

HUDSON MERIDIAN CONSTRUCTION GROUP

**125TH STREET FIREHOUSE RESTORATION
NEW YORK, NY**

**GEOTECHNICAL INVESTIGATION
REPORT**

MAY 2011



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Prepared by:

HALCROW, INC.

22 Cortlandt Street, 30th Floor
New York, NY 10007

EXECUTIVE SUMMARY

Halcrow, Inc. (Halcrow) has been retained by Hudson Meridian Construction Group (Hudson Meridian) to provide geotechnical investigation and design services for the restoration of the 125th Street Firehouse, located at 120 East 125th Street in Harlem, New York City, NY. Currently the 125th Street Firehouse structure is abandoned.

The New York City Economic Development Corporation (NYCEDC) and Hudson Meridian are planning on renovating the 125th Street Firehouse structure into a new facility for the Caribbean Cultural Center African Diaspora Institute.

As part of the 125th Street Firehouse Renovation Project, a geotechnical investigation was performed to determine the nature and competency of the subsurface materials, and to examine the existing foundation system. Evaluations were completed with respect to foundation support for the proposed rehabilitation project.

The general scope of work for the current project consists of the restoration of the structure, and addition of more floors. This renovation will include increasing the building height to 74.25 ft, and also, increasing the building floor space area to 10,600 SF. Additional floors will be constructed, especially at the rear of the current structure, with partial building roofs at the sixth and seventh floors. At the front, the height of the structure will remain unchanged.

The geotechnical investigation consisted of two borings and two test pits, all performed within the building, through the basement floor slab. The investigation disclosed subsurface conditions consisting of a medium dense sand and gravel deposit, underlain by dense to very dense residual soils that were developed by the complete decomposition of the underlying bedrock. Bedrock consisting of Mica Schist, was encountered beneath the overburden soils. The excavated test pits revealed the existing Firehouse shallow foundations; details of the foundations are provided in this report.

The existing Firehouse structure is supported on shallow foundations. Analyses results are presented showing the expected settlements for a variety of shallow foundation sizes with varying bearing pressures, ranging up to 6,000 psf. This information is to be used to assess the settlement magnitudes that have occurred for the current structure, and the additional settlements that can be expected as a result of

the construction of the additional proposed floors. If expected total and differential settlements are less than 1 in, and $\frac{1}{2}$ in, respectively, then no modification would be required to the foundations in order to accommodate the proposed structure. However, if it is determined that excessive settlement can be expected, then modification or enlargement of the existing building foundations will be required. Shallow foundation modification, if required, should be constructed at the same level as the existing building foundations. The basement floor slab, or portions of the slab, will be required to be removed in order to access the building foundations. For the replacement foundation slab, a coefficient of vertical subgrade reaction of 200 kcf is recommended. The basement floor slab subgrade should include a 6 in. (minimum) layer of crushed stone.

Excess excavated site soils are, in general, suitable for use as Structural Fill. Structural Fill may also consist of imported, well graded, granular soils.

Compaction of the subgrades for foundations and the basement floor slab are required.

GEOTECHNICAL INVESTIGATION REPORT

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1. INTRODUCTION

Halcrow, Inc. (Halcrow) has been retained by Hudson Meridian Construction Group (Hudson Meridian) to provide geotechnical investigation and design services for the restoration of the 125th Street Firehouse, located at 120 East 125th Street in Harlem, New York City, NY. The New York City Economic Development Corporation (NYCEDC) and Hudson Meridian are planning on renovating the 125th Street Firehouse structure into a new facility for the Caribbean Cultural Center African Diaspora Institute.

This landmark Firehouse structure is currently not in use. The current structure is 24.85 ft by 84.44 ft, and varies in height between 59.08 ft at the front, to 42.58 ft at the rear, with 5,050 SF of building floor space area. The structure is five stories high at its front on 125th Street, and four stories at its rear, and also, has a basement. It is located on a 2,500 SF lot.

The general scope of work for the current project consists of the restoration of the structure, transforming it into the Caribbean Cultural Center African Diaspora Institute. This renovation will include increasing the building height to 74.25 ft, and also, increasing the building floor space area to 10,600 SF. Additional floors will be constructed, especially at the rear of the structure, with partial building roofs at the sixth and seventh floors. At the front, the height of the structure will remain unchanged.

Halcrow performed a geotechnical investigation, with the assistance of D.K. Drilling of NY (D.K. Drilling), to evaluate the subsurface conditions as they pertain to foundation support and installation. The investigation consisted of both geotechnical soil test borings and test pits, both conducted within the firehouse, and also, soil laboratory testing.

This report has been prepared to present the results of the subsurface geotechnical investigation performed at the site. The investigation established the engineering and construction characteristics of the subsurface materials encountered, and allowed for the determination of optimum foundation types. The results obtained from the field investigation are addressed.

The site and project descriptions are presented in Sections 2 and 3, respectively. A description of the site investigation is presented in Section 4. The geology and seismicity of the site area is provided in Section 5. Section 6 contains a description of

the subsurface conditions at the site, while the laboratory testing conducted is discussed in Section 7. The geotechnical design parameters are presented in Section 8. Foundation recommendations are provided in Section 9, and construction recommendations are presented in Section 10. The appendices to this Geotechnical Investigation Report, consisting of the test boring logs, test pit logs, and the laboratory testing results, are provided at the end of this report.

2. SITE DESCRIPTION

The project site, consisting of a landmark Firehouse, is located at 120 East 125th Street, in Harlem, New York City, New York. The Firehouse is no longer in use.

The existing structure is approximately 24.85 ft by 84.44 ft in footprint, and varies in height between 59.08 ft to 42.58 ft, with 5,050 SF of building floor space area. The structure is five stories high at its front on 125th Street, and four stories at its rear, and also, has a basement. The structure is located on a 2,500 SF lot.

The entire building, including all existing floors and the basement, will be renovated. Additional stories will also be constructed at the rear of the building.

Figure 2-1 provides a vicinity plan of the site area, while Figure 2-2 provides an aerial view of the site. The front view of the former Firehouse structure is provided in Figure 2-3.

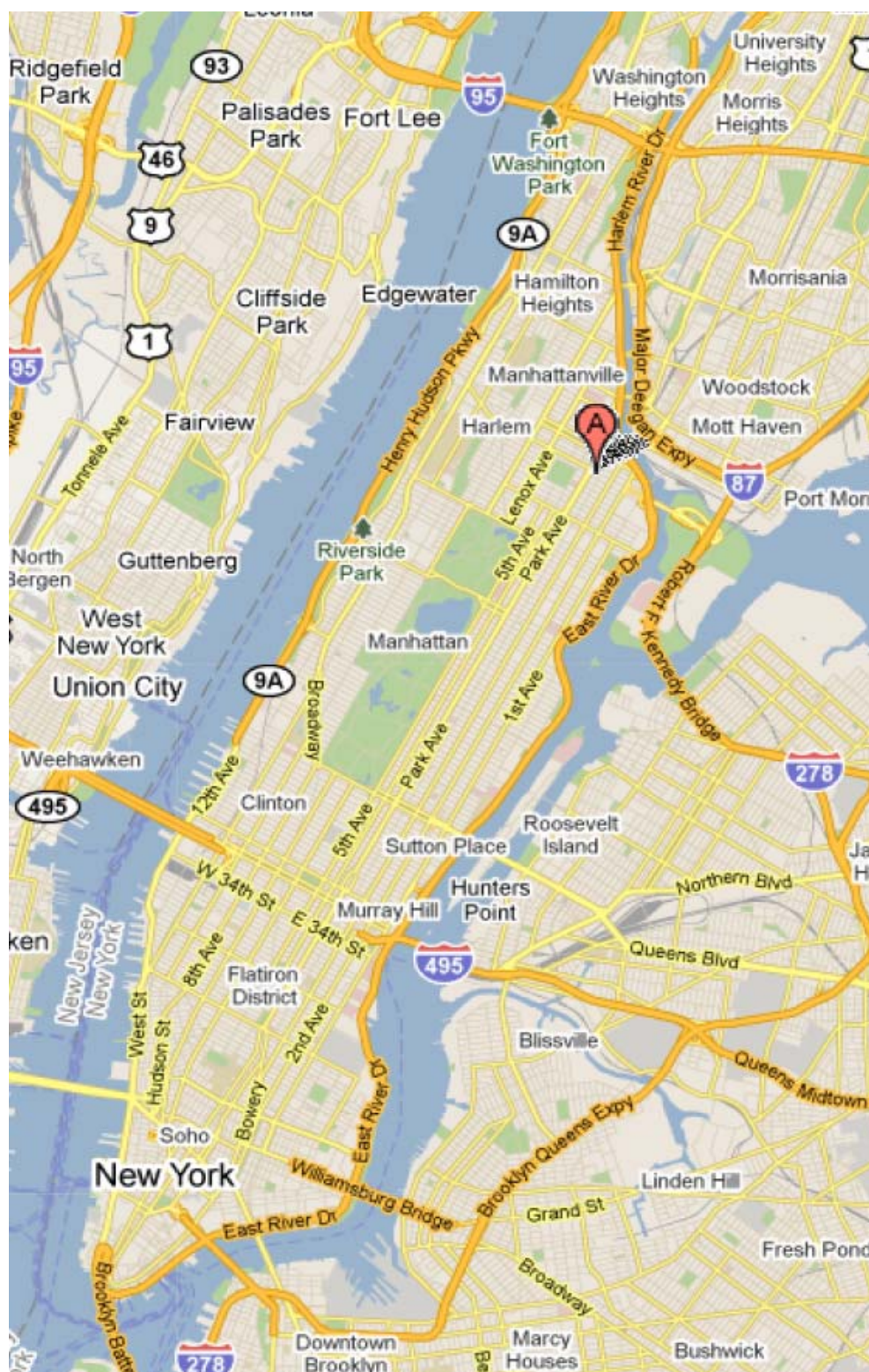


Figure 2-1 Vicinity Map



Figure 2-2 Site Aerial View

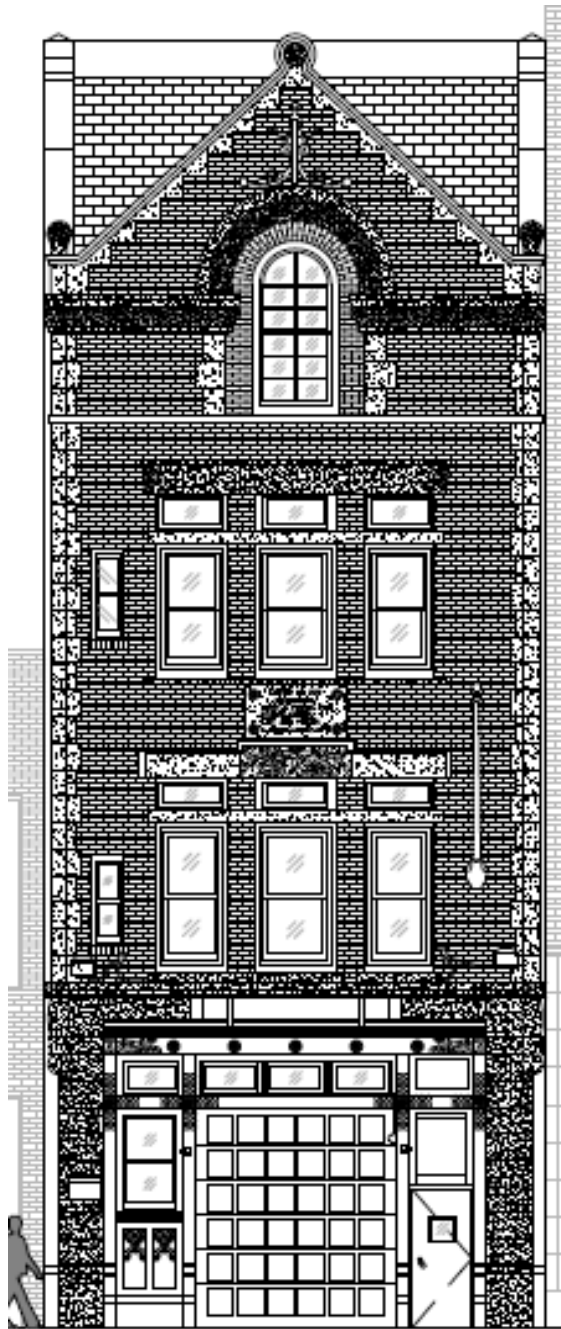


Figure 2-3 Front View of the Former Firehouse Structure

(From drawings produced by CSA New York Architects & Engineers, P.C.)

3. PROJECT DESCRIPTION

3.1 GENERAL

The project consists of restoration of the former 125th Street Firehouse, transforming it into the Caribbean Cultural Center African Diaspora Institute. The existing structure is approximately 24.85 ft by 84.44 ft in footprint, and varies in height between 59.08 ft to 42.58 ft, with 5,050 SF of building floor space area. The structure is five stories high at its front at 125th Street, and four stories at its rear, and also, has a basement. The structure is located on a 2,500 SF lot.

The general scope of work for the current project consists of the restoration of the structure, and addition of more floors. This renovation will include increasing the building height to 74.25 ft, and also, increasing the building floor space area to 10,600 SF. Additional floors will be constructed, especially at the rear of the structure, with partial building roofs at the sixth and seventh floors. At the front, the height of the structure will remain unchanged.

