

CONSULTANTS, INC.
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NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified
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Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

May 11, 2023

Schmitt Anderson Architects
10 Hillside Avenue
Metuchen, NJ 08840

Attn.: Mr. Fred Schmitt

Re: **Subsurface Soil Investigation & Field Percolation Test Report**
Proposed Building Addition & Parking
100 Prospect Street
Metuchen, NJ 08840
Block:152, Lot: 51.01 and 51.02

Dear Mr. Schmitt,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Field Percolation Test Report for the three (3) Soil Borings and two (2) field percolation tests performed on May 01, 2023 at the project referenced above.

Soil samples collected during soil boring program will be discarded after thirty (30) days from the date of this report, if not requested in advance to do otherwise. We thank you very much for providing us an opportunity to service you on this project.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

Sincerely,
ANS Consultants, Inc.

Atulkumar N. Shah, PE, PP, F. ASCE
President
NJ PE License #24GE03443900
ANS/RM

Reported: Schmitt Anderson Architects– (2); File – (1)

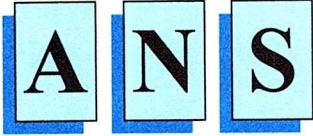
cc: Menlo Engineering Associates Inc. - (1)
261 Cleveland Avenue
Highland Park, NJ 08904
email: MMarinelli@menloeng.com

cc: email :saa.metuchen@verizon.net

File: ANS-6382_01.SB & Field Percolation

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100 Prospect Street
Metuchen, NJ 08840
Block:152, Lot: 51.01 and 51.02

Dear Mr. Schmitt,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Field Percolation Test Report for the three (3) Soil Borings and two (2) field percolation tests performed on May 01, 2023 at the project referenced above. The soil boring work was performed in accordance with our revised proposal dated April 27, 2023.

Our **Scope of Services** included the following:

1. A total of three (3) soil borings B-1, B-2 & B-3 were performed, out of which B-1 was performed done to 17'-0" depth and B-2 & B-3 were performed down to 12'-0" depth. Two (2) field percolation tests were performed at boring locations B-2 & B-3.
2. Performance of engineering evaluation to determine the stratification and physical properties of the subsurface materials and to develop and recommend appropriate type of foundation systems.
3. Preparation of a written report summarizing all findings and recommendations.

PROPOSED CONSTRUCTION:

The project site is located at 100 Prospect Street, Metuchen, New Jersey in Middlesex County. At the present time, the subject site consists of a 2-story block & brick building. We understand that proposed building addition & parking towards rear (in open grass area) of the existing building is planned at the subject property. Since, detailed construction drawings were not provided, our recommendations are based upon NJ IBC-2021 ASCE 7-22 and construction material loads for the Building Construction based upon American National Standards. Please see soil boring location plan in Appendix-A for the exact location and photographs in Appendix-C for the existing site conditions.

SITE CONDITIONS:

The subject site is located towards westside of Prospect Street. The site was noted to be fairly leveled during soil boring activities. The subject site is noted to be primarily surrounded by residential & commercial properties. The subject property is located at approximately Latitude N 40° 31' 58.55", Longitude W 74° 22' 18.84" on the USGS Digital Elevation Model. It is at an approximate elevation of 136' above mean sea level. See the site location plan in Appendix-A for more details.

FIELD INVESTIGATION:

SOIL BORING:

The soil boring locations were selected and marked by an ANS field representative based upon the location plan provided by the client and also based upon the equipment access. Surface utility mark-out was performed by New Jersey One-Call System. Underground utilities were also cleared by Gradient Construction Services (GCS LLC), a Private Utility Mark out Company on April 13, 2023. Once cleared, the soil boring work began on May 01, 2023. A total of three (3) soil borings, B-1 to B-3 were drilled during the geo-technical investigation at the site are as follows:-

Boring Number	Date Performed	Groundwater Depth (ft)	Depth of Boring (ft)
B-1	05/01/2023	8'-8.5"	17'-0"
B-2	05/01/2023	5'-4"	12'-0"
B-3	05/01/2023	5'-1"	12'-0"

The soil boring locations are shown in the Soil Boring Location Plan which is included in Appendix-A. Soil boring work was performed under the direction and supervision of field Engineer Mr. Syed Abbas. The borings were drilled using a 3" diameter hollow stem auger. Soil encountered was sampled continuously down to a depth of 12'-0" and then at 5'-0" interval down to 17'-0" in boring B-1 and soil encountered was sampled continuously down to a depth of 12'-0" in borings B-2 & B-3. Soil samples were extracted using a 2" diameter split spoon sampler as per the procedure specified in ASTM 1586-99.

Samples for the boring were obtained by the Standard Penetration Test (SPT) Method (ASTM D 1586), which consists of driving a 2-inch outside-diameter split-spoon sampler into the soil with a 140-pound weight falling freely from a distance of 30 inches. The samplers were driven in four successive 6-inch increments, with the number of blows per increment being recorded. The number of blows required to advance the sampler in the middle 12 inches is termed as the Standard Penetration Resistance (N-value) and is presented on the Field Test Boring Logs in Appendix-A.

During drilling operations, extracted soil samples were visually examined and classified by our Field Engineer. The soil sample description, Standard penetration test (SPT) blow counts and locations, strata changes, groundwater depth and other pertinent information were recorded on a detailed field log. Soil samples obtained from the split spoon sampler were visually classified according to the Unified Soil Classification System (USCS). Samples were later returned to our laboratory for further review and testing.

FIELD PERCOLATION TESTS:

Two field percolation tests were performed at soil boring locations B-2 & B-3. The details of field percolation tests are as follows:-

Percolation Test-1:

1. Depth of test: 3'-6" below existing ground elevation.
2. A 2" diameter PVC pipe was installed at test location. Bottom of PVC pipe was secured at test depth.

3. Water was filled to top of PVC pipe at 12:37 PM and left for one-hour saturation period.
4. Continued filling water into PVC pipe each time level dropped until saturation.
5. Saturation period ended at 1:37 PM. Water was levelled off to top of PVC pipe, again at 1:37 PM and drops in water level was recorded at 5 minutes interval.

Sr. No.	Time	Drop in Water Level every 5 min. interval	Remarks	Percolation Rate Per Hour
1.	1:37 PM	Water was levelled off to top after saturation.		
2.	1:42 PM	3/8"		4 1/2"
3.	1:42 PM		Refilled	
4.	1:47 PM	3/8"		4 1/2"
5.	1:47 PM		Refilled	
6.	1:52 PM	5/16"		3 3/4"
7.	1:52 PM		Refilled	
8.	1:57 PM	5/16"		3 3/4"
9.	1:57 PM		Refilled	
10.	2:02 PM	5/16"		3 3/4"
11.	2:02 PM		Refilled	
12.	2:07 PM	5/16"		3 3/4"
13.	2:07 PM		Refilled	
14.	2:12 PM	1/4"		3"
15.	2:12 PM		Refilled	
16.	2:17 PM	1/4"		3"
17.	2:17 PM		Refilled	
18.	2:22 PM	1/4"		3"
19.	2:22 PM		Refilled	
20.	2:27 PM	1/4"		3"
21.	2:27 PM		Refilled	
22.	2:32 PM	1/4"		3"
23.	2:32 PM		Refilled	
24.	2:37 PM	1/4"		3"

$$\begin{aligned}
 \text{Average Percolation Rate Per Hour} &= \frac{2 \times 4\frac{1}{2}'' + 4 \times 3\frac{3}{4}'' + 6 \times 3''}{12} \\
 &= \frac{42''}{12''} \\
 &= 3.5'' \text{ per hour}
 \end{aligned}$$

Percolation Test-2:

1. Depth of test: 3'-0" below existing ground elevation.
2. A 2" diameter PVC pipe was installed at test location. Bottom of PVC pipe was secured at test depth.
3. Water was filled to top of PVC pipe at 3:15 PM and left for one hour saturation period.
4. Filled water into PVC pipe whenever its level drops down until saturation period.
5. Saturation period ended at 4:15 PM. Water was levelled off to top of PVC pipe once again a 4:15 PM and drops in water level were recorded at 5 minute interval.

Sr. No.	Time	Drop in Water Level every 5 min. interval	Remarks	Percolation Rate Per Hour
1.	4:15 PM	Water was levelled off to top after saturation.		
2.	4:20 PM	¾"		9"
3.	4:20 PM		Refilled	
4.	4:25 PM	11/16"		8¼"
5.	4:25 PM		Refilled	
6.	4:30 PM	11/16"		8¼"
7.	4:30 PM		Refilled	
8.	4:35 PM	5/8"		7½"
9.	4:35 PM		Refilled	
10.	4:40 PM	5/8"		7½"
11.	4:40 PM		Refilled	
12.	4:45 PM	9/16"		6¾"
13.	4:45 PM		Refilled	
14.	4:50 PM	9/16"		6¾"
15.	4:50 PM		Refilled	
16.	4:55 PM	9/16"		6¾"
17.	4:55 PM		Refilled	
18.	5:00 PM	9/16"		6¾"
19.	5:00 PM		Refilled	
20.	5:05 PM	9/16"		6¾"

$$\begin{aligned}
 \text{Average Percolation Rate Per Hour} &= \frac{1 \times 9" + 2 \times 8\frac{1}{4}" + 2 \times 7\frac{1}{2}" + 5 \times 6\frac{3}{4}"}{10} \\
 &= \frac{74\frac{1}{4}"}{10} \\
 &= 7.425" \text{ per hour}
 \end{aligned}$$

LABORATORY TESTING:

A total of three (3) soil samples, one each from borings B-1 to B-3 were laboratory tested to determine in-place moisture content and to classify the soil as per Unified Soil Classification System, ASTM-D2487-93. The findings are summarized below. Laboratory test reports are enclosed in Appendix –B.

