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HISTORICAL PERSPECTIVES INC.

PHASE 1A ARCHAEOLOGICAL ASSESSMENT

PROPOSED IKEA SITE, BLOCK 612, LOT 130

RED HOOK, ERIE BASIN

BROOKLYN, KINGS COUNTY, NEW YORK

8/2003

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BROOKLYN, KINGS COUNTY, NEW YORK

Prepared For:

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EXECUTIVE SUMMARY

IKEA Property, Inc. has proposed construction of a new 346,000 gross square foot (sf) furniture and home furnishings store in the Red Hook neighborhood of Brooklyn, Kings County, New York. The project site is located on Block 612, Lot 130, and comprises 22 acres bounded by Beard and Halleck streets on the north, Columbia Street on the east, Erie Basin on the south, and a deep-water slip (located west of the southern extension of Dwight Street) on the west.

The project site constitutes the majority of the property formerly owned and operated by the New York Shipyards (also known as the Todd Shipyards). Current plans call for all 12 extant buildings on the property to be demolished as part of the proposed IKEA project. Additionally, the project site contains five piers, known as Piers 1, 2, 3, 4, and 5, and a graving dock, known as Graving Dock No. 1. A second, adjacent graving dock (previously designated Graving Dock No. 2) has been buried with backfill and is no longer operable. It is possible that Piers 1, 2, and 4 may be incorporated into the proposed waterfront esplanade. The remaining piers, Piers 3 and 5, have deteriorated to the point that they are no longer safe for public access. Current plans call for severing these two piers from the shoreline so as to prevent public traffic, but leaving them otherwise unaltered from their present condition. Graving Dock No. 1 will be filled in and/or covered over to become part of the proposed parking lot; a portion of the soon to be filled graving dock would be incorporated into the waterfront esplanade plan.

The New York City Department of City Planning (DCP) is acting as the lead agency for this project's environmental review. Although the New York City Landmarks Preservation Commission (LPC) has determined that this project does not possess archaeological sensitivity, federal and state regulations specify that requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, must still be met. The New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) has identified the project site as having the potential to contain significant archaeological resources and has required a Phase IA archaeological sensitivity assessment to be undertaken (NYSOPRHP 2003a).

The NYSOPRHP has determined that Graving Dock No. 1 and Buildings 2, 3, 4, and 5 are eligible for the National Register of Historic Places (NRHP), whereas Piers 1-5 are not eligible. Prior to backfilling Graving Dock No. 1, if impacts cannot be avoided, mitigation of this structure would need to occur. This could consist of recording the structure using Historic American Engineering Record (HAER) documentation forms or recording the structure according to state standards put forth by the NYSOPRHP. Since Graving Dock No. 1 currently is exposed (in other words, not buried like a typical archaeological resource), no subsurface archaeological investigations would be required.

Graving Dock No. 2, currently buried under landfill, has not been evaluated for NRHP eligibility, but likely would meet the criteria. The structure is thought to retain much of its original wooden construction, dating from 1867, and may be one of the few large wooden graving docks left in the New York City Harbor. However, this resource will not

be disturbed by excavation for the IKEA store, and therefore a program of archaeological testing or monitoring is not recommended at this time.

Further information concerning the possible 1860s-era buried pumps under NRHP-eligible Building 3 would be necessary if the design plans change and there could be impacts to this area, warranting an evaluation of the pumps. However, this potential resource will not be disturbed by excavation for the IKEA store, and therefore a program of archaeological testing or monitoring is not recommended at this time.

Finally, no further archaeological investigations are recommended for Piers 1-5, the bulkheads on the property, or the landfill retained behind the bulkheads.

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I. INTRODUCTION

IKEA Property, Inc. has proposed construction of a new 346,000 gross square foot (sf) furniture and home furnishings store in the Red Hook neighborhood of Brooklyn, Kings County, New York. The project also will include approximately 71,400 sf of adjacent restaurants/retail establishments, an approximately 1,400-space parking lot, and a waterfront esplanade measuring about 5.5 acres. The project site is located on Block 612, Lot 130, and comprises 22 acres bounded by Beard and Halleck streets on the north, Columbia Street on the east, Erie Basin on the south, and a deep-water slip (located west of the southern extension of Dwight Street) on the west (Figure 1).

The project site constitutes the majority of the property formerly owned and operated by the New York Shipyards (also known as the Todd Shipyards). Currently, there are 12 buildings extant within the project site, all constructed during either the Todd Shipyards' occupation of the property, or the Robins Shipyard's occupation (its precursor company). The 12 buildings range in size from ca. 750 sf to 225,000 sf, and one to three stories in height. A number of the buildings currently are unused. Current plans call for all 12 of the buildings to be demolished as part of the proposed IKEA project. Additionally, the project site contains five piers, known as Piers 1, 2, 3, 4, and 5, and a graving dock, known as Graving Dock No. 1. A second, adjacent graving dock (previously designated Graving Dock No. 2) has been buried with backfill and is no longer operable. Currently, there also is a floating, sectional dry dock located north of Pier 5 that is unused. It is possible that Piers 1, 2, and 4 may be incorporated into the proposed waterfront esplanade. The remaining piers, Piers 3 and 5, have deteriorated to the point that they are no longer safe for public access. Current plans call for severing these two piers from the shoreline so as to prevent public traffic, but leaving them otherwise unaltered from their present condition. Graving Dock No. 1 will be filled in and/or covered over to become part of the proposed parking lot; a portion of the soon to be filled graving dock would be incorporated into the waterfront esplanade plan. Figures 2 and 3 illustrate the project site's current conditions, and the proposed IKEA building footprint on the site, respectively.

Planned subsurface impacts to the project site include 100-foot deep pilings for the foundation of the 231,000 sf IKEA store footprint, located on the northeastern part of the property, and as of yet undetermined foundation work for three buildings: two with approximately 24,000 and 23,000 sf footprints, respectively, on the western edge of the site, and one with an approximately 25,000 sf footprint on the southeastern part of the site. Additionally, demolition of the existing buildings on the site may result in subsurface impacts, and landfilling to create the proposed parking lot could disturb extant below-ground archaeological resources.

The New York City Department of City Planning (DCP) is acting as the lead agency for this project's environmental review. Although the New York City Landmarks Preservation Commission (LPC) has determined that this project does not possess archaeological sensitivity, federal and state regulations specify that requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, must still be

met. The New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) has identified the project site as having the potential to contain significant archaeological resources and has required a Phase IA archaeological sensitivity assessment to be undertaken (NYSOPRHP 2003a). AKRF, Inc. is preparing the project's Environmental Impact Statement (EIS), and in April 2003 contracted Historical Perspectives, Inc. to conduct the Phase IA archaeological sensitivity assessment, results of which will be incorporated into the EIS. The Phase IA report is being conducted to comply with environmental review regulations and meet the standards of the NYSOPRHP (New York Archaeological Council 1994).

This Phase IA report will describe current conditions on the project site (including recent boring data), previous cultural resources investigations undertaken within and adjacent to the project site, the history of the property, and based upon the preceding sections, the site's sensitivity for the recovery of archaeological resources. Julie Abell Horn, M.A., R.P.A. conducted the majority of the project research, the site walkover, and wrote this report. Christine Flaherty, M.A. assisted with the research, collected the historic maps, and prepared the graphics.

II. METHODOLOGY

Preparation of this archaeological study involved using documentary, cartographic, and archival resources. Repositories visited (either in person or by using their on-line electronic resources) or contacted included the New York Public Library; the Brooklyn Public Library; the Columbia University library; the New York City Landmarks Preservation Commission; the New York State Office of Parks, Recreation, and Historic Preservation; and the New York District, Army Corps of Engineers office. The Brooklyn Historical Society remains closed as of this writing. AKRF provided soil boring data, current site data, and various maps.

A site walkover was undertaken on July 3, 2003 by Julie Abell Horn, M.A., R.P.A. of HPI and Jennifer Morris of AKRF. Conditions were cool and overcast. The team made notes and took photographs of buildings, structures, and existing ground conditions.

III. ENVIRONMENTAL/PHYSICAL SETTING

The project site is located at the northeast corner of Erie Basin on the South Brooklyn waterfront, in the neighborhood known as Red Hook. Historically, the property was owned and operated as a shipyard, but today it is owned by the U.S. Dredging Company and is leased to a variety of tenants, as shown below in Table 1.

Table 1: Tenants on IKEA Project Site

Type of Business	Company	No. of Employees
Towing	US Towing	20
Towing	Ken-ben Towing	20
Marine Repair	Stevens Technical Services	8
Limousine Services	International Limo	10
Boat Repair	Nigel Boat Repair	3
Set Builders	Scott Inger	2
Furniture Manufacturing	Brooklyn Farm Table	2
Supply Company	D & L Time	3
Production Vehicles	5th & Sunset	8
Production Vehicles	Majestic Light	2
Production Vehicles	Lighting	2
Set Buildings	Projection Set Shop/Time	--
Property Management	U.S. Dredging Corporation	6

Source: U.S. Dredging Corp., August 8, 2003

Currently, there are 12 buildings on the site ranging in size from approximately 750 sf to 225,000 sf and from one to three stories in height. Table 2, below, lists the buildings, their construction information, and current use. As part of the project's environmental review, AKRF will prepare a separate analysis describing and evaluating the historic buildings on the property.

Table 2: Buildings on IKEA Project Site

Building No.	Number of Stories	Approx. Size (in sf)	Current Use
1	3	±8,400	In use/Office
2	3	±36,000	In use/Office
3	2	±5,000	Vacant
4	2	±1,200	Vacant
5	2	±750	Vacant
6	3	±108,900	In use/Vehicle parking
7	2	±67,900	Portion in use/garage, personnel, locker
8	1-3	±225,000	Vacant
9	1	±37,400	Vacant
10	1	±16,800	In use/garage and furnace shop
11	1	±6,400	Vacant

Building No.	Number of Stories	Approx. Size (in sf)	Current Use
12	1	±6,000	Vacant

Source: AKRF, Inc.

The entire project site formerly was either under water or marshy; as such, the present property sits completely on artificial land. Initial landfilling occurred on the property in the 1850s-1860s, at the northwest corner of the parcel. Subsequent landfilling took place at various times in the later nineteenth and early- to mid-twentieth centuries. The last episode of landfilling appears to have occurred in the 1940s, along the eastern side of the parcel (Sanborn 1939, 1950). The landfill on the project site is contained behind bulkheads, which were installed at different times as the shoreline was moved further into Erie Basin. The project site is generally flat, with little slope or change in grade, and is less than 10 feet above mean sea level.

In addition to the 12 buildings on the property, the project site contains 5 piers (several with large gantry cranes on them), known as Piers 1-5, and one extant (and working) graving dock, known as Graving Dock No. 1 (Photographs 1 and 2). A second graving dock, formerly known as Graving Dock No. 2, was buried in the late 1970s and the top of it currently is used as a fenced storage yard (Photograph 3). As of this writing, there also is a floating, sectional dry dock located north of Pier 5 that is unused. Piers 1, 2, 3, and 5 are constructed of timber piles and a timber deck; some of these piers have a concrete surface added on top of the timber decking. Pier 4 has concrete filled, steel pipe piles and a concrete deck. Piers 1, 2, and 4 have elements above the water line in reasonably good condition, although they have been repaired or replaced since the piers' original construction (Photograph 4). Piers 3 and 5 are in a severe state of deterioration; large portions of these piers have collapsed into the water, and access can be dangerous due to rotting timbers (Photograph 5). All of the bulkheads retaining the landfill within the project site are constructed of timber cribbing and timber faces; many of them are in poor condition (Photographs 6 and 7). Most of the project site that does not contain buildings or other structures is paved with asphalt or gravel, although in many areas these surfaces are uneven, buckled, or otherwise compromised (Photograph 8). Plants on the property consist solely of weeds.

A. Soil Boring Data

As part of the environmental studies conducted on the IKEA project site, 47 soil borings were excavated at various locations on the property in September 2002 (Figure 4). All of the borings contained one or more episodes of fill; no natural surfaces were reached during these tests. Most of the borings were excavated to a depth of either 6 or 8 feet below the present ground surface; the exceptions were borings placed on the western side of the property, within the former footprint of Graving Dock No. 2 and the area immediately west of Graving Dock No.1. In these areas, borings were excavated deeper (26-37 feet below grade within the former footprint of Graving Dock No. 2, at which point the machine halted at the bottom of the original graving dock; and 10-12 feet below grade west of Graving Dock No. 1). In no instances, however, did any of these borings extend below the fill layers.

The boring logs differentiate the fill layers by general soil composition and inclusions, although only occasionally by color. Most of the fill was characterized as sand and silt, with very occasional mention of clay. Within the fill, the boring logs indicated inclusions of wood, cinders, gravel, brick, concrete, asphalt, metal, rubber, cobbles, roots, and, in one instance, plastic. The ground water table was encountered in every soil boring, suggesting that prior to landfilling, the entire project site was either under water or very marshy. Depth of the ground water table varied across the property. The shallowest depth was 6 inches below grade; the deepest was 11 feet 9 inches below grade. (Of note, the boring logs do not indicate tidal conditions at the time the borings were excavated; the depth to ground water may also fluctuate with the tides.) Generally, the water table was deepest in the western part of the property, within the former Graving Dock No.2 footprint and west of Graving Dock No. 1, a condition that may be due partially to the construction of the graving dock itself, whose closed gate was designed to keep water out. Within the remainder of the site, the ground water table mostly ranged from 2-6 feet below grade.

IV. BACKGROUND RESEARCH/HISTORICAL OVERVIEW

A. Site File Search Results

According to information available at the NYSOPRHP, there have been no prior archaeological investigations conducted within the project site, and no archaeological sites have been recorded within its boundaries. One archaeological site (Post Hospital/Feature 11 site, NYSOPRHP site A06101.009526) falls within a one-mile radius of the IKEA project site, on Governors Island. This is a rubble-filled cellar associated with a Civil War-era hospital, which was demolished in 1874. The site has been determined not eligible for inclusion on the NRHP (Herbster and Garman 1997, Garman and Russo 1998).

The NYSOPRHP also indicates a number of historic structures have been recorded within and immediately adjacent to the IKEA project site (see Table 3, below). Although the current report does not address standing structures, mention of these resources is included here, as many of them have below-ground components and/or possible associated archaeological deposits.

Table 3: Historic Structures Within and Near IKEA Project Site

Resource	Location	SR/NRHP* Eligibility
Piers 1-5	Within project site	Not eligible
Graving Dock No. 1	Within project site	Eligible
37 Beard Street (a.k.a. Building 3; includes attached Buildings 4 and 5)	Within project site	Eligible
41 Beard Street (a.k.a. Building 2)	Within project site	Eligible
Gowanus Bay Terminal/ Terminal Pier (also known as Columbia Street Pier)	East of project site	Eligible, HAER documentation completed, Terminal Pier now removed
Warehouse Pier (Beard Stores)	West of project site	Eligible

*SR/NRHP= State Register/National Register of Historic Places, data available at the NYSOPRHP

Additionally, information housed at the United States Army Corps of Engineers, New York District office (but not on file at the NYSOPRHP) indicates that an extensive cultural resources investigation was conducted along the Brooklyn waterfront as part of the New York Harbor Collection and Removal of Drift project (Raber Associates 1984). In this report, Raber Associates prepared a comprehensive history of the Brooklyn waterfront and inventoried and evaluated those waterfront resources (such as bulkheads, piers, and pier sheds) that were slated for repair or removal, including a number of items in the Erie Basin area. Raber Associates' discussion of Erie Basin and its history is a benchmark study, and much of the present report relies on the information it provides. Raber Associates also conducted an addendum report for the Todd Shipyards site the

following year, but because they were denied access to the property, their conclusions and evaluations of significance were preliminary in nature (Raber Associates 1985). Raber Associates' report indicated that while the Todd Shipyards site as a whole probably was not significant, individual components of the site, such as the graving docks and the pump house on Beard Street, may be significant. No additional archaeological studies have been undertaken by the Army Corps of Engineers since the Raber Associates studies in 1984 and 1985 (Rakos 2003).

In 1999, the City of New York's Department of Sanitation proposed construction of a solid waste transfer station on the present project site. As part of that project, a historic summary of the property was prepared (Greenhouse Consultants 1999) and an EIS was compiled (CEQR No. 99DOS022Y). In their evaluation of the EIS, the New York City LPC determined that the site did not possess archaeological sensitivity, and therefore no further archaeological investigations were undertaken. The solid waste transfer station project was never constructed.

B. Site History

1. *Precontact Period*

During the precontact period, the entire project site was either under water or covered by low-lying marshland. In the mid-nineteenth century, the project site was dredged extensively in order to create Erie Basin (Raber Associates 1984). Hence, there is a low potential for recovery of prehistoric resources within the project site, and the NYSOPRHP has indicated that it is not necessary to address this period (NYSOPRHP 2003b).

2. *Colonial Era*

Use of the project site was limited during the Colonial period, as most of it was not firm land. The portion of the project site now south and west of Beard Street was under water during this time, while the remaining parts of the project site probably were marshy (see Figures 5, 6, 7, and 8). After 1760 there was a mill located at the modern-day intersections of Van Brunt and Richards Streets with Van Dyke Street, several blocks northwest of the project site. Historic maps show that there were mill ponds in the project site vicinity, which had been created by damming existing waterways. The maps differ as to exact locations of these ponds, but it appears that an edge of one of them may have been located within the northeastern part of the project site, east of the modern-day intersection of Beard and Dwight Streets (see Figures 5, 6, and 8). Besides the mill pond, there is no indication that the project site supported any activities other than perhaps cattle grazing in the salt meadow grass along the shoreline (Raber Associates 1984).

During the Revolutionary War, the Continental Army established a defensive redoubt called Fort Defiance, in the general vicinity of the project site. Historic sources differ as to the exact location: the fort has been described as located near the present-day intersection of Conover and Van Dyke Streets, several blocks northwest of the project

site (Figures 9 and 10); and at the intersection of Beard and Dwight Streets, just north of the project site (Figure 11). Considering a photograph of the site made in 1866 shows that the northeast corner of the Beard and Dwight Street intersection still was under water (probably the former mill pond's edge) it seems less likely that the fort was located at this intersection (Figure 12). Furthermore, due to the site's location offshore, there is a low probability that the project site was occupied or impacted by events of the war, even if the fort was located in close proximity, as the area south of Beard Street was still covered by water at that time.

