GEOTECHNICAL ENGINEERING REPORT

Proposed Municipal Building

Monmouth County, New Jersey

June 30, 2025

Prepared for:
T&M Associates
11 Tindall Road
Middletown, New Jersey 07748

Attn: Eric Nathanson

Prepared by:
Geo-Technology Associates, Inc.
Geotechnical and Environmental Consultants
Construction Observation and Testing

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GTA Project No: 31251263

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm

June 30, 2025

T&M Associates
11 Tindall Road
Middletown, New Jersey 07748

Attn: Eric Nathanson

Re: Geotechnical Engineering Report
Proposed Municipal Building
Monmouth County, New Jersey

Dear Eric:

In accordance with our proposal dated February 16, 2025, Geo-Technology Associates, Inc. (GTA) has conducted a geotechnical engineering study in support of a proposed municipal building to be constructed in the Borough of Eatontown, Monmouth County, New Jersey. GTA has prepared this report to convey our findings, conclusions, and recommendations about subsurface conditions that could affect foundation support and related geotechnical considerations for the proposed municipal building.

Please note that, unless you make other arrangements, GTA will discard all soil samples obtained from the explorations 60 days after the date of this report. If you have any questions or concerns about this report, or if you want additional information, please contact our office at (732) 271-9301.

Sincerely,

GEO-TECHNOLOGY ASSOCIATES, INC.

Kyle T. Plaza, P.E.
Associate

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TABLE OF CONTENTS

1.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

We have prepared this summary for the user's convenience only. Do not rely on it exclusively for any decision-making purpose. Please review the full text of the report which addresses each topic in further detail.

TOPIC	DESCRIPTION
Site Attributes	
Existing Conditions	At the time GTA's exploration was performed, the site was occupied by the existing Eatontown Municipal Building, a 2-story firehouse building, and a single-story library with parking lots serving the public facilities. The location of the proposed building was the existing parking lot.
Proposed Construction	A proposed 2-story municipal building with a footprint area of about 21,000 square feet containing a below grade basement level.
Conditions Encountered	
Surface Materials	A 5- to 6-inch-thick layer of asphalt was encountered at the surface in 12 of the 15 explorations performed. Test pits TP-3, TP-4, and TP-4A encountered a 10- to 12-inch-thick layer of topsoil at the surface.
Existing Fill	Encountered in all explorations extending to depths ranging from about 2 to 5 feet bgs. Generally classified as silty and clayey sand with varying amounts of gravel.
Native Soils	Generally interlayered loose to medium dense granular soils with varying gradations and fines content (SM, SP-SM, SC) and medium soft to stiff fine-grained silt (ML) and clay (CL) soils.
Groundwater	Encountered in all borings at depths of about 11 to 13 feet bgs. Mottling indicative of the potential SHWT was observed at about 10 feet bgs in Test Pits TP-1 and TP-4A.
Recommendations	
Site Preparation	Remove existing topsoil and pavement sections within and at least 5 feet beyond the proposed development area.
Existing Fill	• Should not be relied upon for direct support of the building foundations, but will likely be removed as part of the basement excavation. • Existing fill materials will likely be suitable for reuse as controlled, compacted fill.
Groundwater	• Groundwater may be encountered at or near basement subgrade levels and will likely impact design and construction. • Perched water may be encountered in localized excavations. • Commonly used temporary dewatering techniques (e.g., sumps, gravity flow trenches) should be sufficient to control perched water seepage. Additional dewatering measures may be required for excavations below the groundwater level.
Fill Material Criteria	Excavated soils will be suitable for reuse as fill, with some limitations.
Fill Placement Requirements	• Place fill in maximum 8- to 12-inch (loose-measure) lifts. Break up clay clumps/clods. • Compact to minimum 95% of max. dry density (Modified Proctor) for structural fill.
Foundations	• Allowable soil-bearing pressure: 3,000 psf. • Minimum widths: 24 inches (wall footings); 30 inches (column footings). • Anticipated post-construction settlements: 1-inch total; ½-inch differential between columns. • Frost Depth Embedment – 36 inches, or deeper if required by local ordinance. • Seismic Site Class – D

*bgs = below existing ground surface

2.0 INTRODUCTION

This report presents the results of a geotechnical engineering exploration performed by Geo-Technology Associates, Inc. (GTA) for the planning and design of a proposed municipal building to be constructed in the Borough of Eatontown, Monmouth County, New Jersey. GTA has conducted a geotechnical engineering study and prepared this report for T&M Associates in accordance with our proposal dated February 16, 2025.

2.1 Study Purpose

This study was conducted to develop confirmation-dependent geotechnical engineering recommendations for the proposed municipal building. The scope of GTA's study included a field exploration, laboratory testing, and geotechnical engineering analyses. The field exploration consisted of 10 Standard Penetration Test (SPT) borings within the proposed building footprint area and 5 test pit excavations within potential stormwater management (SWM) areas.

2.2 Referenced Documents

A set of architectural plans (4 pages) prepared by Parallel Architecture Group titled "New Construction: Eatontown Municipal Complex" dated December 17, 2024, a draft topographic plan prepared by T&M Associates titled "Boundary and Topography Survey" dated January 29, 2025, and marked up aerial images were provided for our use. The plans indicate the site boundaries, existing site features and topography, and the layout and dimensions of the proposed site improvements.

GTA has based our understanding of the project on our review of the provided plans and subsequent conversations with the Client. If the referenced documents are modified after the date of this report, Client should provide the updated version to GTA. Modifications may make it necessary for GTA to revise this report.

3.0 PROJECT DESCRIPTION

3.1 Site Location

The project site is located at 47 Broad Street in the Borough of Eatontown, Monmouth County, New Jersey. The Site Location Map, in Appendix A, Figure No. 1, indicates the site location in relation to adjacent properties.

3.2 Existing Site Conditions

At the time GTA's exploration was performed, the site was occupied by the existing Eatontown municipal building, a 2-story firehouse building, and a single-story library with parking lots serving the public facilities. The area of the proposed building was the existing parking lot.

Access to the site was provided from Throckmorton Avenue and Broad Street from the northern and southern portions of the site, respectively. The ground surface sloped gently from about Elevation (EL) 33 feet and EL 32 feet in the western and eastern portions of the site, respectively, to about EL 31 feet in the central portion of the site.

3.3 Proposed Construction

3.3.1 Site Grading

Proposed grading was not indicated on the plans provided to us; however, based on the existing site grades and for the purpose of this report, we anticipate that minor cuts and fills of up to about 2 feet will generally be required to achieve final surface grades throughout the site. We anticipate that the basement level will be established about 10 feet below the existing grades.

3.3.2 Proposed Buildings

The proposed development will include a 2-story municipal building with a below-grade basement level and a footprint area of approximately 21,000 square feet. We anticipate the proposed structure will be constructed using cast-in-place concrete and steel-framed construction.

Based on our experience on projects of similar scope, we estimate that the maximum column and wall loads will be approximately 150 kips and 8 kips per linear foot, respectively. We anticipate maximum floor slab loads of up to 200 pounds per square foot (psf).

3.3.3 Subsurface Utilities

We anticipate that public water and private storm drains will serve the proposed site improvements, and that they will generally be installed about 5 to 10 feet below the existing site grades.

3.3.4 Stormwater Management

The proposed development will include stormwater management (SWM) facilities across the site. Preliminary test pits and testing for SWM purposes was performed at the site, the results of which are presented in our letter titled "Stormwater Management Testing" dated June 23, 2025.

3.3.5 Pavements

The proposed development will include driveways to provide access and egress from Broad Street, White Street, and Throckmorton Avenue and at-grade parking will be provided in the southern and western portion of the site.

4.0 GEOTECHNICAL ENGINEERING STUDY

4.1 Geologic Review

The subject site is situated within the Coastal Plains physiographic province of New Jersey, which is characterized by unconsolidated deposits gently dipping to the southeast. Based on the *Surficial Geology of the Long Branch Quadrangle, Monmouth County, New Jersey (OFM 38, 2000)* prepared by the New Jersey Geological Survey, the site surficial geology consists of the Cape May Formation (Unit 2). The formation is described as very pale brown, yellow, white, and olive yellow sand, minor silt and clay. The surficial soils can be as much as 50 feet thick.

The site is underlain by the Hornerstown Formation as shown on the *Bedrock Geology of the Long Branch Quadrangles, Monmouth County, New Jersey (OFM 78, 2010)*. The formation is described as olive, dark green, black where unweathered, olive-brown with brown to reddish-brown mottles where weathered, glauconite clay and silty clay. This unit can be as much as 25 to 30 feet thick in the map area.

Please refer to the publications for more detailed descriptions of the geological members.

4.2 Subsurface Exploration Scope

On May 30 and June 2, 2025, GTA performed a subsurface exploration of the site consisting of 10 Standard Penetration Test (SPT) borings within the proposed building footprint area and 5 test pit excavations within potential SWM areas. The borings were performed by Environmental Technical Drilling, Inc. on May 30 and June 2, 2025, using a Geoprobe 7822 track-mounted drill rig and extended to a depth of about 25 feet below the existing surface grades. The test pits were excavated by J.A. Neary Excavating using a Case CX580 backhoe and extended to depths ranging from approximately 4 to 12 feet below the existing ground surface. Preliminary in-situ infiltration testing was performed adjacent to each of the test pits using a double-ring infiltrometer. The test pit locations were selected by the Client and the boring locations were selected by GTA. GTA located the explorations in the field using a hand-held GPS unit and the existing site features as reference. The approximate locations of the explorations performed for this study are shown on the Exploration Location Plan, which is included as Figure 2 in Appendix A of this report.

