

RELEASE FOR PERMIT

APR 09 2018

BMP
RBD CONSTRUCTION

Scan all sheets



CTL|THOMPSON

INCORPORATED

**GEOTECHNICAL INVESTIGATION
TIMBERLINE LANDSCAPING
OFFICE AND WAREHOUSE
CAPITAL DRIVE AND INDUSTRY ROAD
COLORADO SPRINGS, COLORADO**

Prepared For:

TIMBERLINE LANDSCAPING, INC.
2480 North Powers Boulevard
Colorado Springs, Colorado 80915

Attention: Mr. Matt Steed

CTL|T Project No. CS18748-125

May 5, 2017

✓ RBT

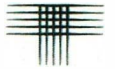
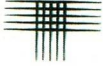


TABLE OF CONTENTS

SCOPE	1
SUMMARY	1
SITE CONDITIONS	2
PROPOSED CONSTRUCTION.....	2
SITE GEOLOGY	3
INVESTIGATION	3
SUBSURFACE CONDITIONS	4
Existing Fill	4
Natural Sand	4
Bedrock	5
Groundwater	5
Seismicity	5
SITE DEVELOPMENT	6
Excavation.....	6
Fill Placement	6
FOUNDATIONS.....	7
Spread Footings.....	8
FLOOR SYSTEMS AND SLABS-ON-GRADE.....	9
BELOW-GRADE CONSTRUCTION.....	10
PAVEMENTS.....	11
CONCRETE.....	12
SURFACE DRAINAGE	12
CONSTRUCTION OBSERVATIONS.....	13
GEOTECHNICAL RISK	14
LIMITATIONS	14
FIG. 1 – LOCATION OF EXPLORATORY BORINGS	
FIG. 2 – SUMMARY LOG OF EXPLORATORY BORING	
FIG 3. – SWELL CONSOLIDATION TEST RESULTS	
FIGS. 4 THRU 8 – GRADATION TEST RESULTS	
TABLE 1 – SUMMARY OF LABORATORY TESTING	



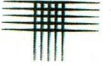
SCOPE

This report presents the results of our Geotechnical Investigation for the proposed Timberline Landscaping office and warehouse to be constructed north-east of the intersection of Capital Drive and Industry Road in Colorado Springs, Colorado (Fig. 1). The purpose of our investigation was to evaluate the subsurface conditions in order to provide geotechnical recommendations and criteria for design and construction of foundations and floor systems, pavement design section alternatives, and surface drainage precautions. The scope of our services was described in our proposal (CS-17-0041) dated March 14, 2017. Evaluation of the property for the possible presence of potentially hazardous materials (Environmental Site Assessment) was beyond the scope of this investigation.

This report was prepared from data developed during our field exploration, laboratory testing, engineering analysis, and from our experience. The design criteria presented in the report were based on our understanding of the planned construction. If changes occur, we should review the revised plans to determine their effect on our recommendations. The following section summarizes the report. More detailed descriptions of subsurface conditions, as well as our design and construction recommendations, are presented in the report.

SUMMARY

1. The soils encountered in the five exploratory borings drilled within the proposed structure footprint consisted of natural silty and clayey sand. An existing two-foot-thick layer of fill was encountered within the proposed access roadway to the south of the planned structure and is considered of suspect quality. Bedrock was encountered beneath the natural soils in two of the borings drilled at the site at depths of 27 feet.
2. At the time of drilling, groundwater was measured in our borings at depths between 19 and 27 feet below the existing ground surface. When checked seven days following the completion of our drilling, groundwater was measured in three of our borings at depths between 18 and 24 feet.



3. We believe the proposed office and warehouse building can be constructed on a spread footing foundation underlain by the natural undisturbed soils or new, densely compacted site grading fill.
4. We believe a low risk of movement and damage for conventional slab-on-grade floors when underlain by the on-site, natural sand soils, and new, densely compacted granular fill. Floor slab preparation details are presented in the report.
5. We believe the proposed future parking areas and drive lanes planned at the site can be paved with 6 inches of asphalt concrete. Alternative pavement sections are included in the report.
6. Overall surface drainage should provide for the rapid removal of runoff away from proposed structures and off of pavements.

SITE CONDITIONS

The site of the proposed Timberline Landscaping office and warehouse is located northeast of the intersection of Capital Drive and Industry Road in Colorado Springs, Colorado. Capital Drive terminated south of the site and access to the site to the east was via open ground. The office and warehouse building is planned to be constructed in the southwest portion of a vacant parcel. The general vicinity of the site and the location of the exploratory borings are shown in Fig. 1. The ground surface at the building site sloped up toward the northwest from the southeast at a grade of about 2 percent.

PROPOSED CONSTRUCTION

We understand a one-story warehouse and two story office, steel frame and metal skin structure is planned at the site. The new building will contain nearly 30,000 square feet of floor space and be a high ceiling, high bay structure. The two-story office will be constructed within the southern end of the structure and contain 10,000 square feet. The warehouse portion of the building will be located within the northern portion of the structure, and contain the remaining 20,000 square feet. Slab-on-Grade construction is anticipated for the new office and



warehouse building. No habitable, below-grade construction are currently anticipated. Proposed grading of the site indicates minimal grading will take place at the site. Cuts and fills of up to 5 feet may be necessary to establish a building pad.

SITE GEOLOGY

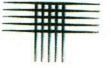
Geologic mapping by Richard F. Madole of the Colorado Geological Survey ("Reconnaissance Geologic Map of the Falcon Northwest Quadrangle, El Paso County, Colorado," 2003) indicates the site is underlain by Alluvial Deposits. Conditions encountered in our borings generally confirm the mapping.

INVESTIGATION

Our field investigation for the planned Timberline Landscaping office and warehouse was completed by drilling five exploratory borings within the proposed structure footprint and three shallow subgrade borings within the proposed parking lot and drive lanes using a 4-inch diameter continuous flight augers and a truck mounted drill rig. Our borings for the new structure were advanced to depths of 30 feet below the existing ground surface, and our shallow borings were advanced to depths of 5 feet below the existing ground surface at the approximate locations shown on Fig. 1.

Samples of the soils were obtained using a 2.5-inch diameter (O.D.) modified California barrel sampler driven by blows from a 140-pound hammer falling 30 inches. Representatives of CTL | Thompson, Inc. were present during drilling to observe drilling operations, logged the subsurface conditions encountered in the borings, and obtained samples. Summary logs of the borings, results of field penetration resistance tests, and laboratory test data are presented in Fig. 2.

Soil samples obtained during drilling were returned to our laboratory and visually classified. Laboratory testing was then assigned to representative samples



and included moisture content and dry density, swell consolidation, sieve analysis, and water-soluble sulfate concentration tests. Results of the swell consolidation testing is presented in Fig. 3 and results of the sieve analysis testing are presented in Figs. 4 through 8. Laboratory test data are summarized in Table 1.

SUBSURFACE CONDITIONS

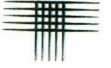
Subsurface conditions encountered in our exploratory borings drilled within the building consisted of natural silty or clayey sand at the surface or underlying the existing fill materials. Bedrock was encountered underlying the sands in two borings (borings TH-1 and TH-3) at depths of 27 feet. In the borings where bedrock was not encountered, silty sand extended to the maximum depths explored of 30 feet. We experienced caving in three of our borings at depths between 20 and 24 feet during drilling. Some of the pertinent engineering characteristics of the soils and bedrock encountered, as well as groundwater conditions, are described in the following paragraphs.

Existing Fill

We encountered up to 2 feet of existing silty and clayey fill material at the existing ground surface in one boring at the site (S-3). The fill materials were medium dense based on field penetration resistance test results. Test results and our experience indicate the sand fill materials are typically non-expansive or exhibit low swell potential when wetted. The fill was likely placed as site grading fill. We have no records of the placement of this fill and we must consider this material to be of suspect quality in its current condition.

Natural Sand

Clean, slightly silty to very silty, clayey, and slightly gravelly to gravelly sand was found in the borings at the surface or underlying the existing fill. The sands



were loose surficially at one boring location (TH-4). Generally, the sands were medium dense to very dense based on field penetration resistance test results. The sands became more dense with depth. Samples of the sand contained 3 to 36 percent silt and clay-sized particles (passing the No. 200 sieve). Atterberg Limits testing performed on two near surface samples indicated the sands exhibit non-plastic properties. Based on test results and our experience, the sands are typically non-expansive or exhibit low swell potential when wetted.

Bedrock

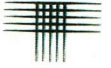
Silty sandstone bedrock was encountered in our exploratory borings TH-1 and TH-3 underlying the sand at depths of 27 feet. The sandstone was judged to be hard based on our field penetrations resistance testing. Our experience indicates the sandstone is typically non-expansive.

