Baruch Houses, Manhattan (Superblock 323 Lot 1)
Phase 1A Archaeological Report

Oracle No. 8320
Builder No. 201
Contract No. GR1508592

Prepared for the New York City Housing Authority (NYCHA)
Through Nelligan White Architects
By Joan H. Geismar, Ph.D., LLC
January 2018
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ABSTRACT

This report presents a Phase 1A archaeological assessment related to the introduction of new utilities and other construction at the New York City Housing Authority’s (NYCHA) Baruch Houses on Manhattan’s Lower East Side. The planned site work comprises new utilities and construction associated with recovery from Superstorm Sandy that struck in November 2012. Joan H. Geismar, Ph.D., LLC prepared the report for NYCHA through Nelligan White Architects.

The approximately 27-acre site is defined by Houston Street to the north, the FDR Drive to the east, Delancey Street to the south and Columbia Street to the west and comprises twelve entire and three partial former city blocks consolidated in about 1952 as Superblock 323 Lot 1. The research goal was to determine if the proposed undertaking will impact archaeological resources listed or eligible for listing in the National Register of Historic Places. Research determined that the potential archaeological issues are backyard features associated with site development that includes land reclaimed from the East River, the creation of streets and slips in the late 18th- to mid-19th-century by water lot grantees on the eastern part of the APE, and mid-19th-century domestic and commercial development within the area of potential effect (APE).

Research identified six (6) areas to be tested and five (5) areas to be monitored, the former for 19th-century backyard sanitary features, the latter for landfill features (mainly wharves erected as street foundations) associated with land reclamation. In addition, the recommendation was made to establish protocols regarding work stoppage in case of an unanticipated find and time to assess and document the find as necessary. It was also recommended that the archaeological protocol established for site work at NYCHA’s Gowanus Houses in Brooklyn be adapted to this undertaking.
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INTRODUCTION

This report presents a Phase 1A archaeological assessment related to the introduction of new utilities and other construction at the New York City Housing Authority’s (NYCHA) Baruch Houses on Manhattan’s Lower East Side (Figures 1 and 2). The site comprises twelve entire and three partial former city blocks consolidated in about 1952 as Superblock 323 Lot 1. The planned site work is associated with recovery from Superstorm Sandy that struck in November 2012. Joan H. Geismar, Ph.D., LLC prepared the report for NYCHA through Nelligan White Architects, the project architect. The goal was to determine if the proposed undertaking could adversely impact archaeological resources listed in or eligible for listing in the National Register of Historic Places in the area of potential effects (APE). Here the APE comprises the site of eighteen multi-story brick apartment buildings, most of them erected between 1952 and 1962 (Buildings 1 to 17) and Building 18 constructed in 1975 (Figure 3).

The project APE, which comprises both fast and reclaimed land in almost equal parts, is bounded north by East Houston Street, east by the FDR Drive, south by Delancey Street, and west by Columbia Street (see Figure 3). According to the project’s civil engineers, Langan Engineers, and architects, Nelligan White, the proposed undertaking entails introducing landscaping and new gas and electric lines c. 2 to 4 feet [0.6 to 1.2 m] deep) as well as a floodwall that will encompass the western portion of the site (foundation depth c. 5 feet [1.5 m]).

At this writing, nine new structures erected on piles and slab, as are all the Baruch site structures, require excavations up to 4 feet (1.2 m) deep. Among them are six that address mechanical/electrical (M.E.A.) needs while another is a Pressure Reduction Valve Station (PRV). The PRV will replace and partially be founded on an underground coal storage/boiler room attached to Building 7. In addition, 12-foot (3.7 m) deep excavations are planned in former Rivington and Stanton Streets to replace manholes and conduct sewer work (some sewer-related work also will occur elsewhere on site) (Tuffs 2017:personal communication; Gonzalez 2018: personal communication; Langan 2017; see Figure 4).

The archaeological assessment entailed researching pre-development conditions in the APE and its subsequent development history. The possibility of encountering evidence of prehistoric or early historic-era Native American and historic-era European resources was considered. However, given the site’s original terrain and development history, evidence of extensive late-18th- to mid-19th-century land reclamation efforts and 19th-century domestic and commercial development became the focus of concern.

Information was obtained by researching the map and digital collections of the New York Public Library Map Division, the New York Historical Society Library, the Topographical Bureau of the Manhattan Borough President’s Office, Manhattan’s Municipal Archives, the Internet, and the author’s private collection. In addition, consultation with Kelly Tuffs at Langan Engineers was essential as was Langan’s 2015 Geotechnical report.

The research methods and findings are presented in the following sections.

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1 Oracle Number 8320; E-builder # 201; Contract Number: GR1508592
BARUCH HOUSES 1A Project Location and APE (USGS Brooklyn Quad, detail)
project APE
SITE DESCRIPTION

Creation of the Superblock that now comprises the project site was initiated in 1950 when the city began to acquire fifteen previously developed city blocks\(^2\) to erect public housing. When consolidation was finalized in 1952 (Damages Map 1951/52; Figure 5), development in the APE mostly comprised tenement buildings dating from just before or just after the turn of the 20th century (compare Bromley and Bromely\(^{1897}\) and Hyde 1912; Figures 6 and 7) and city-owned facilities just east of the APE, near the river, mainly for storage and sanitation purposes. Located on the original fifteen blocks of the Baruch site but not included in the APE are the Dewitt Church, according to a plaque initially erected in 1880 and reconstructed 1957 (Photo 1); Public School 97, built in 1915 and now Bard High School Early College Manhattan (Photo 2); and the Lavanburg Homes constructed as model living accommodations for low income families in 1920 and currently a homeless shelter (Photo 3).\(^3\) The Rivington Bathhouse, erected by the city in 1901 and long vacant, still stands (Photo 4) but it, too, is not included in the APE.

When the city officially acquired the Baruch Houses site in 1952, neighboring housing projects were under development. Among them were NYCHA’s Lillian Wald Houses to the north and union-sponsored housing to the west and south. Following the city’s land acquisition, standing structures were episodically demolished to make way for the Baruch Houses designed by Emery Roth & Sons that, according to Wikipedia, now offers “2,194 apartments that house an estimated 5,397 people.” Building 18, the 1973 addition to the complex, is a 23-story senior living facility (Wikipedia 2017). These buildings are mainly if not entirely founded on slab and piles.

The Baruch Houses, NYCHA’s largest project, is separated from the East River by the FDR Drive, a roadway initiated in the 1930s by Robert Moses and then called the East River Drive. The second and longest of the Drive’s sections, constructed in segments from 92nd Street to the Battery, runs beyond the APE and separates it from East River Park, another Robert Moses undertaking, that borders the river.

ARCHAEOLOGICAL POTENTIAL OF THE APE

Research to determine prehistoric and other archaeological site potential typically entails documenting known sites within a mile radius (1.6 km) of the project area (see Appendix A). However, this tends to accomplish little when assessing the archaeological potential of most Manhattan project sites.\(^4\) Comparison of pre- and post-development conditions has proved a more reliable indicator.

The transformation of the island of Manhattan from its original bucolic state, that is, its original configuration and terrain (e.g., Sanderson 2013), to the mainly uniform terrain found today began not long after the first European settlers arrived in 1626 and has continued at an increasingly accelerated pace over time. That said, Reginald Bolton’s research into Native American life on the island, most notably *Indian Paths in the Great Metropolis* (1921) and *Indian Life of Long Ago in the City of New York* (1934), offers useful information about what can no longer be found. He bemoans the lack of interest in documenting evidence of local Native

\(^2\) Former Blocks 323 [x2], 324 [x2], 325 [x2], 328 [x2], 329 [x2], 330 [x2], 333 [1], 334 [1], 335 [1]
\(^3\) Now the Urban Family Center run by the Henry Street Settlement (Survana 2014).
\(^4\) See Appendix A for sites listed in the New York State CRIS system.
(Note revised Rivington St entrance to accommodate construction of building 18 in 1973).
Photo 1. The DeWitt Reform Church, not included in the APE, is located on the north side of the Riverton Street entrance to the Baruch Houses. The view is west toward Columbia Street in the background and with another housing project beyond it (11-29-17). A plaque on the church façade indicates it was erected in 1880 and reconstructed in 1987.

Photo 2. Former Public School 97, erected on the south side of Houston Street in 1915, is also not included in the APE. It is now Bard High School Early College Manhattan (BHSEC Manhattan). The view is southwest from Houston Street. The building’s northern façade is under renovation. (11-29-17)

Photo 3. Former Lavanburg Homes, a model, E-shaped, multifamily dwelling for low-income families, was erected in 1920 on the south side of Houston Street. It is currently a homeless shelter under the auspices of the Henry Street Settlement and not part of the APE. The view is southeast from Houston Street with BHSEC Manhattan to the far left behind it. (11-29-17)

Photo 4. The long-vacant Riverton Street Bathhouse (arrow), within but not included in the APE, was erected by the city in 1901. The view is northeast from the east side of Baruch Drive. Building 2 is in the left background and Building 3 is to the right behind the bathhouse. (11-29-17)
American life while it existed, and noted in 1922 that, “the long, sheltered shore-line with its
desirable fishing facilities, from Corlears hook (sic) [south of the APE] to 105th Street [well to the
north], is devoid of definite native associations” (Bolton 1922:67). This, of course, includes the APE.

Using historical records and information from his early 20th century explorations and
those of his colleagues, mainly in Upper Manhattan, Bolton documented Manhattan’s known
Indian sites. None, however, are in or in close proximity to the APE (e.g., Bolton 1934; Figure
8). Pre-development site conditions, which included wetlands as discussed in an 1865 Sanitary
report (see below) and land reclaimed from the East River as documented in maps and evidenced
by water lot grants, clearly suggest the site was not amenable to Native American or early
historic-era use. Given the location and history of the APE this is not surprising.

In its natural state, the western portion of the APE was fast land with an East River shoreline
that theoretically could offer food procurement and transportation opportunities to both
prehistoric and early historical populations. However the APE was low ground that rendered it
inhospitable to settlement by either population. This is suggested not only by fill introduced to
reclaim land from the East River but also by fill documented throughout the APE both before
construction of the Baruch Houses. Therefore it is more than likely that Native American resources
that might be found in the western part of the APE would be ephemeral at best, perhaps an isolated
hunting implement more than likely buried under deep fill. However, 19th-century development
occurred throughout this filled and reclaimed land (see below).

SITE CONDITIONS PRIOR TO BARUCH/SOIL BORING DATA

Available data indicate that more than the eastern half of the APE originally comprised
land under water with fast and reclaimed land separated today approximately by Baruch Drive
(e.g., Viele 1865; Figure 9). Based on historical maps, construction of the Baruch Houses in the
1950s entailed demolition, mainly of tenements, mostly built between 1897 and 1912 (see Figures
6 and 7). However, initial site development comprised smaller structures from the 1850s (Perris
1852/1853; Figure 10) that persisted at least into the late 1860s (Dripps 1867; Figure 11).

A soil boring program conducted in anticipation of the current undertaking, which
comprised 43 borings, documents between 4 feet (1.2 m)--somewhat of an anomaly--and 14 feet
(4.2 m) of fill in the APE (Table 1; boring logs from the 43 borings are found in Appendix B this
report). Given development in the APE, it is not surprising that the logs indicate the site fill
includes demolition debris (brick, glass, etc.) from buildings then standing on the site.

The cultural material described in the upper strata of the soil borings is typical of fill before
the 1960s when demolition debris was no longer permitted to remain on site. However, the age and
type of cultural material in the fill can often distinguish between a fill associated with reclaimed
land and fill associated with demolition. In addition, dating artifactual material in landfill often
makes it possible to reconstruct an undocumented fill sequence (e.g., Geismar 1980).

As for earlier soil borings, those drilled in the 1940s in anticipation of construction of the
Baruch Houses were sampled at 5-foot (1.5-m) intervals, a sequence that often blurs potential
details and available boring logs are virtually illegible. That said, those that are decipherable,
suggest deep fill throughout the site. Boring logs from 43 soil borings associated with the current
project (Langan 2015) offer information to assess current subsurface conditions, and here too, fill
is a component of both fast and reclaimed land throughout the APE (see Table 1).
BARUCH HOUSES 1A Manhattan Indian Sites (Bolton 1934:132)

- X project area, approx.
- O Indian site 3 ("Rechtank," a village site)

[Diagram of land and sites with annotations]

Joan H. Geismar, Ph.D., LLC
Baruch Houses Archaeological Phase 1A
January 2018
Table 1. BARUCH HOUSES Soil Boring Information (Langan 2015; see Appendix B and Figure B1)

<table>
<thead>
<tr>
<th>Boring No.</th>
<th>Location</th>
<th>Fill Depth (ft.)</th>
<th>Soil Immediately Below Fill</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB-1</td>
<td>N side of Delancey, btwn Columbia and former Cannon</td>
<td>8.5</td>
<td>Br m-c sand, tr gravel, wet</td>
<td></td>
</tr>
<tr>
<td>LB-2</td>
<td>N side of Delancey, on former Cannon</td>
<td>9.25</td>
<td>Br fine sand, silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-3</td>
<td>, E of former Cannon</td>
<td>5.0</td>
<td>Or-Br m-f sand, silt, f gravel, wet</td>
<td>Fill ID to 5 ft; fill material to 7 ft ?</td>
</tr>
<tr>
<td>LB-4*</td>
<td>, W of former Lewis</td>
<td>7.5</td>
<td>Or-Br m-f sand, some silt, wet</td>
<td>Wood @ base of fill @ 7.5 ft</td>
</tr>
<tr>
<td>LB-5*</td>
<td>N side of Delancey, at former Lewis</td>
<td>7.5</td>
<td>Lt Br silty sand, wet</td>
<td>Wood bottom of fill @ 7.25 ft</td>
</tr>
<tr>
<td>LB-6*</td>
<td>N of Delancey, just E of former Lewis</td>
<td>11.0</td>
<td>Or-Br silty sand:wet @ 16 ft</td>
<td>wood @ 11 ft, bottom of fill</td>
</tr>
<tr>
<td>LB-7</td>
<td>, E of former Lewis</td>
<td>9.0</td>
<td>Br silty sand, wet</td>
<td></td>
</tr>
<tr>
<td>LB-8</td>
<td>, W of former Goerck</td>
<td>10.0</td>
<td>Gr m-f sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-9</td>
<td>, in/E of former Goerck</td>
<td>14.0</td>
<td>Br silty sand, wet</td>
<td>Deepest fill</td>
</tr>
<tr>
<td>LB-10</td>
<td>, in/E of former Goerck</td>
<td>11.0</td>
<td>Dk Br m-f sand, some silt, tr clay, tr f gravel, wet</td>
<td></td>
</tr>
<tr>
<td>LB-11</td>
<td>, in former Goerck</td>
<td>7.0</td>
<td>Gravel, some sand, wet</td>
<td></td>
</tr>
<tr>
<td>[LB-12]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>[No Boring]</td>
</tr>
<tr>
<td>LB-13</td>
<td>S of former Rivington, E of former Lewis</td>
<td>8.0</td>
<td>Or-Br c-f sand, tr f gravel, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-14*</td>
<td>On or just E of former Lewis, S of former Rivington</td>
<td>8.0</td>
<td>No recovery followed by f Gr sand, some silt, wet</td>
<td>Poss deeper fill; wood-covered telephone lines @ 4 ft</td>
</tr>
<tr>
<td>[LB-15, 16]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>[No Boring]</td>
</tr>
<tr>
<td>LB-17</td>
<td>Intersection of former Rivington and Lewis</td>
<td>7.0</td>
<td>Ol-Gr f sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-18</td>
<td>N of former Rivington, W of former Lewis</td>
<td>8.0</td>
<td>Gr-Br m-f sand, some silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-19</td>
<td>, in/E of former Rivington</td>
<td>9.0</td>
<td>Gr-Br fine sand, some silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-20</td>
<td>Btwn former Stanton and Rivington, just W of former Lewis</td>
<td>8.0</td>
<td>Lt Br m-f sand, tr silt, tr clay, wet</td>
<td></td>
</tr>
<tr>
<td>LB-21</td>
<td>, , , in/E of former Goerck</td>
<td>10.0</td>
<td>Tan-Br f sand, some silt</td>
<td></td>
</tr>
<tr>
<td>LB-22</td>
<td>S of former Stanton, in or just W of former Lewis</td>
<td>4.0?</td>
<td>Br silty sand, wet</td>
<td>Shallowest fill?</td>
</tr>
<tr>
<td>LB-23</td>
<td>Intersection of former Lewis and Stanton</td>
<td>7.0</td>
<td>Br m-f sand, some silt, wet</td>
<td>Wood in drill tip at 6 ft; unid fill appears to continue to c 7 ft</td>
</tr>
<tr>
<td>LB-24*</td>
<td>N of former Stanton in or just W of former Lewis</td>
<td>7.0?</td>
<td>Gr sandy m-f gravel followed by Gr-Br f sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-25</td>
<td>Just S of Houston on former Lewis</td>
<td>7.0</td>
<td>Or-Br c-f sand, some silt, tr f gravel, wet</td>
<td></td>
</tr>
<tr>
<td>LB-26</td>
<td>S of Houston, W of former Lewis</td>
<td>7.0</td>
<td>Br silty sand, tr clay, wet</td>
<td></td>
</tr>
<tr>
<td>LB-27*</td>
<td>S of Houston btwn former Cannon and Lewis</td>
<td>11.0</td>
<td>Br-Gr silty sand, tr clay, wet</td>
<td>Wood in 3 lowest fill samples</td>
</tr>
<tr>
<td>LB-28</td>
<td>S of Houston in or just E of former Cannon</td>
<td>9.0</td>
<td>Ol-Br m-f sand, tr silt, tr clay, wet</td>
<td></td>
</tr>
<tr>
<td>LB-29</td>
<td>S of Houston just W of former Cannon</td>
<td>9.0</td>
<td>Br silty sand, tr organics (root fibers), wet</td>
<td></td>
</tr>
<tr>
<td>LB-30</td>
<td>S of Houston mid-way between Columbia and former Cannon</td>
<td>10.0</td>
<td>Br sandy silt, tr organics, wet</td>
<td></td>
</tr>
<tr>
<td>LB-31</td>
<td>S of Houston E of Columbia (NW corner of APE)</td>
<td>10.0</td>
<td>Br fine sandy organic, clay, wet</td>
<td></td>
</tr>
<tr>
<td>LB-32</td>
<td>E of Columbia btwn Houston and former Stanton</td>
<td>9.0</td>
<td>No recovery, followed by Br m-f gravel (limited recovery)</td>
<td></td>
</tr>
<tr>
<td>LB-33</td>
<td>S edge of former Rivington btwn former Cannon and Lewis</td>
<td>70-80</td>
<td>Br c-f sand, tr silt, some c-f gravel, wet</td>
<td></td>
</tr>
</tbody>
</table>

(continues)
### Table 1. BARUCH HOUSES Soil Boring Information (Langan 2015; see Appendix B and Figure B1) (continued)

<table>
<thead>
<tr>
<th>Boring No.</th>
<th>Location</th>
<th>Fill Depth (ft.)</th>
<th>Soil Immediately Below Fill</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB-34*</td>
<td>N of Rivington btwn former Lewis and Cannon</td>
<td>11.0</td>
<td>Gr-Br silty sand, tr c-f gravel, wet</td>
<td>Wood in fill @ 6 ft</td>
</tr>
<tr>
<td>LB-35</td>
<td>Btwn and Houston and former Stanton on W edge of former Lewis</td>
<td>10.0</td>
<td>Br m-f sand, tr silt, tr gravel, wet</td>
<td></td>
</tr>
<tr>
<td>LB-36</td>
<td>“ “ “ “ ” “ ”</td>
<td>8.0</td>
<td>Br m-f sand, tr silt, tr gravel, wet</td>
<td></td>
</tr>
<tr>
<td>LB-37</td>
<td>N of Delancey, btwn former Lewis and Goerck</td>
<td>13.5</td>
<td>Br m-f sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-38</td>
<td>S of Rivington, btxn former Lewis and Goerck</td>
<td>8.0</td>
<td>Br f sand, tr silt, tr gravel, wet</td>
<td></td>
</tr>
<tr>
<td>LB-39</td>
<td>N of former Stanton E of former Lewis</td>
<td>13.5+?</td>
<td>Gr-Or Br m-f sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-40</td>
<td>S of Houston, W of former Goerck</td>
<td>10.0</td>
<td>Br m-f sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-41</td>
<td>“ “ “ “ ” “ ”</td>
<td>8.0</td>
<td>Br c-f sand, tr organics, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-42</td>
<td>N of Delancey, E of former Goerck</td>
<td>9.0</td>
<td>Or-Br c-f sand, some silt, tr m-f gravel, wet</td>
<td></td>
</tr>
<tr>
<td>LB-43</td>
<td>N of Delancey, W of FDR, E of former Mangin</td>
<td>10.0</td>
<td>Br c-f gravelly sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-44</td>
<td>Btxn Delancey and former Rivington in or just E of former Mangin</td>
<td>7.0-10.0?</td>
<td>Br m-f sand, tr silt, tr m-f gravel, wet</td>
<td></td>
</tr>
<tr>
<td>[LB-45, 46]</td>
<td>--</td>
<td>--</td>
<td>[No Boring]</td>
<td></td>
</tr>
<tr>
<td>LB-47</td>
<td>W of FDR Drive, E of intersection of former Stanton and Mangin</td>
<td>10.0</td>
<td>Br m-f sand, tr silt, wet</td>
<td></td>
</tr>
<tr>
<td>LB-48*</td>
<td>W of FDR Drive, just N of former Stanton at former Mangin</td>
<td>8.0</td>
<td>Gr-Bl silty sand, tr m-f gravel, tr organics</td>
<td>Tr wood and organics @ 8 ft (bottom of fill)</td>
</tr>
</tbody>
</table>

* 8 of 43 borings, or 19%, produced evidence of wood (in one, LB-14, wood was associated with telephone lines [“modern”])

Bl = black; Br = brown; c-f = course to fine; Dk = dark; f = fine; Gr = gray; ID = identified; Lt = light; m-c = medium-course; m-f = medium-fine; Ol = olive; Or = orange; OW = observation well; poss = possibly; tr = trace; unid = unidentified

A plan of the city created by or for Prince Karl Bernhard, the Duke of Saxe-Weimar-Eisenach, when he traveled through North America between 1825 and 1826, shows most of the streets in the APE then in place. This was also true of slips off Delancey Street east of Goerck Street and between Rivington and Stanton Streets (Bernhard 1828; Figure 12). To this point, several recent borings document wood where wharves to create streets and/or slips were stipulated in Water Lot grants (see below). However, the wood also could be random fragments in the fill material, so their significance is at present unknown. Proposed deep excavations along former Rivington and Stanton Streets (Langan 2017) potentially could provide information to refine this assessment (see Figure 4).

### HISTORIC-ERA CONSIDERATIONS

The project site is situated on the western edge of land that, in colonial times, belonged to James De Lancey (thus the name Delancey Street on the southern edge of the APE; Ratzer 1766; Figure 13). A Loyalist, De Lancey was in England when the Revolutionary War was imminent. Realizing that his family, his standing, and his land holdings were in danger, he sent for his family before his property, which included the APE, was confiscated. Beginning in 1783, confiscated land was redistributed by representatives of the new Republic. However, given site conditions at the time—lowlands bordering a pristine portion of the East River—no early historic-era resources are documented within the APE.

While prehistoric, early Native American, or early-historic site potential within the APE virtually is non-existent, as noted, evidence of mid-19th-century development is an identified issue.
project area, approx.

James Delancy [DeLancey]
This is based on map data mainly from the aforementioned mid-19th-century Perris insurance maps that indicate brick and frame structures throughout the APE (Perris 1852/53; see Figure 10). It is also based on the grants of land under water housed in the Topographical Bureau of the Manhattan Borough President’s Office.

The earliest water lot grant the city issued within the APE was to Alexander Macomb(e) in 1791 (Grant of Land Under Water [hereafter, GLUW] 1791:D 639; Figure 14). Located on the north side of Delancey Street east of Columbia Street, that is, in the southwestern corner of the APE, it was a logical progression northward of land reclamation along the East River. The last water lot grant issued in the APE, to Adam Brown and Noah Bell in 1846, was south of Houston Street between former Mangin and Tompkins Streets (GLUW 1807:E 389; see Figure 14).

