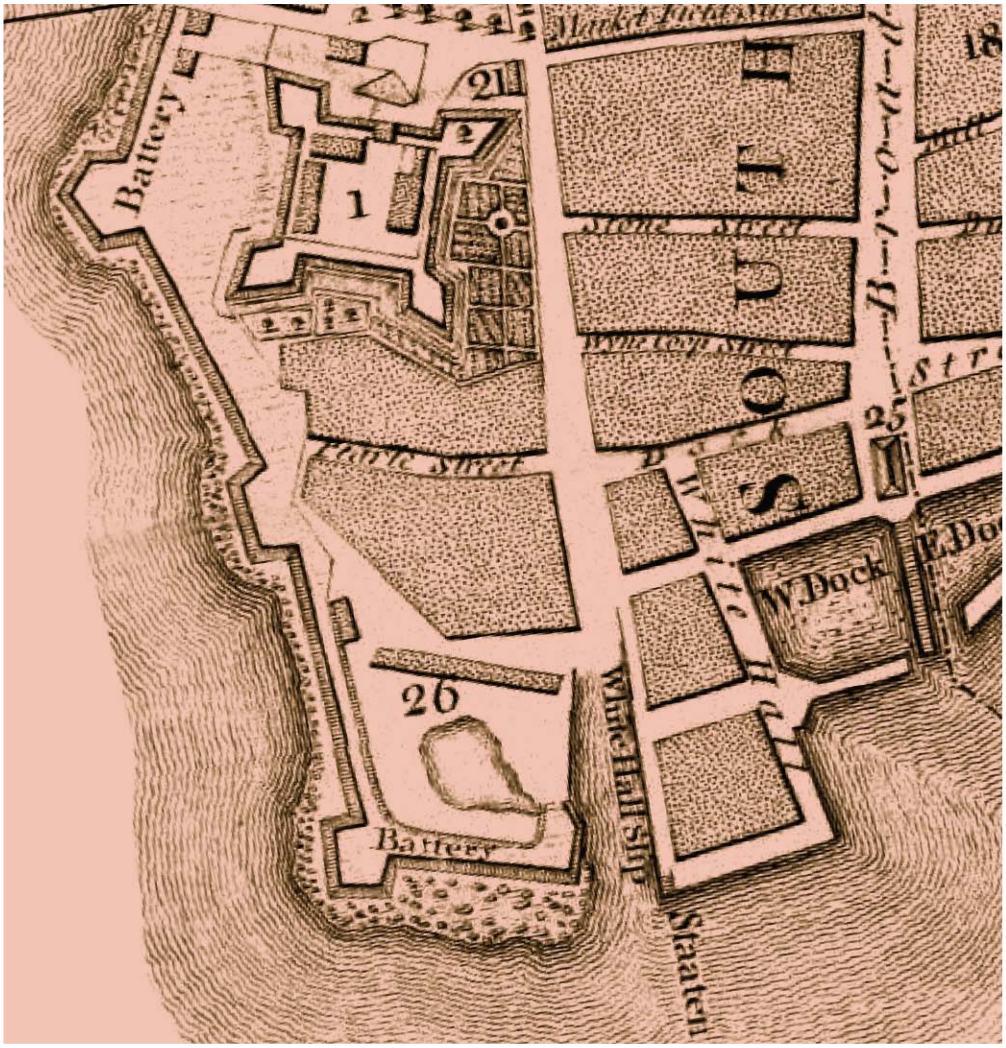
FINAL REPORT

Prepared as part of NYCT-WO41 – Implementation of the Mitigation Plan for Analysis, Curation, Report Preparation, and Public Outreach for the South Ferry Terminal Project

South Ferry Terminal Project



Prepared for

Metropolitan Transportation Authority
New York City Transit
Capital Construction
2 Broadway
New York, NY 10004

Prepared by

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Volume I: Text and Figures

April 2012

SOUTH FERRY TERMINAL PROJECT
Final Report

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Prepared by

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April 2012

Management Summary

SHPO Project Review Number:	06PR2806
Involved Agencies:	Federal Transit Administration Metropolitan Transportation Authority Capital Construction
Phase of Survey:	Phases 1, 2, and 3

Location Information

Location:	New York, New York
Minor Civil Division:	06101 – Manhattan
County:	New York

Survey Area

Length:	1800 feet (548.64 meters)
Width:	Variable: 40 feet (12.92 meters) to 100 feet (30.48 meters)
Depth:	Up to 20 feet (6.1 meters) below ground surface
Acres Surveyed:	2.43 acres (105,884 square feet)
Area Excavated:	Units: approximately 500 square feet (46.45 square meters) Trenches: approximately 800 square feet (74.32 square meters)
Percentage of Site Monitored:	Approximately 80 percent of the project corridor.

USGS 7.5 Minute Quadrangle Map:	Jersey City

Archaeological Survey Overview

Number & Interval of Shovel Tests:	N/A
Number & Size of Units:	41 units of varying size: maximum length: 6.8 feet (2.07 meters); maximum width: 6.5 feet (1.98 meters); maximum depth: 5.8 feet (1.77 meters).
Width of Plowed Strips:	N/A
Surface Survey Transect Interval:	N/A

Results of Archaeological Survey

Identified prehistoric sites:	None
Identified historic sites:	Battery Wall (A06101.05768) Whitehall Slip (A06101.015598) General South Ferry (A06101.16196)
Number & name of sites recommended for Phase II/Avoidance:	N/A

Results of Architectural Survey: N/A

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Meta F. Janowitz, RPA (URS)
Linda Stone, RPA

Date of Report: April, 2012

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VOLUME II

SOUTH FERRY

Composite Map Incorporating
Archaeological Features and Contractor Work

Chapter 1: History of the Project

A. INTRODUCTION

The Metropolitan Transportation Authority (MTA) had identified a need to replace the existing South Ferry Station on the 1 line, the terminal station on that line. Their web site describes the pre-existing inadequate condition of the station and alignment.

> The station was built in 1905, at a time when subway trains were much shorter than they are today. As a result, the platform can only accommodate the first five cars of each train, requiring customers in the rear cars to walk forward to exit, increasing the chance of train delays which can affect service throughout the entire 1/2 and 3 subway lines. It was also built as a single loop track, which limits the number of trains that can be stored (other subway terminal station have two or three tracks). In addition, the curvature of the platform requires the use of mechanical "gap fillers" to cover the space between the platform and the train door, and causes moving trains to generate excessive noise. Other limitations include a single entrance and narrow stairs that cause congestion for customers entering and leaving the station, and no station access for customers with disabilities (http://www.mta.info/capconstr/sft/description.htm).

The reconstruction plan for the new South Ferry Terminal Station included building a full-length platform to accommodate two 10-car subway trains, additional station entrances and sufficient overrun track south of the platform. Implementation of that plan required massive excavations of a large corridor of land extending approximately 1800 feet from Greenwich Street southward through Battery Park to the Staten Island Ferry Terminal (see **Figure 1.1** and **Figure 1.2**). This excavation area comprises the area of potential effect (APE). Much of the APE is within the portion of Manhattan Island that has the longest occupation history, first occupied by Native Americans and later controlled by Dutch and British interests prior to the Revolutionary War. The APE is indisputably rich in history and has high archaeological potential. The former MTA Chief Environmental Sustainability Officer described it as “the most important archaeological site in North America” (A. Singh, pers. comm. 2004). Areas of archaeological potential within the APE were identified in the Phase 1A Archaeological Assessment (Louis Berger Group [LBG] 2003: 54). These included almost the entire South Ferry Terminal project corridor, except the four locations where the previously existing subway alignment traversed the new corridor. Ultimately, the archaeological work conducted during the South Ferry Terminal project identified two significant archaeological sites: the Battery Wall and Whitehall Slip.

The MTA, on behalf of itself and the New York City Transit Authority and MTA Capital Construction Company, respective affiliates and subsidiary agencies of the MTA of the State of New York (collectively referred to as “MTA”), entered into a programmatic agreement with the Federal Transportation Authority (FTA) and the New York State Historic Preservation Office (SHPO) that called for archaeological monitoring of construction excavations for the new South Ferry Terminal project (July 2004). The New York City Landmarks Preservation Commission

(LPC) is listed as a consulting party to the project. Robert Kuhn and then Douglas Mackey represented SHPO and Amanda Sutphin, LPC throughout the duration of the project. An Archaeological Resource Management Plan (ARMP) was prepared during the planning phases of the South Ferry Terminal project (LBG 2004). Both documents can be downloaded at: http://www.mta.info/capconstr/sft/dea.htm (also see **Chapter 7: D. Evaluation of Archaeological Plans and Field Methods**).

> Because the proposed subway station project is federally funded, under Section 106 of the National Historic Preservation Act (NHPA) and the regulations established by the Protection of Historic Properties (36 CFR 800), the local agency, NYCT, must take into account the effects of their undertaking on historic properties either listed on or eligible for listing on the National Register of Historic Places (NRHP). The *Phase IA Archaeological Assessment, Proposed New South Ferry Terminal*, *Lower Manhattan*, *New York*, *New York* (LBG 2003) has determined that portions of the project area (approximately 65%) possess the potential to contain previously undocumented archaeological resources (LBG 2004: 1).

Because the archaeological work was undertaken during construction of the structural box for the new South Ferry Terminal, the MTA, their field archaeologists, and their construction contractor established protocols to work together and to identify potentially significant archaeological resources (Dewberry 2004a, 2004b, 2005a, 2005b, SGH 2005). The president of MTA Capitol Construction [MTACC] during the entire field project was Mysore L. Nagaraja. MTACC provided construction management services for the South Ferry Terminal project. Vijay Verma was the Construction Manager and Joe Trainor was the Chief Engineer. The Chief Environmental Sustainability Officer during the field phase was Ajay Singh and during the analysis and reporting phase, Audrey Heffernan. Both are acknowledged for their attention to and facilitation of the archaeological work. Mr. Singh's primary liaison to the archaeological team was Dennis Ramdahin and Ms. Heffernan's liaison, Derek Piper. The construction contractor was a joint venture between Schiavone Construction Company, Inc. and Granite Halmar Construction Company, Inc. (SGH). They were issued a contract for the construction of the South Ferry Terminal Structural Box on February 25, 2005.

The South Ferry Terminal project archaeological work was conducted as a Task Order of a contract for federally funded MTA projects. Three separate Task Orders were issued by MTA one for the field work (TO #3 to Dewberry-LMS), one for analysis and reporting (TO #41 to AKRF), and the third for archaeological, educational and public outreach commitments (Non-ESA Task Order for PMC Services to URS Corporation).

The field work Task Order was issued to the joint venture Dewberry-LMS. The actual work was conducted by Dewberry-Goodkind, Inc. Archaeological work began on October 27, 2004 and lasted through March 15, 2006. The archaeological field team consisted of a core group of archaeologists working for Dewberry-Goodkind, Inc. MTA initially planned for two full-time archaeologists to handle all of the site work, but it soon became evident that more staffing was needed. The actual size of the team fluctuated with the needs of the project to a maximum of 17 archaeologists per day. A second shift was established on August 22, 2005. The supervisory personnel were Linda Stone, Principal Investigator; Patience Freeman, Senior Archaeologist; and Diane Dallal[1], Senior Archaeologist. The project manager was Ileana Ivanciu with James

[1] Ms. Dallal shifted roles prior to the discovery of the Battery Wall, moving from Dewberry to AKRF.

Heeren as deputy project manager and Kathleen Buchholtz, administrative assistant. Additional administrative support was provided by Erin Gehan, Marlene Lindhardt, Daniel Lattanzi and Carrie Strain. There was also a small historic architecture component to the project conducted by Mary B. Dierickx Architectural Preservation Consultants. The core staff were (in alphabetical order) Alison Boles, Kay Carlson, James Cox, Amy Knippenberg, Dubravko Lazo, Jessica McLean, Martin Neinstedt, and Ada Prieto. Supplemental staff included Eliot Blair, Amber Creighton, Alyce Dagorn, Doris Del Castillo, Frank Feeley, Richard Kleinert, George Myers, Rosaceli Ortega, Arnold Pickman, Lynn Rakos, Constance Rocklein, and Shelly Spritzer. In addition to the core and supplemental staff, surge support was used to augment the team. The firms of URS Corporation, A.D. Marble & Company and John Milner Associates, Inc. provided surge support. The URS archaeologists were led by Edward Morin and included Richard Affleck, John Blong, Ruth Dickau, Daniel Eichinger, Susan Garst, Jeffrey Harbison, Scott Hood, Michael Krakovsky, Eileen Krall, Robby Menke and Brian Siedel. The A.D. Marble & Company archaeologists were led by John Lawrence and Richard Baublitz. The other A.D. Marble archaeologists were Dan Bailey, Brooke Blades, Scott Emory, Amy Fanz, Chris Gebert, Frank Mikolic and David Weinberg. John Milner Associates, Inc. provided Geraldine Baldwin. MTA provided an archaeological intern, Erica LaSala, who helped organize and process artifacts.

The Task Order for the analysis and reporting of the South Ferry Project was awarded to AKRF. The AKRF team was lead by Project Manager Diane Dallal, Director of Archaeology, with oversight by Project Director Claudia Cooney. Diane Dallal conducted additional historical research assisted by archaeologists Elizabeth D. Meade and Molly McDonald. Ms. McDonald also contributed to Chapter 4 of the Draft and Final Reports. Kenneth Mack, Jordan Schuler, and Eymund Diegel produced the GIS drawings. Eunice Inquimboy, Elizabeth Heyman and W. R. Reynolds produced the report graphics with W. R. Reynolds providing oversight and color corrections. Additional support was provided by George Penesis, Patricia Alvear, Alexander Korniakov, Steven Krivitsky, Eileen Petrullo, and JoLayne Morneau. The Publications Department was represented by Ann Galloway, Sergei Burbank, Matthew Dailey and Nancy Vega; the Production Department consisted of Rolando Vega, Jean Fox, and Jeff Jamrog. The analysis and reporting of the field effort was subcontracted to Linda Stone, RPA. The artifact analysis and reporting was subcontracted to URS Corporation, which used its own staff as well as outside consultants. The one exception was the analysis of the smoking pipes, completed by Diane Dallal of AKRF. The URS team was led by Edward Morin and Meta F. Janowitz. Artifacts were washed and labeled at URS by Karen Bieling, Drew Stanzeski, Sharon Malek, Mara Kaktins, Matthew Olson, Robert Kotlarek, Erin Shiles, Amber Creighton, Lovely Elyseé, and Sean Cassidy. Drew Stanzeski performed the flotation. Artifact analysis at URS was completed by Meta F. Janowitz, George L. Miller, Mara Kaktins, and Rebecca White with technical help from Brian Seidel. Conservation of some metal artifacts was done at URS by Robert Wiencek. Scott Hood prepared figures of the field drawings for this report after Lynda Bass scanned the drawings into an electronic format. Consultant analysts and specialists were Allan Gilbert of Fordham University, brick analyst; Samuel Marquez of SUNY Downstate Medical Center, physical anthropologist; Gary McGowan of Cultural Preservation and Restoration, conservator; Marie-Lorraine Pipes, faunal analyst; Linda Scott-Cummings of the PaleoResearch Institute, pollen, phytolith and paleobotanical analyst; William E. Wright of the Tree Ring Laboratory, Lamont-Doherty Earth Observatory of Columbia University, dendrochronology; John Walsh of Testwell, Inc., mortar analyst; and Daniel P. Wagner of Geo-Sci Consultants, Inc., geochemical analyst. Rob Tucher took photographs of artifacts and faunal material for this report.

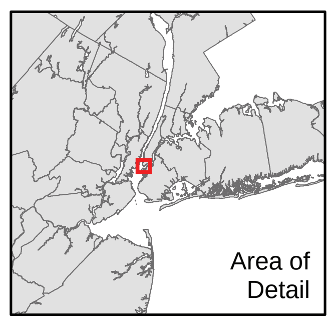
Under the Non-ESA Task Order awarded to URS Corporation, Ed Morin was the Project Manager for URS, Diane Dallal, Project Manager for AKRF, and Linda Stone continued as a subconsultant for the project. Under this task order, Meta Janowitz and her URS team curated the collection. An exhibit, “Where New York Began: Archaeology at the South Ferry Terminal,” was prepared by the New York Transit Museum in collaboration with AKRF, URS Corporation and Linda Stone. Additional public outreach conducted by the principals includes a Public Report, Brochure Middle-School Lesson Plan, Documentary Film and providing website support. Also under this Task Order, the Human Remains will be reburied and the artifact collection and associated materials transferred to a final repository (as yet to be determined).

The following technical report is organized in eight chapters, as outlined in *Mitigation Plan for Analysis, Curation, Report Preparation, and Public Outreach for the South Ferry Terminal Project* (AKRF/URS 2006): history of the project; methods; statement of research questions; historical context; field results; artifact analysis; conclusions and recommendations; and references. ✷

4.26.10

Study Area

0 2000 FEET
SCALE



USGS 7.5 Minute Topographic Map
Jersey City Quadrangle
Figure 1.1

SOUTH FERRY

USGS 7.5 Minute Topographic Map
Jersey City Quadrangle
Figure 1.2

SOUTH FERRY

Chapter 2: Methods

A. HISTORICAL RESEARCH METHODS

The goal of this historical research was to provide additional information beyond that which was included in the *Phase 1A Archaeological Assessment for the Proposed New South Ferry Terminal* (Louis Berger Group, Inc. [LBG] July 2003) and to provide answers to research questions formulated during and after fieldwork. This research was conducted primarily on the subjects of the Battery Wall, Whitehall Slip, Battery Pond, Lower Barracks, landfill-retaining structures, and the human remains encountered during excavations.

The historical research necessary for this study presented numerous challenges, not so much from a lack of British and American primary sources as from their nature and location. The sources are widely distributed among dozens of collections in libraries and archives and in federal repositories. Fortunately, many of these resources are available online or as copies or Photostats of originals and are now in the collections of local libraries and institutions.

Any study of an archaeological site in New York City and its finds has to begin with maps, especially those collected by I.M. Phelps Stokes in his *Iconography of Manhattan Island* (1967). In addition, the map collections of the New York Public Library, the Library of Congress, New-York Historical Society, British National Archives including the War Department, George III Topographical Collection in the British Library, the David Rumsey Historical Map Collection, and Cohen and Augustyn's *Manhattan in Maps* (1997), while not the only collections, were found to be exhaustive and the most useful for this study.

The discovery in the British National Archives of two unpublished maps of Fort George and the Battery from two different time periods—one dating circa 1756 by John Dies, Commissioner of Fortifications in New York City and the other by British Captain Douglas Campbell dating 1782—was significant because the maps provided accurate measurements of the Battery, additional information, and assigned names to several previously mapped, but unlabeled structures situated on the project site in the 18th century.

GIS was also used to inform the historical research. Historical maps were scanned from paper copies or converted from their source digital formats (BMP, JPG, Sid, PDF) to a common digital format (TIF). They were color-adjusted to maximize legibility of mapped features.

The most accurate historic map was then selected as a benchmark for positioning other maps, as there was a wide variety of survey accuracy and graphic techniques among the historic maps. The most accurate map in terms of spatial representation was John Dies' 1756 *Exact Draught of the Work Built this Year, as also of Fort George and the houses that have any Conection [sic] with the Batteries or Fort* from the British National Archives, based on quality of detail and its alignment with the Battery Wall segments identified by the archaeologists **(**see **Figure 4.16)**. The maps were georeferenced using ArcGIS to obtain a "best fit" between the known remnants of the Battery Wall and modern street alignments that had survived from the 18th century. Even the most accurate maps, however, had potential discrepancies of + or – 10 to 20 feet when compared with current conditions.

Current conditions used for calibration included the survey quality mapping of the New York City Department of Information Technology and Telecommunications digital base map, showing 2006 street alignments and the surveyed remnants of the Battery Wall. Where discrepancies were potentially greater, e.g. several hundred feet for 17th century "sketch" maps, priority was given to aligning the coarser maps with the Battery Wall location of the Dies' map to show the relative location of mapped features relative to the project corridor.

The shoreline and water areas as shown on many of the historical maps were colorized by ARCGIS tracing to highlight shoreline and pier changes over time.

Other primary sources used in this study are diverse and encompass traditional resources such as letters and diaries as well as less traditional resources such as orderly books[1], payment records, muster rolls, lists of barrack houses, and payment receipts. For example, the *British Headquarters Papers* (Great Britain Army 1775-1783) provide a wealth of information about New York City for the period circa 1780-1782, and Photostats of the original documents are located in the Manuscripts Division of the New York Public Library (NYPL). The finding aid to the collection, *Report on the American MS in the Royal Institute of Great Britain*, encompasses four volumes (Historical Manuscripts Commission 1904-1909). Three of the four volumes are available online at www.books.google.com and a photocopy of all four volumes is available in the MSS Division of the NYPL. These papers include such items as a *List of Barrack Houses in the Garrison of New York*, which includes the name(s) of the individuals, households, and/or groups occupying these buildings, most of which had been confiscated from American sympathizers who fled the city. Listings include, for example, "25 Broadway: Negro Ordnance Barracks," "5 White Hall: Royal Artillery Barracks," and "24 Beekman: Artificers in Engineer Department" (for a list of other barracks see **Table 4-2 in Chapter 4: 10.b. John Dies' Map and New Construction**).

Telling the story of the Battery Wall required giving equal attention to international events as well as to the microhistories of New York City, colony and state. It required using the papers and writings of the major decision makers such as Cadwallader Colden, Sir Henry Clinton, George Washington and the Montresors, father and son, as well as published compilations such as *Records of New Amsterdam from 1653 to 1674* (Fernow 1897), *Calendar of Council Minutes 1668-1783* (Fernow and Van Laer 1902), *The Montresor Journals 1757-1779* (Scull 1882), *Documents Relative to the Colonial History of New York* (O'Callaghan 1856-1887), and numerous others. A number of scholars prepared dissertations and/or wrote books from one vantage point or another about the assorted time periods and phases during which the Battery Wall and Whitehall Slip were constructed. Several of the most valuable were Bonomi's, *A Factious People: Politics and Society in Colonial New York* (1971), Gilder's *The Battery* (1939), and Ziebarth's dissertation, *The Role of New York in King George's War, 1739-1748* (1972). Barnet Schecter's, *The Battle for New York: The City at the Heart of the American Revolution* provided a framework for events leading up to the American Revolution, the capture of New York City, and the interval when the city was a fortified British garrison.

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[1] The most exhaustive list of orderly books, the daily orders for each regiment, can be found at http://www.RevWar75.com, a web site maintained by John K. Robertson and Robert McDonald.

Orderly books of both Continental and British soldiers contain the daily orders for each regiment, including the place where the regiment was at the time, where it was to go, and where it would set up camp. While not contributing directly to the history of the Battery Wall, these facts are noteworthy because they provide us with the feelings and sights described by soldiers fighting on both sides of the war. For example, Chaplain Andrew Hunter of the New Jersey Brigade of the Continental Army described, from his vantage point on the Harlem Heights, the September night in 1776 when New York City went up in flames: “The West Side of Broad Way was burnt from opposite White Hall to Dean’s Distillery above the College” (McDonald and Robertson 2007: published online). Personal accounts by American and British military personnel, engineers, prisoners of war, doctors and merchants have also provided a wealth of source material.

Walter R. Borneman’s *The French and Indian War (2006)* was useful for interpreting international events and colonial affairs during the period between 1748 and 1763, demonstrating how the events of this period became a prelude to the Revolution. Christopher Hibbert’s *Redcoats and Rebels: the American Revolution through British Eyes (2002)* provided a unique perspective through which to view New York City as a British garrison throughout the Revolutionary War period (1776-1783). The letters of the young Robert Biddulph were another wonderful resource (Biddulph 1923). With a rollicking sense of humor, he provided insightful and surprisingly mature vignettes about life in the city during this stressful time, including accounts of mosquitoes, dour Hessians, and the weather. However, he also documented the terrible winter of 1780 and its supply shortages, when soldiers were reduced to eating raw meat because of the lack of firewood.

Ongoing discussions with archaeologists, cartographers, and historians enriched the interpretation of the data. Steven Jaffe, Eugene Reyes, Paul Huey, Douglas Mackey, Amanda Sutphin, Kenneth Cobb, Diana Wall, and others gave of their time by suggesting additional resources to explore, sharing theories about the conventions of mapmaking, military life and nomenclature, the construction and use of the Lower Barracks, the various building episodes on the Battery, and possible uses of the Battery Pond. One patient individual also answered endless questions about firing angles and attacks by land and water.

Internet resources were used extensively. These resources provided access to documents and histories, some well known, some obscure, that otherwise would have required numerous trips to out-of-state or overseas libraries but were now, fortunately, available desk-side, allowing one to navigate a sea of fairly inexhaustible resources. For a complete list of internet and other resources see **Chapter 8: References**. The sites most often consulted for this study were www.livebooks.com (now extinct), www.books.google.com, www.loyalists.com, the website of the Royal Engineers Museum at www.remuseum.org.uk, the Loyalist Institute website at www.royalprovincial.com, early newspapers available online at www.newyork familyhistory.org and http://proquest.umi.com, articles available at www.jstore.org, the website of the British National Archives, www.nationalarchives.com, and the *Calendar of State Papers Colonial, America and the West Indies* at www.british-history.ac.uk.

Published and unpublished resources were consulted at various repositories of information—the Main Research Branch of the New York Public Library (including the Manuscripts and Rare Book, History and Map Divisions), the New-York Historical Society, Museum of the City of New York Archives, the South Street Seaport Museum Library, Municipal Archives, Municipal Library, New York City Transit Museum Archives, the New York City Landmarks Preservation

Commission (LPC) Archaeological Division, and the Topographic Bureau of the Manhattan Borough President's Office.

Archaeological reports significant to this study include "The Waterfront of Colonial New York: an Intensive Archaeological Sensitivity Study of Potentially Surviving Archaeological Remains within the Defined South Ferry Development Parcel" (Grossman & Associates Inc. 1987), "17 State Street: An Archaeological Evaluation: Phase I Documentation" (Geismar 1986), "Phase 1A Archaeological Documentary Study: Peter Minuit Park Map Change" (Historical Perspectives, Inc. [HPI] 1993), "Archaeological Test Pit Excavations: Whitehall Ferry Terminal Project, New York, New York" (Louis Berger and Associates [LBA] 2000), and the "Proposed New South Ferry Terminal Lower Manhattan New York, New York Phase 1A Archaeological Assessment" (LBG 2003), as well as many others.

An excellent source of information about landmaking and landfill structures, albeit in Boston, was Nancy Seasholes' *Gaining Ground: A History of Landmaking in Boston* (2003). Also useful for providing information about New York City landfill structures was Cantwell and Wall's *Unearthing Gotham: The Archaeology of New York City* (2001), *The Assay Site Historic and Archaeological Investigations of the New York City Waterfront, [Block 35]* (LBA 1990a), and many other New York City site reports. Site reports from Philadelphia and Boston were also consulted. Studies of Manhattan's water resources, wharves and piers included Koeppel's *Water for Gotham* (2000), Bone's *The New York Waterfront* (1997), Buttenwieser's *Manhattan Water-Bound* (1987) and Greene's seminal work, *Wharves and Piers: Their Design, Construction and Equipment* (1917), among others.

After the discovery of the Battery Wall segments, the New York State Historic Preservation Office (NYSHPO) arranged a site visit for members of local professional archaeological organizations together with archaeological staff of the New York State Museum. Paul R. Huey, senior scientist working for the NYSHPO's Bureau of Historic Sites and a well known expert in the field of military history in New York State, visited the site and subsequently compiled a paper entitled *Narrative Notes from a Field Trip to Visit Excavations at the Battery, New York City* (February 2006). This document was useful in preparing an approach to the historical analysis of the Wall for this report (see **Appendix L**).

New York historian and author, Steven Jaffe[2], also shared information about the city and its resources and introduced the work of historian Jill Lepore who provides an analysis of the so-called "Negro Plot" of 1741 in her book, *New York Burning* (2005). Her work and Daniel Horsmanden's (1744) first-hand account of the trials of the "plotters" introduced us to John Roosevelt's slave, Quack, who worked at the Battery.

One of the goals of this study was to determine who built the Wall or Walls. Another was to determine the role, if any, of the enslaved population in its construction. To answer these questions, many resources were consulted, including *The New York African Burial Ground History Final Report*, edited by Edna Green Medford (2004), *Black and White Manhattan* (Foote 2004), *Black Life in Colonial Manhattan* (Foote 1991), *Slavery in New York* (Berlin and Harris 2005), *Many Thousands Gone* (Berlin 1998), *New York Burning* (Lepore 2005) and "The African Burial Ground in the Age of Revolution: A Landscape in Transition" (LaRoche, in press).

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[2] Dr. Jaffe is writing a book about New York City's modern defenses.

It should be noted that because the Battery and Whitehall Slip had been public land for much of the historic period, i.e. a military fortification and/or thoroughfare, various sources of documentary data normally accessed when studying building lots, such as real estate and personal tax records, census materials, etc., were not always relevant for discerning land usage. A useful document for sorting out the boundaries of the Fort and the Battery in the late-18th century was the *Treatise Upon the Estate and Rights of the Corporation of the City of New York as Proprietors*, 2 volumes (Hoffman 1862).

A number of archaeological investigations of 18th-century fortifications and/or military encampments have been performed in New York, New Jersey, Pennsylvania and New England as noted by Historical Perspectives (2001b: 17). The Revolutionary War-era investigations of both American and British sites have been a major focus of the National Park Service, as well as avocational and professional archaeologists (Lopez 1978; Poirier 1976; Cohn 1983; Seidel 1983, Fisher 1983; Lenik 1987; Starbuck 1998, 1990; Historical Perspectives 1997). Investigations at northern military outposts such as Fort Bull, Fort Stanwix, Crown Point, and Fort Ontario relate the life and military activities of the Upper Hudson Valley/Lake Ontario/Oswego River area and relations between the English, French, and Native Americans (Gilmore 1983, Ping Hsu 1972; Workmaster 1972; Fisher 1995).

French and Indian War period site excavations have also been conducted at Fort Edward, Rogers' Island, Fort Ticonderoga and elsewhere (Grossman & Associates 1986; Starbuck 2002, 2004) and at Fort Gage (Huey 1975, 1985; Feister and Huey 1985), among others. Many of the articles, websites, books and site reports about these excavations have been consulted.

To analyze the landfill-retaining structures documented at the site, a context for landfill-retaining structure typology has been developed (see **Chapter 4:C.Waterfront Landfill-Retaining Structures and Previous Cultural Resources Investigations)**. Information was collected regarding the methods that archaeologists have used previously to classify and describe landfill-retaining structures. Data was also collected on the construction characteristics of landfill-retaining structures that had previously been documented in the United States and abroad. Archaeological reports and journal articles from the United States and portions of Europe were collected from the LPC, NYSHPO, Massachusetts Historical Commission, websites, public libraries and other repositories, and from the personal files of professional archaeologists. In addition, the analysis drew from scholarship within the field of vernacular architecture. Published materials on vernacular construction methods and carpentry history were reviewed and summarized to provide a context for the evaluation of timber landfill-retaining structures.

B. FIELD METHODS

Four documents guided the South Ferry Terminal fieldwork. These are the Programmatic Agreement (FTA, MTA & SHPO 2004), the Archaeological Resource Management Plan (ARMP) (LBG 2004), the Cultural Resources Management Plan (CRMP) (Schiavone/Granite Halmar [SGH] 2005) and the Draft Archaeological Testing and Monitoring Plan (DATMP) (Dewberry 2005b). These documents provide specific details regarding both anticipated and unanticipated archaeological resources and the level of effort required for the archaeological work. The documents also include specific time frames for preparing documentation for agency review and response as well as details regarding the communications protocol and information on artifact processing and reporting.

Monitoring for the South Ferry Terminal project excavations was conducted as part of the archaeological identification process, commonly referred to as Phase 1B testing. The goal of

Phase 1B archaeological work is to determine the presence or absence of archaeological resources. As with any monitoring project, the archaeologist was given authority to examine contractor excavations and halt them if necessary.

The archaeologists followed the communication protocol in accordance with the Programmatic Agreement and other guiding documents, which allowed for the archaeologist to have "direct simultaneous communications with the NYCT Engineer" and the contractor (Dewbery 2004a: 3, 2005b: 14)[3]. For the most part, the communication protocol was adequate; however, there were times when the archaeologist on site had to call the Engineer, who wasn't in the work zone, in order to communicate with the equipment operator. While it is not believed by the archaeological team that any information was lost as a result of this communication protocol, it did prove to be inconvenient, and it is conceivable that problems could have arisen if the Engineer hadn't responded immediately.

1. MONITORING

Monitoring the contractor's work involved observing and documenting a variety of types of excavation. The contractor's excavation work, as it pertained to archaeological investigations, included three activities; 1) installing a cut-off wall to prevent ground water from seeping into the excavations, 2) relocating utilities outside of the corridor, and 3) general site excavations of all soil within the corridor, making way for the new concrete and steel structural box for the subway alignment and station.

General site excavations were done in one of two ways, either archaeological trenching, or "hogging." Archaeological Test Trenches (ATTs) were prescribed as part of the ARMP. ATTs were trenches located in specific parts of the corridor previously defined as having the highest archaeological potential (see **Figure 2.1**). ATTs were excavated solely for the purpose of archaeological identification. The ARMP and CRMP specified that the contractor use a scoop no greater than 1.5 feet for archaeological trenching. ATTs were excavated in one of two widths. They were either eight or six feet wide. The eight-foot wide trenches were excavated down the center of the South Ferry Terminal project corridor. They were abbreviated ET for 'E'ight-foot wide 'T'rench and numbered sequentially from north to south. The six-foot wide trenches crossed the ETs at specified locations and spanned the width of the corridor, unless otherwise prescribed in the ARMP. These trenches were abbreviated XTs for si'X'-foot wide 'T'rench and were also numbered sequentially from north to south. A total of twelve archaeological test trenches were excavated, or partially excavated, for the South Ferry Terminal project: five ETs and seven XTs. The archaeological protocol included stopping ATT excavation in lieu of data recovery excavations for the Battery Wall.

Hogging is a construction term which, in the archaeological sense, means unsystematic excavation. Although unsystematic, all contractor excavations within archaeologically sensitive areas of the South Ferry Terminal project, as defined in the ARMP, were required to use limited scoop sizes, as detailed in the ARMP and CRMP. The bucket could be no larger than three cubic yards and each scoop no greater than 2.5 feet for hogging.

Depending on the type of excavation monitored, the archaeologists would take notes on various types of field forms (see **Appendix C** for examples of the forms used) or in field books. The

[3] A more detailed evaluation of the field approach and its implementation is provided in **Chapter 7: D. Evaluation of Archaeological Plans and Field Methods Used for the South Ferry Terminal Project**.

forms contained space for the field technicians to record information such as depth, location, soil types, samples, photographs, drawings and artifacts for the various types of excavation. While they all provided space to record similar data, the forms were tailored to the type of excavation. Field drawings were completed to document soil profiles, plan views, and features.

Photo documentation was done throughout the South Ferry Terminal project using a digital camera. All archaeological field personnel had access to the camera and were instructed to photograph any findings, as well as daily site activities and the variety of contractor excavations. Photographs were regularly downloaded to a laptop computer during the fieldwork and have since been copied to CD. All photographs taken in the field were recorded on "Photo Log" forms that contained the date, location, direction and a brief description of the image. Individual pages and lines on each page within the Photo Log were numbered. A total of 121 Photo Log forms were used. Each form contained up to 30 lines to describe individual images. Subsequently, the photographs have been organized by "date taken" and "digital image identifier" and stored on CD. The Logs have been entered into a spreadsheet and correlated with the digital identification numbers. That log is appended to this report (see **Appendix A**) and will accompany the artifact collection. Unless otherwise noted, all field photographs produced in this report were taken by members of the Dewberry field team.

The horizontal and vertical positions of archaeological resources were measured in relation to construction features. The contractor's terminology was generally used to assign provenience designations, using terms such as "cut-off wall," "secant pile," "secant wall," "soldier pile," "strut," "deck beam," "perimeter trench," and "decking" except in the case of excavation units and archaeological test trenches (see **Table 2-1**). and the large folded **Composite Map** located in a pocket on the inside cover of Volume I of this report. The cut-off wall was the barrier wall the contractor built to prevent water seepage into the excavation area. Secant piles were augur-excavated columns filled with concrete and steel to the depth of bedrock. These were excavated in an overlapping fashion to create a secant wall, which is a type of cut-off wall. Soldier piles were similar to secant piles, but were placed in locations where bedrock was very shallow or which the large auger could not access. These were hand-excavated pits called solder pile pits. Deck beams and struts were members of the steel support structure that connected the cut-off walls. The deck beams were covered with decking, thus protecting the excavation area. Perimeter trenches were shallow trenches excavated along the perimeter of the South Ferry Terminal project corridor to enable construction of the cut-off wall.

A hand-held GPS (global position system) unit was used to identify locations in the field, but this device was not always within satellite range and was often subject to interference from the construction equipment. Therefore GPS use was minimal. The contractor's soldier piles, trenches, work/survey points, deck beams and other construction features were all mapped as part of their contract. Those maps were provided to the archaeologists enabling all archaeological finds to be located in space, thus establishing the provenience.[4] Common abbreviations for the South Ferry Terminal project archaeological work were often abbreviations of the contractor's terminology. These are depicted on the field drawings in Chapter 5 as well as the 20"X30" **Composite Map**, which shows the contractor's work locations, the archaeological

[4] The contractor's maps use the surveyor's convention, and common practice, of adding 100 feet to the actual elevation above (or below) sea level, thus eliminating negative numbers (e.g., elevation 95 feet above sea level on a contractor's drawing is 5 feet below sea level in the field). Current ground surface elevations throughout the project corridor range from approximately 5 to 10 feet above sea level.

work locations and the archaeological features. The **Composite Map** is located in a pocket on the inside cover of Volume I of this report.

Table 2-1
Abbreviations Used in Archaeological Proveniences

Abbreviation	Term	Abbreviation	Term
ATT	Archaeological Test Trench	N	North
B	Boring	P	Pit
BGS	Below Ground Surface	PC	Geoprobe
BW	Battery Wall	PT	Perimeter Trench
C	decking Column	S	South
DB	Deck Beam	SFT	South Ferry Terminal
DRP	Data Recovery Plan	SGH	Schiavone/Granite-Halmar
E	East	SP	Secant Pile
ET	Eight-foot wide archaeological test Trench	SPP	Soldier Pile Pit
EU	Excavation Unit	TB	Tie Back
F	Feature	TP	Test Pit
GC(P)	Girder Column (Pit)	UT	Utility Trench
GW	Guide Wall	W	West
IC(P)	Interior Column (Pit)	WHS	Whitehall Slip
MF	Miscellaneous Find	WP	Work Point
MR	Mueser Rutledge Consulting Engineers	XT	Six-foot wide archaeological test Trench

When artifacts or soil samples were recovered, they were placed in plastic zip-top bags marked with the provenience and date. The provenience assignments were descriptive of the context and included references to the contractor's work. Examples include "Soldier pile pit 60 at 10' bgs," "Perimeter Trench West Profile 32.5' North of Work Point 11 @ 3.7' bgs," or "Monitoring Hogging Approx. 120' N of Deck Beam 4." These descriptions sometimes also included interpretations made in the field, which have since been reevaluated. One such example is "Deck Beam 4 soil beneath 3rd layer of cribbing west of Wall," referring to the log feature associated with Wall 3. We now know this feature is not "cribbing," however the field description remains in the database. Other reasons for the provenience database containing descriptions that may differ from those provided in this report include calling something in the field by an arbitrary name such as "Section D of Whitehall Slip Profile" referring to part of a field drawing labeled "D" rather than to analytical unit "WHS D" (discussed in detail later in this report), or the use of the term "wall" in the field to refer to a variety of features and trench profiles in addition to the Battery Wall.

In addition to the specific provenience information, the site has been divided into six geographic areas (see **Figure 2.2 and Composite Map**). These are from north to south: Greenwich Street and Battery Place (BPL), Battery Park north of the existing 1 line loop (BPN), Battery Park south of the loop to the 4/5 subway line (BPS), the area at the south of Battery Park paved with cobblestones and the Coast Guard access road (CCG), the area between the existing 1 line fan plant and loop (FPSP), and Peter Minuit Plaza (PMP). In some cases, this Area information was also written on the artifact and sample bags. Areas were later added to all contexts as part of the provenience database (see Laboratory Methods). After completion of fieldwork, individual contexts were grouped into Analytical Units (AUs) in order to facilitate interpretation of the field data. AU assignments were based on both field and artifact information.

In addition to the standard archaeological monitoring required for the entire construction project, contingency plans were established for additional levels of effort, when potentially significant archaeological resources were encountered. These plans were labeled Type I and Type II responses by MTA in its initial Request for Proposal for the project, and were tools used to allocate appropriate manpower to field efforts, beyond the normal monitoring. Generally, a Type I response would be called to enable manpower for a Phase 2 archaeological evaluation or a short Phase 3 data recovery and a Type II response would be used for longer data recovery[5]. These response types were enacted for the two significant South Ferry Terminal project finds: Whitehall Slip and the Battery Wall.

Phase 2 evaluations were required for the South Ferry Terminal project when potentially significant features were identified during monitoring; however, there was no requirement for written Phase 2 protocols. The DATMP and the ARMP directed that Phase 2 evaluations include exposure of the feature or find using hand tools (assisted by mechanical equipment, if appropriate); drawing and photographing the feature; screening and/or water screening associated soil through ¼ inch mesh to recover artifacts that might be present; and recording, drawing and photographing excavation plans, profiles and stratigraphy. When a potentially significant feature was identified during monitoring, the archaeologist would request a temporary construction work stoppage. At that point, there was a 30-minute window, as prescribed by the ARMP, during which the feature or deposit could be evaluated to determine its extent, integrity and significance according to the standards of the National Register of Historic Places. In cases when the archaeologist determined additional time was needed for Phase 2 evaluations and the contractor stated they needed to return to that area after the 30-minute window, a Type I response was initiated. This involved MTA formally requesting a longer construction work stoppage and a provision for additional manpower for the archaeological effort. Such responses were requested only for the two significant South Ferry Terminal project finds: the Battery Wall and Whitehall Slip.

2. BATTERY WALL

Four truncated sections of what appeared to be the same colonial-era battery wall were identified during South Ferry Terminal excavations (see **Figure 2.3**). Three of these were identified during excavations of ATTs and the other (Wall 2) during “hogging” or general excavations. The first section was identified during second shift work on November 7, 2005 and all Phase 3 data recovery excavations and removal of the Wall were completed by March 10, 2006.

In conjunction with archaeological Phase 3 data recovery, some publicity was also generated regarding the Wall. MTA contacted their cable news division, Transit Transit News, to film the initial find. Subsequently, other archaeologists and professionals were encouraged to visit.

The Battery Wall was easier for the public to view than the other South Ferry Terminal project archaeological findings for several reasons. The Walls were relatively compact with each section covering a narrow swath of the overall project corridor. This allowed the public to view the Wall from the perimeter of the site, without major safety issues. Removable decking covered

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[5] In general, Phase 2 archaeological evaluations enable identification of the extent of features, collecting enough information to allow evaluations of their significance according to the criteria set forth by the National Register of Historic Places, and to establish a plan for data recovery prior to the destruction of any archaeological resources. Phase 3 archaeological excavations are the result of the execution of that data recovery plan.

excavations permitting limited access for archaeologists and visitors without hindering construction. The areas where the Wall sections were found were not water logged, as was the case with the other South Ferry National Register of Historic Places eligible site, Whitehall Slip. Most importantly, the Wall was something to which the public could relate.

a. PHASE 2 EVALUATION AND PHASE 3 DATA RECOVERY PLAN METHODS

The Battery Wall discovery was certainly the most provocative find of the South Ferry Terminal archaeological work. It stimulated interest not only within the archaeological community, but also throughout the city. The Commissioner of the New York City Parks Department, Adrian Benepe, held a joint press conference with the President of MTA Capital Construction, Mysore L. Nagaraja, to announce the Walls' discovery and highlight its importance to the city. Mr. Benepe described the find as "one of the most important archaeological discoveries in several decades in New York City" (McGeehan 2005: published online). The *New York Times* covered the story extensively and foreign media outlets as far as Russia and New Zealand reported about the discoveries. The British in particular, seemed to take pleasure in the idea that the discovery of an 18th-century Wall built by their ancestors had somehow stopped construction in Manhattan, e.g. "Redcoats Halt Subway in New York" (Harris 2005). There was also national interest in the project with requests for information and interviews by the History Channel, Civil Engineering News and other outlets. For a complete list of media coverage, see **Appendix M.**

After identification of the first section of Wall, archaeological evaluation (Phase 2) was done. This led to the recommendation of eligibility for listing on the National Register of Historic Places. The Data Recovery Plan stated the Wall could be considered significant under eligibility criteria A or D: "Criterion A may apply because of the relationship of the Battery to the Revolutionary War. Criterion D would be applied because of the potential to yield important historic information" (Dewberry 2005d). The NYSHPO determined the Battery Wall was a significant archaeological find. A State Site Inventory Form was filed with the NYSHPO office and a unique site number assigned (A06101.015768).

Although the Wall sections had been truncated, it was anticipated that Phase 3 data recovery and analysis of the Wall could provide important information about its construction, repair, and use, as well as information about the historical landscape of lower Manhattan in its vicinity.

Phase 2 archaeological evaluations were unique at each of the four sections of Wall and are described below. The results of these evaluations were used to inform and develop appropriate Phase 3 data recovery plans at each location, as a supplement to the initial data recovery plan when other sections of Wall were identified (Dewberry 2005d, 2006a). The Supplement addressed unique aspects of each Wall section as well as sampling issues, such as how many archaeological excavation units would be placed per how many feet of Wall identified, as well as where the units would be placed in relation to the Wall. The Supplement also detailed how much additional sampling of soils and screening for artifact recovery would take place. The data recovery excavations of all four sections of the Battery Wall provided an unprecedented opportunity to examine various aspects of the Wall's construction, repair and eventual destruction. The recovered data would also be used, to the extent possible, to interpret changes in the local landscape over time, including the history of landfill in what is now Battery Park.

Data recovery included completing excavation units[6], taking soil samples for potential flotation, geochemical, pollen and phytolith analyses and taking samples of stones and mortar, as well as clearing all soil from the faces of the Wall and drawing plans and profiles. Jablonski Berkowitz Conservation, Inc. (JBCI), an architectural conservation consulting firm, was hired to dismantle Walls 1, 3 and 4 for storage and later reconstruction of two sections (Wall 1 and part of Wall 3). The process of dismantling was also archaeologically monitored and samples of soil were taken for potential analyses as well as for artifact recovery. JBCI prepared a report which is included as **Appendix K**.

The analysis of the results of the Battery Wall excavations is presented in **Chapter 5: Field Results**, and considers not only the different construction techniques and the deconstruction of the Wall, but also the subsequent filling of the park. In looking at construction techniques, comparisons have been sought with other examples, both archaeological and extant, and historic documentation has been used to enhance interpretations of the field data. Descriptions of individual Excavation Units (EUs) related to the Wall are presented in **Appendix N.**

1.) Wall 1

Phase 2 excavations were conducted at Wall 1 in preparation for writing the Phase 3 data recovery plan. Wall 1 was located in the northern part of Battery Park, south of the World Trade Center memorial globe. It measured approximately eight feet wide. Wall 1 was the first section of Battery Wall identified when it was accidentally impacted during archaeological monitoring of the excavation of ET 1. The bisection of Wall 1 was not intentional and may not have occurred had excavations been conducted during daylight hours. Despite the damage, the deposits which were uncovered intact still yielded much information (see **Chapter 5: A. Battery Wall).** This bisection points out the problems inherent in night monitoring and argues against such action on future projects. A more detailed evaluation of the field methods prescribed in the ARMP is provided in **Chapter 7: D. Evaluation of Archaeological Plans and Field Methods Used for the South Ferry Terminal Project**. Other sections of Battery Wall were sequentially numbered in the order in which they were discovered. Once this first section of Wall was identified and Phase 2 evaluation completed, the initial field assessment concluded this was a section of an 18th-century wall that was in fact part of the Battery. A Phase 3 data recovery plan was developed that included placing excavation units in relation to the exposed sections of Wall (on top of the Wall, underneath it, on the landward side, and the waterside). All units were excavated stratigraphically and all soils screened through ¼-inch hardware mesh for artifact recovery.

One of the goals of the Phase 2 work at Wall 1 was to determine the amount of fill above the Wall that could safely be removed using a backhoe. This would help determine the extent of the Wall within the South Ferry Terminal project corridor and would expose a soil surface into which archaeological excavation units could be placed. Screening a large sample of the removed soil was also done to determine the date of deposition of the fill and thus potentially the date of destruction of the Wall. Another goal was to identify any soil that still existed at the base of the Wall.

[6] Excavation Units were numbered sequentially at each Wall location, beginning with a multiple of 10. Excavations at Wall 1 began with EU 1. Those at Wall 3 began with EU 20 and at Wall 4 with EU 40 (see Appendix N).

Very little soil remained since the Wall was constructed directly on the bedrock; however, a small sample of this soil was screened for artifact recovery to determine the possible date of construction of Wall 1. The profiles of ET 1 were trowel scraped (see **Figure 2.4**). Cross-section drawings of the Wall and surrounding soil were drawn and these profiles examined.

Consultant specialists were invited to visit the site during Phase 2 excavations. Joseph Schuldenrein of Geoarchaeological Research Associates, a specialist in the analysis of the chemical composition of soils and soil formation processes, visited the site and conferred with the Principal Investigator about the stratigraphy. They concurred on the soil types and Dr. Schuldenrein recommended locations for sampling the soil exposed in the profile – sands which he preliminarily identified as Holocene sands – for potential geochemical analysis (see **Figure 2.5**). More is presented on the methods for soil collection and analysis below.

Allan Gilbert of Fordham University is a recognized expert in historic brick analysis. As a result of his expertise in historic construction techniques, it was thought he could provide some insight regarding the mortar and could also recommend other specialists in specific aspects of stone and mortar. His initial impression was that the mortar was atypical for the colonial period because of its strength. He hypothesized that the British would have had the financial means to use the best and strongest building materials available. Dr. Gilbert recommended contacting Norman Weiss of the Program in Historical Preservation at Columbia University, a technical specialist in the analysis and preservation of traditional building materials. Mr. Weiss was not able to visit the site until Phase 3 data recovery excavations were underway. His sampling recommendations are discussed later in this chapter. When Mr. Weiss was unavailable to work on the analysis phase of the South Ferry Terminal project, Dr. Gilbert suggested engaging John Walsh of Testwell Laboratories to conduct mortar analysis and Patrick Brock, a geologist at the City University of New York Queens College, to examine the Wall stones. The results of Brock's and Walsh's analyses are presented in **Chapter 5: Field Results**.

After documenting the profiles, exploratory excavations were completed as part of the archaeological Phase 2 evaluation to determine the extent of the Wall within the project corridor. The contractor removed the overburden from the eastern section of the Wall under archaeological supervision. The archaeologists could then manually scrape the surface of this section to determine if the Wall extended to the eastern limit of the South Ferry Terminal project corridor, which it did. The backhoe removed an eight-foot wide (N - S) and thirteen-foot long (E - W) section of overburden. The archaeologists, with the assistance of the contractor, next removed the loose fill by hand. They then excavated the soils above the Wall, selectively screening for the recovery of artifacts. The stratigraphy of the fill deposits around the Wall and the artifacts recovered from these contexts will be discussed in **Chapter 5: Field Results** and **Chapter 6: Artifact Analysis**.

The Data Recovery Plan (Phase 3) for the Battery Wall was developed based on the results of the Phase 2 work. It contained research questions and a research design to guide the subsequent Phase 3 data recovery fieldwork. Fieldwork consisted of excavating units, recording stratigraphy, screening soil for artifact recovery and sampling of building materials and soils for potential specialized analyses. Methods for taking the samples are discussed below. The research questions have since been augmented to include questions raised during the course of analysis and all are presented in the following chapter of this report.

2.) Wall 2

Wall 2 was located directly north of the World Trade Center Memorial Globe and therefore north of Wall 1. It had been previously disturbed at some point after this Wall section was truncated and prior to the South Ferry Terminal project excavations. Very little of this section of Wall remained *in situ* (see **Figure 2.6**). It measured approximately eight feet wide, as did Wall 1. The remains of Wall 2 were two feet high at the western end, but quickly petered out with the rising bedrock toward the east after only 4.5 feet. Wall 2 was identified during hogging (general excavation) when the backhoe scooped one bucket of soil from the southern face of the Wall, leaving no surrounding soils within which to conduct archaeological Phase 3 data recovery excavations, but not damaging the Wall.

Phase 2 level archaeological evaluation was conducted at Wall 2. This archaeological work at Wall 2 consisted of cleaning the remaining soil above and adjacent to Wall 2 and drawing and photographing it. Wall 2 exhibited similar construction materials and techniques as Wall 1. The NYSHPO did not require JBCI to document Wall 2 for later reconstruction. A few samples of stone were retained from Wall 2 and it was destroyed as part of construction excavations. No Phase 3 data recovery was warranted because of the lack of preservation.

3.) Wall 3

Wall 3 was originally identified when a seven-foot long section was exposed during archaeological trenching (ET 4). This seven-foot section of the face was found along with a twenty-foot long section of stone rubble (see **Figure 2.7**). It was not initially clear if the Wall and rubble were related to one another. It was later determined that the rubble was Wall fill. Upon identification of Wall 3, one of the face stones was found protruding from the Wall. The stone itself was 1.2 feet wide by 0.8 feet high by 2.3 feet long. Later, during the course of excavation, it was concluded this stone was once flush with the other face stones, but that it became dislodged during the original dismantling of the upper levels of the Wall. Wall 3 was ultimately from approximately 75 to 95 feet long and averaged 8.5 feet wide. The variation in the length of the faces of the Wall is due to the angle of the archaeological remains in relation to the South Ferry Terminal project corridor.

Phase 2 excavations of Wall 3 included creating measured drawings of the exposed area and establishing survey points followed by screening a substantial amount of soil from ET 4, adjacent to the Wall, and the placement of two exploratory excavation units. One of the units was to identify the base of the Wall stones and the other was to evaluate the rubble and determine its relationship to the Wall. The results of this Phase 2 evaluation were included in the *Supplement to the Battery Data Recovery Plan* (Dewberry 2006a). During the preparation of the Supplement, an additional exploratory excavation unit was placed to identify a possible western face of the Wall. The Supplement also presented research questions specific to Wall 3 (see **Chapter 3: Statement of Research Questions**). Field methods for the Phase 3 data recovery were similar to those established for Wall 1. However, two hand-excavated trenches were also included. One hand-excavated trench was placed along the line of the initially exposed landward face of Wall 3 at a higher elevation. The other trench was excavated approximately eight feet to the west on top of the truncated Wall remains and intended to expose a waterside face, should it exist. In addition to exposing additional lengths of Wall, these trenches would also enable identification of a builder's trench if it existed. Additional trenches and excavation units were based on the results of the excavation of these trenches and the three exploratory excavation units. Additional units were placed depending on the length of exposed Wall on the water or landward sides, as identified in the hand-excavated trenches. According to the Supplement, one three by three foot excavation unit would be placed for every fifteen feet of Wall face exposed during trenching with a maximum of three units placed on each side of the Wall. In addition, once the Wall was removed, excavation units were to be placed beneath it. Not only was screening for artifact recovery prescribed in the Supplement, but also the collection of samples of the stone, mortar and soil were to be completed using methods established for Wall 1 and described below.

