AGEC

Applied GeoTech

GEOTECHNICAL INVESTIGATION

TOOELE TENTH AND MAIN DEVELOPMENT

1000 NORTH SR-36

TOOELE, UTAH

PREPARED FOR:

INTERLINE GROUP, LLC
TALLY THREE, LLC
MRI INVESTMENT, LLC
1030 SALT LAKE CITY, LLC
TOOELE 1000, LLC

C\O
KIMBALL INVESTMENT COMPANY
1000 SOUTH MAIN, SUITE 104
SALT LAKE CITY, UTAH 84101

ATTENTION: VICTOR KIMBALL

PROJECT NO. 1180597 **MARCH 4, 2019**

600 West Sandy Parkway • Sandy, Utah 84070 • (801) 566-6399 • FAX (801) 566-6493

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EXECUTIVE SUMMARY

1. The subsurface soils encountered at the site consist of fill to the following depths:

Test Pit	Fill Depth (feet)
TP-1	6½
TP-1A	7
TP-2	9½
TP-2A	11½
TP-3	11
TP-3A	* **18½**
TP-4	* **17½**
TP-4A	10
TP-5	* **4**
TP-5A	1½
TP-6	* **3½**
TP-6A	9½
TP-7A	3
TP-8	* **8**
TP-12	13½
TP-13	2

* indicates fill contains debris

Fill was not encountered in Test Pits TP-7, TP-9, TP-10, TP-11, TP-14 and TP-15, but approximately ½ foot of topsoil overlying the natural soil was encountered in these test pits.

Sand and gravel were encountered below the fill or topsoil and to the maximum depth investigated in Test Pits TP-1, TP-3A, TP-4, TP-4A, TP-5, TP-7, TP-10, TP-12, TP-13 and TP-14. Clay and gravel layers were generally encountered in the other test pits.

2. No subsurface water was encountered in the test pits at the time of excavation to the maximum depth investigated, approximately 21 feet.

3. Fill was encountered in most of the test pits to depths ranging from approximately 1½ to 18½ feet. There are piles of fill and debris at the site. The fill appears to be relatively loose and erratic in density. The fill encountered in Test Pits TP-3A, TP-4, TP-5, TP-6 and the upper 3½ feet of the fill in TP-8 contains significant debris. Unsuitable fill, topsoil, organics, debris and other deleterious materials should be removed from below areas of buildings, pavement and other improvements that would be sensitive to differential settlement. Additional study may be considered to better define the extent and condition of fill at the site.

4. Due to the presence of fill at the site, it will be important to have an engineer from AGEC observe the base of footing excavations prior to placing structural fill or concrete and to observe subgrade areas prior to placing site grading fill. Site specific geotechnical studies may be considered to better define conditions for a particular structure.

5. The proposed structures may be supported on spread footings bearing on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil. Spread footings bearing on the undisturbed natural soil or on compacted structural fill may be designed using an allowable net bearing pressure of 1,500 pounds per square foot. Spread footings bearing on at least 2 feet of the undisturbed natural gravel or on at least 2 feet of compacted structural fill may be designed using an allowable net bearing pressure of 2,500 pounds per square foot.

6. The near-surface soil in portions of the site consists of clay. Construction equipment access difficulties can be expected where the upper soil is clay and has a high moisture content such as following periods of precipitation, snow melt or irrigation or where excavations extend down to very moist soil. Placement of approximately 1 to 2 feet of granular fill may be needed to provide equipment access and to facilitate construction of pavement when the upper soil consists of very moist to wet clay.

7. Geotechnical information related to foundations, subgrade preparation, pavement design and materials is included in the report.

SCOPE

This report presents the results of a geotechnical investigation for the proposed Tooele Tenth and Main development to be located at 1000 North SR-36 in Tooele, Utah. The report presents the subsurface conditions encountered, laboratory test results and recommendations for foundations and pavement. A geotechnical study was previously conducted for Tooele City Economic Development and our findings were presented in a report dated June 19, 2017 under Project No. 1170357. The information from the previous study is incorporated into this report. Additional exploration and testing was performed for this study and our services are provided in general accordance with our proposal dated August 10, 2018.

Field exploration was conducted to obtain information on the subsurface conditions. Information obtained from the field investigation was used to define conditions at the site for our engineering analysis and to develop recommendations for the proposed foundations and pavement.

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

SITE CONDITIONS

The site generally consisted of vacant land at the time of our field studies in both 2017 and 2018. An asphalt-paved driveway extends onto the northeast end of the property from Main Street to a chainlink-fenced area that was previously used by a trucking company on the north center of the property. There is a paved area in the central portion of the site that is in poor condition. The concrete and asphalt-pavement has been overgrown with vegetation.

This area was previously occupied by three buildings and a fueling area. The buildings have been removed but the concrete floor slabs and foundations remain.

The south end of the property is occupied by a vacated trailer park with a center asphalt-paved road and concrete pads. Utility pedestals and piping presumably for sewage remain in the pads.

A small amount of debris was near the southwest corner including a tire, broken asphalt and loose trash. On the east center is an area approximately 120 by 120 feet with fill that has been end dumped into piles 3 to 4 feet high. The fill is covered with grass.

The south and east portions of the property are relatively flat with a gentle slope down to the northwest.

The northwest portion of the site appears to have been used as a sand and gravel pit. This area is on the order of 20 feet lower than the rest of the property. The area is uneven with large grass-covered piles of fill. Debris in this area included a large pile of tires, partially buried and unburied broken concrete and a pile of brush and concrete. Scattered loose trash, debris and broken asphalt was observed is the northwest end of the property. There is a ditch south of 1000 North Street.

The site is bordered on the east by SR-36 and there are commercial buildings to the east of SR-36. There is a restaurant on the west side of SR-36 in the northern portion of the area. The site is bordered by 1000 North Street on the north. There are generally vacant fields to the north. There is a commercial building to the north of 1000 North Street in the eastern portion of the area. To the south is a mobile home park and commercial buildings on the east side. The site is bordered on the west by 200 West Street and residential development to the west.

FIELD STUDY

Test Pits TP-1 through TP-15 were excavated on May 22 and 23, 2017 with a rubber-tired backhoe. Test Pits TP-1A through TP-7A were excavated on August 24 and 27, 2018 with a trackhoe. The test pits were excavated at the approximate locations indicated on Figure 1. The test pits were logged and soil samples obtained by an engineer from AGEC. Logs of the subsurface conditions encountered in the test pits are graphically shown on Figures 2 through 5 with legend and notes on Figure 6.

The test pits were backfilled without significant compaction. The backfill in the test pits should be properly compacted where it will support proposed buildings, floor slabs, pavement or other improvements.

SUBSURFACE CONDITIONS

The subsurface soils encountered at the site consist of fill to the following depths:

Test Pit	Fill Depth (feet)
TP-1	6½
TP-1A	7
TP-2	9½
TP-2A	11½
TP-3	11
TP-3A	* **18½**
TP-4	* **17½**
TP-4A	10
TP-5	* **4**
TP-5A	1½

Test Pit	Fill Depth (feet)
TP-6	* 3½
TP-6A	9½
TP-7A	3
TP-8	* 8
TP-12	13½
TP-13	2

* indicates fill contains debris

Fill was not encountered in Test Pits TP-7, TP-9, TP-10, TP-11, TP-14 and TP-15, but approximately ½ foot of topsoil overlying the natural soil was encountered in these test pits.

Sand and gravel were encountered below the fill or topsoil and to the maximum depth investigated in Test Pits TP-1, TP-3A, TP-4, TP-4A, TP-5, TP-7, TP-10, TP-12, TP-13 and TP-14. Clay and gravel layers were generally encountered in the other test pits.

A description of the various soils encountered in the test pits follows:

Fill - The fill consists of silty sand with gravel to clayey gravel with sand. The fill contains cobbles up to approximately 1 foot in size. The fill is slightly moist to very moist and brown. The fill in Test Pits TP-3A, TP-4, TP-5, TP-6 and TP-8 contains debris that includes metal, brick, wood, concrete, asphalt, plastic, rubber and glass.

Laboratory tests conducted on a sample of the fill indicate a moisture content of 4 percent. The results of a gradation test conducted on a sample of the fill are presented on Figure 7.

Topsoil - The topsoil consists of silty sand. The topsoil is moist, brown and contains roots.

Lean Clay - The clay contains small to moderate amounts of sand. The clay is slightly porous. The clay is medium stiff to stiff, slightly moist to very moist and brown to grayish brown.

Laboratory tests conducted on samples of the clay indicate natural moisture contents range from 15 to 27 percent and natural dry densities range from 75 to 98 pounds per cubic foot (pcf).

Consolidation tests conducted on samples of the clay generally indicate that the soil will compress a small to moderate amount with the addition of light to moderate loads. Results of a consolidation test from Test Pit TP-3 at a depth of 14 feet indicate that the soil collapses and becomes more compressible when wetted. However, additional testing of the porous soil in Test Pits TP-2A and TP-7A suggest that the soil does not appear to be significantly moistue-sensitive. It appears that the collapse observed is likely due mostly to sample disturbance. Results of the consolidation tests are presented on Figures 8 through 16.

Silty Sand - The silty sand contains occasional gravel. It is medium dense, moist and brown.

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

Laboratory tests conducted on a sample of the sand indicate a natural moisture content of 6 percent and a natural dry density of 91 pcf.

Clayey Gravel with Sand - The gravel contains cobbles up to approximately ½ foot in size. The gravel is medium dense to dense, slightly moist to very moist and brown to grayish brown.

Poorly-graded Gravel with Silt and Sand - The gravel contains cobbles up to approximately 1 foot in size and occasional boulders up to approximately 1½ feet in size. The gravel is dense, slightly cemented in Test Pits TP-6A, TP-13, TP-14 and TP-15. It is slightly moist to moist and brown to grayish brown.

The results of laboratory tests conducted on a sample of the gravel indicate a natural moisture content of 4 percent. The results of a gradation test conducted on a sample of the gravel are presented on Figure 7.

Results of the laboratory tests are summarized on Table I and are included on the logs of the test pits.

SUBSURFACE WATER

No subsurface water was encountered in the test pits at the time of excavating to the maximum depth investigated, approximately 21 feet.

PROPOSED CONSTRUCTION

We understand that the site encompasses approximately 33 acres that will be developed for residential construction in the western portion of the site and retail development in the eastern portion of the site. We anticipate that residential structures will consist of one to three-story, wood-frame structures with basements. We anticipate that the commercial

buildings will consist of one to two-story wood, steel frame or masonry structures with slab-on-grade floors.

We have assumed building loads consisting of wall loads up to 5 kips per lineal foot and column loads up to 100 kips.

