

16 November 2018

6825 Silver Ponds Heights #101
Colorado Springs, CO 80908
(719) 481-4560

Shay Miles
15630 Fox Creek Lane
Colorado Springs, Colorado 80908

RE: Soil Test Receipt, 15630 Fox Creek Lane, Geoquest #18-0975

Dear Shay,

The attached soil test report provided by Geoquest, LLC, has a number of specific requirements for the design and construction of the foundation of a structure at the location noted on the report. Some of these requirements are placed on the homeowner of the property and may be outside of the builders' control. Accordingly, we are requiring both you as the builder and the homeowner to sign this letter indicating you have accepted a copy of the report, have read and understood the contents, and know you each have specific responsibilities. Failure to follow the recommendations and requirements of the report by any party can result in unsatisfactory performance of the foundation or building components.

Geoquest, LLC, will not provide any documentation for site inspections until we have received this letter with the required signatures. If the property is being developed as a speculative investment and no homeowner has been contracted to purchase the property, you can indicate that under the homeowner signature line. Upon the sale of the property the builder understands that both this letter and a copy of the Soils Report shall be provided to the buyer, and a homeowner signed copy returned to Geoquest.

If you have any questions, feel free to contact us at (719) 481-4560.

Sincerely,


Charles E. Milligan, P.E.
Civil Engineer

Builder Representatives

Homeowner(s)



6825 Silver Ponds Heights #101
Colorado Springs, CO 80908
(719) 481-4560

SOILS REPORT

FOR

SHAY MILES

JOB #18-0975

Subdivision Report,
15630 Fox Creek Lane,
El Paso County,
Colorado

Sincerely,

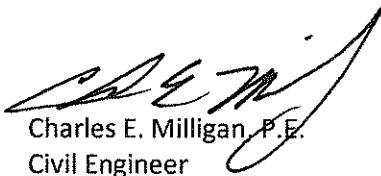

Charles E. Milligan, P.E.
Civil Engineer



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INTRODUCTION

The owners must be made aware of the contents of this report. It is the responsibility of the contractor on this project to make subsequent home owners aware of the contents of this report. This is to ensure that the recommendations and requirements of the report, especially regarding the surface drainage, are acknowledged and followed. This report is prepared for Shay Miles #1, Tierra Ridge Subdivision, 15630 Fox Creek Lane, El Paso County, Colorado. It is a light-lot subdivision is planned for this site. Each lot is planned for residential construction occupied.

Include statement of structural system recommendation in plat note and Letter of Intent

CONCLUSIONS

This Over Excavation Scheme may be revised or rescinded pending the results of the Open Hole Observation. Separate Open Hole Observations are required for each lot.

A satisfactory foundation for this structure is a properly designed shallow foundation system consisting of foundation components resting directly on over-excavated and replaced materials. This over-excavation and replaced materials scheme is necessary due to the low to moderate expansive on-site material. This over-excavation and replaced materials scheme will reduce, but not eliminate the potential for movement with moisture fluctuations in the unstable subgrade soils. Since those materials will remain in-place beneath the fill, a potential remains that moisture changes in these deeper unstable materials will cause some movement in the overlying fill and structure. **Vertical slab movement of one to three inches is considered normal of soils of low to moderate expansion potential and for compacted structural fill after the removal of the expansive soils. In some cases, vertical movement may exceed this range. If movement and associated damage to basement floors and finishes cannot be tolerated, a structural floor system shall be installed.** This material has an expansion potential values ranging from 0.2-2.9% expansion potential with a dead load of 400-6100 pounds per square foot. The over-excavated area shall extend to a minimum depth of 4 feet below the bottom of the foundation elevation and 4 feet laterally from the location of the foundation walls. It may be necessary to place approximately 1-2 feet of 4-12-inch diameter crushed rock in the bottom of the excavation to stabilize the native soil material. The material to be compacted in the excavation shall meet or exceed CDOT Class 6 Road Base Materials specifications. This material shall be compacted to a minimum of 95% of its modified Proctor density. **Proctor testing will be required on a sample of the replacement material to be used for this over-excavation scheme. A 5-gallon valid sample of the soil to be used, must be provided for testing (unless a previous proctor test can be provided) at least 7 days prior to the placement and compaction of the material.** The compressibility of the over-excavated and replaced material shall be taken to be low. A maximum allowable bearing capacity for the over-excavated and replaced material is a presumptive value of **1,500 pounds per square foot**. This bearing capacity is calculated with a safety factor of three. The type of foundation configuration used depends on the building loads applied. The depth of foundation elements shall be determined by the foundation engineer but should be at least as deep as the minimum depth required by the governing building authority. **The laboratory testing revealed that the on-site soil is clayey sand, well graded silty sand, low plasticity clay and silty sand (U.S. Classification Symbol SC, SW, CL, SM). The unit weight of equivalent fluid soil pressure of this material is 45 (SC), 39 (SW), 100 (CL) and 40 (SM) pounds per cubic foot. The owners shall be made aware that movement will definitely occur if surface or subsurface water is allowed to collect around or in the over-excavated area.**

GENERAL

The investigation was made to reveal important characteristics of the soils and of the site influencing the foundation design. Also evaluated during the investigation were subsurface conditions which affect the depth of the foundation and subsequent loading design, such as ground water levels, soil types, and other factors which affect the bearing capacity of the soils. Design loadings are based on soils characteristics and represent the maximum permissible loads for these conditions.

FIELD AND LABORATORY INVESTIGATION

Eight exploratory holes were drilled on October 12, 2018, at the locations shown on the enclosed site map. The location of these test holes was determined by Shay Miles. The test holes were drilled with a 3-inch diameter auger. At intervals anticipated to be the foundation depths, and as determined by the soils conditions, the drill tools were removed, and samples were taken by the use of a 2 inch "split barrel" sampler connected to a 140-pound drop-hammer. This hammer is dropped 30 inches to drive the penetration sampler into the soil (**ASTM D-1586**). The depths and descriptions of the materials encountered in each test boring at which the samples were taken are shown on the enclosed log sheets. All samples were classified both in the field and in the laboratory to evaluate the physical and mechanical properties of the materials encountered.

TOPOGRAPHY

The topography of this site varied.

WEATHER

The weather at the time of the soil examination consisted of partly cloudy skies with warm temperatures.

DESIGN AND CONSTRUCTION CONSIDERATIONS

Slabs-on-grade may move and crack. Vertical slab movement of one to three inches is considered normal for soils of low to moderate expansion potential and for compacted structural fill after removal of expansive soils. In some cases, vertical movement may exceed this range. If movement and associated damage to basement floors and finish cannot be tolerated, a structural floor system shall be installed. The native materials encountered during the exploratory testing are not suitable for the support of residential construction. If compaction is not performed, settlement may occur causing cracking of foundation walls and floors. Personnel of Geoquest, LLC, shall inspect the base of the over-excavation prior to any placement of any fill materials. All backfill material and over excavated and replaced material shall be properly tested by Geoquest LLC, at the time of installation of said material. Soil located beneath concrete walls and floors shall be compacted to at least 95% Modified Proctor density. Other backfill materials shall be compacted to at least 85% Modified Proctor density.

Special care is to be taken to re-compact the material above utility lines to a minimum of 90% Modified Proctor density. During construction, conditions that could cause settlement shall be eliminated. Interior non-bearing partition walls shall be constructed such that they do not transmit floor slab movement to the roof or overlying floor. The gap or void (1.5-inch min.) installed in these non-bearing partitions may require re-construction over the life of the structure to re-establish the gap or void to allow for vertical slab movement. Stairwells, doorways and sheeted walls should be designed for this movement. The following are general recommendations of on-grade slabs:

1. Slabs shall be placed on well-compacted, non-expansive materials, and all soft spots shall be thoroughly excavated and replaced with non-expansive fill materials as stated above. Exterior concrete shall slope away from the structure the same amount as requirements of soil.
2. The slab shall be separated from all foundation walls, load bearing members, and utility lines.
3. At intervals not to exceed 12 feet in each direction, provide control joints to reduce problems with shrinkage and curling as recommended by the American Concrete Institute (ACI). Moisten the ground beneath the slab prior to placement of concrete.

DESIGN AND CONSTRUCTION CONSIDERATIONS (CONTINUED)

4. All concrete placed must be cured properly as recommended by the American Concrete Institute (ACI). Separate load bearing members from slabs, as discussed above. Care must be exercised to prevent excess moisture from entering the soil under the structure, both during and after construction. Concrete shall be vibrated or rodded in forms to avoid segregation and cold joints.
5. Due to the exposure of exterior concrete to variations in moisture fluctuations, heaving and cracking of exterior slabs-on-grade should be expected. Placement of at least 3 feet of non-expansive fill beneath the slabs can help to reduce the impact of differential movement and cracking but may not eliminate movement.
6. **The clayey sand (SC) and Low plasticity clay (CL) in Test Holes #1, #2, #3, #5, #6 and #8 have been tested for their expansion and/or consolidation potential. In Test Holes #1 the clayey sand (SC) has a 0.7% expansion potential with a dead load of 400 pounds per square foot. In Test Holes #2 the low plasticity clay (CL) has a 0.7% expansion potential with a dead load of 1600 pounds per square foot. In Test Holes #3 the clayey sand (SC) has a 0.2% expansion potential with a dead load of 1300 pounds per square foot. In Test Holes #5 the low plasticity clay (CL) has a 0.4% expansion potential with a dead load of 2100 pounds per square foot. In Test Holes #6 the low plasticity clay (CL) has a 2.9% expansion potential with a dead load of 6100 pounds per square foot. In Test Holes #8 the low plasticity clay (CL) has a 1.3% expansion potential with a dead load of 2400 pounds per square foot. Basement slabs, garage slabs, and all concrete floor slabs, exert a very low dead-load pressure on the soil. Since this soil contains a small to moderate amount of swell potential, slabs will crack and heave or settle if excess water is allowed to penetrate the subgrade. For example, column openings to pads below the placed slab, if exposed to precipitation during construction, will conduct water to the subgrade, possibly causing it to expand. Also, if the slab is placed with concrete too wet, expansion may occur. We recommend 3,000 psi concrete placed at a maximum slump of 4 inches.**

RECOMMENDATION REMARKS

The recommendations provided in this report are based upon the observed soil parameters, anticipated foundation loads and accepted engineering procedures. The recommendations are intended to minimize differential movement resulting from the heaving of expansive soil or from the settlement induced by the application of loads. **It must be recognized that the foundation will undergo some movement on all soil types.** In addition, concrete floor slabs will move vertically, therefore, adherence to those recommendations which isolate floor slabs from columns, walls, partitions or other structural components is extremely important, if damage to the superstructure is to be minimized. Any subsequent owners should be apprised of the soil conditions and advised to maintain good practice in the future with regard to surface and subsurface drainage and partition framing, drywall and finish work above floor slabs.

Geoquest, LLC does not assure that the contractor or homeowner will comply with the recommendations provided in this report. Geoquest, LLC provides recommendations only and does not supervise, direct or control the implementation of the recommendations.

COLD TEMPERATURE CONSIDERATIONS

1. Concrete shall not be placed upon frozen soil.
2. Concrete shall be protected from freezing until it has been allowed to cure for at least 7 days after placement in forms.
3. Snow or other frozen water shall not be allowed in the forms during placement of concrete.
4. Concrete shall be cured in forms for at least 72 hours.
5. Concrete shall be vibrated or rodded in forms to avoid segregation and cold joints.
6. The site shall be kept well drained at all times.

SURFACE DRAINAGE

After construction of foundation walls, the backfill material shall be well compacted to 80% Modified Proctor density, to reduce future settlement. Any areas that settle after construction shall be filled to eliminate ponding of water adjacent to the foundation walls. The finished grade shall have a positive slope away from the structure with an initial slope of 6 inch in the first 10 feet. If a 10 feet zone is not possible on the upslope site of the structure, then a well-defined swale should be created a minimum of 5 feet from the foundation and sloped parallel with the wall at a 2% grade to intercept the surface water and carry it around and away from the structure. Homeowners shall maintain the surface grading and drainage installed by the builder to prevent water directed in the wrong direction. All downspouts shall have splash blocks that will remove runoff to outside the foundation area and carried across backfill zones. No irrigation devices shall be placed within 10 feet of the foundation. Shrubs and plants requiring minimal watering shall be established in this area. Irrigated grass shall not be located within 5 feet of the foundation. Sprinklers shall not discharge water within 5 feet of the foundation. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. Application of more water will increase likelihood of floor slab and foundation movement.

All exterior grading and location of downspouts and their performance shall be inspected by Geoquest, LLC. **The native clayey sand (SC) and low plasticity clay (CL) material is not suitable and shall not be used as backfill material around the perimeter of the foundation.** It is the responsibility of the contractor to schedule all inspections. Also, the backfill material shall consist of road base material as described previously.

SUBSURFACE DRAINAGE

The necessity for perimeter drains will be determined at the time of the Open Hole Observation.

REINFORCING

The concrete foundation walls shall be properly reinforced as per the specific design for this foundation by a **Colorado Registered Professional Engineer. Exact requirements are a function of the design of the structure. Questions concerning the specific design requirements shall be referred to the design engineer.**

FOOTING DESIGN

The design for footings for this structure is determined by applying the dead load and full live load to the foundation walls.

CONSTRUCTION DETAILS

It is necessary with any soils investigation to assume that the materials from the test holes are representative of the materials in the area. On occasion variations in the subsurface materials do occur, therefore, should such variations become apparent during construction, the owner is advised to contact this office for a determination as to whether these variations will affect the design of the structure's foundation. If anomalies are observed during the excavation for the dwelling, this office should be contacted to determine whether this may adversely affect the design.

MINIMUM MATERIALS SPECIFICATIONS

1. Minimum materials specifications of the concrete, reinforcing, etc., shall be determined by the Professional Engineer.
2. Compact beneath foundation walls a minimum of 95% Modified Proctor density to prevent settlement.
3. Compact all backfill material located around the perimeter of the foundation to 80% Modified Proctor density.
4. Concrete shall be vibrated or rodded in forms to avoid segregation and cold joints.
5. The site shall be kept well drained at all times.

OPEN HOLE OBSERVATION (added cost)

Open Hole Observations are required at the time of construction for each individual lot.

If anyone other than Geoquest, LLC performs the Open Hole Observation and/or compaction testing, that person/company assumes liability for the soils, and any possible changes to the foundation design.

