



Supplemental Archaeological Assessment

**Second Avenue Subway:
96th Street Station**

New York, New York

Prepared for:

MTA New York City Transit
New York, NY

Prepared by:

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440 Park Avenue South
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Management Summary

SHPO Project Review Number: 05PR00975

Involved Agencies: Metropolitan Transportation Authority New York City
Transit
Federal Transit Administration

Phase of Survey: Supplemental Phase 1A Archaeological Assessment

Location: Second Avenue between East 90th and East 105th
Streets

Minor Civil Division: 06101: Manhattan

County: New York County

Survey Area Length: Approximately 1600 feet

Survey Area Width: Variable; between approximately 600 and 1200 feet

Number of Acres Surveyed: Approximately 16

USGS 7.5 Minute Quadrangle Map: Central Park

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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 96th Street Station of the Second Avenue Subway (see Figure 1). This Supplemental Archaeological Assessment to the *Second Avenue Subway Phase 1A Archaeological Assessment* has been prepared in accordance with the provisions of the Second Avenue Subway project's Programmatic Agreement, 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; 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 (HPI 2003a).

Since the execution of the PA, completion of the FEIS, and issuance of the ROD, the design for the Second Avenue Subway has advanced and additional archaeological analysis has been conducted in accordance with the provisions of the PA (see below for a discussion of archaeological analyses completed since the completion of the FEIS). Plans for station entrances and ancillary facilities were not finalized at the time of the completion of the FEIS. At this time, design for the 96th Street Station have advanced considerably and include areas located outside of the Area of Potential Effect (APE) analyzed in the FEIS. Therefore, consistent with the requirements of the PA, this assessment was prepared to evaluate the potential for impacts to archaeological resources in the new APE at the 96th Street Station.

In the vicinity of the 96th Street Station, the APE analyzed in HPI's Phase 1A Archaeological Assessment, addended, included the streetbed of Second Avenue from western building line to eastern building line (with several exceptions, please see Section B, below). 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. This Supplemental Archaeological Assessment of the 96th Street Station analyzes the archaeological sensitivity of any areas of planned construction that fall outside the archaeological APE already evaluated. These locations include station entrances, ancillary facilities, and utility relocations. This includes the following (see Figure 2):

- An entrance at the southwest corner of Second Avenue and 94th Street.
- An entrance at the northeast corner of Second Avenue and 94th Street.
- An entrance at the southwest corner of Second Avenue and 96th Street.
- An ancillary facility at the northeast corner of Second Avenue and 93rd Street.

- Utility relocations in all side streets between East 90th and East 99th Streets for up to one block east and west of Second Avenue as well as within East 105th Street for one block east of Second Avenue

The station's ancillary facility at the southwest corner of Second Avenue and 97th Street falls within the APE already analyzed in the FEIS.

B. PREVIOUSLY ANALYZED PORTIONS OF THE 96TH STREET STATION APE

The main "box" that will house the 96th Street Station falls mainly within Second Avenue between an area just north of East 97th Street and an area to the south of East 92nd Street. The portion of this area to the north of East 94th Street was identified in the 2003 Phase 1A and a supplemental analysis of soil boring logs (completed in December 2003) as sensitive for precontact archaeological resources to depths of more than 20 feet below the ground surface.

In addition to the streetbed of Second Avenue, the 2003 Phase 1A Archaeological Assessment examined two areas in adjacent blocks and lots. The first of these was identified as "Shaft Site B" in the Phase 1A and was located within Block 1668, Lot 1. The assessment determined that this area was not sensitive for archaeological resources dating to either the precontact or historic periods. The second location analyzed in the 2003 Phase 1A was identified as "Shaft Site C" in the Phase 1A on Block 1646, Lot 28 (Ancillary 2 of the 96th Street Station is located in this area). The assessment determined that this area was sensitive for precontact archaeological resources within a layer of shell and peat deposits located between approximately 13 and 29 feet below grade. HPI recommended additional archaeological research in all of the locations identified as sensitive.

To refine the recommendations presented in the 2003 Phase 1A, a subsequent geoarchaeological analysis of the soils within the Second Avenue streetbed between East 92nd and East 99th Streets was completed by Geoarcheology Research Associates (GRA) in January 2008 (discussed in greater detail in Chapters 2 and 3). The GRA report included an intensive analysis of soil boring records and concluded that while some soil levels within the areas identified as sensitive by HPI in the 2003 Phase 1A may have moderate sensitivity for precontact archaeological resources, the thin and broad distribution of those deposits was such that additional monitoring was not recommended. Therefore, GRA revised the sensitivity determination of the 2003 Phase 1A report and additional archaeological research was not necessary. SHPO concurred with this assessment in comments dated April 2, 2008.

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 the State Historic Preservation Office (SHPO, 2005) and the New York City Landmarks Preservation Commission (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 including both precontact and historic cultural resources.

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 project site and vicinity (including the 2003 Phase 1A Archaeological Assessment and the 2008 GRA geoarchaeological analysis) of the APE were reviewed. In addition, historic maps and atlases were examined to determine a chronology for the development of the APE. Finally, 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

Historic maps¹ show that the majority of the 96th Street Station APE was originally covered with a large tract of marshland. The 1865 Viele map (Figure 3) shows that the streetbed of Second Avenue was inundated by the swamp between approximately East 93rd and East 103rd Streets. The Harlem Creek was situated several blocks to the north, bordered with thick tracts of marshland leaving a narrow neck of dry land between modern East 103rd and East 106th Streets east of modern Park Avenue (shown on the Viele map as Fourth Avenue). This stretch of land, later known as Benson's Point, was "little more than a mound of sand, rising above the marshland [and] overflowed by high tides" (Bolton 1922: 71). Other historic maps, including the 1811 Bridges and 1836 Colton (Figure 4) maps of Manhattan, depict tall hills bordering the marsh south of East 92nd Street. Several of the streetbeds in the APE—including East 90th and East 91st Streets east and west of Second Avenue, East 92nd and East 93rd Streets west of Second Avenue, and portions of East 94th through East 97th Street west of Second Avenue—were composed of dry land rather than marsh and Viele's map depicts hills of varying size in all of these locations. In addition, the eastern ends of East 95th through East 98th Streets near modern First Avenue were completely inundated by the Harlem River.

