

1169R  
1999

LBA

---

---

PHASE IA ARCHAEOLOGICAL SURVEY  
SPRAGUE AVENUE HOUSES

BOROUGH OF RICHMOND (STATEN ISLAND)  
NEW YORK

---

---

99D0B001R

*Prepared For:*

THE ESTATE OF MILTON KESTENBERG

*and:*

MAX KADIN

B7826 L1

L375

L200

*Prepared By:*



THE CULTURAL RESOURCE GROUP  
LOUIS BERGER & ASSOCIATES, INC.  
East Orange, New Jersey

April 1999

---

---

769

---

---

**PHASE IA ARCHAEOLOGICAL SURVEY  
SPRAGUE AVENUE HOUSES**

**BOROUGH OF RICHMOND (STATEN ISLAND)  
NEW YORK**

---

---

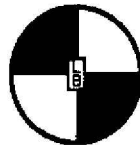
*Prepared For:*

**THE ESTATE OF MILTON KESTENBERG**

*and:*

**MAX KADIN**

*Prepared By:*



**THE CULTURAL RESOURCE GROUP  
LOUIS BERGER & ASSOCIATES, INC.  
East Orange, New Jersey**

**April 1999**

---

---

## TABLE OF CONTENTS

CHAPTER		PAGE
	List of Figures .....	ii
I	INTRODUCTION .....	1
II	ENVIRONMENTAL SETTING .....	4
III	CULTURAL CONTEXTS .....	6
	A. Regional Prehistoric Cultural Sequence .....	6
	B. Historical Development .....	9
	1. Overview .....	9
	2. Tottenville and the Surrounding Area .....	11
IV	RESULTS OF BACKGROUND RESEARCH .....	18
	A. Prehistoric Archaeological Sites in the Project Vicinity .....	18
	B. Historic Development of the Project Area .....	19
V	RESULTS OF SURFACE RECONNAISSANCE .....	22
VI	CONCLUSIONS AND RECOMMENDATIONS .....	23
VII	BIBLIOGRAPHY AND REFERENCES CITED .....	25

## LIST OF FIGURES

FIGURE		PAGE
1	Project Location .....	2
2	Proposed Development .....	3
3	Project Location in Map of Land Grants, 1668-1712 .....	12
4	Project Area, 1836-1839 .....	13
5	Project Area in 1853 .....	14
6	Project Area in 1874 .....	15
7	Project Area in 1898 .....	16
8	Project Area in 1907 .....	17
9	Western Half of Project Area, 1917-1926 .....	21
10	Project Area; Area of Archaeological Potential .....	24



## I. INTRODUCTION

This report presents the results of a Phase IA archaeological survey for the proposed Sprague Avenue Houses in the Borough of Richmond (Staten Island), New York City (Figure 1). The survey was conducted by the Cultural Resource Group of Louis Berger & Associates, Inc. (Berger), for Mr. Max Kadin and the estate of Mr. Milton Kestenberg. This work was performed after a review of the proposed development by the City of New York Landmarks Preservation Commission, which indicated that the property might have the potential for the recovery of prehistoric and nineteenth-century archaeological remains.

This study was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966; Section 101 of the National Environmental Policy Act of 1969, Protection and Enhancement of the Cultural Environment (Executive Order 11593); and the Procedures for the Protection of Historic and Cultural Properties, as amended (36 CFR 800); as well as the recommendations and guidelines of the Office of Parks, Recreation and Historic Preservation of New York (OPRHP).

The proposed Sprague Avenues Houses project will involve construction of six dwellings on approximately 3 acres on the west side of Sprague Avenue, roughly midway between Hylan Boulevard and Surf Avenue (Figure 2). The proposed development will also involve the installation of a septic system on each lot, yard drains, the construction of Sprague Court, and landscaping. Approximately 40 percent of the 3-acre parcel consists of wetlands, which will not be developed.

Background research and a walkover reconnaissance of the proposed development site was conducted. During the background research, survey reports and historic and archaeological site files were examined at the New York State OPRHP. Based on the background research, the project area was judged to contain areas of moderate sensitivity for historic archaeological resources. The walkover reconnaissance indicated discontinuous areas of surface disturbance that were eliminated from further consideration.

Dr. Meta Janowitz served as Project Manager for this study and Richard Affleck, RPA, served as Principal Investigator. The background research was completed by Ingrid Wuebber and Mallory Gordon, and the walkover reconnaissance was undertaken by Rob Jacoby under Mr. Affleck's supervision. The report was edited by Valerie Coleman-Moore; the graphics were produced by Victor Reynolds.