Standard Penetration Testing (SPT) was performed in the borings in general accordance with procedures of ASTM D1586. Soil samples were obtained continuously within the boreholes in the upper 10 feet and then at 5-foot intervals to completion depth. The SPT involves driving a 2-inch O.D., 1⅜-inch I.D. split-spoon sampler with a 140- pound hammer free-falling from a height of 30 inches. The number of blows required to drive the sampler was recorded in six-inch intervals. The SPT N-value, given as blows per foot, is defined as the total number of blows required to drive the sampler from the 6- to 18-inch interval.

Detailed descriptions of the encountered subsurface conditions are indicated on the Logs of Borings and Logs of Test Pits which are included in Appendix B. The ground surface elevations shown on the exploration logs were obtained from interpolating between topographic contours shown on the provided plan and should be considered approximate.

The soil samples obtained from the explorations were delivered to GTA's laboratory for visual classification and laboratory testing. The classifications shown on the logs are based on the Unified Soil Classification System (USCS) visual/manual methods, supplemented by laboratory testing.

4.3 Subsurface Conditions

The results of the subsurface exploration were consistent with the known site history and geologic mapping of the project site. The specific subsurface conditions at each exploration location are shown on the individual exploration logs within Appendix B. GTA has summarized the subsurface conditions encountered in the following sections.

4.3.1 Surficial Materials

An approximately 5- to 6-inch-thick layer of asphalt was encountered in 12 of the 15 explorations performed for this study. Test Pits TP-3, TP-4, and TP-4A which were located in an existing landscaped area of the site encountered an approximately 10- to 12-inch-thick layer of topsoil at the surface.

4.3.2 Existing Fill

Beneath the surficial materials, all of the explorations encountered existing fill materials that extended to depths ranging from about 2 to 5 feet below the ground surface. The existing fill materials consisted predominantly of silty and clayey sands with varying amounts of gravel. Test pits TP-1, TP-4, and TP-4a encountered brick, concrete and ceramic fragments within the fill materials. The fill was generally loose to medium dense in relative density based on the SPT N-values.

4.3.3 Native Soils

Beneath the surficial materials and existing fill, the borings encountered native soils consistent with the geologic mapping of the site. The subsurface profile consisted of interlayered clayey/silty and poorly-graded sands (SC, SM, SP-SM) and sandy lean clays (CL). The fine-grained soils were generally medium stiff to stiff in consistency and the granular soils were generally loose to medium dense in relative density based on the SPT values.

4.3.4 Groundwater

Groundwater was encountered in all of the borings at a depth of about 13 feet below the ground surface during drilling and was observed at about 11 to 13 feet below the ground surface immediately after drilling. Mottling potentially indicative of the seasonal high water table (SHWT) was encountered in Test Pits TP-1 and TP-4A at a depth of about 10 feet below the ground surface.

4.4 Laboratory Testing

GTA performed laboratory testing on selected soil samples obtained from the explorations, including natural moisture content determinations and grain size analyses for classification of the soils in accordance with the Unified Soil Classification System (USCS). Detailed results of the laboratory testing performed for this study are included in Appendix C. The results of the laboratory tests are summarized in the following table:

SUMMARY OF CLASSIFICATION TESTING

Boring No.	Depth (ft.)	USCS Classification	NMC (%)	Fines (%)
B-3	18	Clayey SAND (SC)	28.0	21.4
B-5	4	Silty SAND (SM)	12.3	17.8
B-8	13	Silty SAND (SM)	53.8	26.0
B-9	8	Silty SAND (SM)	7.1	15.2

Note: NMC=Natural Moisture Content, Fines=Material passing the #200 sieve

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our geotechnical engineering study, it is GTA's professional opinion that the subsurface conditions at the project site are generally suitable for construction of the proposed municipal building provided the following geotechnical engineering recommendations are followed, and that the applicable standard of care is maintained during construction. Following the recommended earthwork procedures outlined in this report, it is our opinion that the proposed municipal building may be supported on conventional spread footings, and the basement floor slab may be established on-grade. **Groundwater may be encountered at, or near, the basement subgrade elevation and may require additional design measures as well as construction considerations. We recommend the installation of a temporary monitoring well. Additionally, the site grading plans should be provided to GTA to review when they are available.** GTA's recommendations for foundations, slabs, subsurface utilities, and other geotechnical considerations are presented in the following paragraphs.

5.1 Site Preparation

5.1.1 Existing Utilities

Due to the potential conflicts with new construction, GTA recommends the site preparation removal or relocation of any existing utilities that fall within the proposed building area. The resulting excavations should be backfilled with structural fill that is placed and compacted in accordance with the recommendations contained in the Fill Placement section. It should be noted that soft/loose existing fill materials and wet soils may be encountered adjacent to and below any existing foundation elements and abandoned utilities. Therefore, GTA recommends that the subgrade be evaluated prior to backfilling. Where soft/loose materials are encountered, localized over-excavation will be required.

Existing utilities to be deactivated beyond the proposed building areas that will not be incorporated into the proposed construction can be abandoned in-place. In-place abandonment of utilities should consist of completely filling the pipelines with grout or flowable fill, or potentially capping the ends. Alternatively, these utilities can be removed and the resulting excavations backfilled in accordance with the recommendations presented in the Fill Placement section.

5.1.2 Stripping

The site should be stripped of topsoil and existing pavements from within and at least 5 feet beyond the proposed building and pavement areas. The removal of topsoil, pavement, and unstable surface soils should be performed before controlled fill placement. The actual stripping thickness will depend on the localized topsoil development, soil moisture, disturbance by construction traffic, and contractor care. The stripped topsoil and asphalt will not be suitable for reuse as controlled compacted fill or backfill within building or pavement areas, or atop utilities. The stripped topsoil can be relocated to proposed landscaped areas to the extent feasible. Milled pavement can be reused in the subbase layer of the proposed pavement section per NJDEP, but GTA recommends that it be thoroughly mixed with equal parts of NJDOT Dense Graded Aggregate (DGA) for stability reasons.

5.1.3 Existing Fill

Existing fill materials were encountered in all the explorations and extended to depths ranging from about 2 feet to 5 feet below the existing surface grades. Placement and testing documentation for the existing fill is not available. Due to the variable nature of the existing fill materials and the lack of compaction records, GTA believes that the existing fill should not be considered reliable for direct support of proposed building foundations. However, based on our explorations, **we expect that the existing fill materials will be removed during excavation of the basement level.**

Consideration can be given to allowing the existing fill to remain in place below proposed paved areas with the risk of potential future pavement settlement, which could manifest as "bird baths" in the pavement. Even in this scenario, however, some undercutting should be expected to remove soft or deleterious materials in isolated areas. **If this risk cannot be accepted, the existing fill will need to be entirely removed from within and 5 feet beyond the proposed development area and replaced with controlled compacted fill.**

Where excavation is necessary to remove unstable or deleterious fill from below the proposed slab area, the existing fills should be replaced with controlled compacted fill as recommended in the Fill Placement section. Existing fill materials may be reused as new fill, under the conditions described in the Fill Material Criteria section.

5.2 Earthwork

5.2.1 Excavations and Support of Excavation Walls

As a minimum, all construction excavations should be sloped and shored in accordance with OSHA excavation regulations or stricter local governing safety codes. It is our opinion that the undisturbed natural soils or controlled compacted fill composed of similarly graded materials would generally be classified as "Type C" soils under the OSHA excavation regulations. Significantly flatter excavation side-slopes will be required where groundwater seepage occurs.

Support of excavation (SOE) walls may be required along locations where excavations for the proposed basement level cannot be properly sloped without undermining sidewalks and utilities. GTA believes steel soldier piles and timber lagging would be appropriate for excavation support. Lateral bracing may be necessary depending on the depth of the excavation supported. The SOE walls will need to be designed for the appropriate surcharge and hydrostatic loads, as well as lateral earth pressures and performed by a Professional Engineer licensed in the State of Jersey. Excavation support may be designed using the granular on-site material parameters listed in the Lateral Earth Pressures section.

5.2.2 Groundwater, Dewatering, and Additional Investigation

Groundwater may be encountered during the excavation of the proposed building basement and potentially in deeper utility excavations. The borings performed for our exploration encountered groundwater at about 11 to 13 feet below the existing grades during and after drilling, and two of the test pits encountered mottling that may be indicative of the SHWT at about 10 feet below the existing grades. Given the proximity of groundwater to the basement level, **we recommend the installation of a temporary monitoring well to observe groundwater fluctuations in the vicinity of the proposed building basement and review of the site grading plans, when available, to determine if additional measures for groundwater control will be necessary.** Monitoring of the groundwater level will help establish a design groundwater level, which will be used in determining hydrostatic pressures that will need to be resisted by the basement floor and foundation walls, and will aid in the evaluation of the dewatering system required during construction.

Groundwater levels may fluctuate with seasonal variations in precipitation and as a result of development activity. **Accordingly, the contractor should be prepared to dewater and shore excavations during construction.**

5.2.3 Moisture Sensitivity & Stability

The on-site soils can be moisture sensitive and will lose strength and stability if disturbed in the presence of water. Additionally, near surface materials and existing fill may be soft and unstable under construction equipment. Drying of the fine-grained soils will only be feasible during the warm, dry season of the year and may require extended drying times and discing effort to adequately dry the soils to a moisture content that is acceptable for compaction.