The marsh was created between approximately 6,000 and 3,500 years before present [BP], after thousands of years of sea level changes caused by retreating glaciers (GRA 2008). The marsh was present in this area until the late-19th century, when it was filled in and developed as the population of Manhattan grew. The maps also show that the marsh was drained by numerous streams of varying size, several of which cut across the streetbeds in the APE. These channels were likely altered and redirected by settlers during the historic period, at which time the area was known as "Hellgate Bay" (ibid).

Historic atlases from the late-19th century show that the elevation of Second Avenue varied. George Hayward's 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 Second Avenue dropped steeply between East 87th and East 92nd Streets until it reached sea level in the vicinity of the marsh. The 1885 Robinson and Pidgeon atlas includes elevations at most street intersections, many of which had changed since Hayward's 1850 map was prepared. A summary of the street elevation changes as depicted on three maps (dating to 1850, 1885, and 2007) is presented in Table 1, below. While modern topographic evidence suggests that the elevations of some locations within the APE have changed very little since the mid- to late-19th century, others appear to have been subjected to significant landscape modification over time. In many locations, large amounts of fill have been added (in the locations of the former marsh) while other locations have been graded and their elevations have been lowered by several feet.

¹ Historic maps reviewed for this project included the 1865 Viele map depicting Manhattan's original topography (Figure 4), ca. 1782 British Headquarters map, the 1811 Bridges version of "The Commissioners' Plan," the 1820 Randel farm map, the 1836 Colton map (Figure 4), the 1851 and 1867 Dripps maps (Figures 5 and 6), the 1879 and 1891 (Figure 7) Bromley atlases, the 1885 Robinson and Pidgeon atlas, and the 1896, 1911, 1939, 1951, and 2007 (Figure 2) Sanborn maps.

Table 1
Street Elevation Changes Over Time

Intersection	1850 Hayward	1885 Robinson and Pidgeon	2007 Sanborn
East 90th Street and Third Avenue	78.8	77	77
East 91st Street and Third Avenue	74	74.1	74.8
East 92nd Street and Third Avenue	[map illegible]	69.2	69.2
East 93rd Street and Third Avenue	63.7	61.7	61.6
East 94th Street and Third Avenue	50.4	53.8	53.7
East 95th Street and Third Avenue	40.8	46.77	46.9
East 96th Street and Third Avenue	51.1	44	40.3
East 97th Street and Third Avenue	[map illegible]	33.8	33.7
East 90th Street and Second Avenue	11.3	36.8	36.7
East 91st Street and Second Avenue	10.11	31.1	31
East 92nd Street and Second Avenue	16.11	25.6	25.5
East 93rd Street and Second Avenue	0	19.11	19.9
East 94th Street and Second Avenue	0	14	14
East 95th Street and Second Avenue	0	11	11
East 96th Street and Second Avenue	0	11	11
East 97th Street and Second Avenue	0	11	11
East 99th Street and Second Avenue	0	12.9	13.7
East 105th Street and Second Avenue	14	9.2	9.2
East 91st Street and First Avenue	14.1	23.2	23.2
East 92nd Street and First Avenue	0	15.7	15.7
East 93rd Street and First Avenue	0	10.11	10.9
East 94th Street and First Avenue	0	9	9
East 95th Street and First Avenue	0	7	7
East 96th Street and First Avenue	0	7	7
East 97th Street and First Avenue	0	7	7
East 99th Street and First Avenue	0	8.6	8.5
East 105th Street and First Avenue	2.3	9.3	7.7
Notes: The 1850 Hayward map was partially illegible and some elevation data was partially or completely obscured.			

B. SOIL PROFILE

As previously discussed, in January 2008, a geoarchaeological analysis of the streetbed of Second Avenue between 92nd and 99th Streets was completed by GRA. The study identified 6 typical soil levels, referred to in the report as Analytical Units (AU) I through VI, in the area. These levels ranged from bedrock (AU-I) through the upper cap of modern and historic fill (AU-VI). The sediments above the bedrock level and beneath the modern fill dated to between approximately 20,000 years and 230 years BP and indicated that significant landscape modification and landfilling took place throughout the APE during the 19th century. These analytical units are summarized in Table 2.

Table 2
Soil Levels Identified by GRA (2008)

Analytical Unit	Approximate Age (Years BP)	Approximate Depth (Feet Below Ground Surface)	Description
AU-I	Unknown	60+	Bedrock
AU-II	Earlier than 15,000 to 12,000	40 to 60	Sediments associated with a glacial lake
AU-III	12,000 to 5,000	34 to 40	Sands marking the interim period between the retreat of glacial lakes and the formation of marshes
AU-IVa	5,000 to 4,000	27 to 34	Sediments associated with the transition from freshwater to salt marsh
AU-IVb	4,000 to 2,500	19 to 27	Sediments associated with the transition from a salt marsh to an inundated mudflat
AU-IVc	2,500 to 200	18.5 to 19	Sediments associated with a stable mudflat
AU-V	200 to present	16 to 18	Late 19th century landfill
AU-VI		0 to 16	Historic and modern fill, immediately below grade.

Notes: Not all AUs were present in all locations; approximate depths are taken from Boring AB-2A, located on the eastern side of Second Avenue between East 93rd and East 94th Streets and approximate age of each soil level was extracted from Table 3 (“Chrono-Stratigraphic summary”) of the 2008 GRA report (p. 58).

Sources: GRA (2008).

The GRA report concluded that levels AU-IVa and AU-IV-b, which date to the time of the transition of the land from a freshwater to a saltwater marsh, had moderate and low to moderate potential, respectively, for precontact archaeological resources. However, because of the thin and localized distribution of the potentially sensitive levels, GRA determined that the project area did not possess enough research value to warrant additional archaeological monitoring (see Chapter 3 for a more detailed discussion of the site’s precontact sensitivity).

A. PREVIOUS PRECONTACT ARCHAEOLOGICAL RESOURCES SENSITIVITY ASSESSMENTS

The precontact sensitivity of 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. As stated previously, historic maps show that the area of the 96th Street Station was formerly a large tract of marshland punctuated by numerous small streams and channels.

