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FLUSHING BAY FORTY MILLION GALLON
STORMWATER STORAGE TANK FACILITY
QUEENS, NEW YORK

STAGE IA CULTURAL SURVEY

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HISTORICAL
PERSPECTIVES INC.



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THE FLUSHING BAY FORTY MILLION GALLON
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QUEENS, NEW YORK

STAGE IA CULTURAL SURVEY

Prepared

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DATE:
March 1992

TABLE OF CONTENTS

I. Introduction 1

II. Environmental Setting 3

III. Prehistoric Period 5

IV. Historical Period11

 Homelot Building Histories17

V. Conclusions and Recommendations26

Bibliography

Figures

Appendices:

- A. New York State Museum and New York State Office of
Parks, Recreation and Historic Preservation Site File
Search Results
- B. Boring Data from Subsurface Exploration Section of the New
York City Topographical Bureau

FIGURES

1. Current U.S.G.S. Topographic Map
2. Project Area - Current Sanborn
3. Topographic Map Circa 1935
4. Final Map of the Borough of Queens, 1924
5. Grumet, Indian Sites, Trails and Planting Fields in Queens
6. Solecki, Indian Village Sites
7. Solecki Photograph #54, Flushing, 1937
8. Solecki Photograph #55, Flushing, 1937
9. Solecki Photograph #56, Flushing, 1937
10. Solecki Photograph #57, Flushing, 1937
11. Solecki Photograph #58, Flushing, 1937
12. Smith, Artifacts from the Grantville Site
13. Smith, Artifacts from the Grantville and Wilkins Sites
14. Sir Henry Clinton Map, 1781
15. Sidney Map, 1849
16. Dripps Map, 1852
17. Walling Topographic Map of Kings and Queens, 1859
18. Beers Atlas of Long Island, 1873
19. Wolverton Atlas, 1891
20. E.B. Hyde Atlas of Queens, 1904
21. E.B. Hyde Atlas of Queens, 1926
22. Sanborn Atlas of Queens, 1930
23. E.B. Hyde Atlas of Queens, 1929 updated to 1955
24. Map of the Elevated Area of the Study Area,
Showing Disturbance
25. Bowne's Ireland Mill, Built 1797
26. World's Fair Map, 1940
27. Photo of World's Fair
with Federal Building and Project Area
28. Insert Map Showing Proposed Facility
and Boring Location Plan

I. INTRODUCTION

The New York City Department of Environmental Protection has proposed the construction of a forty million gallon stormwater storage tank facility south of Flushing Bay. The site is located in a section of Flushing Meadows-Corona Park that is presently used for softball and baseball fields. It is bounded by College Point Boulevard (formerly Lawrence Street), Fowler Avenue, and the elevated Van Wyck Expressway. The site is immediately north of a pedestrian bridge that connects the Kissena Corridor with the Lawrence Entrance of the Flushing Meadows-Corona Park. Although the final design is not completed, this facility will most likely be placed at a depth of 35' below the current ground surface. There will also be a small building and parking lot constructed on the northern end of the site, adjacent to Fowler. When the facility is completed, the ball fields will be restored over the tank. Figure 1, a U.S.G.S. topographic map, provides the general site location. Figure 2 depicts the direct-impact site location on the current Sanborn Building and Property Atlas and Figure 28 depicts the precise location of direct impact of the tank and proposed connecting infrastructure.

The Department of Environmental Protection has requested that a Stage IA cultural resources survey be conducted for the site, including both proposed alternative routes for the sewer lines leading to and from the facility, which will cross Fowler Avenue approximately 190 feet west of College Point Boulevard, and on College Point Boulevard approximately 170 feet south of Fowler, at its intersection with Blossom Avenue to the east (See Figures 2, 24 and 28). The entire triangular-shaped park area enclosed by College Point Boulevard, the Van Wyck, and Fowler Street, including lands south of the direct-impact site and the pedestrian overpass, was considered a discreet study area and is depicted in most of the attached figures.

The purpose of this survey is to determine the presence, type, extent and significance of any cultural resources which may be present on the site. It is based on archival research which documents the probability that the Flushing Bay Tank Facility site hosted any prehistoric or historical resources, and their likely survival of post-depositional disturbances, which may have accompanied subsequent development.

In order to address these concerns, various sources of data were researched. Primary source material on the project site was collected to determine the study lot's original topography, and to compile a building history and disturbance record. Particularly helpful was a series of maps provided by the New York City Parks Department Olmsted Center, in Flushing Meadows-Corona Park, which give valuable pre- and post-development topographical information. These and other historical maps as well as descriptions of the

study area were provided by the Local History and Map Divisions of the New York Public Library, the collections of the Municipal Library and the Long Island Division of the Queens Central Library in Jamaica. Boring and utility data, as well as historical information, was provided by Lawler, Matusky & Skelly, Engineers, the Subsurface Exploration Section of the New York City Topographical Bureau (See Figure 28 and Appendix B), and the New York City Departments of Transportation, Sewers and Environmental Protection.

To place the Flushing Bay Storm Tank site within an historical context, local and regional histories such as the W. W. Munsell & Company's History of Queens County, New York, and Henry Waller's History of the Town of Flushing were examined, as well as local guides to New York City. William A. Ritchie's The Archaeology of New York State provided a valuable overview of Native American culture and lifeways during the prehistoric period. Other archaeological literature, available site reports and journal publications were researched for data specific to the project area. Ralph Solecki's Photographic archive of his archaeological reconnaissance of Brooklyn and Queens was examined in the Long Island Division of the Jamaica Library. Inquiries concerning inventoried prehistoric and historic sites were sent to the New York State Museum and the New York State Office of Parks, Recreation and Historic Preservation.

Although no subsurface investigations were conducted, a site visit (3-9-92) and a photographic record of current conditions was made (See Photographs 1-5).

Information gathered during the various research tasks revealed a strong prehistoric presence in the vicinity and indicates that the elevated portion of the DEP site, as noted on Figure 4, has a high potential for in situ prehistoric-era resources. Further archaeological consideration for prehistoric cultural resources in this section of the project site is recommended.

In addition to its prehistoric potential, the elevated portion of the project site, as noted on Figure 4, is also potentially sensitive for nineteenth century residential resources. Truncated remains from backyard features dating to the second half of the 19th century, along with evidence of and from activities of the residents, can serve as valuable sources of information on earlier, poorly documented city dwellers. Further archaeological consideration for historic cultural resources in this section of the project site is recommended. The section of the project site east of College Point Boulevard, shown as Lots 6 and 7 on Figure 20, is excluded from further archaeological consideration, either prehistoric- or historic-era, due to post-1900 construction impacts.

II. ENVIRONMENTAL SETTING

Long Island is the top of a Coastal Plain ridge formation that is covered with glacial drift, in reality an elevated sea bottom demonstrating low topographic relief and extensive marshy tracts. In the last million years, as glaciers advanced and receded three times, the surficial geology of the island, including the proposed Flushing Bay Stormwater Storage Tank Facility site, was profoundly altered. "The glacier was an effective agent of erosion, altering the landscape wherever it passed. Tons of soil and stone were carried forward, carving and planing the land surface. At the margins of the ice sheet massive accumulations of glacial debris were deposited, forming a series of low hills or terminal moraines" (Eisenberg 1978:19). Circa 18,000 years ago, the last ice sheet reached its southern limit, creating the Harbor Hill moraine that traverses the length of Long Island. The moraine lies approximately three miles south of the Flushing Bay Tank Facility site (See Figure 14), along the Grand Central Parkway. North of the moraine, the complex rising and subsidence of the coastal plain, relieved of its glacial burden, and the rising sea level, caused by the volume of melting ice, created the coastline of embayed rivers and estuaries, with extensive marsh tracts, which stabilized approximately 3,000 years ago (Schuberth 1968:195,199).

From the available maps, including the Sir Henry Clinton Map of 1781 and the 1859 Walling Topographic Map of Kings and Queens, it is clear that the study parcel straddled the eastern border of the vast inundated marsh or meadow tract associated with the Flushing River, and was crossed by its tributary, Ireland Creek (See Figures 14, 15, 16, 17). The northeastern corner of the site, along present Fowler Avenue and at its intersection with College Point Boulevard, lay outside the low-lying meadowland, in an area which reached an elevation of almost 25 feet above the marsh surface at the southwest corner of the Fowler/College Point Boulevard intersection (See Figures 3 and 5). During the last quarter of the 19th century, this dry area even hosted a small community of houses, named Fowlerville (See Figure 18). No data has been uncovered which indicates that this construction caused any substantial alteration of the topography.

Between 1912 and the construction of the World's Fair site in the 1930s, Flushing Meadow was used as a dumping site for refuse and incinerator ash. This occurred on the project site as well. Figure 3 illustrates this prolonged dumping episode: the DEP site terrain varies from 6 to 31 feet above Queens datum/2.725 feet above U.S.G.S. datum with hillocks labeled "ash dump" and areas marked "ash fill." The naturally elevated areas along Fowler Avenue were apparently not filled to any significant degree. Further alterations occurred with the construction for the 1939/40 World's Fair but, again, not seriously affecting the naturally elevated area fronting on Fowler. The ash dumps and fill were graded as proposed on Figure 3, resulting in approximately the

current topography. The 1963/64 World's Fair also incorporated the project site but impacted it minimally. After the second fair the study parcel became part of the recreational facilities of Flushing Meadows-Corona Park. As a result of these uses, the ash-filled marshy areas were leveled and covered with topsoil, and the site was eventually graded up to College Point Avenue. The former meadowlands have elevations that range from 5 feet to between 13 and 15 feet along College Point Boulevard. The former elevated areas are relatively unchanged, with elevations between 11 feet, and 22 feet at the intersection of Fowler and College Point Boulevard (Olmsted Center: "Development of Portions of Flushing Meadow Park, Contract No.FMP1" 1-28-66).

Data from borings agree with this interpretation (See Figure 28). Those which correspond to the elevated areas shown on the historical maps show either a layer of ash and/or topsoil (MW-1, 2'; MW-2, 3'; B-2, 4.3'; B-9, 8';) over a sand layer that extends to between 35' and 43' below the surface, or alternatively, simply a thick sand layer without fill (B-3, to 35' below surface). In these areas water is encountered between 22' and 29' below the present surface. The borings in the southern and far western sections of the project site, as well as the sewer connection crossing College Point Boulevard, indicate a former marsh environment. Beneath a thin or nonexistent veneer of topsoil (e.g. MW-8, 2'; MW-7, 0.4'; B-5, 0.8'; B-7, 0') lies a layer of ash fill ranging from 5' to 20' thick, over peat, sand or clay, or all three. The water level is uniformly high, between 5' and 10' feet below the present surface. Although in the case of MW-7 and MW-8 on the east side of College Point Boulevard, the water level is much lower, 17'-23' below the present surface, the ash/fill layer is also much thicker here, extending between 17' and 18' below the surface. Borings done by the Department of Sewers in 1938 support the findings of the later but more precisely described boring log (See Appendix B).

Presently, the Department of Environmental Protection (DEP) site begins just north of the pedestrian overpass that crosses College Point Boulevard and connects the Kissena Park Corridor with the Lawrence Entrance to the Flushing Meadows Corona Park. The site contains three baseball fields north of the overpass and a parking lot at the northern end, with an entrance from Fowler Avenue (See Photos 1-5). The storage facility plans show proposed tank, maintenance building, and junction chamber impact confined to the areas north of the pedestrian overpass (See Figure 28).

For the following discussions please refer to Figure 4 which is marked to show what is considered to be the approximate location of the pre-1912 elevated area. It is this elevated portion that host potential prehistoric and historic cultural resources.

III. PREHISTORIC PERIOD

The prehistoric era on the north shore of western Long Island can be divided into three time periods, based on prehistoric man's adaptations to changing environmental conditions. These are generally known as the Paleo-Indian (c.12,000 to 10,000 years ago), the Archaic (c.10,000 to 2,700 years ago) and the Woodland (c.2,700 to 300 years ago). In order to be able to assess the project site's potential for prehistoric exploitation, it is first necessary to review these time periods and their associated settlement patterns.

Paleo-Indian Period (c.12,000 y.a. - 10,000 y.a.)

Toward the end of the Wisconsin Glaciation, during the Late Pleistocene Epoch, the first humans wandered across the exposed land bridge which connected Siberia and Alaska. These small groups of hunters were probably following the roaming herds of megafauna which were their chief prey. The distinctive weapon in their chipped stone tool kit was the fluted point, which has been found in association with mammoth, mastodon, bison and horse remains at various sites in the southwestern United States. Although none of these "kill sites" is located east of the Mississippi, the discovery of campsites such as that at Port Mobil, Staten Island, suggest a scattered, highly mobile population in bands of approximately 20 individuals, who ranged across a vast area necessary to support lifeways organized around the hunting of migratory game (Ritchie 1980:1-3, 13). In the Northeast, the glacially lowered sea level exposed a broad coastal plain of which Long Island was a part. "This large area apparently contained abundant big game resources and provided access along the entire length of the south shore to the area that is present day Long Island" (Saxon 1978:251).

The fluted, lanceolate points, two to five inches in length with a concave base and channelled or fluted faces, presumably to facilitate hafting, exhibit a considerable range in shape and size. They were usually made from a high-grade silicious stone, often exotic to the region in which they are recovered, a function of their makers' seasonal migrations. Other artifacts in the Paleo-Indian tool kit include scrapers, knives, borers and graters, tools which indicate extensive handiwork in wood, bone and leather (Ritchie 1980:3,6).

From the locations of recorded sites in the Northeast, Paleo-Indians exhibited a marked preference for well-elevated situations. However, 30% of sites were found on or near the margins of swampy ground. Environmental characteristics which appear to have been attractive to Paleo-Indians include the proximity of major waterways, large fertile valleys and the coastal plain, where the densest population of desired food animals was supported (Ritchie 1980:7). However since 10,000 years ago, the rise in sea level

estimated to be from 75 to 80 feet, has submerged large numbers of these sites.

The retreat of ice from Long Island approximately 18,000 years ago and a global warming trend circa 14,000 years before present, encouraged Paleo-Indian settlement in the Northeast. The post-glacial environment of spruce and pine underwent a gradual modification in favor of deciduous hardwoods such as oak and hickory, which have greater importance in terms of nutritional value to both animals and humans than do conifers. By 8,000 B.C., these deciduous species dominated forests along the eastern seaboard. In addition, the megafauna on which Paleo-Indian diet was based "were rapidly becoming extinct, and were being replaced by the temperate-climate fauna that are indigenous today" (Gwynne 1982:190-191).

Archaic Period (c.10,000 y.a. - 2,700 y.a.)

The warming trend at the end of the last glaciation completely transformed the northeastern coastal environment from tundra and conifer-dominated forests, to the present deciduous woodlands with generally modern distributions of fauna. Due to the dwindling contribution of meltwater from disappearing glaciers, the reduced flow of streams and rivers promoted the formation of swamps and mudflats. These wetlands created a congenial environment for migratory waterfowl, and a host of edible plant species and shellfish. The new mixed hardwood forests of oak, hickory, chestnut, beech and elm attracted such mast-eating fauna as white-tailed deer, wild turkey, moose and beaver.

Although the Archaic diet was still based on hunting and gathering, due to the greater variety of plants available and exploited, excavated Archaic sites yield a wide array of plant processing tools, including grinding stones, mortars and pestles. The diagnostic tool was the grooved axe. In the coastal areas of New York, numerous, small "nearly always multi-component sites variously situated on tidal inlets, coves and bays, particularly at the heads of the latter, and on fresh-water ponds on Long Island," have been found (Ritchie 1980:143). By the Late Archaic, these areas provided shellfish, small game, fish, salt hay and tuberous grasses making larger more permanent settlements possible. Semi-nomadic life is still indicated, but wandering occurred within well-defined territorial limits, with seasonal movements between camps near exploitable resources. A dietary shift to shellfish in coastal New York near the end of the Archaic suggests a scarcity of large game, and a change from the early Archaic inland adaptation of forest hunting. Coastal sites show a principal reliance upon shellfish, especially oysters, hard and soft shell clams and bay scallops, which were easily gathered all around Long Island. Characteristic of the Late Archaic were "fish-tailed" projectile points and soapstone bowls (Ritchie 1980:142,166, 167, 171). In

contrast to conditions during the Paleo-Indian, Early and Middle Archaic, "by Late Archaic times sea level was so close to present levels that its subsequent small rise has failed to obliterate much of what remains on Long Island from that period" (Gwynne 1982:192). Hence the Late Archaic Wading River complex, four sites on the north shore of Suffolk County, was found at the edge of a salt marsh, on dry ground ranging only two to seven feet above mean high water (Wyatt 1982:71).

Woodland Period (c.2,700 y.a. - 300 y.a.)

Pottery use became widespread following the use of soapstone vessels in the Late Archaic, and although copper tools were utilized during that period, the earliest copper ornaments, tubular beads, made their appearance during the Woodland. Stone or clay smoking pipes were also an Early Woodland innovation (Ritchie 1980:179-180)

Settlement patterns were substantially altered with the introduction of agriculture, the systematic cultivation of maize, beans and squash possibly beginning as early as 1000 A.D. During this time large villages within palisaded enclosures developed for the use of a semi-sedentary people, with groups moving seasonally, depending on exploitable food resources, between villages and camps of varying population concentrations. Preferred village/camp sites were in protected, elevated locations at the confluence of two water systems. "Nearly all the permanent sites are situated on tidal streams and bays on the second rise of ground above water." Despite the advent of agriculture, shellfish and small game remained an important component of the Woodland diet. Shellfish refuse heaps, termed "middens," reached immense proportions, covering from one to over three acres. Deer, turkey, raccoon, muskrat, ducks and other game were stalked with bow and arrows, replacing the spear and javelin, while dug-out boats, bone hooks, harpoons and nets with pebble sinkers were employed in fishing (Smith 1950:101; Ritchie 1980:180,267).

The first recorded visit to the Flushing area by a European was probably that of the trader/explorer Adriaen Block, in the ship Onrust, who sailed up Long Island Sound and explored the bays on either side in 1614 (Waller 1899:5). Contact with Europeans had far-reaching effects on Native American cultures. European goods such as metal and glass began to replace traditional materials. Trade for these and other goods probably encouraged a more sedentary lifestyle, and larger villages developed into permanent settlements. The population of these villages would expand and contract with the seasonal availability of natural food resources, and maize agriculture contributed surplus food which could be stored to bolster their already rich diet. Tragically, these cultural developments were cut short, as natives were exposed to European diseases against which their bodies had no resistance. The

Native American population was decimated (Kearns, Kirkorian and Schaefer 1989:10). Centuries before the formulation of germ theory, settlers such as Daniel Denton could only marvel how God had vacated the land in expectation of European settlement:

To say something of the Indians, there is now but few upon the island, and those few no ways hurtful, but rather serviceable to the English, and it is to be admired how strangely they have decrease by the Hand of God, since the English first settling of those parts; for since my time, where there were six towns, they are reduced to two small Villages, and it hath been generally observed, that where the English come to settle, a Divine Hand makes way for them, by removing or cutting off the Indians; either by Wars, one with the other, or by some raging mortal Disease (Denton 1670:49).

Due to these tremendous stresses, the socio-political situation of Long Island's Native Americans was extremely fluid, with groups splitting and combining in complex ways, which are only beginning to be understood. Most 19th century histories of Flushing and Queens County identify the 17th century inhabitants of the Flushing area as being Matinecock Indians (Waller 1899:17). The Matinecock claimed jurisdiction over northern Long Island east of Newtown and as far west as Smithtown in Suffolk. They are described as being once numerous in northeastern Queens, with their settlements in Little Neck and Bayside and a large one in Flushing, where they made wampum, and dried oysters and clams for winter use (Munsell 1882:19,76). The Matinecock:

were a seafaring race, mild in temperament, diligent in the pursuits determined by their environment, skilled in the management of canoe, seine, or spear, and dexterous in the making of sewan, or wampum (Waller 1899:17)

Others record the original sellers of the land as the Massapequa, despite recording the presence of the Matinecock's Flushing settlement (Thompson 1918:I 126,III 3), or Canarsee or even Rockaway (Kearns and Kirkorian 1985:6). At present, it is generally believed that western Long Island was inhabited by Munsee-speaking Canarsee Indians, members of the Delaware culture group. According to the research of Robert Grumet and Reginald Bolton, the divisions or sub-divisions known as the Matinecock and the Massapequa had fairly close ties. They were allies during the late 17th century, and eventually combined in 1676, and went to live in the Rockaways. The Massapequa sachem signed treaties with the Dutch in the name of other groups such as the Rockaway on more than one occasion, and when he was killed the Matinecock sachem signed an agreement representing his own and some of the Massapequa's towns. Thus, there existed a complex relationship between the Indian groups on Long Island which is yet to be explained sufficiently (Grumet 1981:5-6,30-33).

Analysis of the study area's pre-grading topography reveals an environment that would have been extremely hospitable to Native Americans during the Archaic and Woodland Periods, as described previously. Maps of the 18th and 19th century, made before any extensive alterations to the site's topography, show an extensive saltwater marsh adjacent to and in the study area, while the northeast third of the study site is consistently depicted as dry elevated ground (See Figures 14, 15, 16, 17). More recent maps show pre-grading elevations rising from 5 feet near the marsh edge to 25 feet at site's northeast corner (See Figures 3 and 4). During the Archaic Period, when sea levels were slightly lower than at present, this elevated area was possibly even more extensive.

In addition to the wealth of fish, shellfish (a year-round dietary source), small game and edible and useful plant materials available in the salt marsh, the course of Ireland Creek, and its possible tributaries running through the southern half of the study site would have provided a convenient source of fresh water (See Figures 4 and 18). Fresh water was also available from springs in the area, one spring was noted east of the DEP site on an 1852 map (See Figure 16). And a mineral spring - popular for its curative powers in the 19th century - was located at the head of Flushing Creek (French 1860:546).

Bolton's research has identified a cluster of four Indian settlements along the southeastern shore of Flushing Bay at the mouth of the Flushing River. Indian trails are also believed to have crossed Flushing Meadow, linking these settlements with other sites to the west and east (See Figure 5). Archaeologist Ralph Solecki located several sites along Flushing Creek, which he investigated during the 1930s, when they were threatened by development:

Out of a total of 29 Indian sites in Queens, 17 within the past three years have become totally obliterated. In the process of enlarging the airport at LaGuardia Field, several sites on Jackson's Creek and Bowery Bay were destroyed. The World's Fair [1939] obliterated a large site on Flushing Creek and another at Sanford and Fowler Avenues, Flushing (Solecki 1942:n.p.).

Solecki's photo-archive, kept at the Long Island Division of the Queens Central Library in Jamaica, contains five photographs taken in 1937, showing the area between Fowler and 41st Avenues, which lies between 0 and about 900 feet north of the study parcel. Photograph Number 56, taken at Fowler Avenue, appears to identify a small puddle as "Indian Spring," a suggestive toponym which also indicates a water source within 50 feet of the elevated portion of the study site (See Figures 7-11). Two of Solecki's photographs, taken between Sanford Avenue (approximately 700 feet north) and Fowler are captioned respectively, "Archaeological site here," and "site here" (See Figures 8 and 11).

Other documented sites in the vicinity of the study area include the Grantville, Graham Court and Tallman's Island sites approximately three miles to the north, at College Point, as well as the Wilkins Site, four miles to the northeast in Whitestone, which yielded a range of Archaic, Woodland and Contact period artifacts (Kearns and Kirkorian 1985:7-9) (See Figures 12 and 13).