We anticipate that paved parking areas and access roads will be constructed at the site. We have assumed the following three traffic conditions for proposed pavement areas.

Traffic Condition	Garbage Trucks	Delivery Trucks	Semis
1	2/week	1/day	—
2	1/day	5/day	1/day
3	5/day	25/day	5/day

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

RECOMMENDATIONS

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

A. Site Grading

Grading plans were not provided for our review. We anticipate that there will be moderate amounts of cut and fill for the proposed development. AGEC should be requested to review

grading plans and provide additional recommendations if needed for the proposed site grading.

1. Existing Fill

Fill was encountered in most of the test pits to depths ranging from approximately 1½ to 18½ feet. There are piles of fill and debris at the site.

The fill appears to be relatively loose and erratic in density. The fill encountered in Test Pits TP-3A, TP-4, TP-5, TP-6 and the upper 3½ feet of the fill in TP-8 contains significant debris. Unsuitable fill, topsoil, organics, debris and other deleterious materials should be removed from below areas of buildings, pavement and other improvements that would be sensitive to differential settlement. Additional study may be considered to better define the extent and condition of fill at the site.

2. Subgrade Preparation

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

Following the removal of unsuitable materials, the subgrade in proposed pavement areas should be proof-rolled to identify soft areas. Soft areas should be removed and replaced with granular borrow having less than 15 percent passing the No. 200 sieve and comprised mostly of gravel.

The near-surface soil in portions of the site consists of clay. Construction equipment access difficulties can be expected where the upper soil is clay and has a high moisture content such as following periods of precipitation, snow melt or irrigation or where excavations extend to very moist soil. Placement of approximately 1 to 2 feet of granular fill consisting of gravel containing less than 15 percent passing the No. 200 sieve may be needed to provide

equipment access and to facilitate construction of pavement when the upper soil consists of very moist to wet clay.

3. 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 re-vegetation or other methods. Surface runoff should be directed away from the face of cut and fill slopes.

4. Excavation

Excavation at the site can be accomplished with typical excavation equipment.

Temporary excavation slopes may be constructed at approximately 1½ horizontal to 1 vertical or flatter.

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
Foundations	≥ 95%
Concrete Flatwork	≥ 90%
Pavement	
Base Course	≥ 95%
Fill Placed Below Base Course	≥ 90%
Landscaping	≥ 85%
Retaining Wall Backfill	85 - 90%

To facilitate the compaction process, fill should be compacted at a moisture content within 2 percent of the optimum moisture content.

Fill and pavement materials should be frequently tested during construction for compaction.

6. Materials

Material placed as fill to support foundations should be non-expansive granular soil.

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 clay is not recommended for use as structural fill but may be considered for use as site grading fill outside of building areas or as utility trench or wall backfill, if topsoil, organics and other deleterious materials are removed or it may be used in landscaping areas.

The natural sand and gravel and existing fill consisting of sand and gravel, may be considered for use as structural fill if they meet the recommendations given

above for imported structural fill and if topsoil, organics, debris, oversized particles and other deleterious materials are removed. The existing fill and natural sand and gravel may also be considered for use as site-grading fill or utility trench or wall backfill if topsoil, organics, debris, oversized particles and other deleterious material are removed.

The on-site soil may require moisture conditioning (wetting or drying) prior to use as fill. Drying of the soil may not be practical during cold or wet periods of the year.

7. Drainage

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

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

B. Foundations

1. Bearing Material

With the proposed construction and the subsurface conditions encountered, the buildings may be supported on spread footings bearing on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil. Structural fill should extend out away from the edge of the footings at least a distance equal to the depth of fill placed beneath footings.

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

2. Bearing Pressures

Spread footings bearing on the undisturbed natural soil or on compacted structural fill may be designed using an allowable net bearing pressure of 1,500 pounds per square foot (psf). Spread footings bearing on at least 2 feet of compacted structural fill or on at least 2 feet of the undisturbed natural gravel may be designed using an allowable net bearing pressure of 2,500 psf.

Footings should have a width of at least 18 inches and a depth of embedment of at least 10 inches.

3. Temporary Loading Conditions

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

4. Settlement

Based on the subsurface conditions encountered and the assumed building loads, we estimate that settlement will be less than 1 inch for foundations designed as indicated above. Differential settlement is estimated to be less than ¾ of an inch.

Care will be required to not disturb the natural soil at the base of foundation excavations to maintain settlement within tolerable limits.

5. Frost Depth

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

6. Foundation Base

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

7. Construction Observation

A representative of the geotechnical engineer should observe footing excavations prior to structural fill or concrete placement. Due to the potential for unsuitable fill, it will be important to have an engineer from AGEC observe the base of footing excavations.

C. Concrete Slab-on-Grade

1. Slab Support

Concrete slabs may be supported on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil. Unsuitable fill, topsoil, organics, debris and other deleterious materials should be removed from below proposed slab areas.

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 below the concrete floor 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.

D. Lateral Earth Pressures

1. Lateral Resistance for Footings

Lateral resistance for spread footings placed on the natural soil or on compacted structural fill is controlled by sliding resistance between the footing and the foundation soils. A friction value of 0.35 may be used in design for

ultimate lateral resistance between footings and the natural clay. A friction value of 0.45 may be used between footings and the natural sand and gravel or structural fill.

2. Subgrade Walls and Retaining Structures

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 values listed below 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

3. Seismic Conditions

Under seismic conditions, the equivalent fluid weight should be increased by 22 pcf for the active condition, increased by 7 pcf for the at-rest condition, and decreased by 22 pcf for the passive condition. This assumes a peak horizontal ground acceleration of 0.31g for a 2 percent probability of exceedance in a 50-year period (IBC 2015).

4. Safety Factors

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

E. Liquefaction, Faulting and Seismicity

1. Liquefaction

The site is located within an area mapped as having a "very low" susceptibility to liquefaction (Black, 1995). Subsurface soils most susceptible to liquefaction are relatively loose, clean sands below the subsurface water level. The liquefaction potential for soil decreases with an increase in fines content and density. The subsurface conditions encountered to the depth investigated are consistent with a “very low” liquefaction susceptibility.

A site-specific evaluation of the liquefaction would require investigation to greater depth using methods suitable to evaluate the liquefaction potential of the subsurface soil. A site specific evaluation of the liquefaction potential is beyond the scope of this report.

2. Faulting

There are no mapped active faults extending through the site. The closest mapped fault considered active is the Oquirrh fault zone, located approximately 2.8 miles southeast of the site (Utah Geological Survey, 2018).

3. Seismicity

Listed below is a summary of the site parameters for the 2015 International Building Code:

a.	Site Class	D
b.	Short Period Spectral Response Acceleration, S_S	0.80g
c.	One Second Period Spectral Response Acceleration, S_1	0.28g

F. Subsurface Drains

The natural soils generally consist of clay and/or gravel with some of the gravel containing clay. Foundation drains are generally recommended for buildings with floors extending below grade. There may be areas where materials with good drainage properties are encountered and drains would not be needed. A representative of AGEC may observe conditions in the excavations and provide consultation during construction relative to the need for foundation drains. Foundation drains should include at least the following items:

1. The underdrain system should consist of a perforated pipe installed in a gravel filled trench around the perimeter of the below grade floor portion of the building.

2. The flow line of the pipe should be placed at least 14 inches below the finish floor level and should slope to a sump or outlet where water can be removed by pumping or by gravity flow.

3. If placing the gravel or drain pipe requires excavation below the bearing level of the footing, the excavation for the drain pipe and gravel should have a slope no steeper than 1 horizontal to 1 vertical away from the edge of the footing to avoid disturbance of the soil below the footing.
4. A filter fabric should be placed between the natural soil and the drain gravel. This will help reduce the potential for fine grained materials filling in the void spaces of the gravel.

5. The subgrade floor slab should have at least 6 inches of free draining gravel placed below it and the underslab gravel should connect to the perimeter drain.

6. Consideration should be given to installing cleanouts to allow access into the perimeter drain should cleaning of the pipe be required in the future.

G. Water Soluble Sulfates

One sample of the natural soil was tested in the laboratory for water soluble sulfate content. Test results indicate that there is less that 0.1 percent water soluble sulfate in the soil. Based on the test results and published literature, the natural soil possesses a negligible sulfate attack potential for concrete. No special cement type is required for concrete placed in contact with the soil. Other conditions may dictate the type of cement to be used in concrete for the project.

H. Pavement

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

1. Subgrade Support

   We anticipate that the subgrade material will consist of clay, sand or gravel. We have assumed a California Bearing Ratio (CBR) value of 3 percent for the clay.

2. Pavement Thickness

   Based on the subsoil conditions, assumed traffic conditions, a design life of 20 years for flexible and 30 years for rigid pavement and methods presented by AASHTO, the following pavement sections are calculated:

	Rigid Pavement	Flexible Pavement		
Traffic Condition*	Portland Cement Concrete	Asphaltic Concrete	Base Course	Granular Borrow
1	5"	—	—	—
	—	3"	6"	—
2	5"	3"	10"	—
	—	3"	6"	6"
3	6"	—	—	—
	—	4"	12"	—
	—	4"	6"	8"

* Assumed traffic is described in the Proposed Construction section of the report.

When the subgrade consists of clay and is very moist to wet, granular borrow may be needed to provide equipment access and facilitate pavement construction as discussed in the Subgrade Preparation section of the report.

Granular borrow may be eliminated where the subgrade consists of the natural gravel or compacted granular fill with a thickness equal or greater than the thickness of granular borrow indicated in the table above.

3. Pavement Materials and Construction

a. Flexible Pavement (Asphaltic Concrete)

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

b. Rigid Pavement (Portland Cement Concrete)

The rigid pavement thickness assumes that the pavement will have aggregate interlock joints and that a concrete shoulder or curb will be provided.

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

4. Jointing

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

I. Pre-Construction Meeting

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

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 test pits excavated at the approximate locations indicated on Figure 1 and the results of laboratory testing. Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted. If the subsurface conditions or groundwater level is found to be significantly different from what is described above, we should be notified to reevaluate our recommendations.

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

Jay R. McQuivey, P.E.

