

Supplemental Archaeological Assessment

Second Avenue Subway: 72nd and 86th Street Stations

New York, New York

Prepared for:

Metropolitan Transportation Authority
New York City Transit
New York, NY

Prepared by:

AKRF, Inc. 440 Park Avenue South New York, New York 10016

May 2009

Management Summary

SHPO Project Review Number:

05PR00975

Involved Agencies:

Metropolitan Transportation Authority, New York City

Transit, and the Federal Transit Administration

Phase of Survey:

Supplemental Phase 1A Archaeological Assessment

Project Location:

Second Avenue between East 69th and East 73rd and

East 83rd and East 87th Streets

Minor Civil Division:

06101: Manhattan

County:

New York County

72nd Street Location Information:

Survey Area Length:

Approximately 1300 feet (396.24 meters)

Survey Area Width:

Variable; between approximately 600 feet (182.88

meters) and 1200 feet (365.76 meters)

Number of Acres Surveyed:

Approximately 6

86th Street Location Information:

Survey Area Length:

Approximately 1400 feet (426.72 meters)

Survey Area Width:

Variable; between approximately 600 feet (182.88

meters) and 1200 feet (365.76 meters)

Number of Acres Surveyed:

Approximately 6

USGS 7.5 Minute Quadrangle Map:

Central Park

Report Author:

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Date of Report:

May 2009

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A. PROJECT OVERVIEW AND BACKGROUND

The Metropolitan Transportation Authority (MTA), in cooperation with New York City Transit (NYCT), is planning to construct the 72nd and 86th Street Stations of the Second Avenue Subway (see Figure 1). This Supplemental Archaeological Assessment to the Second Avenue Subway Phase 1A Archaeological Assessment (Historical Perspectives, Inc. 2003a) has been prepared in accordance with the provisions of the Second Avenue Subway project's Programmatic Agreement (PA), among the Federal Transit Administration (FTA), MTA New York City Transit, and the New York State Historic Preservation Officer (SHPO), executed April 8, 2004. The PA sets forth the steps to be followed for "any changes to the project that introduce new project elements that would involve subsurface construction and for which the effects of such construction have not yet been analyzed." For these areas, archaeological investigation should be conducted in consultation with the SHPO and the New York City Landmarks Preservation Commission (LPC).

FTA issued a Record of Decision (ROD) for the Second Avenue Subway project on July 8, 2004. The ROD was issued based on the findings presented in the Second Avenue Subway Final Environmental Impact Statement and Final Section 4(f) and 6(f) Evaluation (FEIS; AKRF April 2004), which examined the potential impacts of the 8.5-mile-long Second Avenue Subway from East 125th Street in Harlem to Hanover Square in Lower Manhattan. The FEIS identified the environmental impacts of the Second Avenue Subway during its construction and the permanent impacts once the subway is operational. It also identified mitigation measures to alleviate the identified impacts. The assessment of the Second Avenue Subway's proposed alignment, ancillary facilities, stations, and station entrances presented in the FEIS was based on conceptual and preliminary engineering. As part of the FEIS, a Phase 1A Archaeological Assessment of the Second Avenue Subway, as well as several addenda to the Phase 1A, were prepared by Historical Perspectives, Inc. (HPI) in 2003.

In the vicinity of the 72nd and 86th Street Stations, the APE analyzed in HPI's 2003 Phase 1A Archaeological Assessment included the streetbed of Second Avenue from western building line to eastern building line (see Section B, below, for a discussion of archaeological analyses completed since the completion of the FEIS). No evaluation was conducted at that time for any of the station's entrances, ancillary facilities, or utility relocations on streets other than Second Avenue. Since that time, however, the designs for the 72nd and 86th Street Stations have advanced considerably and now include areas located outside the Area of Potential Effect (APE) analyzed in the FEIS. Some of these areas have subsequently been evaluated for their archaeological potential in accordance with the provisions of the PA, including analyses prepared as part of a Supplemental Environmental Assessment prepared in 2009 to assess the potential impacts of proposed station entrance modifications for the 72nd and 86th Street Stations (see Section B, below, for more details).

This Supplemental Archaeological Assessment of the 72nd and 86th Street Stations analyzes the archaeological sensitivity of any areas of planned construction that fall outside the previously evaluated archaeological APE. These locations include station entrances, ancillary facilities, and utility relocations. This includes the following (see Figure 2):

The APE for the 72nd Street Station for the purposes of this archaeological assessment includes the following:

- An entrance on the eastern side of Second Avenue between East 69th and East 70th Streets;
- An entrance and ancillary facility at the northwest corner of Second Avenue and East 72nd Street that extends southward beneath 72nd Street and the southwest corner of Second Avenue and 72nd Street;
- An ancillary facility at the northwest corner of Second Avenue and East 69th Street; and

 Utility relocations in East 69th and East 73rd Streets between First and Third Avenues, East 70th Street between First and Second Avenues, and East 72nd Street between Second and Third Avenues (including the sidewalks).

An entrance at the southeast corner of Second Avenue and East 72nd Street and the streetbed of East 72nd Street between First and Second Avenues were previously analyzed for archaeological sensitivity (see section B, below).

The APE for the 86th Street Station for the purposes of this assessment includes the following:

- An entrance on the eastern side of Second Avenue between East 83rd and East 84th Streets;
- An ancillary facility at the northwest corner of Second Avenue and East 83rd Street;
- An ancillary facility at the northwest corner of Second Avenue and East 86th Street; and
- Utility relocations in East 82nd Street between First and Second Avenues, East 83rd Street between First and Third Avenues, East 84th Street between First and Second Avenues, and East 86th and East 87th Streets between Second and Third Avenues (including the sidewalks).

An entrance at the southeast corner of Second Avenue and East 86th Street and the streetbed of East 86th Street between First and Second Avenues were previously analyzed for archaeological sensitivity (see section B, below).

B. PREVIOUSLY ANALYZED PORTIONS OF THE APE

The 72nd Street Station will be constructed within the streetbed of Second Avenue between East 68th and East 69th Streets to East 73rd Street. The box for the 86th Street Station will extend on Second Avenue between East 82nd Street and a point midway between East 86th and East 87th Streets. Both of these areas were analyzed in the 2003 Phase 1A and neither was identified as having sensitivity for either precontact or historic period archaeological resources. The Phase 1A states that there were areas which may at one time have possessed archaeological sensitivity (i.e. in the areas surrounding streams near East 75th and East 86th Streets, which would have been ideal locations for Native American habitation sites, and an area near the southwest corner of Second Avenue and East 84th Street, the location of the former Yelles Hopper estate). However, soil borings showed that there were no intact soil levels present in these areas and/or bedrock was very close to the surface. Therefore, there was a low probability of finding intact archaeological resources in any of these locations.

In December 2007, AKRF prepared two disturbance memoranda that analyzed the potential archaeological sensitivity of portions of the streetbeds of East 72nd and East 86th Streets between First and Second Avenues. Neither memorandum identified any areas of archaeological sensitivity for either area. SHPO concurred with the findings of the disturbance memo for the 72nd Street Station in comments dated January 1, 2008. After requesting more information regarding the 86th Street Station, SHPO also concurred with the findings of the 86th Street Station disturbance memorandum in comments dated June 20, 2008. LPC also concurred with the findings of the 86th Street Station disturbance memo in comments dated May 8, 2008.

Additional archaeological analysis was completed by AKRF for the Supplemental Environmental Assessment to the Second Avenue Subway Final Environmental Impact Statement: 72nd and 86th Street Station Entrance Alternatives (EA). The EA was prepared by AKRF in 2009 in accordance with the National Environmental Policy Act (NEPA) for the FTA as lead federal agency, to provide environmental analyses of proposed entrance modifications to the 72nd and 86th Street Stations. For that assessment, three alternative designs for Entrance 3 of the 72nd Street Station were analyzed. This analysis covered the entire streetbed of East 72nd Street between First and Second Avenues and the lot at 300 East 72nd Street (Block 1446, Lot 51) at the southeast corner of East 72nd Street and Second Avenue. The EA determined that as a result of numerous factors, (including the disturbance generated by the construction and maintenance of streets and utilities, excavation of basements, the late development of certain historic lots until after water and sewer networks were available, and the shallow nature of the bedrock in the area), none of the project alternatives for Entrance 3 of the 72nd Street Station would impact precontact or historic period archaeological resources.

Three design alternatives were also analyzed for Entrance 2 of the 86th Street Station, which included the entire streetbed of East 86th Street between First and Second Avenues as well as two properties at 1654 and 1656 Second Avenue (Block 1548, Lots 50 and 49, respectively). The EA determined that as a result of disturbance generated by the construction and maintenance of streets and utilities, excavation of basements, the late development of certain historic lots until after water and sewer networks were present in the area, and the shallow nature of the bedrock in

the area, none of the project alternatives for Entrance 2 of the 86th Street Station would impact precontact or historic period archaeological resources.

LPC concurred with the conclusions of the EA for 72nd and 86th Streets in comments dated February 18, 2009 and SHPO concurred with the EA in comments dated March 12, 2009.

C. RESEARCH GOALS AND METHODOLOGY

The goal of this Supplemental Archaeological Assessment is to determine the likelihood that potential archaeological resources have survived in the portions of the APE not evaluated in previous archaeological assessments. The study has been designed to satisfy the requirements of SHPO (2005) and LPC (2002) and it follows the guidelines of the New York Archaeological Council (NYAC, 1994). The study documents the history of the APE as well as its potential to yield archaeological resources dating to both the precontact and historic periods.

In order to determine the extent to which archaeological resources within the APE may have been disturbed, numerous primary and secondary sources were examined. Cultural resources assessments of the APE and vicinity were reviewed, including the 2003 Phase 1A Archaeological Assessment and the 2009 AKRF EA. In addition, historic maps and atlases were examined to determine a chronology for the development of the APE. Soil boring records (including soil borings analyzed for the FEIS and others that were completed after the FEIS was published) were reviewed to create a soil profile for the APE which could be used to assess its archaeological sensitivity. Finally, local histories, historic newspapers, and historic photographs were also reviewed as necessary.

A. ORIGINAL TOPOGRAPHICAL SETTING

Viele's 1865 map (Figure 3) shows that the location of the 72nd Street station was originally a flat meadow bordered on the southwest by a hill, the base of which entered the southern portion of Block 1424. A large stream surrounded by marshland ran to the north of this area, between East 73rd and East 74th Streets. In the vicinity of the 86th Street station, the Viele map shows that the APE was originally situated within a meadow bounded by large hills to the southeast and northwest. One large hill cut across the location of the 86th Street Station, travelling northeast-southwest from an area near the intersection of Second Avenue and East 88th Street and terminating at a larger hill near the intersection of Third Avenue and East 85th Street. Two streams ran in the vicinity of the station: one to the northeast that crossed through the eastern ends of Block 1532 and terminated in Block 1531 and the other to the southeast that began in Block 1546 and continued to the southeast until it drained into the East River.

Several historic atlases from the mid- and late 19th century include information regarding the elevations of street intersections in the vicinity of the 72nd and 86th Street stations. George Hayward's circa 1850 map, *Profile of the Twelve Avenues in the City of New York from 24th to 161st Streets Shewing* (sic) the Elevations at the Streets, shows that the elevation of some of the streets in the vicinity of the APE have been modified significantly since the mid-19th century. However, data from the 1885 Robinson and Pidgeon atlas shows that little landscape modification has taken place since the late 19th century. Therefore, it appears that most of the alterations took place between the 1850s and 1880s, around the time when the neighborhood surrounding the APE was leveled and streets were cut through in preparation for residential development (discussed in greater detail in Chapter 4). A summary of the street elevation changes as depicted on three maps (dating to 1850, 1885, and 2007) is presented in Table 1, below.

The most significant landscape modification appears to have occurred near the APE for the 72nd Street station. The elevation data presented in Hayward's 1850 map confirm the presence of the large hills that extended northeast-southwest across the 72nd Street Station APE on the 1811 Bridges (Figure 4), 1836 Colton (Figure 5), and 1851 Dripps maps. If the information on Hayward's map is accurate, this hill may have been cut down by more than 40 feet in certain portions of the 72nd Street Station APE. In the vicinity of the 86th Street Station, some filling appears to have occurred in the vicinity of the former streams, and some small hills may have been leveled, however, the changes are not nearly as drastic as those seen near 72nd Street Station APE.

Table 1
Street Elevation Changes Over Time

Intersection	1850 Hayward	1885 Robinson and Pidgeon	2007 Sanborn
East 69th Street & First Avenue	53.5	52	52
East 69th Street & Second Avenue	60.2	58.4	58.4
East 69th Street & Third Avenue	83.4	77	77
East 70th Street & First Avenue	49.11	50	50
East 70th Street & Second Avenue	85.7	54.1	54.1
East 71st Street & Second Avenue	98.3	51.1	51.1
East 72nd Street & First Avenue	47	42	42
East 72nd Street & Second Avenue	58.2	47.8	47.5
East 72nd Street & Third Avenue	68.4	68.4	68.4
East 73rd Street & First Avenue	78.5	34.6	34.6
East 73rd Street & Second Avenue	52.11	43.5	43.4
East 73rd Street & Third Avenue	57.4	58.3	58.3
East 82nd Street & First Avenue	41.4	46	45
East 82nd Street & Second Avenue	52.2	53	53
East 83rd Street & First Avenue	48.8	51	51
East 83rd Street & Second Avenue	53.5	56.2	56.2
East 83rd Street & Third Avenue	76.2	78.2	76.2

Table 1 (continued)
Street Elevation Changes Over Time

		Street Elevation Ci	langes Over Time
Intersection	1850 Hayward	1885 Robinson and Pidgeon	2007 Sanborn
East 84th Street & First Avenue	62.1	58.9	58.4
East 84th Street & Second Avenue	61.8	59.4	59.4
East 85th Street & Second Avenue	60.4	62.6	62.6
East 86th Street & First Avenue	46.4	45.8	45.8
East 86th Street & Second Avenue	59.1	59	59
East 86th Street & Third Avenue	75.2	75.2	75.2
East 87th Street & Second Avenue	57.1	53.5	53.1
East 87th Street & Third Avenue	78.5	78.6	78.5

Notes:

The 1850 Hayward map was partially illegible and some elevation data was partially obscured; this table attempts to transcribe the data accurately but there may be some errors. In addition, none of the maps included above indicate the datum from which the elevation was measured with the exception of the 1885 Robinson atlas, which presents elevations "above high tide." Therefore, it is assumed that all measurements are with respect to sea level.

B. SOIL PROFILE

HPI's 2003 Phase 1A archaeological assessment and subsequent supplemental soil borings analysis (HPI 2003b) included numerous soil borings located within the streetbed of Second Avenue in the vicinity of the 72nd and 86th Street Stations. In general, the borings showed that the majority of the Second Avenue streetbed is composed of a layer of fill of varying thickness that is located directly above bedrock or decomposing bedrock. While most of the borings showed that fill rested directly above bedrock, some included levels of sand, silt, or clay beneath the layer of fill. However, these soil levels were not consistently present throughout the Second Avenue streetbed. Based on the evidence gathered from the soil borings logs, HPI determined that the soil levels in the vicinity of the APE of the 72nd and 86th Street Stations were disturbed. Therefore, HPI did not identify any areas of archaeological sensitivity in either location.

Of the more than 70 soil borings completed in the vicinity of the 72nd and 86th Street Stations by MTA NYCT between 2002 and 2007 (see Appendix), all but seven show that bedrock is separated from the ground surface by a layer of fill measuring between 1.5 and 19 feet in thickness. Two borings in the vicinity of the 72nd Street Station included soil levels between fill and bedrock but only one of these was located within the APE. This boring was located on the southern side of East 72nd Street approximately 50 feet west of Second Avenue. This boring showed 6 feet of fill, then 2 feet of silty sand, 2 feet of clean sand, 5 feet of sandy gravel with silt, and finally decomposing bedrock beginning at 15 feet below the ground surface. Another boring located on the northern side of East 72nd Street approximately 30 west of Second Avenue showed only 3 feet of fill directly over decomposing bedrock.

In the vicinity of the 86th Street station, five soil borings included sediments other than fill between bedrock and the ground surface, although only one was located within the APE while three others were located within the streetbed of Second Avenue in the area previously analyzed in the 2003 Phase 1A study and the fourth was located in the streetbed of East 85th Street east of Second Avenue where no work is proposed for this station. The boring located within the APE was on the southern side of East 83rd Street approximately 45 feet east of Second Avenue. It identified 3.5 feet of fill over a level of silt and clay measuring 4.5 feet in thickness, then a 3-foot layer of silty sand, and finally decomposing bedrock at 11 feet below the streetbed. This boring was located within 10 to 40 feet of other borings which showed only a level of fill between bedrock and the ground surface.

This suggests that while isolated areas may contain small patches of natural soil levels, they are irregularly distributed throughout the APE.

A. PREVIOUS PRECONTACT ARCHAEOLOGICAL RESOURCES SENSITIVITY ASSESSMENTS

The precontact sensitivity of project sites in New York City is generally evaluated by the presence of level slopes, water courses, well-drained soils, and close proximity to previously identified precontact archaeological sites. HPI's 2003 Phase 1A included an analysis of soil borings, historic maps, previously identified Native American archaeological sites, and other documentary evidence which could indicate if the project site was sensitive for precontact archaeological resources. The Phase 1A noted that a Native American trail known as Wickquasgeck, ran to the west of the project site. In addition, two Native American habitation sites, Coneykeest and Konaande Kongh were documented to the north of the 72nd and 86th Street APEs, although the latter site may have extended as far south as East 91st Street.

The Phase 1A concluded that there were several locations in the vicinity of the APE that would have been appealing to Native Americans as habitation or resources exploitation sites. However, because of the lack of natural stratigraphy and the shallow depth of bedrock that was indicated by soil borings near the project site, the Phase 1A did not identify any areas of sensitivity within Second Avenue near the 72nd and 86th Street Station APE. Similarly, because of the disturbance of the ground surface, the 2007 disturbance memos and 2009 EA prepared by AKRF determined that the location of Entrance 3 of the 72nd Street Station (including Block 1446, Lot 51and the streetbed of East 72nd Street between First and Second Avenues) and Entrance 2 of the 86th Street Station (including Block 1548, Lots 49 and 50 and the streetbed of East 86th Street between First and Second Avenues) were not sensitive for precontact archaeological resources.

B. PRECONTACT SENSITIVITY OF SUPPLEMENTAL LOCATIONS

72ND STREET STATION

Historic maps including the 1811 Beers (Figure 4), 1836 Colton (figure 5), 1851 Dripps, and 1865 Viele map (Figure 3) all show the 72nd Street Station APE in the vicinity of streams and tall hills, however, these maps don't suggest that the APE was located on a level area. It is less likely that a Native American habitation site would have been constructed on a hillside rather than nearby level a hilltops.

Regardless of the potential presence of a Native American site within the 72nd Street Station APE, the documentary record shows that this area was disturbed during the late 19th century. Historic maps show that the hills that formerly occupied the site were leveled, possibly by more than 40 feet in some locations, after 1850 and before 1885. There is also evidence (described in greater detail in the following chapter) that in preparation for the residential development of the Upper East Side in the late 19th century, much of the area was graded and excavated.

Because precontact archaeological resources are usually found at relatively shallow depths (within several feet of the precontact living surface) the significant landscape modification that took place within the 72nd Street Station APE during the late 19th century would have disturbed Native American archaeological resources in this area. The construction of the APE's streetbeds, as well as the decades of grading, paving, and utility installation that have followed would also have generated disturbance in this area. All of the locations of the station's entrances and ancillary facilities are located within blocks and lots that are currently occupied by buildings with basements. The excavation of those basements would have resulted in the disturbance of any archaeological resources in those locations.

Soil borings confirm the extensive disturbance of this area, as all but one of the soil borings located within the 72nd Street Station APE indicate that levels of fill are located between the ground surface and the bedrock of all the streetbeds within the APE. Only one soil boring indicated the presence of soil levels other than fill. That boring was located on the southern side of East 72nd Street approximately 55 feet west of Second Avenue. An additional soil boring located across the street showed that only 3 feet of fill were present above the decomposing bedrock.

Utility plans show that the streetbed of East 72nd Street west of Second Avenue contains numerous utilities, including sewer, water, gas, electric and telecommunications lines. A gas line runs through the southern sidewalk of the street in the vicinity of the aforementioned soil boring. Even if precontact archaeological resources could have survived the leveling of the hills and the subsequent construction of East 72nd Street and the installation of utilities, they would be irregularly distributed and would not likely possess significant research value.

Therefore, it is unlikely that the construction of the 72nd Street Station will impact archaeological resources dating to the precontact period.

86TH STREET STATION

The location of the 86th Street Station would have been a more ideal location for a Native American habitation site than the 72nd Street Station portion of the APE. As seen on the 1865 Viele map (Figure 3), the 86th Street Station APE was on more level ground and near the heads of two small streams, one that drained out into the East River and the other that drained into the saltwater marshes to the north. These streams and the surrounding environment could have provided numerous resources which would have been exploited by Native Americans for food and supplies.

However, as with the 72nd Street Station, there has been substantial landscape modification within the 86th Street Station APE since the late 19th century. While the map elevation data presented in Table 1 suggests that much of the APE in this area has been filled in, resulting in an increase in elevation since 1850, soil borings indicate that much of the ground surface has been disturbed. With the exception of one, all of the soil borings completed within the APE identified only layers of fill between the original ground surface and bedrock, indicating that no natural soil levels remain in those areas. The remaining boring was located in the southern sidewalk of East 83rd Street, approximately 40 feet east of Second Avenue. In that location, 3.5 feet of fill were present over a 4.5-foot layer of silt and clay, 3 feet of silty sand, and then decomposing bedrock. Another boring located within the streetbed of East 83rd Street approximately 30 feet away showed 12 feet of fill above the bedrock with no natural soil levels present. Numerous utilities run beneath the streetbed of East 83rd Street including sewer, water, gas, electric, and telecommunications lines. Even if precontact archaeological resources could have survived the construction of East 83rd Street and the subsequent grading, paving, and installation of utilities, they would be irregularly distributed and would not likely possess significant research value.

In addition, all of the locations of the station's entrances and ancillary facilities are located within blocks and lots that are currently occupied by buildings with basements. The excavation of those basements would have resulted in the disturbance of any archaeological resources in those locations.

Therefore, it is unlikely that the construction of the 86th Street Station will impact archaeological resources dating to the precontact period.

A. HISTORIC CONTEXT

Despite its large population during the historic period, the urban center of New York City was largely restricted to the southern end of Manhattan until the mid-19th century. Before that time, most of the northern portion of the island was occupied by large tracts of saltwater marshes, hills, uncultivated meadows, and farmland. The 1865 Viele map (Figure 3) shows that the locations of the 72nd and 86th Street stations were located in areas that were originally occupied or surrounded by tall hills and marsh-bordered streams that ran east to the East River. Early 19th century maps including the 1811 Bridges, 1820 Randel, and 1836 Colton maps (Figure 5), show that few structures were located in the vicinity of the two stations. The maps depict several historic roads that crossed through the area, connecting the isolated farmhouses and country estates with the main Post Road to Boston, which ran in the vicinity of modern Third Avenue near the APE.

By the mid-19th century, however, the population of New York began to move northward and neighborhoods began to develop throughout the area. Much of the development was brought about by the Tammany political machine and was heavily influenced by William Tweed, who at that time was the commissioner of the Department of Public Works (Burrows and Wallace 1999). The majority of development was located between Third and Fifth Avenues and East 59th and East 110th Streets because this area was "easy to grade, dig up, and build upon" (ibid: 929). Industrial development shifted east toward the river while crews of workers constructed streets and laid down sewer, water, and gas lines for the homes that were to be developed there (ibid). Therefore, it is likely that this neighborhood was outfitted with water and sewer lines before the majority of residential development occurred. AS seen on the 1865 Viele map, by that time sewers had been installed in several streets within and in the vicinity of the APE including Third Avenue between 69th and 87th Streets and 86th Street between Third Avenue and the East River. Second Avenue was lined with 4-story tenements that were intended to create a community more appealing to the working class than the crowded slums downtown (ibid). The growth of these neighborhoods was also due to the establishment of elevated train lines along Second and Third Avenues, which allowed individuals to work in Manhattan's downtown commercial center while living in residential districts uptown.

Dripps' maps of New York City published in 1851 and 1867 (Figure 6) depict the developing neighborhood of Yorkville, located in the vicinity of the 86th Street Station. The neighborhood surrounding the 72nd Street Station was less well-developed, especially east of Second Avenue. The 1867 map is the first to depict all of the side streets adjacent to the three stations as fully constructed, whereas previous maps had depicted some or all of the streets as proposed rather than built. Also by 1867, many of the tall hills that formerly marked the landscape in the area had been leveled and may have been used to fill in the adjacent streams and marshes in advance of the residential development of the Upper East Side.

While the 1867 Dripps map shows that some of the blocks adjacent to Second Avenue had been divided into individual lots, by the time of the publication of the 1879 Bromley atlas, all of the adjacent blocks had been lotted out and most had been developed with structures. The 1885 Robinson and Pidgeon atlas and the 1891 Bromley atlas (Figure 7) depict increased development throughout the Upper East Side. Bromley's atlas shows that by 1891, nearly all of the lots lining Second Avenue were occupied by structures and Sanborn maps dating to 1896, 1911, 1939, and 1951 show that the side streets were almost entirely developed by the early 20th century and have remained developed since that time.

B. LOCATIONS OF DISTURBANCE FOR THE 72TH STREET STATION APE

The APE for the 72nd Street Station remained undeveloped through the mid-19th century. Even after the streets in the area were constructed, by 1867 only one building had been constructed in the area, outside of the APE on the southern side of East 69th Street near the corner of Third Avenue. The lots adjacent to the APE were not substantially developed until the late 19th century.

As described above, portions of the 72nd Street Station APE were previously analyzed for archaeological sensitivity. The 2003 Phase 1A assessed the location of the main station "box" within the streetbed of Second Avenue between East 68th and East 73rd Streets and the 2007 disturbance memo and 2009 EA prepared by AKRF analyzed the location of Entrance 3 (including the streetbed of East 72nd Street between First and Second Avenues and Block 1446, Lot 51). Neither of those locations was determined to be sensitive for archaeological resources dating to the historic period.

ANCILLARY FACILITY 1:

Ancillary Facility 1 will be located at the northwest corner of East 69th Street and Second Avenue, within Block 1424, Lots 21, 22, and part of 7501. This area was undeveloped through the mid-19th century and no historic maps depict any structures on Block 1424 until the 1880s. The 1879 Bromley atlas shows that the block had been divided into lots, all of which were developed with brick or stone-fronted brick structures by 1885, when the Robinson-Pidgeon atlas was published. Eight historic lots were formerly located along the eastern side of Block 1424, fronting on Second Avenue, six of these are included in whole or in part in the location of Ancillary Facility 1. The 1885 atlas also depicts the presence of fire hydrants in the streetbed of East 69th Street, indicating that water lines (and sewers) were present.

The structures depicted within modern Lots 21 and 22 on the 1885 Robinson-Pidgeon atlas are still situated on the property. Current Sanborn maps indicate that both buildings are 5 stories tall and have basements. Lot 7501, which covers the remainder of this side of the block, is currently occupied by a 14- to 16-story structure with a basement. This structure was built in 1956.

Soil borings completed in the vicinity of Ancillary Facility 1 indicate the presence of 6 to 10 feet of fill located directly over bedrock or layers of decomposing bedrock. A single boring, located in the western sidewalk of Second Avenue in front of Lot 21 (outside of the APE), indicated the presence of 8 feet of fill over a layer of sand and gravel, although the boring was terminated at 10 feet below ground surface and no additional information was provided.

Because of the lack of development in this area until after water and sewer networks were available and the subsequent construction of 5- to 16-story buildings with basements over relatively shallow bedrock, it is not likely that archaeological resources dating to the historic period remain undisturbed within the location of Ancillary Facility 1.

ENTRANCE 1:

Entrance 1 of the 72nd Street Station will be located on the east side of Second Avenue between East 69th and East 70th Streets within Block 1444, Lots 49, 50, 51, and part of 7501. This area was undeveloped through the mid-19th century and no historic maps depict any structures in the location of Entrance 1 until the 1890s. The 1879 Bromley atlas shows that the block had been divided into lots, although none were depicted as developed until 1891, when an updated Bromley atlas (Figure 7a) was published. That map depicts eight historic lots along the western side of Block 1444 (fronting on Second Avenue), all of which were brick structures with stone fronts. Subsequent maps show that these buildings all were 5 stories tall and had basements.

The late 19th century structures first depicted on the 1891 Bromley atlas still stand on Lots 49, 50, and 51, within the location of Entrance 1. The remainder of the site of Entrance 1, covering a portion of Lot 7501, was redeveloped with a 14- to 18-story (with basement) residential building that was constructed in 1962.

Soil borings completed in the vicinity of Entrance 1 indicate the presence of 1.5 to 10 feet of fill located directly over bedrock or layers of decomposing bedrock. Because of the lack of development in this area until after water and sewer networks were available and the subsequent construction of 5- to 18-story buildings with basements over relatively shallow bedrock, it is not likely that archaeological resources dating to the historic period remain undisturbed in the location of Entrance 1.

ENTRANCE 2 AND ANCILLARY FACILITY 2:

Entrance 2 and Ancillary Facility 2 will require excavation in several locations, including a portion of Block 1426 Lot 25, a portion of East 72nd Street west of Second Avenue, and Block 1427, Lots 23 and 24 and a portion of Lot 28.

BLOCK 1426, LOT 25

Lot 25 of Block 1426 is currently occupied by a row of four 5-story structures without basements, although portions of the subway entrance to be constructed within this lot will be located in the bedrock level beneath the northern two structures (1361 and 1363 Second Avenue).

This area is depicted as vacant on historic maps through the late 19th century, although the 1862 Perris atlas depicts a small (approximately 10 by 20 feet) wood frame building in the southwestern corner of modern Lot 25, but not within the APE.

No other maps depict any structures within modern Lot 75 until the 1885 Robinson-Pidgeon atlas, which shows a 30-foot-square wood frame building in the northeastern corner of the lot, within the APE. However, the 1891 Bromley Atlas once again depicts modern Lot 25 as vacant. Maps continue to depict the lot as vacant through Bromley's atlas of 1899. While the Knox Presbyterian Church (now the Roman Catholic Church of Saint John the Martyr) was constructed to the west of Lot 25 (on modern Lot 27) circa 1887, historic maps do not suggest that it was associated with what was then vacant Lot 25 (New York Times 3/7/1887).

The buildings that currently occupy Lot 25 were constructed by 1907 and a Sanborn map from that year is the first to depict them. No maps suggest that the buildings themselves have basements, although Sanborn maps dating between 1951 and the present show that a rear addition to the structure at 1361 Second Avenue has a 1-story rear addition that has a basement.

A soil boring located within the southern curb of East 72nd Street west of Second Avenue indicated the presence of 6 feet of fill over 2 feet of silty sand, 2 feet of clean sand, 5 feet of sand, gravel, and silt, and then decomposing bedrock. Another boring located within the northern curb of East 72nd Street west of Second Avenue indicated that 3 feet of fill rested directly atop decomposing bedrock.

Although one soil boring suggests the presence of potentially intact soil levels in the vicinity of the location of modern Lot 25, the property was developed late in the 19th century, after water and sewer networks were available in adjacent streetbeds. Therefore, it is not likely that archaeological resources dating to the historic period are located in modern Lot 25.

BLOCK 1427, LOT 23

Although the 1879 Bromley atlas shows that modern Lot 23 was divided into four historic lots, the 1885 Robinson-Pidgeon atlas is the first to depict any structures on the property. The latter map depicts four stone structures on the lot (253 through 259 East 72nd Street). It appears that the structures that currently stand on Lot 23 are the same as those depicted on the 1885 map, although renovations some of the buildings in the first half of the 20th century have resulted in confusion regarding the number of floors within and the presence of basements below these buildings. Sanborn maps dating between 1896 and 1939 depict the structures at 253, 255, and 257 East 72nd Street as 4 stories with basements and the structure at 259 East 72nd Street as 5 stories with a basement, even though it was only 2 feet taller than the 4-story buildings to the west. However, maps dating after 1951 identify the structures at 253, 255, and 257 East 72nd Street as 5-story structures without basements even though photographs confirm that they are the same buildings (Sperr 1941). The historic photographs suggest that in the early 1940s, the lower floors of these buildings were renovated. It therefore appears that the alterations made to the ground floors of these buildings, formerly identified as basements, resulted in a change in the floor count as defined by the mapmakers.

As mentioned previously, a soil boring located in the northern curb of East 72nd Street indicates that the streetbed in this area is located over a 3-foot-thick layer of fill which sits directly on top of decomposing bedrock. Because of the late development of this area and the relatively shallow depth of the bedrock, it is not likely that archaeological resources dating to the historic period are located in modern Lot 23.

BLOCK 1427, LOT 24

The first historic map to depict any structures on Block 1427, Lot 24 is the 1885 Robinson-Pidgeon atlas, which depicts the 5-story (with basement) building that currently stands on the lot. Although a small open rear yard is currently situated behind this building, as with Lot 23, because of the late development of this area and the relatively shallow depth of the bedrock, it is not likely that archaeological resources dating to the historic period are located in the location of modern Lot 24.

BLOCK 1427, LOT 28

Like Lots 23 and 24, no structures were depicted on Lot 28 until the 1885 Robinson-Pidgeon map. In 1962, Lot 28 was redeveloped with a 21-story (with basement) residential tower. Because of the shallow depth of bedrock in this area, the construction of this building would have disturbed any natural soil levels within the lot. Therefore, it is not likely that archaeological resources dating to the historic period are located in modern Lot 28.

STREETBEDS TO BE AFFECTED BY UTILITY RELOCATION:

EAST 69TH STREET BETWEEN FIRST AND THIRD AVENUES

Early 19th century maps including the 1865 Viele (Figure 3), 1811 Bridges (figure 4), and 1836 Colton (Figure 5) maps all depict hills crossing the streetbed of East 69th Street between First and Third Avenues in various locations. No historic maps dating between the late 18th century and the present suggest that any structures ever entered the streetbed of East 69th Street in the vicinity of the APE. The street itself was not constructed until the 1860s and the 1867 Dripps map (Figure 6) is the first to depict any structures along (but not within) the streetbed in this area. In addition, soil borings taken within the streetbed of East 69th Street show that bedrock is very shallow in the vicinity of the APE and it is separated from the surface of the streetbed by a layer of fill between 2 and 10 feet thick. Finally, numerous utilities including water, sewer, gas, electric, and telecommunications lines run beneath the streetbed of East 69th Street east and west of Second Avenue.

Therefore, as a result of the disturbance relating to the construction, paving and grading, and the installation of utilities within the streetbed of East 69th Street between First and Third Avenues, it is not likely that intact archaeological resources dating to the historic period are present and will be impacted by the Second Avenue Subway project.

EAST 70TH STREET BETWEEN FIRST AND SECOND AVENUES

No historic maps dating between the late 18th century and the present suggest that any structures ever entered the streetbed of East 70th Street in the vicinity of the APE. The street itself was not constructed until the 1860s and the 1879 Bromley map is the first to depict any structures along (but not within) the streetbed. In addition, soil borings taken within the streetbed of East 70th Street show that bedrock is very shallow in the vicinity of the APE and it is separated from the ground surface by a layer of fill between that as thin as 1.5 feet in places. Finally, numerous utilities including water, sewer, gas, electric, and telecommunications lines run beneath the streetbed of East 70th Street both east and west of Second Avenue.

Therefore, as a result of disturbance relating to the construction, paving and grading, and the installation of utilities within the streetbed of East 70th Street between First and Second Avenues, it is not likely that intact archaeological resources dating to the historic period are present will be impacted by the Second Avenue Subway project.

EAST 72ND STREET BETWEEN SECOND AND THIRD AVENUES

Historic maps show that East 72nd Street between Second and Third Avenues has never been occupied by structures. A soil boring located on the northern side of the street indicated the presence of 3 feet of fill over a layer of decomposing bedrock while a boring on the southern side of the street suggested that presence of 6 feet of fill over a 2-foot layer of silty sand, then a 2-foot layer of clean sand, a 5-foot layer of sandy, gravel, and silt, and then decomposed bedrock. Several test pits completed within the streetbed of East 72nd Street west of Second Avenue identified numerous utilities beneath the road's surface. The tops of most of these utilities were located between 2 and 4 feet below the ground surface and therefore these utility lines extend to greater depths beneath East 72nd Street. Utility plans provided by MTA NYCT show that many more utility lines run through the APE in this area, including sewer, water, electric, gas, and telecommunications lines.

Because of the lack of development in this area as well as the amount of disturbance generated by the construction, paving, grading, and maintenance of the streetbed as well as the installation of utilities within it, utility relocations within the streetbed of East 72nd Street between Second and Third Avenues are not expected to impact any intact archaeological resources dating to the historic period.

EAST 73RD STREET BETWEEN FIRST AND THIRD AVENUES

Early 19th century maps including the 1811 Bridges (Figure 4), 1836 Colton (Figure 5), and 1865 Viele (Figure 3) maps depict East 73rd Street between First and Third Avenues as a hilly stretch of land bordered by a marshy stream to the north. No 19th century maps depict any buildings in the path of the streetbed and the street itself was not constructed until the 1860s (see Figure 6). Sanborn maps dating to 1911, 1939, and 1951 all depict a small (approximately 5 feet by 15 feet) 1-story structure that was constructed within the northern sidewalk of East 73rd Street adjacent to the structure at 1361 First Avenue. The small structure was likely commercial in nature and may have been constructed as part of a store located on the ground floor of the adjacent building.

In addition, Sanborn maps dating between 1896 and 1939 depict two steam boilers within the streetbed of East 73rd Street approximately 90 feet west of Second Avenue in front of a cigar factory formerly located at 232-234 East 73rd Street at the southwest corner of Second Avenue. An additional boiler was present in the streetbed of East 73rd Street in front of the Bohemian National Hall at 323 East 73rd Street, between First and Second Avenues. That boiler appears on Sanborn maps dating to 1911, 1939, and 1951. These boilers were likely entirely contained within the sidewalks.

Compared with other portions of the APE, the streetbed of East 73rd Street has experienced less disturbance as a result of utility installation, especially between First and Second Avenues. However, soil borings taken in various locations throughout the streetbed and vicinity show only levels of fill present between the ground surface and bedrock. Because of the lack of development in this area, utility relocations within the streetbed of East 72nd Street between Second and Third Avenues are not expected to impact any intact archaeological resources dating to the historic period.

C. LOCATIONS OF DISTURBANCE FOR THE 86TH STREET STATION APE

Unlike the APE for the 72nd Street Station, by the mid-19th century the neighborhood surrounding the APE for the 86th Street Station had become a well-developed community known as Yorkville. While the majority of this development originally centered on Third Avenue, by 1867, the neighborhood had spread to the east and structures were present on many of the lots adjacent to the APE (see Figure 6).

As described above, portions of the 86th Street Station APE were previously analyzed for archaeological sensitivity. The 2003 Phase 1A assessed the location of the station within the streetbed of Second Avenue between East 83rd and East 87th Streets and the 2007 disturbance memo and 2009 EA prepared by AKRF analyzed the location of Entrance 2 (including the streetbed of East 86th Street between First and Second Avenues, and Block 1548, Lots 49 and 50). Neither of those locations was determined to be sensitive for archaeological resources dating to the historic period.

ANCILLARY FACILITY 1:

Ancillary Facility 1 will be constructed at 1601 Second Avenue (Block 1529, Lot 21), at the northwest corner of East 83rd Street and Second Avenue. No structures are depicted in this area on historic maps dating to the first half of the 19th century, although structures associated with the Yelles Hopper estate were located near the center and northern portions of Block 1529 during this time. The Hopper estate extended into the streetbed of Second Avenue and was discussed in the 2003 Phase 1A. The 1A concluded that while the home was present on the site before sewer and water networks were available, soil borings show that the bedrock is so shallow in the vicinity of the Hopper home that it could have made digging shaft features (such as privies cisterns and wells) very difficult. In addition, soil borings showed that the soil levels are heavily disturbed and were likely disturbed after the Hopper home was demolished.

No structures related to the Hopper estate are depicted on maps in the vicinity of Lot 21. The first map to depict a structure in that lot is the 1879 Bromley atlas, which indicates that the lot was developed but does not depict the building's footprint. By the time this map was published, water (and likely sewer) lines were already present in both Second Avenue and East 83rd Street. At that time, Lot 21 was 25 feet longer than it is today. In the late 19th century, the former rear yards of Lot 21 and the lots to the north were separated and combined to create what is now Lot 121 to the west of Lot 21. The Bromley atlas of 1891 (Figure 7a) shows that a 4-story brick structure with a basement and a small open rear yard had been constructed on the lot. Sanborn maps show that by 1896 a small

addition had been added to the rear of the building leaving only an approximately 5-foot rear yard behind the structure. This structure continues to stand on the site to this day.

Because the structure at 1601 Second Avenue was constructed after or around the same time that water and sewer lines were available in the neighborhood, it is not likely that shaft features such as privies, cisterns, and wells would be present within the lot. Furthermore, soil borings show that bedrock is extremely shallow in this area, ranging from 4.5 to 8.5 feet below the ground surface, also suggesting that shaft features would not be present because they could not have been dug to the necessary depths. Any undisturbed soils on this lot would subsequently have been disturbed during the excavation of the basement that is situated beneath the existing structure at 1601 Second Avenue. Therefore, there is a low probability that the construction of the Ancillary Facility will impact archaeological resources on Lot 21.

ANCILLARY FACILITY 2:

Ancillary Facility 2 will be constructed along the eastern side of Lot 22 on Block 1532, on the western side of Second Avenue between East 86th and East 87th Streets. The 1865 Viele map (Figure 3) depicts a narrow hill and a small stream running across this area. No early 19th century maps depict any structures in this area, although the 1811 Bridges map (figure 4) and the 1820 Randel farm map both depict the home of W. Waldron immediately to the south of the block, within the streetbed of East 86th Street (discussed below). The 1836 Colton map (Figure 5) depicts a small structure within the location of Ancillary Facility 2, adjacent to an older road that ran northeast-southwest through the area, connecting many large homes to the northeast. The same structure appears on the 1851 Dripps map, which identifies the owner as "Quakenbos" (also spelled "Quackenbush"). The 1867 Dripps map (Figure 6) shows the area as vacant, although structures owned by the Quackenbos family were still present on the block.

By 1879, the block had been divided into lots and two structures were present along the western side of Second Avenue within Block 1532. However, by the publication of the 1885 Robinson-Pidgeon atlas, the lots were once again depicted as vacant. By 1891, the Bromley atlas (Figure 7b) shows that the entire side of Block 1532 fronting on Second Avenue had been developed with a row of 4-story brick residential structures. Subsequent maps indicate that all of these buildings had basements. These buildings stood on the lot until circa 1970, when a 30-story (with basement) structure known as the "Newbury Apartments" was constructed on the lot. Sanborn maps show that the plaza and garage adjacent to the building also have basements and that the building itself has two sub-basements. A soil boring sample was taken from the western curb of Second Avenue directly east of the Newbury Apartments, which showed that the streetbed in this area is underlain by approximately 12 feet of fill situated directly above bedrock.

The excavation of the basements and sub-basements of the existing structure on Lot 22 would likely have generated substantial disturbance well into the bedrock, as it is relatively shallow in this area. Therefore, there is little chance that archaeological resources associated with the early and mid-19th century structures that were formerly situated in the location of Ancillary Facility 2 could remain intact within the lot.

ENTRANCE 1:

Entrance 1 will be located on the eastern side of Second Avenue between East 83rd and East 84th Streets. The entrance will require excavation within Block 1546, Lots 1, 49, and 50 between the eastern building line of Second Avenue and a point approximately 40 feet east as well as a portion of the streetbed of East 84th Street between First and Second Avenues. Soil borings taken within Block 1546 indicate that the majority of the block is covered by fill that rests directly on top of the bedrock, which is located between 9 and 19 feet below the ground surface. The 1865 Viele map (Figure 3) shows that a small marsh-bordered stream formerly terminated in the southern end of the site of Entrance 1. Topographic information from historic maps suggests that several feet of fill has been added near the intersection of East 83rd Street and Second Avenue, reflecting the filling of this stream (see Table 1).

Block 1546, Lot 1

The 1867 Dripps map (Figure 6) is the first historic map to depict any structures within Lot 1, which was originally made up of six historic lots. Dripps' map shows that although those lots had been laid out, only three of them were developed with structures. Interestingly, none of those structures fronted directly on Second Avenue. Instead, they were erected in the rear of the historic lots. Therefore, the location of Entrance 1 is within the open front yards of

these structures. Two of these structures are depicted on the 1879 Bromley atlas, which shows that the third lot had been redeveloped. That map also depicts a building within one of the formerly vacant historic lots. This map is the first to indicate the presence of fire hydrants within Second Avenue in this area, suggesting that water pipes (and likely sewers) had been laid in Second Avenue by this time.

Additional development had occurred by the mid-1880s, as seen on the 1885 Robinson-Pidgeon atlas, which shows that a Methodist Episcopal Church had been constructed on one of the historic lots within modern Lot 1. By the publication of the 1891 Bromley atlas (Figure 7b), however, all of the lots fronting Second Avenue within Block 1847 had been redeveloped with brick structures that subsequent maps show were constructed with basements. The location of Entrance 1 will be located entirely within the footprints of these buildings and will not include any of the open rear yard areas that were located to the east.

These buildings stood on the site until circa 1977, when the building currently situated on the lot, the "Carmague House," was constructed. Sanborn maps show that this building is 30 stories and both the building and the adjacent plaza have a basement and a sub-cellar with below-ground parking facilities. The excavation necessary to construct the basement and sub-cellar in this lot would have generated significant disturbance to the original soil levels, especially given the fact that bedrock is relatively shallow (approximately 11 to 12 feet below grade) near the southern end of Block 1546. Therefore, the construction of Entrance 1 is not expected to impact any archaeological resources within Lot 1.

Block 1546, Lot 49

The first historic map to depict any structures within Lot 49, which is located at 1616 Second Avenue (at the southeast corner of East 84th Street and Second Avenue), is the 1885 Robinson-Pidgeon atlas. That map depicts the building as a stone structure with a small open rear yard but does not present any other information about it. Subsequent maps show that this building is the 5-story brick structure with a basement that continues to stand on the site to this day.

Because this lot was not developed until after water and sewer lines were available in the area, there is a low probability that historic period archaeological resources exist on Lot 49 which would be impacted by the construction of Entrance 1.

Block 1546, Lot 50

The first historic map to depict any structures within Lot 50, which is located at 1614 Second Avenue, is the 1879 Bromley atlas. That map shows that the lot was developed but does not depict the building's footprint. Subsequent maps show that the lot was developed with a 5-story brick structure with a basement, likely the same one that had been constructed by 1879. This structure continues to stand on the site to this day. Because this lot was not developed until after water and sewer lines were available in the area, there is a low probability that historic period archaeological resources exist on Lot 50 which would be impacted by the construction of Entrance 1.

East 84th Street between First and Second Avenues

The land now occupied by East 84th Street between First and Second Avenues is depicted on the 1865 Viele map (Figure 3) as a level meadow that was uninterrupted by hills or streams. As seen in Table 1, some grading has occurred in the vicinity of this streetbed since the mid-19th century and it appears that between 2 and 4 feet of earth may have been removed. The 1836 Colton map (Figure 5) shows that the street had not yet been constructed (although it had already been planned out) and a single structure had been erected along the southern side between First and Second Avenues, outside of the APE. The Dripps map of 1851 is the first to depict the street as constructed, although little development is seen along the street (outside of the APE) until Dripps' 1867 map (Figure 6). Fire hydrants indicating the presence of water lines are first depicted on the 1879 Bromley atlas and it is likely that sewer lines were available in the streetbed by that time as well.

The 1879 Bromley atlas depicts a portion of the structure at 312 East 84th Street, approximately 150 feet east of Second Avenue, as projecting out into the streetbed. The map does not depict the complete footprint of the building, although it shows that the portion that extended approximately 5 feet into the southern sidewalk of East 84th Street was approximately 15 feet wide. It is possible that the projection of the structure into the streetbed is a cartographic error, as the structure was built after East 84th Street was cut through the area and no other structures in the vicinity are depicted as entering the surrounding streetbeds. It is not likely that the city would have permitted any structure

to obstruct the active sidewalk. Even if the building did extend into the APE, it is not likely that shaft features were constructed in the streetbed at this time as the building does not appear on the lot until water and sewer lines were already available. In addition, multiple utility lines run under the streetbed in this area, including sewer, water, electric, gas, and telecommunications lines. Therefore, it is unlikely that any archaeological resources associated with the structure would have survived within the APE.

No other historic maps depict any structures within the path of the streetbed of East 84th Street between First and Second Avenues. Because of the lack of development in this area until after the installation of water and sewer lines as well as the amount of disturbance generated by the construction, paving, grading, and maintenance of the streetbed as well as the installation of utilities within it, utility relocations within the streetbed of East 84rd Street between First and Second Avenues are not expected to impact any intact archaeological resources dating to the historic period.

STREETBEDS TO BE AFFECTED BY UTILITY RELOCATION:

East 82nd Street between First and Second Avenues

As seen on the 1865 Viele map (Figure 3), a small marsh-bordered stream formerly ran through the streetbed of East 82nd Street in the vicinity of First Avenue. The stream was located at a lower elevation than the surrounding land and was filled in at some point after 1850 (see Table 1). East 82nd was constructed by 1867, and the Dripps map of that year (Figure 6) is the first to depict any development fronting the road. Water (and likely sewer) lines were present in the street by 1879, as seen on the Bromley atlas of that year.

No historic maps depict any structures within the path of the streetbed of East 82nd Street. Multiple utility lines run under the streetbed in this area, which include water, electric, gas, and telecommunications lines. Minimal work is proposed for this streetbed, including a single electric line to connect to an existing electrical vault within the street's southern curb. Because of the lack of development in this area, utility relocations within the streetbed of East 82nd Street between First and Second Avenues are not expected to impact any intact archaeological resources dating to the historic period.

East 83rd Street between First and Third Avenues

The 1865 Viele map (Figure 3) shows that the same stream that was present in the East 82nd Street portion of the APE also entered the streetbed of East 83rd Street near its intersection with Second Avenue. In addition, hills were present near the street's intersections with First and Third Avenues. As seen on Table 1, since the mid-19th century, some fill has been added to the streetbed east of Second Avenue (where the former stream was filled in) although the elevation of the land near Third Avenue has changed little since that time. The street was constructed by 1851, as seen on the Dripps map of that year. Fire hydrants indicating the presence of water lines are first depicted on the 1879 Bromley atlas and it is likely that sewer lines were available in the streetbed by that time as well.

No historic maps depict any structures within the path of the streetbed of East 83nd Street between First and Third Avenues. The 1811 Bridges map (Figure 4) shows that a portion of an historic road formerly entered the APE near the intersection of East 83rd Street and Third Avenue. This road is not depicted on any other maps. Multiple utility lines run under the streetbed in this area, which include sewer, water, electric, gas, and telecommunications lines. Because of the superficial nature of historic roads, it is likely that the original road surface was destroyed by the subsequent construction of East 83rd Street. As mentioned previously, one soil boring identified layers of fill, silty clay, and silty sand over the bedrock on the southern side of East 83rd Street east of Second Avenue while 4 other borings from various locations in the streetbed (both east and west of Second Avenue) show nothing but fill between the ground surface and bedrock.

Because of the lack of development in this area as well as the amount of disturbance generated by the construction, paving, grading, and maintenance of the streetbed as well as the installation of utilities within it, utility relocations within the streetbed of East 83rd Street between First and Third Avenues are not expected to impact any intact archaeological resources dating to the historic period.

East 86th Street between Second and Third Avenues

Viele's 1864 map (Figure 3) depicts a stream within the streetbed of East 86th Street near Second Avenue. The terminus of the stream was within Block 1532, between East 86th and East 87th Streets just west of Second Avenue.

The Viele map also shows that multiple hills were present in the area, several of which interrupted the streetbed of East 86th Street near Second and Third Avenues.

The 1811 Bridges map (Figure 4) depicts a structure belonging to "W. Waldron" in the path of East 86th Street just west of Second Avenue. The building was situated at the intersection of two historic roads, one that lead northwest to other Waldron properties, and another which led to the Hell Gate or Horn's Hook ferry, on the shore of the East River at the foot of East 86th Street. The Waldron family had been granted a large farm in the area, and the 1811 map shows numerous homes owned by various family members in the vicinity of East 86th Street and Second Avenue, this included the Hopper estate, as Yelles Hopper was married to one of Waldron's daughters (Stokes 1968). The structure that is located in the APE was later granted to Cornelia Waldron (Tuttle 1877) and is listed on numerous 19th century maps as the property of "the heirs of William Waldron."

The route of East 86th Street had been laid out by the Street Commissioners circa 1811, however, it was not until 1827 that the City's Common Council actually ordered it to be constructed. East 86th Street was built long before many of the other streets in the area in part to replace the narrow, winding road to the Hell Gate Ferry, which was nearly impassible in inclement weather (*Minutes of the Common Council 1784-1831* XVI: 433). The construction of the road was approved, despite the objection of David Waldron and his sisters, who did not want the new public road cutting through their properties (ibid).

During the road's construction, it was necessary to level the large hill that was formerly located near the intersection of East 86th Street and Third Avenue. This appears to have been the same hill depicted within the streetbed of East 86th Street within the APE near Third Avenue on Bridges' 1811 map as well as Viele's map depicting the original topography of Manhattan (Figures 3 and 4). In 1829, 20 to 25 convicts being held on nearby Blackwell's Island were sent to provide the labor (ibid: 135). The 1836 Colton map (Figure 5) reflects the leveling of the hill and the construction of East 86th Street between the East River and Eighth Avenue. However, the stream that ran to the east of the hill, near Second Avenue, is still depicted on the 1836 map, suggesting that the eastern end of the block may not have experienced as much landscape modification as the western portion at this time.

The 1836 map also shows that the construction of East 86th Street resulted in the removal of the former Waldron home. No subsequent maps depict any structures within the streetbed. The 1865 Viele map is the first to depict sewers within the streetbed in this area and water lines were installed around the same time, as indicated by the presence of fire hydrants on the 1879 Bromley atlas. A steam boiler was depicted within the streetbed on the 1896 Sanborn maps at the northeast corner of Third Avenue and East 86th Street adjacent to a hotel at 1535 Third Avenue. Additional boilers were present in front of the "Yorkville Casino" (at 212 East 86th Street); one was depicted in 1911 and two more had been added by 1939. Again, these boilers appear to have bene entirely contained within the sidewalks. Current utility maps show the presence of multiple utility lines within the streetbed including sewer, water, electric, gas, and telecommunications lines.

Two soil borings taken near intersection of East 86th Street and Second Avenue show that there are no natural soils present in the area and that bedrock is very shallow. One of the borings, located at the southwest corner of East 86th Street and Second Avenue within 20 to 30 feet of the location of the former home, indicates the presence of 8 feet of fill directly over the bedrock. Another boring, originally included in the 2003 Phase 1A study, located on the western side of Second Avenue between East 86th and East 87th Streets, was aborted because of the shallow depth of the bedrock. As seen in Table 1, the elevations for this stretch of East 86th Street have changed very little since 1850. It is unclear when the fill was placed here although it is likely that it dates to circa 1829, around the time when the adjacent hill was leveled.

Despite the presence of a historic structure formerly located within this portion of the APE, the streetbed of East 86th Street between Second and Third Avenues has been greatly disturbed. Early 19th century landscape modification resulted in the removal of hills and the filling in of a stream that formerly ran near the APE. The elevations in the area have remained relatively unchanged since the mid-19th century, and therefore the late 19th and 20th century development in the area, including the paving and grading the streetbed as well as the installation of utilities, would have disturbed historic soil levels rather than fill placed at a later date. It is not likely that

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¹ Current Sanborn maps show that a ticket booth for a movie theatre extends onto the southern sidewalk of East 86th Street but this structure does not have a basement.

archaeological resources relating to the former Waldron home could have survived within the APE after the construction of East 86th Street, the landscape modifications that took place in the first half of the 19th century, and utility installations during the late 19th and 20th centuries. Therefore, the proposed utility installations in the streetbed of East 86th Street between Second and Third Avenues are not expected to impact significant archaeological resources dating to the historic period.

East 87th Street between Second and Third Avenues

Early maps including the 1811 Bridges (Figure 4), 1836 Colton (Figure 5), and 1865 Viele (Figure 3) maps all show that the same stream that entered the APE at 86th Street also ran through the APE at 87th Street. This stream was surrounded by more elevated ground and likely ran through a ditch or ravine. Additional hills interrupted the streetbed near its intersections with Second and Third Avenues. The 1811 map also shows that one of the historic roads that also crossed East 86th Street within the APE traveled through East 87th Street as well, connecting the home of D. Waldron with the aforementioned William Waldron home.

East 87th Street is first depicted as fully constructed on the 1851 Dripps map, which also shows three structures constructed along, but not within, the streetbed. Dripps' 1867 map (Figure 6) shows that development had increased in the area, although most of it was clustered on the western side of the block, near Third Avenue. Water (and likely sewer) lines were present in the street by 1879, as seen on the Bromley atlas of that year.

No historic maps depict any structures within the path of the streetbed of East 87th Street between Second and Third Avenues. Multiple utility lines run under the streetbed in this area including water, electric, gas, and telecommunications lines. Because of the lack of development in this area, utility relocations within the streetbed of East 87th Street between Second and Third Avenues are not expected to impact any intact archaeological resources dating to the historic period.

A. APE SENSITIVITY

As part of the background research for this Phase 1A Archaeological Documentary Study, various primary and secondary resources were analyzed, including historic maps and atlases, historic photographs and lithographs, newspaper articles, and local histories. The information provided by these sources was analyzed to reach the following conclusions.

PRECONTACT SENSITIVITY ASSESSMENT

The precontact sensitivity of project sites in New York City is generally evaluated by the presence of level slopes, water courses, well-drained soils, and close proximity to previously identified precontact archaeological sites. Historic maps suggest that portions of the 72nd Street and 86th Street Station APE may have at one time been attractive to Native Americans as locations for habitation sites or resource exploitation. However, there have been many episodes of landscape modification and disturbance to these areas associated with the transformation of the Upper East Side from a hilly, undeveloped wilderness into highly developed urban neighborhood. Soil borings show that nearly the entire APE is composed of fill located directly over bedrock and there are no intact soil levels present. Therefore, the APE for both the 72nd and 86th Street Stations is determined to have low sensitivity for precontact period archaeological resources.

HISTORIC SENSITIVITY ASSESSMENT

All of the proposed excavation within blocks adjacent to Second Avenue is located within areas that have already been disturbed by the excavation of buildings with basements. Some of these areas were occupied by historic structures during the late 19th and early 20th centuries. However, the locations of the entrances and ancillaries are all situated within the footprints of structures and none included any portions of former open rear yards. In addition, many areas were not developed for residential use until around the same time that historic atlases suggest water and sewer networks were installed. Therefore, it is not likely that any of these historic properties would have included shaft features such as privies, cisterns, or wells.

A search of historic maps shows that only two structures were ever situated completely or partially within the lines of the streetbeds that run east and west of Second Avenue between East 69th and East 73rd and East 82nd Street and East 87th Streets. A small portion of a late 19th century structure appears to have entered the southern sidewalk of East 84th Street between First and Second Avenues. However, this structure appears to have been constructed after the installation of water and sewer lines within East 84th Street and does not appear to have remained in that location for a substantial period of time. Therefore, it is not likely that archaeological resources associated with this structure remain within the APE at this location. In addition, a structure belonging to William Waldron and his heirs was formerly located within the streetbed of East 86th Street immediately west of Second Avenue. However, the documentary record and recent soil borings suggest that this area is highly disturbed and therefore it is not likely that archaeological resources related to the former structure remain intact in this area.

Because of the lack of development in the area until the late 19th century, the extent of the landscape alterations that are visible in the cartographic record and in soil borings, and the substantial disturbance generated by the construction, paving, and grading of the APE streetbeds as well as the installation of utilities within them, it is not likely that undisturbed archaeological resources dating to the historic period remain present within the APE for either the 72nd or 86th Street Stations. Therefore, the APE is determined to have low sensitivity for archaeological resources dating to the historic period.

B. RECOMMENDATIONS

The APE has low sensitivity for both precontact and historic period archaeological resources. Therefore, no additional archaeological research or investigation is recommended. However, if project plans change so that additional areas are added to the APE, they should be reviewed by an archaeologist in accordance with the Second Avenue Subway project's PA to determine if archaeological resources could be impacted.

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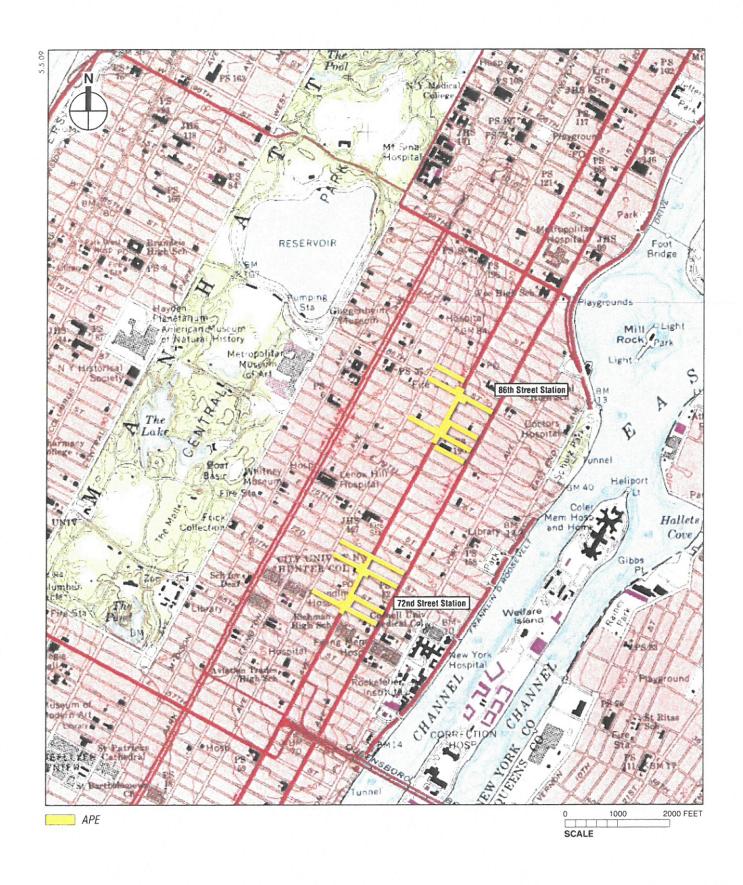
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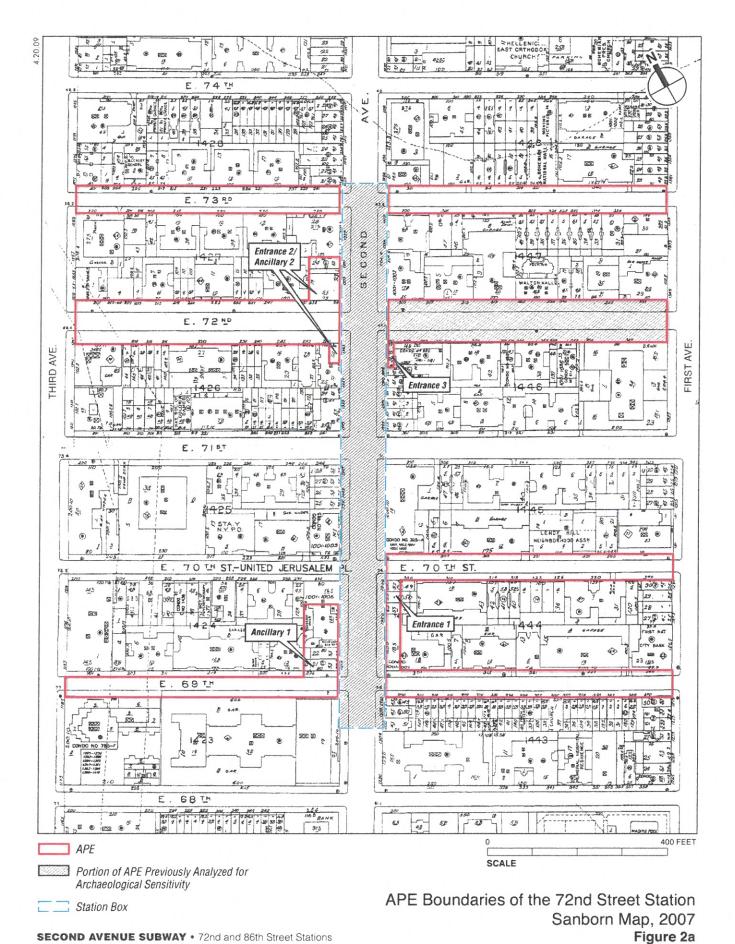
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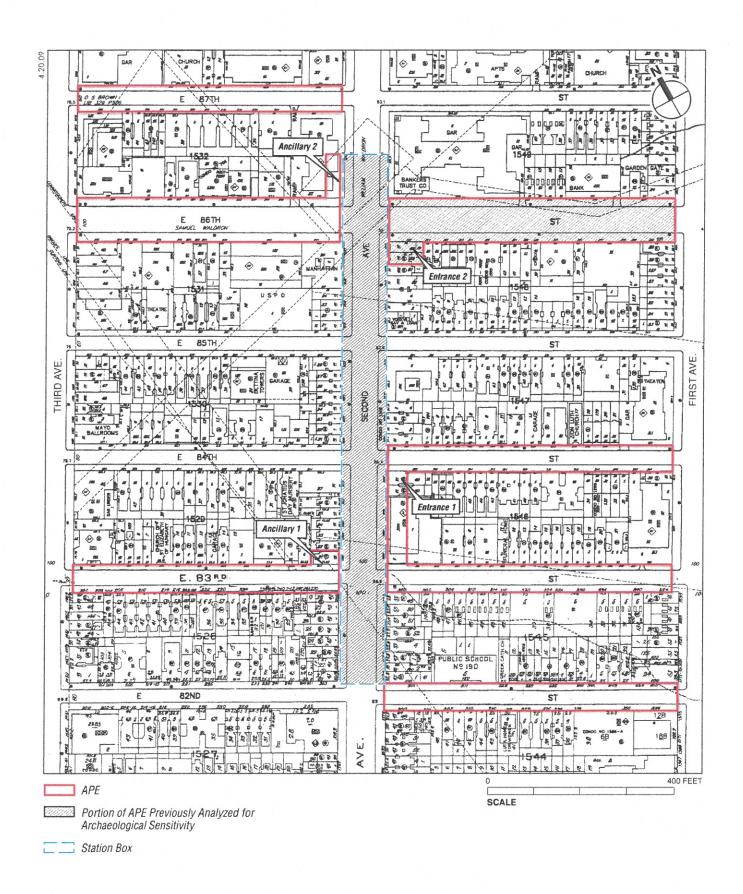
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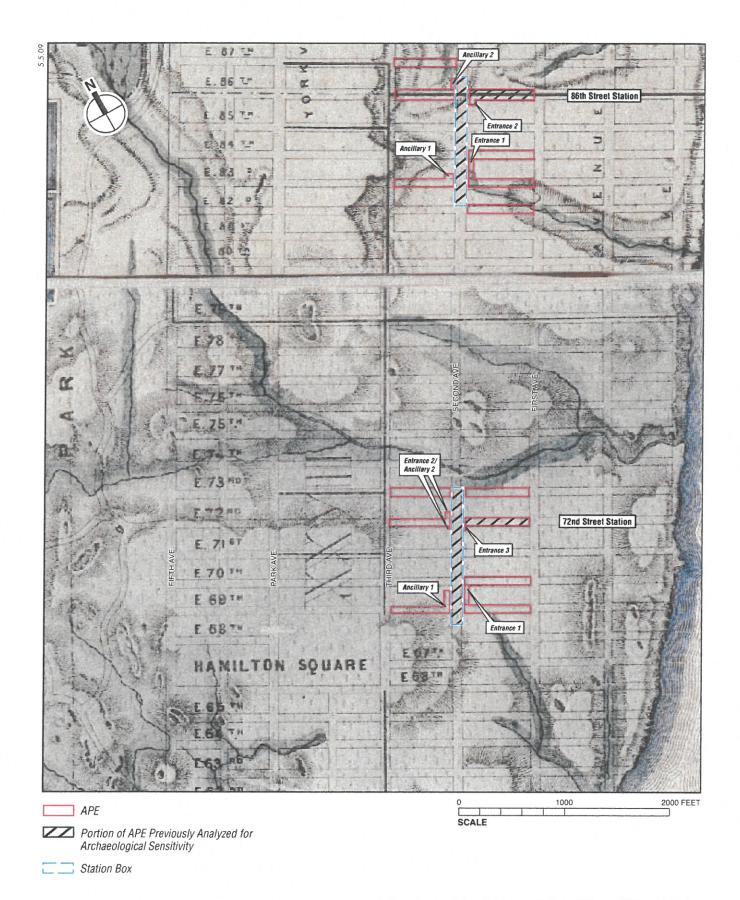
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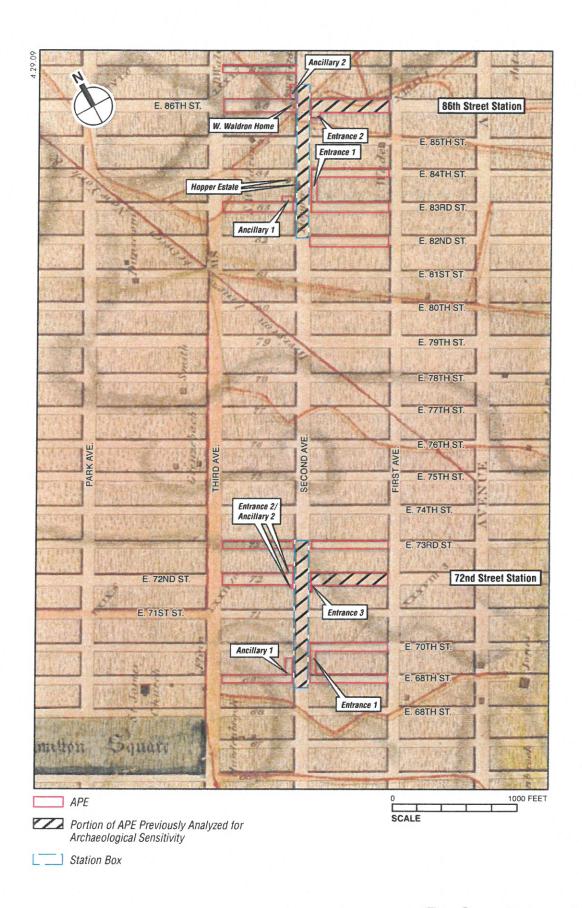




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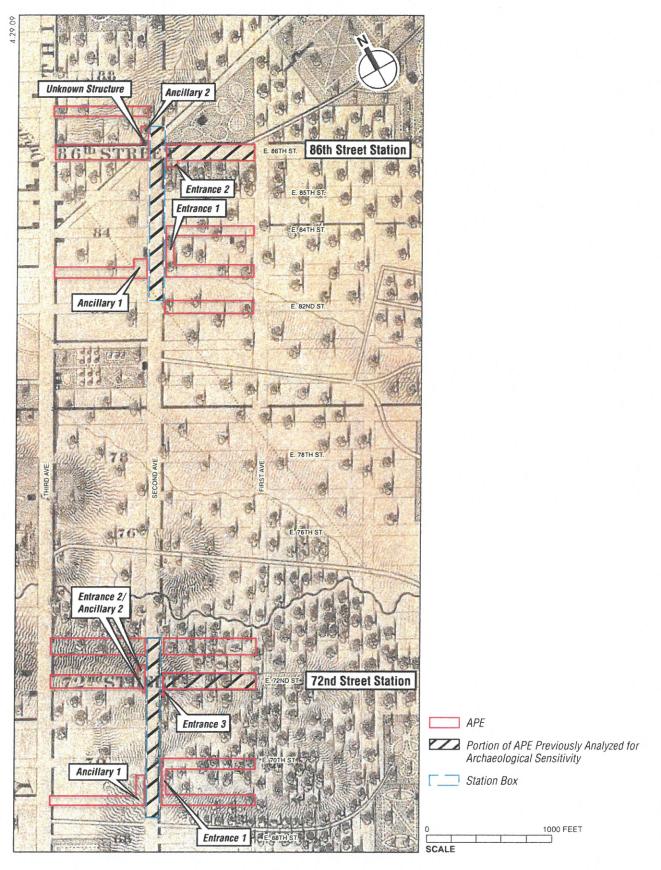
E. Viele, 1865

Figure 3



"The Commissioners' Plan." W. Bridges, 1811 Figure 4

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Topographical Map of the City and County of New York

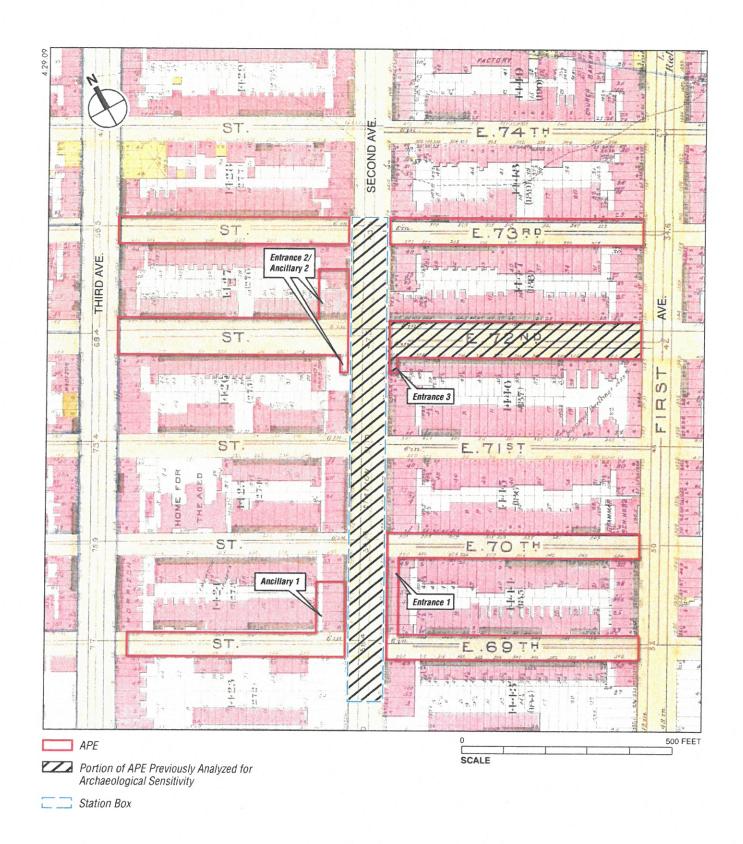
J.H. Colton, 1836

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Figure 5

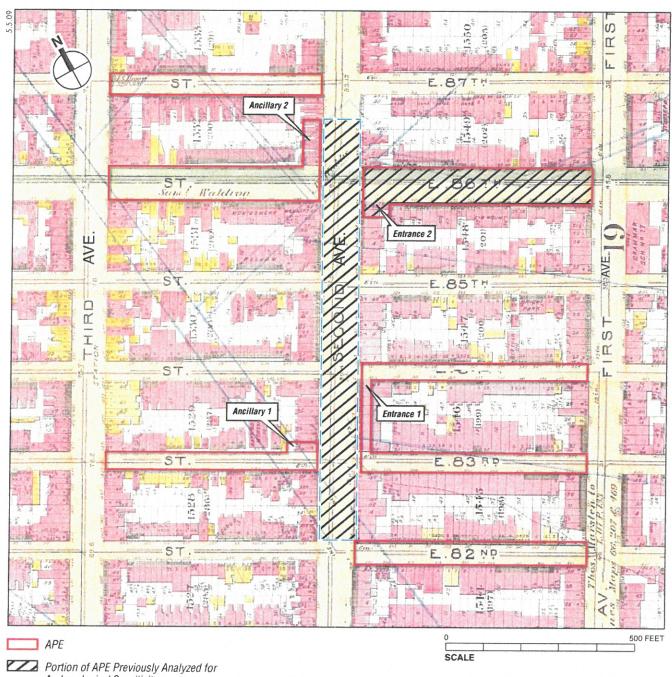
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Atlas of the City of New York showing 72nd Street Station GW Bromley,1891 Figure 7a

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Portion of APE Previously Analyzed for Archaeological Sensitivity

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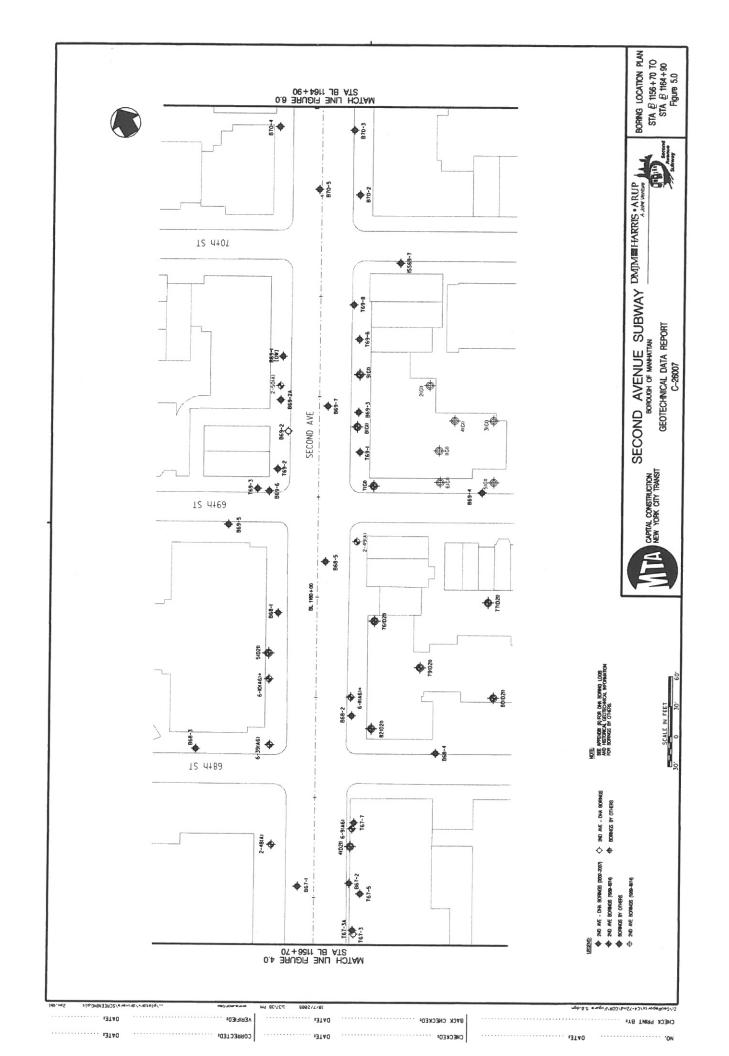
Atlas of the City of New York showing 86th Street Station GW Bromley,1891 Figure 7b

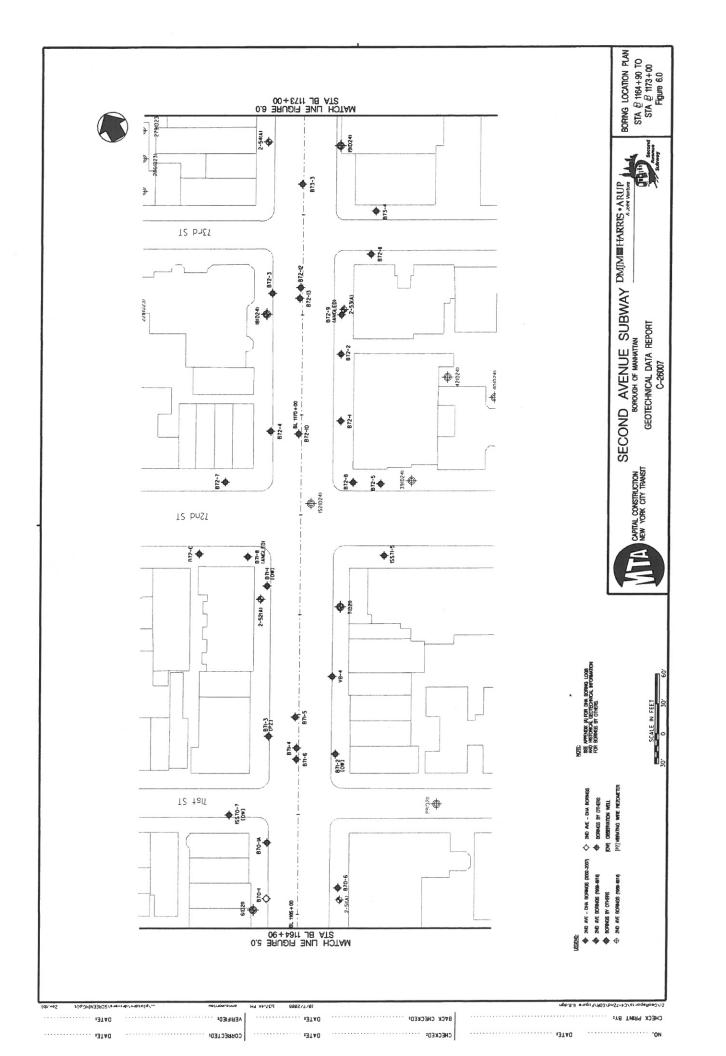
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Appendix A: Soil Boring Logs for the 72nd Street Station Provided by MTA NYCT

Note: only borings located within the APE have been included here.

