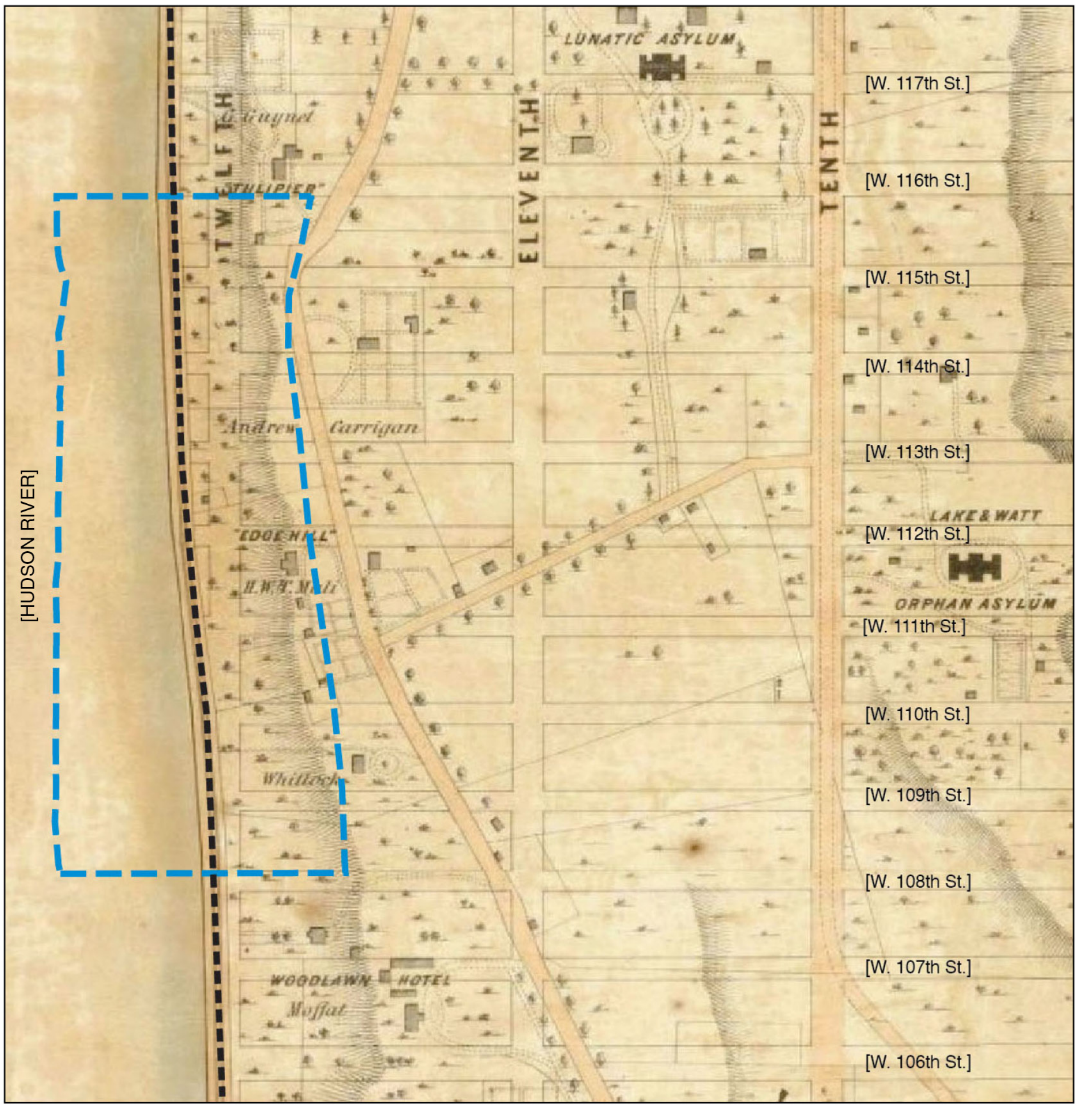
Pre-scope Investigation of Reconstruction of Drainage Systems in Riverside Park Archaeological Assessment

DRAFT



Hudson River RR

Project Area of Potential Effect (APE) in 1851 (Dripps & Jones 1851, detail)

Prepared for the New York City Department of Parks & Recreation
Through Stantec Consulting Services
By Joan H. Geismar, Ph.D., LLC
January 2022

Pre-scope Investigation of Reconstruction of Drainage Systems in Riverside Park
Phase 1A Archaeological Assessment

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EXECUTIVE SUMMARY

This Phase 1A assessment addresses the archaeological component of a pre-scope investigation related to reconstruction of drainage systems in historical Riverside Park located on Manhattan's Upper West Side (Tax Blocks 1187, 1254, and part of 1897). Joan H. Geismar, Ph.D., LLC, as archeological consultant to Stantec Consultants, the project engineers, prepared the study for the New York City Department of Parks & Recreation (NYC Parks). The park from 72nd Street to 129th Street has earned national, state, and city Landmark status. The project area, which comprises the original extent of the park, is from 72nd Street to 125th Street and is within the landmarked portion of the park. The area of potential effect (APE) in this assessment, where new drainage is being considered, is between 108th and116th Streets.

Since the park's inception in the 1870s, Frederick Law Olmsted's Riverside Drive has defined its eastern limit and, until the 1930s, its western limit was defined by railroad tracks. Initially, they were the tracks of John Jervis's mid-19th-century Hudson River Railroad that ran along the low-lying Hudson River shore. Before landfill shifted the shore west, this was in the vicinity of 12th Avenue, a paper street in the project area. In the 1930s, when the park underwent major change, the tracks had long-been part of the New York Central Railroad.

In 1934, Robert Moses, then the new Parks Commissioner, initiated major restructuring and redesign of the park, an undertaking that entailed extensive ground movement and disturbance. The tracks were enclosed in a "train tunnel" (now the Amtrak tunnel) and landfill extended the parkland west of both the tunnel and the original Hudson River shore. Construction of the Henry Hudson Parkway on landfill west of the new parkland was completed in 1937, and now the Hudson River Greenway runs between the parkway and the river.

In an archaeological perspective, research identified two potential concerns in the APE. One was the early-19th-century, and perhaps earlier, homes of wealthy New Yorkers located in the eastern part of the project APE (the "core" APE). However, creating the park as we know it caused such great ground disturbance that evidence of these demolished structures is unlikely. Also, the current Concept Plan for new drainage in the APE (Stantec 1/10/22) compared with the park's 1872 survey, which locates the houses prior to demolition, does not appear to impact known former house sites.

The other concern is related to shoreline improvements Jervis introduced to run his railroad throughout the project area, and, in this assessment, more specifically in the APE. It is possible that evidence of these improvements may be found in the immediate vicinity of the Amtrak tunnel (the project soil borings do not investigate this area). Therefore, if excavation extends beyond known disturbance or 20th-century fill in the vicinity of the Amtrak tunnel, archaeological oversight is recommended. Also recommended is a review of final plans in the APE as is an archaeological assessment of new drainage planned elsewhere in the project area. As a precautionary measure, a protocol to address unanticipated discoveries throughout the project area is recommended and should be in place during construction.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

PHOTOS

Report Research, Writing, and Production: Joan H. Geismar, Ph.D.

Graphics: Amy Geller

INTRODUCTION

This Phase 1A assessment addresses the archaeological component of a pre-scope investigation related to reconstruction of drainage systems in Riverside Park. Joan H. Geismar, Ph.D., LLC, as archeological consultant to Stantec Consultants, the project engineers, prepared the study for the New York City Department of Parks & Recreation (NYC Parks).

Located on Manhattan's Upper West Side (Figure 1), the project area (Tax Blocks 1187, 1254, and part of 1897) extends from West 72nd Street to West 125th Street between Riverside Drive and the Hudson River (Figure 2). In the early 1980s, the park from 72nd to 129th Streets was designated a New York City Scenic Landmark and listed in the State and National Registers of Historic Places (LPC 1980; Park Master Plan 2016:65).

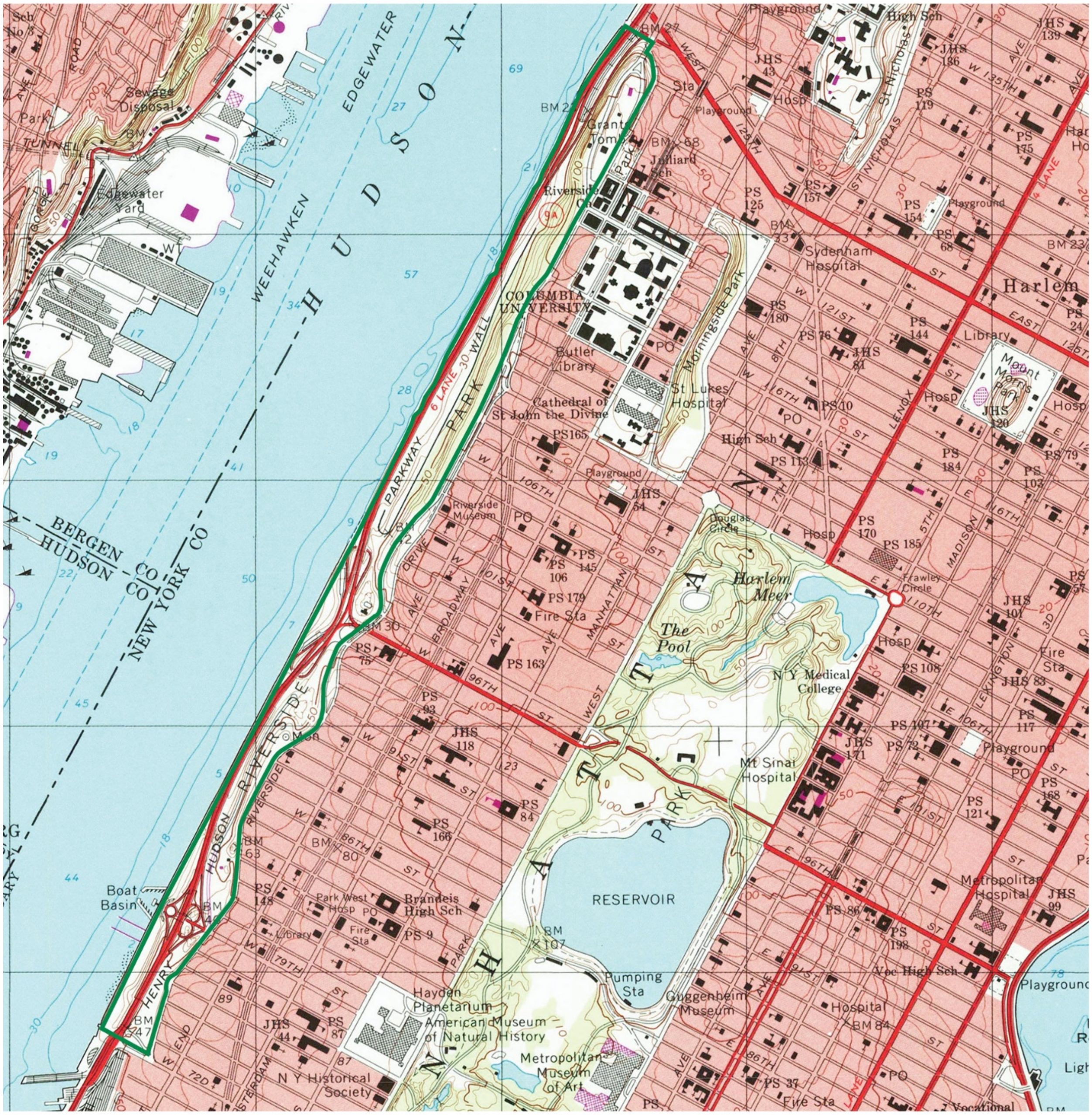
At the park's inception in the 1870s, the western boundary was the exposed tracks of John Jervis's historic mid-19th-century Hudson River Railroad (also referred to here as the HRRR) was the western boundary. The tracks ran along the Hudson River shore in the project area (see Photo 1) at or just west of where 12th Avenue was mapped but not run. In the 1930s, the tracks were enclosed in a "train tunnel" (the Amtrak tunnel) that bisects the park from 72nd Street to 124th Street, and landfill extended the park west, well beyond the tracks and the Hudson's original shoreline.

Photo 1. The view is from an upper path looking across the Hudson beyond the exposed railroad tracks (arrow). The photo is undated, but warships on the river suggest a WW1-era timeframe (Photo: courtesy of Nicholas Catalano [Stantec]).

Archaeological sensitivity is a concern in the area of direct or indirect project impacts, identified as the area of potential effect (APE). Although the entire project area is addressed, the main focus of research is the APE, from 108th Street to 116th Street, between the retaining wall on Riverside Drive and the Hudson River, where new drainage is being considered. Here and throughout the project area, it includes both original parkland and parkland created on 1930s landfill. Within the APE, the original parkland is considered the "core" area.