Soil Boring Number	Soil Sample Number	Depth Sample collected	% Moisture Content	Fines thru #200 Sieve	USCS Classification Symbol
B-1	S-1	8' - 10'	28.6	32.6	SM
B-2	S-2	6' - 8'	27.7	58.1	ML
B-3	S-3	4' – 6'	15.3	20.1	SM

SM: Silty sands ML: Silty loam

SUBSURFACE CONDITIONS:

Detailed description of the soil encountered in the test boring is documented in the boring log which is presented in Appendix-A. The following gives a general description of the subsurface conditions encountered at the borings. While the borings may indicate that the subsurface conditions appear to be relatively uniform across the site, it should be recognized that the size of borings was small compared to the size of the site, and that the existence of anomalies cannot be precluded.

According to NJ Geoweb website, the geologic formation is weathered shale, mudstone, and sandstone and geologic age is Pleistocene. The lithology consists of silty sand to silty clay with shale, mudstone, or sandstone fragments; reddish brown, yellow, light gray. As much as 10 feet thick on shale and mudstone, 30 feet thick on sandstone.

Based on the results of soil borings and our geo-technical laboratory testing, we estimate the general stratigraphy of the site to consist of the following major units, in an increasing order of depth.

Stratum-1: Fill material containing gray-brown and black f/c sand, trace silt, some f/c gravel, trace fragments of asphalt and dark gray silty f/c sand, little f/m gravel was noted under this stratum in top 10" in boring B-1 and in top 11" in B-2. The relative density of of this stratum was noted to be in medium dense condition. This stratum was not noted in boring B-3.

Stratum-2: Gray and reddish brown silt, trace fragments of gray clay and reddish brown silty clay was noted under this stratum between 2 feet to 4 feet & between 15 feet to 17 feet in only B-1. The relative stiffness of this stratum varied between medium stiff to stiff condition.

Stratum-3: Dark reddish brown silt, little fine sand, some f/c gravel and dark reddish brown and yellowish orange silty f/m sand, little f/c gravel was noted under this stratum between 2 feet to 8 feet in boring B-2 and in top 4 feet in B-3. The relative density of this stratum varied between loose to medium dense condition. The relative stiffness of this stratum was noted in stiff condition.

Stratum-4: Red & reddish brown clay, trace f/c sand, trace f/c gravel/ red, yellow & reddish brown clay was noted under this stratum between 4 feet to 12 feet in boring B-1, between 8 feet to 12 feet in B-2 and between 6 feet to 10 feet in B-3. The relative stiffness of this stratum varied between very soft to stiff condition.

SUMMARY OF FINDINGS:

Boring Number	Depth (feet)	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity (PSF)	Recommended Safe Bearing Capacity (PSF)
B-1	0 - 2	28	FILL	+5000	3000
B-1	2 - 4	15	CL-ML	3000	3000
B-1	4 - 6	20	SC	4000	3000
B-1	6 - 8	15	CL	3000	3000
B-1	8 - 10	22	SC	4400	3000
B-1	10 - 12	16	SC	3200	3000
B-1	15 - 17	18	CL-ML	3600	3500

Boring Number	Depth (feet)	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity (PSF)	Recommended Safe Bearing Capacity (PSF)
B-2	0 - 2	24	FILL	+5000	3000
B-2	2 - 4	25	SM-ML	3000	3000
B-2	4 - 6	30	SM-ML	4000	3000
B-2	6 - 8	10	SM-ML	3000	3000
B-2	8 - 10	14	CL	4400	3000
B-2	10 - 12	11	CL	3200	3000

Boring Number	Depth (feet)	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity (PSF)	Recommended Safe Bearing Capacity (PSF)
B-3	0 - 2	9	SM-ML	1800	2000
B-3	2 - 4	15	SM-ML	3000	3000
B-3	4 - 6	13	SM-ML	2600	3000
B-3	6 - 8	5	CL	1000	1000
B-3	8 - 10	14	CL	2800	3000
B-3	10 - 12	7	GC	1400	2000

GROUNDWATER:

Groundwater was encountered at 8'-8.5" in boring B-1, at 5'-4" in B-2 and at 5'-1" in B-3 below existing grade surface. It should be noted that groundwater level will fluctuate due to variations in rainfall or other factors not evident at the time of our investigation.

SEASONAL HIGH WATER TABLE:

Sign of gray, orange & black mottling was noted at 6 feet in B-1 and at 5 feet in boring B-2 and B-3 below grade indicating SHWT between 6' and 5 feet below grade.

CONCLUSIONS & RECOMMENDATIONS:

1. Groundwater was encountered at 8'-8.5" in boring B-1, at 5'-4" in B-2 and at 5'-1" in B-3 below

existing grade surface. Consequently, we anticipate that groundwater management during construction will be critical.

2. Seasonal Highwater table was noted between 5' and 6' below grade.
3. Fill was noted in top 10" in boring B-1 and in top 11" in B-2. The majority of the onsite soil consists of clay/clay with trace fine sand and silty f/m sand with little f/c gravel. The onsite soil below 6' depth will not be suitable as structural fill. Depending upon the time of the year when the actual construction takes place, drying of excavated sandy soil and aeration may be required to reduce the moisture content.
4. We recommend safe soil bearing capacity of 3,000 lbs/sq. ft at 4' depth. The complete removal of soft soil and fill is recommended. Due to high water table, full depth basement below grade is not recommended.
5. The average percolation rate was noted to be 3.5" per hour in perc test-1 and 7.425" per hour in perc test-2. We recommend utilizing 3.0 inch/hour for the design purpose.
6. Removal of fill from top 12 inches is recommended. To minimize cracking due to settlement of the soft sub-grade soil, the floor slab shall be constructed on compacted structural fill after removing loose fill material. Placing reinforcing steel bars in concrete instead of using wire mesh or fiber concrete is also recommended. Compaction of soil below the floor slab sub-grade to 95% of its optimum density will be required. We recommend performing compaction tests at the rate of one test per 200-sq.ft area. Recommended Modulus of Sub-Grade reaction is 50 pci.
7. Any back fill required for the structural area to be off site or ¾" clean crushed stones may be utilized to minimize the influence of moisture on the first fill layer. All off-site fill should compose of relatively well graded sand and gravel containing less than 15% by weight passing U.S. Standard #200 sieve and having a maximum particle size of six inches.

Acceptable soil materials for backfill and fill should be free of clay, rock or gravel larger than six (6) inches in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter and it should comply with ASTM D-2487-91 soil classification groups GW, GP, SM, SW and SP. All fills shall be placed in lifts in the order of twelve (12) inches in loose thickness and it should be uniformly compacted to at least 95% of its maximum dry density as determined by the Modified Proctor Density values derived based upon ASTM D-1557-93 test procedure.

8. The following parameters should be used for seismic design of the building in accordance with **IBC-2021 ASCE 7-22**:

Description	Parameter	Recommended value
Mapped Spectral Acceleration for short periods:	S _s	0.26
Mapped Spectral Acceleration for 1-sec period:	S ₁	0.049
Site Class:	D	Stiff Soil
5 percent damped Design spectral response acceleration at short periods:	S _{Ds}	0.19
5 percent damped Design spectral response acceleration at 1-sec periods:	S _{D1}	0.069

The following parameters should be used for seismic design of the building in accordance with **IBC-2018- ASCE 7-16**:

Description	Parameter	Recommended Value
Mapped Spectral Acceleration for short periods:	S _s	0.266
Mapped Spectral Acceleration for 1-sec period:	S ₁	0.057
Site Class:	D	Stiff Soil
Site Coefficient:	F _a	1.587
Site Coefficient:	F _v	2.4
5 percent damped Design spectral response acceleration at short periods:	S _{Ds}	0.281
5 percent damped Design spectral response acceleration at 1-sec periods:	S _{D1}	0.091

RECOMMENDED SERVICES:

It is recommended that we should be retained to provide continuous observation and Soil engineering services during the excavation and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations, and to allow design charges in the event that subsurface conditions differ from those anticipated prior to start of construction.

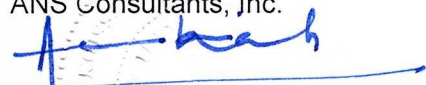
LIMITATIONS:

The recommendations contained in this report are our best professional judgment as to be followed in the design and construction of the proposed project. There may be subsurface conditions not disclosed by the explorations adequately identify subsurface conditions for the purpose of this study. If during construction any differences are found between the report of the explorations and the actual subsurface conditions, they should be brought to our attention immediately so that the effect in our recommendations can be evaluated.

