PRELIMINARY 5/26/2016
PROPOSED ALIGNMENTS, GEOMETRICS AND ACCESS CONTROL SUBJECT TO REVIEW AND APPROVAL BY IDOT

NOFSINGER ROAD IMPROVEMENTS

CITY OF WASHINGTON

City of Washington

TERRA ENGINEERING LTD.

GEOTECHNICAL ENGINEERING REPORT
OF
SITE INVESTIGATION
NOFSINGER ROAD IMPROVEMENT
SECTION #13-00113-00-EG
WASHINGTON, ILLINOIS
BY
WHITNEY & ASSOCIATES
PEORIA, ILLINOIS

SEE THE

PREPARED FOR

Ms. Karen Dvorsky, P.E.
Terra Engineering, Ltd.
401 Main Street; Suite 1130
Peoria, Illinois 61602

DATE

August 24, 2016

TELEPHONE
309-673-2131
TESTS • INVESTIGATIONS
ANALYSIS • DESIGN • EVALUATIONS
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ARBITRATION • EXPERT WITNESS TESTIMONY
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SOILS • PORTLAND CEMENT CONCRETE
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WHITNEY & ASSOCIATES
INCORPORATED
2400 West Nebraska Avenue
PEORIA, ILLINOIS 61604-3193

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GEOTECHNICAL ENGINEERING
CONSTRUCTION QUALITY CONTROL
SUBSURFACE EXPLORATIONS
ENVIRONMENTAL INVESTIGATIONS
• • • • • • • • • •
MONITORING WELL INSTALLATIONS
BUILT-UP ROOF INVESTIGATIONS
WELDER CERTIFICATIONS
INSURANCE INVESTIGATIONS

August 24, 2016

Ms. Karen Dvorsky, P.E.
Terra Engineering, Ltd.
401 Main Street; Suite 1130
Peoria, Illinois 61602

Re: Geotechnical Engineering Report
Of Site Investigation
Nofsinger Road Improvement
Section #13-00113-00-EG
Washington, Illinois

Dear Ms. Dvorksy:

This geotechnical engineering report presents the results of a subsurface soils and ground water investigation for the proposed Nofsinger Road Improvement near the northern limits of Washington, Illinois. Included in this report are the results of our field and laboratory tests as well as a summary of the data that was obtained during the investigation. In addition, this engineering report includes our recommendations regarding the proposed improvement and potential construction problems which may occur as a result of the soil and ground water conditions at the proposed site.

This Report of Subsurface Soils and Ground Water Investigation was prepared in accordance with information provided by personnel from Terra Engineering, Ltd. and in general accordance with the Illinois Department of Transportation guidelines for roadway investigations. Sixteen (16) roadway and

structure borings extending to depths ranging from eight (8) to twenty-six (26) feet below the existing surface grades were performed within the limits of the proposed roadway improvement. Fourteen (14) borings were performed for the proposed Nofsinger Road realignment with the final two (2) borings performed at the future Wellington Road intersection with U.S. Route 24 in an easterly direction. A plan sheet illustrating the extent of the proposed improvements and scope of this investigation is included in the Appendix of this report.

INVESTIGATION AND TESTING

The exploratory borings were typically conducted with an ATV mounted, rotary auger drill rig using eight (8) inch diameter hollow stem, continuous flight auger attachments. Hand auger borings and manual sampling operations were however performed at Borings B-6, B-7, B-8, B-9, B-13 and B-14 to minimize, if not eliminate, damage to the crops. By using the hollow stem augers, our drill crew was able to retrieve relatively undisturbed soil samples in advance of the auger cutting head as well as determine the approximate depth at which ground water was encountered. Representative soil samples were retrieved at approximately two and one-half (2.5) feet intervals to a depth of fifteen (15) feet whereupon five (5)-feet intervals were utilized until the structure borings were discontinued by our drill crew personnel. Standard split-barrel soil samplers were used to obtain the soil samples. In addition, the split-barrel soil samplers were used to determine the number of blows "N" of standard penetration into the subsoils using an automatic hammer dropping 30 inches per stroke. The results of these standard penetration tests indicate a comparative consistency of the various soils and thereby provide a basis for estimating the relative shear strength and compressibility characteristics of the soil profile stratas.

The representative soil samples gathered during the investigation were returned to our materials testing laboratory where they underwent further analysis, testing and some refined classification by our geotechnical engineers. From the information and data obtained in both the field and laboratory, recommendations regarding the subgrade soil and ground water conditions as well as potential construction problems can be established by our engineering firm as well as the design engineers.

All of the soils were classified in accordance with the Illinois Department of Transportation textural classification system with AASHTO group classification modifiers. The different soil strata were visually classified in the field and further verification or modification of these classifications was made in our materials testing laboratory. A few grain size analyses and Atterberg limits tests were conducted on the representative soil samples to determine their "exact" classification, soil type and engineering properties. In addition, two (2) standard Proctor tests (ASTM D-698 /AASHTO T99) and Illinois Bearing Ratio (IBR) tests were preformed on the representative soils anticipated to exist at or near the proposed subgrade elevations. Two (2) organic content tests were also performed on some of the samples to determine their suitability for use as subgrade soils. The results of these tests have been summarized on the Laboratory Soil Analysis Summary, Soil Boring Logs and data sheets included in the Appendix of this report.

SITE AND SUBSURFACE CONDITIONS

The site for the proposed roadway improvement primarily exists as rolling, agricultural property located adjacent to U.S. Route 24 and north of West Cruger Road near the northern limits of Washington, Illinois. In the areas of the

exploratory borings, approximately seven (7) to at least eighteen (18) inches of dark brown and brown, Silty Clay Loam organic topsoil was typically noted at the existing surface grades, with the thicker accumulations encountered within the waterway drainage areas at the southern limits of the proposed improvement. Six (6) inches of sand and gravel, aggregate base course materials were also penetrated in the shoulder area at the location of Boring B-11.

As may be observed from the enclosed Soil Boring Logs, normally consolidated cohesive soils were typically encountered below the surface cover and extended to depths ranging from approximately seven (7) to fourteen (14) feet from the existing surface grades. These soils were primarily classified as Silty Clay and Silty Clay Loam soil types as well as some Silt, Silt Loam and Clay Loam soils. Fill materials, consisting of Clay Loam and Silty Clay soil types, were however noted to depths ranging from approximately four (4) to six and one-half (6.5) feet in Borings B-15 and B-16 at the location of the proposed Wellington Road intersection. It may also be observed from the Soil Boring Logs that the soils to depths ranging from approximately four (5) to seven (7) feet in Borings B-1 through B-5 within the southern portion of the proposed improvement contained a trace of organic matter.

In those borings which were extended beyond the normally consolidated soils, Silty Clay and Clay Loam Glacial Till soils were encountered and typically extended in depth until these borings were discontinued by our drill crew personnel. A seam or pocket of fine- to medium-grained Sand with considerable Silty Clay Loam was however penetrated between the approximate depth of nineteen (19) to twenty-two (22) feet in Boring B-11.

The consistency of the normally consolidated soils ranged from soft to very stiff and was typically classified as medium to stiff whereas the cohesive fill materials were classified as very stiff to hard. Upon encountering the glacial till soils, the consistency ranged from stiff to hard. Standard penetration tests, designated as "N" values, ranged from 3 to 28 blows per foot within the soils encountered during this investigation, with the higher values typically recorded in the glacial till soils.

A somewhat high, but acceptable, range of natural moisture contents exists within the soils encountered during the scope of this investigation. The natural moisture contents of the normally consolidated soils ranged from 17 to 33 percent and would generally be considered above an estimated, optimum moisture content range of approximately 15 to 20 percent for the typical soil types encountered. Within the glacial till soils, natural moisture contents ranging from 11 to 17 percent were recorded and these soils would be considered near to slightly above their respective optimum moisture content range of approximately 11 to 14 percent. As may be observed from the standard Proctor test results and the Laboratory Soil Analysis Summary included in the Appendix of this report, optimum moisture contents of 16.7 and 17.4 percent were obtained for the normally consolidated, Silty Clay Loam soils.

As indicated previously, the majority of the soils encountered within approximately four (4) to seven (7) feet of the existing surface grades in Borings B-1 through B-5 contained a trace of organic matter which prompted organic content tests to determine their suitability as subgrade soils for the proposed roadway improvement. As may be observed from the Organic Content Test Result Summary, the organic contents of these soils ranged from 4.3 to 5.5 percent which is considerably below the ten (10) percent maximum organic content allowed by the

Illinois Department of Transportation Permissible Limit for soils within the top twenty-four (24) inches of the subgrade. It is therefore our opinion that undercutting of these soils will not be required.

