PHASE 1A ARCHEOLOGICAL SENSITIVITY ASSESSMENT
BLOOMINGDALE PARK
STATEN ISLAND, RICHMOND COUNTY, NEW YORK

John Milner Associates
Architects • Archeologists • Planners

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Prepared for

The City of New York
Department of Design and Construction
30 – 30 Thompson Avenue
Long Island City, New York 11101

By

Patrick J. Heaton, RPA
Joel I. Klein, Ph.D., RPA

John Milner Associates, Inc.
1 Croton Point Avenue
Croton-on-Hudson, NY 10520

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MANAGEMENT SUMMARY

John Milner Associates, Inc. (JMA) conducted a Phase 1A cultural resources investigation for the City of New York, Department of Design and Construction on a 38-acre portion of Bloomingdale Park in Staten Island. The proposed construction of athletic and recreational facilities in this section of Bloomingdale Park has the potential to impact archeological resources that may be located within the Project Area. The Phase 1A cultural resources investigation consisted of documentary and cartographic background research and a reconnaissance inspection of the Project Area.

The results of background research indicate that at least four previously recorded prehistoric archeological sites are located in the immediate vicinity the Project Area. Furthermore, the Project Area is located near a permanent inland drainage and contains a large wetland. Beyond land clearing and plowing activities related to past agricultural uses, most of the Project Area does not appear to have been subject to substantial ground disturbances. Previous disturbances appear to be limited to areas adjacent to recently constructed roads and drainage ditches located along the perimeters of the Project Area. The combination of these factors indicates that prehistoric archeological resources may be located in the non-wetland portions of the Project Area. Based on the results of a historic map review, JMA does not anticipate that significant historic archeological resources are likely to be located within the Project Area.

Due to the potential for prehistoric archeological resources to be located within the Project Area, JMA recommends that a Phase 1B archeological survey be conducted before construction for the Project begins.

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1. INTRODUCTION

1.1 Purpose and Goals of the Investigation

John Milner Associates, Inc. (JMA) conducted a Phase 1A cultural resources survey of a 38-acre portion of Bloomingdale Park in Staten Island. The City of New York, through the Department of Design and Construction (DDC) working with the New York City Department of Parks and Recreation (DPR), is proposing the construction of recreational facilities within a portion of Bloomingdale Park (the Project). The information and recommendations contained in this report are intended to assist the DDC in complying with the requirements of the New York City Environmental Quality Review Act (CEQR), and/or Section 14.09 of the New York State Parks, Recreation, and Historic Preservation Law, and/or Section 106 of the National Historic Preservation Act (NHPA).

The purpose of the Phase 1A investigation is to identify previously recorded archeological or historic sites and assess the likelihood for there to be previously unrecorded cultural resources within the Project's area of potential effect. The information contained in this report is intended to help assess what effects the proposed construction of recreational facilities within Bloomingdale Park will have on archeological or historical resources. All research and report preparation were conducted in accordance with the New York Archaeological Council's *Standards for Cultural Resources Investigations and the Curation of Archaeological Collections* (NYAC 1994) recommended for use by the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP).

1.2 Project Location and Description

Bloomingdale Park is a 138-acre park owned by the City of New York located in the northwest quadrant of the intersection of the West Shore Expressway (State Route 440) and the Korean War Veterans Highway in the Borough of Staten Island. The proposed improvements to the park would be located in the 38-acre eastern portion of the park (the Project Area; Figure 1). The Project Area is located east of the mapped but not built section of Maguire Avenue and is known as Block 6950, Lot 41. The purpose of the Project is to provide the surrounding residential communities with active recreational facilities while preserving the park's natural resources and open spaces to the greatest extent practicable (ES et al. 2000).

Proposed activities for the Project include the construction of soccer and baseball fields, tennis courts, basketball courts, a boccie court, a playground, walking and biking trails, and comfort stations within the Project Area (Figure 2). Construction of these recreational facilities would require the clearing and disturbance of approximately 12 acres within the Project Area. Additionally, proposed activities include the construction of an approximately 1,700-foot section of Maguire Avenue between Ramona Avenue and Drumgoole Road. In the proposed construction designs, Maguire Avenue will be built as two unconnected cul-de-sacs to provide public access and parking for the park (Figure 2). Approximately 2.5 acres of land disturbance will be required for the construction of Maguire Avenue (ES et al. 2000). Construction of the recreational facilities and sections of Maguire Avenue have the potential to impact prehistoric or historic archeological sites which may be located in the Project Area.

2. ENVIRONMENTAL AND CULTURAL CONTEXTS

2.1 Environmental Setting

Staten Island is located in the Coastal Plain physiographic province, a broad low-lying region that slopes gently to the Atlantic Ocean. The surficial geology and topography of the island were greatly affected by the advance and retreat of glaciers during the Pleistocene. The final advance of the Wisconsin Glacier can be observed in the vicinity of the Project Area at nearby Harbor Hill Moraine, which extends across Staten Island through Brooklyn, Queens, and Long Island to Montauk Point. The retreating glacier caused the cutting and erosion of local sediments, and resulted in the deposition of vast quantities of outwash sediments. The melting glaciers resulted in the formation of Lake Hackensack, ca. 20,000 B.P., over western Staten Island. As the lake retreated it deposited clay, silt, sand, and gravel settlements and resulted in the formation of the Arthur Kill valley (Boesch 1994; LBA 1989; HPI 1996; Silver 1984; SIG 2001). When human beings may have first entered the area around 12,000 B.P., sea levels were as much as 300 feet lower than present and the Atlantic coast 60 to 90 miles from its current position. At this time the Arthur Kill would have been a narrow freshwater stream that would not have obstructed human passage (LBA 1989; Silver 1984). Gradual warming of the environment after 12,000 B.P. resulted in the replacement of the tundra vegetation with conifer and subsequently more temperate deciduous forest environment (Davis 1983, cited in TRC 1998).

The Project Area is characterized by gentling undulating topography, sloping generally south from higher elevations in the northwest corner of the park to lower elevations in the south. Soils in the Project Area consist of moderate to moderately well drained Keyport soils in relatively flat and slightly sloped areas, and poorly drained Elkton soils in low-lying flats, basins, and drainage ways. Approximately 8 acres of the 38-acre Project Area are wetlands, the rest of the Project Area is composed of relatively young secondary growth woodland vegetation. As late as 1968 the portions of the Project Area appears to have been cleared and used for agricultural activities (ES et al. 2000).

2.2 Prehistoric Period Cultural Contexts

Evidence from known archeological sites reveals dramatic cultural changes occurred throughout the long period of human occupation in the southeastern New York. Environmental changes and technological innovations influenced subsistence practices and choices of settlement location of prehistoric groups. The availability and changing importance of ecological resources affected the distribution of camping sites, special activity sites, and village locations across the landscape. Settlement locations and cultural practices were also affected by increasing exchange and social contact between groups in the later prehistoric periods and the influence of Europeans in the Contact and Colonial periods.

The prehistory of Eastern North America is commonly divided into three major temporal periods: Paleo-Indian, Archaic, and Woodland. These periods are each characterized by distinctive subsistence practices, social organization, settlement systems, and material culture. The definition of these cultural systems and an explanation for changes in culture through time provide a structure upon which archeological research questions can be framed. Archeologists continually debate many of the specifics regarding chronology, adaptation, and culture change, but a generally accepted outline of Staten Island prehistory is presented here. A discussion of known archeological sites in the vicinity of the Project Area is included.

The Paleo-Indian Period, ca. 12,500 to 10,000 B.P.

Based on radiocarbon age estimates of sites associated with Paleo-Indian fluted points, it appears that human beings first occupied the northeastern United States about 13,000 B.P. (Levine 1990). This period marked the latter stages of a dramatic climate change, as the tundra habitat of the Pleistocene gave way to warmer conditions and forested vegetation characteristic of the Holocene. During the late Pleistocene, coastal sea levels were considerably lower and the tundra vegetation of southern New York supported a diversity of fauna including mammoth, mastodon, and caribou (Boesch 1994; Funk 1976; LBA 1989; Ritchie 1980; Snow 1980).

Artifact assemblages from Paleo-Indian sites are usually comprised of lithic (stone) tools, while organic technological materials and food remains have only been recovered from contexts of remarkable preservation. The distinctive lithic component of Paleo-Indian assemblages consists of long, fluted projectile points and a variety of end scrapers, side scrapers, knives, gravers, and perforators (Fiedel 2000; Funk 1976; Ritchie 1971). This tool-kit is superbly designed for hunting, butchering, and animal processing activities. The association of Clovis points with extinct megafauna such as mammoth and mastodon at sites in the western and southern United States suggests that Paleo-Indians were largely dependent on big game hunting for subsistence (Fiedel 2000). However, there is no clear evidence for Paleo-Indians hunting Pleistocene fauna other than caribou in the northeastern United States (Funk 1976; Levine 1990; Ritchie 1980). Like historically documented hunters and gatherers, Paleo-Indian subsistence patterns were likely very dependent on the collection of a variety of fruit and vegetable resources. The preservation of food remains such as charred hawthorn pits and fish bones at the Shawnee-Minisink site in Pennsylvania (McNett 1985; Snow 1980) may represent a more accurate picture of Paleo-Indian subsistence. Paleo-Indian peoples probably lived in small, mobile bands and their choice of settlement seems to have been conditioned by access to upland forest resources, low-lying swamp areas, medium to large sized drainages, and high-quality lithic sources (Fiedel 2000; Funk 1976).

Paleo-Indian occupation of Staten Island is indicated by the recovery of numerous fluted points from bluffs overlooking the Arthur Kill between Rossvile and Tottenville (Boesch 1994). The Port Mobil site yielded a diverse assemblage of fluted points lithic and other tool types from disturbed contexts (Ritchie 1980; Snow 1980), suggesting that the site was likely a hunting camp (Eisenberg 1978). Paleo-Indian sites on Staten Island are generally situated on high terraces that would have afforded excellent views of the surrounding landscape.

The Archaic Period, ca. 10,000 to 2,700 B.P.

The Archaic Period subsumes a diverse group of hunting and gathering cultures that occupied North America beginning with the transition from glaciated Pleistocene to modern Holocene conditions, through the adoption of ceramic technologies by prehistoric peoples in the 3rd millennium B.P. Archaic cultures in the Northeast are generally characterized as small, mobile social groups. The archeological sites associated with their occupations are usually small and lacking permanent structures, fortifications, extensive storage pits, and elaborate mortuary remains (Ritchie 1980). Archaic settlement and subsistence practices in the Lower Hudson Valley seem to have been based on seasonal movement between coastal and inland/riverine areas with a reliance on both woodland and aquatic resources (Tuck 1978).

