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STAGE 1A ARCHAEOLOGICAL ASSESSMENT

WILLIS AVENUE BRIDGE
RECONSTRUCTION
BRONX COUNTY AND NEW YORK COUNTY
NEW YORK

PIN X757.00.121
BIN No. 2-24005-9\A\B
CONTRACT No. HBM1124
#96PR073

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March 27, 2001

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TABLE OF CONTENTS

FIGURES

EXECUTIVE SUMMARY

The Federal Highway Administration (FHA), in cooperation with the New York City Department of Transportation (NYCDOT) is proposing to replace the 100-year-old Willis Avenue Bridge over the Harlem River between Manhattan and the Bronx. The project is intended to improve land width and geometry of the bridge and its approach ramps, reduce the rate of accidents, increase the bridge's load carrying capacity, improve the bridge's bicycle and pedestrian facilities, and to address all structural and seismic deficiencies. The proposed upgrading of the Willis Avenue Bridge has five possible schemes, ranging from an on-line rehabilitation (Scheme I and IA) to the off-line replacement with an alternate alignment and new swing span (Scheme IV). Each of these actions will have a different level of impact, depending on where new and/or rehabilitated pier supports will be located.

As part of the City Environmental Quality Review (CEQR) and State Environmental Quality Review (SEQR), an Environmental Impact Statement (EIS) is being prepared. As part of the EIS, a Stage 1A Archaeological Assessment was completed by Historical Perspectives, Inc. This archaeological study is designed to determine the likelihood that prehistoric and historic archaeological resources were deposited on the site and have remained undisturbed by historic and modern development. In order to establish prior usage of the project site, background research was completed which included a review of primary and secondary sources to document the prior usage of the project site, cartographic analysis, site file reviews of previous pertinent archaeological findings, informant interviews, and field visits.

The Manhattan section of the project site was found to be potentially sensitive for a 17th century cemetery which once stood somewhere near First Avenue and East 126th Street. It also has a low to moderate sensitivity for precontact resources beneath 12 to 21 feet of landfill along the shoreline and beneath the footprint of the FDR and Harlem River Drives. The Bronx section of the project site is potentially sensitive for a ca.1873 roundhouse foundation on Block 1806, just north of Willis Avenue near East 132nd Street, and potential precontact resources beneath 15 feet of fill in the footprint of Willis Avenue just south of the roundhouse and north of Block 1805.

In order to further assess the likelihood that potential archaeological resources will be impacted, comprehensive topic intensive studies on each of these resource types are recommended. For the Manhattan section of the project site, this study should concentrate on attempting to better define the boundaries of the cemetery, and focus on documenting its history and possible removal. For precontact resources, further investigations (e.g., individual railroad company archives) into disturbance of the shoreline prior to filling should be pursued. For the Bronx section of the project site, this study would concentrate on documenting the use and removal of the roundhouse, and any subsequent impacts. Furthermore, precontact resources should be further addressed through the completion of a more extensive disturbance analysis.

It is recommended that these topic intensive studies should be completed in conjunction with the selection of a final design scheme, so that definitive impacts can be compared to the location of potential resources. If necessary, subsurface investigations and possible mitigation measures would be recommended at that time

INTRODUCTION

The Federal Highway Administration (FHA), in cooperation with the New York City Department of Transportation (NYCDOT) is proposing to replace the 100-year-old Willis Avenue Bridge over the Harlem River between Manhattan and the Bronx (Figure 1). The project is intended to improve lane width and geometry of the bridge and its approach ramps, reduce the rate of accidents, increase the bridge's load carrying capacity, improve the bridge's bicycle and pedestrian facilities, and to address all structural and seismic deficiencies (Figures 2, 3).

While the NYCDOT is the public agency undertaking the replacement of the bridge, Federal funds will be used and Federal permits are also required. To comply with both City Environmental Quality Review (CEQR) and State Environmental Quality Review (SEQR) requirements, an Environmental Impact Statement (EIS) is being prepared. As part of the EIS, a Stage 1A Archaeological Assessment was completed by Historical Perspectives, Inc.

This Phase 1A Archaeological Assessment Report documents the potential impacts to archaeological resources by proposed project schemes I, IA, II, III, and IV, and a temporary loom ramp, and will be submitted to the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) for review by the State Historic Preservation Officer (SHPO) in accordance with the State Historic Preservation Act. The purpose of the report is to outline the known history of the landside sections of the project site, to assess their archaeological potential, and to identify any areas that might warrant further investigation.

Both the Willis Avenue Bridge and the Willis Avenue Station in the Bronx were determined eligible for listing on the National Register of Historic Places, and were also found eligible for landmarking by the New York City Landmarks Preservation Commission (NYCLPC). This study precludes an assessment of impacts to these standing structures, which are addressed in a separate report (Hardesty and Hanover 2000a).

RESEARCH GOALS AND METHODS

Background research is designed to address two major questions:

- What is the specific level of potential for precontact - or prehistoric - and historical archaeological resources of significance to exist in the project site; and

- What is the likelihood that such resources have survived the subsurface disturbances concomitant with the original construction of the bridge, shoreline regulation, utility and infrastructure installations, highway and road construction, and any subsequent subsurface work.

Sufficient information must be gathered to compare, both horizontally and vertically, the prehistoric past, the historical past, and the subsurface disturbance record. In order to answer these questions background research was conducted, including reviews of primary and secondary sources, cartographic analyzes, site file reviews, informant interviews, and field visits.

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. Previously completed archaeological assessments of Harlem Yard in the Bronx were reviewed, and work efforts completed for those reports were not duplicated.

Cartographic Analysis

Historical maps and atlases were obtained from the Map Division of the New York Public Library. 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.

Site Files Review

Site file reviews were conducted at the New York State Office of Parks, Recreation, and Historic Preservation (SHPO), and the New York State Museum (NYSM), to determine if prehistoric or historical materials had previously been reported in the vicinity of, or within, the project site.

Field Visit

Field visits were conducted in September and October, 2000. Photographs were taken of current conditions in the project site and obvious signs of disturbance were recorded (Photographs A - D).

SITE LOCATION AND CONDITIONS

The Willis Avenue Bridge is a swing bridge located over the Harlem River linking Willis Avenue in the Bronx to First Avenue in Manhattan (Figures 1-3). It provides a continuous street grid system between upper Manhattan and the southwest Bronx, and is one of six bridges which span the lower Harlem River. It was built at the turn of the century and opened in 1901, and consists of a swing span with a single flanking through truss span and multi-girder approaches. There are currently 8-foot walkways on both sides of the bridge serving pedestrians and bicyclists (Photographs A-D).

Manhattan Project Site

On the Manhattan side, the bridge passes over a waterfront parcel on a relieving platform between the FDR Drive and the Harlem River. A section of the land south of the bridge, between Willis Avenue and the Triborough Bridges, is currently used by the Department of Sanitation for salt storage. North of the bridge, from East 127th Street to East 131st Street, the land is also used for materials storage, and includes an abandoned concrete batching plant. The surrounding Manhattan neighborhood of East Harlem is a primarily residential neighborhood with some commercial and industrial areas.

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 Wisconsonian 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.

Bronx Project Site

On the Bronx side of the project site, the bridge passes over the Harlem River Yard, a waterfront intermodal waste transfer facility and industrial/commercial park on the site of a former rail yard. The intermodal waste transfer facility south of the bridge is the southern terminus of the Oak Point Rail Line, recently completed by the State of New York, providing a direct rail link from the Bronx to the national rail freight network. Several rail lines and at-grade roadways are located within the Harlem River Yard. Also within the yard and south of the bridge's eastern exit ramp is the Willis Avenue Station, a former rail station built in 1891. This structure was determined eligible for New York City landmarking and listing on the National Register of Historic Places.

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 feed the Harlem River, it is essentially a tidal strait (Kieran 1982).

PRECONTACT PERIOD BACKGROUND

In order to determine the likelihood that precontact, or prehistoric, cultural resources were ever present within the Willis Bridge project site, and to provide a framework in which to interpret potential resources, it is necessary to establish the cultural chronology and prehistoric context of the project area.

The present knowledge and understanding of the Native Americans in the lower Hudson Valley and Greater New York area is derived from four sources: historical accounts, ethnographic reports, Native American artifact collections, and archaeological investigations. The precontact period in the northeastern United States is traditionally divided into the Paleo-Indian, Archaic, Transitional, Woodland and Contact stages, the Archaic and Woodland periods being further subdivided into Early, Middle, and Late substages. Settlement, subsistence and cultural systems changed through time, leading to the designation of these distinct periods. At the time of European contact, a Native American group known as the Siwanoy occupied the northern coastline of Long Island Sound from Norwalk, Connecticut to what is now the south Bronx. However the Bronx River, east of the project site, may have been the dividing line between the Siwanoy and another Upper Delaware Munsee speaking cultural group who most likely inhabited the project area, the Wiechquaesqueak (Grumet 1981).

It is generally accepted that the proto-historic cultural groups that populated the area practiced a settlement and subsistence pattern of seasonal rounds exploiting a diverse array of resources. The types of sites found in the surrounding area, as reported by archaeologists, ethnographers, and amateur collectors, reflect this pattern and include villages, burials, and small campsites which were seasonally occupied. These sites are often situated on well-drained upland soils in proximity to fresh water, and on tidal inlets. However, shell heaps, or middens, were frequently generated along rivers where precontact peoples discarded their "garbage," away from their living areas (Ritchie and Funk 1973).

Manhattan Project Site

The project site lies in an area near former flatlands called Muscoota by Native Americans, which once stretched between the Harlem River and Morningside Heights, northwest of what was once the Harlem Creek and its bordering wetlands (Rubinson 1989:3). The Native American name "Rechgawanes" was given to a section of land south of 109th Street west of the confluence of the East and Harlem Rivers, and to the stream that once ran along the route of East 107th Street just south of the project site (Grumet 1981:46). Planting areas and old fields once stood in the vicinity of the project site, and were especially noted along the shoreline.

A Native American trail known as "Wickquasgeck" was reported in northern Manhattan west of the project site through what is now Central Park. A second Indian Path veered off this trail at East 110th Street near Fifth Avenue, and headed northeast toward a habitation site on the Harlem River near East 124th Street, just south of the project site (Grumet 1981:46). This

Amerindian Trail was incorporated into the first road system of the village of Harlem. Passing through the meadows of Muscoota to a place called Conykeekst, the trail crossed First Avenue at 124th Street and terminated at a camp or village site near the shoreline (Bolton 1922:72,74-76). When arrowheads and flakes were found in 1855 during the excavation of a cellar on Avenue A between 120th and 121st Streets, south of the project site, Bolton's analysis of remains concluded that the precontact site here was intermittently used for fishing or as a place for landing and trading (Riker 1904:123, Bolton 1922:72F., pl. IV as reported in Rubinson 1989:7).

Bronx Project Site

The earliest cartographic source reviewed depicting aboriginal habitation in the vicinity was the Hendricks Map of 1616, which shows the Wikagyl (Wiechquaesgeek) Indians inhabiting the southern New York mainland just north of the Manhattes Indians on Manhattan Island. The Wiechquaesgeek are identified as the group of Indians living in northern Manhattan, Bronx County, and southern Westchester County in a number of seventeenth century Dutch and English manuscripts, deeds, treaties, and maps (Bolton 1934; Grumet 1981).

Historical references to precontact sites and shell middens in the immediate vicinity of the project site attest to this area's potential sensitivity (Bolton 1848:280; Bolton 1881:451). A precontact period trail once ran from the northern Bronx, south to its termination at the Bronx River somewhere near the project site (Grumet 1981:69). The Native American name "Ranachqua," which was applied to the southwest Bronx below Highbridge, may translate to "the end place" referring to the termination of the trail. It's location reportedly coincided with the boundaries of the original tract deeded to Jonas Bronck, which eventually became "Bronck's Land" (Ibid.:43). A second translation suggests the term should be applied more specifically to a precontact village site (Bolton 1934:137).

Bolton reported that the Native American village of "Ranachqua" stood near Cypress Avenue and 131st Street, directly east of the project site (Bolton 1934:137). Regardless of the correct application of the term "Ranachqua," Bolton did verify the presence of a precontact site containing "food-pits and Indian implements" on a knoll at 131st Street (Ibid.). Although the knoll which the site reportedly occupied was leveled when eight to nine feet of its apex, or about 80,800 cubic yards of earth, was removed, a previous assessment of archaeological potential concluded that lower areas within Harlem Yard which may be archaeologically sensitive were filled and raised (Johannemann and Schroeder 1982:26). It was postulated that these actions served to protect archaeological resources from later disturbance (Ibid.).

This sensitivity assessment was repeated in another previously completed archaeological assessment for Harlem Yard, which stated that "where fill has been introduced, prehistoric and historical sites or features could remain..." (Tams 1993:3.5-5). Furthermore, the study cites a resident who claimed that burials were found near the former site of the Gouverneur Morris Mansion, just east of the project site, but that no evidence for the existence of the burial ground

was found (Ibid.). The report goes on to say that if burials did exist, they would be situated below a fill over mantle that now covers the yard (Ibid.).

After these previous documentary studies on the Harlem River Yard were completed, Stage 1B field testing was undertaken in 1993 for two areas designated as potentially sensitive. The first (test area G1) was at the location of Gouverneur Morris's mansion near Cypress Avenue and 131st Street, about 2500 feet west of the project site, at the reported location of the precontact village of Ranachqua. The second (test area G2) was near the former site of Gouverneur II's house several blocks southeast of the project site (Geismar 1993:89). Subsurface testing found that both areas were disturbed and lacked intact archaeological deposits representing prehistoric inhabitants (Geismar 1993:3). Conceivably, the extent of land manipulation in conjunction with the creation of Harlem River Yard destroyed any remnants of potential prehistoric resources in these areas.

HISTORIC BACKGROUND

Manhattan Project Site

- *Contextual History*

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. The purpose of this expedition was to strengthen Dutch ownership claims by occupying strategic points in the territory. Surprisingly, Manhattan was ignored in favor of Governors Island, where eight men were left to build a fort to protect the mouth of the Hudson. The main group of colonists established Fort Orange, now part of Albany, in an area advantageously situated for participation in the lucrative fur trade (Brodhead 1853:150-151).

Eventually, Manhattan was recognized as the strategic heart of the region, and colonization began in earnest in 1625, when an expedition of Company farmers with livestock, tools and provisions arrived on the Hudson River, establishing itself at the southern tip of Manhattan Island, with the purpose of building a fort and laying out nine Company farms, or bouwerijen (bow-wer-RAY-en). These bouwerijen were intended to supply Company personnel with agricultural provisions, so that the Manhattan post would be self-sufficient (Bachman 1969:82-87).

The West India Company was generally scrupulous about acquiring title to the lands it occupied, and upon his arrival on Manhattan Island in 1626, Governor Peter Minuit opened negotiations with the local Indians, and purchased the approximately 22,000 acres of the island for about 60 guilders[1] worth of goods. The erection of a fort, named Fort Amsterdam, was begun near the foot of present Broadway, commanding the upper bay and the entrances to the Hudson and East Rivers (Brodhead 1853:164). The settlement which grew up around the fort, eventually called Nieuw Amsterdam, grew slowly, and at the time of the English conquest in 1664, extended only as far north as the palisades built along present Wall Street, approximately 2.4 miles south of the project site.

This does not mean that the lands north of Nieuw Amsterdam were deserted. Although the central part of the island was considered too rocky for agriculture, and sections were heavily forested, as early as c.1628 at least six Company bouwerijen, four of which were near the East River shore, had been laid out and leased to tenants. The farms embraced a total area of 120 acres. Unfortunately, Manhattan was not terribly fertile, and only two of the farms were considered good, the others better-suited for growing rye or buckwheat (Brodhead 1853:167; Bachman 1969:91; Jenkins 1913:69-70).

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[1]It is not clear how the figure of 24 dollars was calculated (Brodhead 1853:64). The exchange rate between early 17th-century guilders and current dollars is probably somewhat different.

New Amsterdam had been settled for 13 years before the first attempt was made to settle at Harlem. Early attempts to settle there in 1637 were unsuccessful due to lack of manpower, poor health, political conflicts, and Indian attacks. Isaac De Forest was the first documented landowner in what eventually became the village of Harlem. In the 1630s he was granted a tract of about 100 acres which formed a narrow strip from the Harlem Creek to the Harlem River. After De Forest's ownership, the tract went through the hands of William Beeckman and Claesen Swits. After Swits' farm was destroyed in an Indian attack, his abandoned land became the first documented settlement of the village of New Harlem which extended from approximately 118th to 125th Streets, from Third Avenue east to the Harlem River and encompassed the project site (Rubinson 1989:11).

By 1658 the village of New Harlem, containing house and garden lots with outlying farm land, was laid out by an order of the Director-General and Council of New Netherland (Rubinson 1989:10). Its autonomous existence did not last long because in 1665 Governor Nicolls declared that the city of New York should include the entire island of Manhattan, including New Harlem. Land in some sections of New Harlem was rugged and rocky, while other sections had gently undulating meadowland. When early settlers found rich soils covered with timber, they soon realized the resource potential (Romer and Hartman 1981:5). Shortly thereafter, the community began to grow.

An influx of immigrants, including Danes, Swedes, Hollanders, French Huguenots, and Germans, established farms on the rich soils there. Despite the diversity of ethnic backgrounds, Dutch was the language used for civic affairs. The village was originally connected with the little town of New Amsterdam by the widening of the previously-discussed Indian trail "by the Dutch West India Company's negroes" (WPA 1982:254). This was eventually named the Old Harlem Road, and terminated at the Harlem River near 125th Street within the project site. Interestingly, the British permitted the community to retain the name of New Harlem, despite the Dutch reference, after their capture of the city in 1664 (Ibid.:256).

New Harlem's first church, which also served as a meetinghouse, was built in 1667 and a second was built in 1685 (Romer and Hartman 1981:5). During the Revolutionary War, the Morris mansion, far north of the project site, served as temporary headquarters for General Washington's army. During a series of raids that occurred in the immediate region, the Harlem Dutch Church, which once stood just east of the project site, was burned. The Dutch Reformed Church was built east of the project site and south of the previous church as a replacement.

By the early 19th century, New Harlem's population had grown. East of Fifth Avenue, between East 110th and East 125th Streets, James Roosevelt, great-grandfather of Franklin Delano Roosevelt, purchased a large tract of land just west of the project site. He cultivated his property, and eventually sold it in the 1820s for development. By this time, a city plan had been devised to provide for the systematic laying out of streets and avenues throughout Manhattan. The resultant Commissioner's Plan of 1811 imposed a grid system over the city, disregarding natural topographic features which may have impeded road construction. Street regulations called for

extensive grading and filling, removing massive rocks and boulders, and tearing down existing houses located in the path of proposed roadways. However, it was not until decades later that the proposed plan came to fruition (Commissioners of New York State 1811).

The 1832 construction of the railroad to Harlem from the southern tip of Manhattan forged the way for New Harlem to change, transforming it from a charming rural enclave to a "suburb" of the growing city. Because of the development and overcrowding in lower Manhattan, need arose for low-cost housing as workers ventured to find accommodations distant from industrial neighborhoods. The railroad enabled large numbers of people to escape crowded neighborhoods and move north to less populated areas. As a result, Harlem's population grew.

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). Along with improvements in water transport, the nineteenth century also marked the introduction of the elevated railroad up Second and Third Avenues in the 1870s. The flatlands of the upper 90s served the transportation industry with the Manhattan Railway Company's yard at East 99th Street, and a trolley barn at East 100th Street and Lexington Avenue. In the early nineteenth century, the majority of Manhattan north of 125th Street was a mix of residential, agricultural, and industrial use, while the late nineteenth century it was shown as residential, commercial, and unimproved land. Presumably agriculture had largely been abandoned in this area by that time (NYCLPC Neighborhood Maps 1983: 1815-1829, 1855-1879). After 125th Street was opened and regulated, it became an important cross-island thoroughfare.

The elevated trains, or Els as they were commonly called, were opened in the 1870s up Second and Third Avenues. While real estate directly along their smoke-filled and noisy routes was typically reserved for the poor, surrounding neighborhoods became more fashionable (WPA 1982:256). The Polo-Grounds were visited by New York's society, and the acclaimed Harlem Opera House was opened on West 125th Street in 1889. Following this period an influx of immigrants, largely Jews and Italians, changed the community character again. By the early twentieth century, African Americans, Puerto Ricans, and other Latin-American groups moved to the area. Subsequently, housing developments which once were stretched along the Lower East Side, took hold in this section of the city. Harlem has a wealth of rich cultural resources chronicling the community's various transformations.

- ***Project Site History***

While the eastern portion of the Manhattan project site was historically land under water (Figure 2), the western section was first developed as the village of New Harlem in the 17th century. Many years after the village was established, its original streets and lot lines were abandoned as the grid system of streets and avenues in Manhattan was imposed on the landscape. Once this system had been established in the 19th century, the project site was divided into streets and avenues surrounding numerically designated city blocks. The following project site history presents development within the footprint of First Avenue separately from each block within the

project site. Although block numbers have changed from their original designations, the current block numbers will be referenced throughout this report for consistency (Figure 2).

The project site includes the footprint of First Avenue between East 125th Street and north to the Harlem River's shoreline; the footprint of Harlem River Drive north of the Triborough Bridge to the Willis Avenue Bridge; and, the footprint of the FDR drive south of the Triborough Bridge to Palidino Avenue (Figure 2). City blocks include:

- Block 1811, between East 124th and 125th Streets, east of First Avenue, now Louis Cuvillier Park (closed);
- Block 1813 between East 125th and 126th Streets, east of First Avenue; and
- Block 1814 between East 126th and 127th Streets, east of First Avenue.

Historically, the natural shoreline of the Harlem River ran approximately along what are now the western boundary lines of the Harlem River and FDR Drives (Figure 2). As early as 1670 the village of New Harlem had been established fronting "The Great Way" or "Church Lane," which ran northeast to cross First Avenue at East 125th Street, and later became "Old Harlem Road" (Romer and Hartman 1981:9; Figure 4). A series of garden lots and home lots fronting this road were laid out and deeded to new residents. By this time, at least two lots in direct vicinity of the project site were developed (see discussion below; Figure 4).

By 1782, more homesteads had been established on Old Harlem Road within or adjacent to the project site (Stevens 1900). An 1815 map, which shows great detail, places several historic dwellings directly within, and adjacent, to the project site (Sackersdorf 1815: Figure 5). Although some of the dwellings appeared to fall just outside of impact areas from the proposed Willis Avenue Bridge project, their yards and unmapped outbuildings which are typically associated with early homesteads, may have fallen within the project site. Therefore, they are presented as potential resources.

First Avenue

Although the 1670 plan of New Harlem showed all of First Avenue vacant, by 1815 the Dutch Reformed Church stood on a lot extending into the intersection of what is now East 125th Street and First Avenue just south of the project site boundaries (Romer and Hartman 1981:9; Sackersdorf 1815; Figures 4, 5). Later maps indicate the church had a cemetery on its property, hereafter referred to as Cemetery 1, which may have extended east into First Avenue just south of East 125th Street, with its northeastern corner extending into the project site (Dripps 1867; Bromley 1879; Robinson 1885a; Figures 6, 7). Although unlabeled, its boundaries are still visible on 20th century atlases (Bromley 1925, Figures 8; Bromley 1974; Figure 10). A drawing of Harlem in 1798 shows the Dutch Reformed Church at the intersection of a small unnamed lane and Harlem Lane (Figure 9).

To the north of the Dutch Reformed Church, Eliphalet William's house stood just west of First Avenue in the footprint of East 125th Street by 1815 (Sackersdorf 1815; Figure 5). Part of William's lot extended into what is now the intersection of First Avenue and East 125th Street. The house was removed sometime between 1836 and 1867, and First Avenue remained devoid of structures after this time (Colton 1836; Dripps 1867; Bromley 1879; Robinson 1885a; Bromley 1925; Figures 6-8). Based on a drawing of Harlem in 1798, the Williams house appeared to be a gambrel-roofed dwelling fronting what would now be East 125th Street at First Avenue (Figure 9). The lot boundaries of William's property are visible on atlases as late as the 1970s (Figure 10).

North and east of William's house, by 1815, Benjamin Judah had established his dwelling near the shoreline in the footprint of what is now First Avenue just south of East 126th Street (Sackersdorf 1815; Figure 5). The house had been removed between 1836 and 1867, and First Avenue remained free of structures after this time (Colton 1836; Dripps 1867; Bromley 1879; Robinson 1885a; Bromley 1925; Figures 6-8). A drawing of Harlem in 1798, shows the Judah house far off in the distance. It apparently had two chimneys, but little else could be gleaned from the graphic (Figure 9). The lot boundaries of Judah's property are visible on atlases as late as the 1970s (Figure 10).

North of both the Williams and Judah houses, a church had been built just east of the intersection with East 125th Street and First Avenue by 1670. Although the church was west of the project site, a grave yard ran perpendicular to the church's plot, with its eastern boundary just northwest of what is now the intersection of East 126th Street and First Avenue (Romer and Hartman 1981: 9; Figure 4). Later maps place the cemetery slightly south, and in 1815, the cemetery's eastern boundary coincided with the shoreline, while its northern boundary was half way between East 126th and 127th Streets (Sackersdorf: Figure 5).

Both an 1867 and 1879 map present the cemetery, hereafter referred to as Cemetery 2, west of the project site with clearly demarcated boundaries (Dripps 1867; Bromley 1879; Figure 6). However, by 1885 the cemetery's mapped boundaries were changed, and it appears to have extended east possibly into the footprint of First Avenue (Robinson 1885a; Figure 7). An 1897 atlas places the cemetery well within the footprint of First Avenue (Bromley 1897). Later maps fail to label the feature as a cemetery, but do show the lot's property lines. Unfortunately, none of the maps show the lot lines consistently in the same place. The boundaries seem to fluctuate over time (Bromley 1916, 1925, 1934, 1955, 1974; Figures 8, 10).

Block 1811

Western Half of the Block. The western half of Block 1811 was historically on fast land and was part of the original village of Harlem. As early as 1670, an unlabeled house stood on Block 1811 south of the project site in what would now be Cuvillier Park (Romer and Hartman 1981:9; Figure 4). The dwelling is more clearly shown on an 1815 map, but it remained unlabeled (Sackersdorf 1815; Figure 5). By 1815, Ben Baily had a dwelling to the north of the block, but

this section of the project site remained vacant (Sackersdorf 1815; Colton 1836; Dripps 1867; Bromley 1879; Figures 5, 6).

Eastern Half of the Block. Throughout much of the historic period, the eastern half of Block 1811, which is now the FDR Drive and land to the east, was inundated by the Harlem River (Figures 2, 5). The eastern half of Block 1811 remained land under water at the beginning of the 19th century (Sackersdorf 1815: Figure 5). Historic maps indicate that filling on the eastern half of the block began sometime between 1867 and 1879 when the surrounding area experienced intensive development (Dripps1867; Bromley 1879; Figure 6). Despite the extent of nearby commercial and residential growth, this newly filled acreage was initially devoid of structures except for a lumber yard which was established at the rivers edge, and two docks which extended into the river through the project site at the foot of East 124th and 125th Streets (Bromley 1879).

The lumber yard on the western half of the lot stood vacant through at least 1897 (Robinson 1885a, Bromley 1897; Figure 7). By 1911 the Lehigh Valley Rail Road Company Freight Station and an extensive lumber yard, including several lumber sheds, were built in the footprint of what is now the FDR Drive (Sanborn 1911). By 1925 the H. Hermann Lumber Company had erected a one-story building where its vacant lumber yard formerly lay (Bromley 1925; Figure 8), and by 1936 a one-story garage had been built near Hermann's lumber company on East 124th Street within the project site (Bromley 1936).

Between 1936 and 1939, the East River Drive (now the FDR), was constructed south of the Triborough Bridge and all of the structures on Block 1811 in its path were razed (Sanborn 1939). Its course extended over Hermann's lumber yard, the parking garage, and the Lehigh Valley Rail Road Freight Station. A vast networks of ramps connecting the highway to the Triborough Bridge was created south of 125th Street and east of First Avenue across Block 1811 over the ensuing years (Bromley 1974; Figure 10).

Block 1813

Western Half of the Block. The western half of Block 1813 was historically on fast land and was part of the original village of Harlem. Although vacant in the 1670s, by 1815 Benjamin Baily had built a dwelling either on Block 1813 or directly south of it within what was the footprint of East 125th Street (Romer and Hartman 1981:9; Sackersdorf 1815; Figures 4, 5). A drawing of Harlem in 1798 facing east up the Old Harlem Road shows the Dutch Reformed Church on the right with the Bailey house behind it to the east. Fences, demarcating property boundaries, and several outbuildings near the Bailey house are also depicted (Figure 9). The dwelling stood through at least 1885, when it was clearly depicted in the middle of Block 1813 (Dripps 1867; Bromley 1879; Robinson 1885a; Figures 6, 7). However, by this time the property was under the ownership of *McDonough and Company Lumber and Timber* (Robinson 1885a; Figure 7).

By 1897, the Baily house had been razed, and the lumber yard had been expanded to cover the western half of the block (Bromley 1897). A saw mill had been built on the northwest corner of the lot near First Avenue, while the rest of the block remained vacant. By 1896 it had been expanded and converted to a planing mill (Sanborn 1896). A stable and three small sheds were built on the southern part of the block along East 125th Street. By 1911 a wagon maker occupied the building, and by 1916 the structure was razed (Sanborn 1911; Bromley 1916). Between 1916 and 1925, the Pennsylvania Rail Road freight station, which was previously constructed on the eastern half of the block, was extended west to cover this section of the project site (Bromley 1925; Figure 8). The structure stood through the 1930s, and was razed between 1936 and 1951 in conjunction with the creation of ramps for the FDR Drive (Bromley 1936; Sanborn 1951). The system of ramps has been basically unchanged over the last fifty years (Sanborn 1951; Bromley 1974; compare Figures 2 and 10).

Eastern Half of the Block. Throughout much of the historic period, the eastern half of Block 1813, which is now the FDR Drive and land to the east, was inundated by the Harlem River (Figures 2, 5). Between 1867 and 1879, landfilling had begun to push the shoreline farther to the east than its original location (Dripps 1867; Bromley 1879; Figure 6). Between 1879 and 1885, a timber basin, owned by McDonough & Co., had been established in the Harlem River between East 125th and 126th Streets, but no other development had transpired (Robinson 1885a; Figure 7). Little had changed by 1897 (Bromley 1897). However, between 1897 and 1911 the Pennsylvania Rail Road Freight Station had been built over landfill where the Harlem River Drive now runs (Sanborn 1911). By 1925 the Pennsylvania Freight Station had been expanded (Bromley 1925; Figure 8).

The greatest transformation to this section of the project site occurred when the Triborough Bridge was constructed at East 125th Street. Although its construction began in 1929, the stock market crash delayed its completion until the early 1930s. By 1936 it had been completed but only two ramps to allow entrance and egress at East 125th Street, west of the project site, were built (Bromley 1936). Despite the bridge's construction, Block 1813 experienced little change, although a ferry to Randalls Island had been established at the foot of East 125th Street on the Harlem River (Bromley 1936). By 1951 the freight station had been razed in conjunction with the construction of a series of ramps connecting the FDR Drive to the Triborough Bridge (Sanborn 1951). Between 1951 and 1953, under Contract 11, eight new approach spans were constructed to allow the new Harlem River Drive to cross below and provide a bus turn-around loop for First Avenue. At the same time, six new spans were built for a connector from the new highway (Hardesty and Hanover 2000a:9). Under Contract 146, 13 additional spans were constructed for the new connector from the northbound FDR/Harlem River Drive (Ibid.; see Figure 10).

Block 1814

Historically, almost all of Block 1814 was land under water (Romer and Hartman 1981:9 Sackersdorf 1815; Colton 1836; Dripps 1867; Figures 2-6). Between 1867 and 1879, landfilling

had pushed the Harlem River shoreline farther east (Dripps 1867; Bromley 1879; Figure 6). The block remained undeveloped and only partially filled through the turn of the 20th century (Robinson 1885a; Bromley 1897; Figure 7).

By 1911 a small building had been constructed along the shoreline, labeled simply as "constructor" It appeared to be part of the Pennsylvania Railroad Company complex which was centered on Block 1813 to the south (Sanborn 1911). Two large piers extended off the shoreline as far as the U.S. Pierhead line, but the block had still not been filled out to this point. By 1916, the constructor building had been razed, and the Pennsylvania Rail Road Company freight station had been built across the southwestern corner of this block (Bromley 1916). Both the large piers had been removed, and in their place a small pier had been installed to service the freight station (Ibid.). The site appeared unchanged in 1925 (Bromley 1925; Figure 8).

Sometime between 1936 and 1951 the freight station was razed in conjunction with the creation of a system of ramps from the Triborough Bridge (Bromley 1936; Sanborn 1951). By 1968 the Harlem River Drive had been built across the lot, traversing the former location of the Pennsylvania Railroad Freight Station (Sanborn 1968). The block has remained virtually unchanged since this time (Bromley 1974; Figure 10).

Bronx Project Site

- ***Contextual History***

The Bronx acquired its name only after the present borough became part of New York City in 1895. Although technically named after the river (hence, ***the*** Bronx) the name indirectly honors the first recorded European settler, Jonas Bronck, a Dane who settled there by 1639. Despite periods of bad relations with the Wiechquaesgeck and other groups described above, the Dutch West India Company, which controlled New Netherland, was usually scrupulous about gaining legal title to the lands which it occupied. Under Governor-General Willem Kieft the company had acquired rights to all the land of the present borough from the Wiechquaesgeck in 1639. Bronck's land was a 500-acre tract of this territory, lying between the Bronx and Harlem Rivers, and approximately south of present 160th Street. With Kieft's permission, he purchased the area from Indians referred to as Ranachqua and Taekamuck (Scharf 1886).

By 1641, the project site was officially part of Bronck's Land. Jonas Bronck constructed a stone mansion, barns, barracks, and a tobacco barn somewhere west of Brook Avenue, just east of the Willis Avenue Bridge (Jenkins 1912:44; Bolton 1922). After Bronck's death in 1642, his descendants conveyed the tract to the Morris brothers, and the parcel eventually became the manor lands of the Morris family, or Morrisania (Jenkins 1912).

The director-general and Council passed an ordinance to promote improved relations with the English to the north of New Amsterdam, and to increase communications by establishing ferry services to Harlem which was a growing village. A number of families had settled in Harlem,

some of whom were attracted to the mainland and eventually moved to Bronxland and Spuyten Duyvil. In 1666 the English Governor, Nicolls, granted a charter to the residents of Harlem to establish a ferry to the mainland to allow the passage of people, goods, and livestock (Scharf 1886).

During the war between England and Holland, New York was surrendered to a Dutch squadron in 1673. The Dutch asserted their claim to all of England's land holdings and held possession until February 9, 1674 when it was returned to the English. The actual surrender of land holdings did not occur until the following November. At this point the English government confirmed Col. Morris as owner of Bronxland, and Governor Andros granted him additional lands, until his estate included most of the present Bronx west of the Bronx River (Scharf 1886; Jenkins 1912). At the end of the 17th century, the project site fell within the Manor of Morrisania, although the earliest Morris manor house, located west of Brook Avenue, was not built until 1789 (Jenkins 1912:82). It stood through 1891 when it was razed in conjunction with the creation of Harlem River Yard.

During the 18th century, the Revolutionary War was, in part, undertaken within the Bronx. As General Washington and his troops withdrew from New York City, a division of American soldiers under General Heath was stationed at Morrisania. A picket of 450 men, constantly mounted, was placed one-half gunshot apart, along the East River shore near Randalls Island, to guard the Continental army from surprise attack. Behind enemy lines, the area was despoiled by British troops (Bolton 1881). A map of British Fortifications in the Bronx identified several forts north of the project site, but none within it (Faden 1777).

A consequence of the Revolution was the abolishment of the manor as a political entity. 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). In 1788 Westchester County was further divided into townships.

The major commercial industry pursued in the area by the late 18th century was market gardening for New York City. Although there were several sloops on Long Island Sound and the Hudson to transport produce to Manhattan, farmers preferred to travel by wagon. A series of bridges built over the Harlem River to service this need were subsequently destroyed or abandoned, hindering access to the city.

In 1800 a second Morris house was erected by Gouverneur Morris near the intersection of 133rd Street and Cypress Avenue, about five blocks east of the project site. Sometime around 1905 it was also demolished to make way for the railroad. The house was probably located just north of Harlem River yard (Energy and Environmental Analysts 1981:8).

In the early to mid-19th century, the character of this section of the Bronx began to change. The area's urbanization began in earnest only after railroads linked the area with New York City. The

first and most important was the New York and Harlem Rail Road, which was authorized in 1831, and began service through the County of Westchester in 1842 (Fitzpatrick 1927). This line ran through Melrose, Morrisania, and Fordham on the same route as the present Conrail tracks along Park Avenue (Shonnard and Spooner 1900). By 1851 a branch line was built to Port Morris along the Harlem River through the project site (Beers 1876). By cutting the time and expense of travel, the railroad made it possible for people to live full-time in the Bronx and work in New York City.. As a result, this section of the Bronx was ripe for development. By 1846, population in the western Bronx had increased so much that the Town of West Farms was created. West Farms, originally a village on the Bronx River, had become an important manufacturing center due to its water-powered mills. The new township consisted of all the present Bronx west of the Bronx River, including the project area (Shonnard and Spooner 1900).

During the 1860s efforts were made to improve navigation on the Harlem River. A survey of depth soundings was completed, and a navigable channel with a uniform depth of ten feet at mean low water was proposed (Murphy 1860). The proposed 150 foot wide channel was thought to be wide enough and deep enough to allow smaller and mid-sized vessels safe passage. The plan called for dredging 19,720 cubic yards of soft mud from the section south of High Bridge within this narrow channel (Ibid.). The irregularly shaped shoreline along the channel's edge was eventually filled and turned into fast land. Thus began the first major steps toward creating the Harlem River canal.

New residents clamored for improved roads and other municipal amenities, and annexation by New York City was discussed as early as 1864. It is significant that the streets laid out near the Harlem River continued the numbers of Manhattan streets (Shonnard and Spooner 1900). When a referendum on annexation was finally held in 1873, Morrisania, West Farms and Kingsbridge voted overwhelmingly to become part of New York City, and officially became the 23rd and 24th Wards in 1874. Under the New York charter the two wards were officially designated the Borough of the Bronx.

Even as the opening of the railroad in 1842 ushered in a period of village growth, the first elevated trains, or "els," began the Bronx's transition into an urban extension of Manhattan. The Suburban Rapid Transit Company bridged the Harlem River and began service on the Second Avenue Line in 1886. Five cents would take a passenger from downtown Manhattan to 143rd Street. This line was extended in 1917, fueling the explosive population growth that characterized the southwestern Bronx during the last decade of the 19th and the first half of the 20th centuries (Wolf and Mantegazza 1970; Olmsted 1989). Crowded Manhattan, with a population of almost 2.3 million in 1913, lost more than 300,000 people from 1920 to 1925, as the new middle class moved to Brooklyn and the Bronx. The population of the Bronx increased 64%, growth which was concentrated in the areas of the transit lines. Moving from Manhattan became the immigrant's badge of success (Patterson 1978; Wolf and Mantegazza 1970).

In 1903 the Board of Estimate approved the plans to grade and pave about 420 miles of streets within the Bronx, east of the Bronx River. Many of these were "paper" streets, which were not

actualized for years. By 1939, subways, the el, and newly improved roads had caused the population within the Bronx to triple. It was reported in 1939 that 92% of the houses in the Bronx had been built during the 20th century (WPA 1982).

- ***Project Site History***

The project site in the Bronx is defined by a series of streets and numbered city blocks. However, in the 20th century, several of the blocks south of Willis Avenue, which fall within the Harlem River Yard, were consolidated and assigned a single block number. For ease in discussing this section of the project site, the historic block numbers and street names will be referenced as follows (see Figure 3):

- Willis Avenue, from East 132nd Street to East 134th Street;
- Block 1808, bounded by the Harlem River, Willis Avenue and East 131St Street;
- Block 1806, bounded by East 131st and 132nd Streets, Willis Avenue on the south and Alexander Avenue on the north;
- Block 1805, bounded by East 131st and East 132nd Streets, Willis Avenue on the north, and Brown Avenue on the south;
- Block 1798, bounded by East 132nd Street, Bruckner Boulevard, Willis Avenue to the north, and Brown Avenue to the south (Pulaski Park); and,
- Bruckner Boulevard just north of Willis Avenue.

An 1836 topographic map of the area confirms that the project site was either land under water or vacant upland along the shoreline at that time (Colton 1836; see Figure 3). By the 1850s, minimal development was observed on the project site (Dripps 1853).

Willis Avenue

The Willis Avenue bridge passes over Willis Avenue from East 132nd Street to East 134th Street (Figure 3). This section of the project site was undeveloped upland bordering the Harlem River until it was regulated as Willis Avenue sometime between 1853 and 1868 (Colton 1836; Dripps 1953; Beers 1868). After this 100-foot wide thoroughfare was created, its elevations were changed considerably in some places. In 1885, elevations at the intersections of East 132nd, 133rd, and 134th Streets, respectively, were 12, 32, and 30 feet above sea level (Robinson 1885b; Figure 12). By 1893 these numbers had changed to 12, 22.5, and 34.4 feet respectively, and in 1905 they were 9.5, 22.5 and 34.4 feet (Bromley 1905). In other words, at East 132nd Street the surface elevation was reduced by 2.5 feet, at East 133rd Street (Bruckner Boulevard), the surface elevation was reduced by 9.5 feet, and at East 134th Street (now the Major Deegan Expressway), it was raised by 4.4 feet (Bromley 1893, 1905). The effect was to level the surface for trackage near 132nd Street, and to turn a steep knoll, just east of the tracks, into a gentle rise.

When the Willis Avenue Bridge was built above Willis Avenue, the street's footprint was widened by 70 feet between Bruckner Boulevard and East 134th Street, to allow for an access

ramp (Bromley 1907). It was widened over formerly vacant lots on the north side of the street, and over the front end of four five-story tenements, which stood for less than ten years, on the south side of the street (Robinson 1885b; Figure 12; Sanborn 1891; Bromley 1893). Other than utility installation and servicing, the road has remained virtually unchanged over the last century (Sanborn 1908, 1935, 1944, 1951, 1968, 1977, 1984, 1989).

Block 1808

Block 1808 is part of the Harlem River Yard, and is bounded by the Harlem River, Willis Avenue and plotted East 131st Street. The Willis Avenue Bridge passes diagonally over this lot, as it veers southeast from the river to join Willis Avenue at 132nd Street (Figure 3). This section of the project site was completely east of the line of high water historically, but by 1873 landfilling had pushed the shoreline west considerably, but not as far as its current location (Colton 1836; New York Department of Parks 1873; Figure 11). By 1885 additional landfilling had allowed the shoreline to creep even farther west to its approximate location today (Robinson 1885b; Figure 12). At that time an extensive network of train tracks covered all of the block, and south of the bridge's touchdown a series of slips had been built along the shoreline (Ibid.). In 1891, the slips were used by the New York, New Haven and Hartford Railroad Company Ferry (Sanborn 1891). Also by this time, a wooden coal shed had been constructed just north the slips on the shoreline, parallel and west of Alexander Avenue (Ibid.).

Although the Willis Avenue Bridge was construction in 1901, both the slips and the coal shed remained undisturbed (Bromley 1905). The coal shed was removed between 1905 and 1912, and by 1923 a small wooden shed had been built in its place directly on the Harlem River shoreline (Bromley 1905, 1923; Hyde 1912). Also by 1923, a long rectangular freight house for the NYNH&HRR was constructed mid-block beneath and perpendicular to the bridge. The block was otherwise covered with tracks. Little changed on this parcel until sometime between 1932 and 1942 when a large covered shed was built along the shoreline north of the bridge (Bromley 1932, 1942). This freight station and shed, which is actually just north of the project site, had an office and storage (Sanborn 1947). The freight station was reduced in size between 1951 and 1968, when much of it was removed and replaced by a loading platform (Sanborn 1951; 1968).

An evaluation of the archaeological sensitivity of Harlem River Yard concluded that the shoreline in this area has been differentially altered over time (TAMS 1993:3.5-4). It appears that at least eight feet of fill has been introduced south of the plotted line of East 130th Street since 1892 (Ibid.).

Block 1806

Block 1806 is bounded by East 131st and 132nd Streets, Willis Avenue on the south and Alexander Avenue on the north (Figure 3). For this project, only the southern end of the block is within the potential impact area. This section was land under water through most of the 19th century, but by 1873 it had been filled (Colton 1836; Dripps 1853; New York Department of

Parks 1873; Figure 11). An 1873 topographic map shows a semicircular railroad roundhouse at the block's southeastern corner, directly north of Willis Avenue (New York Department of Parks 1873; Figure 11). However, the 1876 map showed the block vacant (Beers 1876). The presence of the roundhouse on maps dating to 1882 and 1885 suggests that the 1876 map was in error (Beers 1876; Bromley 1882, Robinson 1885b; Figure 12).

Between 1885 and 1891 the roundhouse was razed in preparation for the creation of Harlem River Yard (Sanborn 1891). In its place were a series of tracks which paralleled East 132nd Street and extended south to the Harlem River Station on Block 1805 (see below). In conjunction with the creation of the rail yard, the topography of the block was altered to create a level surface. Prior to any changes, the grade elevation at the intersection of Willis Avenue and East 132nd Street, directly adjacent to the former site of the roundhouse, was 12 feet above mean sea level (Robinson 1885b, Figure 12; Bromley 1893). After the yard was completed, the elevation at this intersection was reduced to 9.5 feet above sea level (Bromley 1905).

At the turn of the 20th century, the Willis Avenue Bridge was completed, running above the southern end of Block 1806 (Bromley 1905). Other than the tracks, the southern end of the block remained vacant until the early 1940s (Sanborn 1908, 1935; Bromley 1942). By 1942, the NYW&BRR Station was built just north of the Willis Avenue Bridge on the southeastern corner of this block (Bromley 1942). It was accessed by a pedestrian overpass on Bruckner Boulevard. Although it functioned as a carpenter shop for a short period of time (Sanborn 1947), the station stood through the remainder of the 20th century, and is still present (Sanborn 1944, 1951, 1968, 1977, 1984, 1989).

Block 1805

Block 1805 is bounded by East 131st and East 132nd Streets, Willis Avenue on the north, and Brown Avenue to the south (Figure 3). Although the site was vacant in 1836, by 1853 a dwelling owned by Lewis Morris was present on the block (Colton 1836; Dripps 1853; Beers 1868). Although historic documents report that Lewis G. Morris acquired the family manor, "Mount Fordham," and established his successful agricultural farm there (Scharf 1886:828), the 1853 map indicates that the actual manor, a substantial coarsed-ashlar house, stood northwest of the project site. The house on Block 1805 was probably a second residential dwelling on the property, not the main manor house as other studies have suggested (TAMS 1993:3.5-8).

According to a previously completed study of archaeological potential for the Harlem River Yard,

> *After passing through several other Morris heirs, Henry M. Morris sold a track of land in 1865 that included the project site to Clarence S. Brown, a Wall Street banker...Lewis Brown, an heir and possibly Clarence's son, leased the manor house site, and perhaps the house itself, to various amusement park proprietors. Brown and others, probably family members, sold their land west of Mill Brook*

to the New York, New Haven and Hartford Railroad in various transactions between 1882 and 1892. A structure believed to be the old manor house was demolished in 1891. (TAMS 1993:5.5-12)

As noted above, it is unclear if Block 1805 was the site of the Morris manor, as suggested in the above reference, or a second less-substantial structure also owned by Lewis Morris, as suggested by the 1853 map (Dripps 1853). Regardless, the dwelling was razed in the early 1890s. Prior to that time, it served an alternative function.

The cartographic record confirms that by 1873 the house on Block 1805 had been converted to a hotel, and eight additional buildings dotted the southern half of the block, including a stable, platform, and rifle alley (Perris and Brown 1873). Rudolph Christ owned the hotel and converted the rest of the block to a park between 1876 and 1879 (TAMS 1993:3.5-8).

An 1882 atlas showed that all of the structures on the block except the hotel, formerly the Morris house, had been razed, and by 1885 the hotel had been expanded on its northwestern side (Bromley 1882; Robinson 1885b; Figure 12). By this time Gustav Baur owned the hotel, and the block had been designated as Union Park, together with Block 1798 directly to the east (TAMS 1993:3.5-8; Robinson 1885b; Figure 12). Between 1885 and 1891, the block lost its designation as a park. Also by 1891, the hotel was removed and the extant Harlem River Station was constructed on the block's western side (Sanborn 1891; Bromley 1893). A series of tracks and platforms had been built covering all of the block east of the station, including the former site of the Morris house.

The block appeared virtually unchanged through most of the 20th century (Bromley 1905; Hyde 1912; Bromley 1923, 1932, 1942, 1950). However, sometime after 1950 the tracks east of the station were removed. This area now serves as a coal storage yard.

In conjunction with the development of the area as a train yard, the original topography of this block was changed and surrounding elevations in the street beds were reduced by several feet. For example, in 1893 the elevation at the intersection of Willis Avenue and East 132nd Street was 12 feet above mean sea level, but by 1905 this number had been reduced to 9.5 feet above mean sea level (Bromley 1893; 1905).

A previously prepared archaeological study of Harlem River Yard, including much of the current project site, documents the site's historic topographic changes. According to that study:

Topographical surveys from 1873 and 1892 indicate that until about 1892, the site terrain included at least two rises, two streams or brooks, and marshland. A modern topographic map suggests that part of a former 30-foot rise lying west of Brown Avenue, near East 132nd Street, still exists in a reduced form, its most obvious remnant being the plateau where the Willis Avenue Station (82 Willis Avenue) is situated (it appears this plateau was created in part when an

embankment on its southern boundary was cut sometime after 1892). The rest of the site [referring to Harlem River Yard] *has been made basically flat and featureless by the filling and grading undertaken to create a rail yard and industrial site.* (TAMS 1993:3.5-3)

The study concluded that at least nine feet of soil was removed from the Morris house site (Ibid.:3.5-5). These extensive topographic changes took place at the turn of the 20th century in conjunction with the creation of Harlem River Yard. While historic elevations for this block ranged from 30 to 40 feet above sea level, current elevations on plotted East 132nd Street south of Willis Avenue are 19 and 18 feet above sea level (New York Department of Parks, 1873; Figure 11; Sanborn 1986). This confirms that the top of the hill that formerly rose here was reduced by at least 11 feet.

A retaining wall, which appeared to have been necessitated by grade changes imposed on the block and by the lowering of Willis Avenue, is visible at the north end of the block. It serves to exhibit the extent of topographic manipulation caused by the introduction of rail service. The wall is actually the remaining abutment of an earlier railroad bridge, which was previously removed. It predates the station, and was built somewhere around 1886 to allow access to an elevated line (Hardesty and Hanover 2000a:13). According to a study of historic resources prepared for this project:

Other remnants of the elevated line include cut off column stubs and footings in the area of East 132nd Street and the Willis Avenue extension...As many as four tracks passed over the Willis Avenue extension in this area to provide connection between the NYNH&HRR as well as the NYW&B with the Suburban Rapid Transit Lines and later with the Third Avenue Elevated. The elevated line was in place at the time the Willis Avenue Bridge was completed in 1901. The station itself consisted of a series of four tracks and four covered platforms which were built over a period of years...The stone abutment remains, as do two of the original three stairways from Willis Avenue to what has once been the track level. (Hardesty and Hanover 2000a:13-14)

Both the wall and stairways are still visible along Willis Avenue.

Block 1798

Block 1798 is bounded by East 132nd Street, Bruckner Boulevard, Willis Avenue to the north, and Brown Avenue to the south, and is currently the site of Pulaski Park (Figure 3). This block remained undeveloped through at least 1885 (Colton 1836; Beers 1876; Bromley 1882; Robinson 1885b; Figure 12). Between 1885 and 1891, a wooden dance pavilion had been constructed mid-block fronting East 132nd Street, and a brick bowling alley had been constructed off its northeast corner (Sanborn 1891). By 1905 these buildings had been razed, and the block was

vacant. By this time the Willis Avenue Bridge had been constructed and the approach to the bridge ran above the block (Bromley 1905).

Between 1908 and 1912 a small rectangular stone building had been built fronting Bruckner Boulevard, and the bridge approach had been completed (Sanborn 1908; Hyde 1912). By 1923 the stone building was owned by the Department of Bridges (Bromley 1923), but by 1932 the Department of Health had acquired it. By this time the block was labeled as Pulaski Park (Bromley 1932). The Department of Health building was removed between 1935 and 1942, and the Pulaski Playground, complete with a one-story brick comfort-station, had been established (Sanborn 1935; Bromley 1942). The Willis Avenue ramp was shown running above the playground on the western side of this block in its current location (Bromley 1942). The site appeared virtually unchanged through the remainder of the 20th century, until the comfort-station was removed between 1984 and 1986 (Bromley 1950; Sanborn 1968,1977, 1980, 1984, 1986, 1989).

Bruckner Boulevard

The project site extends about 50 feet north of Willis Avenue on the west side of Bruckner Boulevard where a pedestrian and bicycle ramp may touch down. This remained undeveloped through the first half of the 19th century (Colton 1836), but by 1876 Bruckner Boulevard had been laid out over land formerly part of the Morris estate. Tracks were laid at grade for rail car service by 1885 (Robinson 1885b; Figure 12).

Between 1885 and 1893 the grade elevation of Bruckner Boulevard at Willis Avenue was reduced significantly. In 1885 the elevation at this intersection was 32 feet above mean sea level, but by 1893 the number had dropped to 22.5 feet (Robinson 1885b, Figure 12; Bromley 1893). As discussed above, a previous archaeological study of the Harlem River Yard concluded that part of a former 30-foot rise laying west of Brown Avenue, near East 132nd Street, still exists but only in a reduced form (TAMS 1993:3.5-3). Sewers were laid through the street bed by 1897 (Commissioners of Street Improvements 1897).

When the Willis Avenue Bridge was constructed at the turn of the 20th century, stairways to allow pedestrian access were constructed at Bruckner Boulevard (Sanborn 1908). Apart from the installation of additional utilities in the street bed through the years, this section of the project site has remained virtually unchanged (Sanborn 1923, 1944, 1951, 1968, 1977, 1989).

EXISTING CONDITIONS

Manhattan Project Site

- ***Precontact Potential***

For the following discussion, the Manhattan section of the project site will be subdivided into two sections: the land side, which was historically west of the Harlem River shoreline; and, river side, which was historically inundated by the Harlem River.

Land Side. The portion of the Manhattan project site that fell west of the historic shoreline includes the western end of Blocks 1813 and 1814, and the footprint of First Avenue from East 125th Street north to about East 127th Street (Figure 2). Precontact and contact period settlement patterns documented in the greater New York area demonstrate a preference for well-drained slightly elevated ground near fresh water. Landforms displaying these topographic features, including the terrain in this section of the project site, may have been utilized for resource procurement and processing, short-term encampments, and more permanent settlements which are highly visible archaeologically[2].

Precontact archaeological resources in the Metropolitan New York area are generally shallowly-buried, usually within three or four feet of the pre-development surface. Consequently, historic development can often serve to disturb precontact site integrity. Clearly, some sections of this portion of the project site have been extensively disturbed with 20th century construction. Blocks 1813 and 1814 were partially impacted by the previous construction of the Pennsylvania Freight Station, and then the building's subsequent demolition. Building both the Triborough and Willis Avenue bridges caused extensive subsurface disturbance to First Avenue and East 125th Street.

A plan of existing conditions of the project site shows the location of footings for both the Willis Avenue Bridge and the Triborough Bridge, and the locations of subsurface utilities in First Avenue (Hardesty and Hanover 2000b). Most of the utility lines on First Avenue north of East 125th Street are located along the building line on the west side of the street. Gas, electric, steam, and water lines are located west of the Willis Avenue Bridge ramp, while only electrical lines are located east of the ramp (Ibid.). The installation of each of these utility lines, and excavations for the footings for each of the bridges have negated precontact sensitivity in these areas.

Soil borings taken from the footprint of First Avenue near East 125th and 126th Streets, revealed three to five meters of fill, underlain by sand and silt (Boring Logs DNB 122 and 124; Appendix). A boring taken from Block 1813 found fill from grade down to five meters below surface (Boring Log DNB 113), and one taken from Block 1814 found fill to three meters below surface (Boring Log DNB 115). None of the borings reported levels of organic material or a

[2]Archaeological visibility is defined as a site's ability to produce buried resources which have retained their integrity, and could address potentially meaningful research issues.

precontact living surface. The implication is that nothing remains of the precontact surface within this section of the project site, probably due to the tremendous amount of 20th century development and redevelopment.

River Side. This section of the project site includes land that was outboard of the Harlem River shoreline historically (Figure 2). This encompasses the FDR Drive, the eastern sections of Blocks 1813 and 1814, and First Avenue north of East 127th Street.

Historic maps indicate that between the 17th and 19th centuries, this section of the project site was inundated by the Harlem River. However, it is possible that over the centuries the project site experienced periods when it was drained and dry as water levels dropped, probably during the Archaic period as suggested by the earlier report on the Harlem River shoreline's prehistoric sensitivity (Energy & Environmental Analysts, Inc. 1981). During these intervals this section of the project site could have been exploited for food resources by prehistoric peoples, but it was probably not inhabited due to its topography. It is more plausible that well-drained uplands to the west were preferred for habitation and that if the project site were easily accessible, it would have been utilized in only a minimal capacity. Although the site probably did not experience extended habitation, it is plausible that shell heaps, like those found north and south of the project site, were left along the river's edge (Kearns et al 1994).

Soil boring logs completed by Hardesty and Hanover in June, 2000, reveal levels of peat and silt with shell existing between four and seven meters below the grade where the FDR Drive now runs (Boring Logs DNB 114 and 120, DHX-118A). Specifically, within the proposed impact areas, Borings DNB 108, 109, 111, and 112 contained peat and shell, underlain with sand, at six, four, four, and three meters deep, respectively (Appendix). Above the peat and shell are levels of silt and introduced fill (Ibid.).

The presence of shell, organic matter, and silt recorded in the above-mentioned borings may be indicative of a former estuarine environment of unknown age. These factors help determine the potential for precontact resources beneath the landfill.

Dr. Dennis Weiss previously conducted research on reconstructing Paleo-shorelines in the metropolitan New York area. He concluded that:

> *The optimal evidence desired for the determination of past shoreline positions, in the New York-New England coastal zone, is the presence of tidal marsh peat lying immediately above bedrock or till.* (Weiss 1988:3)

Weiss determined approximate estuarine and shoreline boundaries along sections of the Hudson River throughout the precontact period, flagging as potentially sensitive those areas which were between 20 and 30 feet above the estuarine surface at lower sea level (Weiss 1988:5). He concluded that ridges and sheltered coves would have been the preferred habitation locations.

The estuary itself was **not** denoted as potentially sensitive for habitation sites. Unfortunately his report did not discuss the potential sensitivity for shell middens.

Certainly, at some point prehistorically the river side section of the Manhattan project site was estuarial before becoming completely inundated. Since the age and extent of the estuarial environment within the project site is currently undefinable, certain assumptions must be made regarding potential sensitivity based on the known prehistoric settlement and subsistence trends demonstrated through the existing archaeological record, and an understanding of the prehistoric environment.

Following deglaciation around 12,000 years ago, the project site would have presumably begun to slowly become estuarial. Paleo-Indians and subsequent Early Archaic peoples occupying the region at this time had a demonstrated preference for upland and inland sites, with an economy based largely on hunting and gathering of interior food sources (Lavin 1988:104). Therefore, it is highly unlikely that the project site would have hosted extensive occupations from either of these cultural periods since it was relatively low land compared to the upland to the west. Furthermore, no prehistoric shell middens in the New York area have been dated to this period, so none would be anticipated within the project site.

During the Paleo-Indian and Early Archaic time periods, shellfish beds were primarily located far south of the project site. A broad band of oyster shell deposits were found on the continental shelf between 65 and 230 feet below present sea level dating to between 5,000 and 10,000 years ago (Funk 1991:55). The size and shape of oysters of this age suggested that water temperatures were at a higher level than they are today. Few oysters were found inshore from this main belt, possibly because of less favorable climatic conditions and erosion over the last 5,000 years (Ibid.). This suggests that even if water levels were lowered and the project site was accessible during this period, shellfish exploitation - if it did in fact occur - would have likely occurred far south of the site where abundant oyster beds were present.

Subsequent Middle Archaic peoples, while known to exploit shellfish in the surrounding region, did not habitate within proximity to their middens. Shell heaps in southern New England and New York dating to this period indicate they were utilized as temporary processing stations, with habitation sites situated elsewhere (Lavin 1988:104). Even if the project site was estuarial by this time, and was exploited for shellfish harvesting and/or processing, evidence of habitation would not exist within the project area.

Late Archaic and Woodland period occupation sites show a marked preference for well-drained soils in proximity to fresh water resources. This strongly suggests that uplands to the west of the site would be more likely to bear evidence of habitation. Furthermore, by this time rising sea-levels had created much of the landscape that we see today. By 5,000 B.P. (Before Present) the Hudson River experienced a decline in oyster shell abundance and a decline in ocean salinity (Funk 1991:56). More fresh water was flowing down from the north than salt water was flowing

up from the south. These factors suggest that the Hudson River, and the Harlem River as well, were experiencing rising water tables which would have inundated the site.

While it is quite probable that the project site did not experience prehistoric habitation, it is minimally plausible that shell heaps, like those elsewhere along the Harlem River's shoreline, were left along the river's edge (Kearns et al 1999). However, as discussed above, there was only a minimal period of time during the Middle Archaic period when the site may have been drained and exposed for shellfish procurement and processing. Earlier and later exploitation of this resource type would have occurred elsewhere for environmental reasons.

Furthermore, the integrity of potential resources must be considered. If any prehistoric resources were to exist below the depth of fill, they would have been subjected to natural current and tidal action for more than 4,000 years and then may have experienced the forces of historic dredging before they were eventually covered with fill. Furthermore, pier supports for both bridges have impacted discrete areas within this section of the project site negating any potential sensitivity on those areas.

While it may be possible that shell heaps associated with precontact resource procurement do exist beneath filled areas within the project site, it is possible that the integrity of resources has been compromised. Therefore, the precontact potential of this section of the project site is considered minimal to moderate, at best.

- ***Historic Potential***

The archaeological study of historic sites differs depending upon the type of resources anticipated. Privy, cistern, and well shafts which are often filled with refuse related to the dwellings and their occupants, provide important stratified cultural deposits for the archaeologist. Such shafts, five or more feet deep, usually survive all but the deepest post-depositional disturbance and frequently provide the best remains recovered on sites, including animal bone, seeds, glass, metal, stone, ceramics, and sometimes leather, cloth, wood and even paper. By analyzing such artifacts, archaeologists can learn much about the diet, activities, customs and technology of the former occupants, and attempt to combine this data with what the documentary record tells us about their ethnicity, socioeconomic status, gender, environment, etc.

The historic use of the Manhattan section of the project site is complex and extensive. The project site falls within the earliest settlement in Harlem which centered around the church one block to the west. Later 19th and 20th century development resulted in a series of industrial ventures within the project site boundaries. The potential for archaeological resources related to these resources types varies depending upon the type of initial deposition, and the degree of subsequent disturbance.

First Avenue

The footprint of First Avenue may be sensitive for Cemetery 1, just south of East 125th Street, whose historic boundaries fluctuated on cartographic sources (Dripps 1867; Bromley 1879; Robinson 1885a; Bromley 1916, 1925, 1934, 1955, 1974; Figures 6-10).

While the boundaries of the cemetery varied through time, most maps placed it slightly south of the project site fronting a historic lane (Figure 10). Because both its northern and eastern sides were bounded by lanes, and because the church that it was associated with appeared to have been surrounded by fencing (Figures 4, 5, 9), it is somewhat unlikely that burials were placed outside of the Church's property bounds within the project site. While many cemeteries are known to extend beyond their limits, usually to accommodate overcrowding and/or indigents or slave burials, typically this would occur to the rear of sides the cemetery's limits, not in front of it in an active roadway.

Even if the cemetery did extend north as far as the project site's southern limit on First Avenue, the extent of destruction caused by the construction of the Triborough Bridge approach would have severely impacted its location. Furthermore, a vast network of utility lines converge at this corner. Not only were buried utilities installed here at the turn of the century, but they were later dug-up and rerouted in conjunction with the construction of the Triborough Bridge (Figure 13). This intersection experienced enough subsurface impacts to negate any potential for this cemetery. However, the footprint of First Avenue south of East 125th Street, south of the project site boundaries, may still be sensitive for this resource.

First Avenue was also identified as potentially sensitive for domestic resources related to the occupation of Eliphalet William's house, which stood just west of First Avenue approximately in the footprint of East 125th Street by 1815 (Sackersdorf 1815; Figures 5, 10). The house and household features would probably be situated west of the project site (where the bulk of the associated yard sat), but shallowly buried yard scatter may have extended into the project site. Although there is sensitivity for this resource type, late 19th and 20th century utility excavations and installations were numerous at this intersection and would have impacted areas sensitive for this fragile resource. Buried electrical, telephone, water, steam, and sewer lines now converge at what would have been the southeastern corner of William's lot (City of New York 2000).

When the Triborough Bridge was constructed at East 125th Street in the 1930s, extensive excavations were necessitated for its construction and for sinking deep pier supports. In fact, much of the footprint of 125th Street, extending into First Avenue, was torn up and disturbed at this time (NYPL Photograph Files, 1315/A5, 1315/A3 Figure 13). Between the original installation and later rerouting of buried utility lines, necessitated by the construction of both bridges, and the excavations for the bridges themselves, it is highly unlikely that any domestic resources related to the William's house have remained *in situ* within the project site.

First Avenue was also the site of the Benjamin Judah dwelling which stood within its footprint just south of East 126th Street (Sackersdorf 1815; Figures 5, 10). Its location is now beneath the access ramp from First Avenue, and from the Triborough Bridge to the Willis Avenue Bridge. Subsurface disturbance to its location would have resulted from the installation of pier supports for the ramp, and from 20th century utilities (City of New York 2000).

Historic grade elevations at this intersection placed it at six feet above mean sea level, as do more modern elevations (Bromley 1897, 1974). Although elevations have remained virtually unchanged since East 126th Street was laid out, prior to that time the original elevation is unknown. Grading may have been needed to create the level roadway visible today. Furthermore, this area experienced extensive excavations when the First Avenue ramp to the bridge was built. The ramp, which required excavations for footings, etc., now runs on top of this historic dwelling's former location. Therefore, it is highly unlikely that fragile home lot features associated with the Judah house still exist within the footprint of First Avenue.

Historic research identified the potential sensitivity for a cemetery associated with the earliest historic inhabitants of Old Harlem dating to the late 17th century. Cemetery 2 may have extended east into First Avenue just north of East 126th Street (Dripps 1867; Bromley 1879; Robinson 1885a; Figures 6, 7). It is unclear if the cemetery actually extended east into the project site, or was contained on land to the west. While unlabeled, its potential boundaries are still visible on 20th century atlases (Bromley 1925, Figures 8; Bromley 1974; Figure 10). Its western end would currently be under a two-story brick bus terminal.

If the cemetery did extend east into First Avenue, sections of it would have been disturbed by 20th century below-grade utility installation. Furthermore, footings for the Willis Avenue bridge appear to be situated above and around what may be the easternmost end of its boundaries (Figure 10).

Soil boring DNB-122, taken in proximity to the potential cemetery, found sand with traces of gravel and silt containing wood from the surface down to about 12 feet below grade (Boring Log DNB-122; Appendix). This reported stratigraphy does little to elucidate potential sensitivity for the cemetery, since it is unclear if the top levels are fill or natural deposits with wood in them. Therefore, the cemetery's approximate location must be considered potentially sensitive.

Block 1811

Eastern Half of the Block. By 1879 a lumber yard stood at the rivers edge within this section of the project site (Bromley 1879). It remained devoid of structures until the turn of the 20th century. Subsequently, the Lehigh Valley Rail Road Company Freight Station was built adjacent to the yard by 1911. Both stood in the footprint of what is now the FDR Drive (Sanborn 1911).

The location of the lumber yard and the freight station were tremendously impacted by the construction of the FDR Drive and the Triborough Bridge. Historic elevations at the intersection

of East 124th Street and the river in 1885 were 5.10 feet above mean sea level (Robinson1885; Figure 7). After the construction of the bridge and the FDR Drive, elevations were reduced to 3.10 feet above mean sea level in the same location (Bromley 1974; Figure 10). At least two feet of the historic surface was removed during the 20th century.

In addition to the site of the mill being disturbed, the archaeological importance of this resource type is questionable. The mill stood for only a short period of time, and the footprint of the building would only yield foundations and footings which have little research value. An intensive documentary study of this resource type in Manhattan concluded that the equipment was probably mounted on concrete footings, and all but the footings were removed when buildings were razed (Historical Perspectives Inc., 1992:9). Furthermore, woodworking scraps and discarded material was typically recycled as fuel for steam power. As a result, little would be left in the archaeological record that could address meaningful research issues.

The archaeological research potential of the freight station is also considered questionable. Likely, all that would remain are foundations and footings of the structure. An intensive study of the research potential of this resource type concluded that certain archaeological deposits from railroad complexes can provide information about changes in architecture, and in railroad technology, craftsmanship, and locomotive maintenance operations (Louis Berger & Associates 1992:19). The archaeological visibility at railroad complexes potentially encompasses architectural features, machines, refuse deposits, and other such features. However, the archaeological evidence associated with structures such as freight stations, which served to store and transfer freight, would most likely only possess the footprints of buildings and tracks (Ibid.:20). Therefore, they were judged to lack the potential to address meaningful research issues.

Because the Lehigh Valley Rail Road Company Freight Station was built in the 20th century, its site was disturbed, and this resource type has been found to lack archaeological research potential, Block 1811 is no longer considered sensitive for this resource.