This report has been prepared in accordance with generally accepted Geo-technical Engineering practices for the exclusive use of our client, Schmitt Anderson Architects and their designated representative(s). No other warranty, express or implied is made. Contractor's wishes to use the soil boring information may do at their own risk. Unless specifically indicated to the contrary in this report, this report does not address environmental considerations, which may affect the site development. The conclusions and recommendations of this report are not intended to supersede or overlook any N.J.D.E.P. Environmental conditions, which should be reflected in the site planning.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

Sincerely,
ANS Consultants, Inc.



Atulkumar N. Shah, PE, PP, F. ASCE
President
NJ PE License #24GE03443900
ANS/RM

Client: Schmitt Anderson Architects
Date: 05/11/2023

Project: 100 Prospect Street, Metuchen, NJ

Page: 9

Reported:

Schmitt Anderson Architects– (2); File – (1)

cc: Menlo Engineering Associates Inc. - (1)
261 Cleveland Avenue
Highland Park, NJ 08904
email: MMarinelli@menloeng.com

cc: email :saa.metuchen@verizon.net

Appendix - A

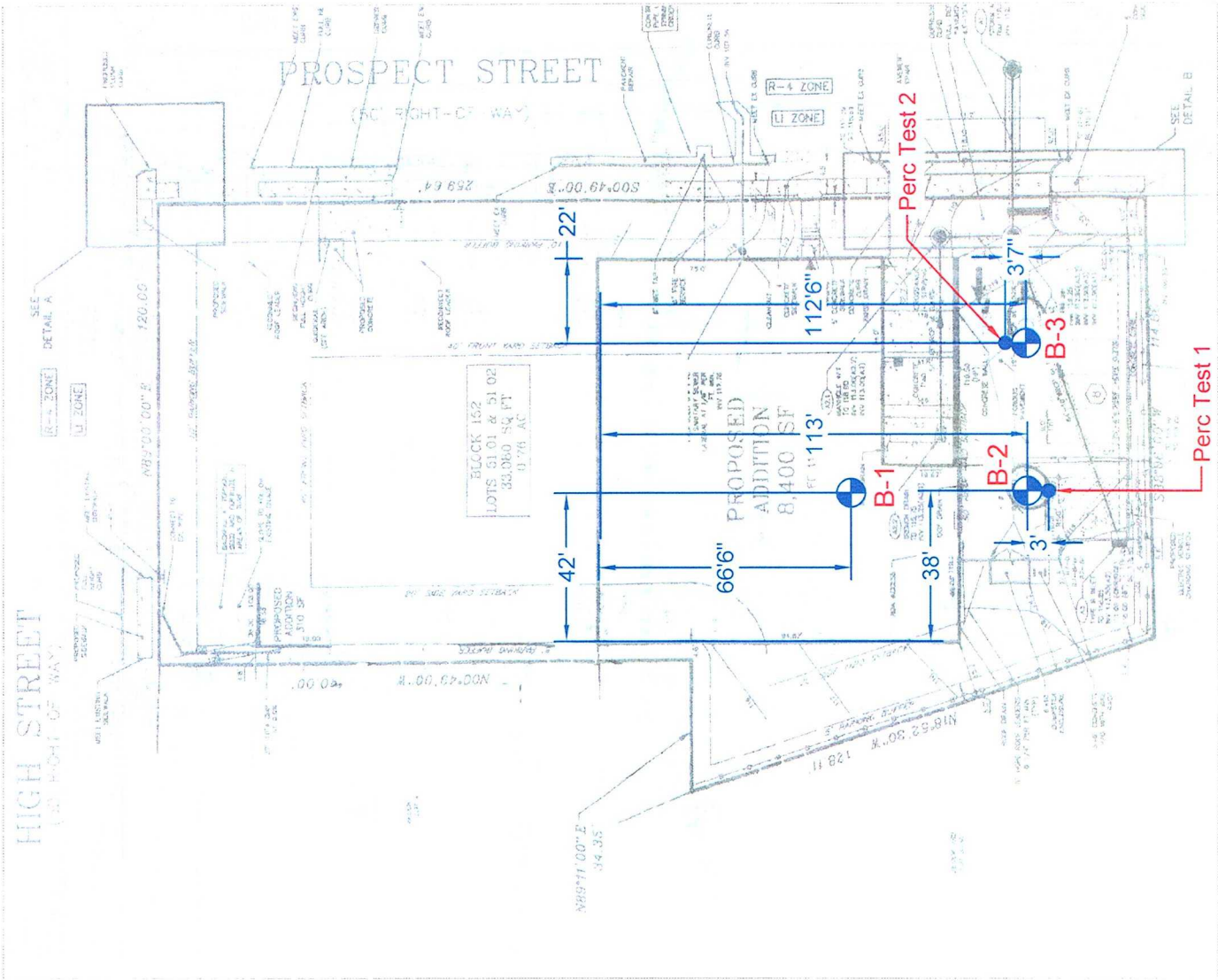
GOOGLE MAP



Client: Schmitt Anderson Architects
Project: 100 Prospect Street
Metuchen, NJ



CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080



LEGEND:

- Soil Boring Location
- Percolation Test Location

SOIL BORING & PERCOLATION TEST LOCATION PLAN
SCALE: N.T.S

CLIENT: Schmitt Anderson Architects
PROJECT: 100 Prospect St, Metuchen, NJ
 ANS CONSULTANTS INC.
 4405 SOUTH CLINTON AVE
 SO. PLAINFIELD, NJ, 07080
 PHONE: (908) 754 8383 FAX: (908) 754 8633
 BY: Dharmin Parekh DATE: 5/11/2023
 Project No: ANS-6382

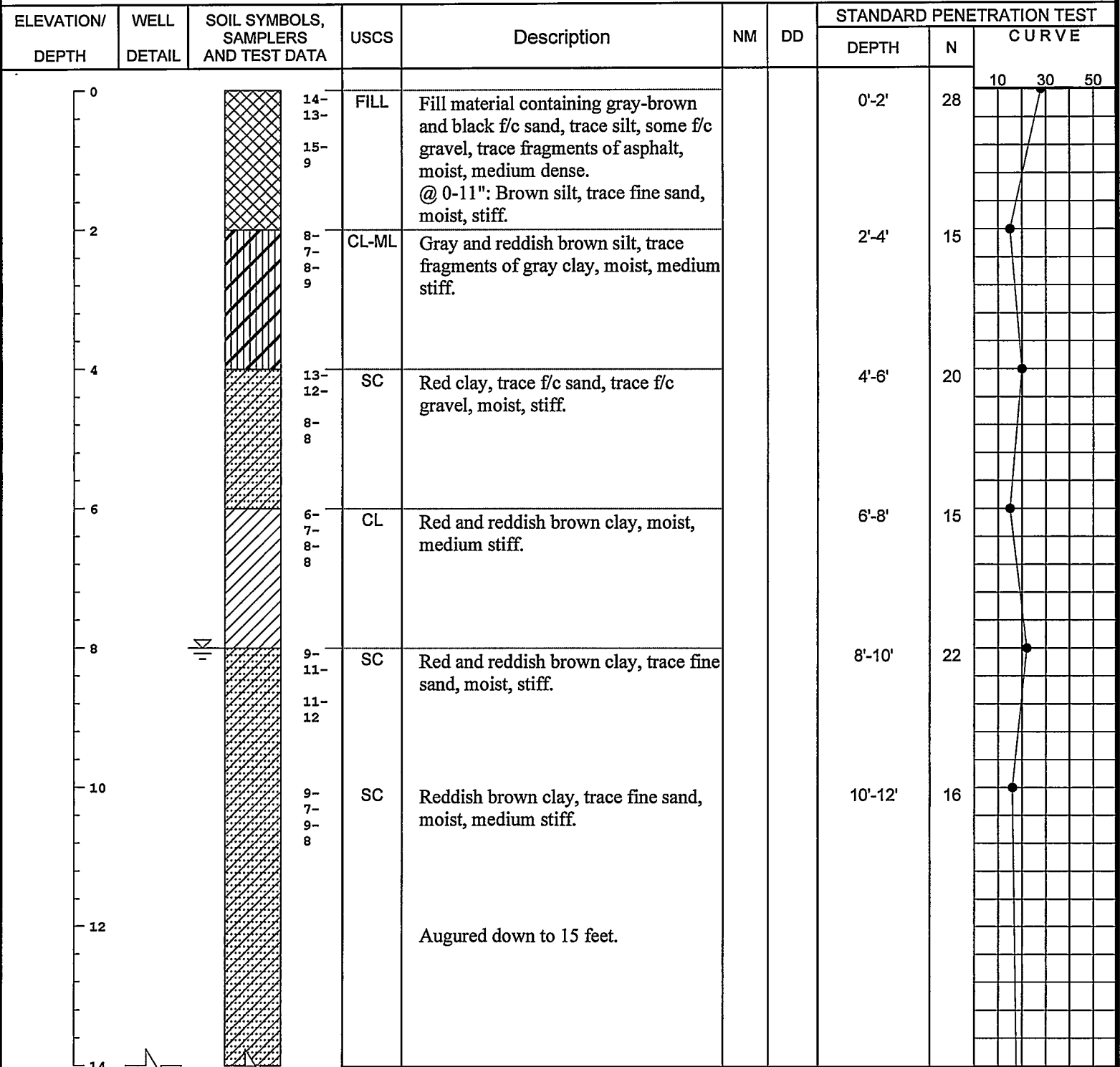
DRILL HOLE LOG

BORING NO.: B-1

PROJECT: Proposed Building Addition and Parking
 CLIENT: Schmitt Anderson Architects
 LOCATION: 100 Prospect Street, Metuchen, NJ 08840
 DRILLER: JESUS, David & A. SHAH
 DRILL RIG: ACKER XLS
 DEPTH TO WATER> INITIAL ∇ : 8'-8.5"

PROJECT NO.: ANS-6382
 DATE: 5-1-2023
 ELEVATION: N/A
 LOGGED BY: Syed Abbas

AT COMPLETION ∇ :



This information pertains only to this boring and should not be interpreted as being indicative of the site.