3.2 FORMER 125TH STREET FIREHOUSE RENOVATION

Renovation of the former 125th Street Firehouse into the new Caribbean Cultural Center African Diaspora Institute will include renovation of all the current floors and basement within the existing structure. Furthermore, additional floors will be added to the structure, increasing the height to 74.25 ft, and will have partial roofs at the sixth and seventh floors. The building floor space will be increased to 10,600 SF.

Figure 3-1, which is obtained from the drawings developed by CSA New York Architects & Engineers, P.C., includes a cross section of the structure, showing the outline of the existing structure, and the proposed additional floors to be added.

The increase of the structure height, and construction of additional floors, will result in an increase of the pressure applied by the current shallow foundation system on the underlying soils. Assessment of the new structure will require determination if the current foundation system is adequate, or modification of the foundations, by increasing them, is necessary.

(From drawings produced by CSA New York Architects & Engineers, P.C.)

3-2



Figure 3-2 Proposed Structure Front and Rear Elevations

(From drawings produced by CSA New York Architects & Engineers, P.C.)

4. SITE INVESTIGATION

4.1 GENERAL

A geotechnical field investigation was conducted at the 125th Street Firehouse by D.K. Drilling of NY (D.K. Drilling), from February 11, through February 28, 2011. Halcrow provided general technical oversight during the field geotechnical drilling activities. The associated soil and rock laboratory testing was conducted from February 28, through May 3, 2011.

The field investigation included the advancement of two (2) test borings, and two (2) test pits for geotechnical purposes and to examine the existing building foundations. The two borings were advanced within the Firehouse structure, to depths ranging between 30 ft to 30 ft 11 in. beneath the basement floor slab; the borings extended through the overburden soils and into the underlying bedrock. Due to difficulties associated with limited access within the structure, the borings were advanced from the main floor slab (1st Floor Slab at El 0 ft) through the basement ceiling and then through the basement floor slab (El -9.48 ft) to the depths indicated above. Additionally, two test pits were conducted to depths ranging from 3 ft 8 in. to 4 ft 6 in. beneath the Firehouse basement floor slab (El -9.48 ft); these were conducted in order to examine the existing building's wall shallow foundations. As-built Boring and Test Pits Locations Plan is provided on Figure 4-1.

4.2 GEOTECHNICAL TEST BORINGS

Two test borings were advanced within the Firehouse structure for geotechnical purposes. Due to limited access issues and the need for powerful drilling equipment capable of drilling through bedrock, the drilling equipment had to be placed on the main floor slab (1st Floor Slab at El 0 ft), and drilling proceeded through the basement ceiling and then through the basement floor slab (El -9.48 ft). The two test borings were advanced to depths ranging between 30 ft to 30 ft 11 in, beneath the basement floor slab. Table 4-1 provides a summary of the geotechnical borings performed.

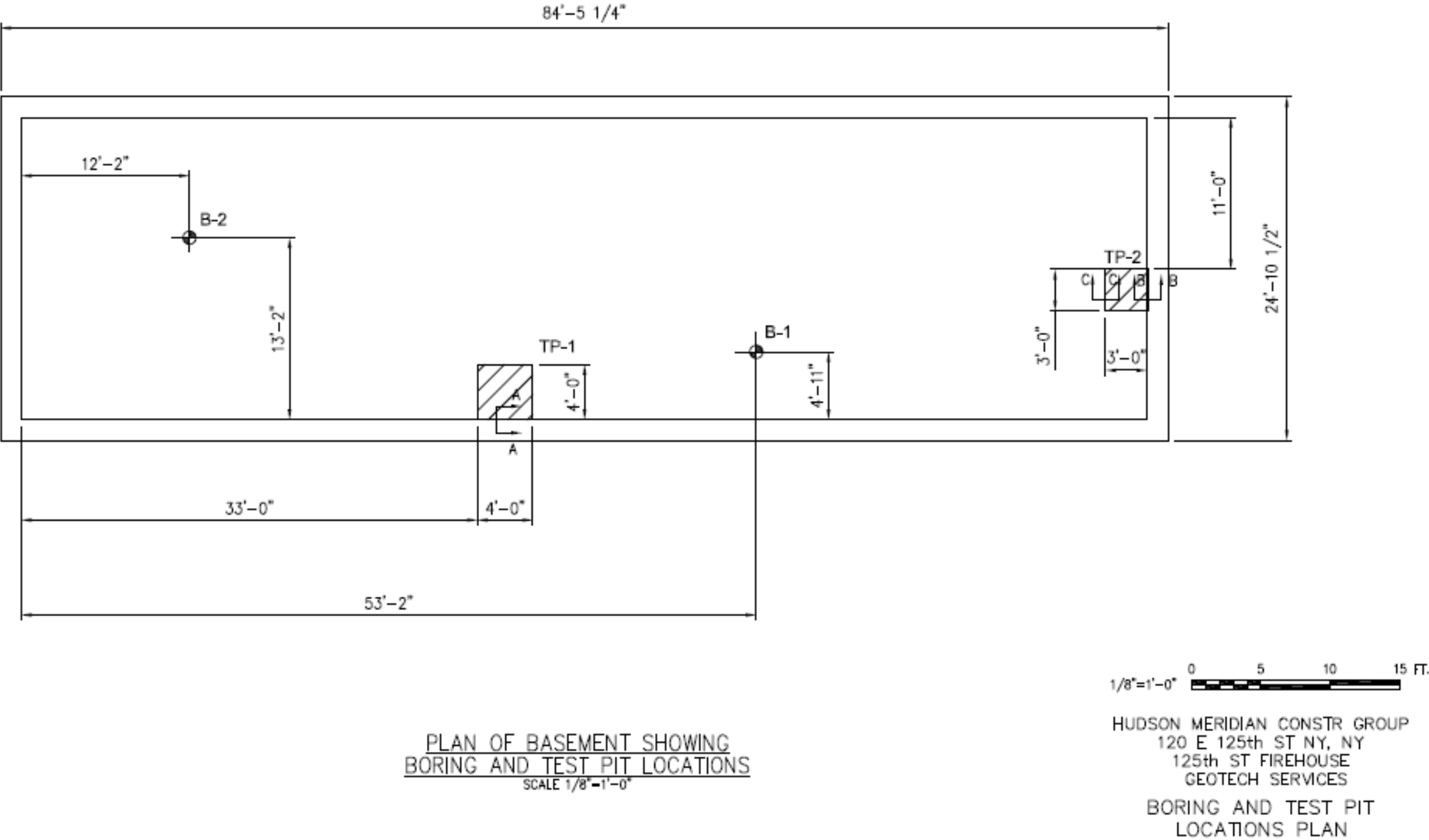


Figure 4-1 Boring and Test Pit Locations Plan

Table 4-1 Geotechnical Boring Schedule

Boring No.	Location	Boring Depth	Basement Floor Slab Elevation	Boring Bottom Elevation
B-1	Within the Firehouse – See Figure 4-1	30'-11"	-9'-5.75"	-40'-4.75"
B-2	Within the Firehouse – See Figure 4-1	30'-0"	-9'-5.75"	-39'-5.75"

All test borings were advanced using mud-rotary drilling techniques with a skid-mounted drill rig. Due to its size, the skid-mounted drill rig was placed on the main floor in the Firehouse, and casing was extended through the basement and then below the basement floor slab in order to stabilize drilling of the borings. Soil samples were obtained via a 24 in. split-spoon sampler (2-in., O.D., 1-3/8-in. I.D.), driven by a 140-lb. hammer free falling 30 in. The number of blows was recorded per 6 in. for the 2 ft split-spoon length. The number of blows required for penetration of the middle 12 in. of the sampler is the Standard Penetration Test (SPT) N-value (blows per foot). The SPTs were completed in accordance with ASTM D1586. Standard Penetration Tests were performed continuously in the upper 12 ft of each boring, and at 5 ft intervals thereafter. SPT N-values recorded on the boring logs are uncorrected for the overburden pressure. Split-spoon samples were visually classified in the field by the Halcrow Field Engineer, and verified by the soils laboratory testing.

The test borings were advanced until refusal was encountered, indicating top of bedrock level. Bedrock was encountered at depths ranging from 20 ft to 22 ft 2 in. beneath the basement floor slab (i.e., El -29 ft 5.75 in. to El -31 ft 7.75 in.). Bedrock was cored by an NX double core barrel, advanced in increments of 5 ft. or less. The recovered rock cores were examined and classified by the Halcrow Field Engineer. The rock cores were classified using the criteria provided in the Navy Manual, DM-7. Additionally, for each core run, the recovery as a percentage of the total core run is reported. The Rock Quality Designation (RQD), which is segments of the recovered rock core longer than 4 in, reported as a percentage of the total core run, is also reported.

The boreholes were grouted after completion of the drilling work, and the floor slab was restored to its original condition.

Geotechnical test boring logs are presented in Appendix A.

4.3 TEST PITS

Two test pits were excavated within the Firehouse basement in order to examine the existing structure's foundations. One test pit was conducted along the structure's eastern foundation wall, and the second was conducted at the rear foundation wall (i.e., northern end). The test pits were excavated to depths ranging from 3 ft 8 in. to 4 ft 6 in. beneath the basement floor slab, and did expose the structure's wall shallow foundations.

After completion, the test pits were backfilled in layers, with each layer compacted by hand tampers. The basement floor slab was restored to its original condition.

The test pit logs, including hand sketches and photographs of the encountered conditions, are presented in Appendix A.

5. GEOLOGY AND SEISMICITY

5.1 AREA GEOLOGY

The 125th Street Firehouse site geology, starting from ground surface consists of a sand and gravel deposit, underlain by residual soils, and then bedrock. Bedrock at the site consists of the Manhattan Schist Formation. This bedrock consists of hard, slightly weathered, Mica Schist. The residual soils above the bedrock consist of bedrock that has completely decomposed into a soil, but still maintains the texture of the parent bedrock material.

5.2 SEISMIC DATA

The 2008 New York City Building Code provides maximum considered earthquake spectral accelerations and criteria to determine the Site Class of the subsoil. Based on 2008 NYC Building Code, the following parameters are to be used for seismic design:

- The short period (S_s) acceleration = 0.365g
- The 1-second period (S_1) acceleration = 0.071g
- Site Class: Class C, Very Dense Soil and Soft Rock

In addition, the Peak Ground Acceleration (PGA) at the site was evaluated based on USGS maps to be 0.2g at bedrock level based on a 2% probability of exceedance in 50 years.

For the renovation design of the Firehouse Structure, seismic design should be based on response spectrum evaluated from the parameters provided above.

6. SUBSURFACE CONDITIONS

6.1 GENERAL

Detailed descriptions of the soils encountered are recorded on the individual test boring logs included in Appendix A. The information presented includes sample position, blow counts per 6 in, SPT N-value, water level, and classification of individual samples in accordance with the Burmister Soil Classification Method. Soil classification symbols in accordance with both the Unified Soil Classification System (USCS – ASTM D2487), and the New York City Building Code are also presented for each sample on the boring logs. The rock core samples descriptions are also included in the test boring logs; this information also includes the rock core position, rock core recovery, and rock core RQD. The encountered soils are also described in the test pit logs, along with a description of the encountered foundations. A general description of the soil materials encountered at the site is provided hereinafter.

The existing Firehouse will be renovated, and additional floors will be added to the existing structure. Two geotechnical borings and two test pits were performed beneath the basement floor slab, in order to determine the subsurface soils conditions, and examine the existing structure's foundation system.

The basement floor slab consists of an unreinforced concrete slab that varies in thickness from 4 in. to 8 in. At some locations a crushed rock layer was encountered beneath the basement floor slab. Underlying the basement concrete slab and crushed rock, if present, three distinct layers were encountered; these layers are described in the following section. For locations of the test borings, refer to Figure 4-1 – Boring and Test Pit Locations Plan.

6.2 SUBSURFACE PROFILE

Three distinct layers were encountered and are described in order of increasing depth.

6.2.1 Stratum 1 – Sand and Gravel Deposit

This stratum was encountered in both Borings B-1 and B-2, as well as both Test Pits TP-1 and TP-2. In Borings B-1 and B-2 this stratum was encountered immediately beneath the basement floor slab, and extended to depths ranging between 7 ft 6 in. to 8 ft 6 in. beneath the basement floor slab. This stratum was also encountered in both Test Pits TP-1 and TP-2 immediately beneath the basement slab; both test pits were terminated within this stratum at depths ranging from 3 ft 8 in. to 4 ft 6 in. beneath the basement floor slab.

The material generally consisted of brown to grayish brown coarse to fine sand, with varying amounts of fine to coarse gravel, and silt. Based on the Unified Soil Classification System (USCS), this material is classified as SP, SM, SW, and GP. Also, in accordance with the New York City Building Code, these soils are classified as 3a or 3b. Based on SPT N-values this material mostly has a medium dense relative density. Moisture content testing conducted on representative samples of this material indicated values ranging from 8.5% to 16.1%. Gradation analyses indicated that the gravel component in these materials is abundant, reaching approximately 50% in some of the samples. The fines content in this deposit varied from 1.1% to 19.8%; these are materials finer than the No. 200 sieve.