The owner, or a representative of the construction, shall contact Geoquest, LLC, **24 hours (prior to excavating)** for the foundation. An open hole observation must be performed prior to the placement of replaced materials. All inspections shall be performed described herein.

COMPACTION TESTING (added cost)

Geoquest, LLC shall perform compaction testing on the replaced material. Soil shall be compacted in maximum 6-inch lifts. Testing shall be performed at intervals not to exceed 18 inches (or as required by the design engineer).

The owner, or a representative of the construction, shall contact Geoquest, LLC, **24 hours (prior to excavating)** for the foundation.

FINAL OBSERVATIONS

The owner, or a representative of the construction company, shall contact Geoquest, LLC at the time final grading and landscaping procedures are completed. This is to ensure that sprinkler systems are not installed adjacent to the structure and that only shrubs or plants that require minimal watering are established in this area. All exterior grading as well as the location of downspouts and their performance shall be inspected by Geoquest, LLC. Any additional landscaping or grading changes performed by subsequent contractors and/or owners shall be inspected and approved. It is the responsible of the contractor and/or owner to schedule all these inspections at the appropriate times.



DRILL LOGS

| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|---|----------------|----------------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-1 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| 0"-6" Topsoil | 0-6 | X X X | | | | |
| 6"-7' Sand (SC) | 6-7 | Diagonal lines | | | | |
| Fine-coarse grained Moderate density Moderate moisture content Moderate clay content Low-moderate plasticity Brown color | 2-4 | | 16 | 12" | 9.3 | SC |
| 7'- 15' Sand (SW/SM) | 7-15 | Vertical lines | | | | |
| Fine-coarse grained Moderate density Low moisture content Low clay content Low plasticity Greyish Brown color | 7-12 | | 24 | 12" | 3.6 | SW/SM |
| | 12-15 | | | | | |
| | 15-16 | | | | | |
| | 16-18 | | | | | |
| | 18-20 | | | | | |

| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|--|----------------|----------------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-2 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| 0"-6" Topsoil | 0-6 | X X X | | | | |
| 6"-9' Clay (CL) | 6-9 | Diagonal lines | | | | |
| Fine-coarse grained Moderate density Moderate moisture content Low-moderate sand content Moderate-high plasticity Brown color | 6-7 | | 16 | 12" | 7.9 | CL |
| 9'- 15' Sand (SM) | 9-15 | Vertical lines | | | | |
| Fine-coarse grained Moderate density Low-moderate moisture content Low-moderate clay content Low-moderate plasticity Strong Brown color Oxidized @ 10' | 9-12 | | 19 | 12" | 5.6 | SM |
| | 12-15 | | | | | |
| | 15-16 | | | | | |
| | 16-18 | | | | | |
| | 18-20 | | | | | |



DRILL LOGS

| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|---|----------------|----------------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-3 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| <u>0"-6" Topsoil</u> | 0-6 | X X X | | | | |
| <u>6"-5' Sand (SC)</u> | 6-11 | Diagonal lines | | | | |
| Fine-coarse grained Low-moderate density Low-moderate moisture content Moderate clay content Low-moderate plasticity Brown color | 2-4 | | | 11 12" | 5.0 | SC |
| <u>5'- 15' Sand (SM)</u> | 11-15 | Vertical lines | | | | |
| Fine-coarse grained Moderate density Low moisture content Low-moderate clay content Low plasticity Brown color Oxidized @ 9' | 8-12 | | | 15 12" | 2.7 | SM |
| | 12-16 | | | | | |
| | 16-18 | | | | | |
| | 18-20 | | | | | |

| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|---|----------------|----------------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-4 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| <u>0"-6" Topsoil</u> | 0-6 | X X X | | | | |
| <u>6"-4' Sand</u> | 6-10 | Diagonal lines | | | | |
| Fine-coarse grained High density Moderate moisture content Low-moderate clay content Low-moderate plasticity Brown color | 2-4 | | | 46 12" | 3.5 | SW / SM |
| <u>4'- 7' Sand (SW/SM)</u> | 10-14 | Vertical lines | | | | |
| Fine-coarse grained Very high density Low moisture content Low clay content Low plasticity Brown color | 8-12 | | | | | |
| <u>7'- 15' Sand (SM)</u> | 14-15 | Vertical lines | | | | |
| Fine-coarse grained High density Low-moderate moisture content Low-moderate clay content Low-moderate plasticity Greyish Brown color | 12-14 | | | 32 12" | 5.6 | SM |
| | 14-16 | | | | | |
| | 16-18 | | | | | |
| | 18-20 | | | | | |



DRILL LOGS

| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|--|----------------|--------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-5 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| 0"-6" Topsoil | 0-6 | X X X | | | | |
| 6"-6' Clay (CL) | 6-6' | | | | | |
| Fine-medium grained Moderate density Moderate moisture content Low-moderate sand content Moderate-high plasticity Brown color | 2-4 | | 18 | 12" | 6.2 | CL |
| 6'-15' Clay (CL) | 6'-15' | | | | | |
| Fine-medium grained High density Moderate-high moisture content Low-moderate sand content Moderate-high plasticity Strong Brown color | 12-15 | | 38 | 12" | 15.7 | CL |

| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|---|----------------|--------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-6 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| 0"-6" Topsoil | 0-6 | X X X | | | | |
| 6"-7' Clay (CL) | 6"-7' | | | | | |
| Fine-coarse grained Moderate density Moderate moisture content Low-moderate sand content Moderate-high plasticity Brown color | 2-4 | | 17 | 12" | 7.8 | CL |
| 7'-15' Clay (CL) | 7'-15' | | | | | |
| Fine-medium grained Moderate-high density Moderate moisture content Low-moderate sand content Moderate-high plasticity Greyish Brown color | 12-15 | | 27 | 12" | 7.0 | CL |



DRILL LOGS

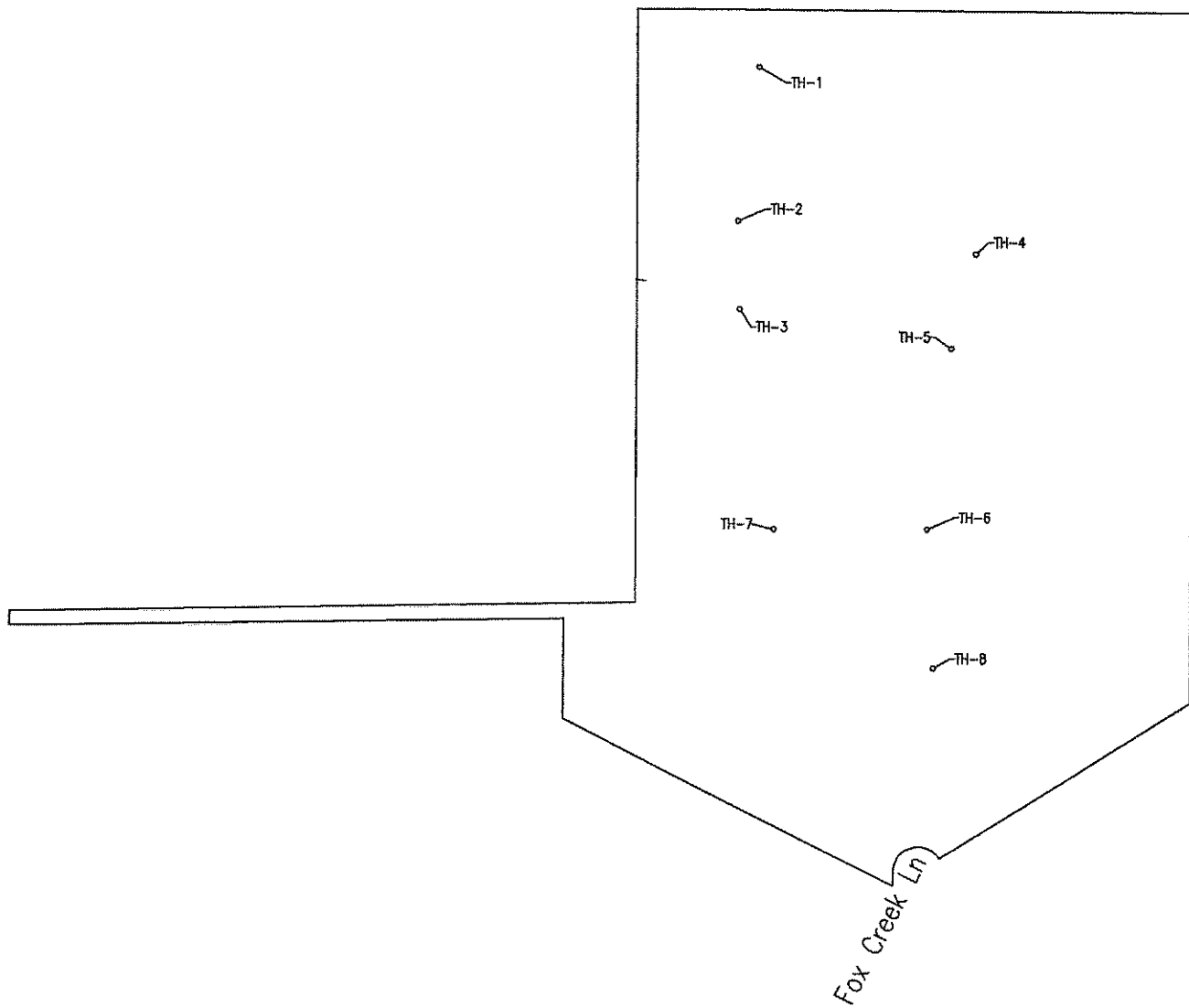
| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|---|----------------|--------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-7 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| <u>0"-6" Topsoil</u> | 0-6 | X X X | | | | |
| <u>6"-5' Sand (SM)</u> | 6-5 | | | | | |
| Fine-coarse grained Moderate density Low-moderate moisture content Low clay content Low plasticity Brown color | 2 | | | 15 | 4.4 | |
| | 4 | | | 12" | | |
| <u>5'- 15' Sand (SM)</u> | 5-15 | | | | | |
| Fine-coarse grained Moderate density Low-moderate moisture content Low-moderate clay content Low-moderate plasticity Greyish Brown color | 8 | | | 20 | 11.8 | |
| | 12 | | | 12" | | |
| | 14 | | | | | |
| | 16 | | | | | |
| | 18 | | | | | |
| | 20 | | | | | |

| JOB #: 18-0975 | DEPTH (in ft.) | SYMBOL | SAMPLES | BLOW COUNT | WATER % | SOIL TYPE |
|---|----------------|--------|---------|------------|---------|-----------|
| TEST BORING NO.: TH-8 | | | | | | |
| DATE: 10/12/2018 | | | | | | |
| <u>0"-6" Topsoil</u> | 0-6 | X X X | | | | |
| <u>6"-8' Clay (CL)</u> | 6-8 | | | | | |
| Fine-coarse grained Moderate density Moderate-high moisture content Low-moderate sand content Moderate-high plasticity Brown color | 2 | | | 22 | 11.4 | CL |
| | 4 | | | 12" | | |
| <u>8'- 15' Sand (SC)</u> | 8-15 | | | | | |
| Fine-coarse grained Moderate-high density Moderate moisture content Moderate clay content Moderate plasticity Greyish Brown color | 8 | | | 36 | 7.1 | SC |
| | 12 | | | 12" | | |
| | 14 | | | | | |
| | 16 | | | | | |
| | 18 | | | | | |
| | 20 | | | | | |