Using soil borings, historic maps, and other documentary sources, HPI identified areas of precontact archaeological sensitivity in the location of the 96th Street station in their 2003 Phase 1A Archaeological Assessment and in a supplemental analysis of boring logs (also prepared in 2003). These assessments identified three areas of archaeological sensitivity within the 96th Street Station APE: the streetbed of Second Avenue between East 106th and East 95th Streets outside of the footprint of the existing Second Avenue Subway tunnel (between 0 and 22 feet below grade); the site of ventilation Shaft C on Block 1646 (between 13 and 29 feet below grade); and the western side of Second Avenue between East 94th and East 95th Streets (between 10 and 15 feet below grade). The potential precontact archaeological resources in this area were expected to relate to habitation, camping, and hunting sites and could also have included shell middens.

In January 2008, subsequent to HPI's analyses of the 96th Street station, GRA completed its aforementioned study to refine recommendations presented by HPI in the 2003 Phase 1A Archaeological Assessment. GRA's report identified the area surrounding the 96th Street station as an ideal location for resource exploitation by Native Americans during the precontact period. As mentioned previously, the study identified 6 main soil levels or Analytical Units (AU) identified in the report as AU-I through AU-VI, ranging from bedrock through modern and historic fill.

Based on an analysis of the APE's original topographic setting, soil borings, and the level of preservation that each level was likely to provide, all but one of the AUs were determined to have low sensitivity for precontact archaeological resources. Level, AU-IVa, was determined to have moderate potential for archaeological resources and portions of level AU-IVb were determined to have low to moderate sensitivity. The potentially sensitive sediments in those layers dated to the Late Archaic period, between approximately 4,200 and 3,000 years BP and represented a transitional environment from freshwater marsh/shoreline to brackish marsh. The sensitive levels were identified between 15 and 25 feet below the ground surface north of 93rd Street. However, the report concluded that these "cultural deposits are likely to be thin and feature a broad and irregular lateral distribution" (GRA 2008: 56). Therefore, because large intact precontact archaeological sites were not likely to be encountered, continuous monitoring was not recommended, as suggested in the 2003 Phase 1A. In a letter dated April 2, 2008, SHPO concurred with the findings of this report.

B. PRECONTACT SENSITIVITY OF SUPPLEMENTAL LOCATIONS

All of the areas formerly located within the Hellgate Bay marsh outside of the Second Avenue streetbed are expected to have a similar soil profile to the one identified for the streetbed of Second Avenue by GRA in 2008. Therefore, those portions of the APE analyzed in this archaeological assessment that were also located within the former marsh are determined to have no sensitivity for precontact archaeological resources.

The only locations included within this assessment that were not included within the former marsh are the streetbeds of East 90th through East 92nd Streets, the western portions of East 93rd through East 98th Street west of Second Avenue, and the streetbed of East 105th Street between First and Second Avenues. These areas are depicted as dry land on the 1865 Viele map and their precontact sensitivity is discussed below.

STREETBEDS OF EAST 90TH THROUGH EAST 98TH STREETS

Before the time of European contact, a precontact habitation site known as *Konaande Kongh*, the chief village of a group of Native American known as the *Rechgawack*, was located to the west of the APE in the area now bounded by Lexington and Madison Avenues and East 98th and East 101st Streets (Bolton 1922). The village was situated on the high ground that overlooked the marsh that made up much of the APE (ibid).

Soil borings included in the 2003 Phase 1A Study and in GRA's 2008 geoarchaeological analysis of the site show that although portions of the APE were originally fast land and not marsh, a thick layer of fill is situated between the ground surface and bedrock in most locations along Second Avenue. Soil borings included within the 2003 Phase 1A study show that the fill layer is 19 feet thick near the intersection of Second Avenue and East 90th Street and it decreases to 13 feet at East 93rd Street. Soil borings completed by MTA New York City Transit and analyzed by GRA show that bedrock in this area is located directly beneath a layer of fill to the south of the former marsh with no undisturbed soil levels in between.

Historic maps depict numerous hills of varying size throughout this area. These hills are no longer reflected in topographic data and there is evidence of significant landscape modification in the form of grading and filling throughout the APE (see Table 1). The leveling of these hills and the cutting through of streets in preparation for the development of the area in the late 19th century appears to have resulted in significant disturbance, as seen by thick layer of fill evident in soil borings for the area. Precontact archaeological sites are generally very shallowly buried. Therefore, as a result of the disturbance caused by landscape alterations in the area as well as disturbance generated by the initial construction of the streets as well as the decades of paving, grading, and road maintenance that followed, there is low sensitivity for archaeological resources dating to the precontact period in this location.

EAST 105TH STREET

Project plans provided by MTA New York City Transit indicate that a small amount of utility work will be completed within East 105th Street approximately 120 to 150 feet east of Second Avenue. As depicted on the plans, this work will involve the installation of electrical lines and vaults within the northern and southern sidewalks. Prior to European contact, East 105th Street was included in a small "island" surrounded on the north, west, and south by marshland and on the east by the Harlem River. This neck of land was associated with the *Rechgawack* and was known as *Rechgewanes*. The topographical setting during the precontact period suggests that it is unlikely that a Native American habitation site was ever located there although it was probably used as a fishing location (Bolton 1922).

The 2003 Phase 1A Archaeological Assessment identified the area between East 106th and East 94th Streets as moderately sensitive for precontact archaeological resources. The Phase 1A included soil boring logs for several locations near the intersection of East 105th Street and Second Avenue. One of these borings (2-94), located near the northwest corner of East 105th Street and Second Avenue, revealed the presence of 17 feet of fill below grade. Another boring (2-93), located at the southwest corner of East 105th Street and Second Avenue, included only 3.5 feet of fill over a layer of medium-coarse brown sand with gravel and clay inclusions that extended to a depth of 13 feet below grade.