6.2.2 Stratum 2 – Residual Soil

This stratum was encountered beneath the soils of Stratum 1, and extends to top of bedrock at depths ranging between 20 ft and 22 ft 2 in. beneath the basement floor slab (i.e., El -29 ft 5.75 in. to El -31 ft 7.75 in.). This residual soil stratum consists of grayish brown to gray micaceous fine to coarse sand, with varying amounts of fine to coarse gravel, and silt. These residual soils consist of the in place complete decomposition of the parent bedrock. Occasionally cobble size rock fragments were encountered when drilling through the stratum. Based on USCS, these soils are classified as SP or SM. Also, in accordance with the New York City Building Code, these soils are classified as 3a or 3b. Based on SPT N-values these soils have a dense to very dense relative density. Moisture content testing conducted on a representative sample of this material indicated a value of 10.1%. A gradation analysis conducted on a representative sample of this soil indicated that the majority of the material consists of

sand with a significant gravel component, up to about 40%. The sample also included 12% fines, consisting of material finer than the No. 200 sieve.

6.2.3 Stratum 3 – Bedrock

Bedrock at the site was encountered at depths ranging from 20 ft to 22 ft 2 in. beneath the basement floor slab (i.e., El -29 ft 5.75 in. to El -31 ft 7.75 in.). Both test borings were terminated within this stratum at depths ranging between 30 ft to 30 ft 11 in. beneath the basement floor slab (i.e., El -39 ft 5.75 in. to El -40 ft 4.75 in.). Bedrock encountered on-site consists of grey, hard, slightly weathered, very closely to moderately fractured, Mica Schist. According to the New York City Building Code, this bedrock is classified as 1b or 1c. Rock core recovery varied from 85% to 100%. The Rock Quality Designation (RQD) for this bedrock varied from 30% to 76%, indicating poor to good conditions. Unconfined compressive strength testing conducted on representative rock core samples indicated strengths ranging from 5,874 psi to 11,915 psi.

6.3 EXISTING FOUNDATIONS

Two test pits were excavated within the Firehouse basement in order to examine the existing structure's foundations. Test Pit TP-1 was conducted along the eastern foundation wall of the Firehouse, while Test Pit TP-2 was conducted at the rear foundation wall (i.e., northern end). The test pits were excavated to depths ranging from 3 ft 8 in. to 4 ft 6 in. beneath the basement floor slab, and did expose the structure's wall shallow foundations.

At Test Pit TP-1 a 1 ft thick concrete strip footing that projects 1 ft from the face of the wall was encountered at a depth of 1 ft below the top of the floor slab. Further, another foundation element, possibly a shear key, with its face lining up with the face of the brick wall was also encountered. The bottom of this lower foundation element appears to be at 3 ft 8 in. depth, which was the depth excavated within the test pit. In order to reach the bottom edge of the footing, a sump pump had to be used since it was below the water table. The width of the lower foundation element, the possible shear key, could not be ascertained due to steady and rapid seepage into the excavation.

Figure 6-1 provides the exposed foundation details revealed by Test Pit TP-1. For location of Test Pit TP-1, see Figure 4-1.

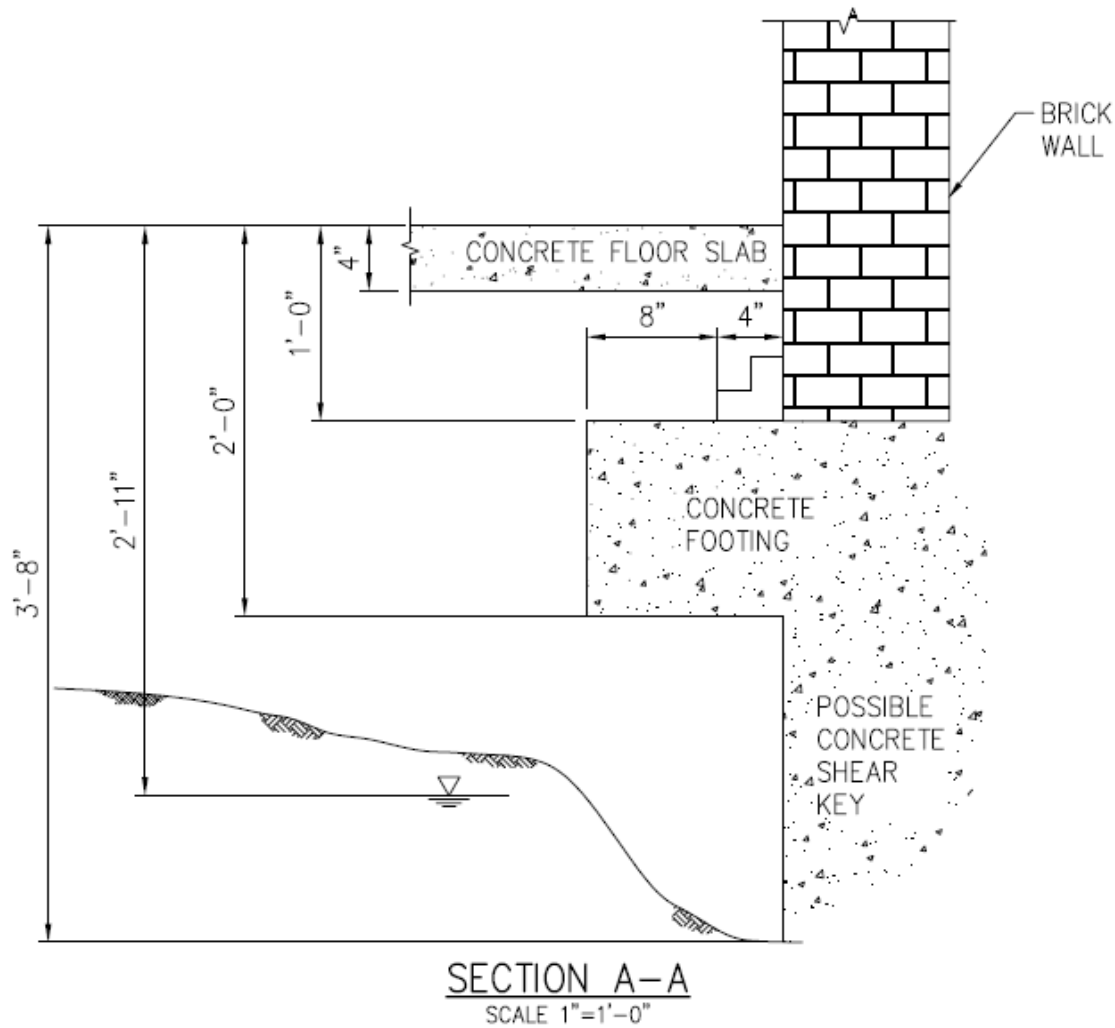


Figure 6-1 Exposed Conditions at Test Pit TP-1

Test Pit TP-2 was excavated to expose the existing foundations supporting the exterior brick wall and the interior CMU wall, both located within the vicinity of this test pit. Two concrete strip footings were revealed during this excavation. The excavation

was terminated at a depth of 4 ft 6 in. Groundwater was encountered at about a 3 ft 4 in. depth. Details revealed by this test pit are as follows:

(i) Concrete Footing Supporting the Brick Wall at the North End of the Basement

The top of this footing was found at the north face of the test pit at a depth of 16 in. below the top of the basement floor slab. This footing, which is about 6 in. thick, projects 5 in. from the face of the wall. This footing was locally undermined over a length of about 2 ft along the wall, by as much as 12 in. to 14 in. laterally under the footing. The width of the footing however, could not be confirmed. No other supporting foundation element below the described footing was discovered. Section B-B in Figure 6-2 depicts the findings.

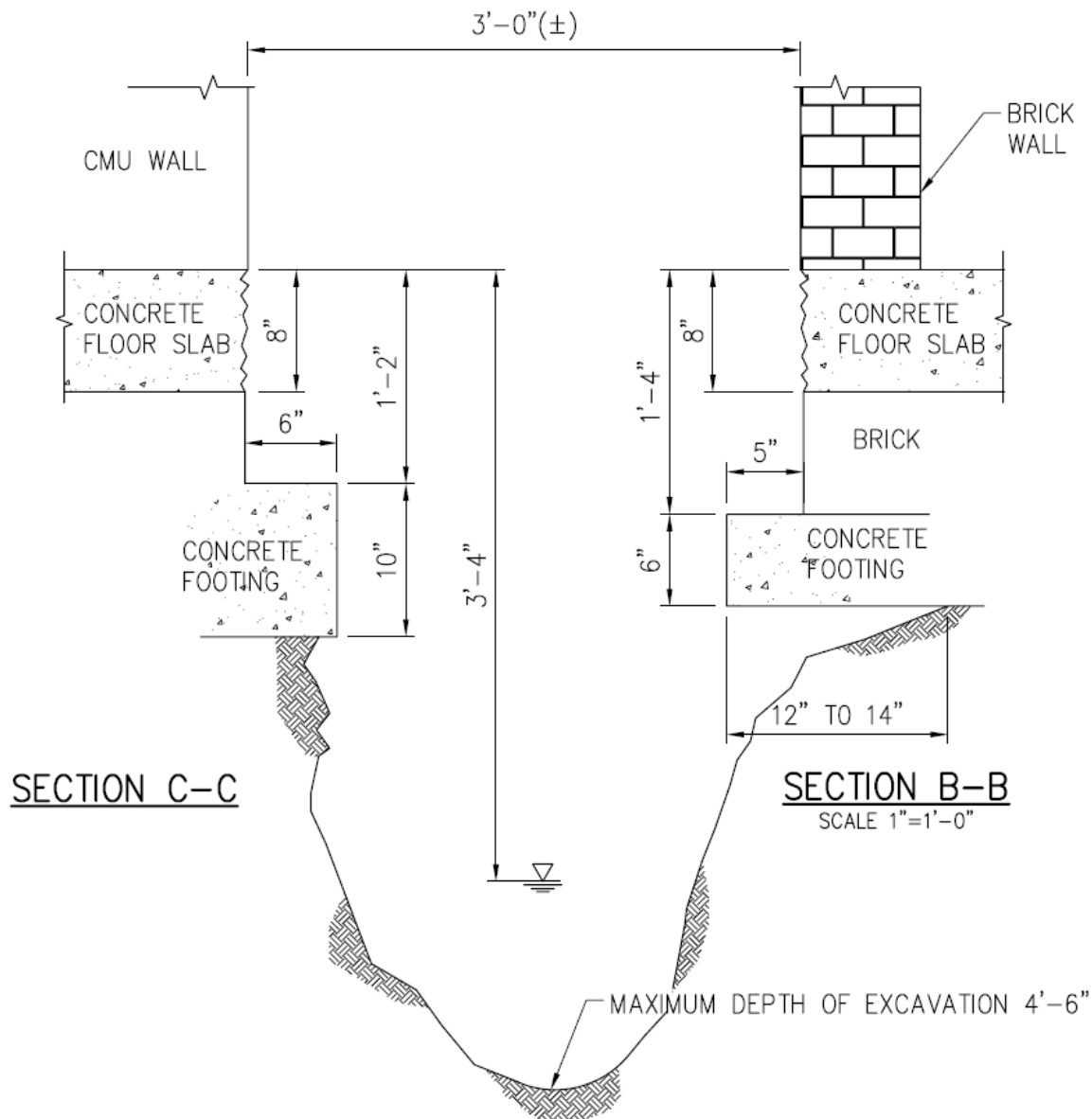


Figure 6-2 Exposed Conditions at Test Pit TP-2

(ii) Concrete Footing spanning the 3 ft Gap Between the CMU and Brick Walls

The top of a 10 in. thick concrete strip footing that projects 6 in. from the face of the wall was encountered at a depth of 14 in. below the top of the basement floor slab. This footing was not undermined, and its width is not known. Section C-C in Figure 6-2 depicts the findings.

After completion, the test pits were backfilled in layers, with each layer compacted by hand tampers. The basement floor slab was restored to its original condition.

The test pit logs, including hand sketches and photographs of the encountered conditions are presented in Appendix A.

6.4 GROUNDWATER

Groundwater was encountered at a depth of 3 ft beneath the basement floor slab (i.e., El -12 ft 5.75 in.), at both Borings B-1 and B-2. In Test Pit TP-1, groundwater was encountered at a depth of 2 ft 11 in. (i.e., El -12 ft 4.75 in.), while at Test Pit TP-2, groundwater was encountered at a depth of 3 ft 4 in. (i.e., El -12 ft 9.75 in.) beneath the basement floor slab.

Actual groundwater levels fluctuate with the daily and seasonally climatic conditions. Perched groundwater may be encountered in shallow excavations especially if construction commences after a rainy season and/or heavy rainfall. Perched groundwater, if encountered during construction, may be controlled using conventional sump pump techniques.

7. LABORATORY TESTING

7.1 GENERAL

Representative soil samples collected from the subsurface geotechnical investigation were subjected to the following testing:

- Moisture Content (ASTM D2216)
- Gradation Analyses (ASTM D422)
- Rock Core Unconfined Compression (ASTM D2938)

The tests were conducted in order to develop the soil characteristics, including the physical properties and shear strength. Geotechnical soil and rock core laboratory testing results are presented in Appendix B.

7.2 PHYSICAL PROPERTIES

Physical properties testing or classification testing was conducted on representative soil samples. This testing included moisture content and gradation analyses. These tests were conducted on the soils of all the strata that were encountered on-site, and were performed to aid in the classification.