Groundwater

At the time of drilling, groundwater was encountered at depths ranging from 19 to 27 feet below the existing ground surface in the borings drilled at the site. When groundwater measurements were performed seven days following our drilling operations, we measured groundwater at depths between 18 and 24 feet below existing ground surface elevations. Our borings were backfilled following the completion of our delayed water level measurements. Groundwater levels will fluctuate with seasonal precipitation, landscaping irrigation, and changes to the surficial drainage patterns.

Seismicity

This area, like most of central Colorado, is subject to a degree of seismic activity. We believe the soils on the property classify as Site Class D (stiff soil profile) according to the 2015 International Building Code (2015 IBC).



SITE DEVELOPMENT

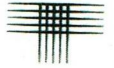
Grading plans were provided to us in the form of proposed topography mapping prior to completion of this study. Based on the existing site topography, the estimated finished floor elevation, and the planned site grading, we anticipate maximum cuts and fills on the order of up to about 5 feet of additional grading fill materials to be placed above the existing ground surface will be necessary to achieve the desired building pad elevation in the southern portion of the proposed building footprint. Minor cuts of up to 4 feet are expected in the northern portion of the building footprint. We recommend permanent cut and fill slopes planned be no steeper than 3:1 (horizontal to vertical).

Excavation

We believe the soils can be excavated with conventional, heavy-duty excavation equipment. Based on our investigation and Occupational Safety and Health Administration (OSHA) standards, we believe the on-site surficial soils classify as Type C materials. OSHA requires Type C materials should be braced or laid back to a maximum slope inclination of 1.5:1 (horizontal to vertical) for dry conditions. If groundwater conditions change and becomes more shallow, the granular materials may “flow” into the excavation. Excavation slopes specified by OSHA are dependent upon the types of soil and groundwater conditions encountered. The contractor’s “competent person” should identify the soils encountered in the excavations and refer to OSHA standards to determine appropriate slopes.

Fill Placement

The soils encountered at this site are suitable to re-use as fill material provided vegetation, topsoil, debris and other deleterious materials are substantially removed. If imported fill is necessary, it should ideally consist of granular material with 100 percent passing the 2-inch sieve and containing less than 30 percent



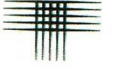
passing the No. 200 sieve. The import soil should exhibit low plasticity with a Liquid Limit less than 30 and a Plasticity Index less than 10. A sample of the import material should be submitted to our office for testing before transporting to the site.

Before fill placement, vegetation, topsoil, and other deleterious material should be removed. Areas to receive fill should be deeply scarified, moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 95 percent of maximum modified Proctor dry density (ASTM D1557).

The properties of the fill will affect the performance of foundations and slabs-on-grade. On-site materials placed as fill below-footings, slabs, and as utility trench backfill should be placed at moisture contents within 2 percent of optimum moisture content, and compacted in thin lifts to at least 95 percent of maximum modified Proctor dry density (ASTM D 1557). The placement and compaction of backfill should be observed and tested by a representative of our firm during construction.

FOUNDATIONS

Our investigation indicates the soils at anticipated shallow foundation elevations for the planned office and warehouse building consists predominantly of non-expansive, clean, slightly silty to very silty, clayey, and slightly gravelly to gravelly sands. Site grading fill is expected to be placed in various areas within the southern portion of the proposed building footprint. Prior to the footing foundation construction and following the excavation for the new foundations, we should visit the site while the existing, natural materials are exposed to determine if loose soils are present at the planned foundation elevation. Our observations during our drilling operations resulted in blow counts of the shallow materials near surface materials that represent loose materials in the vicinity of TH-4. Loose soils encountered within the building footprint excavation should be removed to a depth of at least two feet and re-placed as moisture conditioned and densely compacted fill as

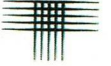


discussed in the **Site Development** section of this report.

In our opinion, the proposed building can be constructed with a spread footing foundation underlain by the natural soils and moisture conditioned; densely compacted site grading fill. The following paragraphs present our design and construction recommendations for the spread footing foundation.

Spread Footings

1. Spread footings should be constructed on the natural granular materials or new, densely compacted granular fill. Fill materials placed below the foundations should be moisture conditioned and compacted as described in the previous paragraphs. Prior to placement of concrete, soils loosened during excavation and pockets of loose material should be removed and densely replaced as discussed.
2. Spread footings should be designed for a maximum allowable soil pressure of 3,000 psf.
3. We recommend footings beneath continuous foundation walls be at least 16 inches wide. Footings beneath isolated column pads should be at least 24 inches square. Larger footing sizes will likely be required to accommodate the anticipated foundation loads.
4. We recommend designs consider total settlement of 1-inch and differential settlement of 1/2-inch.
5. Continuous foundation walls should be reinforced, top and bottom, to span local anomalies in the subsoils. We recommend the reinforcement required to simply span an unsupported distance of at least 10 feet.
6. Exterior footings must be protected from frost action with a soil cover of at least 30 inches.
7. A representative of our firm should observe the completed foundation excavations to confirm the exposed conditions are similar to those encountered in our exploratory borings. The placement and compaction of below-footing. Fill should be observed and tested by a representative of our firm during construction.

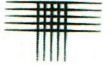


FLOOR SYSTEMS AND SLABS-ON-GRADE

We anticipate a slab-on-grade floor is preferred within the proposed building. Slab loads are expected to be less than 50 psf. We believe a low risk of poor slab performance will exist for a floor slab underlain by undisturbed natural on-site granular soils and new, densely placed granular fill. Loose soils encountered in foundation excavations should be removed to a depth of at least two feet and replaced as moisture conditioned and densely compacted fill as discussed under the **Fill Placement** section of this report.

Shallow building foundations will likely settle relative to lightly loaded slab-on-grade floors. We estimate this relative movement between footing foundations and floor slabs could be on the order of 1 inch. The settlement can cause cosmetic cracking of drywall. We recommend the slab-on-grade floors be separated from exterior walls and interior bearing members with joints that allow for free vertical movement of the slab. Slip-joints in slab-bearing partitions should allow for at least 1-1/2 inches of free vertical movement. If the "float" is provided at the tops of partitions, the connection between interior, slab-supported partitions and exterior, foundation-supported walls should be detailed to allow differential movement. These architectural connections are critical to help reduce cosmetic damage when foundations and floor slabs move relative to each other. We have seen instances where these architectural connections were not designed and constructed properly and resulted in moderate cosmetic damage, even though the movement experienced was well within the anticipated range. The architect should pay special attention to these issues and detail the connections accordingly.

The 2015 International Building Code (IBC) requires a vapor retarder be placed between base course or the subgrade soils and the concrete slab-on-grade floor, unless the designer of the floor (structural engineer) waives this requirement. The merits of installing a vapor retarder below the floor slab depend on the sensitivity of floor coverings and building use to moisture. A properly installed vapor

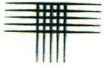


retarder (10 mil minimum) is more beneficial below concrete slab-on-grade floors where floor coverings, painted floor surfaces or products stored on the floor will be sensitive to moisture. The vapor retarder is most effective when concrete is placed directly on top of it, rather than placing a sand or gravel leveling course between the vapor retarder and the floor slab. The placement of concrete on the vapor retarder may increase the risk of shrinkage cracking and curling. Use of concrete with reduced shrinkage characteristics including minimized water content, maximized coarse aggregate content, and reasonably low slump will reduce the risk of shrinkage cracking and curling. Considerations and recommendations for the installation of vapor retarders below concrete slabs are outlined in Section 3.2.3 of the 2006 report of the American Concrete Institute (ACI) Committee 302, "Guide for Concrete Floor and Slab Construction (ACI 302.R-96)".

All parties must realize that even small movements of the floor slab (less than 1-inch) can damage comparatively brittle floor treatments such as ceramic or stone tile that might be used in restrooms, or impact movement sensitive medical equipment. If some movement of the slab is not acceptable, a structurally supported floor with an air space between the floor and the subgrade soils is recommended. The air space required by building codes depends on the materials used to construct the floor. The structural floor is supported by the foundation system. There are design and construction issues associated with structural floors, such as ventilation and increased lateral loads that must be considered.

BELOW-GRADE CONSTRUCTION

We are not aware of any proposed habitable, below-grade construction. If plans should change to include below-grade construction, we should be contacted to provide recommendations for foundation wall lateral earth pressures and sub-surface drains.



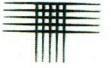
PAVEMENTS

Our exploratory borings and understanding of the proposed construction suggest the subgrade soils within the planned access drive lanes and roadways as well as parking lots will consist predominantly of slightly silty to very silty sand, and sand fill. The anticipated subgrade soil samples tested in our laboratory classify as A-1-b and A-4 according to the American Association of State Highway Transportation Officials (AASHTO) system. The silty sand and sand fill subgrade materials generally exhibit fair pavement support characteristics. Based on our laboratory testing of A-4 soils, a Hveem stabilometer ("R") value of 30 was assigned to the subgrade materials for design purposes.

