

# **Proposed Development at 3966 Tenth Avenue**

**BLOCK 2229, LOT 25**

**NEW YORK, NEW YORK**

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## **Topic Intensive Archaeological Documentary Study**

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**A. INTRODUCTION AND PROJECT DESCRIPTION**

Bowery Residents' Committee, Inc. ("BRC," or the "Client") is contemplating the redevelopment of the property located at 3966 Tenth Avenue in the Inwood neighborhood of Manhattan, New York County, NY (see **Figure 1**). The project site includes Tax Block 2229 Lot 25 (see **Figure 2**) and is currently privately owned and occupied by a single-story auto repair shop and parking lot. The proposed project is expected to involve the construction of a new building with a homeless shelter and administrative office space. The project would be developed under existing zoning and would be facilitated with funding from the New York City Department of Homeless Services (DHS) (the "proposed action"). The project is subject to New York City Environmental Quality Review (CEQR).

**B. PREVIOUS ENVIRONMENTAL REVIEW**

The project site was identified as the northern half of Potential Development Site E (which also included Lot 32) in the *Inwood Rezoning Final Environmental Impact Statement (FEIS)* as issued in 2018. The archaeological sensitivity of development sites in the rezoning area was assessed in a Phase 1A Archaeological Documentary Study ("Phase 1A Study") prepared by Celia J. Bergoffen, PhD in 2017. The results of the Phase 1A Study and its documentation of the development and occupation history of the project site are summarized in this report as necessary. AKRF was retained by BRC to complete a Topic Intensive Archaeological Documentary Study ("Topic Intensive Study" or the "Study") designed to further refine the sensitivity determinations made in the 2017 Phase 1A Study. This report is therefore designed to expand on and supplement the previous research as described in the following sections.

**C. RESEARCH GOALS**

This Topic Intensive Study follows the guidelines of the New York City Landmarks Preservation Commission (LPC) as issued in 2018 and the guidelines of the New York Archaeological Council (NYAC) and documents the history of development and landscape modification on the project site to further refine the determinations of archaeological sensitivity of the 2017 Phase 1A Study.

While the 2017 Phase 1A Study focused on the project site's development and occupation history, this Study focuses on an intensive assessment of the history of landscape modification on the project site and the specific history of a former cemetery. This Study has four major goals: (1) to determine the effect of subsequent development and landscape alteration on any potential archaeological resources that may have been located within the project site; (2) to summarize the history of the burial ground and its subsequent redevelopment with the goal of determining the extent to which human remains may still be present; (3) to clarify previous determinations of the project site's potential archaeological sensitivity; and (4) to make recommendations for further archaeological analysis, if necessary. The steps taken to fulfill these goals are explained in greater detail, below.

The first goal of this Study is to make a determination of the extent to which the landscape of the project site was modified as a result of its development in the 20th century. This was accomplished through a review of historical maps depicting elevation information that pre- and post-dated the area's development to determine changes made to the historical ground surface in the early 20th century. Where possible,

historical datums—the point from which surface elevations are measured—were converted to a permanent modern datum to allow for comparison.

The second goal of this Study is to summarize the history of the cemetery formerly located within the project site’s boundaries. The cemetery’s history has been previously documented in other sources and was supplemented with new research.

The third goal of this Study is to determine the likelihood that archaeological resources could have survived intact on the project site after development and landscape alteration. Potential disturbance associated with previously archaeological investigations, grading/paving, utility installation, and other previous construction impacts was also considered. As described by NYAC in their Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State:

*An estimate of the archaeological sensitivity of a given area provides the archaeologist with a tool with which to design appropriate field procedures for the investigation of that area. These sensitivity projections are generally based upon the following factors: statements of locational preferences or tendencies for particular settlement systems, characteristics of the local environment which provide essential or desirable resources (e.g., proximity to perennial water sources, well-drained soils, floral and faunal resources, raw materials, and/or trade and transportation routes), the density of known archaeological and historical resources within the general area, and the extent of known disturbances which can potentially affect the integrity of sites and the recovery of material from them (NYAC 1994: 2).*

As stipulated by the NYAC standards, sensitivity assessments should be categorized as low, moderate, or high to reflect “the likelihood that cultural resources are present within the project area” (NYAC 1994: 10). For the purposes of this Study, those terms are defined as follows:

- Low: Areas of low sensitivity are those where the original topography would suggest that Native American archaeological sites would not be present (i.e., locations at great distances from fresh and salt water resources), locations where no historic activity occurred before the installation of municipal water and sewer networks, or those locations determined to be sufficiently disturbed so that archaeological resources are not likely to remain intact.
- Moderate: Areas with topographical features that would suggest Native American occupation, documented historic period activity, and with some disturbance, but not enough to eliminate the possibility that archaeological resources are intact on the project site.
- High: Areas with topographical features that would suggest Native American occupation, documented historic period activity, and minimal or no documented disturbance.