3. *Federal Period and Early Nineteenth Century*

The project site remained essentially unused and undeveloped during the federal period and the early nineteenth century, as the property was still under water or marshland. However, the future of the project area changed dramatically after 1834, the year Brooklyn became a city. Developers pushed for expansion of the street grid from the downtown area over to Red Hook, in anticipation of new housing, and creation of a city bulkhead line to attract waterfront commerce. A new speculative development group, the Red Hook Building Company, formed to stimulate growth, advertised in its prospectus for 1838 construction of at least 500 homes in the next two years. Although the building schedule lagged for another decade, it did provide an impetus to prepare the ground in Red Hook for future construction. Prior to actual development, marshes and ponds in the Red Hook area were filled, often by leveling adjacent hills, so as to create a more level building surface (Raber Associates 1984:26). The pace of grading and filling may be seen in a series of historic maps from this period: the 1849 Colton map (Figure 7) shows the original topography of Red Hook with the projected street grid superimposed; the 1844 U.S. Coast Survey map (Figure 6) illustrates the area just prior to landfilling; and the Perris 1855 map (Figure 8) shows the area with the proposed Erie Basin outline superimposed, but also shows lines of the original shoreline.

4. *Erie Basin Construction*

Beginning in the mid-1840s, a number of successful merchants and developers – most notably William Beard, and brothers Jeremiah and George Robinson – began to acquire offshore rights in the area stretching from Van Brunt Street to Hamilton Avenue at the Gowanus Canal. This property consisted of marshland, offshore areas with up to 8 feet of water at mean tide, and "sand spits and islands with irregular connections to the mainland" (Raber Associates 1984:63). Their plan was to create two contiguous ship basins, named Erie Basin and Brooklyn Basin. Although some undocumented improvements apparently occurred in the area between 1845 and 1855, work on the basins began in earnest in 1856, and continued through about 1880.

Beard oversaw construction of the basins, and began the work by erecting a narrow breakwater beginning at about Conover Street (north of the later Erie Basin perimeter) and stretching around the projected ends of the two basins, about 8,000 feet to the foot of Court Street (south of the projected end of the Brooklyn Basin). Once the area was enclosed, Beard dredged out the basin areas, using the recovered material to create

bulkhead lines that would become the inner Erie Basin lines. Other materials added to the landfill at certain times may have included ballast from arriving European ships (Raber Associates 1984:74). By ca. 1864, Beard had completed the bulkhead outlines – along Elizabeth Street (later renamed Beard Street) to Otsego Street – and the outer breakwaters, and had enclosed about 60 acres of water. The eastern end of Erie Basin was at this time an irregular line of dredged fill, and would remain so for a number of years. Between 1865 and 1880, Beard constructed piers and additional bulkheads extending into Erie Basin from the shores. The north breakwater for Erie Basin, now known as Warehouse Pier, was built in the early 1870s, and the inner bulkhead of the southeastern breakwater was erected after 1873. The outer edge of this breakwater remained an irregular mass of loose, dredged fill until the early twentieth century, with an open pile bridge connecting this breakwater to the finished bulkheads on Elizabeth Street. This breakwater was the division between Erie Basin and Brooklyn Basin, but as Brooklyn Basin was not fully constructed during the nineteenth century, completion of its outer edge became a lower priority for Beard (Raber Associates 1984:64).

5. *Early Years of the Shipyard*

In 1864, while construction of Erie Basin was still underway, Beard and the Robinson brothers sold a portion of Erie Basin, running southeast from a point between Richards and Dwight Streets at Elizabeth (Beard) Street, to another entity, called the Erie Basin Dock Company, whose president was Jeremiah Robinson. Here, the Erie Basin Dock Company established a shipyard, which would survive, under various owners, for over 100 years. The current IKEA project site falls within the former Erie Basin Dock Company's property.

The Erie Basin Dock Company's primary order of business was to hire Bostonian James Simpson to construct the shipyard's first graving docks,[1] where ships would be repaired. Raber Associates (1985:5) describes these permanent graving docks as:

> "basin drydocks," of a type generally excavated into a shoreline, made watertight with timber or masonry lining, and provided with a gate or caisson to seal one end. With the basin flooded, a ship could enter through the gate and rest over a set of timber keel and bilge blocks. With the gates closed and the water pumped out, the ship settled on the blocks for repairs to the lower hull, rudder, or propellers. Such drydocks in the United States dated to naval yard facilities of the 1830s in Boston and Norfolk, and included the extant 1851 Brooklyn Navy Yard dock with a masonry lining (Anderson 1907:156).

Graving Dock No. 1, as the first facility came to be known, was completed in 1866, along with an engine or pump house (housing a compound steam pump set in a pit to dewater the dry docks) and several storehouses (Mitchell 1981:5). This initial cluster of structures was located on the south side of Elizabeth (Beard) Street, near the intersection of Dwight Street. Figure 12, a photograph taken in 1866, shows Graving Dock No. 1 – already

[1] The term "graving dock" derives from the structure's excavation below ground, like a "grave."

containing a ship – along with the machine shop on the left and the storehouses on the right. Of particular note, the foreground of the image, depicting the northeast corner of the Elizabeth (Beard) Street and Dwight Street intersection, still shows the edge of the former mill pond (Mitchell 1981:1).

An article in the *Brooklyn Eagle* described the initial configuration at the shipyard. Graving Dock No. 1 was 500 feet long, 120 feet wide at the top, 60 feet wide at the floor, 90 feet wide at the top of the gate (or caisson), and 60 feet wide at the bottom of the gate. The structure was constructed of heavy timbers, and could receive vessels measuring 12 feet draft at low water and 18 feet draft at high water. Graving Dock No. 2, completed by Simpson in 1867 and located immediately east of Graving Dock No. 1, was 447 feet long, 100 wide at the top, and 47 feet wide at the floor. It could receive vessels measuring 17 feet draft at low water and 22 feet draft at high water. As an added feature, a second gate was installed near the middle of Graving Dock No. 2 that allowed the structure to house two ships at one time. The two sectioned parts of the dock measured 222 feet and 218 feet long. The newspaper article also noted that the engine gates used centrifugal pumps that could pump 1,500 gallons of water per minute. The stylish brick engine house at the head of the docks (it had a mansard roof and brownstone trimmings) housed a 100 horse power horizontal engine and two oscillators using 50 and 30 horse power. By the late 1860s, the shipyard also had built four large warehouses (located west of Graving Dock No. 1 on top of a newly filled area behind an extended bulkhead) to house cargoes of vessels being repaired. These buildings were four stories high, 132 feet deep, and 29 feet wide. They had granite and concrete foundations resting on pilings sunk 25 feet in depth (*Brooklyn Eagle* 1870).

6. *Late Nineteenth Century*

From the 1870s through the 1890s, the shipyards were sold and leased several times. In 1876, the owners of the Erie Basin Dock Company sold out to a new company, the Erie Basin Dock and Warehouse Company, Ltd. (Mitchell 1981:6). This second organization went bankrupt in 1880, and its assets and liabilities were purchased at a public auction by Thomas Buckley, a local businessman, who immediately conveyed the shipyards to the Anglo-American Dry Dock and Warehouse Company. This company in turn leased the shipyard to the Cramps of Philadelphia for a term of 14 years, beginning in 1881. In 1883, however, the Cramps subleased the yards to the father and son team of James Simpson Sr. and Jr. (the senior Simpson had previously supervised construction of the graving docks). During this period, the shipyards were known locally as the "Boston Docks." In 1886, the Simpsons surrendered their sublease, and the Cramp lease transferred to the partnership of Handren and Robins, of Manhattan. After Handren's exit from the firm in 1892, the company became known as the John N. Robins Company, and in 1895, the Cramps ownership of the property officially was sold to the Robins Company (Mitchell 1981:6-7). By this time, the Erie Basin businesses also had their own horse-car line: the Van Brunt Street and Erie Basin Railroad, which began running between the Hamilton Ferry and the shipyards in 1880, and by the 1890s, had converted to an overhead electric trolley (Mitchell 1981:6, 10).

One of the first maps that shows the actual layout and shoreline of the shipyards in its first decade of operation (as opposed to projected lines of the basin, which had not yet been built but were often depicted on maps of this period) was made by the U.S. Coast Survey in 1874 (Figure 13). Here, both the shoreline and the bulkhead line are clearly visible. The Bromley map from 1880 (Figure 14) illustrates the shipyards (and the former shoreline), and labels the two graving docks (identified as dry docks). The unlabeled structures to the north and west are the engine house and the warehouses. The 1886 Sanborn map shows the project site and the shoreline in additional detail (Figure 15). In particular, it illustrates that the eastern breakwater for Erie Basin, along the line of Columbia Street, was still only accessible via a wooden causeway, and that a large portion of the project site east of the graving docks was still under water. A photograph from the early 1890s (Figure 16) shows both graving docks in use, with buildings along Beard Street in the foreground bearing the name of Handren & Robins Dry Docks (Mitchell 1981:8).

Under the John N. Robins ownership of the shipyards, the repair facilities expanded considerably. The company purchased three floating dry docks, one in 1892 and two in 1901 (Mitchell 1981:9, 11). The 1904 Sanborn map shows the locations of these new repair facilities (Figure 17). The first dry dock – a Balance Dry Dock – was located between Piers 1 and 2, west of Graving Dock No. 1. Raber Associates (1985:5-6) describes this dry dock in detail:

> The first acquisition was the venerable Balance Dry Dock, a wooden floating dock built in 1854 by William H. Webb, then the port's leading wooden shipbuilder. Handren & Robins moved this dock to Erie Basin from upper South Street in Manhattan, installing it north of the graving docks between two earlier pier sites. Floating drydocks were evidently an American invention dating to the early nineteenth century, first patented in 1816 by a J. Adamson as a wooden drydock with a gate at its stern, much like a floating graving dock. The balance drydock, first patented in 1840 by John S. Gilbert of New York, was instead open at both ends. By flooding pontoon-like chambers on the high sides, balance drydock operators could sink the structures. When a ship was in position over the dock floor, pumping out the chambers raised the dock until the floor cleared the water with the ship supported on the keel and bilge blocks. The mobility and lower construction cost of all types of floating docks, relative to graving docks, have made them far more popular for private shipyard work (Anderson 1907:316; Morrison 1909:105; Mitchell 1981:10).

The other two dry docks, called sectional dry docks, were placed adjacent to Piers 3 and 4. Raber Associates (1985:6) elaborates:

> Sectional floating drydocks appeared soon after the development of the balance dry dock. Although operated on the same principle, the sectional docks were made of identical segments which could be linked together to create drydocks of variable lengths. They were also "self-docking," in that

any segment could be detached and drydocked for repairs on the remaining segments.

In 1896 Graving Dock No. 1 was rebuilt, and plans were underway to construct a third graving dock west of it and measuring 800 feet in length, although it appears this mammoth project was never actually undertaken (*Brooklyn Eagle* 1896).

The Robins shipyard expansion around the turn of the century was well documented. A *Brooklyn Eagle* article from 1899 described the activity:

> The old freight shed of the Anglo-American Stores has been torn down and a much larger one built close up to the warehouses. Half of the old wharf upon which the shed stood has been removed and the remainder is being strengthened and rebuilt. Parallel to this a narrow wharf had been built out some 500 feet into the basin and a new bulkhead is being built between these pieces. In the slip between, one of the sectional docks will be located. The pierhead adjoining and just north of the entrance to the smaller chamber dock is being rebuilt.
>
> Farther over, beyond the ship house, two dredges are at work deepening the basin for a chamber for a second sectional dock. Two long piers will also be built there. The third dock will be located on the south side of the yard, from between the lines of the boiler shop and Long Dock (*Brooklyn Eagle* 1899a).

The changes to the shipyard that the article describes include modifications to Piers 1 and 2 and the bulkhead in between them, and new construction of Piers 3 and 4.

7. *Twentieth Century*

A lithograph made circa 1900 (Figure 18) shows the Robins shipyard facilities several years after the above article was written, and illustrates the results of these changes (Mitchell 1981: frontispiece). In the image, ships are visible in the two graving docks, as well as in the three new floating dry docks acquired in 1892 and 1902: the Balance Dry Dock between Piers 1 and 2, and the sectional dry docks adjacent to Piers 3 and 4. The lithograph also depicts the various support buildings associated with the shipyard, including structures along Beard Street, the warehouses and new "freight shed" described above, west of Graving Dock No. 1, and a number of enclosed and semi-enclosed structures east of Graving Dock No. 2. The Hamilton Ferry trolley is shown running along Beard Street.

The 1904 Sanborn map, made soon after the lithograph, details additional improvements at the shipyard, including additional support buildings on top of newly filled areas stretching east to the line of Otsego Street. Pier 5 is now shown to support the Mannings Yacht Agency and several ancillary structures. During this period, piers along the eastern breakwater of Erie Basin provided berths and repair facilities for yachts, as well as places

for canal barges and their occupants to tie up over the winter months, when ice prevented their passage up to the Erie Canal (*Brooklyn Eagle* 1894, 1899b; Raber Associates 1984).

In 1911, the John N. Robins Company became the Robins Dry Dock and Repair Company. As World War I approached, the owners of the company received a lucrative offer from a British firm to buy the shipyards. At the time, William H. Todd was in charge at Robins, having moved up the ranks from boilermaker foreman in 1895, to superintendent in 1903, to general manager and vice president in 1905, and finally to president in 1909. Todd, drawing on the loyalty and funds of about 100 of his coworkers, made a counteroffer to the company owners, in the same amount as the British rivals, and succeeded in purchasing the shipyards in 1915. From then, the company name changed to the William H. Todd Corporation. It was said that in 1915 the Todd Corporation shipyards were the largest repair facility in New York, containing 29 acres of real estate, two graving docks, and three floating docks capable of handling ships up to 18,000 tons (Mitchell 1981: 14-17). The 1915 Sanborn map (Figure 19) provides additional details of the shipyard around the time it was acquired by Todd. All three of the floating dry docks are shown, and the pier formerly located just east of Graving Dock No. 2 has been removed.

On the cusp of the United States involvement in World War I, the Todd Shipyards had become the harbor's largest repair facility, employing about 2,500 men. Its graving docks could handle ships of up to 10,000 and 11,000 tons capacity, and its floating dry docks between 6,000 and 18,000 tons capacity. Todd's claim that the yards were "designed especially for the repairing of ocean-going vessels, and its dry docks can accommodate ships of large size" made it particularly attractive for upcoming war-related work (Mitchell 1981:27-28). During World War I, Todd Shipyards and its new subsidiaries (several other facilities located elsewhere in New York Harbor) received contracts to repair and refit approximately 70% of all damaged German and Austrian vessels interned at the Port of New York, and close to 80% of the work done outside the Navy Yard (Mitchell 1981:35).

The shipyard also expanded its holdings during World War I. According to Raber Associates (1985:7), the two sectional dry docks, originally installed in 1901-1902, were replaced during World War I with new wooden sectional docks made by the Cossey Shipyard in Tottenville, Staten Island. The two new dry docks had five sections, each 90 feet long and 114 feet wide, and could accommodate vessels measuring 460 feet long and with a 25 foot draft. The piers adjacent to the sectional dry docks were rebuilt at this time to accommodate these new structures.

Following World War I, Todd Shipyards experienced an abundance of work during the first part of the 1920s, due in part to post-war backlog, although as the Depression grew nearer and shipping activity decreased overall, contracts tapered off. In 1921-22, the shipyards engaged in an extensive program to add third-class accommodations to American passenger vessels now making the Atlantic crossing to England and the Continent, and worked on a series of medium-sized ocean liners (Mitchell 1981:79). The

following year, the shipyard installed a fourth floating dry dock, consisting of five wooden sections, and capable of handling 10,000 tons (Mitchell 1981:85).

The most impressive addition to the yard, however, was the drastically reworked and enlarged Graving Dock No. 1. Begun in 1928 and completed in 1929, just after the Wall Street crash, the new and improved graving dock – the original timber walls were rebuilt in concrete and the facility was lengthened – was touted as the most capacious dry dock in New York Harbor, now measuring 790 feet in length, 90 feet in width, and able to dock a ship 731 feet in length and 28 feet draft (Mitchell 1981:91; Raber Associates 1985:7). It was also something of an engineering marvel: in the United States, this may have been the first time the "Tremie Method" of pouring concrete underwater (a procedure that used a specialized pipe (called a Tremie pipe) to conduct the concrete from dry land to its underwater destination) was used to build a graving dock. Where once constructing concrete graving docks could take up to a decade, now they could be completed in only two years. The rebuilt Graving Dock No. 1 was held up as a pioneering example of how to construct "Tremie-placed concrete dry docks" in record time; the procedure later was employed to build concrete dry docks in Philadelphia; Pearl Harbor, Hawaii; and the Brooklyn Navy Yard (Harris 1942). Graving Dock No. 2 was also lengthened in 1928-29, but was not rebuilt in concrete (Raber Associates 1985:7).

In addition to rebuilding and enlarging the graving dock, the original 1866-67 era centrifugal pumps were replaced with 48-inch electric spiral screw pumps, which had the ability to pump 16 million gallons a day. These new pumps were installed in a pit nearer the docks, and the old pump house was converted into an electric generator and switchboard room. The original centrifugal pumps from the pump house (Building 3) were too cumbersome to remove, and so were said to have been simply buried and floored over under the structure, where presumably they remain today (Raber Associates 1985:7).

Despite the downturn in the economy just prior to its completion, when it reopened, Graving Dock No. 1 attracted considerable contracts, including work on the *George Washington*, America's second largest flagship at the time, which previously could not secure large enough dry dock space in the harbor (Mitchell 1981:92). This reworked graving dock is the same structure in use today. The 1939 Sanborn map (Figure 20) shows the Todd Shipyards after the building episodes of the 1920s. In addition to reclaiming more of the basin behind bulkheads, particularly around the line of Otsego Street, this edition illustrates that more buildings also had been constructed or expanded in this area. Raber Associates (1985:7) indicate additional changes to the shipyard in the period from ca. 1925-1934. These included rebuilding Piers 1 and 2, erecting a reinforced concrete barrier between the two graving docks and installing a 20 ton crane there, and creating of a rail track network for cranes on most of the piers.

Work slowed considerably for Todd Shipyards during the Depression, although the facility never closed. However, during World War II, business was once again plentiful. In this period the yards serviced over 3,000 ships, and for the first time included women workers – about 5,000 of them – among its crews, as the men shipped off to battle

(Mitchell 1981:143). Todd Shipyards also participated in a wartime program to build two dozen LCI (Landing Craft Infantry) boats for the U.S. Navy, assisting Todd's Hoboken yards. For construction of these vessels, workers transformed Graving Dock No. 2 and its adjacent yard space into a modified assembly line (Mitchell 1981:153). In the midst of the war, the shipyards also went through two name changes. In 1942, the company became Todd Erie Basin Dry Docks, Inc., and in 1943, the yards became known as the Todd Shipyards, Brooklyn Division, to distinguish it from the numerous other shipyards that the company had acquired during its nationwide expansion during the preceding decades (Mitchell 1981:160-161).