A request to the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) and the New York State Museum (NYSM) for a sensitivity evaluation and information on archaeological sites in the vicinity of the DEP Stormwater Tank site has yielded information corroborating this archival research (See Appendix A). There are five prehistoric sites listed in the files, three of which are within one mile of the project site, adjacent to or overlapping it. One of these is NYSM #4524, based on the investigations of Arthur C. Parker, who reported the 1841 discovery of burial sites, including 11 skeletons, confirming Solecki's opinion of the Flushing area's sensitivity. Parker's report (1920:672) was based on Furman's much earlier citation of the discovery "in the Linnaean garden in Flushing." Extensions of Prince's original (c.1873) Linnaean nursery were situated both north and south of the project site but further study indicates that these burials were most likely recovered north of Northern Boulevard and not in the immediate vicinity of the DEP parcel. Bolton (1922:182) placed the Linnaean discoveries on nursery land north of Broadway [Northern Boulevard]. This is very possibly the same burial ground of a dozen skeletons, "with lead bullets," found when Linnaeus Street - the northern extension of Prince Street and removed from the project site - was opened (Mandeville 1860:67).

Also based on Parker's research are NYSM #4545, a site showing traces of prehistoric occupation; and NYSM #4544, another Parker site, with a prehistoric camp, adjacent to the project parcel along the Van Wyck Expressway. The two other Museum sites are just beyond a one mile radius of the study parcel, namely: NYSM #4542, a Parker investigated prehistoric camp, north-northeast of the project site, north of Northern Boulevard; and OPRHP #A081-01-0133, the Grantville site (See Figures 12 and 13) in College Point with artifacts from the pre-ceramic Bowman's Brook and Clason's Point phases. Due to the presence of recorded sites in or immediately adjacent to the study parcel, and the fact that the terrain in the project area is similar to the terrain in the general vicinity, the State Museum classifies the project site as having a higher than average probability of producing prehistoric archaeological data.

IV. HISTORICAL PERIOD

Many English colonists found the orthodox religious atmosphere of Puritan New England too stifling, and for some "heretics" it was dangerous. As a result many colonists fled to Rhode Island, and others settled in New Netherland, which was desperately in need of settlers since the disastrous Indian wars of 1640s. Thus, Flushing was one of several English towns founded in New Netherland, including Hempstead, Newtown and Jamaica. Director General Kieft granted a patent for approximately 16,000 acres east of Flushing Creek to a group of English emigrants, including Thomas Farrington, John Lawrence and Thomas Stiles in October 1645. The Dutch called the settlement Vlissingen, after an important town in the Dutch province of Zeeland, and eventually the English corrupted the name to Flushing (Brodhead 1853:410).

As was the practice of the Dutch West India Company, rather than appropriate native property, title was secured by purchase. This had been accomplished in 1639 when the area which was later the Towns of Flushing and Jamaica (now the eastern half of Queens County) was purchased from an Indian delegation headed by Mechowod, sachem of the "Massapeague," accompanied by his cousin Piscamoe, Worttewoockhow, Kackpohor and Ketachquawars. The liberal terms allowed Mechowod's people to "remain to dwell, to plant Indian corn, to fish and to hunt in the said lands" (Thompson 1918:III 3-4).

Before the English conquest of New Netherland in 1664, the Village of Flushing was quite definitely a thorn in the side of the Dutch Director General. The charter declared the patentees would "enjoy the liberty of conscience according to the custom and manner of Holland, without molestation or disturbance from any magistrate, or magistrates, or any ecclesiastical minister." In religious matters, the Netherlands in the 17th century was the most tolerant country in Europe, allowing even Roman Catholics to set up "secret" churches. Such toleration was not written into law, and not always uniformly observed in all areas, but evolved as the prevailing custom, especially in the province of Holland. In colonial possessions such as New Netherland, the Director General made the rules, as influenced by the local Reformed minister. In the case of Peter Stuyvesant, an extremely orthodox Calvinist, even other Protestants such as New Amsterdam's Lutherans were prohibited from organizing congregations.

When a ship from Rhode Island brought a group of Quakers to Jamaica and Flushing under the leadership of Robert Hodgson in 1651, Stuyvesant took immediate action, levying a heavy fine against anyone who sheltered a Quaker for the night. Vessels that brought Quakers were confiscated. Many Flushing residents were sympathetic to the Quakers, and others were appalled by Stuyvesant's measures, and therefore 28 Flushing residents and 2 from Jamaica banded together to sign the Flushing Remonstrance,

refusing to lift a hand against the Quakers, because:

the law of love, peace, and liberty in the state, extending to Jews, Turks, and Egyptians, as they are considered the sons of Adam, which is the glory of the outward state of Holland, so love, peace, and liberty, extending to all in Christ Jesus, condemns hatred, war, and bondage (Brodhead 1853:637).

For this Remonstrance, Flushing is celebrated as the birthplace of religious freedom in the United States. However, incensed at this behavior, Stuyvesant arrested the magistrates, and Tobias Feake, the schout (sheriff) who delivered the 'impudent' epistle, was demoted, fined 200 Flemish pounds and threatened with banishment. Despite the severity of Stuyvesant's measures, Quaker meetings were still held in the woods, and John Bowne and his Quaker wife, who had settled in Flushing after 1651, allowed them to meet in his home. Bowne was eventually arrested and fined 25 Flemish pounds, imprisoned three months and sent to Amsterdam in 1663, where he protested to the directors of the West India Company. They exonerated Bowne, and rebuked Stuyvesant for his intolerance, namely because the colony, then being threatened by bellicose New Englanders, needed all the settlers it could get, Quaker or no (Waller 1899:39-45). Bowne's house, erected in 1661, now a museum on present Bowne Street, and the Quaker Meeting House on Northern Boulevard, with sections dating to 1694, still stand in downtown Flushing, about one mile northeast of the project site. It is possible that Stuyvesant's unpopularity contributed to the early overthrow of Dutch hegemony over the English towns on Long Island when a force of about 100 Englishmen under the leadership of Anthony Waters of Hempstead and John Coe of Middelburgh 'liberated' Flushing in 1663. Until the official conquest of New Netherland in 1664, Flushing, renamed Newarke, and the other English towns were quasi-independent entities (Waller 1899:50).

Despite the religious controversy during the Colonial Period, Flushing developed into a thriving agricultural area, with Flushing village at its center. Before the Revolution, Flushing was already famous for its wheat production, and the farmers tended their animals and crops, producing "corn, beef, pork, butter, tobacco and staves, which they exchange for liquors and merchandise," with the assistance of black slaves (Munsell 1882:82,91). At the end of the 17th century, the population of the entire town was 660, of which 130 were slaves. Although some Quakers did own slaves, by 1716 the first agitation against slavery was recorded at the yearly meeting (Waller 1899:85,92,96). Due to the continued strong Quaker influence in the area during the early 19th century, Flushing later became a haven for free blacks.

The market for Flushing produce was New York City, since it was easier to transport goods to Manhattan by canoe than west by overland routes through the marshes around Flushing Creek. Aside

from being a barrier to communication, the marshes, which included part of the project area, were a valuable resource for the inhabitants. Oysters, clams and other shellfish were gathered (Munsell 1882:77), and the salt hay that grew in the marsh was a valuable source of horse and cattle feed, and was later used as packing material and bedding for animals (Thompson 1918:I 13; Sheel 1963:8). The occupation of Flushing by British and Hessian troops during the Revolution, although a difficult period for most residents, was a time of economic prosperity, because the farmers had a ready market for their grain and livestock, and production increased. The population grew to 1,601 in 1790, and 2,820 in 1830 (Mandeville 1860:26). With all the grain produced, a tidal grist mill was erected in 1797 along Ireland Creek, 400 feet south of the study parcel. It was acquired by Stephen Cornell Bowne, direct descendent of John Bowne, in 1800, and was apparently passed down through the Bowne family until it was demolished in 1925 (Lawson 1952:180) (See Figures 17, 19 and 25).

During the 1680s Huguenot refugees from the persecutions of Louis XIV settled in Flushing and introduced an industry for which Flushing was to be famous until the 20th century: horticulture. Apparently they were overly successful, because the earliest commercial nursery in the United States, the Old American Nursery, was founded in Flushing by Samuel Prince c.1725, where he sold fruit and nut trees, and later expanded into shade trees, berries and grapes. The gardens were so famous that when General Howe's redcoats occupied Flushing in 1776, they were specifically ordered not to damage Prince's nursery. In 1793 his grandson William Prince bought additional property, and formed the Linnean nursery, leaving the Old American to his brother Samuel. Eventually the two combined. During the 19th century, other nurseries were established in Flushing, including Samuel Parson's Nursery in 1838, and G. R. Garretson's seed farm in 1836 (Sheel 1964:19; Munsell 1882:92-94). These commercial establishments are depicted quite prominently on the 1852 Dripps Map, with 51 acres of Prince's nursery about 1,500 feet directly north of the study area, straddling Lawrence Street and a smaller Prince nursery southeast of the study area (See Figure 16).

Flushing's prosperity led to the village's incorporation in 1837, and the raising of \$25,000 for grading and opening the streets. By 1855 the village had a population of 3,488, which was about half the population of the entire town. This growth was spurred by the improvement of transportation links with New York City and other towns on Long Island. William Prince was responsible for many improvements, including the first bridge over Flushing Creek in 1800 (one half mile north of the study area, at present Northern Boulevard), and the construction of the Flushing-Newtown Turnpike. The first stage service was started in 1801 by William Mott, which took passengers to Brooklyn via Newtown for 5 cents. Ferries also served the town, and the first steam ferry was introduced in 1823. Flushing Creek remained an important waterway,

as evidenced by the fact that between 1833 and 1881 it was dredged and deepened five times. In 1854 the Flushing & North Shore (or Side) Railroad was opened, running along the same route the Long Island Railroad takes today, 1,500 feet north of present Fowler Street (Munsell 1882:103) (See Figure 17).

Better transportation connections and the beautiful countryside, which was enhanced by the varied nursery plantings, spurred the erection of country houses for those trying to escape hectic city life. Flushing took on an aristocratic tone, which it retained into the 20th century. "There are many charming sites for genteel residences, and they are rapidly being taken up and occupied by gentlemen of leisure, or of business from the city" (Mandeville 1860:74-75).

The project site was not immune to this development. From the elevated ground the marsh grasses stretching into the distance must have been a very attractive prospect. The site was readily accessible, just at the edge of the village, and the 1849 Sidney Map (See Figure 15) already shows that Lawrence Street (presently College Point Boulevard) which forms the eastern site boundary was laid out. Fowler Street, the northern border and a single structure on the highest spot in the project area (northeast corner) appear by 1859. (See Figure 17) Since neither this building nor Fowler Street is depicted in 1852, the changes were made within that period, 1852-1859 (See Figure 16).

Although Flushing continued in its reputation as an area of gardens and country houses, the importance of the village and the growth of nearby Brooklyn, Williamsburg and New York City brought light industry to Flushing Creek, where building materials, coal and grain were stockpiled and loaded for shipment. These businesses, founded in the 1850s and 60s, gave the lands along the shore of Flushing Creek an industrial aspect (Munsell 1882:106), spreading as far south as 600 feet north of the project site, with the appearance of the Zucker, Levett Chemical Co. by 1891 (See Figure 19).

It was probably a combination of industrialization and the mosquito problem (Sheel 1963:8), that made Fowler Street a prime site for less palatial residences. By 1873 both sides of the street had been divided into lots and houses built. On the DEP site 10 houses faced Fowler and four houses were oriented toward Lawrence (See Figure 18). The house first noted on an 1859 map is listed as belonging to H. Bommann, while across Fowler, outside the study parcel, is the residence of T. Fowler, for whom the street is obviously named. A dirt road, running roughly parallel to and south of Fowler Avenue and inside the current DEP site, was originally named First Street and later Willow Street. As was planned on paper and apparently executed in some manner, this rough street had 6 structures, fronting on First/Willow Street, inside the project site (See Figure 18).

The 1873 Beers Atlas names the project site hamlet as Fowlerville, and it appears from anecdotal evidence that a community spirit grew among the residents. On Saturday nights the residents would drink in a nearby saloon, which usually resulted in drunken brawls in the street. This happened so regularly that young men would come down from the Flushing village on Saturdays, just to watch the fights. The area also received the name Monkey Hill, from the story of a group of monkeys that escaped from a "gentleman's" estate in the early 1870s. His servants found them days later congregated in the trees at the corner of Fowler and Lawrence, and had an extremely difficult time recapturing them, to the amusement of the local populace (Lawson 1952:48-50).

By 1891, the number of structures in the DEP project site was 25 (See Figure 19), and this increased to 38 in 1904, of which 8 of the buildings appear to be stables or sheds. By 1904 Lawrence and Fowler had been macadamized, and a trolley line ran up Lawrence (See Figure 20). Although the public water works began piping water to the "busy section" of Flushing in 1874, Fowler and Willow Streets were connected some time between 1891 and 1904 (See Figures 19 and 20), and until then residents had to rely on cisterns or a public pump on Fowler (Lawson 1952:28-29).

The beginning of Fowlerville's demise occurred in 1906, when the Brooklyn Ash Removal Company began using the Flushing Meadows as a dumping ground for incinerator ash, a practice which continued for 26 years, placing an estimated 50 million cubic yards of refuse there (Improvement 1937:15). From a Flushing Creek dock, barges of ash were unloaded into dumpcars, which ran by "donkey steam engine" along a track. When the desired destination was reached, the car could be tilted to dump the cargo on either side of the track. In some places the track was 20 feet above the ground, and when that section of swamp was filled, often with more than 50 feet of "jelly-like black mud," the ash was tamped down until it became firm, and the track was moved onto the new foundation, and the process began again (Sheel 1964:21). Known as the Corona Dump, it was more poetically described by F. Scott Fitzgerald in The Great Gatsby and cited by Wurts (1977:ix):

a valley of ashes - a fantastic farm where ashes
grow like wheat into ridges and hills and grotesque
gardens . . . bounded on one side by a small foul
river [Flushing Creek]

The dumps extended into the formerly marshy sections of the project site, creating ash hills over 30 feet high, with the dumping extending to the very edge of the residential area (See Figure 3). This development must have ruined the value of the properties there, and lots 6,7 and 8 along Willow Street are listed a "wrecks vacant" by 1917 (Sanborn 1917:53), later the lots become a laundry, and an auto repair shop is established on the south side of Willow, at Lawrence Street (See Figure 22). Although the fill

was only supposed to be ash, and a coal oil product used to give the dump a pine smell, the dump reeked of garbage. Locals picked through the dump looking for unburnt coal and other materials that could be resold. Old iron bedsteads were recycled as fences, and some harvested the wild tomatoes and citrons which grew in the dump, and some small farms were started, but many were wary about eating produce grown in the ash. When a large trunk sewer was completed, pouring sewage into Flushing Bay, the last of the native wildlife fled, being replaced by rats and other vermin (Sheel 1964:21; Improvement 1937:18). Solecki's 1937 photograph of Fowler Street, shows a bleak, refuse-strewn, street of mud and stunted trees (See Figure 9). The dumps were purchased by the City in 1934, and turned over to the Department of Parks.

Without having seen the Corona Dumps except in black and white photographs, it is difficult to imagine the sense of accomplishment that the planners and builders of the 1939-1940 World's Fair felt when the extensive ash heaps had been levelled, the whole covered with topsoil, and the futuristic pavilions of the fair were completed between the formation of "New York World's Fair 1939 Incorporated" in 1935 and its opening in 1939. The project site was included in the fair grounds, apparently hosting a 25 foot wide macadam path, asphalt paving, and possibly flower beds (Olmsted Center: "Topographical Map for Portion of Flushing Meadows Park, QT-99-101,102" 12-31-43). The "rear garden court" of the United States, or Federal, Building was south of the elevated portions of the DEP site. This garden, approximately 425 feet south of Fowler Street, contained a brick walk and small fountain (Wurts 1977:104) (See Figures 23 and 27). All of the houses on Fowler and Willow Streets were removed, and the Boy Scout camping ground for the World's Fair was located on the north side of Fowler, removed from the DEP parcel (See Figure 26). Little was done to the elevated areas of the project site, except some minor regrading, raising the elevation to between 11 and about 22 feet, where previously it had been between 4 and 25 feet, both high points at the intersection of Fowler and Lawrence (College Point Boulevard).

During the 1964-1965 World's Fair, the study parcel was used as a parking lot, since the construction of the Van Wyck Expressway, now the site's western boundary, cut it off from the rest of the fairgrounds (Guide 1965:4). After the conclusion of the fair, the project site was converted to its present configuration, baseball diamonds and a parking lot in 1966. Comparison of topographic maps from the 1939 Fair regrading and the 1966 construction, show little or no change in site contours (Olmsted Center: "Development of Portions of Flushing Meadow Park, Contract No.FMP1" 1-28-66).

Building History of Project Site Homelots

This 1859-1930 building history of the homelots on Willow (formerly First), Fowler, Lawrence (currently College Point Boulevard) and Avery Streets was compiled from real estate atlases. They are described using the lot boundaries and numbers on the 1904 map (See Figure 20) as a point of reference. They will be discussed in numerical order, beginning with Lot 1 at the westernmost end of Willow Street, followed by the building histories of the lots impacted by the two proposed sewer connections. The observable inconsistencies in describing buildings are generally due to homeowner remodelling, the complicated roof lines of Victorian houses, as well as the varying interpretation of these structures by the different compilers. All structures are of wood frame construction unless otherwise mentioned.

In addition, residential and business directories were reviewed for evidence of turn of the century residential patterns, e.g. multi-family or extended family occupation and residential/commercial occupancy. This occupancy information, along with the names from the 1873 Beers map is listed in tabular form at the end of each building history. The directories include Trow's 1898, 1910-11, 1912; Richmond's 1887-88; Curtin's 1865-66 and 1868-69; Lain's 1878-79. They are listed in the bibliography. There are many gaps in these data. For example, in the 1898 directory there were only 3 listings in total for the north and south sides of Fowler Street and Willow Street was not listed in either directory. None of the resident names correspond to the earlier 1873 atlas listings. Other directories (1868-69 e.g.) list only the street name without a number. The strong Irish presence in the area makes it difficult to match these names to later citations, because of the repetition of given and surnames. The street addresses in the charts were assembled from 1904, 1926, and 1930 atlases.

Lot 1

Lot 1 was vacant during the historical period.

Lot 3 (31 Willow)

The first structures on Lot 3 were erected between 1873 and 1891, when a 2-story frame building and two sheds were erected (See Figure 19). The building was still standing in 1930, but one of the sheds was removed in 1926 (See Figures 21 and 22).

Lot 6 (29 Willow)

A building was erected on Lot 6 between 1859 and 1873. The owner is listed as M. Kaley (See Figure 18). In 1904 the same building is described as having 1½- and 1-story sections. In 1917 this building is labelled as "wrecks vacant" (Sanborn 1917:53), and the building is gone in 1926 (See Figure 21).

1873 Kaley, M.
 1878 Kaley, Michael gardener
 1887 Caley, Edward laborer
 " Joseph farmhand
 " Michael laborer
 " Michael Jr. porter

Lot 7 (27 Willow)

Lot 7 was vacant in 1873, but the property owner was Torrington (See Figure 18). The first structure on this lot was built between 1891 and 1904, when a 1½-story building first appears. In 1917 this structure is one of three labelled as "wrecks vacant" (Sanborn 1917:53), and by 1926 the property is vacant (See Figure 21).

Lot 8 (25 Willow)

Lot 8 was vacant in 1873, but the name of the owner was Woods (See Figure 18). A building appears by 1891, and is listed as 1-story in 1904 (See Figures 19 and 20). In 1917 it is labelled "wrecks vacant" (Sanborn 1917:53), and by 1926 it has disappeared (See Figure 21).

Lot 9 (21 Willow)

A building was erected on this lot sometime between 1859 and 1873. The owner in 1873 is Parkerson. The 1904 atlas shows a 2-story building (See Figures 18 and 20), and in 1926 this same structure is listed as having 2½ stories, and a second structure was built at the rear of the lot, this one having 1½ stories (See Figure 21). In 1930 this rear building is shown to be a laundry, built of concrete or cinderblock. The building at the front of the lot is described as a dwelling with a 2- and a 1-story section (See Figure 22).

Lot 11 (19 Willow)

Between 1859 and 1873 a building was erected here for H. Jarvis (See Figure 18). In 1904 it is depicted as having 2- and 2½-story sections and a covered porch. This dwelling remains through 1930, when it is shown as a 2-story frame house with a porch and a rear shed (See Figures 20 and 22).

1873 Jarvis, H.
 1878 Jarvis, Henry plasterer

Lot 13 (17 Willow)

A building owned by A. Meserole appears on this lot between 1859 and 1873 (See Figure 18). In 1904 and 1930, the same building is still standing, a dwelling of 1½ and 1 stories and a porch (See Figures 20 and 22).

1873 Meserole, A.

Lot 14 (15 Willow)

Owned by W. Jarvis, a building was erected on this property between 1859 and 1873 (See Figure 18). The same structure is depicted as a 1- and 2-story dwelling in 1926 and 1930 (See Figures 21 and 22).

1873 Jarvis, W.

Lot 16 (13 Willow)

Lot 16 was the empty portion of the W. Jarvis property, the other section of which is Lot 14. Between 1873 and 1891 a building was put up at the front of this lot, shown as a structure of 1½ and 2 stories in 1904 (See Figures 19 and 20). The 1930 map describes the structure as a 2- and 1-story frame dwelling (See Figure 22).

Lot 17 (11 Willow)

A building was erected at the rear of Lot 17 between 1859 and 1873 (See Figure 18) but it is no longer present in 1891 when there is only a house at the front of the lot (See Figure 19). In 1926 this same building is shown as having two stories and a porch (See Figure 21), while in 1930 the same dwelling is described as having 1 and 2 stories and a porch (See Figure 22).

Lot 18 (301 and 303 Lawrence) (corner of Willow and Lawrence)

An L-shaped house owned by Torrington was built between 1859 and 1873 (See Figure 18). Torrington is listed at 301 Lawrence in two directories. It is likely that the property was renumbered between 1887 and the first time 303 appears, 1904. In 1904 it is labelled as a 2-, 1- and 2-story house with a porch and a shed at the rear of the lot (See Figure 20). The same dwelling remains standing through 1930 (See Figure 22).

301 Lawrence

1873 Torrington

1878 Torrington, Owen painter

1887 Torrington, Owen painter (home and place of business)

303 Lawrence

1909 Gaffney, Patrick paver

Gilner, Henry shoer

1912 Gilner, Henry shoer

Lot 21 (299 front and rear)

A building was erected on Lot 21 by 1873, the ownership is listed as Torrington/ P.E. Field. It is possible that they were partners, or that Field owned the building and Torrington the vacant land adjacent to it (See Figure 18). The irregularly-shaped house has 2 stories in 1904 and 2, 2 and 1 in 1930. Between 1904 and 1926 a row of three brick-lined attached 2-story dwellings was erected at the rear of the lot, in addition to the older structure (See Figures 20 and 21).

