

**ENGINEERING INVESTIGATION & ANALYSIS
GEOTECHNICAL & STRUCTURAL
ASSESSMENT REPORT**

**90 PIER LANE
FAIRFIELD, NEW JERSEY 08203**

MATRIX**NEW**WORLD
Engineering Progress

Prepared for:

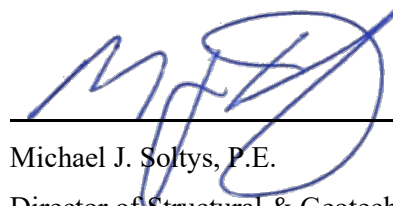
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Department of Community Affairs
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Matrix No. 20-1052

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Director of Structural & Geotechnical Engineering

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1.0 PROJECT BACKGROUND

The State of New Jersey Department of Community Affairs (DCA), Division of Disaster Recovery and Mitigation, anticipates receiving approval for grant funding through FEMA's Flood Mitigation Assistance (FMA) appropriation. This funding is provided through FMA to states and local communities to reduce or eliminate flood risk due to repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP). The DCA intends to use the funding for the State's Mitigation Assistance Program (MAP) to elevate residential properties located in a floodplain in the Township of Fairfield. The properties are to be elevated at least 3 feet above the base flood elevation (BFE). The DCA hosted a town hall meeting for homeowners in Fairfield, focused on homeowners with properties that experience Repetitive Losses or Severe Repetitive Losses.

In preparation of procuring a Design-Build firm to conduct the effort, the DCA has contracted Matrix New World Engineering, Land Surveying and Landscape Architecture, P.C. (Matrix) to conduct a geotechnical analysis, preliminary structural analysis, and elevation certificate for residences anticipated to be included in the program. It is understood that this document will serve as the basis for the development of a Request for Proposal (RFP) to procure Design-Build firms to do final structural design and perform the elevation of the properties.

2.0 PROJECT SCOPE

Matrix has completed a geotechnical and structural assessment and elevation certificate to evaluate the viability of elevating the residential building located at 90 Pier Lane in Fairfield, New Jersey (Site). Matrix provided geotechnical and structural engineering and land surveying services as a consultant to the DCA. The project location is shown on the attached Site Location Map (Figure 1).

The purpose of the engineering study was to compile comprehensive data regarding the existing building's foundations and overall structural composition and condition at the Site. The information obtained will be further utilized to determine the feasibility and proposed design of raising the existing residence 3 feet above the base flood elevation (BFE) as determined by FEMA. A team of Matrix engineers and surveyors performed the evaluation, consisting of a geotechnical soil inspection, test pits to reveal the existing building foundations, an interior inspection of the building's visible foundation walls and frame, and topographic surveying for the development of a flood elevation certificate. One test pit (TP-1) was completed to a depth 48 inches below the ground surface (bgs) and 2 geotechnical borings (B-1 and B-2) were completed to a depth of 27 feet bgs (see Figure 2).

Matrix's geotechnical characterization of the property is based on an engineering evaluation of the subsurface conditions as indicated by the field exploration data and geotechnical laboratory test results on representative soil samples.

3.0 SITE LOCATION & PROJECT DESCRIPTION

The project site is located at 90 Pier Lane in Fairfield, New Jersey. The property consists of a two-story timber-framed colonial house with an approximately 1,100 square foot footprint. The house is situated atop concrete masonry unit (CMU) foundation walls. The substructure of the house is comprised of a basement and crawl space area. The timber frame of the residential structure is covered with a vinyl siding throughout its exterior. The property also contains a concrete entrance deck with brick-encased columns in the front of the building.

To assist with the geotechnical and structural evaluation, test pits and geotechnical borings were advanced in areas around the residence to obtain information regarding the soil's structural properties and building's existing foundation. The 1 test pit and 2 borings were located to provide the most useful information about the subsurface conditions. Refer to Figure 2 of this report for a map of the test pit and boring locations.

4.0 GEOLOGIC SETTING

According to the USDA Soil Survey of Essex County, the Site is situated atop approximately 61% Horseneck-Urban land and 39% Preakness Sandy Loam. These two subsurface compositions are typically sandy loams underlain by loamy sands from 8 to 60 inches bgs.

According to the 2014 Bedrock Geologic Map of New Jersey, the Site is underlain by the Sedimentary and Bedded Volcanic Rocks Towaco Formation. Specifically, the subsurface consists of micaceous, reddish-brown sandstone, siltstone and silty mudstone in upward-fining sequences. The Bedrock Geologic Map is shown in Figure 3.

From the Surficial Geologic Map of Northern New Jersey, compiled by and edited by Byron D. Stone, Scott D. Stanford, and Ron W. White in 2002, the natural surface material (beyond fill) is suggested to be in the Pine Brook terrace deposit, which contains sand and gravel, moderately to poorly sorted. The Surficial Geology map is shown in Figure 4.

The documented site conditions presented above are consistent with the findings from the subsurface investigation, in which Sand was encountered followed by layers of sandy, silty loams. Groundwater was encountered in the borings at approximately 4-6 feet bgs. Bedrock was not encountered during this subsurface program.

5.0 SUBSURFACE FIELD PROGRAM

The subsurface investigation was completed by generally accepted practices in the Geotechnical Engineering field and consisted of the advancement of 1 test pit and 2 Standard Penetration Test (SPT) borings using mud rotary. Matrix retained Boring Brothers, Inc., located in Egg Harbor Township, NJ, to complete the subsurface field program.

A Matrix Geotechnical Engineer provided full-time drilling oversight, soil logging, and sample collection. Matrix prepared the field test pit and boring logs, which included sample depths, SPT-N blow counts, soil recovery, and soil descriptions based on the Burmister Soil Classification System followed by the Unified Soil Classification System (USCS) letter symbol. Test pit and soil boring logs are provided in Appendix A. Classification tables and charts used to determine the soil attributes are included in Appendix B.

Upon the completion of the field program, representative samples were subjected to geotechnical laboratory analyses. Laboratory results aided in soil classification and assessing the relevant engineering properties of the stratigraphic layers which were used in developing the revised geotechnical parameters outlined herein. Geotechnical laboratory reports are included in Appendix C.

5.1 Test Pits

On May 13, 2021, Boring Brothers completed a foundation survey which included 1 test pit to a depth of 48 inches below the ground surface. Site constraints around the perimeter of the building allowed for only one test pit excavation to be completed at the Site. The test pit was dug using a Bobcat E55 and shovel to prevent any damage to the existing building foundations. The exterior edge of the building footing was exposed to accurately measure the structure's dimensions, as well as to analyze the conditions of the concrete foundation.

The Matrix Geotechnical Engineer also observed the subsurface soil conditions encountered within the test pits, noting the type and composition of the soils surrounding and beneath the existing footings. Test Pit TP-1 was conducted in the backyard. All test pits were backfilled with the original soils upon completion of the test pit logs. No test pit samples were collected at the site for further analysis.

5.2 SPT Borings

On May 12, 2021, Boring Brothers advanced 2 geotechnical borings with a Mobile CME 55 track-mounted drill rig using mud rotary drilling techniques.

Split spoon (SS) samples were collected in accordance with *ASTM D-1586, Standard Method for Penetration Test and Split-Barrel Sampling of Soils*. A standard 2-inch outer diameter split spoon, two feet in length, was used to collect the soil samples. An automatic 140-pound hammer having a 30-inch drop was used to drive the split spoon sampler. As a part of boring observation, the SPT blow counts were recorded for the 0- to 6-inch interval, the 6- to 12-inch interval, the 12- to 18-inch interval and the 18- to 24-inch interval. The SPT N-values for design purposes are reported as the sum of the SPT N values observed for the above referenced 6- to 12-inch interval and the 12- to 18-inch interval that the split spoon sampler was driven.

The Matrix Geotechnical Engineer observed the split spoon samples and collected representative samples in sealed containers for further examination. All borings were continuously sampled to 12 feet bgs and at every subsequent 5-foot interval thereafter. The 2 borings were each advanced to a depth of 27 feet bgs. Boring B-1 was conducted on the Northern side of the building and boring B-2 was conducted on the northwestern side of the lot. The borings were backfilled with soil cuttings and bentonite hole plug (if necessary) upon completion of the borehole.