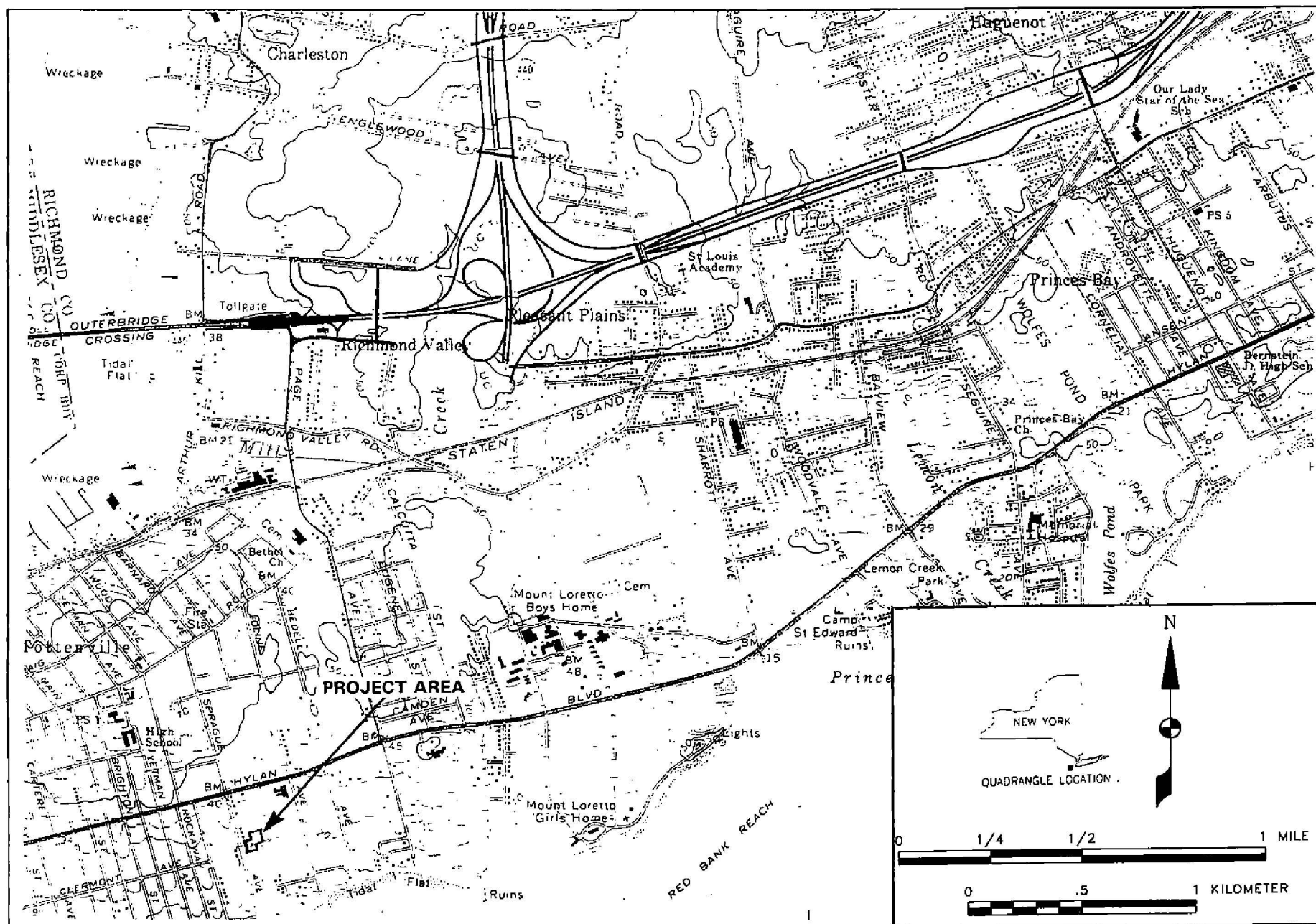


FIGURE 1: Proposed Location

SOURCE: USGS 1966, 1981

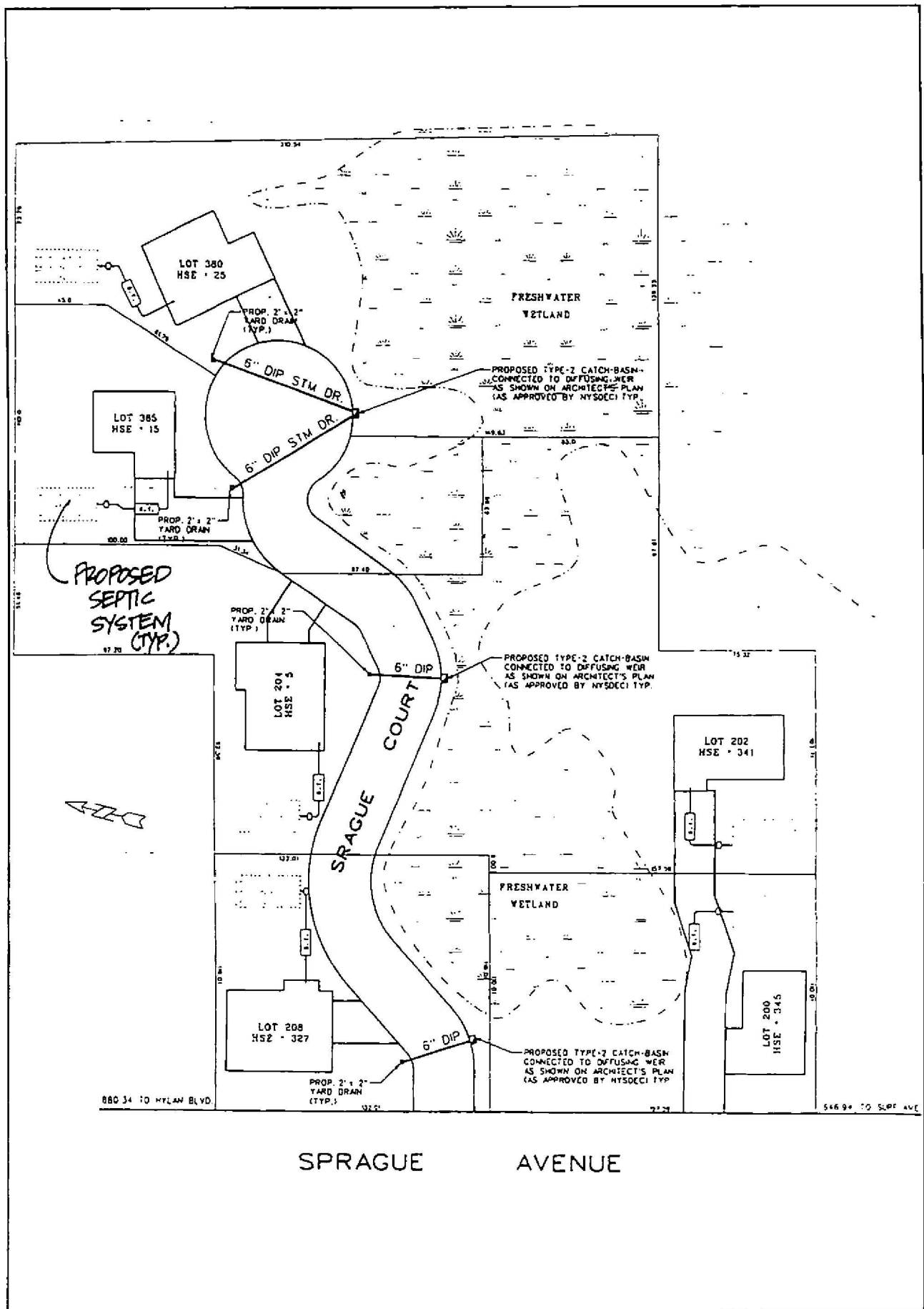


FIGURE 2: Proposed Development

## II. ENVIRONMENTAL SETTING

The current land-use patterns in the vicinity of the Sprague Avenue Houses project on Staten Island exhibit a combination of undeveloped and overgrown areas to the east and south, and residential development to the west and north. For the most part, the latter consists of a mix of single-family homes, apartment buildings, and condominiums.

The project area falls within the Inner Coastal Plain physiographic province, which is generally characterized by nearly level topography and gradual changes in elevation. Surface elevations in the project area range up to 20 feet above mean sea level. Aside from the shoreline of the the Lower Raritan Bay, there are no major bodies of water in the project area or its immediate vicinity, although there are some small scattered wetland areas, including the wetlands within the boundaries of the proposed Sprague Avenue Houses project.

The surficial geology of the Coastal Plain is composed of various sands, gravels, and clays, most of which are of Late Cretaceous or Tertiary age (Widmer 1964; Wolfe 1977). While the core of Staten Island consists of serpentine, the bedrock of the project area probably contains redbeds and diabase of the Newark Series (at depths of 150 to 190 feet) (Federal Energy Regulatory Commission 1981:54). Overlying sediments (from bottom to top) consist of preglacial clays, glacial till, varved clays and fine sands, younger glacial till, and beach deposits.

Given the potential for human occupation of the project area vicinity as early as the close of the Pleistocene, a reconstruction of the area's environmental history should consider at least the last 12,000 to 15,000 years. The primary factors to be considered in a local paleoenvironmental reconstruction are changing climatic conditions and sea levels which, in turn, influenced the local distribution of floral and faunal resources.

During the late Pleistocene, a series of massive continental glaciers advanced and retreated over much of North America. Because vast amounts of water were incorporated into these ice sheets, the sea levels were much lower than at present. The late Pleistocene environment was not only slightly cooler than the present, but was also characterized by higher levels of precipitation.

The terminal moraine which marks the extent of the Wisconsin glaciation extends as far south as Perth Amboy, New Jersey, and cuts across Staten Island. The lowered sea levels during the glacial maxima exposed a large area of the continental shelf, and many of the islands in New York Harbor, including Staten Island, would have been connected to the mainland. The net effect of glaciation was the subsequent creation of a variety of habitats, including estuaries, salt and freshwater marshes, bogs, uplands, and midslope zones. Glacial soils contained a diversity of particle sizes, permitting good drainage and providing adequate water supplies for developing plant and animal communities. At this time, glacial Lake Hackensack deposited a mixture of clay, silts, sands, and gravels on western Staten Island.

Glaciers in the New York City region began to retreat about 17,000 years ago. While data indicate that the sea level has been rising continuously during the past 12,000 to 14,000 years, the rate of marine transgression over the Coastal Plain has varied considerably. In the millenia immediately following the glacial maximum, sea levels rose relatively rapidly, while in the most recent millenia, sea levels have been rising at a rate of somewhat less than 1 foot per century (Edwards and Merrill 1977).

Human populations first inhabited the region no earlier than 11,500 years before present (BP), when sea levels may have been 300 feet lower than at present and when the Atlantic shoreline had regressed approximately 60 to 90 miles from its present position. River and stream systems then exhibited different configurations, as did the plant and animal communities within these environments (Edwards and Merrill 1977). By 5000 BP, the sea level had risen to approximately 30 feet below its present level. The sea continued to rise, reaching a point some 14 feet below the present level by 2000 BP.

The development of the Arthur Kill drainage began around 13,000 BP. At this time, the Arthur Kill channel formed as an outlet for glacial Lake Hackensack, and began to cut through the clays, silts, sands, and gravels that had been deposited on western Staten Island (Silver 1984a:2-5). Initially, the Arthur Kill was a narrow, probably brackish stream. As the sea level rose, this narrow stream valley was gradually inundated, forming a wide estuary flanked by extensive marshlands (Sirkin 1977).

As climatic conditions ameliorated during the Holocene, the regional vegetation changed from open spruce forest to mixed hardwood vegetation in the uplands and grasses and wetland forests in the lowlands (Sirkin 1977). Changes in faunal communities accompanied the shifts in climate and vegetation. Large cold-adapted species, such as mammoth, mastodon, and caribou, were replaced by more temperate species, such as white-tailed deer.

With the rise in sea levels, the project area changed from an inland to a coastal setting. These changes would have had an enormous effect on the potential for population movements and resource exploitation. Upland terrain would support mixed hardwood forests while lowlands would support a variety of wetland and lowland forest vegetation. Expanding wetlands and waterways in the project area would have provided environments for numerous migratory birds, waterfowl, fish, and mollusks (Robichaud and Buell 1973).

### III. CULTURAL CONTEXTS

#### A. REGIONAL PREHISTORIC CULTURAL SEQUENCE

Ritchie (1980) has observed that the prehistoric development of southeastern New York, which includes Staten Island and Long Island, is most similar to that of northern New Jersey and eastern Pennsylvania. The major divisions of the prehistoric cultural sequence for the region, with their approximate beginning and ending dates, are as follows

<u>Cultural Period</u>	<u>Approximate Dates</u>
Paleoindian	9500 - 8000 BC
Early Archaic	8000 - 6000 BC
Middle Archaic	6000 - 4000 BC
Late Archaic	4000 - 1000 BC
Early Woodland	1000 - 500 BC
Middle Woodland	500 BC - AD 800
Late Woodland	AD 800 - 1600
Contact	AD 1600 - 1700

The Paleoindian period (circa 9500 to 8000 BC) was characterized by a hunting and gathering subsistence pattern followed by small, highly mobile nomadic bands. Large, fluted lanceolate projectile points, usually made of high-quality cryptocrystalline lithic material, are the distinctive artifacts of this period, although the Paleoindian toolkit also includes scrapers, graters, wedges, and bifacially flaked tools. The Paleoindian populations in the region appear to have based their subsistence economy on the hunting of various game species, supplemented by fishing and by foraging vegetal foods available in the boreal forest environments that characterized this period (Dent 1981; Gardner 1974, 1981, 1989; Kauffman and Dent 1982; Marshall 1982; Ritchie 1980).

Based on extensive research in the Virginia Valley and Ridge province and neighboring areas, Gardner (1981, 1989) has suggested that the Paleoindian settlement pattern in the region was oriented primarily toward high-quality cryptocrystalline lithic source areas. There are no comparable lithic source areas in the coastal areas of New York, although secondary cobble deposits were widely available. Ritchie (1980) has noted a high frequency of Pennsylvania jasper in New York Paleoindian assemblages, and there are a number of possible chert sources in New Jersey that may also have been used during the Paleoindian period (Marshall 1982). There have been scattered finds of fluted points throughout the Hudson and Connecticut River valleys, and a few sites have been excavated. The distribution of sites and isolated point finds has led Ritchie to point out the importance of well-elevated settings and margins of low-lying swamps formerly occupied by lakes. In general, research of this period in the coastal areas has been limited by the lack of deeply stratified or buried sites and by the fact that rising sea levels have submerged early Holocene river valleys.

The Port Mobil Site, located on Staten Island along the Arthur Kill, is the nearest well-known Paleoindian site. Excavations at this site have yielded an assemblage of fluted points, backed knives, endscrapers, drills, perforators, and other implements. The fluted points from the Port Mobil area appear to have been heavily

reworked, and the assemblage exhibits overall similarity to that of the Plenge Site in the Upper Delaware Valley (Kraft 1977a).

Archaic period (circa 8000 to 1000 BC) lifeways were characterized by a hunting and gathering subsistence economy that included a variety of different food resources, and a settlement pattern based on scheduled seasonal movements throughout various resource zones. Whereas Paleoindian lifeways were tightly focused on hunting and the procurement of high-quality lithic material, the Archaic economy was more diffuse, with a reliance on a broad array of resources (Cleland 1976). During the ensuing Woodland period, the generalized Archaic hunting and gathering pattern was eventually replaced by a more sedentary settlement pattern and a subsistence economy based on food production.

The Archaic period is poorly known because most intensive site excavations have focused on the Paleoindian and Woodland periods. Hallmarks of the Archaic period include artifact assemblages that contain tools for the processing of plant foods, a decreased emphasis on the use of high-quality cryptocrystalline lithic materials, and an increase in the importance of riverine and estuarine food resources. The Archaic period is commonly divided into Early, Middle, and Late subperiods, although various terminal dates have been used for these subperiods by different investigators. Some investigators also recognize a Terminal Archaic or Transitional stage at the close of the Archaic period.

The Early Archaic period (circa 8000 to 6000 BC) showed a strong continuity with the preceding Paleoindian period, evident in the settlement pattern and a preference for high-quality cryptocrystalline lithic material (Gardner 1974, 1989). Gardner (1974) has argued that the Early Archaic economy had a primary emphasis on hunting, although other investigators (Dent 1981, 1982; Kauffman and Dent 1982) argue that vegetal foods, particularly nuts and seeds, were also an important subsistence resource during this period. A few Early Archaic sites have been identified on Staten Island. The Old Place Site, the Ward's Point Site, and the Richmond Hill Site all yielded Kirk components. In addition, the Richmond Hill Site yielded a Palmer component. Radiocarbon dates associated with Kirk and Palmer components suggest a date range of circa 7600 to 6000 BC. A radiocarbon date of 7410 BC from the Richmond Hill Site is probably associated with the Palmer component (Ritchie and Funk 1971, 1973).

