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**DRAFT PHASE IA
ARCHAEOLOGICAL
DOCUMENTARY STUDY**

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**REHABILITATION OF THE
HIGH BRIDGE
IN THE BOROUGHS OF
MANHATTAN AND THE BRONX,
NEW YORK**

**CITY OF NEW YORK,
DEPARTMENT OF
PARKS & RECREATION**



1347

DRAFT PHASE IA ARCHAEOLOGICAL DOCUMENTARY STUDY REPORT

**REHABILITATION OF THE HIGH BRIDGE
IN THE BOROUGH OF MANHATTAN AND THE BRONX, NEW YORK**

CITY OF NEW YORK, DEPARTMENT OF PARKS & RECREATION

Prepared for:

Li / Saltzman Architects, PC
62 White Street
New York, NY 10013-3593

Prepared by:

Historical Perspectives, Inc.
P.O. Box 3037
Westport, CT 06880

Authors:

Faline Schneiderman-Fox, RPA
Julie Abell Horn, RPA

| **April 2011**

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MANAGEMENT SUMMARY

SHPO Project Review Number (if available):

Involved State and Federal Agencies:

Phase of Survey: **Phase IA Archaeological Documentary Study**

Location Information

Location: **High Bridge spans the Harlem River between Manhattan and the Bronx. The Manhattan touchdown APE includes Block 2106, Lot 1; the Bronx touchdown APE includes Block 2533, Lots 22, 107, and 111.**

Minor Civil Division: **06101, Manhattan and 00501, Bronx**

County: **New York and Bronx**

Survey Area

Length: **varies**

Width: **varies**

Number of Acres Surveyed: **ca. 1**

USGS 7.5 Minute Quadrangle Map: **Central Park**

Archaeological Survey Overview

Number & Interval of Shovel Tests: **N/A**

Number & Size of Units: **N/A**

Width of Plowed Strips: **N/A**

Surface Survey Transect Interval: **N/A, urban area**

Results of Archaeological Survey

Number & name of precontact sites identified: **Possibly NYSM 4066**

Number & name of historic sites identified: **None**

Number & name of sites recommended for Phase II/Avoidance: **None**

Report Authors(s): **Faline Schneiderman-Fox, RPA and Julie Abell Horn, RPA, Historical Perspectives, Inc.**

Date of Report: **April 2011**

EXECUTIVE SUMMARY

The proposed New York City Department of Parks & Recreation's proposed renovation of High Bridge for pedestrian passage over the Harlem River between Manhattan and the Bronx requires environmental review. As part of the environmental review process, a Phase IA Archaeological Documentary Study has been prepared by Historical Perspectives, Inc. (HPI) for Li/Saltzman Architects. The specific locations of ground disturbance by proposed upgrades at two ramp pier locations near existing touchdowns of the bridge, and where scaffolding will be temporarily installed for the repair of the masonry surfaces define the Area of Potential Effect (APE); HPI's report addresses the archaeological sensitivity of the APE. Also included in the APE are portions of the historically significant High Bridge and the Old Croton Aqueduct (OCA), which it carries between the two boroughs, and which would be modified to accommodate pedestrian access.

The historically significant High Bridge is a designated New York City Landmark and is listed on the State and National Register (S/NR) of Historic Places. The entire Old Croton Aqueduct (OCA) system, of which High Bridge is a component, also maintains S/NR designation. It is also a National Historic Civil Engineering Landmark, as well as a National Historic Landmark. High Bridge, being a part of the OCA system, maintains these same National designations. Historic American Engineering Record (HAER) recordation of High Bridge has been completed.

The preliminary assessment of archaeological potential for the High Bridge APE suggests that neither the Manhattan nor the Bronx portions of the project site have the potential to contain precontact resources due to the naturally steep slope and the extent of historical disturbance. The construction of High Bridge coupled with other 19th and 20th century improvements to the project site would negate the possibility of encountering any intact precontact deposits.

With regard to historical archaeological resource potential, map and atlas research to date suggests that the Manhattan project site APE may be potentially sensitive for the footprint of a former Pump House associated with the Croton water distribution system. The Pump House once stood northwest of the High Bridge Gate House, and there is an extant retaining wall immediately north of the Gate House. The Bronx project site may be archaeologically sensitive for the remains of a mid-19th century dwelling that once stood northeast of the Gate House, although imprecise mapping may have erroneously placed the dwelling in the APE.

For those portions of the APE that are found to be potentially sensitive for archaeological resources, but would not undergo any subsurface disturbance, no archaeological testing would be warranted. However, if future plans are revised to entail subsurface disturbance to these sensitive areas, then testing would be recommended.

High Bridge and the OCA are of industrial archaeological significance; the Historic American Engineering Record (HAER) for both resources is recognition of this status. Although the HAER reports are at the Library of Congress, they were filed in 1984 and are more than 25 years old. An updated photographic record to current HAER standards of both High Bridge and OCA features prior to any proposed changes is recommended. HPI will assist in documentation with the industrial archaeological component as requested.

I. INTRODUCTION

The New York City Department of Parks & Recreation's proposed renovation of High Bridge for pedestrian passage over the Harlem River between Manhattan and the Bronx requires environmental review. As part of the environmental review process, a Phase IA Archaeological Documentary Study has been prepared by Historical Perspectives, Inc. (HPI) for Li/Saltzman Architects. The specific locations of disturbance to the ground surface by various activities related to improvements to High Bridge define the Area of Potential Effect (APE); HPI's report addresses the archaeological sensitivity of the APE. Also included in the APE are portions of the historically significant High Bridge and the Old Croton Aqueduct (OCA), which it carries between the two boroughs, and which would be modified to accommodate pedestrian access.

II. STATEMENT OF SIGNIFICANCE

The historically significant High Bridge over the Harlem River is New York City's oldest extant bridge, and was designated a New York City Landmark in 1970 (Site No. LP-0639). The nearby Old Croton Aqueduct (OCA) Water Tower in Highbridge Park was designated a City Landmark in 1970 (Site No. LP-0319). Both were listed on the State and National Register of Historic Places (S/NR) in 1972 (Site No. 72001560). The entire Old Croton Aqueduct (OCA) system, of which High Bridge is a component, was listed on the S/NR in 1974 (Site No. 74001324), and was designated as a National Historic Civil Engineering Landmark (NHCEL) by the American Society of Civil Engineers in 1975. The OCA was also designated as a National Historic Landmark (NHL) in 1992. High Bridge, being a part of the OCA system, maintains these same National designations. Historic American Engineering Record (HAER) recordation of High Bridge and the OCA was completed in 1984 (HAER NY-119 and HAER NY-120).

High Bridge was constructed between 1839 and 1848 as part of the original Croton Aqueduct System, now referred to as the OCA. Plans for an aqueduct into Manhattan from points north were proposed from 1833 onward, with construction commencing in 1837. Originally designed by Major David Douglass, who proposed a horseshoe shaped tunnel to carry water to the City, the design was later modified by engineer John Bloomfield Jervis who was hired to replace Douglass after he had been fired. As per the 1984 HAER documentation of the OCA, and, more specifically, the original engineering drawings, the aqueduct was built as a brick and mortar lined tunnel with stones and mortar along the exterior sides. Much of the aqueduct was supported above surrounding grade by a stone pediment and then backfilled with soil and reinforced with cement bracing. This ensured support of the conduit, and helped to prevent degradation.

When planned, the OCA was to be carried over the Harlem River in "two three feet pipes at present...[in the future] they are to be taken up and replaced by four feet pipes" (The Morning Herald, July 18, 1839). The High Bridge was designed to carry the OCA across the river, and was originally built with fifteen arches, eight with an eighty foot span, and seven with a fifty foot span (Ibid). In 1861-1862, a 90-inch main was installed between the original two three-foot pipes to increase water flow to Manhattan. However, even with the increased capacity, the OCA soon proved inadequate for the City's fast-growing population, and thus the New Croton Aqueduct (NCA) was constructed in the 1890s. The mains traversing High Bridge continued to carry a reduced water flow to Manhattan until 1955, supplementing water from the NCA (HAER 1984).

The OCA was considered an important engineering feat in the mid 19th century, serving internationally as a model for urban water supply. Its significance has been recognized through its multiple historic designations. The NHL nomination form for the OCA reports:

Constructed between 1837 and 1842, this aqueduct provided New York City with its first planned water supply system and served as a model for other cities. The eight-and-one-half foot tall, masonry-lined conduit ran 40 miles through undulating topography to central Manhattan; in a few places it is tunneled through solid rock or carried across valleys on bridges and berms, yet most of the aqueduct lies on a stone foundation immediately below ground (NHL 1992).

Extensive documentation pertaining to High Bridge and the OCA's planning, construction, use, and discontinuation of use are provided in the NR and NHL Registration Forms prepared in conjunction with their historical designations. These documents, along with an extensive collection of original engineering drawings and a detailed construction history prepared for HAER documentation of the overall OCA and, more specifically, High Bridge, provide a broad diversity of information on these historically significant structures.

III. RESEARCH DESIGN AND METHODOLOGY

This Phase IA Archaeological Documentary Study is designed to satisfy the requirements of both State Environmental Quality Review (SEQR) and City Environmental Quality Review (CEQR), and to comply with the standards of the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) and the New York City Landmarks Preservation Commission (LPC) (New York Archaeological Council 1994, NYSOPRHP 2005; LPC 2002; CEQR 2001). Where guidelines for the archaeological evaluation and report format of the LPC and the NYSOPRHP varied, those of the LPC, which specifically address New York City conditions and resources, took precedent.

This study specifically addresses those land areas within the proposed project site that will be subject to direct subsurface disturbance activities, which define the APE (see Figures 2 and 3). The Manhattan APE for the proposed ramp pier (Ramp Pier) includes the land approximately 100 feet to the west of the extant Gate House, and approximately 35 feet to the north and south of the existing bridge fascia (Figure 2). East of the proposed Ramp Pier, the APE is 25 feet on either side of the north and south fascia of the bridge where scaffolding would be erected to allow for repair of masonry surfaces (Figure 2). This temporary scaffolding would have timber mat foundations that would not penetrate the ground by more than two feet. Upon completion of repair work, the ground will be restored. Where the bridge crosses above extant roads, temporary lift equipment would be placed at grade rather than installing scaffolding. The staging area for proposed work would be within the plaza to the west of the extant Gate House on previously graded and paved land, and is not part of the archaeological APE as there is no potential subsurface impact.

The Bronx Ramp Pier APE includes the land east of the extant Gate House to the western edge of University Avenue, and approximately 35 feet to the north and the south of the existing bridge fascia (Figure 3). West of the proposed Ramp Pier, the APE is 25 feet wide on either side of the north and south fascia of the bridge where temporary scaffolding would be erected to allow for the repair of masonry surfaces (Figure 3). Impacts would be no more than two feet below grade for the timber mat foundations. Where the bridge crosses above the Major Deegan Expressway, the railroad right-of-way, and local streets, work in these areas would be limited to lift equipment for access to the sides of the bridge. The staging area for proposed work would be within the plaza to the east of the extant Gate House on previously graded and paved land, and is not part of the archaeological APE as there is no potential subsurface impact.

In addition to the east and west Ramp Pier and scaffolding locations, potential impacts to High Bridge and the historically significant OCA within High Bridge are also addressed.

Sufficient information was gathered to assess the subsurface disturbance record of the APE, both horizontally and vertically, and to establish the potential for precontact period and historical archaeological resources, as well as industrial archaeological resources. This was accomplished by undertaking an intensive cartographic analysis of the project site through time in order to identify areas of sensitivity as well as areas unlikely to produce archaeological materials due to prior disturbance. At the High Bridge APE, disturbances were caused by bridge construction, excavations for underground utilities, extensive landscape manipulation, and several episodes of bridge, aqueduct, and park improvements.

Review of Primary and Secondary Sources

Primary and secondary source material was researched in order to document the prior usage of the project site. These resources included pertinent archaeological reports as well as local and regional source material for data on prehistoric and historical settlements, and manuscripts and newspaper articles held by the New York Public Library, the New-York Historical Society, the New York City Municipal Archives and various online archival sites including the Library of Congress American Memory collection, and the New York Public Library Digital Image collection. Previously completed archaeological assessments of nearby locations were reviewed, and work efforts completed for those reports were not duplicated.

Of note, a number of archival resources normally consulted for a Phase IA Archaeological Documentary Study in New York City were not used, because either they were not relevant or did not include coverage of High Bridge. Specifically, because the project site has been municipally owned since construction of High Bridge in the 1830s, no deeds were reviewed. Additionally, the few Department of Buildings records on file for the APE were not deemed useful. Census and city directory data also were not pertinent due to the inability to precisely locate any individuals within the APE and its vicinity during the 19th century using these sources.

Cartographic Analysis

Historical maps and atlases were obtained from the Map Division of the New York Public Library, the New-York Historical Society, the Manhattan Borough President's Office, and various online sources including the New York Public Library, Digital Images collection, DavidRumsey.com, and the Perry-Castañeda Library Map Collection. These were compared for early and later land use, topography, historical events, and documented subsurface disturbance episodes. Early maps helped to provide an account of land-use modifications and episodes of construction over the course of the last two centuries.

Late 19th and 20th century atlases and Sanborn Fire Insurance Maps were reviewed to establish construction episodes, building locations in relation to the APE, and the presence of basements, which are indicators of subsurface disturbance. Cartographic comparisons were critical in demonstrating site-use changes over the last 150 years.

Site Review

A walkover of the High Bridge APE and a photographic record of the current conditions were completed on March 31, 2010. At the time, plants were defoliated and visibility was excellent. Anomalies and areas of obvious ground disturbance were photographed and noted on the site sensitivity map.

IV. RESULTS OF RESEARCH

Manhattan APE

Geological Conditions: The prehistory and history of Manhattan was in part shaped by the topography, ecology, and economic conditions that prevailed at various times. Understanding the city's geologic history aids in understanding the land-use history. During the Pleistocene period, ice advanced in North America four times. In the last 50,000 years, the Wisconsinian period, ice was 1,000 feet thick over Manhattan. Gravel and boulders deposited at the ice sheet's melting margin formed Long Island about 15,000 years ago (Kieran 1982:26). Briefly, Manhattan was largely covered by a glacial lake. Glacial Lake Flushing occupied broad, low-lying areas when deglaciation of the region produced vast volumes of meltwater. Higher elevations of Manhattan may have been marginal to this lake (Church and Rutsch 1984:6). By 12,000 years ago the lake drained and sea levels have gradually risen as glaciers retreated

The project area is within the embayed section of the Coastal Plain which extends along the Atlantic Coast and ranges from 100 to 200 miles wide. The Manhattan prong, which includes southwestern Connecticut, Westchester

County and New York City, is a small eastern projection of the New England uplands, characterized by 360 million year old highly metamorphosed bedrock (Schuberth 1968:11). The Manhattan ridge generally rises in elevation toward the north, and sinks toward the south.

The prevalent gneissoid formation is known as Hudson River metamorphosed rock. The city is characterized by a group of gneissoid islands, separated from each other by depressions which are slightly elevated above tide and filled with drift and alluvium. Historical development has altered many of the natural topographic features that once characterized Manhattan (Gratacap 1909:5). Soil within Manhattan is mostly glacial till, clay, sand, gravel, mud, and assorted debris (Kieran 1982:24). The groundwater level fluctuates with tidal variations in the river.

Soils: The USDA soil survey for New York City (Figure 5) indicates that the Manhattan APE falls within an area mapped as “Chatfield-Charlton complex, 15 to 50 percent slopes.” These soils are described as:

Moderately steep to very steep areas of bedrock controlled hills and ridges modified by glacial action that are relatively undisturbed and mostly wooded; a mixture of moderately deep and deep gneissic till soils; located in Manhattan and the Bronx (USDA 2005:17).

Properties of the two soil series are described in the table below.

| Name | Soil Horizon Depth | Color | Texture, Inclusions | Slope % | Drainage | Landform |
|------------------|---|---|--|---------|----------|-------------------------------------|
| Chatfield series | A: 0-2 in AB: 2-8 in Bw: 8-25 in 2R: 25 in | VDkGryBrn DkBrn Brn | Lo Lo GrlSiLo Bedrock | 15-50 | Well | Bedrock controlled hills and ridges |
| Charlton series | A1: 0-5 in A2: 5-10 in AB: 10-14 in Bw1: 14-24 in Bw2: 24-33 in C1: 33-45 in C2: 45-72 in | VDkGryBrn DkBrn DkYelBrn StrBrn DkYelBrn YelBrn LtOlBrn | Lo Lo Lo SaLo SaLo StoLoSa StoLoSa | 15-50 | Well | Till plains and hills |

Key: Color: V-Very, Dk-Dark, Gry-Gray, Brn-Brown, Yel-Yellow, Str-Strong, Lt-Light, Ol-Olive
Soils: Lo-Loam, Sa-Sand, Si-Silt
Other: Grl-Gravel, Sto-Stony

Current Conditions: The Ramp Pier APE in Manhattan is predominantly situated on a slope along the Harlem River, while the scaffolding APE includes both the slope down to the river, and manmade land to the east (Figure 2). The terminus of the bridge is on a terrace elevated high above the Harlem River Drive. To the north and south of the bridge, the APE is steeply sloped with mature trees and brush extending down to the Highbridge Interchange, which linked the George Washington Bridge, the Cross Bronx Expressway, and the Harlem River Drive (Photographs 1-2). Immediately to the north of the bridge is exposed bedrock, as well as a level area with low cement retaining walls and fencing (Photograph 3). Bricks and architectural debris are strewn across the surface in this area. Below the slope is the Harlem River Drive (Photograph 4). South of the bridge touchdown is a stepped stone buttress that originates at the paved terrace and extends downward into another relatively level area now in the woods (Photograph 5). A Gate House is visible at the Manhattan touchdown, and the area to the east is paved (Photographs 6, 7). The OCA runs through the Gate House, and veers to the southwest, protected by a retaining wall that serves to create the paved terrace. Further west of the Gate House is a steep incline with exposed bedrock that rises up to Highbridge Tower and a recreation area with a pool (formerly a reservoir for the OCA) (Photograph 8).

Prior to construction of the OCA, the APE was steeply sloped down to the Harlem River. In the 19th century, fill was added along the shoreline to the east of the Ramp Pier APE, extending the shore eastward further into the Harlem River, and both a highway (the Harlem River Drive) and an access ramp (Highbridge Interchange) were constructed beneath the westernmost piers of High Bridge.

Precontact Use: Research conducted at the NYSOPRHP, the LPC, and the library of HPI revealed that there are a number of archaeological resources mapped within a one mile radius of the Manhattan APE, including a village site mapped by the NYSOPRHP as within a broad area along the Harlem River from 169th to 185th Avenues. These precontact sites are detailed in the table below.

| Site Number | Site Description | Location | Time Period |
|-------------|------------------|--|--------------------|
| NYSM#4065 | Village | West 155 th Street and the Harlem River | Unknown precontact |
| NYSN#4066 | Village | Broad area from 169 th to 185 th Streets, from the Harlem River west to Broadway | Unknown precontact |
| NYSM#4068 | Village | Fort George area | Unknown precontact |
| NYSM#8370 | Camp | Fort George area | Unknown precontact |

Based on proximity to the archaeological sites along the Harlem River on the Manhattan shore, the NYSOPRHP GIS database (which indicates sensitivity for areas within one mile of known resources) indicates that the Manhattan APE is within an area of archaeological sensitivity.

Historical Use: Although Dutch trading expeditions had already been visiting the Hudson River for many years, the first settlement in New Netherland was not undertaken until 1624, under the authority of the Dutch West India Company (Brodhead 1853:150-151). New Amsterdam had been settled for 13 years before the first attempt was made to establish a village at the northern end of the island. Jan Dyckman settled the area in 1661. Roger Morris - whose home was temporarily used as a headquarters by General Washington during the American Revolution in the fall of 1776 and during the Battle of Harlem Heights - eventually owned the land in the vicinity of High Bridge, but lost it after the American Revolution, being a Tory. His estate and surrounding land was conveyed to Stephen Jumel in 1810 (Riker 1904). Although the surrounding area saw extensive occupation and military action during the American Revolution due to the strategic importance of northern Manhattan, no maps or military surveys from that period depict structures or earthworks in proximity to the APE (Stevens 1900; Johnston 1897).

During the 1860s, dredging for the Harlem River Canal generated tons of fill material when much of the river bottom was removed to create a deep channel for easier shipping (Murphy 1860). In the early 19th century, the majority of Manhattan north of 125th Street was a mix of residential, agricultural, and industrial use, while by the late 19th century it was shown as residential, commercial, and unimproved land. Northern Manhattan, or what is now considered Washington Heights, was dotted with grand family estates. Presumably agriculture had largely been abandoned in this area by that time (NYCLPC Neighborhood Maps 1983: 1815-1829, 1855-1879).

Historical Land Use in APE and immediate vicinity: The 1781 Taylor Skinner map shows the Manhattan APE at the top of a bluff and devoid of any structures, whereas the Randel 1811 map just shows a vacant shoreline. Several small farms and estates dotted the northern portion of Manhattan during the early 19th century, with the project APE falling in the Stephen Jumel lot (Sackersdorff 1868 [depicting 1815]). No buildings or roads were mapped near the project site until after the construction of the OCA.

When a survey of the Harlem River shoreline was completed in 1835, it also depicted the Manhattan APE as a vacant bluff along the western side of the river High Bridge had not yet been completed (M'Neill 1835). By 1836, the route of the OCA was mapped crossing the Harlem River, but since the bridge was still not yet completed, it was not portrayed on the map (Colton 1836, Figure 6). The 1837 USCS survey failed to show the aqueduct at all, either crossing the river or along the shoreline (USCS 1837).

In 1849, High Bridge was mapped crossing the Harlem River, and the Manhattan APE was portrayed at the top of a bluff and a slope down to the river, and devoid of structures (Sidney 1849). When Dripps created his map of

Manhattan in 1851, he depicted several structures around the Manhattan touchdown of the bridge, but details of their location in relation to the current APE are difficult to discern (Dripps 1851). To the northwest, and far outside of the APE, stood a hotel on what was formerly the Jumel landholding.

By 1855, a coastal survey showed two Gate Houses present; one at either end of the bridge (USCS 1854-55, Figure 8). Because of the dark shading on the map directly along the river's edge to indicate a steep slope, it is unclear if any other structures are present in the Manhattan APE. A road had been laid out east-west across upper Manhattan, terminating just south of the Gate House. In 1857 the APE appeared to only contain the extant Gate House, and a road was clearly laid out to the south of the Gate House and above the route of the OCA as it meandered along the top of the bluff heading south to lower Manhattan (USCS 1857). Two years later, the Gate House was clearly mapped in the APE (Nicholson 1857, Figure 9).

When a new 90.5" pipe over the two original OCA pipes in High Bridge was constructed in 1861-1862 so as to increase water capacity, it became necessary to provide a mechanism to increase water pressure in northern Manhattan where elevations were higher than the pipes coming over the Harlem River. To address this, a reservoir was built to the west of the Gate House within what is now Highbridge Park, and water was mechanically pumped from it into an elevated storage tank at the top of a new water tower. A contract was issued for the construction of a reservoir, wharf, and coal house in 1866, and a pump and boiler house in 1867. Construction of the High Service Tower and Reservoir was completed in the early 1870s, and the tower remains on the landscape today. The coal house and wharf were built to the east of the APE on the Harlem River, with coal delivered through a tunnel under what is now Harlem River Drive, and coal conveyor built immediately north of the Gate House within the APE. Coal was hoisted up the conveyor to service a pump house or pumping station (also called an engine and boiler house) that stood to the immediate northwest of the Gate House also in the APE (Wegmann 1896; Bone 2006; Sanborn 1893, 1900 [see Figure 22], 1913 [see Figure 24]; City of New York Department of Plant and Structures 1926, see Appendix A of this report)

By 1867, both the High Service Tower and the Reservoir were mapped even though they were still under construction, but none of the other features were (Harrison 1867, Figure 12). An 1871 image of the site shows the new High-Service Tower, Reservoir, coal house, wharf, and coal conveyor as they appeared upon completion of construction (Figure 14). By 1874, the tower, reservoir, and engine house were depicted cartographically, and the site appears unchanged in 1879 and 1885 (Grant 1874 [Figure 15], Bromley 1879a [Figure 16]; Robinson 1885 [Figure 18]). A ca.1900 photograph of the Manhattan touchdown of High Bridge shows the pump house to be a two-story structure with a basement and chimney stack that architecturally mimics the more ornate High Service Tower to the west (Figure 22).

Late 19th and early 20th maps and atlases show variations on the descriptive name of the pump house (pumping station, boiler house, engine house), and the newly created Harlem River Speedway, where horses and carriages were raced, on manmade land along the Harlem River shoreline (Sanborn 1893, 1900 [Figure 22], 1913 [Figure 23]; Bromley 1916). Eventually, this became the Harlem River Drive. In 1926, long after the New Croton Aqueduct had been put into service, the coal conveyor and tower were to be removed, and the coaling tunnel that was out of the APE was to be sealed at both ends. Simultaneously, the 36" siphon conduits in the Gate House were to be discontinued, and the 6" pipe service lines were to be removed (City of New York Department of Plants and Structures 1926; see Appendix A of this report). A 1934 topographic map of Highbridge Park shows the placement of all of the structures and the surrounding topography at the time. While the coal conveyor and tower had been removed, the pump house was still standing in the APE (City of NY Dept of Parks 1934; see Appendix A of this report). Most of the land in the APE was either steeply sloped, or developed with structures and features affiliated with the OCA and High Bridge.

The APE was again modified in the 1950s with the construction of the Trans-Manhattan Expressway that opened to traffic in 1962 (Sanborn 1936, 1951, 2008; compare Figures 2 and 28). More specifically, construction of the Highbridge Interchange, which linked the George Washington Bridge, the Cross Bronx Expressway, and the Harlem River Drive, caused extensive changes to the landscape of Highbridge Park. An access ramp to the Harlem River Drive was constructed to the north and east of the Manhattan Ramp Pier APE, running beneath High Bridge.

Despite the fact that the pump house is portrayed on insurance maps as late as 2008, the structure is no longer standing in the APE (Sanborn 2008, Figure 2; see Photograph 8)

Bronx APE:

Geological Conditions: The borough of the Bronx also lies within the Hudson Valley Region and is considered to be part of the New England Upland Physiographic Province, which is a northern extension of the Great Appalachian Valley (Schuberth 1968). Situated within the Manhattan Prong, the region has a landscape of rolling hills and valleys. Underlying bedrock include metamorphic rocks that resist erosion and thus make up the hills (Isachsen et al 1991).

During the most recent period of glacial activity, the Wisconsin episode, the Bronx was covered by ice. Following deglaciation, postglacial Lake Hudson covered much of the Hudson Valley below the Highlands including the project site. When it receded, smaller water courses were left, scouring the landscape into what it is today. The adjacent Harlem River, underlain by easily abraded Inwood Marble, was created through these actions. Although many fresh water tributaries once fed the Harlem River, it is essentially a tidal strait (Kieran 1982).

Soils: The USDA soil survey for New York City (Figure 5) indicates that the Bronx APE falls within an area mapped as “Pavement & buildings-Chatfield-Greenbelt complex, 15 to 50 percent slopes.” These soils are described as:

Moderately steep to very steep urbanized areas of bedrock controlled hills and ridges modified by glacial action, that have been substantially cut and filled, mostly for residential use; a mixture of moderately deep gneissic till soils and anthropogenic soils, with 50 to 80 percent impervious pavement and buildings covering the surface; located in Manhattan and the Bronx (USDA 2005:17).

Properties of the two soil series are described in the table below.

| Name | Soil Horizon Depth | Color | Texture, Inclusions | Slope % | Drainage | Landform |
|------------------|--|---|--------------------------------|----------------|-----------------|-------------------------------------|
| Chatfield series | A: 0-2 in AB: 2-8 in Bw: 8-25 in 2R: 25 in | VDkGryBrn DkBrn Brn | Lo Lo GrlSiLo Bedrock | 15-50 | Well | Bedrock controlled hills and ridges |
| Greenbelt series | A: 0-3 in Bw: 3-13 in C: 13-57 in Ab: 57-58 in BwB: 58-65 in | Brn YelRd RdBrn DkBrn YelRd | Lo Lo GrlLo Lo Lo | 15-50 | Well | Anthropogenic urban fill plains |

Key: Color: V-Very, Dk-Dark, Gry-Gray, Brn-Brown, Yel-Yellow, Rd-Red
 Soils: Lo-Loam, Sa-Sand, Si-Silt
 Other: Grl-Gravel

Current Conditions: The Bronx APE for archaeological resources includes the footprint for the Ramp Pier, which is situated on a slope at the base of a bluff that rises above the Harlem River, where a Gate House and park are located (Figure 3; Photograph 9). The APE for the scaffolding includes both the slope and the land to the west, exclusive of roadways and railroad right-of-way. Immediately to the south of the bridge touchdown is an ashlar block stair street that was constructed in the 19th century to allow access from the top of the bluff to Sedgwick Avenue (formerly Undercliff Avenue) below (Photograph 10). It appears that the terraces created by the zigzagging stair street were once landscaped, and a stone and cement wall demarcates the southern boundary of the planted area (Photograph 11). To the north of the touchdown is a wooded and brushy slope located below the park above

(Photographs 12 and 13). An alignment of stones protruding from the dirt amidst the brush suggests either a crude retaining wall or prior structure once stood in this location (Photograph 14).

A park surrounds the north, south, and east sides of the Gate House, and is tiered up to the level of University Avenue to the east (Photograph 15). Within the park to the immediate south of the Gate House are the remains of a foundation for an office building that stood on the site in the late 19th and early 20th centuries (Photographs 15, 16).

Precontact Land Use: The presence of Native Americans in the Bronx for the Early Archaic through Late Woodland Periods has been documented, although some periods are more abundantly represented than others. Archaeologist Eugene Boesch undertook the task of creating a model of precontact land use in the Bronx based upon the knowledge of existing precontact sites and their topographic locations coupled with an understanding of the precontact environmental conditions (Boesch 1994). His generalized sensitivity map for the borough indicated that the current project site has a high sensitivity for precontact period resources (Ibid.). Boesch specifically called out the north to south extending ridge overlooking the Harlem River as an area that “may have been the location of numerous hunting camps” (Ibid.). However, it should be noted that Boesch’s assessment was generalized, and was not intended to account for prior disturbance, which is essential to establish in order to determine if any potential archaeological resources may have retained their integrity.

Research conducted at the NYSOPRHP, the LPC, and the library of HPI revealed no archaeological resources specifically mapped within the Bronx APE, and no precontact sites recorded within a one mile radius of the project site in the Bronx, although the four precontact noted for the Manhattan APE have been recorded within a one mile radius in Manhattan. These sites are detailed in the table below.

Based on proximity to the archaeological sites along the Harlem River on the Manhattan shore, the NYSOPRHP GIS database (which indicates sensitivity for areas within one mile of known resources) indicates that the project site is within an area of archaeological sensitivity. Additionally, a Native American trail has been documented in the project site vicinity, along the approximate location of modern Jerome Avenue (Grumet 1981). Last, Boesch’s study of the Bronx identifies the top of the ridgeline at the Bronx APE eastern terminus as within a moderately archaeologically sensitive area for precontact resources (Boesch 1994).

Historical Land Use: The Bronx APE vicinity falls within the original Fordham Manor grant, initially obtained by John Archer in the 1660s. Fordham Manor encompassed some 1,250 acres, extending from the Bronx River on the east to the Harlem River on the west, and roughly between present Kingsbridge on the north to the Manor of Morrisania on the south (about West 169th Street) (Scharf 1886). The lands of the manor including the project site were mortgaged by John Archer in 1676, and later passed to the Dutch Reformed Church. In 1683 the County of Westchester was formed, extending from Putnam County to the north, south to the Harlem and East Rivers. What is now the Borough of the Bronx, including the project site, was included in this tract (Jenkins 1912:1). In 1759, local landowner Lewis Morris purchased a large portion of the former Fordham Manor, including the project site, but through a series of transactions the land ended up back with the Archer family in 1766. In 1788, Westchester County was reorganized, and the Town of Westchester expanded westward to include the lands of the former Manors of Fordham, Morrisania, and the settlement of West Farms, basically all of the Bronx between the Bronx and Harlem Rivers. The Town of Westchester, along with all lands in the Bronx west of the Bronx River, was annexed by New York City in 1874 and became part of the 24th Ward. In 1898 the Borough of the Bronx was formed (Jenkins 1912:7).

Historical Land Use in APE and immediate vicinity: Prior to construction of High Bridge in the Bronx, the area along what was then the Westchester County shoreline that would become the APE was devoid of any structures, as shown on the 1781 Taylor Skinner map. The nearest roadway was Macombs Dam Road, which ran along the ridgeline several blocks to the east, from Fordham near modern day University Heights to Macombs Dam Bridge. By at least the 1830s, the line of what is now known as Undercliff Avenue had been laid out west of the APE, as shown on the 1836 Colton map (Figure 6) and the 1837 U.S.C.S. map. Undercliff Avenue began at Macombs Dam Road and ran southwest along the shoreline, under the bluffs along the bank to the river’s edge, just west of the APE. No buildings were mapped near the APE site until after the construction of the OCA.

As noted above, the OCA was built between 1837 and 1842. The land including the Bronx APE was acquired in 1837. When a survey of the Harlem River shoreline was completed in 1835, it depicted the Bronx APE as a vacant bluff along the eastern side of the river as the bridge had not yet been completed (Hall 1835). By 1836, the route of the OCA was mapped crossing the Harlem River, but since High Bridge was not yet completed, it was not portrayed on the map (Colton 1836, Figure 6). The 1837 USCS survey failed to show the aqueduct at all, either crossing the river or along the shoreline (USCS 1837). However, both the 1836 and 1837 maps did illustrate the route of Undercliff Avenue.