The fourth and final goal of this Study is to make recommendations for additional archaeological investigations where necessary. According to NYAC standards, Phase 1B testing is generally warranted for areas determined to have moderate sensitivity or higher. Archaeological testing is designed to determine the presence or absence of archaeological resources that could be impacted by a proposed project.

## **D. RESEARCH METHODOLOGY**

To satisfy the research goals as outlined above, supplemental documentary research was completed to refine the chronology of the project site’s development and landscape alteration as documented in the 2017 Phase 1A Study. Intensive research was completed with respect to the former cemetery that occupied the project site. Data was gathered from various published and unpublished primary and

secondary resources, such as historical maps, topographical analyses (both modern and historic), historic and current photographs (including aerial imagery), newspaper articles, local histories, and previously conducted archaeological surveys. These published and unpublished resources were consulted at various repositories, including the Main Research Branch of the New York Public Library (including the Local History and Map Divisions), the Library of Congress, the New York City Department of Buildings (NYCDOB), and the New York City Department of Finance. File searches were conducted at LPC, the New York State Office of Parks Recreation & Historic Preservation (OPRHP), and the New York State Museum (NYSM). Information on previous cultural resources assessments on file with OPRHP and NYSM was accessed through the New York State Cultural Resource Information System (CRIS).<sup>1</sup> Online textual archives, such as Google Books and the Internet Archive Open Access Texts, were also accessed.

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<sup>1</sup> <https://cris.parks.ny.gov>

## **Chapter 2: Physical Setting, Project Site History, and Landscape Modification**

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### **A. CURRENT CONDITIONS**

The project site is currently developed with an auto repair shop and is currently developed with a several one-story commercial buildings. The on-site structures include a garage lining the lot's western side; a building/store along its northern side; and a small trailer/truck on its western side that is permanently parked (see **Figure 2**). The interior of the lot between the buildings is paved. The garage along the western end contains hydraulic lifts and subsurface oil storage tanks (Roux Environmental 2019a). Additional hydraulic lifts are located in the paved lot in the southeastern quadrant of the project site (ibid). The garage along the western side of the project site is constructed on an 8-inch cement slab and does not contain a basement (MRCE 2020). A retaining wall lines the western side of the garage, separating it from an adjacent public school parking lot. The wall is constructed on a foundation that extends approximately 2.6 feet below grade, or to an elevation of 13.9 feet North American Vertical Datum of 1988 (NAVD88) (ibid). A brick building situated to the south of the project site was constructed with a partial basement; its foundation extends to depths of at least 3.6 to 5.7 feet below grade (11.5 to 9.4 feet NAVD88) (ibid).

### **B. GEOLOGY AND TOPOGRAPHY**

The island of Manhattan is within a geographic bedrock region known as the Manhattan Prong of the New England (Upland) Physiographic Province (Isachsen, et al. 2000). Bedrock in the vicinity of the project site is represented by Inwood Marble (Fisher, et al. 1970). This type of bedrock dates to the Lower Ordovician and Cambrian Periods of the Paleozoic Era and was likely formed more than 435 million years before present (ibid; Isachsen, et al. 2000). Surficial geology in the immediate vicinity of the project site includes a mix of glacial till and exposed bedrock (Cadwell, et al. 1986). The glacial till was left behind by massive glaciers up to 1,000 feet thick that retreated from the area towards the end of the Pleistocene. There were four major glaciations that affected the region until approximately 12,000 years ago when the Wisconsin period—the last glacial period—came to an end (Schuberth 1968). Modern soil borings documented bedrock at depths of 92 to 104 feet, and groundwater was identified at 12 to 14 feet below ground surface (Roux Environmental 2019b; MRCE 2020).

Historically, the project site was occupied by a hill that sloped down to the south and east (see **Figure 3**). The hill appears to have been graded in the early 20th century (see **Section E, “Assessment of Landscape Modification”**). The project site is generally level with a slight rise to the west and is situated at an elevation of approximately 13.5 to 15.5 feet NAVD88 along Tenth Avenue and 20.2 feet along 212th Street (MRCE 2020). A comprehensive assessment of landscape modification and topographical changes across the project site is included in **Section D, “Summary of Project Site Development History.”**

### **C. SOILS AND SUBSURFACE CONDITIONS**

The “Web Soil Survey” maintained by the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture (USDA) indicates that soils in the vicinity of the project site are associated with the complex known as “Urban land, till substratum” (UtA, UtB). The typical soil profile

for this complex includes up to 15 inches of cement or pavement underlain by gravelly sandy loam to a depth of at least 79 inches. Those soils identified as UtB, which occupy the majority of the project site, are typically found in level areas with slopes ranging from 3 to 8 percent while the UtA soils in the extreme eastern part of the site are typically characterized by slopes between 0 and 3 percent. As described in the sections that follow, historical soil borings from the early-to-mid 20th century and modern soil borings identify layers of fill material and glacial sand/subsoil underlying the ground surface of the project site and the surrounding area. None of the borings identifies soils described as topsoil or loam that could potentially represent a buried ground surface.