GEOQUEST LLC

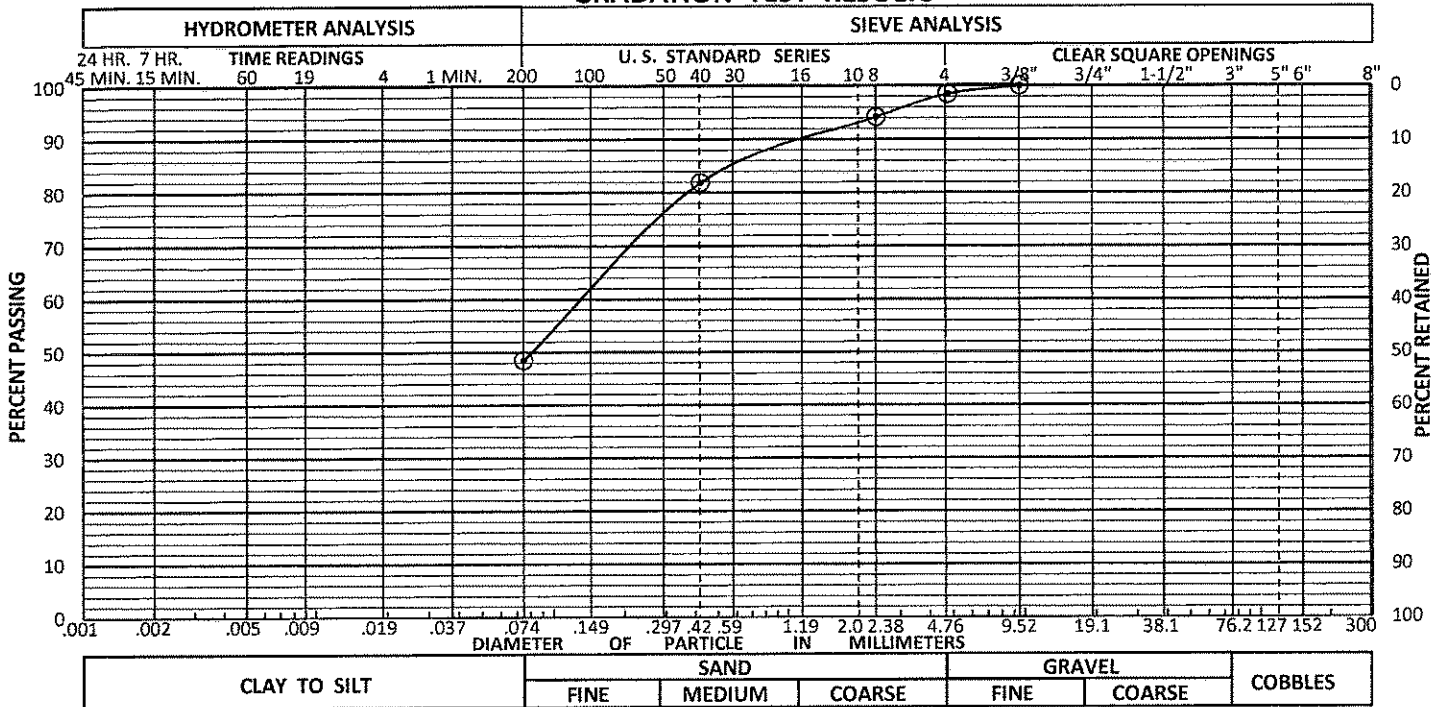
SITE MAP

15630 Fox Creek Ln
El Paso County
Colorado
Job #18-0975



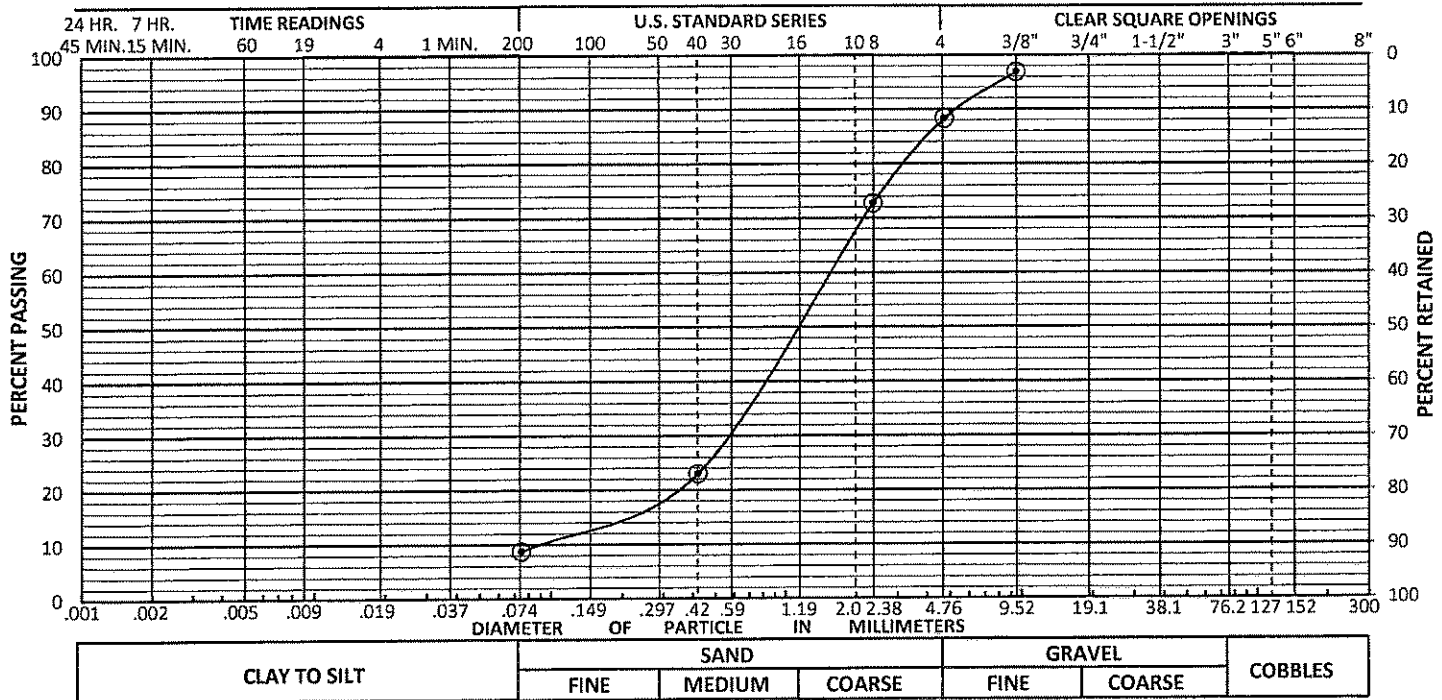
0 100 200 300 400
GRAPHIC SCALE IN FEET
SCALE: 1" = 400'

GEOQUEST LLC GRADATION TEST RESULTS



CLASSIFICATION SC
 GRAVEL 1.5 %
 SAND 50.1 %
 FINES 48.4 %
 SAMPLE # 1 HOLE # TH-1 DEPTH 3 FEET

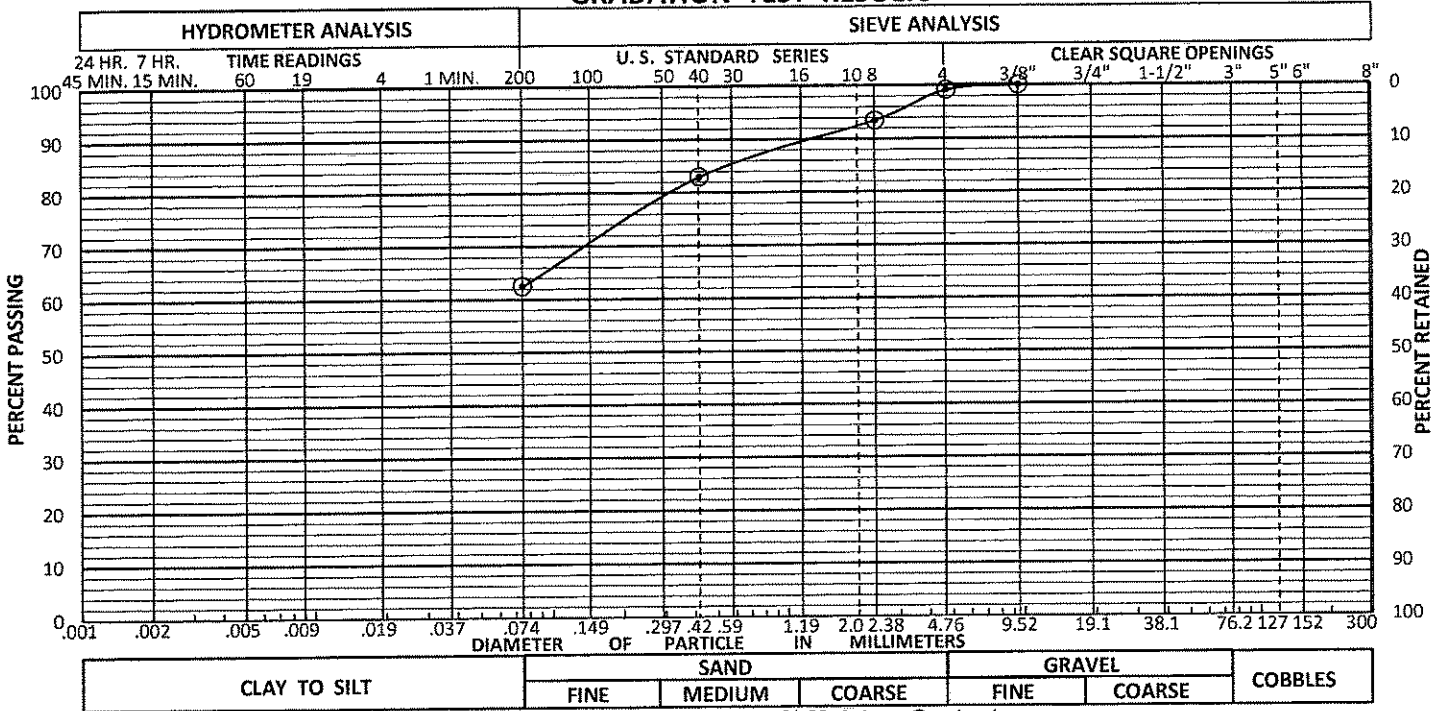
NOTES: 9.3 % Moisture Content
LL = 38.2
PL = 24.0
PI = 14.2



CLASSIFICATION SW/SM
 GRAVEL 11.7 %
 SAND 79.6 %
 FINES 8.7 %
 SAMPLE # 1 HOLE # TH-1 DEPTH 12 FEET

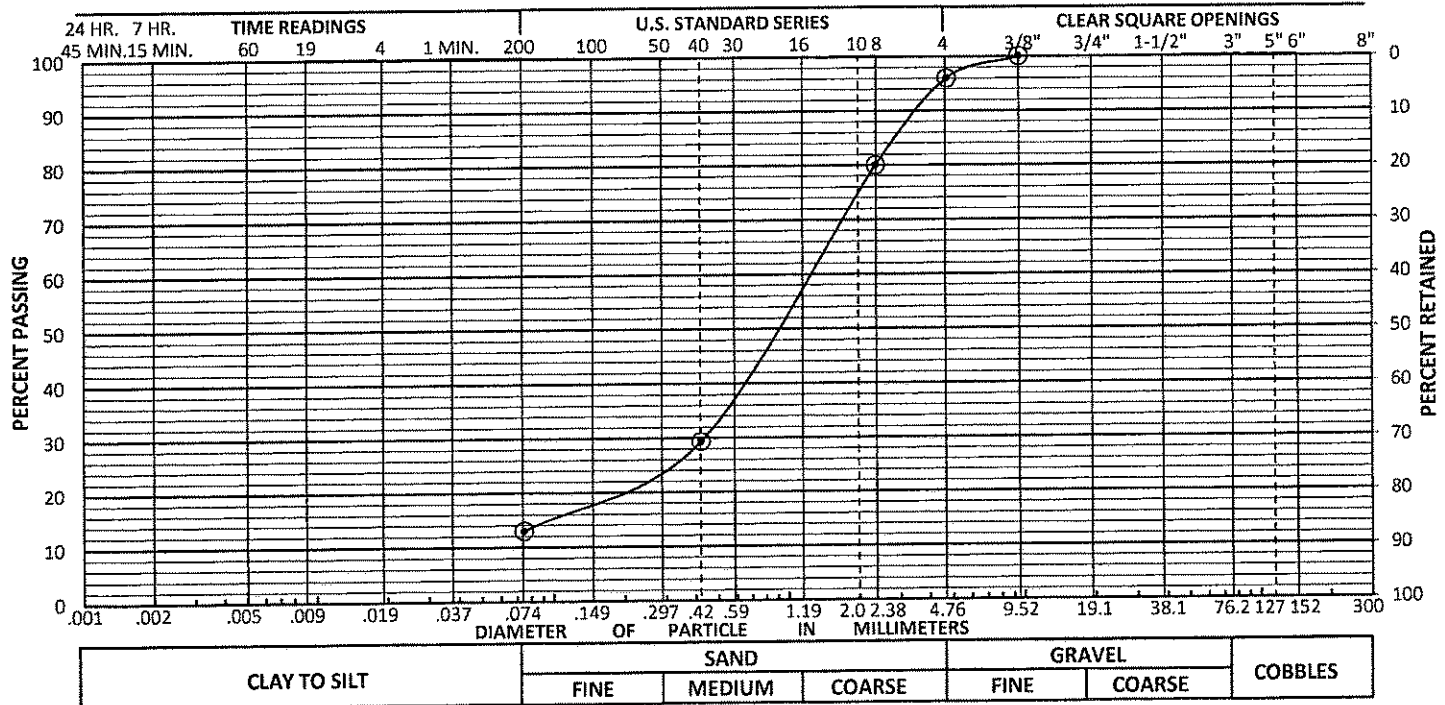
NOTES: 3.6 % Moisture Content
Cu = 16.3
Cc = 2.2
 Job #: 18-0975 By: MJ 10/12/2018