Water lot grants identify the 19th century grantees in the APE who were mainly members of the merchant elite of the time. Among them are Frederick DePeyster from an illustrious colonial family (an uncle was an early mayor of New York) and John Jacob Astor, once the wealthiest man in America.

The water lot grants all include stipulations to construct wharves to create streets or slips. Some grants extended a short distance eastward from the river’s low water mark approximately between former Cannon and Lewis Streets while others continued further into the river to what became Tompkins Street, just east of the APE (see Figure 14). As noted earlier, the blocks located approximately between Columbia and Lewis Streets from Delancey to Houston Streets comprised lowlands associated with the East River while the APE to the east is entirely reclaimed land. Based on soil boring data and on mid-19th-century accounts (see below), both fast and reclaimed land in the APE required filling prior to development.

Development included the mid-19th-century domestic structures and the few commercial buildings documented on the maps in the 1850s and 1860s (see Figures 10 and 11) as well as the tenements and additional commercial buildings mainly located closer to the river over time (e.g., Robinson 1884; Figure 15). Between 1897 and 1912, buildings in the APE were mainly those that persisted through 1934 (Bromley 1934:Figure 16; compare with Figures 6 and 7) and, as mentioned previously, were demolished to make way for the Baruch Houses.

1860s CONDITIONS IN THE APE

Conditions in and around the APE are described in the 1865 Citizens’ Sanitary Report, a watershed study recording sanitary and health conditions in the then developed city. The report is divided into twenty inspection districts, some described in more detail than others. The Tenth and Fifteenth Sanitary Districts, the two that include the APE, are very telling.

Dr. John C. Acheson, the inspector for the Tenth Sanitary Inspection District that included the APE from Delancey to Rivington Streets (Sanitary Report 1865:110-115), describes a flat

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5 An 1852 grant was for land under water east of Tompkins, beyond the APE (see Figure 14).
6 Based on the water lot grant and deed information, it appears that DePeyster resold at least part of this grant to Henry Eckford that same day (LD 195:119) and later to others as well. However, the grant’s stipulations may not have been met by any of these owners as there is a notation on the original grant indicating it was reissued in 1851 (GLUW J:162 [actual grant not available]).
7 Because the Baruch buildings were erected on piles and slabs rather than foundations, minimal site disturbance is documented in construction photos reviewed at the NYCHA archive at LaGuardia Community College.
terrain in the project area “scarcely sufficient…to carry off the surface drainage,” noting that a ridge of hills in the district southwest of the APE (the highest point was at Grand Street to the south where Revolutionary War-era forts had been erected) had been “cut down” to create a conforming terrain. “This process of ‘filling in’ created…a “good straight water front…with a depth of water capable of accommodating the largest vessels.” So in addition to the benefits of creating new, saleable land, the early-to mid-19th century merchant grantees apparently found the prospect of deeper dockage that could accommodate larger vessels an impetus to obtain water lot grants in the APE much as it was the impetus in the South Street Seaport to the south in the 18th century (e.g., Geismar 1983:675).

Acheson notes there are no records of streams or collections of water in the district, though he presumes the whole district was once covered by the river since, with the exception of those on the hills beyond the APE, wells “furnished” brackish, salty water. The streets, which included Delancey to Rivington Streets in the APE, were paved with cobblestones but were generally in a “filthy and unwholesome condition…especially in front of the tenant-houses.” This despite the fact that about half the district was “provided with capacious brick sewers” (Sanitary Report 1865:111).

It seems this was the situation at least in Columbia and Cannon Streets in the APE where city sewer records indicate 4.5-foot (1.4 m) egg-shaped brick sewers in place as early as 1861 (Sewer Records; Croton Aqueduct 1857). Unfortunately, this information is lacking in city sewer records for other streets in the APE, but Viele documents sewers on his map to accompany the Sanitary Report (see Figure 8). However, Acheson notes that a very small proportion of the dwelling houses were connected to the sewers. Undoubtedly this is at least in part because the majority of the houses were tenanted rather than owner occupied (see RESIDENTS below). But while sewers may not have improved conditions in the houses, Acheson remarks that they did improve street drainage.

Acheson describes a mainly working class neighborhood with the majority of the men of “the laboring class” but with some tradesmen and mechanics and “a large number of females who earn their living as operatives in factories in this and in the lower parts of the city.” The population was mainly Irish, “followed by Germans, then Americans.” In this sanitary district, which as noted included the southern part of the APE, private buildings were mostly brick (although some were frame or frame faced with brick) and in the early 1860s were at least twenty years old. While they mainly lacked “…the conveniences and comforts of dwellings of more modern date, such as baths, gas, and sewer-connections, etc. in their appointments for health, such as capacity, size of apartments and dormitories, ventilation, drainage, heating, etc., they present few objectionable features, and indeed are, in some respects, superior to many buildings of more recent date” (Sanitary Report 1865:112).

On the other hand, he goes on to note:

“Their general character as regards location, age, size, drainage, water supply, etc., is bad. They generally occupy too much of the lots on which they are built [and] are not connected with the sewers…Many have an insufficient supply of water, sometimes from 20 to 40 families depending upon a single hydrant in the yard. Many are densely crowded” (Sanitary Report 1865:112).

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8 Not to be confused with Belgian Block.
9 Apparently many of these mid-19th-century sewers, now lined, are still in use in the project area.
He finds the worst area for diseases is between Broome and Rivington Streets and the East River, that is, within the southern part of the APE. He describes it as the “poorest part of the district, having the lowest ground, the filthiest streets, and most dense population.”

Dr. James Ross reported on the Fifteenth Sanitary District (Sanitary Report 1865:171-181), which included the APE from Stanton Street to East Houston Street. He notes that two thirds of the district, once covered by the water of the East River and low salt marshes, was filled by grading down the bordering sand hills (although he neglects to mention land reclamation). He describes former streams in the district, but none in the APE. However, because of the dampness of the ground, some houses apparently were built on stilts.

Ross notes that, like the neighboring Tenth Sanitary District, all the avenues were by then sewered and, with only a few exceptions, so were the streets. The street sewers were (and, as noted, apparently are often still) egg-shaped “with outlets below tide-water…[that force] back the contents of the sewers throughout the lower level of the district, and thereby cause a noxious reflux of sewer gases.” Columbia and Houston Streets in the district were paved with “trap-rock Belgian pavement,” the others with cobblestone. Ross notes,

“This district probably has a greater number of artisans, workers in wood and metals, than any other district in the city, and nearly the whole waterfront as well as several entire blocks are occupied by the extensive manufactories by which they are employed. The shipyards, iron, lead, and copper works here, give employment to many thousand hands to whom a residence near is a great necessity. Hence the excessive crowding in this locality”

Citing his notes, Ross describes blocks in the APE as “Ground filled in, and so level as to render the natural drainage imperfect.” While there were sewers on Lewis, Stanton, and Rivington Streets, houses were not connected to them. He notes that privies in the district were “carelessly attended.” Using the example of Rivington Place, an alleyway located in the APE at the rear of 316 and 318 Rivington Street (Dripps 1867; Figure 11), he says they were “always in a filthy condition” with its small houses overcrowded. He indicates that the 30 families who reside in the alley’s five houses,

“…have no other water supply than… two hydrants… in the exterior courtyard; while for this population of nearly 200 persons of all ages there are but two privy vaults, and, at the time of last inspection of the quarters, these vaults were filled nearly to the surface.”

He goes on to describe the privy in “Cat Alley,” a group of dilapidated tenant houses also in the APE. Located on Cannon Street between Stanton and Houston Streets, “The privy is a small and broken-down structure, covering only a part of the vault, which is now full almost to overflowing.”

So the inspectors of the two districts that include the APE describe insalubrious conditions. While sewers were present, houses apparently were rarely connected to them and backyard hydrants provided household water. The houses then in the APE are indicated on the 1867 Dripps map (see Figure 11). It should be noted that this map also documents two successful

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10 Reflecting the prejudices of the time, Acheson equates these conditions not only with the physical conditions of the district, the economic conditions of its inhabitants, and concomitant population density and overcrowding but also with national character.
commercial enterprises within the APE, the Balthazar Kreischer clay brick manufactory and a Singer Sewing Machine factory. Kreischer maintained a Manhattan presence from the 1840s till his death in 1884 even though, beginning in 1850, his brick and clay products mainly were produced at Kreischerville, his company town on Staten Island (Geismar 2016a). Singer Sewing Machines are manufactured elsewhere to this day.

MID- TO LATE 19th-CENTURY RESIDENTS IN THE APE

Available data analyzed to determine the make-up of the mid-century residents of the APE include city directories, a very helpful resource in this regard as well as in determining the length of a residency or a resident’s occupation. In Manhattan, however, the 1851 Street Directory (Doggett 1851) is a singular and invaluable resource since it provides the name and occupation of what appears to be the head of each listed household or principal in a business by address and block. Other invaluable data are tax assessment records.

Based on both the Perris insurance maps and the Doggett directory, it appears that the APE was developed with frame and brick structures by the early 1850s. Based on tax assessments, as mentioned earlier, it also seems that all but a few were tenanted rather than owned.

The 1851 street directory identifies a minimum number of approximately between 1,446 and 1,466 possible households and/or businesses then in the APE while the tax records indicate that very few of those listed in the directory were property owners. This was found in two blocks researched for this analysis. On the APE’s most southwesterly block, that is a block on fast land bounded by Delancey, Columbia, Rivington, and Cannon Streets, two of 41 occupants (0.05%) were owners. Further east, on a landfill block nearer the river bounded by Delancey, Goerck, Rivington, and Mangin Streets, where only 21 residents are documented, the percentage of owners (1 of 21 or 0.05%) was the same as the more densely occupied block to the west. Not surprisingly, the directory also indicates that those living or working nearest the river were more likely to be involved in trades or occupations associated with the seaport (Doggett 1851; see Table 2).

POTENTIAL ARCHAEOLOGICAL FEATURES

As stated earlier, of concern in regard to the archaeological potential of the APE are the former backyards of houses documented on the 1852/53 Perris maps (see Figure 10). However, these mid-19th-century structures mainly were replaced throughout the APE by brick tenements by 1912. That said, while the 1850s structures were erected prior to the introduction of sewers, based on the Sanitary Inspectors’ reports discussed above, even when sewers were available, tenanted houses likely were not connected to them. Therefore, houses documented in the APE through 1867 undoubtedly utilized the outhouse in one form or another as a toilet facility and also may have depended on cisterns to provide household water.

With Lower East Side tenements as an example, later tenements utilized water-cleansed versions of the privy known as a “school sink” rather than the ubiquitous dry-laid stone privy pit as a sanitary facility. This was the case at 97 Orchard Street. Here the owner/builder of a tenement provided this multiple compartmented, brick-vault connected to a newly available sewer in 1863, the year the tenement was erected. It is noteworthy that this was decades before sewer connections were mandated by law (e.g., Geismar 2010).
Table 2. BARUCH HOUSES Occupations of Residents on Two Former APE Blocks (Delancey, Columbia, Rivington, Cannon [Block 393] and Delancey, Goerck, Rivington, Mangin [Block 323])

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Category</th>
<th>No.</th>
<th>Occupation</th>
<th>Category</th>
<th>No.</th>
</tr>
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<tbody>
<tr>
<td>Baker</td>
<td>T</td>
<td>3</td>
<td>Boilermaker</td>
<td>T</td>
<td>1</td>
</tr>
<tr>
<td>Barber</td>
<td>A</td>
<td>1</td>
<td>Bookmaker</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>Blacksmith/Smith</td>
<td>A</td>
<td>6</td>
<td>Bootmaker</td>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>Blindmaker</td>
<td>A</td>
<td>1</td>
<td>Bording</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td>Bookbinder</td>
<td>A</td>
<td>1</td>
<td>Bricks</td>
<td>T</td>
<td>1</td>
</tr>
<tr>
<td>Bootmaker</td>
<td>A</td>
<td>1</td>
<td>Butcher</td>
<td>T</td>
<td>1</td>
</tr>
<tr>
<td>Bording (sic)</td>
<td>--</td>
<td>1</td>
<td>Carman</td>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>Butcher</td>
<td>T</td>
<td>4</td>
<td>Carpenter</td>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>Cabinetmaker</td>
<td>A</td>
<td>1</td>
<td>Coal</td>
<td>T</td>
<td>1</td>
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<tr>
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<td>T</td>
<td>4</td>
<td>Engineer</td>
<td>S?</td>
<td>1</td>
</tr>
<tr>
<td>Carpenter</td>
<td>A</td>
<td>11</td>
<td>Grocer</td>
<td>T</td>
<td>7</td>
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<td>Carver</td>
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<td>1</td>
<td>Laundress</td>
<td>--</td>
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</tr>
<tr>
<td>Clerk</td>
<td>--</td>
<td>1</td>
<td>Machinist</td>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>Coal</td>
<td>T</td>
<td>1</td>
<td>Moulder</td>
<td>A</td>
<td>2</td>
</tr>
<tr>
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<td>1</td>
<td>Printer</td>
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<tr>
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<td>Sailmaker</td>
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<td>Ships Carpenter/Joiner</td>
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<td>Stage Driver</td>
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<td>Whitesmith/Tinware</td>
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<td>T</td>
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<td>A</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threads &amp; Needles</td>
<td>T</td>
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<td></td>
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<tr>
<td>Tinsmith</td>
<td>A</td>
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<td></td>
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</tr>
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<td>1</td>
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<td></td>
<td></td>
</tr>
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<td>--</td>
<td>67</td>
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<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>160</td>
<td></td>
<td></td>
<td>49</td>
</tr>
</tbody>
</table>

93 of 160 (58%) Identified Occupations 42 of 49 (86%) Identified Occupations

A = artisan; S = seaport related; T = trade
Whether a dry-laid stone privy pit or a brick-vaulted school-sink, once abandoned and filled, these backyard features become archaeological resources with the potential to reveal unprecedented aspects of every day life in the APE. They also can provide markers for the introduction and/or adoption of municipal utilities. These backyard features are among the archaeological concerns in the project APE.

While privy pits or vaults of several types are a potential archeological issue in former backyards in the APE, as mentioned, so possibly are water cisterns. Unlike the privy, which was located as far from the building as the yard configuration would allow, cisterns usually associated with earlier, smaller buildings were located close to the building to collect rainwater from roof drains. Therefore, cisterns were more than likely obliterated by construction of the larger tenement buildings documented in the APE (e.g., Hyde 1912; see Figure 7). For this reason, backyard features that might be encountered include the stone-lined privy pits associated with the earliest buildings in the APE as well as multiple privy facilities similar to the water cleansed “school sink” documented in the yard of the Lower East Side Tenement Museum. There was also evidence in the yard of a hydrant, perhaps similar to those mentioned in the 1865 Citizens’ Sanitary Report. And given ground conditions in much of the APE, sumps to manage backyard water accumulation also may be encountered. These might be similar to the stone feature uncovered at NYCHA’s Gowanus Houses in Brooklyn erected in former wetlands (Geismar 2016b), or those documented at the 175 Water Street site in the South Street Seaport area, where land reclamation was a factor (Geismar 1982).

Stipulations to construct wharves and piers as foundations for streets and slips documented in the water lot grants suggest that landfill structures, perhaps in the form of log wharves or log and stone landfill retaining features, exist within the APE, most particularly in the vicinity of former streets and slips. And then there is always the possibility of an unanticipated find.

FINDINGS AND RECOMMENDATIONS

Development of the APE entailed grading and filling lowlands as well as extensive land reclamation. To eliminate the lowlands, nearby hills were graded; to reclaim land from the East River, wharves were constructed to create streets that defined new blocks and rendered the land developable. As an interim step in this development, wharf construction also created slips for dockage, an economically advantageous undertaking. Therefore, potential archaeological issues in the APE not only include evidence of mid-19th-century domestic and commercial development—more specifically, the sanitary features located in backyards that followed land preparation and creation—but also the landfill-retaining structures required to reclaim land from the East River that comprise more than half of the APE.

As noted in the introduction, proposed site work includes relatively shallow landscaping, new gas and electric lines c. 2 to 4 feet (0.6 to 1.2 m) deep, and an encompassing floodwall around the western part of the site with a foundation c. 5 feet (1.5 m) deep. It also includes deep excavations associated with sewer work and, at this writing, nine structures erected on piles and slabs are also planned (see Figure 4). This information was coordinated with map data that document early and subsequent development in relation to the current project configuration (see Figure 17 for the former and Figure 18 for the latter that also shows the location of late 18th- and

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11 By law, the dry-laid stone or brick privy pit was to be 2-feet from the rear property line (e.g., NYC By-Laws 1845:356). Also, any constructed south of 14th Street were to be 10 feet deep (NYC By-Laws 1845:355).
early- to mid-19th-century water lot grants; also see Photo 5 for a view of the site area just east of the APE in 1931). This information suggests six (6) locations with possible archaeological potential. All are where new utility lines will require 2- to 4-foot (0.6 to 1.2 m) deep excavations. The six locations indicated on the 2017 utility plan (Figure 19) are recommended for testing.

In addition, monitoring is recommended at five locations where deep excavations are planned to replace manholes and conduct sewer work on former Rivington and Stanton Streets (see Figure 19). This is where wharves and piers apparently served as landfill structures and where sewer-related excavation could reach depths of 12 feet (3.7 m) BGS, that is, deeper than the wood recorded in recent soil boring logs (see Table 1 and Appendix B Figure B1 re locations of wood inclusions in soil borings). However, it is recommended that the monitoring program be revisited once manhole and sewer excavations are underway to adjust the monitoring effort as warranted. In addition, protocols should be in place to address the issue of potential finds during testing/monitoring and unexpected finds during any site work. This includes protocols regarding work stoppage in an unanticipated area of sensitivity and time to assess and document the find as necessary. It is also recommended that the archaeological protocol established for site work at NYCHA’s Gowanus Houses in Brooklyn be adapted to this undertaking.

Photo 5. Looking south along East Street (just beyond the APE) from Houston Street in 1931. The Williamsburg Bridge is in the far background and beyond the tenement to the right are New York City storage buildings. (Municipal Archives bpm_0405-b1.jpg)
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Bromley G. W. and Walter S. Bromley

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Damages Map
  1951/  Map Showing a Change in the Street System by Eliminating the Lines of
  1952  Rivington St., Stanton St., and Cannon St. and by Widening Delancey St., Columbia St., Baruch Pl., and Franklin D. Roosevelt Drive in the Area Bounded by Delancey St., Columbia St., and East Houston St. and Franklin D. Roosevelt Drive and by Laying Out a New Street between Baruch Pl. and Mangin St. Dated March 8, 1951. Certified and Adopted April 21, 1952.

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1867 Plan of New York City from the Battery to Spuyten Duyvil Creek. Showing every lot and building thereon; old farm lines, street numbers at the corner of blocks, railroads, steamboat landings, bulkhead and pier lines, etc. based on the surveys made by Messrs. Randall & Blackwell, and on the special survey by J. F. Harrison. Published by Mathew Dripps, N.Y.

Farm Tract Map
1917 R.D. 257, Plate No. 7. Municipal Archives, 31 Chambers Street, Manhattan.

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Gonzalez, Sonny

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Misc. Water Lot Grant Libers D, E, F, G. Topographical Bureau, Manhattan Borough President’s Office. Municipal Building, New York, NY.

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2017 Restoration Associated with Sandy Recovery Plan. General Site Utility Plan (C400.00); Partial Site Utility Plans (C401.00, 402.00, 403.00, 404.00). August 25, 2017). Sheets 50-54 of 536. For NYCHA, Capital Projects Division, Office of Recovery and Resilience, NYCHA, Sandy Program Unit, Manhattan.


Liber of Deeds
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Longworth, David

NYC By-Laws

NYCHA

Perris, William


Ratzer, Bernard
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Robinson, E.  

Sanderson, Eric W.  

Survana, Kuritha  

Tax Assessments  
Misc. Municipal Archives. 31 Chambers Street, New York, NY.

Tuffs, Kelly, P.E.  

USGS  

Viele, Egbert L.  

Wikipedia  
APPENDIX A. Archaeological Sites Listed in the NY State Cultural Resources Information System (CRIS) within 1-Mile (1.6 km) of APE
## BARUCH APPENDIX A. Archaeological Sites Listed in the NY State Cultural Resources Information System (CRIS) within 1-Mile (1.6 km) of APE

<table>
<thead>
<tr>
<th>SHPO Site No./Site Name</th>
<th>Distance from APE/Borough</th>
<th>Site Type/Time Period</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>A06101.017933/34 Lower East Side Girls Club</td>
<td>0.27 &amp; 0.30 miles (0.44 &amp; 0.48 km)/Manhattan</td>
<td>Historical/19th C.</td>
<td>Scatter/small 19th C. artifact assemblage; mortared brick foundation, oyster shell concentration, one intact/one partial dry-laid stone privy</td>
<td>Historical Perspectives (2008, 2009)</td>
</tr>
<tr>
<td>A06101.018336/PSA4 Pre-Civil War Cistern [?] NYSM 11653 – undetermined</td>
<td>0.43 miles (0.69 km)/Manhattan</td>
<td>Historical/18th-20th C.</td>
<td>Late 18th-20th C glass &amp; ceramics, animal bone, organic material, clothing-related artifacts, coins, game pieces</td>
<td>Joel Grossman Assoc. (1994)</td>
</tr>
<tr>
<td>A06101.015708/Lower East Side Tenement Museum</td>
<td>0.53 miles (0.85 km)/Manhattan</td>
<td>Historical/19th C.</td>
<td>Former church site (1828) then a tenement (c.1863); the Lower East Side Tenement Museum since the late 1980s; “school sink” and site drainage documented</td>
<td>Geismar (1999)</td>
</tr>
<tr>
<td>A06101.018564/St. Philip’s Cemetery</td>
<td>0.66 miles (1.1 km)/Manhattan</td>
<td>Historical/19th-20th C.</td>
<td>Historic fill including human remains</td>
<td>Historical Perspectives (2006)</td>
</tr>
<tr>
<td>A04701.015660/Continental Iron Works</td>
<td>0.90 miles (1.5 km)/Manhattan</td>
<td>Historical/19th C.</td>
<td>The Monitor, an Iron-clad Civil War-era vessel constructed here</td>
<td>Greenpoint Monitor Museum</td>
</tr>
<tr>
<td>A06101.016117/Columbus Park Pavilion Cistern</td>
<td>0.99 miles (1.6 km)/Manhattan</td>
<td>Historic/19th C.</td>
<td>Cistern exposed; not excavated</td>
<td>Chrysalis (2007)</td>
</tr>
</tbody>
</table>

*From OPRHP’s on-line Cultural Research Information System (CRIS)*
APPENDIX B. Soil Boring Plan and Logs (Langan 2015)
BARUCH HOUSES 1A APPENDIX B  Soil Boring Plan (2014 and 2015) with APE and Pre-1950 Street Pattern (Langan 2015 and Bromley 1934)

2015 boring location
• boring abandoned or not yet drilled
• 2014 borings
• wood in borings
[OW] proposed groundwater observation well
• proposed additions

APE

existing building number

proposed flood wall

SLUG

SLUG test location

pre-1951 street pattern
(Bromley 1934)

The base map used here (Langan 2015) has subsequently been revised (Langan 2017)
**Log of Boring**

**Project No.** 170334001

**Location** Baruch Houses, NYCHA

**Drilling Company** Craig Geotechnical Drilling

**Drilling Equipment** CME 75 Truck Mounted Rig

**Drill Through** 4" concrete sidewalk

**Hand clear to 4'**

**Tale S-1**

**Take S-2**

**Clean out hole to 9'**

**Brown wash**

**Rig chatter**

**Take S-3**

**Take S-4**

**Drill to 15'**

**Easy drilling**

**Brown wash**

**Take S-5**

**Completion Depth** 26 ft

**Rock Depth** Not Encountered

**Number of Samples** Disturbed 8, Undisturbed 0, Core 0

**casing Diameter (in)** 3" & 4" I.D. Steel

**Casing Hammer** Automatic

**Weight (lbs)** 140, Drop (in) 30

**Sampling Foreman** Keith Parent

**Inspecting Engineer** Nick Kerr

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>SYMBOL</th>
<th>SCALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCRETE (4&quot;)</td>
<td></td>
<td></td>
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<tr>
<td>Brown f-c SAND, trace f-c gravel boulders (rounded)</td>
<td></td>
<td></td>
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<tr>
<td>Orange brown f-c SAND, some silt, trace f-c gravel (wet)</td>
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<td></td>
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<tr>
<td>Brown m-c SAND, trace silt, trace f-c gravel</td>
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<td></td>
</tr>
<tr>
<td>Orange brown fine SAND, some silt (wet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown f-m SAND, some silt (wet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray silty SAND (wet)</td>
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<td></td>
</tr>
</tbody>
</table>

**Remarks**

(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

**Date Started** 4/22/15

**Date Finished** 4/22/15

**Date Finished** 4/22/15

**Report:** Log - LANGAN
Baruch Houses, NYCHA

Baruch Drive, Manhattan New York

Elevation and Datum

Approx. 12± NAVD88

MATERIAL
SYMBOL

Elevation
(ft)

Sample Description

Depth
Scale

Sample Data

N-Value
(Blows/ft)

Remarks

(Drilling Fluid, Depth of Casing,
Fluid Loss, Drilling Resistance, etc.)