GTA recommends that positive drainage be maintained across the site during construction to prevent ponding of water since the exposed subgrades could destabilize in combination with construction traffic and precipitation. If the subgrade is disturbed by construction traffic and becomes unstable, undercutting and replacement of these surficial materials will be required.

5.2.4 Fill Material Considerations

The soils encountered in the explorations will generally be suitable for reuse as structural fill. Additional considerations regarding the fill materials are presented below.

- Pavement Subgrade Fill: Fine-grained and/or plastic soils (USCS Classifications ML, CL, and the more-plastic SC) will likely be moisture- and disturbance-sensitive. If encountered, MH and CH materials should be undercut and replaced with approved structural fill.
- Utility Backfill: GTA generally recommends against using fine-grained soils (USCS Classifications ML, MH, CL or CH) as utility trench backfill. If fine-grained soils are used for trench backfill, the contractors involved must apply the special construction methods described in the Utility Trench Backfill section.
- Basement Wall Backfill: Clays (USCS Classifications CL or CH) are not recommended for use as basement wall backfill.
- Imported Fill: GTA recommends that off-site borrow materials, if required, should meet the USCS designation SM, SP, SW, SC, GP, GM, GC, or GW. These materials should be approved by the geotechnical engineer and be tested for their environmental quality before import.
- Existing Fill: Existing fill materials may be reused as controlled fill, provided organic material, debris, and other deleterious materials are removed. Durable rubble within the fill (such as concrete, brick, and asphalt fragments) may be reused as controlled fill, provided the fragments are crushed to particles no greater than 3 inches in the largest dimension and mixed with soil at a ratio of at least one to one.

5.2.5 Fill Placement

The areas to receive fill should first be proofrolled with a loaded, tandem-axle dump truck or numerous passes of a large smooth drum vibratory compactor with a static drum weight of at least ten tons under the observation of GTA. A sheep's foot type roller will be more efficient in areas where clay (CL) soils are exposed at subgrade elevations. Other methods of compaction may be deemed more appropriate for the subgrade evaluation by GTA's on-site representative depending on prevailing weather conditions and space constraints. Any subgrade materials identified as soft/loose, wet, or otherwise unsuitable should be over-excavated to a stable bearing stratum before placement of controlled fill. After a suitable subgrade has been achieved, controlled fill should be placed and compacted in 8- to 12-inch thick lifts (as measured before compaction). The fill should be compacted to the following recommended specifications:

RECOMMENDED COMPACTION SPECIFICATIONS

Fill Location	Compaction Specification
Below foundations, slabs-on-grade, retaining walls, slopes steeper than 5H:1V, utility and roadway fill within the top 12 inches of pavement subgrade	95% of Maximum Dry Density per the Modified Proctor (ASTM D-1557), Moisture: ± 3% of optimum

RECOMMENDED COMPACTION SPECIFICATIONS

Fill Location	Compaction Specification
Utility and roadway fill greater than 12 inches below pavement subgrade	92% of Maximum Dry Density per the Modified Proctor (ASTM D-1557), Moisture: ± 3% of optimum

The 2021 IBC requires that fill placement must be observed on a full-time basis by a field representative working under the supervision of a licensed geotechnical engineer and be retained by the Owner or their authorized representative (not the contractor). All compactive effort should be verified by in-place density testing.

5.3 Buildings

5.3.1 Foundation Design

It is GTA's opinion that shallow spread footings will be able to support the proposed municipal building, providing the footings are constructed on firm, native materials, controlled compacted fill, or compacted AASHTO No. 57 stone placed directly atop the suitable natural soils. **Footings that are supported on controlled compacted fill and/or natural soils can be proportioned for a net allowable soil-bearing pressure of 3,000 pounds per square foot (psf).** Based on this design, GTA anticipates the foundations will experience post-construction settlements on the order of 1-inch total and ½-inch differential over a 30-foot span. GTA recommends minimum widths of 24 inches for wall footings and 30 inches for column footings, where foundation design based on the recommended allowable soil-bearing pressure would result in a narrower footing. Exterior footings should be founded at least 36 inches below final exterior grades to protect against the effects of frost, or deeper if required by local ordinance.

5.3.2 Foundation Construction Considerations

If encountered at foundation subgrade levels, existing fill materials must be removed and replaced with new compacted structural fill. New fill will be suitable for foundation support only if it is placed and compacted as we recommend in the Fill Placement section. The proposed footings will likely be supported on a combination of native soils, new compacted fill, or AASHTO No. 57 stone. The native soils encountered during our subsurface exploration were generally firm enough for foundation support.

Before concrete placement, a licensed geotechnical engineer or a qualified representative should evaluate the footing subgrade soils and perform penetration testing on the exposed footing subgrades to confirm the design allowable bearing capacity. **Any loose/soft soils should be over-excavated to a**

stable bearing stratum. Over-excavations should be replaced with lean concrete, AASHTO No. 57 stone, or controlled compacted fill. If over-excavations are replaced with soil fill, they should be placed and compacted as recommended in the Fill Placement section. Alternatively, the footings could be lowered to a competent bearing stratum. Over-excavation and replacement, if required, should be performed as recommended by a licensed geotechnical engineer or a qualified representative based on conditions observed in the field during construction. Concrete for footings should be placed the day the excavations are made to prevent excessive disturbance and/or moisture increase.

5.3.3 Slab Design

Following the earthwork procedures recommended in this report, the basement floor slab may be supported at grade and designed using a modulus of subgrade reaction of 150 pci, which assumes that granular soils are present at the slab subgrade elevation. If encountered, fine-grained soils should be undercut and replaced with granular materials as controlled compact fill.

Groundwater seepage was encountered within all of the borings at depths of 11 to 13 feet bgs. Mottling, potentially indicative of the SHWT was observed in two test pits at a depth of about 10 feet below the ground surface. Accordingly, consideration should be given to raising basement grades so the slab is established at least two feet above the observed SHWT level. Additionally, incorporating open-graded stone and a series of subsurface drains beneath the slab should be considered. The subsurface drains should direct water towards sump pump stations for removal. Each sump should include a backup sump pump incorporated into the basement design. Sump crock discharge water and roof downspouts should be diverted outside of the backfill zone to prevent recirculation. Sump pumps should be designed to run longer for a period of time after rain events.

The basement floor may need to be designed as a hydrostatic slab capable of resisting pressures associated with a potential two-foot rise in the observed water level depending on the design elevation of the basement floor and the results of the temporary groundwater monitoring well that is recommended.

GTA recommends that the slabs be founded on a minimum 4-inch-thick layer of open-graded stone to provide a stable base to facilitate the proper placement of the waterproofing membrane, vapor barrier, and reinforcing steel. The open-graded stone layer should be comprised of imported washed gravel or crushed stone materials with less than 5 percent fines. The vapor retarder at the sidewalk level should be at least 6-mil thick if it will also serve as a radon gas retarder.

5.3.4 Slab Construction

Before concrete placement, a representative of GTA should evaluate the stability and compaction of natural and compacted fill subgrades for support of the floor slabs. Soft or loose layers should be removed from the slab subgrade and replaced as recommended in the Fill Placement section. Floor slabs should not be rigidly connected to foundation walls, so that wall movements will not affect the slab. Control joints should be provided to control shrinkage cracking of the concrete floor system.

5.3.5 Basement Excavation

Barring unanticipated findings, commonly used excavation techniques can likely be used to make basement excavations. Depending on final grading plans and the data gathered from the temporary monitoring well, **dewatering devices may be necessary during excavation in order to lower and maintain groundwater levels below the excavation and to reduce the possibility of associated subgrade stability problems.**

The on-site soils at the foundation bearing level will be subject to loosening and loss of bearing support if exposed to groundwater and upward seepage. **Consideration should be given to incorporating a 6- to 12-inch-thick layer of open graded stone as a working platform during construction.** Additionally, dewatering measures should lower and maintain the groundwater level to at least 1 to 2 feet below the base of the construction excavations. Several sumps or dewatering well points will likely be necessary, with pumps sized to handle the observed flow. Ideally, the dewatering system should be continuously operational until foundation construction has been completed.

5.3.6 Seismic Site Class Designation

The soil conditions within the upper 100 feet at this site can be categorized as Site Class D per ASCE/SEI 7-16 guidance. This categorization is based on the boring data, general geologic information for the region, and the information contained in the applicable code. Subsurface explorations at this site were extended to a maximum depth of 25 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of the geologic conditions of the general area. A site-specific seismic study could be performed to confirm the conditions below the current maximum boring depth.

5.4 Lateral Earth Pressures

It is GTA's understanding that the building will contain a below-grade basement level. Below-grade building walls will be subjected to unbalanced lateral-earth pressures and so must be designed to resist such pressures. For design, GTA recommends the following design parameters and considerations:

Soil Property	On-Site Backfill (PI < 15)	AASHTO #57 Clean Stone	Dense-Graded Aggregate backfill
Unit Weight, γ	125 pcf	105 pcf	145 pcf
Angle of Internal Friction, Φ	32°	38°	42°
Coefficient of Active Earth Pressure (Ka)	0.31	0.24	0.20
Coefficient of Passive Earth Pressure (Kp)	3.25	4.20	5.00
Coefficient of Earth Pressure at Rest (Ko)	0.47	0.38	0.33
Base Friction, tan δ	0.39	0.47	0.53
Equivalent Fluid Pressure (Unrestrained Top of Wall)	40 psf/ft	25 psf/ft	30 psf/ft
Equivalent Fluid Pressure (Restrained Top of Wall)	60 psf/ft	40 psf/ft	50 psf/ft

Hydrostatic pressure is not included in the above values. Provided the foundations are constructed above the groundwater level, drainage panels and a perimeter drain should be provided behind below grade walls to carry away any infiltrating surface water so that hydrostatic pressures do not develop. The perimeter drain should consist of a minimum four-inch diameter slotted or perforated pipe encased in a minimum of six inches of crushed stone that is wrapped by a geotextile filter. The crushed stone should meet the gradational requirements of AASHTO Size No. 57 aggregate. The perimeter drain should tie into a sump pit, stormwater management system, or daylight. If foundations walls extend below the design groundwater level, they should be designed for hydrostatic pressure and a perimeter drain should not be installed. All below grade foundation walls should be water- or moisture-proofed as appropriate.