5.3 Laboratory Testing

In addition to the field investigation, a laboratory testing program was conducted to determine additional pertinent engineering characteristics of representative samples of on-site soils. The laboratory testing program was performed in general accordance with applicable ASTM standard test methods and included physical/textural testing of representative samples of various strata.

Upon review of the boring logs, Matrix selected representative samples for laboratory testing. Laboratory testing of selected samples was completed by TerraSense, LLC, located in Totowa, New Jersey. The following table presents a summary of the testing program.

The results of the laboratory testing program were utilized to assist in developing geotechnical design parameters and recommendations, and are provided in Appendix C.

Table 5.3-1: Laboratory Testing Program

Test	Testing Procedure	Quantity Performed	Sample Locations and Depth Intervals
Water Content	ASTM D2216	4	B-1: 20-27' B-2: 4-6', 15-17', 25-27'
Sieve Analysis	ASTM D422	1	B-2: 4-6'
Atterberg Limits	ASTM D4318	2	B-2: 15-17', 25-27'
Combined Sieve & Hydrometer	ASTM D422	1	B-1: 20-27'

6.0 SUBSURFACE CONDITIONS

The subsurface conditions beneath the site can be characterized by the following stratigraphy, proceeding from the surface materials downward, unless noted otherwise below. Classification tables and charts used to determine the soil attributes are included in Appendix B.

Test Pits

The top of concrete was uncovered in TP-1 at 40” bgs. The test pit revealed the concrete protrudes 10” from the wall and extends 8” deep.

Surface Cover

The surface cover for boring B-1 and B-2 consisted of grass cover and topsoil approximately 3.5 to 4 inches thick.

Stratum 1: Sand (SW, SM)

Beneath the surface cover in each boring, a soil layer was encountered consisting of brown coarse-to-fine Sand with varying amounts of Silt and little to trace amounts of fine Gravel. This Sand layer extended from the bottom of the surface cover to approximately 13.5 feet below the ground surface (bgs) in both borings.

The SPT N-values in this layer ranged from 2 to 27 blows per foot (bpf), which is indicative of very loose to medium-dense Sand. The SPT N-values for Stratum 1 are summarized in the tables below.

Table 6.0-1: Very Loose to Loose SPT N-Values for Stratum 1

Soil Boring Location	USCS Group Symbol	Depth Below Ground Surface	SPT N-Values
B-1	SM	0-6'	4-9
B-2	SM	0-6'	2-5

Table 6.0-2: Medium-Dense SPT N-Values for Stratum 1

Soil Boring Location	USCS Group Symbol	Depth Below Ground Surface	SPT N-Values
B-1	SW	6-8'	15
	SM	8-13.5'	12-21
B-2	SW	6-13.5'	13-27

Stratum 2: Clay (CL, CH)

Beneath the granular material of Stratum 1, a soil layer was encountered consisting predominantly of Clay with significant amounts of Silt and traces of fine Sand. This cohesive layer was encountered at approximately 13.5 feet bgs in each boring, and both borings were terminated within this layer at 27 feet bgs.

The SPT N-values in this layer ranged from 9 to 24 blows per foot (bpf), which is indicative of stiff to very stiff. The SPT N-values for Stratum 2 are summarized in the tables below.

Table 6.0-3: Stiff Clay SPT N-Values for Stratum 2

Soil Boring Location	USCS Group Symbol	Depth Below Ground Surface	SPT N-Values
B-1	CL	18.5-23.5'	14
	CH	23.5-27'	9
B-2	CH	18.5-27'	9-13

Table 6.0-4: Very Stiff Clay SPT N-Values for Stratum 2

Soil Boring Location	USCS Group Symbol	Depth Below Ground Surface	SPT N-Values
B-1	CL	13.5-18.5'	24
B-2	CL	13.5-18.5'	22

Groundwater

Groundwater levels could not be measured during drilling in either boring, due to the use of water and drilling mud to advance the borings. Based on soil saturation levels, the groundwater table lies approximately between 4 and 6 feet bgs. Saturated soils were encountered in B-1 at 6 feet bgs at 12:37 PM and in B-2 at 4 feet bgs at 1:25 PM. It should be noted that the groundwater levels will vary with temperature, precipitation, and other climatic factors.

7.0 GEOTECHNICAL SUBSURFACE PARAMETERS

The geotechnical design parameters in this report are derived from the field program and are based on accepted geotechnical standards and practices. At the time of the geotechnical assessment, loading conditions and the final proposed grading plans were not available. Therefore, certain assumptions were made for the recommendations provided in this report.

Table 7.0-1 summarizes the recommended geotechnical design parameters for the various soil strata encountered at the Site. The values are based on review and interpretation of the subsurface field program and laboratory test data results.

Table 1806.2 of the 2018 International Building Code provides allowable coefficients of friction to be used in the evaluation of resistance to sliding.

Table 7.0-1: Geotechnical Design Parameters

Stratum	Unit Weight	Friction Angle (Φ)	Cohesive Strength, c_u	Earth Pressure Coefficient		Net Allowable Foundation Pressure*	Lateral Bearing
	(pcf)	(deg)	(psf)	Active (Ka)	Passive (Kp)		
							(psf/ft. bgs)
Native Medium-Dense to Dense Granular Soil (SP, SP-SM, SM) [SPT N > 10]	$\gamma = 125$ $\gamma' = 63$	32°	0	0.31	3.26	4,000	200
Native Loose Granular Soil (SP, SP-SM, SM) [SPT N ≤ 10]	$\gamma = 120$ $\gamma' = 58$	30°	0	0.33	3.00	2,500	150
Native Clay Material (CL) Very Stiff - Stiff [8 ≤ SPT N ≤ 30]	$\gamma = 110$ $\gamma' = 48$	-	1,500	-	-	2,000*	100

Notations: γ = moist unit weight, γ' = buoyant unit weight, and c_u = average undrained shear strength.

- + Allowable foundation pressure is contingent upon either replacement of at least two feet of existing fill below the bottom of footing by a Controlled Fill, or upon confirmation that the field density of the existing fill material down to four feet below the bottom of footing meets 95% of the maximum dry density of the existing fill material observed in Modified Proctor Tests.
- * These values are based on the 2018 International Building Code, New Jersey Edition, and adjusted for field conditions encountered. To increase the allowable foundation pressure above the values recommended in the table given above, further testing of soil will be required. In Cohesive soils, it should be noted that the shallow footing may fail under the settlement criteria before the footing pressure approaches the anticipated allowable bearing capacity. Allowable Foundation Pressure values assume the water table is below the influence depth of the foundation.
- Coefficient of earth pressure at rest may be computed using Jaky's equation, $K_0 = 1 - \sin \phi'$.

8.0 STRUCTURAL INSPECTION

The following sections present the results of the structural inspection of the residential building at 90 Pier Lane in Fairfield, New Jersey. The conclusions presented herein are derived from Matrix's geotechnical and structural investigation of the existing soils and building foundations and framing configurations, along with pertinent survey data as compiled by Matrix's team of land surveyors.

Matrix conducted a subsurface investigation that included both test pits and soil borings to obtain maximum pertinent information regarding the existing site conditions (refer to Section 6.0 of this report). The test pit performed at the site exposed the exterior portion of the building's foundation wall footings, allowing for measurement of dimensions of the structure and assessment of the construction methods utilized. Two geotechnical borings were also conducted to gain further information regarding the existing soils beneath the site.

In addition to the geotechnical investigation, Matrix also conducted a structural site inspection to observe the existing foundation walls and framing of the building. Matrix's structural engineer was granted access to the residence's basement and crawl spaces to observe the building's foundation structure. Substructure composition was recorded, including beam/girder type, building dimensions, and spacing of structural components. Structural defects, if any, were also noted during the inspection and have been included within Section 8.3.

8.1 Existing Building Frame and Foundations

The building at 90 Pier Lane is a two-story structure built on concrete masonry unit (CMU) basement/foundation walls. The west side of the house is an addition to the original building, as per construction plans provided by the client.

The main basement of the building measures 28'-7" long x 20'-11" wide. The CMU walls of the basement consist of 16x8x8 block and range from 73 to 75 inches in height (measured from the basement floor to the top of the block wall). The foundation walls of the basement support the nominal 2x8 timber floor joists of the first floor, which are spaced 16" on center and run east to west. The timber joists are connected at the center of the basement to a perpendicular girder consisting of (3) nominal 2x8 timber beams. The girder, which runs north to south (front to rear of building) is approximately 11'-7" off the building's east wall and is supported along its length by (7) 4" diameter steel posts. The longest clear span of the girder was

measured at 4'-8" near the read of the building. The basement measured 6'-10" in height from the concrete floor to the bottom of the first-floor floorboards.