Raber Associates (1985:8) describes the physical changes to the shipyard during World War II:

> Todd rebuilt and/or razed virtually the entire yard upland in 1941-42 except the old shops and offices along Beard Street... All the older structures behind Piers 1 and 2, including the historic storehouses which had been a join shop for some years, disappeared. South of the graving docks and behind Piers 3 and 4, new structures included a large manufacturing/storage building, a personnel building, a new blacksmith shop, a compressor building, and a rivet shop, together with a new set of crane tracks through this part of the yard serving piers from No. 3 southwards.

With few exceptions, by issuance of the 1950 Sanborn map (Figure 21), new construction at the Erie Basin facility was finished; review of this map shows few alterations (other than demolition or removal of structures) from the present layout of the plant. Expansion of the shipyards by this time included reclamation of the remainder of the basin waters behind bulkheads to the east of Otsego Street (the area that previously had only been accessible via a causeway), and erection of a number of service buildings along the property's eastern boundary.

Work continued at the shipyards through the second half of the twentieth century. In the late 1950s, a shift to container ship use occurred, and Todd Shipyards converted many vessels to this type of cargo carrier (Mitchell 1981:193). Government work increased during the Cold War and the Vietnam War eras, as the yards repaired many damaged freighters and other naval ships. In 1968, the yards even repaired a specialized Navy dry dock, itself used to repair large ballistic submarines. It was perhaps the only known instance at the yards of a dry dock nestled inside another dry dock (Mitchell 1981:235-236).

The 1968 Sanborn map (Figure 22) illustrates no change to the yards since the 1950 edition, other than the removal of all but one floating dry dock, the one adjacent to Pier 5. However, according to Raber Associates (1985:8), there had been some repairs and overhauls to existing structures around 1965. This included replacing or adding several gantry cranes, rebuilding Pier 4 in concrete and steel, overhauling the gate and pump at Graving Dock No. 1, and renovating part of Pier 2.

Although there was still work at the Todd Shipyards during the 1970s, it was dwindling. By 1975, the facility employed only 650 people, and had to apply for a Federal loan guarantee of 225 million dollars to remain operating (Raber Associates 1985:8). One result of this downturn in contracts was that Graving Dock No. 2, a bit longer but otherwise largely unchanged from its original 1867 configuration and by now obsolete and deteriorating, was no longer being used. In early 1976, the company ordered it filled in (Mitchell 1981:271). Although Sanborn maps after this time continue to show Graving Dock No. 2 as an active structure, in fact for 25 years it has been buried. The area is now used for outdoor storage.

Todd Shipyards closed permanently in 1983, and in 1986, the facility was sold; today the property is owned and managed by the U.S. Dredging Corporation, which leases the former shipyards to a variety of maritime and non-maritime tenants.

V. CONCLUSIONS

A. Precontact Period Resources

As the preceding sections have described, the project site was formerly under water or extremely marshy. There is no evidence to suggest any occupation or use of the property prior to landfilling activities, which began in the 1850s and 1860s, with initial construction of Erie Basin. Additionally, much of the project site appears to have been dredged as well as filled, suggesting that any natural surfaces within the property have been destroyed. Therefore, there is a very low likelihood that prehistoric archaeological resources survive anywhere within the project site, unless perhaps random artifacts have become commingled in the redeposited landfill, and in which case they would have little research value or overall significance.

B. Historic Period Resources

There is likewise low potential for historic period archaeological resources to exist within the landfill. Accounts claim that the majority of the soil used to create Erie Basin was locally dredged material redeposited within timber cribbing to form breakwaters and bulkheads. Although ballast from European ships was claimed to have been added to the landfill at times, this practice is thought to have occurred mostly for the Erie Basin property owned by Beard, outside of the project site (Raber Associates 1984:74). There is no evidence to suggest that the landfill in this area included scuttled ships or other maritime resources that sometimes were used to supplement earlier waterfront area landfill in other parts of the city, such as lower Manhattan.

Raber Associates' 1985 report on Todd Shipyards offered preliminary conclusions that the shipyard as a whole probably was not significant, although this conclusion was based on incomplete data, and a final determination was not made. Their report says:

> The extensive World War II rebuilding program suggests that the yard's significance as a whole would rest largely on its integrity and significance as an example of a repair facility of this period (Raber Associates 1985:15).

However, Raber Associates concluded that the equipment on site was probably well documented elsewhere, and common in shipyard and non-shipyard settings. They summarized:

> The yard thus appears on the surface to have little if any technological significance when considered as a complex (Raber Associates 1985:15).

According to Raber Associates, any potentially significant archaeological resources within the project site therefore would consist solely of individual structural elements associated with creation of the facility (such as bulkheads) and its operations (such as the piers, graving docks, and subsurface machinery). These resources are described below.

1. *Graving Docks*

As described above, Graving Dock No. 1 was built in 1866, rebuilt to some degree in 1896, and completely rebuilt in 1928-29. Historic images of the graving dock (see Figures 12, 16, and 18) show that the nineteenth century construction was of wooden timbers, whereas in 1928-1929 the facility was rebuilt using concrete. The twentieth century structure is much steeper than the original facility; it appears that the original wooden timbers were removed completely in order to create the newer dock. In 2003 the NYSOPRHP reevaluated Graving Dock No. 1 and determined that it is eligible for inclusion in the NRHP.

Graving Dock No. 2, unlike Graving Dock No. 1, was not substantially altered after its original construction in 1867, although it was lengthened in 1928-29, and some wooden elements presumably were replaced over the years as they wore out. This graving dock was buried under landfill in the late 1970s; despite possible demolition of some elements prior to backfilling, it is believed that at least some of its original components survive under the fill. Graving Dock No. 2 has not been evaluated for NRHP eligibility, but it is very likely that it would meet the criteria. Construction of the IKEA store will overlap the northeast corner of the Graving Dock No. 2 footprint; however, the building will be cantilevered over the graving dock, and no pilings will be sunk to support this part of the new building (Bry 2003).

2. *Machine/Pump House (Building 3)*

The original machine or pump house, located on Beard Street just north of the graving docks, dates to 1866 and has been determined eligible for the NRHP. Although there have been various additions to the building, it is believed that the original structure survives behind the more recent add-ons and facades. Raber Associates 1985 report indicates that the 1860s era pumps for the shipyards may survive buried under this building (Raber Associates 1985:16). Because this building presently is structurally unsound, access to its interior was not possible during the field visit, and existence of these pumps could not be confirmed. However, if extant, the pumps would be considered a significant element of the resource.

3. *Piers 1-5 and Bulkheads*

In 2003, the NYSOPRHP reevaluated Piers 1-5, and determined that they are not eligible for the NRHP. Raber Associates' report (1985:16) likewise indicates that because of their "extremely well documented nature and repeated modifications or repairs" the wooden piers and upper wooden bulkhead surfaces would not be considered significant. As such, no archaeological investigations are warranted for these resources.

VI. RECOMMENDATIONS

Based upon the above conclusions, the following recommendations are offered.

Prior to backfilling NRHP-eligible Graving Dock No. 1, if impacts cannot be avoided, mitigation of this structure would need to occur. This could consist of recording the structure using Historic American Engineering Record (HAER) documentation forms (a federal process administered by the National Park Service, which can be undertaken on several different levels of effort), or recording the structure according to state standards put forth by the NYSOPRHP. This decision will need to be made by the NYSOPRHP. Regardless of which method is chosen, additional research regarding the structure's construction and history should be included in the undertaking. Since Graving Dock No. 1 currently is exposed (in other words, not buried like a typical archaeological resource), no subsurface archaeological investigations would be required.

Graving Dock No. 2, currently buried under landfill, has not been evaluated for NRHP eligibility, but likely would meet the criteria. The structure is thought to retain much of its original wooden construction, dating from 1867, and may be one of the few large wooden graving docks left in the New York City Harbor (the extant graving dock at the Brooklyn Navy Yard is made of masonry). However, this resource will not be disturbed by excavation for the IKEA store, and therefore a program of archaeological testing or monitoring is not recommended at this time.

Further information concerning the possible 1860s-era buried pumps under NRHP-eligible Building 3 would be necessary if the design plans change and there could be impacts to this area, warranting an evaluation of the pumps. However, this potential resource will not be disturbed by excavation for the IKEA store (Bry 2003), and therefore a program of archaeological testing or monitoring is not recommended at this time.

Finally, no further archaeological investigations are recommended for Piers 1-5, the bulkheads on the property, or the landfill retained behind the bulkheads.

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FIGURES

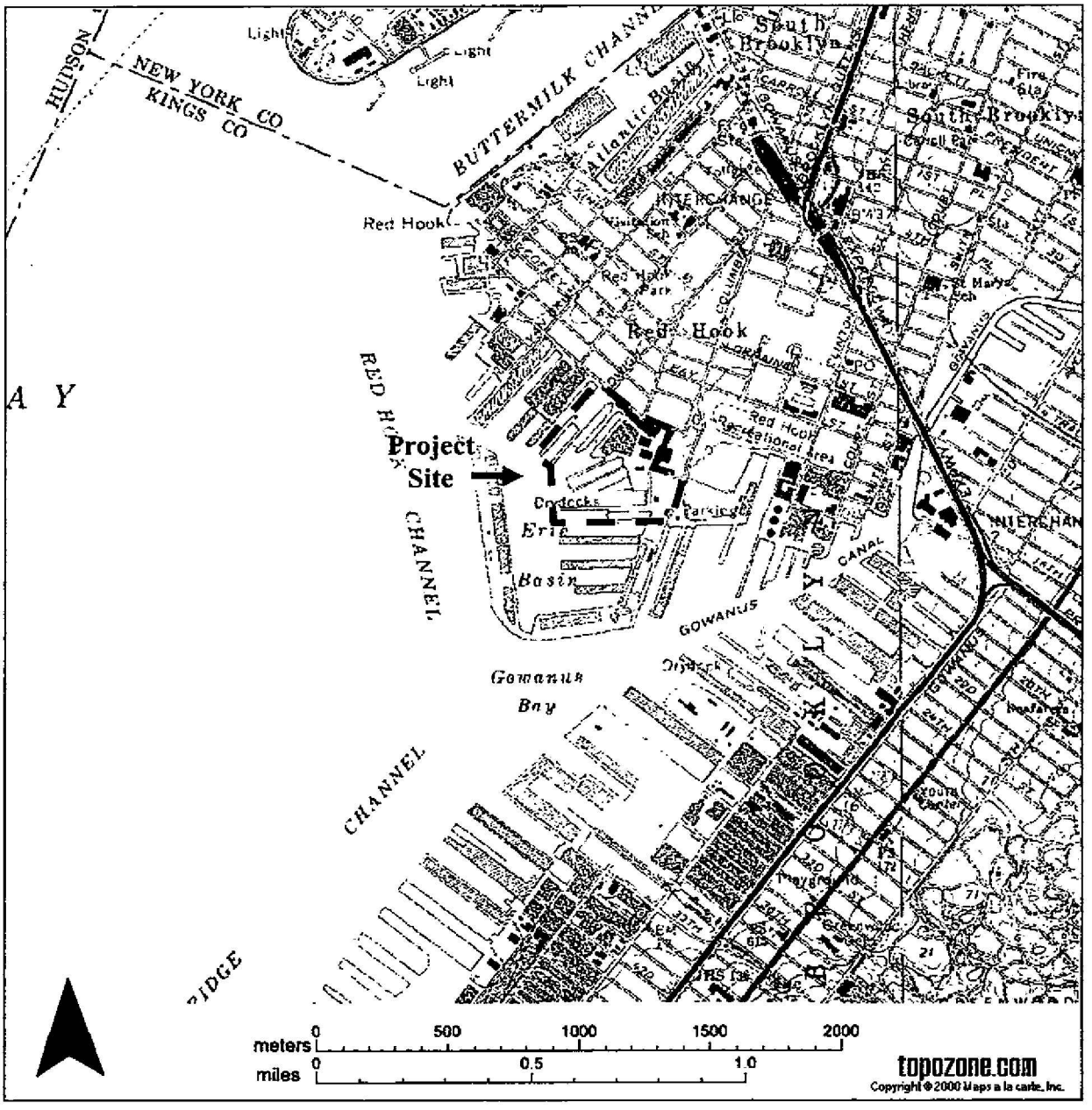


FIGURE 1

Jersey City Quadrangle, New Jersey and New York; Brooklyn Quadrangle, New York.
United States Geological Survey, 1976 and 1995.

IKEA Red Hook Project Site, Brooklyn, NY.

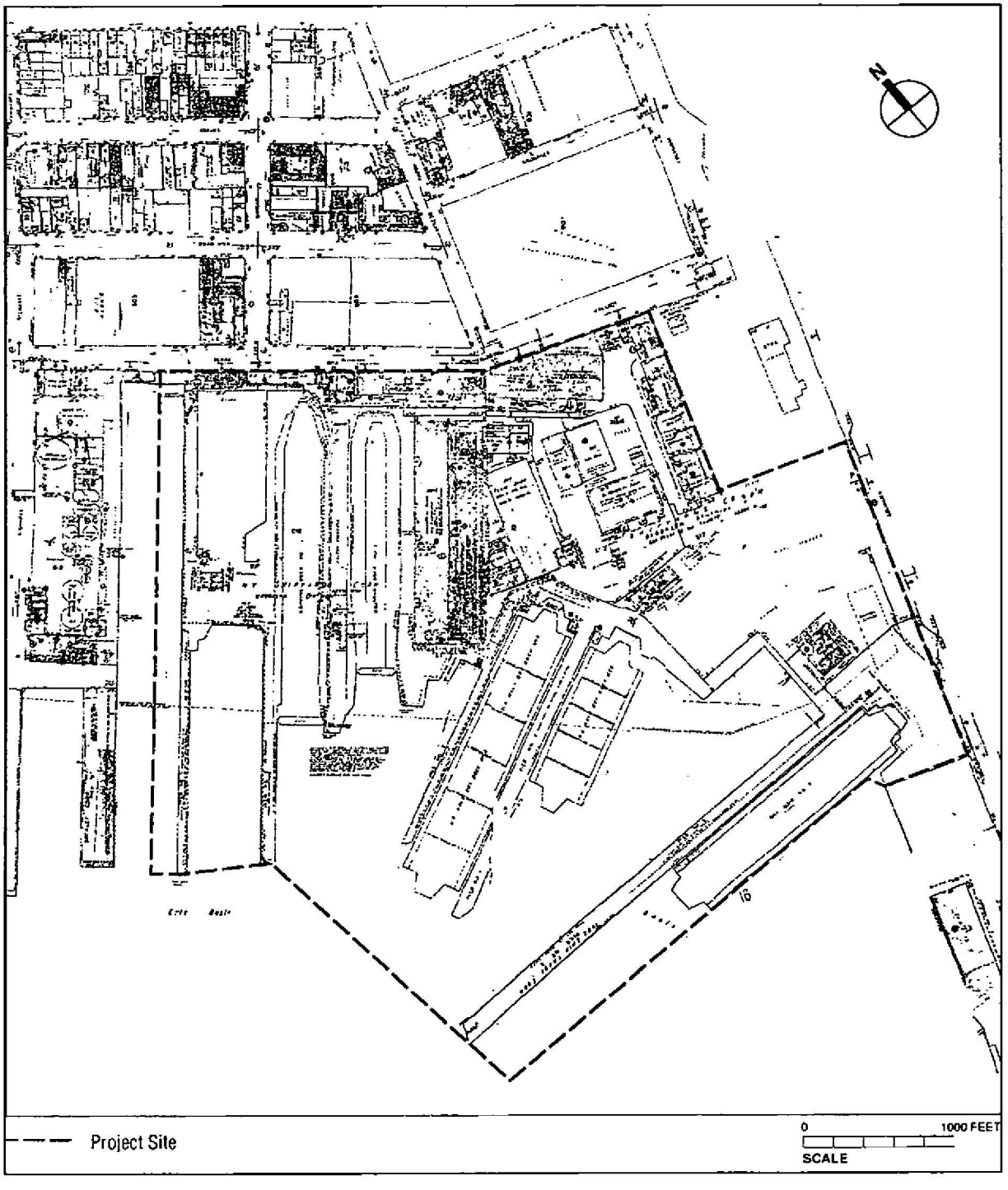


FIGURE 2

IKEA Red Hook Project Site, Brooklyn, NY.
Sanborn 2003.

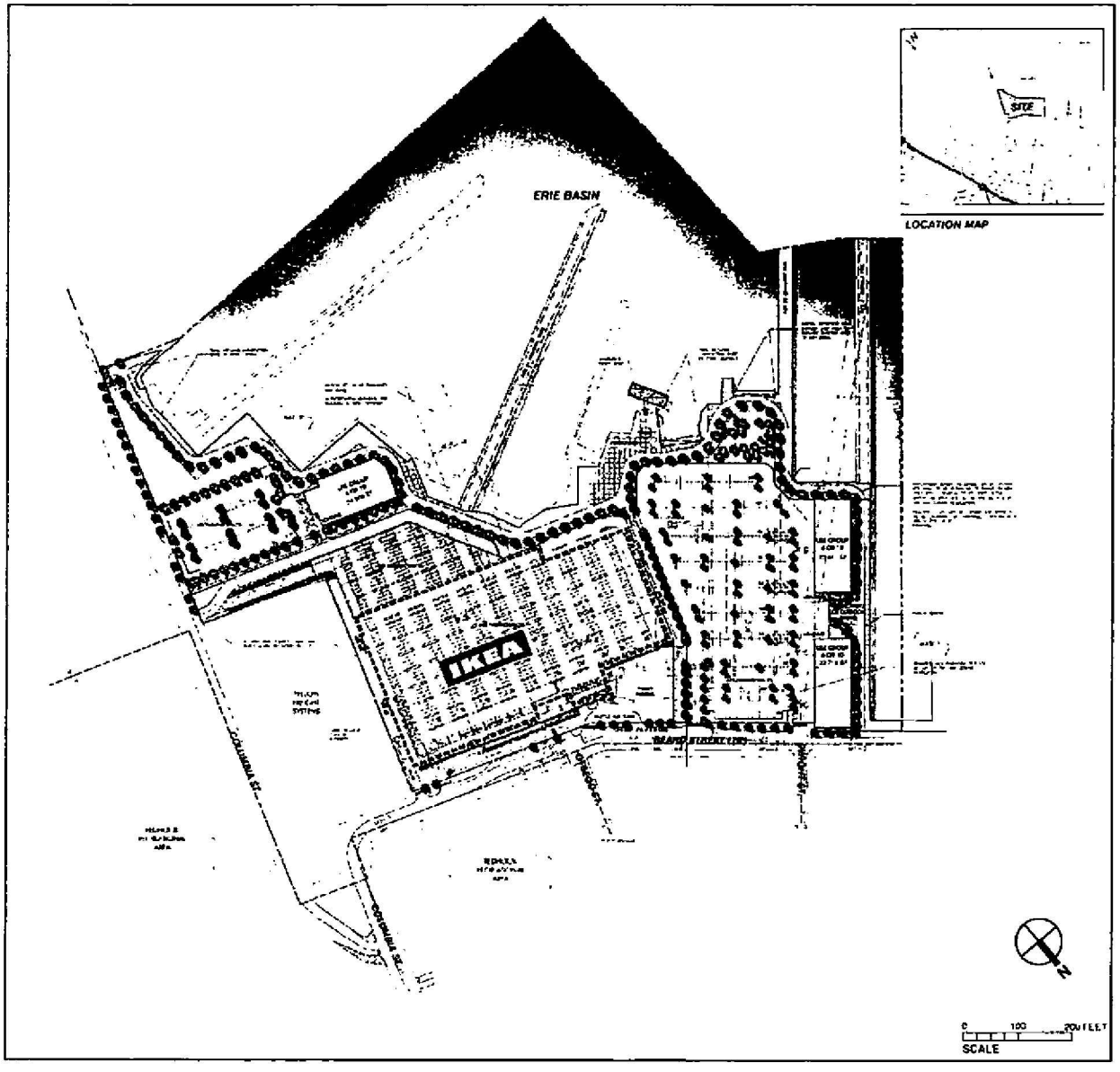


FIGURE 3

IKEA Red Hook Project Site with proposed development, Brooklyn, NY.
Greenberg Farrow Architecture 2003.