Block 1813

Western Half of the Block. This section of the block was identified as potentially sensitive for domestic features associated with the Benjamin Baily house, first observed on maps in 1815 and razed between 1885 and 1897 (Sackersdorf 1815; Robinson 1885a; Bromley 1897; Figures 5, 7, 10). The house stood mid-block where a ramp now diverges from the southbound lane of the Harlem River Drive to access the Triborough Bridge. A historic photograph of construction in this area shows how the roadway and access ways were built on piles, after all of the buildings were razed and the surface leveled (NYPL Photograph Files 1313/B8). The extent of subsurface disturbance caused by the creation of the ramp and roadway would have destroyed any potential for fragile home lot resources associated with this dwelling to remain *in situ* within the project site.

The block may also be sensitive for a ca. 1897 saw mill which stood on the northwest corner of the block near First Avenue. The mill expanded at the turn of the 20th century, and was later occupied by a wagon maker before it was razed in 1916. However, as previously discussed, the research potential for 20th century saw mills in the metropolitan New York area is non existent (Historical Perspectives Inc., 1992:9). Mills were an integral part of a vast network of industries which supplied each other with resources. Excess lumber and scraps would have been sold or recycled as fuel at another nearby industrial site, and little would remain representing the building's function since its machinery would have also been removed and recycled for use after the structure was dismantled. Therefore, Block 1813 is not considered sensitive for this resource type.

Eastern Half of the Block. This section of the block is sensitive for remains of the Pennsylvania Rail Road Freight Station dating to ca.1911 (Sanborn 1911). However, the construction of access ramps and footings for pier supports for the Triborough bridge may have destroyed any potential resources. And, as discussed above for Block 1811, this resource type also lacks the potential to address significant research issues.

Block 1814

By 1916 the Pennsylvania Rail Road Company freight station had been built across the southwestern corner of this block (Bromley 1916). Sometime between 1936 and 1951 the freight station was razed in conjunction with the creation of a system of ramps from the Triborough Bridge (Bromley 1936; Sanborn 1951). Again, as discussed above for Block 1811, this resource type also lacks the potential to address significant research issues since all that would remain, if in fact anything survived the construction of the Harlem River Drive and access ramps, would be foundations and footings which have no research value. Therefore, Block 1814 is not sensitive for this resource.

Bronx Project Site

- ***Precontact Potential***

For the following discussion, the Bronx section of the project site will be subdivided into two sections: the land side, which was historically east the Harlem River shoreline; and, river side, which was historically inundated by the Harlem River.

Land Side. This section of the Bronx project site lies southeast of what was the historic shoreline of the Harlem River, which once ran between the routes of East 131st and 132nd Streets (Figure 3). Included in this section are Blocks 1798 and 1805, both south of Willis Avenue, a small section of Bruckner Boulevard just north of Willis Avenue, and Willis Avenue from East 132nd to East 134th Street.

The project site is in an area of known precontact occupation. Precontact sites have been inventoried nearby to the north and east of the project area, although none were reported directly within it. Like Manhattan, precontact archaeological resources in the area are generally shallowly-buried, usually within three or four feet of the pre-development surface. Consequently, historic development often destroys these fragile resources.

Much of this section of the project site has experienced the types and extent of historic land manipulation that effectively destroy any potential precontact resources. Earlier research on topographic changes to this section of the project site brought about by the creation of the Harlem River Yard, was presented in the previous chapter. The elevation of Willis Avenue has been reduced by 2.5 feet at East 132nd Street, and 9.5 feet at Bruckner Boulevard. However, it was raised by 4.4 feet at East 134th Street (Bromley 1893, 1905). The effect was to level the surface for trackage near 132nd Street, and to turn a steep knoll, just east of the tracks, into a gentle rise.

Subsurface impacts to the footprint of both Willis Avenue and Bruckner Boulevard have not only occurred by their reductions in elevation, but also by the installation of subsurface utility lines, and footings for support piers for the Willis Avenue Bridge and a pedestrian access way. Existing condition plans of these roadways show utility lines spanning much of their width in many places (City of New York Department of Bridges 2000). Furthermore, the creation of the Major Deegan Expressway at East 134th Street caused extensive subsurface disturbance to the very eastern end of the project site (Ibid.). A soil boring taken from the intersection of Willis Avenue and East 134th Street found fifteen feet of fill over levels of sand with gravel (Boring Log DNB-156). No organic levels or evidence of a buried precontact living surfaces were encountered.

The extent of prior disturbance to the footprints of Willis Avenue and Bruckner Boulevard has either displaced or destroyed any potential precontact resources, which tend to be found shallowly buried near the precontact period surface. Disturbance has negated any precontact sensitivity to this section of the project site. Therefore, these thoroughfares are not considered sensitive for precontact period archaeological resources.

As previously documented, Block 1805 had about nine to 11 feet of its surface removed when the top of a former 30-foot rise was truncated (TAMS 1993:5.3-3). Although a small knoll still exists, its apex has been removed. This action would have destroyed any precontact archaeological potential on this block as well.

Block 1798, now Pulaski Park, was also subjected to extensive historic disturbance. In 1873, this block rose from an elevation of 10 feet above sea level at its northern and southern ends, peaking at 40 feet above sea level in the middle of the block (New York Department of Parks, 1873; Figure 11). Currently, the block is a relatively level playground, with elevations at surrounding intersections ranging between 9.5 and 22.5 feet above mean sea level at Willis Avenue, and between18 and 20 feet at Brown Place to the south (Bromley 1942). Since no

evidence of a 40 foot rise is evident at the site, this suggests that at least 10 feet of soil have been removed from the surface of the block.

According to soil boring DNB153, taken at the southern end of Pulaski Park near the Bruckner Boulevard approach, the grade elevation in this location is 10.5 meters, or about 30 feet above mean sea level. Below the asphalt are layers of sand and gravel, but no organic soils indicative of a potential precontact living surface (Boring Log DNB 153). Extensive leveling of the block and removal of the precontact surface probably occurred when it was turned into a playground. Therefore, the truncation of the knoll has negated any prehistoric potential for this block.

River Side. This section of the Bronx project site was historically situated west of the Harlem River shoreline, and was land under water. It includes all of the project site west of East 132nd Street, including Blocks 1806 and 1808, both north of Willis Avenue (Figure 3).

Historic maps indicate that between the 17th and 19th centuries, this section of the project site was inundated by the Harlem River. However, as discussed above for the Manhattan project site, it is possible that over the centuries the project site experienced periods when it was drained and dry as water levels dropped, probably during the Archaic period as suggested by the earlier report on the Harlem River shoreline's prehistoric sensitivity (Energy & Environmental Analysts, Inc. 1981). During these intervals this section of the project site could have been exploited for food resources by prehistoric peoples, but it was probably not inhabited due to its topography. It is more plausible that well-drained uplands to the east were preferred for habitation and that if the project site were easily accessible, it would have been utilized in only a minimal capacity. Although the site probably did not experience extended habitation, it is plausible that shell heaps, like those found north and south of the project site, were left along the river's edge (Kearns et al 1999).

Soil boring logs from 1991 indicate that levels of dry fill, ranging from two to four feet deep, overlay levels of moist and wet silty sand and gravel in the western section of this area (TAMS Borings B-2, B-3, B-4). Almost none of the borings from this section of the project site were found to have organic soil levels, indicative of a precontact living surface.

More recent geotechnical investigations (Hardesty and Hanover 2000), reported two borings in this area containing organic levels with peat (Boring Logs DNB 140, 141; Appendix). These were taken from the northern end of Block 1805 within the footprint of Willis Avenue, which was historically west of the high water mark directly along the shoreline (see Figure 3). Both borings had levels of fill and sand extending about 15 feet below grade, overlying a level of brown organic silt with peat. This level extended down to almost 18 feet below surface, and below this were levels of sand and gravel (Ibid.; Appendix).

As discussed above, the presence of peat does not necessarily indicate a potential precontact living surface, but it is plausible that shell heaps, like those elsewhere along the Harlem River's shoreline, were left along the river's edge here (Kearns et al 1999). However, as previously

detailed, there was only a minimal period of time during the Middle Archaic period when the site may have been drained and exposed for shellfish procurement and processing. Earlier and later exploitation of this resource type would have occurred elsewhere for environmental reasons. Furthermore, no shell was reported in either boring.

This section of the project site has a low to moderate potential to contain precontact resources buried beneath modern landfill. A small cove once lay here directly on the shoreline. It was probably protected from dredging since it was not part of the main channel of the Harlem River. Although dredging probably did not disturb potential resources, the installation of an extensive network of underground utilities and footings for the bridge have considerably reduced the area of potential precontact sensitivity. Most likely, only small pockets of potential sensitivity still exist between areas of modern disturbance.

- ***Historic Potential***

Only two potential historic resources were identified within the Bronx section of the project site. These were the roundhouse on Block 1806, and the Lewis Morris house on Block 1805.

Block 1806

A roundhouse was identified on the southern end of Block 1806 beneath the Willis Avenue Bridge access ramp (Figures 11, 12). The structure stood between 1873 and 1885, and was razed by 1891 (New York Department of Parks 1873; Figure 11; Robinson 1885b; Sanborn 1891). Since the structure stood north of Willis Avenue, it was not disturbed by excavations for utilities, which are typically buried in the street beds.

After the roundhouse was razed for the creation of the Harlem River Yard, its location was developed with a series of tracks which paralleled East 132nd Street and extended south to the Harlem River Station on Block 1805 (see below). The grade elevation at the intersection of Willis Avenue and East 132nd Street, directly adjacent to the former site of the roundhouse, was reduced by 2.5 feet (Bromley 1905). If the elevation of the block was also lowered, this would have served to truncate the top of the roundhouse foundation, but its base may have been left intact.

After the roundhouse was razed, the northeastern section of the roundhouse was impacted by the early 20th century construction of a brick station, now extant (Sanborn 1989). Despite impacts to this section of the foundation, the remainder of the roundhouse foundation may lie buried beneath the surface of the Willis Avenue Bridge ramp.

Recent archaeological excavations at a contemporaneous roundhouse in Poughkeepsie, New York have found that this resource type has the potential to address significant research issues, as defined by the eligibility requirements for inclusion on the National Register of Historic Places (Historical Perspectives, 1999:61). The truncated foundation of the roundhouse still

contained the intact bases of stalls, walls, and footings. Evidence of drainage channels and heating systems were also encountered (Historical Perspectives, 2000:20).

Block 1805

Although this block was once the site of the Lewis Morris house, its location has probably been impacted to an extent that destroyed any potential historic resources related to its occupation. As previously detailed, the house stood on the knoll from sometime prior to 1853, until it was razed around 1891 (Dripps 1853; Sanborn 1891; TAMS 1993:5.5-12).

After the dwelling was razed, the immediate vicinity became the site of Harlem River Yard. In conjunction with the creation of the yard, at least nine feet of soil was removed from the Morris house site (Ibid.:3.5-5). While historic elevations for this block ranged from 30 to 40 feet above sea level, current elevations on plotted East 132nd Street south of Willis Avenue are 19 and 18 feet above sea level (New York Department of Parks, 1873; Figure 11; Sanborn 1986). This confirms that the top of the hill that formerly rose here was reduced by at least 11 feet, and, therefore, this block no longer is potentially sensitive for resources related to the Morris house.

Summary

To summarize potential sensitivity, the Manhattan project site outboard of the historic shoreline is minimally to moderately sensitive for precontact period resources beneath landfill, and for a potential cemetery near the intersection of First Avenue and East 126th Street. The Bronx project site is potentially sensitive for precontact resources at the northern end of Block 1805 within the footprint of Willis Avenue, which was historically west of the high water mark, and for a ca.1873 roundhouse on Block 1806 near the intersection of East 132nd Street and Willis Avenue (Figure 14). The remainder of the project site either lacked sensitivity or experienced prior subsurface impacts extensive enough to destroy site integrity.

PROJECT IMPACTS

Manhattan Project Site

Any impacts to the footprint of First Avenue near East 126th Street, **outside of the footprint of existing pier supports,** may potentially cause an impact to a 17th century cemetery. Since the exact boundaries and depth of the cemetery are unknown (Figure 14), any subsurface work in this area which disturbs areas not previously impacted by bridge piers, must be assumed to cause a negative impact. In particular, the installation of subsurface footings or piles for a proposed temporary loop ramp at East 127th Street during FDR ramp construction, may cause potential impacts to this resource.

Subsurface work, below the level of modern landfill, where the FDR and Harlem River Drives now run, may also potentially impact precontact resources. This area was determined to have a low to moderate sensitivity for precontact resources beneath the fill, which ranges in depth from 12 to 21 feet below grade. However, the likelihood of successfully recovering *in situ* undisturbed precontact resources beneath these deep layers of fill is minimal.

Bronx Project Site

No impacts are anticipated for any work to be done along the Harlem River shoreline in the Bronx since no potential archaeological resources were identified in this location. This area is currently landfill overlying what was once the bottom of the Harlem River, and lacks archaeological potential.

Since the ca.1873 roundhouse base was probably truncated, it may lie shallowly buried beneath the surface. If new pier footings are installed at the site of the roundhouse, then this potentially important historic resource may be negatively impacted (Figure 14). However, if subsurface impacts are contained to areas previously impacted by piers for the elevated bridge ramp above the site, then the negative impact could be avoided. Therefore, any subsurface work here outside of previously impacted areas would have a negative impact.

Subsurface work, below the level of modern fill, at the north end of Block 1805 in the footprint of Willis Avenue may potentially impact precontact resources. This area was identified as moderately sensitive for this resource type, since it was found to have levels of peat beneath the fill, and was historically a cove along the shoreline that would have remained untouched by dredging. After the cove was filled, modern impacts - such as utility installation, would have only extended into the landfill. Therefore, if impacts go beneath the depth of fill, which is about 15 feet deep in this location, there may be a negative impact on potential precontact resources. If subsurface work is limited to the first 15 feet below grade, then there will be no negative impact.

No impacts are anticipated by proposed work within the channel of the Harlem River since there has been extensive dredging of the river bottom over the last 140 years.

CONCLUSIONS AND RECOMMENDATIONS

The proposed upgrading of the 100-year-old Willis Avenue Bridge over the Harlem River between Manhattan and the Bronx has five proposed schemes for its rehabilitation or replacement. Schemes range from an on-line rehabilitation (Scheme I and IA) to the off-line replacement with an alternate alignment and new swing span (Scheme IV). Each of these actions will have a different level of impact, depending on where new and/or rehabilitated pier supports will be located.

Prior to implementing any of these schemes, the archaeological potential of both the Manhattan and Bronx project sites was assessed. This included completing documentary and cartographic research to determine the likelihood that precontact and historic buried resources remain within the project site.

The Manhattan section of the project site was found to be potentially sensitive for a 17th century cemetery which once stood somewhere near First Avenue and East 126th and East 127th Streets. It also has a low to moderate sensitivity for precontact resources beneath 12 to 21 feet of landfill along the shoreline and beneath the footprint of the FDR and Harlem River Drives (Figure 14).

The Bronx section of the project site is potentially sensitive for a ca.1873 roundhouse foundation on Block 1806, just north of Willis Avenue near East 132nd Street, and potential precontact resources beneath 15 feet of fill in the footprint of Willis Avenue just south of the roundhouse and north of Block 1805 (Figure 14).

Each of these sites could potentially be impacted by the proposed project depending on the location and depth of subsurface impacts. Negative impacts will occur if impacts extend into potentially sensitive levels, as described above.

In order to further assess the likelihood that potential archaeological resources will be impacted, comprehensive topic intensive studies on each of these resource types are recommended. For the Manhattan section of the project site, this study should concentrate on attempting to better define the boundaries of the cemetery, and focus on documenting its history and possible removal. For precontact resources, further investigations (e.g. individual railroad company archives) into disturbance of the shoreline prior to filling should be pursued.

For the Bronx section of the project site, this study would concentrate on documenting the use and removal of the roundhouse, and any subsequent impacts. Furthermore, precontact resources should be further addressed through the completion of a more extensive disturbance analysis.

It is recommended that these topic intensive studies should be completed in conjunction with the selection of a final design scheme, so that definitive impacts can be compared to the location of potential resources. If necessary, subsurface investigations and possible mitigation measures would be recommended at that time.

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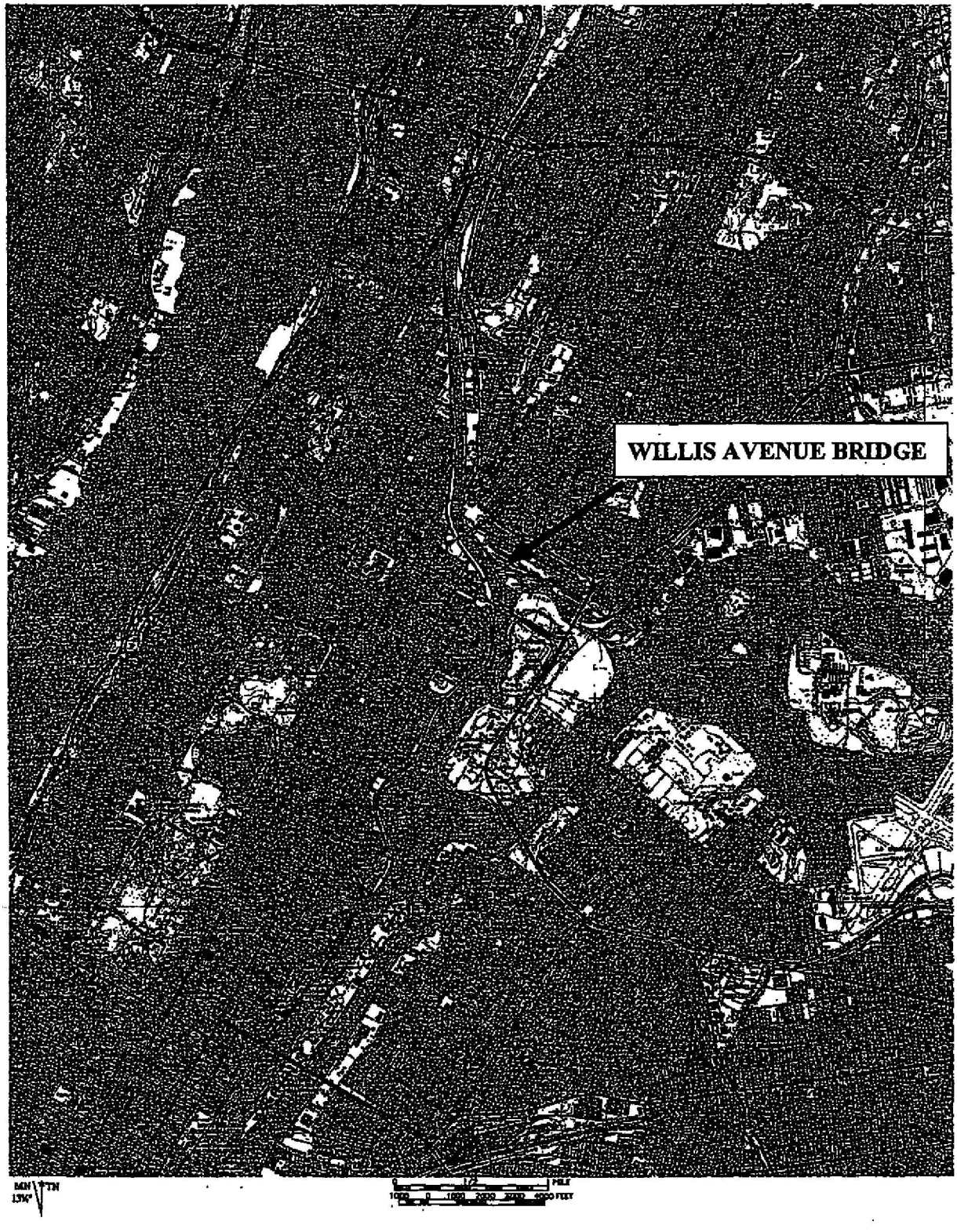


FIGURE 1

Project Location, *U.S.G.S BROOKLYN, N.Y. and CENTRAL PARK, N.Y. QUADRANGLES.* 1979

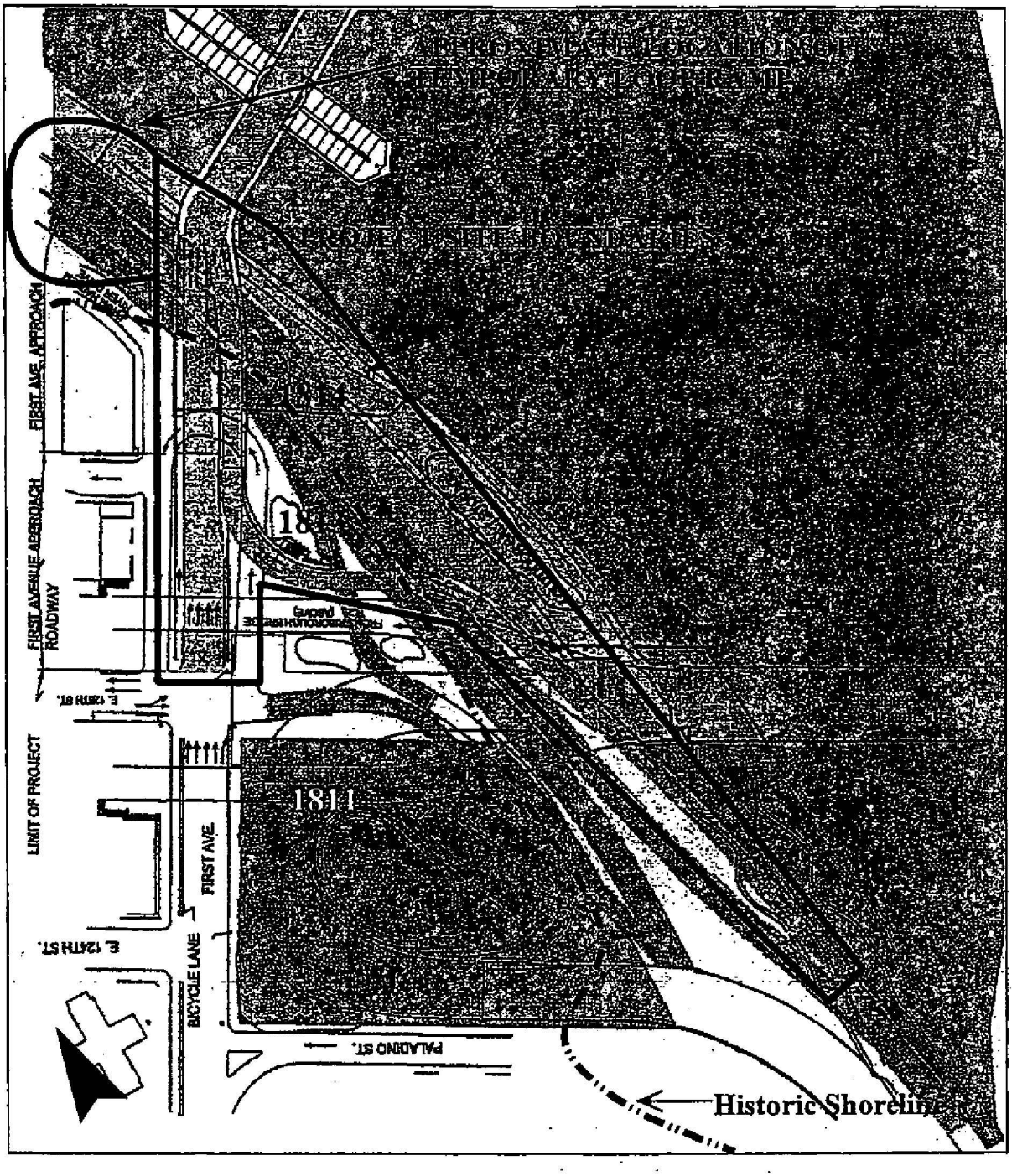


FIGURE 2

Manhattan Project Site Boundaries
Showing Current New York City Block Numbers and
Location of Historic Shoreline

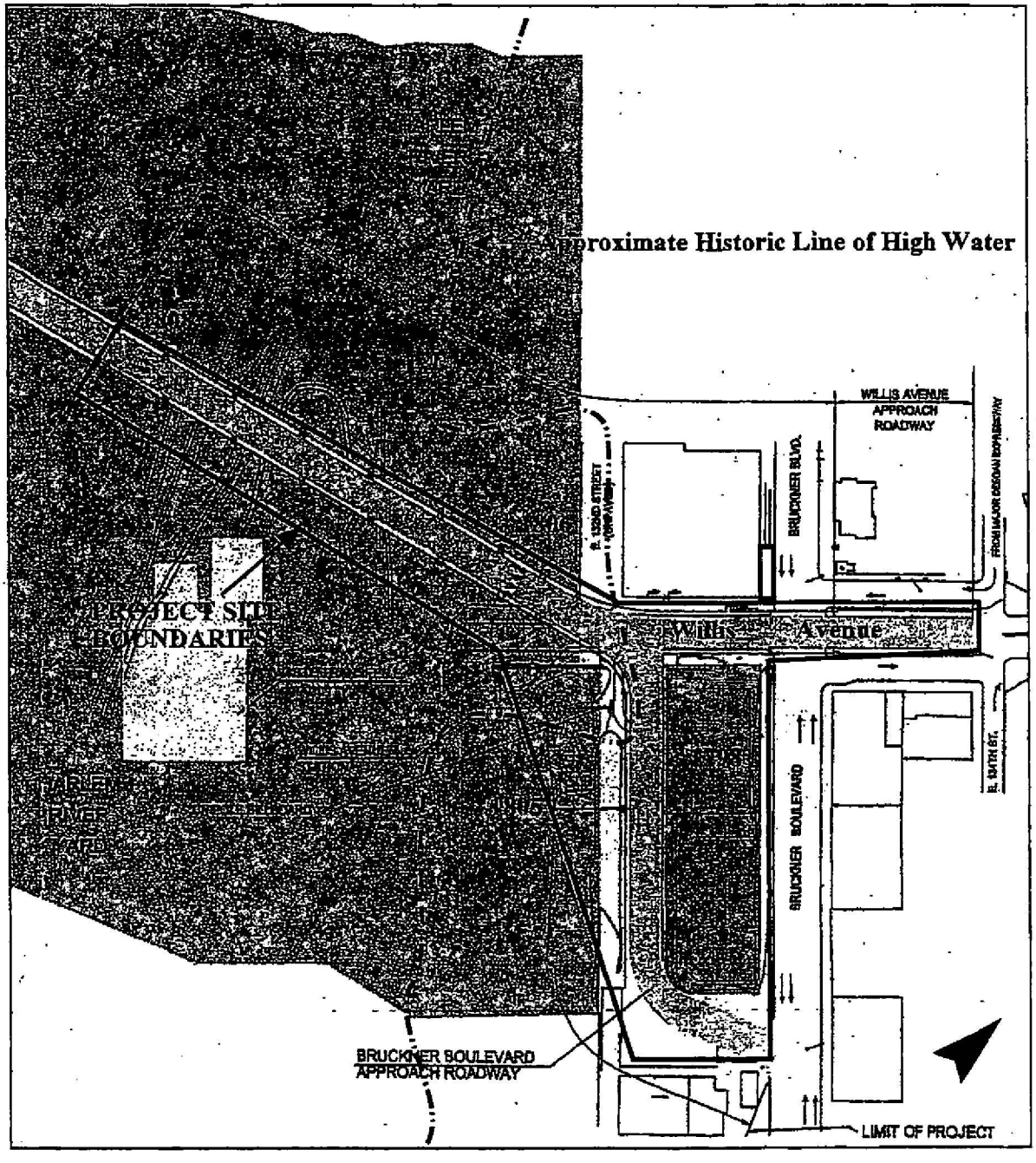


FIGURE 3

Bronx Project Site Boundaries
Showing Historic New York City Block Numbers and
Location of Historic Shoreline

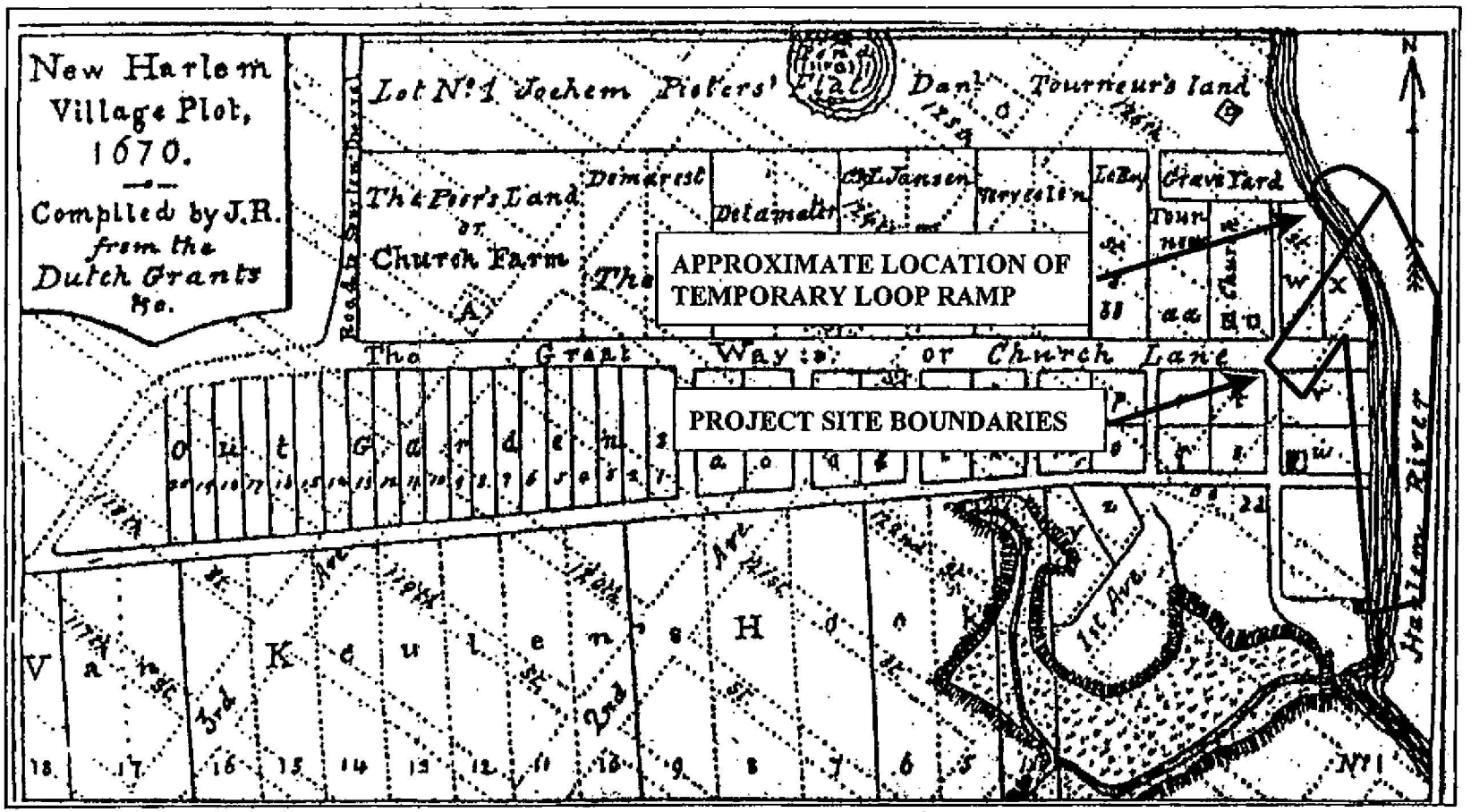


FIGURE 4

New Harlem Village Plot, 1670
Source: Romer and Hartman 1981:9

Although this 1670 places the Church Grave Yard north and west of the project site, later more detailed maps place its eastern end in the footprint of First Avenue.

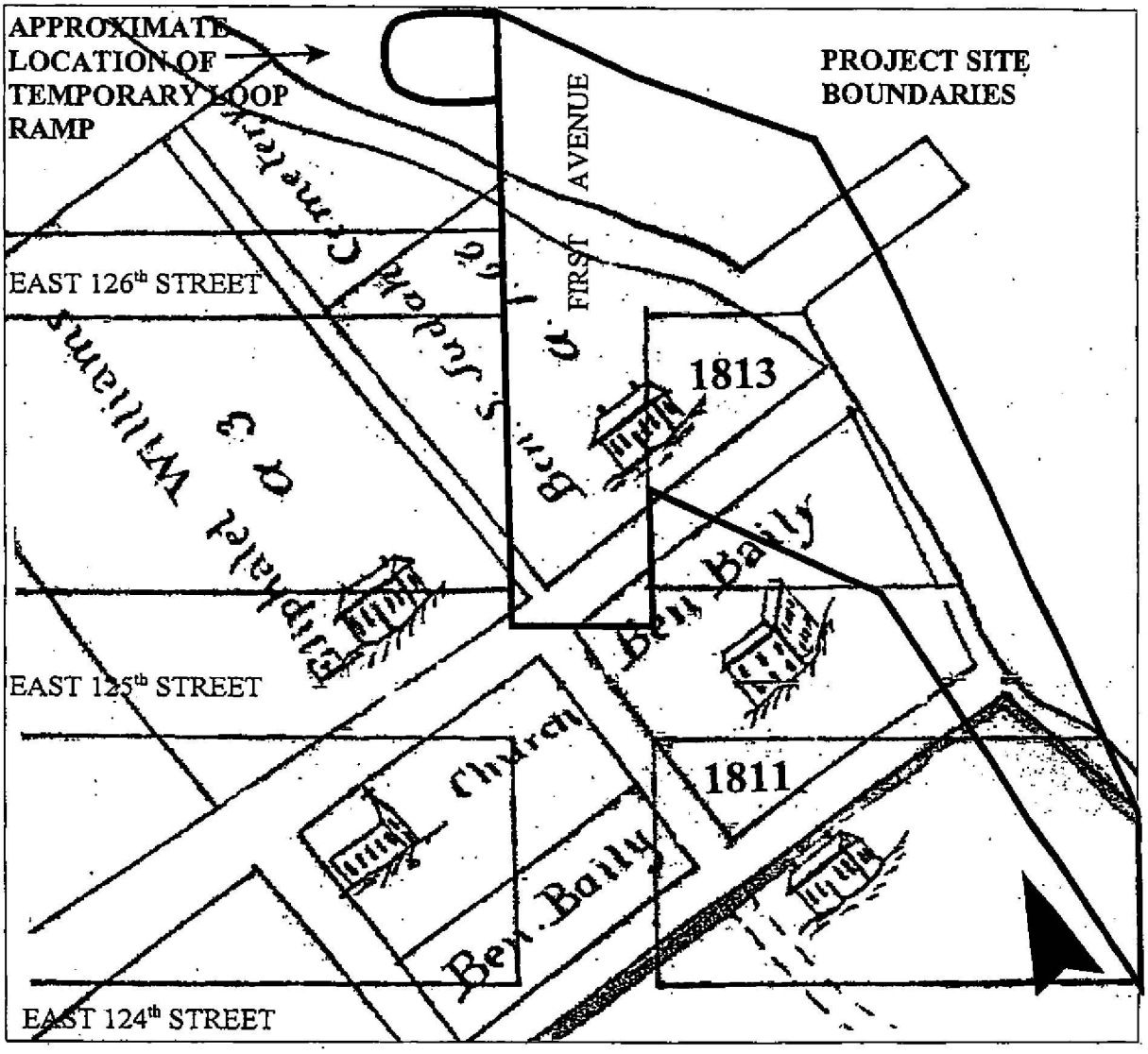


FIGURE 5

Map of Farms Commonly Called the Blue Book
Sackersdorff, 1815

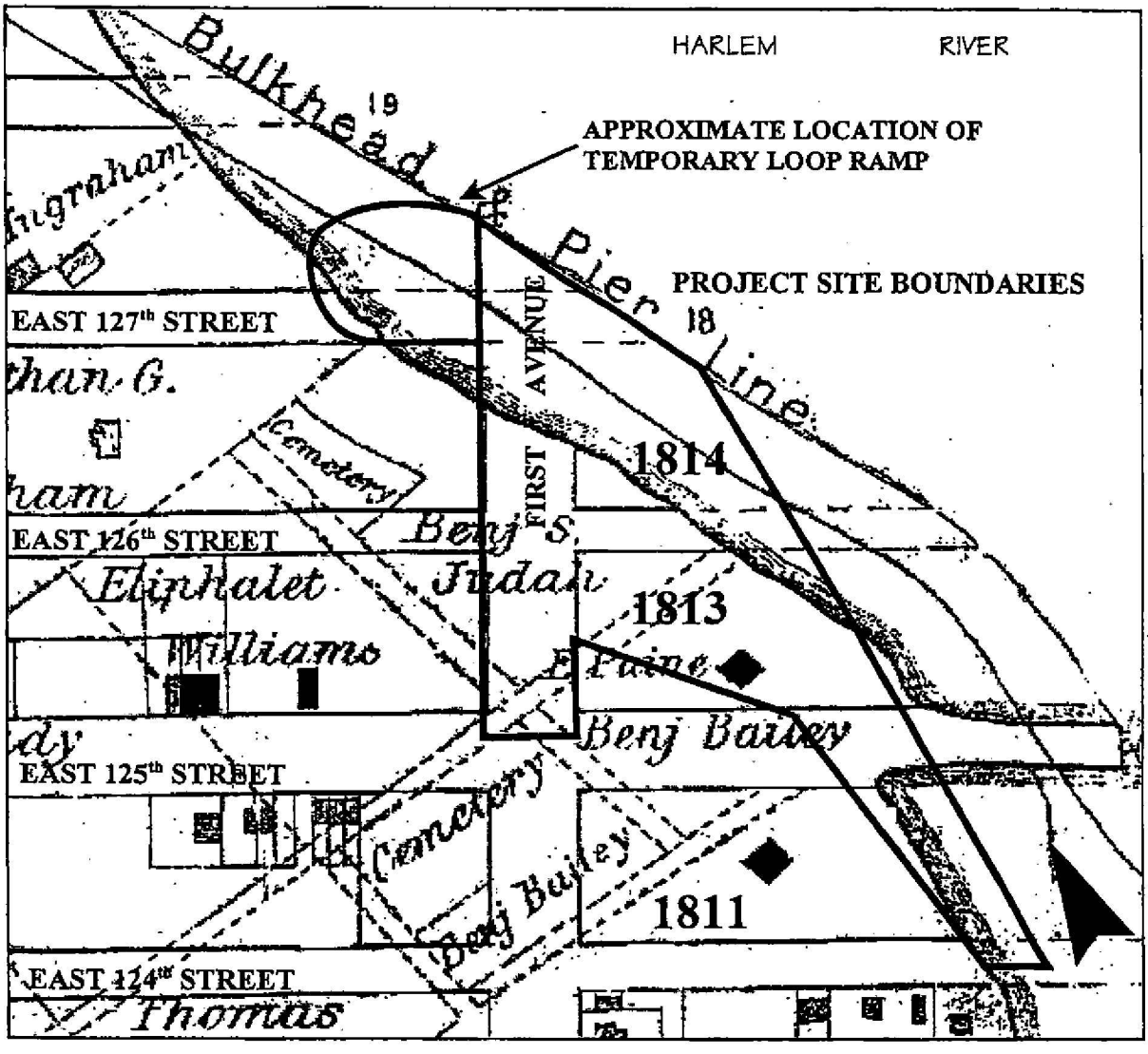


FIGURE 6

Map of New York and Vicinity
Dripps, 1867

This 1867 map places the Church Grave Yard west of the project site at East 126th Street, but later more detailed maps place its eastern end within the footprint of First Avenue. The Dutch Reformed Church cemetery at East 125th Street is shown extending into the footprint of First Avenue.

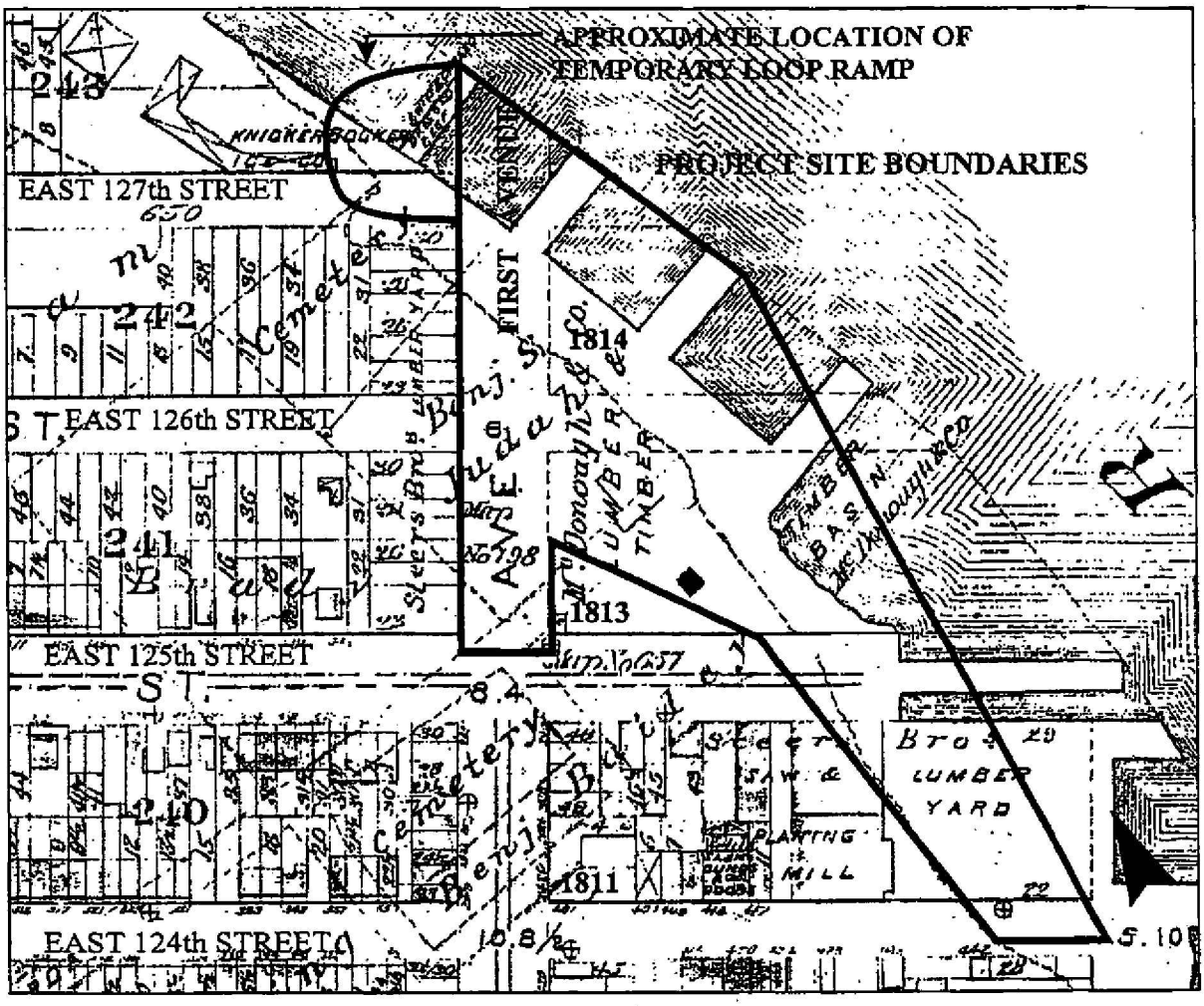


FIGURE 7

Atlas of the City of New York
Robinson, 1885

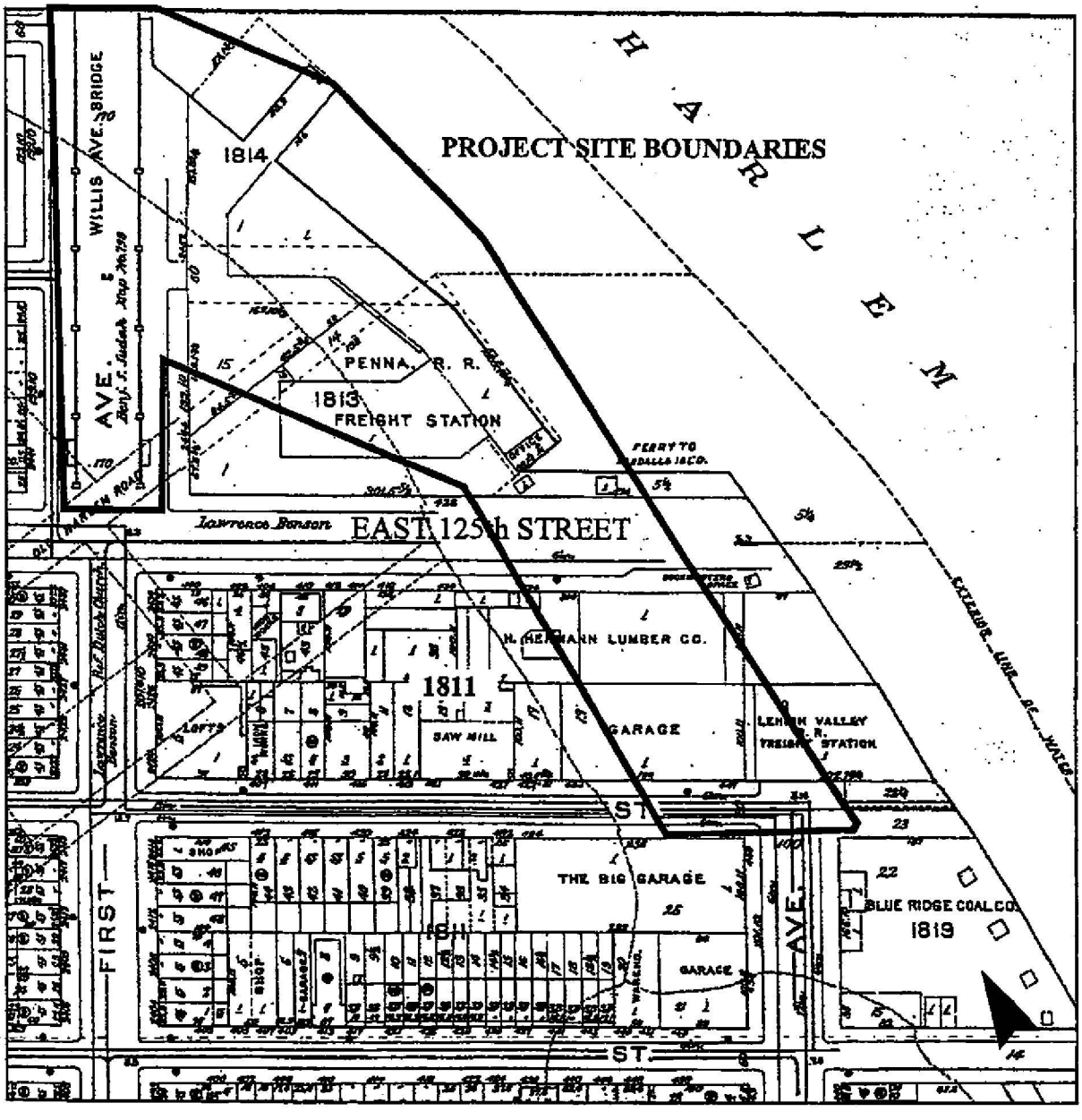


FIGURE 8

Atlas of the City of New York, Borough of Manhattan
G.W. Bromley, 1925

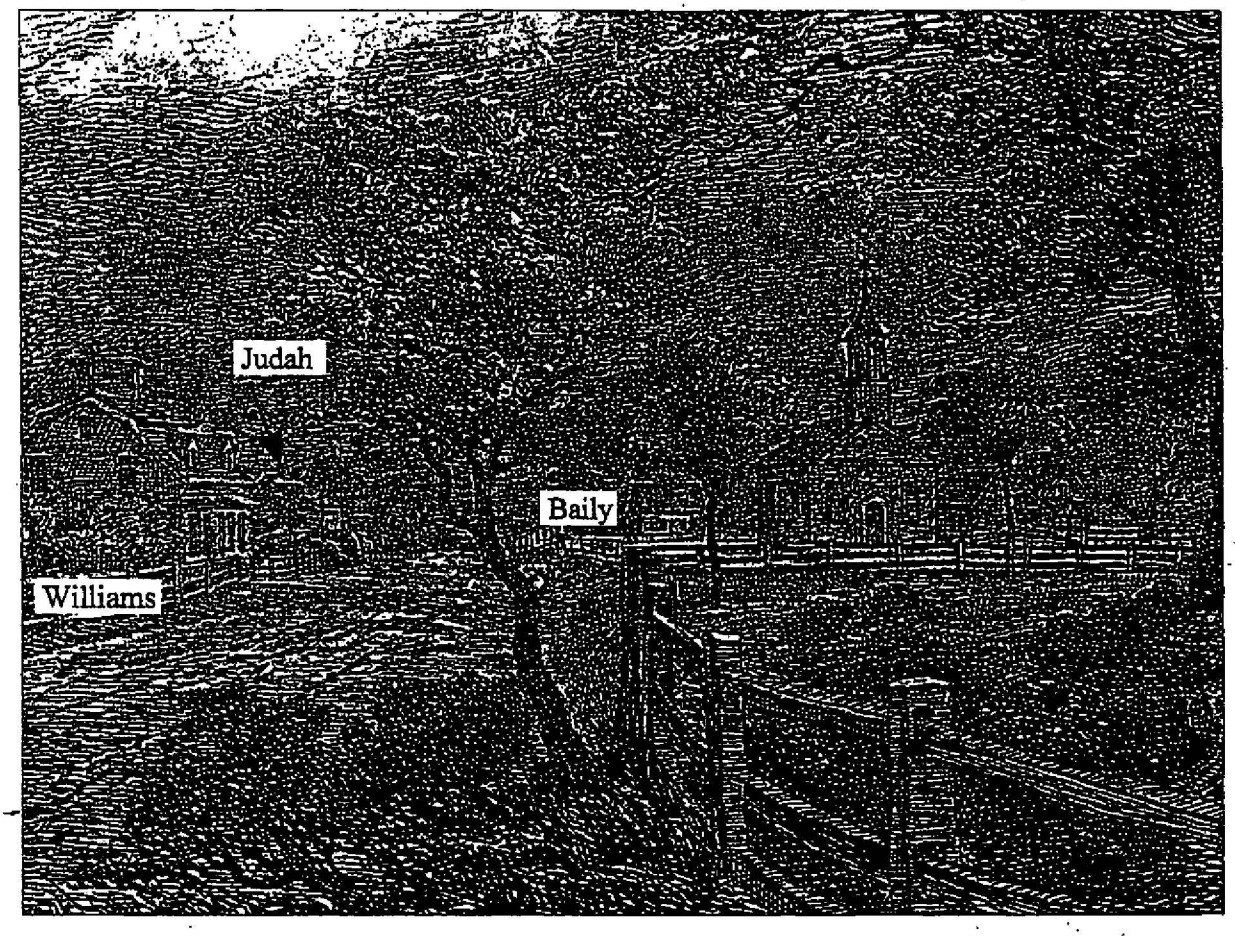


FIGURE 9

Harlem, 1798
Drawing by Archibald Robertson
Source: Jackson 1995:523

Facing east up Harlem Lane towards the Harlem River. Dutch Reformed Church and Ben Baily house behind it to right. Eliphalet Williams house - standing in what would now be the footprint of East 125th Street - across from Church to left. In the distance behind the Williams house is Ben Judah's house where First Avenue would now run.

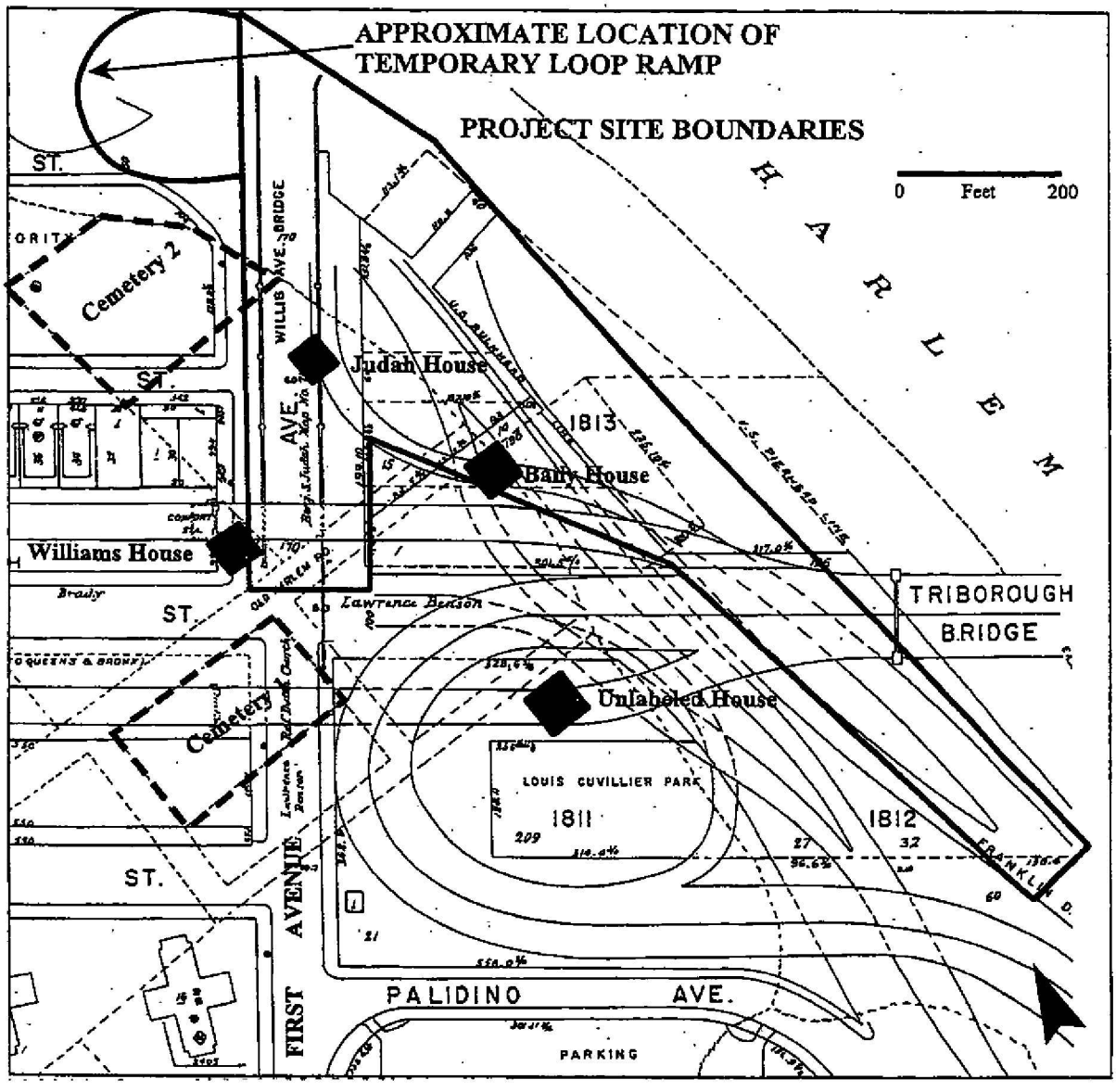


FIGURE 10

Historic Archaeological Features with Approximate Boundaries superimposed over the *Atlas of the City of New York, Borough of Manhattan* G.W. Bromley, 1974

Note: The locations of potential resources are approximate since the boundaries of the cemeteries and locations of the dwellings varied on historic maps. (see Figures 6 through 9)

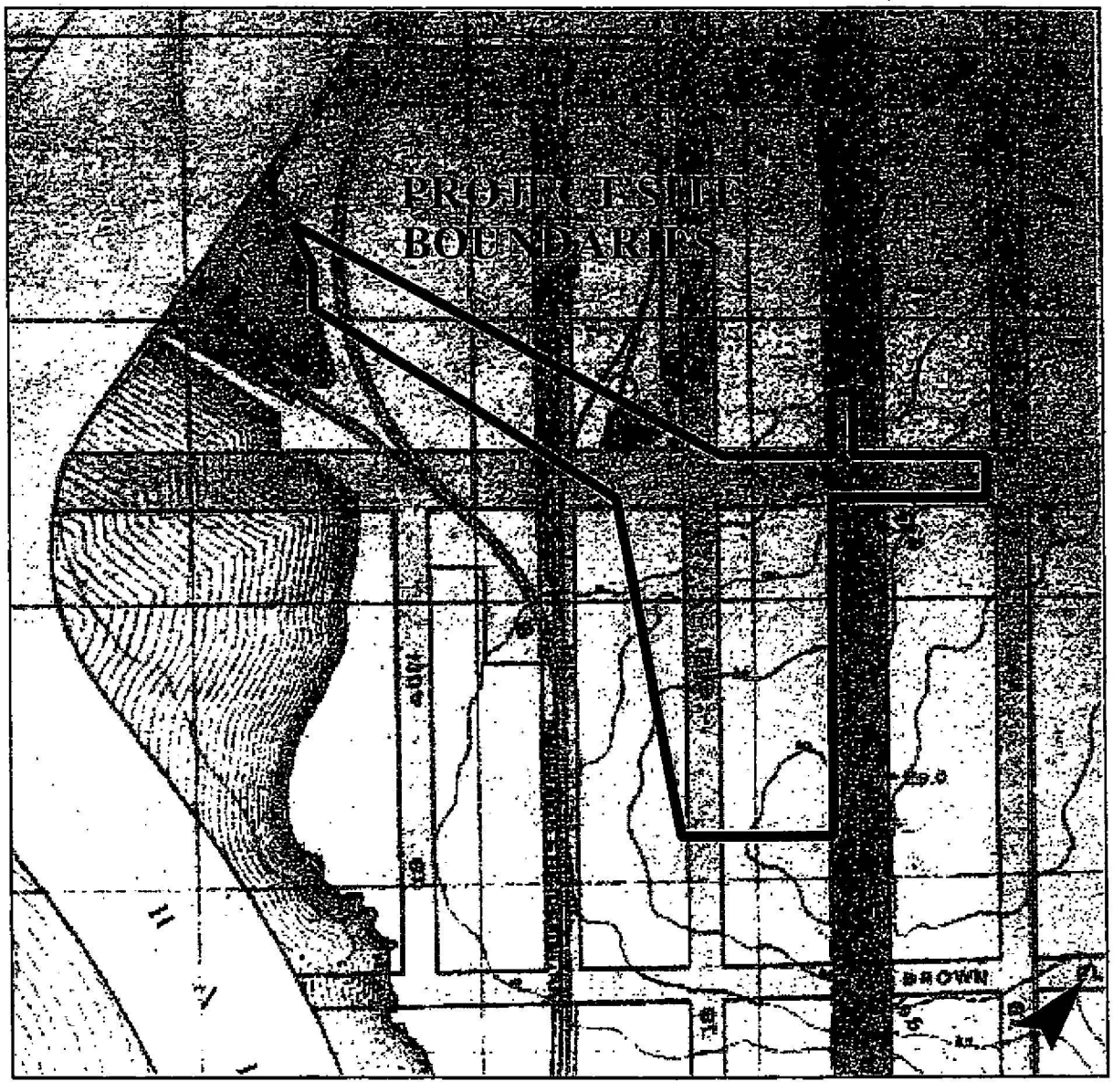


FIGURE 11

Topographical map made from surveys by the Commissioners of the Department of Public Parks, New York Department of Parks 1873

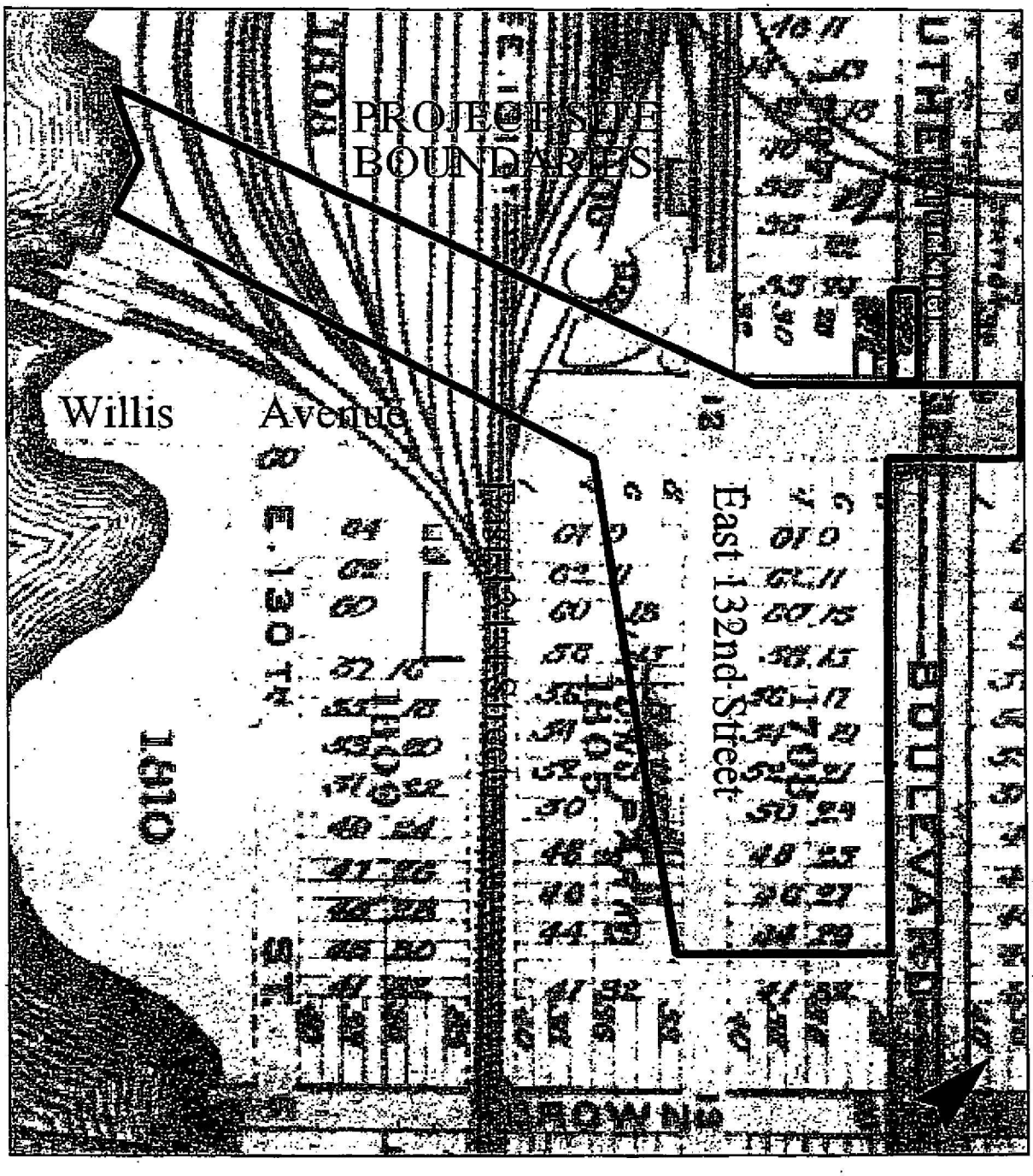


FIGURE 12

Atlas of the 23rd Ward, City of New York
Robinson, 1885

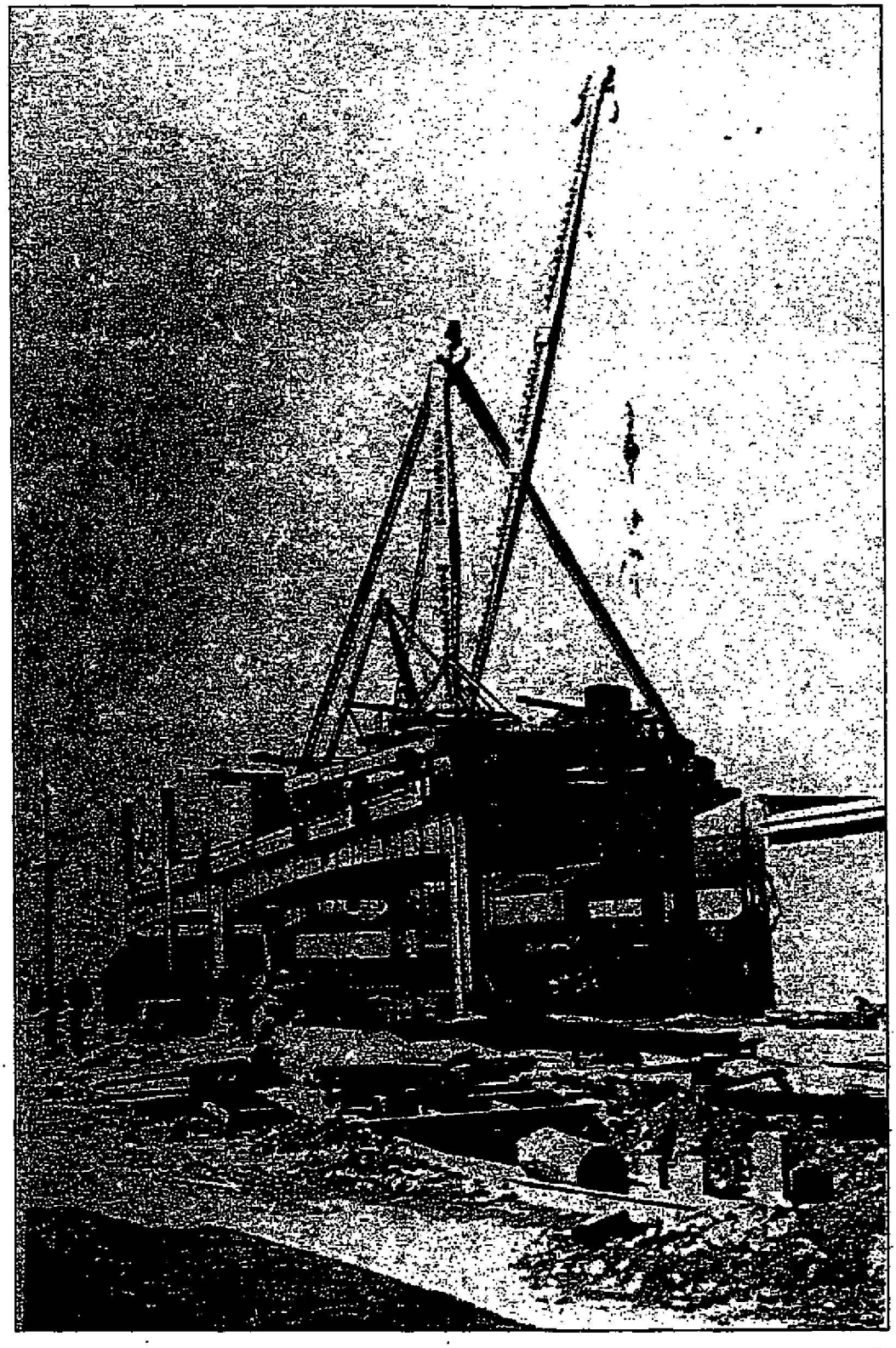
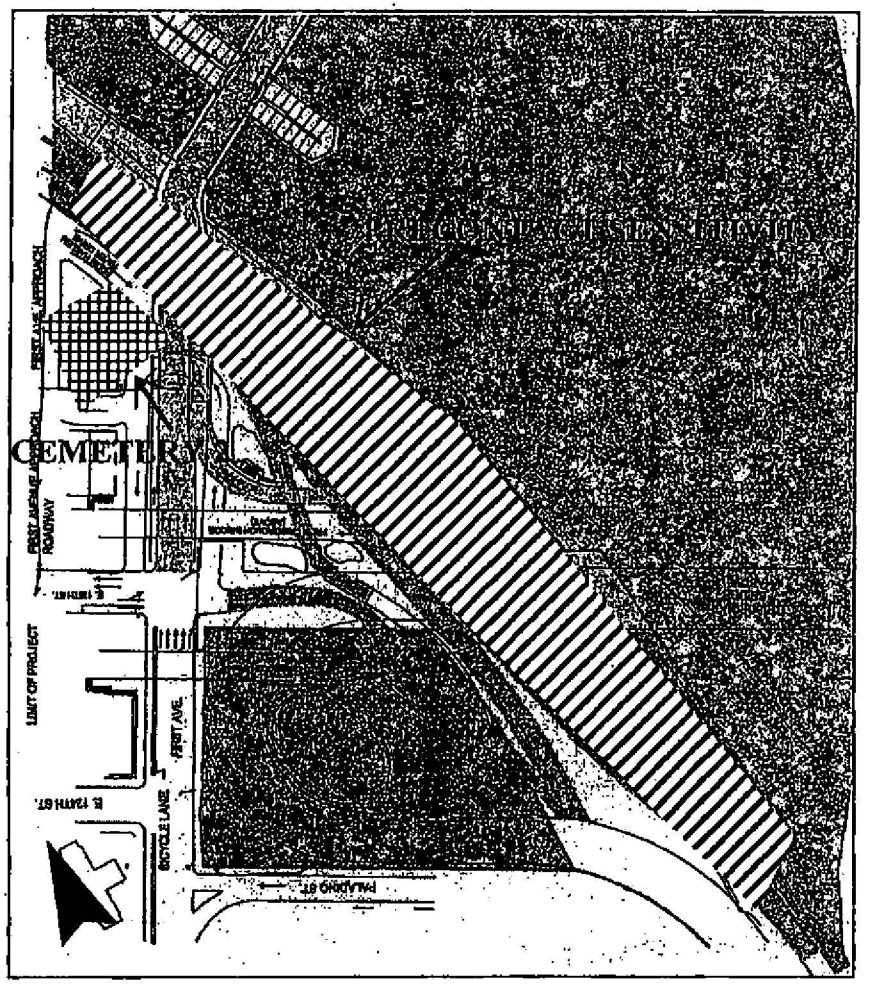


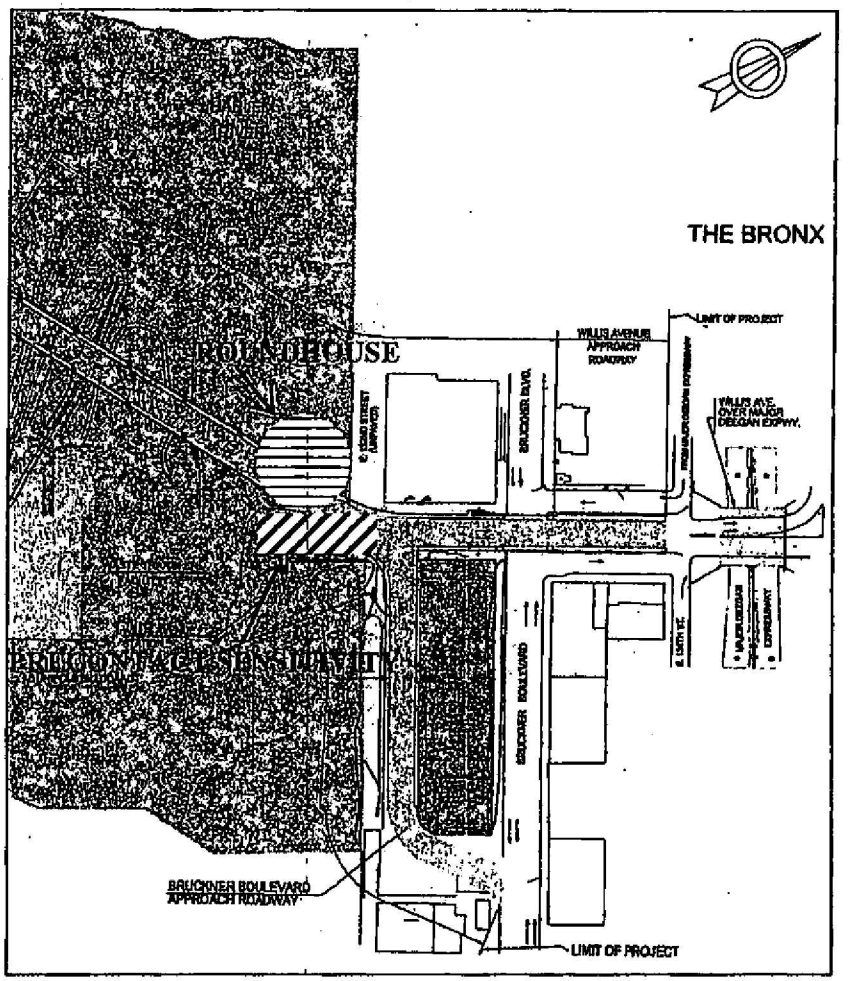
FIGURE 13

Construction of Triborough Bridge in Manhattan, March 10, 1936.
Facing northwest at East 125th Street and First Avenue.

