

June 9, 2021

via email

1980 US HWY 1, LLC
c/o PRINCIPAL REAL ESTATE INVESTORS, LLC
711 High Street
Des Moines, IA 50392

Attention: Mr. Kevin Stubbs
Director Architecture & Engineering

**Regarding: PRELIMINARY GEOTECHNICAL INVESTIGATION &
STORMWATER MANAGEMENT AREA EVALUATION
PROPOSED WAREHOUSE FACILITY
1980 U.S. HIGHWAY 1
BLOCK 148, LOTS 34, 35.01 & 36
NORTH BRUNSWICK, MIDDLESEX COUNTY, NEW JERSEY
WHITESTONE PROJECT NO.: GJ2117917.000**

Dear Mr. Stubbs:

Whitestone Associates, Inc. (Whitestone) has completed a preliminary geotechnical investigation and stormwater management (SWM) area evaluation at the above referenced site. The results of the limited evaluation and preliminary recommendations presented below are based on the soil conditions disclosed from a limited number of subsurface tests conducted during Whitestone's field investigation. Recommendations for further investigation also are included herein.

The purpose of the preliminary subsurface soils investigation was to assess anticipated geologic features, shallow groundwater and/or rock, refusal depths, existing fill, and the potential feasibility of shallow foundations and/or expected earthwork requirements. While the scope of this preliminary investigation will not be sufficient to formulate detailed design recommendations and a more comprehensive geotechnical investigation ultimately will be required, this preliminary investigation may be used to assess potentially development impactive geotechnical issues to support preliminary studies regarding the feasibility of developing the property.

1.0 SUMMARY OF FINDINGS

In general, the subsurface conditions preliminarily indicate conditions suitable for shallow foundation design. The exploration indicated the presence of moderately to highly moisture-sensitive soils throughout the site that will impact the planned construction. Based on past experience with similar soils, earthwork activities will require stringent soil moisture control efforts. Depending on the time of year of construction, site work should anticipate overexcavation of moisture sensitive soils in structural areas, using mechanical and/or chemical subgrade stabilization techniques, and exercising detailed attention to construction methods while maintaining strict moisture control. In addition, existing fill containing

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variable amounts of debris was encountered to a depth of up to four feet below ground surface (fbgs) that will require overexcavation below proposed foundations, if encountered at or below proposed foundation bearing elevations. Limited overexcavation of existing fill may be anticipated for proposed floor slab and pavement areas as well. In addition, weathered rock and rock were encountered at variable depths that will present excavation difficulties.

2.0 PROJECT DESCRIPTION

2.1 Site Location and Existing Conditions

The subject property located at 1980 U.S. Highway 1 in North Brunswick, Middlesex County, New Jersey currently houses a single-story office/warehouse building with a loading dock, wooded area, pavements, landscaping, and utilities. At the time of Whitestone's investigation, the existing structure was observed to be in relatively fair structural condition. The existing pavements were observed to be in fair to poor structural condition with multiple areas of variable cracking.

2.2 Site Geology

The site is located within the Piedmont Physiographic Providence of New Jersey. Specifically, the subject site is underlain by the Lower Jurassic-aged and Upper Triassic-age Siltstone, Sandstone, and Shale members of the Passaic Formation, which is part of the Brunswick Group. These members generally consist of reddish-brown to brownish-purple and grayish-red siltstone, sandstone, and shale. The overburden materials at the site include weathered shale, mudstone, and sandstone. Overburden materials also include glacial deposits and man-made fill associated with past and present development of the subject site.

2.3 Proposed Construction

Based on the January 20, 2021 (last revised) *Concept Plan 'A'* prepared by Bohler Engineering NJ, LLC (Bohler), the proposed redevelopment is anticipated to include demolishing the existing site structure and constructing an approximately 190,600-square feet (maximum footprint), single-story warehouse facility with a maximum height of 40 feet, loading dock area, truck trailer parking, pavements, landscaping, utilities, and SWM facilities potentially including an aboveground bioretention basin and porous pavements. The proposed building is not anticipated to include a basement or crawl space. No new retaining walls, with the exception of the below-grade walls for the loading dock area, are anticipated for redevelopment.

Detailed grading or structural loading information have not been finalized. Whitestone assumes the site will be redeveloped at or near existing site grades with maximum cut and fill on the order of one foot to five feet. Based on Whitestone's experience with similar structures, the maximum design loads are anticipated to be less than the following: column load - 150 kips, wall load - 2.0 kips/foot, and floor load - 150 pounds per square foot.

3.0 FIELD INVESTIGATION & LABORATORY TESTING

3.1 Field Exploration

Field exploration at the project site was completed by means of five soil borings (identified as B-1 through B-4 and offset B-1A) conducted with a truck-mounted drill rig using hollow stem augers and

split-spoon sampling techniques and eight soil profile pits (identified as SPP-1 through SPP-8) with a track-mounted excavator. The borings were conducted within accessible portions of the proposed building footprint and pavement areas to depths ranging from approximately one fbgs (offset conducted) to 13.3 fbgs. The profile pits were conducted within the proposed SWM facilities to depths ranging from approximately eight fbgs to nine fbgs. The subsurface tests were backfilled to the surface with excavated soils from the investigation and borings within existing paved areas were surficially restored with asphaltic pavement cold patch, as necessary. The locations of the subsurface tests are shown on the *Test Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The subsurface tests were conducted in the presence of a Whitestone engineer who conducted field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Soil borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D 1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations, where encountered, were recorded during and immediately after the completion of field operations prior to backfilling the tests. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

3.2 Laboratory Program

A representative sample of a selected strata encountered were subjected to a laboratory program that included Atterberg limits determination (ASTM D-4318), moisture content determinations (ASTM D-2216) and washed gradation analyses (ASTM D-422) in order to conduct supplementary engineering soil classifications in general accordance with ASTM D-2487. The soil stratum tested was classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table. Quantitative test results are provided in Appendix B.

PHYSICAL/TEXTURAL ANALYSES SUMMARY							
Boring	Sample	Depth (fbgs)	% Passing No. 200 Sieve	Moisture Content (%)	Liquid Limit (%)	Plastic Index (%)	USCS Classification
B-2	S-3	4.0 - 6.0	92.6	27.1	56	36	CH

4.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the subsurface tests consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Surface Materials: The subsurface tests were conducted within either existing paved areas, gravel-covered areas, or grass-covered areas. The borings within existing paved areas encountered approximately 1.5 inches to 2.5 inches of asphaltic concrete pavement at the surface underlain by approximately two inches to five inches of stone subbase materials. The test within an existing gravel-covered area encountered approximately four inches of gravel at the surface. The tests within existing grass-covered areas encountered approximately four inches to six inches of topsoil at the surface.