We anticipate the access driveways could be subjected to occasional heavy vehicle loads such as trash and delivery trucks. We considered a daily traffic number (DTN) of 5 for the auto parking areas and 10 for the access drive lanes and roadway which correspond to 18-kip Equivalent Single-Axle Loads (ESAL) of 36,500 and 73,000, respectively, for a 20-year pavement design life. We recommend the parking stalls be paved with 5 inches of asphalt concrete or 3 inches of asphalt concrete over 6 inches of aggregate base course. The access drive lanes and roadway should be paved with 6 inches of asphalt concrete or 4 inches of asphalt underlain by 6 inches of aggregate base course. Alternately, a plain Portland cement pavement section consisting of 8 inches of concrete over a prepared subgrade may be used for concrete access roads.

We recommend a concrete pad be provided at the trash dumpster site and any service areas. The pad should be at least 8 inches thick and long enough to support the entire length of the trash truck and dumpster or delivery service vehicle. Joints between concrete and asphalt pavements should be sealed with a flexible compound.

Our design considers pavement construction will be completed in accord-



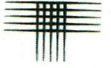
ance with the City of Colorado Springs "Standard Specifications" and the Pikes Peak Regional Asphalt Paving Specifications. Our calculations are based on regionally accepted structural coefficients of locally available materials. The specifications contain requirements for the pavement materials (asphalt, base course, and concrete) as well as the construction practices used (compaction, materials sampling, and proof-rolling). Of particular importance are those recommendations directed toward subgrade and base course compaction and proof-rolling. During proof-rolling, particular attention should be directed toward the areas of confined backfill compaction. Areas that pump excessively should be stabilized prior to pavement construction. A representative of our office should be present at the site during placement of fill and construction of pavements to perform density testing.

CONCRETE

Concrete in contact with soils can be subject to sulfate attack. We measured the water-soluble sulfate concentration in one sample obtained from this site at less than 0.1 percent. Sulfate concentrations less than 0.1 percent indicate Class 0 exposure to sulfate attack for concrete in contact with the subsoils, according to ACI 201.2R-01 as published in the 2008 ACI Manual of Concrete Practice. For this level of sulfate concentration, the American Concrete Institute (ACI) indicates Type I cement can be used for concrete in contact with the subsoils. Superficial damage may occur to the exposed surfaces of highly permeable concrete, even though sulfate levels are relatively low. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious material ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist due to surface drainage or high water tables. Concrete subjected to freeze-thaw cycles should be air entrained.

SURFACE DRAINAGE

Performance of the foundation system, floor slabs, pavements, and concrete



flatwork to be constructed at this site will be influenced by the moisture conditions existing within the near-surface soils. Overall surface drainage patterns must be planned to provide for the rapid removal of storm runoff. Water should not be allowed to pond adjacent to foundations or over pavements or concrete flatwork. We recommend the following precautions be observed during construction and maintained at all times after the building is completed.

1. Excessive wetting or drying of the open foundation excavation should be avoided.
2. Foundation wall backfill should be graded to provide for the rapid removal of runoff. We recommend a slope equivalent to at least 6 inches in the first 10 feet. In flatwork areas adjacent to the structure, the slope may be reduced to comply with ADA requirements.
3. Exterior wall backfill should be placed in thin, loose lifts, moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 95 percent of maximum standard Proctor dry density (ASTM D 698). The on-site soils can be used as exterior wall backfill.
4. Roof downspouts and drains should discharge well away from the building. Downspout extensions and/or splash blocks should be provided to help reduce infiltration into the backfill adjacent to the structure.
5. Landscaping concepts should concentrate on use of plantings that require little or no supplemental irrigation after the vegetation is established. Irrigated sod, if it is included in the landscaping plan, should not be located within 6 feet of the foundation walls. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. Application of more water will increase likelihood of slab and foundation movements.

CONSTRUCTION OBSERVATIONS

We recommend that CTL|Thompson, Inc. provide observation and testing services during construction to allow us the opportunity to verify whether soil conditions are consistent with those found during this investigation. If others perform these observations, they must accept responsibility to judge whether the recommendations in this report remain appropriate.



GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and experience. Therefore, the recommendations presented in any geotechnical evaluation should not be considered risk-free. Our recommendations represent our judgment of those measures that are necessary to increase the chances that the facility will perform satisfactorily. It is critical that all recommendations in this report are followed during construction. The owner must assume responsibility for maintaining the structures and pavements, and use appropriate practices regarding drainage and landscaping.

LIMITATIONS

This report has been prepared for the exclusive use of Timberline Landscaping, Inc. for the purpose of providing geotechnical design and construction criteria for the planned Timberline Landscaping office and warehouse. The information, conclusions, and recommendations presented herein are based on consideration of many factors including, but not limited to, the type of structure proposed, the geologic setting, and the subsurface conditions encountered. The conclusions and recommendations contained in the report are not valid for use by others. Standards of practice evolve in the area of geotechnical engineering. The recommendations provided are appropriate for about three years. If the building is not constructed within about three years, we should be contacted to determine if we should update this report.

Our borings were spaced to obtain a reasonably accurate indication of subsurface conditions at this site. The borings are representative of conditions encountered only at the location that was drilled. Subsurface variations not indicated



by our borings are possible. We recommend a representative of our office observe the completed foundation excavation. Representatives of our firm should be present during construction to perform construction observation and materials testing services.

We believe this investigation was conducted with that level of skill and care normally used by geotechnical engineers practicing under similar conditions. No warranty, express or implied, is made.

If we can be of further service in discussing the contents of this report or in the analysis of the influence of the subsoil conditions on design of the building from a geotechnical engineering point-of-view, please call.

CTL | THOMPSON, INC.

Patrick Foley, EIT
Staff Engineer

PF:WCH:vc

(2 copies sent)



Via Email: msteed@timberlinelandscaping.com

Reviewed by:

William C. Hoffmann, Jr., P. E.
Senior Principal Engineer

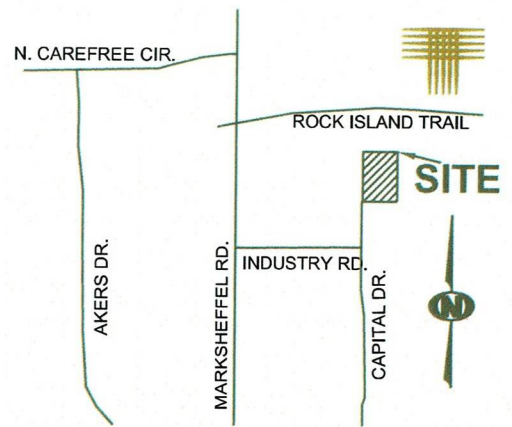


LEGEND:

- TH-1
● APPROXIMATE LOCATION OF EXPLORATORY BORING.
- S-1
○ APPROXIMATE LOCATION OF SUBGRADE SAMPLE.
-  PROPOSED GRADING CONTOURS
-  EXISTING TOPOGRAPHY