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5) 39'-44', 47'-50.5', and 52'-53.5': Core fractured also, incipient and healed fractures; no fractures per foot recorded.
6) Core barrel blocked.
7) RQD affected by sub-vertical joints/fractures between 81.0' and 83.5'.
8) Packer testing performed in bedrock in 10' intervals approximately between the depths of 30.9' and 89.8' after coring was completed.
9) Bottom of borehole at 92.5'; borehole left open for ATV to be performed at a future date.

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21	Circlific	ation li	level not re	ent anni	nyimate	e boundaries	s hehe	veen 4	soil a	d rock types, transition may be gradual.										
1	Field Te	est Dat	a - Total o	roanic va	pors le	vels are refe	erence	ed to	a ber	zene standard measured in the head space of sea	aled	soil sa	mple jars usir	ng ai	n organi	c vapor	meter	equipped [,]	with a	
r	hotoion	ization	detector (PID) and	a 10.6	eV lamp. Re	esults	are in	n pari	per million by volume (ppmv).			ex " ex							

4) Top of rock at 7'.
5) Borehole reamed to 10' to facilitate flush installation of 3" diameter casing for ATV.

BORING NO. B69-3

7) Bottom of borehole at 112.6'; borehole grouted upon completion.

	BORING LOG BORING NO. B69-3 DMIMILIARRIS ARUI! BORING STATION: 1161+85.19 BORING STATION: 1161+85.19 BORING STATION: 1161+85.19 BORING STATION: 1161+85.19 BORING STATION: 1161+85.19																
	PAC 200	-		- 1 11	rin .			T	_								. B69-3
	LM	MH	HAKKIS	D. A. J. L.	districts	d.d.				ATACANA AVENUE CURWAY						FFSET: 4.00	
	-			****						SECOND AVENUE SUBWAY		T NO. CM 1	188			OORDINATES	
					4.6	1				PROJECT		EL. 158.81				ORTH: 21873	
					111	Description of the last of the					DATUM		11.45	T) 440		AST: 995471.	4/94
								1==	D1116	00 1 0 10 10 10 10	FINAL B	ORING DEPT				EADINGS	
). Split Sp							CO: Jersey Boring and Drilling Co., Inc	DATE			DEPTH			B. TIME
	NG SIZ		ER: 140 lb :	Safety	Hamr	ner				N: P. Lynch ER: D. Persaud	DATE		一		0		
	NG HA		: N/A							TART: 04/02/04 DATE END: 04/06/04							
	K COR						_	RE	VIEW	ED BY: M.A. Ponti, Jr DATE: 05/13/04			-	,			
						2	8	8						INS	ITU PRO	OPERTIES	NUMBER OF
	(BPF) OR (MIN/FT)	ORE NO.	SAMPLE DEPTH (FT)	NCH	(PF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	CORE REC (%)	ROCK CORE RQD (%)	T DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE)	YMBOL	АРНУ		HARDI	NESS	WEATHERING	FRACTURES PER FOOT
ОЕРТН (FT)	CASING (BE CORING (M	SAMPLE / CORE	MPLE DE	BLOWS / 6 INCH	N VALUE (BPF)	WREC: S	TOTAL COF	CK COR	FIELD TEST	CLASSIFICATIONS	STRATA SYMBOL	STRATIGRAPHY	NOTES	see beli valu	es	see below for values	see below for values
ä	38	SA	SA	핆	ž	F.8	5	8	H		ST	ST	ž	1 2 3	4 5	1 2 3 4 5	1234 2
	3									Similar to Schist in C1, except rough to smooth,	= =						1
		1								dosely to very closely spaced, sub-horizontal to							1
-	3.5	C6	57.1-67.2			10.1/10.1	100	99		moderately dipping, slightly weathered, clay	==						2
-	3.5									coated foliation joints/fractures.	==						0
_	3									61.3'-62.0', 63.0'-63.6': Similar to amphibole Schist in C4.	= =						Sizes -
	3_			1						JUNIST IFI C4.	==	-					1
65 —	3										==					· 3/ - 1	0
-											= =			t.			0
-	3			_					_		= =						0
_	2.5									Very hard, fresh, fine to coarse grained, light to	==						
	2.5									dark gray, guartz-mica-garnet SCHIST, with	==						0
_		1								very thin, crenulated, convoluted, moderately dipping to horizontal foliation, no apparent							0
70 -	2.5				ļ	1				foliation joints/fractures; very thin to thin, very	IE E						0
-	3					1				hard Granofels zones.						-	0
_	2.5																
	2.5	C7	67.2-77.3			10.1/10.1	100	100									0
_														5. 4			0
•	3_										==						0
75-	3										==					1	0
_	3_		2.5.5					iΙ			==			5 = 12		· ************************************	
	2.5										==				繼	_	0
_	2.5	-				15,000	\vdash		\neg	The test too Supplies the same	==						0
-			10.7			100				Similar to Schist in C7.	==			100			0
-	2.5		499	1												1 14	0
80 —	3				100						= =						
_	3					1					= =						0
1	3	16			2.5						==						0
-	-	C8	77.3-87.4			10.1/10.1	100	100			==						0
-	2.5					10					==						0
_	2.5	10			- 1						==				100 - 100		
0.F	2.5										= =						0
85	3										==						0
_											= =						0
-	2.5							\Box			E						0
_	2.5					100					==			a year			
	3										E						0
	2.5										= =					104	0
90 —		لـــــا		<u></u>	011	000		ᅼ	011	POOF CHARACTERISTICS		OINT/FRACT	יפון	CHADA	CTERIS	TICS	
	RANUL			COHE		STENCY		RO		ORE CHARACTERISTICS WEATHERING NO. PER		SPACING					ATTITUDE
BF 0-		ENSIT			ery Sc		- 1	Ve	ry So	ft 1 Complete (1) 0		<2" Very	/ clo	se/Very T		0-5 P	Horizontal
4-	10 Lo	oose		2-4 5	Soft Ned Sti		2		edium			2"-1' Clos		nin ose/Mod 1	hick		ub-Horizontal Mod Dipping
10- 30-		ledium ense			veo Su Stiff	"	4	Ha	ard	4 Slight (4) 11-20	0	3'-10' Wid	e/Tr	nick		55-85 S	ub-Vertical
		ery Der	nse 1	5-30 V	ery St	iff	5	Ve	ry Ha	rd 5 Fresh	1	>10' Very	y Wi	de/Very 1	hick	85-90 \	/ertical
				>30 F	lard												
6) F	RQD for	r core s	sample C5 a	ffected	by sub	-vertical to	vertica	al cros	ss-fol	ation joint/fracture between 52.9'-53.3' and 53.6'-53	3.9'.						
7) E	Sottom	of bore	hole at 112.	b', bore	nole gi	routed upon	comp	pietior	1.								

BORING LOG Sheet: 4 of 4 DMIMBHARRIS ARUP **BORING NO. B69-3 BORING STATION: 1161+85.19** OFFSET: 4.00 SECOND AVENUE SUBWAY PROJECT NO. CM 1188 COORDINATES: **PROJECT** G. SURF EL. 158.81 NORTH: 218734.4203 DATUM: NYCT EAST: 995471.4794 FINAL BORING DEPTH (FT) 112.6 SAMPLER: 2" O.D. Split Spoon BORING CO: Jersey Boring and Drilling Co., Inc. GROUND WATER READINGS
TIME | DEPTH | CASING | S SAMPLER HAMMER: 140 lb Safety Hammer FOREMAN: P. Lynch DATE STAB. TIME CASING SIZE: 3" ENGINEER: D. Persaud CASING HAMMER: N/A DATE START: 04/02/04 DATE END: 04/06/04 ROCK CORE: NO REVIEWED BY: M.A. Ponti, JrDATE: 05/13/04 (IN/II) TOTAL CORE REC (%) 8 INSITU PROPERTIES NUMBER OF (BPF) OR (MIN/FT) 80 DATA CORE SAMPLE DEPTH STRATA SYMBOI PEN/REC: SOIL ROCK (FT/FT) STRATIGRAPHY HARDNESS WEATHERING SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS (BPF) PER FOOT CORE DEPTH (FT) FIELD TEST BLOWS / 6 SAMPLE / (CASING (I N VALUE NUMBER values for values ROCK 12345 2 3 4 5 1234 0 Similar to Schist in C7. 0 C9 87.4-97.1 9.7/9.7 100 100 0 0 0 2.5 0 0 2.5 0 Similar to Schist in C7. 0 0 00 0 2.5 0 C10 97.1-107.0 9.9/9.9 100 100 0 0 0 0 Similar to Schist in C7. 0 0 C11 107.0-112.6 5.6/5.6 100 100 110 0 0 Bottom of borehole at 112.6 feet. 15 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS BPF DENSITY CONSISTENCY HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS <2 2-4 4-8 8-15 (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-4 Very Loose Loose Very Soft Soft Very Soft Medium Complete 0-5 5-35 35-55 Very close/Very Thin Close/Thin Horizontal 4-10 Severe 2"-1' 1'-3' Sub-Horizontal 10-30 Med Stiff Medium Dense 3 Med Hard Mod Close/Mod Thick Mod Dipping Dense Stiff Hard Slight Fresh 3'-10' Wide/Thick 55-85 Sub-Vertical >50 Very Dense 15-30 Very Stiff Very Hard Very Wide/Very Thick 85-90 Vertical >30 Hard 6) RQD for core sample C5 affected by sub-vertical to vertical cross-foliation joint/fracture between 52.9'-53.3' and 53.6'-53.9'. 7) Bottom of borehole at 112.6"; borehole grouted upon completion.

	BORING LOG Sheet: 1 of 4 BORING NO. B69-4 BORING STATION: 1161+05 54 OFFSET: 127.39																			
DMIMINIARRIS - ARUP SECOND AVENUE SUBWAY BORING STATION: 1161+05.54 O PROJECT NO. CM1188																				
	DMJ	MH	HAKKIS	# A K	distre:	1.1				OFOONE	AVENUE CUDIALA	·				+05.54				
1						1		1		SECOND		Ψ			88			RDINATE		
					널唱	-					PROJECT			EL. 158.53	<u>. </u>			TH: 21860		
					7	Average :							DATUM:	NYCT DRING DEPT	U /6	T) 02 4	EASI	995540	1.8099	-
					• • •			1	50016		D. J J D. Illian La		FINAL BU	CP.	011	ND WATER	REAL	DINGS		-
). Split Sp				···				Boring and Drilling., Ir	ic	DATE		Ti	DEPTH CA	SING	ST	AB. TIME	\neg
			ER: 1.40 lb	. Donu	t .					AN: J. Zamb			Note 1	7	-	-				
	NG SIZ		SPUN	• •						TART: 9/08/0		13/04								
	K COR									ED BY: C. S		4			\vdash					
				T		2	18	3	Γ	,					1	INSITU	PROPE	ERTIES	NUMBER	OF
	~~	8	E			₹	Ü	RQD (%)	×				پ ا	١.			T		FRACTU	RES
	OF.	A.	. 표 .	동	1	= _	2	8	DATA		SAMPLE DESCRIPTION	ı) AB	\ £		HARDNESS	WE	ATHERIN	G PER FO	ОТ
E	₽ N	. 8	D D	Z (0	B	SF	18	CORE	Į.	BURMI	STER (USCS / NYC BLD		\ & .	₹		see below fo	r ser	e below fo	r see below	110
рертн (FT	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	8	TEST		. CLASSIFICATIONS		STRATA SYMBOL	STRATIGRAPHY	S	values		values	for values	
Ė	동순	Δ	MP	1 8	1	₽Ş	F	ROCK	FIELD					1 2	NOTES	12345	1	2 3 4 5	1234	15
H	38	SA	SA	H .	z	F.S	12	1 2º	E						ž	1237	+-	7 7 7		→ Z
				1	1			1						FILL	2					
	3°			1	-		1					ecorded								7
	1			1	1		1	-	-		ered to a depth of 2 feet pr	ior to start o	of eas	DEC ROCK	3				1111	-
		S1	2-2	1,00\0"	100/0"	. 0/0		٠.		boring.			~~				- - -	1-1-1	++++	
1				1						S1: No Re	covery		~~							
-						1	1.		-				~~		١.					
5-	*			1	-	-	-	-	-	C1: Hard,	slightly weathered, fine to	coarse		ROCK	4		70.0			2
ľ	3.0	· .		·	1					grained, lig	ght to dark gray, quartz-mi	ca-garnet	ΞΞ				-			-
-		٠.	:	1			1		1	horizontal	to moderately dipping folia	ation, rough								5
	3.5	C1	5.0-10.0		1.	5.0/5.0	100	72		to smooth,	very closely to closely spa	aced,	E				1			1
-	3.0	Ci	5.0-10.0		1	3.0/3.0	100	12			to sub-horizontal, iron-oxionts/fractures; high mica co		I		l					0
Ι.	3.5			1.			1			ionation jo.	and and a control of the control of		==							-H
	4.0			2.1			1						I		1					0
10	T			1	1		1				r to Schist in C1. 7': Cross-foliation joint/frac	ture rough	==							7
-	4.0					2.7/2.7	1	78		to smooth.	sub-vertical to vertical, sli	ghtly			1					0
	4.0	C2	10.0-12.7	1	1	2.112.1	100	/°		weathered joints/fracti	, iron-oxide stained foliation	n	==							-
	4.5			· ·	1		-		-	10.0' - 10.2	2': Fracture zone, rough to	smooth,				ŝ -				0
						1				horizontal	to sub-horizontal, slightly t arent healed foliation joint	weathered.	E				4			0
-	4.5					1	1			11.3 : Appa	arent nealed tollation joint	macture.					3.25			0
15-	5.0						1				r to Schist in C1.		三三							0
	4.5						1.	١.		18.8'-22.8'	: Very hard, fresh, fine to o ark green, quartz-mica-am	coarse					- 2			-
"							·-	- 1		SCHIST, w	with very thin, slightly conv	oluted,	E			200	3, 18			0
-	4.5						1 :			crenulated	, horizontal to sub-vertical	foliation,					1,9			0
-	4.5	- C3	12.7-22.8	Y	1	10.1/10.1	100	73			mooth, very closely spaced izontal, slightly weathered		' <u> </u>							3
١.	4.5			1.	1			1		joints/fracto									-	+
	5.0							18.8'-19.2': Moderately weathered, with 1/4"					ΙΞΞ							4
20 -										garnet aug	en.							1,11		0
-	5.0			1		1.3	1			19.2' -19.5'	: Cross-foliation joint/fract closely spaced, sub-vertice	ure, rough	ΙΞΞ							0
	5.0			1		1			-		, iron-oxide stained.	, ongriuy	==							+
	5.0			1	-		-	-	-		4.1		ΙΞ =						-	0
-			1	1									= =							1
-	4.5												= =			4.1				0
25 -	5.0		1							25 00			ΞΞ							0
	5.5									Similar to a	amphibole Schist in C3.		==							+
				1	1						: Similar to Schist in C1, e		= =							0
-	5.5			1							very thin quartzo-feldspat		==							0
-	5.0	C4	22.8-32.6	1		9.8/9.8	100	100					==						5.0	0
١.	5.0												ΞΞ	***						-
	5.0												= =				_88	10 Tab.		0
30 -								<u> </u>	Ĺ	2000	DAOTEDIOTICO			OINT/EDAC	110	E CHARACTE	RISTIC	rs.		$\overline{}$
	RANU				ESIVE S	SOILS		HAR			RACTERISTICS WEATHERING	NO. PE				ICKNESS			ATTITUDE	\neg
		ENSIT	ose		Very S		1		ery S		1 Complete	(1) 0		<2" Ver	y clo	se/Very Thin	1	0-5	Horizontal	.
4	-10 L	oose		2-4	Soft		2	· M	lediur	n ·	2 Severe	(2) 1-2	,	2"-1' Clo					Sub-Horizontal Mod Dipping	'
10-30 Medium Dense 4-8 Med Stiff 3 Med Hard 3 Moderate (3) 3-10 11-3 Mod Close/Mod Trick 55-85 Sub-Vertical 30-50 Dense 8-15 Stiff 4 Hard 4 Slight (4) 11-20 31-10 Wide/Thick 55-85 Sub-Vertical																				
	>50 Very Dense 15-30 Very Stiff 5 Very Hard 5 Fresh >10' Very Wide/Very Thick 85-90 Vertical																			
	>30 Very Dense 15-50 Very Sun S Very Herb																			
NC	TES:						_					-								
11	Fraund	water	level not re	corded.							. According to the condition	t								
	T bloid	ef Dal	a - Total or	manic v	anors le	vels are ref	erenc	ed to	a be	nzene standa	s, transition may be gradua rd measured in the head s	pace of sea	aled soil sa	mple jars usi	ng a	n organic vapo	or mete	er equipped	d with a	
	hotoior	nization	detector (PID) and	d a 10.6	seV lamp. R	esults	are	in pai	ts per million	by volume (ppmv).									
(4)	3" Casi	ng spu	n to a dept	h of 5'.																
5)	Slow dr	illing a	1.57.5'.																	1

	BORING LOG Sheet: 1 of 4 BORING NO. B69-5																					
BORING NO. B69-5 BORING NO. B69-5 BORING STATION: 1160+72.77 OFFSET: -124.16 PROJECT NO. CM1188 COORDINATES:																						
SECOND AVENUE SUBWAY BORING STATION: 1160+72.77 OFFSET: -12 PROJECT NO. CM1188 COORDINATE PROJECT G. SURF EL. 161.70 NORTH: 2180 DATUM: NYCT EAST: 99530														4.16								
				AGES VI	more	delle .						PROJEC1	NO. CM11	88								\dashv
•										PROJECT	- [•	\dashv
				٠.		Arresta		1									EAST:	99530)4.89	56		\dashv
					7.00		·-					FINAL BO	RING DEPT	H (F	T) 91.1 ND WA		DEAD	INICE	_			\dashv
SAM	PLER:	2" O.E). Split Sp	oon						CO: Jersey Boring and Drilling Co., Inc.	-	DATE	TIME		DEPTH!		SING	INGS	TAR	TIME		\dashv
			ER: 140 lb.	Auto	natic					AN: P. Lynch		Note 1	TIME	۲	JEF III	OAG	,,,,		TAD.			ヿ
	NG SIZ									ER: R. Nunez FART: 9/7/04 DATE END: 9/9/04		14016 1	1.	_								\Box
	NG HA		Spun							ED BY: M.A. Ponti, Jr DATE: 9/21/04												
RUC	LOK	E: NQ	Γ	<u> </u>	T		100	1		2001.01.01.01.01.01.01.01.01.01.01.01.01.					INS	ITU P	ROPE	RTIES	- 1			_
		NO.	F		1	\(\frac{1}{2}\)	100	8	1						_		T			NUME		
1	8F	m Z	H	Ι×		=	M M	٠ğ.	DATA			8	₹	1	HARD	NESS	WEA	THER			F001	
_	ŒŽ	. 6	1	≧	ď.	1 gE	삝	iii		SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG COD	DE)	≥	ı́S				_		. +			_
DEPTH (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST	CLASSIFICATIONS	-,	STRATA SYMBOL	STRATIGRAPHY	1	see bel		see	below to		see be for val	ues	E I
E	25	P.E	P.	NS N]].	EX.	TOTAL	·×		•		\$	\$	NOTES	· Valo	63	1		- 1			NUMBER
E	ASI	AM	AM	2	≥	N N	5	ő	핕			ST	STE	12	1 2 3	4 5	1	2 3 4	5	12:	3 4	3
0	00	S	S	m.	Z	4.4	-	11.				400	FILL	\vdash	1 1 1	П			T	П		\neg
	3"			1	1	1				PAVEMENT THICKNESS: Not recorded	d			2	- - -		+				+	
	1				1					10 C C C C C C C C C C C C C C C C C C C		000		3								
-	111			1	1							0000										
			ľ		1		1			Hand augered to a depth of 6 feet prior to s	start of	2.4			+++	++	1	\Box	11	11		- 1
			1	1				1		boring.				1						+-	- -	
"	1			1	1						0.500											
5-	11		1											1		T			1			
				_				_		Dense, brown, fine to medium SAND, some	e Sill						1-	+++	11	11		
				7						little Gravel (SM / 11-65)	c on,					11			++	+		1
-	11	S1	6-8	15	31	24/13										11						
-	-		-	18	+		+-	-	\vdash	Very dense, brown-gray, fine to coarse SAN	ND,	200					T					
		-	8-9.7	22	67	20/7	1	1		some Rock Fragments, trace Silt, trace Mic	ca					++	-	++		1		
		S2	0-9.7	45 100\2		20"	1	1		(SM / 11-65)		000							44		1	
10-	111			10	_					Dense, gray-brown, slightly micaceous, fine	e to	~~	DEC ROCK									
-		S3	10-12	14 17	31		1		-	coarse SAND, little Silt, trace Rock Fragme (SM / 7-65)	ents	~~				1-1-	11					
				33		<u></u>	_			(3M11-00)		~		1		++-		++		++		
-	1				T							~~										
	11			1					•	C1: 14.4'-18': Very hard, fresh, fine to medi	lium	~~										
					1					grained, light gray, GRANOFELS, with no apparent foliation, rough to smooth, very cle	losely	~~				1				1		
	-	_	-		1		 		\vdash	to closely spaced, sub-horizontal to sub-ver	ertical,	250	ROCK	١.		S			9-8			\dashv
15-	2				1		1			moderately weathered, strongly iron-oxide stained foliation joints/fractures.		12-51		4	12.1		R.	- j		. ±1.		4
-	2				1			ĺ		18,0'-22.1: Hard, fresh to slightly weathered	ed,	17.7					2					8
١.					1		1	}	fine to coarse grained, light to medium gray, quartz-mica-gamet SCHIST, with sub-horizontal foliation, rough, very closely to moderately						110			₹.				8
	2				1			1							1 - B		-					
-	2	C1	14.4-22.1		1	7.7/7.3	94	36	closely spaced, sub-horizontal to sub-vertical,								變	13				
-	2		1				1		slightly weathered, kaolinized, imonitic, chloritized, slightly iron-oxide stained foliation									7				
										joints/fractures; occasional thin quartzitic zo	ones:	==		4		-	7.5					\dashv
20 -	2				Ι΄		1	1	high quartz, mica, garnet content.								4					
-	2						1			17.4'-18.1': Fracture zone, smooth, very clo	oselv	==						4.7		10		4
-	2				-		-	<u> </u>	Н	spaced, sub-vertical, strongly iron-oxide sta		==						5 6				7
	2									foliation/cross-foliation joints/fractures. 18.8'-19.2', 20.2'-20.6', Cross-foliation							1 3	× -			++	\exists
	1				1	1				joints/fractures, rough, closely spaced, sub-)-	= =									-1-1	5
-	3			l						vertical, kaolinized, slightly iron-oxide stains	ned.		PEGMATITE		N. (T		2
25-	3											111									11	0
120	3											1.1				-				1		\dashv
-					1	1				C2: Similar to Schist in C1.		750	GRANOFE	1	8							2
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		J.	-							PEGMATITE, with no apparent foliation, rou		學出				-			1-6		++	\dashv
]				1	1				moderately closely spaced, sub-horizontal,	•	1分制									-1-1	2
										slightly weathered joints/fractures.	17:77			1.0							2	
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2)	ouguno	duon i	mes represe	our aht	" UNITED	- Douriuarie	2 201			no rock types, transmort may be greater.	of coa	lad soil sai	nole iars usia	nh a	n prognic	vapo	r meter	equipp	ed wi	lh a		- 1

²⁾ Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

⁴⁾ RQD affected by sub-vertical joints/fractures (conjugate) between 15.3' and 18, 18.7 and 19.2', 20.3' and 20.6'.

										BORING LOG	Sheet: 3 of 4						
	PN 6	7.700	LEADING	A 151	110			T). B69-5
	DIVI	IVI	HARRIS	CAN'S MAS	Same	ماتنف				SECOND AVENUE SUBWAY		STATION: 1		72.77		RDINATES	
1	-				00	100				PROJECT		T NO. CM11 EL: 161.70	88			TH: 21869	
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F	E ≥	E.	. 🗓	9/9) H	ÖE	8	8	TES	CLASSIFICATIONS	AS	lG _R	_	see below f	or see	below for values	for values
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-		· .				1.				67.0'-67.2' and 67.9'-68.3': Cross-foliation joints/fractures, rough to smooth, irregular,		5.43					6
-	2						1			truncated, closely to widely spaced, vertical, slightly weathered.	==						2
70 -	3			٠.						. Silginiy Weathereo.	==						2
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-			5 1				1.	٠.		75.9'-81.6': Similar to amphibole Schist in C8.	==	SCHIST					0
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5)8	ottom	of bore	hole at 91.1';	poreh	ole gro	uted upon	compi	etion.									
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BORING NO. B69-5

serecitized, calcified, mineralized foliation- cross-foliation joints/fractures. 2 27.3*-27.8*: Cross-foliation joint/fracture, rough, sub-vertical, slightly weathered, slightly iron- oxide stained.												BORING LOG	11.50								Sheet:	1 of 4	
SECOND VENUE SUBVIVA PROJECT NO CMT188 DORNAMES DESCRIPTION OF SUBVIVA PROJECT NO CMT188 DORNAMES DORN		BORING STATION: 1161+06.53 OFFSET: -48.70 PROJECT NO: CM1188 COORDINATES:																					
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Cremulated, horizontal to sub-vertical foliation, rough, with very closely to moderately dosely spaced, horizontal to sub-vertical, slightly to moderately dosely spaced, horizontal to sub-vertical, slightly to moderately dosely spaced, horizontal to sub-vertical, slightly to moderately weathered, serectized, mineralized, slightly increased, mineralized, slightly increased, mineralized, slightly increased, mineralized, slightly increased, mineralized, slightly search, per gamet content. 25	4													~			1		Ш.	111	+++	4	
3 3 3 3 3 3 3 3 3 3	20	+						\perp			crenula	ted, horizontal to sub-vertical	foliation,		ROCK				-				
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signty from Coxtoe Stained Children 3 C1 20-27.7 7.77.7 100 75 - Gastratures; high mica content. 26.5'-28.8'Very hard, fresh, coarse grained, light gray-peach, PEGMATITE; occasional garnet content. 26.6'-28.8'\text{Conjugate, rough to smooth, sub-vertical, slightly weathered, chloritized, serectized, calcified, mineralized foliation-cross-foliation joints/fractures. 27.3'-27.8': Cross-foliation joints/fracture, rough, sub-vertical, slightly weathered, slightly iron-oxide stained. 25.5': Healed horizontal cross-foliation GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY, 0-4 Very Loose 42 Very Soft 1 Very Soft 1 Complete (1) 0 Corp. 42 Very close/Very Thin Cost. 43 Very Cost. 44 Ned Stiff 3 Med Hard 3 Moderate (3) 3-10 1'-3' Mod Close/Mod Thick 5-5-85 Sub-Vertical Sight (4) 11-20 3'-10' Very Wide/Very Thick 85-90 Vertical Vertical Sight (4) 11-20 3'-10' Very Wide/Very Thick 85-90 Vertical Vertical Sight (4) 11-20 3'-10' Very Wide/Very Thick 85-90 Vertical Vertical Sight (4) 11-20 3'-10' Very Wide/Very Thick 85-90 Vertical Vertical Sight (4) 11-20 3'-10' Very Wide/Very Thick 85-90 Vertical Vertical Vertical Sight (4) 11-20 3'-10' Very Wide/Very Thick 85-90 Vertical	1	2									modera	tely weathered, serecitized, m		=								6	3
Section Sect	+	9									joints/fra	actures; high mica content.		==			P				3.0		4
3	+	3									26.5'-28	3.8':Very hard, fresh, coarse g	rained, ional	$\equiv \equiv$									2
sub-vertical, slightly weathered, chloritized, serectitized, calcified, mineralized foliation-cross-foliation joint/fracture, rough, sub-vertical, slightly weathered, slightly iron-oxide stained. 25.5: Healed horizontal cross-foliation GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY, O4 Very Loose 2 Very Soft 1 Very Soft 1 Complete (1) 0 2 Very Close/Very Thin Loose 2-4 Soft 2 Medium 2 Severe (2) 1-2 2-1 Close/Thin 5-35 Sub-Horizontal 10-30 Medium Dense 4-8 Med Stiff 3 Med Hard 3 Moderate (3) 3-10 11-30 Wedy Soft 15-30 Very Stiff 4 Hard 4 Slight (4) 11-20 10 Very Wide/Very Thick 85-90 Vertical	+	3	C1	20-27.7			7.7/7.7	100	75	-	garnet o	content.					4	96			-		\dashv
serecitized, calcified, mineralized foliation- cross-foliation joint/fracture, rough, sub-vertical, slightly weathered, slightly iron- oxide stained. 25.5: Healed horizontal cross-foliation GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY 0-4 Very Loose 4-10 Loose 4-10 Loose 2-4 Soft 2-4 Soft 2-5 Medium 2-5 Severe 2-1 1-2 2-1 Close/Thor Soils 2-7 Severe 2-1 1-2 2-1 Close/Thor Soils 3-3 Sub-Horizontal 1-3 Med Hard 3-4 Moderate 3-3 Moderate 3-3 Silfi 4 Hard 4 Slight 4 Slight 4 Slight 5 Very Dense 15-30 Very Stiff 5 Very Hard 5 Fresh Soil Silfi 4 Hard 5 Fresh 1 Very Soil Very Wide/Very Thick 85-90 Vertical	25	3									sub-ven	tical, slightly weathered, chlor	itized,	= =						12.1			\dashv
27.3'-27.8': Cross-foliation joint/fracture, rough, sub-vertical, slightly weathered, slightly iron-oxide stained. 25.5': Healed horizontal cross-foliation GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY, O4 Very Loose 4 Very Loose 5 Very Soft 1 Very Soft 1 Complete (1) 0 4 Very Consideration 1 Very Soft 2 Medium 2 Severe (2) 1-2 2-1' Close/Thin 5-35 Sub-Horizontal 10-30 Medium Dense 3-15 Stiff 4 Hard 4 Slight (4) 11-20 3-10' Wide/Thick 55-85 Mod Dipping 5-85 Very Dense 15-30 Very Stiff 5 Very Hard 5 Fresh 10' Very Wide/Very Thick 85-90 Vertical		3_									serecitiz	zed, calcified, mineralized folia	ation-	==		-	P				_		1
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27.3'-27.8': Cross-foliation joint/fracture, rough, sub-vertical, slightly weathered, slightly iron-oxide stained. 25.5': Healed horizontal cross-foliation GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY 0-4 Very Loose 4-10 Loose 4-10 Loose 4-10 Loose 4-10 Loose 4-10 Loose 5-10 Soft 1 Very Soft 2 Severe 1 (2) 1-2 2 1-1' Close/Thin 1 S-35 1 Sub-Horizontal 2 Sub-Horizontal 3 S-55 1 Sub-Horizontal 3 Soft 3 Sub-Vertical 3 Soft 3 Very Sliff 3 Very Sliff 5 Very Hard 5 Fresh >30 Hard Very Wide/Very Thick 85-90 Vertical	1	3												1,41	Ì				100				3
Sub-vertical, slightly weathered, slightly iron- oxide stained. 25.5': Healed horizontal cross-foliation GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY 0-4 Very Loose 4-10 L	†													1-21									1
GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY 0-4 Very Loose 4-10 Loose 2-4 Soft 1 Very Soft 2 Ned Hard 3 Moderate 3 3-10 3'-10' Very Wide/Very Thick 85-90 Vertical	+												ly iron-	= =				200		200		8	$\overline{}$
BPF DENSITY O-4 Very Loose Very Soft 1 Very Soft 1 Complete 1 O-5 Close/Thin O-5 Close/Thin O-5 Sub-Horizontal O-5	30 7 1 1 1												n	三三			8242 R	25			350	5	
0-4 Very Loose	GRANULAR SOILS COHESIVE SOILS												110 55							OLF.			
4-10 Loose 2-4 Soft 2 Medium 2 Severe (2) 1-2 2*-1* Close/Thin 5-35 Sub-Horizontal 3 Close/Mod Disping 30-50 Dense 8-15 Stiff 4 Hard 4 Slight (4) 11-20 3*-10* Wide/Thick 55-85 Sub-Vertical 5-50 Very Dense 15-30 Very Stiff 5 Very Hard 5 Fresh 5-10* Very Wide/Very Thick 85-90 Vertical	BPF DENSITY BPF CONSISTENCY HA													<	2". Very c	ose	Very 1		0	-5 F	-torizont	al	
30-50 Dense	4-10 Loose . 2-4 Soft 2									dium	1	2 Severe	(2) 1-2	2*	-1' Close/	Thir	1						
>30 Hard	30-50 Dense 8-15 Stiff 4									ırd		4 Slight	(4) 11-20	3'	-10' Wide/	Thic	:k		55	-85 S	ub-Verti		
	>50 Very Dense 15-30 Very Stiff 5 Ver										ard	5 Fresh		>1	10' Very V	Vide	e/Very	nick	85	-90 \	rertical		
	110											<u> </u>											\dashv

NULLS:

1)Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.

**Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

**ield Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor mater equipped with a whotoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) Tip of spoon wet on sample S2.

	DATIMENHARRIS VARUE 6. BORING NO. B69-6														Sheet: 3 of 4					
BORING NO. B69-														O. B69-6						
1	L	WAITA	MALENIA	NOUR CEL	NAME !	L		1			BORIN	IG STATION: 1	161	+06.53	OFFSET: -48.70					
1 -	'ant'	YOURSELISTON			1	TO The			S											
					9	Derived .	•			PROJECT		RF EL. 160.28		NORTH: 218708.1254						
1				*	-30	Salaries		1				M: NYCT		7 100 0	EAST: 995356	6.2763				
								150	-	200.1	FINAL	BORING DEPT		ND WATER	DEADINGS					
			D. Split Sp ER: 140 lb							G CO: Jersey Boring and Drilling Corp. AN: Peter Lynch	DATE TIME			DEPTHI CA		AB. TIME				
	ING SI			. (Aut	omatic					ER: Sara Rocha	- DA	L	+	JE1 1111 OF 1	0					
			R: N/A (Sp	un)				D/	TE S	TART: 06/30/05 DATE END: 07/06/05										
	K COF							RE	VIEV	VED BY: C. Snee DATE: 11/14/05			\Box							
1			_			2	8	8	1					INSITU P	PROPERTIES	NUMBER OF				
	α	2	Ē			2	l ö	ò	1		ہ ا					FRACTURES				
	CASING (BPF) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / BINCH	Ē	PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA		STRATA SYMBOL	STRATIGRAPHY		HARDNESS	WEATHERIN	IG PER FOOT				
F	l la	1 8	l iii	=	N VALUE (BPF)	S	18		S	SAMPLE DESCRIPTION	\ X	₹		see below for	see below fo	or see below or				
ОЕРТН (FT)) O	<u>"</u>	m	0	3) Si	10	8	1.2		₹	1 5	S	values	values	for values H				
I E	NS.	₽	2 ₹	S	1	≥	₹	Š		l'	≨	≴	NOTES	4 2 2 4 5	12215	1 2 2 4 5				
풉	გ		\ S	@	Z	- H	2	2	E		S	ST	ž	12345	1 2 3 4 5	1 2 3 4 2				
	7	C6		1	1	1	T	7.	1	C5:Very hard, fresh, fine to coarse grained, light	=		6		1	1				
١.	3	1				1.				to dark gray, quartz-mica-gamet SCHIST, with very thin, slightly convoluted, crenulated,	= :	=				2				
	4.5								١.	horizontal to moderately dipping foliation, rough	= :	=	1		- 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10					
	3.5							1	1	to smooth, with very closely to moderately closely spaced, horizontal to sub-horizontal,	= :	=			7.4	0				
'	2			1		1:				slightly weathered, serecitized foliation	= :	= -		350		0				
65 3									1	joints/fractures; occasional very thin quartzo-	= :		1			2				
								1	-	feldspathic zones. 45.7'-48.0': Several healed sub-vertical to	1 = :	=								
	5_						١.			vertical joints/fractures.	=:	=	7.			2				
3.5 C7 65.1-67.9 2.7/2.7 10											= :	=				3				
		1				1	1				= :	=				10				
-	3.5				1	1	1		1		= :	_								
	3	1							1	C6:Similar to Schist in C5, except occasional	= :		8	-		1				
	3	C8.	67.9-71.	5		3.6/3.6	100	82	-	very thin quartz veins.	<u> =</u> :	=		T MAS		2				
70 -		1				1				C7 and C8: 65.1'-65.8': Very hard, fresh, quartz vein.	= :	=	8			3				
s										65.8'-68.5' and 69.9-70.5': Very hard, fresh, fine	= :	<u> </u>			2.5	2				
	2.5	-			1 :		1	1		to coarse grained, green-black, quartz-mica- amphibole SCHIST, with very thin, horizontal to	Ε:				- Y					
	2.5	1		١.					1 :	moderately dipping foliation, rough to smooth,	= :	_			- 20 3	2				
										with closely to moderately closely spaced, slightly weathered, serecitized foliation	= :			17.76	Sec. 26.	4				
	4.5 C9 71.5-76.0 4.5/4.5 100									joints/fractures; occasional very thin quartz	± :	=		F-1	F 1	3				
75 -	4	}					1			veins. 65.9'-66.3' and 66.7'-67.9': Cross-foliation	=					2				
_	3			-	+	- :	1	_	-	joints/fractures, rough, very closely spaced,	= :	=	8	/¥/ /¥/						
٠.	3.5			1.	1.					vertical, slightly weathered, chloritized, pyrite.	=				2	1				
_	3.5	,					1			65.9'-68.3': Several healed sub-vertical to vertical joints/fractures.	= =	_				0				
-				1.	1				1	69.4': Healed sub-vertical joint/fracture.		=				2				
-	3.5	-				1.00				68.5'-69.9' and 70.5'-71.5': Similar to quartz- mica Schist in C5.	= =	_								
80 -	-3.5			1	1.						= :					1				
-	3.5	C10	76-84.6			8.6/8.6	100	94		C9:71.5'-73.3' and 74.2'-76.0': Similar to Schist	= =	_				1				
-	,	1	:							in C5, except slightly weathered, serecitized,	==	=		A		0				
-	4		1,39	1						kaolinized, chloritized, mineralized, slightly iron- oxide stained.	==					0				
-	4									73.0' and 74.8': Foliation joint/fracture, slightly	==				原来					
	3.5				1.7					slickensided.	= =	_				0				
_	3.5	-	-	1	1.	-	\vdash		-	74.2'-74.7': Cross-foliation joint/fracture, rough, moderately dipping, slightly weathered, slightly	1= =	-				3				
85 —					1				.	chloritized, slightly mineralized, partially healed.	= -	-				1				
-	3.5									72.4'-75.8': Several healed sub-vertical to vertical joints/fractures.	\equiv									
_	3.5		2 3							72.4'-74.8': Cross-foliation joint/fracture, partially.		_		-		1				
	3.5			1	1	' .'		,	: 1	healed, rough to smooth, vertical, slightly weathered, calcified, talcified, kaolinized.	==	-				3				
-				1.						Todarered, Carolinea, Radinista.		-	6			3				
	3.5			1.							E		1			0				
90 —	3.5	C11	84.6-94.6			10/10	100	83												
G	RANUL	AR SC	DILS	COH	ESIVE S	SOILS		RO	CK	CORE CHARACTERISTICS		JOINT/FRACT	URE	CHARACTER	ISTICS					
BF	F D	ENSIT	γ .	BPF	CONSI	STENCY		IARD			FT	SPACING/T				ATTITUDE Horizontal				
		ery Loc oose	ose	<2 2-4	Very So Soft	ж	1 2		ery So ediun		- 1	"-1" Close/	Thin		5-35	Sub-Horizontal				
10-	30 M	ledium	Dense	4-8	Med St	iff	. 3	M	ed Ha	ord 3 Moderate (3) 3-10			lose	/Mod Thick		Mod Dipping Sub-Vertical				
		ense ery De			Stiff Very St	iff	. 5		ard ery H	4 Slight (4) 11-20 ard 5 Fresh	'			Very Thick		Vertical Vertical				
		,			Hard				•	1.	1									
9) (Change RQD aff Core ba	d bit. fected i irrel be	came block	oint/fra ed.		tween 66.7														
3) t	OCCOM (oi pore	HOIR BE 109	.0, acc	POUL IS	ENEME! 201	sey p	CITON	ileu,	borehole grouted upon completion.						1				

BORING LOG Sheet: 4 of 4 DMIM##HARRES - ARUP **BORING NO. B69-6 BORING STATION: 1161+06.53** OFFSET: -48.70 SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES: .. PROJECT NORTH: 218708.1254 G. SURF EL. 160:28 DATUM: NYCT EAST: 995356.2763 FINAL BORING DEPTH (FT) 109.6 SAMPLER: 2" O.D. Split Spoon BORING CO: Jersey Boring and Drilling Corp. GROUND WATER READINGS
TIME | DEPTH | CASING | S SAMPLER HAMMER: 140 lb. (Automatic) FOREMAN: Peter Lynch STAB. TIME DATE CASING SIZE: 3" ENGINEER: Sara Rocha CASING HAMMER: N/A (Spun) DATE START: 06/30/05 DATE END: 07/06/05 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 11/14/05 8 % INSITU PROPERTIES E NUMBER OF REC ROD DATA 8 FRACTURES CORE DEPTH (STRATA SYMBOL HARDNESS WEATHERING (BPF) SOIL PER FOOT CORE (BPF) CORE SAMPLE DESCRIPTION E FIELD TEST BLOWS / 6 SAMPLE / PEN/REC: CASING SAMPLE N VALUE NUMBER DEPTH (TOTAL values values for values ROCK 1 2 3 4 5 1 2 3 4 5 1234 0 73.6'-75.2': Healed vertical joint/fracture. 2 C10:Similar to Schist in C5, except occasional 0 3.5 very thin amphibole Schist zones 83.8'-84.6': Altered brecciated quartz-mica 3 3.5 SCHIST. 81.5'-82.5': Healed, calcite, sub-vertical to vertical joint/fracture. 2 81.6'-82.1' and 81.9'-82.5': Healed, sub-parallel, 0 slightly mylonite, sub-vertical joints/fractures. 1 5 C11:Similar to Schist in C5, except occasional very thin quartz veins. 84.6'-85.6': Healed vertical joint/fracture. 0 0 85.6'-86.3': Two healed vertical joints/fractures above and below-parallel). C12 94.6-104.4 9.8/9.8 100 100 0 6 86.8': Healed, mylonite, sub-horizontal foliation 00 joint/fracture. 87.2'-88.3': Fracture zone, rough to smooth, 1 very closely spaced, sub-vertical to vertical, slightly weathered, talcified, cross-foliation joints/fractures. 0 0 94.0'-94.6': Fracture zone, rough to smooth, very closely spaced, slightly weathered, cross-foliation joints/fractures. C12: Similar to Schist in C5, except moderately 0 closely spaced foliation joints/fractures; occasional very thin quartz veins. 1 C13 104.4/109.6 5.2/5.2 100 98 C13:Similar to Schist in C5, except occasional 0 very thin quartz veins. 108.3'-108.4': Clay gouge. 3 108.6'-109.6': Healed vertical joint/fracture. 0 10 Bottom of borehole at 109.6 feet 15 120 ROCK CORE CHARACTERISTICS GRANULAR SOILS COHESIVE SOILS JOINT/FRACTURE CHARACTERISTICS BPF DENSITY. BPF CONSISTENCY HARDNESS WEATHERING NO PER ET SPACING/THICKNESS ANGLE ATTITUDE (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-4 Very Loose <2 2-4 Very Soft Soft Very Soft Complete Very close/Very Thin 0-5 Horizontal 4-10-Loose Medium Severe ".1° Close/Thin 5-35 Sub-Horizontal 4-8 8-15 Med Stiff Stiff 10-30 Medium Dense Med Hard Moderate Mod Close/Mod Thick 35-55 Mod Dipping Dense Sub-Vertical Hard Slight '-10' Wide/Thick 55-85 >50 Very Dense 15-30 Very Stiff Very Hard 5 Fresh Very Wide/Very Thick Vertical >30 Hard Core barrel became blocked. 6) Changed bit.
7) RQD affected by vertical joint/fracture between 66.7'-67.9'.
8) Core barrel became blocked. 9) Bottom of borehole at 109.6'; acoustic televiewer survey performed; borehole grouted upon completion.

								Sheet: 1 of													
BORING LOG BORING LOG BORING NO. B69-7 BORING STATION: 1161+91.43 OFFSET: 8.46 SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES:																					
	LAVI	IVIEZ	LEAKKE	Whole M	Mittee	باندا				SECOND AVENUE SURWAY											
					100					PROJECT		EL. 159.37				NORTH: 218					
į.						ATTENNIX Substan	H					: NYCT				EAST: 995447.4843					
241/	DI CD.	11/4						100	DING	CO: Warren George, Inc.	FINAL B	ORING DEPT				READINGS		\dashv			
	PLER:		ER: N/A							AN: A. London	DATE			DEPTH			TAB. TIME				
CAS	ING SIZ	Æ: 4"	to 9'					EN	GINE	ER: J. Thampi								-			
	K COR		₹: 300 lb [Oonut						TART: 12/19/06 DATE END: 12/19/06 ED BY: C. Snee DATE: 3/16/07	+	-	+			+					
1100	T			T	T	Î	<u> </u>	T					Г	INS	ITU PE	ROPERTIES	NUMBER	OE			
	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	(F)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	CORE ROD (%)	DATA	SAMPLE DESCRIPTION	STRATA SYMBOL	STRATIGRAPHY		HARDI	NESS	WEATHER	FRACTUR	ES			
DEPTH (FT)	B 8	E/C	30 3	19/	N VALUE (BPF)	Sign	8	l S	FIELD TEST	BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	A SY	IGRA	_	see bel		see below values	for see below for values	ow r			
F	N N N	MPL	MPL.	SW.	ALC	CK (TA TA	ROCK	9		₹ .	P. P.	NOTES	valu				NUMBER			
OE	88	SA	SA	BLC	ž	F. S.	2	8	쁜		S	S	ž	1 2 3	4 5	1 2 3 4	5 1234	ž			
	4-									PAVEMENT THICKNESS: 4* Asphalt											
-	111									6" Concrete			1								
-	111						1						2								
-	{												3	HII	111						
-					1									1111	++-	11111					
5-	{				1									HH							
_																					
_																	+++++	1			
_															111		11111				
	111				1																
					_		+			Hard to moderately hard, slightly to severely		7	4	Report Alla			1000	Н			
10-	5			1						weathered, fine to coarse grained, gray, quartz- mica-garnet SCHIST, with very thin to thin,				J				14			
-	5				l					horizontal to sub-horizontal foliation, rough, irregular, slightly iron-oxide stained, very closely	.			\$C) 5		<u> </u>		Ш			
-	5	C1	9.7-14.6			4.9/4.0	81	51		to closely spaced, horizontal to sub-horizontal								4			
-	5									foliation joints/fractures. 12.3'-12.8' and 14.0': Cross-foliation			5					>10			
-	5									joints/fractures: Rough, irregular, sub-vertical.)			++1			10			
15-						1.2	_			Hard to very hard, fresh to slightly weathered,								0			
_	6_		1.0							fine to coarse grained, gray, quartz-mica SCHIST, with thin to very thin, horizontal to sub-								1			
	5					5050	400	100		horizontal foliation,rough, close to moderately closely spaced, horizontal to sub-horizontal				1				0			
	3	C2	14.6-19.6			5.0/5.0	100	100		foliation joints/fractures.											
	3					195				16.6'-17.4': Cross-foliation joints/fractures: Tightly healed, sub-vertical.	1- 1		6	į.				0			
	5			_	_		1		\dashv	Bottom of borehole at 19.6 feet.	-				a p			-			
20 -										Bottom of porenole at 19.6 leat.											
1									- 1						III						
-															111						
\dashv														-	+++	++++	\Box				
4														- - -	1++	++++	+++++				
25-								- 1							+		+++++				
								- 1								444	++++++				
														111			\square				
7									- [Ш							
٦																					
7		,											1								
30													1	01110	CTED	PTICE		\dashv			
GI	RANUL	AR SC			SIVE S	OILS	-	RO		CORE CHARACTERISTICS WEATHERING NO. PEI		SPACING				ANGLE	ATTITUDE	\dashv			
0-	4 Ve	ry Loo		<2	Very So		1	Ve	ry So	1 Complete (1) 0		<2" Very	dos	se/Very T		0-5 5-35	Horizontal Sub-Horizontal				
10-		ose edium l	Dense		Soft Med Stif	F	2		dium d Ha	d 3 Moderate (3) 3-10		1'-3' Mod	Clo	se/Mod T	hick	35-55	Mod Dipping				
30-	50 De	nse ry Der		8-15	Stiff Very Sti	ff	4 5	Ha Ve	rd ry Ha	4 Slight (4) 11-2 d 5 Fresh	0	3'-10' Wide		ick de/Very T	hick		Sub-Vertical Vertical				
-5	ve	, y Uer			Hard	.	,	76	. , , ,,	- 1		701)									
NO	res.																				
1) G	round v	water l	evel not re	corded.	ovince+-	hounder'-	e has-		oil a-	d rock hones transition may be gradual											
	ield Tes	st Data	- Total org	anic va	pors lev	els are ref	erence	ed to a	ben:	d rock types, transition may be gradual. ene standard measured in the head space of sea	led soil san	nple jars usin	g an	organic v	rapor m	eter equippe	ed with a				
ıhر	otoioni	zation	detector (P	ID) and	a 10.6	V lamp. R	esults	are in	part	per million by volume (ppmv).											
5) C	ore bar	rel dro	rock; soil :	approxi	mately 1	12.7'-13.7'.	Comp	letely	weat	nered zone.											
6) B	ottom o	f borel	nole at 19.6	feet. B	orehole	grouted u	pon co	mplet	ion.												

											BORING LOG							SI	neet: 1 of	6				
			DOT EATSTON	-40	132			T								В	ORING NO. ISS 69-7							
	D	MIM	##HARRE	WAK.	UP	Li.a.		1			**		BORING	STATION: 1	163		OFFSET: 79.71							
1	343	27422.472	CHECK THE CHILD	THE REAL PROPERTY AND	-	111			S		AVENUE SUBWAY			T NO. CM11			COORDINATES:							
					4.1	20000					PROJECT	G. SURF	EL. 156.23			NORTH: 218843.2984								
ŕ					130	Supremy .						DATUM: NYCT EAST: 995580.8315												
								_						FINAL BORING DEPTH (FT) 156.5										
			D. Split Spo			*** * * *	·	BO	RIN	G CO: Jers	sey Boring and Drilling Co					ATER READINGS HI CASING STAB. TIME								
			ER: 140 lb (atic)					IAN: Peter			DATE 06/07/05	10:05		DEPTH C/	ASING _		5. 5 Min.					
CASING SIZE: 3" (Spun to 7')										ER: Sara TART: 06		06/08/05	10:05	· - 8.2				. 5 Min.						
										VED BY: C				1										
											, once			ľ		INSITU	PROPERTI	ES						
SAMPLE DEPTH (FT) SAMPLE DEPTH (FT) SAMPLE DEPTH (FT) BLOWS / 6 INCH N VALUE (BPF) PENIREC: SOIL (IN/IN)									-							-			FRACT					
	S.	W	Ĕ	1 5			8	ğ	A	1				₹		HARDNES	S WEATH	ERING	PERF					
_	F.	8		Z	8	8	H.	W.	12		SAMPLE DESCRIPTION	1	¥	STRATIGRAPHY										
Ē	8	E E	□ □	9/	E	Ö	8	18	VIVO SAMPLE DESCRIPTION			AS	<u>គ</u>		see below for			see belo	ow in					
Ŧ	Z.	₫.	₫.	N.	13	<u> </u>	¥	X	۱۵				\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	\$	E	values	valu	es	for value	NUMBER 4				
ОЕРТН (FT)	CASING (BPF)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	Ž.	0	ROCK CORE ROD (%)	FIELD				STRATA SYMBOL	ST	NOTES	12345	5 1 2 3	4 5	1 2 3	4 3				
-	-	-		-	-	-	+-	+-	+-	-			980	FILL	1			TI		1				
-	3*									PAVEN	MENT THICKNESS: 41	Concrete						-		4				
	ΙΙ.	S1	1.5-1.8	100\3*	100/3	3/3	+	· -	\vdash	Very de	ense, gray-black, fine to medic			DEC ROCK	2									
-	1	-31	1.5-1.0	10013	10013	3/3	+		Ť	little Ro	ck Fragments, little Silt (SM /	6-65)	-65) ~~~		3									
-		1											~~					++	++++	+				
١ -													==	ROCK	1					4				
	*			1				1										11						
5-										Very ha	ird, fresh, fine to coarse grain	ed, light to	==			(2000) A				. 0				
-	2.5					1				very thi	ay, quartz-mica-gamet SCHIS n, slightly convoluted, crenula	ted.	==		4					-				
	2.5					1.			1	horizon	tal to sub-horizontal foliation,	rough, with	==				_ 21		B	0				
	3	Ċ1	5-10.3			5.3/5.3	100	-96			to moderately closely spaced nonzontal, slightly weathered,								1	0				
-	3.5							1			de stained, pyrite foliation	Singritay	_ ·							2				
-										joints/fr	actures.		= =			1	- 4	- T		1				
10-	4	Į		1													_	_	8	0				
1.0	,	2							1		to.Schist in C1, except occasi						30			0				
										artz veins; occasional very thin thic zones.	n quartzo-	==					3,	ા, ચૂં	3					
-	2 .									ieiuspa	unc zones.		===			6. (1)	一度。	-	1	1				
١ _	3												==				_	Ī		0				
	3							-					==							0				
, -		C2	10.3-17.5			7.2/7.2	100	99	-											0				
15-	3.5			:		ļ			1	a Sala a			===				-1	-		+-				
-	3					}							- = =					_		0				
	3.5						'													0				
-						<u> </u>	-	-	_	17.5'-19	0.4' and 26.0'-27.3':Similar to	Schist in				13.7				1				
-	3									C1, exc	ept occasional very thin to thi		==						4 X &	4				
-	5										thic zones. .4':Very hard, fresh, coarse g	rained	==					, is -	1 1 d	1 4				
	12			1						quartz-f	eldspathic SCHIST (PEGMA)	ITÉ).	==							1				
20 -	2										5.0":Very hard, fresh, fine grain uartz-mica-amphibole SCHIS		==					1		3				
-	-									thin, slig	ahtly convoluted, slightly cren	ulated,	==			(a,b,a)				1				
-	3				. !					horizon	tal to sub-horizontal foliation,	rough to	三三				-	-		+++				
	2.5	C3	17.5-27.3			9.8/9.8	100	92		smooth, spaced	very closely to moderately cl slightly weathered, chloritize	d foliation	=							1				
ΙĪ	3									joints/fra	actures; occasional very thin t	o thin	==					11.		1				
-	3									quartz v		mooth	==							0				
25 -	2.5									very clo	i.6': Fracture zone, rough to s sely spaced, horizontal to mo	derately	==			ાં વિદ્વા			-					
	3									dipping	slightly weathered, chloritize	ď	= =			9				2				
1										foliation	/cross-foliation joints/fracture: ealed moderately dipping join	s. t/fracture	ΞΞ							1				
-	2.5			\vdash			\vdash	\vdash	_	19.9'-20	.5':Cross-foliation joint/fracture	e, partially				2号数据				7				
-	3								healed,	rough, slightly weathered, su	b-vertical.	==							+					
	2.5																			3				
1																				2				
30								ل_		<u></u>					Ш	and the state	- Anthanio	rate Mill						
	GRANULAR SOILS COHESIVE SOILS										HARACTERISTICS			OINT/FRACT					TITUDE					
	BPF DENSITY BPF CONSISTENCY							HARE			WEATHERING	NO. PER		SPACING/I		KNESS Very Thin								
	0-4 Very Loose <2 Very Soft 1 . 4-10 Loose 2-4 Soft 2								ery S ediur		1 Complete - 2 Severe	(1) 0 (2) 1-2		2"-1' Close	/Thir	า	5-3		orizontal b-Horizont	tal				
10-	10-30 Medium Dense · 4-8 Med Stiff ·							· M	ed H		3 Moderate	.(3) 3-10		1'-3' Mod (Close	e/Mod Thick	35-5	5 M	od Dipping	9				
	30-50 Dense								ard ery H	ard	4 Slight 5 Fresh	(4) 11-20		3'-10' Wide >10' Very			55-8 85-9		Sub-Vertical Vertical					
	>50 Very Dense 15-30 Very Stiff 5								J 11		116311		>10' Very Wide/Very Thick 85-90											
4											L													
NO.	LS:																							

NOTES:

1)Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.

Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

⁴⁾ Spun 3" casing to 7" to be able to place new core bit in 10' barrel.

BORING LOG Sheet: 2 of 6 **BORING NO. ISS 69-7** DMIMSHARRIS -ARUP BORING STATION: 1163+34.04 OFFSET: 79.71 SECOND AVENUE SUBWAY COORDINATES: PROJECT NO. CM1188 PROJECT. G. SURF EL. 156.23 NORTH: 218843.2984 DATUM: NYCT EAST: 995580,8315 FINAL BORING DEPTH (FT) 156.5 GROUND WATER READINGS TIME | DEPTH | CASING | S SAMPLER: 2" O.D. Split Spoon BORING.CO: Jersey Boring and Drilling Corp. SAMPLER HAMMER: 140 lb (Automatic) FOREMAN: Peter Lynch STAB. TIME CASING SIZE: 3" (Spun to 7') CASING HAMMER: N/A (Spun) ENGINEER: Sara Rocha DATE START: 06/03/05 DATE END: 06/08/05 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 11/14/05 REC (%) INSITU PROPERTIES 3 NUMBER OF E 80 DATA FRACTURES CORE STRATA SYMBOL DEPTH HARDNESS WEATHERING STRATIGRAPHY SOIL PER FOOT (BPF) CORE (BPF) RDCK CORE SAMPLE DESCRIPTION (FT FIELD TEST BLOWS / 6 N VALUE (see below for see below for see below PEN/REC: NUMBER SAMPLE SAMPLE CASING values values for values TOTAL DEPT 1 2 3 4 5 2 3 4 5 1 2 3 4 22.7: Cross-foliation joints/fracture, partially 0 healed, rough, moderately dipping to sub-0 22.8'-23.3': Healed sub-vertical joints/fractures. 27.2': Cross-foliation joint/fracture, rough to C4 27.3-36.9 9.6/9.6 100 76 4 smooth, moderately dipping, slightly weathered 0 0 C4: Similar to Schist in C1, except convoluted, horizontal to moderately dipping foliation. 34.1-36.9':Similar to amphibole Schist in C3, except occasional thin quartz vein. 35 0 1 0 0 1 40 1 C5: Similar to amphibole Schist in C3. 43.0'-46.9': Similar to Schist in C1, except very 1 10.0/10.0 100 96 36.9-46.9 thin to thin quartzo-feldspathic zones and thin, moderately spaced, garnet rich zones. 1 1 Very hard, fresh, fine to coarse grained, light to dark gray, quartz-mica-gamet SCHIST, with very thin, convoluted, crenulated, horizontal to 0 0 vertical foliation, no apparent joints/fractures; = occasional very thin to thin amphibole Schist; occasional very thin quartzo-feldspathic zones 0 50 and very thin, moderately spaced, garnet rich 0 0 10.1-10.1 100 100 C6 46.9-57.0 0 0 0 55 0 0 0 1 0 60 JOINT/FRACTURE CHARACTERISTICS GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY CONSISTENCY HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE Very close/Very Thin Close/Thin Very Soft Soft (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 <2 Very Soft 0-4 Very Loose Complete Horizontal Severe Moderate 4-10 Loose Medium "-1" 5-35 Sub-Horizontal 35-55 55-85 10-30 Medium Dense Med Stiff Med Hard '-3' Mod Close/Mod Thick Mod Dipping 30-50 >50 Sliff Wide/Thick 8-15 Hard Slight Sub-Vertical Very Wide/Very Thick Very Dense Very Stiff Very Hard Vertical Fresh >30 Hard 5) New core bit. 6) Bottom of borehole at 156.5'; acoustic televiewer survey performed; borehole grouted upon completion.

		BORING LOG																	Sheet: 3 of 6	6	
	DNJM##I-ARRIS -ARUP BORING NO. IS BORING STATION: 1163+34.04 OFFSET: 79.71). ISS 6	9-7					
	D	MIM	#HARR	S-AF	UP	Le							BORING :	STATION: 11	163						
	2/2	WELLOW!	- THE LAND STREET, STR			100		1	S		ENUE SUBWAY		PROJEC1	NO. CM11	88		COORDINATES:				
					1	name .		1		PRO	DJECT			EL. 156.23							
					-	Sulpricy.								NYCT		EAST: 995580.8315					
													FINAL BO	RING DEPT							
			D. Split Sp			100		BO	RING	CO: Jersey B	Boring and Drilling C	orp.				ND WATER			AD TIME		
			ER: 140 lb		natic)		• •			AN: Peter Lyne			DATE	TIME	<u> '</u>	DEPTH C	CASING STAB. TIME				
CAS	ING SI	MMF	(Spun to 7 R: N/A (Sp	10)						ER: Sara Roc FART: 06/03/0		6/08/05		 	-						
	K COR			111)						ED BY: C. Sne					\vdash						
	T	Π.	T	T	T	Ê	100	1	П						Г	INSITU	PROPE	RTIES			
	1 ~	9	E			₹	CORE REC (%)	Ö Ł									T		FRACTURE		
	Ö	H.	Ŧ	동	1	يّ	2	DATA				8	₹		HARDNES	s WE	ATHERING				
F	l k	8	d	Z	8	S	1 %	ROCK CORE ROD (%) FIELD TEST DATA NOITHUNDSAND NOT					}	\$							
DEPTH (FT)	CASING (BPF) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN)	ŏ	8	TEST				STRATA SYMBOL	STRATIGRAPHY	S	see below for values	or se	e below for values	see below	S E	
l E	N S	₩ M	₽	8	₹	E	TOTAL	Š	FIELD				[₹	≨	NOTES				100	NUMBER	
"	\ 5	\ ×	8	面	Z	E	12	%	12		٠		ST	S	ž	1234	1	2345	1234	4 Z	
	1			-					1	. C7: Similar t	to Schist in C6, except	rough,				1 Pag 2		10000		0	
1	3	1				1	.			widely space	ed, horizontal to modera	stely dipping,	==				- 188			0	
	3	C7	57.0-67.1			10.1/10.1	100	100	-	slightly weath quartz conter	hered foliation joints/fra	actures, high	==			9.4	-			+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$	
	2.5] "	07.00			10]			400.00.00			==							0	
	3].			*. *			==				· 1888			0	
	1	1			1						• •		==				-			0	
65-	2.5						1.						==			3.1					
1	2.5			-									==				_			0	
	2.5				.													(1)		0	
	2.5			1.		1	+				hist in C6, except horiz					13			0		
	2.5	1								horizontal fol	liation, widely spaced, l hered foliation joints/fra	horizontal, actures: no								0	
	2.5	-	h 1,							amphibole So	chist zones.						- [8]				
70-	2.5	1	20 0		1	٠٠.				67.5'-68.1': H	lealed vertical joint/frac	ture.	==							0	
10	2.5																			1	
'	1									• -			==					198		0	
	2.5	C8	67.1-77.0	1		9.9/9.9	100	100					= =					17.		0	
1	2.5																	_		H	
	3												==							0	
	2.5												==	• •		k k f tur				0	
75-	12.5	1								٠.		•	==			10				0	
	3	20	1										==	-			- 8				
	- 3			_			_		\sqcup				三目				-			0	
	3						1			moderately di	hist in C6, except horiz lipping foliation, rough,	ontai to moderately	昌昌							1	
'	1									closely to wid	dely spaced, sub-horizo	ntal, iron-								0	
1 .	1 3			1	1	. 1				oxide stained occasional ve	foliation joints/fracture ery thin quartz veins; o	casional								0	
80-	2.5									very thin quar	rtzo-feldspathic zones.		= =					-		\vdash	
	3									80.3'-80.8': H	lealed sub-vertical to v	ertical								1	
	3	-						400					==							0	
'		C9	77.0-86.9			9.9/9.9	100	100					==		5					0	
'	-					1							==		"						
	2.5			1	1	1							==						-	0	
85 -	2.5												= =				35			0	
"	2.5												= =				200			0	
Ι.													==							0	
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90 -							\perp						1	1			1	20		=	
	RANUL				SIVE S	SOILS			NES!	ORE CHARAC	WEATHERING	NO. PEF		SPACING/T		CHARACTE	:KISTIC		ATTITUDE		
		ENSIT			CONSI Very S		. 1		INES:		1 Complete	(1) 0 -		2" Very o	lose	Very Thin		0-5	Horizontal		
4	-10 Lo	oose		2-4	Soft		2	M	ediun		2 Severe	(2) 1-2		"-1' Close	Thir	1	1		Sub-Horizoni Mod Dipping		
		edium ense			Med St Stiff	ım .].	3		ed Ha ard	ra	3 Moderate 4 Slight	(3) 3-10		'-3' Mod ('-10' Wide/		e/Mod Thick			Sub-Vertical		
. >		ery De	nse 1	5-30	Very St	tiff	5		ery Ha	ird	5 Fresh	',				Very Thick			Vertical	.	
>30 Hard																					
5) New core bit.																					
	6) Bottom of borehole at 156.5'; acoustic televiewer survey performed; borehole grouted upon completion.																				
.,							′ ′				.91										
l																_					

BORING LOG Sheet: 6 of 6 **BORING NO. ISS 69-7** DMIMBIHARRIS - ARUP **BORING STATION: 1163+34.04** OFFSET: 79.71 SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL. 156.23 NORTH: 218843.2984 DATUM: NYCT EAST: 995580.8315 FINAL BORING DEPTH (FT): 156.5 GROUND WATER READINGS ME | DEPTH| CASING | STAB. TIME SAMPLER: 2" O.D. Split Spoon BORING CO: Jersey Boring and Drilling Corp. SAMPLER HAMMER: 140 lb (Automatic) FOREMAN: Peter Lyrich DATE CASING SIZE: 3" (Spun to 7') ENGINEER: Sara Rocha DATE START: 06/03/05 CASING HAMMER: N/A (Spun) DATE END: 06/08/05 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 11/14/05 TOTAL CORE REC (%) **INSITU PROPERTIES** ROCK CORE ROD (%) SOIL (IN/IN) Š NUMBER OF DEPTH (FT) FRACTURES PER FOOT DATA CORE STRATA SYMBOL BLOWS / 6 INCH STRATIGRAPHY HARDNESS WEATHERING SAMPLE DESCRIPTION FIELD TEST see below for see below for SAMPLE / N VALUE CASING (SAMPLE NUMBER values values for values 12345 2 3 4 5 1 2 3 4 0 Similar to Schist in C12, except horizontal to 0 moderately dipping foliation, very closely to widely spaced, horizontal to moderately dipping C16 146.9-156.5 9.6/9.6 100 93 0 foliation joints/fractures. 155.9'-156.5': Cross-foliation joint/fracture, 0 rough to smooth, sub-vertical, chloritized, mineralized, slickensided, partially healed parts. 2 155 0 3 60 70 175

GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS	JOINT/FRACTURE CHARACTERISTICS
0-4 Very Loose <2	NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE

⁵⁾ New core bit.