### **INFORMATION FROM HISTORICAL SOIL BORINGS**

No historical soil borings were available for the project site itself; however, the Rock Data Map compiled by the Office of the Manhattan Borough President in 1937 and updated in the decades that followed included a series of borings advanced on adjacent or nearby parcels of land. Thirteen borings included in the collection were advanced on the adjacent parcel to the west in preparation for the construction in 1923 of the existing PS 98 located to the west of the project site (Sheet 34, Borings 35 through 47). For each of the thirteen borings, the elevation was measured to the elevation of the adjacent curb line, or 29 feet relative to what is presumed to be the Manhattan Borough Datum (MBD) or 30.65 feet NAVD88.<sup>1</sup> Each boring includes a blank area representing the soils underlying the surface datum for an area between 16.4 and 22.9 feet (extending to elevations of 12.6 to 6.1 feet relative to MBD/14.25 to 7.75 feet NAVD88). It is unclear if the soils for that area were not recorded or if the first depths to be recorded reference the ground surface relative to the standard datum. For eleven of the thirteen borings, only two layers of sand were recorded to the depth that the borings were terminated before reaching rock. In seven of those, the second (lower) layer of sand was identified as fine red sand that began at elevations ranging between -0.9 and -11 feet MBD (-0.75 to -9.35 NAVD88) below the datum. The final two borings (46 and 47)—located on the extreme eastern and western sides of the school site, respectively—extended to the depth of bedrock. The top of the bedrock was identified at a depth of 76.8 feet below the datum/curb line (an elevation of -47.8 feet MBD/-46.2 feet NAVD88) on the western side of the school property and a depth of 109.5 feet below grade (an elevation of -80.5 feet MBD/-78.9 feet NAVD88) on the western side. In both borings, fine red sand with traces of clay or clay and gravel were observed immediately above the top of the bedrock.

The Rock Data Map also includes two soil borings that were advanced opposite the project site within the eastern sidewalk of Tenth Avenue. The first (Sheet 34, Boring 19) was completed by the Board of Transportation at an unknown date. The surface elevation of the boring was 12.2 feet MBD (13.852 feet NAVD88) and it was advanced through 15 feet of clay and sand before the boring was terminated. The second (Sheet 34, Boring 79), was advanced in 1963 in association with the nearby North River Pollution Control Plant. The boring was completed following the area's urban development, and as such, the soil profile is more varied. Immediately underlying the ground surface (elevation 13 feet MBD/14.652 feet NAVD88) was a 7-foot-thick layer of concrete and fill containing cinders, sand, gravel, and silt. Beneath the fill were alternating layers of brown or red-brown sand containing traces of silt or gravel extending to a depth of 63 feet below grade (elevation -50 feet MBD/-48.4 feet NAVD88). The lowest deposits identified before the boring was terminated at a depth of 82 feet below grade (elevation -69 feet MBD/-69.1 feet NAVD88) included brown silt and brown sand with traces of clay and mica.

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<sup>1</sup> See the following section for a discussion of the conversion of datums and other historical elevation information.

## **INFORMATION FROM MODERN SOIL BORINGS**

Two sets of recent soil borings were reviewed as part of this Study. The first is a set of three geotechnical borings, four cone penetration test probes, and two machine-excavated test pits completed by MRCE as part of a geotechnical investigation of the project site in July 2020. The borings identified a 4- to 6-foot layer of “man-made” fill immediately underlying the asphalt pavement (MRCE 2020:5). The fill was described as “black to brown, fine to medium sand, some to trace silt, gravel, with trace brick over brown fine to medium sand, some to trace silt, trace coarse sand, concrete and debris” (ibid). The fill was underlain by a 16.5- to 24.5-foot layer of natural sand (ibid). Beneath these sands were layers of silty sand identified by MRCE as glacial lake deposits, suggesting that they were deposited before the region was occupied by humans.

The second set of six soil borings was completed by Roux Environmental Engineering in October 2019 as part of a Phase II Environmental Site Investigation (Roux Environmental 2019b). These borings identified 2 to 3 feet of fill containing demolition debris, sand, gravel, brick, and glass across the project site. “Native soil” identified as fine to coarse sand with gravel and traces of clay was documented beneath the fill material (ibid). As part of the Phase II, a non-invasive ground-penetrating radar investigation was completed that did not identify any subsurface anomalies or buried tanks (ibid).

## **D. SUMMARY OF PROJECT SITE DEVELOPMENT HISTORY**

The history of the project site’s development and use as a burial ground was documented in the 2017 Phase 1A Study. This section summarizes that research and supplements previous research with additional information.