The archaeological fieldwork detailed in the Supplement was later modified in consultation with MTA, NYSHPO and LPC to include Phase 3 data recovery for the features uncovered during the Wall 3 excavations (a counterfort, a log feature and wooden sheeting). Ultimately, 16 excavation units were completed as part of Wall 3 data recovery, including those excavated as part of the Phase 2 evaluation. Five of the units were located on the waterside of the Wall and eight units were on the landward side of the Wall, including two adjacent to the counterfort. One unit each was excavated in the rubble, beneath the Wall, and beneath the log feature, after they were removed. In addition to the units, four trenches were excavated at Wall 3. Two of these, as noted above, were hand excavated to identify the Wall faces and their lengths. The other two were to recover data regarding the soils on the waterside of the Wall, including the mortar layer that capped the stones. These two trenches were machine excavated. Wall 3 was also documented by JBCI and boxed for storage and possible later reconstruction. The disassembly was archaeologically monitored and samples of soil taken for both artifact recovery and potential analyses. Samples of the logs associated with Wall 3 were also sampled. Video documentation was also done for much of the disassembly of Wall 3 and the associated log feature. Dewberry archaeological field technicians used the MTA Field Engineer’s hand-held camcorder to record the process on Mini DV tape. The Field Engineer (Ramash Ramanathiah) converted the tapes to CDs, three of which were given to the Principal Investigator. These are now included with the original site documentation and field photographs. The whereabouts of the other two tapes is unknown, but they were likely reused for another purpose.

4.) Wall 4

The fourth section of Battery Wall was also identified during archaeological trenching, (Archaeological Test Trenches ET 4 and XT 6). This section of Battery Wall was located between the 1 loop and the eastern side of the 4/5 line south of Pearl Street. The northern part of Wall 4 was sandwiched between the existing 4/5 vent shaft and the duct bank which extended along the eastern side of the project corridor north of Wall 3 (see **Figure 2.8**). Phase 2 evaluation of Wall 4 included manual scraping of the exposed top surface, which initially looked like a stone floor, to document the physical extent of it.

Sheeting, similar to that seen at Wall 3, was documented on the landward side face of Wall 4. The corner joint in the sheeting near the southeast end of the floor-like section of the Wall suggested this segment was part of a bastion and that the Wall would extend eastward which it did. Exposure and documentation of the southern face of Wall 4 was also part of the Phase 2 archeological work. After completion of the plan view of the northern segment, an exploratory trench was excavated through the Wall to determine the depth of the remaining Wall stones and to expose the foundation. A three-foot wide section of stones was removed by hand, solely to determine the height of the truncated Wall section, without screening the soil for artifact recovery. The Wall ranged from 1.0 to 1.7 feet high at the trench. The removal of these stones revealed a sand foundation.

The Supplement to the Battery Data Recovery Plan developed for Wall 3 was also used for Wall 4; however the mandate for excavated soils was to simply document stratigraphy and screen for artifact recovery. No samples of soil were collected for flotation or potential geochemical, pollen or phytolith analyses. Four excavation units were dug in association with Wall 4 data recovery. Two units were located beneath the Wall and two were adjacent to the Wall on the landward side.

Wall 4 was also documented by JBCI, although not for reconstruction, and boxed for storage. Once the Wall was removed, Phase 3 data recovery also included machine excavation of a trench within the landward side of the bastion. Profiles were drawn and selective screening for artifact recovery was performed for the trench.

b. SOIL SAMPLING

All soils from excavation units were screened for artifact recovery, unless otherwise noted in **Chapter 5: Field Results**. In addition to screening for artifacts, soil samples were taken for a variety of possible analyses associated with the Battery Wall data recovery: flotation, geochemical studies, and pollen and phytolith analyses. Before Phase 3 data recovery began, specialists were consulted for advice on how and from where to take these samples.

1.) Flotation Soils

A total of 93 samples were taken for possible flotation processing and analysis. Flotation samples were taken to recover small artifacts, seeds and small animal bones, including fish bones and scales. Flotation involves agitating the soil in water and passing it through a fine screen so that the sand and other soil components sink to the bottom; this "heavy fraction" is caught in a fine mesh screen. The "light fraction" floats to the top where it is skimmed. This method maximizes the recovery of all types of small material. Artifacts smaller than ¼ inch can be found in the heavy fraction, along with small animal bones including fish and rodents. Seeds and other macrobotanicals are recovered from the light fraction and can be used to analyze past environments, supplementing data from pollen and phytolith analyses.

Flotation samples were taken from five distinct contexts: above the Wall, the landward and watersides, beneath the Wall, and within the Wall fill. Two gallons of soil for flotation were retained from each context where the context contained at least that much soil. Smaller contexts only provided a one-gallon bag of soil. Flotation soils were initially taken from excavation unit strata after they had been screened for artifact recovery through ¼-inch mesh. Samples collected with this method were recovered from the screened back dirt for many Wall 1 units; however, this method later proved impractical and samples were taken without screening for artifact recovery for the remainder of the Battery Wall data recoveries. Those samples were taken from the units themselves prior to screening for artifact recovery. Samples of soil for flotation were also taken from inside the Walls during their dismantling, without screening for artifact recovery. All soils taken for flotation have subsequently been processed as part of the analysis and any artifacts contained therein are included in the artifact inventory (**Appendix A**).

2.) Geochemical Soils

Geochemistry is another analytical tool that uses soil samples. This type of analysis can provide insights into the ways people interacted with and altered the environment, often providing insight into site formation processes and thus enabling or informing environmental reconstructions of buried landscapes. Chemical markers can indicate localized variations attributable to human activity. Using chemical analysis of the South Ferry Terminal project soils, archaeological interpretations linked to landscape developments have been reconstructed by examining these sediments in conjunction with their stratigraphic position. In addition to looking at the chemicals that signify human influence, such as phosphorus, calcium, potassium, and magnesium, chemicals that may indicate former surfaces or soil horizons were also identified. Strontium and barium become more concentrated at land surfaces and other chemical elements can facilitate identification of terrestrial versus marine environments.

Joseph Schuldenrein of Geoarchaeology Research Associates was consulted regarding sediment collection strategies and methods. For soil collection, a quart-size sample from each representative context was collected. The samples were stored in sealed plastic zip-top bags labeled with provenience information. Dr. Schuldenrein advised that storage conditions would be immaterial for analysis purposes. During the field effort, these soil samples were stored with the other soils. Dr. Schuldenrein visited the site of Wall 1 and was asked to identify locations where soil chemistry could be used to analyze the depositional origins and subsequent transformation of sediments. He recommended a soil profile be sampled from a context on the waterside of the Wall. He also visited Wall 3 and recommended sampling of a trench on the waterside of that Wall section. In addition to these two sediment sampling locations, Dr. Schuldenrein also recommended taking soil samples for possible geochemical analysis from excavation units and from any surfaces where potentially intact soils existed, including soil from the top of, inside, outside and beneath the Wall. A total of 130 soil samples were taken from Wall contexts for possible geochemical analysis. Twenty-four have since been processed. The remainder of these soil samples has been curated with the rest of the collection from this project so they may be used for possible future analysis. Geochemical analysis for this report was performed by Daniel Wagner of Geo-Sci Consultants, Inc. The results of the analysis are incorporated into the appropriate sections of **Chapter 5: A.8.c. Geochemical Analysis**. The complete report on the chemical composition of the soil samples is attached as **Appendix I**.

3.) Pollen and Phytolith Soils

The other specialized soil collection procedure is for microflora analysis, which isolates pollen and phytoliths. Analyses of microflorals can help to generate interpretations of the past environment and human exploitation of plants, possibly providing a glimpse of historic Battery Park. Pollen can provide information concerning local and regional trees and the likely clearing or planting of trees on the Battery, as well as the presence of other shrubbery and herbaceous plants. Phytoliths are silica bodies produced by plants when soluble silica in the ground water is distributed and absorbed through the plant. Phytolith analysis can provide information primarily about grasses and cultivated cereals that might have been processed for food or might have been growing in the immediate area. It is also possible to evaluate the presence of historically cleared areas, since some grasses require more sunlight than others, and to identify changes in frequencies of summer droughts.

A total of 497 pollen/phytolith soil samples was taken from 13 columns in Wall 1 and Wall 3 contexts. The minimum vertical sampling interval was 2 cm within a column, accomplished by trowel scraping the surfaces. This sampling protocol provided many samples per column. Linda Scott Cummings, PhD. of Paleo Research Institute suggested two column samples from each context as well as the collection of multiple samples within each column even if they would not all be immediately processed. The additional column samples may later be needed if samples are not viable or if additional analysis is warranted or desired. The most productive contexts of the Wall to process for analysis were considered to be the deposits on top of the Wall, to the landward side of the Wall and beneath the Wall. The number of columns and samples collected was dependant on the extent of the deposits and is discussed in **Chapter 5: Field Results**.

Sampling soils for pollen and phytolith analysis requires care because contamination by wind and human movement are possible. Dr. Cummings provided initial advice on sampling procedures and has since processed some of the South Ferry samples (see **Appendix E**). Collection procedures required the trowel be thoroughly cleaned with distilled water prior to sampling and that the samples be collected quickly to prevent contamination with modern botanicals. Less than 10 minutes per sample is optimal and all South Ferry samples met that target. Dr. Cummings recommended sampling soil at 2 cm intervals during excavation. This method was impractical because of the excavation time constraints. Therefore, samples were taken from the profile after the completion of an excavation unit. Approximately one cup of soil was collected for possible pollen and phytolith analyses, combined in one plastic bag. The zip-top bags were then double bagged. Both bags were marked with provenience information using a Sharpie indelible marker. Additionally, the provenience and sampling information was written on a card placed in between the two zip-top bags.

It was important that the samples not be allowed to develop mold, as mold is a contaminant that could have destroyed their research potential. They were temporarily stored in an MTA-provided air-conditioned trailer for up to five months. During temporary storage, the trailer's air conditioning was checked on a daily basis during the workweek. Occasionally, the unit would require resetting. However the samples were also checked periodically for moisture and vented as necessary. Toward the end of the field effort, the bags were all permanently vented. This was done by placing each opened zip-top bag inside a paper bag, also labeled with provenience information. The paper bags were folded over and stapled. This allowed the samples to slowly dry while preserving their integrity. After excavations were completed, the samples were moved to an MTA storage room located at 2 Broadway that had consistent climate control. Upon issuing Task Order #41, MTA transferred the samples to URS Corporation in Burlington, New Jersey where they were kept in climate-controlled conditions. Twenty-five of the samples have been processed for pollen and/or phytolith as part of this analysis (see **Chapter 5: A.8.b. Pollen and Phytolith Analysis**). After analysis, the unprocessed portion of these samples was returned to URS to be curated with the rest of the collection.

c. LOG AND WOOD SAMPLING

Wood was present at two of the Battery Wall sections, Wall 3 and Wall 4. Wall 4 had sheeting on the landward side. Wall 3 had sheeting along the northern part of the landward side and also had a large log feature flanking it. The handling of and analysis of these features was an essential part of the interpretation of the Battery Wall.

The Wall 3 logs were expected to provide important information regarding the date of construction through dendrochronological analysis. Dendrochronological analysis was used to determine the date of death (year and season) of the trees and identify the possible geographic source(s) of the wood. In addition, identification of the species and diversity of wood types added to the interpretation of the feature.

Sampling protocols for logs selected for potential dendrochronological analysis were established during the excavations of the Whitehall Slip section of the South Ferry Terminal project site. The South Ferry Terminal project was the first archaeological project, of any conducted along the Lower Manhattan shoreline, where dendrochronology was performed. William E. Wright of the Tree Ring Lab of the Lamont-Doherty Earth Observatory of Columbia University visited the site of Whitehall Slip to educate the archaeologists and contractor on sampling methodology. The protocol is detailed below in the *Whitehall Slip Log Sampling* section of this chapter.

One-hundred log samples were taken from the Wall 3 log feature. The logs depicted on the measured drawings of the feature were individually numbered and tags with those numbers were nailed into each log (see **Figure 2.9**). Whenever possible, one tag was placed at each end of the log. Logs were removed layer by layer and placed in a staging area so samples of the logs could be saw cut. Once a layer of logs was removed, a new measured drawing was produced and the new logs numbered and tagged. Log samples were later transmitted to Dr. Wright for analysis via Paul J. Krusic of the Tree Ring Lab of the Lamont-Doherty Earth Observatory of Columbia University. Once the Wall 3 logs were cut, the remainder of the logs was set aside to be saved by JBCI on behalf of MTA and stored with the Wall 3 stones, however the quantity and condition of the wood was not evaluated in the Wall Documentation report (JBCI 2007: 30) (see **Appendix K**).

Not all logs are viable for dendrochronological analysis. To be viable, a sample needs to have at least 50 growth rings and some of the bark remaining intact. Logs with the under-bark surface, or waney edge, still intact are the most conducive for dendrochronology. This means the tree-ring patterns in transverse sections cut from the timbers would include all growth years. Tree-ring dating is used to match the patterns of ring width change in the samples with the various regional chronologies of ring width change developed over many years of sampling across the region.

Of the 100 log samples, 34 were viable. The remaining logs will be curated by the Tree Ring Lab so that they may be available for future study by other professionals. Eleven samples of planks from Wall 3 and ten from Wall 4 were retained for potential dendrochronological analysis. Dendrochronological analysis cannot produce as specific results with plank samples as it can with logs because the number of rings present in the plank may not be indicative of the entire tree and there is generally no bark surface present. However, Dr. Wright has had some past success in establishing date ranges for the death of trees from similar planks. Therefore, samples were retained from the South Ferry Terminal project with the intent of conducting dendrochronological work. Fifteen of these were processed and are discussed in **Chapter 5: A.4.d.1. Sheeting** and **A.5.c**.1. **Sheeting** and in Dr. Wright's report (see **Appendix H**). The planks are to remain with the archaeological artifact collection.

d. STONE AND MORTAR SAMPLING

Samples of stone and mortar were taken by the archaeological team under the direction of Norman R. Weiss of the Program in Historical Preservation at Columbia University. Mr. Weiss is a technical specialist in the analysis and preservation of traditional building materials. He visited Wall 1 during Phase 3 data recovery excavations to make an initial inspection and advised the team on sampling methods for both stone and mortar.

Mr. Weiss recommended one-quarter pound of each type of stone be retained. The collection method included photographing the stone prior to removal and using a rock hammer (or similar tool) to break off a piece. Each piece was individually bagged in a plastic zip-top bag. The bags were labeled with the provenience information, as well as an assessment of whether the sample was "sound" or "unsound" and whether it was from a weathering face of the Battery: a sound sample is one that does not shatter or crumble significantly upon breakage and an unsound sample is one that does. Storage temperature and humidity conditions of the samples would not affect the analysis of these building materials.

Since Mr. Weiss was unavailable for consultation during the analysis phase of the South Ferry Terminal archaeological work, Patrick Brock of Queens College of the City University of New

York was consulted on the identification of and possible sources of the stones used to construct the Battery Wall. He visited the site of the Wall 1 temporary reconstruction in the Castle Clinton exhibit, “Walls Within Walls,” and was later sent a sample of stone. The results of his visit and analysis are included in the Field Results for the Battery Wall (see **Chapter 5: A.1.a. Understanding Construction Materials and Techniques**).

Mortar was sampled in the same way as the stone, as advised by Mr. Weiss, with the same type of labeling. Approximately 60 grams per sample were taken. Mr. Weiss explained that the composition and adhesion of the paste can be evaluated through a combination of scientific analyses which can tell what the material is, and the strength and composition of the mortar.

Subsequent to Norman Weiss’s site visit, MTA retained Jablonski Building Conservation, Inc. (JBCI) to document and disassemble Wall 1. JBCI’s protocol also included sampling and analyzing the stone and mortar. However, they did not complete the data analysis for the stone. Gravemetric analysis was conducted from three of the Wall sections. Petrographic analysis was conducted from Wall 1 only (see **Appendix K**).

John Walsh of Testwell Laboratories completed the mortar analysis from the archaeological samples. Testwell Laboratories conducts mortar analysis for chemical composition and other types of inclusions. These analyses are not necessarily geared toward or compatible with those used for restoration work, as is the case for the JBCI analysis. Testwell Laboratories, Inc. processed two mortar samples from each of the four Wall sections for chemical analysis and one sample from each for petrographic analysis. The results are incorporated into **Chapter 5: A.8. Mortar, Microbotanical, Geochemical Analyses, and Human Remains** and their full report is appended (see **Appendix G**).

e. FIELD NOTES, DRAWINGS AND PHOTOGRAPHS

As noted above, a variety of preprinted field forms were used during the South Ferry Terminal archaeological work. Samples are included as **Appendix C**. Much of the archaeological work at the Battery Wall sections was done via archaeological excavation units. Each level of each stratum within each excavation unit had its own unit level form. A total of 229 unit level forms were completed during the Battery Wall data recoveries. Eighty-five forms were completed for Wall 1 units, 125 for Wall 3, and 19 for Wall 4. As previously mentioned, no excavation units were placed near Wall 2. In addition to containing data about the soils, artifacts and samples, the unit forms also had space to make a field sketch. Such sketches were in addition to measured field drawings. The catalog of field drawings is included with **Appendix A**.

In addition to the excavation units (see **Appendix N**), some trenching was also done for the Battery Wall. For all non-excavation unit archaeological fieldwork, field drawings and/or field notes were made and forms, rather than field notebooks, were used by technicians to record the excavations. Preprinted “Daily Notes Forms” were used to record a variety of excavation and excavation monitoring activities. These forms contained space for written data, including the technician’s name, work location, date and work shift, soils documented, artifacts recovered and other data, as well as a large area for a sketch or measured drawing of pertinent information.

3. WHITEHALL SLIP

Whitehall Slip was the first major archaeological find of the South Ferry Terminal project. This feature was identified in August 2005 in the new station area within Peter Minuit Plaza. Phase 2 archaeological work at Whitehall Slip took place beginning on August 22, 2005 and data recovery of Whitehall Slip was completed on October 3, 2005. Construction constraints resulted in an intermittent and delayed data recovery schedule. Although the ARMP specified five calendar days to complete the data recovery, it was actually completed intermittently over a period of six weeks.

The entire portion of Whitehall Slip excavated at the South Ferry Terminal site was located underneath and in line with non-removable decking. The top of the highest point of Whitehall Slip was approximately five feet below the present ground surface and its base close to 14 feet below ground surface. The initial exposure of the Whitehall Slip timber cribbing was approximately eight to ten feet below ground surface. A section approximately 50 feet long was initially exposed and evaluated during Phase 2 archaeological excavations. The actual length of the Whitehall Slip remains documented during Phase 3 data recovery was ultimately over 200 feet long and up to 60 feet wide (see **Figure 2.3**).

a. PHASE 2 EVALUATION AND DATA RECOVERY METHODS

Upon identification of several large logs, archaeological evaluation (Phase 2) was initiated. This led to the recommendation of eligibility for listing on the National Register of Historic Places. The Data Recovery Plan stated "the remains of the Whitehall Slip are considered significant under National Register of Historic Places criterion D 'have yielded, or may be likely to yield, information important in prehistory or history' and possibly criterion A, 'associated with events that have made a significant contribution to the broad patterns of our history.' Criterion A may apply because of the prominence of Lower Manhattan in the nascent development of shipping and commerce in the United States" (Dewberry 2005c). The NYSHPO determined Whitehall Slip was a significant archaeological find. A State Site Inventory Form was filed with the NYSHPO office and a unique site number assigned (A06101.015598).

Dense concentrations of shell and of cobbles were initially documented in addition to the exposed large logs. Phase 2 archaeological work at Whitehall Slip consisted of using hand tools to clean soil from the log landfill-retaining structures and screening samples for artifact recovery. Measured drawings of the initial exposure were completed and photographs taken (see **Figure 2.10**). The fill excavated within Whitehall Slip exhibited complex stratigraphy typical of fill deposited in batches over time. In order to enable post-field analysis of the material recovered from Whitehall Slip, the data recovery plan included an archaeological protocol involving the sampling of artifacts from individual sections as they were excavated and the logs removed,

Data recovery excavations of Whitehall Slip provided an opportunity to investigate many aspects of slip construction, use, and abandonment. The ability to document construction methods was of prime importance. Most 18th-century building techniques were passed down orally from father to son or from Master to Apprentice. Few things were written down. These archaeological excavations provided an opportunity to look closely at how Whitehall Slip was constructed and how it was filled. Research questions were developed to guide the Phase 3 data recovery excavation and are presented in the following chapter (see **Chapter 3: Statement of Research Questions**).

The data recovery excavation plan had to take into account the limited access to the area due to the non-removable decking plates that made excavation from above impossible. Furthermore, the excavation area was extremely waterlogged and often partially under water (see **Figure 2.11**). Each morning the contractor would spend hours pumping out the water. In addition to creating a safety concern, the quality of the soil profiles was compromised. The planned Phase 3 data recovery excavation method mandated that the archaeologists draw and photograph exposed log landfill-retaining structures, selectively screen representative soils for artifact recovery and retain soil samples for potential soil analyses. Once the area was considered safe enough for the heavy equipment to enter, a front-end loader removed approximately five-foot wide sections (east - west) of the Slip, comprising both the log structures and the fill. If additional logs were thus exposed, they were cleaned by hand using shovels and trowels, measured, drawn, photographed, and then removed. Each subsequent section of the Slip was similarly documented. This method precluded documenting plan views of the excavations. Samples of the fill were screened for artifact recovery and sections of the logs were cut for dendrochronological analysis.

Chapter 5: B. Whitehall Slip delineates the important information recovered from the Whitehall Slip excavations regarding shoreline construction and filling practices during the 18th- and early-19th centuries. The successful use of dendrochronology definitively dated sections of Whitehall Slip and provided information on the source of the logs used.

b. SECANT PILE AND DECKING COLUMN SAMPLING

Secant pile excavation involved the contractor using a three-foot diameter machine-mounted auger, removing soil and driving metal casing into the ground to the depth of bedrock. These columns were later filled with concrete and steel in an overlapping fashion, creating a wall. The augured soil was archaeologically sampled at five-foot intervals and screened for artifact recovery. This was done to identify concentrations of artifacts, and, possibly, potential locations of archaeological features. For archaeological purposes, the five-foot interval samples were given decimal subdivisions (e.g., SP 0029.4 means the secant pile numbered 29 at a depth of 15-20 feet below ground surface, the fourth 5-foot increment).

The archaeological protocol dictated every fourth secant pile be sampled, as well as all of the decking columns (Dewberry 2004a). Decking columns were non-overlapping secant piles. Sampling involved taking two buckets of soil from each five-foot increment of auguring. There was not a height gauge on the machine. The field archaeologist would estimate the depth of the deposit based on the distance the four-foot high augur went into the ground and the amount of soil it brought up. When the contractor’s equipment needed changing or maintenance, as it often did, there was an opportunity to measure the total depth of the hole. Combining these measurements with the archaeologist’s estimates of depth provided confirmation that the archaeological methods were sound. The buckets of soil thus sampled were water screened for artifact recovery to identify concentrations of cultural material. The stratigraphy, including soil color and texture, was recorded on forms created for that purpose.

Secant pile sampling conducted prior to the discovery of Whitehall Slip was intended to identify concentrations of artifacts and possible features for later exploration. However, construction plans changed, as is common in a design-build project. For example, the decking that covered the Whitehall Slip area was originally intended to be removable, but was installed permanently. As a result of the non-removable nature of the decking covering Whitehall Slip, this area was not accessible for archaeological evaluation prior to construction. Thus, many of the secant piles were excavated through the structure and fill of Whitehall Slip and have been combined with the Whitehall Slip contexts for analysis. A total of 66 secant piles and decking columns was sampled from areas now identified as Whitehall Slip. These secant piles were numbered from 1 to 129 and 153 to 198. The decking columns were numbered from 1 to 20. Information about secant pile stratigraphy can be found in **Appendix N**.

c. LOG SAMPLING

One very important aspect of the discovery of Whitehall Slip was the analysis of the wood samples collected during Phase 3 data recovery by William E. Wright. The logs themselves were expected to yield important data regarding the construction of Whitehall Slip, providing an overall understanding of the construction methods and maintenance of a ship docking facility in 18th-century Lower Manhattan. Identification of the species, date of tree death, sources of wood, and the diversity of wood have added to the interpretation of the construction of Whitehall Slip. Dendrochronological analysis has also been used to determine if some of the logs were reused from other features, possibly indicating maintenance of the Slip.

The death date of a tree can be related to the construction date of a structure based on knowledge of wood use behavior. For example, timbers cut for some uses may be dried for a season or even a year prior to use. However, timbers in a submerged context, such as Whitehall Slip, are likely not dried before use, so the death date of a tree cut for construction of this feature likely coincides with the year of construction.

Ring-width chronologies have been analyzed by Dr. Wright to determine the possible geographic source(s) of the trees used to build Whitehall Slip. Additionally, indications that the timbers were replaced and/or reused were noted and preferences for different species of wood in different construction elements were evaluated.

As mentioned above, it was not always possible to access the logs prior to their removal. In those cases, logs were stockpiled and marked with the date or date range of excavation as they were being sampled. Log samples were later transmitted to Dr. Wright. Because it was not possible for the archaeological technicians and the contractor to determine the number of rings with consistent accuracy, more samples were collected than were viable or than could be economically processed. Although the Data Recovery Plan specified “up to 24 samples”, a total of 34 log samples were collected from Whitehall Slip, 25 of which were viable. Results of the dendrochronological analysis are summarized in **Chapter 5: B. Whitehall Slip**, and the complete report is attached as **Appendix H**.

d. SOIL SAMPLING

The methods previously described for sampling the Battery Wall soils for geochemical analysis were also applied to the Whitehall Slip deposits. It was subsequently determined by Mr. Wagner that chemical analysis of these soils would not significantly contribute to the understanding of Whitehall Slip as defined by the research questions (see **Appendix I**). However, the soils remain part of the collection and are available for future analysis.

e. FIELD NOTES AND DRAWINGS

A total of 60 field drawings or sketches was made of Whitehall Slip during the field effort. No formal excavation units were placed within Whitehall Slip, therefore unit forms were not appropriate and other means of recording the fieldwork were used, i.e., Daily Notes forms were completed by the field technicians. These forms contained information about the field activities using narrative accounts, quantitative measurements and sketches (see **Appendix C** for a sample). Data collection included recording the location of the archaeological work relative to construction features (e.g., secant piles, decking columns and decks), the progress of contractor activities being monitored, soils encountered (including comparison to Munsell Soil Color Charts) and location of any samples collected. Photographs were also taken; however they are of limited quality because of poor lighting and diffraction from air-born silica particles, the result of contractor jack-hammering of concrete simultaneous with archaeological excavations. The best quality photographs taken of Whitehall Slip were from outside the non-removable decking.

4. GENERAL SOUTH FERRY

A description of the types of construction activities monitored during the general South Ferry Terminal excavations is provided below. It includes an account of the contractor excavations and the level of effort completed for the archaeological work. In addition, a brief mention of the archaeological findings during the various types of excavations is provided. The details of the actual findings of fieldwork are presented in **Chapter 5: C. General South Ferry**. As with the excavations for the Battery Wall and Whitehall Slip, all archaeological documentation was done using a variety of pre-printed field forms. General excavations used a wider variety of these forms to accommodate recording a wider variety of excavation types. These include Archaeological Boring Forms, Trench Monitoring Forms, Soldier Pile Pit Forms, Archaeological Drilling Forms, and Daily Notes Forms.

a. CUT-OFF WALL INSTALLATION

The initial step in the construction process, and thus the first archaeologically monitored activity, was the installation of the cut-off wall that prevented the site from being inundated with water. Several types of cut-off wall were built: secant pile wall; soil-cement mixed wall with steel beams; steel soldier piles with timber lagging; and concrete support wall poured in sheeted pits (see **Figure 2.12**). Work on the secant pile wall and the soil-cement mixed wall began with the excavation of a trench at the perimeter of the appropriate section of the South Ferry Terminal project corridor. These trenches guided the equipment used to install the cut-off wall. Soil from the excavation of secant piles was sampled for artifact recovery. Soil was not removed during construction of the soil-cement mixed wall, rather cement was incorporated into the soil, solidifying it and forming the cut-off wall. The steel soldier piles were installed after excavation of soldier pile pits and the pits filled with concrete to secure the steel. They were later connected by driving wooden planks between the beams to the depth of bedrock. The concrete support wall was constructed by the excavation of connected pits that were lined with wood sheeting (planks) and then filled with concrete. Once completed, the entire cut-off wall was traversed with steel beams and struts connecting the opposite ends of the project corridor. In addition to installing the cut-off wall, some areas of the secant wall required tying back the secant wall to the cross-beams to stabilize them. Those excavations are also included here.

b. PERIMETER TRENCHES

Excavation of the perimeter trenches began at the start of the project in October 2004 and continued through November 2005. The perimeter trenches were generally 3 to 4 feet wide and 3 to 8 feet deep. Trenches were excavated in segments depending on the construction plans. Trenches cut through various types of deposits, including fill and natural soils. The soil types were recorded and most trench segments were drawn, either partially or in their entirety. A total of 26 field drawings of profiles, ranging in length from 10 to 85 feet, were completed.

c. SECANT PILE SAMPLING

Secant piles were one of the main types of cut-off walls used in the South Ferry Terminal project. Construction and sampling methods were the same as those described above for construction within Whitehall Slip. Those that were archaeologically sampled were located in much of the new station area in Peter Minuit Plaza (PMP) and within the Cobblestone Area/Coast Guard Access Road (CCG) section of the site. Concurrently with the secant piles, decking columns were also installed, using the same equipment and methods. These were primarily located in PMP with a few also excavated in Battery Place (BPL). The excavations were numbered using the contractor's convention: secant piles were abbreviated "SP" and followed by a number; decking columns were abbreviated "C" and followed by a number; girder column piles were abbreviated "GC."

Secant pile sampling was among the first archaeological activity conducted for the South Ferry Terminal project, beginning on October 27, 2004. It continued in spurts until October 11, 2005 when a waiver from secant pile sampling was granted by the NYSHPO and LPC due to the availably of alternative sampling methods at more recently excavated locations. A total of 119 secant piles and decking columns was sampled. Two locations of dense concentrations of artifacts were identified and closer interval secant sampling was performed there. This entailed sampling every other secant pile, as opposed to every fourth.

d. SOLDIER PILE PITS

Soldier piles were used in Battery Place as the main excavations for the cut-off wall; additional soldier piles pits were excavated in the northern part of Battery Park, locations where the bedrock was closest to the ground surface. The contractor excavated soldier pile pits at specified intervals by hand, or occasionally by backhoe, to the depth of bedrock, generally 8 to 15 feet below ground surface. The pits were lined with wooden sheeting and then filled with concrete and steel beams. These were connected by driving lagging (wooden planks) between the vertical steel beams. A total of 53 soldier pile pits was monitored between April 30 and June 28, 2005, oftentimes at night.

Stratigraphy within each pit was recorded on a pre-printed form. A portion of the soldier pile pits on the southern side of Battery Place was discovered to contain potentially natural soil, not landfill. This was the first area of the project site where the natural soils were exposed and its stratigraphy documented. The analysis of the soldier pile pits has been incorporated into the stratigraphic analysis for the entire South Ferry Terminal project.

Several of the soldier piles were excavated in the fill above the existing subway tunnel in Battery Place. Two of these contained fragments of human remains. The human remains contexts are discussed in **Chapter 5: C.4.g. Human Remains**.

e. SHEETED PITS

A series of four adjoining sheeted pits was excavated near the existing fan plant in the Peter Minuit Plaza for a concrete support wall, a type of cut-off wall. The excavation method for the sheet pits was similar to that used for soldier pile pits. Excavations were by hand and the pits shored for safety as they got deeper, obscuring soil profiles. This work took place from June 6 through August 12, 2005 when excavations reached a depth below which no cultural material was identified. This was a depth of approximately 15 feet below ground surface, similar to the base of nearby Whitehall Slip. The total combined length of the pits was 35 feet. The width of the pits ranged from four to seven feet. The location of these pits was at what is now believed to have been the Battery Pond (see **Chapter 5: C.4.e. Fan Plant Sheeted Pits**).

Artifacts were collected during the contractor's hand excavation and some of the soil was screened for artifact recovery. The artifacts from the base of these pits date almost exclusively from the second quarter of the 18th century. In addition to containing many artifacts, logs which may have been part of a landfill-retaining structure and associated cobbles were also documented within these pits.

f. TIE-BACKS

Pits and trenches were excavated in the station area of Peter Minuit Plaza at the north secant wall for tie-back installation during the second half of October 2005. Although tie-backs were also placed beneath the decking in the new station area, those were installed after soil was excavated under the decking. Excavations were conducted and archaeologically monitored for six tie-backs. They ranged in size from 2 feet by 3 feet wide to 7 by 15 feet long and were excavated to depths of 8 to 10 feet below ground surface. No access to the excavations was possible due to safety concerns, but stratigraphy was recorded and artifacts recovered from the backdirt. This stratigraphy has also been incorporated into the stratigraphic analysis for the South Ferry Terminal project.

g. TEST PITS/TRENCHES

A number of test pits and trenches were excavated by the contractor mainly to identify locations of existing utilities. The work took place from late-February through late-March of 2005. However, a number of these approximately 20 pits/trenches were excavated outside of those original utility disturbances, allowing the documentation of adjacent deposits. Seven profiles or plan views depicting these locations were drawn in the field. As with the other trench data, this stratigraphic data has been incorporated into the final analysis of the South Ferry Project.

h. UTILITY TRENCHES

Utility trenches were begun in conjunction with secant pile sampling. These trenches were excavated by the contractor for two reasons: to find and expose existing utilities or to install new utilities. Trenches that contained existing utilities were monitored by the archaeologists to ensure the contractor did not extend beyond the footprint of the previously disturbed trench, and if they did, to document the stratigraphy and identify the presence or absence of archaeological resources. Trenches for new utilities within Peter Minuit Plaza afforded documentation of the existence of various fills, including dense oyster shell deposits discussed in **Chapter 5: C.4.d. Shell Contexts**. Monitoring excavation of utility trenches elsewhere in the project corridor also facilitated the documentation of various soil deposits. Utility trenches were monitored from mid-December 2004 through the end of October 2005. The stratigraphy from these trenches has been synthesized, analyzed and interpreted with the other stratigraphic data from the South Ferry project to assess possible depositional episodes and events throughout the project corridor.

i. RELOCATING UTILITIES

Work on existing utilities consisted of identifying the utility and then either moving it or supporting it in place. When in-place support was used, the utility would be exposed, partially undermined and then various types of construction supports installed. Lateral movement of utilities was completed to temporarily place the utility in a nearby location until excavations were at a sufficient depth that the utility could be suspended in its original location.

j. BORINGS AND GEOPROBES

Forty-five geoprobes and borings were monitored and documented from an archaeological perspective to evaluate site stratigraphy. The 12 monitored borings were located along the path of the new subway alignment from the southern part of Battery Park, just north of the 1 line loop, south of Peter Minuit Plaza. The 33 monitored geoprobes were situated along the entire project corridor. The location of the borings and geoprobes were mapped (see **Figure 5.134**). Monitoring took place from February 9 to April 11, 2005 and provided a glimpse of the deeper deposits (up to 50 feet) in a larger section of the project corridor than had been previously available with secant pile sampling. Even if no archaeological resources had been identified during South Ferry excavations, one of the more productive and interesting aspects of analysis would have been documenting the stratigraphy throughout the project corridor. This aspect of the project is still of great importance because of the physical location of the corridor along the early shoreline of Manhattan combined with the historic record documenting land fill beginning in the 17th century. The results of this analysis are presented in **Chapter 5: C.5. Project-Wide Fill Assessment**.

k. TREE REMOVAL

Approximately 60 trees were removed in Battery Park as part of the South Ferry Terminal project, most on October 17, 2005. They were cut to stumps and then the stumps removed. This typically involved excavating to a depth of about 6 feet below ground surface. Because the soil was pulled out along with root balls, the deep holes were unstable and unsafe for entry. No archaeological features were identified during tree removal and this effort yielded little archaeological data.

l. GENERAL EXCAVATIONS

1.) Archaeological Trenches

Archaeological trenches (ATTs) were excavated by the contractor exclusively for archaeological testing purposes with the intention of identifying archaeological resources. As noted above, ATTs were excavated in either eight-foot (ETs) or six-foot (XTs) wide swaths (see **Figure 2.1**). The excavation methodology for ATTs was explicitly prescribed in the ARMP. Trench coordinates were also provided as part of the ARMP. However, it was determined prior to excavation that these coordinates were slightly off. Some of the discrepancy was due to software used to provide this data which showed all trenches 10 feet wide, rather than 6 or 8 feet wide. The other main discrepancy had to do with the final site plans differing from the schematic design plans used in the ARMP preparation. Where these discrepancies existed, the rule of thumb was to place the eight-foot-wide trenches down the center of the alignment and the six-foot-wide trenches as close to the southwest coordinate locations as was physically possible. However, ET 5 could not be excavated this way because the prior installation of support beams precluded entry by a backhoe to dig a trench. A front-end loader was used to excavate ET 5 from the east, enabling the documentation of only the west profile of that ATT.

The excavation methodology as dictated in the ARMP and CRMP was for the contractor to remove the upper five feet of soil from the site prior to starting ATT excavations. The ATTs themselves were excavated by a backhoe scooping up to 18 inches of soil at a time for a maximum depth of 5 feet. This depth was called a “lift.” Once an ATT lift was completed, the archaeologists could enter the trench and document the stratigraphy. After archaeological documentation was completed, the contractor would switch to a larger bucket and scoop size, provided that no potentially significant archaeological resources were encountered, and then excavate the surrounding area to the same depth as the ATT lift. Once a new ground surface was thus established, the ATT excavation would resume for another five-foot lift. This process continued until either bedrock was reached or the excavations were beneath the depth at which cultural material could be encountered. As with any archaeological monitoring, if the archaeologists needed to examine any potentially significant features or deposits, they could gain access to the ATTs prior to the completion of a lift.

The use of Archaeological Test Trenches (ATTs) to identify archaeological resources was successful in that three sections of the Battery Wall were found during these excavations, as were sections of historic landfill-retaining structures and artifact-bearing strata. Identification of resources during ATT excavations facilitated archaeological work for Phase 2 evaluation and Phase 3 data recovery by having the areas identified. This enabled the MTA and its contractor to know exactly where resources were, thus where they could not excavate without clearance from the archaeological team. A total of 59 field drawings of ATTs was completed. Many are presented and discussed in **Chapter 5: Field Results**.

2). Hogging

Much of the South Ferry Terminal project soil removal fell under general excavation called "hogging". These excavations were not systematic in the archaeological sense. Most frequently, the largest bucket allowable and largest permissible "scoop" size defined in the CRMP was used to excavate. Alternatively, much of the excavation was done with a front-end loader. The front-end loader was used to get into tighter spaces to excavate by undermining soils, loosening them so they could be scooped out from above. It was rarely possible to enter such excavations safely. The only archaeological resources found intact during hogging activities were Whitehall Slip where the front-end loader was used and Wall 2 where a small backhoe was used. On rare occasions, it was possible to document the stratigraphy within the general excavations. However, as expected, hogging is not the most effective technique for identification of archaeological resources.

C. LABORATORY METHODS AND ARTIFACT STORAGE DURING THE FIELD EFFORT

During the South Ferry Terminal project field monitoring effort, artifact processing was mandated only for material collected from secant pile sampling. For the remainder of the artifacts collected, the contract for archaeological monitoring did not include a budget for processing. However, because artifact processing is a vital component of dynamic fieldwork and was included in the DATMP (Dewberry 2005b), MTA was persuaded to allow the archaeological consultant to use monitoring down-time to process artifacts; furthermore, MTA provided a part-time archaeological intern to assist in artifact processing.

Artifacts were processed by context. Each generally had one bag of artifacts, but occasionally more than one bag was needed for all the artifacts collected from an individual context; these multiple bags were processed together. Each context was entered on an Artifact Processing Log. This log contained columns for provenience, excavation date, wash date, initials of washer, label and re-bag date, initials of re-bagger and comments. All artifacts were washed in water using a soft toothbrush. Two wash tubs were used so that the second rinse was in clear water. Dry-brushing was generally used to clean bone and some metal recovered from dry screening. Artifacts were air dried on perforated baking trays labeled with the provenience.

Once dry, most artifacts were individually labeled with their provenience using indelible ink sandwiched between layers of clear acrylic nail polish and then inventoried. It had been previously established that the field inventory was only to be a preliminary list of finds and that MTA would issue a subsequent contract to complete artifact processing and identification. That subsequent contract has been issued and this report is part of that contract.

Artifact proveniences established during the field monitoring were often cumbersome. In cases where these contexts were processed, abbreviations were established to facilitate identification (see **Table 2-1** and associated narrative). These abbreviations were used to label the individual artifacts along with sequential numbers. Once Site Identification Numbers were assigned by NYSHPO, those artifacts were labeled with the last five digits of Site Number in lieu of the abbreviation. This was followed by a decimal point and then a unique number. These unique provenience numbers were assigned sequentially as artifacts were processed. Number assignments were recorded on forms.

Once labeled, artifacts were logged on inventory forms called Field Artifact Logs. These included space for provenience, excavation date, log date and initials of logger and individual lines with space for material, identity, form, count, weight, color, discarded or sampled material, and motifs/marks or description. Once logged, the artifacts were sorted by material class and re-bagged in perforated 4-mil zip-top bags labeled using a Sharpie indelible marker with the site name, provenience, and excavation date and then stored in a locked office or locked cabinet. The bags for glass artifacts were not perforated.

Methods for artifact processing during the field effort are considered standard practice. The actual scope of artifact processing and the procedures were first described in the *Scope of Work for Archaeological Testing and Monitoring during Excavations for Secant Piles* (Dewberry 2004a) and were augmented in the DATMP (Dewberry 2005b). The collection of artifacts from secant piles was intended to be all encompassing in order to identify loci of secant piles with comparatively dense artifact concentrations. This included collecting not only diagnostic material, but also every fragment of non-diagnostic cultural material (e.g., brick fragments, coal, cinder, shell, wood shreds, etc.). The non-diagnostic material was washed, dried, weighed and/or counted, inventoried and photographed as a group with the digital field camera. Samples were generally retained, but the remainder of the non-diagnostic material was discarded. Under the current contract for artifact processing and analysis, these artifacts have been cataloged in the final inventory with the comment "Discarded in Dewberry Lab" (see **Appendix A**). The photographs of the discarded artifacts have since been transferred to CD and are part of the South Ferry Terminal archaeological collection. The DATMP also discussed the sampling of certain non-diagnostic artifacts. Again, any artifacts discarded as a result of sampling in the lab were logged and photographed and are listed in the attached Inventory as "Discarded in Dewberry Lab"

Artifacts from approximately half of the excavated contexts were processed this way during the South Ferry Terminal project field effort. Unprocessed artifacts were stored in either a locked office or a locked cabinet, separate from the washed artifacts. Oversize artifacts were stored in the MTA-provided field trailer along with the previously discussed soil samples. Once the field effort had ended, all artifact bags were placed in numbered Bankers boxes. Washed and unwashed artifacts were boxed separately. A list of which proveniences were stored in which box and what level of processing had been completed was made. A copy of the box list was placed inside each box and the compilation of lists from all boxes was placed with the collection. The entire collection was moved to the MTA offices at 2 Broadway for temporary storage until the contract for analysis, curation and reporting was issued. The disposition of the collection from that time forward is detailed next.

D. POST-FIELD LABORATORY METHODS

At the start of the analytical phase of the project, the artifacts were transported from their interim storage facility at 2 Broadway to the URS laboratory in Burlington, New Jersey for further processing before analysis.

As noted above, artifacts from approximately half of the excavated contexts were washed in the field laboratory. Once the collection reached the URS lab, all of the artifacts were examined and the unprocessed artifacts were washed. Artifacts were washed in tap water with soft-bristle brushes using a mild, non-ionic detergent (Orvis) and were air-dried on racks. Artifacts with fragile surfaces (such as tin-glazed ceramics or porcelains with over-glaze decorations) were washed separately. Fragile artifacts were washed as gently as possible and care was taken not to let porous artifacts become waterlogged. All artifacts, including faunal material and metal, were washed.

When dry, artifacts were labeled with site and catalog (provenience) numbers. Before labeling, existing numbers were removed from those artifacts already marked in the field lab using different conventions, as described above. Site numbers were assigned by the NYSHPO to each of the three sites identified in the project area: A06101.15598 for Whitehall Slip; A06101.15768 for the Battery Wall; and A06101.16196 for all other areas of the site. Sequential catalog numbers were assigned by URS lab personnel for each individual context from the three sites; each site begins with catalog number 1. On the artifacts themselves, on all packaging materials, and in the artifact inventory, the catalog numbers are prefaced by abbreviated site numbers (15598.001, 15768.001, 16196.001, etc.). This arrangement allows for inclusion of all artifacts in the same electronic database (Microsoft's *Access 2003*) while ensuring that the data can be easily separated by site as necessary.

Artifacts were labeled using pens with archival-quality ink. A base coat of Acryloid B-72 resin dissolved in acetone was laid down and allowed to dry. When dry, site and catalog numbers (in the form "15598.001, 15768.001, 16196.001" etc.) were placed on this base; after the ink dried, a sealing coat of the same materials was applied. Artifacts and bones with stable surfaces were labeled in this manner unless they were too small to receive a legible number. Diagnostic artifacts too small for written numbers were either labeled with an attached acid-free paper tag (as for beads) or were placed in individual small polyethylene bags labeled with site and catalog numbers. Coins were not marked but were placed in individual coin holders labeled with site and catalog numbers. Several contexts included large numbers (between twenty and 207) of window glass pieces: only a sample of pieces was marked in each bag. Shells, floral materials, and objects with unstable surfaces—such as rusted nails—were not marked but were placed in individual bags labeled with site and catalog numbers using permanent markers.

After the artifacts were labeled, they were separated by class (e.g., ceramic, glass, metal, shell, etc.) and to some extent by function (e.g., brick, as an architectural item, was bagged separately from earthenware sherds and domestic items, even though both are frequently made of the same type of clay) and were placed in individual 4-millimeter thick polyethylene bags labeled with provenience information using permanent markers. The individual bags were placed within a large polyethylene bag(s) for the entire provenience, labeled with site and catalog numbers and provenience description (e.g., "15768.174 EU 28 Str 1, Lev 1" or "16196. 087 Sediment Around Wall Segment Between DB30-32 Along Lagging"). All bags were pierced for air circulation.

During the washing process, technicians identified artifacts from significant contexts, and objects suitable for exhibition, in need of conservation. A professional conservator, Gary McGowan, of Cultural Preservation & Restoration, evaluated these artifacts for possible treatment. Some were taken to Mr. McGowan's lab for conservation while some metal artifacts were conserved in the URS lab using methods and techniques recommended by Mr. McGowan. Conserved artifacts are identified as such in the *Access* artifact inventory (see **Appendix A**). Leather and wooden objects not selected for conservation were dried slowly on racks, under weights if necessary to prevent distortion. Tin-glazed ceramics were soaked in distilled water to remove the salts with which they were permeated: the ceramics were immersed individually in distilled water, which was changed regularly until salts were no longer detected.

Flotation of soil samples collected from 105 proveniences during excavation was done using a professional Archaeological Flotation Tank (manufactured by Sean Taylor of Columbia, South Carolina). All soils collected for flotation and not selected for specialized analyses were processed and the recovered artifacts, seeds, bones, etc. were analyzed and added to the artifact inventory[7].With the exception of smoking pipes, which were analyzed by Diane Dallal of AKRF, all artifacts were inventoried and analyzed by URS lab personnel. Faunal materials were sent to zooarchaeologist Marie Lorraine Pipes. All data from the smoking pipe analysis has been added to the general URS artifact inventory (see **Appendix A**). The faunal database is included as a separate table in this appendix.

Bones identified as human remains had been separated from the rest of the excavated materials in the Dewberry field lab. These bones were not washed or otherwise treated in the URS lab but were brought directly from the URS lab to Dr. Samuel Marquez of SUNY Downstate Medical Center for analysis.

E. THE DATABASE

Analysts entered information about the artifacts directly into a Microsoft *Access* (2003) database. Before artifact analysis began, a provenience table was created with information for each context (see **Appendix A**).

The fields in the Provenience Table are as follows:

Rec ID is a sequential number automatically assigned by the *Access* program to each line of data.

Area refers to sections of the site, such as “PMP” for Peter Minuit Plaza and “W1” for Wall 1 (see **Table 5-14**)

Catalog Number is the unique number assigned to each context. It consists of the abbreviated site number (15598, 15768, or 16196) followed by a “.” and a sequential number. Each site begins with .001, (e.g. 15598.001, 15786.001, 16196.001).

What indicates the types of materials in each context: “A” signifies artifacts and/or bone and shell, “F” indicates a flotation sample, and “S” is for all other samples (soil, geochemical, mortar, stone and micro-floral. Separate tables in **Appendix A** list these samples by type and context.)

Description is the name/label for each context. For example, 15598.001 is “Whitehall Slip.01 Civetta Area, Pin from Timber;” 15768.001 is “EU 01 Str 1, Lev 1;” and 16196.001 is “Around SPP 51, Battery Place 10-11'.” (See **Table 2-1** for explanations of abbreviations used, such as SPP for soldier pile pit.)

Concordance is used to explain and keep track of changes to context identifications that occurred during the course of the post-field analysis. For example, 15768.558 (ATT 124 ET4, 5’ BGS, SE Corner) was originally thought to be part of the General South Ferry portion of the

[7] Those soils collected for geochemical analysis but not sent to the geochemical analyst have not been processed and are available for future research.

project area and was assigned the catalog number 16196.134. After closer analysis, it was reassigned to the Wall 3 area and the new catalog number reflects this. The Concordance field for this context reads "Was 16196.134."

Unit, Strat, and Level fields were used only for excavation units.

Note is a field used for remarks as needed. For example, 15768.558 (cited in "Concordance" above) has "human tibia sent to S. Marquez" in the Note field.

Date is the excavation date.

Site Name is "Whitehall Slip," "Battery Wall," or "South Ferry."

Analytical Unit identifies the analytical unit into which each context was placed (see **Chapter 5 Introduction**).

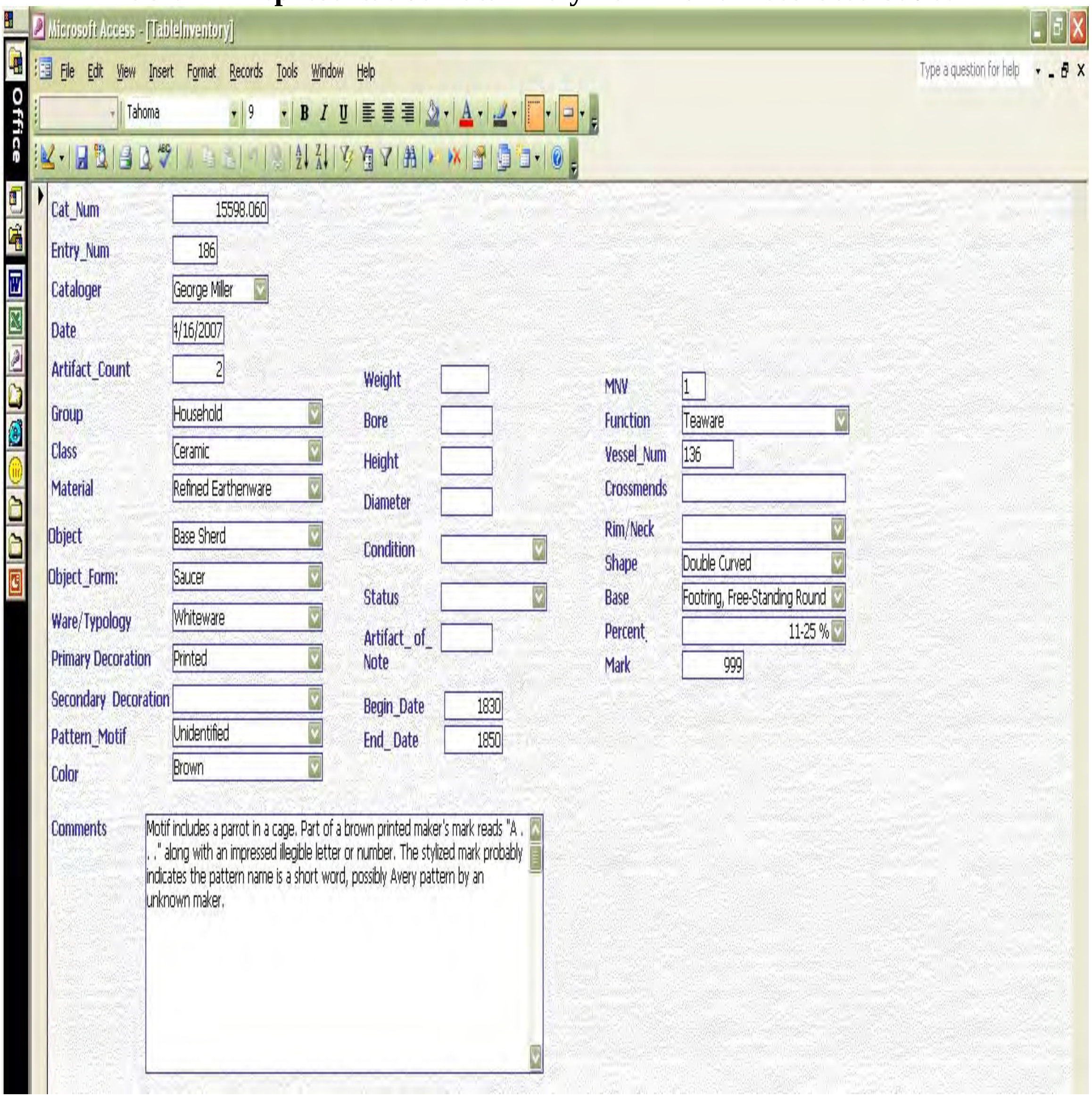
DU_ID identifies the depositional unit into which contexts associated with the Wall were placed (see **Chapter 5 Introduction**).

Changed is a simple check field used to identify those contexts whose catalog numbers were changed during the course of analysis.

Artifact information was entered into the *Access* inventory in English terms, rather than alphanumeric or numeric codes, using "pull down" menus that include standard terms (e.g., tin glazed earthenware, pearlware etc.) but that can also accept unique items. URS maintained a daily computer back up file of all data.