DRILL HOLE LOG

BORING NO.: B-2

PROJECT: Proposed Building Addition and Parking
CLIENT: Schmitt Anderson Architects
LOCATION: 100 Prospect Street, Metuchen, NJ 08840
DRILLER: JESUS, David & A. SHAH
DRILL RIG: ACKER XLS
DEPTH TO WATER > INITIAL ∇ : 5'-4"

PROJECT NO.: ANS-6382
DATE: 5-1-2023
ELEVATION: N/A
LOGGED BY: Syed Abbas

AT COMPLETION ∇ :

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST		
							DEPTH	N	CURVE
0			10- 14- 5	FILL			0'-2'	24	
2			7- 11- 14- 15	SM-ML			2'-4'	25	
4			16- 15- 15- 14	SM-ML			4'-6'	30	
6			8- 5- 5- 5	SM-ML			6'-8'	10	
8			4- 6- 8- 8	CL			8'-10'	14	
10			5- 6- 5- 6	CL			10'-12'	11	
12				End of boring.					
14									

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DRILL HOLE LOG

BORING NO.: B-3

PROJECT: Proposed Building Addition and Parking
 CLIENT: Schmitt Anderson Architects
 LOCATION: 100 Prospect Street, Metuchen, NJ 08840
 DRILLER: JESUS, David & A. SHAH
 DRILL RIG: ACKER XLS
 DEPTH TO WATER> INITIAL ∇ : 5'-1"

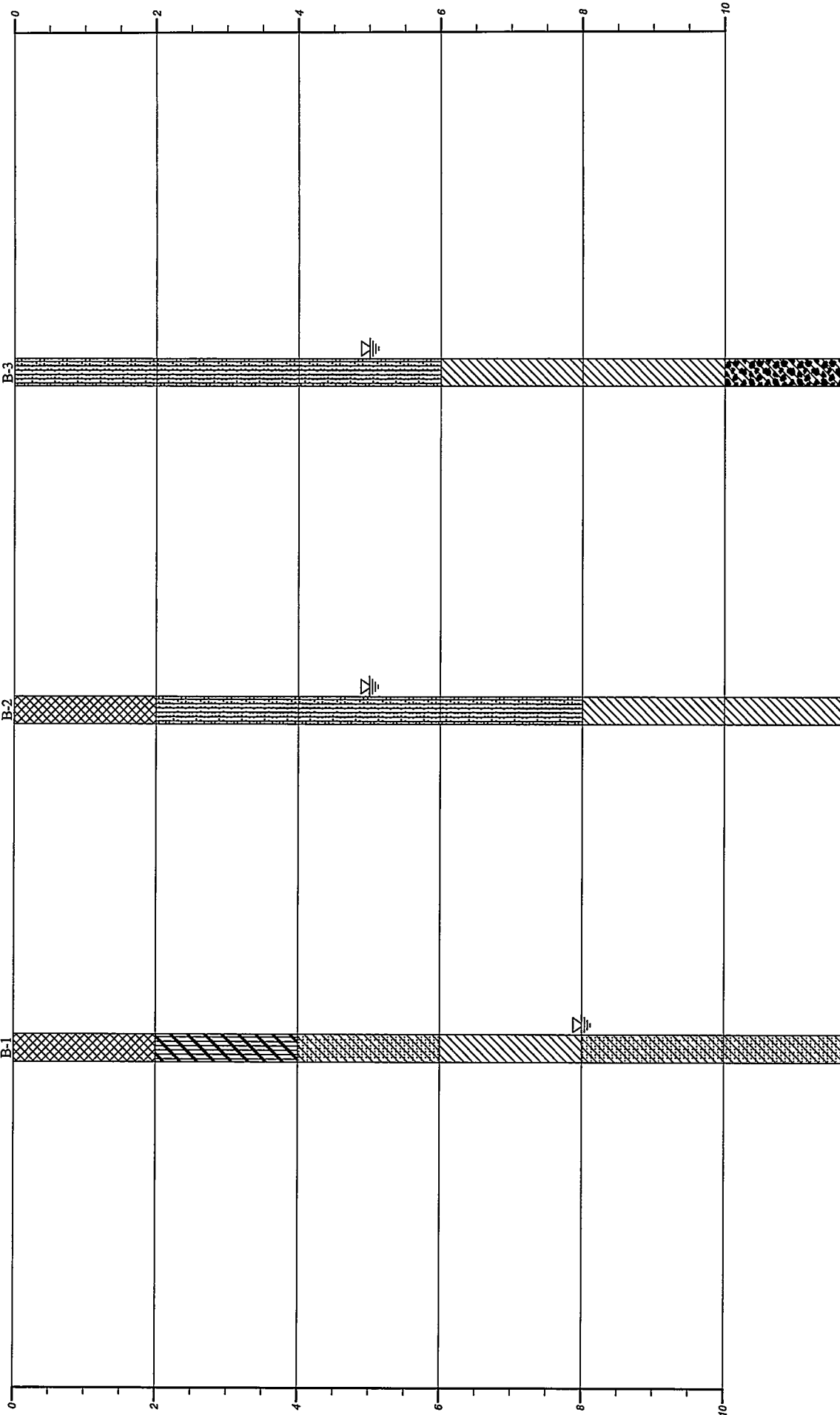
PROJECT NO.: ANS-6382
 DATE: 5-1-2023
 ELEVATION: N/A
 LOGGED BY: Syed Abbas

AT COMPLETION ∇ :

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST		
							DEPTH	N	CURVE
0		6- 5- 4- 9	SM-ML	2" Thick Top Soil. Reddish brown silty f/m sand, trace fine gravel, moist, loose.			0'-2'	9	10 30 50
2		9- 8- 7- 7	SM-ML	Reddish brown and yellowish brown silty f/m sand, little f/c gravel, moist, slightly compact.			2'-4'	15	
4		5- 7- 6- 8	SM-ML	Reddish brown and yellow silty f/m sand, little f/c gravel, moist to slightly wet, slightly compact.			4'-6'	13	
6		3- 2- 3- 5	CL	Yellow and reddish brown clay, wet to slightly wet, very soft.			6'-8'	5	
8		4- 7- 7- 9	CL	Red clay, sign of black mottling, moist, medium stiff.			8'-10'	14	
10		3- 3- 4- 4	GC	Red clay, trace medium gravel, moist, soft.			10'-12'	7	
12				End of boring.					
14									

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth in Feet



- Strata symbols**
- Fill
 - Silty low plasticity clay
 - Clayey sand/ Low plasticity clay
 - Low plasticity clay