The Middle Archaic period (circa 6000 to 4000 BC) was marked by the use of distinctive projectile points and by the appearance of groundstone tools and the use of a wider variety of lithic materials. The types of groundstone tools found in Middle Archaic assemblages (axes, nutting stones, and mortars) suggest an increasing adaptation to the modern hardwood forest biome that characterized this period. The Middle Archaic is perhaps the least well known of the Archaic subperiods for the region, but a generalized hunting and gathering economy is postulated for this period.

The Late Archaic (circa 4000 to 1000 BC) is marked by the appearance of more diverse artifact forms and sites in an increased variety of environmental settings. A generalized hunting and gathering subsistence strategy was followed throughout this period. Exploitation of riverine and estuarine resources became more important at the end of the Archaic, judging from the presence of fishing implements in the artifact assemblages and the abundance of sites in estuarine and riverine environments. Intensive shellfish gathering appears to have become important during the Late Archaic, not only in the coastal areas but in interior riverine zones as well.

Late Archaic sites are more numerous and larger than sites of earlier periods, suggesting increased population levels. The principal diagnostic artifacts associated with the Late Archaic are a variety of



stemmed points, such as the Lackawaxen, Bare Island, Poplar Island, Rossville, and Lamoka types; other items in the Late Archaic toolkit include axes, choppers, mortars, pestles, netsinkers, and other implements that appear to have been used for woodworking, fishing, and the processing of plant foods (Kraft and Mounier 1982a). Ritchie (1980) has observed that the Late Archaic cultures of Staten Island are closely related to those of the lower Susquehanna Valley and the Middle Atlantic region.

The Terminal Archaic or Transitional stage is marked by the appearance of broad-bladed projectile points, such as the Perkiomen, Susquehanna, and Orient Fishtail types, and by carved steatite vessels. The core area of the Transitional cultural complex is located in southeastern Pennsylvania, but the Orient phase represents a well-developed expression of this complex in southern New York.

Ritchie (1980) has noted that Orient phase burial sites are most concentrated on the eastern end of Long Island, but that the diagnostic points and soapstone (steatite) vessels are widely distributed over southeastern New York. Burial ceremonialism was apparently an important feature of the Orient phase, and the burial sites include some large communal pits containing the remains of numerous individuals and ritually broken vessels. Occupation sites associated with the Orient phase show a heavy reliance on shellfish (clam, oyster, scallop, periwinkle, whelk, and ark), which were plentiful in mud flats, shallow bays, and estuaries all around Long Island (Ritchie 1980:164-178).

The Woodland period (circa 1000 BC to European contact, circa AD 1600) is better known in the region than the preceding Paleoindian and Archaic periods. The Woodland period is typically subdivided into Early (circa 1000 to 500 BC), Middle (circa 500 BC to AD 800) and Late (circa AD 800 to 1600) subperiods. The principal cultural traits of the Woodland period include larger populations, increased complexity of social organization, the introduction of ceramics, a settlement pattern characterized by increased sedentism, and a subsistence pattern that includes horticulture. A generalized pattern of seasonal hunting and gathering persisted from the Late Archaic into the Early and Middle Woodland subperiods; however, during the Late Woodland, when horticulture assumed greater importance, seasonal population movements gave way to more sedentary village life. Woodland sites in southeastern New York, which includes Staten Island and western Long Island, show a strong subsistence focus on riverine and marine resources, especially shellfish. The larger habitation sites are located along tidal streams and inlets, and the village sites include numerous pit features and large shell middens (Ritchie 1980).

During the Early and Middle Woodland periods, a pattern of seasonal hunting and gathering continued, with emphasis on the exploitation of aquatic resources. There are numerous Early Woodland sites in the adjacent Coastal Plain region, but few sites have been subject to intensive excavation. The major habitation sites show a riverine/estuarine focus, where seasonally abundant anadromous fish and shellfish were exploited. Incipient agriculture may have been practiced during the Early Woodland, but it is not until the Late Woodland that a significant settlement pattern shift is visible that is suggestive of a shift to subsistence agriculture. During the Late Woodland, villages became larger and more permanent, and they tended to be located adjacent to areas with easily worked floodplain soils. In addition to major village sites, the Late Woodland settlement system included smaller outlying hamlets and special-use sites, such as hunting camps and fishing and shellfish-gathering stations, although the importance of these secondary sites may have diminished as agricultural technology developed (Kraft and Mounier 1982b; Williams and Thomas 1982). Ceci has challenged the idea that the aboriginal populations in coastal New York had developed into fully sedentary horticultural groups prior to contact with European traders, arguing instead that a transhumant subsistence/settlement pattern persisted in coastal New York until contact (Ceci 1982).



Adena and Hopewell cultures flourished in the Midwest riverine region during the Early and Middle Woodland periods, and these cultures were characterized by an elaborate burial ceremonialism, including the construction of burial mounds, and the interregional exchange of raw materials, such as shell, copper, and high-quality lithics. However, these cultural developments appear to have had little influence on the development of indigenous groups in southern New York, although there are some Middlesex phase sites in this area that appear to exhibit some characteristics of the Adena culture of the Ohio River Valley.

Regular contact between European and Native American groups along the eastern seaboard began early in the sixteenth century, and the Late Woodland groups experienced regular contact with Euro-American populations during the early seventeenth century. At the time of European contact, southern New York was occupied by Algonquin-speaking groups that existed in loosely structured, autonomous bands residing in small dispersed settlements (Ceci 1982; Goddard 1978; Kraft 1981). Regular contact with European traders and settlers resulted in the breakdown of traditions and the increased reliance on European goods in exchange for land, furs, and wampum production. Warfare, disease, and alcoholism rapidly decimated the native population, and most surviving Native American groups were forced to migrate west.

## B. HISTORICAL DEVELOPMENT

### *1. Overview*

From 1621 to 1664, Staten Island was part of the Province of New Netherland, which was administered by the Dutch West India Company (Goldstone and Dalrymple 1976:471). Attempted development under David Pietersen DeVries (1639-1641) and Cornelius Melyn (circa 1641-1643; 1650-1655) was interrupted by resistance from Native American populations, culminating in the "Peach War" of 1655, which drove Europeans from the island. During the early 1660s, settlement recommenced on the island. About a dozen families settled Oude Dorp, or Old Town, on a site near the Narrows. The settlers, who were chiefly Dutch- and French-speaking refugees from the Palatinate, thrived, using the flatlands for crops and the uplands for pasturage (Bayles 1887:58, 71; Leng and Davis 1930:104).

Great Britain seized the Dutch colony in 1664, and the Native American claims were extinguished six years later. The county of Richmond, comprising the entire island, was created in 1683. In 1688, Richmond County was partitioned into the towns of Castleton, Northfield, Southfield, and Westfield. The project area was included in Westfield (Bayles 1887:90, 95). In 1898, Staten Island became a part of New York City, as the borough of Richmond (Morris 1900:490).

In July 1776, British forces landed on Staten Island and established a military rule that lasted until the close of the Revolutionary War in 1783. As many as 40,000 Hessian and British troops were encamped on the island, greatly outnumbering the inhabitants (Schneider 1977:9). The island served as a staging area for British forays into Long Island and New Jersey, and as a source for foodstuffs, wood, and fodder for the military and civilian population on Manhattan (Bayles 1887:172).

Following the War for Independence, Staten Island developed as an agricultural and fishing area, with the county seat of Richmond Town emerging as the principal village. Products included beef, pork, wheat, rye, and apples, as well as fish, oysters, and clams. Salt hay was harvested from extensive salt meadows in Northfield, Southfield, and Westfield townships (Bayles 1887:78, 90, 326-327). Westfield contained the island's most productive farmland, and many of the owners of this farmland in the 1830s were descendants of the original settlers (Schneider 1977:9).

In the 1830s, wealthy New Yorkers "discovered" Staten Island and established fashionable bathing resorts and summertime retreats along its shores. As transportation modes improved, eastern shore communities gradually developed into year-round suburbs for New Yorkers.

Agriculture and oystering supported the Staten Island economy in the post-Civil War period. During the 1880s, more than 300 farms operated on Staten Island. Their primary crops were potatoes (both white and sweet), Indian corn, oats, wheat, rye, and buckwheat. Dairy products were also marketed (Board of Education 1964:111-112). The farming economy on Staten Island began to decline after the turn of the century, however, as a result of farm labor shortages, escalating land values, and industrial air pollution. By the 1960s, only 12 truck farms survived (Board of Education 1964:179).

Staten Island's native oyster populations had been exhausted by the end of the eighteenth century, and the nineteenth-century industry was based upon oyster populations transplanted from Long Island, Virginia, Maryland, and elsewhere (Bayles 1887:707). In 1887, local historian Richard Bayles commented:

All the inhabitants of the southern half of Staten Island may be called oystermen, since many of them have invested a little in the beds in some shape, or work more or less on hire for the regular growers. Exactly how many real planters there are on the island it would be difficult to learn; they are scattered everywhere, but chiefly live at Pleasant Plains, Tottenville, Rossville and Chelsea [Bayles 1887:710].

The oyster industry began to decline in the 1880s and 1890s. The bottom sands on which oyster rafts lay became increasingly contaminated with industrial and shipping pollutants and sewage. In 1916, the New York Department of Health declared clamming and oystering in the waters around Staten Island illegal (Schneider 1977:16).

Many of Westfield's oystermen supplemented their income in the off-season with truck farming. The sandy soils in this part of Staten Island were well suited for strawberries, tomatoes, asparagus, and cabbage. Produce was marketed in either Manhattan or Jersey City. Because many oystermen were also engaged in truck farming, the banning of shellfishing in 1916 also negatively affected these agricultural pursuits. By the close of the first quarter of the twentieth century, Westfield was in a state of decline (Schneider 1977:16).

Around 1850, residents of Staten Island and Perth Amboy who were interested in building a railroad between Stapleton and Tottenville organized the Staten Island Railroad. After undergoing financial difficulties, the railroad was completed in 1860 under the direction of William H. Vanderbilt. Its terminus was switched from Stapleton to Vanderbilts Landing (Clifton), a distance of 13 miles. In Westfield, construction of the railroad redirected development away from Rossville toward the southwestern part of the island. In 1880, the Staten Island Rapid Transit Railway Company, a newly organized subsidiary of the Baltimore and Ohio Railroad, gained control of the Staten Island Railroad and the Manhattan ferry. In 1866, the tracks were extended to St. George, where a new ferry terminal was established (Board of Education 1964:134-135; Morris 1900:461, 463-464).

The island's first physical link to the mainland was a railroad bridge built over the Arthur Kill near Howland (Holland) Hook in 1889 (Board of Education 1964:216; Morris 1900:466). Staten Island's need for vehicular bridges became pressing in the period following World War I. In 1928, the Goethals Bridges was opened between Howland Hook and Elizabeth, New Jersey. The Outerbridge Crossing was built the same year between Perth Amboy, New Jersey, and Pleasant Plains. The Bayonne Bridge became operational in 1931

and the Verrazano Narrows Bridge in 1964. The South Shore area, including the project area, remained the island's least populated section through the 1960s (Board of Education 1964:147).