299 Lawrence (front)
 1873 Field, P. E., Torrington
 1878 Field, Peter
 1912 Ingle, Harriet M., widow William
 Knoles, Arthur gardener

299 Lawrence (rear)
 1912 Maiers, George A. painter
 Noessner, John machinist

Lot 23 (renumbered Lot 24, 1930 - 295 Lawrence)

R. Jarvis' house was erected on Lot 23 between 1859 and 1873. It is drawn as a 2- and 1-story building in 1904, and a 2-story dwelling in 1930 (See Figures 20 and 22).

1873 Jarvis, R.
 1878 Jarvis, Richard S. mason
 1887 Bowne, Cornell miller
 1909 Downs, Martha J. widow William S.

Lot 25 (2 Fowler?) (Corner Fowler and Lawrence)

The first house in the project site was erected on the corner of Fowler and Lawrence between 1852 and 1859 (See Figure 17). On the 1873 map the L-shaped house is owned by H. Bommann, and the lot has two smaller buildings on the Fowler side (See Figure 18). In 1904, the main house of 2-, 1- and 1-stories is the largest on the block, and has a large shed on the southern side of the lot (See Figure 20). A brick garage appears by 1926 (See Figure 21), and the garage and shed remain in 1930, by which time the main building has become a combination dwelling and store. Apparently on the Fowler side there are three stores, one of which sells flowers, and the dwelling is confined to the south side of the house (See Figure 22).

1873 Bommann, H.
 1909 Nehls, Henry liquors
 1912 Nehls, Henry liquors

Lot 28 (16 Fowler)

A building on Lot 28 appeared between 1859 and 1873, owned by W. Ryerson (See Figure 18). This 2-story dwelling was still standing in 1930 (See Figure 22).

1868 Ryerson, William laborer
 1873 Ryerson, W.
 1878 Ryerson, William H. laborer
 1909 Hunt, William H. gardener
 1912 Hunt, William H. gardener

18 Fowler

This address does not appear on any of the atlases consulted. There is no extra building between 16 and 20 Fowler. It is possible that 18 was one or the other, but it is difficult to tell which since surnames overlap with each.

1878	Field, Jacob G.	grocer
1887	Field, Jacob	plumber
	Fowler, John	carpenter
	Hunt, Benjamin	brakeman
	Maher, James	printer
1909	Hunt, William	clerk

Lot 30 (20 Fowler)

The L-shaped frame building on this lot was owned by J. Kent. It was built between 1859 and 1873 (See Figure 18). In 1904 it is shown as being in 2-, 1- and 1-story sections (See Figure 20). The 1930 cartographer interpreted the same dwelling as having 2½, 1½ and 1 stories (See Figure 22).

1873	J. Kent	
1912	Hunt, Francis	mason
"	Nathan	plumber
"	William	surveyor

Lot 32 (22 or 24 Fowler)

Between 1859 and 1873 a house was built at the front of Lot 32. The 1873 occupant was A. Brokaw (See Figure 18). In 1930 this same dwelling was described as having 2½ and 1 stories (See Figure 22).

1873	Brokaw, A.	
1909	Walsh, Dennis	plasterer
1912	Walsh, Dennis	plasterer

Lot 33 (26 Fowler)

In 1873 this lot already had two structures on it, one at the front, the house of J. Mack, and a structure at the rear, possibly an outbuilding, which is gone in 1891 (See Figures 18 and 19). In 1904, what appears to be the same house has 2 and 1 stories, and in 1930 2½ and 1 (See Figures 20 and 22).

1873	Mack, J.	
1887	?Mackinine, John F.	driver
"	Christopher J.	
"	Patrick	peddler
1912	Masterson, Charles	inspector
	Mearns, Thomas	agent

Lot 35 (28 and 30 Fowler)

By 1873, M. Leonard had two structures on this lot, one at the front and one at the rear (See Figure 18). The 1891 map shows two buildings at the front of the lot, although it is not certain if either of these is one of the 1873 originals (See Figure 19). In 1904 the house on the western side has 2 stories, and the eastern house is a 1½- and 1-story building (See Figure 20). The 1926 map divides Lot 35 in two, but they are recombined in 1930, when the western dwelling has 1½ and 1 stories, and the eastern house 2 (See Figures 21 and 22).

28 Fowler (E)

1873 M. Leonard
 1878 Leonard, Michael liquors
 1887 McMann, Annie dressmaker
 " Patrick carpet weaver
 1898 McMahan, John weaver
 1909 McMahan, Anne C. dressmaker

30 Fowler (W)

1909 McMahan, James engineer
 1912 McMahan, James engineer

Lot 37 (32 and 34 Fowler)

Lot 37 was divided into two lots in 1873, that contain the M. Kady residence on the east and the J. Hanlon house on the west. Both structures were erected between 1859 and 1873 (See Figure 18). The same buildings still stand in 1930, when the easternmost house is labelled as a 2- and 1-story dwelling, and the other is a 2- and 2½-story house (See Figure 22).

32 Fowler (E)

1873 Kady, M.

34 Fowler

1868 Hanlan, James laborer
 1873 Hanlon, J.

Lots 39-41 (36, 38 and 40 Fowler)

In 1873 the McGrath residence stood at the center of these lots and remained until sometime between 1891 and 1904 (See Figures 18, 19, 20). By 1904, the plot had been divided into three lots, with a 1½-story building on lot 39; a 2-story structure on Lot 40, which could be the McGrath house; a 2-story building on Lot 41. These same houses remain standing through 1930 (See Figure 22).

36 Fowler

1873 McGrath
 1878 ?McGrath, John hostler
 1887 ?McGrath, James

1912 Young, William driver

38 Fowler

1909 Hanlon Patrick gardener

1912 Hanlon, Patrick gardener

40 Fowler

1909 Voorhes, George C. driver

1912 Voorhes, Abraham driver

" Priscilla widow George C.

Lot 42 (42 Fowler)

Lot 42 was built on sometime between 1859 and 1873. The 1873 map shows the residence of M. Kehoe at the front of the lot. The house appears as 1 and 1½ stories in 1904, and a shed was built to the west (See Figures 18 and 20). The 1926 atlas shows a 2½-story brick house standing on the site of the Kehoe house, and another house of 2½ and 1 stories on the site of the shed (See Figure 21). The brick building is listed as a 2-story store in 1930, and the other structure as a concrete or cinderblock 1-story store, with two sheds at the rear (See Figure 22).

1873 Kehoe, M.

1878 Kehoe, Michael laborer

1887 Kahoe, Mary widow Michael

" Mary dressmaker

" Simon laborer

1909 Heiser, Joseph fireman

1912 Gorrie, John laborer

Lot 44 (48 Fowler)

Lot 44 hosted the J. Hogan house, erected between 1859 and 1873. This building is depicted as a 1½-story frame house in 1904 (See Figure 20), and a 2- and 1-story dwelling in 1926 and 1930 (See Figures 21 and 22).

1873 Hogan, J.

1887 Hogan, John laborer

Lot 46 (48 Fowler)

Lot 46 was vacant until a structure was built along its eastern border with Lot 44 between 1873 and 1891 (See Figure 19). Although the structure is shown as having 1, 1½ and 1 stories in 1904 (See Figure 20), by 1926 the site is vacant (See Figure 21).

Lot 170 (no number)

Lot 170 is located on the southern side of Willow Street at the corner of Lawrence. Between 1926 and 1930 an auto repair business appeared there, having three 1-story buildings of brick-clad frame, and two gas tanks (See Figure 22). It was located on what must have been filled-in marshland (See Figure 18).

Lots on the eastern side of Lawrence, and north of Fowler, impacted by the proposed sewer line connections:

Block 5107 Lot 6 (284 Lawrence)

The first structure on Lot 6 was erected between 1891 and 1904, a two story house with a basement (See Figure 20). This dwelling was still present in 1930, but by 1955 the lot was vacant (See Figures 22 and 23).

1912 Kelly, Daniel F. plumber
Kno?p, Henry W. machinist

Block 5107 Lot 7 (286 Lawrence)

Lot 7 was vacant until between 1891 and 1904, when two 2-story houses were built on the property, the southernmost of which also had a basement (See Fig 20). By 1926, with the opening of Blossom Avenue, which ran through Lot 7, the northern house was gone, and the remaining house jutted into the mapped roadbed of the new street (See Figure 21). When the street was finally completed the house was removed, but the back of the lot remained south of Blossom (See Figure 23).

1887 Costello, Matthew stableman
McMorrow, Ann widow William
" James laborer
" John laborer
" Patrick stableman
" William laborer
1912 Mickey, Lewis electrician

Block 872 Lot 24 (17 and 19 Fowler)

The first structure on Lot 24 was built between 1859 and 1873, when it was labelled as the property of J. Fields (See Figure 18). The 1904 map shows one 2-story building, divided into two sections, with a small addition at one corner (See Figure 20). In 1930, this same house is shown as a double dwelling, with two addresses, 17 and 19 Fowler. It is unchanged except for the addition of a garage by 1955 (See Figures 22 and 23), but by 1991 the lot is vacant (See Figure 28).

17 Fowler
1873 Fields, J.
1887 ?Field, John roofer
1912 Treadwell, James driver

Block 872 Lot 42 (1 Avery)

The first house on Lot 42 appears between 1904 and 1926. The latter map depicts a two 2½-story houses, the easternmost of which is part of the project area. It is shown in more detail in 1930, when it is drawn on a separate lot from its neighbor (See Figures 21 and 22). By 1955 the building had been removed, and the lot vacant (See Figure 23).

V. CONCLUSIONS AND RECOMMENDATIONS

Overwhelming evidence exists that Native Americans exploited the natural resources of western Long Island for thousands of years before the arrival of Europeans. It is also clear that the tidal marshland which lies on and adjacent to the proposed Stormwater Tank Facility site offered an extremely rich source of food and raw materials for prehistoric man.

Settlement pattern data of the prehistoric culture periods reveal a strong correlation between habitation and processing sites and the confluence of two water courses, proximity to a major waterway, a marsh resource and/or well-drained, elevated land. A review of the cartographic and historical evidence confirms that these criteria existed along present Fowler Street since at least Late Archaic times. However, due to the marshy nature of the southern section of the project site it is unlikely that this section would have been utilized by prehistoric man, especially since it is so close to a preferred dry, elevated parcel. In addition, the relatively narrow sewer connection across College Point Boulevard to Blossom Avenue extends through an area that was marshy. This area of the proposed eastern sewer hookup has been greatly disturbed also. It is crossed by two existing sewers and impacted by the construction and utility installation of the Boulevard and along Blossom Avenue (See Figure 28).

In addition to the topographic evidence from historical maps and borings, which demonstrates a high probability that prehistoric man exploited the elevated sections of the project area, there is also historical and documentary evidence. Ralph Solecki's reconnaissance through Queens during the 1930s determined that a large Indian site existed in and north of the Fowler Street area. Additional borings performed in 1986 in this area north of Fowler Street indicate that beneath their fill layers is a sandy layer comparable to that found by the borings in the elevated part of the project area, supporting the other evidence indicating similarity of terrain (See Appendix B). Reginald Bolton's research into Indian settlements and trails indicates that at least one trail and several settlements were located near or possibly on the project site. The New York State Museum's evaluation identifies three sites adjacent to or overlapping the study site, and gives it a high probability of prehistoric occupation. This combination of archival and topographic evidence suggests an extremely high potential for Indian exploitation during the Prehistoric Period.

Furthermore, subsequent historical grading and construction activities in that section of the site seems to have had only a moderate impact. There is no indication that the frame houses which stood along Fowler and Willow Streets between 1859 and c1935 had any basements, therefore the only disturbance would be from their foundation footings, leaving large areas untouched except for

backyard features, e.g. cisterns and privies, and the occasional outbuilding. Although the project site was regraded for the 1939 World's Fair, a comparison of the new and old grading shows very little difference. The lowest areas, those on the western two thirds of the elevated portion of the site, were regraded from between 4 and 9 feet above the marsh to between 8 and 14 feet (roughly corresponding to Lots 1 - 9, 33 - 47, as numbered on Figure 20). The highest section of the project site, near the corner of Fowler and College Point Boulevard, which ranged in elevation from 9 to less than 25 feet, was regraded to between 16 and greater than 20 feet (roughly corresponding to Lots 11 - 32) (See Figure 3). Rather than disturb any archaeological remains, this would have given them more protection.

Although the garden of the Federal Building was partly on the project site, it had no impact on the sensitive northern section. The major disturbance from the 1939-40 World's Fair was its redirection of Flushing Meadow's drainage. Although early plans proposed running the eastern storm trunk sewer directly through the elevated area of the study site (Improvement Oct. 1936:6-7), subsequent revisions placed it further to the west, with only a connection to a pumping station under Lawrence Street (Olmsted Center Feb. 1937: "Study for Proposed Drainage System" QE SK-99-108) (See Figure 24, "sewer connection (1939-40 Fair)"). A c1937 address by the Engineer-in-charge of the Bureau of Sewers declared that south of Fowler the storm sewers had to be very near the surface, "for a considerable distance we will have to provide fill to get even eighteen inches [of cover], just sufficient to grow grass over the roof of the sewer (Perrine c1937). This suggests that subsurface disturbance, was minimal. However, a sewer, a telephone cable, an electrical line, 20", 8" and 4" water pipes and a sanitation manhole may have disturbed the elevated area, despite the approximately 4 to 9 feet of fill overmantle protecting the original surface (For the location of these utilities in relation to the sensitive area of the site, See Figure 24). However, only the sewer, electric line and manhole impact the center of this area, the other utilities are confined to its edges.

A further disturbance was caused by the widening of College Point Boulevard to 100 feet from 50 feet, at the time of the first fair. If the 1926 map is placed over the 1955 map, (See Figures 21 and 23), it is clear that this only affected a twenty foot wide section along the Boulevard. The 1930s regrading appears to have sufficed for the 1964-65 World's Fair (the study area utilities added for that fair are included in the above discussion, and in those shown on Figures 24 and 28), and for the present ball fields, ramp and parking lot, according to the 1966 plans for the construction of the present configuration (Olmsted Center: "New York World's Fair 1964-65 Flushing-Meadow Park Utilities" QE (10700/99)-2, Aug. 1960; "Development of Portions of Flushing Meadow Park, Contract No.FMP1" 1-28-66).

In spite of these intrusions, a large fairly undisturbed area, roughly corresponding to the original elevated frontage on Fowler Street, remains. The northern border of this undisturbed area, which is depicted on Figure 28, runs approximately 850 feet along Fowler Avenue, and roughly 270 feet in width from College Point Boulevard until approximately 160 feet east of the Van Wyck Expressway, and the route of the northern sewer connection on Avery Avenue, except for the disturbed portions directly under Fowler and Avery. The areas of Lots 9, 11, 13, 14, 16, 17, the two lots north of Fowler, and the rears of Lots 18, 21, 23, 28, and 30, appear to have suffered from no utility disturbance whatsoever (See Figure

¹
24). The proposed facility projects an excavation of between 31 and 50 feet below current grade in this entire section of the project site. This would severely impact any buried prehistoric remains (Personal Communication: Stu Klatzman, URS Consultants, with Cece Kirkorian, 3-12-92).

Therefore, due to the high potential for prehistoric occupation, and the data indicating a strong prehistoric presence in the vicinity, further archaeological consideration is recommended for the pre-1900 elevated portion of the site (See Figure 28).

In addition to its prehistoric potential, the project site also contained a large number of frame houses, one of which dated back to at least 1859. Dwellings, along with their associated outbuildings and yards, have the potential to contain resources which may furnish information about past lifeways, urban residential settlement patterns, socio-economic status, class distinctions, ethnicity and consumer choice issues. Such resources could be preserved in privies, cisterns or wells, which in the days before the construction of municipal services - namely sewers and a public water supply - would probably be located in the garden or yard at the rear of the average dwelling. Once the abovementioned services were provided by the city, these shafts, no longer in use for their original purposes, would be quickly filled with refuse, providing a valuable time capsule of stratified deposits for the modern archaeologist. They frequently provide the best domestic remains recovered on urban sites. Truncated portions of these shaft features are often encountered on homelots because their deeper and therefore earlier layers remain undisturbed by subsequent construction, and in fact, construction often preserves the lower sections of the features by sealing them beneath structures and fill layers. Other commonly occurring but more fragile backyard remains include fence lines, paths, traces of landscaping and sheet midden scatter.

1

In order to distinguish original homelot boundaries, which are not shown on current Sanborns, lot numbers refer to those on the 1904 atlas, Figure 20.

One of the first steps in assessing the likelihood of the preservation of shaft features is the determination of the earliest dates of sewer and water line installation. As stated above, these facilities obviate the necessity of installing privies, cisterns and wells. Although Flushing was hooked up to a public water system in 1874, many houses did not get hooked up until the 1880s (Lawson 1952:29). The real estate atlases give no evidence of water lines on Fowler and Willow Streets until 1904, when all the streets of the study area except Avery (which was not laid out and had no buildings) had water lines present. This is confirmed by the records of the Department of Environmental Protection, where a field notebook (118M) dating from 1906-07 shows that Fowler, Willow and Lawrence already had water service by that date. Therefore, there were at least 31 years during which the houses on the 1873 map were forced to get their water from wells or cisterns.

There is no indication on any of the historical maps that sewers were ever installed for the use of the project area houses, until the 1939 World's Fair was constructed in the late 1930s. The 1930 Sanborn shows only water lines on Fowler, Willow and Lawrence (See Figure 22). The earliest available data from the Sewer Department record the installation of a 12" sewer line on Fowler in 1934 (project #35-3671), which extended as far as 19 Fowler on the north (Lot 24) and 20 Fowler (Lot 30) on the south. Projects on the other streets in the project area all have later numbers, and therefore postdate 1934. This is hardly surprising, considering Willow Street was never paved, and Fowler seems to have been paved only on paper (See Figure 9). Therefore, there is a high potential for the existence of privies dating from the second half of the 19th century to c.1935, and in the case of Lot 25 at the corner of Fowler and Lawrence, beginning before 1859.

The records of the Department of Transportation reveal no further information on utility installation in the area. Despite the maps indicating that Fowler was macadamized as early as 1904 (See Figure 20), the DOT records Fowler as being first paved in 1938. Avery was still a dirt road in 1955 (See Figure 23). Neither was paved until all the residents had moved away!

Remains from backyard features dating to the second half of the 19th century along with evidence of and from activities undertaken there would be valuable because such information is unlikely to be recovered from other sources. In many cases, public services installed by this period eliminate even shaft sites as a source of data. The importance of this data would be enhanced by knowledge of the residents' identities and their length of occupancy, since this enables the archaeologist to associate recovered artifacts with a specific historical context. Although there are indications that some lots contained multifamily dwellings or stores at certain times of their existence (as described in the building history section, e.g. Lot 42, and Lots 39-41), it is not certain whether they were built with this

intention, or were converted at a much later date. A systematic search of residential guides from between the years 1868 and 1912 indicates that Fowlerville was a predominantly Irish section of Flushing with a few residents of German and Italian extraction. When the non-Irish names appear, they are generally in the same building (e.g. Lot 21, 299 Lawrence rear). From their listed occupations (such as gardener, laborer, blacksmith, plumber, painter) it is clear that the residents were of a similar economic status. Despite the high probability of recovering mostly mixed remains of several households from any shaft features, the predominant ethnic and economic homogeneity would indicate that these artifacts could provide important insights into the late 19th century lifeways of a lower and working class Irish neighborhood.

However, the section of the study area east of College Point Boulevard, Lots 6 and 7 (286 and 284 Lawrence) can be excluded from further consideration. Construction of Blossom Avenue, its sewer complex and other utilities would have impacted any information there of value to archaeologists (See Figure 28).

On the other hand, in the remaining areas, the scattered disturbance described in detail above for the prehistoric recommendation is unlikely to have had an impact on existing shaft features related to the homelots on Willow, Fowler and Avery Streets which would have been too deep and too numerous at the rears of the lots to be destroyed. The projected construction on the entire homelot section of the project site, an excavation between 31 and 50 feet below current grade, would destroy any cultural data still present. Further historical archaeological consideration is recommended for the following areas, identified by lot numbers as listed on Figure 20:

Willow Street frontage:

Lots 1, 3, 6, 7, 8, 9, 11, 13, 14, 16, 17

College Point Boulevard (formerly Lawrence) frontage:

Lots 18, 21, 23, 25

Fowler Street frontage:

Lots 28, 24, 30, 32, 33, 35, 37, 39, 39/41, 42, 44, 47

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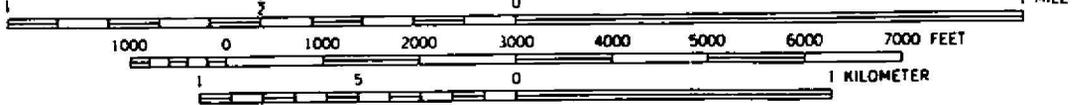
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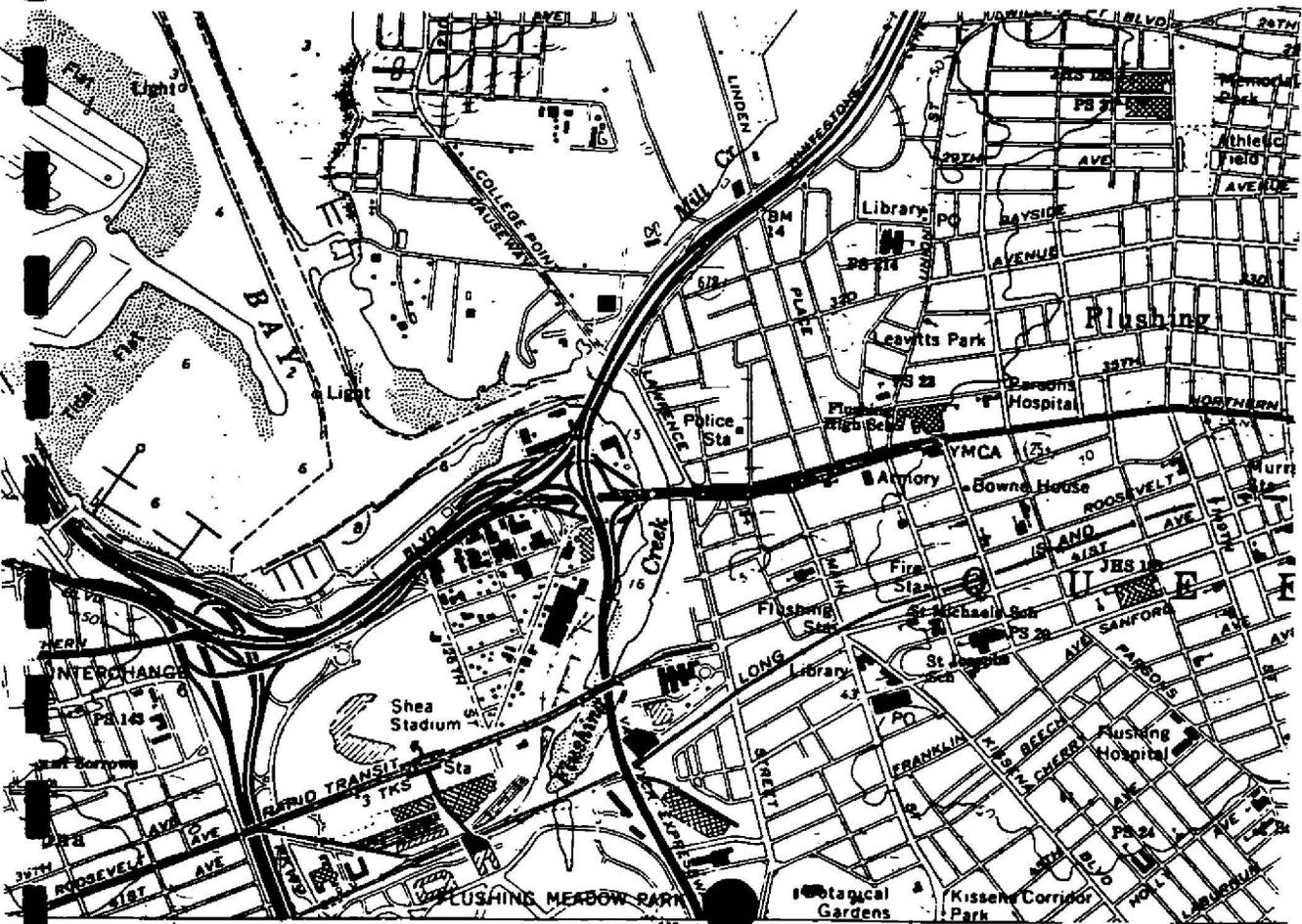
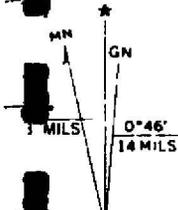
Figure 1