GEOQUEST LLC GRADATION TEST RESULTS



CLASSIFICATION CL
 GRAVEL 0.9 %
 SAND 36.6 %
 FINES 62.5 %
 SAMPLE # 1 HOLE # TH-2 DEPTH 4 FEET

NOTES: 7.9 % Moisture Content
LL = 48.8
PL = 26.2
PI = 22.6

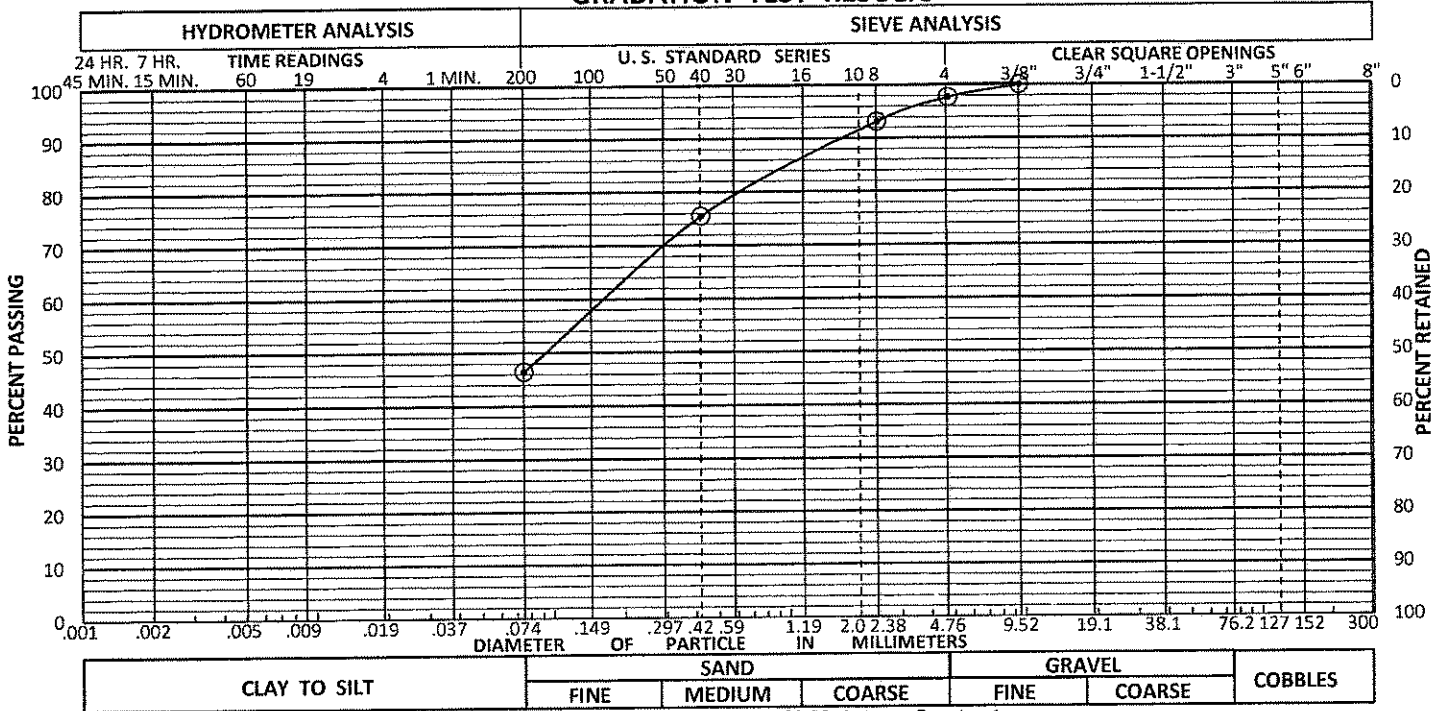


CLASSIFICATION SM
 GRAVEL 4.0 %
 SAND 83.0 %
 FINES 13.0 %
 SAMPLE # 1 HOLE # TH-2 DEPTH 13 FEET

NOTES: 5.6 % Moisture Content

Job #: 18-0975 By: MJ 10/12/2018

GEOQUEST LLC GRADATION TEST RESULTS

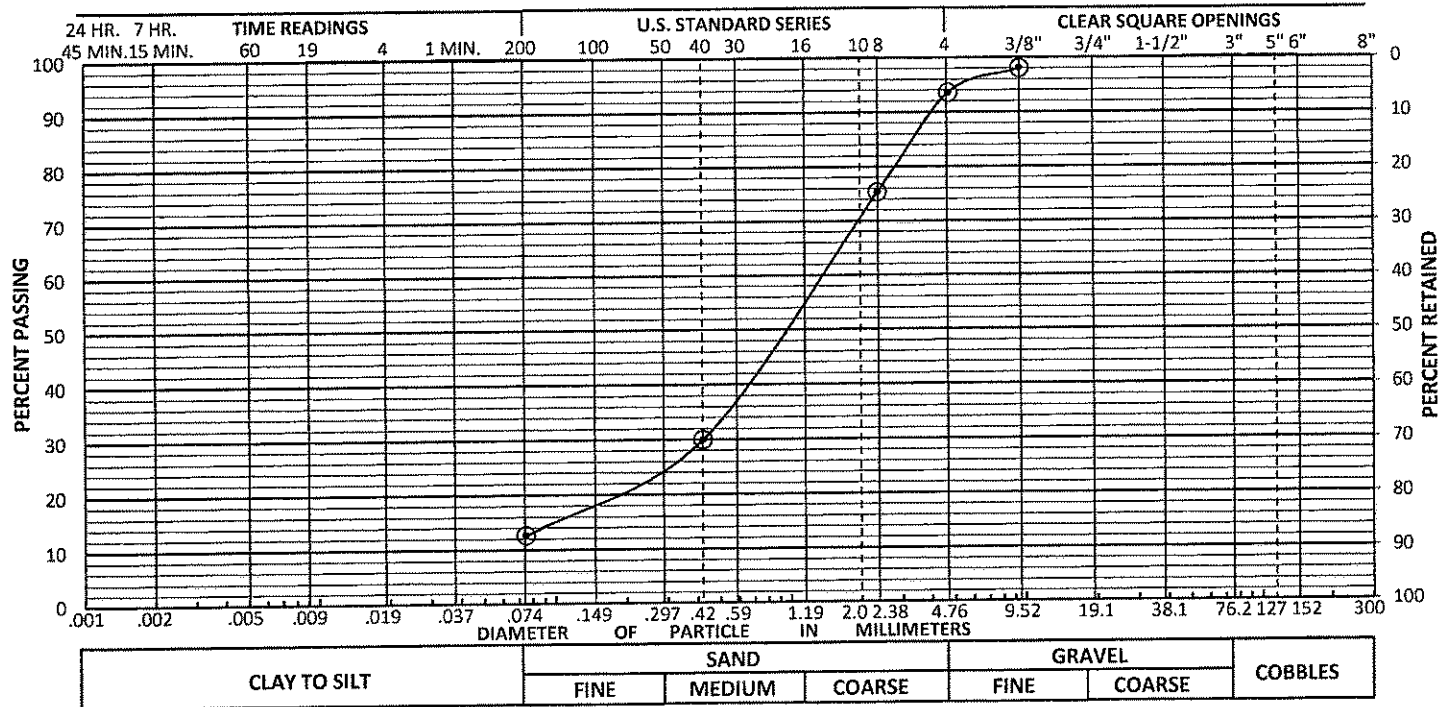


| | | | |
|--------------|--------------------------|----------------|---------|
| CLAY TO SILT | SAND | GRAVEL | COBBLES |
| | FINE MEDIUM COARSE | FINE COARSE | |

CLASSIFICATION SC
 GRAVEL 2.3 %
 SAND 51.3 %
 FINES 46.4 %

NOTES: 5.0 % Moisture Content
 LL = 37.9
 PL = 19.6
 PI = 18.3

SAMPLE # 1 HOLE # TH-3 DEPTH 3 FEET



| | | | |
|--------------|--------------------------|----------------|---------|
| CLAY TO SILT | SAND | GRAVEL | COBBLES |
| | FINE MEDIUM COARSE | FINE COARSE | |

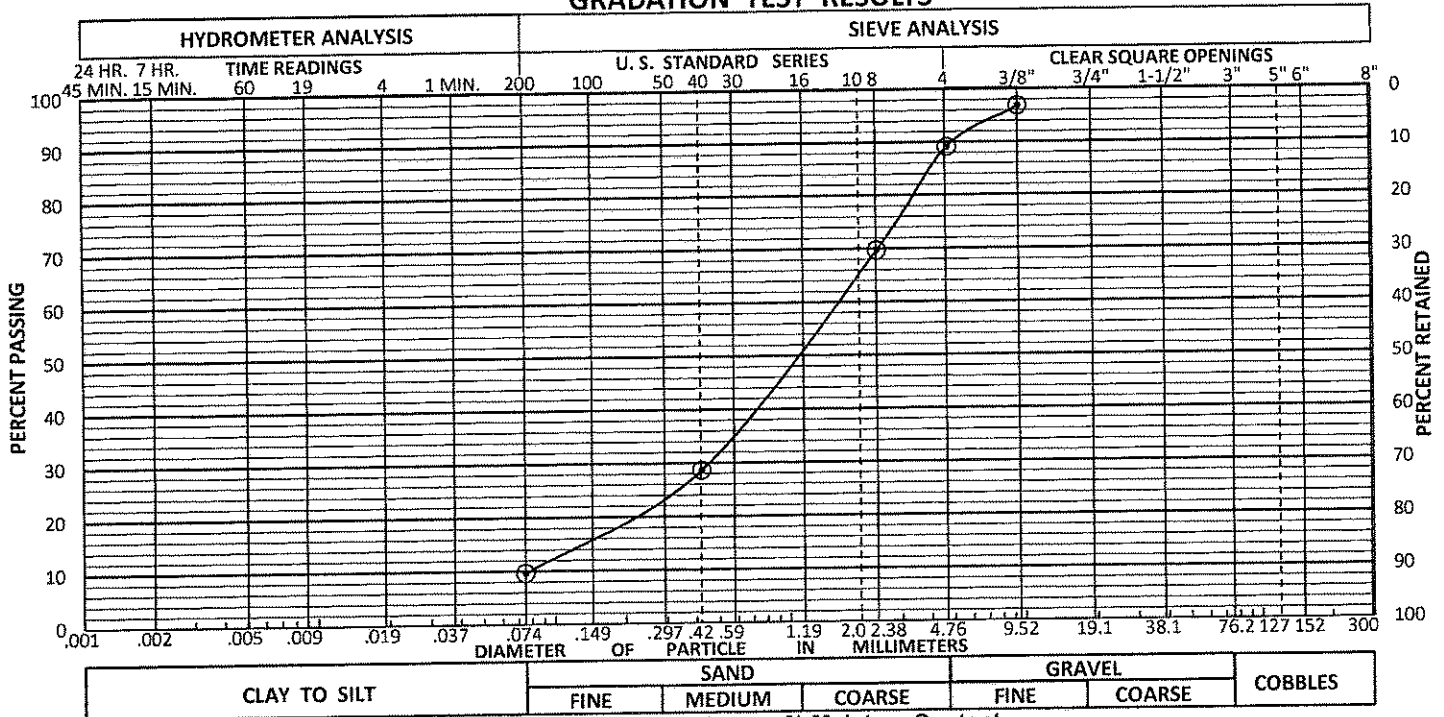
CLASSIFICATION SM
 GRAVEL 6.5 %
 SAND 80.9 %
 FINES 12.6 %

NOTES: 2.7 % Moisture Content

SAMPLE # 1 HOLE # TH-3 DEPTH 12 FEET

Job #: 18-0975 By: MJ 10/12/2018

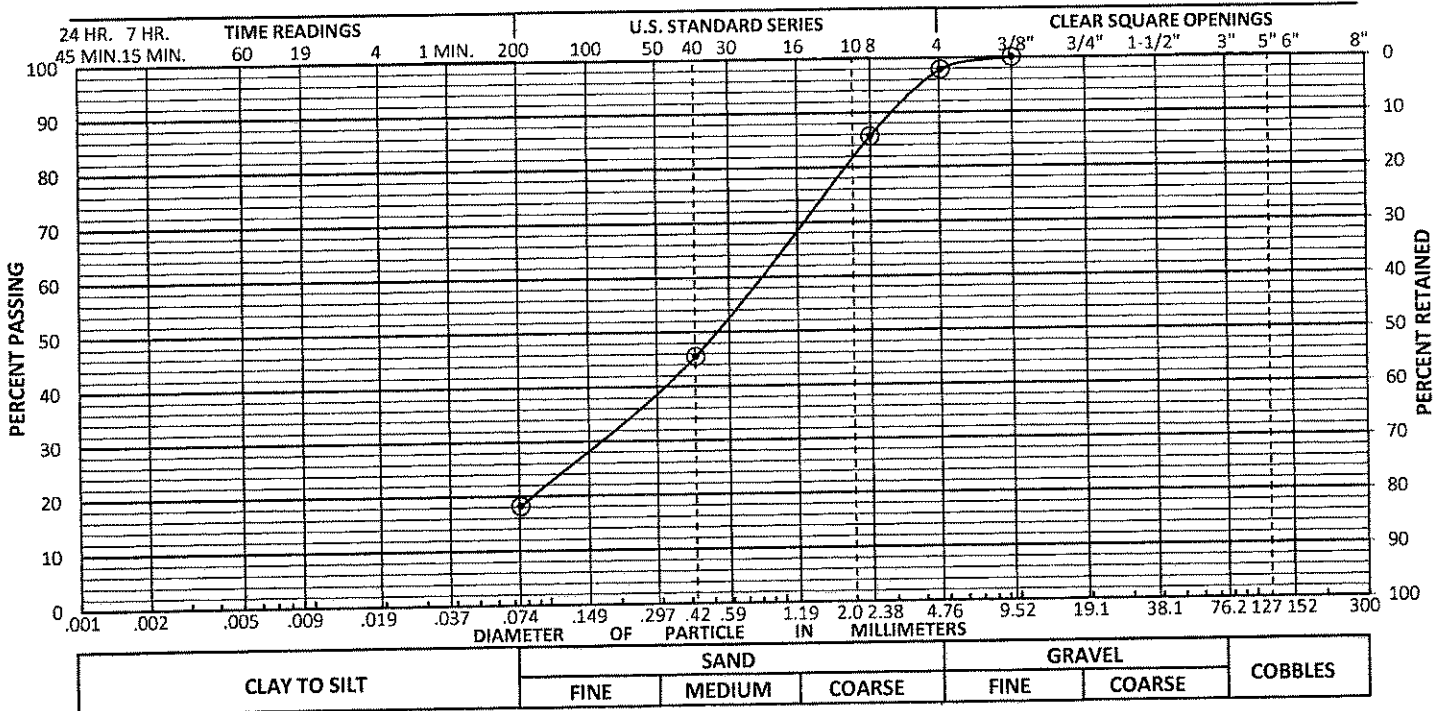
GEOQUEST LLC GRADATION TEST RESULTS



| | | | | | | |
|--------------|------|--------|--------|--------|--------|---------|
| CLAY TO SILT | SAND | | | GRAVEL | | COBBLES |
| | FINE | MEDIUM | COARSE | FINE | COARSE | |