⁶⁾ Bottom of borehole at 156.5'; acoustic televiewer survey performed; borehole grouted upon completion.

											BORING LOG						:	Sheet: 1 of 6
BORING NO. IS BORING NO. IS BORING STATION: 1168+59.89 OFFSET: 83.89 PROJECT NO. CM1188 COORDINATES: G. SURF EL. 152.10 NORTH: 219203.6 DATUM: NYCT EAST: 995682.536 FINAL BORING DEPTH (FT) 155.1																		
	и	Affica	HIP TO THE	John Ha	mare .	int.				ECOND	AVENUE SUBWAY							
• •	AII:1		Andrea me processor and			11			31			-			88			
						Angel					1100201	1			-			
1					•••		•								H (F			
SAMP	LER:	2" O.E	. Split Spo	on				BO	RING	CO: Jers	ey Boring and Drilling Cor	p		GR		ID WATER I		
SAMP	LER H	AMME	R: 140 lb. (Auton	natic)			FO	REM/	AN: Peter	Lynch	· .	DATE	TIME				AB, TIME Irs. 20 Min.
CASIN	IG SIZ	E: 3"								ER: Sarà		0.4105	5/23/05 5/24/05	10:05		12.77 18.3 ·7	20 N	
ROCK			: N/A - Spu	n ·		<u>.</u>				TART: 05/ ED BY: C			3/2-//00	1.40	+	10.0	1	
ROCK	COR	- NQ		T		2	10			<u> </u>	Silee DAVE: 11/14/0		T			INSITU P	ROPERTIES	
	CASING (BPF) OR	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	BPF)	PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE RaD (%)	FIELD TEST DATA		SAMPLE DESCRIPTION		STRATA SYMBOL	STRATIGRAPHY		HARDNESS		
ОЕРТН (FT)	NG (B	PLE/	PLE	NS/6	N VALUE (BPF)	REC	AL CO	K CO	D TES				ATA	ATIG	ES	see below for values	see below fo values	for values H
DEP.	CAS	SAM	SAM	BLO	> N	PEN	TOT	8	FIEL					STR	NOTES	12345	1 2 3 4 5	1234 2
	3"									PAVEM	ENT THICKNESS:	2		FILL	1			
	. 1									6" Cond	rete; 6".Gravel sub-grade				3			
				5000	5007		-		_		nse, dark gray-brown, fine to		~~	DEC ROCK	"			
-		S1	3-3.25	50\3*	50/3"	-3/3			i		some Rock Fragments, little S M / 6-65)	ilt, trace	~~				1111	
5-													2					
														ROCK				
1 +	_										very hard, fresh, fine to coars dark gray, quartz-mica-gamet		=					3
1 +	2.5									with ver	y thin, crenulated, horizontal t	o sub-	三目		4		- L	2
1	3									horizoni	al foliation, with very close to horizontal to sub-horizontal,s	closely lightly						
١	2	C1	7-12.3			5.3/5.3	100	72		weather	ed, slightly to strongly iron-oxid	de stained	三三				_ [4]	3
10	2.5			1						to clay o	coated foliation joints/fractures nat very thin amphibole Schist	zone:						2
1 +	2,5									occasio	nal thin quartz-feldspar zone.	20110,	三目				1	3
+	3											4					124	
' 1	4										and 11.5': Foliation joints/fraction and same black.	lures				**	-6- "%	2
	25																	0
. †													三三				大震	0
15	2.5												= =			100		0
1 1	2.5			1									==			-		
	2.5									C2. C:	ilar to Schist in C1, except no	foliation	= =					0
ΙΤ	0.5	C2	12.3-22.3			10/10	100	100	-		actures; occasional very thin q		==				成為. 精	0
†	2.5						1			veins.			= =			建		0
1 1	2.5				1 1								==				一 设施 特殊	
	2.5												= =				_	0
20	25												==					0
†	2.3												==			图 少强	第一句,	0
+	2.5			_			\sqcup						= =					0
1	2										to Schist in C1, except slightly ed foliation joints/fractures.		==				-	
	2									***************************************	jetamotaras.		==					1
†													= =					0
25	-												巨量					0
1 +	2												==					
1	2	СЗ	22.3-31.7			9.4/9.4	100	100	.									0
	2	w	22.5-31./			9. 7 13.4							= =				4.7	0
†	7.																	0
- +	2.5												= =					0
30	2.5												==		L	T 4. TO 3		- S88
	PANUL	AR S	DILS		SIVE S						HARACTERISTICS					E CHARACTE		
BPI		ENSIT				STENCY		HARI			WEATHERING 1 Complete	NO. PEI (1) 0		SPACING/ <2" Very		KNESS e/Very Thin		ATTITUDE Horizontal
0-4 4-1		ery Loo oose			/ery 6c Soft	ж :	1 2		ery Si ediun		2 Severe	(2) 1-2	1 :	2"-1' Close	/Thi	n	5-35	Sub-Horizontal
10-3	30 M	edium	Dense 4	8-1	Med Sti	ff	3	М	ed Ha		3 Moderate	(3) 3-10		1'-3' Mod 3'-10' Wide		e/Mod Thick		Mod Dipping Sub-Vertical
30-5 >5		ense erv De			Stiff /ery Sti	iff	5		ard ery H	ard	4 Slight 5 Fresh	(4) 11-2				e/Very Thick		Vertical
>50 Very Dense 15-30 Very Stiff 5											200. 000000000000					1999		
NOTES:															_			
1//4/	مامد اه	l =0.0	di basa b		ada at	times and	ındar	cond	tions	stated flu	ctuations of ground water may	occur due	to other fa	ctors than the	ose i	present at the t	time measureme	nts were made.

'Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

Field Test Data - Total organic vapors levels are referenced to a benzane standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.5eV lamp. Results are in parts per million by volume (ppmv).

4) Slight water loss observed throughout the borehole.

BORING LOG

Sheet: 2 of 6

DMIMBEHARRIS - ARUP

SECOND AVENUE SUBWAY **PROJECT**

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BORING NO. ISS 71-5 OFFSET: 83.89 COORDINATES: BORING STATION: 1168+59.89 PROJECT NO. CM1188 G. SURF EL. 152.10 NORTH: 219203.6171 DATUM: NYCT FINAL BORING DEPTH (FT) 155.1 EAST: 995682.5366

SA	MPLER	: 2" O	D. Split Sp	oon							rsey Boring and Drilling Co	orp.						ADINGS			
			MER: 140 lb	(Auto	matic)	<u> </u>			IAN: Pete			DAT	E TIME	1	DEPTH	CASIN	ig s	TAB.	TIME	
	SING S		R: N/A - Sr				•			EER: Sara		5/24/05		-	+						
	CK CO			un						VED BY: (+		-	-			
-	1	\top	1	T	T		Ta	_	T		5. Oncc	<u> </u>		T	1	INS	SITU PRO	PERTIES	T		
F	3PF) OR	CORE NO	SAMPLE DEPTH (FT)	INCH	(BPF)	PEN/REC: SOIL (IN/IN)	CORE REC (%)	CORE ROD (%)	ST DATA		SAMPLE DESCRIPTION	I	YMBOL	ЗАРНУ		HARD	NESS W	/EATHER!		PER	ER OF TURES FOOT
DEPTH (FT)	CASING (BPF) OR	SAMPLE /	SAMPLE	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC	TOTAL CO	ROCK CC	FIELD TEST				STRATA SYMBOL	STRATIGRAPHY	NOTES	see bel		values		see be for valu	ues
	2.5	-											Ξ						Series S		1
	2.5	\perp	 	+	+-	+	+	+-	\vdash	Very h	ard, fresh, fine to coarse grain	ned, light to	= =	_		i n					- 1
	2.5										ray, quartz-mica-garnet SCHI in, crenulated, horizontal to si		= =	_				With		1	1
	T	7								horizor	ntal foliation, rough, widely sp	aced,	= =	-		-10°-					-
	2.5	-									ntal, slightly weathered foliation ractures; occasional very thin		==								
35	2.5	4			1						veins; pyrite content.	to unit	==	_		5.4			-		
	2.5												$\equiv \equiv$			1					1
	2.5	C4	31.7-40.9			9.2/9.2	100	100	-	40.4": 1	rlealed sub-vertical joint/fractu	ire.		- '		14		3			1
	T	1							1				\equiv			4					-
	2.5	-												-			# - B		-	++	
	2.5			١.,	1		1						\equiv			200			_		- 0
	2.5					1 1							===	-		10			9		0
40	2.5	7 .	1. 1.		-																1
	12.5	1			1		 -	1		Similar	to Schist in C4, except occas thin amphibole Schist; occasion	ional very		-			V				
	2.5	- .								thin qu	artz-feldspar zones; pynte cor	ntent.	: E			E					0
	2.5	1						1		40 3' 6	0.1': Healed vertical joint/fract		_ =	-	1		E A			$\sqcup \bot$	0
	3					1				45.5-5	o.i . Healeo vertical joinullact	ure.				117.					1
	1	1									,			-		4.7					
45	2.5	-											$I \equiv \Xi$			- 35	M -W			++	┧.
	2.5	C5	40.9-50.8		1	9.9/9.9	100	100						-		74	-				0
	2.5	-	37					1					\equiv								0
1.	2.5		1	١.			1.														0
	1	1											1= =							72	2
	2.5	-											==						- 1	250	
50 -	2.5	1	1.3	1							T		==			4. 19	23				0
	2.5		110	-			-		_	Similar	to Schist in C4, except slightly	,	==								0
	2.5	1	70		1					convolu	ited foliation; occasional very	thin to thin	IE Ξ								0
'	2.0	1	14.14			200				amphib	ole Schist; occasional very thing zones.	n quartz-	==	:		$i_1 - i_2$	#-B			11	0
.	2.5	1		1 .				12					==			i i	M-M		- 1		
1.	2.5										2.1' and 55'-55.8': Healed sub- joints/fractures.	vertical to	==				第二階	農	- 3		1
	2.5	C6	50.8-57.7			6.9/6.9	100	100	-	veracei	joina/iractores.		==					4.			0
55 -		1		-									==					3.5			0
١.	2.5	1											==							11	0
.	2.5	1	378	1					. [==	-			1 - 1		- 6	++	-
١.	2,5	-		-	-		+-+		-				==						_	11	0
	2.5												==			1					0
1		1											ĮΞΞ		1				200	T	0
60 -	2.5												<u> </u>	<u> </u>	6	asset E	13	******	32		<u></u>
	RANU				SIVE S						ARACTERISTICS			JOINT/FRACT			CTERIST				
10 30	-10 L -30 M -50 D	ery Loc oose ledium	Dense 8	<2 \\2-4 \\1-8 \\1-15 \\5-30 \\	CONSIS Very So Soft Med Sti Stiff Very Sti Hard	ff .	1 2 3 4 5	Me Me Ha	ry So edium ed Ha	oft n ord	WEATHERING 1 Complete 2 Severe 3 Moderate 4 -Slight 5 Fresh	NO. PER (1) 0 (2) 1-2 (3) 3-10 (4) 11-20		"-1' Close '-3' Mod ('-10' Wide/	Thin Close Thick	Very Thi	ck	ANGLE 0-5 5-35 35-55 55-85 85-90	Sub-	zontal Horizo Dippir Vertica	ntal ng

⁵⁾ RQD affected by vertical joint/fracture between 104.8' and 106.3'.
6) Core barrel became blocked.
7) Bottom of borehole at 155.1'; acoustic televiewer survey performed; in-situ stress test performed; borehole grouted upon completion.

										. 1	BORING LOG								Sheet: 3 of 6	6
	D	MIM	BEHARRE	-AR	UP	للع		Γ	-		AVENUE OUDWAY			STATION: 1		+59.89	0	RING NO	9	1-5
	yad.	EU DOWN	AND AND ADDRESS OF THE PARTY OF	*********		111			SI		AVENUE SUBWAY ROJECT	_		NO. CM1	_		_	OORDINATE		
						America Contracts					NOOLO I			EL. 152.10 NYCT				ORTH: 2192 AST: 995682		
					•••									RING DEP	TH (F	T) 155.				
			D. Split Spo								ey Boring and Drilling Corp.	工						EADINGS	AD THE	
			ER: 140 lb.	Autor	natic)		•			AN: Peter		+	DATE	TIME	+-	DEPTH	CASI	NG 51	AB. TIME	
	NG SIZ		R: N/A - Spu	ın.						ER: Sara J				+	+					
	K COR									ED BY: C.					1					
						2	8	8								INS	ITU PR	OPERTIES	NUMBE	R OF
E	BPF) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	(BPF)	PENREC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	ST DATA		SAMPLE DESCRIPTION		STRATA SYMBOL	STRATIGRAPHY		HARD see be		WEATHERIN	FRACTL PER FO	PRES
DEPTH (FT)	CASING (BPF)	MPLE	MPLE	ows/	N VALUE (BPF)	EN/REC	DTAL C	SCK CC	FIELD TEST				TRATA	TRATIG	NOTES	val.	es	values	for value	s NA
۵	9	Ŝ	Š	1 8	Z	<u> </u>	۲	ŭ	Œ				_ O	ės –	Z	0.0000000000000000000000000000000000000	78GVM		Scot	Z
	2.5			1							Schist in C4, except slightly		= =							0
-	2.5										ed foliation, chloritized foliation ctures; occasional very thin to thin									1
-	2.5	C7	57.7-67.2	1		9.5/9.5	100	96	-		eldspar zones.	1	==		1			100		3
-	2	0,	07.17-07.12					"			oss-foliation joint/fracture, rough, sub	ıb-					200	- 40		2
-	2.5			-							slightly weathered, mineralized.		$\equiv \equiv$							0
65	2.5				-					62.5'-63.	 Cross-foliation joints/fractures, su o vertical, slightly weathered, 	ub-	= =							-
	2.5			1						chloritize	ed to clay coated; partially healed.		= =						_8	1
	2.5			ľ		1				61'-62.3'	: Healed vertical joint/fracture.		= =							1
	2.5	\vdash		1	 	 		-		Very har	d, fresh, fine to coarse grained, light		= =							5
											y, quartz-mica-garnet SCHIST, with , slightly convoluted, crenulated,		= =					1	4 2	1
-	2.5									horizonta	al to moderately dipping foliation, rou	ugh	= =	12						1
70 -	2.5										h, very close to widely spaced, at to sub-horizontal, slightly weathers	ed,	$\equiv \equiv$				**	31.7	The state of the s	
	3			1						chloritize	ed foliation joints/fractures; occasiona to thin quartz veins; pyrite content.	al l	= =					31		0
	3	C8	67.2-76	1.		8.8/8.8	100	94	-	very triin	to thin quartz veins, pyrite content.		= =				3 _			0
	2.5	,			1						S. 5		= -					11.		0
					1						6': Fracture zone, rough to smooth, ely spaced, horizontal to sub-	٠	==							1
-	2.5										al, slightly weathered, chloritized cross-foliation joints/fractures.	1						5.71		0
75 -	3									69.2': Cr	oss-foliation joints/fracture, rough, su	ub-	$\equiv \equiv$							0
_	2.5		-	-	-		-	_	\dashv	vertical, mineraliz	slightly weathered, chloritized,		==						-	-
	3									69'-69.7'	, 70.7'-71.5', 71.3'-72.1' and 72'-72.6	6':	==			1	-			0
	3									Healed s	ub-vertical joints/fractures.		==		1					0
-	3					,							= =			4			3	0
-		C9	76-82.6	1		6.6/6.6	100	100	-	C9: Simil	lar to Schist in C4, except no appare	ent	ΞΞ		-	1.				0
80 -	3									foliation	joints/fractures; occasional very thin	to								0
-	3.5									. um quar	tz-feldspar zones.		<u> </u>			4				0
	3	٠														1				-
_	3			1				-	\vdash	Similar to	Schist in C8, except moderately to		==		1					0
	2,5									widely sp	paced, slightly weathered foliation		= =							0
	2.5									joints/fra			= =	*						0
85 -				1						87.0': Py	rite on foliation joint.		= =		1.					0
-	2.5												= =							1
-	2.5	C10	82.6-91.8			9.2/9.2	100	100	_				= =			24	30			0
-	3												= =				-			-
_	3												$\equiv \equiv$						203	0
00 -	3.5												_ =			No.			西豐	1
90 -	RANUL	AR S	DILS. T.	COHE	SIVE	SOILS · · · ·		RO	CK (CORE CHA	RACTERISTICS			OINT/FRAC	TUR	E CHAR	ACTERI	STICS		
	F D	ENSIT	Y E	PF (CONSI	STENCY	+	ARD	NES:	S	WEATHERING NO.	PER F		SPACING	THIC	KNESS	T	ANGLE	ATTITUDE	
		ery Lo			Very Soft	oft	1 2		ery So ediun		1 Complete (1) (2) 2 Severe (2) 1	0 1-2	- 1	"-1' Clos	e/Thi			0-5 5-35	Horizontal Sub-Horizon	
10	-30 M	edium	Dense 4	1-8	Med St	iff ·	3	< M	ed Ha		- 3 Moderate (3)	3-10	1	'-3' Mod		e/Mod T	hick	35-55 55-85	Mod Dipping Sub-Vertical	
		ense ery De	nse 15	5-30	Stiff Very SI	tiff	- 5		ard ery Ha	ard	4 Slight (4) 1 5 Fresh	11-20				e/Very T	hick	85-90	Vertical	
>30 Hard																				
5) 1	5) POD affected by vertical inint/fracture between 104 8' a																			

5) RQD affected by vertical joint/fracture between 104.8' and 106.3'.
 Core barrel became blocked.
 Bottom of borehole at 155.1'; acoustic televiewer survey performed; in-situ stress test performed; borehole grouted upon completion.

15-30

>30

Very Stiff Hard

Dense

Very Dense

Very Hard

. 5 Fresh 85-90

Vertical

Very Wide/Very Thick

 ⁵⁾ RQD affected by vertical joint/fracture between 104.8' and 106.3'.
 6) Core barrel became blocked.
 7) Bottom of borehole at 155.1'; acoustic televiewer survey performed; in-situ stress test performed; borehole grouted upon completion.

1											BORING LOG								Sheet: 5 of 6	;
		NAD.	PALIADOR	Cade	1170			\top		-							BORI	NG N	O. ISS 71	1-5
	L	44flw	HARRE	A Jose I	MOLT	1							BORING S	STATION: 1	168-			SET: 83.		
	4		double, a top cratical less	NA GREAT CO.		100			S		AVENUE SUBWAY	Ì	PROJECT	NO. CM11	88		COC	RDINATE	ES:	
					4	20.00	a				PROJECT			L. 152.10			NOF	TH: 219	203.6171	
1					-30	Submary						*	DATUM:				EAS	T: 99568	2.5366	
_								1					FINAL BO	RING DEPT						
			D. Split Spo								sey Boring and Drilling Cor	rp.	DATE			ID WATE			FAD THAT	
	ING SI		ER: 140 lb.	(Auto	matic)					AN: Peter			DATE	TIME	+-	EPTH	CASING	3 5	TAB. TIME	
			R: N/A - Spi	מו						TART: 05		/24/05		-	┢	-+		 		
	K COF									ED BY: C						-				
	T	Π.		\top		Î	18	_	_							INSIT	U PROP	ERTIES	T	
1	00	2	SAMPLE DEPTH (FT)			PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)					ادا						FRACTU	
	0	2	Ŧ	공	1	. <u>=</u>	1 %	2	DATA				8	Ţ		HARDNE	ss w	ATHERI	VG PER FO	
F	8	8	l ii	I Z	B B	S	1 %	1 2	15		SAMPLE DESCRIPTION		3	. ≸						
1 =	0	1	<u> </u>	100	当	<u> </u>	Ö	8	TEST				Z	5	S	see below		e below for values	for values	18
DEPTH (FT)	CASING (BPF) OR	SAMPLE / CORE	2 ≥	BLOWS / 6 INCH	N VALUE (BPF)	N N	ΙŽ	Š	FIELD				STRATA SYMBOL	STRATIGRAPHY	NOTES					Z
8	8	S	S	=	z	2	15	5	12				S	ST	일	1 2 3 4	5 1	2 3 4	5 1234	≥
	1							Т					==						密 趣	1
1	4	1						1					三三							-
.	3.5	١	117.3-127.1	.						in place	r to Schist in C8, except highly	crenulated	==				墨			5
١.	3.5	C14	117.3-127.	ή .		9.8/9.8	100	91	-					10		1.0				1
	3.5			1						121.0'-	121.6': Fracture zone, rough to ntal to moderately dipping, sligh	smooth,				200		1	4	1
'		1					1 .			weathe	ered foliation, cross-foliation	illy					2-B	9		+
125-	3.5	1								joints/fr	ractures.					7 4				0
1 .	3.5	1								121.9'-	122.2': Healed sub-vertical joir	Vfracture.	==							0
	3												= =			1			2	3
1 .		\vdash				1	+	<u> </u>			resh, fine to coarse grained, lig		==							0
.	3				-						uartz-mica-gamet SCHIST, wit provoluted, highly crenulated, high		= =				- 3			-
	3.5									modera	ately dipping foliation, rough to	smooth,								0
L	3.5	C15	127.1-132.5			5.4/5.4	100	100			oderately closely to widely spa- ital to moderately dipping, sligh							6		1
130 -	3.5	10.0	127.1-102.0			5.475.4	1.00				red foliation joints/fractures, hi		==					15.4		0
-							1			content	l		I I							+
-	3.5						1			-			三三							0
١.	3.5						1	\vdash	П		to Schist in C15, except closel				-					0
	3.5									spaced feldspar	foliation joints/fractures; frequ	ent quartz-								0
, -										ieiospai	r zones.	:						(3)		2
135-	3						ŀ				142.2': Closely spaced quartz-	feldspar	$\equiv \equiv$					7		-
١.	3.5								1 1	zones,	very thin to moderately thick.							1107		2
	5					-							==							0
-	4.5	C16	132.5-142.2			9.7/9.7	100	95	-							4,7				0
-													==							+
-	4.5														- American	40	- 2	5.00		10
140 -	8												==	1					2	0
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-	4			-			+-	\vdash	\dashv	0:- "					0				- E	
-	3.5										to Schist in C15, except closel eldspar zones.	y spaced	$\equiv \equiv$							0
-	3.5										2000. • 2 0000 0000000				1 65					1
-	4	C17	142.2-146.9			4.7/4.7	100	98	-	145'-146	6.9': Very hard, fresh, coarse ç ıy-white-pink, quartzo-feldspat	rained, hic			1					0
145 —										SCHIST	and PEGMATITE.		- 1		200					0
-	6												141		PACK A				-123-1-1-1-	\vdash
-	5.5						+		\dashv				1.3		27.00	100		200		0
	7									-			1.1.					1		0
-	3.5												1							0
-	3.5												1.1						353	\vdash
150 —	3.5												1.7.3		É	4.4			2.00	7
	RANUL	AR SC	DILS	COHE	SIVE S	OILS I	-	RO	CK C	ORE CHA	ARACTERISTICS		10	INT/FRACT	URF	CHARAC	TERISTI	cs		=
BF	F DI	ENSIT	Y B	PF C	ONSIS	TENCY	- F	IARD	NESS		WEATHERING .	NO. PER	FT.	SPACING/T	HICH	NESS		ANGLE	ATTITUDE	\dashv
0		ry Loc			ery So	ft	1 2		ry So		1 Complete 2 Severe	(1) 0	2			Very Thin		0-5	Horizontal	.
4- 10-		ose edium			ioft · Med Stif	ff .	3		edium ed Ha		2 Severe 3 Moderate	(2) 1-2 (3) 3-10				/Mod Thick		5-35 35-55	Sub-Horizonta Mod Dipping	.
30-	50 De	ense	8-	15 S	tiff		4	Ha	ird		4 Slight	(4) 11-20	1 1	10' Wide/	Thick			55-85	Sub-Vertical	
>:	U VE	ery Der			ery Stit	п	5	ve	ry Ha	rd	5 Fresh		1	0° Very V	vide	Very Thick	`	85-90	Vertical	
			y vertical joi		ure bet	ween 104.	8' and	106.3	3'.											
5) C	ore bar	rel be	came blocked	i.						n eite et-	on tool and amed. beach	routed	enemics.							
, 5	oliom (, core	note at 155.1	, acou	SUC TEH	eviewer Su	vey p	enom	ieo; i	-sau sire	ess test performed; borehole g	routed upon	completion							
																				1

BORING LOG Sheet: 6 of 6 **BORING NO. ISS 71-5** DMIMSHARRIS ARUP **BORING STATION: 1168+59.89** OFFSET: 83.89 **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: PROJECT G. SURF EL. 152.10 NORTH: 219203.6171-DATUM: NYCT EAST: 995682.5366 FINAL BORING DEPTH (FT) 155.1 BORING CO: Jersey Boring and Drilling Corp. FOREMAN: Peter Lynch GROUND WATER READINGS TIME | DEPTH | CASING | S SAMPLER: 27 O.D. Split Spoon STAB. TIME DATE SAMPLER HAMMER: 140 lb. (Automatic) CASING SIZE: 3" CASING HAMMER: N/A - Spun ENGINEER: Sara Rocha DATE START: 05/19/05 DATE END: 05/24/05 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 11/14/05 % **INSITU PROPERTIES** PEN/REC: SOIL (IN/IN) ROCK CORE ROD (%) E NUMBER OF FRACTURES TOTAL CORE REC DATA 8 STRATA SYMBOL SAMPLE / CORE SAMPLE DEPTH STRATIGRAPHY HARDNESS WEATHERING PER FOOT BLOWS / 6 INCH N VALUE (BPF) CASING (BPF) SAMPLE DESCRIPTION FIELD TEST see below see below to see below for 1 2 3 4 1 2 3 4 5 1 2 3 4 5 Similar to Pegmatite in C17, except frequent very thin mica-Schist zones; high mica and C18 146.9-155.1 8.2/8.2 100 62 3 gamet content. 149.3-150.5: Fracture zone, several, rough to smooth, very closely spaced, sub-vertical, slightly weathered, kaolinized, mineralized cross-foliation joints/fractures. 149.1-149.6: Healed, serecitized 3 0 0 joints/fractures. Bottom of borehole at 155.1 feet 60 165 75

GRAN	NULAR SOILS	COHESIVE SOILS	ROCK CORE CHA	ARACTERISTICS		JOINT/FRACTURE CHARACTE	RISTICS
BPF 0-4 4-10 10-30 30-50 >50	DENSITY Very Loose Loose	BPF CONSISTENCY <2 Very Soft 2-4 Soft 4-8 Med Stiff 8-15 Stiff 15-30 Very Stiff >30 Hard	HARDNESS 1 Very Soft 2 Medium 3 Med Hard 4 Hard 5 Very Hard	WEATHERING 1. Complete 2. Severe 3. Moderate 4. Slight 5. Fresh	NO. PER FT (1) 0 (2) 1-2 (3) 3-10 (4) 11-20	- SPACING/THICKNESS 2" Very close/Very Thin -1' Close/Thin -3' Mod Close/Mod Thick -10' Wide/Thick 10' Very Wide/Very Thick	ANGLE ATTITUDE 0-5 Horizontal 5-35 Sub-Horizontal 35-55 Mod Dipping 55-85 Sub-Vertical 85-90 Vertical

⁵⁾ RQD affected by vertical joint/fracture between 104.8' and 106.3'.

180

⁶⁾ Core barrel became blocked.

⁷⁾ Bottom of borehole at 155.1'; acoustic televiewer survey performed; in-situ stress test performed; borehole grouted upon completion.

	MPLER: NA MPLER HAMMER: NA SING SIZE: 3" to 35" SING HAMMER: NA CK CORE: NQ Wireline 30 degrees f							AN	GLE BO	RING LOG										She	et: 1	of 8			
	TAA	TA / DE	LIADDI	COAR	11D-1			Τ											BOR				B7	1-8	
ŀ	-444	lisina	r to striction	4 404 9	Nittee	delle				SECO	ID AVEN	IUE SUBWA	Y		NO. CM11		+58.0	66			: 87.9				
								1		0200.		JECT			EL. 150.67	00			_		2193	_	38		
					-	Averus Subway								DATUM:					EA	ST: 9	9569	0.38	2		_
CALA	ot EO.	NIA.						BO	DIMO	CO: Mos	ren Georg	o lee		FINAL BO	RING DEPT		_		R RE	ADIN	IGS		_		_
			ER: NA					\rightarrow	_	AN: J. Hai		e, inc.		DATE	TIME				CASIN			AB.	TIM	Ē	_
CASI	NG SI	ZE: 3"	to 35'					EN	GINE	ER: G. G	utshtevn							7		1					
				30 da	rope fr	om horizo	ntal			TART: 10/ ED BY: C		DATE END: 10 DATE: 03/06/0			-	\vdash	_	+		+					_
1100	100.	T .		1	T CCS II						Onco							INSIT	TU PRO	PER	TIES	T	A11 14	IBER (05
) OR (FT)	RE NO	TH (FT	F	Œ.	OIL (IN/I	REC (Rab (DATA		SAMPL	E DESCRIPTION		/BOL	¥		НА	RDNE	ess w	/EAT	HERIN	- 1	FRA	CTUR R FOO	ES
DEPTH (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	BUR	MISTER (U	SCS / NYC BLDG SSIFICATIONS		STRATA SYMBOL	STRATIGRAPHY	SS		belov			elow fo			elow alues	RH H
DEPT	CASIN	SAMP	SAMP	BLOW	N V A	ROCK	TOTA	ROCK	FIELD					STRA	STRA	NOTES	1 :	2 3 4	4 5	1 2	3 4	5	1 2	3 4	NUMBER
	3"		- "	+-	-			_	-	DAVEN	ENT THICK	NESS: 6" Concr	ata aidawall					1							
-	1			1		l				PAVEIN	ENT THICK	MESS. 6 CONC	ete sidewaii	1		1									
1										Excavat	e 6' x 10' x 2	2' feet trench to cl	ear utilities			2									
-						ļ				for angle	e boring.					3				Ħ	TT	T		П	1
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NOTES:
1) Ground water level not recorded.
2) Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

Sheet: 2 of 8 **ANGLE BORING LOG ANGLE BORING NO. B71-8** DMJMHHARRIS ARUP **BORING STATION: 1168+58.66** OFFSET: 87.98 SECOND AVENUE SUBWAY COORDINATES PROJECT NO. CM1188 **PROJECT** G. SURF EL. 150.67 NORTH: 219390.738 DATUM: NYCT EAST: 995690.382 FINAL BORING DEPTH (FT) 229.4 **GROUND WATER READINGS** SAMPLER: NA BORING CO: Warren George, Inc. TIME | DEPTH CASING STAB. TIME DATE SAMPLER HAMMER: NA FOREMAN: J. Harris CASING SIZE: 3" to 35' ENGINEER: G. Gutshteyn DATE END: 10/23/2006 CASING HAMMER: NA DATE START: 10/02/2006 REVIEWED BY: C. Snee ROCK CORE: NQ Wireline 30 degrees from horizontal DATE: 03/06/07 INSITU PROPERTIES TOTAL CORE REC (%) 8 NUMBER OF FRACTURES PER FOOT DATA (BPF) OR (MIN/FT) ROCK CORE ROD STRATA SYMBOL WEATHERING CORE STRATIGRAPHY HARDNESS SAMPLE DEPTH BLOWS / 6 INCH PEN/REC: SOIL ROCK (FT/FT) SAMPLE DESCRIPTION N VALUE (BPF) TEST BURMISTER (USCS / NYC BLDG CODE) see below for DEPTH (FT) CLASSIFICATIONS see below for SAMPLE / CASING (values for values FIELD . 1 2 3 4 5 2 3 4 5 1 2 3 4 35 ROCK Very hard, fresh, fine to coarse grained, light gray to gray, quartz-mica-gamet SCHIST, with very thin to thin, convoluted, crenulated, acute to intermediate foliation, rough, closely to 2 0 moderately closely spaced, acute to intermediate, fresh to slightly weathered 0 100 87 6/6 C1 35.5-41.5 foliation joint/fracture. 0 35.8'-36.0': Cross-foliation joint/fracture: Rough, intermediate, slightly weathered, slight 7 0 iron-oxide staining. 0 0 6 Similar to SCHIST in C1. 46.3' and 49.0': Cross-foliation joints/fractures: Rough, planar, acute to intermediate, slightly weathered, with calcite and chlorite coating. 48.2': intermediate foliation fracture (possible 7.5/7.5 100 97 2 slickensides). 1 1 Very hard, fresh, fine to coarse grained, light 50 1 gray to gray, quartz-mica-gamet SCHIST, with thin, convoluted, acute to intermediate foliation, 0 rough, closely to moderately closely spaced, fresh to slightly weathered, some calcite, chloritic, acute to intermediate foliation 0 4 joint/fracture. 49.1': Cross-foliation joint/fracture: Fracture 0 100 81 10/10 C3 49-59 0 zone: Rough, planar, intermediate 55.2'-55.5' and 57'-57.4': Smooth to rough, 7 irregular, planar to stepped, moderately weathered, chlorite coated, very closely spaced. = 0 10 10 2 5 60 -JOINT/FRACTURE CHARACTERISTICS ROCK CORE CHARACTERISTICS COHESIVE SOILS GRANULAR SOILS WEATHERING NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE CONSISTENCY ARDNESS BPF DENSITY BPF Horizontal Sub-Horizontal (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Very Soft Medium Very close/Very Thin Close/Thin Mod Close/Mod Thick Very Soft Complete Very Loose Severe 2"-1' 1'-3' 5-35 2-4 Soft 4-10 35-55 Mod Dipping Sub-Vertical 4-8 8-15 Medium Dense Med Stiff 3 Med Hard 3 Moderate 55-85 Stiff Hard 3'-10' Wide/Thick 30-50 Dense Vertical Very Dense Very Wide/Very Thick 15-30 Very Stiff Very Hard Fresh >10' Hard >30

4) 57.4-59.0: Lost 1.5 in initial run. Over drilled to retrieve core sample. Core damaged and does not represent bedrock conditions accurately.

5) Bottom of borehole at 229.4 feet. Borehole grouted upon completion.

										ANG	SLE BORING LOG								Sheet: 3 (of 8
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					元	Samuel		1			PROJECT	1		L. 150.67				ORTH: 219:		
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-	6	C4	59-69	1		10/10	100	93	1	59.2' 63	joints/fractures. 3.0', 66.3'-66.5' and 67.6'-67.8	": Cross-	==			-1 -12				1
65 -	5			1				1		foliation	joints/fractures: Rough, plan	ar, slightly					- 1		-	
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-						1		1		joints/fra	ctures: Rough, slightly weat	nered,				96				2
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41.0	7 4 50	0.1-	4 61 1-1-1-1	1 =	0	ritlad to	iour	0000		e Corn d	maged and does not represe	at bedrock o	onditions	ccurately						
4)5	1.4-59.	U: LOS	stin in c.i s	n tun.	Over 0	inied to retr	ICAG (use:	aitip	e. Out 8 02	mayou and over not represe	boulous t								

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										ANGLE BORING LOG				ΔΝ	GLEI	RORI	NG NC	D. B71-8	
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					000	0				PROJECT		G. SURF E	L. 150.67				TH: 21939		
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٥	00	Ŋ	v)	-	Z	0.00	-	Œ.	-							8 32	3- 4	*	0
	4									Very hard, fresh, fine to coarse grained	f. light	三三			\$ 257				-
_	5									gray to gray, quartz-mica-gamet SCHIS	ST, with						3		0
-	-									very thin to thin, slightly crenulated, intermediate foliation, rough, closely to	widely				4		/e-r		0
-	7								spaced, fresh, intermediate foliation	maony				- 14		(C.,		0	
_	7				10.1/10.1	100	100		joints/fractures. 122.3'-124.3': Thick band of quartzo-fe	denathic	ΞΞ							0	
	5	Ciu	119.1-129.2			10.1710.1	100	100		SCHIST.					, A				+
125 -	5									125.2'-125.9': Thin band of quartz-mice amphibole SCHIST.	a-						-		2
-	-									125.3' and 126.1': Cross-foliation		==							0
-	5									joints/fractures: Rough, planar, interme obtuse, slickensided.	ediate to				F. Fr				1
_	5									obluse, sickersideo.		= =							0
	5														3 4				-
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130 -												==			4				0
-	5									Very hard, fresh, fine to coarse grained gray to gray, quartz-mica-gamet SCHIS	f, light	==			\$ 5				2
_	5									very thin to thin, convoluted, crenulated	d, acute								0
١.	6									to intermediate foliation, rough to slight smooth, fresh to slightly weathered, clo	tly selv to	= =		П		1 -8			-
	6									widely spaced, acute to intermediate fo	diation	==		П	459				0
-		C11	129.2-139.2			10/10	100	96		joints/fractures. 130.7'-132', 134'-134.8' and 135.4'-135	6" Thin				17.5				0
135 -	5									bands of Amphibole rich SCHIST.		==			3512		13-5		0
_	6					1				131.2'-131.35': Cross-foliation joints/fra Rough, slightly weathered, acute.	actures:								1
_	6									roogii, siigiity waatic es, soots.		= =		П					1
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-	5									139.2'-142.5' and 148.9'-149.2': Simila	r to	==							1
_	5					1.0				SCHIST in C11. 142,5'-148.9': Medium hard to very sof	ft.								H
	5									moderately to severely weathered, fine	to	==		H			288	41 4	10+
	E									coarse grained, light gray to gray, quan- gamet SCHIST, with thin, convoluted,	12-mica-	==							10+
-	-	C12	139.2-149.2			10/10	100	42		crenulated, acute to intermediate foliati	ion,								10+
145-	6									smooth to rough, kaolinite and chlorite very closely to closely spaced, severely	у								10+
_	6									weathered, acute to intermediate foliati	ion	$\equiv \equiv$				1		58	5
	5									joints/fractures (frequent cross foliation in severely weathered zones).		= =				-			+
	6																	_	10+
-												= =		H					10+
-	6						-	\vdash	-			==			4				2
150 -	5													Ш					Щ
	RANUL	AR S	OILS		SIVE S					CORE CHARACTERISTICS			DINT/FRAC			TERIST		ATTITUDE	-
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10	-30 M	ledium	Dense 4	-8 1	Med Sti	iff	3		ed H ard	ard 3 Moderate 4 Slight	(3) 3-10 (4) 11-2			d Ck de/Ti	se/Mod Th nick	HCK		Sub-Vertical	
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		, - •			Hard	1													
		_			A	المسلم	nio	~		e. Core damaged and does not represen	nt hedrock	conditions	accurately						
4)	57.4-59 Bottom	.0: Lo of bore	st 1.5' in initia chole at 229.4	feet.	Boreh	oniea to reti ole grouted	neve upon	com	samp oletio	ie. Core damaged and does not represen 1.	" DEOLOGY	Jonations	_ Journalory.						
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GRANULAR SOIL	S	COH	IESIVE SOILS		ROCK CORE CHA	ARACTE	RISTICS	T		JOINT/F	RACTURE CHARACTE	RISTICS	
BPF DENSITY 0-4 Very Loose 4-10 Loose 10-30 Medium Dense >50 Very Dense	nse		CONSISTENCY Very Soft Soft Med Stiff Stiff Very Stiff Hard	HA 1 2 3 4 5	ARDNESS Very Soft Medium Med Hard Hard Very Hard	WI 1 2 3 4 5	EATHERING Complete Severe Moderate Slight Fresh	(1) (2) (3)	O. PER FT) 0) 1-2) 3-10) 11-20	SPA <2" 2"-1' 1'-3' 3'-10' >10'	CING/THICKNESS Very close/Very Thin Close/Thin Mod Close/Mod Thick Wide/Thick Very Wide/Very Thick	55-85	Horizontal Sub-Horizontal Mod Dipping Sub-Vertical

^{4) 57.4-59.0:} Lost 1.5' in initial run. Over drilled to retrieve core sample. Core damaged and does not represent bedrock conditions accurately. 5) Bottom of borehole at 229.4 feet. Borehole grouted upon completion.

										ANG	SLE BORING LOG									Sheet	7 of 8	
			ar tarter					T								A	IGLE	BO	RING N	O. E	71-8	
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_	(BPF) OR (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	BUR	SAMPLE DESCRIPTION MISTER (USCS / NYC BLDG	CODE)		STRATA SYMBOL	STRATIGRAPHY							
F	<u>@</u> ≥	%	Ĭ.	10	1	l öÈ	18	ļ Ķ	ES	1	CLASSIFICATIONS		1	A S	89		see bel		see below for		ee belov	Y K
Ξ	22	1 2	1 2	NS NS	13	EX.	¥	X	0					¥	¥	E	valu	ies	values	"	ir value:	NUMBER
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	00	S	6	-	12	u.u.	μ-	-	-				+	==		-	SEE	A COMMENT	in the second			1.
	10						1			Van ha	rd, fresh, fine to coarse grains	ad light	-	= =					1.414			0
				1			1			gray to	gray, quartz-mica-gamet SCH	IST, with	-									0
-	12				1					very thir	n, convoluted, crenulated, inte	rmediate	-	==								0
_	12				1						 (pinch and swell features thr torted foliation). 	ougnout,					ritigie.		\$ 34			1
	11									180.1', 1	183.4' and 188.7': Cross-folia	tion	:	= =				W -		-	_	-
	12	C16	179.2-189.	3		10.1/10.1	100	96			ectures: Rough, planar, acute nd 184.5': Cross-foliation	t.								100		3
85 -	12						1				ectures: Rough, irregular, obt	use.	-	= =					318			0
-	10				1								-								11	0
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-	16									quartz-n	nica-gamet SCHIST, with very	thin to	-	= =							1	0
	13				1		1				voluted, crenulated, intermed		-	= =			1			-8	++-	-
	12						1			intermed	, rough, widely spaced, fresh, fiate foliation joints/fractures.		:	= =								0
-		C17	189.3-199.	4		10.1/10.1	100	100		194.3' a	nd 199.0': Cross-foliation		-	= =								1
95 —	14									joints/ira	ctures: Rough, planar, interm	eciate.	-	= =					1.00			0
_	14			-									-	= =				ME			++-	-
	14					1								= =			- 63				44	0
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-	12				1		1						-	= =				3				1
_	14				1	1							-					展開一		-8		_
	18												=	= =			17				1	0
00	24												-	_ =						B		0
-	24				1					Vonchor	of fresh fine to coarse praine	d light	-	= =			Early St	4				0
_	16			1						gray to g	rd, fresh, fine to coarse graine gray, quartz-mica-gamet SCH	IST, with	-							-8	++-	0
	18									very thin	, convoluted, crenulated, inte	mediate	-	Ξ							++-	0
_	14				1					closely s	e foliation, rough, closely to ma spaced, fresh, intermediate fol	liation										0
-	14	C16	199.4-209.	ا،		10/10	100	100		joints/fra	clures.		-	= =					1			0
05	16	0.0	190.4-209.	1		.0,10					nd 206.6': Cross-foliation actures: Rough, planar, slighti	lv	-				,					1
	34									weather	ed, acute to intermediate, with	slight	-				2	8				-
	14									chlorite (coating.		-				7.5		492			1
-						1							1=							1.		0
_	12												-								11	1
													[=							- 2	++-	0
	12			+-	-		1	-	\neg				-	= =			Ų.		Let 100		<u>il</u>	0
10 -					<u></u>	<u></u>		Щ	Ш								- 01:45	ACTES	DTICE			
	RANUL				SIVE S						RACTERISTICS	NO. PER	0 =		DINT/FRACT	_			ANGLE	ATT	ITUDE	
	PF D	ENSIT ery Lo			CONSI Very St	STENCY	1	HARD Ve	NES ery S		WEATHERING 1 Complete	(1) 0	KFI	'	SPACING <2" Ver	y clo	se/Very	Thin	0-5	Hori	zontal	
	10 Lo	oose		2-4	Soft		2	M	ediun	n	2 Severe	(2) 1-2			2"-1' Clos	se/TI	hin		5-35 35-55		Horizon Dippin	
10-					Med Sti Stiff	m	3		ed Ha ard	ard	3 Moderate 4 Slight	(3) 3-10 (4) 11-2			1'-3' Mod 3'-10' Wid		se/Mod hick	INICK	55-85	Sub-	Vertical	
30-		ense · ery De			Very St	iff	5		ery H	ard	5 Fresh	.,,					ide/Very	Thick	85-90	Vert	ical	
>30 Very Dense																						
>30 Hard														-								

5) Bottom of borehole at 229.4 feet. Borehole grouted upon completion.

										BORING LOG								She	et: 1 of	3
	TAA	73.70	LLADDE	a A D	110.	1		T			T					ВО	RING	NO.	B72-	5
	TYAI	MATER	II-LARRIE	A JOHN W	richard:	الملا				CECOND AVENUE CUDWAY			STATION: 1		+31.45		OFFSET: 4			
						121		1.	-	SECOND AVENUE SUBWAY			T NO. CM11			_	COORDINA			
					1	1	0			PROJECT			EL. 147.84	•			NORTH: 2			
1					111	Balavery							NYCT ORING DEPT	H/E	T) 00 2		AST: 995	808.04	111	
SAM	PLER:	2" 0	D. Split Sp	noon				BO	RING	CO: Jersey Boring and Drilling Co., Inc	11110	AL DO					EADING	s		
			ER: 140 lb		matic					N: P. Lynch	D	ATE			DEPTH				TIME	
	NG SI									ER: S. Mendes / R. Nunez	Not	e 1								
			R: SPUN							ART: 8/30/04 DATE END: 8/31/04				_						
ROC	K COF	E: NO	Wireline		·	·	1.	T	VIEW	ED BY: C. Snee DATE: 9/21/04	1.	_	1	╀						
		Š	E		1	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	CORE REC (%)	ROCK CORE RQD (%)		·				1	IN:	SITUP	ROPERTIE	S	NUMBE	R OF
1	SF.	N N	Ī	1 =	_	€	12	8	DATA			7	>	1	LARRE	NESS	WEATHE	BINIC	FRACTI	
-	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	ØF.	l iii	i iii	10	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE)		STRATA SYMBOL	STRATIGRAPHY		HARL	IACOO	WEATHE	NIIVO	PER FO	JUI
DEPTH (FT)	E €	1 5	Ö	16	E (E	ÜÈ	18	5	TEST	CLASSIFICATIONS		18	GR.		see be	low for	see belo	w for	see belo	
F	SE	1 5	1 2	NS WS	3	EX.	¥	×	5			ATA	Ą	ES	valu	Jes	value	s	for value	. 1 #
B	SSS	N. N.	. ¥	Q.	2	NO NO	TOTAL	8	FIELD			T.	5	NOTES	1 2 3	3 4 5	123	4 5	123	4
10	00	00	. 0)	-	-	u. u.	-	IL.	"					2		-			111	7-
Ι.	3.		1.	-						PAVEMENT THICKNESS: Not recorded	0.0	7	FILL	2						
	PAVEMENT THICKNESS: Not recorded FILL A decision of the content																			
Medium dense, brown to dark gray, slightly micaceous, fine to Medium SAND, some Rock														TT	111					
		S1	24 .		27	24/15			0	micaceous, fine to Medium SAND, some Rock	~	\sim				++-				-
١.				15			\perp			Fragments, little Silt (SM / 6-65)	~	~								_
S1 2-4 10 27 24/15 0 Fragments, little Silt (SM / 6-65)																				
Fragments, little Silt (SM / 6-65) Hard to very hard, fresh, fine to coarse grained,														1	92 -	爾				2
-	4	-				1		1		light to dark gray, quartz-mica-garnet SCHIST,		4 .			- T			W -1		1-1-
١.	4						1			very thin, crenulated, horizontal to sub- horizontal foliation, rough to smooth, very	-				能 生态		ی د			1
	2	C1	5-10	1		5/4.5	90	80		closely to moderately closely spaced, horizontal	=	\equiv			10 A					2
-	-				1				1	to sub-horizontal, slightly weathered, iron-oxide stained foliation joints/fractures.										
-	3.5									statried foliation joints/fractures.	=	=						8 -1		1
10-	4									5.8'-6.2': Very hard, fresh, fine to coarse					1					0
10	2.5									grained, white-light gray, PEGMATITE, no apparent foliation joints/fractures.	=	=								1
-			1							apper and remarked journal master as							7			0
-	2,5					1					=	=							10750	
١	2.5						1										6			2
	25									C2: Similar to Schist in C1, except very thin										0
, -		C2	10-18.2			8.2/8.2	100	94		Pegmatite zone.	-									0
15-	3		1								E									
-	3									16.5'-16.8': Cross-foliation joint/fracture, rough, uneven, widely spaced, sub-vertical, slightly								W		0
	2.5		İ							weathered.	=				hi e		1. 1.		33	3
-				1							-				, you					0
-	-			-			-		-			Ξ			2	- P				-
-	2.5										-	-			tir.			33 -48	235	0
	2										-	=		1						2
20 -	2										=	_				4				0
-	-			1							=	=								-
-	2										=				17.16	M		8		0
	2									Similar to Schist in C1, except very thin quartz	=				1					1
	2	C3	18.2-28.2			10/10	100	91		zones.	=				1 00	3			-	0
										24.3'-24.7': Conjugate, cross-foliation		=			. 1		7		200	5
25 -	2									joints/fractures, rough to smooth, sub-vertical,					· D		510			
	2.5		l							slightly weathered, iron-oxide stained, clay coated.	=				1 (4)					0
	3							-			=	=								0
1						1		-			-									0
-	4.5		-								E	≣								
	2.5						1 1				-	_								0
	2.5										E		1	1072						1
30							Ш		\perp											
	RANUL				SIVE S					CORE CHARACTERISTICS		J	DINT/FRACT						THE	
BP 0-		ENSIT			CONSI: Very So	STENCY	1	HARD Ve	NESS ry So		r FT		SPACING/		CKNESS se/Very		ANGLE 0-5		ITUDE zontal	
4-	10 Lc	ose		2-4	Soft		2	Me	edium	2 Severe (2) 1-2			2"-1' Clos	e/Th	in		5-35	Sub-	Horizonta	ıt
10- 30-	-30 Medium Dense 4-8 Med Stiff 3 Med Hard 3 Moderate (3) 3-10 11-3 Mod Close/Mod Thick 35-55 Mod Dipping																			
>5																				
		72 5		>30	Hard				50 %											
NO	ES:						·			·		-								-
1) G	round																			
'\S	round water level not recorded. tratification lines represent approximate boundaries between soil and rock types, transition may be gradual. eld Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a																			
										per million by volume (ppmv).		5011		J	J. 34.110		oquip	,	-	
41 11				506-0																- 1

BORING LOG

Sheet: 2 of 3

DMIMITHARRIS ARUP

SECOND AVENUE SUBWAY **PROJECT**

BORING NO. B72-5 OFFSET: 44.55 COORDINATES: BORING STATION: 1169+31.45 PROJECT NO. CM1188 G. SURF EL. 147.84 NORTH: 219367.5154 EAST: 995868.6411 DATUM: NYCT

L.					71.7			\perp					FINAL E	SORING DEP					
			D: Split Spo								sey Boring and Drilling Co	, Inc.						EADINGS	40 THE
SAN	PLER	HAMM	ER: 140 lb.	Autor	natic					AN: P. Ly			DAT	E TIME	1	DEPTH	CAS	ING ST	AB. TIME
CAS	ING SI	ZE: 3"			:						endes / R. Nunez	•			+-			· ·	
			SPUN							TART: 8/3				-	+				
ROC	K COF	E: NO	Wireline					RE	VIEW	VED BY: C	. Snee DATE: 9/21/0	4			+	_			
		.	_			Î	8	3	1:							INS	SITU PF	ROPERTIES	NUMBER OF
1	\~_	2	SAMPLE DÉPTH (FT)			PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	4				1 _		1				· FRACTURES
	OF	M	Ξ	I X	-	1	1 22	ΙĒ	DATA		CALIDI E DECEDIMINA		8	호		HARD	NESS	WEATHERIN	
-	(BPF) OR (MIN/FT)	Ö	. E	Ιž	1 4	₽ ØE	씵	l iii		BUE	SAMPLE DESCRIPTION RMISTER (USCS / NYC BLDC		Į	₽ A					
DEPTH (FT)	<u>@</u> ≥	SAMPLE / CORE	<u> </u>	BLOWS / 6 INCH	N VALUE (BPF)	öÈ	8	l ö	FIELD TEST		CLASSIFICATIONS		STRATA SYMBOL	STRATIGRAPHY	1	see be		see below fo	or see below &
E	CASING (1 2	1 2	SS	13	\mathbb{\tilde{\tilie}\tilde{\tilde{\tilde{\tilde{\tilde{\tilde{\tilde{\tilde	A P	×	15				A _T	F	ES	vali	ues	values	for values
=	IS S	₹.	₹	. 6	\$	1 20	16	8	교				1 2	2	Ş	123	3 4 5	1234	5 1234 5
ă	00	0	Ŝ	<u></u>	z	2.5	F	~	Œ				S	σ.	Z		and the same of		200
-	0.5										ard, fresh, fine to coarse grain		E	-	1	7.7			0
,	2.5				1		1			dark gr	ay-dark green, quartz-mica-ga T, with very thin, crenulated, h	arnet	==	=					0
	2.5			1			1				rizontal foliation, rough to smo		==	ᅴ		7 × 1			
	2.5					1	1			spaced	, horizontal to sub-horizontal,	slightly	==	_					0
'	2.5	C4	28.2-38.1	1		9.9/9.9	100	100			red, iron-oxide stained, chlori			-1		- 1	建器		0
1 .	2.5	1		1		1			H		n joints/fractures; pyrite; occas hin amphibole Schist zones.	ional very	==	=	1		100		
	2.5									unn to t	min ampribole Schist zones.					, luci		*	1
35 -		1	1			1					4 0 4 0 1 0			_		112-11		第二章	0
1	2.5			1	1		1				d 34.2': Cross-foliation joints/ o smooth, widely spaced, mod			-		3. E			
	2.5				1		1		"		, slightly weathered, chloritize		==					-S	1
Ι.		1			1		.					7.760	= =						1
] .	2.5	<u></u>	٠	_	-	-	 .	<u> </u>	I.I	Very ha	ard, fresh, fine to coarse grain	ed. light to		-	1	5, 8			
	2.5									dark gra	ay, quartz-mica-gamet SCHIS	T, with	E	7					0
Ι.		1					1.			very thi	n, crenulated, slightly convolu	ted,				1			0
40 -	2.5					1					tal to moderately dipping folia oth, moderately to widely space		E	=					
	2.5			l	Ι.						tal to sub-horizontal, slightly v			-		- 43		7	4
Ι.	l a è			l							joints/fractures.		= =	7		C 10			0
	2.5	C5	38.1-46.3	l	1	8.2/8.2	100	92	-				==	7		3.5			1
١.	2,5	~	00.1-10.0	l		0.20.2					0.4' and 40.6': Cross-foliation actures, rough to smooth, irre	nuler very	<u> = =</u>	-		112	100	to Jones &	
	2.5		· .	l.							spaced, moderately dipping,		l= =	-1					, L
	2.5				١.				-		red, calcite, mineralized; pyrite		I	-	11				
45-	2.5			1						44 0'- E	oliation joint/fracture, slickens	ided	==					-4. F	
175	3		X	٠,		12	1			41.0.1	ollation joint macture, shokens			9		4.1			0
1		<u> </u>			-		 	\vdash	\dashv	C6: Sim	ilar to Schist in C5, except no	apparent	1==	-	5				0
١.	2.5						1			foliation	joints/fractures.			-					
	2.5	C6	46.3-49.4			3.1/3.1	100	100					==	-]		1.7			0
'		1 40	40.3-43.4			3.1/3.1	100	100		C7: Sim	ilar to Schist in C5, except no	apparent	==	-					0
-	2	1									joints/fractures; occasional v	ery thin '	1= =	-1	1 1		一類語		
E0.	2.5					44.19				Pegmat	ite zones.		= =		5		36		0
50 -	25	C7	49.4-50.9			1.5/1.5	100	-			3.9': Fracture zone, quartz-mic			-				3/42	4
1 -	2.5				1		\Box				with highly convoluted foliation		==		5				7
-	3_						1				very closely spaced, modera slightly weathered, serecitize						NAME OF THE OWNER, OWNE		-
	2.5										joints/fractures.		737		1	4			0
-			. Destabli								142		(- , -		1.1	+ +		3	0
١.	3									C8: Sim	ilar to Schist in C5, except ve	y closely	==						
	. 3	. 1								. to widely	y spaced; high muscovite mic	a content;	==						0
55 -		·C8	50.9-59.3			8.4/8.4	100	90			nal very thin quartz veins; occ	asional							0
-	3.5							٠		very thir	quartzo-feldspathic zones.		==					¥	
	3.5										.1: Very hard, fresh, fine grain	ned, light							0
-	Ü.,									gray GR	ANOFÉLS.		==	:					1
-	4						-		. [50.9'-60	.7': Fracture zone, rough to si	nooth,		`	1				
	3.5		9							very clos	sely spaced, horizontal to sub	-	==						2
"					-		1		\dashv		al, slightly to moderately wear /cross-foliation joints/fractures		==						0
60-	4		1 4							ionation	ra oss-ronation junts/nactures			<u> </u>		BUT ASSESSED AND	mis-ii		
	RANUL	AR-SC	ILS I	COHE	SIVE S	SOILS		RÒ	ĆK C	ORE CH	ARACTERISTICS			JOINT/FRAC	TURE	CHARA	ACTERI		
		ENSIT	Y . B	PF (CONSI	STENCY	H	IARD			WEATHERING	NO. PER	FT	SPACING					ATTITUDE
0	-4 V	ery Loc	se <	2 '	Very Sc		1		ry So		1 Complete	(1) 0 :				se/Very	Thin	0-5 5-35	Horizontal Sub-Horizontal
		oose			Soft Med Sti	er .	. 3		edium ed Ha		2 Severe 3 Moderate	(2) 1-2 (3) 3-10			se/Th	iin se/Mod '	Thick	35-55	Mod Dipping
	-30 M -50 D				Stiff		4		rd		4 Slight	(4) 11-20	- 1	3'-10' Wie	de/Th	ick		55-85	Sub-Vertical
	50 · V		nse 15	-30	Very St	iff	. 5	Ve	ry Ha	ard	5 Fresh	50 20		>10' Ver	y Wi	de/Very	Thick	85-90	Vertical
			>	30 1	Hard	1					1								

Sheet: 3 of 3 **BORING LOG BORING NO. B72-5** DMJMIHHARRIS · ARUP **BORING STATION: 1169+31.45** OFFSET: 44.55 **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: **PROJECT** NORTH: 219367.5154 G. SURF EL. 147.84 DATUM : NYCT EAST: 995868.6411 FINAL BORING DEPTH (FT) 90.2 GROUND WATER READINGS
ME | DEPTH | CASING | S SAMPLER: 2" O.D. Split Spoon BORING CO: Jersey Boring and Drilling Co., Inc. STAB. TIME SAMPLER HAMMER: 140 lb. Automatic DATE TIME FOREMAN: P. Lynch CASING SIZE: 3" ENGINEER: S. Mendes / R. Nunez DATE START: 8/30/04 DATE END: 8/31/04 CASING HAMMER; SPUN REVIEWED BY: C. Snee DATE: 9/21/04 ROCK CORE: NQ Wireline INSITU PROPERTIES (N/N) 8 8 NUMBER OF DATA **FRACTURES** (BPF) OR (MIN/FT) ROCK CORE ROD SYMBOL HARDNESS WEATHERING PER FOOT SAMPLE / CORE DEPTH / BINCH STRATIGRAPHY PEN/REC: SOIL ROCK (FT/FT) SAMPLE DESCRIPTION BPF) CORE BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS TEST see below for see below for see below VALUE (CASING (STRATA BLOWS / NOTES TOTAL FIELD 1.2345 1 2 3 4 5 1 2 3 4 Similar to Schist in C5, except no apparent 0 foliation joints/fractures; high quartz content. 1 62': Cross-foliation joint/fracture, rough to smooth, widely spaced, moderately dipping, 0 C9 59.3-67.1 9.8/9.8 100 100 0 slightly weathered. 0 0 0 0 Hard, fresh, fine to coarse grained, light to dark gray, quartz-mica-garnet SCHIST, horizontal to sub-horizontal foliation, closely to widely spaced 0 2 foliation joints/fractures. 70 0 0 67.4'-67.7': Very hard, quartzo-feldspathic zone. 0 9.8/9.8 100 96 68.5'-69.9': Clay GOUGE, highly weathered C10 67.1-78.9 0 zone, soil like material. 0 76.6'-76.8': Cross-foliation joints/factures, rough, 75 undulating, moderately dipping, mineralized with calcite, iron-oxide stained and pyrite. 0 1 0 0 0 Hard, fresh, fine to coarse grained, light to dark gray, quartz-mica-granet SCHIST, horizontal to moderated dipping foliation, widely spaced foliation joints/fractures. 0 0 5/5 100 100 78.9-83.9 C11 0 0 1 0 Similar to Schist in C11. 0 84.9': Cross-foliation joint. C12 83.9-90.2 6.3/6.3 100 100 0 0 0 Bottom of borehole at 90.2 feet JOINT/FRACTURE CHARACTERISTICS COHESIVE SOILS ROCK CORE CHARACTERISTICS GRANULAR SOILS ATTITUDE NO. PER FT ANGLE BPF CONSISTENC HARDNESS WEATHERING SPACING/THICKNESS BPF DENSITY (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-5 5-35 Horizontal Very Soft Very close/Very Thin Very Loose Loose <2 2-4 Complete Very Soft Sub-Horizontal 2"-1" Severe Moderate 4-10 -Soft Close/Thin Med Hard Mod Close/Mod Thick 35-55 Mod Dipping 4-8 Med Stiff 10-30 Medium Dense 55-85 Sub-Vertical 30-50 Stiff Hard Slight 3'-10' Wide/Thick Dense Very Wide/Very Thick 85-90 Vertical Very Hard 15-30 Very Stiff >50 Very Dense >30 5) Core barrel became blocked; core bit changed at a depth of 46.3'. 5) Bottom of borehole at 90.2'; borehole grouted upon completion.

										BORING LOG								18	Sheet:	1 of 4	
	-							Ť	_									S NO		2-6	
	DM	MH	HARRIS	o a k A John W	nture	i.i.				SECOND AVENUE SUBWAY		STATION: 1		61.29				:-137.			
ı					(m)	0		1		PROJECT		T NO. CM11 EL. 151,11	88		-	_		21939		2	
					9.0	Second		1		, 1100201	DATUM :							95675			
					1	Subseq		1				DRING DEPT									
SAM	PLER:	2" O.E). Split Sp	oon						CO: Jersey Boring and Drilling., Inc							EADIN	IGS	AD TII	AE	-
			R: 140 lb	. Autor	natic					AN: P. Lynch	DATE Note 1	TIME	1-	EPTH	4	ASI	NG	31/	AB. TI	ME	-
	NG SIZ		SPUN .				<u> </u>			ER: R. Nunez FART: 09/01/04 DATE END: 09/02/04	Note 1		\vdash		+						
_	K COR		SPUN .							ED BY: C. Snee DATE: 9/4/04	1										
				T		Ê	8	2		••				IN.	SITI	J PR	OPER	TIES	_ Nu	MBER	OF
	&E	E NO	H (FT	_		N.	REC (000	DATA	* ** ** *	30.	_		HAR	ONE	ss	WEAT	HERING	FR FI	ACTUR	RES OT
E	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE RQD (%)	TEST D	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	STRATA SYMBOL	STRATIGRAPHY		see b	elow	for		elow for		below	/ œ
ОЕРТН (FT)	SING	PLE	PLE	WS/	ALUE	JAEC CK (F	ALC	X	0.1		RATA	RATE	NOTES		lues	- 1		lues		values	≥
DEP	SSA	SAN	SAN	임	>.	M S S	10	RO S	FIELD				욷	1 2	3 4	5	1 2	3 4 5	11	2 3 4	_ Z
	-	- 0,		+-	-		+	7				FILL	2			П	1:	-			
,-	-									PAVEMENT THICKNESS: Not recorded			3		П	11	11				
_											200				+		++	+++	-+-	111	-
				1.]					Hand augered to a depth of 6 feet prior to	0.00				++					+++	
-	1			1						boring.	332				Ш		1.	111			- 1
-	1			.		1 1															
5-	1			1	1	:			٠.	5 00		ļ			T	TT			TI]
-				1	-		-	<u> </u>	-	Very loose, brown, fine SAND and SILT, trace		SILTY	1		1	++	++	111	++		- 1
		S1	6-8	1	2	24/18				Clayey Silt layers, trace Mica (SM / 8-65)		SAND		$\vdash \vdash$	1-	+1	++	+++	+		-
			0-0	1	1	24/10				Madison deans became fine to people SAND					1		44	4-4-4			- 1
	1		·	2.						Medium dense, brown, fine to coarse SAND trace Silt, trace Gravel, trace Mica (SP-SM 7-65)	CLEAN									
-		S2	8-10	8	1,2	24/17						OAINE			П		1.				
10-		<u> </u>		12	-		-	_	H	Medium dense, gray-brown, fine to medium	0	SAND/	1	11	1	11	+	111	11	i	7 1
		S3	10-12	6	12 .	24/17				SAND and SILT, trace Gravel, trace Clay, trace Mica (SM / 7-65)	, o g	GRAVEL/ SILT					++	+++			-
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15-	1 .	-		-	-			_	-	Medium dense, gray, fine to medium SAND.	~~			H	11	++	1	tttt	11	TT	
		S4	15-17	5	18	24/18				some Silt, trace Clay pockets (SM / 7-65)	~~				1	+	++	+++			-
		34	13-17	7		24770					~~	14			++			444			- 1
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-	1			1						7	~~										
-	1			1						20'-21': Hard, moderately to slightly weathered,	² /2						TI				
20 -	-			100	1				<u> </u>	poorly sub-horizontal foliated, quartz-mica-		ROCK	1			1					10
	3	1.0								amphibole SCHIST, with sub-horizontal, smooth, planar foliation joints/fractures.	==				4			1			-
	3.5			1							==				44	-		4-1-4			5
'	1									 21'-21.5': Moderately to weathered, micaceous SCHIST, and quartz-mica-amphibole SCHIST 	IE E					7					0
-	3									contact zone.	==					1					1
-	3.5	C1	20-28	1	.	8/4.5	56	34		21'-28': Hard, moderately to slightly weathered,	, = =				m	TAN'S		TIT			1
25 -	3.5			1						quartz-mica-garnet SCHIST, with sub-horizonta to moderately dipping foliation, rough,				1750	\$	1				11	-
~	3.5	-:								undulating, closely to moderately closely	ΙΞΞ				200.20	-					0
	4									spaced, sub-horizontal to moderately dipping foliation joints/fractures; smooth, planar, widely	E								- M		0
	1				. •			٠,	1.	spaced, moderately dipping to sub-vertical	==					1727			- 2		0
	3.5			-	<u> </u>		\vdash			cross-foliation joints/fractures. 37': Cross-foliation joints/fractures: moderately	==					1			3.5		0
-	3.5									dipping, slightly to moderately weathered, clay-	= =						3				1
30 -	3.5				1					coated; possibly healed.	_J <u>=</u> =		\sqcup			A	Maria Sta	122.5	- BENTS		
	RANU	LAR S	DILS I	COH	ESIVE S	SOILS T		R	OCK	CORE CHARACTERISTICS		IOINT/FRAC	rur	E CHA	RAC	TERIS					
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10	-30 M	<i>l</i> edium	Dense	4-8	Med.SI	ift	. 3	M	ed H	ard 3 Moderate (3) 3-	10		d Ck	se/Mo	d Thi	ck			Mod Dij Sub-Ver		
		ense ery De	nse		Stiff Very S	tiff	5		ard ery H	4 Slight (4) 11- ard 5 Fresh	20			nick ide∕Ver	y Th	ick			Vertical		
ĺ	۰ س	21,5 00			Hard		,	•	.,,												
110	TCO:															-+-					
11	TES: Ground	water	level not re	ecorded																	
ור '	Stratific	ation li	nes repres	ent app	roximat	vels are ref	erenc	ed to	a be	nd rock types, transition may be gradual. nzene standard measured in the head space of se	aled soil sa	mple jars usi	ng a	n organ	ic va	apor n	neter e	quipped	d with a	1	
p	hotoio	nization	detector (PID) an	d a 10.6	SeV lamp. R	esults	are	n pa	ts per million by volume (ppmv).											
۱ '																					

BORING LOG Sheet: 2 of 4 DMIMILIFIARRIS - ARUP **BORING NO. B72-6 BORING STATION: 1168+61.29** OFFSET: -137.02 **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL. 151.11 NORTH: 219394.1462 DATUM: NYCT EAST: 995675.8208 FINAL BORING DEPTH (FT) 92.9 SAMPLER: 2". O.D. Split Spoon BORING CO: Jersey Boring and Drilling., Inc. **GROUND WATER READINGS** SAMPLER HAMMER: 140 lb. Automatic FOREMAN: P. Lynch TIME | DEPTH | CASING DATE STAB. TIME CASING SIZE: 2" ENGINEER: R. Nunez CASING HAMMER: SPUN DATE START: 09/01/04 DATE END: 09/02/04 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 9/4/04 (IN/IN) REC (%) % INSITU PROPERTIES E SAMPLE / CORE NO NUMBER OF (BPF) OR (MIN/FT) DATA ROD FRACTURES DEPTH (SYMBOL BLOWS / 6 INCH PEN/REC: SOIL (ROCK (FT/FT) HARDNESS WEATHERING STRATIGRAPHY (BPF) SAMPLE DESCRIPTION PER FOOT CORE CORE BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS TEST N VALUE (CASING (I see below fo SAMPLE see below NUMBER STRATA TOTAL FIELD 1 values values for values ROCK 1 2 3 4 5 1 2 3 0 Hard, fresh to slightly weathered, medium to 0 4.5 coarse grained, gray, quartz-mica-garnet SCHIST, sub-horizontall foliation, weathered C2 28-37.2 9.2/9.2 100 75 0 1 29'-30.0': Quartzo-feldspathic zone. 3 4.5 35 8 4 4 2 Hard to very hard, fresh to slightly weathered to fresh, fine to coarse grained, quartz-mica-garnet SCHIST, moderately dipping foliation, smooth, closely widely spaced, slightly weathered 0 40 2 3 0 ioints/fractures. C3 37.2-47.2 10/10 100 89 0 38.1': Moderately weathered foliation joint/fracture, rough, undulating. 45 0 0 0 Hard, fresh, fine grained, gray, quartz-mica-gamet SCHIST, moderately dipping foliation, closely spaced, no apparent joints/fractures. 0 C4 47.2-52.2 5/5 100 100 0 50 0 0 0 Hard, fresh, fine to coarse grained, quartz-1 gamet-mica SCHIST, sub-horizontal to moderately dipping, very widely spaced, rough, moderately dipping foliation joints/fractures. 0 0 61.2'-61.7': Hard, light gray, fresh, quartzo-felspathic zone, with faint, relic foliation. 0 C5 52.2-62.4 10.4/10.4 100 100 0 0

⁴⁾ Lost water return 37.2'.

⁵⁾ RQD affected by sub-vertical joint/fracture between 81'-81.7'.

⁶⁾ Bottom of borehole at 92.9'; borehole left open for ATV to be performed at a future date.

Sheet: 3 of 4 **BORING LOG BORING NO. B72-6** DMJM#HARRIS ARUP BORING STATION: 1168+61.29 OFFSET: -137.02 SECOND AVENUE SUBWAY COORDINATES: PROJECT NO. CM1188 **PROJECT** G. SURF EL. 151.11 NORTH: 219394.1462 DATUM: NYCT EAST: 995675.8208 FINAL BORING DEPTH (FT) 92.9 GROUND WATER READINGS
TIME | DEPTH | CASING | S SAMPLER: 2" O.D. Split Spoon BORING CO: Jersey Boring and Drilling., Inc. STAB. TIME FOREMAN: P. Lynch SAMPLER HAMMER: 140 lb. Automatic ENGINEER: R. Nunez CASING SIZE: 2"
CASING HAMMER: SPUN DATE END: 09/02/04 DATE START: 09/01/04 REVIEWED BY: C. Snee DATE: 9/4/04 ROCK CORE: NO INSITU PROPERTIES TOTAL CORE REC (%) 8 NUMBER OF E FRACTURES PER FOOT DATA (BPF) OR (MIN/FT) ROCK CORÉ ROD STRATA SYMBOL HARDNESS WEATHERING STRATIGRAPHY SAMPLE / CORE SAMPLE DEPTH PEN/REC: SOIL (ROCK (FT/FT) SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS BLOWS / 6 INCH N VALUE (BPF) see below CASING (values values for values 2 3 4 2 3 4 5 1 3.5 1 0 0 3.5 0 Similar to Schist in C5 except, gray, mica Schist, sub-vertical foliation, closely to widely spaced, slightly weathered joints/fractures. 0 2 3.5 0 9.9/9.9 98 98 62.4-72.3 63.2': High quartz content. C6 1 0 0 3.5 0 0 0 0 3.5 1 Similar to Schist in C6. 0 0 10/10 100 92 72.3-82.3 C7 81'-81.7': Cross-foliation joint/fracture: rough, 0 undulating, sub-vertical, slightly clay-coated, chloritized, serecitized. 0 0 5 6 1 0 Hard, fresh, fine to coarse grained, gray, mica-1 SCHIST, horizontal to moderately dipping foliation, closely to widely spaced foliation 85 0 ioints/fractures. 0 90'-90.3': High quartz content. 1 C8 82.3-92.9 10.6/10.6 100 98 1 0 JOINT/FRACTURE CHARACTERISTICS ROCK CORE CHARACTERISTICS GRANULAR SOILS COHESIVE SOILS ATTITUDE NO. PER FT HARDNESS WEATHERING SPACING/THICKNESS CONSISTENC BPF BPF DENSITY 0-5 5-35 35-55 (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Very close/Very Thin Close/Thin Horizontal Very Soft Soft Very Soft Medium <2 2-4 Complete Very Loose 2"-1" 1'-3" 4-10 10-30 Loose Medium Dense Mod Close/Mod Thick Mod Dipping 4-8 8-15 Med Stiff Stiff Moderate Med Hard 3 Slight 3'-10' Wide/Thick 30-50 Dense Very Wide/Very Thick Vertical 15-30 Fresh Very Dense Very Hard 5 Hard 4) Lost water return 37.2'.