5.4.1 Basement Wall Backfill & Design

The soils at this site predominantly consist of sands (SM, SP-SM, SC) per the USCS. The SP-SM and SM soils are considered better suited for below-grade wall backfill than the SC soils, with some limitations as discussed herein. Additionally, clay soils (CL) were encountered in our explorations and are not recommended for use as basement wall backfill as these types of soils can exert swell pressures on the walls. Foundation walls should be designed to resist the lateral soil pressure from the retained backfill. This will be a function of the height of the walls, the differential height of backfill, the type of soil backfill material, the drainage conditions, and the method of placement and compaction.

Basement wall backfill should be free of organic matter, rocks greater than three inches in diameter, and construction debris. Backfill should be placed and compacted in lifts in a manner that does not damage the foundation, damp- or water-proofing, and drainage system. Foundation wall backfill should not be placed until the concrete has achieved adequate strength, the basement and first floors have been constructed, and the walls have been adequately braced from the interior of the building.

5.5 Utilities

5.5.1 Utility Excavations

Utility excavations can likely be accomplished using standard excavation techniques. If perched water is encountered in utility excavations, dewatering devices like sumps or gravity-flow trenches will likely be sufficient to control the water. If utility excavations are planned to extend more than a foot or 2 below the anticipated groundwater level, dewatering wellpoints may be required to maintain stable excavations. We recommend that 8- to 12-inches of AASHTO No. 57 stone be placed below utilities that will be installed below the groundwater level. Utility excavations should be properly shored and supported in accordance with the latest requirements of OSHA and such other regulatory authorities with jurisdiction.

5.5.2 Utility Support

The native soils and controlled fill placed during mass grading will likely be suitable for supporting the associated utilities. Any soft/loose or unstable soils encountered at the utility subgrades should be over-excavated and replaced with controlled compacted fill or AASHTO No. 57 stone. To facilitate compaction, provide additional protection for the pipe, and decrease the risk of excessive trench settlement, GTA recommends placing AASHTO No. 57 stone or DGA to at least 6 inches above utility pipes made of plastic or flexible metal (i.e., CMP) and to the spring line of rigid pipes.

5.5.3 Utility Trench Backfill

Utilities installed below proposed structural areas should be backfilled with controlled compacted fill. The backfill should be placed and compacted in accordance with project requirements or the recommended compaction specifications provided in the Fill Placement section. Utility trenches should be backfilled with the most granular material available. The soils encountered during the subsurface exploration of the project site will generally be suitable for use as utility backfill. However, fine-grained soils (CL) were encountered in the explorations, and will likely be encountered in utility excavations. **The use of fine-grained, plastic soils for utility backfill should be limited to the extent feasible.** If fine-grained/plastic soils are used as utility backfill, they should be placed in maximum 6-inch (loose measure) lifts and compacted with a sheep's-foot type roller at a moisture content of 2 to 4 percent above optimum. To reduce the risk of trench settlement and associated impacts, moisture conditioning and breaking of clay clumps/clods must be performed for proper placement and compaction of clayey soils as utility backfill**.** These materials are not recommended to be placed within 18 inches of final pavement subgrade.

Hand-operated equipment should be used for compaction around utility structures. Where hand-operated equipment is used for compaction, lift thicknesses should not exceed 6 inches (as measured before compaction). When backfilling around utility structures, each lift should be uniformly compacted with a sufficient number of passes to obtain the required degree of compaction.

It should be noted that excavated boulders, weathered rock, and/or rock materials removed during utility installations may not be suitable for reuse as backfill unless these over-size materials are segregated or processed to a gradation similar of dense graded aggregate.

5.6 Pavement

5.6.1 Pavement Subgrade Preparation

The upper 18 inches of pavement subgrade should be constructed of soils meeting the following characteristics:

• Liquid Limit (AASHTO T-89):	30 percent or less
• Plasticity Index (AASHTO T-89, T-90):	14 percent or less
• California Bearing Ratio (ASTM D1883):	5 percent or higher
• Maximum Dry Density (ASTM D1557):	105 pcf or higher

The on-site soils with USCS classifications of SP, SP-SM, SW-SM, SM, and the less-plastic SC, will likely meet pavement subgrade criteria. The more plastic and/or fine-grained soils (USCS classifications CL, and the more-plastic SC), may not meet these suggested pavement subgrade criteria and should not be used as fill in the top 18 inches of pavement subgrade.

If soils not meeting pavement-subgrade criteria are encountered, the top 18 inches of pavement subgrade should be undercut and replaced with controlled compacted fill meeting pavement subgrade criteria.

5.6.2 Pavement Construction

GTA should make observations of soil stability during mass grading. GTA recommends that a testing program, including CBR testing, be implemented to develop a suitable pavement section for the project. A CBR value of 5 can be used for preliminary design purposes. The pavement subgrade should be proofrolled using a loaded, tandem-axle dump truck before pavement sections are constructed. An appropriately experienced representative of GTA should observe the entire proofrolling operation to evaluate stability. Unstable soils or otherwise unsuitable materials, if encountered, should be over-excavated to a stable stratum and replaced with controlled, compacted fill, placed as recommended in the Fill Placement section.

Construction traffic should be controlled in order to limit disturbance of previously approved subgrade, or stone base course, or partially completed asphalt pavements. Too much traffic can result in damage to or premature failure of the pavement. Any damaged pavement areas should be repaired adequately before placing asphalt surface courses. The chemically stabilized subgrade, if used, will provide improved pavement subgrade support and will reduce the potential and extent of pavement damage during construction.

6.0 ADDITIONAL SERVICES

We recommended that GTA be retained during construction of the subject project to provide geotechnical consultation and construction observation and testing services as outlined below:

- Installation of a temporary groundwater monitoring well and additional recommendations for below-grade level design (if necessary).
- Support of excavation design.
- Review final site and structural plans to evaluate if they conform to the intent of this report.
- Provide on-site observation of site stripping, subgrade evaluation, and testing of controlled fills.
- Observe excavated footings for compliance with the project drawings and the intent of this geotechnical report.
- Observe the proofrolling of floor slab and pavement subgrades to evaluate stability.
- Perform special inspections during concrete and masonry construction and structural steel erection.
- Testing of imported fill for environmental quality.

7.0 LIMITATIONS

This report, including all supporting boring logs, field data, field notes, laboratory test data, calculations, estimates and other documents prepared by GTA in connection with this project have been prepared for the exclusive use of T&M Associates pursuant to agreement between GTA and T&M Associates in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement and the General Provisions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and T&M Associates is unauthorized and such use is at the sole risk of the user.

The analysis and recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Borings indicate soil conditions only at specific locations and times and only at the depths penetrated. They do not necessarily reflect strata or variations that may exist between the exploration locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations of subsurface conditions from those described in this report are noted during construction, recommendations in this report may need to be reevaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. GTA is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of Geo-Technology Associates, Inc.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our client.

This report and the attached logs are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL
BUSINESS
ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX A

Figures

Note: Site boundary is approximate.

SITE LOCATION MAP

14 Worlds Fair Drive, Suite A
Somerset, New Jersey 08873
(732) 271-9301
fax (732) 271-9306

GEO-TECHNOLOGY ASSOCIATES, INC.

PROPOSED MUNICIPAL BUILDING

Borough of Eatontown,
Monmouth County, New Jersey

Prepared For: T&M Associates

SOURCE: Google Maps

SCALE: NTS	DATE: JUN. 2025	PROJECT#: 31251263

Figure 1

*Base plan prepared by Parallel Architectural Group titled "Site Plan" dated Decemeber 17, 2024, overlaid in Google Earth

LEGEND:

B-X	⊕	Indicates the numbers and approximate locations of borings performed by GTA for this study.
TP-X	▚	Indicates the numbers and approximate locations of test pits performed by GTA for this study.