### **PRECONTACT OCCUPATION OF THE PROJECT SITE**

The precontact history of the Inwood area was detailed in the 2017 Phase 1A Study and will therefore be only briefly summarized here as it pertains to the project site itself. Lot 25 was the location of a small Native American archaeological site within a larger precontact occupation area known as *Muscoota* (Bolton 1922). The occupation site appears to have been situated on the small hill that formerly occupied the project site and was documented by early archaeologist Reginald P. Bolton (ibid). Precontact artifacts were reported by Bolton beneath the depths of the historic period cemetery as described below. Bolton hypothesized that the site was used either for occupation or for ceremonial purposes, and that it contained shell pits with “pottery and dog, turtle, or snake skeletons” (ibid: 86).

### **EARLY COLONIAL HISTORY AND OCCUPATION**

The early colonial history of the Inwood area is described in the 2017 Phase 1A Study. The project site was included within a larger farm property that was owned by the Dyckman family, whose home was located on 210th street by 1708 (Bolton 1924). The Dyckman property was shared with the Nagel family, whose home was located in West 213th Street until the properties were formally separated in 1744 (ibid). The “sandy hillock” on which graves were identified was reported to have been located near the location of an old stone boulder fence that separated what was historically the Dyckman and Nagel farms (Bolton 1924:47, 204).

The project site was later included in a parcel of land acquired by Dennis (also spelled Dennes) Post, who is identified as the owner of the area surrounding the project site on the 1811 Bridges and ca. 1820 Randel maps. The latter map depicts the Post house along the waterfront within the line of what is now West 213th Street. The map also depicts a fence line—possibly that which separated the Dyckman and Nagel properties as described above—extending approximately north-south through the project site, with Post identified as the owner of the property on either side. A similar property line appears on later maps (see

**Figure 3).** Slavery was not abolished in New York State until 1827, when Post appears to have been the property owner according to maps. The 1810 and 1820 federal censuses do not indicate that Post was an enslaver in the early 19th century and neither census suggests that enslaved or free people of African descent were associated with his household.

The 1867 Dripps map of Manhattan indicates that the northern half of what is now Block 2229 was owned by A.N. Gunn. By the publication of the 1879 Bromley atlas, the block on which the project site is located had been divided into development lots. No maps published in the 19th century depict any structures on the project site.

## DOCUMENTATION OF THE ON-SITE BURIAL GROUND

Much of the knowledge regarding the cemetery for enslaved persons on the project site was collected by Bolton and his colleagues during an early archaeological investigation in 1903. That year, remains from the cemetery were impacted during the grading of Tenth Avenue, which had long been planned and mapped but had not yet been constructed (*New-York Tribune* 1903). The construction of the road involved the grading of hills and upland areas on adjacent properties to generate the material used to construct the Avenue, resulting in the initial disturbance of the cemetery (American Scenic and Historic Preservation Society [ASHPS] 1905). Contemporary newspaper reports describing the discovery and exhumation of remains from the cemetery differ but confirm that local residents had long assumed that the site had been used for the burial of enslaved Africans whose forced labor was used on neighboring farms, including those of the Dyckman, Vermilye, and Hadley families (*New York Times* 1903). The homestead burial ground utilized by these families was situated on the eastern side of Tenth Avenue. The Dyckman-Nagel family cemetery contained hundreds of burials and was preserved and well documented through the early 20th century (Haacker 1954; Inskeep 2000). While some excavation was overseen by early archaeologists during the road construction work in 1903, the site was further investigated in 1904 by ASHPS, which was affiliated with the American Museum of Natural History (AMNH) (*ibid*). Bolton's photographs of the excavation of the cemetery site in either 1903 or 1904 are in the collection of the Dyckman House Museum. As mapped by Bolton in 1912, Lot 25 is entirely included within the boundaries of the cemeteries, which continued in all directions around the project site into what are now adjacent properties and streetbeds. Known information regarding the two phases of the archaeological site's investigation is summarized in the following sections.

### *CONSTRUCTION DISTURBANCE IN 1903*

The majority of the information about the cemetery site was collected during its initial disturbance in 1903 and documented first in newspapers and later in reports authored by the participating archaeologists who investigated the site. In 1919, William L. Calver described the cemetery as containing approximately 30 grave markers and being partly enclosed by pear trees. Reginald P. Bolton (1924) similarly described the cemetery as being surrounded by trees and indicates that the stones that served as markers were sunken into the ground surface. The number of markers varies widely according to published sources, with some suggesting that up to 50 markers may have been present (ASHPS 1903); however, Bolton's 1912 map indicates that 36 graves were documented.