⁵⁾ RQD affected by sub-vertical joint/fracture between 81*-81.7'.

3) Bottom of borehole at 92.9'; borehole left open for ATV to be performed at a future date.

BORING LOG Sheet: 4 of 4 **BORING NO. B72-6** DMJM#HARRIS ARUP **BORING STATION: 1168+61.29** OFFSET: -137.02 **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL. 151.11 NORTH: 219394.1462 DATUM: NYCT EAST: 995675.8208 FINAL BORING DEPTH (FT) 92.9 SAMPLER: 2" O.D. Split Spoon BORING CO: Jersey Boring and Drilling., Inc. GROUND WATER READINGS TIME | DEPTH | CASING | S FOREMAN: P. Lynch SAMPLER HAMMER: 140 lb. Automatic DATE STAB. TIME CASING SIZE: 2" ENGINEER: R. Nunez CASING HAMMER: SPUN DATE START: 09/01/04 DATE END: 09/02/04 ROCK CORE: NO REVIEWED BY: C, Snee DATE: 9/4/04 (IN/IN) % 8 INSITU PROPERTIES 8 SAMPLE DEPTH (FT) NUMBER OF TOTAL CORE REC (ROCK CORE ROD DATA CASING (BPF) OR CORING (MIN/FT) FRACTURES PER FOOT SAMPLE / CORE STRATA SYMBOL PEN/REC: SOIL (ROCK (FT/FT) BLOWS / 6'INCH STRATIGRAPHY HARDNESS WEATHERING SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS (BPF) TEST see below for see below for N VALUE NUMBER FIELD 1 values NOTES values for values 1 2 3 4 5 2 0 0 Bottom of borehole at 92.9 feet 1 95 105 10 15 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS DENSITY RPF RPF CONSISTENCY HARDNESS WEATHERING ATTITUDE NO. PER FT SPACING/THICKNESS ANGLE (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Very Loose Very Soft Medium Med Hard Very Soft Complete Severe 0-5 5-35 35-55 Very close/Very Thin Horizontal 4-10 Loose 2-4 4-8 Soft 2"-1' 1'-3' Close/Thin Sub-Horizontal Med Stiff Stiff Very Stiff Mèdium Dense Moderate Mod Dipping Mod Close/Mod Thick 8-15 15-30 30-50 Dense Hard Slight 55-85 3'-10' Wide/Thick Sub-Vertical Very Dense Very Hard 5

Fresh

>30 Hard Vertical

Very Wide/Very Thick

⁴⁾ Loss water return 37.2.
5) ROD affected by sub-vertical joint/fracture between 81*-81.7'.
6) Bottom of borehole at 92.9'; borehole left open for ATV to be performed at a future date.

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CARAT	DI ED.	" O D	. Split Spo	200				BOI	RING	CO: Jerse	ey Boring and Drilling Corp).		GF				READINGS		
			R: 140 lb (natic)	-				N: Peter I			DATE		1_	DEPTH			TAB. TIME Hrs. 10 Min	
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Ŧ	SAMPLE / CORE NO. SAMPLE DEPTH (FT) BLOWS / 6: INCH N VALUE (BPF) PENIREC: SOIL (IN/IN)							X	9				[₹		NOTES	4				4 5
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-				1	1	ļ				moderat	ely dipping foliation, rough to	smooth,								0
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	3	C1	7.0-11.8	1	1	4.8/4.8	100	88	-	to mode	rately dipping, slightly weathe	red, iron-					- 12 M			
10								l			ained, clay coated foliation		==			A Co		《 集集》		3
-	3							1		joints/fra	ictures. I.O Cross-foliation joint/fractur	e rough	==					360	20	1
	,				1		-	-		to smoot	th, sub-vertical, slightly weath	ered,							}- ##	+++
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' _	3															in the same		1. 1. 1.		1
	2		1			1		1		00:11	hard leach fine to ename as	ained	==			4				+
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15-	3						1	1		with ven	thin crenulated, sub-horizon	ital				19.7				2
13	2.5						1	1		foliation	rough to smooth, with moder	ately	==			-	-		-	
-	4.5		1			1				closely t	o widely spaced, sub-horizoni	al, slightly				77.7	1			0
_	2.5	C2	11.8-21.8			10.0/10.0	100	95	-		ed, slightly iron-oxide stained	idilation	_ =							0
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1 -	2.5						1			loints/fra	ctures, rough, irregular, mode	rately	==		1	美国				3
							1		1	closely t	o widely spaced, moderately of	ipping to		1		A T				3
20 -	3									sub-vert	ical, slightly weathered.		==				1			0
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1	2.5		1	1	1					moderat	ely dipping, slightly weathered actures; occasional very thin q	uartz	==				-			-
25 -				1						joints/tra veins.	ictores, occasionar very trilli q		==							1
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	2.5 C3 21.8-31.5 9.7/9.7							100	-	31.4': Cr	ross-foliation joint/fracture, rou	igh, widely	/							+++
	120 00 1200									spaced,	moderately dipping, slightly w	reatnered.				4			2 8	0
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(-4 · V	ery Lo		<2 .	Very S		1	.V	ery S	oft	1 · Complete	(1) 0 (2) 1-2	ſ		y clo se/Ti		1 (III)	5-35	Sub-Horiz	
	4-10 Loose 2-4 Soft 10-30 Medium Dense 4-8 Med Stiff 30-50 Dense 8-15 Stiff								lediur led H		2 Severe 3 Moderate	(3) 3-1				se/Mod	Thick	35-55	Mod Dipp	ing
	30-50 Dense 8-15 Stiff								ard	0.0	4 Slight	(4) 11-2	20	3'-10' Wid	le/TI	hick		55-85	Sub-Vertic	al
	30-50 Dense 8-15 Stiff						5		ery H	ard	6 Fresh	350.00		>10' Ver	y W	ide/Very	Thick	85-90	Vertical	- 1
1	>50 Very Dense . 15-30 Very Stiff																			

NOTES:

1)Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.

2)Stratification times represent approximate boundaries between soil and rock types, transition may be gradual.

5)Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) Observed drilling fluid loss throughout borehole.

BORING LOG Sheet: 2 of 4 **BORING NO. B72-7** DMIMESHARRIS - ARUP BORING STATION: **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL. NORTH: DATUM FINAL BORING DEPTH (FT) 107.0 BORING CO: Jersey Boring and Drilling Corp. GROUND WATER READINGS TIME | DEPTH | CASING | S SAMPLER: 2" O.D. Split Spoon SAMPLER HAMMER: 140 lb (Automatic) FOREMAN: Peter Lynch STAB. TIME DATE ENGINEER: Sara Rocha CASING SIZE: 3" CASING HAMMER: N/A DATE END: 05/18/05 DATE START: 05/17/05 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 11/14/05 INSITU PROPERTIES 8 % E NUMBER OF RQD (DATA CORE REC 8 FRACTURES DEPTH (CORE STRATA SYMBOL SOIL BLOWS / 6 INCH **HARDNESS** WEATHERING PER FOOT (BPF) (BPF) ROCK CORE SAMPLE DESCRIPTION E FIELD TEST PEN/REC: see below for see below for CASING (SAMPLE N VALUE SAMPLE DEPTH (for values TOTAL values values N 2 3 4 5 1 2 3 Similar to Schist in C3 except with highly 0 2.5 crenulated, horizontal to moderately dipping 0 2.5 0 2.5 36.4': Cross-foliation joint/fracture, sub-vertical, quartz healed joints/fractures. 0 2.5 C4 31.5-37.8 6.3/6.3 100 100 35 0 2.5 1 0 Similar to Schist in C3 except with very closely to widely spaced, chlorite stained foliation. 2 2.5 joints/fractures, high mica content. Ξ 0 40 38.8' - 41.0': Light gray, poorly foliated. 2 46.8': 47.1' - 47.4': Cross-foliation joints/fractures, rough to smooth, closely spaced, moderately dipping to sub-vertical, slightly weathered, chloritized, weakly healed, 0 0 2.5 C5 37.8-47.6 9.8/9.8 100 94 partially calcite coated. 0 2.5 45 2.5 1 2.5 Similar to Schist in C3 except with very closely to widely spaced foliation joints/fractures; occasional thin granofels zones; pyrite; 2 0 occasional very thin quartz veins. Ö 2.5 50 47.7": Cross-foliation joint/fracture, rough, 2 2.5 irregular, moderately dipping, slightly weathered, chlonitzed, pyrite. 0 C6 47.6-57.1 9.5/9.5 100 99 0 0 5 0 55 0 0 2.5 0 0 0 60 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS CONSISTENCY DENSITY HARDNESS WEATHERING NO. PER F ANGLE ATTITUDE SPACING/THICKNESS (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 <2 2-4 Very Soft Soft Very Soft Medium 0-4 Very Loose Complete Very close/Very Thin Horizontal 4-10 Loose -1' 5-35 Severe Close/Thin Sub-Horizontal

5) No water return- slight water return at approximately 56'.

15-30

4-8 Med Stiff 8-15 Stiff

Very Stiff

6) Core barrel blocked and jammed.

Medium Dense

Very Dense

Dense

10-30

30-50

>50

3

Med Hard

Very Hard

Hard

3

5

Moderate

Slight

35-55

55-85

Mod Dipping

Sub-Vertical

'-3' '-10'

Mod Close/Mod Thick

Very Wide/Very Thick

Wide/Thick

⁷⁾ Bottom of borehole at 107.0'; acoustic televiewer survey performed; borehole grouted upon completion.

ſ.										BORING LOG							S	Sheet: 3 of 4
-								Т								BOR	ING NO	. B72-7
	D	MIM	HARRE	SAR	UP	110						BORING S	STATION:	-			FSET:	
1	20.44	CONTRACTOR		CATACANA DA	STREET, STREET			1	S	ECOND AVENUE SUBWA'	(PROJECT	NO. CM11	88		CO	ORDINATES	3:
					978					PROJECT		G. SURF				NO	RTH:	
					7	Assessed						DATUM				EA	ST:	
													RING DEPT	H (F	T), 107.0)		
CAM	DI ED:	2" 0 [). Split Spo	200				BO	RING	CO: Jersey Boring and Drilling	Corp.		· GR				ADINGS	
			R: 140 lb (,		_		AN: Peter Lynch		DATE	TIME	D	EPTH	CASIN	IG STA	AB. TIME
	NG SIZ	_	-140 ID	Auton	latic ₄					ER: Sara Rocha								
	NG HA		: N/A			,				TART: 05/17/05 DATE END:	05/18/05			Ŀ				
	K COR							RE	VIEV	/ED BY: C. Snee DATE: 11/1	4/05	<u> </u>		_				
		Ι.				Î	8	10				.			· INS	ITU PRO	PERTIES	NUMBER OF
	F) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	NG.	PF)	PEN/REC: SOIL (IN/IN)	CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA			STRATA SYMBOL	УЬНУ		HARDI	NESS V	VEATHERING	FRACTURES
Ē	CASING (BPF)	LE/O	LE DE	BLOWS / 6 INCH	N VALUE (BPF)	EC: S	L COR	COR	TEST	SAMPLE DESCRIPTION)N	TAS	STRATIGRAPHY	S	see belo		see below for values	see below for values
ОЕРТН (FT)	CASIN	SAMP	SAMP	BLOW	N VA	PENA	TOTAL	ROCK	FELD	•		STRA	STRA	NOTES	1 2 3	4 5	1 2 3 4 5	1 2 3 4
<u> </u>	2.5			-	-		\vdash			C7-Cimites to Sebiet in C2		E		П				0
-		1				1	1	1.		C7:Similar to Schist in C3.								0
	3	C7	57.1-67.3			10.2/10.2	100	100		65.7' - 66.5': Very hard, fresh, fine							(6.7	0
1	2.5	0,	.51.1-01.3			10.210.2	1.00	1.00		grained, dark green-black, mica-a	mphibole					数 - 1		
-		١.		1						SCHIST, with very thin, horizontal horizontal foliation, rough, horizon	to sub-	==						0
- 1	2.5					'	1			weathered foliation joints/fractures	; high gamet	==						0
65 -	2.5			1			1	-		content; occasional very thin quar	z veins.						# -	
100	2				1			-				==			- 4			0
~		ì					1											1
-	2.5					<u> </u>				0		==			20			0
	3			T		T				Similar to Schist in C3 except with closely to widely spaced foliation	moderatery					38 -3		
-		1					1			joints/fractures; occasional very th		==						0
-	2.5									veins; occasional very thin phlogo								0
70-	3									(amphibole) zones; high gamet co content; occasional feldspathic zo	ntent; mica	==						A Section 1
70 -	,					-				Content, occasioner reluspative 20		==						1
ļ	3					1	1			70.5'; 71.2'; 72.5'; 77.0': Cross-fol	ation							1
١.	3								i	joints/fracture, rough to smooth, c	osely to	==			4-3-2			
	,	C8	67.3-77.5			10.2/10.2	100	100		widely spaced, moderately dipping vertical, slightly weathered, chlorid						24		1
-	-8-						1			mineralized.		==					3	0
_	3																	
1	3	}			1							= =						1
75 -										,		= =						0
-	2.5											= =				图-图		2
	2.5						١.			-		. = =			· /		6 PM	2
1 -		<u> </u>		-			-	_	_	Very hard, fresh, fine to coarse gra	ined. light to	==			LZ.			. 0
-	3						1	- 1		. dark gray, quartz-mica-gamet SCI	IIST, with	==						0
١.	2.5						1		1	very thin, horizontal to sub-vertica	foliation,	1 7			**************************************	- 19		- Carrier -
	3						1			rough to smooth, with closely to w sub-horizontal to sub-vertical, slig	dely spaced, ally					38 周	1.0	2
80 -	3	1					1			weathered, chloritized, talcified fol	ation							0
1 :	3					-				joints/fractures; occasional thin qu	artzo-	==				18一定		200123
	2	C9	77.5-85.9	1.		8.4/8.4	100	95		feldspathic zones; occasional very	thin ·	==						2
-	-	09	11,5-05.9			0.40.4	1.00	"		amphibole schist zone. 82.5' - 84.0': High quartz content.		= =						1
-	2.5									85.0'; 85.7': Cross-foliation joints/		==		#	ng i v	77 8		
	2.5							i		rough to smooth, horizontal to mo	lerately	= =	100			翼隊		0
-										dipping, slightly weathered.		$\equiv \equiv$						1
85 -	3									G (M) 1						二 [6		4
	4_			-				_	_	Similar to Schist in C3 except with	very closely	==			7	33-8	_	- CONTRACTOR -
1 -										to moderately closely spaced, chic				6				2
-	5	C10	85.9-87.7	1		1.8/1.8	100	.78		talcified foliation joints/fractures.						2		3
-	4			+	_		1	_		86.5' - 86.8': Healed joints/fracture	٥.	===	- 1	6		2 - 2		
	3									C11:Similar to Schist in C3 excep	with			Ĭ		** B		1
-	3					2000	1400	-		chloritized, talcified foliation joints	fractures,	==						0
90 -	3	C11	87.7-91.3			3.6/3.6	100	64	-	high mica content.						2	ts versional	- FSE
	RANU	AD C	DILS T	COHE	SIVE S	SOILS 1		RC	CK	CORE CHARACTERISTICS		· J(DINT/FRACT	URE	CHARA	CTERIS		
		ENSIT				STENCY	. 1	HARD			NO. PE	RFT	SPACING/T	HIC	KNESS		ANGLE	ATTITUDE
		ery Lo		<2	Very S		1	.V	ery.S	oft. 1 Complete	(1) 0				/Very Th	in		Horizontal Sub-Horizontal
4-	10 L	oose		2-4	Soft		2	M	ediu	n 2 Severe	(2) 1-2		"-1' Close,		/Mod Th	ick		Mod Dipping
		ledium			Med St Stiff	III	3		ed H ard	erd 3 Moderate 4 Slight	(3) 3-10		-3 Mod (55-85	Sub-Vertical
		ense ery De		5-30 1		iff	5		ery H		,,,,.,				Very Th	ick	85-90	Vertical ·
					Hard													
5) No water return- slight water return at approximately 56'.																		
5) (No wate	er retur arrel blo	n- slight wat ocked and ja	er retur	n at ap	proximately	/ 56¹.											

BORING LOG Sheet: 4 of 4 CMIMESHARRIS ARUP **BORING NO. B72-7** BORING STATION: OFFSET **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL NORTH: DATUM FINAL BORING DEPTH (FT) 107.0 SAMPLER: 2" O.D. Split Spoon BORING CO: Jersey Boring and Drilling Corp. **GROUND WATER READINGS** SAMPLER HAMMER: 140 lb (Automatic) FOREMAN: Peter Lynch DEPTH CASING STAB. TIME CASING SIZE: 3" ENGINEER: Sara Rocha CASING HAMMER: N/A DATE START: 05/17/05 DATE END: 05/18/05 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 11/14/05 SOIL (IN/IN) ROCK CORE RQD (%) INSITU PROPERTIES Š F NUMBER OF TOTAL CORE REC 8 DATA CORE FRACTURES PER FOOT DEPTH STRATA SYMBOL (BPF) STRATIGRAPHY HARDNESS WEATHERING (BPF) E SAMPLE DESCRIPTION 9/ TEST SAMPLE / PEN/REC: see below for values CASING N VALUE see below for see below to BLOWS NUMBER values 12345 1 2 3 4 5 1 2 3 89.0': Cross-foliation joint/fracture, rough to smooth, irregular, moderately dipping, slightly 10 weathered, quartz coated. 8 6 90.0' - 92.0'; Fracture zone, rough to smooth, C12 91.3-93.8 2.5/2.5 100 76 3 sub-horizontal to vertical, slightly to moderately weathered, chloritized, talcified, silicate, clay 2 coated/mylonite; slightly slickensided, gamet nch foliation cross-foliation joints/fractures (Few 0 0 healed joints/fractures within zone). 2.5 0 C12: Similar to Schist in C?. 91.8' - 92.4': Healed sub-vertical joints/fractures. 3 2.5 C13 93.8-101.7 7.9/7.9 100 100 0 C13: Very hard, fresh, fine to coarse grained, light to dark gray, quartz-mica-garnet SCHIST, with very thin, crenulated, horizontal to 0 3 moderately dipping follation, no apparent foliation joints/fractures. 96.6' - 100.0': Cross-foliation joints/fractures, rough to smooth, irregular, slightly weathered, chloritized, slightly iron-oxide stained, slightly 1 3 0 0 slickensided. 0 94.5'-95': 96.6'-97.3': 99'-99.5': 101.4'-101.7': Healed sub-vertical to vertical joints/fractures. 101.7-107.0 C14 5.3/5.3 100 100 C14: Similar to Schist in C13. 102.5' - 103.6': Very hard, fresh, coarse grained. light gray to white, quartzo-feldspathic-garnet SCHIST. 0 Bottom of borehole at 107.0 feet 10 15 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS DENSITY CONSISTENCY HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE 0-4 Very Loose Loose <2 2-4 Very Soft Soft

(1) 0 (2) 1-2

(3) .3-10 (4) 11-20

Complete

Moderate

Fresh

4

Very close/Very Thin Close/Thin

Mod Close/Mod Thick

Very Wide/Very Thick

Wide/Thick

'-3'

.10

No water return- slight water return at approximately 56'.

4-8 8-15

15-30

Med Stiff Stiff

Very Stiff

Medium Dense

Very Dense

Dense

4-10

10-30

>50

6) Core barrel blocked and jammed.
7) Bottom of borehole at 107.0; acoustic televiewer survey performed; borehole grouted upon completion.

Very Soft

Med Hard

Very Hard

Medium

Hard

5-35

35-55

55-85

Horizontal

Sub-Horizontal

Mod Dipping

Sub-Vertical

											BORING LOG								Sheet: 1 of 4	
								Т									во	RING N	D. B72-8	
	C	MIN	HARRES	AR	UP 1	1.0.							BORING	STATION:	1169	+33.05		OFFSET: 52.		
	mona		BOMESTIC PARTICIPATION	CHEST AND		170		1	S		AVENUE SUBWAY			NO. CM				COORDINATE		
					ALE.	2000		1		P	ROJECT			EL. 148.1	5			NORTH: 2193		$\overline{}$
					236	Salamoy							DATUM;		TH /E	T\ 106		EAST: 99584	4.376	\neg
								1.			- 1 10 10 0		FINAL BC	RING DEF				READINGS		\neg
			. Split Spoo		•			_	_		ey Boring and Drilling Cor	р.	DATE			DEPTH			AB. TIME	\neg
			R: 140 lb (A	utom	atic)		-			AN: Peter ER: Sara			06/22/05		- 1 -	10.8	5		Hrs 45 Min	
	NG SIZ		: N/A (Spun							TART: 06/2		22/05			\top					
	K CORE		· N/A (Spuri		<u> </u>					ED BY: C.		5								
1.00	I		٠.	1		9	18	3								INS	SITU PE	ROPERTIES	NUMBER	ROF
	~	9	E		1	1 ₹	ö	0	<				ایا						FRACTU	RES
	Ö	- E	Ξ	픙	F.	٦	2	2	DATA	ŀ	***		8	Ě	1	HARD	NESS	WEATHERIN	NG PER FO	IOT
-	E	Ö	Ġ.	BLOWS / 6 INCH	PP PP	PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE RaD (%)	F		SAMPLE DESCRIPTION		STRATA SYMBOL	STRATIGRAPHY		see bel	lau for	see below f	or see below	V ~
Ē	8	E/	Ш	9/8	Ĭ,		8	8	TEST				Ĭ.	밑	S			values	for values	
Ŧ	Z I	귤.	AP.	Š	\f	N N	Ιĕ	X	9				[₹	≱	NOTES				5 1234	3
DEPTH (FT)	CASING (BPF) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	1 2	N VALUE (BPF)	Į.	9	8	FIELD					ST	ž	1 2 3	4 5	1 2 3 4	1 2 3 4	Ž
	-			-	 -		1							FILL	1					
_	4*. Spun			1						PAVEM	ENT THICKNESS: 6" (Concrete			2			HIII		
,	opu						<u></u>						000				. -			
-	1 1	S1	2-2	50\0°	50/0	-			-	NO REC	COVERY		~~	DEC ROC	K 3					_
-							T						~~							
_													\simeq	ROCK	\dashv		-11:			7
	111				-						to the state of the first time		$\equiv \equiv$		-	9200500			32030343	+
5-	20						Γ.			coarse o	very hard, fresh to slightly we grained, light to dark gray, qua	artz-mica-								5
-	2.5									· garnet S	CHIST, with very thin, horizon	ntal to	==							6
٠,	2		,	'						moderat	ely dipping foliation, rough to close to closely spaced, hor	smooth,								3
	2	C1	5-10.1		. •	5.1/5.1	100	68	-	moderat	ely dipping, slightly weathere	d, slight to	==		- 1					-
-										heavy in	on-oxide stained, clay coated					, R				4
				1						kaolinize	ed foliation joints/fractures.		==							1
10 ÷	2			_			1	_	_	Similar t	o Schist in C1.		- = =							6
	2			1	:					12.7': C	ross-foliation joint/fracture, tru	ncated,	==							-
				1						sub-vert	ical, slightly weathered, serec	itized,								2
-	-									12.6'-13	.3': Cross-foliation joints/fract	ures, some	$\equiv \equiv$			000				2
٠ -	2					60/60	100	60		healed.	sub-parrallel, rough to smooth	n, sub	= -			16.35	-			4
	2	C2	10.1-16.4			6.3/6.3	100	80		vertical, serecitiz	slightly weathered, iron-oxide	staineo,			- 1	10.00			- 100	-H
							-			14 6'-15	11. Cross-foliation joints/fract	ure, rough,		,	١.	李				6
15 -		٠, .								vertical,	slightly weathered, fron-oxide slightly pitted.	stained,	==		4		1	2.5	F 916	1
	3								L	16,2'-16	.6': Very hard, fresh, fine grain		==		7				基整	6
_	2.5.	. ,			-				-	green-bl	ack, amphibole-mica SCHIST nal very thin garnet concentra	tion	==			.	38 -			_
	1,			1						occasion	ai very inin gamei concentra	uoi.	==							2
-													==			, X				1
-	2	СЗ	16.4-21.8			5.4/5.4	100	87	-	C3: 16 6	'-21.8': Similar to Schist in C1	. except	==							2
20 -	2									with ven	closely to moderately closely	y spaced	==			e de				1
20	2										joints/fractures; occasional ve eins; occasional very thin gar		==							-
-										concent	rations.		==			25.5				0
-				Г						19.1'-19	.7': Cross-foliation joints/fract	ures,	==			44				-
-	2.5									rough, s	ub-vertical, slightly to modera ed, irregular, serecitized.	lely	==			30				
	3				1					16.4'-16	.6': Fracture zone, rough to si	nooth,	==						38	H
-				1						sub-hori	zontal to vertical, slightly wea lation joints/fractures.	tnered,				2.53	N. C.			0
25 -	3									cross to	iation joints/fractures.		$\equiv \equiv$			3,000				0
-	2							1					==					1		0
	3	C4	21.8-31.7			9.9/9.9	100	100	-	C4: Simi	lar to Schist in C1, except slig ed, moderately closely to wide	htly	==						- Best -	-
		٠,	2110 0111							spaced.	slightly weathered foliation	siy								2
-	3									ioints/fra	ctures: occasional very thin o	uartz								0
-	2									veins; or zones.	ccasional very thin amphibole	SCHIST							3	0
20-	2									20100.			三三		,					
30 -		45.0	DW.C. 1	CC: 15	Chr.	OIL S. I.	_		CC	COPECI	ARACTERISTICS .			IOINT/FRA	CTUF	E CHAR	ACTER	RISTICS	-	
	PF D	AR SO			CONSI	STENCY	•	HAR			WEATHERING	NO. PE		SPACING	3/THI	CKNESS		ANGLE	ATTITUDE	
		ery Lo	ose	<2 1	Very S	oft ·	- 1	· V	ery S	oft	1 Complete	(1) 0			y clos	e/Very Ti	hin	0-5 5-35	Horizontal Sub-Horizonta	.
4	-10 L	oose	2		Soft -		2		lediu led H		2 Severe 3 Moderate	(2) 1-2 (3) 3-1				in se/Mod T	hick	35-55	Mod Dipping	
	10-30 Medium Dense								ard		4 Slight	(4) 11-2	20	3'-10' Wi	de/Th	ick			Sub-Vertical Vertical	
	30-50 Dense 8-15 Stiff								ery F	lard	5 Fresh			>10' Ve	ry Wid	le/Very T	IIICK	85-90	A EL MOSI	
									_											1

NOTES:
1)Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.
1)Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
1)Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

⁴⁾ Core barrel became blocked; possible very thin Silt/Clay vein.

BORING LOG

Sheet: 2 of 4

DMIMESHARRIS - ARUP

SECOND AVENUE SUBWAY PROJECT

BORING NO. B72-8

OFFSET: 52.14

COORDINATES: BORING STATION: 1169+33.05 PROJECT NO. CM1188
G. SURF EL. 148.15 NORTH: 219381.443 DATUM: NYCT EAST: 995844.376

-											FINAL BOF	RING DEPT	H (F	T) 106.	0		
SAI	MPLER	2" O	D. Split Sp.	oon				BC	DRIN	G CO: Jersey Boring and Drilling Corp.		GRO	OUI	ND WA	TER RE	ADINGS	
SAI	MPLER	HAM	MER: 140 lb	(Auto	matic)	:		. F.C	DREM	AN: Peter Lynch	DATE	TIME			CASI		B. TIME
	SING S							EN	IGINI	ER: Sara Rocha		-	1			1	
			R: N/A (Spi	in)						TART: 06/20/05 DATE END: 06/22/05			+				
	CK CO							P	VIEV	VED BY: C. Snee DATE: 11/14/05	+		-				
1.0	1	1	4	T		T _	T			T DATE. 11/14/05		·	-				
1		10	F			PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)			1 1		1	INS	SITU PRO	OPERTIES	
	· œ	2	SAMPLE DEPTH (FT)		1	Z	0	l ŏ	1 <		1				. 1		NUMBER OF FRACTURES
	1.0	1 22	E	공	10	Ĭ,	2	l 8	DATA		0	≥		HARD	NESS I	WEATHERING	PER FOOT
1 ~	. "	1.8	<u> </u>	Ιž	1 0	1 2	"	w	15	SAMPLE DESCRIPTION	. ≥	4					12001
DEPTH (FT)	CASING (BPF) OR	SAMPLE / CORE	ā	BLOWS / 6 INCH	N VALUE (BPF)	. 6	١ã	1 8	TEST	SAMPLE DESCRIPTION	STRATA SYMBOI	STRATIGRAPHY		see be	ow for	see below for	see below ~
I	9	1 3		2	1 5	m	15	0	F		≤	일	S	valu		values	for values
	1 5	≝	1 🖺	18	₹	ž	≰	ď	15		\$.≴	2				8
	1 8	l ⊗	l &	1 3	1 · Z	W W	12	18	FIELD		1 1 1	150	NOTES	1 2 3	4 5	1 2 3 4 5	for values BWO
-	+	+	+	_	1		-	+	+				-	20000	SER I	100 SQ 500 S	DECEMBER 1
	. 2				- [1			27.8'-30.6': Cross-foliation joints/fractures,							1
	T	7		1				1		rough, moderately closely spaced, moderately	==			基础			
1	2	_		1	+		1	+	_	dipping to sub-vertical, slightly weathered.				1, 1			0
	1 2		1.	1	1	1	1		1	30.3'-30.6': Healed sub-vertical joint/fracture.	= =						1
	13	1			1			1		C5: Very hard, fresh, fine to coarse grained,						_	
1	2		1		1	1		1	1	light to dark gray, quartz-mica-gamet SCHIST,		į			FX4		1
1	T	1						1	1	with very thin, slightly crenulated, horizontal to				7.			
35-	3.5	1				1		1	1	moderately dipping foliation, rough to smooth,				7.		7	1
150	1.	1	1	1			1	1		with moderately closely to widely spaced, sub-							
1.	3_	1.		1				1	1	horizontal, slightly weathered foliation		ĺ				13.	1
	3	C5	31.7-40.9	1	1	9.2/9.2	100	100	-	joints/fractures, occasional very thin quartz veins; occasional very thin amphibole Schist.		1		2.			1.
	1.	1		1 .			1.	1	1	zones, occasional very high garnet	= =			46.0			
1	4	1		1	1			1		concentrations.		1					0
}	1.		1 .	1			1	1	1	34.4'-34.9': Cross-foliation joint/fracture, rough,	==	I		71 7 A		1. Sec. 1. 1. 1.	
	4	1	1.0	1						sub-vertical, slightly weathered, chloritized,				7.75	333-4		0
1	14	1		1	1	1				epidote, clay coated.		- 1					0
40 -	1	1	1	1	1							- 1				2.50	Assi I
1 .	5.5	5.5							_	CC. Similar to Sobiet in CE assessment and a		- 1		3.7	24		1
				- [C6: Similar to Schist in C5, except very closely to moderately closely spaced, foliation				4	1		
	3.5	ł		1	1					joints/fractures.				*	開		0
	4.5									jointainactures.				2.7		4.4	2
	1	1		1		1	1	1				1		/		1000	
Ι.	3.5	C6	40.9-46.7	1		5.8/5.8	100	93	t - I			}	٠ ا				1
	2.5			1						a second of the second			- 1	11			
45~	2.0	1		-				'	1 1		$\cdot = = $						
Ι.	3	ĺ		1	1					•		ı	1			2 4 to	1 1
			l	1	١					<u></u>		1					
	5			1						C7: Similar to Schist in C5, except no apparent	==						. 3
	1 4				1		ľ		1 1	joints/fractures; occasional thin, very hard,		1		46.7			1
	,	1								granofels zones.		1					
١.	4						1.			47.4': Cross-foliation joint/fracture, rough to		1					0
,	0-	C7	46.7-51.9	1		5.2/5.2	100	100		smooth, irregular, slightly weathered, epidote, talcified, slightly slickensided.	==						
50 -	3,5									talence, signity shokeholded.	==	1	_ [% _ []		0
	4										I— —		5				0
-				1						•	=						
-	4		· ·	-	-		-			Similar to Schiet in CE avant was placed to					500		0
	3									Similar to Schist in C5, except very closely to moderately closely spaced, slightly to	==	1	2		9		
	3								1	moderately weathered foliation joints/fractures;	-71-7		è	er y er e	第 [2]		4
	4.5									occasional very thin to thin quartz veins; high	(-)!-		9			4.00	1
					1				. [phlogopyte content.			ě				
55	3.5	٠.			1			.	-	52.8'-53.8': Very hard, fresh, fine grained, light to			8		概 _ 篇		0
50	3								- 1	medium gray, GRANOFELS.			1				0
-	-2-									52.7'-52.8': Hard, moderately weathered,			à		2 - 2		
	5	C8.	51.9-61.2			9.3/9.3	100	95	- 1	medium to coarse grained, quartz-mica-gamet SCHIST.			2				1
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BE	DE DE	TIPINE	V 1 B	PE (CANCIC	STENCY	L	ADD	HECC	MEATHERING NO DEC		DACINOTE	1101	41500		*****	

GRANULAR SOILS COHESIVE SOILS	ROCK CORE CHARACTERISTICS	JOINT/FRACTURE CHARACTERISTICS
BPF DENSITY BPF CONSISTENCY	HARDNESS WEATHERING	NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE

⁵⁾ Changed bit.
6) Bottom of borehole at 106.0°; acoustic televiewer survey performed; borehole grouted upon completion.

											BORIN	G LOG								:	Sheet: 3 of	4
		0.00	MAY ENTOT	1007 - A	DIID	,		T											BOF	RING NO). B72-8	В
1	L	MIM	HARF	WASTER MOUNT	Penture	LL.			_							STATION: 1		+33.05		FFSET: 52.1		
•	230	· Semanatura	THE RESERVE ASSESSMENT	NOT THE OWNER OF THE OWNER.	-	100			S		AVENU		WAY			1 NO. CM1			_	CORDINATES		
					1	2000					PROJEC	31		1		EL: 148.15				ORTH: 21938		
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			D. Split S		e. v						sey Bonno	and Dni	lling Cor	D	DATE			DEPTH!			AB. TIME	-
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			R: N/A (Sp	un).		******				TART: 06		DATE	END: 06/2	22/05								
	K COR									VED BY: C		DATE:	11/14/05	5			I					
						2	8	18										INSIT	U PR	OPERTIES	NUMBE	R OF
	S.	SAMPLE / CORE NO	SAMPLE DEPTH (FT)			PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	[≤						١ ٢ ١	_					FRACTU	URES
	100	1 %	₹	HOWS / BINCH	Ě		2	18	DATA					• *	STRATA SYMBOL	STRATIGRAPHY		HARDNE	SS	WEATHERING	G PER FO	100
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		ery Loc		<2	Very S		1	Ve	ery S	oft	1	Complete		(1) 0	1 .			Very Thin			Horizontal Sub-Horizont	lal
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30	50 D	ense		8-15	Stiff .		4	. Ha	ard		4	Slight		(4) 11-20		'-10' Wide	Thic	k	- 1	55-85	Sub-Vertical	
30-50 Dense 8-15 Stiff 4 Hard 4 Stight (4) 11-20 1-10 Wide/Nery													very Thic	`	85-90	Vertical						
>30 Hard																						
5) (5) Changed bit. 1) Bottom of borehole at 106.0; acoustic televiewer survey performed; borehole grouted upon completion.																					
1	Bottom	of bore	hole at 10	3.0'; ac	oustic te	leviewer su	rvey p	erfon	med;	borehole ç	grouted upo	n completi	lion.							•		
1																						
I																						- 1

BORING LOG Sheet: 4 of 4 DMIMINHARRIS ARUP **BORING NO. B72-8 BORING STATION: 1169+33.05** OFFSET: 52.14 **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL. 148.15 NORTH: 219381.443 DATUM: NYCT EAST: 995844.376 FINAL BORING DEPTH (FT) 106.0 SAMPLER: 2" O.D. Split Spoon -BORING CO: Jersey Boring and Drilling Corp. GROUND WATER READINGS TIME | DEPTH | CASING | S SAMPLER HAMMER: 140 lb (Automatic) FOREMAN: Peter Lynch DATE STAB. TIME CASING SIZE: 4" ENGINEER: Sara Rocha CASING HAMMER: N/A (Spun) DATE START: 06/20/05 DATE END: 06/22/05 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 11/14/05 REC (%) INSITU PROPERTIES 8 2 F NUMBER OF ROD (DATA R CORE FRACTURES DEPTH (STRATA SYMBOL SOIL HARDNESS WEATHERING STRATIGRAPHÝ (BPF) PER FOOT (BPF) CORE ROCK CORE TEST SAMPLE DESCRIPTION SAMPLE / N VALUE CASING (SAMPLE see below for see below for see below BLOWS / DEPTH (NUMBER TOTAL values values for values FIELD . 2 3 4 5 2 3 4 5 2 3 Similar to Schist in C9, except slightly convoluted, crenulated, horizontal to moderately 0 C12 86.2-96.3 10.1/10.1 100 100 dipping foliation, with closely to widely spaced foliation joints/fractures, high quartz content; 0 0 occasional very thin to thin quartz veins 89.7'-90.0' and 90.6'-91.4': Very hard, fresh, fine grained, light gray, GRANOFELS. 2 0 0 Similar to Schist in C9, except slightly 0 convoluted, crenulated, horizontal to moderately dipping foliation. 0 101.0' Cross-foliation joint/fracture, rough, moderately dipping, slightly weathered. 102.2' Cross-foliation joint/fracture, rough, uneven, slightly weathered, chloritized, calcified. 0 0 C13 96.3-106.0 9.7/9.7 100 99. 2 0 110 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS DENSITY CONSISTENC HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS ATTITUDE <2 2-4 4-8 Very Soft Soft Very Soft Medium (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 .0-4 Very Loose Complete 0-5 5-35 35-55 Very close/Very Thin Close/Thin Horizontal Sub-Horizontal 4-10 Severe -1" Medium Dense Med Stiff 10-30 Med Hard 3 Moderaté ·-3· Mod Close/Mod Thick Mod Dipping Sub-Vertical 30-50 8-15 Stiff Hard Wide/Thick Very Wide/Very Thick Slight .'-10° · >50 Very Dense Very Stiff Hard 15-30 Very Hard Vertical >30 5) Changed bit. 6) Bottom of borehole at 106.0'; acoustic televiewer survey performed; borehole grouted upon completion.

										AN	GLE BORING LOG							Sheet: 1 of 8
-	SECOND AVENUE SUBWAY PROJECT BORING STATION: 1171+00.87 OFFSET: 39.07 PROJECT OFFSET: 39.07 PROJECT NO. CM1188 COORDINATES: G. SURF EL. 145.74 NORTH: 219536.687 DATUM: NYCT EAST: 995915.231 FINAL BORING DEPTH (FT) 231.1 GROUND WATER READINGS														O. B72-9			
1	DM	MH	HARRI	SOAF	WP	1.0							BORING :	STATION: 1		+00.87	OFFSET: 39.0)7
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					10	Seren					PROJECT				_			
1					20	POTETTUR Subway	7								U /E		AS1: 99591	5.231
								1	5111	200.141	0		FINAL BU				FADINGS	
_			FD: 11/4					_		AN: J. Ha			DATE	TIME	T	EPTH CAS	ING ST	AB. TIME
		ZE: 4"	ER: N/A							ER: G, G								
		AMMER	R: N/A							TART: 10/		/10/06						
		RE: NO						RE	VIEV	VED BY: C	Snee DATE: 3/5/07			L	┡			
						Ξ	8	8					1 1			INSITU PE	ROPERTIES	NUMBER OF
_	(BPF) OR (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	CORE REC (%)	ROCK CORE ROD (%)	ST DATA	BUR	SAMPLE DESCRIPTION	S CODE)	STRATA SYMBOL	STRATIGRAPHY		HARDNESS	WEATHERIN	
ОЕРТН (FT)	200	Ä	Ē	18/8	JUE (SEC.	00	8	FIELD TEST		CLASSIFICATIONS		ITA:	ATIG	ES	see below for values	values	for values below for values by 1 2 3 4
I di	CASING (M M	M M	Š	\\ \X	N N	TOTAL	Ö	믑				1 5	₹	NOTES	12345	1234	5 1234 3
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										PAVEM	ENT THICKNESS: 4" Concr	ete sidewalk	.					
-	1				1					Excavat	e test pit to 2 feet to clear util	ities for			1			
-	-	\vdash		+	_		+	-	-	angle b	oring. Exposed bedrock at th	al depth.	==	ROCK	2			1
-	7	-								C1: 2'-	3.3': Medium to medium hard	, slightly to	==		3			
	14					1	1			moderal	tely weathered, fine to coarse	grained,	==				- K	0
•	16	1				1				obtuse	nica-gamet SCHIST, with ver foliation. Rough, very closely	to	==					2
5-		C1	2-8.3			6.3/6.3	100	75			lely closely spaced, obluse, s		==		4			0
-	14	{								joint/frac	ed, iron-oxide stained foliation	n	==			7.4	128	1
_	12	1				l	1			4.5': Cr	oss foliation joint/fracture: Ro	ugh, very	==					
					1					closely s	spaced, slightly weathered, a ained joint/fracture.	cute, iron-	==					3
-	24	-		+	+		+-	-	-	7.0° and	7.6': Cross-foliation joints/fra	actures:	==					
-	8			1						Rough,	obtuse. oss-foliation joint/fracture: Re	nuah.	==					
10-	12				1					acute.	033-1011BitOff Joint Indicator C. Th	Jog.1,	==					0
_			ļ	1									==					3
_	11_									C2: Me	dium to medium hard, slightly	to	==					>10
-	12_										weathered, fine to coarse gr artz-mica-gamet SCHIST, with							_ 6
-	14	C2	8.3-17.3		1	9/8.8	98	50		thin, inte	ermediate to obtuse foliation,	rough,	==				200	
_	10			1						closely t	o moderately closely spaced, diate to obtuse, slightly to mo	derately	==					0
				1						weather	ed iron-oxide stained foliation	i I	==				· _	1
15-	13									Joints/fra	ictures. 3', 12.0'-13.2', 11.5', 15.2' and		==					2
-	12						1			Cross-fo	liation joints/fractures: Rough	٦,		`				6
-	7_			_			_				ely weathered, intermediate t de stained.	o obtuse,	==					
_	6			1	1					Iron-oxic	de stained.		==					10
	,		1										= =					>10
1	4												==					>10
20 —	6									C3: Med	dium to very hard, fresh to slig ed, fine to coarse grained, lig	ghtly ht gray	= =				100	0
-	7									guartz-m	nica-gamet SCHIST, with very	thin,	==					
	7									intermed	liate to obtuse foliation, rough	, closely	==					
		СЗ	17.3-27.3			10/8.8	88	53		moderat	rately closely spaced, slightly ely weathered, iron-oxide sta	ined						0
	8_									foliation	joints/fractures.		= =					0
-	8									Rough i	d 26.7': Cross-foliation joints/ ntermediate to obtuse, iron-o	xide		ĺ				
25 -	5									stained.			= =				<u>Janas</u>	0
-											 .4': Cross-foliation joints/fractely to severely weathered, ve 		==	1	- 1			4
٦	_5									spaced,	obtuse, iron-oxide stained.		ΞΞ					4
-	6			-				-	-	22.6'-23. Healed,	 Cross-foliation joints/fraction 	ures:	==	1			65	0
-	7							- 1		i icaleu,								
	7												==	1	-	- 10 A		0
_																	The second	0
30 -	7		- T		ECN/E C	0116			OCY	CORECT	ARACTERISTICS			INT/FRACT	URF	CHARACTERI	STICS	
		LAR SO		BPF	CONSI	STENCY		HARD			WEATHERING	NO. PER	_	SPACING	_		ANGLE	ATTITUDE
0	4 V	ery Loc		<2	Very Sc		1	Ve	ery S	oft	1 Complete	(1) 0		<2" Very	clos	se/Very Thin	0-35 35-55	Acute Intermediate
	10 L	oose		2-4	Soft Med Sti	,,	2		ediun ed Ha		2 Severe 3 Moderate	(2) 1-2 (3) 3-10		2"-1' Clos 1'-3' Mod		se/Mod Thick	55-90	Obtuse
10- 30-	30 M 50 D	ledium Jense	Dense	4-8 8-15	Stiff	"	4	Ha	ard		4 Slight	(4) 11-20		3'-10' Wide	e/Th	ick		
		ery De	nse	15-30	Very Sti	ff	5	Ve	ry H	ard	5 Fresh			>10' Very	/ Wi	de/Very Thick		See GDR for definitions
				>30	Hard													
NOTES: 1) Ground water level not recorded.																		
1) (Pround	water l	level not re	corded	rovimate	houndarie	s het	veen s	soil a	nd rock typ	es, transition may be gradual							

Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) Core run time is not representative because conng started at a shallow depth without casing.

ANGLE BORING LOG Sheet: 2 of 8 ANGLE BORING NO. B72-9 DMIMEHARRIS ARUP **BORING STATION: 1171+00.87** OFFSET: 39.07 SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES **PROJECT** G. SURF EL. 145.74 NORTH: 219536.687 DATUM: NYCT EAST: 995915.231 FINAL BORING DEPTH (FT) 231.1 SAMPLER: N/A BORING CO: Warren George, Inc. **GROUND WATER READINGS** STAB. TIME SAMPLER HAMMER: N/A FOREMAN: J. Harris TIME DEPTH CASING CASING SIZE: 4" ENGINEER: G. Gutshteyn CASING HAMMER: N/A DATE START: 10/25/06 DATE END: 11/10/06 ROCK CORE: NO REVIEWED BY: C.Snee DATE: 3/5/07 REC (%) INSITU PROPERTIES (NI/NI) (%) NUMBER OF 2 DATA (BPF) OR (MIN/FT) FRACTURES PER FOOT CORE ROD CORE STRATA SYMBOL DEPTH HARDNESS WEATHERING BLOWS / 6 INCH STRATIGRAPHY PEN/REC: SOIL ROCK (FT/FT) BPF) SAMPLE DESCRIPTION CORE BURMISTER (USCS / NYC BLDG CODE) TEST E CLASSIFICATIONS see below for see below for see below N VALUE SAMPLE / CASING (SAMPLE values values for values TOTAL FIELD NOTES ROCK 1 2 3 4 5 2 3 4 5 1 2 3 4 0 Very hard, fresh, fine to coarse grained, light gray to gray, quartz-nica-garnet SCHIST, with very thin, intermediate foliation. 27.9' and 28.8': Tightly healed, intermediate to other foresters. 0 C4 27.3-37.3 10/10 100 100 0 obtuse fractures 0 34.2-36.2': Foliation slightly crenulate and 0 convoluted. 35 0 0 1 0 Very hard, fresh, fine to coarse grained, light gray to gray, quartz-mica-garnet SCHIST, with thin to very thin, intermediate to obtuse foliation, 0 40 rough, closely to moderately closely spaced, fresh to slightly weathered, intermediate foliation joints/fractures. 0 0 38.2': Cross-foliation joint/fracture: Rough, slightly weathered, acute. 37.3-47.3 100 93 10/10 0 0 7 0 1 Very hard, slightly weathered to fresh, fine to coarse grained, light gray, quartz-mica-garnet SCHIST, with thin to very thin, intermediate to obtuse foliation, rough to slightly smooth, 0 1 0 50 closely to moderately closely spaced, intermediate to obtuse, iron-oxide stained, 0 Intermediate to obtuse, iron-oxide stained, slightly chloritic foliation joints/fractures. 50.7'-51.3' and 56.8'-57.3': Fresh bands of dark greenish gray quartz-mica-amphibole SCHIST. 48.7', 51.7', 52.0', 53.2', 55.1', 56.8' and 57.0': Cross-foliation joints/fractures: Rough, very 2 87 C6 47.3-57.3 10/10 100 2 1 closely to moderately closely spaced, acute, iron-oxide stained. 1 55 0 3 1 0 1 60 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS BPF DENSITY CONSISTENCY HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-4 Very Loose Loose <2 2-4 Very Soft Soft Very Soft Medium Complete Very close/Very Thin Close/Thin 0-5 Horizontal Severe 5-35 Sub-Horizontal Med Stiff 4-8 35-55 10-30 Medium Dense Med Hard 3 Moderate 1'-3" Mod Close/Mod Thick Mod Dipping Stiff Slight 3'-10' Wide/Thick 55-85 Sub-Vertical Very Stiff Hard Very Hard Very Dense Very Wide/Very Thick >50 15-30 5 Fresh Vertical >30 NOTES: 5) 95.7'-96.0': Very soft, severely weathered zone, slight clay buildup on outside of core. No fractures, core came out in one piece. Bottom of borehole at 231.1 feet. Borehole grouted upon completion.

										ANGLE BORING LOG							Sheet: 3 of 8
_					240			T						Al	IGLE BC	RING N	O. B72-9
	DM	MI	HARRIS	• AIU	UP I	1.4		1					TATION: 11			OFFSET: 39.0	
				Yacke sou		-				SECOND AVENUE SUBWAY	_		NO. CM11	88		COORDINATE	
					A.	Second				PROJECT			L. 145.74			NORTH: 2195 EAST: 99591	
					111	Substray						DATUM : N	RING DEPTI	H (F		DAG1. 99391	3.231
	- cn							100	DING	G CO: Warren George, Inc.		FINAL BUI			ND WATER F	READINGS	
_	PLER:		ER: N/A							IAN: J. Harris		DATE	TIME		EPTH CAS		AB. TIME
	ING SIZ		LIV. N/A					_		ER: G. Gutshtevn							
	ING HA		E N/A							TART: 10/25/06 DATE END: 11/10/	0/06			_			
ROC	K COR	E: NQ						RE	VIEW	VED BY: C.Snee DATE: 3/5/07		T T			INCITLLD	ROPERTIES	
		o	٦	1		2 Z	8	8							INSTITUTI	T	NUMBER OF FRACTURES
	SE.	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	Ē.	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	CORE REC (%)	ROCK CORE ROD (%)	DATA	SAMPLE DESCRIPTION	410000EW	STRATA SYMBOL	STRATIGRAPHY		HARDNESS	WEATHERIN	
F	(BPF)	ŭ	l iii	9	N VALUE (BPF)	100 H	l R	8	FIELD TEST	BURMISTER (USCS / NYC BLDG CO CLASSIFICATIONS	ODE)	SY	GR.		see below for	see below fo	or see below 🖭
Ĕ	99	쀨	, H	VS/	ΙΞ	H A	۲	Š	1	02.00		A A	AT	ES	values	values	for values and a second and a s
ОЕРТН (FT)	CASING (AM	A A	0	\$	NO.	TOTAL	8	I I			STR	STR	NOTES	1 2 3 4 5	1 2 3 4	1234 2
٥	00	S	S	<u> </u>	Z	8.02	+-	12	-					-			
										Very hard, fresh, fine to coarse grained, li gray to gray, quartz-mica-gamet SCHIST,					- Sala		2
	7		i							very thin, slightly crenulated, acute foliation	tion,	==					0
•	7	C7	57.3-67.3			10/10	100	93		rough, widely spaced, slightly weathered,	d, acute					Constitution	2
-	7						1			foliation joints/fractures. 60.0' and 66.1': Cross-foliation joints/frac	ctures:				7		
	- 8				1		1			Rough, acute, iron-oxide stained. 60.5', 60.7', 62.5' and 63.3': Cross-foliation		==			_		-0
						1				ioints/fractures: Rough, slightly weathere		= =					0
65	7					1				acute to intermediate.		=					1
-	8									66.3'-67.1': Cross-foliation joints/fracture: Rough, planar, obtuse, iron-oxide stained	es. d,	=			144		
-	8						\perp			chloritic.					1.4		
_	- 6																0
												$\equiv \equiv$					4
-	7_															224	3
70 -	7									Very hard, fresh, fine to coarse grained, q	quartz-	$\equiv \equiv$			10000		0
_	7						1			mica-garnet SCHIST, with thin to very thir convoluted, crenulated, acute to intermed	diate						
										foliation, rough, closely to widely spaced,	f,	==			_		-0
	 	C8	67.3-77.3			10/9.8	98	86		slightly weathered, intermediate, Iron-oxid stained, kaolinite on foliation joints/fractur	res.						0
	8-	14			1	1				68.7': Cross-foliation joint/fracture:		= =					0
-	7_					1392				intermediate. 69.0', 69.5' and 74.8': Cross-foliation						4	Market
75-	8									joints/fractures: obtuse.		$\equiv \equiv$	1		- A		-1-1-1
,,					1					69.0'-69.7': Moderately to severely weath zone, chloritic (1/8" to 1/16" thick).	hered				_		_ 2
-	1-8-			100	1					77.1'-77.3': Zone of severely weathered r	rock.	$\equiv \equiv$		-1		1	0
-	В				-	P. 154	\vdash	\vdash	-	0.05'-0.3' thick quartz bands.				. [7.2		0
-	5	- 6		251								$\equiv \exists$			V 1	-1-3-1	
_	4			1.00		100								1			1
	1		1 1		1	12.7				Very hard, fresh, fine to coarse grained, lin	light				_		2
80 —	1-4-			9		100				gray to gray, quartz-mica-gamel SCHIST,							2
-	4	2			155	200	1			thin to very thin, convoluted, crenulated, intermediate foliation, rough to smooth, cle		= =					0
-	5		77.0.07	-		10.1/10.1	100	07	- 4	to moderately closely spaced, slightly		==					
-	5	C9	77.3-87.4	4.		10.1/10.1	100	3/		weathered, acute, iron-oxide stained folial	ation	==				7.0	0
			1000		9.3	7.00				joints/fractures. 79.5': Cross-foliation joint/fracture: Smoo	oth,	==		-		13.14	1
-	5									slightly weathered, with 1/8" of kaolinite, o	obtuse.	==	1			8.0	0
85 -	5		a Maria				1 1			84.2': Cross-foliation joint/fracture: Rough slightly weathered, acute.	A.,	= =	- 1				0
_	6									83.3'-84.0' and 86.5'-87.0': Healed, obtus	se,	==	- 1				
_		100								chloritic.		==					1
1	6	-	-	1			\vdash	\neg	\neg			==	1	ı			0
-	5									<i>*</i>		==		100		1	0
-	4_					100							1			<u> </u>	1
90 —	4											<u> </u>					1
	RANUL	AR SC	OILS	COHE	SIVE S	OILS		RO	CK (CORE CHARACTERISTICS					CHARACTER		A
	PF D	ENSIT	Y	BPF (CONSI	STENCY		ARD			NO. PER		SPACING		CKNESS se/Very Thin	ANGLE 0-5	ATTITUDE Horizontal
		ery Loc oose	ose		Very So Soft	m.	1 2		ery So ediun		(1) 0 (2) 1-2		2"-1' Clos	e/Th	in	5-35	Sub-Horizontal
			Dense	4-8	Med St	er	3	Me	ed Ha	ard 3 Moderate ((3) 3-10	1 .	1'-3' Mod	Clo	se/Mod Thick	35-55 55-85	Mod Dipping Sub-Vertical
30	-50 D	ense			Stiff Very St	iff.	5		erd ery Ha		(4) 11-20		3'-10' Wide >10' Very		de/Very Thick	85-90	Vertical
>	50 V	ery De			Hard	-	,	**	.,, .,				,		.		
											-			_			
NO	TES:																

95.7-96.0': Very soft, severely weathered zone, slight clay buildup on outside of core. No fractures, core came out in one piece.

1) Bottom of borehole at 231.1 feet. Borehole grouted upon completion.

ANGLE BORING LOG Sheet: 4 of 8 **ANGLE BORING NO. B72-9** DMJM#HARRIS-ARUP **BORING STATION: 1171+00.87** OFFSET: 39.07 SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL. 145.74 NORTH: 219536.687 DATUM: NYCT EAST: 995915.231 FINAL BORING DEPTH (FT) 231.1 GROUND WATER READINGS TIME | DEPTH | CASING | S SAMPLER: N/A BORING CO: Warren George, Inc. STAB, TIME FOREMAN: J. Harris DATE SAMPLER HAMMER: N/A ENGINEER: G. Gutshteyn CASING SIZE: 4" CASING HAMMER: N/A DATE START: 10/25/06 DATE END: 11/10/06 ROCK CORE: NO REVIEWED BY: C.Snee DATE: 3/5/07 INSITU PROPERTIES 8 % NUMBER OF REC FRACTURES PER FOOT DATA (BPF) OR (MIN/FT) CORE ROD DEPTH (SYMBOI SAMPLE / CORE HARDNESS WEATHERING STRATIGRAPHY SOIL SAMPLE DESCRIPTION (BPF) CORE BURMISTER (USCS / NYC BLDG CODE) TEST E see below for see below for see below BLOWS / 6 PEN/REC: ROCK (FT/ CLASSIFICATIONS NUMBER CASING (N VALUE SAMPLE STRATA for values values values TOTAL ROCK FIELD 1 2 3 4 3 4 2 3 2 Hard to very hard, slightly weathered to fresh, 0 fine to coarse grained, light gray to gray, quartz-mica-gamet SCHIST, with thin to very thin, 0 convoluted, crenulated, intermediate to obtuse foliation, rough, moderately closely spaced, 4 10/9.6 96 86 C10 87.4-97.4 1 slightly weathered to fresh, intermediate to obtuse foliation joints/fractures. 87.5'-88.4' and 90.3'-91.2': Healed, obtuse 0 3 joints. 93.2': Cross-foliation joint/fracture: Rough, 95 4 fresh, acute. 94.9'-95.7': Cross-foliation joint/fracture: NA 2 0 Smooth, moderately weathered, obtuse, 5 0 3 0 100 Very hard, fresh, fine to coarse grained, light very nard, rresh, nine to coarse grained, light gray to gray, quartz-mica-garnet SCHIST, with thin to very thin, convoluted, crenulated, intermediate to obtuse foliation, smooth, widely spaced, slightly weathered, intermediate 0 0 4 82 C11 97.4-107.4 10/9.4 94 0 foliation inints/fractures 4 97.4'-98.4': Medium hard to soft, severely 103.6': Cross-foliation joint/fracture: Rough, 0 planar, obtuse. 105 1 0 0 0 0 10 Very hard, fresh, fine to coarse grained, light gray to gray, quartz-mica-garnet SCHIST, with 1 thin to very thin, convoluted, crenulated, acute to intermediate foliation, rough, widely spaced, fresh, acute to intermediate foliation 0 C12 107.4-117.4 10/10 100 100 joints/fractures. 115.9' and 117.4': Cross-foliation joint/fracture: 0 Rough, planar, acute to intermediate. 0 5 0 5 1 0 0 >10 5 20 JOINT/FRACTURE CHARACTERISTICS COHESIVE SOILS ROCK CORE CHARACTERISTICS **GRANULAR SOILS** ATTITUDE CONSISTENCY HARDNESS WEATHERING NO PER FT SPACING/THICKNESS ANGLE DENSITY Horizontal (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Very close/Very Thin Close/Thin Very Loose Loose 04 <2 Very Soft Very Soft Complete 2 Severe Moderate 2"-1" 5-35 Sub-Horizontal 4-10 2 35-55 10-30 4-8 Med Stiff Med Hard 1'-3' Mod Close/Mod Thick Medium Dense Stiff Slight 3'-10' Wide/Thick 55-85 Sub-Vertical Very Hard Fresh Very Wide/Very Thick Very Stiff >50 Very Dense 15-30 5 >10 >30 NOTES: 5) 95.7'-96.0': Very soft, severely weathered zone, slight clay buildup on outside of core.

6) No fractures, core came out in one piece.7) Bottom of borehole at 231.1 feet. Borehole grouted upon completion.

										ANGLE BORING LOG							:	Sheet: 5 of 8	
\vdash	SECOND AVENUE SUBWAY PROJECT SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES:																		
I	LAVI	INTER	E II MANAGA	COPE VO	ture	بالمان				SECOND AVENUE SURW	AV				+00.87				
	-					100					71			88					
ı					7.6	Secon	ıt			1 KOULO I									
					11	Subway								H (F	T) 231.1				
SAN	PLER:	N/A						ВО	RIN	G CO: Warren George, Inc.							DINGS		
SAN	PLER	HAMM	ER: N/A					_		MAN: J. Harris		DATE	TIME	1	DEPTH CA	SING	STA	AB. TIME	
	ING SI									EER: G, Gutshteyn START: 10/25/06 DATE END: 1	4/40/00			\vdash					
	ING HA									START: 10/25/06 DATE END: 1 WED BY: C.Snee DATE: 3/5/07				\vdash					
1100	T	I	T	T	Τ	9	10	1	1	1					INSITU	PROPE	ERTIES		05
5	(BPF) OR (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	NCH	(BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLD	N G CODE)	SYMBOL	КАРНУ		HARDNESS		ATHERING		ES
ОЕРТН (FT)	CASING (E	AMPLE /	AMPLE	BLOWS / 6 INCH	N VALUE (BPF)	EN/REC:	OTAL CC	SOCK CO	ELD TE	CLASSIFICATIONS		STRATA SYMBOL	STRATIGRAPHY	NOTES	see below for values		values	for values	NUMBER
125	5 5 5 5 5 5 5 5 5 5 5	117.4-127.	4	Z	10/10		87	Ĭ.	C13: 117.4'-120.4': Hard to moder slightly to moderately weathered, fir grained, light gray, quartz-mica-gar with very thin, acute foliation, smool closely to closely spaced, slightly to weathered, acute to intermediate, of foliation joints/fractures. 118.9'-119.9': Fracture zone: Medi severely weathered, very closely sp smooth, irregular fractures, with ser chlorite, vugs, and slickensided. 119.0'-119.5': Brecciated. 119.9'-120.4': Tightly healed fractured. 120.4'-127.4': Very hard, fresh, fine grained, quartz-mica-garnet SCHIS to very thin, convoluted, crenulated, obtuse foliation, rowofuted, crenulated, obtuse foliation, rough, widely space intermediate foliation joints/fractures	ne to coarse net SCHIST, h, very moderately nloritic um hard, aced, cite, es, obtuse. ion htty to coarse f, with thin acute to ad, fresh,	50	· δ	Z					3 0 0 1 0 0 0 0 0 0	
135 -	6 6 6	C14	127.4-137.4				100	97		C14: Very hard, fresh, fine to coars light gray to gray, quartz-mica-game with thin to very thin, slightly convoluted, intermediate to obtuse frough to smooth, moderately closely spaced, slightly weathered, intermed obtuse follation joints/fractures, kaol 133.4'-135.4': Isolated zone of hard streets defeatable SCHIST.	t SCHIST, ited, station, to widely liate to inite.						\{\bar{\}} = \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		0 0 1 1 0
45 —	6 - 7 0 - 7 8 10 - 12 12 12 5 - 14 - 16									quartzo-feldspathic SCHIST. 131.2', 132.0' and 136.0': Cross-foli- joints/fractures: Rough, fresh, obtus C15: Very hard, fresh, fine to coarse white to light gray, quartzo-feldspath SCHIST, with occasional thin, interm foliation, rough to slightly smooth, mi closely spaced, slightly weathered, intermediate, slightly chloritic foliatio joints/fractures. 141.0' and 144.4': Cross-foliation joints/fractures: Rough, planar, inter	e grained, ic-gamet ediate oderately								0 1 1 0 0 1 0 0
- - 50 —	15 16 22 18													on the day to make on the					0 0
	RANUL	AR SC	ILS .	COHE	SIVE S	OILS	_	RO	CK (CORE CHARACTERISTICS			OINT/FRACTI						\Box
BPF DENSITY BPF CONSISTENCY C2 Very Soft C3 C4 C4 C5 C6 C6 C6 C6 C6 C6 C6									NESS ry Sc edium ed Ha erd ry Ha	oft 1 Complete n 2 Severe ard 3 Moderate 4 Slight	NO. PER (1) 0 (2) 1-2 (3) 3-10 (4) 11-20	FT	2"-1' Close 1'-3' Mod 3'-10' Wide	clos e/Thi Clos e/Thi	e/Very Thin in se/Mod Thick		0-5 1 5-35 S 35-55 1 55-85 S	ATTITUDE Horizontal Jub-Horizontal Mod Dipping Jub-Vertical Pertical	
NOTES:																			

^{95.7&#}x27;-96.0': Very soft, severely weathered zone, slight clay buildup on outside of core. No fractures, core came out in one piece.

(f) Bottom of borehole at 231.1 feet. Borehole grouted upon completion.

ANGLE BORING LOG Sheet: 6 of 8 **ANGLE BORING NO. B72-9** DMJMHHARRIS - ARUP **BORING STATION: 1171+00.87** OFFSET: 39.07 SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES: **PROJECT** NORTH: 219536.687 G. SURF EL. 145.74 DATUM: NYCT EAST: 995915.231 FINAL BORING DEPTH (FT) 231.1 SAMPLER: N/A BORING CO: Warren George, Inc. **GROUND WATER READINGS** SAMPLER HAMMER: N/A FOREMAN: J. Harris TIME DEPTH CASING STAB. TIME CASING SIZE: 4" ENGINEER: G. Gutshteyn CASING HAMMER: N/A DATE START: 10/25/06 DATE END: 11/10/06 ROCK CORE: NO REVIEWED BY: C.Snee DATE: 3/5/07 REC (%) (NVIN) INSITU PROPERTIES 8 NUMBER OF F (BPF) OR (MIN/FT) ROD FRACTURES TEST DATA CORE STRATA SYMBOI DEPTH HARDNESS WEATHERING STRATIGRAPHY SOIL /FT) PER FOOT (BPF) SAMPLE DESCRIPTION CORE CORE BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS DEPTH (FT) BLOWS / 6 PEN/REC: see below for see below for see below ABER SAMPLE / CASING (N VALUE SAMPLE values for values FIELD T TOTAL NOTES ROCK Š 1 2 3 4 5 2 3 4 5 1 2 3 4 147.5'-151.2' and 152.9'-155.0': Similar to quartzo-feldspathic SCHIST in C15. 151.2'-157.5': Hard to very hard, fresh to 2 24 2 slightly weathered, fine to coarse grained, gray, quartz-mica-garnet SCHIST, with thin, 12 C16 147.5-157.5 10/10 100 87 1 10 convoluted, crenulated, acute to obtuse foliation, rough, very closely to closely spaced, = 0 10 slightly weathered, acute to obtuse, slightly chloritic foliation joints/fractures. 155.6', 156.2' and 157.7': Cross-foliation 1 155 11 joints/fractures: intermediate. 155.9'-156.2': Fracture zone: Very closely spaced, 1/16" thick chlorite, vugs. 3 10 2 12 0 0 10 0 60 10 6 0 Very hard, fresh, fine to coarse grained, quartzmica-garnet SCHIST, with thin to very thin, convoluted, crenulated, intermediate to obtuse 0 C17 157.5-167.4 9.9/9.9 100 100 foliation. 0 16 16 0 165 18 0 16 0 20 0 14 0 14 0 170 17 0 22 Very hard, fresh, fine to coarse grained, light gray to gray, quartz-mica SCHIST high quartz content, with few feldspar crystals throughout, 0 26 167.4-177.4 10/10 100 100 thin to very thin, intermediate to obtuse foliation 0 30 0 47 1 175 40 0 32 0 0 15 0 18 180 18 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS NO. PER FT DENSITY BPF CONSISTENC HARDNESS WEATHERING SPACING/THICKNESS ATTITUDE (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-4 Very Loose Loose <2 2-4 Very Soft Soft Very Soft Medium Complete Very close/Very Thin 0-5 Horizontal 4-10 Severe 5-35 Sub-Horizontal Close/Thin

10-30

>50

NOTES: 5) 95.7-96.0': Very soft, severely weathered zone, slight clay buildup on outside of core.

3

5

Med Hard

Very Hard

Hard

3

5 Fresh

Moderate

Slight

1'-3'

3'-10"

Mod Close/Mod Thick

Very Wide/Very Thick

Wide/Thick

Med Stiff

Very Stiff Hard

Medium Dense

Very Dense

Dense

6) No fractures, core came out in one piece.
7) Boltom of borehole at 231.1 feet. Borehole grouted upon completion.

4-8

8-15 Stiff

15-30

>30

35-55

85-90

Mod Dipping

Vertical

Sheet: 7 of 8 ANGLE BORING LOG ANGLE BORING NO. B72-9 DMIMINIARRIS ARUP OFFSET: 39.07 BORING STATION: 1171+00.87 SECOND AVENUE SUBWAY COORDINATES PROJECT NO. CM1188 **PROJECT** NORTH: 219536.687 G. SURF EL. 145.74 DATUM: NYCT EAST: 995915.231 FINAL BORING DEPTH (FT) 231.1 **GROUND WATER READINGS** SAMPLER: N/A BORING CO: Warren George, Inc. STAB. TIME TIME | DEPTH CASING DATE FOREMAN: J. Harris SAMPLER HAMMER: N/A ENGINEER: G. Gutshteyn CASING SIZE: 4" DATE START: 10/25/06 DATE END: 11/10/06 CASING HAMMER: N/A REVIEWED BY: C.Snee DATE: 3/5/07 ROCK CORE: NO INSITU PROPERTIES CORE REC (%) 8 NUMBER OF ġ L FRACTURES PER FOOT DATA 800 (BPF) OR (MIN/FT) STRATA SYMBO WEATHERING / CORE! STRATIGRAPHY HARDNESS LE DEPTH PEN/REC: SOIL (ROCK (FT/FT) SAMPLE DESCRIPTION (BPF) ROCK CORE BURMISTER (USCS / NYC BLDG CODE)
CLASSIFICATIONS TEST see below see below for DEPTH (FT) see below fo NUMBER CASING (SAMPLE N VALUE values for values BLOWS TOTAL FIELD T 2 3 4 5 1 2 3 1 2 3 4 5 Very hard, fresh, fine to coarse grained, light 21 gray to gray, quartz-mica-garnet SCHIST, with thin to very thin, convoluted, crenulated, 0 22 um to very trun, convoluted, crenulated, intermediate to obtuse foliation, rough to slightly smooth, closely to moderately closely spaced, fresh to slightly weathered, obtuse, slightly chloritic foliation joints/fractures. C19 177.4-187.2 9.8/9.8 100 97 1 20 0 24 0 22 0 18 0 16 0 8 0 Very hard, fresh, fine to coarse grained, light gray to gray, quartz-mica SCHIST, with thin to very thin, convoluted, crenulated, intermediate to obtuse foliation, rough, slightly weathered, widely spaced, obtuse foliation joints/fractures. 0 12 0 15 1 15 10.1/10.1 100 100 0 C20 187.2-197.3 19 0 27 0 36 0 16 0 12 0 18 0 22 0 40 0 59 Very hard, fresh, fine to coarse grained, light gray, quartz-mica-garnet SCHIST, with thin to 0 70 10/10 100 100 C21 197.3-207.3 very thin, convoluted, crenulated, obtuse 0 22 0 100.5'-102.3': Quartzo-feldspathic zone 18 0 16 0 14 0 14 0 13 0 14 0 JOINT/FRACTURE CHARACTERISTICS ROCK CORE CHARACTERISTICS COHESIVE SOILS GRANULAR SOILS ANGLE ATTITUDE WEATHERING NO. PER FT SPACING/THICKNESS CONSISTENCY HARDNESS DENSITY 0-5 5-35 Very close/Very Thin Close/Thin Mod Close/Mod Thick Horizontal (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Complete Severe <2 Very Soft Medium Very Soft 0-4 Very Loose Sub-Horizontal 2"-1' 1'-3' 2-4 4-8 4-10 Soft Mod Dipping Sub-Vertical 35-55 Med Stiff Med Hard 3 Moderate Medium Dense 10-30 55-85 3'-10' Wide/Thick 4 Slight 30-50 8-15 Stiff Hard Very Wide/Very Thick 85-90 Vertical Very Stiff Very Hard >10" 15-30 >50 Very Dense >30 Hard NOTES:
95.7-96.0': Very soft, severely weathered zone, slight day buildup on outside of core. No fractures, core came out in one piece. ,) Bottom of borehole at 231.1 feet. Borehole grouted upon completion.

ANGLE BORING LOG Sheet: 8 of 8 DMJM#HARRIS • ARUP **ANGLE BORING NO. B72-9 BORING STATION: 1171+00.87** OFFSET: 39.07 SECOND AVENUE SUBWAY PROJECT NO. CM1188 COORDINATES **PROJECT** G. SURF EL. 145.74 NORTH: 219536.687 DATUM: NYCT EAST: 995915.231 FINAL BORING DEPTH (FT) 231.1 SAMPLER: N/A BORING CO: Warren George, Inc. GROUND WATER READINGS TIME | DEPTH | CASING | 5 SAMPLER HAMMER: N/A FOREMAN: J. Harris DATE STAB. TIME CASING SIZE: 4" ENGINEER: G. Gutshteyn CASING HAMMER: N/A DATE START: 10/25/06 DATE END: 11/10/06 ROCK CORE: NQ REVIEWED BY: C.Snee DATE: 3/5/07 3 INSITU PROPERTIES 8 8 NUMBER OF DATA (BPF) OR (MIN/FT) TOTAL CORE REC Rob FRACTURES SAMPLE / CORE DEPTH STRATA SYMBOL BLOWS / 6 INCH HARDNESS WEATHERING PEN/REC: SOIL ROCK (FT/FT) STRATIGRAPHY N VALUE (BPF) SAMPLE DESCRIPTION PER FOOT ROCK CORE BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS E FIELD TEST CASING (I see below for see below for see below SAMPLE DEPTH (values values for values 1 2 3 4 5 2 3 4 5 1 2 3 4 0 11 0 C22 207.3-217.4 10.1/10.1 100 100 0 12 C22: Similar to SCHIST in C21 0 14 18 0 26 0 0 20 0 12 16 0 220 23 0 0 C23: Similar to SCHIST in C21 0 C23 217.4-227.5 10.1/10.1 100 100 0 20 16 14 18 0 18 0 0 C24: Similar to SCHIST in C21 0 14 C24 227.5-231.1 3.6/3.6 100 100 0 18 12 0 Bottom of the borehole at 231.1 feet 35 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS DENSITY CONSISTENCY NO. PER FT HARDNESS WEATHERING SPACING/THICKNESS ATTITUDE Very Soft Soft Very Soft Medium 0-4 Very Loose <2 (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Complete Very close/Very Thin Close/Thin 0-5 Horizontal Sub-Horizontal 2-4 4-8 8-15 4-10 Loose 2"-1" 5-35 35-55 Severe · Med Stiff 3 10-30 Medium Dense Med Hard Moderate Mod Dipping Sub-Vertical Mod Close/Mod Thick Stiff Hard Slight 3'-10' Wide/Thick >50 Very Dense 15-30 Very Stiff Very Hard Fresh Very Wide/Very Thick 85-90 Vertical 5) 95.7-96.0°: Very soft, severely weathered zone, slight clay buildup on outside of core. 6) No fractures, core came out in one piece. 7) Bottom of borehole at 231.1 feet. Borehole grouted upon completion.