Adjacent to the basement, to the west, a crawl space has been constructed to support the recent addition to the residence. The walls of the crawl space consist of CMU blocks similar to the basement. The crawl space floor is higher than that of the basement, with the bottom of the first-floor floorboards only 3'-3" above the concrete floor. The floor joists in this area were observed to be (2) nominal 2x8 timber members (16" on center) running east to west and supported at either end by the CMU foundation walls.

Below the foundation walls in the northwest corner of the crawl space area, an approximately 28" wide concrete spread footing was revealed during the test pit excavation program, with a footing bottom approximately 48" below the exterior ground surface. Based on our findings within the test pits and from conventional foundation construction, Matrix utilized a 16" wide footing as a minimum value for analysis, but believes the actual footings for the building to likely range from 16" to 28" in width. The construction plans provided by the resident showed a concrete footing detail with a 24" typical width. Prior to raising the house, Matrix recommends that the contractor confirm the foundation size and bearing adequacy with multiple test pits around the building perimeter.

To the rear of the basement, an adjacent wall area was observed with a floor approximately 3" above the main basement floor. This area contains the same CMU foundation walls as the rest of the building. The east side of this space is elevated 25" off the floor by an added concrete ledge, and connects to another crawl space area to the south (same CMU walls). Perpendicular nominal 2x8 timber members create the subfloor above in this area, with ultimate load transfer to the foundation walls.

8.2 Existing Equipment

One sump pump was observed within the basement area of the building, in the southwest corner. Also observed in the basement was a water heater situated at the floor level and an oil-fired boiler set atop a concrete slab and stone block (elevated 7" above the basement floor). An electrical switchboard was observed mounted to the east basement wall in the northeast corner. Multiple PVC and metal pipes were observed throughout the basement at varying elevations.

No equipment or machinery was observed in the west crawl space or rear basement area at the time of the inspection.

According to the ground penetrating radar technician (during utility mark outs for geotechnical drilling), an underground storage tank is located along the east side of the property, adjacent to the building. The use of this storage tank is unknown, but likely supplies fuel to the basement boiler.

8.3 Site Observations

The property at 90 Pier Lane is surrounded by waterways along its boundary. The Passaic River is located approximately 850 feet away from the existing residential building to the east. To the north and west, offshoot creeks from the Passaic River run along and through the property limits of the Site.

Within the building interior, in the basement, loss of concrete along the southwest corner of the floor was observed. The lost concrete creates a makeshift trench which runs along most of the western wall of the basement to the sump pump in the southwest corner. The soil below the concrete floor is exposed throughout this trench.

In the rear addition portion of the basement, there appears to have once been stairs that led to the backyard of the property (steel hatch doors were observed above the CMU walls). At the time of the inspection, the stairs had been removed and the space left vacant. The rear offshoot of this area also seems to be non-structural, as the CMU walls only support a ground concrete slab at this location.

A brick exhaust chimney was observed in the center of the basement, connected to the boiler exhaust pipes. A second chimney was observed protruding out from the west wall of the building's exterior. The bottom of this chimney appears to begin above the crawl space foundation walls.

The concrete front entrance platform contains an archway over the front door with brick-encased columns at either end.

8.4 Elevation Requirements

The FEMA 100-year flood elevation at 90 Pier Lane is El. +171 (NAVD88). As per the New Jersey Department of Community Affairs (DCA), and in accordance with the New Jersey Flood Hazard Area Control Act, the lowest floor of newly elevated buildings must be at least 3 feet above the base flood elevation. Therefore, the new first floor elevation must be at El. +174 or higher to meet the requirements set forth in the program.

The current first-floor elevation at the Site is at El. +168.41, with the basement level approximately at elevation El. +161.55. To achieve the elevation requirements, the existing building would need to be raised at least 5.6 feet.

8.5 Recommendations for Building Elevation

Matrix recommends that the existing foundation system of the residential building at 90 Pier Lane be kept and extended to achieve the required design flood elevation. The existing CMU foundation walls are expected to provide sufficient support for the additional height of the newly raised building. Based on loading estimation and analysis for the existing building, Matrix estimates that the anticipated additional dead load of the required new courses of CMU would remain under an allowable bearing capacity of 2,500 psf for the shallow concrete strip footings at the Site.

In accordance with NFIP requirements, it is required that the existing basement and crawl space be filled in to match the lowest adjacent exterior grade following raising. It is recommended that the existing new ground level of the house be set at El. +166.96. The new area will replace the filled-in basement, with sufficient height to satisfy the specifications laid out in the 2018 International Residential Code, New Jersey Edition. This new ground-level space can be used for storage at the resident's discretion.

The most feasible method of elevation for the building consists of jacking up the entire residential structure from below using steel beams and jack posts. The building will then sit atop temporary cribbing while the existing CMU foundation walls are heightened with additional courses of masonry block units. Additional vertical reinforcement would need to be installed in ungrouted masonry cells to properly transfer loads through the new heightened wall to the existing wall, and horizontal ladder reinforcement should be installed at a minimum of every other course. Also, the existing steel posts intermittently supporting the building's girder must be removed and replaced by new concrete or masonry block columns. These new columns will need to include a spread footing beneath to sufficiently support the building loads.

Within the new foundation walls, permanent openings are required to allow floodwater to enter the ground level and equalize the hydrostatic pressure during a flood event. As per the 2018 International Residential Code, New Jersey Edition, the total net area of non-engineered openings must comprise at least 1 square inch for every square foot of enclosed space within the building's ground floor. This equates to approximately 7.64 square feet of total flood openings in the building's new foundation walls. Additionally, a minimum of two openings must be provided for each enclosed area of the new ground floor. These

openings must be located no higher than one foot above the adjacent finished exterior grade along the building perimeter. Matrix recommends the use of engineered openings in lieu of non-engineered openings to maximize efficiency and minimize the quantity of openings required.

Additionally, any service equipment, whether outside or in the cellar, such as air conditioning, heat pump compressors, gas meters, electric meters, and hot water heaters, must be elevated 3 feet above the BFE. For interior elements, this may include relocation to an upper floor and thus less usable living space. For this residence, the hot water heater, boiler, and electrical switchboard in the basement would require elevating 3 feet above the BFE onto the raised first floor. The underground storage tank is not anticipated to be compromised during construction efforts in raising the house; however, it is recommended that all staging areas and heavy construction equipment be located outside of this area.

9.0 CLOSURE

This report has been prepared to assist the State of New Jersey Department of Community Affairs with the structural evaluation of the residential building at 90 Pier Lane in Fairfield, New Jersey. The conclusions and recommendations provided within this report were prepared based on our understanding of the project and through the application of generally accepted engineering practices. No warranties, expressed or implied, are made. Matrix should be notified of any changes to the existing building foundation system or if subsurface conditions differing from those described herein are encountered, so the impact on the geotechnical and/or structural recommendations can be evaluated.

10.0 REPRESENTATIVE SITE PHOTOS

Structural Inspection Photos



Photo 1. 90 Pier Lane (Front of Building)



Photo 2. 90 Pier Lane (Rear of Building - West Addition)



Photo 3. 90 Pier Lane (Rear of Building – East Side)



Photo 4. First-Floor Girder & Steel Support Posts (Looking North)



Photo 5. Rear Area of Basement (Looking West)



Photo 6. Rear Offshoot of Rear Basement Space (Looking South)



Photo 7. Sump Pit in Unfinished Trench (Southwest Corner of Basement)



Photo 8. Crawl Space Area (Looking West)