In maps made in 1849 and 1851 by Sidney and Neff, High Bridge was mapped crossing the Harlem River, and the route of the OCA was shown making a turn from High Bridge to the northeast. The 1849 map shows a structure on the northwest side of this angled turn, and the 1851 map shows a second structure on the southeast side of the turn. The 1851 map illustrates a hotel to the southeast of the APE, accessed from Undercliff Avenue to the west (Figure 7). It is unclear what the unmarked structures represent, and based on the scale of the mapping, whether they were even located within the APE. Review of slightly later maps indicates that there were no structures immediately adjacent to the OCA within the APE that might have corresponded to those shown on the Sidney and Neff maps. For example, by 1855, a coastal survey showed only the Gate House (within the line of the bridge, and not adjacent to it) and the hotel just off the APE (USCS 1854-55, Figure 8). In 1857 the APE appeared to only contain the Gate House; the hotel is not shown nearby, although few buildings were included on this map (USCS 1857). The same year, another mapmaker showed the Gate House clearly within the APE, the hotel was shown just outside the APE, and another unnamed stone structure was shown to the northeast of the APE, within the overall project site (Nicholson 1857, Figure 9). Thus, it is possible that the Sidney and Neff maps were showing structures further away from the APE, such as the hotel to the southeast, and/or the structure shown on the Nicholson map (which was shown on later maps and images to be a dwelling, as described below) but imprecisely located. There does not seem to be any evidence that there were additional structures within the APE during this period.

As noted above, in 1861-1862 a new 90-inch conduit was installed along the top of High Bridge, to increase the carrying capacity of the aqueduct. Construction of this new pipe was documented by a number of illustrations (Figures 10 and 11), some of which are included in the HAER documentation of the OCA. These lithographs, which generally showed the bridge looking east from the Manhattan side, also included some details for the Bronx APE. In particular, these images show that the building to the northeast of the APE within the overall project site was a two-story structure with a hipped roof, perched on the top of the ridgeline and oriented with its entrance to the southwest. Although none of the maps or images identify its occupants, because it was located on land owned by the city and used for OCA purposes, it is likely that the building was a house for OCA-related personnel.

Maps made during the 1860s and 1870s often did not show enough detail to confirm use of the Bronx APE (e.g. Beers 1868 [Figure 13], 1876, Viele 1874). The 1868 Beers map showed a long structure on the northeast side of the OCA where it meets High Bridge, but based on other maps, this unnamed building appears to have been located off the APE. For example, the 1874 Grant map (Figure 15) shows this building as a long structure just outside the APE and the 1879b Bromley map, also showing it just bordering the APE, attributes it to "Kart" (Figure 17). Both the 1874 and 1879b maps illustrate the Gate House at the end of High Bridge and the dwelling to the northeast of the APE, partially within the modern footprint of University Avenue. The hotel, shown to the southeast of the APE on earlier maps, is no longer depicted by the 1870s.

During the 1880s, there were a number of modifications made within the Bronx APE. The 1891 Sanborn map (Figure 19) shows that by this time, a two story stone office building had been constructed just south of the Gate House, and an extensive stair street had been constructed leading from the top of the bridge down to the base of the hill, accessing what is now known as Sedgwick Avenue. The steep area between the stairs and the bridge was landscaped. The 1891 Sanborn map also confirms that the dwelling shown to the northeast of the Bronx APE within the overall project site on earlier maps was two stories high with a front porch on the southwest and a one story rear extension on the back, or northeast (Figure 19). There were two outbuildings northeast of the dwelling, one of which was octagonal shaped and may have been a gazebo or tower. Additionally, a series of six small structures was shown within the line of what is now University Avenue to the east of the Bronx APE. The structure just outside the APE on the north was a one, two, and three story, large building attributed to "J. Kart." A walkway extended from the Gate House within the APE to this property. The 1893 Bromley map provided further details

about these buildings, showing that the Kart structure was a hotel. Interestingly, the Bromley map did not show any buildings within the modern line of University Avenue. The 1895 Topographic map showed some of the details from the other maps as well (Figure 20).

Maps made during the early 20th century show additional details about the Bronx APE, although few changes. The 1904 Bromley map and the 1909 Sanborn map both indicate similar conditions as their earlier editions, although the 1909 Sanborn map notes both the hotel and the structure to the northeast of the APE as dwellings, but indicates at least a part of the former hotel was vacant at this time). The dwelling is shown next to the hotel and not within the roadway anymore. It appears that the roadway was narrowed to accommodate the house.

By the publication of the 1923 Bromley map (Figure 24), both the former hotel and the dwelling described above had been demolished, and the area north and northeast of High Bridge was vacant. There was no change shown on the 1932 Bromley map update, although High Bridge itself had been reconstructed in the 1920s. Drawings from the bridge reconstruction show that the area north of High Bridge, including the location once containing the dwelling, was now noted as landscaped (City of New York Department of Plants and Structures 1926; see Appendix A of this report). The bridge reopened in 1928 (New York Times 10/30/1928, Figure 25). In 1931, reconstruction plans were made to upgrade the stairs adjacent to the Bronx APE with new treads, cleats, and hand rails (City of New York Department of Water Supply, Gas and Electricity 1931; see Appendix A of this report). In the 1930s, the Major Deegan Expressway (Route 87) was built beneath the eastern end of High Bridge in the Bronx, west of Undercliff Avenue. A photograph from 1940 shows the stair street with the office building at the top of the hill in the APE (Sperr 1940, Figure 26).

In 1941, the Carmelite Sisters Monastery, a brick two story complex, was built on the property just north of the APE, where the former Kart hotel once stood. The 1942 Bromley map (Figure 27) shows the building and the 1952 Sanborn map confirms that the monastery had been built in 1941. The area northeast of the APE was noted in 1952 as a park, and was separated from the monastery property and University Avenue by retaining walls.

Maps made during the remainder of the 20th century showed no change to the current configuration of the Bronx APE (Hyde 1969, Bromley 1978). By issuance of the 2008 Sanborn map (Figure 3), the office building south of the Gate House had been removed; today this area contains the former building's stone foundation walls. A renovation to the park portion northeast of the APE was completed in 2001.

High Bridge APE:

Plans for an aqueduct into Manhattan from points north were proposed from 1833 onward, with construction of the OCA dating between 1837 and 1842. Originally designed by Major David Douglass, it was later modified by engineer John Bloomfield Jervis who was hired to replace Douglass. When originally built, it was undecided if the aqueduct would pass over the Harlem River on a low bridge – over a relatively low embankment with one low arched passage for boats - or at grade level, crossing high above the river over a bridge of towering Roman arches (Bone 2006). The High Bridge, or grade option, was ultimately chosen and construction began in 1839; the bridge was ready for use in 1848, six years after the completion of the OCA. During the interim, the aqueduct was carried across the Harlem River via a pipe siphon on a low embankment (Ibid.). When completed, the OCA was carried across High Bridge in two 36” diameter iron pipes.

In 1859 plans were made to lay a new 90.5” pipe over the two original OCA pipes in High Bridge so as to increase water capacity (Bone 2006). Several historic images show this construction underway (Figures 10 and 11), with work completed between 1861-1862. At that time, the top of the bridge was covered with a masonry arch that served to both protect the piping beneath, and to provide a pedestrian surface. This increased the quantity of water that could pass over the bridge.

The OCA was considered an important engineering feat in the mid 19th century, serving internationally as a model for urban water supply. As previously stated, there is extensive documentation pertaining to High Bridge and the OCA's planning, construction, use, and discontinuation of use provided in the NR and NHL Registration Forms

prepared in conjunction with their historical designations. These documents, along with an extensive collection of original engineering drawings and a detailed construction history prepared for HAER documentation of the overall OCA and, more specifically, High Bridge, provide a broad diversity of information on these historically and industrially significant features.

In the 1920s High Bridge was reconstructed, with the most dramatic change being the replacement of the central spans with a single steel span. Piers 10 through 13 that stood in and adjacent to the Harlem River were removed to allow the passage of larger vessels (see Appendix A). Upon completion of the renovations, the bridge reopened in 1928 (New York Times 10/30/1928; Figure 25).

V. ARCHAEOLOGICAL POTENTIAL

Manhattan APE

As presently defined, the APE for the Manhattan Ramp Pier includes the area measuring approximately 100 feet to the west of the Gate House and 35 feet on either side of the bridge fascia, while the scaffolding APE extends out 25 feet from the bridge fascia above fast land to the east, exclusive of existing paved roads (Figure 2).

Based on the modifications to the landform to support High Bridge and the OCA on the western portion of the APE, and the steep topography and exposed bedrock on the northern and southern portions of the APE, precontact archaeological sensitivity is low. Although a NYSM precontact village site has been mapped broadly as overlapping the APE, the landform of the APE suggests that this would not have been a favorable location for a precontact village. It is probable that the site was located further inland, on more level terrain, and the mapping is imprecise.

Prior to construction of High Bridge and the OCA, there was no historical development within the APE. Potential historical archaeological resources associated with High Bridge and the OCA includes any remains of the former pump house/engine house that was located northwest of the Gate House, a retaining wall to the north, and the pipes and conduits of the OCA itself. The Scaffolding APE lacks archaeological potential as it extends across land that was extensively modified with the construction of the Harlem River Drive and an access ramp built as part of the Highbridge Interchange. These construction activities caused extensive changes to the predevelopment landscape of the APE, rendering it too disturbed to yield any potential intact resources.

Bronx APE

As presently defined, the APE for the Bronx Ramp Pier includes the area from the Gate House east to University Avenue and the area approximately 35 feet on either side of the bridge fascia for the area east of Sedgwick Avenue. To the east of this, the scaffolding APE extends out 25 feet from the bridge fascia west to the river, exclusive of roads and railroad right-of-ways (Figure 3).

As with the Manhattan Ramp Pier APE, based on modifications to the landform to support High Bridge, the OCA, and the former late 19th century office building and stair street, combined with the steep topography on the north and south sides of the bridge, precontact archaeological sensitivity within the APE is low.

Prior to construction of High Bridge and the OCA, there was no historical development within the APE. Potential historical archaeological resources in the Bronx APE include the pipes and conduits of the OCA itself. The visible foundation of the former office building (from ca. 1880s-late 20th century), located south of the Gate House, is preserved in the current parkland and is part of the historical OCA landscape, but is not assumed to have archaeological research potential given its late date (post-dating municipal sewer and water availability). Although just outside the present APE, any remains associated with a former 19th century dwelling located at the northeastern corner of the park within the overall project site (from ca. 1857-1923) would also be archaeologically sensitive, but no impacts are anticipated in this location. There is also the possibility that remains from possible unidentified structures shown on the 1851 Sidney map (Figure 7) located on the northwest and southeast side of the OCA alignment could be located with the Ramp Pier APE. However, the identity and precise location of these possible

structures could not be confirmed and it is equally possible that the map was in error and that the structures in question were located outside the APE and were imprecisely mapped.

High Bridge APE

Both High Bridge and the OCA have industrial archaeological significance in their own right. As noted above, High Bridge is New York City's oldest extant bridge. It has been listed as a New York City Landmark and on the S/NR. The entire OCA system, of which High Bridge is a component, also is listed on the S/NR and is a National Historic Civil Engineering Landmark (NHCEL), a NHL, and is nationally renowned by both engineers and laymen alike. High Bridge, being a part of the OCA system, maintains these same National designations.

Because of the industrial archaeological significance of the bridge and the OCA, HAER recordation was completed in 1984 (HAER NY-119 and HAER NY-120). Any potential changes to the structural or mechanical elements of either the bridge or the OCA would constitute an impact to the fabric of these features as they exist today.

VI. CONCLUSIONS AND RECOMMENDATIONS

HPI has determined that portions of the Manhattan and Bronx APEs may be archaeologically sensitive for resources associated with High Bridge and the OCA. The Manhattan Ramp Pier APE may be sensitive for historical resources identified northwest of the Gate House, and the Bronx Ramp Pier APE may be potentially sensitive for ca.1851 mapped historic dwellings – although the imprecise nature of the mapping makes it just as likely that these resources were outside of the APE. For those portions of the APE that are found to be potentially sensitive for archaeological resources, but would not undergo any subsurface disturbance, no archaeological testing would be warranted. However, if subsurface disturbance is anticipated in these sensitive locations, then testing would be recommended.

High Bridge and the OCA are of industrial archaeological significance; the Historic American Engineering Record (HAER) for both resources is recognition of this status. Although the HAER reports are at the Library of Congress, they were filed in 1984 and are more than 25 years old. An updated photographic record to current HAER standards of both High Bridge and OCA features prior to any proposed changes is recommended. HPI will assist in documentation with the industrial archaeological component as requested.

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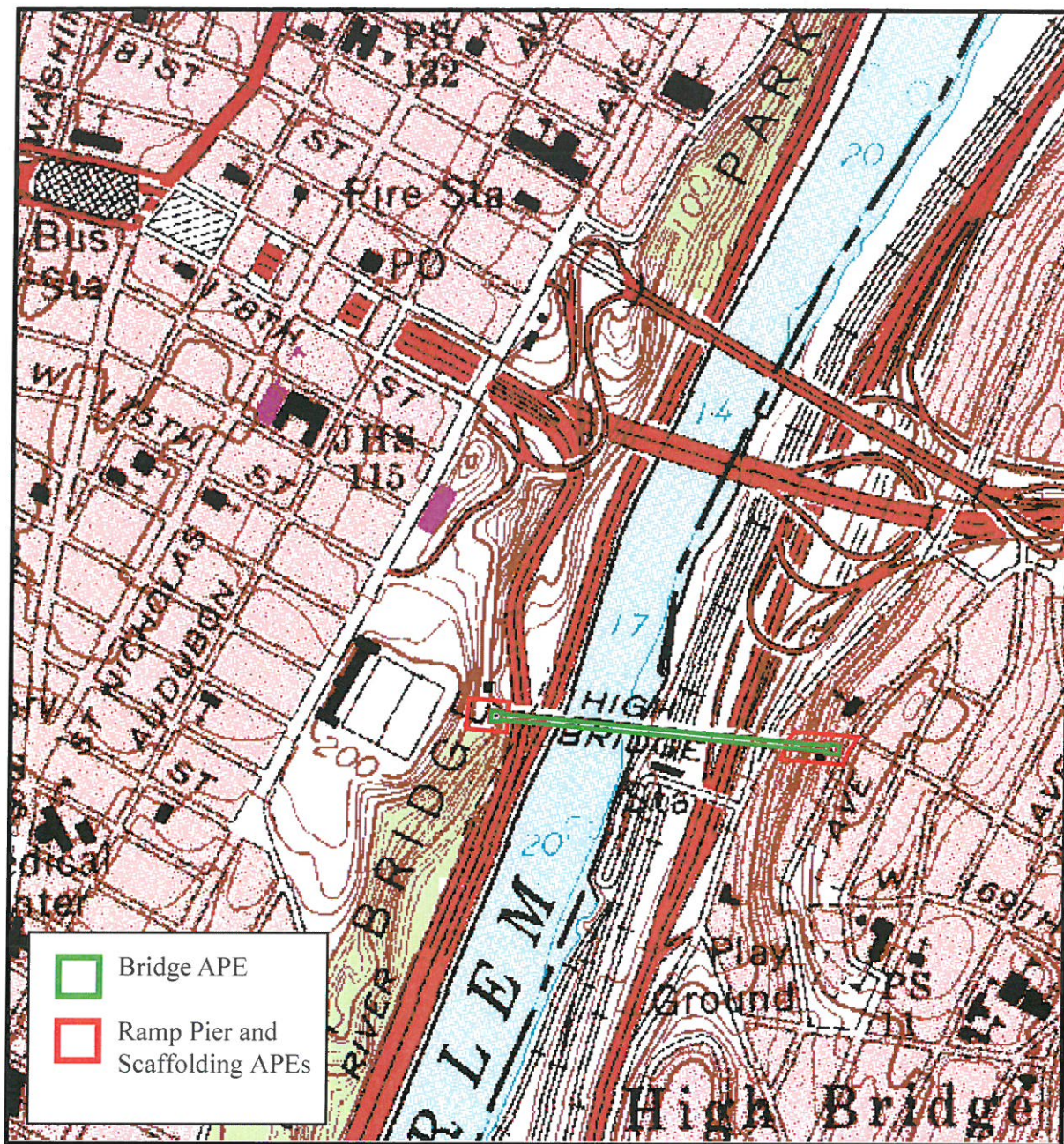
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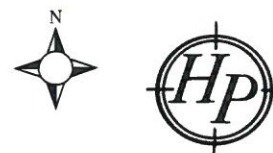
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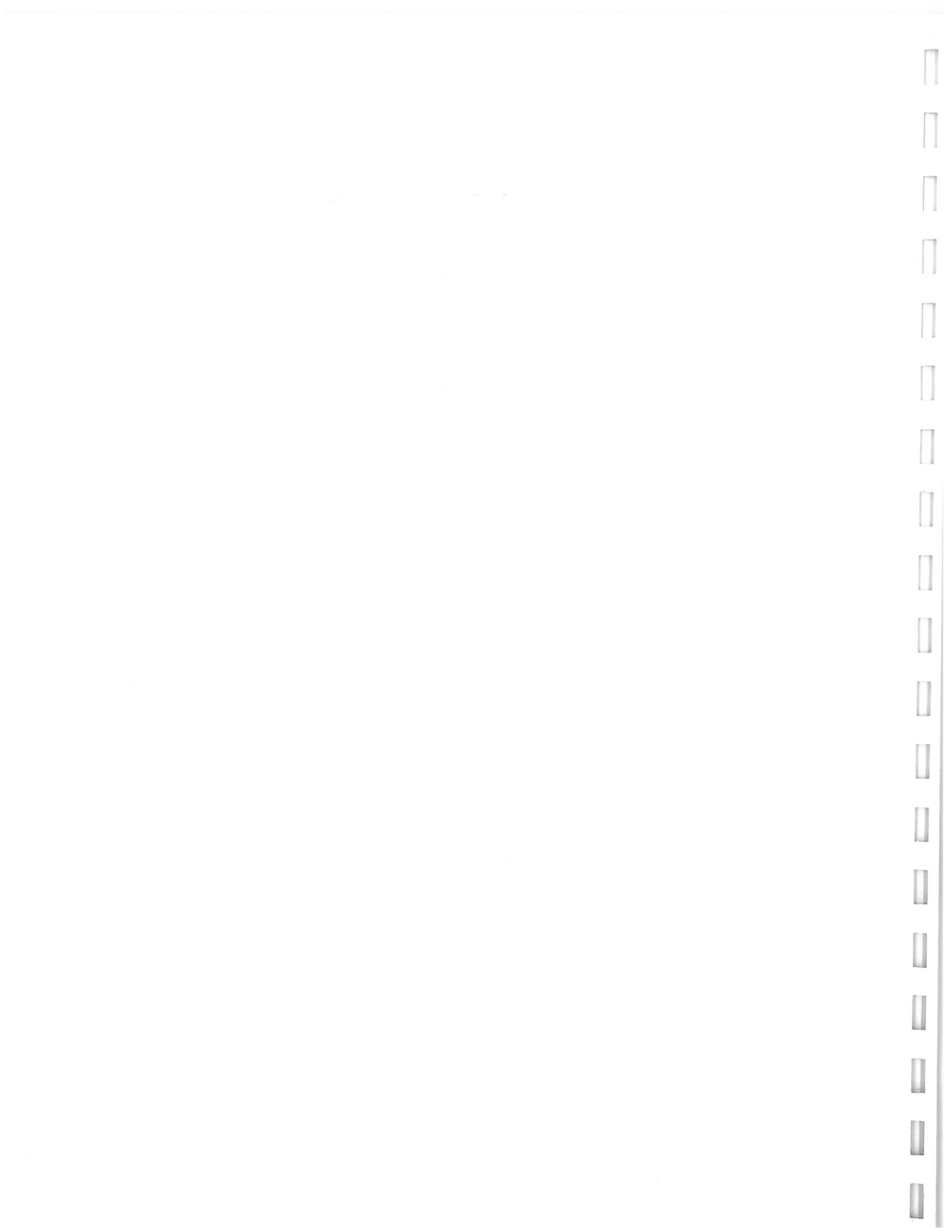


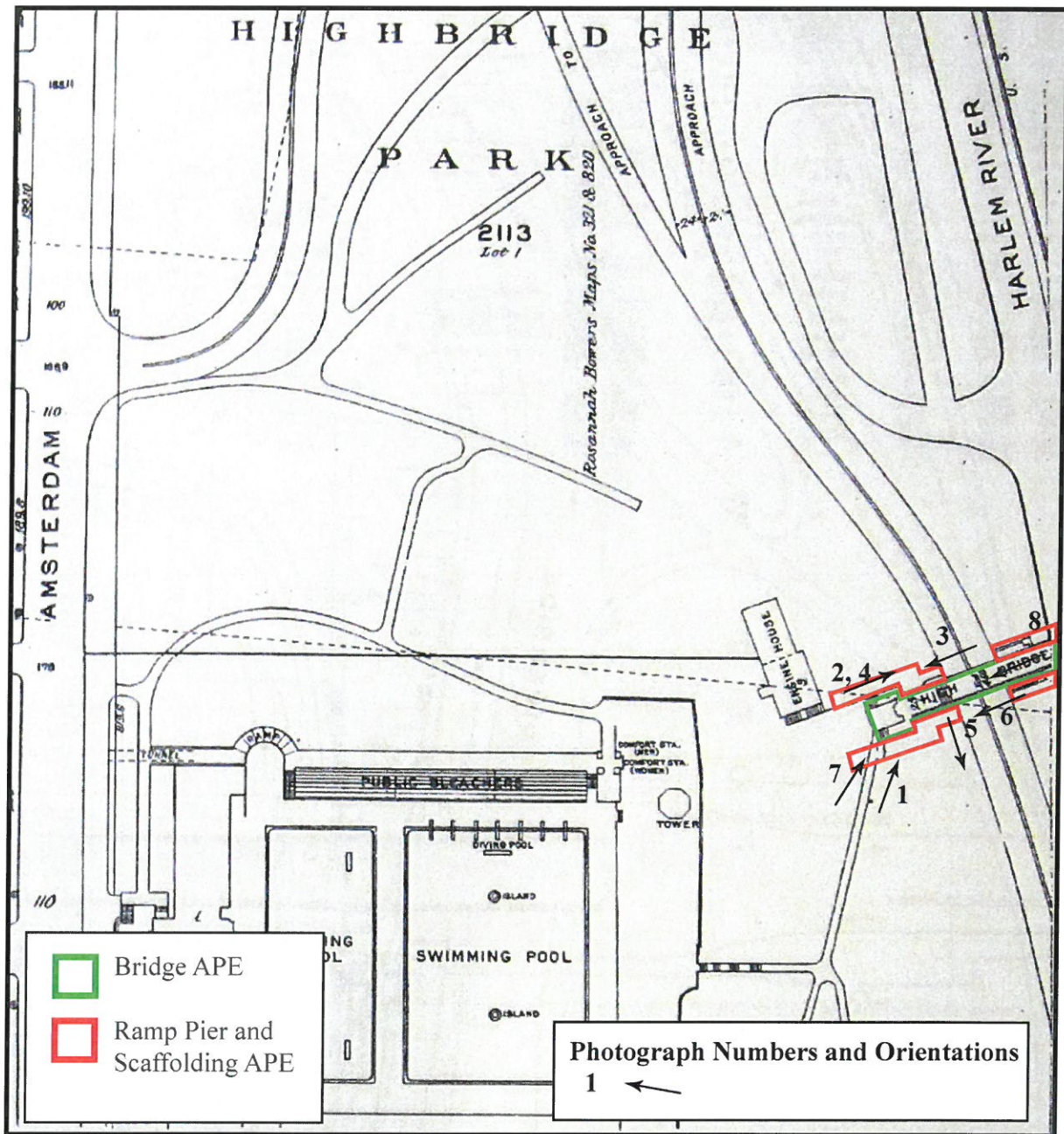
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

**Figure 1: *Central Park, N.Y.-N.J.* 7.5 Minute Quadrangle
(U.S.G.S. 1979).**



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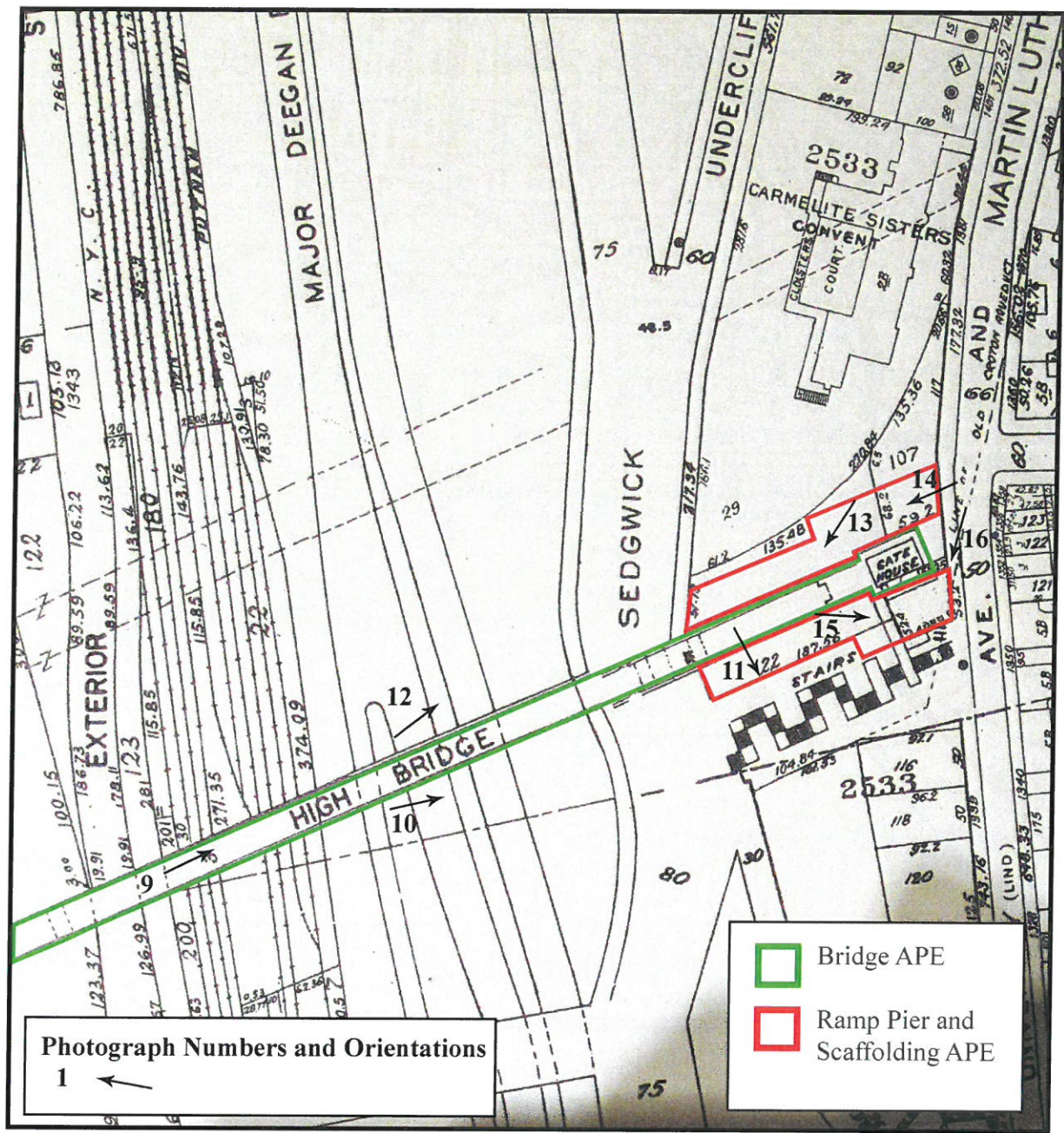
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

**Figure 2: Manhattan APE and Photograph Key on
Insurance Maps of the City of New York (Sanborn 2008).**



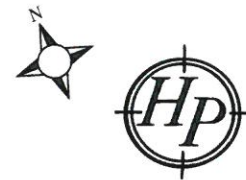
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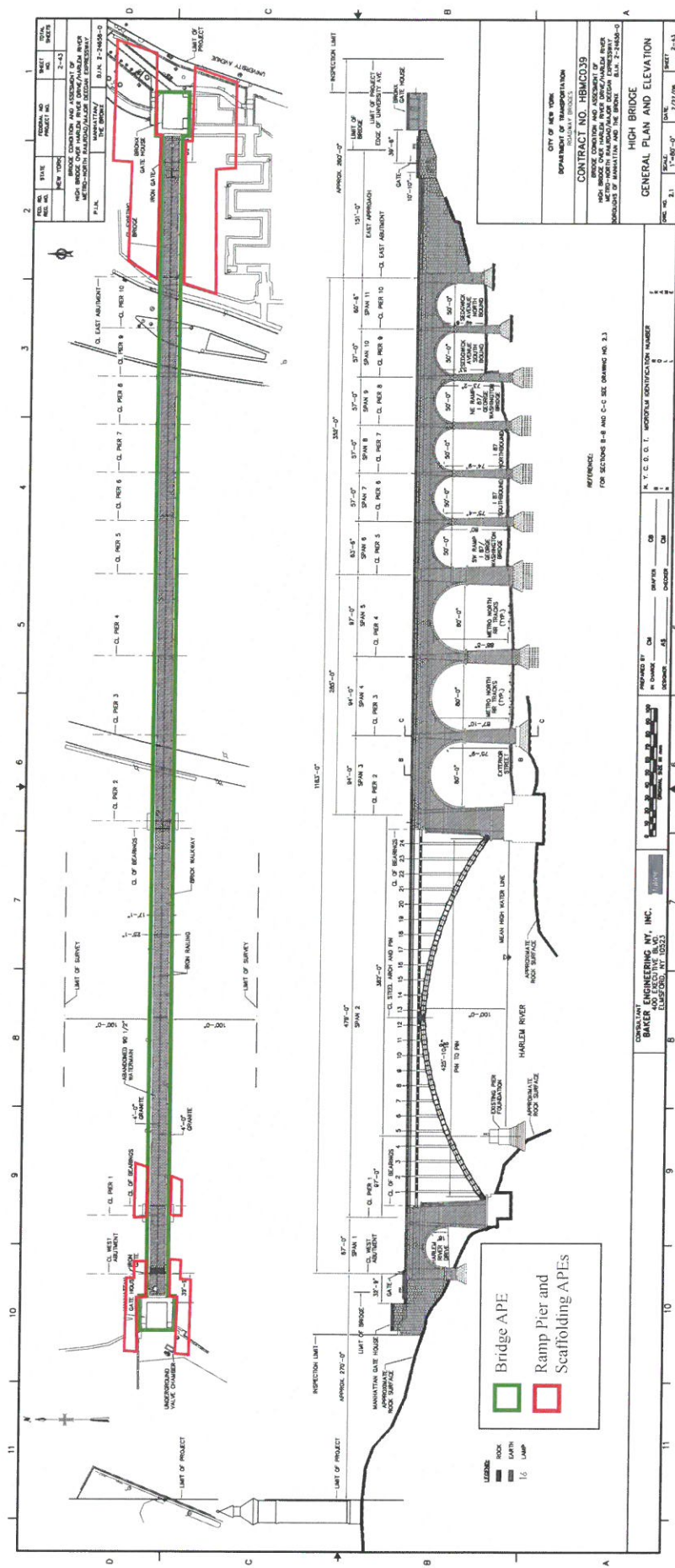
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

**Figure 3: Bronx APE and Photograph Key on
Insurance Maps of the City of New York (Sanborn 2008).**



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Phase IA Archaeological Documentary Study
 High Bridge, Manhattan and Bronx, New York
 Figure 4: High Bridge Existing Conditions (Baker Engineering 2006).