7.3 BEDROCK UNCONFINED COMPRESSIVE STRENGTH

Unconfined Compressive Strength (UCS) testing was conducted on rock core samples from Stratum 3 – Bedrock. The UCS tests produced results indicating strengths varying from 5,874 psi to 11,915 psi. The detailed results can be found in Appendix B.

8. GEOTECHNICAL DESIGN PARAMETERS

8.1 GENERAL

The subsurface geotechnical data collected from the 125th Street Firehouse Subsurface Geotechnical Investigation was utilized to develop a typical subsurface profile for geotechnical design. A single profile was developed from the two borings.

8.2 DEVELOPED SOIL PROFILE

Stratum 1 – Sand and Gravel Deposit (From Basement floor slab to a depth of 8 feet)

$$\gamma = 120 \text{ lb/ft}^3; \gamma' = 57.6 \text{ lb/ft}^3$$

$$\phi = 33^\circ$$

Stratum 2 – Residual Soil (From depth of 8 feet to 22 feet)

$$\gamma = 125 \text{ lb/ft}^3; \gamma' = 62.6 \text{ lb/ft}^3$$

$$\phi = 38^\circ$$

Stratum 3 – Bedrock (From depth of 22 feet and below)

$$\gamma = 150 \text{ lb/ft}^3; \gamma' = 87.6 \text{ lb/ft}^3$$

$$q_u = 6,965 \text{ psi (mean value from the tested lower strength rock core)}$$

9. FOUNDATION RECOMMENDATIONS

9.1 GENERAL

For satisfactory performance, the foundation of any structure must satisfy two independent design criteria:

1. It must have an acceptable factor of safety against a bearing type failure under maximum design loads.
2. Settlement during the life of the structure must not be of a magnitude that will cause structural damage, or impair the operational efficiency of the facility.

Selection of a foundation type to satisfy these criteria depends on the nature and magnitude of the structural loads, and the settlement tolerances. Where more than one foundation type satisfies these criteria, then cost, scheduling and material availability will have an influence on, or determine, the final selection of the type of foundation.

The subsurface geotechnical investigation at the former 125th Street Firehouse has indicated that the subsurface conditions beneath the basement floor slab consist of medium dense sand and gravel, underlain by dense to very dense residual soils consisting of sand and gravel that formed by the complete decomposition of the underlying bedrock. Beneath the residual soils the parent bedrock, consisting of Mica Schist, was encountered.

For the support of the renovated 125th Street Firehouse, shallow foundations supported within Stratum 1 – Sand and Gravel Deposit may be utilized. The current structure is supported on shallow foundations placed within Stratum 1. The current shallow foundations may be found to be adequate for support of the renovated structure's loads, or possibly, might have to be increased in size in order to accommodate the additional loads that will be applied to the foundation system.

Recommendations for shallow foundations are presented in the following sections.

9.2 SHALLOW FOUNDATIONS

The current former 125th Street Firehouse structure is supported on shallow foundations placed within Stratum 1 – Sand and Gravel Deposit. The current shallow foundations may be found to be adequate for support of the renovated structure's loads, or possibly, might have to be increased in size to accommodate the additional loads that will be applied to the foundation system as a result of the additional stories that will be constructed.

9.2.1 Shallow Spread Footings

The site soils of Stratum 1 – Sand and Gravel Deposit can provide adequate support for conventional shallow footing type foundations. It is recommended that foundations be designed for a maximum allowable bearing pressure 6,000 psf. This recommended allowable bearing pressure is consistent with the value provided in the NYC Building Code for Soil Type 3b. The current structure's foundations are below the basement floor slab, so the minimum 4 ft depth below final finished grade required by the NYC Building Code for frost protection, is already met.

The current structure's foundations may have to be increased to accommodate the additional loads that will be applied on the foundations. In general, wall foundations should have a width of not less than 1.5 ft, and column foundations should have a width of not less than 3 ft; these minimum requirements are necessary as a safeguard against local shear failure of the foundations. Should the current foundations be increased in size, all foundation subgrades must be inspected by a Geotechnical Engineer prior to foundation construction, to confirm the design bearing pressure.

The estimated settlements for wall footings ranging from 2 ft in width to 6 ft in width are presented in Figure 9-1. Note that in the figure the estimated settlements are plotted for bearing pressures of 1,000 psf, 2,000 psf, 3,000 psf, 4,000 psf, 5,000 psf, and 6,000 psf.

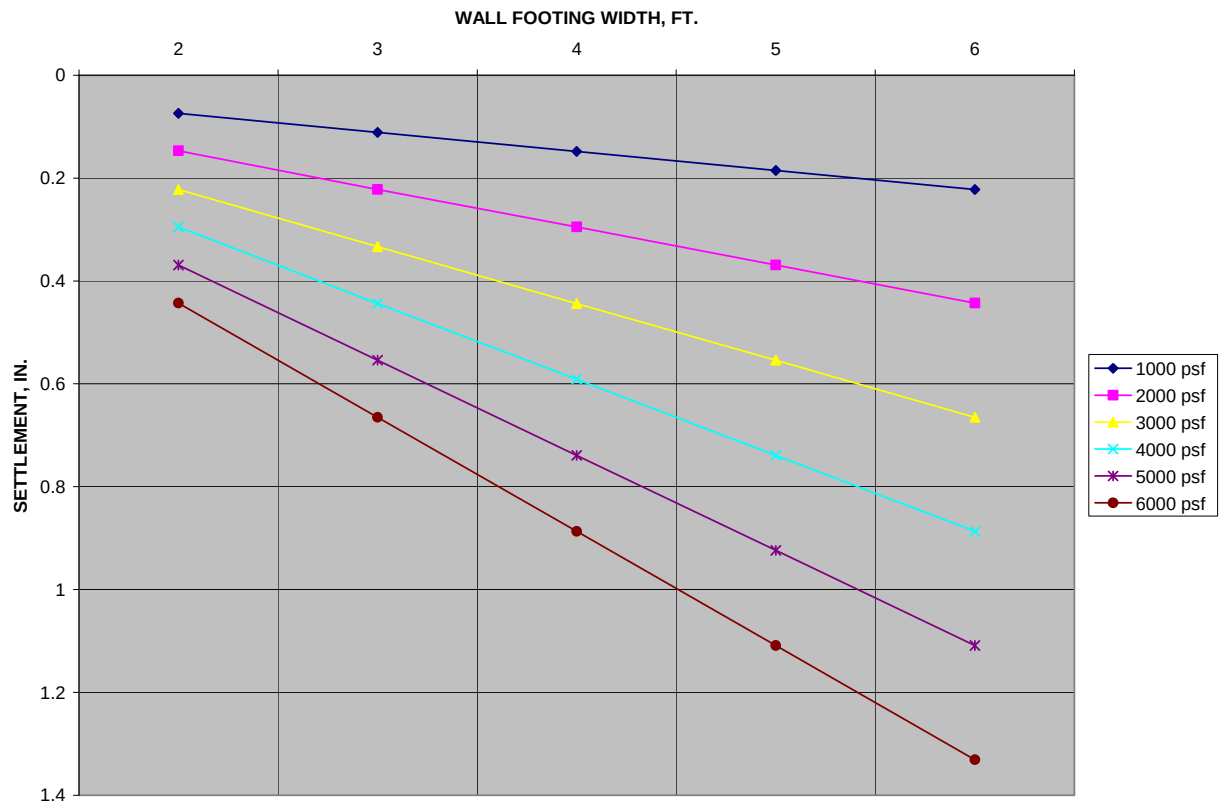


Figure 9-1 Estimated Wall Footing Settlement

The estimated settlements for square footings ranging from 2 ft. in width to 8 ft. in width are presented in Figure 9-2. Note that in the figure the estimated settlements are plotted for bearing pressures of 1,000 psf, 2,000 psf, 3,000 psf, 4,000 psf, 5,000 psf, and 6,000 psf.

Since the subsurface conditions consist mostly of granular soils, the estimated settlements provided in Figures 9-1 and 9-2 are elastic in nature and expected to occur instantaneously as foundation load is applied. Figures 9-1 and 9-2 can be used to estimate the settlement that has occurred previously due to construction of the original structure, as a result of the currently applied foundation pressures, and also, to determine the magnitude of the additional settlements that can be expected as a result of the additional foundation pressure due to the proposed renovation. If this evaluation indicates that expected total and differential settlements are greater than 1 in. and ½ in., respectively, then consideration needs to be given to increasing the size of current foundations.

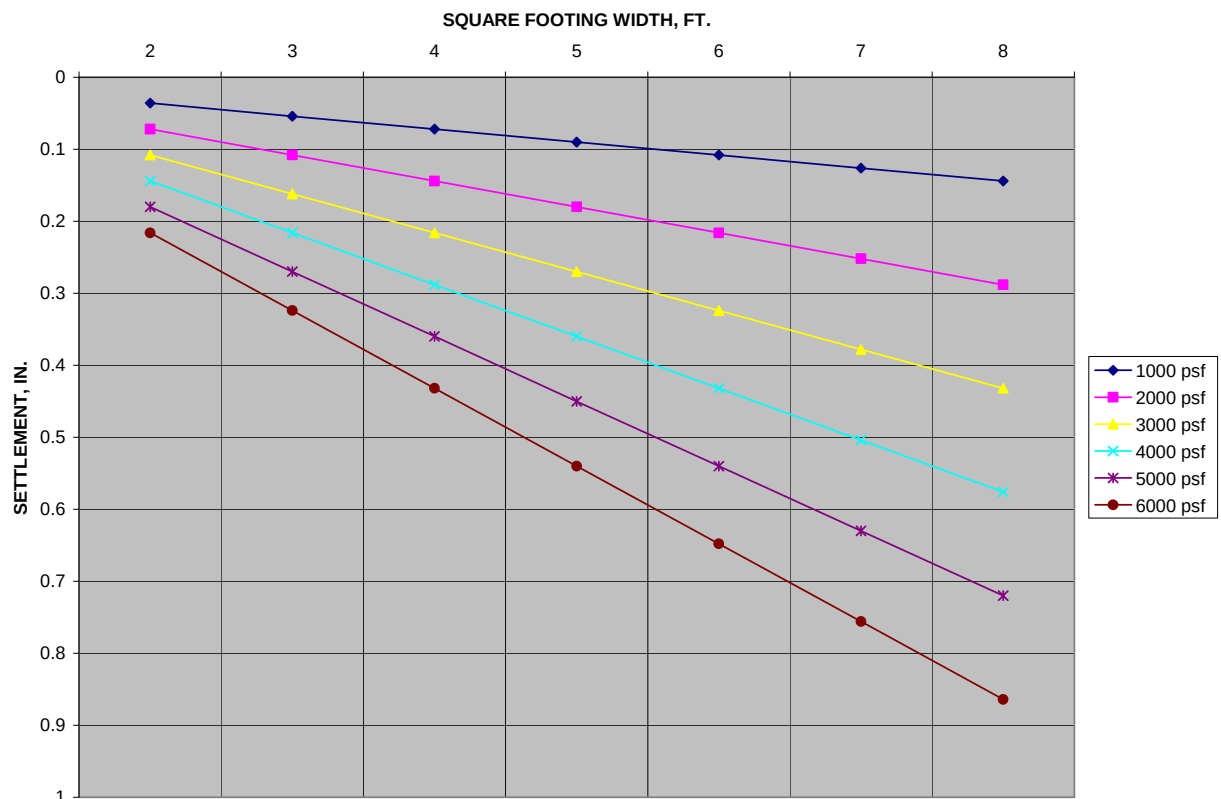


Figure 9-2 Estimated Square Footing Settlement

Should the existing foundations need to be increased in size, it is recommended that excavation to current foundation bottom be performed, without undermining the foundations. After compaction of the subgrade soils at existing foundation level, extension to the existing foundations may be constructed. Reinforcement should be drilled and grouted into the existing foundations, tying the foundation additions to the existing foundations.

9.2.2 Basement Floor Slab

If the existing structure's foundations are altered to accommodate the additional loads applied by the renovated structure, the existing basement floor slab, or portion of the slab will need to be removed to allow for access to the existing foundations. The replacement basement floor slab should be designed as a slab-on-grade. The slab-on-grade should be supported on a six-inch (minimum) thick layer of crushed stone. If the entire slab is not removed, the replacement portion should be tied into the existing slab-on-grade. A vapor barrier should be placed between the slab and the crushed stone

subbase. If required for design of the slab, a coefficient of vertical subgrade reaction (K_v) equal to 200 kips per cubic foot can be assumed.

Sump pumps should be included as part of the basement to assure that the groundwater table is maintained at all times beneath the basement floor slab.

9.3 LATERAL EARTH PRESSURE

Retaining wall unrestrained against lateral movement should be designed to resist lateral earth pressures on the basis of active earth pressure coefficient K_a . Retaining walls that are restrained against lateral movement should be designed on the basis of the “at-rest” earth pressure coefficient K_o .

The following parameters are recommended for the design of retaining structures.