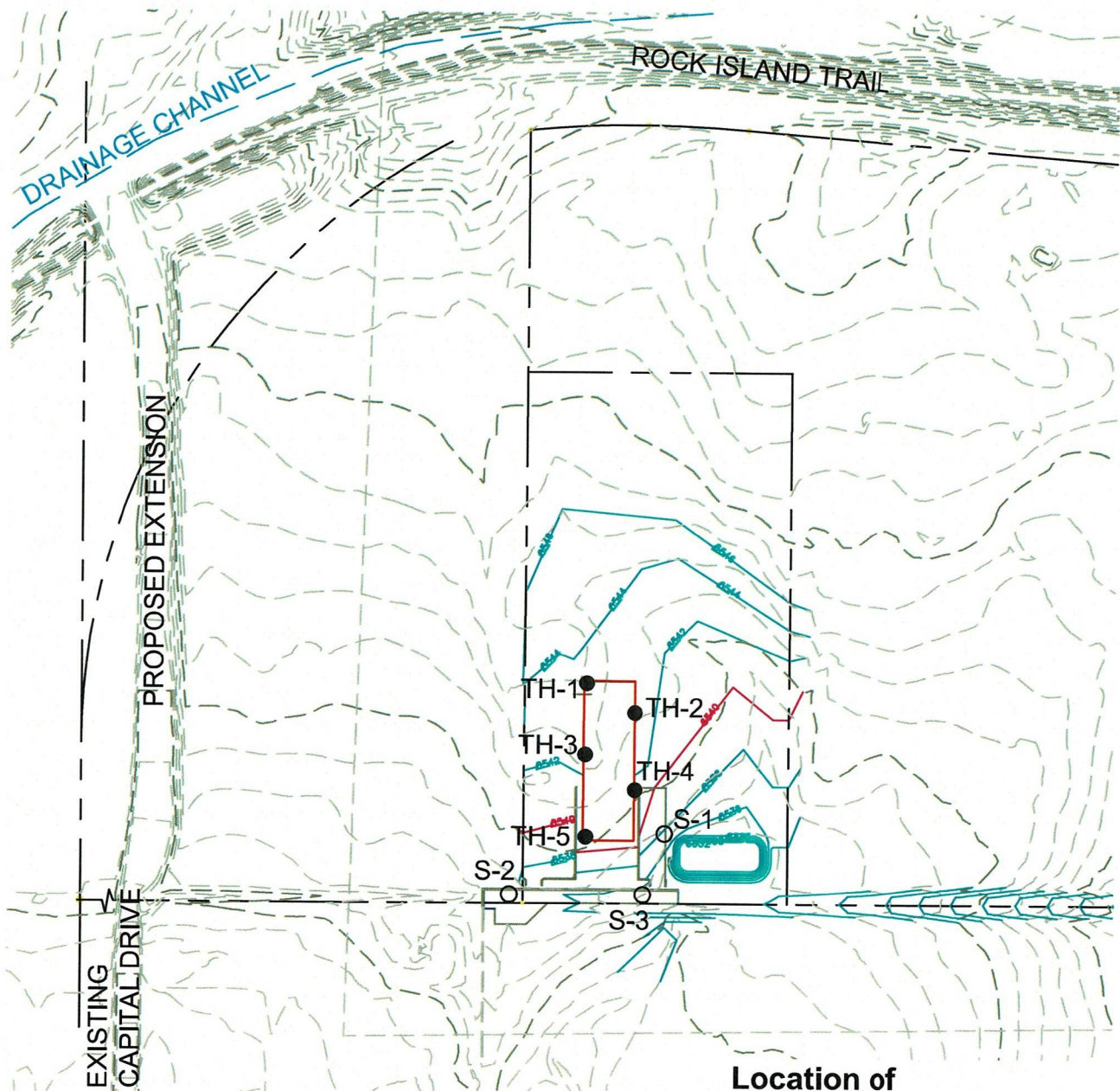


0 150' 300'
SCALE: 1" = 300'



VICINITY MAP

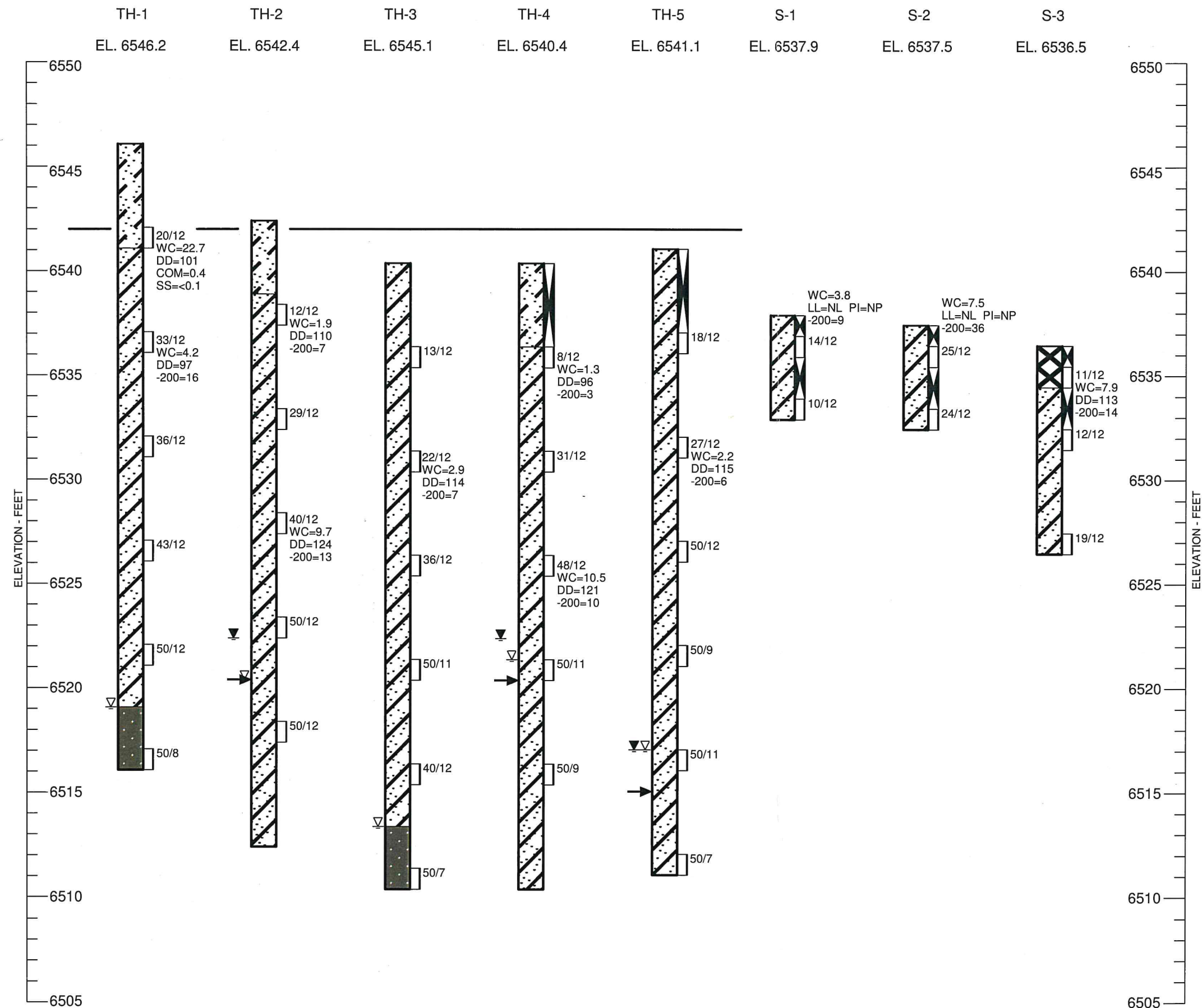
(NOT TO SCALE)