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

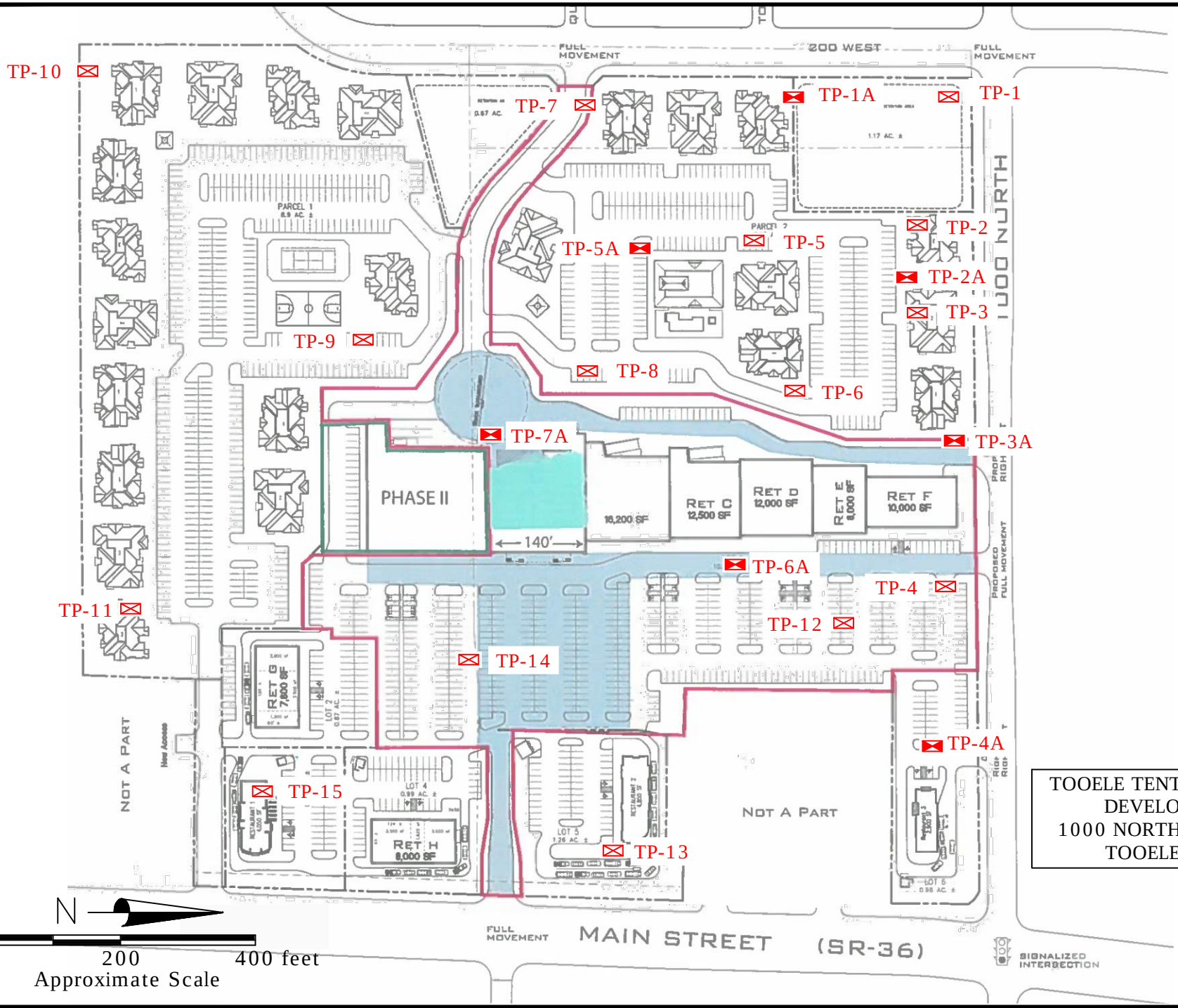
JRM/bw

REFERENCES

Black, Bill D. 1995; Liquefaction Susceptibility, Tooele quadrangle, Tooele County, Utah; Utah Geological Survey Open-file Report 318 Plate 2H.

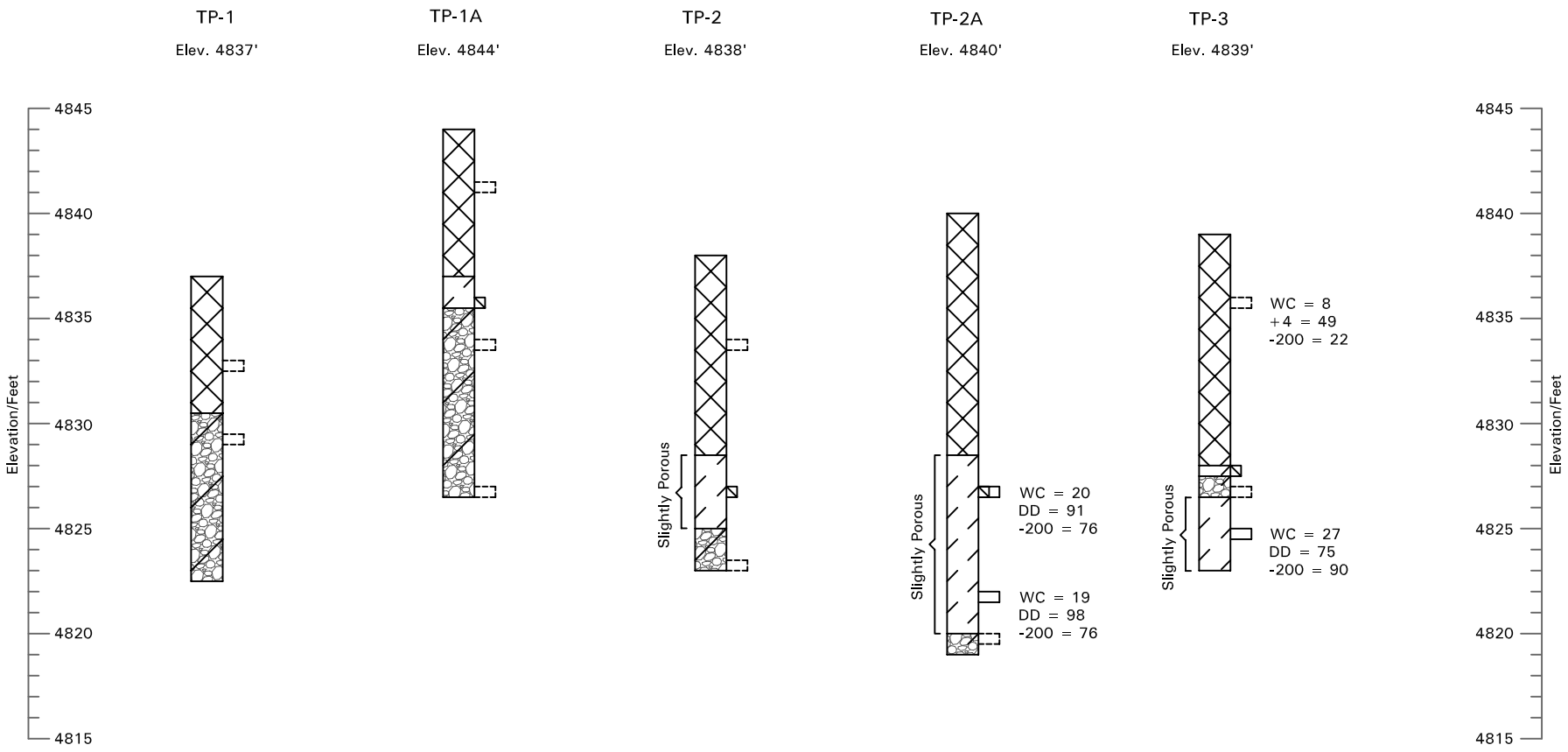
International Building Code, 2015; International Code Council, Inc., Falls Church, Virginia.

Utah Geological Survey, 2018; Utah Quaternary Fault and Fold Database, http://geology.utah.gov/resources/data-databases/qfaults/ Accessed January 4, 2018.



TOOELE TENTH AND MAIN
DEVELOPMENT
1000 NORTH AND SR 36
TOOELE, UTAH

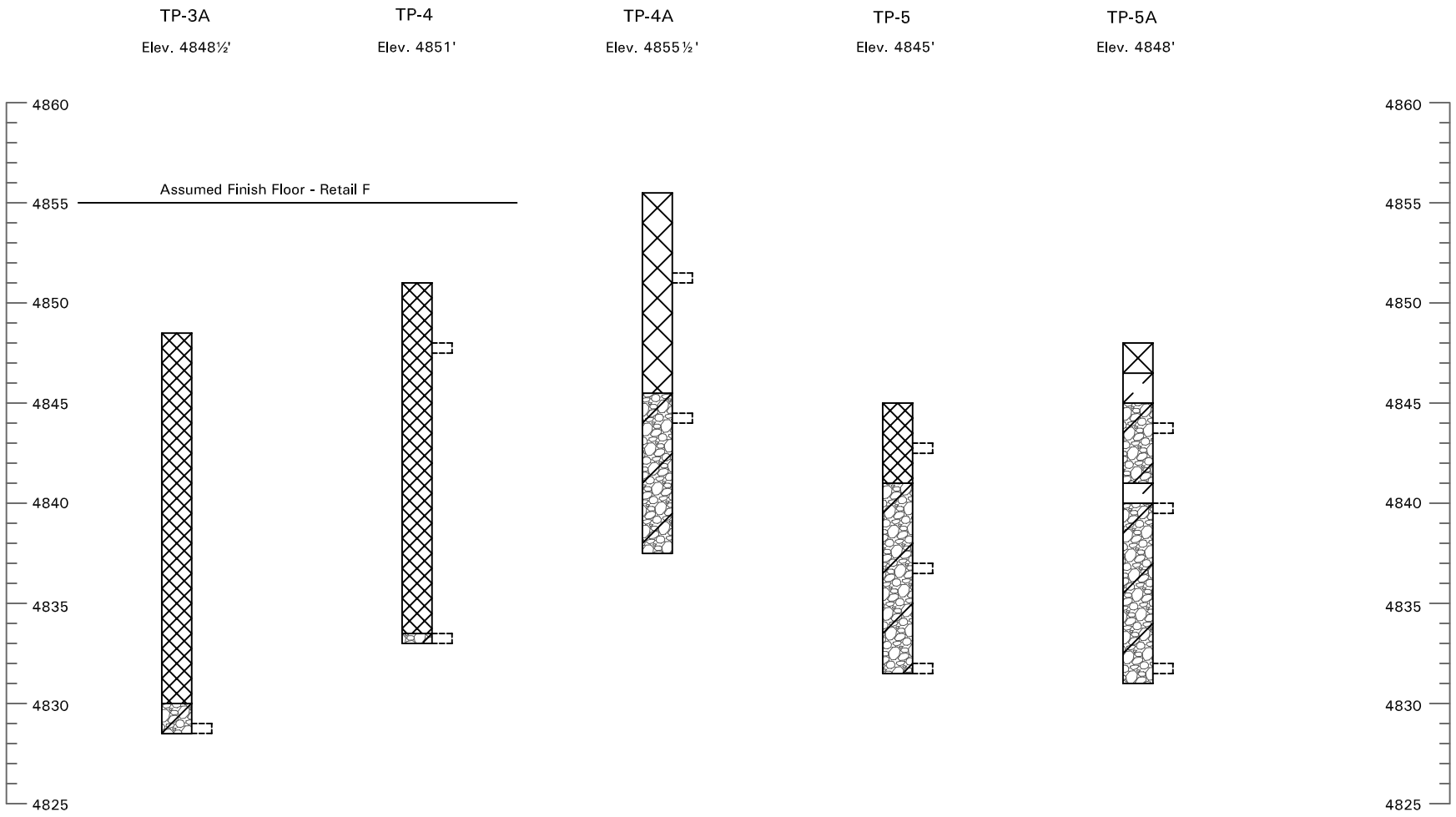
1180597	AGEC	Test Pit Locations	Figure 1