## *2. Tottenville and the Surrounding Area*

During the 1670s, Captain Christopher Billop was granted more than 1600 acres of land at the southern tip of Staten Island (Figure 3). His dwelling, the Conference House, which was built around 1675 and overlooks Raritan Bay, is the sole surviving manor house in New York City. Because of their loyalist connections, Billop's descendants lost the property after the American Revolution—the land was subsequently divided into smaller farms and sold. Following the war, a village began to develop along Amboy Road (which led to the ferry connecting Staten Island with Perth Amboy, New Jersey), and scattered houses were built along the shore and elsewhere in the area (Figure 4). Except for development along the shoreline and along Amboy Road, much of this portion of Staten Island was covered by woodland and agricultural fields. By the mid-nineteenth century the area had become known as Tottenville, after the locally prominent Totten family. The mid-century saw increased development in Westfield Township south of Amboy Road, although the area remained overwhelmingly rural (Figure 5). Several roads had been extended southward from Amboy Road in the direction of Raritan Bay, and a number of dwellings were scattered along these thoroughfares, of which present-day Sprague Avenue was one (see Figure 5).

Tottenville exhibited a developmental pattern typical of southern Staten Island in the nineteenth century. The local landscape was characterized by small scattered villages interspersed with farms; the majority of the inhabitants worked in agriculture or were fishermen, sailors, or laborers employed in the shipbuilding industry (Rubinson 1988:12). During the second half of the nineteenth century, Tottenville underwent a period of rapid growth and development. Much of the land in the village proper was subdivided into small lots and developed. A mixture of large lots (20 acres or more) and smaller properties (generally between 1 and 5 acres) extended south of the village and Amboy Road to the shore of Raritan Bay (Figure 6). By the 1880s, some of these properties, particularly along Beach Avenue between Amboy Road and present-day Hylan Boulevard, had been divided into smaller parcels (Beers 1887). The 1890s witnessed increasing suburbanization in the Tottenville area. By 1898 many of the larger properties west of the project area had been divided into 25x100-foot lots (Figure 7). Over the next ten years, the developed areas extended eastward, especially along Amboy Road (Figure 8); much of the land east and immediately west of Sprague Avenue, however, remained divided into lots encompassing one-half acre or more.

The village of Tottenville prospered until the turn of the twentieth century when, as noted earlier, the oyster beds were destroyed by severe water pollution. In addition, the introduction of the steel hull effectively ended the wooden shipbuilding industry of Tottenville; however, several new industries—a silk mill, a copper smelting plant, and the Atlantic Terra Cotta Company—were introduced at about the same time, reducing the economic impact caused by the collapse of the oystering and the shipbuilding trades.

For much of the twentieth century, development in the Tottenville area continued to occur north and west of the project area with the construction of single-family homes, apartment buildings, and subsequently, condominium complexes. Following World War II, housing construction along Sprague Avenue accelerated, as much of the street frontage north and south of the project area was developed.



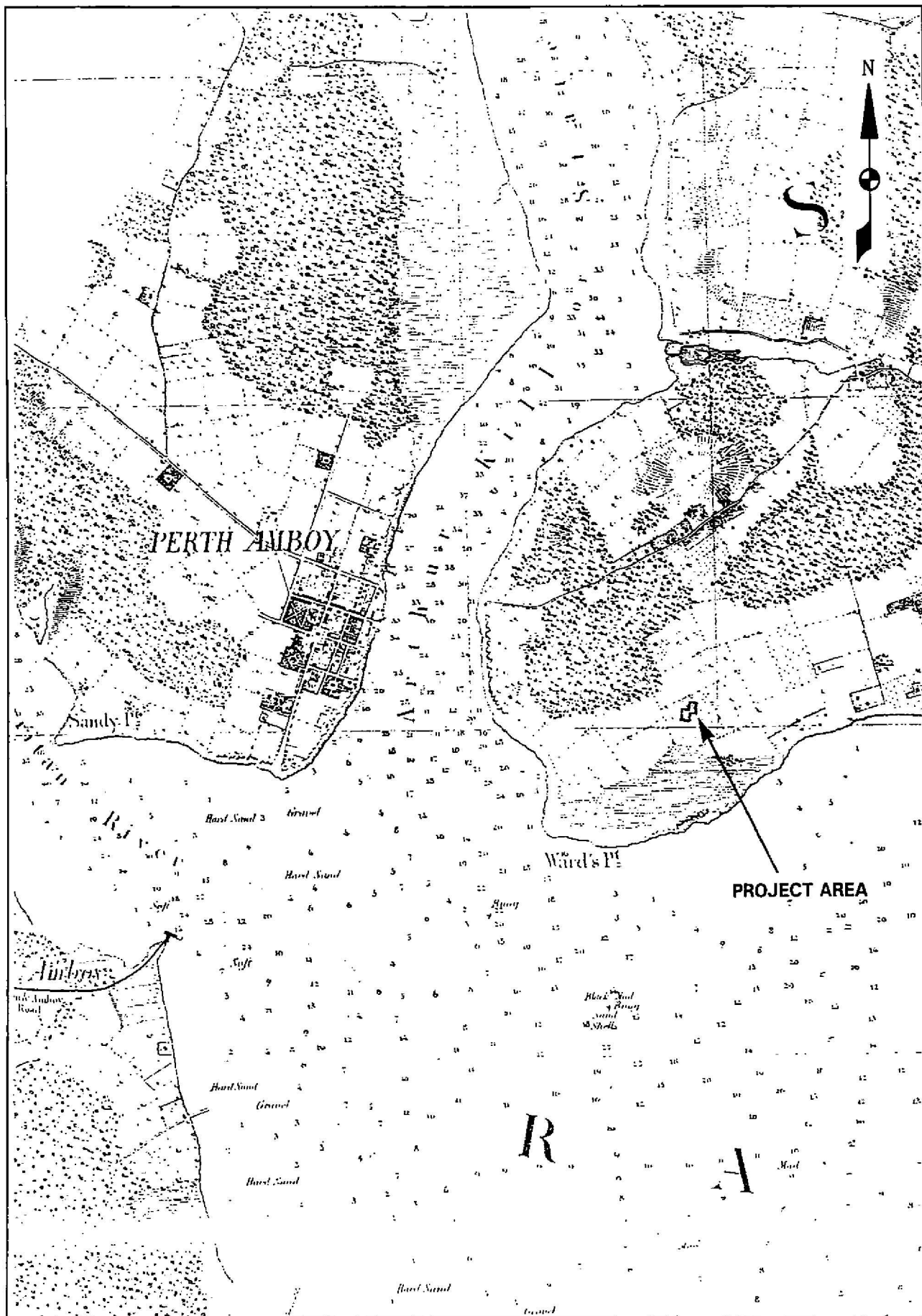
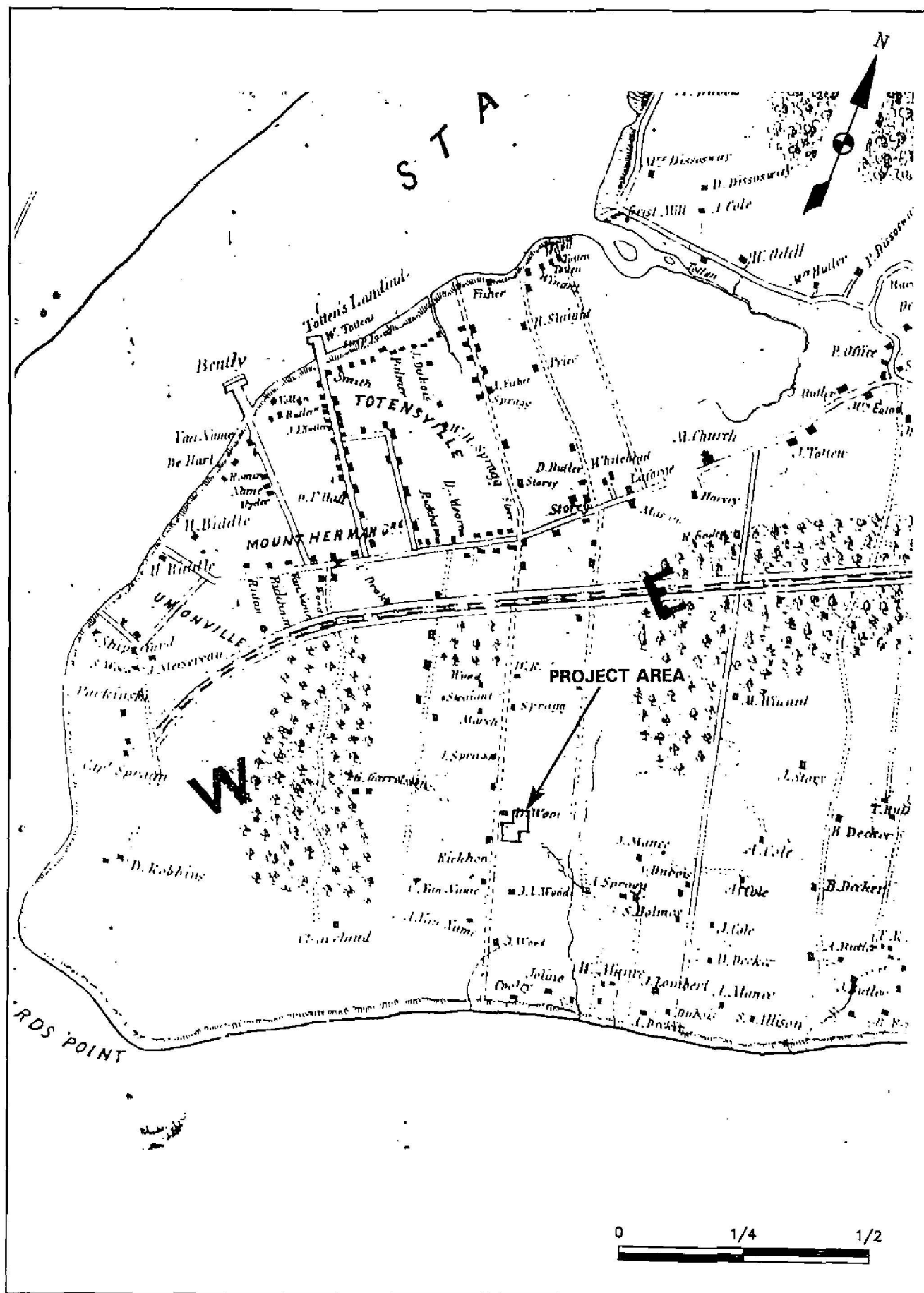