The Early Archaic Period (ca. 10,000 to 8,000 B.P.) is poorly represented in the Northeast generally (Snow 1980), perhaps due to relatively unfavorable or inhospitable climactic conditions during the period (Funk 1976). Very few Early Archaic sites have been excavated or radiocarbon

dated in the Northeast; as a result these sites are usually identified by the presence of projectile points that resemble types found in better documented, stratified sites in the southeastern United States (TRC 1998). A number of Early Archaic sites have been identified on Staten Island based on the presence of diagnostic Kanawha Stemmed, Le Croy Bifurcated Base, Stanly Stemmed, Hardaway, and Palmer projectile points, in association with a variety of scrapers, choppers, and ground stone woodworking tools (Ritchie and Funk 1971). Early Archiac projectile points were recovered from the lowest artifact bearing strata at the Hallowell and Ward's Point Sites in Tottenville, and from the Old Place Site in the northwest portion of Staten Island. Palmer Corner Notched points were recovered in association with a hearth feature radiocarbon dated to 7,410 BC ± 120 years at the Richmond Hill Site (Ritchie and Funk 1971). These sites indicate that Staten Island was occupied earlier than northern areas of New York, likely because temperate climactic conditions similar to the Coastal Plain of more southern states reached Staten Island earlier than more inland areas of the Northeast (Funk 1976; Ritchie and Funk 1971).

The Middle Archaic (ca. 8,000 to 6,000 B.P.) is often characterized as a period of adaptation to the emerging temperate climactic conditions of the Holocene, including the exploitation of a wide variety of floral and faunal species similar to those of the modern era (LBA 1989; Snow 1980). Middle Archaic sites in the Northeast are identified by diagnostic Neville, Stark, and Merrimack projectile point types and the appearance of several new technological innovations including stone gouges and axes, large ground stone semi-lunar knives, notched net-sinkers and plummets, and ground stone spear-thrower (or atatl) weights (Dincauze 1971; Snow 1980). Only a few sites with Middle Archaic components have been identified on Staten Island, including Ward's Point, Chemical Land, and Harik's Sandy Ground (Boesch 1994).

The Late Archaic Period (ca. 6,000 to 4,000 B.P.) in southeastern New York is identified by the presence of distinctive narrow stemmed projectile points (Tuck 1978). Local variants of this point tradition have been identified as Lamoka, Wading River, Sylvan Lake or Sylvan Stemmed, Taconic, and Bare Island (Fiedel 1986; Ritchie 1971). Narrow stemmed projectile points recovered on Staten Island are frequently made from argillite, and their resemblance in material and form to points found in New Jersey and Pennsylvania suggest that regional networks of trade and interaction were well-established by this period (Lenik 1989). The foraging economy of the Late Archaic seems to have been based on the scheduled exploitation of specific seasonally available resources, including an emphasis on marine resources as evident from large shell middens on coastal and riverine sites (Ritchie 1980; Schaper 1993; Snow 1980). Late Archaic occupations on Staten Island include some sites that appear to have been occupied on a semi-permanent basis located near estuaries such as the Pottery Farm, Bowman's Brook, Smoking Point, and Goodrich sites. Other sites are located along major interior streams, such as the Sandy Brook, Wort Farm, and Arlington Avenue sites, and hunting camps are typically located on sandy knolls such as in Clay Pit Pond Park (Boesch 1994).

The Terminal Archaic (ca. 3,700 to 2,700 B.P.) is characterized by technological innovations and subsistence practices that are often viewed as precursors to developments that occurred in the subsequent Woodland Period. In southeastern New York, distinctive Orient Fishtail projectile points serve as a diagnostic marker of this period, along with carved steatite (or soapstone) vessels (Ritchie 1971, 1980; Snow 1980). Steatite does not occur naturally on Staten Island, and the nearest quarry sources are in Maryland, eastern Connecticut, and Rhode Island; thus these vessels indicate participation in long-distance networks of exchange and social interaction (Lenik 1989). Sites with Terminal Archaic components on Staten Island, such as the Pottery Farm, Ward's Point, Old Place, and Travis sites, tend to be located on the coast or on major waterways (Boesch 1994).

The Woodland Period, ca. 3,000 B.P. to European Contact

The Woodland Period is often distinguished from earlier prehistoric periods by significant changes in technology (notably the widespread production and use of ceramics), more intensive subsistence practices (often including the domestication of plants), increasing trends towards sedentism and larger settlements, and changes in social organization (Ritchie 1980; Versaggi 1999). Woodland Period sites are relatively ubiquitous on Staten Island, and reflect a gradual trend towards increasingly longer, more intensive and continuous occupation of site locations as evidenced by generally greater densities of artifacts and features found on sites of this period (Boesch 1994; Lenik 1989).

Sites with Early Woodland Period (ca. 2,700 to 2,000 B.P.) components are fairly widespread on Staten Island (Boesch 1994; Lenik 1989). The Early Woodland in New York State has traditionally been identified by the presence of diagnostic Meadowood and Adena projectile points (Ritchie 1971, 1980). The distribution of these points, and related evidence for elaborate mortuary ceremonialism, within the state is generally restricted to central and western New York (Ritchie 1980; Snow 1980; Tuck 1978) however examples of these projectile points have been recovered on Staten Island (Lenik 1989). Many researchers have recently begun to question whether Adena and Meadowood are appropriated diagnostics of the Early Woodland in the Hudson Valley and southeastern New York, and argued that projectile point chronologies for the Terminal Archaic and Early Woodland need to be reevaluated (Versaggi 1999). Rossville points, named for the nearby site where they predominated, serve as another diagnostic marker of Early Woodland occupations in the region; these points are usually recovered in association with coastal shell middens (HPI 1996; Lenik 1989; Ritchie 1971). Vinette I pottery, a thick grit-tempered ware decorated on interior and exterior surfaces with impressed cordage or fabrics, represents one of the earliest ceramic traditions in the region and has been found on sites in Staten Island (Lenik 1989; Ritchie 1980; Tuck 1978).

The Middle Woodland Period (ca. 2,000 to 1,000 B.P.) in eastern New York is characterized by changes in social and economic organization, including increasing trends towards sedentism and long-distance exchange of smoking pipes and lithic materials. In southeastern New York, Middle Woodland sites occur near large streams with special activity sites on high bluffs and small inland streams. Diagnostic artifacts from the Middle Woodland include Fox Creek stemmed and lanceolate projectile points, Jack's Reef points, Greene points, and a variety of decorated pottery styles (Funk 1976; Kostiw 1995; Ritchie 1971; Snow 1980). On Staten Island, Middle Woodland sites are typically located near estuaries with smaller campsites located in the interior (Boesch 1994). Sites with components from this period include the Charleston Beach, Huguenot, Pottery Farm, Clay Pit Road, and Page Avenue Sites (LBA 1989; HPI 1996).

In southeastern New York, the Late Woodland Period (ca. 1,000 to 400 B.P.) is divided into the Bowman's Brook and subsequent Clasons Point Phases. These cultures are known from large village sites near tidal pools and small coves, with numerous pits for cooking, storage, and the disposal of refuse (Ritchie 1980) as well as smaller activity sites. The Late Woodland economy on Staten Island seems to have been primarily oriented to marine resources, supplemented by horticulture and seasonal hunting and gathering (Lenik 1989; Ritchie 1980; Snow 1980). Diagnostic artifacts for the period include Levanna and Madison style points (Ritchie 1971) and distinctive types of pottery including Bowman's Brook Incised and Stamped, East River Cord Marked, Munsee Incised, Castle Creek Beaded, and Wickham Punctate and Incised (Lenik 1989; Ritchie 1980). Late Woodland sites on Staten Island include large village sites near major rivers and estuaries that were probably occupied on a permanent basis, and smaller interior sites used for seasonal hunting and foraging (Boesch 1994).

2.3 Historic Period Cultural Contexts

In the Late Woodland and Early Contact periods, the lower Hudson Valley and coastal areas of New York were inhabited by Munsee-speaking groups of the larger Lenape (or Delaware) cultural group of Native Americans (Burrows and Wallace 1999; Goodard 1978; Snow 1980). Staten Island was occupied by people variously identified by early European settlers as the Raritan, Hackensack, Tappan, and Neversink Indians and it is likely that all of these nearby groups had at least usufructuary rights to the island (Figure 3; Goddard 1978; HPI 1996; Morris 1898). The Munsee generally lived in multi-family longhouse structures about 20 feet wide and up to 100 feet long. These houses were usually arranged as loose clusters in hamlets as opposed to nucleated villages. In addition to speaking a similar dialect of the Eastern Algonkian language, Munsee groups generally shared similar modes of subsistence, settlement, social organization, and forms of material culture (Goodard 1978; Snow 1980).

Contact and Colonial Periods

The exploration of the Lower Hudson River by Henry Hudson in 1609 provides the earliest detailed records of contact, and violent conflict, between European and Native American peoples on Staten Island (Brasser 1978; Clute 1877; Morris 1898). In the early 17th century, the fur trade served as the primary motivation for Dutch colonization of the region. Interactions with the Dutch and participation in the fur trade resulted in rapid and dramatic changes in the economy, social relations, and material culture of local Delaware groups (Burrows and Wallace 1999; Goddard 1978). Contact Period settlements are recognized in the archeological record by small quantities of European manufactured goods, such as metal kettles, tools, projectile points, ornamental brass cones, glass beads, bottles, jugs, and cloth among larger quantities of Native American material culture and refuse (Lenik 1989; LBA 1989). On Staten Island, contact period village and burial sites have been recorded at Old Place (or Tunissens Neck), Bloomfield (or Wathogue), Lake's Island, Chelsea, Sandy Ground, Burial Ridge (near Tottenville), Hammer Stone Hill (near Rossville Road), Ward's Point, and between Sandy Brook and Wort Farm (Bolton 1934; Lenik 1989; Parker 1922).

The government of Holland formally established the colony of New Netherlands in 1614, claiming exclusive rights to trade on all lands between the Connecticut and Delaware Rivers. The seat of government for this new colony was at New Amsterdam, a small Dutch fort on Manhattan Island. In 1621 the charter for the colony was transferred to the Dutch West India Company, an armed mercantile association formed to serve as the agents of Dutch colonialism in the New World (Burrows and Wallace 1999; Morris 1898). Dutch colonists began to settle in increasing numbers at New Amsterdam in 1624. The subsequent growth of the European population and encroachment upon Native American lands lead to increased tensions between the two groups. Furthermore, competition for access to the fur trade resulted in rivalries and strained relations among Native American groups in the region (Goddard 1978). The Native American population was decimated by newly introduced diseases in the early 17th century, and these losses were compounded by casualties in wars both among Native groups and with the colonists (Brasser 1978; Snow 1980).