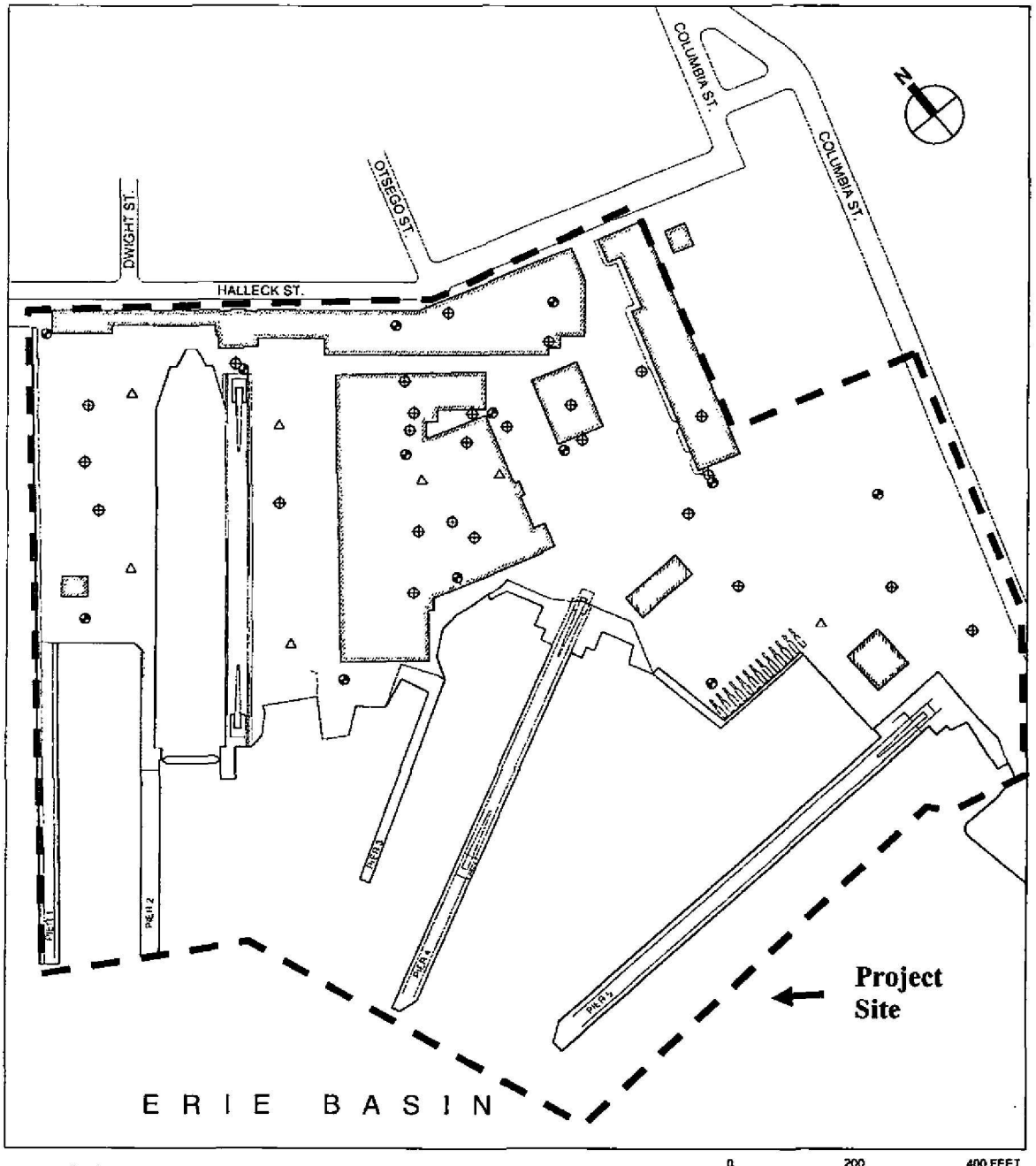


FIGURE 4

Soil Boring Locations, 2002.
Note: Monitoring well location data not provided to HPI.

IKEA Red Hook Project Site, Brooklyn, NY.

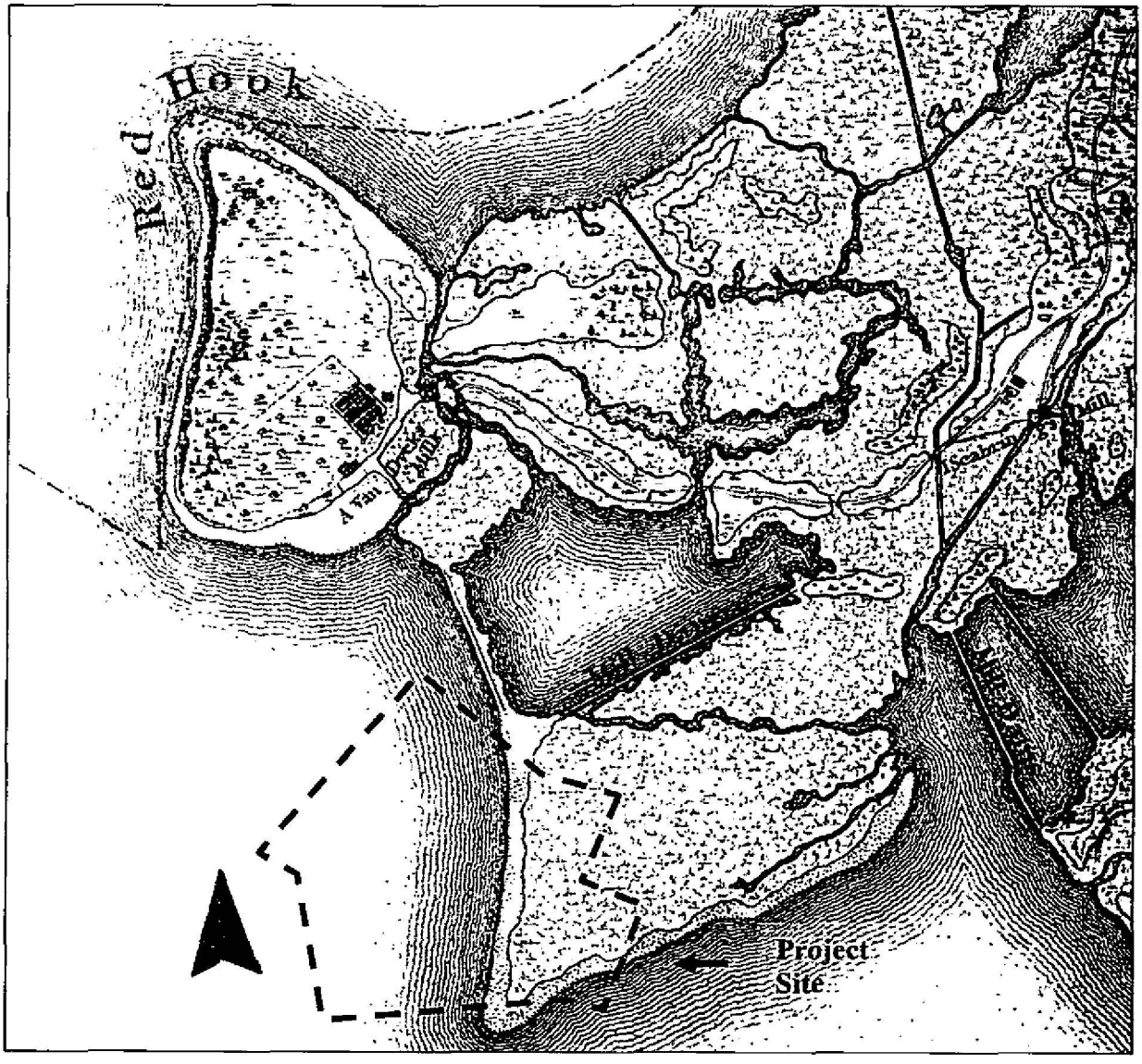


FIGURE 5

Plan of the Town of Brooklyn and Part of Long Island.
Ratzer 1767.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: one inch = 1000 feet

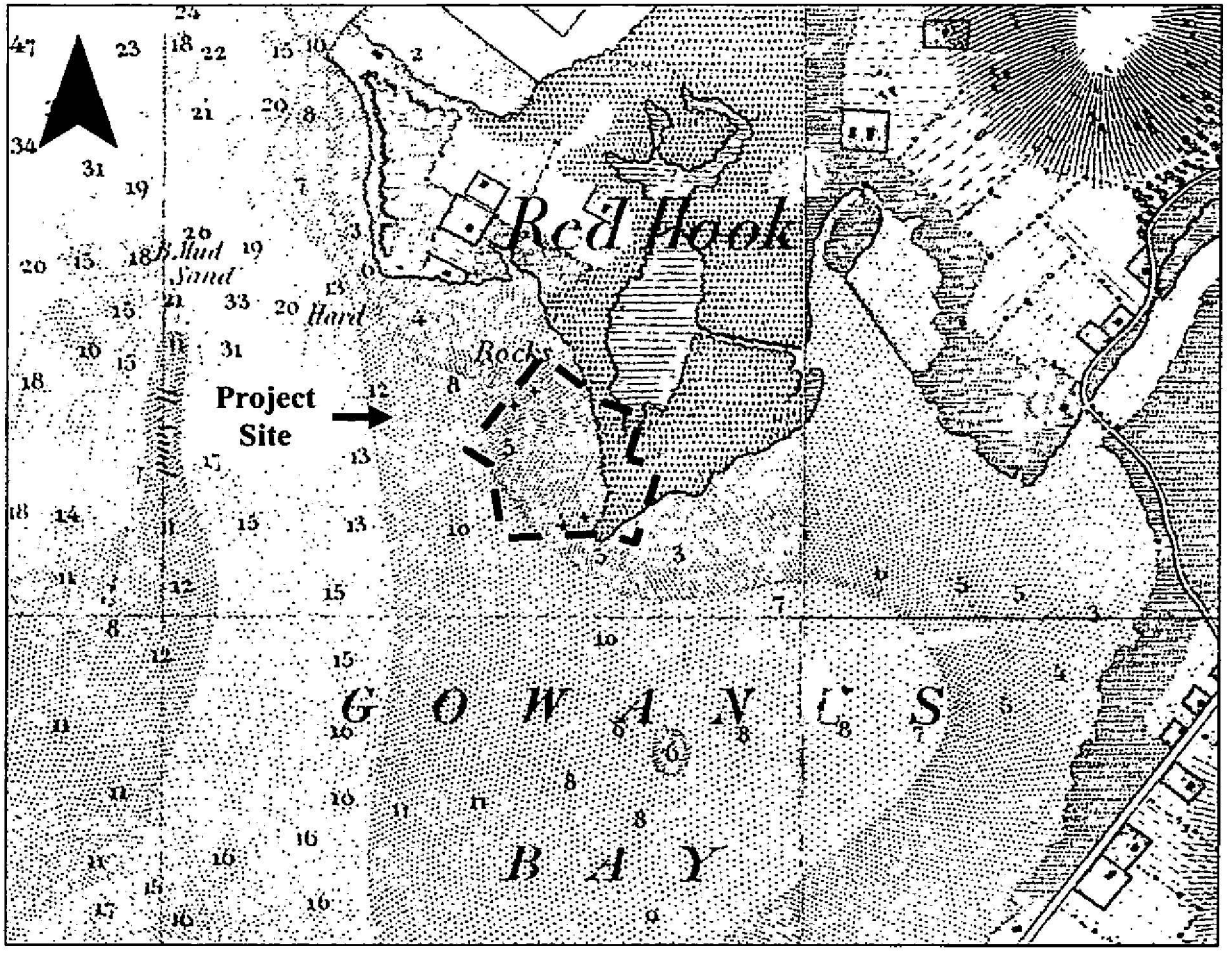


FIGURE 6

Map of New-York Bay and Harbor and the Environs.
Coast Survey Office 1844.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: ½ inch = 1000 feet

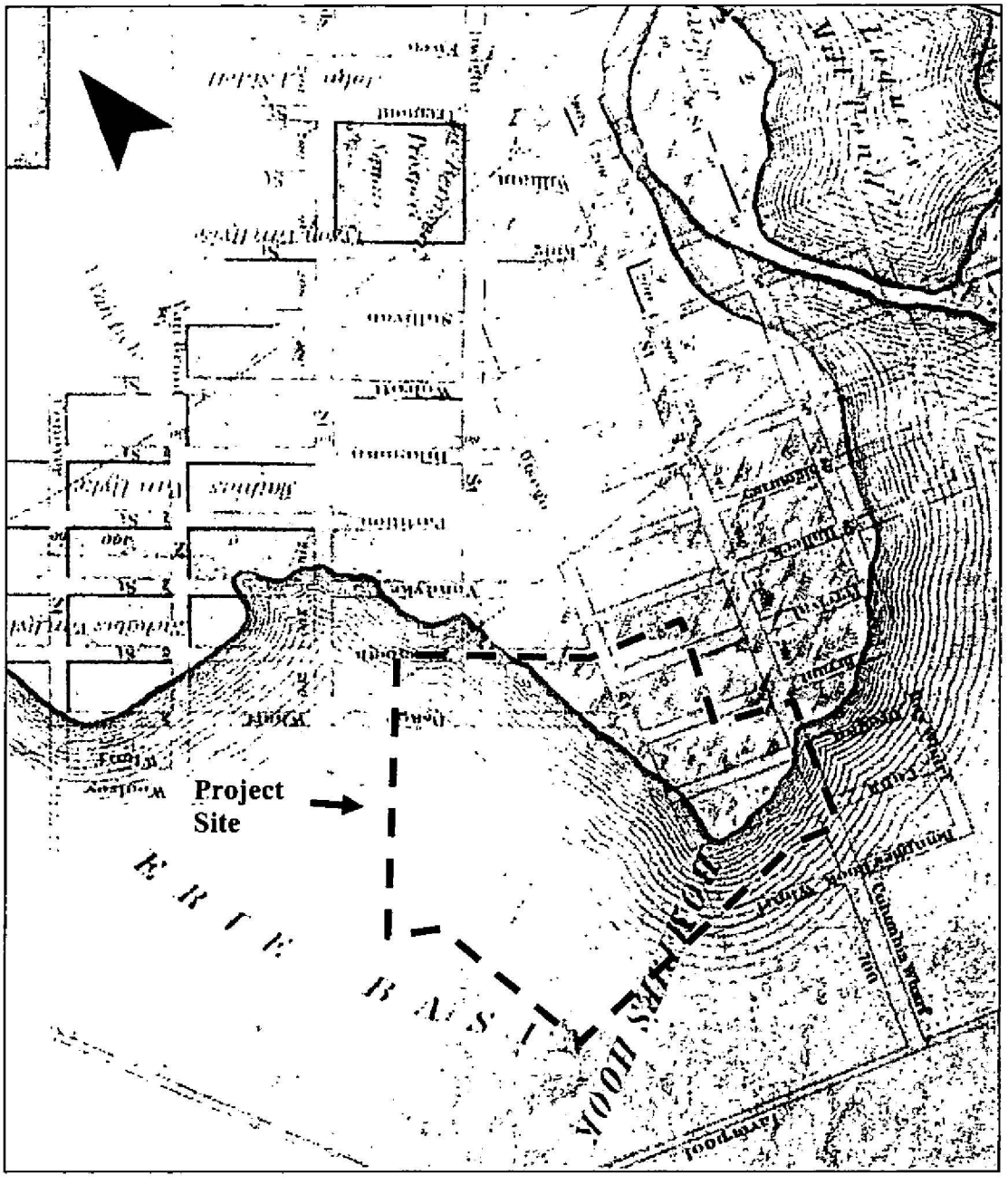


FIGURE 7

Map of the City of Brooklyn.
Colton 1849.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: one inch = 1000 feet