ORGANIC CONTENT TEST RESULT SUMMARY

BORING NUMBER	SAMPLE DEPTH - FEET	ORGANIC CONTENT - PERCENT
B-1	2.5 - 3.5	5.5
B-4	2.5 - 3.5	5.5

The most prevalent cohesive soil types, as classified in accordance with the Highway Research Board Classification System, were A-7-6, A-6 and A-4 group soils. The Silty Clay soils were grouped into the A-7-6 soil category, the Silty Clay Loam and some of the Silty Clay glacial till soils were grouped into the A-6 soil category and the remaining glacial till soils as well as the Clay Loam, Silt and Silt Loam soils were grouped into the A-4 soil category. The granular soils were classified as A-2-4 soils. Group indices of 11 and 14 were recorded for the A-6, Silty Clay Loam soils retrieved from Borings B-6 and B-13.

The stratification of the soils, as indicated on the Soil Boring Logs, represents the subsurface conditions in the actual boring locations and other variations may occur between the borings. The lines of demarcation represent the approximate boundary between the soil types although the transition may be gradual.

Representative samples of the soils encountered in the field are presently being stored in our materials testing laboratory for possible future reference and analysis, if desired. Unless our firm is notified to the contrary, all soil samples will be disposed of after approximately four (4) months.

It may also be observed from the Soil Boring Logs that ground water accumulations were encountered during the scope of the investigation. The ground water levels were checked upon completion of the borings as well as after 24+ hours in those borings in which ground water was encountered during drilling. These readings and site observations indicate that the ground water levels appear to exist at depths ranging from approximately four (4) to seven (7) feet below the existing surface grades. Some fluctuation in the ground water levels may be anticipated however due to typical seasonal variation. Few, if any, construction problems are anticipated as a result of these ground water conditions.

In addition to the routine geotechnical tests, a few grain-size analyses and Atterberg limits tests were performed on the representative soils to more precisely determine their "exact" classification and engineering properties. As may be observed from the Laboratory Soil Analysis Summary included in the Appendix of this report, the Silty Clay Loam soils analyzed consist of 1.4 and 2.4 percent sand, 69.3 to 75.8 percent silt and 22.8 to 28.3 percent clay. Atterberg limits tests performed on these soils indicated Liquid Limits results of 32 to 36 percent and Plasticity Indices of 11 to 14 percent.

Two (2) standard Proctor maximum dry density tests (ASTM D-698 /AASHTO T-99) were performed on representative soils which will most likely exist at the proposed subgrade elevations. The majority of these soils were a normally

consolidated, Silty Clay Loam soil type which yielded maximum dry densities of 106.9 to 108.7 pounds per cubic foot at optimum moisture contents ranging from 16.7 to 17.4 percent. Soaked Illinois Bearing Ratio test results of 3.3 to 3.6 were recorded for these representative soils.

Assuming that the minimum specification requirements as set forth by the Illinois Department of Transportation are satisfied, a minimum Illinois Bearing Ratio of 3.0 is recommended for the typical soil types encountered during the scope of this investigation. With this bearing ratio information, the design engineers can proceed to develop a final design for the proposed pavement system in accordance with the Illinois Department of Transportation, Division of Highways design and specification requirements, using the AASHTO method of pavement design.

As may be observed from the enclosed Laboratory Soil Analysis Summary, the support rating of the cohesive soils encountered during this investigation was typically classified as poor. Maximum frost penetration for this region is forty-two (42) inches.

ROADWAY RECOMMENDATIONS

Throughout the majority of the proposed roadway improvement, it is recommended that the organic topsoil be removed to a depth of approximately eight (8) inches whereas a stripping depth of approximately eighteen (18) inches is recommended within the waterway drainage swales within the southern limits of the proposed improvement (Borings B-1 through B-5). Based on our visual observations, the organic topsoil would be considered most acceptable for top dressing of all disturbed areas beyond the limits of the proposed pavement construction.

Scarification, moisture conditioning and recompaction of the subgrade soils are recommended prior to the placement of fill materials. It is essential that all excavation cuts and compacted earth fill embankments be constructed in strict accordance with the Illinois Department of Transportation, Standard Specifications for Roads and Bridge Construction relating to construction procedures. In addition, the excavation cuts and embankment fill materials which are to be utilized for the proposed improvement must be carefully evaluated at the time of construction to insure that only suitable soils exist within the embankment fills as well as beneath the pavement section. Based on the results of this investigation and evaluation, it is our opinion that the majority of the soils encountered at this site would be considered unrestricted soils suitable for construction of the proposed embankment fills.

Aeration of the on-site cohesive soils to within 110 percent of optimum moisture content is recommended for those soils which exist at the proposed finished subgrade elevations in the cut sections as well as those materials utilized for embankment fill materials. It is also recommended that the embankment fills as well as the finished subgrade in those areas requiring cuts be compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D-698/AASHTO T-99).

Proofrolling of the compacted subgrade at the finished subgrade elevations is further recommended to verify the subgrade integrity prior to further construction. In those areas where soft or unstable soils may be observed during the proofrolling evaluation, it is recommended that these soils be reprocessed and recompacted or removed and replaced with select compacted fills. Should any areas not respond to conventional aeration and compaction operations, overexcavation and

replacement with select, angular aggregates with or without geotextile fabric may be utilized to correct the instability.

Based on the soil and ground water information gathered throughout the proposed highway improvement, combined with the various laboratory tests and analyses performed on select, representative soil samples obtained, it has been concluded by our geotechnical engineer that the minimum 20 year standard design as recommended by the Illinois Department of Transportation, Division of Highways will adequately serve the anticipated traffic over the improvement, providing the special considerations outlined in this report are included in the overall final design.

With respect to the proposed traffic signal foundations at the new Nofsinger Road and U. S. Route 24 intersection (Borings B-9, B-10, B-11 and B-12), it is our opinion that an average, unconfined compressive strength of 1.0 tons per square feet (TSF) may be utilized for the soils encountered at these locations.

SUMMARY

In conclusion, a subsurface exploration and an evaluation of the soil and ground water conditions have been conducted for proposed Nofsinger Road Improvement in Washington, Illinois. A summary of the existing site conditions has been presented and potential design and construction problems have been discussed in some detail. The exploration and analyses of the subsurface conditions presented in this engineering report are considered of sufficient detail and scope to form a reasonable basis for design evaluation. The observations and comments submitted within this geotechnical engineering report are based upon the subsurface soil and ground water information which was obtained as well as the preliminary design details which have been furnished by the Design Engineer.

Should deviations from the noted subsurface conditions be encountered during construction, it is mandatory that they be brought to the attention of our personnel for further evaluation. On-site observation and testing by personnel from our construction materials testing firm is also considered essential to further evaluate the subsurface conditions encountered at the time of construction as well as document the recommendations presented in this report.