											BORIN	G LOG								Sh	eet: 1 of	1
-	-	i inchi		*	176 .		_	1						T T							B72-	10
	SECOND AVENUE SUBWAY PROJECT SURVEY BORING NO. B72-10 BORING STATION: 1169+81.66 OFFSET: -2.72 PROJECT NO. CM1188 COORDINATES: G. SURF EL. 148.23 NORTH: 219451.2495 DATUM: NYCT EAST: 995820.7104																					
	PROJECT G. SURF EL. 148.23 NORTH: 219451.2495																					
					河, 阳	Seconi	1				PK	OJECI				_						
					111	Subwill		L								H (F	T) 26					
SAM	PLER:	NA						ВО	RING	CO: War	ren Geor	ge, Inc.									TIME	
														DATE	TIME	H	DEPTH	CASI	NG	SIAB	. IIME	-
				Daniel						ER: J. Th TART: 12/		DATE END: 1	2/15/06			\vdash			+			
	K COR		: 300 lb	Donut						ED BY: C		DATE: 3/16/0										
			_		\Box	2	1%	8									INSI	TU PR	OPERTIES	S	NUMBE	R OF
	&E	E NO.	H (FI	=	_	L (IN)	REC (SOD (ATA		CAMO	LE DESCRIPTIO		BOL	¥		HARDN	ESS	WEATHE	RING	FRACT PER F	URES
(F.F.)	(BPF) OR (MIN/FT)	SAMPLE / CORE	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	BUR	MISTER (USCS / NYC BLD ASSIFICATIONS	G CODE)	STRATA SYMBOL	STRATIGRAPHY		see belo		see below		see belo	W K
DEPTH (FT)	CASING (CORING	PLE	fP.LE	WS	١٦	R X	F	X	9					ZAT	\ ₹	NOTES	value					Σ
胺	SSP	SAM	NA.	일	}	M	2	Š.	12					ST	STE	2	1 2 3	4 5	1 2 3	4 5	1 2 3	4 ≥
_	100	-		+-	 -		+		-						FILL		TH					
-	4"									PAVEM	ENT THIC	KNESS: 6" Aspha 12" Cond				1						\Box
										12		12 0011	a etc	302		2		++		1		
C1: Medium hard to hard, moderately to slightly weathered, fine to medium grained, light gray, quartz-mica SCHIST, feldspar rich, with very thin, poorly laminated horizontal to sub-horizontal foliation, rough, very dosely to																	$H \mid$					
"] [[300		3						
-	11											to hard, moderate medium grained,										
5-	111									quartz-n	nica SCHIS	ST, feldspar rich,	with very	3.3			HIT					
												ted horizontal to s				ĺ		+++			+++	+11
										closely	spaced hor	rizontal to sub-hor	izontal	333					+++	- -		+
-	1												ture:	200	DEC BOCK	-						
-	111									Vertical.		•		~	DEC ROCK		-					
-	-											4'-17.8': ¼" band	s tightly	~					111			
10 -										17.6'-19	2' and 19.			~				++	++-		+++	
	closely spaced horizontal to sub-horizontal foliation joints/fractures. 16.0-1-16.8': Cross-foliation joint/fracture: DEC ROCK																					
-	1									18.2'-21	.0': Mediu	m hard to very ha	rd,	~								
E 2	closely spaced horizontal to sub-horizontal foliation joints/fractures. 16.0-16.8': Cross-foliation joint/fracture: Vertical DEC ROCK																					
	17.0'-17.3' and 17.4'-17.8': 'X' bands lightly healed joints. 17.6'-19.2' and 19.4'-21.0': Cross-foliation joints/fractures: kregular, very closely to closely spaced, moderately dipping to sub-vertical. 18.2'-21.0': Medium hard to very hard, moderately weathered, fine to medium grained, gray mica SCHIST, rough, irregular, very closely spaced, sub-horizontal foliation joint/fracture.																					
_												y weathered quar	z-feldspar	~			+++			++	+++	$H \mid$
										mylontic 19.2'-19		0'-20.1': Chlorite,	calcite.	~							111	
15														~		4						
-	-			+			1-1	_	\vdash				- 04 (40 0)	\equiv	ROCK				40.25			1
_	5							-		21.0').)'-23.4': S	imilar to SCHIST	n C1 (18.2-	==			3.4	-				
	4									23.4'-26		m hard to hard, m		==							-	3
_		C1	16-21			5/4.8	98	32				fine to medium gi , quartz and felds		==								4
-	4	.								with very	thin, poor	ly laminated folial	ion, very								- 4.5	>10
20 -	4									closely t	closely s	paced, horizontal joints/fractures.	to sub-	ΞΞ								>5
-	4			1			\sqcup			22.1'-22	8': Cross-	foliation joint/fract	ure:						7.5			-
	5										ely dipping		and white								_	3
-									Ì	mylonite	chlorite, s											3
-	5			1				_		22.8' and	23.4': Cr	oss-foliation joint/	fracture:	==								>6
_	6	C2	21-26			5/5	100	33	1	23.4'-24. vertical i		4'-25.8': Iron oxid	e stained				Q or					-
	6			1				1		24.6', 25		6': 1/4" Chlorite fill	ing at	==					1. 1. 18		1.3	3
25 -	7									joints.						5	i di		A		1.00	>6
_	-'-			1			T^{\dagger}	1	\neg		Bottom of	borehole at 26.0	feet					-				
-														1			111	11				
_									- 1					1			++++		++++	++	+	HI
		į					1 1								1		111	4-		_		
-				1																		
30 —					$\sqcup \sqcup$		Ш							1					TIOS			
		LAR SC			SIVE \$		1 1			CORE CH			NO DE		SPACING			IERIS	ANGLE	ΔΤΙ	ITUDE	
BF		ENSIT			CONSIS Very So	TENCY	1	IARD Ve	NES ry Sc			THERING Complete	NO. PEI (1) 0				se/Very Th	in	0-5	Hori	izontal	. 1
			36			"	2	Me	dium	1	2	Severe	(2) 1-2		2"-1' Clos	e/Ti	nin					
	4-10 Loose 2-4 Soft 2 Medium 2 Severe (2) 1-2 2"-1' Close/Thin 5-35 Sub-Horizontal (10-30 Medium Dense 4-8 Med Stiff 3 Med Hard 3 Moderate (3) 3-10 1"-3" Mod Close/Mod Thick 35-55 Mod Dipping (4) 11-20 3"-10" Wide/Thick 55-85 Sub-Verifical																					
	4-10 Loose 2-4 Soft 2 Medium 2 Severe (272 2 1 State 2																					
	-50 Dense 8-15 Stiff 4 Hard 4 Slight (4) 11-20 3'-10' Wide/Thick 55-85 Sub-Verifical																					
MO	TES;																					
1) (Ground water level not recorded.																					
5	Fround water level not recorded. Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual. Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a																					
, F	Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual. Teld Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a hotoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).																					
4) [Orilled t	o top of	rock; soi	sample	were n	ot taken.																
5) E	Bottom	of bore	note at 26	0 feet. E	Borehole	grouted u	pon co	mple	lion.													

										E	BORING LOG										1	eet: 1		
-								T									E	301	RIN	G N	0.	B72	!-11	
1	DM	M	HARRIS	•AR	UP 1	1.4.						_		TATION: 1		+61.4	10			T: 68.				
				Societ 10	-	The same				SECON	D AVENUE SUBWAY			NO. CM 1	188			_		TAMIC	_			
						-		1			PROJECT			EL. 143.95						1: 219	_			\dashv
1					7	Arrennet .							DATUM:		11.05	T) 4	45.0		ASI:	99596	59.88	52		-
								_					FINAL BO	RING DEPT				D D	EADI	NGS				\dashv
). Split Sp								en George, Inc.		DATE	TIME			THI				TAB	. TIM	E	\dashv
			R: 140 lb	Safety	hamm	ner		_		N: A. Lon			DATE	THAL	+	-		0/10						\neg
	NG SI		lo 6' : 300 lb D							R: J. Tha		02/07			\vdash		+							
	K COR		C 300 ID D	onut						ED BY: C.												_		
100	T			Г	Т	5	10	_									INSIT	U PR	ROPER	ITIES		A 11 13	BER	05
	l	ġ	E			Ś	0	5	1												\neg		CTUR	
]	SE.	Ę.	Ī	I.	_	5	W.	RQD (%)	F		CALVEL E DECCRIPTION		8	눞		HA	RDNE	SS	WEA.	THER	ING		R FOO	
_	œΣ	ő		2	F.	ÖF	₩	i iii	2	RUR	SAMPLE DESCRIPTION MISTER (USCS / NYC BLDG	CODE)	₹	ξ										-
1	(BPF) OR (MIN/FT)	5	0	9/	E (E	öĒ	8	ő	ES	Doru	CLASSIFICATIONS	,	AS	15			below values			below alues	for		elow	띪
I	25	P. P.	1 2	WS	13	E X	¥	×	9				STRATA SYMBOL	STRATIGRAPHY	E	'	values		,	alues	- 1			NUMBER
ОЕРТН (FT)	CASING (SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE	FIELD TEST DATA				ST	STE	NOTES	1:	2 3 4	5	1 2	3 4	5	1 2	3 4	[]
10	100	0)	0,	-	-		+-	-	-					FILL	1	1		П		TT	\Box	T		П
	4"									PAVEME	ENT THICKNESS: 6" Concret	e Sidewalk			1		-		-++		++	-		1 1
"	1												030		1					11	\perp	11	11.	1
-	11			1]			1 1	Hand av	acced bombolo to a donth of	6 feet ories			2							-		
١.	11			1	1					to boring	gered borehole to a depth of	o leet phoi			3					++	+	11	11	1
				1	1				1 1										-44		+-		1-1-	- 1
-	1		ĺ										000											1 1
5-	11			1									300										T	1
]						_		\sqcup									-			++	++	++-	1 1
1				5						S1: Med	lium dense, brown, fine to co	arse	400						1		1	11.	11	11
-	1	S1	6-8	8	10	10"					ome Silt, trace Gravel, trace								4,000					
١ -	1			15			+-	-	\vdash		occasional Brick and Asphal its (SM / 11-65)	•	000			1		1		11	11	11	11	1 1
				5 9					1 1		lium dense, same as above (Ch4/11	32			-				1+			++-	1
1 -	1	S2	8-10	7 8	16	6"			1	65)	ium dense, saine as above (JIVI 7 1 1-	030] [
10-	1			1	+	-	+-	\vdash	\vdash		, brown, Clayey SILT, little fir	e SAND.	320											11
١.		53	10-12	1	2	20"			1 1		a (ML / 11-65)									++	++	++	+	1
		33	10-12	1 2	1	20												11			11		44	1 1
] -	1			1	1				\Box	C1: Med	lium hard, moderately to com	pletely						11					11	
	-										ed, fine to coarse grained, ligh					-		-1-1	111	11	+1	TT	11	1
									1 1	quartz-m	ica-gamet SCHIST, with thin								-		+	++	++	1 1
"	1			1	1				1 1		ed, crenulated, sub-horizonta ery closely to closely spaced,		200											
15-	1			1					1 1	moderate	ely weathered, sub-horizontal	, iron-					П	П						11
١ -				1			1		1 1	oxide sta	ined foliation joints/fractures.	Manaturan	000		4	-	1	-1-1	++	++	++	+	11	11
	1			1							21.55': Cross-foliation joints ely dipping.	s/iraciures.			1			4			4	++	+	11
-	1					}			1 1	21.2', 21	.4', and 21.9': Cross-foliation		000					11		11	11			
-	-								1 1	joints/frac	ctures: Rough, planar, horizo	ontal, iron-								TT				
١.							1		Ш	21.8': Cr	ineo. ross-foliation joints/fractures:	Rough,		DOOM	1	50050	H	+			++		1	H
											vertical, iron-oxide stained.			ROCK				4			4		1	3
20 -	4																		4		1	1.0		6
-	4											4-1	昌					77	17.					5
	4	C1	19.1-24.1			5.0/3.4	68	24		C2: Med	fium to medium hard, modera ed, fine to coarse grained, gra	iely iv. guartz-			5	2	<u> </u>	+		3			+	+
-										mica-gan	net SCHIST, with thin, poorly	,, quoi u."	昌		1				2.5					3
-	4_						1			laminated	d, sub-horizontal foliation, ro	ugh, very	==		1									3
١ -	4				_		_	_	\vdash	closely to	closely spaced, horizontal tal, iron-oxide stained foliation	o sub-	==		1		100	+			+-			\vdash
1	5									joints/frad	ctures.		昌				2	4						>5
25 -						2500	100	25	1 1	25.7'-26.	7: Cross-foliation joints/fract	ures:							i e					3
-	5	C2	24.1-27.6			3.5/3.0	85	20		Rough, p	lanar, sub-vertical, iron-oxide	stained.						T						>7
-	5						-	_	Ш						1			+	y .		+-1		1-	\vdash
	3										ilar to SCHIST in C2, except	convoluted			1			Ш	15 11.		1	1.1	11	2
-	5									and cren 31.2'-31.	ulated foliation.					177				1		2.3		4
-	-									31.2-31.	, vugs.					う 。		$\exists \exists$			7		11	2
	5	СЗ	27.6-32.6			5.0/5.0	100	64														<u> </u>	<u>i</u>	É
30 -	1			COL	EDNE (UCK I	CORECH	ARACTERISTICS		.)(OINT/FRAC	TUR	E CH	ARAC	TER	ISTIC	3				「
	RANU PF D	LAR SO			CONSI	STENCY			DNES		WEATHERING	NO. PE		SPACING				T		NGLE		TITUE		
		ery Lo			Very S		1	V	ery So	oft	1 Complete	(1) 0	1	<2" Ve	y clo	se/V	ery Th	in		0-5 5-35		rizonta -Horiz		1
4.	-10 L	oose		2-4	Soft		2		ledium		2 Severe 3 Moderate	(2) 1-2 (3) 3-1	.		se/T		fod Th	ick		5-35 35-55		o-Honz		
		Aedium Jense	Dense		Med St Stiff	ш	3		led Ha lard	no i	3 Moderate 4 Slight	(4) 11-2		3'-10' Wi	de/T	hick				55-85	Sub	-Verti		
		ery De		15-30	Very St	iff	5		ery Ha	ard	5 Fresh			>10' Ve	ry W	ide/V	ery Th	nick	8	35-90	Ve	rtical		
		6000	7	>30	Hard																			
NO	TES:																							

NOTES:

1) Ground water level not recorded.
Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) Drilled through obstruction at 15.5'-17.5'.
5) Approximately 1.6 feet loss of recovery.

Sheet: 2 of 4 **BORING LOG BORING NO. B72-11** DMJM##HARRIS - ARUP **BORING STATION: 1171+61.40** OFFSET: 68.23 SECOND AVENUE SUBWAY PROJECT NO. CM 1188 COORDINATES **PROJECT** NORTH: 219574.0779 G. SURF EL. 143,95 DATUM: NYCT EAST: 995969.882 FINAL BORING DEPTH (FT) 115.3 BORING CO: Warren George, Inc. **GROUND WATER READINGS** SAMPLER: 2" O.D. Split Spoon DATE TIME DEPTH CASING STAB. TIME FOREMAN: A. London SAMPLER HAMMER: 140 lb Safety hammer ENGINEER: J. Thampi DATE START: 12/26/06 CASING SIZE: 4" to 6' DATE END: 01/02/07 CASING HAMMER: 300 lb Donut ROCK CORE: NX REVIEWED BY: C. Snee DATE: 3/16/07 INSITU PROPERTIES 3 3 NUMBER OF ġ F FRACTURES PER FOOT REC DATA 80 (BPF) OR (MIN/FT) STRATA SYMBOL CORE HARDNESS WEATHERING STRATIGRAPHY SAMPLE DEPTH BLOWS / 6 INCH SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) PEN/REC: SOIL ROCK (FT/FT) (BPF) CORE CORE TEST E see below for CLASSIFICATIONS SAMPLE / N VALUE CASING (values values for values TOTAL (DEPTH ROCK FIELD. 2 3 4 5 100 2 5 C4: Similar to SCHIST in C3, except medium 3 hard, severely weathered from 35.8' to 36.3'. 34.4' and 34.9': Iron-oxide stained. 3 35.0' and 35.8'-36.3': Cross-foliation joint/fracture: Rough, irregular, slightly weathered, sub-vertical, chlorite. 4 3 4.6/4.3 93 32 32.6-37.2 35 4 C5: Hard, slightly weathered, fine to coarse grained, light gray to gray, quartz-mica-garnet SCHIST, with thin, convoluted, crenulated, sub-horizontal foliation, rough, irregular, closely to >10 5 3 5 moderately closely spaced, sub-horizontal foliation joints/fractures.

Gamets ¼" in diameter throughout the entire 0 1 4.7/4.7 100 91 C5 37.2-41.9 40 41.6': White/pink mineral coating. 1 1 C6: Similar to SCHIST in C5, except for 0 moderately weathered, very closely spaced, horizontal to sub-horizontal foliation between 45.2'-45.5'. 41.9-46.9 5.0/5.0 100 82 5 C7: Hard, slightly weathered, fine to coarse 6 grained, light gray to gray, quartz-mica-gamet SCHIST, with thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, 0 irregular, very closely to moderately close 3 spaced, slightly weathered, horizontal to sub-horizontal foliation joints/fractures. 46.9'-47.1' and 47.2'-47.2': Cross-foliation 0 joints/fractures: Rough, irregular, slightly weathered, moderately dipping to sub-vertical, 1 92 C7 46 9-51 9 5.0/5.0 100 50 1 chlorite coated. 2 = C8: 51.9'-54.9': Very hard, fresh, medium to 1 coarse grained, light gray, quartzo-feldspathic SCHIST, with thin, horizontal foliation, rough, 3 irregular, moderately closely spaced, horizontal foliation joints/fractures. 0 100 99 C8 51.9-56.9 54.9'-56.9': Similar to SCHIST in C7, no 55 1 fractures present. 55.1': Possible slickenside and pyrite coating. 3 C9: Hard, fresh to slightly weathered, fine to coarse grained, gray, quartz-mica SCHIST, with thin, horizontal foliation, rough, very closely to 2 0 widely spaced, slightly weathered, horizontal foliation joints/fractures. 0 C9 5.0/5.0 100 98 JOINT/FRACTURE CHARACTERISTICS **ROCK CORE CHARACTERISTICS** GRANULAR SOILS COHESIVE SOILS ANGLE ATTITUDE CONSISTENCY HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS DENSITY (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-5 5-35 Horizontal Sub-Horizontal <2 2-4 Very Soft Soft Very Soft Medium Very close/Very Thin Complete Very Loose 2"-1' 1'-3' Close/Thin 4-10 Mod Dipping 35-55 Mod Close/Mod Thick Med Stiff Med Hard Moderate 10-30 Medium Dense 4-8 Sub-Vertical 8-15 Hard 3'-10' Wide/Thick Dense 30-50 Very Wide/Very Thick 85-90 Vertical Very Stiff Very Hard Fresh >50 Very Dense 15-30 >30 6) Bottom of borehole at 115.3 feet; acoustic televiewer survey performed; borehole grouted upon completion.

											BORIN	G LOG								Sheet: 3 of 4
	PAC	Th./The	LIADDIC	a à D	116 1			T												D. B72-11
1	TVAI	ITATRI	HARRIS	JORE 10	direa.	بالتباد				CECO	ND AVE	NUE CUDW	[STATION: 1				SET: 68.2	
	-				100			1		SECO		NUE SUBWA OJECT			T NO. CM 1	_			RDINATE	
					1	Secon	đ				FI	OULCI		DATUM :	EL. 143.95				TH: 2195 T: 995969	
					177	Subvery									DRING DEPT	H (F	T) 115.3	_ DAG	. 990908	9.002
SAI	MPLER:	2" O.	D. Split Sp	oon				BC	RING	CO: Wa	ren Geor	rge, Inc.					ND WATE	REA	DINGS	
			ER: 140 lb		hamr	ner				AN: A. Lo				DATE	TIME	1	DEPTH C	ASING	ST	AB. TIME
	SING SI									ER: J. Th		DATE FAID	4 /00/07		-	╀				
	CK COR		R: 300 lb D	onut						TART: 12/ ED BY: C		DATE END: 0 DATE: 3/16/0				+	-+		-	
1.0	T		T	T	T	9	1 3	_	T		· Orice	2.10.0		T	1	\top	INSITU	PROP	ERTIES	
E	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	6 INCH	(BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	BUF	MISTER (LE DESCRIPTION (USCS / NYC BLD ASSIFICATIONS		STRATA SYMBOL	КАРНҮ		HARDNES see below		ATHERIN	
DEPTH (FT)	CASING	SAMPLE	SAMPLE	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC ROCK (F	TOTALC	ROCK CC	FIELD TE			ASSIFICATIONS		STRATA	STRATIGRAPHY	NOTES	values		values 2 3 4 5	for values
	5													E			0.00			0
	5	1			l							CHIST in C9, exce		1					3 G.	1
				\top								horizontal foliation cross-foliation join								
	5	1		1	1					Rough,	irregular, i	fresh, moderately		==			-	-	-	
	5	-								sub-ver 64.5'-65		-foliation joint/frac	ture:				-		*	0
65	5	C10	61.9-66.9			5.0/5.0	100	98				ly dipping to vertice artz bands.	al.							3
100	5					1				0.05-0.	z trick qu	artz barios.		==					S	0
	5			1										==			3, 3			1
				\top			\top			C11: S	milar to St	CHIST in C10, exc	ept medium	==						>10
1	5	1	1							hard, m		weathered, very cl		==						5
1	5									spaced. 67.5'-68	.2': Horizo	ontal to sub-vertic	al fracture	==					22	
70-	5	C11	66.9-71.9			5.0/5.0	100	74	1	zone.										0
10	5					1				C12: S	milar to So	CHIST in C9.								0
	†-	1				1		1						==						1
	1-5	-		1	1		_	1						==						1
	5									C13: H	ard to very	hard, fresh to slig	htly	==			¥, ,			
	5									weather	ed, fine to	coarse grained, g	ray, quartz-	= =				_		0
	5	C12	71.9-76.9			5.0/5.0	100	99		horizoni	al to sub-h	orizontal foliation	rough,	==						0
75-	5				ļ							paced, horizontal i joints/fractures.	o sub-			П	7	1		1
1	1									80.7'-80	9': Cross	-foliation joint/frac	ture:	昌				18/1	1	0
.	5	_	l	1			_		\vdash	Rough,	rregular, fi	resh, moderately	dipping.				3		14	0
.	-6											weathered, fine		ΞΞ			20			1983
Ι.	5	10		1								rtz-mica SCHIST, ated, horizontal to						- 8	-	1
80-	6	C13	76.9-81.9			5.0/5.0	100	92		horizont	al foliation	, rough, irregular,	very closely							1
100	6									to mode horizont	rately close al foliation	ely spaced, horizo joints/fractures.	intal to sub-				- 18			0
'	5									83.7'-84	6': Cross-	-foliation joints/fra		$\equiv \equiv$			5			1
									\neg	Healed, calcite fi		sub-vertical, with	1/10	==						2
-	6													三三						
	6									C15: Ha	rd, fresh to	o slightly weather ht gray to gray, qu	ed, fine to rartz-mica-	==					2.4	2
95-	7	C14	81.9-86.9			5.0/5.0	100	95		gamet S	CHIST, wi	th thin, convoluted	i.	==				- 23		2
85~	5								1			ntal to sub-horizor noderately weathe		==						0
										to mode	ately close	ely spaced, horizo		==				1		2
	1						\sqcap			87.8', 88	oints/fract .2°-88.5', 8	9.2' and 89.6'-89.	8': Cross-	==						2
-	5								- 1	foliation	oints/fract	ures: Rough to si	nooth,	==						
	4											slightly to modera rizontal to modera		$\equiv \equiv$				- 86		2
00-	5	C15	86.9-91.9			5.0/5.0	100	65		fractures	ickensides									3
90 -	RANUL	AR SC	n s T	COLE	SIVE S	OILS T		PO	CK C		RACTERI		T		DINT/FRACT	URF	CHARACTI	RISTIC	S	
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- 1	pottom c	or Dore	note at 115.	o teet; a	cousti	c televiewe	T SUIV	еу ре	nom	eu; poreno	e grouted	upon completion.								

Sheet: 4 of 4 **BORING LOG BORING NO. B72-11** DMIMILHARRIS · ARUP BORING STATION: 1171+61.40 OFFSET: 68.23 SECOND AVENUE SUBWAY COORDINATES PROJECT NO. CM 1188 NORTH: 219574.0779 **PROJECT** G. SURF EL. 143.95 DATUM: NYCT EAST: 995969.882 FINAL BORING DEPTH (FT) 115.3 **GROUND WATER READINGS** SAMPLER: 2" O.D. Split Spoon BORING CO: Warren George, Inc. STAB. TIME TIME DEPTH CASING DATE FOREMAN: A. London SAMPLER HAMMER: 140 lb Safety hammer ENGINEER: J, Thampi CASING SIZE: 4" to 6' DATE END: 01/02/07 DATE START: 12/26/06 CASING HAMMER: 300 lb Donut DATE: 3/16/07 REVIEWED BY: C. Snee ROCK CORE: NX INSITU PROPERTIES 8 (NVIN) NUMBER OF 8 8 SAMPLE DEPTH (FT FRACTURES REC ROD (DATA (BPF) OR (MIN/FT) STRATA SYMBOL HARDNESS WEATHERING PER FOOT CORE STRATIGRAPHY PEN/REC: SOIL (ROCK (FT/FT) BLOWS / 6 INCH SAMPLE DESCRIPTION (BPF) CORE BURMISTER (USCS / NYC BLDG CODE)
CLASSIFICATIONS ROCK CORE FIELD TEST see below see below for see below for N VALUE values for values CASING (SAMPLE TOTAL 1 2 3 4 2 3 4 5 12345 C16: 91.9'.94.7': Hard, fresh, fine to coarse grained, light gray, quartzo-feldspathic SCHIST, with thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, fresh to slightly weathered, closely to moderately closely spaced, horizontal foliation joints/fractures. = = 1 2 = 1 92.6' and 93.2': Cross-foliation joints/fractures: Rough, irregular, fresh to slightly weathered, 0 4.9/4.9 100 89 91.9-96.8 C16 moderately dipping. 91.9'-93.6: Quartz rich. 0 95 94.7'-96.8': Similar to SCHIST in C15. 0 C17: Hard, fresh to slightly weathered, fine to 0 coarse grained, light gray, quartz-mica-garnet SCHIST, with thin, convoluted, slightly 5 crenulated, horizontal foliation, rough, irregular, slightly weathered, moderately closely spaced, horizontal foliation joints/fractures. 1 97 4.75/4.9 100 C17 96.8-101.7 0 1 5 2 C18: Similar to SCHIST in C17. 100 89 C18 101.7-106.7 5.0/5.0 0 0 3 C19: Similar to SCHIST in C17. 0 3.6/3.6 100 87 C19 106.7-110.3 0 1 1 C20: Similar to SCHIST in C18, except poorly 0 100 100 5.0/5.0 C20 110.3-115.3 2 Bottom of borehole at 115.3 feet JOINT/FRACTURE CHARACTERISTICS ROCK CORE CHARACTERISTICS GRANULAR SOILS COHESIVE SOILS ANGLE NO. PER FT SPACING/THICKNESS WEATHERING DENSITY CONSISTENCY HARDNESS 0-5 5-35 (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Very close/Very Thin Close/Thin Mod Close/Mod Thick Horizontal Very Soft Medium Complete Severe <2 2-4 4-8 0-4 Very Loose Very Soft Sub-Horizontal 2"-1' Soft Med Stiff 4-10 Mod Dipping Sub-Vertical 35-55 Med Hard Moderate Medium Dense 10-30 55-85 Wide/Thick Dense 8-15 15-30 Slight Stiff Hard Very Wide/Very Thick 85-90 Vertical Very Hard Fresh >10 Very Stiff >50 Very Dense >30 6) Bottom of borehole at 115.3 feet; acoustic televiewer survey performed; borehole grouted upon completion.

											BORING LOG									Sh	eet: 1 d	of 1	
	BORING LOG BORING NO. B72-12 BORING STATION: 1171+27.95 OFFSET: -1.86 PROJECT OFFSET: -1.86 PROJECT OFFSET: -1.86 OFFSET: -1.86 PROJECT NO. CM1188 COORDINATES: OFFSET: -1.86 OFFSET:																						
l	SECOND AVENUE SUBWAY BORING STATION: 1171+27.95 OFFSET: -1.86 PROJECT NO. CM1188 COORDINATES:																						
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ROC	K CO	RE: NX	Τ	1	_	1 -	Ta	_	T	VED BY: C	C. Snee DATE: 3/16/0)7	<u> </u>		╁	1	LTIS	PROP	FRTIE				\neg
		ģ	E			Z	5	8	-				١.			<u> </u>		1			NUM		
	CASING (BPF) OR	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	공	<u>c</u>	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA		SAMPLE DESCRIPTIO	N	STRATA SYMBOL	¥		HAR	DNES	S WE	ATHE	RING	PER		
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	S2 10-12 24/7 Medium dense, brown, fine to coarse SAND, some Gravel (Schist fragments), trace Silt (SP / 7-65) Loose, brown, fine to coarse GRAVEL (Schist fragments), some fine to coarse Sand, trace Silt																						
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	4			T			T				ard, fresh, fine to coarse grain gray, quartz-mica-gamet SC			ROCK				3.				Ш	2
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20		.									n joints/fractures. Cross-foliation joint/fracture:	Rough,								1	震		1
1	5	1 1								curved,	moderately dipping.		$\equiv \equiv$		5	,,,,,			j., .			11	0
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30-	50 D	ense		8-15	Stiff		4	Ha	ard		4 Slight			3'-10' Wid	le/Th	ick			55-85	Sub	-Vertica		
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NO	50 Dense 8-15 Stiff 4 Hard 4 Slight (4) 11-20 3'-10' Wide/Thick 55-85 Sub-Vertical 5-30 Very Stiff 5 Very Hard 5 Fresh >30 Hard 5 Fresh >30 Hard 5 Fresh 5 Fre																						
1) G	>30 Hard TES: Ground water level not recorded.																						
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ph	otoion	nization	detector (I	PID) and	a 10.66	eV lamp. Re					on by volume (ppmv).	0		-	-	-	-						
			tional split note at 22.			ples. grouted up	pon co	mple	tion.														

										E	BORING LOG								1	et: 1 of		_
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SECOND AVENUE SUBWAY PROJECT IN SUBPLICATION: 1171+17.27 OF PROJECT NO. CM1188 COMPANDED TO SUBWAY PROJECT OF SUBPLICATION OF														FFSET: -2.				\dashv				
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					-77	Liberty		1	٠.				FINAL BOI	RING DEPT	H (F	T) 13.5		CADINICC			_	\dashv
SAME	PLER:	2" O.D	. Split Sp	oon				_			en George, Inc.		DATE	GRO	iuc T	DEPTH	CASI	EADINGS NG S	TAB	TIME		7
			R: 140 lb	Safety	/ Hamm	er				N: L. Mun ER: G. Gu			DAIL	THVIC	<u> </u>	72,	0					口
		ZE: 4" I	0.5' : 300 lb D	onut						ART: 12/2	1/06 DATE END:											\dashv
		E: NX						RE	/IEW	ED BY: C.	Snee DATE: 3/2/	07	1	L	-	INC	ITU PR	OPERTIES	Т			٦
			F			N N	8	%									1	0	\dashv	NUMBE		
	KF.	ž	F)	1	_	Ę	W	8	DATA			ON	교	₹		HARDN	NESS	WEATHER	ING	PER F	OOT	
_	EN N	ğ	EPT	2	AP	SE.	CORE REC (%)	ZE F	5	BUR	SAMPLE DESCRIPTI WISTER (USCS / NYC BI	DG CODE)	\X_{\text{\chi}}	\$		see belo	ow for	see below	for	see belo	ow I	=
рертн (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	8	ROCK CORE RQD (%)	FIELD TEST		CLASSIFICATIONS	3	STRATA SYMBOL	STRATIGRAPHY	ន្ទ	value		values		for value	es	NUMBER
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]	-		+	-		+-			rineely e	naced slightly to modera	telv	==	ROCK				10111			2	20
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10 -	1									8 4'-9 1'	10.6'-10.9, 11.5'-11.9' at	nd 12.4'-12.7:			1			· /* 1			4	6
-	1	C1	8.4-13.5	1		5.1/5.1	100	51		to moder	liation joints/fractures: R rately weathered, very clo	sely to closely	I				64.40				1 -	4
-	1									spaced, oxide sta	moderately dipping to su	b-vertical, iron-	三三		5				100		1	\dashv
						-0140				DAGE SIE			==		L				1		H	3
											Bottom of borehole at 1:	3.5 feet					111			TII		1
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	-10 L	very Loc Loose		<2 2-4	Very So Soft		2	M	lediur	n	2 Severe	(2) 1-2 (3) 3-1		2"-1" Clo	se/T			5-35 35-55	Mo	-Horizon d Dippin	g	
10	-30 N	Medium Dense	Dense	4-8 8-15	Med Sti Stiff	n	3		led H ard	ard	3 Moderate 4 Slight	(4) 11-2		3'-10' Wi	de/T	hick	- 1	55-85 85-90		-Vertical rtical	l	
		Very De	nse	15-30	Very St	iff	5		егу Н	ard	5 Fresh			>10' Ve	ry W	ide/Very	LINCK	33-30	76			
L				>30	Hard																	1
	TES:		Inval																			
. ")	Stratific	cation li	level not re ines repres	ent app	roximate	boundarie	es bet	ween	soil a	and rock typ	es, transition may be gra	idual. ad space of se	aled soil sar	mple jars usi	ng a	n organic	vapor	meter equip	ped w	ith a		

Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the I photoionization detector (PID) and a 10.6eV tamp. Results are in parts per million by volume (ppmv).

4) Drilled to top of rock; soil samples were not taken.

5) Bottom of borehole at 13.5 feet. Borehole grouted upon completion.

										BORING LOG						s	heet: 1 of 1
	DAV	ijМш	HARRI	S=A	Wr.	2	1			SECOND AVENUE SUBWAY PROJECT	PROJECT G. SURF DATUM :		88	+31.30	COO	NG NO ET: -1.09 RDINATES TH: 21966 : 995943.	8.7842
SAM	PI FF	- 2" O	D. Split S	noon				BO	RING	CO: Warren George, Inc.	FINAL BU	RING DEPT		ND WATER	READ	INGS	
			ER: 140 l		ty Hami	mer				AN: A. London	DATE			DEPTH CA			B. TIME
		IZE: 4"								ER: J, Thampi FART: 12/22/06 DATE END: 12/22/06	-	-	-				
		RE: NX	R: 300 lb	Donut					_	ED BY: C. Snee DATE: 3/16/07							
	Π	T .	-			2	8	8						INSITU	PROPE	RTIES	NUMBER OF
E)	(BPF) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	E (BPF)	C: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE RQD (%)	FIELD TEST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	STRATA SYMBOL	STRATIGRAPHY		HARDNESS see below fo		ATHERING	FRACTURES PER FOOT
БЕРТН (FT	CASING (AMPLE	AMPLE	LOWS	N VALUE (BPF)	PEN/REC: ROCK (FT/	OTAL	OCKC	IELD T		TRAT/	TRATI	NOTES	values 1 2 3 4 5	,	values 2 3 4 5	for values 1 2 3 4
5	4	C1	16-20.9			4.9/4.9	100	82	Œ	Medium hard to hard, slightly weathered, fine to coarse grained, light gray, quartz-mica-gamet-feldspar SCHIST, with very thin to thin, slightly convoluted, slightly crenulated, horizontal to sub-horizontal foliation, rough, closely to moderately closely spaced, fresh to slightly weathered, sub-horizontal, iron-oxide stained foliation joints/fractures. 16.5°, 18.5' and 19.5°: Quartz/feldspar bands. Similar to SCHIST in C1, except highly convoluted and crenulated, horizontal to sub-horizontal foliation. 20.9°-21.3°: Completely weathered and fractured. 22.3°, 23.7°-23.8' and 23.9°-24.15°: Quartz/feldspar bands.		FILL	1 2 3				4 3 4 2 1 1 >>10 2 2 2 2
25 —										23.0': Iron-oxide stained.	==		5				1
30 -										Bottom of the borehole at 25.5 feet							
		ILAR SO			IESIVE S					CORE CHARACTERISTICS				CHARACTE			TTMILE
10- 30-	4 1 10 I 30 I 50 I	DENSIT /ery Loo Loose Medium Dense /ery De	Dense	BPF <2 2-4 4-8 8-15 15-30 >30	CONSII Very So Soft Med Sti Stiff Very Sti Hard	iff	1 2 3 4 5	Me Ha	ery So edium ed Ha	fit 1 Complete (1) 0 2 Severe (2) 1-2 rd 3 Moderate (3) 3-1 4 Slight (4) 11-2	0	2"-1' Clos 1'-3' Mod 3'-10' Wid	clo e/Th Clo e/Th	se/Very Thin nin se/Mod Thick		0-5 Hi 5-35 Su 35-55 M 55-85 Su	TTITUDE orizontal ob-Horizontal od Dipping ob-Vertical ertical
1) G S	tratificield T	cation li	- Total or	ent app	roximate	vels are refe	erence	ed to	a ben	nd rock types, transition may be gradual. zene standard measured in the head space of sea	aled soil san	nple jars usin	g ar	organic vapo	r meter	equipped	with a

Drilled to top of rock; soil samples were not taken.
 Bottom of borehole at 25.5 feet. Borehole grouted upon completion.

										BORING	LOG										She	et: 1 (of 4	
-								T									E	301	RIN	G N	0.	B73	-4	
	DM	JM	HARRI	S.AR	UP 1	1.4							BORING S	STATION: 1	172-	04.4		C	FFSE	T: 72	.36			
1				4 Jose Vo	after .	del.				SECOND AVE		Y	PROJECT	NO. CM11	88			_		DINAT				
					P					PRO	DJECT	•		EL. 142.91						1: 219				_
1						Avertie							DATUM;					E	AST:	9959	94.79	21		
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			D. Split S					-		CO: Warren Georg	ge, Inc.		DATE	TIME		EPT				S	TAB.	TIME	Ē	_
			ER: 140 I	Safety	hamn	ner				AN: L. Muniz ER: G. Gutshteyn			DATE	1 tiviL	+-		'' `	,,,,,,,,						
		ZE: 4"	to 27' R: 300 lb I	Conut						TART: 12/27/06	DATE END: 01	/03/07			\vdash				\Box					
		RE: NX		Jonat						ED BY: C. Snee	DATE: 3/16/07													
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	哼	2	푸	F	(C)	=======================================	2	8	M	SAMPI	LE DESCRIPTION		AB	Æ		HAF	RDNE	ss	WEA	THER	ING	PER	F00	٦
F	监	8	ם	Z	g	SST	18	뿞	ST	BURMISTER (L	JSCS / NYC BLDG		SYMBOL	₹		see	below	for	see	below	for	see b	elow	100
БЕРТН (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE RQD (%)	FIELD TEST DATA	CLA	SSIFICATIONS		STRATA	STRATIGRAPHY	S		alues			alues		for va	lues	NUMBER
Ė	NS E	MP	0. ¥	8	¥	E S	TA.	ğ	믦				2	2€	NOTES	1 2	3 4	5	1 2	3 4	5	1 2	3 4	3
2	28	\ S	δ	B 8	z	# %	۲	ĕ	Ē				, v		z			-	1 1	++	+	+	1 1	H
	4.			T						PAVEMENT THIC	KNESS: E" Concre	e Sidewalk		FILL								11.		
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10-	11	-		9			-		-	pockets (SM / 7-65	-					-†-†	11	\forall	11	TT		11		
		S3	10-12	3	7	24/7	П			Loose, brown, fine Gravel, little Silt (S						++		++	-+-+	++	++	++-		
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'5				3 7						Very stiff, brown, C	Clayey SILT, trace	fine Sand	11111			11	11	\bot	4+	44		444		
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BORING LOG Sheet: 2 of 4 **BORING NO. B73-4** EMIMINHARRIS ARUP **BORING STATION: 1172+04.46** OFFSET: 72.36 **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES **PROJECT** G. SURF EL. 142.91 NORTH: 219609.5098 DATUM: NYCT EAST: 995994.7921 FINAL BORING DEPTH (FT) 115.6 SAMPLER: 2" O.D. Split Spoon BORING CO: Warren George, Inc. **GROUND WATER READINGS** SAMPLER HAMMER: 140 lb Safety hammer FOREMAN: L. Muniz TIME | DEPTH CASING STAB. TIME CASING SIZE: 4" to 27' ENGINEER: G. Gutshteyn CASING HAMMER: 300 lb Donut DATE START: 12/27/06 DATE END: 01/03/07 ROCK CORE: NX REVIEWED BY: C. Snee DATE: 3/16/07 REC (%) INSITU PROPERTIES (NIN) 8 NUMBER OF Ē ROD (DATA (BPF) OR (MIN/FT) FRACTURES DEPTH (SAMPLE / CORE STRATA SYMBOL SOIL (FF) STRATIGRAPHY HARDNESS WEATHERING PER FOOT (BPF) SAMPLE DESCRIPTION CORE ROCK CORE BURMISTER (USCS / NYC BLDG CODE) FIELD TEST DEPTH (FT) 9/ VALUE (PEN/REC: ROCK (FT/ CLASSIFICATIONS see below for see below for see below CASING (SAMPLE BLOWS / for values TOTAL (values values 2 3 4 5 1 2 3 4 5 1 2 3 C1: Medium hard to hard, slightly to severely weathered, fine to coarse grained, light gray to gray, quartz-mica-gamet SCHIST, with thin to very thin, convoluted, crenulated, horizontal to 5 C1 27.1-37.1 10.0/9.7 97 40 moderately dipping foliation, rough to smooth, very closely to closely spaced, slightly to moderately weathered, horizontal to moderately dipping, iron-oxide stained, kaolinite filled 1 3 5 5 foliation joints/fractures. = 35 28.7'-28.9', 35.8'-36.1' and 36.7'-36.9': Cross-foliation joints/fractures: Rough, slightly 9 5 weathered, moderately dipping. 31.9'-32.2': Cross-foliation joint/fracture: 3 PEGMATITE Rough, moderately dipping with kaolinite 2 21 deposits.
34.3'-34.9': Healed vertical joint. C2 37.1-39.1 2.0/2.0 100 45 4 46 34.6'-35.3': Cross-foliation joint/fracture: ROCK Slightly to moderately weathered, sub-vertical, N NA 40 with kaplinite deposits 36.0'-36.4' and 36.7'-37.1': Very soft rock, 2 severely weathered, kaolinite. 1 C2: Very hard, slightly weathered, fine to coarse grained, orange and white, quartzo-feldspathic PEGMATITE, with fresh to slightly 0 weathered, rough, irregular fractures. СЗ 40.2-48.2 8.0/8.0 100 88 45 C3: Hard, fresh, fine to coarse grained, gray, quartz-mica-garnet SCHIST, with very thin, 2 5 convoluted, crenulated, horizontal to subhorizontal foliation, rough, very closely to moderately closely spaced, horizontal to sub-horizontal foliation joints/fractures. 40.7'-41.0' and 45.8'-45.9': Cross-foliation 0 1 2 joints/fractures: Smooth, slightly weathered, ub-horizontal to moderately dipping, iron-oxide 3 stained, kaolinite coated. 50 2 C4: Hard to very hard, slightly weathered, fine consequence of the consequence of the coarse grained, light gray, quartz-mica-garnet SCHIST, with very thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, very 0 0 closely to moderately closely spaced, fresh to slightly weathered, horizontal to sub-horizontal, kaolinite coated foliation joints/fractures. C4 48.2-58.2 10.0/10.0 100 77 8 4 7 50.1'-50.2': Cross-foliation joint/fracture: Smooth, sub-vertical, kaplinite coated. 55 2 53.2'-53.8' and 54.8'-55.3': Rough to smooth, slightly to moderately weathered, sub-horizontal 2 to moderately dipping, very closely fractured 1 53.6'-53.8': Cross-foliation joint/fracture: Rough, slightly weathered, vertical 54.7'-54.8': Very soft rock. 0 4 60 **GRANULAR SOILS COHESIVE SOILS** ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS DENSITY CONSISTENCY HARDNESS WEATHERING NO. PER FT ANGLE ATTITUDE SPACING/THICKNESS <2 2-4 Very Soft Medium (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-4 Very Loose Very Soft Complete Very close/Very Thin 0-5 5-35 Horizontal 4-10 Soft 2"-1" Severe Close/Thin Sub-Horizontal Moderate 10-30 Medium Dense 4-8 Med Stiff Med Hard 3 Mod Close/Mod Thick 35-55 Mod Dipping Dense 8-15 Stiff Hard 55-85 Slight 3'-10' Wide/Thick Sub-Vertical Very Hard >50 Very Dense 15-30 Very Stiff 5 Very Wide/Very Thick NOTES: 4) 39.1"-40.2": Roller bit got stuck due to borehole collapse. Spun 3" diameter casing and cleaned out. Sp Pinch and swell features in C10.
 Boltom of borehole at 115.6 feet; acoustic televiewer survey performed; borehole grouted upon completion.

											BORING LOG							S	heet: 3 of 4
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	DMJ	M	HARRIS	ARI	IF A	1.4							BORING S	STATION: 11	72	-04.46		SET: 72.36	
1			A.	disk sau						SECO	ND AVENUE SUBWA	Y	PROJECT	NO. CM11	88			RDINATES	
											PROJECT			EL. 142.91				RTH: 21960	
ı						Second							DATUM:				EAS	T: 995994.	7921
						SHOWING		L					FINAL BO	RING DEPT			DEA	DINICE	
SAM	PLER:	2" O.E). Split Spo	on							ren George, Inc.		DATE		JUL	DEPTH C	A SINC	DINGS ATO E	B. TIME
SAM	PLER H	IAMMI	ER: 140 lb S	afety	hamn	ner				AN: L. Mu			DATE	TIME	-	EPIN C	ASIIAC	3 31/	D. THAL
CAS	ING SIZ	E: 4"	to 27'							ER: G. GI		/02/07		-	\vdash	-		 	
			: 300 lb Do	nut						TART: 12/ /ED BY: C				1	\vdash				
ROC	K COR	E: NX		_		T _	12	1	A IEV	EU BT. C	. Snee DATE. S/10/01					INSITU	PROP	ERTIES	
	F) OR N/FT)	ORE NO.	РТН (FT)	NCH	PF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	DATA	our.	SAMPLE DESCRIPTION	CODE)	YMBOL	АРНҮ		HARDNES	s WE	EATHERING	
ОЕРТН (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	EN/REC: 8 OCK (FT/F	OTAL COF	OCK COR	FIELD TEST DATA	BUR	CLASSIFICATIONS	, 0052,	STRATA SYMBOL	STRATIGRAPHY	NOTES	see below values		ee below for values 2 3 4 5	see below for values
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	4									fine to c	very hard, fresh to slightly we coarse grained, light gray, qua SCHIST, with very thin, convo	rlz-mica-						+	0
٠.	4									slightly	crenulated, horizontal to sub-	horizontal	=						1
	4									foliation	, rough, very closely to mode spaced, fresh, horizontal to st	rately	==				-	+	
		C5	58.2-68.2			10.0/10.0	100	89			tal foliation joints/fractures.	,,,,	==			Act of			0
	4										.9': Smooth, horizontal to sul		==						1
65-	5										tal fractures, possible slickens (.3': Cross-foliation joint/fraction								0
"	5									Rough,	slightly weathered, moderate	y dipping,	==						
'	1,									calcite o	coated.		==						0
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	5_												==			r at the		18	3
	4																- 66		
'	-										HERROSEN WIN		==						1
70 -	5						1			Similar	lo SCHIST in C5. 3.8', 69.0', 70.0', 70.8', 73.8', 1	75.4' 76.0'	==						2
١.	5										3: Cross-foliation joints/fracti					2.00	- 1		0
	5				ŀ					Smooth	very closely to closely space	d, slightly	三三			Ç.	- E	-	
١.										to mode	rately weathered, moderately ical, with kaolinite deposits.	dipping to							0
	5	C6	68.2-78.3			10.1/10.1	100	77		73.8' an	d 76.3': Cross-foliation joints	fractures:						2.2	3
	5_	Cb	00.2-70.3			10.1710.1	100	l ''		Rough,	planar, calcite coated.					-	-		
	5		1.0								.0' and 76.9'-77.5': Tightly he to vertical, calcite filled.	aled, sub-						_	1
75 -	1-3-										.4': Very closely spaced fract	ures,						A 4 5	4
١.	5										coated.		三三			法基金		3.45	1
	5					100							三三			4.5	-		
'	-					100							==						0
١.	–			-			-	-	\vdash				==			-1	3-1		2
-	4												==			T 65			0
90-	4									Similar	o SCHIST in C5.		==				-		329.59
80 -	5		100							80.8'-81	.0': Cross-foliation joint/fractu	ires:	==		- 1	E.			5
	1										slightly weathered, very close	ly spaced,	= =						5
١ -	4									moderat	ely dipping.				- 1				2
	4												$\equiv \equiv$	1	- 1	100	-		
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		ENSIT				STENCY	1	HARD	NES: ery So		WEATHERING 1 Complete	(1) 0		<2" Very	do	se/Very Thin		0-5	Horizontal
4-10 Loose 2-4 Soft 2 10-30 Medium Dense 4-8 Med Stiff 3										n	2 Severe	(2) 1-2		2"-1' Clos	e/M	nin			Sub-Horizontal Mod Dipping
10	10-30 Medium Dense 4-8 Med Stiff 30-50 Dense 8-15 Stiff >50 Very Dense 15-30 Very Stiff									ard	3 Moderate	(3) 3-10		1'-3' Mod 3'-10' Wid		se/Mod Thic	*	35-55 I 55-85 S	sub-Vertical
30-50 Dense 8-15 Stiff									ard ery Ha	ard	4 Slight 5 Fresh	(4) 11-20	'			de/Very Thic	k		/ertical
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NOTES:

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\frac{39.1^40.2^*}{20.2^*}. \]
Roller bit got stuck due to borehole collapse. Spun 3" diameter casing and cleaned out. Pinch and swell features in C10.

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Bottom of borehole at 115.6 feet; acoustic televiewer survey performed; borehole grouted upon completion.

Sheet: 2 of 4 **BORING LOG BORING NO. B73-4** DMIMITHARRIS - ARUP **BORING STATION: 1172+04.46** OFFSET: 72.36 SECOND AVENUE SUBWAY COORDINATES: PROJECT NO. CM1188 **PROJECT** G. SURF EL. 142.91 NORTH: 219609.5098 EAST: 995994.7921 DATUM: NYCT FINAL BORING DEPTH (FT) 115.6 SAMPLER: 2" O.D. Split Spoon GROUND WATER READINGS BORING CO: Warren George, Inc. STAB. TIME DATE TIME | DEPTH | CASING FOREMAN: L. Muniz SAMPLER HAMMER: 140 lb Safety hammer CASING SIZE: 4" to 27' ENGINEER: G. Gutshtevn DATE START: 12/27/06 DATE END: 01/03/07 CASING HAMMER: 300 lb Donut REVIEWED BY: C. Snee DATE: 3/16/07 ROCK CORE: NX INSITU PROPERTIES (NIN) 3 8 NUMBER OF F FRACTURES REC ROD DATA (BPF) OR (MIN/FT) STRATA SYMBOL CORE DEPTH SOIL (FFI) STRATIGRAPHY HARDNESS WEATHERING PER FOOT (BPF) SAMPLE DESCRIPTION CORE CORE BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS TEST see below for see below for see below BLOWS / 6 PEN/REC: ROCK (FT/ SAMPLE / NUMBER CASING (CORING (N VALUE values DEPTH (TOTAL FIELD 1 ROCK 3 4 5 1 2 3 4 C1: Medium hard to hard, slightly to severely weathered, fine to coarse grained, light gray to gray, quartz-mica-garnet SCHIST, with thin to 1 5 very thin, convoluted, crenulated, horizontal to C1 27.1-37.1 10.0/9.7 97 40 1 moderately dipping foliation, rough to smooth, very closely to closely spaced, slightly to moderately weathered, horizontal to moderately 3 dipping, iron-oxide stained, kaolinite filled 5 foliation joints/fractures. 28.7'-28.9', 35.8'-36.1' and 36.7'-36.9': Cross-9 foliation joints/fractures: Rough, slightly weathered, moderately dipping. 31.9'-32.2': Cross-foliation joint/fracture: 3 PEGMATITE 2 Rough, moderately dipping with kaolinite 21 37.1-39.1 2.0/2.0 100 45 34.3'-34.9': Healed vertical joint. 34.6'-35.3': Cross-foliation joint/fracture: 4 46 ROCK N Slightly to moderately weathered, sub-vertical, NA with kaplinite deposits 40 36.0'-36.4' and 36.7'-37.1': Very soft rock, 2 9 severely weathered, kaolinite. 1 5 C2: Very hard, slightly weathered, fine to 0 coarse grained, orange and white, quartzo-feldspathic PEGMATITE, with fresh to slightly reathered, rough, irregular fractures. СЗ 40.2-48.2 8.0/8.0 100 88 C3: Hard, fresh, fine to coarse grained, gray, 45 cas: hard, fresh, fine to coarse grained, gra-quartz-mica-garnet SCHIST, with very thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, very closely to 2 0 moderately closely spaced, horizontal to sub-horizontal foliation joints/fractures. 40.7'-41.0' and 45.8'-45.9': Cross-foliation 1 2 joints/fractures: Smooth, slightly weathered, sub-horizontal to moderately dipping, iron-oxide 3 4 stained, kaolinite coated. 50 2 C4: Hard to very hard, slightly weathered, fine to coarse grained, light gray, quartz-mica-garnet SCHIST, with very thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, very 0 0 closely to moderately closely spaced, fresh to slightly weathered, horizontal to sub-horizontal, 10.0/10.0 100 77 C4 48.2-58.2 8 kaplinite coated foliation joints/fractures. 7 50.1'-50.2': Cross-foliation joint/fracture: 55 Smooth, sub-vertical, kaolinite coated. 2 53.2'-53.8' and 54.8'-55.3': Rough to smooth, slightly to moderately weathered, sub-horizontal 2 to moderately dipping, very closely fractured 1 53.6'-53.8': Cross-foliation joint/fracture: 0 Rough, slightly weathered, vertical. 54.7'-54.8': Very soft rock. 60 ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS GRANULAR SOILS COHESIVE SOILS ATTITUDE NO. PER FT ANGLE CONSISTENCY ARDNESS WEATHERING SPACING/THICKNESS DENSITY (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 0-5 5-35 Horizontal Very close/Very Thin Very Loose Loose Very Soft Medium 0.4 <2 Very Soft Complete Sub-Horizontal 2"-1' 1'-3' Severe Close/Thin 4-10 35-55 55-85 Moderate Mod Dipping Mod Close/Mod Thick Med Stiff Med Hard 10-30 Medium Dense 4-8 Sub-Vertical 8-15 Hard Slight 3'-10' Wide/Thick 30-50 Dense Very Wide/Very Thick Vertical Very Hard Fresh Very Stiff >10 >50 Very Dense 15-30 >30 NOTES: 4) 39.1'-40.2': Roller bit got stuck due to borehole collapse. Spun 3" diameter casing and cleaned out. 5) Pinch and swell features in C10. 6) Bottom of borehole at 115.6 feet; acoustic televiewer survey performed; borehole grouted upon completion.

										E	BORING LOG							Sheet: 3 of 4
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	DMJ	M	HARRIS	٨R	UP 1	1.4						.,	BORING S	STATION: 11	72		OFFSET: 72.3	
•			-	Acis = 0.	-					SECON	ID AVENUE SUBWA	T		NO. CM11	88		COORDINATE	
					4.8						PROJECT			L. 142.91			NORTH: 2196	
					7	Aversor Substra							DATUM : I		11/5		EAST: 995994	4.7921
								 					FINAL BO	RING DEPT		D WATER I	PEADINGS	
			D. Split Spo					_			en George, Inc.		DATE	TIME		EPTH CA		AB. TIME
			ER: 140 lb \$	afety	hamn	ner				AN: L. Mur ER: G. Gu			DATE	111112		2,		
	ING SIZ		300 lb Do	nut						TART: 12/2		/03/07						
	K COR		000 10 00					RE	VIEW	ED BY: C.	Snee DATE: 3/16/0	7			_			
		T.	_	Τ		Î	8	8								INSITU P	ROPERTIES	NUMBER OF
FT)	(BPF) OR (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	BURN	SAMPLE DESCRIPTION MISTER (USCS / NYC BLDC CLASSIFICATIONS	G CODE)	STRATA SYMBOL	STRATIGRAPHY		HARDNESS		
БЕРТН (FT)	CASING (AMPLE	AMPLE	LOWS	VALUE	EN/RE	OTAL (OCKO	IELD T				STRAT	STRAT	NOTES	values	1 2 3 4 5	Σ
۵	00	Ø,	v)	-	Z	4 2	1	2	ш		had for the all abilities	athorad			-	The state of the s		2
	4									fine to co	very hard, fresh to slightly w parse grained, light gray, qu	artz-mica-					-	- Sen
	4									garnet St	CHIST, with very thin, convo	duted,						0
-	4					i	l			slightly o	renulated, horizontal to sub- rough, very closely to mode	nonzontai rately	==					1
	4_	C5	58.2-68.2	1		10.0/10.0	100	89		closely s	paced, fresh, horizontal to s	ub-	= =					0
	4	L-3	JU.2-00.2	1	1	10.0/10.0	1.00	""		horizonta	i foliation joints/fractures. 9': Smooth, horizontal to su	b-	==			71 - Y	- 100	1900
	5_	1					1			horizonta	I fractures, possible slicken	sides.						1
65	T				l					62.8'-68.	 Cross-foliation joint/fract lightly weathered, moderate 	ure: Iv dipoina						0
-	5_							ĺ		calcite co		iy dipping.				7		0
-	5			1														1
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70 -	5				1		1			Similar to	SCHIST in C5.		==					2
	5_										8', 69.0', 70.0', 70.8', 73.8', Cross-foliation joints/fract					-	A STATE OF THE STA	-
	5		1		1					Smooth,	very closely to closely space	ed, slightly	三三			C _		0
-	-									to modera	ately weathered, moderately cal, with kaolinite deposits.	dipping to	==					0
	5	C6	68.2-78.3			10.1/10.1	100	77		73.8' and	76.3": Cross-foliation joints	/fractures:					24	3
-	.5			1						Rough, p	lanar, calcite coated. O' and 76.9'-77.5': Tightly he	noted cub.	1 1	1		= 3 %		1
~-	5_		1999							vertical to	vertical, calcite filled.	58160, 300-				73 TO _		
75 -	5					123.4				76.3'-76.4	4': Very closely spaced frac	tures,						4
-		21								kaolinite	coateo.		==				1.3630	1
-	5					100								i		- 1 to 1	N. A. S.	0
_	5				,								==					2
	4					*11.00										(-
	4										500000000000000000000000000000000000000		= =					0
80 —											SCHIST in C5. Cross-foliation joint/fraction	ures:						5
_	5									Rough, sl	ightly weathered, very close	ly spaced,	= =					5
_	4					1					ly dipping.					- ·		
	4		10.0										==					2
-		C7	78.3-88.3			10.0/10.0	100	88									7.7	1
-	5												==			11.	2.5	0
85	5					233												0
	5												==	[1			
-	5					100								1	1			0
-													==		3			1
-	5														S. Carlotte		100	2
_	4													1	0	_	发生为 生	15500
_	5														200			2
90 —				<u></u>			Щ	_		ODE OU	ACTEDISTICS.			INT/EPACT	IPE	CHARACTER	ISTICS	
	RANUL				SIVE S			RO			RACTERISTICS WEATHERING	NO. PER		SPACING/			ANGLE	ATTITUDE
0-4 Very Loose										oft	1 Complete	(1) 0		<2" Very	dos	e/Very Thin	0-5	Horizontal Sub-Horizontal
4-10 Loose 2-4 Soft 2 Medium 2 Severe 10-30 Medium Dense 4-8 Med Stiff 3 Med Hard 3 Moderate												(2) 1-2 (3) 3-10		2"-1' Clos 1'-3' Mod		in se/Mod Thick	35-55	Mod Dipping
10-50 Meuton Dense 8-15 Stiff 4 Hard 4 Slight (4) 11-20 3-10' Wide/Thick 30-50 Dense 8-15 Stiff 4 Hard 4 Slight (4) 11-20 3-10' Wide/Thick 10-10-10-10-10-10-10-10-10-10-10-10-10-1												55-85	Sub-Vertical					
										ard		200		>10' Very	Wio	le/Very Thick	85-90	Vertical
			,	30 F	ard										_			
110	TEC:																	
NO	TES:	21. D	aller hit ant s	hick di	e to br	rehole colla	กรค	Sour	3° di	iameter casi	ing and cleaned out.							

 ^{39.1&#}x27;40.2': Roller bit got stuck due to borehole collapse. Spun 3" diameter casing and cleaned cut.
 Pinch and swell features in C10.
 Bottom of borehole at 115.6 feet; acoustic televiewer survey performed; borehole grouted upon completion.

		BORING LOG BORING NO. B73-4 BORING STATION: 1172+04.46 OFFSET: 72.36 BORING STATION: 1172+04.46 OFFSET: 72.36 BORING STATION: 1072+04.46 OFFSET: 1072+04.46 OFFSET: 1072+04.46 OFFSET: 1072+04.46 OFFSET: 1072+04.46 OFFSET: 1072+04.46 OFFS															
	DMJ	MB	HARRIS	ARI	IP A	1				SECOND AVENUE SUBWAY PROJECT	PROJEC	STATION: 1 T NO. CM11 EL. 142.91			OFFS COO		
1					300	Average Submer		-			DATUM	NYCT	11/5	E) 445.6	EAST	995994.	7921
_	151 55		0 1110			- Towns		100	DIMO	CO: Warren George, Inc.	FINAL B	ORING DEPT		1) 115.6 ID WATER	REAL	DINGS	
			D. Split Spc ER: 140 lb \$		hamn	ner				N: L. Muniz	DATE			EPTH C			B. TIME
CAS	ING SIZ	E: 4"	to 27°							R: G, Gutshteyn ART: 12/27/06 DATE END: 01/03/07		-	\vdash				
	ING HA		: 300 lb Dc	nut						ART: 12/27/06 DATE END: 01/03/07 ED BY: C. Snee DATE: 3/16/07		1					
	T					Ê	(%	8						INSITU	PROPE	RTIES	NUMBER OF
F	BPF) OR MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	6 INCH	(BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	STRATA SYMBOL	зварну		HARDNES		ATHERING	
ОЕРТН (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE	SAMPLE	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC ROCK (F)	TOTALC	ROCK CC	FIELD TE	CLASSIFICATIONS	STRATA	STRATIGRAPHY	NOTES	values	5 1	values 2 3 4 5	for values
65	4 4 5 5 5 5 5 5	C5	58.2-68.2			10.0/10.0	100	89		Hard to very hard, fresh to slightly weathered, fine to coarse grained, light gray, quartz-mica-garnet SCHIST, with very thin, convoluted, slightly crenulated, horizontal to sub-horizontal foliation, rough, very closely to moderately closely spaced, fresh, horizontal to sub-horizontal foliation joints/fractures. 59.6'-59.9': Smooth, horizontal to sub-horizontal fractures, possible slickensides. 62.8'-68.3': Cross-foliation joint/fracture: Rough, slightly weathered, moderately dipping, calcite coated.							2 0 1 0 1 0 0 0 1 3
75-	5 5 5 5 5 5 5 5 5 5	C6	68.2-78.3			10.1/10.1	100	77		Similar to SCHIST in C5. 68.6', 68.8', 69.0', 70.0', 70.8', 73.8', 75.4', 76.0' and 76.3': Cross-foliation joints/fractures: Smooth, very closely to closely spaced, slightly to moderately weathered, moderately dipping to sub-vertical, with kaolinite deposits. 73.8' and 76.3': Cross-foliation joints/fractures: Rough, planar, calcite coated. 76.5'-77.0' and 76.9'-77.5': Tightly healed, sub-vertical to vertical, calcite filled. 76.3'-64': Very closely spaced fractures, kaolinite coated.							1 1 2 0 0 0 0 3 1 1 4 1 0 0 2 2
80 -	4 5 4 5 5 5 5	C 7	78.3-88.3			10.0/10.0	100	88		Similar to SCHIST in C5. 80.8'-81.0': Cross-foliation joint/fractures: Rough, slightly weathered, very closely spaced, moderately dipping.			And the second states and the second				0 5 5 5 2 1 0 0 0 0
	4										==		0000			415	2
90-	5 COANIII AR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS																
10 30	BPF DENSITY BPF CONSISTENCY HARDNESS WEATHERING 1 Complete 1 Complete 2 Very close/Very Thin 2 Severe 2 1-2 2*-1 Close/Thin Cose/Unicontal Solid Sol																
NO	OTES:	2': R	oller bit got s	tuck du	e to bo	orehole colla	pse.	Spur	3° di	ameter casing and cleaned out.							

Pinch and swell features in C10.

Bottom of borehole at 115.6 feet; acoustic televiewer survey performed; borehole grouted upon completion.

										BORING LOG						Sheet: 3 of 4
-			1 45 4					T			T			ВС	DRING N	O. B73-4
	DMJ	M	HARRIS	• ARI	JP 1	1.4					BORING	STATION: 1	172-	04.46	OFFSET: 72.	
			•	nderk son	-					SECOND AVENUE SUBWAY		T NO. CM11	88		COORDINATI	
										PROJECT		EL. 142.91			NORTH: 219	
1					7	Averse					DATUM:			7) 445.0	EAST: 99599	4.7921
								1			FINAL BO	ORING DEPT		1) 115.6 ND WATER	DEADINGS	
			D. Split Spo							CO: Warren George, Inc.	DATE					TAB, TIME
SAM	PLER H	IAMM	ER: 140 lb	Safety	hamn	ner				AN: L. Muniz	DAIL	THAT	+	, L. 111 O/		
	ING SIZ		to 27' 300 lb Do	anut.						ER: G, Gutshteyn FART: 12/27/06 DATE END: 01/03/07						
	K COR		JOO ID D	Jilut						ED BY: C. Snee DATE: 3/16/07						
				T		Î	18	9						INSITU F	PROPERTIES	NUMBER OF
-	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	S INCH	(BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE)	SYMBOL	STRATIGRAPHY		HARDNESS		FRACTURES PER FOOT
ОЕРТН (FT)	SING (I	MPLE /	MPLE	BLOWS / 6 INCH	N VALUE (BPF)	EN/REC	DTAL C	OCK CC	ELD TE	CLASSIFICATIONS	STRATA	TRATIC	NOTES	values 1 2 3 4 5	values	for values
8	28	Š	တိ	<u>8</u>	z	2 %	F	×	ŭ.			S -	z	**************************************		G219241
	4									Hard to very hard, fresh to slightly weathered, fine to coarse grained, light gray, quartz-mica-						2
٠	1									garnet SCHIST, with very thin, convoluted,						0
-	4									slightly crenulated, horizontal to sub-horizontal foliation, rough, very closely to moderately	ΞΞ					1
Ι.	4	1.3.		1			l			closely spaced, fresh, horizontal to sub-					-	
	4	C5	58.2-68.2			10.0/10.0	100	89		horizontal foliation joints/fractures.	ΞΞ				-	0
Ι.	5									59.6'-59.9': Smooth, horizontal to sub- horizontal fractures, possible slickensides.				100		1
65 -	1.5									62.8'-68.3': Cross-foliation joint/fracture:	==			a to te		0
-	5_									Rough, slightly weathered, moderately dipping, calcite coated.						0
١.	5_															1
	5										==					
'				+	_		_	-			==					3
-	4		Ì													1
70 -	5									Similar to SCHIST in C5.	E					2
Ι	5			1						68.6', 68.8', 69.0', 70.0', 70.8', 73.8', 75.4', 76.0' and 76.3': Cross-foliation joints/fractures:					- Sept.	
	5]							Smooth, very closely to closely spaced, slightly	三三			100 m		0
-										to moderately weathered, moderately dipping to sub-vertical, with kaolinite deposits.	I					0
	5	C6	68.2-78.3			10.1/10.1	100	77		73.8' and 76.3': Cross-foliation joints/fractures:	==		Н		2(2)	3
	5	-	00.2 70.0	1						Rough, planar, calcite coated. 76.5'-77.0' and 76.9'-77.5': Tightly healed, sub-				100		1
	5_		100							vertical to vertical, calcite filled.	三三			# T-	-	
75 -	5									76.3'-76.4': Very closely spaced fractures,	==					4
-										kaolinite coated.	==			1,500	4.38	1
-	5				1	100	1				==					0
-	5				,	4					==					2
	4	1	120								==					
	4	1.0								DI VIV. AND BOLLIOT IN OF						0
80 -										Similar to SCHIST in C5. 80.8'-81.0': Cross-foliation joint/fractures:	= =					5
-	5									Rough, slightly weathered, very closely spaced,						5
-	4									moderately dipping.				-		2
	4										$\equiv \equiv$			- 100		- 4
	5	C7	78.3-88.3			10.0/10.0	100	88			_ =					
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90 -	5															100000
	RANUL	AR SC	DILS I	COHE	SIVE S	SOILS		RO	CK (CORE CHARACTERISTICS	J			CHARACTE	RISTICS	
		ENSIT		BPF (CONSI	STENCY		IARD	NES	WEATHERING NO. PE	RFT	SPACING			ANGLE 0-5	ATTITUDE Horizontal
0	4 V	ery Lo	ose		ery So Soft	oft	1 2		ery So		1	<2" Very 2"-1' Clos		se/Very Thin in	5-35	Sub-Horizontal
		ose edium			son Ved Sti	iff	3	M	ed Ha	rd 3 Moderate (3) 3-1		1'-3' Mod	Clo	se/Mod Thick	35-55 55-85	Mod Dipping Sub-Vertical
30	-50 D	ense	8	3-15	Stiff		4 5		ard ery Ha	4 Slight (4) 11-2 ard 5 Fresh	20	3'-10' Wid >10' Very		ick de/Very Thick	85-90	Vertical
>50 Very Dense 15-30 Very Stiff 5 >30 Hard							3	ve	y rie] 0 7,5511		,	,		aversor resident.	
NO	TES:									and the section and alapsed and						- 1

BORING LOG Sheet: 4 of 4 **BORING NO. B73-4** DMJM#HARRIS - ARUP **BORING STATION: 1172+04.46** OFFSET: 72 36 **SECOND AVENUE SUBWAY** PROJECT NO. CM1188 COORDINATES: **PROJECT** G. SURF EL. 142.91 NORTH: 219609.5098 DATUM: NYCT EAST: 995994.7921 FINAL BORING DEPTH (FT) 115.6 SAMPLER: 2" O.D. Split Spoon GROUND WATER READINGS ME | DEPTH | CASING | 5 BORING CO: Warren George, Inc. SAMPLER HAMMER: 140 lb Safety hammer FOREMAN: L. Muniz STAB. TIME CASING SIZE: 4" to 27' ENGINEER: G. Gutshtevn CASING HAMMER: 300 lb Donut DATE START: 12/27/06 DATE END: 01/03/07 ROCK CORE: NX REVIEWED BY: C. Snee DATE: 3/16/07 8 (NVI) **INSITU PROPERTIES** 8 F NUMBER OF CORE REC ROD ((BPF) OR (MIN/FT) DATA / CORE N **FRACTURES** DEPTH (STRATA SYMBOL STRATIGRAPHY HARDNESS WEATHERING PER FOOT PEN/REC: SOIL ROCK (FT/FT) SAMPLE DESCRIPTION ROCK CORE BURMISTER (USCS / NYC BLDG CODE) TEST DEPTH (FT) BLOWS / 6 CASING (SAMPLE / N VALUE CLASSIFICATIONS see below for see below for see below SAMPLE NUMBER TOTAL NOTES FIELD . 1 2 3 4 5 1 2 3 4 5 1 2 3 4 Very hard, fresh, fine to coarse grained, light gray, quartz-mica-gamet SCHIST, with thin, 2 convoluted, crenulated, horizontal to sub-0 horizontal foliation, rough, very closely to closely spaced, fresh, horizontal to sub-2 horizontal foliation joints/fractures. 90.2', 90.5' and 92.9': Cross-foliation C8 88.3-98.2 9.9/9.9 100 90 0 joints/fractures: Rough, fresh, sub-horizontal to 0 moderately dipping. 0 0 0 0 1 Very hard, fresh, fine to coarse grained, light gray, quartz-mica-garnet SCHIST, with thin, 0 severely convoluted and crenulated, horizontal 0 foliation (no foliation fractures). 98.2'-108.1': High quartz feldspar content. 0 99.6: Cross-foliation joint/fracture: Rough, fresh, moderately dipping. 106.4'-108.1': Poorly laminated. 18 C9 98 2-108 1 9.9/9.9 100 100 26 0 24 0 19 0 22 27 0 0 20 4 47 Similar to SCHIST in C9 109.1'-109.7': Rough, very closely to closely spaced, horizontal to sub-horizontal foliation 110 0 60 joints/fractures. 109.6'-111.4': Thick quartz band. 0 C10 108.1-115.6 7.5/7.5 100 96 5 0 0 0 115 Bottom of borehole at 115.6 feet GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS BPF DENSITY BPF CONSISTENCY HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS <2 Very Soft Very Loose (1) 0 (2) 1-2 (3) 3-10 0-5 5-35 Horizontal Sub-Horizontal Very Soft Complete Very close/Very Thin 4-10 Loose 2-4 4-8 Soft 2 2"-1" Close/Thin Med Stiff Medium Dense Med Hard Moderate 1'-3' Mod Close/Mod Thick 35-55 **Mod Dipping** Slight 30-50 Dense 8-15 Stiff Hard 3'-10' Wide/Thick 55-85 Sub-Vertical 15-30 Very Dense Very Stiff Very Hard Fresh >10 Very Wide/Very Thick 85-90 Vertical >30 Hard NOTES: 4) 39.1"-40.2": Roller bit got stuck due to borehole collapse. Spun 3" diameter casing and cleaned out. 5) Pinch and swell features in C10. 6) Bottom of borehole at 115.6 feet; acoustic televiewer survey performed; borehole grouted upon completion.