APPENDIX B

Exploration Logs

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS	
				GRAPHIC	LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)		○	GW
				●	GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)		▥	GM
				▨	GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)		⁘	SW
				░	SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)		▥	SM
				▨	SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)		SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50	▥	ML
				▨	CL
				☰	OL
			ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50	▥	MH
				▨	CH
				▨	OH
HIGHLY ORGANIC SOILS				≋	PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		░
	MAN MADE FILL		▦
	GLACIAL TILL		▨
	COBBLES AND BOULDERS		○
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	△
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	△

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	▽
UPON COMPLETION OF DRILLING	▼
24 HOURS AFTER COMPLETION	▼

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

LOG OF BORING NO. B-1

Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **11 Ft.**	▽ **N/A**
DATE:	**6/2/2025**	**6/2/2025**	**-**
CAVED (ft):	**In Auger**	**17 Ft.**	**BOC**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **31 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.0	0		■	6 In. of Asphalt	
1	0.5	16	6-7-9	16	30.5			▩	FILL - Yellow-brown, moist, medium dense, silty sand	
2	2.0	20	8-6-3-4	9	29.0		CL	▨	Brown, moist, stiff, Lean CLAY with sand	
3	4.0	19	2-3-5-6	8	27.0	5	SM	░	Dark yellow-brown, moist, loose, Silty SAND	
4	6.0	18	6-7-7-7	14				░	- medium dense at 6 Ft.	
5	8.0	16	6-4-10-10	14				░		
6	10.0	19	6-6-5-5	11		10		░		▽
7	13.0	18	1-2-4-4	6	18.0		SC	▨	Yellow-brown, moist, loose, Clayey SAND	▽
						15		▨		
8	18.0	20	3-3-7-7	10				▨	- Black at 18 Ft.	
						20		▨		
9	23.0	22	4-4-7-8	11	8.0		CL	▨	Black, moist, stiff, Sandy Lean CLAY	
					6.0	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-1

Sheet 1 of 1

Sheet 1 of 1

LOG OF BORING NO. B-2

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **12 Ft.**	▼ **N/A**
DATE:	**6/2/2025**	**6/2/2025**	**-**
CAVED (ft):	**In Auger**	**18.5 Ft.**	**BOC**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **31 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.0	0		■	6 In. of Asphalt	
1	0.5	18	5-6-8	14	30.5			▩	FILL - Yellow-brown, moist, medium dense, silty sand	
2	2.0	17	5-3-3-4	6	29.0		CL	▨	Dark brown, moist, medium stiff, Lean CLAY with sand	
3	4.0	22	WOH-1-4-9	5		5		▨	- Yellow-brown, Lean CLAY at 4 Ft.	
4	6.0	17	12-12-14-12	26	25.0		SM	░	Yellow-brown, moist, medium dense, Silty SAND	
5	8.0	6	3-3-3-3	6				░	- wet, loose at 8 Ft.	- perched water at 8 Ft.
6	10.0	23	2-3-5-6	8		10		░	- moist at 10 Ft.	
								░		▽
7	13.0	16	1-1-4-7	5	18.0		SC	▧	Dark yellow-brown, wet, loose, Clayey SAND	▽
						15		▧		
8	18.0	21	4-3-5-6	8				▧	- Black at 18 Ft.	
						20		▧		
9	23.0	18	3-5-7-8	12	8.0		CL	▨	Black, moist, stiff, Sandy Lean CLAY	
					6.0	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-2

Sheet 1 of 1

LOG OF BORING NO. B-3

Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **12 Ft.**	▽ **N/A**
DATE:	**6/2/2025**	**6/2/2025**	**-**
CAVED (ft):	**In Auger**	**17.5 Ft.**	**BOC**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **31 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.0	0		■	6 In. of Asphalt	
1	0.5	17	4-3-5	8	30.5			▩	FILL - Dark gray-brown, moist, loose, clayey sand	
2	2.0	18	5-4-5-5	9	29.0		SC	▨	Dark yellow-brown, moist, loose, Clayey SAND	
3	4.0	19	4-4-4-7	8	27.0	5	SM	▥	Dark yellow-brown, moist, loose, Silty SAND	
4	6.0	20	4-6-8-10	14					- Yellow-brown, medium dense at 6 Ft.	
5	8.0	20	5-8-9-11	17	23.0	10	SP-SM	▥	Yellow-brown, moist, medium dense, Poorly-graded SAND with silt and gravel	
6	10.0	16	10-8-5-4	13	20.0		SM	▥	Dark yellow-brown, very moist, medium dense, Silty SAND	▽ ▽
7	13.0	22	1-2-4-9	6	18.0	15	SC	▨	Dark yellow-brown, wet, loose, Clayey SAND	
8	18.0	19	1-2-4-4	6		20				- NMC = 28.0%
9	23.0	21	3-5-7-7	12	8.0		CL	▨	Black, moist, stiff, Sandy Lean CLAY	
					6.0	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-3

Sheet 1 of 1

LOG OF BORING NO. B-4

Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **12 Ft.**	▼ **N/A**
DATE:	**6/2/2025**	**6/2/2025**	**-**
CAVED (ft):	**In Auger**	**18 Ft.**	**BOC**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **31.5 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.5	0		■	6 In. of Asphalt	
1	0.5	16	7-7-9	16	31.0				FILL - Light brown, moist, medium dense, clayey sand	
2	2.0	19	6-7-7-5	14	29.5		CL		Dark yellow-brown, moist, stiff, Sandy Lean CLAY	
3	4.0	21	2-2-3-4	5	27.5	5	SP-SM		Yellow-brown, moist, loose, Poorly-graded SAND with silt	
4	6.0	19	4-3-4-6	7						
5	8.0	16	5-7-8-8	15					- medium dense at 8 Ft.	
6	10.0	16	6-10-11-11	21		10			- with gravel at 10 Ft.	
										▽
7	13.0	17	2-2-3-3	5					- wet, loose, gravel grades out at 13 Ft.	▽
					17.5	15	SC		Dark yellow-brown, wet, loose, Clayey SAND	
8	18.0	19	1-2-4-5	6		20			- Black at 18 Ft.	
9	23.0	20	3-4-6-8	10	8.5		CL		Black, moist, stiff, Sandy Lean CLAY	
					6.5	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-5

Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **12 Ft.**	▼ **N/A**
DATE:	**6/2/2025**	**6/2/2025**	**-**
CAVED (ft):	**In Auger**	**19 Ft.**	**BOC**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **31.5 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.5	0		■	6 In. of Asphalt	
1	0.5	18	8-8-9	17	31.0			▩	FILL - Dark gray-brown, moist, medium dense, silty sand with gravel	
2	2.0	20	5-5-5-5	10	28.5		CL	▨	Yellow-brown, moist, stiff, Sandy Lean CLAY	
3	4.0	17	2-3-5-5	8	27.5	5	SM	░	Yellow-brown, moist, loose, Silty SAND	- NMC = 12.3%
4	6.0	19	7-9-6-5	15				░	- medium dense at 6 Ft.	
5	8.0	20	1-2-3-3	5				░	- loose at 8 Ft.	
6	10.0	17	3-4-4-4	8		10		░		
								░		▽
7	13.0	19	1-3-5-7	8	18.5		SC	▨	Dark yellow-brown, moist, loose, Clayey SAND	▽
						15		▨		
8	18.0	18	4-4-9-9	13				▨	- medium dense at 18 Ft.	
						20		▨		
9	23.0	16	3-4-5-7	9	8.5		CL	▨	Black, moist, stiff, Sandy Lean CLAY	
					6.5	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

LOG OF BORING NO. B-6

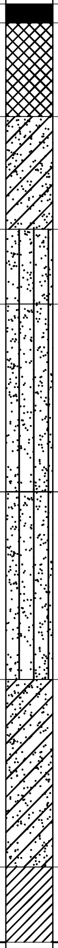
Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **14 Ft.**	▽ **13 Ft.**	▼ **N/A**
DATE:	**5/30/2025**	**5/30/2025**	**-**
CAVED (ft):	**In Auger**	**19 Ft.**	**BOC**

DATE STARTED: **5/30/2025**
DATE COMPLETED: **5/30/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **32 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**



SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					32.0	0			6 In. of Asphalt	
1	0.5	18	6-4-4	8	31.5				FILL - Dark olive-brown, moist, loose, clayey sand	
2	2.0	16	6-5-5-4	10	29.0		SC		Yellow-brown, moist, loose, Clayey SAND - medium dense at 4 Ft.	
3	4.0	18	5-8-9-10	17		5				
4	6.0	21	7-7-6-7	13	26.0		SM		Yellow-brown, moist, medium dense, Silty SAND	
5	8.0	20	5-3-3-8	6	24.0		SP-SM		Yellow-brown, moist, loose, Poorly-graded SAND with silt - medium dense at 10 Ft.	
6	10.0	22	7-12-15-14	27		10				
7	13.0	19	2-1-3-4	4	19.0		SM		Yellow-brown, moist, very loose, Silty SAND - wet at 14 Ft.	▽ ▽
						15				
8	18.0	22	1-1-2-3	3	14.0		SC		Black, wet, very loose, Clayey SAND	
						20				
9	23.0	20	2-4-7-7	11	9.0		CL		Black, moist, stiff, Sandy Lean CLAY	
					7.0	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-6

Sheet 1 of 1

LOG OF BORING NO. B-7

Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **11 Ft.**	▽ **N/A**
DATE:	**5/30/2025**	**5/30/2025**	**-**
CAVED (ft):	**In Auger**	**17 Ft.**	**BOC**

DATE STARTED: **5/30/2025**
DATE COMPLETED: **5/30/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **32 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					32.0	0			6 In. of Asphalt	
1	0.5	18	10-11-11	22	31.5				FILL - Gray-brown, moist, medium dense, silty sand	
2	2.0	22	7-8-8-6	16					- Dark green-gray, moist, medium dense, clayey sand at 2 Ft.	
3	4.0	23	2-3-5-5	8	28.0	5	SC		Dark yellow-brown, moist, loose, Clayey SAND	
4	6.0	19	11-19-11-8	30	26.0		SP-SM		Yellow-brown, moist, medium dense, Poorly-graded SAND with silt and gravel	
5	8.0	23	3-5-5-6	10	24.0		CL		Dark yellow-brown, moist, stiff, Sandy Lean CLAY	
6	10.0	21	3-5-7-7	12	22.0	10	SC		Yellow-brown, moist, medium dense, Clayey SAND	▽
7	13.0	20	3-3-4-8	7	19.0	15	SM		Gray-brown, wet, loose, Silty SAND	▽
8	18.0	18	1-2-4-4	6						
					12.5	20	CL		Black, moist, medium stiff, Sandy Lean CLAY	
9	23.0	23	3-4-7-7	11					- stiff at 23 Ft.	
					7.0	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