Tables 2-2, 2-3, 2-4, 2-5, 2-6, and **2-7** are samples of data entry forms. As these examples illustrate, the database accommodates varying levels of detail for different classes of artifacts. Some fields are filled in for all artifacts while others are used only for certain types of artifacts.

Table 2-2 Representative Data Entry Form for a Decorated Saucer



Microsoft Access - [TableInventory]

File Edit View Insert Format Records Tools Window Help

Type a question for help

Cat_Num	15598.060
Entry_Num	186
Cataloger	George Miller
Date	4/16/2007
Artifact_Count	2
Group	Household
Class	Ceramic
Material	Refined Earthenware
Object	Base Sherd
Object_Form:	Saucer
Ware/Typology	Whiteware
Primary Decoration	Printed
Secondary Decoration	
Pattern_Motif	Unidentified
Color	Brown
Weight	
Bore	
Height	
Diameter	
Condition	
Status	
Artifact_of_Note	
Begin_Date	1830
End_Date	1850
MNV	1
Function	Teaware
Vessel_Num	136
Crossmends	
Rim/Neck	
Shape	Double Curved
Base	Footring, Free-Standing Round
Percent	11-25 %
Mark	999

Comments: Motif includes a parrot in a cage. Part of a brown printed maker's mark reads "A . . ." along with an impressed illegible letter or number. The stylized mark probably indicates the pattern name is a short word, possibly Avery pattern by an unknown maker.

Table 2-3 Representative Data Entry Form for a Glass Bottle

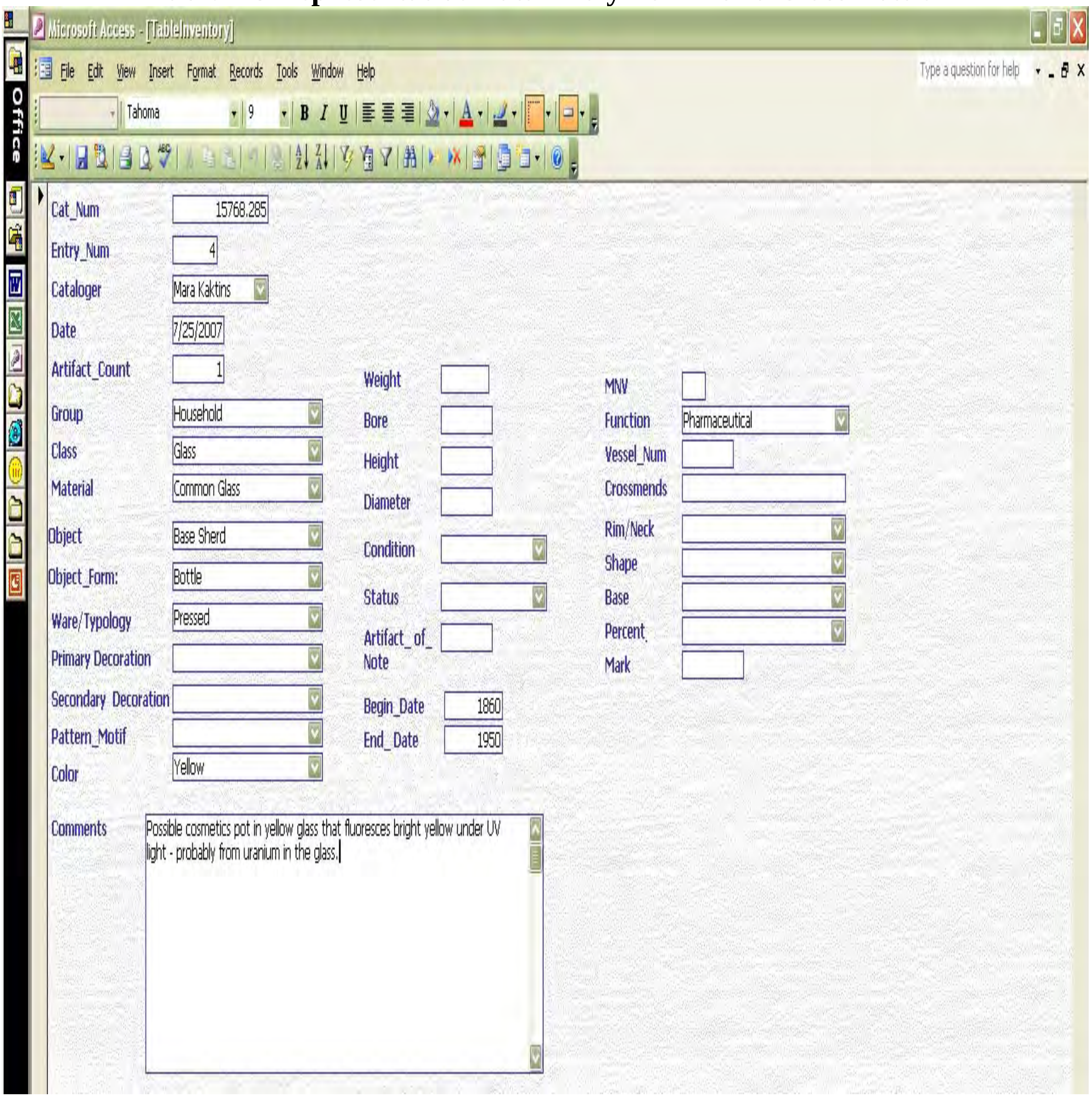


Table 2-4 Representative Data Entry Form for a Smoking Pipe

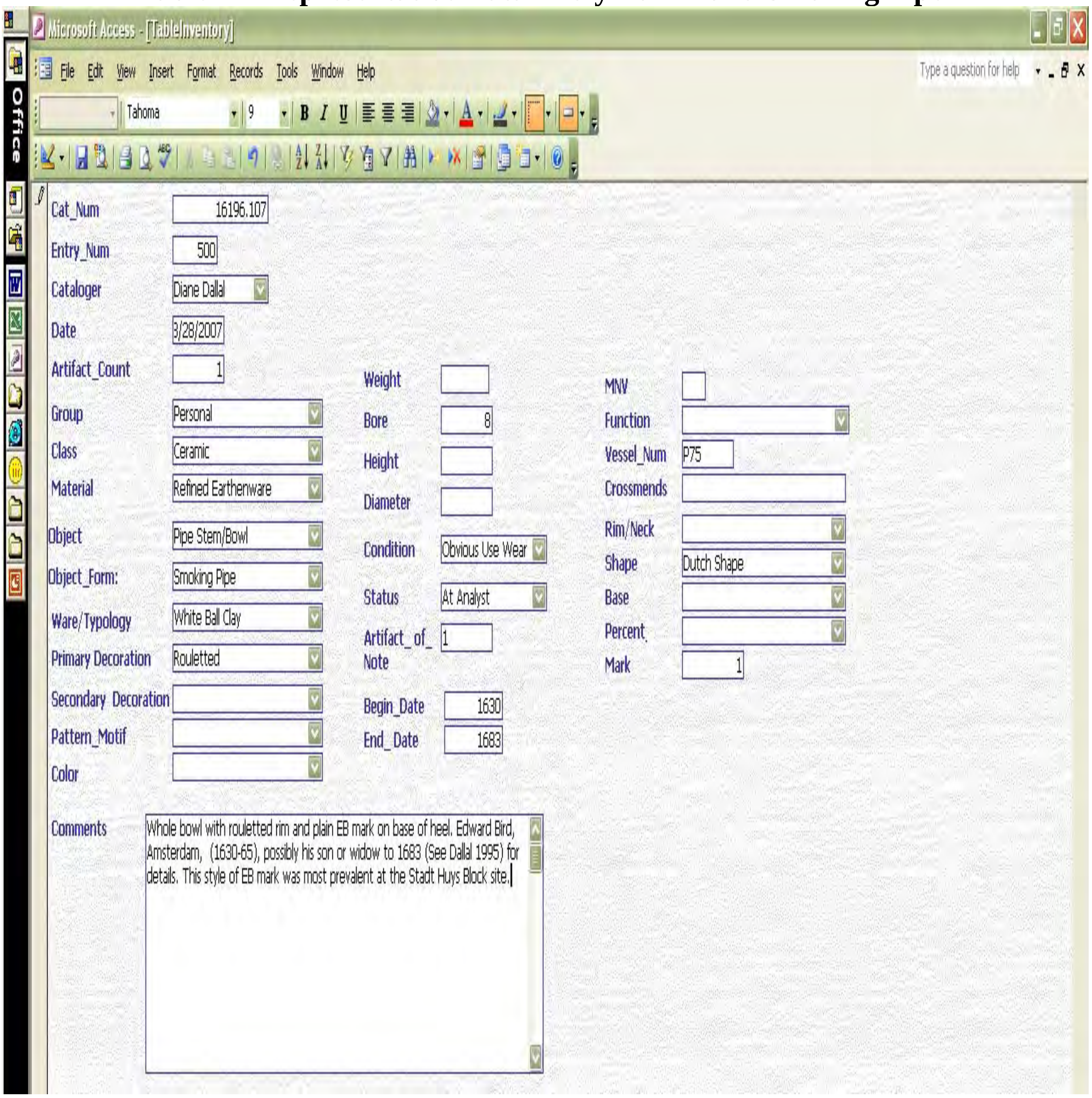


Table 2-5 Representative Data Entry Form for a Wall Tile

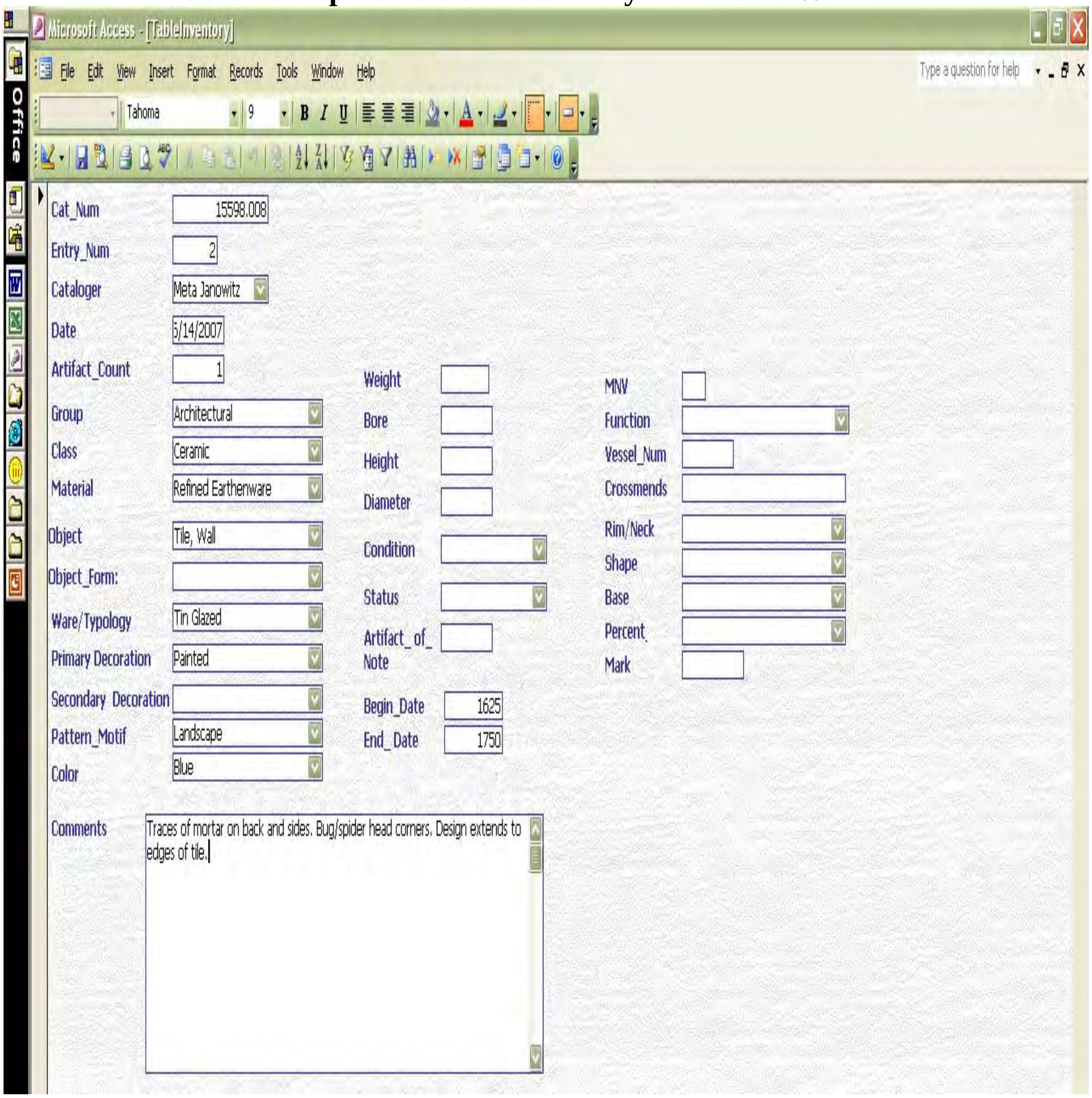


Table 2-6 Representative Data Entry Form for Window Glass

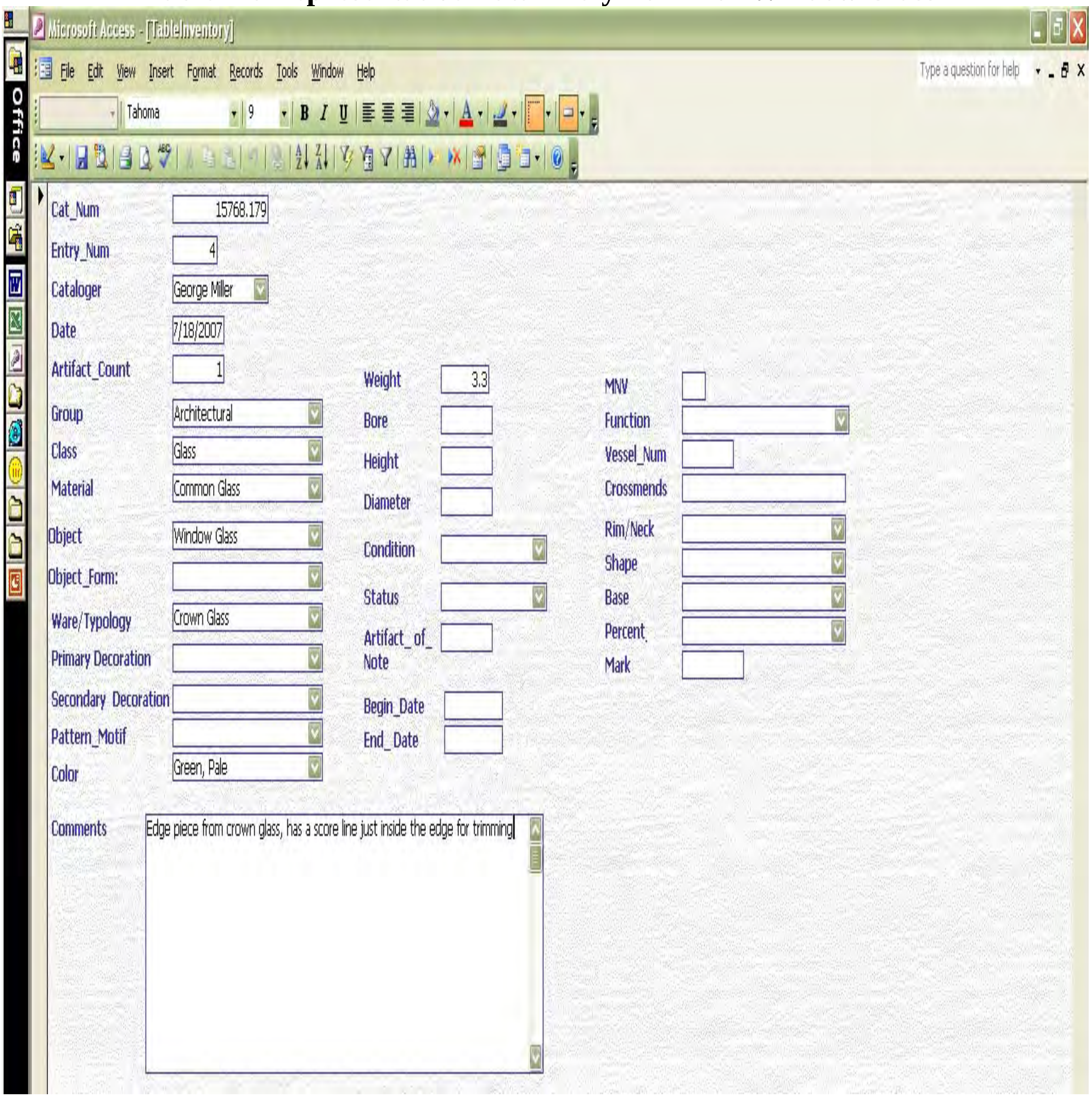
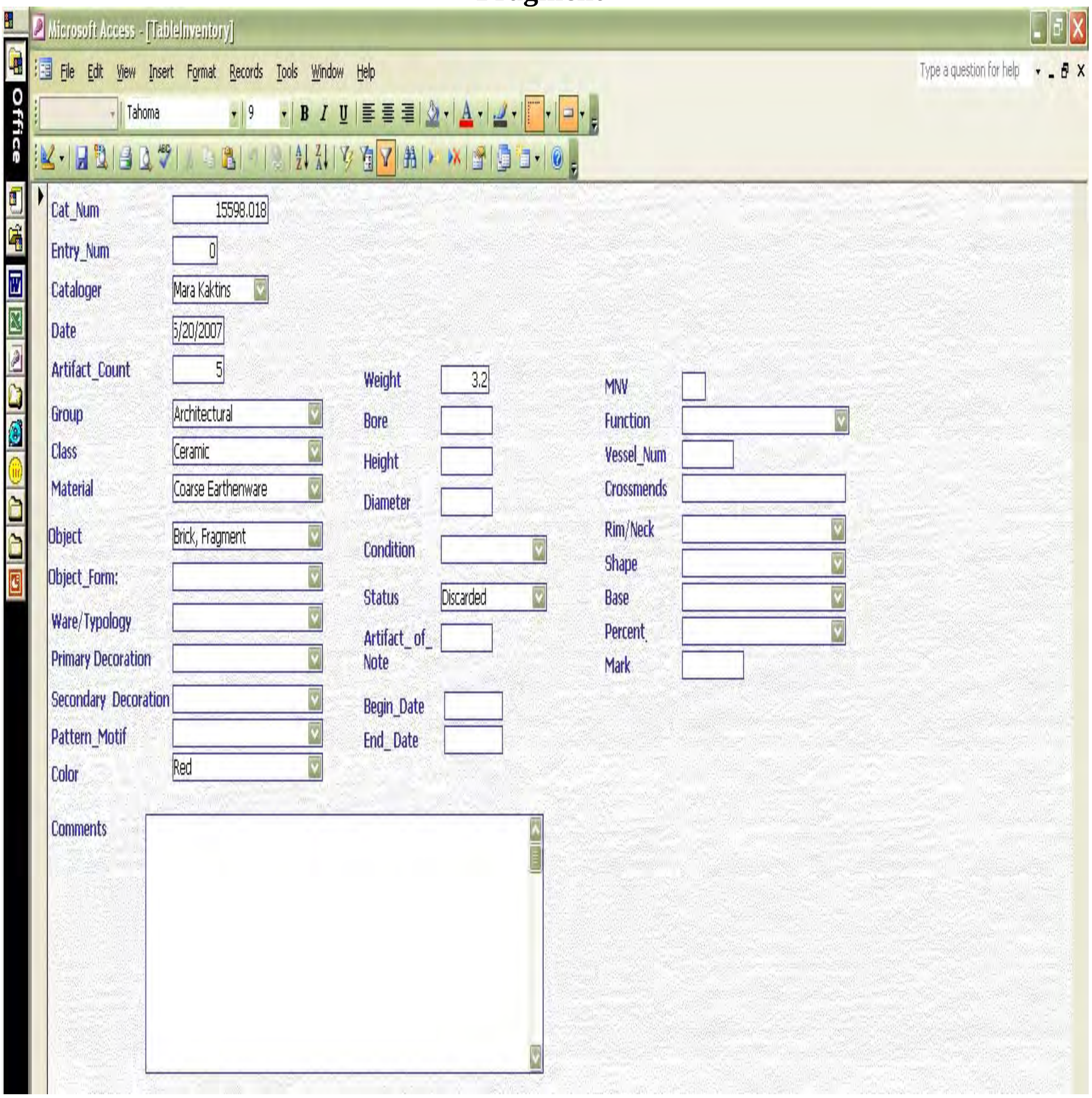


Table 2-7 Representative Data Entry Form for Brick Fragment



1. REQUIRED FIELDS

Cat[alog] Number: This number is unique to each context and consists of the abbreviated site number (e.g., 15598, 15768, 16196) followed by a decimal point and the internally assigned consecutive catalog number. The Provenience section of the database includes every consecutive number within each site, although some have "Number Not Used" in the Description Field. As noted above, catalog numbers were assigned at the beginning of the post-field analytical process; after more intensive examination of the field data some contexts were combined (eliminating some catalog numbers), or were reassigned to different sites (necessitating new catalog numbers). These unused catalog numbers do not appear in the Artifact section of the database.

Entry Number: This is the individual consecutive number assigned during analysis to each record within each catalog number. The artifact(s) described in each record were bagged separately and the entry numbers were written on the bags in order to facilitate locating artifacts. Records that have "0" in the Entry Number field were discarded, either in the Dewberry field lab or in the URS lab, and this is noted in the Comments Field. The only artifacts discarded in the URS lab were small brick, mortar, and cinder fragments and shell fragments without hinge portions; these artifacts were weighed before discard (see **Table 2-7**).

Cataloger: This category identifies the analyst.

Date [of inventory]: Dates were assigned automatically by the *Access* program.

Artifact Count: All artifacts, with the exception of shell fragments without hinges, were counted. In order not to artificially inflate the amount of shell present, only those pieces with intact hinges sections were counted.

Group: This field records functional groups, as first described by Stanley South (1977) and as amended by other analysts. It is designed to classify artifacts into broad functional categories: Architectural, Activities, Arms, Commercial, Electrical, Fauna, Flora, Fuel, Furniture, Hardware, Household, Industrial, Medical, Other, Personal, Prehistoric, Tack, Toy, Transportation, and Unknown.

Class: This field separates Groups into types based on their composition, e.g., Ceramic, Glass, Metal, etc.

Material: This field records information about the artifacts' material types, e.g., Coarse Earthenware, Lead Glass, Aluminum, etc. For floral and faunal pieces, information such as Seed, Pit, Mammal, or Shell is recorded.

Object: For Household Group artifacts made of ceramic or glass, Smoking Pipes, and some other ceramic objects, this field is used to record what part of the vessel is present, e.g., Rim, Body/Base, Bowl and Stem, etc. For all other artifacts, it describes the object, e.g., Nail, Button, Coal, Scissors, etc.

2. OPTIONAL FIELDS

Object Form: For artifacts whose form is not described in the Object Field, as noted above, this field records their shape: Saucer, Plate, Bottle, etc. This field is left blank for artifacts already described in the Object Field.

Ware/Typology: This is a composite field used to record both ware types, e.g., Pearlware, Porcelain, Chinese Export, British Buff-Bodied Slipware, etc. and manufacturing technology, e.g., Mold Blown, Lynch Machine Made, Cut, Sand Temper; etc.

Primary Decoration: Information about the main type of decoration on an artifact is entered in this field, e.g., Painted, Transfer Printed, Applied Color Label, Embossed, etc.

Secondary Decoration: This field is used if more than one type of decoration is present or to expand on the information in the Primary Decoration field. There is overlap between the two fields. For example, a plate with only a gold band around the rim would be listed as “Gilded” in Primary Decoration, but a plate with decal decoration and gilding would have “Decal” in Primary Decoration and “Gilded” in Secondary Decoration.

Pattern/Motif: If a pattern can be identified or a motif described, the information is recorded here, e.g., Biblical Scene, Willow, Chinese Landscape, Floral, etc.

Color: This field is used to describe colors of decorations or colors of objects, as appropriate. For example, the glaze color of lead-glazed redware artifacts is noted, as is the color of transfer-printed decorations on refined earthenware and porcelain vessels.

Weight: The weight of certain types of artifacts is equally or more significant than their counts, as count is strongly affected by degree of fragmentation. All window glass, bricks, mortar, plaster, cement, roofing tiles, coal, cinders, charcoal, asphalt, and slag were weighed as well as counted. All shell was weighed but, as noted above, only pieces with hinges were counted.

Mark: If a maker’s or other mark was present on an artifact, this field was checked. The marks themselves were described in the Comments field.

Function: This field was used to describe the probable function of Household Group ceramic and glass artifacts, e.g., Teawares, Tablewares, Sanitary, etc.

Begin and End Dates: These fields were filled in when manufacturing date ranges could be determined from an artifact’s manufacturing technology, decoration, or maker’s mark. The principal sources used to determine dates were Miller et al. 2000 and Noël Hume 1969. Other sources used were noted in the Comments field when applicable.

MNV: Minimum Numbers of Vessels were calculated only for the ceramic vessels from the pearlware deposit found in the Whitehall Slip fill. Vessels from this intact deposit were mended and compared to calculate the minimum number present. This was the only deposit with sufficient integrity to warrant this procedure.

Vessel Number: Vessel numbers were assigned to the ceramic vessels from the Whitehall Slip pearlware deposit and to Smoking Pipes with particular analytical significance.

Crossmends: This field is used to track mending between contexts.

Condition: The condition of the artifact (e.g., Burned, Water Worn, Manufacturing Defect, etc.) is noted here.

Status: The present location (as of November 2008) of the artifact was recorded here, e.g., Sent to Specialist, Pulled for Exhibit, Discarded, etc.

Bore: Pipe stem bores, in 64ths of an inch, were recorded.

Height: The heights of several complete bottles were recorded.

Diameter: The diameters of several complete bottles were recorded.

Rim/Neck: This field was used to record the finish shapes or manufacturing technique of selected bottles, e.g., Lightening Stopper, Lipping Tool, etc.

Shape: The overall shape of selected vessels (Chinese shape, London Shape, cylindrical, etc.) was described here.

Base: Either the type of base, for bottles (Pontil, Sand, Snap Case, etc.) or the footring shape, for ceramic vessels (Undercut, Free-Standing, etc.) was recorded in this field for selected vessels.

Percent: This field is used to record what percent of a vessel is present; this information was noted only for vessels assigned an MNV and where the information was useful for analysis. Percentage categories are: 0 to 2 percent, 3 to 10 percent, 11 to 25 percent, 26 to 50 percent, 51 to 75 percent, 76 to 95 percent, 96 to 99, 100 percent (mended), and 100 percent (intact).

Artifact of Note: This field was checked for objects suitable for exhibit or for particularly significant or interesting artifacts.

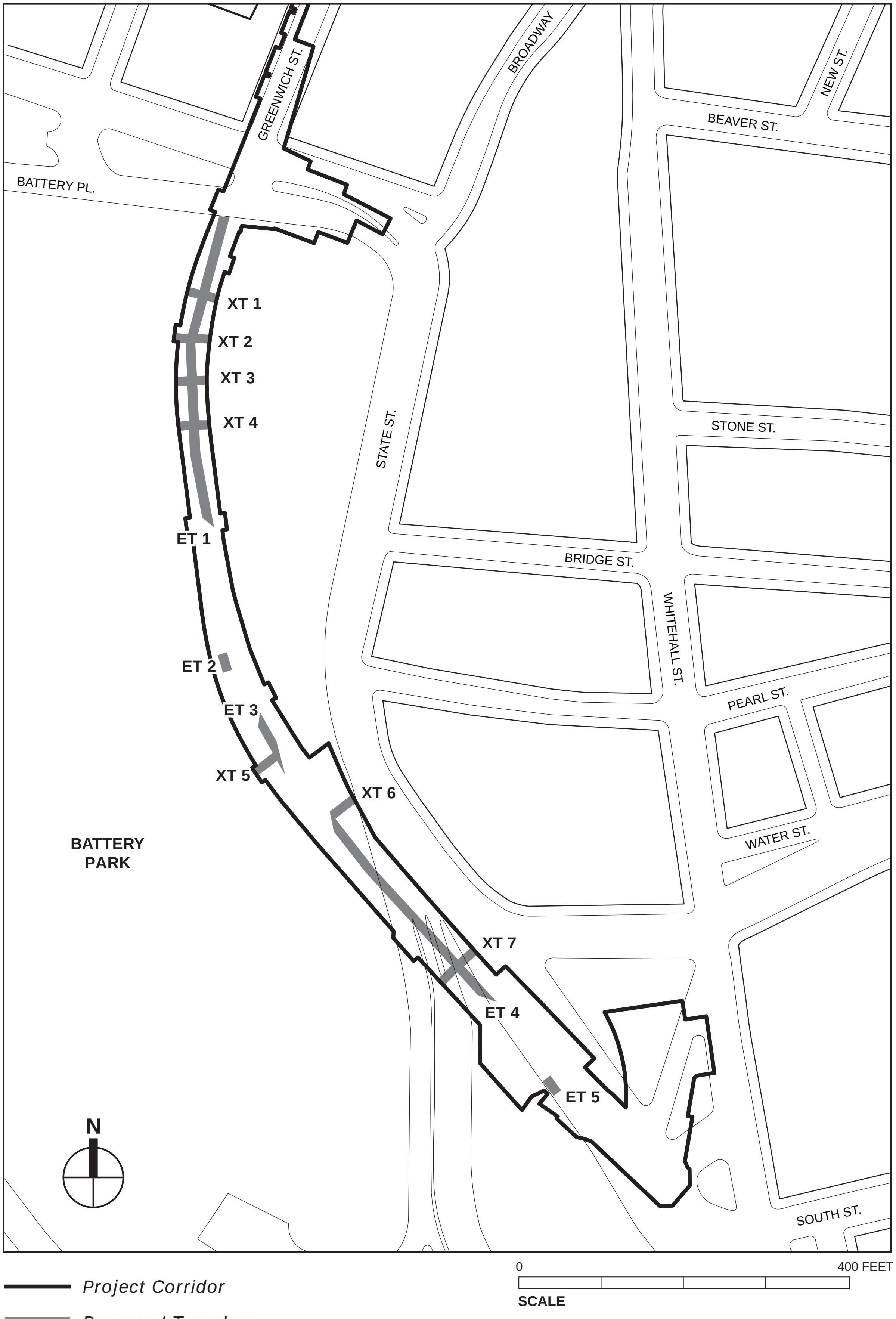
Comments: This is an open text field used to record details about objects, maker's or other marks, and any information useful for analysis and interpretation.

3. OTHER

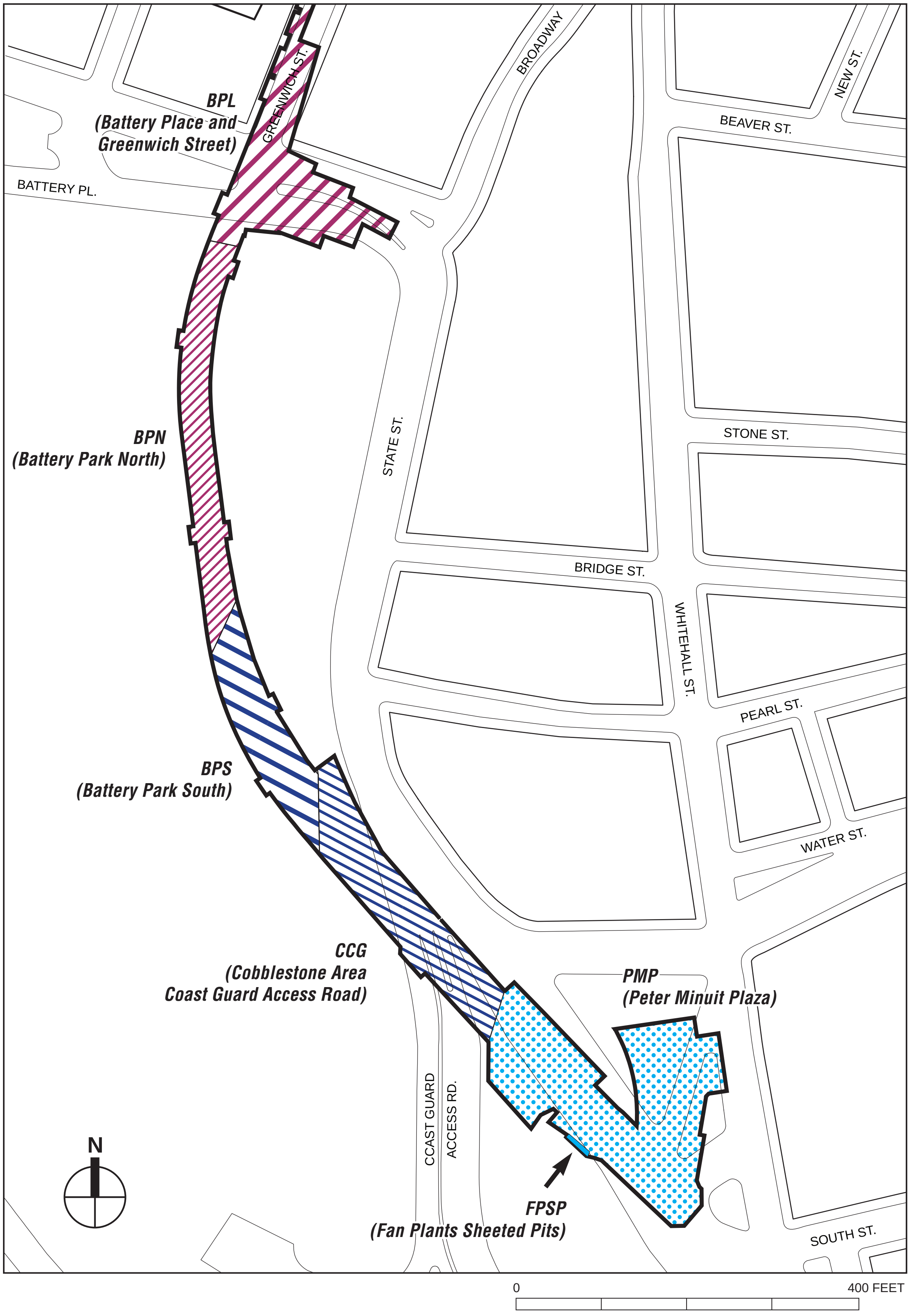
The program automatically assigned individual record numbers to each entry as it was created. Record numbers are not shown on the data entry forms but are visible on Tables and Queries.

As the analysts worked, they bagged each entry separately in pierced (perforated) 4-mil polyethylene zip-loc bags. The individual entry bags were then returned to the large context bag. Separate bagging of individual entries facilitates finding particular artifacts as needed for reexamination, collection for exhibit, photography, etc. The context bags were placed by site in catalog number order in acid-free cardboard storage boxes. Each box measures approximately one square foot.

The final disposition of the South Ferry Terminal collection is at present undetermined. At the close of the project, the artifacts will be returned to the MTA and will again be stored in climate-controlled conditions at 2 Broadway until a permanent repository is designated. Once a repository has been chosen, all artifacts and paper records along with electronic copies of the field drawings, field photos, the artifact inventory, and paper and electronic copies of this report will be delivered to the receiving institution. ✷



Archaeological Test Trenches (ATTs) in the South Ferry Terminal project corridor
Figure 2.1

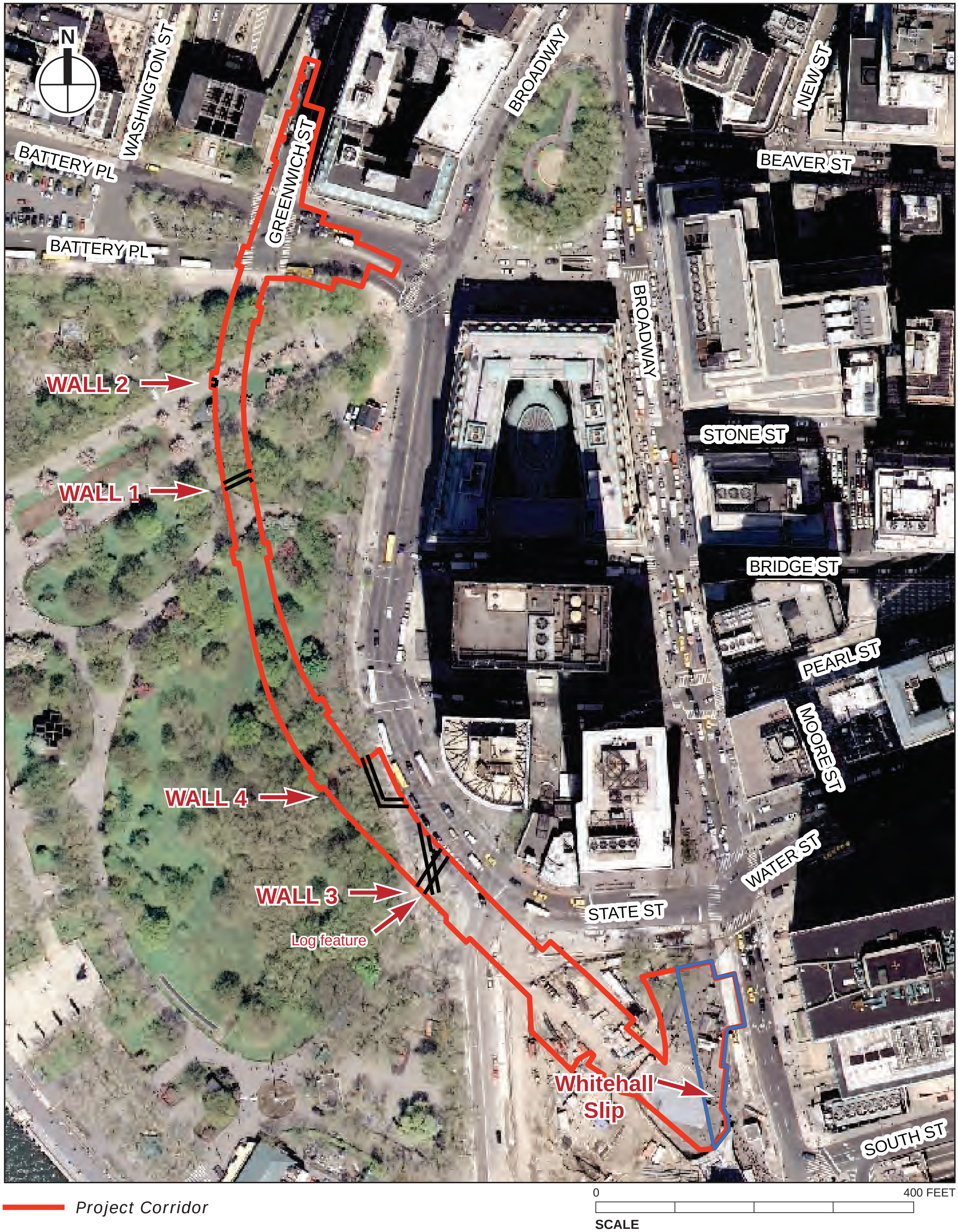


The six geographic areas assigned to the South Ferry Terminal project for archaeological analytical purposes

SOUTH FERRY

Figure 2.2

5.19.10



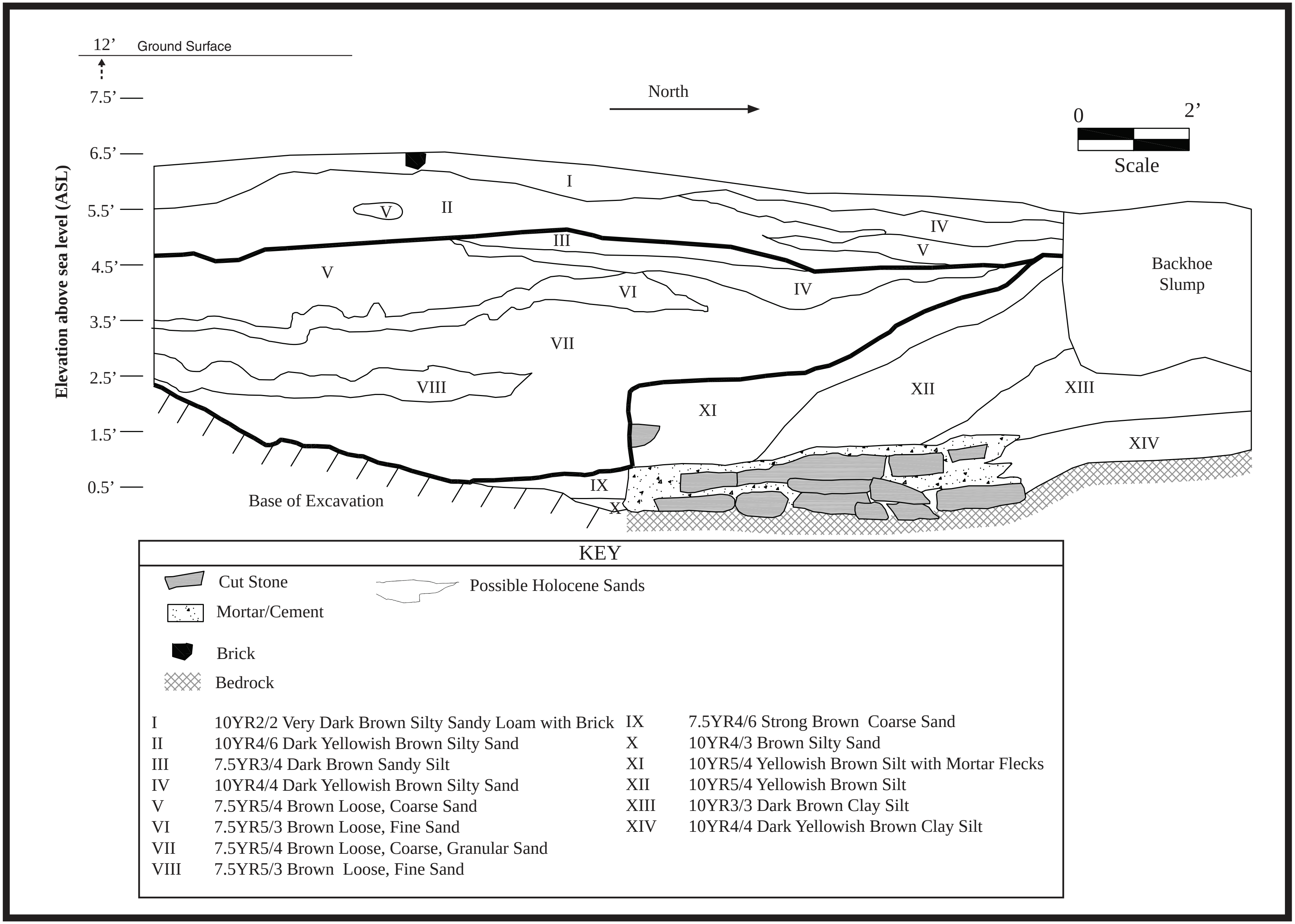
The location of the four sections of Battery Wall, the log feature and Whitehall Slip shown on an aerial photograph of Battery Park and Lower Manhattan

Figure 2.3

Photograph of western cross section of Wall 1 upon initial discovery
(November 8, 2005 – ID# 3139)

Figure 2.4

4.5.12



Field Drawing ID# 1: West profile of ET 1 showing the cross section of Wall 1 and overlying/surrounding deposits

Figure 2.5

SOUTH FERRY

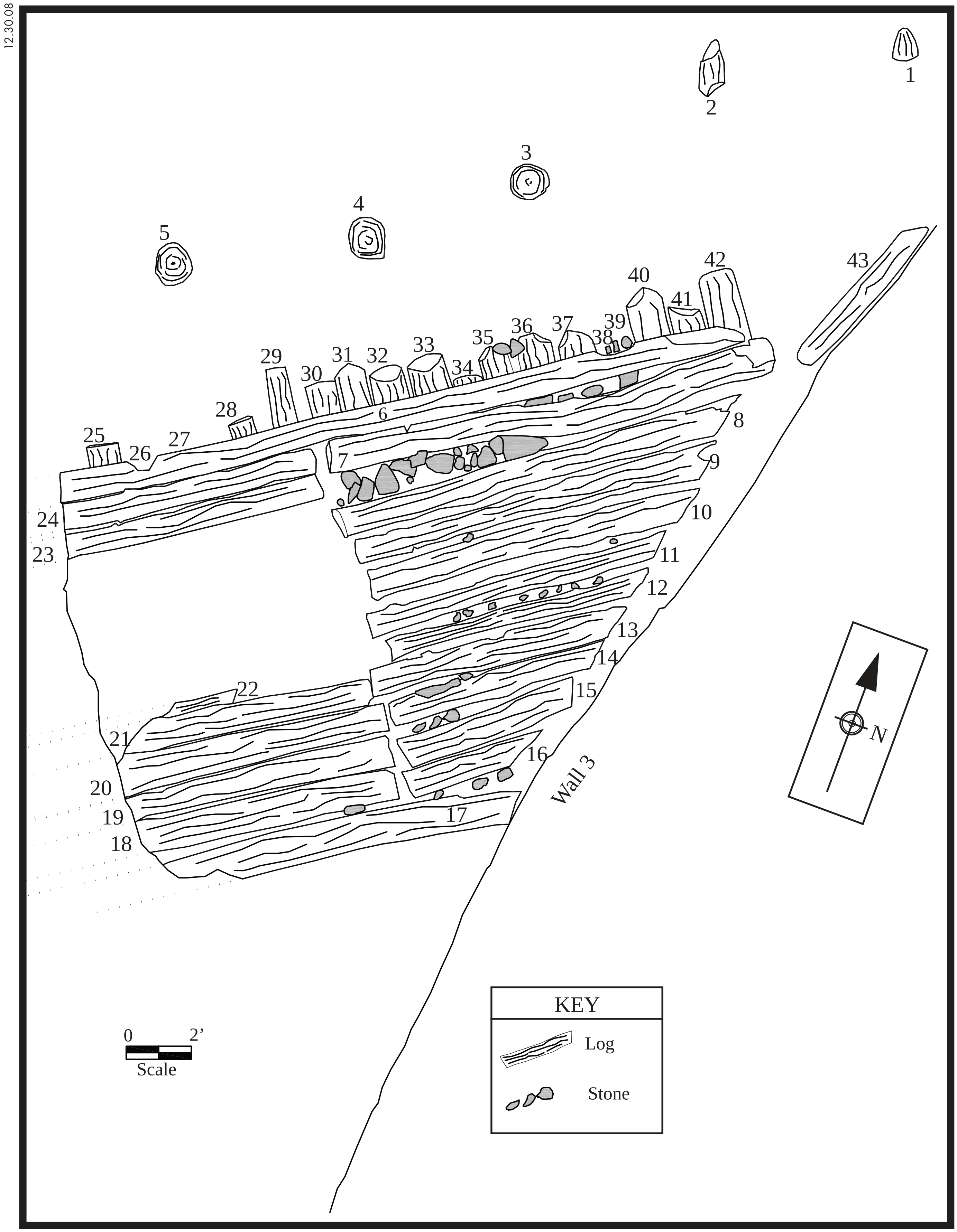
Photograph of Wall 2 facing northwest
(December 5, 2005 – ID# 3612)
Figure 2.6

Photograph of the initial section of Wall 3 and the associated rubble stone after the area was opened and cleaned, facing north. Note the large stone protruding from the eastern face and the absence of stone directly behind it (December 28, 2005 – ID# 0480)

Figure 2.7

Photograph of the top of the northern end of Wall 4 as it was being initially cleaned of soil, facing south. Note the existing vent shaft on the right and the duct bank on the left (February 22, 2006 – ID# 1482)

Figure 2.8



Field Drawing ID# 589: Log numbering plan for the logs numbered 1 – 43 on the west side of Wall 3

SOUTH FERRY

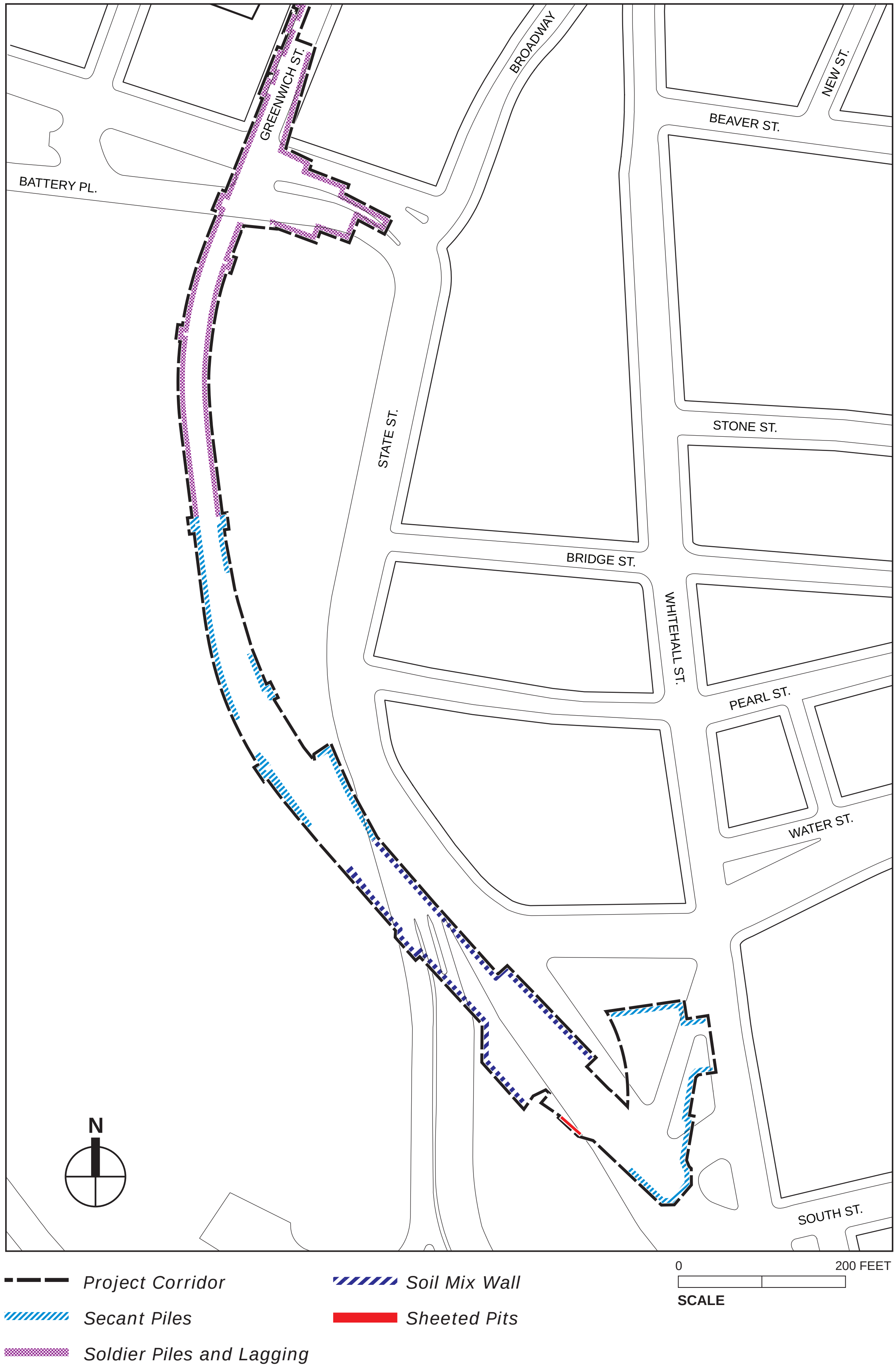
Figure 2.9

Photograph of the southern part of Whitehall Slip when it was initially exposed between Decking Columns C 9 (left) and C 10 (right) facing southeast showing the horizontal logs to the right and a concrete duct bank over cobbles above it and a shell deposit to the left (August 26, 2005 – ID# 1856)

Figure 2.10

Photograph of a water pump being set up in the Whitehall Slip excavation area. The height and "quality" of the profile created by the front-end loader can be seen to the left of the laborer with the pump, where logs can be seen protruding from the uneven profile (August 24, 2005 – ID# 1784)

Figure 2.11



Types of cut-off walls constructed
for South Ferry Terminal project
Figure 2.12

Chapter 3: Statement of Research Questions

Research questions were initially developed as part of the data recovery plans to guide the field excavations. Additional questions were subsequently formulated based on actual field results, information provided by historic documents and maps, and the artifacts recovered. Questions are grouped by the three sites from the project excavations: Battery Wall, Whitehall Slip and the general South Ferry Terminal. Some of the earlier questions that related to specific aspects of the data recoveries were based on initial impressions and were easily and rapidly addressed and dismissed while in the field. Others remain probing and relevant. All research questions are addressed in the subsequent chapters. **Chapter 4: Historic Context**, **Chapter 5: Field Results** and **Chapter 6: Artifact Analysis** present the findings and **Chapter 7: Conclusions and Recommendations** synthesizes that data by the research goals presented in this chapter and by using these questions as guidelines.

A. BATTERY WALL

Research questions were initially developed for the Battery Wall sections based on the discovery of Wall 1. Four goals were established and research questions focused on collecting data that could accomplish these goals. When additional Wall sections were identified, research questions were augmented and tailored to those sections. Answers to some of the research questions can fall under more than one goal. In these cases, the question is presented below under the primary goal.

In addition to the questions developed for specific research goals, a comparison of the Battery Wall archaeological findings with the historic record has been completed to provide an in-depth review of the Wall within a broader context, providing an important addition to the history of fortification of New York Harbor. This analysis has also contributed to the critical evaluation of historic map data, highlighting some of the inaccuracies.

GOAL 1) UNDERSTANDING CONSTRUCTION MATERIALS AND TECHNIQUES:

- What types of stone and mortar were used? Were there variations in the sandstone seen in the Wall? What other types of stone were used? Were these locally procured? Was this considered optimal building material at the time or was it merely readily available?
- The mortar/cement at Wall 1 contained large coarse aggregate and was extremely hard. Is this typical for the time period? If not, what does that tell us about British fortification construction techniques?
- Why was so little mortar seemingly used, particularly in Walls 3 and 4? Was this because the construction of that part of the Wall was sturdy enough without the need for additional mortar?
- What is the makeup of the mortar in the other sections of Wall? How do the mortars compare with one another and with other known examples?
- Can the mortar/cement be compared to samples from other British sites from the same time period?