The removal of the "beautiful knoll" and the discovery of the remains "surprised" the road construction workers, despite the area's rumored history as a burial place (ASHPS 1903: 40). Archaeologists, including Bolton, were summoned to the site following the discovery of the remains. As reported by the *New-York Tribune* shortly after the first exposure of human remains, the work crews ultimately exhumed a number of remains from the cemetery under the supervision of Bolton and Edward H. Hall, an archaeologist with the Museum of Natural History (*New-York Tribune* 1903). In addition to the human remains, it was reported that the excavation recovered coffin fasteners (nails/screws), chain links and an

iron disk (found at a depth of 4 feet), a cannon ball, and at least one stone inscribed with the date of March 31, 1777 (*New-York Tribune* 1903; *New York Times* 1903, ASHPS 1903). The *Evening Telegram* described the remains as “huge skeletons, with rusted iron chains and balls hanging from the bones” and suggested that at least one set of remains were more than 7 feet in height and that several were interred in an upright position (*Evening Telegram* 1903:16). Other reports indicated that the upright burials were located at a depth of 3 feet below what was then the ground surface (*New York Times* 1903). According to the newspaper reports, the excavators initially believed the remains to be of individuals of both European and African descent, based largely on the remnants of hair found within some graves (*New-York Tribune* 1903; ASHPS 1903). The stone bearing the 1777 date further made some suspect that the remains could have been associated with individuals who died during the Revolutionary War (ASHPS 1903).

Despite the sensationalized newspaper reports, Bolton and his fellow archaeologists later appear to have confirmed the identity of the remains as only those of enslaved individuals of African descent. The confirmation appears to have been based on an examination of the skeletal remains by AMNH anthropologist Ales Hdlicka; however, such a forensic identification was not conducted according to modern standards for identifying the geographic origins of human remains. The subsequent investigation also reportedly disproved other aspects of the newspaper reports, and suggested that burials were not observed in upright positions and that no iron balls were found with the exception of a cannonball located several hundred yards away (Wall and Cantwell 2004: 99). The graves were also reported to have been oriented so as to face the west (*ibid*). The team later confirmed that nails and brass pins were found, suggesting the use of burial shrouds and coffins and that a “brass brooch with brass and blue glass beads” was also recovered (Calver 1948:29).

The fate of the remains following their initial disturbance and excavation is unknown. Several sources reported that local children were using the exhumed remains as toys or that local residents took remains back to their homes (*Evening Telegram* 1903; ASHPS 1903). It was also reported that the workmen were directed to gather the remains and rebury them elsewhere (*Evening Telegram* 1903). Another report suggested that “Capt. Flood of the Kingsbridge Police Station had directed that the old bones be decently reburied, but nobody has so far deemed it incumbent on himself to obey, and the bones, such as have not been carted off by relic hunters, lie in a confused mass in an old soap box near the scene of the work” (*New York Times* 1903: 2). The remains, “were treated with what to our eyes today would be shocking callousness” ultimately “[ending] up in the hands of collectors, workers, and people who lived in the neighborhood” (Wall and Cantwell 2004: 99). The reburial of any remains on the project site or on adjacent properties remains unconfirmed and unknown.

#### *AMERICAN SCENIC AND HISTORIC PRESRVATION SOCIETY INVESTIGATION IN 1904*

By the time of ASHPS’s 1904 investigation, “the knoll had been brought down to the level of the adjacent meadow” (ASHPS 1905: 42). Given the extent of the grading, the historical ground surface may have been removed or otherwise disturbed, and the 1904 investigation appears to have focused solely on precontact archaeological features that remained on the project site and the adjacent properties. The precontact features were described as roughly one dozen “pockets or holes in the ground, each about 36 inches in diameter...arranged approximately in a semi-circle...[at the] western base of the knoll” (*ibid*:43). It was in these features that dog burials and other animal bones as referenced above were documented (*ibid*). Bolton’s 1905 map of the area (included as Figure 7 in the 2017 Phase 1A Study) indicates that two additional graves in coffins located within what is now the streetbed of West 212th Street were excavated during the 1904 work.

## REDEVELOPMENT IN THE 20TH CENTURY

Following the construction of Tenth Avenue, the project site remained vacant for several decades. The 1913 Sanborn map depicts no development on the block on which the project site is situated, but suggests that its southern half had been divided into development lots by that time. A 1924 aerial photograph<sup>1</sup> appears to depict excavation on the adjacent property in association with the construction of existing PS 98 and may indicate that the construction-related disturbance extended into the western edge of the project site. Two photos taken in 1929 and showing the western side of Tenth Avenue between West 211th and West 212th Streets appear to depict the project site as undeveloped land lined with advertising billboards.<sup>2</sup> The ground surface of the two parcels as seen in the images appears to be higher than that of Tenth Avenue, which at the time was developed with an elevated rail viaduct. A 1940s tax photo of adjacent Lot 32 appears to depict the project site in a similar manner.<sup>3</sup>

Subsequent maps and atlases, including the 1934 Bromley and 1935 Sanborn maps continue to depict the project site as vacant. The project site was in use as a parking lot by the publication of the 1950 Sanborn map, which depicts a small, wood-frame office or shed in the lot's southeast quadrant. The project site remained in use as a parking lot through the end of the 20th century. Records on file with NYCDOB suggest that a new building permit was issued in 1950 for a 15- by 25-foot, one-story restaurant. At the time, the lot was owned by Samuel Liebman of 204 Sherman Avenue (Office for Metropolitan History n.d.). NYCDOB issued a Certificate of Occupancy for the building in 1951, and it may have been located in a small extension to the previously described wood-frame office/shed. The expanded shed appears on Sanborn maps published between 1968 and 1977, after which time it appears to have been demolished. Aerial photographs taken in 1996<sup>4</sup> continue to depict the project site as a paved parking lot, and the existing on-site buildings are first depicted on Sanborn maps published in 2001.