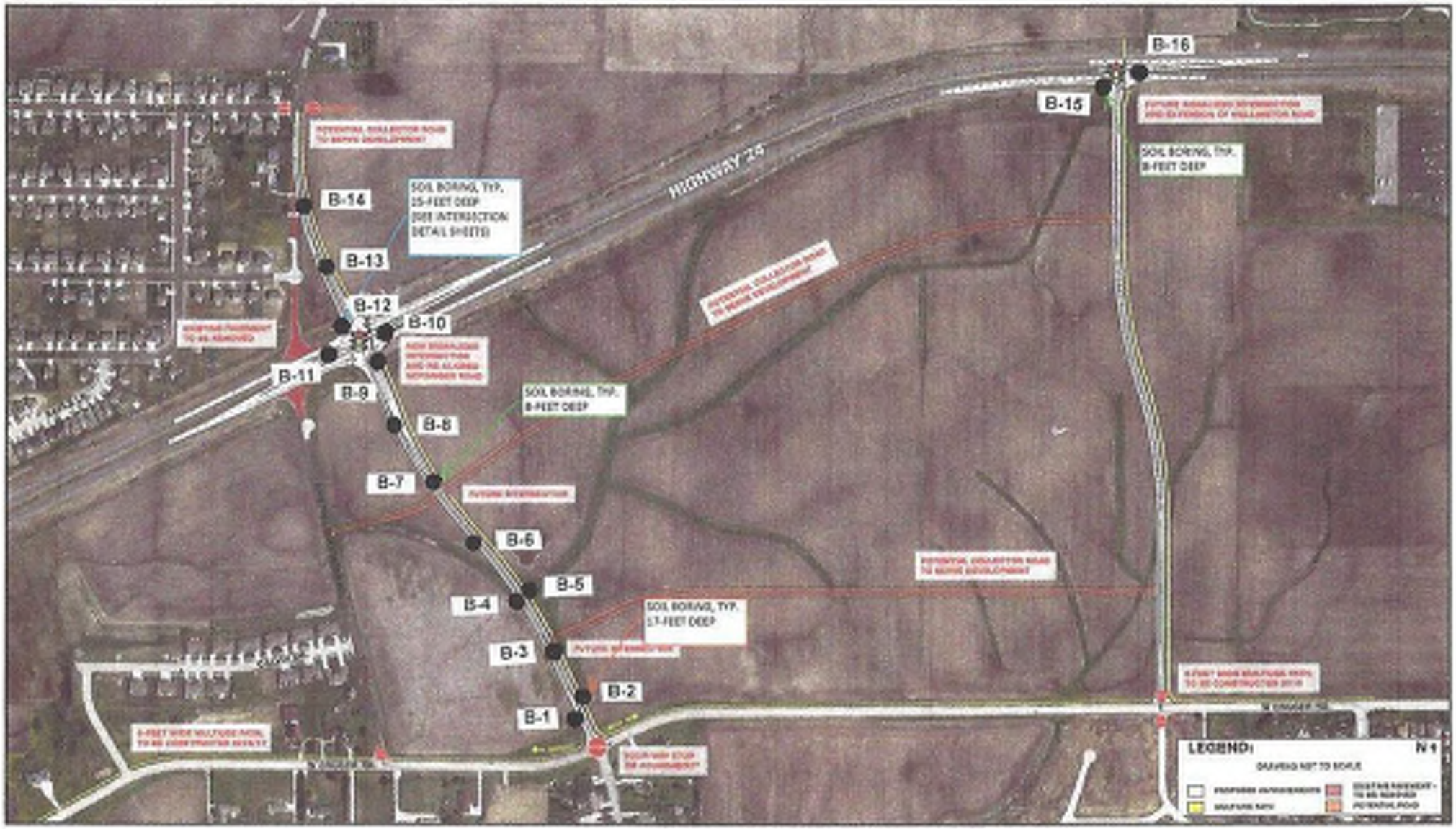
Should additional information be requested in regard to the subsurface conditions presented in this report, or if a more comprehensive evaluation of the enclosed data is desired from our geotechnical engineer, please do not hesitate to contact us at your convenience.

Respectfully submitted,

WHITNEY & ASSOCIATES

(By) James R. Krusemark, P.E.

JRK:rma
Enclosures



NOFSINGER ROAD IMPROVEMENTS

PROJECT Nofsinger Road Improvement PROJECT LOCATION Washington, Illinois			DATE August 24, 2016 W. & A. FILE NO. 7405 SCALE None

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/11/15

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T28N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-01
Station 21+71
Offset 22.4 ft Left
Ground Surface Elev. 761.44 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After 24+ Hrs. 754.2 ft ▽

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (18.0")					
759.94					
Medium, Black SILTY CLAY With Trace Of Organic Matter A-7-6		2			
		2 2	0.8 B	33	DD = 87 PCF
757.44					
Medium, Black SILTY CLAY LOAM With Trace Of Organic Matter A-6	-5	1			
		2 2	0.9 B	32	
754.44					
Hard, Gray-Brown SILTY CLAY, GLACIAL TILL A-6	-▽-	6			
		7 3	4.2 B	13	DD = 123 PCF
751.94					
Very Stiff, Gray CLAY LOAM, GLACIAL TILL A-4	-10	5			
		8 8	3.1 B	11	
		5			
		6 8	2.8 B	13	DD = 122 PCF
746.94					
Hard, Gray CLAY LOAM, GLACIAL TILL A-4	-15	5			
		7 8	6.7 S	11	
744.44					
End of Boring	-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/11/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T25N, RNG. R3W, 4th PM
Latitude . Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE DG0 Automatic

STRUCT. NO.
Station

BORING NO. B-02
Station 22+23
Offset 32.5 ft Right
Ground Surface Elev. 760.22 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 753.0 ft ▼
Upon Completion None ft
After 24+ Hrs. 753.9 ft ▼

DEPTH (ft)	BLOWS (6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (17.0")				
758.80				
Medium, Black SILTY CLAY With Trace Of Organic Matter A-7-6	1			
	1 2	0.7 B	32	DD = 88 PCF
756.22				
Stiff, Light Brown And Gray CLAY LOAM A-4	-5 2			
	2 3	1.0 B	20	
753.72 ▼				
Very Stiff, Gray-Brown SILTY CLAY, GLACIAL TILL A-6	6			
	7 12	3.4 B	14	DD = 120 PCF
750.72				
Very Stiff, Gray CLAY LOAM, GLACIAL TILL A-4	-10 6			
	7 9	3.1 B	13	
	5			
	6 8	3.1 B	12	DD = 123 PCF
	-15 7			
	8 10	3.7 B	11	
743.22	11			
End of Boring	-20			

The Unconfined Compresaive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/11/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R5W, 4th PM.
Latitude . Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-03
Station 24+68
Offset 10.1 ft Left
Ground Surface Elev. 766.80 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 759.8 ft ▼
Upon Completion None ft
After 24+ Hrs. 762.0 ft ▽

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (17.0") 765.38				
Stiff, Black SILTY CLAY With Trace Of Organic Matter A-7-6	2			
	2 3	1.0 B	31	DD = 92 PCF
762.80				
Soft, Gray And Light Brown SILT LOAM A-4 ▽ -5	1			
	1 2	0.3 B	17	
760.30				
Medium, Brown And Gray CLAY LOAM A-4 ▼	1			
	2 4	0.9 B	18	DD = 100 PCF
758.80				
End of Boring				
-10				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Association

SOIL BORING LOG

Date 8/11/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EC LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM.
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-04
Station 27+17
Offset 11.7 ft Left
Ground Surface Elev. 765.43 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 753.4 ft ▼
Upon Completion 751.6 ft ▽
After 24+ Hrs. 759.9 ft ▼

Material Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (17.0")	764.01					
Stiff, Black SILTY CLAY With Trace Of Organic Matter A-7-6			2			
			3 4	1.2 B	30	DD = 91 PCF
	761.43					
Medium, Gray, Light Brown And Dark Gray SILTY CLAY A-7-6		-5	1			
		▼	1 2	0.6 B	28	
	758.43					
Soft, Gray And Light Brown SILTY CLAY LOAM A-6			1			
			1 2	0.4 B	24	DD = 97 PCF
	755.93					
Stiff, Gray-Brown CLAY LOAM, GLACIAL TILL A-4		-10	2			
			3 4	1.5 B	17	
	753.43 ▼					
Very Stiff, Gray SILTY CLAY, GLACIAL TILL A-6			3			
			4 7	2.3 B	14	DD = 119 PCF
		▽				
		-15	5			
			6 6	2.4 B	14	
	748.43		7			
End of Boring		-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/11/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE 050 Automatic

STRUCT. NO.
Station

BORING NO. B-05
Station 27+50
Offset 36.9 ft Right
Ground Surface Elev. 765.70 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 753.2 ft
Upon Completion None ft
After 24+ Hrs. 760.0 ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (18.0")					
764.20					
Stiff, Dark Brown SILTY CLAY LOAM With Trace of Organic Matter A-6		2			
		3 3	1.3 B	27	DD = 91 PCF
761.20					
Medium, Dark Gray SILTY CLAY With Trace of Organic Matter A-7-6	-5	2			
		1 2	0.9 B	30	
759.20					
Medium, Light Brown And Gray SILT LOAM A-4		2			
		2 2	0.7 B	18	DD = 101 PCF
756.70					
Stiff, Light Brown And Gray SILT A-4	-10	2			
		2 3	1.1 B	22	
753.70					
Very Stiff, Gray-Brown SILTY CLAY, GLACIAL TILL A-6		4			
		5 8	3.0 B	16	DD = 116 PCF
	-15				
		5			
		6 7	3.2 B	14	
748.70		7			
End of Boring					
	-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 6/30/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T28N, RNG. R3W, 4th PM,
Latitude . Longitude