Location of
Exploratory
Borings

TIMBERLINE LANDSCAPING, INC
TIMBERLINE LANDSCAPING OFFICE AND WAREHOUSE
CTLJT PROJECT NO. CS18748-125

FIG. 1

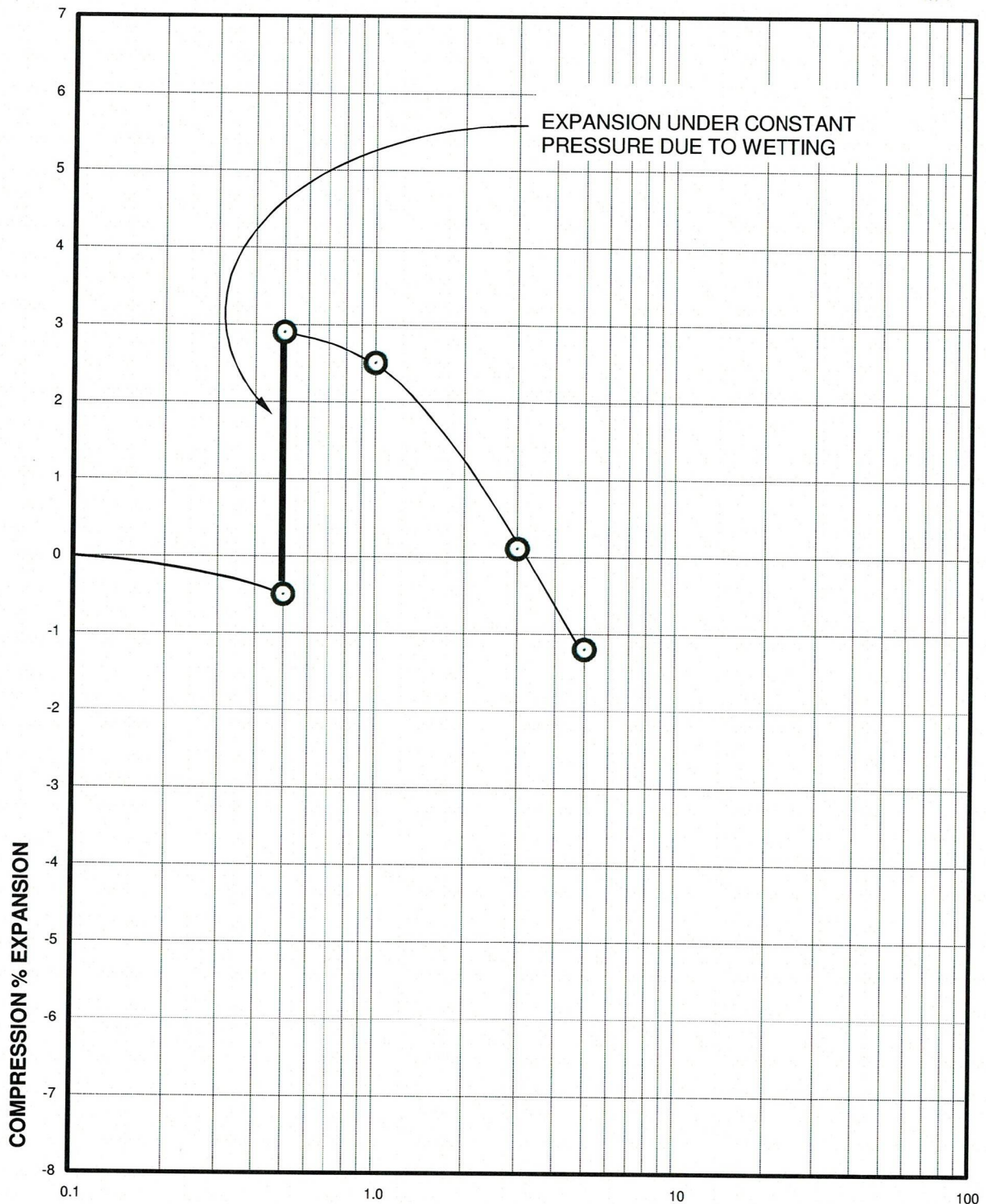


LEGEND:

- FILL, SAND, SILTY TO CLAYEY, MEDIUM DENSE, MOIST, BROWN.
- SAND, CLAYEY, MEDIUM DENSE, MOIST, BROWN. (SC)
- SAND, CLEAN, SLIGHTLY SILTY TO VERY SILTY, SLIGHTLY GRAVELLY TO GRAVELLY, LOOSE TO VERY DENSE, LIGHT BROWN. (SP, SW, SW-SM, SP-SM, SM)
- BEDROCK. SANDSTONE, SILTY, HARD, MOIST, BROWN.
- DRIVE SAMPLE. THE SYMBOL 20/12 INDICATES 20 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- INDICATES BULK SAMPLE OBTAINED FROM AUGER CUTTINGS.
- GROUNDWATER LEVEL MEASURED AT TIME OF DRILLING.
- GROUNDWATER LEVEL MEASURED SEVEN DAYS AFTER DRILLING.
- ESTIMATED FINISHED FLOOR SLAB ELEVATION OF 6542.0

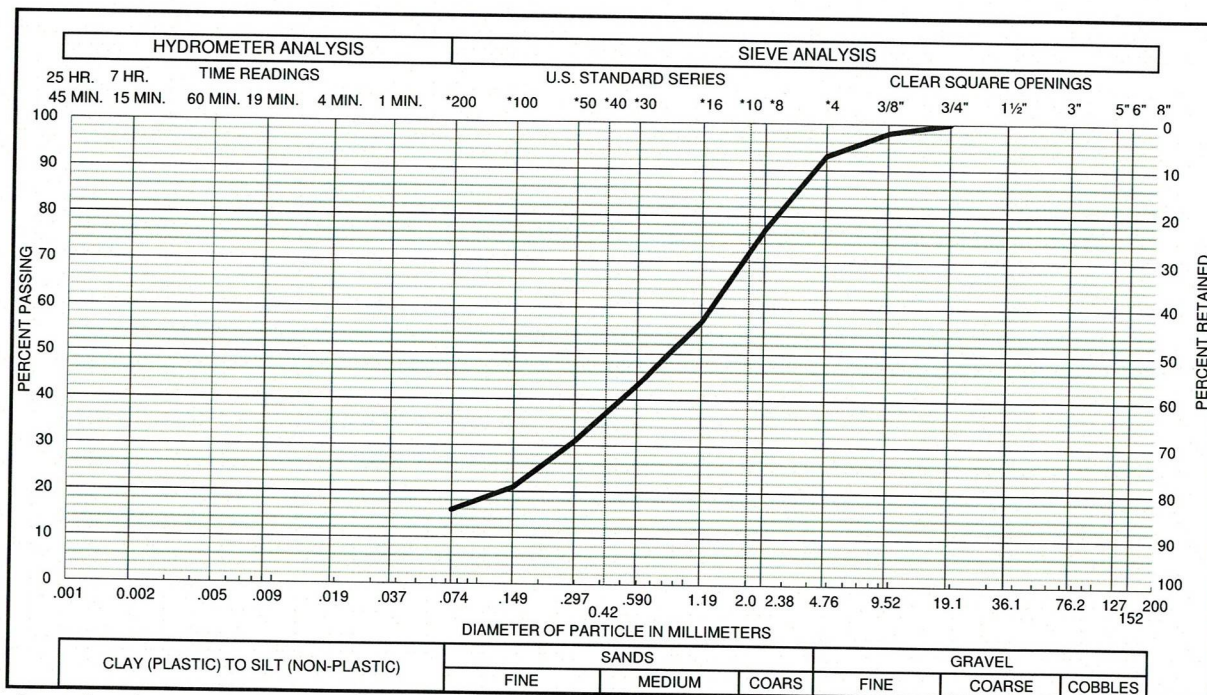
NOTES:

- THE BORINGS WERE DRILLED MARCH 31, 2017 USING A 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND A CME-45, TRUCK-MOUNTED DRILL RIG.
- THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS, AND CONCLUSIONS AS CONTAINED IN THIS REPORT.
- THE BORING ELEVATIONS WERE DETERMINED DURING A FIELD SURVEY PERFORMED BY M&S CIVIL CONSULTANTS, INC.
- WC - INDICATES MOISTURE CONTENT. (%)
DD - INDICATES DRY DENSITY. (PCF)
COM - INDICATES COMPRESSION WHEN WETTED UNDER ESTIMATED OVERBURDEN PRESSURE. (%)
LL - INDICATES LIQUID LIMIT. (%)
(NV : NO VALUE)
PI - INDICATES PLASTICITY INDEX. (%)
(NP : NON-PLASTIC)
-200 - INDICATES PASSING NO. 200 SIEVE. (%)
SS - INDICATES WATER-SOLUBLE SULFATE CONTENT. (%)



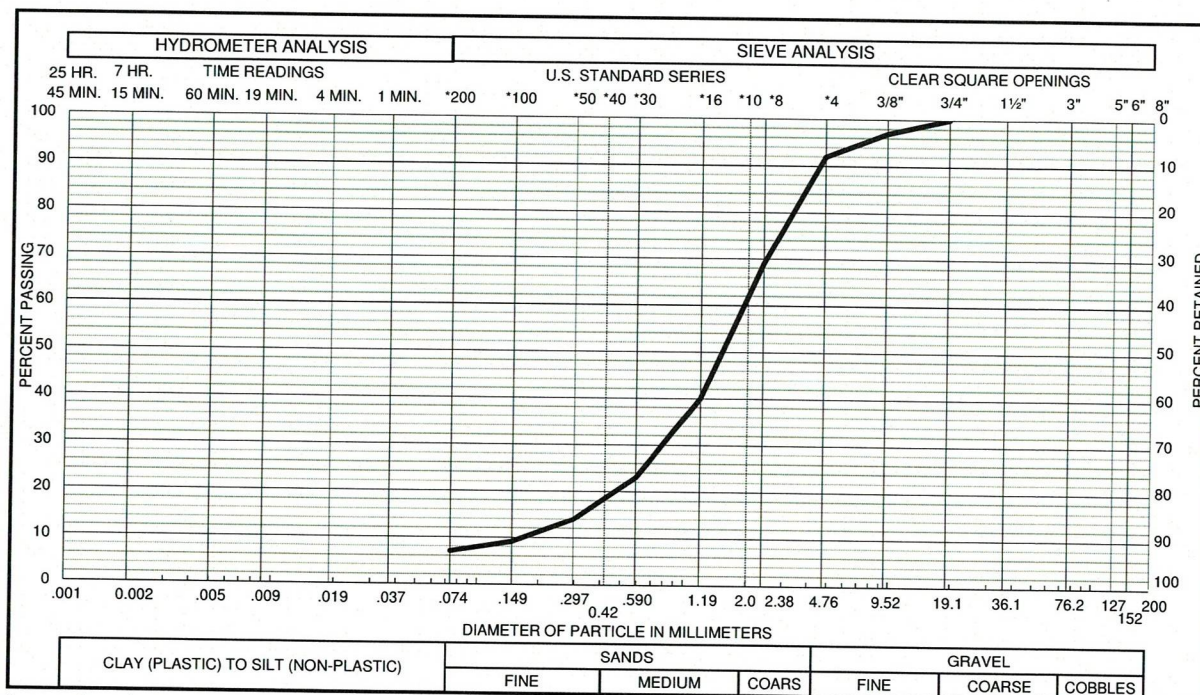
APPLIED PRESSURE - KSF
 Sample of SAND, CLAYEY (SC)
 From TH-1 AT 4 FEET