Photo 9. Boiler in Basement



Photo 10. Water Heater in Basement



Photo 11. Chimney Off West Wall of Building



Photo 12. Entrance Archway with Brick-Encased Columns

Test Pit Photos

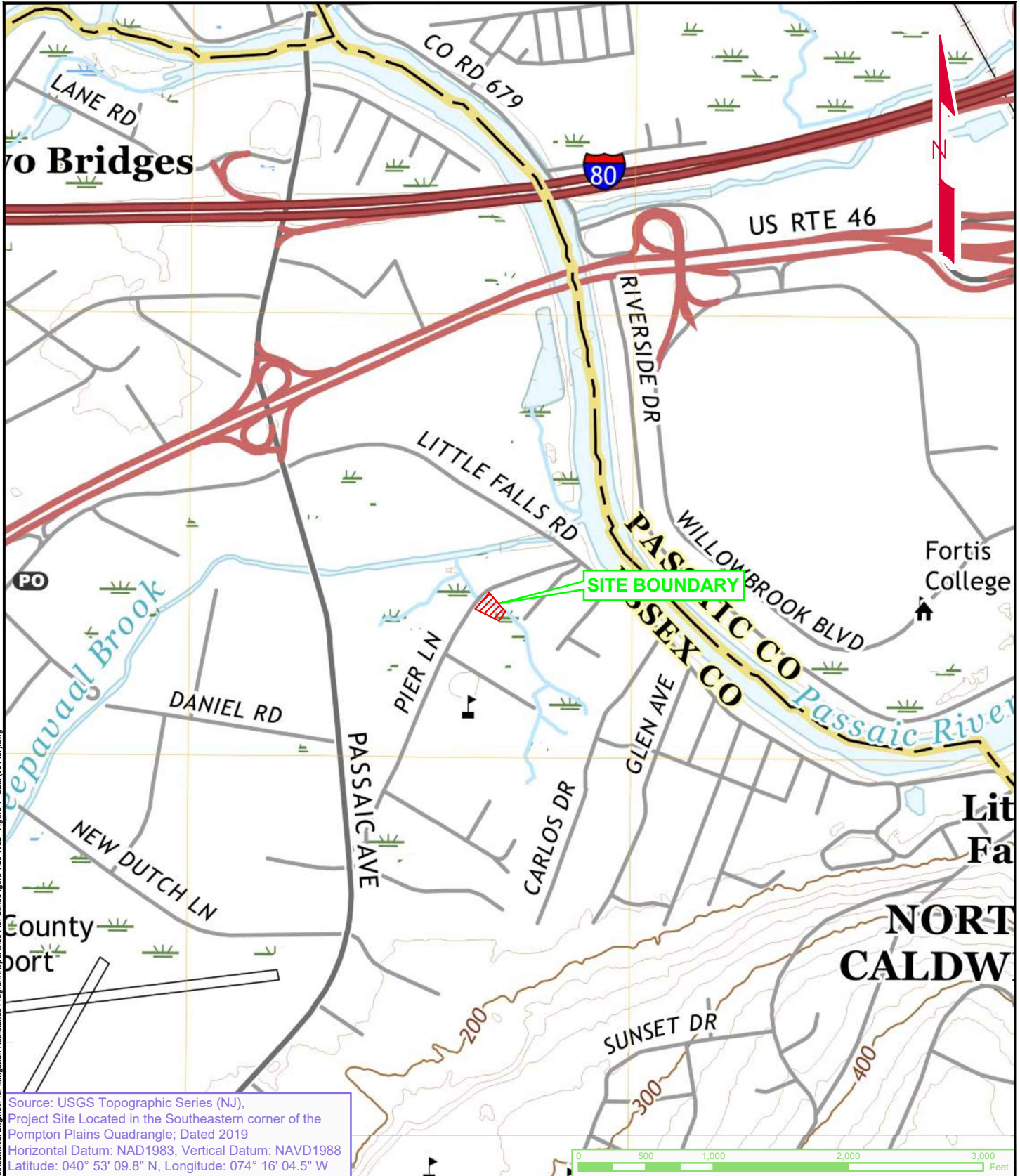


Photo 13. Test Pit TP-1 Location (Northwest Corner of Building – Crawl Space)



Photo 14. Test Pit TP-1 Foundation Conditions

FIGURES



Source: USGS Topographic Series (NJ),
 Project Site Located in the Southeastern corner of the
 Pompton Plains Quadrangle; Dated 2019
 Horizontal Datum: NAD1983, Vertical Datum: NAVD1988
 Latitude: 040° 53' 09.8" N, Longitude: 074° 16' 04.5" W

SITE LOCATION MAP

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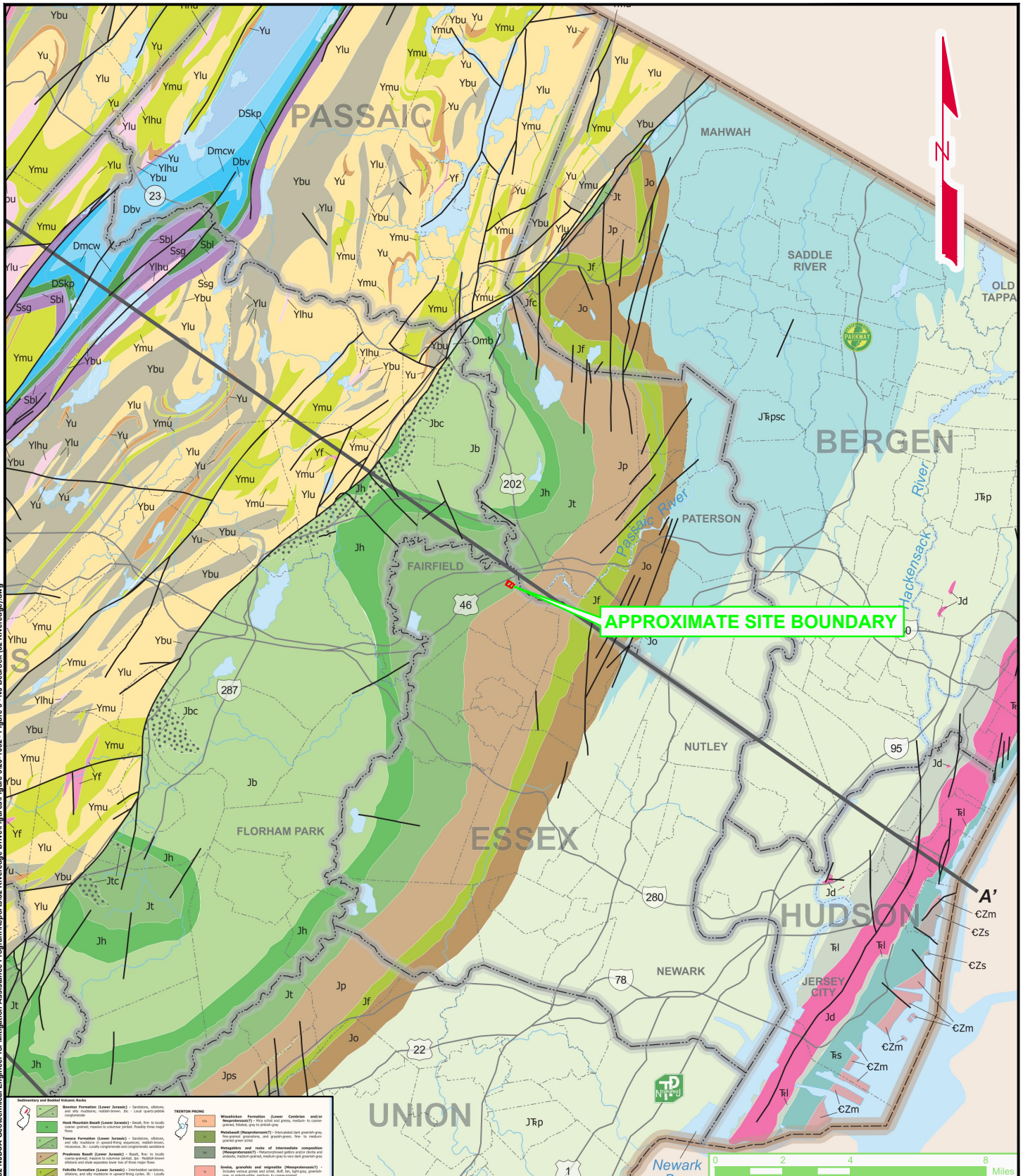
SCALE:
 1" = 1,000'

PROJECT NO.:
 20-1052

DATE:
 JUNE 2021

FIGURE NO.:
 1

© MATRIXNEWORLD/IF: 2020/20-1052 NJDCA Geotechnical Engineer for Mitigation Assistance Program/Report/90 Pier Lane/Figure 120-1052 - Figure 1 - SLM (90 Pier).dwg



© MATRIXNEWORLD\1\10.10.2.6\Start\2020-1052 - Figure 3 - NJ Bedrock (62 Rivered)pl.dwg

Subsidiary and Related Tables	
	Passaic River (Lower Jersey) - Sandstone, siltstone and clay partings (Lower Jersey) - 25' - local quartzite conglomerate.
	Hook Mountain (Lower Jersey) - Sandstone, siltstone and clay partings (Lower Jersey) - 25' - local quartzite conglomerate.
	Newark Basin (Lower Jersey) - Sandstone, siltstone and clay partings (Lower Jersey) - 25' - local quartzite conglomerate.
	Passaic River (Upper Jersey) - Sandstone, siltstone and clay partings (Upper Jersey) - 25' - local quartzite conglomerate.
	Fairfield (Lower Jersey) - Sandstone, siltstone and clay partings (Lower Jersey) - 25' - local quartzite conglomerate.
	Newark (Lower Jersey) - Sandstone, siltstone and clay partings (Lower Jersey) - 25' - local quartzite conglomerate.
	Newark Bay (Lower Jersey) - Sandstone, siltstone and clay partings (Lower Jersey) - 25' - local quartzite conglomerate.