LOG OF BORING NO. B-8

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **13 Ft.**	▼ **N/A**
DATE:	**5/30/2025**	**5/30/2025**	**-**
CAVED (ft):	**In Auger**	**19 Ft.**	**BOC**

DATE STARTED: **5/30/2025**
DATE COMPLETED: **5/30/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **32 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					32.0	0			6 In. of Asphalt	
1	0.5	18	12-16-12	28	31.5				FILL - Gray-brown, moist, medium dense, silty sand with gravel - Dark gray-brown, gravel grades out at 2 Ft.	
2	2.0	14	7-9-10-10	19						
3	4.0	17	3-4-8-8	12	28.0	5	CL		Yellow-brown, moist, stiff, Sandy Lean CLAY	
4	6.0	19	10-9-11-13	20	26.0		ML		Yellow-brown, moist, very stiff, Sandy SILT	
5	8.0	17	4-6-7-6	13	24.0		SC		Yellow-brown, moist, medium dense, Clayey SAND	
6	10.0	20	4-5-6-6	11		10				
7	13.0	22	1/18"-3	0	19.0		SM		Dark yellow-brown, wet, very loose, Silty SAND	▼NMC = 53.8%
						15				
8	18.0	20	2-2-5-6	7	14.0		SC		Black, wet, loose, Clayey SAND	
						20				
9	23.0	23	3-3-5-6	8	9.0		CL		Black, moist, medium stiff, Sandy Lean CLAY	
					7.0	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-8

LOG OF BORING NO. B-9

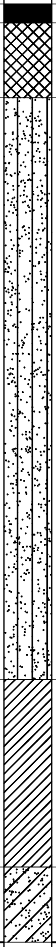
Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **12 Ft.**	▼ **N/A**
DATE:	**5/30/2025**	**5/30/2025**	**-**
CAVED (ft):	**In Auger**	**18 Ft.**	**BOC**

DATE STARTED: **5/30/2025**
DATE COMPLETED: **5/30/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **32.5 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**



SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					32.5	0			6 In. of Asphalt	
1	0.5	16	9-7-6	13	32.0				FILL - Gray-brown, moist, medium dense, silty sand with gravel	
2	2.0	22	6-4-4-3	8	30.0		SM		Dark yellow-brown, moist, loose, Silty SAND - medium dense at 4 Ft	
3	4.0	18	6-10-17-12	27		5				
4	6.0	17	12-9-8-10	17						
5	8.0	18	3-4-9-9	13					- Yellow-brown at 8 Ft.	- NMC = 7.1%
6	10.0	19	8-8-8-9	16		10				
										▽ ▽
7	13.0	19	1-1-2-4	3					- Gray-brown, wet, loose at 13 Ft.	
						15				
8	18.0	20	1-2-3-3	5	14.5		CL		Black, moist, medium stiff, Sandy Lean CLAY	
						20				
9	23.0	19	3-5-6-8	11	9.5		SC		Black, moist, medium dense, Clayey SAND	
					7.5	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

GEO-TECHNOLOGY
ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-9

Sheet 1 of 1

LOG OF BORING NO. B-10

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, NJ**

WATER LEVEL (ft):	▽ **13 Ft.**	▽ **12 Ft.**	▼ **N/A**
DATE:	**5/30/2025**	**5/30/2025**	**-**
CAVED (ft):	**In Auger**	**18 Ft.**	**BOC**

DATE STARTED: **5/30/2025**
DATE COMPLETED: **5/30/2025**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **2-1/4" HSA**
SAMPLING METHOD: **SPT**

GROUND SURFACE ELEVATION: **32 Ft.**
DATUM: **Topo**
EQUIPMENT: **Geoprobe**
HAMMER TYPE: **Automatic**
LOGGED BY: **VP**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					32.0	0			6 In. of Asphalt	
1	0.5	18	8-12-9	21	31.5				FILL - Gray-brown, moist, medium dense, silty sand with gravel - Dark gray-brown, moist, loose, clayey sand at 2 Ft.	
2	2.0	14	5-4-4-3	8						
3	4.0	17	3-5-11-16	16	28.0	5	SP-SM		Yellow-brown, moist, medium dense, Poorly-graded SAND with silt - dense at 6 Ft.	
4	6.0	19	19-17-16-8	33						
5	8.0	20	3-4-4-6	8	24.5		CL		Dark yellow-brown, moist, medium stiff, Sandy Lean CLAY - stiff at 10 Ft.	
6	10.0	22	8-5-6-5	11		10				▽ ▽
7	13.0	20	1-1-2-3	3	19.0	15	SC		Dark yellow-brown, wet, loose, clayey sand - Black at 19 Ft.	
8	18.0	18	1-2-3-5	5		20				
9	23.0	17	3-4-6-6	10	9.0		CL		Black, moist, stiff, Sandy Lean CLAY	
					7.0	25			Boring complete at 25 Ft.	
						30				

NOTES: **Location and elevation are approximate.**
BOC = Backfilled on completion

LOG OF TEST PIT NO. TP-1

PROJECT: **Proposed Municipal Building**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, New Jersey**
CLIENT: **T&M Associates**

PROJECT NO.: **31251263**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
CONTRACTOR: **J.A. Neary Excacating**
EQUIPMENT: **Case CX580**

GROUNDWATER ENCOUNTERED: **N/E**
GROUND SURFACE ELEVATION: **31.5 Ft.**
DATUM: **Topo**
LOGGED BY: **AFS**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0		■	5 In. of Asphalt	
31.1			▩	FILL- Dark yellow-brown (10YR 4/6), moist, 15% gravel, loose, loamy sand - Dark brown (10YR 3/3), moist, single grain, loose, sandy loam with concrete fragments at 1-1/2 Ft. - with ceramic fragments and scrap metals at 2 Ft.	
28.5		SM	░	Dark yellow-brown (10YR 4/4), moist, single grain, loose, Sandy Loam - Yellow-brown (10YR 5/6), 10% gravel at 5-1/2 Ft. - Yellow-brown (10YR 5/4), gravel grades out at 7 Ft. - Brown (10YR 4/3) at 9-1/2 Ft.	- Infiltration rate = 6.6 in/hr at 4 Ft.
21.5	10	SC	▨	Gray-brown (10YR 5/2) and dark yellow-brown (10YR 4/6), faint mottling, moist, single grain to subangular blocky, loose to friable, Sandy Clay Loam	
19.5	12			Test pit complete at 12 Ft. Estimated seasonal high water table encountered at about 10 Ft.	
	14				
	16				
	18				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

LOG OF TEST PIT NO. TP-2

PROJECT: **Proposed Municipal Building**
PROJECT NO.: **31251263**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, New Jersey**
CLIENT: **T&M Associates**

GROUNDWATER ENCOUNTERED: **N/E**
DATE STARTED: **6/2/2025**
GROUND SURFACE ELEVATION: **32 Ft.**
DATE COMPLETED: **6/2/2025**
DATUM: **Topo**
CONTRACTOR: **J.A. Neary Excacating**
LOGGED BY: **AFS**
EQUIPMENT: **Case 580**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
31.5	0			6 In. of Asphalt	
				FILL - Brown-yellow (10YR 6/6), moist, single grain, loose, sandy loam	
	2				
				- Very dark brown (10YR 2/2), with organics at 3 Ft.	
	4			- Dark brown (10YR 3/3) at 4 Ft.	- Infiltration rate = 8.4 in/hr at 4 Ft.
27.0		SC		Dark yellow-brown (10YR 4/6), moist, single grain to subangular blocky, loose to friable, Sandy Clay Loam	
	6				- Infiltration rate = 6.0 in/hr at 6 Ft.
	8				
	10				
20.0	12			Test pit complete at 12 Ft.	
	14				
	16				
	18				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

Sheet 1 of 1

LOG OF TEST PIT NO. TP-3

PROJECT: **Proposed Municipal Building**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, New Jersey**
CLIENT: **T&M Associates**
PROJECT NO.: **31251263**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
CONTRACTOR: **J.A. Neary Excacating**
EQUIPMENT: **Case 580**

GROUNDWATER ENCOUNTERED: **N/E**
GROUND SURFACE ELEVATION: **33 Ft.**
DATUM: **Topo**
LOGGED BY: **AFS**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0		⁘	10 In. of Topsoil	
32.2	2		▩	FILL - Dark yellow-brown (10YR 4/6), moist, single grain, loose, sandy loam - with topsoil at 2-1/2 Ft.	
29.5	4	SM	⁙	Dark yellow-brown (10YR 4/4), moist, single grain, loose, Sandy Loam	
28.0		SC	▧	Dark yellow-brown (10YR 4/6), moist, single grain to subangular blocky, loose to friable, Sandy Clay Loam	- Infiltration rate = 2.8 in/hr at 5 Ft.
27.0	6 8 10	SM	⁙	Dark yellow-brown (10YR 4/6), moist, 10% gravel, single grain, loose, Sandy Loam	
21.0	12 14 16 18			Test pit complete at 12 Ft.	