U.S.G.S. Topographic Quads, 1979

SCALE 1:24 000



CONTOUR INTERVAL 10 FEET



FLUSHING QUAD



PROJECT SITE



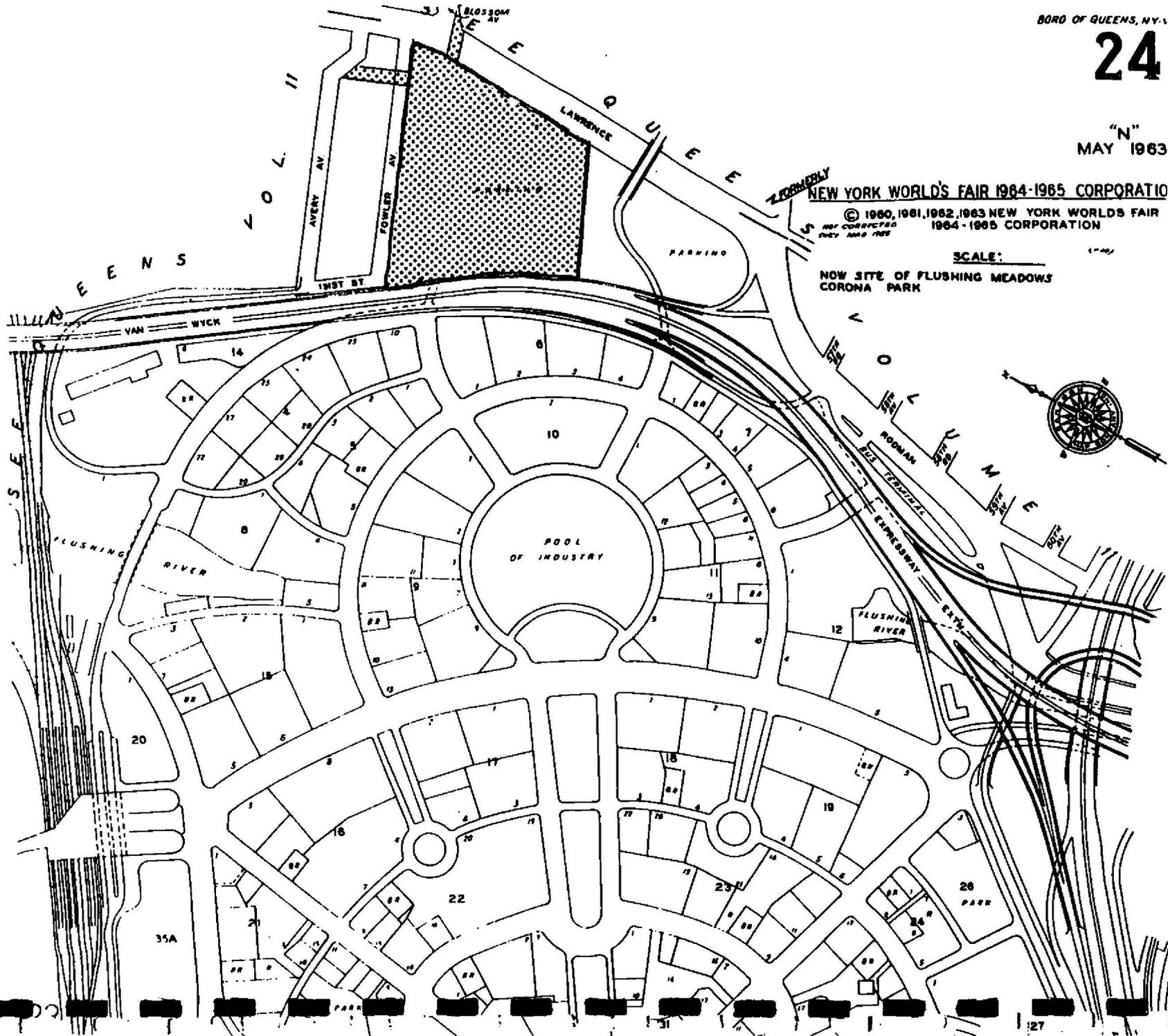
JAMAICA QUAD



Figure 2

Sanborn Building and Property Atlas of Queens, NY, vol. 19

Project Site Location



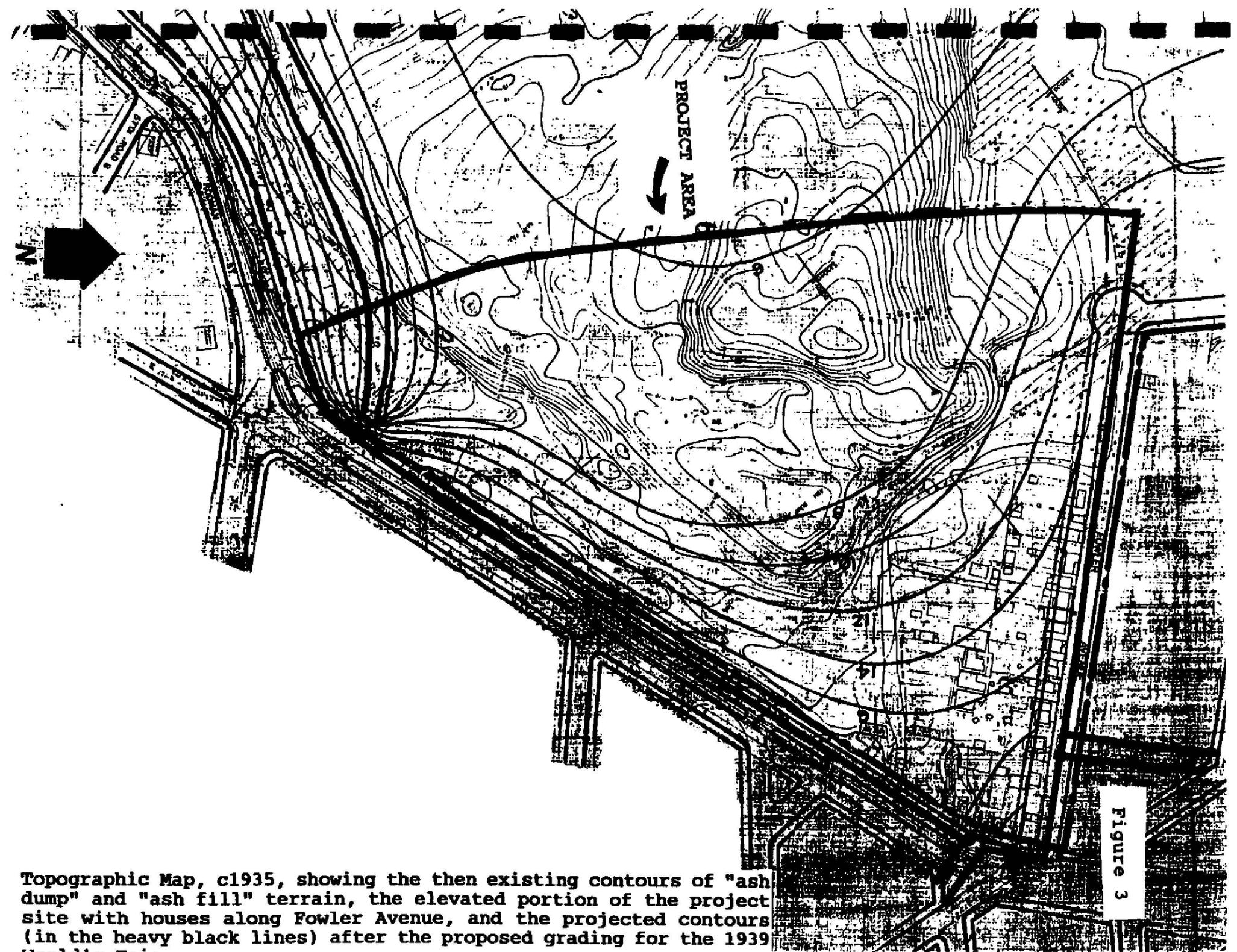
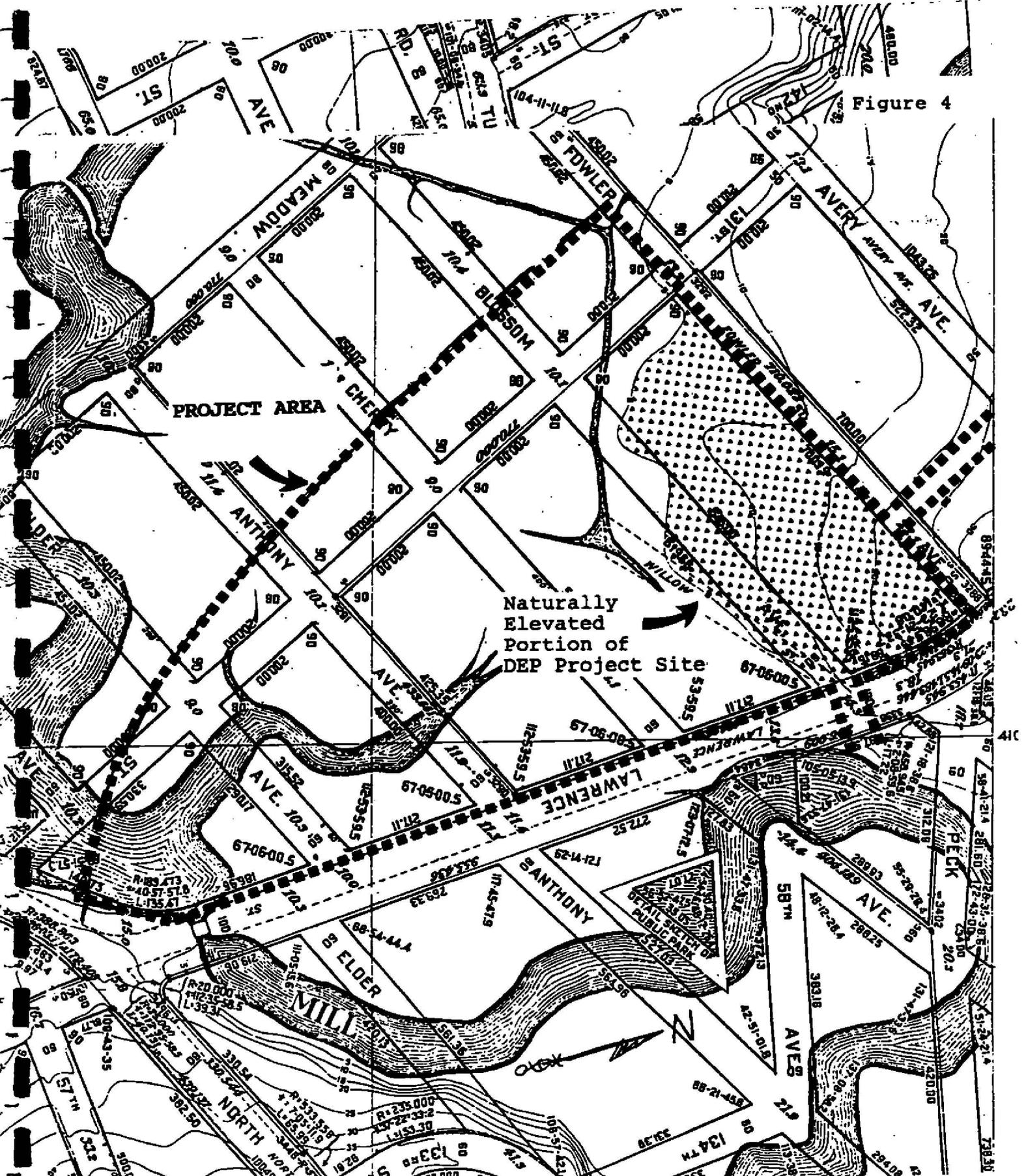


Figure 3

Topographic Map, c1935, showing the then existing contours of "ash dump" and "ash fill" terrain, the elevated portion of the project site with houses along Fowler Avenue, and the projected contours (in the heavy black lines) after the proposed grading for the 1939

Figure 4



Final Map of the Borough of Queens, 1924 Plate 41

NOTE: The east-west streets through the Project Area (Elder Mill, Anthony, and Cherry Avenues) were never realized.

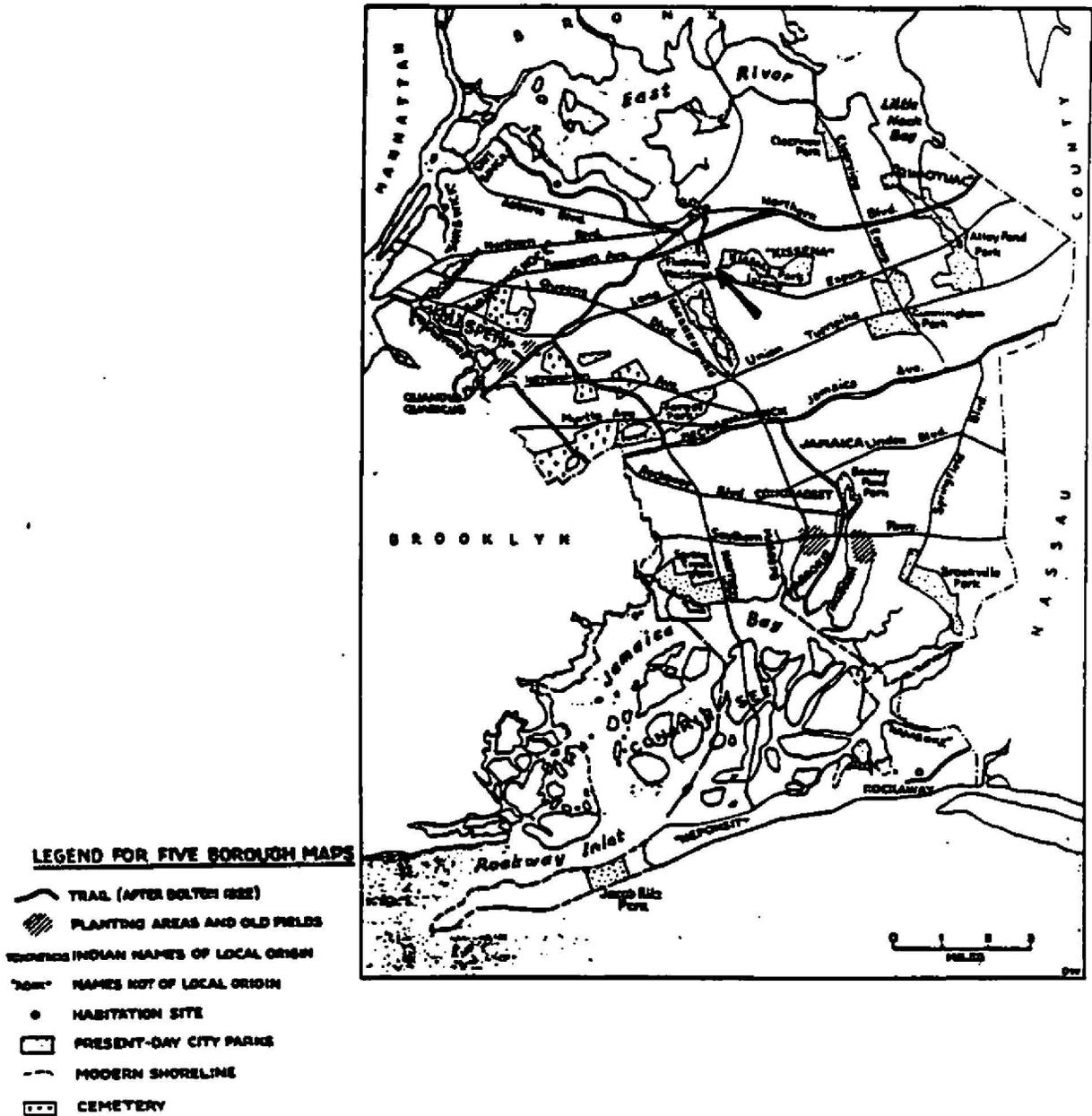


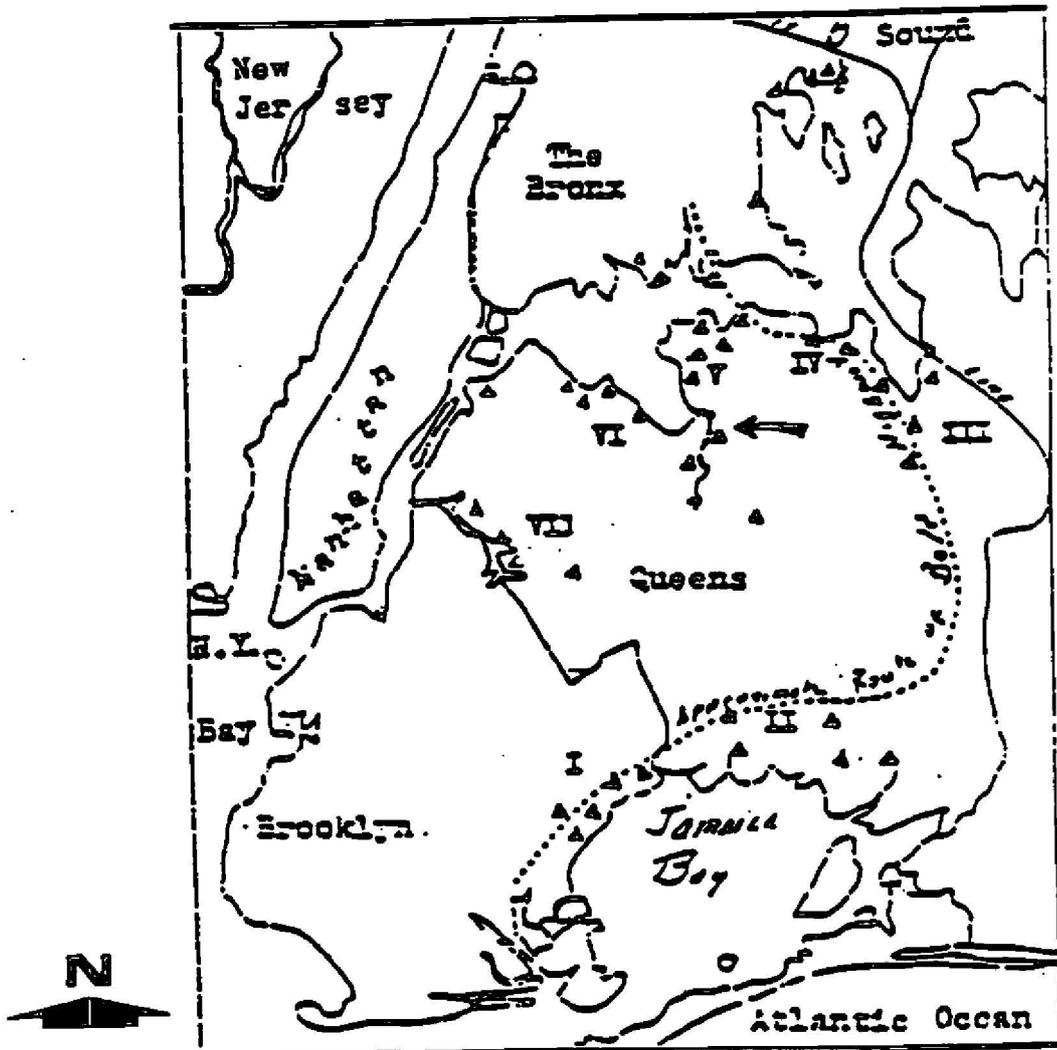
Grumet.

Figure 5

Indian Sites, Trails and Planting Fields in the Borough of Queens.