- Poorly graded silty fine sand
- Clayey gravel

Plan View

B-1

B-2

B-3

ANS CONSULTANTS, INC.
GENERALIZED SOIL PROFILE

HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=2'	PPP	5/11/2023

Proposed Building Addition and Parking

PROJECT NO. ANS-6382	FIGURE NUMBER
----------------------	---------------

KEY TO SYMBOLS

Symbol Description

Strata symbols



Fill



Silty low plasticity
clay



Clayey sand/
Low plasticity clay



Low plasticity
clay



Poorly graded silty
fine sand



Clayey gravel

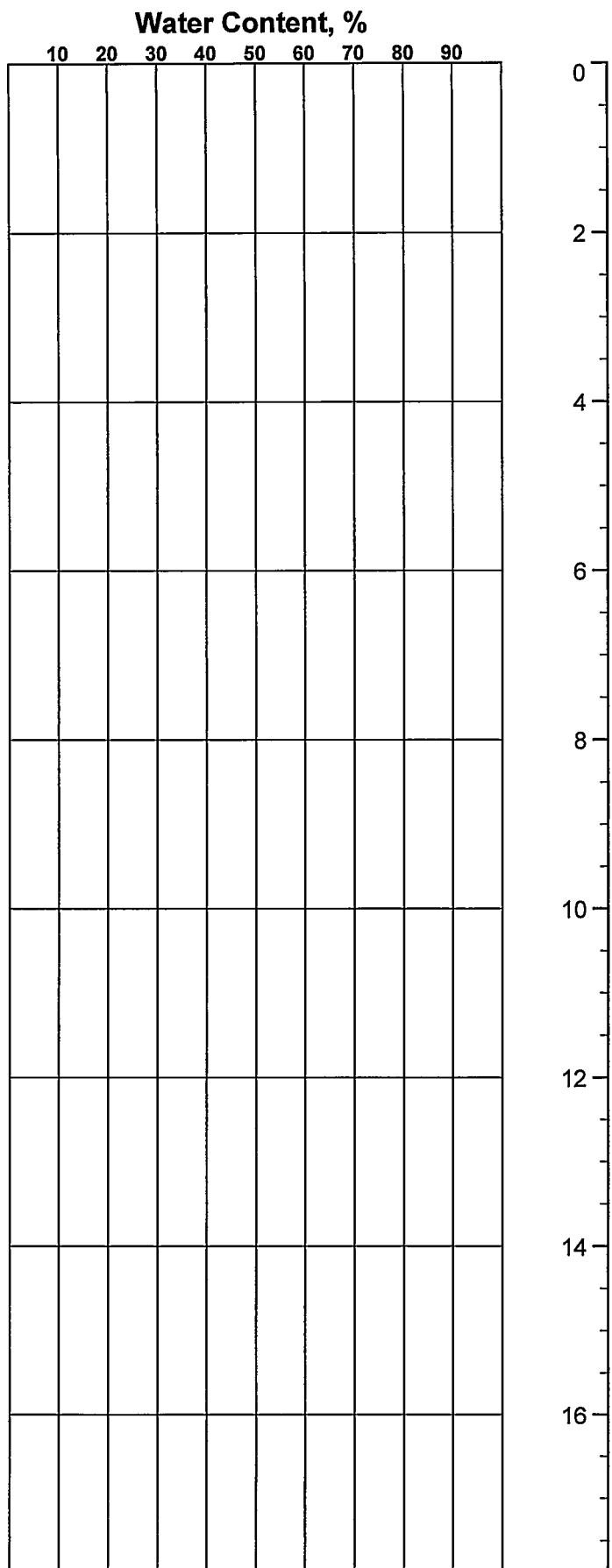
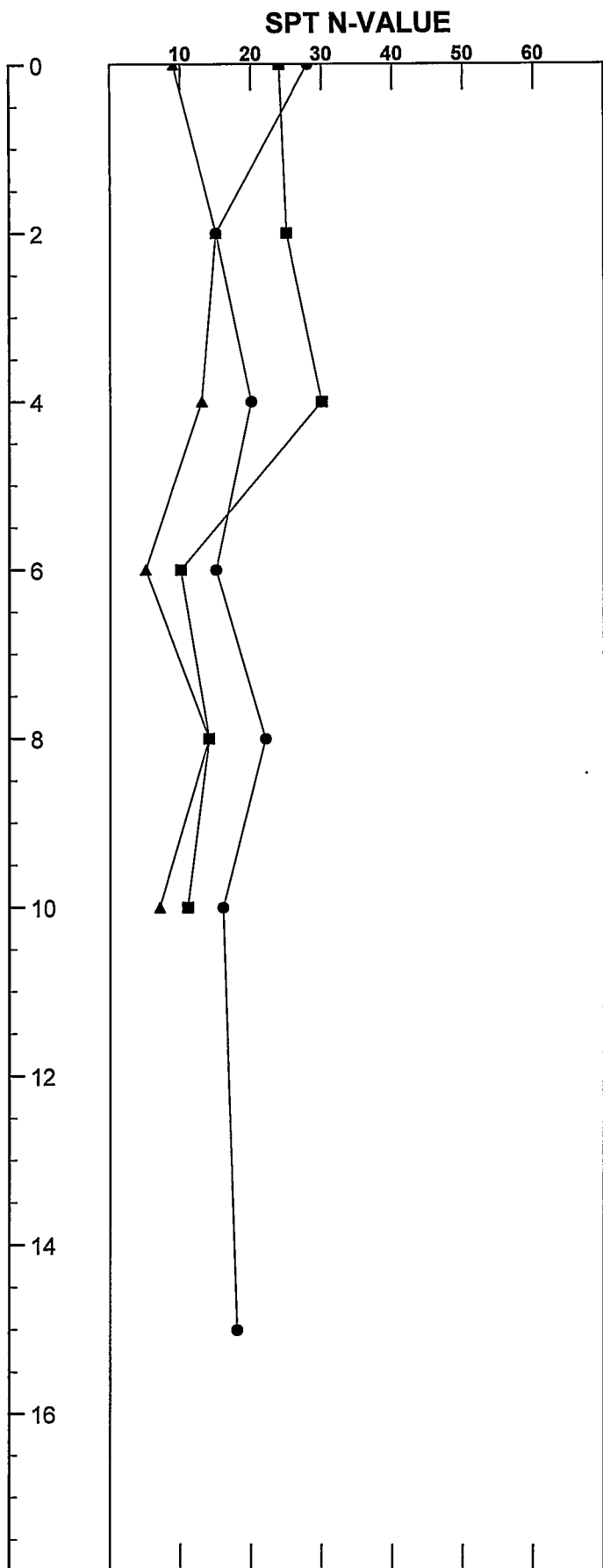
Misc. Symbols



Water table during
drilling

Notes:

1. Exploratory borings were drilled on 5-1-2023 using a 4-inch diameter continuous flight power auger.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.



Key to Borings

- B-1 ▲ B-3
- B-2

ANS CONSULTANTS, INC.	
Proposed Building Addition and Parking	
Vertical Scale: 1 to 2	Figure:

Client: Schmitt Anderson Architects

Project: 100 Prospect Street, Metuchen, NJ

Report of Field Percolation Tests

Percolation Test-1

1. Depth of test: 3'-6" below existing ground elevation.
2. A 2" diameter PVC pipe was installed at test location. Bottom of PVC pipe was secured at test depth.
3. Water was filled to top of PVC pipe at 12:37 PM and left for one hour saturation period.
4. Kept filling water into PVC pipe whenever its level drops down until saturation period.
5. Saturation period ended at 1:37 PM. Water was levelled off to top of PVC pipe once again at 1:37 PM and drops in water level were recorded at 5 minute interval.

S. No.	Time	Drop in Water Level every 5 min. interval	Remarks	Percolation Rate Per Hour
1.	1:37 PM	Water was levelled off to top after saturation.		
2.	1:42 PM	3/8"		4½"
3.	1:42 PM		Refilled	
4.	1:47 PM	3/8"		4½"
5.	1:47 PM		Refilled	
6.	1:52 PM	5/16"		3¾"
7.	1:52 PM		Refilled	
8.	1:57 PM	5/16"		3¾"
9.	1:57 PM		Refilled	
10.	2:02 PM	5/16"		3¾"
11.	2:02 PM		Refilled	
12.	2:07 PM	5/16"		3¾"
13.	2:07 PM		Refilled	
14.	2:12 PM	¼"		3"
15.	2:12 PM		Refilled	
16.	2:17 PM	¼"		3"
17.	2:17 PM		Refilled	
18.	2:22 PM	¼"		3"
19.	2:22 PM		Refilled	
20.	2:27 PM	¼"		3"
21.	2:27 PM		Refilled	
22.	2:32 PM	¼"		3"

Client: Schmitt Anderson Architects

Project: 100 Prospect Street, Metuchen, NJ

23.	2:32 PM		Refilled	
24.	2:37 PM	¼"		3"

$$\begin{aligned} \text{Average Percolation Rate Per Hour} &= \frac{2 \times 4\frac{1}{2}'' + 4 \times 3\frac{3}{4}'' + 6 \times 3''}{12} \\ &= \frac{42''}{12} \\ &= 3.5'' \text{ Per Hour} \end{aligned}$$

Percolation Test-2

1. Depth of test: 3'-0" below existing ground elevation.
2. A 2" diameter PVC pipe was installed at test location. Bottom of PVC pipe was secured at test depth.
3. Water was filled to top of PVC pipe at 3:15 PM and left for one hour saturation period.
4. Kept filling water into PVC pipe whenever its level drops down until saturation period.
5. Saturation period ended at 4:15 PM. Water was levelled off to top of PVC pipe once again a 4:15 PM and drops in water level were recoded at 5 minute interval.