Drill to 20'
Easy drilling
Gray/brown wash

Take S-6
Take S-7A & S-7B
Clean out hole with 3 7/8" roller bit

Take S-8
Install well

Gray brown silty SAND (wet) [SM]

Gray fine sandy SILT [ML]

Gray brown silty SAND (wet) [SM]

Gray fine sandy SILT [ML]

E.O.B. @ 26.0 ft bgs
Log of Boring          LB-2   Sheet  1 of 2

Project No.                170334001

Elevation and Datum
Approx. 11.5 ft NAVD88

Drilling Equipment
CME 75 Truck Mounted Rig

Casing Diameter (in)
3" & 4" I.D. Steel

Casing Depth (ft)
8.5'

Water Level (ft.)
First
24 HR.

Drilling Foreman
Keith Parent

Inspecting Engineer
Nick Kerr

Sample Data

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<tr>
<td>CONCRETE (4&quot;)</td>
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<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown f-c SAND, some f-c gravel</td>
<td>1.5</td>
<td>1</td>
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<td></td>
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<tr>
<td>Gray f-c GRAVEL, trace f-c sand, trace brick, concrete and crushed rock (wet) [FILL]</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Brown f-c SAND, some silt, trace f-m gravel, trace brick, trace fibers (wet) [FILL]</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown fine SAND, some silt (wet) [SM]</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>Brown silty SAND, trace clay (wet) [SM]</td>
<td>5</td>
<td>1</td>
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<td></td>
</tr>
<tr>
<td>Gray brown silty SAND (wet) [SM]</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
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</tbody>
</table>

Remarks
4/22/15
Start at 7:15 AM
Roller bit through 3" asphalt
Roller bit through 4" concrete

Hand clear to 5'
Take S-1

Take S-2
Install casing to 8.5'
Clean out hole with 3 7/8" roller bit
Bricks in wash
Gray wash
Take S-3

Take S-4
Add quickgel

Drill to 15' with 3 7/8" roller bit
Take S-5 (no recovery)
Take S-5 with 3" split spoon

MATERIAL   SYMBOL
ASPHALT (3")   A
CONCRETE (4")   C
Brown f-c SAND, some f-c gravel   S-1
Gray f-c GRAVEL, trace f-c sand, trace brick, concrete and crushed rock (wet) [FILL]   S-2
Brown f-c SAND, some silt, trace f-m gravel, trace brick, trace fibers (wet) [FILL]   S-3
Brown fine SAND, some silt (wet) [SM]   S-4
Brown silty SAND, trace clay (wet) [SM]   S-5
Gray brown silty SAND (wet) [SM]   S-6
<table>
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<th>Elev. (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>Sample Data</th>
<th>Remarks</th>
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</thead>
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<tr>
<td>11.5</td>
<td>Class 6</td>
<td>Gray brown silty SAND, trace medium sand (wet) [SM]</td>
<td>20</td>
<td>S-6 SS 15</td>
<td>Drill to 20' Easy drilling Gray wash Take S-6</td>
</tr>
<tr>
<td>15.5</td>
<td>Class 6</td>
<td>Gray SILT, some fine sand (wet) [ML]</td>
<td>21</td>
<td>S-7 SS 21</td>
<td>Drill to 25' Easy drilling Gray brown wash Take S-7</td>
</tr>
</tbody>
</table>

E.O.B. @ 27.0 ft bgs
### Log of Boring LB-3

**Project:** Baruch Houses, NYCHA  
**Location:** Baruch Drive, Manhattan New York  
**Drilling Company:** Craig Geotechnical Drilling  
**Elev. and Datum:** Approx. 11.5 ft NAVD88

#### Drilling Details
- **Start Date:** 4/21/15  
- **Finish Date:** 4/21/15  
- **Completion Depth:** 31 ft

#### Rock Depth
- Not Encountered

#### Casing Details
- **Casing Diameter:** 3" & 4" I.D. Steel  
- **3 7/8" Tricone Roller Bit**

#### Sample Data

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Depth (ft)</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown f-c SAND, trace silt, trace f-c gravel, bricks,</td>
<td>23.5'</td>
<td></td>
</tr>
<tr>
<td>concrete, asphalt [FILL]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown m-f SAND, some silt, trace f-m gravel, concrete,</td>
<td>13'</td>
<td></td>
</tr>
<tr>
<td>asphalt, brick (wet) [SP]</td>
<td>3'</td>
<td></td>
</tr>
<tr>
<td>Orange brown m-f SAND, some silt, trace fine (wet)</td>
<td>9'</td>
<td></td>
</tr>
<tr>
<td>gravel [SP]</td>
<td>3'</td>
<td></td>
</tr>
<tr>
<td>Brown f-m SAND, trace fine gravel, trace silt (wet)</td>
<td>11'</td>
<td></td>
</tr>
<tr>
<td>[SP]</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Olive brown silty SAND (wet) [SM]</td>
<td>14'</td>
<td></td>
</tr>
<tr>
<td>Tan brown silty SAND (wet) [SM]</td>
<td>16'</td>
<td></td>
</tr>
</tbody>
</table>

#### Remarks
- **Date Started:** 4/21/15  
- **Date Finished:** 4/21/15

- **Remarks:**
  - 4/21/15 Start at 11:00 AM
  - Hand clear to 5'
  - Take S-1
  - Take S-2
  - Install casing to 8.5'
  - Clean out hole with 2 7/8” roller bit
  - Gray/brown wash
  - Chatter
  - Take S-3 (no recovery)
  - Take S-3 with 3” split spoon
  - Take S-4
  - Install casing to 13.5'
  - Drill to 15'
  - Take S-5
Gray brown silty SAND (wet) [SM]

Gray CLAY, some silt (wet) [CL]

Gray CLAY, some silt, trace fine sand (wet) [CL]

Gray silty CLAY (wet) [CL-ML]

E.O.B. @ 31.0 ft bgs
8" CONCRETE

Brown c-f SAND, trace silt, bricks, glass, concrete, some c-f gravel [FILL]

BRICK, wood, trace c-f sand, schist in tip [FILL]

Orange brown m-f SAND, some silt (wet) [SM]

Brown m-f SAND, some silt (wet) [SM]

Gray brown silty SAND (wet) [SM]

Remarks

4/23/2015
11:00 AM Start roller bit through 8" concrete sidewalk

Hand clear to 5'
Take S-1 (refusal)
Schist in tip
Hammer casing down through obstruction 5' to 8'
Clear hole to 8'
Brown wash

Take S-2

Take S-3

Install casing to 13.5'
Drill to 15'
Brown wash
Easy drilling

Take S-4

Drill to 20'
Brown wash
Easy drilling
### Log of Boring

**Project**
Baruch Houses, NYCHA

**Location**
Baruch Drive, Manhattan New York

**Elevation and Datum**
Approx. 10.5 ft NAVD88

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.5</td>
<td>Gray silty CLAY, trace fine sand, trace clay (wet) [CL-ML]</td>
<td>Take S-6</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Drill to 25'</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Gray/brown wash</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>Easy drilling</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>E.O.B. @ 27.0 ft bgs</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>[CLASS] 4c</td>
</tr>
</tbody>
</table>
Log of Boring

Project: Baruch Houses, NYCHA
Project No.: 170334001
Location: Baruch Drive, Manhattan New York
Elevation and Datum: Approx. 10± NAVD88

Drilling Company: Craig Geotechnical Drilling
Date Started: 4/15/15
Date Finished: 4/15/15
Drilling Equipment: CME 75 Truck Mounted Rig
Completion Depth: 31 ft
Rock Depth: Not Encountered

Size and Type of Bit: 3 7/8" Tricone Roller Bit
3" & 4" I.D. Steel

Casing Diameter (in): 3" & 4" I.D. Steel
Casing Depth (ft): 13.5'

Sample Description:

Class 7
- ASPHALT (3")
- CONCRETE (5")

Light brown f-c SAND, some silt, some f-c gravel, trace bricks, concrete, asphalt
[FILL]

Class 6
- Gray brown and black f-c SAND, some f-m gravel, some silt, trace brick, asphalt, glass, wood (moist)
[FILL]

Class 3b
- Light brown silty SAND (wet) [SM]

Class 6
- Brown silty SAND (wet) [SM]

Class 3b
- Mottled brown and black m-f SAND, trace silt (wet) [SP]

Class 6
- Brown m-f SAND, trace silt (wet) [SP]

Sample Data

Elev. (R): +9.6
Building Code: 1
Sample Description: ASPHALT (3")
Sample Data: Depth Scale

Remarks:
4/16/15
Start at 8:00 AM
Roller bit through 3" asphalt and 5" concrete

Hand clear to 5'
Take S-1

Take S-2
Install casing to 8.5'
Push 0'-5.5'
Hammer 5.5'-8.5'
Clean out hole to 9'
Light brown wash
Take S-3

Take S-4
Push casing to 13.5'
Add mud
Drill to 15'
Brown wash
Slight rig chatter
Take S-5
<table>
<thead>
<tr>
<th>Elev. (ft)</th>
<th>MATERIAL SYMBOL</th>
<th>Sample Description</th>
<th>Sample Data</th>
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<tbody>
<tr>
<td>14.0</td>
<td>Class 3b</td>
<td>Tan brown m-f SAND, trace silt (wet) [SP]</td>
<td>Drill to 20' Brown wash Take S-6</td>
</tr>
<tr>
<td>17.0</td>
<td>Class 5b</td>
<td>Gray SILT, trace fine sand, trace clay (wet) [ML]</td>
<td>Drill to 25' Easy drilling Brown gray wash Take S-7</td>
</tr>
<tr>
<td>21.0</td>
<td>Class 3b</td>
<td>Brown m-f SAND (wet) [SP]</td>
<td>Clean out hole to 27' Gray wash Take SH-1 at 9:30 AM Pull at 9:52 AM Sand observed seeping out of tube when pulling out</td>
</tr>
</tbody>
</table>

**E.O.B. @ 31.0 ft bgs**
Project
Baruch Houses, NYCHA  
Project No. 170334001
Location Baruch Drive, Manhattan New York  
Elevation and Datum Approx. 9+ NAVD88
Drilling Company Craig Geotechnical Drilling
Drilling Equipment CME 75 Truck Mount

Class 3b

Class 6

Class 7

Drill through 3" Asphalt, and 4" Concrete
Hand clear to 3.5' Concrete obstruction
Move hole 3.5' to the West
Start LB-6A
Hand clear to 3.5'
3" split spoon to 5' (14 blows)
Take S-1, Take S-2
Bouncing hammer at 8'
Wood in tip

4/23/2015
8:00 AM
Move hole slightly
Drill through asphalt, concrete
Take S-1
Take S-2
Install casing to 8.5'
Clean out hole
Add bentonite
Tough drilling
Gravel in wash
Heavy rig chatter
Casing unscrewed down hole
Reconnect

Drill to 20'
Brown gray wash
Easy drilling
Take S-6

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Casng blws/ ft

Remarks

+9.0

-2.0

-9.5

Log of Boring

LB-6

Sheet 1 of 2

Sample Data

Completion Depth

Rock Depth

30 ft

Not Encountered

Date Started
4/16/15

Date Finished
4/23/15

Completion

-2.0

-9.5

-3/8

55

20/2"
## Log of Boring

**Project**: Baruch Houses, NYCHA  
**Location**: Baruch Drive, Manhattan New York  
**Project No.**: 170334001  
**Elevation and Datum**: Approx. 9± NAVD88

### Material and Sample Data

<table>
<thead>
<tr>
<th>Material</th>
<th>Symbol</th>
<th>Elevation (ft)</th>
<th>Sample Description</th>
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<tbody>
<tr>
<td>Brown m-f SAND, trace silt (wet)</td>
<td>SP</td>
<td>15.0</td>
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</tr>
<tr>
<td>Gray fine SAND, some silt (wet)</td>
<td>SM</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>Gray CLAY, some silt</td>
<td>CL</td>
<td>21.0</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

- **S-6**: Brown m-f SAND, trace silt (wet) [SP]
- **S-7**: Gray fine SAND, some silt (wet) [SM]
- **S-8**: Clean out hole to 24'
  - Gray wash
  - Take S-8
- **S-9**: Clean out hole to 26'
  - Take SH-1
  - Drop 10:05 AM
  - Pull 10:25 AM
  - Take S-9
- **E.O.B.**: End of Drilling at 30.0 ft bgs
CONCRETE (8")
Brown f-c SAND, some silt, some f-c gravel, brick, concrete, building material [FILL]

Brown f-m SAND, some silt, trace fine gravel, trace asphalt, brick [FILL]

Brown f-c SAND, trace silt, trace f-m gravel, trace brick [FILL]

Brown silty SAND (wet) [SM]

Brown silty SAND, trace fine gravel (wet) [SM]

Gray brown silty SAND (wet) [SM]

Remarks
4/15/15
Start at 7:30 AM
Drill through 8" concrete sidewalk

Hand clear 8" to 5'
Take S-1

Take S-2
Take water level with tape 6.1'

Install casing to 8.5'
Push 0' to 4'
Hammer 4' to 8.5'
Add mud (quikgel)
Clean out hole to 9'
Brown wash
Rig chatter
Take S-3
Take S-4 (no recovery)
Take S-4 with 3" split spoon

Install casing to 13.5'

Drill to 15'
Brown wash
Rig chatter
Take S-5
### Sample Description

- **Elevation (Ft):** 15.5
  - **Sample:** Tan brown fine SAND, trace silt (wet) [SP]
  - **Remarks:** Drill to 20’ Easy drilling
  - **Take:** S-6

- **Elevation (Ft):** -19.0
  - **Sample:** Gray CLAY, trace silt, trace fine sand (wet) [ML]
  - **Remarks:** Drill to 25’ Brown wash Easy drilling
  - **Take:** S-7

- **Elevation (Ft):** -25.5
  - **Sample:** Marron gray brown silty SAND, trace clay, trace m-f sand (wet) [SM]
  - **Remarks:** Drill to 28’ Gray wash
  - **Take:** S-8

- **Elevation (Ft):** -34.5
  - **Sample:** Maroon gray brown varved SILT, some fine sand (wet) [ML]
  - **Remarks:** Drill to 34’ Easy drilling
  - **Take:** S-9

### Sample Data

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<thead>
<tr>
<th>Depth (Ft)</th>
<th>S-6</th>
<th>S-7</th>
<th>S-8</th>
<th>S-9</th>
<th>S-10</th>
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<td>Depth (ft)</td>
<td>Sample Description</td>
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<tr>
<td>71</td>
<td>Gray silty SAND, some c-f sand, trace f-c gravel [SM] (wet)</td>
<td></td>
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<tr>
<td>72</td>
<td>E.O.B. @ 72.0 ft bgs</td>
<td></td>
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</tr>
</tbody>
</table>

**Remarks**
- Drill to 70'
- Brown wash
- Rig chatter
- Add mud
- Take S-21
Log of Boring  

Project: Baruch Houses, NYCHA  
Project No.: 170334001  
Location: Baruch Drive, Manhattan New York  
Elevation and Datum: Approx. 8.5± NAVD88  

Drilling Company: Craig Geotechnical Drilling  
Date Started: 4/13/15  
Date Finished: 4/13/15  

Drilling Equipment: CME 55 ATV  
Completion Depth: 27 ft  
Rock Depth: Not Encountered  

Size and Type of Bit: 3 7/8" Tricone Roller Bit  
Casing Diameter (in): 4" O.D. Steel  
Casing Depth (ft): 15'  
Water Level (ft.): First  

Casing Hammer: Automatic  
Weight (lbs): 140  
Drop (in): 30  
Drilling Foreman: Rob Dollar  
Sampler Hammer: 2" Split Spoon  
Weight (lbs): 140  
Drop (in): 30  
Inspecting Engineer: Rene Silvestre  

MATERIAL  SYMBOl  SCALE  NUMBER  TYPE  PENET. RESIST.  RECOV. (IN)  N-VALUE (BLOWS/FT)  DEPTH  DATE  LOCATION  DATE  REMARKS  
BARUCH HOUSES, NYCHA  
BARUCH DRIVE, MANHATTAN NEW YORK  
+8.5  
1  

4/13/15  
Hand cleared to 5'  
Install casing to 5'  
Clean out hole with roller bit to 6'  
Take S-1  
Take S-2  
Install casing to 10'  
Clean out hole with roller bit to 10'  
Brown wash  
Smooth drilling  
Take S-3  
Drive casing to 15'  
Clean out hole with roller bit to 15'  
Brown wash  
Smooth drilling  
Take S-4  

Remarks: (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
<table>
<thead>
<tr>
<th>MATERIAL SYMBOL</th>
<th>Elev.</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>Sample Data</th>
<th>N-Value (Blows/ft)</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Class 3b</td>
<td>-15.0</td>
<td></td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>10-20-30</td>
<td>S-5</td>
<td>4 5 6 10 5 6</td>
<td>Advance with roller bit to 20' Brown wash Smooth drilling</td>
</tr>
<tr>
<td>Class 6</td>
<td>-18.5</td>
<td></td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>10-20-30</td>
<td>S-6</td>
<td>4 3 4 4</td>
<td>Take S-6</td>
</tr>
<tr>
<td></td>
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<td>E.O.B. @ 27.0 ft bgs</td>
<td></td>
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</tbody>
</table>
### Log of Boring
**Sheet 1 of 2**

**Project No.**
170334001

**Location**
Baruch Houses, NYCHA

**Drilling Company**
Craig Geotechnical Drilling

**Date Started**
4/24/15

**Date Finished**
4/24/15

---

#### Details

- **MATERIAL**
  - Brown m-c SAND, some brick and concrete, trace silt, trace f-c gravel (moist) [FILL]

- **SYMBOL**
  - CONCRETE

- **Remarks**
  - Drill through 4" concrete sidewalk
  - Hand auger to 5'
  - Install casing to 5'
  - Clean out with roller bit to 5'
  - Brown wash
  - Smooth drilling

---

#### Log Data

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample</th>
<th>Type</th>
<th>Sample Data</th>
<th>Remarks</th>
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</thead>
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<tr>
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<td>S-1</td>
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<td>Take S-1</td>
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<tr>
<td>10</td>
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<td>Take S-2</td>
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<td>9</td>
<td>S-3</td>
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<td>Take S-3</td>
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<td>S-4</td>
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<td>Take S-4</td>
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<tr>
<td>15</td>
<td>S-5</td>
<td></td>
<td></td>
<td>Take S-5</td>
</tr>
</tbody>
</table>

---

#### Sample Description

- **CONCRETE**
  - Brown m-c SAND, some brick and concrete, trace silt, trace f-c gravel (moist) [FILL]

- **BRICK and CONCRETE**
  - Fragments, trace m-c sand (moist) [FILL]

- **BRICK and GRAVEL**
  - Trace m-c sand (wet) [FILL]

- **Gray CLAYEY SILT**
  - Trace brick (wet) [FILL]

- **Brown silty SAND (wet)**
  - [SM]
### Log of Boring

**Location**: Baruch Houses, NYCHA  
**Baruch Drive, Manhattan New York**

**Elevation and Datum**: Approx. 7.5± NAVD88

<table>
<thead>
<tr>
<th>MATERIAL SYMBOL</th>
<th>Elevation (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 6</td>
<td>-16.0</td>
<td></td>
<td>Brown fine SAND, some silt (wet) [SM]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 6</td>
<td>-19.5</td>
<td></td>
<td>Gray SILT, trace fine sand (wet) [ML]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**E.O.B. @ 27.0 ft bgs**

- **Take S-6**: Advance with roller bit to 25' Brown wash Smooth drilling
- **Take S-7**: End of Drilling Install observation well 20' 10' riser 10' screen
Log of Boring

Project No. 170334001

Location: Baruch Drive, Manhattan New York
Elevation and Datum: Approx. 8t. NAVD88

Drilling Company: Craig Geotechnical Drilling
Date Started: 4/13/15
Drilling Equipment: CME 75 Truck Mounted Rig
Date Finished: 4/13/15

Size and Type of Bit: 3 7/8" Tricone Roller Bit

Casing Diameter (in): 3" & 4" I.D. Steel
Casing Depth (ft): 13.5'

Casing Hammer: Automatic
Weight (lbs): 140
Drop (in): 30

Drilling Foreman: Keith Parent
Inspecting Engineer: Nick Kerr

Sample Description:

- **CONCRETE**
  - Light brown m-c SAND, trace silt, trace building material, m-f gravel, brick, concrete (moist) [FILL]
  - Brown m-c SAND, some silt, trace clay, trace f-m gravel, trace brick (wet) [FILL]
  - Brown, black f-c GRAVEL, some m-c sand [FILL] (wet)

- **WOOD**
  - Encountered wood at 2.5'
  - Break through wood

- **SAND**
  - Class 7
    - Dark brown m-f SAND, some silt, trace clay, trace fine gravel (wet) [SM]
  - Class 3b
    - Gray brown silly SAND, trace clay (wet) [SM]
  - Class 6
    - Brown silty SAND (wet) [SM]

Remarks:
- 4/13/15
- Start at 10:00 AM
- Drill through concrete sidewalk
- Hand clear 0' to 2.5'
- Encountered wood at 2.5'
- Break through wood
- Penetrate to 5' with 3" split spoon
- Take S-1
- Take S-2
- Push casing to 4'
- Hammer casing to 8.25'
- Clean out hole to 9'
- Brown wash
- Rig chatter
- Take S-4
- Hammer casing to 13.5'
- Drill to 15'
- Brown wash
- Rig chatter
- Take S-5
- Clean out hole to 18'
- Take SH-1
### Log of Boring

**Location:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Elevation and Datum:** Approx. 8 ft NAVD88

#### Building Code and Elevation

<table>
<thead>
<tr>
<th>Elev. (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
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</thead>
<tbody>
<tr>
<td>-16.0</td>
<td>Class 6</td>
<td>Brown m-f SAND, some silt (wet) [SM]</td>
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<tr>
<td>-21.0</td>
<td>Class 4c</td>
<td>Gray CLAY, some silt, trace fine sand (wet) [CL]</td>
</tr>
<tr>
<td>-23.0</td>
<td>Class 4b</td>
<td>Varved gray CLAY, some silt, trace silty fine sand (wet) [CL]</td>
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<td>E.O.B. @ 31.0 ft bgs</td>
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</table>

#### Sample Data

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<th>Depth (ft)</th>
<th>Sample</th>
<th>Type</th>
<th>Penetr. resist.</th>
<th>Recov. (in)</th>
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<td>20</td>
<td>S-6</td>
<td>SS</td>
<td>3</td>
<td>4</td>
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<td>S-6</td>
<td>SS</td>
<td>4</td>
<td>8</td>
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<tr>
<td>22</td>
<td>S-6</td>
<td>SS</td>
<td>4</td>
<td>5</td>
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</tbody>
</table>

#### Remarks

- Drill to 25'
- Black brown wash
- Easy drilling
- Take S-7
- Take SH-2 (no recovery)
- Take S-8
**Log of Boring**

**Project No.** 170334001  
**Elevation and Datum** Approx. 8.5± NAVD88

### Drilling Details

- **Drilling Company**: Craig Geotechnical Drilling  
- **Equipment**: CME 75 Truck Mount  
- **Size and Type of Bit**: 3-7/8" Tricone Roller  
- **Disturbance**: 7 disturbed, 0 undisturbed, 0 core  
- **Casing Diameter**: 3" & 4" I.D. Steel  
- **Casing Depth**: 13.5 ft  
- **Water Level**: 24 HR.  
- **Drilling Foreman**: Keith Parent  
- **Inspecting Engineer**: Nick Kerr

### Sample Data

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Number</th>
<th>Type</th>
<th>Penetr. resist</th>
<th>Recov. (in)</th>
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<tr>
<td>+8.5</td>
<td>0</td>
<td>Core</td>
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<td>+1.5</td>
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<td>0</td>
<td>Core</td>
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</tbody>
</table>