COUNTY Tazewell DRILLING METHOD Hand Auger HAMMER TYPE N/A

STRUCT. NO.
Station

BORING NO. B-06
Station 30+37
Offset 18.7 ft Left
Ground Surface Elev. 768.11 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 764.6 ft ▼
Upon Completion 763.7 ft ▽
After 3 Hrs. 764.7 ft ▽

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (13.0") 767.03				
Stiff, Light Brown And Gray-Brown Mottled Dark Brown SILTY CLAY LOAM A-6(14)	-	1.4 B	27	DD = 92 PCF
764.61 ▼				
Medium, Light Brown And Gray SILTY CLAY LOAM A-6 ▽	-	0.6 B	28	
-5				
762.11				
Medium, Light Brown CLAY LOAM A-4	-	0.7 P	26	
760.11				
End of Boring				
-10				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 6/30/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hand Auger HAMMER TYPE N/A

STRUCT. NO.
Station

BORING NO. B-07
Station 33+33
Offset 25.2 ft Right
Ground Surface Elev. 773.92 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 768.9 ft ▼
Upon Completion 768.3 ft ▽
After 2 Hrs. 769.7 ft ▼

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (12.0") 772.92				
Stiff, Brown And Light Brown SILTY CLAY LOAM A-6	-	1.3 B	28	DD = 94 PCF
770.42				
Medium, Light Brown And Gray SILTY CLAY LOAM A-6	-	0.7 B	28	
▼ -5 ▽				
767.42				
Soft, Light Brown And Gray SILTY CLAY LOAM A-6	-	5.0 P	28	
765.92				
End of Boring				
-10				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/30/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hand Auger HAMMER TYPE N/A

STRUCT. NO. _____
Station _____

BORING NO. B-08
Station 37+07
Offset 6.1 ft Left
Ground Surface Elev. 780.71 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After 2 Hrs. None ft

DEPTH (ft)	BLOWS (6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (11.0") 779.79				
Stiff, Light Brown And Brown SILTY CLAY A-6	-	1.8 B	25	DD = 95 PCF
777.21				
Stiff, Light Brown And Gray SILTY CLAY LOAM A-6	-	1.4 B	22	
-5				
	-	1.5 P	22	
772.71				
End of Boring				
-10				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/11/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-09
Station 143+88
Offset 88.2 ft Right
Ground Surface Elev. 778.75 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After 24+ Hrs. 771.6 ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Soil Description
				Brown SILTY CLAY LOAM Organic Topsoil (8.0") 778.08
	2			Stiff, Black SILTY CLAY With Trace Of Organic Matter A-7-6
	3 4	1.5 B	29	DD = 88 PCF
				774.75
-5	1			Stiff, Dark Gray SILTY CLAY A-7-6
	2 2	1.1 B	30	
				771.75 ▽
	1			Medium, Gray, Light Brown And Dark Gray SILTY CLAY A-7-6
	2 3	0.5 B	29	DD = 91 PCF
				769.25
-10	4			Very Stiff, Light Brown And Gray-Brown SILTY CLAY, GLACIAL TILL A-6
	5 7	3.1 B	16	
				766.75
	4			Very Stiff, Gray CLAY LOAM, GLACIAL TILL A-4
	5 7	2.5 B	14	DD = 118 PCF
-15	5			
	6 9	3.7 B	13	
	8			
	7 9	3.4 B	14	DD = 118 PCF
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Soil Description
	6			Very Stiff, Gray CLAY LOAM, GLACIAL TILL A-4 (continued)
	8 11	3.8 B	13	
	6			
	8 10	3.7 B	13	DD = 120 PCF
-25	7			
	8 12	3.4 B	13	
				752.75
				End of Boring
-30				
-35				
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/16/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-10
Station 144+52
Offset 2.8 ft Right
Ground Surface Elev. 780.92 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 770.9 ft ▼
Upon Completion 768.1 ft ▽
After - Hrs. - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown SILTY CLAY Organic Topsoil (8.0") 780.25			
Very Stiff, Gray, Gray-Brown And Dark Gray SILTY CLAY A-7-6	5		
DD = 93 PCF	6 7	2.1 B	27
776.92			
Stiff, Light Brown And Gray SILTY CLAY LOAM A-6 -5	3		
	4 4	1.7 B	24
773.92			
Medium, Gray And Light Brown SILT LOAM A-4	3		
DD = 95 PCF	4 5	0.5 B	24
771.42			
Stiff, Brown And Gray-Brown CLAY LOAM, GLACIAL TILL A-4 ▼-10	2		
	4 6	1.6 B	16
768.92			
Stiff, Gray CLAY LOAM, GLACIAL TILL A-4 ▽	6		
DD = 117 PCF	7 8	1.8 B	15
-15	7		
	8 9	1.5 B	16
	6		
DD = 117 PCF	9 10	1.9 B	15
761.92			
Very Stiff, Gray CLAY LOAM, GLACIAL TILL A-4 -20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff, Gray CLAY LOAM, GLACIAL TILL A-4 (continued)	8		
	9 11	2.7 B	13
	6		
DD = 119 PCF	8 11	2.6 B	13
-25	7		
	8 12	2.4 B	14
754.92			
End of Boring			
-30			
-35			
-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/18/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-11
Station 142+25
Offset 5.3 ft Left
Ground Surface Elev. 784.50 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 770.5 ft ▼
Upon Completion 766.9 ft ▽
After - Hrs. - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CA-6 GRAVEL (6.0") 784.00
				Brown SILTY CLAY With Trace Of Organic Matter 782.30
	5			
	6	2.3	26	Very Stiff, Light Brown And Gray SILTY CLAY A-7-6 DD = 94 PCF
	7	B		
				780.00
-5	3			Stiff, Light Brown And Gray-Brown SILTY CLAY LOAM A-6
	4	1.6	25	
	5	B		
				777.60
	2			Medium, Light Brown And Gray SILT A-4 DD = 96 PCF
	2	0.6	24	
	3	B		
-10	3			
	4	0.7	24	
	5	B		
				772.50
	2			Medium, Light Brown And Gray SILT LOAM A-4 DD = 98 PCF
	3	0.5	20	
	4	B		
				770.00
-15				Very Stiff, Gray-Brown CLAY LOAM, GLACIAL TILL A-4
	3			
	4	2.1	14	
	5	B		
	5			DD = 118 PCF ▽
	6	2.2	14	
	8	B		
				765.50
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	8			Medium-Density, Gray-Brown,
	12	-	12	Fine- To Medium-Grained SAND
	10			With Considerable Silty Clay Loam A-2-4 (continued) 763.00
	7			Very Stiff, Gray CLAY LOAM, GLACIAL TILL A-4
	9	3.7	13	DD = 120 PCF
	11	B		
				760.00
-25	10			Hard, Gray CLAY LOAM,
	12	4.4	12	GLACIAL TILL A-4
	16	B		758.50
				End of Boring
-30				
-35				
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Wilsey & Associates

SOIL BORING LOG

Date 8/11/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-12
Station 143+19
Offset 84.7 ft Left
Ground Surface Elev. 781.10 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 773.6 ft ▼
Upon Completion None ft
After 24+ Hrs. 774.3 ft ▽

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Soil Description
				Dark Brown SILTY CLAY LOAM Organic Topsoil (8.0")
780.43				
				Very Stiff, Dark Gray SILTY CLAY A-7-6
	3			
	4	2.1	21	DD = 102 PCF
	5	B		
777.10				
-5				Stiff, Gray And Light Brown SILTY CLAY A-7-6
	1			
	2	1.3	26	
	3	B		
774.10 ▽				
	2			Soft, Light Brown And Gray SILTY CLAY LOAM A-6 DD = 90 PCF ▼
	1	0.4	29	
	1	B		
771.60				
-10	4			Very Stiff, Light Brown SILTY CLAY, GLACIAL TILL A-6
	5	2.7	16	
	6	B		
769.10				
	4			Very Stiff, Light Brown SILTY CLAY, GLACIAL TILL A-6
	5	2.4	16	DD = 116 PCF
	7	B		
767.10				
-15				Stiff, Gray CLAY LOAM, GLACIAL TILL A-4
	6			
	7	1.4	13	
	8	B		
	6			
	7	1.7	13	DD = 118 PCF
	9	B		
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Soil Description
	6			Stiff, Gray CLAY LOAM, GLACIAL TILL A-4 (continued)
	7	1.9	12	
	10	B		
	7			
	7	1.8	13	DD= 117 PCF
	9	B		
757.10				
-25	6			Stiff, Gray SILTY CLAY, GLACIAL TILL A-6
	7	1.9	14	
	8	B		
755.10				
				End of Boring
-30				
-35				
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 5/30/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM.
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hand Auger HAMMER TYPE N/A