Approximate Vertical Scale 1" = 8'

See Figure 6 for Legend and Notes

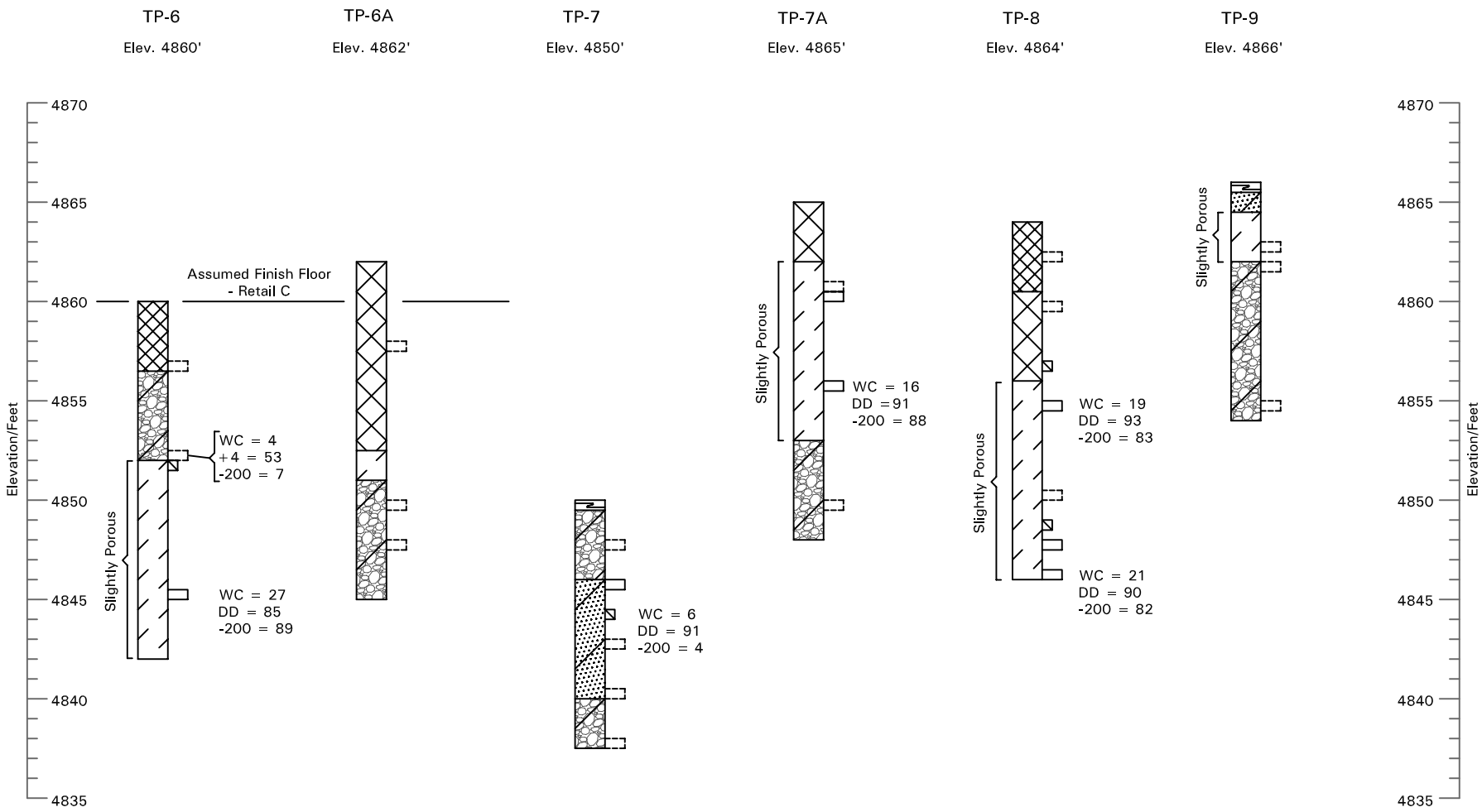
1180597	AGEC	Test Pit Logs	Figure 2



Approximate Vertical Scale 1" = 8'

See Figure 6 for Legend and Notes

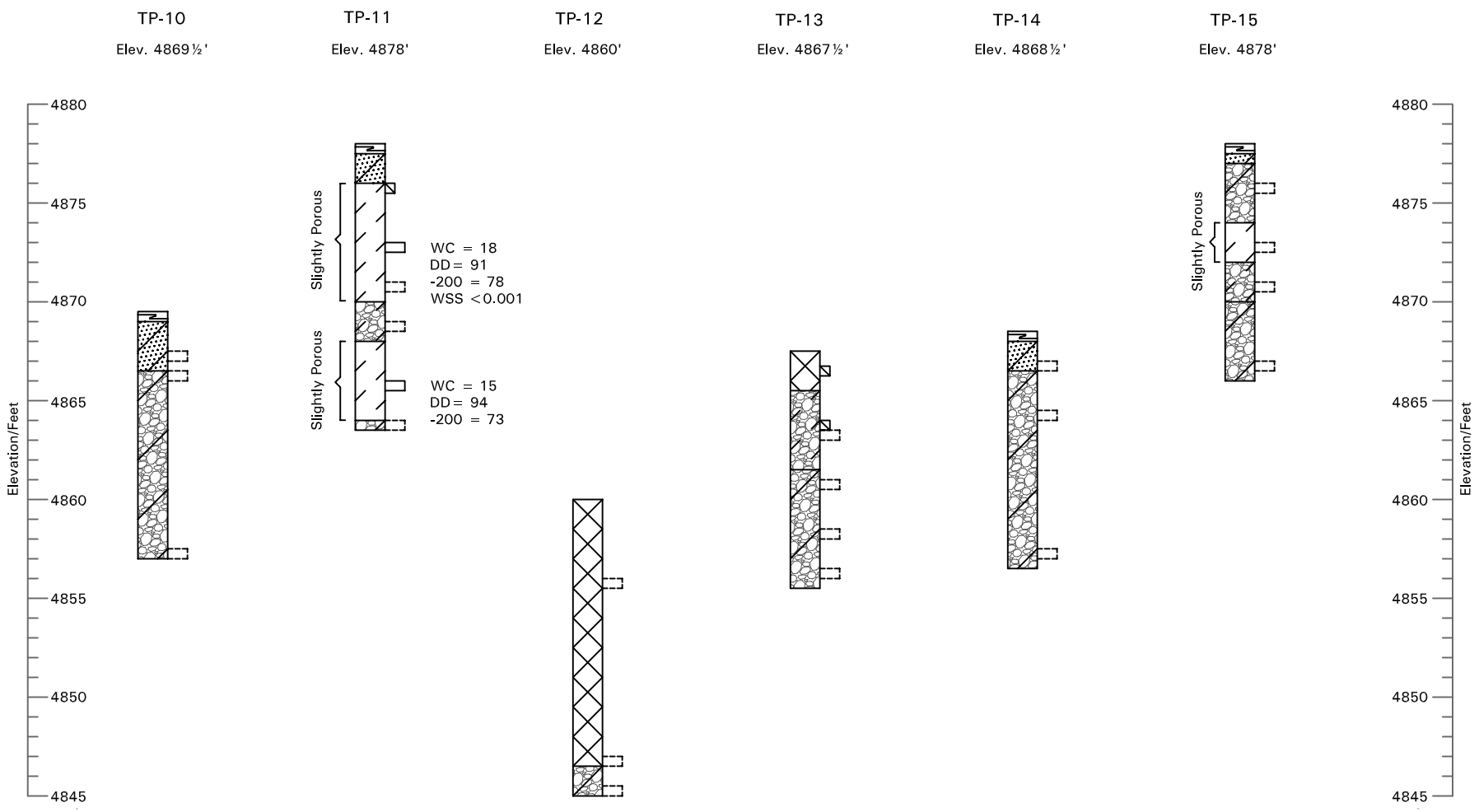
1180597	AGEC	Test Pit Logs	Figure 3



Approximate Vertical Scale 1" = 8'

See Figure 6 for Legend and Notes

1180597	AGEC	Test Pit Logs	Figure 4



Approximate Vertical Scale 1" = 8'

See Figure 6 for Legend and Notes

1180597	AGEC	Test Pit Logs	Figure 5

LEGEND:

Fill; silty sand with gravel to clayey gravel with sand, cobbles up to approximately 1 foot in size, slightly moist to moist, brown, metal, brick, wood, concrete, asphalt, plastic, rubber, glass and other debris.

Fill; silty sand with gravel to clayey gravel with sand, cobbles up to approximately 1 foot in size, moist to very moist, brown.

Topsoil; silty sand, moist, brown, roots.

Lean Clay (CL); small to moderate amounts of sand, medium stiff to stiff, slightly moist to very moist, brown to grayish brown, slightly porous.

Silty Sand (SM); occasional gravel, medium dense, moist, brown.

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

Clayey Gravel with Sand (GC); cobbles up to approximately ½ foot in size, medium dense to dense, slightly moist to very moist, brown to grayish brown.

Poorly-graded Gravel with Silt and Sand (GP-GM); cobbles, occasional boulders up to approximately 1½ feet in size, dense, slightly cemented in TP-6A, TP-13, TP-14 and TP-15, slightly moist to moist, brown to grayish brown.

Indicates relatively undisturbed hand drive sample taken.

Indicates disturbed sample taken.

Indicates relatively undisturbed block sample taken.

NOTES:

1. Test Pits TP-1 through TP-15 were excavated on May 22 and 23, 2017 with a rubber-tired backhoe. Test Pits TP-1A through TP-7A were excavated on August 24 and 27, 2018 with a trackhoe.

2. Locations of the test pits were measured approximately by pacing from features shown on Figure 1.

3. Elevations of the test pits were determined by interpolating between contours shown on the site survey provided.

4. The test pit locations and elevations should be considered accurate only to the degree implied by the method used.

5. The lines between materials shown on the logs represent the approximate boundaries between material types and the transitions may be gradual.