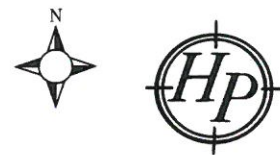




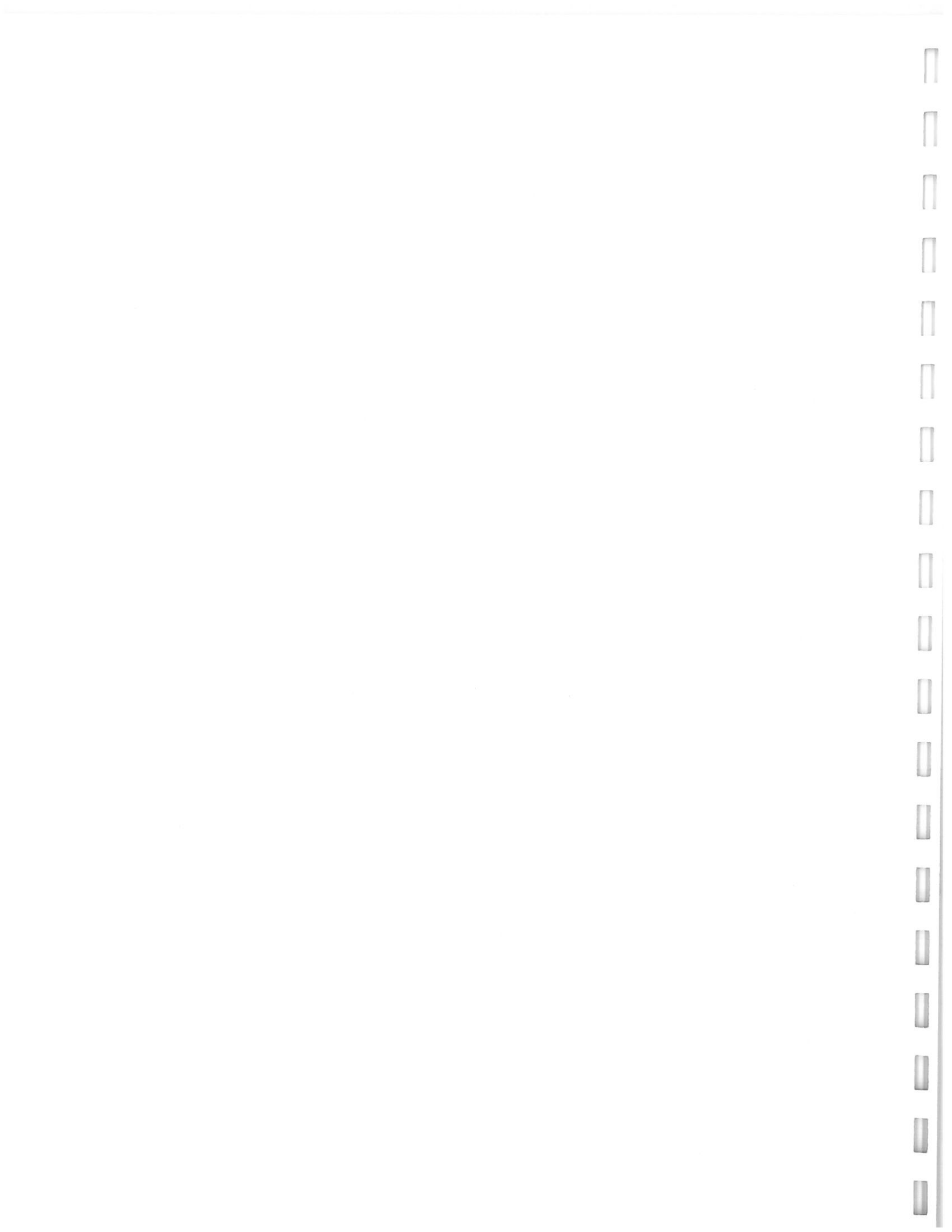


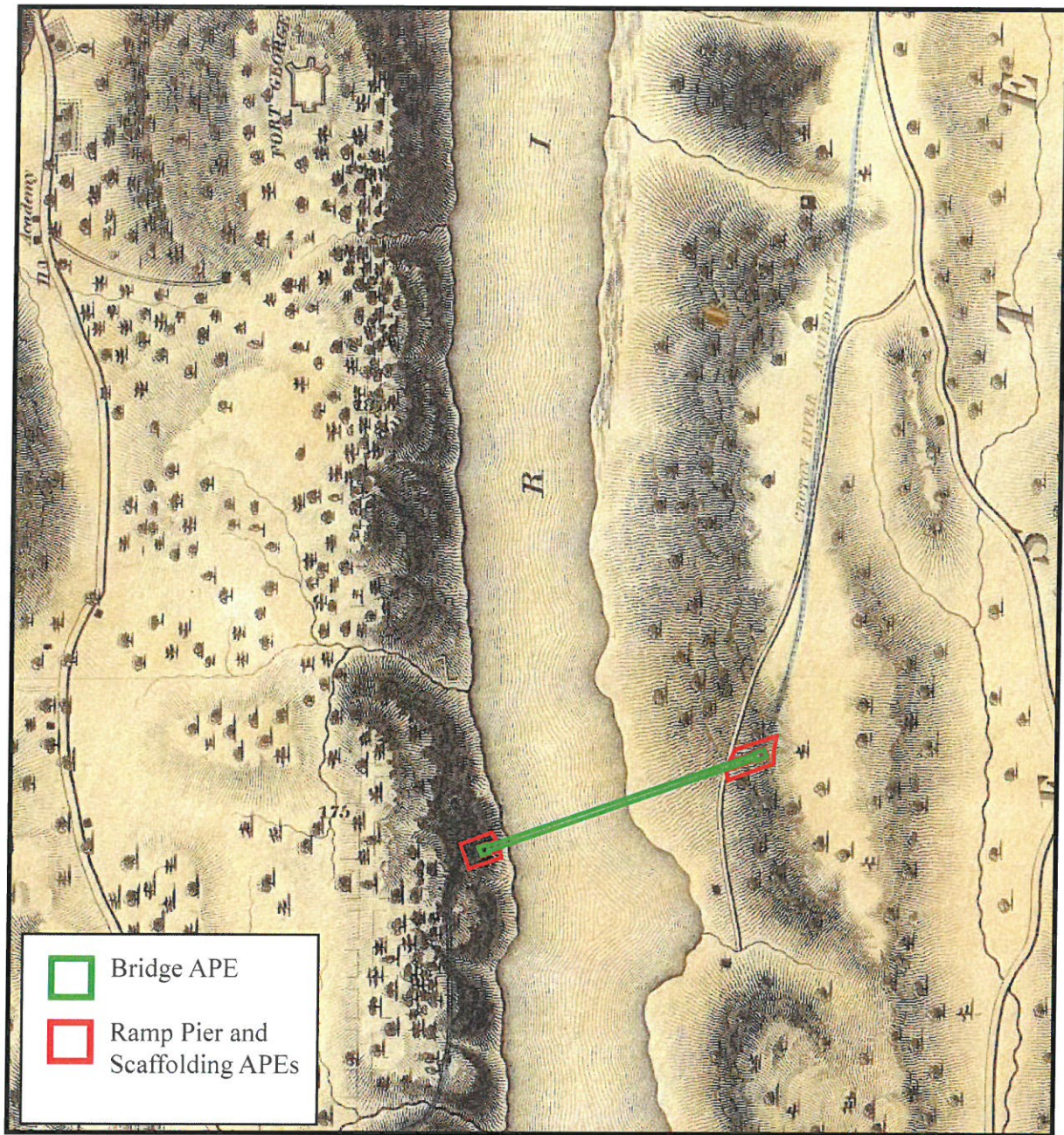
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

**Figure 5: New York City Reconnaissance Soil Survey
(U.S.D.A. 2005).**



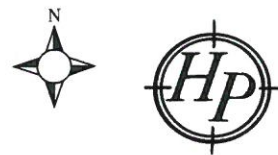
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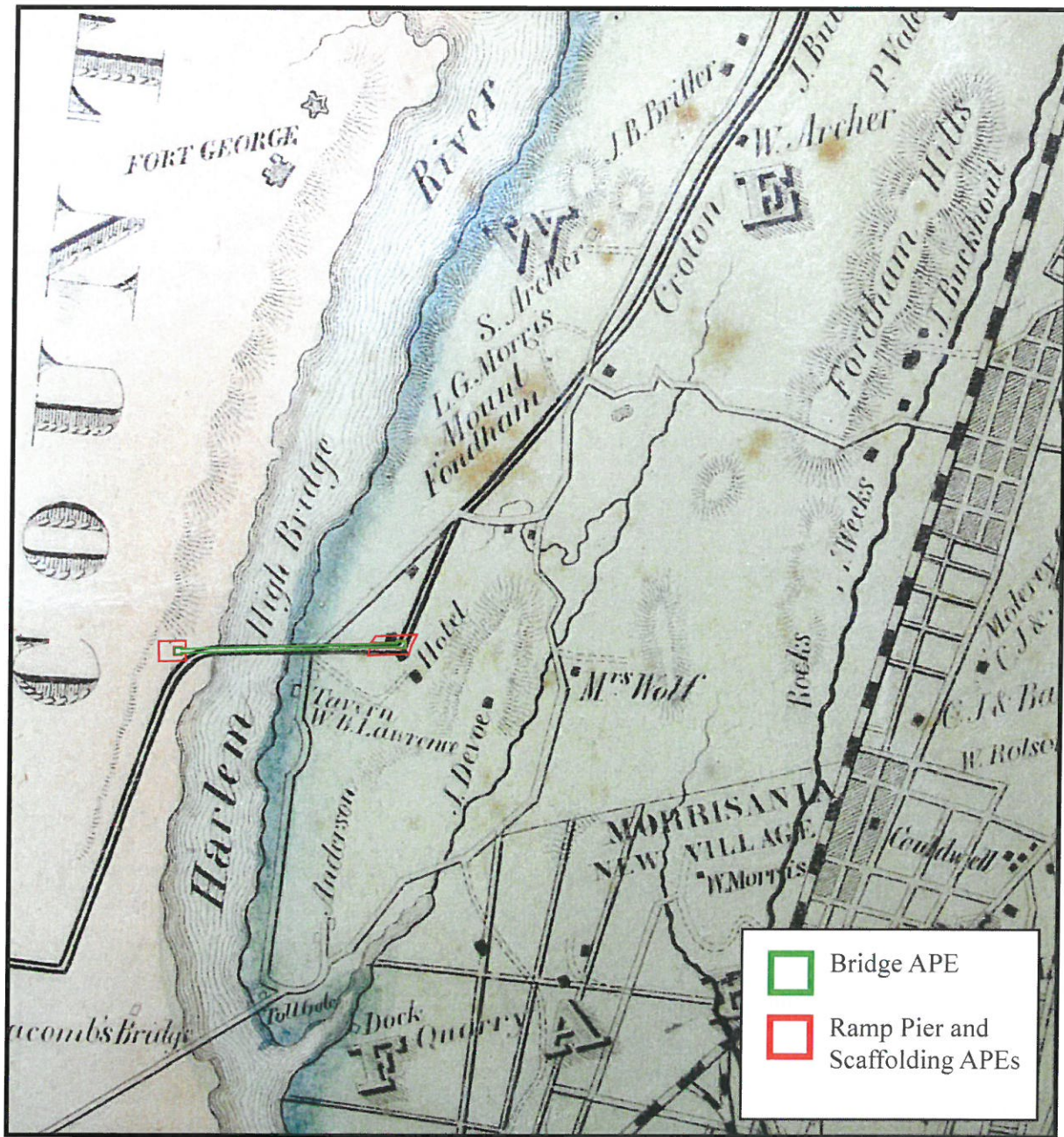
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 6: *Topographical Map of the City and Country of New York, and the Adjacent Country (Colton 1836).*



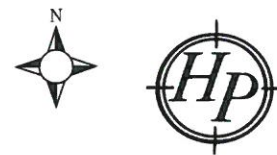
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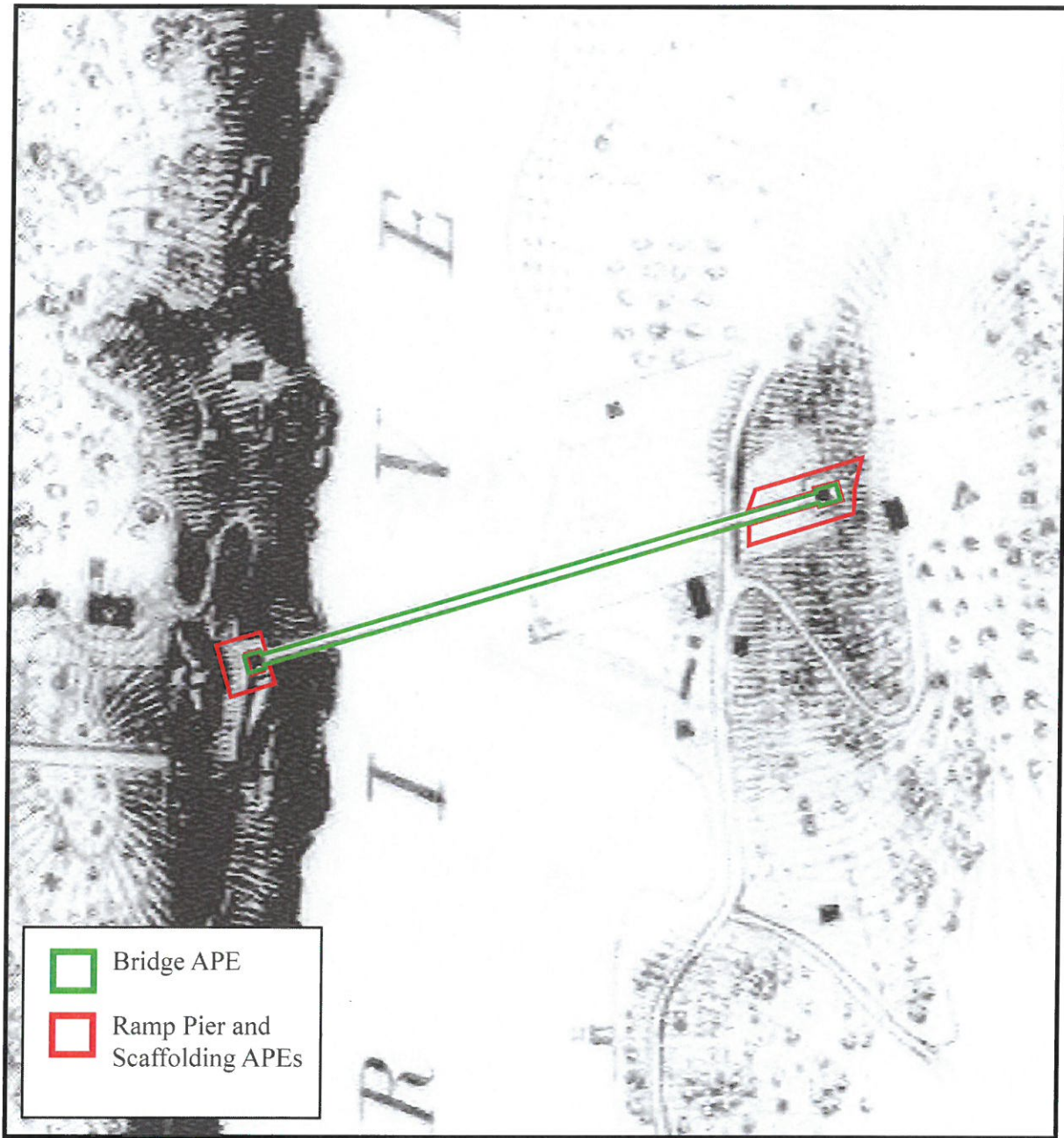
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

**Figure 7: Map of Westchester County, New York
(Sidney and Neff 1851).**



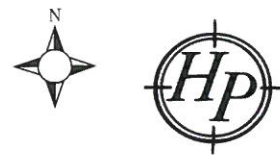
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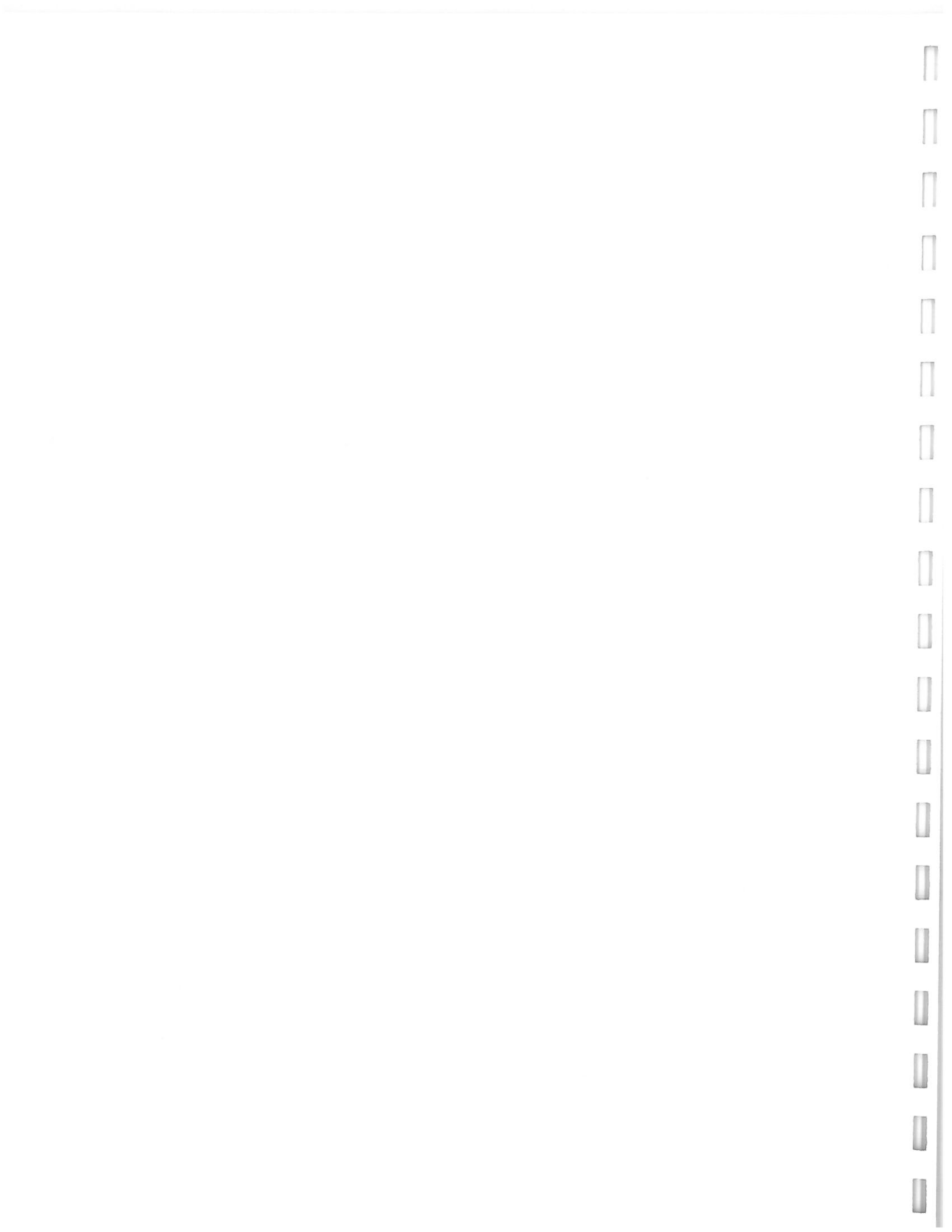


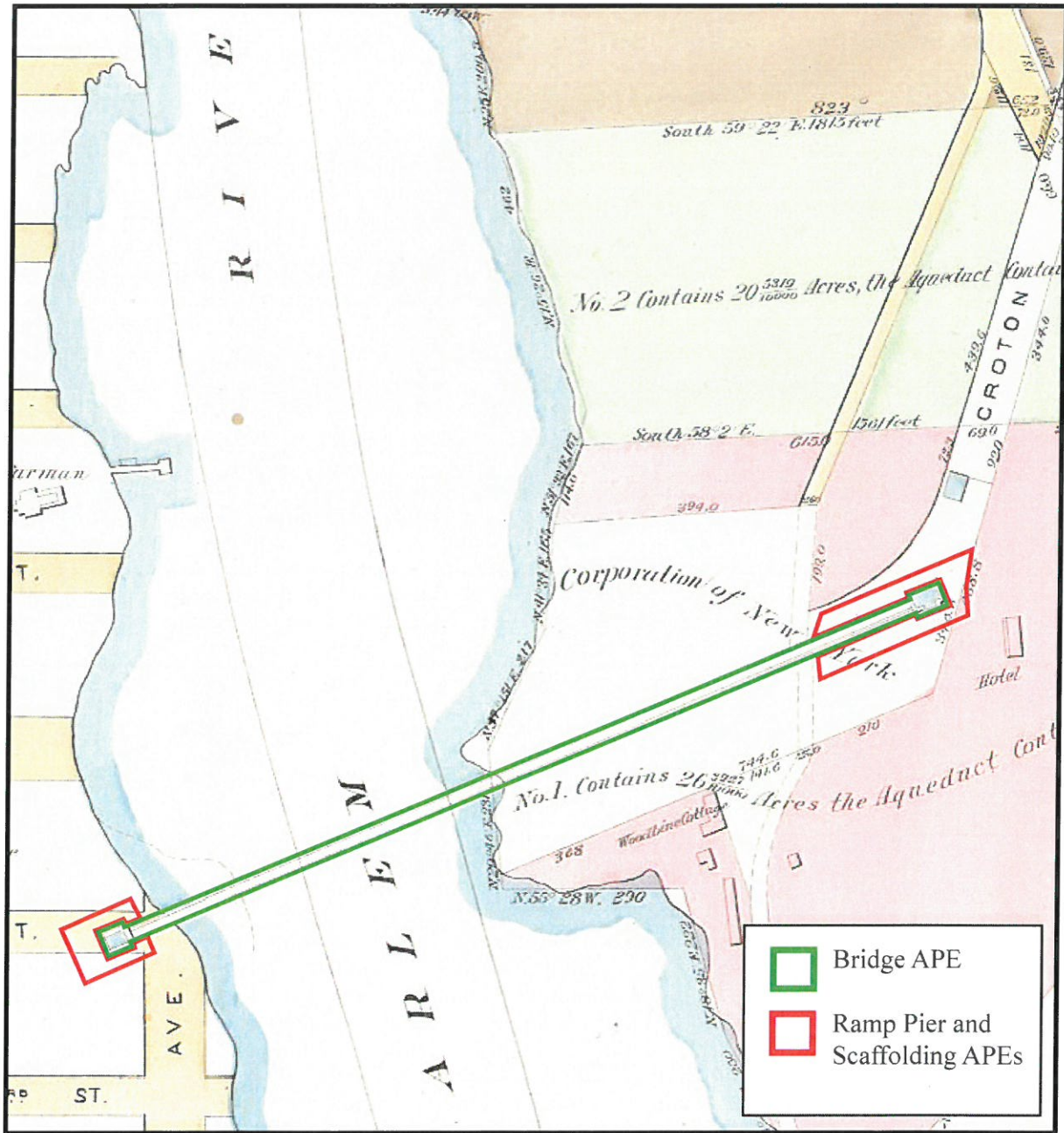


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High Bridge, Manhattan and Bronx, New York**

Figure 8: *New York City and Manhattan Island* (U.S.C.S. 1854-5).







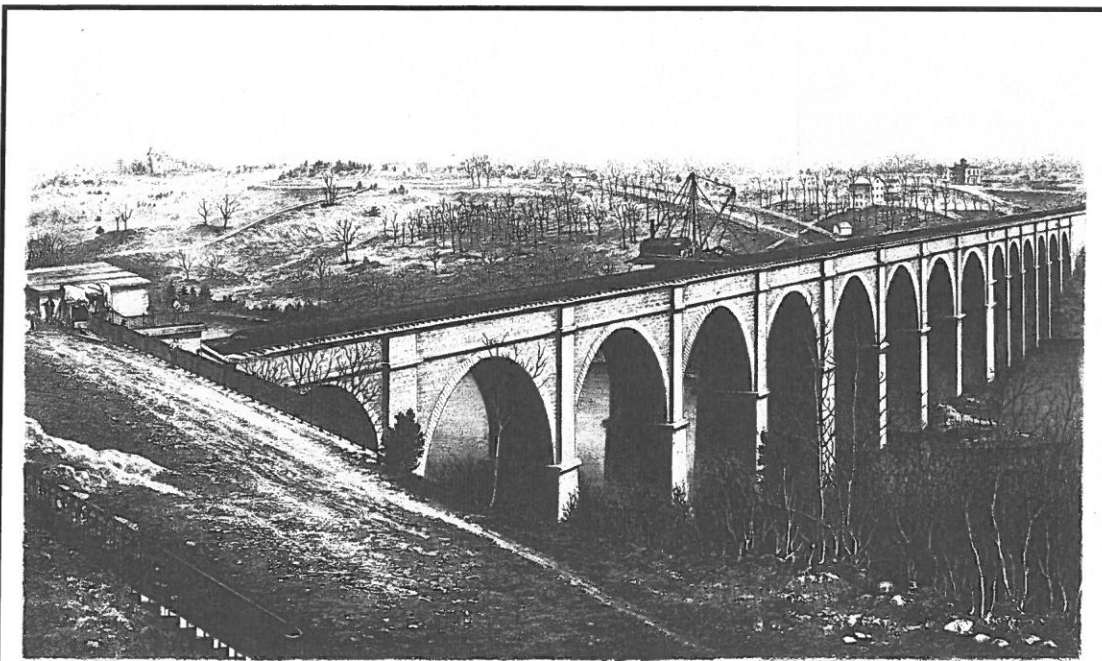
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 9: Map of Lands in the County of Westchester Belonging to Richard F. Carman, John Lowery, and Archibald H. Lowery (Nicholson 1857).

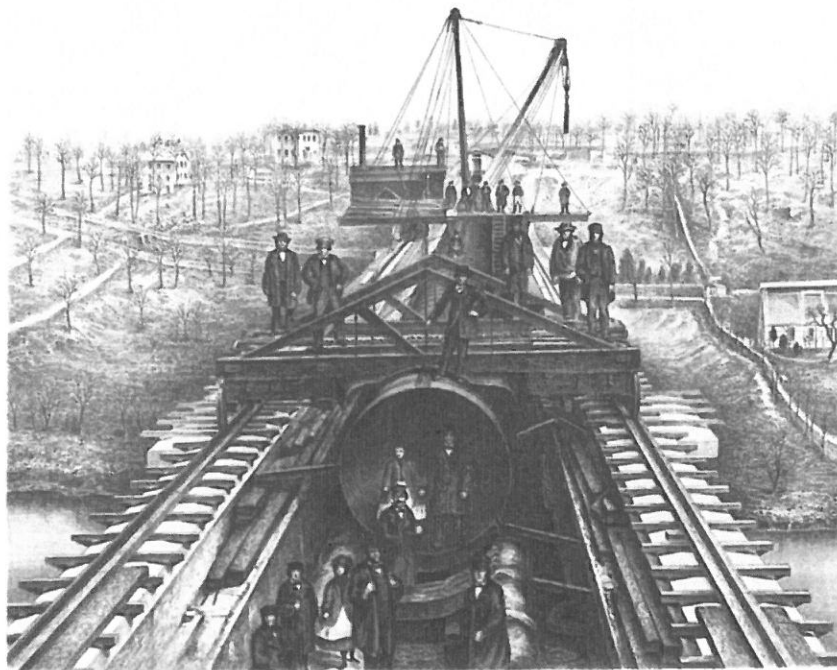


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HIGH BRIDGE DURING CONSTRUCTION OF THE LARGE MAIN
viewed from the New York side looking South East



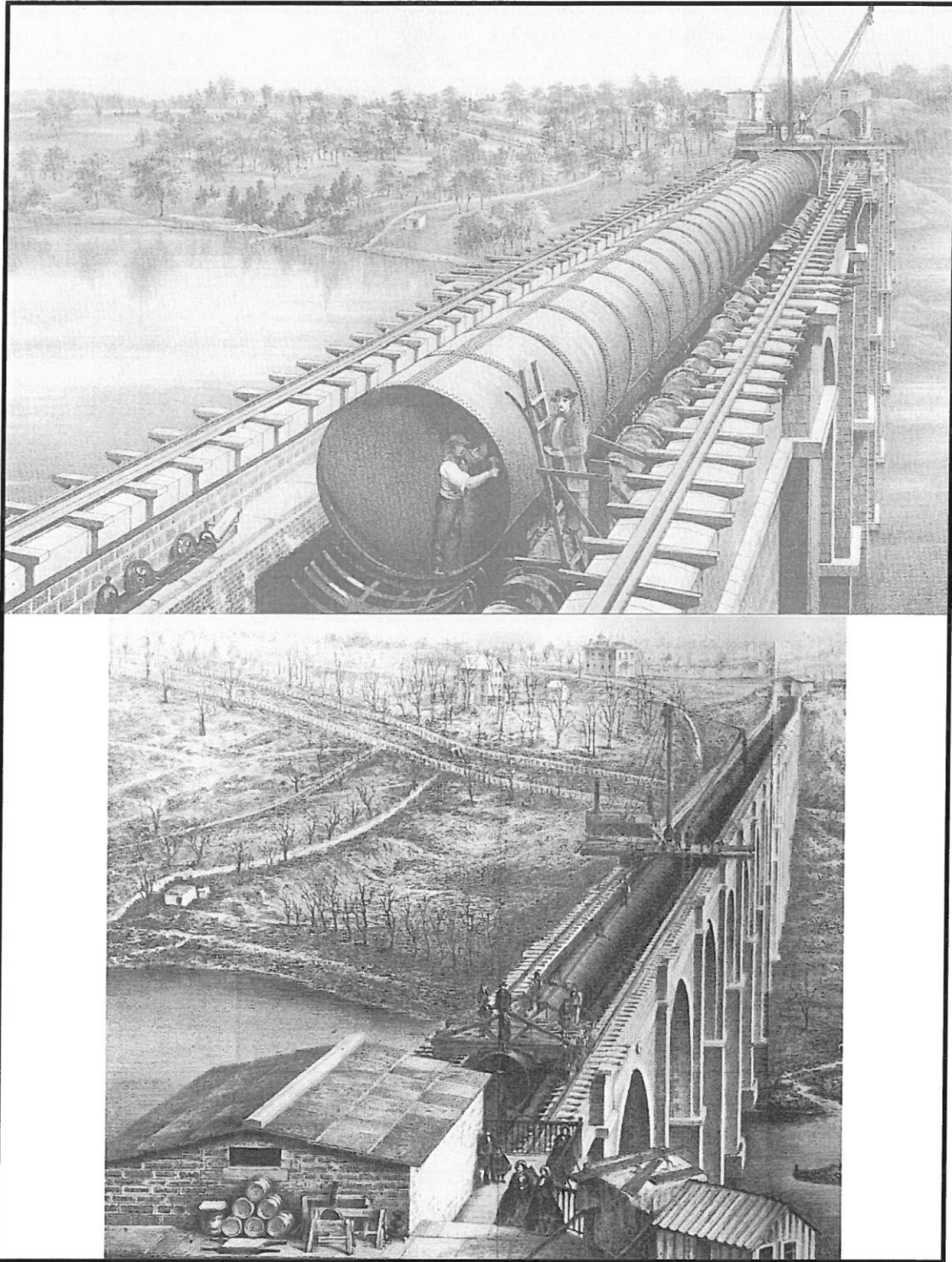
HIGH BRIDGE DURING CONSTRUCTION OF THE LARGE MAIN
viewed from the West Gate House looking East

**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 10: *High Bridge During Construction of the Large Main: Viewed from the New York Side Looking Northeast (top) and Viewed From the West Gate House Looking East (bottom) (ca. 1860-1862, reproduced in HAER-NY- 119).*





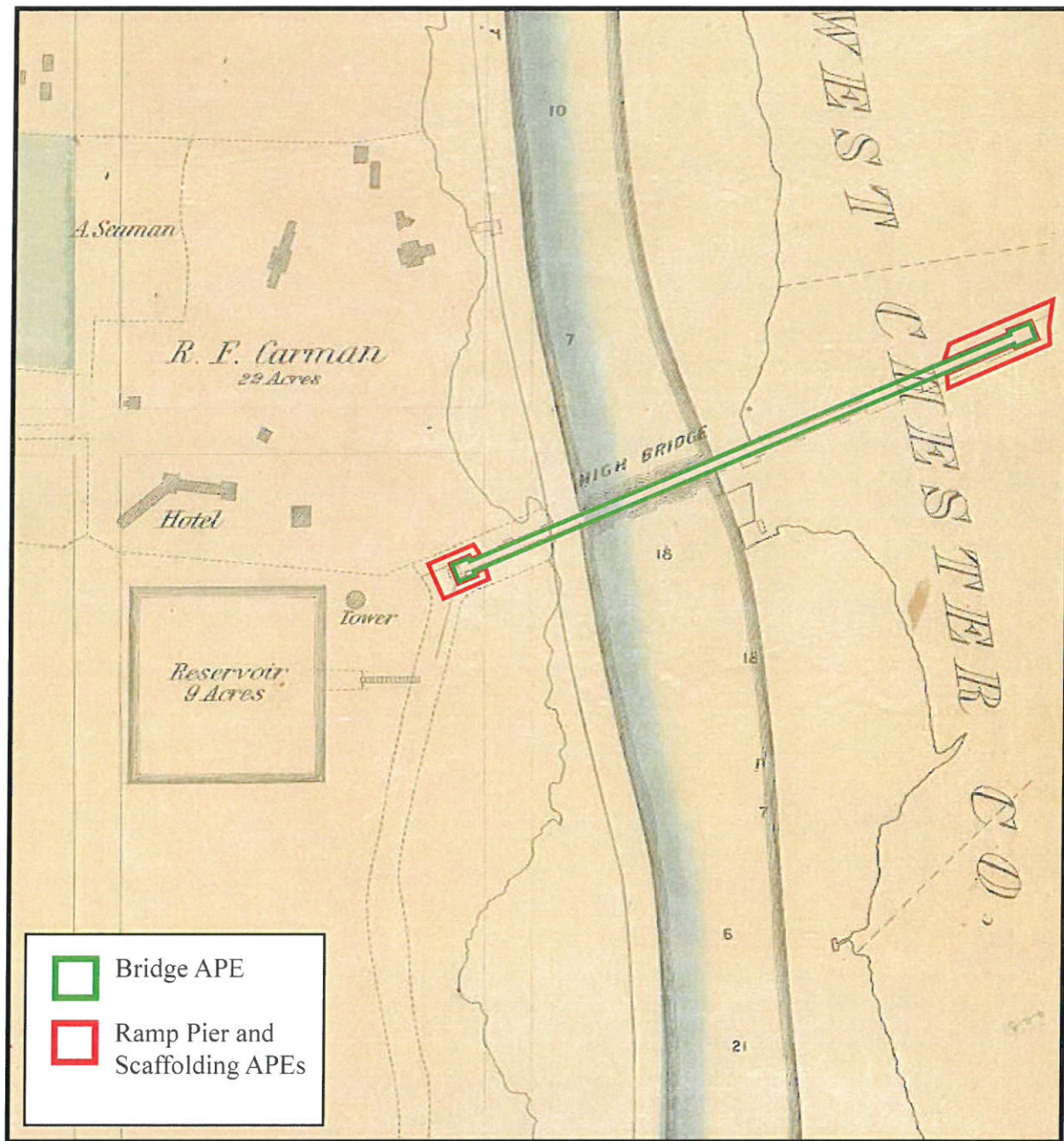


**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 11: Two images of High Bridge During Construction of the Large Main (ca. 1860-1862). Top image from New York Public Library, bottom image from Bone (2006).