STRUCT. NO.
Station

BORING NO. B-13
Station 44+16
Offset 10.6 ft Right
Ground Surface Elev. 784.32 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 779.8 ft ▼
Upon Completion 779.1 ft ▽
After 1 Hrs. 780.0 ft ▼

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Dark Brown SILTY CLAY LOAM Organic Topsoil (7.0") 783.74				
Stiff, Brown And Light Brown SILTY CLAY LOAM A-6	-	1.2 B	26	DD = 94 PCF
780.82				
Stiff, Light Brown And Gray SILT A-4 ▼ ▽	-	1.1 B	22	
-5				
777.82				
Medium, Light Brown And Gray SILT A-4	-	1.0 P	23	
776.32				
End of Boring				
-10				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 6/30/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T26N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hand Auger HAMMER TYPE N/A

STRUCT. NO.
Station

BORING NO. B-14
Station 46+85
Offset 1.0 ft Right
Ground Surface Elev. 784.40 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 780.4 ft ▼
Upon Completion 780.5 ft ▽
After - Hrs. - ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dark Brown SILTY CLAY LOAM Organic Topsoil (16.0") 783.07				
Medium, Dark Brown SILTY CLAY A-6 780.90		-	0.8 B	30
Medium, Gray And Light Brown SILTY CLAY A-6 777.40	-5	-	0.7 B	31
Medium, Light Brown And Gray SILTY CLAY LOAM A-6 776.40		-	0.6 P	27
End of Boring	-10 -15 -20			

DD = 90 PCF

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/18/16

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 15, TWP. T28N, RNG. R3W, 4th PM,
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO. _____
Station _____

BORING NO. B-15
Station 177+71
Offset 70.9 ft Right
Ground Surface Elev. 799.46 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After 24+ Hrs. None ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Brown SILTY CLAY LOAM Organic Topsoil (8.0") 799.79				
Hard, Gray-Brown CLAY LOAM With Some Fine-Grained Gravel (Fill) A-4	4 5 6	5.3 B	11	DD = 115 PCF
796.46				
Very Stiff, Light Brown And Olive-Green SILTY CLAY (Probable Fill) A-7-6	4 5 6	2.6 B	24	
792.96				
Medium, Gray And Olive-Green SILTY CLAY LOAM A-6	6 7 8	0.9 B	24	DD = 97 PCF
791.46				
End of Boring				
-10				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Whitney & Associates

SOIL BORING LOG

Date 8/16/18

ROUTE US 24 (FA 317) DESCRIPTION Nofsinger Road Improvement LOGGED BY Krusemark

SECTION 13-00013-00-EG LOCATION Washington, SEC. 16, TWP. T26N, RNG. R3W, 4th PM
Latitude , Longitude

COUNTY Tazewell DRILLING METHOD Hollow Stem Auger HAMMER TYPE D50 Automatic

STRUCT. NO.
Station

BORING NO. B-16
Station 179+18
Offset 5.6 ft Right
Ground Surface Elev. 800.23 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - Hrs. - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Brown SILTY CLAY LOAM Organic Topsoil (8.0") 799.56				
Hard, Gray-Brown And Light Brown CLAY LOAM (Fill) A-4	4			
	6 8	4.2 B	16	DD = 112 PCF
798.23				
Stiff, Black SILTY CLAY LOAM With Trace of Organic Matter A-6	4			
-5	4 8	1.8 B	28	
793.73				
Stiff, Gray And Light Brown SILTY CLAY A-7-6	5			
	7 8	1.7 B	26	DD = 94 PCF
792.23				
End of Boring				
-10				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

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BUILT-UP ROOF INVESTIGATIONS
WELDER CERTIFICATIONS
INSURANCE INVESTIGATIONS

CLIENT:

W&A FILE NO. 7405001
DATE: 08-23-16

Ms. Karen Dvorsky
Terra Engineering, Ltd.
401 Main Street, Suite 1130
Peoria, Illinois 61602

PROJECT:

Nofsinger Road Improvement
Section #13-00113-00-EG
Washington, Illinois

LABORATORY SOIL ANALYSIS SUMMARY

SAMPLE NUMBER	:	1	3
BORING NUMBER	:	B-6	B-13
SAMPLE DEPTH - FEET	:	1 - 4	1 - 4
BORING LOCATIONS	:	30+37	44+16
STATION OFFSET	:	19' Right	11' Right
HRB CLASSIFICATION & GROUP INDEX	:	A-6(14)	A-6(11)
GRAIN SIZE CLASSIFICATION	:	SILTY CLAY LOAM	SILTY CLAY LOAM
PERCENT PASSING 3/4" - %	:	100.0	100.0
PERCENT PASSING #4 - %	:	100.0	100.0
PERCENT PASSING #10 - %	:	100.0	100.0
PERCENT PASSING #40 - %	:	99.0	99.6
PERCENT PASSING #200 - %	:	97.6	98.6
GRAVEL - %	:	0.0	0.0
SAND - %	:	2.4	1.4
SILT - %	:	69.3	75.8
CLAY - %	:	28.3	22.8
LIQUID LIMIT - %	:	36	32
PLASTIC LIMIT - %	:	22	21
PLASTICITY INDEX - %	:	14	11
IN-SITU MOISTURE CONTENT - %	:	26.8	26.2
OPTIMUM MOISTURE - %	:	17.4	16.7
STANDARD DRY DENSITY AASHTO T99-%	:	106.9	108.7
ILLINOIS BEARING RATIO - %	:	3.6	3.3
SUBGRADE SUPPORT RATING	:	POOR	POOR

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BUILT-UP ROOF INVESTIGATIONS
WELDER CERTIFICATIONS
INSURANCE INVESTIGATIONS

CLIENT:

Ms. Karen Dvorsky
Terra Engineering, Ltd.
401 Main Street, Suite 1130
Peoria, Illinois 61602

W&A FILE NO. 7405002
DATE: 08-23-16

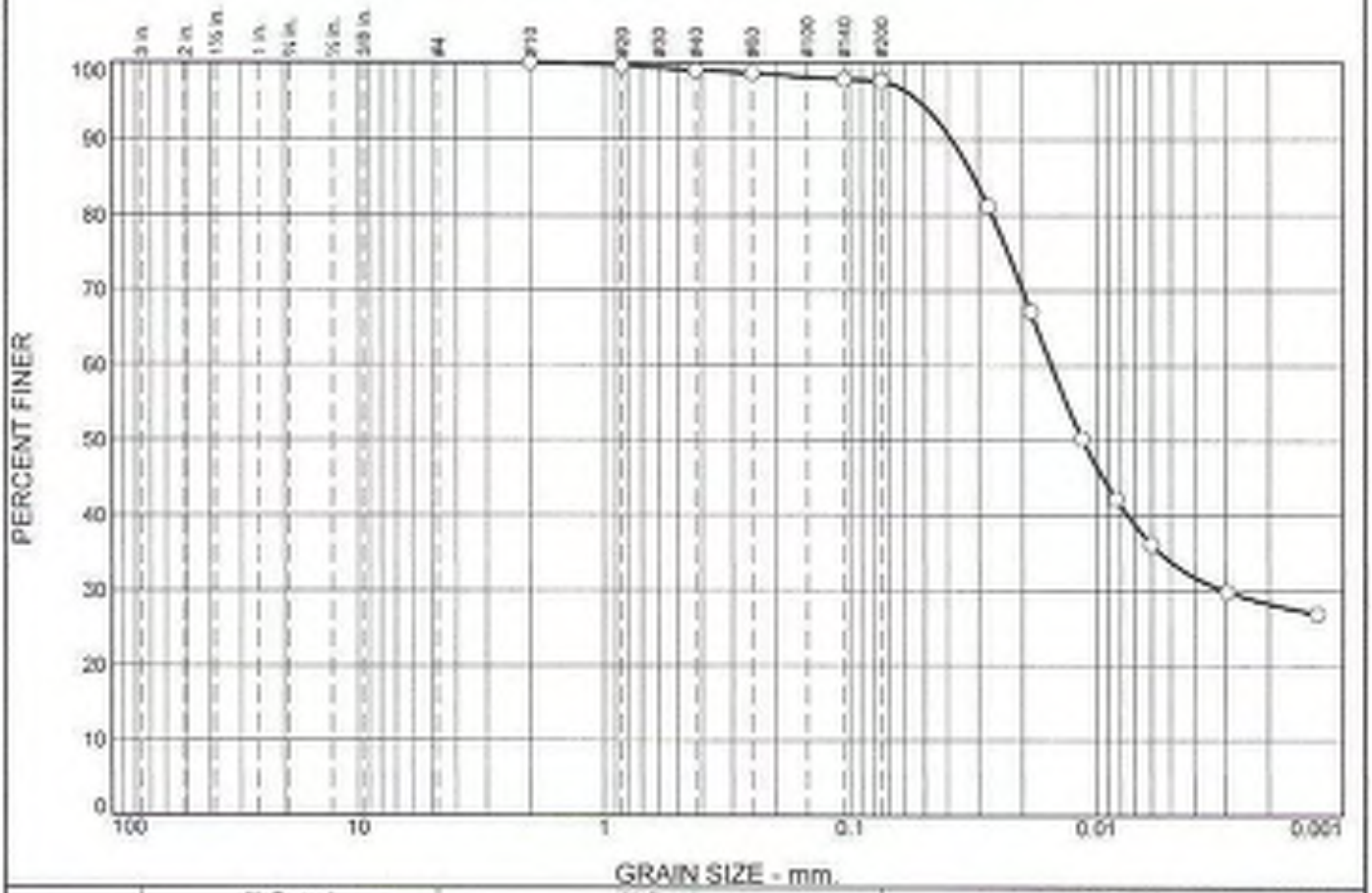
PROJECT:

Nofsinger Road Improvement
Section #13-00113-00-EG
Washington, Illinois

ILLINOIS BEARING RATIO TEST RESULTS

BORING NUMBER:	B-6	B-13
SAMPLE DEPTH-FEET:	1 - 4	1 - 4
STATION LOCATION:	30+37	44+16
STATION OFFSET:	19' Right	11' Right
GRAIN SIZE CLASSIFICATION:	SILTY CLAY LOAM	SILTY CLAY LOAM
HRB CLASSIFICATION & INDEX:	A-6 (14)	A-6(11)
NATURAL MOISTURE CONTENT-%:	26.8	26.2
ASTM D-698 OPTIMUM MOISTURE CONTENT-%:	17.4	16.7
ASTM D-698 MAXIMUM DRY DENSITY-PCF:	106.9	108.7
PERCENT COMPACTION ACHIEVED-%:	94.7	95.1
BEARING RATIO:	3.6	3.3
PERCENT SWELL-%	0.2	0.1
FINAL MOISTURE CONTENT (AFTER SOAK)-%:	18.1	17.8

GRAIN SIZE ANALYSIS REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.0	1.4	69.3	28.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.6		
#40	99.0		
#60	98.6		
#140	97.8		
#200	97.6		

* (no specification provided)

Material Description

Light Brown and Gray Brown,
SILTY CLAY LOAM

Atterberg Limits

PL= 22 LL= 36 PI= 14

Coefficients

D_{90}= 0.0388 D_{85}= 0.0314 D_{60}= 0.0153
D_{50}= 0.0114 D_{30}= 0.0030 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6 (14)

Remarks

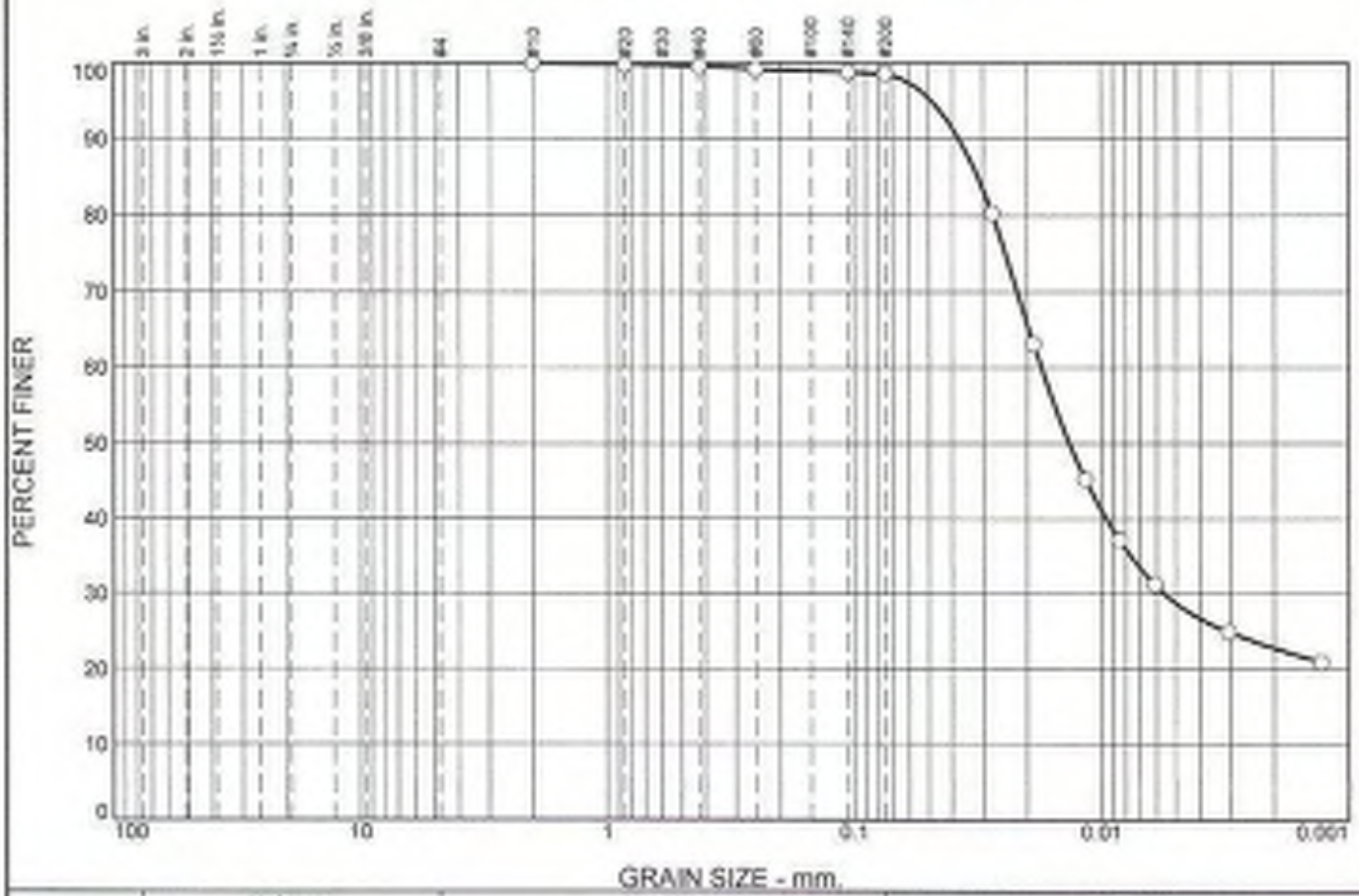
Location: BORING B-6, 1' - 4'

Date: 7-28-16

WHITNEY & ASSOCIATES
PEORIA, ILLINOIS
www.whitneyassociates.com

Client: Ms. Karen Dvorsky Terra Engineering, Ltd.
Project: NOFSINGER ROAD IMPROVEMENT
Washington, Illinois
Project No: 7905 **Figure** GS-1

GRAIN SIZE ANALYSIS REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	1.0	75.8	22.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.6		
#60	99.2		
#140	98.8		
#200	98.6		

* (no specification provided)

Material Description

Brown and Light Brown,
SILTY CLAY LOAM

Atterberg Limits

PL= 21 LL= 32 PI= 11

Coefficients

D_{90}= 0.0377 D_{85}= 0.0317 D_{60}= 0.0175
D_{50}= 0.0135 D_{30}= 0.0056 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6 (11)

Remarks

Location: BORING B-13; 1' - 4'