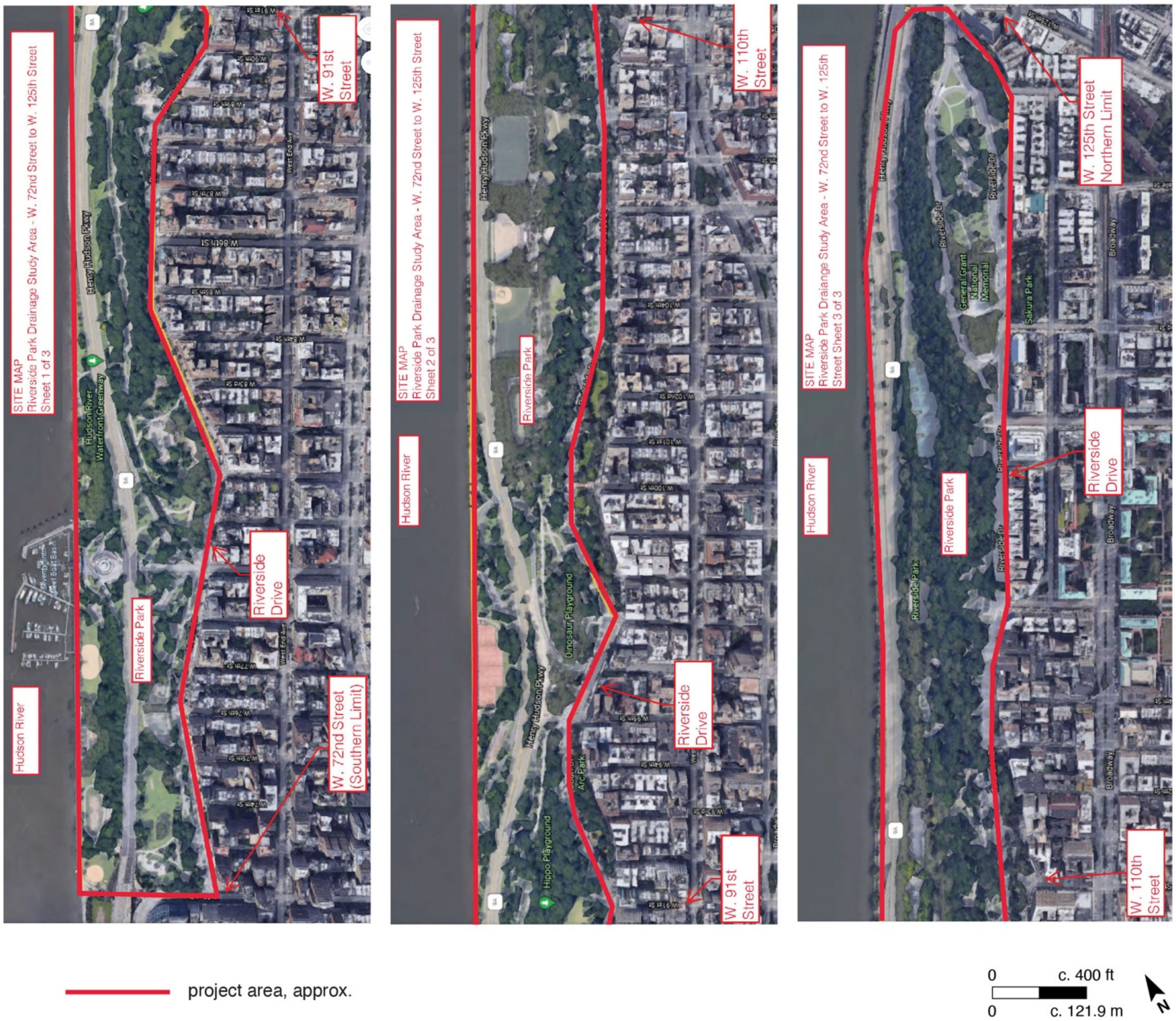
The method and findings of the research are presented in the following sections.

RIVERSIDE PARK DRAINAGE Project Location (USGS Central Park Quadrangle 1995, detail) **1**



project area, approx.

0 1000 ft
0 304.8 m
N


SITE MAP
Riverside Park Drainage Study Area - W. 72nd Street to W. 125th Street
Sheet 1 of 3
W. 91st Street
Riverside Drive
W. 72nd Street (Southern Limit)
Riverside Park
Hudson River
SITE MAP
Riverside Park Drainage Study Area - W. 72nd Street to W. 125th Street
Sheet 2 of 3
W. 110th Street
Riverside Park
Riverside Drive
W. 91st Street
Hudson River
SITE MAP
Riverside Park Draiange Study Area - W. 72nd Street to W. 125th Street Sheet 3 of 3
W. 125th Street Northern Limit
Riverside Drive
Riverside Park
W. 110th Street
Hudson River
project area, approx.
0
c. 400 ft
0
c. 121.9 m
N

METHOD

Many resources were researched to address potential archaeological sensitivity in the project area in general, and particularly in the APE between 108th and 116th Streets, where, as noted, new drainage currently is under consideration. This included historical maps, archaeological reports, and the records and archives of several city agencies, among them the Municipal Archives, the Topographical Bureau of the Manhattan Borough President's Office, and NYC Parks. Research was conducted both in print and on-line, with the New York Public Library's Digital Collections and NYC Park's comprehensive 2016 master plan among the invaluable on-line resources accessed.

It should be noted that the assessment occurred during the Covid 19 Pandemic, a circumstance that curtailed in-person research as well as a site visit, so I am indebted to Hector Rivera of the Topographical Bureau of the Manhattan Borough President's Office, Ken Cobb of the New York City Department of Records, and Coleen Alderson of NY City Parks for information they made available on-line. I also thank Nicholas Catalano, a Stantec Principal and the project manager, for sharing project documents, such as geotechnical reports with information about subsurface conditions, an important component of an archaeological assessment (see SOIL BORINGS and Appendix A for soil boring logs and locations).

THE PROJECT AREA

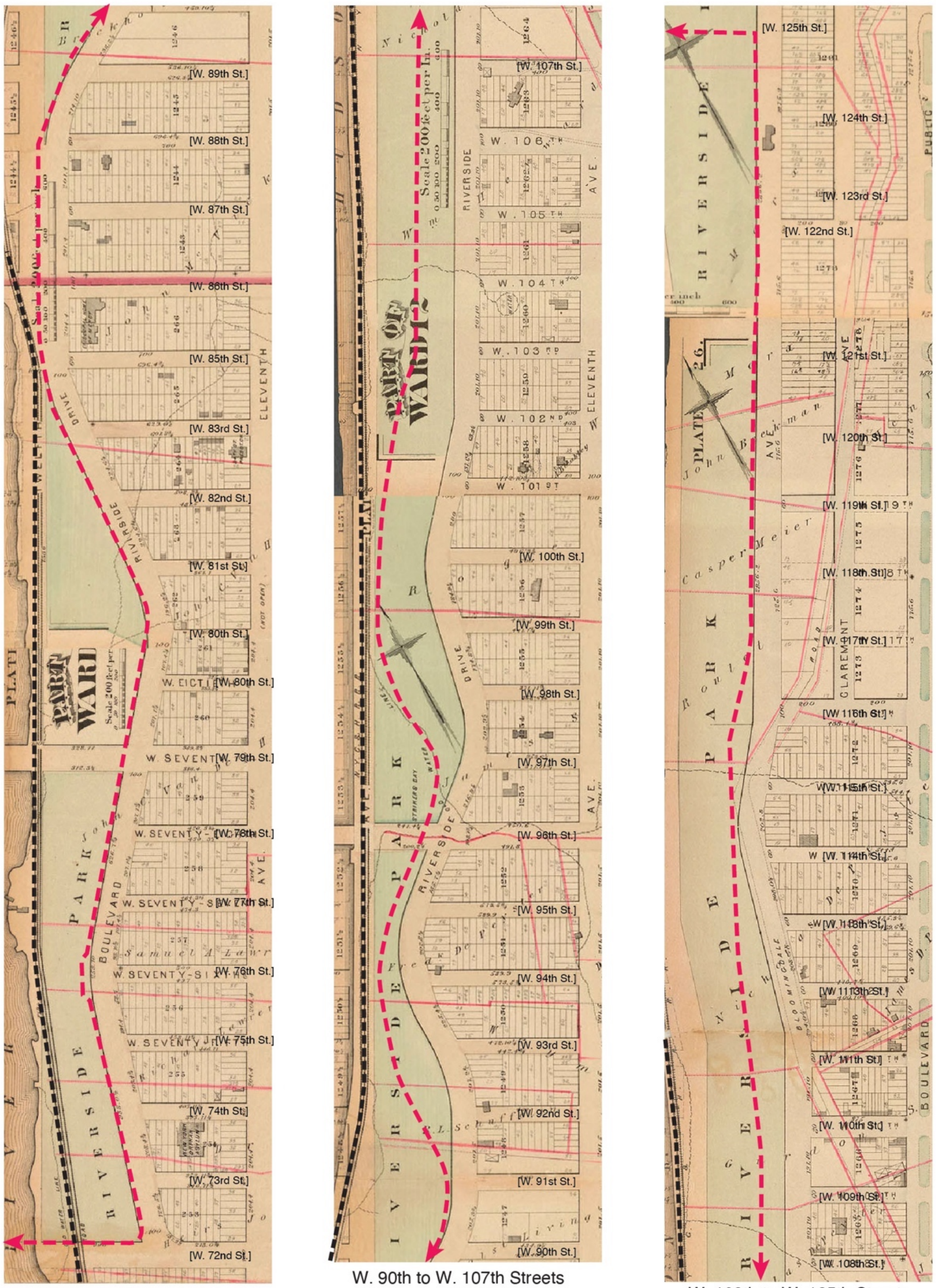
The project area, which extends from West 72nd Street to West 125th Street, comprises about 2.6 miles (c. 4.2 km) that border the river and includes the park's initial north-south extent (Bromley 1879:Figure 3) and 1930s landfill. The park's retaining wall on Riverside Drive, an original and enduring park feature, defines the eastern limit of the project area. West of parkland created on landfill is the Henry Hudson Parkway, also a 1930s landfill feature. Both the parkway and the Hudson River Greenway, located between the parkway and the river, are under the jurisdiction of NYC Parks.

Riverside Park developed in response to public needs, park esthetics, and an adjacent railroad that, with the introduction of landfill, was within the park. Development included expansion of the two-track HRRR (Stokes Vol. 5 1926: 1806), and, in 1867, absorption into Cornelius Vanderbilt's New York Central Railroad to become the New York Central & Hudson River Railroad (EB 2019). As mentioned, in the 1930s, the tracks were enclosed in a "train tunnel" (Photo 2; see also Photo 4). This, as well as landfill and park alterations, was part of the West Side Improvement Project, long on the table but only intermittently imple-mented until 1934, when Robert Moses became Park Commissioner. The landfill added 132 acres (53.4 hectares) to the park's original footprint (Parks 1973; Figure 4).[1]

Photo 2. The "train tunnel" under construction in an undated photo. The view is south (Photo courtesy of N. Catalano).

[1] The park's more recent northern and southern expansion is beyond the current project limits.

RIVERSIDE PARK DRAINAGE Project Area in 1879 (Bromley 1879:Plates 17, 25, 26, 29, detail) **3**



W. 72nd to W. 89th Streets

W. 90th to W. 107th Streets

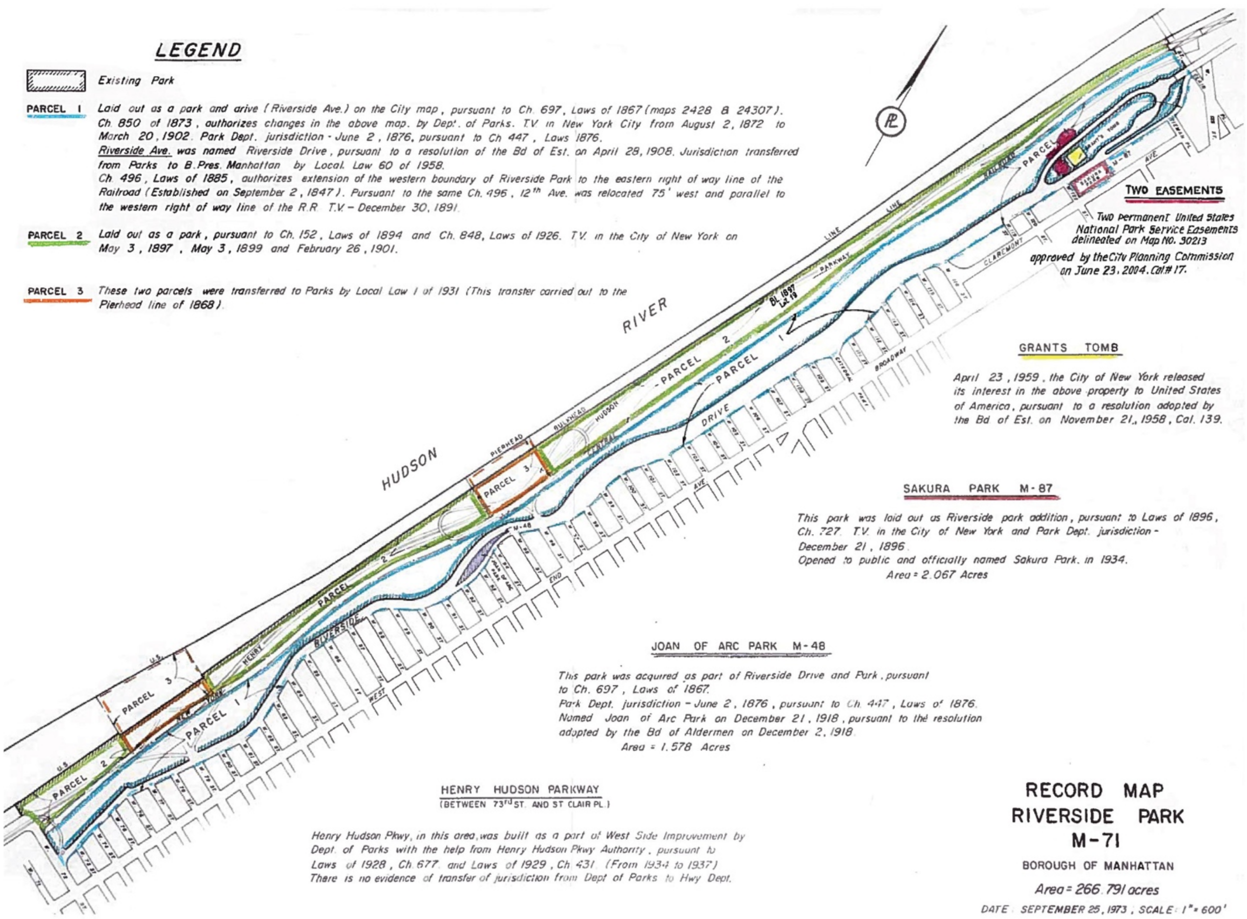
W. 108th to W. 125th Streets

project area (re Bromely 1897), part of, approx.