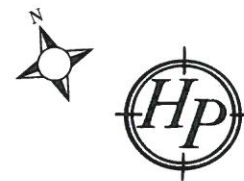






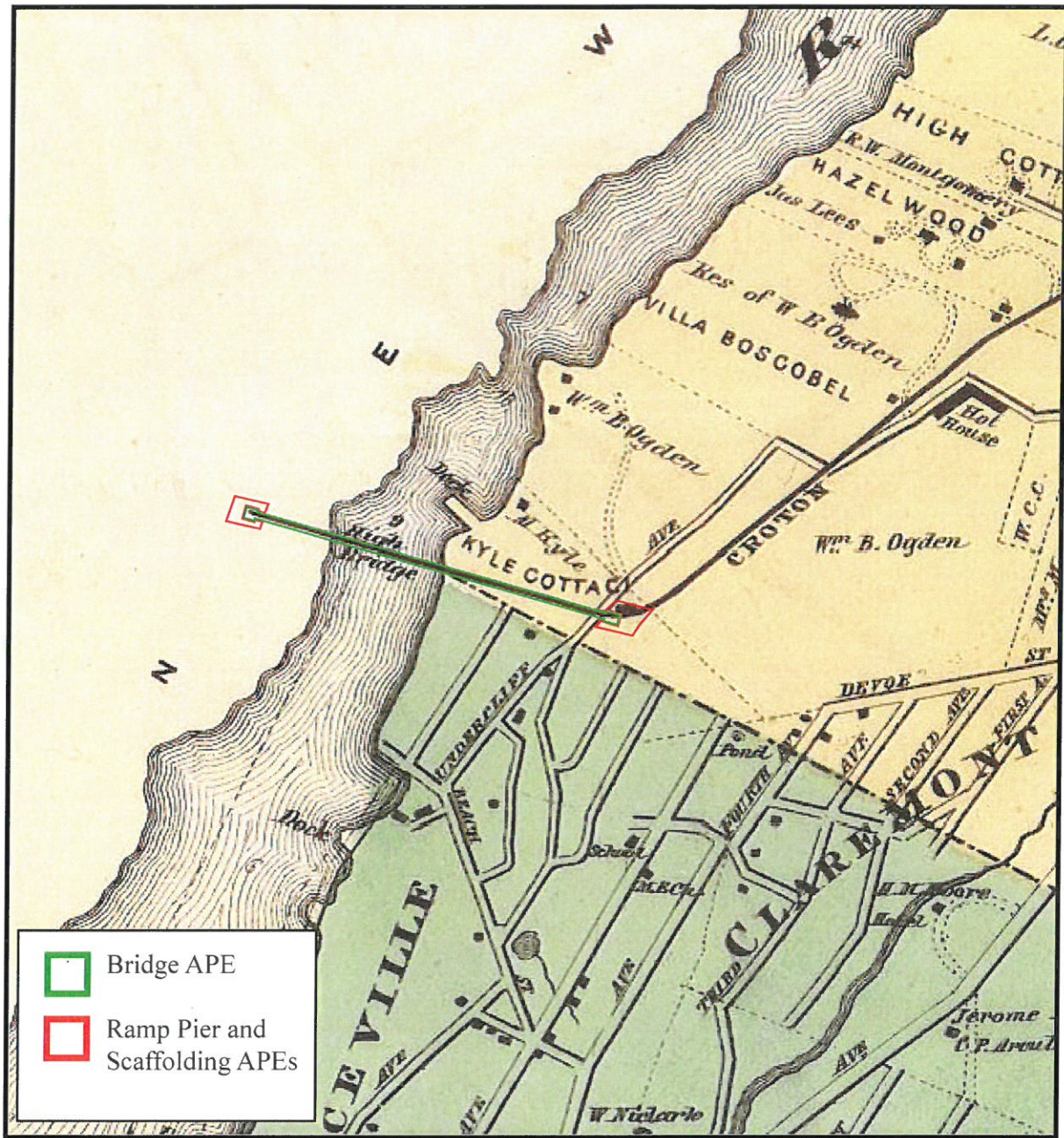
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 12: Plan of New York City, from the Battery to Spuyten Duyvil Creek (Harrison 1867).



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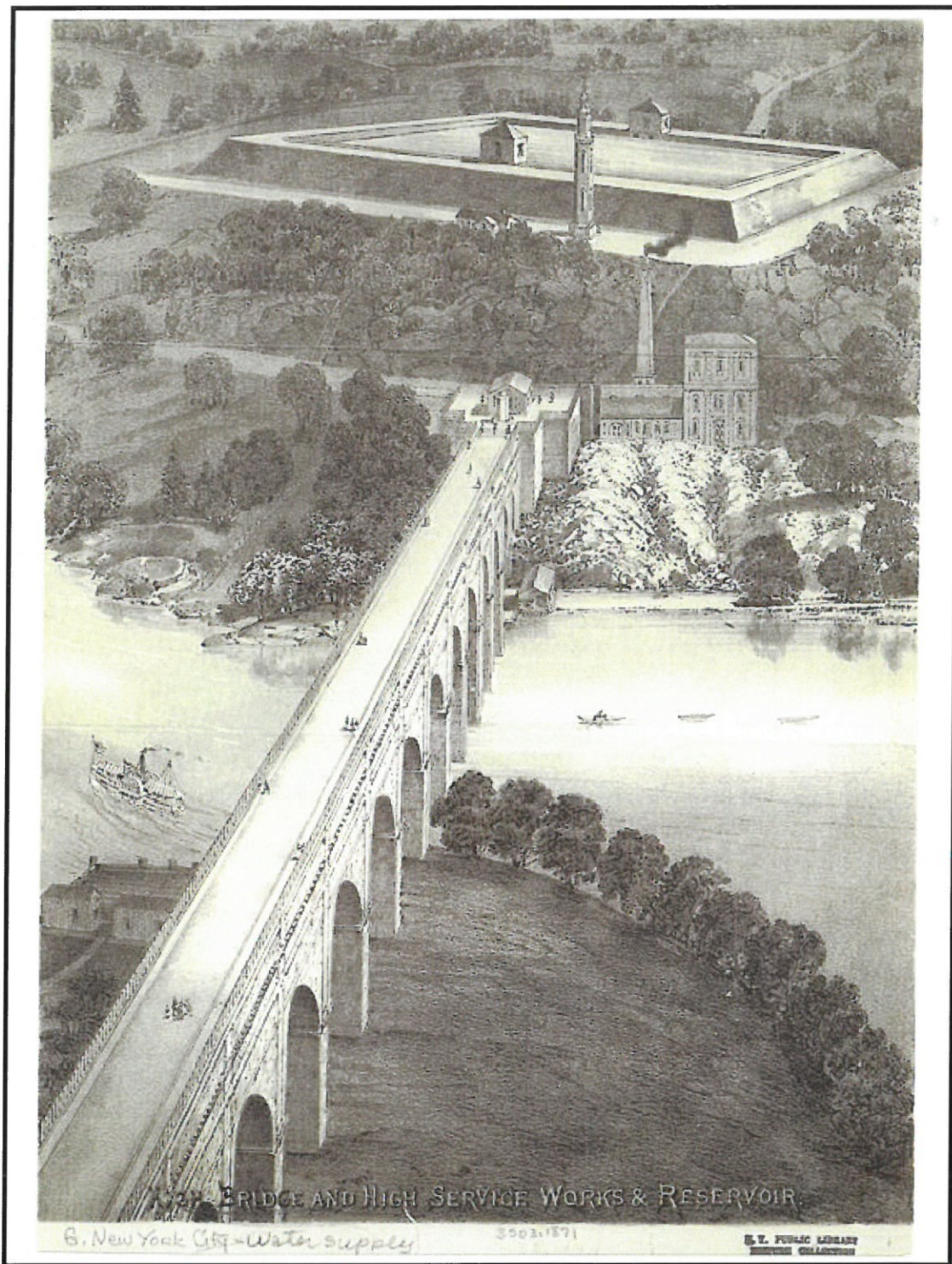
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 13: *Atlas of New York and Vicinity* (Beers 1868).



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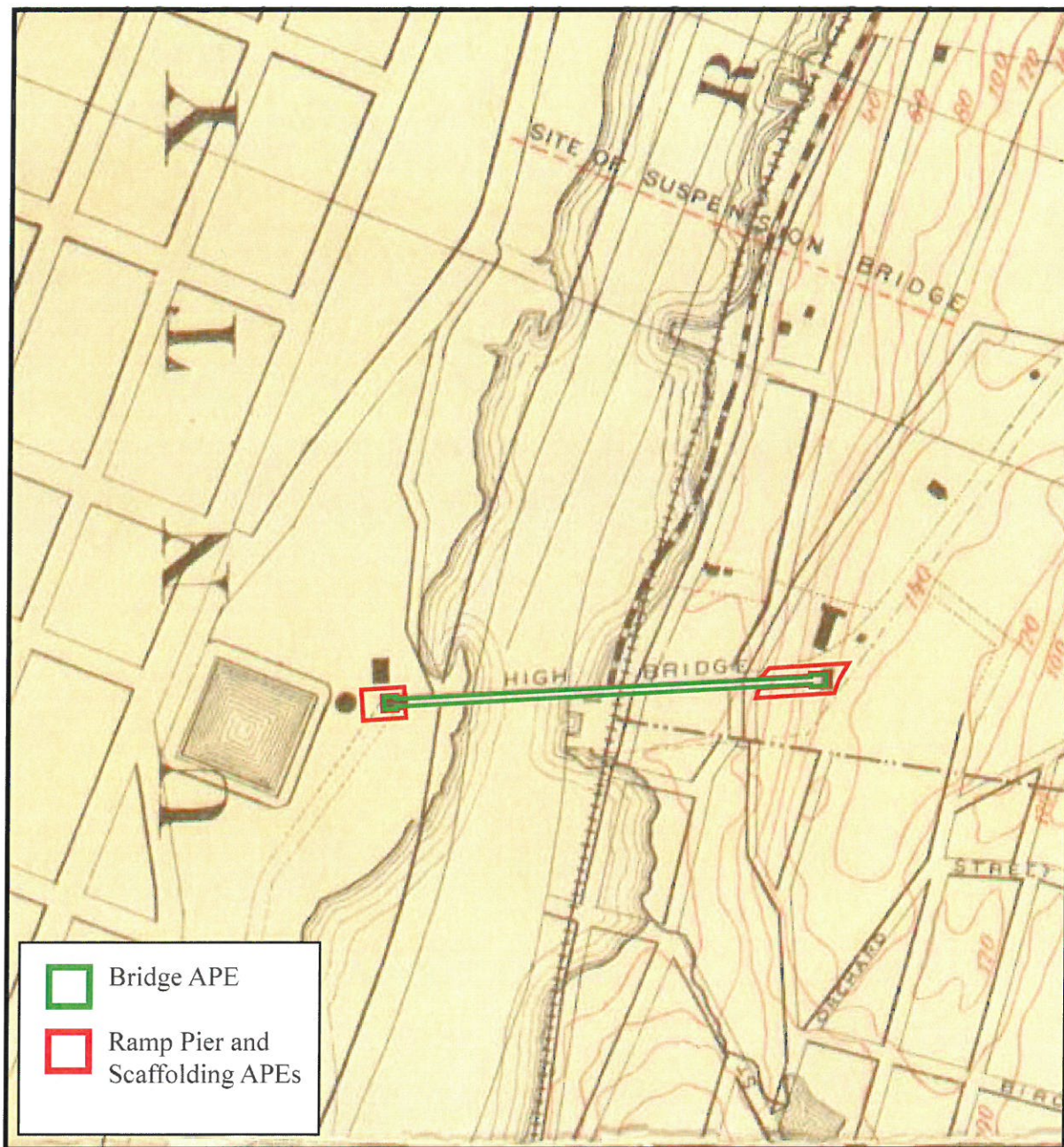


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High Bridge, Manhattan and Bronx, New York**

Figure 14: *High Bridge and High Service Works & Reservoir* (1871).

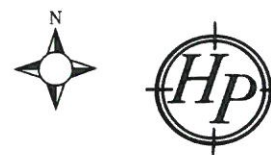






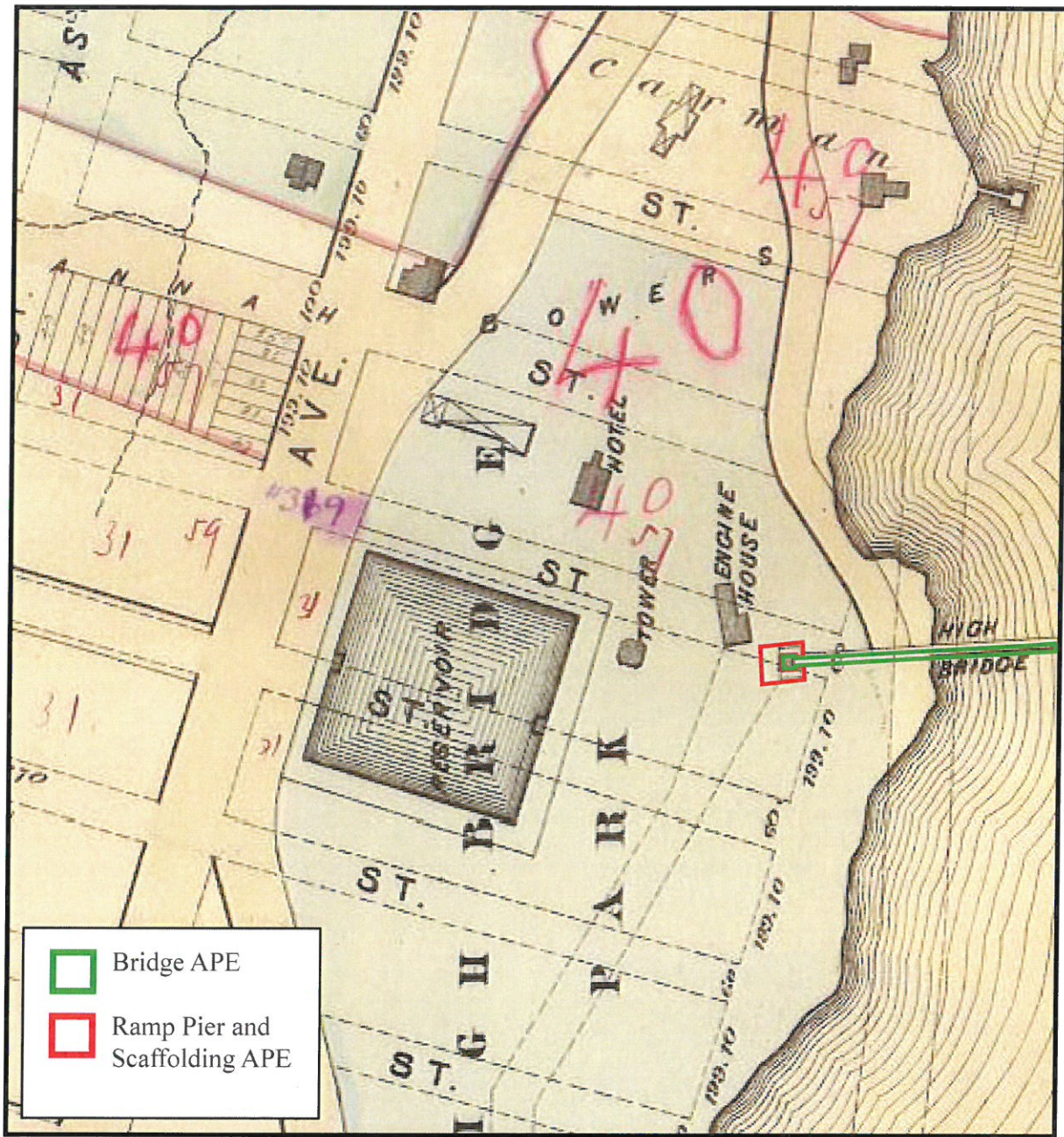
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 15: *Topographical map made from surveys by the commissioners of the Department of Public Parks of the city of New York... (Grant 1874).*



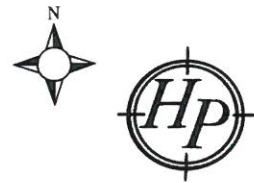
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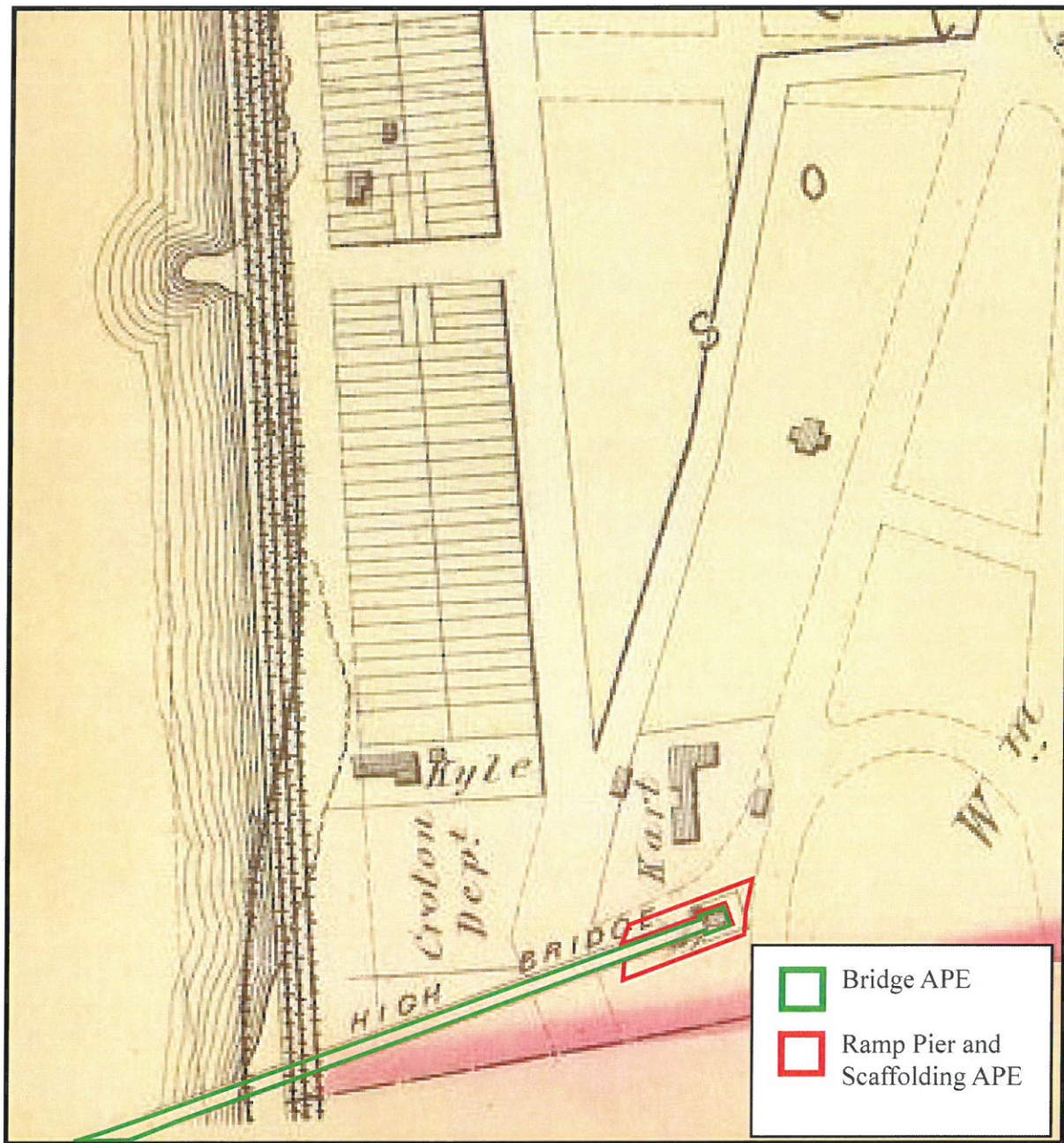
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 16: *Atlas of the city of New York: Borough of Manhattan* (Bromley 1879a).



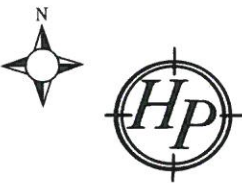
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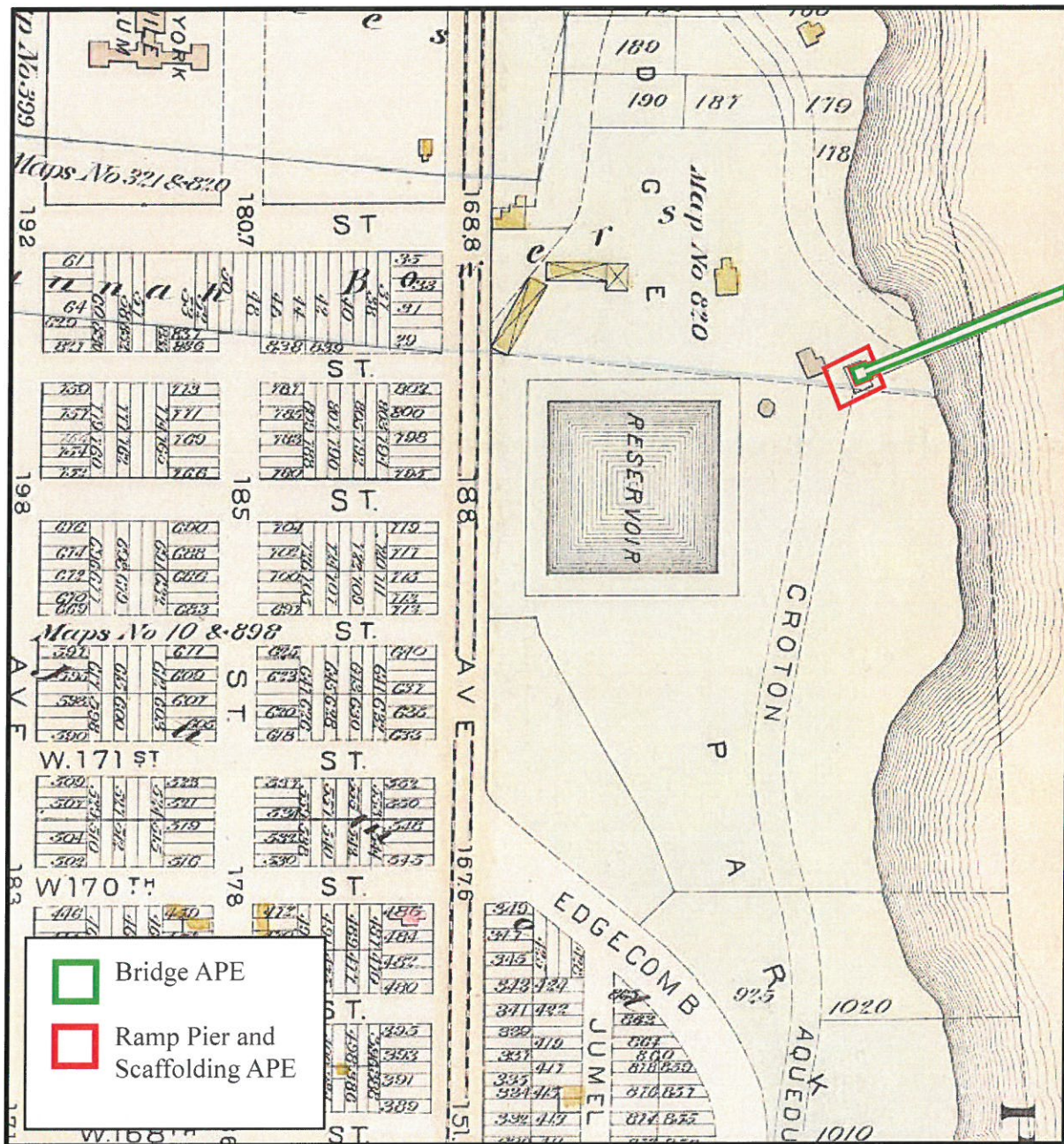
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 17: *Atlas of the 23rd Ward, City of New York* (Bromley 1879b).



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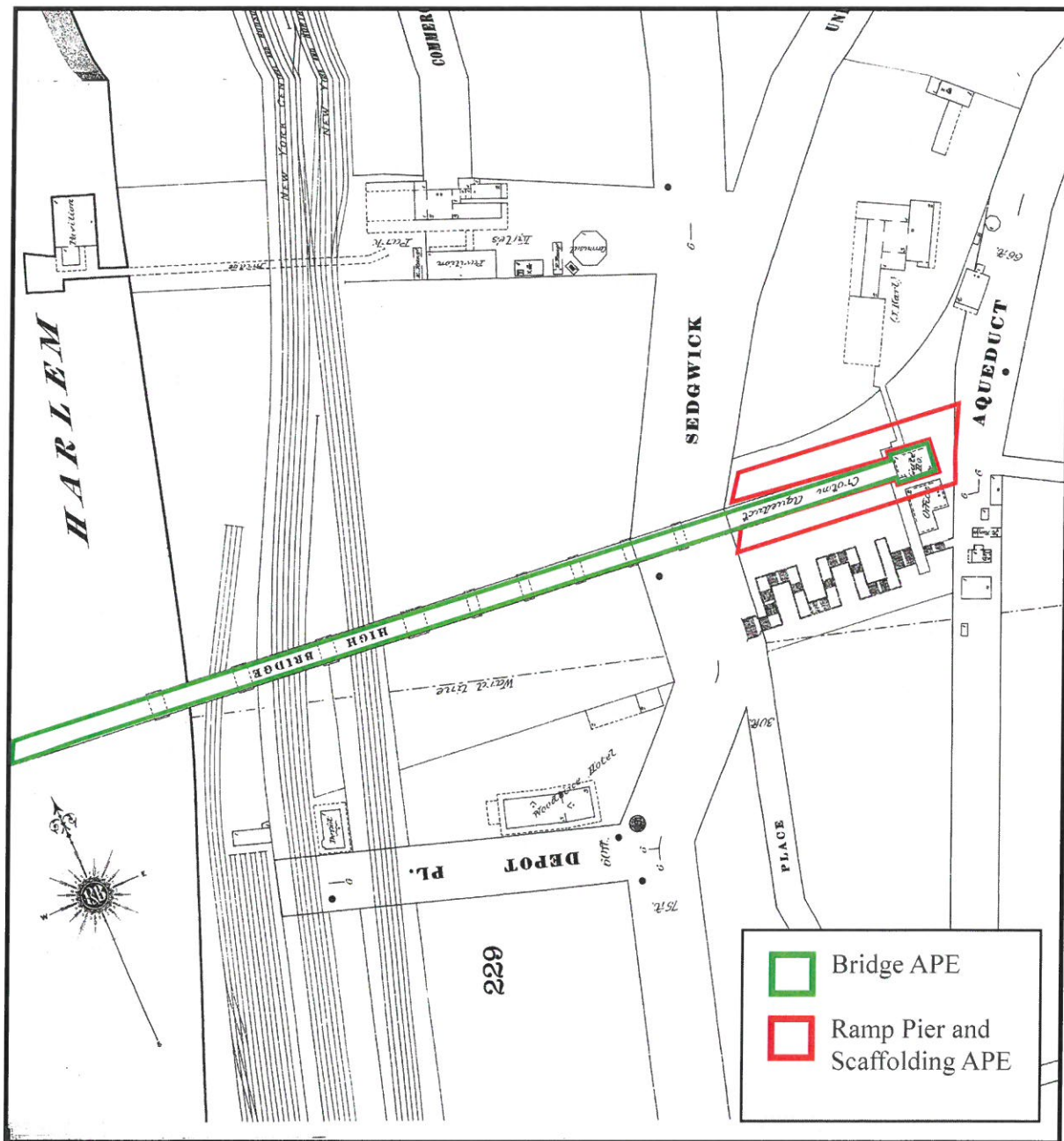
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 18: Atlas of the City of New York (Robinson 1885).



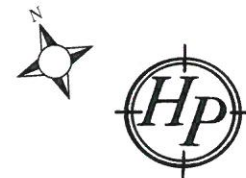
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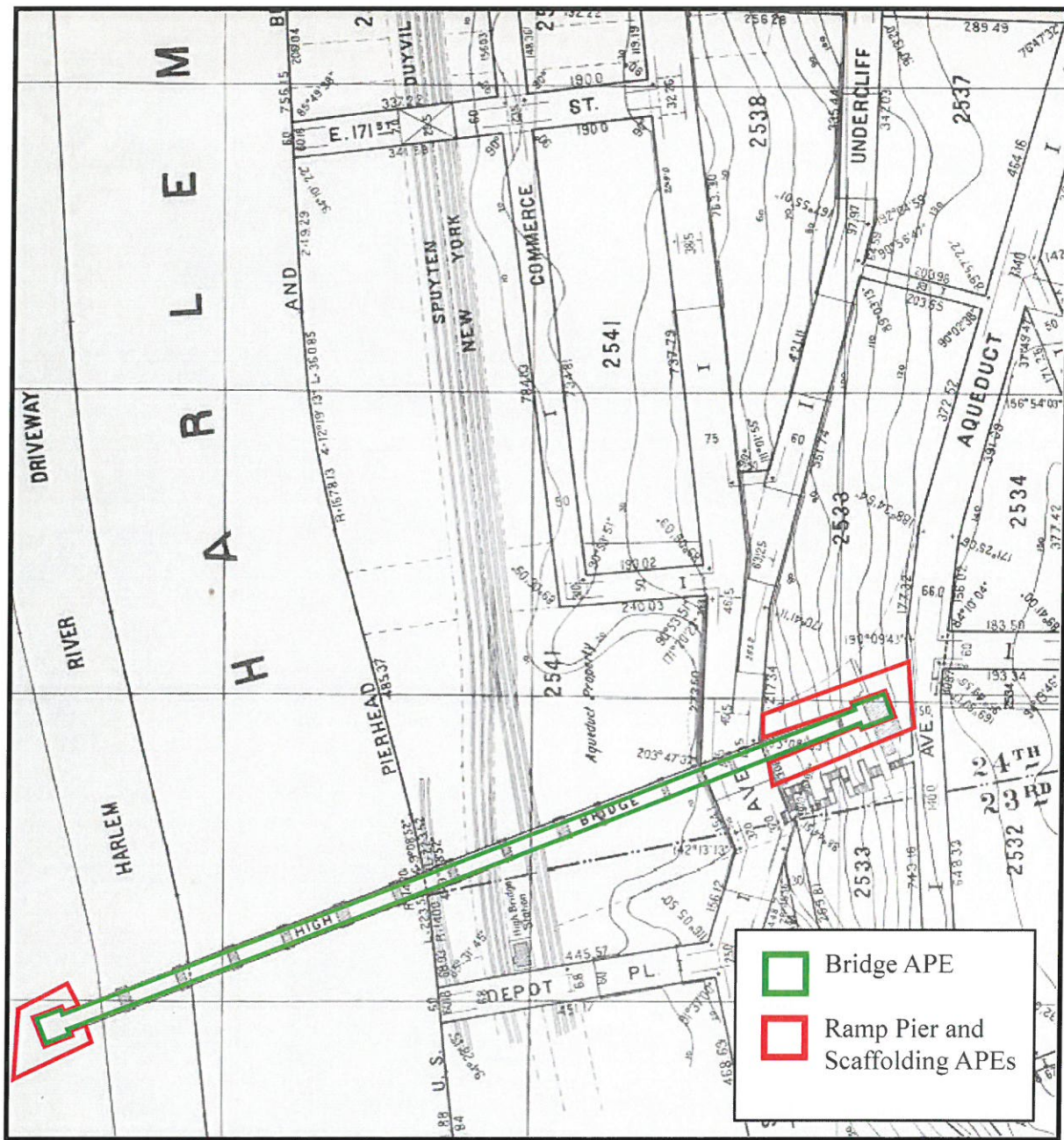
Phase IA Archaeological Documentary Study
 High Bridge, Manhattan and Bronx, New York

Figure 19: Insurance Maps of the City of New York (Sanborn 1891).



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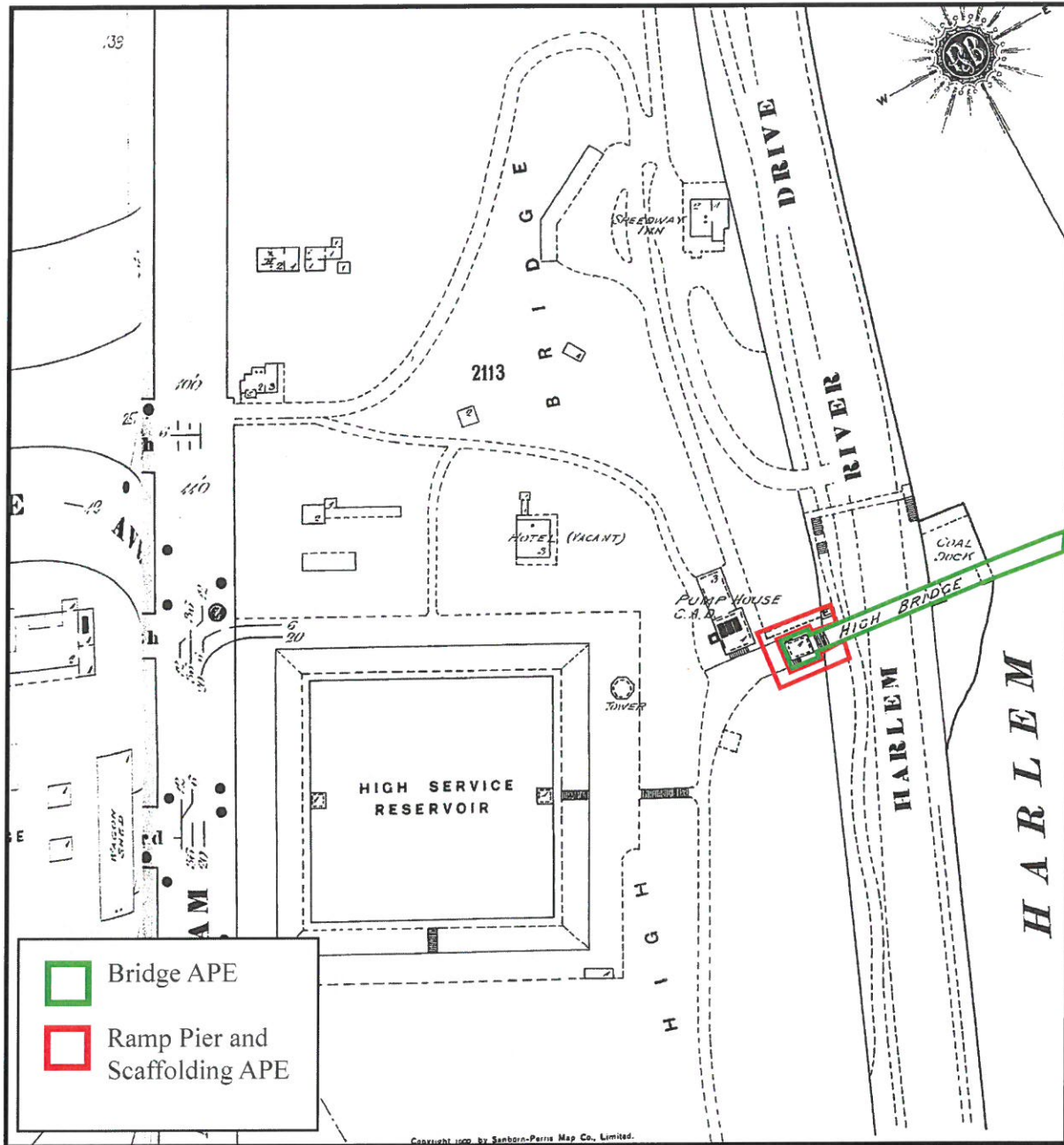
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 20: Maps or plans and profiles, with field notes and explanatory remarks... (Topographical Bureau 1895).