Existing Fill: Beneath the surface cover, the majority of subsurface tests encountered existing fill that generally consisted of silty sand with variable amounts of debris. The debris encountered consisted of concrete, brick, metal, and cinderblock fragments. Borings B-1 and B-4 were terminated within the existing fill at depths of approximately four fbgs and one fbgs, respectively. Within the remaining tests, the existing fill, where encountered, extended to depths ranging from approximately one fbgs to two fbgs. SPT N-values within the existing fill ranged between four blows per foot (bpf) and refusal (refusal defined as greater than 50 blows per six inches of split-spoon sampler advancement).

Glacial Deposits: Underlying the surface cover and/or existing fill, the majority of the tests encountered natural glacial deposits generally consisting of silty sand (USCS: SM) with variable amounts of gravel, poorly graded sand with silt (USCS: SP-SM), lean clay (USCS: CL) with variable amounts of sand and gravel, and/or fat clay (USCS: CH). Where encountered, the glacial deposits extended to depths ranging from approximately four fbgs to eight fbgs. SPT N-values within coarse-grained portions of this stratum ranged between 10 bpf and 24 bpf, generally indicating medium dense relative density and averaging approximately 17 bpf. Pocket penetrometer tests within fine-grained portions of this stratum resulted in unconfined compressive strengths ranging between approximately 0.5 ton per square foot (tsf) and 1.5 tsf, generally indicating medium stiff to stiff consistency.

Residual Soils: Underlying the glacial deposits, a portion of the tests encountered natural residual soils generally consisting of silty sand (USCS: SM) with variable amounts of gravel and/or silt (USCS: ML) with gravel. Borings B-4A was terminated within the residual soils at a depth of approximately 10 fbgs. Within the remaining tests, the residual soils, where encountered, extended to depths ranging from approximately six fbgs to 13 fbgs. SPT N-values within coarse-grained portions of this stratum ranged between 14 bpf and 41 bpf, generally indicating medium dense to dense relative density and averaging approximately 22 bpf.

Weathered Rock/Bedrock: Beneath the glacial deposits and/or residual soils, the majority of the tests encountered weathered rock materials. The top of weathered rock was encountered at depths ranging from approximately four fbgs to 13 fbgs. The above tests were terminated within the weathered rock materials or weathered rock/bedrock interface at depths ranging from approximately eight fbgs to 13.3 fbgs. SPT N-values within this stratum generally were in the refusal range.

Groundwater: Static groundwater was encountered within the majority of the tests at depths ranging from approximately two fbgs to eight fbgs. Additionally, indications of seasonal high groundwater were encountered within the soil profile pits at the depths indicated in Section 6.0. Seasonal variations, temperature effects, and recent rainfall conditions may influence the levels of the groundwater. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater level.

5.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered during Whitestone's limited subsurface investigation for the proposed redevelopment and is intended to provide general characteristics of the subsurface conditions for preliminary planning purposes and should not be utilized for final design

of structural foundations, floor slabs, or pavements. These preliminary considerations and site development options should be confirmed or revised upon development of the final project design concept and completion of a site-specific subsurface investigation and engineering analyses.

Foundations: Whitestone preliminarily anticipates that the structures may be supported on conventional spread and continuous wall footings designed to bear either within the underlying natural materials and/or controlled structural fill materials that are properly evaluated, placed, compacted, and prepared in order to control their moisture content. Existing fill should be overexcavated where encountered at or below proposed foundation bearing elevations and the resulting excavation should be restored with controlled structural backfill. Foundations bearing within the above materials may be preliminarily designed to impart a maximum allowable net bearing pressure in the range of 2,000 pounds per square foot (psf) to 4,000 psf, depending on final design column and wall loading, column spacing, settlement tolerances, and the final geotechnical investigation. Reuse of the existing fill for foundation support will be contingent upon supplemental evaluation, as recommended herein. The fat clay (USCS: CH) sporadically encountered should be overexcavated if encountered at or within 24 inches of foundation bearing elevations and resulting excavations should be restored with approved, controlled structural fill materials.

Floor Slabs and Pavements: Whitestone preliminarily anticipates that the properly evaluated, prepared and approved existing fill, natural site subgrade soils, and/or controlled structural imported fill will be suitable for support of the proposed floor slabs and pavements. At least limited overexcavation of existing fill may be required due to the variability that exists within existing fill, evidenced by the debris encountered. Subgrade stabilization and protection may also be necessary during wet conditions to obtain a stable surface. Subgrade stabilization may be achieved through the use of separation geotextiles, geogrids, and/or the addition of lime-cement to the subgrade. Fat clays (USCS: CH), if encountered at the proposed floor slab or pavement subgrades, should be overexcavated to a minimum depth of 12 inches below proposed subgrade elevation and resulting excavations should be restored with approved, controlled structural fill materials.

On-Site Soil Reusability: Whitestone preliminarily anticipates that the majority of the existing fill and natural site soils situated above the groundwater table will be suitable for selective reuse as structural fill and/or backfill where free of debris and moisture contents are controlled within two percent of the optimum and the soils are placed during favorable weather conditions. Fat clay soils (USCS: CH), where encountered, should not be used as structural backfill materials due to their moisture sensitivity and expansion potential. Reuse of the existing fill will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations during construction as recommended herein. Soils located at or near the existing groundwater table will require extensive drying prior to reuse.

Based on the conditions disclosed by the subsurface exploration and the results of the laboratory test results, portions of the on-site natural soils contain an appreciable amount of fines and are not anticipated to be immediately suitable for reuse as structural fill and/or backfill due to high moisture content characteristics. Disturbance of these soils should be minimized. The on-site moisture sensitive soils, while stable and often hard when in a dry natural state, will degrade when wetted or disturbed. Whitestone anticipates that the sandy and/or less plastic site soils, where encountered, may be suitable for reuse as structural fill and/or backfill provided moisture contents are controlled within two percent of the optimum only during favorable weather conditions. Due to moisture sensitivity, use of portions of the on-site soils should expect mixing with a granular material, extensive moisture conditioning, and/or drying to facilitate their reuse, workability, and compaction in fill areas. These materials will become increasingly difficult to reuse and compact where wetted beyond the optimum moisture content. Materials that become exceedingly wet likely will require discing and aerating and extended time to dry during favorable weather.