6. No free water was encountered in the test pits at the time of excavation.

7. WC = Water Content (%);
   DD = Dry Density (pcf);
   +4 = Percent Retained on the No. 4 Sieve;
   -200 = Percent Passing the No. 200 Sieve;
   WSS = Water Soluble Sulfates (%).

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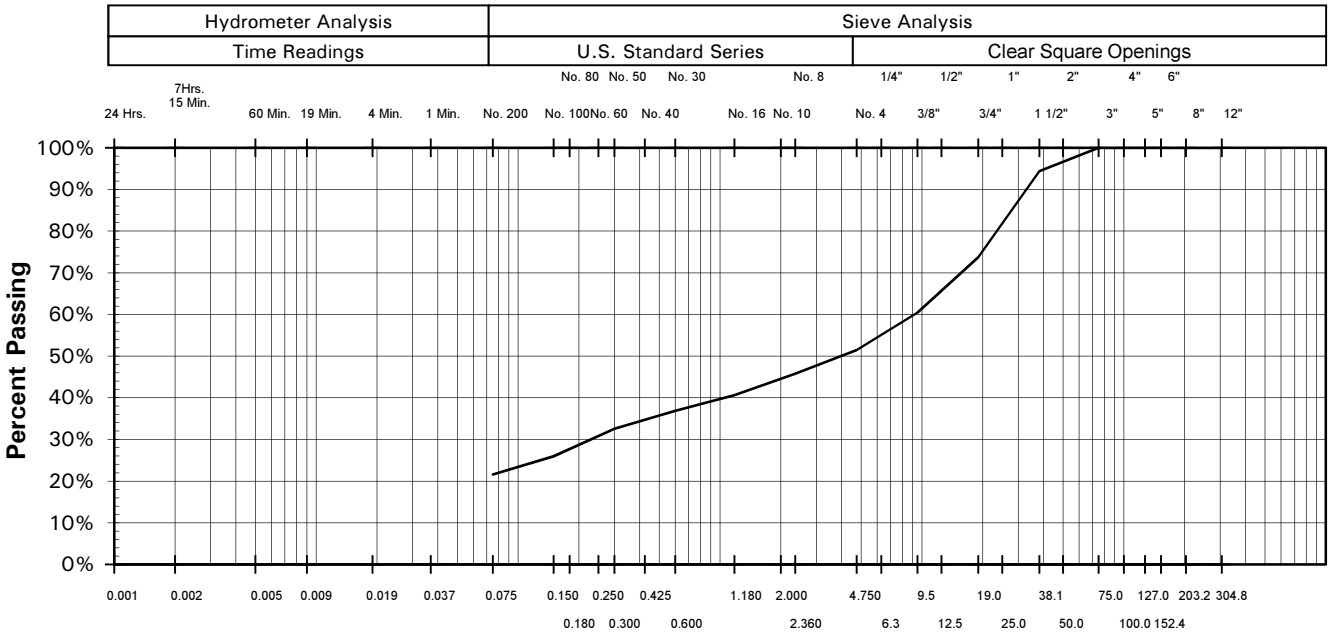
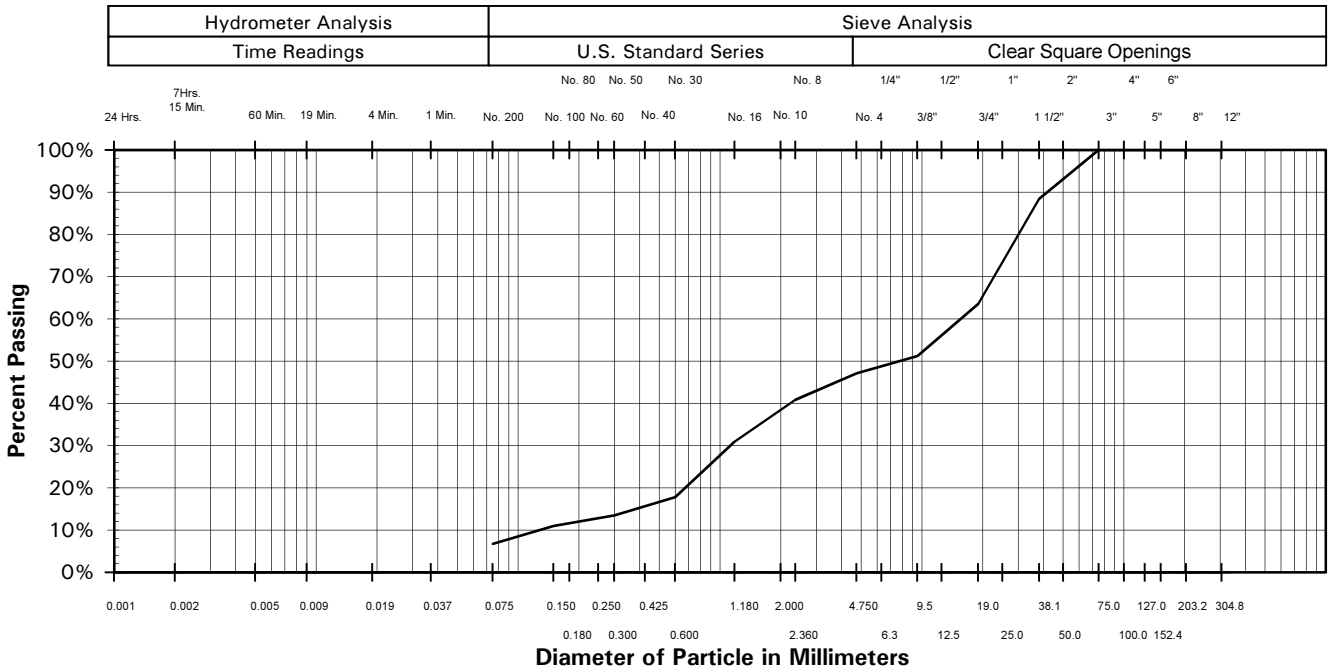


Clay to Silt	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

Gravel	49%	Liquid Limit	-
Sand	29%	Plasticity Index	-
Silt and Clay	22%	Sample Location	TP-3 @ 3'
Sample Description	Fill, Silty Gravel with Sand		



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

Gravel	53%	Liquid Limit	-
Sand	40%	Plasticity Index	-
Silt and Clay	7%	Sample Location	TP-6 @ 7.5'
Sample Description	Poorly Graded Gravel with Silt and Sand		

Project No. 1180597 **GRADATION TEST RESULTS** Figure 7

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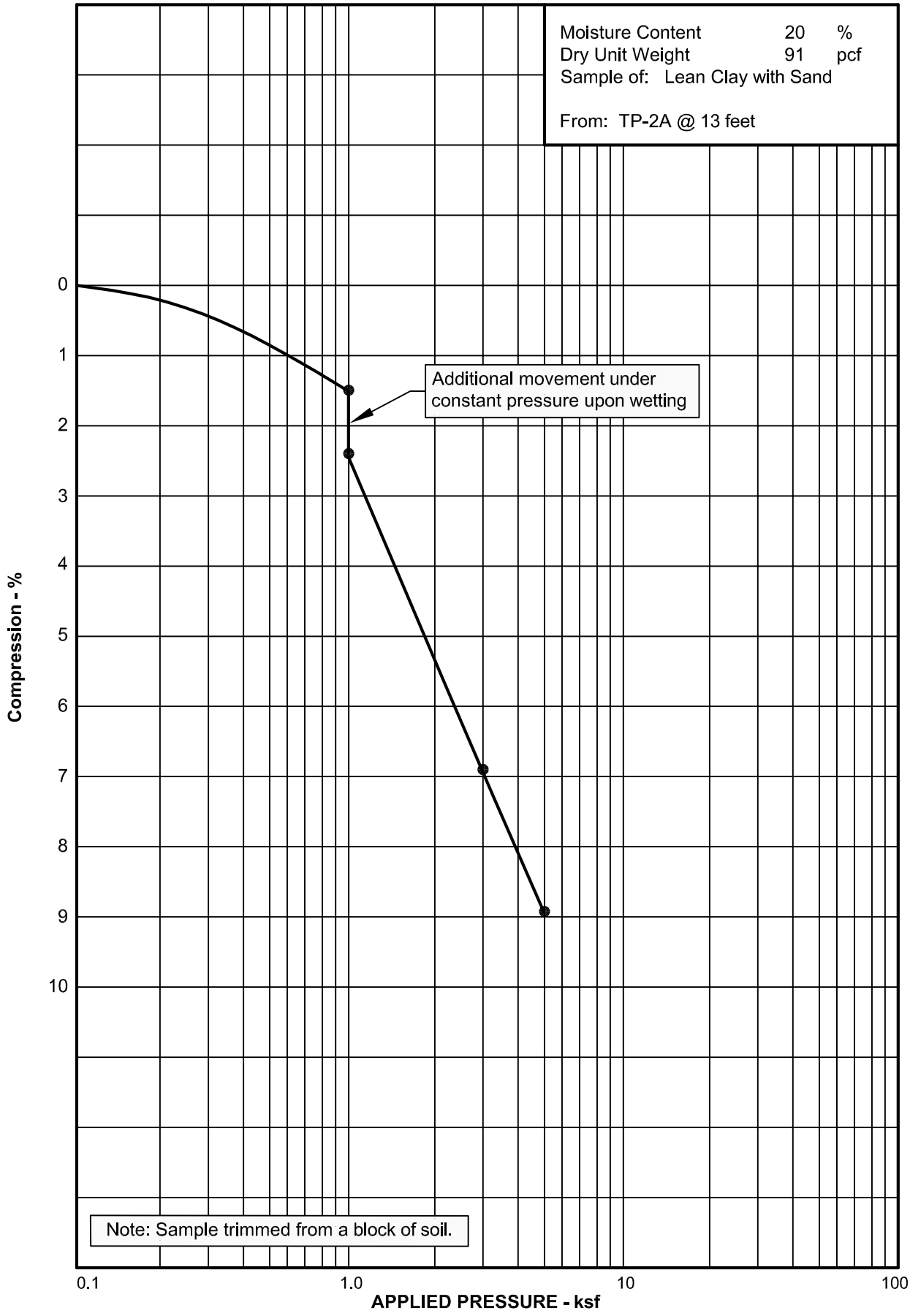
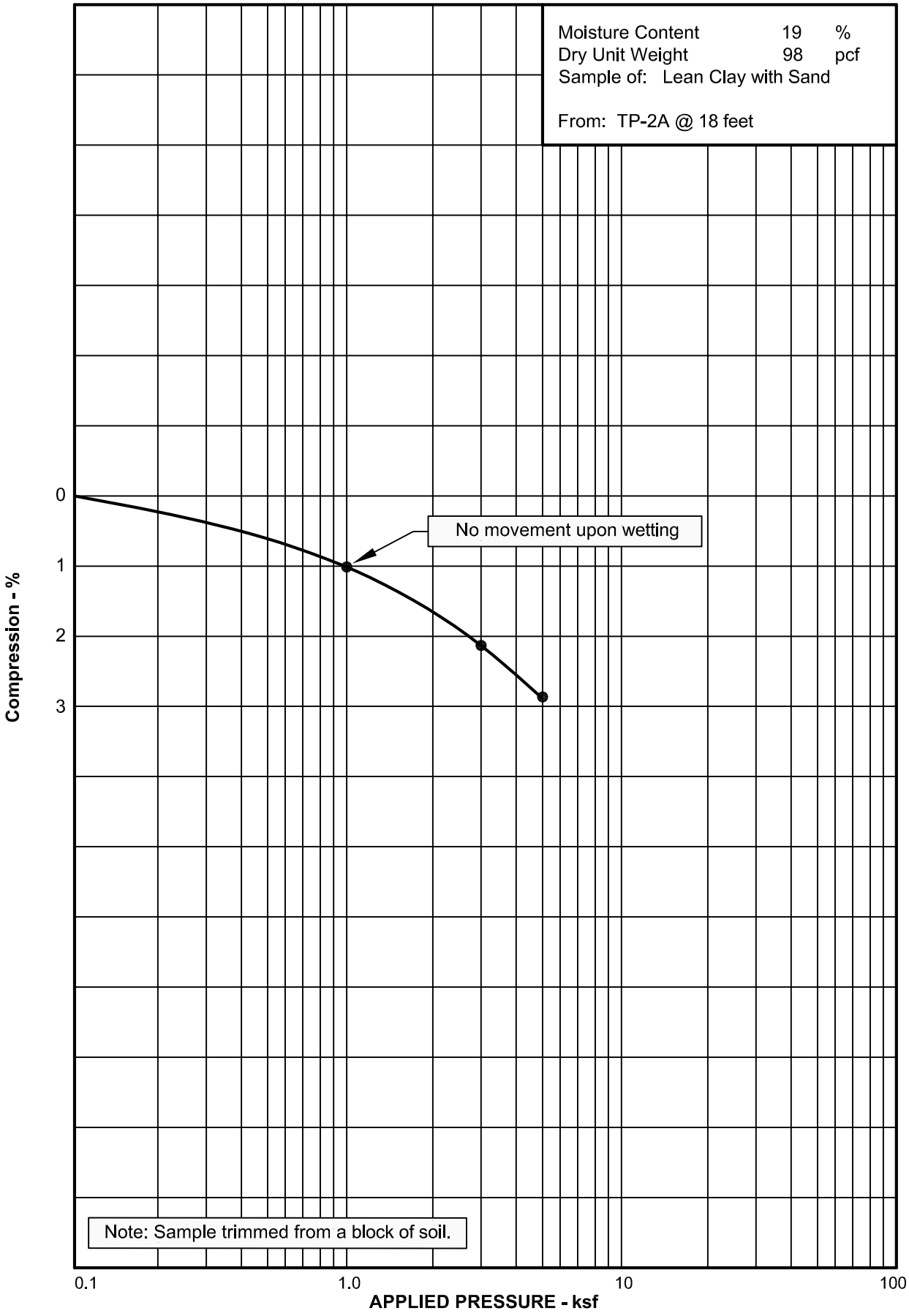