The small hamlet of Oude Dorp (or Old Town), constructed in 1641, was the first European settlement on Staten Island. Subsequent relations between the colonists and local Native American groups were characterized by periodic warfare throughout the 1640s, 1650s, and 1660s. In 1664 the Dutch surrendered the New Amsterdam colony to the British. Despite numerous treaties between the Dutch and the Indians, Staten Island was not permanently acquired by deed

until 1670 (Clute 1877; Morris 1898). In 1683 there were over 200 European families living on the island (HPI 1996). By the end of the 17th century there were only a handful of Native Americans still living on Staten Island (Boesch 1994).

During the 18th century European settlers began clearing the wooded landscape of Staten Island and pursued a livelihood based on agriculture and fishing. The population steadily increased, growing from 727 in 1698 to 2,847 in 1771 (Clute 1877). The mixed farming economy produced beef, pork, wheat, rye, and apples and fish, oysters, and clams were taken from the estuaries and waterways around the island (LBA 1989; SIG 2001). A few gristmills and a distillery represent early industrial enterprises on the island, and schools, churches, cemeteries, post offices, and businesses grew up alongside the increasing number of farms and residences (TRC 1998). New York grew in prominence throughout the 1700s as the principal port in the Northeast for exporting agricultural produce to feed the slave populations of British sugar plantations in the Carribean. Small and medium sized farms dispersed across the hinterland of the growing port-city, including those on Staten Island, were responsible for producing agricultural staples for export (Burrows and Wallace 1999). Many of these farms were dependent on slave labor, and population records indicate that 'Blacks' made up as much as 20% of Staten Island's population throughout the 18th century (Clute 1877).

The British occupied Staten Island throughout the Revolutionary War, using the island for as a staging area and source of produce, wood, and fodder (LBA 1989). British and allied troops were reported to assault civilians, ravage women, and pillage the landscape at will (Burrows and Wallace 1999). Numerous hostilities occurred both on and in the waters around Staten Island, and the British constructed numerous forts, or redoubts, including one in the vicinity of the Project Area at Kreischerville, now Charleston (Morris 1898; HPI 1996). Archeological remains of the redoubt on Richmond Creek, located west of Richmond Hill Road on Old Mill Road, were documented in the 1970s (Solecki 1977).

The Nineteenth and Twentieth Centuries

After the war, the small population of Staten Island was composed mostly of "the old families", direct descendants of early Dutch, French, and English colonists, and a number of Hessian and English soldiers who remained after the British surrendered. The livelihood of the population remained primarily agricultural. In the early 19th century Staten Island was relatively isolated, and it wasn't until the 1830s that outsiders began to settle in significant numbers (Morris 1900). Although Staten Island was generally not included in the real estate speculation and development fervor that gripped New York in the 1830s, one group of entrepeneurs initiated the development of the northeast coat of the island as a resort center. This development attracted a few of the emerging wealthy class of New Yorkers who began to construct summer resorts and cottages along the shore near New Brighton (Burrows and Wallace 1999; LBA 1989).

The state of New York abolished slavery in 1817, decreeing that all slaves would be freed on July 4, 1825. At that time there were approximately 700 enslaved African Americans living on Staten Island (ES et al. 2000; Morris 1900). In the late 1830s free black migrants, primarily oystermen and their families from Maryland, established an important African American community at Sandy Ground, located just north of the Project Area in Woodrow (Burrows and Wallace 1999). Historical archeologists have examined mid- to late-19th century inter-ethnic relations in this community through excavations of both white and black households. In the 19th century African Americans in Sandy Ground made important contributions to the local economy including their participation in berry and fruit harvesting and oystering (Askins 1980, 1985; Schuyler 1974).

In the mid-19th century the economy and landscape of Staten Island, like the rest of the New York City region, began to be transformed by the establishment of large-scale manufacturing operations (Burrows and Wallace 1999). The opening of the Staten Island Railroad between Tottenville and Vanderbilts Landing (now Clifton) in 1860 encouraged population growth and economic development in the southwestern area of the island (LBA 1986; Morris 1900). The village of Pleasant Plains grew during this period as the location of the post office and railroad station for the larger community of Princes Bay. Local industrial developments included the establishment of a dental instrument manufactory at Princes Bay and the emergence of a major firebrick industry in the vicinity of Rossville (Burrows and Wallace 1999; Morris 1900).

In 1854 Balthasar Kreischer established the earliest and largest firebrick manufactory on Staten Island in the vicinity of the Project Area near present-day Charleston. Kreischer purchased large tracts of land that contained deposits of high-quality clay and kaolin (now Clay Pit Ponds State Park), and built a factory in 1855. By 1860 Kreischer's approximately 60 employees, living in the company town of Kreischerville (now Charleston), produced over 1 million firebricks per year (Burrows and Wallace 1999; Clute 1877; HPI 1996; Morris 1900). Recently conducted Phase II investigations of the archeological remains of the Balthasar Kreischer estate resulted in the partial documentation of the house, barns, outbuildings, and plumbing system of the estate (Klein et al. 2000).

The transition to a large-scale manufacturing-based economy in the mid- to late-19th century affected the organization of Staten Island's traditional small-scale industries, such as oystering. Most of the natural shellfish beds off Staten Island had been depleted by the early-19th century, requiring oystermen to import and transplant "seed" oysters from the Chesapeake (Askins 1985; Burrows and Wallace 1999; Clute 1877; Schuyler 1974). These beds were then tended and harvested by "planters", who typically owned their own small sloop and hired on laborers. Between 1875 and 1900 the organization of this industry was radically transformed, as oystering came to be dominated by large corporations that owned numerous steam powered vessels, employed hundreds of workers, and began to acquire exclusive rights to oyster beds in the region. These large-scale corporate enterprises quickly drove the small independent sloop owners, including some residents of Sandy Ground, out of business (Askins 1985; Schuyler 1974).

These changes in the organization of production also affected farmers on Staten Island. Since most agricultural staples for New York City were increasingly imported from distant locales, such as the midwest, Staten Island farmers were limited to operating small "truck gardens" that supplied limited quantities of produce for local distribution. By the turn-of-the-century many Staten Islanders had been dispossessed of their traditional means of income, and increasingly sought employment as laborers or in clerical positions (Askins 1985). The rise of manufactories also had deleterious impacts on the natural resources of Staten Island. Due to pollution from the dumping of human and industrial wastes, the Staten Island oyster beds became gradually contaminated and were condemned in 1916 by the New York Department of Health after a series of typhoid epidemics were linked to the oyster beds (Askins 1985; LBA 1989; Schuyler 1974).

The western coast of Staten Island took on an increasingly industrial character in the early-20th century. In 1938 the Outerbridge Crossing and Goenthals Bridge were opened, and subsequent rezoning permitted the construction of natural gas and petroleum storage facilities on the coastline (LBA 1989). The Fresh Kills landfill was opened in 1947, and has subsequently grown to 2,100 acres in size (SIG 2001). Subsequent to the opening of the Verrazano-Narrows Bridge in 1964, the population of Staten Island has tripled. The last 35 years has marked an unprecedented boom of residential and commercial development on Staten Island (ES et al. 2000; SIG 2001).

3. METHODS

3.1 Archival Research

Primary and secondary sources were examined in order to document the environmental setting of the Project Area, develop historic contexts for understanding potential cultural resources in the Project Area, and assess the likelihood for the Project Area to contain archeological resources. These sources included both written and cartographic documents relating to the past and present environmental conditions and human occupation of the region. Information concerning previously recorded archeological sites in the vicinity of the Project Area was acquired from the site files of the New York State Museum (NYSM), New York State Office of Parks, Recreation and Historic Preservation (OPRHP), and the New York City Landmarks Preservation Commission (LPC). Additionally, the Staten Island Institute of Arts and Sciences (SIIAS) was contacted in order to perform background research at that facility, however JMA was informed that the SIIAS archives would be inaccessible until the middle of March, 2001. Prehistoric site information recorded by the SIIAS is included in Boesch's (1994) summary of prehistoric resources on Staten Island, and is included in the LPC archeological site records. Previous cultural resources reports from other projects in the vicinity of the Project Area and regional syntheses of prehistory were examined to construct Native American cultural contexts for the Project Area. Historic maps from the collection of the New York Public Library (NYPL) were examined in order to determine the presence of historic structures in the Project Area. Additional regional histories and secondary sources were used to construct a historic context for the region and assist in developing the archeological sensitivity assessment.

3.2 Field Reconnaissance and Existing Site Conditions

JMA personnel conducted a field reconnaissance of the Project Area on December 5, 2000. The purpose of the field reconnaissance was to assess the degree of previous ground disturbance and evaluate the potential for the Project Area to contain archeological resources. The Project Area is characterized by gently sloped topography, with higher elevations in the northern section of the Project Area. Most of the Project Area is covered by relatively lightly wooded, secondary growth woodland vegetation (Plate 1; ES et al. 2000). Wetland areas in the southern section of the Project Area are generally marshy flats or depressions, and an apparently seasonal drainage channel transects these wetlands from north to south on the eastside of the Project Area (Plate 2). The majority of the Project Area does not exhibit evidence of prior disturbance beyond land clearing from past agricultural activities. A large drainage ditch or channel runs along the proposed route of Maguire Avenue, along the northern section of the western perimeter of the Project Area (Plate 3). This channel appears to be recent and indicates some prior disturbance along the western perimeter of the Project Area. Hazard and warning signs along Drumgoole Avenue indicate the presence of buried cables running parallel to and adjacent to Drumgoole Avenue (Plate 4). Earth removal and construction related activities associated with the installation of these cables and the construction of Drumgoole Avenue would have extensively disturbed any archeological materials that could have been located along the southern perimeter of the Project Area. Similarly, push piles and a ditch were observed adjacent to Ramona Avenue. With the exception of these areas along the perimeters of the parcel, the Project Area appears to be undisturbed.

4. RESULTS OF BACKGROUND RESEARCH

4.1 Prehistoric Archeological Sensitivity

The results of background research conducted by JMA indicate that there are numerous previously recorded prehistoric sites in the immediate vicinity (within 1 mile) of the Project Area (Table 1). At least three sites are located within ½ mile of the Project Area.

LPC Site # 92 is located within ¼ mile to the west of the Project Area adjacent to and perhaps partially destroyed by the Korean War Veterans Memorial Highway (Boesch 1994). The site is known from a 19th century reference to "Indian implements' being found (Davis 1896, in Boesch 1994).