railroad

0 600 ft
0 182.9 m

N


LEGEND
Existing Park
PARCEL 1
Laid out as a park and drive (Riverside Ave.) on the City map, pursuant to Ch. 697, Laws of 1867 (maps 2428 & 24307).
Ch. 850 of 1873, authorizes changes in the above map, by Dept. of Parks. T.V. in New York City from August 2, 1872 to March 20, 1902. Park Dept. jurisdiction - June 2, 1876, pursuant to Ch 447, Laws 1876.
Riverside Ave. was named Riverside Drive, pursuant to a resolution of the Bd of Est. on April 28, 1908. Jurisdiction transferred from Parks to B.Pres. Manhattan by Local Law 60 of 1958.
Ch 496, Laws of 1885, authorizes extension of the western boundary of Riverside Park to the eastern right of way line of the Railroad (Established on September 2, 1847). Pursuant to the same Ch. 496, 12th Ave. was relocated 75' west and parallel to the western right of way line of the R.R. T.V. - December 30, 1891.
PARCEL 2
Laid out as a park, pursuant to Ch. 152, Laws of 1894 and Ch. 848, Laws of 1926. T.V. in the City of New York on May 3, 1897, May 3, 1899 and February 26, 1901.
PARCEL 3
These two parcels were transferred to Parks by Local Law 1 of 1931 (This transfer carried out to the Pierhead line of 1868).
HUDSON
RIVER
PARCEL 1
PARCEL 2
PARCEL 3
RIVERSIDE
DRIVE
TWO EASEMENTS
Two permanent United States National Park Service Easements delineated on Map No. 30213 approved by the City Planning Commission on June 23, 2004. Cal# 17.
GRANTS TOMB
April 23, 1959, the City of New York released its interest in the above property to United States of America, pursuant to a resolution adopted by the Bd of Est. on November 21, 1958, Cal. 139.
SAKURA PARK M-87
This park was laid out as Riverside park addition, pursuant to Laws of 1896, Ch. 727. T.V. in the City of New York and Park Dept. jurisdiction - December 21, 1896.
Opened to public and officially named Sakura Park, in 1934.
Area = 2.067 Acres
JOAN OF ARC PARK M-48
This park was acquired as part of Riverside Drive and Park, pursuant to Ch. 697, Laws of 1867.
Park Dept. jurisdiction - June 2, 1876, pursuant to Ch. 447, Laws of 1876.
Named Joan of Arc Park on December 21, 1918, pursuant to the resolution adopted by the Bd of Aldermen on December 2, 1918.
Area = 1.578 Acres
HENRY HUDSON PARKWAY
(BETWEEN 73rd ST. AND ST CLAIR PL.)
Henry Hudson Pkwy, in this area, was built as a part of West Side Improvement by Dept. of Parks with the help from Henry Hudson Pkwy Authority, pursuant to Laws of 1928, Ch. 677 and Laws of 1929, Ch. 431 (From 1934 to 1937).
There is no evidence of transfer of jurisdiction from Dept of Parks to Hwy Dept.
RECORD MAP
RIVERSIDE PARK
M-71
BOROUGH OF MANHATTAN
Area = 266.791 acres
DATE SEPTEMBER 25, 1973, SCALE 1" = 600'

The park's development during and since the 1930s involved extensive land movement and landscaping, and the introduction of recreational facilities such as tennis and handball courts and a skate park (the Riverside Skate Park is within the current APE). This is in addition to other recreational, public use, and commemorative features. As mentioned, it also included the Henry Hudson Parkway and, more recently, the Hudson River Greenway, an evolving shoreline feature situated between the parkway and the river.

EARLY PARK HISTORY IN AN ARCHAEOLOGICAL PERSPECTIVE

While there are many who fostered Riverside Park's development, several stand out. Among them are William R. Martin, who in 1865 promoted the idea of creating a park on the "riverside precipice" along the Hudson River (LPC 1980:8); Frederick Law Olmsted, the landscape architect most notably associated with Central Park, who created Riverside Drive (initially Riverside Avenue) and, in the early 1870s, was the first to propose plans for the park; Andrew Haswell Green, a 19th-century Central Park Commissioner and a planner known as "The Father of Greater New York" for his role in the city's1898 Consolidation (Miscione 2001); Robert Moses, the urban planner who became the Parks Commissioner in 1934 and forever changed the park, and, in 1937, Gilmore D. Clarke, Michael Rapuano (of Clarke & Rapuano) with Clinton Lloyd designed the modern park and landscape (Park Master Plan 2016:67).

Integral to the park's earliest development, albeit unwittingly, was John Bloomfield Jervis, the mid-19th century engineer who, between 1836 and 1842, created the Croton Water Supply System that brought municipal water to Manhattan and also constructed reservoirs for its storage and distribution. In 1846, Jervis designed and, in the early 1850s, engineered the aforementioned Hudson River Railroad that ran along the original Hudson River shore in the project area (Jervis Papers 1999). It's more than likely this engineering feat was one of many factors in the transformation of a bucolic riverside haven for the wealthy into a city park.

Decades prior to the railroad's introduction, wealthy New Yorkers acquired property on high ground above the Hudson River, with some, but not all, erecting country houses. John Randel's early-19th-century survey of Manhattan identifies land owners and, in some instances, their residences (Randel 1819-1820:Nos.52/56; Figure 5). Among those named within or near the APE are John Jacob Astor, one of 19th-century New York City's wealthiest residents,[2] and Nicholas de Peyster, a large landholder in and around the project area (see Figure 5). Later maps, such as Dripps & Harrison (1867; Figure 6), continue to document structures on the high ground above the Hudson in the project area (and particularly in the APE), but by 1865, development of a different sort was underway to the east.[3]

In 1865, under the auspices of a newly formed Sanitary Commission, an innovative sanitary report divided the city into twenty-nine sanitary districts with each one assessed by a physician (*The Citizen's Sanitary Report* 1865). The inspector of the 28th Sanitary District,

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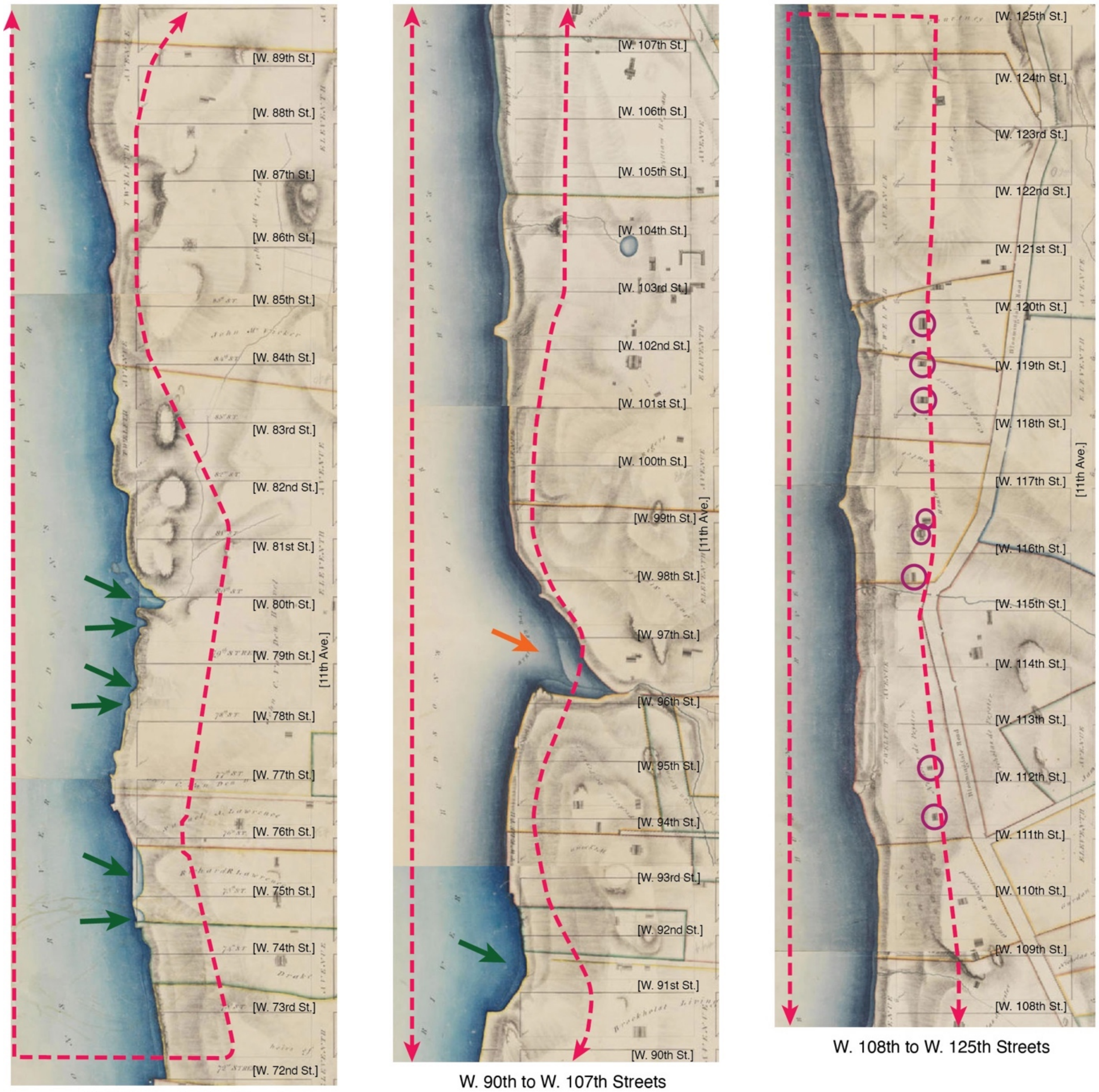
[2] Although Astor owned property near the APE, his summer home was on the East River at Hellgate, not on the Hudson (MCNY 2015).

[3] The Claremont Inn, erected as a residence in the late 18th Century and later a hotel and then a restaurant, was a popular and enduring park feature demolished in 1951 (Miller 2017; Cohen 2015). Although apparently located above 125th Street, and therefore beyond the project area, conflicting information suggests a review of its history in an archaeological perspective is warranted if new drainage is considered between 122nd and 127th Streets..

RIVERSIDE PARK DRAINAGE Project Area in 1819-1820 (Randel 1819-1820:Plates 36, 40, 44, 48, 56, 60, detail) **5**



W. 72nd to W. 89th Streets

W. 90th to W. 107th Streets

W. 108th to W. 125th Streets

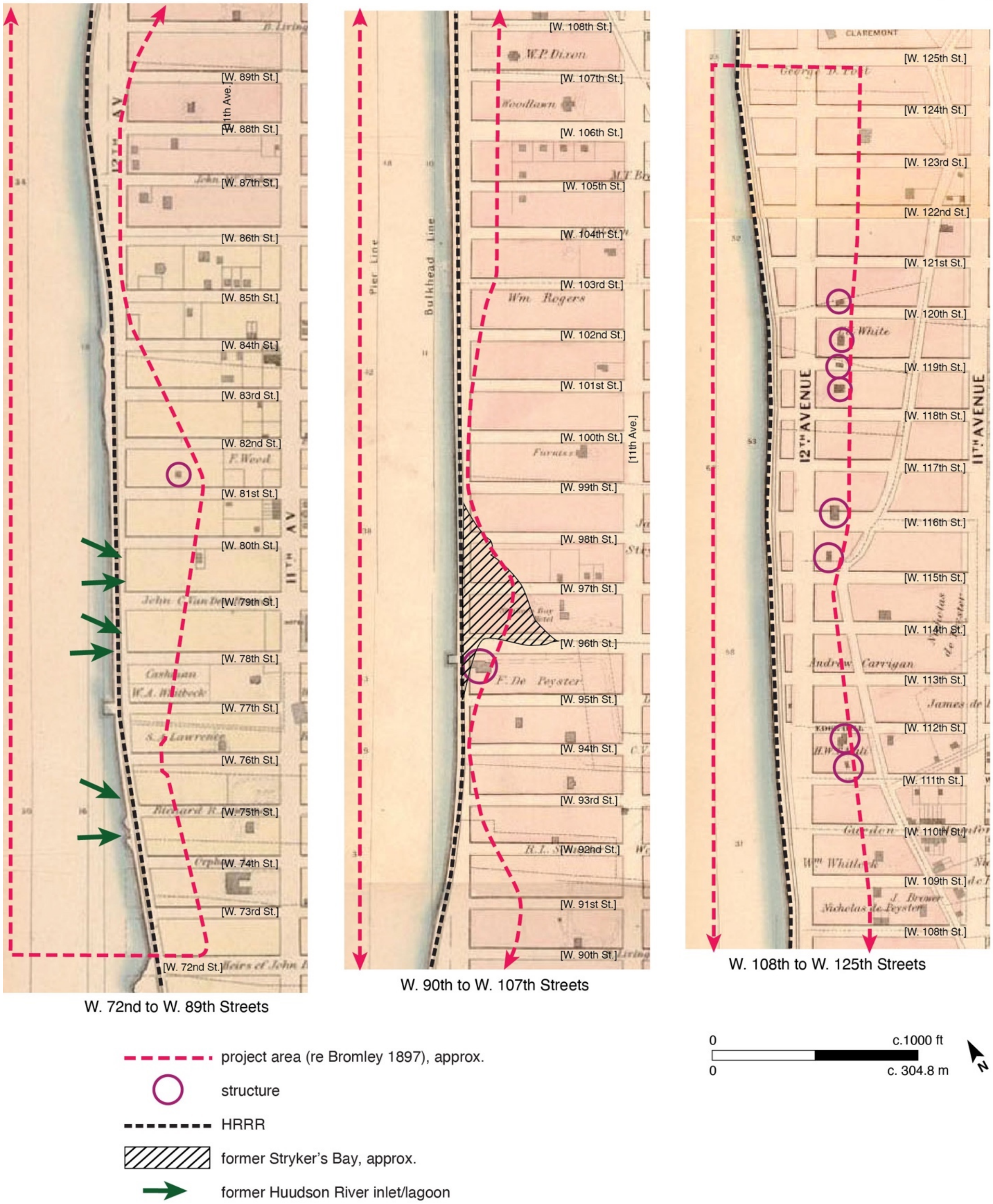
project area (re Bromely 1897), approx.

structure in APE

Stryker's Bay

Hudson River inlet/lagoon

RIVERSIDE PARK DRAINAGE Project Area in 1867 (Dripps & Harrison 1867:Plates 12, 14, 16, detail) **6**



which included land that would become Riverside Park, was Dr. L. A. Rodenstein. His report to the Sanitary Commission describes three-story and larger tenant houses and commercial properties in the developing district, but he also notes, "where the district still preserves the air and appearance of country, the handsome residences...along the banks of the Hudson …are the stately mansions of the rich" (*Citizens Sanitary Report* 1865:340).

The following year, a new law gave the Commissioners of Central Park jurisdiction for five years over the streets and land from the north side of 59th Street to the south side of 155th Street between the west side of 8th Avenue and the Hudson River (Commissioners 1867:31-32). With this, they initiated land acquisition through condemnation to widen streets and create squares and parks, one of them Riverside Park. A driving force among the commissioners was the aforementioned Andrew Haswell Green, then the Central Park Commission's comptroller.