DRY UNIT WEIGHT= 101 PCF
 MOISTURE CONTENT= 22.7 %



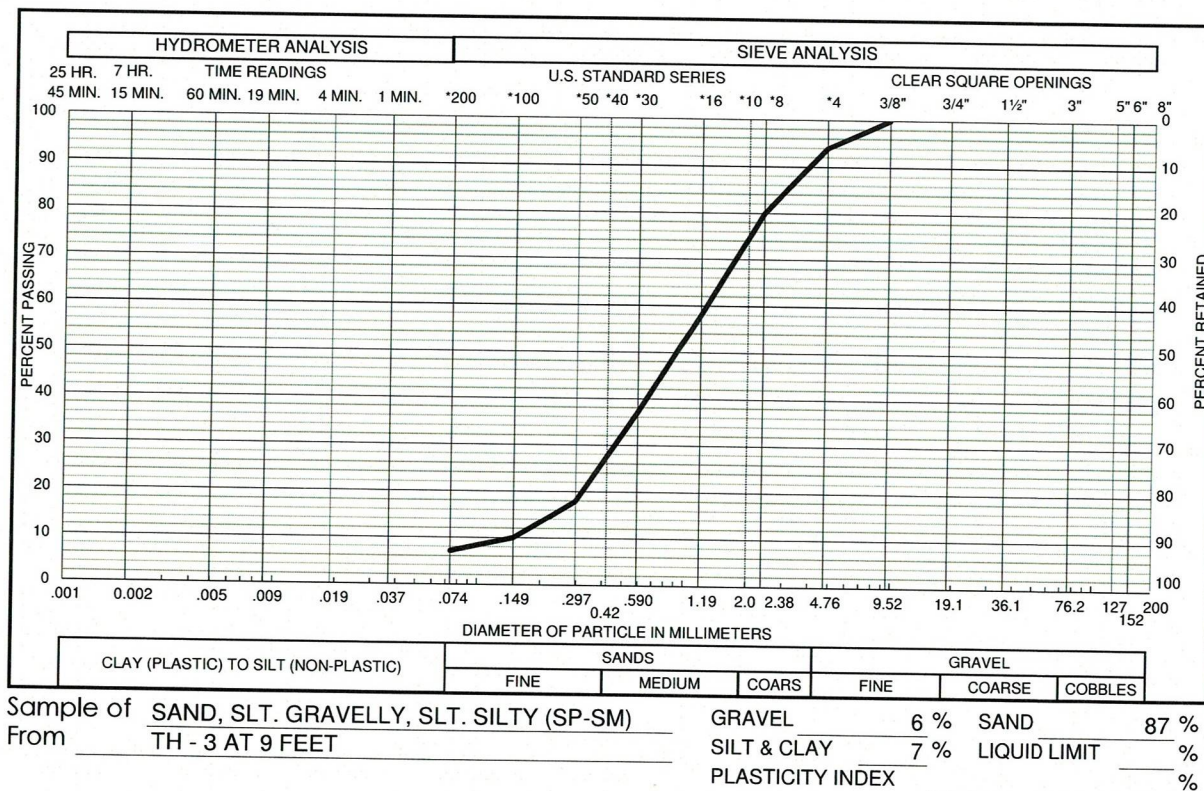
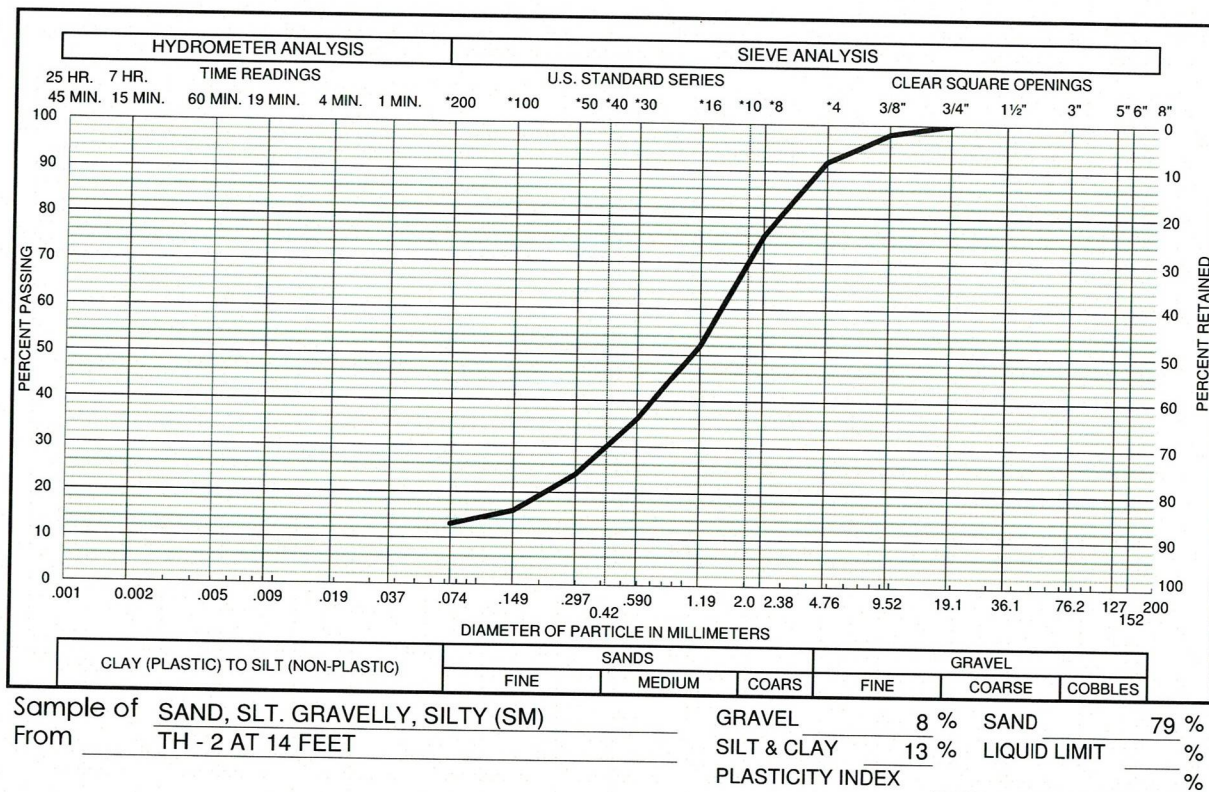
Sample of SAND, SLT. GRAVELLY, SILTY (SM)
From TH - 1 AT 9 FEET