New York Public Library, Local History Room Photograph Files 1315/A3



MANHATTAN PROJECT SITE

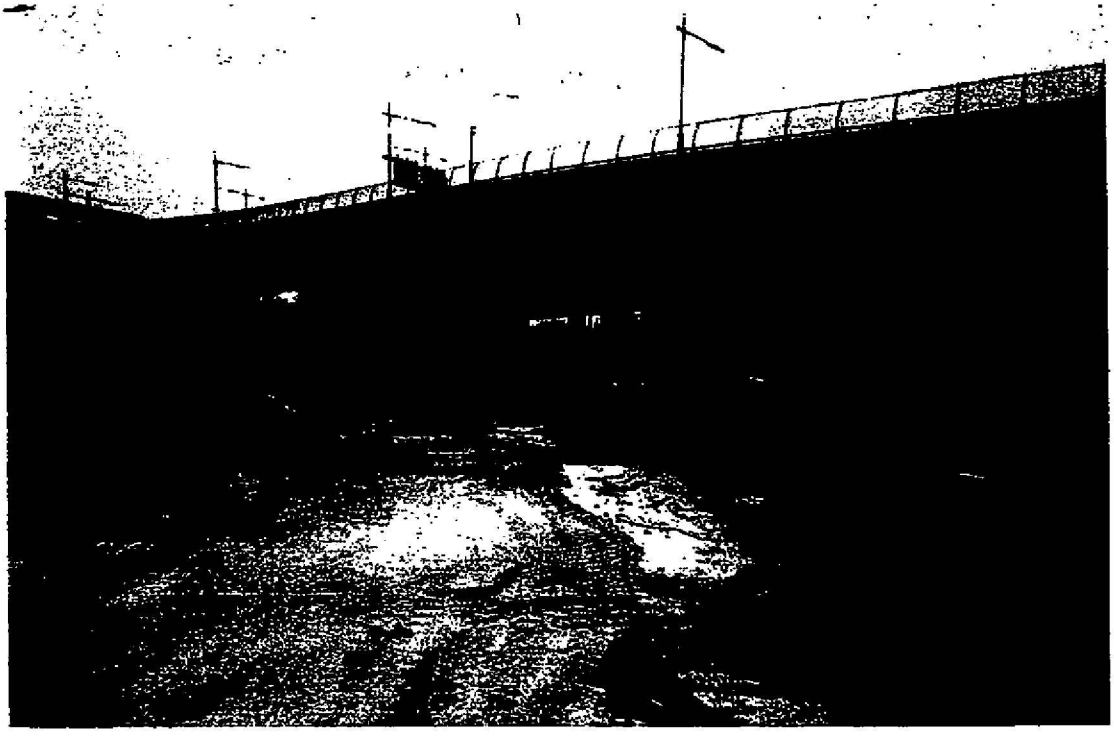


BRONX PROJECT SITE

FIGURE 14

Areas of Potential Archaeological Sensitivity
All locations are approximate

Photograph A. Beneath the Willis Avenue Bridge from First Avenue. (Facing northwest.)

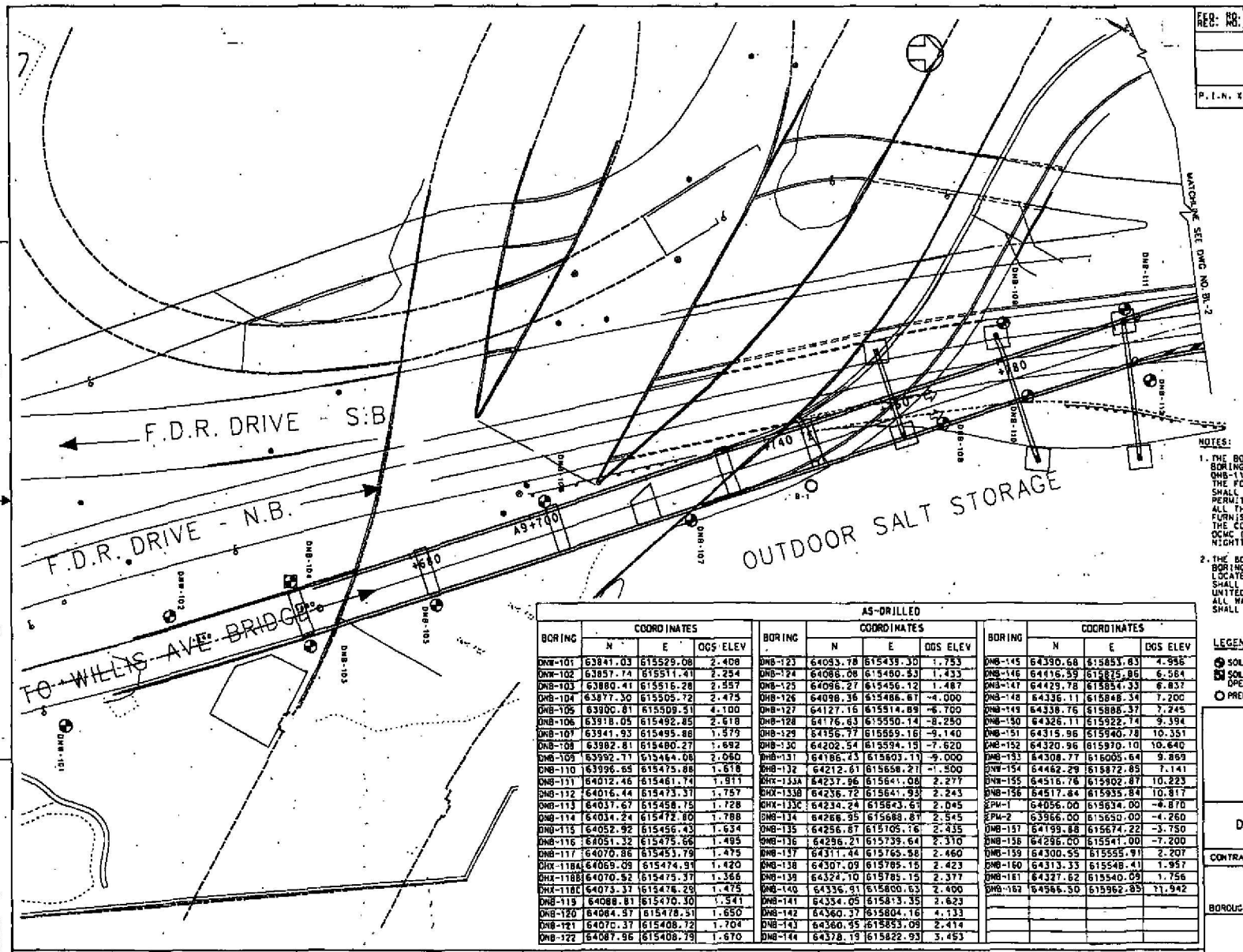


Photograph B. Facing south from beneath Willis Avenue Bridge to FDR Drive South.

Photograph C. Facing south from Willis Avenue to north end of Block 1798, Pulaski Park.

Photograph D. Willis Avenue in Bronx, facing west. Area of potential pre-contact sensitivity. Block 1805 at left, Block 1806 at right.

Appendix



FED. NO. REC. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X757.00.121	NEW YORK AND BRONX COUNTIES	B.I.N. 2-24005-9/A/B

NOTES:

1. THE BORING CONTRACTOR IS ALERTED TO THE FACT THAT BORINGS NOS. DNB-108, DNB-111, DNB-113, DNB-115, DNB-117, DNB-124 AND DNB-125 ARE LOCATED WITHIN THE FDR DRIVE NORTHBOUND ROADWAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NESCESSARY PERMITS FOR LANE CLOSURES AND SHALL COMPLY WITH ALL THE REQUIREMENTS OF SUCH PERMITS, INCLUDING FURNISHING AND MAINTAINANCE OF TRAFFIC DEVICES. THE CONTRACTOR SHALL ABIDE BY THE NYC OFFICE OF OCMC (FORMERLY MTCCC), INCLUDING THE CONDUCT OF NIGHTTIME OPERATIONS IF REQUIRED.
2. THE BORING CONTRACTOR IS ALERTED TO THE FACT THAT BORINGS NOS. DNB-126 THROUGH DNB-132 ENCLUSIVE ARE LOCATED WITHIN THE HARLEM RIVER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE NESCESSARY UNITED STATES COAST GUARD PERMIT FOR CONDUCTING ALL WATER-BORNE OPERATIONS. THE CONTRACTOR SHALL ABIDE BY ALL USCG PERMIT STIPULATIONS.

LEGEND:
- SOIL BORING
- SOIL BORING WITH OPEN WELL PIEZOMETER
- PRELIMINARY BORING

AS-DRILLED

BORING	COORDINATES N	E	ODS ELEV
DNB-101	63841.03	615529.08	2.408
DNB-102	63857.74	615511.41	2.254
DNB-103	63880.41	615516.28	2.557
DNB-104	63877.30	615505.72	2.475
DNB-105	63900.81	615509.51	4.100
DNB-106	63918.05	615492.85	2.618
DNB-107	63941.93	615495.88	1.579
DNB-108	63982.81	615480.27	1.692
DNB-109	63992.77	615464.06	2.060
DNB-110	63996.69	615475.88	1.618
DNB-111	64012.46	615461.74	1.911
DNB-112	64016.44	615473.31	1.757
DNB-113	64037.67	615458.75	1.728
DNB-114	64034.24	615472.80	1.788
DNB-115	64052.92	615456.43	1.634
DNB-116	64051.32	615475.66	1.495
DNB-117	64070.86	615451.79	1.475
DNB-118A	64069.09	615474.91	1.420
DNB-118B	64070.52	615475.37	1.366
DNB-118C	64073.37	615476.29	1.475
DNB-119	64088.81	615470.30	1.541
DNB-120	64084.97	615478.51	1.650
DNB-121	64070.37	615408.72	1.704
DNB-122	64087.96	615408.79	1.670
DNB-123	64083.78	615439.30	1.753
DNB-124	64086.08	615480.53	1.433
DNB-125	64096.27	615456.12	1.487
DNB-126	64098.36	615486.67	-4.000
DNB-127	64127.16	615514.89	-6.700
DNB-128	64176.63	615550.14	-8.250
DNB-129	64156.77	615559.16	-9.140
DNB-130	64202.54	615594.15	-7.620
DNB-131	64186.43	615603.11	-9.000
DNB-132	64212.61	615658.21	-1.500
DNX-133A	64237.96	615641.08	2.277
DNX-133B	64236.72	615641.93	2.243
DNX-133C	64234.24	615643.61	2.045
DNB-134	64268.95	615688.81	2.545
DNB-135	64256.87	615705.16	2.435
DNB-136	64296.21	615739.64	2.310
DNB-137	64311.44	615765.58	2.460
DNB-138	64307.09	615785.15	2.423
DNB-139	64324.10	615785.15	2.377
DNB-140	64336.81	615800.63	2.400
DNB-141	64354.05	615813.35	2.623
DNB-142	64360.37	615804.16	4.133
DNB-143	64360.95	615853.09	2.414
DNB-144	64378.19	615822.93	3.453
DNB-145	64390.68	615851.83	4.986
DNB-146	64416.59	615875.86	6.584
DNB-147	64429.78	615854.33	6.837
DNB-148	64336.11	615848.34	7.200
DNB-149	64338.76	615888.37	7.245
DNB-150	64326.11	615922.74	9.394
DNB-151	64315.96	615940.78	10.351
DNB-152	64320.96	615970.10	10.640
DNB-153	64308.77	616005.64	9.869
DNW-154	64462.29	615872.85	7.141
DNW-155	64516.76	615902.87	10.223
DNB-156	64517.84	615935.84	10.817
EPM-1	64056.00	615634.00	-4.870
EPM-2	63966.00	615650.00	-4.260
DNB-157	64199.88	615674.22	-3.750
DNB-158	64296.00	615541.00	-7.200
DNB-159	64300.55	615555.91	2.207
DNB-160	64313.33	615548.41	1.957
DNB-161	64327.62	615540.09	1.756
DNB-162	64586.30	615962.85	11.942

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX BIN 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 1

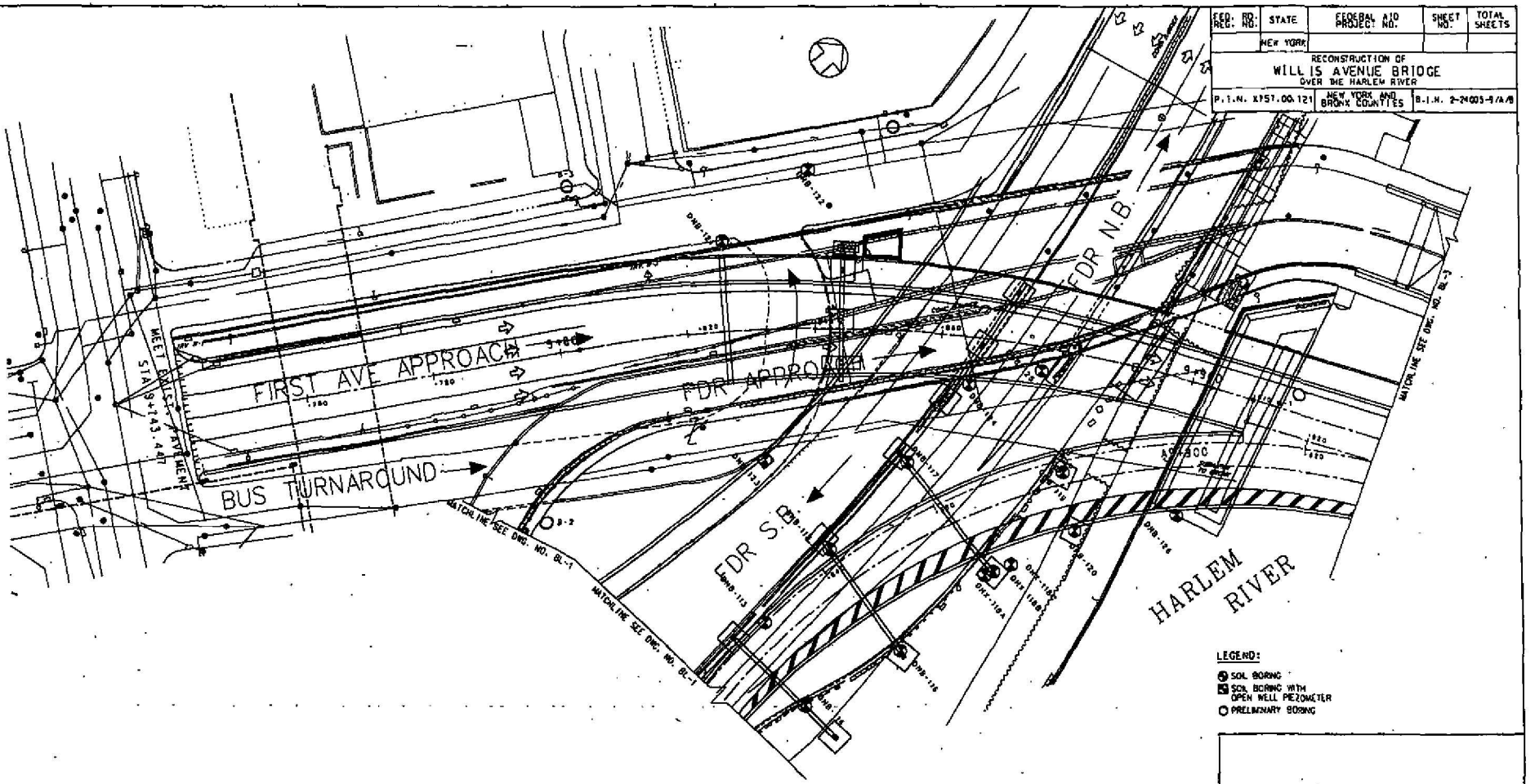
DWG. NO.	SCALE:	DATE:	SHEET NO.
BL-1	1:300	OCT 2000	

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

CONSULTANT: HARDESTY & HANOVER, LLP
IN CHARGE OF: MEN CHAPTER: BS
DESIGNED: JFP CHECKED: ECP

NYSDOT MICROFILM IDENTIFICATION NUMBER
12-24005-9/A/B F95



FED. RR. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X957.00.121	NEW YORK AND BRONX COUNTIES	B.I.N. 2-24005-9/A/B

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX BIN 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 2

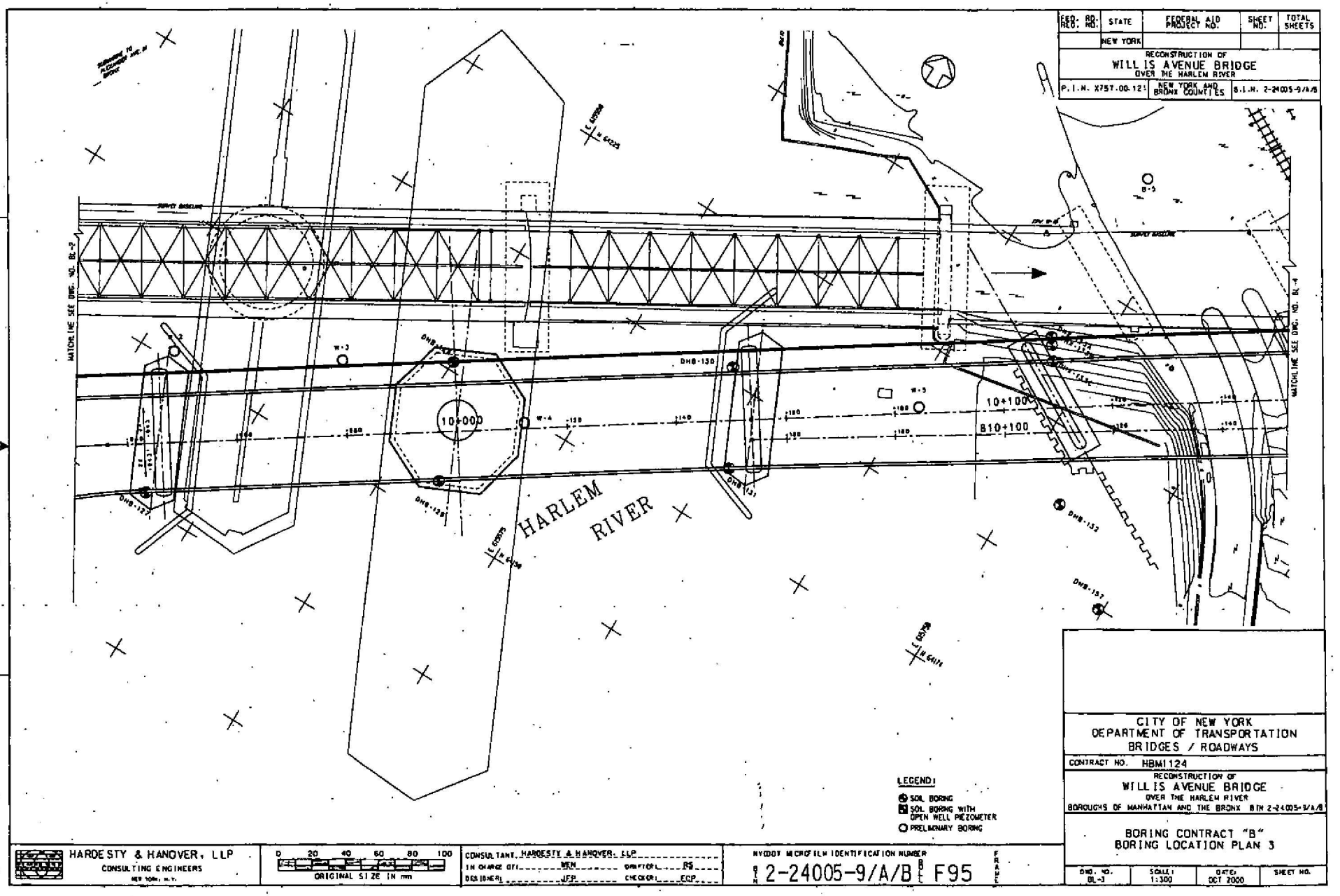
DWG. NO.	SCALE:	DATE:	SHEET NO.
BL-2	1:300	OCT 2000	

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

CONSULTANT: HARDESTY & HANOVER, LLP
IN CHARGE OF: BEN DRAFTER: RS
DESIGNED: JFP CHECKED: EOP

NYSDOT MICROFILM IDENTIFICATION NUMBER
BIN 2-24005-9/A/B BL F95 FRAME



REG. RD. REQ. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X757.00.121 | NEW YORK AND BRONX COUNTIES | B.I.N. 2-24005-9/A/B

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX BIN 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 3

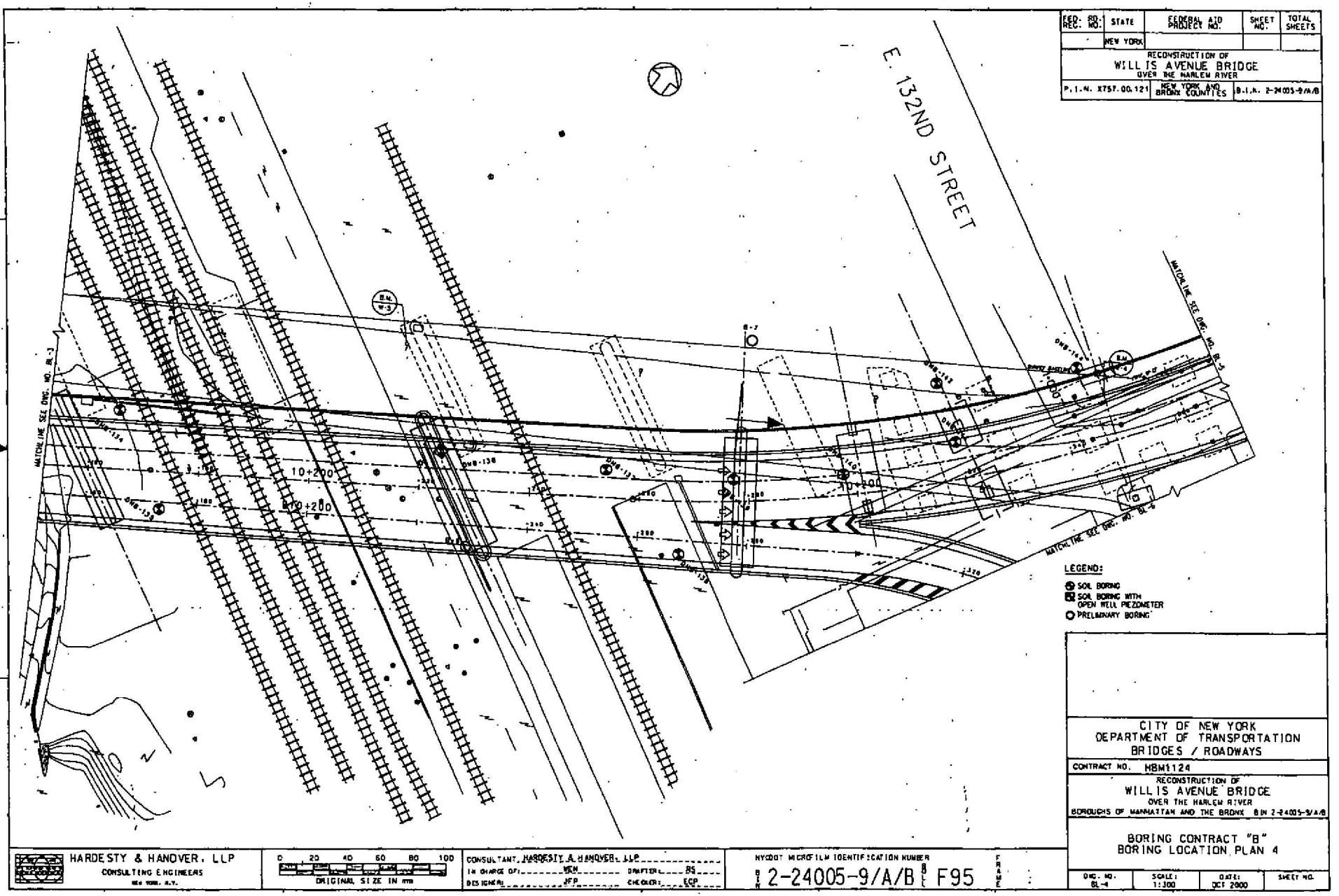
DWG. NO.	SCALE	DATE	SHEET NO.
BL-3	1:300	OCT 2000	

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

CONSULTANT: HARDESTY & HANOVER, LLP
IN CHARGE OF: MEN DRAFTSM: RS
DESIGNER: JFP CHECKER: ECP

NYSDOT MICROFILM IDENTIFICATION NUMBER
BIN 2-24005-9/A/B BLK F95 FRAME



FED. RD. REC. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X757.00.121	NEW YORK AND BRONX COUNTIES	B.I.N. 2-24005-9/A/B

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX B.I.N 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 4

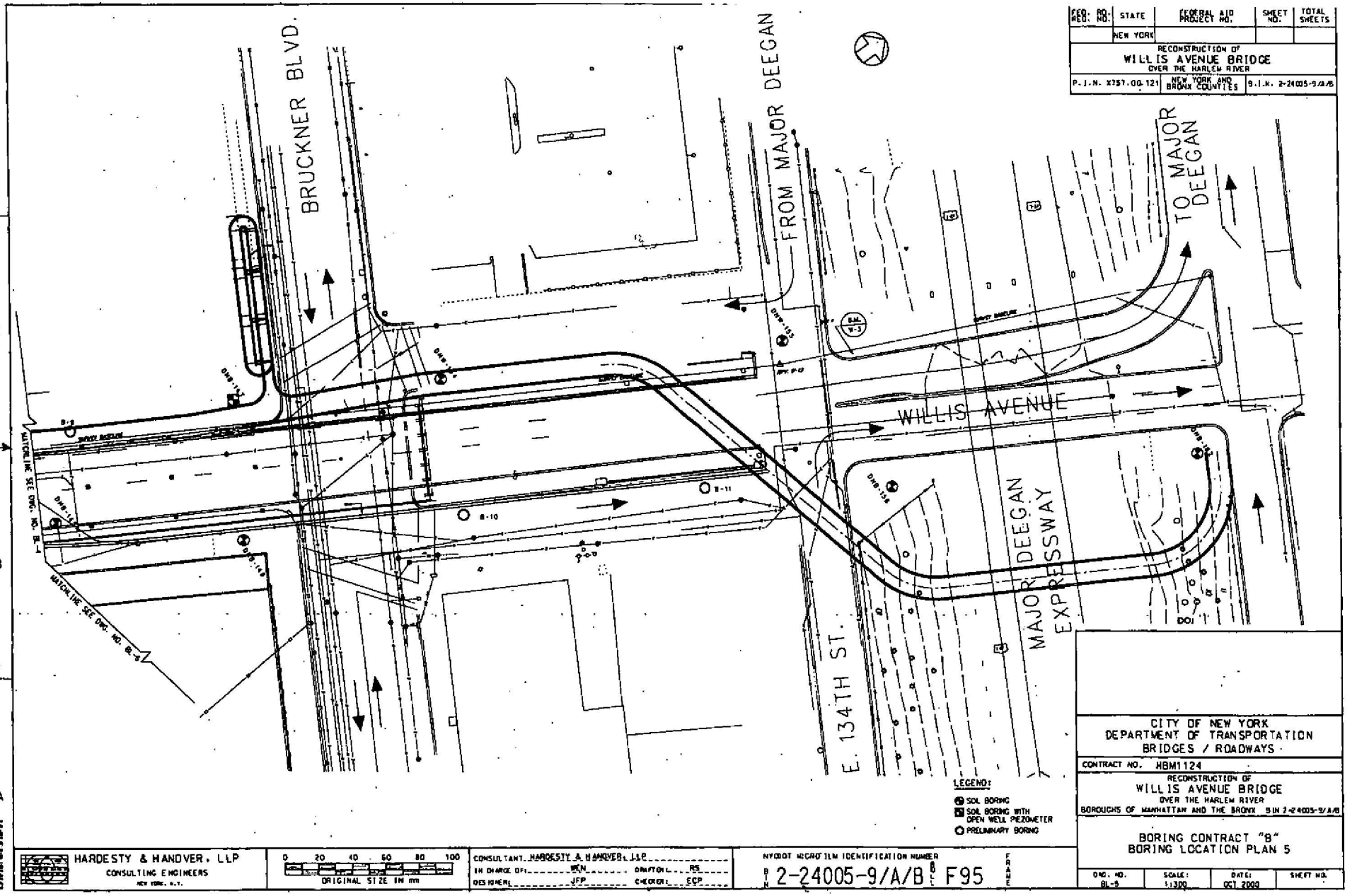
DWG. NO.	SCALE:	DATE:	SHEET NO.
BL-4	1:300	OCT 2000	

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

CONSULTANT: HARDESTY & HANOVER, LLP
IN CHARGE OF: MEH DRAFTER: BS
DESIGNED: JFP CHECKED: ECP

NYSDOT MICROFILM IDENTIFICATION NUMBER
BIN 2-24005-9/A/B BLT F95 FRAME



FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X757.00.121	NEW YORK AND BRONX COUNTIES	B.I.N. 2-24005-9/A/B

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX B.I.N 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 5

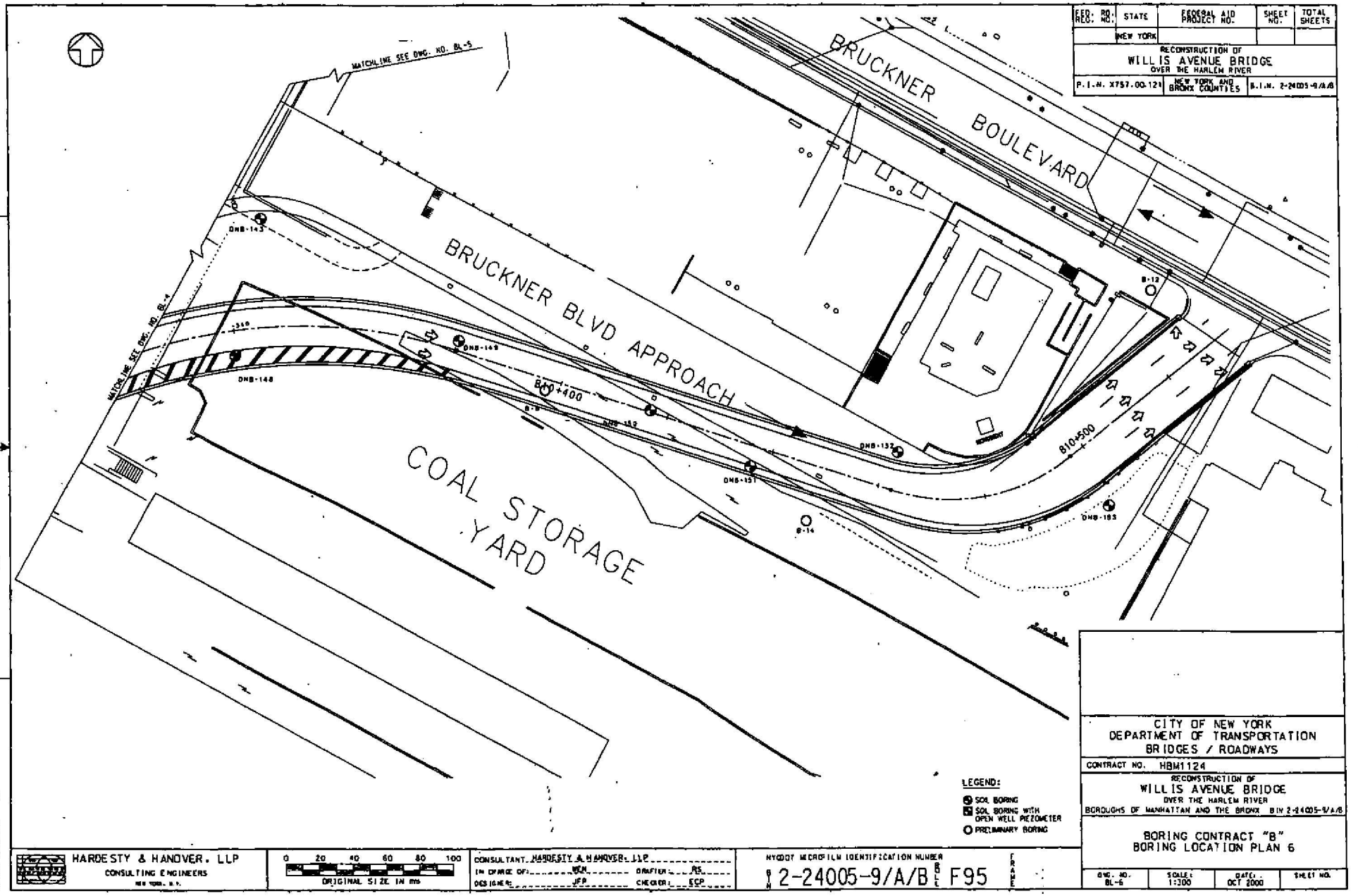
DWG. NO.	SCALE:	DATE:	SHEET NO.
BL-5	1:300	OCT. 2000	

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

CONSULTANT: HARDESTY & HANOVER, LLP
IN CHARGE OF: BKN DRAFTSMAN: RS
DESIGNED: JFP CHECKED: ECP

NYCDOT MICROFILM IDENTIFICATION NUMBER
B 2-24005-9/A/B F95 FRAME



FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X757.00.121	NEW YORK AND BRONX COUNTIES	B.I.N. 2-24005-9/A/B

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX BIN 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 6

DWG. NO.	SCALE:	DATE:	SHEET NO.
BL-6	1:200	OCT 2000	

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

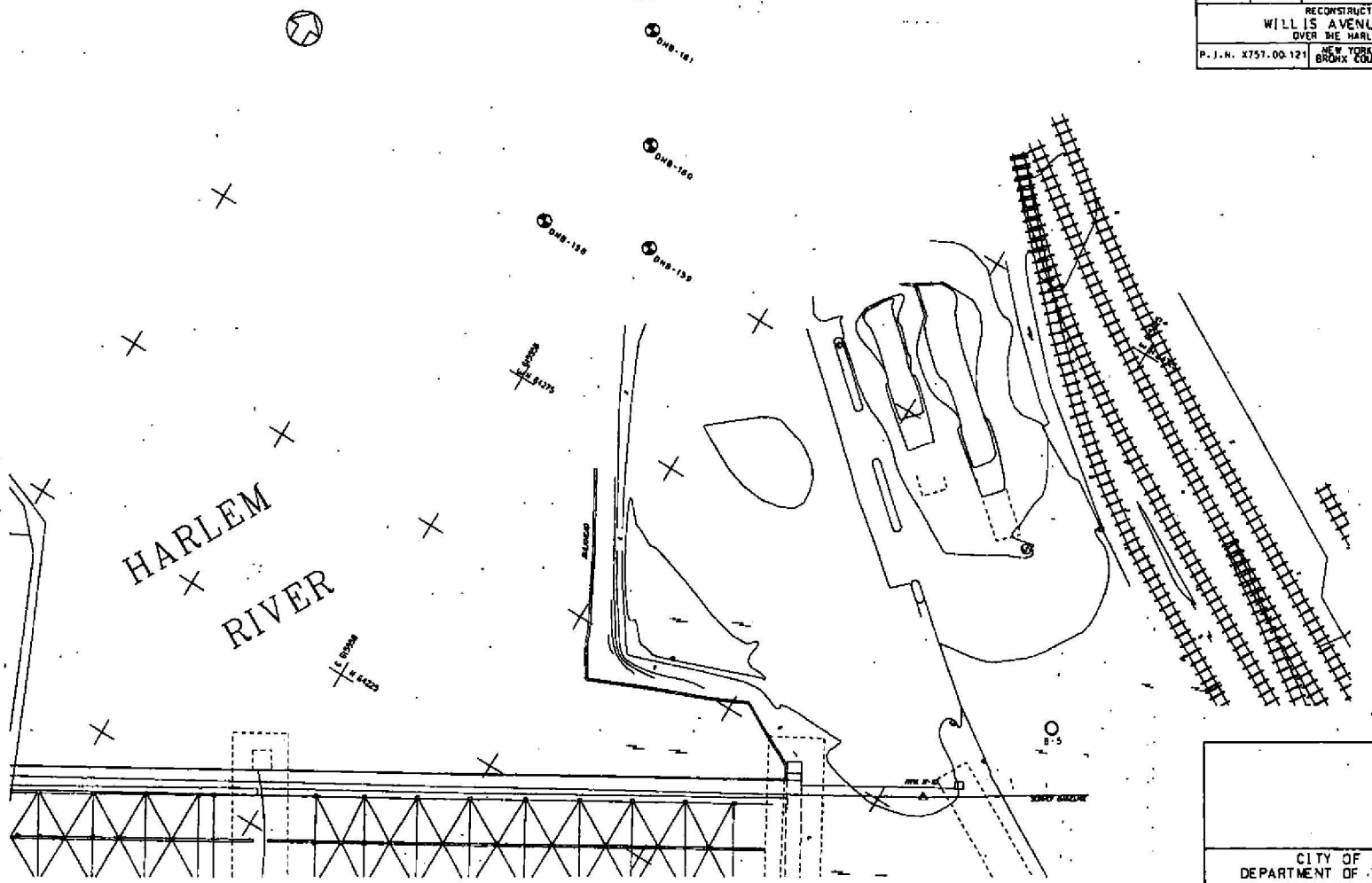
CONSULTANT: HARDESTY & HANOVER, LLP
IN CHARGE OF: WEN DRAFTER: RS
DESIGNED: JFP CHECKED: ECP

HYDOT MICROFILM IDENTIFICATION NUMBER
BIN 2-24005-9/A/B BLK F95 FRAME

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X757.00.121	NEW YORK AND BRONX COUNTIES	B.I.N. 2-24005-9/A/B



LEGEND:
- SOIL BORING
- SOIL BORING WITH OPEN WELL PIEZOMETER
- PRELIMINARY BORING

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX B.I.N 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 7

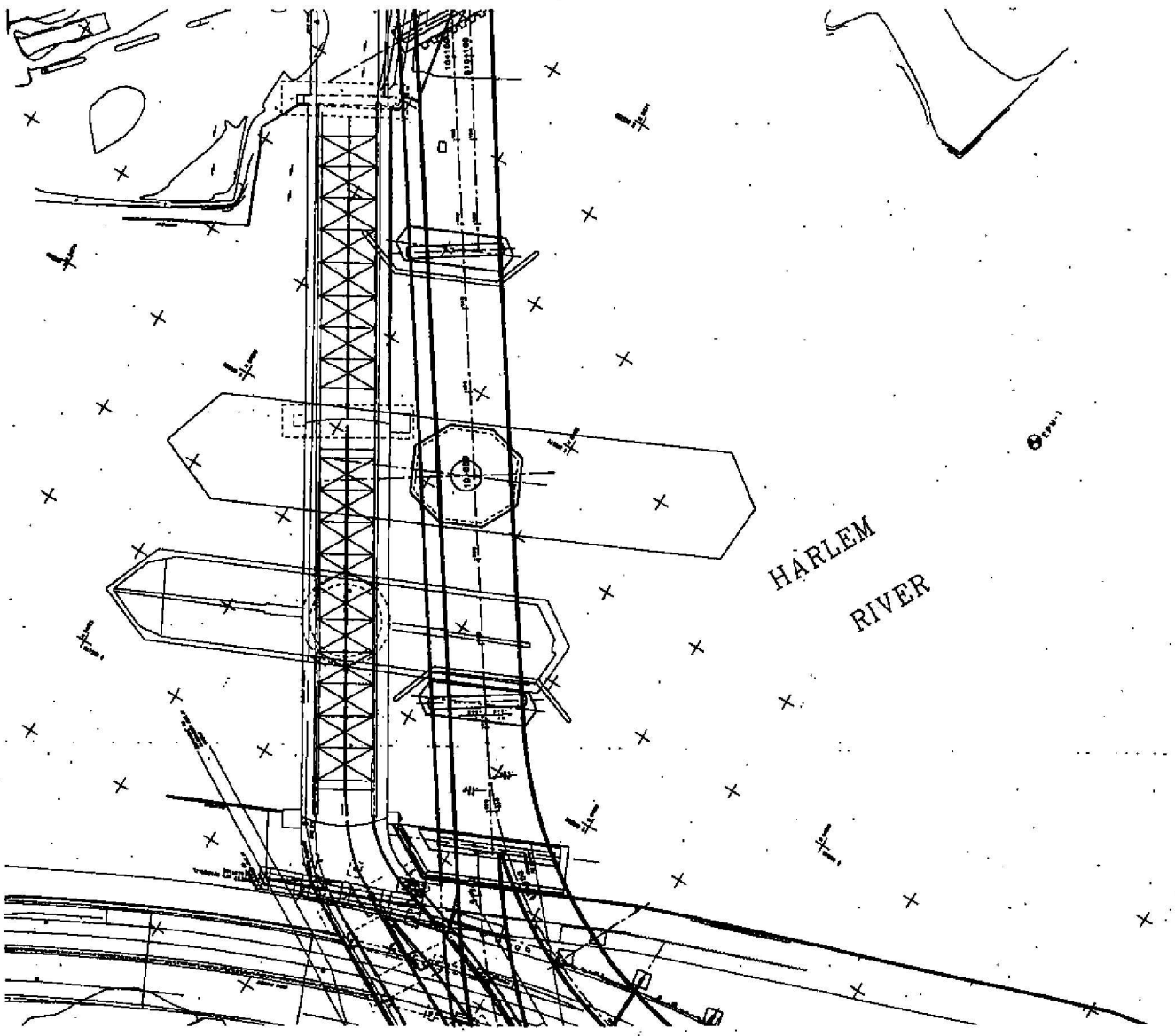
DWG. NO.	SCALE:	DATE:	SHEET NO.
BL-7	1:300	OCT 2000	

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

CONSULTANT HARDESTY & HANOVER, LLP
IN CHARGE OF: WEH DRAFTSM: RS
DESIGNER: JFP CHECKED: ECP

NYDOT MICROFILM IDENTIFICATION NUMBER
BIN 2-24005-9/A/B BLE F95 FRAME



FED. RD. REC. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER

P.I.N. X757.00.121	NEW YORK AND BRONX COUNTIES	B.I.N. 2-24005-9/A/B

LEGEND:
- SOIL BORING
- SOIL BORING WITH OPEN WELL PIEZOMETER
- PRELIMINARY BORING

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
NEW YORK, N.Y.

0 20 40 60 80 100
ORIGINAL SIZE IN mm

CONSULTANT: HARDESTY & HANOVER, LLP
IN CHARGE OF: BEN DRAFTER: RS
DESIGNED: JFP CHECKED: ECP

NYSDOT MICROFILM IDENTIFICATION NUMBER
B I N 2-24005-9/A/B ROLL F95 FRAME

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX B/W 2-24005-9/A/B

BORING CONTRACT "B"
BORING LOCATION PLAN 8

DWG. NO. BL-8	SCALE: 1:500	DATE: OCT 2000	SHEET NO.

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-108
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 63,982.81 E 615,480.27 | SURF. ELEV. +1.692 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 22Jun00 | DATE FINISH 29Jun00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH ELOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK		MOIST. CONT. (%)
0.0	Drill						Asphalt		
	Ahead	J-1	18	35			Br cf SAND, some mf Gravel, trace Silt	[SW] [11-65]	
					41	30	w/concrete & bluestone		
		J-2	12	29			Br Gr cf SAND, trace mf Gravel, trace Silt	[SW] [11-65]	
1.5					28	23			
		J-3	10	16			Gr mf GRAVEL, trace cf Sand, trace Silt	[GP] [11-65]	
					35	21	w/concrete & stone		
		J-4	11	100/			Br mf SAND, trace Silt	[SP] [11-65]	
				125			w concrete		
3.0		J-5	15	8			Blk mf SAND, trace Silt, w/wood	[SP] [11-65]	
	Mud				7	13			
		J-6	7	3			Blk Gr Organic SILT, trace f Sand	[OL] [11-65]	
					5	6	w/wood & shells		
		J-7	5	6			Gr SILT, trace f Sand w/wood	[ML] [11-65]	
4.5					10	5			
		J-8	1	2			Br Gr Clayey SILT	[ML] [11-65]	
					2	1			
6.0									
		J-9A	1	1			Br Gr Organic Clayey SILT w/shell frags	[OL] [11-65]	
		J-9B			2	3	Dk Br PEAT, trace f Sand, trace Silt	[PT] [11-65]	
7.5									
		J-10	7	9			Rd Br SILT, trace f Sand	[ML] [10-65]	
					15	24			
9.0									
		J-11	5	14			Rd Br varved SILT, little f Sand	[ML] [10-65]	
					10	17	w/occ pockets f Sand		
10.5									
		J-12	5	3			Rd Br Gr varved Clayey SILT, trace f Sand	[ML] [10-65]	
					9	14	w/lenses f Sand		
12.0							Boulder 11.4 m to 12.3 m depth		
		J-	100/0						
		J-13	20	32			Grn cf SAND, little Silt, trace mf Gravel	[SW-SM] [7-65]	
					32	39			
13.5									
		J-14	84	48			Gr cf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
					44	36			
15.0									

The subsurface information shown here was obtained for design and estimate purposes. It is made available so that users may have access to the same information available to the Owner. It is presented in good faith. By the nature of the exploration process, the information represents only a small fraction of the total volume of the material at the site. Interpolation between data samples may not be indicative of the actual material encountered.

DRILL RIG Reynolds
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A/B

CONSULTING ENGINEERS
GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | HOLE DNB-108
COUNTY New York | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 63,982.81 E 615480.27 | SURF. ELEV. +1.692 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 22Jun00 | DATE FINISH 29Jun00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH: ELOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-15	57	44			Gr cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					39	41	w/decomposed rock	
16.5								
		J-16	100/				Yel Br cf SAND, trace Silt, trace(-) f Gravel [SW] [7-65]	
			75					
18.0								
		J-	100/				No recovery	
			25				Top of Rock @ 18.6 m	
		C-1	NX	Core	Rec	36%	Weathered DOLOMITE, multi-horizontal breaks at 18.67, 18.87,	
					RQD	28%	& 19.03 m. [4-65]	
19.5					Pcs	4		
		C-2	NX	Core	Rec	35%	Highly weathered and decomposed DOLOMITE. [4-65]	
					RQD	0.6%	Multi- horiz breaks at 20.28, 20.44, 20.57, 20.69, 20.83 &	
21.0					Pcs	14	21.42 m. Angular breaks of 15° at 20.39, 21.25 & 21.35 m.	
		C-3	NX	Core	Rec	96%	Weathered and decomposed Inwood MARBLE [4-65]	
					RQD	42%	Horiz breaks at 21.73, 21.94, 22.08, 22.19, 22.33 & 22.93 m.	
22.5					Pcs	24	Angular breaks of 15° at 21.89, 22.25, & 22.85 m.	
		C-4	NX	Core	Rec	100%	Weathered and decomposed Inwood MARBLE. [4-65]	
					RQD	66%	Horiz breaks at 23.15, 23.2, 23.35, 23.72, 23.96 & 24.27 m.	
24.0					Pcs	24	Angular breaks of 30° at 23.1, 23.5, 24.1 & 24.17 m.	
25.5							Bottom of Hole @ 24.6 m	
27.0							NOTE: Casing broke off at 15 m depth. Hole moved 0.6 m south of original hole and advanced to 15 m depth w/o sampling.	
28.5								
30.0								

The subsurface information shown here was obtained for design and estimate purposes. It is made available so that users may have access to the same information available to the Owner. It is presented in good faith. By the nature of the exploration process, the information represents only a small fraction of the total volume of the material at the site. Interpolation between

DRILL RIG	Reynolds / Elmo
SOIL & ROCK	J. Maiello / Rich Murray
GEOTECH. ENGINEER	John F. Pizzi, P.E.
INSPECTOR	J. Maiello / Rich Murray
STRUCTURE	Willis Ave Bridge / Harlem R.

REGION 11 — GEOTECHNICAL ENGINEERING — HOLE DNB-109
COUNTY New York — SUBSURFACE EXPLORATION LOG — LINE
PIN — STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River — OFFSET
ACTUAL COORDINATES N 63,992.77 E 615,464.08 — SURF. ELEV.
DATUM Manhattan — DEPTH TO WATER 2.1 m
DATE START 26Aug00 — DATE FINISH 27Aug00

CASING O.D. 100 mm — I.D. 100 mm — WEIGHT OF HAMMER-CASING 136 kg — HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm — I.D. 35 mm — WEIGHT OF HAMMER-SAMPLER 63.5 kg (Automatic) — HAMMER FALL-SAMPLER 760 mm

DEPTH FLOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (/m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK		MOIST. CONT. (%)
0.0	Drill						0.3 m Asphalt & Stone		
	Ahead	I-1	21	17			Br cf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
	&				13	9			
	Spin	I-2	5	5			Br cf SAND, trace Silt	[SW] [7-65]	
1.5					6	4			
		I-3	2	3			Br mf SAND, trace Silt, w/pcs red brick & wood	[SP] [7-65]	
					5	5			
		I-4	6	5			Br f SAND, trace Silt	[SP] [7-65]	
					4	5			
3.0		I-5	5	4			Ditto		
					4	2			
		I-6	6	5			Gr f SAND, little Organic Silt, w/peat & shells	[SP-SM] [7-65]	
					3	1			
		I-7	WH	2			Gr Organic SILT, trace Peat	[OL-PT] [11-65]	
4.5					1	2			
		I-8	WH	WH			Ditto		
					WH	3			
6.0									
		I-9	10	8			Br mf SAND, trace mf Gravel, trace Silt	[SP] [7-65]	
					9	10			
7.5									
		I-10	7	6			Br varved Clayey SILT, little f Sand w/occ pocs & lenses of f Sand	[ML] [10-65]	
					6	8			
9.0									
		I-11	6	8			Ditto		
					10	11			
10.5									
		I-12	4	9			Ditto		
					6	5			
12.0									
		I-13	3	3			Br mf SAND, some varved Clayey SILT (pockets)	[SM] [7-65]	
					5	5			
13.5									
		I-14	9	13			Lt Gr cf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
					13	12			
15.0									

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DRILL RIG Ernie Thomas
SOIL & ROCK L. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR L. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A/B

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-109
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 63,992.77 E 615,464.08 | SURF. ELEV.
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 26Aug00 | DATE FINISH 27Aug00

CASING O.D. 508 mm I.D. 150 mm WEIGHT OF HAMMER-CASING 136 kg HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 35 mm WEIGHT OF HAMMER-SAMPLER 63.5 kg (Automatic) HAMMER FALL-SAMPLER 760 mm

DEPTH BLOW SURF. (m)	CASING BLOWS /0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-15	27	26			Yel Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					20	25		
16.5		J-16	28	25			Ditto	
					18	11		
18.0		J-17	60	50			Yel Br cf SAND, trace Silt [Dolomite Sand] [SW] [7-65]	
					100			
19.5							Top of Rock @ 19.5 m	
		C-1	NX	Core	Rec	27%	Inwood MARBLE in a weathered to decomposed state. Multiple horizontal & angular fractures. [4-65]	
					RQD	0%		
21.0					Pcs	15+		
		C-2	NX	Core	Rec	40%	Inwood MARBLE in a weathered to decomposed state. Horizontal fractures at 21.03, 21.28, 21.48 & 21.5 m. Angular fractures of 80° at 21.05 to 21.13 m. Vertical fractures 21.5 to 22.5 m. Multiple fractured & decomposed pcs 21.28 to 21.48 m. [4-65]	
					RQD	8%		
22.5					Pcs	14+		
		C-3	NX	Core	Rec	68%	Calcitic DOLOMITE in a weathered state. All seams & fractures are decomposed. Horiz fracts at 22.53, 23.18, 23.25 & 23.4 m. Angular fract of 35° at 22.65 m. Multiple fractured pcs 23.25 to 23.4 m. [4-65]	
					RQD	43%		
24.0					Pcs	11+		
		C-4	NX	Core	Rec	92%	Calcitic DOLOMITE in a weathered state. Horiz fracts at 24.2, 24.55, 24.73 & 25.1 m. Angular fracts at 24.3 [80°], 24.4 [80°], 24.45 [15°], 24.48 [15°] & 24.78 m [39°]. [4-65]	
					RQD	52%		
25.5					Pcs	13		
							Bottom of Hole @ 25.5 m	
27.0								
28.5								
30.0								

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DRILL RIG Ernie Thomas
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A/B
SHEET 2 OF 2

CONSULTING ENGINEERS

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-111

COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE

PIN | STA.

PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET

ACTUAL COORDINATES N 64,012.46 E 615,461.74 | SURF. ELEV.

DATUM Manhattan | DEPTH TO WATER 2.1 m

DATE START 26Aug00 | DATE FINISH 27Aug00

CASING O.D. 106 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm

SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH (Elev.) (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
0.0	Drill Ahead & Spin						0.6 m Asphalt, Stone, Concrete & Cobbles	
		J-1	45	100/100			Br cf SAND, trace mf Gravel, trace Silt w/wood BOULDER 0.85 m to 1.5 m [lost mud] [SW] [7-65]	
1.5								
		J-2	4	3			Br Gr f SAND, little Silt [SP-SM] [7-65]	
					2	4		
		J-3	5	7			Ditto	
					7	6		
3.0		J-4	2	1			Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					1	4		
		J-5	4	6			Gr f SAND, little Organic Silt, w/shells & peat [SP-SM] [7-65]	
					6	5		
		J-6	2	2			Gr Organic SILT, trace f sand, w/peat & shells [OL-PT] [11-65]	
4.5					3	2		
		J-7	1	WH			Gr Organic SILT, trace Peat [OL-PT] [11-65]	
					1	1		
6.0								
		J-8	5	8			Br mf SAND, trace Silt [SP] [7-65]	
					8	10		
7.5								
		J-9	9	9			Ditto	
					9	10		
9.0								
		J-10	9	10			Ditto	
					9	8		
10.5								
		J-11	5	4			Red Br Clayey SILT [ML] [10-65]	
					4	4		
12.0								
		J-12	6	5			Ditto	
					4	4		
13.5								
		J-13	6	10			Ditto	
					7	12		
15.0								

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DRILL RIG Mike McErlean

SOIL & ROCK J. Maiello

GEOTECH. ENGINEER John F. Pizzi, P.E.

INSPECTOR J. Maiello

STRUCTURE Willis Ave Bridge / Harlem R.

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-111
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | | OFFSET
ACTUAL COORDINATES N 64,012.46 E 615,461.74 | | SURF. ELEV.
DATUM Manhattan | | DEPTH TO WATER 2.1 m
DATE START 26Aug00 | DATE FINISH 27Aug00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH BELOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-14	16	26			Yel Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					41	50		
16.5								
		J-15	100/				Wht cf GRAVEL, trace cf Sand, trace Silt [GW] [6-65]	
			75					
18.0								
		J-	100/				No recovery	
			75					
19.5								
		J-16	100/				Br cf SAND, trace Silt [SW] [7-65]	
			75					
							Top of Rock @ 20.7 m	
21.0		C-	NX	Core	Rec	0%	No recovery.	
					RQD	0%		
					Pcs	0		
							Spoon Refusal.	
22.5		C-	NX	Core	Rec	0%	No recovery.	
					RQD	0%		
					Pcs	0		
24.0		C-1	NX	Core	Rec	35%	Inwood MARBLE and Calcitic DOLOMITE. Multiple fractured pcs.	
					RQD	0%	Rock is in a weathered to decomposed state. [4-65]	
					Pcs	Mult		
25.5		C-	NX	Core	Rec	0%	No recovery.	
					RQD	0%		
					Pcs	0		
							Spoon refusal.	
27.0		C-	NX	Core	Rec	0%	No recovery.	
					RQD	0%		
					Pcs	0		
28.5		C-	NX	Core	Rec	0%	Spoon refusal.	
					RQD	0%	No recovery.	
					Pcs	0		
30.0		C-2	NX	Core	Rec	90%	Calcitic DOLOMITE in a weathered state. Multiple fractures every	

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DRILL RIG Mike McErlean
SOIL & ROCK L. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR L. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/M3

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-111
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,012.46 E 615,461.74 | SURF. ELEV.
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 26Aug00 | DATE FINISH 27Aug00

CASING O.D. 104 mm | I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 650 mm
SAMPLER O.D. 50 mm | I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (70ton) | HAMMER FALL-SAMPLER 760 mm

DEPTH ELEV SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
30.0					RQD	37%	12.5 to 25 mm from 29.8 to 30.2 m. Inwood MARBLE 30.2 to 31.2 m	
					Pcs	27	w/horiz fracts at 30.23, 30.3, 30.35, 30.4, 30.65, 30.78 & 30.8 m.	
							Angular fracts at 30.3 [35°], 30.5 [50°] & 30.78 m [50°]. [4-65]	
31.5		C-3	NX	Core	Rec	75%	Inwood MARBLE. Horiz frats at 31.25, 31.58, 32.13, & 32.23 m.	
					RQD	22%	Angular fracts at 31.28 [25°], 31.5 [50°], 31.58 [50°], 31.9 [55°],	
					Pcs	16+	32.03 [20°], 32.13 [80°] & 32.33 m [55°]. Decomposed to Sand	
							31.95 to 32.03 m. [4-65]	
33.0		C-4	NX	Core	Rec	70%	Inwood MARBLE. Horiz fracts at 32.83, 32.93, 33.0, 33.08, 33.2,	
					RQD	25%	33.28, 33.5 & 33.63 m. Multiple fractured pcs 32.7 to 32.75 m,	
					Pcs	26+	32.93 to 32.98 m, 33.33 to 33.35 m, & 33.5 to 33.63 m. [4-65]	
34.5							Bottom of Hole @ 34.2 m	
36.0								
37.5								
39.0								
40.5								
42.0								
43.5								
45.0								

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INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-0/A/B

CONSULTING ENGINEERS
GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | HOLE DNB-112
COUNTY New York | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,016.44 E 615,473.37 | SURF. ELEV. +1.76 m
DATUM Manhattan | DEPTH TO WATER N/A
DATE START 25May00 | DATE FINISH 31May00

CASING O.D. 106 mm | I.D. 100 mm | WEIGHT OF HAMMER-CASING | 136 kg | HAMMER FALL-CASING | 450 mm
SAMPLER O.D. 50 mm | I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER | 63.5 kg (Donut) | HAMMER FALL-SAMPLER | 760 mm

DEPTH ELEV. SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
0.0	Drill	J-1	25	23			Blk Br cf SAND, little(+) mf Gravel, trace Silt [SW] [11-65]	
	Ahead				19	24	w/asphalt, brick & glass	
	&	J-2	28	25			Br cf SAND, trace mf Gravel, trace Silt [SW] [11-65]	
	Push				100			
1.5		J-3	8	16			Ditto	
					14	25		
		J-4	20	16			Ditto	
					13	27		
		J-	6	1			No recovery, 2 attempts	
3.0					1	2		
	Mud	J-5	3	1			Br cf SAND, trace mf Gravel, trace Silt, w/wood & brick [SW][11-65]	
					1	3		
		J-6	1	1			Blk SILT, trace(-) f Sand, w/Peat [ML] [11-65]	
					2	1		
4.5								
		J-7	WH	WH			Blk SILT, little Br f Sand [ML] [11-65]	
					WH	WH		
6.0								
		J-8	5	4			Br f SAND, little(+) Silt, trace(-) f Gravel [SM] [7-65]	
					11	8		
7.5								
		J-9	12	14			Yel Br f SAND, little Silt, w/mica [SM] [7-65]	
					18	19		
9.0								
		J-10	12	6			Rd Br varved SILT, w/lenses f Sand [ML] [10-65]	
					8	12		
10.5								
		J-11	6	8			Ditto	
					8	12		
12.0								
		J-12	3	7			Ditto	
					9	20		
13.5								
		J-13	4	6			Ditto	
					6	9		
15.0							Hard drilling 14.7 m to 15.0 m depth	

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DRILL RIG Reynolds
SOIL & ROCK Joseph Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR Joseph Maiello
STRUCTURE Willis Ave Bridge / Harlem R.

HARDESTY & HANOVER, LLP
CONSULTING ENGINEERS
GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | HOLE DNB-112
COUNTY New York | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,016.44 E 615,473.37 | SURF. ELEV. +1.76 m
DATUM Manhattan | DEPTH TO WATER N/A
DATE START 25May00 | DATE FINISH 31May00

CASING O.D. 108 mm | I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm | I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH(S) ELOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-	100/0				No recovery	
		B-1	NX	Core	Rec	33%	BOULDER - Inwood Marble	
16.5		J-	145	20*			Yel Br cf SAND, trace mf Gravel [insufficient recovery] [SW-SP] [7-65]	
							[* - used 136 kg hammer to drive sampler]	
		J-14	74	99			Yel Br cf SAND, trace mf Gravel, trace Silt, w/mica [SW-SP] [7-65]	
					104	154		
18.0								
		J-15	23	17			Ditto	
					17	17		
19.5								
		J-	100/5				No recovery	
							Drilled ahead to 21.0 m depth - hard but steady drilling	
		J-	100/0					
21.0		J-	100/0				Sample attempt @ 21.0 m	
		C-	NX	Core	Rec	0%	No recovery -core block @ 21.6 m depth - cleaned out hole to 21.6 m	
		C-	NX	Core	Rec	0%	No recovery - wash shows coarse sand, possible decomposed rock	
22.5								
		J-16	15	123			Yel cm SAND, trace mf Gravel, trace Silt [SP] [7-65]	
					100/0		Hard drilling 23.7 m to 24.0 m depth - sampler ref. [100/0] @ 24.0 m	
24.0							Top of Rock @ 24.0 m	
		C-1	NX	Core	Rec	42%	Top 100 mm of recovery fractured Calcitic DOLOMITE of poor quality.	
					RQD	28%	Remaining 525 mm Inwood MARBLE with 100 mm fractured section,	
					Pcs	7	with this section being coarse grained & soft. Remainder is of	
25.5							good quality [4-65]	
		C-2	NX	Core	Rec	100%	Inwood MARBLE from 25.5 m to 26.3 m depth w/angular fractures	
					RQD	57%	Rock is fractured & soft from 26.2 m to 26.3 m depth. Calcitic	
					Pcs	16	DOLOMITE 26.3 m to 27.0 m depth, having horiz & vert fractures	
27.0							with 3 areas that crumble under finger pressure [4-65]	
		C-3	NX	Core	Rec	100%	Calcitic DOLOMITE from 27.0 m to 27.9 m depth w/multi horiz & occ	
					RQD	20%	vertical fractures. Rock is of poor quality. Inwood MARBLE 27.9 m	
					Pcs	28	to 28.5 m depth with angular fractures running throughout [4-65]	
28.5								
		C-4	NX	Core	Rec	88%	Inwood MARBLE w/intrusions of Calcitic Dolomite	
					RQD	33%	Multiple fractures w/weathered seams. Multiple fractured pcs from	
					Pcs	16+	29.65 m depth to bottom [4-65]	
30.0							Bottom of Hole @ 30.0 m	

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INSPECTOR Joseph Maiello
STRUCTURE Willis Ave Bridge / Harlem R.

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GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | HOLE DNB-113
COUNTY New York | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,032.73 E 615,459.41 | SURF. ELEV. +1.728 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 26Aug00 | DATE FINISH 27Aug00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Direct) | HAMMER FALL-SAMPLER 760 mm

DEPTH BLOW SURF. (m)	CASING BLOWS /0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
0.0	Drill						0.3 m Asphalt / Concrete	
	Ahead	J-1	24	26			Gr Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
	&				29	32		
	Spin	J-2	27	15			Ditto	
1.5					32	35		
		J-3	7	5			Gr to Blk cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					3	3		
		J-4	10	8			Ditto	
					22	14		
3.0		J-5	15	7			Gr cf SAND, trace Silt, w/pcs wood [SM] [7-65]	
					2	2		
		J-6	1	1			Gr SILT, w/pcs wood [ML] [11-65]	
					1	1		
		J-7	1	3			Ditto	
4.5					3	5		
		J-	1	1			No recovery.	
					1	2		
6.0								
		J-8	5	7			Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					7	9		
7.5								
		J-9	5	9			Br cf SAND, trace Silt [SM] [7-65]	
					16	15		
9.0								
		J-10	10	11			Ditto	
					15	14		
10.5								
		J-11	12	9			Br mf SAND, little Silt [SM] [7-65]	
					14	15		
12.0								
		J-12	6	6			Red to Gr varved SILT, w/intrusions Br mf Sand [ML] [10-65]	
					7	8		
13.5								
		J-13	6	7			Ditto	
					13	13		
15.0								

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DRILL RIG Tom Gregory
SOIL & ROCK R. Murray
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR R. Murray
STRUCTURE Willis Ave Bridge / Harlem R

CONSULTING ENGINEERS

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-113

COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE

PIN | STA.

PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET

ACTUAL COORDINATES N 64,032.73 E 615,459.41 | SURF. ELEV. +1.728 m

DATUM Manhattan | DEPTH TO WATER 2.1 m

DATE START 26Aug00 | DATE FINISH 27Aug00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm

SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH ELOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-14	9	15			Gr-mf SAND, little Red to Gr varved Silt [SM] [8-65]	
					17	19		
16.5								
		J-15	13	14			Ditto	
					15	14		
18.0								
		J-16	63	100/ 150			Br cf SAND, trace Silt w/decomposed Dolomite Sand [SW] [6-65]	
19.5								
		J-17	61	70			Yel to Br cf SAND, trace Silt, w/decomposed Rock [SW] [6-65]	
					85	70		
21.0								
		J-18	16	17			Wht to Blue decomposed Rock, trace Br cf Sand, trace Silt [SW] [6-65]	
					100/ 75			
22.5							Top of Rock @ 21.6 m	
		C-1	NX	Core	Rec	61%	Highly weathered Calcitic DOLOMITE from 22.5 to 24.0 m. Horiz fracts at 22.51, 22.64, 22.68, 22.76, 23.21, 23.25 & 23.35 m. Multiple pcs from 23.35 to 23.44 m. Breaks in [C-1/4] occurred in handling after removal from barrel. [4-65]	
					RQD	29%		
					Pcs	8+		
24.0								
		C-2	NX	Core	Rec	70%	Weathered Inwood MARBLE from 24.0 to 25.5 m. Multiple fractured pcs from 24.0 to 24.17m and 24.73 to 24.83 m. Horiz breaks at 24.17, 24.34, 24.49 & 25.03 m. Angular breaks of [30°] at 24.73, 24.83, 24.88, 24.90 & 24.96 m. [4-65]	
					RQD	36%		
					Pcs	14+		
25.5								
		C-3	NX	Core	Rec	70%	Highly weathered Calcitic DOLOMITE from 25.5 to 27.0 m. Multiple fractured pcs from 25.5 to 25.7m & 26.36 to 26.39 m. Horiz fracts at 25.91, 26.26, 26.31, 26.36, 26.39, 26.47 & 26.52 m. Angular breaks of 20° at 25.7, 26.03 & 26.21 m, 10° at 26.57 m. [4-65]	
					RQD	26%		
					Pcs	14+		
27.0								
		C-4	NX	Core	Rec	100%	Multiple highly weathered & fractured pcs of Inwood MARBLE and Calcitic DOLOMITE from 27.0 to 28.5 m without defined lineage of seams or breaks. [4-65]	
					RQD	15%		
					Pcs	24+		
28.5								
							Bottom of Hole @ 28.5 m	
30.0								

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DRILL RIG Tom Gregory

SOIL & ROCK R. Murray

GEOTECH. ENGINEER John F. Pizzi, P.E.