S. No.	Time	Drop in Water Level every 5 min. interval	Remarks	Percolation Rate Per Hour
1.	4:15 PM	Water was levelled off to top after saturation.		
2.	4:20 PM	¾"		9"
3.	4:20 PM		Refilled	
4.	4:25 PM	11/16"		8¼"
5.	4:25 PM		Refilled	
6.	4:30 PM	11/16"		8¼"
7.	4:30 PM		Refilled	
8.	4:35 PM	5/8"		7½"
9.	4:35 PM		Refilled	
10.	4:40 PM	5/8"		7½"
11.	4:40 PM		Refilled	
12.	4:45 PM	9/16"		6¾"
13.	4:45 PM		Refilled	
14.	4:50 PM	9/16"		6¾"
15.	4:50 PM		Refilled	

Client: Schmitt Anderson Architects

Project: 100 Prospect Street, Metuchen, NJ

16.	4:55 PM	9/16"		6¾"
17.	4:55 PM		Refilled	
18.	5:00 PM	9/16"		6¾"
19.	5:00 PM		Refilled	
20.	5:05 PM	9/16"		6¾"

$$\begin{aligned} \text{Average Percolation Rate Per Hour} &= \frac{1 \times 9" + 2 \times 8\frac{1}{4}" + 2 \times 7\frac{1}{2}" + 5 \times 6\frac{3}{4}"}{10} \\ &= \frac{74\frac{1}{4}"}{10} \\ &= 7.425" \text{ Per Hour} \end{aligned}$$

File: ANS_MS

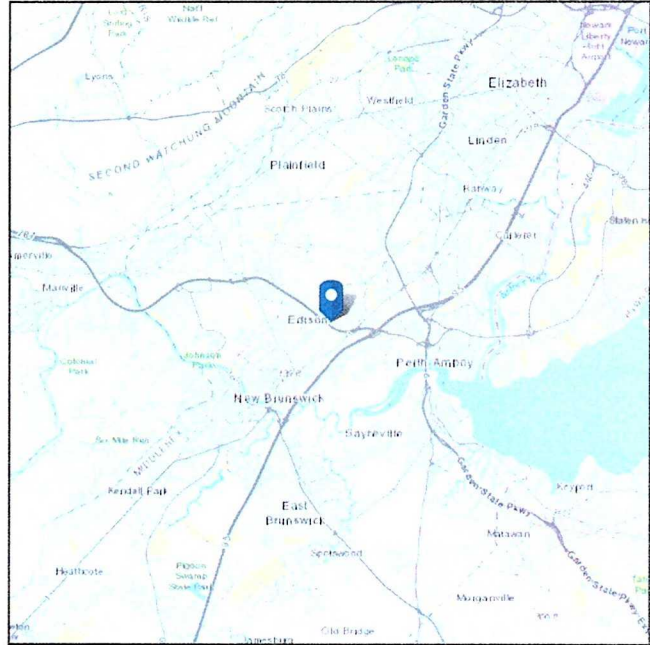
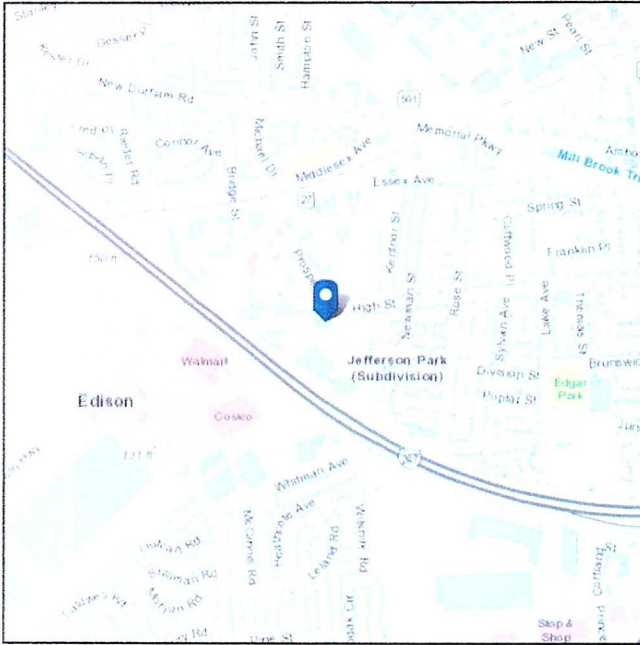


ASCE 7 Hazards Report

Address:
100 Prospect St
Metuchen, New Jersey
08840

Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 40.533041
Longitude: -74.371942
Elevation: 110.43307389803148 ft
(NAVD 88)

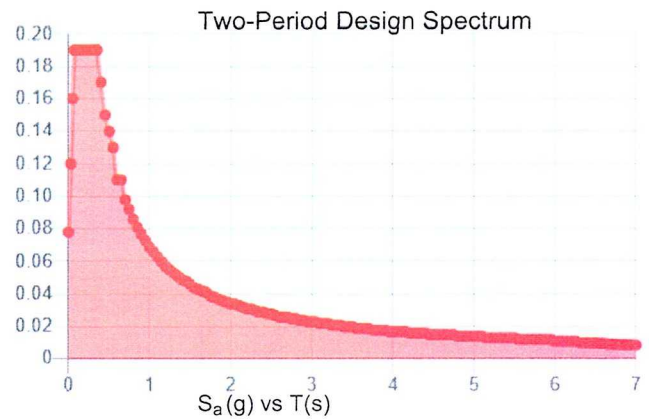
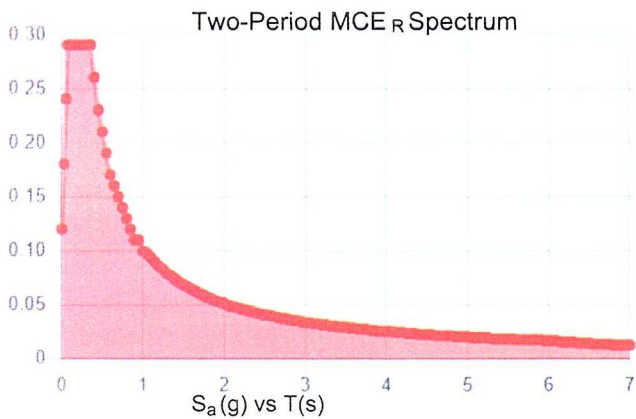
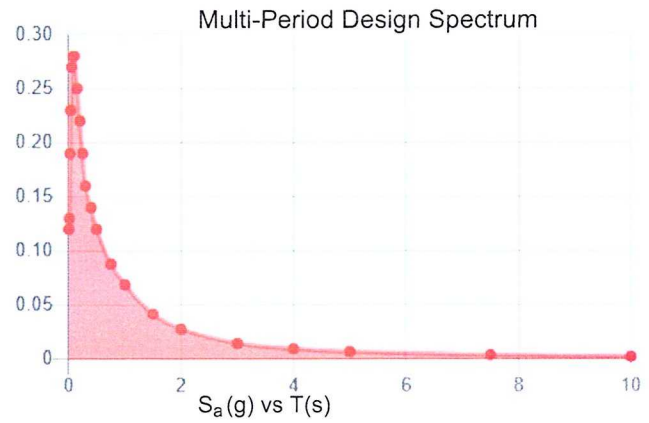
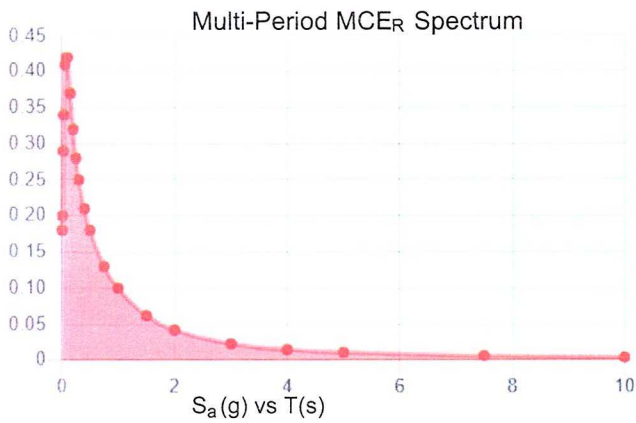


Site Soil Class:

Results:

PGA _M :	0.16	T _L :	6
S _{MS} :	0.29	S _S :	0.26
S _{M1} :	0.1	S ₁ :	0.049
S _{DS} :	0.19	V _{S30} :	260
S _{D1} :	0.069		

Seismic Design Category: B



MCE_R Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.



Data Accessed: Mon May 08 2023

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

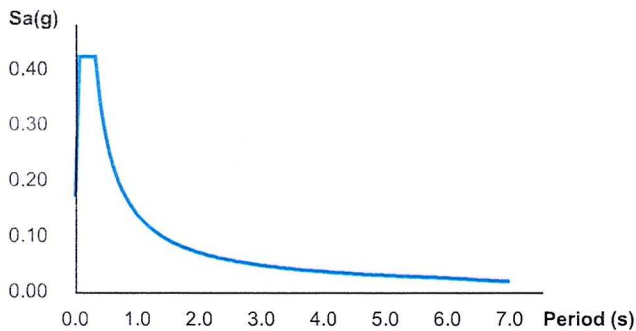
ATC Hazards by Location

Search Information

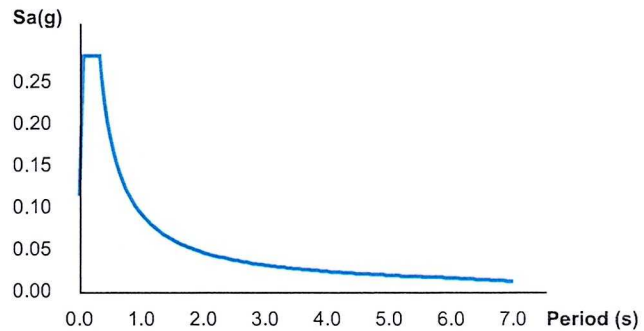
Address: 100 Prospect St, Metuchen, NJ 08840, USA
 Coordinates: 40.5330498, -74.3719093
 Elevation: 110 ft
 Timestamp: 2023-05-08T18:47:09.221Z
 Hazard Type: Seismic
 Reference Document: ASCE7-16
 Risk Category: II
 Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.266	MCE _R ground motion (period=0.2s)
S_1	0.057	MCE _R ground motion (period=1.0s)
S_{MS}	0.422	Site-modified spectral acceleration value
S_{M1}	0.136	Site-modified spectral acceleration value
S_{DS}	0.281	Numeric seismic design value at 0.2s SA
S_{D1}	0.091	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1.587	Site amplification factor at 0.2s
F_v	2.4	Site amplification factor at 1.0s
CR _S	0.94	Coefficient of risk (0.2s)
CR ₁	0.944	Coefficient of risk (1.0s)
PGA	0.161	MCE _G peak ground acceleration

F_{PGA}	1.478	Site amplification factor at PGA
PGA_M	0.238	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
$SsRT$	0.266	Probabilistic risk-targeted ground motion (0.2s)
$SsUH$	0.283	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
$S1RT$	0.057	Probabilistic risk-targeted ground motion (1.0s)
$S1UH$	0.06	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
$S1D$	0.6	Factored deterministic acceleration value (1.0s)
$PGAd$	0.5	Factored deterministic acceleration value (PGA)

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. [Find out why.](#)

Disclaimer

Hazard loads are provided by the U.S. Geological Survey [Seismic Design Web Services](#).