Cobble- and boulder-sized weathered rock/bedrock materials or similarly sized materials greater than three inches in diameter will need to be separated from on-site soils to be placed as structural fill or backfill. Cobble-sized materials between three inches to 12 inches may be crushed or individually placed in structural fill or backfill layers deeper than two feet below proposed foundation and pavement subgraded levels. Care must be taken to individually seat any large particles and to compact soil around large particles with hand operated equipment to minimize risk of void formation. Boulder-sized greater than 12 inches in diameter need to be crushed prior to replacement as structural fill materials. Materials greater than three inches in size should be placed a minimum of three feet from utilities.

Excavation Difficulties: Weathered rock and bedrock were encountered across the subject property at variable depths that can present difficult excavation. Removal of weathered rock and potentially limited bedrock may be required within portions of the proposed site foundations and utilities, depending on final grading. Heavy excavating equipment with ripping tools will typically be effective in removing dense/hard weathered soils, transition materials, and cobble/boulder-sized rock fragments during site mass grading. The speed and ease of excavation will depend on the type of grading equipment, the skill of the equipment operators, and the geologic structure of the material itself, such as the direction of planes of weakness and spacing between discontinuities. Planned excavation in confined excavations, such as for footing and utility trenches, may require ripping tools, pneumatic hammers, pre-spitting and/or expansive grout.

Groundwater Control: Static groundwater was encountered at depths as shallow as two fbgs. Additionally, perched/trapped groundwater may be encountered within the existing fill, at the existing fill /natural soil interface, within fine-grained portions of the natural materials, and at the natural soil/weathered rock interface, especially following precipitation events. As such, construction phase dewatering of static and perched/trapped groundwater through the use of gravity fed sump pumps should be anticipated during excavation activities for this site. Additionally, permanent groundwater control including perimeter drains for proposed foundations may be required, depending on final grades.

Supplemental Borings: A supplemental subsurface investigation designed to address site-specific conditions for proposed construction should be conducted following demolition of the existing site structure and the finalization of the design concept, grading, and general site layout. The final subsurface investigation and geotechnical evaluation should be conducted to obtain subsurface information across the site at more closely spaced intervals within the proposed building, pavements, and utility alignments, etc.

6.0 PRELIMINARY SWM AREA EVALUATION

General: Soil profile pits SPP-1 through SPP-8 were conducted within accessible areas of the SWM facility locations provided by Bohler. The soil profile pits within the SWM areas were terminated at depths ranging between approximately eight fbgs to nine fbgs.

Estimated Seasonal High Groundwater Levels: The methods used in determining the seasonal high groundwater level include evaluating the soil morphology within a test excavation and identifying irregular spots or blotches of different colors or minerals unlike that of the surrounding soil (mottles). A summary of the estimated seasonal high groundwater observations as well as infiltration test results are included in the following table.

INFILTRATION TEST SUMMARY					
Profile Pit #	Surface Elevation (feet*)	ESHGW (fbgs/feet*)	USDA Classification @ Test	Infiltration Test	
				Depth (fbgs/feet*)	Rate (in/hour)
SPP-1	110.5	2.0/108.5	Clay	2.0/108.5	< 0.2
SPP-2	112.0	2.0/110.0	Clay	2.0/110.0	< 0.2
SPP-3	109.5	2.0/107.5	Clay	2.0/107.5	< 0.2
SPP-4	110.5	2.0/108.5	Clay	2.0/108.5	< 0.2
SPP-5	113.0	1.5/111.5	Clay	1.5/111.5	< 0.2
SPP-6	112.0	1.5/110.5	Clay	1.5/110.5	< 0.2
SPP-7	113.0	1.5/111.5	Clay	1.5/111.5	< 0.2
SPP-8	114.0	2.0/112.0	Clay	2.0/112.0	< 0.2

* above NAVD 88

Soil Infiltration Rates: An in-situ infiltration test was conducted within the proposed SWM area at soil profile pit SPP-1. Infiltration testing was conducted using the single-ring infiltration test method per the *New Jersey Stormwater Best Practices Manual*. The test resulted in an infiltration rate of less than 0.2 inches per hour (iph). Infiltration test results are provided in Appendix C, Soil Profile Pit Logs are included in Appendix A. Representative samples within the remaining profile pits were subjected to tube permeameter analysis as detailed in *New Jersey Stormwater Best Practices Manual*. Laboratory tube permeameter testing resulted in a permeability rate of less than 0.2 iph. Individual tube permeameter test results are provided in Appendix B.

Conclusions and Recommendations: The results of the subsurface investigation and infiltration testing indicate that the tested site soils consist predominantly of clay materials that are relatively impermeable and not conducive for SWM infiltration. Additionally, indications of seasonal high groundwater were observed as shallow as 1.5 fbgs. Based on the findings of this investigation, Whitestone recommends using BMPs that are not reliant upon subsurface infiltration.

7.0 CLOSING

Whitestone appreciates the opportunity to be of service to 1980 US Hwy 1, LLC and Principal Real Estate Investors, LLC. Please note that Whitestone has the capability to conduct the additional geotechnical engineering services recommended herein. Please contact us at (908) 668-7777 with any questions or comments regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.