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

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LOG OF TEST PIT NO. TP-3

Sheet 1 of 1

LOG OF TEST PIT NO. TP-4

Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, New Jersey**
CLIENT: **T&M Associates**
PROJECT NO.: **31251263**

DATE STARTED: **6/2/2025**
DATE COMPLETED: **6/2/2025**
CONTRACTOR: **J.A. Neary Excacating**
EQUIPMENT: **Case 580**

GROUNDWATER ENCOUNTERED: **N/E**
GROUND SURFACE ELEVATION: **32 Ft.**
DATUM: **Topo**
LOGGED BY: **AFS**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
31.0				FILL - Dark yellow-brown (10YR 4/6), moist, single grain, loose, sandy loam - with bricks and concrete fragments at 1-1/2 Ft.	
	2				
				- with ceramic fragments at 3-1/2 Ft. - with a concrete slab at 4 Ft.	
27.9	4			Test pit complete at 4 Ft. due to bucket refusal on a concrete slab.	
	6				
	8				
	10				
	12				
	14				
	16				
	18				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

LOG OF TEST PIT NO. TP-4A

Sheet 1 of 1

PROJECT: **Proposed Municipal Building**
PROJECT LOCATION: **Borough of Eatontown, Monmouth County, New Jersey**
CLIENT: **T&M Associates**
PROJECT NO.: **31251263**

GROUNDWATER ENCOUNTERED: **N/E**
DATE STARTED: **6/2/2025**
GROUND SURFACE ELEVATION: **32.5 Ft.**
DATE COMPLETED: **6/2/2025**
DATUM: **Topo**
CONTRACTOR: **J.A. Neary Excacating**
LOGGED BY: **AFS**
EQUIPMENT: **Case 580**
CHECKED BY: **KTP**

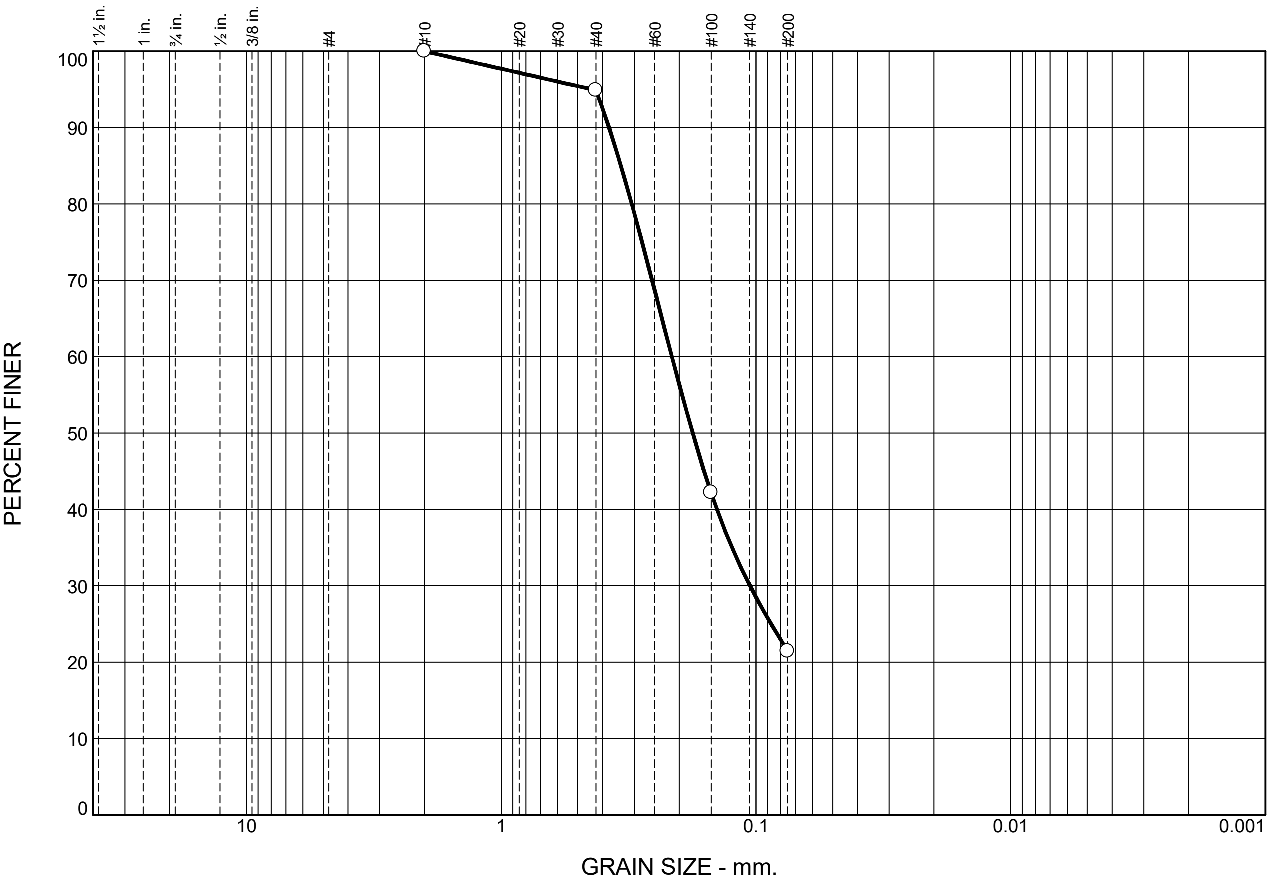
ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0			12 In. of Topsoil	
31.5				FILL - Dark yellow-brown (10YR 4/4), moist, single grain, loose, sandy loam	
	2			- with bricks at 2 Ft.	
29.0		SM		Dark yellow-brown (10YR 4/6), moist, single grain, loose, Sandy Loam	- Infiltration rate = 1.8 in/hr at 4 Ft.
	4				
	6			- with 15% gravel at 7 Ft.	
	8			- gravel grades out at 8 Ft.	
22.5	10	SC		Strong brown (7.5YR 4/6) and gray (7.5YR 5/1), faint mottling, moist, single grain, loose, Sandy Clay Loam	
20.5	12			Test pit complete at 12 Ft. Estimated seasonal high water table encountered at about 10 Ft.	
	14				
	16				
	18				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

APPENDIX C

Laboratory Data

Particle Size Distribution Report



	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	5.1	73.5	21.4	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.3390	0.2138	0.1771	0.1055				

Material Description	USCS	AASHTO
○ Clayey SAND	SC	A-2-4(0)

Project No. 31251263 **Client:** T&M Associates
Project: Proposed Municipal Building

○ **Source of Sample:** B-3 **Depth:** 18 **Sample Number:** 8

Remarks:
○NMC = 28.0%

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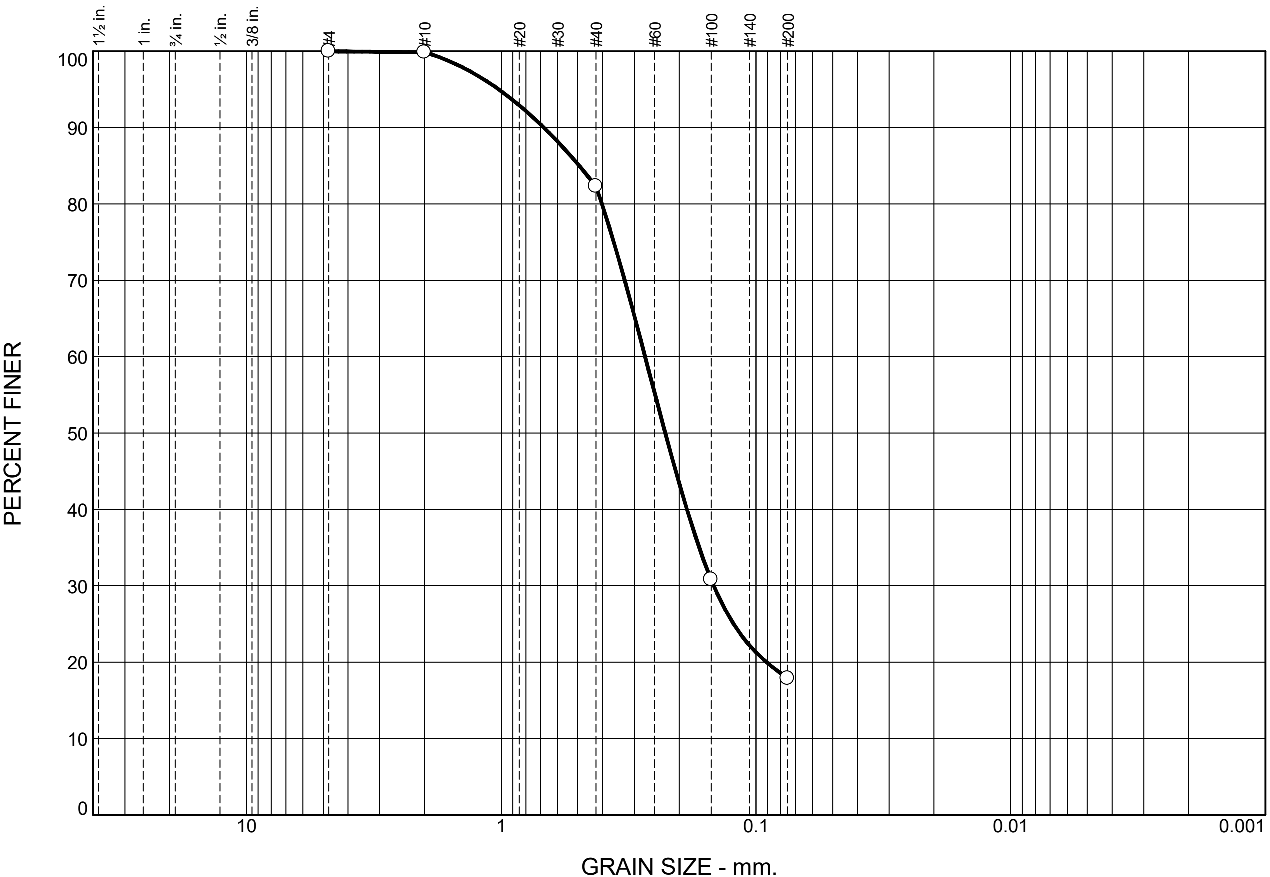
Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: RR **Checked By:** AFS