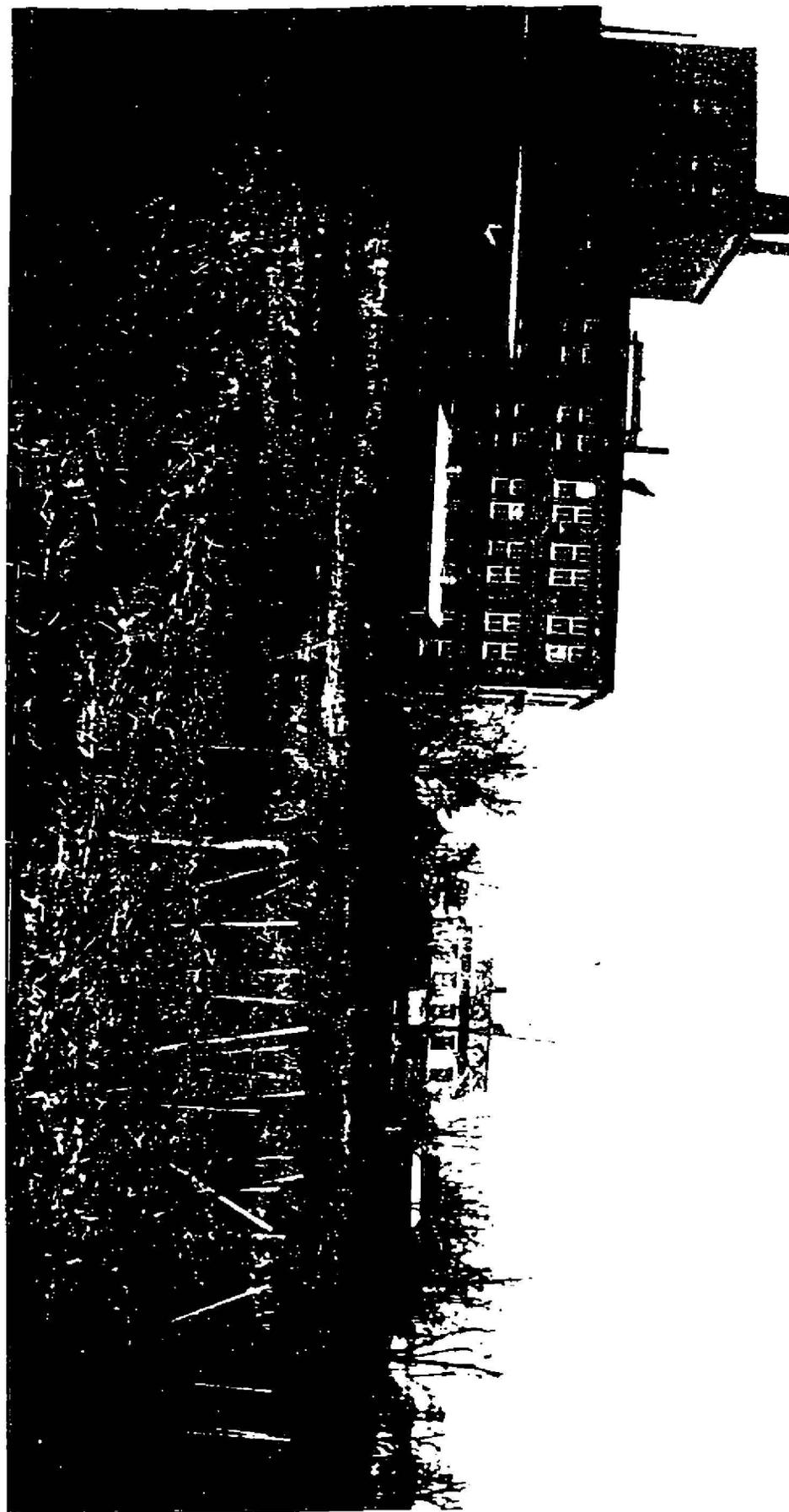
QUEENS / 71





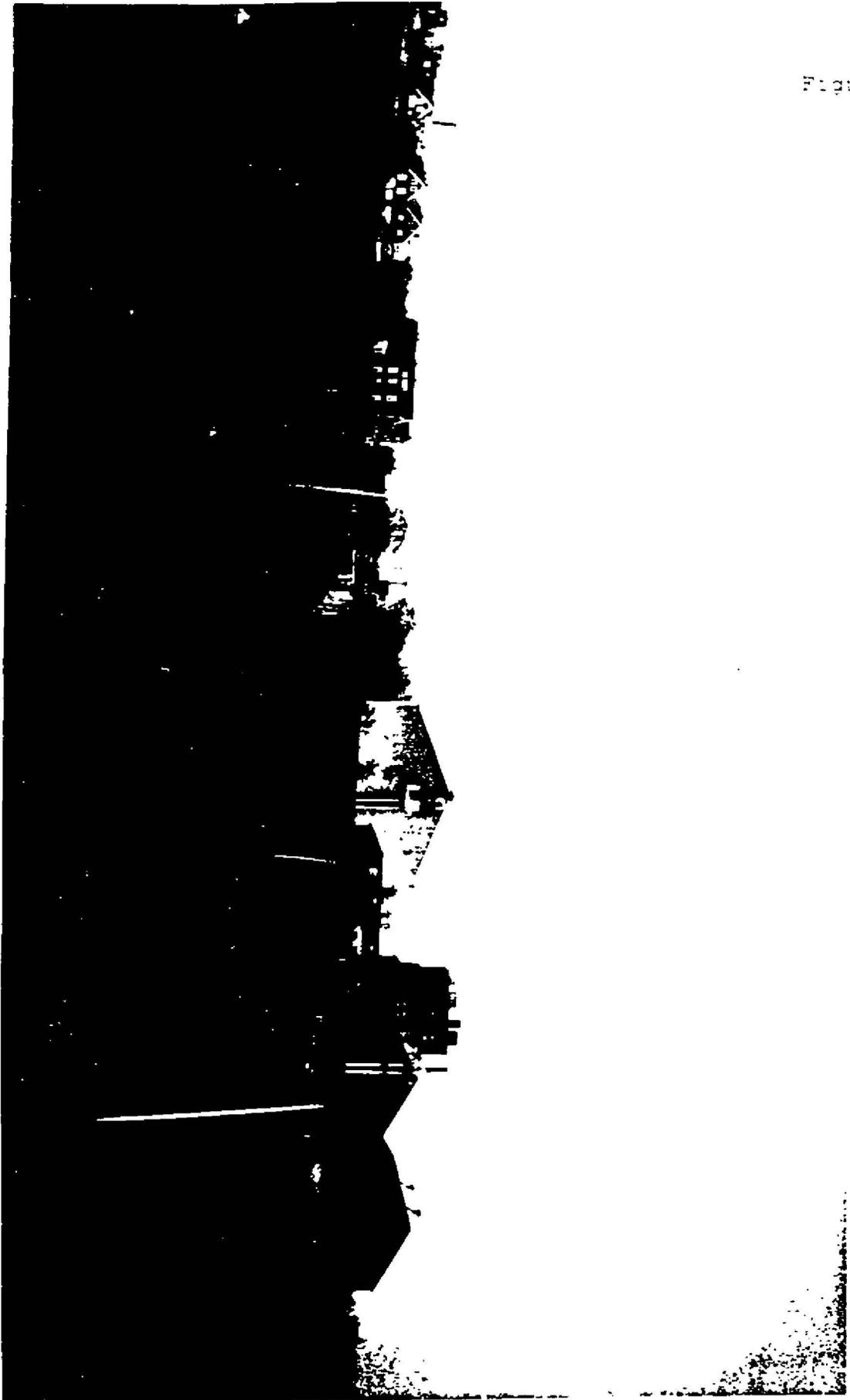
INDIAN VILLAGE SITES: Triangles on diagram indicate sites explored by Committee on American Anthropology of the Flushing Historical Society. Important locations described in accompanying article are numbered.

Figure 7



Selecki Photograph #54: "Flushing west of Lawrence Street, Fowler Avenue at end of Maple and Avery Avenues. March 1937."

Figure 1



Collection Photograph #88: "Flushing West Summer 1937. Edge of Bronx south of Long Island Railroad, Barford Avenue, SW of Flushing. Archaeological site located."

Figure 9



Solecki Photograph #56: "Fowler Avenue, off Lawrence Ave. at Indian Spring, SW Flushing."

Figure 10



Sielecki Photograph #57: "Sanford Avenue and Spring No. 2 in center. Spring No. 1 to right in crater. Area SW Flushing, south of L.I. R.R."



Figure 11

Solecki, Photograph #88: "Flushing, south west, one of springs, No. 1, in crater, Summer 1937, Site here."

Figure 12

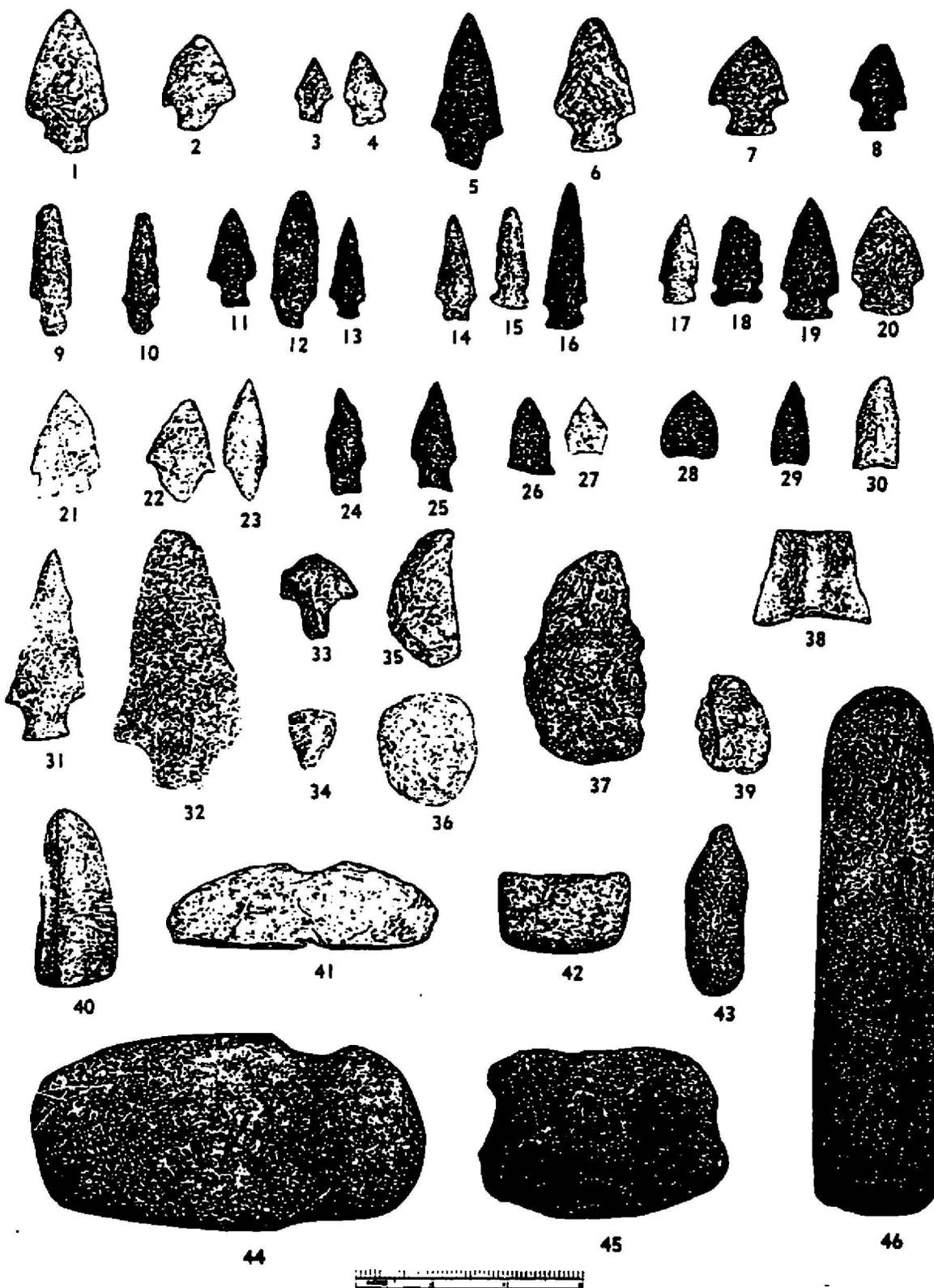


PLATE 15

ARTIFACTS OF STONE, ATTRIBUTED TO THE PRECERAMIC HORIZON AT THE GRANTVILLE SITE

1-5, Chipped stone projectile points of broad and narrow, stemmed forms; 6-20, broad and narrow, side-notched forms; 21, broad, corner-notched form; 22, broad and narrow lozenge forms; 24, 25, fishtail and semi-lozenge forms; 26, narrow trianguloid form with eared base; 27, pentagonal form; 28-30, broad and narrow, trianguloid forms with concave base; 31, stemmed spearpoint; 32, stemmed knife, or spearpoint; 33, bunt, or stem scraper; 34, plano-convex scraper; 35, crescentic knife, or sidescraper; 36, ovoid scraper; chopper; 38-40, fragments of winged and perforated bannerstones; 41, notched bannerstone; 42, fragment of the blade of an adze; 43, plummet (?); 44, grooved ax; 45, netsinker; 46, pestle.

Figure 13

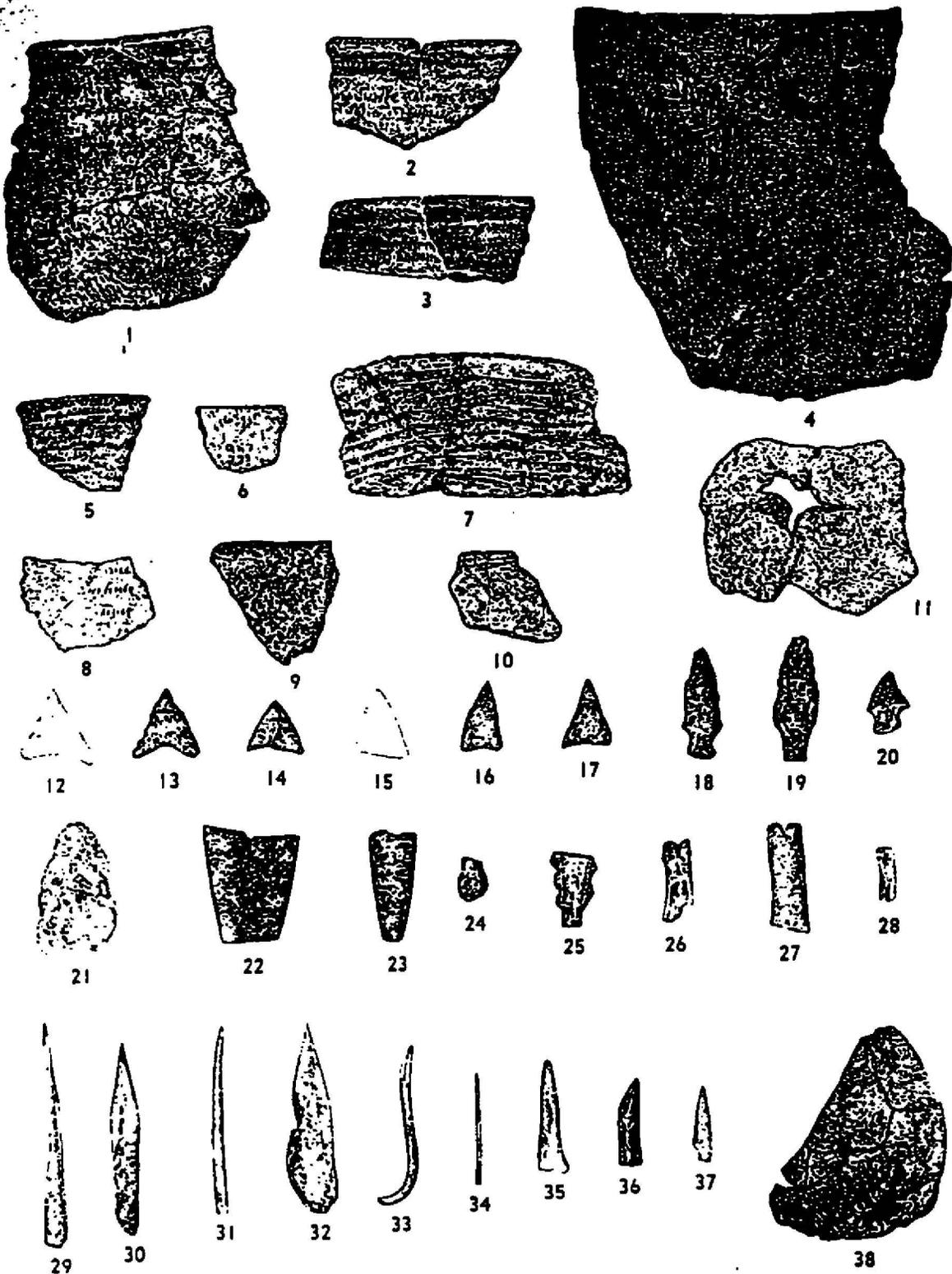


PLATE 12

ARTIFACTS OF POTTERY, STONE, BONE, AND ANTLER OF THE BOWMAN'S BROOK FOCUS, EAST RIVER ASPECT

1, 11, East River cord-marked pottery; 2, 3, 5-8, Bowman's Brook stamped; 4, Bowman's Brook incised, bearing face formed by three punctates; 9, unclassified cord wrapped stick stamped; 10, unclassified sherd bearing faint incised lines; 12-17, broad and narrow, triangular projectile points with straight and concave bases; 18, narrow, side-notched form; 19, 20 narrow and broad, stemmed forms; 21, trianguloid knife; 22, fragment of a polished stone gorget; 23-25, fragments of pottery smoking pipes; 26, 27, worked deer phalanges, used in the cup-and-pin game; 28, beaver incisor; 29-34, bone awls; 35, 36, flakers of antler and bone; 37, conical antler projectile point; 38, fragment of a turtle shell dish.

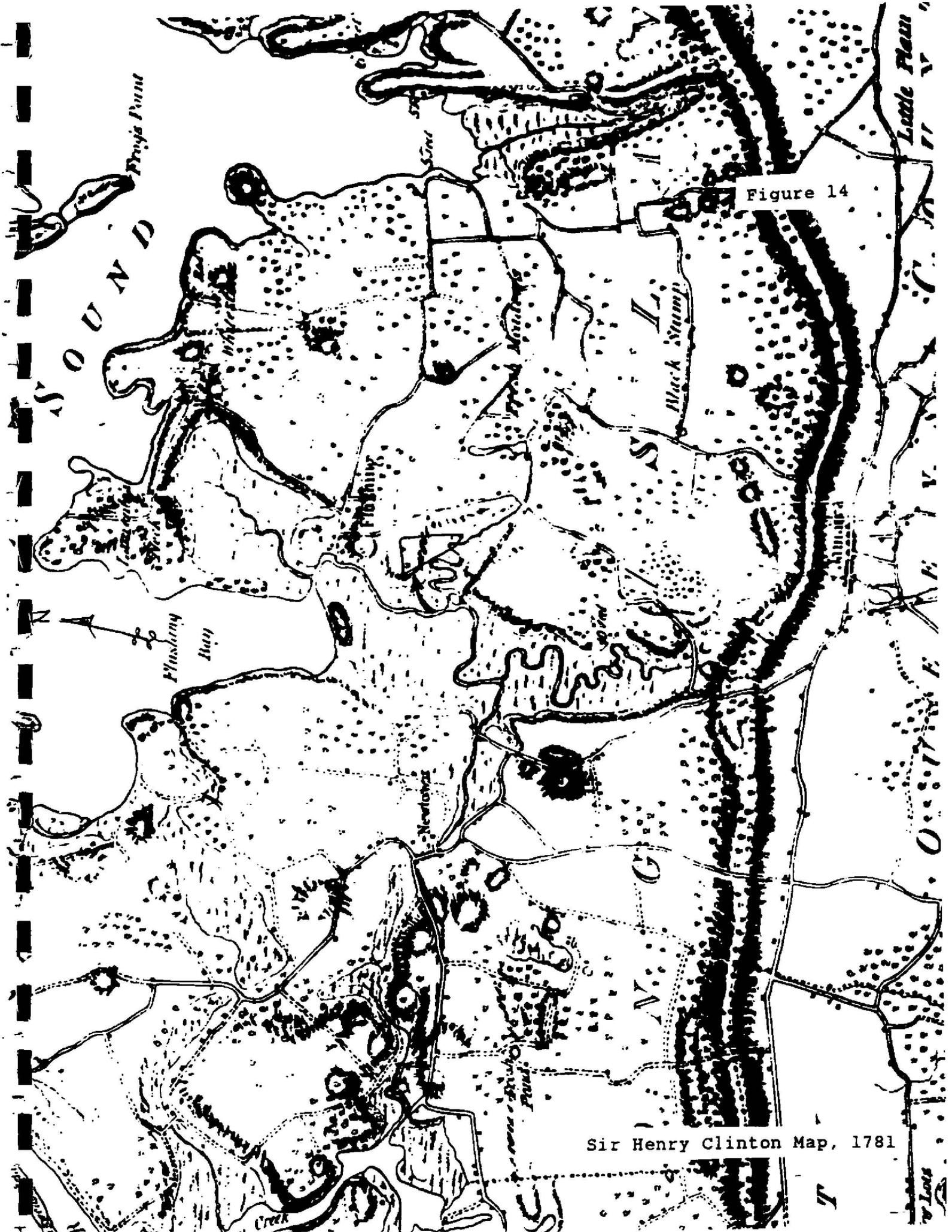


Figure 14

Sir Henry Clinton Map, 1781

Fry's Point

SOUND

Plymouth Bay

Fishing

Newtown

Black Swamp

Little Flan

Creek

N



T

Ston

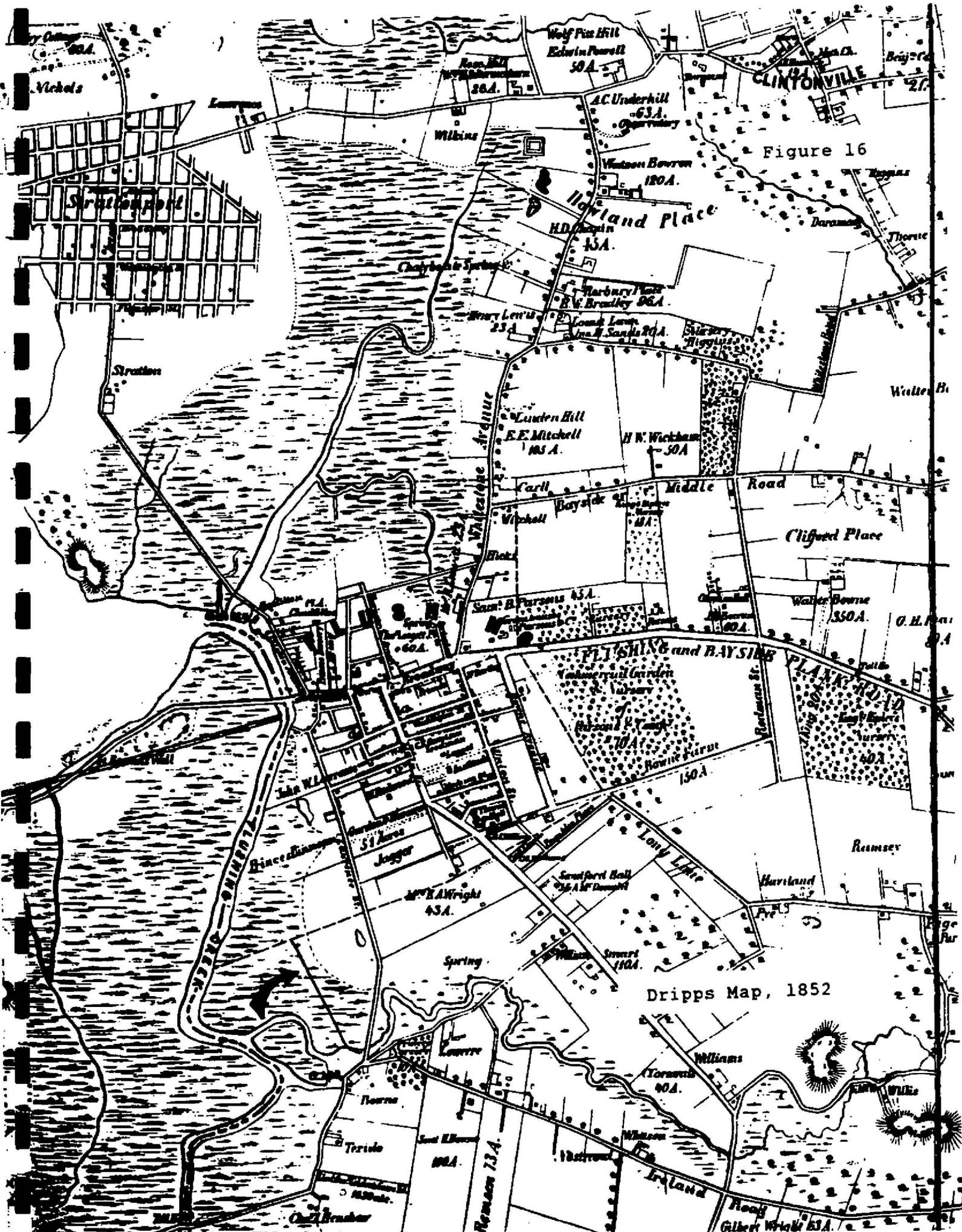


Figure 16

Dripps Map, 1852

CLINTONVILLE

Wolfe Fox Hill
Edwin Powell
50A

AC Underhill
63A

Watson Bowen
120A

Highland Place
H.D. [unclear]
15A

Harbury [unclear]
E.W. Bradley 26A
Wm. Lewis 23A
J. [unclear]
J. [unclear]

Lusten Hill
E.E. Mitchell
105A

J.N. Wickham
50A

Carl
Mitchell
10A

Middle Road

Cliffed Place

Saml B. Parsons 45A

Walker Downe
350A

PLANTING and HAYING

Yonkersville Garden
Lansing
10A
Rowie Farm
150A

PLANK ROAD

Ramsay

Sandford Hall
25A
1st Downe

Low Line

Haviland

Wm. Wright
45A

Spring

Street
110A

Dripps Map, 1852

Williams
100A

Terride

100A

Ramsay 73A

Irland

Head
Gilbert Wright 63A

Nichols

Stratford

Stratton

Walter B.