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Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York

Figure 21: Insurance Maps of the City of New York (Sanborn 1900).





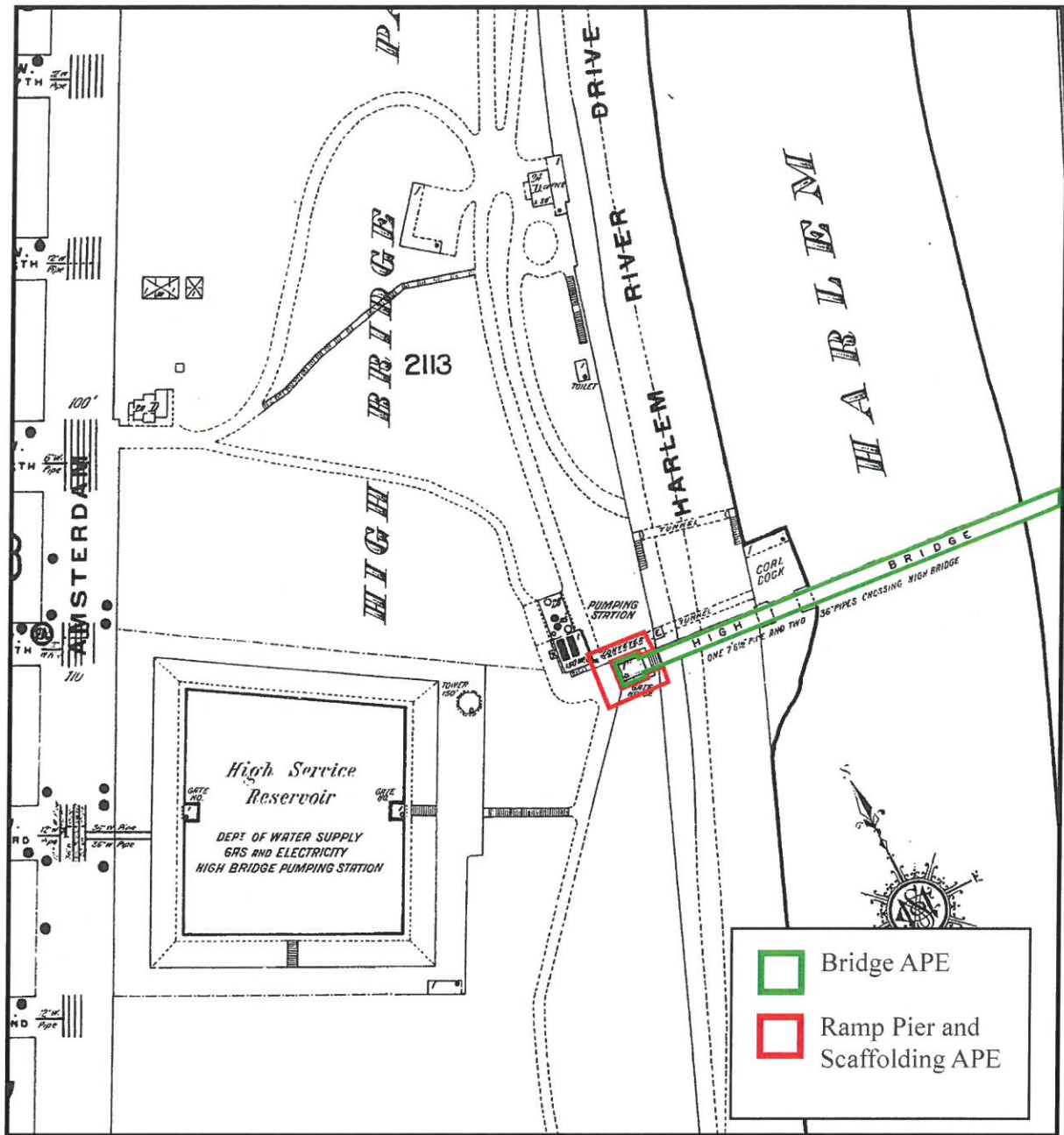


Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York

Figure 22: *High Bridge, New York City* (Detroit Publishing Company 1900).





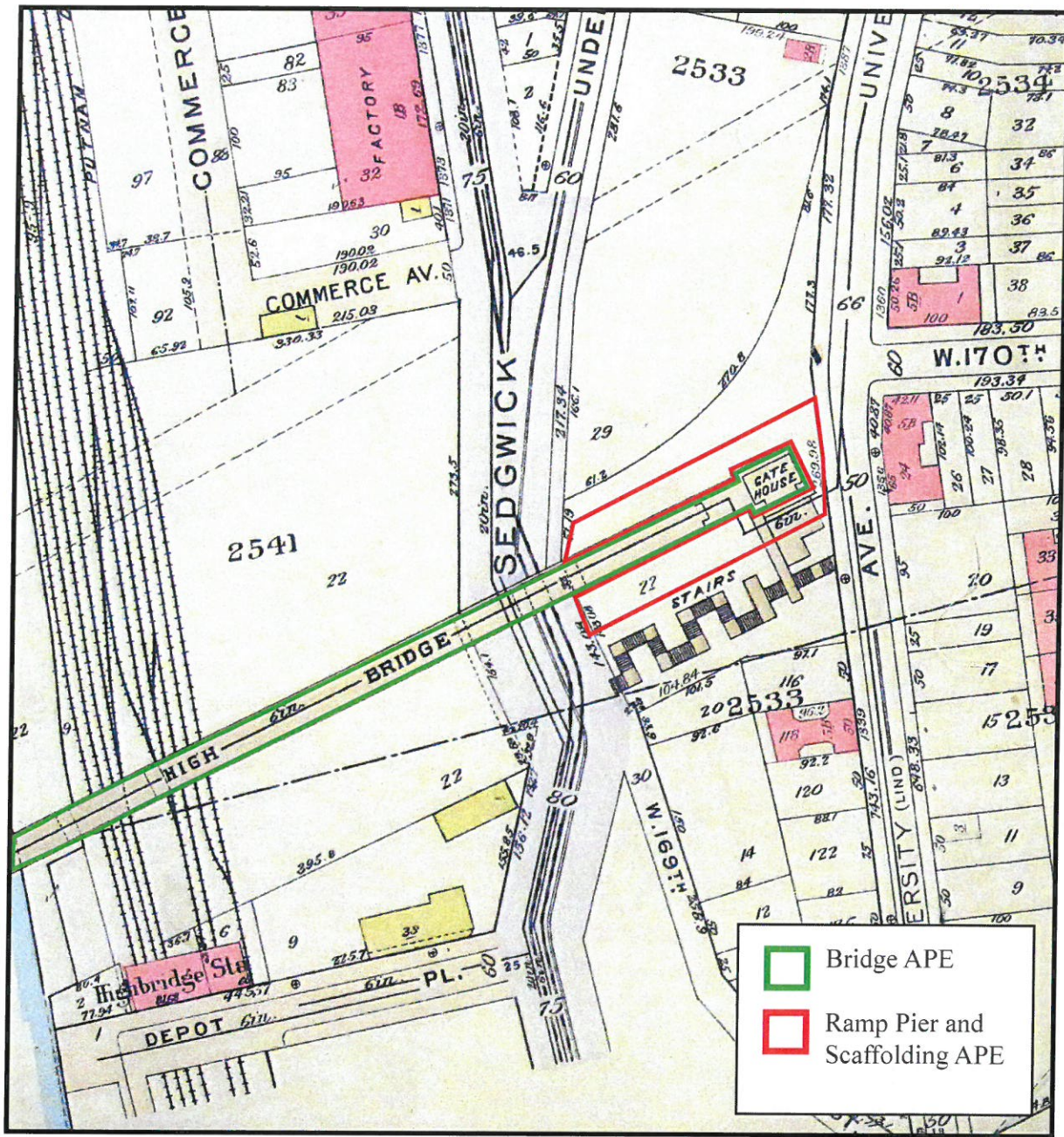


Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York

Figure 23: Insurance Maps of the City of New York (Sanborn 1913).





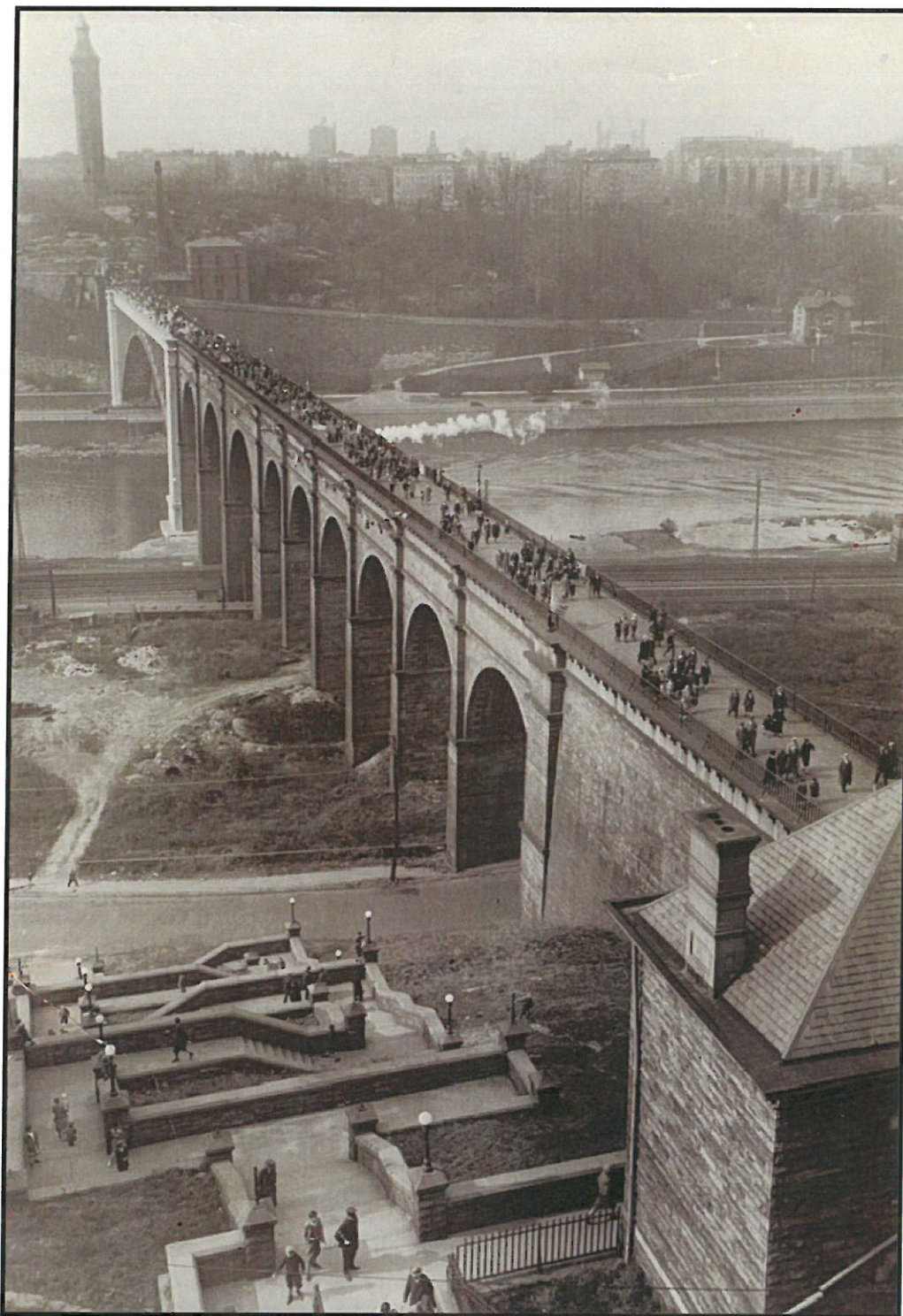


**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

**Figure 24: Atlas of the City of New York, borough of the Bronx,
from actual surveys and official plans (Bromley 1923).**







**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

**Figure 25: Reopening of High Bridge for Pedestrian Traffic (1928).
(Note: stair street down to Sedgewick Avenue and
office building at lower right)**







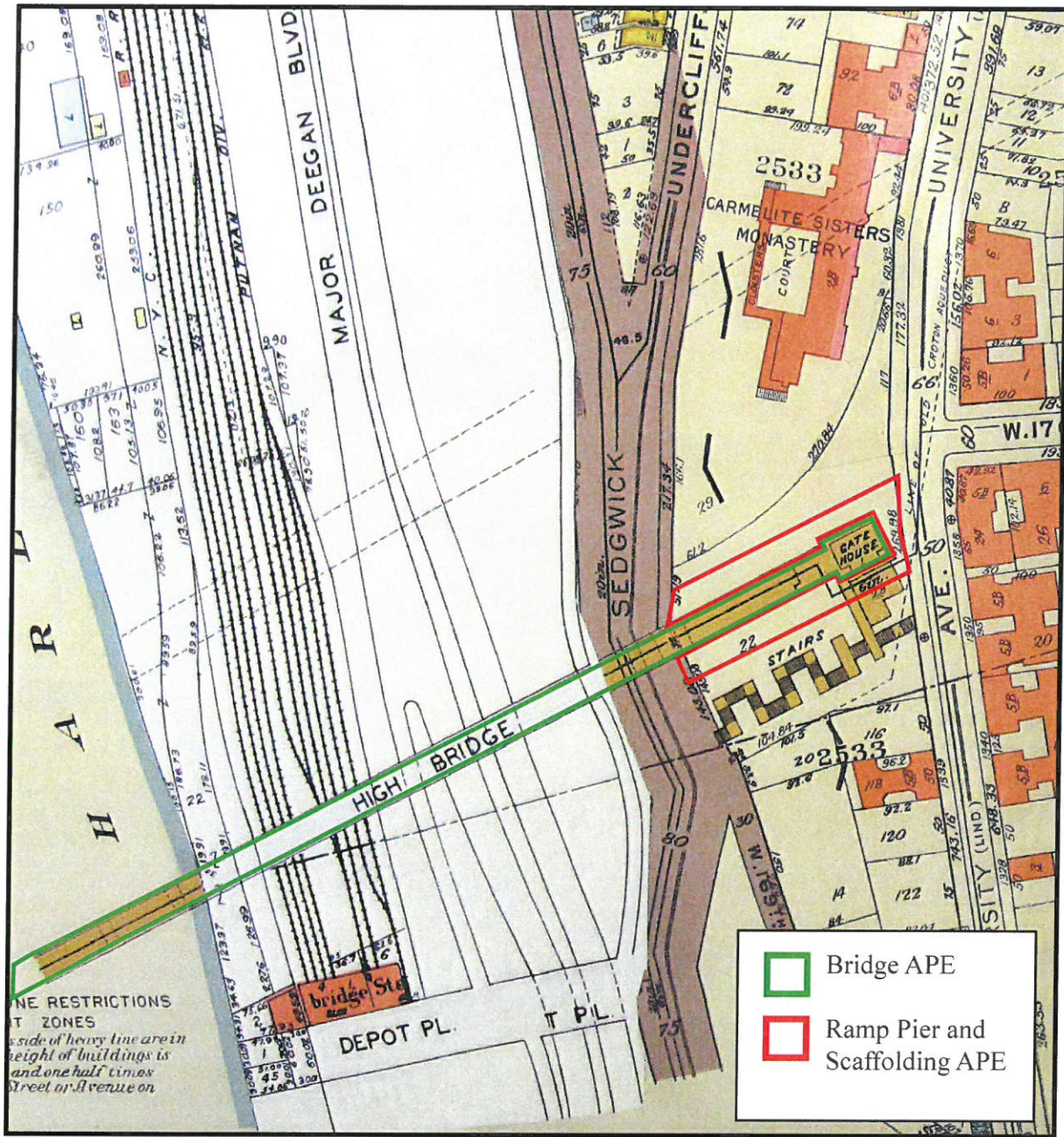
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 26: *High Bridge [Spanning the Harlem River, and connecting the Bronx at about 170th Street to the Manhattan Highbridge Park at 174th Street] (Sperr 1940).*

(Note: stair street in foreground and office building in background, in front of apartment complex)







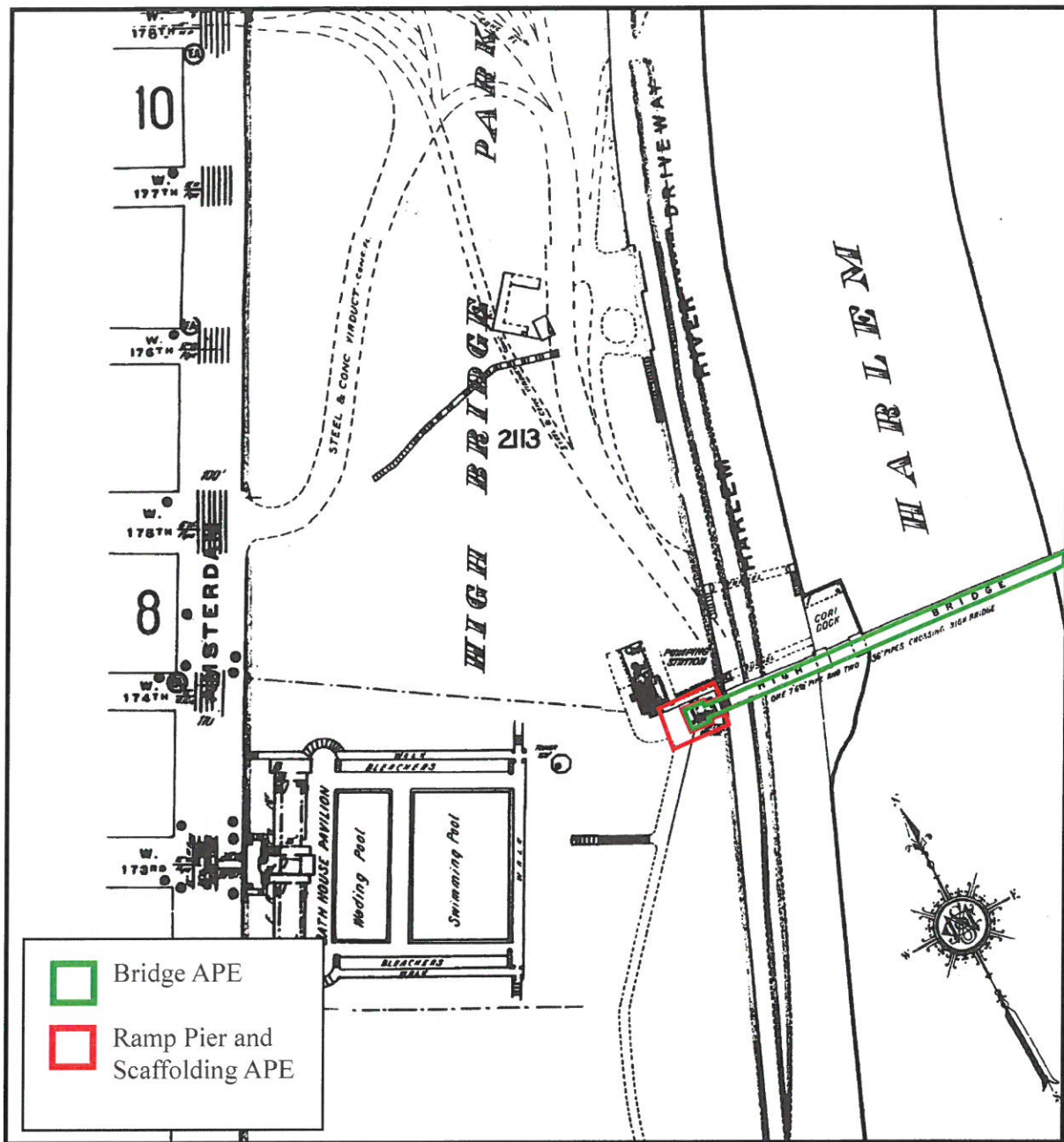
**Phase IA Archaeological Documentary Study
High Bridge, Manhattan and Bronx, New York**

Figure 27: Atlas of the City of New York, borough of the Bronx, from actual surveys and official plans (Bromley 1942).



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Phase IA Archaeological Documentary Study
 High Bridge, Manhattan and Bronx, New York

Figure 28: Insurance Maps of the City of New York (Sanborn 1951).



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Photograph 1: Manhattan terminus of High Bridge, with Harlem River Drive and Harlem River at base of slope. View looking northeast from south side of APE.





Photograph 2: Manhattan terminus of High Bridge, with Harlem River Drive and Harlem River at base of slope. View looking east from north side of APE.





Photograph 3: Manhattan terminus showing north side of bridge with exposed bedrock and a level area with low cement walls and fencing. Note bricks and architectural debris on ground surface. View looking northwest from bridge.





Photograph 4: Manhattan terminus showing detail of an arch supporting the Harlem River Drive. View looking east from bridge approach on north side of APE.



Photograph 5: Manhattan terminus showing area south of the bridge touchdown with a set of stairs that originate at the paved terrace and extend downward into another relatively level area now in the woods. View looking southeast from bridge touchdown.





Photograph 6: Manhattan terminus showing gate house and approach to bridge. View looking west from bridge.



Photograph 7: Manhattan terminus showing detail of gate house. View looking northeast from bridge approach.





Photograph 8: High Bridge and Manhattan terminus showing the area east of the gate house including a steep incline with exposed bedrock that rises up to Highbridge Tower and a recreation area with a pool (formerly a reservoir for the OCA). View looking west from bridge.





Photograph 9: High Bridge with Bronx APE in background. View looking east from bridge.





Photograph 10: Bronx terminus showing ashlar block stairway immediately to the south of the bridge touchdown. View looking southeast from bridge.





Photograph 11: Detail of ashlar stairway south of Bronx touchdown. Note stone wall marking southern edge of property. View looking south from bridge.





Photograph 12: Bronx terminus showing wooded and brushy slope on north side of APE in background. View looking east from bridge.





Photograph 13: Bronx terminus showing detail of wooded and brushy slope on north side of APE. View looking southwest from bridge approach.





Photograph 14: Bronx terminus showing an alignment of stones protruding from the dirt amidst the brush on the north side of the APE, suggesting either a crude retaining wall or prior structure once stood in this location. View looking west from bridge approach.





Photograph 15: Bronx APE showing detail of park on south side of bridge. The foundation represents remains of the former office building that was once in this location. View looking southeast.

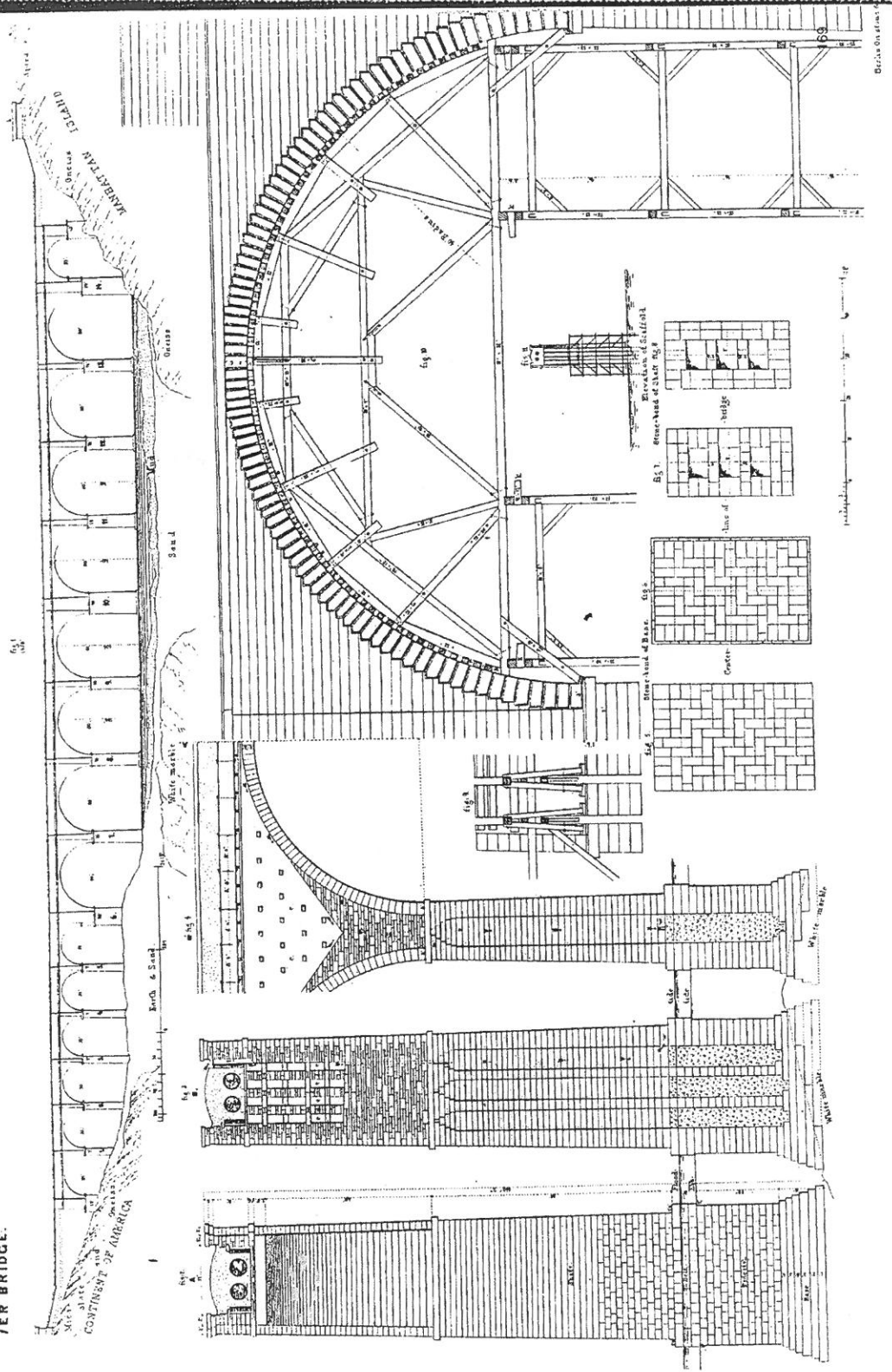


Photograph 16: Bronx APE showing additional detail of park on south side of bridge. The foundation represents remains of the former office building that was once in this location. View looking southwest.



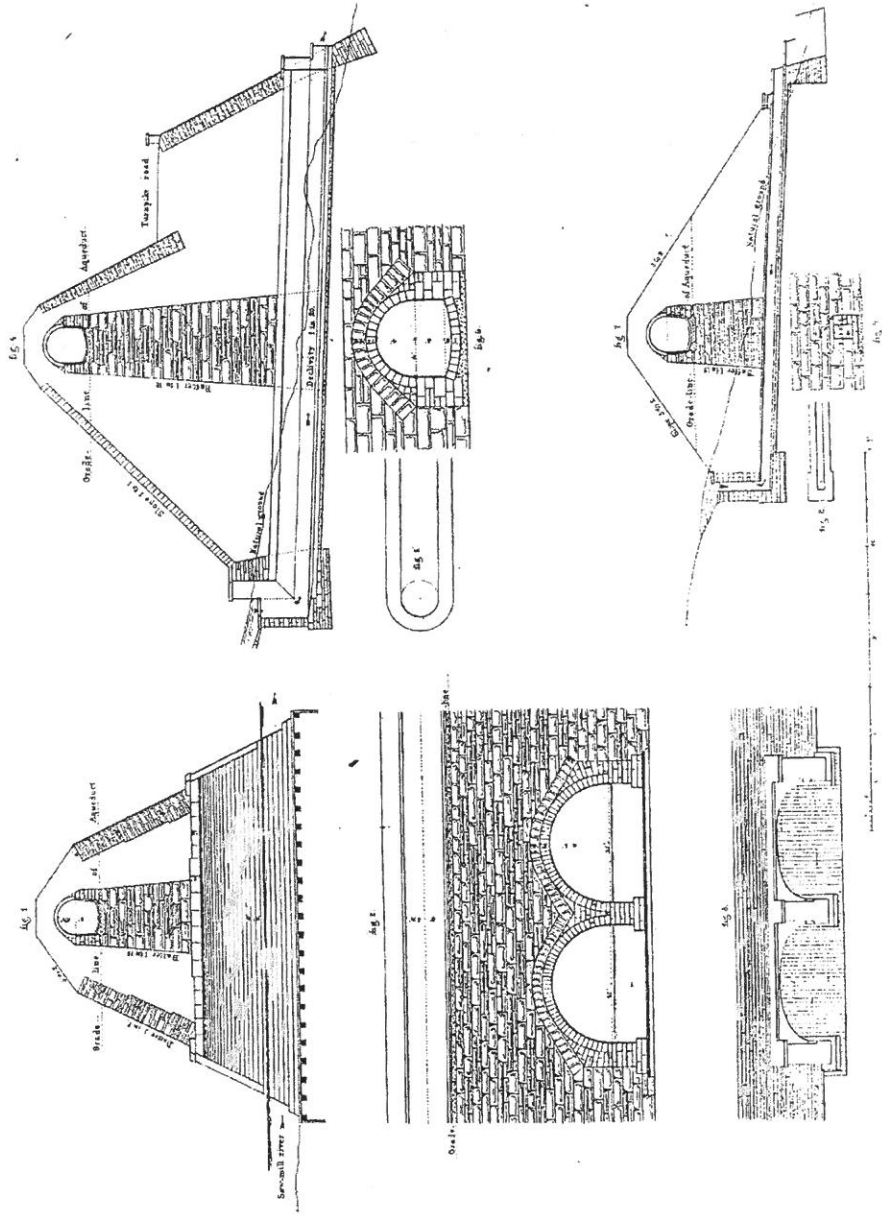
PLATE IX

IER BRIDGE.





CULVERTS.