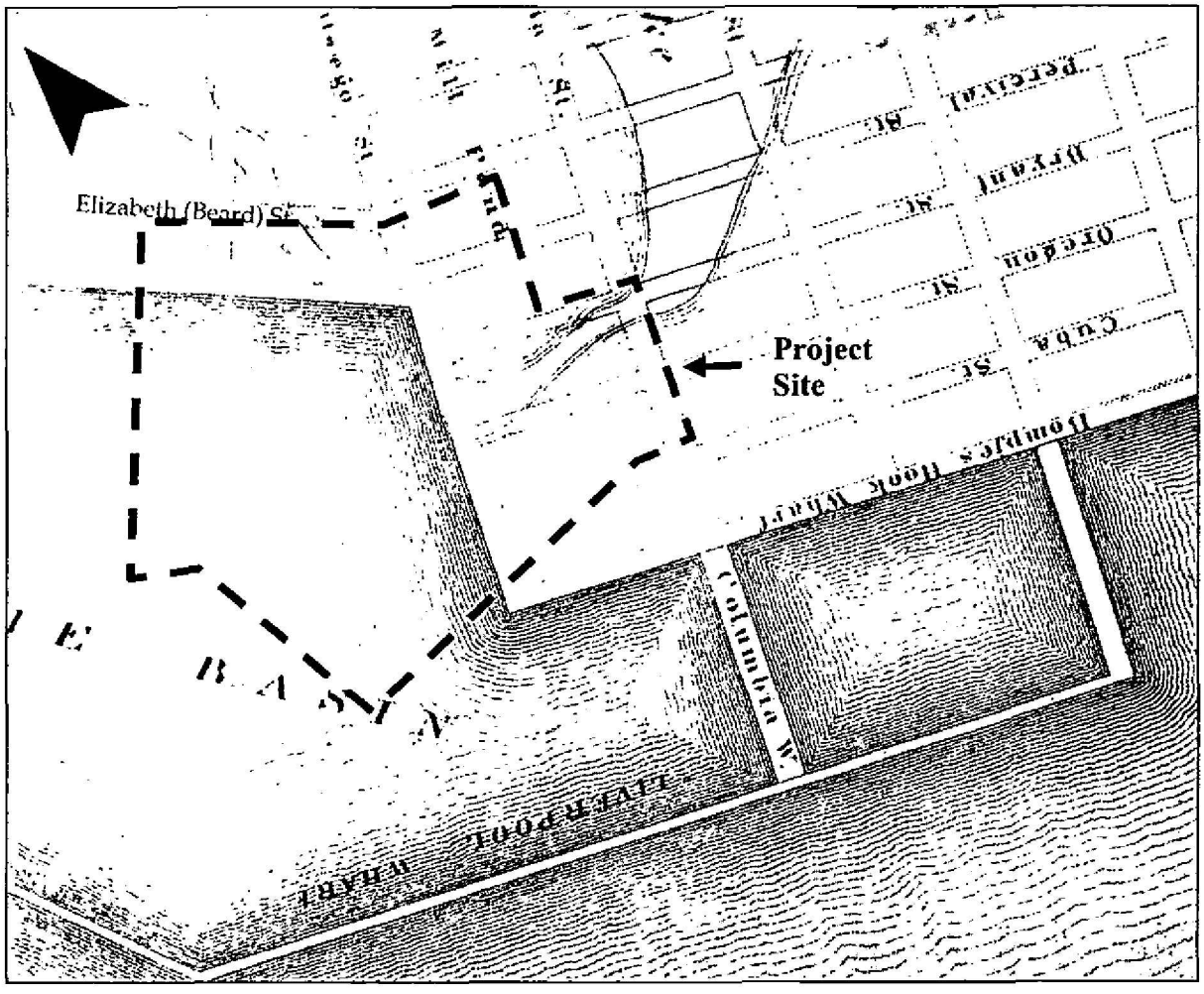


FIGURE 8

Maps of the City of Brooklyn.
Perris 1855.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: one inch = 1200 feet

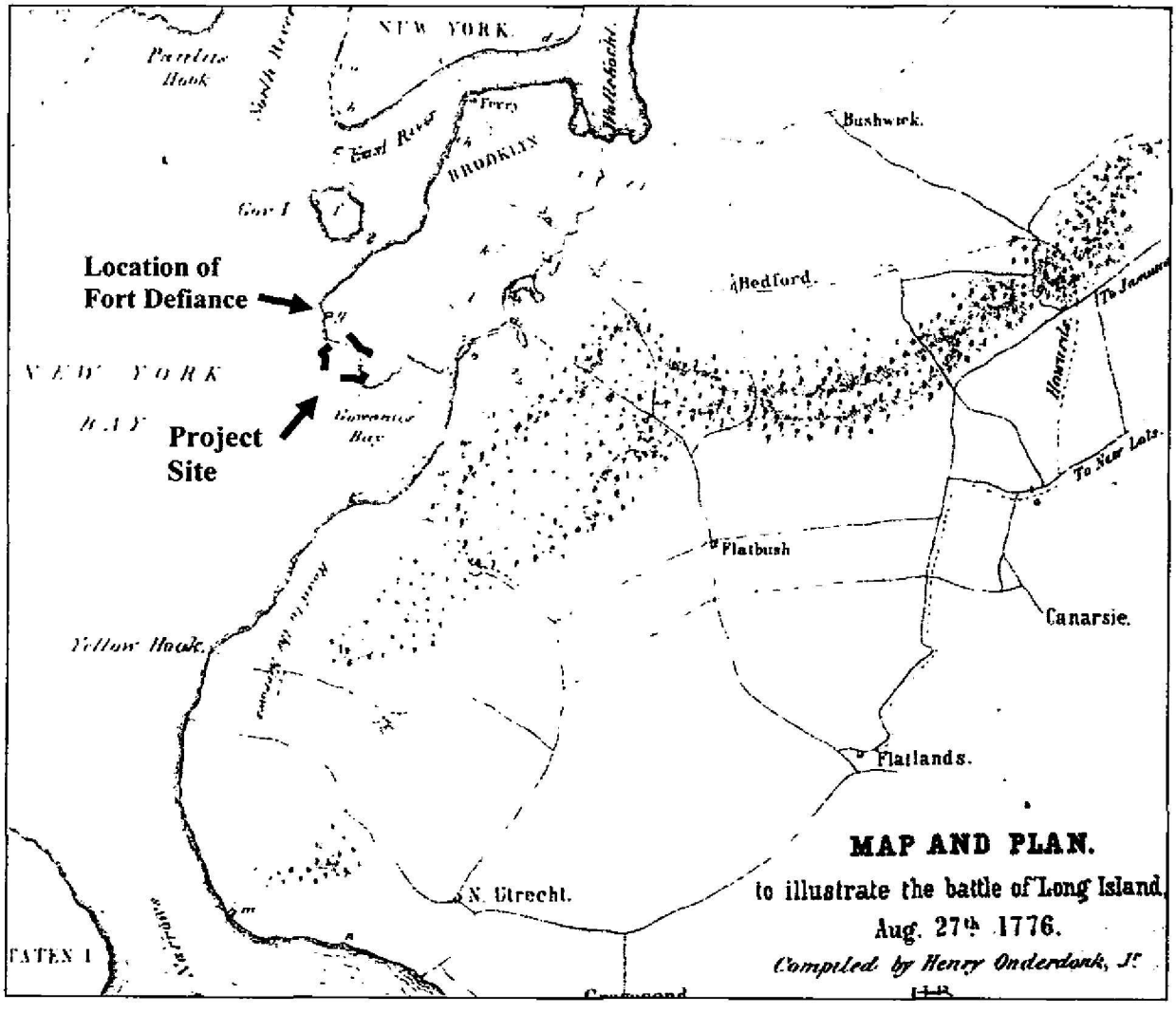


FIGURE 9

Map and Plan to Illustrate the Battle of Long Island, Aug. 27th 1776.
Onderdonk 1849.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: ¼ inch = 2000 feet

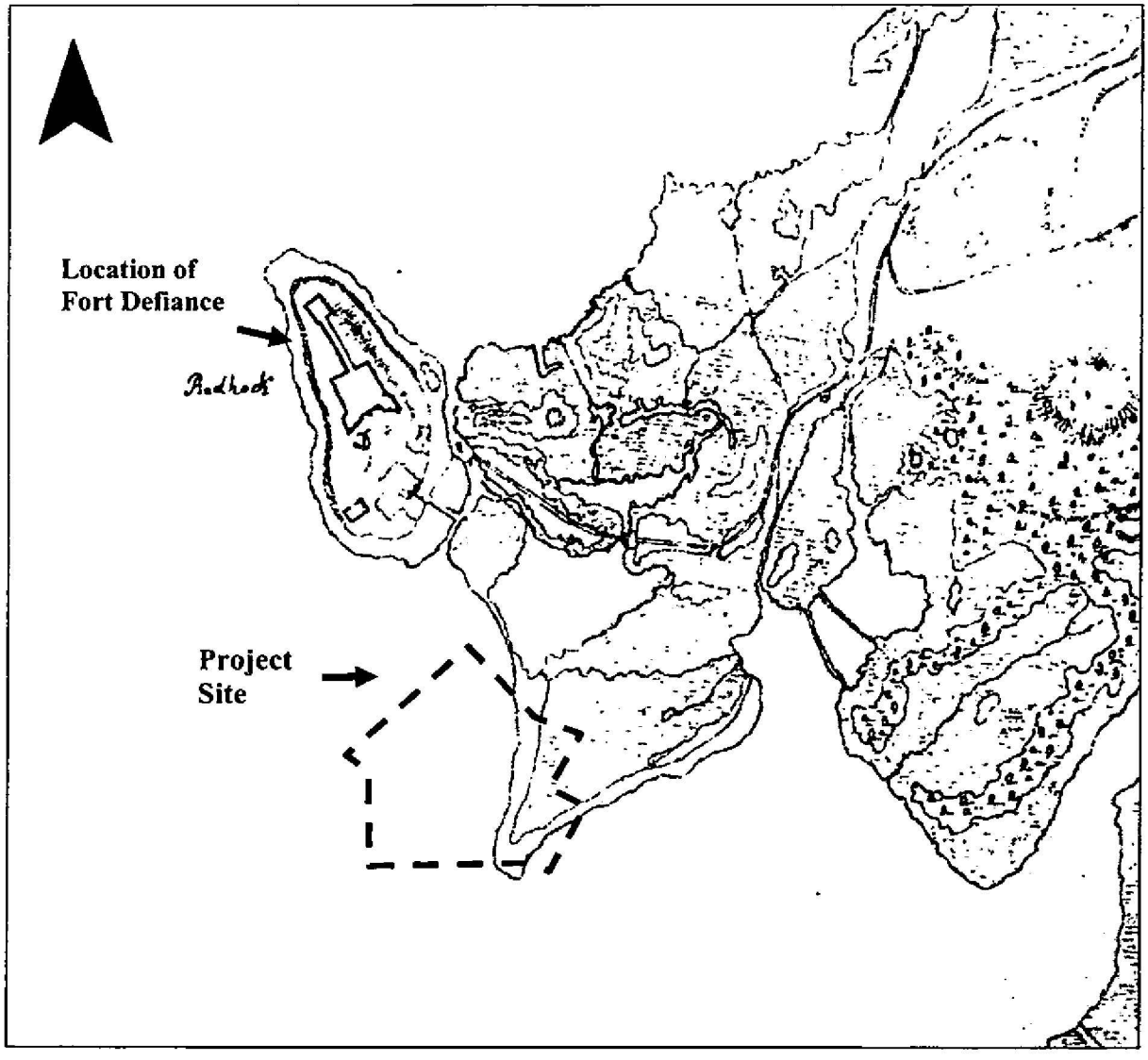


FIGURE 10

Plan des Redouter...(Plan of Fortifications showing Brooklyn during the Revolutionary War).
Anonymous 1776.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: ¾ inch = 1000 feet

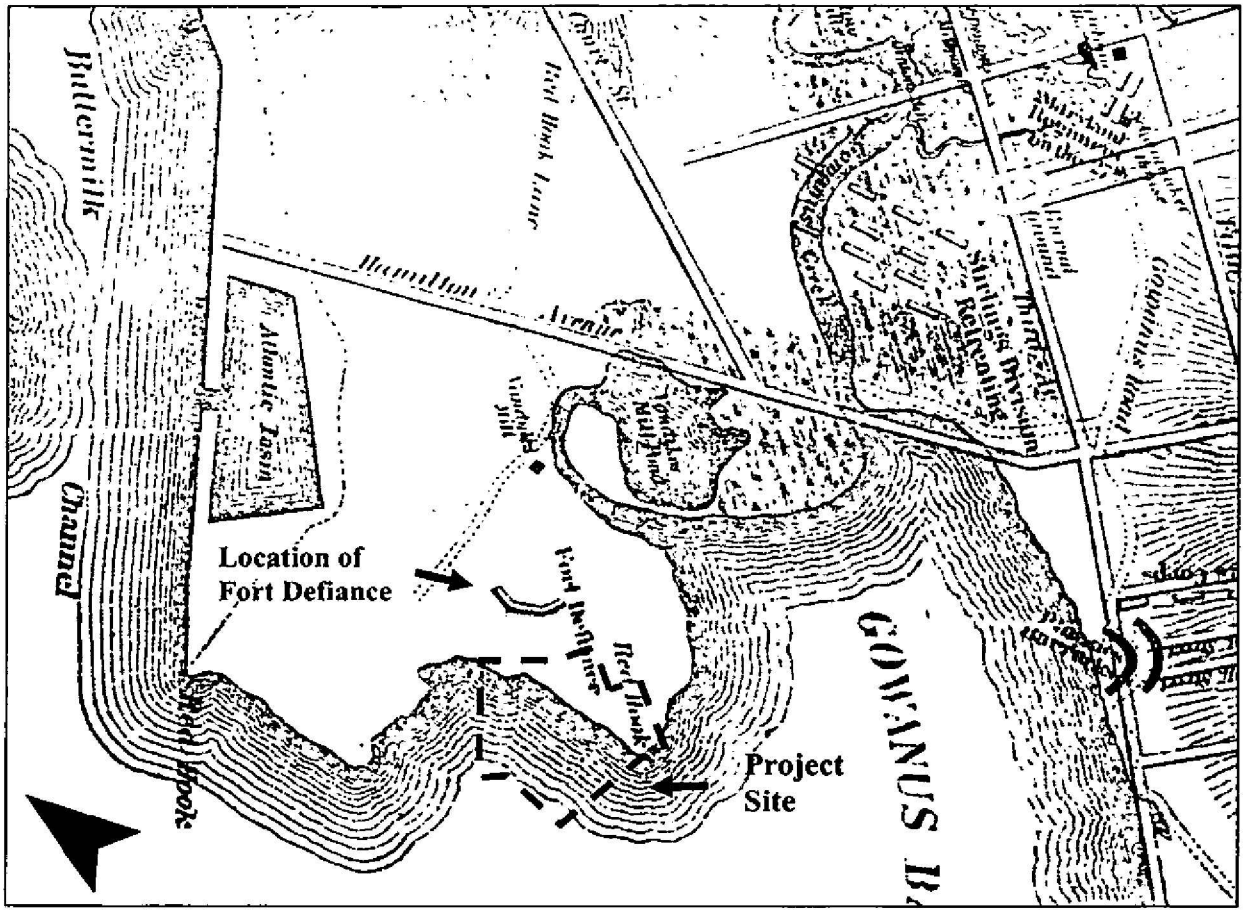


FIGURE 11

Positions and Movements of the British and American Army.
Field 1869.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: ½ inch = 1000 feet

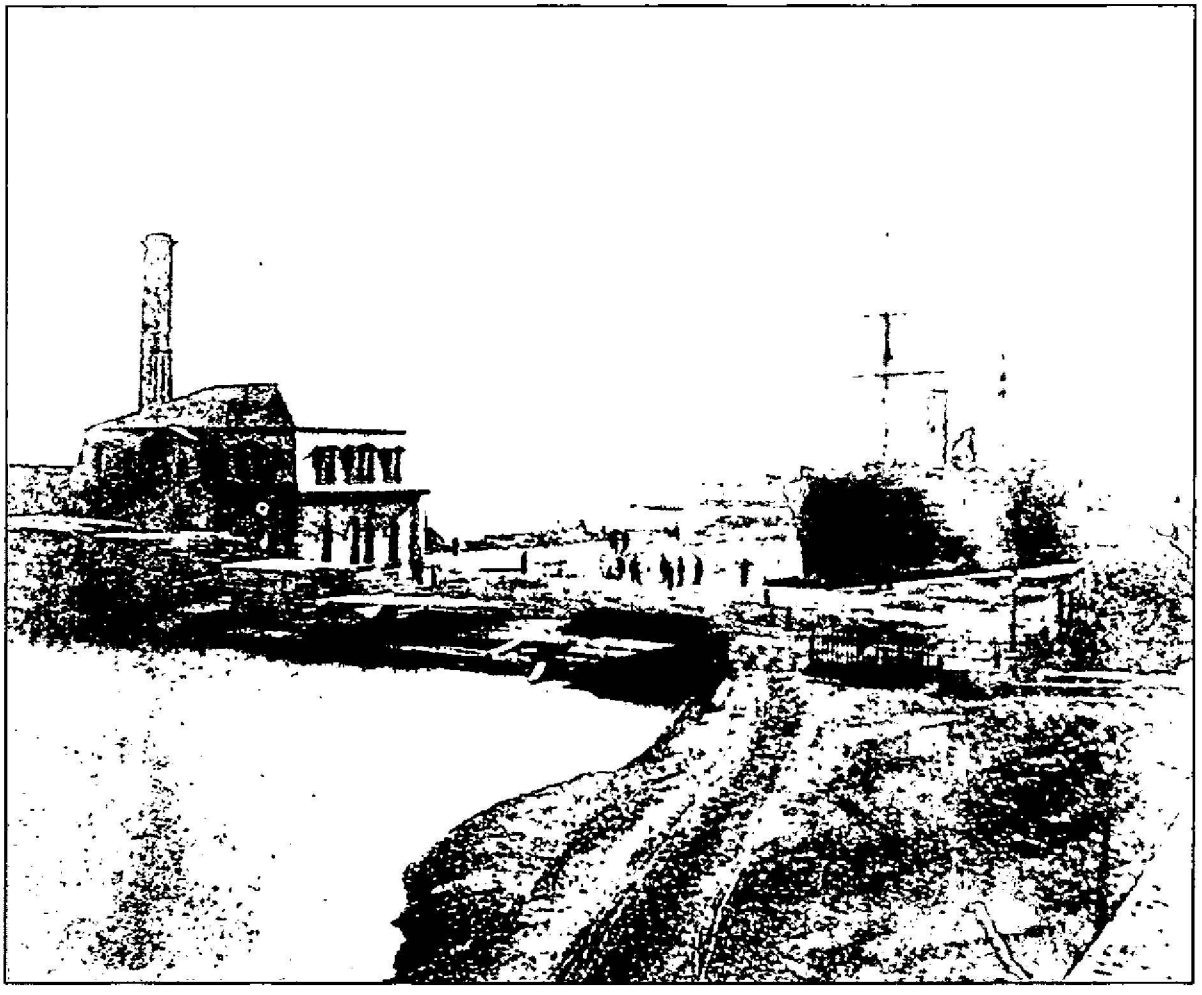


FIGURE 12

"Erie Basin's first graving dock, photographed in 1866, the year it opened. The sidewheeler under repair is believed to be the 2,000-ton New York-New Orleans liner Morning Star *of the New York Mail Steamship Co."*

Mitchell 1981, p. 1.