- Do the Battery Wall sections conform to other known examples of batteries from the time period, both those that are extant or have been archaeologically excavated?
- Is there evidence of repair or replacement of the building materials? What could such evidence tell us about the use of the Battery?
- Wall 1 was laid directly on top of bedrock. There was very little soil between the rock and the Wall. Wall 3 was built on boulders and cobbles and Wall 4 on a base of sand. Why was each section leveled and stabilized in a different way? What does that tell us about the effort that went into building the Battery?
- There may have been a builder's trench at Wall 1. Was this actually the case? If so, what can the contents of the builder's trench tell us about the construction methods or the people who built it?
- The soils to the south of Wall 1 were different from the soils to the north, as observed during the initial field identification. It was initially presumed the northern soils represented the landward side and the southern soils represented the waterside of the Battery Wall. Was this a valid hypothesis? If so, what does that tell us about the construction of the Battery? If not, what is the origin of the deposits? Do they pre- or post-date the Battery? Are these fill deposits? If so, what is the origin of the fill?
- One stone was observed protruding from the face of the Wall 3. Why was this stone sticking out? Was this part of a feature within the Wall, such as an opening or an anchor for artillery or for the Wall itself?
- How was the rubble associated with Wall 3 related to the construction of that section? Can the rubble be dated by soil analysis and/or artifact recovery from the matrix? Was the rubble actually fill for the Wall? What was the source of the rubble? Why were many of the rubble stones burned?
- What was the purpose of the sheeting found with Walls 3 and 4? How was it put together? What type or types of wood were used? Can the wood be dated?
- When was the log feature at Wall 3 built and what was its purpose? Does it pre-date Wall 3?
- What types of wood were used to construct the log feature?
- There was a gap in the top layer of the log feature to the west of Wall 3. Were logs present there originally? Did the gap have a purpose?

GOAL 2) ESTABLISHING THE TIMELINE OF CONSTRUCTION:

- Was it possible to establish a construction date for the Wall based on the documentary evidence?
- Who built the Wall?
- How does the archaeological data compare to the Phase 1A analysis of possible structures in the project area?
- Was the log feature still in use when Wall 3 was built?
- Were there any artifacts present beneath the Battery Wall that may help determine the construction date(s)?
- Were there any soil deposits which may be present beneath the Battery Wall to determine the construction date?

- Although the Battery Wall was truncated, was there evidence of gun emplacements? Was there evidence of other munitions? If there were munitions, what can they tell us about the use of the Battery? Can any other military-related artifacts be recovered?

GOAL 3) IDENTIFYING ENVIRONMENTAL CONDITIONS:

- Do the landward side soil deposits reveal any data about the environmental conditions at the time of construction of the Battery?
- Were there any soil deposits present beneath the Battery Wall that help determine the environmental conditions?
- What does the fact that different sections of the Wall were built on different foundation materials tell us about the environment and topography at that time?
- What was the environment like at the time during which the Wall or Wall sections were built and at the time they were destroyed?
- The soils on top of the truncated Battery Wall originally appeared different in profile from those adjacent to it. What can the contents of the soil tell us about the environment and destruction/dismantling of the Wall?

GOAL 4) ESTABLISHING THE TIMELINE OF DESTRUCTION, DISMANTLING, AND BURIAL:

- When was the Battery Wall destroyed or truncated and covered with fill?
- What can the contents of the soil above the Wall tell us about the destruction and dismantling of the Wall?
- Was the log feature still in use when Wall 3 was destroyed?

B. WHITEHALL SLIP

The data recovery plan for Whitehall Slip contained research questions which could also be grouped into four goals, similar to those established for the Battery Wall. However, a larger emphasis was placed on understanding the fill. Environmental questions comparable to those formulated for the Wall were not posed for Whitehall Slip because the site was submerged for much of its history.

Additionally, the archaeological excavations of Whitehall Slip had to allow for recovery of any other information about the evolution of the Whitehall Slip. The Whitehall Slip excavations have now added to an existing body of knowledge about historic shoreline construction and development in Lower Manhattan.

GOAL 1) UNDERSTANDING CONSTRUCTION MATERIALS AND TECHNIQUES:

- What construction techniques were used to build the slip?
- How much of the earth, if any, was excavated and/or dredged to create room to construct the slip?
- What wood types were used?
- Can reasons for the wood choices be determined?
- Can the source of the wood be identified?

- Were the soils surrounding the logs part of the natural silt or was some treatment and/or soil applied to preserve the slip?
- Was the Whitehall Slip wood reused?
- Is there any information about improvements to Whitehall Slip?
- How does construction of Whitehall Slip compare to other such features previously excavated in lower Manhattan?
- Is there continuity of fill techniques, e.g., cribbing, encapsulation of wharves, and the use of ships, boats, and fragments of both as landfill-retaining structures?

GOAL 2) ESTABLISHING THE TIMELINE OF CONSTRUCTION:

- What is the date, or date range, of construction?
- Modification to the original slip construction likely took place as the shoreline evolved; therefore, can specific dates be applied to specific sections of Whitehall Slip?

GOAL 3) ESTABLISHING THE TIMELINE FOR FILLING:

- When and how was the slip filled to create Whitehall Street?
- Can any information be identified on the techniques used to fill Whitehall Slip?

GOAL 4) UNDERSTANDING THE FILL:

- What are the contents of the fill used at Whitehall Slip?
- Could recovered artifacts provide information about the presence of shipbuilding in the vicinity?
- Would items related to a shipyard be present in the Whitehall Slip excavations?
- What type of wood were the large planks found in the excavation fill and what were they originally used for? Can they be dated?
- What types of materials were used in the fill?
- What was the source(s) of the fill?
- Filling was done over time. Can any differences in the fill be identified based on time period?
- What can the fill tell us about historic period commerce along the New York City waterfront?

C. GENERAL SOUTH FERRY

Research questions are developed prior to excavation for data recovery; however, the large size of the South Ferry Terminal project excavations made it possible to examine avenues of research that are not generally possible with smaller projects. Landscape reconstruction is a major research theme. From the outset of South Ferry Terminal archaeological work, it was anticipated that data on the location of natural soils and fill deposits would be identified and documented to provide a basis for developing a chronology. Analysis of these data in conjunction with historic maps and the artifacts recovered from the general excavations has provided a unique opportunity to reconstruct the historic landscape of the tip of Manhattan Island, the earliest part of New York City. Furthermore, the analysis has once again proven the utility of analyzing artifacts recovered from fill contexts.

- Can specific fill episodes or sources of fill be identified based on the findings of the South Ferry Terminal project non-data recovery excavations?
- Can the presence of dense oyster shell concentrations within historic strata be explained and compared to other Lower Manhattan archaeological sites?
- Can the historic topography of Battery Park be established and/or corroborated?
- Has historic landscape reconstruction been possible using South Ferry Terminal data?
- In general, how does the South Ferry Terminal fit into the landfilling history of Lower Manhattan?
- What can the South Ferry Terminal Project tell us about the utility of examining artifacts from fill contexts?

D. EVALUATION OF ARCHAEOLOGICAL PLANS AND FIELD METHODS USED FOR THE SOUTH FERRY TERMINAL PROJECT

South Ferry Terminal was the first large New York City construction project where archaeological monitoring was used exclusively as the field technique for identification of potentially significant resources. This was considered controversial from the very beginning of the planning stages of the South Ferry Terminal project. This report presents questions related to the validity of this technique and its success at fulfilling the requirements of the Programmatic Agreement.

- What were the original plans for fieldwork and were they altered, augmented or changed prior to implementation?
- What were the logistical problems associated with the South Ferry Terminal monitoring?
- Was the CRMP a successful document? If not, how could it have been improved?
- Was the fieldwork conducted according to the approved protocols?
- Were the time limits suggested in the ARMP adequate?
- Did the South Ferry Project have the ability to incorporate flexibility based on real time findings?
- Was the oversight of the fieldwork conducted according to typical procedures for archaeological investigations?
- Six potentially significant archaeological resources were listed in the ARMP for South Ferry Terminal: 1) Prehistoric features, 2) 17th century Battery, 3) 18th century fortifications and structures within the fort, 4) 18th century military barracks, 5) 18th century Whitehall Slip and wharf, and 6) 18th and 19th century bulkhead. While some of these were identified, is it possible the others were not found because monitoring was an inadequate field technique for their identification?
- Was the original premise, that monitoring would substitute for pre-construction testing, valid?
- What aspects of the project were most effective?
- What aspects of the project could have been improved and how?

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Chapter 4: Historic Context

A. THE HISTORY OF THE BATTERY AND ITS WALLS

1. INTRODUCTION

Fort Amsterdam was located at the foot of present-day Broadway and was designed by Dutch West India Company military engineer, Krijn Fredericks, under Director Willem Verhulst in 1626 (Gehring 2001: 6-7). The site was selected to command the entrance of the East and Hudson Rivers, the tides of which beat upon the western wall of the Fort where it lay along the line of present day State Street. Throughout its long history, changes of name and numerous political administrations, the Fort and its series of supporting batteries survived in alternating states of construction, renovation and decay until they were ultimately demolished circa 1790 and the soil and debris incorporated into present-day Battery Park.

2. THE EARLY BATTERIES

a. DONGAN'S BATTERY

Fort Amsterdam lay outside the land examined during the South Ferry Terminal project. The earliest European impact to the project area probably took place in 1683 when Governor Dongan ordered cannon placed on the narrow beach west of what was then called Fort James[1] on the west side of present-day State Street at about Battery Place. Five demiculverins[2] were positioned on the Copsey Rocks under the Fort at that time (Gilder 1936: 25; Wilson 1903: 16). The Copsey Rocks were boulders located off shore in the East and Hudson Rivers and are discussed in more detail below (see **Chapter 4: A.3. Governor Fletcher's Whitehall Battery**). It is likely that a wooden platform was constructed on the rocks to support the guns and the men who tended them.

b. LEISLER'S HALF-MOON BATTERY

In 1688, King James II of England, a Catholic, was replaced on the throne by his Protestant daughter Mary and her husband, William of Orange, Stadtholder of the Netherlands. Great Britain and its North American colonies, including New York, were justifiably in a state of flux because of these events. Jacob Leisler, a fervently anti-Catholic, pro-Dutch, New Yorker, seized control of the government and the Fort and awaited orders from the new monarchs. He wrote to Governor Robert Treat of Connecticut on August 7, 1689 reporting the presence of "a battery under the Fort" which was in ruins (Gilder 1936: 26). This battery was likely the one installed by Governor Dongan in 1683.

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[1] Formerly Fort Willem Henrik when it was recaptured by the Dutch, 1673-1674 and before that, Fort James (1664-1673) and Fort Amsterdam (1635-1664).

[2] "Demiculverins were small, long cannons with serpent-shaped handles, firing between eight- and twelve-pound cannonballs. These cannons were used for precision shooting and had a range of up to 5,000 yards" (Louis Berger Group [LBG] 2003:19).

"I am repairing the Fort," he wrote to William and Mary, England's new monarchs, and "caused one battery to be made at the river side at the west of the Fort" (Ibid). Leisler's new half moon-shaped battery "of 100 foot over grass which defends the landing of both rivers & also the comeing[3] in," was "defended easily by the Fort" (Stokes 1967, IV: 355). Leisler's "Half Moon" was built on a well-known local geographical feature called the "Flat Rock," an outcrop of bedrock along the Hudson River shoreline, west of the Fort. The Reverend John Miller illustrates the Battery on a *Plan of the City of New York* from 1695. It is curious that Miller's original *Plan* incorrectly places this Battery north of Battery Place about on a line with Beaver Street. Perhaps it is because Miller's original map was lost when French privateers captured him and he later redrew it from memory. A redraft of Miller's *Plan* produced for Valentine's 1853 Manual shows the correct location, about on a line with Stone Street (see **Figure 4.4**). Brodhead (1871: 574) cites numerous colonial documents which corroborate the location of Leisler's Battery on what is probably the Flat Rock to the west of the Fort. Despite the importance of this location relative to the history of the Battery, the Flat Rock itself, where in 1741 a larger battery would be constructed (see **Chapter 4. A. 9. The Flat Rock Battery**) is only identified on one map, Mrs. Buchnerd's vernacular 1735 *Plan of the City of New York* (see **Figure 4.5**). The Buchnerd *Plan* depicts the Flat Rock as a ledge of bedrock extending out into the Hudson River. The 1990 Baskerville *Bedrock Contours and Outcrops* map shows a slight bulge in the 20-foot bedrock contour at that location (Diegel, personal communication May 8, 2008) (see **Figure 4.6**); as corroboration, the archaeologists documented shallow bedrock in this area of Battery Park.

The GIS overlay of the project corridor indicates the Half Moon battery was located outside of the South Ferry Terminal project corridor. Therefore, the Wall segments identified by the archaeologists were not part of Leisler's Half-Moon battery and must have been more recent.

One can assume it is easier to construct a Battery on a flat ledge of bedrock than it is to construct a platform on the rocks in a swiftly flowing river. However, that is exactly what the subsequent English governor, Benjamin Fletcher, proposed in 1693 when he resolved to build a "battery of fifty guns on the outside point of rocks under the Fort, so situated as to command both rivers" (Wilson 1903: 16).

3. GOVERNOR FLETCHER'S WHITEHALL BATTERY, 1693 TO 1694: "A NECESSARY WORK"

At this time, the Fort (now called Fort William Henry) and other military installations about the city were in ruins. The French under King Louis XIV were repeatedly encroaching upon English territories and Governor Fletcher believed an attack was imminent. New York City's Common Council ordered residents over the age of 15 who were not serving in a trained militia company, called "trane bands," as well as servants and "negroe(s)," upon orders from the captain of each city ward, to arrive at a place appointed by the city's military officers and be ready to work with shovels, pick axes, wheel barrows and "other needful instruments," to repair the fortifications of the city (New York City Common Council 1905, I: 271-2, hereafter NYCC).

Governor Benjamin Fletcher chose a site for his new battery, which he called "a Necessary Work," on the Copsey Rocks in the East River (NYCC 1905, I: 339). As mentioned previously, the Copsey Rocks was a local geographical feature well known to New Yorkers. This ledge of rocks, stretching from approximately either Stone Street or Battery Place to Whitehall Street

[3] The original spelling, capitalization and punctuation in quotations throughout this report have been maintained. In some cases words or phrases are underlined for emphasis by the authors of this report.

(historic maps conflict), was inundated during high tides but exposed during low tides. The Copsey Rocks are visible on a *Plan of the City of New York* in 1728 by city surveyor, James Lyne (see **Figure 4.10**).

In October of 1693, Governor Fletcher wrote to the Lords of Trade and Plantation[4] informing them he had chosen a site and designed a platform on which he proposed to mount a new battery (Fortesque 1903, XIV: 167-183). He said he had "sounded in several places between the Fort at New York and Sandy hook, and design(ed) to make a Platforme on the Out most Rocks under the Fort and Errect a battery thereon: it is so designed that by the swiftness of the tyde no ship can ride before the Town, but must have her Stemm or Stern towards it" (O'Callaghan 1856-1887, IV: 57). Fletcher also informed the Lords of Trade that he had enough cannon for "one tier" but planned to write their Majesties for more (Ibid). He asked the Lords of Trade to send some "military stores," as well as 20 more "great guns," including several with longer barrels (Ibid). Fletcher asked Mayor Abraham De Peyster and the Recorder and Aldermen of the city to order inhabitants of the Out Ward and of Manning (Roosevelt) and [Great] Barnes (Ward's) Islands to cut down "86 cord of stockadoes of 12 foot in length and have them ready to be conveyed to the city and county of New York" (NYCC 1905, I: 354). It is likely these "stockadoes" were used to build landfill structures and a platform to support the new battery. At the beginning of 1694, Fletcher reported "the Inhabitants are now at work to get Stockades to fill up the water, it will take some time to finish it" (O'Callaghan 1856-1887, IV: 75).

On January 22, 1694, the city levied a tax upon the "Freeholders, Inhabitants and Sojourners" within the city for the repair of the Fort and the building of a battery, at the rate of "3 pence upon every pound's value of all their real and personal estates" (NYCC 1905, I: 345-346). Reverend John Miller's 1695 *Plan of the City of New York* (Valentine 1853:214) shows the location of the new "Whitehall Battery" that "extended from the present Whitehall Street westward two or three hundred feet" along the water (Gilder 1936: 27) (see **Figure 4.4).** In *New York Considered and Improved* (1903: 199) Miller described the city's batteries: "mounted…in convenient places, are three batteries of great guns; one of fifteen, called Whitehall Battery, one of five by the Stadthouse[5]…and the third of ten, by the Burgher's Path[6]."

It is likely the new Whitehall Battery was located about on a line with present day State Street and was therefore outside and just north of the Peter Minuit Plaza (PMP) section of the South Ferry Terminal Project area. The new Whitehall Battery was also located in the vicinity of the old wharf built by Governor Peter Stuyvesant at *Schreyer's Hoeck*.

South of Fort Amsterdam during the Dutch Colonial Period, there was a spit of land called *Schreyer's Hoeck*[7] after a similar place in the Netherlands. It was here people said goodbye to loved ones leaving the country by ship (Innes 1902: 19). *Schreyer's Hoeck* or Point can be seen on the circa 1650-53 *Prototype View* with the dock built by Stuyvesant, the crane and the weigh

[4] The Lords of Trade and Plantation were a standing committee of the English Privy Council that was founded by King Charles II in 1675. While it was technically only an advisory group, it maintained a powerful influence over the Council (Bieber 1919: 12).

[5] The *Stadt Huys* or City Hall was located on present-day Pearl Street at the head of Coenties Slip.

[6] The Burgher's path was named for blacksmith Burgert or Bogaert Jorisen and was a ravine or gully that provided a road to the shore from Stone Street to Pearl Street in the vicinity of present-day Hanover Square and Old Slip.

[7] *Schreyer's Hoeck* was also known as Weepers' or Shouters' Point in the Netherlands.

beam[8] or primitive signal light (see **Figure 4.1**). *Schreyer's Hoeck* can also be viewed on Innes' *Plan* of *New Amsterdam about 1644* (see **Figure 4.7**). During construction of the Whitehall Battery, Governor Fletcher "caused the edge of the point [*Schreyer's Hoeck*] to be filled in" and it was here he erected his new battery (Jenkins 1911: 18). This appears to be the first major filling episode along the west side of Whitehall Street.

In addition to the 1695 Miller Plan (see **Figure 4.4**) discussed above, there is another late 17th century map—the 1693 French Franquelin Plan, *Ville de Manathe ou Nouvelle-Yorc* (see **Figure 4.8**). The South Ferry Terminal Phase 1A report (Louis Berger Group [LBG] 2003: 19) states that this map provides significant information about the Fort and "associated Fortifications lying to its west in the area of present day Battery Park" at the end of the 17th century." Research conducted for the present study, however, suggests this map is largely fiction and should be disregarded as an accurate plan of lower Manhattan at the end of the 17th century (Cohen and Augustyn 1997: 50-51; Allen 2005: 4). For instance, it depicts New York as a heavily fortressed city, surrounded by strong walls and batteries. What is probably meant to represent the Great Dock to the east of Whitehall Street is illustrated as a place with a narrow entrance, which would present difficult entry for ships. The map also inaccurately shows a large wharf sitting on the rocks at the foot of and to the west of Whitehall Street that appears to be part of the Great Dock. It also shows a great sand bar at the foot of Whitehall Street and the Battery. Recent research has suggested that Franquelin used information provided by spies and informers and was possibly "mislead by a double agent, for his plan shows a fictionalized New York City as a powerful Fortress, which would have discouraged any potential French invader (Allen 2005: 7)." In fact, New York was far from being a powerful fortress. While the buildings in the Fort and Leisler's Battery to the west are depicted on this map, other structures on the Battery, south of the Fort, are not accurately illustrated and do not conform to Miller's 1695 *Plan* or any subsequent maps. A sand bar depicted on the map, however, should be noted because Wall 4 was built on a bed of sand.

4. THE EARLY EIGHTEENTH CENTURY—1706

In 1702, Edward Hyde, Lord Cornbury, Captain General, Vice Admiral and Governor of New York, New Jersey and Territories, provided an account of the conditions of the soldiers, forts and fortifications of the city to the Council of Trade and Plantations in England. He stated that in addition to officers, only 156 effective men were in the New York garrison.

> Those at New York are naked: I cannot describe their cloathes bad enough; and their arms were in such a condition that we could pick out but seaven and twenty muskets fit to fire in both Companys; there is but twelve swords in each Company, and as many bayonets… The fort at New York I found in a miserable condition, the parapet, which is of sod-work, being fallen down in many places; not one platform good, but most of them quite rotten; many of the guns dismounted, most of the carriages rotten, and some of the guns so honeycombed that they are not fit to be fired. The stores are in an ill condition too, there being very few fit for service... The magazeen of the fort at New York is a building of bricks made by my Lord Bellomont over the gate going into the fort; it cost £800 and was built under Col. Romer's directions, but I am well satisfied that a better building might have been made for £200, besides that it is the most improper place in the world for a Magazeen for powder, because of the great storms of

[8] Some historians identify it as a gibbet.

> thunder and lightning, which are very frequent in this country; besides many people, that live near the fort, have been very earnest with me to remove the powder from thence, it being very certain that if the magaseen should by any accident blow up, it would destroy many houses as well as the fort (Fortesque 1912, XX: 599-611).

At the end of July 1706, New Yorkers learned that four French privateers had left Martinique for the North American coast and that "Monsieur Deberville with a Strong Squadron of ships of Warr designs Speedily to Attacque this City and Province" (NYCC 1905, II: 306). The French had attacked the Islands of Nevis, St. Christopher's and Montserrat; it was feared New York City would be next. City officials asked Lord Cornbury to direct the repair of the fortifications, make "others in convenient places," mount the artillery and arm the citizens (NYCC 1905, II: 299-300). Labor on the fortifications was mandatory for men who had resided in the city for at least two years and/or who intended to live in the city for the next two years, although they could provide replacements to work in their stead (NYCC 1905, II: 303). On the day before their labor was needed, the "Cryer by the beat of a drum," would announce the time and place to meet and the work to be performed. Each laborer had to bring with him, "A good Spade Shovell Axe Pickax or Other Necessary Tool or Instrument" (Ibid: 304).

On October 3, 1706 Lord Cornbury reported to the Lords of Trade that a "good Brestwork" was erected "along the River side" and one battery was constructed "upon a point of Rock under the Fort of eleven guns" (O'Callaghan 1856-1887, IV: 1184-1185). It is not clear if Cornbury was referring to improvements to Leisler's Half Moon Battery constructed in 1689; Fletcher's Whitehall Battery built in 1693-4, or was referring to new batteries. The earliest 18th century representation of New York from that approximate time period is the Burgis View of 1716-1718 which clearly shows the Whitehall Battery mounted with eight guns along present-day State Street, just south of the ruins of "Whitehall built by Governor Duncan[9]" and extending out in the East River between Water Street and what would later become Front Street (Stokes 1967, I: 246) (see **Figure 4.9**).

5. THE MONTGOMERIE CHARTER—1730

On August 13, 1730, Governor Montgomerie authorized Surveyor-General Cadwallader Colden to "survey for the corporation of New York, 400 feet beyond low water mark, on Hudson's river, from Bestavers Killitie [Minetta Brook] to the limits of the fort, from thence (leaving out for the use of the fort, all the west side of the street that leads down to Whitehall) Eastward along the East river, to the north side of corlaer's Hook" (O'Callaghan 1864, X: 129). In other words, the Charter increased the city's ownership privileges "four hundred feet, or two blocks, beyond the low-water mark" (Buttenweiser 1978: 35). The purpose of this directive was to extend the boundaries of the city into the rivers and Colden's surveys were carried out to help determine the amount of land thus added.

a. THE UNIDENTIFIED BATTERY

It is possible that James Lyne was one of Colden's surveyors (Stokes 1967, I: 256). The project corridor was laid over the 1728 Lyne-Bradford *Plan of the City of New York* (see **Figure 4.10**). A comparison of the Lyne-Bradford (1728) and Miller (1695) *Plans* (see **Figure 4.10 and Figure 4.4**) suggests that some landfilling had taken place west of and between the North and

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[9] Governor Dongan.

Southwest bastions of the Fort. Wall 1, found by the archaeologists, touches upon this newly filled area, however, Wall 1's orientation suggests it is not part of this expansion and is likely part of a later period of construction.

Lyne's *Plan* also shows a dotted line along the outer limit of the Copsey Rocks, less than 200 feet from shore (see **Figure 4.10**). It is possible this line represents shoal water or simply the extent of the Copsey Rocks. Outside the project corridor, a battery or redoubt is depicted south of the Southwest bastion of the Fort. It is possible this fortification was constructed during Lord Cornbury's term of office and is the 11-gun battery located under the Fort. The 1730 Carwitham View (published 1740) also illustrates the unidentified battery (see **Figure 4.12**). Lyne's map also shows the house of the Fort's armorer, Thomas Elde ["Ell's Corner"] that was located within present-day Battery Place and inside the project corridor.

6. GEORGE AUGUSTUS' ROYAL BATTERY—1734 TO 1735

a. THE BATTERY

In December 1733, the *New York Weekly Journal* reported the activities of an alleged spy ship from French-occupied Canada that was thought to be probing the city's defenses (in Ziebarth 1972: footnote 5). It was rumored the French spies believed the city could be easily captured "by a small number of ships and troops" (Ziebarth 1972:14). It is likely this "rumor mongering" was a political ploy to obtain additional defense appropriations (Ibid). Not surprisingly in 1734, Governor William Cosby advised the New York Assembly[10] that £12,000 was needed for the "Erecting of a Battery at the Point of Rocks by Whitehall" (Stokes 1967, IV: 534). On November 28th, 1734, the Assembly passed an act to provide for the construction of fortifications in the colony (New York State 1894, II: 892-902). The city would erect "a Substantial Battery on the Rocks Lying off White Hall commonly called copsie Rocks and to adjoin the Land already there, so far Westward as the Wharff commonly called Hunts Peer[11]" (Stokes 1967, IV: 538). This statement suggests that landfilling would need to take place.

The Assembly ordered the new Battery to "be built and Completed in the Speediest & cheapest manner" possible (Gilder 1936: 47). Commissioners[12] appointed to carry out the work were John Cruger, Cornelius de Peyster, John Roosevelt and John DeWitt Petroze. The Commissioners were also directed to repair or construct new carriages for the guns and to erect sheds to protect them from the elements.

The future development of the Battery was restricted by the Common Council in 1734 when it resolved to keep the locations of harbor defenses clear and to prohibit the construction of buildings "except for platforms, batteries, or other fortifications in the River or in any part or parts which now Overflow with the Water from and between the Westerly part of the Battery…to be Built on Capske Rocks to the Place commonly Called & Known by the Name of Elds Corner or Slip" [present day Battery Place between Greenwich Street and Broadway] on Hudson's River" (NYCC 1905, IV: 237-238). The city also reserved "the rights to the Soil from

[10] This Provincial Assembly which met in New York City was a legislature composed of elected representatives from various towns and manors. It was held in check by the Governor's Council, composed of royal appointees, as was the Governor himself (Schecter 2002: 18-19).

[11] Hunt's Pier was located at the north side of Battery Place, just west of the Battery.

[12] Commissioners for Fortifications hired laborers, managed payments and oversaw construction.

High Water Mark to low Water Mark from Whitehall to elds [also known as Ell's] Corner" (Ibid).

The "Capske Rocks," prominent on early maps and mentioned repeatedly in historical documents and elsewhere in this chapter, were situated off shore and extended from approximately present-day Battery Place to the tip of Whitehall Street or from Stone to Whitehall Streets (see **Figures 4.10, 4.11, 4.15** and **Chapters 4: A.2. The Early Batteries and 4:A.3 Gov. Fletcher's Whitehall Battery**)**.** The rocks were also called Kapsee, Copsey, and Copsie and, until the end of the Revolutionary War, State Street was known as Copsey Street (Stokes 1967, IV: 538). According to Bolton (1922: 220), *Kapsee* was a Native American Delaware word meaning "the sharp rocks place," although Ruttenber (1906: 17) believed it to be a derivative of the Dutch word, *kaaphoekje* or "little cape or promontory" (Grumet 1981: 17).

Notwithstanding the passing of an Act of the Assembly for the building of fortifications in 1734, Governor Cosby was allotted only £6,000 instead of the £12,000 he requested (NYCC 1905, IV: 237-238). Despite the lesser amount, construction of the new Battery at Whitehall was a major development effort, as can be seen by comparing the 1728 Lyne-Bradford *Plan* (**Figure 4.10**) with that of Maerschalck's 1754 *Plan*[13] (**Figure 4.11**). This new construction, which extended out into the East River, also formed the west side of what was later to be called Whitehall Slip (see **Chapter 4: B.2.**).

George Augustus' Royal Battery replaced or was an extension of Fletcher's Whitehall Battery and extended farther out into the River. This suggests a large landfilling effort took place to provide new land upon which to erect the new battery. Some of this land-making activity was related to the proposed construction of George Augustus' Royal Battery and some resulted in the creation of the earliest portion of Whitehall Slip found by the archaeologists during the South Ferry Terminal Project excavations (NYCC 1905, IV: 224-225; see **Chapter 5: B. Whitehall Slip and Chapter 4: B.2. The Creation of Whitehall Slip**). Archaeologists uncovered a large log feature during Data Recovery for Wall 3 both underneath and flanking the Wall partway up its truncated remains (see **Chapter 5: A.4.d.2. Log Feature**). Dendrochronological analysis conducted for this project indicated logs from this feature were cut in 1734, just prior to the erection of George Augustus' Royal Battery (see **Appendix H**). The log feature predates Wall 3 which was not constructed until 1755. Additional tree-ring studies also dated the logs used to construct the earliest part of Whitehall Slip to 1734 (Ibid). This date coincides with significant landfilling activities that took place south, east and west of Whitehall Street at that time. It is possible the log feature provided a platform for heavy equipment, supplies, draft animals and people that were needed to fill in this wet and marshy area.

When the foundations for the new battery on the rocks at Whitehall were completed on July 16, 1735, Governor Cosby laid the first stone of the platform and named the fortification, "George Augustus Royal Battery" after King George II (Pelletreau 1907, II: 69; Stokes IV: 541). The new horseshoe-shaped battery can be seen on Grim's circa 1741 *Plan of New York* (**Figure 4.13**) and the 1754/55 Maerschalck *Plan* (**Figure 4.11**). It is likely the new battery was an extension of the old Whitehall Battery constructed in 1693 by Governor Fletcher (Pelletreau 1907, II: 69; Watson 1832: 163).

Governor William Cosby, attended by his council and the most important men in the city, performed the ceremony under the general discharge of cannon planted for the occasion. The

[13] Maerschalck depicts the city in 1754 but the map was published in 1755.

New-York Weekly Journal (7/14/1735) as well as other out-of-town newspapers including the *Boston Post-Boy* (7/28/1735) reported that "10 Barrels of Strong Beer" were given to the workmen and laborers and a whole ox roasted on the Battery. Cannon were fired; toasts were drunk and games played until a tragic accident occurred. "The Guns of the Battery were again fired, one of which burst & kill'd and maimed several people" (Ibid). The dead included New York City Sheriff, John Hendrick Symes; Catharina Courtland, age 9, only daughter of Philip Courtland; and Jacob Hendrick Vollwiller, son-in-law of Alderman William Rome (Scott 1977: 16). In October of that same year, another celebration was held in honor of Governor Cosby's safe return from Albany where he had successfully negotiated a peace treaty with the "Six nations of Indians" (*Boston Post-Boy* 10/20/1735). During the ceremonies, toasts were drunk to the success of George Augustus' Royal Battery (Ibid).

The 1755 Maerschalck *Plan of the City of New York from an Actual Survey* reveals the extent of the construction efforts that created the new horseshoe-shaped battery (see **Figure 4.11**). The outer portion of the new battery has many gunports. Directly behind the firing platform of George Augustus' Royal Battery, the builders left a basin or pond created out of the East River. It is possible the pond was left in place as a defensive measure, to prevent a flanking attack from the landward side (Huey personal communication 2008). It is also possible the new battery with its pond represents the cheap and speedy construction advocated by the Assembly—what Harris and Reyes (1991) have described about dock construction and maintenance, e.g., one builds and maintains only what is absolutely necessary for the task at hand.

b. THE POND

The use of the Pond, Pool, or Basin ["Bason"] illustrated by Maerschalck (**Figure 4.11**), Grim (**Figure 4.13**) and Ratzer (Ratzen) (**Figure 4.15**) has caused endless conjecture. The water was brackish because it was fed by the tide that entered through Whitehall Slip and would have been a poor source of drinking water, although it could have been used for fighting fires. We <u>do</u> know the pond or basin was used by carpenters and/or boatwrights for soaking wood. An entry in the *Journal of the Legislative Council of the Colony of New York* (1861, II: 914) in 1746, noted that many had made it a practice "to lay Boards Masts & other Timber within the Enclosure of the Fortification on Copsey Battery and to square & work the same there to the great Incumbrance & annoyance thereof as well as hazard and danger which is likely to arise therefrom to the Storehouse & other Buildings thereon erected by accidents from fire." A fine of £40 was imposed upon anyone who "shall lay any Boards Masts or other timber on any part within the Enclosure of the Fortification aforesaid out of the <u>Bason</u> thereof or work & manufacture the same there"(Ibid). On Feb. 27, 1746, a new Militia Act further elaborated: "If the boards, shavings, etc. are not removed in two days, the head-gunner of this battery shall cause them to be removed and kept in his custody until the further sum of 40s and expenses shall be paid to him (Stokes 1967, IV: 595). The act was continued and amended between December 6, 1746 and at least 1754 suggesting that the use of the Pond for this purpose was a continuing problem.

Other references to the Pond were sought to shed light on its possible use(s). One reference dated to 1748; David Van Horne asked permission to lay a drain from a lot near the Whitehall[14] where he was erecting a still house, and was given permission to do so (NYCC 1905, V: 227). The entry in the Common Council Minutes noted that this was "the street into the Bason within the Battery" (Ibid). John Dies'1756 map depicts a "Still House," [No. 22 on the map] near the foot of Pearl Street but it is closer to the Hudson River than to Whitehall Street (see **Figure**

[14] This might have been Stuyvesant's old lot at the corner of present-day Whitehall and State Streets.

4.16). It is possible this is the still house built by Van Horne in 1748, but it is more likely Van Horne constructed one closer to Whitehall Street (see **Chapter 4: B.7. Filling in Whitehall Slip**).

Further references to the Pond were somber. For example, the *New-York Mercury* (6/16/1757) reported that "a Child about seven Years old, named Griffiths, fell into the Pond of Water at our new Battery, and was drowned."

The Pond was a city landmark for about 40 years, existing from circa 1734/35 when it was created until circa 1773 when it was completely filled in because it was "a nuisance." The filling-in process was gradual, however, and occurred in spurts whenever more land was needed for storehouses, blockhouses, barracks and a military hospital.

The new battery at Whitehall with its great Pond is similar in appearance to the Mole[15], a proposed stone battery for 35 guns in Boston. This Mole was illustrated by William Burgis in 1743 but apparently never constructed. It was described as an addition to Boston's South Battery (Seasholes 2003:37) (see **Figure 4.14**). Unlike George Augustus' Royal Battery in New York, the Boston Mole had an entrance for boats to the east. The 1755 Maerschalck *Plan* depicts no such entrance (see **Figure 4.11**). However, the 1766/67 Ratzen *Plan* illustrates what appears to be a small entrance to the Pond from Whitehall Slip (see **Figure 4.15**). It does not look large enough for vessels, however, and by that time the Pond was much smaller due to filling.

c. THE GARDEN

Governor Cosby, under whose auspices George Augustus' Battery was built, died of tuberculosis on March 10, 1736 and was buried three days later in the King's Chapel in the Fort (Stokes 1967, IV: 545; see **Chapter 4: A.16. Demolition of the Fort**). George Clarke replaced him as Lieutenant-Governor. Clarke "cultivated a garden south and west of the Fort" circa 1737 according to the historian John Fanning Watson, who's *Historic Tales* appeared in 1832. Watson claimed to have met "old-timers "who told him of seeing deer kept by the Governor in front of the Fort on the ground of the Water Battery" (Gilder 1936: 50). It is not clear if the Water Battery is George Augustus' Royal Battery or the unnamed battery or redoubt possibly built by Cornbury in 1706, or some other battery (see **Figure 4.11**). The Garden was already present in 1735, however, and is noted as "2" on Mrs. Buchnerd's *Plan of the City of New York in 1735* (see **Figure 4.5**). Stokes (1967, III: 946) states that in 1735, the Fort's Garden was located south of Bridge Street, between Whitehall and State Streets. An elaborate Garden within the Fort grounds can be seen on the 1766/67 Ratzen *Plan* extending south of Market Field Street (present-day Battery Place) to just south of Wyne Coop (present-day Bridge Street, see **Figure 4.15**)

7. ADDITIONAL WORK AT THE BATTERY – 1738-1739

On January 10, 1737, John Richards told his brother-in-law in Albany that New York City had experienced a bitter winter and that ice had done a great deal of damage to the fortification and the "New Wharfs that was Built Last Year" (Van Rensselaer Family 1708-1885: Box 1). That same year, an earthquake shook New York City after Christmas:

> About 11:00 o'Clock, there was a severe Shock of an Earthquake felt all over this City; and continued about one Minute; It began with a Rumbling Noise like a Coach or

[15] According to Seasholes (2003:37), a mole is a "massive breakwater, usually of stone."

> Coaches running along the Streets; the Houses did Shake, the China, the Glasses and Pewter did move and clatter, to the surprize of the inhabitants (Stokes 1967, IV: 555)..

These natural disasters caused damage to Lower Manhattan. On June 2, 1738, the Board of Trade[16] inquired about the condition of the fortifications in New York. Lt. Governor Clarke reported there was a three-year-old battery that commanded “the mouth of the harbor whereon may be mounted fifty cannon…but it wants finishing” (Gilder 1936: 50). The following year Clarke gave the Assembly an estimate of £1,800 for “the finishing of the battery” (New *York Weekly Journal* 9/3/1739a and Stokes 1947 IV: 560). The Assembly, in turn, requested an accounting of the original £6,000 the city claimed it spent for materials and labor during construction of George Augustus’ Royal Battery, as well as for new cannon carriages and for construction of a storehouse for the carriages. An accounting was provided and the city demonstrated that it spent £5,913:16:2 and that £86:3:10 was left (Ibid).

The Assembly immediately passed a resolution allocating £1,200 for putting the Battery in a posture of defense but this sum included the £86:3:10 left over from the previous work. Clarke also provided an estimate for rebuilding the barracks in the Fort for which the Assembly granted £425, although Clarke had asked for £500. Many soldiers were “without Kettles, Bowls or Platters” and Clarke asked that some provision be made to provide them with these items until they and other items could be sent from England (*New-York Weekly Journal* 9/3/1739b: 4).

On October 25, 1739, the Assembly officially acknowledged that the amount appropriated five years earlier for erecting George Augustus’ Royal Battery on Copsey Rocks was insufficient and passed another act “for Completing and building the Fortifications” and for other purposes “for the Defence and Security of this Colony” (New York State 1894, III: 14-15). This new act authorized the Commissioners of Fortifications

> To cause a Sufficient quantity of Large Stones to be Lay’d or thrown so far Round the outside of the Said Battery Somewhat higher than the Lower part of the Frame work, as shall be Deemed necessary to Secure the Foundation, to fill up with Earth Sand or other proper Materials round the Inside about Twenty feet more than is filled already, and so much at the East & West End of the Store House, as by the advice aforesaid Shell be Deemed needful…and to procure at Least thirty New Carriages more for the Great Guns,…, To remove the Great Guns design’d & Intended for the Said Battery, to their proper Places on the Platform thereof, To provide one or Two good Engines and Ropes for mounting of them, and to make of Sods So much of the Parepet as Shall be Judgd proper & when that is Done to Dispose of the Brick & Stone the Same is now composed of to the best advantage (Ibid).

This suggests that the interior of the original George Augustus’ Royal Battery was only minimally filled (see **Chapter 4: A.6.b. The Pond**) and that the exterior of the battery was made, at least partially, of wood since there is a reference to “Frame work,” above.

[16] The Board of Trade and Plantations was a permanent committee established by William and Mary in 1696 to replace the Lords of Trade and Plantations (Hildreth 1863). . The decisions of the Governor and his Council were subject to their approval or veto (Schecter 2002:18-19).

8. THE HARD WINTER—1740 TO 1741

On April 13, 1740, Lieutenant-Governor Clarke announced that England had declared war on Spain (Stokes 1967, III: 563). The Mayor advised the Common Council of "Some War like Stores in the custody of the Corporation which may be Usefull to the Commissioners of Fortifications at the New Battery[17]" (NYCC 1905, IV: 488-489).

The winter of 1740/1741 was called "the hard winter" (Smith 1829, II: 57). Weather was severe from November until the end of March and more than six feet of snow lay upon the ground. "The poor, both in town and country, were distressed for food and fuel; and by the scarcity of these articles, the prices of almost everything else was raised" (Ibid). At the same time, many of the city's military troops had been deployed to the Caribbean Islands and the city was nearly defenseless.

On March 18, 1741 fire broke out on the roof of the Governor's mansion in the Fort. Lieutenant-Governor Clarke attributed it to an accident caused by Mr. White, the plumber, who had been mending a roof gutter between the Governor's House and the Chapel in the Fort and who, it was thought, had probably left behind a live coal from his soldering work (Foote 1991: 286; Gilder 1936: 51; Horsmanden 1744: 5-6). The Governor's House was covered in cedar shingles and possessed old wooden floors and wainscoting. It went up in a flash and was beyond saving (O'Callaghan 1856-61, VI: 156-7, 185-86). A strong wind blew from the southeast and the Chapel, Secretary's Office and Fort Barracks were consumed in less than two hours but the Fort itself, its guns and gun carriages, were not damaged (Stokes 1967, IV: 566). On Monday, April 6, 1741, at about 10:00 in the morning, there was a fire at the house of Sergeant Burns who lived opposite the garden in the Fort."Towards noon a fire broke out in the roof of Mrs. Hilton's house on the East side of captain Sarly's house" (Horsmanden 1744: 6 in Stokes 1967, IV: 566). The following week, a fire started in the house of Captain Warren, who lived near the Great Dock but it was attributed to the accidental firing of a chimney (Ibid). Six days later, Mr. Van Zandt's storehouse went up in flames but it was said a pipe smoker had accidently ignited the hay (Ibid). Three days later, two separate fires occurred but were extinguished and two days after that, live coals were found to have been deliberately placed under a haystack near John Murray's stables. Fortunately, the fire went out by itself. When two more fires broke out on April 6th, suspicion began to center on the city's enslaved population (Ibid).

There were rumors that the city's enslaved black population had fashioned a plot to seize the town, had set the fires and planned to murder the whites and set up their own government. Many white people believed that the blacks were in league with "Catholics and Spaniards" (Ibid). More than 100 enslaved individuals were imprisoned. After a trial, 29 were burned at the stake or hanged and 88 were transported, probably to sugar plantations where life was even harsher. Three whites were also executed, including an individual who was falsely accused of being a Catholic priest.

John Roosevelt was one of the Commissioners of Fortifications. His slave Quack was accused of setting fire to the Governor's Mansion in the Fort. Quack's wife Barbara was Lieutenant-. Governor Clarke's cook and Quack visited her often although recently Clarke had made it clear that he wasn't pleased about the visits. Quack knew the sentries at the gate and rarely had a problem getting in but recently he'd scuffled with a Private McDonald and they had come to

[17] George Augustus' Royal Battery was often called the New Battery, Copsey Battery or Whitehall Battery.

blows. McDonald clubbed him with his flintlock and knocked him down. Quack grabbed McDonald by the collar and shouted, "Murder!" The Officer of the Guard intervened and ordered McDonald to lower his weapon. Quack took that opportunity to dash into the Fort and into the Lieutenant-Governor's kitchen. McDonald and the officer chased after him and tossed him out of the Fort. Quack was unhappy about the situation. Suspicion fell on him and he was imprisoned.

Quack was accused of setting fire to the Governor's Mansion. At his trial, Roosevelt and his son testified "that Quack was employed most part of that morning the Fort was fired, from the time they got up, in cutting away the ice out of the yard; that he was hardly ever out of their sight all that morning, but a small time while they were at breakfast; and that they could not think he could that morning have been from their house so far as the Fort" (Horsmanden 1744: 89-90). As to Quack's character, fellow Commissioners Capt. Rowe and Gerardus Beekman testified, "he was employed last year to work at the new battery[18], and that he minded his business very well" (Ibid: 90). Despite their testimony, Quack was found guilty and sentenced to death by burning.

Roosevelt believed that Quack's life might be spared if he would only "confess." On the day of his scheduled execution, Quack "confessed" that he "fired the Fort" with a "lighted stick taken out of the servants hall, about eight o'clock at night, that he went up the back stairs with it and so through Barbara's room, and put it near the gutter, betwixt the shingles, and the roof of the house" (Ibid: 97). Unfortunately, this last minute "confession" did not save his life. An unruly crowd clamored for his death and the unfortunate Quack was burned at the stake.

9. THE FLAT ROCK BATTERY AND ADDITIONAL WORK ON GEORGE AUGUSTUS' ROYAL (COPSEY) BATTERY—1741 TO 1755

On April 15, 1741, Lt. Gov. Clarke cautioned New Yorkers that war with France was imminent and suggested the city fortify itself "by erecting Batteries in proper Places" (Stokes 1967, IV: 567). The Assembly reminded Clarke that recently and at "vast Expence," there was "erected… a noble Battery, mounted with upwards of fifty great guns, at the Entrance of the Harbour of this city" (Ibid). Despite the derogatory tone of the Assembly's response, it resolved to erect several additional batteries and firing platforms and a special committee was appointed to consider where these should be placed (Ibid).

The Twenty-Second Assembly of the Colony of New York passed "An Act for the better Fortifying of this Colony… to put the Colony in a better Posture of Defence for its Security" (New York State 1894, III: 134). The present fortifications were to be improved, new batteries and platforms constructed and buildings that "had the MisFortune to be Burnt down in Fort George" would be replaced (Ibid). The Assembly was referring to the alleged burning of Fort George by black and white "conspirators" believed to be involved in a plot to capture the city.

New Yorkers were experiencing a sense of extraordinary vulnerability due to the traumatic events that had recently taken place – the numerous fires, the ensuing trials and executions of the alleged conspirators, the severe winter weather which resulted in food and fuel shortages, the absence of regular troops from the city, and the current and impending wars with (Catholic) Spain and France. As a result of these events, the Assembly allotted £600 pounds to construct an additional 20-gun battery on the Flat Rock to the west of Fort George. "If an Enemy should make an attempt upon this City by a naval Force, a good Battery upon and near the Flat Rock

[18] George Augustus's Royal Battery.

behind Fort George would very much annoy them, and at the Same time be able to flank the Battery already Erected on copsy rocks" (New York State 1894: 138). The Assembly instructed the new battery be built a "Sufficient distance from the (Hudson) River that a proper space may be Left for a Passage between Them[19]" (Ibid). This new battery on the Flat Rock was constructed in the area where more than 50 years earlier, Governor Dongan and Jacob Leisler had constructed their batteries (see **Chapter 4:A.2.a. Dongan's Battery**).

The Assembly also ordered additional landfilling as "the ground already made in the Battery on the Copsy Rocks would not Afford Room enough for our People if we should have the Misfortune to be attacked by any number of Ships of War" (Ibid). For a sum not to exceed £176, the Copsey Battery would be filled up "with Earth Sand or other proper materials round the Inside of the Said Battery, the Space of Ten feet more than is filled up already" (Ibid 1894: 138-139). An additional sum, not to exceed £9:12, was allotted "for amending and Repairing the Floar thereof, and to Fix at the outside of the Said Floar a Beam or Scantling, to prevent the Guns from Recoiling beyond it in case of action" (Ibid). The money was to be paid by the Treasurer of the Colony and used by the Commissioners of Fortifications who would oversee the work.

It was also thought important to have "some works on the Inner part of the Battery on Copsy Rocks," not only to "clear it from an Enemy," but also to provide shelter for the troops on duty there (Ibid: 139). For that reason, "two proper Block Houses were to be built on the Copsey Battery," on the east and west sides of an existing storehouse and £50 provided to cover the costs of materials and workmanship (Ibid). The new Blockhouses bracketing an older Storehouse are labeled "30" on the 1755 Maerschalck *Plan* (see **Figure 4.11**). Two additional structures are illustrated north of the western blockhouse but their functions are unknown.

For the safety of the troops, the Assembly ordered that the "great guns" on the Copsey Battery[20], as well as those intended for the new Flat Rock Battery should be loaded and fired, e.g., tested because they had not been used in years and there were concerns they might blow up (Stokes 1967, IV: 569).

In sum, the following work, which cost £1,880:2, was performed:

- New barracks in the Fort to replace those burned down during the "Negro Conspiracy";
- A new battery on the Flat Rock;
- Filling up 10 more feet of ground in the Battery on the Copsey Rocks and "amending its Floar";
- Constructing two Block Houses on the Copsey Battery; and
- Gun powder to "prove the Great Guns, and for Removing and Replacing Them" (Ibid).

John Cruger, William Roome, John Roosevelt and Capt. Henry Rowe were appointed Commissioner of Fortifications and would manage the work. They were ordered to "procure Materials at the cheapest rate, and to Imploy able Workmen to perform the Same in the best & Speediest manner" (New York State 1894, III: 140). Another Act of Assembly passed in May 1742 allotted £618 for repairing Fort George and the "outside of the Battery on Copsy Rocks…with good Sound Oak Plank," as it had been damaged by ice during the previous winter (Stokes 1967, IV: 574). The Commissioners, (Roosevelt, Roome, Rowe, and Cruger), appointed

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[19] Set back from the river so there would be room for a passage between the two batteries.

[20] George Augustus' Royal Battery.

to construct the Flat Rock Battery had already purchased wood for the platform of the new battery but concluded "that a Platform of Stones" would be more serviceable (New York State 1894, III: 203-8). The Commissioners were instructed to sell the wood and use the proceeds "towards making the Said Platform of Large thick Squar'd Stones" (Ibid). This work continued through October of 1742 and beyond (Ibid: 575).

Similar to those who had governed New York before him, Governor George Clinton was concerned about the city's defenses and in 1743 requested funds to raise "the walls round the battery on Copsey Rocks… with sod work, as it will defeat the attempt of an enemy to land there" (Gilder 1936: 52). Clinton also demanded "an officer's guard of the militia[21] be kept there every night" (Ibid). He appropriated money for "mounting cannon on Flat Rock Battery and for sentry boxes," and for a fence and gate at either end of the Battery to keep out marauding hogs and cattle (Ibid: 53). He also replaced the "old platform of copsey Battery" with a new one of "pitch pine" 2 ½ inches thick, at least 12 inches wide, "clear of sap, on good substantial white oak sleepers, not less than five under the length of one plank" (Ibid). Governor Clinton also asked that "`leaden aprons[22]…be made for the cannon on copsey Battery,'" as well as "a Banquette or foot-Bank" to be raised "along the Inside of the Parapet on copsey and Flat-Rock Batteries, to a proper Height for the Musketeers to fire over" (Ibid: 52-53).

In 1744, a visitor from Annapolis[23] noted that the main battery (George Augustus' Royal Battery) was in the shape of a:

> great half-moon or semi-circular rampart bluff upon the water, being turf upon a stone foundation, about 100 feet in length, the platform of which is laid in some places with plank, in others with flagstone. Upon it there are 56 great iron guns, well mounted, most of them being 32 pounders. The smaller battery with turf ramparts is mounted with twelve-to eighteen pounders (Ibid: 53).

He also noted that prostitutes walked the battery platform in the evenings, seeking customers (Ibid).

Finally, on May 19, 1744, a provincial Act provided funds for repairing the fortifications:

> The Fortifications of this Colony are not in Sufficient Repair to Oppose the Attacks of a formidable enemy, or to Encourage the good people thereof, To make a vigorous Defence, in case of any Attempts against them, and the present Situation of affairs in Europe is Such as Render it absolutely Necessary, to Repair & compleat Them at this critical Juncture (Stokes 1967, IV: 580).

Out of the revenue derived from a liquor tax, the treasurer was to provide the three Commissioners of Fortification, who were now Peter Jay, John Roosevelt and William Roome, the following sums:

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[21] Participation in the militia of New York was a duty required of all men in the province between the ages of sixteen and sixty according to a law passed in 1721 and extended every three years (Ziebarth 1972:13). At age 16, all males in the province were required to register and be enrolled in the militia company in their area. The company provided training but the individuals were required to bring their own equipment such as rifles and ammunition. "Uniforms were a rarity" (Ibid).

[22] An apron is a lead plate that covers the vent or touch-hole of a cannon (Crabb 1823).

[23] Alexander Hamilton, a 32-year old Scottish physician.

- £16 for mounting cannon "on the Flatt rock Battery, and Erecting one or two Centinell Boxes";
- £17:15 for making a fence at both ends of this battery, with a "Gate to open fit for a Cart to go in upon Occasion, and a Turn Pike," and also a "Turn Pike" at the north end";
- £7:10 for repairing the sod work on this battery;
- £285 for "Building a good New Plat Form on copsy Battery of Pitch Pine Plank 2 ½" thick and not Less than 12" wide clear of Sap, on good substantial white Oak Sleepers, not less than Five under the Length of one Plank;
- Other work, such as rebuilding the Governor's House in the Fort that had burned in 1741, was also part of this work (Ibid) but did not affect the project area.

Not all of the above work took place immediately. Months and even years later, monies were still being appropriated and meted out for portions of this massive project.

For example, in September of 1744, another provincial Act was passed to raise the sum of £3,200 to put the colony into "a Proper Posture of Defence." The money was to be raised by taxation and these funds were used to pay for a number of repairs, some of which had already been undertaken. Those of interest to this report include the following:

- £8:5 for the additional sentry boxes already constructed;
- £5:15 for defraying the cost of the "Fence on the Flat rock Battery, above what was allowed for it in a former act";
- £27:10 for making "a Sufficient Fence for Copsy Battery from Whitehall Slip to the East corner of the Red house[24], and from the west corner of the Red house to the Wharf[25] on the North West end of the said Battery, with gates at each end of the Red House for carts to pass, and turnpikes at the east and west parts of said Battery"; [£6:18 for making a sufficient number of shot boxes (one for each gun) for all the Batteries;
- £12:15 for providing "Leaden Aprons and Tompkins for all the Guns on the Battery's and wharfs";
- £22:18 for removing the cannon to the Red Hook Battery, Burnett's Key and North river;
- £7:10 for "raiseing a Banquet[26] or foot bank all along the Inside of the Parapets on all the Batteries to a proper height, for musquitiers to fire over, and to make use of as many of the old Plank of the Platform, of copsie Battery, as will be Serviceable for that purpose";
- £4:12 for sorting the shot and placing the same in boxes, for each gun on all the batteries & wharfs; and
- £450 for "altering copsie Battery & Reduceing the same to a 36-gun battery, with an addition of five foot sod work on the inside of the same (New York State 1894, III: 437-40; Stokes 1967, IV: 585).

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[24] The identity and location of the Red House is unknown but could possibly be the Store House bracketed by the blockhouses.

[25] The location of the Wharf at "the North West end of [Copsey] Battery" is unknown. It is possible it refers to Hunt's Pier at Battery Place but it is tempting to think the log feature under Wall 3 might have been part of this wharf.

[26] A platform along the inside of a parapet for soldiers to stand on when firing.

A small additional storehouse was also proposed between the Flat Rock Battery and the Fort in April of 1745, to "secure and preserve gun carriages and other stores" (Gilder 1936: 52).