In the 1870s, articles in the *New York Times* report on the problems and progress of introducing the park. There was the effect on real estate (NYT 1872) and the objections to compensation for land taken for street openings and widenings (NYT 1871). Property owners, and often their lawyers, are mentioned, as is the Hudson River Railroad (NYT 1871), but no reference was found to land on the high ground above the river, or to those who owned it.[4]

How, and from whom, land for the park was acquired, and exactly when structures were demolished, has not been determined, but plans for the park incrementally moved forward. Olmsted's undulating drive, originally Riverside Avenue renamed Riverside Drive in 1904 (Parks 1973), defined the park's eastern boundary (NYT 1875) then as it does now, but with subsequent refinements (see Bromley 1897; Figure 7 and compare with Figure 3).[5]

THE RAILROAD AND THE PARK

The John Bloomfield Jervis Library in Rome, New York, is the repository of the Jervis papers and among them are his work diaries. An entry from 1846, that is, prior to construction of the HRRR, records his assessment that the river's shore was "generally favorable for an embankment where it is necessary" (Jervis 1846:3 in Geismar 1987), although he later acknowledged problems, such as the rugged shoreline and the difficulty of running and maintaining the line through the river's numerous bays (Geismar 1987:36). Surely among his many challenges in the project area was crossing Stryker's Bay shown between 96th and 98th Streets on the 1819-1820 Randal survey (see Figure 5) and the 1865 Viele map that depicts the reconstructed Manhattan shoreline (Viele 1865; Figure 8).

Jervis also faced a challenge south of the park where the railroad crossed a Hudson River lagoon. His solution was revealed at Manhattan West, a private development site at 63rd Street on the west side of West End Avenue. In 1994, at about 20 ft. (6.1 m) below the ground surface (bgs), archaeological Phase 1b testing exposed two large earthen embankments separated by a c. 21-ft. (6.4-m) wide gap, apparently intended to manage the river's tides. Each embankment was

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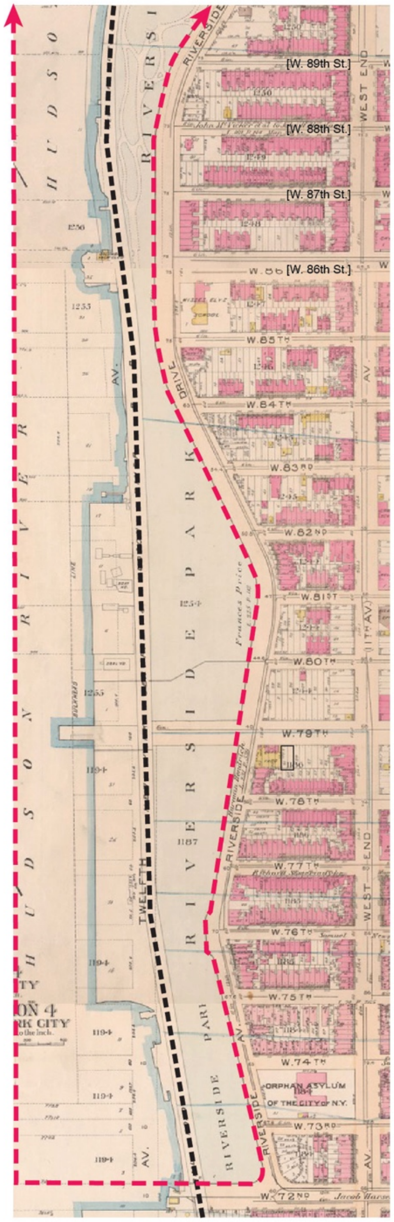
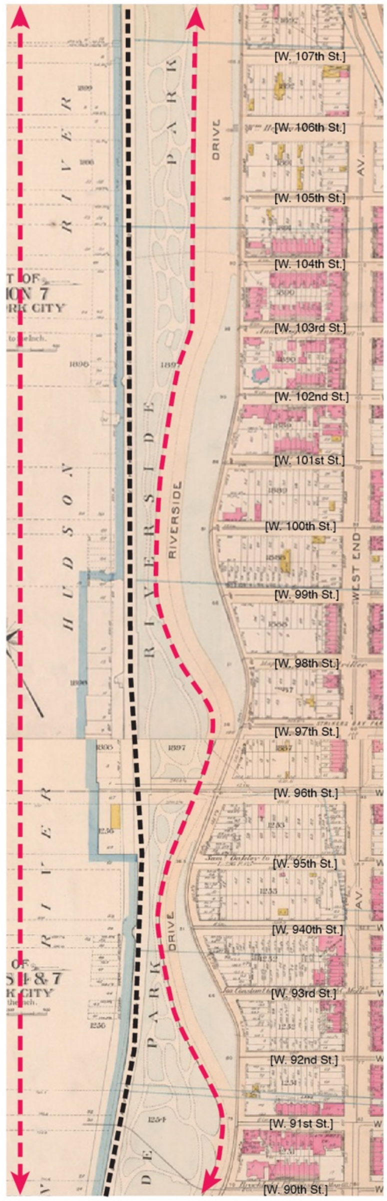
[4] A July 2, 1871 article names the Hudson River Railroad but nothing specific is mentioned (NYT 1871).
[5] As indicated on the report graphics, the configuration of the APE in this report is based on Bromley 1897 (Figure 7) and is approximate.

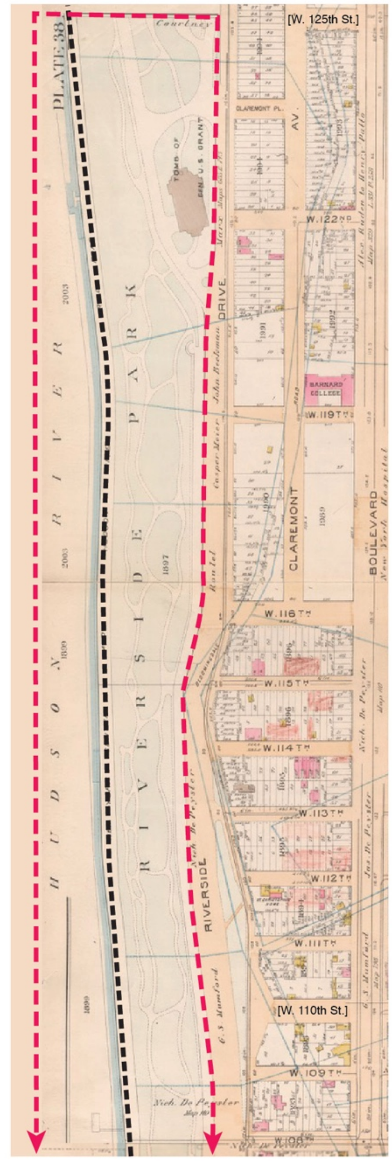
RIVERSIDE PARK DRAINAGE Project Area in 1897 (Bromley 1897:Plates 25, 26, 36, 37, 38, detail)



W. 72nd to W. 89th Streets



W. 90th to W. 107th Streets



W. 108th to W. 125th Streets

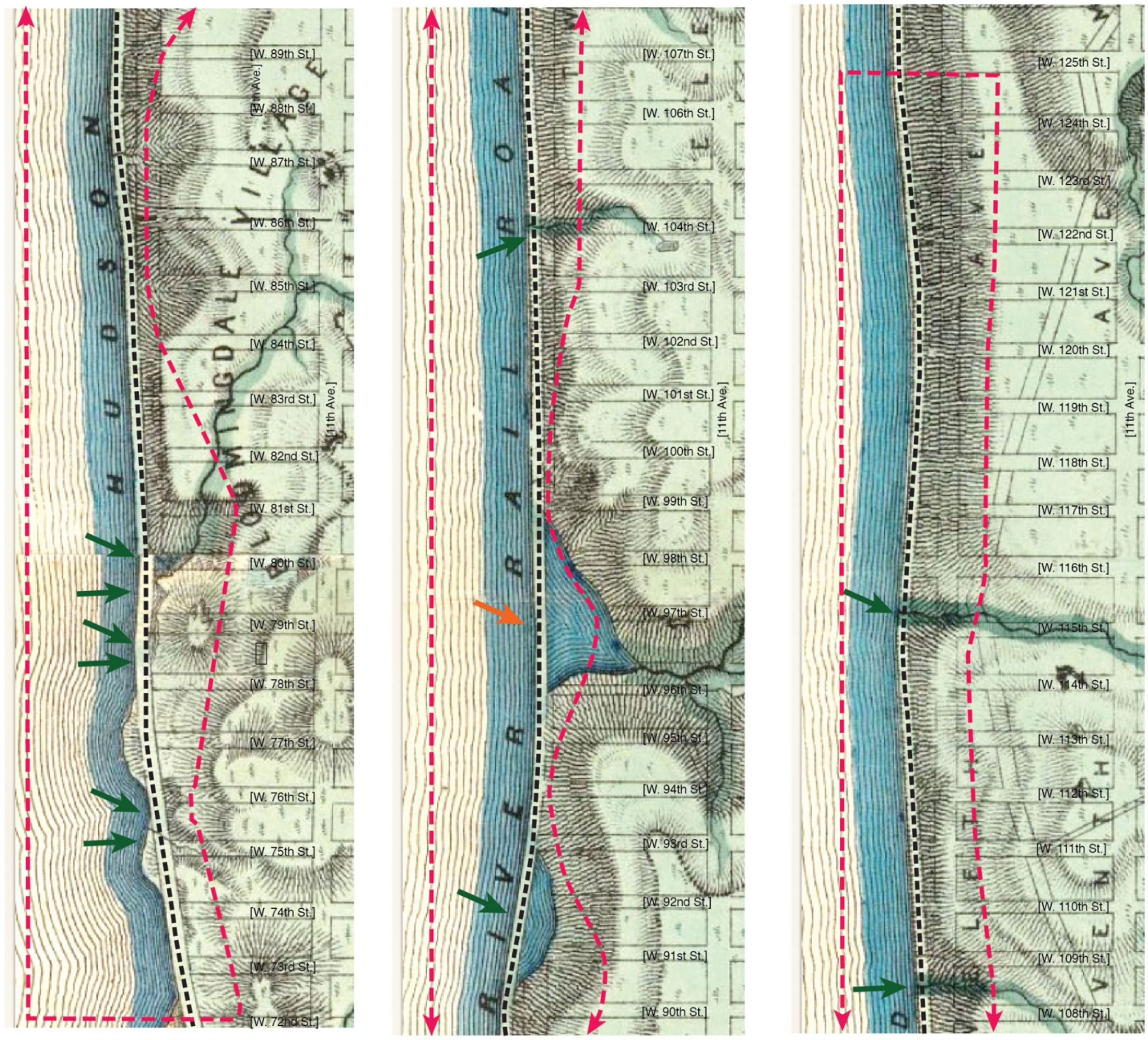
project area (re Bromley 1897), approx.

railroad

0 c. 600 ft

0 c.182.9 m

N



W. 72nd to W. 89th Streets | W. 90th to W. 107th Streets | W. 108th to W. 125th Streets

0 c.1000 ft
0 c. 304.8 m
N

project area (re Bromley 1897), approx.
HRRR
Stryker's Bay
Huudson River inlet/lagoon/stream

defined on three sides by 3-ft. (0.9- m) wide mortared stone walls[6] and was c. 100+ ft. (c. 30.5 m) long (north to south) and 50 ft. (15.2 m) wide, a width Jervis considered safe for a two-track road (Geismar 1995:4; see Figure 9 this report for the cover of the 1995 field report with an image of the site during 1994 field testing). The embankment fill proved to be remarkably clean, apparently an example of Jervis's intended use of excavated earth and rock as fill (Geismar 1995:38, 1987:36).

As previously noted, after 1867, Cornelius Vanderbilt's New York Central Railroad absorbed the HRRR. When the park was introduced, the exposed tracks and trains along the western limit were more than likely considered a potential hazard,[7] and the noise and belching steam from the locomotives surely adversely affected the park setting.

The 1916 annual report of the *American Scenic and Historic Preservation Society* mentions several proposals to alleviate the problem of a train adjacent to a park. Among them was one that enclosed the tracks in an above-ground structure (ASHPS 1916:61-63), the strategy that Robert Moses, the new Parks Commissioner, initiated in 1934 (Park Master Plan 2016:88). In a 1931 photo (Photo 3), grading is underway in preparation for the tracks "to be shifted east" during construction. To the left, west of the tracks, "marginal" land is being filled (Sperr 1931; see also Photo 4).

Photo 3. Graded strip (arrow) east of the tracks at 75th Street in 1931. The view is north (Sperr 1931)

RIVERSIDE PARK AFTER 1937

In 1937, Gilmore Clarke and Michael Rapuano with Clinton Lloyd created the park's new design and landscape that honored at least two aspects of Olmsted's original plan: his "sinuous Riverside Drive that curved around areas of topographical interest" remained, as did a "focus on drawing the gaze to the Hudson River" (Park Master Plan 2016:66). The new train tunnel was integrated into the landscape and park features were added throughout the extended parkland. In 1937, construction of the Henry Hudson Parkway was completed along the western edge of the extended park. Since 1970, the Riverside Park Conservancy has worked with the city and NYC Parks to upgrade and maintain what is one of the city's most beautiful parks.

SOIL BORINGS IN THE APE

Two geotechnical reports, one from 2015 (McLaren 2015) the other from 2021 (MATRIX 2021), offer information about subsurface conditions in the APE (see Appendix A for soil boring locations and logs). The five borings from 2015 (B-1, B-2, B-4, B-5, B6) were all within the footprint of the Riverside Skate Park adjacent to the Henry Hudson Parkway ranged from

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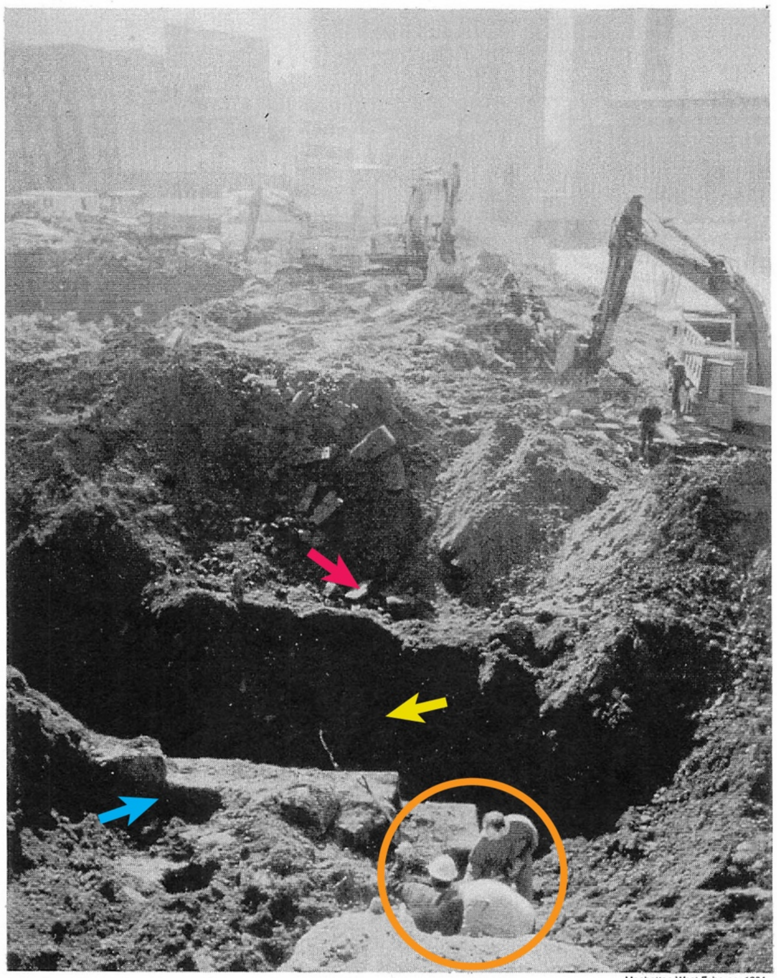
[6] Plans generally called for embankments 3.0 ft. (0.9 m) wide at the top and 7.0 ft. (2.1 m) at the base (Jervis 1850:5).
[7] As described in the Common Council's 1847 permit for the HRRR, the tracks left the shore at about 68th Street where the trains ran at grade to 11th Avenue at or near 60th Street, then on 11th Avenue to 32nd Street where it curved to 10th Avenue and 30th Street and ran down 10th Avenue to about Canal Street (Stokes Vol. 5 1926:1803). The at-grade route resulted in inevitable mishaps and 10th Avenue became known as "Death Avenue" (Bureau of Municipal Research 1910:30).