FIGURE 4: Project Area, 1836-1839

SOURCE: US Coastal Survey, circa 1836-1839; Published 1845



**FIGURE 5: Project Area in 1853**

*SOURCE: Butler 1853*

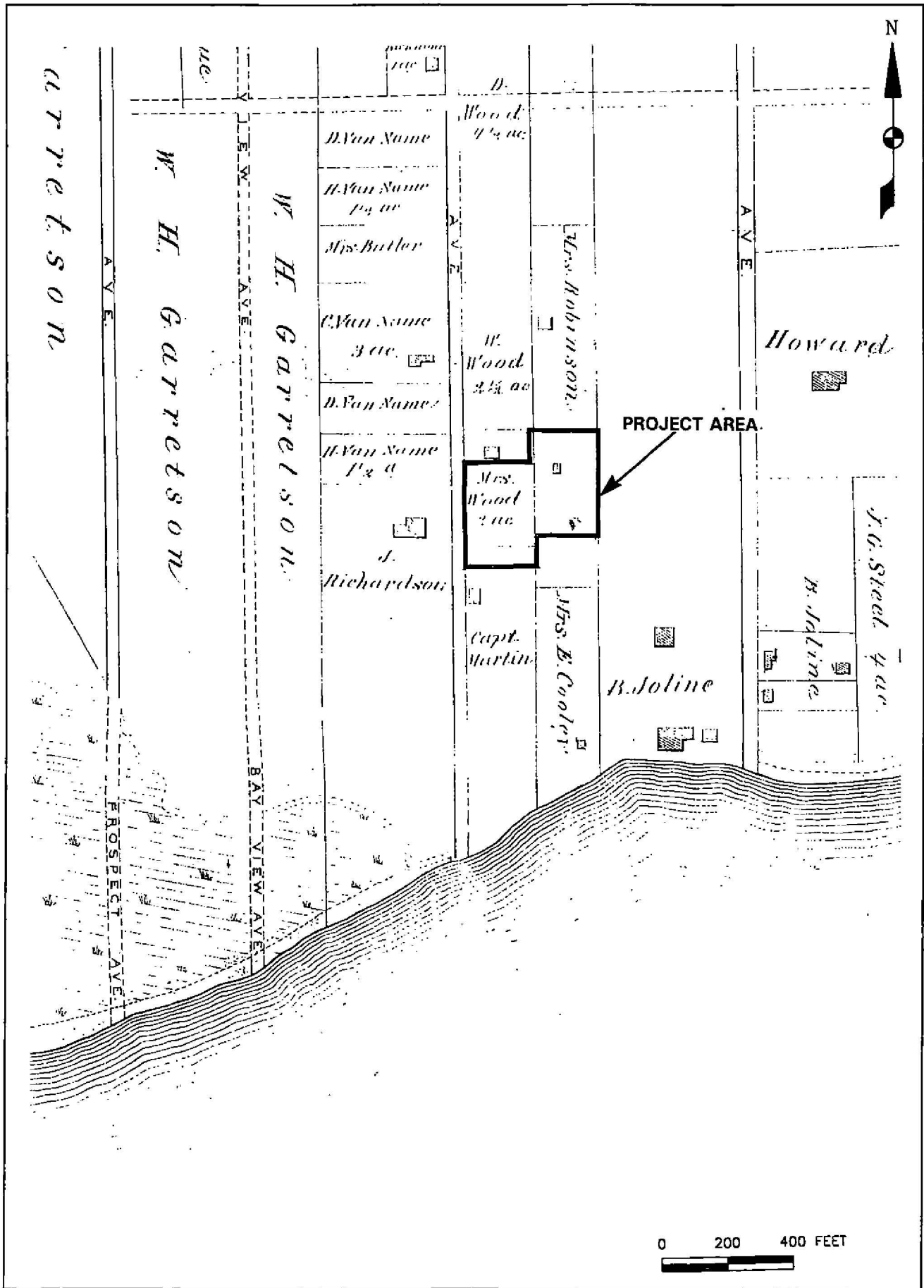
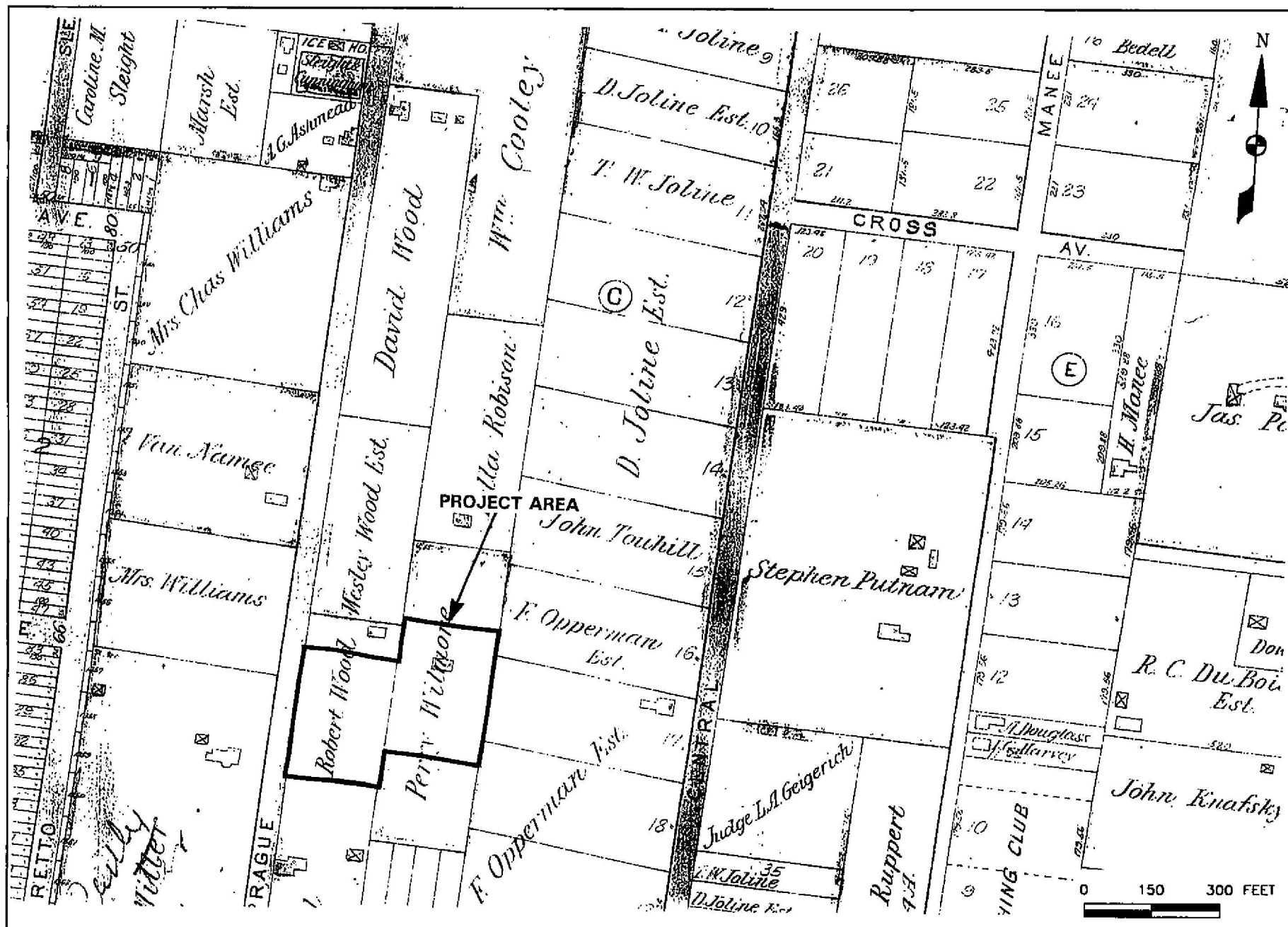


FIGURE 6: Project Area in 1874

SOURCE: Beers 1874





*SOURCE: Robinson 1898*



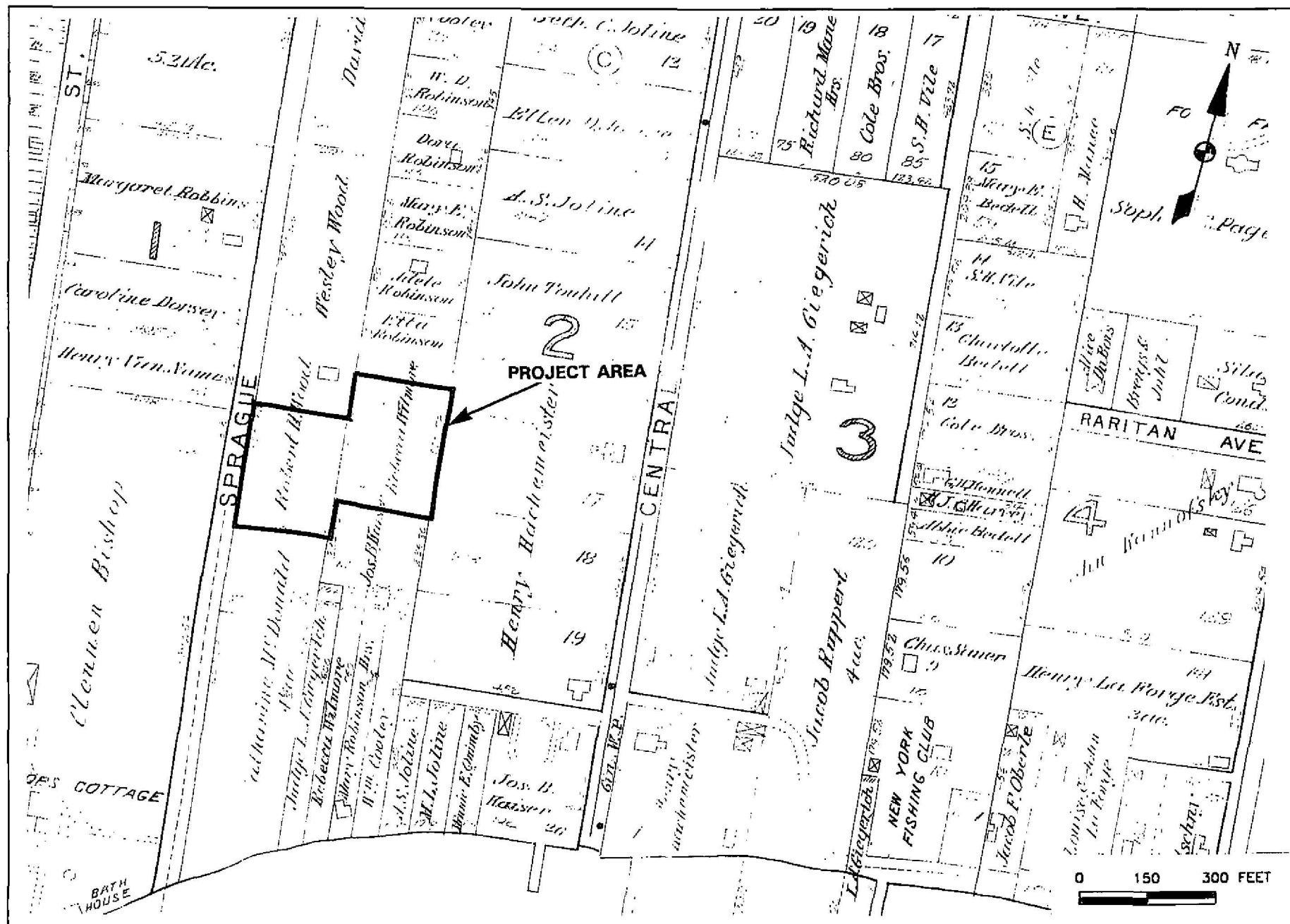


FIGURE 8: Project Area in 1907

SOURCE: Robinson 1907

## IV. RESULTS OF BACKGROUND RESEARCH

### A. PREHISTORIC ARCHAEOLOGICAL SITES IN THE PROJECT VICINITY

Archaeological investigations of the metropolitan New York area have a long history, although the region's modern development has obliterated much evidence of prehistoric and early historic activity. Staten Island has been the focus of much archaeological activity, and many survey and excavation projects have provided information that is directly pertinent to the Sprague Avenue Houses project area. Archaeological site files and reports at the New York State OPRHP have provided most of the information used for the following discussion of previous archaeological activity in the project area vicinity.