## E. ASSESSMENT OF LANDSCAPE MODIFICATION

The landscape of Manhattan has changed dramatically since the island was first colonized by Europeans in the 17th century. The topography of the island prior to human occupation more than 12,000 years ago was formed through the advancement and retreat of glaciers, which left behind sandy hills and low-lying swamps (Schubert 1968). Geologist Louis P. Gratacap described the transformation of Manhattan's natural landscape as:

*A manifold mound of drifted material, a surface formation of gravel, stones, sand, and earth, sculptured by streams and interrupted by natural subsidences or dips in the underlying rocks, which the engineering requirements of the city encountered as the population steadily moved northward in its peaceful conquest of this wild and beautiful region (Gratacap 1904: 5)*

The construction of the city's street grid beginning in the early 19th century contributed greatly to the large-scale transformation of Manhattan Island, as hills were cut down and the resulting sediments used to fill in low-lying areas (Koeppel 2015). The 1865 Viele map and the 1879 Bromley atlas indicate that a stream formerly ran to the south of the project site south of what is now West 211th Street. Extensive

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<sup>1</sup> <http://maps.nyc.gov/doitt/nycitymap/>

<sup>2</sup> The photos can be viewed in the collections of the New York City Municipal Archives using the following links: <http://nycma.lunaimaging.com/luna/servlet/s/nv7ao3> and <http://nycma.lunaimaging.com/luna/servlet/s/qva2p4>.

<sup>3</sup> Accessible here: <http://nycma.lunaimaging.com/luna/servlet/s/y4z80x>.

<sup>4</sup> <http://maps.nyc.gov/doitt/nycitymap/>

landscape modifications appear to have occurred across the Inwood area in the early 20th century as a result of urban development.

## RECONSTRUCTION OF 19TH CENTURY TOPOGRAPHY

Information regarding surface topography and elevations was collected from historic and modern maps, most notably the 1873 survey of northern Manhattan and the Bronx that was completed by the New York City Department of Parks’ Topographical Bureau and a topographical map produced by Egbert L. Viele in 1880. Both maps were published before the urban development of the project site and the surrounding area and before the early 20th century archaeological investigation of the cemetery site formerly located on the property. As such, the maps represent the original ground surface of the cemetery before the exhumation of any remains and the subsequent redevelopment of the project site. The following section describes the efforts made to reconstruct the landscape modification that has occurred on the project site between the late 19th century and the present

### *CALCULATION AND CONVERSION OF ELEVATION DATA RELATIVE TO HISTORICAL DATUMS*

A significant problem with the comparison of historical and modern data sets is the lack of the use of an accurate, consistent datum across all maps. A datum is the point from which surface elevations are measured (where the elevation is considered to be 0). Elevations of the same ground surface, recorded at the same time, but taken relative to different datum points, will obviously differ despite the fact that they refer to the same location. Datums have historically been linked to tidal action—either mean sea level (representing the average of high and low tide) or the high water mark. Therefore, understanding the datum from which an elevation was measured is critically important to an analysis of historic elevations and landscape change. However, given historic surveying techniques and inaccuracies that may exist in measuring tides and elevations, especially during the 19th century, as well as sea level rise, discrepancies may be encountered when comparing current and historic elevation data. See **Table 2-1** for a comparison of historic and current datum information.

**Table 2-1**  
**Comparison of Historic Datum Elevations**

	<b>NGVD29</b>	<b>NAVD88</b>	<b>Manhattan Borough Datum</b>
<b>Elevation (in feet)</b>	2.75	1.65	0 (datum)
	1.1	0 (datum)	-1.65
	0 (datum)	-1.1	-2.75
	-2.88	-3.98	-5.63
<b>Notes:</b>			
NGVD29 = National Geodetic Vertical Datum of 1929			
NAVD88 = North American Vertical Data of 1988			

Small differences in elevation between historical maps may therefore vary according to the datum that was used to calculate the elevation as well as the exact point where the elevation was measured, which likely also varied as some cartographers measured the center of intersections and others measured specific street corners. Furthermore, the National Oceanic and Atmospheric Administration (NOAA) has calculated that since 1850, the mean sea level near the Battery at the southern end of Manhattan has risen at a rate of approximately 0.11 inches per year, or almost one foot over the course of a century. Therefore, while the location of sea level should not contribute greatly to differences in elevation as depicted on historical maps, some variation may be the result in the change of sea level itself or in inaccurate ways of measuring sea level and high tide during the historic period. Much of the historical elevation information available for the project site appears to have been recorded relative to the modern Manhattan Borough

Datum (MBD). The MBD is 2.75 feet higher than the National Geodetic Vertical Datum of 1929 (NGVD29), an approximation of mean sea level at Sandy Hook, New Jersey (Rose Redwood 2003: 125).<sup>1</sup> The NGVD29 datum has largely been replaced by the North American Vertical Datum of 1988 (NAVD88), the 0-point of which is approximately 1.1 feet higher than the 0-point of NGVD29 and 1.65 feet higher than the MBD.