### Remarks

- 4/24/2015  
  - 10:15 AM Drill through 4" concrete sidewalk  
  - Hand clear 0' to 4'  
  - 3" split spoon sample 4' to 5'  

- Take S-1  
- Take S-2  
- Install casing to 8.5'  
- Clean out hole to 9'  

- Take S-3  
- No recovery  
- Take S-4 with 3" split spoon  
- Install casing to 13.5' (push)  

- Take S-5  
- Advance with roller bit to 20'  
- Brown wash  
- Smooth drilling
## Log of Boring

### Project Information
- **Project:** Baruch Houses, NYCHA
- **Project No.:** 170334001
- **Location:** Baruch Drive, Manhattan New York
- **Elevation and Datum:** Approx. 8.5± NAVD88

### Building Code
- **Location:** Baruch Drive, Manhattan New York
- **Approx. Elevation:** 8.5± NAVD88

### Material Table
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<tr>
<th>Elev. (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>N-Value (Blows/ft)</th>
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</thead>
<tbody>
<tr>
<td>21</td>
<td>S-6</td>
<td>Brown silty SAND, trace fine sand (wet) [SP]</td>
<td>6 8 10</td>
</tr>
<tr>
<td>25</td>
<td>S-7</td>
<td>Gray varved CLAY with some fine sand (wet) [ML]</td>
<td>2 3 4</td>
</tr>
</tbody>
</table>

### Remarks
- **Take S-6**: Advance with roller bit to 25'
- **Brown wash**: Smooth drilling
- **Take S-7**: End of Drilling
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Project No.:** 170334001

**Location:** Baruch Drive, Manhattan New York  
**Elevation and Datum:** Approx. 8.5± NAVD88

**Drilling Company:** Craig Geotechnical Drilling  
**Date Started:** 5/6/15  
**Drilling Equipment:** CME 75 Truck Mount  
**Date Finished:** 5/6/15

**Size and Type of Bit:** 3-7/8" Tricone Roller  
**Completion Depth:** 31.5 ft  
**Rock Depth:** Not Encountered

<table>
<thead>
<tr>
<th>Casing Diameter (in)</th>
<th>Casing Depth (ft)</th>
<th>Water Level (ft.)</th>
<th>First</th>
<th>Completion</th>
<th>Core</th>
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</thead>
<tbody>
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<td>3&quot; &amp; 4&quot; I.D. Steel</td>
<td>13.5</td>
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<td></td>
</tr>
</tbody>
</table>

**Casing Hammer:** Automatic  
**Weight (lbs):** 140  
**Drop (in):** 30  
**Drilling Foreman:** Mike Gorski

**Sampler:** 2" Split Spoon  
**Weight (lbs):** 140  
**Drop (in):** 30  
**Inspecting Engineer:** Nick Kerr

---

### Sample Data

**Elev. (R): +8.5**  
**Building Code:** Class 7  
**MATERIAL:** ASPHALT and CONCRETE

**Sample Description:**
- Brown c-f SAND, trace silt, trace concrete, trace asphalt, trace bricks (wet) [FILL]
- Gray-Brown m-f GRAVEL, some c-f sand, trace brick, trace concrete
- Orange-Brown c-f SAND, trace fine gravel, trace silt (wet) [SP]
- Orange-Brown c-f SAND, trace fine gravel, trace silt (wet) [SP]
- Olive brown fine SAND, trace silt (wet) [SP-SM]

**Remarks:**
- 5/6/2015 Start at 8:00 am  
  Drill through Concrete and Asphalt road  
  Hand clean 1.2'-4'

- Take 3" split spoon 4-6'

- Take S-1 6-8'  
  Install casing to 8.5'  
  Clean out, gray wash

- Take S-2 8'-10'

- Take S-3 10'-12'  
  Push casing to 13.5'  
  Drill to 15' with 3 7/8" Roller, easy drill  
  Gray wash

- Take S-4 15-17'

- Drill to 20'  
  Easy drilling  
  Gray-Brown wash
<table>
<thead>
<tr>
<th>Depth</th>
<th>Type</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>SS</td>
<td>Olive brown fine SAND, trace silt (wet) [SP-SM]</td>
<td>Take S-5 20-22'</td>
</tr>
<tr>
<td>21</td>
<td>SS</td>
<td>Gray SILT, trace clay, trace fine sand (wet) [ML]</td>
<td>Drill to 25'</td>
</tr>
<tr>
<td>22</td>
<td>SS</td>
<td>Gray fine sandy SILT [ML]</td>
<td>Easy drilling</td>
</tr>
<tr>
<td>23</td>
<td>SS</td>
<td>Gray silty fine SAND [SM]</td>
<td>Gray-Brown wash</td>
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</tbody>
</table>

E.O.B. @ 31.5 ft bgs
**Log of Boring**

**Project No.** 170334001

**Location** Baruch Houses, NYCHA

**Elevation and Datum** Approx. 8.5± NAVD88

**Drilling Company** Craig Geotechnical Drilling

**Drilling Equipment** CME 75 Truck Mounted Rig

**Size and Type of Bit** 3 7/8" Tricone Roller Bit

<table>
<thead>
<tr>
<th>Casing Diameter (in)</th>
<th>Casing Depth (ft)</th>
<th>Water Level (ft.)</th>
<th>Disturbed</th>
<th>Undisturbed</th>
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</thead>
<tbody>
<tr>
<td>3” &amp; 4” I.D. Steel</td>
<td>6.5’</td>
<td>8.5’</td>
<td>8</td>
<td>1</td>
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</tbody>
</table>

**Casing Hammer** Automatic

**Sampler** 2” Split Spoon

**Sampler Hammer** Automatic

**Drilling Foreman** Keith Parent

**Inspecting Engineer** Nick Kerr

<table>
<thead>
<tr>
<th>Elev. (R)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Samples Taken</th>
<th>N-Value (Blows/ft)</th>
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<tbody>
<tr>
<td>+0.5</td>
<td>Baruch Drive, Manhattan New York</td>
<td>Light brown m-f SAND, some silt, trace c-f gravel, trace construction debris, brick [FILL]</td>
<td>S-1, S-2, S-3, S-4, S-5</td>
<td>10, 20, 30, 40</td>
</tr>
</tbody>
</table>

**Drilling Details**

- **Start Date:** 4/9/15
- **Start Time:** 8:20 AM
- **Drill through 3" sidewalk with 12" concrete cutter**

**Remarks**

- Hand clear to 4'
- Wooden covered telephone lines exposed at 4'
- Move hole North
- Install casing to 8.5'
- Clean out hole to 9'
- Add bentonite
- Drill to 15'
- Brown wash
- Easy drilling

- **Take S-1**
- **Take S-2 (no recovery)**
- **Take S-3**
- **Take S-4**
- **Take S-5**
### Log of Boring

**Project No.** 170334001

**Location**
Baruch Drive, Manhattan New York

**Elevation and Datum**
Approx. 8.5 ft NAVD88

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>E.O.B. @ 31.0 ft bgs</td>
</tr>
<tr>
<td>20</td>
<td>Brown fine SAND, some silt, trace clay (wet) [SM]</td>
</tr>
<tr>
<td>21</td>
<td>Gray silty SAND, some clay (moist) [SM]</td>
</tr>
<tr>
<td>22</td>
<td>Gray silty SAND, trace clay (wet) [SM]</td>
</tr>
<tr>
<td>25</td>
<td>Gray brown m-f SAND, some silt, trace clay (wet) [SM]</td>
</tr>
</tbody>
</table>

**MATERIAL**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>Depth (ft)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown fine SAND, some silt, trace clay (wet) [SM]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray silty SAND, some clay (moist) [SM]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray silty SAND, trace clay (wet) [SM]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray brown m-f SAND, some silt, trace clay (wet) [SM]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**
- Drill to 20'
- Brown wash
- Easy drilling
- Take S-6
- Drill to 25'
- Take S-7
- Silt/clay in tip
- Start 10:20 AM
- Pull 10:40 AM
- $q_v=1.5$ tsf
- Take S-8
**Sample Description**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3&quot; CONCRETE</td>
</tr>
<tr>
<td>2.5</td>
<td>Brown f-c SAND, trace f-c gravel, trace cobbles, boulders</td>
</tr>
<tr>
<td>3.5</td>
<td>Brown f-c SAND, some silt, trace f-m gravel (wet) [FILL]</td>
</tr>
<tr>
<td>7.5</td>
<td>Olive gray fine SAND, trace silt (wet) [SP-SM]</td>
</tr>
<tr>
<td>10.5</td>
<td>Gray brown m-f SAND, some silt (wet) [SM]</td>
</tr>
<tr>
<td>11.5</td>
<td>Gray brown m-f SAND, some silt (wet) [SM]</td>
</tr>
<tr>
<td>12.5</td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
</tr>
</tbody>
</table>

**Remarks**

- **4/27/2015**
  - Start at 11:50 AM
  - Drill through 3" concrete sidewalk
  - Hand clear to 4" 3" split
  - Take S-2
  - Install casing to 8.5' Clean out hole with 2 7/8" roller bit
  - Gravel in wash
  - Hard drilling
  - Rig chatter
  - Take S-3
  - Take S-4
  - Gravel in tip
  - Omitted from sample
  - Drill bit stuck in casing
  - Drill to 15'
  - Brown wash
  - Take S-5

**Project**

- Baruch Houses, NYCHA

**Location**

- Baruch Drive, Manhattan New York

**Elevation and Datum**

- Approx. 8.5± NAVD88

**Drilling Company**

- Craig Geotechnical Drilling

**Drilling Equipment**

- CME 75 Truck Mount

**Size and Type of Bit**

- 3-7/8" Tricone Roller

**Casing Diameter (in)**

- 3" & 4" I.D. Steel

**Casing Depth (ft)**

- 8.5

**Number of Samples**

- Disturbed: 7
- Undisturbed: 0
- Core: 0

**Water Level (ft.)**

- First: +8.5
- Completion: -10.0

**Date Started**

- 4/27/15

**Date Finished**

- 4/27/15

**Drilling Foreman**

- Mike Gorski

**Inspecting Engineer**

- Nick Kerr
Class 3b

E.O.B. @ 27.0 ft bgs

Brown m-f SAND, trace silt (wet) [SP-SM]

Gray silty SAND (wet) [SM]

Take S-6
No recovery
Take S-6 with 3" split spoon

Drill to 25'
Brown wash
Easy drilling
Take S-7
<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Depth</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3” CONCRETE</td>
<td>0</td>
<td>0</td>
<td>4/25/2015 Start at 8:00 AM Drill through 3” concrete sidewalk</td>
</tr>
<tr>
<td>Brown f-c SAND, some f-c gravel, bricks, boulders,</td>
<td>6</td>
<td>11</td>
<td>Hand clear to 4’ 3” split spoon 4’ to 5’ Take S-1</td>
</tr>
<tr>
<td>glass, concrete [FILL]</td>
<td>11</td>
<td>7</td>
<td>Concrete in tip of spoon</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>11</td>
<td>Stop drilling</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>11</td>
<td>4/27/2015 Start at 10:45 AM Roller bit through 3” concrete</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>11</td>
<td>Hand clear to 4’</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>11</td>
<td>S/4/2015 Set up over previously hand cleared LB-18A</td>
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<td></td>
<td>30</td>
<td>11</td>
<td>Take S-2</td>
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<td>30</td>
<td>11</td>
<td>Take S-3</td>
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<td>30</td>
<td>11</td>
<td>Install casing to 8.5’ Add mud</td>
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<tr>
<td></td>
<td>30</td>
<td>11</td>
<td>Clean out hole to 10’ Brown wash</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>11</td>
<td>Take S-4</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>11</td>
<td>Install casing to 13.5’</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>11</td>
<td>Drill to 15’ with 3 7/8” roller End of day at 3:00 PM</td>
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**Log of Boring**

**Project No:** 170334001

**Location:** Baruch Drive, Manhattan New York

**Elevation and Datum:** Approx. 94’ NAVD88

**Drilling Company:** Craig Geotechnical Drilling

**Drilling Equipment:** CME 75 Truck Mounted Rig

**Size and Type of Bit:** 3 7/8” Tricone Roller Bit

**Casing Diameter (in):** 3” & 4” I.D. Steel

**Casing Hammer:** Automatic

**Casing Weight (lbs):** 140

**Casing Drop (in):** 30

**Drilling Foreman:** Keith Parent

**Inspecting Engineer:** Nick Kerr

**Completion Depth:** 46 ft

**Rock Depth:** Not Encountered

**Number of Samples:**
- Disturbed: 11
- Undisturbed: 1
- Core: 0

**Sample Data**

<table>
<thead>
<tr>
<th>Number</th>
<th>Core</th>
<th>Undisturbed</th>
<th>Disturbed</th>
<th>Water Level (ft)</th>
<th>Casing Depth (ft)</th>
<th>Completion Date</th>
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<tbody>
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<td>4/27/2015</td>
</tr>
<tr>
<td>2</td>
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<td>18.5</td>
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<td>3</td>
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<td>13.5</td>
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<td>4</td>
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<td>10.5</td>
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<td>6</td>
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<td>4.5</td>
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<tr>
<td>7</td>
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<td>1.5</td>
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<td>4/24/15</td>
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</table>

**Remarks**

- (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
Log of Boring

Project: Baruch Houses, NYCHA

Project No.: 1703340001

Location: Baruch Drive, Manhattan New York

Elevation and Datum: Approx. 92 NAVD88

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Description</th>
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<tbody>
<tr>
<td>0.0</td>
<td>Gray brown fine SAND, some silt (wet) [SM]</td>
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<tr>
<td>5.0</td>
<td>Gray fine sandy SILT (wet) [ML]</td>
</tr>
<tr>
<td>10.0</td>
<td>Gray maroon brown silty SAND (wet) [SM]</td>
</tr>
<tr>
<td>15.0</td>
<td>Gray SILT, trace fine sand (wet) [ML]</td>
</tr>
<tr>
<td>20.0</td>
<td>Gray varved CLAY with seams of silty sand (wet) [CL]</td>
</tr>
</tbody>
</table>

Remarks:
- 5/5/2015
- Start at 7:00 AM
- Take S-6
- Drill to 25'
- Easy drilling
- Gray wash
- Take S-7
- Drill to 30'
- Take S-8
- Take S-9
- Drill to 40'
- Easy drilling
- Gray wash
- Take S-10
- Clean out hole to 42'
- Gray wash
- Push SH-1 at 8:00 AM
- Pull SH-1 at 8:25 AM
- $q_0 = 0.5$ tpsf
- Take S-11
## Baruch Houses, NYCHA

### Baruch Drive, Manhattan New York

<table>
<thead>
<tr>
<th>Material Symbol</th>
<th>Sample Description</th>
<th>Depth</th>
<th>Type</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Gray varved CLAY with seams of silty sand (wet) [CL]</td>
<td></td>
<td></td>
<td>E.O.B. @ 46.0 ft bgs</td>
</tr>
</tbody>
</table>

### Log of Boring

**Project No.:** 170334001

**Location:** Baruch Drive, Manhattan New York

**Elevation and Datum:** Approx. 9 ± NAVD88

**Building Code:** Log of Boring Sheet 3

**Location:** Baruch Houses, NYCHA

**Baruch Drive, Manhattan New York**

**Elevation and Datum:** Approx. 9 ± NAVD88

**Building Code:** Log of Boring Sheet 3

**Remarks**

(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
Project: Baruch Houses, NYCHA
Location: Baruch Drive, Manhattan New York
Elevation and Datum: Approx. 9.5± NAVD88

Drilling Company: Craig Geotechnical Drilling
Drilling Equipment: CME 75 Truck Mount

Size and Type of Bit: 3-7/8" Tricone Roller

Casing Diameter (in): 3" & 4" I.D. Steel
Casing Depth (ft): 8.5

Sample Description:

- Gray brown f-c SAND, trace f-c gravel, trace brick, trace concrete, trace silt (wet) [FILL]
- Light brown f-c SAND, some silt, trace f-m gravel (wet) [FILL]
- Gray brown fine SAND, some silt (wet) [SM]
- Gray brown fine SAND, trace silt (wet) [SP-SM]
- Olive brown fine SAND, trace silt (wet) [SP-SM]

Sample Data:

Completion Depth: 27 ft
Rock Depth: Not Encountered

Number of Samples: Disturbed 7, Undisturbed 0, Core 0

Drilling Foreman: Keith Parent
Inspecting Engineer: Nick Kerr

Remarks:

4/23/2015
Start at 1:00 Pm
Drill through 3" concrete sidewalk

Hand cleat to 4'
3" split spoon 4' to 5'

Take S-1
Take S-2
Install casing to 8.5'
Clean out hole to 9'
Brown/grey wash
Add quik gel
Take S-3 no recovery
Take S-3 with 3" split spoon

Take S-4
Take S-5
Drill to 15'
Add mud
Rig chatter
Brown wash
Hard drilling
Take S-5

Take S-5

Drill to 20'
Brown wash
Easy drilling
Take S-6
### Log of Boring

**Project**
Baruch Houses, NYCHA

**Location**
Baruch Drive, Manhattan New York

**Project No.**
170334001

**Elevation and Datum**
Approx. 9.5± NAVD88

<table>
<thead>
<tr>
<th>Material</th>
<th>Elev. (ft)</th>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 6</td>
<td>-14.0</td>
<td>Gray silty SAND, trace c-f sand (wet) [SM]</td>
<td>20</td>
<td>Number: 20, Type: Penetr., resist: BL/6in, Recov.: (in)</td>
<td>Take S-6</td>
</tr>
<tr>
<td>Class 5b</td>
<td>-17.5</td>
<td>Marron gray SILT, some clay, trace fine sand (wet) [ML]</td>
<td>21</td>
<td>N-Value (Blows/ft): 3, 4, 8, 7</td>
<td>Drill to 25', Easy drilling</td>
</tr>
</tbody>
</table>

**E.O.B. @ 27.0 ft bgs**

**Casng blws/ ft**
Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
Log of Boring  LB-20  Sheet 1 of 2

Project  Baruch Houses, NYCHA  Project No. 170334001
Location  Baruch Drive, Manhattan New York  Elevation and Datum  Approx. 9.5± NAVD88
Drilling Company  Craig Geotechnical Drilling  Date Started  4/8/15
Drilling Equipment  CME 75 Truck Mounted Rig  Date Finished  4/8/15

Drill through sidewalk with 12" concrete cutter
Start at 1:00 PM
No recovery (gravel in tip)
Hand clear to 5'
Install casing to 8.5'
Drill to 15'
Easy drilling

Sample Data

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>SYMBO</th>
<th>SCALE</th>
<th>Depth</th>
<th>Number</th>
<th>Type</th>
<th>Moister</th>
<th>Penetr. Resist (in)</th>
<th>N-Value (Blows/ft)</th>
<th>Remarks</th>
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</thead>
<tbody>
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<td>CONCRETE (3&quot;)</td>
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<td>0</td>
<td>0</td>
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<td></td>
<td></td>
<td></td>
<td>4/8/15</td>
</tr>
<tr>
<td>Mottled gray black orange brown c-f SAND, trace m-f gravel, trace brick, glass and concrete (moist) [FILL]</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light brown m-f SAND, trace silt, trace clay (wet) [SP-SM]</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>Gray fine SAND, some silt, trace clay (wet) [SM]</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No recovery (gravel in tip)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tan brown fine SAND, trace silt, trace clay (wet) [SP-SM]</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Hand clear to 5'
Take S-1
Take S-2
Install casing to 8.5'
Take S-3
Take S-4
Drill to 15'
Easy drilling
Take S-5
<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Gray varved fine SAND and clayey SILT, trace fine sand (wet) [SP-ML]</td>
</tr>
<tr>
<td>21</td>
<td>Varved maroon brown fine SAND, clayey silt, trace fine sand (wet) [SP-ML]</td>
</tr>
<tr>
<td>22</td>
<td>E.O.B. @ 27.0 ft bgs</td>
</tr>
</tbody>
</table>

**Remarks**
- Drill to 20'
- Brown wash
- Easy drilling
- Take S-6

- Drill to 25'
- Easy drilling
- Take S-7
Light brown f-c SAND, some f-c gravel

Dark brown silty SAND (wet) [SM-FILL]

Brown c-f SAND, trace f-m gravel, some silt (wet) [SW-FILL]

Tan brown fine SAND, some silt [SM]

Brown M-f SAND, trace silt [SP-SM]

Brown m-f SAND, trace silt (wet) [SP-SM]
Gray brown silty f-m SAND (wet) [SM]

Light maroon brown f-m SAND, trace silt (wet) [SP]

Brown m-f SAND, trace silt [SP]

E.O.B. @ 42.0 ft bgs
Log of Boring

**LB-22 (OW)**

- **Project No.:** 170334001
- **Location:** Baruch Drive, Manhattan New York
- **Elevation and Datum:** Approx. 9+ NAVD88

### Drilling Company
- Craig Geotechnical Drilling

### Drilling Equipment
- **Casing Diameter:** 3 7/8" Tricone Roller Bit
  - 3" & 4" I.D. Steel
- **Casing Hammer:** Automatic
- **Sampler:** 2" Split Spoon
- **Sampler Hammer:** Automatic
- **Weight (lbs):** 140
- **Drop (in):** 30

### Date Started/Finished
- **Date Started:** 4/16/15
- **Date Finished:** 4/16/15

### Rock Depth
- Not Encountered

### Casing Depth
- 13.5'

### Water Level
- 4/16/15
- Start at 12:00 PM
- Hand clear to 5'
- Take S-1
- Install casing to 8.5'
  - 4.5' push, 8.5' hammer
- Clean out hole to 9'
- Brown wash
- Slight rig chatter
- Take S-3 (no recovery)
- Take S-3 with 3" split spoon
  - (no recovery)
- Take S-4
- Drill to 15'
- Take S-5
- Drop SH-1 at 1:05 PM
- Pull SH-1 at 1:25 PM
- Take S-6

### Remarks
- Hand clear to 5'
- Take S-1
- Install casing to 8.5'
  - 4.5' push, 8.5' hammer
  - Clean out hole to 9'
  - Brown wash
  - Slight rig chatter
- Take S-3 (no recovery)
  - Take S-3 with 3" split spoon
    - (no recovery)
- Take S-4
  - Install casing to 13.5' (push)
- Drill to 15'
- Take S-5
- Drop SH-1 at 1:05 PM
- Pull SH-1 at 1:25 PM
- Take S-6
Log of Boring  

**Baruch Houses, NYCHA**

**Location**
Baruch Drive, Manhattan New York

**Elevation and Datum**
Approx. 9 ft NAVD88

**Project No.**
170334001

**Building Code**
LB-22 (OW)

**Sample Data**

<table>
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<tr>
<th>Depth</th>
<th>Sample Description</th>
<th>N-Value (Blows/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Light brown m-f SAND, trace silt (wet) [SP]</td>
<td>7 12</td>
</tr>
<tr>
<td>21</td>
<td>Orange brown m-f SAND, trace silt (wet) [SP]</td>
<td>8 12</td>
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<tr>
<td>43</td>
<td></td>
<td>10 20</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>10 20</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>10 20</td>
</tr>
</tbody>
</table>

**Remarks**
Drill to 23'
Brown wash
Easy drilling
Take S-7
**Log of Boring**  
**Project No.** 170334001  
**Location** Baruch Houses, NYCHA  
**Elevation and Datum** Approx. 8.5± NAVD88  
**Drilling Company** Craig Geotechnical Drilling  
**Completion Depth** 90.5 ft  
**Date Started** 4/17/15  
**Date Finished** 4/17/15  
**Rock Depth** Not Encountered  
**Drilling Equipment** CME 75 Truck Mounted Rig  
**Drilling Foreman** Keith Parent  
**Inspecting Engineer** Nick Kerr

### Sampling Details

**MATERIAL**  
**SYMBOL**

<table>
<thead>
<tr>
<th>Completion Depth</th>
<th>Number of Samples</th>
<th>Undisturbed</th>
<th>Disturbed</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 HR. Water Level</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Sampler**  
**2" Split Spoon**  
**Automatic**  
**Weight (lbs)** 140  
**Drop (in)** 30

**Casing Hammer**  
**Automatic**  
**Casing Diameter (in)** 3" & 4" I.D. Steel  
**Casing Depth (ft)** 13.5'  
**Weight (lbs)** 140  
**Drop (in)** 30