The Sandy Brook site (NYSM 4604; LPC 44) is located only about ¼ mile north-northwest of the Project Area, along Sandy Brook (or Creek). Artifacts dating from the Late Archaic to Late Woodland periods have been recovered from the site (Lenik 1987). Boesch (1994) and Lenik describe the site as a large prehistoric base camp. Bolton (1934) refers to a village at Bogardus Corners, with evidence of 'native occupancy' spread along Sandy Brook apparently forming an extension of the village. Parker (1922) also refers to the site, and notes that 'Indian fields' spread from the Sandy Brook to Kreischerville. Most of the site has been destroyed by residential development (Lenik 1987).

The Wort Farm site (NYSM 735 and 7271; LPC 11) was located northeast of the intersection of Woodrow Road and Winant Avenue, within about ½ mile of the Project Area. This site contained evidence for occupation as well as numerous burials, and components dated from the Late Archaic through the Contact Period. A housing development was recently constructed on the location of this site (Boesch 1994).

The Rossville sites include both shell middens and campsites, located between ½ and 1 mile to the north-northwest of the Project Area. The Rossville shell middens (NYSM 772; OPRHP A085.01.0119) were largely destroyed by the construction of the West Shore Expressway. The Rossville campsites (NYSM 773; LPC 12, 21) are located only about ½ mile from the Project Area, and date to the Woodland Period (Boesch 1994).

A series of campsites referred to as the Harik's Sandy Ground sites (LPC 5) are located between Wort Farm and the West Shore Expressway. These sites appear to date to the Archaic Period as no pottery has been recovered (Boesch 1994).

Early records from the New York State Museum locate the Canada Hill Site (NYSM 770) only about ½ mile west of the Project Area. However, in the 1960s the Metropolitan Archeological Survey identified the site in the vicinity of Charleston, a little more than 1 mile west of the Project Area (OPRHP A085.01.0073; LPC 17). Recent Phase I and II investigations by JMA at the proposed site of the Bricktown Centre at Charleston (retail center) confirmed this location for the site (Klein et al. 2000). Additional sites within 1 mile of the Project Area include the Smoking Point, Hammerstone Hill, and Clay Pit State Park sites (Table 1; Boesch 1994; Parker 1922; Yamin and Pickman 1986).

There have been at least three recent CRM surveys in the immediate vicinity of the Project Area. In 1982 and 1983, Phase I and II archeological investigations were conducted for the Sharrott Estates residential development, located west of Bloomingdale Road between Sharrotts and Clay

Pit Roads (Lenik 1987). Two loci of lithic debitage were investigated resulting in the identification of a small Late Woodland site associated with the Sandy Brook site. The Sharrott Estates survey was located about ½ mile northwest of the Project Area.

In 1995, a Phase I survey was conducted for the School Construction Authority in the lot northeast of the corner of Woodrow Road and Winant Ave. The survey recovered Woodland and Middle to Late Archaic materials, including lithic debitage, pottery, bifacially worked stone tools, and projectile points. The site was designated NYC SCA 56R Prehistoric Site (OPRHP A085.01.002569). Given the project's location, it seems clear that the materials recovered were components of the Wort Farm Site, recorded by the LPC (Boesch 1994) in the same location, or components of the nearby Harik's Sandy Ground, Rossville Campsites, or Sandy Brook sites. The 1995 survey was located about ½ mile north of the Project Area.

In 1989, a Phase 1B archeological survey was conducted for the proposed Maguire Estates residential development (Roberts 1989). The Maguire Estates survey area is located immediately northwest of the Project Area, extending approximately 1600' north of Ramona Avenue and approximately 850' west of Maguire Avenue, between Maguire Avenue and Sandy Brook. The Phase 1B survey consisted of 88 shovel test units excavated at 100-foot intervals. The survey identified only a few small areas of previous disturbance, and resulted in the recovery of 451 historic period artifacts. These historic artifacts were recovered from scattered sheet midden deposits and plow zone soils, and seem to be associated with the foundation remains of a 19th century farmstead located in the northwest corner of the Maguire Estates survey area. The survey report concluded that these archeological remains were not historically significant (Roberts 1989). No prehistoric archeological materials were recovered in this survey.

The *Archaeological Evaluation and Sensitivity Assessment of Staten Island, New York* (Boesch 1994) prepared for the LPC, identifies five criteria for assessing the prehistoric sensitivity of areas on Staten Island. In general, highly sensitive areas on Staten Island are those characterized by three or more of the following criteria (1994: 18-19):

1. known sites, or surface finds recovered, in the immediate vicinity
2. freshwater source located nearby
3. high subsistence potential for area (e.g., marsh, shoreline, river/stream mouth nearby)
4. high ground overlooking water with slopes not exceeding 30%
5. well-drained soil, particularly areas with a sandy soil substratum.

The results of background research indicate that there are numerous previously recorded prehistoric sites to the north and northwest of the Project Area. At least four of these sites, including the 'Indian implements' referred to by Davis (1896; LPC 92 in Boesch 1994) immediately west of the Project Area, are located within a ½ mile of the Project Area (Table 1). Furthermore, the Project Area is located immediately east of a permanent inland drainage, the Sandy Brook, and contains a large wetland (Sections 3.2, 4.2; Figures 8, 9; ES et al. 2000). The presence of a sandy subsoil stratum within the Project Area cannot be verified without archeological survey. The combination of these factors indicates that the upland (i.e., non-wetland) portions of the Project Area should be considered highly sensitivity for prehistoric archeological resources.

4.2 Historic Archeological Sensitivity

The historic archeological potential of the Project Area was investigated by examining historic maps depicting the Project Area. When possible and permitted, copies of these maps were made and are included as Figures in this report. The locations of structures on these maps were investigated to determine if any structural remains or associated archeological deposits are likely to be present within the Project Area. Additionally, information from these maps was used to determine previous patterns of land use and potential soil disturbance within the Project Area.

JMA's review of historic map sources indicates that throughout the 19th and early 20th centuries, the Project Area was generally characterized by agricultural use. The earliest map located that depicts the Project Area in any detail is the 1859 Walling Survey (Figure 4). This map does not specify land use within the Project Area, but does demonstrate the generally rural nature and sparse settlement of the area north of Pleasant Plains. Due to the lack of identifiable landmarks and contemporary cross-streets on this map, the exact location of the Project Area is difficult to determine. The only structure in the vicinity of the Project Area is the residence of "T. Thomas".

The next available historic map of the Project Area is the 1874 Beers survey (Figure 5). Due to the greater detail and potentially more accurate scale of this survey, the approximate location of the Project Area was superimposed with somewhat greater confidence. If the residence of "E. Thomas" depicted on the Beers 1874 survey represents the same structure as the residence of "T. Thomas" on the 1859 Walling survey, than this residence is not located within the Project Area. Verifying whether or not this middle 19th century residence is located within the Project Area would require archeological survey. According to the 1874 Beers survey, the Project Area was part of at least two larger properties, the 40-acre "D. Maguire" property, and the 64-acre "John McNeish" property. These properties were likely farmsteads, and the structures associated with each farmstead do not appear to be located in the Project Area.

The locations of roads and property boundaries appear relatively unchanged in the Beers 1887 survey (Figure 6). Immediately east of the Project Area, the 100-acre parcel formerly owned by "Mrs. Foster" is now shown as the property of "W. H. Dusenbury", although the smaller 17-acre parcel is still identified as belonging to Mrs. Foster. No structures are depicted within the Project Area.

In the 1898 Robinson survey (Figure 7), the 64-acre parcel formerly owned by John McNeish is now identified as belonging to "W. Reed". A possible dirt road may be indicated running along the eastern boundary of the Reed property. No structures are depicted within the Project Area. No structures are depicted within the Project Area on the slightly later 1907 Robinson survey. The 1907 Robinson survey was examined at the Maps Division of the NYPL.

The Borough of Richmond Topographical Survey, conducted between 1906 and 1913, provides the first detailed representation of land use and vegetation cover for the Project Area (Figure 8; Bridgeman 1912). No structures are depicted within the Project Area on the 1912 survey, however the subsequently built neighborhood street plan for the vicinity of the Project Area is depicted on this map. A large area in the eastern section of (and immediately east of) the Project Area is identified as swamp. Most of the eastern section of the Project Area is identified as 'thickly wooded', and the western section is identified as 'open field'. The only apparent ground disturbances within the Project Area indicated on this map are two ditches. The first ditch apparently drained a small pond (which could be artificial), and ran parallel to Maguire Avenue in the southwestern portion of the Project Area. A second ditch is indicated in the northeast corner of the Project Area. Maguire Avenue is designated as a dirt road.

No structures are depicted within the Project Area on the slightly later 1917 Bromley survey. In a 1924 aerial photograph (FACC 1924) the Project Area appears to be mostly wooded, with some cleared areas in the western portion near Maguire Avenue. No structures are depicted within the Project Area in this photograph. The 1917 Bromley atlas and the 1924 aerial photograph were examined at the Maps Division of the NYPL.

Based on the results of the historic map review, JMA did not identify any map-documented structures within the Project Area. Furthermore, during JMA's field reconnaissance of the Project Area, no above ground or surface indications of structures or other historic archeological features were identified. The Project Area was burned over in a disastrous 1963 brush fire that destroyed many of the buildings in the area (ES et al. 2000). This fire likely destroyed any undocumented structures that may have been located in the Project Area.

The historic map review also indicates that the Project Area was not subject to substantial modification or ground disturbance in the 19th or early 20th centuries. Land clearing and plowing associated with past agricultural activities seems to be the extent of previous disturbances to most of the Project Area. The more recent construction of paved streets along Ramona, Lenevar, and Drumgoole Avenue likely resulted in some ground disturbances in the areas immediately adjacent to these streets. At some point after 1912, the dirt road Maguire Avenue became overgrown. Based on JMA's field reconnaissance it appears that a drainage ditch was recently excavated adjacent to Maguire Avenue in the northern section of the Project Area (Section 3.2; Plate 3).

In addition to disturbing the southern portion of the Project Area, the construction of the Korean War Veterans Parkway and service road (Drumgoole Avenue) between 1966 and 1972 affected drainage patterns within the Project Area. The current distribution of wetlands within the Project Area (Figure 9; ES et al. 2000) do not correspond to the extent of 'swamp' areas indicated on the 1912 topographic survey (Figure 8; Bridgeman 1912). Some of the discrepancy between these two surveys is likely the result of improved cartographic standards and accuracy in delineating wetlands since the 1912 survey. However, it seems that the swamp/wetland area in the eastern portion of the Project Area was generally greater in size in the 1912 survey. It is likely that the construction of the parkway, and associated construction of ditches, channels, and culverts for draining the areas in the vicinity of the parkway, altered drainage patterns within the Project Area. Thus the historic map data indicates that wetlands characterized a slightly greater portion of the Project Area in the early 20th century than they do at present.