The Flat Rock is illustrated on William Cockburn's *Plan of New York City* in 1765 [published in 1767] at letter "I" (Swift 2001: 77) (see **Figure 4.17**). Cockburn situates the Flat Rock on the waterside of the curtain wall between the north and middle bastions of the Wall. That would place the additional storehouse behind the Wall, perhaps not far from the Lower Barracks.

On April 3, 1745, Commissioners of Fortifications, John Roosevelt and William Roome provided an estimate for "taking down the Sodd Work on Copsey-Battery" and re-sodding it "to join with the Addition of five Feet, amounting to £230" also noting "that an Addition of large Stone on the Outside will be of Service, to preserve the Battery, the charge of which will amount to about £90" (Stokes 1967, IV: 588).

Finally, on April 9, 1745, in accordance with the recommendations of the Commissioners of Fortifications the assembly appropriated a sum for completing what two Acts of Assembly had directed. This work included: new sodding[27] for the Copsey Battery, large stones to be laid around the outside of Copsey Battery, the building of a stone [store?] house between the Flat Rock Battery and the Fort, 28 feet long and 20 feet wide, to secure and preserve the carriages and other military stores, and for directing Capt. John Waldron the military storekeeper, to construct "a close Room in the red Store-House on Copsey-Battery, and for purchasing necessary stores of war for the use of all the Batteries, as well as other things not related to the batteries" (Ibid). The proposed small additional storehouse discussed above was constructed between the Flat Rock Battery and the Fort that same month (Ibid) but its exact location is unknown. It is not likely it is the "North Store House" illustrated on Dies' Map as No.17 (see **Figure 4.16**). The structure on Dies' map south of Mr. Blundle's house is already present on the 1728 Lyne-Bradford Map.

On March 31, 1746, New Yorkers were called to mount guard in Fort George when professional troops were deployed to Cape Breton to fight the French. A private citizen suggested in a letter to the editor of the *New York Post-Boy* (3/31/1746), "that a collection be taken up immediately to clean out the filth and rubbish left behind in the fort by the soldiers now bound for Cape Breton" (in Stokes 1967, IV: 596).

Governor Clinton was exasperated by the quality and snail-like pace of the repairs and improvements to the city's defenses. On Dec. 12th 1746, he described the "Present State of the Province" to the Lords of Trade:

> In the fortifications they have everywhere employed Men intirely ignorant of the art, who have no more pretence to knowledge than the meanest plowman, and have squandered away large sums of money with no other view than can appear, but in being useful to Relations, or to such persons as they thought could serve them in future Elections. The works have been so manifestly absurd that they have been in most places altered, & rebuilt at their own desires. In making repairs to the Fort, which not only defends this town, but likewise the principal Battery at the entrance of the Harbour, they refuse repairing the side next the town, and even left the guns dismounted on that side; There can be no reason assigned for

[27] "Seeding or sodding was necessary for the proper maintenance of an exterior slope of a field work that was expected to stand over a prolonged period of time" (http://civilwarfortifications.com). It permanently stabilized an area by laying a cover of grass sod to prevent erosion.

> this, but a malicious insinuation that the town may be in Danger from a Governour whose Residence is in the Fort; yet as the Town is open the Fort may be more easily attacked from the Town than any other way; and as soon as an enemy gets possession of the Fort, all the Batterys must fall into their hands, because the Fort commands them" (O'Callaghan 1856-61, VI: 462).

Clinton made similar remarks in a speech to the Assembly in April of 1747 but the Assembly defended itself:

> The governor in his message of April 24 having charged the House with neglecting to provide for the Safety of the Colony, with treating him with Disrespect, etc. etc…we wish we could say, the large Sums which have been expended by this colony, from time to Time, in making fortifications, had been properly employed likewise; but the Want of a skillful Engineer to make Draughts, and see the Work well performed has, in our Opinion, occasioned a great deal of needless Expense (Stokes 1967, IV: 603).

When Great Britain, France, Holland, Germany, Spain, and Genoa signed the Treaty of Aix-la-Chapelle, terminating the war of Austrian Succession, on October 7, 1748, it promised a breathing spell in the conflict between the French and English in the colonies. By this treaty, England gave back the French strongholds of Louisbourg and Cape Breton that had been taken by 4,000 Americans reinforced by the British fleet in 1745 (Stokes 1967, IV: 610).

On November 5, 1753 *The New-York Mercury* reported that Lieutenant- Governor James De Lancey had spoken to the Assembly about the "great damage done" to the Copsey Battery in "the late storm." He informed them that the Battery was in "ruinous condition" and that the earlier provision made for repairing the Fort and the Battery would not be enough given the extensive damage to the Battery from that storm. He requested additional funds for those repairs. The following year John Dies and Christopher Bancker, the new Commissioners of Fortifications[28], were given permission to purchase materials to repair the Copsey and Flat Rock Batteries (Fernow and Van Laer 1902: 398). In May 1754, Lieutenant-Governor De Lancey was still trying to convince the Assembly of the need to repair existing fortifications and to build additional defenses. He was convinced there would be another war with France and that New York would be the first city attacked (Stokes 1967, IV: 650).

On February 4, 1755, De Lancey again reminded the Assembly that the city's fortifications were in need of repair and alteration and that other defense works were necessary. De Lancey applied to General Braddock, Commander-in-Chief of the British Army in America, for an engineer (Stokes 1967, IV: 664). Three days later, the house passed a resolution allowing £45,000 "for putting the Colony into a proper Posture of Defence" and to pay for this work, a tax was levied on all real and personal estates for five years (Ibid). Commissioners of Fortifications, Christopher Bancker and John Dies, were in charge of purchasing materials for the fortifications and the repair of Copsey Battery (Ibid). They immediately advertised for stone, lime, timber, plank, iron trucks for gun carriages, and cannon balls, stating they would pay cash for the best materials at the cheapest rate (Stokes 1967, IV: 660).

On March 28, 1755, the Assembly adopted a resolution "that the barracks in Fort George…be repaired, and such other erected, as may be necessary for accommodating such of his Majesty's

[28] The Commissioners were a semi-autonomous group that hired workmen, managed payments and oversaw construction. .

troops as may be posted in the colony"(Stokes 1967, IV: 666). In 1757, barracks were erected on the Commons, in present-day City Hall Park (Ibid). They were called the Upper Barracks as opposed to the Lower Barracks, which were built the same year on the Battery in the area of present-day Peter Minuit Plaza, just outside the project corridor. The GIS overlay of the project corridor on the 1754/55 Maerschalck Map shows that a portion of the Flat Rock Battery, a platform in the Hudson River, a portion of the Copsey Battery including the Pond and the western blockhouse, were all located within the project area (see **Figure 4.11**). The residence of Christopher Blondel (Blundle), the Fort Storekeeper was also located within the Battery Place portion of the project site. On the map, Blondel's house is next to the Northern Storehouse, which is so identified on Dies 1756 Map (see **Figure 4.16**)**.** The tiny segment that was Wall 2 found during the South Ferry Terminal Project excavation appears to overlap one of the walls of the Flat Rock Battery and might have been part of the circa 1741 construction episode. Although Wall 1 is nearby, the map places it in an area that is still under water. Despite the fact that Wall 1 does not exactly touch upon this area on the 1755 Maerschalck *Plan of the City of New York***,** it was probably constructed in 1741 as part of the Flat Rock Battery (see **Figure 4.11**). This illustrates the limitations of cartographic comparisons. The fault is usually with the map, however, and not GIS (see **Chapter 2: A. Historical Research Methods**). Walls 1 and 2 are different from Walls 3 and 4 in composition and method of construction and are believed to be earlier (see **Chapter 5: A. Battery Wall**).

On April 1, 1755, the Calendar of Council Minutes noted an "order to proceed with the Fortifications from Flat Rock battery to Teunis Rivet's house which must be purchased" (Fernow and Van Laer 1902: 414-415). Rivet or Rivett was a pilot for the City of New York (*New-York Gazette*, 1/25/1762). According to the 1756 Dies' map, "Capt. Rivitt's House" [Number 20 in the key] was situated outside the project corridor, on the southwest side of Pearl Street, south of the Flat Rock Battery and east of the Wall 4 bastion identified by archaeologists (see **Figure 4.16**). The order to proceed implies that the Flat Rock Battery was to be expanded and improved. Rivet's house is not present on subsequent maps suggesting it was demolished to make way for this additional work. The Council also ordered guns mounted on the Copsey and Flat Rock Batteries (Fernow and Van Laer 1902: 415; Stokes 1967, IV: 667). A number of invoices were submitted and payments were made to Francis Barca for providing lime for the fortifications, John Myers for blacksmithing, Tobias Ten Eyck and Johannis Samuel Pruyn for lumber for the improvements at Fort George, and to Commissioner John Dies who erected ship beacons and built bateaux (O'Callaghan 1865-1866, II: 667-669; Stokes 1967, IV: 667).

Men were impressed into the Navy when sailors were needed; press-gangs combed waterfront taverns searching for inebriants that could not put up much of a fight. It was interesting to learn that men were also impressed to labor on public works. On May 3, 1755, a provincial statute was passed that allowed the impressment of ship and house carpenters, "Joyners Sawyers and their Servants and all other Artificers and Labourers" for the building of bateaux[29] (Stokes 1967, IV: 668). That same year, the Governor ordered bastions "built between Copsy and Flat Rock batteries" and Commissioner John Dies was directed to impress workmen on the fortifications (Fernow and Van Laer 1902: 416, 449). It is thought Walls 3 and 4 were constructed at this time (see **Chapter 5: A.9. Battery Wall Conclusions** and **Chapter 7: Conclusions and Recommendations**). On May 29, 1755, the provincial council provided specifications for the

[29] River flatboats used for ferrying livestock, merchandise and people.

new construction. "Merlons[30] of the batteries in New York (were) to be made of white cedar wood" and "the north line and the line from Hunt's within the Half Moon battery (was) to be finished" (Ibid: 417). The mention of "Hunt's within the Half Moon battery" is confusing. The Copsey [George Augustus' Royal] Battery had a half-moon shape according to Grim (**Figure 4.13**) and Maerschalck (**Figure 4.11**). Hunt's Shipyard is illustrated at the foot of Whitehall Street on the Lyne–Bradford 1728 *Plan* but is not located within the half-moon-shaped Copsey Battery or even within the project area (see **Figure 4.10**).

During the period of early Battery construction circa 1734/35, there was a Hunt's wharf or pier located north at Battery Place and it was still known by that name in the 1750s. To add to the confusion, Dies' 1756 map notes a Capt. Hunt's House at Number 19 (see **Figure 4.16**). It is possible, although not likely, that the reference to Hunt's in the directive is a reference to Capt. Hunt's house, which was located south of Capt. Rivett's (No. 20). Both Hunt and Rivitt's houses are outside of the project area.

The reference to the "Wall from the east line of the battery along the west side of Whitehall Slip to be continued" (Fernow and Van Laer 1902: 419), however, is likely the area noted as the proposed "Barbets & Mounts for 4 cannon" mentioned and illustrated as No. 3 on Dies' 1756 map (see **Figure 4.16**). It is clear that between 1755 and 1756, substantial landfilling and construction has taken place and that bastions were constructed. This can be seen by comparing the 1755 Maerschalck (see **Figure 4.11**) and Dies' 1756 maps (see **Figure 4.16**). Dies' map is discussed in greater depth in **Chapter 4: 10. The French and Indian War Period.**

On June 6, 1755, Capt. John Waldron, military storekeeper at New York was ordered to deliver "certain cannon lying in the pasture near the fort" to agents for Governor Shirley of Massachusetts, (O'Callaghan 1864:636; Stokes 1967, IV: 670). Although the exact location of the pasture near the fort is unknown, its presence on or next to the battery might be one explanation for the presence of manure in one of the South Ferry Terminal soil samples (see **Appendix E**). Work on the Fort and Battery proceeded quickly, despite the fact that there was a substantial earthquake on November 17th, 1755. Lieutenant-Governor Cadwallader Colden described the quake in a letter to a London friend: "I felt the bed under me and the house shaking…I plainly heard the noise like that of carts on pavements…with now and then, a noise like the explosion of a great gun at a distance" (Stokes 1967, IV: 674).

10. THE FRENCH AND INDIAN WAR PERIOD - CIRCA 1756 TO THE MID-1760S

Historian William Smith (1829: 187-196), described the Fort and Battery in 1756 at the beginning of the Seven Years War[31]:

> Upon the south-west Point of the city stands the Fort which is a Square with four Bastions. Within the Walls is the House in which our Governours usually reside; and opposite to it Brick Barracks, built formerly for the Independent Companies… At the South End there was formerly a Chapel but this was burnt down in the Negroes Conspiracy of the Spring, 1741…Below the Walls of the Garrison, near the Water, we have lately raised a Line of fortifications, which commands the Entrance into the

[30] A merlon is the solid section between two crenels in a crenellated battlement. It has also been described as the solid part between two embrasures (NYSDMNA 2006a).

[31] The Seven Years War (1756-1763) was the European counterpart to the French and Indian War (1754-1763) but fighting had been going on in America for years. It eventually ended France's position as a major colonial power in the Americas.

> Eastern Road [the East River], and the Mouth of Hudson's River. This Battery is built of Stone, and the Merlons consist of Cedar Joists[32], filled in with Earth. It mounts 92 cannon and these are all the Works we have to defend us…The standing Militia of the Island consists of about 2300 Men…and the City has in Reserve, a thousand Stand of Arms[33] for Seamen, the Poor and others in Case of an Invasion.

a. THE BARRACKS

In 1756 John Campbell, Colonel-in-Chief of the 60th Regiment of Rifles, was given supreme command of the British forces in North America. Campbell imposed order on the "chaotic logistics of the colonial war machine" (Borneman 2006:84). He established a system for moving supplies "from the centralized storehouses at New York, Albany, and Halifax to the principal forts and troops in the field" (Ibid). While the British debated military strategy after Campbell's arrival, French forces were already on the move. Under the command of the Marquis de Montcalm, "French forces numbering about 1,300 regulars, 1,700 militia, and assorted Indian allies, sailed south across Lake Ontario from Fort Frontenac and, at Oswego, surrounded the forts of Ontario, Pepperell, and George" (Ibid: 68). In this way, the English lost the "gateway to the lucrative fur trade that had made Albany so crucial on the northern frontier" (Ibid: 69). The French and Indian War, however, proved to be a turning point in New York City's economic history. The British stationed 25,000 soldiers in North America and a fleet that included 14,000 sailors, all of whom had to be provisioned (Beck 2006). In addition, New Yorkers could now legally capture French and Spanish ships and keep the spoils (see **Chapter 4: B.5. Further History of Whitehall Slip**).

Many of these troops were sent to winter in New York in 1756 and Campbell impressed 400 more men without authority (Borneman 2006: 84). Fort George was bursting at the seams and it was necessary to billet officers in the homes of private citizens. Adding to the frenetic atmosphere, a 32-pounder exploded on the "New Stone Battery," throwing pieces more than 800 yards. One piece weighing about 80 pounds "fell within three yards of Whitehall Slip" (*Pennsylvania Gazette* 5/13/1756).

The housing problem was relieved somewhat in mid-April 1756 when independent companies proceeded to Albany and the local militia was ordered to stand guard in Fort George during their absence (*New-York Mercury* 4/19/1756). By May, Great Britain had declared war on France and in July six cannon that fired 18-pounders were removed from the Battery and shipped to Albany for the Crown Point Expedition (*New-York Mercury*, 7/12/1756). However, in November, the New York Assembly considered the Governor's message of Nov. 15th with respect to quartering an entire battalion of the Royal American Regiment in New York City, stating that immediate provision should be made for furnishing such of them as are to be quartered in the "Barracks and Block-Houses in the city with those necessary articles such as firewood, candles and beds for as long as they are in these winter quarters" (Stokes 1967, IV: 685).

On February 19, 1756, an order was been given to construct barracks near Whitehall Slip (Fernow and Van Laer 1902: 425). However, these barracks are not illustrated on Commissioner Dies' 1756 map, which claims to be an exact draft of the works built that year. This suggests that they[34] were not erected until 1757.

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[32] A joist is the horizontal framing member or beam that supports a floor or ceiling.

[33] Muskets (Stokes 1967, IV: 677).

[34] The city retained title to the property on which the barracks were constructed and could rent them out as they saw fit, except in times of war (New York State 1894, IV: 211-214).

The Lower Barracks, as it was called, was partly located in present-day Peter Minuit Plaza. The Upper Barracks was built the same year on the Commons in present-day City Hall Park, as already noted. The Lower Barracks was constructed partly as a military hospital and is referred to as such on Montresor's 1766 *Plan of the City of New York* (published 1767, see **Figure 4.18**). Both sets of Barracks were built to relieve the burden of the citizenry who were often forced to billet soldiers in their homes.

At a Common Council Meeting on November 29, 1757, the mayor issued a warrant to the city treasurer to pay Isaac Stoutenburgh the sum of £50 for the "purchase of fire wood for the Gard House and Hospital" (NYCC 1905, VI: 117). Both the Upper and Lower Barracks would have been especially useful in December of 1757 when fire destroyed the west barracks in the Fort. No description of the Lower Barracks constructed on the Battery in 1757 exists but there is a description of the new barracks constructed in the Fort. It is likely the two barracks were similar. The Fort barracks were two stories high and divided into as many rooms and fireplaces as the Governor or Commander-in-Chief Campbell determined. The stories were

> to be no higher than between Six & Seven feet under the Beams. The partitions of the Rooms, to be one Bricks Length in thickness; every Chimney to be Arched with iron and Bricks, and all the Hearths wide to prevent Fire, The Roof to be no Steeper than is necessary to make it tight and to carry off Rain Water; and one or Two dormant Doors in the West Side of it for Receiving and Issuing of his Majestys Stores; and that all the Hindges and other Iron Work which is Saved of the Former Barracks, as likewise the Bricks of the Ruins in the Said Fort," should be used as much as possible for constructing the new barracks (New York State 1894, IV:137).

b. JOHN DIES' MAP AND NEW CONSTRUCTION

Historian Garret Abeel's notes published by the Holland Society in 1916 briefly traced the history of the Battery. He stated that in 1734 "commissioners were appointed to build a half-moon battery on Copses rocks near Whitehall…it could mount 70 guns" [35](Abeel 1916: 72). In 1741 "a battery or bastion of 20 guns (was) voted to be built on the flat rock back of the Fort" (Ibid). Abeel maintained that "the half-moon battery was taken away, and a battery built from Whitehall opposite to the n. corner of the Fort, by a plan of Mr. John Dice, who was overseer of the works. It had an embrasure[36] of wood and could mount 92 guns" (Ibid: 73). John Dies (Dice) was one of the city's Commissioners of Fortifications between circa 1755 and 1762 (Scull 1882:727; O'Callaghan, 1856-1866, II: 705).

The plan of John Dies mentioned by Abeel is illustrated in a signed but undated map from the British National Archives[37] (see **Figure 4.16**). The map is titled:

> *The above is an Exact Draught of the work Built this year, as also of Fort George and the Houses that have any Conection to the Batteries or Fort, the whole Length of the Batteries att the Cordon*[38] *is 326 fathoms 2 ft: 10 In and will*

[35] He is referring to George Augustus' Royal Battery.

[36] An embrasure is an opening in a battlement that allows the soldier to fire his weapon while remaining under cover (NYSDMNA 2006a).

[37] Formerly the Public Record Office.

[38] A fathom is six feet, so the cordon was 1,958 feet, 10 inches.

Mount 82 Cannon and 10 Flankers the above is Laid Down By a Scale of 16 Fathoms or 96 Feet to the Inch.
By John Dies

Although, unfortunately the map is undated, it likely dates to 1756. The Province Store House (No. 14) and east and west block houses (Nos. 13 and 15) are present and have not yet been replaced by the Lower Barracks constructed in 1757. Corroborating evidence for the 1756 date was found in Stokes (1967, IV: 686) who made note of a map he examined, dated December 4, 1756 that was also drafted by John Dies and titled, "*An Exact Draught of the Batteries and Fort George in the City of New York for the Honerable Thomas Pownel*[39] *Esqr Lieh Governor of New Jersey N.B.: The Above is Laid Down by a Scale of 16 Fathoms or 96 Feet to the Inch by John Dies*." Stokes reported that this map was part of "a splendid collection of 88 manuscript maps, charts, surveys, plans and views…the majority of which were made for the purposes of military operations during the Seven Years War…(that) "cover a period from 1714 to 1760" (Ibid). He also noted that the "collection was at that time (Dec., 1919) in the possession of Mr. L.M. Thompson, of New York" (Ibid). Unfortunately, Stokes was unable or chose not to provide a copy of this plan for his opus, *The Iconography of Manhattan Island*.

The British National Archives copy of Dies' map illustrated in this report (see **Figure 4.16**) differs from the version discussed by Stokes. First, it is not dedicated to the Governor of New Jersey, or anyone else, therefore the dedicatory paragraphs are different. Second, the map keys are dissimilar. Fortunately, Stokes reproduced the key of his map[40] and listed the numbered structures and features. By comparing the two versions, it became apparent that the keys were different but not markedly so. The undated map from the National Archives illustrated in this report provides more detail and notes additional features not listed on Stokes' dated version of the map. **Table 4-1** reveals the differences in more detail.

If these maps are exact drafts as stated in the dedicatory paragraphs, one must question why the Pond on the Battery is missing. The Pond was not completely filled until 1774[41]. It is possible that the map illustrated in this report, as well as Stokes' version, are later, perhaps Revolutionary War period copies of an earlier plan and the draftsman who copied the original Dies' map chose to eliminate the Pond which had been filled by that time. This seems unlikely, however. It is more likely that Dies drew exactly what he said he did, e.g. "*The above is an Exact Draught of the <u>work Built this year</u>, as also of <u>Fort George</u> and the <u>Houses</u> that have any Conection to the Batteries or Fort.*" and thus did not include all the structures in the area. This map has great significance because it illustrates the new bastions and connecting wall at the Battery that were ordered constructed in 1755. The GIS overlay of the project corridor shows the four Wall segments found by the archaeologists, in nearly perfect alignment with this new construction. It should be noted, however, that Wall 2 and somewhat less so, Wall 1 is also in alignment with the 1741 Flat Rock Battery construction episode, as depicted on the 1755 *Plan of the City of New York* (see **Figure 4.11**).

[39] Thomas Pownall or Pownell was the Governor of Massachusetts in 1758 when he came to New York to communicate with the governing council (Stokes 1967, IV:696)

[40] It is assumed Stokes faithfully copied the Key to the Dec. 4, 1756 plan.

[41] It was ordered filled in 1772 but the work did not take place all at once.

Table 4-1
A Comparison of Dies' Maps from Stokes (1967)
and the British National Archives

AN EXACT DRAUGHT OF THE BATTERIES AND FORT GEORGE IN THE CITY OF NEW YORK, FOR THE HONERABLE THOMAS POWNELL ESQR LIEh GOVERNOR OF NEW JERSEY N.B.: THE ABOVE IS LAID DOWN BY A SCALE OF 16 FATHOMS OR 96 FEET TO THE INCH BY JOHN DIES	The above is an Exact Draught of the Work Built this year, as also of Fort George and the Houses that have any Connection to the Batteries or Fort, the Whole Length of the Batteries att the Cordon is 326 fathom 2 ft: 10 In and will Mount 82 Cannon and 10 Flankers the Above is Laid Down by a Scale of 16 Fathoms or 96 Feet to the Inch By John Dies
Stokes: Dec. 4, 1756 Map	**National Archives: Undated Map (CO700/New York 12)**
1. the Breadth of the Platforms	1. The Depth of Plattforms
2. the Prickd Line the whole Breadth of ye Rampart	2. The whole Breadth of the Rampart
3. the East Block House	13.[42] The East Block House
4. the Province Store House	14. The Province Store House
5. the west Block House	15. The west Block House
6. Capn Hunts House	19. Capn Hunts House
7. Rivits House	20. Capn: Rivitts House
8. A Still House	22. Still House
9. the Province Store House	14. The Province Store House
10. Bundles House	18. Mr. Blundles House
11. the Governers Stables	10. The Governours Stables
12. Mr Kennedy's House	25. Mr: Kennedy's House
13. Part of the Bouling Green	16. The Bowling Green
14. the Ravilin before the Fort Gate	12. The Ravilin before the Fort Gate
15. The Seceratorys office	11. The Secretary's office
16. Fort George	4. Fort George
17. the Baracks	7. The H(oes?) Baracks
18. the N. Wt: Magazine	8. The n:wt: Magazine
19. the S. Et: Magazine	9. The S:Est Magazine
20. White Hall Street	21. White Hall Street
21.White Hall Slipp	23. White Hall Slipp
22. Statten Island Ferrey Stairs	26. Statten Island Ferrey Stairs
23. the General course of the Eat:River warfs	29. The General Course of the Eat River Warffs
24. the Governers House	5. The Governors House
25. the old Ruinous Chappel	6. The old Ruinous Chappel
26. this will Mount 4 Guns Amberlet[43]	3. This is to be an Barbet and mounts 4 Cannon
	17. The north Store House
	24. Pearl St.
	27. the General Course of high watter mark along the N. River Shoar
	28. The Broadway
	30. The Governor's Kitchen
	A. The Course To the House on Nutten Island (Distance ¾ of a mile)
	B. The Course to Mr. Kennadys[44] Light House (Distance 2 ¼ miles)

[42] Note the difference in numbering between the two documents.

[43] Either Stokes miscopied or the draftsman was unfamiliar with military terminology. This is a French term, *en barbette* and refers to a platform raised high enough for artillery placed thereon to fire over the top of the parapet.

[44] This is possibly Bedlow's Island.

In July 1758, Admiral Boscawen leading the English fleet, along with Generals Wolfe and Amherst and their regiments captured the Fortress of Louisbourg from the French. A medallion commemorating that battle was found by the archaeologists (see **Chapter 6: Artifact Analysis**). On August 28, 1758, New York City celebrated the victory of the capture of the Fortress of Louisbourg and Cape Breton. At noon "the Cannon on Fort George began to play, and continued till Sunset on the Succession of every Loyal Health drank at the Entertainment at the *Province of Arms* in the Broad-Way, where his Honour our Governor with the principal Gentlemen of the City, dines" (*New York Post-Boy*, 9/4/1758 in Stokes 1967, IV: 701). In the evening, the houses in the city were illuminated and fireworks were set off on the Common (Ibid).

General Amherst was appointed Commander-in-Chief of all the British forces in America in 1758 and chose to establish his winter quarters in New York City. When he arrived, he was given a public ovation (*New-York Mercury*, 10/16/1758:2). Additional work was done on the Battery, Barracks and Fort at New York in 1759 and 1760, as is shown by an account for funds John Dies and John Martin submitted for those years (O'Callaghan 1865-66, II: 705, 711).

A description of the project area in 1759 was provided by the newly arrived Episcopal minister, Rev. Andrew Burnaby who noted that the Battery was capable of mounting 94 guns and had barracks for a company or two of soldiers (Burnaby 1775: 76). The Lower Barracks is illustrated in Montresor's 1766 *A Plan of the City of New-York* (published 1767, see **Figure 4.18**). Montresor labels the Barracks a "Military Hospital" whereas Ratzen's *Plan* (see **Figure 4.15**) identifies it as "Barracks" in 1766/67. It was probably both.

In 1760 French prisoner-of-war, Pierre Pouchot, the former commandant of Forts Niagra and Levin, was also in New York, apparently free on his own recognizance. He noted in his memoirs that

> Along the front of (the Fort) which is on the point of land, they have built upon some notches [or outcrops; translations differ] in the rocks, a wall 12 feet thick, which forms an intrenchment and a kind of *fausse braye* [low rampart] to the citadel, when they have 90 cannon, of from 12 to 24-pound balls [deployed as a battery].The platforms are all of large flat stones. These pieces [are mounted] on marine carriages, and sweep not only the bay, but a small Island used as a hospital for the Quarantine [Bedlow's Island] (Dunnigan 1994: 358-359).

The Battery was also used for other purposes. In April 1760, Cornelius Bogert drowned at the Flat Rock Battery while bathing (Watson 1846: 269). The Battery was also attractive to young boys, sometimes fatally. In 1768, a lad playing on the high ramparts of the Battery fell onto the rocks

> at the Foot of the Wall, whereby he was dangerously bruised and wounded and now lies very ill. This being the 4th or 5th Accident of a similar Kind that has happened within these 3 Months, should serve as a Caution to Boys how they approach too near the Edge of these Ramparts, the wooden Facing of which now decay'd, the Earth is apt to give way (*New-York Gazette and Weekly Mercury* 9/19/1768:3).

John Dies was the surviving Commissioner of Fortifications when Christopher Bancker died in November 1763 (Fernow and Van Laer 1902: 462). The end of the wars with France and Spain brought a period of commercial prosperity to the colonies (Stokes 1967, IV: 736). Despite the calm, repairs to the fortifications continued. Lieutenant-Governor Cadwallader Colden's account book shows payment to Christopher Blundell [Blondel] for repairs to the fort's flag pole.

Blundell had been the Fort's storekeeper and when hostilities ceased and the independent militia companies disbanded, his salary was discontinued. Apparently Blundell continued to do odd jobs about the fortifications to earn a little money (Stokes 1967, IV: 741). Blundell's house had a long history and is noted on many 18th-century maps of the city (see **Figures 4.10, 4.15, and 4.16**). In addition to work done by the former storekeeper, Andrew Gautier was paid a considerable sum for repairs to the Governor's House in the Fort, the Battery, Hospital and the Red Storehouse during 1763 and 1764 (Stokes 1967, IV: 743) (see **Chapter 4:A.9. The Flat Rock Battery).**

In 1764, a sale took place "at the Hospital at the Battery; All the Medicines, Instruments and utensils belonging to his Majesty's Hospital in this Place" were sold at auction (*New-York Mercury,* 4/2/1764). This suggests the Lower Barracks was not being used as a hospital at this time, despite the fact that as late as 1766, Montressor labeled it as such on his *Plan of the City of New-York* (see **Figure 4.18**).

11. THE STAMP ACT PERIOD TO THE REVOLUTION CIRCA 1765 TO CIRCA 1776

> "Whatever happens in this place has the greatest influence on the other colonies. They have their eyes perpetually on it and they Govern themselves accordingly" (Colden 1765).

On July 8, 1765, Lieutenant-Governor Colden wrote to General Gage who in 1763 had succeeded Amherst as Commander-in-Chief of the British forces in North America. "As there is no guard now in his majesty's Fort in this City, I think it is my duty to apply to your Excellency for such a number of Men at least as may be sufficient to secure it against the Negroes or a Mob" (Stokes 1967, IV: 749). Gage replied that a company would be sent to garrison the Fort and two weeks later a company of Royal Americans arrived from Crown Point and were "quartered in the Barracks in Fort George" (New-*York Mercury,* 8/5/1765:2). On September 2, 1765, Colden again wrote to Gage advising him that a battalion should be quartered at once in the Upper Barracks on the Common (present-day City Hall Park) to discourage opposition to the laws and to prevent the capture of military stores which were at that time unguarded (O'Callaghan 1856-61, VII: 758).

The profound uneasiness of Colden, Gage and, eventually, Montresor, was the direct result of a Stamp Act that triggered opposition, riots, and disturbances throughout the colonies. The Stamp Act was a revenue-raising bill the provisions of which required certain goods to bear a revenue stamp, similar to those already in use in Great Britain, and for which a fee was payable to the government for such "stamping." It sought to impose duties on all legal and official papers such as wills and deeds as well as newspapers, pamphlets, die and playing cards. The bill met with great opposition in the colonies and was eventually repealed under pressure from merchants and manufacturers trading with America. In 1767, the Townshend Act was passed which introduced customs duties on a whole range of imported goods, some of which had never been taxed, such as tea. Although most of these provisions were repealed by 1770, the duty on tea continued and this lay behind the infamous Boston Tea Party (www.parliament.uk; Burrows and Wallace 1999).

New York City was the site of British military headquarters in North America (Schecter 2002: 37). There were reports of riots in opposition to the Stamp Act at Newport and Boston, therefore John Montresor, as chief engineer, was asked to evaluate New York City's fortifications (Stokes 1967, IV: 750). He provided a detailed report that included recommendations with regard to where to place frigates off shore if called upon to fire upon the citizenry. He also prepared Fort

George to maximize the raking fire of its guns (Schecter 2002: 15). Although Montresor recommended work to put the fort in a better posture of defense, he did not specifically recommend additional work on the Battery. On October 7, 1765, the Stamp Act Congress met at City Hall, assembled a declaration of their rights and grievances and protested taxation without representation. When the stamps arrived on October 23, 1765, James McEvers was appointed Distributor of the Stamps for Lieutenant-Governor Colden but resigned due to fears for his life. The care of the stamps therefore devolved to Colden (Fernow and Van Laer 1902: 469). On October 31st, Montresor reported in his journal that a mob was running through the streets crying "Liberty!" They broke lamps, shattered windows, and threatened to bury Major James of the Royal Artillery alive. According to Montresor, James was "commanding the Troops in the Fort for the protection of the Stamps" (Scull 1882: 336) and "was the artillery officer in charge of the fort" who promised to "cram the stamps down New Yorkers' throats'" (Schecter 2002: 14-15).

The most serious protest occurred on the night of November 1, 1765, when a mob of about 2,000 protestors marched through the streets to Fort George where they threw bricks and stones over the walls before burning an effigy of Lieutenant-Governor Colden, together with his carriage, which they had stolen from a building outside the Fort. Colden and the soldiers watched these activities from the walls. The protestors also marched to the house of an unpopular British army officer and burned it to the ground (Hibbert 2002: 9). On November 3rd, Captain Montresor referred to the guns on "Copsey Battery near the foot of White Hall Street that had been spiked by order of the Lt. Governor to prevent people from turning them on the Fort. This act only served to increase the anger of the people and there were several demonstrations" (Dawson 1861:44).

In a letter to Sir Jeffrey Amherst in 1765, Colden defended actions taken when threats by the populace forced him to put "the fort in a Posture of Defense" (Colden 1877: 125). He stated that prior to September 1st, the New York Garrison had consisted of a "single Company of Royal Americans, which the General sent in at my desire, after every soldier which had been in Garison were sent away on different services" (Ibid). Colden also noted that during the summer, (while he was cooling off at his country estate), Major James, without his knowledge, brought in "a number of Howitzers & royals, with their proper ammunition, together with two Companies of the Artillery Regiment" which had just arrived from England (Ibid). Soon after, "all the Howitzers belonging to the Army were brought into the Fort" (Ibid). Colden's letter to Amherst contributes to our understanding of the rage felt by New Yorkers towards Major James.

A new Governor, Sir Henry Moore, arrived in the city on November 13th, 1765. He attempted to placate the public by "dismantling the fort" and removing the artillery stores which Major James had placed there (O'Callaghan 1856-61 VII: 793-94, 805-7). Montresor noted this event in his journal (Scull 1882: 339-340). In December, Colden wrote:

> The fort is dismantled, everything which Major James introduced of artillery, artillery stores and Gun Powder removed out of it. New York by its situation, the great quantity of Artillery in it, and of ammunition and small arms, 14,000 in the King's Stores may require the more immediate attention of his Majesty's Ministers. Whatever happens in this place has the greatest influence on the other colonies. They have their eyes perpetually on it and they Govern themselves accordingly (O'Callaghan 1856-61, VII: 794; Stokes 1967, IV: 759).

William Cockburn recorded the position of the British fleet in the Hudson River on November 1, 1765 during the Stamp Act controversy (see **Figure 4.17**). Cockburn also depicted the Fort with a curtain wall and three bastions along the Hudson River side, as well as the Lower Barracks and the Pond "The flat Rock" is located at letter "I," north of the middle bastion.

Another map drawn during this time period is Capt. John Montresor's *Plan of the City of New-York* (see **Figure 4.18**). As previously noted, the Montresor map illustrates the Pond, the Lower Barracks, here called a Military Hospital, and the bastions of the batteries. It is not as accurate as Bernard Ratzer's (Ratzen) *Plan* (**Figure 4.15**) but that is probably the result of Montressor being forced to roam the city at night to make his drawings, "sub rosa," as he described it. Such was the temper of the people towards the British military at this time.

Meanwhile work to unspike the cannons on the Battery continued. Montresor noted it was

> scarce worth their trouble in their present situation. The guns are mostly old and honeycomb, the carriages so rotten as scarce to be able to support the weight of metal, the Platforms so totally out of order as to admit the Trucks of the Carriages nearly to their axles. And the checks of the Embrasures choke`em on every explosion, as the Log work is decayed and ill tired (Scull 1882: 360).

As stated earlier, the embrasures were openings made in the parapet for the cannon to fire through (Straith 1852: 6). The sides of the embrasures were known as "cheeks" (Ibid). It is not known if Montresor was actually referring to "cheeks" or "checks" which checked or held the wheels of the gun carriage to prevent them from injuring the gunner. Nevertheless, professionals were brought in and Robert Andrews and Robert Boyd were paid £166:10 to unspike the guns on the Battery (Stokes1967, IV: 771).

It is generally acknowledged that the most accurate map of this time period is a *Plan of the City of New York in North-America Surveyed in the Years 1766 & 1767* by Bernard Ratzer, a version of which is illustrated here with a GIS overlay of the project area and the location of the National Register Eligible finds (see **Figure 4.15**). The Ratzer (misspelled Ratzen) *Plan* depicts the Battery, Pond and Barracks. Whitehall Slip is identified as such, although Moore Street is labeled as Whitehall Street, which might have been its correct name at the time. Several segments of the Battery Wall found by the archaeologists' line up perfectly with the outline of the wall on the Ratzen *Plan*, providing corroborative evidence that the Wall was constructed prior to 1766/1767.

In 1767**,** General Gage reviewed the Seventeenth and Forty-Sixth Regiments and the Royal Artillery detachment on the Battery (Gilder 1936: 73). Dawson (1861: 13-14), who described the area at this time, noted that the lower part of the island "was occupied with Fort George and its outworks—the latter embracing three bastions, with connecting curtains, extending from Whitehall Slip on the southeast to the line of the present Battery Place on the northwest". The archaeologists found a portion of one of the bastions built circa 1755 (Wall 4), part of the curtain wall (Wall 3) that connects the bastions and two small segments (Walls 1 and 2) of the northernmost bastion at or near what was once called the Flat Rock Battery originally built in 1741. These features appear for the first time in their present configuration on Dies'1756 map (see **Figure 4.16**), although Walls 1 and 2 might be associated with the 1741 construction of the Flat Rock Battery (see **Figure 4.11**) (see **Chapter 4: A.9. The Flat Rock Battery and 10 The French and Indian War Period**).

Dawson also described the Fort as "a rectangular stone work, strengthened at its angles" (Ibid). It was

> elevated on an artificial mound, about 14 feet in height, which had been thrown up 'at great expense,' and its gateway, which fronted 'the Bowling Green', was defended by a raveling[45] or covert-port which had been thrown out in front of the Fort—toward the city. Within the enclosure of the Fort were the Provincial governor's residence, a barrack which would accommodate 200 men, and two powder magazines…; and the glacis[46] or counterscarp on its eastern and southern fronts, as far eastward as Whitehall Street, and southward as far as Pearl Street, was occupied as gardens for the Governor's wife.
>
> Beside the barracks which were within the fort, another sometimes used for a military hospital, occupied the south-eastern part of the present Battery, extending from Whitehall street along the present [1861] southerly line of State street; while a third, in which were posted the troops who harassed the people so much at the period under consideration [during the Stamp Act 1765]), occupied the northern part of `*the Common,'* on the southern line of the Chambers Street of our day" (Ibid).

Dawson also noted that the eastern part of the Battery, then and many years afterward, was occupied with a pool of water, into which the tide flowed through Whitehall Slip (Ibid).This suggests the Pond was fed by the East River tides. Artist and traveler, Pierre Eugene du Simitiere, noted there was "a barrack in the battery near the entrance from the Side of White-hall," which also suggests an entrance onto the Battery from Whitehall Slip or Street (Ibid).

As previously noted, a boy was fatally injured in 1768 while playing on the Battery ramparts when a portion of the sod gave way. He fell from "a considerable height on(to) the rocks at the foot of the wall" (Gilder 1936: 73) (see **Chapter 4: A. 6. George Augustus' Royal Battery).** It is likely the rocks referred to were riprap at the base of the curtain wall. Similar accidents occurred because the wooden facing of the ramparts on the Battery was decaying and the earth was giving way. The archaeological team found wooden planks associated with Walls 3 and 4. It is possible these planks correspond to some of the wooden facing of the ramparts in place prior to 1768[47]. It is also possible the planks were installed to prevent water or weather-related deterioration of the stone walls constructed in 1755. Numerous instances of cladding or sheeting (eg. planks about 2 inches thick) being installed to buffer the walls at the Island Battery guarding the Fortress of Louisbourg have been documented (Krause 2006). The stone walls of the Island Battery suffered the effects of salt-spray, snow and frost heave upon the masonry joints and much of the facing had degraded. To prevent further climate-related deterioration, pine planks or cladding was used to prevent constant repairs (Ibid).

Where did the stone that built and repaired the Battery Walls come from? Initial analysis indicated the sandstone used to build Walls 1 and 2 probably came from quarries in the Newark Basin and the stone that comprised most of Walls 3 and 4 was a local schist (Brock, personal communication 2008). However, several properties containing stone quarries were present within immediate travelling distance of New York City in the mid-18th century and although we

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[45] A "ravelin'" or "raveling" is a triangular fortification or outwork that protects vulnerable areas of a fortress, such as the gate (NYSDMNA 2006a).

[46] A glacis or counterscarp is an artificial sloped earthwork in front of the fortification (NYSDMNA 2006a).

[47] An EU in that location containing a piece of one of these planks has a *Terminus Post Quem* of 1730.

do not always know the kind of stone they produced, one at the “mouth of the Peeks Kill” contained a lime kiln and limestone as well as a wharf and “Quarry of building Stone” (*New-York Gazette* 2/16/1767:4). At “Little Yonkers” about a mile from King’s Bridge in the Bronx, there was an “excellent Stone Quarry of the very best sort of building stone, the quarry being very easy to work… and with a gradual desent [sic] to draw the stone to the Landing, where a good craft constantly attends, to transport the same to New-York” (*New-York Mercury* 12/28/1767:3). Another with “extraordinary” stone “fit for building” was situated in Eastchester (*New-York Gazette and Weekly Mercury* 2/29/1768:4). Closer to the city, “Big Bearn Island” (Ward’s Island) also had “some good Stone Quarries” (*New-York Gazette or Weekly Post-Boy* 5/23/1768:4).

Additional construction took place under Governor John Murray in 1770/1771 when the New York Assembly voted £1,275 for various “repairs about Fort George, the (Governor’s) House therein, and for removing the barracks out of the said fort” and erecting them elsewhere (Gilder 1936: 76). One thousand pounds was also paid for “timber and plank, and for making gun carriages, and platforms for the guns in the fort and battery” (Ibid). On January 8, 1772, New York Governor William Tryon reported to the Assembly that time and storms had “so defaced the fortifications of this city that, they require a thorough repair, as soon as the season will admit” (Stokes 1967, IV: 825). Warrants were signed to Jacob Walton and James Jauncey for repairs to the fortifications (Fernow and Van Laer 1902: 492). Peter Vessels and Theophilis Hardenbrook also won a contract to fabricate aprons for the Battery’s guns and to undertake general repairs to Fort George, the Governor’s Mansion and the Battery (Fernow and Van Laer 1902: 496).

In 1773, Mayor Whitehead notified the Common Council that Governor Tryon wanted the “Pond opposite the barracks, on the Battery” filled in because it was a “nuisance” (NYCC 1905, VII: 423-424) (see **Chapter 4: A.6. George Augustus’ Royal Battery**). This work was conducted by John Brandon who was paid for his work incrementally between August and November (NYCC 1905, VII: 440, 442, 454, 455), the balance being paid in 1774 (NYCC 1905, VIII: 63).

Charles H. Haswell in *Reminiscences of New York by an Octogenarian* (1896: 81-82) wrote about Columbia College students meeting “in the “hollow’ on the Battery” to play football, baseball or marbles. Haswell described the hollow as “very nearly the entire area bounded by Whitehall and State Streets, the sea wall line, and a line about two hundred feet to the west; it was of uniform grade, fully five feet below that of the street, it was nearly as uniform in depth, and as regular in its boundary as a dish”. It is possible this sunken area, which roughly corresponds to the boundaries of the Battery Pond filled in 1773, might be the result of slump or subsidence and a direct result of landfilling associated with the filling of the pond or a later fill episode. No other references to the “hollow” could be found.

Work in 1774 included flagging the Battery with stone. Jacob Walton was paid £8 for carting the stone and James Hallet £8 for the use of his wheel barrows. William Winterton was also paid £14 for “Mason’s Work done on the Battery” (New York State 1894, V: 685).

Estimates for the cost of constructing a fort on nearby Governors Island and of joining and altering the Flat Rock and Copsey Batteries, bear the date of December 31, 1774 (O’Callaghan 1865-66: 830). This suggests that the curtain wall constructed in 1756 between the Flat Rock and Copsey Batteries was in need of substantial repairs and alterations. In addition, on September 15, 1775, the clerk of the Common Council produced a release from the Corporation of the City of New York to Governor Tryon, for an area “at the lower end of Pearl Street for the Purpose of enlarging the Battery" (NYCC 1905, VIII: 104). It is possible that this was the old Teunis Rivet property, which was purchased for enlarging the Flat Rock Battery in 1755. Rivet's house was situated at the end of Pearl Street and is No. 20 on the 1756 Dies Map (see **Figure 4.16**).

As the relationship between America and Great Britain deteriorated, "the New York Provincial Congress…ordered the militia to remove the royal guns mounted on the Battery" (Schecter 2002: 63). In late August 1775, John Lamb's artillery company raided the Battery and using ropes, dragged "the heavy cannons up Broadway to the Common" (Ibid). After removing 11 of 21 guns, the Americans were spotted by British sailors in a sloop that had been dispatched when Governor Tryon received intelligence about the raid. The sailors

> fired a musket as a signal to the *Asia*, 1,000 yards away in the East River off Murray's wharf at the foot of Wall Street. Thinking they were under attack, the colonists fired at the sloop and killed one man. The *Asia* responded with some cannonballs and grapeshot, a warning round to the thieves at the Battery. All over the city people panicked and prepared to flee, imagining that a British invasion was in progress. At three in the morning, a full thirty-two gun broadside from the *Asia* rocked the city and lit up the sky. The guns…were aimed at the Battery where they destroyed some small buildings and did little damage to the rest of the city (Schecter 2002: 63).

Governor Tryon brokered a truce: the guns would remain on the Commons, the rebels would stop stealing the king's stores, the *Asia* would hold its fire, "and local merchants would continue to provision the warship" (Ibid).

Despite the removal of some of the guns by the Americans, the artillery at Fort George and the Battery consisted of 88 working guns and 21 unserviceable pieces in late September 1775 (O'Callaghan 1856-61, VIII: 572; McCashion & Robinson 1977: 13).

12. THE REVOLUTIONARY WAR PERIOD

In 1776, General George Washington appointed Major-General Charles Lee to command the defenses of New York. As a result, "redoubts, fleches, and barricades sprang up at every eligible point" (Gilder 1936: 81). A week after Lee's arrival, on February 12, 1776, he struck back against the British

> by completing John Lamb's interrupted cannon heist at the Battery, this time in broad daylight on a Sunday morning…. A throng of men and boys gathered to help the soldiers drag the ten remaining guns up Broadway. They made 'an astonishing Uproar,' a startled William Smith noted in his diary, 'and the work continued all day long with an almost intire neglect of public worship'…The guns joined the eleven others in front of the Liberty Pole (on the Commons), where British ships were unable to get at them. In response to Lee's provocation, the captain of the *Phoenix* sent a boat to inspect the situation at the Battery, but when it reported back to him, rather than responding, the ships weighed anchor and left the East River (Schecter 2002: 75).

Washington kept his 10,000 "ragged boys" busy "throwing up widely scattered earthworks across lower Manhattan and on the heights of Brooklyn" (Diamont 2004:35). Major Nicholas

Fish wrote to Richard Varick, Capt. of the 1st New York Regiment, that "the parapet of the old battery is raised to a proper height with a sufficient number of ambersures[48]" (Ibid).

Both Washington and Lee knew it would have been easy for the British to sail right up to the Battery and storm "its low wall with a landing party before seizing Fort George and using it to dominate the city" (Schecter 2002: 78). On July 13, 1776, Dr. Solomon Drowne wrote to his sister from New York's General Hospital, describing a terrifying event when British ships-of-the- line [warships] stood toward the city. "Our Forts and Batteries began to fire but the British kept sailing until they were right up to the works, gave a couple of broadsides and blithely sailed away" (Dawson 1861: 101). Six American solders were killed and four wounded on the Grand Battery.

Lieutenant Isaac Bangs also wrote about this event in his journal:

> By the carelessness of our own Artilery Men, Six Men were killed with our own cannon, & several others very badly wounded. It is said that several of our Company out of which they were killed were drunk, & neglected to Spunge, Worm, & stop the Vent, and the Cartridges took fire while they were raming [sic] them down (Schecter 2002: 104).

The Pastor of the Moravian Church noted in his diary that the six men killed by their own cannon were buried in a single grave on the Bowling Green (Ibid). It is not clear what cemetery the Pastor was referring to, as there is no record of a cemetery on the Bowling Green. Major-General Lee demolished the Northeast and Northwest bastions of Fort George, which faced the city, for fear the Fort would be turned into a citadel that would keep the city in subjection (Diamant 2004: 36). Cannons aimed at the Fort's interior were also installed at a barricade on Broadway. This was to prevent the British from seizing the fort without being attacked from the city (Schecter 2002: 78).

The Fort minus its wall and two bastions is clearly illustrated on Campbell's 1782 map (see **Figure 4.19**). The city had a minimal defense system in place at this time. "On the Grand Battery—where there was room for about 90 guns—were only 16 guns and 4 mortars" (Gilder: 82). British intelligence from New York confirmed that the Americans "on the lower Battery under Fort George had mounted ten 32 Pounders – (however) the Embrazures on this last Battery, are not yet finished" (Stokes 1967, IV: 925). This suggests the American rebels had conducted additional work on the Battery. Although the embrasures and firing platforms on the Battery are depicted on Campbell's 1782 map, it is not clear if the work illustrated was undertaken by the Americans or the British since this map was drafted by the British near the end of the War.

The *Papers of George Washington* describe the locations of three of the batteries in lower Manhattan and tell us what they were called at the time: "The Battery at the South part of the Town, the Grand Battery—the one immediately above it, Fort George—the one on the left of the Grand Battery, Whitehall Battery" (Library of Congress, Manuscript Division n.d.) (see **Figure 4.33**). The Whitehall Battery was "located just east of the Grand Battery in what had been Whitehall Dock (now South Ferry)" (NYSDMNA 2006b). Fort George and the Grand Battery, which had been declared nearly useless by Lee, were repaired and greatly strengthened. Guns were brought into Fort George, the walls of the Grand Battery were banked up from within, and

[48] Probably embrasures.

13 thirty-two pounders, one 24-pounder, 3 eighteen-pounders, 2 twelve-pounders[49], 1 thirteen-inch brass mortar, 2 eight-inch and 1 ten-inch iron mortars were added. At this time, the Whitehall Battery was a small 2-gun emplacement at Whitehall Dock, although almost a continuum of the Grand Battery. “Therefore, a line of works extended from the foot of Greenwich Street along the water-front to Whitehall slip” (Wilson 1903: 17). The British retained the works and made improvements in 1782 (Ibid).

Although the Whitehall Battery is described as located in “Whitehall Dock,” it is not illustrated as a separate entity on any map. The fortifications as they appear on Campbell’s 1782 map (see **Figure 4.19**) are nearly identical to those on the 1766/67 Ratzen *Plan* (see **Figure 4.15**) and the 1756 Dies’ *Draught* (see **Figure 4.16**).

Many troops were quartered in private houses; three large and very grand houses together had 600 men (Schecter 2002: 90). However, “in early May (1776), the Manhattan brigades moved out of their barracks into three camps on a line north of the city, from which they could be efficiently deployed to work on the fortifications that remained incomplete” (Ibid: 91). No. 1 Broadway, at the corner of present-day Broadway and Battery Place, was Washington’s headquarters. “We expect a very bloody summer at New York and Canada,” Washington wrote to his brother in 1776 (Ibid: 93). He anticipated the arrival of the British fleet. When it finally arrived, one astonished New Yorker observed:

> I was upstairs in an outhouse and spied as I peeped out the Bay something resembling a wood of pine trees trimmed…I could not believe my eyes, but keeping my eyes fixed at the very spot, judge you my surprise when in about ten minutes, the whole Bay was full of shipping as ever it could be. I declare that I thought all London was afloat’” (Ibid: 99).

13. THE BRITISH OCCUPATION OF NEW YORK CITY: SEPTEMBER 15, 1776 TO NOVEMBER 25, 1783

On September 15, 1776, General William Howe, Commander-in-Chief of the British Army in America sent a force under the command of General Henry Clinton[50] across the East River to land at Kipp’s Bay[51] on Manhattan Island, “while the British fleet bombarded the Americans’ entrenchments” (Hibbert 2002: 126). General Washington succeeded in withdrawing most of his forces to Harlem Heights. The British entered New York in triumph. “Cheering Tories came out in the streets to welcome them, lifting officers shoulder-high, waving British flags and pointing out the houses of leading rebels which were marked with the letter R” (Ibid: 126-127).

Less than a week after the British occupation of New York, “a fierce fire broke out in a timber grog shop near Whitehall Strip [sic]…Within hours, the flames spread throughout the town. Nearly five hundred buildings were destroyed, and before the flames were at last extinguished, a large part of New York had been reduced to ashes” (Ibid: 127). David Grim reported the fire started in a small wooden house on the wharf near Whitehall Slip “occupied by a number of men

[49] A twelve-pound cannon ball was recovered by archaeologists the Broad Financial Center site, a block from the South Ferry Terminal Project site (Greenhouse Consultants, Inc. 1985). It is currently on display at New York Unearthed, the South Street Seaport Museum’s urban archaeology museum at 17 State Street opposite Battery Park.

[50] Clinton eventually replaced Howe as Commander-in-Chief of the British Army in North America, 1778-1782.

[51] An inlet, now the site of 34th Street.

and women of bad character" (Gilder 1936: 93). The area consumed by the fire is illustrated in **Figure 4.20**.

The British believed American rebels had set the fire but General Washington categorically denied it, although he admitted privately to his cousin that if Congress had not forbidden him to do so, he would have set the city alight.

> It will be next to impossible for us to dispossess them of it again as all their Supplies come by Water, whilst ours were derived by Land; besides this, by leaving it standing, the enemy are furnished with warm and comfortable Barracks, in which their whole force may be concentrated—the place secured by a small garrison (if they chuse it) having their Ships round it, & only a narrow Neck of Land to defend—and their principal force left at large to act against us, or to move to any other place for the purpose of harassing us (Schecter 2002: 207-208).