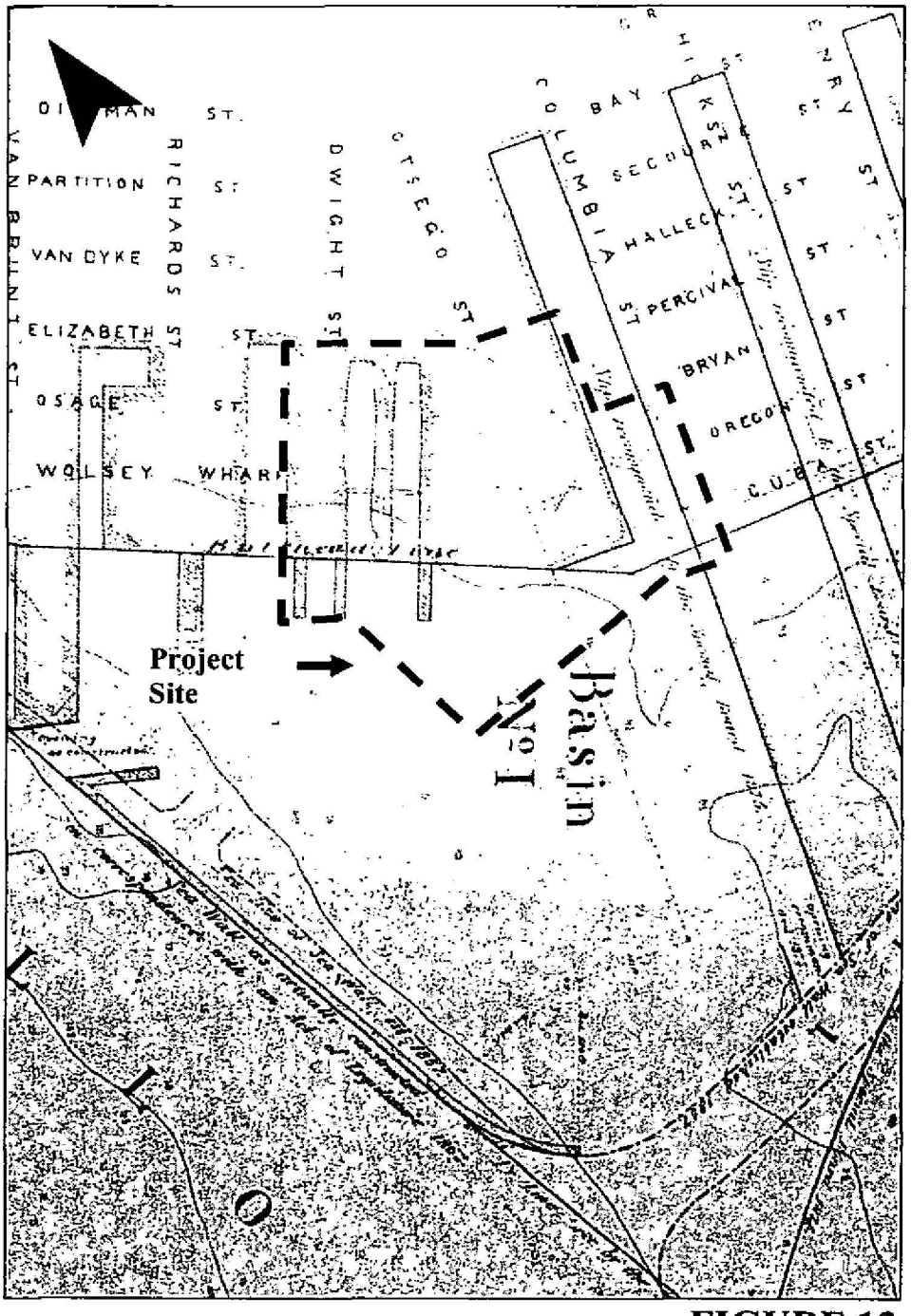


FIGURE 13

Bay and Harbor of New York.
United States Geological Survey 1874.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: one inch = 1000 feet

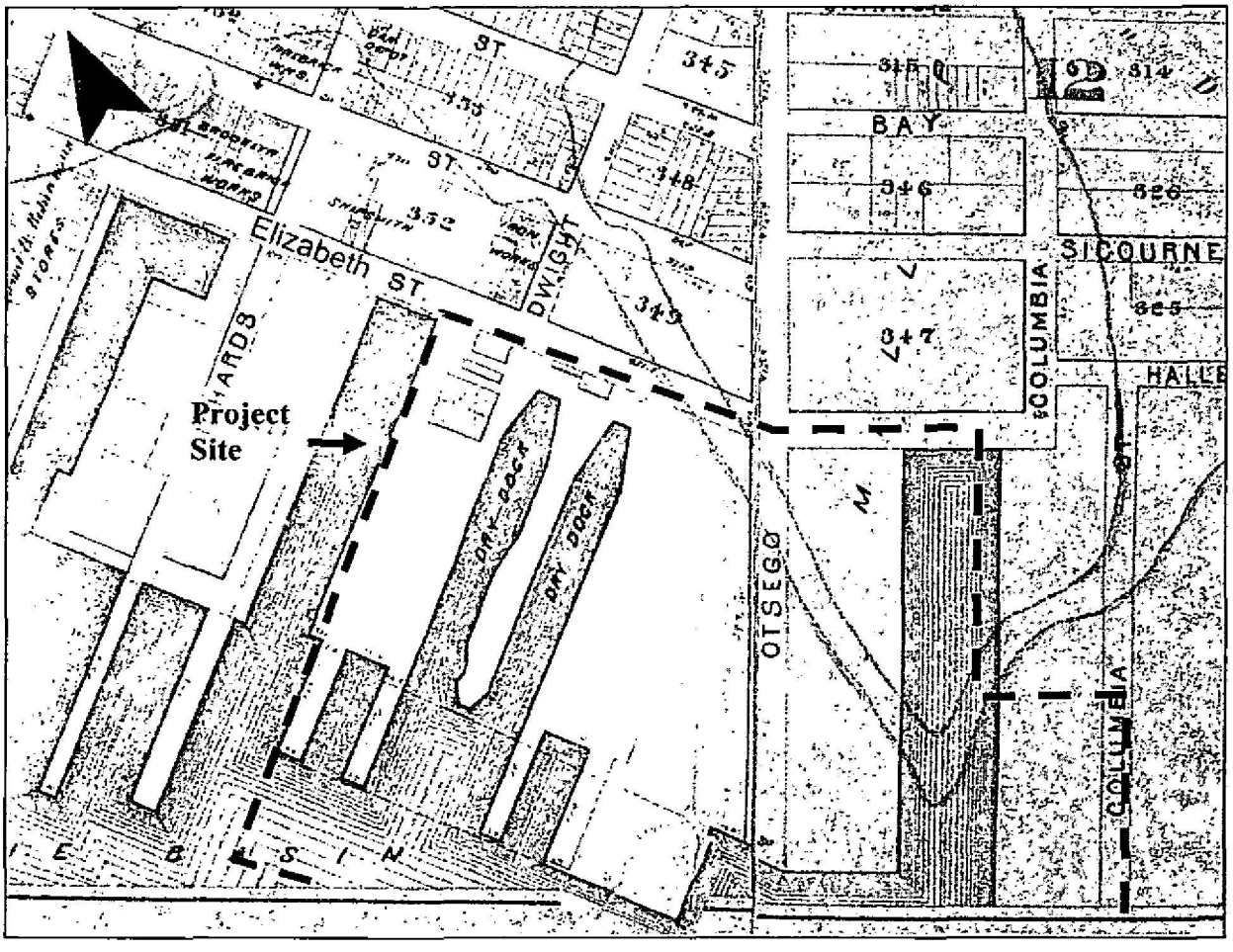


FIGURE 14

Atlas of the Entire City of Brooklyn.
Bromley 1880.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: ¾ inch = 500 feet

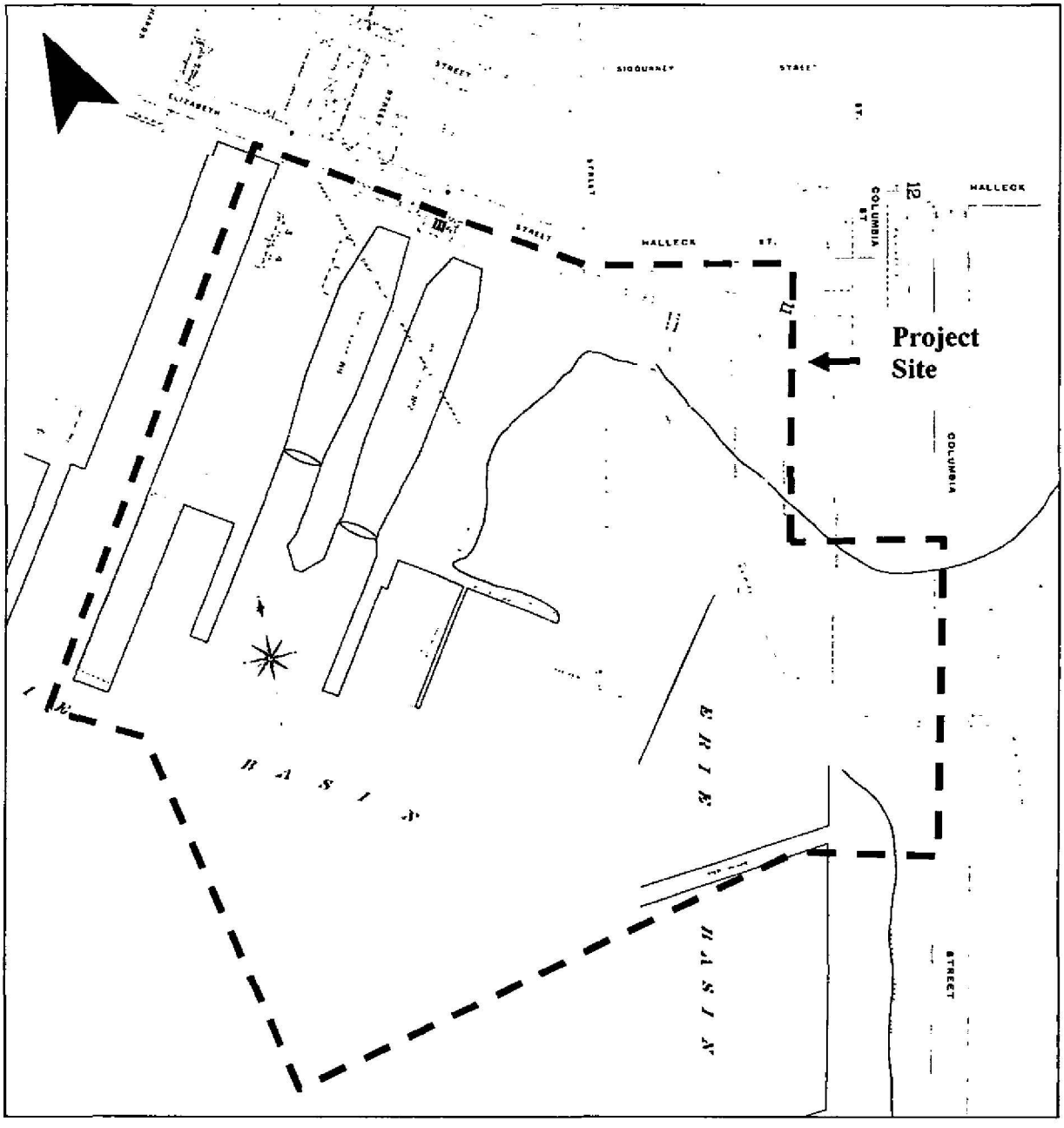


FIGURE 15

Insurance Maps of Brooklyn.
Sanborn 1886.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: one inch = 500 feet

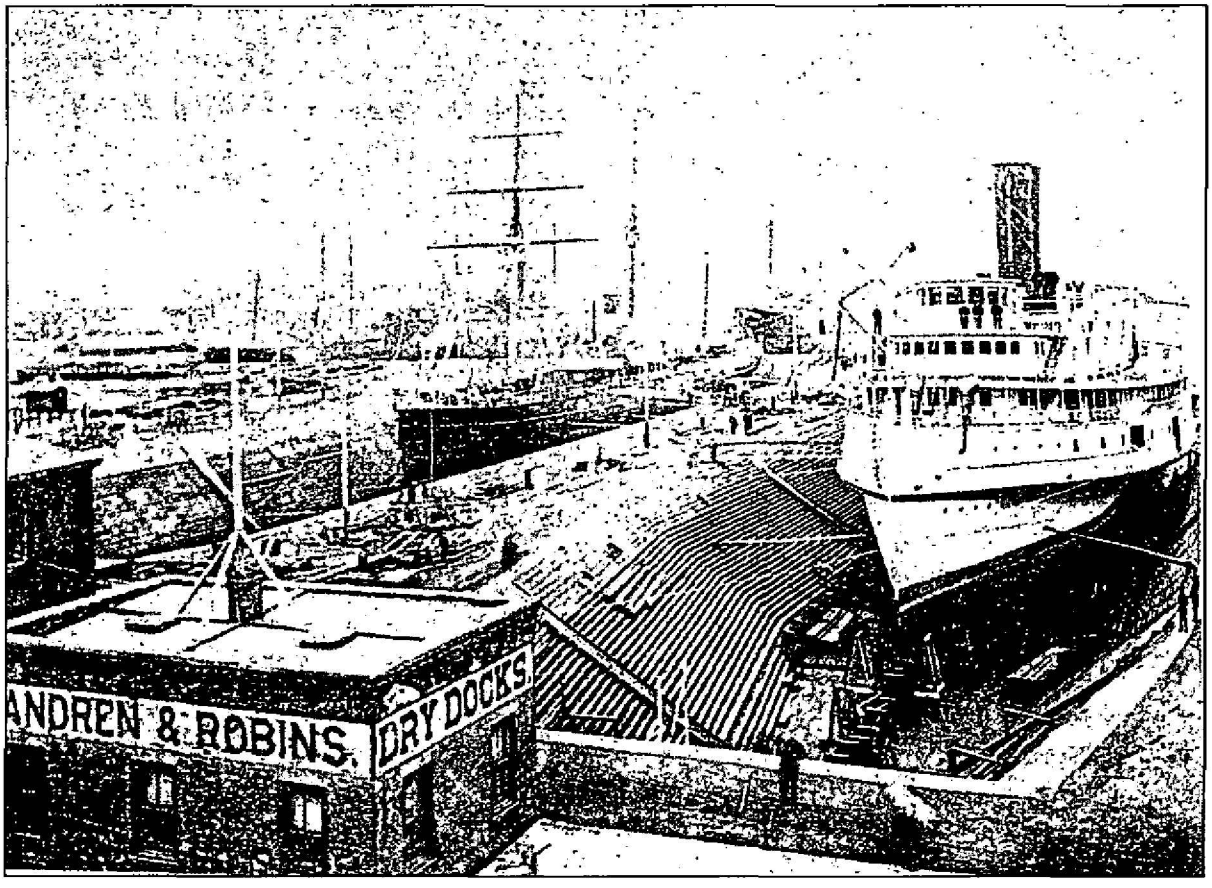


FIGURE 16

"Coastwise and ocean tonnage under repair at Erie Basin in the Nineties: Graving Dock No. 1 holds the 3,400-ton Long Island Sound passenger steamboat Connecticut*; No. 2 (at left), the 2,300-ton Hamburg Liner* Procida*."*

Mitchell 1981, p. 8.

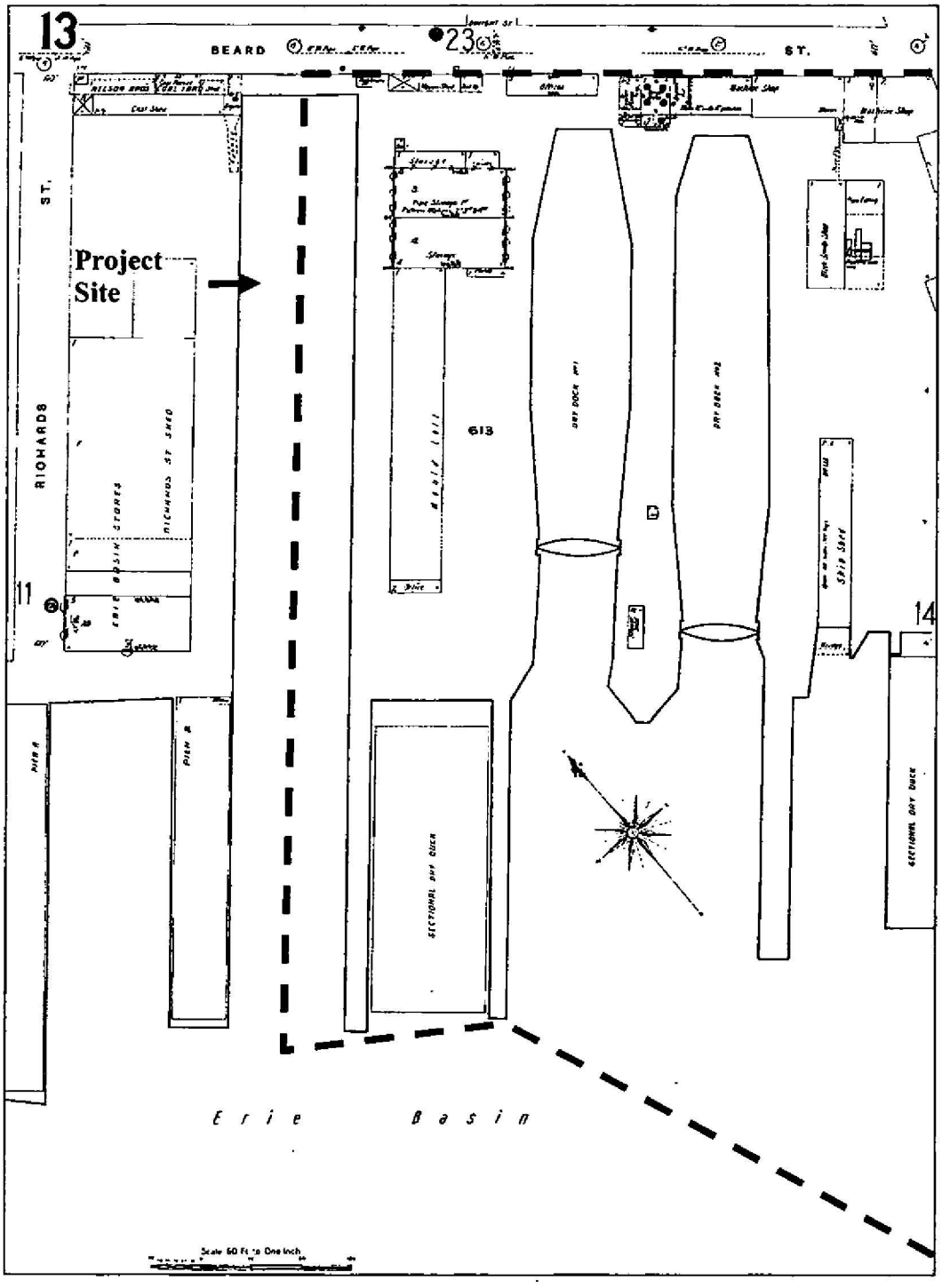


FIGURE 17a

Insurance Maps of Brooklyn.
Sanborn 1904.

IKEA Red Hook Project Site, West Half, Brooklyn, NY.