**Remarks**  
4/17/15 START 7:50  
Drill through 4.5" concrete sidewalk  
Hand clear to 5'  
Expose pipe at 4'  
Move hole 4" North  
Drill through 4.5" concrete  
Hand clear to 5'

**Log of Boring**  
**Sheets** 1 of 4  
**Project** Baruch Drive, Manhattan New York  
**Elevation and Datum** Appro. 8.5± NAVD88  
**Drilling Company** Craig Geotechnical Drilling  
**Completion Depth** 90.5 ft  
**Date Started** 4/17/15  
**Date Finished** 4/17/15  
**Rock Depth** Not Encountered  
**Drilling Equipment** CME 75 Truck Mounted Rig  
**Drilling Foreman** Keith Parent  
**Inspecting Engineer** Nick Kerr

### Sample Data

**Sample Description**  
**Depth**  
**Elev.**  
**Sample Data**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Data</th>
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<tbody>
<tr>
<td>0</td>
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<tr>
<td>1</td>
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<tr>
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</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brown/black f-m SAND, some silt, trace asphalt [SP-SM] [FILL]</td>
</tr>
<tr>
<td>7</td>
<td>Brown m-f SAND, some silt (wet) [SM]</td>
</tr>
<tr>
<td>8</td>
<td>Brown M-f SAND, trace silt (wet) [SP-SM]</td>
</tr>
<tr>
<td>9</td>
<td>Tan brown fine SAND, trace silt (wet) [SP]</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
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<td>18</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**  
Drill to 20'  
Easy drilling, brown/gray wash
<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Depth</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange brown m-f SAND, trace silt (wet) [SP]</td>
<td>21</td>
<td>Take S-6</td>
</tr>
<tr>
<td>Orange brown m-f SAND, trace silt (wet) [SP]</td>
<td>22</td>
<td>Drill to 25' with 3 7/8 in roller bit</td>
</tr>
<tr>
<td>Brown m-f SAND, trace silt (wet) [SP]</td>
<td>23</td>
<td>Take S-7</td>
</tr>
<tr>
<td>Orange brown m-f SAND, trace silt (wet) [SP]</td>
<td>24</td>
<td>Add quik gel</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand (wet) [CL]</td>
<td>25</td>
<td>Drill to 30'</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand 9wet) [CL]</td>
<td>26</td>
<td>Easy drilling, brown wash</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand (wet) [CL]</td>
<td>27</td>
<td>Take S-8</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand (wet) [CL]</td>
<td>28</td>
<td>Drill to 35'</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand 9wet) [CL]</td>
<td>29</td>
<td>Easy drilling, brown wash</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand (wet) [CL]</td>
<td>30</td>
<td>Take S-9</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand 9wet) [CL]</td>
<td>31</td>
<td>Drill to 40'</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand (wet) [CL]</td>
<td>32</td>
<td>Brown/gray wash, easy drilling</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand 9wet) [CL]</td>
<td>33</td>
<td>Take S-10</td>
</tr>
<tr>
<td>Maroon grey brown varved CLAY, seams of silt and fine sand (wet) [CL]</td>
<td>34</td>
<td>Drill to 43'</td>
</tr>
</tbody>
</table>
No recovery

Maroon grey brown varved CLAY, some silt, some fine sand (wet) [ML-CH]

Maroon grey brown varved CLAY, some silt, some fine sand (wet) [ML-CH]

Grey silty CLAY, trace fine sand (wet) [CH]

Maroon grey brown varved CLAY, some silt, some fine sand (wet) [ML-CH]

Maroon grey brown varved CLAY, some silt, some fine sand (wet) [ML-CH]

-50.0

-55.0

-60.0
**Log of Boring**

**Project No.** 170334001

**Location** Baruch Drive, Manhattan New York

**Elevation and Datum** Approx. 8.5± NAVD88

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Data</th>
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</thead>
<tbody>
<tr>
<td>Number</td>
<td>Type</td>
</tr>
<tr>
<td>70</td>
<td>S-16</td>
</tr>
<tr>
<td>71</td>
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<tr>
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<tr>
<td>89</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>S-20</td>
</tr>
</tbody>
</table>

**Remarks**
- Take S-16
  - Drill to 75'
  - Grey wash, easy drilling
- Take S-17
- Take S-18
- Take S-19
- Take S-20
  - Drill to 90'
  - Grey/brown wash (mica), heavy rig chatter

**Sample Description**
- Grey varved CLAY, seams of silt and fine sand (wet) [CL]
- Grey varved CLAY, seams of silt and fine sand (wet) [ML-CH]
- Grey silty f-m SAND, some fine gravel (wet) [SM]
- Decomposed rock

**E.O.B. @ 90.5 ft bgs**
**MATERIAL** | **SYMBOL**
--- | ---
ASPHALT PAVERS | S-1
ASPHALT | S-2
Mottled red gray c-f GRAVEL, building material, brick, concrete, wood in tip [GP] | S-3
Brown m-f SAND, trace silt, red brick [SP] | S-4
Gray sandy m-f GRAVEL [GP] | S-5
Gray brown fine SAND, trace silt (wet) [SP-SM] | S-6
Brown fine SAND, some silt (wet) [SM] | S-7

**Remarks**

4/8/15
Remove asphalt pavers (8"x8"x2")

Hand clear to 5'
Take S-1 (wood in tip)
Take S-2
Obstruction at 7'

Install casing to 8.5'
Take S-3

Install casing to 13.5'
Drill to 15' with 3 7/8" roller bit
Gray wash
Slight rig chatter
Take S-4
<table>
<thead>
<tr>
<th>Elev. (R)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.5</td>
<td>Class 3b</td>
<td>Orange brown m-f SAND, trace silt [SP-SM]</td>
<td></td>
<td>Drill to 20'</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td></td>
<td>21</td>
<td>S-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Orange brown m-f SAND, trace silt [SP-SM]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td></td>
<td>25</td>
<td>S-6</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Brown fine SAND, some silt (wet) [SM]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31</td>
<td></td>
<td>30</td>
<td>S-7</td>
</tr>
<tr>
<td>-30.5</td>
<td>Class 6</td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td></td>
<td>Take S-7</td>
</tr>
<tr>
<td>-33.5</td>
<td>Class 4b</td>
<td>Varved gray CLAY, trace silt, seams of silty sand [CL]</td>
<td></td>
<td>Drill to 40'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The table includes data on the material, sample description, depth scale, sample data, and remarks for each sampling point.
CONCRETE (3")

Brown m-f SAND, some silt, trace fill material, concrete (wet) [FILL]

- 4/22/15 Start at 10:00 AM
- Hand clear to 4'
- Take S-1 with 3" split spoon

Orange brown c-f SAND, some silt, trace fine gravel (wet) [SM]

Gray brown silty SAND (wet) [SP]

No recovery

Gray silty SAND (wet) [SM]

Brown m-f SAND, trace silt (wet) [SP-SM]

- Take S-2
- Install casing to 8.5'
- Clean out hole with 2 7/8" roller bit
- Brown wash
- Casing spinning in hole
- Take S-3
- Take S-4 (no recovery)
- Fix casing
- Push to 13'
- Take S-5
- Clean out hole
- Brown wash
- Take S-6
**Log of Boring**

**Project No.:** 170334001

**Elevation and Datum:** Approx. 9± NAVD88

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.0</td>
<td>Orange brown c-f SAND, trace silt, trace fine gravel (wet) [SP-SM]</td>
<td>Drill to 20' Brown wash Easy drilling</td>
</tr>
<tr>
<td>20</td>
<td>Gray orange brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>Take S-7</td>
</tr>
<tr>
<td>27</td>
<td>E.O.B. @ 27.0 ft bgs</td>
<td>Take S-8</td>
</tr>
</tbody>
</table>

**MATERIAL**

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>S-7</td>
</tr>
<tr>
<td>21</td>
<td>S-7</td>
</tr>
<tr>
<td>22</td>
<td>S-7</td>
</tr>
<tr>
<td>23</td>
<td>S-7</td>
</tr>
<tr>
<td>24</td>
<td>S-7</td>
</tr>
<tr>
<td>25</td>
<td>S-8</td>
</tr>
<tr>
<td>26</td>
<td>S-8</td>
</tr>
<tr>
<td>27</td>
<td>E.O.B.</td>
</tr>
</tbody>
</table>

**Building Code**

- Baruch Houses, NYCHA

**Location**

- Baruch Drive, Manhattan New York

---

**Sample Data**

- **Sample Description:** Orange brown c-f SAND, trace silt, trace fine gravel (wet) [SP-SM]
- **Remarks:** Drill to 20' Brown wash Easy drilling
- **E.O.B. @ 27.0 ft bgs**
<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Depth (ft)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown m-f SAND, some m-f gravel, brick [SP] [FILL]</td>
<td>8.5'</td>
<td>4/8/15 Start at 10:10 AM Drill through</td>
</tr>
<tr>
<td>Brown silty SAND, trace clay (wet) [SM]</td>
<td>10</td>
<td>Take S-2</td>
</tr>
<tr>
<td>Brown gray silty SAND trace clay (wet) [SM]</td>
<td>11</td>
<td>Take S-3 Sample in tip only</td>
</tr>
<tr>
<td>Brown gray fine SAND, trace silt, trace clay (wet) [SP-SM]</td>
<td>12</td>
<td>Take S-4</td>
</tr>
<tr>
<td>Light maroon brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>13</td>
<td>Drill to 15'</td>
</tr>
</tbody>
</table>

- **Elevation and Datum**: Approx. 8.5± NAVD88
- **Drilling Company**: Craig Geotechnical Drilling
- **Drilling Equipment**: CME 75 Truck Mounted Rig
- **Casing Diameter (in)**: 3 & 4" I.D. Steel
- **Casing Hammer**: Automatic
- **Weight (lbs)**: 140
- **Drop (in)**: 30
- **Drilling Foreman**: Keith Parent
- **Inspecting Engineer**: Nick Kerr
- **Date Started**: 4/8/15
- **Date Finished**: 4/8/15
- **Number of Samples**: 7
- **Disturbed**: 7
- **Undisturbed**: 0
- **Core**: 0
- **Completion Depth**: 27 ft
- **Rock Depth**: Not Encountered
- **Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.**

**Location**: Baruch Drive, Manhattan New York
Log of Boring  

**Project:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Location:** Baruch Drive, Manhattan New York  
**Elevation and Datum:** Approx. 8.5± NAVD88  

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.5</td>
<td>Class 3b</td>
<td></td>
</tr>
</tbody>
</table>
| 20            | Tan brown m-f SAND, trace silt (wet) [SP-SM] | Drill to 20'  
Brown wash  
Easy drilling  
Take S-6 |
| 25            | Orange brown m-f SAND, trace silt, trace clay (wet) [SP-SM] | Drill to 25'  
Easy drilling  
Take S-7 |
| 27            | E.O.B. @ 27.0 ft bgs |         |
Log of Boring

Log of Boring

Baruch Houses, NYCHA

Baruch Drive, Manhattan New York

Elevation and Datum
Approx. 9 ft NAVD88

Date Started
4/8/15

Date Finished
4/8/15

Completion Depth
29 ft

Rock Depth
Not Encountered

Casing Diameter (in)
3 & 4" I.D. Steel

Number of Samples
8

Disturbed
0

Undisturbed
0

Core
0

Casing Depth (ft)
8.5'

Water Level (ft.)
First
Completion

Drilling Foreman
Keith Parent

Inspecting Engineer
Nick Kerr

Sampler
Automatic
Weight (lbs)
140
Drop (in)
30

Sampler Hammer
2" Split Spoon

Drilling Company
Craig Geotechnical Drilling

CME 75 Truck Mounted Rig

Equipment

3 7/8" Tricone Roller Bit

3" & 4" I.D. Steel

Samplers

Sample Description

MATERIAL
ASPHALT (2")
CONCRETE (6")

SYMBOL

Sample Data

Elev.

(+8.3

(+8.8

Building Code

MATERIAL
Black gray m-f SAND, brick, trace gravel, wood [FILL]
Yellow WOOD, fresh [FILL]
Yellow WOOD, fresh [FILL]

Elevation and Datum

Baruch Drive, Manhattan New York

Approx. 9 ft NAVD88

Remarks

Hand clear to 5'
Clean out hole with 3' split spoon
Take S-1

Take S-2

Push casing to 5'
Hammer casing to 8.5'
Clean out hole
Gray wash
Rig chatter
Brick & wood in return wash

Take S-3

Take S-4

Drill to 15'
Brown wash
Easy drilling

Take S-5 (no recovery)
Take S-5 with 3' split spoon

Remarks

4/8/15
Start at 7:30 AM
Drill through asphalt & concrete to 6”

Completion

Casng blws/ ft

(2"

Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Remarks

Hand clear to 5'
Clean out hole with 3' split spoon
Take S-1

Take S-2

Push casing to 5'
Hammer casing to 8.5'
Clean out hole
Gray wash
Rig chatter
Brick & wood in return wash

Take S-3

Take S-4

Drill to 15'
Brown wash
Easy drilling

Take S-5 (no recovery)
Take S-5 with 3' split spoon

Remarks

4/8/15
Start at 7:30 AM
Drill through asphalt & concrete to 6”

Completion

Casng blws/ ft

(2"

Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Remarks

Hand clear to 5'
Clean out hole with 3' split spoon
Take S-1

Take S-2

Push casing to 5'
Hammer casing to 8.5'
Clean out hole
Gray wash
Rig chatter
Brick & wood in return wash

Take S-3

Take S-4

Drill to 15'
Brown wash
Easy drilling

Take S-5 (no recovery)
Take S-5 with 3' split spoon
<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>SYMBOL</th>
<th>Sample Description</th>
<th>Depth</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Orange brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>20</td>
<td>9 10</td>
<td>Drill to 20' Easy drilling Take S-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Orange brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>21</td>
<td>9 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown CLAY, trace silt, trace fine sand (wet) [CL]</td>
<td>26</td>
<td>8 10 15</td>
<td>Drill to 25' Brown wash Easy drilling Take S-7A &amp; S-7B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Varved maroon brown CLAY, trace silt(wet) [CL]</td>
<td>28</td>
<td>11 13</td>
<td></td>
</tr>
</tbody>
</table>

E.O.B. @ 29.0 ft bgs
**Log of Boring**

**Project No.** 170334001

**Location** Baruch Houses, NYCHA

**Elevation and Datum** Approx. 9.5± NAVD88

**Drilling Company** Craig Geotechnical Drilling

**Date Started** 4/7/15

**Drilling Equipment** CME 75 Truck Mounted Rig

**Date Finished** 4/7/15

**Competition Depth** 27 ft

**Rock Depth** Not Encountered

**Size and Type of Bit**
- 3 7/8" Tricone Roller Bit
- 3" & 4" I.D. Steel

**Number of Samples**
- Disturbed: 7
- Undisturbed: 0
- Core: 0

**Casing Dia (in)** 33

**Casing Depth (ft)** 13.5

**Water Level (ft)**
- First: -
- Completion: 24 HR.

**Number of Samples**
- S-1: 9
- S-2: 8
- S-3: 10
- S-4: 5
- S-5: 3

**Remarks**
- 4/7/15: Start at 11:30 AM
- Drill through 2" of asphalt
- Drill through 6" concrete
- Hand clear to 5'
- Take S-1
- Take S-2
- Push casing to 5'
- Hammer casing to 8.5'
- Clean out the hole
- Brick in return
- Rig chatter
- Brown wash
- Take S-3
- Take S-4
- Driller threw out sample
- (No sample obtained in jar)
- Push casing to 13.5'
- Take S-5

**Sample Description**

- **Class 7**
  - ASPHALT (2")
  - CONCRETE (6")
  - Mottled red, black, brown m-f SAND, some silt, trace building material, brick, asphalt, concrete (dry) [FILL]

- **Class 6**
  - Olive brown m-f SAND, trace silt, trace clay (wet) [SP-SM]

- **Class 3b**
  - Gray brown fine SAND, trace silt, trace clay (wet) [SP-SM]

- **Class 6**
  - Gray silty SAND, trace clay (wet) [SM]
<table>
<thead>
<tr>
<th>Elev (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Depth</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>S-7</td>
<td>Maroon brown CLAY, trace silt, trace fine sand (wet) [CL]</td>
<td>24</td>
<td>6 11</td>
<td>Drill to 25' Brown wash Easy drilling Take S-7</td>
</tr>
<tr>
<td>20</td>
<td>S-6</td>
<td>Orange brown c-f SAND, trace silt, trace fine gravel (wet) [SP]</td>
<td>10</td>
<td>9 19</td>
<td>Drill to 20' Gray wash Easy drilling Take S-6</td>
</tr>
<tr>
<td>-17.5</td>
<td>Class 4b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-14.0</td>
<td>Class 3b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E.O.B. @ 27.0 ft bgs
Brown c-f SAND, trace c-f gravel, trace silt, some concrete, trace brick
[FILL] (moist)

Brown c-f SAND, trace m-f gravel, trace silt, some concrete, trace brick
[FILL] (moist)

Brown silty SAND, trace organics (root fibers)
[SM] (wet)

Gray silty SAND
[SM] (wet)
<table>
<thead>
<tr>
<th>Material Description</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown c-f SAND, some fine gravel, trace silt</td>
<td>S-5</td>
<td>Take S-5: 20-22'</td>
</tr>
<tr>
<td>[SP-SM] (wet)</td>
<td></td>
<td>Advance with roller bit to 25'</td>
</tr>
<tr>
<td>Brown m-f SAND, trace silt [SP-SM] (wet)</td>
<td>S-6</td>
<td>Take S-6: 25-27'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 30'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown wash, smooth drilling</td>
</tr>
<tr>
<td>Brown silty SAND [SM] (wet)</td>
<td>S-7</td>
<td>Take S-7: 30-32'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 35'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown wash, smooth drilling</td>
</tr>
<tr>
<td>Brown silty SAND [SM] (wet)</td>
<td>S-8</td>
<td>Take S-8: 35-37'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 40'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown wash, smooth drilling</td>
</tr>
<tr>
<td>Brown SILT, trace fine sand [ML] (wet)</td>
<td>S-9</td>
<td>Take S-9: 40-42'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 45'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown wash, smooth drilling</td>
</tr>
</tbody>
</table>
Brown-gray varved CLAY, seams of silt [CL] (wet)

Brown silty SAND (wet) [SM]

Brown-gray varved CLAY with seams of silt [CL]

Brown-gray varved CLAY with seams of silt [CL]

Brown-gray varved CLAY with seams of silt [CL]

Brown-gray varved CLAY with seams of silt [CL]

Brown-gray varved CLAY, seams of silt [CL] (wet)

Brown-gray varved CLAY with seams of silt [CL]

Brown-gray varved CLAY with seams of silt [CL]
Brown-gray varved CLAY with seams of silt (wet) [CL]  

Brown-gray varved CLAY with seams of silt (wet) [CL]  

S-17A: Brown and gray varved CLAY with seams of silt and fine sand (wet) [CL]  

S-17B: Brown c-f GRAVEL, trace c-f sand, trace silt, trace clay (GW)  

E.O.B. @ 82.0 ft bgs  

Take S-15: 70-72’  
Advance with roller bit to 75’  
Brown wash, soft drilling  

Take S-16: 75-77’  
Advance with roller bit to 80’  
Brown wash, soft drilling  

Take S-17: 80-82’  
End of drilling
**Log of Boring**

**Project**: Baruch Houses, NYCHA  
**Project No.**: 170334001  
**Location**: Baruch Drive, Manhattan New York  
**Elevation and Datum**: Approx. 10.5 ± NAVD88

**Drilling Company**: Craig Geotechnical Drilling  
**Date Started**: 4/16/15  
**Date Finished**: 5/16/15

**Drilling Equipment**: CME 55 ATV  
**Completion Depth**: 37 ft  
**Rock Depth**: Not Encountered

### Size and Type of Bit
- 7 1/8" Tricone Roller Bit
- Casing Diameter (in): 4" O.D. Steel

### Sampler and Hammer
- Sampler: Automatic
- Weight (lbs): 140
- Drop (in): 30
- Sampler Hammer: 2" Split Spoon
- Weight (lbs): 140
- Drop (in): 30

### Drilling Foreman
- Rob Dollar

### Inspecting Engineer
- Rene Silvestre

### Completion Depth
- Number of Samples: 9
- Disturbed: 9
- Undisturbed: 0
- Core: 0

### Remarks
- 5/16/15
- 9:30 - Hand augering to 4' on 5/15/15
- Install casing to 4'
- Take S-1: 4-6'
- Take S-2": 6-8'
- Refusal at 9'-2"  
- Install casing to 10'
- Clean out with roller bit
- Brown wash, light rig chatter
- Take S-3: 8-10'
- Install casing to 15'
- Clean out with roller bit to 15'
- Brown wash, smooth drilling
- Take S-4: 10-12'
- Install casing to 15'
- Clean out with roller bit to 15'
- Brown wash, smooth drilling
- Take S-5: 15-17'
- Advance with roller bit to 20'
- Brown wash, smooth drilling

### Sample Data

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>SYMBOL</th>
<th>Building Code</th>
<th>Elev. (R)</th>
<th>MATERIAL</th>
<th>SYMBOL</th>
<th>Building Code</th>
<th>Elev. (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown c-f SAND, trace c-f gravel, some brick and concrete</td>
<td>[FILL] (moist)</td>
<td>Class 7</td>
<td>+10.5</td>
<td>S-4B: Brown silty SAND, trace organics (wet) (11'-12') [SM]</td>
<td>SS</td>
<td>S-3</td>
<td>6</td>
</tr>
<tr>
<td>Brown c-f SAND, trace silt, some brick</td>
<td>[FILL] (moist)</td>
<td>Class 6</td>
<td>+0.5</td>
<td>Gray silty SAND (wet) [SM]</td>
<td>SS</td>
<td>S-5</td>
<td>10</td>
</tr>
<tr>
<td>Brown c-f SAND, trace silt, some brick</td>
<td>[FILL] (moist)</td>
<td>Class 6</td>
<td>-0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Log of Boring Sheet 1

- Sample Data
- Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
- Approx. 10.5 ± NAVD88
- Baruch Drive, Manhattan New York
- Baruch Houses, NYCHA
- Craig Geotechnical Drilling
- CME 55 ATV
- Casing Diameter (in): 4" O.D. Steel
- Sampler: Automatic
- Weight (lbs): 140
- Drop (in): 30
- Sampler Hammer: 2" Split Spoon
- Weight (lbs): 140
- Drop (in): 30
- Drilling Foreman: Rob Dollar
- Inspecting Engineer: Rene Silvestre
- Disturbed: 9
- Undisturbed: 0
- Core: 0
- Date Started: 4/16/15
- Date Finished: 5/16/15
- Remarks
- Install casing to 4'
- Take S-1: 4-6'
- Take S-2": 6-8'
- Refusal at 9'-2"  
- Install casing to 10'
- Clean out with roller bit
- Brown wash, light rig chatter
- Take S-3: 8-10'
- Install casing to 15'
- Clean out with roller bit to 15'
- Brown wash, smooth drilling
- Take S-4: 10-12'
- Install casing to 15'
- Clean out with roller bit to 15'
- Brown wash, smooth drilling
- Take S-5: 15-17'
- Advance with roller bit to 20'
- Brown wash, smooth drilling
<table>
<thead>
<tr>
<th>Elevation</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 21        | Gray-brown fine SAND, trace silt (wet) [SP-SM] | Take S-6: 20-22'
Advance with roller bit to 25' Brown wash, smooth drilling |
| 25        | Brown m-f SAND, trace silt (wet) [SP-SM] | Take S-7: 25-27'
Advance with roller bit to 30' Brown wash, smooth drilling |
| 30        | Brown m-f SAND, trace silt (wet) [SP-SM] | Take S-8: 30-32'
Advance with roller bit to 35' Brown wash, smooth drilling |
| 37        | Brown m-f SAND, trace silt (wet) [SP-SM] | Take S-9: 35-37'
End of drilling |
| 37        | E.O.B. @ 37.0 ft bgs |         |
Project: Baruch Houses, NYCHA
Location: Baruch Drive, Manhattan New York

Class 7
Brown c-f SAND, trace brick and concrete, some c-f gravel, trace silt
[FILL] (moist)

Class 6
Brown c-f SAND, trace silt, trace brick, trace metal fragments
[FILL] (moist)

Brown c-f SAND, trace silt, trace brick, trace metal fragments
[FILL] (moist)