Howe had planned to quarter his men in many of the city's houses for the winter (Hibbert 2002: 127). The Fire of 1776 created a logistical nightmare for the British. Where would they house the troops? What would they do with homeless inhabitants? "Even before the fire, the military authorities had struggled to house all of their soldiers, warehouse supplies, create hospitals, and accommodate an influx of loyalist refugees. The flames left thousands homeless, turning the existing shortage into an enduring crisis" (Schecter 2002: 209). The physical damage was colossal but the psychological damage was worse. A tent city called "Canvass-town" grew up near Whitehall Slip. It was filthy, odiferous and overcrowded (see **Chapter 4. B.7. Filling in Whitehall Slip**). "The rest of the occupied city was dirty too, as residents routinely threw their garbage into the streets, and the military regime struggled with sanitation problems" (Ibid: 275). Meanwhile, officers moved into houses confiscated from the rebels. Public buildings were converted into prisons or infirmaries. Troops were quartered in private homes.

Another mysterious fire in 1777 further damaged the city. Sir Henry Clinton found himself stuck in New York "with a dangerously small garrison of seven thousand men, nearly all of them Loyalists and Germans, and no very definite idea as to what to do with them" (Hibbert 2002: 141). The British troops had not enjoyed their summer in New York. The weather was hot, hospitals were overcrowded and chronic food shortages were endemic (Ibid: 153). In 1778, an additional fire destroyed more than 60 buildings. "The British had done little to rebuild the lost housing, and many residents continued to live in 'Canvass-town'" (Schecter 2002: 319). Despite martial law, there was rampant corruption. "A horde of petty functionaries enriched themselves by trafficking in the basic necessities of life" (Ibid). One judge complained that these men were "draining the British treasury by their profiteering" (Ibid: 319-320). He mentioned corrupt barrack and forage-masters, land, water, timber and cattle commissaries, hay inspectors, examiners of refugees, ration providers, ration deliverers and numerous other petty bureaucrats (Ibid).

During the harsh winter of 1778-1779, seven ships in the harbor were destroyed by a snowstorm and three soldiers froze to death in their sentry boxes (Schecter 2002: 322). The cold, lack of housing, food and basic necessities made life difficult. The inadequate administration of the city by the military government shocked loyalist New Yorkers. It was at this time that the French entered the war on the side of the Americans.

The scope of the British military's task in providing supplies for their troops can be seen in a document titled, "Return of Men Women Children & Waggoners of the British Regiments, Hessian, New Levies & Civil Department Victualled at New-York and its Dependencies from 18 to 24th March 1779."[52] This document, which provides the figures for one week of supplies, reveals that 29,630 men, 3,386 women, 3,096 children, and 212 Waggoners were provided victuals in New York for one week in March of 1779. Of these, 8,264 individuals were at Rhode Island but they were provided provisions by the Commissary General's Department in New York. If one takes into consideration the fact that the British occupied New York for 7 years and then multiplies 7 by the 52 weeks of each year, the scope of providing "victuals" to soldiers, waggoners and their dependents becomes evident. The document also makes it clear that nearly every military regiment, brigade and battalion included women and children. It is surmised that these women either followed their husbands to New York, bringing their children with them, or encountered a soldier in America and later married him. One example is the Royal Regiment of Artillery comprised of 505 men. One hundred seventeen women and 103 children were dependents attached to this artillery regiment. Very few military units did NOT include women and children, and these were mostly volunteer regiments, rebel or British prisoners, boatmen, and workers in various official departments such as the Secretary's Office or Commissaries. Also, the Hessians did not have many women & children attached to their units (On-line Institute for Advanced Loyalist Studies 2010a).

Eighteen-year-old Robert Biddulph traveled to New York City from England in 1779. He was partner in a firm that had large contracts for supplying the army with clothing. Biddulph spent seven months in the city and the letters he wrote to family and friends provide interesting details of life in the British military garrison that was New York. Excerpts from his letters are provided below:

> New York, *August 27, 1779.* I cannot give you any other Acct. of this town than that the greatest part of it is burnt down (Biddulph 1923: 89)
>
> New York, *August 31st, 1779.* The Army in general upon this Island, only the Guards and Hessians in town…This coast swarms with American Privateers…Nothing here but Stores full of goods, which sell very cheaply by wholesale, but not the least thing to be had under a dollar separately. Since I have been here I have not been able to do much, being almost eaten up by the Mosquitos…and…we have just received intelligence of a Declaration of War both with France and Spain. There are good Peaches here with which they feed their Hogs, indeed they are good for nothing else, being in general like a bad Apricot (Ibid).
>
> New York, *September 4, 1779.* I think Great Britain cannot maintain this Country much longer and never conquer it…Among other things which will prevent Conciliation, the contempt every soldier has for an American is not the smallest. They cannot believe that any good quality can exist among them (Ibid: 90).
>
> New York, *October 7, 1779.* The season has been very unhealthy, 2/3 of the Army have been sick, the Guards excepted, who are almost constantly drunk (Ibid).
>
> New York, *October 9, 1779.* The Diligence with which the Fortifications and all the works near this Town and upon Long Island have been repair'd, and the

[52] Reproduced on-line by the On-line Institute for Advanced Loyalist Studies, URL: http://www.royalprovincial.com/military/civil/commissary/comretn1.htm

> many new ones which have been constructed, looks much more like defensive than offensive… We are very happy in having Provisions for 60,000 men now in the Garrison for 6 months (Ibid: 91).
>
> New York, *December 17, 1779.* We had some very Cold weather for this last Week, and much Snow, which is very agreeable to those who are fond of Sleighing—an Exercise only calculated for American Constitutions…The ensuing Winter will be a very dull one, as we are garrison'd by Hessians[53], who, tho' they all speak English, do not make their Way among the Inhabitants who are sociable people and great talkers (Ibid: 92).
>
> New York, *March 24th, 1780.* We have experienced the coldest Winter ever known in this Country, which will easily appear to any Body that knows this place if they can believe the Story. The North [Hudson] River which runs at the rate of 5 Knots an Hour was shut for 46 days between this Town and Paulus Hook[54], which was never known before to be frozen. Many thousand people passed over at different Times, myself among others. Soon after, the river was frozen to Staten Island, when 150 Sleighs passed to the Troops there with provisions and returned on the Ice. During this Time we were in the greatest distress for wood; sometimes the troops were obliged to eat their Meat raw, no fuel being deliver'd (Ibid).

Sir Henry Clinton's proclamation of 1779, inviting runaway slaves to take up residence in the city and pursue gainful employment was a strategic move to "mobilize a labor force to rebuild the city's burnt districts" and to improve the fortifications at the British garrison, "a traditional occupation of black laborers dating back to Dutch rule" (Foote 1991: 367). The British Quartermaster's Department also employed black laborers as teamsters and they "carted provisions and armaments from the city's docks to storehouses and magazines about town" (Ibid: 368). Blacks were also experienced pilots and seamen and were used as such by the British. They also "manned British privateering vessels which cruised the Atlantic coast and the Caribbean Sea" (Ibid).

These "torified[55]" blacks were paid wages that were used to purchase the freedom of loved ones and/or to feed and care for themselves and other refugees. Many blacks were housed in segregated barracks. See **Table 4-2** for a list of barrack houses[56] in the city. Some blacks were attached to the households of British Loyalists and white officers. Slave labor was in great demand and loyalist slave-owners often hired out their slaves to the British military (Foote 1991: 377).

By the end of the Revolutionary War between 7,000 and 10,000 southern blacks had been evacuated from southern port towns. At least 2,500 of these individuals were brought to the British Headquarters at New York City. "These 'torified' negroes, engrossed the already swollen

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[53] When Sir Henry Clinton set sail for Charleston in December of 1779, he left the command of the garrison of New York to the Hessian Lieutenant-General Van Knyphausen.

[54] Jersey City.

[55] From the word Tory, a label for British Loyalists and sympathizers.

[56] Barrack Houses in this instance include residences for military personnel, Loyalist refugees, various military and civil departments, regimental stores and hospitals, civilian workers e.g. artificers, who were used on construction projects, etc.

numbers of displaced "Loyals" and black refugees from the northern colonies who inhabited the city of New York from September 15, 1776 to November 25, 1783 and transformed that busy entrepot into a refugee camp" (Foote 1991: 355).

Table 4-2
Abbreviated List of Barrack Houses
in the Garrison of New York, circa 1782[57]

Address	Occupant
Broadway	
3	Commander-in-Chief's Secretary's Office
6	Lt. LeComte, formerly of the 8th Regiment
7	Mr. Mallock of Adj. General's Dept.
24	Royal Artillery Hospital
25	Negro Ordnance Barracks
28	Royal Artillery Store
33	Mr. Shaw, Ordnance Lay?[58] Master
79	Royal Artillery [illegible]
80	Ditto
82	Mr. Cox, Board of Refugees
87	Mr. Bull, Clerk of the Church
93	Lt. Thompson, 34th Reg. and Infantry
Great George Street [**Broadway between Ann St. north to Astor Place**]	
16	Royal Artillery Grand House
18	Negro Barracks of Fuel Dept.
20	Conductor in Waggon Master General's Dept.
21	Two Refugee families
26	[illegible] Guard house
42	Randel, a Refugee
Chatham	
6	J. Dowers, Refugee
28	Surgeon Baur of Hessian Hospital
29	Cath's Montayne, Refugee
41	Blacksmith shop for Hessian Artillery
44	J. Gallidit, Refugee
45	Apothecary Shop for Hessian Artillery
80	Hessian Regimental Store

[57] 1. Abstracted from a longer list entitled List of Barrack Houses in the Garrison New York (Great Britain Army 1775-1783: Box 42, Document 10349). The date has been estimated based on the fact that most documents dated to this year. Original spelling has been maintained.

[58] A question mark means that a word is either partly illegible or the meaning is not clear

Table 4-2 (cont'd)
Abbreviated List of Barrack Houses
in the Garrison of New York, circa 1782

Address	Occupant
Broad Street	
2	Dr. Johnson of 17th [illegible] Dragoon
3	Major Milledge
6	Major McKenzie, D.A.G.
28	Brig. General Bruce
29	Mess House of 7th Reg. of Foot
32	Barracks for 7th Reg. of Foot
35	Qtr. Master Taylor, 7th Reg. of Foot & others
38	Dr. Daslage
43	Dr. McIntyre of B. Hospital
45	Mrs. Bruce, widow
50	Barracks for Invalids
55	Capt. Hansfield, 22nd Reg.
60	Mr. Green, agent of Ordnance Transports
63	James Day, a refugee
Nassau Street	
2	Porter of Secretaries' Office & others
3	Mr. Horner
4	Mr. Bowers, Refugee
7	Mr. Cuyler, Refugee
14	Alexr Watson, Refugee
16	Col. Faille, Royal Artillery
18	Surgeon Norris, Royal Artillery
19	Mr. Knox, Secretary
27	Geo. Heaton, Refugee
45	Kitchen to Brick [illegible] Hospital
46	Dispensing House to Bri [illegible] Hospital
59	A. Donaldson, Refugee
66	Conductors Royal Artillery
68	Thomas Hay'l, Refugee

Table 4-2 (cont'd)
Abbreviated List of Barrack Houses
in the Garrison of New York, circa 1782

Address	Occupant
Smith St.	
19	Mrs. Montier, Refugee
25	Officers of 17th Lt. Dragoons
31	Sam. Hayt, Refugee
33	Mr. Mendenhall, Commissary General Dept.
34	Susanna Jandine, Refugee
43	Deb. Ratcliff, Refugee
46	Maj. Adye D.J. [illegible]
47	Mr. Wanton, Refugee
48	Major Willmowsky
49	Capt. Aldenbrook
William St	
8	Mr. Ross, Commissary General's Dept.
14	Fuel Office
26	Mr. Moodie, Com. Gen. Dept.
27	Col. Willard, D. Com.
40x	J. Bruce, Fuel Dept.
65	Mr. Hammett, Fuel Dept.
73	Lt. Brownigg, Barrack Master
75	Mr. Chew, Fuel Dept.
76	Fuel Office
77	Mr. Stevens & Ordnance Office
Gold Street	
5	Com. Genls' Store
19	Occupied by engineers
32	Store to Gen. Hospital
51	Capt. Baillie, Royal American Reg.
53-55	Com. Genl's Store
57	Stable
Cliff Street	
1	Stable
16	42nd Regimental Store
17	42 Reg. Guard
Great Dock Street	
1	Maj. Gillian
2	Officers on Courts Martial
8	Doctor North
9	Sundry Officers on Duty
29	Hessian Regimental Store

Table 4-2 (cont'd)
Abbreviated List of Barrack Houses
in the Garrison of New York, circa 1782

Address	Occupant
Hanover Square	
4	Public Office naval Dept.
6	General Campbell
8	Capt. Armstrong, D.Q.M.G. [Department Quartermaster General]
10	Admiral Digby
17	Adm. Digby's Secretary's Office
Queen Street	
5	Spanish Familys [sic]
27	Mr. William Bayard
65	Artificer to General Hospital
96	Maj. Menries of American Legion
Continuing on Queen Street but not listed here were many officers of the 40th Reg., 17th Light Dragoons, Queens Rangers and Royal Artillery	
144	Public Guard House
171	40th Regiment Hospital
182	Public Guard House
Little Dock Street	
8	Ordnance Store
18	Public Guard House
Water Street	
25	Jacob Hart, Refugee
53	Mr. Law, Captain of the Port
71	Stables
79	71st Reg'l Store
92	43rd Regimental Store
98, 127, 133, 164, and 165	Taken for the Commissary General's Stores
127	Commissary General Stores
186	Commissioner of Prisoners & Office
203	Mr. Lorentz, Hessian paymaster
Cherry Street	
25	Naval Stores
41	Boatswain and others of Naval Department
42	Ditto
51	Commissary General Dept.
63	Col. Eydel of Hessian Artillery

Table 4-2 (cont'd)
Abbreviated List of Barrack Houses
in the Garrison of New York, circa 1782

Address	Occupant
Duke Street [now Stone St. between Broad & Hanover Sq. Also former name of Gold St. btwn John & Fulton]	
8	Officers on Court Martial
10	Judge Advocate Heymel
14	Agent for Transports
17	Hessian Store Guard
19	Lt. Jones, 17th Lt. Dragoons
24	Hessian Store
28	Stable
29	Dr. Boggs, Brit. Hospital
Crown Street	
13	City Scavenger
40	40th Mess House
Maiden Lane	
17	Barrack office
33	Com. of Naval Prisoners
38,39	Ordnance Artificers
John Street	
17	Hessian Baggage Store
Ann Street	
9	An Old Soldier
Beekman Street	
24	Artificers in Engineer Dept.
Skinner Slip Lane [former name of Cliff St. between Ferry St. and Hague St., became part of Cliff St. in 1827].	
8	Negro Barracks
St. James Slip (slip ran from Cherry to South Sts. at foot of James St. Filled by 1836 but retained name of James St.	
36	Negro Barracks
Warren Street	
23	Ranelsgh? Hospital
Church Street	
	Negroe Barracks
White Hall	
5	Royal Artillery Barracks
8	Wm. Smith Sng'd Chief Justice

Table 4-2 (cont'd)
Abbreviated List of Barrack Houses
in the Garrison of New York, circa 1782

Address	Occupant
Pearl Street	
1	Royal Artillery Barracks
7	Royal Artillery Barracks
15	Major Uphram and DeCamp
14	Thomas Randel, Inspector of Officers
Copice [perhaps Copsey] Street	
2	Royal Artillery Barracks
Little Water Street	
15-17	Barrack Stores
Coentie's Slip	
1	Regiment [illegible] Stores
8-9	Qtr. Master General's Stores
Old Slip	
6-8	Medicine Stores
18	Barracks, 17th Dragoons
Hunter's Quays—largely occupied by the Commissary General's Stores	
1	Apothecary of the BG Hospital
3-10	Commissary General's Stores
Burnetts Quay—largely occupied by Commissary General's Stores	
22-24	Com. General's Stores
DePeyster	
1-2	[Assts?] in Police Office
Cooper [Dover]	
9	Com. Genl's Store
11	Hessian Regimental Store
Burling Slip	
5	John Van Buren, Refugee
7	Co. Genl's Store
Dover	
8	Artificers Engineers Department
9	63rd Regiment Store
10	Hessian Reg. Store
Slote Lane	
7-11	Stables
Bankers Street	
11	Mrs. Ferguson, a refugee widow
Bowery Lane	
1	Barracks for 17th Dragoons
68	A Powder House

Table 4-2 (**cont'd**)
Abbreviated List of Barrack Houses in the Garrison of New York, circa 1782

Address	Occupant
Mill Street	
	Devoted to Stores and Stables
Wall Street	
3	Commandant's House
7	General Lossberg
10	Col. Morse, Chief Engineer
18	Mr. Shoemaker of Philadelphia
25	Public Guard House
48	Commodore Affleck
62	Mrs. Webster, Refugee

There were also Loyalist refugees whose homes had been burned or confiscated by the Americans. They were dependent upon the army for protection, housing, rations and fuel. A Refugee Agency was set up to deal with their needs. Refugees were required to state their losses, which had to be certified by reliable sources. If approved, the refugees were provided a sum of money or placed on a list for rations or fuel. They could also be given an allowance. Houses vacated by Americans were designated "derelict property" and in New York City were in the care of the Vestry. These properties were meted out for the King's Service or for housing Loyalists or refugees (Historical Manuscripts Commission 1904: xiv-xv).

a. THE BLACK PIONEERS

In October 1781, 85 black laborers were employed in the Royal Artillery Department (On-Line Institute for Advanced Loyalist Studies 2010b). The "Negro Ordnance Barracks" where they probably lived was located at 25 Broadway near the Royal Artillery Hospital (see **Table 4-2**).

In the 18th century, the term "pioneer" meant "a soldier whose main task was to provide engineering duties in camp and in combat. Tasks could include clearing ground for army encampments, removing obstructions, and digging privies (On-Line Institute for Advanced Loyalist Studies 2001). In the British Army, these tasks were often assigned to blacks. Although they were not allowed to serve as regulars in the British Army or the Provincial forces, when "an expedition under General Henry Clinton arrived off North Carolina" in April of 1778, he was joined by at least 71 runaway slaves. Clinton organized a company called the Black Pioneers with black non-commissioned and white commissioned officers (Ibid). Clinton ordered the white officers to treat them with respect and to make sure they were adequately clothed and fed. Clinton also promised the Black Pioneers emancipation at the end of the war, as far as it was within his position to do so. The Black Pioneers accompanied Clinton north and witnessed the capture of New York City by British forces. They accompanied him when he took Newport, Rhode Island and when he was given command of New York City, he "immediately recalled the Black Pioneers to New York, where they served until sent on to Philadelphia to join the main army" (Ibid). During their service in the city, they "were often allotted out as servants, cooks and tradesmen to high ranking British officers. The Pioneers also "served as guards, pilots, spies, and interpreters" (Hodges 2005: 97). They were given the same pay as white loyalist infantry[59] (Historical Manuscripts Commission 1907: 86). They also provided labor. In New York, the Black Pioneers "assisted the carpenters in building fortifications to defend the city" (Hodges 2005: 99). They manned the blockhouses along the lower Hudson River and were among the last British soldiers to leave New York on Evacuation Day, November 25, 1783" (Ibid: 103, 106). "When they departed, they greased the flagpole so thoroughly that it took some time for arriving American soldiers to remove the Union Jack and replace it with the Stars and Stripes" (Ibid: 107).

In 1779, Clinton issued the Phillipsburgh Proclamation which decreed that any slave who fled a rebel owner and reached the British lines was free. Of course, this proclamation did not apply to slaves who ran from their Loyalist owners and captured slaves in Rebel service were likely to be sold by the British.

At the end of the war a number of disputes arose over the legal status of black refugees. Those enumerated in Sir Guy Carleton's *Book of Negroes* "had received passports which certified that the bearers had been in residence at the city of New York or some other place of British occupation before November 30, 1782—the date of the signing of the Provisional Peace Treaty" (Foote 1991: 379). Article Seven of that Treaty stated that the British would leave the country without destroying or taking away any property including blacks. Carleton, the Commander-in-Chief of the British military forces in North America, interpreted this to mean that

> all black refugees who had fled to the British lines before November 30, 1782 were entitled to the sanction of the British proclamations regarding Negroes and were therefore free to depart New York with the British fleet. Brigadier General Samuel Birch, the Commandant of the City of New York under British occupation, interviewed black refugees who claimed entitlement to the British sanctions and issued passports to all 'torified Negroes' who stated that they had fled to the British before November 30, 1782 (Foote 1991: 379-380).

American slave owners interpreted the terms of the Provisional Peace Treaty differently and demanded that their slaves be returned. A number of slave-owners travelled to New York City to claim former slaves who had remained in the city or who had already "boarded British vessels waiting for clearance to depart American waters" (Foote 1991: 380-381). One former slave wrote that the appearance of former slave owners in New York City filled him and the other black refugees "with inexpressible anguish and terror, especially when [they] saw [their] old masters coming from Virginia, North Carolina, and other parts, seizing upon their slaves in the streets of New-York, or even dragging them from their beds'" (Ibid: 381).

These violent seizures threatened to turn the British evacuation of the city into "anarchy and despair" (Ibid). General Washington and Sir Guy Carleton, leader of the defeated British forces, met at Orangetown, New York to discuss the evacuation. Washington demanded the return of the slaves to their former owners. Carleton believed he had to honor "the British promise of freedom to those black refugees who had removed to the British lines before Nov. 30, 1782" but assured Washington that if his government should disagree with his decision, the American slave-owners would be compensated for their loss of property (Foote 1991: 380-381).

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[59] See "Warrant for pay for June 25 - August 24, 1782 – Black Pioneers attached to the corps of Guides and Pioneers commanded by Maj. John Aldington" (British Headquarters Finding Aids, Vol. III:86).

14. EVACUATION

At the beginning of May, 1783, George Washington and the Governor of New York State, George Clinton, hosted the British commanders with the objective of putting together a time table for the British evacuation. Washington had three priorities. First, the British were not to destroy or steal American property, especially not the formerly enslaved. Second, he sought to establish a timetable for completing the evacuation and third, to extend the authority of New York State's government, "bringing it right up to the British lines before the withdrawal was complete to ensure a seamless transfer of power and avoid the disorders that might otherwise break out" (Schecter 2002: 373).

Sir Guy Carleton refused to return the formerly enslaved many of whom planned to leave the city for British-owned Nova Scotia (Schecter 2002: 372). Carleton created a registry of those individuals and agreed to reimburse their owners. A copy of this registry, *The Book of Negroes*, is part of the British Headquarters Papers collection of manuscripts at the New York Public Library (Great Britain Army 1775-1783).

Washington replied that "this theft of American property seemed to be a violation of the peace treaty…Carleton insisted that the treaty should not impinge on Britain's national honor, which required keeping its promises to people of all races. Ironically, the American Revolution, which began with the colonists' assertion that all men were created equal, ended with their Commander-in-Chief bickering with the British in an attempt to deny freedom to blacks" (Schecter 2002: 372). At the end of the war, thousands of Loyalists, white and black, emigrated to Nova Scotia, the West Indies, England and Canada.

15. AFTER THE REVOLUTION

In June, of 1789, "the Common Council appointed a committee to confer with the Assemblymen from the city as to the best means of obtaining for the city's use the lands at the Fort, Battery, and Nutten [Governor's] Island, which were apparently controlled by the State" (Smith 1972: 21-22). The result of this conference was the adoption of a resolution by the Legislature, in July 1789, "that the ground upon which the Fort stood should be reserved for public use, and that a house for the use of the President of the United States should be erected upon part of it" (Ibid).

The Governor and Common Council viewed the ground on July 30, 1789, and proposed the use of state funds to remove "so much of the Fort as obstructed the line of Broadway to the river," and to erect bulkheads from Eld's corner [Battery Place] to the Flat Rock [near Walls 1 and 2] to receive the dirt from the Fort and thus enlarge the area of the Battery" (Smith 1972: 21).

It was also determined that a bulkhead be constructed from Kennedy's Wharf, which was near Eld's corner, to the northwest bastion of the Battery, a distance of about 210 feet, the approximate distance from Battery Place to Wall 2. Elias Burger, Jr. constructed this bulkhead for £378. On November 12, 1789 the *Philadelphia Independent Gazetteer* reported that one half of the bulkhead had already been completed "and formed into excellent wharves" but that the rest would have to wait until next spring. When completed it would "connect the whole into a most beautiful circuitous street around three-fourths of New York, from Greenwich street along the North River until it comes to White Hall, and from thence by the East River along the Albany Pier" (Stokes 1967, V: 1257).

In 1790, the Common Council applied to the legislature for funds with which "to effect the compleat removal of the Earth, & Stone & leveling the Ground at the Fort & Battery so as to accommodate the Building to be erected there for the use of the Government and also to continue the Wharf or Bulkhead, in the River, to the Corner of the Battery at Whitehall Slip" (NYCC 1917 I: 833).

An Act of the State Legislature that same year officially marked the establishment of the Battery as a park space (Stokes 1967, I: 417). The stone from the Fort was used for the foundations of the Government House, whose cornerstone was laid on May 21, 1790 (Ibid), while the earth was used for filling in the adjoining Battery Park (Andrews 1901: 20) (see **Figure 4.21**).

16. DEMOLITION OF THE FORT

In 1790, while removing earth in the area of the old church in the Fort, workmen uncovered vaults, which included several coffins, human remains and a number of coffin plates[60] (Smith 1972: 23). The laborers also recovered artifacts including Dutch tobacco pipes, coins, including a Dutch silver piece from Groningen marked "1605," and a 17th century brass sword hilt[61]. Beneath the ruins of the old church, the workmen also found a dedicatory stone plaque, possibly from the Reformed Dutch Church of St. Nicholas, which was the first church to be constructed within the walls of Fort Amsterdam. The stone read: "In the Year 1642, W. Kieft, Director-General, caused the congregations to build this temple" (Stokes 1967, V: 1268-1269). The Dutch residents of early New York had worshipped in this church but, after the English conquest of New York, the two groups shared the use of the building until the late 1600s when the Dutch built a new church further north. By the early 1690s, the church had fallen into a state of disrepair and was considered to be too hazardous for use (Leavitt 1911: 12). As already noted, Governor Benjamin Fletcher had the old building torn down in 1693 and replaced with a new building, which was known as the King's Chapel or the Chapel in the Fort (Leavitt 1869: 507-529). The church opened in 1696 and was used until 1741, when it burned to the ground less than two hours after having caught fire (see **Chapter 4: A.8. The Hard Winter**). In 1756, John Dies noted "The Old Ruinous Chapel" as No. 6 in the key to his map (see **Figure 4.16**).

Although it is not clear if the Dutch used the chapel as a burial location, it was used as a place of interment for English colonial leaders who died in New York as early as 1701. The earliest known burial was that of Richard Coote, the Earl of Bellomont, who succeeded Benjamin Fletcher as Governor in the late 1690s (Burrows and Wallace 1999: 112). Bellomont's remains were uncovered in 1790 during the demolition of the old fort. An article published in the *Daily Advertiser* at that time reported that, "a number of bones... [were]…dug up, but the coffins were totally decayed…three vaults have also been discovered" (*Daily Advertiser* 6/17/1790). Based on this article, it is not clear if there was a conventional cemetery on the church grounds or if all the human remains found on the site were interred within burial vaults.

One vault contained 4 or 5 coffins, two of which were made of lead. One of the lead coffins, adorned with a silver escutcheon, held the remains of Lord Bellomont (Ibid). The other was thought to contain the remains of his wife, although it was later discovered that she had remarried after his death and died in England (Kelby 1903: 23). The two lead coffins found by the workmen were reinterred in the churchyard of Saint Paul's Church (Ibid) and the silver plate that formerly marked Bellomont's grave was melted down into teaspoons (Moss 1897: 86).

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[60] Lady Elizabeth Hays (d.1716), wife of Gov. Hunter, the family escutcheon of Lord Bellamont, d.1701, and another unnamed individual.

[61] A 17th century brass sword hilt was also found by archaeologists at the Broad Financial Center site along Pearl Street between Whitehall and Broad Streets (Greenhouse Consultants, Inc. 1985).

One of the other vaults was discovered in the walls of the old chapel (*Daily Advertiser* 6/17/1790). This vault held the remains of Lady Elizabeth Hay, the wife of Governor Hunter, who died in 1716 (Ibid). As Hunter had "engaged in…heated contention" with the rector of Trinity Church, he had refurbished the Chapel in the Fort in 1710 so that he and his supporters would not have to worship at Trinity (Dix 1901:152). He appears to have constructed a burial vault as part of the renovation, and it is likely that this is the one in which his wife was ultimately interred (Ibid).

Other remains uncovered during the Fort's demolition were reinterred in the charnel house in Trinity Churchyard (*Daily Advertiser* 6/28/1790: 3). Contemporary newspaper accounts do not mention the names of those individuals; although there is evidence that many other notable leaders of colonial New York were also interred there. The Will of Governor William Burnet, Hunter's successor, drafted in 1727 and proved in 1729, states that if he were to die in New York, he would want to be buried in the Chapel in the Fort next to his wife and young son (Leavitt 1869: 507-529). Mrs. Mary Burnet had died shortly after giving birth to the child, who also died, in 1727 and the two were in laid to rest "in a vault prepared for them" (Wilson 1892: 175). In 1731, Governor John Montgomerie, who succeeded Burnet in 1728, died at Fort George, likely of smallpox, and was buried in the Chapel, as was his successor, Governor William Cosby, who died in 1736 (Stokes 1967, IV: 546). Cosby's successor, George Clarke, was the governor of New York until 1743, after the church burned down, and was buried elsewhere (Earwaker 1880: 101).

The recovery of human remains in Battery Park during Wall 1 data recovery makes one wonder if the workmen demolishing the Fort in 1790 recovered all of the human remains associated with the Church. It is possible that some of these remains found their way into the landfill that was used to expand the Battery circa 1790, although it is also possible the human remains found during the South Ferry Terminal excavations originated elsewhere (see **Appendix J**).

17. CONTINUED IMPROVEMENTS AT THE BATTERY

Extensive improvements to the Battery were conducted between 1791 and 1793. Improvements near Battery Place included the demolition of Thomas Elde's house that had been purchased by the city (Gilder 1936: 114). The house was located within the South Ferry project corridor[62].

Elde[63] was the Fort's armorer and his house was constructed in 1723. It is likely it was part storehouse, part residence. In 1752 it was leased to the Fort's storekeeper, Christopher Blondel (Blundell, Blundel) or "Blundle" as he is noted on Dies 1756 map (No. 18, "Mr. Blundle's House" in **Figure 4.16**). By the time of the Battery improvements circa 1790—the demolition of the Fort and the filling of the Battery—the house was in the possession of Thomas Joseph Smith but at one time had been used as a pest house[64]. Smith's house was purchased by the city on Sept 10, 1792 for £750 (Stokes 1967, I: 419; NYCC 1917, I: 739). The Elde/Blundel/Smith house is illustrated on *A View of New York from the Northwest shortly before 1773* (see **Figure 4.22**). Wooden pickets given to the poor as firewood in 1784 are also depicted (Stokes 1967, I: 346).

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[62] The Phase 1A identified it as "Structure within the Fort" (LBG 2003: 50).

[63] In a deed dated 1725, Elde is called a blacksmith. As the Fort's armorer it would make sense that he was also a blacksmith.

[64] A hospital or quarantine for persons with highly contagious diseases such as tuberculosis, smallpox and cholera

Several other buildings associated with the fortifications were razed in the 1790s including the Lower Barracks or Military Hospital illustrated on the Montresor and Ratzen *Plan*s (see **Figures 4.18 and 4.15**). It is interesting in terms of adaptive reuse that in 1786 Christopher[65] and John Colles used the Lower Barracks as a paper staining manufactory (Stokes 1967, III: 943). The cousins were staining or "bluing" paper for wall hangings (Gilder 1936: 108).

On July 9, 1792 the Barracks were ordered razed and the associated materials were used in the improvements being made at the Battery (NYCC 1917, I: 730). Some of the materials from the demolished Barracks, however, were appropriated for a new Watch House at City Hall. City Hall can be seen on the *New York View of 1796* (see **Figure 4.23**). The Watch House was erected at the southeast corner of Wall Street on the site of No. 1 Broad St. (Stokes 1967, V: 1290).

On Sept. 21, 1792, the Common Council passed an ordinance for filling in Copsie [State] Street and accounts for paving the street indicate that earth from "the old fort" was used for filling it in (Stokes 1967, V: 1292). The name Copsey was changed to State Street in 1793 (NYCC 1917, II: 5). The Bancker collection at the New York Public Library has a plan of the proposed alteration at the Battery, showing the proposed new street, 18 feet wide. However, the Bancker Collection is currently being conserved and attempts to gain access were unsuccessful.

On July 8, 1791, the Committee on Battery Improvements complained that a plan by Col. Bauman[66] "to carry out a Bastion at the point of the Battery & to finish the Wharf running into the East River would cost three times as much as the plan proposed by the committee" which was "to make Return at right Angles at the Point of the Battery & continue the line of the Wharf to the Whitehall Slip—the quantity of Earth required for the former Plan being so much greater than for the Latter" (NYCC 1917, I: 654-55). Others disagreed and on July 15th Thomas Randall petitioned that Col. Bauman's plan be followed, laying out the great advantage that would result "from the completing of the Improvements at the Battery towards Whitehall Slip by extending the Line into the River so as to include the remains of the old Half Moon Battery" (Stokes 1967, V: 1281). This petition was again rejected (NYCC 1917, I: 656) but the mention of the "old Half Moon Battery" is confusing since it implies that the remains of this battery (also called the Copsey or George Augustus' Royal Battery) were still extant. Perhaps they had been incorporated into work conducted in 1756. When John Drayton came to town in 1793, he described the Battery as it looked at the time:

> It has no mortars or embrasures, but the guns (which are 13 in number) are placed upon carriages, on a stone platform *en barbette*, some four feet above the level of the water. Between the guns and the water is a public walk made by a gentle decline from the platform: and going round the ground upon which the battery is placed. Some little distance behind the guns two rows of elm trees are planted which in a short time will afford an agreeable shade. The flag staff rises

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[65] Colles is better known for an attempt to establish a water works that would provide the city with fresh water although the Revolutionary War made his plan impossible. Colles was a patriot and left the city in 1776, when the British occupied New York and turned it into a garrison.

[66] Col. Bauman was an Engineer in the Austrian service before coming to America. He fought on the side of the Americans during the Revolutionary War and was in charge of the evacuation of New York City in 1776 and the last to leave. Bauman was also the first to enter New York City on November 25th, 1783, as the British marched out. He was appointed Commissary of Military Stores at the Battery between 1788 and 1798.

> from the midst of a stone tower, and is decorated on the top with a golden ball; and the back part of the ground is laid out in smaller walks, terraces and a bowling green. Immediately behind this and overlooking it is the Government House, built at the expense of the State (quoted in Stokes 1967, I: 420; V: 1297).

According to the above description, the Battery at that time (1793) had no mortars or embrasures, which suggest the Battery Wall found by the archaeologists, had been, at the very least, partially demolished. The stone platform for guns mentioned above was west of the archaeological Battery Wall. It seems clear that Battery Wall sections 1 through 4 were partially demolished and covered by landfill at that time. The flagstaff or "churn," some newly planted trees, and the Government House are visible on the 1796 color print of *New York, 1796* (see **Figure 4.23**). The map also shows the fence constructed in 1792 as well as the bulkhead that had been continued to Whitehall Slip circa 1789. These structures were about on a line with present-day Washington Street and therefore outside of the project corridor.

Fear of war with France, in 1798, prompted additional work at the Battery. Stone was purchased "to secure the outside of the Battery" and other stones were taken up on the south side (NYCC 1917, II: 437). The city expressed regret at the destruction of "the finest walk in the world" but the undertaking was necessary "to save our liberties and violated Independence" (Ibid). New Yorkers were asked to contribute either their labor or 10 shillings a day and on July 27th, the *New-York Gazette & Daily Advertiser* reported that citizens were exerting themselves to raise fortifications on the Battery and, though the work was only started days before, "strong ramparts of protection and defence are in great forwardness—heavy cannon have been brought to the city, and, in a few days, will show their terrific muzzles from their intended situation" (quoted in Stokes 1967, V: 1355). On December 31, 1798, a report on fortifications and the military showed a total expense of £52.242.65 since June 29th when construction had started, "for building 4 batteries, mounting artillery, procuring military stores, building arsenals, and surveying the harbour" (Stokes 1967, V: 1359). It is not clear if all four batteries were constructed, however a number of fortifications were built at the Battery and on the islands in the Harbor in 1798 (Stokes 1967, I: 429).The 1797 Taylor-Roberts map (see **Figure 4.24**) indicates the Battery had become an open park space as intended by the State Legislature in 1790.

On January 30, 1805, the Legislature authorized the city "to take down and remove the wooden bastions at the Battery…and appropriate the same for fuel for the use of the poor;" also to "cause the superfluous earth where the said bastions are erected, to be removed and disposed of for the use of the said poor" (Stokes 1967, I: 429; V: 1431; NYCC 1917, III: 680). These planks and posts had been "built into the bastions on the battery four years earlier [1801] when the attack of a French squadron was feared" (Gilder 1936: 129; Stokes 1967, I: 429). The order to give the planks and posts to the poor is similar to an episode that occurred in 1784. The location of the wooden bastions on the Battery is unknown.

A new battery is shown on the Taylor-Roberts (1797) and Goerck-Mangin (1803)] *Plans* (see **Figures 4.24 and 4.25**). It is situated along the Hudson River, about on a line with Washington Street and between Marketfeldt Street on the north and Bridge Street on the south, if they had extended into the park. It is also the location of the flag-staff, known as "the churn" because of its resemblance to a butter churn.

In 1805, the Common Council appointed a committee

> to report what improvements and alterations are proper to be made on the Battery, and also their ideas relative to extending, docking out, and filling in on the ground under water adjoining to the same, so as to render the whole a commodious military parade, and a public walk, and that the said Committee be authorized to employ a surveyor (NYCC 1917, III: 684 in Stokes 1967, V: 1431).

The Common Council also ordered manure to be laid down on the grounds of the Battery (NYCC 1917, III: 696). This was possibly the first order of its kind related to the care of a city park (Stokes 1967, V: 1432). The Council also resolved to raise the exterior walk around the Battery at least 6 inches above its present height and to remove "the remainder of the Timber, and materials of which the batteries were constructed" (NYCC 1917, III: 714; Stokes 1967, V: 1433). Additional amenities and improvements took place that year. Gravel was laid on the newly raised walkway, benches were placed in the park and a shed and awning erected around the flag staff that was to be used as a refreshment stand (Stokes 1967, V: 1436).

An editorial in the *Daily Advertiser* [2/28/1805]) reported the city was contemplating enlarging the Battery considerably, "to render it more suitable for a parade-ground and promenade, as well as to do away [with] the danger to vessels arising from the rocks which lie in every direction in front of it" (Stokes 1967, V: 1432). This suggests the Copsey Rocks extended quite far out into the river and had not all been incorporated into earlier-17th and 18th-century land-making efforts. The article also noted that "boats were yesterday employed in taking soundings to the distance of at least 150 feet from the edge; and probably the work of enlarging will soon commence'" (Ibid). John Peterson was appointed in charge of the Battery and Flag Staff and was ordered to reimburse the Widow Keefe for improvements made by her husband who was the former park caretaker (Stokes 1967, V: 1441).

On July 13, 1807, a portion of the ground at the Battery was ceded to the United States government "with the right of soil under water, or elsewhere within their jurisdiction, as the Secretary of War may deem necessary" (Stokes 1967, V: 1463). This event was instigated by an attack of an American vessel by a British ship off Virginia. The Secretary of War believed it necessary to "erect a strong fort, with two or three tiers of guns, to extend beyond the present battery, in front of the Flagg staff" (Ibid: 1469).

Col. Jonathan Williams designed the new fortification designated the Southwest Battery (later Fort Clinton, Castle Clinton, and Castle Garden). It was erected on a ledge a hundred yards or so from the shore, access to which was by means of a long bridge with a draw.

Fort Clinton was completed in 1811 and can be seen with its long access bridge on *The Commissioner's Plan* by William Bridges (see **Figure 4.26**). After the War of 1812, the *Evening Post* complained that the former beauty of the Battery had been destroyed by the fortifications that had been constructed for the protection of the city and by 1816, the Battery had become nothing more than a cow pasture and a place "for hogs to root up in a thousand furrows" (Gilder 1936:14). The Common Council recommended improvements such as "filling up the ditches which the erecting of the parapets, which now encumber the Battery, having occasioned, leveling and regulating the walks, manuring and sanding the soil and otherwise improving the grounds" (Ibid). In addition, an old boat house located at the southern end of the Battery was removed. One year later, the Battery was once more a "most delightful walk, on the edge of the bay" (Ibid: 142). And a decade after the War, Fort Clinton was transformed into Castle Garden, the City's foremost cultural center, where artists including Jenny Lind performed.

Improvements to the Battery continued. In the 1820s, hundreds of ornamental trees were planted (Gilder 1936: 143-144). The park was expanded in 1824 and again in the 1850s. Daniel Ewen illustrated the *Proposed Enlargement of the Present Battery* in 1848 (see **Figure 4.27**). Sometime after August 19, 1851, the city contracted with a Mr. Conkling for the extension of the Battery; however, work progressed slowly and in 1853, the contract was transferred to George Law. A newspaper sketch of the work being undertaken at the Battery at this time shows teamsters with wagonloads of fill traveling along a path opposite the Washington Baths, turning right along the shore, then progressing to an area between the Baths and Castle Garden where they finally dumped their loads. The empty wagons returned along this same path, picked up another load of fill and then repeated the journey (see **Figure 4.28).** The continuing enlargement of the Battery can also be seen in an early photograph from this time period (see **Figure 4.29).**

By 1855, successive landfill episodes had enlarged the Park to encompass Castle Garden (see **Figure 4.30).** This expansion almost doubled the size of Battery Park. Work progressed slowly until 1865, when the "legislature placed control of this improvement in the hands of the city's pilot commissioners and provided for its early completion" (Stokes 1967, V: 1836) (see **Figure 4.31**). In 1869, the sea-wall that the federal government erected to protect the shoreline was completed. Additional improvements to the park, including the 1871 installation of corner fence posts made of iron (**Figure 4.32**) and landfilling increments (**Figure 4.73**), can be seen in a views from the New York City Department of Parks and Recreation archives.

Work which began in 1854 continued until 1872. Castle Garden was an immigration station from 1855-1890. In 1896 it became the New York Aquarium.

Fort Clinton was nearly demolished in 1941 and a major preservation battle took place. "The original fort walls were declared a National Monument by an Act of Congress in 1946 and restored to its fortification appearance by the National Park Service in 1975 (Battery Conservancy n.d.).

B. WHITEHALL SLIP

1. THE AREA OFF WHITEHALL

Ships arriving at New Amsterdam in the 17th century dropped anchor in the East River. Cargo and passengers were transferred to smaller vessels which could then be rowed to shore. Transatlantic vessels required deeper water and had to anchor far from shore until the construction of large piers in the 19th century. Shoreline landowners were offered incentives to fill in the shallows in front of their properties. They might be obliged to construct a wharf or street of a specified width at the outer edges of their properties but the remainder of the newly-made land was theirs to build upon. The first wharf along the East River waterfront was built by Governor Peter Stuyvesant circa 1648 near Whitehall Street (see **Figure 4.1**).

Manhattan's early waterfront was unique; unlike other major colonial cities such as Boston and Philadelphia, New Yorkers constructed few wharves that jutted out into its rivers. Manhattan had slips. A slip is an inlet between piers or wharves where vessels can dock. Slips were customarily created in three ways. The first method involved cutting into the existing shoreline or taking advantage of a natural cove or waterway. Slips could also be created when land was filled along the waterfront: space was left open between filled lots, creating the numerous slips whose outlines are still visible along the East River in places such as Burling Slip and John Street. In this way, slips were positioned as canal-like continuations of streets, mirroring the configuration of seaports in the Netherlands (Huey 1984).This practice was standard in 17th century New York (New Amsterdam) and stemmed from Dutch influence on the city. Slips could also be formed by constructing two parallel wharves out into the water; the slip would consist of the watery space between the two wharves. A bulkhead was constructed at the head of the slip to hold firm the land along the shore. This method was typical of New York by the mid- to late-18th century when Whitehall Slip was constructed. The process of "wharfing out" — extending parallel wharves (which created slips), later filling these slips with soil, cobbles, and sometimes garbage, and then extending the wharves farther to create new slips, was probably responsible for most of the new land created in New York in the 18th and 19th centuries. Slips were generally filled in by building a seawall (also called a breastwork or breakwater) to bridge the gap between the ends of the two wharves that flanked it. Sometimes derelict ships were sunk as part of the seawall. The area within the former slip was then filled with unconsolidated soils and/or trash, thus creating new land.

The area of Whitehall Slip was completely inundated by the East River during the 17th and early-18th centuries. At that time, the foot of Whitehall Street was situated along the original shoreline at about present-day State Street on the west and just south of Pearl Street on the east (see **Figure 4.36**). The area immediately to the north was marsh or soil inundated by the alternating tides. The primitive waterfront is depicted in the *Prototype View* of the early 1650s (see **Figure 4.1**) and a *View of the Site of the Battery* in 1656 (see **Figure 4.2**). The circa 1660 *Castello Plan* (see **Figure 4.3**) illustrates the waterfront during the Dutch colonial period, after sheet piling had been installed along the shore to prevent erosion. Schreyer's Hoeck or Hook [also Point] is also depicted on Innes' (1902) *Plan of New Amsterdam about 1644* (see **Figure 4.7**). A (GIS) overlay of the modern project corridor has been applied to the Castello Plan (see **Figure 4.3**). The overlay shows Schreyer's Hoeck abutting the project corridor, but this is incorrect. Subsequent maps indicate that the South Ferry Terminal project corridor in the vicinity of present-day Whitehall Street was still underwater at that time. The problem here is with the Castello Plan, an intensively detailed, seemingly accurate, but probably somewhat fanciful portrait of New Amsterdam, and not with GIS[67] (see **Chapter 2: A. Historical Research Methods**).

Whitehall Street existed from the early Dutch colonial period, when it was called the *Marckveldt* or (meat) market field or place (see **Figures 4.1, 4.2,** and **4.7**). It comprised an area east of Fort Amsterdam that included present-day Whitehall Street and ended at the shoreline just below Pearl Street on the east and near State Street on the west. In 1914, Stokes (1967, III: 847) found several large oyster shells on the hard-rilled surface of what was apparently the original sandy beach, at a point 6-7 feet below the surface of State Street.

Although Peter Stuyvesant conducted some landfilling and constructed a wharf near present-day Whitehall and State Streets in the area called Schreyer's Hoeck (see **Figures 4.1 and 4.7),** the first significant fill episode in the vicinity of the project area took place in 1693 on the north and west sides of what ultimately became Whitehall Slip, although north of the South Ferry Terminal project corridor.

In 1693, Governor Fletcher "caused the edge of the (Kapsee[68]) point to be filled in and erected a platform upon which was placed a number of guns to command both rivers. The works extended from present-day Whitehall Street westward about 300 feet and was commonly known as the Whitehall Battery" (Jenkins 1911: 17; also see **Chapter 4:A.3. Governor Fletcher's Whitehall**

[67] Similar problems arise with the Maerschalck Plan (**Figure 4.13**)

[68] Kapsee or Copsey Point is probably Schreyer's Hoeck.

Battery). The Battery was completed in 1694. Miller's *Plan of the City of New York* in 1695 shows the location of the Whitehall Battery of 15 guns (see **Figure 4.4**). The 1693 Whitehall Battery, along with a basin or cove along the shoreline at the foot of Whitehall Street is also represented by Burgis (see **Figure 4.9**). This basin was constructed about 1662 (Stokes 1967, III: 991) and can be seen more clearly on the 1733 Popple *Map of the British Empire in America* (see **Figure 4.37**). At the time, the south side of the Whitehall Battery was about on a line with the southernmost portion of the Great Dock constructed on the east side of Whitehall Street although the Whitehall Slip area of the South Ferry project corridor was still underwater at this time.

From the late 17th century until circa 1724, the area known as "Whitehall" functioned as a "broad plaza" favored by country farmers who came to the city to peddle their produce (Stokes 1967, I: 246). The Burgis view indicates the shoreline on the east had been extended a full block into the East River, so that the location of the houses that line the shore in front of the Great Dock are located at present-day Water Street which was the low-water line in 1679 (Stokes 1967, I: 243).

2. THE CREATION OF WHITEHALL SLIP

One of the most significant archaeological discoveries at the South Ferry Terminal project site was the Whitehall Slip (see **Chapter 5: B. Whitehall Slip**). Constructed in the 1730s, it developed into one of the largest, busiest and most important slips in a city filled with slips. Whitehall Slip was created in the 1730s when commercial developers purchased lots west of the Great Dock[69] and constructed land, buildings, streets and wharves that ultimately led to the formation of the east side of the Slip. The west side of the Slip was created about the same time in 1734/5 when the area was developed for defensive purposes and George Augustus' Royal Battery replaced Governor Fletcher's Whitehall Battery on the Copsey Rocks in the East River (NYCC 1905, IV: 238) (see **Chapter 4:A.6. George Augustus' Royal Battery).**

The Copsey Rocks, extending from Whitehall Street to the line of Stone Street, are depicted on the 1728 Lyne-Bradford *Plan of the City of New York* (see **Figure 4.10).** The *Plan* shows the foot of Whitehall Street outside the project area at present-day Water Street on the west and between modern Water and Front Streets on the east. Hunt's Shipyard is present at the foot of Whitehall Street and the Great Dock constructed in 1676 is located to the east of the wide expanse of the Broad Plaza which has not yet been laid out into blocks and lots. The commercial development of the east side of Whitehall Street through land and wharf-building resulted in the creation of the east side of Whitehall Slip. The west side of the Slip consisted of the east side of George Augustus' Royal Battery (see **Figure 4.11**). As early as 1686, however, the area east of the Broad Plaza consisting of that portion of modern Block 8 bounded by modern Pearl, Broad, Water and Moore Streets was granted as water lots to eight individuals and developed (see **Figure 4.35**). The owners were: Peter De Lancey, Henrica Anthony, John Hendrix De Bruyn, Benjamin Blagg, William Boyle, Hendrix Jacobs, Maria Schrick and Jacobus Kipp. Landfilling took place between 1686 and circa 1716. This block can be seen on the 1695 Miller *Plan* (see **Figure 4.4**) and the circa 1717 Burgis View which shows dwellings and warehouses on the newly filled block (see **Figure 4.9**). The lots were sold in 1687 with the proviso that buyers construct a street along the water and a "substantial wharf along the fronts of their lots"

[69] Shortly before the Revolutionary War, the Great Dock was filled in and new East and West Basins were constructed south of Front Street. These were filled prior to 1797 with the extension of the shoreline to South Street

(Wakeman 1914: 9-10). The new street became Water Street and it lay between present-day Whitehall Street and Old Slip.

The area to the west of the block filled between 1686 and circa1716 remained unimproved until circa 1732. On August 26, 1731, the Common Council appointed a committee to survey the lots of land belonging to the Corporation of the City of New York that were situated on the west side of the Great Dock. This included part of the wide expanse of Whitehall's Broad Plaza. On March 23, 1732, the Common Council charged that the "Parcell of unimproved Ground belonging to this Corporation…be laid out in seven Lotts and Exposed to Sale…" (NYCC 1905, IV: 30). These seven lots included the present-day northwest and southwest quadrants of modern Block 8 (see **Figure 4.35**)**.** Each 18th-century lot was between 108-136 feet long and approximately 31 feet wide. On April 25, 1732, the seven lots were auctioned off at the house of Obadiah Hunt who owned a popular tavern on Pearl Street, between Whitehall and Broad Streets[70].

The new lot owners included Stephan De Lancey (Lots 1, 2 and 5), David Clarkson (Lot 3), John Moore (Lot 4), Robert Livingston, Jr. (Lot 6) and Anthony Rutgers (Lot 7). The conditions of the grant stipulated that the southern borders of those lots were to front a "new Street to be made and laid out of 45' wide to run along the East River" (Ibid). When completed, the new street was called Front Street.

The owners of Lots 4-7 on Block 8W, bounded by Whitehall, Water, Moore and Front Streets, purchased adjacent water lots in 1734 "to be made land against out of the East River, low lying under water" (*Liber* B, p. 234-261) (see **Figure 4.35**). These adjacent lots (Block 4W, Lots A-D), bounded by Whitehall, Front, Moore, and South Streets, became the western segment of present-day Block 4 and extended 245 feet into the East River.

The owners were also required to construct, at their own expense, a street, wharf or "way," forty feet wide fronting the East River that could be used by the general public. Anthony Rutgers owned the westernmost lot on the east side of Whitehall Street and was charged with constructing a wharf 20 feet long on the west side of his water lot. John Moore, the owner of the easternmost corner lot, was obligated to build a wharf along the east side of his property (today's Moore Street).

The development of Lots 4-7 on the southwestern segment of Block 8W between Water, Whitehall, Front and Moore Streets in 1734, the actual construction of Front Street and the filling in and development of the southwestern segment of Block 4W, located between Whitehall, Front, Moore and the East River, resulted in the formation of the wharf that became the east side of Whitehall Slip. The dendrochronological evidence dates the logs associated with the earliest portion of the Slip (WHS A) within the South Ferry project corridor to 1734 (see **Appendix H**) corroborating the documentary evidence that the Slip was constructed in 1734/5.

In 1796 John C. Moore's son and heir, Lambert Moore was granted an extension to his father's original 1734 water lot grant:

> And whereas the common council, for improving the accommodation of shipping, have determined that a new street or wharf, to be called South street, of seventy feet in breadth, be made in the East River, in front of the water lots between Whitehall

[70] Approximately 7,000 clay tobacco pipe fragments were recovered by archaeologists from the floor of an outbuilding adjacent to Hunt's Tavern. It was assumed that Hunt was either supplying his customers with pipes or using broken pipes for drainage purposes (Dallal in Greenhouse Consultants 1985).

> slip and Moore street, by reason whereof the said street, of forty feet in width, in the river at the south end of the water lot granted to the said John Moore, will become unnecessary; and have agreed to extend the lots of the said proprietors (Rutgers, Livingston, DeLancey and Moore) between Whitehall slip and Moore street, to the new street of seventy feet wide (Hoffman 1862, II:83-84).

In other words, the owners of lots A-D on Block 4W were offered an additional 64 feet in front of their property if they would construct South Street and make it 40 feet wide. Therefore, in actuality, the lot owners received only 24 feet beyond the street made under Moore's original grant. It also suggests that the east side of Whitehall Slip was built out to South Street by 1796.