In the first decade of the twentieth century, Skinner (1909) documented numerous prehistoric sites from Rossville south to Kreischerville (present-day Charleston). He also noted that the Rossville and Woodrow area of Staten Island was a unique zone, where sites were found both inland on sandy soils and along the coast. Shoreline locations had the highest frequency of sites (Skinner 1909). Numerous prehistoric sites have been recorded in the project area vicinity in southwestern Staten Island, encompassing the Paleoindian, Archaic, and Woodland periods of prehistory.

Paleoindian material has been recovered from a number of sites along the Arthur Kill shoreline of southwestern Staten Island, including the Cutting Site (Sainz 1962), the Port Socony and Port Mobil sites (Kraft 1977b), the Charleston Beach Site, and the Kreischerville sites (Kraft 1977b), all to the north and west of the project area. The areas favored by Paleoindian groups would have been near the ancestral stream that developed into the Arthur Kill. Archaic and Woodland period sites were also located along the Arthur Kill shoreline, and there is a cluster of sites near the Smoking Point/Chemical Lane area opposite Woodbridge, New Jersey (Pickman and Yamin 1978; Rubertone 1974; Silver 1984a, 1984b; Skinner 1912-1913). The Pottery Farm and Clay Pit Road sites, also located in this general area, have also yielded evidence of Archaic and Woodland occupation (Jacobsen 1980; Rubertone 1974; Yamin and Pickman 1986).

The Wards Point area, located on the shoreline west of the project area, consists of eight known prehistoric sites dating from the Archaic through the Contact periods. At the Wards Point/Billopp Ridge Site, probably representing a large village, roughly 127 features—refuse pits and hearths—have been excavated, together with portions of a large associated shell midden. At least 72 burials have been excavated at the Burial Ridge/Conference House Site since the mid-nineteenth century (Jacobson 1980).

Prehistoric sites have also been reported along the bluffs overlooking Prince's Bay on the south shore of Staten Island. Skinner documented a number of sites along the southwestern shore of Staten Island, in what is referred to as the Huguenot area (Skinner 1909). Skinner (1909:16) described these sites as small shell heaps overlooking the bay. He mapped these prehistoric site localities at Red Bank, which is now the location of the Mount Loretto Girls' Home, at the shoreline near the foot of Sharrott Avenue, and at Wolfe's Pond further to the east (Pickman 1990).

Further inland, in the immediate vicinity of the project area, previous investigations identified a number of prehistoric sites and finds. The closest of these, the Sprague Avenue Site, was identified during a Phase IB archaeological survey of the Surfside Village Development (Roberts and Stehling 1987), located on the west side of Sprague Avenue, approximately 500 feet south of Hylan Boulevard and roughly 300 feet north of the

project area. More than 100 pieces of lithic debitage were recovered in addition to some 50 pieces of fire-cracked rock. The 1911 topographic map of the borough indicates the presence of small streams and marshy areas, roughly 300 feet east and 300 feet northwest of the site.

Shovel testing to the south of Hylan Boulevard and west of Joline Avenue (east of the project area), for the Joline Avenue Pool Parking Lot, resulted in the recovery of a prehistoric ceramic sherd, lithic debitage, and fire-cracked rock, suggesting the presence of a prehistoric campsite. These finds were made on higher ground adjacent to the former location of a small stream and marshy area (Pickman 1988).

Further to the east, shovel testing for the Oakwood Beach Water Pollution Control Project encountered a thin scatter of lithic debitage on the south side of Hylan Boulevard, between Bedell and Joline avenues. As noted by Pickman and Yamin (1984), the 1911 topographic map shows a small stream several hundred feet east of where the material was recovered, and a pond and adjacent marsh several hundred feet to the south.

Prehistoric sites have also been recorded in the vicinity of Page Avenue, roughly a mile to the west of the Sprague Avenue Houses project area. Anderson (1965, 1966) excavated sites on both sides of Page Avenue north of Hylan Boulevard, including a burial of a child and dog on the east side of Page Avenue. Most of the material from these sites was dated to the Early and Middle Woodland periods (Anderson 1965, 1966). The Oakwood Beach Water Pollution Control Project also yielded prehistoric material in this area. The artifacts were recovered from shovel tests excavated northeast of the Page Avenue/Hylan Boulevard intersection (Pickman and Yamin 1984). A surface inspection of a ridge west of Page Avenue documented the presence of lithic flakes, a mano, a hammerstone, and a ceramic sherd (Grossman 1985, Pickman 1990).

As Pickman (1990) observes, most of the inland sites that have been identified in the southwestern portion of Staten Island have typically been located on high ground near streams and marshy areas. These loci probably represent campsites situated to take advantage of resources of the nearby watercourses and wetlands which would have attracted game and waterfowl (Pickman 1990:9).

## B. HISTORIC DEVELOPMENT OF THE PROJECT AREA

There is no indication that the Sprague Avenue Houses project area was developed prior to the latter part of the nineteenth century. By the early 1870s, a dwelling had been constructed within the project area on the east side of Sprague Avenue; according to Beers's 1874 map, the lot upon which this dwelling sat had no recorded owner (see Figure 6). A second dwelling, fronting on Sprague Avenue, was located just outside the project area to the north, and was owned by a Mrs. Wood (see Figure 6). Twenty-five years later, nothing appears to have changed except for the property owners (see Figure 7). The tract fronting on Sprague Avenue, just north of the project area, was still in the Wood family, with Robert Wood shown as the owner on the 1898 Robinson map. The lot to the east was owned by Perry Gilmore (see Figure 7).

By the first decade of the twentieth century, roughly half of the Gilmore property had been sold—two lots, totaling approximately 1.5 acres from the northern part of the tract, were acquired by Adele and Etta Robinson. A third parcel, roughly 1.3 acres, from the southern portion of the Gilmore property, was acquired by Joseph B. Kaiser (see Figure 8). The remaining 1.7 acres, including the dwelling, was retained by the Gilmore family and, in 1907, was owned by Rebecca Gilmore. Robert H. Wood is depicted on the 1907 Robinson map as owning the 2-acre property on Sprague Avenue (see Figure 8). Some 19 years later, the dwelling on the lot owned by the Wood family, just north of the project area, apparently had been demolished; the 1917 Sanborn map, updated in 1926, only covers the western half of the project area, so it

is unclear if the house within the project area boundaries, on the Gilmore lot, was still standing at this time (Figure 9).

By the 1940s, the Sprague Avenue Houses property appears to have been empty (United States Army 1947). However, by the mid-1950s, three structures had been built near the northeastern corner of the property (United States Geological Survey 1955). These buildings were evidently bungalows, probably similar to structures built elsewhere along Sprague Avenue during the twentieth century—described as summer homes on the Sanborn maps produced in 1917 (updated to 1926) (see Figure 9). These were usually small one- or two-story dwellings, many of which are described as “open under,” meaning they were raised up on concrete piers with storage space underneath. These three structures were demolished between 30 and 40 years ago (Kadin, personal communication 1999).

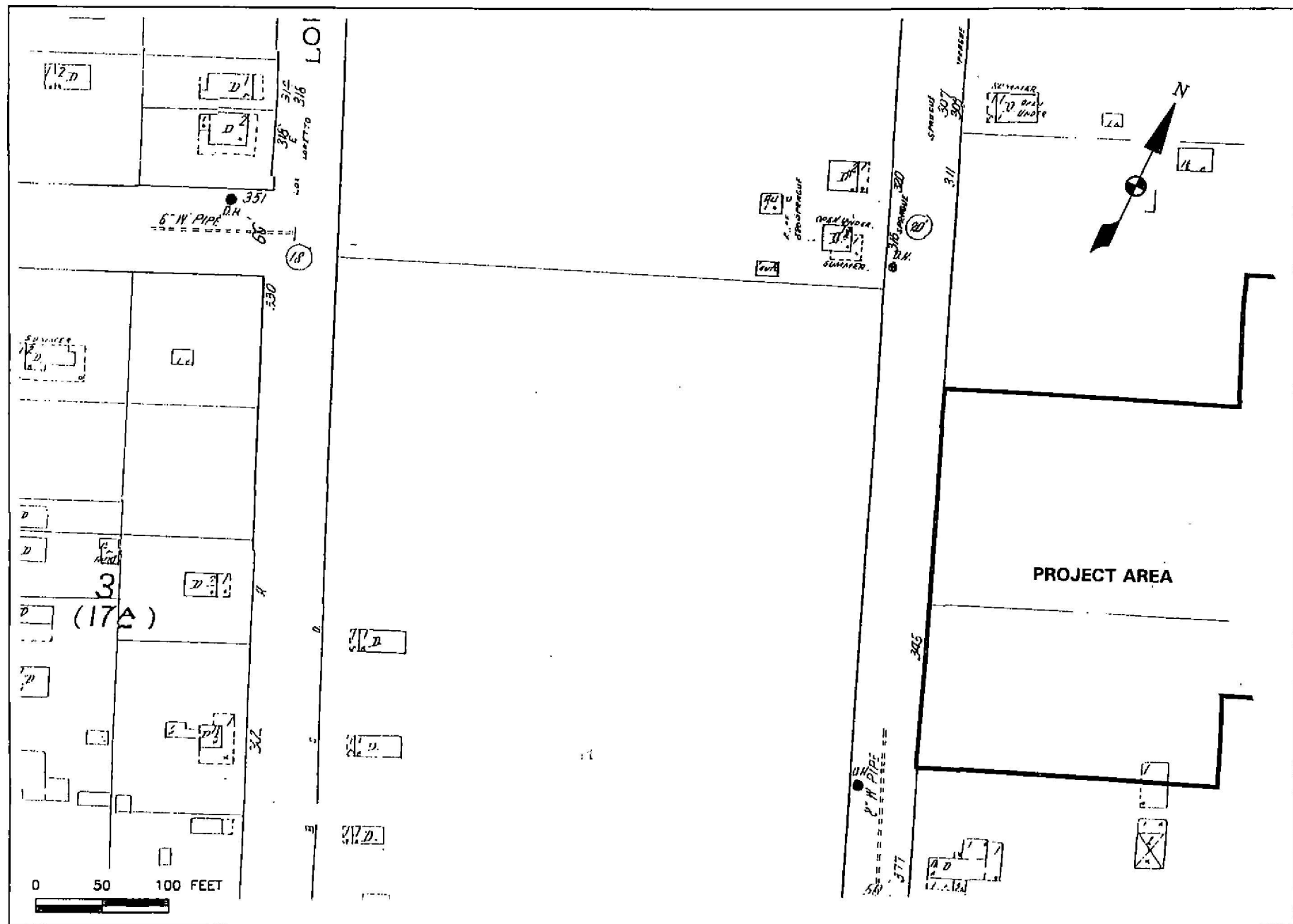


FIGURE 9: Western Half of Project Area, 1917-1926

SOURCE: Sanborn 1917 (with additions to 1926)