BEDROCK GEOLOGY LOCATION MAP

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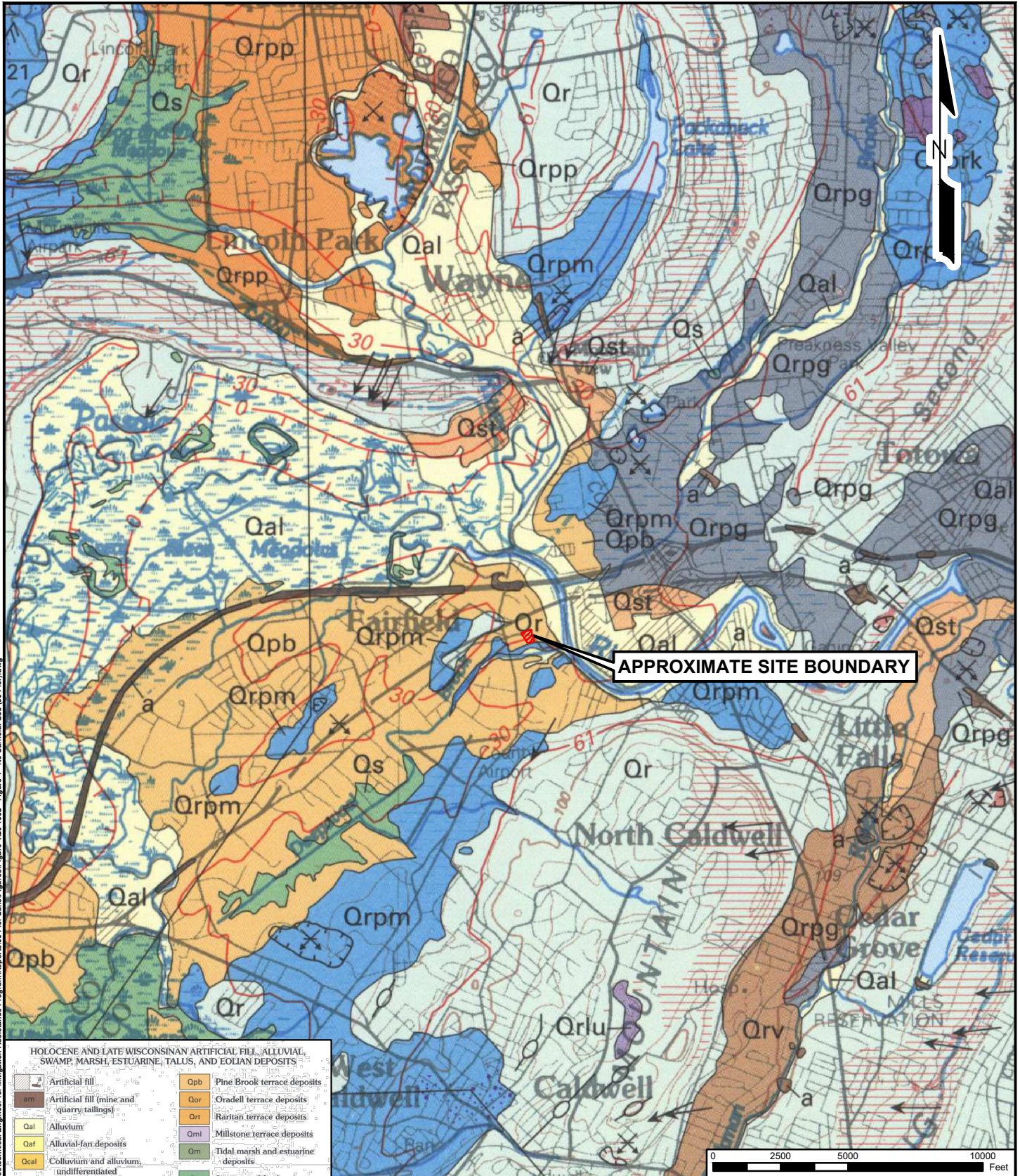
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SCALE:
1" = 4 Miles

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20-1052

DATE:
JUNE 2021

FIGURE NO.:
3



HOLOCENE AND LATE WISCONSINAN ARTIFICIAL FILL, ALLUVIAL, SWAMP, MARSH, ESTUARINE, TALUS, AND EOLIAN DEPOSITS

am	Artificial fill	Qpb	Pine Brook terrace deposits
Qal	Artificial fill (mine and quarry tailings)	Qor	Oradell terrace deposits
Qaf	Alluvium	Qrt	Raritan terrace deposits
Ocal	Alluvial-fan deposits	Qml	Millstone terrace deposits
	Colluvium and alluvium undifferentiated	Qm	Tidal marsh and estuarine deposits

SURFICIAL GEOLOGY LOCATION MAP

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NJ DEPARTMENT OF COMMUNITY AFFAIRS
GEOTECHNICAL AND STRUCTURAL ASSESSMENT REPORT
90 PIER LANE
FAIRFIELD, NEW JERSEY 07004

SCALE:
1" = 5000'

PROJECT NO.:
20-1052

DATE:
JUNE 2021

FIGURE NO.:
4

© MATRIXNEWORLD\IF: 2020\20-1052 NJDCA Geotechnical Engineer for Mitigation Assistance Program\Reports\90 Pier Lane\Figures\Figure 4\20-1052 - Figure 4 - NJ Surficial Geo (80 Pier).dwg

APPENDIX A

SOIL BORING & TEST PIT LOGS

BORING LOG

BORING NO.: **B-1**

SHEET **1** OF **1**

PROJECT NO.: **20-1052** PROJECT: **NJDCA Geotechnical Engineer for Mitigation Assistance Program** DATE: **5/12/21**

PROJECT LOCATION: **Fairfield, NJ** BORING LOCATION: **90 Pier Lane, Between Trees**

DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **-----** ELEV.: DATUM: **NAVD88**

DRILLING CONTRACTOR: **Boring Brothers, Inc.** DRILLER: **R. Dollar** INSPECTOR: **D. Alia**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		140 lbs	30"	AUTO		140 lbs	30"	5/12/21	12:37 pm	6.0	
FJ Steel	4"			SS	1 3/8"						

Depth Feet (Elev.)	CASING		SAMPLE			Graphic Symbol	Description Of Material	Laboratory Tests
	Blows/ Foot	No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]			
		S-1	SS	0-2	2-2-2-2 (63%)		4" Topsoil	
		S-2	SS	2-4	3-4-4-6 (79%)		S-1: Dark Brown mf* SAND, little Silt, trace roots, moist (SM) S-2: Brown mf* SAND, little Silt, moist (SM)	
5		S-3	SS	4-6	3-4-5-7 (54%)		S-3: Brown mf* SAND, little Silt, trace fine Gravel, moist (SM)	
	4" Casing	S-4	SS	6-8	3-6-9-5 (67%)		S-4: Brown cmf SAND, trace Silt, trace fine Gravel, wet (SW)	
		S-5	SS	8-10	7-5-7-6 (100%)		S-5: Brown mf SAND, little Silt, wet (SM)	
10		S-6	SS	10-12	8-12-9-7 (100%)		S-6: Same as Above, wet (SM)	
		S-7	SS	15-17	10-11-13- 15 (71%)		S-7: Gray CLAY & Silt, wet (CL)	
		S-8	SS	20-22	4-5-4-6 (83%)		S-8: Brown Silty CLAY, trace mf Sand, wet (CH) WC: 28%, Gravel: 0.0%, Sand: 1.7%, Fines: 98.3%, <2 µm: 48%	Sieve; Hydrometer
20		S-9	SS	25-27	6-7-6-6 (92%)		S-9: Gray Silty CLAY, wet (CH)	
25							Bottom of Borehole @ 27 ft.	