The Sandy Ground Historic Archeological District, listed on the National Register of Historic Places in 1982, is located about ½ mile north-northwest of the Project Area. This district is composed of at least 51 sites, mostly residential, associated with the 19th and early 20th century African American community (OPRHP Site #s A085.01.2259.DO3 through A085.01.2310.DO3). Archeologists have extensively documented this community, and excavated several of the house sites within this district (Askins 1980, 1985; Schuyler 1974). The Sandy Ground community was located around the intersection of Woodrow and Bloomingdale Roads. JMA does not anticipate that archeological materials associated with the Sandy Ground community are likely to be located within the Project Area.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary and Conclusions

In the opinion of JMA, several factors affect the archeological sensitivity of the Project Area. The results of background research indicate that the Project Area is located within ½ mile of at least four previously recorded prehistoric archeological sites (Table 1). The Project Area is located near a permanent inland drainage, the Sandy Brook, and contains a large wetland that is documented previous to the construction of the nearby Korean War Veterans Memorial Parkway (Figure 8; Bridgeman 1912). The combination of these factors indicates that the non-wetland portions of the Bloomingdale Park Project Area should be considered highly sensitive for prehistoric archeological resources (Section 4.1; Boesch 1994). The locations of present (Figure 9) and former (Figure 8) wetlands are indicated as areas of lower archeological sensitivity in Figure 10.

The historic map review conducted by JMA for the Project indicates that no 19th or early 20th structures are documented within the Project Area. Furthermore, no standing structures or surface indications of historic occupation were identified during JMA's field reconnaissance of the Project Area. Based on these results, JMA does not anticipate that significant historic archeological resources are likely to be located within the Project Area (Section 4.2).

The historic map review also indicates that beyond land clearing and plowing activities related to past agricultural uses, the Project Area does not appear to have been subject to substantial ground disturbances. Previous disturbances appear to be limited to areas adjacent to recently constructed roads (Drumgoole, Lenevar, and Ramona Avenues) along the south, east, and north perimeters of the Project Area, and the excavation of a drainage ditch adjacent to the western perimeter of the Project Area (Maguire Avenue). The locations of these previously disturbed areas are indicated as areas of lower archeological sensitivity in Figure 10. The lack of substantial previous disturbances to most of the Project Area indicates that any prehistoric archeological sites that may be located within the Project Area are likely to be relatively intact.

5.2 Recommendations

The proposed construction of athletic and recreational facilities in the eastern section of Bloomingdale Park (Figure 2, 10) would involve clearing, grading, and leveling of certain locations within the Project Area. The construction of these facilities has the potential to impact archeological resources that may be located within the Project Area. Due to the potential for prehistoric archeological resources to be located within the Project Area, JMA recommends that a Phase 1B archeological survey be conducted before construction for the Project begins.

The purpose of the Phase 1B archeological survey is to locate previously unrecorded prehistoric and historic archeological resources that may exist within the Project Area. The Phase 1B survey should include all locations (including construction staging and laydown areas) where ground disturbance activities are planned; the limits of Project disturbance (from DDC 2001: L-1 [Site Clearing Plan]) are indicated in Figure 10. The archeological survey can exclude areas of present or former wetlands and those areas that exhibit obvious indications of previous disturbance; the locations of these areas of lower archeological sensitivity are indicated by gray shading in Figure 10. In the opinion of JMA, a Phase 1B survey should be conducted in all other locations within the limits of Project disturbance.

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TABLES

Table 1. Previously recorded prehistoric archeological sites within 1 mile of the Bloomingdale Park project area.

Site File Designation(s)	Site Name	Description and Location	References
LPC 92	not named	records of 'Indian implements' recovered, site possibly destroyed by Korean War Veterans Highway; <¼ mile west of Project Area	Boesch 1994
NYSM 4604 LPC 44	Sandy Brook	Late Archaic to Late Woodland 'large base camp' or village site at Bogardus Corners and over considerable area along Sandy Creek; Parker also indicates 'Indian Fields' from Sandy Brook to Kreischerville; ~¼ mile north-northwest of Project Area	Boesch 1994 Bolton 1934 Parker 1922
NYSM 735 and 7271 LPC 11	Wort Farm Site	Late Archaic, Woodland, and Contact Period habitation site and burials; ~½ mile north of Project Area	Boesch 1994 Parker 1922
OPRHP A085.01.002569	NYC SCA 56R Prehistoric Site	Woodland and Middle to Late Archaic materials recovered (including lithic debitage, pottery, bifaces, and projectile points); likely component of the Wort Farm site (or Harik's Sandy Ground, Sandy Brook sites); ~½ mile north of Project Area	from OPRHP site files; excavated by Historical Perspectives, Inc. in 1995
LPC 5	Harik's Sandy Ground	Archaic period campsites on sandy knolls between Wort Farm and West Shore Expressway; between ~½ and 1 mile north-northwest of Project Area	Boesch 1994
NYSM 772 and 773 OPRHP A085.01.0119 LPC 12 and 21	Rossville Sites	Shell heaps and camp with Early Wooodland and later artifacts; shell heaps destroyed by construction of the West Shore Expressway; ~½ and 1 mile north-northwest of Project Area	Boesch 1994 Bolton 1934 Parker 1922
OPRHP A085.01.0076 LPC 6	Smoking Point	Late Archaic through Woodland shell midden, with permanently occupied Woodland village and possible Paleo-Indian component; mostly destroyed by construction; ~1 mile north-northwest of Project Area	Boesch 1994
NYSM 7270 and 8226 LPC 4	Hammer Stone Hill	Traces of occupation described by Parker near Woodrow, and at 'Hammer Stone Hill'; ~1 mile north of Project Area	Boesch 1994 Parker 1922
OPRHP A085.01.0121 OPRHP A085.01.0123 OPRHP A085.01.0131	Clay Pit Pond State Park Preserve Sites	Series of lithic scatters, at least one site dated to the Late Woodland; ~1 mile northwest of Project Area	Yamin and Pickman 1986
NYSM 770 OPRHP A085.01.0073 LPC 17	Canada Hill	Prehistoric and historic artifacts reported by Metropolitan Area Archaeological Survey in late 1960s; components recently documented by JMA; ~1 mile west of Project Area	HPI 1996 Klein et al. 2000
NYSM 8496	'traces of occupation'	NYSM files indicate traces of occupation, encompassing many of the sites above, over large area north of Woodrow Road; between ~½ to 1½ miles north and northwest of Project Area	

FIGURES

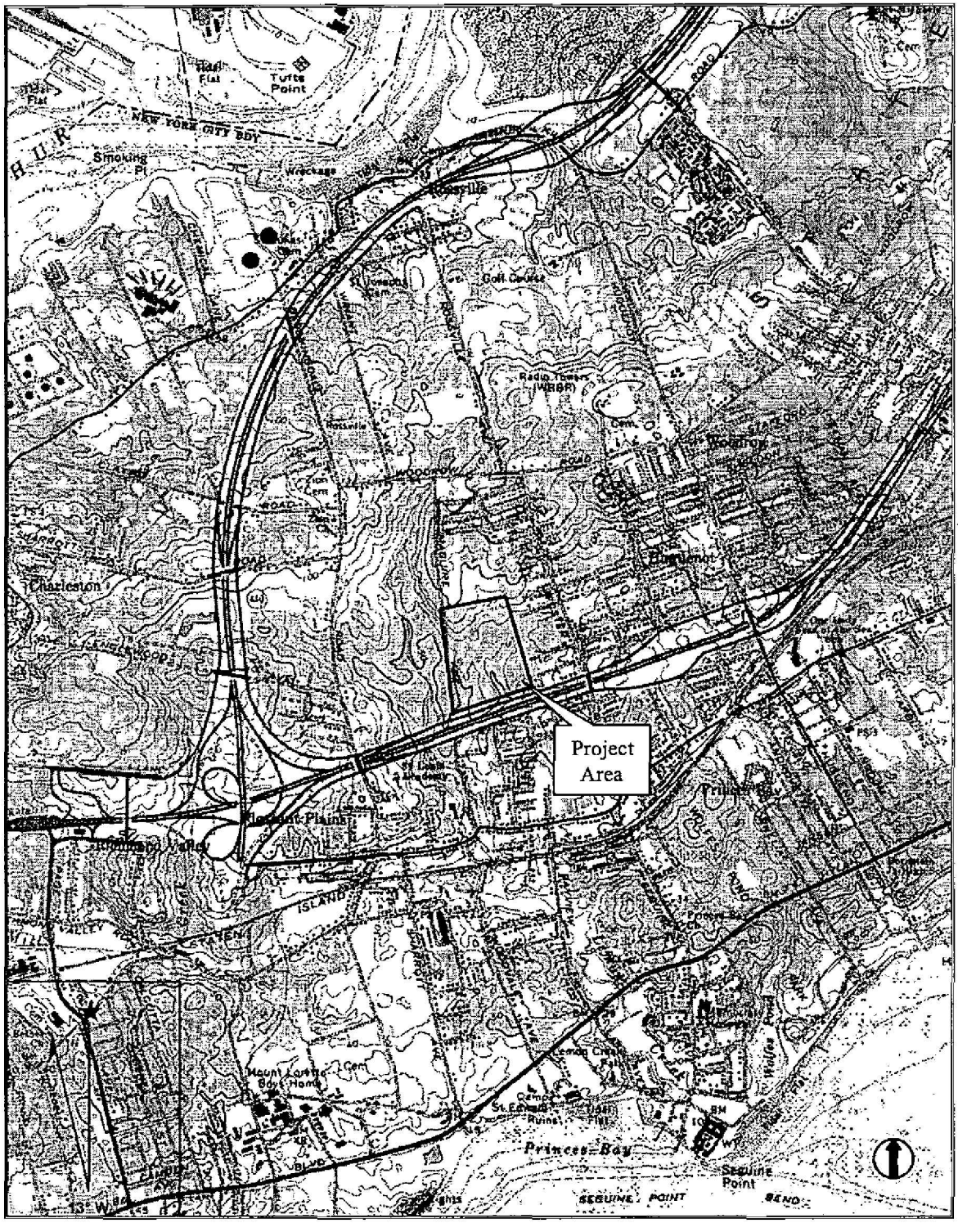

Figure 1. Detail of the *Arthur Kill* 7.5-minute series USGS quadrangle showing the location of the project area.