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FIELD SOIL CLASSIFICATION SYSTEM

PARTICLE SIZE IDENTIFICATION

Boulders 8 inch diameter or greater
Cobbles 3 to 8 inch diameter
Gravel Coarse -- 1 to 3 inch
Medium -- 1/2 to 1 inch
Fine -- 4.75 mm to 1/2 inch
Sand Coarse -- 2.0 mm to 4.75 mm
(dia. of pencil lead)
Medium -- 0.425 mm to 2.0 mm
(dia. of broom straw)
Fine -- 0.075 mm to 0.425 mm
(dia. of human hair)
Silt & Clay. . . Smaller than 0.075 mm

RELATIVE PORTIONS

Descriptive Term	Percent
Trace - tr	1 - 10
Some - sm	11 - 20
Adjective - ly	21 - 35
And - &	36 - 50

ABBREVIATIONS

Bn - Brown	
Gy - Gray	
Blk - Black	
Rd - Red	
Or - Orange	
Bl - Blue	
Lt - Light	Coarse grained - c
Dk - Dark	Medium grained - m
Multi - Multi colored	Fine grained - f

COHESIONLESS SOIL

(Gravel, Sand, Silt and Combinations)

DENSITY

Very Loose 05 blows / ft or less
Loose 06 to 10 blows / ft
Medium Dense 11 to 30 blows / ft
Dense 31 to 50 blows / ft
Very Dense 51 blows / ft or more

COHESIVE SOIL

(Clay Silt and Combinations)

CONSISTENCY

Very Soft 01 blow / ft or less
Soft 02 to 4 blows / ft
Medium Stiff 05 to 8 blows / ft
Stiff 09 to 15 blows / ft
Very Stiff 16 to 30 blows / ft
Hard 31 blows / ft or greater

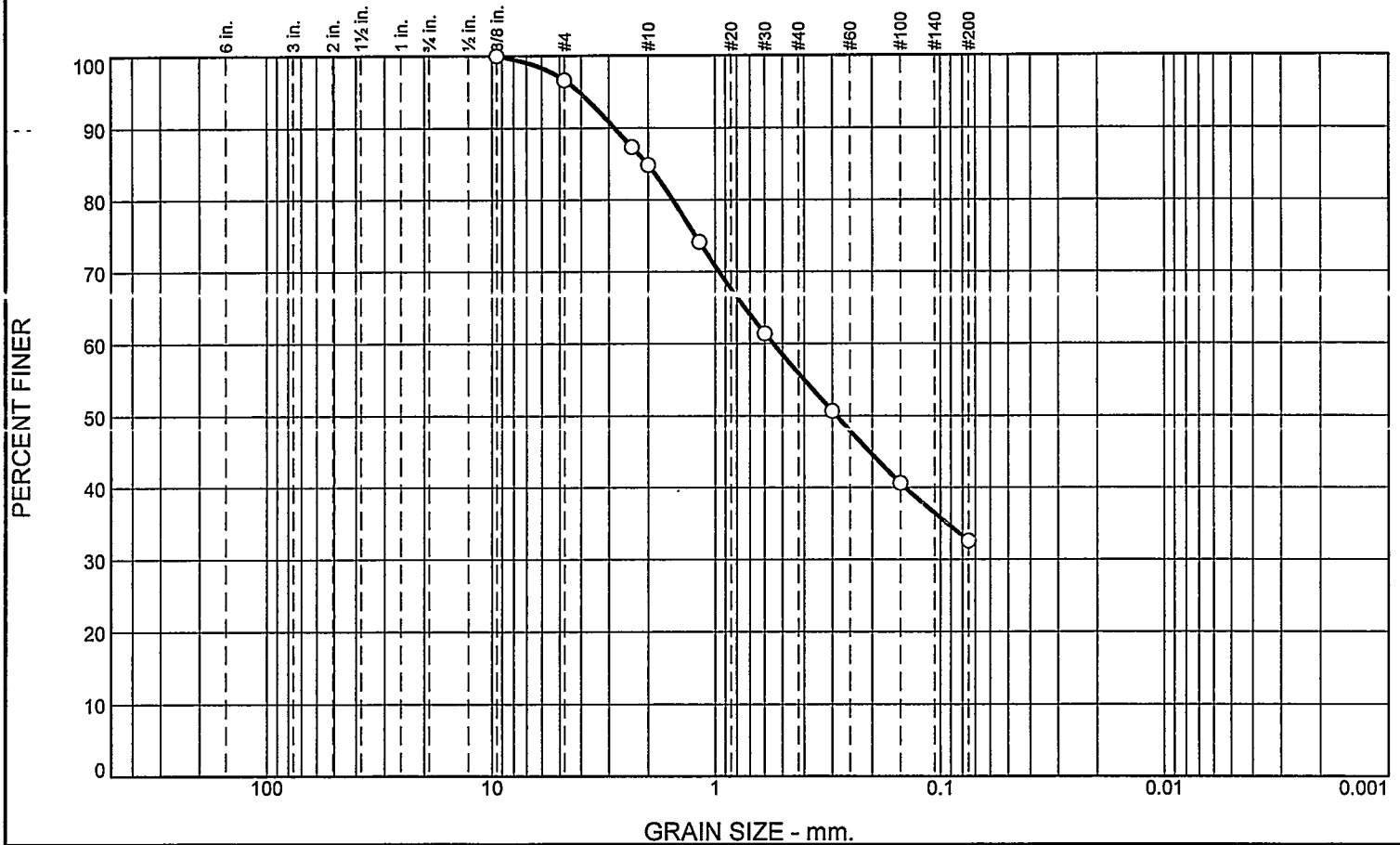
ROCK

R.Q.D.	Rock Quality
00 - 25	Very Poor
25 - 50%	Poor
50 - 75%	Fair
75 - 90%	Good
90 - 100%	Excellent

HSA - Hollow Stem Auger
SS- Split Spoon Sampler
WOR - Weight of Rods
WOH - Weight of Hammer
NR - No Recovery of Sample

Appendix-B

Particle Size Distribution Report As per ASTM D-6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.4	11.7	29.0	23.3	32.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	96.6		
#8	87.3		
#10	84.9		
#16	74.2		
#30	61.4		
#50	50.6		
#100	40.6		
#200	32.6		

Material Description

Reddish brown in color. silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 2.8338 D₈₅= 2.0181 D₆₀= 0.5512
 D₅₀= 0.2877 D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