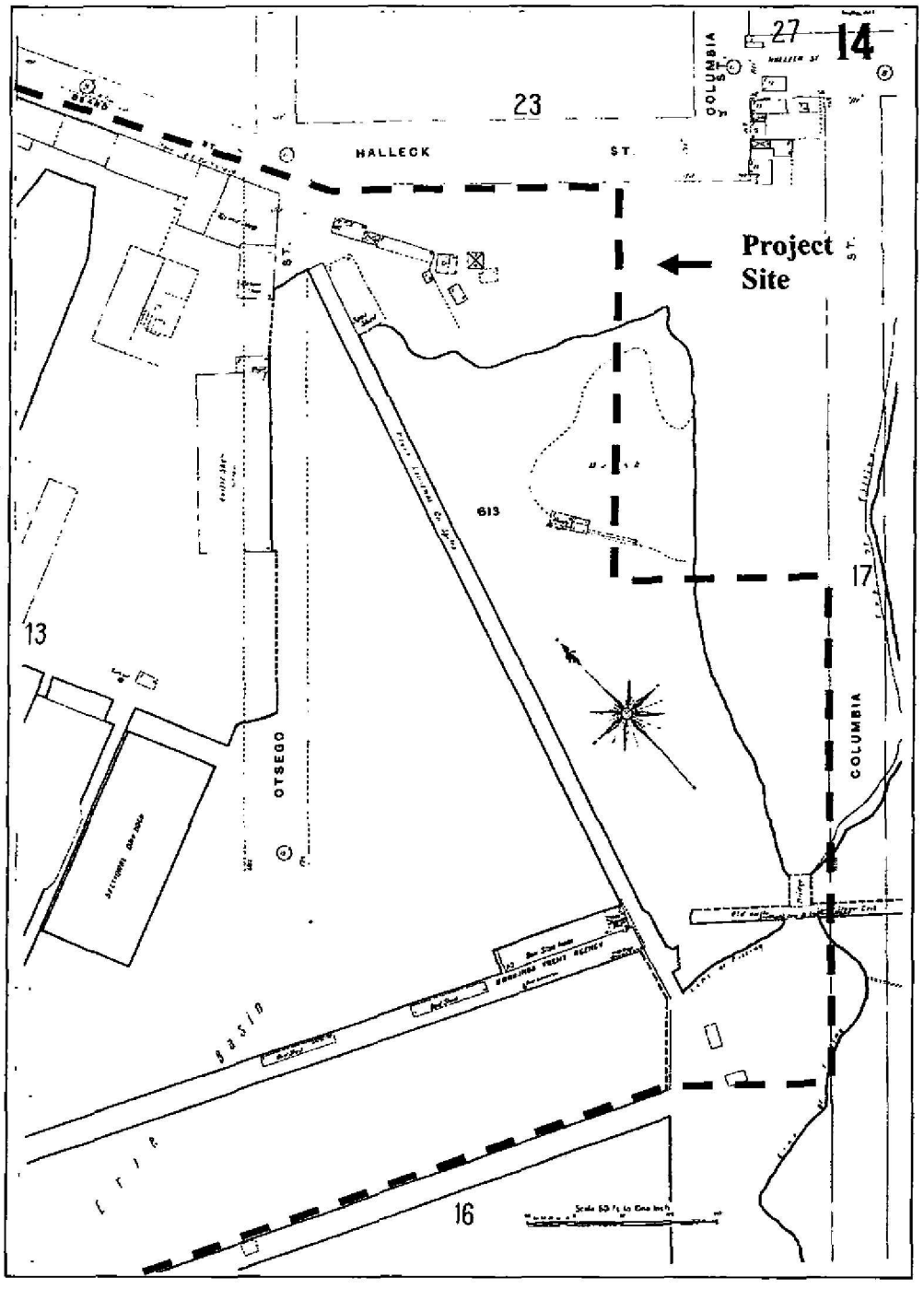


FIGURE 17b

Insurance Maps of Brooklyn.
Sanborn 1904.

IKEA Red Hook Project Site, East Half, Brooklyn, NY.

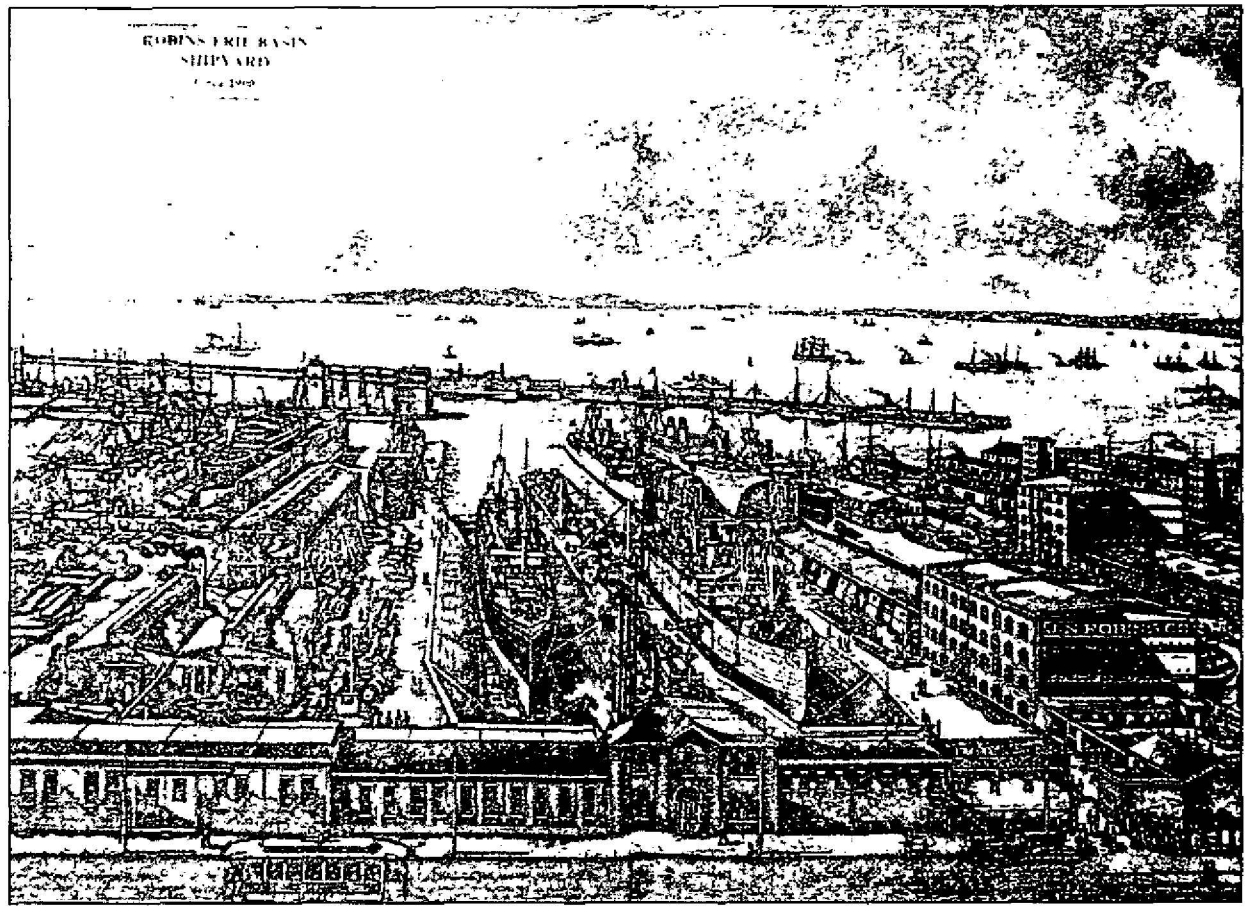


FIGURE 18

Robins (Todd) Shipyard *c.* 1900

Mitchell 1981, frontispiece.

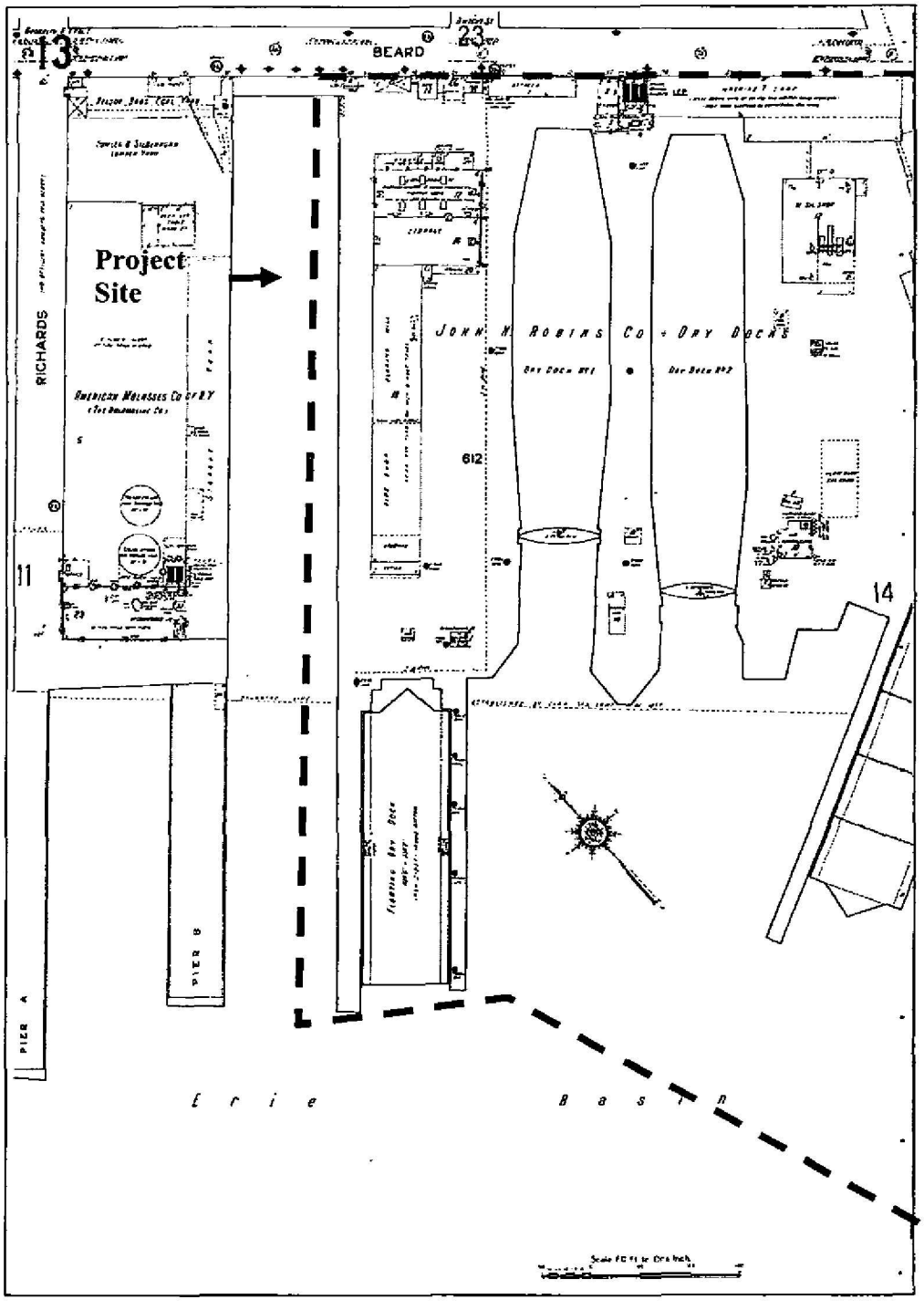


FIGURE 19a

Insurance Maps of Brooklyn.
Sanborn 1915.

IKEA Red Hook Project Site, West Half, Brooklyn, NY.

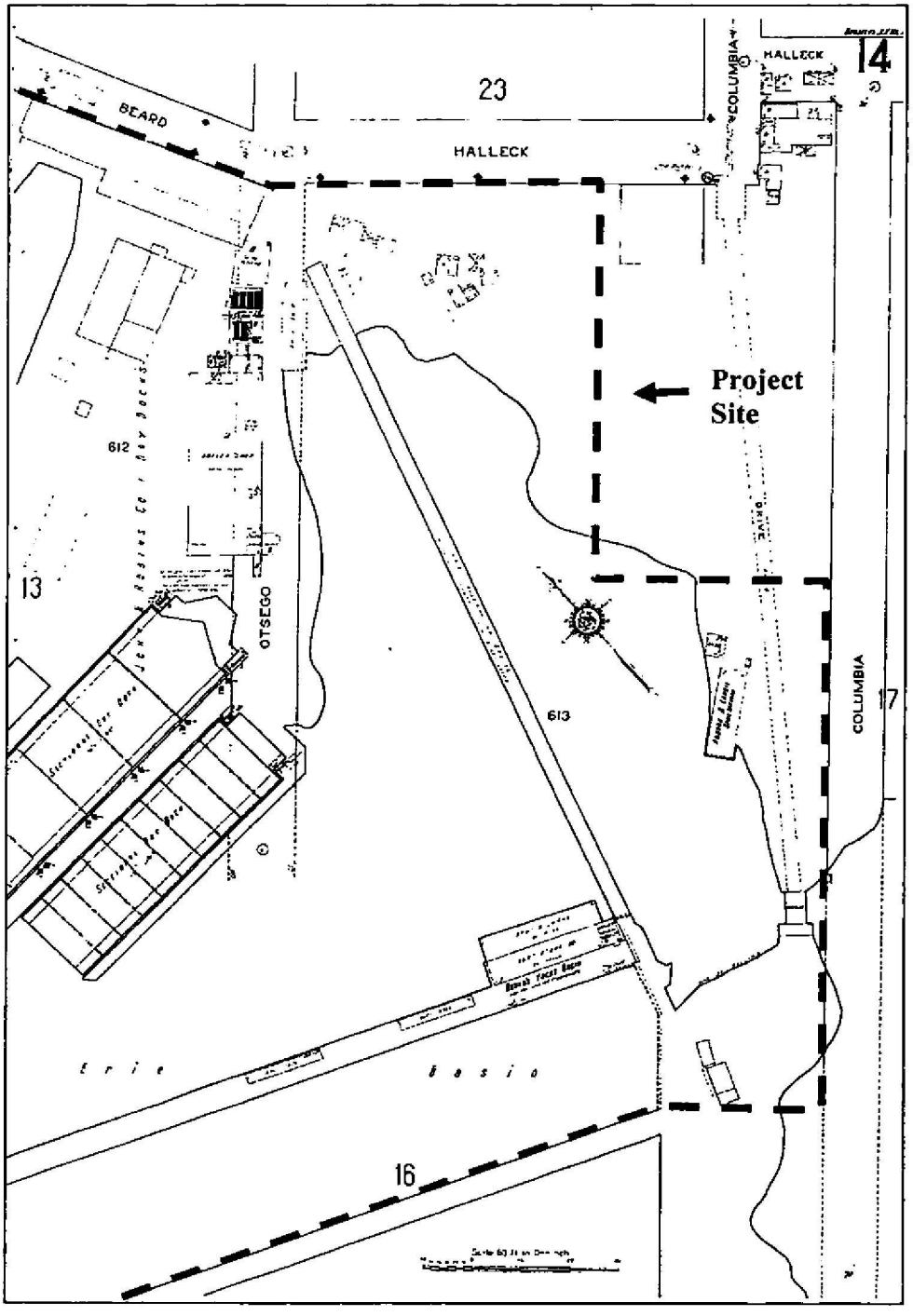


FIGURE 19b

Insurance Maps of Brooklyn.
Sanborn 1915.

IKEA Red Hook Project Site, East Half, Brooklyn, NY.

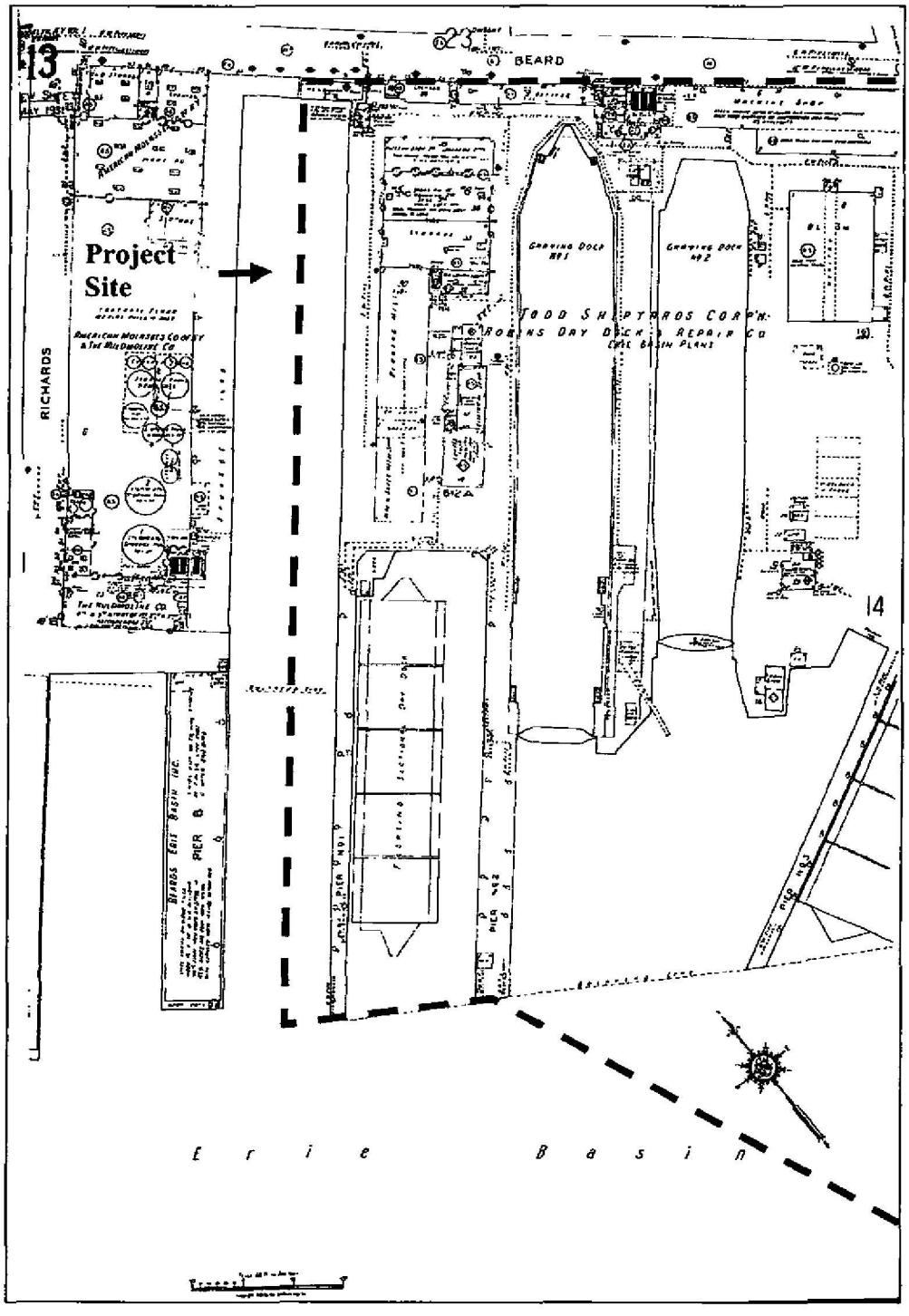


FIGURE 20a

Insurance Maps of Brooklyn.
Sanborn 1939.