INSPECTOR R. Murray

STRUCTURE Willis Ave Bridge / Harlem R.

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REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-114
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,034.24 E 615,472.80 | SURF. ELEV. +1.788 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 01Jun00 | DATE FINISH 05Jun00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg [Donut] | HAMMER FALL-SAMPLER 760 mm

DEPTH (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-15	5	8			Red Br SILT, some f Sand [ML] [10-65]	
					10	14		
							Drilling indicates change	
16.5								
		J-16	45	68			Yel Br cf SAND, trace Silt, trace(-) f Gravel [SW] [7-65]	
					110			
							Hard drilling 16.95 m to 18.0 m depth	
18.0								
		J-17	112	150			Yel cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
							[decomposed rock]	
							Drilling softened up at 19.1 m depth	
19.5								
		J-18	21	48			Ditto	
					26	41		
							Hard drilling 20.1 m to 21.0 m depth	
21.0								
		J-19	100/				Gr Br & Yel cf SAND, trace Silt [SP] [7-65]	
			100				[Note: 77/25 using 136 kg hammer]	
							Hard drilling	
22.5								
		J-20	300/				Red Br mf SAND, trace Silt, w/mica [SP] [7-65]	
			125				[Note: 3/25 then 22/150 using 136 kg hammer]	
							Hard drilling 22.8 m to 24.0 m depth	
24.0							Top of Rock @ 24.0 m ?	
		J-	100/0				[Note: 25/0 using 136 kg hammer]	
							No recovery	
							Hard drilling 24.0 m to 24.6 m depth	
25.5							Wash indicates decomposed rock 24.6 m to 25.5 m depth	
		C-1	NX	Core	Rec	68%	Calcitic Dolomite MARBLE from 25.5m to 25.68 m depth [4-65]	
					RQD	45%	w/weathered horiz seam at 25.68 m depth	
					Pcs	11	Inwood MARBLE 25.68 m to 26.18 m w/ intrusion of Calcitic	
							Dolomite to bottom w/weathered horiz seams at 100 mm avg spacing.	
27.0								
		C-2	NX	Core	Rec	73%	Calcitic Dolomite MARBLE w/ horiz weathered fractures [4-65]	
					RQD	38%	at <100 mm avg spacing, bottom highly weathered	
					Pcs	9+		
28.5								
		C-3	NX	Core	Rec	53%	Inwood MARBLE, multiple fractures 28.5 m to 28.6 m, [4-65]	
					RQD	0%	horiz fractures 28.7 m, 28.8 m to 29.05 m, horiz & angular	
					Pcs	14+	fractures 29.05 m to 29.1 m - multiple pcs - highly decomposed	
30.0								

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DRILL RIG Reynolds
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A/B

CONSULTING ENGINEERS

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-114

COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE

PIN | STA.

PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET

ACTUAL COORDINATES N 64,034.24 E 615,472.80 | SURF. ELEV. +1.788 m

DATUM Manhattan | DEPTH TO WATER 2.1 m

DATE START 01Jun00 | DATE FINISH 05Jun00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm

SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH/ELEV SUBP. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
30.0		C-4	NX	Core	Rec	82%	Calcitic Dolomite MARBLE 30.0 m to 30 .18 m. Horiz. [4-65]	
					RQD	58%	fractures at 30.05m, 30.13m & 30.18 m. Rock weathered.	
					Pcs	9	Inwood MARBLE w/vert fractures from 30.3 m to 30.38 m. [3-65]	
31.5							Horiz fracture at 30.65 m. Angular fracture at 31.15 m w/weathered seam.	
							Bottom of Hole @ 31.5 m	
33.0								
34.5								
36.0								
37.5								
39.0								
40.5								
42.0								
43.5								
45.0								

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DRILL RIG Reynolds

SOIL & ROCK J. Maiello

GEOTECH. ENGINEER John F. Pizzi, P.E.

INSPECTOR J. Maiello

STRUCTURE Willis Ave Bridge / Harlem R.

B.I.N. 2-24005-0/A/B

CONSULTING ENGINEERS
GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | HOLE DNB-115
COUNTY New York | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,052.92 E 615,456.43 | SURF. ELEV. +1.634 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 26Aug00 | DATE FINISH 27Aug00

CASING O.D. 106 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 178 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 70 mm I.D. 55 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Safety) | HAMMER FALL-SAMPLER 760 mm

DEPTHS BLOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no.) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK		MOIST. CONT. (%)
0.0	Drill						0.3 m Asphalt / Concrete		
	Ahead	J-1	100/				Gr cf SAND, w/concrete & asphalt	[SW] [7-65]	
	w/		100						
	Mud	J-2	6	4			Gr to Blk cf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
1.5					3	3			
		J-3	4	3			WOOD [odor of creosote]		
					50	53			
		J-4	8	8			Ditto		
					8	5			
3.0		J-5	3	3			Gr mf SAND, trace Silt, w/wood	[SW] [7-65]	
					2	1			
		J-6	3	2			Gr mf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
					1	1			
		J-7	2	2			Ditto		
4.5					1	2			
6.0									
		J-8	WH	1			Gr mf SAND, little Silt	[SM] [7-65]	
					1	1			
7.5									
		J-9	10	14			Br cf SAND, trace Silt	[SM] [7-65]	
					12	13			
9.0									
		J-10	5	6			Ditto		
					5	8			
10.5									
		J-11	11	14			Ditto		
					17	16			
12.0									
		J-12	4	5			Red to Gr varved SILT, trace f Sand	[ML] [10-65]	
					5	6			
13.5									
		J-13	3	4			Red SILT, trace Br f Sand	[ML] [10-65]	
					5	6			
15.0									

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DRILL RIG Gus Suri
SOIL & ROCK R. Murray
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR R. Murray
STRUCTURE Willis Ave Bridge / Harlem R.

REGION 11 — GEOTECHNICAL ENGINEERING — HOLE UNB-115

COUNTY New York — SUBSURFACE EXPLORATION LOG — LINE

PIN — STA.

PROJECT Reconstruction of Willis Ave Bridge / Harlem River — OFFSET

ACTUAL COORDINATES N 64,052.92 E 615,456.43 — SURF. ELEV. +1.634 m

DATUM Manhattan — DEPTH TO WATER 2.1 m

DATE START 26Aug00 — DATE FINISH 27Aug00

CASING O.D. 168 mm — I.D. 150 mm — WEIGHT OF HAMMER-CASING 136 kg — HAMMER FALL-CASING 450 mm

SAMPLER O.D. 50 mm — I.D. 33 mm — WEIGHT OF HAMMER-SAMPLER 63.5 kg [Safety] — HAMMER FALL-SAMPLER 760 mm

DEPTH (Elow Surf.) (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-14	3	4	5	7	Red SILT, trace Br f Sand [ML] [10-65]	
16.5		J-15	6	8	17	17	Br mf SAND, little Red to Gr Silt [SM] [7-65]	
18.0		J-16	15	25	30	40	Br cf SAND, trace Silt w/little Wht to Blue decomposed rock [SW] [6-65]	
19.5		J-17	59	100/ 100			Br cf SAND, trace Silt w/some Wht to Blue decomposed rock [SW] [6-65]	
21.0		J-18	100/ 100				Yel to Br cf SAND, trace Silt w/some decomposed rock [SW] [6-65]	
21.8							Top of Rock @ 21.8 m	
22.5		C-1	NX	Core	Rec	0%	No recovery.	
24.0					RQD	0%		
					Pcs	0		
24.0		C-2	NX	Core	Rec	80%	Multiple fractured & weathered pcs Inwood MARBLE and Calcitic DOLOMITE from 24.0 to 25.5 m. Horiz seams at 24.13, 24.16, 24.35, 24.6, 24.67, 24.82, 24.86, 25, 25.09 & 25.14 m. Ang fracts of 35° at 24.21 & 24.90 m, 45° at 24.54 m, & 20° at 24.46 m. Fractured pcs 24.0 to 24.13 m. [4-65]	
					RQD	0%		
25.5					Pcs	16+		
25.5		C-3	NX	Core	Rec	43%	Multiple fractured & weathered pcs Calcitic DOLOMITE from 25.5 to 27.0 m. Multiple fractured pcs 25.5 to 25.55 & 29.93 to 26.27 m. Horiz fracts at 25.55, 25.77 & 25.82 m. Ang fracts of 30° at 25.63 & 25.90 m. [4-65]	
					RQD	15%		
27.0					Pcs	12+		
27.0		C-4	NX	Core	Rec	100%	Multiple weathered pcs Inwood MARBLE from 27.0 to 28.5 m. Horiz fracts at 27.0, 27.53, 27.76, 27.98, 28.13 & 28.30 m. Ang fracts of 10° at 27.22, 27.58, & 28.46 m, 35° at 27.48, 27.86 & 27.93 m. Multiple fractured pcs 28.46 to 28.50 m.	
					RQD	67%		
28.5					Pcs	13+		
28.5		C-5	NX	Core	Rec	100%	Highly weathered Inwood MARBLE from 28.5 to 29.26 m & 29.74 to 30.0 m. Highly decomposed Calcitic DOLOMITE 29.26 to 29.74 m. Horiz fracts at 28.5, 28.57, 28.68, 29.08, 29.14, 29.22, 29.26, 29.74, 29.77, & 30.0 m. Ang fract of 20° at 28.83, 28.92 & 29.0 m, 10° at 29.84 m. Bottom of Hole @ 30.0 m [4-65]	
					RQD	16%		
30.0					Pcs	12+		

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DRILL RIG Gus Suri

SOIL & ROCK R. Murray

GEOTECH. ENGINEER John F. Pizzi, P.E.

INSPECTOR R. Murray

STRUCTURE Willis Ave Bridge / Harlem R.

B.I.N. 2-24005-9/A/B

SHEET 2 OF 2

CONSULTING ENGINEERS
GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | HOLE DHX-118A
COUNTY New York | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,069.09 E 615,474.91 | SURF. ELEV. +1.420 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 13Jun00 | DATE FINISH 16Jun00

CASING O.D. 168 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Automatic) | HAMMER FALL-SAMPLER 760 mm

DEPTH ELOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no.) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
0.0	Drill						0.3 m Rock Salt & Asphalt & Stone	
	Ahead	J-1	5	8			Br cf SAND, trace f Gravel, trace Silt [SW-SM] [7-65]	
	&				11	9		
	Push	J-2	8	8			Br cf SAND, little Silt, trace mf Gravel [SW-SM] [7-65]	
1.5					12	11		
		J-3	5	6			Ditto	
					5	4		
		J-4	1	1			Br cf SAND, little mf Gravel, little Silt [SW-SM] [7-65]	
3.0					1	1		
		J-5	1	1			Br cf SAND, trace mf Gravel, trace Silt [SW-SM] [7-65]	
					1	2		
		J-6	3	4			Br mf GRAVEL, little cf Sand, trace Silt [GM] [6-65]	
					3	4	[w/glass & brick]	
		J-7	3	3			Br mf GRAVEL, little cf Sand, trace Silt [GM] [6-65]	
4.5					1	3		
		J-8	8	6			Dk Br cf SAND, trace(+) mf Gravel, trace Silt [SW-SM] [7-65]	
					17	8		
6.0								
		J-9	3	1			Gr Organic Clayey SILT, trace shells [MH] [11-65]	
					1	1		
7.5								
		J-10	WR	WR			Gr Organic Clayey SILT, trace f Sand, w/shells and peat [MH] [11-65]	
					7	5		
9.0								
		J-11	9	7			Br f SAND, little(+) Silt, w/mica [SP-SM] [7-65]	
					6	9		
10.5								
	Mud	J-12	5	4			Rd Br varved Clayey SILT, trace f Sand, w/pockets f Sand [ML] [10-65]	
					5	5		
12.0								
		J-13	5	5			Br F SAND, some Silt [SP-SM] [7-65]	
					5	6		
13.5								
		J-14	3	3			Rd Br Clayey SILT [ML] [10-65]	
					3	5		
15.0								

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DRILL RIG Ernie Thomas
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DHX-118A
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,069.09 E 615,474.91 | SURF. ELEV. +1.420 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 13Jun00 | DATE FINISH 16Jun00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Automatic) | HAMMER FALL-SAMPLER 760 mm

DEPTH/ELEV BELOW SURF. (m)	CASING BLOWS /0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-15A	5	5			Br f SAND, some Silt [SM] [7-65]	
		J-15B			8	9	Rd Br varved SILT [ML] [10-65]	
16.5								
		J-16	2	2			Rd Br varved SILT, trace f Sand, [ML][10-65]	
					6	8	w/pockets of f Sand	
18.0								
		J-17A	2	6			Rd Br varved Clayey SILT [ML] [10-65]	
		J-17B			8	9	Br f SAND, trace Silt, w/mica [SP] [7-65]	
19.5								
		J-18	6	13			Lt Gr cf SAND, little Silt, trace mf Gravel, w/mica [SW-SM] [7-65]	
					16	17		
21.0								
		J-19	35	80			Lt Gr, Yel cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					29	21		
22.5								
		J-20	10	6			Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					8	6	[decomposed rock]	
24.0								
							Lost water at 23.9 m	
		J-21	45	80			Yel-Br, Br-Gm cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					90	100		
							Top of Rock ?	
25.5		J-	100/0					
		C-	HX	Core	Rec	0%	No recovery.	
							Wash shows Inwood Marble & Calcitic Dolomite Sand.	
27.0								
		J-22	100/	25			Yel-Br cf SAND, trace f Gravel, trace Silt [SW] [7-65]	
		C-	HX	Core	Rec	0%	No recovery. [decomposed rock]	
28.5								
							Top of Run at 28.53 m	
		C-1	11X	Core	Rec	92%	Calcitic DOLOMITE & Inwood MARBLE SAND 28.53 m to 28.78 m.	
					RQD	18%	Inwood MARBLE 28.78 m to 29.28 m. Four pcs 28.78 m to 28.85 m.	
					Pcs	19+	Highly weathered. Horiz fracts at 29.0, 29.08, 29.13, 29.18 & 29.2 m.	
							Calcitic DOLOMITE 29.28 m to 29.6 m , highly weathered & crumbles	
30.0							Under slightest pressure. Any fracts at 30.9 m [20°]. [4-65]	

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INSPECTOR I. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A/B

CONSULTING ENGINEERS
GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | HOLE DHX-118A
COUNTY New York | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,069.09 E 615,474.91 | SURF. ELEV. +1.420 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 13Jun00 | DATE FINISH 16Jun00

CASING O.D. 168 mm I.D. 159 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg [Automatic] | HAMMER FALL-SAMPLER 760 mm

DEPTH ELEV SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
30.0		C-2	HX	Core	Rec	92%	Calcitic DOLOMITE w/intrusions Inwood Marble from 30.2 m to 30.33 m & 30.84 m to 31.08 m. Horiz fracts at 30.05, 30.08, 30.1, 30.2, 30.23, 30.25, 30.3, 30.63, 30.8, 30.83, 30.9, 30.93, 30.98, 31.08, 30.1 & 31.18 m. Seams are weathered. [4-65]	
					ROD	47%		
					Pcs	20		
31.5								
		C-3	HX	Core	Rec	97%	Inwood MARBLE w/intrusions Calcitic DOLOMITE w/weathered seams to 32.3 m. Horiz fracts at 31.55 to 31.73 [6pcs @ 25mm], 31.75, 31.78, 31.85, 31.98, 32.0, 32.25, 32.75 & 32.18 m. Ang fracts At 32.08 [45°], 32.28 [20°], 32.3 [30°], 32.4 [30°], & 32.58 m [50°]. Rock 31.53 m to 32.3 m [4-65], remainder [3-65]	
					ROD	39%		
					Pcs	22		
33.0								
		C-4	HX	Core	Rec	100%	Inwood MARBLE w/clean horiz fracts at 33.05, 33.08, 33.25, 33.38, 33.5, 33.98, 34.13 & 34.23 m. [3-65]	
					ROD	82%		
					Pcs	10		
34.5								
							Bottom of Hole @ 34.53 m	
36.0							NOTE: 75 mm ID Slope Indicator Casing installed and grouted into entire depth for future crosshole seismic testing by others.	
37.5								
39.0								
40.5								
42.0								
43.5								
45.0								

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DRILL RIG Emie Thomas
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.

CONSULTING ENGINEERS

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-156
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,515.29 E 615,934.47 | SURF. ELEV. +10.817 m
DATUM Manhattan | DEPTH TO WATER 9.0 m
DATE START 02Aug00 | DATE FINISH 15Aug00

CASING O.D. 100 mm | I.D. 108 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm | I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 65.5 kg (Safety) | HAMMER FALL-SAMPLER 760 mm

DEPTH: ELEV. SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
30.0		J-22	100/				Br cf SAND, trace Silt w/decomp Grn Sand [SM] [7-65]	
			75				BOULDER 30.08 to 31.0 m	
31.5								
		J-23	60	100/			Br cf SAND, trace Silt [SM] [7-65]	
				75				
33.0								
		J-24	100/				Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
			75					
34.5								
		J-25	100/				Br cf SAND, trace Silt [SM] [7-65]	
			125					
36.0								
		J-26	22	64			Br cf SAND, trace Silt, w/Dolomitic Sand & Grn Sand [SM] [7-65]	
					30	40		
37.5								
		J-27	100/				Br cf SAND, trace Silt, w/decomposed Grn Sand [SM] [7-65]	
			125					
							NOTE: Lost mud. Hole filled with sand-cement mix. On 15Aug00 hole redrilled by advancing to 39.0 m w/o sampling.	
39.0								
		J-28	11	27			Yel Br cf SAND, trace Silt [SW] [7-65]	
					116			
40.5							Top of Rock @ 40.5 m	
		C-1	NX	Core	Rec	43%	Calcitic DOLOMITE in a decomposed state. Horiz fracts at 40.58,	
					RQD	12%	40.63, 40.68, 40.7, 40.73, 40.75, 40.83, 40.9 & 40.95 m. From	
					Pcs	13	40.9 to 4.95 contains decomposed pcs. [4-65]	
42.0								
		C-2	NX	Core	Rec	100%	Calcitic DOLOMITE w/intrusions of Inwood Marble. Horiz fracts	
					RQD	95%	at 42.18, 42.53, 43.2 & 43.45 m. Angular fracts of 48° from 42.65 to	
					Pcs	6	42.78 m. [4-65]	
43.5								
		C-3	NX	Core	Rec	40%	Calcitic DOLOMITE 43.5 to 43.9 m in a decomposed state with a	
					RQD	27%	slight angular fracture at 43.68 m. 43.9 to 45.0 m Inwood MARBLE	
					Pcs	7+	with multiple fractured pcs, weathered and also containing decomposed	
45.0							Sand. [4-65]	

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DRILL RIG Mitchell / Thomas
SOIL & ROCK R. Murray
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR R. Murray
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-0/A/B

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-156
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,515.29 E 615,934.47 | SURF. ELEV. +10.817 m
DATUM Manhattan | DEPTH TO WATER 9.0 m
DATE START 02Aug00 | DATE FINISH 15Aug00

CASING O.D. 100 mm | I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm | I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg [Safety] | HAMMER FALL-SAMPLER 760 mm

DEPTHS (Low Surf.) (m)	CASING BLOWS /0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
45.0		C-4	NX	Core	Rec	15%	Inwood MARBLE - four angular pcs, weathered to	
					RQD	0%	decomposed. [4-65]	
					Pcs	4		
46.5								
		C-5	NX	Core	Rec	17%	Inwood MARBLE in a decomposed state - five fractured pcs.	
					RQD	0	[4-65]	
					Pcs	5		
48.0								
		C-6	NX	Core	Rec	100%	Completely decomposed Brown, Orange & Red-Brown Rock.	
					RQD	0%	Extremely soft. It has the consistency of putty, yet no plasticity.	
					Pcs	-	When subjected to a wash test, it has the characteristics of	
49.5							SILT, with trace fine Sand. [4-65]	
							Bottom of Hole @ 49.5 m	
51.0								
52.5								
54.0								
55.5								
57.0								
58.5								
60.0								

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DRILL RIG Ernie Thomas
SOIL & ROCK R. Murray
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR R. Murray
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A/B

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-120
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,084.57 E 615,478.51 | SURF. ELEV. +1.650 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 12Jun00 | DATE FINISH 16Jun00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH BLOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
0.0	Drill						0.3 m Rock Salt & Asphalt & Stone	
	Ahead	J-1	66	25			Blk Yel Br cf SAND, trace mf Gravel, trace Silt, w/asphalt [SP] [11-65]	
	&				32	33		
	Push	J-2	8	7			Yel Br cf SAND, trace f Gravel, trace Silt [SP] [7-65]	
1.3					8	8		
		J-3	7	8			Ditto	
					20	44		
							BOULDER 2.1 m to 2.4 m depth.	
		J-4A	1	WH			Ditto	
3.0		J-4B			WH	WH	Dk Gr SILT, little cf Sand [ML] [11-65]	
		J-					No recovery - 2 attempts - lost water	
		J-5	WH	1			Lt Gr cf SAND, trace f Gravel, trace Silt [SP] [7-65]	
					1	1		
4.3								
		J-6	WH	WH			Ditto	
					WH	2		
6.0								
		J-7A	1	2			Dk Gr SILT, little f Sand [ML] [11-65]	
		J-7B			3	3	Gr Yel Br f SAND, trace Silt [SP] [7-65]	
7.3								
		J-8	6	2			Gr Organic Clayey SILT, w/shells [OL] [11-65]	
					2	2		
9.0								
		J-9A	6	21			Ditto	
		J-9B			12	7	Dk Gr cf SAND, some Silt, trace mf Gravel,w/shells [SP-SM] [7-65]	
10.5								
	Mud	J-10	9	23			Ditto	
					25	20		
12.0								
		J-11	4	7			Rd Br SILT, trace f Sand [w/f Sand lenses] [ML] [10-65]	
					8	14		
13.5								
		J-12	4	6			Rd Br varved Clayey SILT [ML] [10-65]	
					6	6		
15.0								

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DRILL RIG Reynolds
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/MB

REGION 11 | GEOTECHNICAL ENGINEERING | BORE BNB-120
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,084.57 E 615,478.51 | SURF. ELEV. +1.650 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 12Jun00 | DATE FINISH 16Jun00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Diesel) | HAMMER FALL-SAMPLER 760 mm

DEPTH BLOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-13	4	7			Rd Br varved Clayey SILT, trace cf Sand, [ML] [10-65]	
					8	13	w/pockets f Sand	
16.5								
		J-14	9	6			Ditto	
					10	9		
18.0								
		J-15	9	8			Ditto [2nd attempt]	
					14	12		
19.5								
		J-16	20	30			Br f SAND, little Silt, w/mica [SP-SM] [7-65]	
					32	34		
21.0								
		J-17	5	9			Rd Br varved Clayey SILT, trace f Sand, [ML] [10-65]	
					12	22	w/pockets f Sand	
22.5								
		J-18	6	10			Gr f SAND, some Silt, trace(-) mf Gravel [SW-SM] [7-65]	
					34	14		
24.0								
		J-19	85	100/			Lt Gr, Yel cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
				100			[decomposed rock]	
							From 24.25 m to 25.5 m drilling hard to soft to hard	
25.5								
		J-20	100/				~~Lt Gr, Yel cf SAND, trace mf Gravel, trace Silt [SW] [7-65]~~	
			50				~~[decomposed rock]~~ Top of Rock @ 26.1 m	
		C-1	NX	Core	Rec	74%	Calcitic DOLOMITE to 26.98 m Inwood MARBLE to end of recovery.	
					RQD	23%	Horiz fracts at 26.13, 26.2, 26.25, 26.35, 26.38, 26.65, 23.73, 26.8,	
27.0					Pcs	23	27.03, 27.1 & 27.15 m. Ang fracts at 26.45 [20°], 26.5 [45°], & 27.05	
							[20°]. Mult fracts 26.5 m to 26.45 m & 26.88 m to 26.93 m. All seams	
							weathered. [4-65]	
		C-2	NX	Core	Rec	93%	Calcitic DOLOMITE w/weathered seams. Horiz fracts at 27.65, 27.75,	
					RQD	8%	27.8, 27.95, 27.98, 28.23, 28.5, 28.63, 28.68, 28.75, 28.8 & 28.83 m.	
28.5					Pcs	28	Ang fracts at 26.85 [55°], 28.13 [35°], 28.35 [35°], 28.43 [120°], 28.6	
							[45°] & 28.98 m [70°]. [4-65]	
		C-3	NX	Core	Rec	100%	Calcitic DOLOMITE w/intrusion of Inwood MARBLE w/weathered	
					RQD	33%	seams. Horiz fracts at 29.18, 29.28, 29.43, 29.58, 29.65, 29.73, 29.98,	
30.0					Pcs	21	30.05, 30.4, 30.53 & 30.55 m. Ang fracts at 29.33, 29.45, 29.55 &	

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DRILL RIG Reynolds
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/AB
SHEET 2 OF 2

CONSULTING ENGINEERS

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-120

COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE

PIN | STA.

PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET

ACTUAL COORDINATES N 64,084.57 E 615,478.51 | SURF. ELEV. +1.650 m

DATUM Manhattan | DEPTH TO WATER 2.1 m

DATE START 12Jun00 | DATE FINISH 16Jun00

CASING O.D. 106 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 430 mm

SAMPLER O.D. 50 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTHS FLOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
30.0							30.15 m. [4-65]	
		C-4	NX	Core	Rec	100%	Inwood MARBLE w/intrusions of Calcitic DOLOMITE.	
					ROD	0%	Recovery consists of multiple horizontal and angular fractured	
31.5					Pcs	Mult.	pieces, highly weathered and decomposed to a state of Marble	
							and Dolomite SAND. [4-65]	
33.0							Bottom of Hole @ 32.1 m	
34.5								
36.0								
37.5								
39.0								
40.5								
42.0								
43.5								
45.0								

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DRILL RIG Reynolds

SOIL & ROCK J. Maiello

GEOTECH. ENGINEER John F. Pizzi, P.E.

INSPECTOR J. Maiello

STRUCTURE Willis Ave Bridge / Harlem R.

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-122
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,087.96 E 615,408.79 | SURF. ELEV. +1.67 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 06Jul00 | DATE FINISH 07Jul00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 70 mm I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 91.3 kg (Donut) | HAMMER FALL-SAMPLER 760 mm

DEPTH/ELEV SCALE (m)	CASING BLOWS /0.5 m	SAMPLE NO.	BLOWS ON SAMPLER (no) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK		MOIST. CONT. (%)
0.0	Drill								
	Ahead	J-1	3	3			Br cf SAND, trace f Gravel, trace Silt	[SW] [7-65]	
	&				3	4			
	Push	J-2	3	3			Br cf SAND, trace f Gravel, trace Silt	[SW] [7-65]	
1.5					1	6			
		J-3	4	2			Br cf SAND, little Silt, trace mf Gravel	[SW-SM] [7-65]	
					3	3			
		J-4	1	1			Br cf SAND, little Silt, w/wood	[SM] [8-65]	
					1	1			
3.0		J-5	5	6			Ditto		
					5	8			
		J-6	2	5			Gr cf SAND, little Silt, w/wood	[SM] [8-65]	
					21	15			
		J-7	11	11			Br cf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
4.5					6	9			
	Mud								
6.0									
		J-8	9	11			Br to Grn cf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
					8	11			
7.5									
		J-9	9	10			Br cf SAND, trace mf Gravel, trace Silt	[SW] [7-65]	
					10	15			
9.0									
		J-10	8	13			Br cf SAND, trace Silt	[SM] [8-65]	
					14	19			
10.5									
		J-11	11	16			Br to Red cf SAND, little Silt	[SM] [8-65]	
					14	25			
12.0									
		J-12	11	19			Br to Red varved SILT, trace cf Sand, trace mf Gravel	[ML] [10-65]	
					19	36			
13.5									
		J-13	8	8			Br to Red varved SILT, trace f Sand	[ML] [10-65]	
					10	15			
15.0									

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DRILL RIG	Ernie Thomas
SOIL & ROCK	Rich Murray
GEOTECH. ENGINEER	John F. Pizzi, P.E.
INSPECTOR	Rich Murray
STRUCTURE	Willis Ave Bridge / Harlem R.
B.I.N.	2-24005-9/A/B

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-122
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,087.96 E 615,408.79 | SURF. ELEV. +1.67 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 06Jul00 | DATE FINISH 07Jul00

CASING O.D. 150 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 114 kg (63.5 kg [Donut]) | HAMMER FALL-CASING 430 mm
SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER | HAMMER FALL-SAMPLER 760 mm

DEPTH (Low Surf.) (m)	CASING BLOWS /0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-14	8	12	15	20	Br to Red varved SILT, trace f Sand [ML] [10-65]	
16.5		J-15	5	10	16	25	Gr to Red cf SAND, little Silt [SM] [8-65]	
18.0		J-16	9	20	20	23	Gr cf SAND, little Silt [SM] [8-65]	
19.5		J-17	12	21	22	25	Gr to Red varved SILT, trace cf Sand [ML] [10-65]	
21.0		J-18	21	24	27	38	Ditto	
22.5		J-19	66	65	100/125		Gr cf SAND, little Silt, trace mf Gravel [SM] [7-65]	
24.0							Top of Rock @ 24.0 m	
25.5		C-1	NX	Core	Rec 20% / RQD 7% / Pcs Mult		Inwood MARBLE. Rock is very soft & decomposed. [4-65]	
27.0		C-2	NX	Core	Rec 35% / RQD 27% / Pcs 4		Inwood MARBLE. 3 angular pcs 25.50 to 25.63 m. Seams show some weathering. Ang fracts of 45° at 25.63 to 25.68 m. Rock is of good quality from 25.63 m to end of recovery [4-65]	
28.5		C-3	NX	Core	Rec 78% / RQD 23% / Pcs 15+		Inwood MARBLE & Calcitic DOLOMITE. Mult Ang fracts 27.0 to 27.2 m. Horiz fracts at 27.3, 27.45, 27.5, 27.6, 27.73, 27.88, 28.03, & 28.1 m. All seams highly weathered to decomposed. [4-65]	
30.0		C-4	NX	Core	Rec 100% / RQD 62% / Pcs 16		Calcitic DOLOMITE 28.5 to 28.95 m/ Inwood MARBLE to 30.0 m. Seams from 28.64 to 29.35 m weathered to decomposed. Horiz fracts at 28.6, 28.7, 28.9, 29.05, 29.15, 29.18, 29.2, 29.25, 29.35, & 29.68 m Ang fracts at 28.65 [15°], 29.05 [45°], & 29.15 m [70°]. [4-65]	
							Bottom of Hole @ 30.0 m	

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DRILL RIG Ernie Thomas
SOIL & ROCK Rich Murray
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR Rich Murray
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-2-4005-9/A/B

CONSULTING ENGINEERS

GEOTECHNICAL ENGINEERING
SUBSURFACE EXPLORATION LOG

REGION 11 | COUNTY New York | PIN | PROJECT Reconstruction of Willis Ave Bridge / Harlem River | ACTUAL COORDINATES | DATUM Manhattan

HOLE DNB-140 | LINE | STA. | OFFSET | SURF. ELEV. +2.401 m | DEPTH TO WATER 2.1 m

DATE START 14Aug00 | DATE FINISH 15Aug00

CASING O.D. 100 mm | I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 920 mm

SAMPLER O.D. 50 mm | I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Automatic) | HAMMER FALL-SAMPLER 760 mm

DEPTH ELOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
0.0	Drill						0.3 m Asphalt & Stone	
	Ahead	J-1	7	25			Br mf GRAVEL, little cf Sand, trace Silt w/pcs brick [GP]	[6-65]
	w/				17	12		
	Mud	J-2	12	9			Br cf SAND, trace f Gravel, trace Silt [SW]	[7-65]
1.5					20	37		
		J-3	1	2			Br mf SAND, little Silt, trace(-) f Gravel [SP-SM]	[7-65]
					1	1		
		J-4	2	2			Ditto	
					2	3		
3.0		J-5A	5	3			Br mf SAND, some Silt, trace(-) mf Gravel [SP-SM]	[7-65]
		J-5B			5	2	Br Organic SILT, trace Peat [OL-PT]	[11-65]
		J-6	WH	2				
					WH	1	Ditto	
		J-7	3	2				
4.5					2	3	Ditto	
		J-8	WH	WH				
					WH	2	Br Organic SILT, trace f Sand, trace(-) Peat [OL-PT]	[11-65]
6.0								
		J-9	6	10			Br cf SAND, trace mf Gravel, trace Silt [SW]	[7-65]
					10	9		
7.5							Gravel layer 7.05 m to 7.20 m	
		J-10	11	12			Br-Gr SILT, trace f Sand [ML]	[10-65]
					15	15		
9.0								
		J-11	9	6			Red-Br SILT [ML]	[10-65]
					6	7		
10.5								
		J-12	3	6			Red-Br SILT, trace mf Sand, trace(-) f Gravel [ML]	[10-65]
					6	6		
12.0								
		J-13	12	7			Red-Br varved Clayey SILT, trace f Sand [ML]	[10-65]
					12	11		
13.5								
		J-14	9	10			Yel Br cf SAND, trace mf Gravel,trace Silt [SW]	[7-65]
					9	16		
15.0								

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DRILL RIG Ernie Thomas
SOIL & ROCK L. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR L. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
RIN 2-24003.01.AM

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-140
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES | SURF. ELEV. +2.401 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 14Aug00 | DATE FINISH 15Aug00

CASING O.D. 168 mm I.D. 149 mm WEIGHT OF HAMMER-CASING 134 kg HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 33 mm WEIGHT OF HAMMER-SAMPLER 63.5 kg [Automatic] HAMMER FALL-SAMPLER 760 mm

DEPTH ELEV. SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (n=) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-15	100/				Yel Br cf SAND, trace Silt [SW] [7-65]	
			75					
							[Hard but steady drilling]	
16.5								
		J-16	100				Ditto	
							Top of Rock @ 17.4 m	
18.0		C-1	NX	Core	Rec	75%	Calcitic DOLOMITE in a decomposed state. Seams decomposed	
					ROD	13%	to Sand. Horiz fracts at 17.48, 17.58, 17.65, 17.68, 18.0 &	
					Pcs	19	18.08 m. Angular fract of 45° at 18.23 m. A vertical fract	
							runs from 17.85 to 18.48 m. Last 0.05 m decomposed to Sand.	
							[4-65]	
		C-2	NX	Core	Rec	20%	Calcitic DOLOMITE, weathered 18.9 to 19.08 m & decomposed	
19.5					ROD	7%	19.08 to 20.4 m. Three angular pcs 18.9 to 18.98 m. Horiz	
					Pcs	8	fracts at 19.0, 19.18, 19.2 & 19.25 m. [4-65]	
		C-3	NX	Core	Rec	40%	Calcitic DOLOMITE in a decomposed state. Horiz fracts at	
21.0					ROD	0%	20.58, 20.63, 20.68, 20.73, 20.75, 20.83, & 20.88 m. Angular	
					Pcs	13	fracts at 20.5 [45°] & 20.95 m [32°]. Four angular pcs 20.48	
							to 20.95 m. M [4-65]	
		C-4	NX	Core	Rec	0%	No Recovery	
22.5					ROD	0%		
					Pcs	0		
		C-5	NX	Core	Rec	100%	Calcitic DOLOMITE in a decomposed state. Horiz fracts at	
24.0					ROD	40%	23.45, 23.55, 23.65, 23.73, 23.8, 23.98, 24.05, 24.15, 24.23,	
					Pcs	14	24.65 & 24.85 m. Angular fracts at 23.63 [30°], 23.93 [53°],	
							& 24.88 m [28°]. [4-65]	
25.5							Bottom of Hole @ 24.9 m	
27.0								
28.5								
30.0								

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DRILL RIG	Ernie Thomas
SOIL & ROCK	L. Maiello
GEOTECH. ENGINEER	John F. Pizzi, P.E.
INSPECTOR	L. Maiello
STRUCTURE	Willis Ave Bridge / Harlem R.
B.I.N.	2-24005-9/M3

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-14i
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES | SURF. ELEV. +2.438 m
DATUM Manhattan | DEPTH TO WATER 2.1 m
DATE START 10Aug00 | DATE FINISH 11Aug00

CASING O.D. 108 mm | I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm | I.D. 35 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Automatic) | HAMMER FALL-SAMPLER 760 mm

DEPTHS FLOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0.0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
15.0		J-15	8	12			Yel Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
					15	15		
16.5							Top of Decomposed Rock ?	
		J-16	10	20			Blue-Grn SILT [decomposed rock] [ML] [10-65]	
					26	30		
18.0								
		J-17	62	100/ 100			Dk Br-Yel Br mf SAND, trace Silt [SP] [7-65]	
19.5							Top of Rock @ 19.5 m	
		C-1	NX	Core	Rec	60%	Calcitic DOLOMITE - all seams decomposed. Horiz fracts at	
					RQD	22%	19.83, 19.9, 19.93, 20.0, 20.05, 20.13, 20.15, 20.2, 20.28,	
					Pcs	12	20.3, & 20.35 m. [4-65]	
21.0								
		C--	NX	Core	Rec	0%	No recovery.	
					RQD	0%		
					Pcs	0		
22.5								
		C-2	NX	Core	Rec	32%	Calcitic DOLOMITE in a decomposed state. Horiz fracts at	
					RQD	0%	22.55, 22.58, 22.6, 22.7, 22.73, 22.8, 22.9 & 22.95 m. [4-65]	
					Pcs	9		
24.0								
		C-3	NX	Core	Rec	87%	Calcitic DOLOMITE in a decomposed state. Horiz fracts at 24.03,	
					RQD	20%	24.05, 24.1, 24.13, 24.18, 24.35, 24.43, 24.6, 24.78, 24.93, 25.2	
					Pcs	18	& 25.25 m. Angular fracts at 24.8 [48°], 24.85 [20°], 25.03 [25°]	
25.5							& 25.1 m [35°]. Vertical fract from 24.23 to 24.35 m. [4-65]	
		C-4	NX	Core	Rec	87%	Calcitic DOLOMITE in a weathered to decomposed state. Horiz	
					RQD	27%	fracts at 25.53, 25.65, 25.7, 25.73, 25.75, 25.8, 26.3 & 20.7 m.	
					Pcs	20+	Angular fracts at 25.95 [50°], 26.0 [35°], 26.15 [19°], 26.18 [17°],	
27.0							26.38 [40°], 26.45 [15°], 26.6 [30°] & 26.65 m [30°]. [4-65]	
							Bottom of Hole @ 27.0 m	
28.5								
30.0								

The subsurface information shown here was obtained for design and estimate purposes. It is made available so that users may have access to the same information available to the Owner. It is presented in good faith. By the nature of the exploration process, the information represents only a small fraction of the total volume of the material at the site. Interpolation between data samples may not be indicative of the actual material encountered.

DRILL RIG Ernie Thomas
SOIL & ROCK J. Maiello
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR J. Maiello
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A/J

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-153
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,308.77 E 616,005.64 | SURF. ELEV. +10.174 m
DATUM Manhattan | DEPTH TO WATER n/a
DATE START 14Aug00 | DATE FINISH 14Aug00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 114 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Drive) | HAMMER FALL-SAMPLER 760 mm

DEPTHS (Low Surf.) (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (#) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
0.0	Push						0.6 m Asphalt / Concrete	
		J-1	8	31			Blk cf SAND, little mf Gravel, trace Silt [SW] [6-65]	
					100/			
1.5		J-2	18	45	125		Ditto	
					100/			
		J-3	47	100/	75		Br cf SAND, trace mf Gravel, trace Silt [SW] [6-65]	
				100				
		J-4	48	100/			Ditto	
3.0				125				
		J-5	100/				Br cf SAND, little mf Gravel, trace Silt [SW] [6-65]	
			75				Top of Rock @ 3.45 m	
		C-1	NX	Core	Rec	100%	Gray GNEISS from 3.6 to 5.1 m. Horiz fracts at 4.02, 4.90 & 4.93 m.	
					RQD	80%	Angular fracts of 10° at 4.41 & 5.08 m, 15° at 4.12, 4.66 & 4.88 m,	
4.5					Pcs	10	40° at 3.6 & 3.91 m, 45° at 3.72 m. [3-65]	
		C-2	NX	Core	Rec	96%	Gray GNEISS from 5.1 to 6.6 m. Horiz fracts at 5.54, 5.88, 6.17, 6.27,	
					RQD	70%	6.31, 6.48 & 6.51 m. Angular fracts of 25° at 5.1, 5.13, 5.23 & 5.24 m,	
6.0					Pcs	7+	45° at 5.24, 6.17 & 6.31 m. Multiple fragments at 5.23 to 5.24 m &	
							6.17 to 6.27 m. [3-65]	
		C-3	NX	Core	Rec	100%	Gray GNEISS from 6.6 to 8.1 m. Horiz fracts at6.6 & 8.02 m,	
					RQD	58%	angular fracts of 10° at 6.92 & 7.22 m, 30° at 7.54, 7.74 & 7.94 m,	
7.5					Pcs	8+	45° at 6.77 m, 50° at 7.15 m. Mult frags at 8.02 to 8.10 m. [3-65]	
		C-4	NX	Core	Rec	100%	Gray GNEISS from 8.1 to 9.6 m. Horiz fracts at 8.23, 8.79 & 9.48 m.	
					RQD	76%	Angular fracts at 10° at 9.21 & 9.6 m, 15° at 8.50 m, 20° at 8.85,	
9.0					Pcs	10+	8.91, 9.03 & 9.06 m, 45° at 9.36 m. Multiple fragments at 8.1 to	
							8.13 m & 8.79 to 8.85 m. [3-65]	
10.5							Bottom of Hole @ 9.6 m	
12.0								
13.5								
15.0								

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DRILL RIG Mike McErlean
SOIL & ROCK R. Murray
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR R. Murray
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-9/A13

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-156
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,515.29 E 615,934.47 | SURF. ELEV. +10.817 m
DATUM Manhattan | DEPTH TO WATER 9.0 m
DATE START 02Aug00 | DATE FINISH 15Aug00

CASING O.D. 100 mm I.D. 100 mm | WEIGHT OF HAMMER-CASING 136 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Safety) | HAMMER FALL-SAMPLER 760 mm

DEPTHS FLOW SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0.0	Drill						0.6 m Concrete / Asphalt	
	Ahead							
	w/	J-1	4	4			Br cf SAND, little mf Gravel, trace Silt [SW] [6-65]	
	Mud				3	3		
1.5		J-2	5	3			Br to Blk cf SAND, little mf Gravel, trace Silt [SW] [6-65]	
					1	2	w/pcs glass	
		J-3	3	1			Br cf SAND, little mf Gravel, trace Silt w/pcs [SW] [6-65]	
					4	2	red brick & tile	
		J-4	WH	WH			Br cf SAND, little mf Gravel, trace Silt [SW] [6-65]	
3.0					1	2		
		J-5	5	8			Br cf SAND, trace Silt w/pcs concrete & brick [SW] [6-65]	
					25	15		
		J-6	17	40			Br cf SAND, some mf Gravel, trace Silt [SW] [6-65]	
					100/		COBBLE	
4.5		J-7	44	47	100		Br cf SAND, little mf Gravel, trace Silt [SW] [6-65]	
					50	32		
							[Hard drilling]	
6.0								
		J-8	31	35			Br cf SAND, some mf Gravel, trace Silt [SW] [6-65]	
					100/			
					100		[Hard drilling]	
7.5								
		J-9	50	70			Br cf SAND, some mf Gravel, trace Silt [SW] [6-65]	
					100/			
					100		[Hard drilling]	
9.0								
		J-10	37	70			Ditto	
					100/			
					125		[Hard drilling]	
10.5								
		J-	100/				No recovery - BOULDER?	
			100					
12.0								
							BOULDERS - roller bit for 0.6 m, slow drilling. Then used core barrel to 13.2 m with recovery of Black Rock, Red Rock, Sand, Gravel, Gray Rock, Sand, Gravel, & Black Rock.	
13.5								
		J-11	40	63			Red to Br cf SAND, some mf Gravel, trace Silt [SW] [6-65]	
					65	100/		
						75		
15.0								

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DRILL RIG	Vince Mitchell
SOIL & ROCK	R. Murray
GEOTECH. ENGINEER	John F. Pizzi, P.E.
INSPECTOR	R. Murray
STRUCTURE	Willis Ave. Bridge / Harlem R.
B.I.N.	2-24005-9/A/B

TOPIC INTENSIVE DOCUMENTARY STUDY

WILLIS AVENUE BRIDGE RECONSTRUCTION BRONX COUNTY AND NEW YORK COUNTY NEW YORK

PIN X757.00
BIN No. 2-24005-9\A\B
CONTRACT No. HBM1124
#96PR073

VOID
see separate document

REGION 11 | GEOTECHNICAL ENGINEERING | HOLE DNB-156
COUNTY New York | SUBSURFACE EXPLORATION LOG | LINE
PIN | STA.
PROJECT Reconstruction of Willis Ave Bridge / Harlem River | OFFSET
ACTUAL COORDINATES N 64,515.29 E 615,934.47 | SURF. ELEV. +10.817 m
DATUM Manhattan | DEPTH TO WATER 9.0 m
DATE START 02Aug00 | DATE FINISH 15Aug00

CASING O.D. 100 mm | I.D. 500 mm | WEIGHT OF HAMMER-CASING 134 kg | HAMMER FALL-CASING 450 mm
SAMPLER O.D. 50 mm | I.D. 33 mm | WEIGHT OF HAMMER-SAMPLER 63.5 kg (Safety) | HAMMER FALL-SAMPLER 760 mm

DEPTH ELEV SURF. (m)	CASING BLOWS / 0.3 m	SAMPLE NO.	BLOWS ON SAMPLER (m) 0/.15	.15/.30	.30/.45	.45/.60	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. (%)
30.0		J-22	100/				Br cf SAND, trace Silt w/decomp Grn Sand [SM] [7-65]	
			75				BOULDER 30.08 to 31.0 m	
31.5								
		J-23	60	100/			Br cf SAND, trace Silt [SM] [7-65]	
				75				
33.0								
		J-24	100/				Br cf SAND, trace mf Gravel, trace Silt [SW] [7-65]	
			75					
34.5								
		J-25	100/				Br cf SAND, trace Silt [SM] [7-65]	
			125					
36.0								
		J-26	22	64			Br cf SAND, trace Silt, w/Dolomitic Sand & Grn Sand [SM] [7-65]	
					30	40		
37.5								
		J-27	100/				Br cf SAND, trace Silt, w/decomposed Grn Sand [SM] [7-65]	
			125				NOTE: Lost mud. Hole filled with sand-cement mix. On 15Aug00 hole redrilled by advancing to 39.0 m w/o sampling.	
39.0								
		J-28	11	27			Yel Br cf SAND, trace Silt [SW] [7-65]	
					116			
40.5							Top of Rock @ 40.5 m	
		C-1	NX	Core	Rec	43%	Calcitic DOLOMITE in a decomposed state. Horiz fracts at 40.58,	
					RQD	12%	40.63, 40.68, 40.7, 40.73, 40.75, 40.83, 40.9 & 40.95 m. From	
					Pcs	13	40.9 to 4.95 contains decomposed pcs. [4-65]	
42.0								
		C-2	NX	Core	Rec	100%	Calcitic DOLOMITE w/intrusions of Inwood Marble. Horiz fracts	
					RQD	95%	at 42.18, 42.53, 43.2 & 43.45 m. Angular fracts of 48° from 42.65 to	
					Pcs	6	42.78 m. [4-65]	
43.5								
		C-3	NX	Core	Rec	40%	Calcitic DOLOMITE 43.5 to 43.9 m in a decomposed state with a	
					RQD	27%	slight angular fracture at 43.68 m. 43.9 to 45.0 m Inwood MARBLE	
					Pcs	7+	with multiple fractured pcs, weathered and also containing decomposed	
45.0							Sand. [4-65]	

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DRILL RIG Mitchell / Thomas
SOIL & ROCK R. Murray
GEOTECH. ENGINEER John F. Pizzi, P.E.
INSPECTOR R. Murray
STRUCTURE Willis Ave Bridge / Harlem R.
B.I.N. 2-24005-0/AB

FIGURES

Top.2 Intensive

2859 x1m

HP
2004

TOPIC INTENSIVE DOCUMENTARY STUDY
WILLIS AVENUE BRIDGE RECONSTRUCTION
BRONX COUNTY AND NEW YORK COUNTY
NEW YORK

PIN X757.00
BIN No. 2-24005-9\A\B
CONTRACT No. HBM1124
#96PR073

Prepared For:

Hardesty & Hanover, LLP
1501 Broadway
New York, NY 10036

and

New York City Department of Transportation
2 Rector Street
New York, NY 10006

Prepared By:

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

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Sara Mascia, RPA

Date: February 23, 2004

1061

TABLE OF CONTENTS

1301

LIST OF FIGURES

EXECUTIVE SUMMARY

Hardesty & Hanover (H&H) has been retained by the New York City Department of Transportation (DOT) to prepare replacement plans for the Willis Avenue Bridge. The bridge connects the north end of First Avenue at 125th Street in Manhattan with the south end of Willis Avenue at 134th Street in the Bronx. It crosses the Harlem River about 1000 feet north of the Triborough Bridge. Pursuant to 36CFR 800.6(a), a Memorandum of Agreement (MOA) between the New York State Historic Preservation Office and the Federal Highway Administration stipulates that, among other actions, a Topic Intensive Archaeological Evaluation be conducted at four sensitive loci in the new bridge/ramp alignment, which were identified during a Stage 1A study completed in March 2001. These four loci are described as follows:

- The Manhattan section of the project site was found to have a low to moderate sensitivity for precontact resources beneath 12 to 21 feet of landfill along the shoreline and beneath the footprint of the FDR and Harlem River Drives.

- The Manhattan section of the project site also was found to be potentially sensitive for a 17th century cemetery which once existed near First Avenue and East 126th Street. The Stage 1A study identified this as "Cemetery 2," but it is hereafter referred to as the 126th Street cemetery.

- The Bronx section has the potential for precontact resources beneath 15 feet of fill in the footprint of Willis Avenue near 132nd Street and north of Block 1805.

- The Bronx section of the project site also is potentially sensitivity for a ca. 1873 railroad roundhouse foundation on Block 1806, just north of Willis Avenue near East 132nd Street.

For the precontact resources within the Manhattan section of the project site, the topic intensive study involved further investigations into disturbance of the shoreline prior to filling, as well as a review of additional soil borings. For the 126th Street cemetery, the study concentrated on attempting to better define the boundaries of the cemetery, and focused on documenting its origination, history, and possible removal. Cemetery bounds, as noted in eighteenth century deeds, maps, and church records were researched in city and state archives. For the Bronx section of the project site, precontact resources were further addressed through the completion of a more extensive disturbance analysis and a review of additional soil borings. Research of the roundhouse concentrated on documenting the construction, use, and removal of the structure and any subsequent impacts to the site.

Based upon the archival research, the following conclusions and recommendations are offered for the four loci of potential archaeological sensitivity:

Manhattan: Precontact Resources

The topic intensive study revealed that site integrity for potential precontact resources has been severely diminished due to rising sea levels, dredging, and compression by heavy fill. In discrete portions of the Area of Potential Effect (APE), construction of piers for the

Triborough and Willis Avenue Bridges, construction of bulkheads and relieving platforms, and the installation of buried utilities would have destroyed any potential precontact resources. Any future archaeological testing within the APE would be complicated by the need to remove contaminated soils, dewater the site, and close a heavily active roadway. The low precontact sensitivity, combined with the difficult logistics in conducting excavations within this portion of the APE, led to the recommendation of no further consideration for precontact resources within the Manhattan APE.

Manhattan: The 126th Street Cemetery

Documentary sources revealed that the 126th Street Cemetery was first used in 1667, as the official burying ground for the first Reformed Low Dutch Church of Harlem. As early as 1771, the eastern portion of the cemetery was known as the "Negro burying ground." It is likely that the cemetery was discontinued after 1853-1854, when tax records ceased acknowledging the cemetery as such. The cemetery was located west of the APE, and at the time of its use was situated along the shoreline of the Harlem River. First Avenue was later created east of the cemetery, by landfilling the area sometime in the mid-19th century. There is no indication that the cemetery was still in use when First Avenue was created as the church had established other cemeteries nearby, and no evidence to suggest that any burials would lie within the First Avenue roadbed. Since archival documents indicate that the 126th Street cemetery's eastern boundary was always west of the Willis Avenue APE, no further archaeological investigations are recommended for this resource type within the project area.

Bronx: Precontact Resources

The analysis of additional soil boring logs revealed that subsurface conditions beneath the fill vary considerably in the area designated as potentially sensitive for precontact resources. Furthermore, site integrity for potential resources had been severely diminished due to rising sea levels and compression by heavy fill. The low precontact sensitivity led to the recommendation of no further consideration for precontact resources within the Bronx APE.

Bronx: The Roundhouse

Historic research revealed that the roundhouse present within Block 1806 may not have seen large amount of usage based on its location at the end of a short section of the railroad line. Research also indicated that large portions of the roundhouse were likely impacted by subsequent demolition, grading, and construction activities at the site. Chief among these was the construction of the Willis Avenue Bridge, the station and carpenter's facility, and the subsequent grading and paving of the rail yard. Although the scope of these activities is unknown, these impacts indicate that there might be limited potential for an intact National Register eligible archaeological resource in this location. Last, there is presently a large body of comparable archaeological and historical data that has been collected on various roundhouse sites. Unlike the Willis Avenue roundhouse, which stood for less than 20 years, most of the roundhouses that have been examined were long-term resources that saw a significant amount of rail traffic within each repair facility. It is unlikely that further investigations within the impact area in Block 1806 could add significantly to the body of historical and archaeological data collected on railroad roundhouses. Therefore, no further consideration is recommended for this resource.

INTRODUCTION

Hardesty & Hanover (H&H) has been retained by the New York City Department of Transportation (DOT) to prepare replacement plans for the Willis Avenue Bridge. The bridge connects the north end of First Avenue at 125th Street in Manhattan with the south end of Willis Avenue at 134th Street in the Bronx (Figures 1, 2, and 3). It crosses the Harlem River about 1000 feet north of the Triborough Bridge. This will require removal of the existing bridge, which is considered a significant historic structure. It is a through truss swing bridge designed by engineer Thomas C. Clarke and opened for traffic on August 23, 1901. Pursuant to 36CFR 800.6(a), a Memorandum of Agreement (MOA) between the New York State Historic Preservation Office and the Federal Highway Administration stipulates that, among other actions:

- the extant bridge undergo recordation to Level III specifications of the Historic American Engineering Record (HAER);
- an Interpretive Plaque to be introduced into the replacement design;
- efforts be conducted to identify Alternative Use of the extant bridge; and,
- a Topic Intensive Archaeological Evaluation be conducted at four sensitive loci in the new bridge/ramp alignment.

This report satisfies the MOA requirement for a Topic Intensive Archaeological Evaluation.

Topic-Intensive Study of Four Archaeological Loci

The potential impacts of various construction schemes for the proposed replacement of the 100-year-old Willis Avenue Bridge were evaluated in a Stage 1A study completed in March 2001. This study, conducted by Historical Perspectives, identified four discreet loci of potential archaeological sensitivity which may be impacted by the proposed project; two loci on the Manhattan shoreline and two loci near the Bronx shoreline (Figure 4). These include the following areas of sensitivity:

- The Manhattan section of the project site was found to have a low to moderate sensitivity for precontact resources beneath 12 to 21 feet of landfill along the shoreline and beneath the footprint of the FDR and Harlem River Drives.

- The Manhattan section of the project site was found to be potentially sensitive for a 17th century cemetery which once existed near First Avenue and East 126th Street. The Stage 1A study identified this as "Cemetery 2," but it is hereinafter referred to as the 126th Street cemetery.

- The Bronx section also has the potential for precontact resources beneath 15 feet of fill in the footprint of Willis Avenue near 132nd Street and north of Block 1805.

- The Bronx section of the project site is potentially sensitivity for a ca.1873 railroad roundhouse foundation on Block 1806, just north of Willis Avenue near East 132nd Street.

The MOA has determined that the design will implement a new bridge on an alignment just south of the existing bridge. In order to definitively assess the likelihood that potential archaeological resources will or will not be impacted by this design, comprehensive topic intensive studies on each of the four resource loci, as recommended in the 1A study, was also stipulated in the MOA.

This topic-intensive analysis serves as a refining process to more narrowly focus the extent of a potential testing field. This in-depth study identifies more specifically on today's landscape the actual bounds of archaeological potential. Such identification will make it possible to more precisely design future site use to avoid potentially sensitive areas. If avoidance is not possible and archaeological testing is required, this analysis will restrict the total archaeological testing field to those locations that possess the highest potential for producing meaningful data - artifacts and features that can be related to specific occupations and cultural periods and used to test current archaeological research hypotheses. It is also possible that this in-depth research will provide sufficient data to completely eliminate concern for one or more of the sensitive loci.

For the Manhattan section of the project site, this topic intensive study has concentrated on attempting to better define the boundaries of the cemetery, and focuses on documenting its origination, history, and possible removal. Cemetery bounds, as noted in eighteenth century deeds, maps, and church records were researched in city and state archives. For precontact resources, further investigations into disturbance of the shoreline prior to filling, as well as a review of additional soil borings was pursued. For the Bronx section of the project site, this topic intensive study concentrated on documenting the construction, use, and removal of the roundhouse and any subsequent impacts to the site. In addition, precontact resources were further addressed through the completion of a more extensive disturbance analysis and a review of additional soil borings.

RESEARCH GOALS AND METHODS

The goal of this topic intensive study is to provide a detailed historical record of the Manhattan and Bronx project site's development and continued archaeological potential, utilizing available cartographic, photographic and documentary sources. For Manhattan, research was designed to determine the nature, age, location, extent and potential removal of the cemetery, as well as the nature of any precontact (prehistoric) sensitivity. For the Bronx, research was designed to trace the use of the roundhouse its role within the greater railroad system, as well as assess the nature of any potential precontact resources. For both areas, research was also designed to determine with a greater degree of accuracy, if possible, the horizontal and vertical location of potential resources in relation to proposed impacts. This comprehensive report details the results of these efforts.

In addition to this historical documentation, the archaeological research potential of each resource type is addressed. The potential for specific resource types to provide information through the archaeological record, rather than through the documentary record, is discussed.

Resources which may have little research potential are distinguished from those which may provide potentially significant information.

To accomplish the research goals of the Topic Intensive study, in-depth documentary study of the potential cemetery and roundhouse was completed. Information was sought on the potential existence and location of the cemetery, and on the local Dutch population in New Harlem, in order to provide a contextual framework in which to assess potential resources. Additional documentary research also expanded upon the known history of the Bronx section of the project site during the years the roundhouse was present. Early documentary records, comparative archaeological studies, and additional maps and atlases were sought. Research was completed at a number of repositories including, but not limited to, the following locations:

Bronx County Historical Society
Local and Internet Railroad History Groups
Manhattan Borough President's Office
Museum of the City of New York-Reference Collection
New York Biographical and Genealogical Society Library
New York City Department of Transportation Archives
New York City Municipal Reference Library
New York City Municipal Archives
New York City Register
New-York Historical Society Library
New York Public Library, Local History Room
New York Public Library, Science and Technology Division
New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), State Historic Preservation Office (SHPO)

At many of these repositories, little or no information was available on the roundhouse. Despite a thorough investigation of available documents, little actual data on the yard's physical layout was available. Apparently, because the railroad lines which passed through what is now Harlem Yard have changed hands many times through the last century, scant records have survived.

Research on the cemetery was hindered by the inability to contact the descendant church. Furthermore, the available manuscript church records at the New York Genealogical and Biographical Society (NYG&BS) indicated that extant burial records were scant, and seldom mentioned race.

MANHATTAN: PRECONTACT RESOURCES

The Stage 1A study of the Manhattan section of the project site found the following (Historical Perspectives 2001:26-27):

> *Historic maps indicate that between the 17th and 19th centuries, this section of the project site was inundated by the Harlem River. However, it is possible that over the centuries the project site experienced periods when it was drained and dry as water levels dropped, probably during the Archaic period as suggested by the earlier report on the Harlem River shoreline's prehistoric sensitivity (Energy & Environmental Analysts, Inc. 1981). During these intervals this section of the project site could have been exploited for food resources by prehistoric peoples, but it was probably not inhabited due to its topography. It is more plausible that well-drained uplands to the west were preferred for habitation and that if the project site was easily accessible, it would have been utilized in only a minimal capacity. Although the site probably did not experience extended habitation, it is plausible that shell heaps, like those found north and south of the project site, were left along the river's edge.*

Subsurface Conditions

Soil boring logs completed by Hardesty & Hanover in June, 2000 and reviewed for the Stage 1A study, reveal levels of peat and silt with shell existing between four and seven meters below the grade where the FDR Drive now runs (Boring Logs DNB 114 and 120, DHX-118A). Specifically, within the proposed impact areas, Borings DNB 108, 109, 111, and 112 contained peat and shell, underlain with sand, at six, four, four, and three meters deep (that is, between nine and 19 feet), respectively (Stage 1A Appendix). Above the peat and shell are levels of silt and introduced fill (Ibid.). The presence of shell, organic matter, and silt recorded in these borings may be indicative of a former estuarine environment of unknown age. These factors contributed to a determination of the potential for precontact resources beneath the landfill.

To further refine precontact archaeological sensitivity within the Manhattan section of the project site, additional soil boring logs that were completed after the Stage 1A report was finalized were reviewed.

Along the shoreline of Manhattan, Borings EPM-M1 through M8, M10, and M13 were completed where the project site was designated as having low to moderate sensitivity for precontact resources (Appendix). Boring EPM-M1 found fill and sand to seven feet below grade, where an obstruction was encountered. Boring EPM-M2 contained fill to four feet below grade, then wet silty sand to eight feet below grade where the probe was terminated. EPM-M3 was virtually identical to M2, and groundwater was encountered between five and six feet below grade in both. Boring EPM-M4 had fill to four feet below grade, then wet, coarse to fine sand and gravel was encountered. Although the groundwater was found at about six feet below grade, beneath this was another two-foot thick fill level which contained

sand, silt, gravel and wood. The boring was terminated at 12' below grade. Boring EPM-M5 contained fill to eight feet below grade, although groundwater was found at about six feet below grade. The boring was terminated at nine feet below grade. Boring EPM-M6 also contained fill to about eight feet below grade, where it was then terminated. Borings EPM-M1 through M6 were all taken where the outdoor salt storage area currently exists.

The remainder of the borings completed within the potentially sensitive section of the Manhattan study area, EPM-M7, 8, 10, and 13, were equally shallow. Most borings were terminated within 12' of the ground surface, and recorded layers of fill and silt with sand and gravel beneath (Appendix 1). None of these borings extended to depths which would help to further assess precontact sensitivity since they did not record conditions beneath the fill.

The goal of the additional boring program was to ascertain soil and groundwater contamination levels. Within the potentially sensitive section of project site, petroleum-contaminated soil was found beneath First Avenue as far north as the Harlem River shoreline. To the southwest along the shoreline, the area has inferred non-hazardous industrial-contaminated soil. Almost all of Harlem River Park falls within this category (Appendix 1). Furthermore, the northern one-third of the area demarcated as potentially sensitive has shallow groundwater (ca. five to six feet deep) that contains elevated dissolved metals. Directly off shore, the floor of the Harlem River has an inferred area of contaminated sediment (City of New York Department of Transportation 2000: Inferred Extent of Non-Hazardous Contaminated Sediment; see Appendix 1).

Research Potential

The entire section of the Area of Potential Effect (APE) previously identified as potentially sensitive for precontact resources was outboard of the high water line during the historical period, and most likely, during much of the precontact period. However, there may have been times during the precontact period when water tables were lower and these landforms were exposed for precontact resource procurement. To address the potential sensitivity of drowned shorelines in Manhattan, Dr. Dennis Weiss previously conducted research on reconstructing Paleo-shorelines in the metropolitan New York area. He concluded that:

> *The optimal evidence desired for the determination of past shoreline positions, in the New York-New England coastal zone, is the presence of tidal marsh peat lying immediately above bedrock or till.* (Weiss 1988:3)

Weiss determined approximate estuarine and shoreline boundaries along sections of the Hudson River throughout the precontact period, flagging as potentially sensitive those areas which were between 20 and 30 feet above the estuarine surface at lower sea level (Weiss 1988:5). He concluded that ridges and sheltered coves would have been the preferred habitation locations. The estuary itself was *not* denoted as potentially sensitive for habitation sites. Unfortunately his report did not discuss the potential sensitivity for shell middens, which are commonly found near paleoshorelines, but focused instead on settlement locations.

Borings indicate that during the precontact period, this section of the Manhattan project site was estuarial before becoming completely inundated and then filled. Since the age and extent of the estuarial environment within the project site is currently indefinable, certain assumptions must be made regarding potential sensitivity based on the known prehistoric settlement and subsistence trends demonstrated through the existing archaeological record, and an understanding of the prehistoric environment.

Following deglaciation around 12,000 years ago, the project site would have presumably begun to slowly become estuarial as sea levels rose. Paleo-Indians and subsequent Early Archaic peoples occupying the region at this time had a demonstrated preference for upland and inland sites, with an economy based largely on hunting and gathering of interior food sources (Lavin 1988:104). Therefore, it is highly unlikely that the project site would have hosted extensive occupations from either of these cultural periods since it was relatively low land compared to the upland to the west in the center of Manhattan. Furthermore, no prehistoric shell middens in the lower Hudson Valley or Metropolitan New York area have been dated to this period, so none would be anticipated within the project site.

During the Paleo-Indian and Early Archaic time periods, shellfish beds were primarily located far south of the project site. A broad band of oyster shell deposits were found on the continental shelf between 65 and 230 feet below present sea level dating to between 5,000 and 10,000 years ago (Funk 1991:55). The size and shape of oysters of this age suggested that water temperatures were at a higher level than they are today. Few oysters were found inshore from this main belt, possibly because of less favorable climatic conditions and erosion over the last 5,000 years (Ibid.). This suggests that even if water levels were lower than they are today, and the project site was accessible during this period, shellfish exploitation - if it did in fact occur - would have likely occurred far south of the site where abundant oyster beds were present.

Subsequent Middle Archaic peoples, while known to exploit shellfish in the surrounding region, did not inhabit sites within proximity to their middens. Shell heaps in southern New England and New York dating to this period indicate they were utilized as temporary processing stations, with habitation sites situated elsewhere (Lavin 1988:104). Even if the project site was estuarial by this time, and was exploited for shellfish harvesting and/or processing, evidence of habitation would probably not exist within the project area.

Late Archaic and Woodland period occupation sites show a marked preference for well-drained soils in proximity to fresh water resources. This strongly suggests that uplands to the west of the site would be more likely to bear evidence of habitation since fresh water was not available nearby. Furthermore, by this time rising sea-levels had created much of the landscape that we see today. By 5,000 B.P. (Before Present) the Hudson River experienced a decline in oyster shell abundance and a decline in ocean salinity (Funk 1991:56). More fresh water was flowing down from the north than salt water was flowing up from the south. These factors suggest that both the Hudson and Harlem Rivers were experiencing rising water tables which would have inundated the project site.

The project site probably did not experience prehistoric habitation due to the tidal wetlands, but it is possible that shell deposits, like those elsewhere along the Harlem River's shoreline, were left along the river's edge (Kearns et al 1999). However, as discussed above, there was only a minimal period of time during the Middle Archaic period when the site may have been drained and exposed for shellfish procurement and processing. Earlier and later exploitation of this resource type would have occurred elsewhere for environmental reasons.

Site Integrity

To address the archaeological potential of the site, the integrity of potential resources must be considered. If any prehistoric resources were to exist below the fill, they would have been subjected to natural current and tidal action for more than 4,000 years and then may have experienced the forces of historic dredging before they were eventually covered with fill.

Prior to filling, land between the high and low water marks along the Harlem River shoreline within the APE was exposed to disturbance. An 1857 report on improvements to the navigation of the Harlem River reports that with regard to mapping the river, "it has been found most useful to mark only the lines of high water and of the channel. The flats are...partially or entirely bare at low water; this depends upon the winds; they are covered with eel grass, and visible distinctly at all times" (Turrey 1857:100).

Because the Harlem River shoreline was shallow, which impeded docking, it was periodically dredged. A 1920 report on the improvement project of Harlem River, adopted June 18, 1879 and modified October 7, 1886, states that "...the expenditures to-June 30, 1909, amounting to $1,530,824.50, has resulted in making a channel 15 feet deep at mean low water and about 400 feet wide from Willis Avenue Bridge..." It further states that "below Willis Avenue Bridge, between One hundred and twenty-second and One hundred and twenty-sixth Streets, the Channel of 15 feet depth is about 100 feet wide" (Report of the Board of Commerce 1920:149). Dredging was essential to retain a navigable channel and to permit ships to dock at the piers along either side of the river.

Following the dredging, the shoreline was filled in stages from the mid-20th century to accommodate a new highway. In 1938 a joint publication by the Borough President of Manhattan, the Park Department, and the Triborough Bridge Authority described the existing conditions for the proposed Harlem River Drive. At that time it was stated that "These drives, parkways and elevated highways will reclaim to Manhattan its entire waterfront boundaries which were heretofore mostly under water, at a comparatively small cost..." (Borough President of Manhattan et al, 1938). Figures with the text indicate that the section of the Harlem River Drive within the APE was built entirely on filled land. Before and after photographs of the project site from 1937 and 1938 show that there was a railroad slip directly along and parallel to the shoreline in 1937, which extended beneath the Willis Avenue Bridge and to the north. By 1938 this slip had been filled to accommodate the new roadway. Furthermore, the access ramps to the Willis Avenue Bridge from First Avenue and from the northbound lane of FDR Drive were elevated above the new highway, and new piers were installed.