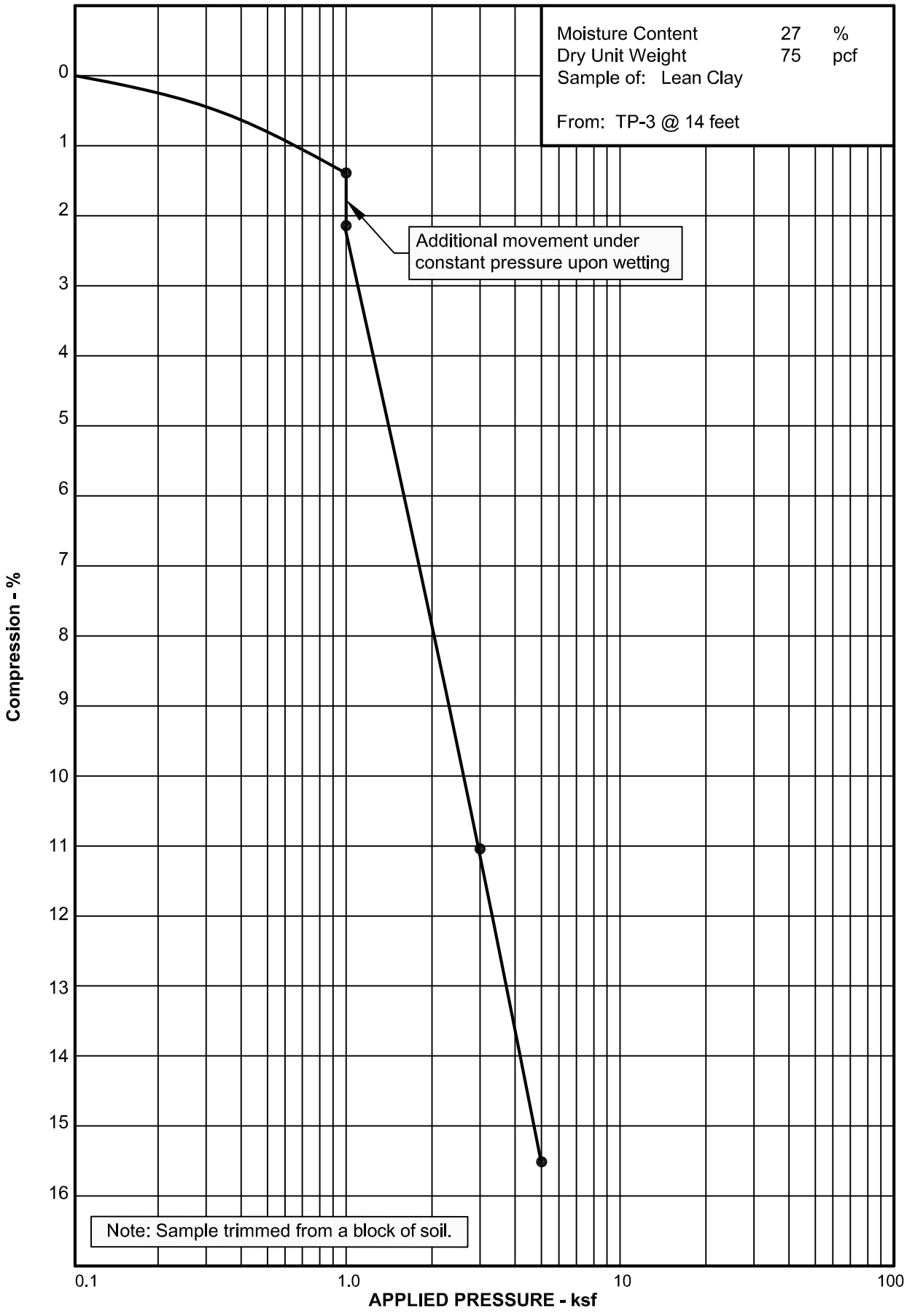
Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 8**

Applied Geotechnical Engineering Consultants, Inc.



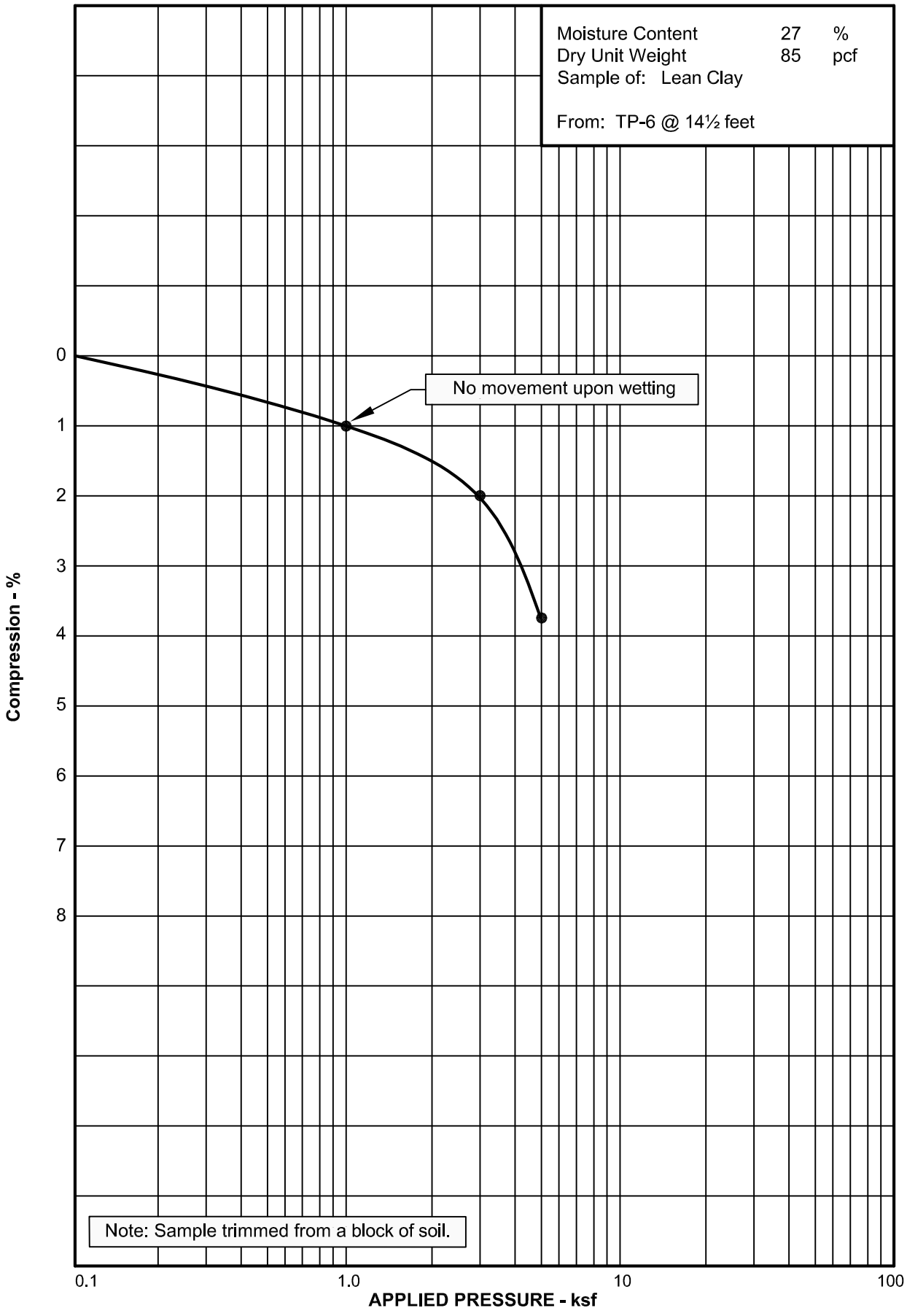
Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 9**

Applied Geotechnical Engineering Consultants, Inc.