Additional borings completed by Warren George, Inc. in August 1972 as part of earlier work on the previous Second Avenue Subway project were provided by MTA New York City Transit for this supplemental assessment. Three borings were completed within the sidewalks of East 105th Street east of Second Avenue. The first, boring 11-25A, was located in the southeastern corner of Second Avenue and East 105th Street. It indicated that there are approximately 11 feet of fill and cobbles located below the surface of the sidewalk. Boring 11-26, located in the northeastern corner of the same intersection showed the presence of approximately 15 feet of fill. This was the same amount seen in Boring 11-27, located in the southern sidewalk of East 105th Street approximately 86 feet east of Second Avenue. All three borings showed that a layer of red-brown or brown sand or sandy-silt was situated below the level of fill.

Both the Randel Farm Map of 1820 and Viele's map of 1865 (Figure 3) depict a large hill that extended north-south across East 105th Street approximately 100 to 150 feet east of Second Avenue. This hill is not depicted on the 1836 Colton map (Figure 4), which shows that the marshes immediately west of this point of land had been filled in. Therefore, it is possible that this hill was cut down and used to fill in the adjacent marshland or to level out the area

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for its later use as a horse racing track and cricket field (described in greater detail in the following chapter). Hayward's 1850 profile drawing of Second Avenue suggests that a small hill was formerly located between East 105th and East 107th Streets which rose to a height to 14.5 feet. As seen on the 1891 Bromley atlas (Figure 7), after all the streets had been cut through this area, the marshes filled in, and the newly created land developed, the elevation along Second Avenue between East 105th and East 107th Streets was relatively level at approximately 9 feet above sea level, further confirming that significant landscape alteration had taken place in this area.

As a result of the depth of fill in this area and the landscape modifications observed in the cartographic record, the locations of utility installation within East 105th Street are determined to have no sensitivity for precontact archaeological resources.

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, the northern portion of Manhattan was occupied mostly by large tracts of saltwater marshes and farmland.

While most of the 96th Street Station APE was inundated by marshland, several of the streetbeds in the APE were also located outside of the borders of the marshland, including East 90th through East 92nd Streets and the western portions of East 93rd through East 98th Street west of Second Avenue. In addition, a small island of dry land was located immediately to the north, in the vicinity of East 103rd through East 106th Streets. The point of dry land was known as Montagne's Point, after original Dutch Settler Jan Montagne Jr. (Pierce 1903), who had purchased the land from the Native Americans in 1669 (Bolton 1922). Montagne sold the land in 1671 to Jan Louwe Bogert and the adjacent marshes were known during this period as "Bogert Marsh."

Bogert sold the land in 1706 to Captain Johannes Benson. The land became known as Benson's Point, after Samson Benson, who constructed a mill near East 105th Street and Third Avenue in 1740 (Stokes 1968). The mill was burned to the ground during the Revolutionary War and reconstructed several blocks to the north at the end of the 18th century (ibid). In addition, during the War of 1812, a redoubt was located near the area located north of East 106th Street between Second and Third Avenues (ibid). In addition, in his description of fortifications during the War of 1812, Rocellus Sheridan Guernsey (1895) stated that a battery may have been located in the vicinity of East 105th Street and Second Avenue, although no other information confirming this as the site of the former battery could confirm be located. No fortifications or structures of any kind are visible in the area on any late 18th or early 19th century maps, including the 1782 British Headquarters map and the 1811 Bridges maps.

Little development occurred in this area of Manhattan until the mid- to late-19th century when the northward dispersal of the population prompted the filling of the marsh located between approximately East 92nd and East 103rd Streets, Third Avenue, and the Harlem River. Historic maps including the 1811 Bridges Map, the 1820 Randel map, the 1836 Colton Map (Figure 4), and the 1851 Dripps map (Figure 5) show that the structures entered the APE or its vicinity in only three locations throughout the early- and mid-19th century (discussed in greater detail below). Prior to the mid-19th century, some small communities had been established nearby, including Yorkville, a predominantly German enclave located to the south of the 96th Street Station APE. The area was not heavily developed in part because streets had not been cut through the area, although they had been planned by the City's Street Commissioners decades earlier. Dripps' 1851 map shows that none of the APE streetbeds had been constructed by the mid-19th century and that Second Avenue extended only as far north as East 86th Street by the middle of the century.

However, in the late-19th century, the development of Harlem increased substantially. Much of the development was brought about by the Tammany political machine and was heavily influenced by William Tweed, who was at the time 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). 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 largely due to the establishment of elevated train lines along Second and Third Avenues, which allowed individuals to work in Manhattan's downtown commercial center and live in residential districts uptown.

Dripps' map of New York City published in 1867 (Figure 6) is the first to depict the growth and development of the area surrounding the 96th Street Station. The map shows that Yorkville had expanded substantially and that Second

Avenue had been extended to the north and all of the side streets had been cut through. The marshes were partially filled in by that time, although some of the channels that formerly drained it remained in place. By the time of the publication of the 1879 Bromley atlas, all of the blocks and lots adjacent to the APE streetbeds had been filled in and divided into lots, most of which had been developed with structures. Many large industrial and commercial institutions were based in the neighborhood, including breweries, lumber and coal yards, and a large railway depot bounded by East 96th and East 97th Streets and First and Second Avenues. The 1885 Robinson and Pidgeon atlas and the 1891 Bromley atlas (Figure 7) depict increased development in the area which included the numerous residential structures which helped to create a new neighborhood. 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.

B. LOCATIONS OF DISTURBANCE FOR THE 96TH STREET STATION

ENTRANCE 1

The location of Entrance 1, at the southwest corner of East 94th Street and Second Avenue (Block 1539, Lot 7501), was formerly situated in the center of a large tract of marshland with a stream flowing through it until at least 1867. Historic maps show that by the time of the publication of the 1879 Bromley and 1885 Robinson and Pidgeon atlases, the location of Entrance 1 was occupied by the fronts of three historic lots, all of which were developed with wood frame structures.

The row of wood frame structures was replaced with a row of brick structures by 1891 and subsequent maps show that all of them stood 5 stories tall and had basements. In addition, the 1891 Bromley atlas (see Figure 7) is the first to depict water and sewer lines present in this stretch of East 94th Street, although earlier atlases depict water lines in adjacent streets. The entrance in this location will be entirely situated within the former footprints of these buildings and will not include former rear yard areas. In 1986, the eastern end of Block 1539, including the location of Entrance 1, was redeveloped with a large 32-story structure which Sanborn maps show has a basement and a sub-cellar.