O.H. [unclear]
20A

Page
Par

Wm. Williams

Head



Wall

S.B. Parsons

J.A. Far

Figure 1

Parson & Co
Nursery

WALLING

WALLING

A. Macdonald
Mrs Macdonald

W. Smart

E. Mann

Quincy Est.

Thorn
Grist Mill
B. Thorn

A. Rensert

G. Nostrand

W.R. Prince

S.H. Bowne

T. White

J.H. Brower

WALLING

E.W. Miller

Carl

T. Hall

A. Bace

T. Jackson

J. Mesrole

Walling Topographic Map of Kings and Queens, 1899

Church

Van Rarst

Wilcox
H. Roe

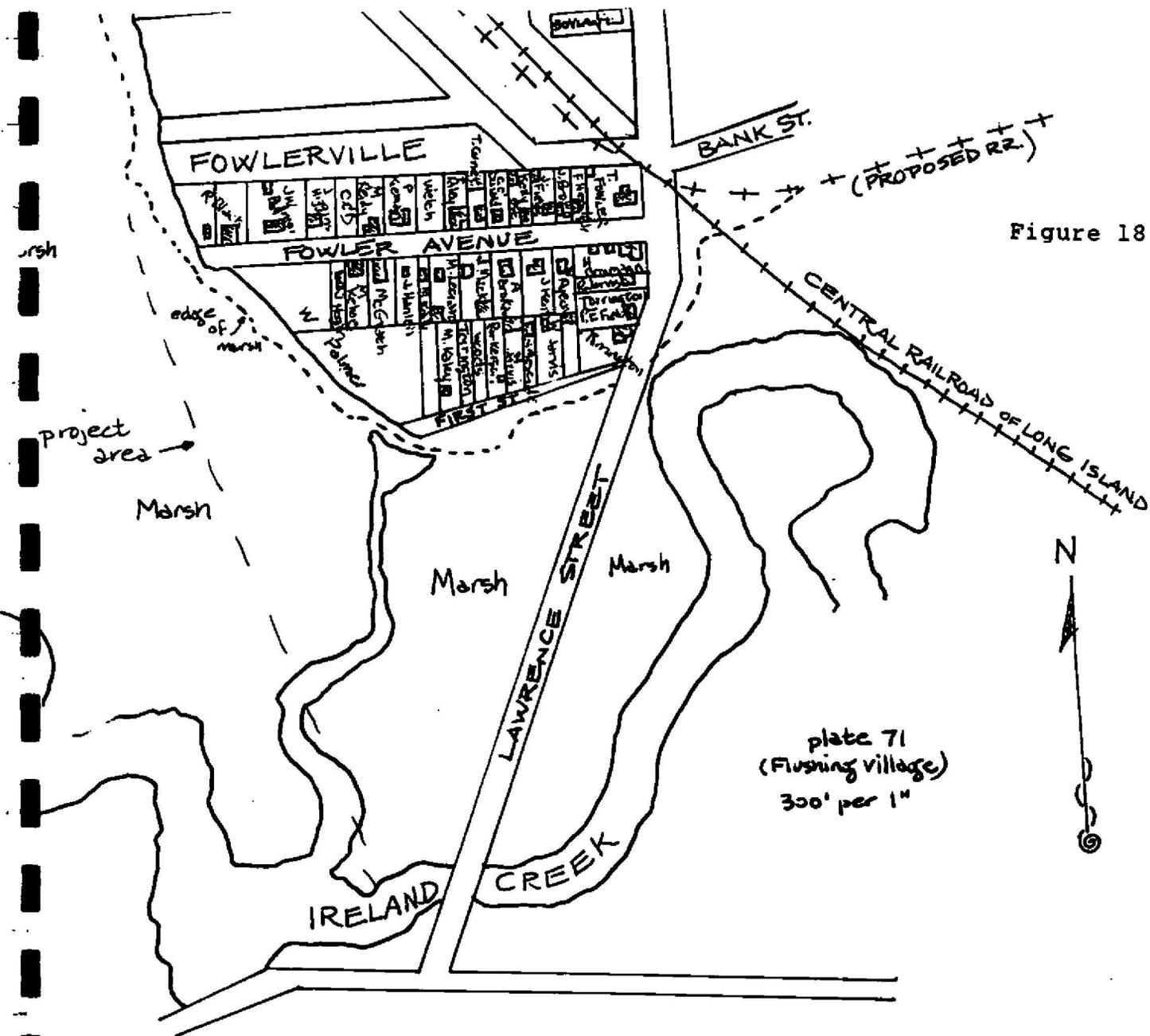


Figure 18

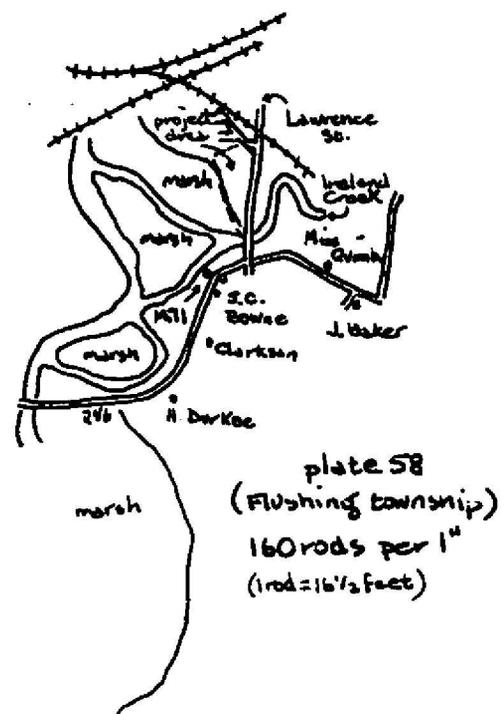
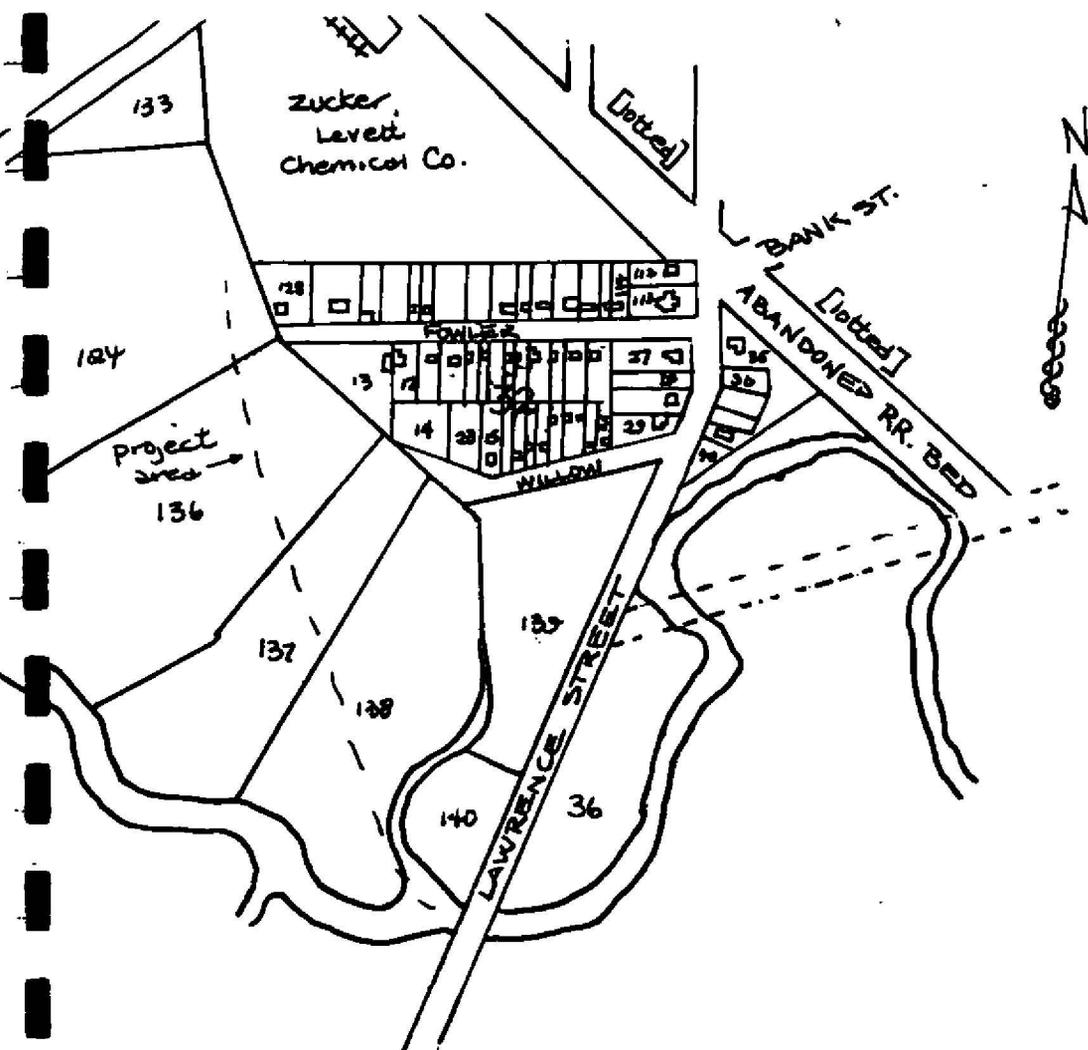


plate 58
(Flushing township)
160 rods per 1"
(1 rod = 16 1/2 feet)

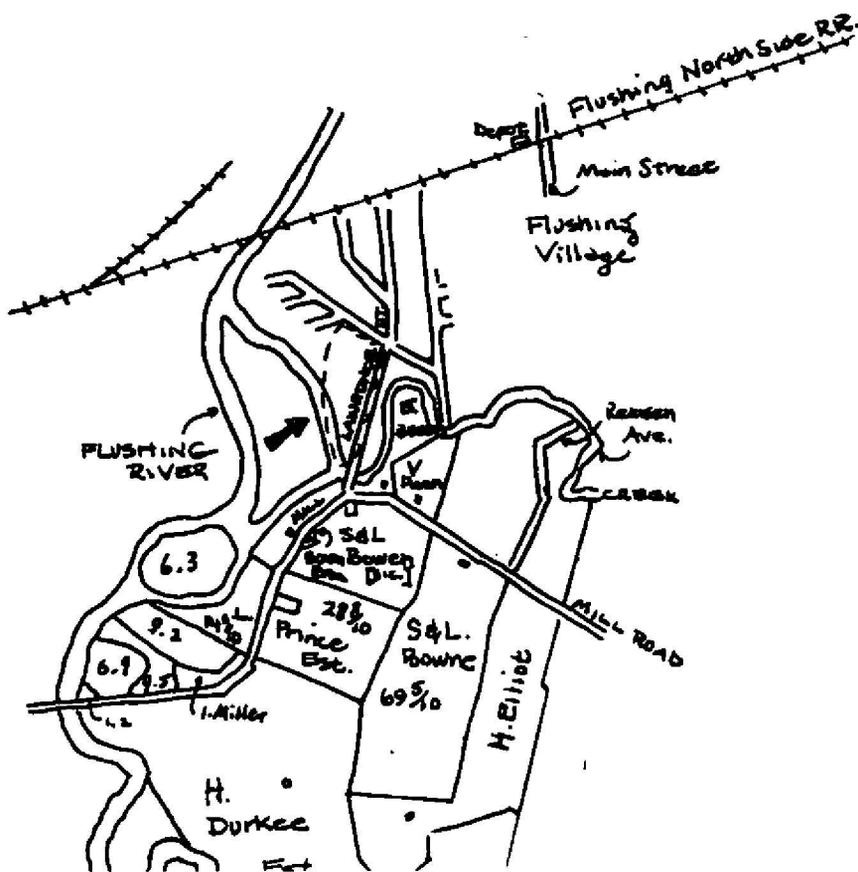
1873
BEERS' ATLAS
OF
LONG ISLAND
COLLECTION NYPL
RGS

Figure 19



1891
 "Part of Flushing
 plate 9
 400' = 1"

WOLVERTON
 1891

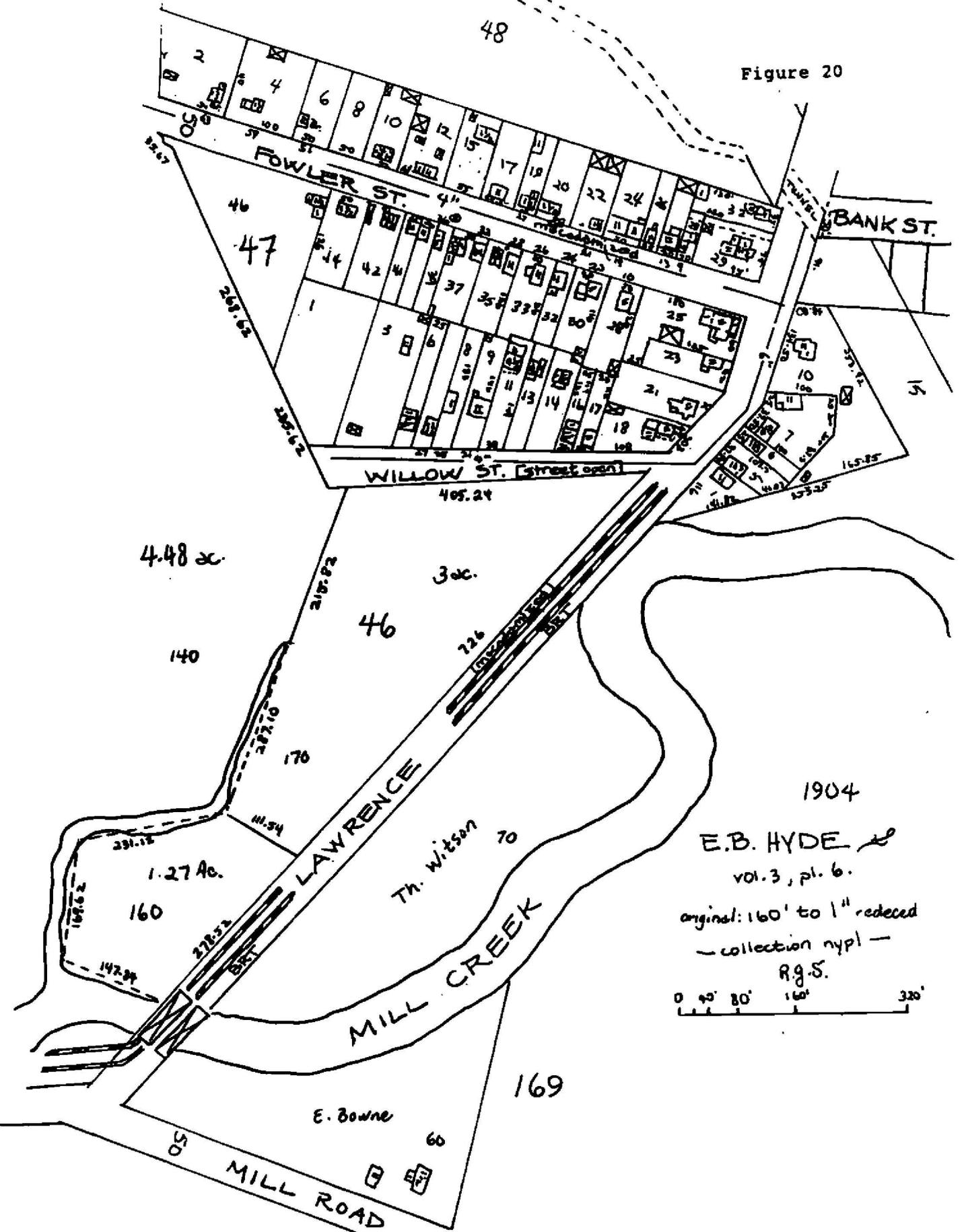


1891
 TOWN OF FLUSHING
 plate 29
 2 1/2" = 1 mile

H. FRANK SONS & Co.
Chicory

48

Figure 20



1904
 E.B. HYDE
 vol. 3, pl. 6.
 original: 160' to 1" reduced
 - collection nypl -
 R.G.S.
 0 40 80 160 320'

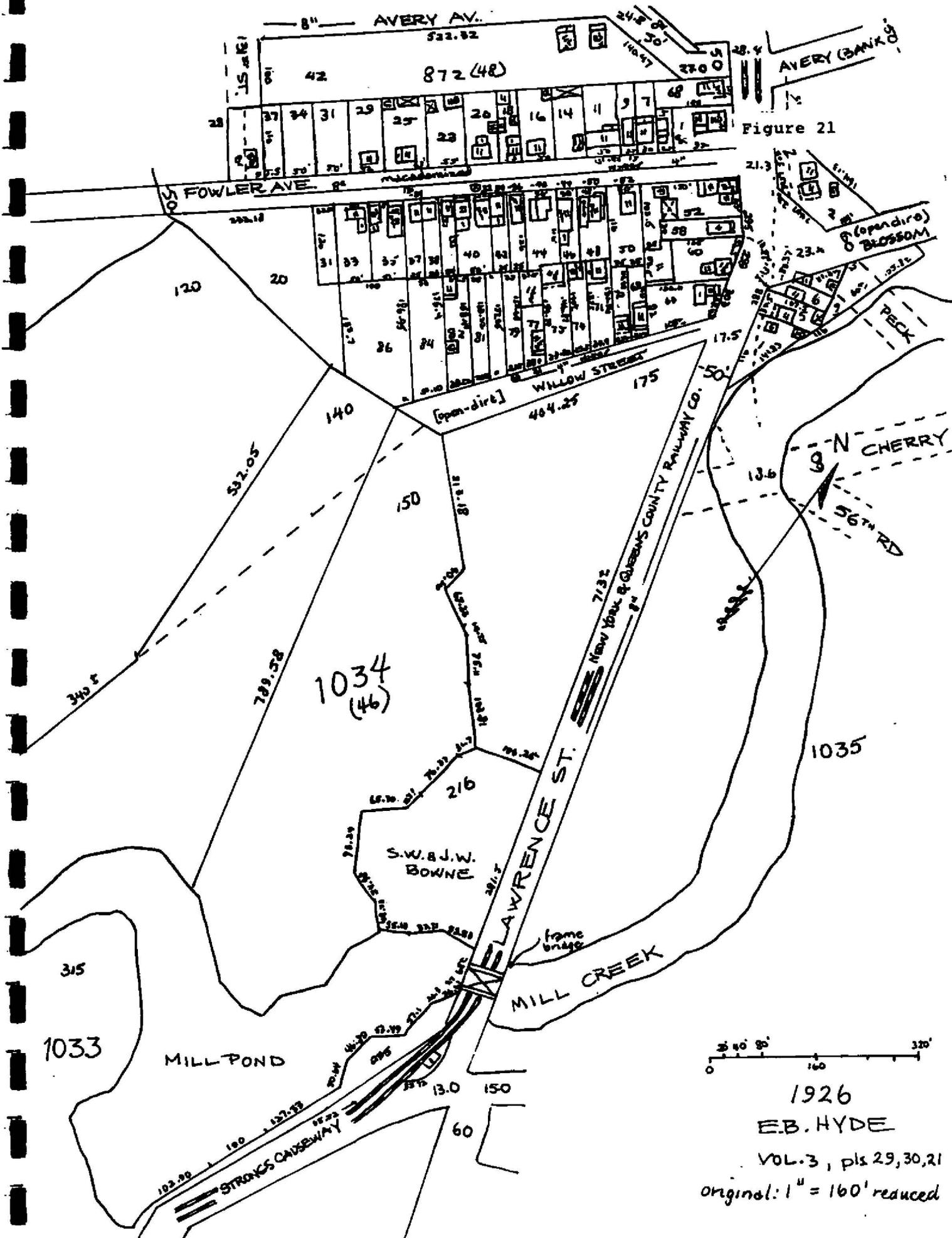
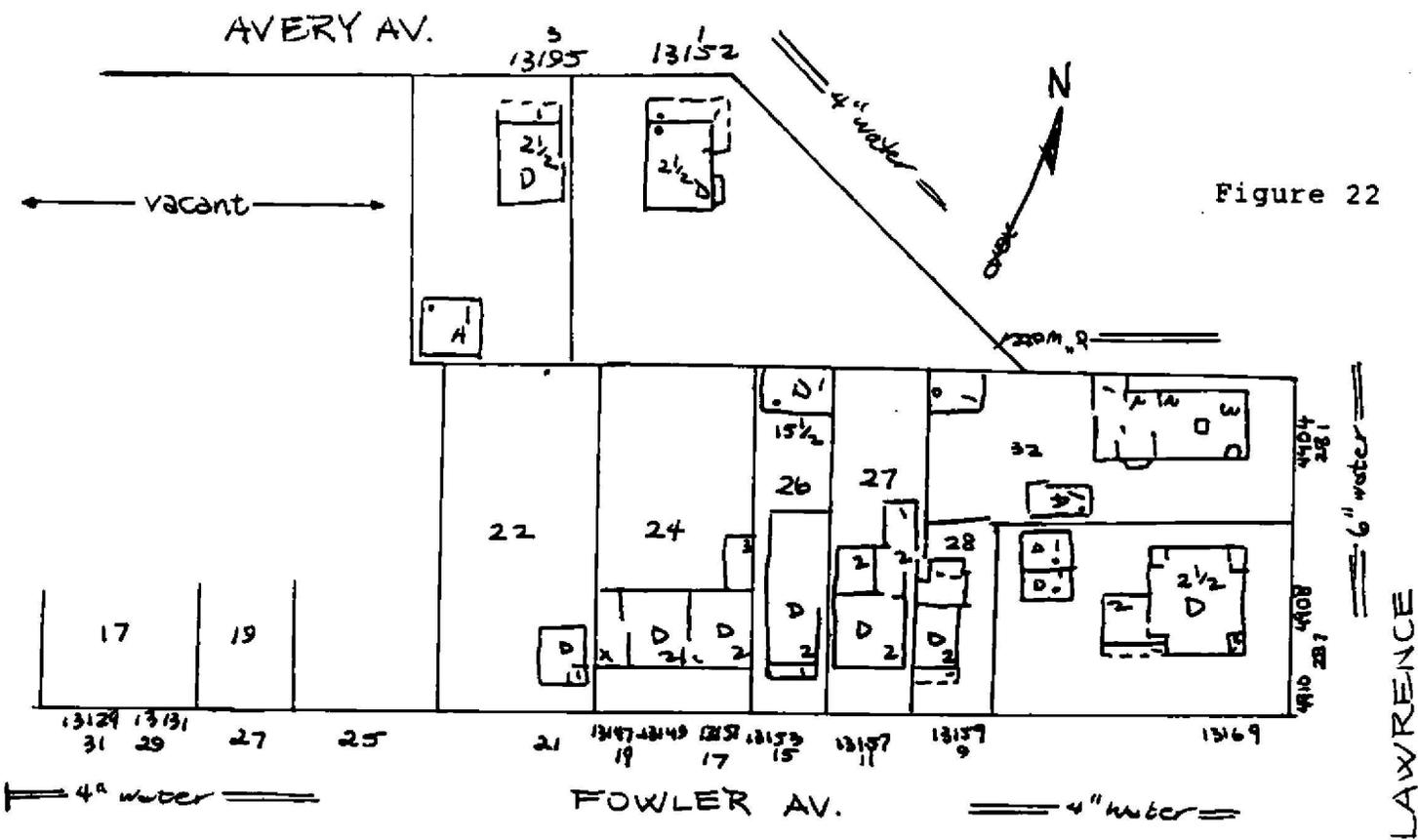