BORING NO. B73-4

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Appendix B: Soil Boring Logs for the 86th Street Station Provided by MTA NYCT

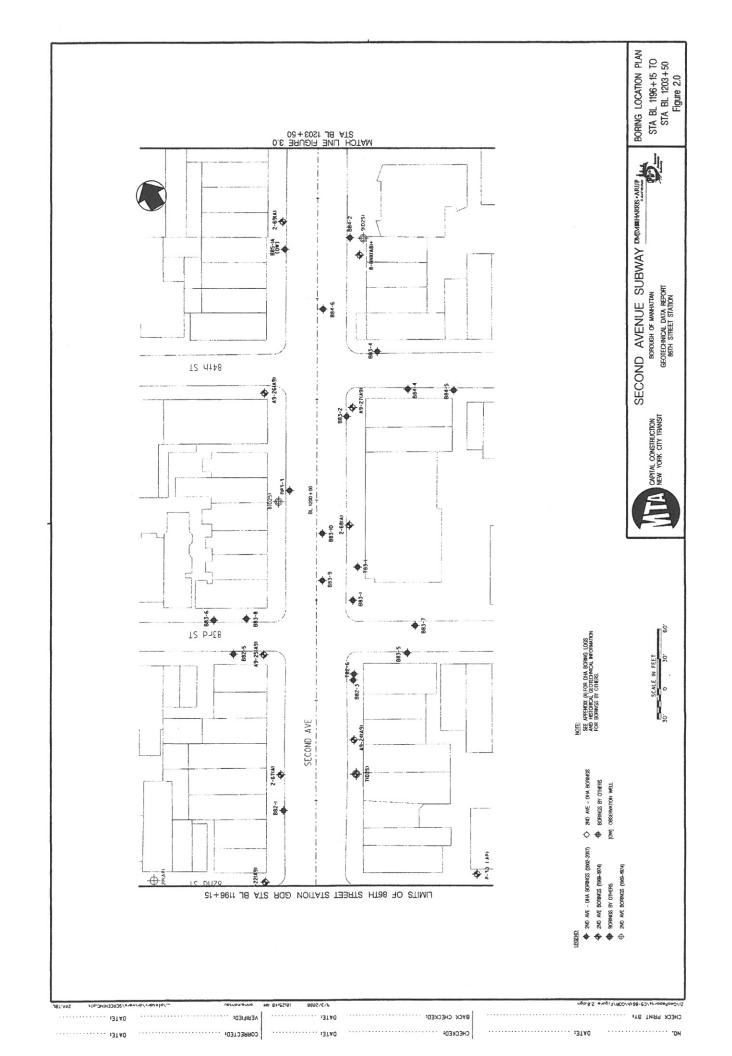
Note: only borings located within the APE have been included here.

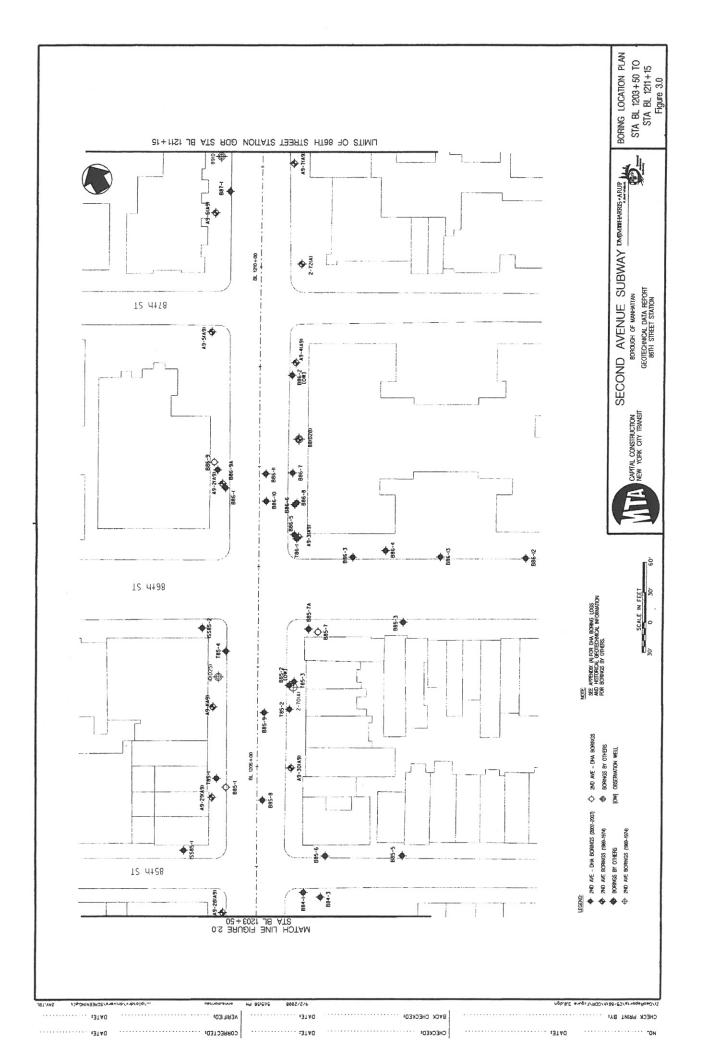
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Appendix B: Soil Boring Logs for the 86th Street Station Provided by MTA NYCT

Note: only borings located within the APE have been included here.

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SAM	PI ER	HAMM!	D. Spiil S ER: 140 lt	Autor	natic					AN: P. Ly	sey Boring and Drilling Co	o., inc.	DATE			EPTH				B. TIME	
		ZE: 3"		. Autor	ilauc					ER: D. Pe			Note 1	111111	+	<u> </u>	0/10		017	J. THVIL.	_
			Spun							TART: 8/1		/17/04			+						_
		RE: NQ									I.A. Ponti, Jr DATE: 9/24/0										
						Î	18	3								IN	SITU PE	ROPERTI	ES		
£	BPF) OR MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	B INCH	(BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	CORE REC (%)	ROCK CORE ROD (%)	TEST DATA	BUF	SAMPLE DESCRIPTION		SYMBOL	зарну		HARD		WEATH		FRACTUR PER FOC	RES OT
БЕРТН (FT)	CASING (BPF) OR CORING (MIN/FT)	AMPLE	AMPLE	BLOWS / 6 INCH	N VALUE (BPF)	EN/REC	TOTAL C	OCK CO	FIELD TE		CLASSIFICATIONS		STRATA SYMBOL	STRATIGRAPHY	NOTES	see be valu	Jes	see bell valu		see below for values 1 2 3 4	
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-	1			1			1			SM / 7-		, o (o.	~~					17			i
-	-				1								\sim								-
5-							_				and the second second		~~								
١		S2	5-6.2	10	110/8"	14/6					nse, olive to greenish-yellow SAND, trace Silt, trace Grave		1/1/1/1								
-	1	- 02	5-0.2	100\2		1410	-		_		ragments (SP-SM / 7-65)	.,	~~					1 -1	-		
-				-			+		-	C1: Har	d, fresh, fine to coarse grain	ed light to	-	ROCK	5	3007500	EC 1	200-607-25-60	- Carteria	605485277 t	1
_										dark gra	ay, quantz-mica-gamet SCHI	ST, with	ΞΞ	ROOK		in and					Ŀ
											n, convoluted, crenulated, su				1 1		OE .				:
-		C1	7-12			500	00	10		closely	al foliation, rough to smooth, to closely spaced, moderatel	very v dipoina to	三三								1
10-		Ci	7-12			5/3.3	66	10		vertical,	slightly weathered, strongly	iron-oxide			6	1030	2 ; .	All party and			L
											foliation joints/fractures; high	n quartz	ΕΞ		7						1
_										content.	I', 8.0', 8.3', 8.8' and 9.8': Cro	es-foliation					- 1			1	1.
-		-		-	-		+	-	-		actures, rough to smooth, ver		E		1 1	-++-:			+		۲
										closely	spaced, sub-horizontal to mo	derately	==		1						1
											slightly weathered, strongly	iron-oxide									1
-										stained. 10 0'-12	2.0': Fracture zone		= =			niesiari	80	PROSTOR'S	NEW CO.	era sec	H
15-		C2	12-17			5/3.1	62	7		10.0 12								A.	Med In		Ŀ
15										C2: Sim	ilar to Schist in C1, except si	ıh.	$\equiv \equiv$						25		[·
-											al to moderately dipping folia					a mark					H
_							1-1				al to moderately dipping folia		==							EEC _	1
										joints/fra veins.	actures; occasional very thin	quartz	E								10
							1 1				.9': Cross-foliation joint/fracti	ure, rough,	==								١,
-											r, sub-vertical to vertical, slig		E								F
20-		C3	17-22			5/5	100	54		weather	ed, strongly iron-oxide staine .2' abd 15.6'-15.8': Fracture :	ed.	==				8	1	530		3
20 —										to smoo	th, very closely spaced, sligh	itly						1	12.0		1
										weather	ed, iron-oxide stained foliation				8					-	H
4		\vdash		-			\vdash		\Box		joints/fractures. itar to Schist in C2, except hi	oh quadz	==		9		E			\$ 15 m	17
										content.		gri qualit.									
٦											ss-foliation joint/fracture, rou					TIT					
\dashv							1				ely closely spaced, moderate weathered, iron-oxide stained		1 1			4	-				
25								- 1	- 1	21.3'-21	.9': Cross-foliation joint/fractu	ire, rough,	1 1								
23											, sub-vertical to vertical, iron	-oxide									
-	- 1						1 1		H	slained	fruncates at 21.9' Bottom of borehole at 3	22 feet	- I		1 1						
4											DOMONTO DOTONO GEN	EE 1001							1 1	1 +	
7	l				- 1																
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30-	1																				
	2001111	ARCO	1 211	COUL	CD/F C	OIL C. T			701/	COREC	ADACTEDICTION	7		ONTERACT		CULT	CTEE	OTICO			_
GI BP		LAR SO			SIVE S	STENCY					MEATHERING	NO DEC		OINT/FRACT					C 1=	TITLIOC	_
0- Bb		ENSITY ery Loo			ery So		1	HARD Ve	NES ry Sc		1 Complete	NO. PER (1) 0		SPACING <2" Ven		CKNESS e/Very		ANGL 0-5		TITUDE rizontal	
4-1	O Lo	oose		2-4 \$	Soft		2	Me	edium	1	2 Severe	(2) 1-2		2"-1' Clos	se/Th	in		5-3	5 Sut	o-Horizontal	
10-		ledium l			Med Stif	ff	3		ed Ha	rd	3 Moderate	(3) 3-10		1'-3' Mod	Clos	se/Mod	Thick	35-5		d Dipping	
30-5 >5		ense ery Den			Stiff /ery Sti	ff	4 5	Ha Ve	ird :ry Ha	ard	4 Slight 5 Fresh	(4) 11-20	'		le/Thi	ick de/Very	Thick	55-8 85-9		o-Vertical rtical	
		.,			Hard	.	-		, , ,,	-		1		- 10 461	, ,,,,	- V CI Y		00-0	- +6		
NOT	TEC:										1										
NOT	EQ.																				

NOTES.

1) Ground water level not recorded.

2) Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) Hand augered to a depth of 2 feet prior to start of boring.
5) RQD affected by sub-vertical to vertical foliation joint/fracture between 7.3' and 7.8'.
6)"N" denotes no data available.
7) Contiguous and consecutive pieces of rock core retrieved from core C1 and C2 indicate possible core loss between 10.0' and 14.0'
8) RQD affected by sub-vertical to vertical joint/fracture between 21.3' and 21.9'.
9) Bottom of borehole at 22'; borehole grouted upon completion.

___...3 NO. B82-5

										BORING LOG									SI	heel: 1	of 1	
\vdash	120.0	Fa . 1 mm	+ + 4 13731		1 21 .			T								BC			NO.	. B8	3-4	
	LM,	ME	HARRI	5 · Kin	d 1	1.4						STATION:					OFFS					
	-				-	The same of				SECOND AVENUE SUBWAY		T NO. CM1				_		RDIN/				
-					4	Second		1		PROJECT		EL. 160.60)							8.4731		
1					211	Avenue		1			DATUM :		T11 (F	T) 0	-		EAS	T: 997	411.9	3480		
								1_			FINAL BO	ORING DEP				rco I	DEA	DING	<u> </u>			
			D. Split S							CO: Jersey Boring and Drilling., Inc	DATE						SING			B. TIN	AF.	
_			ER: 140 ll	Auton	natic					AN: P. Lynch ER: D. Persaud	Note 1	THAIL	+) <u>_</u> _		- OA	01140	_	OIA	J. 1111	-	
	NG SI		R: SPUN							TART: 8/16/04 DATE END: 8/16/04	111010	+	+-		\dashv							
	K COR									ED BY: M.A. Ponti, Jr DATE: 9/24/04					\exists							
1100	T	140	T	T	T	=	16	1	T		T		T	I	INS	ITU P	ROP	ERTIE	s	T		
		Š	E	1		\{	0	2	1_		1 .			\vdash			\top				MBER ACTUR	
	(BPF) OR (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	NCH	3PF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE)	STRATA SYMBOL	АРНҮ		НА	RDN	VESS	WE	ATHE	RING		R FOC	
БЕРТН (FT)	ING (BI	PLE / C	PLE DI	BLOWS / 6 INCH	N VALUE (BPF)	/REC:	AL CO	X CO	D TES	CLASSIFICATIONS	ATAS	STRATIGRAPHY	ES		value	ow for es	se	e belo value			below values	
DEP	CASING (SAM	SAM	810	N N	PEN	101	ROC	FIEL		STR		NOTES	1	2 3	4 5	1	2 3	4 5	1 2	3 4	Ž
							T			PAVEMENT THICKNESS: Not recorded		FILL	2									
-	1					1				PAVEMENT MICRIESS. NOTECOIDES								1				
-	1												3		. =/-	4			1 1	1:	1 1	
_		1							1	Hand Augered to a depth of 5 feet prior to start of boring.			1	l. i	1	1	-			1		1
								1		or boring.	400											
-	1		1		1						9				-						11	1
5-				+	-		-	_	-	Madium dance group brown Cli T broat fac to	000						1	(m	+	-		1
3				5 7			1	1		Medium dense, green-brown SILT, trace fine to medium Sand, trace Gravel, trace Clay (ML /						i						
-	1	S1	5-7	7	14	24/16	1			11-65)	000				1	-		1			1	
_				12	-		+	-	-	Medium dense, brown, fine to medium SAND,					-		17	1	1 1	tt	-	1
				11				1		little Silt, trace Gravel, trace Rock Fragments,												
_	1	S2	7-9	9 26	20	24/16		1		trace Clay pockets (SM / 11-65)												
-	1	-		6	+		\vdash	-	_	Medium dense, brown, fine to medium SAND,	0.00				1 .	america de la		1				
40-			9-11	7	26	24/10				some Silt, trace Gravel, trace Rock Fragments,									-			
10-		S3	9-11	19 20	1 20	24/10				trace Clay pockets, trace Mica (SP / 7-65)				-	1			i				
-				1 20	-		\vdash	-			000							The laws	1			
_								ĺ			1						,	1		- 1		
							1															
-	1			1	1								J		1			1	ii	ITT		
_					1						~	DEC ROCK	1						1 +			1
			1	}							~					i		1			1	
15-				10	1		<u> </u>		\vdash	Very dense, green-brown, fine to medium	~		11						11			
_		S4	15-16.3	35 100\4*	135/10°	16/16				SAND, little Silt, trace Rock Fragments, trace	~~		11							1		
				1004						Mica (SM / 7-65)	~							i				
-					1						~		1 [1								
_											~				-	- 1		-			1	
									1 1		~			1								
-	1 1	S5	20-20	100\0	100/0"	0/0				No Recovery	1999999999		11			. [1	
20-		33	20-20	1.500		0/0			\vdash			ROCK	4		(1) (A)		150	NEW Y	88	1		H
1000	6.0			1						Hard to very hard, fresh, fine to coarse grained,	==				35		1		圖			0
				1						light to dark gray, quartz-mica-gamet SCHIST, with very thin, convoluted, crenulated,				9		(No.	139					0
-	5.5	C4	20-24.6	1		4.6/4.6	100	100		horizontal to sub-horizontal, no apparent								1			1	0
	6.0	C1	20-24.6	1		4.0/4.0	100	100		foliation joints/fractures; occasional very thin,	- =			12		Ž	225	Cly,	Ø	ā		H
	E.F.			1						very hard, quartzo-feldspathic seams; high	==						1	- 1			1	0
-	5.5			1						quartz, garnet content.	==						THE STATE OF	100				0
25 -	6.0			1							==			7.0			15.00			1	-	Н
	6.5			1							==				Mar.			1				1
-			7							Similar to Schist in C1, except horizontal to sub-				WE .								1
_	7.0	C2	24.6-29.4			4.8/4.8	100	100		vertical foliation; high quartz, gamet, and mica content.					100 H	-	a A	100				\vdash
	7.0							-			1 1					9			糖			2
-				1				- 1			巨目											1
-	7.5 3.0							- 1		Bottom of borehole at 29.4 feet	==		5		3.4		410	POT N	施			1
	- J. J			1																		
30 -										2005 01410 0750107100		OINT/FRAC	TUDE	CIT	ADA	CTED	ICTL	-				닉
	RANUL				ESIVE S					CORE CHARACTERISTICS										TITUD	E	\dashv
BF		ENSIT				STENCY	1	HARD			KFI	SPACING <2" Ver	3/THI y clos				,	4NGLE 0-5		rizonta		
0-		ery Loo oose	JSE		Very So Soft	"	2	M	ery So ediun	2 Severe (2) 1-2		2"-1' Clo	se/Th	in	,			5-35	Sut	b-Horiz	contal	
			Dense	4-8	Med Sti	ff	3	Me	ed Ha	rd 3 Moderate (3) 3-10		1'-3' Mo	d Clo	se/M	od T	hick		35-55		od Dipp		
30-	50 D	ense			Stiff		4		ard	4 Slight (4) 11-2	20	3'-10' Wie			20. T	hick		55-85 85-90		b-Vertio	aı	
>5	50 V	ery De	nse		Very St Hard	ш	5	Ve	ery Ha	rd 5 Fresh		>10' Ve	ry Wid	ue/VE	ау І	HICK		-30	ve			
				- 00	. 10.0																	_
	TES:									-												
		water	level not re	corded.																		

4) Driving shoe broken during sampling at 20' below ground surface. 5) Bottom of borehole at 29.4'; borehole grouted upon completion.

²⁾ Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

										BORING LOG								She	et. 1 of 2	
		DMIN	MIIHM	RRIG	·AR	110		T			T				В	OR	NG N	0.	B83-5	
		Distili	ATMBI K		Joint Ve.			1	_		BORING	STATION:					SET:	-		
					4.				S	ECOND AVENUE SUBWAY	PROJEC	T NO. CM1	188			CO	ORDINAT	ES:		
					ALL A					PROJECT		EL. 156.33				NO	RTH: 221	911.3	1967	
					Policy						DATUM:	NYCT				EAS	ST: 997	293.1	904	
				_ >	-	7					FINAL BO	DRING DEPT	TH (F	T) 5	5.9					-
			D. Spilt S							CO: Jersey Boring & Drilling Corp.		GR	OU	VD V	VATER	REA	DINGS			
			ER: 140 II	b Auto	matic					AN: P. Lynch	DATE	TIME	10	DEPT	H		S	TAB	. TIME	
		IZE: 3"						EN	GINE	ER: D. Persaud	Note 1									
			: Spun							TART: 11/19/04 DATE END: 11/19/04			_							
ROC	K CO	RE: NQ		_			-	$\overline{}$	VIEV	ED BY: C. Snee DATE: 11/22/04			4							
		1 6	F			PENREC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	8	1						INSITU	PROF	PERTIES	- 1		
	80	2	F.	_	1	Z	22	lõ	1		ر ا								NUMBER	
1	(BPF) OR	%		Ϊ́	Ē	1 50	~	5	DATA	SAMPLE DESCRIPTION	8	È		HAF	RDNES	s w	EATHERI	NG	PER FO	
F	BP	8	l Ä	2	8	SPI	1 2	8	1 5	BURMISTER (USCS / NYC BLDG CODE)	<u>≥</u>	×		L				\perp		
1 =	00	Ш	ш	S	빌	SE	0	18	H	CLASSIFICATIONS	×	ğ			below i	for s	ee below f	ior	see below	02
Ē	NS &	SAMPLE / CORE	SAMPLE DEPTH (FT)	8	₹	\$ ₹	1 3	18	9		₹	₹	12	١,	aiues		Values	- 1	for values	18
DEPTH (FT)	CASING CORING	SAI	SAI	BLOWS / 6 INCH	N VALUE (BPF)	E S	5	ROCK CORE RQD (%)	FIELD TEST		STRATA SYMBOL	STRATIGRAPHY	NOTES	1 2	3 4	5 1	2 3 4	5	1234	NUMBER
\vdash		-	-	+	+-	-	+	+-	-			FILL	+			+		\Rightarrow	+	7
-	SPU					1	1			PAVEMENT THICKNESS: Not recorded		FILL	2				1	. 1		
		1		1									3				i	1		1
-	11	-		1.	+	-		-	-	Medium dense, brown, fine to coarse SAND,			4		: :				- 1	
-		S1	2.3-3.3	14	7	12/6				some Rock Fragments, little Silt, trace Gravel,			5		: !	- 1 -	e i	1	. 1.	
							\top	T		trace Mica (SM / 11-65)	3613	SILT/	1 1		1		4	1	. 1	
1		1		1	1						57.67	CLAY	1 1		-		1	1		
5-		-	 	2	+	+	-	-		Medium stiff, gray-brown, Clayey SILT, little fine						1	4	J.	mak da	
_		S2	5-7	2 4	6	24/15				Sand (ML /10-65)	57.67				i.					
		52	1 -	5	1	24/13					12 1						1	1	111	
		S3	7-8	5			_			Top 12":Green-brown, Clayey SILT, little fine Sand (ML / 10-65)	1575		П		+	1	y	4		
-		1		14	21	24/18				Bot 6": Brown, fine SAND, little Silt, trace Mica	1000	OII TV	1		}	1.	1 4 -			
		S3A	8-9	16						(SM/8-65)		SAND	1		1		1			
		S4	9-9.7	8	T					Top 8": Brown, fine SAND, some Silt, trace Mica (SM / 8-65)		01110			- 1				1 1	1.1
10 -		S4A	9.7-11	8	15	24/18				Bottom 16": Brown, fine to medium SAND, some	200				-1	+	. f			1
_		544	3.7-11	7					Ш	Silt, trace Gravel, trace Mica (SM / 7-65)	24303.4								1	
				6 7			1		ı	S5: Medium dense, brown-green, slightly	~	DEC ROCK		i	11	1				
_		S5	11-13	11	18	24/21	1			micaceous, fine to medium SAND, some Silt,	~~			7 .	1			-		1 1
-		<u> </u>		19	-		-	_	-	trace Rock Fragments (SM / 7-65)	~		1		ing A.	1	i		: •	
			i	1	1						~~			1	. :	1 :		;		1 1
			1		1			1			~~			1					1	1 1
15-		-		9	1-	-	+	\vdash	-	Medium dense, brown-white, micaceous, fine to	~~			****		- 1				11
4		S6	15-16.8	11	25	21/18				coarse SAND, some Rock Fragments, little Silt	~			,					1	
				100\3"						(SM / 6-65)	~				1		1			
٦									- 1		1~			3		- 1	-1			1 1
-	1				1				- 1		~	1	- 1	+					4	1 1
					1						~							: 1		
						ł			- 1		~			i						1 1
20 -		<u> </u>		33			+		\neg	Very dense, gray, micaceous, fine to coarse	~~	1	-	5		1	A			1 1
4		S7	20-21.5	43	143	18/12				SAND and ROCK FRAGMENTS, little Silt (SM /	~			· .						
		\vdash	-	100\6"	-		+-		\dashv	6-65)		1		į	1 :	1			1	
1											~~			1	1 ,				1 1	
4											~	1	-	-	1	-			i_!	
J				1							~~	1			1 1		1		1 ,	
1								- 1			~	1		1	1			1	1 1	
25 -		S8	25-25.3	100/3"	100/3"	3/3	1-1	-	\dashv	Very dense, gray, micaceous, fine to coarse	~		1	l	7 -	-	-	1		
4		30	20.20.0	1	13,70	313	+	\neg	\dashv	SAND, some Rock Fragments, little Silt (SM / 6- 65)	~				ļ. i			1		
	4									,	~~						1			
1	0.5									C1: Hard to very hard, fresh to severely	= =	ROCK	6		150	200	MP5H	73	Sec 1	
+	2.5								- 1	weathered, fine to coarse grained, light to dark gray, quartz-mica-garnet SCHIST, with very thin,					2.47	1		33		3
1	3.0									convoluted, crenulated, horizontal to sub-vertical								137	A	3
	2.5	C1	27-31.5			4.5/4.5	100	33		foliation, rough to smooth, closely	三三			dr.	3.44					4
30	4.5			L			\perp		\perp				15	11033	awate.	443	CHEST OF		(%2X)	\exists
		LAR SO			SIVE S			RC	CK	CORE CHARACTERISTICS	JC	INT/FRACTI	URE	CHAI	RACTE	RISTI	CS			$\overline{}$
BPI		ENSITY				STENCY		HARD				SPACING/	THIC	KNE	SS		ANGLE		TUDE	\dashv
0-4 4-1		ery Loos oose	se		Very So Soft	m	1 2		ry So						Thin	1		Honz		
10-3		ledium [Dense		Med Stit	rr I	3		d Ha			2"-1' Close 1'-3' Mod			d Thick				lorizontal Dipping	
30-5	O O	ense		B-15	Stiff		4	Ha	rd	4 Slight (4) 11-20) [3'-10' Wide	/Thio	ck		1	55-85	Sub-V	/ertical	
>5	U V	ery Den			Very Stir Hard	п	5	Ve	ry Ha	d 5 Fresh					y Thick	1		Vertic		
				- 50	. zeru															
NOT	ES:					-														\dashv
			vel not rec		autar - 4	ha	a b+		- 10	d										
3) Fi	eld Te	st Data	- Total oro	anic va	pors lev	els are refe	wied e	een si d to a	benz	f rock types, transition may be gradual. ene standard measured in the head space of seale	ed soil same	ole iars using	ann	mani	c veno	meter	equinner	d with	2	
pho	otoion	zation d	letector (P	ID) and	a 10.6e	V lamp R	esults	are in	parts	per million by volume (ppmv).	- our suili	jai a aoniy	4110	. yaı n	- tapoi	1110101	adaibhea	. ***(11)		
						to start of				1										

5) Split spoon hit an obstruction and deflected at 3.25 feet.
6) Apparent top of rock at 27.0 feet.

										BORING LOG						S	sheet: 2 of 2	
	1	DMI	MEHA	RRIS	· Al	SHP		T						B	DRING	NO	. B83-5	
	,	Davi)	141401 E		Joint Ve					COND AVENUE CUDWAY	BORING S				OFFSET			
1					1.				5	ECOND AVENUE SUBWAY		NO. CM11	88		COORDIN			
										PROJECT		EL. 156.33			NORTH: 2			
				-							DATUM: I		11.75	D 55.0	EAST 9	97293	3.1904	
CAL	101 ED	0".0	D C=/4 D		77 =	~		-	DIM	CO. to Bode & Delline Com	FINAL BU	RING DEPT		ND WATER	DEADING			
			D. Spilt S IER: 140 II		matic					CO: Jersey Boring & Drilling Corp. N: P. Lynch	DATE	TIME		DEPTH	READING		B. TIME	
	ING SI			Auto	made					ER: D. Persaud	- D/112		+				D. THUL	
			R: Spun							ART. 11/19/04 DATE END: 11/19/04								
ROC	K COF	RE: NO	2					$\overline{}$	7	ED BY: C. Snee DATE: 11/22/04								
		10	=			2	8	8						INSITU F	PROPERTIE	S	NUMBER	OF
	18F	Ž	 	1 -	.	Z.	잂	RQD (%)	DATA		4	>					FRACTUR	RES
	U. N	8	I d	Š	H.	일단	III	1 2	A	SAMPLE DESCRIPTION	M M	Ę		HARDNESS	WEATHE	RING	PER FO	от
E	0.≥	1 8	8	19	(8)	ii.	1 6	18	EST	BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	8	32		see below fo	r see belo	w for	see below	10
E	188	P.E.	P.E	N S]	EX.	1	X	10		4	ATIC	ES	values	value	s	for values	BE
DEPTH (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	HOWS / 6 INCH	N VALUE (BPF)	PENREC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE	FIELD TEST		STRATA SYMBOL	STRATIGRAPHY	NOTES	12345	1 2 3	4 5	1234	NUMBER
-	100	100	- 0	-	12	1 44	+-	14	-				-	ALCOHOLOGICA			P400-6-10905	+
	3.0	1								to moderately closely spaced, slightly weathered, clay coated, chloritized foliation	==							9
	3.0	-	-	+-	+-	+	+	-	\vdash	joints/fractures.	= =							10
	3.5	1	1							27.8', 28.3', and 28.5': Cross-foliation joints/fractures, rough to smooth, closely to	三目						Company of the compan	5
		1				1				moderately closely spaced, sub-horizontal to	1 1					12	2.4	2
	4.0	C2	31.5-36.	0		4.5/4.5	100	58		sub-vertical, slightly weathered, clay coated. 29.9'-31.5'; Fracture zone, rough to smooth,						7/84) 6/35		-
35 -	4.5	1								very closely spaced, moderately to severely				15.4				6
	4.0			\perp						weathered, clay coated foliation/cross-foliation joints/fractures.							1547	5
'										C2: Similar to Schist in C1.	EΞ			36	Sec. 2		- 2	1
	1	1	1							32.1',32.3',32.8',33.8'-34.3',34.7', and 35.3'- 35.7': Cross-foliation joints/fractures, rough to	==					7.00		3
	5.5	СЗ	36.0-40.	,		4.7/4.7	100	77	1	smooth, very closely to moderately closely	==					-		-
	5.0	1 63	36.0-40.			4.714.7	100	''		spaced, sub-horizontal to sub-vertical, slightly weathered, clay coated, chloritized.	$\equiv \exists$							3
40-	5.0		1							36.2'-36.8': Cross foliation joint/fracture, healed,		1		V. Head		7	325	1
40 -	5.5			\perp						very closely spaced, moderately dipping to sub- vertical.	E目							1
											==	1						0
-	6.0	1	1								==	1		9,434	1500 Star-1		Bases	H
	5.5		40745	.				25		C3: Similar to Schist in C1, except high mica content.	==	1		3335			F 12 15	3
	5.5	C4	40.7-45.1			5.0/5.0	100	85		37.0'-37.1', 37.6', 37.9', 38.5', 39.9', and 40.5'-	==	1			150			2
	5.0									40.7': Cross-foliation joints/fractures, rough to smooth, closely to moderately closely spaced,	==	1	1					1
45 -										sub-horizontal to moderately dipping, slightly	==	- 1	- 1	C Francis	100		2 (1)	4
-	6.0									weathered, clay coated. 37.1'-37.4': Cross-foliation joints/fractures.	==	1					100 mg 2	\vdash
	5.5									healed, closely spaced, sub-vertical		- 1	- 1	350-	100 AC 100		d K	1
	5.5									C4: Similar to Schist in C1, except high gamet,	I							3
	5.5	C5	45.7-50.9	1		5.2/5.2	100	92		mica content.	ΞΞ							2
-			1							42.4', 42.8', 43.5', 45.0', and 45.3':Cross- foliation joints/fractures, rough to smooth, very	==			ST POST		3 1		0
50 -	5.5									closely to moderately closely spaced, sub-	= =	1			SE AME OF		SANTE -	Н
-	5.0		 	+-	-	-	+		\dashv	horizontal to moderately dipping, slightly weathered, day coated, talcified.	==	1					EMFORM	4
_	5.0									C5: Similar to Schist in C1.	==	İ	200			8		0
	5.0							- 1		46.4', 48.3', and 50.2'-50.5': Cross-foliation	==	1						0
-	5.0	C6	50.9-55.9			5.0/5.0	100	96		joints/fractures, rough to smooth, very closely to moderately closely spaced, sub-horizontal to	= =	1	ě		144			2
-	5.0	200								sub-vertical, slightly weathered, clay coated.	= =	1						2
55 -	5.0					1				chloritized.	= =		- 1			題		_
	5.0			_	-		-	_	-	C6: Similar to Schist in C1.			7		2000000	料	238.00	2
										53.2'-53.8': Cross-foliation joint/fracture, healed, sub-vertical.					1 1	1		
-										53.8' and 54.7': Cross-foliation joints/fractures,			1	i majantur n	1 : 1	1		
-										rough to smooth, moderately closely spaced, sub-horizontal, slightly weathered.			ŀ			,		
-				1						55.5'-55.6': Cross-foliation joint/fracture,			-					
60 —					1					severely weathered.								
	RANUL	AR SC	DILS I	COH	SIVE S	SOILS		RO	CK C	DRE CHARACTERISTICS	101	NT/FRACTI	IRF	CHARACTER	ISTICS			=
		ENSIT	1	BPF	CONSI	STENCY	Н	ARDI		WEATHERING NO. PER		SPACING/	_		ANGL		TTITUDE	\neg
	4 V	ery Loc	se		Very So	oft	1		ry So			2" Very	dos	e/Very Thin	0-5 5-35		orizontal	
	10 Lo		Dense		Soft Med Sti	iff	2		d Ha			'-1' Close '-3' Mod (n e/Mod Thick	35-55		b-Horizontal od Dipping	
	50 D	ense			Stiff Very St		4	Ha		4 Slight (4) 11-20	3	'-10' Wide	Thic	*	55-85		b-Vertical	
>	50 Ve	ery Dei			Very St Hard	"	5	ve	ry Ha	5 Fresh	,	10' Very	vvid	e/Very Thick	85-90	, V6	ertical	
>30 Hard																_		
7) E	ottom	of bore	hole at 55.	o'; bore	hole gro	uted upon	comple	etion.										
															ORING I	י חא	R83-5	
) [WINITE	4U. I		-

										BOF	RING LOG								She	et 1 of 2	2
		DAIN	(EELIARR	TG - 45	2110	,		T									BOR	ING N			
		Perilan	(#IHARR	ا ومريز ه	Service .	liket.			_				BORING S	STATION:				FSET:		D00-0	
					10	1:10			S		ENUE SUBWAY		PROJECT	NO. CM11	88			ORDINAT	ES:		
					41.5	-	m².			PRO.	JECT		G. SURF	EL. 159.88			NC	ORTH: 222	2033.6	706	
					2.0	fa transp							DATUM:	NYCT			EA	ST: 997	140.74	459	
													FINAL BO	RING DEPT	H (F	T) 31.2					
			D. Split Sp					BC	ORIN	GCO: Jersey Bo	oring and Drilling Co	orp.		GR	ΟU	ND WAT	ER RE	ADINGS			
			ER: 140 lb	. (Auto	matic)		FC	DREM	AN: Peter Lync	:h		DATE	TIME	1	DEPTH	CASIN	G S	TAB.	TIME	
		SIZE: 4"						EN	VGINI	ER: Sara Roch	na				I						
			R: N/A (Sp	un)				DA	ATE S	TART: 6/13/05	DATE END: 6										
ROC	KCC	RE: NO	}		_	Т	1	$\overline{}$	$\overline{}$	VED BY: DA Sne	e TE: 11/14	/05	<u> </u>		-						
	1	Š.	F	1		Į į	8	18								INSI	TU PRO	PERTIES			
E	CASING (BPF) OR	III.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	VALUE (BPF)	PEN/REC: SOIL (IN/IN)	CORE REC (%)	ROCK CORE ROD (%)		S	AMPLE DESCRIPTION	N	SYMBOL	STRATIGRAPHY		HARDNE see below		VEATHER	ING	PER FO	RES
DEPTH (FT)	200	1 2	PLE	NS NS	1 3	/REC	AL C	N N	FIELD TEST				STRATA	ATIG	ES	values		see below values		see below for values	
둄	CAS	SAN	SAN	1 28	> z	l E	TOTAL	100	昌				TR.	TR.	NOTES	1234	4 5	1 2 3 4	5	1 2 3 4	2
	1			+-	1	1	+	+-	+-				980	FILL	1		+		\Rightarrow		14
	4"							1		PAVEMENT	THICKNESS:			ILL			1				
	Spu	n				1									2			111			
	1					1									3		-				
	1 1				1	1											- 1				
		1	1				-						3								
	11	-		-	-		-	-		Dense brown	-orange-black-white, fi	ine to	~ [DEC ROCK	١. ا					·	1
5-	1 1	S1	4.5-5.0	32\6"	32/6"	6/6	-	-	-	medium SANI	D, some Silt, trace Ro		~~		4						- 1
	11	1			1	l		1		Fragments, tra	ace Mica (SM / 7-65)		~~							1 1 1	
	11				1								~~							1 7	
-		S2	7-7.2	100\2	100/2	2/2	_	1		Very dense, b	rown-orange, fine to m	edium	~				-				
-	+	-	1-1.2	1111	1	6/4	\pm		-	SAND, some : Fragments (SI	Silt, little Gravel, trace	Mica, Rock	= F	ROCK	1 1	and the second second					
	5			1								41 1 4 4									4
-		1		1	1						, fresh, coarse grained artz-mica-gamet SCHIS									1943 .	+
10-	3	١		1						thin crenulate	d, sub-horizontal to mi	oderately	==			1000400			10		2
	3.5	C1	8-12.4	1	1	4.4/4.4	100	59	-		on, rough, with very clo										1
-	3.5	1			1						d, sub-honzontal to mo						2 B			Start	H
_	3.5	_			1					dipping, slightl stained, clay c	ly weathered, heavily it	ron-oxide					3 4				3
	2.5	-		+	-		+-	-	\vdash	stained, day c	coated.		1 1			A Parent					5
-	2.5	-								11.0'-11.3': Cro	oss-foliation joint/fracti	ure, rough,									2
_	3.5]		1	1					sub-vertical, he	eavily iron-oxide staine							1		200	4
										coated.					- 1						-
15-	3	-		1						C2: Similar to	Schist in C1		==				9 - B			577	3
	3	C2	12.4-18.6		1	6.2/6.2	100	37	-		y hard, fresh, medium						2	Age		3.75	4
										grained, light g	ray, poorly foliated, qu	artz-mica-		1							
-	2.5	- 1		1	1 1					12 9' 13 6' 14	(Healed Breccia to 18 .7', 15.8' and 16.3': Cr	3.9")									8
	2.5									foliation joints/	fracture, rough, moder	ately					8 B				10
	5									dipping, slightly	y weathered, iron-oxide	e stained.		-	5					W 1	-
-	5	1 1									cture zone, rough, ver		= =	i			¥ (5)				5
20-	3										y weathered, heavily in foliation joints/fracture		= =	1			至 機	100			1
20-	4						11						E	-		Will ber			1	# · · · ·	-
-	4	1 1								C3:18.6'-21.3':	Very hard, fresh, coan	se grained,		1		美华 美国	Ē		18	j	1
	3	СЗ	18.6-25.0			6.4/6.4	100	58	- 1	light brown-gra	y, quartz-mica-gamet	SCHIST.	111			National Control				57	2
-	3.5										folded, highly convolut h frequent concentration		1,11			7		70		Signal Signal	6
+		1 1						-		quartz and mic	a, rough, with very clos	se to	1. 1.				一题				0
1	3.5	1 1								closely spaced	, slightly weathered, in	on-oxide	4.1					ESS.		55	4
	4.5										pyrite foliation, cross for high garnet content,	oliation	1,1					P 30 2	1		10
25-									\neg	jonitornactures,	, mgn gamet content,		==		5	E CONTRACT	- A54		1 16		\vdash
4	3	1						1			12 1010 11	2 0	==					以北方		S i	1
_	3						1 1	- 1		21.3'-24.8': Ver	y hard, fresh, coarse g	rained,								9 1	1
1	-] [11	1			MATITE, with rough, w , sub-horizontal to verti		==	1			2 B	114 mH	1	81.	\vdash
+	2	C4	25.0-31.2			6.2/6.2	100	97	.	slightly weather	red, chlorite, limonite,			1		PACO A	- 1			8 1 1	1
	2.5		20.0.01.2			0,20.2	.30	-	-	iron-oxide stain	ed, cross foliation		= =	1				程制。	1	# : I	1
7		1									frequent quartz rich zo met Schist zones; high		==		1	SHEW		State.	100		H
10-	2										ou not zories, riigi				اء	Section 15			100	Đ :	1
		LAR SO		COHES						CORE CHARAC				NT/FRACTL			ERISTIC				\neg
BP 0-		ENSITY ery Loo			ONSIS	TENCY	1	HARD	NES		VEATHERING Complete	NO. PER		PACING/TH	IICK	NESS			ATTITI		\neg
4-1		oose			oft		2		iy so edium		Complete Severe	(1) 0 (2) 1-2	<2° 2"-	1' Close/I	ose/ Thin	Very Thin			Horizo Sub-H	ontal orizontal	
10-3	80 N	ledium l	Dense 4	-8 M	led Stif	r	3	Me	d Ha		Moderate	(3) 3-10	114	" Mod Cl	lose	Mod Thick				onzontal Dipping	
30-5		ense			tiff	. 1	4	Ha		4	Slight	(4) 11-20	3'-	10' Wide/T	hick		1	55-85	Sub-Ve	ertical	
>0		ery Den	oc 15		ery Stif ard	'	5	ve	ry Ha	rd 5	Fresh		>10	Very W	/ide/	Very Thick		85-90	Vertica	al	
				,																	1
NOT	ES:																-				\dashv

NOTES:
1)Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.
2)Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
3)Frield Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) Hammer weight bounding at 4.8°. Removed spoon at 5.0° to check on type of hard surface. 5) Core barrel became blocked

										BOR	ING LOG								s	heet 2 d	of 2
	C	MIM	##HARR	IS · AP	ur i	,		T											IG NO	. B83	-6
1	~	incompany of	en dermonalisten	A Seac C	TAN	dela			S	ECOND AVE	NUE SUBWA	Y	BORING S	NO. CM11	00			OFFS	RDINATES:		
			. "		S.	9			_	PROJ				EL. 159.88	80				H: 222033		
					10	Sarray Sarray							DATUM :						997140		
L								\perp					FINAL BO	RING DEPT							
			D. Split Sp							AN: Peter Lynch	ning and Drilling	Corp.	DATE	GR TIME	<u> </u>	ND WA	TERF	READ	DINGS	B. TIME	
		ZE: 4"	ER: 140 lb	. (Auto	matic)					ER: Sara Rocha			DATE	I HVIC	+	DEFIN	CAG	NVG	317	D. TIME	-
CASI	NG HA	MMEF	N/A (Sp	un)				DA	TE S	TART: 6/13/05	DATE END										
ROCI	COR	E: NO	1				Τ_	T	VIEV	VED BY: 100A Snee	TE: 11/	14/05		ł	+-	T				1	
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	8	i ii	E	Ŧ		رُ	E S	ğ	DATA				교	≿		HARD	NESS	WEA	ATHERING	FRAC	TURES FOOT
	(Ha	8	E G	ž	BPF	SOI	E E	ZE F	5	SA	MPLE DESCRIPT	ION	× ×	ΑÞ							
Ē	G (B	E E	=	8/8	J. H	ü	8	8	TES				TA S	E E	S	see bel			below for values	see be	ues w
ОЕРТН (FT)	CASING (BPF)	SAMPLE / CORE	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST				STRATA SYMBOL	STRATIGRAPHY	NOTES	1					\frac{1}{2}
ă	රී	ŝ	S	8	z	a.	15	ĭ.	Ē				S	rs.	ž	1 2 3	4 5	1	2 3 4 5	1 2 3	Ž
	2									content; healed	fractures through	nout.	E		6						1 1
	-4-			+						21.7'-22.0': Gai											
_											nilar to Schist in C foliation joints/fra		1 1								
7										,,,,										1	
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1																					
60-																	1.1.				
	ANI I	AR SO	us I	COHES	SIVE SO	DILS		BO.	CK C	ORE CHARACTE	RISTICS		افلا	NT/FRACTI	IRF	CHARA	CTERIS	STICS			
BPI	DE	NSITY		BPF C	ONSIS	TENCY		ARDI	VESS	W	EATHERING	NO. PER	FT S	PACINGTI	IICK	NESS			NGLE A	TITUDE	
4-1		ery Loo ose	se		ery Soft oft	'	1 2	Ve Me	ry So dium	ft 1 2	Complete Severe	(1) 0 (2) 1-2	2	1' Close/	nin	Very Thi	1		5-35 Su	orizontal ib-Horizo	ntai
10-3 30-5	O Me	edium (led Stiff tiff		3	Me Ha	d Ha	rd 3	Moderate Slight	(3) 3-10 (4) 11-20		3' Mod C 10' Wide/		/Mod The	ck		35-55 M 55-85 Su	od Dippii b-Vertica	ng
>50		ry Den	se 1	5-30 V	ery Stiff		5		ry Ha		Fresh	(4) 11-20	1			Very Thi	ck			ertical	
				>30 H	ard																
6) Bo	ottom o	of bore	nole at 31.2	', obsen	ration w	ell installe	d to a	depti	of a	pproximately 15.											
,			1																		
																	В	ORIN	IG NO. I	383-6	

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L											BORING LOG										She	eet: 1 of	4
	PM	ers ers	## 7 A #Y#Y	ter 1	1 21			T										BO	RIN	GN	0	B83-	7
	LAN	1)ME	HARR	D* 1	Michigan I	44 4							BORIN	G STA	TION:				OFFSE			000	•
1	MINISTRA	- producery pro-				The same of		-		SECC	OND AVENUE SUBWA	ΔY	PROJE	CTN	D. CM 1	188			COOR		ES:		
						140	00000	1			PROJECT				155.27				NORTH			6230	
1					3	Avenue	DIA.	-					DATUN						EAST:				
					- 27	zesest										TH (F	T) 116.			,0,0	10.00	704	
SAN	IPLEF	2" 0	D. split s	poon				BC	ORIN	G CO: Wa	аrren George, Inc.						ND WA		READII	VGS			
SAN	IPLEF	HAM	MER: 140		ety Han	nmer		FC	REM	IAN: A. D	epue		DAT	E	TIME		DEPTH		ING		TAB	. TIME	
CAS	ING S	IZE: 4°	to 22'								Burzynski		09/21/	06	7:30	\top	12.9	2	1.0		161	nrs	
CAS	ING H	IAMME	R: 300 lb	. Donut				DA	ATE S	TART: 09	3/15/06 DATE END: 0	9/20/06				T							
ROO	K CC	RE: N)	(RE	VIEV	VED BY: (C. Snee DATE: 01/29	/07		\perp									
	1		_			Î	8	. S	1								INS	SITU PI	ROPER	TIES			
	F) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	Ę H	JE)	SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	DATA		SAMPLE DESCRIPTION		ABOL		¥		HARD	NESS	WEAT	HERI	ING	FRACT PER F	URES
БЕРТН (FT)	CASING (BPF) OR	PLE/C	PLE DE	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: S ROCK (FT/F	AL COR	K CORE	FIELD TEST DATA	BU	RMISTER (USCS / NYC BLD CLASSIFICATIONS	G CODE)	STRATA SYMBOL		STRATIGRAPHY	S	see be			elow f	for	see belo	
DEP.	CASI	SAM	SAM	PE O	×	PEN ROC	10	200	量				STR		STR	NOTES	1 2 3	4 5	1 2	3 4	5	1 2 3	12
<u> </u>	4-	1			1		Ť	+-	+-					2	FILL	1				Ŧ	Ħ		+
	17									Sidewa	MENT THICKNESS: 4" Con alk	crete		•		2		71		1	+	1	
	11									Hand :	augured to a depth of 6 feet p	rior to				3		11.			1		
	11									boring		10 10					l : l 1						-
	11																					1	
5-	H													Ž				1 !			-	l	
	+	-	 	21	+-		+	-	\vdash		ense, gray to dark brown, fine						-++1				-		
-	$\left\{ \right. \right\}$	S1	6-8	50 60	110	20/24			0	SAND, Clavey	some Clayey Silt, trace Grav Silt pockets (SM / 11-65)	el, trace					++:				11	-	
-	11	-		77		-	-	-			ense, gray-brown, fine to med	ium SAND,		•							.		
-	$\ \cdot \ $	S2	8-10	38	79	15/24			0	little Si	It, trace Gravel (SM / 7-65)							4.4.					
10-	11		-	34	-		+	_		Top 12	": Very dense, gray-brown, fi	ne to						44					
-	11	53	10-12	27 26 13	39	18/24			0		n SAND, little Silt, trace Grave			250	, nook	11						1	
_			,	14	-		_			Bottom	6": Medium dense, brown, m		2	DEC	ROCK								
_											medium SAND, some Silt, tra- ents (decomposed SCHIST) (~			11							
_													1~~			П						1	
15 -										Van de	ense, gray, slightly micaceous	fine to	Philiphphphphph				1						
		S4	15-17	26 36	77	16/24			0	coarse	SAND, some Clayey Silt, little	Rock	12	-									
		54	15-17	41		10/24			0	Fragme	ents (decomposed Schist) (SM	1 / 6-65)	1~	1									
													~~	1									
													~~					1					
7			ĺ										~				- +				1		-
20 -		_		-	-		-		_	Very de	nse, light to dark gray, fine to	medium	~	1									
				28 37					_	SAND,	some Clayey Silt, trace Mica		·~	1		4							
	1	S5	20-22	B1 56	118	18/24			0	(decom	posed Schist) (SM / 7-65)		~~	1		5				ì			
-	<u> </u>			1 30			+		-	Medium	hard, light to dark gray, med	ium to	-~	R	оск	6	405-16500	5	5000000	3561	55	SHEW	-
-	4								- 1		grained, quartz-mica-garnet S n, crenulated, sub-horizontal f		==	-			- d			TRO .	. 18		3
	5								- 1		resh to slightly weathered, pla										1		4
7	5	C1	22.2-27.2	,		4.6/5.0	91	61			ng, very closely to closely sp	aced, sub-	= =		-		沿器的			GC:			8
25 -	_ 5	Ci	22.2-21.2	1		4.0/5.0	91	01			tal foliation joints/fractures. 12.8' and 22.3' - 22.8': Very cl	nse	==		i	al al		4 - 1	100	E		1	
4	6			1				- 1		fracture	spacing.		E			TAN DE							1
	6			1				- 1			.7', and 24.8': Cross-foliation					0	1	1	Terry.	1	1/2		0
1				+	\vdash		+-	\dashv	\dashv		actures: Rough, planar to und slightly weathered, closely to		E			1000				127			
+	6			1						closely :	spaced, sub-vertical.	,		-	1					4		Appropriate	0
_	6							- 1		22.2' - 2	7.2': Iron-oxide staining.		==	1	- 1	200				145	1	41.0	3
_	7												==	-		1					1		1
30				1										1		1	MATERIAL		alk topics	1761,t	- 56	1605ii	Ш
		AR SC			SIVE S						IARACTERISTICS			_			CHARA						
BP 0-		ENSIT				STENCY		HARD			WEATHERING	NO. PER	FT				CKNESS					TUDE	
4-1		ery Loc oose	136		Very So Soft	"	1 2		ry So		1 Complete 2 Severe	(1) 0 (2) 1-2		<2" 2"-1			e/Very T	nin				zontal Horizonta	al I
10-3	30 N	edium	Dense	4-8	Med Stif	ff]	3	Me	d Ha		3 Moderate	(3) 3-10		1'-3			in se/Mod T	hick	35	-55	Mod	Dipping	
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>5	U V	ery Der	961	15-30 >30	Very Sti Hard	"	5	ve	ry Ha	rd	5 Fresh			>10	Very	/ Wid	le/Very T	hick	85-	90	Verti	cal	
				'						_													

NOTES:

1) Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.

2) Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

⁴⁾ Set 4" diameter casing to 20 feet.
5) Spun 4" diameter casing from 20 feet to 22 feet.
6) Harder drilling at 22 feet.

										BORING LOG							S	Sheet: 2 of 4	4
Г	ra f	n. Æbe	HARRIS	• A D	1 - 85 - 4			T							1	BOR	ING NO	. B83-7	•
	LWI	IAT ma	PENNIS	John Re	NULE D	Land.				CECOND AVENUE CUD	VAV		STATION:				FSET.		
	-				7			1		SECOND AVENUE SUB	VAT		T NO. CM 1	188		$\overline{}$	ORDINATES		
					A.F	Secon	ed			PROJECT			EL. 155.27				RTH: 22193		
l					111	Astron						DATUM :				EA	ST: 997313.	3864	
<u></u>			- "					-	500	200.111		FINAL BO	ORING DEPT				4 DIN 100		
			D. split spor							G CO: Warren George, Inc.		DATE	I TIME		ND WATE			B. TIME	
CAS	ING SI	7E · AH	to 22'	Salet	y nan	mer				ER: C. Burzynski		DAIL	LIMIT	+	JE! !!!	CASII	017	D. THVIL	
CAS	ING HA	MME	R: 300 lb. Do	onut						TART: 09/15/06 DATE END	09/20/06	 	1	✝					
	K COR									VED BY: C. Snee DATE: 01/	9/07								
		1	_			Î	8	2							INSIT	U PRO	PERTIES		
	m-	2	E	1		Z	ပ္က	là	1							$\neg \top$		NUMBER FRACTU	
	(MIN/FT)	H.	Ę	l 5	1	= -	1 2	8	DATA	SAMPLE DESCRIPTI	ON	180	È	ı	HARDNE	SS W	VEATHERING		
F	(BPF)	8	l ii	€ 9	8	SEF	18	1 %	TEST	BURMISTER (USCS / NYC B		N.	₹		see below	100	see below for	see below	
H	00	쁘	ш,	100	3	5 F	Ö	8	12	CLASSIFICATION		₹	13	S	values		values	for values	, E
ОЕРТН (FT)	CASING (SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE RQD (%)	FIELD			STRATA SYMBOL	STRATIGRAPHY	NOTES					NUMBER
20	20	S	SA	ᆸ	z	E 5	6	2	Ē			ST	S	ž	1 2 3 4	5	1 2 3 4 5	1 2 3 4	١Į٤
	6			T	T		T	П		Hard to very hard, dark to light gr	ay and light	==			72451343E	75 E		10	0
										green, fine to coarse grained, qua		==			17.76	7			2
	6	C2	27.2-37.2			9.9/10.0	99	80		gamet SCHIST, with thin, poorly convoluted, sub-horizontal foliation		==					30.00		-
	6	02	21.2-31.2	1		3.3/10.0	1 33	100		closely to moderately closely spa		==							2
	6					1				horizontal foliations with pyrite. 32.7' - 34.5': Tightly healed vertice	al ioints with	==				37			2
				1				1		1/16" to 1/8" light orange calcite.	•	= =						Active	10
35 -	6									32.6' - 33.9': ¼" to ½" vugs and it fractures.	cipient	==			1111 -				-
	6			1		1				28.1', 28.7', 32.6', 32.9', 33.3', and		= =				7			3
	6									Cross-foliation joints/fractures: Pi sub-horizontal to moderately dipp		==			A.				1
	6				1		1			sub-nonzonian to moderately dipp	ilg.	= =			A THE SECTION AND A SECTION ASSESSMENT AND A SECTION ASSESSMENT AS A SECTION ASSESSMENT AS A SECTION AS A SECTION AS A SECTION ASSESSMENT AS A SECTION AS A SECTI		State .	*	0
•					1	1						==							2
	6						1					==							\vdash
40 -	5						1					==							2
70	6					1				Hard to very hard, fresh to slightly		==	1		WHITE A	1		179	4
•				1						dark gray, fine to coarse grained, garnet SCHIST, with thin, slightly			1						2
	6	C3	37.2-46.2			8.9/9.0	99	85		sub-horizontal to moderately dipp	ng foliation,	= =						4	+
	7									rough, planar, very closely to mod closely spaced foliation joints/frac		==		- 1		1			0
	5									pyrite.		三三	- 1	- 1	14 14 1				2
	7								- 1	42.7' - 43.0' and 43.2' - 44.0': Cro		==			W.W.	150	the state of	daz.	0
45-									- 1	joint: Curved, undulating, modera vertical.	ely dipping to	= =	Ì			1			1
-	6								_	38.5', 38.7', 39.6', and 42.2': 1/2" to	1/4" light gray	==	1		PARTY NEWS				+
_	6									quartz veins.			1	-	201	- 2			1
	6											==							1
-										46.2' - 51.1': Hard, fresh to slightly dark gray, fine to coarse grained,		==							3
-	-									SCHIST, with poorly laminated, ho	rizontal to				13.00	18		600	3
50 -	6									sub-horizontal foliations, smooth, a closely to moderately closely space		==	1	ı		1 48			+
_	6								- 1	to sub-horizontal foliation joints/fra	ctures,	==	- 1	ı					0
	8	C4	46.2-56.2			9.9/10.0	99	93		except very closely spaced from 45 51.1' - 56.2': Very hard, fresh to si		==							11
-										weathered, dark to light gray, fine	o coarse	= =			100	1			1
-	-									grained, quartz-mica-garnet SCHIS convoluted, crenulated, moderately		==							
_	8	1								foliation, rough, planar to undulating	9.	= =	1	1				建 进	2
55	6	-								moderately closely spaced foliation joints/fractures with pyrite.		= =							0
35	8	1		- 1						52.9' and 53.0': Cross-foliation join		==		0.00		1			0
	<u> </u>			-	\vdash		\vdash	\dashv	\dashv	Rough, planar, irregular and curve	l, sub-	= =		8					1
-	\vdash									vertical to vertical, with pyrite conte 52.0' - 53.5': Quartz-mica-feldspar		==		2000		- 14			-
	6		- 1				[1		to 1" thick.		==				. 6		10	2
	6											==		10.00	170				2
7												==	1	45.00	44.75				2
60-	6						\Box		\perp			<u> </u>		13	BARBELLE STA	s Difficie		的被毒	
	RANUL				SIVE S					ORE CHARACTERISTICS			INT/FRACTU			ERISTI			
BF 0-		NSIT				TENCY	H 1	ARDN	VESS y Sol		NO. PER (1) 0		SPACING					TTITUDE orizontal	
	4 ve	ry Loo ose	se 2-		ery Sof	"	2		y Soi dium	2 Severe	(2) 1-2		<2" Very (2"-1' Close		e/Very Thin n	'	5-35 Su	b-Horizontal	.
	30 Me				Aed Stiff	ſ	3		d Har		(3) 3-10		1'-3' Mod (Clos	e/Mod Thic	*		od Dipping	
	50 De 50 Ve	nse ry Den	se 8-1		itiff 'ery Stif	,	5	Har Ver	d y Hai	d Slight 5 Fresh	(4) 11-20		3'-10' Wide >10' Very		ck e/Very Thic	*		b-Vertical ertical	
		,	>3		lard		-											2 The section of	
																			\dashv
		of bore	ehole at 116.2	2 feet;	acoust	ic televiewe	er sun	ey pe	rform	ned; in-situ stress testing performed a	t a depth interv	ral from 96°	-103'; boreho	le g	routed upor	n			
com	pletion.																		
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											BORING LOG								Sheet: 3 of	f 4
DA	en es	HARR	ic.	Apl	11 ,			T									BO	RING N	O. B83-	-7
LAV	ilivim	HI II WAN	1,50	ma, Kildi La Ers	ang I	Lef.				SECO	ND AVENUE SUBWA		BORING S				(OFFSET:		
		***************************************			160	120				SECO	PROJECT	*1		NO. CM 1	188		$\overline{}$	COORDINATI		
1					4 1	Second	í				TROOLOT		DATUM :	EL. 155.27				NORTH: 2219 AST: 99731		
					177	Salbway								RING DEPT	H (F	D 116		201.88731	3.3004	
SAMPLER	2" 0	D. split s	poon	1				BC	RING	6 CO: Wa	arren George, Inc.							EADINGS		
		IER: 140	b. Sa	afety	Ham	mer		FC	REM	AN: A. D	epue		DATE	TIME		DEPTH			TAB. TIME	
CASING S											lurzynski									
ROCK CO			Don	nut						TART: 09 VED BY: (⊢					
NOCK CO	KE. N	1				1 =	Ta	$\overline{}$	$\overline{}$	LOBI.	J. Snee DATE. U1/29	07			-	INI	L DD	OPERTIES		
~	9	SAMPLE DEPTH (FT)	- 1			PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	1				1.1			1140	3110 FR	OFERTIES	- NUMBI	
DEPTH (FT) CASING (BPF) OR	SAMPLE / CORE NO	Ŧ	1	끙	£	=	A.	å	TEST DATA		SAMPLE DESCRIPTION		STRATA SYMBOL	눞		HARD	NESS	WEATHERI	NG PER F	
E #	8	9		2	de	SF	1 %	E E	I E	BU	RMISTER (USCS / NYC BLD		×	₹						
T 00		"		SI	빌	SIE	18	8	ľ		CLASSIFICATIONS		\ \lambda	Ĕ	6	see be		see below for values	or see bell for valu	
DEPTH (FT)	₽	l ₽		BLOWS / B INCH	N VALUE (BPF)	N N	I	١š	FIELD				\ ₹	STRATIGRAPHY	NOTES		- 1			1 5
8 35	S	S.		В	ź	E 5	2	5	E				ST	ST	ž	1 2 3	4 5	1234	5 123	4 2
6			\neg					T	Т	56.2' -	65.0': Similar to SCHIST in C	4 (as 51.1'-	E				100 to 1		1000	1
1	C5	56.2-66	5.2			10.0/10.0	100	93			except convoluted, crenulated		==						- 15 T	
-6	\dashv									56.5' to	ately dipping to sub-vertical for 57.0'.	illation from	= =			10.00		Call March		10
8	4								1		58.4°, and 60.5°: Cross-foliation		目目			1000				0
8											ractures: Rough, planar, irregately dipping, with 1/16" olive		= =			据(数)				1
6	8								1	calcite	minerals.		= =			4.14			2.276	2
65	6									46.2' to	66.2': Similar to SCHIST in C 51.1')	A (Trom	昌			有有			+	
- 8	+-		4	_		ļ	+	-	-	1/2/2008/18/18	99000000000000000000000000000000000000					***			ENG T	0
5	-									66.2" -	68.6": Similar to SCHIST in C	4 (as from	$\equiv \equiv$				1620			2
6	_					1				46.2' -	51.1')									1
8								1		green t	67.8', 67.1' – 67.2', and 72.4' blue quartz and feldspar vein	: Light with 1/2"								2
T -	7			- 1							mets 0.05'-0.2' thick. 76.2': Similar to SCHIST in C	4.41				1.00				0
70 10	1									51.1' - !		4 (Irom							-6	-
10	C6	66.2-76	2			9.9/10.0	99	89			nd 66.7': Cross-foliation joints								A STATE OF	0
6	1 00	00.2-70	-			3.3/10.0	1 33	03			, planar, smooth, sub-vertical, coating.	, with	= =					-		1
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75 6	1												==						- 4575	2
6				- [2
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6	1										36.2': Hard to very hard, fresh by, fine to coarse grained, qua					7			447	2
1-	1	1								gamet 5	SCHIST, with thin to moderate	ely thick,	目目			1000			Artico	-
+ 7	1		- 1							foliation	ited, horizontal to sub-horizon i, rough, closely to widely spa	tai ced, sub-								1
80 7	-			- 1						horizon	tal foliation joints/fractures wit	h closely								1
7											white and light gray quartz-fe h veins 1" to 3" thick.	idspar-							4.2	1
7	C7	76.2-86.	2		- 1	9.8/10.0	98	95						-	ı				200	2
8	1												==	- 1		17				1
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85 7													==	1					2	0
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	ery Loc	se	<2		ery Sol	ft	1	Ve	ry So	ft	1 Complete	(1) 0		<2" Very	dos	se/Very T		0-5	Horizontal	
	oose ledium	Dense	2-4 4-8	So	ort ed Stif	r I	2		edium ed Ha		2 Severe 3 Moderate	(2) 1-2 (3) 3-10		2"-1' Close 1'-3' Mod		in se/Mod T	hick	5-35 35-55	Sub-Horizon Mod Dippin	
	ense		8-15			.	4	Ha			4 Slight	(4) 11-20	3	3'-10' Wide	/Thi	ick		55-85	Sub-Vertical	
>50 V	ery De	126	15-30 >30		ery Stif ard	'	5	ve	ry Ha	10	5 Fresh		,	>10' Very	Wid	le/Very T	nick	85-90	Vertical	
											ļ	L								
(7) Botton completion		ehole at 1	16.2 f	feet; a	coust	ic televiewe	er sur	vey p	erform	ned; in-siti	u stress testing performed at	a depth interv	ral from 96'-	-103'; boreh	ole g	routed u	pon			
Son spiedol	••																			
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1										BORING LOG							Sheet: 4 of 4	\$
	~		es ta papac	. 1.15	1			T							ВО	RING NO	D. B83-7	,
	LM	ME	HARRIS	● /\ \\ Kont Be	polise	1.4					BORIN	IG STATION:				OFFSET.		
	*	organization and the			-	100				SECOND AVENUE SUBWAY		CT NO. CM 1	188			COORDINATE		
					9.	3	d			PROJECT		RF EL. 155.27				NORTH: 2219		
					111	Avenue Subway						M: NYCT				EAST: 997310	.3864	
	101.50		D					100	2111	3 CO. W O	FINAL	BORING DEPT				EADINGS		-
			D. split spoo		h. Ham					G CO: Warren George, Inc. IAN: A. Depue	DAT			EPTH		READINGS	AB. TIME	
			to 22'	Sale	y nan	imer				EER: C. Burzynski	UNI	- Invic	1-				TO. THE	
			R: 300 lb. Do	onut						TART: 09/15/06 DATE END: 09/20/06								
	KCOR							RE	VIEV	VED BY: C. Snee DATE: 01/29/07								
		-		1		Î	8	(%)					11	INS	ITU PF	ROPERTIES	NUMBER	205
	20	Ž	E	1		N.	REC (%)	l o	_ ≤		~		1 [FRACTU	
	(BPF) OR (MIN/FT)	1 8	F	ᅙ	E.	SOIL (IN/IN)	1 2	1 8	A	SAMPLE DESCRIPTION	l Me	£		HARDN	VESS	WEATHERIN	G PER FO	тос
E	M M	١٥	DE	9	8	SE	CORE	%	ST	BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	S.	\$	1 }	see belo	ow for	see below fo	see below	W T-4
H	200	삘	LE LE	8	H	5.6	10	1 5	F	CLASSIFICATIONS	4	l E		value		values	for values	; iii
ОЕРТН (FT)	CASING (BPF) CORING (MIN/	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: ROCK (FT/	TOTAL	ROCK CORE ROD	FIELD TEST DATA		STRATA SYMBOL	STRATIGRAPHY	NOTES	1 2 3	15	12345	1234	NUMBER
2	38	8	SS	ם	z	2 2	۲	ĕ	ū		l S	ြ	ž	143	4 5	1 2 3 4 3	11117	LZ
	8									Very hard, fresh, light to dark gray, fine to	E	=	1					0
		C8	86.2-96.2	1		10.0/10.0	100	100		coarse grained, quartz-mica-garnet SCHIST, with thin, convoluted, horizontal to sub-	= =	=						0
	8	1		1						horizontal foliation, rough, widely spaced, sub-	= =	=			10 t		la.	\vdash
	8									horizontal foliation joints/fractures.	= =	-					-	0
320	8										==		1					1
•	8			1							===							0
95 -														4.4				0
	8			_	1_		1	_	_				9000	ALL CAN	10.2		100	-
	8									Similar to SCHIST in C8, except convoluted, crenulated foliation and closely to widely	E						- Mai - 1	0
	8									spaced joints/fractures.	==	-						1
	8									105.3' and 104.9': Cross-foliation ioints/fractures: Sub-vertical, white quartz	E	3	13		248		100	0
•				1						mineralization on joints.		-	á					0
00-	8					l					E	=	1000				- 00	-
	8						1						2			ALL PROPERTY OF THE PARTY OF TH		0
	7	C9	96.2-106.2			10.0/10.0	100	96			=	3 1	1000					0
-	-											-	- 10		320			0
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05 —	7										IE E	3 1						1
us	7										==	-	340					2
-					_		1		\dashv		= =	- 1						0
-	-									Similar to SCHIST in C8, except convoluted,		_		6		1000		\vdash
_	8					100		- 1		crenulated foliation and closely to moderately spaced joints/fractures.	==] [靈一		Sum TT	0
	8					197.6				108.8' and 115.9': Cross-foliation		1 1	8	-014		17 9 18		11
	В							- 1		joints/fractures: Rough, planar, undulating, moderately dipping to sub-vertical, with orange	= =	= 1						1
10-										non-softening coating minerals.	==		2.0	47/10				1
-	8	C10	106.2-116.2			10.0/10.0	100	95			==	= 1		¥ 7.				
_	8										==					和主义		2
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	8										==		7					1
										Bottom of borehole at 116.2 feet	1							1
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		-															,	
-		1																
20-										and the same of the same trace of the same				اللللا		بالماليدان		
	RANUL	AR SC	DILS I C	OHE	SIVE S	OILS I		ROC	CK C	ORE CHARACTERISTICS		JOINT/FRACTL	JRE C	CHARAC	TERIS	STICS		\neg
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0-		ry Loc ose	se <		/ery So Soft	ft	1 2		ry So dium			<2" Very 2"-1' Close		Nery Th	nin		Horizontal Sub-Horizontal	.
			Dense 4-		Med Stif	4	3		d Ha	rd 3 Moderate (3) 3-10	1	1'-3' Mod	Close	/Mod Tr	nick	35-55	Mod Dipping	
30-		ense	nse 8-1		Stiff	.	5	Ha	rd ry Ha	4 Slight (4) 11-20		3'-10' Wide			niet		Sub-Vertical Vertical	
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																		\dashv
			ehole at 116.	2 feet;	; acous	tic teleview	er sun	ey pe	erform	ned; in-situ stress testing performed at a depth inten-	val from 9	96'-103'; boreho	ole gro	outed up	oon			
corr	pletion																	
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															1 DC	ON DRIVE	D03"1	- 1