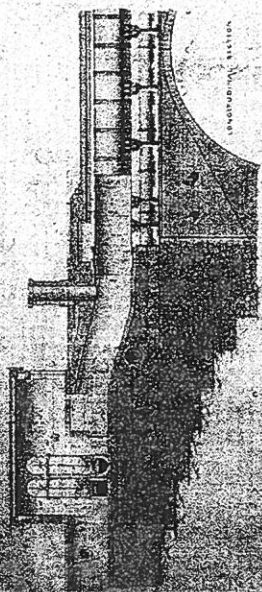




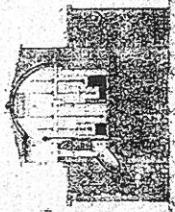
HIGH BRIDGE

CADTON AQUEDUCT
GATE HOUSE AND PART OF BRIDGE ON MANHATTAN END

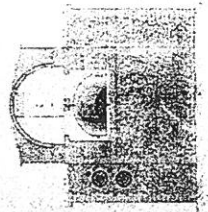
Drawn by E. F. Felt



LONGITUDINAL SECTION



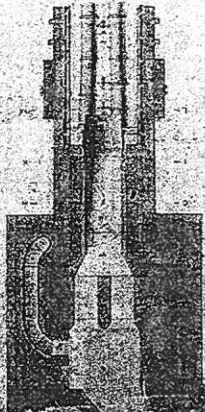
SECTION AT AD



SECTION AT CD



ELEVATION OF GATE HOUSE



LONGITUDINAL SECTION



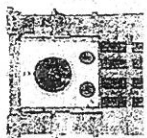
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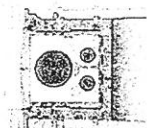
SECTION AT GH



SECTION AT IJ



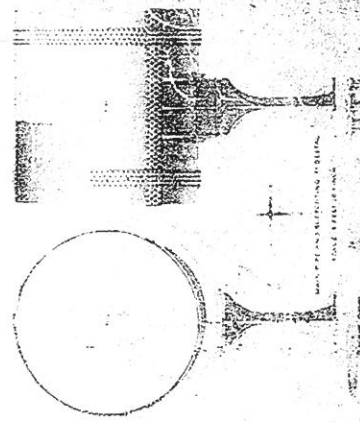
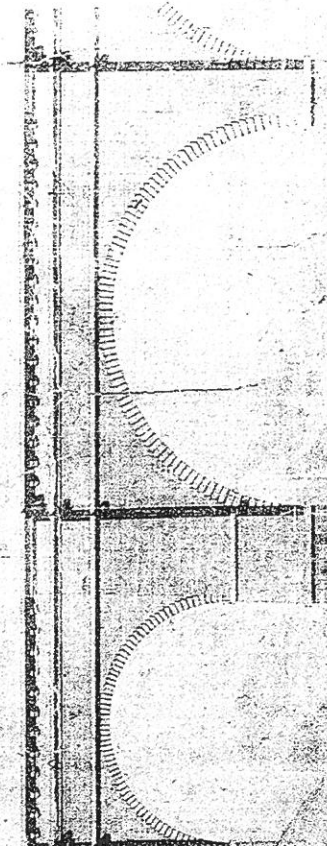
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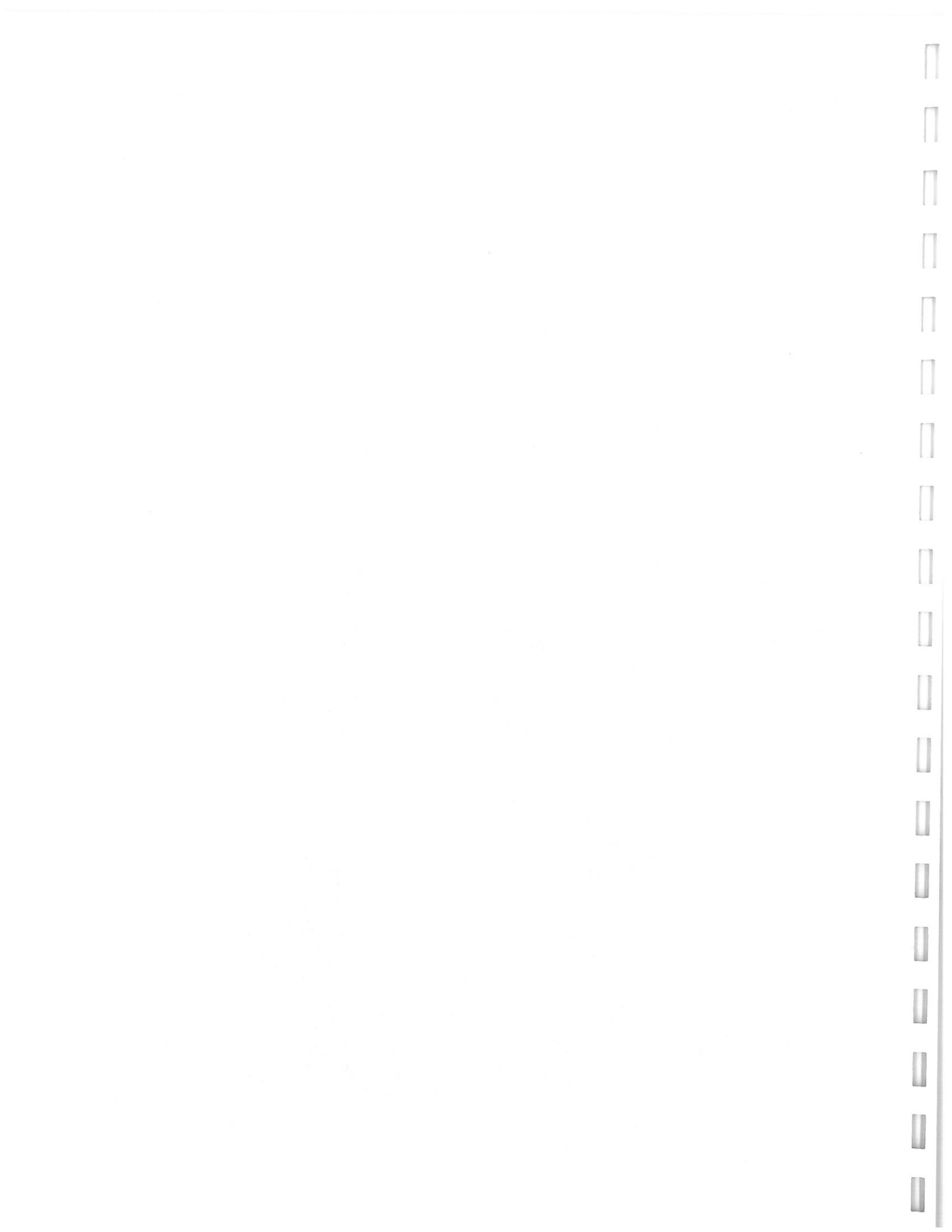
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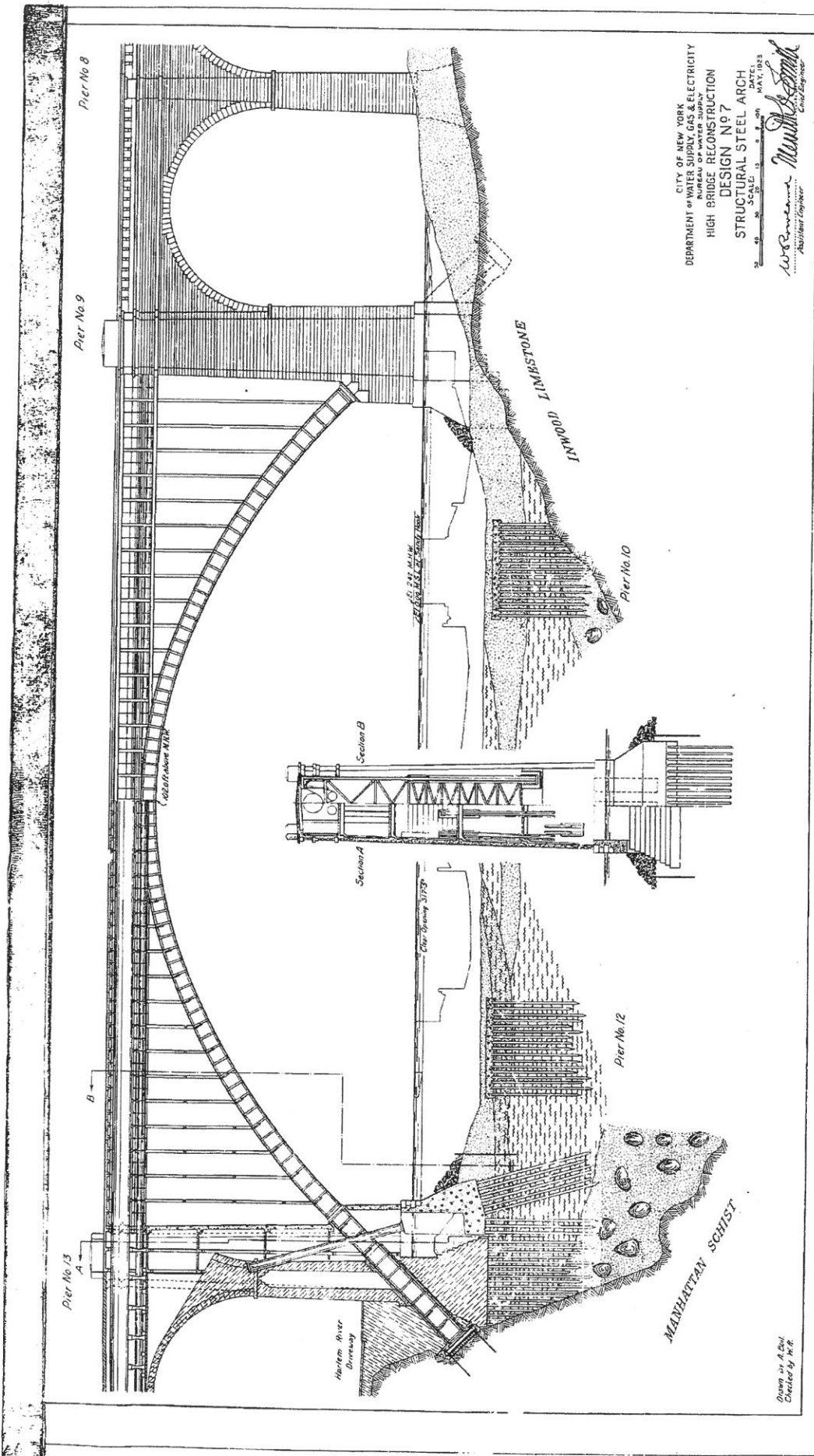


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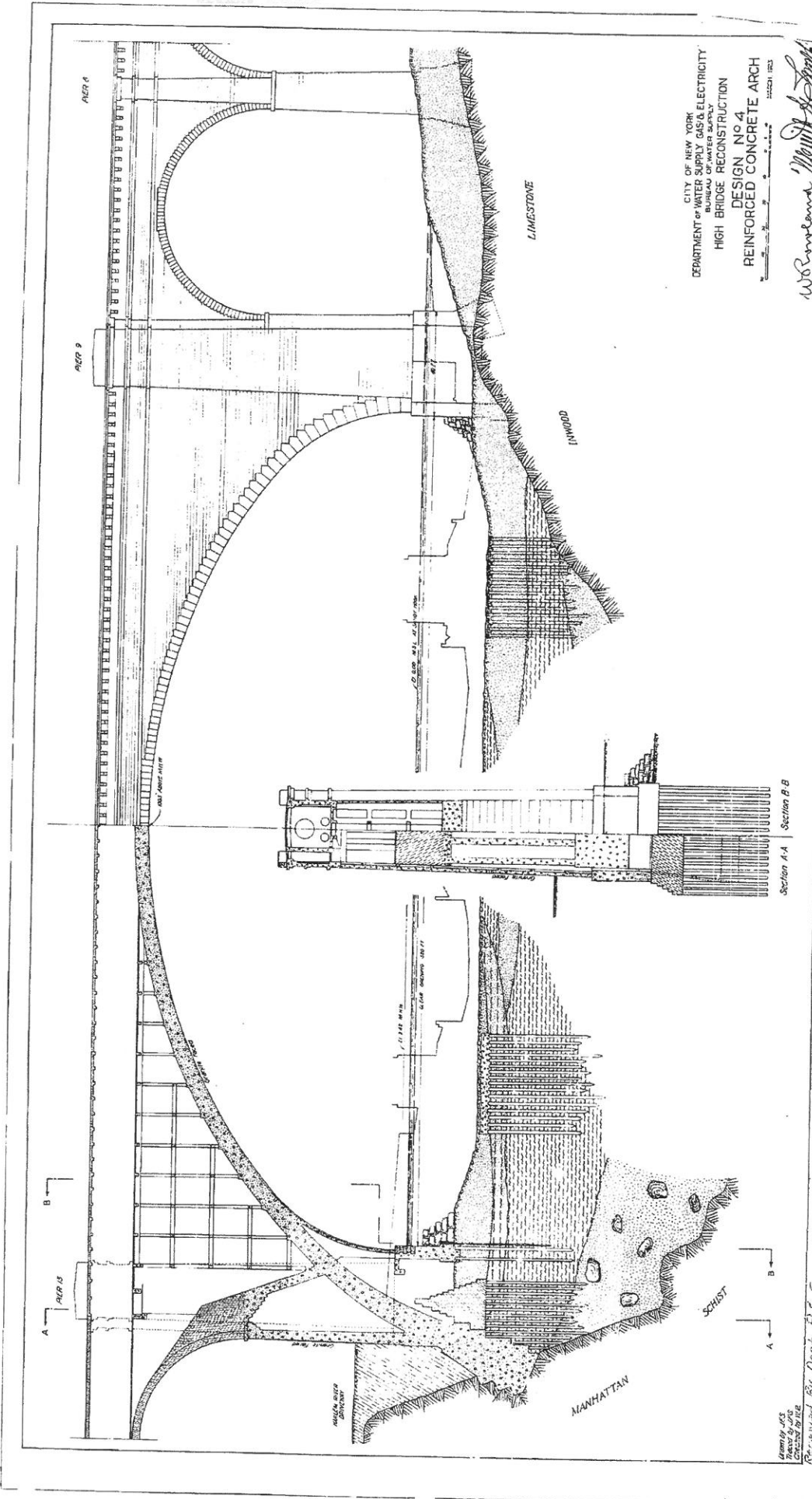




CITY OF NEW YORK
 DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
 HIGH BRIDGE RECONSTRUCTION
 DESIGN No 7
 STRUCTURAL STEEL ARCH

W. S. ...
 ...
 MAY 1, 1923





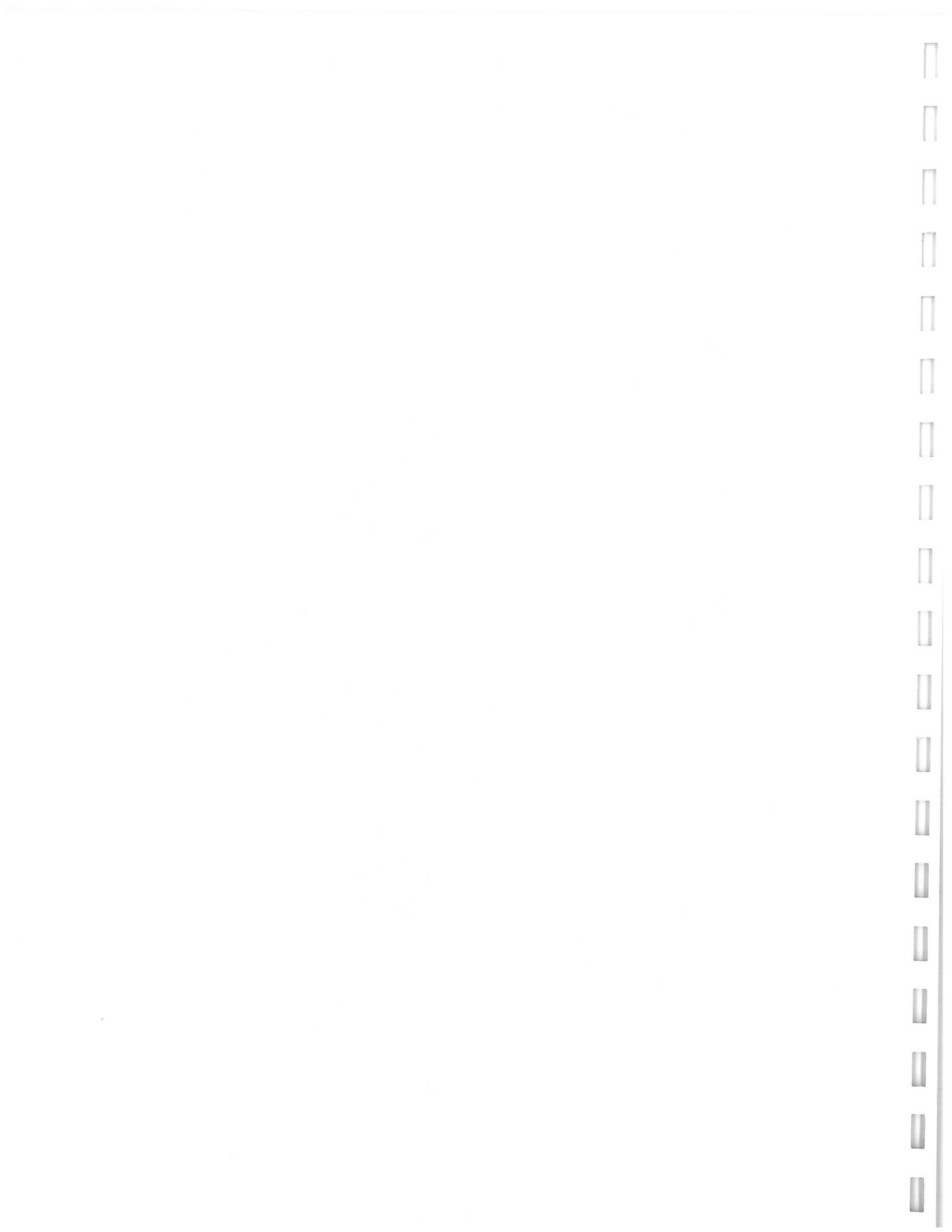
CITY OF NEW YORK
 DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
 BUREAU OF WATER SUPPLY
 HIGH BRIDGE RECONSTRUCTION
 DESIGN NO. 4
 REINFORCED CONCRETE ARCH
 JAN 20 1923

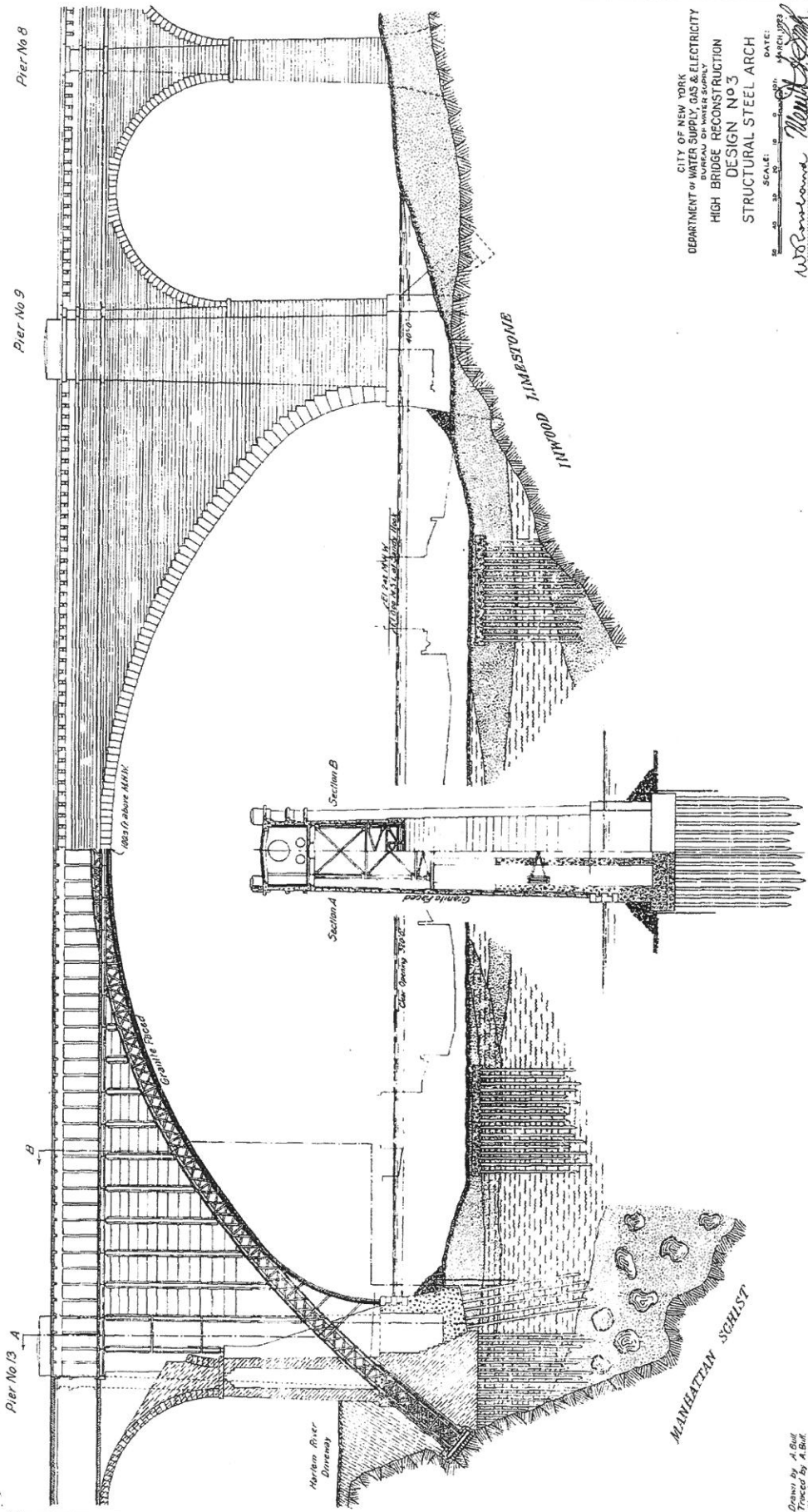
W. R. ...
 Assistant Engineer

X-13654

Section A-A Section B-B

Drawn by J.C.S.
 Checked by J.W.B.
 Approved by J.W.B.
 RECEIVED BY CIVIL ENGINEERING DEPT.





CITY OF NEW YORK
 DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
 BUREAU OF WATER SUPPLY
 HIGH BRIDGE RECONSTRUCTION
 DESIGN No 3
 STRUCTURAL STEEL ARCH

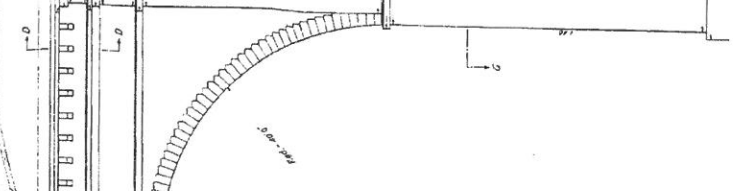
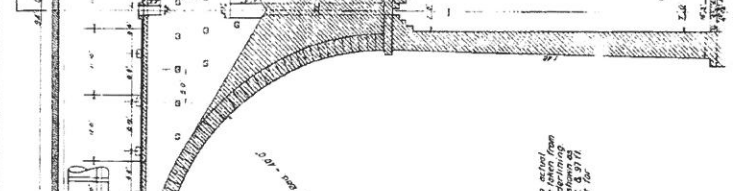
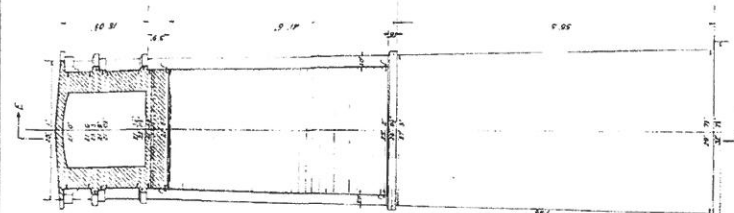
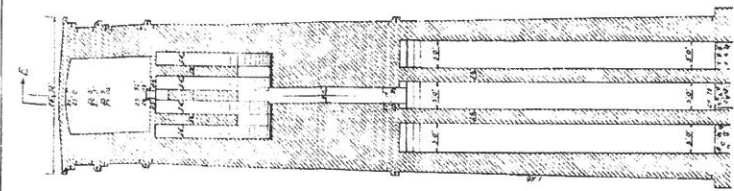
SCALE: 1" = 10'-0"
 DATE: APR 23 1913
 W. R. ...
 Assistant Engineer

X-13653

Drawn by A. Bull
 Checked by A. Bull
 Checked by W. R.

Approved by W. R. ...





SECTION CC

SECTION DD

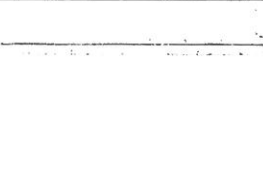
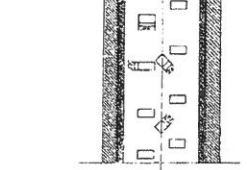
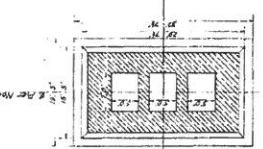
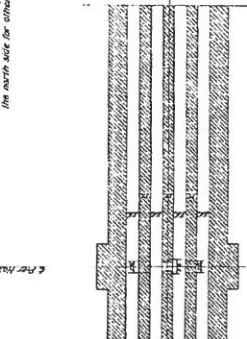
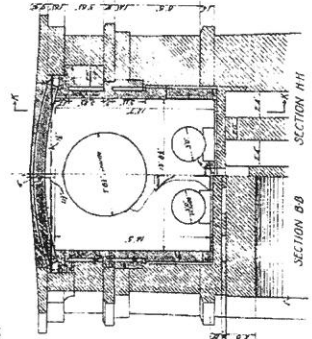
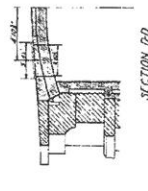
SECTION EE PIER D

SECTION FF

SECTION GG

SECTION HH

SECTION II



SECTION DD

SECTION BB

SECTIONAL PLAN A-A

SECTIONAL PLAN G-G

SECTIONAL PLAN FF

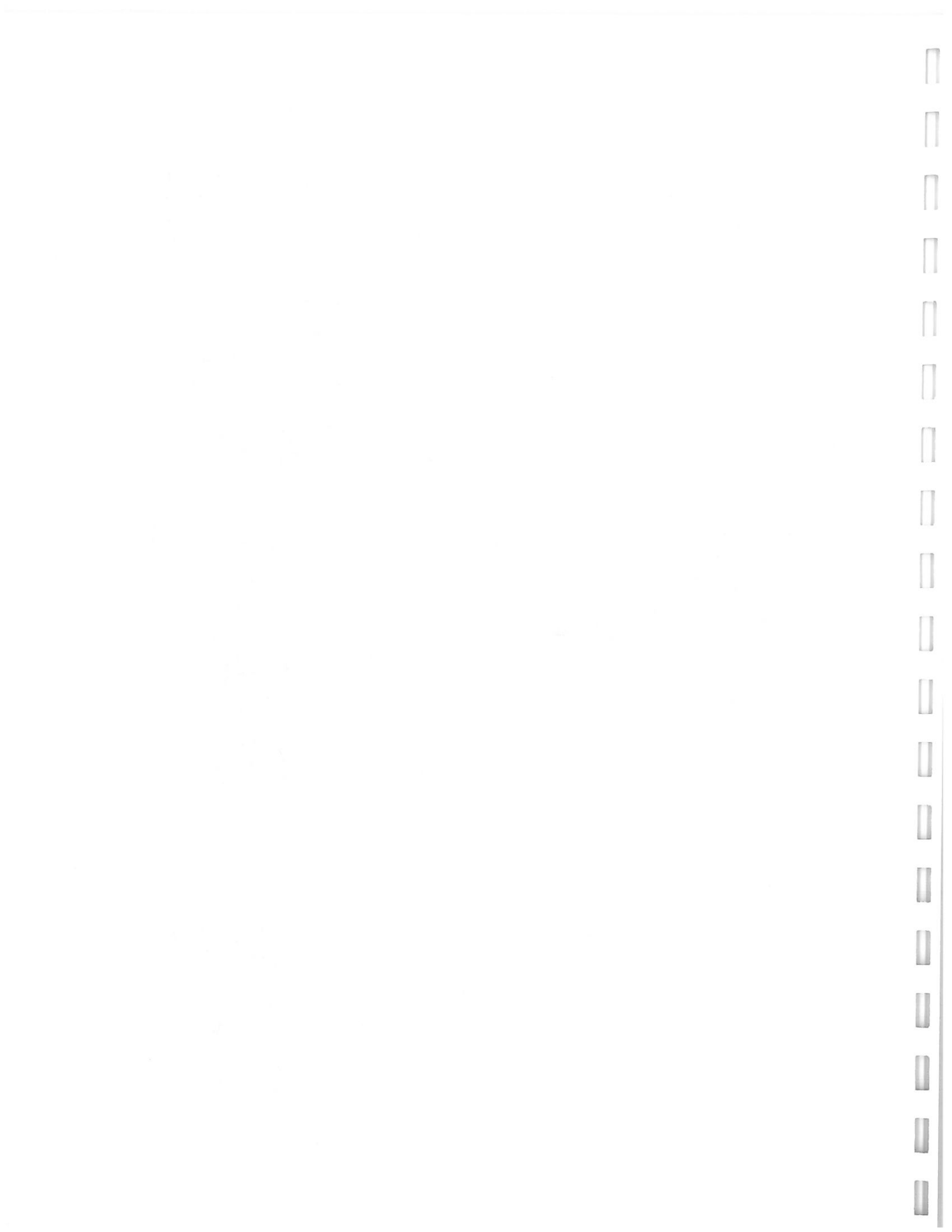
SECTIONAL PLAN GG

Note: Dimensions shown on this drawing are taken from actual work on the structure. All dimensions are in feet and inches. All dimensions are given to center of line unless otherwise specified. Because dimensions are different from

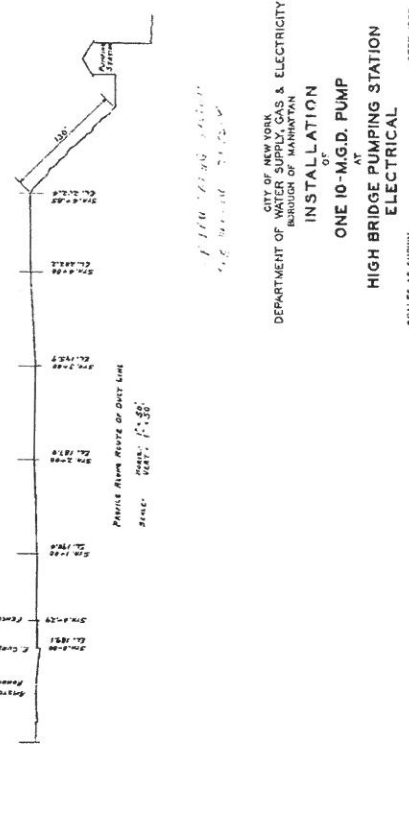
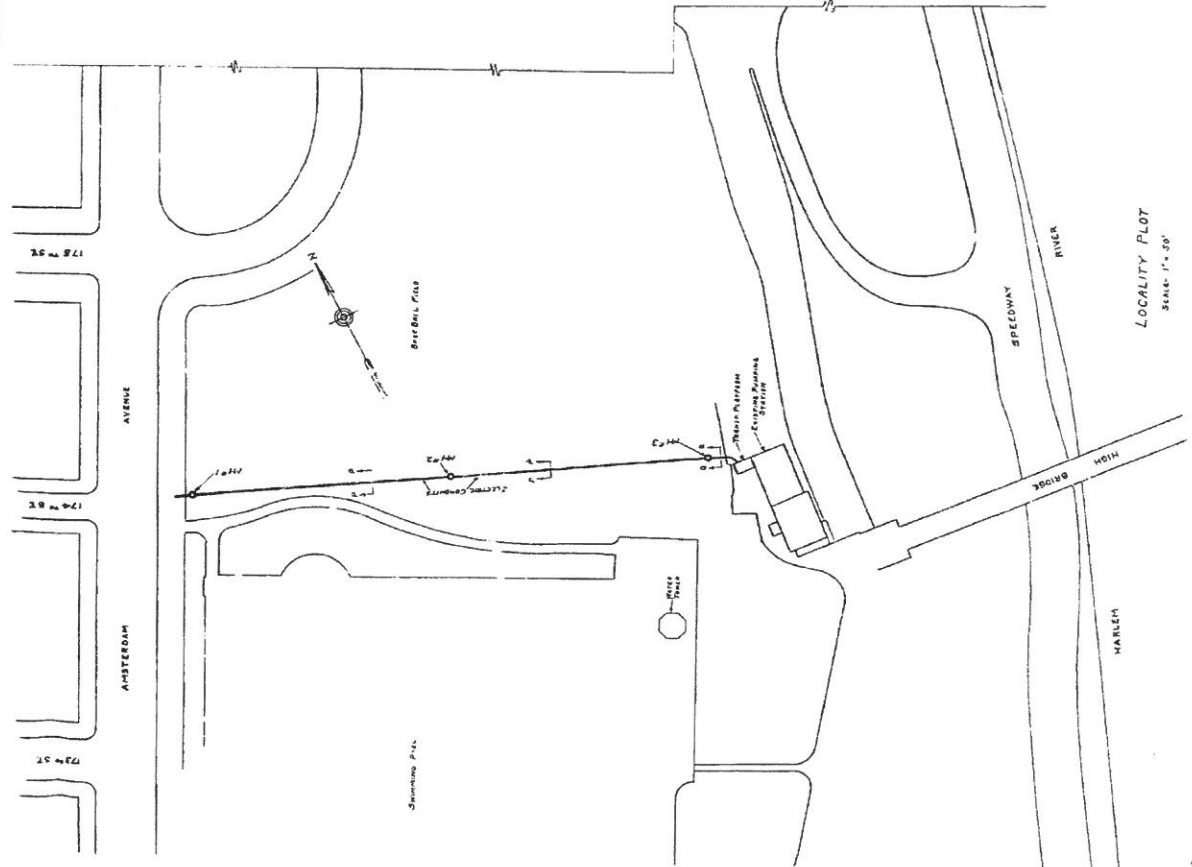
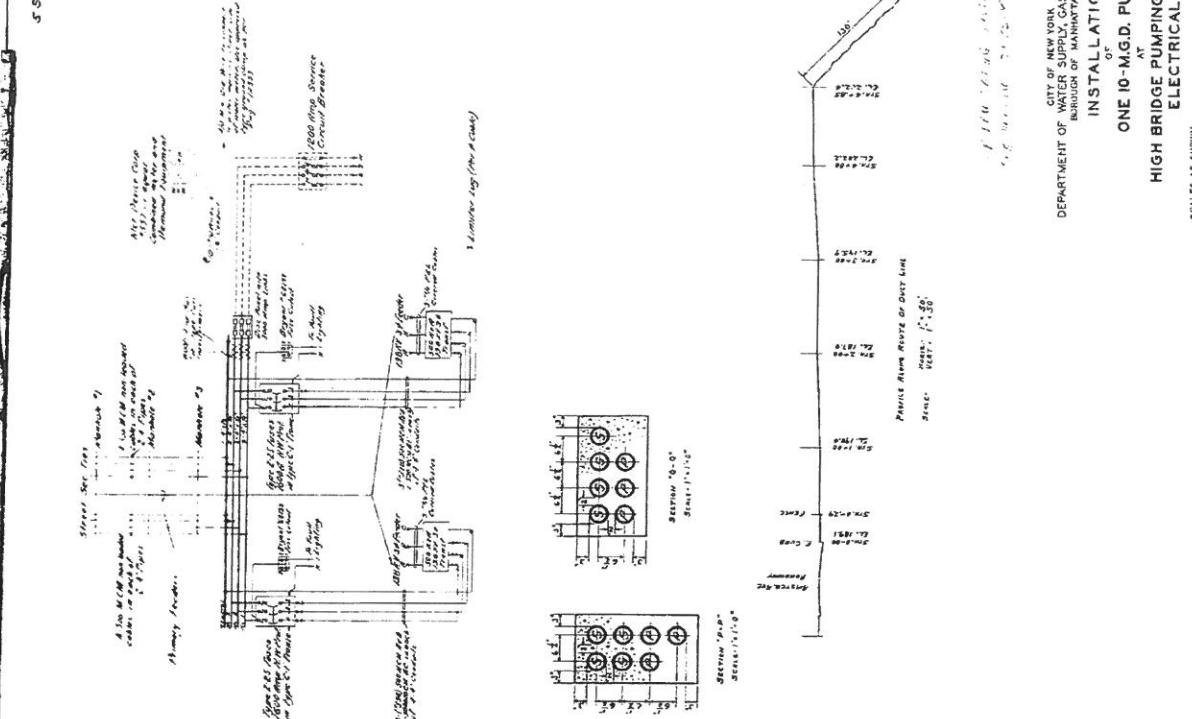
These drawings are on the south side for even numbered piers and on the north side for odd piers.