CLASSIFICATION SW/ SM
 GRAVEL 11.0 %
 SAND 79.5 %
 FINES 9.5 %
 SAMPLE # 1 HOLE # TH-4 DEPTH 4 FEET

NOTES: 3.5 % Moisture Content
Cu = 21.6
Cc = 1.5

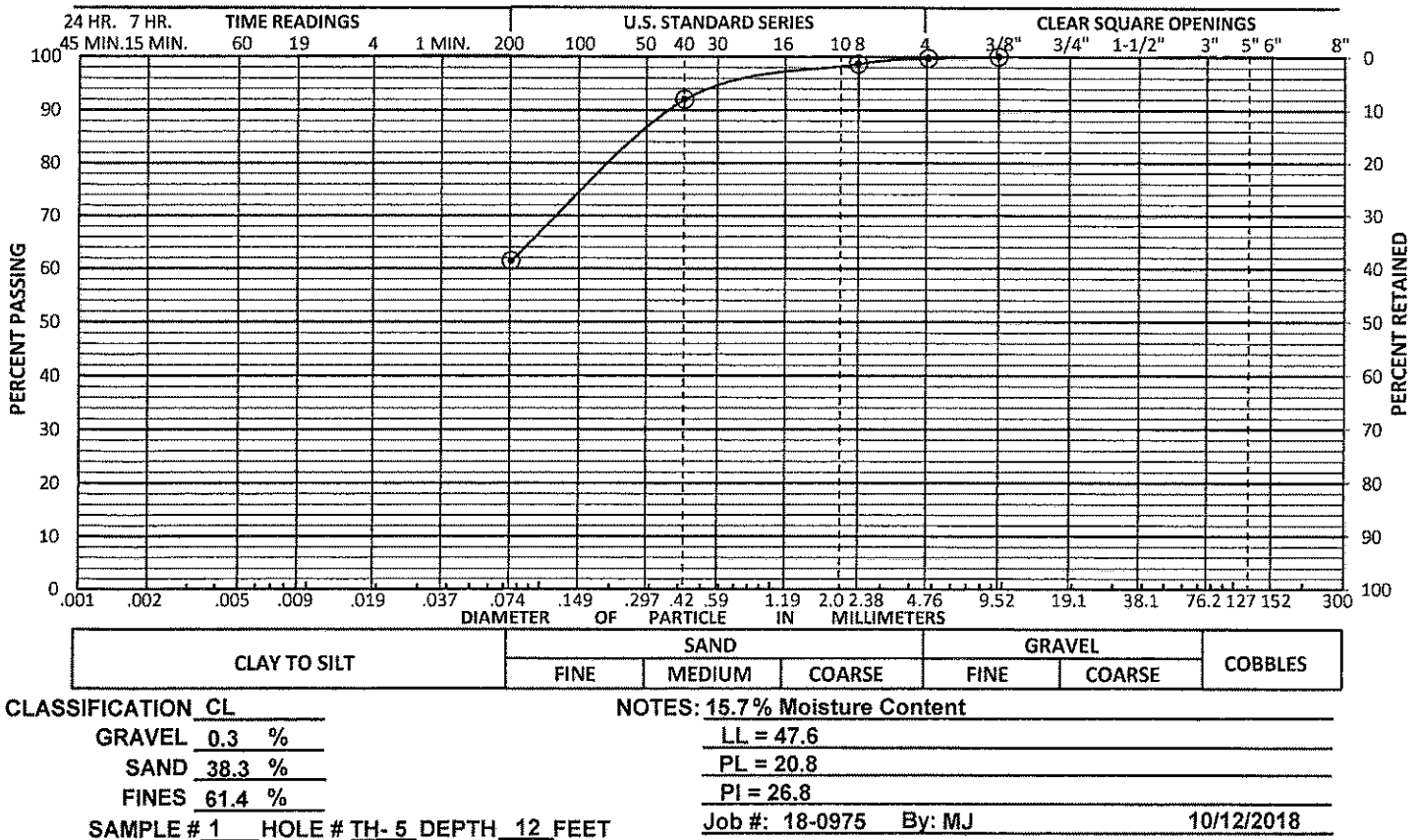
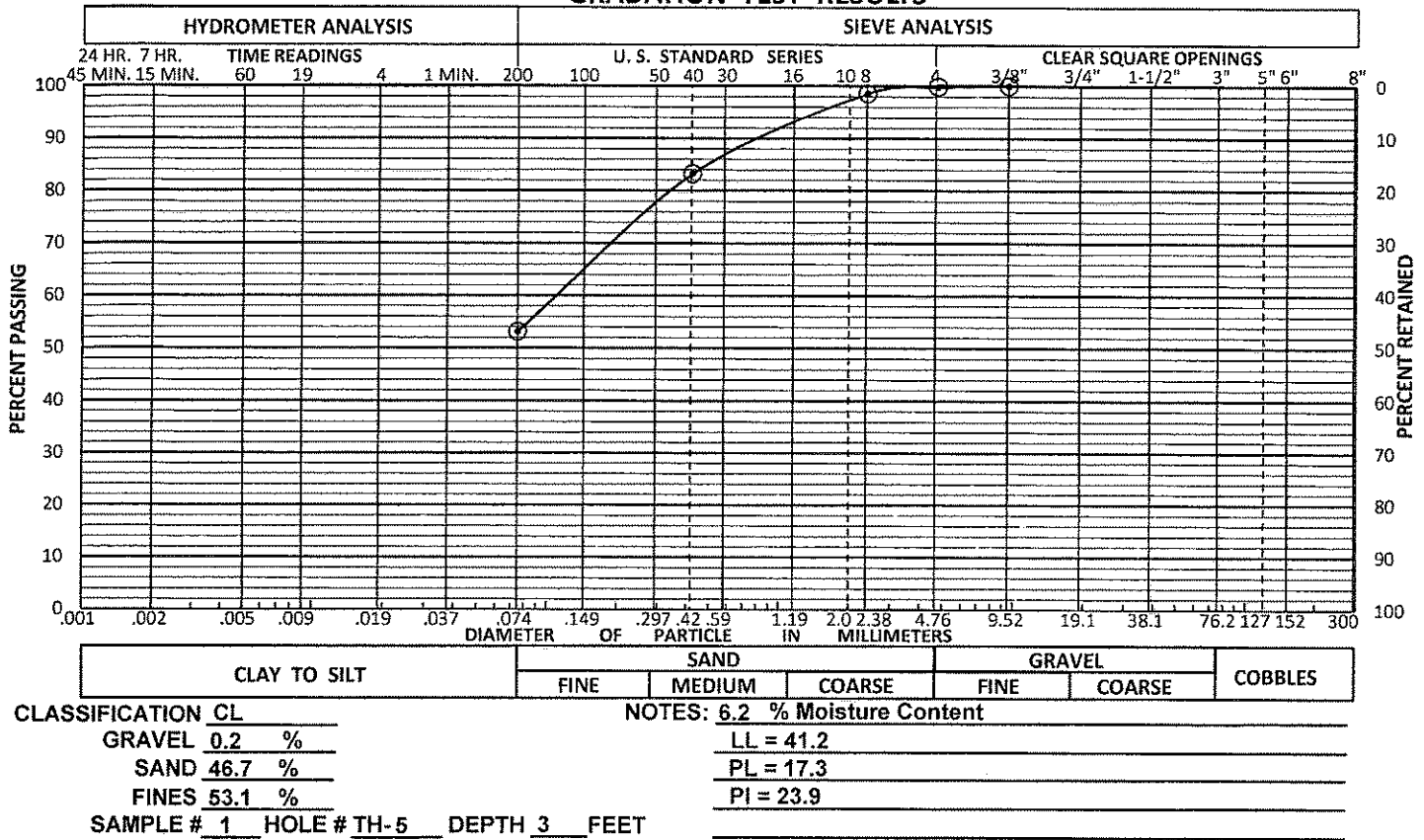


| | | | | | | |
|--------------|------|--------|--------|--------|--------|---------|
| CLAY TO SILT | SAND | | | GRAVEL | | COBBLES |
| | FINE | MEDIUM | COARSE | FINE | COARSE | |

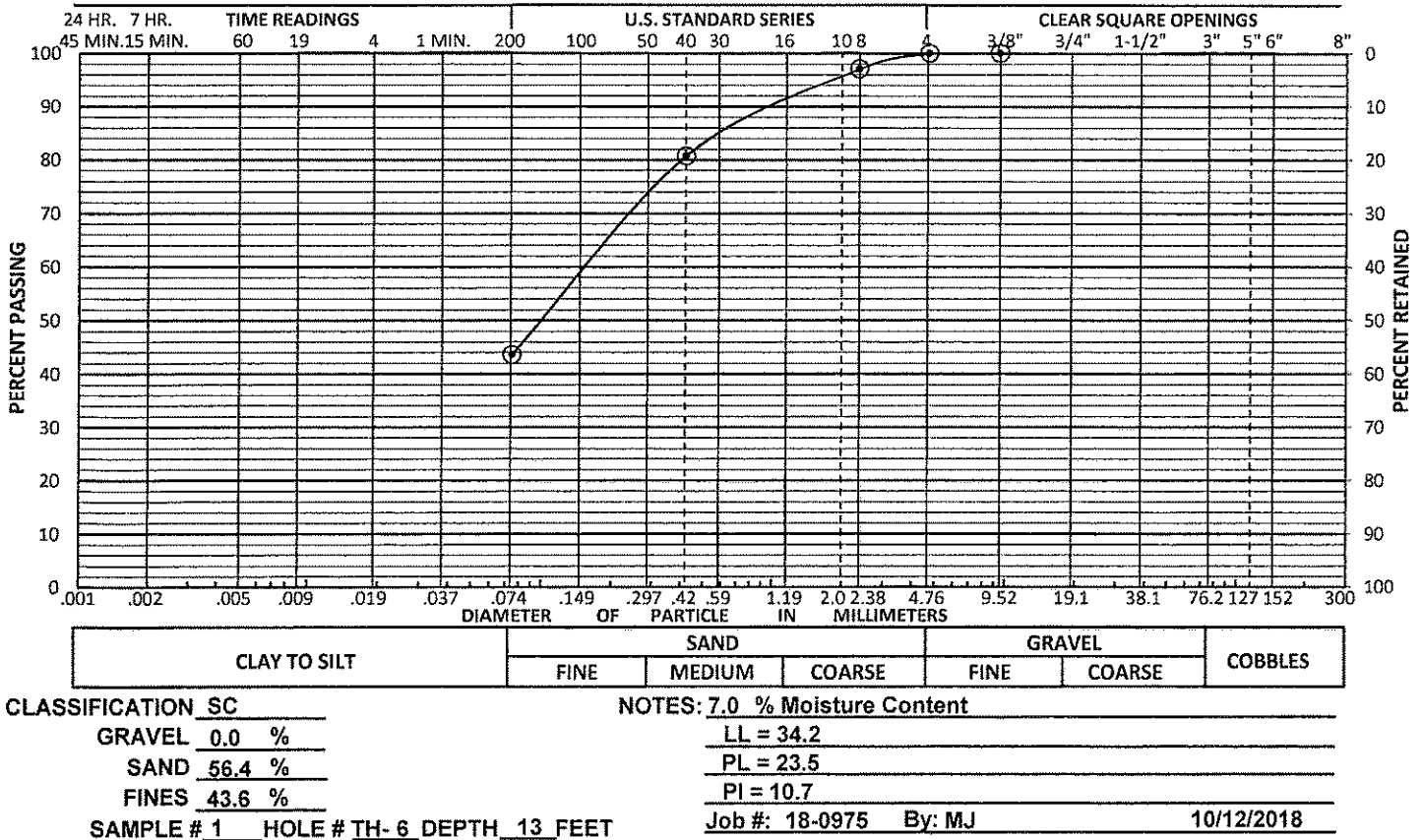
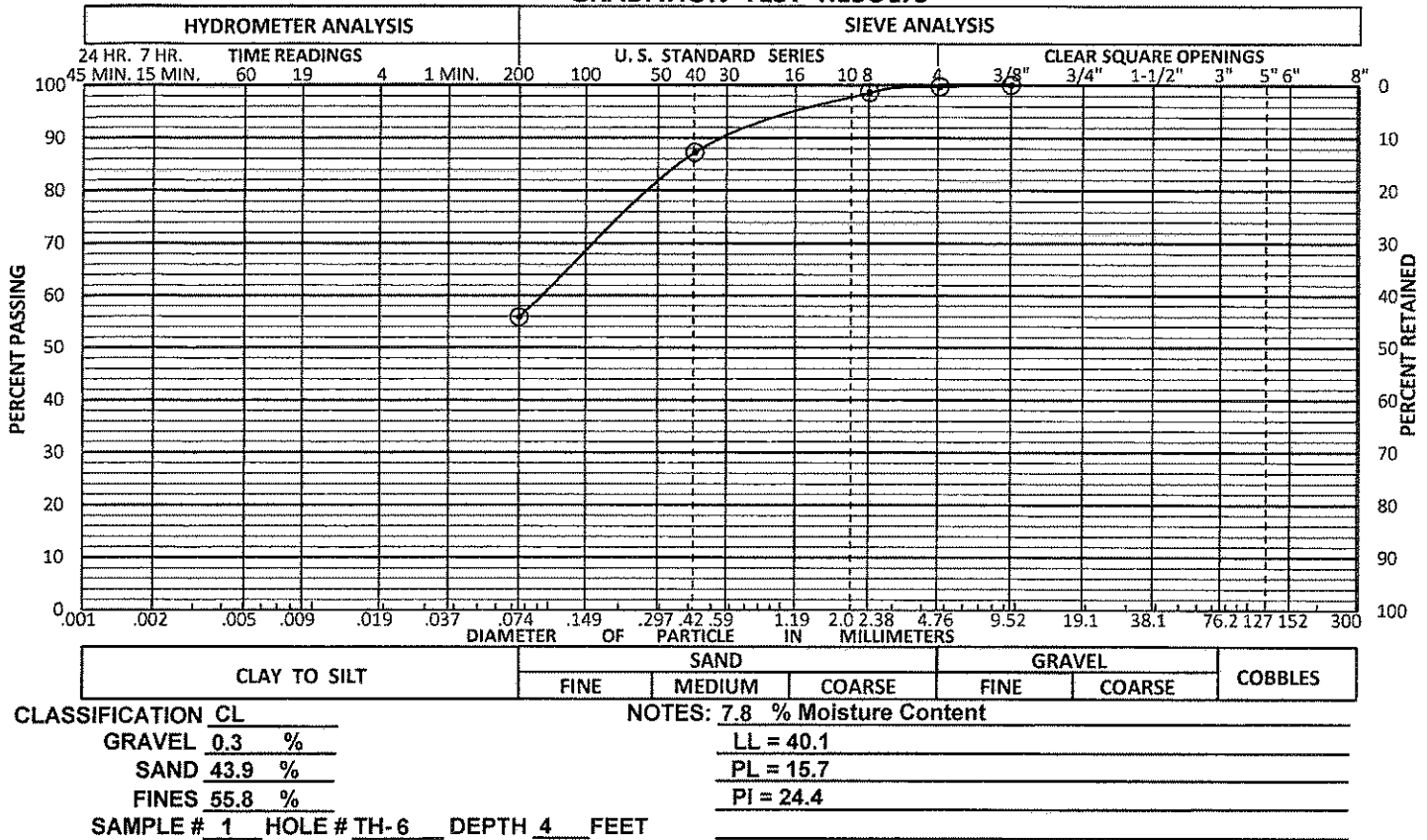
CLASSIFICATION SM
 GRAVEL 2.2 %
 SAND 79.7 %
 FINES 18.1 %
 SAMPLE # 1 HOLE # TH-4 DEPTH 13 FEET