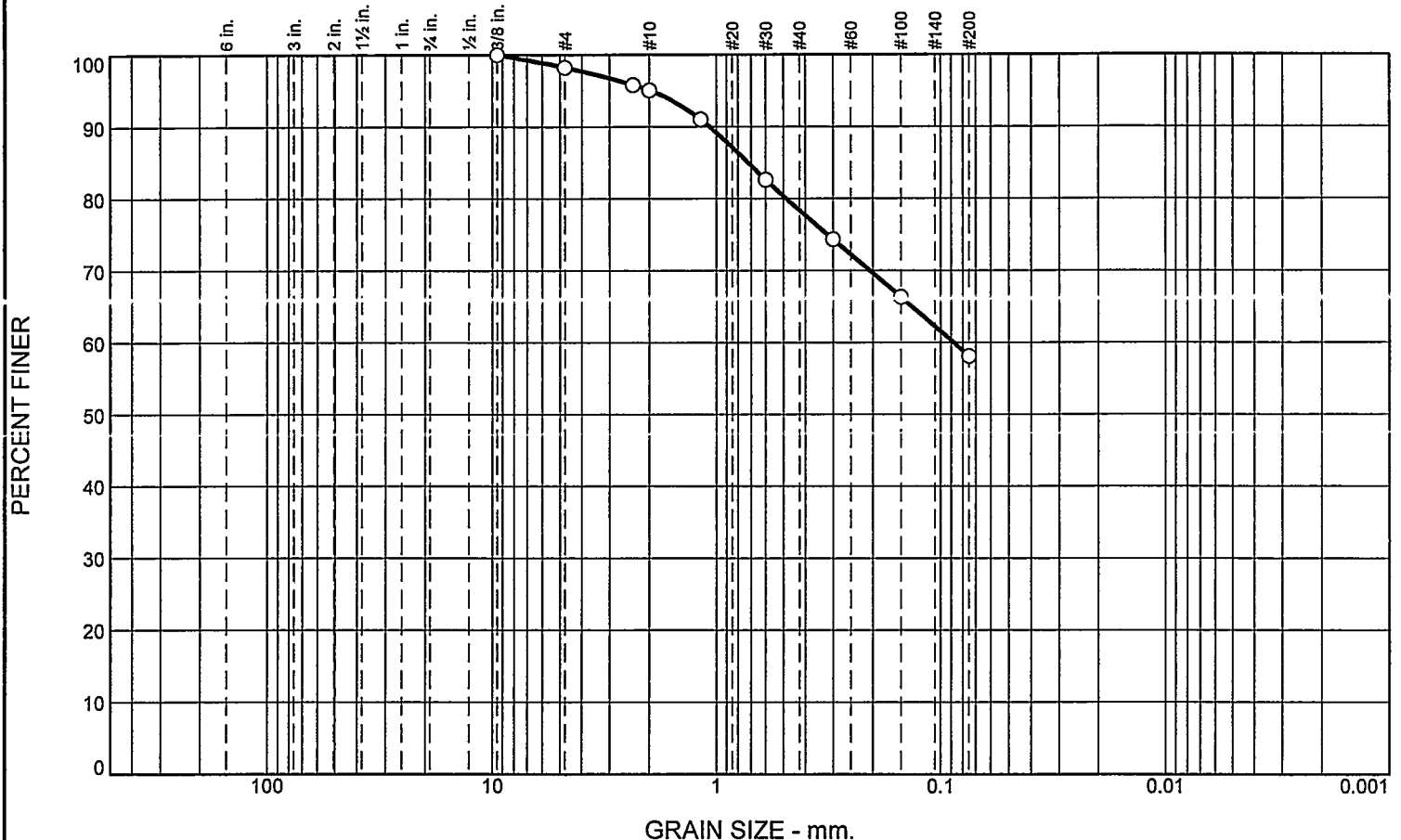
Remarks

Sample was collected on 05/01/23 and tested on 05/08/23. in-Situ
 %MC=28.6
 F.M.=1.89

* (no specification provided)

Location: B-1 Sample Number: S-1 Depth: 8'-10' Date: 05/08/2023

Particle Size Distribution Report As per ASTM D-6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.8	3.2	16.6	20.3	58.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	98.2		
#8	95.8		
#10	95.0		
#16	91.0		
#30	82.6		
#50	74.3		
#100	66.3		
#200	58.1		

Material Description

Brown in color. sandy silt

Atterberg Limits
 PL= NP LL= NV PI= NP

Coefficients
 D₉₀= 1.0759 D₈₅= 0.7215 D₆₀= 0.0880
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= ML AASHTO= A-4(0)

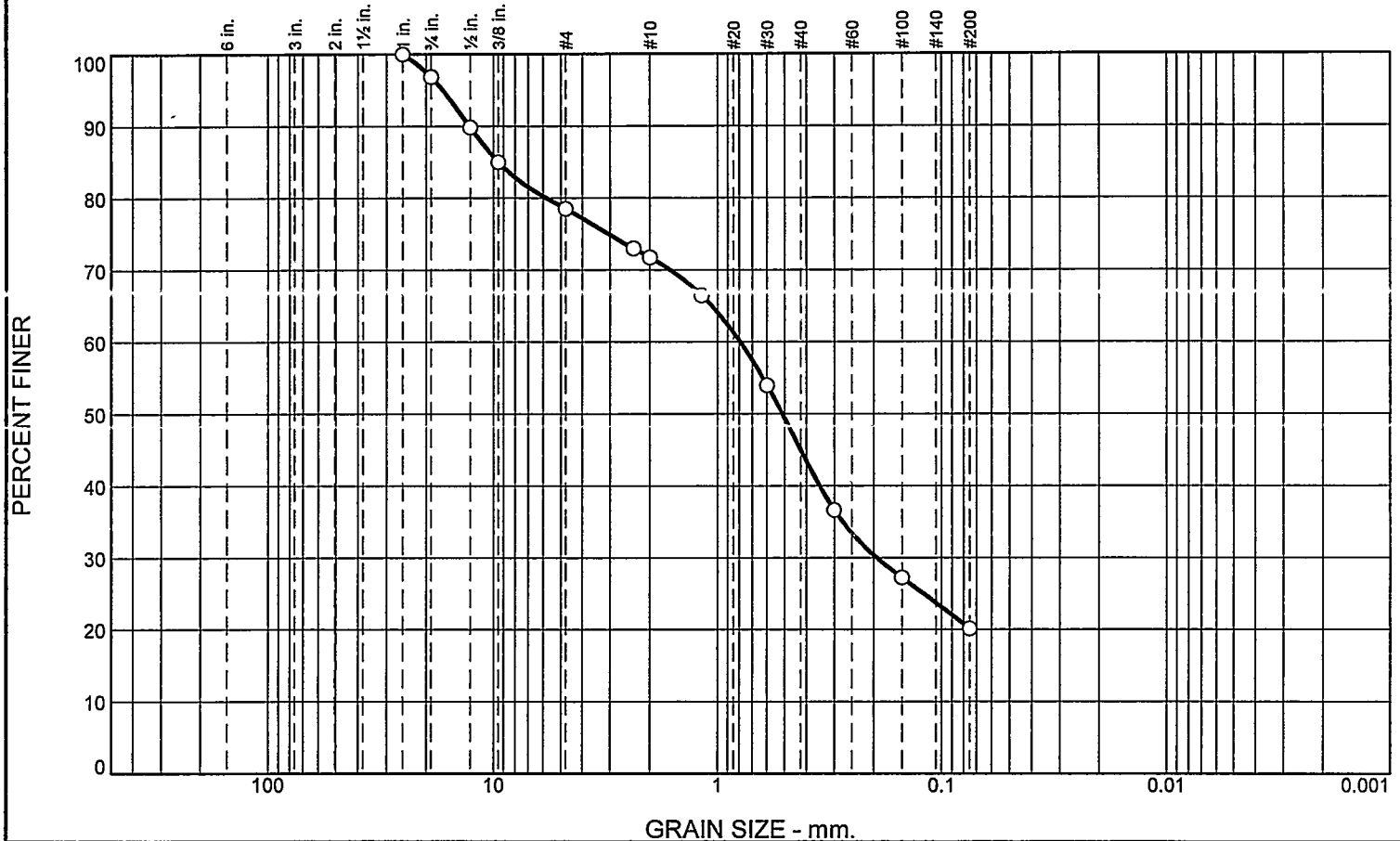
Remarks
 Sample was collected on 05/01/23 and tested on 05/08/23. In-Situ
 %MC=27.7
 F.M.=0.92

* (no specification provided)

Location: B-2 Sample Number: S-2 Depth: 6'-8' Date: 05/08/2023

ANS CONSULTANTS, INC.	Client: Schmitt Anderson Architects	
South Plainfield, New Jersey	Project: 110 Prospect Street, Metuchen, NJ	
	Project No: ANS-6382	Figure 2 F 1

Particle Size Distribution Report As per ASTM D-6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.2	18.3	6.7	26.8	24.9	20.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
3/4	96.8		
1/2	89.8		
3/8	85.0		
#4	78.5		
#8	73.0		
#10	71.8		
#16	66.5		
#30	54.0		
#50	36.7		
#100	27.2		
#200	20.1		

Material Description
Orange brown in color, silty sand with gravel

Atterberg Limits
 PL= NP LL= NV PI= NP

Coefficients
 D₉₀= 12.8406 D₈₅= 9.5337 D₆₀= 0.7920
 D₅₀= 0.5129 D₃₀= 0.1941 D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= SM AASHTO= A-1-b

Remarks
 Sample was collected on 05/01/23 and tested on 05/08/23. in-Situ
 %MC=15.3
 F.M.=2.82

* (no specification provided)

Location: B-3
 Sample Number: S-3 Depth: 4'-6'

Date: 05/08/2023

ANS CONSULTANTS, INC.

Client: Schmitt Anderson Architects
 Project: 110 Prospect Street, Metuchen, NJ

South Plainfield, New Jersey

Project No: ANS-6382

Figure 3 F 1

Appendix-C



CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Client: Schmitt Anderson Architects

Project: 100 Prospect Street, Metuchen, NJ



Sample procurement using split spoon samplers and augurs



Sample recovery from split spoon samplers



CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Client: Schmitt Anderson Architects

Project: 100 Prospect Street, Metuchen, NJ



Sample procurement using split spoon samplers and augurs



Sample recovery from split spoon samplers



CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Client: Schmitt Anderson Architects

Project: 100 Prospect Street, Metuchen, NJ



Sample procurement using split spoon samplers and augurs



Sample recovery from split spoon samplers



CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Client: Schmitt Anderson Architects

Project: 100 Prospect Street, Metuchen, NJ



Field Percolation Test



Field Percolation Test