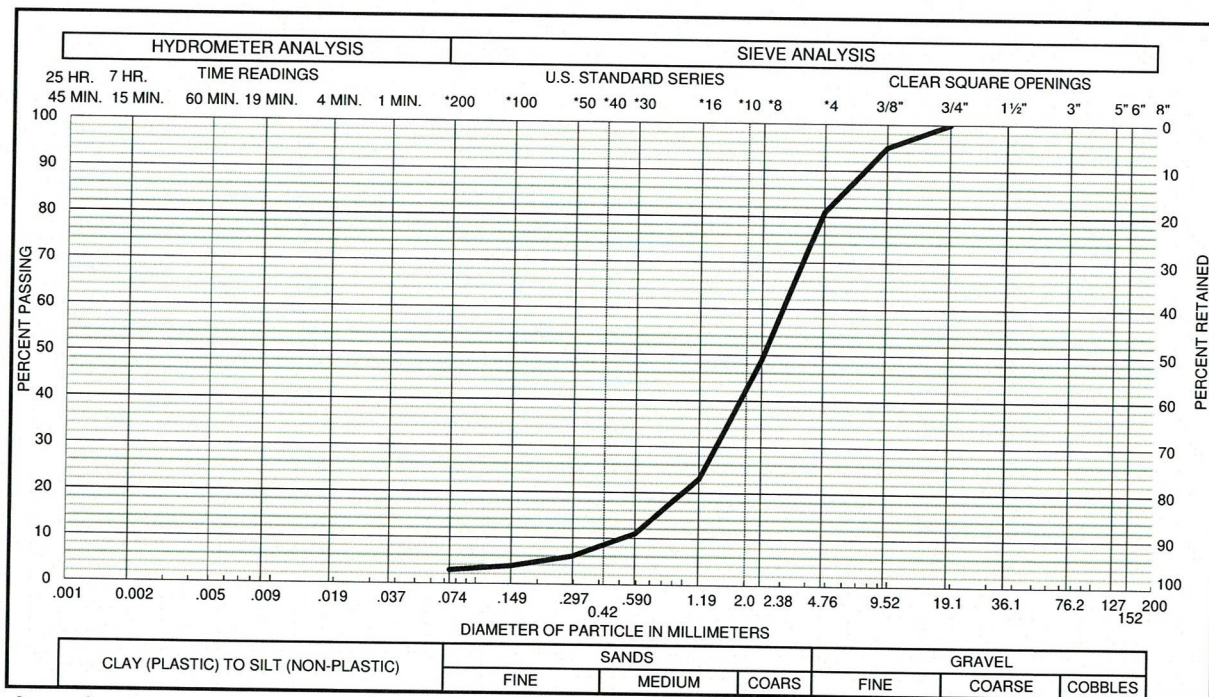
GRAVEL 7 % SAND 77 %
SILT & CLAY 16 % LIQUID LIMIT %
PLASTICITY INDEX %



Sample of SAND, SLT. GRAVELLY, SLT. SILTY (SW-SM)
From TH - 2 AT 4 FEET

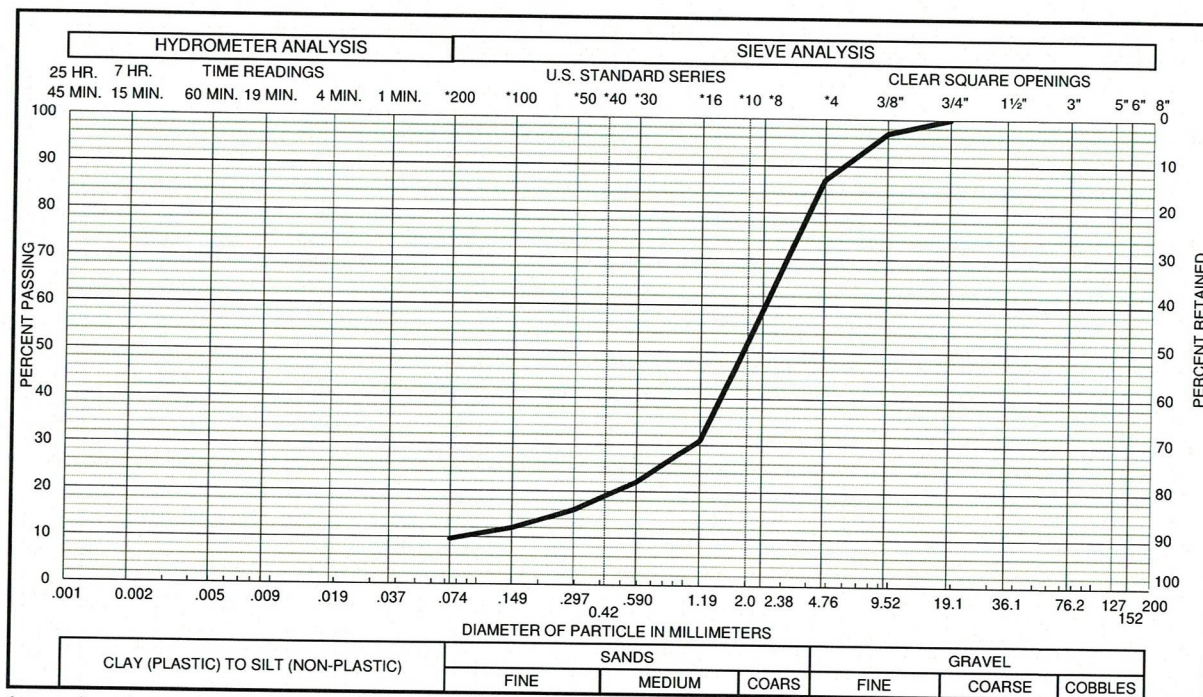
GRAVEL 8 % SAND 85 %
SILT & CLAY 7 % LIQUID LIMIT %
PLASTICITY INDEX %





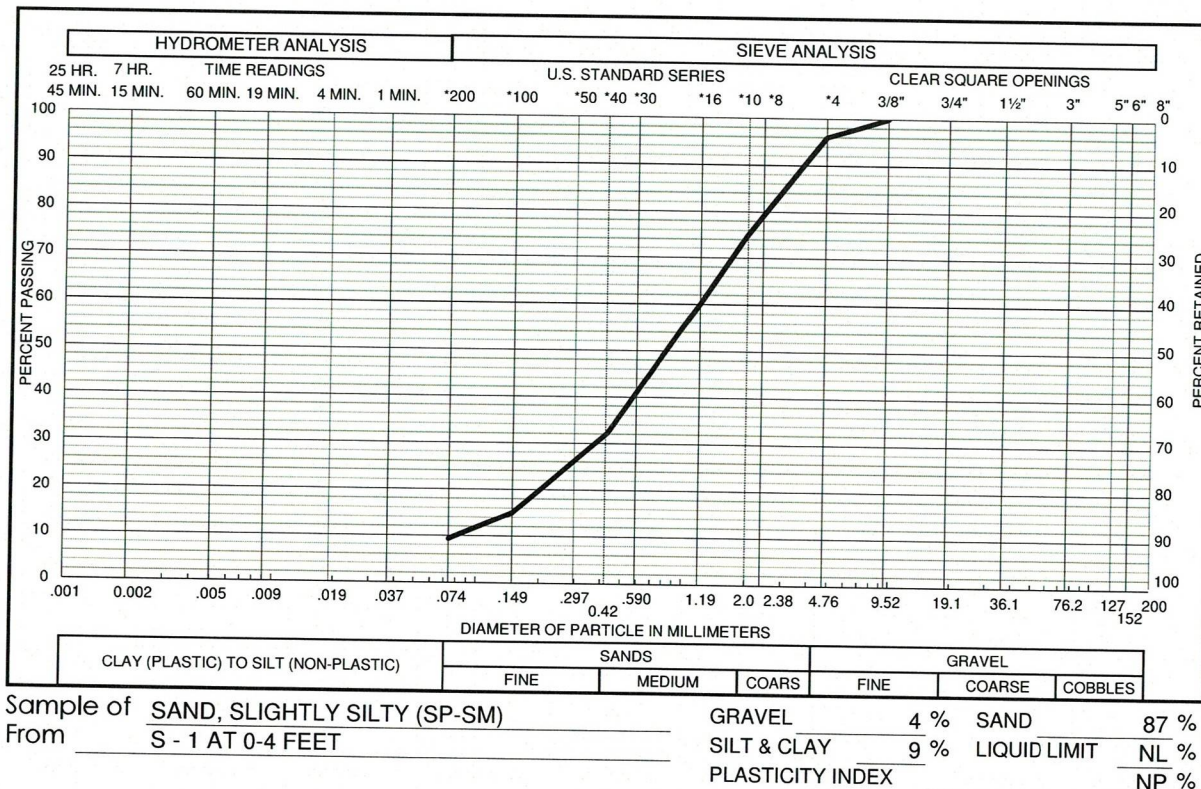
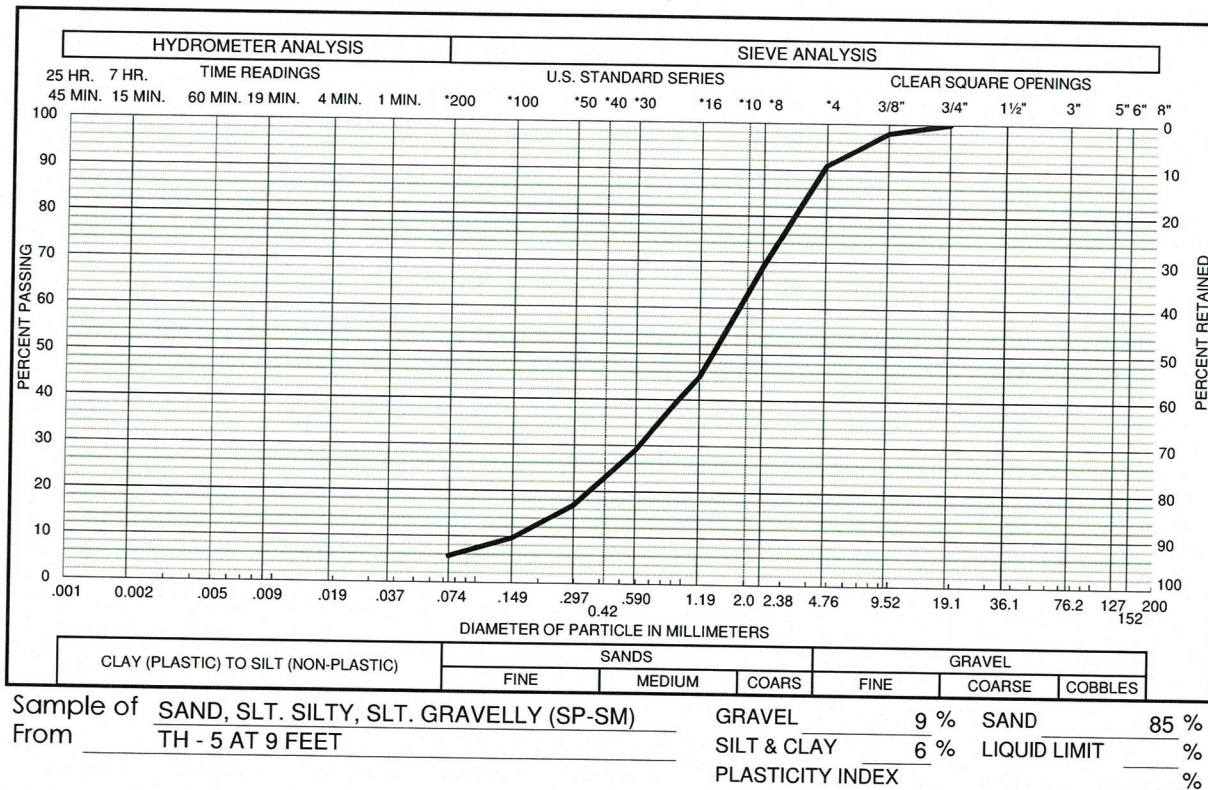
Sample of SAND, SLT. SILTY, GRAVELLY (SP)
From TH - 4 AT 4 FEET