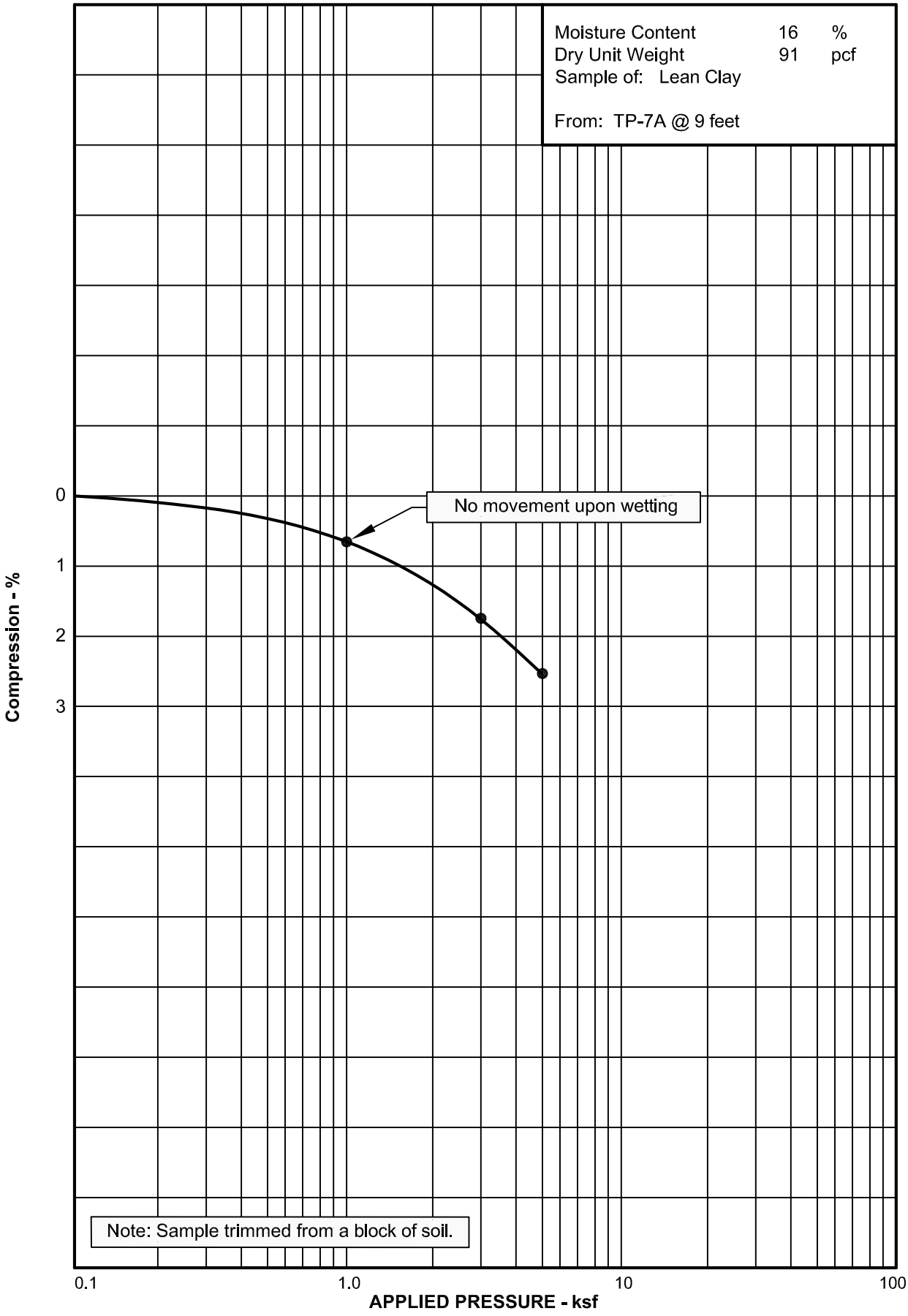
Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 10**

Applied Geotechnical Engineering Consultants, Inc.



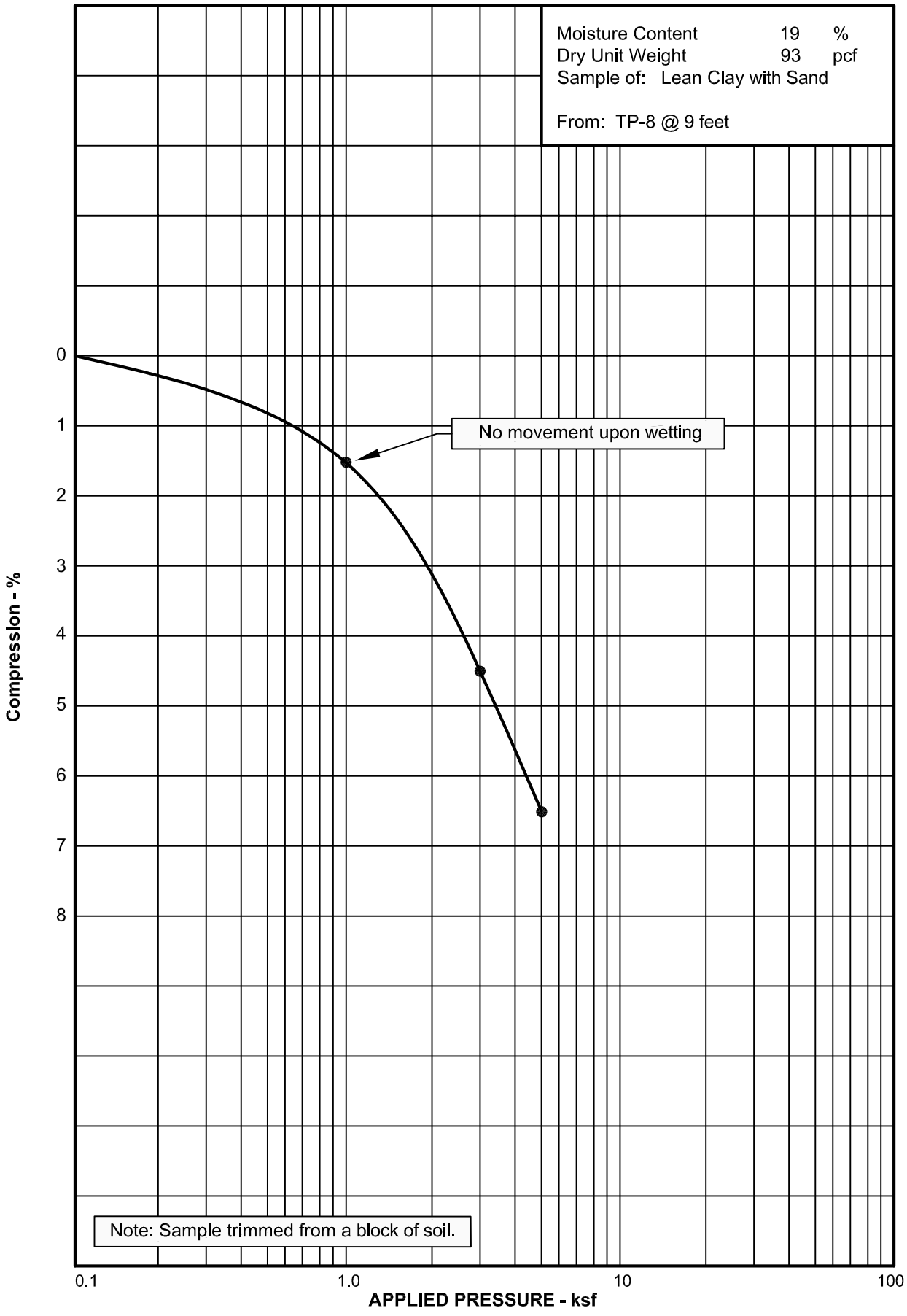
Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 11**

Applied Geotechnical Engineering Consultants, Inc.



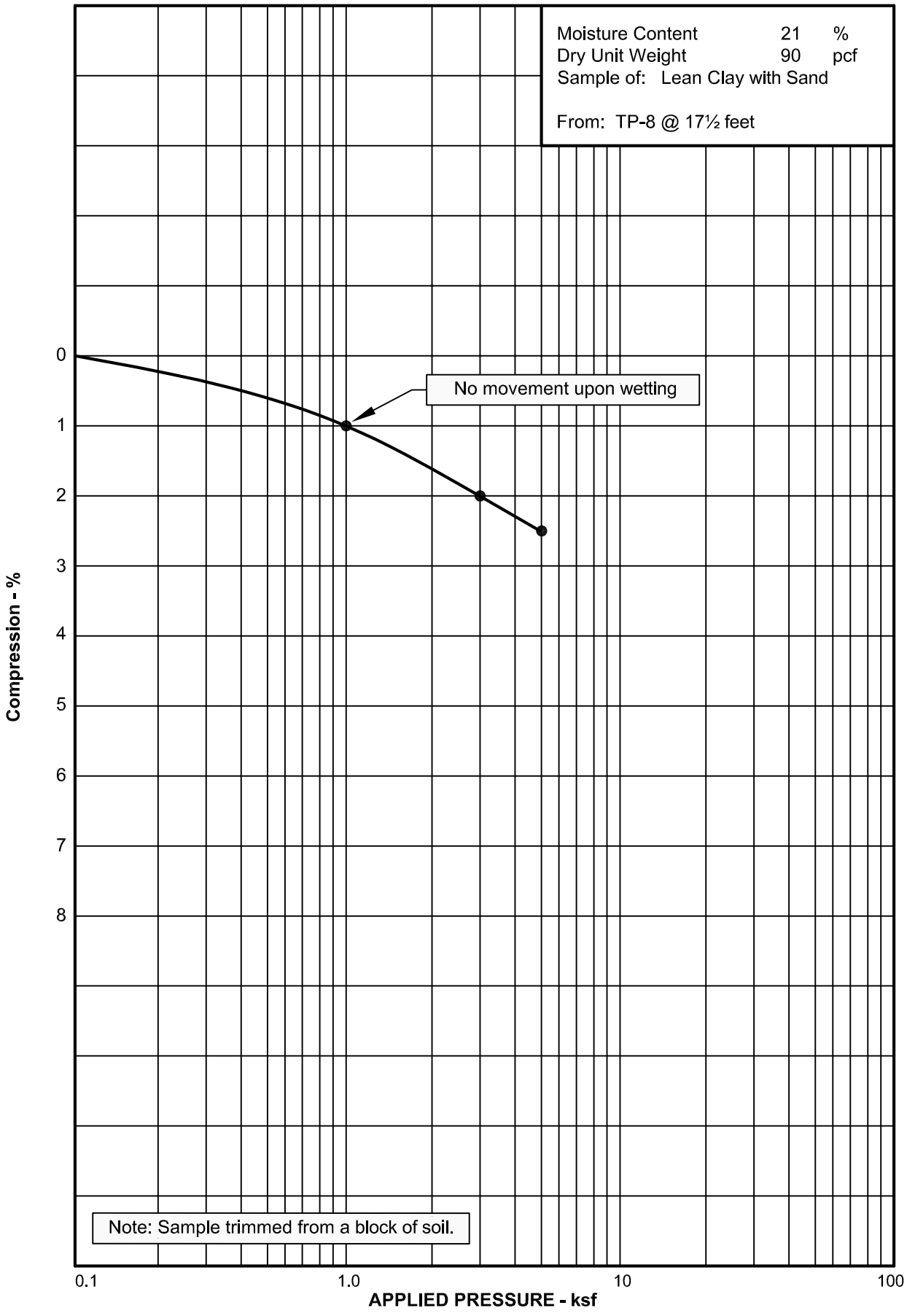
Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 12**