Particle Size Distribution Report



	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.1	17.6	64.5	17.8	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.4936	0.2723	0.2270	0.1465				

Material Description	USCS	AASHTO
○ Silty SAND	SM	A-2-4(0)

Project No. 31251263 **Client:** T&M Associates

Project: Proposed Municipal Building

○ **Source of Sample:** B-5 **Depth:** 4 **Sample Number:** 3

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Remarks:

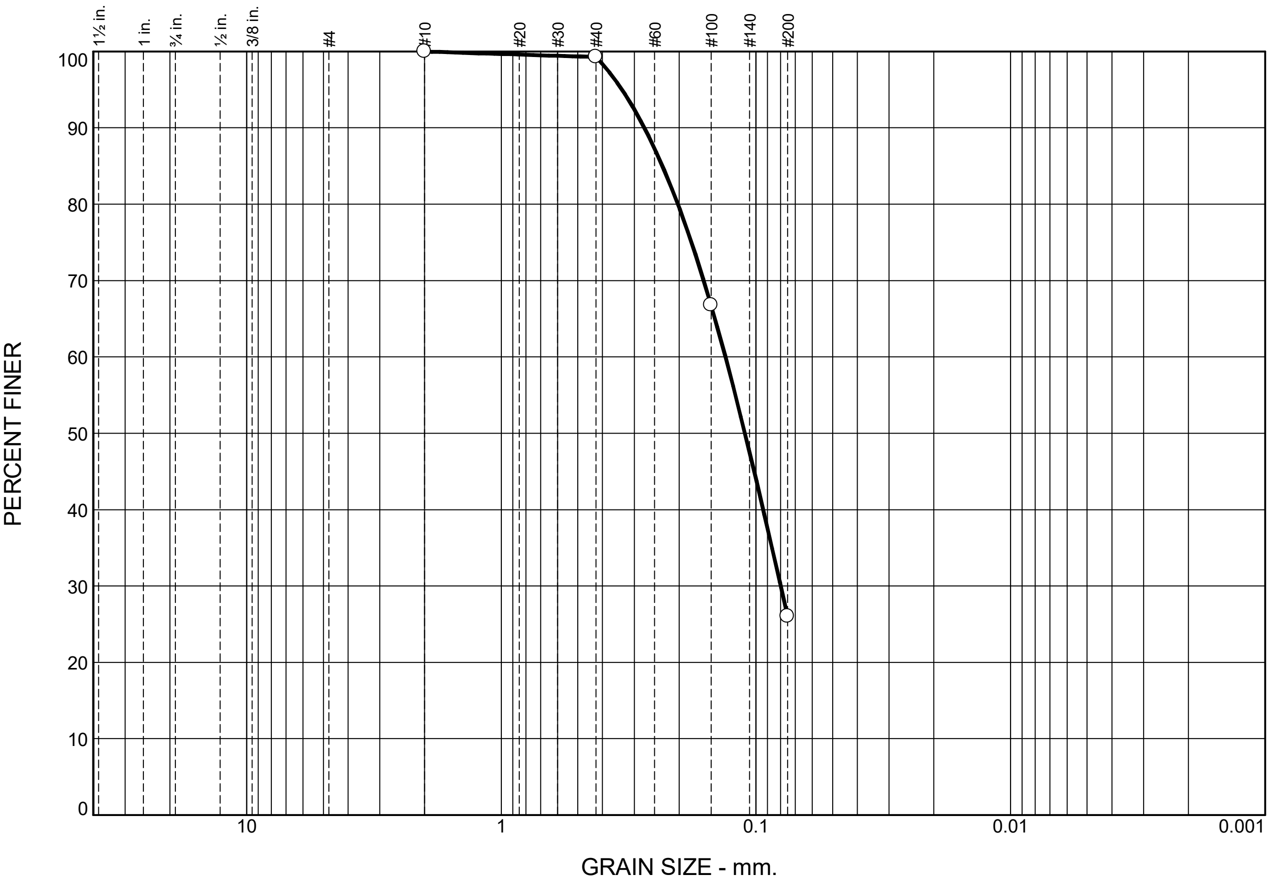
○NMC = 12.3%

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: RR **Checked By:** AFS

Particle Size Distribution Report



	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.7	73.3	26.0	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.2329	0.1317	0.1104	0.0799				

Material Description	USCS	AASHTO
○ Silty SAND	SM	A-2-4(0)

Project No. 31251263 **Client:** T&M Associates

Project: Proposed Municipal Building

○ **Source of Sample:** B-8 **Depth:** 13 **Sample Number:** 7

Remarks:

○NMC = 53.8%

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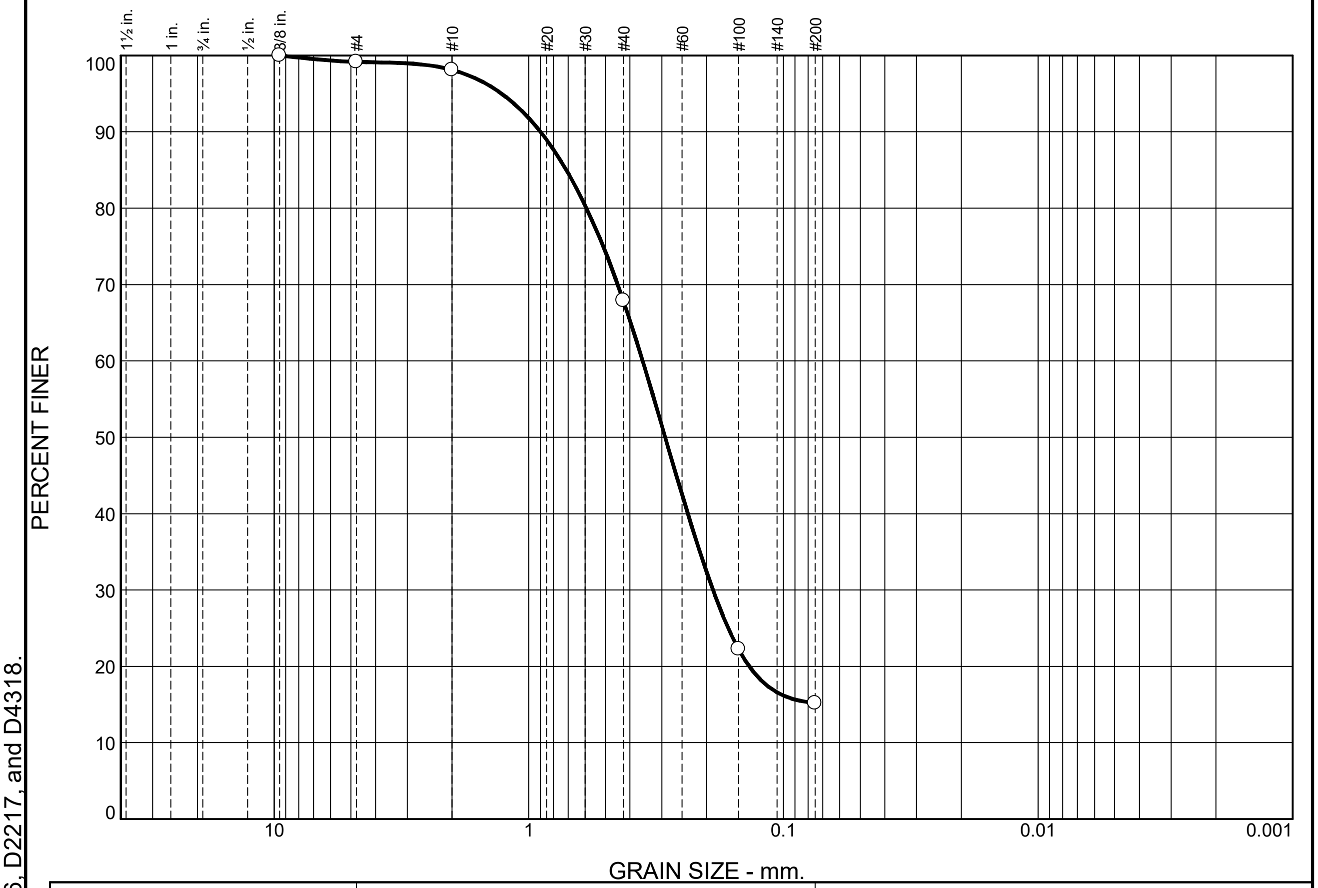
Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: RR/AFS **Checked By:** AFS

Particle Size Distribution Report



	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.8	1.1	30.2	52.7	15.2	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	0.7119	0.3570	0.2911	0.1891				

Material Description	USCS	AASHTO
○ Silty SAND	SM	A-2-4(0)

Project No. 31251263 **Client:** T&M Associates

Project: Proposed Municipal Building

○ **Source of Sample:** B-9 **Depth:** 8 **Sample Number:** 5

Remarks:

○NMC = 7.1%

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Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: RR/AFS **Checked By:** AFS