NOTES: 5.6 % Moisture Content
Job #: 18-0975 By: MJ 10/12/2018

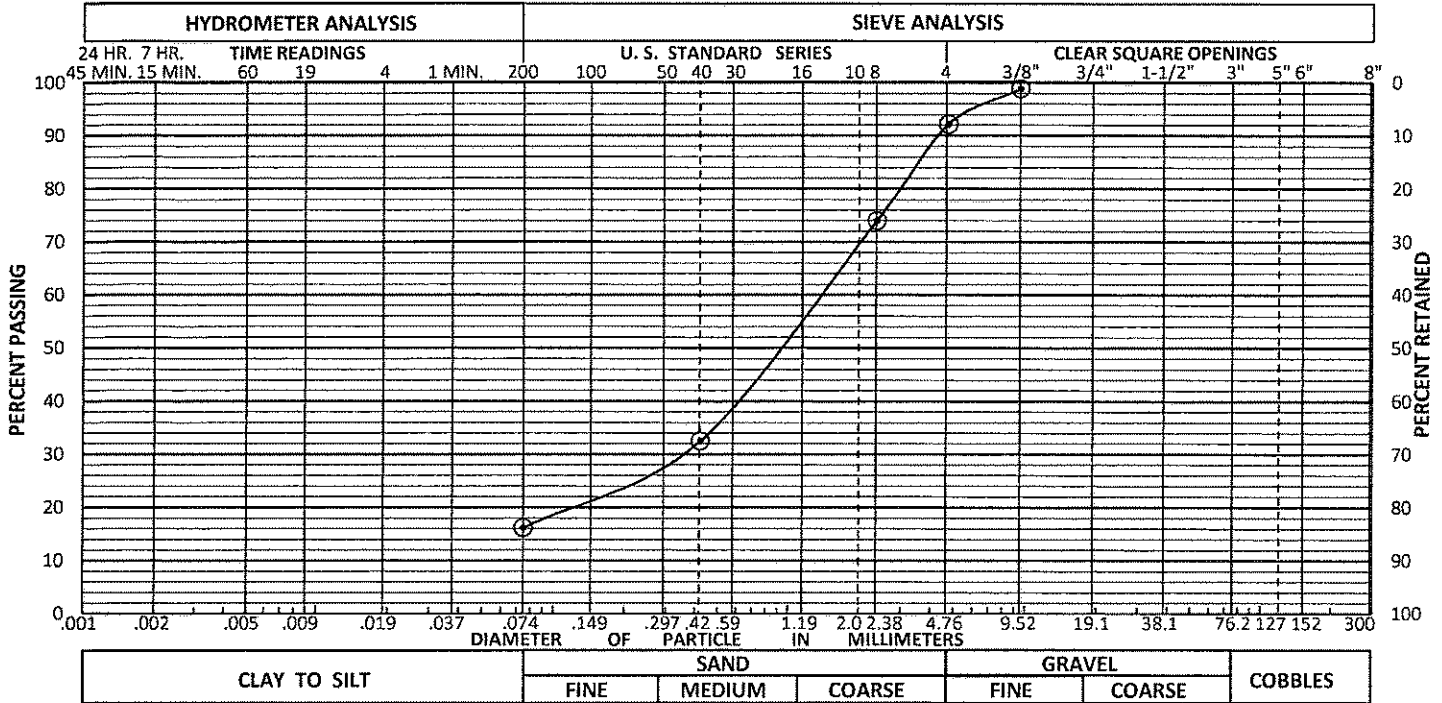
GEOQUEST LLC GRADATION TEST RESULTS



GEOQUEST LLC GRADATION TEST RESULTS



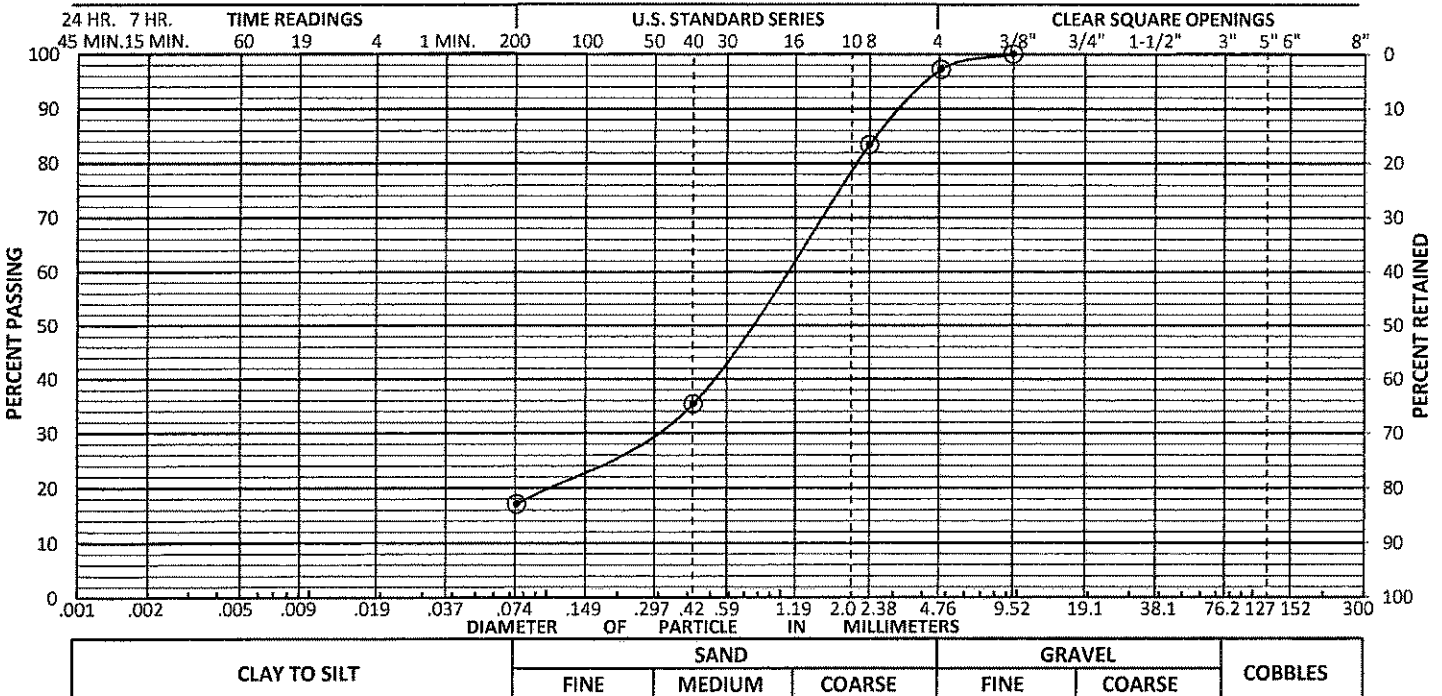
GEOQUEST LLC GRADATION TEST RESULTS



| | | | |
|--------------|--------------------------|----------------|---------|
| CLAY TO SILT | SAND | GRAVEL | |
| | FINE MEDIUM COARSE | FINE COARSE | COBBLES |

CLASSIFICATION SM
 GRAVEL 7.9 %
 SAND 76.0 %
 FINES 16.1 %
 SAMPLE # 1 HOLE # TH-7 DEPTH 3 FEET

NOTES: 4.4 % Moisture Content



| | | | |
|--------------|--------------------------|----------------|---------|
| CLAY TO SILT | SAND | GRAVEL | |
| | FINE MEDIUM COARSE | FINE COARSE | COBBLES |

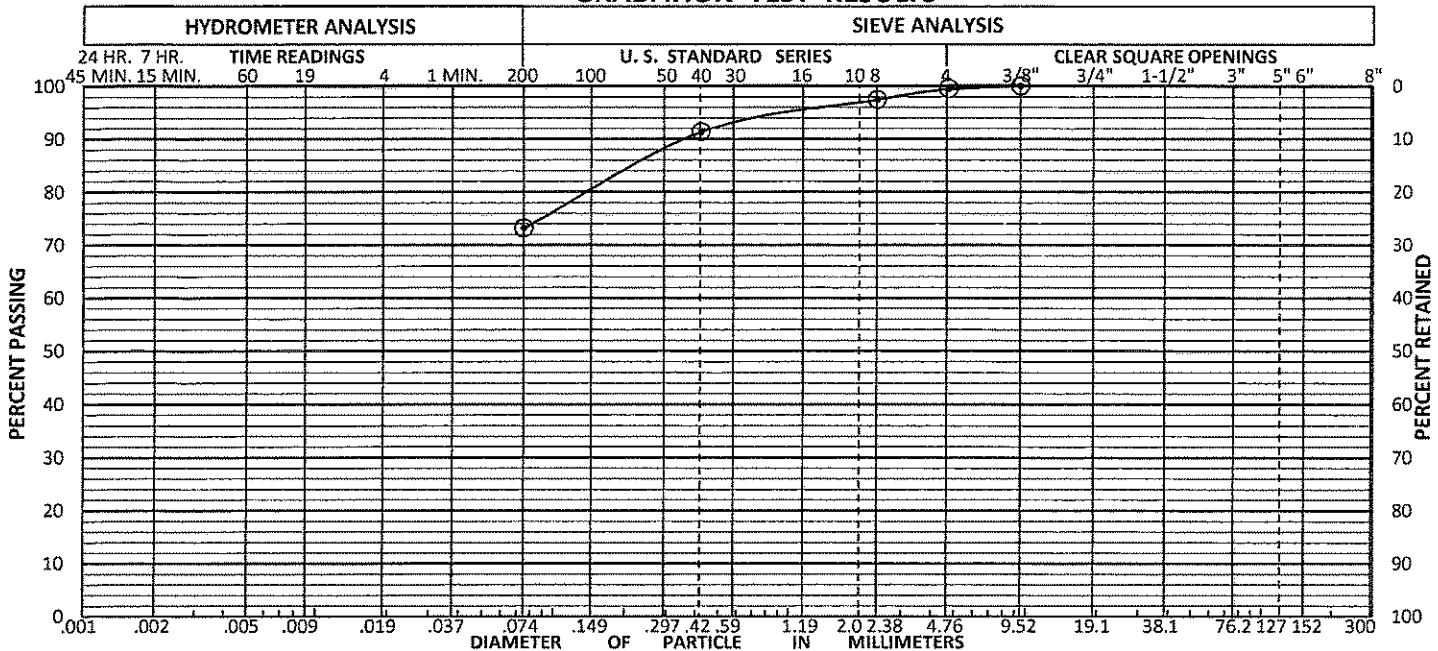
CLASSIFICATION SM
 GRAVEL 2.8 %
 SAND 80.2 %
 FINES 17.0 %
 SAMPLE # 1 HOLE # TH-7 DEPTH 12 FEET