1											BORING	G LOG							5	Sheet: 1 of	14
	-	n /50	E PARY	M - 4 D	1 (1)			Т									BC	RINC	3 NO	. B83-	-8
	LM,	Ma	HARR	NAME OF	LF1'	1.1		1						BORING	STATION:		•	OFFSET			
1			-			1		1		SECO		NUE SUBWA	AY		T NO. CM 1	188		COORD			
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L								1_						FINAL BO	ORING DEPT	_		DEADIA	100		
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-			ER: 140			mer				AN: J. Ha				7/31/06	7:15			1.0'	-24 h		
			to 9' and		9.					ER: C. BU		DATE END: 0	8/01/96	3/1/06	7:30			1.0'	24 h		
	K COR			DONUL						ED BY: C		DATE: 01/29			1	1					
I NOC	T	- IVA			T	6	Ta	1	I		. 01100				ľ	T	INSITU P	ROPER	LIES	T	
	SET.	RE NO.	TH (FT)	동	ı.	SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	DATA		SAMP	LE DESCRIPTIO	N	ABOL) Fa		HARDNESS	WEAT	HERING	FRACT PER F	TURES
DEPTH (FT)	NG (BP	SAMPLE / CORE	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	VALUE (BPF)	PEN/REC: SC ROCK (FT/F1	AL CORE	K CORE	D TEST DATA	BUR		USCS / NYC BLD ASSIFICATIONS	G CODE)	STRATA SYMBOL	STRATIGRAPHY	ES	see below for values		elow for	see bel for valu	
DEPT	CASING CORING	SAMI	SAM	BLO	2 >	ROC	10T	80	FIELD					STR	STR	NOTES	12345	1 2	3 4 5	1 2 3	4 5
	4.									PAVEM	ENT THIC	KNESS: 4" Con	crete		FILL	1			:		
١.	1 .				1		1			sidewal						2		1			
-	1		1	1	1			1						200		3		1	1		- 1
				1				1		bonng.	ugered to a	depth of 6 feet p	nor to								-
						1				boning.								1	1		
-			1			İ		1								1		1			
5-										S1: Ve	ry dense, o	range brown, fine	to coarse	000				1	1		-
-											little Silt, litt	tle Gravel, micace	eous (SM /					1.	1 1		
1				5 42	142\1*	4047				11-65)				000				1			
-		S1	6-7.4	100\5	14211	12/17	1					rown, fine to coar						1			1
-							-	_	-	Some Si (SM / 7-		ock i-ragments, m	caceous,	400		4			: 1	+ : :	-
		S2	8-8.6	100\1"	100\1*	6/7				•	•			~	DEC ROCK	17		1 1			
-										C1 Me	dium hard,	slightly weathere	d, fine to	~~	DEC NOON		1				
10 -	-			-		-	+	-	\vdash			ht to dark gray, qu th thin, convolute		=-	ROCK	1	10 kg	1000	ien.		
"	4									crenulal	ed. sub-ho	inzontal foliation,	rough, very	= =	NOON			44.		on inventor (3
-						ł				dosely t	to dosely s	paced, iron-oxide	stained				美 第		67 5 G		4
-	4	C1	10-14	1		4.0/3.7	94	62				ation joints/fracture		==			7.1		1	The state of the	
	5											12.2' and 13.2': C tures: Rough, irre		==			388	1	Tank Tank		2
-			l				1				ained, sub-		90101, 11011	= =				100			3
-	5			+	-		+	-	\vdash	13.1' - 1	3.4': Clay	gouge with grave	size rock	= =	A.					在民族	5
15-	5				1					fragmen	its 1/3" thick	k.						4	SEL	-	* 1º
15	5											HST in C1, excep		==				100			>10
-	-				1							al to moderately d	ipping								5
_	6	C2	14-19			5.0/3.3	66	8			joints/fracti 4.3' and 15	5,4' - 15.8': Cross	-foliation			5	22.02.1			STATE OF	
	6											ery closely spaced				"			器		N
-														==							. 5
_	6						-	-	\dashv			fIST in C1, excep						1.0	25	-	-1-1
	6								- 1	loints/fra		n, sub-horizontal f	diadori	==							7
20 —									- 1	19.0'-21	.3': Cross-	foliation joints/fra		==				rance.		- 440	7
_	6		999448787-4-4							Rough,	slightly wea	athered, iron-oxid							嗣	*	
	5	C3	19-24			5.0/4.8	95	42		sub-vert 23.3' - 2		s foliation joint/fra	cture:	三目			1143			THE STATE OF	\vdash
1	6					[1		Rough,	slightly wea	athered, iron-oxide	stained,	==						授款	2
-	-0											range brown calci		==		H				2	1
4	6			-			1	_	\dashv		4 -0-4						200		器		
	6						1 1		- 1	C4: Har	a, slightly v	weathered, fine to rk gray, quartz-mi	coarse ca-camet	IE目				1			5
25								-		SCHIST	, with thin, I	horizontal to sub-	horizontal	= =						72.5	3
4	_6_									foliation,	, rough, pla	ınar, iron-oxide st	ained,	= =		П				V.	-
	6	C4	24-29			5.0/4.9	98	27				orizontal joints/ira 27.3' and 28.1': C		==							- 4
٦	6									foliation	joints/fractu	ures: Rough, slig	htly	==					a		2
-	-									weathere	ed, iron-oxi	de stained sub-we	ertical.	==				0.00			4
	6			4			\vdash	_	\dashv	24.2' - 2	4.4': Orang	ge brown seconda 4" long and 1/8" t	ny mineral nick radial	==							
	5			1 1			1 1		- 1	arong joi	THE TOURS IF	. 1019 010 110 0		==	,		经信贷证	· 以	盤	经 、经	3
30				ليبيا			ш			0075	ADIOTE	HOTICO			OINTERACT	710	CHADACTE	ISTICS			
	RANUL				SIVES						MARACTER		NO. PER				CHARACTER		GLE A	TTITUDE	
BP 0-		ENSIT			CONSI: Very Sc	STENCY	1	HARD	INES By Sc			THERING Complete	(1) 0		SPACING		se/Very Thin			iorizontal	
4-		ay coc ose	se		very so Soft	,,,	2		edium			Severe	(2) 1-2			se/Ti		5-	-35 Sc	ub-Horizon	ıtal
			Dense		Med Sti	irr	3		ed Ha	ird		Moderate	(3) 3-10				se/Mod Thick			lod Dipping	
		ense			Stiff		4	Ha		and .		Stight Fresh	(4) 11-20	'	3'-10' Wid		nick de/Very Thick			ub-Vertical 'ertical	
>5	U Ve	ry Der	ise		Very Sti Hard	"	5	ve	ry Ha		" '	1.6311	1		- IV VE	, 111	SO TO THUK	~	J- V		
				-50		,															
NO	ES:											•	2000								
1) G	bnuon	water I	evel not r	ecorded.					4				at .								1
2) S	tratifica	tion li	nes repre	sent appn	oximate	ooundarie	s DetV	reen :	sori ai a hon	nd rock typ zene stan	res, transition dard measu	on may be gradu: ured in the head s	nace of seal	led soil sar	nole jars usir	ng an	organic vapor	meter ed	pedqiup	with a	
3) F	rau re Ioloioni	a vali zation	detector	(PID) and	a 10.6	eV lamp. R	esults	are in	ı parl	s per millio	on by volum	пе (ррпту).			J						
						cimately 8.5			Ĩ.	7											
						nued run to		eet.													1
																					1

BORING LOG Sheet: 2 of 4 **BORING NO. B83-8** DMJMISHARRIS - ARLIP BORING STATION: **SECOND AVENUE SUBWAY** PROJECT NO. CM 1188 COORDINATES: **PROJECT** G. SURF EL. 158.91 NORTH: 222019,241 DATUM: NYCT EAST: 997169.878 FINAL BORING DEPTH (FT) 114.0 SAMPLER: 2" O.D. Split Spoon BORING CO: Warren George, Inc. **GROUND WATER READINGS** SAMPLER HAMMER 140 lb. Safety Hammer FOREMAN: J. Harris DEPTH CASING STAB. TIME CASING SIZE: 4" to 9' and 3" to 15' ENGINEER: C. Burzynski CASING HAMMER: 300 lb. Donut DATE START: 07/27/06 DATE END: 08/01/06 ROCK CORE: NX REVIEWED BY: C. Snee DATE: 01/29/07 3 **INSITU PROPERTIES** (IN/IN) 3 NUMBER OF DEPTH (FT REC CORE ROD CASING (BPF) OR CORING (MIN/FT) TEST DATA **FRACTURES** SAMPLE / CORE STRATA SYMBOL BLOWS / 6 INCH PEN/REC: SOIL (ROCK (FT/FT) STRATIGRAPHY HARDNESS WEATHERING PER FOOT (BPF) SAMPLE DESCRIPTION CORE BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS see below for see below for see below N VALUE SAMPLE for values values values TOTAL NOTES FIELD ROCK 12345 2 3 4 5 1 2 3 4 No. of Lot C5: Medium to medium hard, slightly 5 weathered, fine to coarse grained, light gray to gray, quartz-mica-gamet SCHIST, with thin to C5 29-34 5/5 100 40 4 6 moderately thick, convoluted, sub-horizontal foliation, rough, planar, closely spaced, calcite 2 6 coated, sub-horizontal foliation joints/fractures. 8 33.5' - 33.8': Cross-foliation joint/fracture: Rough, planar, very closely spaced, sub-3 6 horizontal to sub-vertical. 33.0': Slickensided joints. 5 6 黄海北 . C6: Similar to SCHIST in C5, except rough to smooth, very closely spaced joints/fractures from 34.2'-34.3', 36.8'-37.0', and 38.6'-38.9' 6 **C6** 34-39 5/5 100 22 4 37.6': Vugs 1/8" and ½" deep.
36.5' - 38.0': Multiple-inciplent fractures. 7 39.0': Slickensides.
38.6': Cross-foliation joint/fracture: Sub-3 6 vertical. 6 6 C7 5/4.9 98 32 C7: Similar to SCHIST in C5, except medium to medium hard, convoluted, sub-horizontal 5 3 foliation, very closely to closely spaced foliation 5 Incipient fractures: 40.2' - 40.5', 40.9' - 41.0', 41.9' - 42.0' and 43.0' - 43.2' 3 C8: Medium hard, slightly weathered, fine to coarse grained, light to dark gray, quartz-mica-garnet SCHIST, with thin, convoluted, sub-horizontal foliation, rough, planar to irregular, sub-horizontal foliation joints/fractures. 5 44-49 C8 5/4.8 95 20 6 10 44.0' -45.2': Green gray mylonitic SCHIST.
44.2' -44.4': Vugs 1/8' wide to 1/4' deep.
45.6', 46.8, and 47.7' - 48.5': Orange-white
non-softening secondary minerals. 2 2 47.9' · 48.3': Cross-foliation joint/fracture: 2 5/4.9 98 83 6 Rough, slightly weathered, sub-vertical. == 2 3 C9: Medium hard, slightly weathered, fine to coarse grained, light gray, quartz-mica-gamet SCHIST, with thin to moderately thick horizontal 4 6 55 to sub-horizontal foliation, rough, very closely to closely spaced, sub-horizontal foliation 4 6 joints/fractures with light grange minerals 1/2" to C10 54-59 5/5 100 42 3 6 1/2" thick. Light orange secondary mineral 1/3" thick along 4 6 incipient fractures from 50.8' with vugs at 52.9'. 10 6 4 6 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS CONSISTENCY DENSITY BPF HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE 0-4 Very Loose 2 Very Soft Soft (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Very Soft Complete Very close/Very Thin Close/Thin 0-5 **Horizontal** 2-4 4-8 4-10 Loose Medium 2"-1' 1'-3' Severe 5.35 Sub-Horizontal 10-30 Medium Dense Med Stiff Med Hard Moderate Mod Close/Mod Thick Mod Dipping Stiff Wide/Thick Very Wide/Very Thick Hard Slight 3'-10" 55-85 Sub-Vertical Very Stiff Hard >50 Very Dense 15-30 Very Hard Vertical >10" >30 NOTES:
6) Bottom of borehole at 114 feet; acoustic televiewer survey performed; borehole grouted upon completion. **BORING NO. B83-8**

											BORING LOG							SI	neet: 3 of 4	
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	DMJ	MEE	HARRI	5 * A (4)	eles:	1.1				CECO	ND AVENUE CUDWA	v L	BORING S				OFFSET:			
					768	100				SECO	ND AVENUE SUBWA' PROJECT	L		NO. CM 11	88		COORDIN			
					A.10	Second					PROJECT		DATUM :	L. 158.91			NORTH: 2 EAST: 99			
					171	Subway								RING DEPT	H (F		D 01. 33	7 103.0	370	
SAN	IPLER:	2" 0.0	D. Split S	poon				ВО	RING	CO: Wa	rren George, Inc.				OUN	ND WATER				
			ER: 140 I		/ Ham	mer				AN: J. Ha			DATE	TIME	1	DEPTH CAS	SING	STA	B. TIME	
			to 9' and		5'					ER: C. B	urzynski /27/06 DATE END: 08	101106			-					
	CK COR		R: 300 lb.	Donut						ED BY: C							_			
	T				Π	Î	18	T	T	I			T			INSITU P	ROPERTI	ES	NUMBER	05
	a-	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)			PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	4				2						FRACTUR	RES
	0)RE	ĮĘ	- 등	Ē	20	2	2	PA		SAMPLE DESCRIPTION		SYMBOL	STRATIGRAPHY		HARDNESS	WEATH	ERING	PER FO	ОТ
E	W W	ŏ	l ä	6	9	SC	8	18	ST	BUF	RMISTER (USCS / NYC BLDG CLASSIFICATIONS	CODE)	S.	₹		see below for	see bel	ow for	see below	100
Ī	200	귀	, F	8	5	X (F	١	Š	D.T.		OB ROSE TO THORID		A A	ATIC	ES	values	valu	es	for values	
DEPTH (FT)	CASING (BPF) OR CORING (MIN/FT)	AM AM	AMI	BLOWS / 6 INCH	N VALUE (BPF)	O C	6	8	FIELD TEST DATA				STRATA	J. L	NOTES	12345	1 2 3	4 5	1234	NUMBER
0	00	S	6	- -	-	1 2.6	+-	1 4	L.						-	12533		9	ESSE	3
	6		1								ledium hard, slightly weathered grained, light gray to gray, qu							ÿ-;-		
	6	C11	59-64			5/5	100	30			SCHIST, with thin, convoluted stal foliation, rough, very close						1454			7
	6									closely	spaced, sub-horizontal foliation		==							>10
	6		1	- 1							actures. 58.7': Cross-foliation joints/fra	ctures:					6072			>10
				\neg			T			Vertica	I to sub-vertical.						43421		131,43	5
65 -	6									55.87:	Small vugs ¼" wide by ¼" dee	ρ.	昌					9 1		3
	6				1						Similar to SCHIST in C10, exce									5
	6	C12	64-69			5/5	100	58			ately weathered from 62.0' - 62 63.9': Cross-foliation joints/fra		==			100				H
	6									Sub-ve	rtical. 63.9': Very soft to hard, SCH	TPI							Sac.	1
	6									coarse	grained, light orange, white to						1500			2
	6									Pegma	tite.		==			10-15		Š		3
70 -	6												==				Story.			2
		C13	69-74			5/5	100	77			edium hard, slightly weathered grained, gray, quartz-mica-ga			PEGMATITE						6
	6	013	05-7-4			3.0	1.00			SCHIST	T, with thin to moderately thick	, sub-	1 1	EGMATTI			1.4			2
	6										tal foliation, rough to smooth, r, sub-horizontal foliation	planar to	==	ROCK					1072	1
9.	6				-		-	_	\vdash		actures. 64.6' and 65.1' - 65.5'; Cross-	oliation	$\equiv \equiv$						50.01	\vdash
75-	6			1						joints/fr	actures: Rough to smooth, pla	anar to	[- A .]	PEGMATITE				ğ I.,		3
13	6										ir, sub-vertical, partly coated w e, and non-softening clay mine		1	ROCK						5
	6	C14	74-79			5/5	100	57		64.9': 5	Slickensides.						14.40			2
										66.21	2" long 1/4" deep vugs.						100	N		4
	6									C13: M	edium hard, slightly weathered grained, dark green to dark gr	l, fine to								1
	6						-	-	Н	mica-ga	arnet SCHIST, unfoliated from	71.5' - 73'				7.5				
80 -	6			1							nvoluted sub-horizontal foliation, rough, planar to irregular, cu					A Para			(A)	H
	6									horizon	tal foliation joints/fractures.		==			10,54	句をき			0
	6	C15	79-84			5/5	100	100		medium	73.0': Light orange and light g to coarse grained PEGMATII	E.								0
	6					-					Cross-foliation joint/fracture: In moderately dipping.	regular,	==							0
	6										1.5', 72' and 72.8': Vugs 1" wi	de.				31.50	124			1
							T						$\equiv \equiv$	l					1	2
85 -	6																10 cm			0
	6										Similar to SCHIST in C13, exce		==				300			6
	6	C16	84-89			5/5	100	97		abunda	to light gray, PEGMATITE, wit nt '%" to 1/3" light gray platey,		==							H
	6										s from 74.4' to 75.7', 75.2': Very closely fractured.		==	- 1			118		4.	1
	6				ļ				\square		77.7': Vertical discontinuous jo	int.				114	1			0
	6																A.H.	¥		0
90 -	RANUL	APC	OH S	COUL	SIVE S	I PIOS		PO	CK (OBECH	ARACTERISTICS		10	INT/FRACT	URF	CHARACTER	RISTICS			-
		ENSIT				STENCY	ŀ	IARD	NES	S	WEATHERING	NO. PER		SPACING	πні	CKNESS	AN		TTITUDE	\dashv
()-4 Ve	ery Loc		2	Very So Soft		1 2	Ve	ery So	oft	1 Complete 2 Severe	(1) 0 (2) 1-2		<2" Very 2"-1" Clos		se/Very Thin			lorizontal ub-Horizonta	,
			Dense	4-8 I	Med Sti	iff	3	M	ed Ha		3 Moderate	(3) 3-10		1'-3' Mod	Clo	se/Mod Thick	35	-55 N	And Dipping	
		ense ery De	nea		Stiff Very Sti	iff	5		ard ery Ha	ard	4 Slight 5 Fresh	(4) 11-20		3'-10' Wid >10' Ven		iick de∕Very Thick			ub-Vertical /ertical	
,	JU VE	, 500			Hard		J	•	.,							, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
											1									\dashv
NC NC	DTES: Bottom o	of bore	hole at 11	4 feet ac	coustic	televiewer	Surve	y perf	ome	d; borehol	e grouted upon completion.									
٠,	- Combine				303110			, , , , , , ,												
																	202		Dec -	\dashv
																[]	BORING	NO.	R83-8	

Г										BORING LOG						s	heet: 4 of 4	
\vdash	radi	N. Albin	LIADDIC	• A D	1 1 .			T								RING NO	. B83-8	
	Divij	IVIMO	IHARRIS	Acres 10	rdirec	والمأم				SECOND AVENUE SUBWAY		STATION:	400			FFSET:		
					100	110				PROJECT		T NO. CM 11 EL. 158.91	188			OORDINATES		
						Anense	d				DATUM:	NYCT			E	AST: 997169.		
-	D) ED.		D 0 110					100	20111	200.111	FINAL BO	ORING DEPT				EADINGS		_
SAN	PLER:	2" O.	D. Split Spo IER: 140 lb.	Safet	v Ham	mer				G CO: Warren George, Inc. AN: J. Harris	DATE			DEPTH			B. TIME	-
CAS	ING SIZ	E: 4"	to 9' and 3'	" to 15	5'			EN	IGINE	ER: C. Burzynski								
	ING HA		R: 300 lb. D	onut						TART: 07/27/06 DATE END: 08/01/06 VED BY: C. Snee DATE: 01/29/07		-	-	\rightarrow				-
ROC	T	E. NA		T	T	9	2	_	T	DATE: 01/29/01	T		\vdash	INST	TU PR	OPERTIES	T	\neg
	a-	Š.	SAMPLE DEPTH (FT)			PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	.≼		ایا				T		NUMBER FRACTUR	
	OF.	SAMPLE / CORE NO.	H	BLOWS / 6 INCH	Į Ę	를 C	ER	8	DATA	SAMPLE DESCRIPTION	STRATA SYMBOL	STRATIGRAPHY		HARDN	ESS	WEATHERING		
E	(8P	Ö	90	9/	(8)	ST	SO.	OR I	TEST	BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	SY	GR.		see belo	w for	see below for	see below	Tα
ОЕРТН (FT)	SING	PLE	1PLE	SS.	N VALUE (BPF)	X X	J. A.	X	D		\ ¥	¥.	NOTES	value	s	values	for values	NUMBER
N N	CASING (BPF) OR CORING (MIN/FT)	SAN	SAN	1 2) ×	PEN	10	8	FIELD		STR	STR	Š	123	4 5	1 2 3 4 5	1234	\§
				T	1					C15: Medium hard, slightly weathered, fine to	1==						178	1
	6	C17	89-94			5/5	100	87		coarse grained, dark to light gray, quartz-mica- gamet SCHIST, with thin to moderately thick,	E					100		0
-	6	3.7	33-34			55	1.30	1		sub-horizontal foliation, planar to irregular,	三目			1			14.0	4
-	6									closely to moderately closely spaced, sub- horizontal foliation joints/fractures.							\$17,74,269 24	0
-	6		ļ	+	-		-	-			三日			5.0				\vdash
95 -	6									C16: Similar to SCHIST in C15, except moderately closely spaced, moderately dipping	==					1.54		0
-	6									cross-foliation joints/fractures.	==					in the second	1800	0
_	6	C18	94-99			5/5	100	100		C17: Similar to SCHIST in C15, except closely	三三			11.24				11
	6									to moderately closely spaced, planar sub- horizontal joints/fractures.								2
	6									92.5' - 92.9': Cross-foliation joints/fractures:		- 1					100	1
	6									Irregular, sub-vertical, with light orange, rutile secondary minerals 1/3" thick.							1000	
100 —	6										==							10
-	6	C19	99-104			5/5	100	75		C18: Similar to SCHIST in C15, except closely to moderately closely spaced joints/fractures.	==							0
-	6										=	- 1			9.8	6. 1754	14270	4
-										C19: Similar to SCHIST in C15, except very	==				1			2
-	6			_					\vdash	closely spaced from 102.6' to 102.9'. 99.8' to 101.2: Cross-foliation joints/fractures:								0
05 —	6									Sub-vertical to vertical, and healed joints coated			-			983		0
-	6	000	404 400			F 15	100	400		with light orange rutile secondary mineral ¼" thick.				100 0 4 4 5 100 0 5 4 4	100			\vdash
-	6	C20	104-109			5/5	100	100				1				4.5		1
-	6									C20: Similar to SCHIST in C15.								1
_	6	-							\dashv	107.8' - 108.4': Incipient fractures.								1
10-	6														1,000		Thomas of	1
_	6									C21: Similar to SCHIST in C15, except closely spaced joints/fractures.		1						3
	6	C21	109-114			5/5	100	80		108.8' and 113.3': Cross-foliation joints/fractures: Planar, imegular, moderately		1	ı		- 1			3
	6									dipping to sub-vertical, with 1/8" non-softening	三目		VECUE					2
	6									mineral coating.			6		1			3
				- 17	T		I	T	T	Bottom of borehole at 114 feet								
15 -																		
1																		
7																		
1													1					
1									-								1111	
20 —													1					_
BP	F DE	NSITY			SIVE SO	TENCY	н	ARDI		ORE CHARACTERISTICS WEATHERING NO. PER		SPACING/T			ERIST		TITUDE	\dashv
0- 4-1	4 Ve	y Loo		2 V	ery Sof		1 2		y So			<2" Very 0 2"-1' Close		e/Very This	1		orizontal b-Horizontal	
10-3	30 Me	dium I	Dense 4-	-8 M	ted Stiff		3	Me	d Hai	d 3 Moderate (3) 3-10		1'-3' Mod C	Clos	e/Mod Thi	×	35-55 M	od Dipping b-Vertical	
30×	50 De 0 Ver	nse ry Den			tiff ery Stiff	r	5	Har Ver	ro ry Ha	4 Slight (4) 11-20 rd 5 Fresh		3'-10' Wide/ >10' Very \		ck e/Very Thi	ck		o-vertical ertical	
			>3	30 H	lard										Ŀ			
NOT			,															
		boret	hole at 114 fe	et; acc	oustic te	eleviewer s	urvey	perfo	rmed	borehole grouted upon completion.								
														ſ	во	RING NO.	B83-8	-

											BORING LOG							Sheet: 1 of 4	
		-						T								BORI	NG NC). B84-4	
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DEPTH (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA			STRATA SYMBOL	STRATIGRAPHY	NOTES	1234	4 5 1	2 3 4 5	1234	NUMBER
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	1 7	C1	12-17			5.0/4.0	80	61		modera	tely weathered, iron-oxide stained					4.6		- Va	1
15-										foliation	joints/fractures.							1	5
١.	3									C2: Sof	ft to hard, slightly to severely weathered	. ===						18 No	-
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Ι.	7										al foliation, rough, very close to closely	= =			ATTACHE TO	- 3	6		
1	8										sub-horizontal, slightly to severely ed, iron oxide stained foliation				1100	1,2			2
'			47 00			F0// 0	00			joints/fra					130	120		200	4
20-	9	C2	17-22	1 1		5.0/4.6	92	23			.3' and 19.2'-19.6': Cross-foliation				200	570		1000	1
	8			1 1		4	1 7				ctures: Rough, slightly to moderately	三目	1	1	100	24.50			>10
١ '	1						1 1			weather			1			19/3/2	Ş.	1	\vdash
Ι.	1										ed, very closely spaced, iron-oxide					No.			101
1	14										moderately dipping to sub-vertical.					53			5
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	12									stained, C3: Har weather	moderately dipping to sub-vertical. d to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz-								
										c3: Har weather mica-ga	moderately dipping to sub-vertical. d to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted,								
	12	СЗ	22-27			5.0/5.0	100	95		c3: Har weather mica-ga crenulat	moderately dipping to sub-vertical. Id to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very								
25-	12	СЗ	22-27			5.0/5.0	100	95		c3: Har weather mica-ga crenulat closely t	moderately dipping to sub-vertical. d to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted,								0 1 0
25-	12	СЗ	22-27			5.0/5.0	100	95		c3: Har weather mica-ga crenulat closely t weather joints/fra	moderately dipping to sub-vertical. Id to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ctures.							3	0
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25	12 15 18 21									C3: Har weather mica-ga crenulat closely t weather joints/fra 25.9' – 2 Rough,	moderately dipping to sub-vertical. Id to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ctures. 6.9: Cross-foliation joints/fractures:								0 1 0 2
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30-	12 15 18 21 21 17 8 6	C4	27-29			2.0/1.9		75		stained, C3: Har weather mica-ga crenulat closely t weather joints/fra 25.9' - 2 Rough, t C4: Sim	moderately dipping to sub-vertical. Indicate to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation cutures. 6.9: Cross-foliation joints/fractures: slightly weathered, sub-vertical. idar to SCHIST in C3 except, hard.								0 1 0 2 2 2 2 2
30-	12 15 18 21 21 17 8	C4	27-29 DILS		SIVE S	2.0/1.9 OILS	95	75 R		stained, C3: Har weather mica-ga created to sely the weather joints/fra 25.9'-2 Rough, C4: Sim	moderately dipping to sub-vertical. Indicate to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation octures. 16.9°: Cross-foliation joints/fractures: slightly weathered, sub-vertical. slightly weathered, sub-vertical.		DINT/FRACTI						0 1 0 2 2 2 2 2
30 -	12 15 18 21 21 17 8 6	C4 AR SCENSIT	27-29 DILS	BPF (CONSIS	2.0/1.9 OILS	95	75 RI	NES	stained, C3: Har weather mica-ga crenulat dosely t weather joints/fra 25.9' - 2 Rough; C4: Sim	moderately dipping to sub-vertical. Id to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation cctures. 16.9°: Cross-foliation joints/fractures: slightly weathered, sub-vertical. iilar to SCHIST in C3 except, hard. IARACTERISTICS WEATHERING NO. Pi		SPACING	THI	CKNESS		ANGLE A	ATTITUDE	0 1 0 2 2 2 2 2
30 - C	12 15 18 21 21 17 8 6 GRANUI	C4 AR SC ENSIT	27-29 DILS	BPF (CONSIS /ery So	2.0/1.9 OILS	95	75 RO HARLI Ve	NES	c3: Har weather mica-ga crenulat closely t weather joints/fix 25.9' - 2 Rough, 3 C4: Sim	moderately dipping to sub-vertical. Indicately dipping to sub-vertical. Indicate to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ictures. 16.9°: Cross-foliation points/fractures: slightly weathered, sub-vertical. idlar to SCHIST in C3 except, hard. IARACTERISTICS WEATHERING WEATHERING NO. PI 1 Complete (1) 0	JC R FT	SPACING	THI	CKNESS se/Very Th		ANGLE A	ATTITUDE Horizontal	0 1 0 2 2 2 2 2 3
30 - C	12 15 18 21 21 17 8 6 SRANUL PF D 0-4 V	C4 AR SC ENSIT ery Lococose	27-29	BPF (<2 \ 2-4 S	CONSIS /ery So Soft	2.0/1.9 OILS STENCY oft	95	75 RC HARD Ve	NES	stained, C3: Har weather mica-ga crenulat closely the weather joints/fra 25.9' - 2 Rough, C4: Sim	moderately dipping to sub-vertical. Indicate to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz-met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ctures. 16.9°: Cross-foliation joints/fractures: slightly weathered, sub-vertical. 18 slightly weathered, sub-vertical. 19 slightly weathered, sub-vertical. 10 slightly weathered, sub-vertical. 11 slightly weathered, sub-vertical. 12 slightly weathered, sub-vertical. 13 complete (1) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	JC ER FT	SPACING <2" Very 2"-1' Clos	Clos	CKNESS se/Very Th	in	ANGLE A 0-5 H 5-35 Si	ATTITUDE Horizontal ub-Horizontal	0 1 0 2 2 2 2 2 3
30 - C	12 15 18 21 21 17 8 6 SRANUE PF DO-4 V-10 LG	C4 LAR SC ENSIT ery Lococose ledium	27-29 DILS Y se Dense	BPF (<2 \ 2-4 \ 4-8	CONSIS /ery So Soft Med Stir	2.0/1.9 OILS STENCY oft	95	75 RO HARLI Ve Me	NES	stained, C3: Har weather mica-ga crenulat closely the weather joints/fra 25.9' - 2 Rough, C4: Sim	moderately dipping to sub-vertical. Id to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation cctures. 6.9': Cross-foliation joints/fractures: slightly weathered, sub-vertical. iilar to SCHIST in C3 except, hard. IARACTERISTICS WEATHERING 1 Complete 1 1 Complete 2 Severe 2 1-3 Moderate 3 3-3-1	JC ER FT	SPACING <2" Very 2"-1' Clos 1'-3' Mod	Clos	CKNESS se/Very Th in se/Mod Th	in	ANGLE A 0-5 H 5-35 St 35-55 N	ATTITUDE Horizontal	0 1 0 2 2 2 2 2 3
30 - (C) B (C) 4 10 30	12 15 18 21 21 17 8 6 SRANUL PF D 0-4 V -10 LC 1-30 M	C4 AR SC ENSIT ery Lococose	27-29 DILS Y se Dense	BPF (<2 \ 2-4 \ 4-8	CONSIS /ery So Soft Med Stif Stiff	2.0/1.9 OILS STENCY off	95 1 2 3	75 RI HARD Ve Me Ha	NES ery So edium ed Ha	stained, C3: Har weather mica-ga crenulal closely to weather joints/fra 25.9' - 2 Rough, C4: Sim	moderately dipping to sub-vertical. Id to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation octures. 16.9°: Cross-foliation joints/fractures: slightly weathered, sub-vertical. wilar to SCHIST in C3 except, hard. ARACTERISTICS	JC R FT 100 200	SPACING <2" Very 2"-1' Clos 1'-3' Mod 3'-10' Wide	clos e/Th Clos e/Th	CKNESS se/Very Th in se/Mod Th	in lick	ANGLE A 0-5 H 5-35 Si 35-55 M 55-85 Si	ATTITUDE Horizontal ub-Horizontal Mod Dipping	0 1 0 2 2 2 2 2 3
30 - (C) B (C) 4 10 30	12 15 18 21 21 17 8 6 SRANUL PF D 0-4 V -10 LC 1-30 M	LAR SC ENSIT ery Locose ledium ense	27-29 DILS Y sse Dense	BPF (2 \ 2-4 \ 3 \ 4-8 \ B-15 \ 5-30 \ \	CONSIS /ery So Soft Med Stif Stiff	2.0/1.9 OILS STENCY off	95 1 2 3 4	75 RI HARD Ve Me Ha	NES ery So edium ed Ha erd	stained, C3: Har weather mica-ga crenulal closely to weather joints/fra 25.9' - 2 Rough, C4: Sim	moderately dipping to sub-vertical. Indicately dipping to sub-vertical. Indicate to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ictures. Indicate to SCHIST in C3 except, hard. INTRACTERISTICS WEATHERING 1 Complete (1) 0 2 Severe (2) 1-2 3 Moderate (3) 3-1 4 Slight (4) 11-	JC R FT 100 200	SPACING <2" Very 2"-1' Clos 1'-3' Mod 3'-10' Wide	clos e/Th Clos e/Th	CKNESS se/Very The in se/Mod The ick	in lick	ANGLE A 0-5 H 5-35 Si 35-55 M 55-85 Si	ATTITUDE Horizontal ub-Horizontal Mod Dipping ub-Vertical	0 1 0 2 2 2 2 2 3
30 - (C) B (C) 4 10 30 30 30 30 30 30 30 30 30 30 30 30 30	12 15 18 21 21 17 8 6 GRANUI PF D 0-4 V 1-30 M 1-50 D	LAR SC ENSIT ery Locose ledium ense	27-29 DILS Y sse Dense	BPF (2 \ 2-4 \ 3 \ 4-8 \ B-15 \ 5-30 \ \	CONSIS /ery So Soft Med Stiff /ery Sti	2.0/1.9 OILS STENCY off	95 1 2 3 4	75 RI HARD Ve Me Ha	NES ery So edium ed Ha erd	stained, C3: Har weather mica-ga crenulal closely to weather joints/fra 25.9' - 2 Rough, C4: Sim	moderately dipping to sub-vertical. Indicately dipping to sub-vertical. Indicate to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ictures. Indicate to SCHIST in C3 except, hard. INTRACTERISTICS WEATHERING 1 Complete (1) 0 2 Severe (2) 1-2 3 Moderate (3) 3-1 4 Slight (4) 11-	JC R FT 100 200	SPACING <2" Very 2"-1' Clos 1'-3' Mod 3'-10' Wide	clos e/Th Clos e/Th	CKNESS se/Very The in se/Mod The ick	in lick	ANGLE A 0-5 H 5-35 Si 35-55 M 55-85 Si	ATTITUDE Horizontal ub-Horizontal Mod Dipping ub-Vertical	0 1 0 2 2 2 2 2 3
30 (C) BB (C) 44 100 300 >>	12 15 18 21 17 8 6 GRANUI PF D 0-4 V -10 Le 1-30 M 0-50 V	AR SO ENSIT ery Loc cose ledium ense ery Der	27-29 DILS Y sse Dense isse	BPF (2 \ 2-4 \ 3-4-8 1 \ 8-15 \ 3 \ 5-30 1 \ >30 1	CONSIS /ery So Soft Med Stiff /ery Sti	2.0/1.9 OILS STENCY off	95 1 2 3 4	75 RI HARD Ve Me Ha	NES ery So edium ed Ha erd	stained, C3: Har weather mica-ga crenulal closely to weather joints/fra 25.9' - 2 Rough, C4: Sim	moderately dipping to sub-vertical. Indicately dipping to sub-vertical. Indicate to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ictures. Indicate to SCHIST in C3 except, hard. INTRACTERISTICS WEATHERING 1 Complete (1) 0 2 Severe (2) 1-2 3 Moderate (3) 3-1 4 Slight (4) 11-	JC R FT 100 200	SPACING <2" Very 2"-1' Clos 1'-3' Mod 3'-10' Wide	clos e/Th Clos e/Th	CKNESS se/Very The in se/Mod The ick	in lick	ANGLE A 0-5 H 5-35 Si 35-55 M 55-85 Si	ATTITUDE Horizontal ub-Horizontal Mod Dipping ub-Vertical	0 1 0 2 2 2 2 2 3
30 - CC BB (C 44 100 300 > NCC 1)	12 15 18 21 21 17 8 6 SRANUU PF D 0-4 V -50 D 50 V	C4 LAR SC ENSIT ery Locose ledium ense ery Der	27-29 DILS Y see Dense nse 1	BPF (2 \ 2-4 \ 3 \ 4-8 \ 1 \ 8-15 \ 3 \ 5-30 \ \ >30 \ F	CONSIS /ery So Soft Med Stiff /ery Sti lard	2.0/1.9 OILS STENCY off ff	95 1 2 3 4 5	75 RI HARE Ve Mo Hare	ONES ery So edium ed Ha ard ery Ha	stained, C3: Har weather mica-ga crenulat closely t weather joints/fra 25.9' - 2 Rough, : C4: Sim	moderately dipping to sub-vertical. In to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ctures. 16.9°: Cross-foliation joints/fractures: slightly weathered, sub-vertical. witar to SCHIST in C3 except, hard. IARACTERISTICS WEATHERING 1 Complete 2 Severe (2) 1-2 3 Moderate 3) 3-1 4 Slight 5 Fresh (4) 11-	JC R FT 100 200	SPACING <2" Very 2"-1' Clos 1'-3' Mod 3'-10' Wide	clos e/Th Clos e/Th	CKNESS se/Very The in se/Mod The ick	in lick	ANGLE A 0-5 H 5-35 Si 35-55 M 55-85 Si	ATTITUDE Horizontal ub-Horizontal Mod Dipping ub-Vertical	0 1 0 2 2 2 2 2 3
30 - (C) B (C) 4 4 10 30 > (C) NC(1) (2) (2) (2)	12 15 18 21 21 17 8 6 6 SRANUU 19 10 10 10 10 10 10 10 10 10 10 10 10 10	C4 AR SC ENSIT ery Locoose ledium ense ery Der water I	27-29 DILS Y se Dense use 1	BPF (2 \ 2-4 \ 3 \ 4-8 1 \ 8-15 \ 5-30 \ >30 F	CONSIS /ery So Soft Med Stiff /ery Stiff lard	2.0/1.9 OILS STENCY off ff boundaries	95 1 1 2 3 4 5	RR RR MM MARKET Ver MM MARKET Ver MM MARKET Ver MM MARKET MM MARKE	ONES ery So edium ed Ha ard ery Ha	stained, C3: Har weather mica-ga crenulal closely the weather joints/fra 25.9" - 2 Rough, S C4: Sim	moderately dipping to sub-vertical. Indicate to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz-met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ictures. 16.9°: Cross-foliation joints/fractures: slightly weathered, sub-vertical. Indicate to SCHIST in C3 except, hard. IARACTERISTICS WEATHERING 1 Complete 1 Complete 1 1 Complete 3 Moderate 3 3-1 4 Slight 5 Fresh INDICATERISTICS WEATHERING 1 Complete 1 10 2 Severe (2) 1-2 3 Moderate 3 3-1 4 Slight 4 Slight 5 Fresh	JC SR FT 100 220	SPACING: <2" Very 2"-1' Clos 1'-3' Mod 3'-10' Wide >10' Very	r clos e/Th Clos e/Th Wic	CKNESS se/Very The in se/Mod The ick de/Very The	iin lick lick	ANGLE A 0-5 H 5-35 Si 35-55 M 55-85 Si 85-90 V	ATTITUDE Horizontal ub-Horizontal Mod Dipping ub-Vertical /ertical	0 1 0 2 2 2 2 2 3
30 (C B ((4 4 10 30 30 30 1) 2) 3)	12 15 18 21 21 17 8 6 6 SRANUU PF D 10 14 10 10 10 10 10 10 10 10 10 10 10 10 10	C4 LAR SC ENSIT ery Loc oose ledium ense ery Der water I attion lir est Data	27-29 DILS Y se Dense evel not recess represes - represes	BPF (CONSIS /ery So Soft Med Stiff /ery Stiff land eximate pors lev	2.0/1.9 OILS STENCY Iff Iff boundaries els are refe	95 11 2 3 4 5	RR HARLE Ve MM Ha Ve	NEStery So ediumed Ha and ery Ha soil ar a ben	stained, C3: Har weather mica-ga crenulal closely to weather joints/fra 25.9' – 2 Rough, c C4: Sim CORE CH S oft in and rock typ: und rock	moderately dipping to sub-vertical. In to very hard, fresh to slightly ed, fine to coarse grained, gray, quartz- met SCHIST, with thin, convoluted, ed, sub-horizontal foliation, rough, very o closely spaced, fresh to slightly ed, sub-horizontal, foliation ctures. 16.9°: Cross-foliation joints/fractures: slightly weathered, sub-vertical. witar to SCHIST in C3 except, hard. IARACTERISTICS WEATHERING 1 Complete 2 Severe (2) 1-2 3 Moderate 3) 3-1 4 Slight 5 Fresh (4) 11-	JC SR FT 100 220	SPACING: <2" Very 2"-1' Clos 1'-3' Mod 3'-10' Wide >10' Very	r clos e/Th Clos e/Th Wic	CKNESS se/Very The in se/Mod The ick de/Very The	iin lick lick	ANGLE A 0-5 H 5-35 Si 35-55 M 55-85 Si 85-90 V	ATTITUDE Horizontal ub-Horizontal Mod Dipping ub-Vertical /ertical	0 1 0 2 2 2 2 2 3
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BORING LOG Sheet: 2 of 4 **BORING NO. B84-4** DMIMIIHARRIS • ARLA BORING STATION: OFFSET: SECOND AVENUE SUBWAY PROJECT NO. CM 1188 COORDINATES: **PROJECT** G. SURF EL. 160.47 NORTH: 222141.2647 DATUM: NYCT EAST: 997420.5723 FINAL BORING DEPTH (FT) 117.5 SAMPLER: 2" O.D. Split Spoon BORING CO: Warren George Inc. **GROUND WATER READINGS** SAMPLER HAMMER: 140 lb. Safety Hammer FOREMAN: D. Samugiel DATE TIME DEPTH CASING STAB. TIME CASING SIZE: 3" to 12'
CASING HAMMER: 300 lb. Donut ENGINEER: D. Wendt DATE END: 10/5/06 DATE START: 9/29/06 ROCK CORE: NX REVIEWED BY: C. Snee DATE: 01/24/07 REC (%) **INSITU PROPERTIES** (IN/IN) 8 NUMBER OF 8 DATA Rab **FRACTURES** (BPF) OR (MIN/FT) STRATA SYMBOL SAMPLE / CORE DEPTH PEN/REC: SOIL (ROCK (FT/FT) STRATIGRAPHY HARDNESS WEATHERING BLOWS / 6 INCH PER FOOT (BPF) SAMPLE DESCRIPTION CORE BURMISTER (USCS / NYC BLDG CODE) ROCK CORE DEPTH (FT) FIELD TEST see below for see below CLASSIFICATIONS CASING (E N VALUE NUMBER values values for values TOTAL 12345 1 2 3 4 5 1 2 3 4 C5: Hard, slightly weathered, fine to coarse 29-32 93 63 1 C5 3.0/2.3 20 grained, quartz-mica-garnet SCHIST, with very thin to thin, convoluted, crenulated, horizontal to 4 19 sub-horizontal foliation, rough, very closely to closely spaced, slightly weathered, horizontal to 3 19 sub-horizontal foliation joints/fractures 30.2'-30.6'; Thin Quartz band 30.1'-30.3': Cross-foliation joint/fracture: 2 12 2 32-37 5.0/4.3 86 66 C6 Healed, moderately dipping. 15 C6: Hard, slightly weathered, fine to coarse grained, gray, quartz-mica-garnet SCHIST, with 4 8 3 very thin to thin, horizontal to sub-horizontal foliation, rough, slightly weathered, very closely to closely spaced, horizontal to sub-horizontal, 2 foliation joints/fractures.
33.0'-33.5': Cross-foliation joint/fracture: 0 Healed, sub-vertical.
32.2' and 36.3': Cross-foliation joints/fractures: 37-42 5.0/4.8 96 83 0 C7 3.5 Slightly weathered, sub-horizontal. 1 C7: Similar to SCHIST in C5, except fresh. 1 37.2' - 37.9': Cross-foliation joints/fractures: 0 Rough, slightly weathered, moderately dipping. 8 0 8 0 42-47 100 96 C8 5.0/5.0 C8: Hard to very hard, fresh, fine to coarse 1 18 grained, gray, quartz-mica SCHIST, with very thin to thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, moderately 3 13 8 closely spaced, fresh, sub-horizontal foliation joints/fractures. >10 46.5' - 46.7': Cross-foliation joints/fractures: Rough, moderately dipping. 1 C9 5.0/4.3 86 15 50 C9: Very soft to medium hard, moderately to severely weathered, fine to coarse grained, gray, quartz-mica-gamet SCHIST, with very 14 convoluted, crenulated, horizontal to sub-20 horizontal foliation, rough, moderately to 1 severely weathered, very closely to closely spaced, foliation joints/fractures. Cross-foliation joints/fractures. Rough, very closely to closely spaced, slightly to severely weathered, moderately dipping to sub-vertical 11 0 18 0 C10 52-57 5 0/5 0 100 90 14 55 2 0 C10: Similar to SCHIST in C7, except closely to 17 moderately closely spaced foliation 0 joints/fractues. 18 0 26 1 5.0/5.0 100 95 C11 20 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS BPF NO. PER FT DENSITY CONSISTENCY HARDNESS BPF WEATHERING SPACING/THICKNESS ATTITUDE (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 <2 2-4 4-8 0-5 5-35 35-55 0-4 Very Loose Very Soft Soft Very Soft Medium Complete Severe Very close/Very Thin Close/Thin Horizontal Sub-Horizontal 4-10 2 2 10-30 Medium Dense Med Stiff Med Hard Moderate 1'-3' Mod Close/Mod Thick Mod Dipping Dense Stiff Hard Slight 3'-10' Sub-Vertical 5 Wide/Thick Very Stiff Very Hard 5 >50 Very Dense 15-30 Fresh Very Wide/Very Thick 85-90 Vertical >30 NOTES:
4) Bottom of borehole at 117.5 feet; acoustic televiewer survey performed; borehole grouted upon completion. **BORING NO. B84-4**

										BORING LOG						5	Sheet: 4 of 4	
	DM	JM	IHARRIS _,	• A 10 Josef M	d solve	111	_			SECOND AVENUE SUBWAY	PROJE	G STATION: CT NO. CM 1	188	_	COOL	RDINATES		
						Sacon	d			PROJECT		F EL. 160.47				TH: 22214 997420		
_		at: -			- 7/	SARWAY		1		200.11		BORING DEPT		T) 117.5 ND WATER				
			D. Split Sp IER: 140 lb.		lv Harr	mer				G CO: Warren George Inc. AN: D. Samugiel	DATI			DEPTH C			AB. TIME	
CAS	ING SI	ZE: 3"	to 12'		,			EN	GINE	ER: D. Wendt								
	K COF		R: 300 lb. D	onut						TART: 9/29/06 DATE END: 10/5/06 VED BY: C. Snee DATE: 01/24/07	-	-						
	T	T		T		2	8							INSITU	PROPE	RTIES	NUMBER	OF
Ŀ	3PF) OR MIN/FT)	CORE NO	SAMPLE DEPTH (FT)	SINCH	(BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	CORE ROD (%)	ST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE)	SYMBOL	RAPHY		HARDNES		ATHERING	FRACTUR PER FO	RES OT
ОЕРТН (FT)	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE	SAMPLE	BLOWS / 6 INCH	N VALUE (BPF)	EN/REC:	OTAL CC	ROCK CO	FIELD TEST	CLASSIFICATIONS	STRATA SYMBOL	STRATIGRAPHY	NOTES	see below for values		below for values 2 3 4 5	for values	MBE
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-	5_	-				1				C18: Similar to SCHIST in C11.	==	-						0
-	3_																	0
95 —	3_	C18	92.3-97.4			5.1/5.1	100	100			E							0
-	3	1								***								0
-	3			-	-		-				E				1		8	0
-	3_									C19: Similar to SCHIST in C18. 100.0' - 100.4: Cross-foliation joint/fracture:	E			1 210	多字			0
_	3									Rough, slightly weathered, sub-vertical.					10		1	0
00	2	C19	97 4-102.4			5.0/4.9	98	94			==							1
-	2										E				A Rose			0
1	2			-	-		\vdash	\vdash	\vdash					7.43		31.4	8.50	0
1	3									C20: Very hard, fresh, fine to coarse grained, gray, quartz-mica-garnet SCHIST, with thin,	==							0
7	3									convoluted, crenulated, horizontal to sub- horizontal foliation.	==					4.71		0
05 —	3	C20	102.4-107.4			5.0/4.9	98	98			==			一种使用				0
	4_										E				14.2		90	0
1	3			-	-		-		\dashv		==				1	自由任		0
1	3									C21: Similar to C-20 except, rough, slightly weathered, moderately closely spaced,	E							0
1	3									horizontal, foliation joint/fracture.	E			17 KA 61	1.2			0
10-	3	C21	107.4-112.5			5.1/5.1	100	100			==		ı					1
1	3							1			E				1 4		2	0
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1	2.5		h .							C22: Very hard, fresh, fine to coarse grained, gray, quartz-mica-gamet SCHIST, with thin,				e de la composition				0
_ 1	4									convoluted, crenulated, horizontal to sub- horizontal foliation, rough, slightly weathered,	ΞΞ							1
15	3	C22	112.5-117.5			5.0/5.0	100	91		horizontal to sub-horizontal foliation joints/fractures.	三三		100					0
1	4									,			1					2
	3			-	\vdash		\vdash	-	+	Bottom of borehole at 117.5 feet	1==		4	- 5 S S S S S S S S S S S S S S S S S S	15.00	西风游		H
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GF	RANUL	AR SC	DILS	COHE	SIVE S	OILS		ROC	CK C	ORE CHARACTERISTICS	J	OINT/FRACTI	JRE	CHARACTER				\exists
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4-1	10 Lo	ose	2	4 5	Soft Med Stil	- 1	2	Me	dium d Ha	2 Severe (2) 1-2		2"-1" Close	/Th			5-35 S	ub-Horizontal Mod Dipping	
30-	50 De	ense	8-	15 \$	Stiff		4 5	Ha	rd	4 Slight (4) 11-20		3'-10' Wide	/Thi	ck		55-85 S	ub-Vertical Vertical	
>5	.υ V€	ery De			Very Sti Hard	"	5	ve	ry Ha	rd 5 Fresh		>10' Very	#VIC	le/Very Thick		55-50 V	- uca	
NOT	Ee.												-					\dashv
1) B		of bore	hole at 117.5	feet;	acoustic	c televiewe	r surve	ey per	forme	ed; borehole grouted upon completion.								
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															BORII	NG NO.	B84-4	

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1					-	100				SECOND AVENUE SUBWAY		ECT NO. CM 1	188				ORDINA			
1					A.A	2000		-		PROJECT		RF EL. 160.73					RTH: 22			
1					111	Assense						M: NYCT				EAS	T: 9974	59.6	76	
								-			FINAL	BORING DEPT					511100			
			D. Split S		. 11					CO: Warren George Inc.	DA			DEPTH			DINGS		. TIME	
			IER: 140 lb	. Saret	у нап	ımer				AN: R. Verpent/J. St. Germain	DA	I IIVIE	+-	/EF II	1 4	40114C	1-	DIAD	. I IIVIC	
			R: 300 lb.	Donut						TART: 10/13/06 DATE END: 10/18/06		-	+		+		+-			
		RE: NO		Donat						/ED BY: C. Snee DATE: 01/23/07			T		+		+-			
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	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	동	-	SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA	SAMPLE DESCRIPTION	SYMBOL	主		HARI	DNES	s w	EATHER	ling		TURES
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		S1	6-7.5	5	104	18/3	1		0	Loose to very dense, gray brown Clayey SILT,		2		. ;	1					
		31	6-7.5	100%	104	10/3			1 "	and fine to coarse SAND, trace Gravel (ML & SM / 11-65)			1							
-			 	7		1	+			control of the second of the second of	200				, ,,,,,,,		1 1	11	1	
-		S2	8-10	11	25	24/14	1		0	Medium dense, gray to brown, fine SAND, and SILT, little Clayey Silt pockets (SM / 11-65)						-	1			
				23							00							1	1	
10				11						Dense, gray to brown, fine to medium SAND,		0							;]	
-		S3	10-12	21 29	50	24/9	1	1	0	little Silt (SM / 11-65)	00								1	
-				39			-	-				•							. įļ	
				18			1			Very dense, brown, fine to coarse SAND, little	200	•		1						
1		S4	12-14	48	86	24/12			0	Silt (SM / 11-65)	40 .4	•							. 1	İ
4		\vdash		1 4/			+	-	-		0.0	•			7			1	11	
15		S5	14-15.3	11 37	137	15/6		1	0	Very dense, gray to brown, fine to coarse SAND, some Sill, trace Gravel (SM / 11-65)										
13	1	35	14-15.5	100V4"	107	13/6			۱۱۱	SAIND, Some Sill, liace Graver (SM / 11-05)	000	•					-			
1										Vanudance army to brown fine to cooms							1			- 1
-	1	S6	16-16.9	14	100	11/4			0	Very dense, gray to brown, fine to coarse SAND, some Silt, trace Gravel (SM / 11-65)		•	1	4			+		1	1
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+	·								Н	Bandi bond to bond offendir to consent.	=	SCHIST		6435	266	1000	125		23	1
20	5_									Medium hard to hard, slightly to severely weathered, fine to coarse grained, gray, quartz-	=					165		8		_
	4									mica-gamet SCHIST, with very thin to thin,		-		140	11.50	1.4	100			1
Т	4	C1	19-24			5/4.5	90	43		convoluted, crenulated, horizontal to sub- horizontal foliation, rough, slightly weathered,	<u> =</u>						50 L/30	U		9
+	_1_			1 1						closely spaced, horizontal to sub-horizontal				S Lan		(5)11 (Arri			-
4	2									foliation joints/fractures.	= :	=	1000		230,254					3
	2									21'-21.3': Iron-oxide staining.		_	2440	54	to by	o and		4	ALC:	2
7	2										E	=	100	0.00	$J \in \mathcal{I}$		V. 3			3
25										Hard to very hard, fresh to slightly weathered,	1		and disc			1	4		STATE OF THE STATE	
1	2									gray, fine to coarse grained, quartz-mica-gamet SCHIST, with very thin to thin, convoluted,		<u> </u>	2000	1		3.9	200			2
	2									crenulated, horizontal to sub-horizontal		-	-		2.5			4		2
T				1 1					- 1	foliation, rough, slightly weathered, closely	E	3 1	of the	1, 44						2
+	2									spaced, horizontal to sub-horizontal foliation joints/fractures.	==	-						- 0		-
1	2	62	24 24 4			40 4/40 4	400	66	- 1	jointa natures.	==	=	Ì			2200		. 2		2
	2.5	C2	24-34.1			10,1/10.1	100	00			==	=	2					0		0
30 —											<u> </u>			POR ST AND S	and the second	- Services	POR LOCAROVES	70a u	1207	
		AR SC			SIVE S					CORE CHARACTERISTICS		JOINT/FRACT								
BPI 0-4		ENSIT			CONSIS /ery So	STENCY	1	HARD	NES		FT	SPACING. <2" Very				1	ANGLE 0-5		TITUDE izontal	
4-1		oose	ise		Soft	""	2		edium			2"-1' Clos		e∕Very in	11011		5-35		-Horizon	ntal
10-3	10 M	ledium		4-8	Aed Sti	ff	3	Me	ed Ha	rd 3 Moderate (3) 3-10		1'-3' Mod	Clos	se/Mod	Thick	1	35-55	Mod	d Dipping	g
30-5 >5	0 D	ense ery Der			Stiff /ery Sti	ff	4 5		erd ery Ha	4 Slight (4) 11-20 rd 5 Fresh			e/Thi	ck le/Very	Thick		55-85 85-90	Sub- Vert	-Vertical tical	
-3		o, bei			lard	"	J	*6	., , , ,			rio very	****	C. VELY	THER	1	30 30			
NOT		water 1	evel not red	mrdad																
					ximate	boundaries	betv	veen s	soil ar	nd rock types, transition may be gradual.										
3) Fi	eld Te	st Data	- Total org	ganic va	pors lev	rels are refe	erenc	ed to	a ben	zene standard measured in the head space of seale	ed soil s	ample jars usin	g an	organic	c vapo	or mete	r equipp	ed wi	th a	
ph	otoion	ization	detector (P	וט) and	a 10.66	ev iamp. Re	sults	are in	part	s per million by volume (ppmv).										

											BORING LOG		-						S	Sheet: 2 of 4	4
\vdash	TAI	IN ARE	HARR	ic.	iel i				T								BC			. B84-5	5
	Divi	livino	HARR	á kv	Pentie	-					SECOND AVENUE SUBWAY			STATION:	100			OFFSET			
					[50120					PROJECT			FNO. CM 1 EL. 160.73	188			NORTH			
					-	Sunday.	ELIME FLIME							NYCT				EAST: 9	97459.	676	
SAR	APLER:	2" 0.	D. Split	Spoon					BC	RIN	CO: Warren George Inc.	FIN	AL BU	RING DEPT			ATER F	READIN	IGS		
SAN	APLER	HAMM	IER: 140			ammer			FO	REM	AN: R. Verpent/J. St. Germain	0	ATE				H CAS			B. TIME	
	SING SI		to 19' R: 300 lb	. Donu	ıt						ER: D. Wendt TART: 10/13/06 DATE END: 10/18/06	+			\vdash		+	-			
RO	CK COR	E: NO	}		_			7	T	VIEV	/ED BY: C. Snee DATE: 01/23/07	I,		I	F	1					
	_	g	E			2	ROCK (FT/FT)	REC (%)	ROCK CORE RQD (%)	1						-	NSITU P	ROPER1	TIES	NUMBER	
	CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)		핑	E 5		RE	P. B.	FIELD TEST DATA	SAMPLE DESCRIPTION		STRATA SYMBOL	¥		HAF	RDNESS	WEAT	HERING	FRACTU PER FO	
E	M M	100	DEF		9	8	F	CORE	ORE	ST	BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS		SYA	3RAF		see	below for	see be	elow for	see belov	W ~
DEPTH (FT)	SING	APLE	APLE		BLOWS / 6 INCH	N VALUE (BPF)	X.	AF.	X	P	55 tosii 15 (116)		MATA	STRATIGRAPHY	NOTES		alues		lues	for values	NUMBER
ä	200	SAN	SAN		BE	N N	80	TOTAL	8	E			STR	STR	Š	1 2	3 4 5	1 2	3 4 5	1 2 3 4	
	3																	大阪(45) (5)(6)(2)	wan da National		0
	2.5											=									1
	3											=	=					3.5	196		1
ľ	3											=	=								4
	2				\top							=									4
35 -	2										Very soft to hard, fresh to completely	=									4
	2										weathered, fine to coarse grained, gray, quartz- mica-garnet SCHIST, with very thin to thin,	1=	=				2 400	7577.17			2
	2										convoluted, crenulated, horizontal to sub- horizontal foliation, rough, completely to	=						7			0
	3										moderately weathered, very closely to widely spaced, horizontal, foliation joints/fractures.	=									0
40	2	C3	34.1-44	1.1		10/	9.9	99	80		36.1'-36.5': Severely weathered zone			- 1							0
40 -	2											=					4.			20	0
	3											=		1			9.2				0
	3											-		1				TAX.			0
	3											=	\equiv								1
45 -	2					\top					Very hard, fresh to slightly weathered, fine to	=									1
45 -	2										coarse grained, gray, quartz-mica-garnet SCHIST, with very thin to thin, convoluted,	=			-	起弹		*****			4
	2										crenulated, horizontal to sub-horizontal foliation, rough, moderately to slightly	E		1							4
	2	C4	44.1-51	.3		7.2	$_{\pi}$	97	68		weathered, closely to moderately closely spaced, horizontal to sub-horizontal, foliation	=					207				2
	2									- 1	joints/fractures. 41.4'-41.8' and 46.7'-47.5': Cross-foliation	=	=					0.75			0
50 —	2									- 1	joints/fractures: Rough, slightly to moderately weathered, sub-vertical to vertical.	=					100				0
50 -	2										45.6'-45.9': Cross-foliation joint/fracture: Rough, slightly weathered, slightly chloritic,		_	. 1	ı						0
_	11				+	1		\neg	\neg		sub-horizontal.	=	\equiv	1							2
_	3											=		-	- Allendar						2
	3								- 1		Similar to SCHIST in C4. 53.1' and 61': Cross-foliation joints/fractures:	=			1650202					6	1
55 —	3								- 1	- 1	Rough, irregular, slightly weathered, vertical.	E		-						***	1
	3											E	\equiv		200			4 ALP 12	692		1
	4	C5	51.3-61.	3		10/1	0	100	90			=				4					1
	5									-		Ξ	\exists								1
	11											=	=		0.4000						1
60-	11											Ξ			2.2						3
G	RANUL					ESOILS	丁				ORE CHARACTERISTICS		JOI	NT/FRACTU	RE	CHAR	ACTERIS	STICS			
BF 0-		NSIT		BPF <2	CON	SISTENC Soft	Y	H. 1	ARDN Ver	IESS y So	WEATHERING NO. PER 1 Complete (1) 0	₹FT		SPACING/1		KNES e/Very				TTITUDE orizontal	
4-	10 Lo	ose dium l	- 1	2-4	Soft Med			2	Me	dium d Har	2 Severe (2) 1-2		2	"-1" Close	Πhi				35 Su	b-Horizontal od Dipping	
30-	50 De	nse ry Der		8-15 15-30	Stiff- Very			4 5	Har		4 Slight (4) 11-20)	3	'-10' Wide/	Thi	ck		55- 85-	-85 Su	b-Vertical ertical	
-	ve	. , <i>D</i> er		>30	Hard			J	VEI	j i idi	o Fiesii		^	10' Very I	MIG	e/Very	THEK	63-	~ VE	a credi	
NO	TES:																				-
		f borel	nole at 11	8.5 fee	t; bore	hole grout	ed up	on co	mple	tion.											
																	D.	משום	NO.	D04 5	\dashv
																	D(DRING	INO.	D-44-2	- 1

											BORING LOG				_				Sheet: 3 of	4
	DAT) die	LIADDIC	• A 131	:1: ,			T									BC	DRING N	O. B84-	5
	Livij	IVINE	HARRIS	April Kin	dien 1	بالسال				SECON	ND AVENUE SUBWA		BORING S					OFFSET:		
	***************************************	-			Th	180				SECO	PROJECT	1		NO. CM 11 L. 160.73	88		\dashv	NORTH: 222		
1					4 P	Avenue	ī						DATUM : I				\dashv	EAST: 99745		
1					177	Subway								RING DEPT	H (F	T) 11	8.5		0.01.0	
SAM	PLER:	3.O "S). Split Sp	oon				BO	RING	CO: Wan	ren George Inc.							READINGS		
			ER: 140 lb.	Safety	/ Ham	mer					rpent/J. St. Germain		DATE	TIME	C	EPT	H CA	SING S	AB. TIME	
	NG SIZ		to 19' 1: 300 lb. D	onut						ER: D. W.		/18/06		-	\vdash		+-	-		
	K COR			Onut						ED BY: C										
			_	T	Г	Î	18	(%)	Π							1	NSITU F	PROPERTIES	NUMBE	
	K.C	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	_		PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	g	1				4	_					FRACT	URES
	(BPF) OR	ORE	Į į	Ş	E.	일 는	l m	I N	A		SAMPLE DESCRIPTION		MB	STRATIGRAPHY		HAH	DNESS	WEATHER	NG PERF	ООТ
E	B €	10	2	19	9	SE	l E	OR	EST	BUR	MISTER (USCS / NYC BLDG CLASSIFICATIONS	CODE)	18	\$		see l	elow fo	r see below f		ow c
E	NS NS NS NS NS NS NS NS NS NS NS NS NS N	PLE	P.E.	8	٦	A.X.	\ \ \ \ \	X	Ta				ATA	ΨŤ	ES	v	alues	values	for value	es H
ОЕРТН (FT)	CASING (AM	NA.	BLOWS / 6 INCH	N VALUE (BPF)	SOEN	5	ROCK CORE ROD	FIELD TEST DATA				STRATA SYMBOL	STR	NOTES	1 2	3 4 5	1 2 3 4	5 123	NUMBER
-				+-	-		+	-	-				-							3
-	10												三目							+H
-	4												1				4.5	70.00	11.04	1
	4									Hard, fre	esh to slightly weathered, fine	to coarse	==							1
	3.5									grained, very thin	gray, quartz-mica-garnet SC to thin, convoluted, crenulate	ed,						17.00		1
										horizont	al to sub-horizontal foliation, to moderately weathered, clos	rough,	= =						23/	2
65 -	3.5									moderat	ely closely spaced, horizonta		冒目					0.00		3
-	3.5	C6	61.3-71.3			10/9.9	99	86			al, foliation joints/fractures. 9,35' and 69.95'-70.35': quar	tz zone						247		2
-	3.5	Co	61.5-71.5			10/3.5	33	00		61.25'-6	1.8', 61.95'-62.05' and 68.0'-6	8.1':				2.0	1		10,400	
	2					1					oliation joints/fractures: Rough ed, moderately dipping to sub					(EAS)			7.4	
	3.5																	7.6		
1	3																	全有一种	447	2
70																		West was		3
-	3			-			_	_					==				14		14	0
-	3			1														12.535		1
4	3					i											100			0
	4									Cimilar t	o SCHIST in C5.							43.5	- 100 mm	1
	4									Similar	o schist in cs.								18	0
75																				0
1 +	3	C7	71.3-81.3			10/9.9	99	90								هو	7			2
	3	٠.				,							= =				703		1	1
1 4	4												三日						7	-14
	3																	1000		1
	4																11	1 57 ab 1		1
80	4																		100 m	0
				-			-	_	\vdash				$\equiv \equiv$						ii.	2
1	3			1						Cimilact	a SCHIST in C5		==	1				40	987	H
1 +	3									83.25'-83	o SCHIST in C5. 3.75': Cross-foliation joints/fra		==						故	H
1 4	3									Rough, n	moderately weathered, sub-ve .8': Cross-foliation joints/fract	ertical. ures:				e de la	18:00	文本基件	70.5	2
85-	2	СВ	81.3-88.1			6.8/6.5	95	76		Rough, s	slightly weathered, moderately	dipping.	= =						35.0	1
65	3															13	1			2
1 1	3															1		12.1	17.00 E	0
†																		1	1	2
+	3		*					-	\vdash											1
	3																1	5, 6,4920	100	+
90	3															ALC: Y		111000	***	1
	RANUL	AR SC	DILS	COHE				RO	CK (CORE CHA	RACTERISTICS			INT/FRACT	URE	CHA	RACTE			
BP		NSIT				STENCY		IARD			WEATHERING 1 Complete	NO. PER (1) 0		SPACING				ANGLE 0-5	ATTITUDE Horizontal	
0- 4-1		ry Loc ose			/ery So Soft	, i	1	M	ery So ediun	n	2 Severe	(2) 1-2		2"-1' Clos	e/Th	nin	y Thin	5-35	Sub-Horizon	
10-					Med Sti Stiff	iff	3		ed Ha ard	ard	3 Moderate 4 Slight	(3) 3-10 (4) 11-20		1'-3' Mod 3'-10' Wid			d Thick	35-55 55-85	Mod Dippin Sub-Vertica	
>5	50 De 60 Ve	ense ery Der	nse 1	5-30 V	ery St	iff	5		ery Ha	ard	5 Fresh	(7,11-20					y Thick	85-90	Vertical	
			1	30 F	lard															
																				\neg
4) B		of bore	hole at 118.	5 feet; t	boreho	le grouted t	upon (compl	etion											
"						-														
																				1
																	_			-
																		BORING N	O. B84-5	İ

	BORING LOG		Sheet: 4 of 4
DAJMII HARRIS • A RUIT 2 José Berlier Lacord	SECOND AVENUE SUBWAY PROJECT	BORING STATION: PROJECT NO. CM 1188 G. SURF EL. 160.73 DATUM: NYCT	ORING NO. B84-5 OFFSET: COORDINATES: NORTH: 222118.205 EAST: 997459.676
SAMPLER: 2" O.D. Split Spoon	BORING CO: Warren George Inc.	FINAL BORING DEPTH (FT) 118.5 GROUND WATE	R READINGS
SAMPLER HAMMER: 140 lb. Safety Hammer	FOREMAN: R. Verpent/J. St. Germain	DATE TIME DEPTH C	
CASING SIZE: 4" to 19' CASING HAMMER: 300 lb. Donut	DATE START: 10/13/06 DATE END: 10/18/06		
ROCK CORE: NO	REVIEWED BY: C. Snee DATE: 01/23/07		
O F (N) (%)	(8)	INSITU	PROPERTIES NUMBER OF
DEPTH (FT) CASING (BPF) OR CORING (MINIFT) SAMPLE / CORE NO. SAMPLE DEPTH (FT) BLOWS / 6 INCH N VALUE (BPF) PENREC: SOIL (IN/IN) TOTAL CORE REC (%)	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	HARDNES	
DEPTH (FT) CASING (BIPF) OR CORING (BINFT) SAMPLE / CORE N SAMPLE DEPTH (I BLOWS / 6 INCH N VALUE (BPF) PENREC: SOIL (IN TOTAL CORE REC	CLASSIFICATIONS	SEE PEION NAMEOUS SEE PEION VAIUES VA	values for values
9 9 9 9 9 E Z E E	8 12	E S S 1234	E PERSENTATION STATES 1
3 3 3 C9 68.1-96.1 10/9.4 94	Similar to SCHIST in C5. 97.9-98.1': Cross-foliation joint/fracture: Rough, slightly weathered, sub-vertical.		
2 2	Medium to very hard, fresh to severely weathered, fine to coarse grained, gray, quartz-mica-garnet SCHIST, with thin to very thin, convoluted, crenulated, honzontal foliation, rough, moderately to slightly weathered, closely spaced, horizontal to sub-horizontal, foliation points/fractures. 96.6-99.2': Rough, slightly weathered, with calcite deposits and iron-oxide staining. 101.3'-102.7': Highly fractured zone,		1 0 2 2 2 1 1 10
2 2 2 2 2 2 3 3 C11 103.5-113.5 10/10 100 100 100 100 100 100 100 100 1	vertical/honzontal fractures. Hard to very hard, fresh to slightly weathered, fine to coarse grained, gray, quartz-mica-garnet SCHIST, with thin to very thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, fresh to slightly weathered, very grassly to moderately desey spaced, horizontal		1 2 2 3 3 3 3 0 0 3 3 2 2 0 0
3 3 3 C12 113.5-118.5 5/5 100			0 0 1 1 0 2 2 2
	Bottom of borehole at 118.5 feet		
20			
GRANULAR SOILS COHESIVE SOILS	Medium 2 Severe (2) 1-2	JOINT/FRACTURE CHARACTE SPACING/THICKNESS 2" Very dose/Very Thin 2"-1" Close/Thin 11-3" Mod Close/Mod Thick 3"-10" Wide/Thick >10" Very Wide/Very Thick	ANGLE ATTITUDE 0-5 Horizontal 5-35 Sub-Horizontal 35-55 Mod Dipping 55-85 Sub-Vertical
4) Bottom of borehole at 118.5 feet; borehole grouted upon co	ompletion.	Γ	BORING NO. B84-5

										E	BORING LOG							Sheet: 1 of 4	
				P - 1 15	100.			T								ВО	RING NO). B85-3	\neg
	DMJ	ME	HARRE	1 \\ \ \ \ \	ithre	A.d.						. 1	BORING	STATION:			OFFSET:		
	-				77.0	100		1		SECON	ID AVENUE SUBWAY	1		TNO. CM 11	88		COORDINATES		
1					4.8	-					PROJECT			EL. 157.56			NORTH: 2225		
					1	Avenue Samuely						1	DATUM:				EAST: 997727	.3183	
								1		00.1		-	FINAL BC	RING DEPTI		ND WATER F	PEADINGS		
			D. Split S		. Hom					AN: P. Lyn	ey Boring and Drilling Co.,	Inc	DATE			DEPTH CAS		AB. TIME	\neg
_	NG SE		ER: 140 II	Sarety	/ Hami	mer				ER: D. Per			NOTE 1		۲,	JEI III OAG	, UT	ED. THVILL	
	NG HA		R: N/A							TART: 04/1		21/04	110121		\vdash				
_	K COR										A. Ponti, JrDATE: 5/20/04								
		Ţ.				Î	8	2							l	INSITU P	ROPERTIES	NUMBER	05
	« C	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)			PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	1				٦		1			FRACTUR	RES
	CASING (BPF) OR CORING (MIN/FT)	, N	\mathcal{E}	BLOWS / 6 INCH	Ē	1 4	8	2	FIELD TEST DATA		SAMPLE DESCRIPTION		STRATA SYMBOL	STRATIGRAPHY		HARDNESS	WEATHERIN	G PER FOO	OT
F	M M	ő	19	29	9	SSE	18	뿞	ST	BUR	MISTER (USCS / NYC BLDG	CODE)	l &	₹		see below for	see below fo	r see below	1121
ОЕРТН (FT)	20	Щ	m	18	N VALUE (BPF)	₩.E	Š	8	12		CLASSIFICATIONS		¥	E SE	S	values	values	for values	
E	S E	₩.	₹	8	1	ξŠ	ΙŽ	ğ					≨	≱	NOTES	40045	1 2 3 4 5	1 2 2 4	
8	58	SA	δ	m	z	88	2	2	E					[S	ž	12345	1 2 3 4 5	1234	_ Ž
	PAVEMENT THICKNESS: 6" Concrete Hand augered to a depth of 6 feet prior to boring.																		
-	Hand augered to a depth of 6 feet prior to															1+1-1+	1-1-1-1-		11
-	Hand augered to a depth of 6 feet prior to															h+ 1 + + +			-
				1				1			gered to a depth of 6 feet price	or to							
-	1									boring.			930		3		Transition of the second		
-	1	l l l l borne															1-1-1-1-	11111	
boring.																			
1	Hand augered to a depth of 6 feet prior to boring.																		
-	Hand augered to a depth of 6 feet prior to boring.																		
-	Hand augered to a depth of 6 feet prior to boring. Dense, brown, fine to medium SAND, some Silt, trace Gravel, trace Cobble, trace Mica (SM /																		
				24						11-65)			•••		1			1 1 1 1	- 1
				14 16						Dense, b	prown, slightly micaceous, fin	e to	Phhhh	DEC ROCK	1				
-	1 1	S2	8-10	14	30	24/24			0	Fragmen	SAND, some Silt, trace Rock its (SM / 7-65)		~~		1		11111		
10-				15			-		_				~		1	1-4-1-1			-
"				8 8							dense, brown, micaceous, fir SAND, some Silt, trace Rock		~~						
-	1	S3	10-11.9	12	20	24/12			0		nts (SM / 7-65)		~				1		
-	1			100\5*	-	-	+	-	-				~~			h-i	1-1-1-1		11
١.			1					1					~~		1	1.1.1.1.1.1	1-1-1-		- 1
				1			1		1				~~		1				11
-				1									~~		1				
15 -	\vdash						-	-	-	C1: Very	hard, fresh, fine to coarse gr	ained,		ROCK	4	Late de lat	15 08 7 Esta	r laid in	
1 _	2.0									with very	ark gray, quartz-mica-gamet thin, crenulated, convoluted,	horizontal	==	TOOK	1	The state of		1 189 -1	1
	2.5	C1	15.0-17.2	1		2.2/2.2	100	100		to sub-ho	orizontal foliation, smooth to	ough,			1		4, 3, 3,	1 23	2
-				+			₩	-	-		paced, horizontal to sub-hori- veathered, iron-oxide stained,		E			5.5	1.000		1
-	2.5							1			d, mineralized foliation joints			1	1	146021	1.75		-
	3.0									40 71 47	DL 4		$\equiv \equiv$			Moles .	A STATE OF		0
-	20			1						joint/frac	0': Apparent healed cross-fol ture.	lation		}					0
20 -	3.0									10			= =			28-22-3			0
-	3.0												= =		1		77.74		-
	3.0												= =	1			12.33		0
-		C2	17.2-27.0			9.8/9.8	100	100		C3: cimi	far to Schist in C1, except wi	delv	= =			1	130 130		0
-	3.0										iar to Scrist in C1, except wi foliation joints/fractures; frequ		==	1		1	200	操門	0
-	3.0					1					hick Quartz bands.		==		1	Vision III.		- 19-1-14	- 0
	3.0			1						17.9'-18	2': Cross-foliation joints/fract	ures.	==	1			14 14 10		0
25-										rough to	smooth, very closely spaced		E	1			三张文文		0
-	3.0									moderate	ely dipping to sub-vertical.					Sections	The sales		
1 -	3.0			1									==		1	test State of	I STATE	1 1 1991	1
	3.5												==			·数车标子			0
-													= =	1	1		@		4
-	3.5													1	1	THE WAY TH	Treed -	- 120	
20-	3.5_												==			1348	1221		7
30-	DAL	ADC	7/1 C	0011	- CA/C /	POLIC T		<u> </u>	OCY	CORE CU	ADACTEDISTICS			IOINT/EDAG	TUE	E CHARACTE	RISTICS		=
BF	RANUL	AR SO			CONSI	STENCY			DNES		IARACTERISTICS WEATHERING	NO. PE				ICKNESS	ANGLE	ATTITUDE	
0		ery Lo			Very So		1	V	ery S	oft	1 Complete	(1) 0		<2" Ve	ry cl	ose/Very Thin	0-5	Horizontal	.
4-	10 Lo	ose	-	2-4	Soft	- 1	2	M	lediur	n	2 Severe	(2) 1-2	,	2"-1' Clo	se/	Thin	5-35 35-55	Sub-Horizonta Mod Dipping	
10- 30-		edium ense	Dense		Med St Stiff	ın	3		ed Ha	aro	3 Moderate 4 Slight	(3) 3-10 (4) 11-2				lose/Mod Thick Thick	55-85	Sub-Vertical	
		ery De	nse	15-30	Very St	iff	5		ery H	ard	5 Fresh	(.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				/ide/Very Thick		Vertical	
			- 1	>30	Hard														
NO	TES:										I								
1) (Found		level not re																
2) 5	tratifica	ation li	nes repres	ent appr	oximate	e boundarie	s bet	ween	soil a	and rock typ	es, transition may be gradua	l.	lad eatl co	mnle iare	inc -	n omanio uson	r meter equinn	ed with a	
3) F	ieid le ioloion	st Dati ization	detector (yanıc va PID) and	pors 161 a 10.6	vels are refe eV lamp. R	esults	918	a pen in par	zene stand ts per millic	lard measured in the head sp on by volume (ppmv).	ace of 562	100 2011 88	imple jars us	my a	ar organic vapo	e.e. ednibb	Ju Triui O	
1 .			to a depth						,										
					iation j	oin//fracture	betw	reen (35.9'-	36.8'.									
i i																			

20 CONTRACTOR OF THE PROPERTY	BORING LOG		Sheet: 1 of 1
DMJM##HARRIS • ARE ** 4		BC	DRING NO. B85-7
A KNY Yorks T. A. A.	OFFICE AVENUE OURWAY	BORING STATION:	OFFSET:
	SECOND AVENUE SUBWAY		COORDINATES:
Second	PROJECT		NORTH: 221931.6230
Submity			EAST: 997313.3864
SAMPLER: 2" O.D. Split Spoon	PODWO OO W	FINAL BORING DEPTH (FT) 14.0	25401400
SAMPLER 2 O.D. Split Spoon SAMPLER HAMMER: 140 lb Safety Hammer	BORING CO: Warren George Inc. FOREMAN: A. Dupue	GROUND WATER I	SING STAB, TIME
CASING SIZE: 4" & 3"	ENGINEER: M. Grifasi	DATE TIME DEFITE CA	SING STAB. TIME
CASING HAMMER: 300 lb	DATE START: 8/28/2006 DATE END: 8/29/2006		
ROCK CORE: NX	REVIEWED BY: C. Snee DATE: 01/26/07		
2 2 8		INSITU P	PROPERTIES
DEPTH (FT) CASING (BPF) OR CORING (MIN/FT) SAMPLE J CORE NO. BLOWS / 6 INCH N VALUE (BPF) PENREC. SOIL (ININ) TOTAL CORE REC (%)	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	STRATA SYMBOL HARDNESS See pelow for values HARDNESS See pelow for values 1 2 3 4 5	
DEPTH (FT) CASING (BR CARING (M) SAMPLE DE SAMPLE DE BLOWS / 6 II N VALUE (BI PEN/REC: S ROCK (FT/F	S E CLASSIFICATIONS	Y See below for	values for values
CASING CORING CORING SAMPLI SAMPLI N VALU N VALU	FIELD	STRATI NOTES Alles Alles	12345 1234
	α u	6 6 Z	11070 1207
	PAVEMENT THICKNESS: 4* Concrete Sidewalk Hand augered to a depth of 6 feet prior to boring.	6 FILL 1 2 3 3	
10 4 4 4.5 C1 9-14 5.0/4.9 98	Medium hard to hard, slightly to moderately weathered, fine to coarse grained, quartz-micagamet SCHIST, with thin, convoluted, crenulated, horizontal to sub-horizontal foliation, rough, very closely to closely spaced, planar to undulating, iron-oxide stained, horizontal to sub-horizontal foliation joints/fractures. 13.7°: Cross-foliation joint/fracture: Rough, undulating, slightly weathered, iron-oxide stained, sub-vertical.	ROCK 4	11/2 × 13
15—	Bottom of borehole at 14.0 feet		3
0-4 Very Loose	ROCK CORE CHARACTERISTICS	JOINT/FRACTURE CHARACTERIS SPACING/THICKNESS 2" Very close/Very Thin 2"-1" Close/Thin 1"-3" Mod Close/Mod Thick 3"-10" Vide/Thick >10" Very Wide/Very Thick	STICS ANGLE ATTITUDE 0-5 Horizontal 35-55 Mod Dipping 55-85 Sub-Vertical 85-90 Vertical
>30 Hard		- To Very Wide Very Tilled	30 00 TOTAL

1) Ground water level not recorded.
2) Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) Borehole terminated at 14.0 feet; borehole location was too close to the basement of adjacent building; to avoid any damage to the basement borehole moved further N-W and drilled new borehole as B85-7A.
5) Bottom of borehole at 14.0 feet; borehole grouted upon completion.