Manhattan West Field Testing: The Hudson River Railroad Platforms

CEQR No. 86-268M



Manhattan West February 1994

Prepared for
The Brodsky Organization
Prepared by
Joan H. Geismar, Ph.D.
February 1995

N wall of S embankment

S wall of N embankment

gap between N and S embankments

archaeologists exposing boulders of the W wall of the N embankment

View is SW across development site
Photo: J. Geismar 2/18/1994

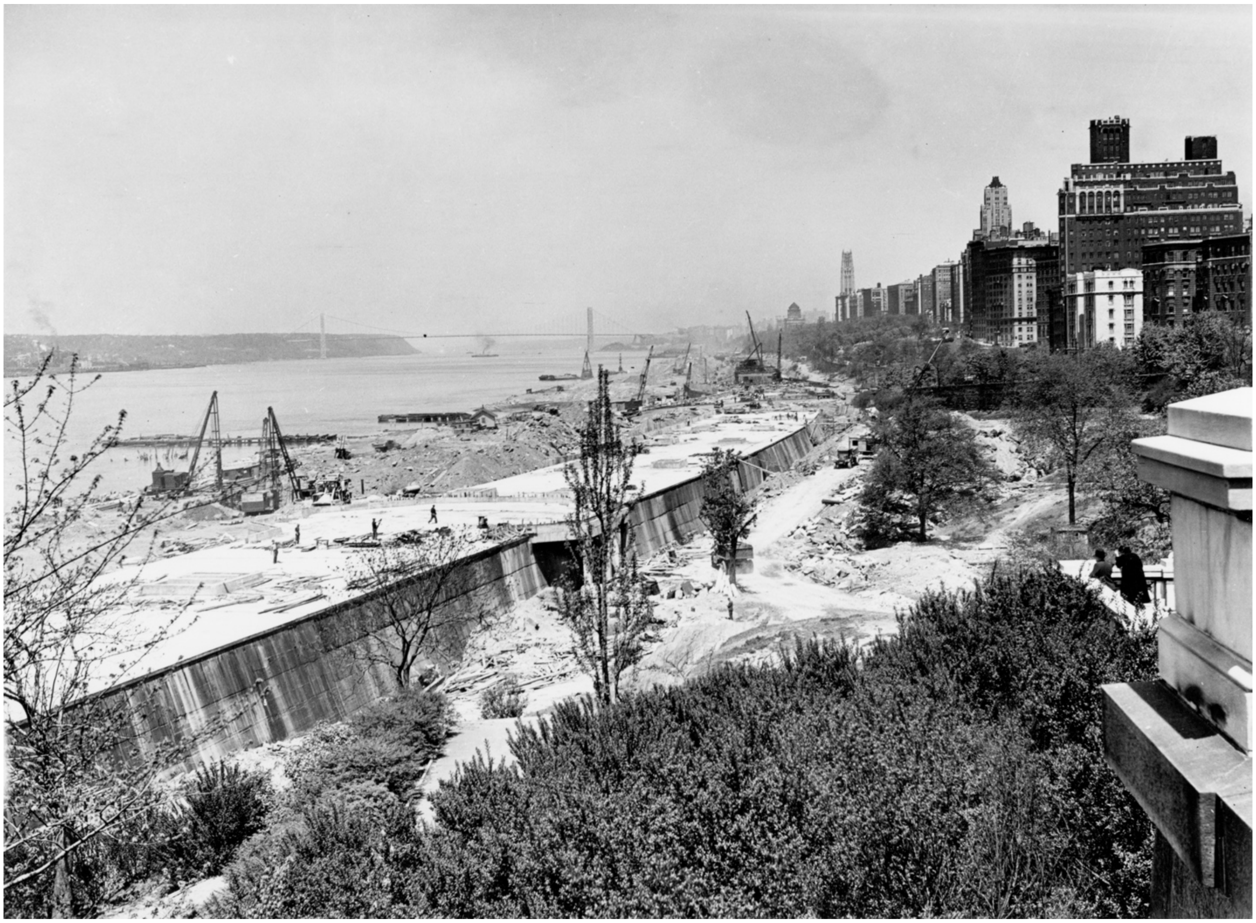


Photo 4. The "train tunnel," or cover, nearing completion c. 1937 (?) with landfill activities underway to the west. The view is north with the George Washington Bridge in the far middle background. (Photo courtesy of M. Bracken (Parks NYC) and N. Catalano (Stantec).

11.0 to 15.0 ft (3.4 to 4.6 m) below the ground surface (bgs). Not surprisingly, fill was documented throughout each boring.

In 2021, eleven borings were located in or immediately adjacent to the APE in three "levels." In the uppermost level, B-01 was located at street level on an asphalt sidewalk east of the park's retaining wall, while all other borings were west of the wall and, therefore, far below street level. B-01 comprised c. 10 ft. (3.1 m) of dry and then moist fill underlain by 0.5 ft. (0.15 m) of decomposed bedrock. This was followed by brown sand with some silt, traces of fine gravel and mica schist moist to the end of the bore hole 22.0 ft. (6.7 m) bgs. Of the seven borings (B-04 to B-10) in the middle level, a grassy area east of the Amtrak tunnel, only in B-04 and B-08 was there fill (13.0 ft. [3.9 m] in B-04 and 2.0 ft. [0.6 m] in B-08). The soil matrix in all seven borings seems comparable but with traces of brick and/or concrete in the two with identified fill. In the third level, a grassy area in the vicinity of the Henry Hudson Parkway, two of three borings, B-11 and B-12, were mostly if not entirely fill: 13.5 ft. (4.1 m) in B-11 and 10.0 ft. (3.1 m) in B-12. In B-13, the third boring, 6.0 ft. (1.8 m) of fill was underlain by brown/black fine sand, some silt, decomposed rock, and fine gravel followed by brown sand, silt, and gravel to the end of the bore hole at 11.5 ft. (3.5 m) bgs.

ARCHAEOLOGICAL ASSESSMENT OF THE APE (108TH TO 116TH STREETS)

Research identified two potential archaeological concerns in the APE. One is associated with the mid-19th-century Hudson River Railroad that ran where the Amtrak tunnel now crosses the APE.[8] The other is mainly related to 19th-century, but possibly earlier, development documented in the APE prior to the park's inception.

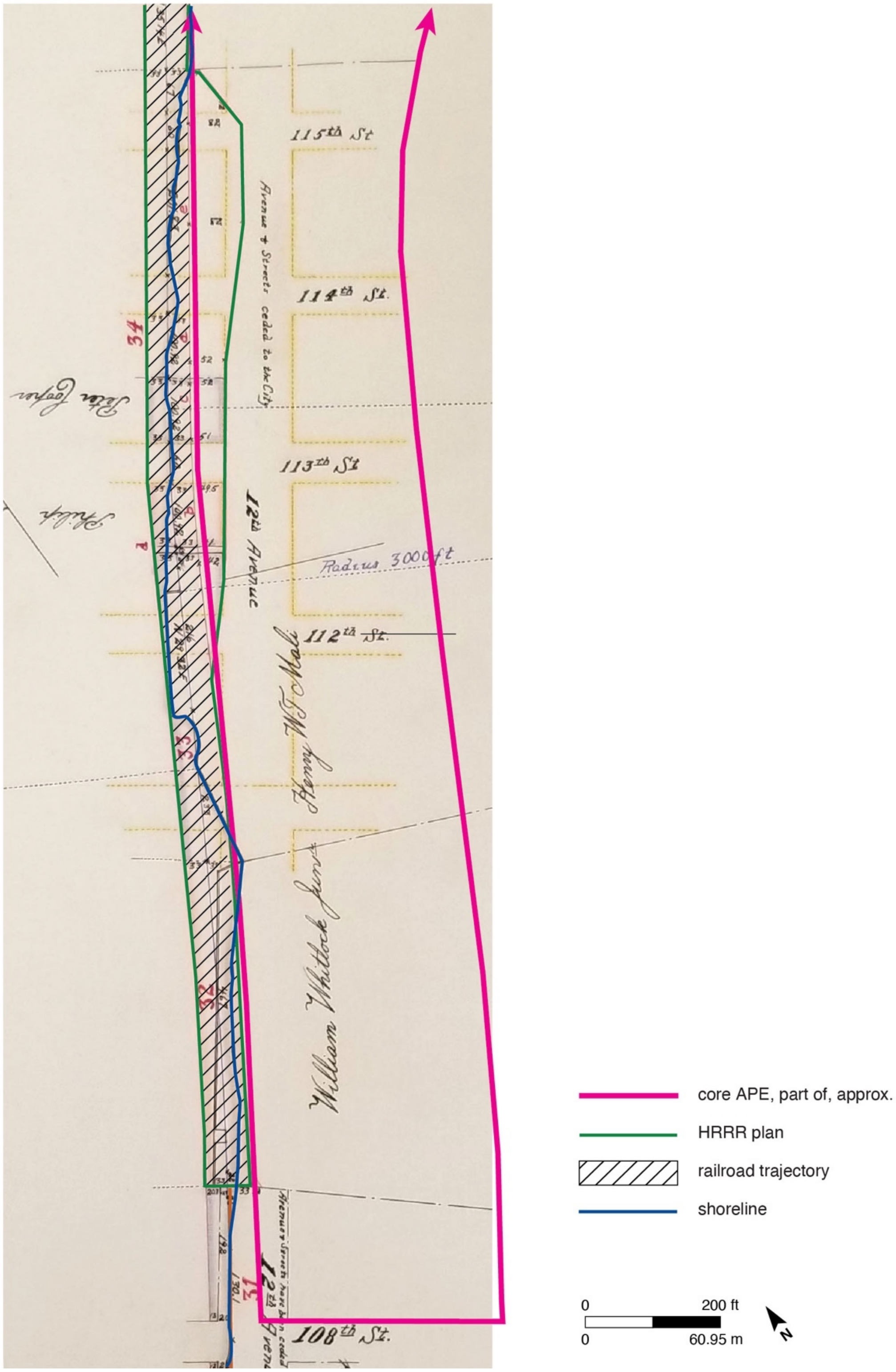
John Jervis's 1847 plans for the Hudson River Railroad indicate that shoreline improvements were required to create a viable track road along the original Hudson shore, including in the APE (Figure 10). Although the 1847 plan does not provide construction details, it undoubtedly entailed earthworks and a "river wall...to protect the earth being carried away by the surf from the river" (Jervis 1850:5). In other words, but undoubtedly with exceptions, shoreline improvements in the APE and throughout the project area were most likely variations of the earthen embankments uncovered during Phase 1B testing at the aforementioned Manhattan West site (see Figure 9).

As for development in the APE, maps from 1819-1820, 1851, and 1867 document the presence of structures in the "core" APE (Figures 11a, 11b, 11c). In 1872, John Bogart, then the newly appointed Chief Engineer of the city's Department of Public Parks (Access Genealogy n.d.), conducted a survey of the park that indicated at least nine structures were then located on the high ground in the APE (Bogart 1872; Figure 12).[9]

In the 1930s, the tracks installed for the Hudson River Railroad, and then expanded and for about a half a century operated as the New York Central Railroad, were enclosed in a train tunnel. This and the park's redesign caused the extensive ground disturbance captured in photos

---

[8] Abandoned in the 1980s and occupied by the homeless until 1991, it was called the "Freedom Tunnel," named for Chris "Freedom" Pape, the best known of the graffiti artists whose work covered its interior walls (Nemetz 2014).
[9] In 1878, Bogart was one of three civil engineers appointed to examine work done on Riverside Avenue (NYT 1878).