Mudar Khantamr, P.E.
 Project Manager



Laurence W. Keller, P.E.
 Principal, Geotechnical Services

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 Enclosures
 Copy: Danielle Loeffler, Avison Young
 Katie Sherman, Avison Young



FIGURE 1

Test Location Plan

APPENDIX A

Records of Subsurface Exploration

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-1**

 Page **1** of **1**

Project: Proposed Warehouse Facility			WAI Project No.: GJ2117917.000		
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ			Client: 1980 US Highway 1, LLC c/o Principal Real Estate Investors, LLC		
Surface Elevation: ± 113.0 feet		Date Started: 5/20/2021		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 4.0 feet bgs		Date Completed: 5/20/2021		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building		Logged By: MH		During: NE --- ▼	
Drill / Test Method: HSA / SPT		Contractor: AD		At Completion: NE --- ▼	
		Equipment: CME-55		24 Hours: --- --- ▼	
				At Completion: --- --- ☒	
				24 Hours: --- --- ☒	



SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.5	PAVEMENT	2" Asphalt, 4" Subbase Stone	
0.5 - 2	S-1	X	3 - 3 - 2	10	5		FILL	Dark Reddish-Brown Silty Sand, Moist (FILL)	
2 - 4	S-2	X	1 - 2 - 2 - 3	3	4			Low Recovery, Presumed As Above (FILL)	
						4.0			
						5.0		Boring Log B-1 Terminated at a Depth of 4.0 Feet Below Ground Surface Due to Existing Utility; Offset to B-1A	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-1A**

 Page 1 of 1

Project: Proposed Warehouse Facility			WAI Project No.: GJ2117917.000		
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ			Client: 1980 US Highway 1, LLC c/o Principal Real Estate Investors, LLC		
Surface Elevation: ± 113.0 feet		Date Started: 5/20/2021		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 11.0 feet bgs		Date Completed: 5/20/2021		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building		Logged By: MH		During: 2.0 111.0 ▼	
Drill / Test Method: HSA / SPT		Contractor: AD		At Completion: 4.0 109.0 ▼	
		Equipment: CME-55		24 Hours: --- --- ▼	
				At Completion: --- --- 	
				24 Hours: --- --- 	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PAVEMENT	2.5" Asphalt, 2.0" Subbase Stone	B-1 Offset
						0.4	GLACIAL DEPOSITS		
0.5 - 2	S-1		7 - 5 - 5	16	10			Brown Silty Sand with Gravel, Very Moist, Medium Dense (SM)	
2 - 4	S-2		7 - 8 - 9 - 8	16	17			As Above, Wet (SM)	
4 - 6	S-3		5 - 3 - 3 - 3	20	6			Gray Sandy Lean Clay with Gravel, Wet, Medium Stiff (CL)	
6 - 8	S-4		4 - 6 - 8 - 13	18	14		RESIDUAL	Reddish-Brown Silty Sand with Gravel, Wet, Medium Dense (SM)	
8 - 9.9	S-5		10 - 15 - 36 - 50/5"	16	51		WEATHERED ROCK	Reddish-Brown Weathered Rock, Very Dense (WR)	
						11.0			
								Boring Log B-1A Terminated at a Depth of 11.0 Feet Below Ground Surface Due to Auger Refusal	
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-2**

 Page **1** of **1**

Project: Proposed Warehouse Facility		WAI Project No.: GJ2117917.000	
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ		Client: 1980 US Highway 1, LLC c/o Principal Real Estate Investors, LLC	
Surface Elevation: ± 112.0 feet	Date Started: 5/20/2021	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 13.3 feet bgs	Date Completed: 5/20/2021	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: MH	During: 2.0 110.0	At Completion: --- ---
Drill / Test Method: HSA / SPT	Contractor: AD	At Completion: 4.0 108.0	
Auto Hammer	Equipment: CME-55	24 Hours: --- ---	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PAVEMENT	2" Asphalt, 5" Stone Subbase	
0.5 - 2	S-1		3 - 9 - 15	18	24	0.6	GLACIAL DEPOSITS	Reddish-Brown Poorly Graded Sand with Silt, Moist, Medium Dense (SP-SM)	
2 - 4	S-2		4 - 6 - 8 - 4	22	14	3.0		As Above, Wet (SP-SM)	
4 - 6	S-3		3 - 3 - 5 - 5	22	8	5.0		Gray Fat Clay, Wet, Stiff (CH)	Qu = 1.5 tsf
6 - 8	S-4		6 - 6 - 9 - 11	18	15	8.0		As Above (CH)	LL = 56, PI = 36
8 - 10	S-5		5 - 8 - 15 - 14	20	23	10.0	RESIDUAL	Reddish-Brown Silt with Gravel, Wet, Very Stiff (ML)	
13 - 13.3	S-6		19 - 50/3"	8	50/3"	13.0	WR	Reddish-Brown Weathered Rock, Wet, Very Dense (WR)	
						13.3		Boring Log B-2 Terminated at a Depth of 13.3 Feet Below Ground Surface Due to Auger Refusal	
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-3**

 Page 1 of 1

Project: Proposed Warehouse Facility			WAI Project No.: GJ2117917.000		
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ			Client: 1980 US Highway 1, LLC c/o Principal Real Estate Investors, LLC		
Surface Elevation: ± 112.0 feet		Date Started: 5/20/2021		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 12.0 feet bgs		Date Completed: 5/20/2021		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building		Logged By: MH		During: NE --- ▽	
Drill / Test Method: HSA / SPT		Contractor: AD		At Completion: NE --- ▽	
		Equipment: CME-55		24 Hours: --- --- ▽	
				At Completion: --- --- ▽	
				24 Hours: --- --- ▽	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.5	PAVEMENT	2" Asphalt, 4" Subbase Stone	
0.5 - 2	S-1		5 - 4 - 6	16	10		GLACIAL DEPOSITS	Gray Lean Clay, Moist, Stiff (CL)	
2 - 4	S-2		4 - 4 - 10 - 7	12	14			As Above, Gravel, Very Stiff (CL)	
4 - 6	S-3		10 - 7 - 7 - 10	20	14	5.0		As Above (CL)	
6 - 8	S-4		12 - 20 - 21 - 20	20	41		RESIDUAL	Reddish-Brown Silty Sand with Gravel, Moist, Medium Dense (SM)	Highly Weathered Rock
8 - 8.9	S-5		38 - 50/5"	10	50/5"			As Above, Dense (SM)	
						8.0	WEATHERED ROCK	Reddish-Brown Weathered Rock, Very Dense (WR)	
						10.0			
						12.0			
						15.0			
						20.0			
						25.0			
								Boring Log B-3 Terminated at a Depth of 12.0 Feet Below Ground Surface Due to Auger Refusal	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-4A**