REPAIRS OF THE BRIDGE OVER THE
MIDDLE OF THE RIVER
HIGH BRIDGE RECONSTRUCTION
TYPICAL 80 FT SPAN OF
EXISTING STRUCTURE
SCALE: 1/4" = 1'-0"

W.S. Parsons
Engineers
New York, N.Y.
X-13488



SHEET NO. 2.
OF SHEETS IN SET.

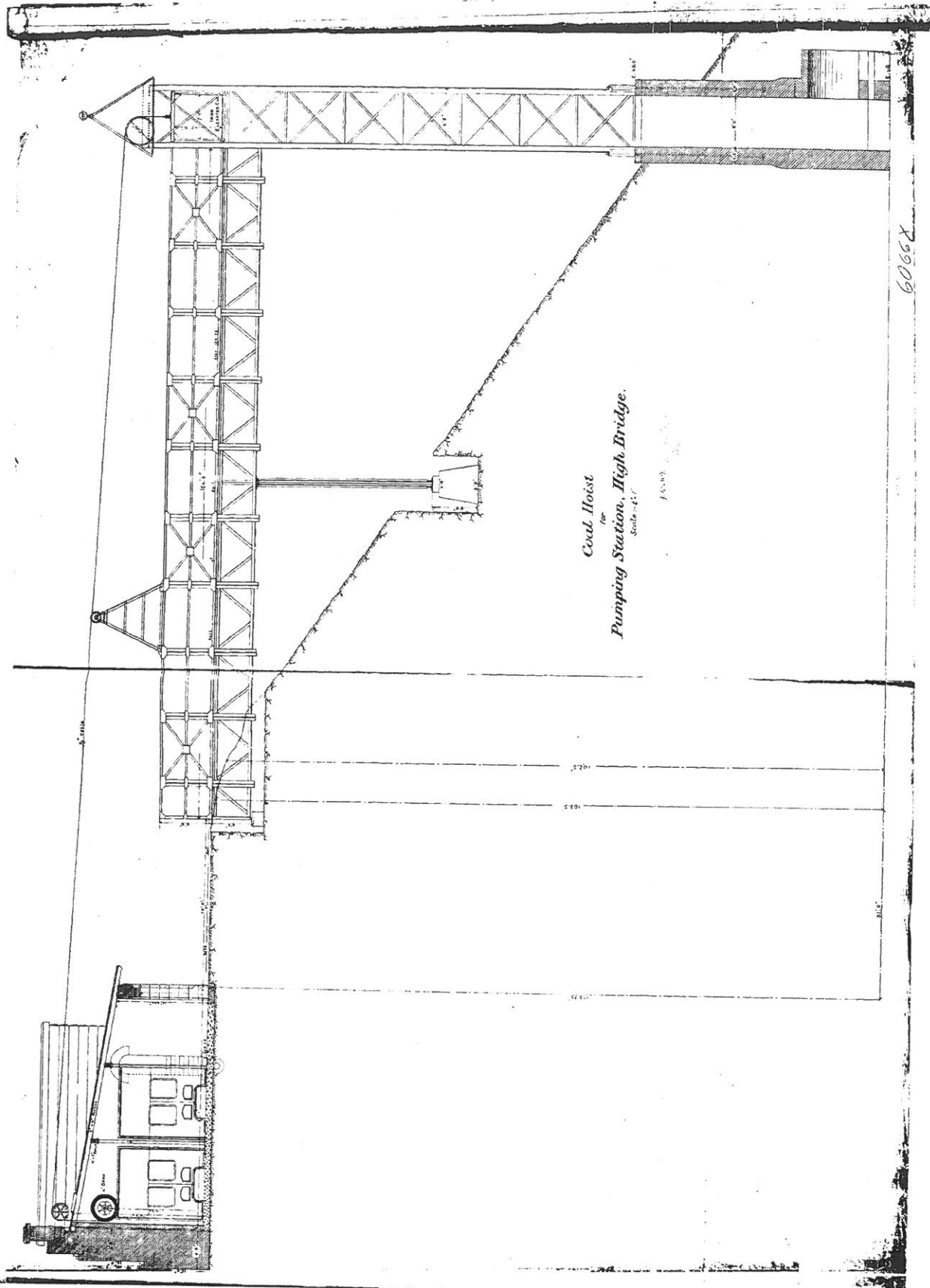


CITY OF NEW YORK
DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
BUREAU OF MANHATTAN
INSTALLATION
OF
ONE 10-M.G.D. PUMP
AT
HIGH BRIDGE PUMPING STATION
ELECTRICAL

SEPT-10-36
SCALES AS SHOWN
DRAWN BY: H. B. S. I. G.
CHECKED BY: J. J. I. G.
APPROVED BY: C. B. I. G.

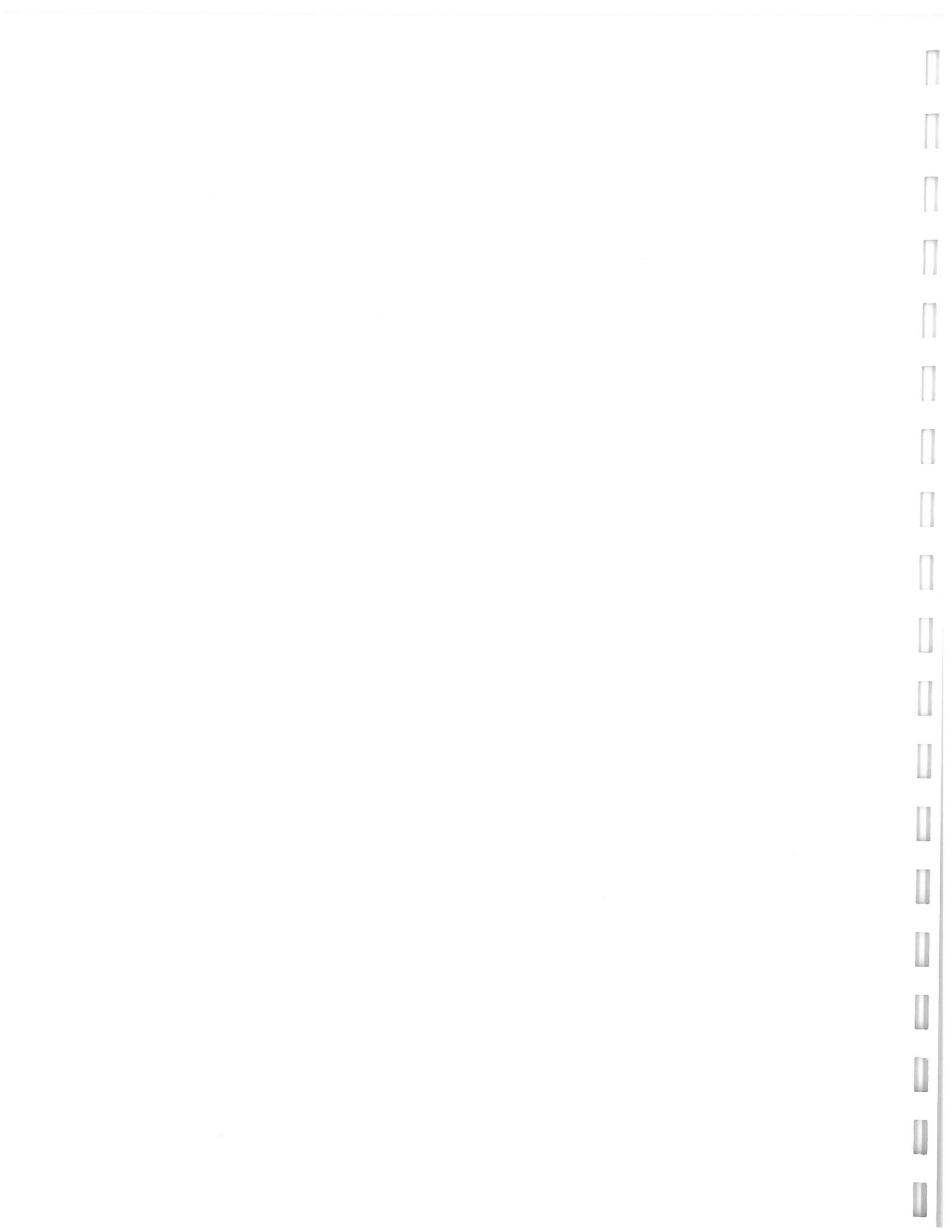
27392-K

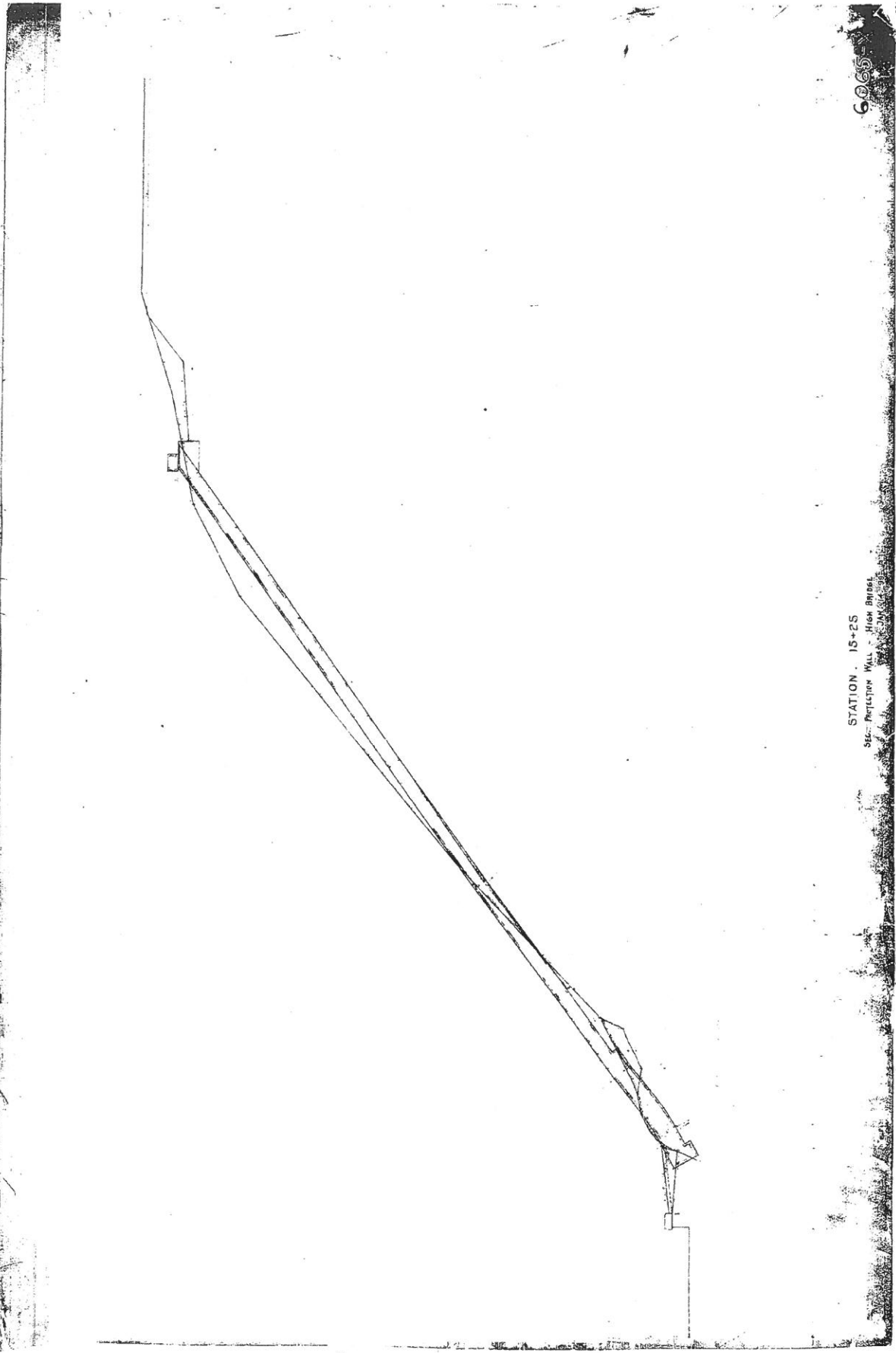




*Coal Hoist
for
Pumping Station, High Bridge.
Scale 1/4" = 1' - 0"*

6009

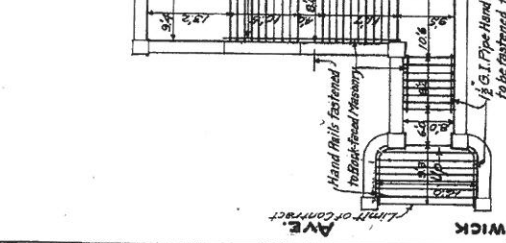
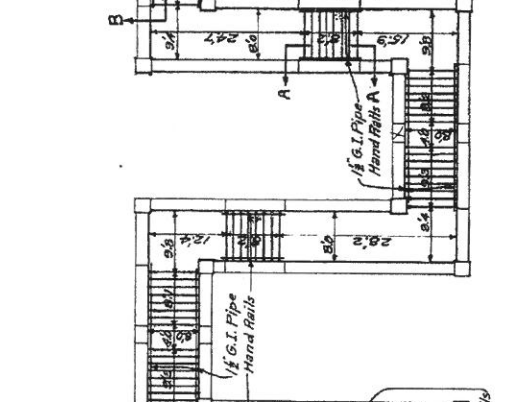
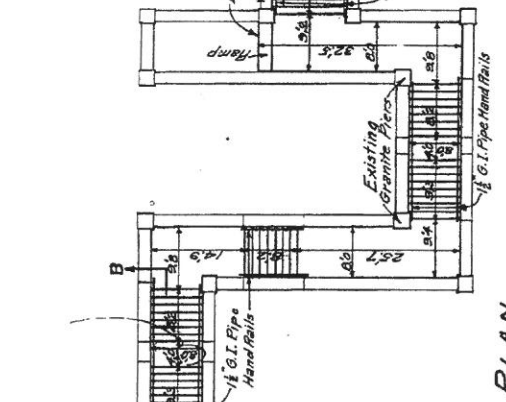
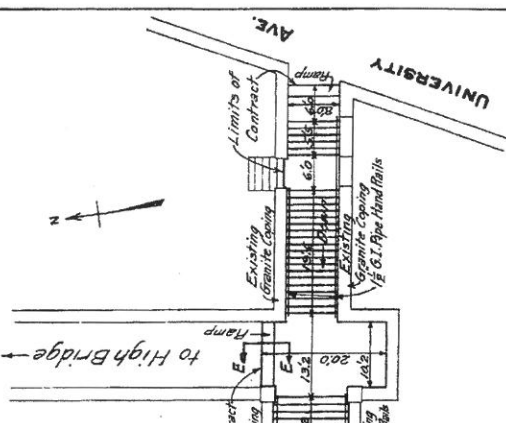




STATION . 15+25
SEC. PERTUSION MILL - HIGH BRIDGE

6065





SECTION E-E
(Typical Ramp)
Scale 1/2" = 1ft.

NOTE: All steps and landings to be covered with 1/2" rough spruce boards on cleats. The attention of the contractor is called to the fact the steps are worn and the width of treads and heights of risers vary. The contractor shall verify measurements and conditions at the site. Where required, cleats shall be trimmed or provided with shims so that the wood steps and landings set firmly under all conditions. All steps shall have 1/2" galv. iron pipe hand rails fastened to stone copings except as otherwise noted.

PROPOSED TREADS, LANDINGS AND HAND RAILS FOR STONE STEPS
FROM
SEDGWICK TO UNIVERSITY AVES. SOUTH OF HIGH BRIDGE

CITY ENGINEER
DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
CITY OF BOSTON

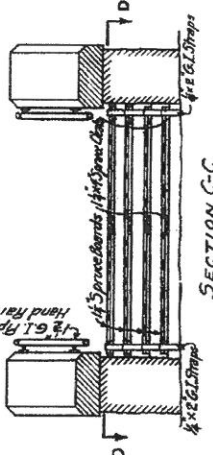
SCALE: AS SHOWN

AUG. 1931

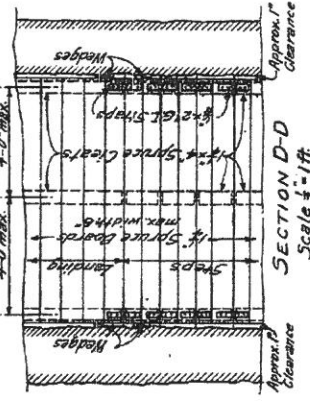
Wm. J. O'Connell
Civil Engineer
100 State Street, Boston, Mass.

23859-A

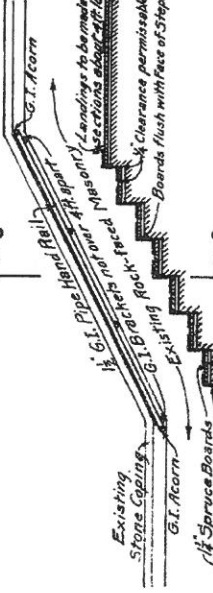
PLAN
Scale 1/2" = 10ft.



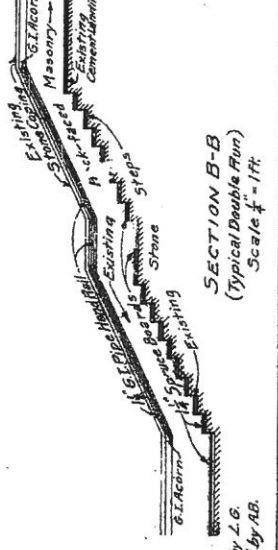
SECTION C-C
Scale 1/2" = 1ft.
4.0 max.



SECTION D-D
Scale 1/2" = 1ft.

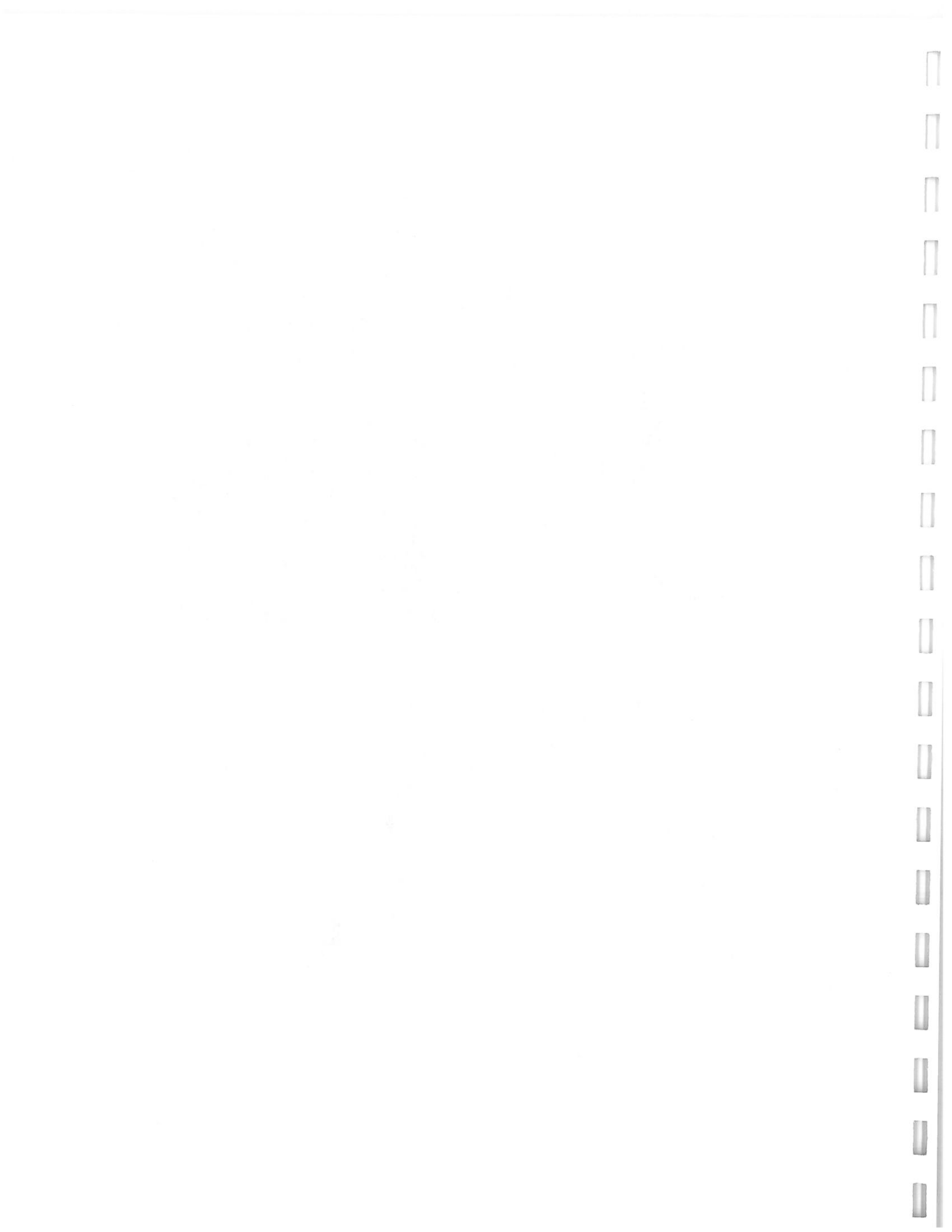


SECTION A-A
(Typical Single Run)
Scale 1/2" = 1ft.

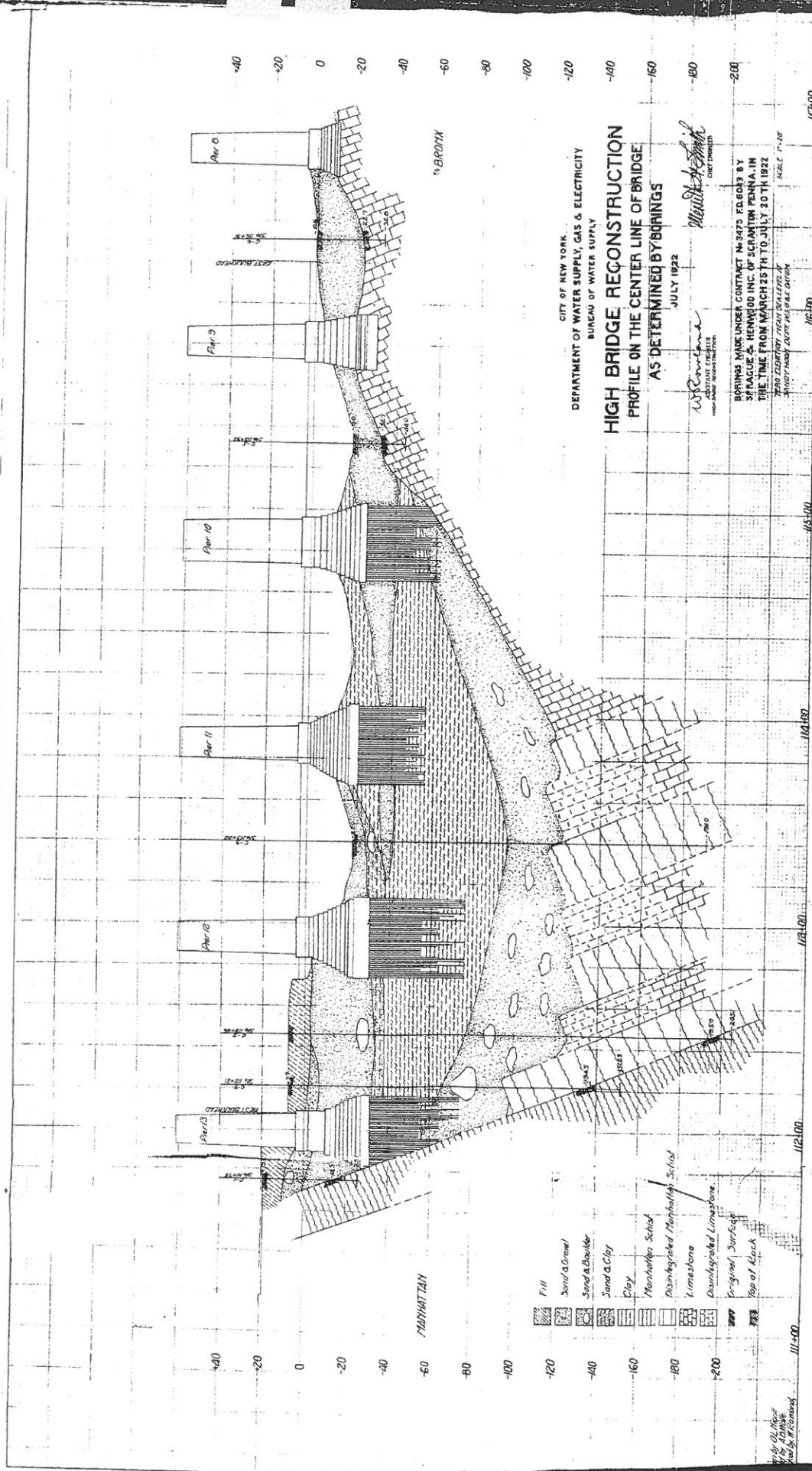


SECTION B-B
(Typical Double Run)
Scale 1/2" = 1ft.

Drawn by L.G.
Checked by A.B.



Y-13523



CITY OF NEW YORK
 DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
 BUREAU OF WATER SUPPLY

HIGH BRIDGE RECONSTRUCTION

PROFILE ON THE CENTER LINE OF BRIDGE
 AS DETERMINED BY BORINGS

JULY 1922

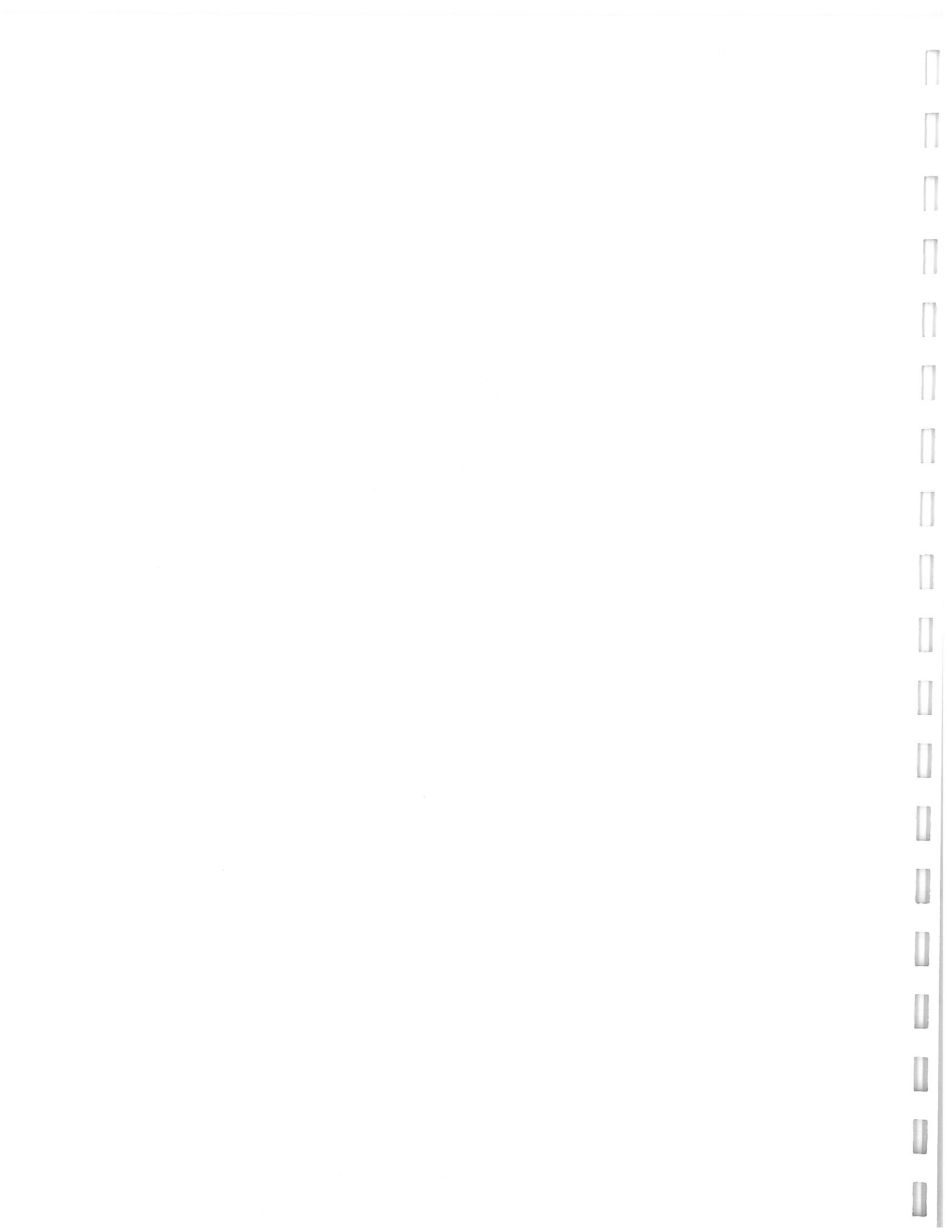
W. R. ...
 CHIEF ENGINEER

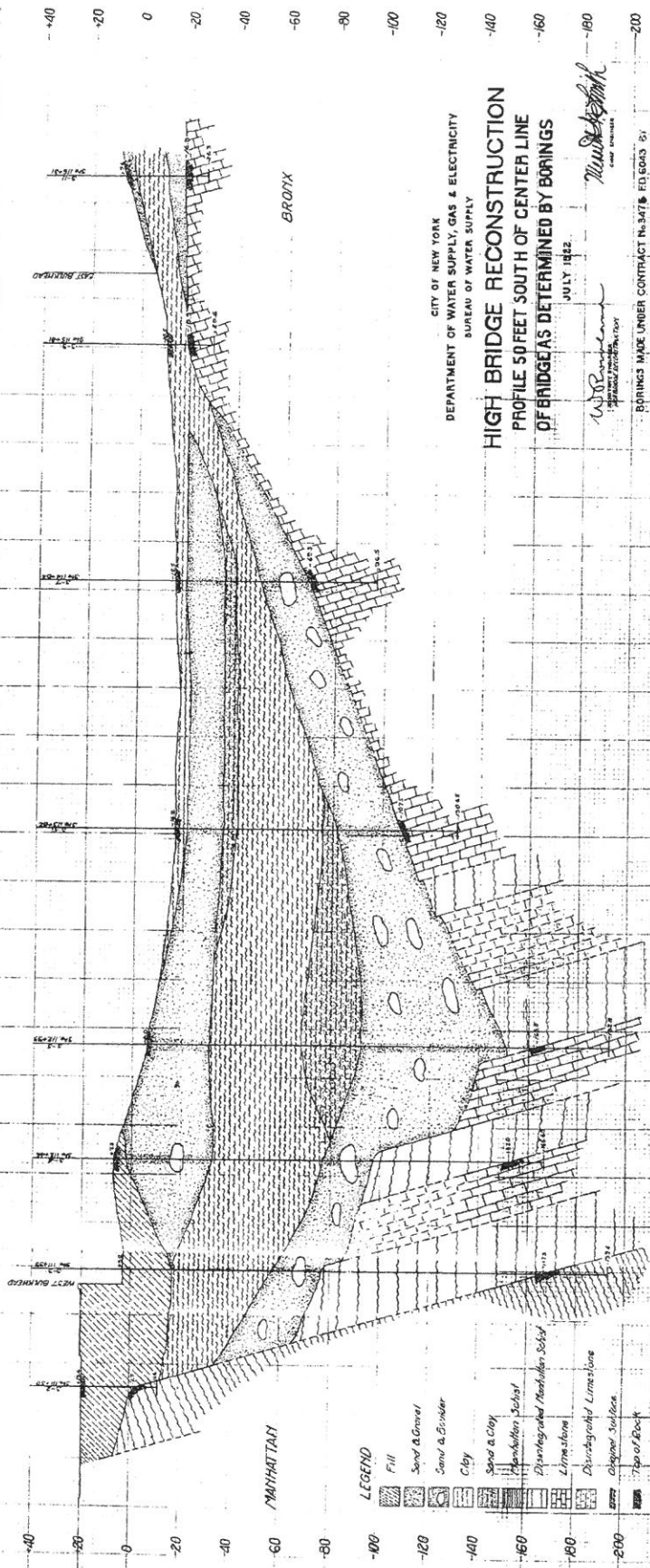
BORINGS MADE UNDER CONTRACT NO. 3475 FEB 6-13 BY
 SFRAGUE & HENNING INC. OF SCANTON PENNA. IN
 THE TIME FROM MARCH 25 TH TO JULY 20 TH 1922
 2000 ELEVATION FEET, SCALE 1"=20'
 SANDY MUD, DEPTH 150 FEET, DIVISION

- Fill
- Sand & Gravel
- Sand & Boulder
- Sand & Clay
- Clay
- Manhattan Schist
- Dismembered Marble Schist
- Limestone
- Dismembered Limestone
- Original Surface
- Top of Rock

By *Oliver ...*
 Chief Engineer

111+00 112+00 113+00 114+00 115+00 116+00 117+00





CITY OF NEW YORK
DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
BUREAU OF WATER SUPPLY