## V. RESULTS OF SURFACE RECONNAISSANCE

An archaeological reconnaissance was undertaken on March 17, 1999, to assess the property along Sprague Avenue in the village of Tottenville, Borough of Staten Island, for potential archaeological resources. The lot is situated along the eastern edge of Sprague Avenue, between Hylan Avenue and Surf Avenue, and consists of undeveloped land supporting a thick secondary growth of trees and briars. The ground surface is generally flat, with freshwater wetlands occupying portions of the southeastern quadrant of the lot. Along the length of the lot frontage on Sprague Avenue is a moderate amount of trash consisting of household litter, automobile tires, concrete, discarded lumber, and other items. The interior of the lot contains little in the way of refuse.

The Berger archaeologist observed several mounds of soil in locations corresponding to the six proposed house lots designated on the building plans (see Figure 2). These mounds reach a height of about 7 to 8 feet, and are composed of reddish brown clayey silt with channery, pebbles, and cobbles. The mounds are the backdirt from the test excavations for the proposed septic systems; these excavations were filled in with clean sand (Kadin, personal communication 1999).

A graveled drive corresponding to the design plans for Sprague Court is in place, connecting the four planned house lots in the northern portion of the property, and a shorter graveled drive is present leading to the two planned house lots in the southern end of the property. In the vicinity of each proposed house lot was observed a vertical iron pipe, apparently placed to monitor percolation tests in compliance with construction regulations. A modest amount of excavation activities centered around the monitoring pipes was evident, though no excavated holes are still open.

Toward the rear of the lot are the remains of a wooden platform raised about 6 inches off the ground and measuring 12x15 feet. This platform, built by neighborhood children, may have supported a simple tent or A-frame structure (Kadin, personal communication 1999).

The absence of significant topographic landmarks overlooking the wetland suggests that this locale was not a particularly attractive setting for prehistoric habitation, especially given the large number of local sites with more advantageous conditions. At most, prehistoric archaeological resources might consist of isolated projectile points or debitage, bearing evidence of hunting forays into the wetland zones.

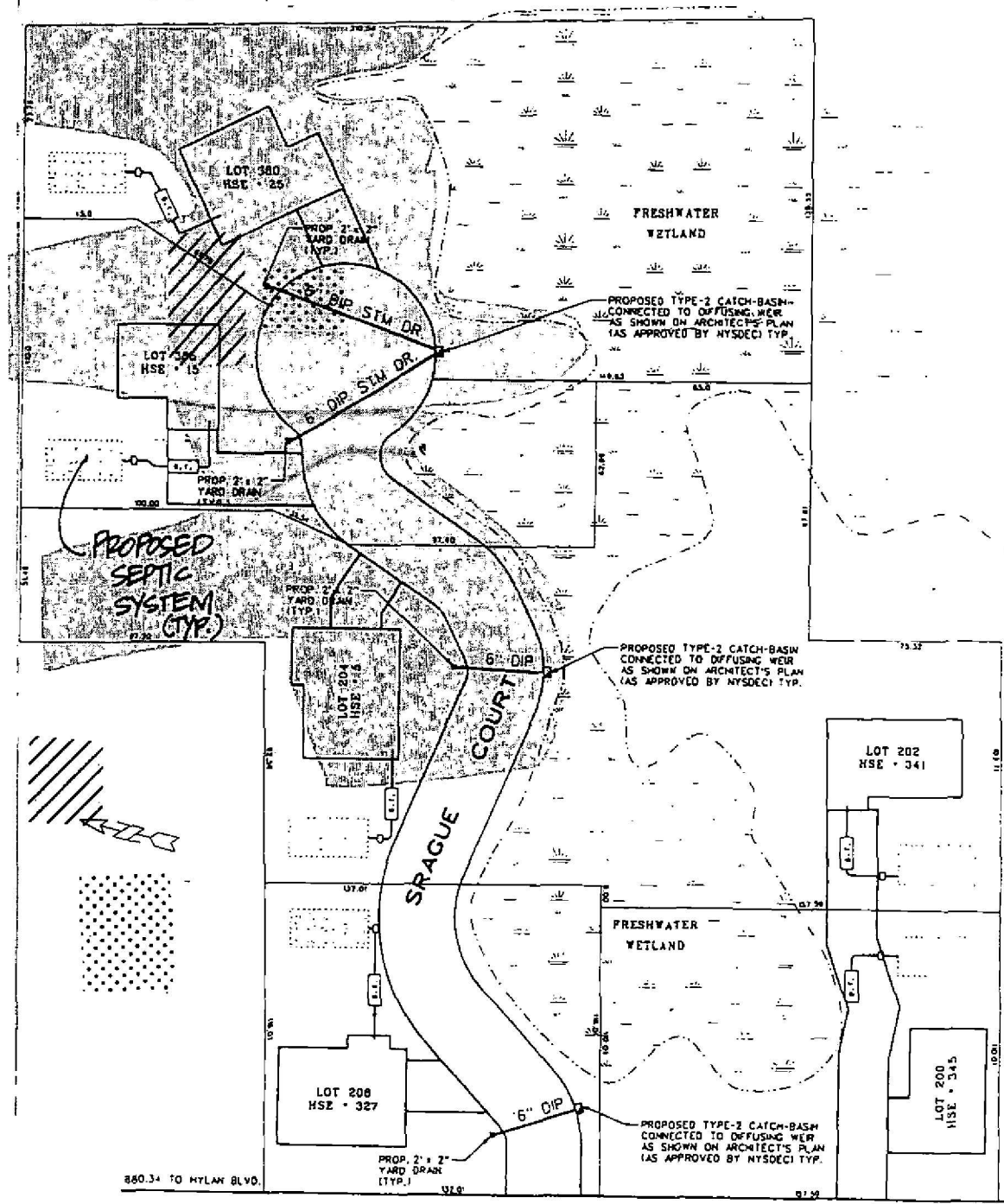
## VI. CONCLUSIONS AND RECOMMENDATIONS

Background research indicates that prehistoric archaeological resources have been found in the general vicinity of the Sprague Avenue Houses project area. However, these generally have been encountered on somewhat higher terrain (the Surfside Village site, for example, was situated at an elevation of roughly 40 feet amsl), overlooking a stream or marsh. Although, according to the 1911 topographic map, there were wetlands within and just north of the project area, the proposed development site is flat and low-lying, and would have been less attractive to prehistoric populations than would areas of higher elevation to the north. Based on the results of background research and surface reconnaissance, the project area is considered to have low potential for prehistoric archaeological resources.




Historic maps depicting the project area indicate that the proposed development site was not built on until the second half of the nineteenth century. By 1874, at least one dwelling is shown on the property, and appears to have survived until the early twentieth century. A second dwelling appears to have been constructed just outside the project area to the north, also by the early 1870s; yard spaces associated with this building may, however, have existed within the proposed development tract. No structures appear to have stood in the project area during the mid-twentieth century until several bungalows or summer homes were constructed between 1947 and 1955.

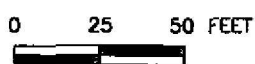
As shown in Figure 10, the dwelling depicted on the 1874 Beers map and the 1898 Robinson map was located (approximately) near the end of proposed Sprague Court. While the suspected presence of nineteenth-century domestic occupation(s) in the project area would normally indicate a high potential for historic archaeological resources (e.g., foundation remains, refuse deposits, wells, or privies) recent disturbance to the tract, observed during the surface inspection, suggests that the potential for such resources is moderate at best. As shown in Figure 10, the zone of moderate archaeological potential covers the northern third of the proposed development, not including the septic systems and immediately surrounding areas where excavation has already occurred.

As noted, the northern third of the project area may have moderate potential to contain historic archaeological resources dating to the nineteenth century. If the New York City Landmarks Preservation Commission deems it necessary, a Phase IB investigation, entailing a program of subsurface survey, could be considered. Based on the size of the area considered to possess archaeological potential—roughly 1 acre—no more than 15 hand-excavated shovel tests would be necessary to achieve the goals of a Phase IB investigation.



**LEGEND**

-  APPROXIMATE LOCATION OF STRUCTURES AS DEPICTED IN 1874
-  APPROXIMATE LOCATION OF STRUCTURES AS DEPICTED IN 1894
-  AREA OF MODERATE ARCHAEOLOGICAL POTENTIAL



**FIGURE 10: Project Area; Area of Archaeological Potential**



## VII. BIBLIOGRAPHY AND REFERENCES CITED

- Anderson, Albert J.  
1965        The Page Avenue Site. *The Chesapeake* 3(3):61.
- 1966        A Child and His Dog. *New Bulletin* 15(9):87-90.
- Bayles, Richard M. (editor)  
1887        *History of Richmond County, Staten Island, New York, from Its Discovery to the Present Time*. L.E. Preston & Company, New York.
- Beers, F.W.  
1874        *Atlas of Staten Island, Richmond County, New York*. J.B. Beers & Company, New York.
- Beers, J.B., & Company  
1887        *Atlas of Staten Island, Richmond County, New York*. J.B. Beers & Company, New York.
- Board of Education, New York City  
1964        *Staten Island: A Resource Manual for School and Community*. Available at the Staten Island Institute of Arts and Sciences, St. George, Staten Island.
- Butler, James  
1853        *Map of Staten Island, Richmond County, New York*. James Butler, [n.l.].
- Ceci, Lynn  
1982        Method and Theory in Coastal New York Archaeology: Paradigms of Settlement Pattern. *North American Archaeologist* 3(1):5-36.
- Cleland, Charles E.  
1976        The Focal-Diffuse Model: An Evolutionary Perspective on the Prehistoric Cultural Adaptations of the Eastern United States. *Midcontinental Journal of Anthropology* 1:59-76.
- Dent, Richard J.  
1981        Amerind Society and the Environment: Evidence from the Upper Delaware Valley. In *Anthropological Careers: Perspectives on Research, Employment and Training*, edited by Ruth H. Landman et al., pp. 74-85. Anthropological Society of Washington, Washington, D.C.
- Edwards, Robert L., and Arthur S. Merrill  
1977        A Reconstruction of the Continental Shelf Areas of Eastern North America for the Times 9,500 BP to 12,500 BP. *Archaeology of Eastern North America* 5:1-42.
- Federal Energy Regulatory Commission (FERC)  
1981        *Staten Island LNG Project Environmental Impact Statement, Draft Supplement*. Ms. on file, New York State Office of Parks, Recreation and Historic Preservation, Albany.