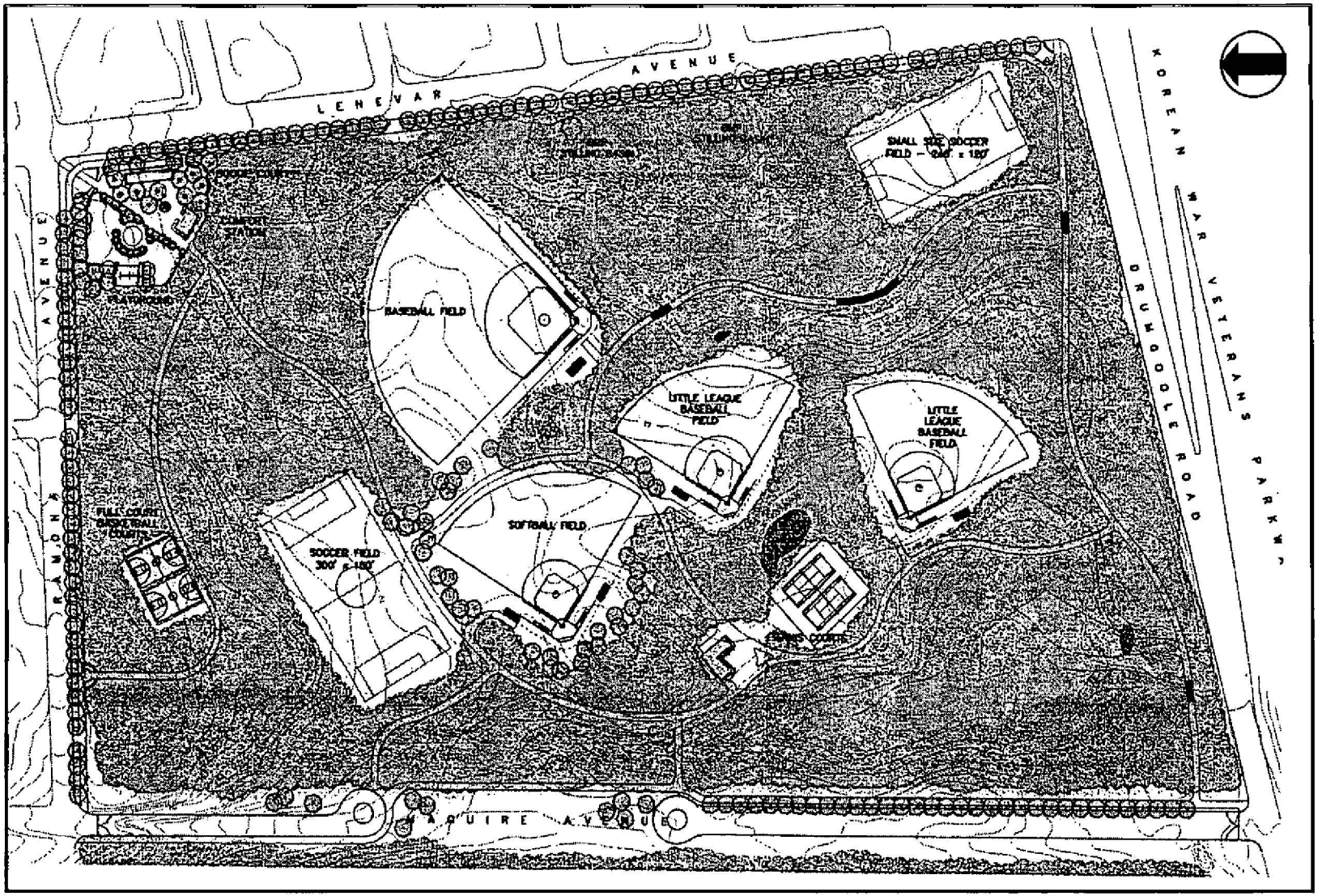

Figure 2. Site plan of the Bloomingdale Park project area showing the locations of proposed athletic and recreational facilities (ES et al. 2000).

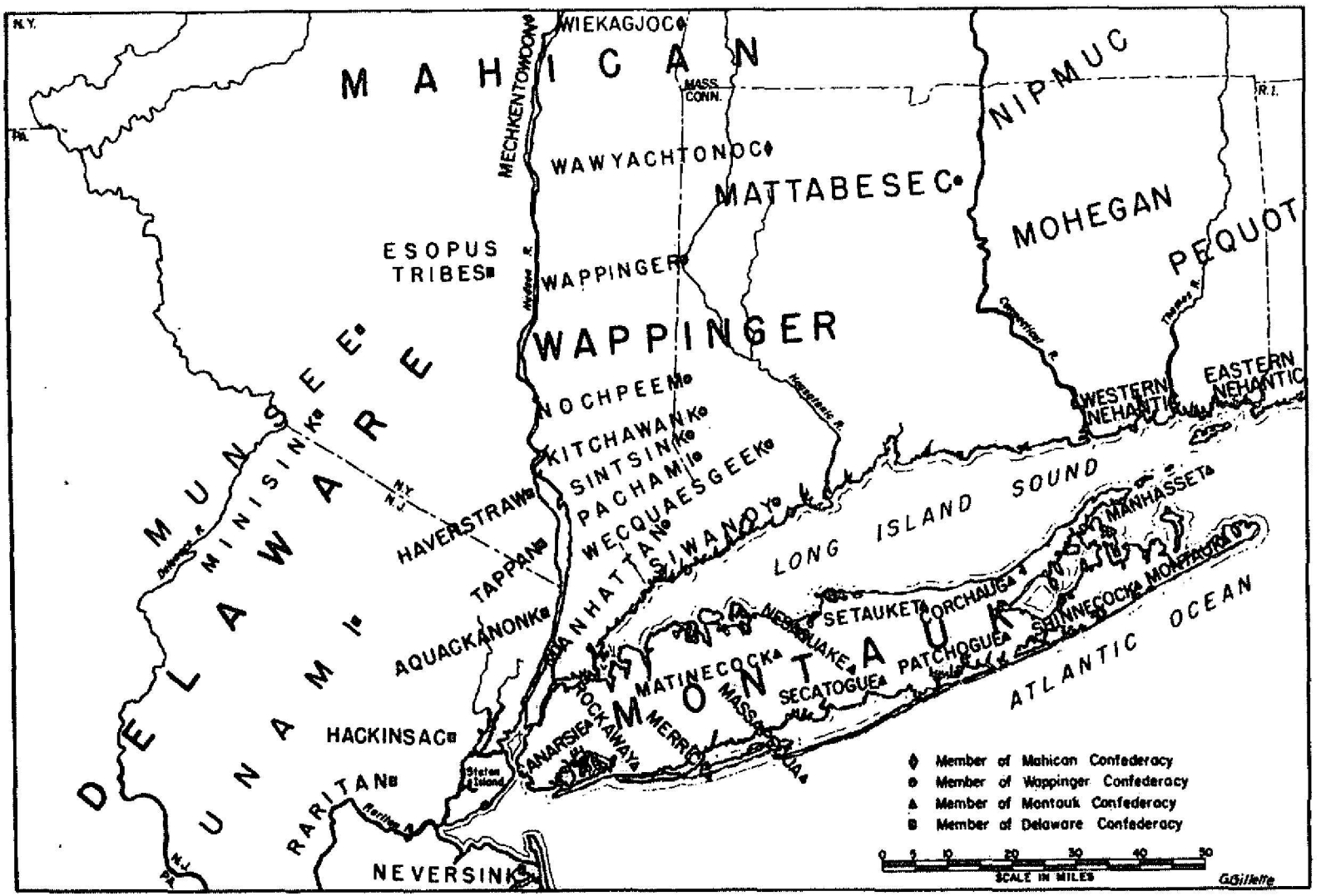

Figure 3. Approximate territories of local Native American groups, ca. 1600 A.D. (from Ritchie 1974).

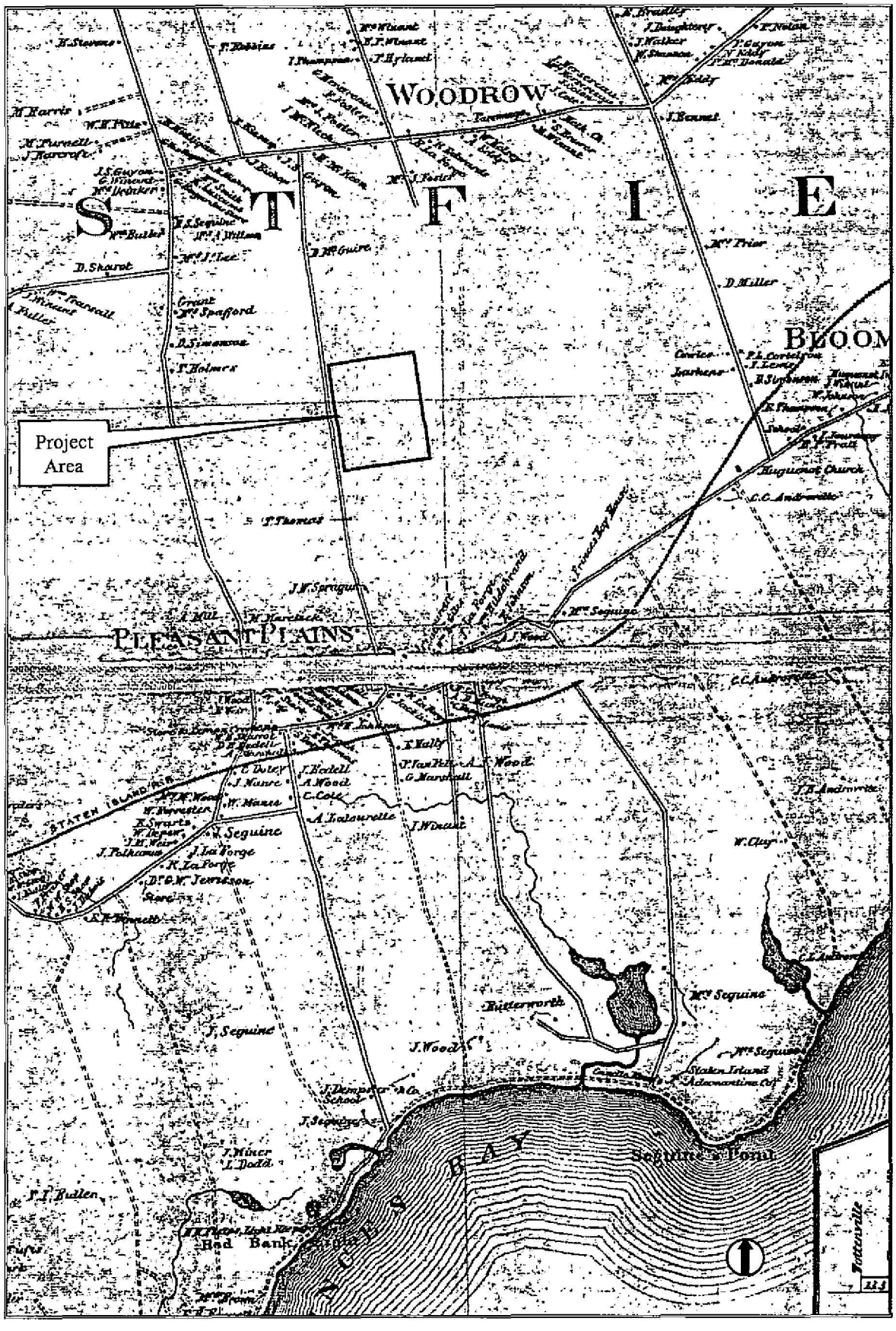

Figure 4. Detail of the 1859 Walling survey showing the approximate location of the project area.