<u>Stratum 1 Soil or Fill Material</u>	
Moist Unit Weight	120
Saturated Unit Weight	125
Earth Pressure Coefficients	
Active (K_a)	0.295
At-Rest (K_o)	0.455
Passive (K_p)	3.392
Soil/Concrete Friction Coeff.	0.45

9.4 SITE DEVELOPMENT

Site development is expected to include minimal earthwork operations, especially if the current shallow foundation system is found to be adequate for the renovated Firehouse structure. However, if the existing shallow foundations are required to be modified to accommodate the additional loads, removal of the basement floor slab or portions of the slab, excavation, enlargement of the existing footings, backfilling, and restoration of the basement floor slab will be required. Fill used for backfilling around the modified footings may consist of excavated on-site soils, free of organic, deleterious, or unsuitable materials, or may consist of imported, clean, granular soils. Fill should be

placed in a controlled manner in accordance with the recommendations contained in this report.

10. CONSTRUCTION RECOMMENDATIONS

10.1 EXCAVATION

For the renovation of the Firehouse structure, modification or enlargement of the existing structure's shallow foundations might be required. If foundation modification is required, the basement floor slab or portions of the slab will be required to be removed, and excavation to the bottom of the existing shallow foundations will be required. Any unsuitable or deleterious materials encountered during the excavation should be removed. A slope consisting of 1(v):1(h) may be utilized for the excavation of the portion above the groundwater table. Beneath the groundwater level, a slightly flatter slope will be required. Excavated soil found to be not containing deleterious materials may be stockpiled for reuse as Structural Fill.

10.2 FILL, BACKFILL, AND COMPACTION REQUIREMENTS

10.2.1 Structural Fill (On-Site Excavated Soils)

Structural Fill will be used for backfilling the excavations performed as part of the foundations renovations, if determined to be required. It is required that Structural Fill contain no organic or deleterious materials. Structural Fill may consist of on-site excavated Stratum 1 sand and gravel soil, classified as "SW", "SP", "SM", or "GP", in accordance with USCS (ASTM D2487). The maximum particle size should be 3 in. Structural Fill should not contain more than 12% fines (Material passing the No. 200 sieve). Fill should be placed in lifts not exceeding 6 in. and compacted to 95% of the maximum modified dry density (ASTM D1557) of the soil.

10.2.2 Structural Fill (Imported Soils)

In lieu of using entirely the on-site soils as Structural Fill for the project, imported granular soils may be used as Structural Fill. Imported granular Structural Fill is recommended to consist of clean, well-graded soils with no more than 12% fines (material passing the No. 200 sieve). The maximum particle size should be 3 in. Fill should be placed in lifts not exceeding 6 in. and compacted to 95% of the maximum modified dry density (ASTM D1557) of the soil.

10.3 COMPACTION

The bottom of excavations, which should not extend beyond the bottom of the existing footings, should be compacted prior to enlarging any of the existing footings. Due to limited access in the basement area, compaction should be performed by hand operated plate tampers. Soft or loose material detected during compaction should be compacted in place, or removed and replaced with Structural Fill. Unsuitable materials should be excavated. Foundation subgrades should be proof tamped and compacted prior to foundation extension construction.

10.4 DEWATERING

Generally, it is not anticipated that major dewatering activities will be required. However, the potential exists for the formation of perched water zones at depths consistent with those required for the construction of the foundations. Perched groundwater, if encountered during construction, may be controlled using conventional sump pump techniques.

10.5 INSPECTION

As indicated earlier in this report, all excavations, compaction, subgrade preparation and compaction, and shallow foundation modification should be inspected by a Geotechnical Engineer. Inspections should take place during foundation construction.

APPENDIX A

TEST BORING AND TEST PIT LOGS

BORING RECORD SHEET
HALCROW

Sheet no.: 1 of 2

Boring no.: 1

Date: 2/11 ~ 2/17/11

Boring Elev.: -9'-5.75"

Datum: _____

Project: Former East 125th Street Firehouse
Location: 120 East 125th St, NY, NY
Contractor: D.K. Drilling

Inspector: M. DeAngelis / P. Kumar

PROGRESS	DEPTH (ft)	CASING BLOWS	SAMPLE			REC. (in)	STRATA	FIELD DESCRIPTION AND REMARKS Soil Classification (USCS / NYC Building Code)
			Depth	No.	Blows/6"			
	0							0 to 4": Unreinforced concrete floor of the basement
			0.5	S-1	5	12	Sand with Gravel ▽ (SP / Class 3a or 3b)	Brown coarse to medium SAND, little medium Gravel (SP / Class 3a)
					13			
					28			
			2.5	S-2	40	12		Brown coarse to fine SAND, some medium Gravel (SP / Class 3b)
			2.5		23			
					13			
			4.5	S-3	6	5		Ground water table at about 3 ft depth
			4.5		11			
					11			
			6.5	S-4	10	5		Brown medium GRAVEL, some coarse to medium Sand, trace Silt (GP / Class 3b)
			6.5		15			
			11					
		8.5	S-5	19	18	Brown coarse to medium SAND, and coarse to fine GRAVEL, trace Silt (SP / Class 3b)		
		8.5		11				
				8				
		10		10	4	Gravel / Cobbles with Sand (SP / Class 3a)	Greyish Brown micaceous coarse to fine SAND, some coarse to fine Gravel, little Silt (SP / Class 3b)	
		10.5	13					
		10.5	12					
				19	4	Gravel / Cobbles with Sand (SP / Class 3a)	Greyish Brown micaceous coarse to fine SAND, and coarse to fine GRAVEL, trace Silt (SP / Class 3a)	
		12.5	36					
			50/2"					
				</				

All depths are below the top of the basement floor

Sample Type: S: 1 3/8" I.D. Split Spoon, 140# hammer, 30" drop, 2 wraps
U: Undisturbed thin wall tube sampler ___ push ___ fixed piston
C: Core size, I.D. ___ Type ___ Casing ___.

Groundwater depth at completion: _____
Groundwater depth after ___ hrs: _____
Boring no.: B-1

HALCROW

Boring no.: 1

Boring Elev.: -9'-5.75"

Datum: _____

Location: 120 East 125th St, NY, NY

Inspector: P. Kumar[illegible]

All depths are below the top of the basement floor

U: Undisturbed thin wall tube sampler ___ push ___ fixed piston

C: Core size, I.D. ____ Type ____ Casing ____.

Groundwater depth after ____ hrs: _____

Boring no.: B-1

BORING RECORD SHEET
HALCROW

Sheet no.: 1 of 2

Boring no.: 2

Date: 2/18 ~ 2/22/11

Boring Elev.: -9'-5.75"

Datum: _____

Project: Former East 125th Street Firehouse

Location: 120 East 125th St, NY, NY

Contractor: D.K. Drilling

Inspector: P. Kumar

PROGRESS	DEPTH (ft)	CASING BLOWS	SAMPLE			REC. (in)	STRATA	FIELD DESCRIPTION AND REMARKS						
			Depth	No.	Blows/6"			Soil Classification (USCS / NYC Building Code)						
	0						▽ Sand (SP or SM / Class 3a or 3b)	0 to 3": Unreinforced concrete floor of the basement						
			1.5	S-1	13	10		Greyish Brown coarse to fine SAND, little coarse to fine Gravel, trace Silt (SW / Class 3b) Water table at about 3 ft depth.						
					9									
					6									
		5		3.5	S-2	7		8	Greyish Brown coarse to fine SAND, some coarse to fine Gravel, trace Silt (SW / Class 3b)					
				3.5		12								
						9								
			10		5.5	S-3		16	5	Brown micaceous medium to fine SAND, and fine to coarse GRAVEL, little Silt (SM / Class 3b)				
				5.5	21									
					10									
		7.5		S-4	9	14		Grey-Brown coarse to fine SAND, some medium to fine Gravel, little Silt (SM / Class 3a)						
		7.5			42									
					25									
	15		9.5	S-5	18	2		Grey fine SAND, little medium to fine Gravel, little Silt (SP / Class 3a)						
			9.5		22									
					100/3"									
			11.5					Occasional cobbles						
	20		15	S-6	23	12			Top 10: Grey-Brown coarse to fine SAND, some medium to fine Gravel, little Silt (SM / Class 3a) Bot 2": Orange-Brown micaceous fine SAND, little Silt					
					18									
					13									
			17		45			Occasional cobbles						
	25			C-1	C-1 (20'-0" to 25'-0")	NR			Mica SCHIST (Class 1c/ Class 1b)	SPT performed at 20 ft depth; met with refusal				
													Rock coring C-1 from 20'-0" to 25'-0"	
													Rock type = Grey, hard, slightly weathered, very closely to moderately fractured, Mica SCHIST	
												The upper 2 ft of the core is very closely fractured (NYCBC classification: Class 1c - upper 2ft; Class 1b lower 3ft)		
												Recovery = 58"/60" = 97%		
										RQD = 24"/60" = 40%				

All depths are below the top of the basement floor

Sample Type: S: 1 3/8" I.D. Split Spoon, 140# hammer, 30" drop, 2 wraps
U: Undisturbed thin wall tube sampler ___ push ___ fixed piston
C: Core size, I.D. ___ Type ___ Casing ___.

Groundwater depth at completion: _____
Groundwater depth after ___ hrs: _____
Boring no.: B-2

Sheet no.: 2 of 2

Boring no.: 2

Date: 2/18 ~ 2/22/11

Boring Elev.: -9'-5.75"

Datum: _____

Project: Former East 125th Street Firehouse
Location: 120 East 125th St, NY, NY
Contractor: D.K. Drilling

Inspector: P. Kumar[illegible]

All depths are below the top of the basement floor

Sample Type: S: 1 3/8" I.D. Split Spoon, 140# hammer, 30" drop, 2 wraps
U: Undisturbed thin wall tube sampler ___ push ___ fixed piston
C: Core size, I.D. ___ Type ___ Casing ___.

Groundwater depth at completion: _____
Groundwater depth after ____ hrs: _____
Boring no.: B-2

TEST PIT RECORD SHEET

HALCROW
Consulting Engineers

Test Pit No. TP-1
Sheet 1 of 1
Date 2/25~2/28/11
Job No. DI125H
Elevation -9'-5.75"

Client Hudson Meridian Construction Group
Project Former East 125th Street Firehouse
Location 120 E. 125th Street, NY, NY
Contractor D.K. Drilling
Inspector Prem Kumar

GROUNDWATER DATA

At 2 ft. 11 in. at Completion of Test Pit
At ____ ft. ____ in. After ____ Hours
Foreman _____

D E P T H	SAMPLE DEPTHS FROM - TO	SAMPLE TYPE & NO.	STRATA CHANGE DEPTH (ELEV.)	FIELD DESCRIPTION AND REMARKS
				(ALL DEPTHS ARE BELOW TOP OF THE BASEMENT FLOOR)
			concrete	Test Pit TP-1 was excavated inside the basement of the building over an area of 4' x 4' adjoining the brick wall as shown in Boring and Test Pit Locations Plan. The excavation was carried out to a maximum depth of 3'-8" below the top of the basement floor slab. The excavation findings are as follows: 0 to 4": Basement floor slab consisting of unreinforced concrete 4" to 10" (approx): GRAVEL / COBBLES with grey-brown coarse to fine Sand (GP) 10" to 3'-8": Brown medium to fine SAND with occasional gravel and cobbles (SP) Remarks The test pit was excavated to expose the existing foundation supporting the brick wall. A 1 ft thick concrete strip footing that projects 1 ft from the face of the wall was encountered at a depth of 1 ft below the top of the floor. Further, another foundation element, possibly a shear key, with its face that appears to line up with the face of the brick wall was also encountered. The bottom of this lower foundation element appears to be at 3'-8" depth which was the greatest depth excavated within the test pit. In order to reach the bottom edge of the footing, a sump pump had to be used since it was below the water table. The width of the lower foundation element, the possible shear key, could not be ascertained due to steady and rapid seepage into the area and also it was judged to be imprudent to undermine it. Section A-A in the attached sketch depicts the findings above. The test pit was backfilled and compacted with a hand-held square plate tamper upon completion of the investigations on 2/25/2011. The floor slab was restored on 2/28/2011. Picture 1 shows a view of TP-1.
			3 ft-8 in	
			(Bot.)	