Applied Geotechnical Engineering Consultants, Inc.



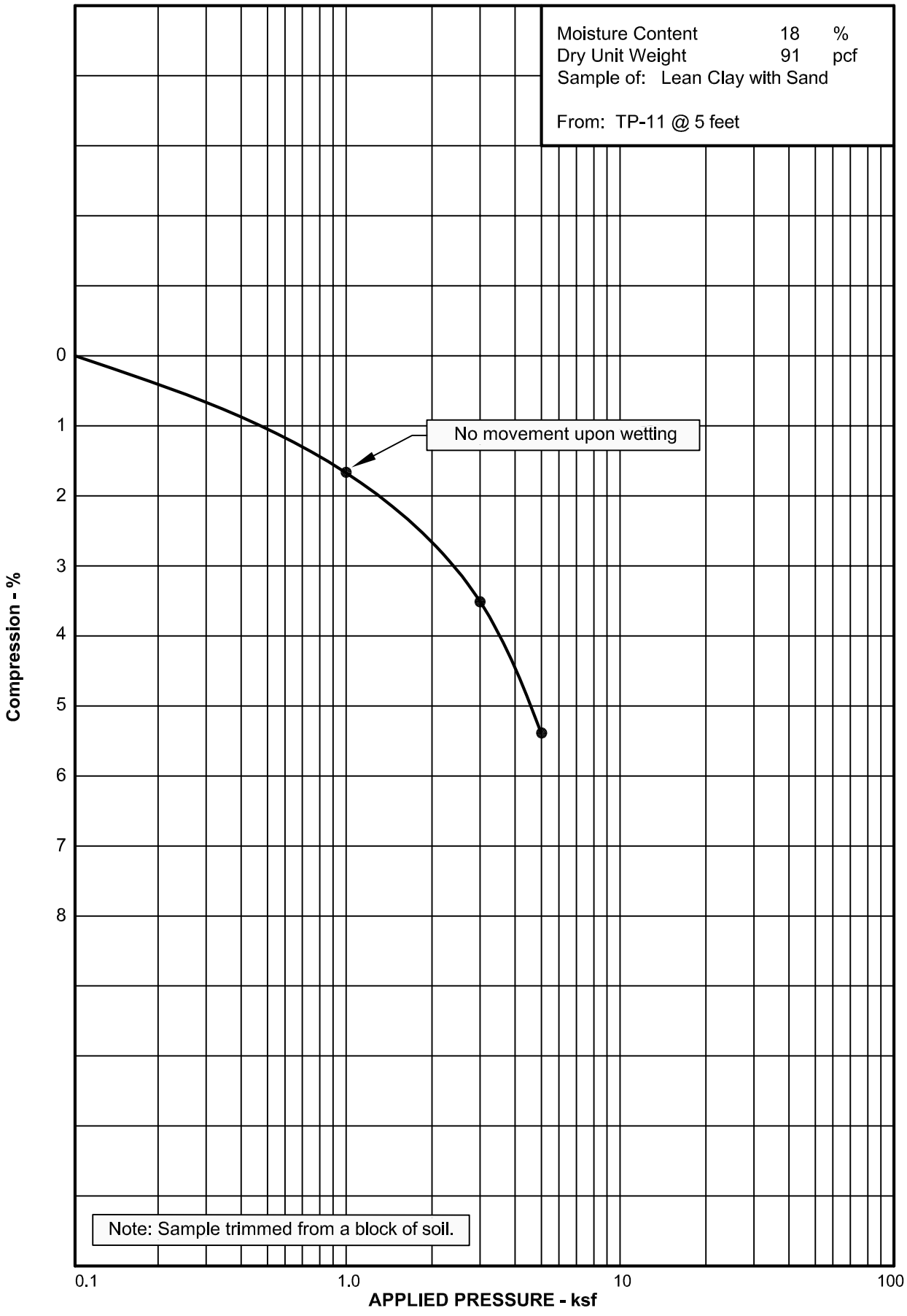
Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 13**

Applied Geotechnical Engineering Consultants, Inc.



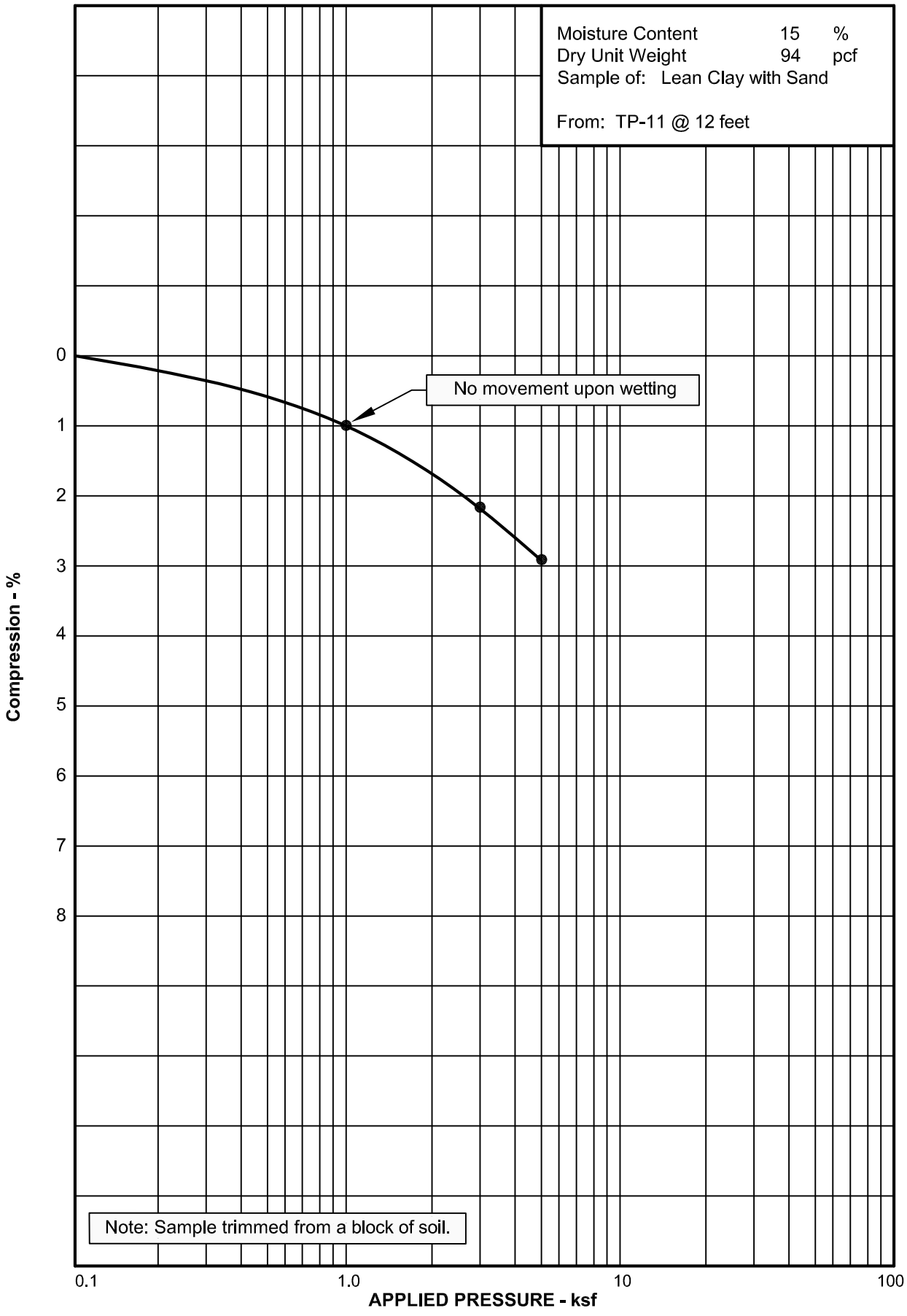
Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 14**

Applied Geotechnical Engineering Consultants, Inc.



Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 15**

Applied Geotechnical Engineering Consultants, Inc.



Project No. 1180597 **CONSOLIDATION TEST RESULTS** **Figure 16**

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TABLE I
SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER: 1180597

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STREGTH (PSF)	WATER SOLUBLE SULFATE (%)	SAMPLE CLASSIFICATION
TEST PIT	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
TP-2A	13	20	91			76					Lean Clay with Sand
	18	19	98			76					Lean Clay with Sand
TP-3	3	8		49	29	22					Fill; Clayey Gravel with Sand
	14	27	75			90					Lean Clay
TP-6	7½	4		53	40	7					Poorly-graded Gravel with Silt and Sand
	14½	27	85			89					Lean Clay
TP-7	5½	6	91			4					Poorly-graded Sand
TP-7A	9	16	91			88					Lean Clay
TP-8	9	19	93			83					Lean Clay with Sand
	17½	21	90			82					Lean Clay with Sand
TP-11	5	18	91			78					Lean Clay with Sand
	12	15	94			73					Lean Clay with Sand