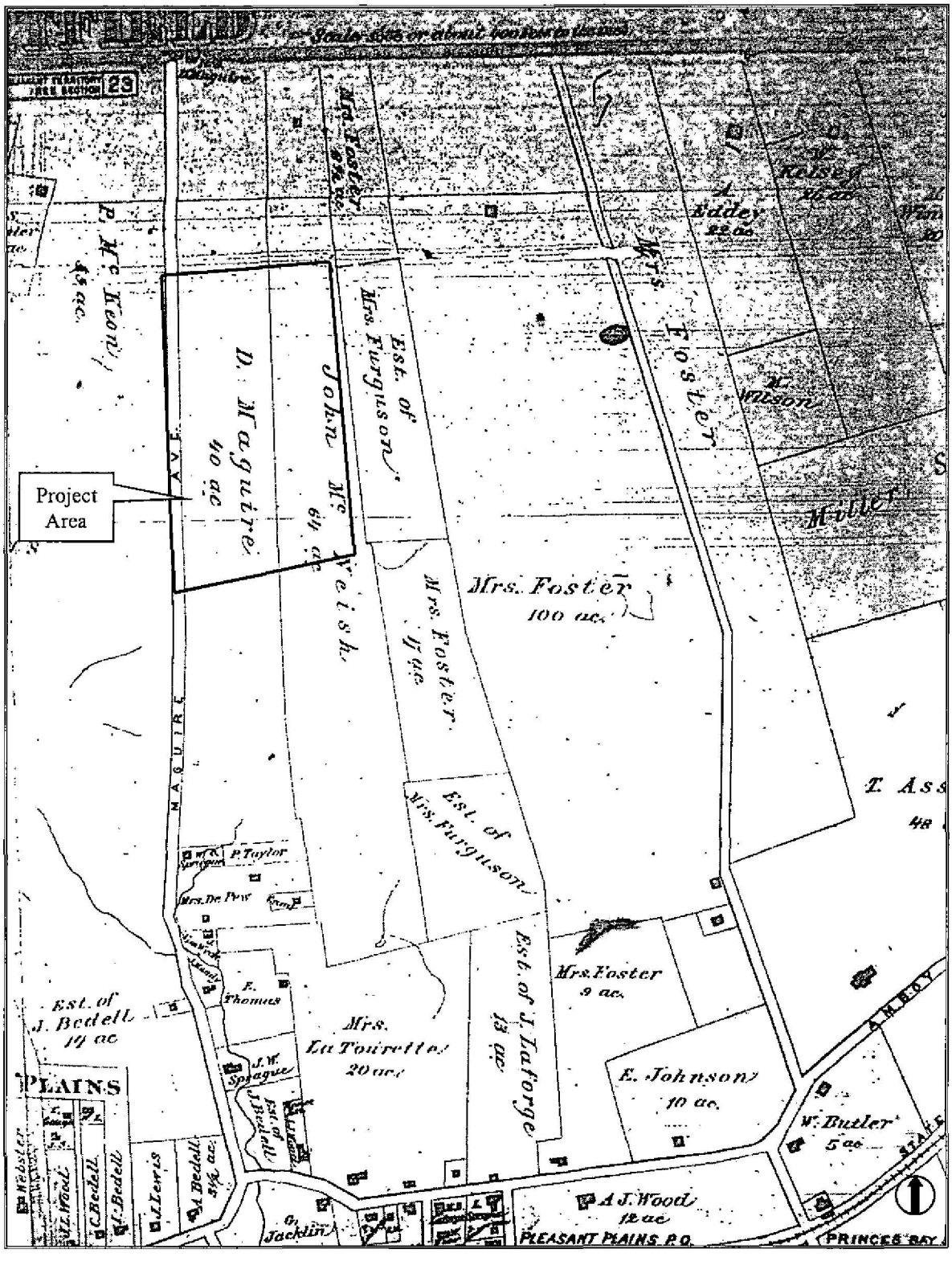

Figure 5. Detail of the 1874 Beers survey showing the approximate location of the project area.

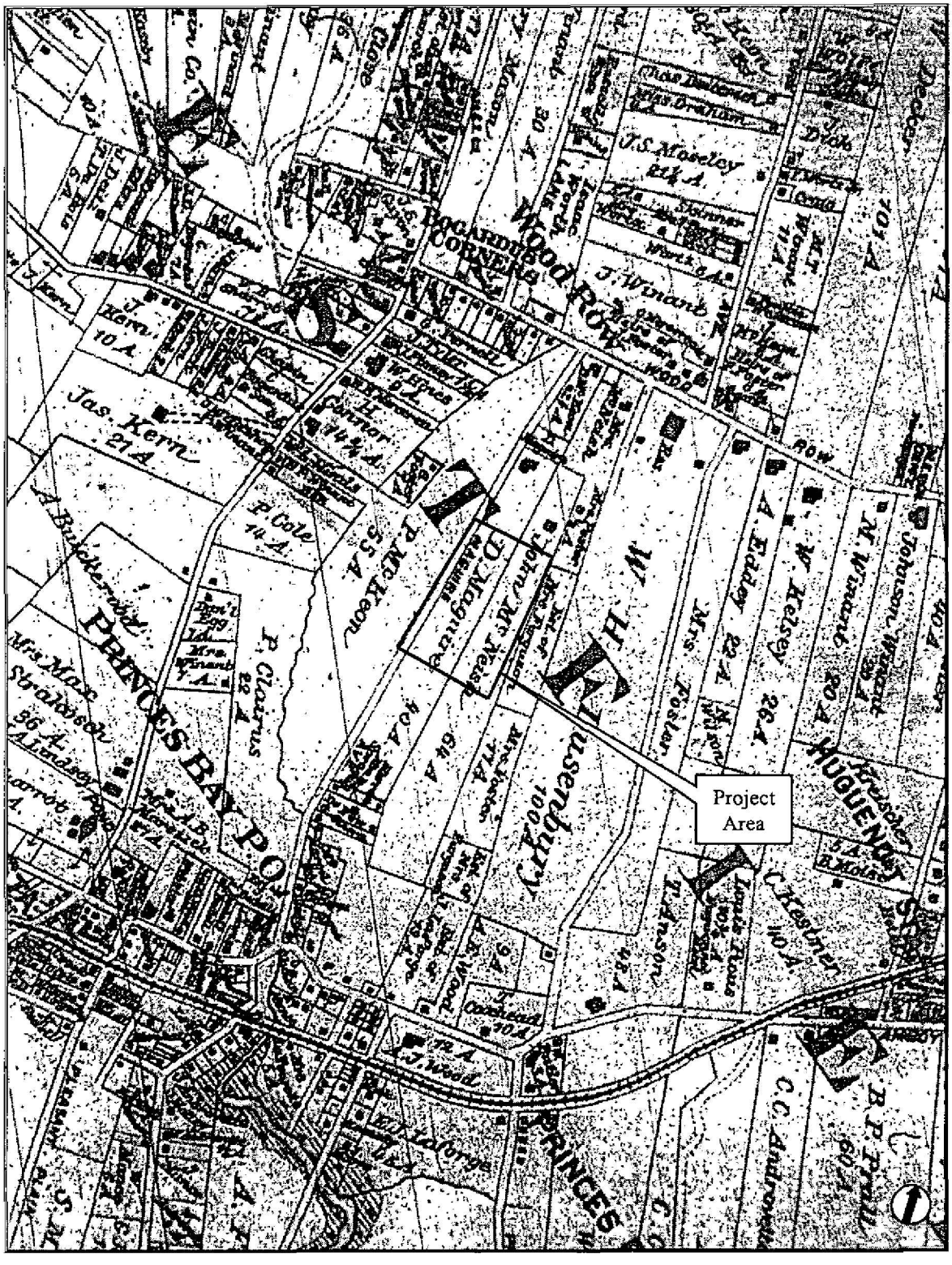

Figure 6. Detail of the 1887 Beers survey showing the approximate location of the project area.