NEWORLD NO GROUT 20-1052 BORING LOGS.GPJ MATRIX EGS.GDT 7/16/21

BORING NO.: **B-1**

BORING LOG

BORING NO.: **B-2**

SHEET **1** OF **1**

PROJECT NO.: **20-1052** PROJECT: **NJDCA Geotechnical Engineer for Mitigation Assistance Program** DATE: **5/12/21**
 PROJECT LOCATION: **Fairfield, NJ** BORING LOCATION: **90 Pier Lane, Side Yard**
 DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **-----** ELEV.: **-----** DATUM: **NAVD88**
 DRILLING CONTRACTOR: **Boring Brothers, Inc.** DRILLER: **R. Dollar** INSPECTOR: **D. Alia**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		140 lbs	30"	AUTO		140 lbs	30"	5/12/21	1:25 pm	4.0	
FJ Steel	4"			SS	1 3/8"						

Depth Feet (Elev.)	CASING		SAMPLE			Graphic Symbol	Description Of Material	Laboratory Tests
	Blows/Foot	No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]			
		S-1	SS	0-2	2-1-1-1 (67%)		3.5" Topsoil S-1: Brown mf* SAND, trace Silt, dry (SM)	Sieve
		S-2	SS	2-4	2-2-2-2 (50%)		S-2: Brown mf* SAND, little Silt, moist (SM)	
5		S-3	SS	4-6	4-2-3-3 (58%)		S-3: Light Brown mf* SAND, some Silt, wet (SM) WC: 17.5%, Gravel: 0.1%, Sand: 78.7%, Fines: 21.2%	
		S-4	SS	6-8	5-7-6-5 (71%)		S-4: Brown cmf SAND, trace Silt, trace medium Gravel (SW)	Atterberg Limits
10		S-5	SS	8-10	8-7-7-10 (100%)		S-5: Brown cmf SAND, little fine Gravel, trace Silt, wet (SW)	
		S-6	SS	10-12	11-13-14-12 (100%)		S-6: Brown cmf SAND, trace fine Gravel, trace Silt, wet (SW)	
15		S-7	SS	15-17	6-9-13-16 (92%)		S-7: Gray CLAY & Silt, wet (CL) WC: 17.4%, LL: 31, PL: 17, PI: 14	Atterberg Limits
20		S-8	SS	20-22	5-5-9-7 (88%)		S-8: Same as Above, wet (CL)	
25		S-9	SS	25-27	4-4-5-6 (100%)		S-9: Gray Silty CLAY, wet (CH) WC: 35.3%, LL: 56, PL: 22, PI: 34	Atterberg Limits
							Bottom of Borehole @ 27 ft.	

NEWORLD NO GROUT 20-1052 BORING LOGS.GPJ MATRIX EGS.GDT 7/16/21

BORING NO.: **B-2**

TEST PIT LOG

TEST PIT NO.: TP-1

SHEET 1 OF 1

PROJECT NO.: 20-1052 PROJECT: NJDCA Geotechnical Engineer for Mitigation Assistance Program DATE: 5/13/2021

PROJECT LOCATION: Fairfield, NJ ELEV.: _____ TIME STARTED: 9:00:00 AM

TEST PIT LOCATION: 90 Pier Lane (Northwest Corner of Building) DATUM: NAVD88 TIME FINISHED: 9:30:00 AM

CONTRACTOR: Boring Brothers, Inc. GROUNDWATER LEVEL: _____

EQUIPMENT: Bobcat E55 OPERATOR: Steve INSPECTOR: A. Bangar

Depth Inches (Elev)	No.	Depth Inches	Graphic Symbol	Description Of Material	Laboratory Tests
		0-4		Topsoil/Mulch surface cover	
5		4-48		Brown mf SAND and Silt, some fine Gravel (SM)	
10					
15					
20					
25					
30					
35					
40		40-48		Top of concrete encountered at 40" bgs, protrudes 10" from the face of the wall and extends 8" downward.	
45					
				Bottom of Test pit @ 48 in. Test Pit Backfilled.	

TEST PIT INCH 20-1052 TEST PIT LOGS.GPJ MATRIX EGS.GDT 7/9/21

TEST PIT NO.: TP-1

LOG NOTATION

Sample Classifications

SS = Split Spoon
NR = No Recovery
NX = Rock Core
SH = Shelby Tube
REC = Soil Recovery
RQD = Rock Quality Designation































Sand Classifications

c = Coarse
m = Medium
f = Fine
* = Predominant Grain Size

Soil Properties

WC = Water Content
PL = Plastic Limit
LL = Liquid Limit
PI = Plasticity Index
OC = Organic Content

LOG GRAPHICAL LEGEND

	Asphalt
	Concrete
	Fill
	Topsoil
	Well graded Gravel (GW)
	Poorly graded Gravel (GP)
	Clayey Gravel (GC)
	Silty Gravel (GM)
	Well graded Gravel with Clay (GW-GC)
	Well graded Gravel with Silt (GW-GM)
	Poorly graded Gravel with Clay (GP-GC)
	Poorly graded Gravel with Silt (GP-GM)
	Well graded Sand (SW)
	Poorly graded Sand (SP)
	Clayey Sand (SC)
	Silty Sand (SM)
	Well graded Sand with Clay (SW-SC)
	Well graded Sand with Silt (SW-SM)
	Poorly graded Sand with Clay (SP-SC)
	Poorly graded Sand with Silt (SP-SM)
	Lean Clay (CL)
	Silty Clay (CL-ML)
	Silt (ML)
	Organic Silt or Clay (Low Plasticity) (OL)
	Fat Clay (CH)
	Elastic Silt (MH)
	Organic Silt or Clay (High Plasticity) (OH)
	Peat (PT)
	Decomposed Bedrock
	Bedrock

APPENDIX B

SOIL CLASSIFICATION TABLES

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	FIELD IDENTIFICATION PROCEDURES (EXCLUDING PARTICLES LARGER THAN 3 IN. AND BASING FRACTIONS ON ESTIMATED WEIGHTS)			INFORMATION REQUIRED FOR DESCRIBING SOILS	LABORATORY CLASSIFICATION CRITERIA				
1	2	3	4	5			6	7				
Coarse-grained Soils More than half of material is larger than No. 200 sieve size. The No. 200 sieve size is about the smallest visible to the naked eye.	Gravels More than half of coarse fraction is larger than No. 4 sieve size. (For visual classification, the 1/4-in. size may be used as equivalent to the No. 4 sieve size.)	Clean Gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixture, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.			For undisturbed soils add information on stratification, degree of compactness, cementation, moisture condition, and drainage characteristics.	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for GW			
			GP	Poorly graded gravels or gravel-sand mixture, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.							
		Gravels with Fines (Appreciable amount of fines)	GM	Silty gravels, gravel and silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).					Give typical name; indicate approximate percentages of sand and gravel, maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses.	Atterberg limits below "A" line or P1 less than 4	Above "A" line with P1 between 4 and 7 are borderline cases requiring use of dual symbols.
			GC	Clayey gravels, gravel and clay mixtures.	Plastic fines (for identification procedures see CL below).							
		Clean Sand (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.					Example: Silty sand, gravelly; about 20% hard, angular gravel particles 1/2-in. maximum size; rounded and subangular sand grains, coarse to fine; about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM).	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	Not meeting all gradation requirements for SW
			SP	Poorly graded sands or gravelly sands, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.							
	Sands with Fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).			Identification Procedure on Fraction Smaller than No. 40 Sieve Size. Dry Strength (Crushing Characteristics) Dilatancy (Reaction to shaking) Toughness (Consistency near PL)	Atterberg limits above "A" line or P1 less than 4	Limits plotting in hatched zone with P1 between 4 and 7 are borderline cases requiring use of dual symbols.			
		SC	Clayey sands, sand-clay mixtures.	Plastic fines (for identification procedures see CL below).								
	Fine-grained Soils More than half of material is smaller than No. 200 sieve size.	Silts and Clays Liquid limit is less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.	None to slight	Quick to slow	None	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions	LIQUID LIMIT PLASTICITY CHART For laboratory classification of fine-grained soils			
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high	None to very slow	Medium					
Silts and Clays Liquid limit is greater than 50		OL	Organic silts and organic silty clays of low plasticity.	Slight to medium	Slow	Slight	Give typical name; indicate degree and character of plasticity; amount and maximum size of coarse grains; color in wet condition; odor, if any; local or geologic name and other pertinent descriptive information; and symbol in parentheses.					
		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	Slight to medium	Slow to none	Slight to medium						
		CH	Inorganic clays of high plasticity, fat clays.	High to very high	None	High						
		OH	Organic clays of medium to high plasticity, organic silts.	Medium to high	None to very slow	Slight to medium						
Highly Organic Soils		Pt	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture			Example: Clayey silt, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (ML)					

1. Boundary classifications: Soils possessing characteristics of two groups are designed by combinations of group symbols. For example GM-GC, well-graded gravel-sand mixture with clay binder.
 2. All sieve sizes on this chart are U.S. standard.
 3. Adopted by Corps of Engineers and Bureau of Reclamation, January 1952.