Two of the three newly-developed blocks of land on the east side of Whitehall Street are depicted on Mrs. Buchnerd's 1735 Plan (see **Figure 4.5**)**.** The Maerschalck *Plan* illustrates a well-defined Whitehall Slip, resulting from the horseshoe-shaped George Augustus' Royal Battery constructed in 1734/5 and improved in 1741. It also illustrates the newly lotted blocks of made land between Pearl and South Streets that formed the east side of the Slip (see **Figure 4.11**). The name "White Hall Slip" appears for the first time on Francis Maerschalck's 1755 *Plan of the City of New York* (see **Figure 4.11**) and he positions the head of the Slip at present-day Front Street as does John Dies' on his 1756 *Draught* (see **Figure 4.16**). Ratzen, however, places the head of the Slip farther north at present-day State/Water Streets (see **Figure 4.15**) which is incorrect. Perhaps the map was surveyed during high tide. Perhaps he simply made an error.

In 1755, the Common Council ordered that the "Wall from the east line of the battery along the west side of Whitehall Slip be continued" (Fernow and Van Laer 1902: 419). The following year the *Pennsylvania Gazette* (5/13/1756) reported the explosion of a large cannon[71] on the "New Stone Battery" (George Augustus' Royal Battery). Some of the pieces were thrown more than 800 yards and one 80 lb. chunk fell within 25 feet of Whitehall Slip (Ibid). A cannonball was found in the Whitehall Slip (WHS B) deposits during the South Ferry Terminal archaeological excavations (see **Chapter 6.E.2. WHS B**). It was a 6 pound shot (Cat. 15598.025). Ratzen's *Plan* (see **Figure 4.15**) depicts the Staten Island Ferry at the foot of the east side of Whitehall Slip, nearly at present-day South Street, and, for the first time, the Whitehall Stairs are shown at that location. In 1767, Ellis Tyron, a soldier of the 46th Regiment stationed in New York City, was found drowned near the Whitehall Ferry Stairs (*New-York Mercury* 8/3/1767, in Scott 1977).

The Stairs also figured prominently in post-Revolutionary War history when, in 1783, General George Washington departed New York City from the Stairs at Whitehall Slip. After making his farewells, Washington walked the few blocks from Fraunces Tavern to Whitehall Slip where he and his infantry took a barge to Paulus Hook, NJ (Burrows and Wallace 1999: 261). After General Lafayette visited the city in December 1784, he embarked on the ferry barge, *Nymphe* at the Whitehall Stairs (Stokes 1967, V: 1197).

3. LOW WATER, HIGH WATER

Some attempt was made to determine where the high and low water marks were in the area of Whitehall Street. The grants discussed above were made on the supposition that Water Street was the low water mark. However, there are good reasons to believe that the "low water mark

[71] It fired 32-pound cannon balls.

from Whitehall street east to Moore Street, was at or about the north side of the present Front street" (Hoffman 1862 II: 84). The reasons are as follows:

In 1732, all the area from Pearl Street to the north side of a street yet to be constructed (now Front Street) was divided into 7 lots and sold. Three of these lots extended from Pearl to approximately Water Street and four of the lots from Water Street to "a street [Front Street] to be made of forty-five feet along the East River" (Hoffman 1862: II: 85). All 7 lots were bounded by Whitehall Street[72] on the west and by Weigh House (Moore) Street on the east. All of the lots were described the way upland lots are always described, e.g. "all that certain lot or parcel of land" (Ibid). Soils between high and low water were described as either a water lot or as soil under water (Ibid). Soils beyond the low water mark were always described as "land under water, soil to be gained out of the river or as a water lot" (Ibid).

In the grant to John Moore in 1734 (Block 4W, Lot A [the block bounded by Whitehall, Front, Moore and the East River]), the property line runs "from the new house or tenement then lately built" 245 feet into the East River (Ibid: 85, 86). This new house must have been constructed on the northerly side of Front Street in Block 8W, Lot 4.

It is unlikely that between 1732 when Moore obtained the land and 1734, he would have constructed a house below the low water mark. The 1728 Lyne-Bradford Map (see **Figure 4.10**) confirms that conclusion. It illustrates the wide expanse of the broad Whitehall plaza prior to the blocks being laid out into lots; whereas the 1754 Maerschalck Map (see **Figure 4.11**) shows three newly developed blocks created out of this space "from Moore street, west, and sold in 1732 and 1734" (Ibid: 86). Hoffman also mentions a map of the Battery (*Atlas No. 7, Street Commissioner's office*, not illustrated) which indicates the 1774 water line, at the eastern end of the Battery, was situated nearly opposite to Front Street . "The upland of the Battery clearly ran as low as Front Street, and there is nothing to warrant the supposition that from that Point to Moore Street, the shore so receded as to make a material change in the line, although further east, toward Broad Street and Coenties Slip, the tide did trench deeper into the land" (Ibid).

4. THE WHITEHALL SLIP MARKET AND SLIP

On February 28, 1746, nearly 150 inhabitants of the South Ward petitioned the city for permission to build a new Market at their own expense at Whitehall and Pearl Streets (NYCC 1905, V: 167). The area near Whitehall's broad plaza had long been the site of marketplaces and as early as 1656 an early market had been established nearby on "The Strand" (Pearl Street) in front of Dr. Hans Kierstede's[73] house at the corner of present-day Pearl and Whitehall Streets.

However, in 1746 the inhabitants now requested authorization to build at their own expense "a Slip for Boats Or Canoos at the West End of Pearle Street to Low Water Mark and no further" (Ibid) and this petition was granted. Thomas De Voe, merchant, butcher and author of *The Market Book,* stated that this slip was to be constructed for the convenience of "boats and canoes that may bring provisions to the same market" (1862: 276). He also remarked that "at this period Pearl Street at the west end commenced on the shore, near where now runs State Street, and ran

[72] Also known as "Broadway continued."

[73] Dr. Kierstede was a surgeon for the Dutch West India Company and married to Sarah Roloefse. A privy associated with the family's residence at the corner of Pearl and Whitehall Street was uncovered by archaeologists at the Broad Financial Center Site (Greenhouse Consultants, Inc. 1985). The materials in the privy were associated with the period their daughter Blandina resided there with her husband Petrus Bayard, nephew of Peter Stuyvesant, and their children, circa 1680-1710.

easterly, or at the east end of Pearl Street ended in Whitehall Street; from this continuation was called Dock Street" (Ibid).

No map has been found to show the location of the Whitehall Slip Market Slip. According to Gilder (1936:56):

> there stood a public market-house at the corner of Pearl and Whitehall Streets and a slip extending to low-water mark just west of the present State and Pearl Streets. Their removal was an early incident in the long campaign, still being waged, to keep encumbrances off the Battery, in order to preserve it as a military fortification and later as a park.

On April 26, 1750, the city agreed "to remove the market-house near the Battery at the Corner of pearle Street" (NYCC 1905, V: 293). The market had only been in operation for 4 years. The 1754/5 Maerschalck Plan (see **Figure 4.11**) shows the western end of Pearl Street ending at the water at about present-day State Street. Offshore, in the Hudson River, is a two-part L-shaped wharf, detached from the land. However no slip at the end of Pearl Street is visible on this or any other map. It is possible it had been partially removed by the 1754/55 date of the Maerschalck map. It is also possible that the L-shaped wharf was also called a slip. Maerschalck confirms what De Voe said about Pearl Street. Beginning at the Hudson River and travelling eastward from the shore, Pearl Street continues and then ends at Whitehall Street where it changes name and becomes Dock Street and then continues east. Why was another slip necessary at the shore end of Pearl Street to accommodate a market located a few blocks inland when there was a closer slip at Whitehall and the Great Dock was next to Whitehall Slip? DeVoe suggests a reason: Native Americans had become a nuisance and were using the Great Dock as a landing place, bringing their stores and food-stuffs and taking up residence in the yard and warehouse of Adolphus Philips where they made baskets and brooms to be sold (De Voe 1862: 277). According to De Voe, the new slip at the end of Pearl Street was "to draw them away…it being sometimes much crowded" (Ibid).

The Whitehall Slip Market at Pearl and Whitehall Streets was situated north of the Whitehall Slip portion of the project area. The Whitehall Slip Market's Slip was purportedly constructed at the end of Pearl Street at about State Street, just to the east of the project area and about half a block north of Wall 4. The curious L-shaped wharf in the Hudson River off-shore at the end of Pearl Street is partially within the South Ferry Terminal project corridor. It is possible that a portion of this wharf might have created a slip-like area at the foot of Pearl Street. This feature and the possible slip only appear on the Maerschalck Plan. If it truly existed at one time, it is likely the L-shaped wharf was incorporated into the landfill as it does not appear on the Ratzen 1766/67 Plan (see **Figure 4.15**). The possibility that the L-shaped wharf was the log feature associated with Wall 3 was investigated. Most of the logs that comprised the log feature were cut in 1734 (see **Appendix H**), prior to construction of Wall 3 which was built circa 1755 and prior to the construction of the Whitehall Market Slip circa 1746. The Wall was built after the log feature and actually cuts through it. However, the L-shaped wharf as depicted on the map is located north of the log feature and both Walls 3 and 4, at the foot of Pearl Street. Therefore, it is not likely the log feature is associated with the Wall (see **Figure 4.11** and **Chapter 7: Conclusions and Recommendations**),

5. FURTHER HISTORY OF WHITEHALL SLIP

Whitehall Slip was a busy place, filled with shops, boarding houses and taverns that catered to merchants, ferry passengers and military personnel. During the 1730s, mail stages between New

York and Philadelphia ran once every two weeks from the *Crown and Thistle* near George Augustus' Royal Battery and continued by water in specially constructed boats (Armbruster 1919: 10). All kinds of shops were present along the Slip. In 1747 merchant Richard Smith sold an assortment of imported drinking glasses, pint and quart decanters, and various other glass goods (*New-York Gazette* 5/25/1747). In 1768, Charles Shipman, an ivory and hardwood turner moved from Old Slip to "the White-Hall, near the Battery" where he made and sold toothpick cases, billiard balls, bowling balls, and dog whistles (*New-York Gazette & Weekly Mercury*, 6/6/1768: Supplement 1*)*. Numerous boats loaded and off-loaded goods from the Whitehall Slip docks. In 1751, Obadiah Hunt offered for sale "a thousand Boston well bricks with a curb, all ready for laying a well; and a parcel of red cedar, lying on the (Whitehall) dock" (Gilder 1936: 58). The *New-York Gazette* advertised a "large stable and chaise-house" for rent "behind Whitehall Slip, facing Copsy battery, for the use of receiving such by the ferryboats" (in Watson 1846: 263 and Gilder 1936: 58).

a. THE FERRIES

The city jealously guarded its ownership rights to Whitehall Slip and the adjacent waterfront. These rights were vested in the Montgomerie Charter of 1730 which gave the city authority to select, direct, and regulate as many ferries as the Corporation of the City of New York saw fit (Grossman & Associates 1987: 39) (see **Chapter 4: A. 5. The Montgomerie Charter**).

Whitehall Slip was the terminus for several ferry lines in the 18th century and in the 19th century a series of ferry lines to Brooklyn, Staten Island, and New Jersey was established by various companies. As previously stated, South Street on the east side of Whitehall Slip was extant by 1796 (NYCC 1917, II: 259) and interest in the area focused on the development of a ferry terminus (see **Chapter 4.B.2. The Creation of Whitehall Slip**).

On October 1, 1753, an advertisement in the *New-York Weekly Gazette & Post-Boy* noted that the Burlington Stage Wagon had been revived. All persons wishing to transport "themselves, Goods, Wares, and Merchandize, from the city of New York to the City of Philadelphia" would now "have the Opportunity of obliging themselves."

Daniel O'Bryant, with "a commodious Stage Boat, well fitted for that purpose," ran a ferry between New York and Philadelphia twice a week, "wind and Weather permitting" (Ibid). O'Bryant met his passengers "at the White-Hall Slip, near the Half-Moon Battery, at the House of Scots Johnny[74] in New York" (Ibid). From there, he ferried his passengers to New Jersey to meet the Perth Amboy Ferry where there was a "good Stage-Waggon." The next day the wagon proceeded to

> the House of John Predmore in Cranberry, where there is kept a fresh set of Horses and Driver, who immediately proceeds with them the same Day, to the House of Jonathan Thomas, in Burlington, where there is kept a commodious Stage-Boat[75] waiting for their reception, Patrick Cowan, Master, who immediately sets out and proceeds with them to the City of Philadelphia (Ibid).

[74] This was probably a tavern at or near Whitehall Slip. "Scots Johnny" was John Thompson who commanded a stageboat at Whitehall Slip that sailed every Monday and Thursday (*New-York Post Boy* 12/1/1755 in Stokes 1967, III: 674; also see Gilder 1936:59).

[75] This was at the New Jersey side of the Delaware River.

The first public Staten Island Ferry had been established in 1713 but, in 1755, Otho Van Tyle on Staten Island and Abraham Bockee at Whitehall Slip established the Staten Island Ferry at the foot of Whitehall Street (NYCC 1905, VI: 4, 7) (see **Figure 4.15**). Van Tyle and Bockee had three boats "well-fitted to transport" people and goods to and from Staten Island (Gilder 1936: 62). In 1756, one of their boats sank in high seas near Oyster Island[76] and "Denyse van Tyle with 10 other men and 3 horses were drowned" (*New York Post-Boy,* 3/11/1756 in Stokes 1967, IV: 679). Later, Darby Doyle ran a ferry between Whitehall and Stapleton, Staten Island. The British destroyed his boats and dock in 1776 (Gilder 1936). It is possible they were destroyed during the 1776 fire that started at Whitehall Slip. Sometime prior to 1783, the Whitehall Ferry to Elizabeth Town Point, New Jersey was launched from Whitehall Slip at Front Street. The ferries from Whitehall to Staten Island and Elizabethtown Point were put up separately for sale on March 29, 1785. Gosen Ryerson was awarded the ferry to Staten Island for 3 years at £20 a year with stated conditions; the ferry to Elizabethtown Point went to Thomas Twigley (or Quigley) for the same term at £60 per year (Stokes 1967 V: 1200).

On October 17, 1785 a petition to the Common Council by Gozen Ryers (Ryerson), Thomas Quigley and others stated that the petitioners had paid the city a great deal of money for the benefit of the Ferries from Whitehall to Staten Island and from Moore's Corner to Elizabethtown, N.J.[77] In return, they expected the piers to be maintained, arguing they were required to keep their boats in good order, therefore asked the same consideration of the city. The docks and ferry stairs "are so much injured by the late storms, that Horses can't be taken off from Whitehall, only at high or near highwater" (NYCC 1917, I: 183). They also asserted that the (late) "Slaughterhouse at Moore's Corner is a great Obstruction to the Ferry," and that it be removed as a "Nuisance" by the spring of 1786 (Stokes 1967, V: 1205). The British had used this building, just east of Whitehall Slip and the project area, as a slaughterhouse during the Revolutionary War and it was converted into a dwelling by Jeremiah Stone and Moses Crosby in 1785 (NYCC 1917, I: 105). Its location was at Moore Street along the waterfront, east of the Staten Island and later Elizabeth Town Ferries. This area was referred to as the Whitehall Dock (NYCC 1917, I: 121). In fact, the 1766/67 Ratzen Plan identifies Moore Street as Whitehall Street (see **Figure 4.15**).

Perhaps associated with the 1785 petition above, the city recommended in 1800 that a new pier be constructed from the "inner part of Whitehall Slip," into the river alongside the Battery. Jonathan Dayton and Aaron Ogden requested permission to erect a wharf or pier on the west side of the Whitehall Slip for the exclusive use of the Staten Island and Elizabethtown ferries. The Slip being a

> natural point of communication with Staten Island, Elizabeth Town and many other parts of New Jersey and is the only Landing place for the Ferry Boats from those places, but from its present unimproved State Horses and Carriages cannot be taken into these Boats except at high Water, and their Numerous Passengers some old and infirm and women and Children are not unfrequently in bad and Windy weather obliged to climb across the Decks of Several Vessels loaded with

[76] Today's Ellis Island was named "Little Oyster Island" by the Dutch in honor of the surrounding oyster beds.

[77] The Taylor Roberts 1797 *Plan* places the Elizabeth Town Ferry at the southeast corner of Whitehall Slip and South Street as it was located at the time (**Figure 4.24**). Present-day South Street is south of that location.

> Hay and other Lumber to get out and into these Ferry Boats—Your committee therefore recommended that a pier be Built from the inner part of the White Hall Slip out into the River along side of the Battery agreeable to a plan made by Robert Valentine and now laid before the Board, which will likewise give very Considerable Accommodation, to the River Crafts and the many Boats that are constantly Communicating with the Shipping in the lower Harbour (NYCC 1917, II: 647).

Two men named Ryerson and Crane offered to construct a pier at their own expense if the city would give them a 21-year lease but the city preferred shorter and more lucrative leases and refused the offer (NYCC 1917, II: 655; Stokes V: 1539).

> There are thirteen Elizabeth Town and Staten Island Ferry Boats. Mr. Crane who has Leased the five former for three Y[ears], offers thirty Dollars for each Boat per annum for the Accommodation the proposed Pier and Stairs will afford him, and the owners of the Staten Island Boats will probably pay about half that Sum for each boat of theirs (NYCC 1917, II: 647).

The Common Council took measures "for obtaining Proposals to build the Pier on contract" and in 1801, a new pier was constructed in line with the "north side of the Slip" for which the city paid $3,000 (Stokes 1967, V: 1380; NYCC 1917, II: 655, 699; Ibid III: 16-17). The city also ordered that piers beginning at the Battery should be designated by numbers although this ordinance does not seem to have been heeded by New Yorkers until circa 1815 (Stokes 1967, V: 1388). The archaeologists recovered timbers cut in 1785 in WHS B and WHS C which might represent trees felled for the work initially requested by the 1785 petition but finally constructed in the early 1800s (see **Chapter 5: B.6. Whitehall Slip Conclusions** and **Appendix H**).

In 1801, the State Legislature passed a Ferry Act forbidding anyone except the Corporation of the City of New York to erect or keep a ferry between New York and Long Island. In that same year, the city passed an ordinance compelling owners of water lots on South Street between Whitehall Slip and Broad Street to build a "pier on the north-east side of Whitehall[78] Slip to range with this slip" and another on the southwest side of the Broad St. Slip. Other piers were to be made at other slips along the East River waterfront. Each new pier had to extend 200 feet into the East River and be 30 feet wide. The new piers also had to be "formed of three blocks the outermost Block to be 30 feet by 40 feet and the two inner blocks to be 30 feet square with 3 Bridges of 33'4" each" (NYCC 1917, II: 744-45 in Stokes 1967, V: 1385). According to Burrows and Wallace (1999: 388), "spiked wooden poles were drop-hammered into the river bottom to form sea walls, then the water lot they enclosed was filled in with rubbish, earth, and cinder." In some places, cribworks were used. Construction of these piers was ordered to begin on July 1, 1801 and to be completed by November 1, 1802 (Ibid). In 1805 the Common Council concluded that the ferry stairs along the east side of the Slip should be moved closer to the river end of the Slip (NYCC 1917, IV: 53) and that Whitehall Slip ought to be filled up an additional 25 feet to the south. The west side of the Slip was only 4 feet deep at low water and only 12 feet deep as far out as 200 feet into the East River. For that reason, it was charged that the new pier to be constructed alongside the Battery should extend 400 feet out into deeper water. It would also have an L-shaped extension 20 feet wide at its end (NYCC 1917, IV: 53; Grossman & Associates 1987: 40). This pier was designated Pier No. 1 (NYCC 1917, VIII: 302). It can be

[78] The Common Council ordered payment of $3,000 for "the New Pier at Whitehall" (NYCC 1917, III: 16-17).

seen unnumbered on the 1811 *Commissioner's Plan* by William Bridges (see **Figure 4.26**) and enumerated as Pier 1 by Hooker in 1824 (see **Figure 4.38**). The west side of Whitehall Slip was set aside for hay boats, while the 20-30 ferry boats that also used the Slip were to be given access to the "L" and the east side of the Slip (NYCC 1917, IV: 53-54). Ferry license fees were expected to cover construction costs.

Robert Fulton's successful experimentation with steam in 1809 brought great changes in water transportation and ferry service began to proliferate in the harbor. Whitehall Slip saw the establishment and expansion of ferry lines to Elizabethtown (Elizabeth, NJ), Atlantic Street and Hamilton Avenue in Brooklyn, Staten Island, and Governor's Island (Stokes 1915, III: 942-944).

In 1809, the Corporation of the City of New York directed that three piers should be constructed into the East River south of South Street between the Whitehall and Exchange Slips[79]. William Bridges' *Commissioner's Plan* (see **Figure 4.26**) shows three piers at that location that were later designated Piers 2, 3 and 4 (see **Figure 4.38**). However, they are outside the project area.

A survey by Street Commissioner John S. Hunn in 1809 indicates that at this time Whitehall Slip extended inland to the north to approximately midway between Front and South Streets (Grossman & Associates, Inc. 1987: Figure 21). This might be the result of the 1805 directive that ordered Whitehall Slip to be filled up an additional 25 feet to the south (see above). This same configuration is shown on the 1811 *Commissioner*'s *Plan* (see **Figure 4.26**), which depicts a somewhat reduced Whitehall Slip due to the construction of the new piers.

In 1809 there were complaints that manure boats berthed at Whitehall Slip were being impeded by "prize vessels[80]" that could not be moved (NYCC 1917, V: 532-533). In 1816, the Common Council ordered private manure dealers to load their boats only at the westerly side of the west pier at Whitehall Slip (NYCC 1917, VIII: 406). It is likely this was the side of Pier 1 facing the Battery.

An April 28, 1810 advertisement in the *New York Evening Post* reported that starting on May 1st, the "Steam Boat *Rariton*" would set sail at 6:00 A.M. each morning "from the north side of the battery for Elizabethtown Point, Perth and South Amboy (Thursdays excepted) and return again the same evening. Stages are furnished to meet Passengers for Philadelphia at each of the above places. Breakfast, Dinner and Tea on board, as usual" (Stokes 1967, V: 1519). It is not clear where the *Rariton* set sail from, perhaps Marktveldt St. (present day Battery Place) where there was a wharf at the time.

In 1813, a 26-ton periauger[81] owned by 19-year old Cornelius Vanderbilt was used as a ferry between Staten Island and Whitehall Slip. When it capsized and sank opposite the Whitehall Ferry Landing, Vanderbilt had it raised and refitted (NYCC 1917, V: 264 and Lane 1942: 17-18, 23).

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[79] Exchange Slip was located at the foot of Broad Street.

[80] A "prize" was a captured enemy vessel. Privateers would attack enemy shipping for profit. The privateer took his prize to a court and could sell his prize legally. A pirate would attack any ship and sell his prize to anyone.

[81] Periaugers (pirogues) were much in use in rivers and harbors in the 18th- and early -19th centuries. Due to its peculiar construction periaugers were considered safe for use as ferries. One account described the vessel as an open boat with 2 masts and a leeboard on each side. When the boat tipped over in a strong wind, the leeboard on that side "spread out like a wing into the water and substituted for a keel" (Folsom 1918: 48).

In 1816, shipbuilders Adam and Noah Brown and Vice President and former New York State Governor Daniel D. Tompkins were awarded exclusive rights to run steamboats between New York City and Staten Island. Tompkins had secured a charter for the Richmond Turnpike Company, as part of his efforts to develop the village of Tompkinsville in Staten Island. Although initially intending to construct a highway across Staten Island, the company also received the right to run a ferry to New York. They asked the city to set apart a portion of land under water between the Battery and the west pier of Whitehall Slip for a steamboat wharf and permission was granted (NYCC 1917, VIII: 658, 740). They also asked to lease the whole of the west pier in Whitehall Slip for 18 years "for the purpose of accommodating the Steam Boats" they planned to build (Ibid). They also needed a "floating bridge to land Carriages passengers and other things thereon from their Boats" and another bridge of approximately 8 feet in width to be constructed from the southern end of the short pier in the Slip to the westernmost pier, "being a distance of about 80 feet for their boats to lay alongside of" (Ibid). In addition, they wanted to erect a "small low building about 10 feet square along side of the last mentioned Bridge" to be used as a toll house for their passengers and requested that "about 10 feet be taken off from the South East corner of the Battery and thrown open to the dock so as to finish the same in a Circular form for the more convenient passing of Carriages" (Ibid). In addition, they wanted a

> Bulkhead sunk from the South West Corner of the Battery to the West pier of the said Slip, at a point about 80 feet from the Battery which will enclose a Triangular piece of Ground which is now left bare at low Water and that the same be filled up with Earth as a stand for Carriages, two sides of which Ground will be about 100 feet each and the other side about 80 feet (NYCC 1917, IX: 59-60).

In 1817, the Richmond Turnpike Company began to run the first motorized ferry, the *Nautilus*, between New York and Staten Island. In 1818, Tompkins and Brown were granted permission to construct a new pier at the southeast end of the Battery (NYCC 1917, IX: 91). At the same time, Aaron Ogden of Elizabeth Town, N.J. sought to obtain a lease for the exterior of the slip for his ferries, which travelled between Elizabeth Town and New York (Ibid: 761). Cornelius Vanderbilt and others opposed Ogden's petition and it was referred to the Ferry Committee of the Common Council (Ibid IX: 766; X: 2). Despite strong opposition, the city granted Ogden permission to use the southwest side of Whitehall Slip between the ferry stairs and the head of the Slip between May and the end of October (NYCC 1917, X: 31), but refused to guarantee use of the Slip during the winter (Ibid). An 1817 Hooker *Pocket Plan* (not illustrated) shows the Elizabeth Town Point[82] and Staten Island Ferries at a wharf on the west side of Whitehall Slip, east of Pier No. 1.

In 1820, Tompkins and Brown complained that the city hadn't kept its promise that Pier 1, the L-shaped pier at the foot of the Battery, and another short pier[83] (possibly the pier depicted on **Figure 4.51**) would be repaired and that the "Lane between the Battery and Whitehall Slip should be widened" (NYCC 1917, XI: 219). Due to the city's negligence, the plaintiffs claimed to have suffered "considerable loss and injury" (Ibid). In 1822, Tompkins and Brown complained that a portion of their pier had been removed to extend the Battery. This was the result of construction work to widen a carriageway by removing a small portion of the battery, to build a new wall and fence from State Street, and to pave a carriageway to the steam boat wharf

[82] Elizabeth, New Jersey

[83] It is not clear which pier this is.

(Ibid XII: 365). That same year, a bulkhead was constructed at Whitehall adjoining Pier 1 and the "Middle Pier" (Ibid: 488). It is possible this work is depicted on the 1836 map that is identical to Ewen's 1827 map (see **Figure 4.51**).

In 1823, Moses Jacques and Elias B.D. Ogden were granted a 10-year lease for use of the west side of Whitehall Slip for the steamboat *Atlanta* which was to provide service to both Staten Island and Elizabeth. The partners extended the bulkhead and constructed 1or 2 small buildings to store baggage (NYCC 1917, XIII: 181, 226-7). It is likely this configuration is illustrated on Hooker's 1824 *Plan* (see **Figure 4.38**). Jacques and Ogden shared the Slip with Brown and Tompkins. In 1824, the Fulton Bank purchased the Richmond Turnpike Company's real property and ferries. The state legislature sanctioned the conveyance by the Richmond Turnpike Company for available consideration to the Fulton Bank. In 1827, a complicated transaction took place whereby the Fulton Bank asked that earlier ferry leases be transferred to the Richmond Turnpike Company owned by Cornelius Vanderbilt and Oroondates Mauran and subsequently to the Fulton Bank. Jacques and Ogden and Brown and Tompkins asked out of their lease and a new 10-year lease to the Fulton Bank was approved in July 1827 (Ibid, XVII: 29, 39, 89). On March 17, 1828, the Committee on Wharves, Piers and Slips was asked to conduct a study of the effectiveness and best method of constructing "Docks and Piers of Stone" (NYCC 1917, XVII: 299-300). It was necessary to know if it was worth the expense to rebuild the city's public docks and piers and to construct new ones of stone rather than wood. At this time there were several ferry-associated structures at or near the Slip. The Richmond Turnpike Company rented one of the buildings for use as a tavern for its passengers. At the same time, David Jacques was given permission to maintain a liquor store at his slip at the "Steam Boat Wharf at Whitehall" (Ibid, XVIII: 150, 183). The Fulton Bank also constructed two small houses for the use of its ferry passengers, although one was for the convenience of male passengers only (Ibid: 184). By 1830 several newspapers were granted permission to erect and share a small boathouse at Whitehall (Ibid: 606). From there, reporters would sail out to meet incoming vessels to gather the news and perhaps obtain a "scoop."

In 1835, the city granted a lease for a "South Ferry" that would travel between Whitehall Street and Atlantic Avenue in Brooklyn. This is the first use of the designation, "South Ferry." The lease was in the name of the Brooklyn Union Ferry Company and was renewed in 1844 to last until 1851 (Pierrepont 1879 Appendix: 17-20). The new company actively proceeded to improve ferry travel by replacing the older boats with sturdier craft and by improving the ferry landings. The establishment of the Long Island Railroad Ferry[84] landing at South Ferry in 1835 also meant additional improvements were necessary (see **Figure 4.52**). In 1838, Cornelius Vanderbilt, who had grown wealthy in the steamboat business, bought control of the Richmond Turnpike Company. Except for brief periods, he would remain the central figure in the company until the Civil War when he sold it to the Staten Island Railway (Stiles 2009).

The Hamilton Ferry, which ran from the foot of Whitehall Street to Fort Hamilton Avenue in Brooklyn, was established in 1846 and leased to the Brooklyn Union Ferry Company who owned the Atlantic Avenue Ferry (see above). As a result of this increased activity, the facilities at Whitehall Slip had to be enlarged (see **Figure 4.42**). Plans to improve the facilities at Whitehall Slip were filed in 1845 and adopted by the city (see **Figure 4.52**). They involved Cornelius Vanderbilt as a central figure. One of the proposed improvements included a 225-foot pier to be constructed by the Brooklyn Union and Richmond Turnpike Companies. This pier was

[84] The ferry traveled between Brooklyn and South Ferry.

to run diagonally from the Battery and Pier No. 1, 105 feet from Pier No. 1, for the use of the Staten Island Ferry. The proposed pier can be seen off the Battery on the 1845 *Plan for Improving White Hall Slip* (see **Figure 4.52**). Additional structural changes were made to the Slip and at this time the bulkhead along the north side of South Street was filled in with debris from the Fire of 1845 that swept through lower Manhattan. The fire reached Bowling Green and all the east side of Broadway from Exchange Place to Whitehall Street was burned or burning. The west side of Broadway, Broad Street, Stone Street, and Wall Street were also affected. There was fear the fire would span the width of the city and reach from river to river. Fire engines drew water from a fountain at Bowling Green. The fire entered Whitehall Street and was approaching State Street when it was suddenly brought to a halt (Pierrepont 1879: 55; Costello 1887, I: 239).

Other proposed changes included straightening bulkheads between the piers and constructing new ferry buildings. For example, a 38-by-35-foot passenger room that would serve the Atlantic and South Ferries was erected, as well as a new 23-by-41-foot passenger room for the use of Staten Island Ferry passengers on the new diagonal pier, called the Vanderbilt Pier.

Vanderbilt was given use of the new pier for nine years beginning in 1846. However in 1849, the city ousted the Richmond Turnpike Company, of which he was the head, from the western side of Pier No. 1. The city held that Vanderbilt had not provided proper service and that the city had the right to act on behalf of the public. By this act, the city reasserted its right to lease and govern all ferries (*New York Supreme Court: Vanderbilt v. Mayor, Alderman and Commonality of New York*, 1849). In 1904, workmen excavating for a new subway loop, found what they believed to be Vanderbilt's Pier near the foot of Whitehall Street (New York Times 9/20/1904). Their pick-axes struck "the planks which covered the dock built by Commodore Cornelius Vanderbilt" (Ibid). The planks were oak and the "stringers" of yellow pine (Ibid). A copper penny dated 1803 was recovered above the planking and a 1755 British half-penny, a cannon ball with the English coat of arms and an engraved arrow, were also found nearby (Ibid) and were "sent to the office of Engineer Parsons" (Ibid). Their final disposition is unknown.

A *Plan for Improving White Hall Slip Submitted to the C. Council and Adopted* shows that by 1845 Whitehall Slip had been filled in to the north side of South Street and plans to fill it in to the south side were proposed (**Figure 4. 52**). At this time there were still two ferry slips that extended to the north side of South St. for the Long Island Railroad (Atlantic Ave.) and South Ferry (Fort Hamilton Ave.) boats. It is possible these were the areas filled with debris from the 1845 fire. Daniel Ewen's 1848 survey, *Proposed Enlargement of the Present Battery*, includes Whitehall Slip and is considered an accurate representation of the waterfront at that time (see **Figure 4.27**). It shows that Whitehall Slip was to be filled in to the south side of South Street. Vanderbilt's diagonal pier runs alongside what will be the newly filled-in Battery, which soon will encompass Castle Garden through more landfilling. Pier No. 1 is present on the west side of Whitehall Slip and two additional and shorter wharves are located at the foot of Whitehall Street between Piers No. 1 and Pier No. 2 which is along the east side of Whitehall but south of South Street.

By 1849, all of South Street had been filled in and improvements had been made. These included the 225-foot-long pier for the Staten Island Ferry beginning at the foot of the east side of the Battery, a U.S. Revenue Barge Office, a pier for the *New York Herald Ship News* Office, Slips for the Atlantic and South Ferries, a Long Island Railroad Baggage Room, Ferry Bridge, Passenger Room, and store rooms and another newspaper office for the *Courier* and *Enquirer*. Some of these piers and buildings were constructed at South and Whitehall Streets, others on the wharves of the Slip and can be seen on the 1849 Smith *Map of the Waterfront* (**Figure 4.70**) and more completely in A *Bird's eye view of New-York & Brooklyn* in 1851 (**Figure 4.40**). The 1852 Dripps Map shows the ferry and newspaper structures as darkened hatched areas. It also indicates that the Hamilton Ferry now occupies the 1849 Atlantic Ferry Berth while the South Ferry remains in its same location (see **Figure 4.39**).

The 1855 *Maps of the Wharves and Piers* by city surveyor Edwin Smith, indicates that the South Ferry berthed at the foot of Whitehall Street, close to the east side of the Slip in 1852, had been replaced by the Hamilton Ferry (**Figure 4.71**). By 1860, a "Harbor Police Boat House" had been constructed off shore, opposite the U.S. Revenue Barge Office (Buckhout 1860).

The 1864 South Ferry Terminal was replaced in 1906 by another structure and this building was extensively altered and expanded over the South Street roadbed in 1954 when it was transformed again into the Whitehall Ferry Terminal that was recently replaced in 2005 by a new Staten Island Ferry Terminal. The 1867 Dripps *Plan* also shows the ferries south of South Street at the foot of Whitehall Street and outside of the project area—the South Ferry to Atlantic Avenue, the Ferry to Hamilton Avenue in Brooklyn, and the Ferry from Tompkinsville, Staten Island (see **Figure 4.30**). It also shows the horse car tracks following the curve of State Street down to the foot of Whitehall Street.

In 1868 the Commissioners of Sinking Fund made a survey of the East River wharves, piers and slips belonging to the Corporation of the City of New York. Pier No. 1 was described as a "block and bridge" pier, 201 feet long and 27 feet wide with an "L" that was 84 feet long and 41 feet wide, and with 6 feet of water at the outer end and no water at the "inner end" (Commissioners of the Sinking Fund 1868) (see **Figure 4.72**). But it needed rebuilding, although the bulkhead, 81 ½ feet east of Pier No. 1, was in good condition at the time. The pier west of Pier No. 1 near the Battery was also a block and bridge pier, 264 feet long and approximately 27 feet wide and with 14-15 feet of water at its foot and none at its head. It, too, was badly in need of repairs.

The west side of Pier No. 1, the bulkhead 26 feet west of Pier 1, and the Pier to the west of Pier No. 1 were used for ferriage. Since the U.S. Revenue Office on Pier No. 1 was scheduled for removal, a suggestion was made to remove the "L" of the Pier which would leave room to accommodate another ferry slip, thereby increasing the value of the bulkhead. Construction at Pier No. 1 began in 1872 and was completed in 1876. This block and bridge pier was 453 feet long and 80 feet wide and "formed of 18 semicircular concrete arches of 11 ½ feet radius…supported by crosswalls 5 ½ feet thick except at the outer end of the pier where the wall is 12 ½ feet thick" (Greene 1917: 154). The crosswalls were constructed of concrete blocks set in place by derricks and employing underwater divers. They rested on concrete beds that were poured from large buckets into weighted and submerged wooden forms that had been placed on the bedrock, 25 to 50 feet below the surface of the river (Ibid).

Additional plans were proposed for further widening and lengthening of existing docks and wharves between the Battery and Broad Street.

A circa 1875 photograph (see **Figure 4.42**) of the Hamilton and South Ferry Terminal illustrates the ornate Victorian structure that served the Brooklyn ferries at the foot of Whitehall at South Street. Whitehall Street and the piers functioned as the southern terminus for public transportation. The Hamilton Ferry was established as a service from the foot of Whitehall Street to Hamilton Avenue in Brooklyn and was leased to the Union Ferry Co. in 1846. The South Ferry from the foot of Whitehall Street to the foot of Atlantic Street in Brooklyn was established in 1835. The construction of the ornate Victorian structure, mentioned above, destroyed the news offices, storerooms and ferry bridges originally located there. In turn, this ebullient, flamboyant structure was destroyed by the construction of the later Staten Island Ferry buildings.

The 1885 Robinson and Pidgeon *Atlas of the City of New York* illustrates the shape of the piers at the foot of Whitehall Street which have begun to take on their modern configuration (see **Figure 4.41**). By 1902, the Staten Island Rapid Transit Company had established the Bay Ridge and St. George Ferries. This company shared the double pier at the location of present-day Pier No. 1.

The Broadway Stage, looking like a horse-drawn bus in 1861, had South Ferry as its destination (see **Figure 4.43**). The foot of Whitehall Street was also a "terminus for omnibus and horse drawn stage lines during the mid- to late-19th century" (HPI 1993: 13; see **Figure 4.44**). The elevated railroad structure winding through Battery Park was built in 1877 (Stokes III: 847). **"**By the 1890s, horse trolleys and elevated rail lines terminated at the foot of Whitehall Street" (Ibid). South Ferry was a hub for the elevated railway (the "El") from the late 1870s through 1941 (see **Figures 4.45, 4.46 and 4.47**). The area was a maze of intersecting ground level and overhead tracks that converged at the South Ferry Elevated Station. The old elevated train system ran on steam until 1903 when it was electrified. It proceeded from Greenwich Street through Battery Park along State Street to Whitehall Street. The Ninth Avenue, Third Avenue and Second Avenue Els all reached their terminus at Whitehall Street, known as the South Ferry Station. Although the El was demolished in 1941, many of the subsurface footings were retained in place. Several early footings were uncovered during excavations for the subway constructed in 1904 (see **Figure 4.50**). Other footings were uncovered in 2005 during excavation for the new South Ferry Terminal Station and were recorded by the archaeologists (see **Figures 5.94-5.98**).

6. THE FIRE OF 1776

British forces under General Howe occupied the city on September 15, 1776. On September 21st, fire broke out at the *Fighting Cocks Tavern* on Whitehall Slip and quickly grew out of control. There were few firemen in the city as most, if not all, had accompanied the retreating American army. In addition, "church bells [which could have tolled out a warning] had been secreted away or carried off by the American troops. Fire engines and pumps were not in good working order" and high winds accelerated the fire (Dunshee 1952: 70).

After the buildings on the east side of Bowling Green were destroyed, the wind shifted and the flames jumped Broadway, sparing the buildings inside the Fort and the British Army headquarters at No. 1 Broadway, as well as the houses just to the north. Eventually, more than 400 buildings including Trinity Church and the steeple of St. Paul's Chapel were consumed (see **Figure 4.20).** The British believed that Washington ordered the burning of New York during his retreat and more than 200 people were interrogated, including Nathan Hale. It is likely that burned materials were dumped or swept into the project area, including Whitehall Slip, and added to the fill along the waterfront.

As noted above (see **Chapter 4.A.13. The British Occupation of New York City**), a tent city called "Canvass-town" grew up near the East River waterfront between Whitehall and Broad Streets near Whitehall Slip after the fire. It was filthy, malodorous and overcrowded with its part huts, part tents made from any standing walls of houses and ship's spars, all covered with old canvas from ships.

Mayor James Duane ordered a grand jury investigation into the activities at Canvas Town after the war in 1784 and many of its inhabitants were sent to the Bridewell Prison in present-day City Hall Park. The slum was still there in 1790 when the United States Supreme Court "met in the

New Exchange building on Broad Street near Water St. and thus smack in the middle of Canvas Town's riot and revelry" (Caldwell 2005: 51). No one seemed to notice.

7. FILLING IN WHITEHALL SLIP

In 1706, Whitehall's residents complained that a "Dunghill" near Whitehall was flowing into the Great Dock when it rained. To prevent the flow of "Dirt" into the Great Dock, the residents were asked to fix a piece of timber on "the Wall Plate" that would rise about 6 inches above the Pavement (NYCC 1905, II: 294). It is not clear if the "wall plate" was a bulkhead at the end of the street or referred to the wall plates of houses and stores. Nonetheless, "dirt" was a problem along the waterfront.

In 1745, physician, botanist and later Lieutenant-Governor Cadwallader Colden wrote to Dr. John Mitchell of Virginia that the slips were the common shores where all the

> filth and nastiness of the town and streets is emptied so that in the summer time there is constantly a most offensive abominable smell in them…All that part where wharfs are is low ground. About 9 or 10 years since the Royal Battery[85] was built at the extreme into the harbor near the confluence of the two rivers and as it extends a considerable way into the stream of the river it stopt the current all along the whole extent of the wharfs. Before this the stream in great measure carried away a great part of the filth that was thrown off the wharfs and came from the slips which now settle & sometimes keeps floating in the eddy (Hartog 1989: 59).

To direct some of the street run-off into the river, Myndert Schuyler constructed a drain from his house at the corner of Whitehall and Pearl Streets into Whitehall Slip in 1746 (NYCC 1905, V:191). In 1748, David Van Horne laid a drain from his lot "near the White Hall"[86] at the corner of present-day State and Whitehall Streets where he was erecting a still house. He noted that this was "the street into the Bason within the Battery" (NYCC 1905, V: 227). It is likely the "Bason" is the Battery Pond (see **Chapter 4. A. 6. George Augustus' Royal Battery**) but it is not clear if he is laying a drain into the Pond or into Whitehall Slip.

The first recorded instance of cleansing or dredging Whitehall Slip was February 23, 1753, when Francis Filkin, Esquire was paid £1:1:6 for cleaning it out (NYCC 1905, V: 393). In 1760, John Griffiths was paid £38:5:2 for "cleansing the White Hall and Ferry Slips &c" (NYCC 1905, VI: 218). Additional dredging episodes took place throughout the 18th century. On March 20, 1797, the Common Council ordered Whitehall Slip to "be dug out" and "Flatt boats (bateaux) of the Commissioners for Fortifications" used for that purpose (NYCC 1917, II: 331). A certain Mr. Haber was ordered to use a "mud drudge" to dig out and deepen the Slip at that time (NYCC 1917, II: 33, 399-400). The "mud drudge" might be the newly invented "Dock Drudge" that allowed public slips to be cleaned more effectively. It had been purchased for 150 pounds by the city in June of 1791 (Stokes 1967, V: 1386). That same year, Daniel Hitchcock was given permission to "take up" Whitehall Street to insert a private drain into the common sewer (NYCC 1917, II: 357). David Walker was also given permission to run a drain from his cellar into the common sewer (NYCC 1917, II: 375). This suggests there was a "kennel" or sewer in Whitehall

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[85] George Augustus's Royal Battery constructed circa1734/35 (**Figure 4.11**).

[86] This is possibly the location of Stuyvesant's official town residence, renamed Whitehall by the British.

Street that probably emptied into the Slip. A drain in a stone retaining wall or bulkhead was found by the archaeologists in WHS A**: B.5.a. WHS A**).

The earliest reference to filling in the Slip occurred on November 13, 1772, when several freeholders and inhabitants living near Whitehall Slip petitioned the city for permission to fill it in "as far to the South ward, as to Range with the Corner of the Street, that adjoins the House of John Martin & no farther" (NYCC 1905, VII: 389). An attempt was made to locate Martin's house or tavern in documents or maps but the exercise was unsuccessful. This information, had it existed, would have allowed the archaeologists to determine exactly how far the Slip was filled in at that time. Historic maps provide conflicting information (compare **Figure 4.11** with **Figure 4.15**, for example).

On April 27, 1774 the Common Council ordered the filling of Whitehall Slip to be completed as it had "become a very great Nusance to the Neighborhood" (NYCC 1905, VIII: 27-28). The work was undertaken by John Brandon, Joseph Farly and Andrew Gautier (NYCC 1905, VII: 39; NYCC 1905, VIII: 27-28). In 1778, James Monnell received £27 for filling in the Wharf and £9 for repairing the Wharf at Whitehall Slip, however it is not clear which wharf was filled or which was repaired (Grossman & Associates 1987: 28). Neither the 1766/7 Ratzen (**Figure 4.15**) nor the 1782 Campbell *Plans* provide many details about Whitehall Slip (**Figure 4.19**). Ratzen illustrates a set of ferry stairs on the east side of Whitehall Slip and it is possible this is the wharf referenced above. Montresor's 1766 depiction of Whitehall Slip is radically different from other maps of the time period and is the only 18th-century map to depict a long middle pier in the center of the Slip, similar to that depicted on much later maps (see **Figure 4.18**). However, Montresor's map is not considered to be as accurate as Bernard Ratzer's (Ratzen) *Plan*. Ratzer, however, put the head of the Slip in the wrong place, so it is apparent that all historic maps have inaccuracies (see **Figure 4.15**).

In 1786 there was another petition by several inhabitants of Whitehall Slip asking that part of White Hall Slip be filled (NYCC 1917, I: 221). The city also paid for a breastwork or bulkhead to be constructed across the Slip, 80 feet farther into the East River than the previous bulkhead (Stokes 1967, IV: 696). This suggests that additional work was undertaken that is not shown on any maps. The 1786 breastwork was to be constructed for the convenience and "health of the Inhabitants" (NYCC 1917, I: 248). At the same time, Whitehall Street was to be raised up "to a sufficient height to carry the water over the…bulkhead" (Ibid). This would prevent standing water from pooling at the head of the Slip, creating a health hazard. On September 12, 1787 vagrants incarcerated in Bridewell Prison were employed to carry "earth to fill up the Street at the Whitehall Slip" (Ibid: 291). The work was not completed at this time, however, as the following year it was ordered that the bulkhead be completed and the Slip filled in (NYCC 1917, I: 372). In May 1788, the city ordered the Whitehall dock to be repaired because it had been damaged during the winter (Ibid: 354, 372, 382, 383, 393, 396, and 403). Again, it is difficult to say with any certainty where this filling took place, as maps from this time period do not show any changes. According to the documents cited above, however, further repairs and filling took place at the Slip that year, including repairs to the Whitehall Ferry Stairs. A "hulk" was also ordered removed from the Slip in 1790 (Ibid: 612; II: 139). Another or perhaps part of the same vessel was removed opposite the Whitehall Ferry in 1812 (Ibid VII: 264, 601).

After Fort George at the foot of Broadway was demolished circa 1790, a new bulkhead beginning at Battery Place and extending to Whitehall Slip was constructed (see **Chapter 4: A.16. Demolition of the Fort**). A New York City Department of Parks and Recreation map drawn in the 1930s shows various bulkheads in Battery Park, some of which wrap around the west side of Whitehall Slip (see **Figure 4.73).**

In 1796, Yellow Fever struck the lower sections of the city's First Ward, including Whitehall Slip. The Fever was assumed to be the result of the 1796 filling in of 70 feet of South Street (located on the southeast side of Whitehall Slip and outside the project area) with "filth and materials tending to produce putrification, as also from the sunken state of many of the lots in that quarter" (NYCC 1917, II: 259). Streets and lots in the area between Whitehall and Exchange Slips[87] were subsequently filled and raised up to "prevent noxious vapours[88]" (Ibid: 204) and Whitehall Slip was straightened (Ibid: 272). There was good reason to believe that noxious vapors caused Yellow or Dock fever as can be seen in the following description of filling methods at that time. The proprietors of lots along the east side of the Slip between Whitehall Dock and Broad Street

> carried out a bulk-head the last spring, with a view to extend the dock farther into the river. The dimensions of the dock are very considerable; and a maxim invariably adopted by the owners of the docks, is, that the cheapest mode of filling up is the best: accordingly carts were employed to collect such dirt and filth as all large and populous cities furnish in abundance; and with materials of this description was the dock filled up, and to give greater salubrity to the mass, there were occasionally added dead horses, dogs, cats, hogs, &c. &c…[However, the] "present exertions of the common council, in giving a new surface of wholesome earth to the dock at White-Hall will no doubt be productive of the greatest advantages to the inhabitants of that part of the city: and if the same measures were extended to other parts of the town there would be much less reason to apprehend a return of the dock fever" (Richard Bayley[89] 7/20/1796).

The street between Pearl Street and the East River was officially designated "Whitehall Slip" in 1796, (NYCC 1917, II: 57), although it had been called that for years and is labeled as such on maps as early as 1755 (see **Figure 4.11**). The 1797 Taylor Roberts map indicates that at the end of the 18th century the head of the Slip was still located just south of present-day Front Street (see **Figure 4.24 and Figure 5.136**).

In 1801, the city passed an ordinance making it obligatory for owners of water lots on South Street between Whitehall Slip and Broad Street to build "a pier on the north-east side of Whitehall Slip…and a pier on the south-west side of Broad St. slip…" (NYCC 1917, II: 744-45). Although these piers are east of and just outside the South Ferry Terminal project area, they are mentioned because their dimensions and descriptions are of interest to this study for the reason that there are no descriptions of how the neighboring Whitehall Slip was constructed. Each new pier was to be 30 feet wide and extend 200 feet into the East River. The piers were "formed of three blocks the outermost Block to be thirty feet by forty feet and the two inner blocks to be thirty feet square with three Bridges of 33'4" each" (Ibid). Cribbing blocks are comprised of a series of interlocking logs that form box-like open cells. While the archaeologists uncovered no complete measurable blocks during the Whitehall Slip data recovery, each of the

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[87] Exchange Slip was situated at the foot of Broad Street and is illustrated on the *Commissioner's Plan* (**Figure 4.26**).

[88] At that time, noxious vapors or "miasmas" were thought to cause Yellow or Dock Fever.

[89] Bayley was the city's Health Officer under Mayor Richard Varick.

cells identified by the archaeologists measured approximately 5 to 7 feet across and up to 7 feet high.

In August 1801, the *Daily Advertiser* reported that the City had begun the plan of filling up all the slips on the East River between the Battery and Corlear's Hook and carrying the wharves further out into the East River. The wharves were to be spaced 150 feet apart and 150 feet from the nearest buildings (Stokes 1967, V: 1386). They were also to be numbered (NYCC 1917, III: 57) (see **Figure 4.38**).

> The wharves are to be no more indented and broken by slips and docks—where the filth of the city accumulates and rots, and proves by its exhalations the fruitful source of pestilence and death…In order to give vessels protection from ice, etc. and to enable them to load or to discharge their cargoes with greater convenience than by lighters, as in some parts of Europe, square or oblong wharves, or piers are to be formed in front of this permanent wharf…at convenient distances from each other, with bridges thrown across the permanent wharf (Ibid).

In 1804, there was a petition demanding the City repair the common sewer near the Whitehall Slip with brick but the work was postponed (NYCC 1917, III: 518). The following year, J.B. Coles requested the City rebuild the Whitehall Slip drain with brick or stone; his petition was also postponed. It is not known if this work was ever conducted.

A number of other wharves and piers were constructed in Whitehall Slip and at the foot of the Battery during the first decade of the 19th century; these are discussed above (see **Chapter 4: B.5.A. Further History of Whitehall Slip**). As also previously mentioned, in 1805 the city recommended that Whitehall Slip be filled in 25 feet at low water and that the ferry stairs be moved. In addition, a new L-shaped pier was to be constructed on the west side of the Slip. This L-shaped pier was designated Pier No. 1 in 1815 (NYCC 1917, VIII: 302). In July, 1805, John Sullivan requested permission to build a vault (possibly a privy vault) at Whitehall Slip (Ibid IV: 49). By 1809, the head of Whitehall Slip was located approximately mid-way between Front and South Streets and the 1811 *Commissioner's Plan* depicts this new configuration (see **Figure 4.26**). Inhabitants living and working in the vicinity of Whitehall Slip in July 1821 complained that the Slip had not been cleaned in years and was offensive. The Committee on Wharves and Piers and Slips was of the opinion, however, that it would be "very improper" to clean out the slips in the heat of summer and refused the petitioners' request. Cleaning of the wharves, however, appears to have taken place in 1828, although this was probably only surface-cleaning, e.g., removing trash and washing off the mud (Ibid XVII: 52).

The L-shaped pier (Pier No. 1) mentioned above is illustrated on the 1824 Hooker Plan (see **Figure 4.38**). When Hooker's map is compared with the 1836 map of proposed improvements[90] (see **Figure 4.51**), it is apparent that plans were being made to fill in the Slip as far as the north side of South Street. "This coincided with an 1822 Common Council resolution that a bulkhead be extended across Whitehall Slip from Pier 1 in a line with the southern side of South Street, which continued the filling of the Slip southward to South Street" (NYCC 1917, XII: 457 in HPI 1993:13). The 1836 Plan for *Proposed Improvements to the Battery* (see **Figure 4.51**) was used in one of Cornelius Vanderbilt's lawsuits against the City during which Vanderbilt attempted to gain access to the pier alongside the Battery (Grossman & Associates 1987). This beautiful

[90] The 1836 map is identical to the 1827 map of improvements by Daniel Ewen (not illustrated).

hand-colored map shows the Whitehall Stairs at the head of the northeast portion of the Slip, which is still located between Front and South Streets at this time, although additional filling had no doubt begun. Proposed improvements depicted on this Plan include the filling of Whitehall Slip to South Street. The 1845 *Plan for Improving White Hall Slip Submitted to the C. Council and Adopted* (see **Figure 4.52**) shows that Whitehall Slip had been filled in to the north side of South Street and plans to continue filling to the south were being made. More fill was later added to the bulkhead along South Street outside of the project area; this fill consisted of debris from the Great Fire of 1845 (Costello 1887, I: 239). By 1848, Whitehall Slip had been filled in to the south side of South Street (see **Figure 4.27**).

C. WATERFRONT LANDFILL-RETAINING STRUCTURES AND PREVIOUS CULTURAL RESOURCES INVESTIGATIONS

1. INTRODUCTION

The practice of creating new land in waterfront locations has been carried out in North America since the 17th century. In recent decades, archaeological field investigations have recorded a large number of landfill-retaining structures. These archaeological studies provide a growing body of data on how such features were constructed. Previous investigations pioneered the study of construction methods and created typologies for the classification of these features. Considerable progress has been made in describing, interpreting, and contextualizing landfill-retaining structures. However, some confusion in interpreting the established typologies has impeded the description and interpretation of landfill-retaining structures. This confusion, which has often been recognized by archaeologists, appears to arise in part from vague definitions and blurred categories characterizing the various construction types. The following seeks to identify the problems in existing typologies and suggests a revised approach to describing and classifying landfill-retaining structures. It is argued that by relating landfill-retaining structures to the vernacular building traditions of which they were a part, they may be more accurately described and more meaningfully contextualized.