In 2004, a Test Pit was excavated by DMJM+Harris·ARUP within the western sidewalk of Second Avenue to the south of East 94th Street, in the location of Entrance 1 as part of the Second Avenue Subway project. The test pit was excavated to a depth of approximately 8 feet below grade, at which point contractors encountered a large concrete-encased duct bank. Therefore, in addition to disturbance generated by basement excavation, the installation of utilities in this area has also resulted in disturbance of more than 8 feet below the ground surface.

Because of the lack of development in this neighborhood until the late-19th century and the amount of disturbance generated by the construction of the existing building, the location of Entrance 1 is determined to have low sensitivity for historic period archaeological resources.

ENTRANCE 2

The site of Entrance 2, located at the northeast corner of East 94th Street and Second Avenue (Block 1557, Lot 1502) was occupied by a thick tract of marshland until the 1860s. The land was filled in and lotted out in the late 19th century, although it is depicted as undeveloped on historic maps dating through 1885. The first map to depict any structures in the location planned for Entrance 2 is the 1891 Bromley atlas, which shows that the location of the entrance was originally composed of three historic lots. Each of those historic lots was developed with a 5-story (with basement) brick structure. In addition, the 1891 Bromley atlas (see Figure 7) is the first to depict water and sewer lines present in this stretch of East 94th Street, although earlier atlases depict water lines in adjacent streets.

The subway entrance will be situated within the footprints of the buildings that formerly occupied the land and will not enter the former rear yards of these buildings. Sanborn maps show that between 1939 and 1951, these buildings were demolished and the historic lots were combined into one vacant lot that was part of a larger property occupied by a filling station located on the adjacent lot to the east. In 1990, the lots formerly making up the vacant lot and the adjacent filling station were redeveloped with a 31-story (with basement) residential tower identified on Sanborn maps as "The Huntington."

Because of the lack of development in this neighborhood until after the installation of water and sewer networks and the amount of disturbance generated by the construction of the existing building, the location of Entrance 2 within Block 1557, Lot 1502 is determined to have low sensitivity for historic period archaeological resources.

ENTRANCE 3

Entrance 3, located at the southwest corner of East 96th Street and Second Avenue (Block 1541, Lot 21), was occupied by marshland until circa 1867. Historic maps show that by 1879 the area had been lotted out and the location planned for Entrance 3 was occupied by the fronts of approximately six historic lots. The atlas shows that only the lot at the southwest corner of East 96th Street and Second Avenue was developed, although it does not depict this building's footprint. In addition, the 1879 Bromley atlas shows that water (and likely sewer) lines were present in the adjacent streetbeds. The 1885 Robinson and Pidgeon atlas depicts all of these lots as vacant. Of the eight lots on Block 1541 that fronted on Second Avenue, the 1891 Bromley atlas (Figure 7) depicts the northern four lots as developed with a row of four 5-story brick structures (subsequent maps show that all of these buildings had basements) while the southern four lots were vacant. The remaining lots were also developed with 5-story (with basement) structures by 1911. The subway entrance will be situated within the footprints of these former buildings and will not enter the former rear yard areas. Sanborn maps show that some of these structures were demolished by 1939 and replaced with 1- and 2-story commercial structures by 1951. In 1987, the entire block was developed with the "Normandie Court," a 36- to 38-story (with basement) building surrounded by large plazas, several of which also have basements used for parking.

Because of the lack of development in this neighborhood until after the installation of water and sewer networks and the amount of disturbance generated by the construction of the existing building, the location of Entrance 3 is determined to have low sensitivity for historic period archaeological resources.

ANCILLARY 1

The planned location of Ancillary 1, at the northeast corner of East 93rd Street and Second Avenue (Block 1556, Lot 1), was occupied by marshland and a stream until circa 1867. The 1879 Bromley atlas shows that the lot was developed with a barn or stable that was likely associated with the coal yard situated in the undeveloped lots to the north of Lot 1. At that time, the lot measured 100 feet along East 93rd Street. However, it was reduced in size before 1885 and now measures 75 feet. By 1885, the barn was replaced with a brick structure that covered the entire 75-foot lot. Subsequent maps show that this structure stood 4 stories tall and had a basement. This building was demolished in the late 20th century and recent Sanborn maps depict the lot as vacant.

Because of the lack of development in this neighborhood until after the installation of water and sewer networks and because the amount of disturbance generated by the excavation of the basement of the structure erected on the lot between 1879 and 1885 would have disturbed any archaeological resources associated with the barn or stable that had stood on the lot earlier, the location of Ancillary 1 is determined to have low sensitivity for historic period archaeological resources.

UTILITY INSTALLATIONS AT THE GEORGE WASHINGTON HOUSES

Project plans show that several gas lines and a new combined sewer are planned within Block 1647, Lot 1, currently the property associated with the George Washington Houses on the western side of Second Avenue between East 97th and East 99th Street (East 98th Street has been de-mapped in the vicinity of this block). Although the new utility lines will pass through the locations of numerous historic lots, none of the lots were developed with structures until after 1879, when utilities were available within the streets. In addition, the new utility lines will enter the front portions of those historic lots (within the footprints of structures constructed in the late 19th century, all of which had basements) and will not impact any former rear yard areas. Therefore the utility installations within Block 1647 are not expected to impact any archaeological resources.

UTILITY RELOCATIONS IN SIDE STREETS

Entrances 1 and 2 will require excavation in the streetbed of East 94th Street east and west of Second Avenue outside of the area analyzed by HPI in 2003. Ancillary 1 will require excavation in the streetbed of East 93rd Street, east of Second Avenue, also in an area that was not analyzed in the 2003 Phase 1A. In addition, there is utility relocation work planned for most of the streetbeds between East 90th and East 99th Streets and in East 105th Street.

Project plans, the locations of the utility relocation will range between approximately 20 and more than 350 feet east or west of the streetbed of Second Avenue. For the purposes of this analysis, all affected streetbeds were conservatively analyzed as far west as Third Avenue and as far east as First Avenue.