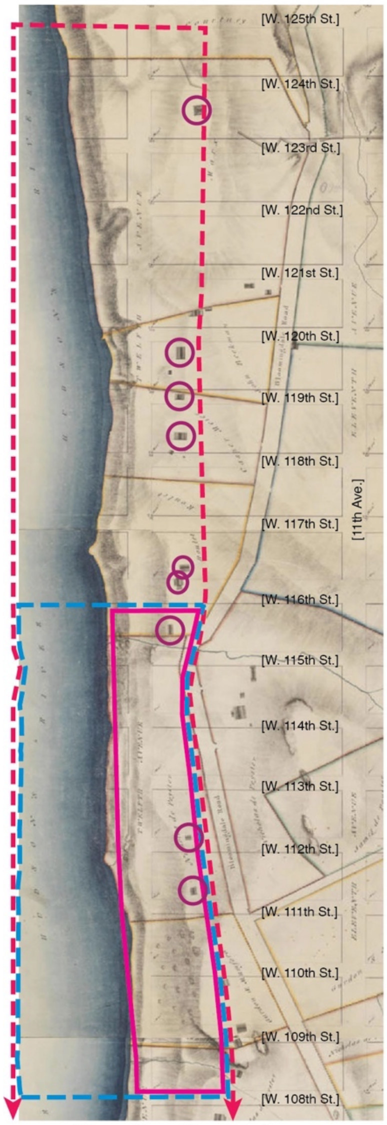

115th St
114th St.
113th St
112th St.
108th St.
12th Avenue
Avenue & Streets ceded to the City
Radius 3000 ft
Henry W. T. Mali
William Whitlock Jun.
34
33
32
31
core APE, part of, approx.
HRRR plan
railroad trajectory
shoreline
0
200 ft
0
60.95 m
N

RIVERSIDE PARK DRAINAGE

11

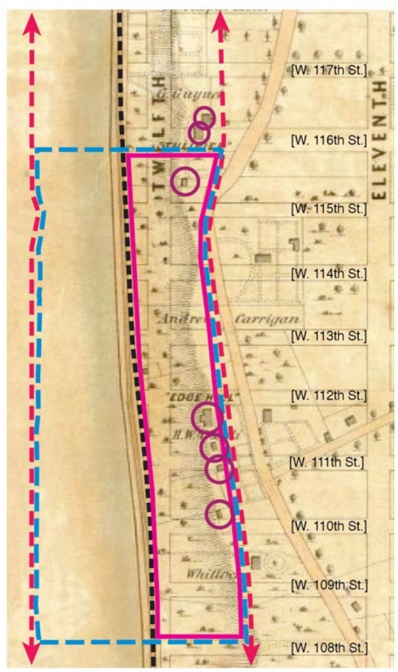
General and Core APE and Part of Project Area in 1819-1820, 1851 and 1867

(Randel 1819-1820: Nos. 52 [detail] and 56) (Dripps & Jones 1851, detail) (Dripps & Harrison 1867:Plate 14, detail)



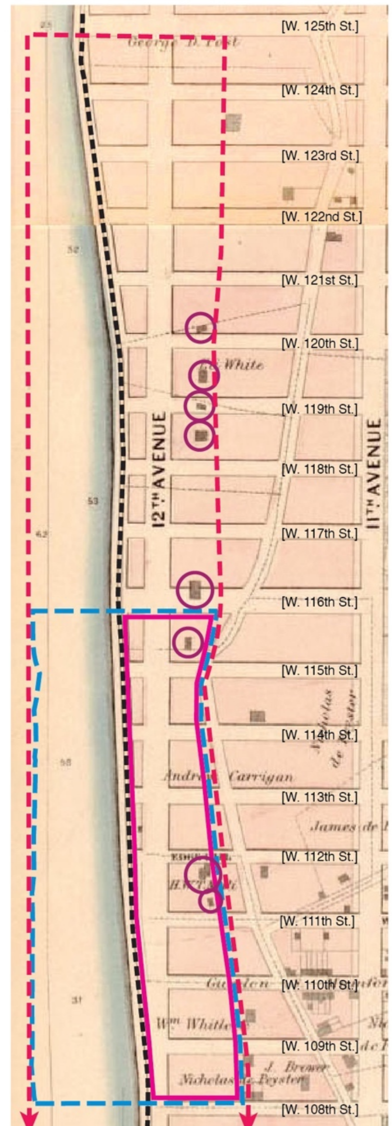
W. 108th to W. 125th Streets

11a 1819-1820



W. 108th to W. 118th Streets

11b 1851



W. 108th to W. 125th Streets

11c 1867

project area (re Bromley 1897), part of, approx.

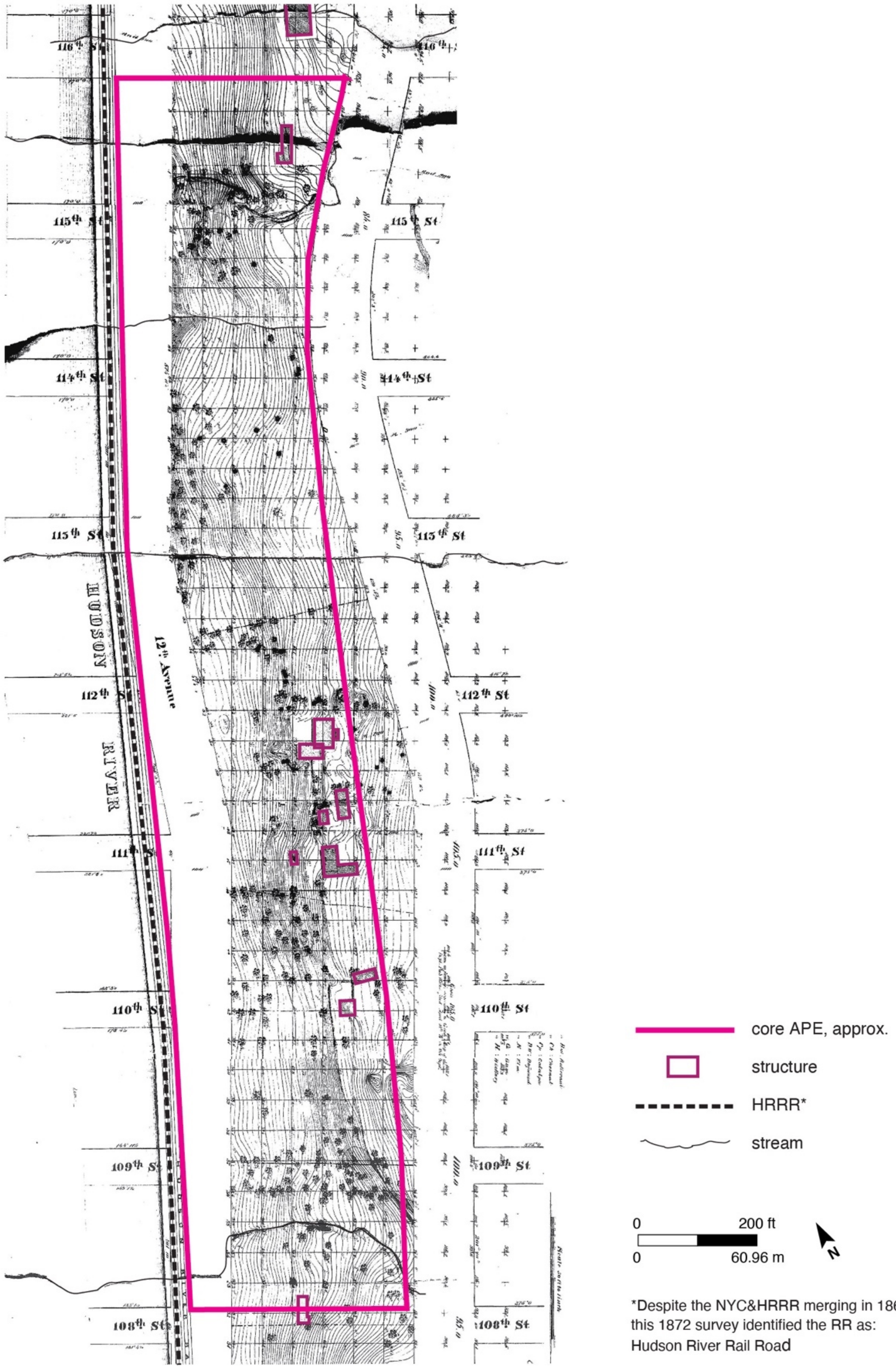
general APE, approx.

core APE, approx.

structure

HRRR

RIVERSIDE PARK DRAINAGE Core APE (108th to 116th Streets) in 1872 (Bogart 1872, detail) **12**



*Despite the NYC&HRRR merging in 1867 this 1872 survey identified the RR as: Hudson River Rail Road and discussed in the park's 2016 master plan (2016: 66-104). Disturbance is also suggested by soil borings that offer information about the depth of fill.

As for evidence of demolished buildings, the documented land movement and ground disturbance precludes finding significant archaeological remains in the APE. However, a consideration is the depth of fill or disturbance in relation to proposed excavation in proximity to the Amtrak tunnel where shoreline improvements were introduced.

SUMMARY AND RECOMMENDATIONS

The Phase 1a assessment addressed the archaeological potential of a pre-scope investigation associated with reconstruction of drainage systems in Riverside Park between West 72nd Street and West 125th Street, the park's earliest section. More specifically, research focused on the park between West 108th Street and West 116th Street where new drainage currently is under consideration and is identified as the archaeological area of potential effect (APE).

Assessing archaeological potential in the APE entailed determining what has occurred over time to create today's park. Research indicated it included demolition of 19th-century, and perhaps earlier, structures located east of and above John Jervis's mid-19th-century Hudson River Railroad that traveled the low-lying Hudson River shore. Today, this is between the Amtrak tunnel and Riverside Drive.

It is noted in the park's 2016 master plan that it was in the 1930s that the park was subject to major upheaval. It was then that railroad tracks laid for the Hudson River Railroad in the early 1850s and expanded after 1867, were enclosed in what is now the Amtrak tunnel, and landfill extended the park to the west. A comprehensive redesign followed that called for extensive land movement and landscaping. Consequently, in an archaeological perspective, the potential of impacting significant archaeological resources in the APE is low.

That said, research identified two possible archaeological concerns within the APE: one is associated with the Hudson River Railroad, the other is pre-park development that included the 19th-century, and possibly earlier, country houses of wealthy New Yorkers.

Jervis's 1847 plans for the railroad indicate that introducing it into the project area required extensive shoreline improvements. More than likely, these were variations of his earthen embankments uncovered at the Manhattan West development site at West End Avenue and 63rd Street where the tracks crossed a river lagoon. While the shoreline in the APE did not include a lagoon, improvements were required to maintain the alignment. Elsewhere in the project area, such as at Stryker's Bay between 96th and 98th streets (see Figures 5 - 8), where the alignment crossed a substantial body of water, other, perhaps more significant, constructions were required.

Although Jervis's written notes stipulate a 50-ft. (15.2-m) wide track road, his plans in the APE indicate it might have been somewhat wider (see Figure 10). His mapped shoreline in the APE, and the embankments documented at the Manhattan West site, suggest his shoreline improvements here, and undoubtedly elsewhere in the project area, were substantial features that might endure beneath landfill. Since the depth of fill in relation to potential drainage-related excavation in the APE currently is not fully determined, the possibility of finding evidence of shoreline improvements associated with the Hudson River Railroad cannot be ignored.

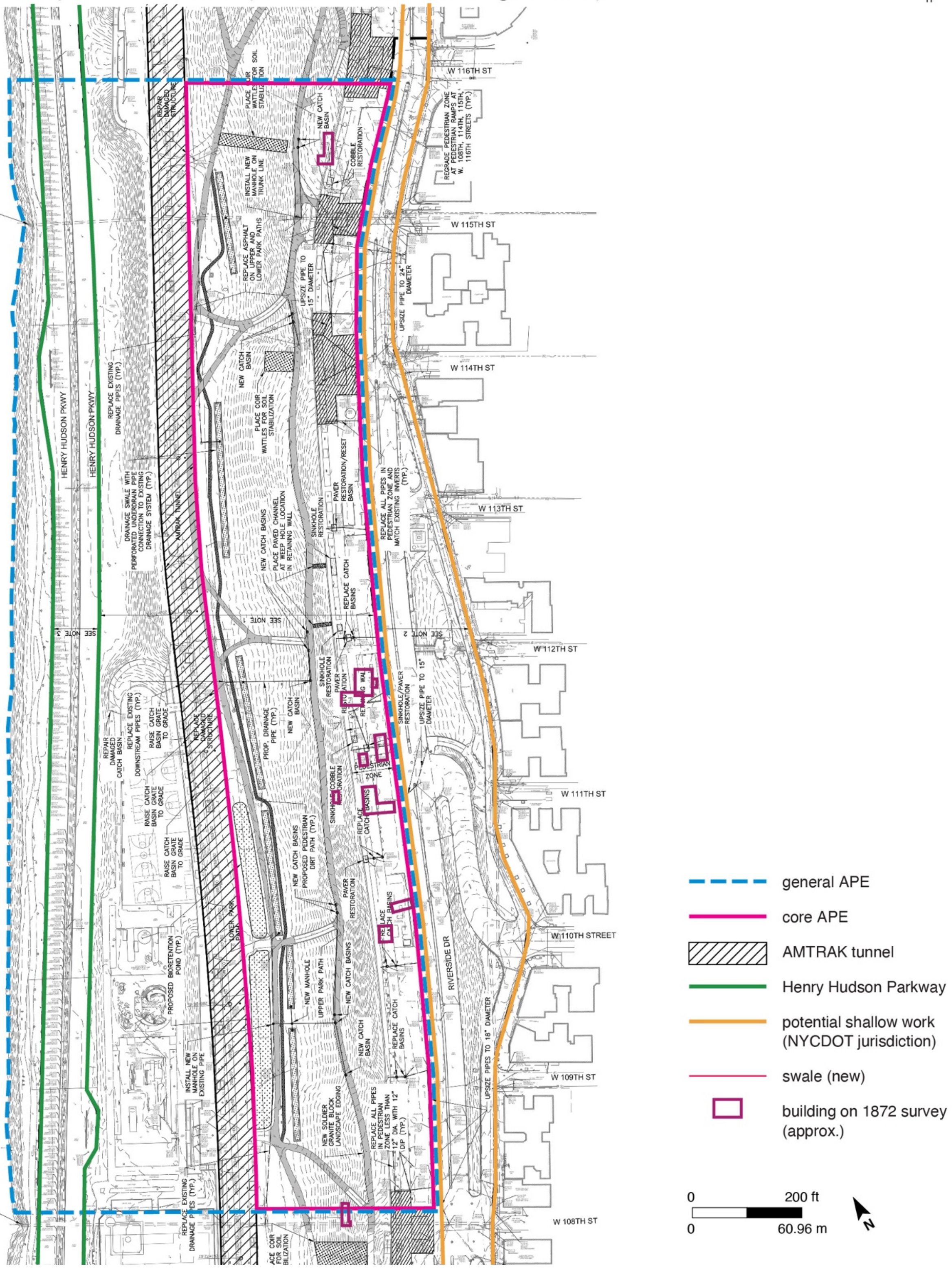
The other potential concern is evidence of the country houses of wealthy New Yorkers once located in the project area and, according to map data, mainly in the APE. Development included mansions and auxiliary structures on the "precipices above the river" (Figure 12; see also Figures 11a, 11b, 11c). But this was before the Central Park Commissioners acquired the land for the park through condemnation and before the terrain was altered both in the past and in the present.

At this writing, concept plans for new drainage in the APE (Stantec 1/10/22) do not impact known sites of 19th-century structures once located in the core APE between the Amtrak tunnel and the Riverside Drive retaining wall (Figure 13). However, archaeological review of final plans is recommended, as is an archaeological assessment of any new drainage planned elsewhere in the project area. Of concern is where excavation will occur in potentially sensitive areas and the depth of fill or the extent of disturbance is unknown. In the APE, this is mainly, if not entirely, in the immediate vicinity of the Amtrak tunnel. If the depth of disturbance and/or fill in relation to excavation cannot be determined in this area, archaeological oversight is recommended.