BURMISTER SOIL IDENTIFICATION METHOD

BURMISTER SOIL IDENTIFICATION METHOD

I. SOIL MATERIAL Composition, Gradation, and Plasticity Characteristics

a) Soil Components and Soil Fractions

Sieve	3"	1"	3/8"	No. 10	No. 30	No. 60	No. 200	
				2 mm			0.076 mm	0.02 mm
Granular Component	GRAVEL			SAND			SILT	
Fractions	coarse	medium	fine	coarse	medium	fine	coarse	fine
Clay Soil Components							CLAY-SOIL Defined and Named on a Plasticity Basis	

b) Identifying Terms for Granular Soils

Composition and Proportion Terms for Components

<u>Component</u>	<u>Proportion Terms</u>	<u>Defining Range of Percentages</u>
Principal Components- GRAVEL, SAND, SILT (all Uppercase)		50% or more
Minor Components-	Gravel Sand Silt	and some little trace
		35 to 50% 20 to 35% 10 to 20% 1 to 10%
<u>Gradation Terms for Granular Soils</u>		<u>ORGANIC SOILS</u>
coarse to fine	all fractions more than 10%	Plasticity Basis, as
coarse to medium	fine less than 10%	
medium to fine	coarse less than 10%	Organic SILT, H. PI
medium	coarse and fine less than 10%	
fine	coarse and medium less than 10%	Organic SILT, L. PI
PLUS or MINUS signs used to indicate upper or lower limits.		

c) Identifying Terms for CLAY SOILS. Plasticity Basis for Combined Silt and Clay

Components, Expressing the Relative Dominance of Clay

<u>Overall Plasticity</u>	<u>Plasticity Index</u>	<u>Principal Component</u>	<u>Minor Component</u>
Non-Plastic	0	SILT	Silt
Slight	1 to 5	Clayey SILT	Clayey Silt
Low	5 to 10	SILT & CLAY	Silt & Clay
Medium	10 to 20	CLAY & SILT	Clay & Silt
High	20 to 40	Silty CLAY	
Very High	more than 40	CLAY	

Example: Soil 60% coarse to fine Sand, 25% medium to fine Gravel, 15% Clayey Silt and color-brown.

Identification: Br. coarse to fine SAND, some medium to fine Gravel, little Clayey Silt.

- References:
- 1) D. M. Burmister, "Principles and Techniques of Soil Identification" 29th Highway Research Board Proceedings, 1949.
 - 2) "Identification and Classification of Soils – An appraisal and Statement of Principles", ASTM Special Technical Publication No. 113, 1951.

Field Classification of Soil Using the USCS

Apparent Density of Coarse-Grained Soils

SPT N-Value (corrected)	Apparent Density
0 - 4	Very loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

Consistency of Fine-Grained Soils

SPT N-Value (uncorrected)	Consistency	Compressive Strength (ksf)	Results of Manual Manipulation
< 2	Very Soft	< 0.5	Specimen (height = twice the diameter) sags under its own weight; extrudes between fingers when squeezed
3 - 4	Soft	> 0.5 - 1.0	Specimen can be pinched in to between the thumb and forefinger; remolded by light finger pressure
5 - 8	Medium stiff	> 1.0 - 2.0	Can be imprinted easily with fingers; remolded by strong finger pressure
9 - 15	Stiff	> 2.0 - 4.0	Can be imprinted with considerable pressure from fingers or indented by thumbnail
16 - 30	Very stiff	> 4.0 - 8.0	Can be barely imprinted by pressure from the fingers or indented by thumbnail
> 30	Hard	> 8.0	Cannot be imprinted by fingers or difficult to indent by thumbnail

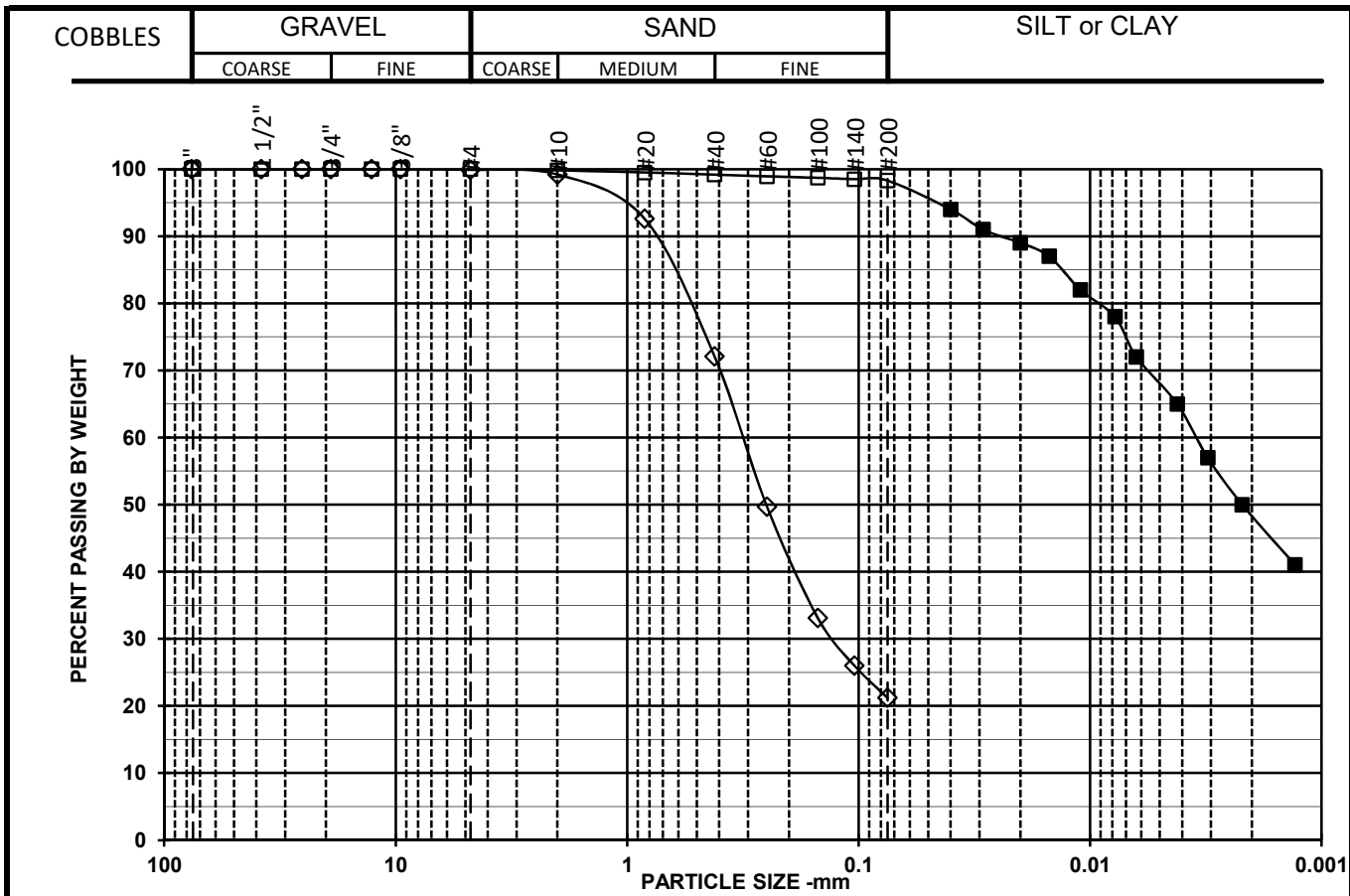
APPENDIX C

GEOTECHNICAL LABORATORY TESTING RESULTS

Matrix New World Engineering, P.C. #20-1052-010
NJDCA MAP - 90 Pier Lane
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS							REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDROMETER % MINUS 2 μm (%)	
B-1	S-8	20-22	28.0				CL	98.3	48	
B-2	S-3	4-6	17.5				SM	21.2		
B-2	S-7	15-17	17.4	31	17	14	CL			
B-2	S-9	25-27	35.3	56	22	34	CH			

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.