 Page 1 of 1

Project: Proposed Warehouse Facility			WAI Project No.: GJ2117917.000		
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ			Client: 1980 US Highway 1, LLC c/o Principal Real Estate Investors, LLC		
Surface Elevation: ± 113.0 feet		Date Started: 5/20/2021		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 10.0 feet bgs		Date Completed: 5/20/2021		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Pavement		Logged By: MH		During: NE --- ▼	
Drill / Test Method: HSA / SPT		Contractor: AD		At Completion: NE --- ▼	
		Equipment: CME-55		24 Hours: --- --- ▼	
				At Completion: --- --- ▼	
				24 Hours: --- --- ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0		Offset B-3A 4.0' South Augering to 2.0 fbgs	
2 - 4	S-1		2 - 2 - 3 - 3	12	5	2.0	GLACIAL DEPOSITS	Gray Lean Clay, Moist, Medium Stiff (CL)	Qu = 0.5 tsf
4 - 6	S-2		3 - 3 - 7 - 10	20	10	5.0		As Above, Stiff (CL)	Qu = 1.5 tsf
6 - 8	S-3		7 - 10 - 10 - 13	20	20	8.0		As Above, Very Stiff (CL)	Some Sand
8 - 10	S-4		8 - 10 - 10 - 18	20	20	10.0	RESIDUAL	Reddish-Brown Silty Sand with Gravel, Very Moist, Medium Dense (SM)	
						15.0		Boring Log B-4A Terminated at a Depth of 10.0 Feet Below Ground Surface	
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-1**

 Page 1 of 1

Project: Proposed Warehouse Facility				WAI Project No.: GJ2117917.000			
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ				Client: 1980 US Highway 1, LLC			
Surface Elevation: ± 110.5 feet		Date Started: 5/20/2021		Water Depth Elevation (feet bgs) (feet)		Estimated Seasonal High	
Termination Depth: 9.0 feet bgs		Date Completed: 5/20/2021				Groundwater Depth Elevation (feet bgs) (feet)	
Proposed Location: Porous Pavement		Logged By: MH		During: 8.0 102.5 ▼		At Completion: 2.0 108.5	
Excavating Method: Test Pit Excavation		Contractor: TS		At Completion: 9.0 101.5 ▼			
Test Method: Visual Observation		Rig Type: Komatsu		24 Hours: --- --- ▼			

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			
			0 - 0.5	TOPSOIL	6" Topsoil	
			0.5 - 2	FILL	Reddish-Brown LOAM; Granular Structure; Moist; Loose; 10% Roots; No Mottles; Clear Boundary; Debris	Debris: Metal
			2 - 5.5	GLACIAL DEPOSITS	Gray to Brown CLAY; Massive Structure; <5% Roots; Common <15MM Mottles; Clear Boundary	
			5.5 - 7	RESIDUAL	Reddish-Brown LOAM; Single Grain Structure; Moist; Stiff; No Roots; Mottles; Clear Boundary	
			7 - 9	WEATHERED ROCK	Reddish-Brown Weathered Rock; Moist to Wet	
			8.0			Wet @ 8.0 fbgs
			9.0			
			10.0		Soil Profile Pit SPP-1 Terminated at a Depth of 9.0 Feet Below Ground Surface Due to Bucket Refusal	
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-2**

 Page 1 of 1

Project: Proposed Warehouse Facility		WAI Project No.: GJ2117917.000									
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ		Client: 1980 US Highway 1, LLC									
Surface Elevation: ± 112.0 feet	Date Started: 5/20/2021	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Water Depth Elevation (feet bgs) (feet)</th> </tr> <tr> <td>During: 7.0</td> <td>105.0 ▼</td> </tr> <tr> <td>At Completion: 8.0</td> <td>104.0 ▼</td> </tr> <tr> <td>24 Hours: ---</td> <td>--- ▼</td> </tr> </table>		Water Depth Elevation (feet bgs) (feet)		During: 7.0	105.0 ▼	At Completion: 8.0	104.0 ▼	24 Hours: ---	--- ▼
Water Depth Elevation (feet bgs) (feet)											
During: 7.0	105.0 ▼										
At Completion: 8.0	104.0 ▼										
24 Hours: ---	--- ▼										
Termination Depth: 8.0 feet bgs	Date Completed: 5/20/2021	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)</th> </tr> <tr> <td>At Completion: 2.0</td> <td>110.0</td> </tr> </table>		Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)		At Completion: 2.0	110.0				
Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)											
At Completion: 2.0	110.0										
Proposed Location: Porous Pavement	Logged By: MH										
Excavating Method: Test Pit Excavation	Contractor: TS										
Test Method: Visual Observation	Rig Type: Komatsu										

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
2.0	T-1A/B	TUBES	0.0				
			0 - 0.5	TOPSOIL	6" Topsoil		
			0.5 - 2	FILL	Reddish-Brown LOAM; Granular Structure; Moist; Loose; 10% Roots; No Mottles; Clear Boundary; Debris		
			2.0				
			2 - 4	GLACIAL DEPOSITS	Gray to Brown CLAY; Massive Structure; <5% Roots; Common <15MM Mottles; Clear Boundary		
			3.0				
			4.0				
			4 - 8	WEATHERED ROCK	Reddish-Brown Weathered Rock; Moist to Wet		
			5.0				
			6.0				
7.0	▼				Wet @ 7.0 fbgs		
8.0	▼						
			9.0			Soil Profile Pit SPP-2 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Bucket Refusal	
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-3**

 Page 1 of 1

Project: Proposed Warehouse Facility		WAI Project No.: GJ2117917.000									
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ		Client: 1980 US Highway 1, LLC									
Surface Elevation: ± 109.5 feet	Date Started: 5/20/2021	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Water Depth Elevation (feet bgs) (feet)</th> </tr> <tr> <td>During: 6.0</td> <td>103.5 ▼</td> </tr> <tr> <td>At Completion: 6.0</td> <td>103.5 ▼</td> </tr> <tr> <td>24 Hours: ---</td> <td>--- ▼</td> </tr> </table>		Water Depth Elevation (feet bgs) (feet)		During: 6.0	103.5 ▼	At Completion: 6.0	103.5 ▼	24 Hours: ---	--- ▼
Water Depth Elevation (feet bgs) (feet)											
During: 6.0	103.5 ▼										
At Completion: 6.0	103.5 ▼										
24 Hours: ---	--- ▼										
Termination Depth: 8.5 feet bgs	Date Completed: 5/20/2021	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)</th> </tr> <tr> <td>At Completion: 2.0</td> <td>107.5</td> </tr> </table>		Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)		At Completion: 2.0	107.5				
Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)											
At Completion: 2.0	107.5										
Proposed Location: Porous Pavement	Logged By: MH										
Excavating Method: Test Pit Excavation	Contractor: TS										
Test Method: Visual Observation	Rig Type: Komatsu										