As a precaution, a protocol to address unanticipated discoveries is recommended and should be in place throughout construction. This should call for work stoppage in the area of discovery (but not elsewhere) to allow an archaeological assessment of the find and, if warranted, for it to be avoided, documented before destruction, or archaeologically excavated. It is recommended that bid documents include protocol information.

RIVERSIDE PARK DRAINAGE Proposed Drainage, Existing Conditions, and Past Development in the APE (Stantec 1/10/22 and Bogart 1872)

13



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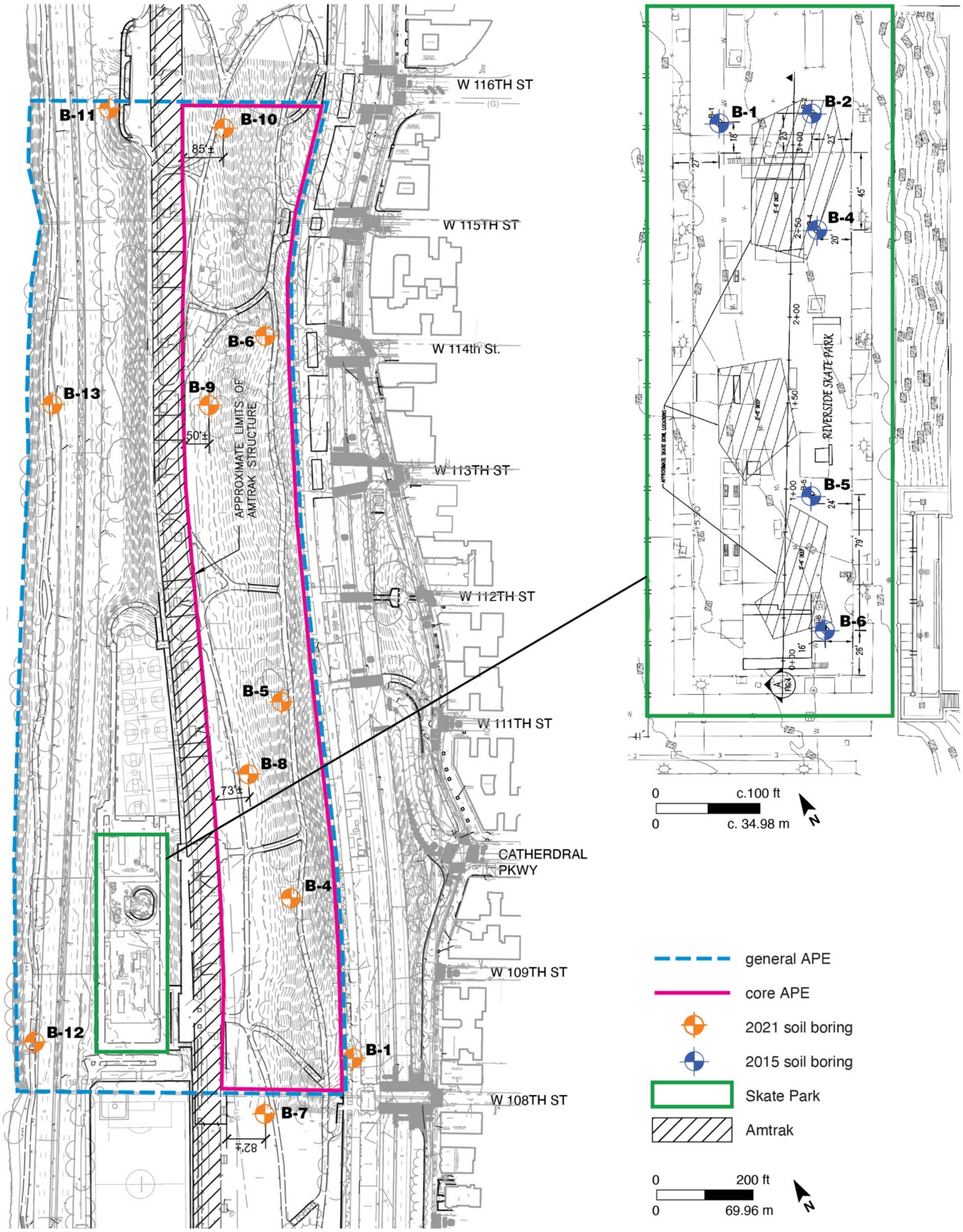
APPENDIX A

SOIL BORING LOCATIONS (FIGURE A1)
AND
SOIL BORING LOGS (McLaren 2015 and MATRIX 2021)

RIVERSIDE PARK DRAINAGE APPENDIX A Soil Boring Locations (McClaren 2015, Matrix 2021) **A1**



SOIL BORING LOGS 2015 (McClaren 2015)

SOILTESTING, INC. **90 DONOVAN RD.** **OXFORD, CT 06478** **CT (203) 262-9328** **NY (914) 946-4850**	CLIENT: **W Architecture & Landscape Architectu** PROJECT NO. **G215-0182-15** PROJECT NAME **Riverside Skate Park**	SHEET 1 OF 1 HOLE NO. **B-1 & B-2** BORING LOCATIONS per Plan
FOREMAN - DRILLER **PD/zm**	LOCATION **Manhattan, NY**	
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT none FT AFTER 0 HOURS AT __ FT AFTER __ HOURS	TYPE: CASING HSA, SAMPLER SS SIZE I.D.: CASING 4 ¼", SAMPLER 1 3/8" HAMMER WT.: SAMPLER 140#, CORE BAR BIT HAMMER FALL: SAMPLER 30"	DATE START 9/29/15 DATE FINISH 9/29/15 SURFACE ELEV. GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORE TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
													3" ASPHALT
		1	ss	24"	8"	3'0"	4	2			moist		Drk Brn/Blk FM SAND & F GRAVEL
							3	1			loose		
		2	ss	24"	6"	5'0"	24	95			moist		Brn/Lt Brn VF-FM SAND & SILT, F GRAVEL, sm brick,
5							40	52			v dense		concrete frags [SM / 7]
		3	ss	24"	8"	7'0"	19	24			moist		
							16	13			dense		
		4	ss	24"	18"	9'0"	20	25			moist		Brn VF-FMC SAND & SILT, FC GRAVEL, lit brick, cobbles
							27	26			v dense		
10		5	ss	24"	20"	11'0"	17	14			moist		
							21	17			dense	11'0"	
													E.O.B. 11'0"
15													

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	0-6	6-12	12-18	CORE TIME	DENSITY OR CONSIST	STRATA CHANGE	FIELD IDENTIFICATION OF SOIL REMARKS
0													**B-2**
	B-2												4" ASPHALT
		1	ss	24"	16"	3'0"	19	25			dry/moist		Brn SILT, sm FM sand, lit cobble, brick
							18	19			hard		[ML / 7]
		2	ss	24"	7"	5'0"	14	12			dry/moist		Drk Brn VF-FMC SAND & FC GRAVEL, lit silt, concrete,
5							11	7			compact		brick frag [SM / 7]
		3	ss	24"	3"	7'0"	80	62			moist		
							12	12			v dense		
		4	ss	8"	8"	9'0"	28	100/2"			v dense		BOULDER from 8 - 9'
10		5	ss	24"	4"	11'0"	9	15			moist		Brn VF-FMC SAND & FC GRAVEL, sm silt, rock frag,
							16	26			dense		brick frag
		6	ss	24"	3"	13'0"	24	24			moist		
							18	17			dense	13'0"	
													E.O.B. 13'0"
15													
20													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________ FT. USED ____________ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-1 & B-2**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: W Architecture & Landscape Architectu	SHEET 1 OF 1 HOLE NO. B-3
	PROJECT NO. G215-0182-15	
	PROJECT NAME Riverside Skate Park	BORING LOCATIONS per Plan
FOREMAN - DRILLER PD/zm	LOCATION Manhattan, NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT__FT AFTER_0_HOURS
AT__FT AFTER__HOURS

DATE START 9/29/15
DATE FINISH 9/29/15
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	CORE TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
5													This boring location omitted
10													
15													
20													
25													
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. HOLE NO. B-3

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: **W Architecture & Landscape Architectu**	SHEET 1 OF 1 HOLE NO. B-4 & B-5
	PROJECT NO. G215-0182-15	
	PROJECT NAME **Riverside Skate Park**	BORING LOCATIONS per Plan
FOREMAN - DRILLER **PD/zm**	LOCATION **Manhattan, NY**	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR		
TYPE	HSA	SS		DATE START	9/29/15
SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH	9/29/15
HAMMER WT.		140#	BIT	SURFACE ELEV.	
HAMMER FALL		30"		GROUND WATER ELEV.	

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT __FT AFTER __HOURS

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	CORE TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
													4" ASPHALT
		1	ss	24"	17"	3'0"	48	47			moist		Brn/Lt Brn VF-FM SAND, sm FC gravel, silt, brick, concrete
							36	25			hard		frag [SM / 7]
		2	ss	24"	9"	5'0"	21	20			moist		
5							12	8			dense		
		3	ss	13"	4"	7'0"	4	55			moist		
							100/1"				v dense	7'0"	
													COBBLES & BOULDERS
												9'0"	
10		4	ss	24"	4"	11'0"	18	6			dry		COBBLES & BOULDERS (fill)
							7	8			compact		
		5	ss	24"	0"	13'0"	2	2			dry		
							2	4			v loose		
		6	ss	24"	0"	15'0"	1	1			dry		SAME (poss voids)
15							2	3			v loose	15'0"	
													E.O.B. 15'0"
0													B-5
	B-5												4½" ASPHALT
		1	ss	20"	11"	2'8"	3	16				2'6"	Brn/Lt Brn FMC SAND, lit silt, FC gravel [SM / 7]
							32	100/2"				3'0"	CONCRETE
		2	ss	24"	5"	5'0"	7	6					Drk Brn / Blk VF-FM SAND, sm FC gravel, concrete, brick frag,
5							5	5					lit silt [SM / 7]
		3	ss	24"	12"	7'0"	7	11					
							14	14					
		4	ss	24"	17"	9'0"	8	14					Brn / Lt Gry VF-FMC SAND, sm silt, FC gravel, rock,
							62	35					brick frag
10		5	ss	24"	20"	11'0"	23	47				10'6"	
							21	17				11'0"	Lt Brn SILT & FMC SAND, FC GRAVEL [ML / 5a]
													E.O.B. 11'0"
15													
20													

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT __FT AFTER __HOURS

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-4 & B-5**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: W Architecture & Landscape Architectu	SHEET 1 OF 1 HOLE NO. B-6
	PROJECT NO. G215-0182-15	
	PROJECT NAME Riverside Skate Park	BORING LOCATIONS per Plan
FOREMAN - DRILLER PD/zm	LOCATION Manhattan, NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR	
TYPE	HSA	SS		DATE START 9/29/15
SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH 9/29/15
HAMMER WT.		140#	BIT	SURFACE ELEV.
HAMMER FALL		30"		GROUND WATER ELEV.

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	CORE TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	18"	3'0"	14	19			moist		Brn VF-FM SAND & SILT, lit FC gravel, brick frag
							19	25			dense		[SM / 7]
		2	ss	24"	12"	5'0"	20	22			moist		
5							16	14			dense		
		3	ss	15"	8"	6'3"	8	20			moist		BRICK, CONCRETE & MISC RUBBLE (fill)
							150/3"				v dense		
		4	ss	24"	4"	9'0"	2	3			moist		Brn VF-FMC SAND, sm silt, FC gravel, lit brick, cobbles
							2	8			loose		
10		5	ss	24"	14"	11'0"	26	13			moist		
							12	12			compact	11'0"	
													E.O.B. 11'0"
15													
20													
25													
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

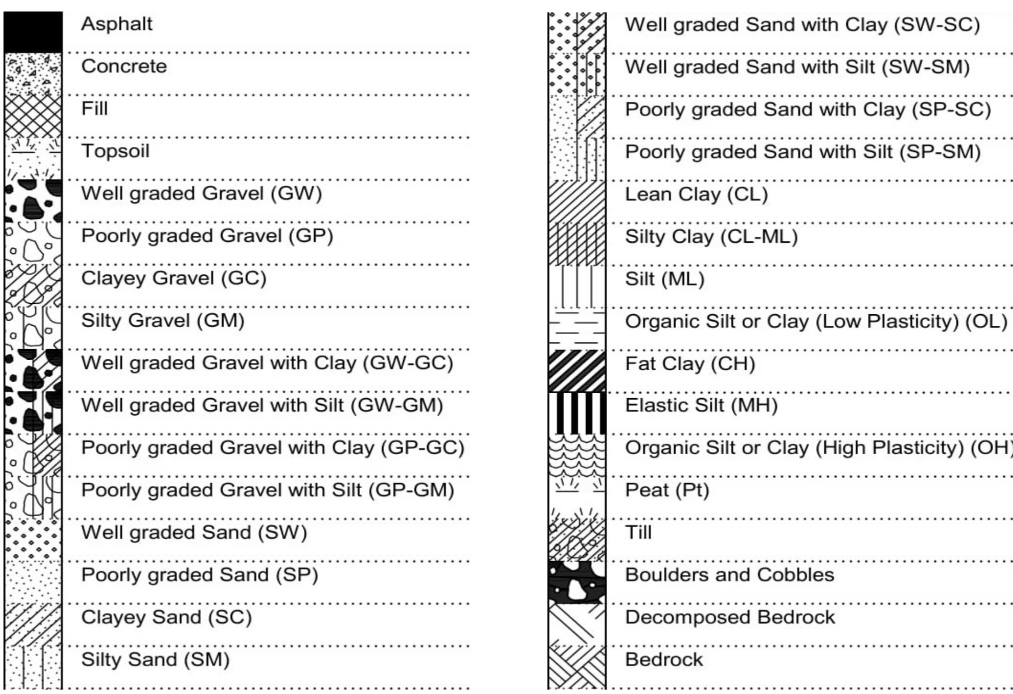
GROUND SURFACE TO ______ FT. USED __________ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-6**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

(Matrix 2021)

SOIL BORING GEOGRAPHICAL LEGEND AND LOGS 20121 (Matrix 2021)

Log Geographical Legend



Log Geographical Legend

Asphalt

Concrete

Fill

Topsoil

Well graded Gravel (GW)

Poorly graded Gravel (GP)

Clayey Gravel (GC)

Silty Gravel (GM)

Well graded Gravel with Clay (GW-GC)

Well graded Gravel with Silt (GW-GM)

Poorly graded Gravel with Clay (GP-GC)

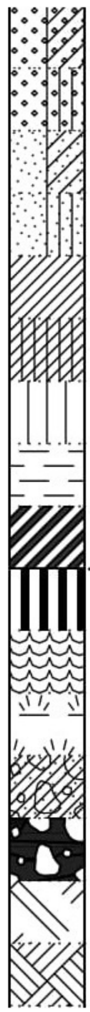
Poorly graded Gravel with Silt (GP-GM)

Well graded Sand (SW)

Poorly graded Sand (SP)

Clayey Sand (SC)

Silty Sand (SM)



Well graded Sand with Clay (SW-SC)

Well graded Sand with Silt (SW-SM)

Poorly graded Sand with Clay (SP-SC)

Poorly graded Sand with Silt (SP-SM)

Lean Clay (CL)

Silty Clay (CL-ML)

Silt (ML)

Organic Silt or Clay (Low Plasticity) (OL)

Fat Clay (CH)

Elastic Silt (MH)

Organic Silt or Clay (High Plasticity) (OH)

Peat (Pt)

Till

Boulders and Cobbles

Decomposed Bedrock

Bedrock

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-01**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **9/30/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	DRILL-9-7-5 (33%)		6" Asphalt Brown mf SAND, trace Silt, trace organic material, trace asphalt, dry (FILL)	
		S-2	SS	2-4	4-5-8-5 (67%)		Brown mf SAND, trace Silt, trace f Gravel, trace organics, dry (FILL)	
5		S-3	SS	4-6	5-4-5-5 (71%)		Brown mf SAND, some Silt, trace asphalt, moist (FILL)	
		S-4	SS	6-8	5-5-12-6 (58%)		Brown cmf SAND, some Silt, trace f Gravel, trace red brick, trace asphalt, moist (FILL)	
		S-5	SS	8-10	4-5-23-8 (71%)		Same as Above, moist (FILL)	
10		S-6	SS	10-12	8-15-12-50/1" (88%)		6" Decomposed Bedrock Brown f SAND, some Silt, trace f Gravel, trace decomposed mica schist, moist (SM)	
15			SS	15-17	50/0" (0%)		No Recovery	
20			SS	20-22	4-5-3-4 (0%)		No Recovery, could not advance casing, mud draining from bottom of retaining wall, End of Boring at 22' BGS	
							Bottom of Borehole @ 22 ft.	