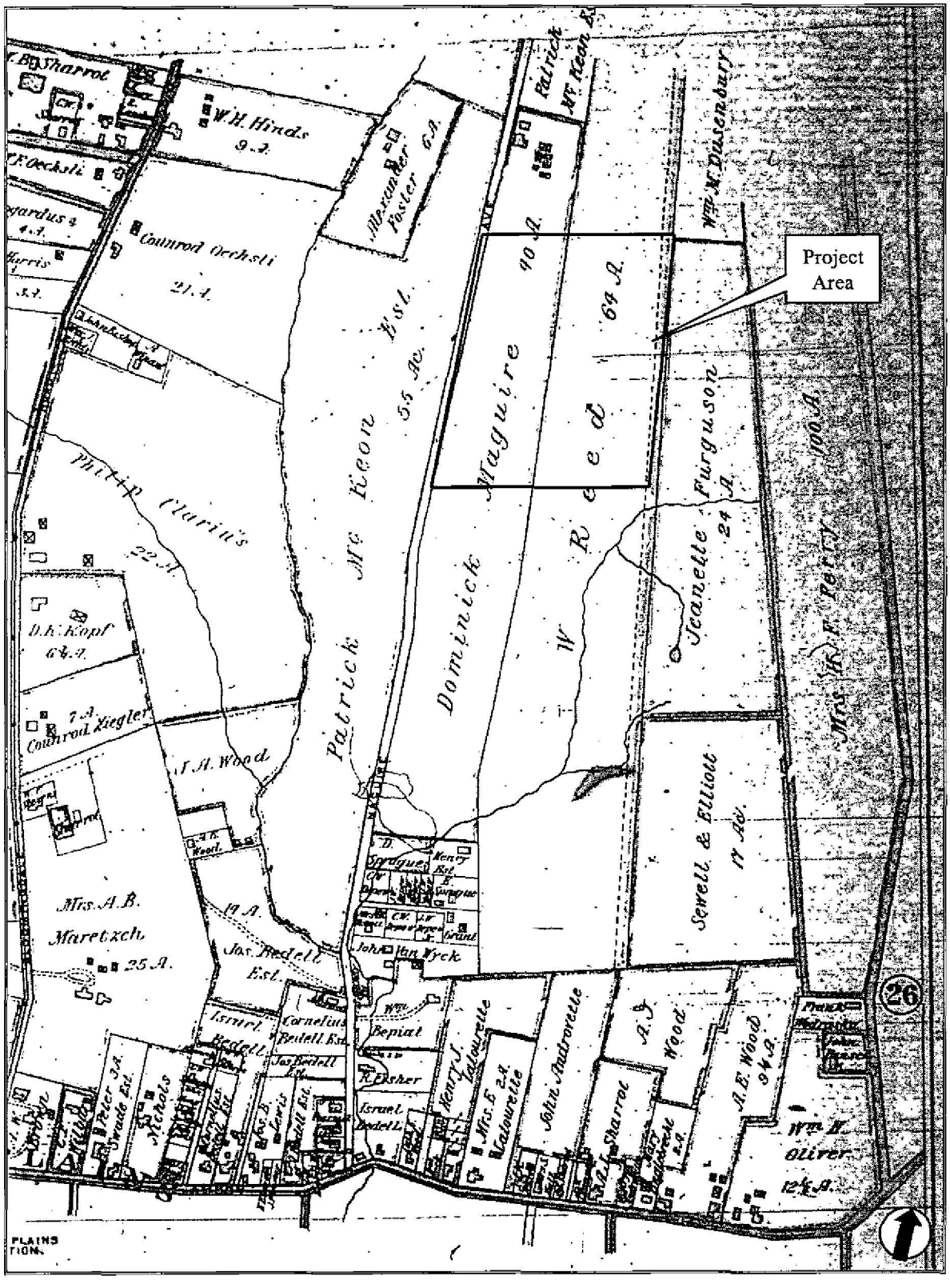

Figure 7. Detail of the 1898 Robinson survey showing the approximate location of the project area.

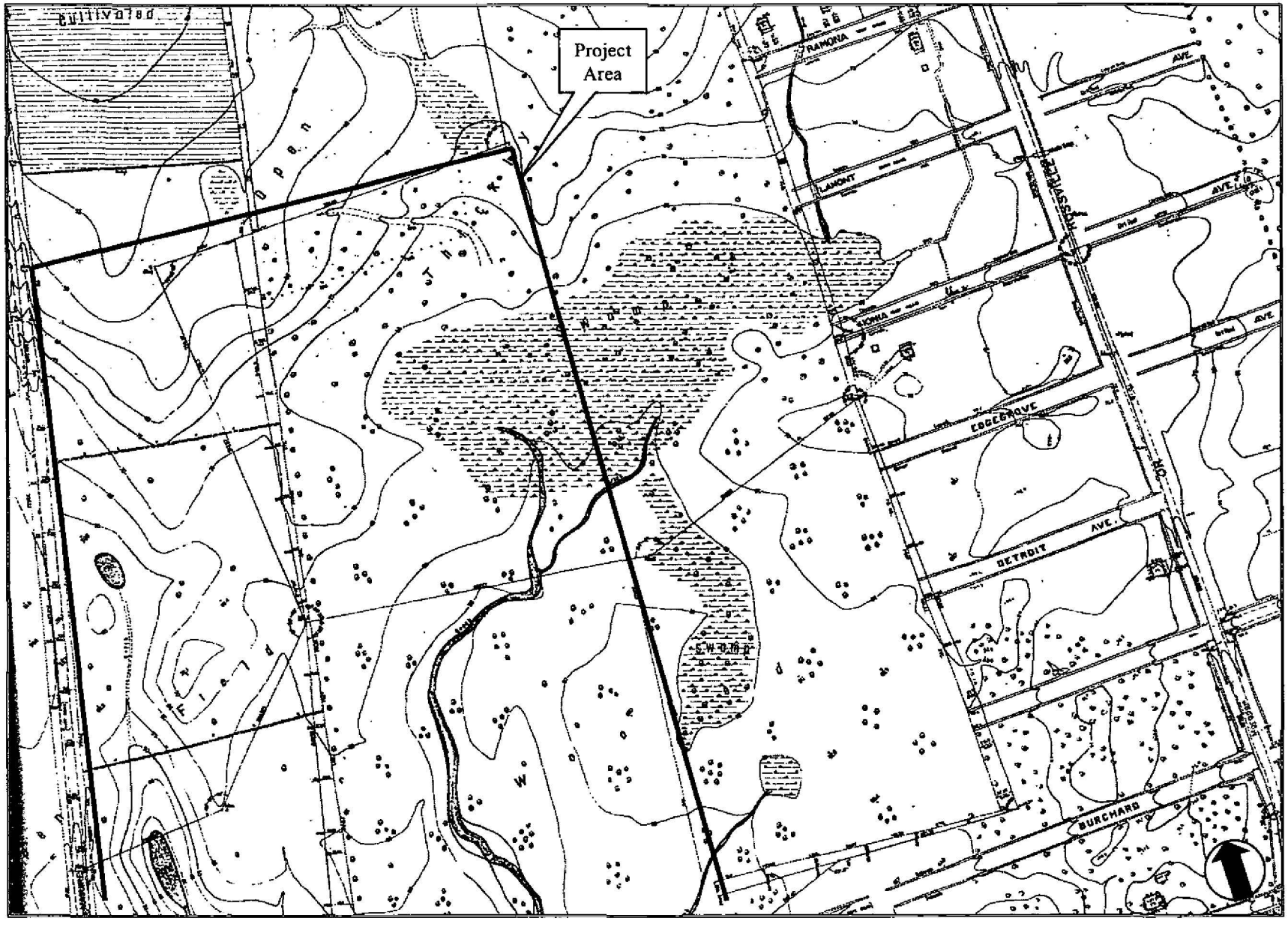

Figure 8. Detail of the 1912 Topographic Survey showing land use and ground cover in the project area.

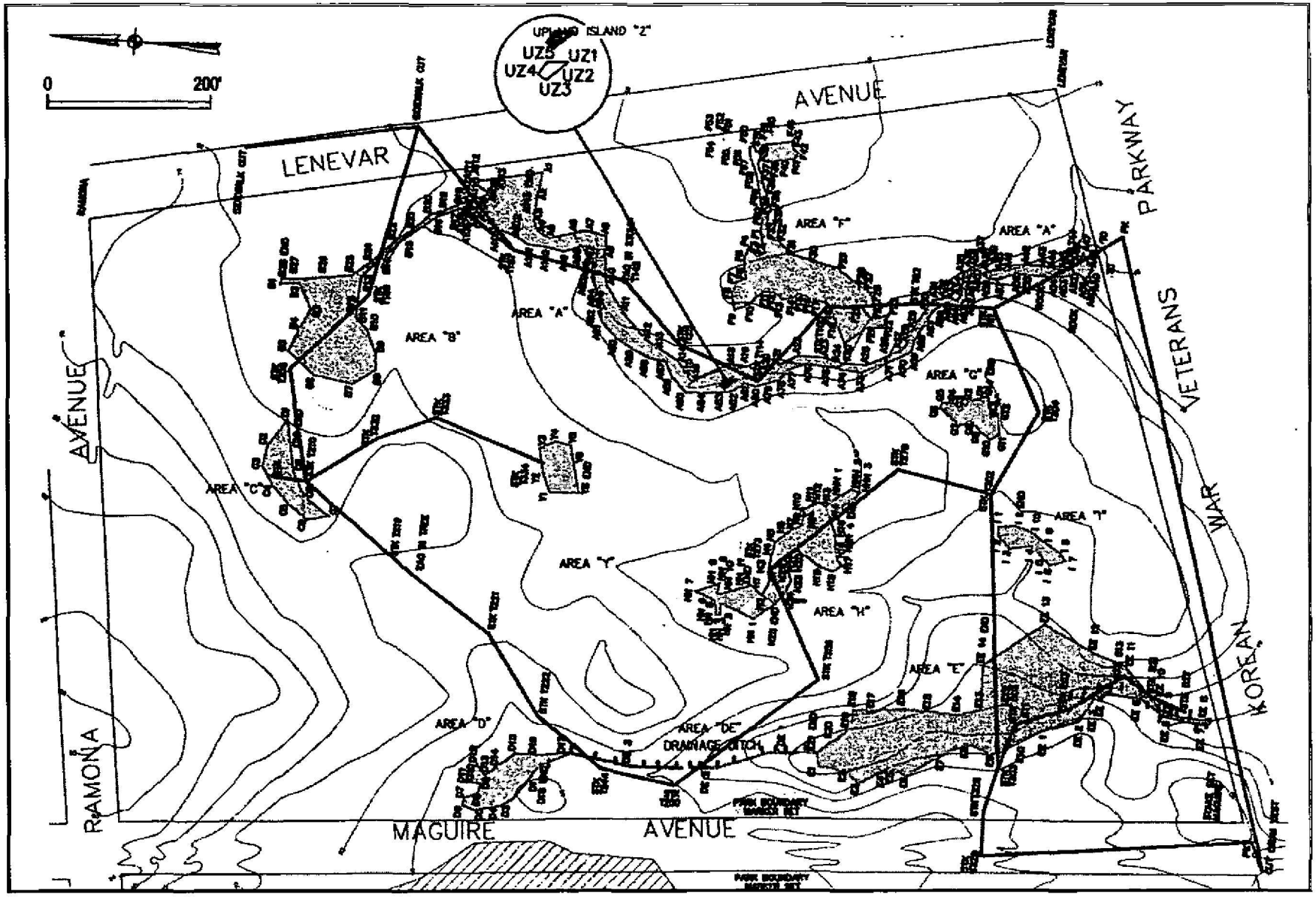

Figure 9. Location wetland areas within the project area (ES et al. 2000).

Figure 10. Proposed project plan showing limits of project disturbance (from DDC 2001) and areas of low archeological sensitivity (map modified from ES et al. 2000: 9-2).

PLATES

Plate 1. Secondary growth woodland vegetation characterizes most of the project area.

Plate 2. Seasonal drainage channel in the marshy wetland areas in the southern portion of the project area; view to the northeast.

Plate 3. A large drainage channel along the western perimeter of the project area (Maguire Avenue) indicates some previous disturbance; view to the north.

Plate 4. Southern perimeter of the project area (Drumgoole Avenue); view to the north.

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