Open Symbols: Sieve analysis by ASTM D6913
 Filled symbols: Hydrometer analysis by ASTM D7928 corrected for complete sample

Symbol	□	◇	○
Boring	B-1	B-2	
Sample	S-8	S-3	
Depth	20-22	4-6	
% +3"	0	0	
% Gravel	0	0.1	
% SAND	1.7	78.7	
%C SAND	0.2	0.7	
%M SAND	0.6	27.1	
%F SAND	0.9	50.9	
% FINES	98.3	21.2	
D ₁₀₀ (mm)	4.75	9.53	
D ₆₀ (mm)	0.003	0.316	
D ₃₀ (mm)		0.13	
Cc			
Cu			

Sieve	Percent Finer Data	
Size/ID #		
6"	100.0	100.0
4"	100.0	100.0
3"	100.0	100.0
1 1/2"	100.0	100.0
1"	100.0	100.0
3/4"	100.0	100.0
1/2"	100.0	100.0
3/8"	100.0	100.0
#4	100.0	99.9
#10	99.8	99.2
#20	99.5	92.6
#40	99.2	72.1
#60	98.9	49.7
#100	98.7	33.1
#140	98.5	26.0
#200	98.3	21.2
5μ m	68	
2μ m	48	
1μ m	37	

SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	USCS DESCRIPTION AND REMARKS	DATE
□	28.0				CL		Brown, Lean clay	06/25/21
◇	17.5				SM		Light brown, Silty sand	06/29/21
○								

Matrix New World Engineering, P.C.	#20-1052-010	NJDCA MAP 90 Pier Lane
TerraSense, LLC	#7783-21018	

PARTICLE SIZE DISTRIBUTION
ASTM D6913 & ASTM D7928

APPENDIX D

FEMA NFIP ELEVATION CERTIFICATE

ELEVATION CERTIFICATE

Important: Follow the instructions on pages 1–9.

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

SECTION A – PROPERTY INFORMATION				FOR INSURANCE COMPANY USE	
A1. Building Owner's Name [REDACTED]				Policy Number:	
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 90 Pier Lane				Company NAIC Number:	
City Town of Fairfield		State New Jersey		ZIP Code 07004-2113	
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Block 2502, Lot 9					
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Residential</u>					
A5. Latitude/Longitude: Lat. <u>N40°53'10"</u> Long. <u>W74°16'05"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983					
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.					
A7. Building Diagram Number <u>2A</u>					
A8. For a building with a crawlspace or enclosure(s):					
a) Square footage of crawlspace or enclosure(s) <u>934.00</u> sq ft					
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>1</u>					
c) Total net area of flood openings in A8.b <u>128.00</u> sq in					
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
A9. For a building with an attached garage:					
a) Square footage of attached garage <u>N/A</u> sq ft					
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____					
c) Total net area of flood openings in A9.b _____ sq in					
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No					
SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number Fairfield, Township of			B2. County Name Essex		B3. State New Jersey
B4. Map/Panel Number 34013C0019	B5. Suffix G	B6. FIRM Index Date 04-03-2020	B7. FIRM Panel Effective/ Revised Date 04-03-2020	B8. Flood Zone(s) AE	B9. Base Flood Elevation(s) (Zone AO, use Base Flood Depth) 171 (NAVD88)
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9: <input type="checkbox"/> FIS Profile <input checked="" type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input checked="" type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expiration Date: November 30, 2022

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE	
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 90 Pier Lane			Policy Number:	
City Town of Fairfield	State New Jersey	ZIP Code 07004-2113	Company NAIC Number	

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: Construction Drawings* Building Under Construction* Finished Construction
 *A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.

Benchmark Utilized: CORS Network NGS Monuments Vertical Datum: NAVD 1988

Indicate elevation datum used for the elevations in items a) through h) below.

NGVD 1929 NAVD 1988 Other/Source: _____

Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

- | | | | |
|---|-------|--|---------------------------------|
| a) Top of bottom floor (including basement, crawlspace, or enclosure floor) _____ | 161.6 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| b) Top of the next higher floor _____ | 165.2 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| c) Bottom of the lowest horizontal structural member (V Zones only) _____ | N/A | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| d) Attached garage (top of slab) _____ | N/A | <input type="checkbox"/> feet | <input type="checkbox"/> meters |
| e) Lowest elevation of machinery or equipment servicing the building
(Describe type of equipment and location in Comments) _____ | 161.6 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| f) Lowest adjacent (finished) grade next to building (LAG) _____ | 166.8 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| g) Highest adjacent (finished) grade next to building (HAG) _____ | 167.3 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |
| h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support _____ | 167.0 | <input checked="" type="checkbox"/> feet | <input type="checkbox"/> meters |

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

Were latitude and longitude in Section A provided by a licensed land surveyor? Yes No Check here if attachments.

Certifier's Name Frank J. Barlowski	License Number 24GS03973500	Place Seal Here
Title Professional Land Surveyor		
Company Name Matrix New World Engineering, Land Surveying and Architecture, P.C.		
Address 442 State Route 35, Second Floor		
City Eatontown	State New Jersey	
Signature	Date	Telephone Ext.

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments (including type of equipment and location, per C2(e), if applicable)

A8(a): There are two separate enclosed areas below the first floor being 666 s.f.(Main Elev.=161.6 NAVD88) and 286 s.f.(right side of main enclosed area Elev.=165.2' NAVD88) totaling 934 s.f.
 The elevation of the first floor = 168.4'(NAVD88)
 C2(e): Hot water heater on the basement floor Elev = 161.6'(NAVD88)

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expiration Date: November 30, 2022

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 90 Pier Lane			Policy Number:
City Town of Fairfield	State New Jersey	ZIP Code 07004-2113	Company NAIC Number

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ feet meters above or below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ feet meters above or below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 1–2 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ feet meters above or below the HAG.
- E3. Attached garage (top of slab) is _____ feet meters above or below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ feet meters above or below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? Yes No Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner or Owner's Authorized Representative's Name

Address _____ City _____ State _____ ZIP Code _____

Signature _____ Date _____ Telephone _____

Comments

Check here if attachments.

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expiration Date: November 30, 2022

IMPORTANT: In these spaces, copy the corresponding information from Section A.	FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 90 Pier Lane	Policy Number:
City Town of Fairfield	State New Jersey
ZIP Code 07004-2113	Company NAIC Number

SECTION G – COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate of Compliance/Occupancy Issued
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- G7. This permit has been issued for: New Construction Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ feet meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ feet meters Datum _____
- G10. Community's design flood elevation: _____ feet meters Datum _____

Local Official's Name	Title
Community Name	Telephone
Signature	Date

Comments (including type of equipment and location, per C2(e), if applicable)

Check here if attachments.

BUILDING PHOTOGRAPHS

See Instructions for Item A6.

OMB No. 1660-0008

Expiration Date: November 30, 2022

ELEVATION CERTIFICATE

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 90 Pier Lane			Policy Number:
City Town of Fairfield	State New Jersey	ZIP Code 07004-2113	Company NAIC Number

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.



Photo One

Photo One Caption Front View

Clear Photo One



Photo Two

Photo Two Caption Rear View

Clear Photo Two

BUILDING PHOTOGRAPHS

Continuation Page

OMB No. 1660-0008
Expiration Date: November 30, 2022

ELEVATION CERTIFICATE

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 90 Pier Lane			Policy Number:
City Town of Fairfield	State New Jersey	ZIP Code 07004-2113	Company NAIC Number

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.



Photo Three

Photo Three Caption Right Side View

Clear Photo Three



Photo Four

Photo Four Caption Left Side View

Clear Photo Four