East 90th through East 102nd Streets

The majority of the APE between East 90th and East 102nd Streets east and west of Second Avenue was inundated by marshland until the late 19th century, at which time the marshes and streams were filled in and the streets cut through. However, East 90th and East 91st Streets were almost entirely composed of dry land between First and Third Avenues, as were East 92nd and East 93rd Streets between Second and Third Avenues, and the western ends of East 94th through East 98th Streets. These areas of dry land were covered with hills of varying size, as seen on Viele's 1865 map (Figure 3).

With the exception of East 90th and East 93rd Streets between Second and Third Avenues (discussed in greater detail below), no historic maps dating from the early 19th century through the present depict any structures or development in the paths of any of these streetbeds. The streets themselves are not shown as having been constructed on historic maps until the 1867 Dripps map (Figure 6). Water lines were installed in these streetbeds by 1879, at which time a Bromley atlas shows that fire hydrants were present in most of the streets. Sewer lines are first depicted in this area on the 1891 Bromley map, but they were most likely installed around the same time as the water lines. Utility maps prepared by DMJM+Harris-ARUP depict numerous utilities (including sewer, water, gas, electric, and telecommunications lines as well as manholes, utility vaults, and cellar entrances) throughout all of these streetbeds.

Because this area was not developed until the late 19th century and there is no evidence that any historic structures ever stood in the paths of these side streets, the utility relocation in the streetbeds of East 91st Street, East 92nd Street, and East 94th through and East 102nd Streets will not impact archaeological resources dating to the historic period.

East 90th Street between Second and Third Avenues

The former home of William Rhinelander was situated on the southern side of modern East 90th Street midway between Second and Third Avenues. The 1811 Bridges, 1820 Randel, and 1851 Dripps (Figure 5) maps show only a small portion of the home within the streetbed although the 1836 Colton map (figure 4) depicts the house in the center of the street surrounded by a large ornamental garden. The 1851 map depicts the home on top of a small hill and shows that it was surrounded by a series of small driveways. Project plans indicate that the only work that will be completed within the streetbed of East 90th Street will involve the installation of a gas line approximately 20 feet east of the western curb of Second Avenue, more than 200 feet east of the former Rhinelander home. In addition, the elevation changes presented in Table 1 suggest that landscape alteration has taken place within this stretch of East 90th Street involving grading near Third Avenue and filling near Second Avenue. That landscape alteration appears to have taken place in the mid- to late-19th century, when hills in this area, including the one on which the Rhinelander home stood, were leveled and the adjacent marshes and streams filled in. Therefore, the Second Avenue Subway project is not expected to impact any historic period archaeological resources associated with that building.

East 93rd Street between Second and Third Avenues

Of the historic maps reviewed for this analysis, the 1851 Dripps map (Figure 5) is the only one to depict structures within the streetbed of East 93rd Street. The map depicts two small structures, likely outbuildings rather than residences, one on the southern side of East 93rd Street approximately 550 feet west of Second Avenue and the other on the northern side of the street approximately 500 feet west of Second Avenue. Project plans show that the planned utility relocations will extend down the streetbed of East 93rd Street for a distance of less than 350 feet west of Second Avenue and are therefore not expected to impact the former locations of the small outbuildings.

Regardless of whether the project is expected to impact the locations of the former structures in this area, the elevation changes presented in Table 1 suggest that significant landscape alteration has taken place within this stretch of East 93rd Street. Numerous historic maps, including the 1811 Bridges, 1836 Colton (Figure 4), 1851 Dripps, and 1865 Viele maps (Figure 3), depict a large hill that ran north-south through East 93rd Street approximately 350 feet west of Second Avenue. Table 1 shows that while almost 20 feet of fill was used to fill in East 93rd Street in the vicinity of Second Avenue, near Third Avenue the street was graded by approximately 2 feet.

The landscape alteration in this area appears to have occurred in the mid- to late-19th century, when many hills in the vicinity appear to have been leveled and likely used to fill in the adjacent marshes. The subsequent cutting through of East 93rd Street as well as decades of paving and grading relating to the maintenance and modernization of the streetbed as well as the installation of utilities in the area would have resulted in significant disturbance at varying depths throughout the streetbed. The project plans indicate that the majority of the work in this area will involve electric, gas, and telecommunications lines, which are usually found at depths of 2 to 3 feet below the ground surface. A new water line and a sewer line and catch basins to be installed approximately 50 feet west of Second Avenue will be installed at greater depths of more than 5 feet below the ground surface.

As result of the distance between the planned utility work and the historic structures formerly located within the path of the streetbed of East 93rd Street as well as the amount of documented landscape alteration and disturbance, the Second Avenue Subway project will not have any impact on historic period archaeological resources in this area.

East 105th Street between First and Second Avenues

The first map to depict a structure in the vicinity of East 105th Street and Second Avenue is the 1836 Colton map (Figure 4). It depicts a structure labeled the “Red House” within Block 1677, north of the future streetbed of East 105th Street. Before becoming the “Red House,” the building was the home of William McGowan (or McGown), whose family owned most of the surrounding land, including the area now known as McGown’s Pass in Central Park (Dayton 1897). The “Red House” was a sports club that featured pigeon shooting and equestrian facilities (Mellville 1998). It was also famous for being the home field of the Gothamites, one of New York City’s earliest community baseball teams (Sullivan 1997).

The 1851 Dripps (Figure 5) map shows the “Red House Hotel” in a slightly different location than that seen on the 1836 map. Dripps’ map also shows that additional buildings had been constructed to the north of the main house (although it is possible that they were outbuildings not depicted on the 1836 map) and that Saint George’s Cricket Club had been established to the east. A drawing of the cricket club that was created by Mrs. Otis Ormsbee in 1843 depicts the main house as well as the stables and outbuildings that were located to the north, as depicted on the 1851 map (Kouwenhoven 1953).

Neither East 105th Street nor any of the adjacent streets had been constructed by the mid-19th century and the hotel and cricket field were accessed by several driveways, one of which ran along the line of modern East 105th Street within the APE. Dripps’ map of 1867 (Figure 6) reflects the construction of East 105th Street and shows that the inn’s driveways were no longer present (although the horse track was still present to the east of the APE). These driveways were identified in the 2003 Phase 1A Archaeological Assessment, which determined that the driveways were not considered archaeological resources “due to their superficial nature” (HPI 2003a: 4.3-10). The 1867 map also shows that the buildings of the “Red House” had been demolished and replaced with new structures approximately 175 feet to the west, along the eastern side of what was then the newly built Second Avenue. By 1879, the blocks adjacent to East 105th Street had been divided into lots, many of which were developed with structures and no trace of the old horse racing track remained.