HIGH BRIDGE RECONSTRUCTION
PROFILE 50 FEET SOUTH OF CENTER LINE
OF BRIDGES AS DETERMINED BY BORINGS

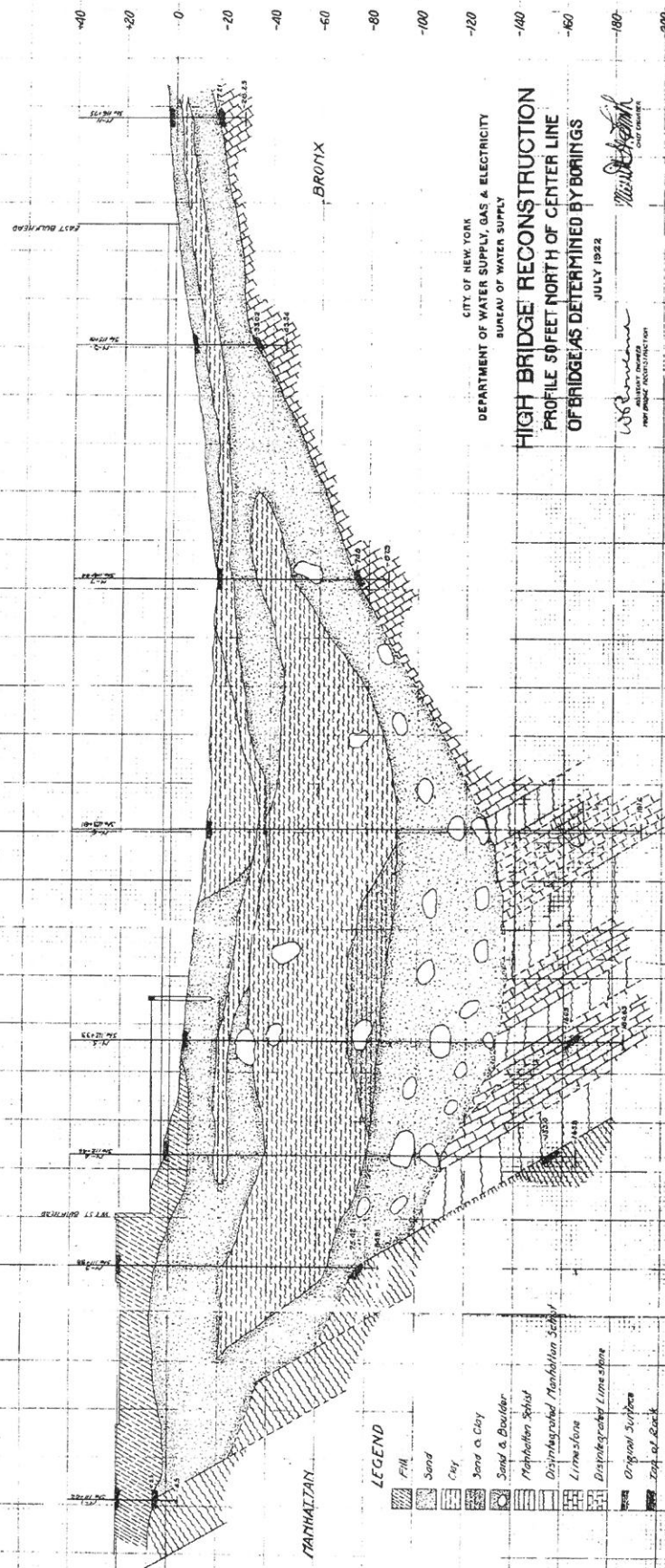
JULY 1922.
W. B. R. [Signature]
C. E. [Signature]

BORINGS MADE UNDER CONTRACT NO. 3478 FD 6043 BY
SPRAGUE & HENWOOD INC. OF SCRANTON PENNSYLVANIA
IN THE TIME FROM MARCH 25TH TO JULY 20TH 1922
DRAWN BY [Signature] CHECKED BY [Signature]
SCALE 1"=40'

- LEGEND**
- Fill
 - Sand & Gravel
 - Sand & Gravel
 - Clay
 - Sand & Clay
 - Manhattan Schist
 - Disintegrated Manhattan Schist
 - Limestone
 - Disintegrated Limestone
 - Original Surface
 - Foot Dock

11200 11300 11400 11500 11600 11700 11800 11900
Y-13527





CITY OF NEW YORK
 DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
 BUREAU OF WATER SUPPLY

HIGH BRIDGE RECONSTRUCTION

PROFILE 50 FEET NORTH OF CENTER LINE
 OF BRIDGE AS DETERMINED BY BORINGS

W. S. ...
 ASSISTANT ENGINEER
 HEAD OF RECONSTRUCTION

July 1922

BRIDGE MADE UNDER CONTRACT NO. 3475 FD 6043 BY SPRAGUE &
 HENWOOD INC OF SEAFORD PENNSYLVANIA IN THE TIME FROM
 MARCH 25 TH TO JULY 20 TH 1922

SCALE 1" = 20'
 200' HORIZONTAL FROM CENTER LINE
 100' HORIZONTAL FROM CENTER LINE
 50' HORIZONTAL FROM CENTER LINE

- LEGEND**
- Fill
 - Sand
 - Clay
 - Sand & Cobble
 - Sand & Boulder
 - Manhattan Schist
 - Disintegrated Manhattan Schist
 - Limestone
 - Disintegrated Limestone
 - Original Surface
 - Top of Rock

Y-3526

174.00

165.00

173.50

174.00

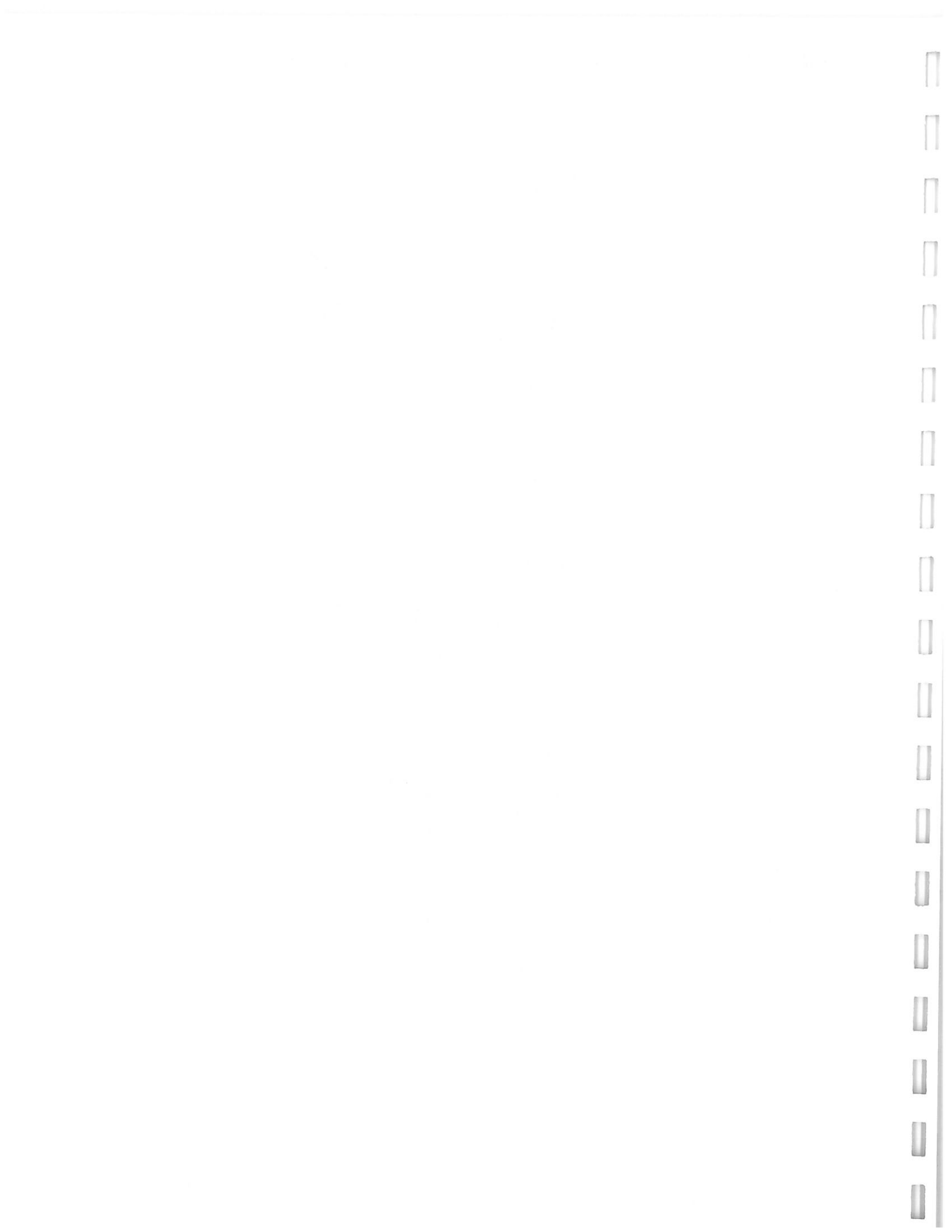
174.00

174.00

174.00

174.00

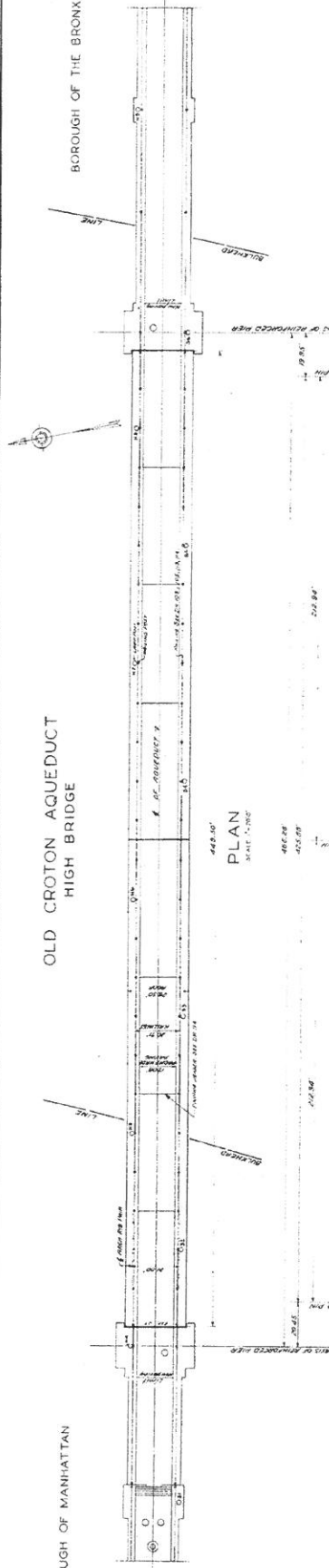
174.00



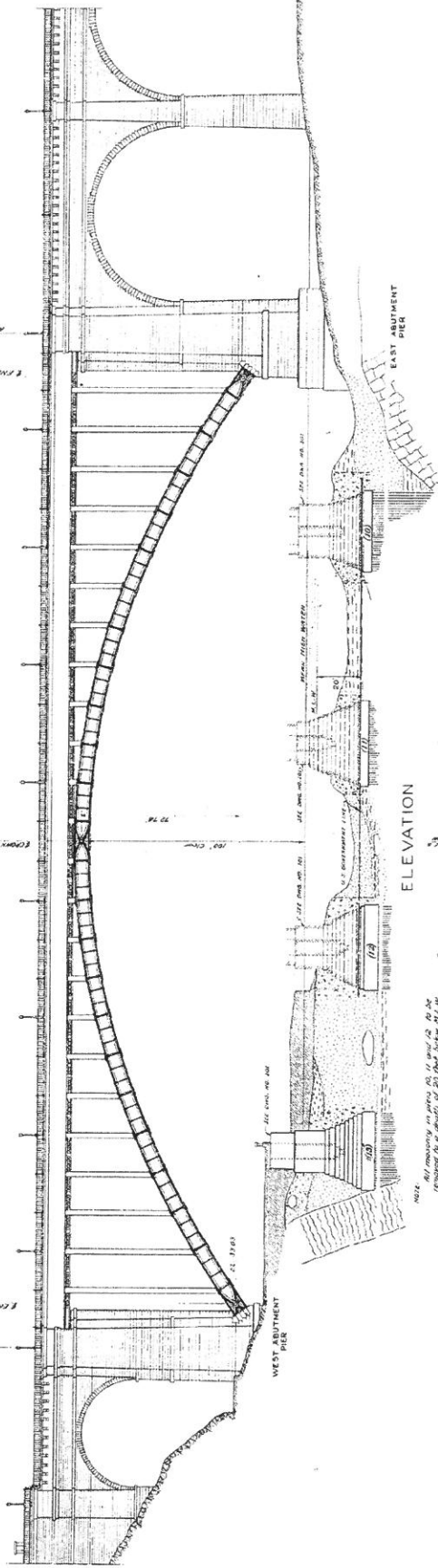
OLD CROTON AQUEDUCT
HIGH BRIDGE

BOROUGH OF MANHATTAN

BOROUGH OF THE BRONX



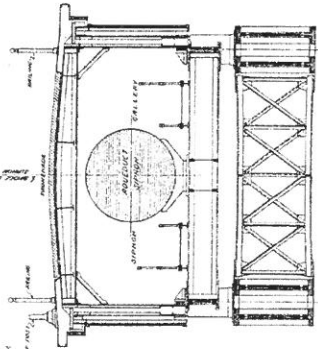
PLAN
SCALE 1"=100'



ELEVATION

NOTE: All masonry in piers, etc., shall be removed to the level shown below.

- LEGEND
- Fill
 - Sand & Gravel
 - Sand & Boulder
 - Sand & Clay
 - Clay
 - Marshall's Earth
 - Concrete
 - Limestone



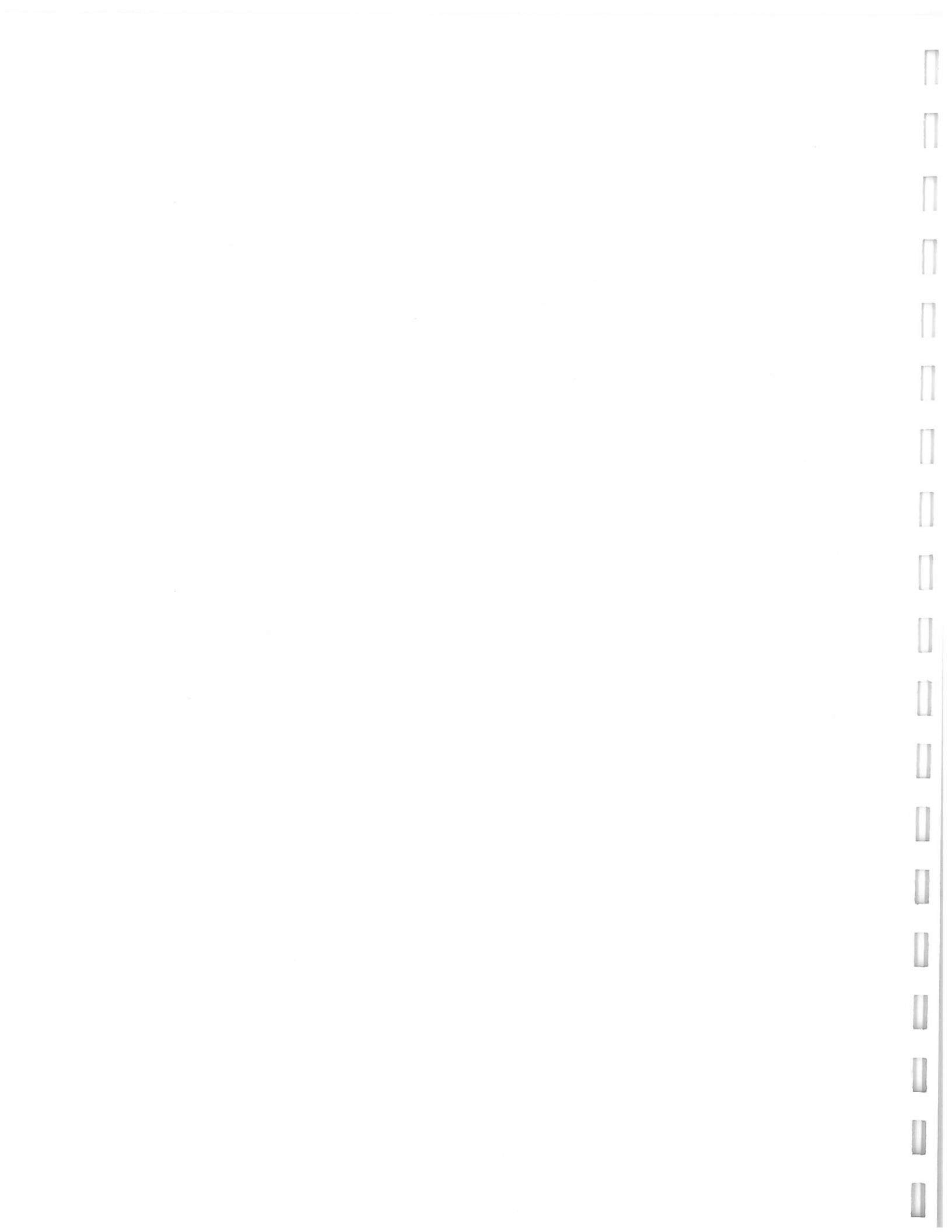
CROSS SECTION
SCALE 1"=10'

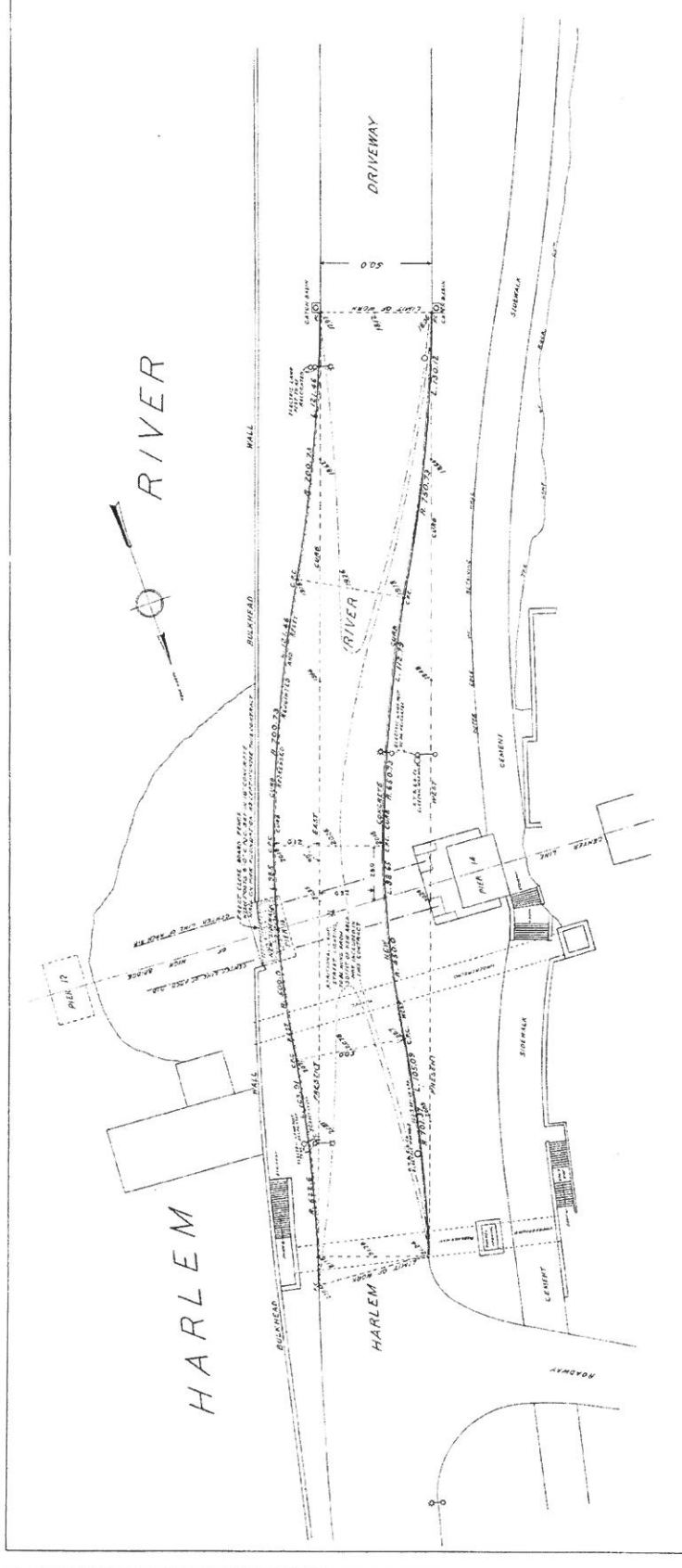
CITY OF NEW YORK
DEPARTMENT OF PLANT & STRUCTURES
HIGH BRIDGE RECONSTRUCTION
OVER
HARLEM RIVER
BETWEEN THE BOROUGHS OF
MANHATTAN AND THE BRONX
STEEL ARCH SPAN
SCALE AS SHOWN
JUNE 1, 1926

Arthur F. ...
COMMISSIONER
OF THE DEPARTMENT OF PLANT & STRUCTURES

W. B. ...
ENGINEER
ASSISTANT IN CHARGE

102





LEGEND
 Dotted line shows present conf. line.
 Solid line shows proposed conf. line.
 Dashed line shows proposed bridge structure.
 Solid line shows proposed roadway.
 Dotted line shows proposed sidewalk.
 Dotted line shows proposed utility lines.
 Dotted line shows proposed drainage lines.
 Dotted line shows proposed sewer lines.
 Dotted line shows proposed water lines.
 Dotted line shows proposed gas lines.
 Dotted line shows proposed telephone lines.
 Dotted line shows proposed electric lines.
 Dotted line shows proposed cable lines.
 Dotted line shows proposed steam lines.
 Dotted line shows proposed oil lines.
 Dotted line shows proposed gas lines.
 Dotted line shows proposed water lines.
 Dotted line shows proposed sewer lines.
 Dotted line shows proposed drainage lines.
 Dotted line shows proposed utility lines.
 Dotted line shows proposed sidewalk.
 Dotted line shows proposed bridge structure.
 Dotted line shows proposed conf. line.

CITY OF NEW YORK
 DEPARTMENT OF PLANT STRUCTURES
HIGH BRIDGE RECONSTRUCTION
 OVER
 HARLEM RIVER
 BETWEEN THE BOROUGHS OF
 MANHATTAN AND THE BOROUGH
 OF THE
 HARLEM RIVER DRIVEWAY

SCALE: 1" = 50 FT.
 MADE BY: J.E.T.
 CHECKED BY: A.S.P.
 ASSISTANT: J.W.J.C.
 APPROVED BY: *Walter D. Schomaker*
 COMMISSIONER
 ENGINEER IN CHARGE
 JUNE 1, 1924
 SHEET NO. 16

APPROVED BY: *Walter D. Schomaker*
 COMMISSIONER
 ENGINEER IN CHARGE



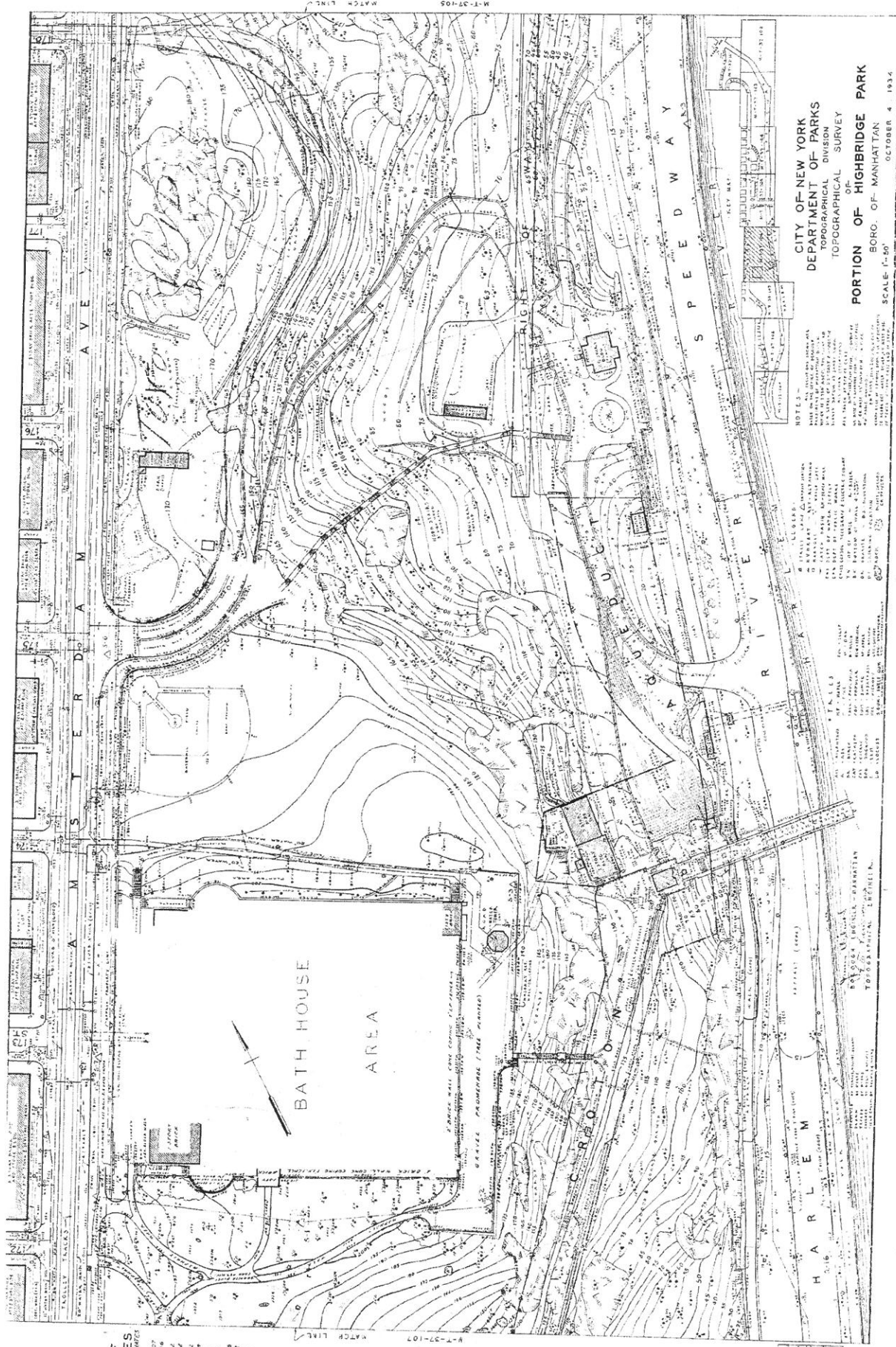


TABLE OF COORDINATES
IMPERIAL POINTS

| | | |
|----|---|---------|
| R | N | 4453 07 |
| | E | 71 86 |
| 41 | N | 4453 07 |
| | E | 71 86 |
| 42 | N | 4533 22 |
| | E | 10 29 |
| 43 | N | 4530 11 |
| | E | 6 00 00 |
| 44 | N | 4492 09 |
| | E | 252 72 |
| 45 | N | 4412 41 |
| | E | 246 07 |

NOTES:
 1. THIS MAP WAS MADE BY THE CITY OF NEW YORK DEPARTMENT OF PARKS TOPOGRAPHICAL DIVISION IN ACCORDANCE WITH THE CITY CHARTER AND THE CITY CODE.
 2. THE MAP IS BASED ON THE CITY OF NEW YORK DEPARTMENT OF PARKS TOPOGRAPHICAL SURVEY OF 1934.
 3. THE MAP IS BASED ON THE CITY OF NEW YORK DEPARTMENT OF PARKS TOPOGRAPHICAL SURVEY OF 1934.
 4. THE MAP IS BASED ON THE CITY OF NEW YORK DEPARTMENT OF PARKS TOPOGRAPHICAL SURVEY OF 1934.
 5. THE MAP IS BASED ON THE CITY OF NEW YORK DEPARTMENT OF PARKS TOPOGRAPHICAL SURVEY OF 1934.

CITY OF NEW YORK
DEPARTMENT OF PARKS
TOPOGRAPHICAL DIVISION
TOPOGRAPHICAL SURVEY
PORTION OF HIGHBRIDGE PARK
BORO. OF MANHATTAN
 OCTOBER 4, 1934
 SCALE: 1"=50'

M-T-27-106

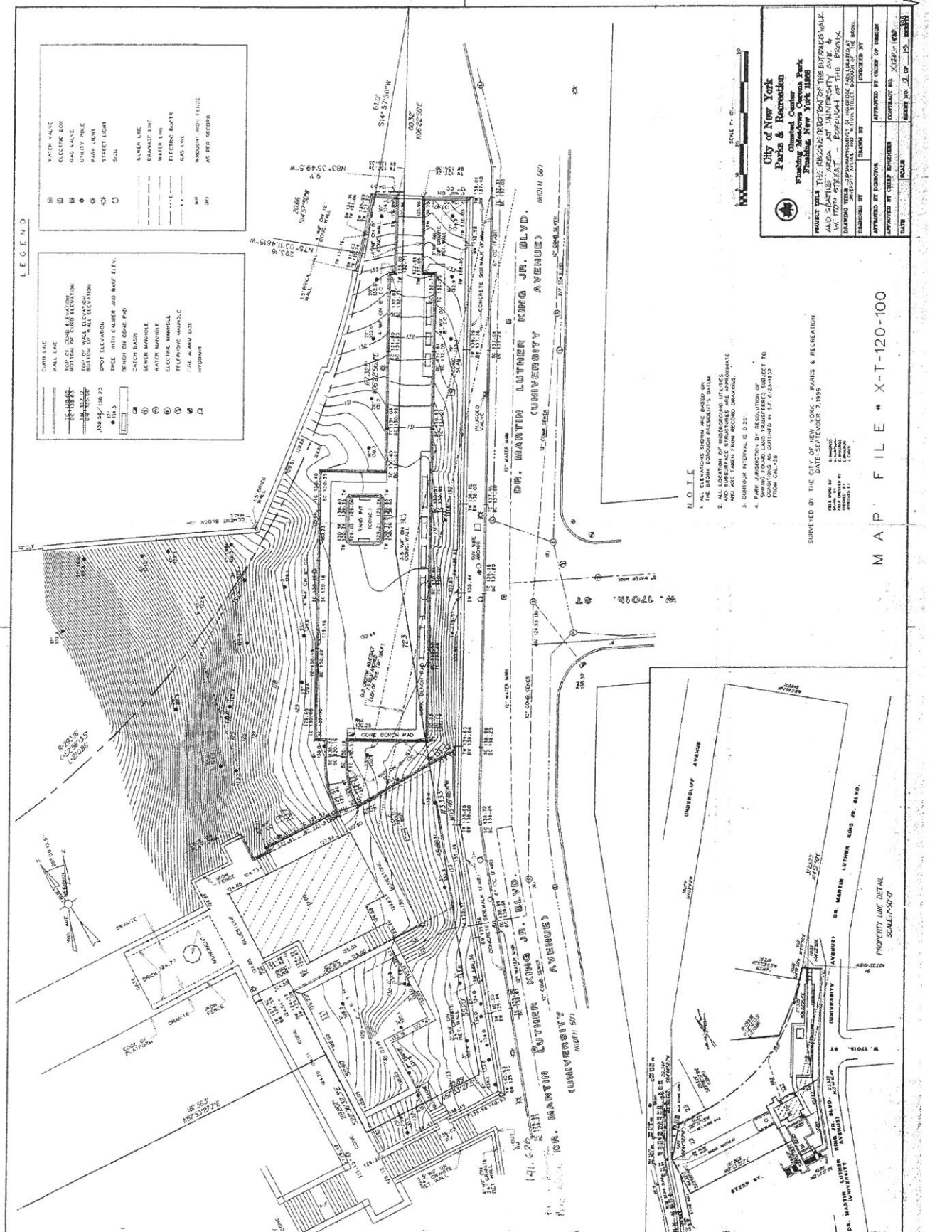
M-T-27-105

M-T-27-107



LEGEND

| | | | |
|--|----------------------------------|--|--------------------|
| | CURB LINE | | WATER VALVE |
| | TOP OF CURB ELEVATION | | ELECTRIC BOX |
| | TOP OF MANHOLE ELEVATION | | GAS VALVE |
| | BOTTOM OF MANHOLE ELEVATION | | UTILITY POLE |
| | SPOT ELEVATION | | MAN VAULT |
| | PIPE WITH COVER AND HALF FT. IN. | | STREET LIGHT |
| | PIPE WITH COVER 2 FT. | | SIGN |
| | SEWER MANHOLE | | SINGLE LINE |
| | WATER MANHOLE | | SPANWISE LINE |
| | ELECTRIC MANHOLE | | WATER LINE |
| | FIRE ALARM BOX | | ELECTRIC DUCTS |
| | HYDRANT | | GAS LINE |
| | | | WROUGHT IRON FENCE |
| | | | AS PER RECORD |



NOTE

1. ALL ELEVATIONS SHOWN ARE BASED ON THE BROWN BENCH MARK PRESENT IN THE AREA.
2. ALL LOCATIONS OF UNDERGROUND UTILITIES ARE INDICATED BY DOTTED LINES AND ARE TAKEN FROM RECORD DRAWINGS.
3. CONTOUR INTERVAL IS 0.25'.
4. PAVEMENT PROFILES BY RESOLUTION OF THE BOARD OF SUPERVISORS ARE SUBJECT TO THE CITY ENGINEER'S OFFICE AND SHALL BE OBTAINED FROM CH-28.



City of New York Parks & Recreation
 Flushing Meadows Corona Park
 Flushing, New York 11355

PROJECT TITLE: THE RECONSTRUCTION OF THE BRONX WALK AND 5400' OF THE BRONX WALK AND 1700' OF THE BRONX WALK FROM 1700' STREET TO THE POINTS OF THE BRONX WALK.

DESIGNED BY: [Name]
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]
 DATE: [Date]

DRAWN BY THE CITY OF NEW YORK, PARKS & RECREATION
 DATE: SEPTEMBER 7, 1959

BY: [Name]
 [Signature]
 [Title]

M A P F I L E * X-T-120-100