While it is somewhat possible that shell deposits associated with precontact resource procurement do exist beneath filled areas within the project site, it is highly likely that the integrity of resources has been compromised.

Summary

The combined action of rising sea levels, dredging, and the compressing of potential prehistoric layers by heavy fill, added in the late 19th and mid-20th centuries, has most likely severely diminished site integrity. In addition, pier supports for both the Triborough Bridge and Willis Avenue Bridge have impacted discrete areas within this section of the project site, negating any potential sensitivity where they exist.

The logistics of testing for potential precontact remains of shell deposits in the project area, which the site has only a low sensitivity for, are compromised by several factors. First, the site contains low-levels of hazardous material, including the elevated levels of dissolved metals. Second, the water table lies about five to six feet below grade, while the potentially sensitive strata lie below recorded fill levels, that is, greater than nine feet below grade. Field testing would require dewatering, while at the same time contending with contaminated soils. Finally, the area of potential sensitivity lies within the path of the active sections of the Harlem River Drive, one of Manhattan's busiest highways.

The determination of low sensitivity coupled with the petroleum-contamination of the site and the logistics of testing for potential resources within active streetbeds, one being an extremely active highway, argue for no further consideration for precontact resources in the Manhattan APE.

MANHATTAN: THE 126TH STREET CEMETERY

A historical cemetery was identified in Manhattan, located in the vicinity of First Avenue and East 126th Street, hereafter referred to as the 126th Street cemetery. The Stage 1A study concluded that the cemetery had been created by 1670 (Romer and Hartman 1981:9). Historical maps were unclear as to the cemetery's boundaries, and on some maps and atlases it appeared to fall within the Willis Avenue APE (Sackersdorf 1815, Dripps 1867, Bromley 1879, Robinson 1885, Bromley 1916). Therefore, intensive documentary research was undertaken to establish the precise boundaries of the cemetery and to determine if it falls within the proposed impact area. Further research documented that the cemetery was, in fact, an African American burial ground.

The availability of deeds for the cemetery tract was limited between 1654 and 1854, with only 18 years containing instruments of record, that is, manuscript land conveyances in the Grantee/Grantor records at the City Register.[1] The lack of primary sources left researchers to review secondary sources to establish a loose chain of landowners and history of the cemetery parcel (Pierce 1903; Riker 1904; Stokes 1967). The few tract reports on file at the Municipal Archives confirmed the existence of the "Negro Burying Ground" at the river's edge, on what is now city Block 1803 (Figure 5). Existing deeds referred to the road that went to or by the "Negro Burying Ground," but little else. The 1917 Tract Report's reference to tax records documented the relationship of the Reformed Low Dutch Church of Harlem and the land ownership and use of the cemetery parcel.

Land Use History

In 1636, after emigrating and spending a short time in New Amsterdam, French Huguenot Dr. Johannes de la Montagne and his family proceeded by canoe up the East River, the first to settle in what became New Harlem (a.k.a. New Haerlem). Governor Kieft had granted Montagne about 200 acres of land between what is now East 109th and 124th Streets. There were four houses depicted in the area that became New Harlem in 1639, one of which may have been Montagne's (Augustyn and Cohen 1997:28-31). Other European settlers as well as their farm hands and servants followed. In 1639, Danish capitalist Captain Jochem Pieter (whose full name was Jochem Pieter Kuyter) was granted a groundbrief or patent for 200 acres, roughly between what is now East 125th and 150th Streets (Figures 6-9).

The easternmost portion of Pieter's Lot 1 was eventually acquired by Daniel Tourneur (Pierce 1903), although there are no instruments of record between 1642 and 1712 to establish precisely when this occurred. Tourneur's name appeared on house lots to the west and east of Pieter's lot. The tract that is referred to in the historical records as the "Negro burying ground" fell roughly between Pieter's lot and Montagne's lot, directly along the shoreline of the Harlem River.

In 1658 Governor Kieft granted to the Corporation, that is, the Town of New Harlem, between 3000 and 4000 acres, roughly the area bounded on the south by a line drawn from

1 The years with land conveyance records are: 1713, 1771, 1790, 1813-1814, 1820, 1822-1823, 1825, 1829, 1832, 1834-1837, 1845, and 1853-1854.

the Hudson River, just above Grant's Tomb, eastward to the East River, at the foot of East 74th Street. This was land that had previously been granted to various individuals. The streets of the new village of New Harlem were laid out either west from the Harlem River or along a north/south alignment (Figures 6-9). The 1811 Commissioners' Plan, which established the existing gridded street system, set the streets and avenues at a 45-degree angle to the colonial street system.

Farm (*bouwlant*), garden, and house (*erf or erven - plural*) lots were created within the settlement of New Harlem., Directly along the Harlem River's shoreline at what is now East 126th Street was a lot that later became known as the "Judah lot," although Judah didn't acquire it until the 19th century. This particular lot was originally two *erven* lots, granted to Johannes Vermilye and Robert Le Maire in 1667 (Riker 1904:263). That same year, the first Reformed Low Dutch Church of Harlem was constructed (Figure 8).

The Reformed Low Dutch Church of Harlem occupied a series of church buildings over time. According to historian Pierce, the first Reformed Low Dutch Church of Harlem was built in 1666 and stood almost in the middle line of what is now East 125th Street, about 100 feet west of First Avenue (1903:31). The second Church was built on the opposite side of Church Lane, facing north (Figure 8). The third church was built in the same location as the burned second church, and there was a churchyard behind the second and third church buildings. The fourth church stood just west of Third Avenue on East 121st Street outside of the current project site (near the middle of Church Lane) (Pierce 1903: opposite page 18).

The 126th Street cemetery established to the north of the first Reformed Low Dutch Church of Harlem was the final resting place for the early settlers, some dying as early as 1670 (Pierce 1903:60). Montagne, who died in 1670, was interred in this burying ground. Furthermore, the Sneden family, another early family in New Harlem, was also probably interred in this cemetery. According to historian Riker:

> *The Snedens were probably interred in the ground used later for the Negroes, and lying at the rear of the Judah plot, as interments were made there many years before "the old graveyard" removed a dozen years since, was taken for that use.* (Riker 1904:215)

The church established their cemetery at the back of their lot by 1667, but soon found the need to enlarge it. This was accomplished by extending it eastward toward the Harlem River across the northern ends of the Le Maire and Vermilye lots (a.k.a. the Judah Lot) (Ibid.:264). The cemetery was later enlarged to the west across the backs of several other *erven*, extending west by "four rods in length, and five in breadth" (Ibid.). Although no primary records could be found documenting when it occurred, a small portion of the cemetery, located directly along the shoreline, came to be known as the "Negro burying ground" at least as early as 1771 (City Register Liber 39, Page 147).

The first documented slaves in New Harlem were purchased by the earliest settlers to work on their expansive farms. Tourneur, Verveelen, De Meyer, and numerous others headed south from their village to Fort Amsterdam at the southern tip of Manhattan in 1664 to

purchase slaves that had just arrived from Curacao. They were reportedly the first slaves owned in New Harlem (Riker 1904:234). There may have been freed African Americans living in the area as well, although most accounts indicate that freed slaves were residing in lower Manhattan. Records of the Reformed Dutch Church of New Amsterdam and New York indicate that as early as 1657, African American marriages were being performed by the church. However, since no separate records were kept by individual Dutch Reformed Churches within Manhattan prior to 1806, it is impossible to tell in which church a marriage was performed (NYG&BS 1987).

In 1686 measures were taken to build a new church at Harlem (the second one). "The old church was no longer adapted to the needs and improved tastes of the community, though still answering the purposes of a schoolhouse...The church was to be built of stone, and upon a new site; an arrangement being made with Laurens Jansen and the Delamater family, who gave up their two north *erven* for this purpose, and which also afforded ample ground for a new churchyard or cemetery." (Stokes 1967 Vol. VI:337). It is probably that when the new church was built, or shortly thereafter, and the new cemetery was established, that burials in the original ca.1667 cemetery ceased. It is not known when a portion of it was designated as the "Negro Burying Ground."

The secondary sources cited and a 1771 deed do indicate that a portion of the original ca.1667 cemetery associated with the church was, in fact, the same parcel that became known as the "Negro Burying Ground" referenced in the 17th through 19th centuries (City Register Liber 39, Page 147). Maps and atlases further support this.

Riker's *History of Harlem* reiterates the fact that the "Kerck Hof" (translation – cemetery, graveyard) that contained the Negro Burying Ground fell just north of the Judah Lot along the shoreline of the Harlem River:

> *The land thus early designated the Kerck lot was that since known as the Church Farm, a part of which is occupied by the present* [1904] *Reformed Church. It lay at the west end of the old gardens, several of which came to be included in it. The Kerck erf, which was distinct from the former, lay at the east end of the old gardens, and was then occupied by the church edifice, being the easterly half of the plot afterward of the Myers, and which Samuel Myer sold to Alexander Phoenix, March 27, 1806, but later known as the Eliphalet Williams plot. The* ***Kerck Hof*** *was the more ancient burying-place, lying in the rear of the Judah plot, and still remembered as the "Negro Burying Ground." The last contained about a quarter of an acre, as conveyed by John De Wit and Catharine his w. to John Be Coles, April 7, 1794.*
>
> (Riker 1904:265)

Although sources document the fact that the church established the graveyard at what is now East 126th Street, the first mention of the Reformed Low Dutch Church of Harlem in the deeds associated with the burial ground was in the mid-19th century. The cemetery was mentioned in a land transfer to Ingraham in 1853, and again in 1854 when another parcel was transferred to Cortlandt. The 1917 tract report for the Negro Burying Ground states:

> *The premises contained in this tract comprises what was known as the "Negro Burying Ground." These premises were sold by John DeWitt and Catherine, his wife, to John B. Coles, April 7, 1794. There is no record of any instrument showing that the Reformed Low Dutch Church obtained possession. The assessment rolls from the period 1841 to 1847 show the property exempt from taxation and given as lots 18 to 22. From 1847 to 1856, it was given as lot 20, still a cemetery and exempt from taxation. In 1857 the assessment roll gives the lot in part,to Courtlandt Palmer and in part to Daniel P. Ingraham, against which who the assessment is charged.*

The tract report suggests that the cemetery parcel was no longer treated as such in the tax records in 1857. It is unclear if the cemetery was closed and relocated at this time, or simply abandoned *in situ* as part of Daniel Ingraham's larger estate.

Cemetery Location

As was previously stated, the cartographic record was conflicting regarding the precise boundaries of the cemetery, and handwritten land conveyances were few or illegible. However, the tract report for the cemetery parcel cites a deed that places it west of First Avenue (Liber 664, Page 305). Furthermore, by comparing several maps, it appears that the cemetery stood to the north of and behind the first church built for the Reformed Low Dutch Church of Harlem, outside of the Willis Avenue APE predominantly on what is now city Block 1803 (Figures 6-9, 11).

Establishing the location of the Negro Burial Ground in relation to today's landscape is largely reliant on the high tide line on Randel's 1819-1820 map (Figure 10). The fact that 20th century New York City-generated maps used and referenced Randel's high tide mark and its proximity to First Avenue is a testament to its presumed accuracy (Department of Borough Works 1939, Department of Transportation: Bridges/Roadways 2003). Using the high tide line on Randel's map together with the maps in the Tract Reports (Figure 5), it appears that the location of the cemetery was about 58 feet west of the western boundary of the Willis Avenue Bridge reconstruction APE. The cemetery's southern corner was located in what became the East 126th Street roadbed, also west of First Avenue, outside the Area of Potential Effect (APE) (Figure 5). Tract Reports 863 and 866 (1917), the Re-indexing Department map of R.D. 387 (1917), Farm Histories on microfilm (1917), Randel's Farm Map (1819-1820) (Figure 10), and Pierce's book on the early history of New Harlem (1903) provided data which further supported this conclusion. In addition, the deeds describe the tract as lying as few as 25 feet and as many as 125 feet west of First Avenue (Liber 664, Page 305).

The tract report of the Negro Burying Ground clearly depicts the ¼ acre parcel west of First Avenue, largely within the bounds of city Block 1803 (Report 866). The 1794 conveyance, re-recorded in 1853, describes the lot as follows:

> *Ground in Harlem whereon Negroes have been commonly buried. Bounded: E(ast) by Harlem River, N(orth) by ground 1 (John Dewit) had sold to 2 (John B. Coles), W(est) by lane or road heading from last mentioned land to Harlem River, S(outh) by Judah. Containing about 1/4 a(cre).* (Liber 644, Page 191)

The 1917 tract report indicates that despite the fact that the church did not appear to own the parcel, it did have a vested interest in it, at least in the mid-19th century:

> *Examination of the record show the title of the above tract to be vested on the 4th day of October, 1853 in Reformed Low Dutch Church of Harlem, whose interest is fee.* (Tract Report 866, 1917)

Available records[2] do not indicate when African Americans were first interred in the burial ground, and when burials ceased. Disinterment data from church records pertain only to a second cemetery that the church established, in the vicinity of what is now West 124th Street (NYG&BS 1875).

Documents and cartographic sources strongly suggest that burials were never extended eastward beyond the high water line that ran through the eastern end of what is now city Block 1803. The 1782 British Headquarters Map depicts the land east of the high water line as marsh – indicating that the cemetery could not have extended east into the project site by that time (Stevens 1900). Furthermore, Folder no. 10 of the farm histories on file at the Municipal Archives contains records of grants for land under water, and the "Negro Burying Ground" parcel is **not** included in this folder. However, other Harlem River grants in the 125th Street area are included.

One of the water grants was given to Benjamin S. Judah on October 21, 1808, for land between the original line of high water and the original line of low water (Tract Report 863). Judah had petitioned the Common Council on September 2, 1790 for "a Grant of the Soil under the Water in front of his Land at Haerlem" *M.C.C.* (1784-1831) (Stokes 1967 Vol. V:1273). As a result of this grant, when the shoreline was filled and extended eastward, Judah's tract bounded the cemetery to the south and east. Since the cemetery was consistently referred to as a ¼ acre tract bounded by the high water line, and since filling post-dated the 1808 grant to Judah, it is highly probable that burials did not extend out of the cemeteries boundaries into Judah's newly filled tract.

After 1808, when Judah was granted the right to fill the parcel bordering the east side of the cemetery, the *Commissioners Plan* for a standardized system of gridded streets and avenues was in the process of being proposed (Commissioners 1811). Randel's 1819-20 survey map, prepared in anticipation for the application of this system, shows that Judah's land grant

2 Primary records were sought at the New York Genealogical and Biographical Society which maintains the available manuscript church records, the City Register's Office and the Municipal Archives. Furthermore, the Holland Society has no Consistory reports or minutes for the Reformed Low Dutch Church of Harlem. No Harlem Town records are available, and no individual church Consistory records exist before 1806. Descendent communities were not contacted because the boundaries of the cemetery appear to be outside of the Willis Avenue APE.

between the high and low water lines was still unimproved, and shows the cemetery west of what will eventually become First Avenue (Figure 10).

It appears that by 1836 Judah's property between the high and low water lines *may* have been filled (Colton 1836). In 1836 Block 1803 appeared to be entirely enveloped within a landscaped estate belonging to Ingraham, which had been laid-out oriented to the new gridded street system, despite the fact that the cross streets had not actually been opened (Colton 1836). The entire acreage that formed the ca.1667 cemetery, including the ¼ acre parcel that contained the "Negro Burial Ground" tract, was encompassed within this formally landscaped estate, although there is no label on the block indicating the presence of a cemetery. While First Avenue and East 126th Street had yet to be officially regulated and opened, their mapped locations served as boundaries for the residential parcel. This was subsequently identified as the Ingraham property (Dripps 1851). In stark contrast to the 1836 map, the 1851 Dripps map indicates that there was no shoreline filling beyond the previously established high water mark (Dripps 1851).

To complicate the issue of when the cemetery ceased being mapped as such, in 1851 Dripps does not indicate that the cemetery exists anywhere on Block 1803, but in 1867 he does (Dripps 1851, 1867; Figure 11). The 1867 Dripps map is the only mid-19th century map to show the historic cemetery property boundaries in relation to the then contemporary development. This map depicts the cemetery boundaries on Block 1803 - labeled as such - with Benjamin S. Judah's land bordering its east and south sides (Dripps 1867, Figure 11). The Ingraham estate bordered to the north and a narrow lane from Church Lane bordering it to the west (Dripps 1867, Figure 11). All of these boundary lines were superimposed on the grid system, which had not yet been entirely established in this area, although First Avenue appeared to be open. As late as 1879, both East 126th and 127th Streets between First and Second Avenues were designated as "Not Open" (Bromley 1879). Furthermore, by 1879 private development on Block 1803 had been abandoned and the block was converted to Harlem Park.

All traces of the early settlement of New Harlem eventually vanished from the landscape. Writing in 1904, Riker states:

> *Before the present century, the erven, or ancient village house lots (...the church and graveyard having occupied two...) had nearly all lost their buildings, and become pasture lots, or been thrown into the adjoining fields, by closing up the lower street* [Church Lane], *the river end only being kept open.* (Riker 1904:191)

Block 1803 is currently occupied by a one-story bus facility where the cemetery once existed.

In summary, the historical Reformed Low Dutch Church of Harlem's burying ground on the western bank of the Harlem River was established in 1667 and was no longer recognized as a cemetery in the tax records by 1853-1854, although its location was depicted on maps as late as 1867 (Pierce 1903:39; Inskeep 2000:xi-xii; City Register Liber 644, Page 664, Liber 670,

Page 500; Dripps 1851, 1867). The cemetery always appeared to lie west of the high water line of the Harlem River, and west of the APE. It was originally established as the official burying ground for the settling European proprietors of New Harlem and their families (Pierce 1903:39), but a small portion of its eastern end became known as the "Negro burying ground" at least as early as 1771 (City Register Liber 39, Page 147). By the time land was filled east of the cemetery along the waterfront in what eventually became First Avenue, post-dating 1820 - and possibly post-dating 1851, the Commissioner's Plan had been adopted and accommodations for First Avenue were made (Randel 1819-1820; Colton 1836; Dripps 1851). There is no evidence to suggest that burials ever extended out into First Avenue because this area was filled at such a late date, long after the Reformed Low Dutch Church of Harlem had established additional burial grounds elsewhere in the area. Therefore, it is highly improbable that any burials would exist within the APE at First Avenue.

Documents indicate that throughout its use, the cemetery's easternmost boundary was west of the Willis Avenue Bridge APE. Therefore, there is no further archaeological concern for this resource type within the project area.

BRONX: PRECONTACT RESOURCES

This section of the Bronx project site was historically situated west of the Harlem River shoreline, and was land under water prior to filling. A small area was identified in the Phase 1A as potential sensitive for precontact resources buried beneath the fill (Figure 4).

Historic maps indicate that between the 17th and 19th centuries, this section of the project site was inundated by the Harlem River. However, as discussed above for the Manhattan project site, it is possible that over the centuries the project site experienced periods when it was drained and dry as water levels dropped, probably during the Archaic period as suggested by the earlier report on the Harlem River shoreline's prehistoric sensitivity (Energy & Environmental Analysts, Inc. 1981). During these intervals this section of the project site could have been exploited for food resources by prehistoric peoples, but it was probably not inhabited due to its topography. It is more plausible that well-drained uplands to the east were preferred for habitation and that if the project site was easily accessible, it would have been utilized in only a minimal capacity. Although the site probably did not experience extended habitation, it is plausible that shell heaps were deposited along the shoreline (Kearns et al 1999).

Soil boring logs from 1991 indicate that levels of dry fill, ranging from two to four feet deep, overlay levels of moist and wet silty sand and gravel in the western section of this area (TAMS Borings B-2, B-3, B-4). Almost none of the borings from this section of the project site were found to have organic soil levels, indicative of a precontact living surface.

More recent geotechnical investigations (Hardesty & Hanover 2000), reported two borings in this area containing organic levels with peat (Boring Logs DNB 140, 141; Appendix). These were taken from the northern end of Block 1805 within the footprint of Willis Avenue, which was historically west of the high water mark directly along the shoreline (see Figure 3). Both borings had levels of fill and sand extending about 15 feet below grade, overlying a level of brown organic silt with peat. This level extended down to almost 18 feet below surface, and below this were levels of sand and gravel (Ibid.: Appendix).

As discussed above, the presence of peat does not necessarily indicate a potential precontact living surface, but it is plausible that shell middens could exist in this area (Kearns et al 1999). However, as previously detailed for the Manhattan section of the project site, there was only a minimal period of time during the Middle Archaic period when the site may have been drained and exposed for shellfish procurement and processing. Earlier and later exploitation of this resource type would have occurred elsewhere for environmental reasons. Furthermore, no shell was reported in borings reviewed for the Stage 1A.

This section of the project site was previously determined to have a low to moderate potential for precontact resources buried beneath modern landfill. A small cove once lay here directly on the shoreline. It was probably protected from dredging since it was not part of the main channel of the Harlem River. Although dredging probably did not disturb potential resources, the installation of an extensive network of underground utilities and footings for the bridge may have considerably reduced the area of potential precontact sensitivity. The

initial Stage 1A concluded that in all likelihood, only small pockets of potential sensitivity still exist between areas of modern disturbance.

ADDITIONAL BORING ANALYSIS

Since the Stage 1A was completed in 2001, additional borings have become available for review. Of particular pertinence to the area identified as potentially sensitive in the Bronx section of the project site are Borings EPM-B5, B6, and B9 (Appendix). Boring EPM-B5, taken on the north side of Willis Avenue west of East 132nd Street, reported 0-2' of asphalt over 2-4' of dry, light orange-brown fine to medium sand and silt. Alternating sand layers continued until 12' when wet gray peat was recovered (Environmental Planning and Management 2001). The water table was encountered at about 8' below grade. Boring EPM-B6, taken on the east side of East 132nd Street at Willis Avenue, had a similar stratigraphy with groundwater encountered at 7' below grade. However, this boring had no evidence of peat below the sand.

On the south side of Willis Avenue, at the north end of an existing coal storage yard, EPM-B9 produced concrete, cinder ash, sand and silt to 20' below grade, where the boring was terminated. No buried peat level was encountered (Environmental Planning and Management 2001).

The additional boring logs did not indicate a strong potential for precontact resources in this vicinity; instead, they demonstrated how varied subsurface conditions are within a relatively small area. That is, some areas contain peat, while others do not. Furthermore, the borings show no evidence of shells in association with peat, and do show that peat levels lie at least six feet below the water table. Sensitivity for potentially significant deposits in this location is further diminished by these findings.

Any potential precontact resources within the area would have been subjected to tidal action for at least four thousand years, and then compressed by layers of fill and use of the roadbed. Both of these actions would have diminished the integrity of any potential deposits. Furthermore, searching for potential deposits – which would be scant since they would not represent extended habitation – would be tantamount to searching for a needle in a haystack.

In conclusions, the potential to recover intact, undisturbed precontact deposits *in situ*, which would meet the criterion for National/State Register eligibility, is extremely low. Therefore, no further archaeological evaluations are recommended.

BRONX: THE ROUNDHOUSE

The Stage 1A Archaeological Assessment of the Willis Avenue Bridge Site found that the Bronx section of the project site is potentially sensitive for the below-ground remains of a ca.1870s roundhouse foundation on Block 1806, just north of Willis Avenue near East 132nd Street. As part of the topic intensive study, additional cartographic resources were reviewed as well as railroad company records, railroad industry journals and histories, data from comparative archaeological sites, and local histories. The results of that study are presented in this section of the report.

CONTEXTUAL OVERVIEW

- **Site History**

The former roundhouse was located within Block 1806, which is bounded to the west by East 131st Street, to the east by 132nd Street, to the south by Willis Avenue, and to the north by Alexander Avenue (Figure 3). Documentary research found that the block was under water until the second half of the 19th century. Cartographic resources indicate that the uneven shoreline was slowly filled in after the 1850s (Colton 1836; Conner 1853; Beers 1860, New York Department of Parks 1873; Figures 12 and 13).

The need to transport both passengers and goods into the growing city was the impetus behind a growing number of entrepreneurs and businessmen who were attempting to expand commerce and industry in the City. During the 1830s, several railroad companies in and around New York were established. The first step toward the creation of a large-scale transportation network in the metropolitan area took place on April 1, 1831, when the state legislature granted a charter to the promoters of the New York and Harlem Railroad. The charter authorized the construction of a double track railroad line, which was under construction by February 25, 1832. It took over five years for track construction to traverse Manhattan and reach the Harlem River. During the early years the New York and Harlem Railroad used a combination of horses and steam locomotives to make the trip from City Hall to the Harlem River.

During the 1840s, the chief competitor of the Harlem line, the Hudson River Railroad, was formed. The location and direct route of the new line, between New York and Albany, proved more popular and cost efficient than the Harlem line, which became a local and suburban carrier and not a major player in the water-shipping and manufacturing economy of New York. Throughout much of the second half of the 19th century, the Directors of the Harlem line began to search for alternative connections and routes into the City.

The Village of Port Chester was officially incorporated in 1868 (The Daily Item, Oct. 11, 1937). The growing suburban population in this location and the potential for the establishment of an alternate coastal route for a new railroad provided a small group of entrepreneurs with the impetus to establish a speculative railroad between Port Chester and the Harlem River. The company planned to provide a pivotal section for a new route between New York City and New Haven. In 1869 the Harlem River and Port Chester

Railroad Company began construction of this railroad line. Unfortunately, during the fall of 1869, the company suffered financial difficulties that enabled the Board of the New York and New Haven Railroad Company to take over the management of the railroad. Once that takeover was final, the Board of the New York and New Haven Railroad proceeded with the construction of "that part of the Harlem River and Port Chester Railroad between [the] Harlem River and New Rochelle" (New York, New Haven and Hartford Railroad, Board of Directors Report 1874: 12). In August 1872, the Hartford and New Haven Railroad merged and consolidated with the New York and New Haven Railroad Company. The Directors of the newly established New York, New Haven and Hartford Railroad justified the earlier takeover of the Harlem River and Port Chester Railroad to their stockholders by stating that

> *unless these facilities were furnished by this Company, by means of the charter of the Harlem River and Port Chester Railroad, a railroad hostile to your interests would have been constructed by other parties, and would have been extended through to New Haven, thus forming a parallel and competing line for all the business between New York and New Haven* (Annual Report 1874: 11).

Historical Maps indicate that the railroad line was present within the project block by 1872. However, company records indicate that the first trains began running over the 11.8-mile route on November 24, 1873 (Ibid). An 1873 topographic map shows a small section of a semicircular railroad roundhouse had been built by that time on the block's southeastern corner, directly north of Willis Avenue (New York Department of Parks 1873; Figure 13). The cost of the railroad was estimated at approximately $2,000,000. This included all real estate expenditures, the construction of extensive wharves, and the purchase of water rights for both the Harlem and East Rivers. After payment of all expenses, taxes, loan interest, and bonds the Company's profit for 1874 was a staggering $1,726,802.82 (Annual Report 1874: 9).

When the line was constructed, there was no bridge across the Harlem River to Manhattan so it terminated in the Bronx. The New York, New Haven and Hartford Railroad indicated that additional expenditures would be necessary for the purchase of "barges, steam-tugs, etc., to make the new road available as a route for freight between New York City and stations on the main line" (Ibid: 12). The presence of large passenger and freight wharves near the roundhouse was noted on maps dating from the 1880s (Bromley 1882, Robinson 1885, Robinson 1887; Figure 14). The 1885 Robinson Atlas also indicates that the roundhouse had seven tracks extending from the turntable into the structure. Although the building was not enlarged, the 1887 Robinson Atlas indicates that ten tracks were then present between the roundhouse and the turntable.

Despite the promising predictions about the viability and profitability of including the Harlem River and Port Chester Railroad as part of the company's holdings, the opposite proved true. The time- consuming processes of turning engines around at the end of the line and offloading passengers and freight to be shipped across the Harlem River became a financial drain as well as a source of constant complaints. Almost immediately, the Board of

Directors began searching for new alternative routes. In the 1880s, a small enterprise called the Suburban Rapid Transit Company began construction of a new passenger line running parallel to Willis Avenue through the adjacent blocks to the west. The line crossed the New York, New Haven and Hartford Railroad Yard (Blocks 1806 and 1807) and continued, via a new bridge, across the Harlem River and into Manhattan. In the 1886 Annual Report to company stockholders, the New York, New Haven and Hartford Railroad Board of Directors announced:

> *We have now near completion a reasonably convenient connection at Harlem River, by easy transfer, with the Suburban Rapid Transit Railroad at the point, which we hope will be found a convenience to our patrons on the Harlem River Branch* (Annual Report 1886: 13).

This new route, shown on the 1887 Robinson atlas, signaled the beginning of the end for both the roundhouse and the section of the route known as the Harlem River and Port Chester Railroad (Figure 14). The 1890 Annual Report of the Board of Directors report that "a new engine house, Harlem River" was constructed during the previous fiscal year at a cost of $95,111.20 (Annual Report 1890: 8). This is likely a replacement for the roundhouse on Block 1806, which was probably of limited use to the railroad. The structure, less than a half-circle in size, could only service a limited number of engines. In addition, it's location at the end of the railroad line made getting the locomotives from the majority of the holdings of the New York, New Haven and Hartford Railroad extremely difficult. It is likely that the roundhouse only served a limited number of freight trains traveling the 11.8-mile route of the Harlem River and Port Chester Railroad.

Once the new roundhouse (built outside the project area) was functioning, the almost inaccessible roundhouse on Block 1806 was probably razed just prior to 1891 when the Company...

> *erected a substantial and commodious passenger station at Willis Avenue and 132nd Street, New York and in connection with the Suburban Rapid Transit Company, (now consolidated with the Manhattan Railway Company,) on the first of August began to furnish a through passenger service to the south side of the Harlem River at Third Avenue* (Annual Report 1891: 4).

Later maps of the project site indicate that a series of tracks which paralleled East 132nd Street and extended south to the Harlem River Station on Block 1805 were present in the location of the former roundhouse (Bromley 1905). In conjunction with the creation of the extensive rail yard, there is evidence that the block was graded in order to create a level surface. By the turn of the 20th century, the Willis Avenue Bridge had been built, running above the southern end of Block 1806 (Bromley 1905). Some of the grading activities might have taken place at this time for the installation of footings and supports for the bridge. Maps indicate that no construction activities occurred within the southern part of the block until the early 1940s (Sanborn 1908, 1935; Bromley 1942). By 1942, the NYW&BRR

Station, accessed by a pedestrian overpass on Bruckner Boulevard, was built just north of the Willis Avenue Bridge on the southeastern corner of this block (Bromley 1942). Maps indicate that the building also functioned as a carpenter shop for a short period of time (Sanborn 1947).

- **History of Roundhouse Development**

Since railroads became a major source of transportation, engine-houses have been used to quarter and/or service the large engines after runs. The design and construction of engine-houses began in Britain during the mid-nineteenth century (Bush 1990). The earliest design types were either roundhouses or square (sometimes cruciform) structures. The roundhouses and smaller square houses typically had exterior turntables while larger square houses required interior transfer tables to move the engines sideways through the building. Citing safety issues and the problems encountered with an external turntable, many British engineers favored the square engine house design (Ibid.).

Early engine-house technology and design in North America was directly influenced by the early British designs. Historians generally agree that large circular, or semi-circular, roundhouses were more commonly built throughout the United State to service steam engines along the main lines during the nineteenth and twentieth centuries (Berg 1974). Because of this, the name roundhouse has become almost synonymous with the engine or locomotive house. Although the majority of engine-houses were built at terminal or division yards, a few were constructed at junctions or in proximity to structures needed during the service of the engines (e.g., water tanks, oil-houses, ash-pits). The location, size and shape of engine-houses were often dependent on the topography of the countryside and the building materials available.

With the introduction of steam engines beginning in the 1850s, associated passenger cars, freight cars, precision parts, tools, and machines were also designed and constructed. According to railroad historian Walter Berg, the typical design for steam engine facilities was a circular or semi-circular pattern building that was arranged in an arc around a turntable. From the interior of the building, radiating stalls had tracks that converged onto a centralized turntable. The structure was designed to enable locomotives to move headfirst into the building stalls with their pilots facing the exterior wall, which formed the circumference of the structure. In the roof above each stall smoke jacks, or small chimneys, were used to ventilate the area. Located beneath the stalls, engine pits, usually 3 feet deep, allowed machinists, fitters and cleaners to complete maintenance under the locomotive. The outer wall had large windows to provide much needed natural light in each work area. The inner wall of the roundhouse, which faced the turntable, was either open or had large doors constructed to enclose the building once the engines were brought in. Railroad historian Edward Bush states that early roundhouse doors were "originally built of wood" and often contained "glazing or lights" (1990). The turntable, which pivoted above a central pit, was exposed to the elements and was connected, via a service track, to the main line.

Numerous late nineteenth century trade journals and Berg's two industry standards *Train Shed Cyclopedia* (1974 reprint of 1893) and *Science of Railways* (1900) extol the advantages

of building a circular roundhouse with an associated turntable. These advantages included the fact that the circular pattern provided the optimum use of limited ground space. The design also encouraged the orderly movement and repair of engines, the presence of windows on the outer wall provided well lit work areas, and, because the width of the stall widened at the outer edge of the structure, workmen had plenty of space to service the head of the engine. In addition, Berg felt that one of the main advantages to this type of engine house was that the structure could be built in segments, allowing for future expansion.

The foundations of early engine houses were usually brick or stone. The interior floors were typically made of cinders, cement, stone, asphalt, or timber, with the floor level flush with the top of the rails. The bases of the stall pits were also comprised of stone or brick. Engine houses usually had an attached office for the Forman, a boiler room, large drainage features utilized to remove oil and cleaning liquids, a privy, and several associated activity areas (storage yards, trash receptacles). The superstructures of early roundhouses were made of wood, brick or stone. In many cases, the building was made with a combination of all three types of construction materials. While some early engine houses had wooden roofs, it was found to be safer to use other materials. The roof of a roundhouse was generally sloped to insure drainage away from the turntable and work areas. Berg indicated that it soon became common to use slate, tarred felt or gravel on top of wood for roof construction in order to prevent deterioration from the sulphurous gasses given off by the engines (1974). Because of the weight of slate, roofs using this material were required to be more heavily pitched, thus making them more expensive. The tarred felt and gravel roofs were more lightweight and easily repaired.

Early roundhouses were heated by large round cast-iron stoves (Berg 1974; Howson 1939). A large stove with an associated chimney would heat the offices and a large section of the roundhouse. Smaller stoves were often placed between, or inside of, every third or fourth stall. These smaller stoves had small stove pipes that would be ventilated out of the nearest smoke jack. Initially, it was believed that a roundhouse had the potential to become a firetrap. However, because the building could be built in segments, the walls in between each section, could act as firewalls. By the early twentieth century, the American Railway Engineering Association had recommended the roundhouse design as being efficient and convenient (Howson 1939). One of the drawbacks to this system was that the turntable, which, if stalled or blocked, could cause costly rail line breakdowns and delays.

Throughout the northeastern United States, there were many individual railroad companies that were formed during the nineteenth century. Frequently, several different companies on a line that traveled interstate or for long distances owned individual sections of a track route. These companies typically paid for the construction of their sections of the track and each built and maintained individual repair facilities. In attempts to economize, many of the combined rail lines closed and razed the smaller shops and engine houses in order to consolidate work areas and workers during the late nineteenth and twentieth centuries.

- **Comparative Roundhouse Studies**

Research and Engineering Studies

Railroad historians and engineers in the United States and Canada have meticulously examined numerous roundhouses. Detailed reports and books have been written about the construction and use of these large transportation facilities. Two of the sites that have been extensively examined in this manner are discussed below.

East Broad Top

The HAER program provided the means for the documentation of engineering, industrial, and transportation heritage sites across the United States. Thousands of drawings, photographs and maps have been created for this process. One of the railroad sites reviewed was the East Broad Top Railroad and Coal Company's roundhouse in Rockhill Furnace, Pennsylvania. During the 1980s and 1990s, the HAER recording team produced extensive drawings of the roundhouse and associated features. The East Broad Top Railroad and Coal Company, chartered in 1856, was established to move coal from the Broad Top Coal field to the Rockhill Furnace where it could be converted to coke to fuel blast furnaces. In 1874, the company constructed a small four-stall wooden engine house in Rockhill Furnace. Because larger and heavier engines were in use by 1882, a larger segmental roundhouse replaced this building in 1882. When originally constructed the brick roundhouse had six stalls, similar to the 7-stall Harlem River and Port Chester roundhouse. The walls were made of brick and a ventilation monitor topped the wood roof and individual smoke jacks above the stalls. The inner wall of the roundhouse, facing the turntable, had large arched openings where hinged wooden doors were installed. Between 1903 and 1913 the outer wall was moved out 12 feet and placed on a concrete base. Additional ventilation monitors were installed and two more stalls were built. When the building was in use, the earthen floor was covered with gravel.

Within the building, six of the eight stalls contained 62 feet long inspection pits between the rails. The other stalls were used for cleaning and painting the engines. Two of the inspection pits had additional drop pits, where sections of the pit were open to a greater depth below the surface, thus enabling workers to remove parts. The floor and walls of the inspection pits were made of concrete. The entire pit sloped eight inches toward the north allowing any fluids to drain out of the exterior of the building.

West Philadelphia

Railroad historian Walter Berg documented a series of roundhouses built in and around Philadelphia, Pennsylvania in the 1890s (1974). Like the Harlem River and Port Chester roundhouse, the West Philadelphia site that he examined was constructed in the early 1870s. Although the 44-stall circular roundhouse in West Philadelphia was much larger, it is likely that the construction methods and materials were similar to those employed at the Bronx site. The foundations were stone and the above-ground walls were brick. The exterior walls were slightly thicker than the ones facing the turntable. The inner brick walls contained arched openings above each of the stalls. Two wooden doors were hinged into the brick to allow access. Berg found that the building had a two-layer wood floor and a thin wood ceiling supported by wrought iron beams. On top of the wood ceiling, slate was used to cover the sloped roof. At the edge of the roof a gutter system was built to contain run off. The gutters

discharged the water into an 8-inch clay pipe drain that ran along the perimeter of the building. Berg gave a detailed description of the construction of the engine pits in the stalls. He noted

> *the engine pits are 42 ft. 6 in. long by 3 ft. 11 in. wide in the clear, 2 ft. 9 in. deep at front and 2 ft. 6 in. deep at back. The sidewalls are of stone, 2 ft. thick. The bottom is dished 1 1/2 in. at the center, and is paved with brick, laid on edge, and grouted with cement. The pits drain at the lower end into a 12 in. circular brick sewer that runs under the ends of all the pits, and discharges into the main sewer that leads from the house* (1974).

Berg also found that gutters ran along the rails within the stall and drained excess fluids into the pit. Because engine houses were washed down frequently to prevent the build-up of oils or any type of puddling, water plugs and hoses were noted in alternate stalls. A cast iron main pipe beneath the floor supplied the plugs. Wash sinks were present in the building. Their associated drains connected to the main drain that ran under the engine pits. Cast iron stoves were used throughout the building to keep it warm in the winter. Berg made no mention of an attached boiler room or any description of the divisions of interior workspace.

Archaeological Studies

Several railroad roundhouses and engine houses have been examined archaeologically during the last two decades. The information complied has added to the already large body of data known about these historical resources. Below is a summary of five archaeological excavations.

- Saybrook Point

As part of a larger field study of Saybrook Point, Connecticut, Harold Juli and students from Connecticut College conducted excavations at the Saybrook Roundhouse in 1980 (1991). Prior to testing, research and informant interviews had determined that a roundhouse built by the Connecticut Valley Railroad had been constructed at Saybrook Point sometime in the last quarter of the nineteenth century and dismantled in 1922. Excavations in the location of the roundhouse and turntable revealed granite footings of a large six-bay, one-quarter wedge shaped roundhouse. Two of the six stalls were excavated and found that each stall was built on a base of two granite footings. Low brick foundation walls above the footings supported the railroad track. Pier supports were found, three meters apart, where the stall entrances would have been. Stalls also contained ceramic pipes used as conduits for venting excess water, as well as bins for the disposal of coal ash. Excavation also revealed the remains of the cement turntable pit. Artifactual material was limited to coal ash, brick spalls, and a few iron objects including railroad spikes. The granite and brick foundations of the roundhouse have been incorporated into the surface interpretation of the park.

- New Haven Rail Yard

In June 2000 Bruce Clouette, Eric Pomo and PAST, INC. conducted archaeological testing at the Lamberton Street Roundhouses in New Haven Connecticut (Clouette 2001). Prior to

testing, sections of the outer foundations of two structures were visible on the surface. These buildings, identified as late 1890s roundhouses were examined during field testing. Although from a later time period than the roundhouse once located within Block 1806 in the Bronx, the buildings in the New Haven Rail Yard might have contained similar construction materials as they were financed by the same company. Excavations revealed that the two roundhouses at the New Haven Rail Yard had stone foundations and a brick superstructure. Although each had 29 stalls, the size of the turntables was significantly different, the south being 75 feet and the north 60 feet long. The south roundhouse also had longer stalls, perhaps indicating that it was used to house the large engines (Clouette 2001). The roundhouses were in operation until the north one was demolished ca.1930 and the south building in ca.1940. The south turntable, however, was used for turning engines in this location until ca.1960.

During field testing, one stall within each of the two roundhouses was excavated and it was apparent that the below ground sections of the building had been filled with both architectural debris from the demolition of the building and materials once used inside. Excavators discovered that both buildings had brick inspection pits and stone footings for vertical roof supports. Artifacts within the fill provided a great deal of information about the activities that once took place at the site. Archaeologists recovered tie-plates, spikes, remnants of wooden sleepers for tracks, an acetylene valve sign, steam pipes, and numerous architectural fragments (e.g., window glass, slate, and brick). During testing, archaeologists also discovered large sections of the exterior brick walls that were buried in the pit during demolition. Additional materials noted in only the north roundhouse included tools (e.g., a reamer and wrenches), paint buckets, parts of wooden freight car bodies (e.g., corner braces, stirrup steps, grab irons, center plates, and king pins) and numerous fasteners (e.g., nuts, bolts, rivets, and cotter pins).

From the materials recovered, the archaeologists determined that the roundhouses likely had slate roofs. The brick inspection pits were found to be intact and the level of preservation was very good. In fact, a small portion of the timber sleepers for the track was still in place and in one of the roundhouses a section of rail was found, also *in situ*. Excavators were unable to see any evidence of an intact floor system. It is possible that the south structure had an earthen or sand floor and the north may have had concrete laid over sand.

- Old Colony Roundhouse

During the 1990s, the Public Archaeology Laboratory conducted an extensive archaeological examination of the Old Colony Railroad Roundhouse in Whitman Massachusetts (Boire and Cherau 1995; Cherau, Kierstead and Chase 2000). The segmental four-stall roundhouse, which had been built in 1881, was examined as part of the Old Colony Railroad Rehabilitation Project. The roundhouse served as an important steam locomotive repair facility from the 1880s to the late 1930s. Although smaller than the Harlem River and Port Chester roundhouse, the methods of construction are still comparable.

During field testing, large granite block foundation walls were exposed delineating the exterior of three sides of the segmental roundhouse. The raw materials for construction were likely available from one of the many quarries known to have operated all over New England

during the late nineteenth century. The section of the roundhouse facing the turntable was constructed of both brick and granite. An interior granite block wall that divided the roundhouse in half was found to have been an original outer wall, indicating that the roundhouse was built in two sections, each containing two stalls. Researchers described the stall construction in the original, or western, half of the roundhouse.

> *The construction technique of the two inspection pits in Stall 3 and Stall 4, each about 64 ft long, within this portion of the roundhouse, is similar in method and material. Both inspection pits are about 3 ft deep, formed by courses of mortared brick that form parallel walls (each four courses wide) to support the rail. The area between each set of parallel walls is approximately 46 inches wide. The interior floors are made of irregularly shaped medium sized flat granite stones. Each inspection pit also has a transverse red brick wall at the northern end against which wood plank steps would have been placed to provide access to the inspection pit* (Cherau, Kierstead and Chase 2000).

Sometime after 1882 the eastern section of the roundhouse was built, likely to provide additional stall space for the increased servicing needs of the expanding railroad. In this section, researchers found that each stall was constructed differently.

> *The inspection pit (Stall 1), about 64 ft long and about 3.5 ft deep, consists of two parallel mortared red brick walls, a transverse brick wall at either end, intact steam pipes, and a brick (running bond) floor. The transverse brick walls were also the location of probable wood plank or timber steps to the inspection pit.*
>
> *The adjacent Stall 2 inspection pit was structurally different from the other inspection pits. This pit, about 3 ft deep, had two parallel long walls along its northern half, constructed of 14 intact courses of mortared brick. A transverse wall was present at the northern end as was a series of five steps, each one brick wide and constructed of mortared brick. These steps were located in a small rectangular area formed by the exterior brick wall of the roundhouse and the transverse wall of the inspection pit. The southern half of the inspection pit contained an approximately 16-foot long rectangular section of wooden railroad ties anchored together with iron bolts. The ties rest directly on the mortared brick walls across the inspection pit. The interior of this wood-tie feature contained a section of wood plank flooring* [while] *the parallel mortared brick walls continued to the rear wall of the roundhouse foundation* (Cherau, Kierstead and Chase 2000).

Within the roundhouse several other features were identified. Excavators uncovered a few post supports, likely used in support of the roof. An irregular section of a red brick (running

bond) floor was discovered adjacent to the end of one of the stalls in the western section. However, it could not be determined how much of the roundhouse floor was covered in this manner or if this location was used for a specific purpose. Testing also revealed what may have been a brick furnace base, adjacent to a stall in the older western half of the roundhouse. It is possible that a cast iron furnace was once present in this location. When the eastern half of the roundhouse was constructed, a separate boiler house was built adjacent to that side of the building and the older feature was likely abandoned. The boiler house, a rectangular addition to the roundhouse, was constructed of granite and brick. In the center of the house, a 9 x 6 foot mortared brick boiler pad was present. To the north of the pad, a circular brick chimney base, that once supported a smoke stack, was revealed. The majority of the artifacts recovered included a variety of architectural and industrial fragments (e.g., window glass, bricks, railroad spikes, iron tie plates, wooden ties, cut metal, roof flashing, ceramic tile pipes, coal and slag). At present, the site has been repaired and the location is now an interpretive archaeological park.

- Poughkeepsie Roundhouse

Historical Perspectives, Inc. recently completed an archaeological investigation of several lots at the Poughkeepsie Train Station in Poughkeepsie, New York. One of these lots, the River Lot, possessed substantial remains of a 1870s roundhouse (Historical Perspectives, 1999; 2000). Although portions of the roundhouse were demolished over time, a large section of the structure stood until the 1950s. During field testing, it was discovered that the truncated foundation of the roundhouse still contained the intact bases of stalls, walls, and footings just beneath the present parking lot surface. Evidence of drainage channels and heating systems was also encountered. The surface of each of these features was covered with ash and coal detritus typically found at railroad sites. After the roundhouse was razed, several catch basins and utility pipes were installed within the parking lot. Only small sections of the transportation structure were impacted by the large catch basins.

Testing exposed the outer wall of the roundhouse, which was constructed of local fieldstone. In contrast, the interior walls, stall floors and boiler room divisions, were mostly constructed of brick. Three different types of stall floors were encountered. The most common found was a curved brick floor, crowned and slanted to promote drainage toward a central drain near the turntable. The truncated remains of brick sidewalls, once two to three feet higher, were also present. This stall design was part of the original construction. The base of a second stall type discovered was slightly different from others. This floor had a central drainage channel rather than a crowned base. A third type of stall, which appeared to be a 20th century upgrade, had a curved cement floor with a large ceramic drain pipe beneath it. The upgraded stall was within the locomotive house, where engines were repaired. The intensive use of this portion of the roundhouse, or possibly changes in locomotive type, may have prompted the modifications made to this stall in the twentieth century.

At the northeastern end of the roundhouse, brick flooring and fieldstone walls of the boiler house were encountered during field testing. The integrated construction methods and materials indicated that the boiler house was constructed at the same time as the roundhouse. Within the center of the boiler house, a brick platform, which likely supported the early heating system, was discovered. The more extensive Stage 3 excavations in this location

indicated that as technology changed and the boiler was updated, the platform and room were modified to allow for the installation of a new heating system (2000). Testing revealed that a portion of the platform was dismantled and bricks were removed from adjacent interior walls to accommodate new pipes. Unfortunately, except for a few fragments of piping, the boiler room machinery had been removed prior to the filling and covering of the feature.

During testing, several drainage pipes and modifications were observed. For example, outside of the boiler house, just north of the exterior wall of the roundhouse, a ceramic drainage pipe was found extending out of the roundhouse, and veering northwest toward Water Street and the river. Evidence indicates that this was probably a later addition to the roundhouse, since the exterior wall was modified to accommodate it.

The Poughkeepsie Roundhouse excavation provided answers to many questions regarding the construction methods and materials used at the transportation facility. Unfortunately, because excavation was limited to the impact area, the research questions were also limited by the constraints of the excavation.

RESEARCH POTENTIAL

Historical research found that a roundhouse was once present on the southern end of Block 1806 beneath the Willis Avenue Bridge access ramp (Figures 12-14). The structure stood between 1873 and 1890 (New York Department of Parks 1873; Robinson 1885; Robinson 1887; Sanborn 1891). Unlike the other long-term roundhouses that have been studied by archaeologists and discussed above, the Harlem River and Port Chester roundhouse was present on the site for less than 17 years. When the roundhouse was demolished it was likely truncated, and portions of the structure may have once been present just beneath the surface. However, subsequent impacts may have disturbed portions of this resource.

Grading

The examination of historical maps indicates that the grade elevation at the intersection of Willis Avenue and East 132nd Street, directly adjacent to the former site of the roundhouse, was 12 feet above mean sea level when the roundhouse was present (Robinson 1885; Robinson 1887). After the roundhouse was removed and site was graded for the installation of the rail yard and the Willis Avenue Bridge, the elevation at this intersection was reduced to 9.5 feet above sea level (Bromley 1905). A site visit found that the interior of Block 1806 is at present lower in elevation than 132nd Street (1-2 feet). Roundhouse inspection pit floors at comparative sites are typically found approximately 3 feet below the ground surface. Because the block was graded between 2.5 and 4.5 feet for the construction of the bridge and the creation of a paved yard, this activity would have severely truncated the roundhouse and likely destroyed much of the foundation and inspection pit floors. In addition, the northeastern section of the roundhouse was impacted by the early 20th century construction of the brick station building.

Bridge Construction

As discussed above, the grading activities undertaken in preparation for the construction of the Willis Avenue Bridge likely impacted the site of the roundhouse. In addition, the installation of the substantial bridge support columns (piers) would have also severely impacted this resource. During the site visit, the large support piers were noted in the location of the potential roundhouse remains.

Drainage

During the site visit, several drains, or catch basins, were also observed within the Block. One of these basins was located near the site of the proposed impacts (Photograph A). In addition, another utility drain was observed to the north of the catch basin. It is undetermined if these utility lines are connected. The installation of a modern catch basin likely disturbed the potential remains of the resource in this location. As observed at other sites, catch basins can be quite large and extend to significant depths below the surface. At this time, the depth and breadth of the basin is unknown. However, its location clearly impacted a portion of the roundhouse site.

Documentary research suggests that the site of the roundhouse has little, if no, research potential. Research also indicates that large portions of the roundhouse were likely impacted by subsequent demolition, grading, and construction activities at the site. Chief among these was the construction of the Willis Avenue Bridge, the station and carpenter's facility, and the subsequent grading and paving of the rail yard. Although the scope of these activities is unknown, these impacts indicate that there is probably only limited potential for an intact National Register eligible archaeological resource in this location.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the archival research described above, the following conclusions and recommendations are offered for the four loci of potential archaeological sensitivity:

Manhattan: Precontact Resources

Site integrity for potential precontact resources within the APE has been severely diminished due to several factors, including rising sea levels, dredging, and compression by heavy fill added in the late 19th and mid-20th centuries. Construction of pier supports for both the Triborough Bridge and the Willis Avenue Bridges also would have destroyed any potential precontact resources within their discrete footprints.

Logistics of testing for potential precontact resources within the APE would be complicated both by the presence of contaminated soils (which contain elevated concentrations of dissolved metals), and the location of the water table at about five to six feet below grade, with potential archaeological deposits at depths greater than nine feet below grade. Thus, any archaeological field testing would need to be undertaken in conjunction with both contaminated soils removal and constant dewatering. Last, because the APE is located under active sections of Harlem River Drive, one of the city's busiest highways, field testing would also require temporary closure of this roadway.

Due to the fact that the APE possesses a low sensitivity for precontact resources, combined with issues of contaminated soils on the site and difficulties of conducting archaeological testing within active streetbeds, no further consideration for precontact resources is recommended within the Manhattan APE.

Manhattan: The 126th Street Cemetery

Documentary sources revealed that the 126th Street Cemetery was first used in 1667, as the official burying ground for the first Reformed Low Dutch Church of Harlem. As early as 1771, the eastern portion of the cemetery was known as the "Negro burying ground." It is likely that the cemetery was discontinued after 1853-1854, when tax records stopped referring to the land as a cemetery.

The cemetery was located west of the APE, and at the time of its use was situated along the shoreline of the Harlem River. First Avenue was later created east of the cemetery, by landfilling the area. There is no indication that the cemetery was still in use when First Avenue was created, and therefore no evidence to suggest that any burials would lie within the First Avenue roadbed.

Since archival documents indicate that the 126th Street cemetery's eastern boundary was always west of the Willis Avenue APE, no further archaeological investigations are recommended for this resource type within the project area.

Bronx: Precontact Resources

The additional boring logs reviewed for this study did not indicate a strong potential for precontact resources in the Bronx section of the project site. Instead, they demonstrated how varied subsurface conditions are within a relatively small area. Furthermore, the borings show no evidence of shells in association with peat, and do show that peat levels lie at least six feet below the water table. Sensitivity for potentially significant deposits in this location is further diminished by these findings.

Any potential precontact resources within the area would have been subjected to tidal action for at least four thousand year, and then compressed by layers of fill and use of the roadbed. Both of these actions would have diminished the integrity of any potential deposits. Furthermore, searching for potential deposits – which would be scant since they would not represent extended habitation – would be tantamount to searching for a needle in a haystack.

In conclusions, the potential to recover intact, undisturbed precontact deposits *in situ*, which would meet the criterion for National/State Register eligibility, is extremely low. Therefore, no further archaeological evaluations are recommended.

Bronx: The Roundhouse

Although historic research identified that a roundhouse was once present within study Block 1806, it is unlikely that additional archaeological research within the limits of the proposed impact area would provide meaningful data on this resource. Not only was the transportation feature standing for a limited number of years, the roundhouse may not have seen large amount of usage based on its location at the end of a short section of the railroad line.

The examination of cartographic resources and the Annual Reports of the New York, New Haven and Hartford Railroad found that the roundhouse was standing for less than 17 years. During that time, it is clear that the roundhouse at Willis Avenue and 132nd Street never operated as the main repair facility for the railroad company. Maps and historical records indicate that during the last quarter of the 19th century there were other, more accessible, roundhouses along the routes of the New York, New Haven and Hartford Railroad. In fact, the construction of a new roundhouse along the Harlem River in 1890 was likely the impetus for the demolition of the Willis Avenue facility. Following its demolition, the site of the roundhouse was graded and paved. Modern drainage features impinge on its former location.

At present, there is a large body of comparable archaeological and historical data that has been collected on various roundhouse sites. Unlike the Willis Avenue roundhouse, which stood for less than 20 years, most of the roundhouses that have been examined were long-term resources that saw a significant amount of rail traffic within each repair facility. It is unlikely that further investigations within the impact area in Block 1806 could add significantly to the body of historical and archaeological data collected on railroad roundhouses. Therefore, no further consideration is recommended for this resource.

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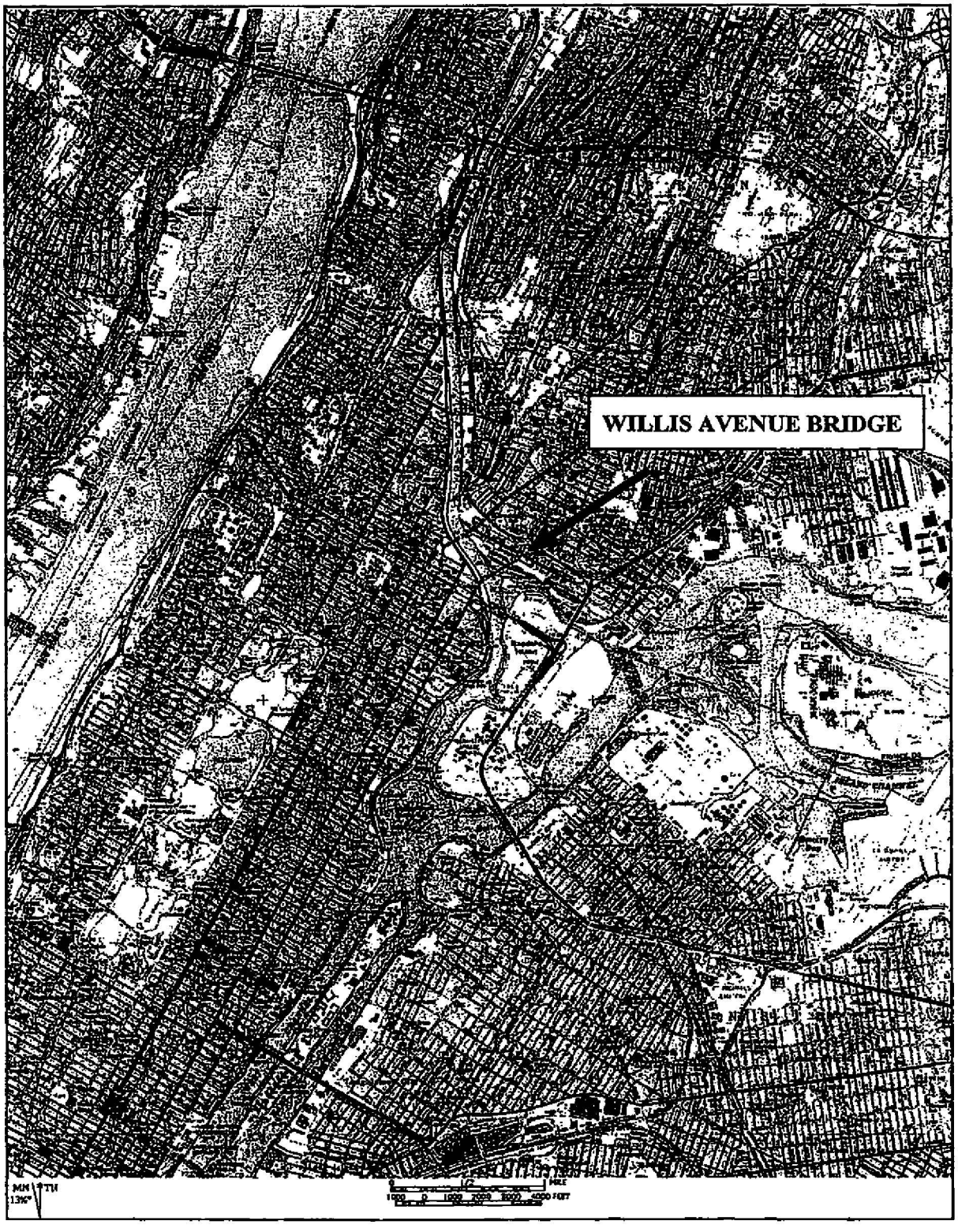


FIGURE 1
Project Location, *U.S.G.S BROOKLYN, N.Y. and CENTRAL PARK, N.Y. QUADRANGLES.* 1979

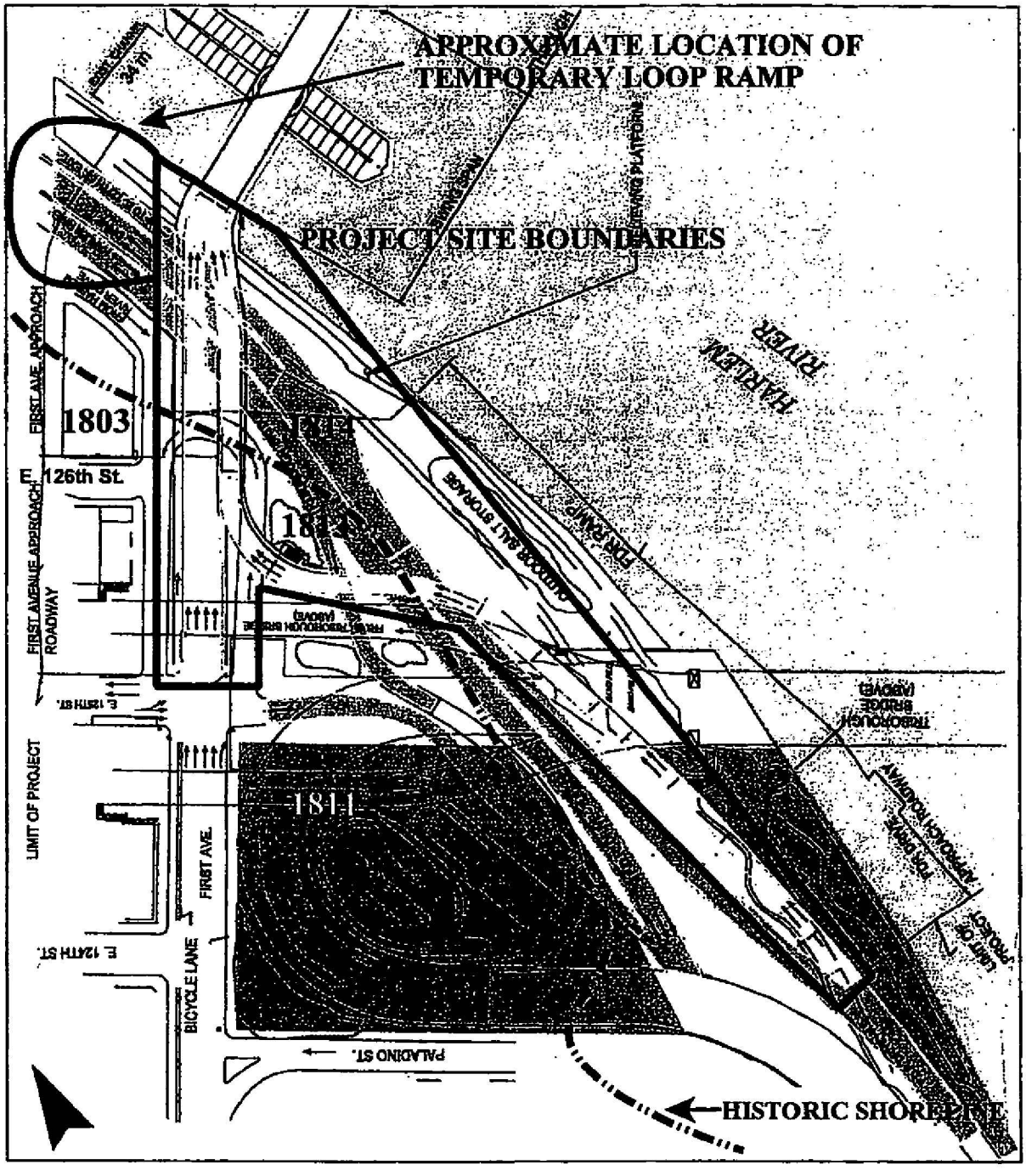


FIGURE 2

Manhattan Project Site Boundaries
Showing Current New York City Block Numbers and
Location of Historic Shoreline.

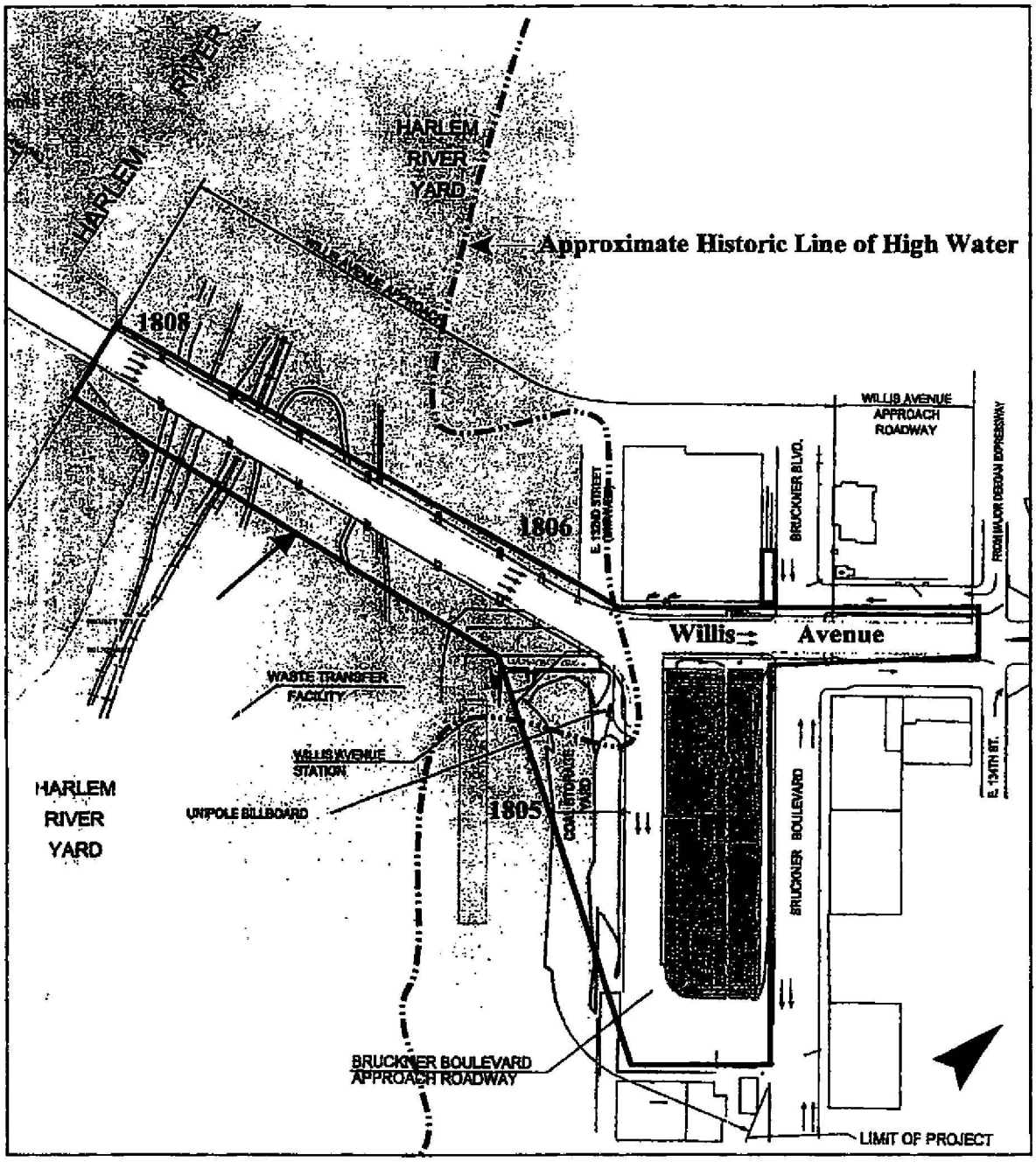
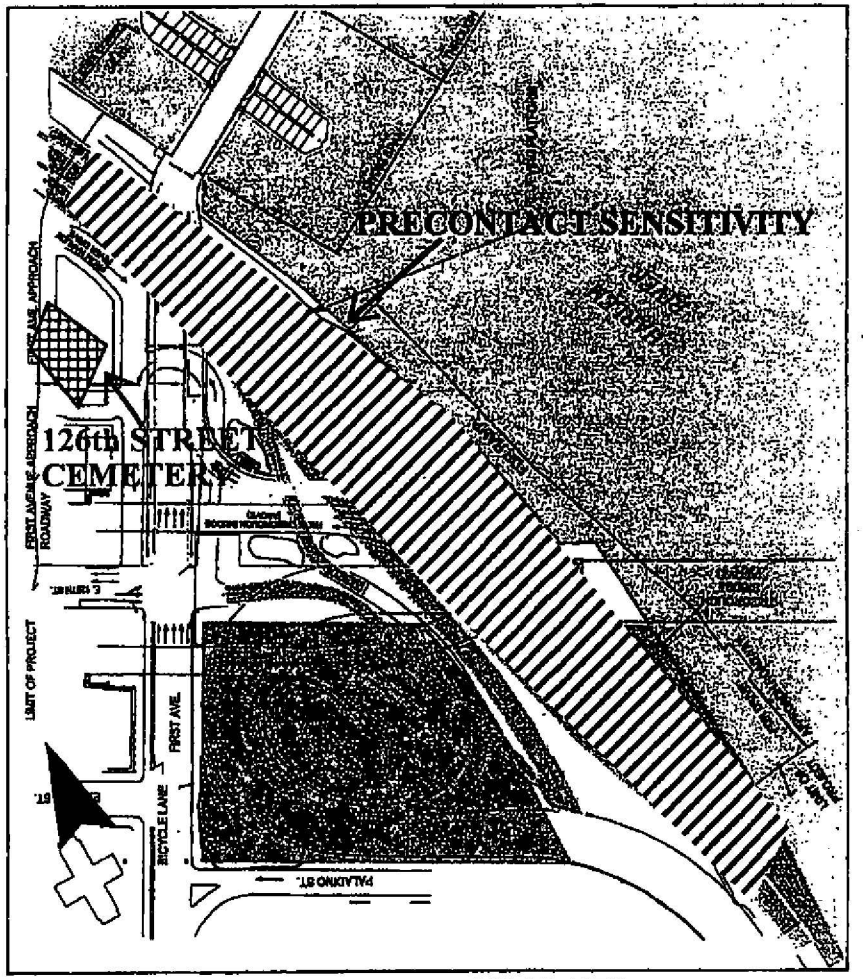
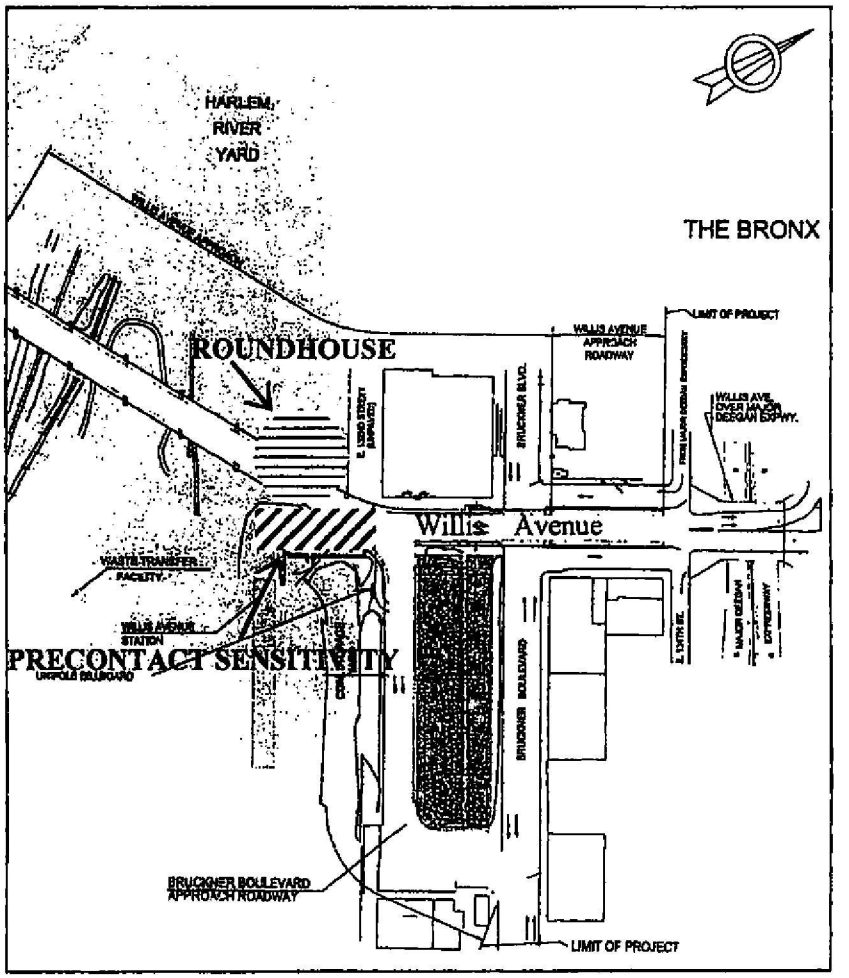


FIGURE 3

Bronx Project Site Boundaries
Showing Historic New York City Block Numbers and
Location of Historic Shoreline.