As previously mentioned, there is cartographic evidence that confirms that significant landscape alteration took place in this area during the second half of the 19th century. During the neighborhood’s conversion from an isolated point of land surrounded by marshland to a heavily developed urban location, much of the area appears to have been graded and leveled. As seen in Table 1, in the mid-19th century followed a downward slope to the east, almost 5 feet of earth have been removed from the streetbed of East 105th Street near Third Avenue and more than 5 feet of fill have been added to the surface of the streetbed near Second Avenue. This was likely due to the fact that a hill that formerly ran north-south through the streetbed of East 105th Street to the east of Second Avenue (as seen on the 1865 Viele and 1820 Randel maps), on which the Red House likely sat, was leveled off, probably in anticipation of the area’s development in the mid-19th century. In addition, soil borings taken in 1972 show that there are approximately 15 feet of fill and cobbles below the ground surface in the vicinity of the planned utility work within East 105th Street.

Therefore, as a result of the documented landscape alteration and disturbance relating to the construction, paving, and grading of East 105th Street and the installation of utilities within the streetbed, it is not likely that intact archaeological resources (such as structural remnants or shaft features associated with the “Red House”) dating to the historic period will be impacted by the Second Avenue Subway project.

A. APE SENSITIVITY**DISTURBANCE ASSESSMENT**

There are several areas within the current 96th Street Station APE that will require excavation outside of the APE analyzed in the 2003 Phase 1A Archaeological Assessment. The locations of the three subway entrances (on Block 1539, Lot 7501; Block 1557, Lot 1502, and Block 1541, Lot 21) are all areas that are currently occupied by large residential towers with basements (and in one case also a sub-cellar). Each of these buildings stands more than 30 stories tall and the excavation for each of the basements would have generated substantial disturbance within each of these lots. In addition, the location of Ancillary 1 (Block 1556, Lot 1), which is now vacant, was occupied by a brick structure between circa 1885 and the late 20th century. This structure was 4 stories tall and had a basement that covered the lot completely (there was no rear yard). The excavation of this basement would have generated disturbance within this lot and to any archaeological resources which may have been associated with the earlier stable that was formerly located there. An additional Ancillary building (Ancillary 2) is planned near the southwest corner of East 97th Street and Second Avenue. This area was analyzed in the 2003 Phase 1A and was determined to be sensitive for precontact archaeological resources but not for historic period resources. However, GRA's 2008 geoarchaeological analysis of the area revised the sensitivity assessment of the 2003 Phase 1A and this area is no longer considered to be archaeologically sensitive.

Numerous utility lines run beneath the side streets to the east and west of Second Avenue between East 90th Street and East 105th Street. The installation of these utilities would have caused disturbance to varying depths: sewers are generally installed at approximately 8 feet below grade, water lines at approximately 5 feet below grade, and electric, gas, and telecommunications lines at approximately 2 to 3 feet below grade. These streetbeds are also likely to have been disturbed to a depth of at least 1 to 2 feet below the ground surface as a result of grading, paving, and other roadwork.

Historic maps and soil borings confirm that significant landscape alteration took place in the area during the second half of the 19th century. During the neighborhood's conversion from an isolated point of land surrounded by marshland to a heavily developed urban location, many of the hills in the area appear to have been leveled while the adjacent marshes were filled in. Additional disturbance would have been caused when streets were cut initially through the area as well as during the decades of paving, grading, and utility installations that followed.

PRECONTACT SENSITIVITY ASSESSMENT

As mentioned previously, the precontact sensitivity of 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 show that the 96th Street Station APE was formerly a large tract of marshland punctuated by numerous small streams and channels and bordered with hills of varying size. This area would likely have been an ideal location for Native American resource exploitation as the marsh would have provided a wide variety of plant and animal life and a habitation site was located on high ground to the west of the APE.

Using soil borings, historic maps, and other documentary evidence, HPI identified areas of precontact archaeological sensitivity in the location of the 96th Street Station in its 2003 Phase 1A Archaeological Assessment and supplemental soil borings analysis. These assessments identified three areas of archaeological sensitivity within the 96th Street Station APE: the streetbed of Second Avenue between East 106th and East 95th Streets outside of the footprint of the existing Second Avenue Subway tunnel (between 0 and 22 feet below grade); the site of ventilation Shaft C on Block 1646 (between 13 and 29 feet below grade); and the western side of Second Avenue between East 94th and East 95th Streets (between 10 and 15 feet below grade). The potential precontact archaeological resources

in this area were expected to relate to habitation, camping, and hunting sites and could also have included shell middens.

In an extensive geoarchaeological analysis of the 96th Street Station APE completed in January 2008, GRA determined that there was moderate archaeological sensitivity for precontact resources between 15 and 25 feet below the ground surface north of 93rd Street. However, the report determined that “cultural deposits are likely to be thin and feature a broad and irregular lateral distribution” (GRA 2008: 56). Therefore, because it would be unlikely to encounter large intact sites, continuous monitoring was not recommended for the streetbed of Second Avenue. In a letter dated April 2, 2008, SHPO concurred with the findings of this report.

Most of the side streets to the east and west of Second Avenue between East 93rd and East 103rd Streets were also inundated by marshland and were filled in the late 19th century. Because these side streets likely feature a similar soil profile, any precontact archaeological resources in the side streets would likely be situated between 15 and 25 feet below grade and would be thin and irregularly distributed similar to those within Second Avenue itself. Therefore, these portions of the APE that were formerly inundated by marshland are determined to have no sensitivity for precontact archaeological resources. The areas that were composed of dry land during the precontact period (East 90th through East 92nd Streets, the western portions of East 93rd through East 98th Street west of Second Avenue, and the streetbed of East 105th Street) are depicted on early maps (including the 1865 Viele map) as being covered with hills. In the late 19th century, the adjacent marshes were filled in and the ground was leveled off. As seen in Table 1, in some areas the streetbeds were graded or filled although the elevations of others were relatively unchanged.