### *19TH CENTURY TOPOGRAPHY IN THE VICINITY OF THE PROJECT SITE*

Few maps published in the 19th century provide topographical information for the project site, as many maps that recorded such information for other parts of Manhattan (e.g., the 1811 Bridges, ca. 1820 Randel, and 1865 Viele maps) do not include elevation data for the Inwood neighborhood. Furthermore, historical atlases did not begin to record street intersection elevations for the Inwood area until the streets were constructed in the late 19th and early 20th centuries, and such data appears to refer only to the legal grade rather than what might have actually been the surface elevation. Therefore, to reconstruct the 19th century topography of the project site, an 1873 topographical map prepared by the New York City Department of Parks was georeferenced to align with current landmarks and topography. The map includes detailed topographical information for the project site and the surrounding area and depicts the elevation of the small hill three decades before it was first disturbed for the road grading work that resulted in the discovery of the cemetery. The topographical information on the map matches less specific topographical data included on the 1880 Viele and 1905 and 1912 Bolton maps.

To assess the extent to which landscape modification has occurred, the 1873 topographical data was compared to topographical information compiled by the United States Geographical Service (USGS) as part of a 2014 Lidar study. The comparison of current and modern topographical information confirmed that the project site was extensively graded and the landscape significantly modified between the late 19th century and the present. The 1873 topographical map indicates that the project site was situated near the top/summit of the former hill, the downward slope of which extended to the south through what is now Lot 32. The project site was situated at an elevation of 24 feet above mean high water or the street grades datum for the City of New York. Because the city at that time was limited to Manhattan, it is presumed that the datum is roughly equivalent to the modern MBD, which would indicate that the project site was situated at an elevation of approximately 25.7 feet relative to NAVD88.

The USGS Lidar information (see **Figure 3**) suggests that the elevation of the project site currently slopes down to the east and southeast from a maximum height of 18 feet NAVD88 (16.4 feet MBD) along the project site's western boundary to approximately 14 feet NAVD88 (12.4 feet MBD) at its southeast corner. This would appear to suggest that the elevation of the project site has been lowered by 7.7 to 11.7 feet since the late 19th century. While the newspaper accounts of the discovery of the human remains on the site may not be fully accurate, if in fact some graves were encountered at depths as shallow as 3 feet below what was then the ground surface, the possibility remains that the soil levels in which human remains were present were entirely removed or extensively disturbed.

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<sup>1</sup> Therefore, the same ground surface that is measured at 0 feet relative to the MBD would be measured at 2.75 feet relative to NGVD29.

**A. CONCLUSIONS**

As part of the background research for this Study, various primary and secondary resources were analyzed, including historic maps and atlases, historic photographs and lithographs, newspaper articles, and local histories in order to supplement previous research and further assess the project site's previous disturbance. The information provided by these sources was analyzed to reach the following conclusions.

**ASSESSMENT OF PREVIOUS DISTURBANCE**

The landscape reconstruction completed as part of this Study concluded that the removal of the hill that formerly occupied the project site appears to have lowered the elevation of the ground surface by as much as 7.7 to 11.7 feet. Four phases of disturbance and possible disturbance have been identified: 1) the grading of the hill and subsequent excavation during the construction of Tenth Avenue in 1903; 2) the completion of additional archaeological excavations in 1904; 3) the conversion of the project site into a parking lot by the 1940s; and 4) the construction of the existing on-site buildings and associated subsurface infrastructure, including utility tanks/connections and hydraulic equipment.

**ARCHAEOLOGICAL SENSITIVITY ASSESSMENT**

The extensive subsurface disturbance associated with previous archaeological excavations and development-related disturbance between the early 1900s and the late 20th century appear to have resulted in the extensive disturbance of the project site and the apparent removal of the hill on which the former cemetery for enslaved persons of African descent was located. It is expected that graves would have been placed at depths ranging from 3 to 6 feet below the original ground surface, and as such, the soil levels potentially containing graves could have been removed in their entirety. This appears to be confirmed by historical and modern soil borings, which indicate only the presence of what appear to be glacial sands underlying the disturbed fill layer beneath the lot's asphalt pavement. However, given the possibility that disturbed sediments containing human remains could have been redeposited on the project site, the site remains sensitive for disarticulated human remains that may have originated in the cemetery documented on the project site. While the Phase 1A identified precontact archaeological sensitivity on the project site, the extent to which the site has been disturbed appears to preclude precontact archaeological sensitivity.