NEWORLD NO GROUT 20-121 BORING LOGS 10-15-21.GPJ MATRIX EGS.GDT 10/15/21

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-04**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/07/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	2-2-2-3 (75%)		Brown mf SAND and SILT, trace red brick, dry (FILL)	
		S-2	SS	2-4	11-16-17-8 (42%)		Brown mf SAND and SILT, some concrete, some mf gravel, dry (FILL)	
5		S-3	SS	4-6	7-6-7-11 (17%)		Same as Above, dry (FILL)	
		S-4	SS	6-8	13-12-15-13 (100%)		Brown f SAND, some Silt, trace f Gravel, trace red brick, trace decomposed bedrock (FILL)	
		S-5	SS	8-10	17-22-15-14 (100%)		Same as Above, dry (FILL)	
10		S-6	SS	10-12	15-16-19-28 (100%)		Same as Above, dry (FILL)	
15		S-7	SS	15-17	11-18-20-20 (42%)		Brown f SAND and SILT, some decomposed bedrock, moist (SM)	
20		S-8	SS	20-22	12-32-60-103 (71%)		Decomposed mica SCHIST, Silt texture, moist (DECOMP BEDROCK)	
							Bottom of Borehole @ 22 ft.	

NEWORLD NO GROUT 20-121 BORING LOGS 10-15-21.GPJ MATRIX EGS.GDT 10/15/21

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-05**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/08/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	2-1-2-1 (75%)		Brown f SAND and Silt, trace f Gravel, trace organic material, moist (SM)	
		S-2	SS	2-4	2-1-2-3 (54%)		Same as Above, moist (SM)	
5		S-3	SS	4-6	2-2-2-2 (71%)		Same as Above, moist (SM)	
		S-4	SS	6-8	3-4-6-6 (83%)		Brown SILT and CLAY, trace f Gravel, moist (CL-ML)	
		S-5	SS	8-10	8-7-10-13 (100%)		Same as Above, moist (CL-ML)	
10		S-6	SS	10-12	10-23-50/3" (0%)		No recovery, rock in tip	
15		S-7	SS	15-17	9-10-15-10 (100%)		Brown mf SAND, trace f Gravel, trace decomposed bedrock, moist (SP)	
20		S-8	SS	20-22	45-35-17-15 (75%)		Decomposed mica SCHIST, Silt texture (DECOMP BEDROCK)	
							Bottom of Borehole @ 22 ft.	

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-06**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/12/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	2-3-6-10 (71%)		Brown mf SAND and SILT, trace grass, trace organic material, dry (SM)	
		S-2	SS	2-4	5-7-6-6 (58%)		Brown mf SAND and SILT, trace f Gravel, trace organic material, dry (SM)	
		S-3	SS	4-6	8-8-12-14 (88%)		Brown cmf SAND, some Silt, trace f Gravel, dry (SM)	
5								
		S-4	SS	6-8	18-16-24-22 (96%)		Same as Above, dry (SM)	
		S-5	SS	8-10	14-22-26-22 (63%)		Brown cmf SAND, some Silt, trace mf Gravel, dry (SM)	
10								
		S-6	SS	10-12	18-13-14-10 (75%)		Same as Above, dry (SM)	
15								
		S-7	SS	15-17	15-17-19-18 (46%)		Decomposed mica SCHIST, Silt texture, moist (DECOMP BEDROCK)	
20								
		S-8	SS	20-22	75/3" (4%)		Same as Above, moist (DECOMP BEDROCK) Bottom of Borehole @ 20.25 ft.	

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-07**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/05/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	2-2-3-4 (71%)		Brown f SAND and SILT, trace mf Gravel, trace organic material, dry (SM)	
		S-2	SS	2-4	6-3-3-3 (58%)		Brown f SAND and SILT, trace Gravel, trace organic material, trace decomposed bedrock, moist (SM)	
5		S-3	SS	4-6	4-9-6-14 (92%)		Same as Above, moist (SM)	
		S-4	SS	6-8	18-18-14-50/5" (92%)		Brown f SAND, trace Silt, trace f Gravel, moist (SP)	
		S-5	SS	8-10	101-17-15-18 (67%)		Decomposed mica SCHIST, Silt texture, moist (DECOMP BEDROCK)	
10		S-6	SS	10-12	20-21-24-30 (100%)		Same as Above, moist (DECOMP BEDROCK)	
15		S-7	SS	15-17	20-22-44-42 (75%)		Same as Above, moist (DECOMP BEDROCK)	
20		S-8	SS	20-22	50/2" (0%)		No Recovery, decomposed bedrock in tip Bottom of Borehole @ 20.16 ft.	

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-08**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/04/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	2-4-4-6 (54%)		Brown mf SAND and SILT, some organic material, trace red brick, dry (FILL)	
		S-2	SS	2-4	4-15-16-13 (50%)		Brown cmf SAND, some Silt, some decomposed bedrock, dry (SM)	
		S-3A	SS	4-5	11-16 (100%)		Top 12" Decomposed Bedrock, Silt texture (DECOMP BEDROCK)	
5							Bottom 12" Brown mf SAND, some Silt, wet (SM)	
		S-3B	SS	5-6	15-20 (100%)			
			SS	6-8	50/6"-50/0" (0%)		No recovery, rock in tip	
		S-4	SS	8-10	30-19-15-17 (58%)		Brown f SAND, trace f Gravel, trace Silt, moist (SP)	
10		S-5	SS	10-12	11-17-22-21 (67%)		Brown f SAND, trace Silt, trace Decomp Bedrock, moist (SP)	
15		S-6	SS	15-17	12-16-16-17 (46%)		Brown mf SAND, trace SILT, moist (SP)	
20		S-7	SS	20-22	14-31-49-84 (79%)		Decomposed mica SCHIST, Silt texture, dry (DECOMP BEDROCK)	
							Bottom of Borehole @ 22 ft.	

NEWORLD NO GROUT 20-121 BORING LOGS 10-15-21.GPJ MATRIX EGS.GDT 10/15/21

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-09**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/01/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	3-5-10-12 (83%)		Brown mf SAND, some Silt, trace f Gravel, trace organic material, dry (SM)	
		S-2	SS	2-4	9-10-9-8 (92%)		Same as Above, moist (SM)	
5		S-3	SS	4-6	6-10-11-10 (29%)		Same as Above, moist (SM)	
			SS	6-8	8-8-5-5 (0%)		No Recovery	
		S-4	SS	8-10	9-17-18-24 (54%)		Brown cmf SAND, some Silt, trace f Gravel, moist (SM)	
10		S-5	SS	10-12	19-18-12-14 (71%)		Brown cmf SAND, some Silt, trace f Gravel, trace decomposed rock, moist (SM)	
15		S-6	SS	15-17	12-23-75-22 (25%)		Brown cmf SAND, some Silt, some decomposed rock, trace f Gravel, moist (SM)	
20		S-7	SS	20-22	26-19-25-21 (67%)		Brown cmf SAND, trace Silt, trace f Gravel, wet (SP)	
							Bottom of Borehole @ 22 ft.	

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-10**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/01/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
				SS	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	3-4-4-6 (100%)		Brown/Red f SAND, some Silt, trace f Gravel, moist (SM)	
		S-2	SS	2-4	7-9-10-11 (88%)		Same as Above (SM)	
							Brown cmf SAND, trace Silt (SP)	
							Brown/Red f SAND, some Silt, trace f Gravel, moist (SM)	
5		S-3	SS	4-6	17-15-10-10 (100%)		Brown cmf SAND, trace Silt, moist (SP)	
			SS	6-8	8-7-8-50/5" (0%)		No Recovery	
			SS	8-10	50/0" (0%)		No Recovery, Drilled to 10'	
10		S-4	SS	10-12	15-36-23-25 (50%)		Brown f SAND, some Silt, trace f Gravel, moist (SM)	
15		S-5	SS	15-17	5-9-15-21 (63%)		Same as above, moist (SM)	
20			SS	20-22	50/0" (0%)		No Recovery Bottom of Borehole @ 20 ft.	

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-11**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/06/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**				
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	2-2-5-10 (63%)		Brown f SAND, some Silt and organic material, trace f Gravel, trace concrete, trace red brick, dry (FILL)	
		S-2	SS	2-4	8-6-50/4" (75%)		Same as Above, rock in tip, moist (FILL)	
5		S-3	SS	4-6	17-3-5-3 (29%)		Same as Above, moist/wet (FILL)	
		S-4	SS	6-8	6-7-2-3 (38%)		Brown f SAND, trace Silt, trace f Gravel, trace red brick, moist/wet (FILL)	
		S-5	SS	8-10	6-5-6-6 (13%)		Brown f GRAVEL and f Sand with red brick, wet (FILL)	
10			SS	10-12	2-1-1-1 (0%)		No recovery, wood in tip	
15		S-6	SS	15-17	8-6-8-5 (50%)		Brown cmf SAND, some mf Gravel, trace Silt, wet (SP)	
20		S-7	SS	20-22	14-4-50/4" (13%)		Brown/black Decomposed mica SCHIST with mf Gravel and cm Sand texture (DECOMP ROCK) End of Boring at 21.33 ft bgs	
							Bottom of Borehole @ 21.33 ft.	

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-12**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/06/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**	**10/07/21**		**20.0**	
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	3-5-8-12 (71%)		Brown f SAND and SILT, trace grass/organic material, trace f Gravel, moist (FILL)	
		S-2	SS	2-4	18-27-18-10 (58%)		Brown f SAND and SILT, trace mf Gravel, trace red Brick, moist (FILL)	
5		S-3	SS	4-6	11-10-15-8 (92%)		Same as Above, dry (FILL)	
			SS	6-8	4-50/5" (0%)		No Recovery	
		S-4	SS	8-10	50/3" (13%)		No Recovery	
10		S-5	SS	10-12	21-24-10-37 (33%)		Gray cmf SAND, trace mf Gravel, some decomposed rock, moist/wet (SP)	
15		S-6	SS	15-17	40-30-25-30 (83%)		Same as above, moist/wet (SP)	
▼ 20		S-7	SS	20-22	17-4-8-10 (58%)		Brown cmf SAND, trace mf Gravel, trace decomposed rock, wet (SP)	
							Bottom of Borehole @ 22 ft.	

MATRIXNEWORLD
Engineering Progress

BORING LOG

BORING NO.: **B-13**

SHEET **1** OF **1**

PROJECT NO.: **20-181** PROJECT: **NYCDPR Riverside Park Drainage** DATE: **10/05/21**
PROJECT LOCATION: **Bronx, NY** BORING LOCATION:
DRILLING EQUIPMENT: **CME 55** ANGLE: **-90.0** DIR.: **------** ELEV.: DATUM:
DRILLING CONTRACTOR: **Craig Geotechnical Drilling Co. Inc.** DRILLER: **Alex T.** INSPECTOR: **W. Boni**

CASING and HAMMER				SAMPLER and HAMMER				GROUNDWATER LEVELS			
Type	I.D.	Weight	Drop	Type	I.D.	Weight	Drop	Date	Time	Depth	Casing Depth
Auto		**140 lbs**	**30"**	**AUTO**		**140 lbs**	**30"**	**10/05/21**		**6.0**	
FJ Steel	**4"**			**SS**	**1 3/8"**						

Depth Feet (Elev.)	CASING Blows/ Foot	SAMPLE No.	Type	Depth Feet	Blows/6" (REC. %) [RQD %]	Graphic Symbol	Description Of Material	Laboratory Tests
		S-1	SS	0-2	2-4-7-16 (63%)		Brown f SAND and SILT with red Brick, dry (FILL)	
		S-2	SS	2-4	10-17-16-14 (75%)		Brown f SAND and Silt with red Brick and Concrete, moist (FILL)	
5		S-3	SS	4-6	7-7-6-4 (46%)		Same as Above, moist (FILL)	
		S-4	SS	6-8	2-7-7-3 (17%)		Brown/black f SAND, some Silt, some decomposed rock, some f Gravel, wet (SM)	
		S-5	SS	8-10	3-3-4-4 (33%)		Brown f SAND and SILT, some mf Gravel, wet (SM)	
10		S-6	SS	10-12	6-4-3-50/3" (0%)		No Recovery. Refusal at 11.75 ft. BGS. 2nd refusal at 10' after 5' offset, drilling mud escaping hole End of Boring at 11.75 ft BGS	
							Bottom of Borehole @ 11.75 ft.	

NEWORLD NO GROUT 20-121 BORING LOGS 10-15-21.GPJ MATRIX EGS.GDT 10/15/21