Precontact archaeological resources are generally found at shallow depths beneath the original ground surface. The extensive landscape alterations that have occurred in the vicinity of the 96th Station APE and the extensive disturbance caused by the cutting of streets in the area as well as decades of paving, grading, and utility installation would have had a significant impact on any precontact archaeological resources which may at one point have been located within the boundaries of the APE. Therefore, the utility installations in those areas are not expected to impact undisturbed precontact archaeological resources.

HISTORIC SENSITIVITY ASSESSMENT

All of the areas of planned excavation within the blocks adjacent to Second Avenue have already been disturbed by the excavation of basements associated with large late-20th century residential towers or other structures. Some of these areas were occupied by historic structures during the late-19th and early 20th centuries. However, the planned locations of the entrances and Ancillary 1 were all situated within the footprints of historic structures and none included any portions of former open rear yards. In addition, because the area was inundated by marshes and streams until the late-19th century, it was 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 structures were formerly situated within or adjacent to the APE streetbeds in three locations. The first of these was the “Red House,” a sports club, which was located near the northeast corner of East 105th Street and Second Avenue, but the structure as depicted on historic maps does not appear to have entered the streetbed of East 105th Street. Driveways associated with the structure ran from the house down the future line of East 105th Street. These driveways were identified in the 2003 Phase 1A Archaeological Assessment which determined that the driveways were not considered archaeological resources “due to their superficial nature” (HPI 2003a: 4.3-10). The second structure that was located within the boundaries of the APE was the former Rhinelander home, partially located within the streetbed of East 90th Street approximately 275 feet west of Second Avenue. The third location was within the streetbed of East 93rd Street, where two small structures were depicted on the 1851 Dripps map between 500 and 550 feet west of Second Avenue. Both East 90th Street and East 93rd Street were formerly interrupted by hills which have since been leveled. As seen in Table 1, a small amount of grading has occurred within both streets near Third Avenue while filling occurred in both streetbeds near Second Avenue (in the location of the former marsh). The landscape modifications and disturbance caused by the construction and maintenance of both streets as well as the installation of utilities would have generated disturbance in both locations. In addition, project plans do not indicate that any utility work will be completed in the locations of the former buildings.

In addition, as stated before, the location of Ancillary 2 was previously analyzed by HPI in the 2003 Phase 1A which determined that it was not sensitive for historic period archaeological resources.

Because of the lack of development in the area until the late 19th century as well as the extent of the landscape alterations that are visible in the cartographic record and in soil borings, it is not likely that undisturbed archaeological resources dating to the historic period remain present within the APE. 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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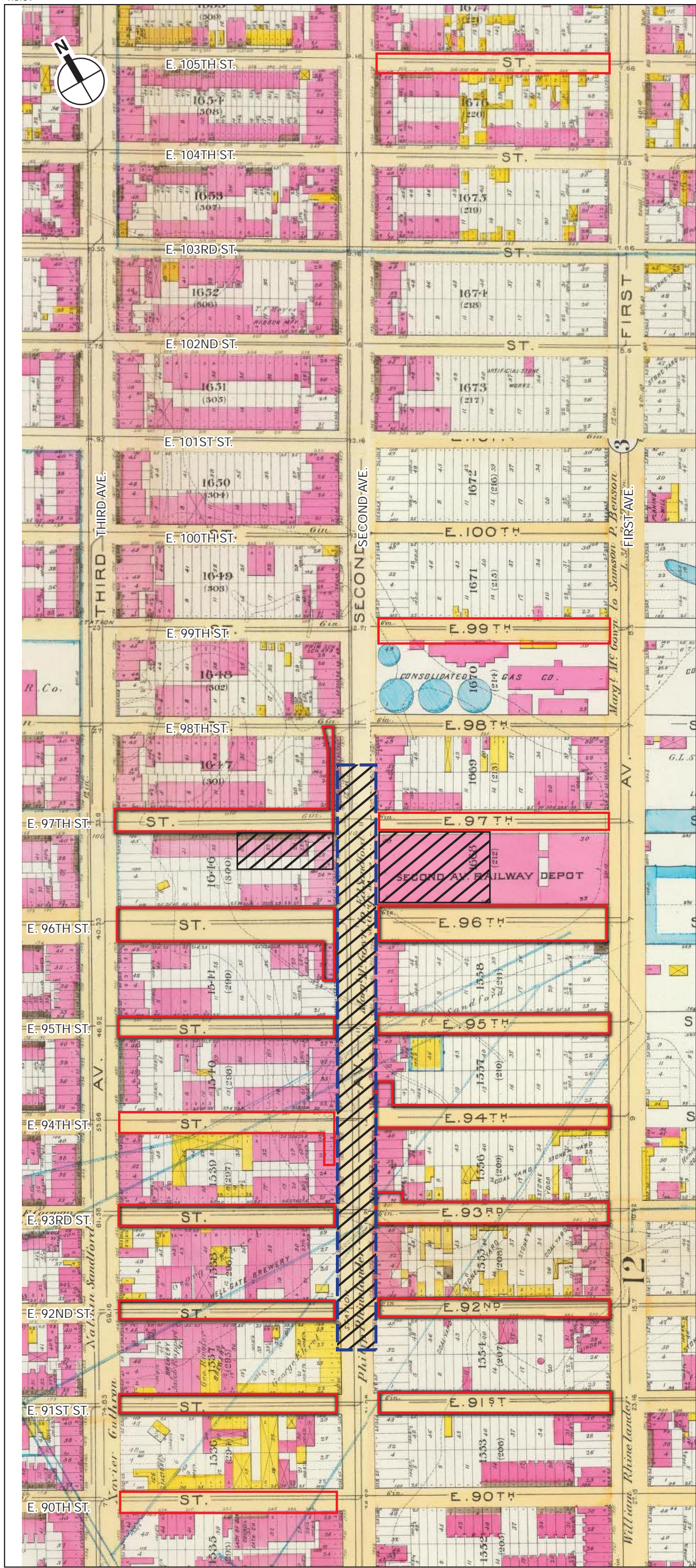
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