Class 6
S-3A: Brown c-f SAND, some c-f gravel, trace silt (wet) [SW]

S-3B: Brown fine sandy organic CLAY (wet) [OH]

No recovery
Olive silty SAND (wet) [SM]

Class 6

Remarks:
4/15/15
10:20am - Start hand augering for utility-clearing

Take S-1: 6-8'
Take S-2: 8-10'
Take S-3: 10-12'
Install casing to 10'
Clean out to 12' with roller bit
Brown wash, smooth drilling
Take U-1: 12-14'
No recovery

Install casing to 15'
Clean out to 15' with roller bit
Brown wash, smooth drilling
Take S-4: 15-17'
Advance with roller bit to 20'
Brown wash, smooth drilling
### Log of Boring

**Location:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Elevation and Datum:** Approx. 11± NAVD88  
**Location:** Baruch Drive, Manhattan New York

<table>
<thead>
<tr>
<th>Elev. (ft)</th>
<th>Building Code</th>
<th>MATERIAL</th>
<th>SYMBOL</th>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>Sample Data</th>
<th>N-Value (Blows/ft)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Class 6</td>
<td></td>
<td>Brown silty SAND (wet) [SM]</td>
<td>20</td>
<td></td>
<td></td>
<td>Take S-5: 20-22'</td>
</tr>
<tr>
<td>-12.5</td>
<td></td>
<td>Class 6</td>
<td></td>
<td>Brown-gray varved CLAY with seams of silt (wet) [ML]</td>
<td>21</td>
<td></td>
<td></td>
<td>Advance with roller bit to 25' Brown wash, smooth drilling</td>
</tr>
<tr>
<td>-16.0</td>
<td></td>
<td></td>
<td></td>
<td>E.O.B. @ 27.0 ft bgs</td>
<td>27</td>
<td></td>
<td></td>
<td>Take S-6: 25-27'</td>
</tr>
</tbody>
</table>

**Remarks:**
- (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Location:** Baruch Drive, Manhattan, New York  
**Elevation and Datum:** Approx. 12 ft NAVD88

**Drilling Company:** Craig Geotechnical Drilling  
**Drilling Equipment:** CME 75 Truck-Mounted Rig

**Date Started:** 4/7/15  
**Date Finished:** 4/7/15

### Completion Depth

<table>
<thead>
<tr>
<th>MATERIAL SYMBOL</th>
<th>MATERIAL</th>
<th>SYMBOl</th>
<th>Depth (ft)</th>
<th>Scale</th>
<th>Drilling Foreman</th>
<th>Inspecting Engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class 7</strong></td>
<td>Red brown grey m-f SAND, some m-f gravel, trace brick, concrete, glass, trace silt [SP] [FILL]</td>
<td></td>
<td>23.5'</td>
<td>10</td>
<td>-</td>
<td>Nick Kerr</td>
</tr>
<tr>
<td><strong>Class 6</strong></td>
<td>Brown f-m SAND, some silt, trace m-f gravel [SM] [FILL]</td>
<td></td>
<td>27'</td>
<td>10</td>
<td>-</td>
<td>Nick Kerr</td>
</tr>
<tr>
<td><strong>Class 3b</strong></td>
<td>No recovery</td>
<td></td>
<td>14</td>
<td>10</td>
<td>-</td>
<td>Nick Kerr</td>
</tr>
<tr>
<td><strong>Class 6</strong></td>
<td>Brown sandy m-f GRAVEL (limited recovery - gravel in tip)</td>
<td></td>
<td>14</td>
<td>10</td>
<td>-</td>
<td>Nick Kerr</td>
</tr>
<tr>
<td><strong>Class 6</strong></td>
<td>No recovery</td>
<td></td>
<td>14</td>
<td>10</td>
<td>-</td>
<td>Nick Kerr</td>
</tr>
</tbody>
</table>

### Remarks

- **4/7/15**  
  - 8:20 - Begin drilling  
  - Drill through 5.5" of concrete sidewalk with 12" concrete cutter  
  - Hand clear to 5'  
  - Observed red brick and concrete  
  - Obstruction at 4' use 3" SS to advance

- **Take S-1:** 9:55am
- **Take S-2**
- **Push casing to 3.5'**
- **Drive casing to 8'**  
  - Clean out hole to 9'
  - Brown wash  
  - Take S-3 (no recovery)  
  - Take S-3 with 3" spoon (no recovery, possible void)  
  - Take S-4
  - **Push casing to 13.5'**  
  - Drill to 15'
  - Add quick gel  
  - Rig chatter, brown wash  
  - Take S-5 (No recovery)  
  - Take S-5 with 3" SS (no recovery)  
  - Retry pushing 3" SS
  - Drill to 20'
  - Easy drilling
  - Gray wash
**Log of Boring**

**Location**: Baruch Houses, NYCHA

**Location**: Baruch Drive, Manhattan, New York

**Elevation and Datum**: Approx. 12± NAVD88

**Material Symbol**: E.O.B. @ 27.0 ft bgs

**Sample Description**:
- Grey SILT with sand (wet) [SM]
- Orange brown f-m SAND, trace silt (wet) [SP]

**Remarks**:
- Take S-6
- Drill to 25'
- Brown wash
- Easy drilling
- Take S-7
- END OF HOLE at 10:50
## Log of Boring

<table>
<thead>
<tr>
<th>Project No.</th>
<th>170334001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Baruch Drive, Manhattan New York</td>
</tr>
<tr>
<td>Elevation and Datum</td>
<td>Approx. 11.0 ± NAVD88</td>
</tr>
<tr>
<td>Drilling Company</td>
<td>Craig Geotechnical Drilling</td>
</tr>
<tr>
<td>Drilling Equipment</td>
<td>CME 55 ATV</td>
</tr>
<tr>
<td>Date Started</td>
<td>4/22/15</td>
</tr>
<tr>
<td>Date Finished</td>
<td>4/23/15</td>
</tr>
<tr>
<td>Rock Depth</td>
<td>85 ft</td>
</tr>
<tr>
<td>Casing Diameter (in)</td>
<td>4&quot; O.D. Steel</td>
</tr>
<tr>
<td>Casing Depth (ft)</td>
<td>15'</td>
</tr>
<tr>
<td>Water Level (ft.)</td>
<td>24 HR.</td>
</tr>
<tr>
<td>Drilling Foreman</td>
<td>Rob Dollar</td>
</tr>
<tr>
<td>Inspecting Engineer</td>
<td>Abdulhusain Ben Nakhi</td>
</tr>
</tbody>
</table>

### Sample Data

<table>
<thead>
<tr>
<th>Depth</th>
<th>Elevation (ft)</th>
<th>Sample Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>+11.0</td>
<td>Brown c-f SAND, trace gravel, some brick (moist) [FILL]</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>+3.0</td>
<td>No recovery (possible fill)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>-4.0</td>
<td>Brown c-f SAND, trace silt, some c-f gravel (wet) [SM]</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-7.5</td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>-8.0</td>
<td>Brown c-f SAND, trace silt, some c-f gravel (wet) [SM]</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>-10.0</td>
<td>Brown c-f SAND, trace silt, some c-f gravel (wet) [SM]</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>-13.0</td>
<td>Brown c-f SAND, trace silt, some c-f gravel (wet) [SM]</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

- 4/22/15: Hand auger to 5' on 4/10/15
- Start drilling at 12:50 pm
- Install casing to 5'
- Add hole plug around the casing
- Add quik gel to mud tub
- Clean out with roller bit to 6'
- Brown wash, smooth

- Take S-1 (6'-8')
- Take S-2 (8'-10')
- Take S-3 (10'-12')
- Install casing to 15'
- Clean out with roller bit to 15'
- Brown-gray wash, rig chatter

- Take S-4
- Advanced with roller bit to 20'
- Brown wash, smooth
Brown m-f SAND, trace silt (wet) [SP-SM]  
Brown-gray m-f SAND, trace silt (wet) [SP-SM]  
Brown m-f SAND, trace silt (wet) [SP]  
Brown m SAND, trace silt, trace mica (wet) [SP]  
Brown silty SAND (wet) [SM]  

Take S-5  
End of day at 2:45 pm  
4/23/15  
Start drilling at 7:25 am  
Advance with roller bit to 25’  
Brown wash, smooth  
Take S-6  
Advance with roller bit to 30’  
Brown wash, smooth  
Take S-7  
Advance with roller bit to 35’  
Brown wash, smooth  
Take S-8  
Advance with roller bit to 40’  
Brown wash, smooth  
Take S-9  
Advance with roller bit to 45’  
Brown wash, smooth
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.0</td>
<td>Brown silty SAND, trace mica (wet) [SM]</td>
<td>Take S-10</td>
</tr>
<tr>
<td>47.0</td>
<td>Brown SILT, trace sand (wet) [ML]</td>
<td>Advance with roller bit to 50' Brown wash, smooth</td>
</tr>
<tr>
<td>48.0</td>
<td>Brown CLAY, trace silt (wet) [CL]</td>
<td>Take S-11</td>
</tr>
<tr>
<td>49.0</td>
<td>Brown CLAY (wet) [CL]</td>
<td>Advance with roller bit to 55' Brown wash, smooth</td>
</tr>
<tr>
<td>50.0</td>
<td>Brown-gray CLAY, trace silt (wet) [CL]</td>
<td>Take S-12</td>
</tr>
<tr>
<td>51.0</td>
<td>Brown-gray CLAY, trace silt (wet) [CL]</td>
<td>Advance with roller bit to 60' Brown wash, smooth</td>
</tr>
<tr>
<td>52.0</td>
<td>Brown-gray CLAY, trace silt (wet) [CL]</td>
<td>Take S-13</td>
</tr>
<tr>
<td>53.0</td>
<td>Brown-gray CLAY, trace silt (wet) [CL]</td>
<td>Advance with roller bit to 65' Brown gray wash, smooth</td>
</tr>
<tr>
<td>54.0</td>
<td>Brown-gray CLAY, trace silt (wet) [CL]</td>
<td>Take S-14</td>
</tr>
<tr>
<td>55.0</td>
<td>Brown-gray CLAY, trace silt (wet) [CL]</td>
<td>Advance with roller bit to 70' Brown gray wash</td>
</tr>
</tbody>
</table>
Log of Boring

Project
Baruch Houses, NYCHA

Project No.
170334001

Location
Baruch Drive, Manhattan New York

Elevation and Datum
Approx. 11± NAVD88

Number
70

Type
Penetr. resist

Building Code
LB-33

Location Sheet
4

Sample Description

MATERIAL
SYMBOL

Elev. (ft)

Scale

65.5

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

Sample Data

Depth Scale

Remarks

Take U-1 at 70'

Take S-15

Take S-15

Advance with roller bit to 80'

Brown wash, smooth

Take S-16

Advance with roller bit to 85'

Brown gray wash, rig chatter at 82'-83'

Hard drilling at 83'5" (possible top of rock)

Start coring C-1 at 85'

Brown wash, smooth

Complete C-1 at 90'

END OF DRILLING at 90'

E.O.B. @ 90.0 ft bgs
Gray brown m-f SAND, some silt, trace f-m gravel, trace brick, wood, asphalt, concrete [SM] [FILL]

Brown m-f SAND, trace silt, trace brick [SP] [FILL]

Gray brown m-f SAND, some silt, trace gravel, trace brick (wet) [SP] [FILL]

Gray brown silty SAND, trace c-f gravel (wet) [SM]

Brown gray silty SAND (wet) [SP]

Remarks

4/6/15 START 8:00
Drill through concrete sidewalk
Hand clear to 5'

Take S-1
Take S-2
Install casing to 9'
Backfill around the casing
Clean out hole with roller bit to 9'
Brown wash, rig chatter
Take S-3

Take S-4
Silt at tip

Hammer casing to 14'
Add quick gel
Drill to 15'
Rig chatter, brown wash

Take S-5

Drill to 20'
Easy drilling, brown/gray wash
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Location:** Baruch Drive, Manhattan New York  
**Elevation and Datum:** Approx. 10.5± NAVD88

<table>
<thead>
<tr>
<th>Material Symbol</th>
<th>Sample Description</th>
<th>Depth (ft)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 3b</td>
<td>Brown silty SAND (wet) [SM]</td>
<td>20-25</td>
<td>Take S-6, Drill to 25', Easy drilling, grey wash</td>
</tr>
<tr>
<td>Class 4b</td>
<td>Brown pink silty SAND, trace fine gravel [SM]</td>
<td>30-35</td>
<td>Take S-7, Drill to 30', Easy drilling, grey brown wash</td>
</tr>
<tr>
<td>Class 3c</td>
<td>Dark brown gray CLAY, some silt, trace fine sand [CL]</td>
<td>36-40</td>
<td>Take S-8, Drill to 35', Easy drilling, brown wash</td>
</tr>
<tr>
<td>Class 3b</td>
<td>Pink brown gray CLAY, trace fine sand (wet) [CL]</td>
<td>41-45</td>
<td>Take S-9, Drill to 40', Brown/gray wash, easy drilling</td>
</tr>
<tr>
<td>Class 4c</td>
<td>Pink brown gray CLAY, trace fine sand (wet) [CL]</td>
<td>46-50</td>
<td>Take S-10, Drill to 45', Easy drilling, grey brown wash</td>
</tr>
</tbody>
</table>

**Sample Data:**
- **Building Code:** LB-34
- **Project No.:** 170334001
- **Location:** Baruch Drive, Manhattan New York
- **Elevation and Datum:** Approx. 10.5± NAVD88
Baruch Houses, NYCHA

Baruch Drive, Manhattan New York

Elevation and Datum
Approx. 10.5± NAVD88

Location

Project No.
170334001

Log of Boring Sheet 3 of 4

Baruch Houses, NYCHA

Baruch Drive, Manhattan New York

Elevation and Datum
Approx. 10.5± NAVD88

Class 4c

Gray pink brown CLAY, trace silt (wet) [CL]

Class 6

Grey brown varved CLAY with seams of silt (wet) [CL]

Class 4b

Grey varved CLAY with seams of silt (wet) [CL]

Take S-11
Drill to 50'
Easy drilling, grey wash

Take S-12
Drill to 55'
Easy drilling, brown grey wash

Take S-13
Drill to 60'
Easy drilling, grey wash

Take S-14
Drill to 63'
Easy drilling, grey wash

Take SH-1
Push at 11:24 am
Pull at 11:53 am

Take S-15
Drill to 70'
Grey wash, easy drilling
Brown m-c SAND, trace f-c gravel, some brick and construction debris (moist) [FILL]

Brown c-f SAND, some c-f gravel, trace silt, some brick (wet) [FILL]

Brown gravelly c-f SAND, trace silt, trace brick (wet) [FILL]

Brown m-f SAND, trace silt, trace gravel (wet) [SW]

Brown silty SAND [SM] (wet)
<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>-14.0</td>
<td>Brown s-f SAND, trace silt (wet) [SW]</td>
<td>Take S-5: 20-22' Advance with roller bit to 25' Brown wash, smooth drilling</td>
</tr>
<tr>
<td>-24.0</td>
<td>Brown silty SAND (wet) [SM]</td>
<td>Take S-6: 25-27' Advance with roller bit to 30' Brown wash, smooth drilling</td>
</tr>
<tr>
<td></td>
<td>Brown silty SAND (wet) [SM]</td>
<td>Take S-7: 30-32' Advance with roller bit to 35' Brown wash, smooth drilling</td>
</tr>
<tr>
<td></td>
<td>Brown SILT with 1-in-thick seams of gray clay (wet) [ML]</td>
<td>Take S-8: 35-37' Advance with roller bit to 40' Brown wash, smooth drilling</td>
</tr>
<tr>
<td></td>
<td>Brown SILT with 1-in-thick seams of gray clay (wet) [ML]</td>
<td>Take S-9: 40-42' Advance with roller bit to 45' Brown wash, smooth drilling</td>
</tr>
</tbody>
</table>
Brown SILT with 1-in-thick seams of gray clay [ML] (wet)

Brown and gray varved CLAY with seams of silt (wet) [CL]

Brown and gray varved CLAY (wet) [CL]

Brown and gray varved CLAY with seams of silt (wet) [CL]

Brown and gray varved CLAY (wet) [CL]

Take S-10: 45-47'
Advane with roller bit to 50'
Brown wash, smooth drilling

Take S-11: 50-52'
Advane with roller bit to 55'
Brown wash, soft drilling

Take S-12: 55-57'
Advane with roller bit to 60'
Brown wash, smooth drilling

Take S-13: 60-62'
Advane with roller bit to 62'
Brown wash, smooth and soft drilling

Take U-1: 62-64'

Take S-14: 64-66'
Advane with roller bit to 70'
Brown wash, smooth drilling
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Location:** Baruch Drive, Manhattan New York  
**Project No.:** 170334001  
**Elevation and Datum:** Approx. 9.5+ NAVD88

<table>
<thead>
<tr>
<th>MATERIAL SYMBOL</th>
<th>ELEV (Ft)</th>
<th>BUILDING CODE</th>
<th>SAMPLE DESCRIPTION</th>
<th>DEPTH</th>
<th>SCALE</th>
<th>NUMBER</th>
<th>PENETRATION RESIST</th>
<th>N-VALUE (Blows/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64.0</td>
<td></td>
<td>Cobble fragment at tip of spoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>64.5</td>
<td></td>
<td>Brown and red c-f SAND, trace silt, trace gravel (glacial till) 9wet) [SW]</td>
<td>70</td>
<td>70</td>
<td>S-15</td>
<td>1</td>
<td>21</td>
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<tr>
<td></td>
<td>71</td>
<td></td>
<td>Brown c-f SAND, trace silt, trace gravel (glacial till) (wet) [SW]</td>
<td>71</td>
<td>71</td>
<td>S-16</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td></td>
<td>Brown c-f SAND, trace silt, trace gravel (glacial till) (wet) [SW]</td>
<td>72</td>
<td>72</td>
<td>S-17</td>
<td>14</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td></td>
<td>Brown c-f SAND, trace silt, trace gravel (glacial till) (wet) [SW]</td>
<td>73</td>
<td>73</td>
<td>S-18</td>
<td>10</td>
<td>24</td>
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<tr>
<td></td>
<td>74</td>
<td></td>
<td>Brown c-f SAND, trace silt, trace gravel (glacial till) (wet) [SW]</td>
<td>74</td>
<td>74</td>
<td>S-19</td>
<td>7</td>
<td>18</td>
</tr>
</tbody>
</table>

**Remarks:**
- Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.
### Class 1d

**E.O.B. @ 105.0 ft bgs**

**C-1: Gray m-f grained; moderately hard to hard; quartz-biotite-feldspar-garnet GNEISS; severely fractured; moderately to highly weathered**

(NYCBC Class 1d)

**C-2: Gray m-f grained; hard; quartz-biotite-feldspar-garnet GNEISS; slightly fractured; unweathered; foliated at 40-50 degrees; joints at 102', 103.5', 104' and 104.5'**

(NYCBC Class 1a)

### Remarks

- **4/20/15**: Install casing to 40’. Rig broke down
- **4/21/15**: 10:10 Rig repaired. Set up complete
  - Clean out w roller bit to 96’
  - Heavy chattering at 95’, hard drilling
  - Start coring C-1 at 96’
  - Brown wash, rig chatter
  - Core barrel blocks up at 100’
  - Complete C-1 at 100’
  - C-1 fractures might be affected by core bit defects (worn out)
  - Change of core bit
  - Start coring C-2 at 100’
  - Brown wash, smooth
  - Complete C-2 at 105’
  - END OF DRILLING
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Location:** Baruch Drive, Manhattan New York  
**Elevation and Datum:** Approx. 9.5± NAVD88  
**Drilling Company:** Craig Geotechnical Drilling  
**Date Started:** 4/21/15  
**Date Finished:** 4/22/15

### Drilling Parameters

<table>
<thead>
<tr>
<th>Casing Diameter (in)</th>
<th>Casing Depth (ft)</th>
<th>Water Level (ft.)</th>
<th>Completion Depth (&quot;)</th>
<th>Disturbed</th>
<th>Undisturbed</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; O.D. Steel</td>
<td>20</td>
<td></td>
<td>24 HR.</td>
<td>First</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Sampling Details

- **Casing Hammer:** Automatic
- **Sampler:** 2" Split Spoon

### Sample Data

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Brown c-f SAND, some brick and construction debris, trace gravel (moist) [FILL]</td>
</tr>
<tr>
<td>6</td>
<td>Brown c-f SAND, trace silt, trace gravel (wet) [FILL]</td>
</tr>
<tr>
<td>10</td>
<td>Brown m-f SAND, trace silt, trace gravel (wet) [SP]</td>
</tr>
<tr>
<td>12</td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
</tr>
<tr>
<td>14</td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
</tr>
</tbody>
</table>

### Remarks

- **4/21/15:** Hand auger to 5' on 4/10/15  
  - Start drilling at 1:55 pm  
  - Install casing to 5'  
  - Clean out to 6'

- **Take S-1 (6'-8')**
- **Take S-2 (8'-10')**
- **Take S-3 (10'-12')**
- Install casing to 15'  
  - Clean out with roller bit to 15'  
  - Brown wash, smooth

- **Take S-4**

- Install casing to 20'  
  - Clean out with roller bit to 20'  
  - Grey wash, smooth  
  - Add quik gel to mud tub
**Log of Boring**

**Location**: Baruch Drive, Manhattan New York

**Elevation and Datum**: Approx. 9.5± NAVD88

**Project No.**: 170334001

<table>
<thead>
<tr>
<th>Building Code</th>
<th>Elev. (Ft)</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 3b</td>
<td>-14.0</td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>Take S-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Advance with roller bit to 25' Brown wash, smooth</td>
</tr>
<tr>
<td>Class 6</td>
<td>-19.0</td>
<td>Brown m-f SAND, trace silt (wet) [SP-SM]</td>
<td>Take S-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Advance with roller bit to 30' Brown wash, smooth END OF DAY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown m-f SAND, some silt (wet) [SM]</td>
<td>Take S-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Add quick gel Drill to 30' Easy drilling, brown wash</td>
</tr>
<tr>
<td>Class 3b</td>
<td>-24.0</td>
<td>Brown silty SAND (wet) [SM]</td>
<td>Take S-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Advance with roller bit to 40' Brown wash, smooth</td>
</tr>
<tr>
<td>Class 6</td>
<td></td>
<td>Brown silty SAND (wet) [SM]</td>
<td>Take S-9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Advance with roller bit to 45' Brown wash, smooth</td>
</tr>
<tr>
<td>Material Symbol</td>
<td>Sample Description</td>
<td>Remarks</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------------</td>
<td>----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brown silty SAND (wet) [SM]</td>
<td>Take S-10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brown silty SAND (wet) [SM]</td>
<td>Advance with roller bit to 50’</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gray wash, smooth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brown SILT (wet) [ML]</td>
<td>Take S-11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 55’</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown gray wash, smooth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gray SILT, trace fine sand (wet) [ML]</td>
<td>Take S-12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 60’</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown wash, smooth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brown-gray CLAY, trace silt (wet) [CL]</td>
<td>Take S-13</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 65’</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown gray wash, smooth</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Take S-14</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advance with roller bit to 70’</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown gray wash</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rig chatter at 72’-73’</td>
<td></td>
</tr>
</tbody>
</table>
Log of Boring  
LB-36  
Sheet 4 of 4

Project  
Baruch Houses, NYCHA

Location  
Baruch Drive, Manhattan New York

Elevation and Datum  
Approx. 9.5± NAVD88

Elevation and Datum  
Location

Baruch Houses, NYCHA  
Baruch Drive, Manhattan New York  
Approx. 9.5± NAVD88

Baruch Houses, NYCHA  
Baruch Drive, Manhattan New York  
Approx. 9.5± NAVD88

<table>
<thead>
<tr>
<th>Material</th>
<th>Symbol</th>
<th>Description</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| Brown CLAY (wet) | [CL] | Class 4c | 70.0 | Take S-15  
Advance with roller bit to 75'  
Gray wash, hard drilling at 72'-73'

Brown c-f SAND, trace gravel (wet) | [SP] | Class 3a | 70.5 | Take S-16  
Advance with roller bit to 80'  
Brown gray wash

Brown c-f SAND, trace silt, trace gravel (wet) | [SP] | Class 1b | 75.5 | Take S-17  
Spoon refusal at 80'3"  
Start coring C-1 at 80'  
Brown wash, smooth  
Complete C-1 at 85'  
END OF DRILLING at 85'