NOTES: 11.8% Moisture Content

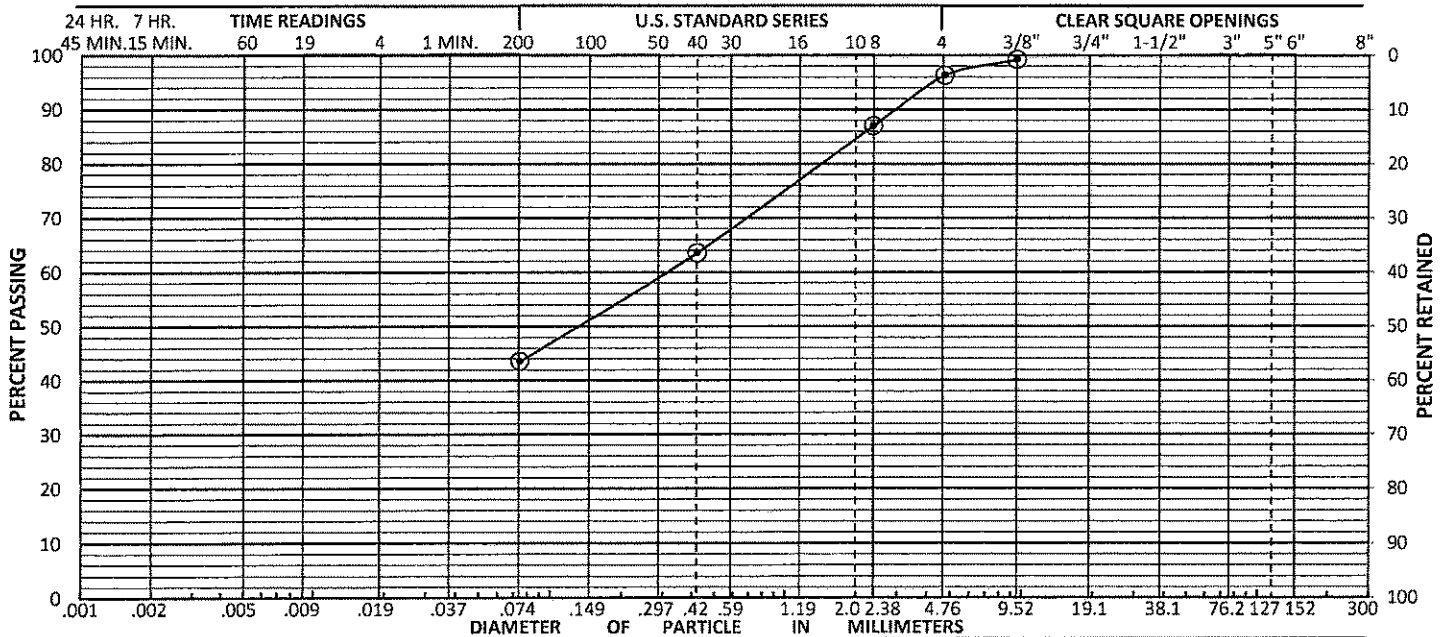
Job #: 18-0975 By: MJ 10/12/2018

GEOQUEST LLC

GRADATION TEST RESULTS

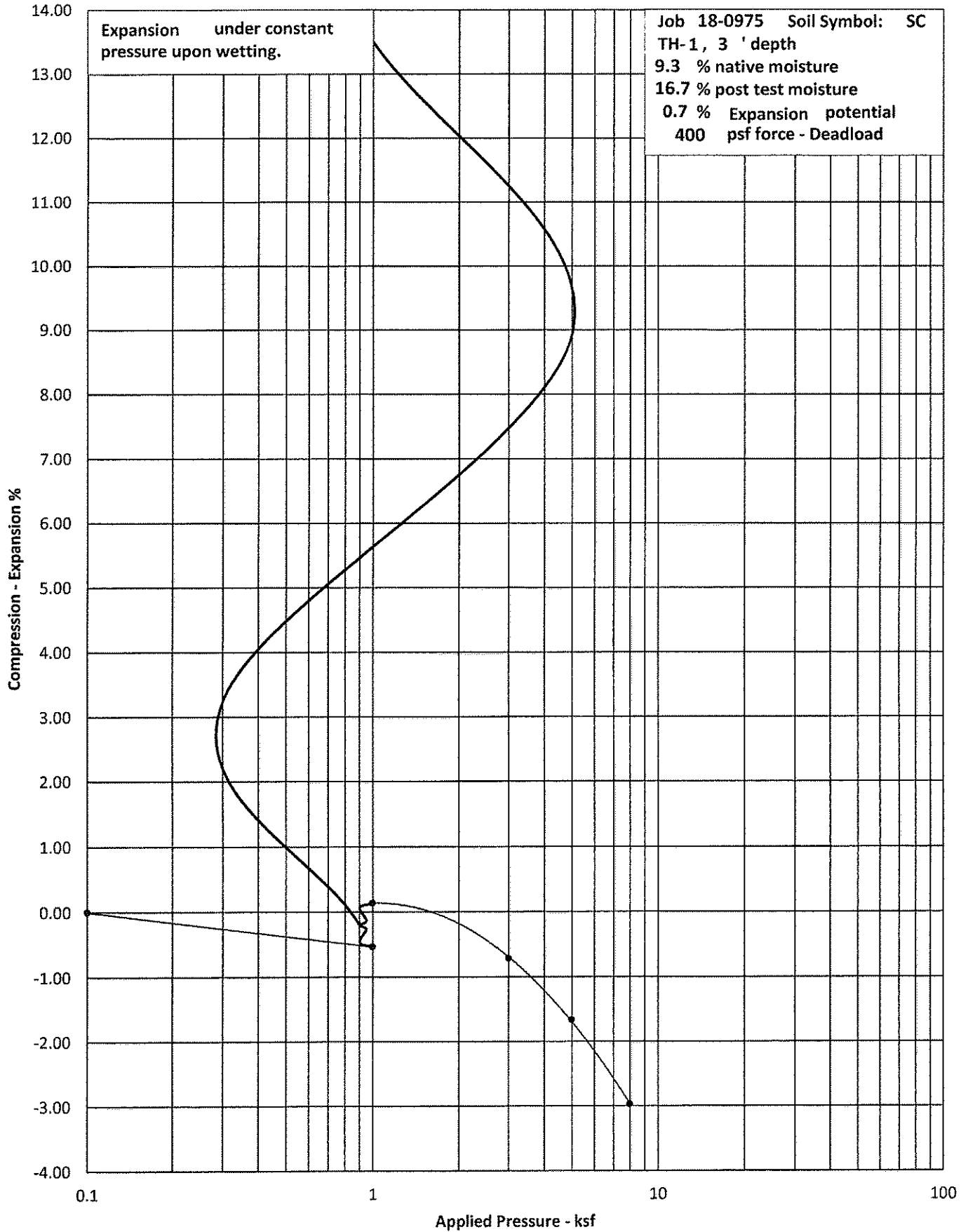


| CLAY TO SILT | SAND | | | GRAVEL | | COBBLES |
|--|---------------------------------------|--------|--------|--------|--------|---------|
| | FINE | MEDIUM | COARSE | FINE | COARSE | |
| CLASSIFICATION <u>CL</u> | NOTES: <u>11.4 % Moisture Content</u> | | | | | |
| GRAVEL <u>0.5 %</u> | <u>LL = 45.9</u> | | | | | |
| SAND <u>26.4 %</u> | <u>PL = 25.7</u> | | | | | |
| FINES <u>73.1 %</u> | <u>PI = 20.2</u> | | | | | |
| SAMPLE # <u>1</u> HOLE # <u>TH-8</u> DEPTH <u>4</u> FEET | | | | | | |

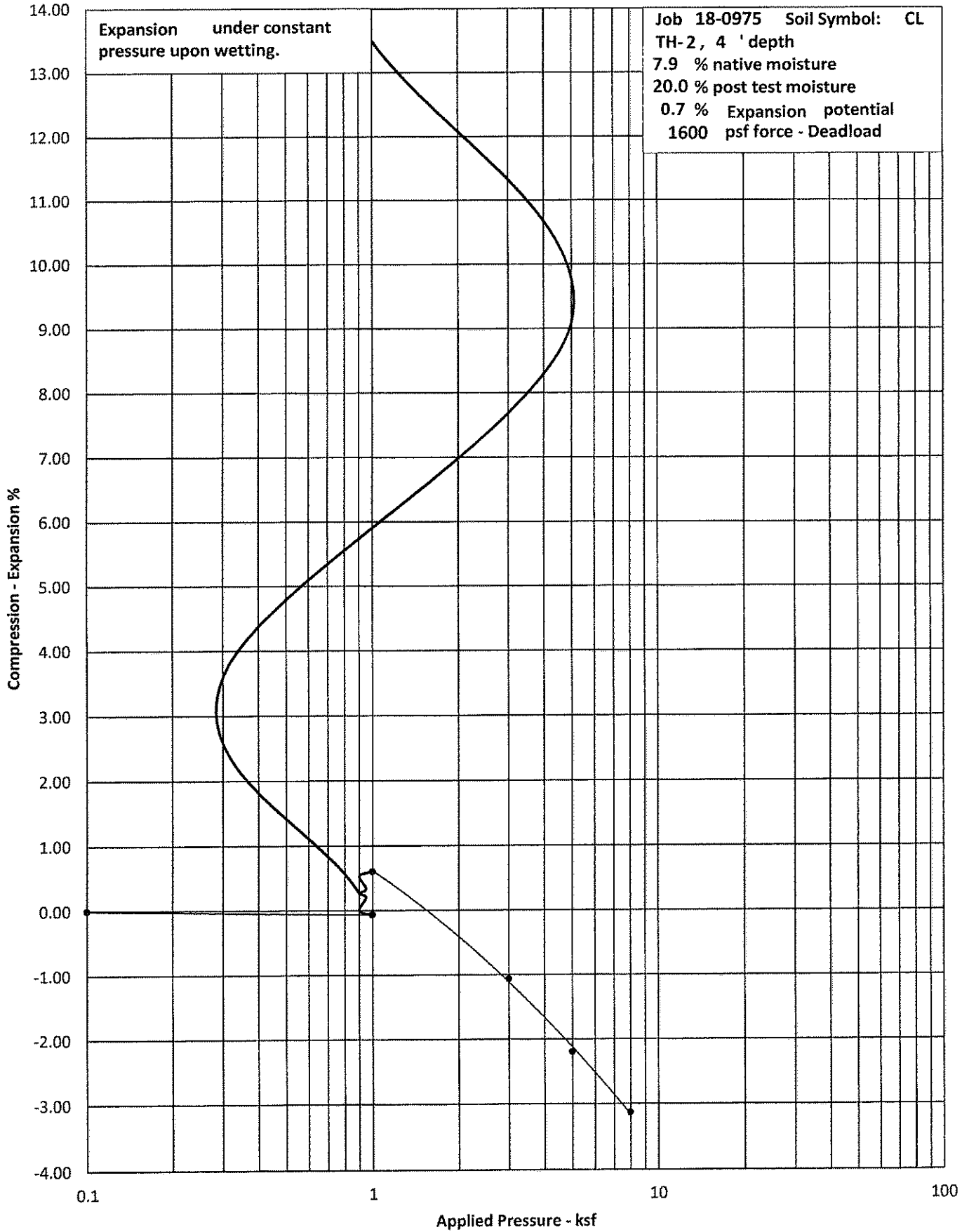


| CLAY TO SILT | SAND | | | GRAVEL | | COBBLES |
|---|--------------------------------------|--------|--------|--------|--------|---------|
| | FINE | MEDIUM | COARSE | FINE | COARSE | |
| CLASSIFICATION <u>SC</u> | NOTES: <u>7.1 % Moisture Content</u> | | | | | |
| GRAVEL <u>3.7 %</u> | <u>LL = 21.6</u> | | | | | |
| SAND <u>52.8 %</u> | <u>PL = 13.0</u> | | | | | |
| FINES <u>43.5 %</u> | <u>PI = 8.6</u> | | | | | |
| SAMPLE # <u>1</u> HOLE # <u>TH-8</u> DEPTH <u>13</u> FEET | | | | | | |
| Job #: <u>18-0975</u> By: <u>MJ</u> 10/12/2018 | | | | | | |