IKEA Red Hook Project Site, West Half, Brooklyn, NY.

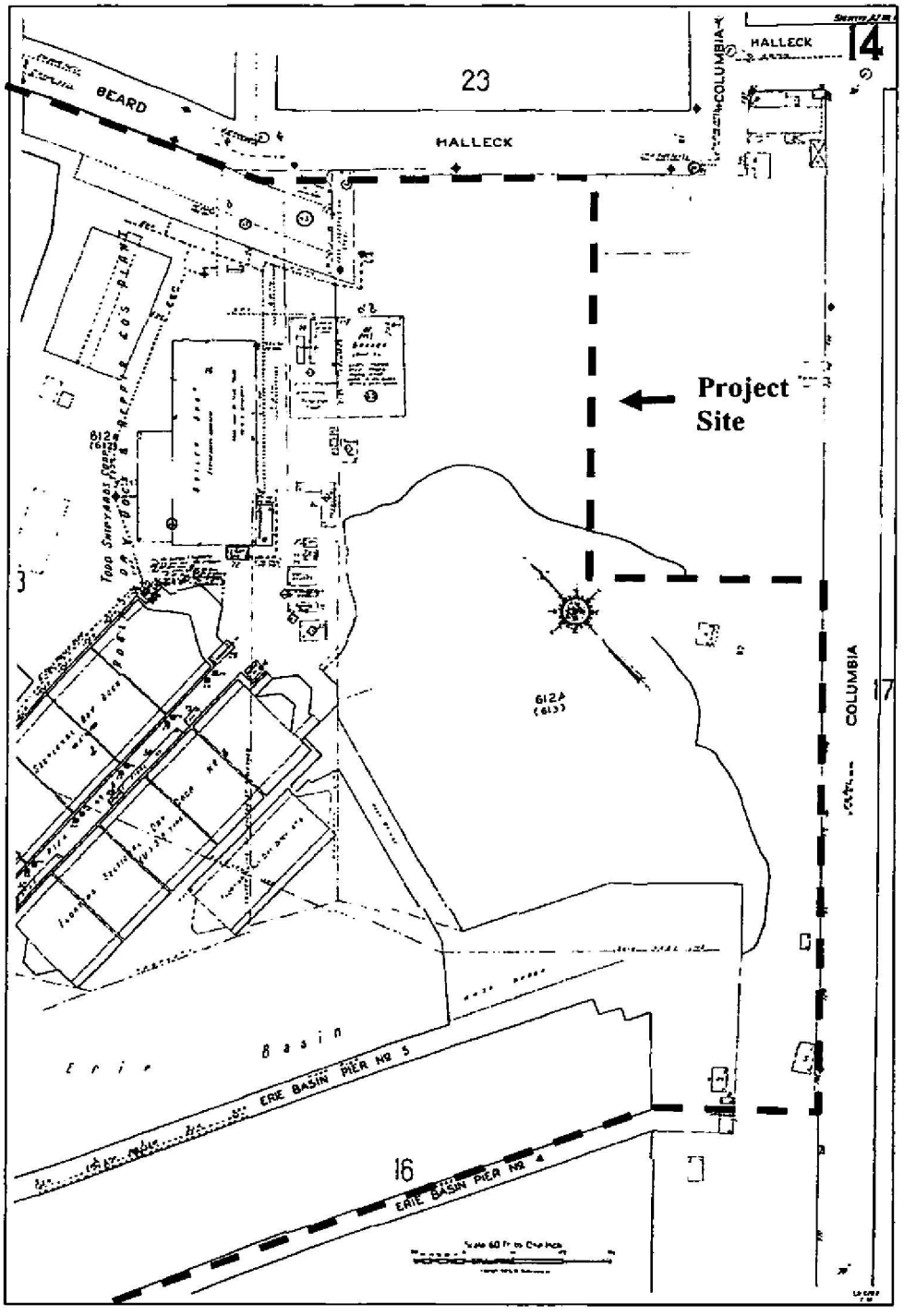


FIGURE 20b

Insurance Maps of Brooklyn.
Sanborn 1939.

IKEA Red Hook Project Site, East Half, Brooklyn, NY.

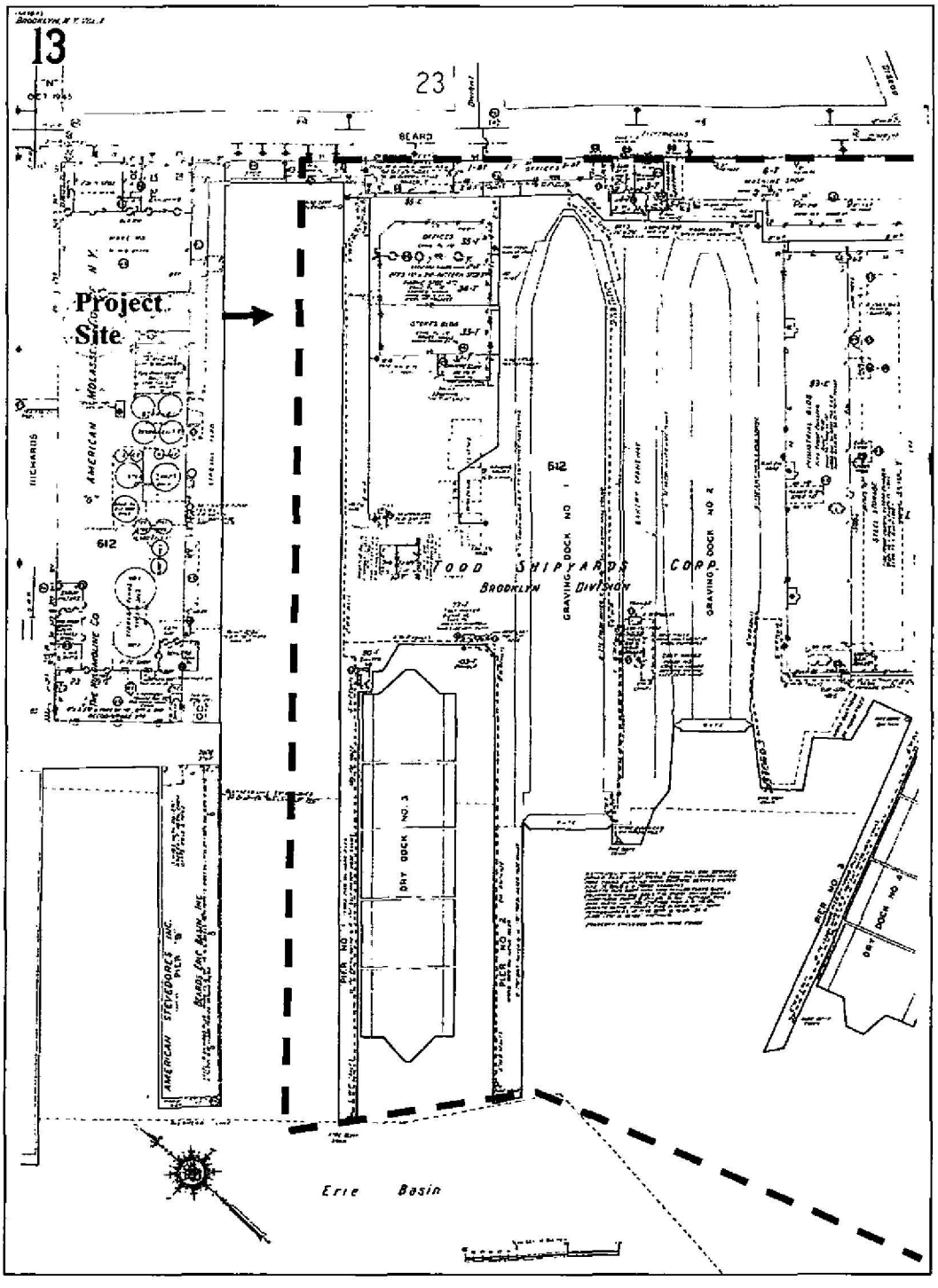


FIGURE 21a

Insurance Maps of Brooklyn.
Sanborn 1950.

IKEA Red Hook Project Site, West Half, Brooklyn, NY.

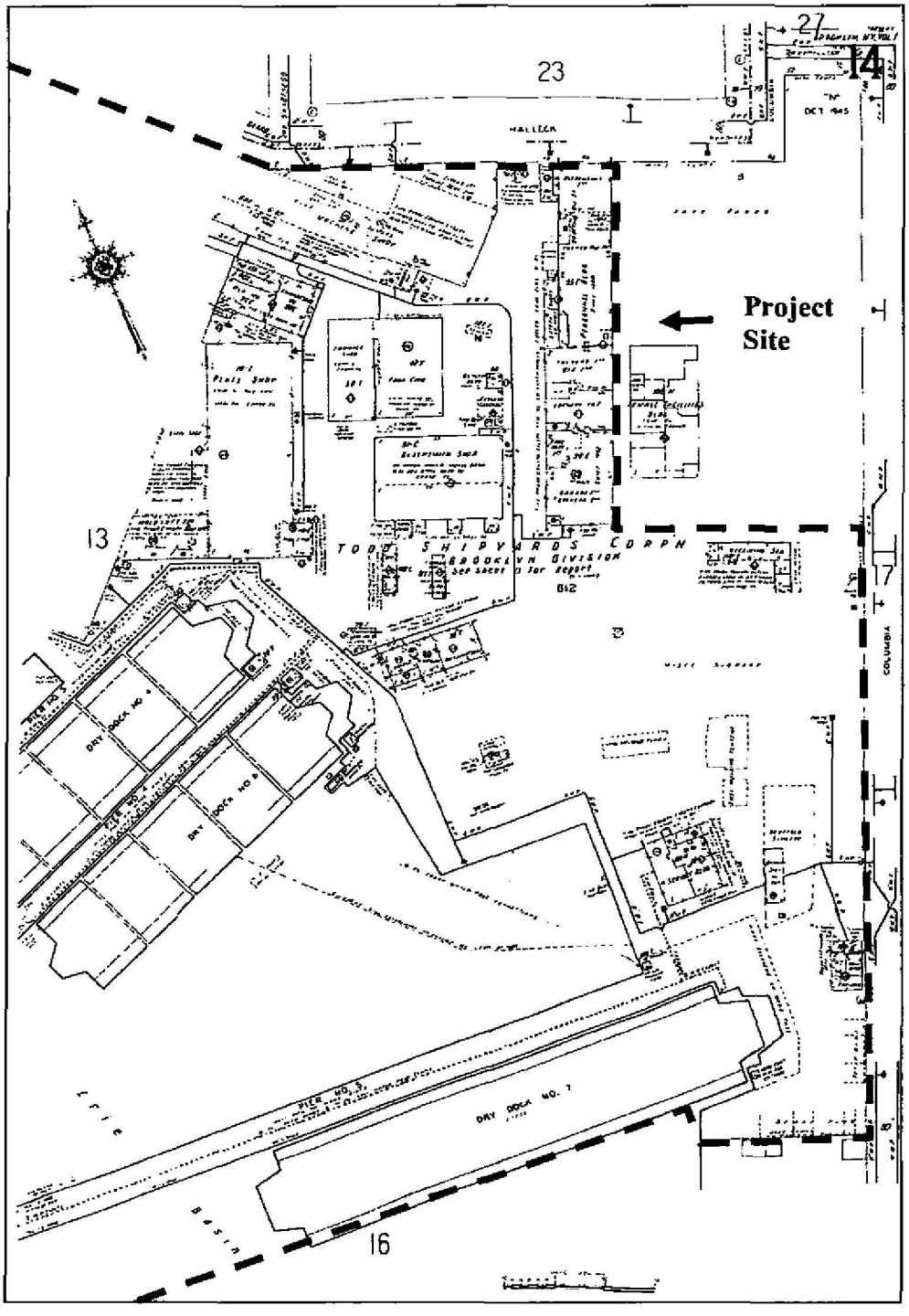


FIGURE 21b

Insurance Maps of Brooklyn.
Sanborn 1950.

IKEA Red Hook Project Site, East Half, Brooklyn, NY.

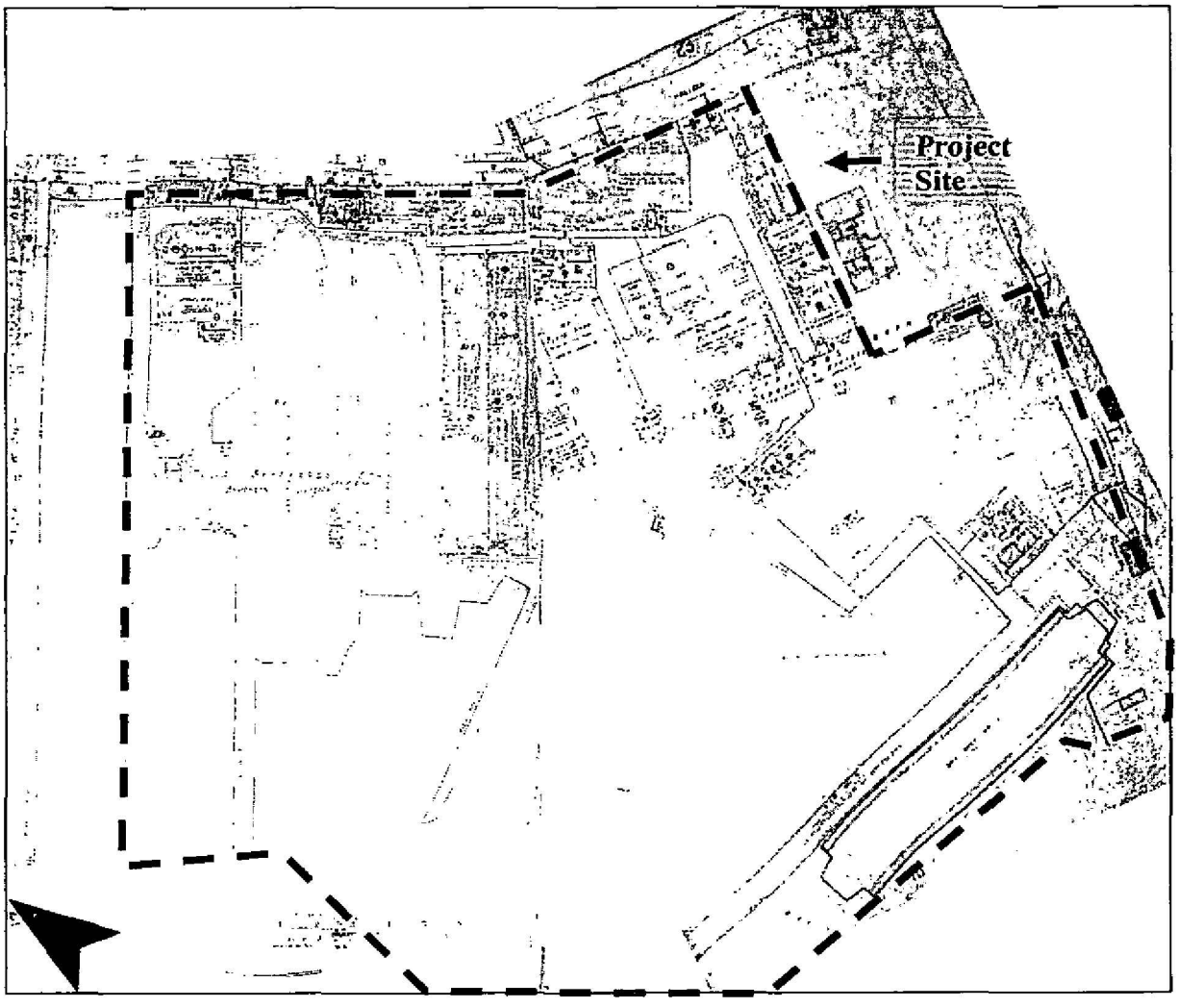


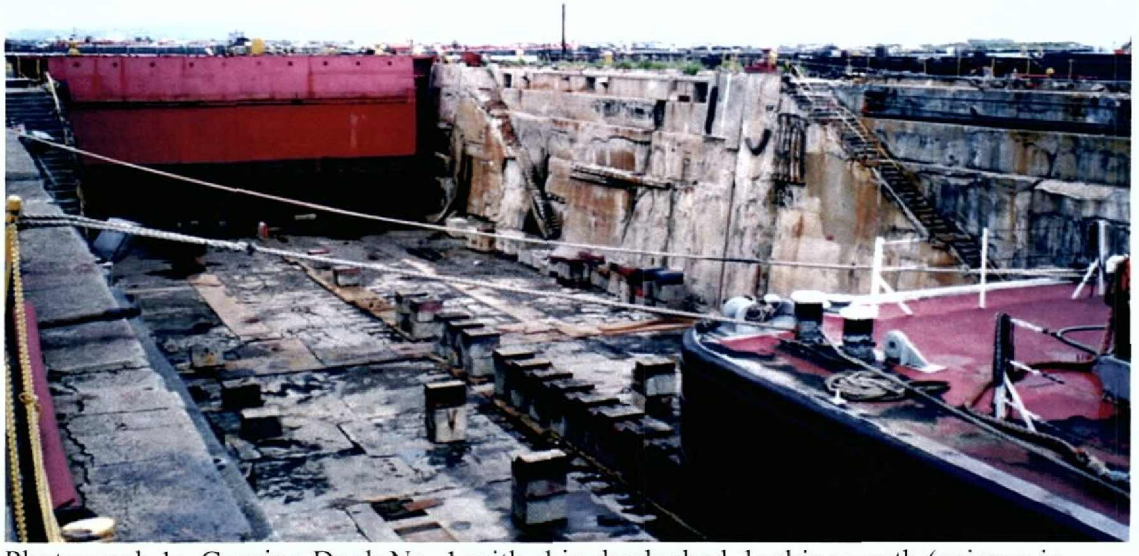
FIGURE 22

Insurance Maps of Brooklyn.
Sanborn 1968.

IKEA Red Hook Project Site, Brooklyn, NY.

Approximate Scale: one inch = 500 feet

PHOTOGRAPHS



Photograph 1: Graving Dock No. 1 with ship drydocked, looking south (caisson in background.)

Photograph 2: Graving Dock No. 1 with ship drydocked, looking north (Buildings 1-5 in background.)

Photograph 3: Former location of Graving Dock No. 2, looking south.

Photograph 4: Pier 1, looking north.

Photograph 5: Remains of Pier 5, looking south from Pier 4.

Photograph 6: Deteriorated bulkhead near Pier 3.

Photograph 7: Deteriorated bulkhead and docking, near Pier 5.

Photograph 8: Interior portion of site showing paved areas with embedded, abandoned railroad tracks.