SAMPLE INFORMATION			DEPTH		HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet				
2.0	T-1A/B	TUBES	0.0				Wet @ 6.0 fbgs
			0 - 0.5	TOPSOIL	6" Topsoil		
			0.5 - 2	FILL	Reddish-Brown LOAM; Granular Structure; Moist; Loose; 10% Roots; No Mottles; Clear Boundary; Debris		
			2.0				
			2 - 4	GLACIAL DEPOSITS	Gray to Brown CLAY; Massive Structure; <5% Roots; Common <15MM Mottles; Clear Boundary		
			3.0				
			4.0				
			4 - 8.5	WEATHERED ROCK	Reddish-Brown Weathered Rock; Moist to Wet		
			5.0				
			6.0				
			9.0		Soil Profile Pit SPP-3 Terminated at a Depth of 8.5 Feet Below Ground Surface Due to Bucket Refusal		
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-4**

 Page 1 of 1

Project: Proposed Warehouse Facility				WAI Project No.: GJ2117917.000			
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ				Client: 1980 US Highway 1, LLC			
Surface Elevation: ± 110.5 feet		Date Started: 5/20/2021		Water Depth Elevation (feet bgs) (feet)		Estimated Seasonal High	
Termination Depth: 9.0 feet bgs		Date Completed: 5/20/2021				Groundwater Depth Elevation (feet bgs) (feet)	
Proposed Location: Porous Pavement		Logged By: MH		During: 8.0 102.5 ▼		At Completion: 2.0 108.5	
Excavating Method: Test Pit Excavation		Contractor: TS		At Completion: 8.0 102.5 ▼			
Test Method: Visual Observation		Rig Type: Komatsu		24 Hours: --- --- ▼			

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS	
Depth (feet)	Number	Type	feet				
2.0	T-1A/B	TUBES	0.0				
			0 - 0.5	TOPSOIL	6" Topsoil		
			0.5 - 2	FILL	Reddish-Brown LOAM; Granular Structure; Moist; Loose; 10% Roots; No Mottles; Clear Boundary; Debris		
			2.0				
			2 - 4	GLACIAL DEPOSITS	Gray to Brown CLAY; Massive Structure; <5% Roots; Common <15MM Mottles; Clear Boundary		
			3.0				
			4.0				
			4 - 9	WEATHERED ROCK	Reddish-Brown Weathered Rock; Moist to Wet		
			5.0				
			6.0				
			7.0				
			8.0				
			9.0				
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-6**

 Page 1 of 1

Project: Proposed Warehouse Facility			WAI Project No.: GJ2117917.000		
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ			Client: 1980 US Highway 1, LLC		
Surface Elevation: ± 112.0 feet	Date Started: 5/21/2021	Water Depth Elevation (feet bgs) (feet)		Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)	
Termination Depth: 9.0 feet bgs	Date Completed: 5/21/2021				
Proposed Location: SWM	Logged By: MK	During: 6.0 106.0	At Completion: 1.5 110.5		
Excavating Method: Test Pit Excavation	Contractor: TS	At Completion: 8.0 104.0			
Test Method: Visual Observation	Rig Type: Komatsu	24 Hours: --- ---			

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
1.5	T-1A/B	TUBES	0.0			
			0 - 0.5	TOPSOIL	6" Topsoil	
			0.5 - 1.5	FILL	Gray Silty Sand with Gravel, Moist (FILL)	
			1.5 - 4	GLACIAL DEPOSITS	Light Gray CLAY; Fine Structure; Moist; Stiff; No Roots; Many Orange Brown Mottles (>15MM)	
			4 - 6	RESIDUAL	Reddish-Brown CLAY LOAM; Moist; No Roots; Faint Mottles	
			6 - 9	WEATHERED ROCK	Reddish- Brown Weathered Rock; Wet	
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			
					Soil Profile Pit SPP-6 Terminated at a Depth of 9.0 Feet Below Ground Surface Due to Bucket Refusal	

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-7**

 Page 1 of 1

Project: Proposed Warehouse Facility		WAI Project No.: GJ2117917.000	
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ		Client: 1980 US Highway 1, LLC	
Surface Elevation: ± 113.0 feet	Date Started: 5/21/2021	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 8.0 feet bgs	Date Completed: 5/21/2021		
Proposed Location: Porous Pavement	Logged By: MK	During: 6.0 107.0 ▼	At Completion: 1.5 111.5
Excavating Method: Test Pit Excavation	Contractor: TS	At Completion: 7.5 105.5 ▼	
Test Method: Visual Observation	Rig Type: Komatsu	24 Hours: --- --- ▼	

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
			0.0			Debris: Concrete (~12" Diameter Fragments)
			0 - 0.3	GRAVEL	4" Gravel	
			0.3 - 1.5	FILL	Brown to Gray Silty Sand with Debris; Moist (FILL)	
			1.0			
1.5	T-1A/B	TUBES	1.5 - 4	GLACIAL DEPOSITS	Light Gray CLAY; Fine Structure; Moist; Stiff; No Roots; Many Orange Brown Mottles (>15MM)	
			2.0			
			3.0			
			4.0			
			4 - 6	RESIDUAL	Reddish-Brown CLAY LOAM; Moist; No Roots; Faint Mottles	
			5.0			
			6.0			
			6 - 8	WEATHERED ROCK	Reddish- Brown Weathered Rock; Wet	
			7.0			
			8.0			
					Soil Profile Pit SPP-7 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Bucket Refusal	
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-8**