Gray m-f grained; hard; quartz-biotite-garnet-feldspar GNEISS; moderately weathered; sound. [NYCBC Class 1b]  
E.O.B. @ 85.0 ft bgs
Log of Boring  LB-37  Sheet 1 of 4

**Project**  Baruch Houses, NYCHA  
**Location**  Baruch Drive, Manhattan New York  
**Elevation and Datum**  Approx. 10± NAVD88  
**Date Started**  4/23/15  
**Date Finished**  4/24/15  

### Drilling Company
Craig Drilling  

### Drilling Equipment
CME Truck Rig  

### Size and Type of Bit
3-7/8" I.D. steel  
4" O.D. steel casing  

### Casing Diameter (in)
<table>
<thead>
<tr>
<th>Class</th>
<th>Symbol</th>
<th>Elevation (ft)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 7</td>
<td></td>
<td>3.5</td>
<td>Brown m-f SAND, trace gravel, some brick (moist) [FILL]</td>
</tr>
<tr>
<td>Class 3b</td>
<td></td>
<td>8.5</td>
<td>Brown m-f SAND, trace silt (wet) [SP]</td>
</tr>
<tr>
<td>Class 6</td>
<td></td>
<td></td>
<td>Brown m-f SAND, trace silt (wet) [FILL]</td>
</tr>
</tbody>
</table>

### Remarks
4/23/15  
Start at 12:30  
Hand augured for utility clearing  
Install casing to 5'  
End of drilling at 12:50pm  
4/24/15  
Started at 1:30am fixing the rig.  
Install casing to 10'  
Clear out with roller bit  
Brown wash, smooth drilling  

### Completion Depth
-3.5
-8.5
-10

### Number of Samples
Disturbed: 14  
Undisturbed: -  
Core: -  

### Sample Data

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>SYMBOL</th>
<th>ELEV. (R)</th>
<th>SCALE</th>
<th>BUILDING CODE</th>
<th>SAMPLE DESCRIPTION</th>
<th>DEPTH SCALE</th>
<th>NUMBER</th>
<th>MOIST</th>
<th>PENETR.</th>
<th>RESIST</th>
<th>RECov. (in)</th>
<th>Core</th>
<th>N-VALUE (BLOW/FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>+10.0</td>
<td></td>
<td></td>
<td></td>
<td>10 20 30 40</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

### Cleaning and Remarks

- Take S-1: 6-8'
- Take S-2: 8'-10'
- Take S-3: 10-12'
- Take S-4: 15-17'
### Material Description

#### Class 5b
- **Sample Description**: Brown m-f SAND, trace silt (moist) [SP-SM]

#### Class 5c
- **Sample Description**: Brown fine SAND, trace silt (wet) [SP-SM]

#### Class 4c
- **Sample Description**: Brown gray CLAY, trace silt (wet) [CL]
- **Sample Description**: Brown gray CLAY, trace silt (wet) [CL]
- **Sample Description**: Brown-gray varved CLAY with seams of silt (wet) [CL]

### Log of Boring

**Notes:**
- Take S-5: 20-22'
  - Advance roller bit to 25'
  - Brown wash, smooth
- Take S-6: 25-27'
  - Advance roller bit to 30'
  - Brown wash, smooth
- Take S-7: 30-32'
  - Advance roller bit to 35'
  - Brown wash, smooth
- Take S-8: 35-37'
  - Advance roller bit to 40'
  - Brown wash, smooth
- Take S-9: 40-42'
  - Advance roller bit to 45'
  - Brown wash, smooth
Brown-gray varved CLAY with seams of silt (wet) [CL]

Brown-gray varved CLAY with seams of silt (wet) [CL]

Brown c-f SAND, trace gravel, trace silt (wet) [SP]

Brown m-f SAND, trace gravel, trace silt (wet) [SP]

Brown c-f SAND, trace silt (wet) [SP]

Brown wash, smooth

Brown wash, smooth

Brown wash, heavy chatter

Brown wash, chatter

Brown wash, chatter

Take S-10: 45-47’
Advance roller bit to 50’

Take S-11: 50-52’
Advance roller bit to 55’

Take S-12: 55-57’
Advance roller bit to 60’

4” split spoon
Take S-13: 60-62’
Advance roller bit to 65’

Take S-14: 65-67’
Advance roller bit to 70’
**Sample Description**

Gray m-f grained, moderately hard to hard; quartz biotite granite GNEISS, slightly weathered; slightly fractured.  

[Class 1b]

---

**E.O.B. @ 75.0 ft bgs**

---

**Remarks**

Top of rock at 68'  
Start coring at 70'  
Brown wash, smooth  
Take C-1: 70'  
End of boring
**Log of Boring**

*Project No.*: 170334001  
*Location*: Baruch Houses, NYCHA  
*Drilling Company*: Craig Geotechnical Drilling  
*Drilling Equipment*: CME 75 Truck Mounted Rig  
*Date Started*: 4/29/15  
*Date Finished*: 4/30/15  
*Completion Date*: 72.5 ft  
*Rock Depth*: 67.5 ft

### Sample Data

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4&quot; CONCRETE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown c-f SAND, trace, bricks, concrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete obstruction at 5'-4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light brown c-f SAND, some silt, trace gravel, trace brick (wet) [FILL]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown-f SAND, trace silt, trace gravel (wet) [SP]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown c-f SAND, some silt (wet) [SM]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray SILT, some fine sand [ML]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray fine SAND, trace silt [SP]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

- 4/28/2015  
  - Hand clear 0’ to 6’ after drilling through 4” concrete

- Obstruction at 5'-4”  
  - 3” split spoon from 5'-4” to 6’  
  - Take S-1

- Take S-2  
  - Install casing to 8.5’  
  - Add mud

- Clean out hole to 10’  
  - Brown wash  
  - Slight rig chatter  
  - Take S-3

- Push casing to 13.5’

- Drill to 15’  
  - Take S-4
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Brown fine SAND, trace silt [SP]</td>
</tr>
<tr>
<td>21</td>
<td>Gray varved SILT with seams of fine sand [ML]</td>
</tr>
<tr>
<td>22</td>
<td>Gray varved SILT with seams of fine sand [ML]</td>
</tr>
<tr>
<td>25</td>
<td>Gray varved CLAY with seams of sand [CL]</td>
</tr>
<tr>
<td>30</td>
<td>Gray varved CLAY with seams of fine sand</td>
</tr>
<tr>
<td>31</td>
<td>Gray varved CLAY with seams of m-f sand (wet) [ML]</td>
</tr>
</tbody>
</table>

**Remarks**
- Drill to 20'
  - Easy drilling
  - Gray brown wash
  - Take S-5

- Drill to 25'
  - Easy drilling
  - Gray wash
  - Take S-6

- Clean out hole to 27'
  - Take S-7

- Drill to 30'
  - Gray wash
  - Take S-8

- Drill to 35'
  - Easy drilling
  - Gray wash
  - Take S-9

- Clean out hole to 37'
  - q* = 0.25 tsf

- Clean out hole to 39'
  - Take S-10
Gray brown varved CLAY with seams of fine sand [CL-ML]

Gray c-f SAND, trace silt, trace fine gravel (wet) [SP]

Gray c-f SAND, some m-f gravel, trace silt (wet) [SP]

Gray m-f SAND, some silt (wet) [SM]

Gray m-f SAND, trace silt, trace m-f gravel (wet) [SP]

Gray slightly jointed, strong, f-m grained GNEISS, slightly dipping joints

Drill to 45'
Easy drilling
Gray/brown wash
Take S-11

q_0 = 1.5 tsf

Take S-12A & S-12B

Drill to 53'
Gray wash
Rig chatter

Drill to 56'
Rig chatter
Brown/gray wash
Take S-14

Slight rig chatter 60' to 62'

Rig chatter 62' to 65'

Take S-15
End of the day

4/30/2015
Start coring at 8:20 AM
<table>
<thead>
<tr>
<th>Elev. (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
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<tbody>
<tr>
<td>70</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**

E.O.B. @ 72.5 ft bgs
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Location:** Baruch Drive, Manhattan New York  
**Elevation and Datum:** Approx. 8' + NAVD88

**Drilling Company:** Craig Geotechnical Drilling  
**Drilling Equipment:** CME 75 Truck Mounted Rig  
**Date Started:** 4/28/15  
**Date Finished:** 5/1/15

### Drilling Details

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Casing Depth (ft)</th>
<th>Water Level (ft.)</th>
<th>First Undisturbed Core</th>
<th>Completion Undisturbed Core</th>
<th>Drilling Foreman</th>
<th>Inspecting Engineer</th>
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</thead>
<tbody>
<tr>
<td>19</td>
<td>8.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Keith Parent</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nick Kerr</td>
</tr>
<tr>
<td>115</td>
<td>150/2”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**
- 4/28/2015 Set up on hole
- 4/30/2015 Obstruction at 5’ 3” split spoon to try to penetrate 300+ blows, brick and concrete  
  - Drill to 6’ with 3 7/8” roller bit, scraping  
  - Take S-1  
  - Refusal at 6’  
  - Rig chatter  
  - Take S-2  
  - Install casing to 8.5’  
  - Add mud  
  - Clean out hole to 10’  
  - Take S-3  
- Drill to 15’  
- Rig chatter, scraping  
- Gray wash  
- Take S-4
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Location:** Baruch Drive, Manhattan New York  
**Project No.:** 170334001  
**Elevation and Datum:** Approx. 8± NAVD88

<table>
<thead>
<tr>
<th>Number</th>
<th>Type</th>
<th>Penetr. resist BL/6in</th>
<th>Recov. (in)</th>
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</thead>
</table>

#### Sample Description

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>S-5 Orange brown m-f SAND, trace silt (wet) [SP]</td>
</tr>
<tr>
<td>21</td>
<td>S-5 Orange brown m-f SAND, trace silt (wet) [SP]</td>
</tr>
<tr>
<td>22</td>
<td>S-6 Orange brown m-f SAND, trace silt (wet) [SP]</td>
</tr>
<tr>
<td>23</td>
<td>S-6 Gray silty SAND, trace clay 9wet) [SM]</td>
</tr>
<tr>
<td>24</td>
<td>S-6 Orange brown silty SAND [SM]</td>
</tr>
<tr>
<td>25</td>
<td>S-8 Brown fine sandy SILT [ML]</td>
</tr>
<tr>
<td>26</td>
<td>S-8 Gray brown SiLT, some fine sand [ML]</td>
</tr>
<tr>
<td>31</td>
<td>S-7 Gray brown SILT, some fine sand [ML]</td>
</tr>
<tr>
<td>32</td>
<td>S-8 Brown fine sandy SILT [ML]</td>
</tr>
<tr>
<td>33</td>
<td>S-9 Gray brown SiLT, some fine sand [ML]</td>
</tr>
</tbody>
</table>

#### Remarks
- Drill to 20’
  - Easy drilling
  - Brown wash
  - Take S-5
- Drill to 25’
  - Easy drilling
  - Brown wash
  - Take S-6
- Drill to 30’
  - Easy drilling
  - Brown wash
  - Take S-7
- Drill to 35’
  - Easy drilling
  - Brown wash
  - Take S-8
- Drill to 40’
  - Easy drilling
  - Gray wash
  - Take S-9
- Drop SH-1 at 12:35
- Pull SH-1 at 12:55
- Clean out hole to 44’
  - Take S-10

---

**Log of Boring**  
**Location:** Baruch Drive, Manhattan New York  
**Elevation and Datum:** Approx. 8± NAVD88

**Remarks**
- Drill to 20’
  - Easy drilling
  - Brown wash
  - Take S-5
- Drill to 25’
  - Easy drilling
  - Brown wash
  - Take S-6
- Drill to 30’
  - Easy drilling
  - Brown wash
  - Take S-7
- Drill to 35’
  - Easy drilling
  - Brown wash
  - Take S-8
- Drill to 40’
  - Easy drilling
  - Gray wash
  - Take S-9
- Drop SH-1 at 12:35
- Pull SH-1 at 12:55
- Clean out hole to 44’
  - Take S-10
<table>
<thead>
<tr>
<th>MATERIAL SYMBOL</th>
<th>Elevation (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 4b</td>
<td>-47.0</td>
<td></td>
<td>Gray brown CLAY, some fine sand [CL]</td>
<td>Drill to 50' Easy drilling Gray brown wash</td>
</tr>
<tr>
<td></td>
<td>-52.0</td>
<td></td>
<td>Marron gray CLAY, some fine sand [CL]</td>
<td>q_s=0.75 tsf</td>
</tr>
<tr>
<td>Class 4b</td>
<td>-57.0</td>
<td></td>
<td>Gray varved CLAY with seams of fine sand (wet) [CL]</td>
<td>Drill to 60' Easy drilling Take S-13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gray varved CLAY with seams of fine sand (wet) [CL]</td>
<td>q_s=1.25 tsf</td>
</tr>
<tr>
<td>Class 6</td>
<td>-57.0</td>
<td></td>
<td>Gray CLAY</td>
<td></td>
</tr>
<tr>
<td>Class 4c</td>
<td></td>
<td></td>
<td>Gray varved CLAY with seams of fine sand (wet) [CL]</td>
<td>End of the day</td>
</tr>
</tbody>
</table>
**Log of Boring**

**Project:** Baruch Houses, NYCHA

**Location:** Baruch Drive, Manhattan New York

**Elevation and Datum:** Approx. 8 ft NAVD88

### Material Symbol and Sample Description

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-77</td>
<td>Class 4c</td>
<td>Gray varved CLAY with seams of fine sand (wet) [CL-ML]</td>
</tr>
<tr>
<td>72-78</td>
<td>Class 3a</td>
<td>Gray varved CLAY with seams of fine sand (wet) [CL-ML]</td>
</tr>
<tr>
<td>79-86</td>
<td>Class 1a</td>
<td>Gray c-f SAND, trace gravel, trace silt (wet) [SP]</td>
</tr>
<tr>
<td>79-86</td>
<td>Class 1b</td>
<td>Gray m-f grained, strong GNEISS BOULDER, slightly jointed</td>
</tr>
<tr>
<td>79-87</td>
<td></td>
<td>Mottled gray, white, black m-f SAND [WEATHERED GNEISS]</td>
</tr>
<tr>
<td>83-91</td>
<td></td>
<td>Gray, white f-m grained, slightly weathered, moderately jointed, moderate dipping GNEISS</td>
</tr>
<tr>
<td>E.O.B.</td>
<td></td>
<td>@ 91.0 ft bgs</td>
</tr>
</tbody>
</table>

### Geotechnical Data

- **MATERIAL**
- **SYMBOL**
- **Elevation and Datum**
- **Sample Data**
  - **Depth Scale**
  - **Sample Data**
    - **Number**
    - **Type**
    - **Penetr. Resistance**
    - **N-Value**
    - **Remarks**

### Remarks

- 5/11/2015
  - Start at 7:30 AM
  - Add mud
  - Take S-15
  - Drill to 75'
  - Easy drilling
  - Gray wash
  - Take S-16
  - Drill to 78.5'
  - Slight rig chatter
  - Take S-17
  - Bent tip of spoon
  - Drill to 80' to confirm bedrock
  - Very hard drilling
  - Gray wash
  - From 83' to 85' quick drilling
  - Penetrated boulder

- 5/4/2015
  - Start at 7:30 AM
  - Push 3" casing 0' to 45'
  - Hammer 3" casing 45' to 50'
  - Hole collapsed at 45'
  - Drill from 45' to 87' with 3 7/8" roller bit
  - Push casing to 80'
  - Hammer casing 80' to 87'
  - Start core at 87'

- **N-Value**
  - Blows/ft

- **Building Code**

- **Log of Boring**

- **Location**

- **Project No.**

- **Start at 7:30 AM**

- **Add mud**

- **Take S-15**

- **Drill to 75’**

- **Easy drilling**

- **Gray wash**

- **Take S-16**

- **Drill to 78.5’**

- **Slight rig chatter**

- **Take S-17**

- **Bent tip of spoon**

- **Drill to 80’ to confirm bedrock**

- **Very hard drilling**

- **Gray wash**

- **From 83’ to 85’ quick drilling**

- **Penetrated boulder**

- **Start at 7:30 AM**

- **Push 3” casing 0’ to 45’**

- **Hammer 3” casing 45’ to 50’**

- **Hole collapsed at 45’**

- **Drill from 45’ to 87’ with 3 7/8” roller bit**

- **Push casing to 80’**

- **Hammer casing 80’ to 87’**

- **Start core at 87’**

- **Start at 7:30 AM**

- **Push 3” casing 0’ to 45’**

- **Hammer 3” casing 45’ to 50’**

- **Hole collapsed at 45’**

- **Drill from 45’ to 87’ with 3 7/8” roller bit**

- **Push casing to 80’**

- **Hammer casing 80’ to 87’**

- **Start core at 87’**

- **Start at 7:30 AM**

- **Push 3” casing 0’ to 45’**

- **Hammer 3” casing 45’ to 50’**

- **Hole collapsed at 45’**

- **Drill from 45’ to 87’ with 3 7/8” roller bit**

- **Push casing to 80’**

- **Hammer casing 80’ to 87’**

- **Start core at 87’**

- **Start at 7:30 AM**

- **Push 3” casing 0’ to 45’**

- **Hammer 3” casing 45’ to 50’**

- **Hole collapsed at 45’**

- **Drill from 45’ to 87’ with 3 7/8” roller bit**

- **Push casing to 80’**

- **Hammer casing 80’ to 87’**

- **Start core at 87’**
Hand augered to 5' for utility clearing
Brown c-f SAND, some c-f gravel, some brick [FILL] (wet)

Brown c-f SAND, some c-f gravel, some brick [FILL] (wet)

Brown m-c SAND, some m-c gravel, some brick [FILL] (wet)

Brown m-f SAND, trace silt [SP-SM] (wet)

Gray m-f SAND, trace silt [SP-SM] (wet)

Remarks:
Hand augered to 5' for utility clearing
Obstruction at 3' (concrete slab)
Move 5' west and 4' north
Install the casing to 5'

Take S-1 with 3' split spoon
Take S-2
Take S-3
Install casing to 15'
Clean out with roller bit to 15'
Add quick gel
Brown-gray wash, smooth drilling

Take S-4
Install casing to 20'
Clean out with roller bit to 20'
Brown-gray wash, smooth drilling
**Log of Boring**  
**Location:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Elevation and Datum:** Approx. 10.5 ft NAVD88  

**MATERIAL** | **SYMBOL** | **N-Value** (Blows/ft) | **Remarks**  
--- | --- | --- | ---  
Brown m-f SAND, trace silt [SP-SM] (wet) | S-5 | 8 11 | Take S-5  
Advanced with roller bit to 25' Brown wash, smooth drilling  
Brown m-f SAND, trace silt [SP-SM] (wet) | S-6 | 7 13 | Take S-6  
Advanced with roller bit to 30' Add quick gel Brown wash, smooth drilling  
Brown m-f SAND, trace silt [SP-SM] (wet) | S-7 | 8 13 | Take S-7  
Advanced with roller bit to 35' Brown wash, smooth drilling  
Brown m-f SAND, trace silt [SP-SM] (wet) | S-8 | 9 13 | Take S-8  
Advanced with roller bit to 40' Brown wash, smooth drilling  
Brown and gray varved CLAY with seams of silt [CL] | S-9 | 2 4 | Take S-9  
Advanced with roller bit to 45' Brown wash, smooth drilling
Brown and gray varved CLAY with seams of silt [CL]

Brown and gray varved CLAY with seams of silt [CL]

Brown and gray varved CLAY with seams of silt [CL]

Brown and gray varved CLAY with seams of silt [CL]

Brown and gray varved CLAY with seams of silt [CL]

Take S-10
Advanced with roller bit to 47'
Brown wash, smooth drilling

Take U-1/Take S-11
Advanced with roller bit to 50'
Brown wash, smooth drilling

Take S-12
Advanced with roller bit to 55'
Brown wash, smooth drilling

Take S-13
Advanced with roller bit to 60'
Brown wash, smooth drilling

Take S-14
Advanced with roller bit to 62'
Brown wash, smooth drilling

Take U-2

Take S-15
Advanced with roller bit to 70'
Add quik gel
Brown-gray wash, smooth drilling
Brown CLAY, trace silt [CL] (wet)

Brown silty SAND, trace m-f gravel [SM] (wet)

Brown silty SAND, trace m-f gravel [SM] (wet)

Brown m-f SAND, trace silt [SP] (wet)

Gray m-f grained; moderately hard, quartz-biotite-gneiss-GNEISS; moderately weathered, slightly fractured [Class 1b]

Take S-16
Advanced with roller bit to 75'
Brown wash, smooth drilling

Take S-17
Advanced with roller bit to 80'
Brown wash, rig chatter

Take S-18
Advanced with roller bit to 85'
Brown wash, smooth drilling

Take S-19
Advanced with roller bit to 90'
Add quik gel
Brown wash, heavy rig chatter at 90'

Start coring C-1

End of boring at 10:45
## Log of Boring

<table>
<thead>
<tr>
<th>Material Symbol</th>
<th>Elev. (ft)</th>
<th>Building Code</th>
<th>Sample Description</th>
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<tbody>
<tr>
<td></td>
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<td>E.O.B. @ 95.0 ft bgs</td>
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</table>

### Sample Data

<table>
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<th>Depth Scale</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
## Log of Boring

**Project No.:** 170334001

**Location:** Baruch Houses, NYCHA

**Drilling Company:** Craig Drilling

**Date Started:** 4/27/15

**Date Finished:** 4/28/15

### Sample Data

<table>
<thead>
<tr>
<th>Material Symbol</th>
<th>Sample Description</th>
<th>Depth Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>Brown c-f SAND, trace c-f gravel, some brick (wet)</td>
<td>Class 7</td>
</tr>
<tr>
<td>S-2</td>
<td>Brown c-f SAND, some gravel, trace brick [FILL] (wet)</td>
<td>+2.5</td>
</tr>
<tr>
<td>S-3</td>
<td>Brown c-f SAND, trace organics, trace silt [SP] (wet)</td>
<td>7.5</td>
</tr>
<tr>
<td>S-4</td>
<td>Brown m-f SAND, trace silt [SP-SM] (wet)</td>
<td>9.5</td>
</tr>
<tr>
<td>S-5</td>
<td>Brown m-f SAND, trace silt [SP-SM] (wet)</td>
<td>11.5</td>
</tr>
<tr>
<td>S-6</td>
<td>Brown c-f SAND, trace c-f gravel, some brick (wet)</td>
<td>13.5</td>
</tr>
<tr>
<td>S-7</td>
<td>Brown c-f SAND, some gravel, trace brick [FILL] (wet)</td>
<td>15.5</td>
</tr>
<tr>
<td>S-8</td>
<td>Brown c-f SAND, trace organics, trace silt [SP] (wet)</td>
<td>17.5</td>
</tr>
<tr>
<td>S-9</td>
<td>Brown m-f SAND, trace silt [SP-SM] (wet)</td>
<td>19.5</td>
</tr>
<tr>
<td>S-10</td>
<td>Brown m-f SAND, trace silt [SP-SM] (wet)</td>
<td>21.5</td>
</tr>
</tbody>
</table>

### Remarks

4/27/15

Start at 10:00

Hand augured to 5' for utility clearing

Clean out to 6'

Take S-1: 6-8'

Take S-2: 8-10'

Take S-3: 10-12'

Install the casing to 15'

Clean out with roller bit to 15'

Brown wash, chatter at 14'

Take S-4: 15-17'

Advance roller bit to 20'

Brown wash, smooth
<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>N-Value (Blows/ft)</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td>Brown-red m-f SAND, trace silt [SP-SM] (moist)</td>
<td>21</td>
<td>19</td>
<td>Take S-5: 20-22'</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>9</td>
<td>Advance roller bit to 25'</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>11</td>
<td>Brown wash, smooth</td>
</tr>
<tr>
<td>Brown fine SAND, trace silt [SP-SM] (wet)</td>
<td>25</td>
<td>14</td>
<td>Take S-6: 25-27'</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>10</td>
<td>Advance roller bit to 30'</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>8</td>
<td>Brown wash, smooth</td>
</tr>
<tr>
<td>Brown m-f SAND, trace silt [SP-SM] (wet)</td>
<td>30</td>
<td>2</td>
<td>Take S-7: 30-32'</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>4</td>
<td>Advance roller bit to 35'</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>2</td>
<td>Brown wash, smooth</td>
</tr>
<tr>
<td>Brown c-m SAND, trace silt [SP-SM] (wet)</td>
<td>36</td>
<td>3</td>
<td>Take S-8: 35-37'</td>
</tr>
<tr>
<td></td>
<td>37</td>
<td>6</td>
<td>Advance roller bit to 40'</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>5</td>
<td>Brown wash, smooth</td>
</tr>
<tr>
<td>Brown gray silty CLAY [CL] (wet)</td>
<td>41</td>
<td>20</td>
<td>Take S-9: 40-42'</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>3</td>
<td>Advance roller bit to 45'</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>3</td>
<td>Brown wash, smooth</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
Brown and gray varved CLAY with seams of silt [CL] (wet)

Take S-10: 45-47'
Advance roller bit to 50'
Brown wash, smooth

Take S-11: 50-52'
Advance roller bit to 55'
Brown wash, smooth

Take S-12: 55-57'
Advance roller bit to 60'
Brown wash, smooth

Take S-13: 60-62'
Advance roller bit to 65'
Brown wash, smooth

Take S-14: 65-67'
Advance roller bit to 70'
Brown wash, smooth
Project: Baruch Houses, NYCHA
Location: Baruch Drive, Manhattan New York
Elevation and Datum: Approx. 8.5± NAVD88
Date Started: 4/14/15
Date Finished: 4/15/15
Drilling Company: Craig Geotechnical Drilling
Drilling Equipment: CME 75 Truck Mounted Rig

Size and Type of Bit
- 3 7/8" Tricone Roller Bit

Casing Diameter
- 4" O.D. Steel

Casing Depth (ft)
- 18'

Number of Samples
- Disturbed: 17
- Undisturbed: 1
- Core: 5'

Water Level (ft.)
- First: - -
- Completion: - 24 HR.