Figure 21

1926
 E.B. HYDE
 VOL. 3, pls 29, 30, 21
 original: 1" = 160' reduced



above: vol. 11 pl. 16 60' = 1"

SANBORN 1930

below: vol. 11 pl. 54 120' = 1"

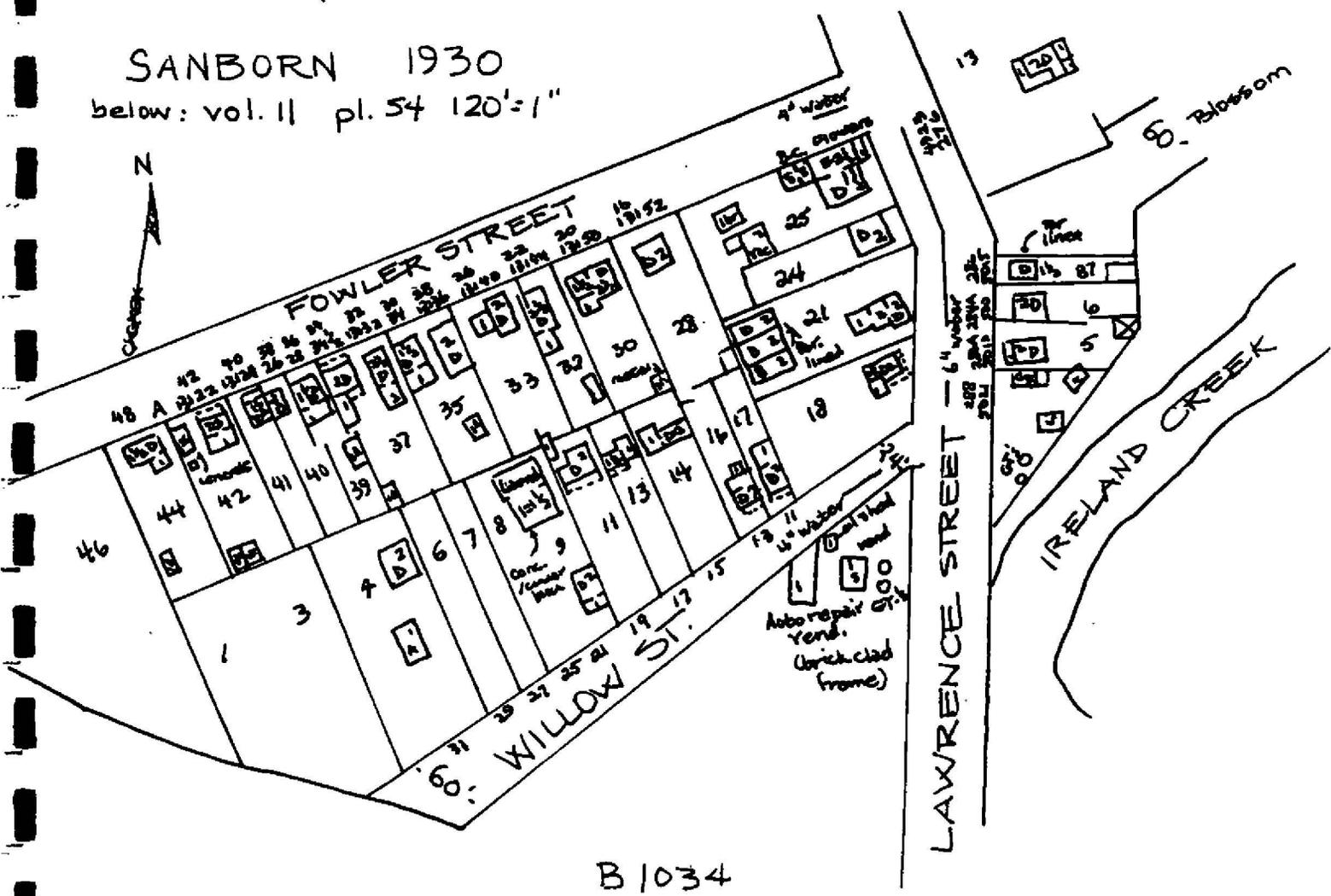
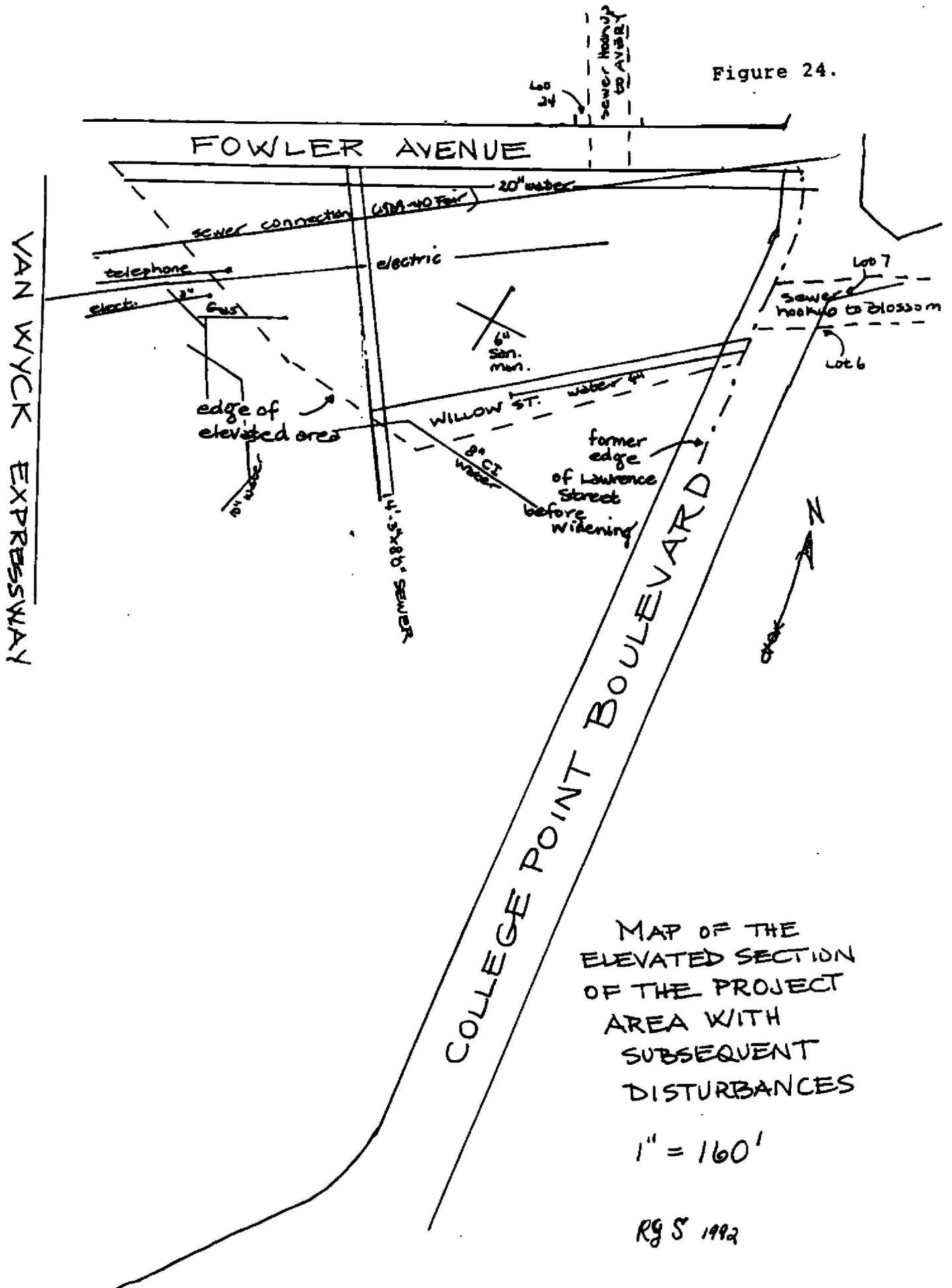


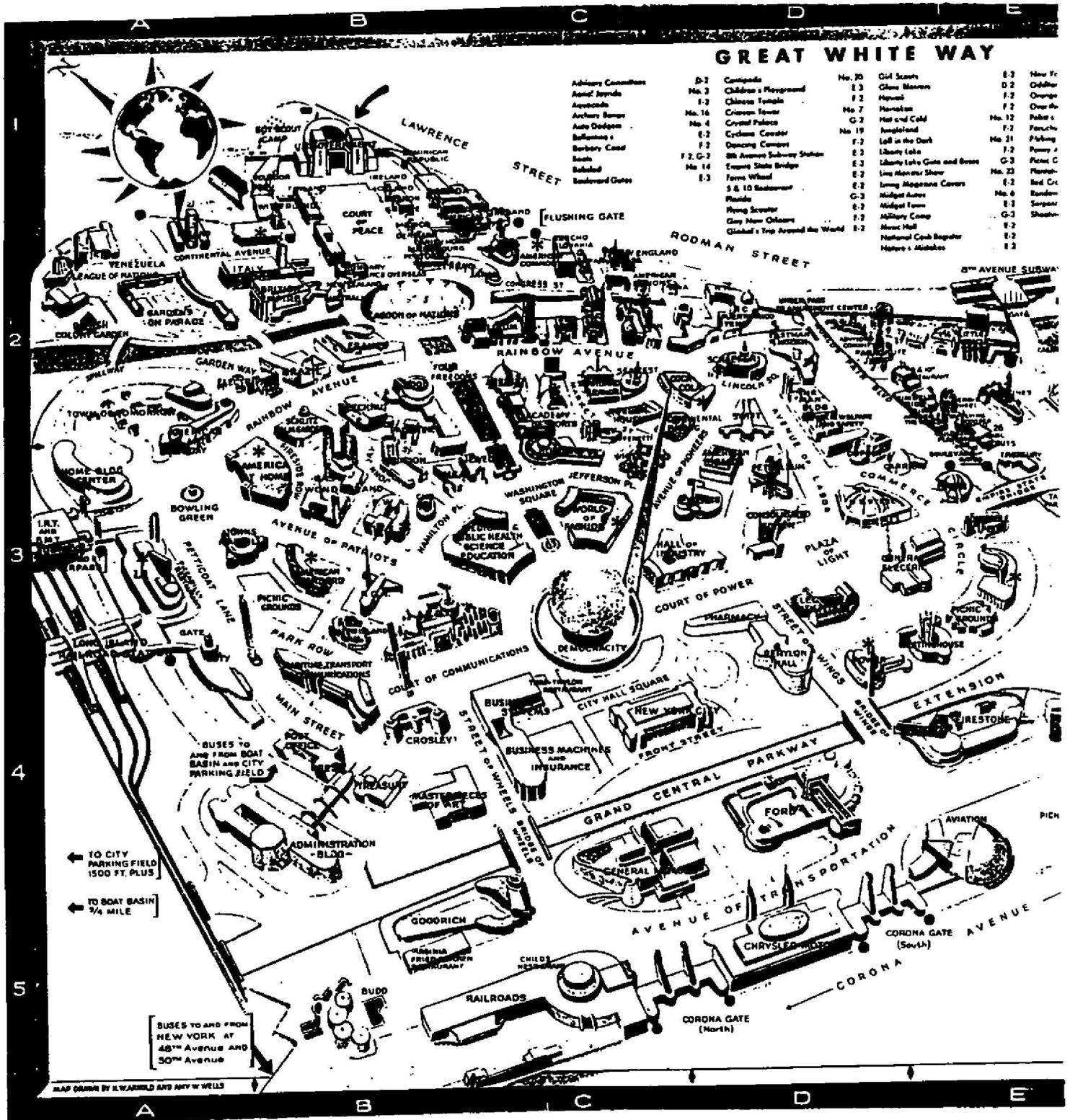
Figure 24.





BOWNE'S IRELAND MILL
Rodman Street — Built 1797 — A grist tide Water Mill
run by 2 iron turbine wheels. — Demolished — 1925

Figure 26



(WURTS 1977: v)

World's Fair Map, 1940



Figure 27

(W. A. 477: 2)

Photo of World's Fair with Federal Building and Project Area

PHOTOGRAPHS



Photo 1: North side of DEP site/parking lot
view: north to south from Fowler Avenue

Photo 2: Western side of DEP site/Van Wyck Expressway on left and
Ballfield # 8 on right
view: south to north

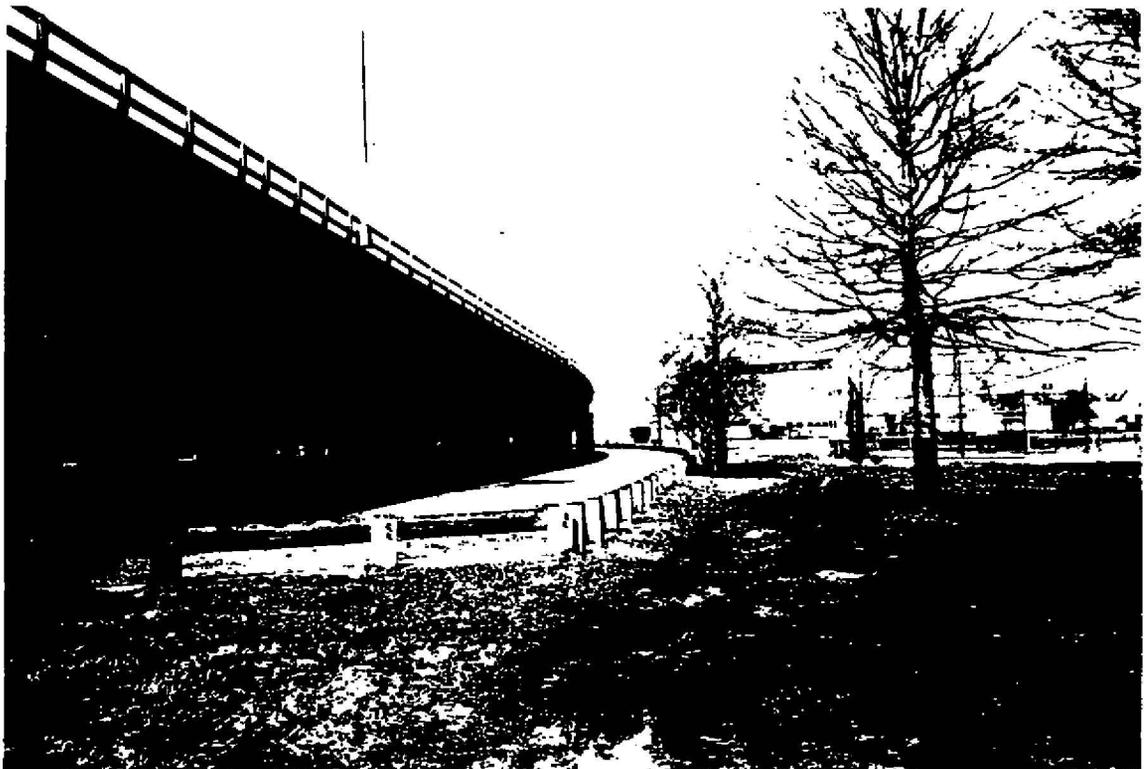




Photo 3: Ballfield # 8 on DEP site/Van Wyck Expressway in rear
view: west from pedestrian overpass inside the Park

Photo 4: DEP site
view: northeast from pedestrian overpass over College
Point Boulevard.





Photo 5: DEP site
view: north from pedestrian overpass inside the Park

APPENDIX A

New York State Museum

and the

**New York State Office of Parks, Recreation and Historic
Preservation (SHPO)**

Site File Search Results

I. New York State
Museum

Site Number	Origin of Site Info.	Type of Site
4524	reported by Arthur C. Parker (ACP), listed as Parker's "Queens County 1" (Parker 1920:672)	burial with 11 skeletons
4542	ACP (Parker 1920:672)	camp
4544	ACP (Parker 1920:672)	camp
4545	ACP (Parker 1920:672)	traces of occupation

See accompanying map for approximate site locations.

II. New York State
Office of Parks,
Recreation and
Historic
Preservation

Site Number	Site Name	Type of Site
081-01-0133	Grantville	pre-ceramic with Bowman's Brook- and Clason's Point-phase characteristics

See accompanying map for approximate site locations.

AOR1-01-0133

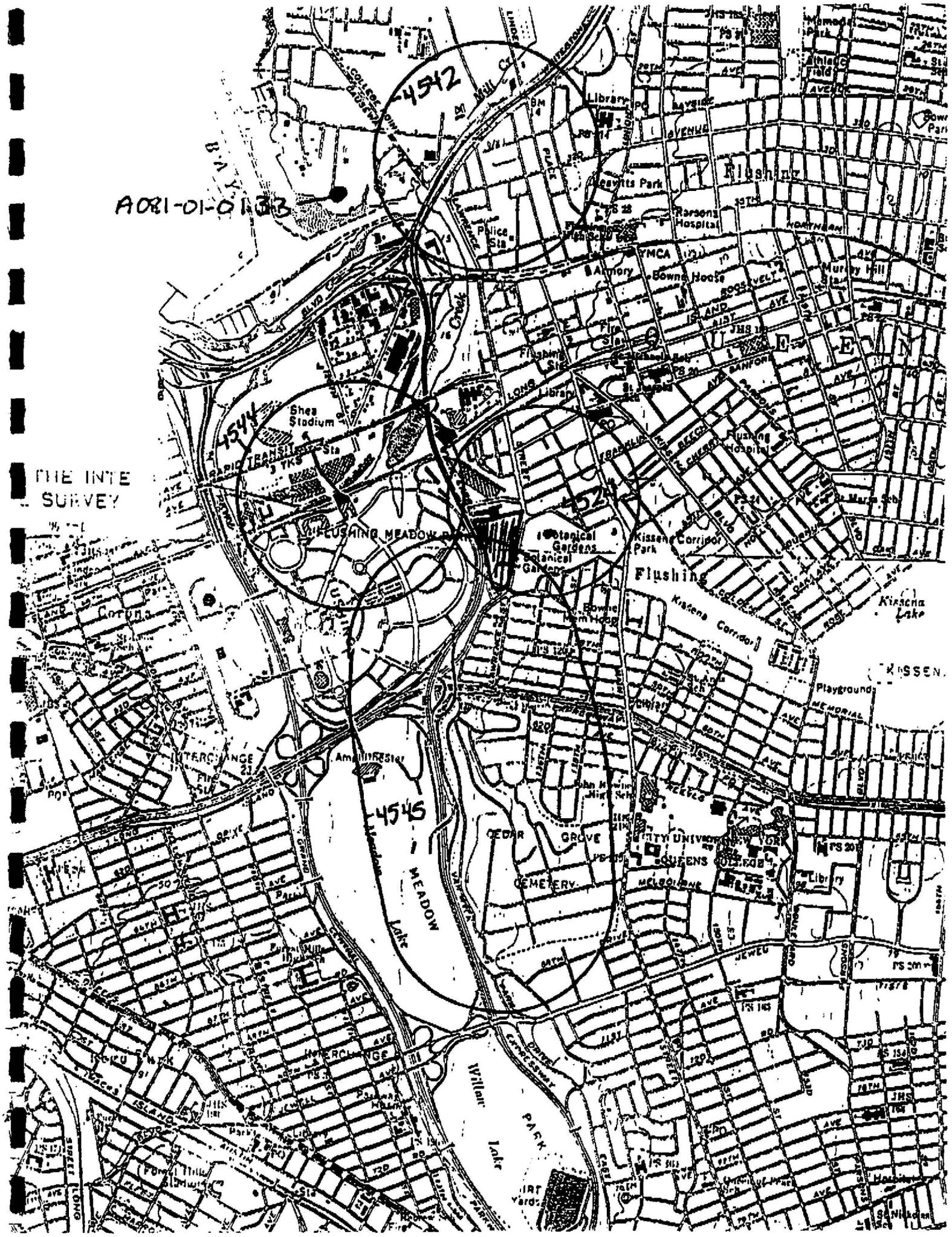
4512

B.V.T.