										BORING LOG									Shee	t: 1 of 4		
Г	ras	Th Enn	HARR	IC . S I	(1, ,			T									ВО	RIN	G N	O. E	385-7/	A
	LAVI	iivina	FPUKK	A 1000	icokes	LL.				0500		. [BORING	STATION:			(OFFSE	Τ.			
	-		· · · · · · · · · · · · · · · · · · ·		700	100				SECO	ND AVENUE SUBWA	14		T NO. CM 1				COORD				
1					6.6	Seco	here				PROJECT	1		EL. 159.73				NORTH				
1					000	Substity	r					1		: NYCT				EAST: 9	99764	1,238	9	
044	DI ED.	011 0	0 0					100		2.00.111			FINAL B	ORING DEPT								
			D. Split S ER: 140		h. Hom						rren George Inc.		DATE			ND WA				TAB.	TIAAC	
CAS	ING SI	7E · A"	2 3"	ib. Sare	ty Ham	mer				AN: A. D			DATE	THAC	+-	JEFIN	CAS	NIVG.	31	AD.	THVIE	
			₹: 300 lb.	Donut						TART: 9/		13/06			+-		_	_				
	K COR									VED BY: C					1							
	T	Ι.			T	2		10	\Box				T		П	INS	SITU PE	ROPER	TIES			
	(BPF) OR (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	Ę Ę)F)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	CORE ROD (%)	TEST DATA		SAMPLE DESCRIPTION	ı	SYMBOL	λH4		HARD	NESS	WEAT	THERIN	F	RUMBER RACTUR PER FOO	RES
DEPTH (FT)	CASING (BPF) CORING (MIN	PLE / C	PLE DE	BLOWS / 6 INCH	N VALUE (BPF)	REC: S	AL COR	K CORE	D TEST	BUF	RMISTER (USCS / NYC BLD) CLASSIFICATIONS	G CODE)	STRATA SYI	STRATIGRAPHY	ES	see be			below for		ee below or values	
DEP	CAS	SAM	SAM	BLO.	×	SEN	101	ROCK	FIELD				STR	STR	NOTES	1 2 3	3 4 5	1 2	3 4	5 1	1 2 3 4	N N
		-	1	+-	+-		+-	+-	-	-					-					1		+
-	4"							1	1	PAVEN	MENT THICKNESS: 4" Concr	ete Sidewalk			1	-				4	. 14	
_				-									000					1				
					1					Hand a	augered to a depth of 6 feet pr	ior to			2						1	
_	111			j						boring.			000	'	3						y 1	1
-	111		1			1												1				
5-				1									000	'								
Ü											ry dense, gray-brown, fine to											
_	1			40	1						little Silt, little Gravel, trace M							-		1-1-1	1	1
-		S1	6.5-7.8	90	190\10*	16/14					trace Brick Fragments(SM / 6						-	1			· ····	1
_				1004*			\perp	_			ry dense, gray-brown, ROCK MENTS, little fine to coarse Sa		•									
	+	S2	8.0-8.2	100\3*	NA .	3/3				Silt, tra	ce Mica (decomposed rock) (GM / 6-65)	==	DEC ROCK	1 !							
										Hard e	lightly weathered, light to dark	oray fine	= =	ROCK		400		1 1 300		-	Dist.	12
10 -	6					1		'			se grained, quartz-mica-garne		==	:				1111	15	7.4		1-
1_	6										n, sub-horizontal foliation, rou		==			114					336	4
	6	C1	9-14	1		5.0/4.9	98	60			, iron-oxide stained, sub-horiz n joints/fractures.	contai				1.2			A	21	43	2
				1							0.5', 12.5' and 13.1': Cross-fo	oliation				430	45	7000	1	1		5
-	6										actures: Rough, planar to un					117944						13
	6									vertical.	de stained, moderately dippin	g to sub-	==			TO MAN		(3)	8	1	120	1
	6									13.5': C	ross-foliation joint/fracture: So	ub-vertical,				100		1				2
15				1							it, with deep vugs.		==					A 1	1			+
+	6				1 1						to SCHIST in C1. nd 16.5'-17.3': Cross-foliation										Marin	2
4	6	C2	14-19			5/5	100	73			actures: Undulating, iron-oxid		==			2.3	7	*			400	5
	6				1 1					modera	tely dipping to sub-vertical.					Asset David	2	2.244	6			3
7											5.3', 16.0' and 19.0': 1" thick to ay, Quartz and Feldspar veins		==						12	6.1	63	2
+	6			+	1-1		+	-	\vdash		yrite minerals 1/64" platey.										¥1	+
20-	6				1 1			- 1					$\equiv \equiv$					100			f. Showi	0
-	6																				4250 <u>1</u>	3
7	6										esh to slightly weathered, dan ne to coarse grained, quartz-m		E =									0
+	-	- 1		1			1 1			SCHIST	, with thin, convoluted, sub-hi	orizontal to						A.		139		۴
+	6										foliation, rough, very closely t iron-oxide stained, sub-horiz		==									2
- 1	6										tical foliation joints/fractures.	ontai to	==					1				2
7	6	C3	19-29	1		10/9.2	92	77		20.3', 21	1.0', 22.5', 22.8', 23.1', 23.8', a		三三				ř.	The Land			1	0
25				1	1 1		1 1				bliation joints/fractures: Roug ating, moderately dipping to s					133			200	1	Sitt	-
+	6									vertical.			冒					200	al form			3
	6	1									lanar, discontinuous joint, wit alcite deposits.	h yellow										1
	6									26.8'-27	.1' and 28.0'-28.2': Cross-foli		EΞ					3 44		8		1
†										joints/fra	ctures: Sub-vertical, Incipien	t.						4100				\vdash
+	6	\rightarrow					+	-	\dashv				==				Single I	34,500	-			3
0	7							-					==				Maria.	S. Maria	W.		(de	4
	LIUNAS				SIVE S			RC	OCK	CORE CH	HARACTERISTICS		J	OINT/FRACT	URE	CHAR	ACTER	ISTICS				\exists
BPI		NSITY				TENCY		IARD			WEATHERING	NO. PER	FT	SPACING						ATTIT		
0-4 4-1		ry Loos ose	se l		Very Sof Soft		1 2		ry So		1 Complete 2 Severe	(1) 0 (2) 1-2		<2" Very 2"-1' Clos		se∕Very ` hin	Thin		0-5 5-35	Horizo Sub-H	ontal Iorizontal	
10-3	O Me	Dense	4-8	Med Stiff	f	3	Me	d Ha		3 Moderate	(3) 3-10		1'-3' Mod	d Clo	se/Mod	Thick	35	5-55	Mod [Dipping		
30-50 Dense 8-15 Stiff >50 Very Dense 15-30 Very Stiff							5	Ha Ve	ird ry Ha	rd	4 Slight 5 Fresh	(4) 11-20		3'-10' Wid		nick de∕Very	Thick			Sub-Vertic		
>50 Very Dense 15-30 Very Stiff >30 Hard									, . 10		. 10011			- io ver	, ****	a welly		-				

NOTES:

1) Ground water level not recorded.
2) Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmw).

Sheet: 2 of 4 **BORING LOG BORING NO. B85-7A** DMIMIEHARRIS . ARUT BORING STATION: OFFSET: SECOND AVENUE SUBWAY COORDINATES PROJECT NO. CM 1188 **PROJECT** G. SURF EL. 159.73 NORTH: 222622.1943 DATUM: NYCT EAST: 997641,2389 FINAL BORING DEPTH (FT) 118.0 SAMPLER: 2" O.D. Split Spoon BORING CO: Warren George Inc. **GROUND WATER READINGS** STAB. TIME SAMPLER HAMMER: 140 lb. Safety Hammer DATE DEPTH CASING FOREMAN: A. Dupue ENGINEER: C. Burzynski CASING SIZE: 4" & 3" DATE END: 9/13/06 CASING HAMMER: 300 lb. Donut DATE START: 9/7/06 ROCK CORE: NX REVIEWED BY: C. Snee DATE: 9/19/06 INSITU PROPERTIES (NIN) 8 8 MI IMBER OF F 2 TOTAL CORE REC **FRACTURES** (BPF) OR (MIN/FT) DATA ROCK CORE ROD SAMPLE / CORE SYMBOI HARDNESS WEATHERING PER FOOT SAMPLE DEPTH BLOWS / 6 INCH PEN/REC: SOIL ROCK (FT/FT) SAMPLE DESCRIPTION N VALUE (BPF) BURMISTER (USCS / NYC BLDG CODE) TEST CLASSIFICATIONS see below for see below for see below CASING (NUMBER STRATA for values values values FIELD . 20 1 2 3 4 1 2 3 4 5 2 3 4 5 29.0' - 39.0', 29.0' - 29.9' and 33.7' - 39.0': Similar to SCHIST in C3, except closely to moderately closely spaced joints/fractures. 29.9'-33.7': Moderately hard, slightly 1 0 weathered, medium to dark gray, fine to medium 7 grained, quartz-mica-amphibole SCHIST, with faint, thin, sub-horizontal foliation, rough, very 2 29-39 10/10 100 68 closely to closely spaced, sub-horizontal foliation joints/fractures with several vugs. C4 1 31.4' and 31.7': 1" thick, white, quartz and 2 feldspar veins. 34.6': Cross-foliation joint/fracture: Sub-vertical, 1 with a thin white calcite coating along joint surface 0 2 0 39.0'-43.0': Very hard to hard, fresh, light to dark gray, fine to coarse grained, quartz-mica-gamet SCHIST, with thin, sub-horizontal 0 7 = foliation, rough, widely spaced, sub-horizontal 0 foliation joint/fracture. 43.0'-47.0' Very hard, fresh, (except slightly 0 weathered 46.8 to 47.0) dark gray, fine to medium grained, quartz-mica-amphibole 100 97 39-47 8/8 2 SCHIST, with faint, thin, sub-horizontal foliation, rough, moderately closely spaced, sub-0 horizontal foliation joints/fractures. 14.3' and 45.5': Cross-foliation joints/fractures: 2 7 Rough, planar, tightly healed, sub-vertical, with white calcite coating. 5 46.5-46.8': Incipient fracture. 3 15 Similar to SCHIST in C5 as 43.0'-47.0'. 47.5'-48.0' and 48.7'-48.3': Light pink and light C₆ 100 NA 1 15 gray, quartz and feldspar Pegmatite veins. 4 15 50 Hard to very hard, fresh to slightly weathered, 0 9 dark gray to gray, fine to coarse grained, quartz-mica SCHIST, with thin, poorly 0 laminated, sub-horizontal foliation, rough, very closely to widely spaced, sub-horizontal 0 foliation joints/fractures. 49.0 - 49.4": Pink and white quartz and feldspar 0 C7 49-59 10/10 100 96 Peomalite vein. 50.0' - 50.2': Very closely spaced foliation fractures with vugs. 0 0 0 7 0 0 2 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS BPF DENSITY CONSISTENC HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE BPF (1) 0 (2) 1-2 (3) 3-10 (4) 11-20 Very Loose <2 Very Soft Soft Very Soft Medium Complete Very close/Very Thin 0-5 Horizontal 2"-1" 5-35 Sub-Horizontal 4-10 Severe Close/Thin Loose 10-30 Medium Dense 4-8 Med Stiff Med Hard Moderate 1'-3' Mod Close/Mod Thick 35-55 Mod Dipping 8-15 Stiff Slight 55-85 Sub-Vertical Dense Hard 3'-10' Wide/Thick 30-50 Vertical >50 Very Dense 15-30 Very Stiff Very Hard 5 Fresh >10 Very Wide/Very Thick 85-90 4) 89.0' – 94.0': Possible core pieces lodged in bit may have contributed to longer coring rates.
5) 102' to 104': Missing core run. 6) Bottom of borehole at 118.0 feet; acoustic televiewer survey performed; borehole grouted upon completion

BORING NO. B85-7A

BORING LOG Sheet: 3 of 4 **BORING NO. B85-7A** DMJM#HARRIS • ARUT BORING STATION OFFSET **SECOND AVENUE SUBWAY** PROJECT NO. CM 1188 COORDINATES: **PROJECT** NORTH: 222622,1943 G. SURF EL. 159,73 DATUM: NYCT EAST: 997641.2389 FINAL BORING DEPTH (FT) 118.0 SAMPLER: 2" O.D. Split Spoon BORING CO: Warren George Inc. **GROUND WATER READINGS** SAMPLER HAMMER: 140 lb. Safety Hammer DATE TIME | DEPTH | CASING FOREMAN: A. Dupue STAB. TIME CASING SIZE: 4" & 3" ENGINEER: C. Burzynski DATE START: 9/7/06 CASING HAMMER: 300 lb. Donut DATE END: 9/13/06 ROCK CORE: NX REVIEWED BY: C. Snee DATE: 9/19/06 REC (%) **INSITU PROPERTIES** (NIN) 8 F NUMBER OF (BPF) OR (MIN/FT) ROD (DATA **FRACTURES** DEPTH SAMPLE / CORE SYMBOL BLOWS / 6 INCH HARDNESS WEATHERING PER FOOT STRATIGRAPHY (BPF) PEN/REC: SOIL ROCK (FT/FT) SAMPLE DESCRIPTION TOTAL CORE ROCK CORE BURMISTER (USCS / NYC BLDG CODE) E TEST CASING (I VALUE (CLASSIFICATIONS see below for see below for SAMPLE NUMBER DEPTH (STRATA values NOTES values for values FIELD 2 3 4 5 2 3 4 Similar to SCHIST in C7 1 64.6'-65.0' and 65.2'-65.8': Thick bands of fine to medium grained amphibole SCHIST. 1 7 59.7': Cross-foliation joint/fracture: Moderately dipping. 60.0' - 60.3': Cross-foliation joint/fracture: Sub-7 0 vertical, thin, tightly healed joint with 1/64" light 1 7 C8 59-69 10/9.9 99 93 orange calcite coating. 7 0 7 0 0 7 1 7 200 1 0 70 Similar to SCHIST in C7, except slightly 0 7 convoluted foliation. 76.6' - 77.2': Cross-foliation Joint/fracture: 0 Rough, planar, sub-vertical, with 1/16" thick, dark orange and yellow calcite coating. 0 1 9 C9 69-79 10/10 100 100 0 9 75 0 1 1 7 2 3 80 Similar to SCHIST in C7, except very hard from 2 79.6' - 79.8': Sub-horizontal, 1/4" thick dark gray 2 green mylonite veins. 82.6' - 82.8': Cross-foliation joint/fracture: 1 Incipient, sub-vertical. 82.8'- 83.0 ': Cross-foliation joint/fracture: 1 8 Rough, undulating, sub-vertical, with dark yellow calcite along joint. C10 79-89 100 95 10/10 0 10 85 0 15 1 12 1 14 0 0 30 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS BPF DENSITY BPF CONSISTENCY HARDNESS WEATHERING NO. PER FT SPACING/THICKNESS ANGLE ATTITUDE 0-4 Very Loose <2 Very Soft Soft Very Soft Medium Complete (1) 0 (2) 1-2 Very close/Very Thin Horizontal 4-10 2-4 4-8 2"-1" Severe Close/Thin 5-35 Sub-Horizontal 10-30 Medium Dense Med Stiff 3 Med Hard Moderate (3) 3-10 Mod Dipping Mod Close/Mod Thick 30-50 Dense 8-15 Stiff Hard (4) 11-20 Slight 3'-10' Wide/Thick 55-85 Sub-Vertical Very Dense Very Stiff >50 15-30 5 Very Hard 5 >10 Very Wide/Very Thick Vertical >30 4) 89.0' - 94.0': Possible core pieces lodged in bit may have contributed to longer coring rates.

^{5) 102&#}x27; to 104': Missing core run.

6) Bottom of borehole at 118.0 feet; acoustic televiewer survey performed; borehole grouted upon completion.

								BORING LOG					s	heet: 4 of 4
CHAIMS	PIRRAHE	• 1/2	.12			T			T			В	DRING NO	. B85-7A
Davigivii	HARRIS	Kund bigar	diez	باسار				SECOND AVENUE SUBWAY		STATION:			OFFSET:	
Santa and Care.	EM THE PROPERTY OF		T	10				PROJECT		T NO. CM 1 EL. 159.73	_		NORTH: 22262	
			10	Aversor	н				DATUM	NYCT			EAST: 997641.	
SAMPLER: 2" C	D. Split Spc	on			_	BC	RIN	G CO: Warren George Inc.	FINAL B	ORING DEPT		T) 118.0 ND WATER	READINGS	
SAMPLER HAM	MER: 140 lb.		Ham	mer				AN: A. Dupue	DATE			DEPTH CA		B. TIME
CASING SIZE: 4 CASING HAMME		anut.						ER: C. Burzynski TART: 9/7/06 DATE END: 9/13/06			F			
ROCK CORE: N		Dirut						TART: 9/7/06 DATE END: 9/13/06 VED BY: C. Snee DATE: 9/19/06	-	-	+			
0	E			<u> 2</u>	(%)	18	T		T		Г	INSITU F	PROPERTIES	NUMBER OF
(FT) (BPF) OR (MIN/FT)	SAMPLE DEPTH (FT)	6 INCH	(BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	ST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE)	SYMBOL	ЗАРНУ		HARDNESS		FRACTURES PER FOOT
DEPTH (FT) CASING (BPF) OF CORING (MIN/FT) SAMPLE / CORE	SAMPLE	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC ROCK (FI	TOTAL CO	ROCK CO	FIELD TEST DATA	CLASSIFICATIONS	STRATA SYMBOL	STRATIGRAPHY	NOTES	see below for values	see below for values	see below for values
17		\Box			+		-	Similar to SCHIST in C7, except slightly	==		-	202034		1
30								convoluted, sub-horizontal to moderately dipping foliation.	==					0
								92.2' - 92.4' and 97.2' - 97.4'; 1 ½* light gray and white quartz and feldspar vein.	==					
25								94.5', 94.7' - 95.1', 95.2' - 95.5': Cross-foliation joint/fracture: 1/16" thick, tightly healed,	==					
30 C11	89-99			10/10	100	100		moderately dipping to sub-vertical, with white	三三				4,000	
95 10								kaolinite.	==					
8									= =					0
- 8									三三					0
8									==			S normal of		0
8					1				三三					1
100 8								Similar to SCHIST in C7 100.6' and 104.0': Hard to medium hard,	==					0
8			- 1					slightly to completely weathered, quartz-mica	= =					2
8								SCHIST. 100.7', 101.4', 101.8' and 105.4': Cross-				1.2		10
8								foliation joint/fracture: Smooth, planar, moderately dipping to sub-vertical, with gray			5		8	
8 040	00.400						- 1	waxy chlorite coating. 108.0' – 108.3': Cross-foliation joint/fracture:		677			NA.	N
C12	99-109			10/8.0	80	65		Tightly healed, sub-vertical, with 1/8" thick dark	= =				13102	1
05 8							1	yellow calcite vein. 108.8'-109.0': Cross-foliation joint/fracture:	==				1765	1
8							-	Sub-vertical, incipient fracture.						2
В									= =					2
										1				3
8		-	-		Н	\dashv	\dashv			1				
10 8								Very hard, fresh, except slightly weathered, from 109.0' to 109.4' gray to dark gray, fine to	==					4
В								coarse grained, quartz-mica SCHIST, with thin, sub-horizontal foliation, rough, widely spaced,	昌					0
8								except closely spaced from 109.0' to 109.4',	= =					0
8								sub-horizontal foliation joints/fractures.	==					0
8 C13	109-118			9,0/8,9	99	95						130		0
15 8									$\equiv \equiv$					0
8									==		1			1
8												11 11 12 12		0
8									三三		6	10 m		0
							\top	Bottom of borehole at 118.0 feet.			7	THE STREET STREET	A PARTIE AND A PARTIE OF A PARTIE OF A PARTIE OF A PARTIE OF A PARTIE OF A PARTIE OF A PARTIE OF A PARTIE OF A	
														111111
GRANULAR SO	OILS CO	OHESIN	VE SO	ILS I		ROC	KC	DRE CHARACTERISTICS	1	INT/FRACTI	IPE	CHARACTERI	STICS	· · · · · · · · · · · · · · · · · · ·
BPF DENSITY	Y BPF	CO	NSIST	FENCY		ARDN	ESS	WEATHERING NO. PER	FT	SPACING	THIC	KNESS	ANGLE AT	TITUDE
0-4 Very Loo 4-10 Loose	2-4	Sof			1		y Sol dium	1 Complete (1) 0 2 Severe (2) 1-2		<2" Very (2"-1" Close		e/Very Thin		orizontal b-Horizontal
10-30 Medium I 30-50 Dense	Dense 4-8 8-15		d Stiff f		3		l Har				Clos	e/Mod Thick	35-55 Mo	od Dipping b-Vertical
>50 Very Den		0 Ver	y Stiff		5		y Har					e/Very Thick		ertical
Notes:	Possible core -	nieces L	odood	l in hit	have	contr	hut-	I to longer coring rates.						
5) 102' to 104': N	fissing core rui	n.												
 Bottom of borehole at 118.0 feet; acoustic televiewer survey performed; borehole grouted upon completion. 														
BOE											ORING NO. I	B85-7A		
												, ,		

Sheet: 1 of 4 **BORING LOG BORING NO. ISS85-2** DMJM#HARRIS • AREE! BORING STATION: OFFSET: A John Kenties SECOND AVENUE SUBWAY PROJECT NO. CM 1188 COORDINATES: **PROJECT** G. SURF EL. 160.40 NORTH: 222675.112 DATUM : NYCT EAST: 997547.824 FINAL BORING DEPTH (FT) 116.5 SAMPLER: 2" O.D. Split Spoon **GROUND WATER READINGS** BORING CO: Warren George Inc. FOREMAN: J. Bryant TIME | DEPTH CASING STAB. TIME SAMPLER HAMMER: 140 lb. Safety Hammer DATE 12.2 10:00 ENGINEER: G.Gutshteyn 8/22/06 CASING SIZE: 4" DATE START: 8/21/06 DATE END: 8/25/06 CASING HAMMER: 300 lb. Donut ROCK CORE: NO REVIEWED BY: C. Snee DATE: 8/25/06 INSITU PROPERTIES (IN/IN) (%) (%) NUMBER OF 8 RE(T ROD (DATA FRACTURES PER FOOT REC STRATA SYMBOL HARDNESS WEATHERING SAMPLE / CORE SAMPLE DEPTH STRATIGRAPHY OWS / 6 INCH PEN/REC: SOIL ROCK (FT/FT) SAMPLE DESCRIPTION (BPF) (BPF) CORE CORE BURMISTER (USCS / NYC BLDG CODE) FIELD TEST DEPTH (FT) see below for see below CLASSIFICATIONS N VALUE CASING (CORING (values values for values NOTES TOTAL ROCK 1 2 3 4 5 1 2 3 4 5 1 2 3 4 0,000,000,000,000,000 FILL 4" PAVEMENT THICKNESS: 5" Concrete Sidewalk 2 Hand augered to a depth of 6 feet prior to 3 boring. 5 5 S1 5-6.9 23/12 12 Medium dense, brown, fine to coarse SAND, some Clayey Silt, trace Gravel (SM / 11-65) 5/4 Hard to medium hard, slightly to moderately ROCK 6 weathered, fine to coarse grained, light gray, quartz-mica-gamet SCHIST, with very thin to 5/4 8 thin, convoluted, crenulated, horizontal to sub-= 5/3 10 horizontal foliation, rough, very closely to closely spaced, horizontal to sub-horizontal, iron-oxide stained foliation joints/fractures. 5 C1 82 5/4.1 20 5/4 = 10 5/4 Cross-foliation joints/fractures: Rough, very 1 closely to closely spaced, vertical to sub-5 vertical, slightly to moderately weathered, ironoxide stained throughout run. 5 N 4 5 15 3 Hard, slightly weathered, fine to coarse grained, 3 C2 15-18 3/2.5 83 52 light gray, quartz-mica SCHIST, with very thin to thin, convoluted, crenulated, horizontal to sub-4 19.2 1 horizontal foliation, rough, very closely to closely spaced, horizontal to sub-horizontal, 1 4 de stained foliation joints/fractures. 15.2'-15.4': Cross-foliation joints/fractures: 5 Rough, irregular, very closely spaced, sub-vertical, slightly weathered, iron-oxide stained 20 2 sericite. 3 4 2 4.5 C3 18-28 10/9.3 93 60 2 Similar to Schist in C2. 2 19.4'-20.2' and 26.7'-27.3': Cross-foliation joints/fractures: Rough, very closely spaced, 25 2 sub-vertical, slightly to moderately weathered, iron-oxide stained, chlorilized, brecciated. 2 4 3 4 3 4.5 JOINT/FRACTURE CHARACTERISTICS GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS BPF DENSITY BPF CONSISTENCY HARDNESS WEATHERING NO. PER F ANGLE ATTITUDE SPACING/THICKNESS 0-4 (1) 0 (2) 1-2 Very Loose <2 Very Soft Very Soft Complete 0 Very close/Very Thin 0-5 Horizontal 4-10 Severe 5-35 Medium 2"-1" Close/Thin Sub-Horizontal Mod Dipping Medium Dense 4-8 Med Stiff (3) 3-10 (4) 11-20 10-30 3 Med Hard 3 Moderate 1'-3' Mod Close/Mod Thick 35-55 30-50 Sub-Vertical 8-15 Stiff Slight 3'-10' 55-85 Wide/Thick Very Stiff 5 5 >50 Very Dense 15-30 Very Hard Fresh >10' Very Wide/Very Thick 85-90 Vertical

NOTES:

Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.

>30

4) Could not keep a seal at 13'. Spun casing to 15' and cleaned out borehole to prevent sidewalk from undermining.

²⁾ Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.
3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

BORING LOG Sheet: 2 of 4 **BORING NO. ISS85-2** DMIMEHARRIS . ARU! BORING STATION: OFFSET: SECOND AVENUE SUBWAY PROJECT NO. CM 1188 COORDINATES **PROJECT** G. SURF EL. 160.40 NORTH: 222675.112 DATUM : NYCT EAST: 997547.824 FINAL BORING DEPTH (FT) 116.5 SAMPLER: 2" O.D. Split Spoon BORING CO: Warren George Inc. **GROUND WATER READINGS** STAB. TIME SAMPLER HAMMER: 140 lb. Safety Hammer FOREMAN: J. Bryant DATE DEPTH CASING ENGINEER: G.Gutshteyn CASING SIZE: 4" CASING HAMMER: 300 lb. Donut DATE START: 8/21/06 DATE END: 8/25/06 ROCK CORE: NO REVIEWED BY: C. Snee DATE: 8/25/06 INSITU PROPERTIES (IN/IN) 8 8 NUMBER OF F REC DATA FRACTURES S (MIN/FT) SAMPLE DEPTH STRATA SYMBOI SAMPLE / CORE INCH STRATIGRAPHY HARDNESS WEATHERING PER FOOT (BPF) PEN/REC: SOIL ROCK (FT/FT) SAMPLE DESCRIPTION CORE CORE BURMISTER (USCS / NYC BLDG CODE) TEST DEPTH (FT) BLOWS / 6 CLASSIFICATIONS see below for see below for see below CASING (I N VALUE values TOTAL (NOTES ROCK (FIELD . 2 3 4 5 C4: 28'-35': Very hard to hard, fresh to slightly = = 0 weathered, fine to coarse grained, light gray, quartz-mica SCHIST, with very thin to thin, 3 4 convoluted, crenulated, horizontal to subhorizontal foliation, rough, very closely to closely spaced, horizontal to sub-horizontal, 5 C4 28-38 10/9 9 99 44 3 iron-oxide stained foliation joints/fractures. Frequently occurring cross-foliation 3 joints/fractures, rough, irregular, very closely to closely spaced, moderately to sub-vertical, 35 2 slightly to moderately weathered, iron-oxide stained, chloritized. 5 1 35'-38': Very hard, fresh fine to medium grained, light gray to dark green quartz-mica-7 amphibole SCHIST, with thin, horizontal foliation, rough, very dosely to dosely spaced. 2 6 horizontal to sub-horizontal, slightly weathered, chloritic, horizontal foliation joints/fractures. 0 = 6 Frequent healed joints/fractures, moderately to sub-vertical dipping, chloritized. 37.5'-37.9': Cross-foliation joints/fractures: Rough, irregular, sub-vertical, slightly 40 3 3 5.5 weathered, chloritized. 1 C5 38-48.1 10.1/10.1 100 78 4 C5: Very hard, fresh, fine to coarse grained, light gray to dark gray, poorly laminated, quartz-mica SCHIST, with thin to thick, horizontal to 5 45 A.C. sub-horizontal foliation, rough, very closely to moderately closely spaced, horizontal, slightly weathered, chloritized foliation joints/fractures: 38.25'-38.6': Cross-foliation joints/fractures: 1 6 1 6 1 Rough, irregular, sub-vertical, slightly weathered, chloritized. 1 43.2'-43.5': Cross-foliation joints/fractures: Rough, irregular, sub-vertical, moderately to 1 5 severely weathered, chloritized. 50 1 2 5 Similar to SCHIST in C5. 49'-49.2' and 55.3'-55.5': Cross-foliation joints/fractures: Rough, irregular, very closely 5 5 48.1-58.1 10/9.9 99 70 3 spaced, sub-vertical, fresh to slightly weathered.
56.35'-56.65': Medium hard to soft, moderately 1 5 to severely weathered, quartz-mica SCHIST, 1 5 with rough, horizontal to sub-vertical, moderately to severely weathered, 0.2' thick 5 clay filled joints/fractures. 2 5 0 1 GRANULAR SOILS COHESIVE SOILS ROCK CORE CHARACTERISTICS JOINT/FRACTURE CHARACTERISTICS BPF DENSITY BPF CONSISTENCY HARDNESS WEATHERING SPACING/THICKNESS ATTITUDE <2 0-4 Very Loose Very Soft Very Soft Complete (1) 0Very close/Very Thin 0-5 Horizontal Loose Medium Dense 2-4 4-8 Soft Med Stiff (2) 1-2 (3) 3-10 4-10 5-35 Sub-Horizontal 2 2"-1" Close/Thin Med Hard Mod Dipping Moderate 1'-3' Mod Close/Mod Thick 35-55 Hard 30-50 Dense 8-15 Stiff Slight (4) 11-20 3'-10' Wide/Thick 55-85 Sub-Vertical >50 Very Dense 15-30 Very Stiff Very Hard 5 Fresh >10 Very Wide/Very Thick 85-90 Vertical >30 Hard NOTES: 5) Core barrel blocked-up at 35.2', rock overdrilled. 6) 87.6'-88.1': Did not retrieve rock; re-cored this zone and rock core was deformed.
7) Bottom of borehole at 116.5 feet; acoustic televiewer survey performed; borehole grouted upon completion.

											BORING LOG								Sheet: 3 of 4	
	DAV	IME	HARRIS	• AR	12 1			T											D. ISS85-	.2
	D241	gavam	HARRIS	Solid ho	ALAE	والمأما				SECO	ND AVENUE SUBWA			STATION:	400			OFFSET:	e.	
	-				TO	180				SECO	PROJECT			NO. CM 1 EL. 160,40	188			NORTH: 2226		_
1					46	Secon	ŧ				TROOLOT		DATUM :					AST: 99754		
1					111	Subway								RING DEPT	H (F	T) 116				_
SAM	IPLER	2" 0.	D. Split Spo	oon				ВС	RING	CO: Wa	rren George Inc.							EADINGS		
SAM	IPLER	HAMM	IER: 140 lb.	Safety	/ Ham	mer				AN: J. Bn			DATE	TIME		DEPTH	CAS	ING ST	AB. TIME	
CAS	ING S	IZE: 4"						EN	GINE	ER: G.G	ıtshteyn									_
			R: 300 lb. D	onut						TART: 8/2				1	1				.	
ROC	K COI	RE: NO	}					_		ED BY: C	. Snee DATE: 8/25/06	5			+	1	L			
	PF) OR	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	INCH	3PF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	TEST DATA	RUE	SAMPLE DESCRIPTION		YMBOL	АРНҮ			NESS	WEATHERIN		RES
DEPTH (FT)	CASING (BPF) OR CORING (MIN/FT)	MPLE /	MPLED	BLOWS / 6 INCH	N VALUE (BPF)	N/REC:	TAL CO	CK COF	FIELD TES		CLASSIFICATIONS	,	STRATA SYMBOL	STRATIGRAPHY	NOTES	see be		see below for values	for values	MBE
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	4.5	1	1								ard, fresh, fine to coarse grain		ΕΞ						2.5	2
'	5	7				ŀ					ay, quartz-mica SCHIST, with convoluted, crenulated, horiz									2
-	T	1		1						sub-hor	izontal foliation, frequent ban	ds of	==							2
-	5	C7	58.1-68.1			10/10	100	85			aminated, mica rich foliation, to moderately closely spaced									-
١.	4.5] "	30.1-00.1			10/10	100	00		to sub-l	norizontal, fresh to slightly we		ΞΞ							2
	4.5									foliation	joints/fractures. I.4' and 66.2'-66.5': Cross-fol	intion					100			1
65 -		1	1							joints/fr	actures: Rough, irregular, clo	sely	ΞΞ				17/10			1
-	5	1								spaced weather	, moderately dipping, fresh to	slightly	I							4
-	5	-								weathe	rea.		E			Salar S		1997		-
	5																			2
-	6		1							Very ha	rd, fresh, fine to coarse grain	ed, light to	E				17.19	建筑	Asset	2
-		1						1			ay, quartz-mica SCHIST, with convoluted, crenulated, horizo					213		424		1
70 -	6	-								sub-hor	izontal foliation, smooth to ro	ugh, very	ΞΞ							+
_	5							1			to moderately closely spaced nonzontal, fresh to slightly we									2
	6									foliation	joints/fractures.		ΞΞ				64) 44			4
-		1								71.1'-71	.7': Cross-foliation joints/fraction hard, moderately dipping, mod	tures:						500 500		1
-	5	C8	68.1-78.1			10/9.8	98	70			i nard, moderately dippling, m rely weathered, healed, sub-v		三三			· WT			2011	-
	5] 00	00.1-70.1			10/5.0	30	/"		72.4'-73	3' and 74.9'-75.2': Healed sub		==						124	3
	6]								micro-fo	olds.		==							2
75 —	-	1											==						- A	2
-	6																		. 900	-
	5.5															が存むが		100		0
	6															70075		15.4		2
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80 -	6										zone: Smooth to rough, very spaced, moderately dipping to		$\equiv \equiv$			120		SERVICE NO.		0
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4-1		ose			oft led Stif	,	2		dium		2 Severe 3 Moderate	(2) 1-2 (3) 3-10			se/TI		Thick	5-35 35-55	Sub-Horizonta Mod Dipping	
						.	4			10	4 Slight	(4) 11-20					THICK	55-85	Sub-Vertical	
>5																				
				30 H	ard															
NOT	NOTES:																			
5) C	NOTES: 6) Core barrel blocked-up at 35.2', rock overdrilled. 6) 87.6'-88.1': Did not retrieve rock; re-cored this zone and rock core was deformed.																			
6) 8	7.6'-88	.1': Di	d not retrieve	rock;	re-core	ed this zone	and i	rock c	ore v	vas deform	ned.									

7) Bottom of borehole at 116.5 feet; acoustic televiewer survey performed; borehole grouted upon completion.

									BORING LOG						s	heet: 4 of 4	
D)	4JM#	EHARRIS,	• ATE	dist	Director of the same of the sa	d			SECOND AVENUE SUBWAY PROJECT	PROJE G. SUR DATUM	G STATION: CT NO. CM RF EL. 160.4 1: NYCT BORING DE	1188 0			RING NO OFFSET: COORDINATES: NORTH: 22267: EAST: 997547.	5.112	2
SAMPLE	R: 2" O	.D. Split Spo	on				BO	RING	CO: Warren George Inc.	FINAL					READINGS		
SAMPLE	R HAMI	MER: 140 lb.		Ham	mer		FO	REM	AN: J. Bryant	DAT			DEPTH			B. TIME	
CASING S		R: 300 lb. Do	t						ER: G.Gutshteyn TART: 8/21/06 DATE END: 8/25/06			-					-
ROCK CO			mut						/ED BY: C. Snee DATE: 8/25/06			+					_
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) OR	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	F	F)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE RQD (%)	DATA	SAMPLE DESCRIPTION	BOL	¥		HARD	NESS	WEATHERING	NUMBER FRACTUR PER FOC	ES
DEPTH (FT)	LE / CO	LE DEF	BLOWS / 6 INCH	N VALUE (BPF)	EC: SO (FT/FT	CORE	CORE	FIELD TEST (BURMISTER (USCS / NYC BLDG CODE) CLASSIFICATIONS	STRATA SYMBOL	STRATIGRAPHY	60	see be		see below for values	see below for values	E E
DEPTH (FT)	SAMP	SAMP	BLOW	N VAL	PEN/R ROCK	TOTAL	ROCK	FIELD		STRA	STRAT	NOTES	1 2 3		1 2 3 4 5	1 2 3 4	NUMBER
95 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	C10	97.9-107.8 107.8-116.5			9.8/9.8 9.9/9.9 8.7/8.7	100	95		Very hard to hard, fresh to slightly weathered, fine to coarse grained, light gray to gray, quartz-mica-garnet SCHIST, with very thin to thin, convoluted, crenulated, horzontal to sub-horzontal foliation, smooth to rough, very closely to moderately closely spaced, fresh to slightly weathered, horizontal to sub-horizontal, slightly chloritized, kaolinite, sericite foliation joints/fractures. 88.1'-88.6', 89.1'-89.5', 90.9'-91.7', 92'-92.8' and 93.6'-94': Cross-foliation joints/fractures: Smooth to rough, irregular, very close to closely spaced, sub-vertical to vertical, slightly to moderately weathered, chloritized. 88.6'-89': Healed sub-vertical fracture. Similar to SCHIST in C10, except closely to moderately closely spaced joints/fractures. 101.6'-103.3': Fresh, fine to medium grained, poorly larninated mica SCHIST. 105.2'-106.8': Cross-foliation joints/fractures: Rough, irregular, sub-vertical, slightly weathered. Similar to Schist in C10, except closely to moderately closely spaced joints/fractures: Rough, irregular, sub-vertical, slightly weathered.								3 6 4 6 1 0 0 0 1 0 1 0 1 1 0 0 1 1 0 0 1 1 1 0 0 1
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0-																	
0-4 Ve 4-10 Lo 10-30 Me 30-50 De	ENSITY ery Loo: lose edium (BPF se <2 2-4 Dense 4-8 8-15	Ver Sof Me Stif Ver	NSIST ry Soft ft d Stiff f ry Stiff	ENCY	H/ 1 2 3 4 5	Very Med Med Hard	ESS Soft ium Harc	2 Severe (2) 1-2 3 Moderate (3) 3-10 4 Slight (4) 11-20		2"-1' Clo 1'-3' Mo 3'-10' Wie	S/THIC y clos se/Thi d Clos de/Thi	KNESS e/Very Ti n e/Mod T	nin nick	ANGLE AT 0-5 Ho 5-35 Su 35-55 Mo 55-85 Su	TTITUDE orizontal b-Horizontal od Dipping b-Vertical ertical	
6) 87.6'-88	.1": Dic	cked-up at 35. I not retrieve n ole at 116.5 fe	ock: re	-cored	this zone	and ro	ick coi perfo	re wa	s deformed. I; borehole grouted upon completion.	,				D.	DRING NO. I	1000E 2	

											BORING LOG								Sheet: 1	of 2
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			ER: 140 lb (natic)					AN: Peter			DATE	TIME		DEPTH	CAS	ING ST	AB. TIM	Ε
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Ŧ	N	글	J.	1 8	13	l R	¥	X	9				1 \$	\ \X	NOTES	valu	les		1	ines a
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		S1	6-6:25	100/3	100/3	3/3	-	-	-	Sitt, trac	nse, brown, fine to coarse SA e Rock Fragments, (SM / 7-6	5)	~	DEC ROCK						
-											-		==	ROCK	7	. 1.		Name of the last		9
-	2.5				1				1	Hard to	very hard, fresh to slightly we	athered,	==			A 100	10		12 12	8 - 1
_	2.5	C1	7-10.1			3.1/3.1	100	0	-	fine to c	oarse grained, light to dark gr feldsphar-mica-gamet SCHIS	ray-peach, ST. with	E		1	4,540			5335	} P
40-	2.5							1		very thir	, crenulated, horizontal to su	b-	==		4	1	20.			10
10 -	2.5						T			horizant	al foliation, rough, very closel spaced, horizontal to sub-hori	ly to izontal	==		5					N
-		C2	10.1-12.1			2/1.2	60	37	-	slightly	weathered, strongly iron-oxide		==		1	美美		建设 对条门	St. C.	5
-	2.5				-	-	-	-	-	foliation	joints/fractures. 1': Soft to hard, slightly to com	nletely	Ē			0.04	7.22	物产 3.	14.3	
_	2							1		weather	ed zone.	pictory	==		1	13 2.	32			í þ
	2						1	l		7.1', 7.9	and 8.4': Cross-foliation clures, rough, closely spaced	4	==			1 to			10.0	5
	2	СЗ	12,1-17,1	1		5/5	100	80	١.	moderat	ely dipping, slightly weathere	d, strongly	==	-		2		A House of	5042	j 3
15-		00	12.1-17.1			0.5	1.00	1	1	iron-oxio	le stained with dissolution, and 9.1'-9.8': Cross-foliation		==		1	1		1300	1	. [
-	2									joints/fra	ctures, rough, irregular, unev	ren,	三三		1	133		THE L	6	1
	2						1			closely s	spaced, vertical, slightly weath iron-oxide stained to day coa	hered,	ΞΞ			KI. W				0
	2			I						dissoluti		a(ed wiii)				90	2006		10	0
٦	2						1						E					4 18 32	X	2
-				1						00.404	1 40 Ob Daniffiti anno lano		==			21.00	9		130	
20	2	C4	17.1-22.0			4.9/4.9	100	100	-	10.9'-12	'-10.9': Possible core loss 1': Similar to Schist in C1.		==			F 19			2	1
	2										.2': Cross-foliation joint/fractu		E			M 1			14.	1
	2										, vertical, slightly weathered, partially healed.	non-oxoe	==			40	橙		Je.	0
1	2										hard, fresh, fine to coarse gr	rained	==		6	进,处	d ve		130	2
+	-									light to d	lark gray, quartz-mica-gamet	SCHIST,	E		1			W I	er.	6
+	2										thin, crenulated, honzontal to al foliation, rough, very closel		==					4.00		P
25	2	C5	22-27			5/5	100	42		moderat	ely closely spaced, honzontal	to sub-	E					. g . h	200	10
	2									horizonti	al, slightly weathered, slightly iron-oxide stained foliation	to	==		1	3	525	想家	2	0
7										joints/fra	clures; occasional very thin o	uartz	==		1	A STATE OF	34.50		2/2	1
+	2.5			1			-	-	-	veins.	ealed sub-horizontal foliation		- =		1	- 1			37	3
+	2									joinVfrac			E			1	1	,	10	· -
	2									-					1			STORES OF	7 4	. 1
_	5	C6	27-31.9			4.9/4.9	100	87	-				E		1				58h	3
30		100		1				<u>_</u>		0000	ADACTEDIOTICS			I IOINT/FRAC	TUE	E-CHAC	ACTED	ISTICS	1	
GF BP		AR SC		COHE PF C		STENCY		HAR			ARACTERISTICS WEATHERING	NO. PER		SPACING/			NOTER		ATTITUE	E
0-	4 V	ery Loc	ose ·	2 V	ery So		1 2	V	ery S	oft	1 Complete	(1) 0		<2" Very	clos	e/Very Tr	nin	0-5	Horizonta	əl
	4-10 Loose 2-4 Soft 10-30 Medium Dense 4-8 Med Stiff 30-50 Dense 8-15 Stiff								ediun	n '	2 Severe 3 Moderate	(2) 1-2 (3) 3-10		2"-1' Close 1'-3' Mod		n e/Mod Tr	nick	5-35 35-55	Sub-Horiz Mod Dipp	
30-50 Dense 8-15 Stiff >50 Very Dense 15-30 Very Stiff								Ha	ard		4 Slight	(4) 11-20)	3'-10' Wide	/Thi	ck		55-85	Sub-Vertic	
							5		ery H	ard	5 Fresh			>10' Very	Wid	e/Very Ti	hick	85-90	Vertical	
NOT	CC.																			

NOTES:

1)Water level readings have been made at times and under conditions stated, fluctuations of ground water may occur due to other factors than those present at the time measurements were made.

2)Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

3)Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

⁴⁾ Core barrel jammed/blocked.
5) "N" denotes, no available data.
6) RQD affected by vertical joints/fractures between 21.6'-23.7' and 23.4'-24.9'.

											BORING LOG							S	theet: 2 of 2	2
	Г	20.415.	FORESADIO	C	2110			T									ORI	NG NO	. B86-3	
	L	Major	#HARR	2.46	CUI	dal.			_				BORING S					SET:		
					11	715			S	ECON	D AVENUE SUBWAY			NO. CM11				RDINATES		
					41.0	3,,,,,	1				PROJECT			L. 158.0	12_			тн: 2226		
					-	Johnsy							DATUM:		* 1 45	71 07 0	EAS	T: 9977	714.01	
	D1 50		0.00					-	0111	200.1	D :		FINAL BOI	RING DEPT		ND WATE	D DEA	DINCS		
			D. Split Spo ER: 140 lb (matic)					AN: Pete	sey Bonng and Drilling Co	orp.	DATE	TIME		DEPTH C			B. TIME	
		ZE: 3"		Autor	nauc)					ER: San			DAIL	11111	+		, 101110	1		
			R: N/A (Spu	n)						TART: 07		7/08/05								
ROC	K COF	RE: NX						RE	VIEV	VED BY:	C. Snee DATE: 11/14	/05								
		1	-			Î	8	8								INSITU	PROP	ERTIES	NUMBER	ROF
	L	Z	<u>E</u>	1_	1	È	8	ğ	1	1			7						FRACTU	RES
	1 6	1 %	l E	Ş	I E	=	2	2	DA.	1			AB	표	1	HARDNES	SS WE	ATHERING	PER FO	TO
F	8	0	DE	9	(8)	So	l R	1 %	ST		SAMPLE DESCRIPTION	١	S.V.			see below	for se	e below for	see below	V 1~
H	9	1 11	Ä	18	1 2	N N	10	1 8	1 5	1			\(\)	Ē	S	values		values	for values	8
DEPTH (FT)	CASING (BPF) OR	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	FIELD TEST DATA				STRATA SYMBOL	STRATIGRAPHY	NOTES	1234	5 1	2 3 4 5	1 2 3 4	NUMBER
ā	O	S	Ø,	1 10	z	ā.	IF	æ	Œ.				io	ω	Z		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7. 7. 7		Z
	4										4,5'; Very hard, fresh, fine gra		三三			4			32	1
-	3.5	1								green- with ve	biack, quartz-mica-amphibole ry thin, sub-horizontal to mod	e SCHIST, lerately				40.00				0
-							1			dipping	foliation, rough to smooth, w	ith dosely	三目			1	9)	42.5	1
-	3	-									i, sub-horizontal to moderatel weathered, iron-oxide stains		1.1			44				
-	4.5	1	}							joints/f	actures;occasional very thin	quartz	4 - A - 3			92.3			1	1
	3.5	C7	31.9-37			5.1/5.1	100	97	-	veins.								157F 7 H		11
35 —	3	1			1					C4: Sir	nilar to quartz-mica-gamet SC	CHIST in						C 1 1 1 2 2	4-10-14	3
-				1						C3, ex	cept occasional very thin amp	hibole	三三			1.4		The feet		2
_	2.5	-		-	-		-	_		13.7-1	4.0'. Cross-foliation joint/fract				7.:		1973	Manager -	9574	H
_											er, rough to smooth, moderate vertical, slightly weathered, in		1	ĺ				4		
											, slightly chloritized, blackene							1 1		
1													1 1					1111		11
40 -				}							0'-22.5' and 26.2'-26.9': Simila				1					1
-				1							n C3, except slightly weather tained, slightly kaolinized folk				- 1	11 11				
										joints/fr	actures.			- 1	- 1					
				1				- 1			 Similar to amphibole Sch Cross-foliation joint/fraction 		1 1		- [1111		1,1,	1	1 +
7										partially	healed, rough, vertical, sligh	ity		- 1	-					
-											red, chloritized, slightly iron-o	xide		[1				11
45 -										stained 23.5°: C	ross-foliation joint/fracture, ro	ugh to			- 1					11
							1	- 1			irregular, horizontal to mode		1 1	1	- 1			1 '		
7											, slightly weathered, slightly k de stained.	aoimized,		1						
+										23.4'-24	9: Cross-foliation joint/fractu	ire, rough,		1	- 1				1.1.1	11
4								- 1			, vertical, slightly weathered, i stilbite, mineralization.	iron-oxide				7 1	-			
							1 1	- 1		25.9-26	.4': Healed, parallel, vertical									
1	- 1							- 1		joints/fn	actures.					111				
50								- 1						1	1				1 1 1	1
4	- 1								- 1	C6: Sim	ilar to mica Schist in C3, exce	ept slightly	1 1		-	++-	-		-	11
4											ted foliation, serecitized foliat actures; occasional very thin t				-1	1:12				
		- 1						- [quartz v	eins; occasional very thin to t	hin quartz								
7	. 1								- 1	veins; o zones.	ccasional very thin quartzo-fe	Idspathic	1 1						1 .	
1		- 1						- 1		29.1'-29	9': Similar to amphibole Schi	st in C3.								11
55 -	- 1							- 1		29.5'-29	9': Healed sub-vertical joint/	nacture.		- 1	-		14	1.	i- j	11
4						1				C7: Sim	lar to mica Schist in C7, exce	pl slightly				1.14.	4			11
							- 1			kaolinize	ed foliation joints/fractures.			1		l'L'i			. in .	
7											.7': Very hard, fresh, coarse g y to peach, PEGMATITE.	rained,						1		11
+						1				ngin gia	y to peach, Promiseire.					1 - 1	-	111	- ;-	
4															-	• • • • •	-			1
60 -	- 1			- 1											1.					
	ANIII	AR SO	LS I C	OHES	SIVE SO	DIES I	-	ROC	CK C	ORE CU	RACTERISTICS	<u> </u>	IOIN	IT/FRACTI	RF	CHARACTE	RISTIC	S		-
BPI		NSITY				TENCY	н	ARDI			WEATHERING	NO. PER		PACING/TH	Cont.			ANGLE A	TTITUDE	\dashv
0-4	Ve	ry Loos	se <	2 V	ery Sof		1	Ver	y Sol	ft	1 Complete	(1) 0	2"	Very cid	ose/	Very Thin		0-5 H	orizontal	.
10-3		ase edium D	2- Dense 4-		oft led Stiff		2		dium d Har		2 Severe 3 Moderate	(2) 1-2 (3) 3-10	1-1			Mod Thick			ub-Horizonta lod Dipping	"
30-5	0 De	nse	8-1	15 S	tiff		4	Har	ď		4 Slight	(4) 11-20	5-4	0' Wide/T	hick		1	55-85 Su	b-Vertical	
>50) Ve	ry Den	se 15- >3		ery Stiff ard		5	Ver	y Hai	rd	5 Fresh		-10	Very W	ide/	Very Thick		85-90 Ve	ertical	- 1
7) Bo	ottom o	f boreh	ole at 37.0';	boreho	ole grou	ited upon c	omple	tion.									1			
																_		***		
											1					1	BORI	NG NO.	B86-3	

П

U

											BORING LOG									She	eet: 1 o	of 1	
	DM	IJM	HARRI	s.	11	11.4		T					BORING	STATION:				RIN	IG N ET:	Ο.	B86	-4	_
	A. or year operation		action wheely contained to the first to		-	STATE OF THE PERSON NAMED IN				SECO	ND AVENUE SUBWA	.Y		T NO. CM11	88			COOF	RDINAT	ES:			_
						111		1			PROJECT		G. SURF	EL. 157.59				NORT	H: 222	2653.	4267		
						Avenue	2						DATUM:					EAST:	99774	45.96	354		
								\perp					FINAL BO	DRING DEPT	`								_
			D. Split S								sey Boring and Drilling Co	., Inc.				ND WA							_
			IER: 140 II	b Auton	natic			_		IAN: P. Ly			DATE	TIME	1	DEPTH	CAS	SING	S	IAB	. TIME	=	_
		IZE: 3"	R: Spun							ER: D. P		2/04/04	Note 1	+	+		-	-					_
		RE: NO									1.A. Ponti, Jr DATE: 09/24/		 	-	+			-					_
1.10	T	1	T	T	T	5	10	1	T	T	M.M. 1 0110, 01	7-7	1	ľ	1	INS	SITU PI	ROPE	RTIES				_
	PF) OR	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	NCH	3PF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	T DATA	RIII	SAMPLE DESCRIPTION RMISTER (USCS / NYC BLDC		YMBOL	АРНҮ		HARD		Т	ATHERI	\neg	FRAC PER		ES
БЕРТН (FT)	CASING (BPF) OR CORING (MIN/FT)	MPLE / (MPLED	BLOWS / 6 INCH	N VALUE (BPF)	N/REC:	TAL CO	CK COF	FIELD TEST DATA		CLASSIFICATIONS	, 0002,	STRATA SYMBOL	STRATIGRAPHY	NOTES	see be	ues		below values		see be	lues	MBER
3	58	SA	S A	B	ź	P. S.	2	1 %	12					ST	ž	1 2 3	4 5	1	2 3 4	2	12:	3 4	S
											MENT THICKNESS: 6" Co	ncrete		FILL	2								
5-		14									n dense, brown, fine to mediu Silt. trace Gravel. trace Mica (S							1			-		
-			24/18	_	_		Mediun	n dense, brown, fine to mediu	m SAND,														
		S2	7-7.5	50\0*	50/0"	6/6	+-		-	some S	Silt, trace Gravel, trace Mica (S	3M / 11-65)								. 1	1 1		
			1								ense, brown, fine to coarse SA							1		- 1			
1	1	S3	9-9.2	50\2"	50/2"	2/2					trace light to dark gray Rock (ISP-SM / 11-65)	Fragments,	• • •		-			3300014		_		-	_
10-	3.0	-	1	+						liace 3	iii (3F-3W7 11-03)		=	ROCK				1			1070	-	2
-	3.0	C1	4.7/4.7	100	87		light gra thin, co foliation modera	ry hard, fresh, fine to coarse g ay, quartz-mica-garnet SCHIS involuted, crenulated, sub-hor n, rough to smooth, very close ately spaced, horizontal to sub weathered, iron-oxide stained	T, with izontal ly to -horizontal,											3			
15-	3.0 4.0	S2 7-7.5 21 50/0" 66 S3 9-9.2 50/2" 50/2" 2. C1 9.5-14.2 4.7					\vdash	_		joints/fr quartz i	actures; occasional very thin	to thin											0
-	4.5 4.5 5.0	C2	14.2-19.3			5.1/5.1	100	100		horizon slightly joints/fr C2: Sin	Ital to sub-honzonial, slightly v iron-oxide stained foliation actures. nilar to Schist in C1, except no njoints/fractures.	weathered,	三三										0
-	5.0									17.2'-19 grained SCHIS	9.3': Very hard, fresh, fine to n I, dark green-gray, quartz-amp T, with very thin, crenulated, h	ohibole iorizontal to											0
20-			1								rizontal foliation, rough to smo to moderately closely spaced,				4				1			-	<u> </u>
_										to sub-h	norizontal, slightly weathered,	iron-oxide				A - 11					ex.	,	7
		СЗ	19.3-24.0			4.7/4.7	100	75			foliation joints/fractures. 7.4': Fracture zone, smooth, pl	lanar to	= =						i i				2
			ĺ								, horizontal to sub-horizontal,		= =								Ĕ.		0
-										weather joints/fra	red, iron-oxide stained foliatio	n	==		5							İ	0
- 25 —										C3: 19.	3'-19,5', 22.4'-24.0': Similar to n C2, except no apparent folia				3			I di i		64			U
										closely slightly	 2.4': Similar to Schist in C1, ex spaced, horizontal to sub-hori weathered, iron-oxide stained 	izontal,							1				
-										rough, r	0.2' and 20.8'-21.0': Fracture z moderately dipping to sub-vert	tical,											
-										slightly loints/fra	weathered, chloritized cross-f	oliation							-		1		
30 —										70							-1		Li.		<u>i. </u>	i	
G	RANUL	AR SC	SIVE S	OILS		R	OCK	CORE CH	HARACTERISTICS		J	OINT/FRAC	TURI	E CHAR	ACTER	RISTIC	S				=		
BP	F D	ENSIT	Y	BPF	CONSIS	STENCY		HARE	NES	S	WEATHERING	NO. PE		SPACING	S/TH	ICKNES	s		ANGLE		TITUDE		
4-1 10-3 30-5	0-4 Very Loose						1 2 3 4 5	Me Me Ha	ery So ediun ed Ha ard ery Ha	n ard	1 Complete 2 Severe 3 Moderate 4 Slight 5 Fresh	(1) 0 (2) 1-2 (3) 3-10 (4) 11-2		2"-1' Clo 1'-3' Mo 3'-10' Wid	se/Ti d Clo de/Ti	se/Mod	Thick		0-5 5-35 35-55 55-85 85-90	Sub Mo Sub	rizontal o-Horizo od Dippi o-Vertical	ontal ing	
NOT 1) G		water I	evel not re		-aru																		

2) Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

4) RQD affected by cross-foliation joints/fractures between 19.9' and 21', 20.8' and 21'. 5) Bottom of borehole at 24'; borehole grouted upon completion.

												BORI	NG LOG									s	heet 1 of 3	3
	DM.	M	HARRI	A. S	RUE	الماداة	4		T			O AVEN	NUE SUBWAY		PROJE		CM11	88			OFFSET COORDI	NATES:		2
							Secon renuer	nd				FROJE			DATU	M: NY		_			NORTH: EAST: 9			
SAM	PLER	2.0	D. Split S	noon					B	ORIN	G CO: W	erron Go	eorge, Inc.		FINAL	BORIN	G DEPTI		T) 81.4 ND WA	TED E	PEADN	GS.		
SAM	IPLER	HAMM	ER: 140 I	b Saf	ety H	ammer			FC	DREA	MAN: A. L	ondon			DAT	TE	TIME		DEPTH				B. TIME	
CAS	ING.S ING H	IZE: 3"	to 7' ₹: 300 lb l	Donu			_				EER: G. C		DATE END: 2	123/07		+		\vdash			-			
		RE: NX		_	1		_	_	RI		WED BY:					1								
	-	Į Š	E			1 2		REC (%)	8	1_									INS	SITU PE	ROPERT	IES	NUMBET	
E	(BPF) OR	CORE	SAMPLE DEPTH (FT)	TOTAL OF SALO IO		N VALUE (BPF)	(FAT)	CORE RE	CORE ROD	TEST DATA	BU	RMISTER	MPLE DESCRIPTION		STRATA SYMBOL		STRATIGRAPHY		HARD			IERING		TOO
ОЕРТН (FT)	CASING (P.E.	PLE	941		ALUE MREG	ROCK (FT/	AL C	Š	D TE		C	CLASSIFICATIONS		AT A		ATIG	ES	see bel			low for ues	see below for values	
B	SSS	SAN	SAN	ā		N N	800	TOTAL	ROCK	FIELD							STR	NOTES	1 2 3	4 5	1 2	3 4 5	1234	N S
-	3-				1						PAVE		HICKNESS: 4" Co	ncrete		900	FILL	1		i.				
-											Hand a boring.		o a depth of 6 feet p	rior to		0.000		3						
5				1																			-	
-				10							Dense,	brown, f	ine to medium SAN	D, some			İ							
		S1	6-7.8	100	1 1	1 20.	10	10		0	Silt, tra	ce Clay k	enses (SM / 7-65)			•			•				1	
	1			1	+						1												1 4	
10	4			1	\top	1										R	оск		P. D. T.	:	100		53	5
-	4										Very so	ft to medi	ium hard, moderately	to completely	y = =	7							_	2
-	4										weathe	red, fine	to coarse grained, g	ray, quartz-	ΈΞ	3				1.				3
+	4			1							rough to	o smooth	zontal to sub-horizor , planar to irregular,	very closely	=	=			2		_			4
+	4	C1	9.2-19.2			10	/8	80	14		iron-oxi	de staine	d, horizontal to sub- d foliation joints/frac	ctures.	= -	_	1	4			<u> </u>			6
15	4										weathe	red, very	y soft, severely to co closely spaced, sub	-horizontal	= :	=				-				7
1	3										vertical.	rough, in	s and moderately di regular cross-foliation f recovery in this zon	on fractures	==	=				•				>1(
]	3										(probac	HE IUSS OF	recovery in this zor	ie)	==	=	1							>1(
-[4										40.21.22	4! and 2	is si 20 2h Similar t	- CCLIICT I-	= =							1		8
20-	4				T						C1, exc	ept medic	6.5'-29.2': Similar to urn hard, slightly to on-oxide at fractures	moderately	E				10					5
4	5										22.4'-26	.5': Med	ium hard to hard, sli hered, fine to mediu	ghtly to	==	=								. 5
+	5										dark gre	enish gra	ay, quartz-mica-amp n, faint horizontal fo	hibole	==				4/4					5
+	5										rough, p	lanar to i	inegular, very closel to moderately weath	y to closely	==					_		_		3
+	8	C2	19.2-29.2			10/1	0	100	53		horizont	al foliatio	n joints/fractures. 6.4': Cross-foliation		==	3				100		2	12	4
25 —	5										joints/fra	actures: I	Rough, irregular, mo erately dipping to ve	derately	==	3								2
+	5								- 1		chlorite	coated.	1.6'-22.2': Rough, in		==	1	1		_	ğ				6
+	6							1			vertical t	fractures.	ed, vertical fractures		E	3		N. Control of the Con					<u> </u>	4
+	5					1					22.2': C	ross-folia	ation joint/fracture:	Smooth,	==	-				199		T	6.Mi	2
t	4			+-	\vdash	+	\dashv	\dashv	+	\dashv		, 223 1011			==]				z down				0
GR		AR SO	LS T	COH	ESIV	SOILS	+		R	DCK	CORE CH	ARACTE	RISTIČS			IOBIT!	EDACE	IDE	CHARA	CIED	CTICS	S.L	Mes Alla	12
BPF 0-4	DE	NSITY ry Loos		3PF <2		SISTENC	Y	1 1	IARD		S		ATHERING	NO. PER	FT	SPA	CING/TH	IICK	CHARA		ANG		TITUDE	
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30-50 Dense 8-15 Stiff >50 Very Dense 8-15 Stiff 15-30 Very Stiff >30 Hard									Ha		10.70	4 5	Slight Fresh	(3) 3-10 (4) 11-20		3'-10' >10'	Wide/T	hick			35-4 55-4 85-4	5 Sul	od Dipping b-Vertical ertical	
																					004	VE		

NOTES:

1) Ground water level not recorded.

2) Stratification lines represent approximate boundaries between soil and rock types, transition may be gradual.

3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photolonization detector (PiD) and a 10.5eV lamp. Results are in parts per million by volume (ppmv).

4) Probable loss of recovery from 14.2 to 18.2 Ft

1										BORING LOG						s	heet: 2 of 3	
								T			T			F	BORII	NG NO	. B86-12	2
	DM	JM	HARE	JS • A	RUP	4					BORING	STATION:			OFFS			-
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1					(F	110				PROJECT			-			TH: 22261		\neg
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	-3		-			+	+-	-	\vdash	chlorite coated.		1					100	. 6
1	Hard, slightly to moderately weathered, fine to coarse grained, light gray to gray, quartz-mica SCHIST. with thin, convoluted, crenulated, sub-horizontal to moderately dipping foliation, rough to smooth, planar, very closely to closely spaced, fresh to moderately weathered, sub-horizontal to moderately weathered, sub-horizontal to moderately weathered, sub-horizontal to moderately weathered, sub-horizontal to moderately weathered, sub-horizontal form of sub-weither convoluted, crenulated, horizontal sub-horizontal sub-horizontal foliation, rough, planar to irregular, wery closely to closely spaced, fresh to moderately weathered, sub-horizontal foliation, rough, planar to irregular, wery closely to closely spaced, fresh to moderately weathered, sub-horizontal foliation, rough, planar to irregular, wery closely to closely spaced, fresh to moderately weathered, sub-horizontal foliation, rough, planar to irregular, wery closely to closely spaced, moderately weathered. 5 C4 37.9-44.7 6.8/6.8 100 79 6.8/6.8 100 79 79 79 79 79 79 79 79 79 79 79 79 79														- 1		100	3
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١.	10	ER: **TO.D. Split Spoon																11
	20	Section Sect															e fits cont	-
1 .	14	## Hard, slightly to moderately weathered, fine to coarse grained, light gray to gray, quartz-mice SCHIST, with thin, convoluted, crenutated, sub-horizontal to moderately dipping foliation, rough to smooth, planar, very closely to closely spaced, fresh to moderately weathered, sub-horizontal to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately dipping foliation in the planar to moderately weathered, sub-vertical, chlorite coated. ### Hard, slightly weathered, fine to coarse grained, gray, quartz-mica SCHIST, with thin, convoluted, crenulated, horizontal to sub-horizontal slightly chlorite coated foliation in moderately weathered, horizontal to sub-horizontal slightly chlorite coated foliation in moderately weathered, horizontal to sub-horizontal slightly chlorite coated foliation in moderately weathered, horizontal in the planar to large the pl																2
١.	-				1					to sub-horizontal foliation, rough, planer to	= =							2
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5) t	I <u>OTES:</u>) Bottom of borehole at 81.4 feet; acoustic televiewer survey performed; borehole grouted upon completion.																1	
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DEPTH (FT) CASING (BPF) OR CORING (MIN/FT)	SAMPLE / CORE NO	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE (BPF)	PEN/REC: SOIL (IN/IN) ROCK (FT/FT)	TOTAL CORE REC (%)	ROCK CORE ROD (%)	TEST DATA	SAMPLE DESCRIPTION BURMISTER (USCS / NYC BLDG CODE)	9	STATE STREET	STRATIGRAPHY		HARDN		WEATHERING	NUMBER OF FRACTURES PER FOOT
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									Bottom of borehole at 81.4 feet						The state of the s		
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							1			gray quartz-mica-garnet SCHIST, with thin,	= =			1000		-			218	- 1	5
	4					1				convoluted, crenulated, horizontal to sub- horizontal foliation, rough, planar to irregular,	三目			15		1.53					-
-	4		0.440	.		4000.0	1 00			very closely to moderately closely spaced, sub-			1	3100						.	2
15 -	4	C1	9.4-19.	4		10/9.8	98	51		horizontal, iron-oxide stained foliation	==					- 48					3
	-						1			joints/tractures. 11.4', 12.5', 13.0' and 16.2'-16.6': Cross-				11 11 11		450			1984	1	2
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7	5							1		gray quartz-mica-garnet SCHIST, with thin. convoluted, crenulated, horizontal to sub-	= =				27	18.27	ASI-	6	1	.	\vdash
-	5									horizontal foliation, rough, irregular, very closely					9 · · · ·			9 1	100	i	1
]	_									to closely spaced, slightly to moderately	三三					- 1		g., j.,			1
1	5	C2	19.4-29.	4		10/9.6	96	65		weathered, sub-horizontal, iron-oxide stained, slightly chloritic foliation joints/fractures.	三三					130	1	8	300		
25	5						1			21.2', 21.9', 22.4' and 28.9'-29.4': Cross-					10.	18	45	ý T	301-	-	1
_	5									foliation joints/fractures: Rough, irregular,	==					- 18		and o			4
1										moderately dipping to sub-vertical, iron-oxide stained.					44	SEC		¥ .			1
7	5									25.4'-25.7': Cross-foliation joint/fracture:	= =			100		550		3	32	-	-
4	5				1					Smooth, irregular, sub-vertical, with 1/16" thick									11.5	1	3
										chlorite coating.			4					1 25	E.		4
-7	5			\perp	-				_	Bottom of borehole at 29.4 feet			H			-	200,110,110	G :	#31 36 W		-
30-						L				Dollotti di potendie al 25.4 lect			Ш			-1	and man				
GF	RANUL	AR SO	ILS	COF	HESIVE	SOILS		F	ROCK	CORE CHARACTERISTICS	J	OINT/FRACT				RIST					
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		water le	evel not re	corde	d.																
						e boundane	es bet	ween	soil a	and rock types, transition may be gradual.											

4) Bottom of borehole at 29.4 feet; acoustic televiewer survey performed; borehole grouted upon completion.

²⁾ Strathlation into represent approximate boundaries between soil and rock types, (ransition may be gradual.)
3) Field Test Data - Total organic vapors levels are referenced to a benzene standard measured in the head space of sealed soil sample jars using an organic vapor meter equipped with a photoionization detector (PID) and a 10.6eV lamp. Results are in parts per million by volume (ppmv).

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