TEST PIT RECORD SHEET

HALCROW
Consulting Engineers

Test Pit No. TP-2
Sheet 1 of 1
Date 2/25~2/28/11
Job No. DI125H
Elevation -9'-5.75"

Client Hudson Meridian Construction Group
Project Former East 125th Street Firehouse
Location 120 E. 125th Street, NY, NY
Contractor D.K. Drilling
Inspector Prem Kumar

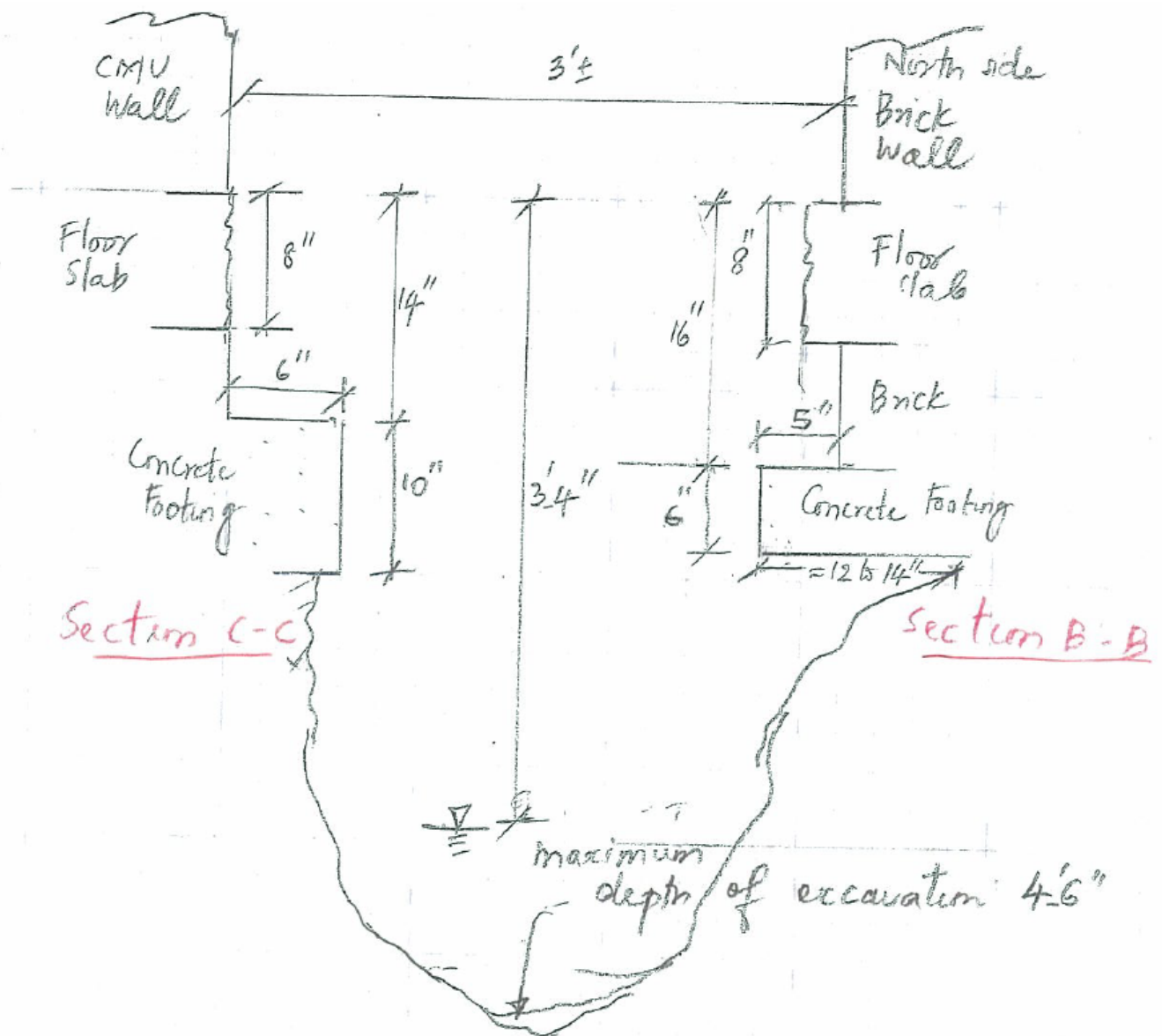
GROUNDWATER DATA

At 3 ft. 4 in. at Completion of Test Pit

At ____ ft. ____ in. After ____ Hours

Foreman _____

D E P T H	SAMPLE DEPTHS FROM - TO	SAMPLE TYPE & NO.	STRATA CHANGE DEPTH (ELEV.)	FIELD DESCRIPTION AND REMARKS
				(ALL DEPTHS ARE BELOW TOP OF THE BASEMENT FLOOR)
			concrete	Test Pit TP-2 was excavated inside the basement of the building over an area of 3' x 3' adjoining the exterior brick and the interior CMU walls as shown in the Boring and Test Pit Locations Plan. The excavation was carried out to a maximum depth of 4'-6" below the top of the basement floor. The excavation findings are as follows:
			4 ft-6 in (bot.)	0 to 8": Basement floor slab consisting of unreinforced concrete 8" to 4'-6": Brown medium to fine SAND, trace Silt (SP) with occasional gravel / cobbles Remarks The test pit was excavated to expose the existing foundation supporting the brick and CMU walls located in the vicinity of the test pit. Two concrete strip footings were revealed during this excavation. The excavation was terminated at a depth of 4'-6". Groundwater was encountered at about 3'-4" depth. The particulars are as follows: (1) <u>Concrete footing supporting the brick wall at the north end of the basement</u> The top of this footing was found at the north face of the test pit at a depth of 16 in below the top of the floor. This footing which is about 6 in thick projects about 5 in from the face of the wall. This footing was locally undermined over a length of 2 ft (approx) run of the wall by as much as 12 to 14 in laterally under the footing. The width of the footing however could not be confirmed. No other supporting foundation element below the described footing was discovered. Section B-B in the attached sketch depicts the findings above. (2) <u>Concrete footing spanning the 3 ft gap between the CMU wall and the brick wall</u> The top of a 10 in thick concrete strip footing that projects 6 in from the face of the wall was encountered at a depth of 14 in below the top of basement floor. This footing was not undermined and its width is not known. Section C-C in the attached sketch depicts the findings above. The test pit was backfilled and compacted with a hand-held square plate tamper upon completion of the investigations on 2/25/2011. The floor slab was restored on 2/28/2011. Picture 2 shows a view of TP-2





Concrete strip footing 12 in thick with its base at a depth of 2 ft below the top of the basement floor. The footing projects 12 in from the face of the brick wall above.

Concrete foundation element, possibly a shear key, located below the above described footing with its face roughly in line with the basement brick wall. The bottom of this is about 3 ft-8 in below the top of basement floor.

Photo 1
TP-1



Concrete footing 6 in thick with its base at a depth of 1 ft-10 in below the top of the basement floor. The footing projects 5 in from the face of the brick wall.

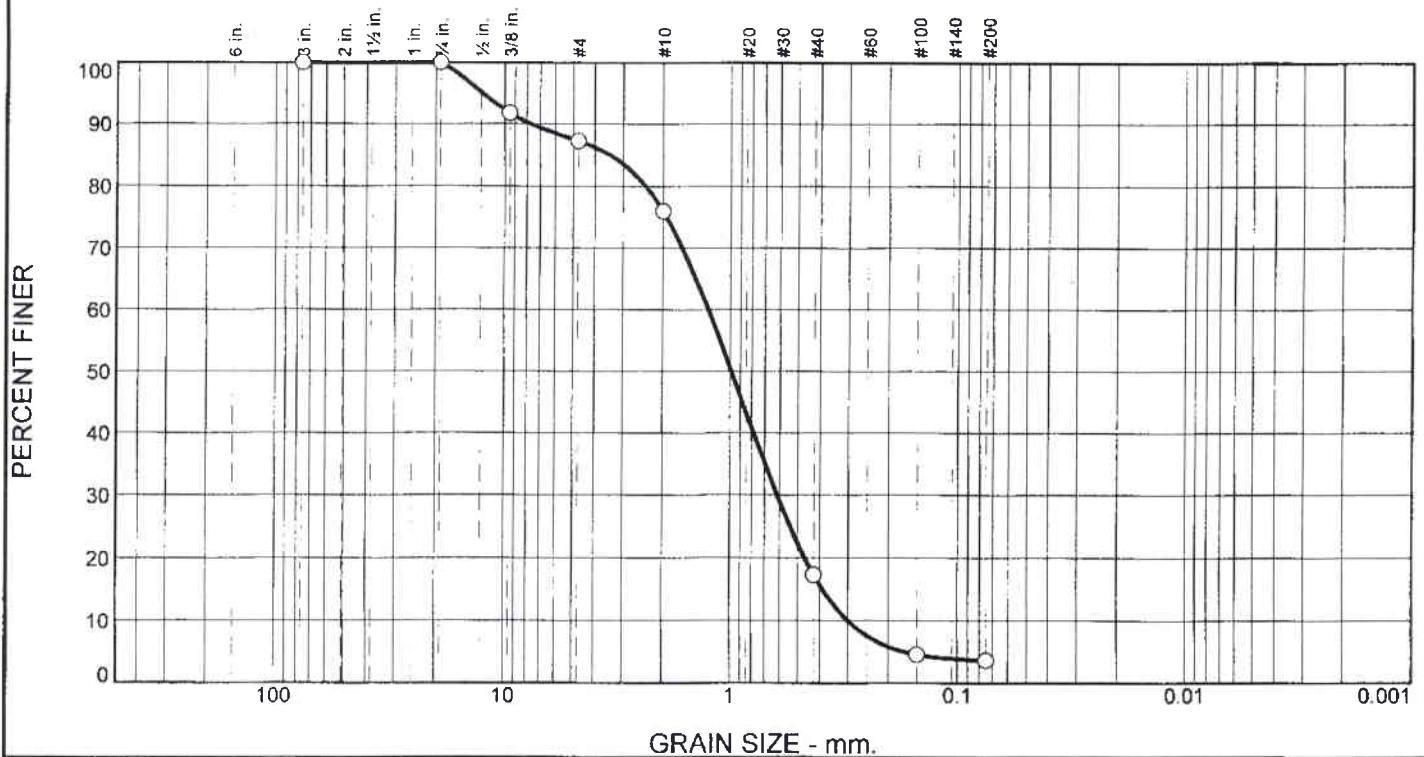
Concrete footing 10 in thick with its base at a depth of 2 ft below the top of the basement floor. The footing projects 6 in from the face of CMU wall.

Photo 2
TP-2

APPENDIX B

LABORATORY TESTING RESULTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.7	11.3	58.7	13.7	3.6	

Test Results (ASTM D422 & ASTM D422)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
3/4	100.0		
3/8	91.7		
#4	87.3		
#10	76.0		
#40	17.3		
#100	4.5		
#200	3.6		

* (no specification provided)

Material Description

REDDISH COARSE TO FINE SAND WITH FEW GRAVEL. (POORLY GRADED SAND). DELIVERED BY IMPACT TESTING ON 4/06/11.

Atterberg Limits (ASTM D 4318)

PL= 0 LL= 0 PI= 0

Classification

USCS (D 2487)= SP AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 7.7716 D₈₅= 3.4367 D₆₀= 1.2544
D₅₀= 0.9887 D₃₀= 0.6156 D₁₅= 0.3883
D₁₀= 0.3013 C_u= 4.16 C_c= 1.00

Remarks

REPORT #B5359.ASTM D2216, D422 & D2487.
MOISTURE%=16.1

Date Received: 4/06/11

Date Tested: 4/06/11

Tested By: M.MATHEW

Checked By: R.KASPARIAN,P.E.

Title: SUPERVISING,P.E.

Location: NYC

Sample Number: B-1 S2

Depth: 2.5' - 4.5'

Date Sampled: 2/11/11

MUNICIPAL TESTING LABORATORY, INC.

Client: DK DRILLING OF NY

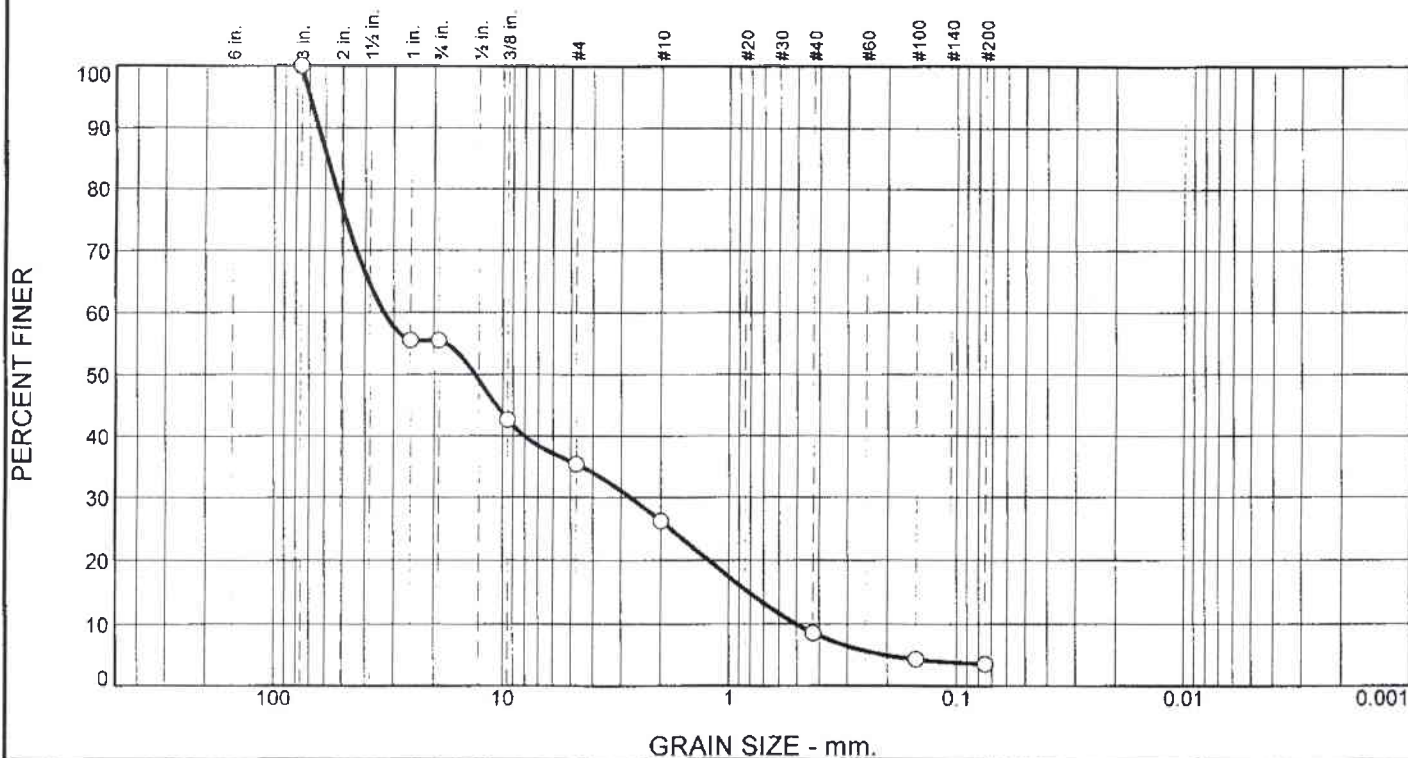
Project: FORMER FIRE HOUSE,120 EAST 125TH ST,NYC

Hauppauge, NY

Project No: 120 EAST 125TH ST.