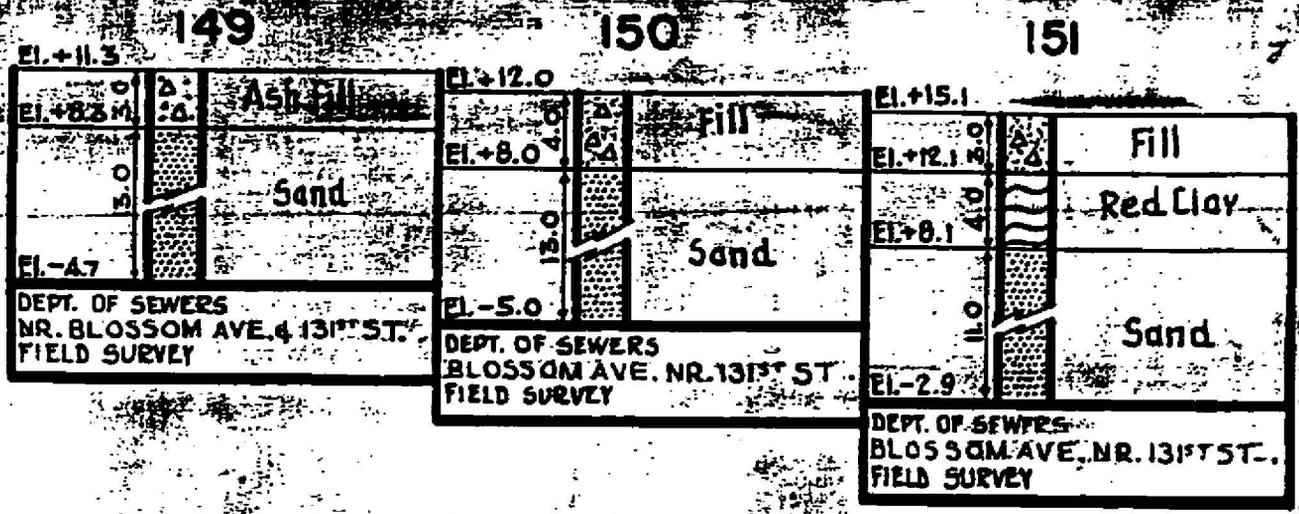
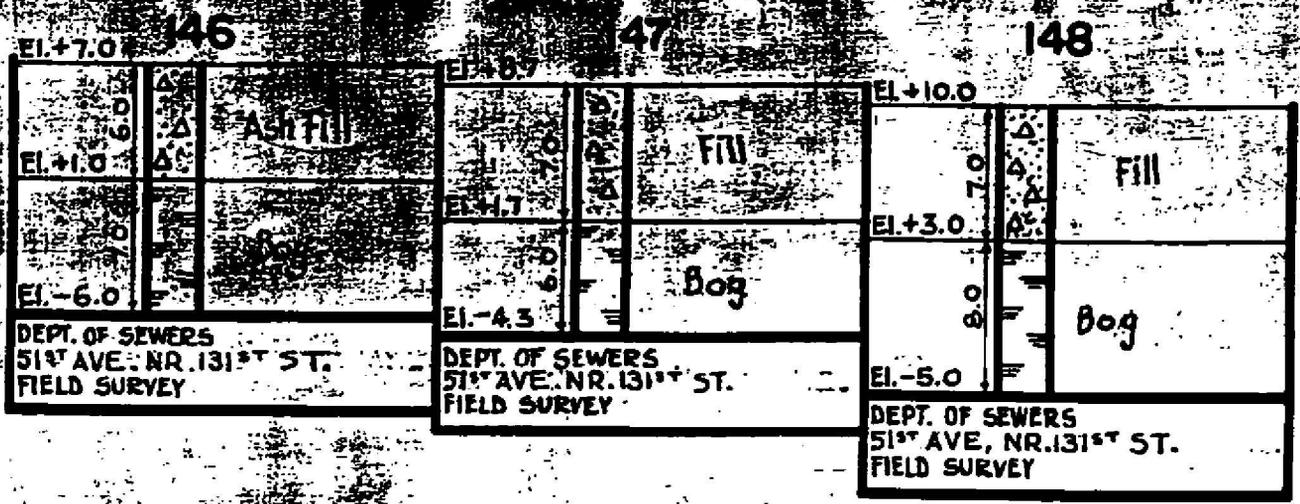
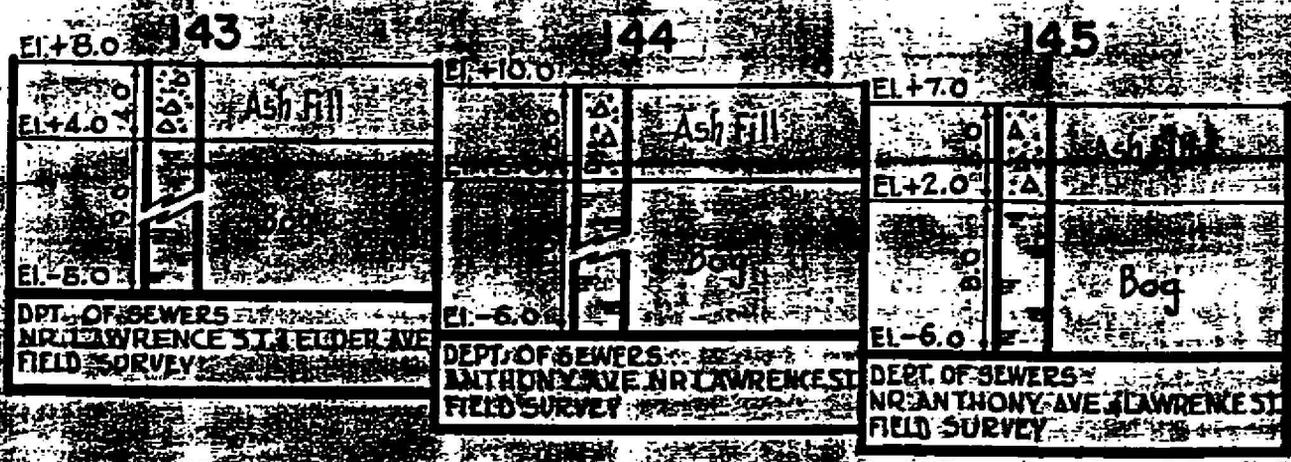
4544

4545

THE INTER
SURVEY

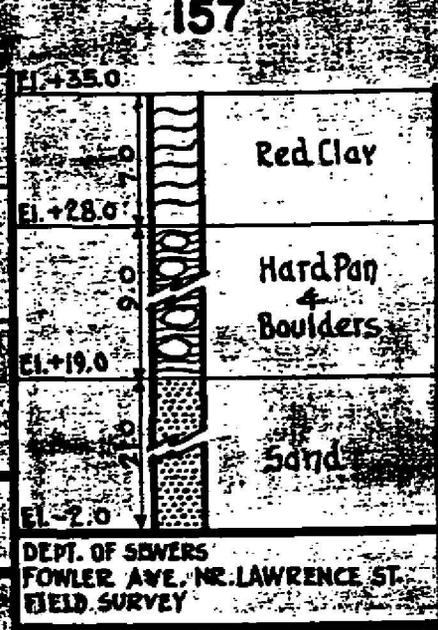
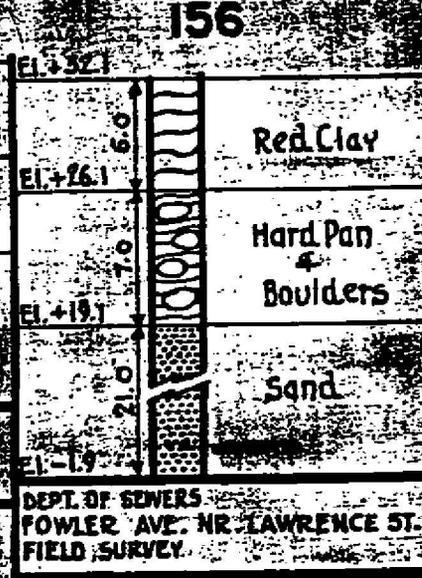
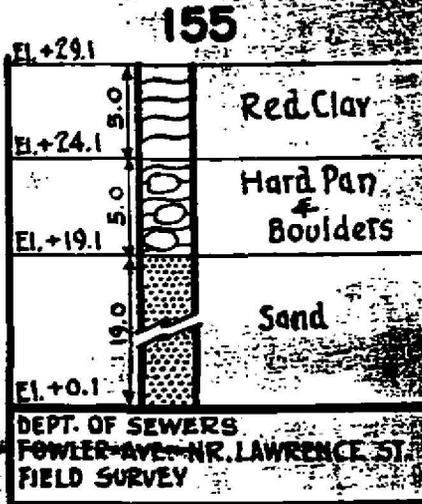
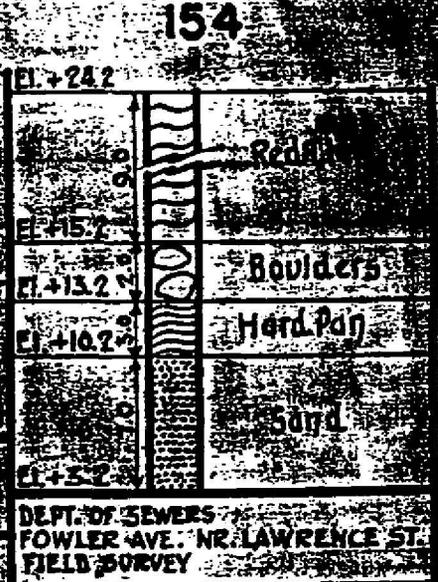
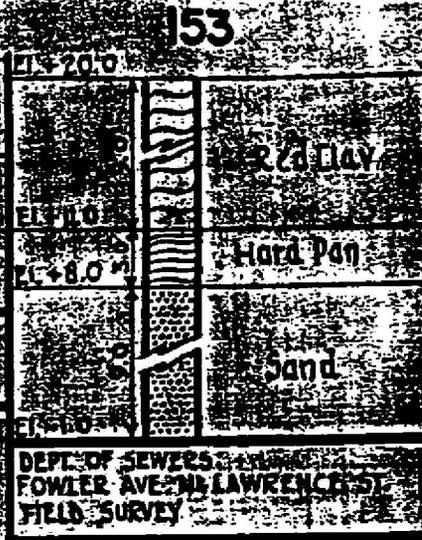
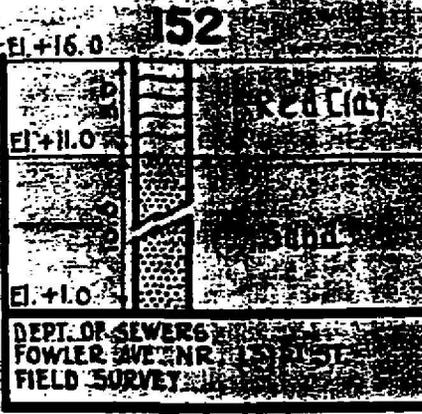


Soil Boring Data
Subsurface Exploration Section
New York City Topographical Bureau



ROCK LINE MAP

QUEENS SECTION



ROCK LINE MAP

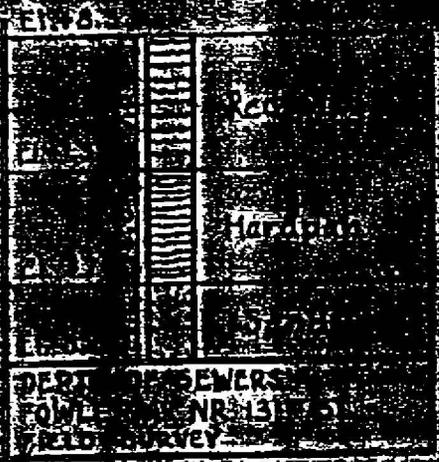
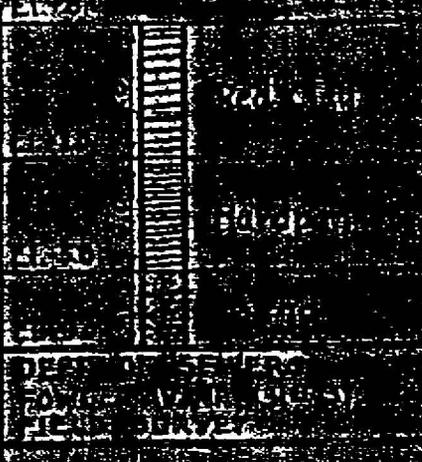
QUEENS SECTION



158

159

160



DEPT. OF SEWERS
FOWLER AV. & LAWRENCE ST.
FIELD SURVEY

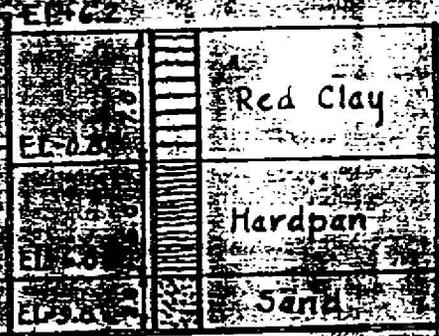
DEPT. OF SEWERS
FOWLER AV. & LAWRENCE ST.
FIELD SURVEY

DEPT. OF SEWERS
FOWLER AV. & LAWRENCE ST.
FIELD SURVEY

161

162

163



DEPT. OF SEWERS
FOWLER AV. & LAWRENCE ST.
FIELD SURVEY

DEPT. OF SEWERS
FOWLER AV. & LAWRENCE ST.
FIELD SURVEY

DEPT. OF SEWERS
FOWLER AV. & LAWRENCE ST.
FIELD SURVEY

ROCK LINE

QUEENS
SECTION

164		165		166	
El.+5.5	6.0	Ash Fill	El.+4.2	5.0	Ash Fill
El.-0.5	7.0	Dry Bog	El.-0.8	7.0	Dry Bog
El.-7.5	4.0	Mud	El.-7.8	3.0	Mud
El.-11.5			El.-10.8		
DEPT. OF SEWERS FOWLER AV. & 131 ST ST. FIELD SURVEY		DEPT. OF SEWERS FOWLER AV. & 131 ST ST. FIELD SURVEY		DEPT. OF SEWERS NR. FOWLER AV. & 131 ST ST. FIELD SURVEY	

167	
El.+5.1	5.0
El.+0.1	4.0
El.-3.9	3.0
El.-6.9	
DEPT. OF SEWERS NR. 131 ST ST. & AVERY AV. FIELD SURVEY	

ROCK LINE MAP

QUEENS SECTION

41

BORING LOG
 "Storm Sewers in DeLong Street and 41st Avenue etc."
 September 15, 1986

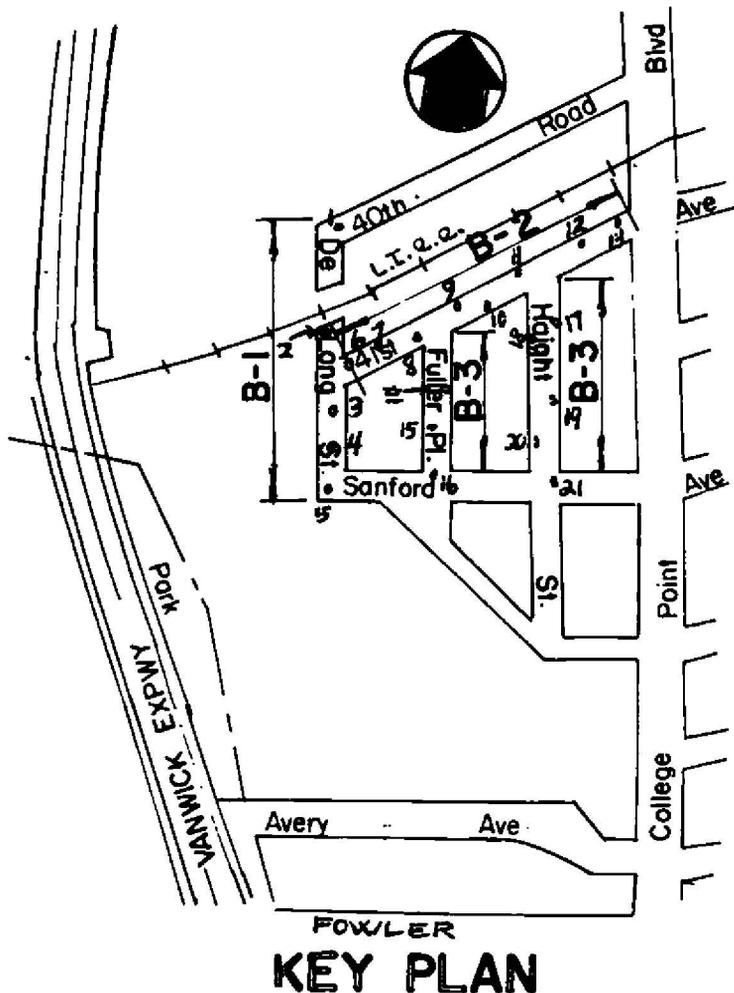
f-fine m-medium c-coarse pen-penetrated grav-gravel

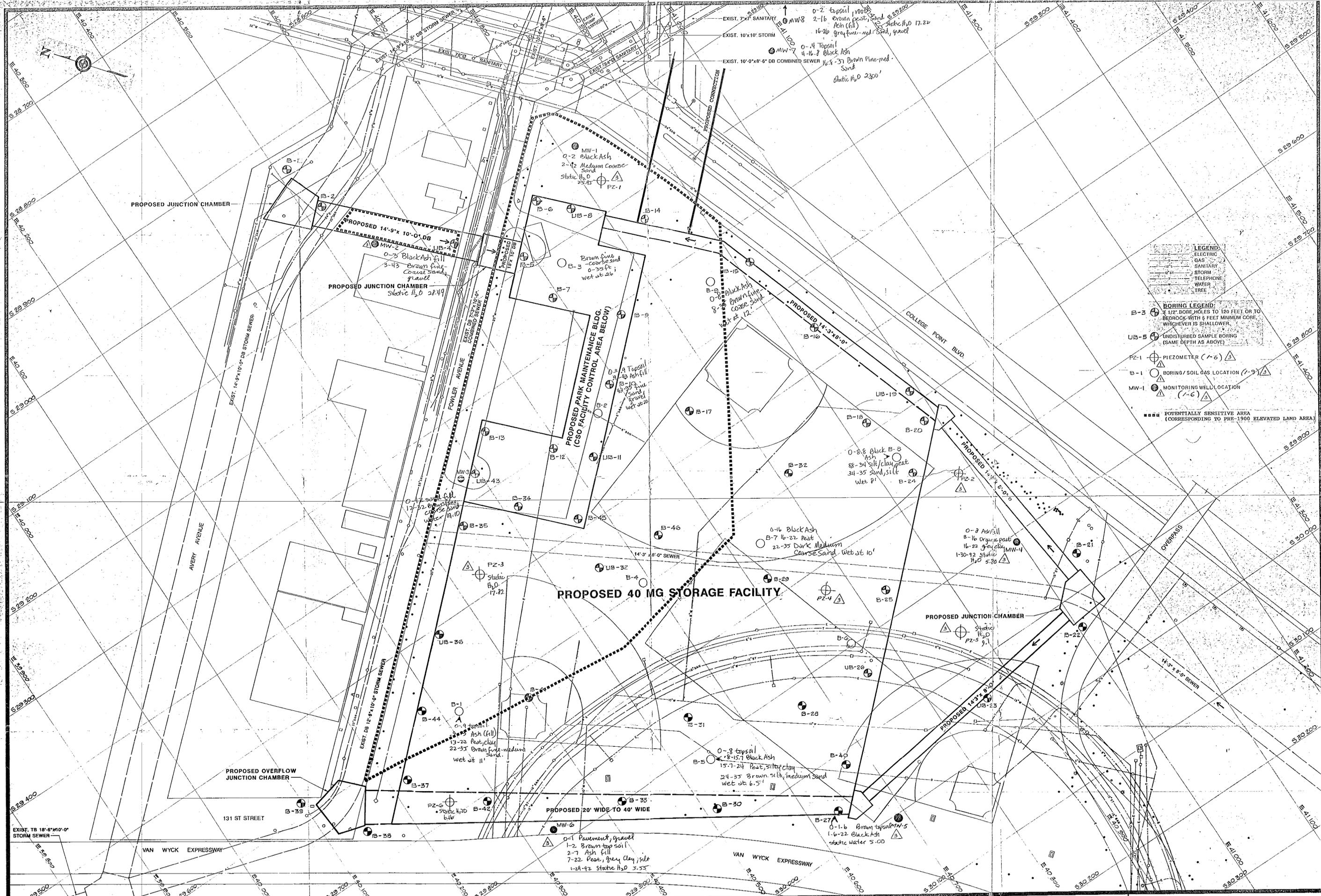
Boring:	1	2	3	4
surface el.:	4.8'	8.8'	11.7'	14.1'
water	0.9'	-0.9'	-3.3'	-1.7'
1st layer:	asphalt & concrete on fill: gravel etc. to 0.8'	asphalt on misc. fill, to 6.8'	concrete misc fill to 6.8'	misc. fill to 11.11'
2nd	dark gray org. silt, pen. by fill cinder etc. to -4.2'	dark brown org. silt little clay & trace veg. to 1.8'	brown silt little clay & fine sand trace grav. to 3.7'	fill with gray silt & black & brown sand to 7.1'
3rd	dark brown peat, some org. silt to -8.2'	light brown silt, some clay, trace fine sand & gravel to -7.2'	brown silt some clay to -1.3	fine brown sand, clayey silt and gravel to 5.1
Boring	5	6	7	8
Surface el.:	14.9'	8.7'	9.7'	7.4'
water	-0.7'	-2.8'	0.8'	2.3'
1st layer	asphalt & fill with gravel and sand to 8.9'	asphalt on misc fill. to 6.7'	sidewalk on misc. fill to 7.7'	asphalt on misc fill & f-m brown sand to 2.3'
2nd	brown silt some clay, trace gravel to 6.9'	brown silt some clay trace gravel cinders and fine sand to -0.3'	gray brown silt some clay, trace fine sand, grav, to -0.5'	brown silt some clay trace f sand gravel to -0.6
3rd	fine brown sand and silt trace gravel "till" to 1.9'	fine brown sand, silt trace grav. to -7.3'	dark brown peat, some org silt. to -7.3'	dark brown peat to -6.6'

Boring	9	10	11	12
Surface el.	7.1'	9.9'	11.7'	15.8'
water	-1.2'	-4.1'	-1.9'	-1.7'
1st layer	misc fill to 4.1'	misc fill to 5.9'	misc fill to 7.7'	misc fill to 12.8'
2nd	fill: f&m brown sand some silt trace grav & cinders to -1.9'	gray brown silt, some clay, little fm sand trace grav. to 1.9'	gray & red silt little clay, trace grav to 3.7'	brown silt some clay to 7.8'
3rd	dark brown peat to -6.9'	org. mat. to -0.1'	f-c brown sand & grav trace silt boulders to 0.7'	brown sand trace grav to 2.8'
Boring	13	14	15	16
Surface el.	19.5'	11.0'	11.8'	16.3'
water	0.4'	-0.7'	-3.5	-0.9'
1st layer	sidewalk on misc fill to 17.5	asphalt on misc fill to 9.0'	misc fill to 8.8'	misc fill gry/brwn clayey silt tr f sand to 11.3'
2nd	fine brown sand, some silt, trace grav to 11.5'	dark gray brown silt some clay trace f sand poss. fill to 2.0'	brown silt little clay to 3.8'	brown silt some clay tr f sand to 6.3'
3rd	f-m brown sand, trace silt, gravel to -3.5'	gray brown silt some clay, tr. fine sand to -3.0'	brown silt little clay lit/som f-m sand, tr grav "till" to -5.2'	ditto 15 plus boulders to -0.7'

Boring	17	18	19	20
surface el.	14.6'	17.2'	20.1'	22.9'
water	-1.2'	-0.1'	-2.2'	below -3.6'
1st layer	concrete on fill: grav clayey silt sand	misc fill to 15.2	fill: brown sand grav etc to 16.1'	asphalt on misc fill to 19.9'
2nd	f-m brown sand tr/little silt, grav. poss fill to 6.6'	brown clayey silt some f sand tr grav to 12.2'	f-m brown sand some grav, tr silt to 10.1'	brown silt some clay tr f sand tr grav to 11.9'
3rd	f-m light brown sand tr grav to -3.4'	f-m brown sand tr silt, grav to 5.2'	f-m-c brown sand, some grav, little silt, boulders "till" to 6.1'	f-m brown sand tr silt, grav to 4.9'

Boring	21
Surface el.	24.5'
water	below -2.5'
1st layer	concrete misc. fill to 22.5'
2nd	f-m brown sand tr silt to 20.5'
3rd	f-m brown sand, silt tr gravel to 15.5'





- LEGEND**
- ELECTRIC
 - GAS
 - SANITARY
 - STORM
 - TELEPHONE
 - WATER
 - TREE
- BORING LEGEND:**
- B-3 3 1/2" BORE HOLES TO 120 FEET OR TO BEDROCK WITH 5 FEET MINIMUM CORE, WHICHEVER IS SHALLOWER.
 - UB-5 UNDISTURBED SAMPLE BORING (SAME DEPTH AS ABOVE)
 - PZ-1 PIEZOMETER (7-6)
 - B-1 BORING / SOIL GAS LOCATION (7-9)
 - MW-1 MONITORING WELL LOCATION (7-6)
- POTENTIALLY SENSITIVE AREA (CORRESPONDING TO PRE-1900 ELEVATED LAND AREA)

NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION
1	1/13/11	REVISED NUMBERING AND LOCATION OF DIAMETERS AND MONITORING WELLS			
2	7/23/11	ADDED MONITORING WELL			
3	7/10/11	ADDED SUBSURFACE ASSESSMENT PROTOCOL			

DESIGNED BY: J.T.
 DRAWN BY: J.P.
 CHECKED BY: J.T.
 PROJ. ENGR. M.Z.



JOB NO. 32104

FLUSHING BAY WATER QUALITY FACILITY PLAN
 40 MG STORAGE FACILITY
 BORING LOCATION PLAN
 Scale: 1" = 40'
 Date: 10-23-11
 DWG. NO. 1 of 1