MANHATTAN PROJECT SITE



BRONX PROJECT SITE

FIGURE 4

Areas of Potential Archaeological Sensitivity.
All locations are approximate.

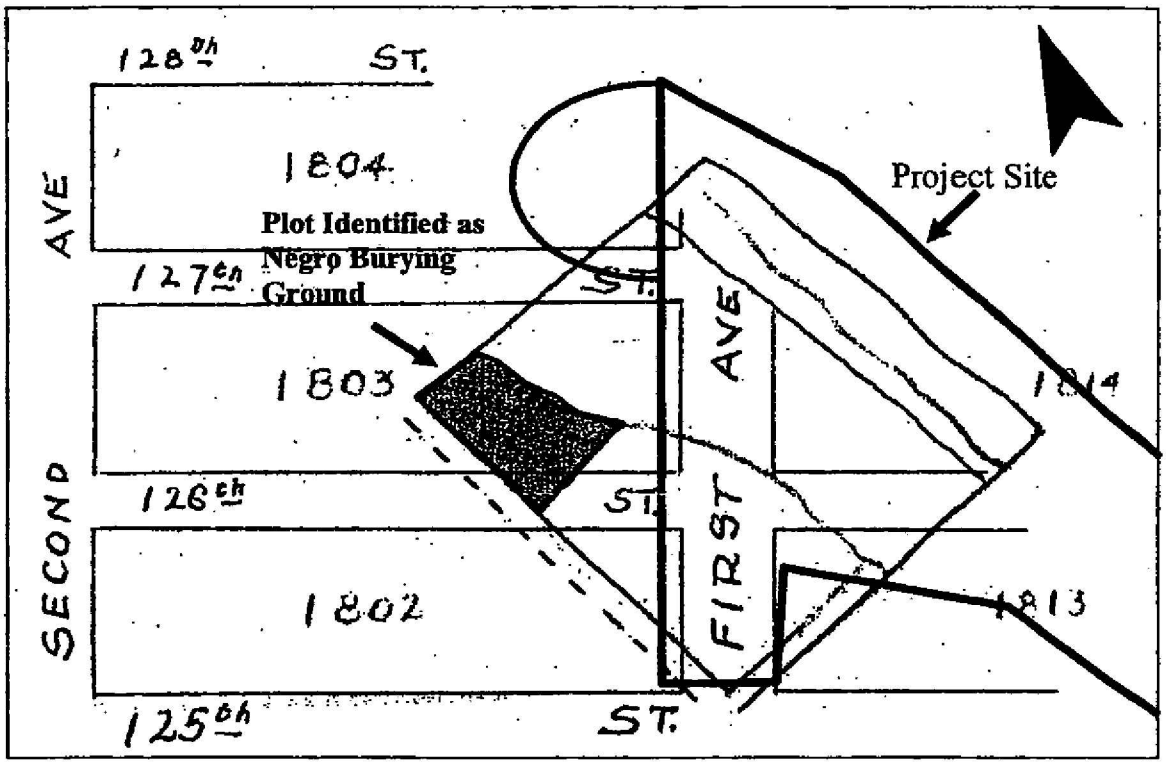


FIGURE 5

Tract Report 863.
1917.

Project Site, Manhattan.

No Scale Available.

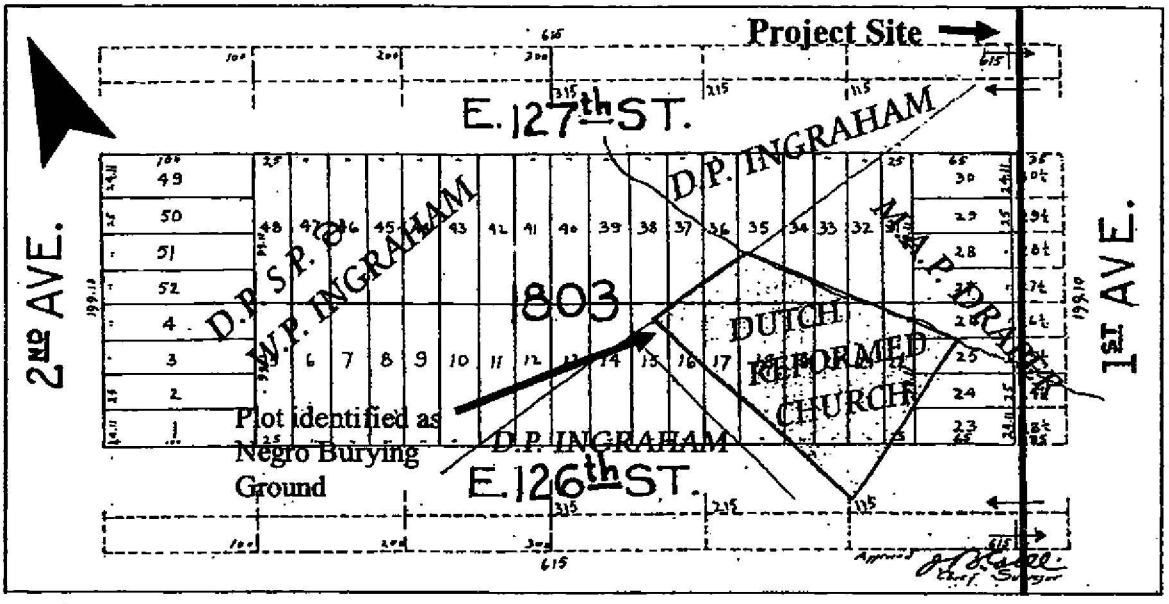


FIGURE 6

Grantor/Grantee Block 1803 Index Map.
Reformed Low Dutch Church 4 Oct. 1853 T.R. 866.

Project Site, Manhattan.

Approximate Scale: 13/16 inch= 100 feet

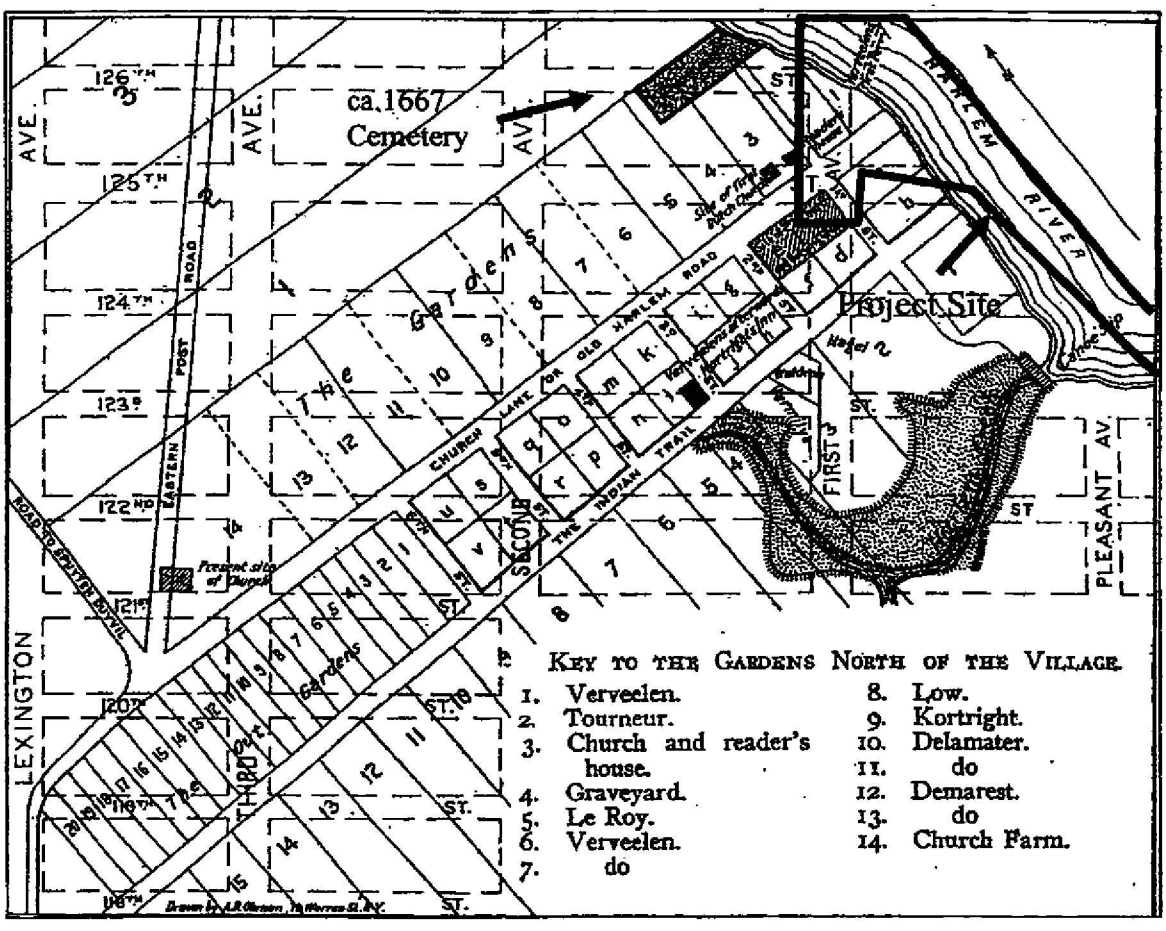


FIGURE 7

Map of New Harlem Village.
Pierce 1903.

Project Site, Manhattan.

No Scale Available.

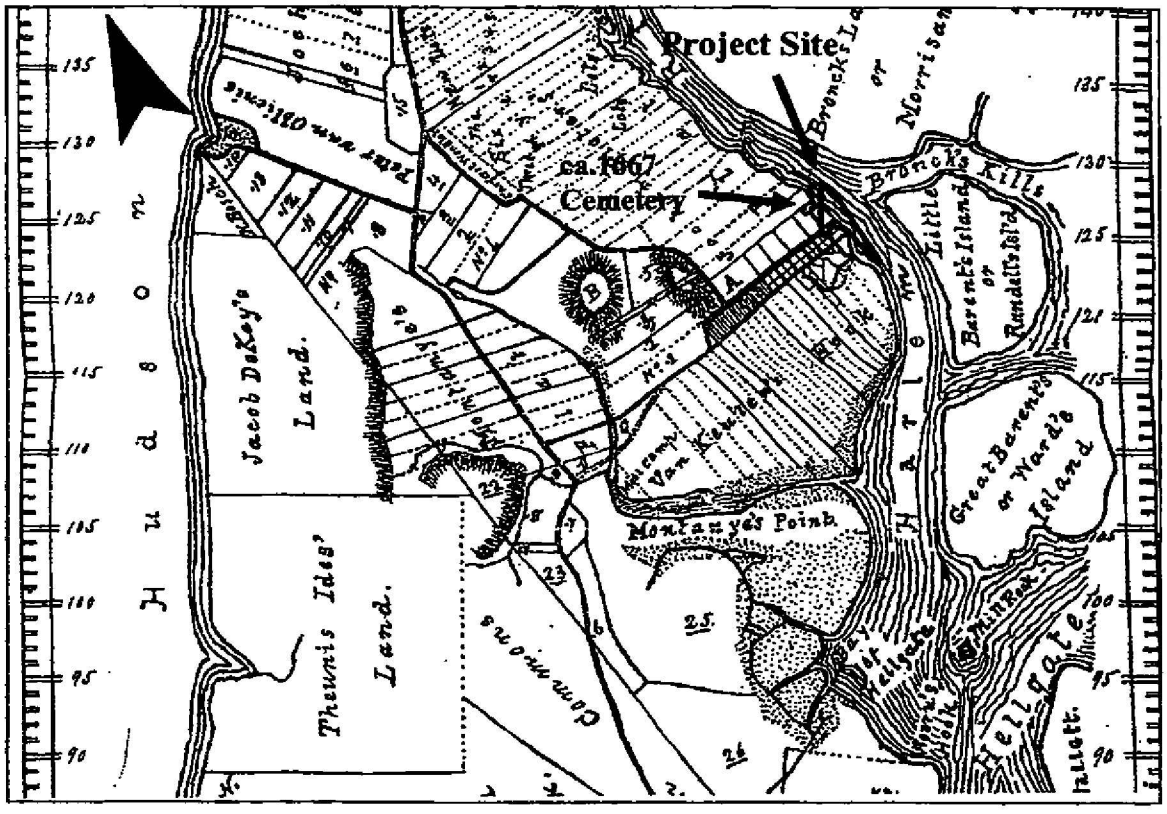


FIGURE 8

Map of Harlem, showing the lands as in the original lots and farms.
Riker 1879 in Pierce 1903.

Project Site, Manhattan.

No Scale Available.

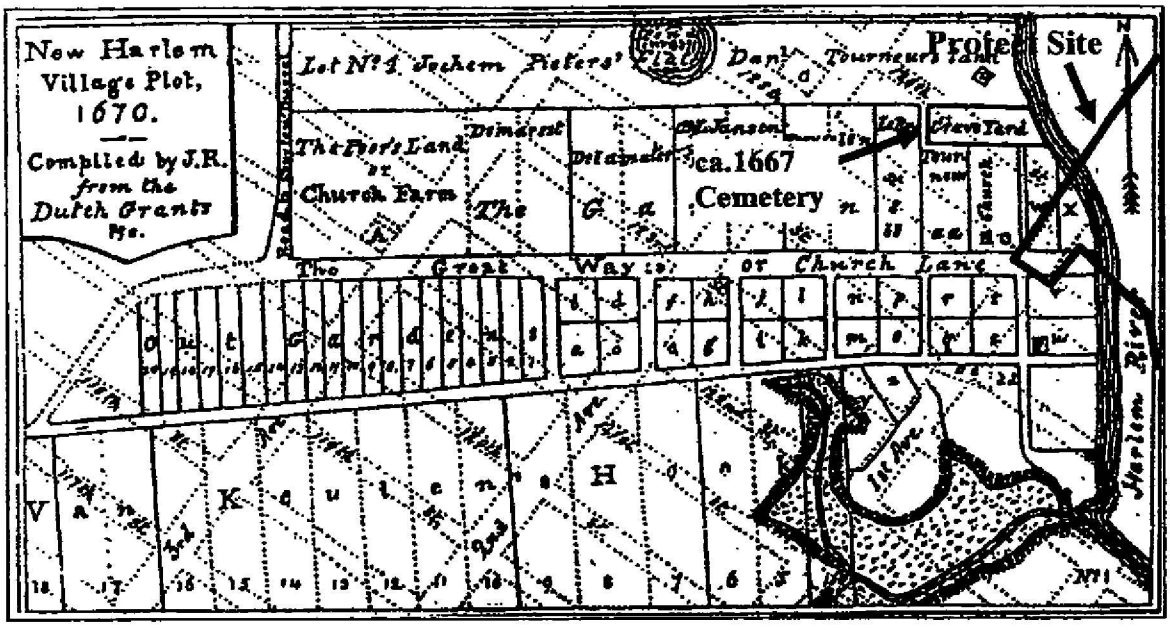


FIGURE 9

New Harlem Village Plot, 1670.
Romer and Hartman 1981.

Project Site, Manhattan.

Approximate Scale: 3/16 inch= 100 feet

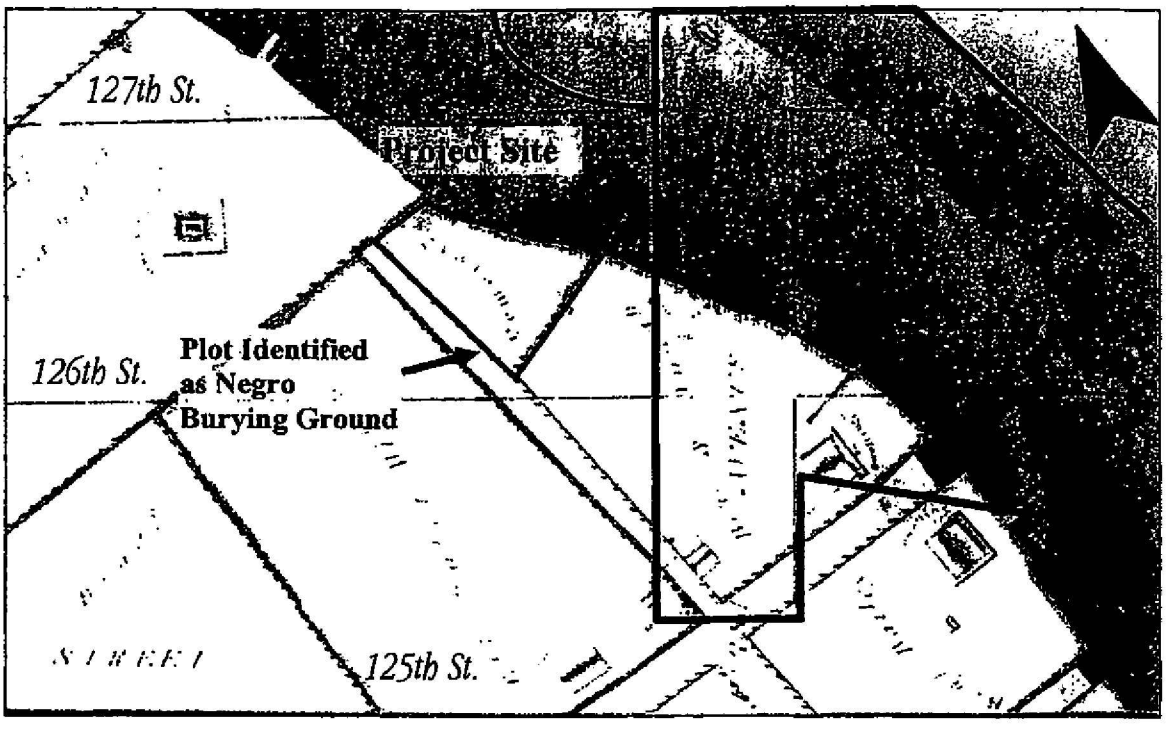


FIGURE 10

Farm Maps.
Randel 1820.

Project Site, Manhattan.

No Scale Available.

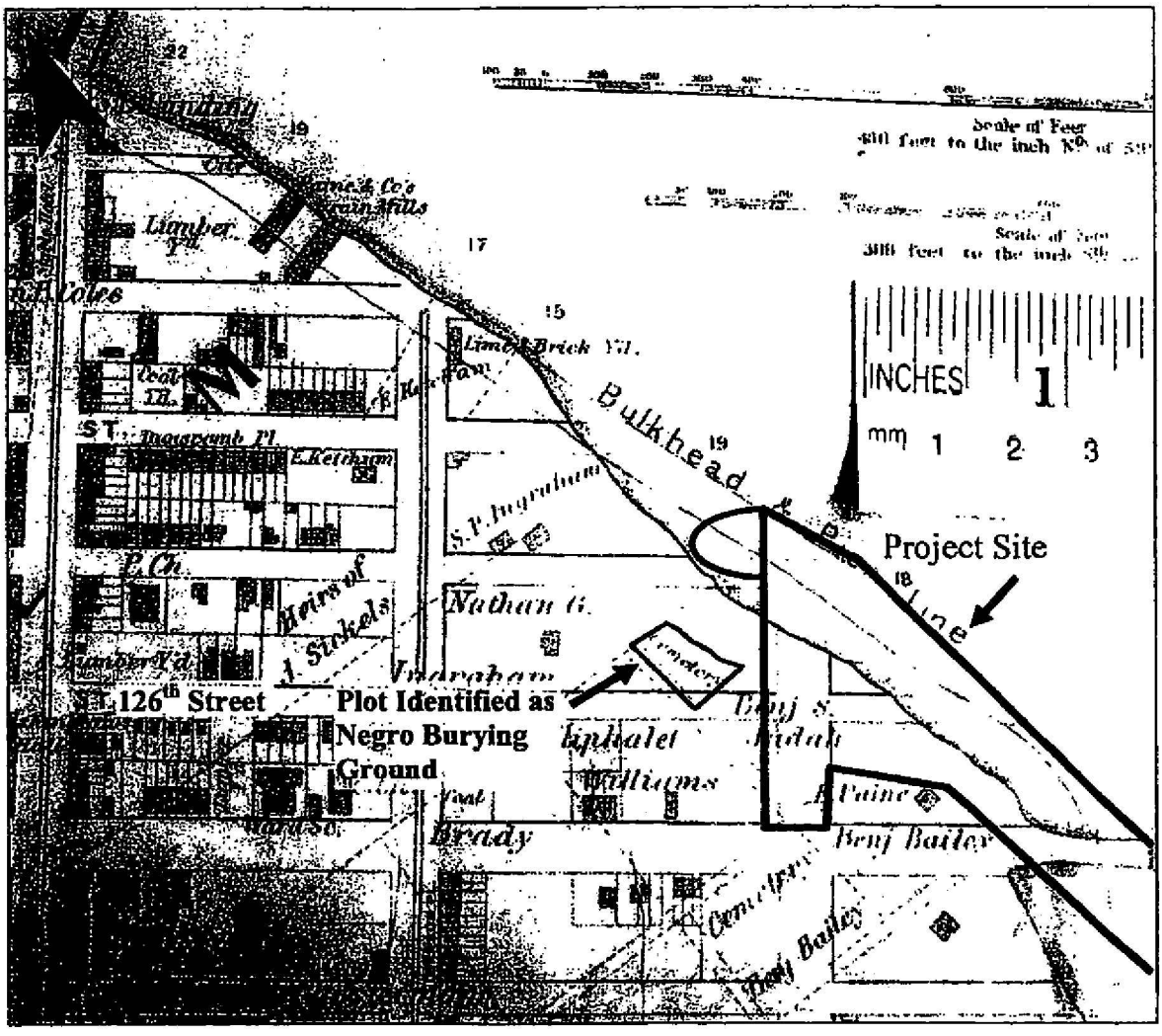


FIGURE 11

New York City, County, and Vicinity.
Dripps 1867.

Project Site, Manhattan.

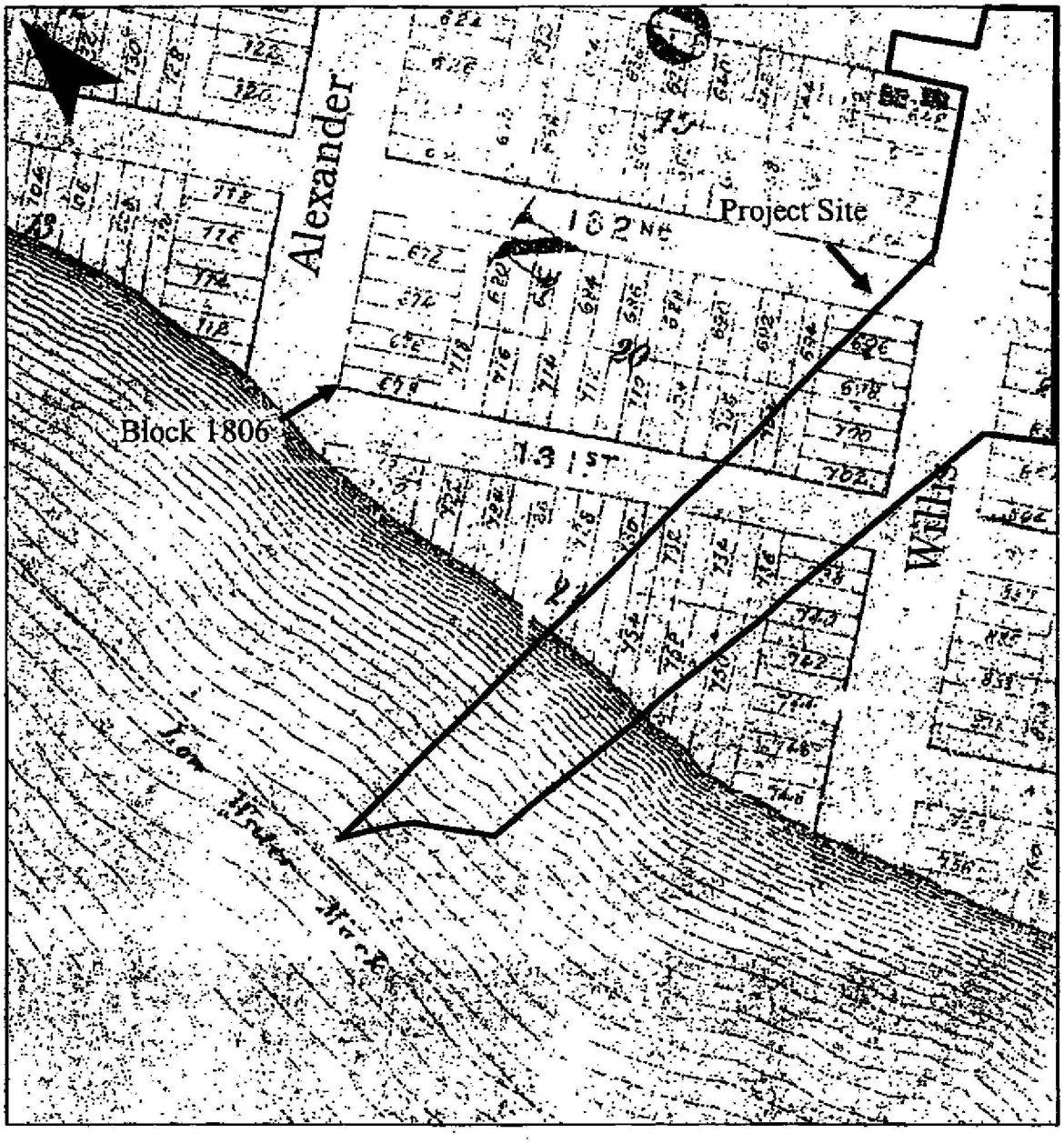


FIGURE 12

Map of the Town of Morrisania, Westchester County, New York.
Beers 1860.

Project Site, Bronx.

No Scale Available.

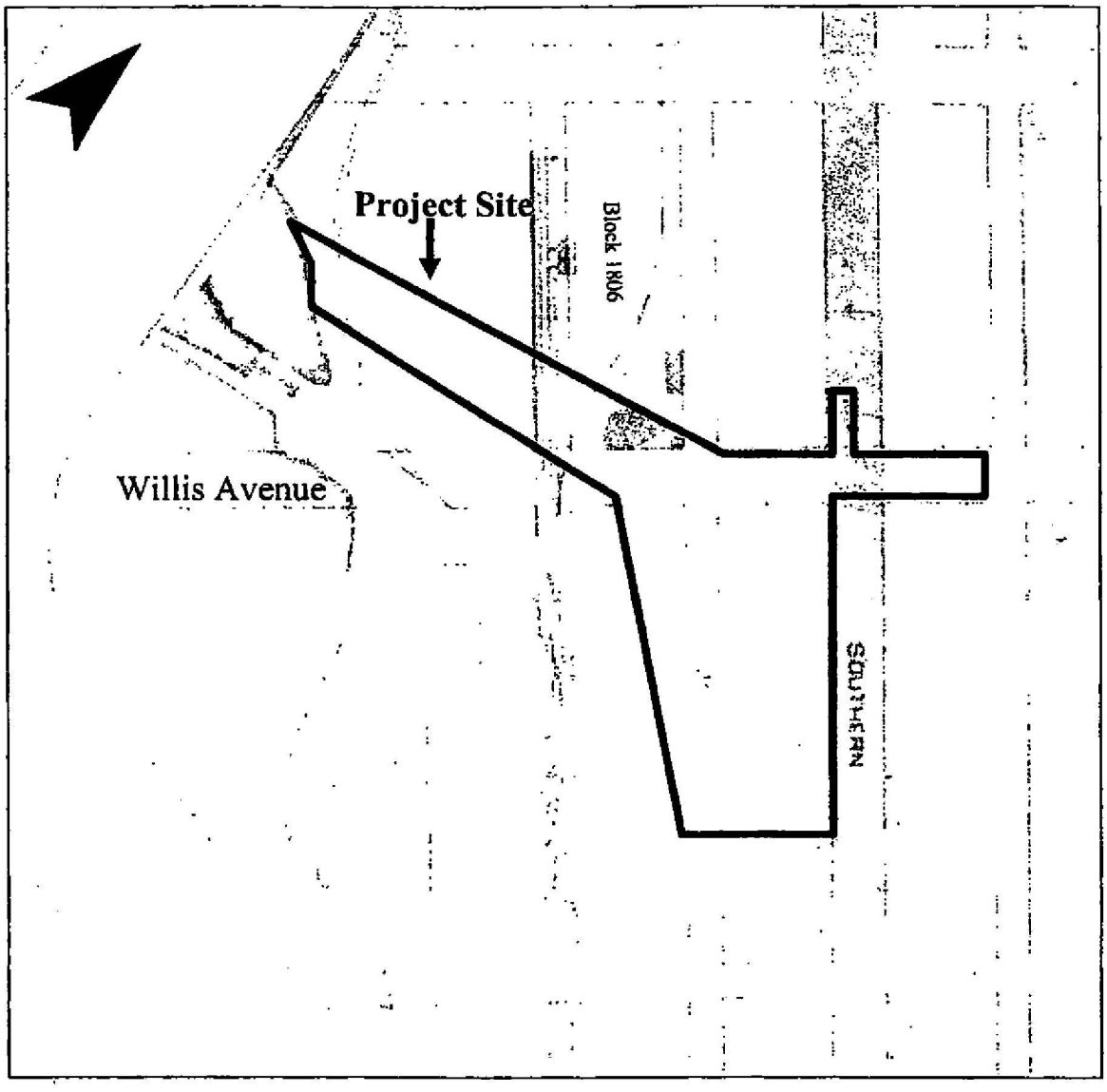


FIGURE 13

Topographical map made from surveys by the Commissioners of the Department of Public Parks.
New York Department of Parks, 1873.

Project Site, Bronx.

No Scale Available.

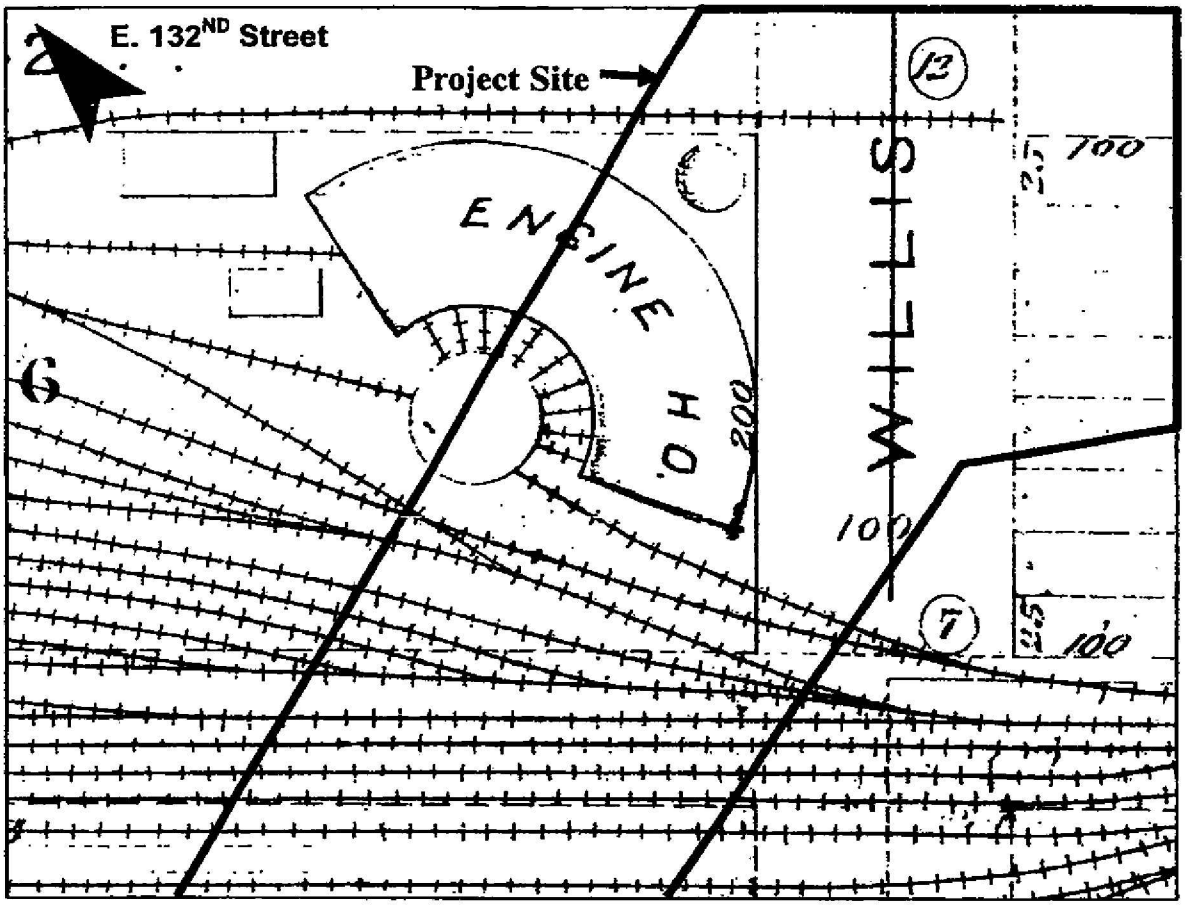
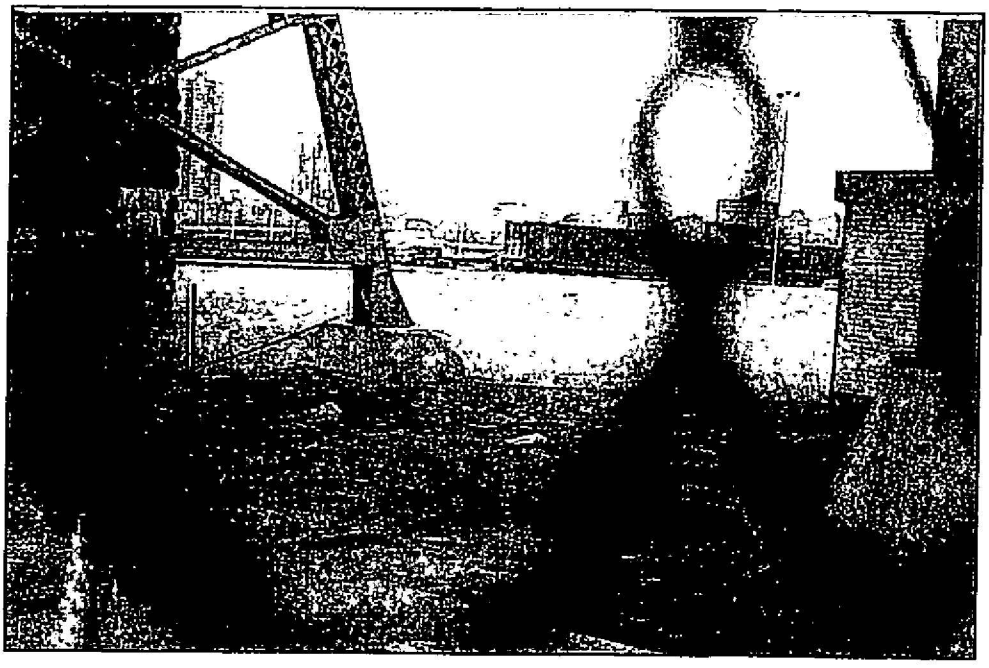


FIGURE 14

Atlas of the City of New York.
Robinson1887.

Project Site, Bronx.

No Scale Available.



Photograph A: Two sewer manholes observed in area of potential sensitivity for a roundhouse. Facing southwest, Bronx Project Area.

APPENDIX

SOIL BORING LOGS

2

LEGEND:

- Soil Sample Location (Geoprobe)
- Soil & Groundwater Sample Location (Geoprobe)
- Groundwater Sample Location (Piezometer)
- Grounwater Sample Location (Monitoring Well)
- River Bottom Sample Location

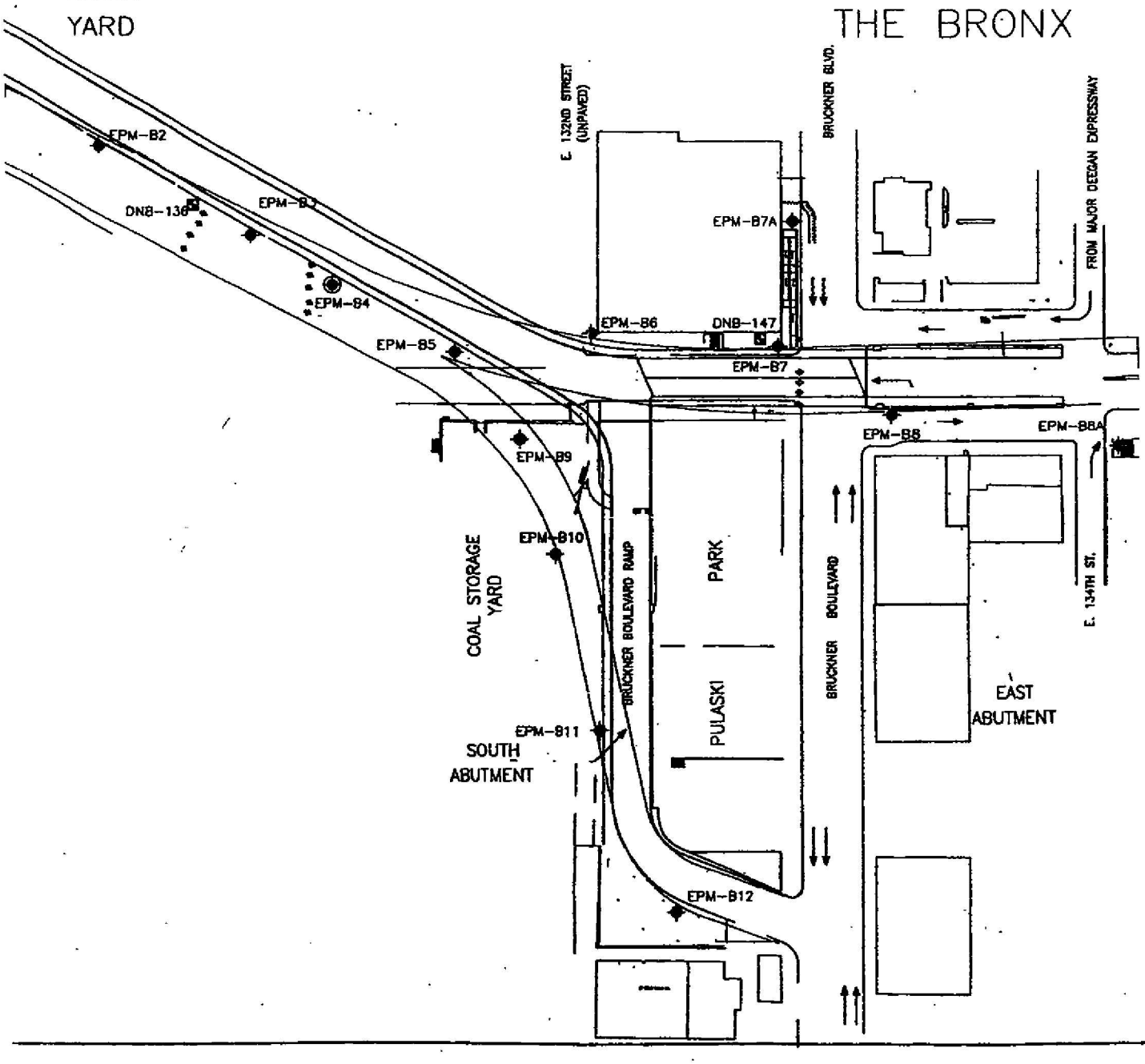
CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS

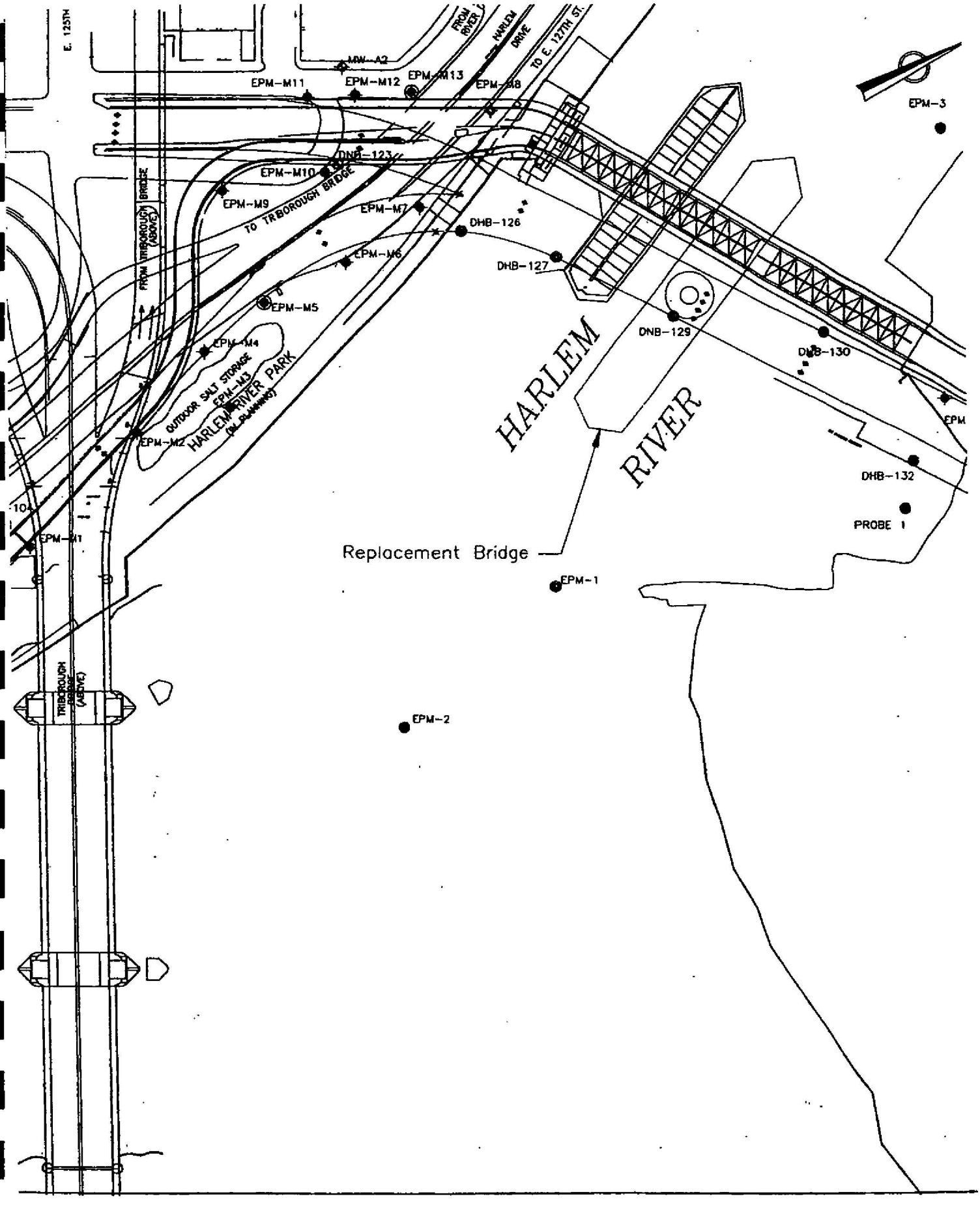
CONTRACT NO. HBM1124

RECONSTRUCTION OF
WILLIS AVENUE BRIDGE
OVER THE HARLEM RIVER
BOROUGHS OF MANHATTAN AND THE BRONX BIN 2-24005-9/A/B

SAMPLE LOCATION MAP

DATE:	SCALE:	FIGURE NO.
December 2000	1 : 2000	2




E. 125TH
FROM RIVER
HARLEM DRIVE
TO E. 127TH ST.
MW-A2
EPM-M11
EPM-M12
EPM-M13
EPM-M8
EPM-3
DNB-123
EPM-M10
EPM-M9
TO TRIBOROUGH BRIDGE
FROM TRIBOROUGH BRIDGE (ABOVE)
EPM-M7
DHB-126
EPM-M6
DHB-127
EPM-M5
DNB-129
DHB-130
EPM-M4
OUTDOOR SALT STORAGE
EPM-M3
HARLEM RIVER PARK (PLANNED)
HARLEM
RIVER
EPM-M2
EPM
DHB-132
PROBE 1
EPM-M1
Replacement Bridge
EPM-1
TRIBOROUGH BRIDGE (ABOVE)
EPM-2

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BORING/CORE LOG OF

EPM - M1

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 8:30		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 9:00		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 12' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* Between ~7' and ~11'10" BG		*Logged by:*	John Lankowicz
Soil Boring Number:	EPM-M2	Boring Location: East of Harlem River Drive Composite 0-7'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-3'	dry, brown-black, very fine SAND and	0.2	36"		0.0
		SILT, some gravel				0.5
						1.0
						1.5
						2.0
						2.5
	3'-4'	dry, light brown-orange, very fine SAND	0.7	12"		3.0
		and SILT				3.5
2	4'-7'	moist, brown, very fine SAND and SILT,	0.1	24"	Refusal at 7'.	4.0
		some gravel, some red brick and concrete			Moved ~2, and	4.5
					preprobed to 4'.	5.0
					Encountered void	5.5
					from 4'-8', and from	6.0
					8'-12'.	6.5
						7.0
						7.5
						8.0
						8.5
						9.0
						9.5
						10.0
						10.5
						11.0
						11.5
						12.0

NR: information not recorded

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BORING/CORE LOG OF

EPM-M2

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 9:15		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 9:30		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 8' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water: Between* ~4' and ~5'6" BG		*Logged by:*	John Lankowicz
Soil Boring Number:	EPM-M2	*Boring Location:* Harlem River Park - Southwest side of Salt Pile Composite 0-6'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'					0.0
		6", SALT and ASPHALT / CONCRETE	<1	42"		0.5
		24" moist, brown, very fine SAND,				1.0
		some gravel				1.5
		12" dry, gray-brown, very fine SAND and				2.0
		SILT, with little gravel				2.5
						3.0
						3.5
2	4'-8'	12" wet, brown-gray SILT	<1	30"		4.0
		18" wet, black, very fine SAND,				4.5
		some silt and gravel				5.0
					Groundwater	5.5
						6.0
						6.5
						7.0
						7.5
						8.0

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BORING/CORE LOG OF

EPM-M3

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 10:00		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 10:30		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 8' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~6' BG		*Logged by:*	John Lankowicz
Soil Boring Number:	EPM-M3	*Boring Location:* Harlem River Park - Northeast side of Salt Pile Composite 0-5'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'					0.0
		6" SALT	0.7	42"		0.5
		6" ASPHALT				1.0
		6" dry, brown, very fine SAND				1.5
		24" dry, brown, fine SAND, with				2.0
		little gravel				2.5
						3.0
						3.5
2	4'-8'	46" dry, brown, fine SAND, with little	0.0	48"		4.0
		gravel				4.5
		2" gray, coarse SAND and GRAVEL				5.0
						5.5
					Groundwater	6.0
						6.5
						7.0
						7.5
						8.0

NR: data not recorded

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BORING/CORE LOG OF

EPM-M4

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 10:40		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 11:00		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 12' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~6' BG		*Logged by:*	John Lankowicz
Soil Boring Number:	EPM-M4	*Boring Location:* Harlem River Park - Northwest side of Salt Pile Composite 2'-6'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'					0.0
		4" SALT	<1	42"		0.5
		12" ASPHALT and CONCRETE and				1.0
		red BRICK				1.5
		26" dry, black-brown, fine SAND and				2.0
		GRAVEL				2.5
						3.0
						3.5
2	4'-8'					4.0
						4.5
						5.0
		30" wet, black-brown, coarse to fine	<1	30"		5.5
		SAND and GRAVEL (wet@6')			Groundwater	6.0
						6.5
						7.0
						7.5
3	8'-12'	24" wet, black, coarse to fine, SAND, with	11.0	24"		8.0
		some silt, some gravel, some wood,				8.5
		organic odor				9.0
						9.5
						10.0
						10.5
						11.0
						11.5
						12.0

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BORING/CORE LOG OF

EPM-M5

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 11:05		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 11:40		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 9' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~7' BG		*Logged by:*	John Lankowicz
Soil Boring Number:	EPM-M5	*Boring Location:* East of Harlem River Drive by Pillar	Composite 2'-6'		

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'					0.0
		18" ASPHALT	0	42"		0.5
		24" dry, brown-black, fine to coarse SAND				1.0
		and GRAVEL and red BRICK and				1.5
		CONCRETE				2.0
						2.5
						3.0
						3.5
2	4'-8'	dry, brown, fine to coarse SAND and	0	NR		4.0
		GRAVEL and red BRICK and				4.5
		CONCRETE (wet@7')				5.0
						5.5
						6.0
						6.5
					Groundwater	7.0
					(Retained)	7.5
3	8'-9'	No Recovery	0	NA		8.0
						8.5
					Refusal at 9'	9.0

NA: not applicable

NR: data not recorded

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BORING/CORE LOG OF

EPM-M6

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 12:15	*Drilling Co.:* ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 12:30	*Rig Type:* Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed	*Drill Method:* direct push
Project Location:	Manhattan, NY	*Completion Depth:* 8' BG	*Sample Device:* 4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~7' BG	*Logged by:* John Lankowicz
Soil Boring Number:	EPM-M6	*Boring Location:* East of Harlem River Drive Composite 0.5'-7'	

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'	6" SALT	<1	44"		0.0
		38" moist, black, fine to coarse SAND				0.5
		and GRAVEL, with some wood, red brick,				1.0
		concrete, some silt				1.5
						2.0
						2.5
						3.0
						3.5
2	4'-8'	32" dry, brown SILT, some gravel	<1	44"		4.0
						4.5
						5.0
						5.5
						6.0
						6.5
		12" wet, brown-black, SILT and fine SAND	see above	see above	Groundwater	7.0
						7.5
						8.0

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BORING/CORE LOG OF

EPM-M7

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 12:45		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 13:00		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 8' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~6' BG		*Logged by:*	Caroline Cadalso
Soil Boring Number:	EPM-M7	*Boring Location:* East of Harlem River Drive Composite 0'-6'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'	6" ASPHALT	<1	48"		0.0
		18" dry, dark brown, fine SAND and				0.5
		CONCRETE and BRICK, with some silt				1.0
		12" dry, light brown fine to medium SAND	<1	see above		1.5
		with some silt				2.0
		12" moist, light brown SILT and fine SAND				2.5
		with some clay				3.0
						3.5
2	4'-8'	medium brown, fine to medium SAND	<1	NR		4.0
		with some silt (wet@6')				4.5
						5.0
						5.5
					Groundwater	6.0
						6.5
						7.0
						7.5
						8.0

NA: not applicable
NR: data not recorded

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BORING/CORE LOG OF

EPM-M8

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 13:10		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 13:40		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 12' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~8' BG		*Logged by:*	John Lankowicz
Soil Boring Number:	EPM-M8	*Boring Location:* Unpaved road beneath Willis Avenue Bridge Composite 0'-8'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'	4" ASPHALT	<1	44"		0.0
		16" dry, black, medium to coarse				0.5
		SAND and GRAVEL				1.0
		24" dry, brown, fine SAND, little gravel	< i	see above		1.5
						2.0
						2.5
						3.0
						3.5
2	4'-8'	28" dry, brown, fine SAND, little gravel	<1	40"		4.0
		12" dry, black, fine to coarse, SAND and				4.5
		GRAVEL				5.0
						5.5
						6.0
						6.5
						7.0
						7.5
3	8'-12'	wet, brown, medium to coarse, SAND and	<1	NR	Groundwater	8.0
		GRAVEL				8.5
						9.0
						9.5
						10.0
						10.5
						11.0
						11.5
						12.0

NR: data not recorded

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BORING/CORE LOG OF

EPM-M10

Client:	NYCDOT/H & H	*Date/Time Started:* 11/27/00 14:30		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/27/00 14:45		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 8' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~6' BG		*Logged by:*	John Lankowicz and Caroline Cadalso
Soil Boring Number:	EPM-M10	*Boring Location:* West of Harlem River Drive Composite 0'-6'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'	12" dry, brown, fine SAND and SILT	<1	48"		0.0
						0.5
		12" CONCRETE				1.0
						1.5
		24" dry, brown, very fine to fine SAND	<1	see above		2.0
						2.5
						3.0
						3.5
2	4'-8'	24" dry, brown, SILT	<1	48"		4.0
						4.5
						5.0
						5.5
		24" wet, brown-gray, SILT	<1	see above	Groundwater	6.0
						6.5
						7.0
						7.5
						8.0

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BORING/CORE LOG OF

EPM-M13

Client:	NYCDOT/H & H	*Date/Time Started:* 11/28/00 8:30		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/28/00 10:45		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Manhattan, NY	*Completion Depth:* 8' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water: Between* ~4' to ~8' BG		*Logged by:*	Caroline Cadalso
Soil Boring Number:	EPM-M13	*Boring Location:* South of Bus Depot	Composite 0-4'		

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-4'	7" dry, brown, very fine to fine SAND	2.1	48"	loose soil	0.0
		with some silt				0.5
		41" dry, brown-black, fine to medium				1.0
		SAND and GRAVEL, some concrete				1.5
						2.0
						2.5
					Slight odor at 3-4'	3.0
						3.5
2	4'-8'	No Recovery (wet spoon)	NA	NA		4.0
						4.5
						5.0
						5.5
						6.0
						6.5
						7.0
					Groundwater	7.5
					(Retained)	8.0

NA: not applicable
NR: data not recorded

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BORING/CORE LOG OF

EPM-B5

Client:	NYCDOT/H & H	*Date/Time Started:* 11/30/00 11:00		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/30/00 11:15		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Bronx, NY	*Completion Depth:* 12' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* 8' BG		*Logged by:*	Caroline Cadalso
Soil Boring Number:	EPM-B5	*Boring Location:* Rail Yard - East Side	Sampled 0-2', 2'-4', and composite 0-8'		

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-2'	dry, beige-gray, fine to coarse SAND and	0.6	24"		0.0
		ASPHALT and CONCRETE				0.5
						1.0
						1.5
	2'-4'	dry, light orange-brown, fine to medium	0.5	24"		2.0
		SAND with some silt				2.5
						3.0
						3.5
2	4'-8'	dry, light brown SILT and very fine to fine	0.4	14"		4.0
		SAND				4.5
						5.0
						5.5
						6.0
						6.5
						7.0
						7.5
3	8'-12'	wet, tan-light, gray-brown, SILT and	0.4	48"		8.0
		very fine to fine SAND				8.5
						9.0
						9.5
						10.0
						10.5
						11.0
						11.5
3	12'	wet, gray PEAT	see above	shoe		12.0

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BORING/CORE LOG OF

EPM-B6

Client:	NYCDOT/H & H	*Date/Time Started:* 11/29/00 14:45		*Drilling Co.:*	ADT
Project Name:	Phase II Investigation	*Date/Time Completed:* 11/29/00 15:00		*Rig Type:*	Geoprobe
Project Location:	Willis Avenue Bridge	*Elevation & Datum:* not surveyed		*Drill Method:*	direct push
Project Location:	Bronx, NY	*Completion Depth:* 12' BG		*Sample Device:*	4' Macro Core Sampler
Project Number:	20019	*Depth to Water:* ~7' BG		*Logged by:*	Caroline Cadalso
Soil Boring Number:	EPM-B6	*Boring Location:* Willis Avenue sidewalk	Composite 0-6.5'		

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-2"	CONCRETE	NA	NA		0.0
	2"-1.5'	dry, brown, fine to medium SAND with some	0.7	16"		0.5
		silt				1.0
	1.5'-4'	dry, light orange-brown SILT with very fine	see above	see above		1.5
		to fine SAND				2.0
						2.5
						3.0
						3.5
2	4'-6'	dry to moist, orange-brown SILT with some	0.4	24"		4.0
		very fine to fine SAND				4.5
						5.0
						5.5
	6'-8'	moist to wet, orange-brown SILT with some	0.7	24"		6.0
		very fine to fine SAND			Groundwater	6.5
						7.0
						7.5
3	8'-12'	wet, light brown, SILT with some very fine	0.6	48"		8.0
		to fine sand, some clay				8.5
						9.0
						9.5
						10.0
						10.5
						11.0
						11.5
						12.0

NA: not applicable

ENVIRONMENTAL PLANNING & MANAGEMENT, INC.
EPM
1983 Marcus Avenue, Suite C-106
Lake Success, New York 11042
(516) 328-1194 Fax (516) 328-1381

BORING/CORE LOG OF

EPM-B9

Client:	NYCDOT/H & H	Date/Time Started: 11/29/00 13:30		Drilling Co.:	ADT
Project Name:	Phase II Investigation	Date/Time Completed: 11/29/00 14:00		Rig Type:	Geoprobe
Project Location:	Wills Avenue Bridge	Elevation & Datum: not surveyed		Drill Method:	direct push
Project Location:	Bronx, NY	Completion Depth: 20' BG		Sample Device:	4' Macro Core Sampler
Project Number:	20019	Depth to Water: 11'		Logged by:	Caroline Cadalso
Soil Boring Number:	EPM-B9	Boring Location: Coal Yard Composite 0-11'			

Sample No.	Sample Interval	Description	PID (ppm)	Recovery (inches)	Comments	Depth (ft. b.g.)
1	0-1.5'	dry, orange-brown fine SAND and SILT	0.4	18"		0.0
						0.5
						1.0
	1.5'-3.5'	dry, brown, fine to medium SAND	0.6	18"		1.5
						2.0
						2.5
						3.0
						3.5
2	4'-8'	dry, light brown, fine to medium SAND with	0.5	48"		4.0
		some silt, some clay lenses				4.5
						5.0
						5.5
						6.0
						6.5
						7.0
						7.5
3	8'-12'	moist, fine to medium SAND and SILT with	0.5	48"		8.0
		some clay lenses				8.5
						9.0
						9.5
						10.0
						10.5
					Groundwater	11.0
						11.5
4	12'-12'6"	wet, WOOD	NA	NA	organic odor	12.0
	12'6"-16'	wet, gray-brown very fine to fine SAND and	0.7	18"		12.5
		SILT				13.0
						14.0
						14.5
						15.0
						15.5
5	16'-16'10"	wet, tan SILT with some very fine SAND	0.4	10"		16.5
	16'10"-20'	wet, gray-brown SILT with some very fine	0.4	35"		17.0
		SAND				17.5
						18.0
						18.5
						19.0
						19.5
						20.0

NA: not applicable

DRAWINGS

Fig D

APPENDIX D:
CULTURAL RESOURCES

- NYCLPC RESOURCE EVALUATION FOR WILLIS AVENUE BRIDGE
- SHPO RESOURCE EVALUATION FOR WILLIS AVENUE BRIDGE
- SHPO ELIGIBILITY DETERMINATION FOR WILLIS AVENUE STATION
- SHPO RESOURCE EVALUATION FOR TRIBOROUGH BRIDGE
- MARCH 31, 2000 SHPO LETTER CONCERNING MITIGATION MEASURES FOR THE WILLIS AVENUE BRIDGE RECONSTRUCTION
- SHPO NOVEMBER 1, 2000 LETTER RE: WILLIS AVENUE STATION BOUNDARY
- NOVEMBER 2, 2000 AKRF MEMO TO HARDESTY & HANOVER CONCERNING HISTORIC PROPERTIES
- STAGE 1A ARCHAEOLOGICAL ASSESSMENT - see separate document on file
- TOPIC INTENSIVE DOCUMENT STUDY - see separate document on file
- SIGNED MEMORANDUM OF AGREEMENT
- CORRESPONDENCE RE: MEMORANDUM OF AGREEMENT AND THE WILLIS AVENUE STATION HOUSE
- SECTION 106 PROCEDURES RE: TRIBAL COORDINATION
- DOCUMENTATION OF ART COMMISSION APPROVAL

NYCLPC AND SHPO RESOURCE EVALUATIONS FOR WILLIS AVENUE BRIDGE

THE CITY OF NEW YORK LANDMARKS PRESERVATION COMMISSION
100 Old Slip, New York, NY 10005 (212) 487-6800

ENVIRONMENTAL REVIEW

DOT/CEQR-X — PROJECT NUMBER

06/03/96 — DATE RECEIVED

PROJECT WILLIS AVE BRIDGE

[ ] No architectural significance

[X] No archaeological significance

[ ] Designated New York City Landmark or Within Designated Historic District

[ ] Listed on National Register of Historic Places

[X] Appears to be eligible for National Register Listing and/or New York City Landmark Designation

[ ] May be archaeologically significant; requesting additional materials

COMMENTS The Willis Ave. Bridge appears to be eligible for listing on the State and National Registers and appears to be eligible for NYC landmarking. Should significant adverse impacts be identified as a result of the applicant's action, consultation with the LPC and the SHPO should be initiated (CEQR Technical Manual, 1993, p. 3F-13, part 400).

Gina Santucci — SIGNATURE

06/19/96 — DATE

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

Bernadette Castro
Commissioner

RESOURCE EVALUATION **DATE:** 06/25/96 **STAFF:** Peter Shaver

PROPERTY: Willis Avenue Bridge **MCD:** Bronx/Manhattan
ADDRESS: over Harlem River **COUNTY:** Bronx/New York
PROJECT REF: 96PR0738 **USN:** 00501.000887
06101.000641

I. ___ Property is individually listed on SR/NR:
name of listing: _____
___ Property is a contributing component of a SR/NR district:
name of district: _____

II. _X_ Property meets eligibility criteria.
___ Property contributes to a district which appears to meet eligibility criteria. **Pre SRB:**___ **Post SRB:**___ _____ SRB date

Criteria for Inclusion in the National Register:
A. ___ Associated with events that have made a significant contribution to the broad patterns of our history;
B. ___ Associated with the lives of persons significant in our past;
C. _X_ Embodies the distinctive characteristics of a type, period or method of construction; or represents the work of a master; or possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction;
D. ___ Have yielded, or may be likely to yield information important in prehistory or history.

III. ___ Property does not meet eligibility criteria.

STATEMENT OF SIGNIFICANCE:

Based on the information provided, it is the opinion of the State Historic Preservation Office that the Willis Avenue Bridge meets Criterion C in the area of engineering as a distinctive example of early-20th century bridge construction in New York City. Completed in 1901 across the Harlem River between First Avenue in Manhattan and Wilis Avenue in the Bronx, the bridge consists of a swing span and a through truss span over the river, both with lattice trusses and curved top chords; 8 approach spans in Manhattan (replaced 1953 - do not contribute to the significance of the bridge); and 26 approach spans in the Bronx. Despite the updating of operating machinery on the swing span, replacement of decks, and the replacement of some of the gatemens houses, the bridge retains its integrity of location, design, setting, materials, workmanship, feeling, and association. Further research may reveal other areas of significance.

SHPO ELIGIBILITY DETERMINATION FOR WILLIS AVENUE STATION

E.O. 11593

DETERMINATION OF ELIGIBILITY NOTIFICATION

National Register of Historic Places
National Park Service

BF NY

Name of property: *Willis Avenue Station*

Location: *New York, Bronx County* State: *NY*

Request submitted by: *DOT/CG/B. L. Solomon*

Date received: *12-28-82* Additional information received:

Opinion of the State Historic Preservation Officer:

☑ Eligible ☐ Not Eligible ☐ No Response

Comments:

The Secretary of the Interior has determined that this property is:

☑ Eligible Applicable criteria: *A,C* ☐ Not Eligible

Comments: *The Willis Avenue Station is architecturally significant as an interesting example of a restrained Dutch Colonial Revival style design employed in the construction of a railroad station that served an important industrial district in the Bronx. The passenger station is also historically significant as the only remaining building associated with the New York, New Haven and Hartford Railroad freightyards, which once provided the distribution and transport facilities to make Mott Haven one of New York's leading industrial centers.*

☐ Documentation insufficient
(Please see accompanying sheet explaining additional materials required)

Patrick Andrus
for Keeper of the National Register

Date: *10/12/83*

WASO-28

SHPO RESOURCE EVALUATION FOR TRIBOROUGH BRIDGE

NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

RESOURCE EVALUATION

DATE: 4/10/01 STAFF: Kathy Howe

PROPERTY: Triborough Bridge MCD: Manhattan, Bronx, Queens

LOCATION: Spans the Harlem River to Randall's Island; COUNTY: NY, Bronx, Queens
Spans the Bronx Kill betw. Randall's Island & the Bronx;
Traverses Randall's and Ward's Island;
spans the East River betw. Ward's Island & Queens.

PROJECT REF: 00PR4506 USN: 00501.000964
06101.008523
08101.000137

I. ☐ Property is individually listed on SR/NR:
name of listing:

☐ Property is a contributing component of a SR/NR district:
name of district:

II. ☒ Property meets eligibility criteria.

☐ Property contributes to a district which appears to meet eligibility criteria.

Pre SRB: ☐ Post SRB: ☐ SRB date

Criteria for Inclusion in the National Register:

A. ☒ Associated with events that have made a significant contribution to the broad patterns of our history;

B. ☐ Associated with the lives of persons significant in our past;

C. ☒ Embodies the distinctive characteristics of a type, period or method of construction; or represents the work of a master; or possess high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction;

D. ☐ Have yielded, or may be likely to yield information important in prehistory or history.

STATEMENT OF SIGNIFICANCE:
The Triborough Bridge, opened in 1936, is a highway system consisting of three bridges and two viaducts spanning the waters between Manhattan, the Bronx, and Queens. The structure meets National Register Criterion A for its association with the transportation history and

development of New York City. Designed by master bridge builder Othmar H. Ammann and architect Aymar Embury, II, the bridge also meets Criterion C as an outstanding example of engineering design of the twentieth century.

Construction began on the bridge on 25 October 1929; the same day the stock market crashed, and construction soon halted when investors were unwilling to purchase municipal bonds. In early 1933 Robert Moses, chairman of the New York State Emergency Public Works Commission, initiated state legislation that formed the Triborough Bridge Authority as an alternative source of funds. The bridge opened to traffic on 11 July 1936 and during its first year generated $2.72 million in tolls.[1]

The primary design components of the structure include[2]:

- **Harlem River Lift Bridge**. When built in 1936 it was the largest lift bridge in the world and the first vertical lift bridge in NYC. Spans the Harlem River between Manhattan and Randall's Island.
- **Bronx Kill Crossing.** Fixed truss bridge with four approach truss spans, a main truss span, and concrete towers. Spans the Bronx Kill between Randall's Island and the Bronx.
- **Hell Gate Crossing.** 2,780-foot eight-lane suspension bridge with two cables carrying a main span and side spans. Features two 300-foot towers. Spans the East River between Ward's Island and Queens.
- **Viaduct.** Traverses Randall's and Ward's Islands connecting the three major river crossings.
- **Junction Structure.** The road interchange structure on Randall's Island.
- **Related Improvements.** Approach roadways to the bridge provide connections to all major nearby highways.
- **TBTA Headquarters Building (aka Robert Moses Building).** Art Deco administration building located northeast of the Manhattan toll plaza. Circular drive in front of building.

The Triborough Bridge has received regular bridge maintenance and routine repairs throughout its 65 year history. A major reconstruction project occurred in the late 1960s involving the shifting of the two toll plazas and reconfiguration of ramps. These changes compromised the original symmetry of the junction structure. Despite these modifications, made to improve traffic flow, the Triborough Bridge system retains sufficient integrity from its initial date of construction to convey its historic engineering significance.