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	44.5	20.1	9.2	17.7	5.0	3.5	

Test Results (ASTM D422. & ASTM D422.)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
1	55.5		
3/4	55.5		
3/8	42.7		
#4	35.4		
#10	26.2		
#40	8.5		
#100	4.2		
#200	3.5		

* (no specification provided)

Material Description

REDDISH COARSE TO FINE GRAVEL WITH SAND.
DELIVERED BY IMPACT TESTING ON 4/06/11.

Atterberg Limits (ASTM D 4318)

PL= 0 LL= 0 PI= 0

Classification

USCS (D 2487)= GP AASHTO (M 145)= A-1-a

Coefficients

D₉₀= 64.0729 D₈₅= 58.6015 D₆₀= 33.0840
D₅₀= 13.2176 D₃₀= 2.7338 D₁₅= 0.8195
D₁₀= 0.5076 C_u= 65.17 C_c= 0.45

Remarks

REPORT#B5360. ASTM D2216,D422 & D2487. MOISTURE CONTENT%=8.5

Date Received: 4/06/11 Date Tested: 4/06/11

Tested By: M.MATHEW

Checked By: R.KASPARIAN,P.E.

Title: SUPERVISING,P.E.

Location: NYC

Sample Number: B-1 S3

Depth: 4.5' - 6.5'

Date Sampled: 2/11/11

MUNICIPAL TESTING LABORATORY, INC.

Client: DK DRILLING OF NY

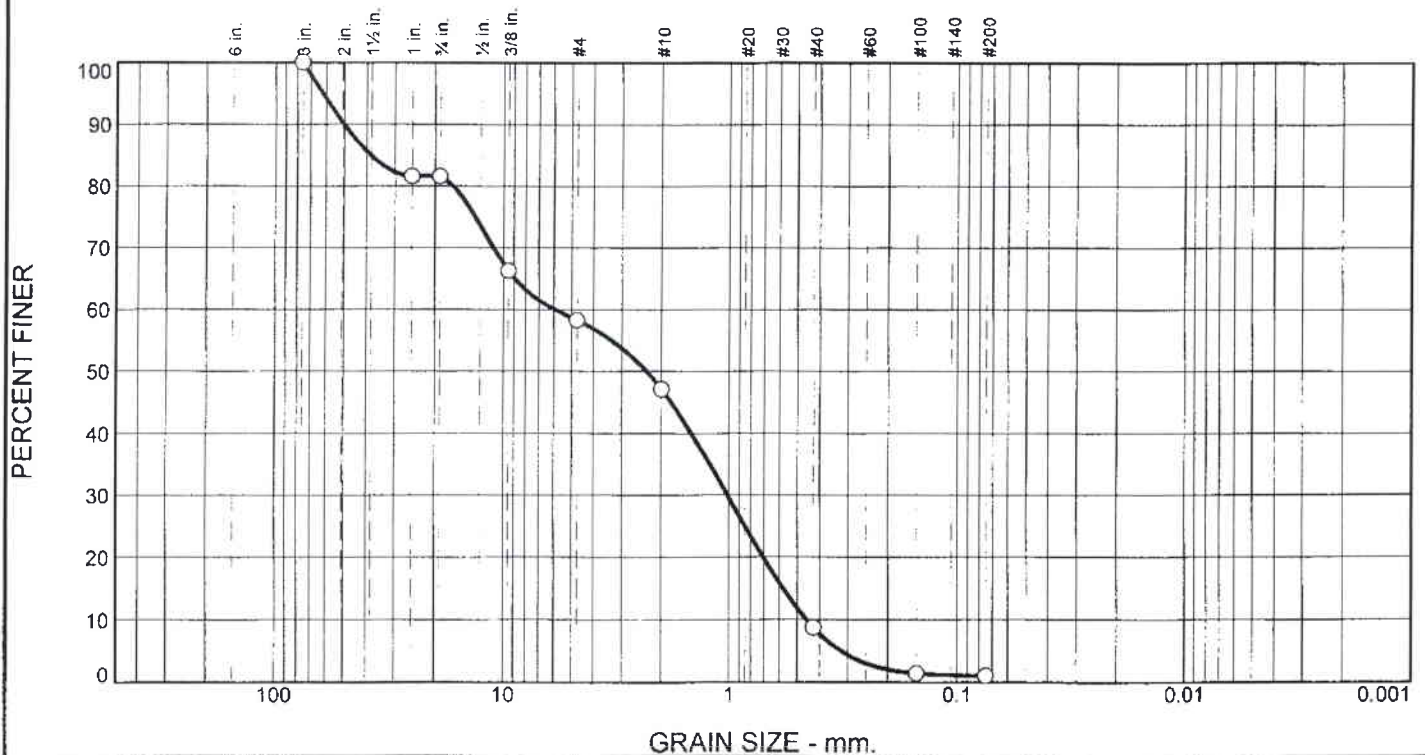
Project: FORMER FIRE HOUSE,120 EAST 125TH ST,NYC

Hauppauge, NY

Project No: 120 EAST 125TH ST.

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.4	23.3	11.2	38.4	7.6	1.1	

Test Results (ASTM D422 & ASTM D422)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
1	81.6		
3/4	81.6		
3/8	66.3		
#4	58.3		
#10	47.1		
#40	8.7		
#100	1.4		
#200	1.1		

* (no specification provided)

Material Description

REDDISH COARSE TO FINE SAND WITH GRAVEL. DELIVERED BY IMPACT TESTING ON 4/06/11.

Atterberg Limits (ASTM D 4318)

PL= 0 LL= 0 PI= 0

Classification

USCS (D 2487)= SP AASHTO (M 145)= A-1-a

Coefficients

D_{90} = 50.1647 D_{85} = 38.3785 D_{60} = 5.9489
 D_{50} = 2.3312 D_{30} = 1.0167 D_{15} = 0.5777
 D_{10} = 0.4561 C_u = 13.04 C_c = 0.38

Remarks

REPORT#B3561. ASTM D2216, D422 & D2487. MOISTURE CONTENT %=12.40

Date Received: 4/06/11

Date Tested: 4/06/11

Tested By: M.MATHEW

Checked By: R.KASPARIAN,P.E.

Title: SUPERVISING ,P.E.

Location: NYC

Sample Number: B-1 S4

Depth: 6.5' - 8.5'

Date Sampled: 2/11/11

MUNICIPAL TESTING LABORATORY, INC.

Client: DK DRILLING OF NY

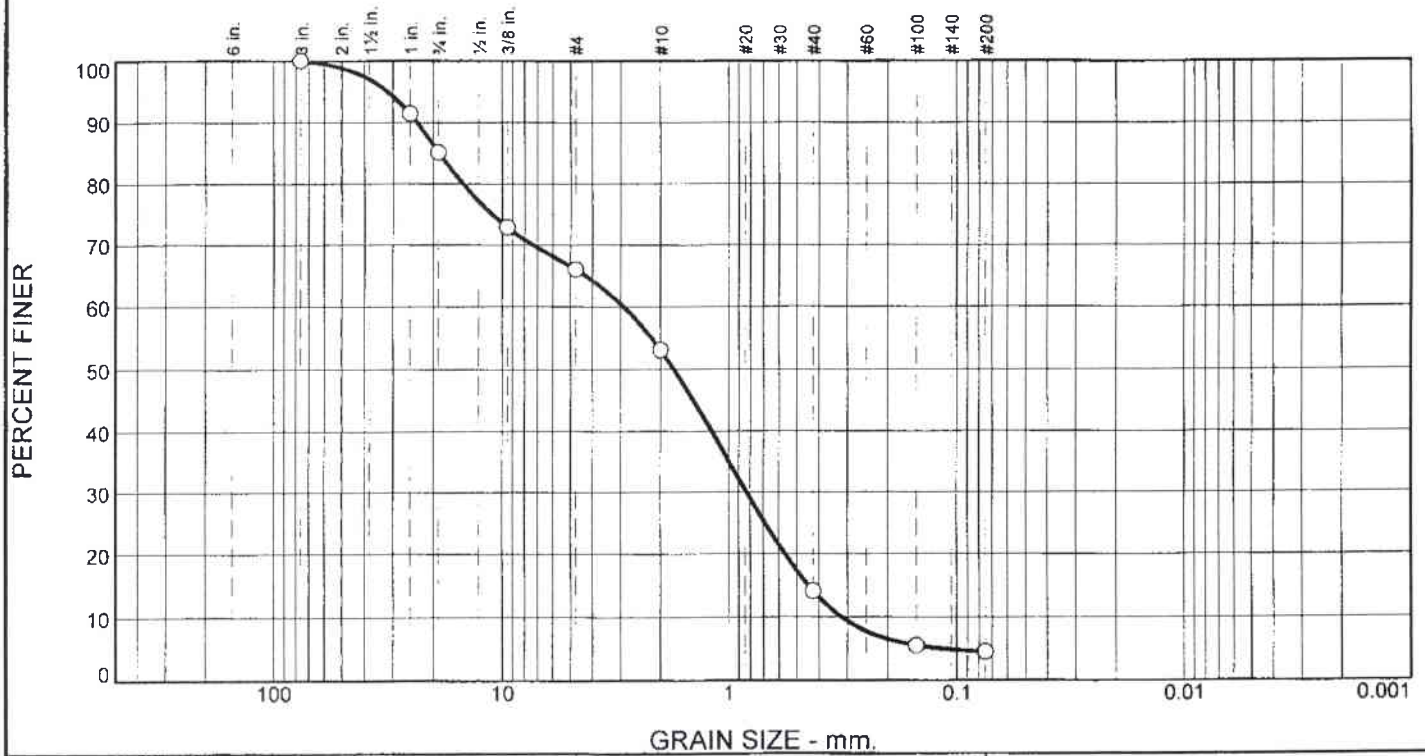
Project: FORMER FIRE HOUSE, 120 EAST 125TH ST, NYC

Hauppauge, NY

Project No: 120 EAST 125TH ST.

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.8	19.2	12.9	39.0	9.6	4.5	

Test Results (ASTM D422 & ASTM D422)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
1	91.5		
3/4	85.2		
3/8	72.9		
#4	66.0		
#10	53.1		
#40	14.1		
#100	5.5		
#200	4.5		

* (no specification provided)

Material Description

LIGHT BROWN COARSE TO FINE SAND WITH GRAVEL & TRACE OF STONE CHIPS. DELIVERED BY IMPACT TESTING ON 4/06/11

Atterberg Limits (ASTM D 4318)

PL= 0 LL= 0 PI= 0

Classification

USCS (D 2487)= SP AASHTO (M 145)= A-1-b

Coefficients

D_{90} = 23.6384 D_{85} = 18.8770 D_{60} = 2.9117
 D_{50} = 1.7423 D_{30} = 0.8315 D_{15} = 0.4455
 D_{10} = 0.3180 C_u = 9.16 C_c = 0.75

Remarks

REPORT#B5362. ASTM D2216, D422 & D2487. MOISTURE CONTENT%=12.30

Date Received: 4/06/11 Date Tested: 4/07/11

Tested By: M.MATHEW

Checked By: R.KASPARIAN, P.E.

Title: SUPERVISING, P.E.

Location: NYC

Sample Number: B-2 S2 Depth: 3.5'- 5.5'

Date Sampled: 2/11/11

MUNICIPAL TESTING LABORATORY, INC.