 Page 1 of 1

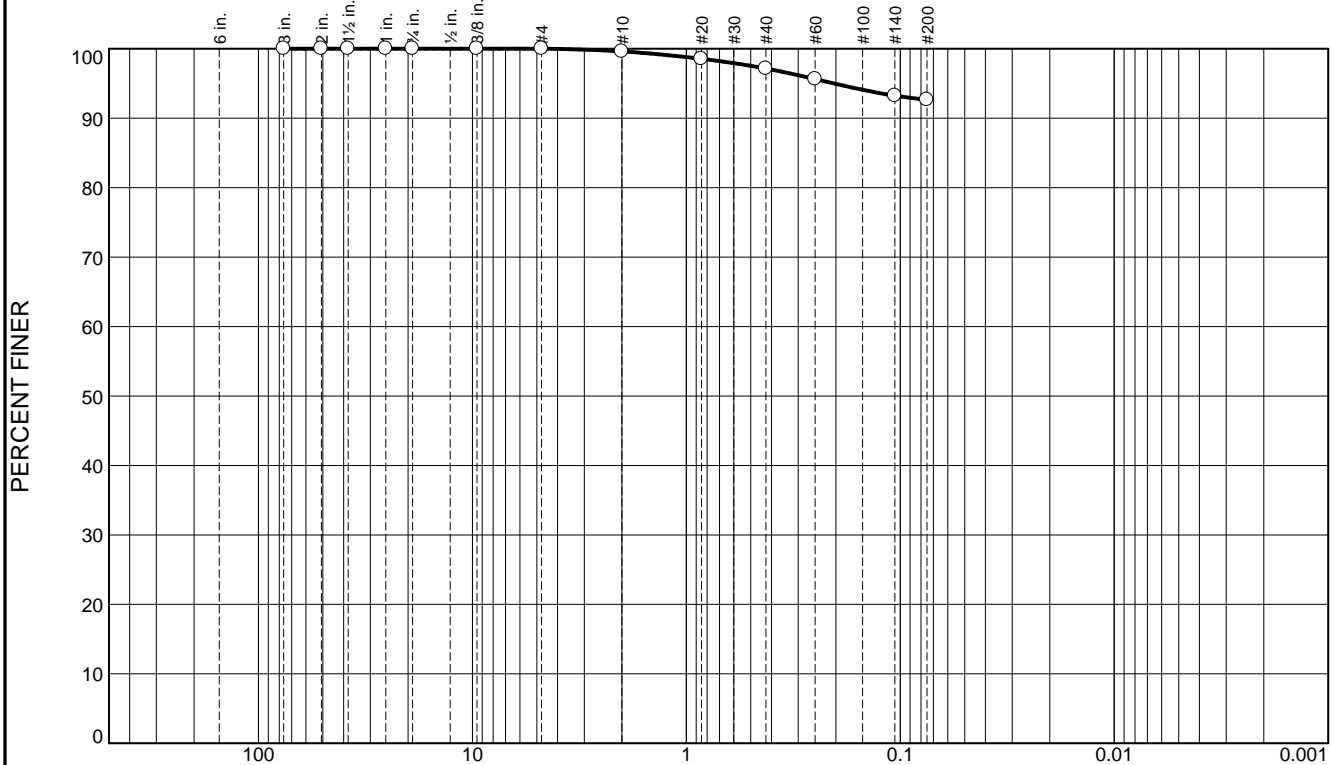
Project: Proposed Warehouse Facility			WAI Project No.: GJ2117917.000		
Location: 1980 U.S. Highway 1; North Brunswick, Middlesex County, NJ			Client: 1980 US Highway 1, LLC		
Surface Elevation: ± 114.0 feet		Date Started: 5/21/2021	Water Depth Elevation (feet bgs) (feet)		Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 8.0 feet bgs		Date Completed: 5/21/2021			
Proposed Location: Porous Pavement		Logged By: MK	During: 6.0 108.0	▼	At Completion: 2.0 112.0
Excavating Method: Test Pit Excavation		Contractor: TS	At Completion: 8.0 106.0	▼	
Test Method: Visual Observation		Rig Type: Komatsu	24 Hours: --- ---	▼	

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
2.0	T-1A/B	TUBES	0.0			Debris: Concrete, Cinderblock & Brick
			0 - 0.5	TOPSOIL	6" Topsoil	
			0.5 - 2	FILL	Dark Gray Silty Sand with Debris, Moist (FILL)	
			2.0			
			2 - 6	GLACIAL DEPOSITS	Gray CLAY; Fine Structure; Moist; Stiff; No Roots; Many Orange Brown Mottles (>15MM)	
			3.0			
			4.0			
			5.0			
			6.0			
			6 - 8	WEATHERED ROCK	Reddish-Brown Weathered Rock; Wet	
			7.0			
			8.0			
			9.0		Soil Profile Pit SPP-8 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Bucket Refusal	
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	2.5	4.5	92.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.6		
#20	98.5		
#40	97.1		
#60	95.6		
#140	93.2		
#200	92.6		

* (no specification provided)

Material Description

Fat Clay

PL= 20

Atterberg Limits

LL= 56

PI= 36

Coefficients

D₉₀=

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CH

AASHTO= A-7-6(37)

Remarks

W_n = 27.1 %

Source of Sample: B-2
Sample Number: S-3

Depth: 4.0' - 6.0'

Date: 05/28/2021

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: 1980 US Hwy 1, LLC c/o Principal Real Estate Investors, LLC
Project: Proposed Warehouse Facility
1980 U.S. Highway 1, North Brunswick, Middlesex County, NJ
Project No: GJ2117917.000
Figure

Job Number: GJ2117917.000

Client: Principal Real Estate Investors, LLC

Sample ID: **Profile Pit No.:** SPP-2 **Sample No.:** T-1 **Depth:** 2.0'

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Job Number: GJ2117917.000
Project: Proposed Warehouse Facility
Client: Principal Real Estate Investors, LLC
Lab Tech: TJ

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117917.000

Project: Proposed Warehouse Facility

Client: Principal Real Estate Investors, LLC

Lab Tech: TJ

Sample ID: Profile Pit No.: SPP-3 Sample No.: T-1 Depth: 2.0'

COUNTY/MUNICIPALITY North Brunswick, NJ BLOCK LOT

1. Test Number 1 Replicate (letter) A Date Collected

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample
Wt. of Empty Tube7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 86.83

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 Classification: K0

13. Defects in the Sample (Check appropriate items):

None

Soil/Tube Contact Large Gravel Large Roots

Dry Soil Smearing Compaction

Other - Specify

Tube Permeameter Test Data

Job Number: GJ2117917.000

Project: Proposed Warehouse Facility

Client: Principal Real Estate Investors, LLC

Lab Tech: TJ

Sample ID: Profile Pit No.: SPP-3 Sample No.: T-1 Depth: 2.0'

COUNTY/MUNICIPALITY North Brunswick, NJ BLOCK LOT

1. Test Number 1 Replicate (letter) B Date Collected

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 2.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample
Wt. of Empty Tube7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 72.36