If you have any questions concerning this Determination of Eligibility, please call Kathy Howe at (518) 237-8643, ext. 3266.

---

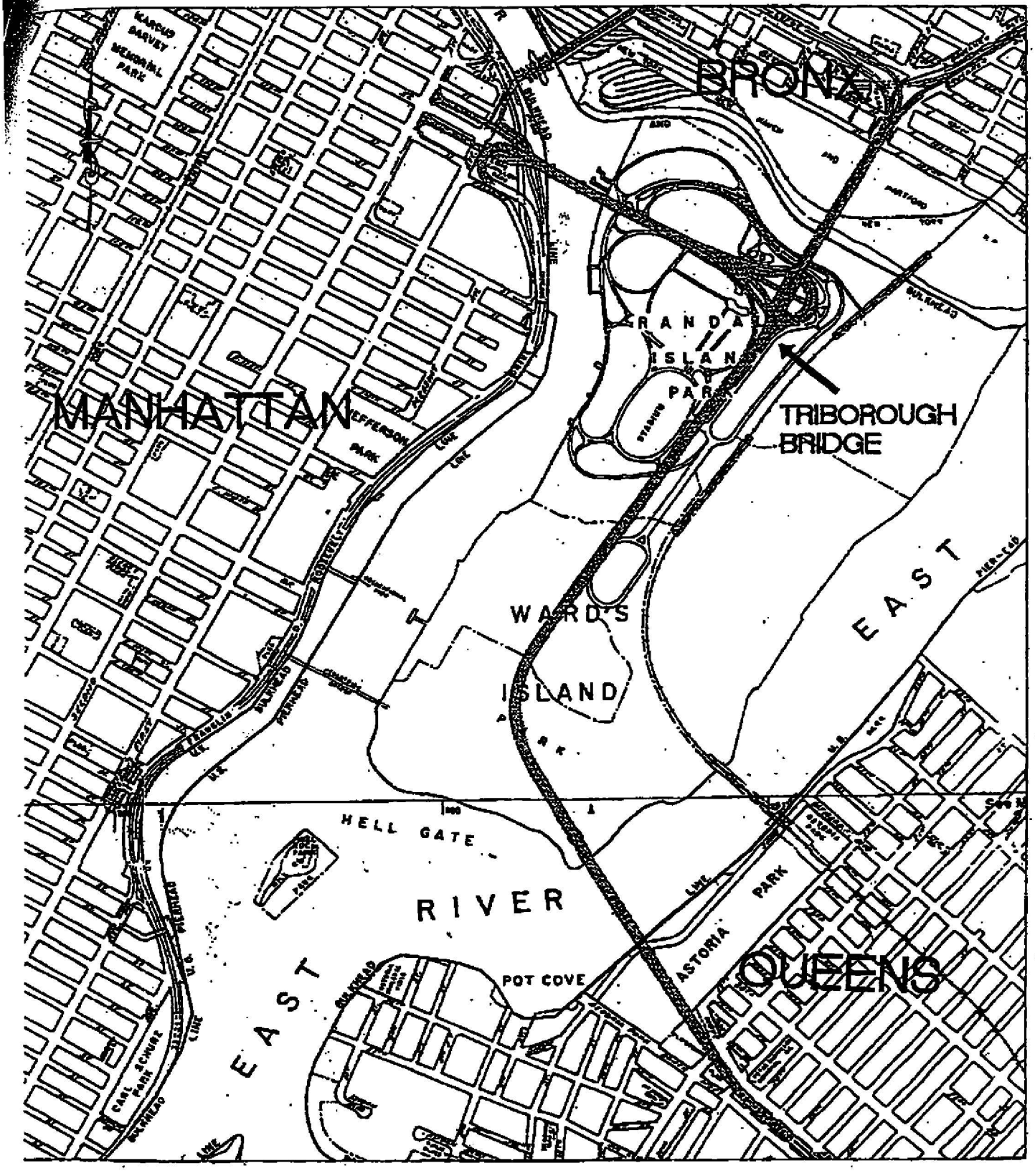
[1] Kenneth T. Jackson, *The Encyclopedia of New York City*. (New Haven: Yale University Press, 1995), p. 1200.

[2] For more information on these features see *Environmental Assessment - Triborough Bridge Rehabilitation Project: Contracts TB-64B and TB-65* prepared by Philip Habib & Associates with Allee King Rosen & Fleming, Inc., January 2001.

borough Bridge Rehabilitation Project

Figure A-1

Area Map



MARCH 31, 2000 SHPO LETTER CONCERNING MITIGATION FOR THE WILLIS AVENUE BRIDGE RECONSTRUCTION

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

March 31, 2000

William Nyman
Hardesty & Hanover, LLP
1501 Broadway
Room 310
New York, NY 10036

Dear Mr. Nyman:

Re: Willis Ave. Bridge Replacement
Bronx & Manhattan Counties
96PR0738

The State Historic Preservation Office (SHPO) has reviewed the "Alternative Evaluation and Historic Considerations" report prepared by Hardesty & Hanover for the reconstruction of the Willis Avenue Bridge over the Harlem River. Since this project requires federal permits, we have reviewed the materials in accordance with the provisions of Section 106 of the National Historic Preservation Act of 1966.

This report was prepared resultant to our office's determining that the replacement of the existing National Register eligible Willis Avenue Bridge will constitute an Adverse Effect on historic resources. Based on this report, and our March 8, 2000 meeting, we are comfortable that prudent and feasible alternatives to rehabilitation of the existing bridge have adequately examined and that Scheme III is the one that will executed. I would ask, however, that estimated dollar figures for the different schemes be included so that those calculations are made part of the record.

At this time, we are comfortable that progress can be made on a proper Memorandum of Agreement covering this project. As we discussed at our meeting, several mitigation measures should be included as part of this agreement document:

- Photographic and historic documentation of the bridge to Historic American Engineering Record standards. The level of documentation shall be determined through consultation with the SHPO prior to the completion of the document.
- At least one of the existing granite piers of the existing bridge shall be retained in situ.
- Materials from the existing abutments shall be used as features in the park adjacent to the bridge.
- The new bridge shall have a truss form to recognize the truss form(s) of the historic bridge.
- An appropriate bridge salvage company or other entity (to be identified by name in the document) shall be offered the existing trusses for reuse/sale.
- An interpretive plaque, panel or other such device shall be installed at the adjacent park, with photographic and historic information on the existing Willis Avenue Bridge.
- The Harlem River Yard Station Building shall be protected (as described in the Evaluation Report) during construction.

I hope that this is of assistance. If you have any questions please call me at (518) 237-8643, ext. 3271.

Sincerely,

Julian W. Adams
Sr. Historic Sites Restoration Coordinator

RECEIVED
APR 6 2000
HARDESTY & HANOVER

Cc: Linda Harvey Opiteck, NYS DOT, Albany Office
Gina Santucci, New York City Landmarks Preservation Commission

SHPO NOVEMBER 1, 2000 LETTER RE: WILLIS AVENUE STATION BOUNDARY

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

November 1, 2000

Mr. Nathan Riddle
Allee, King, Rosen & Fleming
117 East 29th Street, 5th floor
New York, New York 10016-8022

RE: Boundary for National Register eligible Willis Avenue Station
Bronx County, New York

Dear Mr. Riddle:

Thank you for requesting a clarification of the boundary for the Willis Avenue Station (USN: 00501.000765) which was deemed eligible by the State Historic Preservation Office in 1983. Along with the brick station, the boundary incorporates the granite abutment walls, stairways (that led to the former platform), and wrought iron railing. Enclosed is a map showing the boundaries of this historic resource.

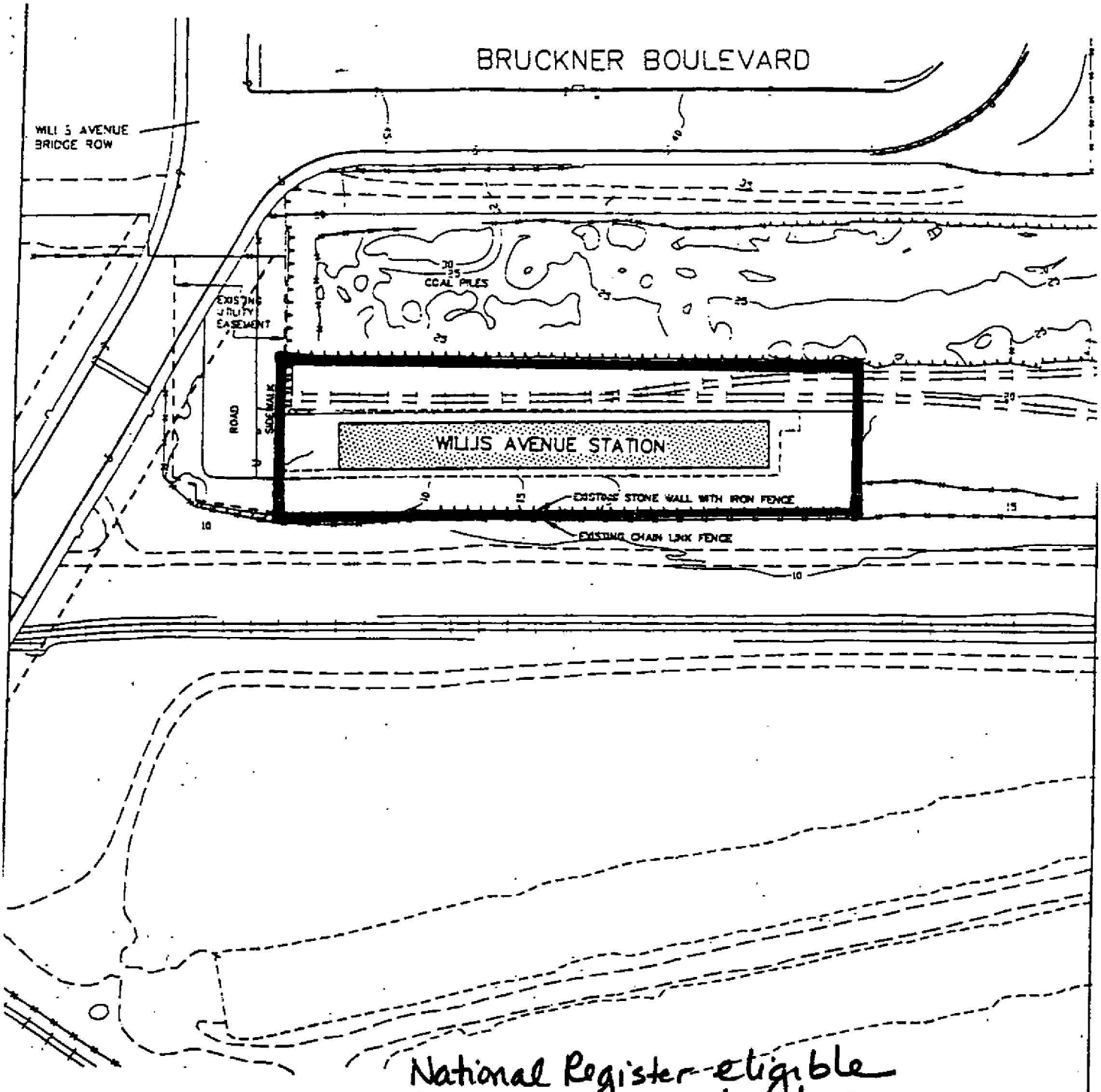
If you have any additional questions please contact me at (518) 237-8643.

Sincerely,

Kathleen A. Howe

Kathleen A. Howe
Historic Preservation Specialist

enc.



National Register-eligible boundaries indicated by dark line.

50 0 50 100
FEET

N

LEGEND

- Fence Line
- Easement
- Property Line

HARLEM RIVER YARD VENTURES INC.
INTERMODAL TRANSPORTATION AND

WILLIS AVENUE STATION
EXISTING CONDITIONS

DATE: OCT 26, 1993

TAMS CONSULTANTS, Inc.

Figure 1

NOVEMBER 2, 2000 AKRF MEMO TO HARDESTY & HANOVER CONCERNING HISTORIC PROPERTIES

MEMORANDUM

TO: Mr. William E. Nyman
Hardesty & Hanover, LLP

FROM: Nathan Riddle
Allee King Rosen & Fleming, Inc.

RE: **Willis Avenue Bridge Reconstruction**
Bronx and New York Counties, New York

DATE: November 2, 2000

In response to the letter dated July 6, 2000 from the Advisory Council on Historic Preservation (ACHP), we have provided the following information regarding the ACHP's first two requests.

Steps Taken to Identify Historic Properties

The initial step taken to identify historic properties was the definition of the area of potential effect for the Willis Avenue Bridge Reconstruction project. The study area for historic properties was based on potential effects that could result where proposed construction activities might physically alter an historic structure, where construction might be close enough to an historic structure to potentially cause structural damage, and where the proposed project might visually or contextually affect an historic resource. For the project, the study area for historic properties includes the project sites themselves and the area defined as follows — on the Manhattan side, the study area is bounded by Second Avenue to the west, Paladino Avenue to the south, the FDR Drive to the east, and the Harlem River to the north; and on the Bronx side, the study area is bounded by Lincoln Avenue to the west, the Harlem River to the south, Brook Avenue to the east, and the Major Deegan Expressway to the north (see attached Figure 8-1 from the Draft Environmental Impact Statement).

Once the study area was determined, a list of officially recognized historic resources within the study area was compiled. This includes properties or districts listed on the State or National Registers of Historic Places (S/NR) or determined eligible for such listing; National Historic Landmarks (NHLs); New York City Landmarks and Historic Districts (NYCLs); and properties that have been considered for designation by the New York City Landmarks Preservation Commission (LPC) at a public hearing or calendared for consideration at such a hearing.

A list of potential historic resources within the study area was also compiled. These were identified through field surveys and research in the sources listed below. Identified potential historic resources comprise properties that may be eligible for listing on the S/NR and/or designation as NYCLs. Assessments were based on the Criteria for listing on the National Register found in the *Code of Federal Regulations, Title 36, Part 60* and the criteria for

NYCL designation found in the *Local Laws of the City of New York, New York City Charter, Administrative Code, Title 25, Chapter 3.*

Sources Consulted to Identify Potential Historic Resources

Hermalyn, Gary and Robert Kornfeld. *Landmarks of the Bronx.* The Bronx County Historical Society; Bronx, New York, 1989.

Jackson, Kenneth T., ed. *The Encyclopedia of New York City.* Yale University Press; New Haven, 1995.

Stern, Robert A.M.; Mellins, Thomas; Fishman, David. *New York 1880.* The Monacelli Press, Inc.; New York, 1999.

Stern, Robert A.M.; Gilmartin, Gregory; Mellins, Thomas. *New York 1930.* Rizzoli International Publications, Inc.; New York, 1987.

Stern, Robert A.M.; Mellins, Thomas; Fishman, David. *New York 1960.* The Monacelli Press, Inc.; New York, 1995.

Willensky, Elliot and Norval White. *AIA Guide to New York City.* Third Edition. Harcourt Brace Jovanovich; New York, 1988.

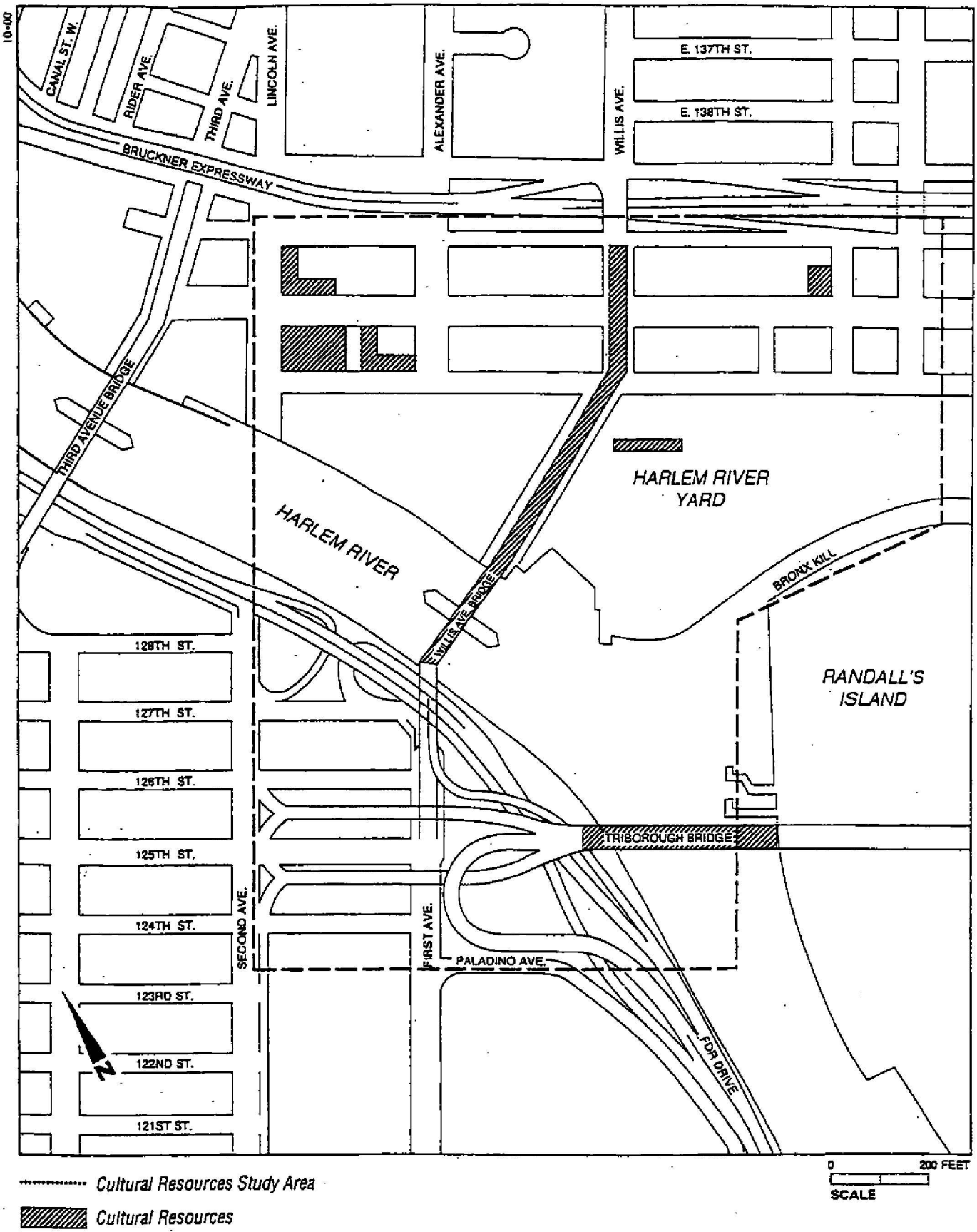
The WPA Guide to New York City. Pantheon Books; New York, 1982.

National Register Eligible Boundary of the Willis Avenue Station

The 1983 *National Register of Historic Places Determination of Eligibility Notification, E.O. 11593* for the Willis Avenue Station does not include a boundary description. The State Historic Preservation Office (SHPO) confirmed that their files do not contain a description of the eligible boundary of the Willis Avenue Station. The *Building-Structure Inventory Form* for the Willis Avenue Station, completed in 1982, describes the site as comprising the Willis Avenue Station, the adjacent granite wall with two staircase openings on Willis Avenue, the surviving granite staircase and wrought iron railing, and the adjacent granite wall to the south of the station. A letter dated November 1, 2000 from SHPO defines the National Register eligible boundary as incorporating the two adjacent granite walls and the stairway, with associated wrought iron railing, leading to the former rail platforms. This boundary roughly conforms to a line extending around the station 30 feet to the south, 50 feet to the west, 50 feet to the north, and 60 feet to the south (see attached SHPO letter and figure).

cc: Eric Prosnier, HH
Darya Kreis, PHA
Stephen Holley, AKRF
Chris Calvert, AKRF

[NJR]\wp
C:\Nathan\ACHP Memo.wpd



WILLIS AVENUE BRIDGE OVER THE HARLEM RIVER

Cultural Resources

FIGURE 8-1

OFFICE OF PARKS, RECREATION, HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

November 1, 2000

Mr. Nathan Riddle
Allee, King, Rosen & Fleming
117 East 29th Street, 5th floor
New York, New York 10016-8022

RE: Boundary for National Register eligible Willis Avenue Station
Bronx County, New York

Dear Mr. Riddle:

Thank you for requesting a clarification of the boundary for the Willis Avenue Station (USN: 00501.000765) which was deemed eligible by the State Historic Preservation Office in 1983. Along with the brick station, the boundary incorporates the granite abutment walls, stairways (that led to the former platform), and wrought iron railing. Enclosed is a map showing the boundaries of this historic resource.

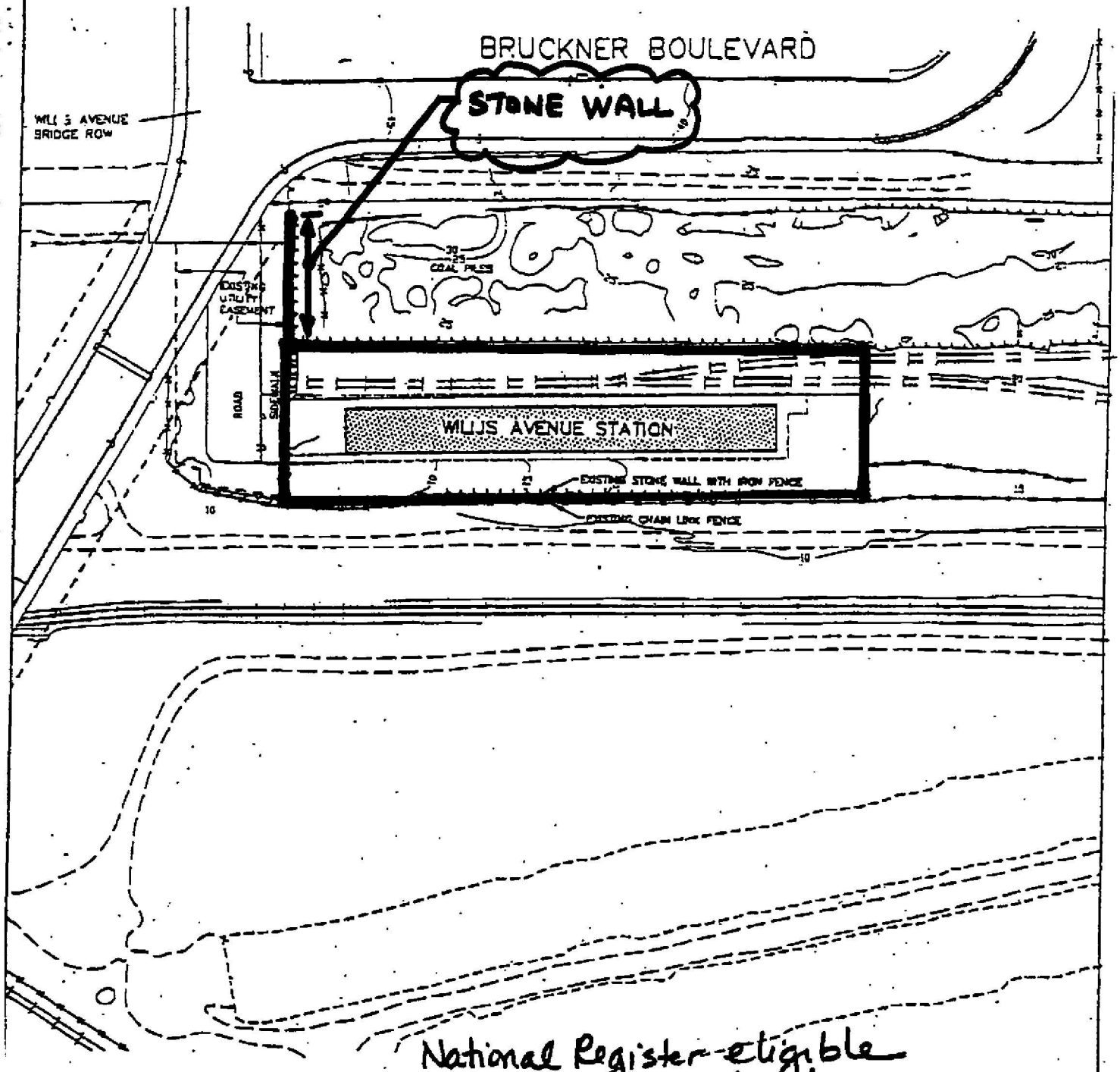
If you have any additional questions please contact me at (518) 237-8643.

Sincerely,

Kathleen A. Howe

Kathleen A. Howe
Historic Preservation Consultant

enc.



National Register-eligible boundaries indicated by dark line.

50 0 50 100
FEET

LEGEND
- Fence Line
- Easement
- Property Line

REV 11/00

OCT 26, 1993

HARLEM RIVER YARD VENTURES INC.
INTERMODAL TRANSPORTATION AND

WILLIS AVENUE STATION
EXISTING CONDITIONS

TAMS CONSULTANTS, Inc. Figure 1

STAGE 1A ARCHAEOLOGICAL ASSESSMENT

WILLIS AVENUE BRIDGE RECONSTRUCTION BRONX COUNTY AND NEW YORK COUNTY NEW YORK

PIN X757.00.121
BIN No. 2-24005-9\A\B
CONTRACT No. HBM1124
#96PR073

this page is void See separate document under same title

SIGNED MEMORANDUM OF AGREEMENT

Memorandum

U.S. Department
of Transportation
Federal Highway
Administration

Subject: PIN X757.00
Willis Avenue Bridge over the Harlem River
Bronx and New York Counties

Date: September 22, 2004

Reply To
Attn of: HDO-NY

From: Robert Arnold
Division Administrator
Albany, New York

To: Mr. Douglas Currey, P.E., Regional Director
New York State Department of Transportation
Hunters Point Plaza
Long Island City, NY 11101

Attn: Antonio Estevez

Enclosed is a copy of the Memorandum of Agreement for the subject project. Please include it in the upcoming DEIS for this project. We are also providing copies to those listed below. We ask that NYCDOT provide a copy to the NYC Landmarks Preservation Commission.

By fulfilling the terms of this agreement the requirements of 36 CFR Part 800 will be met for this project. Should you have any questions, please advise. I can be reached at (518) 431-4125 extension 237.

/S/ DAVID M. HART

David M. Hart
Senior Operations Engineer

Enclosure

cc:
Ms. Mary Ivey, Director, EAB, POD 41 w/ enclosure
Ms. Ruth Pierpont, SHPO(03PR00939) w/enclosure
Mr. Balram Chandiramani-NYCDOT, 2 Rector St 5th floor, New York, NY 10006 w/enclosure

bcc: PIN X757.00, DO Day, s:\fy04\4th\memo\X757.00 MOA.doc, HART:dh:tm 09/22/04

Preserving America's Heritage

September 7, 2004

David M. Hart
Senior Operations Engineer
U.S. Department of Transportation
Federal Highway Administration
New York Division
Leo W. O'Brien Federal Building, Room 714
Albany, NY 12207

Re: Willis Avenue Bridge Replacement Project
Bronx and New York Counties

Dear Mr. Hart:

Enclosed is the executed Memorandum of Agreement for the Willis Avenue Bridge Replacement Project. By carrying out the terms of the agreement, you will have fulfilled its responsibilities under Section 106 of the National Historic Preservation Act and the Council's regulations for this project. We recommend that you provide copies of the fully executed agreement to the New York State Historic Preservation Officer, the New York State Department of Transportation, The New York City Department of Transportation, and the New York City Landmarks Preservation Commission.

Should you have any need to discuss this project further, you may contact me at (202) 606-8534. Thank you for your ongoing cooperation.

Sincerely,

Karen Theimer Brown

Karen Theimer Brown
Office of Federal Agency Programs

Enclosure

ADVISORY COUNCIL ON HISTORIC PRESERVATION
1100 Pennsylvania Avenue NW, Suite 809 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

MEMORANDUM OF AGREEMENT

among the

New York State Historic Preservation Office,
Federal Highway Administration , the
Advisory Council on Historic Preservation
the New York State Department of Transportation
and the New York City Department of Transportation

concerning the

Willis Avenue Bridge (BIN No. 2-24005-9/A/B) over the Harlem River

Boroughs of Manhattan and the Bronx, New York

Pursuant to 36 CFR 800.6(a)

WHEREAS, the Federal Highway Administration (FHWA) proposes to replace the Willis Avenue Bridge, located in the Boroughs of Manhattan and the Bronx in New York, with a new bridge on a new alignment south of and roughly parallel to the existing bridge in order to address safety concerns with the existing bridge; and

WHEREAS, FHWA has determined that the PIN: X757.00 Willis Avenue Bridge replacement project (undertaking) will have an adverse effect upon the Willis Avenue Bridge which is eligible for inclusion in the National Register of Historic Places (National Register), and has consulted with the New York State Historic Preservation Office (SHPO) pursuant to 36 CFR Part 800, "Protection of Historic Properties," the Advisory Council on Historic Preservation's (Council's) regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

WHEREAS, FHWA in consultation with the SHPO, has determined that the undertaking will not adversely affect the Willis Avenue Station, a property eligible for the National Register, and the new bridge will be located at least 60 feet away from the station building; and

WHEREAS, FHWA in consultation with the SHPO has determined that the undertaking will not adversely affect other historic or potentially historic architectural resources within the study area including the Haines Piano Company Building, the Rupert Brewery Ice Factory, the Estey Piano Company Building, the Triborough Bridge, the Warehouse at Bruckner Blvd and Brown Place, and the Warehouse at Lincoln Avenue and Bruckner Blvd; and

WHEREAS, NYCDOT has determined in consultation with SHPO that four areas within the area of potential effect have been determined sensitive for prehistoric or historic archaeological resources (Attachment B); including potential prehistoric resources below the FDR and Harlem River Drives in Manhattan; potential prehistoric resources below

the north end of Block 1805 in the Bronx; a 17th century cemetery near First Avenue and 126th Street in Manhattan; and an 1873 roundhouse in the southern portion of Block 1806 in the Bronx; and,

WHEREAS, FHWA has consulted with the New York State Department of Transportation (NYSDOT), the New York City Department of Transportation (NYCDOT) and the Advisory Council on Historic Preservation (Council) and these parties are invited to sign this Memorandum of Agreement (MOA); and

WHEREAS, the New York City Landmarks Preservation Commission (LPC) has declined the offer to be a signatory to this Memorandum of Agreement, but they will be provided copies of all related project documents created during the course of historic preservation compliance for this project; and

WHEREAS, NYCDOT and FHWA notified the public about this project through the SEQRA/EIS process. The project was advertised and public hearings were held at the scoping phase in December 2000 and will be held after publication of the draft Design Approval Document (DR/EIS). The public has an opportunity to comment on the project at each public hearing; and

WHEREAS, NYCDOT and FHWA consulted with property owner Zee Frank as an interested party throughout the consultation process; and,

NOW, THEREFORE, the FHWA, NYSDOT, NYCDOT, SHPO, and the Council agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

FHWA will ensure that the following measures are implemented:

1 NYCDOT will complete an Historic American Engineering Record (HAER) Level III photographic and historic documentation of the existing bridge and will submit the documentation to the SHPO for review and comment prior to demolition. NYCDOT will provide final archival documentation to the SHPO for repository in the New York State Archives.

2. NYCDOT will preserve one existing arched granite pier (Pier 17) within the new right-of-way of the new bridge.

3. The new swing span will be a through truss type which recognizes the form of the Willis Avenue Bridge.

4. NYCDOT, in consultation with the SHPO, will develop a plan for marketing the existing swing span and through trusses for reuse. The detailed plan shall be reviewed by the SHPO, and a copy will be given to LPC.

5. NYCDOT, in consultation with SHPO, will develop an interpretive plaque, panel, or other device to interpret the history of the Willis Avenue Bridge and incorporate it's installation as part of the bridge replacement project. In consultation with SHPO, NYCDOT will identify an appropriate location for the interpretative materials, and NYCDOT will be responsible for installation.

6. NYCDOT will design the Bruckner Boulevard ramp of the new bridge to pass over the stone wall and such that no foundations will be constructed within the buffer zone (Attachment A). A 60-foot clearance to the Willis Avenue Station building will be maintained.

7. NYCDOT will protect the Willis Avenue Station during construction using fencing and signage. The area protected will encompass the entire National Register Boundary, which includes the station, granite walls, stairways that lead to the former platform and wrought iron railings. NYCDOT will submit specific details of the construction plan and limits of work to SHPO, NYSDOT and FHWA for a 30-day review and comment.

8. NYCDOT will conduct studies as necessary to determine the eligibility for the National Register on the four areas that have been identified as potentially eligible for the National Register. Should the areas be determined eligible, NYCDOT will further consult with the SHPO to determine appropriate treatment measures, which may include avoidance if possible or excavation as necessary. Any such plans developed will be appended to, and made part of, this Memorandum of Agreement.

9. Materials from existing abutments and piers shall be identified, and a letter offering these materials for reuse in nearby parks shall be sent by NYCDOT to the New York City Parks Department.

10. Duration

This Agreement will be null and void if its terms are not carried out within ten (10) years from the date of its execution. Prior to such time, FHWA may consult with the other signatories to reconsider the terms of the agreement and amend in accordance with Stipulation 13 below.

11. Post Review Discoveries

In the event of any unanticipated discoveries during construction, all activities will be suspended in the area of discovery. FHWA will contact SHPO no more than 48 hours after the discovery. FHWA, NYSDOT, NYCDOT, and SHPO will consult to agree upon any appropriate treatment of the discovery prior to the resumption of construction activities in the area of the discovery. In the event of any unanticipated discovery, the Council will be notified per 36 CFR §800.13.

12. Human Remains

A. In the event that human burials are encountered during archeological investigations, NYCDOT will ensure that any human remains and grave-associated artifacts are brought to the immediate attention of the SHPO and appropriate local government officials. NO activities that might disturb the remains will be conducted until SHPO has determined whether excavation is necessary and/or desirable.

B. Consultation will be conducted with the appropriate affiliated Indian Tribes in the event that human burials are encountered.

13. Dispute Resolution

Should any party to this agreement object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA shall consult with the objecting party (ies) to resolve the objection. If FHWA determines, within 30 days, that such objection(s) cannot be resolved, FHWA will:

A. Forward all documentation relevant to the dispute to the Council in accordance with 36 CFR Section 800.2(b)(2). Upon receipt of adequate documentation, the Council shall review and advise FHWA on the resolution of the objection within 30 days. Any comment provided by the Council, and all comments from the parties to the MOA, will be taken into account by FHWA in reaching a final decision regarding the dispute.

B. If the Council does not provide comments regarding the dispute within 30 days after receipt of adequate documentation, FHWA may render a decision regarding the dispute. In reaching its decision, FHWA will take into account all comments regarding the dispute from the parties to the MOA.

C. FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged. FHWA will notify all parties of its decision in writing before implementing that portion of the Undertaking subject to dispute under this stipulation. FHWA's decision will be final.

14. Professional Qualifications

All archeological investigations carried out pursuant to this MOA will be by or under the direct supervision of a person or persons meeting, at a minimum, the Secretary of Interior's Professional Qualifications Standards for archeologist.

15. Amendments and Non-Compliance

If any signatory to this MOA determines that its terms will not or cannot be carried out or that an amendment to its terms must be made, that party shall immediately

consult with the other parties to develop an amendment to this MOA pursuant to 36 CFR §§800.6(c)(7) and 800.6(c)(8). The amendment will be effective on the date a copy signed by all of the original signatories is filed with the Council. If the signatories cannot agree to appropriate terms to amend the MOA, any signatory may terminate the agreement in accordance with Stipulation 16, below.

16. Termination

If a MOA is not amended following the consultation set out in Stipulation 15, it may be terminated by any signatory or invited signatory. Within 30 days following termination, FHWA shall notify the signatories if it will initiate consultation to execute an MOA with the signatories under 36 CFR §800.6(c)(1) or request the comments of the Council under 36 CFR §800.7(a) and proceed accordingly.

Execution of this MOA by the FHWA, the SHPO, the NYSDOT, the NYCDOT and the Council and implementation of its terms, provide evidence that the FHWA has afforded the Council an opportunity to comment on the PIN X757.00 Willis Avenue Bridge replacement project and its effects on historic properties and that FHWA has taken into account the effects of the undertaking on historic properties.

FEDERAL HIGHWAY ADMINISTRATION

By: Vincent P. Barone Date: 08/24/04

NEW YORK STATE ~~HISTORIC PRESERVATION OFFICE~~ DEPT. OF TRANSPORTATION

By: _____ Date: 6/1/04

NEW YORK STATE ~~DEPARTMENT OF TRANSPORTATION~~ HISTORIC PRESERVATION OFFICER

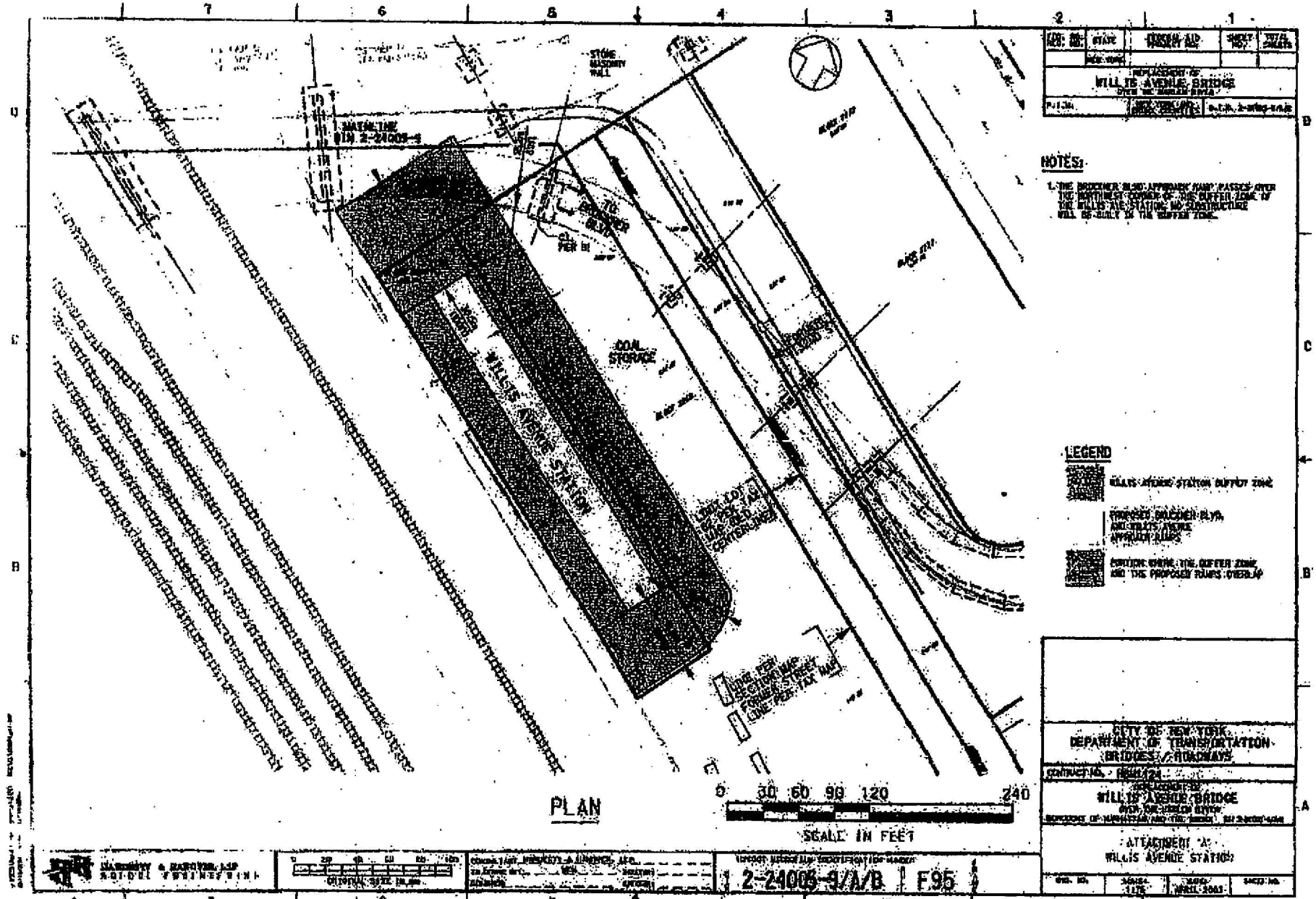
By: _____ Date: 7/7/04

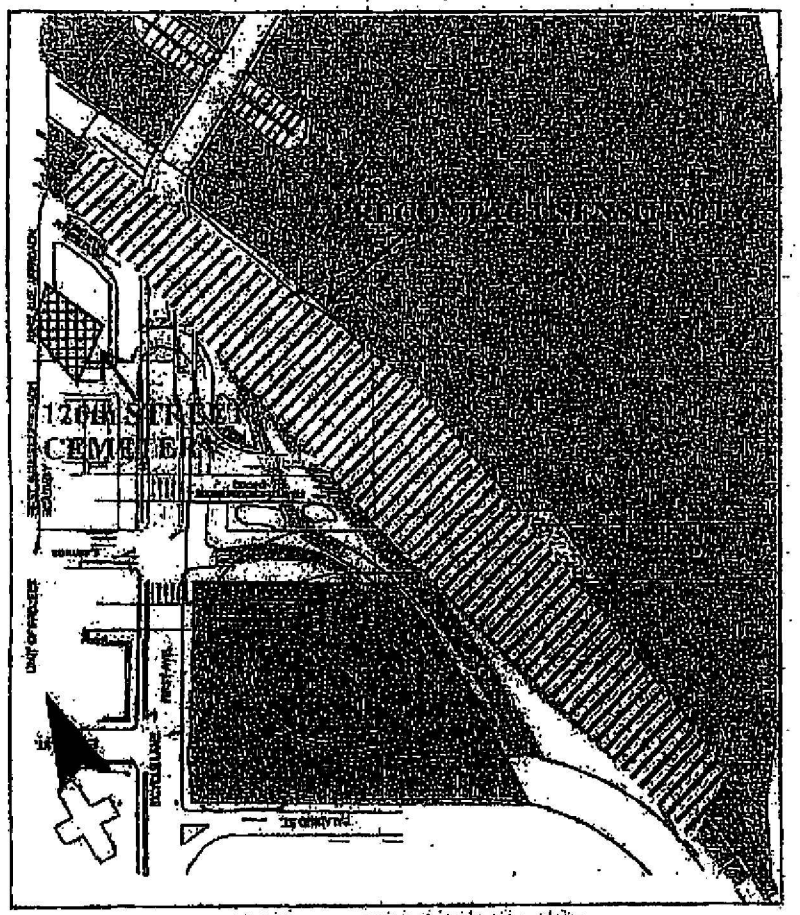
NEW YORK CITY DEPARTMENT OF TRANSPORTATION

By: _____ Date: 6/10/04

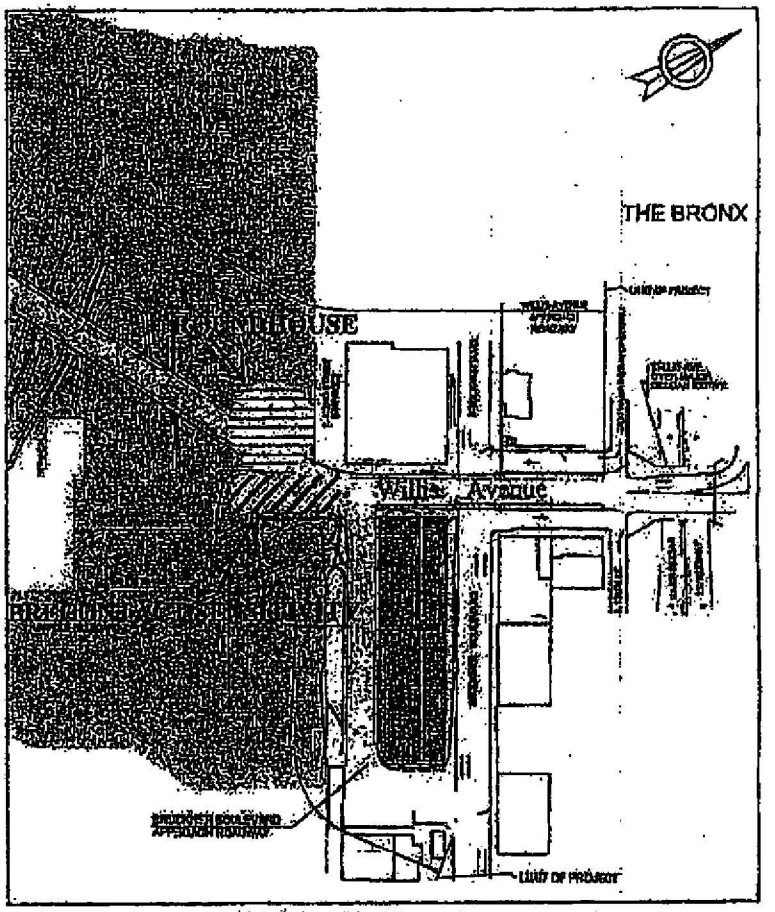
ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: 7/8/04


HOTES:
1. THE BRUCKNER BLVD. APPROACH RAMP PASSES OVER THE NORTH WEST CORNER OF THE BUFFER ZONE OF THE WILLIS AVE. STATION NO CONSTRUCTURE WILL BE BUILT IN THE BUFFER ZONE.
LEGEND
WILLIS AVENUE STATION BUFFER ZONE
PROPOSED BRUCKNER BLVD. AND WILLIS AVENUE APPROACH RAMPS
PORTION WHERE THE BUFFER ZONE AND THE PROPOSED RAMPS OVERLAP
PLAN
0 30 60 90 120 240
SCALE IN FEET
CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BRIDGES / ROADWAYS
WILLIS AVENUE BRIDGE
ATTACHMENT 'A'
WILLIS AVENUE STATION
1 2-24006-9/A/B
F95



MANHATTAN PROJECT SITE



BRONX PROJECT SITE

ATTACHMENT "B"

Areas of Potential Archaeological Sensitivity.
All locations are approximate.

CORRESPONDENCE RE: MEMORANDUM OF AGREEMENT AND THE WILLIS AVENUE STATION HOUSE

Finkelstein, Simona

From: Hart, Dave [Dave.Hart@fhwa.dot.gov]
Sent: Friday, May 07, 2004 11:35 AM
To: Finkelstein, Simona
Cc: RSHAH@DOT1LAN.CI.NYC.NY.US; Shah, Rahul; AEstevez@gw.dot.state.ny.us (E-mail); MICHAEL BERGMANN (E-mail)
Subject: FW: Willis Ave. MOA

MEMO OF EEMENT 3-29-04.D | ny-willis avenue MOA.doc (42 K... | attachment a.jpg (376 KB) | ny-willis avenue MOA w-o tribe...

Simona;
Attached are the following;
file: memo of agreement 3-39-04; this document is your original draft.
file: ny-willis avenue moa; this document is Karen's re-write of your draft.
file: ny-willis avenue moa w-o tribes; this document is Karen's but I have removed the tribal coordination language she inserted based on the below email discussions that we don't need this additional coordination.
This is the file, ny-willis avenue moa w-o tribes, I would suggest we begin circulating for signatures. Noteworthy changes to your original document; 1) page 2 area of potential effect is assumed to be figure IV. 6-1 from the preliminary DEIS and shown as the cultural resources study area boundary in the DEIS 2) a whereas clause that we consulted with Zee Frank.
Please let me know what you think.

-----Original Message-----
From: Karen Theimer Brown [mailto:ktheimer@achp.gov]
Sent: Monday, May 03, 2004 11:49 AM
To: Hart, Dave
Subject: Re: Willis Ave. MOA

Dave, this looks fine, thank you for the information. I am fine with keeping this in our files and not putting any additional language in the MOA. If you are comfortable with the changes that i made to the MOA, you can start circulating it for signature. When all the other signatories have signed the MOA, please send it to our office to my attention. I will then forward it to our Director for his signature and we will send a scanned copy to the signatories. If you could also attach email addresses for FHWA and DOT, that would be great. Feel free to call me should you have any questions. Karen
----- Original Message -----
From: "Hart, Dave" <Dave.Hart@fhwa.dot.gov>
To: "Karen Theimer Brown" <ktheimer@achp.gov>
Sent: Monday, May 03, 2004 9:39 AM
Subject: RE: Willis Ave. MOA

Karen;
Below file is our office procedure for tribal coordination. Tribal coordination is only required for federally recognized tribes. The list of tribal "lands of interest," was provided to us by the six Nations of the Haudenosaunee. If the project is not in a county of interest to any of the Nations, no further consideration of tribal coordination is required. New York City is not in any counties of interest. Should any NYC county be designated a "land of interest" in the future, coordination will be performed. Please let me know if you have any questions. Thanks

-----Original Message-----
From: Karen Theimer Brown [mailto:ktheimer@achp.gov]
Sent: Thursday, April 29, 2004 11:38 AM
To: Hart, Dave
Subject: Re: Willis Ave. MOA

Dave,
thank you for the reminder. I have attached a red-line version of the draft MOA which incorporates my comments. A few other points: First, the MOA references four areas where their might be historic properties. Really, the MOA should not be executed until the survey is completed. However, we can still move forward with it as proposed, but i would recommend that you clarify that these sites are located within the APE (as appropriate) and limit the discussion in #8 that talks about next steps should any arch sites be identified. Take a look at what i proposed and let me know if that works for you. Second, I know this makes things difficult, but FHWA really needs to talk to tribes. Especially since there is some speculation that the area may contain pre-historic sites. the SHPO is a good starting point to identify tribes that might attach religious and cultural significance to the area. Also, customarily the ACHP is the final signatory to the MOA. Next week i will be in the office monday, tues, and thurs. Please feel free to contact me should you have any questions. thanks for the opportunity to comment. Karen Theimer Brown

----- Original Message -----
From: "Hart, Dave" <Dave.Hart@fhwa.dot.gov>
To: "Karen Theimer Brown" <ktheimer@achp.gov>
Sent: Monday, April 26, 2004 3:31 PM
Subject: RE: Willis Ave. MOA

Karen; just curious if you need anything additional. Please call if you have any questions. 518-431-4125 ex. 237. Thanks

-----Original Message-----
From: Karen Theimer Brown [mailto:ktheimer@achp.gov]
Sent: Thursday, April 08, 2004 5:25 PM
To: Hart, Dave
Subject: Re: Willis Ave. MOA

Dave, i received all three emails and i also received your fax. Thank you for the information; this clearly demonstrates that NYDOT and FHWA has coordinated their efforts with her. I will get to the agreement by the end of next week and forward my comments accordingly. Thank you - Karen Theimer Brown
----- Original Message -----
From: "Hart, Dave" <Dave.Hart@fhwa.dot.gov>
To: "Hart, Dave" <Dave.Hart@fhwa.dot.gov>; "Ktheimer" <ktheimer@achp.gov>
Cc: <SFinkelstein@dot.nyc.gov>; "AEstevez@gw.dot.state.ny.us (E-mail)" <Aestevez@gw.dot.state.ny.us>
Sent: Thursday, April 08, 2004 9:30 AM
Subject: RE: Willis Ave. MOA

Since I received this undeliverable message I will send these files in 3 steps, please be patient.

Your message did not reach some or all of the intended recipients.

Subject: FW: Willis Ave. MOA
Sent: 4/8/2004 9:10 AM

The following recipient(s) could not be reached:

ktheimer@achp.gov on 4/8/2004 9:20 AM
This message is larger than the current system limit or the recipient's mailbox is full. Create a shorter message body or remove attachments and try sending it again.
< mdspxy01.dot.gov #5.3.4 SMTP; 552 message size exceeds fixed maximum message size>

Aestevez@gw.dot.state.ny.us on 4/8/2004 9:20 AM
This message is larger than the current system limit or the recipient's mailbox is full. Create a shorter message body or remove attachments and try sending it

again.
< mdspxy01.dot.gov #5.3.4 SMTP; 552 message size exceeds fixed maximum message size>

SFinkelstein@dot.nyc.gov on 4/8/2004 9:20 AM
This message is larger than the current system limit or the recipient's mailbox is full. Create a shorter message body or remove attachments and try sending it again.
< mdspxy01.dot.gov #5.3.4 SMTP; 552 message size exceeds fixed maximum message size>

-----Original Message-----
From: Hart, Dave
Sent: Thursday, April 08, 2004 9:10 AM
To: 'ktheimer@achp.gov'
Cc: '"SFinkelstein@dot.nyc.gov".gwhub.hubsmtp (E-mail)'; 'AEstevez@gw.dot.state.ny.us (E-mail)'; Conlan, Douglas P
Subject: FW: Willis Ave. MOA

Karen;
After our discussion last Thursday, I requested the City summarize their coordination with Zee Frank as to the development of this MOA. I'm sad to inform you Ms. Frank died late last year. Nonetheless, the below message outlines some of the coordination the City had with Ms. Frank and the resolution of those issues. The 10 attached scans are the memos that are mentioned in this email that were faxed to me.
If you have any questions please let me know, 518-431-4125 ex 237. Thanks

-----Original Message-----
From: Finkelstein, Simona
Sent: Thursday, April 08, 2004 7:53 AM
To: 'Hart, Dave'
Cc: Shah, Rahul
Subject: RE: Willis Ave. MOA

Dear Dave,

Although this MOA was only circulated to and reviewed by signatories, it addresses concerns that Ms. Frank had about this project.

Concerns about any impact of the proposed bridge (including an aesthetic concern) are addressed in Whereas No.3 and Stipulation No.6 by specifying location and alignment of the proposed bridge and by maintaining a buffer zone around the Willis Avenue Station.

Stipulation No. 7 addresses how the Willis Avenue Station will be protected during construction.

This MOA is a result of intensive studies, coordination with SHPO, public hearings and meetings with community boards, and coordination with Ms. Frank.

* We obtained from SHPO information concerning the Willis Avenue Station and materials regarding the buffer zone that was delineated around the Willis Avenue Station to protect it from construction activities in the Harlem River Yard.

* Location and alignment of the proposed bridge were coordinated with SHPO. We met with SHPO on October 26, 1999 and March 8, 2000 to discuss the project's effect on the Willis Avenue Station. In order to accommodate SHPO's request to provide at least 60 feet clearance to the Willis Avenue Station building and do not construct any foundation in the buffer zone, we revised alignment for the Bruckner Boulevard Ramp.

* Public Scoping Hearing for the Willis Avenue Bridge Reconstruction Project was held on December 1, 1999 at Lincoln Hospital Auditorium, at 234 East 149th Street, Bronx, New York. Ms. Frank not only attended this hearing, but she also made a speech, that is entirely included in the Public Scoping Hearing Transcript (see attached copy of attendance sheet, transcript is available but it is too voluminous to attach).

* We received comments on Draft Public Scoping Document from Ms. Frank on December 29, 1999 (see attached copy of her fax) and made an effort to address her concerns (see attached memo of February 1, 2000 from Ms. Dee, NYCDOT Director of Community Affairs). Our subconsultant, PHA prepared written responses to all comments and submitted it to NYSDOT, Region 11 (see attached PHA memo of May 11, 2000). Also the text of the Scoping Document has been revised to reflect responses and it was incorporated in the Final Scoping Document , dated July 1, 2000, that was made available to public (including Ms. Frank).

* Ms. Frank's requested to provide her with a copy of Public Scoping Hearing Transcript and paper copies of the slides used by Hardesty & Hanover presentation for the Scoping Meeting. I attached a copy of my transmittal to Ms. Dee, NYCDOT Director of Community Affairs, dated March 3, 2000. Ms. Dee is currently on a maternity leave and I was not able to obtain a copy of her transmittal to Ms. Frank. We believe that Ms. Dee must have forwarded requested materials to Ms. Frank.

* On June 1, 2000 Michael Hershey, Director of Movable Bridges, Alvin Kahn, Project Manager and I met with Ms. Frank at Willis Avenue Station. She gave us a tour of the station building and we discussed her concerns and answered her questions about our project.

After that we did not receive any comments or concerns from Ms. Frank in connection to the Replacement of Willis Avenue Bridge project. And recently we learned that Ms. Frank passed away last year.

All attachments, mentioned in my memo will be faxed to you.

Please contact me if you need any additional information.

Thank you,
Simona

-----Original Message-----
From: Hart, Dave [mailto:Dave.Hart@fhwa.dot.gov]
Sent: Thursday, April 01, 2004 1:32 PM
To: Finkelstein, Simona
Cc: AEstevez@gw.dot.state.ny.us (E-mail); RSHAH@DOT1LAN.CI.NYC.NY.US
Subject: RE: Willis Ave. MOA

Simona;
I sent the below message to Karen Theimer-Brown at the Advisory Council in DC and I talked to her today. I wanted to make sure she received the files and to get a feel for her concerns. She did say she would let us know if she has any comments in the next few weeks. She wanted to know what concerns Zee Frank still had about the project. Have you coordinated this MOA with her, Zee Frank? Do you have any memos or internal correspondence documenting coordination? Since the Advisory Council has received many phone calls and letters from Zee Frank we should inform them of our coordination efforts. If you have anything I can forward to Karen I would appreciate it. We are getting closer and closer each day. Thanks

> -----Original Message-----
> From: Hart, Dave
> Sent: Wednesday, March 31, 2004 8:53 AM
> To: 'ktheimer@achp.gov'
> Cc: 'Finkelstein, Simona'; AEstevez@gw.dot.state.ny.us (E-mail)
> Subject: Willis Ave. MOA
>
> Karen,
> Your May 2, 2002 email to Jymmi Kopach and Dick Beers of our office provided comments on a draft MOA for the Willis Ave. bridge project by NYCDOT. (I am now assigned to this section of NYC) Below file,achp5-2-20email, is a copy of the message you sent us. As you requested at the end of your message, you wanted to see the final draft before it is circulated. Below file, memo of agreement 3-29-04 with attachment a, are the latest edition of the MOA. We have provided the City your previous comments and our comments and have coordinated with SHPO. (email comments, Douglas.Mackey@oprhp.state.ny.us, mostly on the
language for archaeology) Based on my review the City has incorporated

all of our comments and are now ready to seek signatures. Should you have any concerns, please let me know, 518-431-4125 ex 237. Thanks

>
>
>
>
>
> << File: attachment a.jpg >> << File: achp5-2-20email.jpg >> <<
> File: MEMO OF AGREEMENT 3-29-04.DOC >>

Willis Avenue Bridge Public Scoping Hearing
December 1, 1999
Lincoln Hospital Auditorium, 6PM

Attendance

Tom Temistokle, NYSDOT
✓ Zee Frank, Landmark Studios, 2 Willis Avenue
B. Schiffman, Landmark Studios, 2 Willis Avenue
Joshua Benson, NYC Dept. of City Planning, Transportation Division
Xavier Rodriguez, Bronx Borough President's Office
Ana Rojas, Bronx Community Board #1
Cedric Loftin, Bronx Community Board #1
James F. Kilkenny, NYCDOT - Bronx Borough Commissioner
Michael Hershey, NYCDOT Movable Bridges
Alvin Kahn, NYCDOT Movable Bridges
Simona Finkelstein, NYCDOT Movable Bridges
Andrew Herrmann, Hardesty & Hanover
William Nyman, Hardesty & Hanover
Philip Habib, Philip Habib & Associates
Darya Kreis, Philip Habib & Associates
Lisa Kralovic, Philip Habib & Associates
Garrick B. Landsberg, Allee King Rosen & Fleming

Post-It® Fax Note 7671	Date 4/6/04	# of pages ▶ 2
To Simona Finkelstein	From S. Gerwirtzman	
Co./Dept. NYCDOT	Co. PHA	
Phone #	Phone #	
Fax #	Fax #	

FAX

Date:	Wednesday, December 29, 1999
Pages including cover sheet:	3

To:	Mr. Michael Hershey,
Phone	
Fax Phone	(212)442-5189

From:	Zee Frank
	Landmark Studios, Inc.
	2 Willis Avenue
	Port Morris, Bronx
	New York 10454-4417
Phone	+1(718)292-9697
Fax Phone	+1(718)292-9698

NOTE:

Gentlemen: We shall appreciate your review of our comments at the hearing and herewith.

We are deeply concerned with the video shown by Harvesty and Hanover and Philip Habib.

Clearly $4,000,000 for such services should have produced at the very least a thoughtful presentation.

We request a copy of that erroneous video and the transcript of that hearing.

Respectfully submitted, Zee Frank

1999 - US Astronaut E-mailed Bronx Maritime College "Congratulations from Space"; Thanks for Career
1999 - BRONX BOMBERS, NEW YORK YANKEES, CENTURY CHAMPIONS, 25TH WIN
1998 - Bronx Attorney (S. Sotomayor) rises to U.S. Court of Appeals, Manhattan
1998 – Bronx Bombers, New York Yankees, repeat World championship, 24th WIN
1998 – U.S. President appoints Bronx Attorney (M. Echaveste for Chief of Staff
1998 – National champions of Chess – Bronx "Middle School" Kids triumphant
1998 – Citywide Basketball Championship, won by Bronx "Mustangs" boys 14-16 division
1998 – New York City – 100 year celebration – "AMERICA BEGINS IN NEW YORK"
Morris Patriots spawned the Declaration of Independence and the Constitution of the United States
1997 – BRONX awarded the honor of "ALL – AMERICA CITY"
1997 – Fordham University, Bronx, placed within the "Nation's Best Values"
1997 – Bronx "Little League" wins Baseball Crown for New York State
1996 – Bronx Bombers – "New York Yankees" – again World Champions
CENTURY World famous – Bronx Zoo and Wild Life Habitat
and Bronx Botanical Gardens
and "Six Most Remarkable Contiguous Bridges in the World" span the Federal Harlem River
to join the Bronx mainland, (then Westchester) with the island of Manhattan
WORLD Famous New York City Marathon cross Remarkable Bridges
that mesh with NYC Highways at this Captive "Tourist Corridor" and "Antique Center"
1994 - FEDERAL EMPOWERMENT ZONE AWARDED TO PORT MORRIS
1888 - RAILROAD BUILDS GRACIOUS OFFICE BUILDING, LANDMARK,
ATOP SCENIC RIVERSCAPE AND HISTORIC REVOLUTIONARY 1776 SITE,
AND HOMELAND OF PATRIOTS "LEWIS (*) AND HONORABLE GOUVERNEUR (**) MORRIS
(**) 1815 - An Early Voice on Conservation to Protect Habitat of Birds, Wildlife, Fish
(*) 1790 - Debate in Congress to have the "Capitol of the United States" rise on this
hill, atop scenic and historic river, and speech rests in the Archives of Congress.
(*) 1788 - Ratified the Constitution of the United States, for New York State
(**) 1787 - PENNED. PHRASED AND DRAFTED THE FINAL "CONSTITUTION OF UNITED STATES"
(*) 1776 - SIGNED THE "DECLARATION OF INDEPENDENCE" at the threat of death
(Copy of document sold for 2.4 $million)
1670-Jonas Brounck's Brouncksland becomes MORRISANIA VILLAGE, birth place of Patriots.
1642 - "INDIAN PEACE TREATY" IS SIGNED WITH THE INDIANS, IN JONAS BROUNCK'S FARM HOUSE
1639 - "Brouncksland settled by Jonas Brounck (then in Westchester)
1492-1639 Home of Reckgawawanc Tribe; NUACIN VILLAGE, Chieftains Ramachqua and Taekamuck
(1996 - New York City's Bronx Park Department, named "Ramachqua")

LANDMARK STUDIOS - Antique District
2 WILLIS AVENUE - Port Morris
THE BRONX, NEW YORK 10454-4417

V. 718-292-9697
F. 718-292-9698
zeefrank@aol.com

New York City Department of Transportation, December 29, 1999, Fax to: Mr. M. Hershey
212-442-5189 (2 pages)

Gentlemen:

We would like to confirm that our comments during the hearing, on the Willis Avenue Bridge, were documented and we ask you to make them part of the record. We have not yet received a copy of the hearing comments.

Further, we advise that the Harvesty & Hanover video had extraordinary errors. For a $4,000,000 study, the failure to consider the objections raised and destructive single design for the bridge in the video, clearly conveys the ruthless destruction of the landmark and historic site, which Harvesty and Hanover called "a house", and the error in documented protective area.

As you know, we have been violated by the deliberate destruction of our property by the Galesi Gang. This is well documented. Harvesty & Hanover, clearly have been in contact with the Galesi Gang as noted from their outrageous video and as we were told. To ignore the landmark and historic site was an obvious destructive act and to call a 30,000 ft office building, a house is a clear intent to use a "spin" ploy to destroy.

Further, the Willis Avenue Bridge is built upon the most extraodinary historic base and is part of the most remarkable bridges in the World.

The restoration of the Second Avenue Bridge was not discussed; which would avoid the most massive traffic gridlock to/from Manhattan. In fact the presentation by both Harvesty and Hanover and Philip Habib per the transcript and video, displayed only a cursory interest, without substance, that does not reflect $4,000,000. (We request a copy of that hideous video as well as the transcript.)

Therefore it is essential that we be kept informed regularly as to the process.

As you know, we were threatened by a Hitler Hate sign on our Gate during the time the Galesi Gang was destroying our property. As Harvesty and Hanover and Philip Habib disregarded our Landmark and historic property, we trust they have not been influenced by the Galesi criminal destruction.

The failure to update the video for the hearing, despite prior notice of this gigantic plot to destroy, clearly sets forth a ruthless disregard for landmarks, historic content and American history and irreplaceable building which Harvesty and Hanover described as a "house"; with a new bridge to hug a 30,000 square foot Building. This is arrogant and deliberately destructive. In view of the Galesi Gang destruction, it continues the intimidation, harassment and terror.

Despite the fact that the Galesi gang was ordered to repair the damages, they have defied the City, NYCEDC, the Public Advocat, and Others, including creating a Fire Hazard.

We have recently read that Washington advised the City that NYCEDC actually has on its Board a Russian Mafia executive. We prefer that this is not true. NYCEDC has been giving $Millions in grants to the Galesi entity.

Notwithstanding the power of Galesi, we believe that maintaining the essence of the landmark and Historic site for 40 years, earns us the right for consideration, even though we are culturally Jewish. Although religious interests are splintered throughout the world, the common bond for Americans is the Constitution of the United States and the Declaration of Independence. These documents have world-wide respect and admiration and its history should not be trampled upon by the Galesi Gang or anyone else.

Respectfully submitted, Zee Frank

New York City
Department of Transportation
Wilbur L. Chapman, Commissioner

Division of Bridges
2 Rector Street 8th floor
New York, New York 10006
Tel: 212/788-2100
Fax: 212/788-9015

Attachment 3.

MEMORANDUM

TO: File

FROM: Jennifer A. Dee
Director of Community Affairs

SUBJECT: Request for Information on Willis Avenue Bridge

DATE: February 1, 2000

The New York City Department of Transportation responded swiftly to Zee Frank's fax dated December 29, 1999. After briefing her with a presentation, correspondence and brochures, Ms. Frank faxed a request to our office demanding that we supply her with additional copies of the video from the Willis Avenue Bridge Public Hearing.

The Bridges Division as well as our consultant, Hardesty and Hanover have already provided Ms. Frank with public information that clearly describes the project. However, this was not to her satisfaction. Subsequently, I telephoned Ms. Frank hoping to answer some of her questions and explain the FOIL process to her. After my explanation she adamantly refused to follow the procedure and hysterically hung up the telephone.

Presently, we have directed our consultant to continue to provide Ms. Frank with any public information we distribute in the Community. Yet, in order to request additional information, the FOIL process must be followed.

CC: CBO Perahia, J. Patel, M. Hershey, A. Kahn, S. Finkelstein, D. Recor

PHA PHILIP HABIB & ASSOCIATES
404 PARK AVENUE SO., NEW YORK, NY 10016
(212) 686-0091 -- FAX (212) 686-0132

Attachment 4.

May 11, 2000

MEMORANDUM

To: **Robert Laravie, NYSDOT Environmental Review**
Norik Tatevossian, NYSDOT Region 11

From: **Darya Kreis**

Re: **Willis Avenue Bridge Reconstruction PIN X757.00**
Draft Public Scoping Document
Comments and Responses

Comments were accepted on the draft public scoping document for the Willis Avenue Bridge project during a period commencing with distribution of the draft public scoping document on October 30, 1999, and extending through December 30, 1999. During that period, two public hearings were held: December 1, 1999 at Lincoln Hospital Auditorium in the Bronx, and December 2, 1999 at the East Harlem Center for Community Improvement in Manhattan.

This memorandum lists and responds to each comment on the scope of work. The comments are organized by subject area, following the organization of the draft scope of work. The agency that made the comment is identified next to each comment. Comments were received from the following individuals and agencies:

✓ Ms. Zee Frank, local property owner
United States Army Corps of Engineers (ACOE)
United States Coast Guard (USCG)
United Stated Environmental Protection Agency (USEPA)
MTA Bridges & Tunnels (MTA)
New York State Department of Health (NYSDOH)
New York State Department of Transportation (NYSDOT) Environmental Review Unit
NYSDOT Structures Plan Review Group
Landmarks Preservation Commission (LPC)
New York City Department of City Planning (NYCDCP)
New York City Police Department, Communications Division (NYPD)

Copies of all comments received are attached. Where the text of the scope of work has been revised to reflect responses, the changes are indicated below and are blacklined in the scope of work. Subsequent to your review of the final scoping document, we will prepare it for final distribution.

cc: Dick Beers, FHWA
Daniel D'Angelo, NYSDOT DBAQ → DQAB
Jay Patel, NYCDOT Movable Bridges
Michael Hershey, NYCDOT Movable Bridges
Al Kahn, NYCDOT Movable Bridges
Simona Finkelstein, NYCDOT Movable Bridges

PROJECT DESCRIPTION

Comment 1: Please specify whether this project is a Transportation Improvement Project. (USCG)

Response: The scope has been revised to indicate that the project is a TIP. See Scope page 2.