Date: 7-28-16

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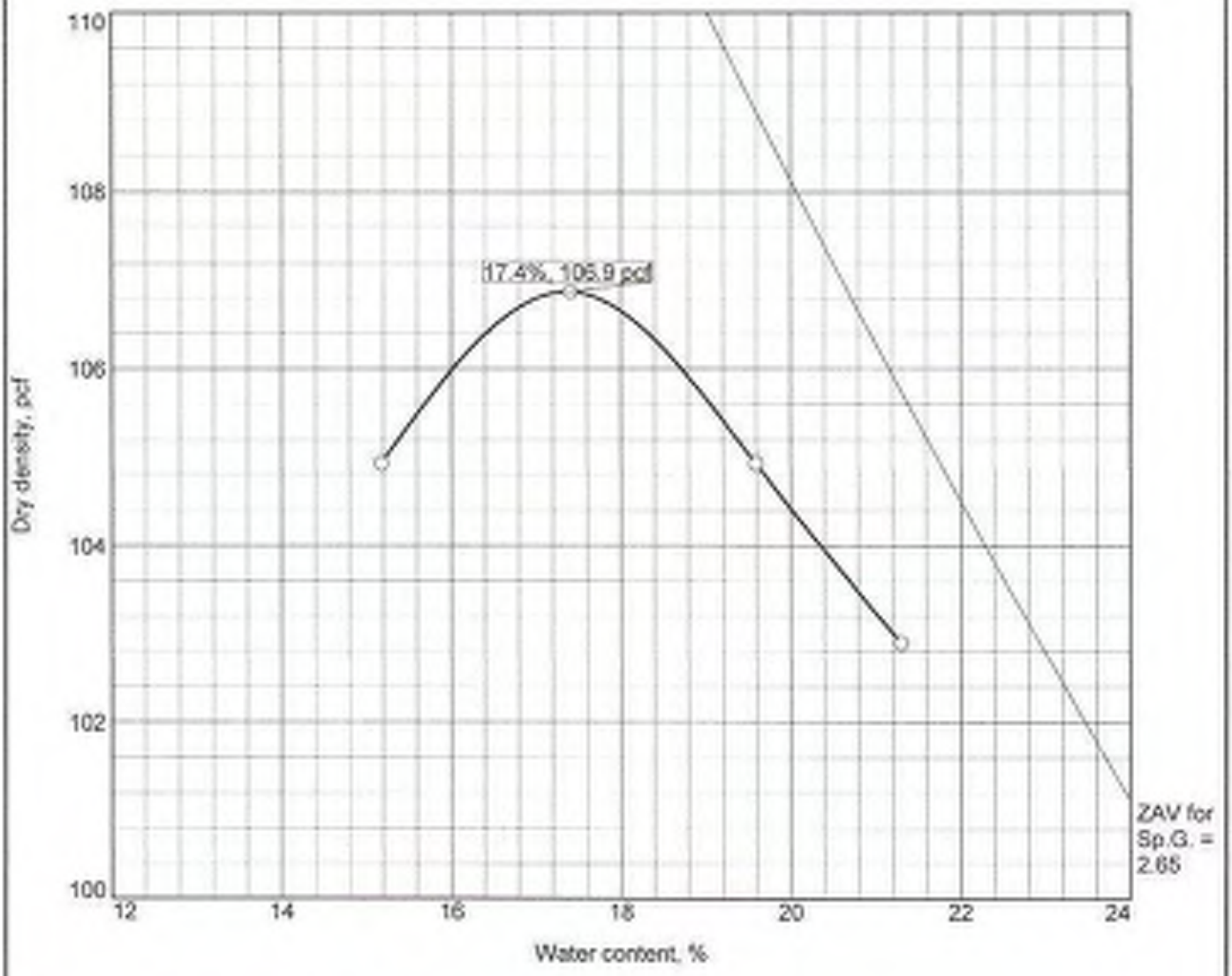
Client: Ms. Karen Dvorsky Terra Engineering, Ltd.
Project: NOFSINGER ROAD IMPROVEMENT
Washington, Illinois
Project No: 7405 **Figure** GS-2

STANDARD PROCTOR TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL	A-6 (14)	26.8		36	14	0.0	97.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 106.9 pcf Optimum moisture = 17.4 %	Light Brown and Gray Brown, SILTY CLAY LOAM

Project No. 7405 **Client:** Ms. Karen Dvorsky Terra Engineering, Ltd.

Project: NOFSINGER ROAD IMPROVEMENT

Washington, Illinois **Date:** 7-26-16

○ **Location:** BORING B-6; 1' - 4'

Remarks:

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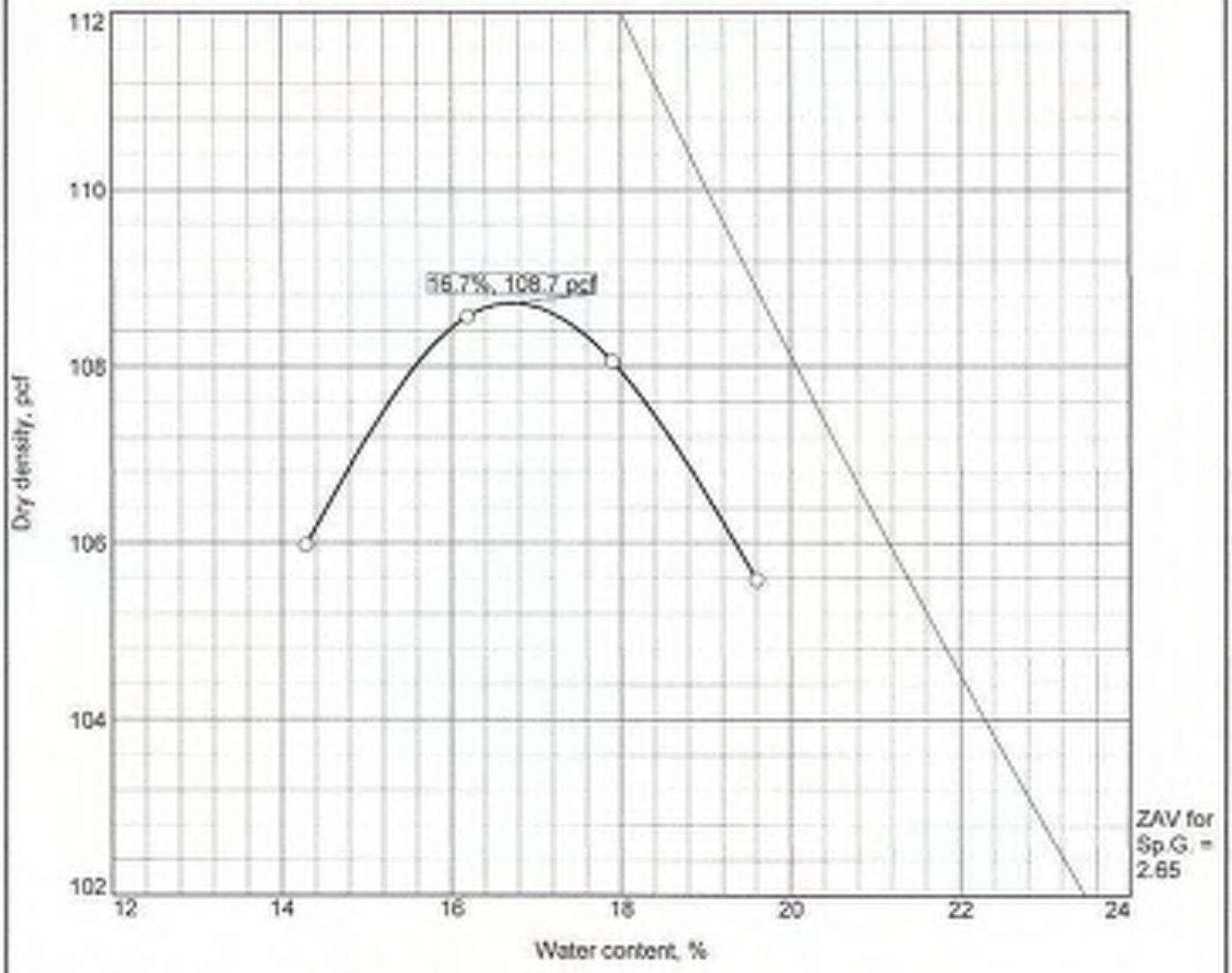
Figure P-1

STANDARD PROCTOR TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL	A-6 (11)	26.2		32	11	0.0	98.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.7 pcf Optimum moisture = 16.7 %	Brown and Light Brown, SILTY CLAY LOAM

Project No. 7405 **Client:** Ms. Karen Dvorsky Terra Engineering, Ltd.
Project: NOFSINGER ROAD IMPROVEMENT
Washington, Illinois **Date:** 7-26-16
○ **Location:** BORING B-13; 1' - 4'

Remarks:

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Figure P-2

TELEPHONE
309 673-2131

TESTS
DESIGN
REPORTS
ANALYSIS
INSPECTION
CONSULTATION
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CONSTRUCTION MATERIALS
AGGREGATES - ASPHALT - POZ-O-PAC

SOILS AND GRAVEL SURVEYS
MATERIALS QUALITY CONTROL
SOIL MECHANICS AND
FOUNDATION ENGINEERING
DRILLING - CORING - TESTING

CLASSIFICATION OF SOILS AND SOIL-AGGREGATE MIXTURES

General Classification	Granular Materials (35% or less passing 0.075 mm)							Silt-Clay Materials (More than 35% passing 0.075 mm)			
Group Classification	A-1		A-3	A-2				A-4	A-5	A-6	A-7
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6
Sieve Analysis, Percent passing: 2.00 mm (No. 10) 0.425 mm (No. 40) 0.075 mm (No. 200)	50 max. 30 max. 15 max.	... ... 50 max. 25 max.	... ... 51 min. 10 max.	... ... 35 max.	... ... 35 max.	... ... 35 max.	... ... 35 max.	... ... 36 min.	... ... 36 min.	... ... 36 min.	... ... 36 min.
Characteristics of Fraction passing 0.425 mm (No. 40): Liquid limit Plasticity index	... 6 max.		... N.P.	40 max. 10 max.	41 min. 10 max.	40 max. 11 min.	41 min. 11 min.	40 max. 10 max.	41 min. 10 max.	40 max. 11 min.	41 min. 11 min.
Usual Types of Significant Constituent Materials	Stone Fragments Gravel and Sand		Fine Sand	Silty or Clayey Gravel and Sand				Silty Soils		Clayey Soils	
General Rating as Subgrade	Excellent to Good							Fair to Poor			

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
SOIL CLASSIFICATION SYSTEM

DEVELOPED BY
PUBLIC ROADS ADMINISTRATION
REVISED BY
HIGHWAY RESEARCH BOARD

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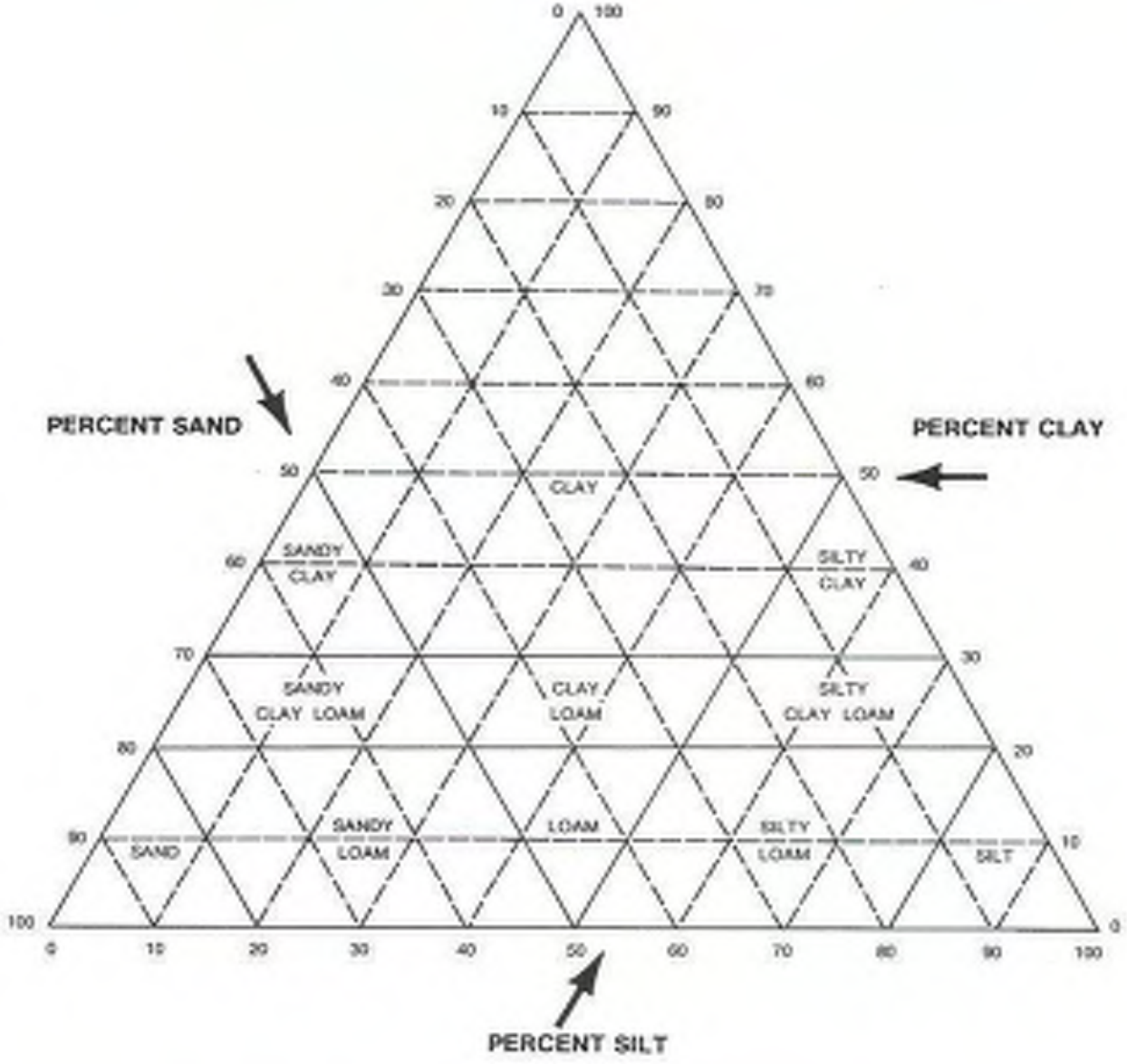
FOUNDATION ENGINEERING
DRILLING - CORING - TESTING



TRIANGULAR TEXTURAL CLASSIFICATION CHART

DEVELOPED BY
UNITED STATES BUREAU OF SOILS AND CHEMISTRY
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ARBITRATION • EXPERT WITNESS TESTIMONY
• • • • • • • • • •
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ASPHALT • AGGREGATES • EMULSIONS
POZZOLANIC MATERIALS • LIME

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BUILT-UP ROOF INVESTIGATIONS
WELDER CERTIFICATIONS
INSURANCE INVESTIGATIONS

SOIL MECHANICS CLASSIFICATION SYSTEMS

TEXTURAL CLASSIFICATION

DESCRIPTION	SIZE
BOULDERS	LARGER THAN 3.0 IN.
COARSE GRAVEL	0.75 IN. — 3.0 IN.
FINE GRAVEL	NO. 4 SIEVE — 0.75 IN.
COARSE SAND	NO. 10 SIEVE — NO. 4 SIEVE
MEDIUM SAND	NO. 40 SIEVE — NO. 10 SIEVE
FINE SAND	NO. 200 SIEVE — NO. 40 SIEVE
SILT	LESS THAN NO. 200 SIEVE — NONPLASTIC
CLAY	LESS THAN NO. 200 SIEVE — PLASTIC

QUANTITY CLASSIFICATION

DESCRIPTION	PERCENT
TRACE	0 - 5
SMALL AMOUNT	5 - 10
SOME	10 - 15
CONSIDERABLE	15 - 20
SUBORDINATE TEXTURAL CLASSIFICATION	OVER 20

RELATIVE DENSITY CLASSIFICATION — COHESIONLESS SOILS

N, BLOWS / FT.	RELATIVE DENSITY
0 - 4	VERY LOOSE
4 - 10	LOOSE
10 - 30	MEDIUM
30 - 50	DENSE
OVER 50	VERY DENSE

* CONSISTENCY CLASSIFICATION — COHESIVE SOILS

N, BLOWS / FT.	CONSISTENCY	Q_u, TONS / SQ. FT.
0 - 2	VERY SOFT	0.00 - 0.25
2 - 4	SOFT	0.25 - 0.50
4 - 8	MEDIUM	0.50 - 1.00
8 - 15	STIFF	1.00 - 2.00
15 - 30	VERY STIFF	2.00 - 4.00
OVER 30	HARD	OVER - 4.00

*** NOTE:**

THIS CLASSIFICATION SYSTEM IS TO BE USED SOLELY AS A GUIDE AND IS NOT ADEQUATE FOR PURPOSES OF DESIGN.