Gardner, William M.

1974        The Flint Run Complex: Pattern and Process during the Paleo-Indian to Early Archaic. In *The Flint Run Paleo-Indian Complex: A Preliminary Report of the 1971-73 Seasons*, edited by William M. Gardner, pp. 5-47. Occasional Paper Number 1. Archeology Laboratory, Department of Anthropology, The Catholic University of America, Washington, D.C.

1981        Paleoindian Settlement Pattern and Site Distribution in the Middle Atlantic. In *Anthropological Careers: Perspectives on Research, Employment and Training*, edited by Ruth H. Landman et al., pp. 51-73. Anthropological Society of Washington, Washington, D.C.

1989        An Examination of Cultural Change in the Late Pleistocene and Early Holocene (circa 9200 to 6800 B.C.). In *Paleoindian Research in Virginia: A Synthesis*, edited by J. Mark Wittkofski and Theodore R. Reinhart, pp. 5-52. Archaeological Society of Virginia Special Publication 19. Richmond.

Goddard, Ives

1978        Delaware. In *Northeast*, edited by Bruce G. Trigger, pp. 213-239. Handbook of North American Indians, vol. 15. William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Goldstone, Harmon, and Martha Dalrymple

1976        *History Preserved: A Guide to New York City Landmarks and Historic Districts*. Schocken Books, New York.

Grossman, Joel W.

1985        *Phase 1A Cultural Resource Survey Report, Amboy Road/Weir Avenue Project #84-116R*, Staten Island, New York. Prepared by Greenhouse Consultants, Inc., New York, New York.

Jacobsen, Jerome

1980        *Report of Stage 1B Archaeological Survey for the Oakwood Beach Water Pollution Control Project, County of Richmond, New York, Contract Numbers FK-24 and FK-25*. Report on file at the New York State Office of Parks, Recreation and Historic Preservation, Albany.

Kauffman, Barbara, and Joseph Dent

1982        Preliminary Floral and Faunal Recovery and Analysis at the Shawnee-Minisink Site. In *Practicing Environmental Archaeology: Methods and Interpretations*, edited by Roger W. Moeller, pp. 7-12. American Indian Archaeological Institute Occasional Paper no. 3.

Kraft, Herbert C.

1977a        Paleoindians in New Jersey. In *Amerinds and Their Paleoenvironments in Northeastern North America*, edited by Walter S. Newman and Bert Salwen, pp. 264-281. Annals of the New York Academy of Sciences, vol. 288.

1977b        The Paleo-Indian Site at Port Mobil, Staten Island. In *Current Perspectives in Northeastern Archaeology: Essays in Honor of William A. Ritchie*. R.E. Funk and C.F. Hayes III, editors. *Researches and Transactions of the New York State Archaeological Association* 17(1).

- 1981      *The Minisink Site: A Re-evaluation of a Late Prehistoric and Early Historic Contact Site in Sussex County, New Jersey*. Archaeohistoric Research, Elizabeth, New Jersey.
- Kraft, Herbert C., and R. Alan Mounier
- 1982a      The Archaic Period in New Jersey ca. 8000 B.C. - 1000 B.C. In *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 52-102. Office of Environmental Protection, Trenton, New Jersey.
- 1982b      The Late Woodland Period in New Jersey ca. A.D. 1000 - 1600. In *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 139-184. Office of Environmental Protection, Trenton, New Jersey.
- Leng, Charles W., and William T. Davis
- 1930      *Staten Island and Its People: A History, 1609-1929*. Lewis Publishing Company, Inc., New York.
- Marshall, Sydne
- 1982      Aboriginal Settlement in New Jersey During the Paleo-Indian Cultural Period ca. 10,000 B.C. - 6000 B.C. In *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 10-51. Office of Environmental Protection, Trenton, New Jersey.
- Morris, Ira K.
- 1900      *Morris' Memorial History of Staten Island, New York*, vol. 2. Memorial Publishing Company, New York.
- Pickman, Arnold
- 1988      *Stage I Archaeological Survey, Joline Avenue Pool Parking Lot, Tottenville, Staten Island, New York*. Prepared for Quennell Rothschild Associates, New York.
- 1990      *Stage IA Archaeological Survey, Amboy/Bedell Shopping Plaza, Pleasant Plains, Staten Island, New York*. Prepared for Calvanico Associates.
- Pickman, Arnold, and Rebecca Yamin
- 1978      *EIS Background Document, Preliminary Cultural Resources Assessment: Literature Search and Windshield Survey, Oakwood Beach Water Pollution Control Project, Phase III and Future Phases, Contract #68-01-4616, DOW #1*. WAPORA, Inc. Submitted to USEPA Region II, New York, New York.
- 1984      *Oakwood Beach Water Pollution Control Project: Phase I Cultural Resources Survey: Hylan Boulevard to Arthur Kill Road at Kreischer Street*. Prepared for Woodward-Clyde Consultants, Wayne, New Jersey, by The Center for Building Conservation, New York, New York.

- Ritchie, William A.  
1980 *The Archaeology of New York State*, Revised Edition. Harbor Hill Books, Harrison, New York.
- Ritchie, William A., and Robert E. Funk  
1971 Evidence of Early Archaic Occupations on Staten Island. *Pennsylvania Archaeologist* 4:145-160.
- 1973 Aboriginal Settlement Patterns in the Northeast. *New York State Museum and Science Bulletin Memoir* 20.
- Roberts, William L., IV, and Nancy Stehling  
1987 *Phase IB Archaeological Survey of the Surfside Village Development Project, Staten Island, New York*. Prepared for the Raritan Bay Development Corporation by Greenhouse Consultants, Inc., New York, New York.
- Robichaud, Beryl, and Murray F. Buell  
1973 *Vegetation of New Jersey: A Study of Landscape Diversity*. Rutgers University Press, New Brunswick, New Jersey.
- Robinson, Elisha  
1898 *Atlas of the Borough of Richmond, City of New York*. E. Robinson & Company, New York.
- Robinson, Elisha, and R.H. Pidgeon  
1907 *Atlas of the Borough of Richmond, City of New York*. E. Robinson, New York.
- Rubertone, Patricia  
1974 *Inventory and Assessment of Archaeological Potential of Distrigas Property, Rossville, S.I., N.Y.* Staten Island Institute of Arts and Sciences. Submitted to Distrigas Corporation.
- Rubinson, Karen S.  
1988 Documentary Study and Field Survey, Totten's Landing Project, Tottenville, Staten Island. Report on file at NYC Landmarks Preservation Commission.
- Sainz, Donald  
1962 The Fluted Point People. *Staten Island Institute of Arts and Sciences, the New Bulletin* 12(1):2-5.
- Sanborn Map Company  
1917 *Borough of Richmond, Insurance Maps of Staten Island*, vol. II. Revised 1926. Sanborn Map Company, New York.
- Schneider, Gail  
1977 "A Cool and Pleasant Retreat but a Hungry Soil," *The Clay Pit Pond Area, Staten Island, New York*. Staten Island Institute of Arts and Sciences, St. George, Staten Island.

- Silver, Anette  
1984a The Smoking Point Site (STD 14-3), Staten Island, New York. *Proceedings, Staten Island Institute of Arts and Sciences* 33:1-46.
- 1984b Functional Analysis of the Scraper-Type Tools from Smoking Point (STD 14-3), Staten Island, New York. *Proceedings, Staten Island Institute of Arts and Sciences* 33:85-105.
- Sirkin, Les  
1977 Late Pleistocene Vegetation and Environments in the Middle Atlantic Region. In *Amerinds and Their Paleoenvironments in Northeastern North America*, edited by Walter S. Newman and Bert Salwen, pp. 207-217. *Annals of the New York Academy of Sciences*, vol. 288.
- Skene, Frederick  
1907 *Map of Staten Island, Richmond County, New York, Showing the Colonial Land Patents from 1668 to 1712*. Available at the Staten Island Institute of Arts and Sciences, St. George, Staten Island.
- Skinner, Alanson  
1909 The Lenape Indians of Staten Island. *American Museum of Natural History Anthropological Papers* 3:1-62.
- 1912-1913 Indian Camp or Village Sites in the Southern Part of Staten Island and Adjacent Parts of New Jersey. *Proceedings of the Staten Island Association of Arts and Science* 4:90-98.
- United States Army  
1947 *Arthur Kill Quadrangle*. Chief of Engineers, U.S. Army Map Service, War Department, Washington, D.C. Available at the Staten Island Institute of Arts and Sciences, St. George, Staten Island.
- United States Coastal Survey  
1845 *Chart of New York Harbor, Map #35, Map of New York Bay and Harbor and the Environs*. Surveyed 1836-1839 by the U.S. Coastal Survey. Available at the Staten Island Institute of Arts and Sciences, St. George, Staten Island.
- United States Geological Survey  
1955 *Arthur Kill Quadrangle*. U.S. Geological Survey, Washington, D.C. Available at the Staten Island Institute of Arts and Sciences, St. George, Staten Island.
- Widmer, Kemble  
1964 *The Geology and Geography of New Jersey*. D. Van Nostrand, Princeton, New Jersey.
- Williams, Lorraine E., and Ronald A. Thomas  
1982 The Early/Middle Woodland Period in New Jersey ca. 1000 B.C. - A.D. 1000. In *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 103-138. Office of Environmental Protection, Trenton, New Jersey.

Wolfe, Peter E.

1977        *The Geology and Landscapes of New Jersey*. Crane Russak, Trenton.

Yamin, Rebecca, and Arnold Pickman

1986        *Stage 1A Archaeological Survey, Clay Pit Ponds State Park Preserve, County of Richmond, Staten Island, New York*. Prepared for the New York State Office of Parks, Recreation and Historic Preservation, Albany.