**B. RECOMMENDATIONS**

The project site is heavily disturbed but could remain sensitive for disarticulated and disturbed human remains that were originally interred within the hilltop burial ground that was later graded down. As such, additional archaeological analysis is recommended in the event of the project site's future redevelopment. Such analysis could be in the form of archaeological testing before construction or archaeological monitoring during construction. All archaeological analysis would be completed in consultation with LPC and, pursuant to LPC's 2018 guidelines, in consultation with a descendant community that is yet to be identified. Before any additional archaeological work would be completed, a Work Plan (for testing

and/or monitoring) would be prepared in consultation with LPC and the descendant community. The Work Plan would include a protocol that would be followed in the event that human remains are discovered on the project site.

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## Figures



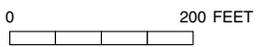
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 Project Site

Approximate coordinates of Project Site:  
73°55'1"W 40°52'3"N



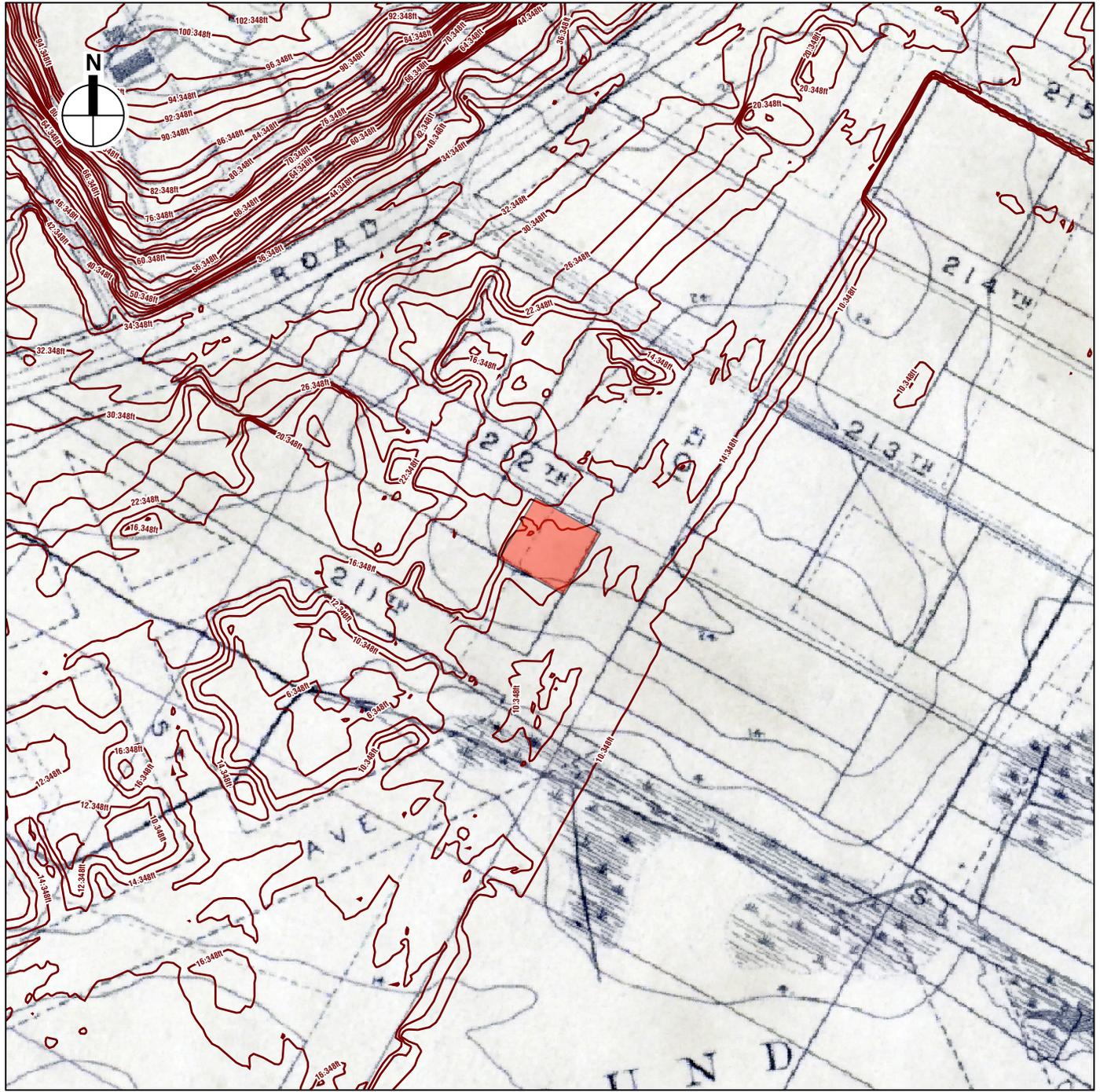
USGS Topographic Map - Central Park Quadrangle



 *Project Site*



Data source: <https://gis.ny.gov/elevation/contours/contours-nyc.html>;  
New York City 2-foot contour line features, created using the USGS NYC 2014 LIDAR Collection.



\* Note: Contour elevations shown in Manhattan Datum

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