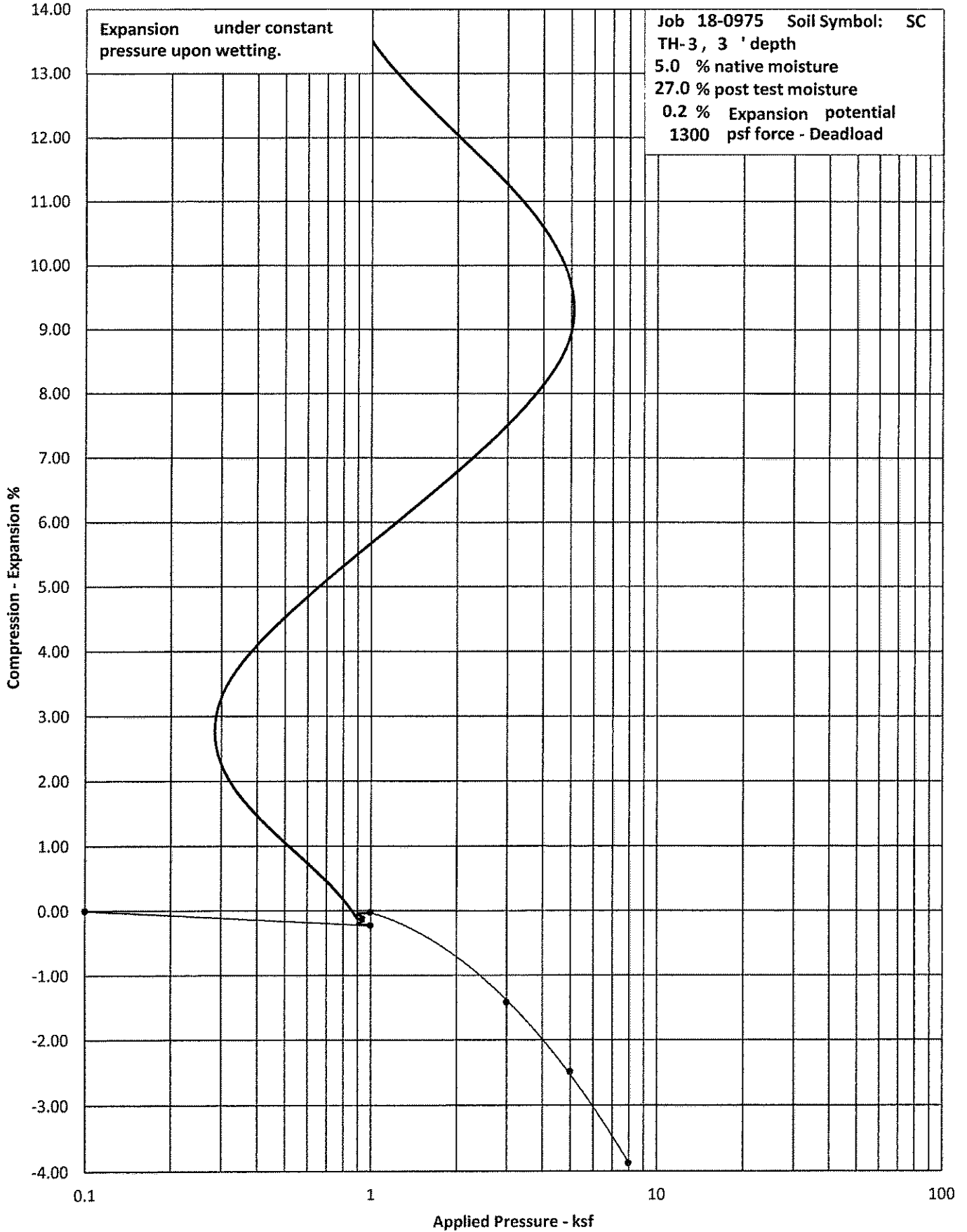
GEOQUEST LLC
SWELL-CONSOLIDATION TEST RESULTS



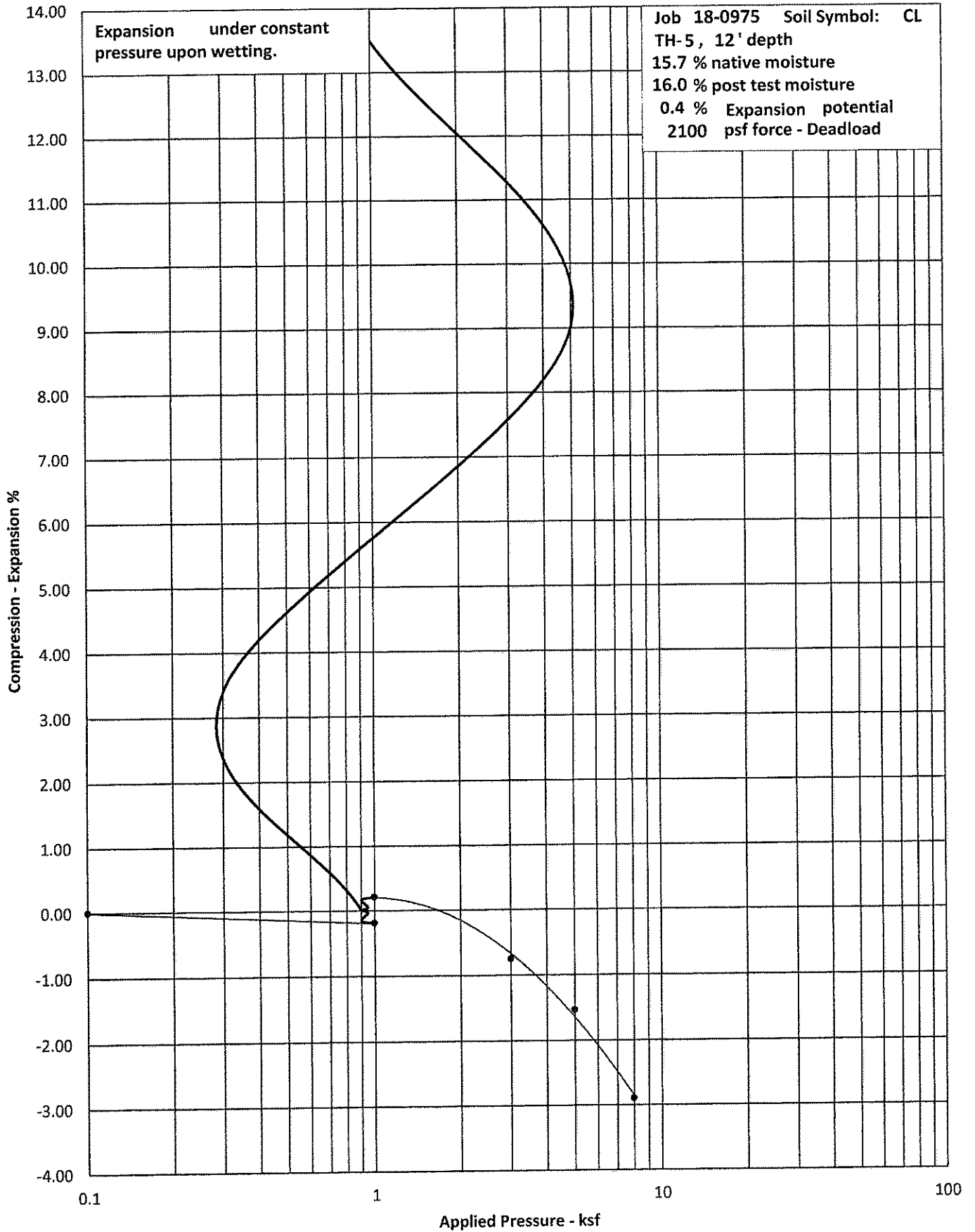
GEOQUEST LLC
SWELL-CONSOLIDATION TEST RESULTS



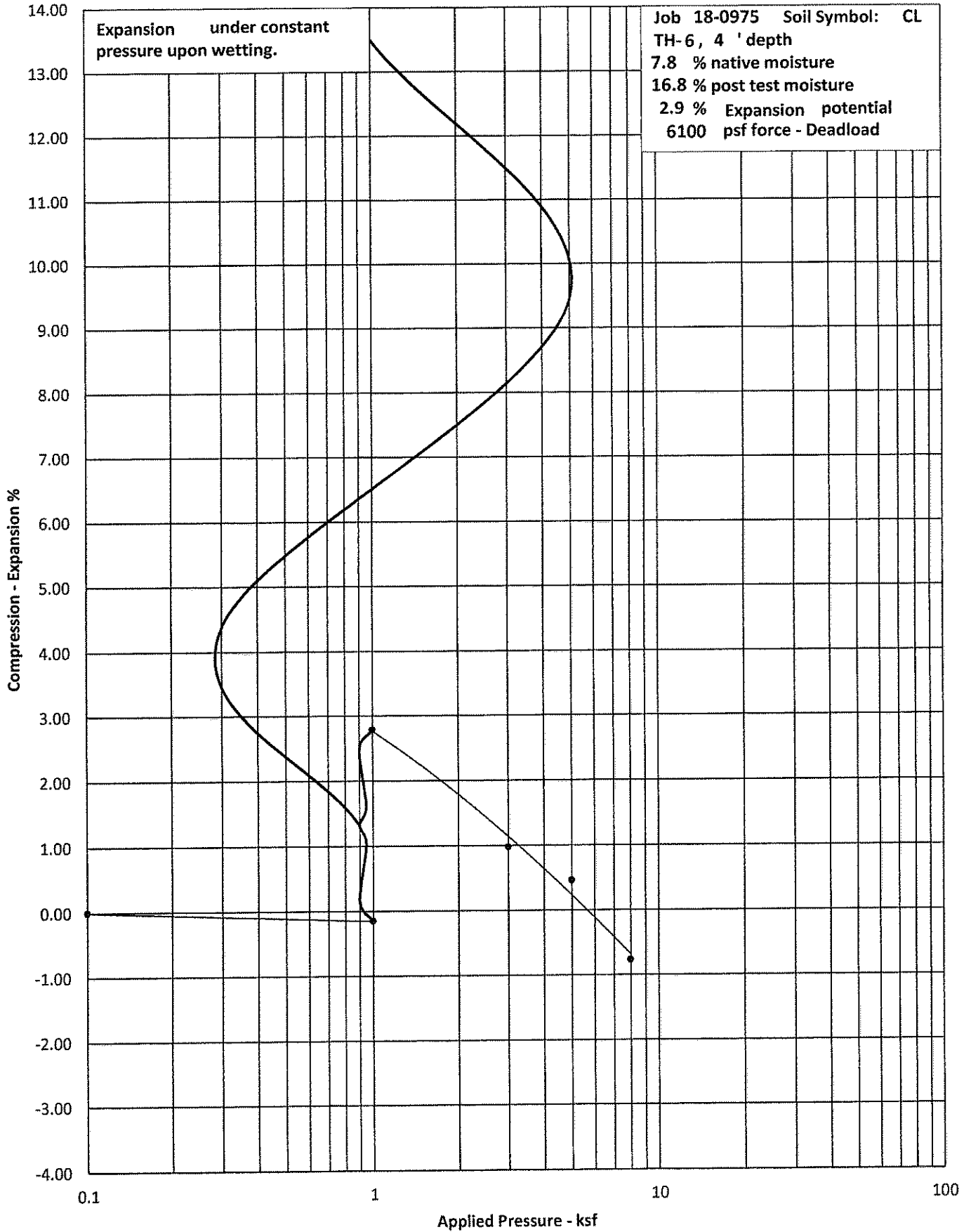
GEOQUEST LLC
SWELL-CONSOLIDATION TEST RESULTS



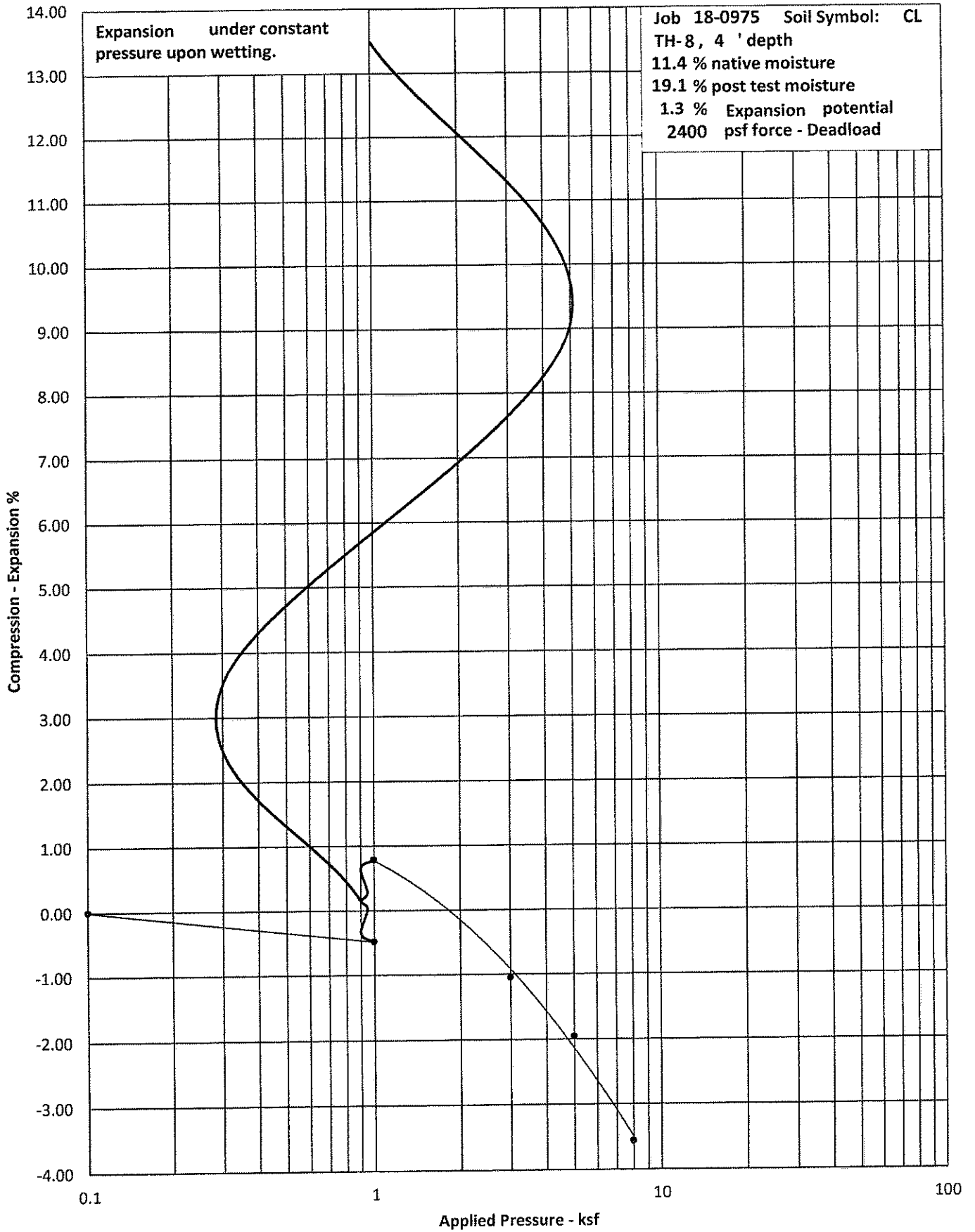
GEOQUEST LLC
SWELL-CONSOLIDATION TEST RESULTS



GEOQUEST LLC
SWELL-CONSOLIDATION TEST RESULTS



GEOQUEST LLC
SWELL-CONSOLIDATION TEST RESULTS

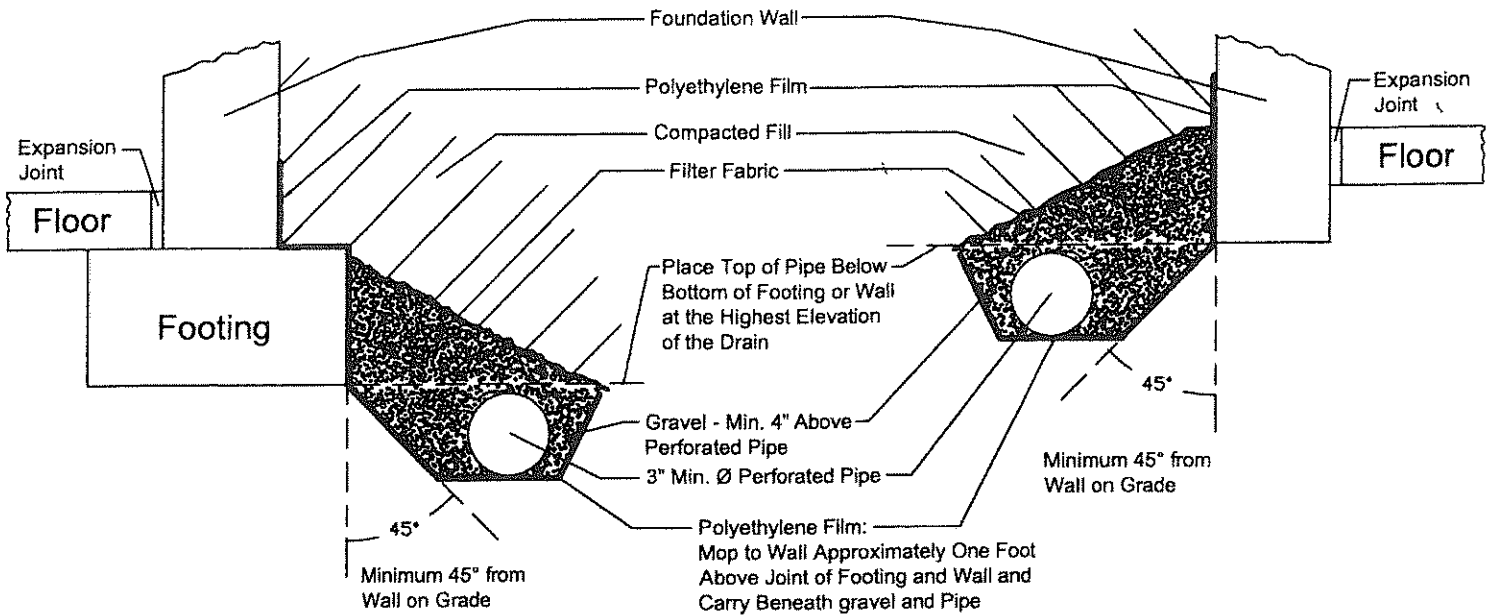




EXTERIOR DRAIN DETAIL

SPREAD FOOTING TYPE

WALL ON GRADE TYPE



1. Gravel to be Not More Than 1-1/2" and Not Less Than 1/2" Diameter.
2. Perforated Pipe Diameter Varies With Expected Seepage. 3"Ø and 4"Ø are Most Common. ABS and PVC are Most Common Materials for Pipe.
3. Pipe to be Laid out in a Minimum Slope of 1" in 10'.
4. Gravity Outfall is Desired if Possible. Portion of Pipe in Area Not Drained Shall be Non-Perforated. Daylight Must be Maintained Clear of Debris in Order to Function Properly.
5. If Gravity Outfall is Not Possible, Provide a Sump With Operational Pump. Pump May Not Connect to Any Sanitary or Storm Sewer.
6. Soil Backfill Should be Compacted to at Least 80% of the Modified Proctor Denisty in the Upper Three Feet of Fill.
7. Filter Fabric to be Mirafi 140s or Approved Equivalent. Roofing Felt and Sheet Plastic are Not Acceptable.
8. Drain Pipe Shall be Laid Below Protected Area, as Shown in The Detail Above.
9. Mop Polyethylene Film to Wall Approximately One Foot Above Joint of Footing and Wall and Carry Beneath Gravel and Pipe.
10. The Polyethylene Film Shall be Continued to the Edge of the Excavation.

LIMITATIONS

This report is issued based on the understanding that the owner or his representative will bring the information, data, and recommendations contained in this report to the attention of the project engineer and architect, in order that they may be incorporated into the plans for the structure. It is also the owner's responsibility to ensure that all contractors and sub-contractors carry out these recommendations during the construction phase.

This report was prepared in accordance with generally accepted professional geotechnical/engineering methods. However, Geoquest, LLC makes no other warranty, express or implied, as to the findings, data, specifications, or professional advice rendered hereunder.

This report is considered valid as of the present date. The owner acknowledges, however, that changes in the conditions of the property might occur with the passage of time, such as those caused by natural effects or man-made changes, both on this land and on abutting properties. Further, changes in acceptable tolerances or standards might arise as the result of new legislative actions, new engineering advances, or the broadening of geotechnical knowledge. Thus, certain developments beyond our control may invalidate this report, in whole or in part.

This report and its recommendations do not apply to any other site than the one described herein and are predicated on the assumption that the soil conditions do not deviate from those described. In the event that any variations or undesirable conditions should be detected during the construction phase or if the proposed construction varies from that planned as of this report date, the owner shall immediately notify Geoquest, LLC in order that supplemental recommendations can be provided, if so required.

Soils & Geology Report_v1.pdf Markup Summary

Cloud+ (1)



Subject: Cloud+
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Author: John Green
Date: 12/15/2020 1:23:59 PM
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Include statement of structural system
recommendation in plat note and Letter of Inent