Hauppauge, NY

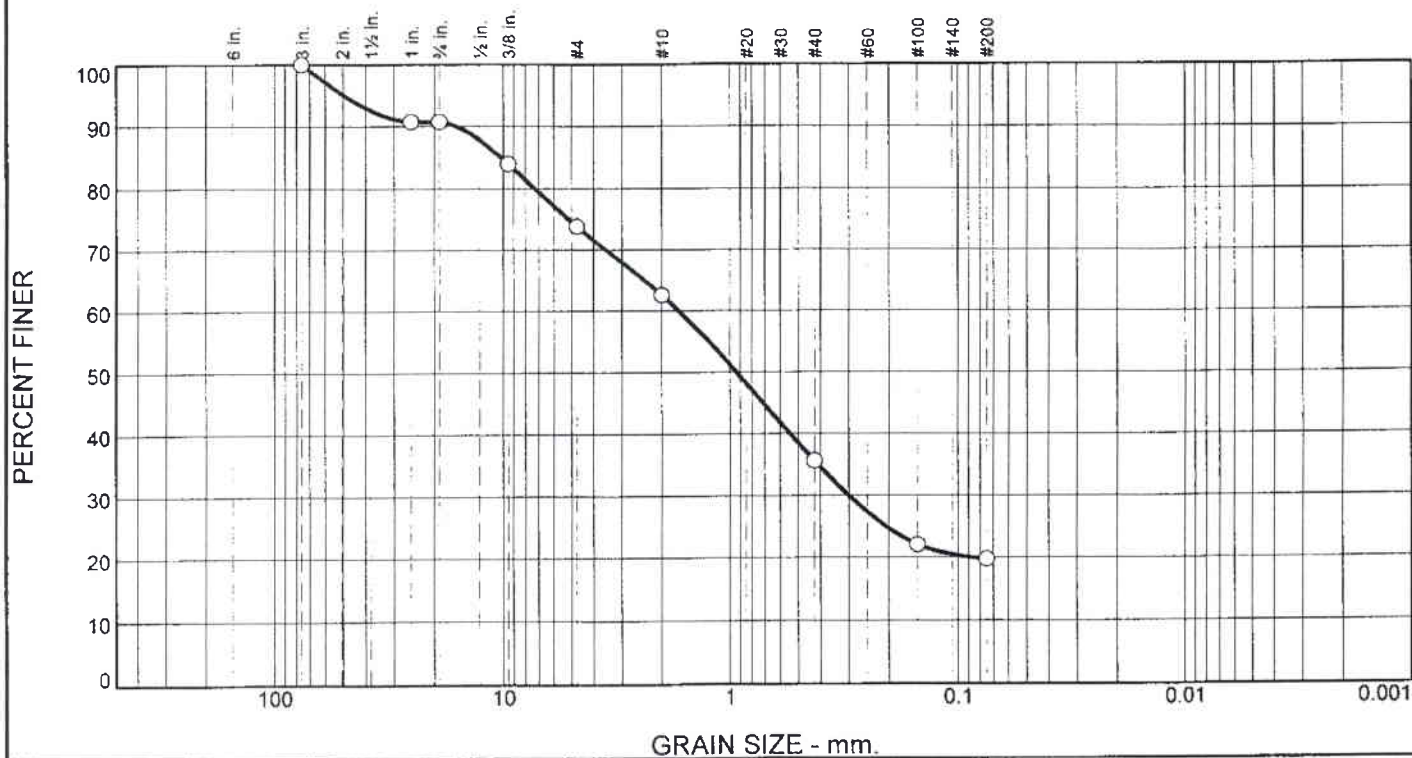
Client: DK DRILLING OF NY

Project: FORMER FIRE HOUSE, 120 EAST 125TH ST, NYC

Project No: 120 EAST 125TH ST.

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.3	16.9	11.2	26.9	15.9	19.8	

Test Results (ASTM D422 & ASTM D422)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
1	90.7		
3/4	90.7		
3/8	84.0		
#4	73.8		
#10	62.6		
#40	35.7		
#100	22.1		
#200	19.8		

* (no specification provided)

Material Description

LIGHT BROWN SILTY SAND WITH FEW GRAVEL & STONE CHIPS. DELIVERED BY IMPACT TESTING ON 4/06/11

Atterberg Limits (ASTM D 4318)

PL= 0 LL= 0 PI= 0

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 16.1522 D₈₅= 10.2443 D₆₀= 1.6790
D₅₀= 0.9371 D₃₀= 0.3000 D₁₅=
D₁₀= C_u= C_c=

Remarks

REPORT#B5363. ASTM D2216, D422 & D2487. MOISTURE CONTENT%=12.3

Date Received: 4/06/11 Date Tested: 4/07/11

Tested By: M.MATHEW

Checked By: R.KASPARIAN,P.E.

Title: SUPERVISING,P.E.

Location: NYC

Sample Number: B-2 S3 Depth: 5.5' - 7.5'

Date Sampled: 2/11/11

MUNICIPAL TESTING LABORATORY, INC.

Client: DK DRILLING OF NY

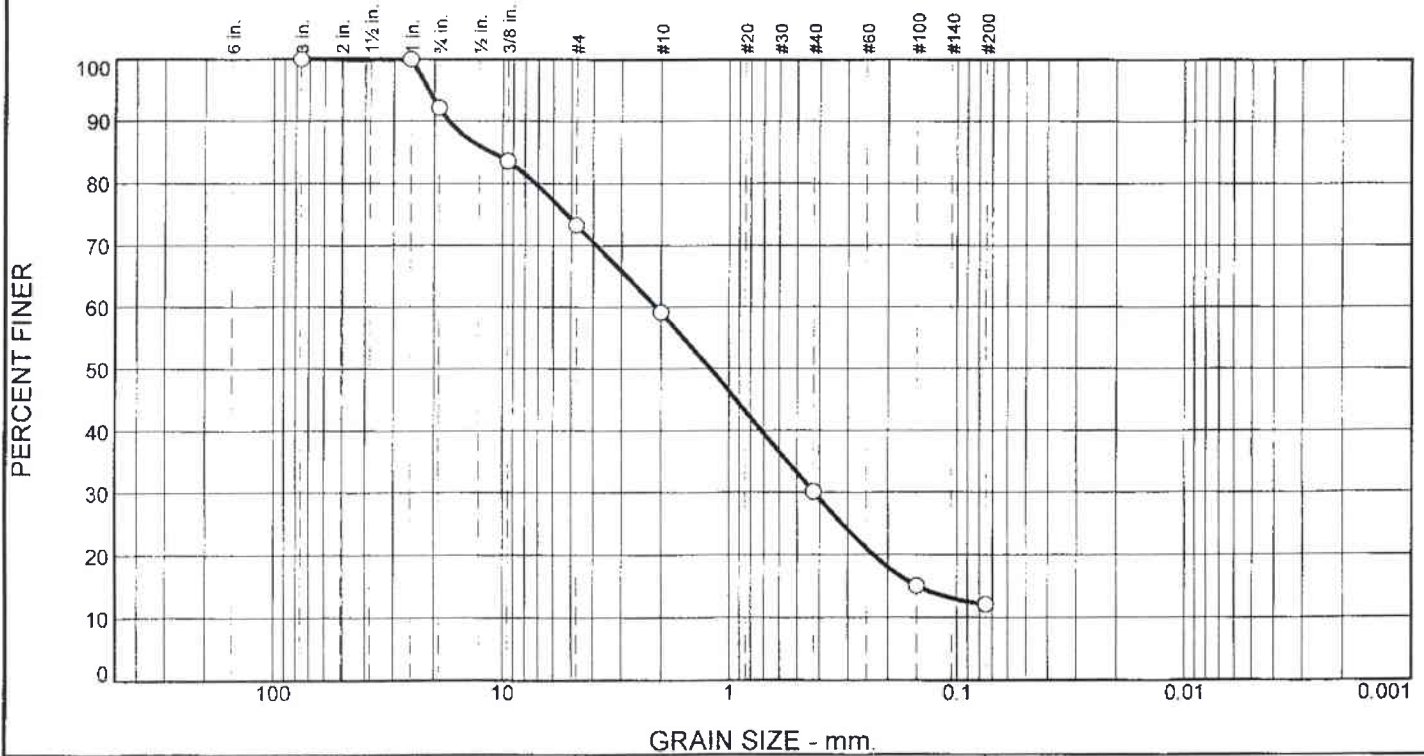
Project: FORMER FIRE HOUSE,120 EAST 125TH ST,NYC

Hauppauge, NY

Project No: 120 EAST 125TH ST.

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.9	18.7	14.3	29.0	18.0	12.1	

Test Results (ASTM D422 & ASTM D422)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
1	100.0		
3/4	92.1		
3/8	83.5		
#4	73.4		
#10	59.1		
#40	30.1		
#100	15.1		
#200	12.1		

(no specification provided)

Material Description

LIGHT BROWN SITY SAND WITH GRAVEL & SOME STONE CHIPS. DELIVERED BY IMPACT TESTING ON 4/06/11.

Atterberg Limits (ASTM D 4318)

PL= 0 LL= 0 PI= 0

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 17.3110 D₈₅= 11.2853 D₆₀= 2.1066
D₅₀= 1.2117 D₃₀= 0.4223 D₁₅= 0.1485
D₁₀= C_u= C_c=

Remarks

REPORT#B5364. ASTM D2216, D422 & D2487. MOISTURE CONTENT%=10.1

Date Received: 4/06/11

Date Tested: 4/07/11

Tested By: M.MATHEW

Checked By: R.KASPARIAN, P.E.

Title: SUPERVISING, P.E.

Location: NYC

Sample Number: B-2 S4 Depth: 7.5' - 9.5'

Date Sampled: 2/11/11

MUNICIPAL TESTING LABORATORY, INC.

Client: DK DRILLING OF NY

Project: FORMER FIRE HOUSE, 120 EAST 125TH ST, NYC

Hauppauge, NY

Project No: 120 EAST 125TH ST.

Figure

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE

IMPACT CONCRETE & CONTROL INSPECTION INC

15-46 129TH STREET, COLLEGE POINT, NY 11356

TEL: 718 939 7774

FAX: 718 9396444

ROCK CORE REPORT (ASTM-2938)

DATE CORED: 2/11/2011
DATE BROKEN: 5/2/2011

Project Location: 120 E125th street

CONCRETE CONTRACTOR: N/A

GENERAL LOCATION:

CORED BY DK DRILLING

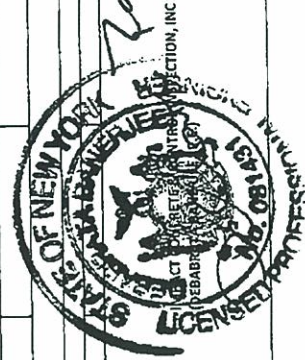
PAGE 1 OF 2

Boring Cores
B1C1: Boring 1 Core 1 sample taken at 22'-2" below top of basement slab
B1C2: Boring 1 Core 2 sample taken at 25' below top of basement slab
B2C1: Boring 2 Core 1 sample taken at 20'-5" below top of basement slab
B2C2: Boring 2 Core 2 sample taken at 25'-5" below top of basement slab

CORE #	B1C1 #1	B1C1 #2	B1C1 #3	B1C2 #1	B1C2 #2	B1C2 #3	H/D CF
END SAWED	4.25	4.01	4.09	4.07	3.96	4	1.85 0.94
(D) DIAMETER (IN)	1.98	1.98	1.98	1.98	1.98	1.98	1.1 0.95
AREA- (SQ INCH)	9.73	9.73	9.73	9.73	9.73	9.73	2.743 0.906
H/D RATIO	2.15	2.03	2.07	2.06	2.00	2.02	1.18 0.98
CORRECTION FACTOR (CF)	1.000	1.000	1.000	1.000	1.000	1.000	2.155 0.97
TOTAL LOAD (lb)	19040	33310	19200	18100	18094	20940	1.16 0.97
STRENGTH (psi)	6185	10818	6237	5877	5874	6800	1.165 0.98
CORRECTED STRENGTH	6185	10818	6237	5877	5874	6800	1.07 0.98
Result (psi)	6185	10818	6237	5877	5874	6800	2.775 0.98

As per ACI Manual core report represents 85 percent of actual strength of concrete in the field.

MEAN	6965	Field Technician	ACI License #
STANDARD DEVIATION	1917.6	Ricky	1142196
Lab Technician	ACI License #	Paul	1142199
David	1165287	Claudio	1142190
Dave	949266	Juan	146949
		Wissar	1142192
		David	1165287
		Gunjan	1179251



UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE

IMPACT CONCRETE & CONTROL INSPECTION INC

15-46 129TH STREET, COLLEGE POINT, NY 11356

TEL: 718 939 7774

FAX: 718 9396444

ROCK CORE REPORT (ASTM-2938)

DATE CORED : 2/11/2011
DATE BROKEN : 5/2/2011

Project Location: 120 E125th street

CONCRETE CONTRACTOR: N/A

GENERAL LOCATION: Boring Cores

PAGE 2 OF 2

CORED BY DK DRILLING

CORE #	B2C1 #1	B2C1 #2	B2C1 #3	B2C2 #1	B2C2 #2	H/D CF
END SAWED	4.01	4.07	3.93	3.57	2.9	1.35 10.242
(Ø) DIAMETER (IN)	1.98	1.98	1.98	1.98	1.98	1.74 0.83
AREA (SQ INCH)	9.73	9.73	9.73	9.73	9.73	2.35 0.63
H/D RATIO	2.03	2.06	1.98	1.80	1.46	1.55 0.66
CORRECTION FACTOR (CF)	1.000	1.000	1.000	1.000	0.955	1.35 0.65
TOTAL LOAD (lb)	36690	25300	23020	28480	33000	1.16 10.92
STRENGTH (psi)	11915	8216	7476	9248	10244	91.63 0.916
CORRECTED STRENGTH	11915	8216	7476	9248	9783	1.15 0.876
Result (PSI)	11915	8216	7476	9248	9783	1.75 0.58
As per ACI Manual core report represents 85 percent of actual strength of concrete in the field.						
MEAN	9328					
STANDARD DEVIATION	1700.9					
Lab Technician	ACI License #		Field Technician	ACI License #		
David	1165287		Ricky	1142196		
Dave	949266		Paul	1142199		
			Claudio	1142190		
			Juan	146949		
			Wascar	1142192		
			David	1165287		
			Gunjan	1179251		