Drilling Foreman: Keith Parent
Inspecting Engineer: Nick Kerr

Material and Symbol

Depth Scale
- 0 1 2 3 4 5

Sample Description
- 0.5" asphalt + 8.5" concrete
- Brown c-f SAND, some silt, some fine gravel, bricks and concrete [FILL] (moist)
- Red orange brown c-f SAND, some silt, some m-f gravel, some brick and concrete (moist) [FILL]
- Brown gray C-f SAND, some silt, some m-f gravel, trace brick and concrete (moist) [SM] [FILL]
- Orange brown c-f SAND, some silt, trace m-f gravel (wet) [SM]
- Brown silty SAND, trace c-f gravel (wet) [SM]
- Light grey brown silty SAND, trace fine gravel (wet) [SM]

Remarks
- Roller bit through 1/2" of asphalt
- Roller through 8.5" concrete
- Hand clear to 5'
- Clean out hole with 3-7/8" roller bit
- Rig chatter
- Gray wash with gravel and bricks
- Drill bit lifting up casing due to heavy rig chatter
- Water observed coming out of asphalt near car park entrance
- Pull casing and reinstall
- Roller bit back down to 9'
- Cobble in bottom of hole
- Case to 13' (hammer)
- Add mud
- Drill to 15' rig chatter
- Gray-brown wash
- Take S-5
- Case to 18' (Push 13-15')
- Case spinning (hammer 15-18')
- Add mud
- Drill to 20'

Log of Boring

LB-42
Sheet 1 of 4

Completion Depth
- S-1: 79 ft
- S-2: 74 ft

Drilling Equipment Rock Depth
- Casing Diameter (in)
- Casing Depth (ft)
- Water Level (ft.)

Drilling Company
- Location
- Elevation and Datum

Drilling Equipment
- Casing Diameter (in)
- Casing Depth (ft)
- Water Level (ft.)

Sample Data

Sample Description
- 0.5" asphalt + 8.5" concrete
- Brown c-f SAND, some silt, some fine gravel, bricks and concrete [FILL] (moist)
- Red orange brown c-f SAND, some silt, some m-f gravel, some brick and concrete (moist) [FILL]
- Brown gray C-f SAND, some silt, some m-f gravel, trace brick and concrete (moist) [SM] [FILL]
- Orange brown c-f SAND, some silt, trace m-f gravel (wet) [SM]
- Brown silty SAND, trace c-f gravel (wet) [SM]
- Light grey brown silty SAND, trace fine gravel (wet) [SM]

Remarks
- Roller bit through 1/2" of asphalt
- Roller through 8.5" concrete
- Hand clear to 5'

Manufacturer: CME 75 Truck Mounted Rig

Project No.: 170334001
### Log of Boring

#### Project
- **Baruch Houses, NYCHA**
- **Project No.:** 170334001

#### Location
- **Baruch Drive, Manhattan New York**
- **Elevation and Datum:** Approx. 8.5± NAVD88

#### Sample Description

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grey silty SAND (wet) [SM]</td>
</tr>
<tr>
<td>11</td>
<td>Grey brown silty SAND (wet) [SM]</td>
</tr>
<tr>
<td>18</td>
<td>Grey maroon brown SILT, some fine sand, trace clay (wet) [ML]</td>
</tr>
<tr>
<td>22</td>
<td>Grey SILT, some fine sand, trace clay (wet) [ML]</td>
</tr>
<tr>
<td>28</td>
<td>Maroon grey brown SILT, some clay, trace fine sand (wet) [ML]</td>
</tr>
<tr>
<td>35</td>
<td>Maroon gray varved CLAY with seams of silt (wet) [CL]</td>
</tr>
<tr>
<td>40</td>
<td>Grey varved CLAY (wet) [CL]</td>
</tr>
<tr>
<td>42</td>
<td>Maroon gray brown CLAY with seams of silt (wet) [ML-CL]</td>
</tr>
</tbody>
</table>

#### Remarks
- **Brown wash, rig chatter**
  - Take S-6
  - Drill to 25'
  - Driller observed change at 23'
  - sand to silt

- **Take S-7**
  - Drill to 30'
  - Gray wash

- **Take S-8**

- **Take S-9**
  - Drill to 35'

- **Take S-10**
  - Drill to 40'
  - Gray-brown wah
  - Easy drilling

- **Take S-11**
  - Clean out hole to 42'

- **Take SH-1 at 42’**
  - pp = 2.5tsf
  - Start 1:15
  - Pull 1:35
Grey m-f SAND, some silt, trace clay (wet) [SM]

Take S-12
Drill to 50'
Gray wash
Easy drilling

Grey m-f SAND, some silt, trace gravel (wet) [SM]

Take S-13
Drill to 55'
Heavy rig chatter, possible boulder
Gray wash

Grey m-f SAND, some silt, trace gravel (wet) [SM]

Take S-14
Drill to 60'
Rig chatter
Gray wash

Grey m-f gravelly c-f SAND, some silt (wet) [SM]

Take S-15
Drill to 60'

Take S-16
End of day at 67'

4/15/15 - Start at 12:00
Push 5' casing to 23.5'
Push casing to 38.5'
<table>
<thead>
<tr>
<th>Elevation (R)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70.0</td>
<td>Grey c-f GRAVEL and gneiss fragments (weathered rock)</td>
</tr>
<tr>
<td>65.5</td>
<td>Grey f-m grained GNEISS; strong; moderately to steeply dipping joints; fresh to slightly weathered; biotite/chalco pyrite staining NYCBC [Class 1a]</td>
</tr>
<tr>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>E.O.B. @ 79.0 ft bgs</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**

- Roller bit to 70' with 2-7/8"
- Rig chatter
- Brown-gray wash
- Change to 3-7/8" roller bit
- Rig chatter, brown wash
- Take S-17
- Drill to 74'
- Gray wash, heavy rig chatter
- Slow drilling, rock chips in wash
- Start C-1 at 1:2
- 74-75: Smooth, slight rig chatter
- 75-76: Rig chatter, smooth the rest
- 76-77: Smooth
- 77-78: Smooth
- 78-79: Smooth
- End of LB-42
Brown c-f SAND, trace gravel, trace brick (moist) [FILL]

Brown c-f SAND, trace gravel, trace silt, trace brick and concrete [FILL] (moist)

Brown c-f SAND, trace fine gravel, trace silt, trace coal tar, trace glass [FILL] (moist)

Brown c-f gravelly c-f SAND, trace silt [SW] (wet)

Brown c-f SAND, trace gravel, trace silt [SW] (wet)

4/14/15
8:30 am Start hand augering for utility clearing to 5'
Fill material retrieved
9:10 am Augering complete

Take S-1: 6-8'
Take S-2: 8-10'
Take S-3: 10-12'

Install casing to 15'
Clean out with roller bit Brown wash, smooth drilling
Take S-4: 15-17'

Install casing to 20'
Clean out with roller bit to 20' Brown wash, light rig chatter
Brown m-c SAND, trace f-m gravel, trace silt, trace clay [SW] (wet)

Olive CLAY, trace silt [CL] (wet)

Olive silty CLAY [CL] (wet)
Top: Olive silty CLAY [CL] (wet)
Bottom: Brown silty SAND [SM] (wet)

Brown SILTY SAND [SM] (wet)

Brown c-f SAND, trace silt, rock fragments in tip of spoon [SP] (wet)

WEATHERED ROCK

C-1: Gray and white m-f grained; medium hard to hard; quartz-biotite-feldspar-garnet GNEISS; sound; unweathered (highly weathered at 43'-44', 45.5'-46.4'. No recovery) [NYCBC Class 1b]
**Log of Boring**

**Location**: Baruch Houses, NYCHA

**Project No.**: 170334001

**Elevation and Datum**: Approx. 8.5± NAVD88

### Sample Description

- **Elev. (ft)**: 46.0
- **Building Code**: Class 1b (NYCBC)
- **Sample Description**: C-2: Gray and white m-f grained; medium hard to hard; quartz-biotite-feldspar-garnet GNEISS; sound; unweathered (highly weathered at 46.5'-47.8'. No recovery) [NYCBC Class 1b]

### Remarks

- **Complete C-1 at 46.5'**
- **Start coring C-2 at 46.5'**
- **Brown wash, smooth**
- **Complete C-2 at 51.5’**
- **END OF DRILLING**

### Log Data

<table>
<thead>
<tr>
<th>Material</th>
<th>Symbol</th>
<th>Elev. (ft)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1b</td>
<td></td>
<td>46.0</td>
<td>C-2: Gray and white m-f grained; medium hard to hard; quartz-biotite-feldspar-garnet GNEISS; sound; unweathered (highly weathered at 46.5'-47.8'. No recovery) [NYCBC Class 1b]</td>
</tr>
</tbody>
</table>

### E.O.B. @ 51.5 ft bg
**Log of Boring**

**Location:** Baruch Houses, NYCHA  
**Project No.:** 170334001  
**Elevation and Datum:** Approx. 8.5± NAVD88

**Drilling Company:** Craig Geotechnical Drilling  
**Drilling Equipment:** CME 55 ATV

<table>
<thead>
<tr>
<th>Casing Diameter (in)</th>
<th>Casing Depth (ft)</th>
<th>Water Level (ft)</th>
<th>First Completion</th>
<th>Undisturbed Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; O.D. Steel</td>
<td>25'</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Casing Hammer:** Automatic  
**Sampler:** 2" Split Spoon  
**Sampler Hammer:** Automatic

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Type</th>
<th>Taper</th>
<th>Penetr. resist</th>
<th>Recov. (in)</th>
<th>N-Value (Blows/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
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<tr>
<td>4</td>
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<td>6</td>
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<tr>
<td>7</td>
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<tr>
<td>8</td>
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<tr>
<td>9</td>
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<tr>
<td>10</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

4/13/15  
Hand augered for utility clearing to 5' on 4/10/15  
10:50 am - Set up complete.  
Install casing to 5'  
Clean out to 6' with roller bit  
Brown wash, smooth  

Take S-1: 6-8'

Take S-2: 8-10'  
Install casing to 10'  
Clean out to 10'  
Brown wash, smooth  

Take S-3: 10-12'

Install casing to 15'  
Clean out with roller bit  
Brown wash, light rig chatter  

Take S-4: 15-17'

Drive casing to 20'  
Clean out with roller bit to 20'  
Brown wash, light rig chatter
### Log of Boring

**Project:** Baruch Houses, NYCHA  
**Location:** Baruch Drive, Manhattan New York  
**Project No.:** 170334001  
**Elevation and Datum:** Approx. 8.5± NAVD88

<table>
<thead>
<tr>
<th>Level (F)</th>
<th>Building Code</th>
<th>Sample Description</th>
<th>Depth Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>-12.5</td>
<td></td>
<td>Brown c-f SAND, trace silt [SW] (wet) 20'-21'</td>
<td>21</td>
<td>Take S-5: 20-22' Brown wash, smooth drilling</td>
</tr>
<tr>
<td>-15.0</td>
<td></td>
<td>Brown CLAY, trace fine sand, trace silt [CL] (wet) 921'-22'</td>
<td>22</td>
<td>Advance with roller bit to 25' Brown wash, smooth drilling</td>
</tr>
<tr>
<td>-22.0</td>
<td></td>
<td>Brown and gray varved CLAY with seams of silt [CL] (wet)</td>
<td>25</td>
<td>Take S-6: 25-27' Brown wash, smooth drilling</td>
</tr>
<tr>
<td>-22.0</td>
<td></td>
<td>A: Brown sily CLAY [CL] (wet) (30'-30.5')</td>
<td>30</td>
<td>Take U-1: 30-32' Tube stuck in the hole Take S-7: 30-32' inside of shelby tube to retrieve it. Advance with roller bit to 35' Brown wash, smooth drilling</td>
</tr>
<tr>
<td>-22.0</td>
<td></td>
<td>B: Brown fine SAND, trace silt [SP] (wet) (30.5'-32')</td>
<td>31</td>
<td>Take S-7: 30-32 inside of shelby tube to retrieve it. Advance with roller bit to 35' Brown wash, smooth drilling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown m-f SAND, trace silt [SP] (wet)</td>
<td>36</td>
<td>Take S-8: 35-37' Brown wash, smooth drilling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown m-f SAND, trace silt, trace fine gravel [SP] (wet)</td>
<td>41</td>
<td>Take S-9: 40-42' Brown wash, smooth drilling</td>
</tr>
</tbody>
</table>

### Additional Information

- **Elevations and Datums:** Approx. 8.5± NAVD88
- **Sample Data:**
  - Bearing Number: 20
  - Type: Penetration resistance
  - Scale: BL/6in
  - Recovery: (in)
  - Building Code: LB-44
  - Location: Baruch Drive, Manhattan New York
  - Project No.: 170334001

---

**Log of Boring Sheet 2 of 3**
### MATERIAL SYMBOL, ELEV (Ft), BUILDING CODE, LOG OF BORING, SCALE, Depth, Sample Data, Remarks, N-Value (Blows/ft), Remarks

**Elevation and Datum:** Approx. 8.5± NAVD88

- **Location:** Baruch Drive, Manhattan New York
- **Project No.:** 170334001
- **Project:** Baruch Houses, NYCHA

#### MATERIAL SYMBOL, ELEV (Ft), BUILDING CODE

<table>
<thead>
<tr>
<th>Elev (Ft)</th>
<th>Building Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40.0</td>
<td>Class 3b</td>
</tr>
<tr>
<td>-44.5</td>
<td>Class 3a</td>
</tr>
<tr>
<td>-48.5</td>
<td>Class 1b</td>
</tr>
</tbody>
</table>

#### Sample Description

- **Class 3b:** Brown m-f SAND, trace silt, trace m-f gravel [SP] (wet)
- **Class 3a:** Brown c-f SAND, trace silt, trace c-f gravel [SW] (wet)
- **Class 1b:** C-1: White and brown m-f grained; medium hard to hard; quartz-biotite-feldspar-garnet GNEISS; slightly fractured; unweathered (highly weathered at 60'-61'. No recovery) [NYCBC Class 1b]

#### Sample Data

<table>
<thead>
<tr>
<th>Number</th>
<th>Penetr. resist</th>
<th>Scale</th>
<th>Type</th>
<th>Recov. (in)</th>
<th>N-Value (Blows/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td></td>
<td>45</td>
<td>S-10</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>46</td>
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<td>46</td>
<td>S-11</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>47</td>
<td></td>
<td>47</td>
<td></td>
<td>35</td>
<td>24</td>
</tr>
</tbody>
</table>

#### Remarks

- **Take S-10: 45-47'**
  - Advance with roller bit to 50'
  - Brown wash, light rig chatter

- **Take S-11: 50-52'**
  - Advance with roller bit to 55'
  - Very hard and slow drilling at 53' (possible top of rock)
  - Drill to 57'. Moderately hard drilling.

**E.O.B. @ 62.0 ft bgs**

#### E.O.B. @ 62.0 ft bgs

- **4/14/15**
  - 7:30 Start coring C-1 at 57'
- **Complete C-1 at 62'**
- **END OF DRILLING**

---

**Baruch Drive, Manhattan New York**

**Project No.:** 170334001

**Elevation and Datum:** Approx. 8.5± NAVD88

**MATERIAL SYMBOL, ELEV (Ft), BUILDING CODE, LOG OF BORING, SCALE, Depth, Sample Data, Remarks, N-Value (Blows/ft), Remarks**
### Log of Boring

**Location**: Baruch Houses, NYCHA  
**Project No.**: 170334001

**Elevation and Datum**: Approx. 7.5 + NAVD88

<table>
<thead>
<tr>
<th>Date Started</th>
<th>Date Finished</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/29/15</td>
<td>4/30/15</td>
</tr>
</tbody>
</table>

**Drilling Company**: Craig Drilling  
**Drilling Equipment**: CME Truck Rig  
**Size and Type of Bit**: 3-7/8" Tricone Roller, 4" O.D. steel casing

<table>
<thead>
<tr>
<th>Casing Depth (ft)</th>
<th>Water Level (ft.)</th>
</tr>
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<tbody>
<tr>
<td>59</td>
<td>-2.5</td>
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**Number of Samples**

<table>
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<th>Disturbed</th>
<th>Undisturbed</th>
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<tbody>
<tr>
<td>11</td>
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**Core**

<table>
<thead>
<tr>
<th>Completion Depth</th>
<th>Rock Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 HR.</td>
<td>54 ft</td>
</tr>
</tbody>
</table>

**Casing Diameter (in)**

- 4" O.D. steel casing
- 2" O.D. Split Spoon

**Drilling Foreman**: Rob Doller  
**Inspecting Engineer**: Abdulhusain Ben Nakhi

### Sample Data

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Brown c-f SAND, some m-f gravel, some brick [FILL] (wet)</td>
</tr>
<tr>
<td>7</td>
<td>Brown-black c-f SAND, some asphalt, trace organics [FILL] (wet)</td>
</tr>
<tr>
<td>8</td>
<td>Brown-black c-f SAND, some organic, trace asphalt [FILL] (wet)</td>
</tr>
<tr>
<td>11</td>
<td>Brown m-f SAND, trace silt [SP] (wet)</td>
</tr>
<tr>
<td>14</td>
<td>4&quot; spoon, no recovery</td>
</tr>
</tbody>
</table>

**Remarks**

- 4/29/15 - Start at 11:45am  
- Hand augured to 5' for utility clearing  
- Take S-1 with 3' split spoon  
- Take S-2  
- Take S-3  
- Install casing to 15'  
- Clean out to 15'  
- Add quik gel  
- Black-brown wash, smooth drilling  
- Take S-4 with 4" split spoon  
- Advance with roller bit to 20'  
- Black wash, smooth drilling
<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-5</td>
<td>Black silty SAND  [SM] (wet)</td>
<td>Take S-5, Advance with roller bit to 25’, Black wash, smooth drilling</td>
</tr>
<tr>
<td>S-6</td>
<td>Brown and gray varved CLAY with seams of silt [CL] (wet)</td>
<td>Take S-6, Advance with roller bit to 30’, Black wash, smooth drilling</td>
</tr>
<tr>
<td>S-7</td>
<td>Brown and gray varved CLAY with seams of silt [CL] (wet)</td>
<td>Take S-7, Advance with roller bit to 35’, Black wash, smooth drilling</td>
</tr>
<tr>
<td>S-8</td>
<td>Brown and gray varved CLAY with seams of silt [CL] (wet)</td>
<td>Take S-8, Advance with roller bit to 40’, Black wash, smooth drilling</td>
</tr>
<tr>
<td>S-9</td>
<td>Brown c-f SAND, trace mica [SP] (wet)</td>
<td>Take S-9, Advance with roller bit to 45’, Black wash, smooth drilling</td>
</tr>
</tbody>
</table>
Log of Boring

Baruch Houses, NYCHA

Baruch Drive, Manhattan New York

Approx. 7.5± NAVD88

**Project No.**

170334001

**Location**

Baruch Drive, Manhattan New York

**Elevation and Datum**

Approx. 7.5± NAVD88

**MATERIAL**

Class 6

**Elevation (R)**

46.5

**Sample Description**

Brown c-f SAND, trace mica, trace silt, trace gravel [SP] (wet)

Class 1b

**Elevation (R)**

51.5

**Sample Description**

Brown-gray c-f SAND, some m-f gravel, trace mica [SP] (wet)

**Remarks**

Take S-10

Advance with roller bit to 50'

Black wash, rig chatter

Take S-11

Advance with roller bit to 55'

Brown-gray wash, rig chatter

**Gray m-f grained, moderately hard to hard, feldspar quartz-biotite, garnet GNEISS, slightly fractured, weathered [Class 1b]**

**Remarks**

Start coring at 54'

C-1: 54-59'

End of drilling

**E.O.B. @ 59.0 ft bgs**
### Log of Boring

**Project**: Baruch Houses, NYCHA  
**Project No.**: 170334001  
**Location**: Baruch Drive, Manhattan New York  
**Elevation and Datum**: Approx. 7 ft NAVD88

**Drilling Company**: Craig Geotechnical Drilling  
**Drilling Equipment**: CME 75 Truck Rig  
**Size and Type of Bit**: 3-7/8" Tricone Roller

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>Sample Data</th>
</tr>
</thead>
</table>
| Black and brown m-f SAND, some silt, trace wood, organics [FILL] | 0-20 | 5/6/2015  
Start at 11:30 AM  
Drill through  
Hand clear to 5'  
Take S-1 |
| Gray black silty SAND, trace m-f gravel, trace organics [SM] | 20-40 | 5/6/2015  
Start at 11:30 AM  
Drill through  
Hand clear to 5'  
Take S-2  
Install casing to 8.5'  
Clean out hole to 10'  
Rig chatter  
Brown wash  
Take S-3 |
| Gray brown m-f SAND, trace fine gravel, trace silt, trace pyrite | 40-60 | 5/6/2015  
Start at 11:30 AM  
Drill through  
Hand clear to 5'  
Take S-2  
Install casing to 8.5'  
Clean out hole to 10'  
Rig chatter  
Brown wash  
Take S-3 |
| No recovery | 60-80 | 5/6/2015  
Start at 11:30 AM  
Drill through  
Hand clear to 5'  
Take S-2  
Install casing to 8.5'  
Clean out hole to 10'  
Rig chatter  
Brown wash  
Take S-3 |
| Coarse gravel in tip | 80-100 | 5/6/2015  
Start at 11:30 AM  
Drill through  
Hand clear to 5'  
Take S-2  
Install casing to 8.5'  
Clean out hole to 10'  
Rig chatter  
Brown wash  
Take S-3 |
| Orange brown m-f SAND, trace silt (wet) [SP-SM] | 100-120 | 5/6/2015  
Start at 11:30 AM  
Drill through  
Hand clear to 5'  
Take S-2  
Install casing to 8.5'  
Clean out hole to 10'  
Rig chatter  
Brown wash  
Take S-3 |
| | | |
No recovery

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

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Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]

Gray maroon varved CLAY with seams of silt, trace fine sand [CL]
<table>
<thead>
<tr>
<th>MATERIAL SYMBOL</th>
<th>Elev. (ft)</th>
<th>Sample Description</th>
<th>Depth Scale</th>
<th>Sample Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43.0</td>
<td>Brown silty SAND, trace m-f gravel (wet) [SM]</td>
<td>45</td>
<td>S-13</td>
<td>SS</td>
</tr>
<tr>
<td></td>
<td>48.0</td>
<td>Gray m-f grained, hard quartz-biotite-garnet GNEISS, slightly fractured</td>
<td>45</td>
<td>C-1</td>
<td>CORE</td>
</tr>
</tbody>
</table>

**E.O.B. @ 55.0 ft bgs**

Remarks:
- Advance with roller bit to 45'
- Brown gray wash
- Smooth drilling
- Take S-13
- Advanced with roller bit to 50'
- Brown wash
- Rig chatter at 48'-5''
- Start coring at 50'
- End of drilling at 55'
- Install 25' (OW)