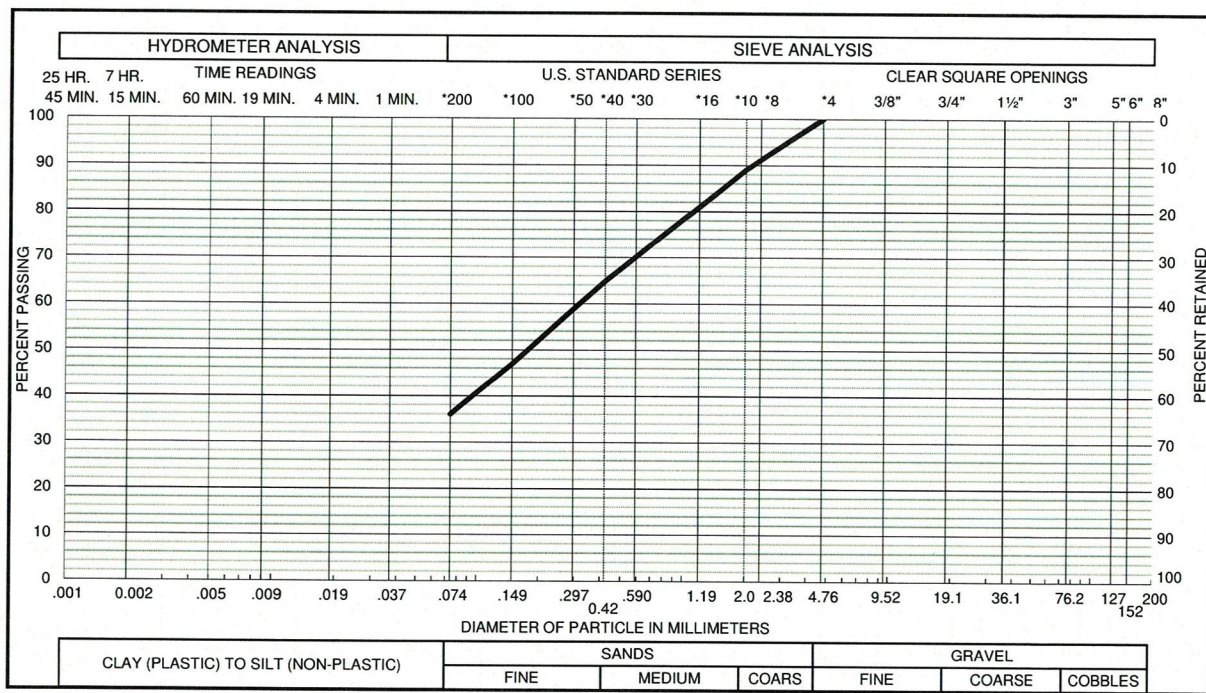
GRAVEL 19 % SAND 78 %
SILT & CLAY 3 % LIQUID LIMIT %
PLASTICITY INDEX %



Sample of SAND, SLT. SILTY, GRAVELLY (SP-SM)
From TH - 4 AT 14 FEET

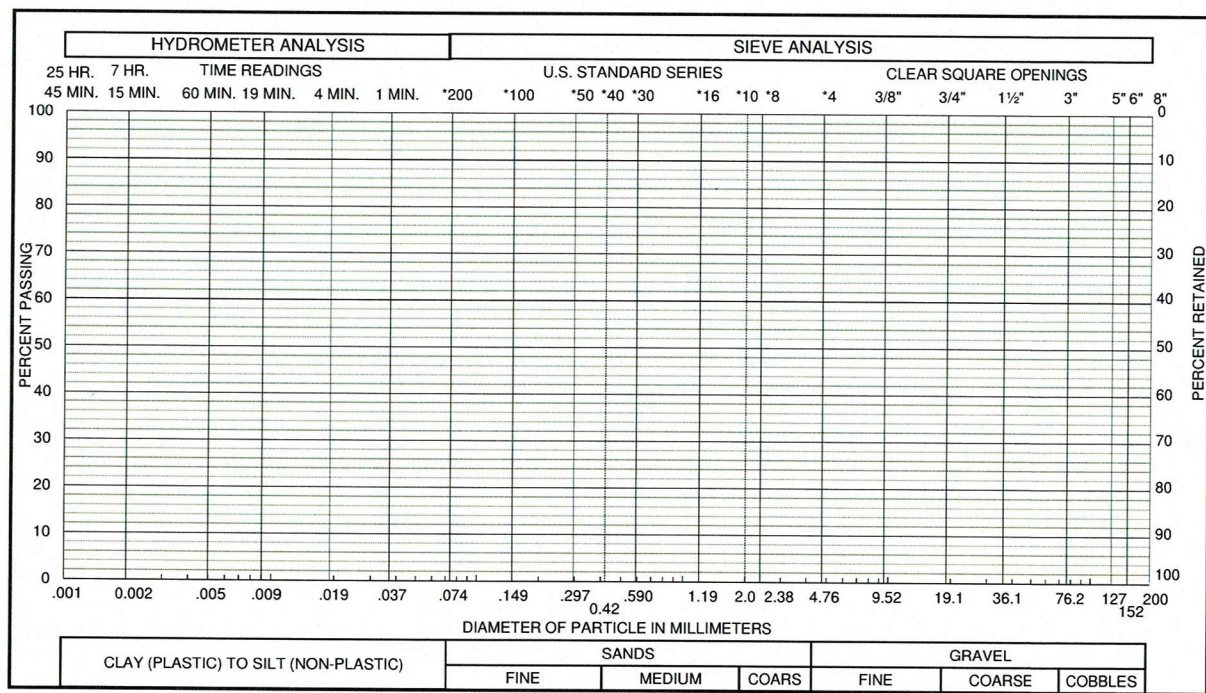
GRAVEL 13 % SAND 77 %
SILT & CLAY 10 % LIQUID LIMIT %
PLASTICITY INDEX %





Sample of **SAND, VERY SILTY (SM)**
From **S - 2 AT 0-4 FEET**

CLAY (PLASTIC) TO SILT (NON-PLASTIC)			SANDS			GRAVEL		
	FINE	MEDIUM	COARS	FINE	COARSE	COBBLES		
GRAVEL				0 %				
SILT & CLAY	36 %							
PLASTICITY INDEX								



Sample of _____
From _____

CLAY (PLASTIC) TO SILT (NON-PLASTIC)			SANDS			GRAVEL		
	FINE	MEDIUM	COARS	FINE	COARSE	COBBLES		
GRAVEL				%				
SILT & CLAY				%				
PLASTICITY INDEX								

SUMMARY OF LABORATORY TESTING
CTL/T PROJECT NO. CS18748-125

[illegible]

* SWELL MEASURED WITH ESTIMATED IN-SITU OVERBURDEN PRESSURE.
NEGATIVE VALUE INDICATES COMPRESSION.