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 Classification: K0

13. Defects in the Sample (Check appropriate items):

None

Soil/Tube Contact Large Gravel Large Roots

Dry Soil Smearing Compaction

Other - Specify

Job Number: GJ2117917.000
Project: Proposed Warehouse Facility
Client: Principal Real Estate Investors, LLC
Lab Tech: TJ

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Job Number: GJ2117917.000
Project: Proposed Warehouse Facility
Client: Principal Real Estate Investors, LLC
Lab Tech: TJ

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Job Number: GJ2117917.000
Project: Proposed Warehouse Facility
Client: Principal Real Estate Investors, LLC
Lab Tech: TJ

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117917.000

Project: Proposed Warehouse Facility

Client: Principal Real Estate Investors, LLC

Lab Tech: TJ

Sample ID: Profile Pit No.: SPP-5 Sample No.: T-1 Depth: 1.5'

COUNTY/MUNICIPALITY North Brunswick, NJ BLOCK LOT

1. Test Number 1 Replicate (letter) B Date Collected

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample
Wt. of Empty Tube7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 86.83

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 Classification: K0

13. Defects in the Sample (Check appropriate items):

None
Soil/Tube Contact Large Gravel Large Roots
Dry Soil Smearing Compaction
Other - Specify

Tube Permeameter Test Data

Job Number: GJ2117917.000

Project: Proposed Warehouse Facility

Client: Principal Real Estate Investors, LLC

Lab Tech: TJ

Sample ID: Profile Pit No.: SPP-6 Sample No.: T-1 Depth: 1.5'

COUNTY/MUNICIPALITY North Brunswick, NJ BLOCK LOT

1. Test Number 1 Replicate (letter) A Date Collected

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample
Wt. of Empty Tube7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 86.83

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 Classification: K0

13. Defects in the Sample (Check appropriate items):

None

Soil/Tube Contact Large Gravel Large Roots

Dry Soil Smearing Compaction

Other - Specify

Tube Permeameter Test Data

Job Number: GJ2117917.000

Project: Proposed Warehouse Facility

Client: Principal Real Estate Investors, LLC

Lab Tech: TJ

Sample ID: Profile Pit No.: SPP-6 Sample No.: T-1 Depth: 1.5'

COUNTY/MUNICIPALITY North Brunswick, NJ BLOCK LOT

1. Test Number 1 Replicate (letter) B Date Collected

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 3.25

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample
Wt. of Empty Tube7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 94.07

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 Classification: K0

13. Defects in the Sample (Check appropriate items):

None

Soil/Tube Contact Large Gravel Large Roots

Dry Soil Smearing Compaction

Other - Specify

Tube Permeameter Test Data**Job Number:** GJ2117917.000**Project:** Proposed Warehouse Facility**Client:** Principal Real Estate Investors, LLC**Lab Tech:** TJ**Sample ID:** **Profile Pit No.:** SPP-7 **Sample No.:** T-1 **Depth:** 1.5'**COUNTY/MUNICIPALITY** North Brunswick, NJ **BLOCK** _____ **LOT** _____1. Test Number 1 Replicate (letter) A Date Collected _____2. Material Tested: _____ Fill X Test in Native Soil3. Type of Sample: X Undisturbed _____ Disturbed4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 3.005. Bulk Density Determination (Disturbed Samples Only): N/A6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample _____

Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 86.838. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.29. Standpipe Used: X No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln (H1/H2)$ T= 120.00K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117917.000

Project: Proposed Warehouse Facility

Client: Principal Real Estate Investors, LLC

Lab Tech: TJ

Sample ID: Profile Pit No.: SPP-7 Sample No.: T-1 Depth: 1.5'

COUNTY/MUNICIPALITY North Brunswick, NJ BLOCK LOT

1. Test Number 1 Replicate (letter) B Date Collected

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample
Wt. of Empty Tube7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 101.30

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 Classification: K0

13. Defects in the Sample (Check appropriate items):

None

Soil/Tube Contact Large Gravel Large Roots

Dry Soil Smearing Compaction

Other - Specify

Job Number: GJ2117917.000

Client: Principal Real Estate Investors, LLC

Sample ID: **Profile Pit No.:** SPP-8 **Sample No.:** T-1 **Depth:** 2.0'

1. Test Number 1 Replicate (letter) A Date Collected _____

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 86.83

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

11. Rate of Water Level Drop (Add additional lines if needed):

		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r_2/R_2 \times L(\text{in})/T(\text{min}) \times \ln (H_1/H_2)$ $T = \underline{120.00}$

K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2117917.000

Project: Proposed Warehouse Facility

Client: Principal Real Estate Investors, LLC

Lab Tech: TJ

Sample ID: Profile Pit No.: SPP-8 Sample No.: T-1 Depth: 2.0'

COUNTY/MUNICIPALITY North Brunswick, NJ BLOCK LOT

1. Test Number 1 Replicate (letter) B Date Collected

2. Material Tested: Fill X Test in Native Soil

3. Type of Sample: X Undisturbed Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample
Wt. of Empty Tube7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 86.83

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: X No Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		120.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 Classification: K0

13. Defects in the Sample (Check appropriate items):

None

Soil/Tube Contact Large Gravel Large Roots

Dry Soil Smearing Compaction

Other - Specify

APPENDIX C

Supplemental Information

(USCS, Terms and Symbols)



UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		CLEAN SAND (LITTLE OR NO FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS <u>LARGER</u> THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		CLEAN SAND (LITTLE OR NO FINES)	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
MORE THAN 50% OF MATERIAL IS <u>SMALLER</u> THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
HIGHLY ORGANIC SOILS	SILTS AND CLAYS		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	SILTS AND CLAYS		PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*

Sand and/or Gravel

RELATIVE DENSITY

LOOSE. 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*

Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE.
WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

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Other Office Locations:

CHALFONT, PA
215.712.2700

SOUTHBOROUGH, MA
508.485.0755

ROCKY HILL, CT
860.726.7889

WALL, NJ
732.592.2101

PHILADELPHIA, PA
215.848.2323



GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

- N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
 δd : Natural dry density, PCF.
 ∇ : Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

- NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 $\frac{3}{8}$ " I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>Term (Non-Cohesive Soils)</u>	<u>Standard Penetration Resistance</u>
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

<u>Term (Cohesive Soils)</u>	<u>Qu (TSF)</u>
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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