✓ Comment 2: The slide presentation at the December 1, 1999 public hearing inaccurately referred to the Willis Avenue Station as the Willis Avenue Station House. It is not a house. (Zee Frank, local property owner)

Response: The slide presentation materials and the draft public scoping document have been revised to refer to the building at 2 Willis Avenue as the Willis Avenue Station rather than the Willis Avenue Station House.

Comment 3: While the report provides several elevation views of the bridge, there is no cross-sectional view provided showing lanes, median barriers, etc.. On pages 2 and 8, the report refers to 'structural/seismic' as well as 'current' deficiencies and also to a need to reduce the rate of accidents. However, these deficiencies and the accident rate are not listed anywhere in the report, which makes it difficult to evaluate the magnitude of the problems sought to be addressed (NYSDOT Environmental Review Unit).

Response: The Bridge Reconstruction Project Report (BRPR) prepared by Hardesty & Hanover contained detailed information regarding the existing deficiencies of the bridge and the rate of accidents. This material will also be presented in detail in the Environmental Impact Statement with sufficient detail provided for each alternative to allow a decision maker to understand the magnitude of the problems and the various effects of the design alternatives.

ALTERNATIVES

Comment 4: The FHWA should comparatively examine locating a new bridge upstream as well as downstream of the existing bridge (USEPA)

Response: All of the existing connections to existing roadways must be maintained in any replacement scheme. Private properties and other elements such as the columns for the Triborough Bridge above the Willis Avenue Bridge limit the alignment choices. When current geometric criteria are met for the alignment of each of the approaches in Manhattan, in particular the curve radii, the only alignment which would be acceptable would fall south of the existing bridge. Alignments to the north of the existing bridge were not considered viable. This information will be included in the Alternatives chapter of the EIS.

Comment 5: The restoration of the Second Avenue Bridge was not discussed. (Zee Frank, local property owner)

Response: During the alternatives development process, a wide range of alternatives were considered to address transportation and bridge design needs and to meet project goals. From among a range of all possible alternatives, a set of "reasonable alternatives" was identified for study in the EIS. These include those alternatives that meet project goals and objectives and are thus potentially suitable for eventual implementation.

The construction of a Second Avenue Bridge to replace the Willis Avenue Bridge was not advanced as a reasonable alternative. A Second Avenue Bridge would connect Second Avenue in Manhattan with Lincoln Avenue in the Bronx. Second Avenue flows southbound, whereas the Willis Avenue Bridge accommodates northbound traffic. The existing Willis Avenue Bridge is an important link between the local street grids of Manhattan and the Bronx, and is used by substantial volumes of traffic from First Avenue.

Construction of a Second Avenue Bridge would require new interchanges at the Harlem River Drive in Manhattan, which would likely require a substantial taking of parkland, particularly in the Crack is Wack Park and along the proposed Harlem River Esplanade east of the Harlem River Drive. In the Bronx, a new interchange would be needed at the Major Deegan Expressway, which would likely require condemnation of a substantial number of privately-owned properties, including residences.

Due to the alignment of Second Avenue and Lincoln Avenue, the Bronx touchdown of the bridge would be located less than one block from the Third Avenue Bridge touchdown., resulting in amplified traffic congestion and associated air quality and noise effects in the vicinity of the two bridge touchdowns.

In summary, there are a substantial number of major planning and design reasons that make it unfeasible to construct a bridge at this location. A discussion of the alternative selection process and alternatives that were considered but not deemed feasible will appear in the Alternatives chapter of the EIS.

Comment 6: A cost estimate should be provided for the alternatives discussed (NYSDOT Plan Review Group).

Response: Preliminary cost estimates and more detailed information regarding each alternative will appear in the EIS.

Attachment 3 P. 1

New York City
Department of Transportation
Division of Bridges
2 Rector Street-7th. Fl.
New York, N. Y. 10006

Date: March 3, 2000
RE: Willis Avenue Bridge over the Harlem River
FOIL Request
(Ms. Zee Frank)

To: Ms. Jennifer Dee
Director of Community Affairs

☐ Attached ☐ Under separate cover via _____

☐ Plan (s) ☐ Specifications ☐ Cross Sections ☐ Other
Approval of Subcontractor ☐ Order on Contract ☐ From
☐ Photographs ☐ Copy of Letter ☐ Report

Copies	Date	Number	Description
1	12/1/99		Public Scoping Hearing Transcript
1			Paper Copies of the Slides used in Hardesty & Hanover Presentation for the Scoping Meeting

These are transmitted as noted below:

☐ For Approval ☐ For information ☐ For Action ☐ As requested
☐ Approved as submitted ☐ Approved as noted ☐ For correction ☐ For Review and Comments
☐ Resubmitted copies for approval ☐ Resubmit copies for distribution ☐ Return corrected prints ☐ Other

Remarks:
Due to sensitive nature of this FOIL Request and a cost of materials enclosed, the duplication of the attachments is not possible. Therefore, one original set of attachments is being submitted directly to Director of Community Affairs for further coordination and handling of this FOIL Request.

Simona Finkelstein

Simona R. Finkelstein, P.E.
Project Engineer
Movable Bridges Bureau
2 Rector Street, 5th Floor
New York, NY 10006
212-788-1796

cc: CBO Perahia, R. Cohen, J. Goldfeld
DCE J. Patel, M. Hershey, A. Kahn, S.Finkelstein

SECTION 106 PROCEDURES RE: TRIBAL COORDINATION

SUPPLEMENT TO THE DIVISION OFFICE SECTION 106 PROCEDURES - TRIBAL COORDINATION

PROJECT ACTIONS TO BE TAKEN BY DISTRICT OPERATIONS (AREA ENGINEERS)

ACTION: CHECK FOR NATIONS HAVING ANCESTRAL LANDS IN THE COUNTIES WHERE TH PROJECT IS LOCATED

Tribal coordination is only required for federally recognized tribes, and only with the individual tribes listing counties corresponding to the project location. See Attachment #1, the list of tribal "lands of interest," provided to us by the six Nations of the Haudenosaunee. This list is subject to change. If the project is not in a county of interest to any of the Nations, *no further consideration of tribal coordination is required.*

ACTIONS: PROJECTS WITHIN COUNTIES OF INTEREST TO A FEDERALLY RECOGNIZED TRIBE

When making a 106 determination or taking a NEPA action for any project with potential to affect historic resources including archeology (i.e. not an exempt project per our 12/22/00 listing in the DO Environmental Procedures), you should check it against the lists of pipeline projects (see Attachme #2) for the county in question.

- **If the project is on the pipeline list and the CRC indicates no tribe has specified an interest or concern, no further tribal coordination is required. Note your contact with the CRC in the file.**

- **If the project is not on the list, and the CRC indicates no tribe has expressed interest/concern, no further tribal coordination is required (based on the current process where NYSDOT is notifying tribes of all "non-pipeline" projects needing cultural resource surveys in their areas of interest). Note your contact with the CRC i the file.**

If, based on the above Area Engineer review, further tribal coordination under Section 106 is requir advise the Region we will require such prior to our Section 106 or NEPA action being taken. If it is apparent this will cause a substantial or critical delay in the project, notify the District Engineer and the Environmental Program Coordinator. The EPC will notify the Environmental Analysis Bureau o the situation.

ATTACHMENT 1

LIST OF COUNTIES "OF INTEREST" TO THE FEDERALLY RECOGNIZED INDIAN NATIONS RESIDING IN NEW YORK

Supplied by the Haudenosaunee Standing Committee on Burial Rules and Regulations, September 2002

MOHAWK NATION

Delaware
St. Lawrence
Franklin
Clinton
Essex
Hamilton
Warren
Saratoga
Fulton
Montgomery
Schenectady
Schoharie
Otsego
Sullivan
Albany
Green
Ulster

ONEIDA NATION

Jefferson
St. Lawrence
Lewis
Oneida
Madison
Herkimer
Chenango
Broome
Delaware
Otsego

ONONDAGA NATION

Oswego
Onondaga
Cortland
Broome
Jefferson
St. Lawrence

CAYUGA NATION

Seneca
Cayuga
Chemung
Tompkins
Tioga
Schuyler
Wayne

NOVEMBER, 2002

SENECA NATION

Niagara
Erie
Chautauqua
Cattaraugus
Allegany
Wyoming
Genesee
Orleans
Monroe
Livingston
Steuben
Ontario
Yates
Wayne
Chemung
Schuyler

TUSCARORA NATION

Broome
Livingston
Madison
Niagara

NOVEMBER, 2002

ATTACHMENT 2

PIPELINE PROJECT LISTING

TRIBAL NATIONS

FY 02-04 NYS STIP

CAYUGA NATION

County Name: CAYUGA

302232	ROUTE 437 OVER OWASCO OUTLET
303762	ROUTE 31 OVER COLD SPRING BROOK, CAYUGA COUNTY
314009	ROUTE 38A OVER DRESSERVILLE CREEK, TOWN OF MORAVIA, CAYUGA COUNTY
315524	ROUTE 90 OVER LITTLE SALMON CREEK AND PAINES CREEK, TOWN OF GENOA AND LEDYARD, CAYUGA COUNTY
319808	ROUTE 104 A, 2 BRIDGES OVER STERING VALLEY CREEK, CAYUGA COUNTY
328715	ROUTE 370, CATO TO MERIDIAN TOWN OF IRA, TOWN OF CATO CAYUGA COUNTY
375293	YORK ST, NORTH-N DIVISION
375295	STATE ST, RTS 5&20-YORK
375346	LAKE AVENUE RECONSTRUCTION, OWASCO STREET (RT 38A) TO SWIFT STREET (RT. 38), CITY OF AUBURN, CAYUGA COUNTY
375351	ROUTE 38 A, OWASCO ROAD, ROUTE 20 TO CITY LINE, CITY OF AUBURN, CAYUGA COUNTY
375354	CONSTRUCTION OF HERITAGE AREA REST STOP (ON / OFF RAMP AND PARKING LOT) PORT BYRON
393244	PUMP ROAD CR/CSX MAINLINE. MP 308.96, TOWN OF BRUTUS, CAYUGA COUNTY
393245	BONTA BRIDGE ROAD CR/CSX MAINLINE, MP 309.50, TOWN OF BRUTUS, CAYUGA COUNTY
393246	TOWN LINE ROAD, (CENTERPORT ROAD) CSX CHICAGO LINE, MP 313.82, TOWN OF BRUTUS, CAYUGA COUNTY

Count of Projects in County: 14

County Name: CHEMUNG

606663	Rt. 17 Kahler Rd AIRPORT ACCESS
675309	City of Elmira Signal Upgrade
693115	HAMMOND ST RR XING

Count of Projects in County: 3

County Name: SCHUYLER

601720	SH 8242, BIN 1041960, RMM 224-6302-1058, TOWN OF CAYUTA, SCHUYLER COUNTY
610009	SH 1005, RT 226 OVER TOBEHANNA CREEK BIN 1042070, RMM 226-6302-1047, Town of Tyrone, SCHUYLER COUNTY
621315	SH 5295 SR79 OVER HECTOR FALLS CREEK BINS 1030640 & 1030650, VILLAGE OF BURDETT AND TOWN OF HECTOR. RMM 79-6306-1086 AND

Count of Projects in County: 3

County Name: SENECA

304724	REPLACE THE ROUTE 96 BRIDGE OVER THE SENECA RIVER, & REHAB RT 96, VILLAGE OF WATERLOO, SENECA COUNTY

Count of Projects in County: 1

County Name: TIOGA

601616	SH 8026, BIN 1035280 over Shendegan Creek, RMM 96B-6501-1039, Town of Candor
604707	SH 9091,BIN 1035010 over Catatonk Creek, RMM 96-6501-1186,TOWN OF SPENCER, TIOGA COUNTY
604709	SH 5471, BIN 1034950 over Owego Creek, RMM 96-6501-1018, Town of Tioga
604710	SH 547 1, BIN 1034960 over Catatonk Creek, RMM 96-6501-1098, TOWN OF CANDOR, TIOGA COUNTY
606664	SH 67-2, RT 17 STE Exit 64, Village of Owego
693109	MAIN ST OWEGO RR XING
693110	FRONT ST OWEG RR XING
693111	GOODRICH RD RR XING
693123	DARTS CROSSING SPENCER RR XING

Count of Projects in County: 9

County Name: TOMPKINS

375279	TRIPHAMMER, RT 13-CHERRY
375320	RINGWOOD ROAD (COUNTY ROAD 164) OVER CASCADILLA CREEK, TOWN OF DRYDEN, TOMPKINS COUNTY
375321	NEWFIELD DEPOT ROAD (COUNTY ROUTE 130) OVER CAYUGA INLET, TOWN OF NEWFIELD, TOMPKINS COUNTY
375322	THURSTON AVENUE BRIDGE REHAB OVER FALL CREEK, CITY OF ITHACA, TOMPKINS COUNTY
375325	HANSHAW ROAD (CR 109), VILLAGE OF CAYUGA HEIGHTS LINE TO LOWER CREEK ROAD, TOWNS OF ITHACA AND DRYDEN, TOMPKINS COUNTY
375326	FALL CREEK ROAD, ROUTE 38 TO FREEVILLE, VILLAGE OF FREEVILLE, TOMPKINS COUNTY
375399	Stewart Avenue Bridge over Fall Creek, City of Ithaca
3TO309	ITHACA CALMING, PED&BIKE

Count of Projects in County: 8

County Name: WAYNE

475313	RIDGE ROAD (CR 143) BRIDGE OVER SODUS BAY
493258	SCHWAB ROAD RR CROSSING, GALEN, WAYNE
493273	CSXT XING @ RTE 350 MACEDON WAYNE
493292	TOWN LINE RD RR CROSSING

Count of Projects in County: 4

MOHAWK NATION

County Name: ALBANY

100210	NY 85A BRIDGE OVER VLY CREEK: BRIDGE RECONSTRUCTION OR REPLA
100713	NY 144 BRIDGE OVER COEYMANS CREEK: BRIDGE REPLACEMENT
101110	NY 145 BRIDGE OVER FOX CREEK: BRIDGE REPLACEMENT
104510	NY 378 BRIDGE OVER D&H: BRIDGE RECONSTRUCTION OR REPLACEMENT
130647	NY 7 BRIDGE OVER I-890: BRIDGE REPLACEMENT
130650	NY 7 BRIDGE OVER 1-87 (EXIT 6): BRIDGE RECONSTRUCTION OR REP
134707	SELKIRK BYPASS THIS IS A NEW TWO-LANE ROAD FROM NY 9W TO TE
146042	NY 32 BRIDGE OVER THE MOHAWK RIVER: BRIDGE REPLACEMENT
152852	I-90 BRIDGE OVER CONRAIL AND SPUR: BRIDGE REHABILITATION
152855	I-90, EXIT 6 TO PATROON ISLAND: RESURFACING SELECTED PORTIO
152856	I-90, FROM 1-87 TO EXIT 6: RECONSTRUCTION TO BE COMBINED WI
172151	EXIT 3 OR 4/AIRPORT CONNECTOR
172160	I-87, FROM EXIT I TO THE SARATOGA COUNTY LINE: RECONSFRUCTIO
175309	EVERETT ROAD, FROM ALBANY SHAKER ROAD TO EXCHANGE STREET: CO
175360	NEW KARNER ROAD (NY 155), FROM US 20 TO NY 5: CORRIDOR IMPRO
175442	ELM AVENUE FROM DELAWARE AVENUE (NY 443) TO DELMAR BYPASS (N
175443	CHERRY AVENUE (CR 52) FROM KENWOOD AVENUE (NY 140) TO DELAWA
175444	LARK STREET (US 9W) FROM MADISON AVENUE TO CLINTON AVENUE: R
175445	CENTRAL AVENUE (NY 5), FROM CITY LIMITS TO EVERETT ROAD: R-EC
175446	MORRIS/CORDELL GRADE CROSSING CONSOLIDATION AND SEPARATION
175449	ELM STREET BYPASS THIS IS A NEW TWO-LANE ROAD FROM NY 32 (C
175474	OLD RAVENA ROAD BRIDGE OVER CONRAIL: BRIDGE REPLACEMENT OR R
175491	RELOCATION OF MAXWELL ROAD PART 2: WOLF ROAD SERVICE ROAD 1
175502	Dunbar Hollow Road over Conrail
175523	CR 53 (JERICHO ROAD) BRIDGE OVER DOWERSKILL: BRIDGE RECONSTR

County Name: ALBANY

175542	ITS Signal Improvements in the City of Troy
175562	CITY OF ALBANY SIGN MANAGEMENT THIS WILL PROVIDE THE CITY W
175591	Mohawk Hudson Bike Hike Trail
175606	New Scotland Ave. Reconstruction
693127	WNY&P Railroad, Alleghany County (At grade crossings & approaches)

Count of Projects in County: 30

County Name: CLINTON

772055	I-87 remove 2 structures over the abandoned railroad.
772076	Rehabilitate 7.7 miles of I87 from Salmon River to Cumberland Head
772077	Rehabilitate 1 0. 1 miles of I87 from Cumberland Head to Chazy
775231	Reconstruct portions of Rt. 9 in the city of Plattsburgh
775260	Replace structure carrying Miner Farm Road over Great Chazy River
775261	Replace structure carrying Canaan Road over North Branch Great Chazy River
775262	Replace structure carrying Angelville Road over the Great Chazy River
775267	Reconstruct Margaret Street, in City of Plattsburgh, from Cornelia Street to Robinson Terrace
793201	Crossbucks to Gates or Clousure

Count of Projects in County: 9

County Name: DELAWARE

901831	SH # 8017 Andes - Margaretville, Town of Middletown, Delaware Co..
901847	SH # 982 Delhi - Andes, Town of Delhi, Delaware Co..
904455	SH #5450 Halcottsville - Roxbury, Town of Middletown, Delaware Co..
905616	SH # 1 888, Deposit - Masonville, Town of Deposit, Delaware Co.
905634	Rt. 8, Stileville to Brace Youth Camp CIPR, Town of Deposit (resurface)
906659	SH # 5246 Hancock - East Branch, Town of Hancock, Delaware Co..
906691	SH # 5167 Hale Eddy - Hancock, Towns of Deposit and Hancock, Delaware Co..
909583	Rte. 10 SH # 1271 Rock Rift - Colchester, SH 1441 A Delancey - Delhi, Towns of Walton & Delhi, Delaware Co..
938933	SH # 5671 Hancock - Long Eddy, Part 1, Village of Hancock, Delaware Co..
975285	Otego Rd. over Ouleout Creek, Town of Franklin, Delaware Co. (rehab or replacement)

Count of Projects in County. 10

County Name: ESSEX

104322	Route 9 over Ausable River, Village of Keeseville, Bridge Replacement
116116	RT 86/WEST BRANCH AUSABLE RIV
172181	871: EXIT 26-28, RESURFACING
175159	JAY TRUMBULLS RD, CR22 /E.B. AUSABLE RIV
175512	C.R. 12/BLACK BROOK

Count of Projects in County: 5

County Name: FRANKLIN

704426	RT 3 & 30 R&P FROM 0.5 MILES SOUTH OF SKI TOW ROAD NORTH EASTERLY 4.8 MILES.
704428	Routes 3 & 30, Village of Tupper Lake (split from 704426)
707815	RT. 11B R&P from St. Lawrence Co. line northerly 9.0 miles to junction CR 15.
775268	Replace structure carrying Mud Pond Rd over Kushaqua Outlet
775269	Replace structure carrying Pulp Mill Rd. over Chateaugay River
793202	Existing Crossbucks to Gates or Closure
793203	Existing Crossbucks to Gates or Closure
7TR404	Existing Crossbucks to Gates

7TR405	Existing Crossbucks to Gates
7TR406	Existing Crossbucks to Gates

Count of Projects in County: 10

County Name: FULTON

204459	ROUTE 30 OVER KENNYETTO CREEK (BIN 1021120) TOWN OF MAYFIELD, FULTON COUNTY

Count of Projects in County: 1

County Name: GREENE

103941	RT 9W RECONSTRUCTION: CATSKILL
112046	RTE 23/911V, DECK REHABILITATION
175513	SKI BOWL RD./SCHOHARIE CREEK

Count of Projects in County: 3

County Name: HAMILTON

201887	ROUTE 28 OVER LOON BROOK

Count of Projects in County: 1

County Name: MONTGOMERY

209531	ROUTE 10 OVER CANAJOHARIE CREEK (BIN 1007930) TOWN OF CANAJOHARIE, MONTGOMERY COUNTY
218812	ROUTE 67: CURVE AT MCDONALD DRIVE, TOWN OF AMSTERDAM
275335	LATIMER HILL ROAD (COUNTY ROUTE 89) OVER FLAT CREEK (BIN 3309890) TOWN OF ROOT
275336	PARIS ROAD (COUNTY ROUTE 68) OVER NORTH BRANCH OTSQUAGO CREEK (BIN 3309480) TOWN OF MINDEN
275338	CRANES HOLLOW ROAD (COUNTY ROUTE 2) OVER EVANS KILL (BIN 33103 10) TOWN OF AMSTERDAM
293134	CSX CHICAGO LINE XING, GRADE CROSSING IMPROVEMENT, CENTER ST., V/FONDA

Count of Projects 6

CountyName: OTSEGO

901849	Rt. 28 at Walnut St. and Rt.28 at CR 26, intersection improvements, Town of Hartwick & Village of Cooperstown, Otsego Co
911123	SH # 1409 Richfield Springs - Winfield, Parts 1 &2, Town of Richfield, Otsego Co..
930681	SH # 5247 Schenevus - Schohaire Co. Line, Town of Worcester, Otsego Co..
935764	SH # 71-18, Int. Rte 508, Rte 205 Connection - Main St; SH 71-5, Int. Rte 508 Oneonta: Main St. - E. Oneonta City Ln.

Count of Projects in County: 4

County Name: SARATOGA

104338	CONSTRUCTION OF A FLUSH MEDIAN ON RTE 9 BETWEEN RTE 32 AND F
108527	BALLTOWN ROAD, FROM RIVER ROAD TO GLENRIDGE ROAD: CORRIDOR I
118821	NY 67 BRIDGE OVER I-87 EXIT 12: BRIDGE RECONSTRUCTION CONST
118832	NY 67 BRIDGE OVER UNNAMED CREEK-, BRIDGE REPLACEMENT OR REHAB
172156	I-87 BRIDGE OVER THE D&H RAILROAD NORTH OF SARATOGA SPRINGS:
172174	KINNS ROAD BRIDGE OVER I-87: BRIDGE REPLACEMENT
175343	RESURFACING OF USHERS ROAD AND VISCHER FERRY ROAD USHERS RO
175363	BATCHELLERVILLE BRIDGE (CR 98): ALTERNATIVES ANALYSIS AND PR
175516	RALPH STREET BRIDGE OVER KAYDEROSSERAS CREEK
175517	HADLEY HILL ROAD OVER PAUL CREEK: BRIDGE REPLACEMENT
180442	GLENRIDGE ROAD, FROM MAPLE AVENUE TO NY 146: RECONSTRUCTION
194105	MECHANICVILLE TERMINAL WALL REHABILITATION FEDERAL FUNDING

Count of Projects in County: 12

County Name: SCHENECTADY

130651	NY 7 AT THE FIVE CORNERS: INTERSECTION IMPROVEMENTS
152529	I-890, FROM CAMPBELL ROAD TO EXIT 26: RECONSTRUCTION
152530	I-890, EXIT 5 TO CAMPBELL ROAD: RESURFACING
175458	STATE STREET STREETSCAPE INCLUDES RECONSTRUCTION, LANDSCAPE
175601	MAPLE AVENUE REALIGNMENT REALIGN "S" CURVE FOR SAFETY PURPO

Count of Projects in County: 5

CountyName: SCHOHARIE

904452	SH # 5577 Middleburg - Breakabeen, Town and Village of Middleburg, Schohaie Co..
904453	SH #8312 Grand Gorge - Breakabeen, Town of Gilboa, Schoharie Co..
909580	Rte 10 Warnerville Connector, (New Construction), Town of Richmondville, Schohaire Co..

Count of Projects in County: 3

County Name: ST. LAWRENCE

704921	Rt. 812 over Beaver Creek (replacement), Town of Oswegatchie, St. Lawrence Co.
703406	RT.345, Rehabilitate structure over Big Sucker Brook.
704919	RT.812, REHABILITATE 6 MILES FROM KENDREW CORNERS TO HEUVELTON
714324	Rt 11 resurface 3.6 miles from Sanfordville northerly to Stockholm.
714331	Rehabilitate 2.1 miles of Rt. 11 in Village of Gouverneur
775265	Replace structure carrying County Route 11 over the Oswegatchie River
7TR402	Existing Crossbucks to Gates
7TR403	Existing Crossbucks to Gates or Closure

Count of Projects in County: 8

County Name: SULLIVAN

906674	SH # 5234, Liberty - Co. Line Pt. 1, SH # 5223 Liberty - Co. Line Pt. 2, Town of Liberty, Sullivan Co..
906698	CR # 166A over Rte. 17, Town of Mamakating, Sullivan Co..
906699	SH 5322 Monticello - Liberty Pt. 2, Town of Liberty, Sullivan Co..
917712	SH # 8287, Port Jervis - Wurtsboro, Part 2, Town of Mamakating, Sullivan Co.
938940	SH #1927 Minisink - Narrowsburg, Town of Tunsten, Sullivan Co..
975257	CR # 53 over Neversink River, Town of Fallsburg, Sullivan Co..
975284	Town Highway #30 over Beaver Kill, Town of Rockland, Sullivan Co. (replacement)

Count of Projects in County: 7

County Name: ULSTER

801835	ROUTE 28/ESOPUS & BIRCH CREEKS; T/SHANDAKEN; EXISTING BRIDGE
801842	ROUTE 28/ESOPUS CREEK
802152	ROUTE 52 SIDEWALKS - WALKER VALLEY

802161	ROUTE 52 @ QUANNACUT ROAD (WAS 8T9745)
803994	ROUTE 9W R&P: CLAY RD TO CANAL ST/SUNSET DR INTERSECTION
803995	9W: ROUTE 32 - GARDEN CIRCLE; T/SAUGERTIES;
812210	RT 212/TANNERY BRK; T/WOODSTOCK;BRIDGES TO BE REPLACED W/3 P
846049	ROUTE 32/RONDOUT CREEK
846051	RT 32 @ DEWITT MILLS RD (WAS 8T9431)
846310	ROUTE 213/RONDOUT CREEK
875618	GREENKILL AVENUE/BROADWAY, CITY OF KINGSTON.
875620	SAWKILL ROAD/SAWKILL, TOWN OF ULSTER
875714	MOSSY BROOK ROAD/COXING KILL: BRIDGE REPLACEMENT; WAS 8T974
875728	REPLACEMENT OF THE RIVER ROAD BRIDGE. BIN 2264230
875771	CAPE AVENUE/BEERKILL
875781	TILLSON AVENUE INTERSECTION AND SIDEWALK IMPROVEMENTS FROM R
875800	SUNSET RIDGE SIDEWALKS, TOWN OF NEW PALTZ
875801	HICKORY STREET/BEERKILL, ELLENVILLE
875802	BECKLEY DRIVE/FANTINE KILL, ELLENVILLE
875879	Denning Rd. over East Branch Neversink River, Town of Denning
8T9742	ROUTE 209 @ BOICE MILL ROAD
8T9743	ROUTE 209 AT AIRPORT ROAD
8T9752	WALLKILL SIDEWALKS

Count of Projects in County: 23

County Name: WARREN

172199	EXIT 18 I-87 RAMP & BIG BOOM RD RELATED IMPROVEMENTS
175382	RTES 9/254 AREA CONGESTION IMPROVEMENTS
175441	WARREN ST PAVEMENT REHAB AND RELATED IMPROVEMENTS
175521	REPLACE CR 3 OVER STONEY CREEK
175559	BAY ST FROM RTE 9 TO CITY LINE; PAVEMENT REHAB WITH CURB, DR
175603	REPLACE WOLLENMILL BRIDGE OVER SCHROON RIVER

Count of Projects in County: 6

SENECA & TONOWANDA SENECA NATIONS

County Name: ALLEGANY

102129	Route 159 over Conrail (Bridge Replacement), Town of Rotterdam (S 129)
601308	SH 8281, RMM 408-6102-1408, BIN 1047910, Town of Grove
601435	SH 5615 BRIDGE REPLACEMENT, BIN 1015040 OVER CRAWFORD CREEK & SAFTEY IMPROVEMENTS, RMM 1 6101-1315 TO 1329, TOWN OF CAN
601439	SH 5476, BIN 1014970 over Genesee River, RMM 19-6101-1192, TOWN OF AMITY ALLEGANY COUNTY
605622	SH 8253, BIN 1012440 over Crowner Creek, RMM 17-6103-1219, Village of Wellsville
606648	SH 1260,70-15 STE FRIENDSHIP-ANGELICA MONO DECKS, BIN 1062211,1062212,1062230
606649	SH 70-5 STE CATTARAUGUS CL-FRIENDSHIP MONO DECKS, BIN 1090041,1090061, 1090062,1090070,1090080,1090092

Count of Projects in County: 7

County Name: CATTARAUGUS

500674	I-86; EXIT 16-EXIT 17
500682	I-86; EXIT 24 - EXIT 26
510167	RT 219/CROWLEY CREEK
510172	RT 219; SECTION 2 SNAKE RUN RD - PETERS
511713	ROUTE 98, ROUTE 16 - ROUTE 243 AND RT 62/CLEAR CK
545208	ROUTE 353; SALAMANCA NORTH CITY LINE - LITTLE VALLEY SOUTH VILLAGE LINE
557671	RT 16/BRANCH ISCHUA CREEK & FARWELL HOLLOW
557672	RT 16/ELTON CREEK
575574	MAIN ST/NICHOLS RUN
575636	MOSHER HOLLOW RD/CONEWANGO CK
575640	ABBOTTS RD/TRIBUTARY CUBA LAKE
580624	RT 95OA(WEST BANK PERIMETER RD) & BONE RUN RD WILDLIFE HABITAT
593389	WNY & P RR, Upgrade Signals, 29 Locations, Harmony to Hinsdale

Count of Projects in County: 13

County Name: CHAUTAUQUA

500670	I-86 RAMPS/I-86
505834	RT 60/CR 49
505838	RT 60; JAMESTOWN SCL-RT 62
506418	ROUTE 394; MAYVILLE EAST VILLAGE LINE - ROUTE 20
511176	RT 20/LITTLE CANADAWAY CREEK
513411	RT 5/CORELL CK & RT 5/BELL CK
530801	NY ROUTE 62/I-86
575611	HARRISON /CHADAKOIN RIVER
575613	WEST FOURTH STREET
575635	WINSOR ST/CHADAKOIN RIVER
575641	KIANTONE RD/STILLWATER CK
580555	CULVERT REPLACEMENT; SFY 03/04; PMT, PVT
580632	CULVERT REPLACEMENT; SFY 04/05
580633	CULVERT REPLACEMENT; SFY 05/06
580634	CULVERT REPLACEMENT; SFY 06/07
593330	CENTRAL AVE CSX
593336	MATHEWS RD CSX
593337	PECOR ST CSX

Count of Projects in County: 18

County Name: CHEMUNG

606663	Rt 17 Kahler Rd AIRPORT ACCESS
675309	City of Elmira Signal Upgrade
693115	HAMMOND ST RR XING

Count of Projects in County:3

County Name: ERIE

504401	SOUTHTOWNS CONNECTOR
511161	ROUTE 20; ROUTE 240-ROUTE 187
513415	SOUTHTOWNS CONNECTOR BLOCK
520940	ROUTE 78(TRANSIT RD); I-90 TO MAIN ST
520943	ROUTE 78; GOULD AVENUE - FRENCH ROAD
526832	ROUTE 240 (HARLEM ROAD); GENESEE STREET TO CLEVELAND DRIVE
530803	RT 62; RT 75-LEGION DR AND RT 391; RT 62-HAMBURG EVL
530808	RT 62 @ KOENIG/RIDGE LEA & 1290 RAMP, SAFETY-RECONS-FRUCTION
539233	ROUTE 400 BRIDGE REHABS
539237	RT 400/RT 240
547020	RT 198/WEST AVENUE, CSX, I190 & NIAGARA ST
551239	Highway Resurfacing, Genesee St. from Dick Rd. to Holtz Rd., City of Cheektowaga
551241	ROUTE 33 (KENSINGTON EXPRESSWAY); RETAINING WALL RAIL & LANDSCAPING
552829	I90/I290 INTERCHANGE
558032	I-290 (YOUNGMANN HIGHWAY); I-190 - MAIN ST.
558033	I290/ABANDONED RAILROAD
558034	1290/I190
575358	PEACE BRIDGE PLAZA & CONNECTING ROADWAY SYSTEM
575519	WEHRLE DRIVE; ELLICOTT CREEK - TRANSIT RD
575530	ITS/INCIDENT MANAGEMENT PHASE 3
575540	FILLMORE AVENUE; BEST STREET-MAIN STREET
575541	SYCAMORE; MICHIGAN-WALDEN & WALDEN; BEST-BAKOS
575547	MAPLE RD; NIAGARA FALLS BLVD-MILLERSPORT HWY
575556	GENESEE ST; BAILEY AVE- BUFFALO ECL
575580	INNER HARBOR/REDEVELOPMENT PROJECT

County Name: ERIE

575581	WILLIAM & LOSSEN TRAFFIC MITIGATION PROJECT
575582	N FRENCH RD; SWEET HOME-RT 78
575583	COMO PARK BLVD; UNION RD-TRANSIT RD
575608	LAPP RD/BEEMAN CK AND TRIBUTARY BEEMAN CK
575610	S SHORE BLVD/SMOKES CK
575634	BAILEY AVE/CAZENOVIA CK
575638	FREEMAN RD/SMOKES CK
575644	BUFFALO SIGNALS
575645	GENESEE ST SIGNALS
575646	YOUNGS @ AERO INTERSECTION
575647	WEHRLE @ HARRIS HILL INTERSECTION
575649	HARRIS HILL @ PLEASANTVIEW
575651	GRIDER ST; LEROY-DELAVAN
575667	Replace Bridge, Babcock Street Norfolk Southern RR
580486	TOC ANNUAL STAFFING
593317	LAKE AVE CSX
593319	LAKEVIEW RD CSX
593322	MAIN ST CSX
593323	ROGERS RD CSX
593326	CLOVERBANK RD CSX
593328	STURGEON POINT ROAD CSX
593360	CHURCH ST BSOR
593361	SHADAGEE RD BSOR
593369	FAIRGROUNDS RD BSOR
5BO301	STATE BRIDGE INSPECTION; SFY 03/04
5BO302	LOCAL BRIDGE INSPECTION; SFY 03/04

Count of Projects in County: 51

County Name: GENESSEE

400506	Rt. 5 from bridge over CSXT RR to Fargo Rd., Towns of Batavia & Stafford

Count of Projects in County: 1

County: LIVINGSTON

400504	RTS 5 & 20 IN THE VILLAGE OF AVON
475310	COVINGTON ROAD OVER THE G&W RAILROAD
475311	WHITE BRIDGE ROAD OVER CANASERAGA CREEK
475325	EAST SWAMP RD BRIDGE OVER THE CONESUS INLET
493311	Old State Rd Crossing of the Genesee & Wyoming RR-Upgrade warning devices from passive crossbucks to active lights/gates

Count of Projects in County: 5

County Name: MONROE

400298	WESTERN GATEWAY/I-490 DESIGN, ROCHESTER, MONROE (PHASE II)
401502	RT 15A FROM JARLEY TO CRITTENDON
403130	RTE 31 INTERSECTION IMPROVEMENT, PERINTON, MONROE
403135	RTE 31 F @ BAIRD ROAD INTERSECTION ALIGNMENT, PERINTON, MONR
403137	RT. 31 OVER THE ERIE CANAL IN CLARKSON
403317	SIDEWALKS ON RT. 33, CHILI
403318	CHILI AVE.
404038	RTE 390, LEXINGTON AVE TO RTE 104 (STAGE I) GATES & GREECE,
404611	RTE 252 (JEFFERSON RD), RTE 15A TO EDGEWOOD AVE, HENRIETTA,
406506	RT 65 AT RT 252 AND FRENCH RD. - PITTSFORD
410409	RTE 104, NORTH GREECE ROAD TO RTE 390, GREECE, MONROE
410422	RTE 104, HANFORD LANDING TO VETERAN'S BRIDGE, ROCHESTER, MO
415303	RT 153 FROM RT 96 TO RT 940U - PITTSFORD TOWN AND VILLAGE
425202	RTE 252, BALLANTYNE RD. BRIDGE FROM RT. 383 TO R.I.T. & RT.
439017	1-390 FROM THE RIVER TO THE SPLIT - STAGE 1
439022	I-390 SLIP RAMP AT BRIGHTON/HENRIETTA TOWN LINE RD.
459007	1-590 INTERCHANGE AT WINTON RD. FORMERLY 99-26

475220	MT. READ AND ENGLISH ROAD, INTERSECTION, GREECE, MONROE
475259	NEW EXIT 46A @ RTE I-90 (NYS THRUWAY) AND CR 170 (UNION STR
475260	PORT OF ROCHESTER ACCESS IMPROVEMENTS, ROCHESTER, N40NROE
475286	BROAD STREET TUNNEL (EAST APPROACH), BIN 2256080, ROCHESTER
475306	LEXINGTON AVENUE IMPROVEMENTS
475307	MILL RD FROM LONG POND TO NORTH AVENUE IN GREECE
475312	CLOVER STREET BRIDGE OVER ALLEN CREEK
475317	HAMLIN - PARMA TOWNLINE ROAD BRIDGE OVER BRUSH CREEK

County Name: MONROE

475318	LAKE RD. BRIDGE OVER FOURMILE CREEK
475319	NORTH GREECE RD. BRIDGE OVER NORTHRUP CREEK - GREECE
475326	BASKET ROAD BRIDGE OVER FOUR MILE CREEK
475327	LAWRENCE ROAD BRIDGE OVER MOORMAN CREEK - BIN 3316990
475328	SWAMP ROAD BRIDGE OVER SALMON CREEK
475329	LAWRENCE ROAD BRIDGE OVER MOORMAN CREEK - BIN 3317010
475330	GILIMORE RD BRIDGE OVER OTIS CREEK
475331	LAWTON RD BRIDGE OVER MOORMAN CREEK
475332	OLD BROWNCROFT BLVD BRIDGE OVER IRONDEQUOIT CREEK
475333	SMITH ST BRIDGE OVER THE GENESEE RIVER
475334	LEHIGH VALLEY MULTI-USE TRAIL
475335	JACKSON RD. AT ATLANTIC AVE. -INTERSECTION IMPROVEMENTS
475338	CANALWAY TRAIL RE-ALIGNMENT BETWEEN BROOKE RD. AND MONROE AV
475341	GARNSEY RD. FROM RT 250 TO I-490
475343	CENTRAL BUSINESS DISTRICT -WAY FINDING SIGN IMPROVEMENTS
475346	JANES RD. FROM LONG POND TO ISLAND COTTAGE
480481	TRANSPORTATION STUDIES
494082A	INGERSOLL LIFT BRIDGE IN ALBION AND WASHINGTON STREET LIFT B
494096A	SMITH & TRIMMER ROAD BRIDGES OVER THE ERIE CANAL

494OK3	RTE 940K (MOUNT READ) BRIDGES, ROCHESTER, MONROE
4BO202	LOCAL BRIDGE INSPECTION VARIOUS LOCATIONS
4BO301	STATE BRIDGE INSPECTION VARIOUS LOCATIONS
4BO401	STATE BRIDGE INSPECTION VARIOUS LOCATIONS
4BO402	LOCAL BRIDGE INSPECTION VARIOUS LOCATIONS
4BO501	STATE BRIDGE INSPECTION VARIOUS LOCATIONS

Count of Projects in County: 50

County Name: NIAGARA

505089	I190/RT 31
505093	I190/LOCKPORT RD & CONRAIL
505095	I190 BEAUTIFICATION
509524	LASALLE EXPRESSWAY, I-190 - WILLIAMS ROAD
530790	ROUTE 62, NORTH TONAWANDA NORTH CITY LINE - 500 METERS WEST OF NASH ROAD
530796	ROUTE 62; NASH RD.- WALMORE ROAD
546028	ROUTE 384 (BUFFALO AVENUE); TENTH STREET - I-190
575472	TUSCARORA ROAD/CSX
575557	QUAY ST EXT; NIAGARA ST-PINE AVE
575642	WEST SOMERSET RD/GOLDEN HILL CK
575653	STONE RD/18 MILE CK
575673	Replace Br, Fitch Rd/ 12 Mile creek
593342	WHEATFIELD ST CSX
593343	ROBINSON ST CSX
593344	THOMPSON ST CSX

Count of Projects in County: 15

County Name: ONTARIO

400534	RT 5 BRIDGE OVER THE NORFOLK-SOUTHERN RAILRAOD IN GENEVA
449019	I-490 RAMP FROM RT. 96 SOUTHBOUND TO I-490 WESTBOUND
475336	SIDEWALKS ON SOUTH ST. AND MAIN ST. IN GORHAM
475339	INTERSECTION OF CR20 AND CR4
493253	PACKWOOD ROAD, RR CROSSING, PHELPS, ONTARIO
493254	ONTARIO STREET, RR CROSSING, VILLAGE OF PHELPS, ONTARIO
493255	EAGLE ST. RR CROSSING PHELPS
493256	WILLIAM STREET, RR CROSSING, VILLAGE OF PHELPS, ONTARIO
493257	OLD STATE ROAD, RR CROSSING, PHELPS, ONTARIO

Count of Projects in County: 9

County Name: ORLEANS

403109	RT 31, VILLAGE OF MEDINA, ORLEANS
475324	MONROE-ORLEANS LINE RD BRIDGE OVER SANDY CREEK
493289	WEST AVE RR CROSSING
493290	GWINN STREET RR CROSSING
493291	GENESEE ST RR CROSSING
494082B	INGERSOLL & WASHINGTON LIFT BRIDGES (INGERSOLL BRIDGE OUTSID
494096B	BUTTS, & PRESBYTERIAN ROAD BRIDGES OVER THE ERIE CANAL - ALB

Count of Projects in County: 7

County Name: SCHUYLER

601720	SH 8242, BIN 1041960, RMM 224-6302-1058, TOWN OF CAYUTA, SCHUYLER COUNTY
610009	SH 1005, RT 226 OVER TOBEHANNA CREEK BIN 1042070, RMM 226-6302-1047, Town of Tyrone, SCHUYLER COUNTY
621315	SH 5295 SR79 OVER HECTOR FALLS CREEK BINS 1030640 & 1030650, VILLAGE OF BURDETT AND TOWN OF HECTOR. RMM 79-6306-1086 AND

Count of Projects in County: 3

County Name: STEUBEN

600807	SH 5026, INTERCHANGE US ROUTE 15 AND ROUTE 186
600822	SRI 5 ROUTE RELOCATION AND WIDENING OF STATE ROUTE 15 FROM WATSONS CREEK, NORTHERLY FIVE (5) MILES TO PRESHO, STEUBEN COU
600839	SRI 5 ROUTE RELOCATION FROM THE NY/PA STATE LINE AT THE HAMLET OF LAWRENCEVILLE, NORTHERLY 1 MILE TO WATSONS CREEK
600844	SR15 Rest Area & Tourist Information Center
603714	SH 535 1, BIN 1011390 COHOCTON RIVER, RMM 415-6401-1400,Town of Avoca
603715	SH 5211, BIN 1048170 over Meads Creek, RMM 415-6401-1014, Town of Erwin
603716	SH 9541, BIN 3334660 over McNutt River, Town of Campbell
603717	SH 9541, BIN 3334670 over Wolf Run, Town of Campbell
608435	SH 5255,RT21 Bridge Replacement over CANACADEA CREEK, BIN 1016330, RMM 21-6402-1035, Town o Hornellsville
609621	SH 5348, SR36 BRIDGE REPLACEMENT (BIN 1012580) OVER TUSCAIPORA CREEK, RMM 36-6401-1106, TOWN OF JASPER
609623	SH 905, RT36 Bridge Replacement over Unknown Creek, BIN 1023470, RMM 36-6401-1016, Town of Troupsburg
610008	SH 1102, 64-3, 69-2, RT 226 STEUBEN MONO DKS, BINs 101 1230,1011240,1061400,1090860,1090880, Towns of Bath & Campbell
621814	SH 73-9, 74-1 RTI-390 MONO DECKS, BINs 1090611, 1090612, 1090591 , 1090632,1090651, Town of Avoca
621815	SH 70-13, 73-3, 73-9, RT 1390 Antlers to Wallace, 6.0 Miles, Town of Avoca
693117	RR XING Sr 415 Maple Street, AAR 264756F, Cohocton
693122	MAIN ST AVOCA RR XING
693124	GRANT STREET AVOCA RR XING
693125	CARRINGTON STREET AVOCA RR XING

Count of Projects in County: 18

County Name: WAYNE

475313	RIDGE ROAD (CR 143) BRIDGE OVER SODUS BAY
493258	SCHWAB ROAD RR CROSSING, GALEN, WAYNE
493273	CSXT XING @ RTE 350 MACEDON WAYNE
493292	TOWN LINE RD RR CROSSING

Count of Projects in County: 4

County Name: WYOMING

401423	RTE 19, VILLAGE OF WYOMING, WYOMING
409804	RTS 98, 238, & 354 IN ATTICA VILLAGE
475314	EAST KOY ROAD BRIDGE OVER EAST KOY CREEK
475315	EAST MAIN ST. BRIDGE OVER OATKA CREEK
475320	STARR ROAD BRIDGE OVER OATKA CREEK
475321	MUNGER MILLS RD BRIDGE OVER OATKA CREEK
475322	TOOLEY RD BRIDGE OVER CAYUGA CREEK
475323	SNYDER RD BRIDGE OVER STONEY BROOK
493274	MAIN ST #1 RR CROSSING NS IN SILVER SPRINGS
493275	MAIN ST #2 RR CROSSING
493284	MAIN ST #3 RR CROSSING

Count of Projects in County: 11

County Name: YATES

601014	BIN 1026930 over Eggleston Creek, Town of Barrington

ONEIDA NATION

County Name: BROOME

901439	SH # 1612 Glen Aubry - Whitney Point Pt. 2, Whitney Point Village: Hickory St., Village of Whitney Point, Broome Co.
904245	SH # 1449, Maine - Glen Aubry, Town of Maine, Broome Co.
904326	SH # C63 -9 Binghamton City: Court Street; SH # C48-7 Bing. City: Court St.; SH # C54-12 Bing. City: Court St. City o
904333	SH # 126 Town Line Extension, Town of Chenango, Broome Co..
904504	Rte. 201 SH # 52-9 Vestal - Johnson City (52-9,52-2, 50-13), Town of Vestal, Broome Co..
921329	Rte. 79 SH # 8209 Chenango Forks - Whitney Pt., Parts 1 & 2, Town of Whitney Point, Broome Co..
921330	Rte 79 # SH 1241 Chenango Forks - North Fenton, Town of Fenton, Broome Co..
950061	SH # 63-24 Interstate 505: Bing.Cty. Broad St.- Bevier St.; SH # 64-4 Int. 505 Chen. Rv.-Bevier St. Ext.; SH 64-5 Int
950065	SH#Int.505 60-3(Penn St. Line-Sunset Dr.), SH#60-4(Sunset Dr.-Five Mile Pt.), SH#61-11(Five Mile Pt-East City Line
950089	I-81, Five Mile Point to Exit 3, Town of Kirkwood & City of Binghamton
950090	I-81 BEARING REPLACEMENT AND GENERAL REPAIRS, TOWN OF KIRKWOOD, BROOME CO.
975245	North Street, Liberty St. to Lincoln Ave., Town of Union, Broome County,
975251	CR # 33 (Hooper Rd.) over CP Railroad, Town of Union, Broome Co..
975267	CR # 69, Airport Road Bridge, Town of Maine, Broome Co.,
975268	CR # 145 Bevier Street Bridge, City of Binghamton, Broome Co..
975269	Lester Avenue Bridge, Village of Johnson City, Broome Co..
975270	Burns Street Bridge, Village of Johnson City, Broome Co.
975271	Court Street Bridge, City of Binghamton, Broome Co..
975272	Front Street Bridge over Big Choconut Creek, Town of Vestal Broome Co..
975273	Main Street over Big Choconut Creek, Town of Vestal, Broome Co..
975274	Front Street Railroad Bridge Replacement, City of Binghamton, Broome Co..
975275	Rte 11 Service Road Construction, Town of Chenango, Broome County.
975283	Mountain Road along the Susquehanna River, Town of Windsor

Projects in County: 23

County Name: CHENAGO

901438	Rte. 206 # SH 8216 Coventryville - Bainbridge, Town of Bainbridge, Chenango Co..
901636	SH # 5565 Chenango River - Greene, Town of Greene, Chenango Co..
901912	SH #1 827 Smithville Flats - McDonough, Town of Smithville, Chenango Co.
905627	SH # 1497, Rockwell Mills - South New Berlin, Towns of New Berlin and Norwich, Chenango Co.
905628	SH # 806 South New Berlin - New Berlin, Pt. 2., Town of New Berlin, Chenango Co.
905630	SH # 806, South New Berlin - New Berlin, Part 2, Towns of New Berlin and Columbus, Chenango Co..
910219	Rte 41 SH #'s 1171 Afton - Coventry Pt. 1 & Afton - Bettesburg, 5698 Afton - Coventry Pt. 1, Towns of Afton & Coventry,
910220	Rte. 41 SH # 1171 Afton - Coventry Pt. I & Afton - Bettsburg, Town of Afton, Chenango Co..
910222	Rt. 41 in the Village of Greene, (hwy reconstruction), Village of Greene, Chenango Co.
975231	CR 32 Phase III Reconstruction, From Rte. 23 to Rte 320, Town of Norwich, Chenango Co.

Count of Projects in County: 10

County Name: DELAWARE

901831	SH # 8017 Andes - Margaretville, Town of Middletown, Delaware Co..
901847	SH # 982 Delhi - Andes, Town of Delhi, Delaware Co..
904455	SH #5450 Halcottsville - Roxbury, Town of Middletown, Delaware Co..
905616	SH # 1888, Deposit - Masonville, Town of Deposit, Delaware Co.
905634	Rt. 8, Stileville to Brace Youth Camp CIPR, Town of Deposit (resurface)
906659	SH # 5246 Hancock - East Branch, Town of Hancock, Delaware Co..
906691	SH # 5167 Hale Eddy - Hancock, Towns of Deposit and Hancock, Delaware Co..
909583	Rte. 10 SH # 1971 Rock Rift - Colchester, SH 1441A Delancey - Delhi, Towns of Walton & Delhi, Delaware Co..
938933	SH # 5671 Hancock - Long Eddy, Part 1, Village of Hancock, Delaware Co-.
975285	Otego Rd. over Ouleout Creek, Town of Franklin, Delaware Co. (rehab or replacement)

Count of Projects in County: 10

County Name: HERKIMER

200913	ROUTE 167 OVER ROUTE 5 AND CONRAIL (BIN 4038920,4038920A & 4038920B) CITY OF LITTLE FALLS, HERKIMER COUNTY
205675	Rt. 8 Interchange with Routes 5 & 12
223010	Griffiss Pkwy., Chestnut St. Resurfacing & Bridge Replacement
294091	Canalway Trail, Oriskany to Barnes Ave.
294092	Canalway Trail, German Flatts-Minden

Count of Projects in County: 5

County Name: JEFFERSON

701118	RT. 177, Rehabilitate structure over N. Branch Sandy Creek
701504	Rt.3, Reconstruct 1.3 miles from Watertown City line to Floral Drive and replace structure over I-81
703310	Widen and Rehabilitate 3.25 miles of Rt.342 from Rt.37 to Rt. 11
750075	Rehabilitate 13.7 miles of I81 from Perch River to Rt. 12
750076	Replace 2 bridges carrying 181 over Rt.232.
750077	I81, Rift Bridge - Customs
775258	Replace structure carrying Cr.69 over Sandy Creek

Count of Projects in County: 7

County Name: LEWIS

701649	RT. 12, R&P From Jefferson County line south 3.8 miles to southerly town line of town of Denmark.
704238	RT.26 R&P from Oneida county line northerly 9.3 miles to the north village line of Constableville.
775253	Replace structure over Moose Creek
775254	Replace structure over East Branch of Fish Creek
780410	Bridge Painting, Various Locations, Jefferson & Lewis Counties
7TR401	Existing Crossbucks to Gates

Count of Projects in County: 6

County Name: MADISON

211131	RT 20 INTERPRETIVE CENTER
213427	ROUTE 5: SENECA STREET TO ONEIDA COUNTY LINE, CITY OF ONEIDA
275320	JOHNY CAKE HILL ROAD OVER MADISON RESERVOIR FEEDER CANAL

Count of Projects in County: 3

County Name: ONEIDA

206401	ROUTE 5S: ROUTE 7901 TO HERKIMER COUNTY LINE, CITY OF UTICA
275302	WELSHBUSH ROAD OVER STARCH FACTORY CREEK (BIN 2206620) CITY OF UTICA
275374	Utica St. & Valley Rd. Signal Improvement, Village of Oriskany
275375	CR 91, Old State Rt. 12, Town of Trenton
275376	CR 24, Chapman Rd., Town of New Hartford
275377	CR 66, Herder Rd. over West Branch Fish Creek, Towns of Annsville & Vienna

275378	CR 69, McConnellsville Rd. over West Branch Fish Creek, Town of Annsville
275379	CR 30, Clinton St., Towns of Whitestown & New Hartford
275380	CR 69, Pinnacle Rd. over Sauquoit Ck., Town of Paris
275381	Floyd Ave., Rt. 46 to Park Drive, City of Rome
280272	ROUTE 69:BRANDY BROOK TO GIFFORD ROAD
293123	RT. 26, 49, 69 CROSSING GVT RAIL
293124	SAND RD CROSSING MA&N
293127	CHENANGO RD CROSSING NYS&W
293131	WASHINGTON AVE CROSSING NYS&W
293132	RT. 49, 69 CROSSING GVT RAIL
2BO403	BRIDGE DIVING FATHOMETER SURVEY

Count of Projects in County: 17

County Name: OTSEGO

901849	Rt. 28 at Walnut St. and Rt.28 at CR 26, intersection improvements, Town of Hartwick & Village of Cooperstown, Otsego Co
911123	SH # 1409 Richfield Springs - Winfield, Parts 1&2, Town of Richfield, Otsego Co..
930681	SH # 5 247 Schenevus - Schohaire Co. Line, Town of Worcester, Otsego Co
935764	SH # 71-18, Int. Rte 508, Rte 205 Connection - Main St; SH # 71-5, Int. Rte 508 Oneonta: Main St. - E. Oneonta City Ln.;

Count of Projects in County: 4

County Name: ST LAWRENCE

704921	Rt. 812 over Beaver Creek (replacement), Town of Oswegatchie, St. Lawrence Co
703406	RT.345, Rehabilitate structure over Big Sucker Brook.
704919	RT.812, REHABILITATE 6 MILES FROM KENDREW CORNERS TO HEUVELTON
714324	Rt 11 resurface 3.6 miles from Sanfordville northerly to Stockholm.
714331	Rehabilitate 2.1 miles of Rt. 11 in Village of Gouverneur
775265	Replace structure carrying County Route 11 over the Oswegatchie River
7TR402	Existing Crossbucks to Gates
7TR403	Existing Crossbucks to Gates or Closure

Count of Projects in County: 8

ONONDAGA NATION

County Name: BROOME

901439	SH # 1612 Glen Aubry - Whitney Point Pt. 2, Whitney Point Village: Hickory St., Village of Whitney Point, Broome Co.
904245	SH # 1449, Maine - Glen Aubry, Town of Maine, Broome Co.
904326	SH # C63-9 Binghamton City : Court Street ; SH # C48-7 Bing. City : Court St.; SH # C54-12 Bing. City : Court St. City o
904333	SH # 126 Town Line Extension, Town of Chenango, Broome Co..
904504	Rte. 201 SH # 52-9 Vestal - Johnson City (52-9,52-2, 50-13), Town of Vestal, Broome Co..
921329	Rte. 79 SH # 8209 Chenango Forks - Whitney Pt., Parts I & 2, Town of Whitney Point, Broome Co..
921330	Rte 79 # SH 1241 Chenango Forks - North Fenton, Town of Fenton, Broome. Co.
950061	SH # 63-24 Interstate 505: Bing.Cty. Broad St.- Bevier St.; SH # 64-4 Int. 505 Chen. Rv.-Bevier St. Ext.; SH 64-5 Int
950065	SH # Int.505 60-3(Penn St. Line-Sunset Dr.), SH #60-4 (Sunset Dr.-Five Mile Pt.), SH # 61-1 1 (Five Mile Pt-East City Line
950089	I-81, Five Mile Point to Exit 3, Town of Kirkwood & City of Binghamton
950090	I-81 BEARING REPLACEMENT AND GENERAL REPAIRS, TOWN OF KIRKWOOD, BROOME CO.
975245	North Street, Liberty St. to Lincoln Ave., Town of Union, Broome County,
975251	CR # 33 (Hooper Rd.) over CP Railroad, Town of Union, Broome Co.
975267	CR # 69, Airport Road Bridge, Town of Maine, Broome Co.
975268	CR # 145 Bevier Street Bridge, City of Binghamton, Broome Co,
975269	Lester Avenue Bridge, Village of Johnson City, Broome Co.
975270	Burns Street Bridge, Village of Johnson City, Broome Co
975271	Court Street Bridge, City of Binghamton, Broome Co.
975272	Front Street Bridge over Big Choconut Creek, Town of Vestal Broome Co.
975273	Main Street over Big Choconut Creek, Town of Vestal, Broome Co.
975274	Front Street Railroad Bridge Replacement, City of Binghamton, Broome Co.
975275	Rte 11 Service Road Construction, Town of Chenango, Broome County.
975283	Mountain Road along the Susquehanna River, Town of Windsor

Count of Projects in County: 23

County Name: CORTLAND

300906	Replace the Route 91 bridge over Labrador Creek, Town of Truxton
300907	ROUTE 91 OVER LABRADOR CREEK AND SHACKHAM BROOK, TOWN OF TRUXTON, CORTLAND COUNTY
302406	ROUTE 221 OVER TRIBUTARY TO THE EAST BRANCH OF OWEGO CREEK, TOWN OF HARFORD CORTLAND OUNTY
302808	ROUTE 281 INTERCHANGE AT HOMER TO ROUTE 13, CORTLAND COUNTY
303805	ROUTE 392 OVER VIRGIL CREEK AND GRIDLEY CREEK
305748	REPLACE 4 BRIDGES ON ROUTE 13 OVER HAIGHTS CREEK, WESTCOTT BTOOK. MORGAN HILL ROAD AND MAXON CREEK, CORTLAND COUNTY
350141	I-81 OVER HOXIE GORGE, CORTLAND COUNTY
375338	Replace the McGraw-Marathon Bridge over Smith Brook, Town of Cortlandville (BIN 3311990)
375350	PAGE GREEN ROAD, TOWNS OF CORTLANDVILLE & VIRGIL, CORTLAND COUNTY

Count of Projects in County: 9

County Name: JEFFERSON

701118	RT. 177, Rehabilitate structure over N. Branch Sandy Creek
701504	Rt.3, Reconstruct 1.3 miles from Watertown City line to Floral Drive and replace structure over I-81.
703310	Widen and Rehabilitate 3.25 miles of Rt.342 from Rt.37 to Rt. 11
750075	Rehabilitate 13.7 miles of I81 from Perch River to Rt. 12
750076	Replace 2 bridges carrying I81 over Rt.232.
750077	I81, Rift Bridge - Customs
775258	Replace structure carrying Cr.69 over Sandy Creek

Count of Projects in County: 7

County Name: ONONDAGA

301916	Rehab Route 173 over Onondaga Creek, Syracuse
303472	ROUTES 5 AND 92, ERIE BLVD TO LYNDON CORNERS I481/5&92 INTERCHANGE IMPROVEMENTS
303484	ERIE BOULEVARD BRIDGE OVER ONONDAGA CREEK - CITY OF SYRACUSE - BIN 2208550
303753	ROUTE 31 FROM SOULE ROAD TO HENRY CLAY BOULEVARD, INCLUDES BRIDGE OVER MUD CREEK, TOWN OF CICERO, ONONDAGA COUNTY
304360	ROUTE 11 AND ROUTE 20 INTERSECTION, TOWN OF LAFAYETE, ONONDAGA COUNTY
304361	ROUTE 11 AND ROUTE 80, TULLY SOUTH VILLAGE LINE TO ROUTE 281, ONONDAGA COUNTY
305616	ROUTE I 481, 1 690 TO 1 81 IN ONONDAGA COUNTY
310419	ROUTE 298, SYRACUSE TO OLD COURT ST SOUTH, SH 672,672A, 56-3, TOWNS OF SALINA AND DEWITT, CITY OF SYRACUSE, ONONDAGA CO
328716	RT 370, CAYUGA CO LN TO NY RT 690
328717	ONONDAGA LAKE PARKWAY CORRIDOR, ROUTE 370, ONONDAGA COUNTY
340301	ROUTE 297 OVER CSX RAILROAD, ONONDAGA COUNTY
350138	I81, ITS DOWNTOWN
350140	I81 VIADUCT REPAIRS
350145	I81 ROUTE 173 TO THE VIADUCT, 3R PROJECT, SENECA TURNPIKE BRIDGES, ONONDAGA COUNTY
350631	MIDLER AVENUE OVER I-690, CITY 0 SYRACUSE, ONONDAGA COUNTY
350632	REHABILITATE 9 BRIDGES 1-690/ WEST STREET INTERCHANGE, CITY OF SYRACUSE, ONONDAGA COUNTY
375269	HENRY CLAY BOULEVARD AT BUCKLEY ROAD
375285	GEDDES/GENESEE SIGNAL INTERCONNECT
375286	7TH NORTH ST @ WETZEL RD
375288	FINEVIEW PLACE BRIDGE
375298	TAFT RD, SOUTH BAY RD-I81, ONONDAGA COUNTY
375307	HIAWATHA BOULEVARD IMPROVEMENTS, STATE FAIR BOULEVARD TO PARK CITY OF SYRACUSE ONONDAGA COUNTY
375313	TEMPLE STREET OVER ONONDAGA CREEK BRIDGE REPLACEMENT, CITY OF SYRACUSE ONONDAGA COUNTY
375327	WEST GENESEE STREET, MILTON AVENUE, BINGHAM PLACE INTERSECTION, VILLAGE OF CAMILLUS, ONONDAGA COUNTY
375329	VELASKO ROAD, ROUTE 175 TO SYRACUSE CITY LINE, ONONDAGA COUNTY

County Name: ONONDAGA

375330	HOSMAN ROAD (CR 71, EAST MOOLOY ROAD), TOWNLINE ROAD TO NORTHERN BOULEVARD, ONONDAGA COUNTY
375331	SALINA-CLAY ROAD (SEVENTH NORTH STREET), BUCKLEY TO SYRACUSE CITY LINE, ONONDAGA COUNTY
375332	TOWN.LINE ROAD OVER LEY CREEK, ONONDAGA COUNTY

375333	JAMESVILLE ROAD OVER LEY CREEK, ONONDAGA COUNTY
375334	SOUTH BAY ROAD OVER DARLENES BROOK, ONONDAGA COUNTY
375336	SCHEPPS CORNERS ROAD OVER CHITTENANGO CREEK, ONONDAGA COUNTY
375337	TANNER ROAD OVER WEST BRANCH ONONDAGA CREEK, ONONDAGA COUNTY
375344	Clean & Paint Various City of Syracuse Bridges
380439	I-81 & I-690 BRIDGE REPAIRS, PHASE 1, CITY OF SYRACUSE, ONONDAGA COUNTY
380440	CAUGHDENOY ROAD OVER CAUGHDENOY LOCK, TOWN OF CLAY, ONONDAGA COUNTY
380466	I-81 & I-690 BRIDGE REPAIRS, PHASE 2, CITY OF SYRACUSE, ONONDAGA COUNTY
393241	POTTERY ROAD CR\CSX MAINLINE, TOWN OF CAMMILLUS, ONONDAGA COUNTY
393242	HERMAN ROAD CR\CSX MAINLINE.MP 299.11,TOWN OF CAMILLUS, ONONDAGA COUNTY
393243	MEMPHIS ROAD CR\CSX MAINLINE MP 302.55 TOWN OF VAN BUREN, ONONDAGA COUNTY
393248	HARTLOT STREET, FLKG AUBURN BR, TOWN OF ELBRIDGE, ONONDAGA COUNTY
3T3306	CREEKWALK STUDY, KIRK-ARM

Count of Projects in County: 41

County Name: OSWEGO

302306	RT 69, VILLAGEOF PARISH, TOWN OF PARISH, OSWEGO COUNTY
304551	ROUTE 104, OSWEGO TO SCRIBA, TOWN OF SCRIBA
305747	ROUTE 11, VILLAGE OF PULASKI, TOWN OF RICHLAND, OSWEGO COUNTY
350143	SALISBURY STREET OVER I-81TOWN OF SANDY CREEK, OSWEGO COUNTY
350146	I-81 SOUTHBOUND REST AREA AT HASTINGS, TOWN OF HASTINGS, OSWEGO COUNTY
350150	I-81 OSWEGO BRIDGES, OSWEGO COUNTY
375339	PEKIN ROAD OVER NIMO TAILRACE AND RIVER, ORWELL, OSWEGO COUNTY
375342	OSWEGO COUNTY BRIDGE PAINT
375348	ROUTE 48, WEST RIVER ROAD, CITY LINE TO MURRAY STREET, OSWEGO COUNTY

Count of Projects in County: 9

County Name: ST LAWRENCE

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Count of Projects in County: 8

TUSCARORA NATION

County Name: *BROOME*

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975275	Rte 11 Service Road Construction, Town of Chenango, Broome County.
975283	Mountain Road along the Susquehanna River, Town of Windsor

Count of Projects in County: 23

County Name: LIVINGSTON

400504	RTS 5 & 20 IN THE VILLAGE OF AVON
475310	COVINGTON ROAD OVER THE G&W RAILROAD
475311	WHITE BRIDGE ROAD OVER CANASERAGA CREEK
475325	EAST SWAMP RD BRIDGE OVER THE CONESUS INLET
493311	Old State Rd Crossing of the Genesee & Wyoming RR-Upgrade warning devices from-passive crossbucks to active lights/gates

Count of Projects in County: 5

County Name: MADISON

211131	RT 20 INTERPRETIVE CENTER
213427	ROUTE 5: SENECA STREET TO ONEIDA COUNTY LINE, CITY OF ONEIDA
275320	JOHNY CAKE HILL ROAD OVER MADISON RESERVOIR FEEDER CANAL

Count of Projects in County: 3

County Name: NIAGARA

505089	I190/RT 31
505093	I190/LOCKPORT RD & CONRAIL
505095	I 190 BEAUTIFICATION
509524	LASALLE EXPRESSWAY; I-190 - WILLIAMS ROAD
530790	ROUTE 62; NORTH TONAWANDA NORTH CITY LINE - 500 METERS WEST OF NASH ROAD
530796	ROUTE 62; NASH RD.- WALMORE ROAD
546028	ROUTE 384 (BUFFALO AVENUE); TENTH STREET - I-190
575472	TUSCARORA ROAD/CSX
575557	QUAY ST EXT; NIAGARA ST-PINE AVE
575642	WEST SOMERSET RD/GOLDEN HILL CK
575653	STONE RD/18 MILE CK
575673	Replace Br, Fitch Rd/ 12 Mile creek
593342	WHEATFIELD ST CSX
593343	ROBINSON ST CSX
593344	THOMPSON ST CSX

Count of Projects in County: 15

DOCUMENTATION OF ART COMMISSION APPROVAL

New York City
Department of Transportation
Iris Weinshall, Commissioner

Division of Bridges
2 Rector Street - 8th Floor
New York, New York 10006
Tel: 212/788-2100 Fax: 212/788-9015
Web: www.nyc.gov/dot

MEMORANDUM

To: Jackie Snyder
Executive Director of the Art Commission

From: Henry Perahia, P.E.
Chief Bridge Officer / Chief Engineer

Re: Reconstruction of the Willis Avenue Bridge
Over the Harlem River
Boroughs of Manhattan and the Bronx
BIN 2-24005-9/A/B; Contract HBM1124
Extension of Approval for Willis Avenue Bridge

Date: December 9, 2004

The design for the replacement of the Willis Avenue Bridge over the Harlem River was unanimously approved by the Art Commission at its meeting on February 10, 2003. However the final approval was contingent upon the commencement of work before February 10, 2005.

Due to the budget constraints, the construction contract for the replacement project is currently scheduled for award around Spring 2007, and the construction would be completed in mid-2012. This delay will not result in any changes to the design for the replacement of the Willis Avenue Bridge represented by exhibits 2095-W, X, Y and Z on record with the Art Commission (see attached certificate 21098 issued by the Art Commission on February 17, 2003).

We are requesting your office to extend the approval for this project to reflect the new construction schedule.

cc: J. Patel, B. Chandiramani, R. Shah, N. Wright, T. Juhasz, S. Finkelstein

February 17, 2003

CERTIFICATE 21098

RESOLVED That the Art Commission, having considered designs for the replacement of the Willis Avenue Bridge over the Harlem River, First Avenue and FDR Drive, Manhattan and Willis Avenue and Bruckner Boulevard, Bronx, submitted by the Department of Transportation, represented by exhibits 2095-W, X, Y & Z of record in this matter, hereby gives to the same unanimous preliminary and final approval.

Final approval is conditioned upon the commencement of work before February 10, 2005, and the submission of an 8" x 10" black and white photograph of the completed project.

A true copy of resolution adopted by
the Art Commission at its meeting
on February 10, 2003.

Deborah Bershad
Executive Director