The following begins by reviewing previously established construction typologies and recent archaeological scholarship concerning landfill-retaining structures; it goes on to identify areas in which existing typologies fall short, and have led to confusion. Then a basic overview of some of the principal vernacular building traditions of North America and Europe is provided, which will serve as a context for describing, evaluating, and contextualizing landfill-retaining structures. A revised approach to classifying and describing landfill-retaining structures and their components is briefly presented. This classification guide emphasizes the association of structures with a vernacular construction tradition, and the accurate categorization of the various aspects of their construction, such as structure material, fill material, construction method, form, and structure type.

2. PREVIOUS SCHOLARSHIP AND EXISTING TYPOLOGIES

This review of the categories that have been used in previous studies to classify and describe landfill-retaining structures explores the difficulties presented by those established typologies.

a. PREVIOUSLY ESTABLISHED RETAINING STRUCTURE TYPOLOGY

In the 1980s and early 1990s, an unprecedented number of archaeological studies in North America focused on waterfront retaining structures. These studies essentially established a framework for classifying and describing waterfront landfill-retaining structures in the United States. Among these pioneer studies were Andrea Heintzelman’s paper presented at Society for

Historical Archaeology conference (1983) and her masters thesis (1985); Soil Systems' investigations of the Telco Block (1983) and at 175 Water Street (1983) in Manhattan; Paul Huey's report regarding Old Slip and Cruger's Wharf in Manhattan (1984); Louis Berger & Associates (LBA) investigations at Site 1 of the Washington Street Urban Renewal Area (1987) in Manhattan and at the Assay Site in Manhattan (1990); a series of papers on waterfront technology in lower Manhattan by Roselle Henn et al (1985); and Joseph Gary Norman's masters thesis on wharf construction in Maryland (1987). The archaeological reports of the 1980s were heavily influenced and informed by one another, and although they differ in certain aspects, they tend to adhere to a relatively consistent pattern of describing and classifying landfill retaining structures.

Previous studies have identified four "types" of construction as the principal guide in classifying landfill retaining structures in North America. These are (1) crib; (2) solid-filled; (3) cobb; and (4) grillage construction (see for example Heintzelman 1985; Norman 1987; and LBA 1990). Definitions of these four types, as presented by various archaeologists over the last three decades, are summarized.

1.) Crib Construction

This type has been described as timbers (either squared or in the round) arranged in a relatively loosely constructed "crib," alternating courses of horizontal "headers and stretchers" aligned perpendicular to each other (see **Figure 4.53A**). (The terms "header" and "stretcher" are traditionally used to describe brickwork, but have also been used to denote the perpendicular alignments of horizontal logs in landfill retaining structures). It is often noted that a floor was built near the bottom of each crib to support the fill. The cribs were filled with large ballast, including stones, cobbles, timbers, gravel, and coral (Heintzelman 1985). The joinery is described as being "notched together in 'Lincoln Log'-type construction to form a box-shaped frame" (LBA 1990: V-2). In other words, the construction methods used were similar to log house construction techniques, employing a variety of notches, including saddle, lap, and dovetail joints.

According to Joseph Gary Norman (Norman 1987: 8), cribs are "box-shaped frames of timber which are constructed in open work with numerous compartments formed by means of transverse and longitudinal ties." Based on late-19th and early-20th century descriptions of crib wharf building, Norman describes the following standard construction procedure: the bottom three or four courses of the timbers were assembled on land; they were then floated into the water and additional courses were added atop, until the structure was slightly taller than the depth of water at its destination. The crib was then filled with stone until it sank. A series of such cribs was commonly constructed and sunk in a configuration such that planking could be laid on top of them to create a wharf walkway.

2.) Solid-Filled Construction

The "solid-filled" category identified in previous studies is at once the most inclusive and ill-defined category. The type is described as being more tightly constructed than the "crib type," described above, and therefore able to retain "a finer fill such as mud, sand, earth, and general refuse" (Heintzelman 1985: 9) (see **Figure 4.53B**). Solid-filled retaining structures, or "solid cribs," have been described as constructed in a box-like form, constructed of headers and stretchers, corner notched in much the same way as the crib type, described above. Solid cribs also tended to have floors to retain the loose fills with which they were filled (Ibid). The difference between solid-filled construction and crib construction is echoed in other reports:

"When the stretcher courses were tightly fitted together so that a finer fill or mud or sand could be used to fill up and sink the crib, the wharf was referred to as a solid-filled type" (LBA 1990: V-2).

It is clear, however, that the solid-filled construction category is also intended to include other types of retaining structures, including timber and stone bulkhead walls. It is noted, for example, that "in addition to horizontal timbers forming a cribwork, vertical piles with horizontal planking or load-bearing stone walls were used to retain the solid fill" (Ibid). Norman defines solid-filled construction retaining structures as "freestanding, load-bearing retaining walls or bulkheads, usually filled behind with dredged materials" (Norman 1987: 13). He continues, however, "three types of bulkheads were used in solid wharf construction. These included 1) large horizontal timbers, squared and notched together and usually positioned in the form of cribwork; 2) vertically driven timber piles with horizontal planking spiked inside the piles; and 3) load-bearing stone walls, usually granite and laid up without mortar" (Ibid).

The defining aspect of solid-filled construction, it seems, is that the structure is built tightly enough to contain loose fills. Norman concludes that "'solid' referred to the nature of the fill employed in the wharf" (Ibid). Yet Heintzelman (1985:9) notes, "cobbles and/or ballast stone, however, were sometimes also used". There is apparent confusion as to whether solid-filled construction is defined by a construction method, a configuration, or a fill material, and, particularly in the case of crib construction, there appears to be no clear characteristics distinguishing a solid-filled crib from a non-solid-filled crib.

3.) Cobb Construction

As with "solid-filled construction," the definition of cobb construction is unclear. Cobb wharves are generally described as "open work" boxes (Heintzelman 1985: 10 or as "an open work version of the crib, using cobblestones to fill up and sink the timber crib"; LBA 1990: V-3). The details of the timber construction method are not clearly defined; however, it is clear that the term refers to a log-construction framework of headers and stretchers forming a cell or crib unit. The use of logs in the round is most often illustrated in hypothetical examples (see for example, Heintzelman 1985:11) (see **Figure 4.53C**). However, most cobb wharves identified in New York make use of squared timbers. Due to their relatively open form, (large gaps between courses of stacked logs, for example), they are only able to contain large cobbles and other large ballast-type fills rather than finer fills. It has been noted that their construction allows for the free movement of tide, water, and materials.

Although the established typology makes a distinction between "crib" and "cobb" wharves, some historians and archaeologists imply that "cobb" wharves were a subtype of crib wharves. The only defining feature of the cobb subtype was its containment of cobbles. Small (1941: 8) notes that "timber cribs, formed by laying up timbers in alternating rows of headers and stretchers, have been mentioned as typical of the 'cobb' wharves."

In her study of historic New England wharf construction types, Mary Jane Brady (Brady 1978: 10A) writes that "cribwork differed from cobbwork only in that it was of solid construction, the timber walls being tightly matched so as to provide a solid retaining wall. This would, of course, lend itself to the use of a finer fill which would provide a more solid building foundation." Brady admits, however:

> The distinction between cobbwork and cribwork is a fine one. Usage of the word cobbwork seems to refer to the earlier and lighter timber construction with fewer heavy timbers and ballast of rubbles and cobbles. The ultimate distinction may be strictly semantic. By the time

> matched timbers were commonly being used to form the cribs for wharves, the word cribwork had replaced cobbwork in common usage. On the other hand, if the term cobb wharf was used specifically in reference to the ballast of cobbles, as has been supposed, then cribwork was more accurate in reference to a structure that contained finer fill (Ibid).

Norman, in his study of Baltimore wharf construction, considers the term "cobb wharf" to be a New England term for crib construction. According to Norman, cobb wharves were essentially crib wharves containing heavy ballast (Norman 1987).

4.) "Grillage" Construction

Grillage or raft construction has been recognized as a distinct category of construction type; the first use of the term in reference to wharf construction has been credited to Joan Geismar in describing a feature at 175 Water Street in New York (Soil Systems 1983b) (see **Figure 4.53D**). The term grillage is an engineering term used to describe sunken caissons or foundations for bridges and other structures isolated in water. Geismar calls grillage "a solid raft-like log construction… weighted with stones" (Soil Systems 1983b: 686). Grillage or raft structures are built of "several layers of logs laid alternately at right angles and intermittently weighted with stone rubble fill" (Norman 1987: 26). These timber structures are floated out to the location desired and sunk with stone and ballast. A series of these rafts sunk in succession atop one another creates the retained land (LBA 1990: V-3).

Although the term is not always used consistently, "grillage" appears to refer to a specific type of stacked log construction in which each perpendicular course of horizontal timbers is continuous, creating no central box-like void; and in which a minimum of joinery is used to hold the structure together.

Using the term 'raft' in association with 'grillage' is common, but may be misleading. As described above, 'crib' and 'cobb' structures were often created on land, floated to their aqueous destination, and sunk. Thus, crib structures may be just as raft-like in form as a grillage construction.

b. OTHER TYPOLOGICAL NOTES

In addition to these generally accepted four construction types, timber pile construction has been called out by some as a separate category or type. Norman notes that "piles and piling are terms used to describe any columnar members which are driven vertically, or near vertically, into the ground to form a foundation for construction purposes or to act as a barrier against horizontal forces" (Norman 1987: 17). Two types of piling are identified by Norman including sheet piling, which are "used to enclose or confine an area," and bearing piles, "which act either in isolation or in groups as supports for construction" (Ibid).

As for other materials, the existing typology, discussed above, places stone retaining walls into the larger category of "solid-filled construction." A number of subcategories of stone wall construction have been identified in previous reports. These aspects will be reviewed briefly below.

1.) Stone Retaining Walls

As described above, stone retaining walls, whether used to construct wharves, continuous bulkheads, or other waterfront retaining structures, have been grouped under "solid-filled" construction. In discussing masonry walls, however, American archaeologists have noted subtypes and have theorized about the use of stone versus timber as material.

Heintzelman (1986) describes three types of stone seawall identified in land records in New Bedford, Massachusetts (see **Figure 4.54**). These consist of a wall of dressed or semi-dressed stone laid in regular courses, with no wood elements; a wall of dressed or rough-dressed stone retained by wood fender piles placed at regular intervals and surmounted by a wood capping; and a wall of un-dressed stone retained by cap and slanted fender piles given additional reinforcement by several courses of horizontal fenders and perpendicular wood back braces.

Stone seawalls were often built on foundations of timber rafts or timber piles. Stone sections of the circa 1800 Derby Wharf in Salem, Massachusetts, for example, were constructed on timber raft foundations. These rafts were constructed of hewn timbers "decked over with 8-inch round timbers laid transversely and floated into position at high tide. Guide piles were driven into the mud as the wall construction was started, the rafts settling into the mud as the wall increased in height and weight" (Small 1941: 6). In her book on the history of landmaking in Boston, Nancy Seasholes (2003) notes that stone seawalls of the 19th century were generally constructed of granite, laid without mortar. They were usually battered (wider at the base than at the top) to increase stability, and were ballasted with small stones banked against the inner face, serving to buttress the wall from within. Timber caps, sometimes several courses high, were often constructed atop stone seawalls..

At the Seven Hanover Square Site and the Barclay's Bank Site, in Lower Manhattan, stone walls were found in a late-17th century landfill context (Rothschild and Pickman 1990; LBA 1987b). Their function as landfill-retaining structures, however, was not definitively confirmed. In the case of Seven Hanover Square, the features appeared to be building foundations that may have served a dual purpose of retaining waterfront land.

It is generally thought that timber was used in early North American wharf construction far more than stone was, in contrast to Europe during the same time period, where stone was the predominant material (Norman 1987). According to Edwin W. Small (1941), stone seawalls using quarry-cut stone were not constructed with regularity along the Massachusetts coast until after 1830. He attributes this to the ready supply of timber prior to that time, as well as to the development of new quarries in the early 1800s, and the creation of the Granite Railway in 1826 which facilitated transportation of stone. The manufacture and use of hydraulic cement beginning in the early 19th century in the United States also likely contributed to popularization of stone seawalls. Seasholes (2003:75) considers timber wharves and retaining structures as predecessors to stone seawalls, noting that "in the eighteenth century wharves were constructed of timbers laid up in log-cabin style whereas in the nineteenth they were enclosed by stone seawalls."

In the late-19th and early-20th centuries stone and concrete were frequently used in seawall construction, but usually as a facing for a larger structure containing timber elements. Carleton Greene wrote in his 1917 book on wharves and piers: "Stone masonry construction is so costly that it enters very little into the construction of wharves and piers at the present time, except as a facing of walls of the most monumental character, such as the New York bulkhead wall[91], and as

[91] The reference likely refers to the granite-faced masonry bulkhead along the East and Hudson River shores of Lower Manhattan, commissioned by the New York City Department of Docks and begun in the 1870s.

a facing for concrete (Greene 1917: 14). Archaeologists Michael Raber (1997) and Thomas Flagg (1987) have inventoried many variations used in the late-19th and early-20th century seawall construction using stone or concrete bulkheads on foundations of timber cribs, timber piles, or a combination of the two. In some cases, stone facing was backed by concrete and built on a rip-rap foundation.

c. DIFFICULTIES WITH EXISTING TYPOLOGY

As is evident from the above descriptions, the classification system currently used for retaining structures (timber structures in particular) is fraught with blurred categories and unclear definitions. Little substantive distinction has been made between the four categories (crib, cobb, solid-filled, and grillage). All are described primarily as timber crib structures built in a manner similar to log houses. Only the "solid-filled" construction category allows for other types of construction method or form, such as timber-framed bulkhead walls or masonry seawalls, yet solid-filled may also refer to a tightly constructed timber-crib structure. Solid-filled cribs are distinguished from cobb cribs in that cobbwork is more openly constructed and can only retain large-aggregate fills such as cobbles. It logically follows, then, that the initial category of "crib" construction is a general term embracing the sub-categories of cobb and solid-filled, rather than the three types being distinct and parallel categories. The final established category of grillage construction is equally problematic, since it is also considered to be a timber crib structure filled with cobbles and sunk in open water, a method which has also been used to describe crib, solid-filled crib, and cobb structures.

Additional confusion has arisen from the multiple definitions or unclear meanings characterizing certain important typological terms. The word "crib" is used to define one of the four "construction types," denoting the product of a construction ***method*** using alternating vertical and horizontal logs or timbers notched or held together at the corners. However, "crib" is also often used to denote the timber cell ***form*** or structural unit. Thus, according to the existing typology, one might refer to the "crib" form of a crib, cobb, or solid-filled wharf. When the word "crib" is used in isolation to describe a wharf, it is unclear if the word is meant to describe a construction method or a built form.

As described above, the word "cobb" has also led to confusion, due to its lack of clear definition. The origin of the term is not clear. It may be a reference to "the use of cobblestones to sink the wooden crib" (Soil Systems 1983a:73), or it may have referred to the "cobbled-together" or unsophisticated construction of these wharves (Norman 1987). Either way, the word would appear to have roots in the English language, yet, historical references to "cobb" wharves in Britain are few, nor is the term in use amongst British archaeologists today (Gustav Milne, pers. comm. 2008)[92] "Cob" building in contemporary Britain and parts of North America, in contrast, refers to a kind of vernacular earth construction using soil, sand, and straw; a technique with no similarity to so-called cobb wharf construction. It may be that the term cobb as applied to wharves is essentially a New England dialect term, and that it was used even in New England only during a certain period (Brady 1978; Norman 1987).

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[92] While the word "cobb" or "cob" has a myriad of definitions, the *Oxford English Dictionary* and *An Analytic Dictionary of English Etymology* recognize only a few etymological groupings for the word: "1) those referring to animals, 2) those referring to lumpy objects, 3) those referring to the head." Sea Cob, the name of a harbor or pier in Dorset, England, has been traced by the Oxford English dictionary to the Old English "cobblestone" or "rounded skerry." However, many other English place names incorporating the term (such as Cobhal, Cobham, or Coventry) are thought to originate in a different Old English meaning of cob, namely "cave, den, small bay, creek" (Liberman and Mitchell 2008: 34-5).

The classification system described above may have hampered archaeological inquiry in part because it has compelled archaeologists to fit the structures that they encounter into a categories which themselves lack meaning or clarity. As has been shown, one archaeologist's crib wharf may be another archaeologist's cobb wharf. Therefore, when a structure is summarized as "a crib wharf," for example, not only is very little real information being conveyed, but the emphasis is shifted from more meaningful classifications and descriptions.

As proposed in detail below, in describing and classifying landfill-retaining structures, it is important to make a distinction between the various aspects of their construction, such as *structure material*; *fill material; form; structure type; and construction method*. Making this distinction would prevent confusions such as the use of the term "crib," for example, to denote both a construction method and a form; or the use of the term "solid-filled," to describe either a construction method, form, or fill material.

It is particularly important to consider the category of construction method, which refers to the vernacular building tradition in which a given structure has been built. A limited number of vernacular building traditions, including log-construction, timber-frame construction, and plank construction, were used in constructing buildings of various sorts. These traditions have been likened to languages, and each carries with it a specific history and set of cultural influences. By locating a retaining structure within a vernacular construction tradition, the structure is meaningfully contextualized within a specific cultural framework.

As part of identifying the construction tradition, it is important to describe any timber joinery that may be present with as much detail and accuracy as possible. This has been done with varying success in previous studies. Some early studies put forth illustrated examples of joint types that contained inaccurate identifications of joint types, and in some cases, these faulty definitions have been cited and reused in subsequent reports. For example, Heintzelman's (1985:95) illustration of a "mortice and tenon secured with a treenail" which was reproduced in the Assay Site Report (LBA 1990: V-17) and others, actually shows an example of saddle-notched corner timbering secured with a wood dowel rather than a mortise and tenon joint (see **Figure 4.55A**). Norman's (1987: 116) illustration of a "mortise and tenon joint secured with a wrought iron pin," was also reproduced in the Assay Site Report (LBA 1990: V-17) (see **Figure 4.55B**). The illustration actually shows lock-notched corner timbering with a wrought iron pin. In an actual mortise and tenon joint, the tenon (the protruding end cut into one timber) is inserted into a mortise (a hole cut into another timber) (see **Figure 4.55C** and **D**). Previous reports also commonly illustrate half-lap scarf joints and identify them simply as "half lap joints" (see, for example, LBA 1990: V-16). In scarf joints, the two pieces of timber are spliced together in the same alignment (see **Figure 4.55E**). In a regular half-lap joint (which can also be referred to as a cross-lap) the two pieces of timber being joined are perpendicular to each other. When referring to half lap joints, therefore, it is important to specify if the joint is a scarf joint. In general, if the name of a joint or notch type encountered in the field is not known, reference guides on traditional timber-framing, log construction, or vernacular building should be consulted and cited and a detailed description of the feature should be provided (see, for example, Sobon 2002; Hewett 1980; Alcock et al. 1996; and Phleps 1982).

3. BRIEF REVIEW OF VERNACULAR BUILDING TRADITIONS

It is important to consider the existing body of knowledge on vernacular architecture as a resource relevant to interpreting the construction technology and cultural context of early landfill-retaining structures examined in the field. A basic background in vernacular construction methods is relevant to the identification of the construction techniques of landfill-retaining structures and facilitates the use of consistent terminology to describe their component parts, such as joint types. In Britain and other parts of Europe, where archaeology and vernacular architectural studies tend to be more closely linked than in North America, archaeologists have successfully related the construction of landfill-retaining structures to contemporaneous developments in vernacular architecture, and have drawn meaningful interpretations based on these comparisons. These studies show that the same carpenters who built timber landfill-retaining structures were also responsible for constructing buildings and that developments in waterfront retaining structure construction methods parallel simultaneous developments in building construction. The close connection between waterfront structures and landbound buildings does not appear to hold true for other types of timber construction such as shipbuilding (Milne 1991: 116).

A brief review of the primary vernacular building traditions using timber are reviewed below, with particular attention to the European origins of these traditions. By looking at a building's physical fabric, the carpentry tradition in which it was built is generally apparent, and suggests something about the cultural origin or influences of the carpenter or owner of the building. It should be noted, however, that, particularly in North America where influences from many traditions and locations came together in new social and environmental conditions, hybrids, borrowings, and localized traditions did occur.

Most 18th- and 19th-century New York City vernacular buildings using wood as their primary construction material were timber-framed, primarily in the English timber-framing tradition. Dutch-style timber-framed buildings were also constructed. Dutch framing traditions were more common and longer enduring in areas where Dutch cultural influence persisted. Stone and brick houses were built with some regularity in New York City. Log-construction dwellings were not common in 18th- and 19th-century New York City. The 1860 *New York State Gazetteer* records the number of dwellings per county and their construction method. The only five counties in New York State that were devoid of log-construction dwellings are the counties that now make up New York City (French 1860).

a. TIMBER-FRAME CONSTRUCTION

As distinct from other wood-based building techniques, timber-framing implies the use of timbers to create a frame made up of vertical and horizontal members tied together by various carpentry joints without the use of nails or other methods of structural support. Most important of the timber-frame carpentry joints are the pegged mortise-and-tenon joint, the scarf joint, the lap joint, and their variations (see **Figure 4.55C** and **E**). A great number of different carpentry joints are used to create a frame, some of which are quite complex and require extensive skill and craftsmanship to master (see Sobon 2002 and Harris 1978).

Most of Europe possesses a strong timber building tradition and, historically, carpentry techniques and building styles have differed considerably from nation to nation or region to region. Although building styles and materials varied regionally within Britain, timber framing represented the most common form of wood construction for roughly five centuries. Timber framing is believed to have developed in England in the 12th or 13th century, replacing a tradition in which wood buildings were constructed using earthfast posts inserted directly into the ground rather than resting on wood sill beams. The scarcity of lumber resulted in the decline of the tradition by the 18th century (Brown 1986: 22). Timber-framing was a standard approach to building in the American colonies, due in part to the relative abundance of wood.

Carpenters in Britain generally learned their trade through long apprenticeships. Extensive research by British archaeologists has shown that the joints used in the construction of timber-framed buildings can be used as indicators of construction date (Hewett 1980). Richard Harris, a scholar of British timber-framing, argues that a specific "grammar of carpentry" existed in England. The framing styles of the nation, like a language, consisted of certain unique rules with which British carpenters would become fluent. Certain framing characteristics, therefore, are to be found only in Britain; and although many English carpenters would have been familiar with French or Dutch techniques, he argues that the retention of the unique British tradition related to a certain sense of cultural identity (Harris 1978).

English-style carpentry did undergo a change, however, when imported to the North American continent. Most obviously, cladding materials changed in response to the differing climate and resources available in the New World. Framing techniques themselves also evolved in North America, diverging from the British "grammar of carpentry." A distinct form of framing was shaped in the New World, although in most regions this has continued to manifest strong roots in the British tradition (Ibid).

The timber-framing traditions of other European countries follow the same basic principles as English timber-framing, with distinctive variations. Dutch timber-framed houses and barns are framed using a series of H-bents, for example, and there are differences in the manner in which building roofs are framed. In terms of joinery, several joint types are recognized as being distinctly Dutch, including the through-tenon common in barns. In this joint, the tenon (often rounded at the end) extends through an open mortise and is typically held in place with a wedge on the outside of the mortise, as well as pegs through the mortise (see **Figure 4.55D**).

b. LOG CONSTRUCTION

Log construction, also commonly referred to as stacked log construction or corner-timbered construction, is typified in North America by log cabins and houses constructed on the American frontier with wide regional dispersal; in the 20th century the technique came to be associated with the Adirondack region and the Pacific northwest. Log-construction houses tend to be made of coniferous tree species, which can be either squared or left in the round. "The basic strategy for constructing a log house is to stack logs one on top of the other and notch them to interlock at the corners. Logs in perpendicular walls are offset in height by one-half log diameter in order to allow the corner joints to lap" (Allen and Thallon 2006: 514). The term 'scribing' in log construction refers to the method of shaping each timber so that its surface perfectly fits the logs above and below it. This is achieved by scribing the contours of one log onto the log above it, often using a special template or square tool. The tradition of log building was a long one in Scandinavia, Germany, Eastern Europe, and elsewhere. However, log building was rarely, if ever, used in Britain (Jordan 1995: 23).

A wide variety of corner notching styles can be found in the log tradition (see **Figure 4.56A, B,** and **C**). One of the simplest corner notches is the saddle notch, which is "fashioned by hollowing out a saddle-shaped depression near the end of the log, shaped to fit the rounded contour of the adjacent log or another saddle" (Jordan 1978: 58). The saddle notch is generally used on round rather than squared logs, and may be either a "double saddle" (notched on the upper and lower faces) or a single saddle (notched on only one face) (see **Figure 4.56B**). A "square notch," which can be used on round or squared logs, is similar in appearance to a square tenon; and a "half notch" which has also been called a lap or half lap joint (see **Figure 4.56A**). Myriad other notch types have also been used, including dovetail notches, V notches, semilunate notches, lock notches, and others (Ibid). Wood dowels or pegs were occasionally used to reinforce corner notches, usually taking the form of a single dowel inserted vertically into a hole bored in the center of a notch (see **Figure 4.57A**). Scarf joints and mortise and tenon joints, more common in the timber-framing tradition, occur in modified forms and with less frequency in log construction. Perpendicular partition wall members or floor joists were notched into the main walls using a variety of flush notches or protruding lock notches (see **4.57 C**) (Phleps 1982).

Henry C. Mercer (1967) was among the first scholars to research the origins of the American log house. There is some evidence for the use of log building techniques in French Canada as early as the 1630s; however, this comes in the form of written accounts which paint too rough a picture of the structures to provide any real insight into their character. No early-17th century examples of French log houses remain in Canada, nor is there any evidence of the technique being used in France during that period (Ibid).

Although log buildings do not appear to have been used in early Dutch settlements in the New World, the English did employ the technique in fort construction in their American colonies. There was no apparent fixed construction system used in the erection of these British "garrison houses"; however, many were built of hewn logs laid horizontally, and fixed at the corners with either simple lap joints or partial dovetails. Mercer acknowledges the presence of this building technique among the English in North America, yet argues that the fort was the only building type for which the English employed log construction, and that no log houses or other domestic structures are known to have existed in the early English settlements (Ibid).

The first North American log houses were probably constructed by the Scandinavian settlers in the New Sweden colony in the year 1638. The New Sweden colony was composed of Swedish, Finnish, and Dutch settlers, and was located along the Delaware River in an area that now includes portions of Delaware, New Jersey, and Pennsylvania. It was organized by the New Sweden Company, a joint-stock company that received financial and administrative support from the Swedish government and from Swedish and Dutch investors. Many of the earliest houses would have been constructed of round logs, saddle-notched at the corners, a method which would doubtlessly have represented the least labor-intensive technique. The gaps formed between the vertical logs by their natural irregularities would have been filled with clay or moss chinking. More sophisticated examples used squared timbers and notches more complex than the basic saddle notch, including the dovetail, the half-dovetail, the square notch, and the V-notch (Jordan 1995).

In a study of the origins of various features of American log dwellings, T. G. Jordan (1995) argues that the New Sweden colony, though small in population, had a strong influence on log construction in America. This was due in large part to the fact that the Finns and other Scandinavians who settled New Sweden were among the few European-American groups with homelands that were still heavily forested. Their vernacular building traditions, therefore, were particularly well suited to the American colonies, such that non-Scandinavian settlers who passed through the vicinity of New Sweden en route to destinations north, south, and west, picked up and disseminated log construction techniques to other regions. Certain corner notches such as the 'V' notch, which would become common in North American log buildings, can be specifically traced to Finnish settlements in Scandinavia. The origin of the dovetail notch is more difficult to isolate with certainty, as it is traditional throughout Scandinavia, Germany, and parts of Central Europe; however, Scandinavians are believed to have been the first group to introduce this notch to the American colonies (Ibid). During the first half of the 18th century, settlers from portions of what is now Germany, Switzerland, and neighboring areas began to settle in Pennsylvania and brought with them their own log building traditions. Like the earlier Scandinavian tradition, (and perhaps more pervasively), these German and Slovakian log-construction methods spread from the Middle Atlantic region to other parts of North America

(Jordan 1978).

c. PLANK CONSTRUCTION

There has been extraordinarily little study of plank construction, and, therefore, its origins, development, and geographical distribution are not well understood. Most plank buildings are covered with clapboards, and cannot be easily recognized from the exterior, compounding the difficulty of inventorying them. However, it is clear that plank construction was a relatively common form of vernacular architecture in certain parts of North America, particularly in the 19th century.

One common type of plank construction uses vertical planks let into the sill beam and wall plate to form building walls (see **Figure 4.57**). The planks themselves act as structural members, and therefore could take the place of posts, studs, braces, and sheathing. Planks were let into the sills and plates using a variety of methods: some were tenoned, often using wood pins or dowels; some were rabbeted into (fit into a groove in) the sill, often using spikes (large nails); and some were spiked into the exterior of the sill and plate (Lewandowski 1995: 48). Vertical plank construction examples were observed in Vermont from the 18th century to circa 1900 (Ibid:45), and apparently conformed to a similar time frame in New York (Kevlin 1986). Examples of horizontal plank construction, or “plank-on-edge” construction, have also been documented in central New York State and elsewhere (Kevlin 1986: 43).

Plank framing might have been favored in some North American applications because it required less specialized knowledge of complex timber-frame joinery, or it may have gained popularity for aesthetic reasons. The Greek Revival style of architecture, which was in vogue during the second quarter of the 19th century, favored the flat walls made possible by plank construction over the bulky posts and exposed members typical of traditional timber framing (Lewandowski 1995). On a more practical level, mill-processed lumber was becoming inexpensive and readily available by the mid-19th century, making plank construction a low-cost framing alternative (Kevlin 1986).

Plank construction in North America is similar to the European “stave” construction used in Scandinavia, particularly in churches, throughout the medieval period. In the Scandinavian examples, as in many American examples, the basic skeleton of the structure was essentially timber-framed: the word stave comes from the Old Norse *stafr*, which referred to the structure’s upright posts. The planks that made up the wall and provided structural support were most frequently vertical, and were let into the sills and plates of the building using mortise-and-tenons and other joints (Jensenius 2003). Stave construction also occurred in medieval England; however, few examples are known, and the significance of the construction method in England is not yet well understood (Milne 1991).

4. CLASSIFYING AND DESCRIBING LANDFILL-RETAINING STRUCTURES

In attempting to clarify, synthesize, and revise those classification systems that have been put forward in previous archaeological reports, it is important that a clear distinction be made between the following: *structural material*; *fill material*; *form*; *structure type*; and *construction method* (see **Figure 4.58**; a sample landfill-retaining structure field documentation form is provided in **Appendix C**). These categories have too often been blurred, causing confusion and hampering the effective description of structures. A brief review of these aspects of construction is presented. Rather than attempting to force a structure into a simple type classification, each of these categories should be considered and described. In the case of timber structures, it is important whenever possible to locate the construction within a vernacular building tradition, because these building traditions carry with them a set of implications regarding cultural influence. Both the overall structural system and construction details, such as joint types, may serve as indicators of specific cultural influences and regional or temporal construction variations. Analyses of this nature are useful not only on a regional level, but also in interpreting individual landfill-retaining structure examples encountered in the field.

a. STRUCTURE MATERIAL

Assigning a *material* for the retaining structure is an obvious starting point, and there has been relatively little confusion in the past in distinguishing between timber construction, masonry construction, and the more modern steel construction. In timber construction, the wood type (pine, oak, sweetgum, hemlock, etc) represents a subcategory. Another subcategory relates to the way the wood was processed, whether it was left in the round (with bark removed or left in place), was square-hewn, half-hewn, milled, etc. In masonry construction, analogous subcategories would be stone type (granite, schist, etc.) and stone treatment (dressed, rough-cut, etc.).

b. FILL MATERIAL

The nature of the fill materials contained within landfill-retaining structures varies from site to site and has often been the focus of archaeological studies involving made land. Because this section deals mainly with the retaining structures themselves, the history and characteristics of fill will be discussed only briefly here, although fill materials should certainly be considered an integral part of a landfill feature.

Some fill-retaining structures contain large-aggregate fill, such as stones, cobbles, ballast, or cordwood. Others contain fine fill, such as sand, silt, and refuse. The use of large-aggregate fill rather than fine fill material may relate to the type of structure holding it, the availability of fill materials, or both.

The reason for the use of refuse-containing fills versus cleaner fills has been the subject of some study, particularly in New York City. In 1796, New York City enacted clean fill ordinances which forbade the use of refuse to fill waterfront locations. In comparing two sites which respectively pre- and post-dated 1796, Joan Geismar (LBA 1987a) argued that the clean fill ordinances had been followed: the earlier site had a high refuse content, while the later site contained relatively clean fills. Most New York City sites post-dating the clean fill ordinances do contain some amount of refuse, however, which may have been the result of piecemeal illegal dumping by residences and businesses in the area (LBA 1987a; Cantwell and Wall 2001). For more detailed discussions, see **Chapter 4: B.7. Filling in Whitehall Slip** and **Chapter 6: B. Refuse Disposal Practices and Regulations**.

Timber “ricking,” a term coined by Christopher Kilkenny and described in greater detail below in the summary of the SUCF Parking Site in Albany (Hartgen 2002), refers to a feature type that may functionally straddle the categories of “fill material” and “structure type.” The ricking found in the Albany site consisted of timbers of small diameter stacked in continuous (solid) perpendicular courses, at least three feet thick, with no joinery or other means of fastening. The Albany Site ricking was located inland of a retaining wall made up of continuous piles. The ricking was believed to have been laid down first as a platform to support the pile driver. After the piles were driven, the ricking served the additional function of a fill material. The ricking would have stayed in place to support the pile driver in this case because the shoreline in the SUCF project area was marshy. It is likely that the use of ricking as a platform as well as a fill material would probably only have been possible in marshy or rocky locations, where it would have been stable enough to remain in place until an anchored structure was built to retain it (Christopher Kilkenny, pers. comm. November 2008). No other clear examples of ricking have been noted in previous archaeological reports. However, a series of small, tightly packed timbers found in Whitehall Slip (AU WHS B) may have been an example of ricking. As discussed in **Chapter 7: B.1. Understanding Construction Materials and Techniques**, this feature consisted of small-scantling wood that may have been used as a construction platform, a fill material, or both.

c. FORM

The form of a retaining structure refers to the shape of the unit or units that comprise the overall structure. As discussed above, this category has often been blurred with construction method or structure type. The word 'crib,' for example, has been used to describe both a form and a method of construction. The resulting confusion underscores the importance of being explicit when referring to form rather than method of construction.

1.) Cribs, Blocks, Cells

The terms crib, block, and cell have all been used to describe a multi-sided (usually four-sided) enclosure. The designation implies that an interior space is created by the walls of the framework.

In referring to a large box-like structure with multiple subdivisions, the larger structure should be referred to as a block, and the subdivisions as cells. In some cases, cribbing does not take the form of a block with cell divisions. Instead, the structure may be either one large box, or crib, or it may consist of a large box braced with cross-ties that do not immediately overlay each other, and therefore do not form discrete cells. The term crib should be used to refer to either a block-and-cell construction or to a box-shaped structure without clear cell divisions, including those with cross-ties that do not immediately overlay each other. The term crib (as well as cribbing and cribwork) is often used to refer more generically to the use of the box form.

2.) Grillage

The term 'grillage' is used here to describe a distinct form of landfill-retaining unit. The substantive difference between "grillage" construction and other types of stacked timber construction is that in "grillage" each course of logs (perpendicular to the one below it) is continuous, creating a "solid" timber structure rather than a box-like "crib" with a void in the center. Christopher Kilkenny (Hartgen 2002: 6.43) clarifies this distinction in describing an Albany site feature: "Although the timbers criss-cross like a crib support system, they differ because the timbers… are simply stacked on top of each other with no joinery, no watertight bulkhead wall, and little room for soil fill in between timber layers."

3.) Walls

Walls are essentially a linear form, which may or may not be braced from either or both sides. Walls may be constructed of a variety of materials, including timber and stone. As discussed above, stone walls may stand on timber foundations, and may be braced or reinforced by timber elements. Timber revetments (retaining walls) have been constructed using log-construction, timber-frame, plank-frame, and other construction methods, and are generally braced from behind or reinforced with piles or stakes. A variety of terms are used in describing landfill-retaining walls in waterfront applications, including revetments, bulkheads, seawalls, and breastworks.

d. STRUCTURE TYPE

The structure type refers to the overall structure that has been created or modified using the landfill-retaining structural units. This section focuses on retaining structures along waterfronts such as harbors, rivers, and canals. Within these various waterfront contexts, made land could take many forms. Several structure types served the dual purpose of extending the shore and creating a structure specifically associated with the docking of vessels, such as wharves and slips, quays, and landing stages. Many terms are used to describe waterfront structure types, several of which have shifted in meaning over time, and still have varying definitions in different countries and regions. A brief review of structure types and their sometimes varying definitions follows.

Types of waterfront fill devices not directly associated with vessel docking include protective moles (see **Chapter 4: 6. George Augustus' Royal Battery**) and linear seawalls or bulkheads running continuously parallel to the shore, which extended and regularized the shoreline. Other structure types in waterfront locations include man-made islands, land connecting existing islands with fast land, and bridge pier foundations. Some of the more frequently encountered waterfront structure types, including wharves, slips, quays, and seawalls are discussed here in greater detail.

1.) Wharf

A wharf generally refers to a structure at which ships may dock, which is connected to fast land and juts into the water. The term is used here to describe a structure which projects from the shore at a roughly perpendicular angle into the water, sometimes with an 'L' or 'T' shaped extension at the water end. This perpendicularly oriented wharf plan is sometimes referred to as a "projecting wharf," to distinguish the structure from a "marginal wharf." Marginal wharves, which are more commonly referred to as "quays," extend the shoreline into the water, but are oriented parallel to the shoreline (Norman 1987: 7). The term "wharf" is used here to describe a projecting wharf only, and "quay" is used to describe a marginal wharf.

In order to avoid confusion, the term wharf is used here in preference to other terms which are sometimes used synonymously. The term "dock," for example, has been used to describe either a wharf (a structure which extends out into the water) or a slip (a water-filled basin) (Seasholes 2003). A third definition is offered by Norman (1987), who contends that "dock" refers to the water adjacent to a wharf, while slip refers to the water between two wharves. The terms "pier" and "jetty" are also generally used as synonyms for "wharf," although wharves and piers are generally considered more substantial structures than jetties. These terms will not be used here, due to their various usages: For clarity, therefore, the more consistently defined terms wharf and slip are favored here over dock, pier or jetty.

A number of different configurations of structural units have been used to create wharves. Several previous archaeological studies in New York City have identified "block-and-bridge" as one such arrangement. In this type of construction, "a heavy timber crib is built near shore and floated into position. The crib is weighted with stone and fill and sunk into place. The distance between the blocks is then spanned with timber bridges" (LBA 1990: IV-25). It has been observed that the block-and-bridge arrangement had the benefit of allowing the free movement of water between blocks, and thus did not result in an accumulation of silt, as did other wharf types (Cantwell and Wall 2001).

Alternatively, crib units could be arranged in two parallel rows and the space between the ends of these wharves retained, such that fill could be deposited in the gap between the two rows of cribs, forming a land surface. This arrangement was used in the 18th-century log-construction Derby Wharf in Salem, Massachusetts (Small 1941). Linear retaining walls could also be configured to form the sides of the wharf, as was the method used at the 18th-century log-construction Keith's Wharf in Alexandria, Virginia (Engineering-Science 1993). There has been no systematic or exhaustive study of wharf subtypes, however, and therefore, future archaeological study may help to identify the various methods used.

2.) Slip

Slips typically consist of the navigable space between two wharves or quays. The physical structure of a slip is usually shared with the physical structure of the adjacent wharf or quay. Slips were generally filled in by building a seawall (also called a breastwork or breakwater) to bridge the gap between the ends of the two wharves that flanked it. The area within the former slip would then be filled (AKRF 2008). Slips are discussed in greater detail in **Chapter 4: B.1. The Area Off Whitehall**.

3.) Quay

The term quay is used here as a synonym for a marginal wharf, that is, a man-made docking place extending into a waterway, connected to the shoreline and (in contrast to a wharf) oriented parallel to it. It should be noted that the definition of quay is somewhat fluid in practice, and even in Britain, where the word quay is used more frequently than in North America, blurriness has persisted between the definitions of quay and wharf throughout history. One British archaeologist (Dyson 1981) has noted that for much of the medieval period, beginning with the Norman Conquest, the words were used more or less synonymously. "The word 'quay,' is, of course, the French equivalent of the more uncouth English 'wharf,' and was first used in connexion with the London waterfront in a deed dating from 1108" (Ibid: 38).

Although common in Britain, quays seem to have been relatively rare in North America. In British examples, discussed in greater detail below, they have most commonly been constructed by building braced walls along the perimeter of the feature, and filling the interior with unconsolidated fills. These revetment walls have been constructed using a variety of methods, including masonry construction, timber-frame construction, and plank (stave) construction.

4.) Continuous Shoreline

In some cases, linear shorelines were regularized or their boundaries extended further into waterways through the construction of continuous linear landfill-retaining structures. These regular shorelines might be found in sea, harbor, canal, or other settings. They could take the form of stone walls, timber revetments, and timber crib structures.

5.) Other Structure Types

New constructions of land surrounded on all sides by water include man-made islands. Hoffman and Swinburne Island in Lower New York Bay, for example, were built in the 1860s using log-constructed timber cribs towed and sunk atop a shoal and stabilized with rip-rap (McDonald 2002).

Landing stages were used for ship docking and loading; however, unlike wharves, they were not connected to the mainland, but were surrounded on all sides by open water. A causeway was generally used to allow access between the landing stage and fast land. Roman-period timber landing stages of crib construction were identified during archaeological excavations at Pudding Lane in London (Bateman and Milne 1983).

Bridge piers represent another form of man-made fill-retaining structure surrounded on all sides by water (Ibid). A “mole” has been defined as “a solid structure of stone or earth faced with piles extending into the sea or tidal river primarily to protect or enclose the harbor (Hobley 1989: 9).

e. CONSTRUCTION METHOD

Construction method is used here to relate structures to the vernacular building tradition or set of general principles underlying the approach to construction and joinery. In order to identify the one or more vernacular building traditions that have influenced a building’s construction, one must draw from typologies already established in studies of vernacular architecture. This may be helpful in contextualizing the structure, since vernacular building traditions are associated with particular cultural origins, patterns of development, and geographic regions. Where elements of more than one construction tradition appear to be present in one structure or group of structures, these elements should be noted, as they may serve as indicators of multiple cultural influences.

1.) Log-Construction

One of the reasons that archaeologists have tended not to emphasize the parallels between waterfront retaining structures and vernacular building traditions may be that the vast majority of waterfront structures in North America appear to be influenced primarily by the log building tradition. Log construction, which relies on stacked horizontal timbers usually notched at angled corners, characterizes the categories of crib and cobb that have so often been used in the past, as well as a large subcategory of so-called solid-filled structures. Due to the ubiquity of log-construction retaining features, the powerful influence of construction tradition on landfill-retaining structures has been taken for granted. Because the structures have not been specifically identified as being part of the log-building tradition, the unique cultural indictors surrounding the log building tradition are overlooked. Relating the structure to a building tradition may help to understand the principles behind its construction, the national or regional origin of the tradition, and thus the cultural influences on the carpenters, laborers, landowner, or locality with which the structure is associated.

2.) Timber-Frame Construction

Timber-framed landfill retaining structures, in contrast, have been identified more frequently in England. These structures have tended to take the form of revetment walls, which are arranged in various configurations to create wharves or quays. As described in greater detail in the discussion of archaeological investigations in England below, these timber-framed structures incorporate horizontal sill beams and wall plates as well as upright posts and diagonal braces, using specifically timber-frame joinery including a variety of scarf joints, pegged mortise-and-tenon joints, etc.

Because certain joints can be located within the timber-framing tradition rather than the log-building tradition, it is important to clearly record joint types found in waterfront structures. For example, if a log-construction wharf feature includes a joint or component more typical of the timber-framing tradition, this may indicate the influence of one tradition on another.

3.) Plank Construction

Plank-construction landfill retaining structures, like their landbound counterparts, rely chiefly on vertical or horizontal planks for structural support. Vertical planks are frequently rabbeted, notched, or spiked into sill beam and/or wall plate. Plank-construction features most often take the form of bulkheads or revetment walls, and these walls may be configured to form a wharf, quay, or other structure type. Plank bulkheads have been identified at numerous archaeological sites in New York, as well as in England and elsewhere. In England, where complex medieval-period plank (also called "stave") revetment walls have been found, these walls often rely on an interior and/or exterior bracing system for stabilization, sometimes incorporating timber-framed elements.

4.) Pile Construction

Early technologies for driving pointed timbers into the ground were many and varied, ranging from individual hand tools to elaborate primitive machines requiring the participation of many men and/or horses. Piles of various sorts have been used in wharves and other landfill retaining structures for thousands of years, and, were often used in combination with other types of construction, to retain or support structures that were essentially masonry walls, timber-framed revetments, etc. Piles increasingly began to serve as the primary structural element in wharves and other types of landfill retaining structure with the advent of steam power as a driving force in the mid-19th century (Norman 1987).

Relatively early pile bulkheads have been encountered archaeologically in North America, however. As described below, Hartgen (2002) encountered several 18th-century timber pile bulkheads along the Hudson River waterfront in Albany at the SUCF Site. Some of these consisted of closely spaced vertical timbers driven into the river sediment to form a continuous wall. Others were propped onto a horizontal timber sill that had been laid into an excavated trench on the river bottom.

5.) Masonry Construction

Stone seawalls built before the mid-19th century may exhibit variation not only in the type of stone used and the manner in which the stone was processed, but in the method of construction, foundation, and stabilization. As discussed above, these were sometimes battered, built wider at the base, in order to improve stability. In some cases, "binders," single stones that ran the entire width of the wall, were used to help tie the wall together.

Waterfront stone walls of the period were most often built on some form of timber foundation, such as grillage or lines of timber piles. Seasholes (2003:15) describes typical pile foundation systems: "The piles for a seawall foundation were usually placed in a trench excavated down to clay… The spaces between the tops of the piles were usually filled with small stones and timber stringers were then attached across the tops to serve as the base for the seawall". The late-15th century stone seawall encountered at Trig Lane in London (described further below) was constructed atop a very similar pile and platform foundation (Milne and Milne 1978).

5. LANDFILL RETAINING STRUCTURES DOCUMENTED IN PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Here landfill retaining structures encountered in archaeological investigations are briefly reviewed, divided by geographic location, including Britain, the Netherlands, Norway, and various regions of the United States, including the Southern and Middle Atlantic states, New England, and New York. The areas chosen for study in Europe were selected both because examples of historic landfill-retaining structures are known in these areas and because cultures associated with them may have had an influence on colonial and post-colonial American building. An attempt has also been made to focus on periods relevant to colonial and post-colonial period American vernacular building traditions. A limited number of investigations of timber wharf structures in Europe dating to the post-medieval period are known; therefore, most of the European structures discussed in this section date to the late medieval period. It is argued, however, that comparison of late medieval European structures with colonial and post-colonial American structures is valid. As discussed earlier, medieval carpentry traditions originating in Europe continued to be relevant in North America through the early-19th century.

a. BRITAIN

1.) Trig Lane, London

From 1974 through 1976, archaeological investigations on the London waterfront at Trig Lane along the north shore of the River Thames uncovered a complex set of medieval landfill-retaining structures constructed in several building campaigns between the mid-13th and late-15th century (Milne and Milne 1978). These structures were revetments behind which fill was placed; they were built in the river, parallel to the shore, for the purpose of reclaiming land. Most of the revetments found were constructed of wood (oak and elm), while others were constructed of stone. The wood revetments encountered at Trig Lane fell into two main construction-type categories: timber-frame construction and stave construction. Within these two categories, substantial variations were observed. The construction of the revetments varied according to both former property boundaries and period of construction; revetments were built successively further south into the river as additional underwater land was reclaimed.

The earliest timber-framed revetments at Trig Lane (dating to the 13th century [Features G2, G3, and G4]) were founded on a principal base-plate (or sill beam), lengthened by means of scarf joints, and retained by piles (see **Figure 4.59**). Squared timber posts were set into the base-plate using pegged mortise-and-tenon joints. Horizontal boards were affixed along the rear faces of the posts. The resulting timber wall was reinforced from both the front (waterside) and the rear (landward side). In the front, a squared-timber shoring member was joined to the top of each post with a chase-tenon, and ran diagonally downwards to meet a pile-retained subsidiary base-plate in a birds-mouth abutment[93]. The revetment was additionally supported from the rear (landward side) using a tie-back aligned perpendicular to the wall fixed in place by piles driven at the corners of a small pegged half-lap cross member. A diagonal brace mortise-and-tenoned into the tie-back supported the rear of the revetment wall (Milne and Milne 1978: 88).

Timber-framed revetments slightly later in date encountered at Trig Lane differed from those described above in that they were no longer shored from the front (waterside). Instead they relied solely on back- (landward side-) braces, which were relatively widely spaced and were more complex in construction. Feature G7, for example, dating to circa 1345, exhibited some similarities to those described above, including a pile-retained base-plate into which vertical posts were set using mortise-and-tenon joints. Horizontal boards were affixed to the rear face. No subsidiary base-plates or front shores were used however. Instead, raised cruciform-shaped tie-backs were secured to the revetment with the use of unusual and effective edge-trenched joinery. This edge-trenching consisted of notches cut into each side of the end of the tie-back, which were fit into corresponding notches in the posts of the revetment wall (Ibid: 91).

Stave-construction revetments encountered at Trig Lane also exhibited complex joinery (see **Figures 4.57** and **4.60**). The late-14th century Features G10 and G11 were constructed of pile-retained base-plates with mortises or grooves into which continuous walls of tenoned vertical planks were set. The planks were fixed to each other using free tenons (in the case of G10) or

[93] A bird's mouth abutment is a V-shaped pocket usually placed at the end of a timber to bear against the inside of another timber. In landbound structures, the joint is most commonly found in rafters, where they connect to wall plates.

dowels (in the case of G11). Feature G11 also had a top plate, with mortises in both upper and lower faces, suggesting a second level of vertical planks that did not survive. Both of the stave revetments also made use of edge-trenched tie-backs. These consisted of pile-founded base plates with diagonal braces chase-tenoned at either end and inclined towards each other to create a triangular shape which provided additional support to the upper portion of the revetment wall (Ibid: 93).

Two stone river walls were encountered at Trig Lane. Feature G8, dated to circa 1330, and Feature G15, dated circa 1500, were both constructed atop a plank raft which was pegged into and retained by elm piles (see **Figure 4.61**). The exterior face of the wall consisted of ten (surviving) courses of dressed ashlar blocks bedded with a yellow sandy mortar. The interior face was comprised of thin irregular stone ("ragstone") and was stepped in a series of three offsets, narrowing towards the top. The core of the wall was formed of chalk rubble (Ibid: 97).

Based on the Trig Lane investigations, Milne and Milne postulated a tentative revetment construction typology that included timber-framed and stave construction techniques using (1) both front and back bracing and (2) only back bracing. In addition to these techniques was the stone river wall construction. Variation in building methods was attributed to both the financial status of the property owner as well as chronological developments in building techniques. In relating the timber joinery used in the revetments to that of other types of vernacular architecture, Milne and Milne argued that although the techniques used parallel each other in many aspects, they differ in others. Certain joints used in the landfill-retaining structures (such as the tusk tenon found in Feature G12) were considered anachronistic in contemporaneous landbound vernacular architecture, while others (such as the bridle-butted scarf joint found in Feature G11) represented earlier examples than had been encountered in extant landbound structures. Furthermore, while stave construction was common throughout the medieval period in Scandinavia, it was relatively rare in medieval England (Ibid: 102).

2.) Other London Sites

Among the several other London sites that encountered waterfront retaining structures were the Custom House Site, the Seal House Site, and the New Fresh Wharf Site, all of which contained medieval timber structures located along the north bank of the River Thames (Hobley 1981; Heintzelman-Muego 1983).

At the Custom House Site, excavated in 1973, less than a mile east of Trig Lane, several successive campaigns of timber retaining structures were encountered, ranging in date from the 2nd century to circa 1300. A 2nd century timber quay was indentified, which was made of "a series of timber boxes… built of four or five tiers of horizontal oak beams" (Hobley 1981: 2). This was essentially a log-construction crib structure made up of blocks and cells, a construction type and form that has not often been encountered on British sites (see **Figure 4.62**).

A later revetment wall structure encountered at the Custom House Site was essentially of earthfast-post (pile) construction (see **Figure 4.63A**). Horizontal planks were affixed to a line of piles to create a wall, which was retained by a horizontal plate which was in turn retained by smaller piles. The wall was also shored with diagonal braces apparently supported on small timber pads or footings. A third revetment at the Custom House site, dated to circa 1300, was of timber-frame rather than earthfast-post construction, and was similar in construction to Feature G3 at Trig Lane (see **Figure 4.63B**). The structure had upright posts fixed into a base-plate. Perpendicular tie-backs positioned at regular intervals along the rear foot of the wall were notched into both the primary base-plate and a subsidiary base-plate, and were retained by piles.

Diagonal braces mortised into the perpendicular plates were chase-tenoned into the tops of the posts, providing support to the upper portion of the wall.

At New Fresh Wharf, a Roman-period quay was identified which was similar to a log-construction crib structure, like the Custom House Site feature of the same period (see **Figure 4.62**). The quay essentially consisted of two parallel walls of squared stacked logs tied to each other with diagonal braces notched into the upper portion of the front wall and the lower portion of the rear wall. The rear wall and the diagonal braces were held in place by timber pilings (Hobley 1981).

The Seal House Site, located roughly midway between the Custom House Site and Trig Lane, was excavated in 1974. A 13th century timber-framed revetment very similar in construction to the circa 1300 revetment at the Custom House Site was encountered. This structure lacked a subsidiary base-plate; instead the perpendicular tie-backs were themselves retained by piles (Heintzelman-Muego 1983: 5-8).

The Sunlight Wharf Site contained an apparent hybrid or transitional structure between earthfast post and stave construction. A stave wall using a baseplate (or sill beam) was separated by braced earthfast posts. A retaining wall of similarly transitional construction method was encountered at the Thames Exchange Site in which “earthfast posts were braced with squared timbers articulated with well-cut pegged joints” typical of framed structures (Milne 1991: 118).

3.) Exeter Quay, Exeter

Exeter is located on the east bank of the River Exe on the south coast of Devon in southern England. A canal was constructed in Exeter in the late-16th and early-17th centuries. Archaeological excavations during the 1980s by the Exeter Museum’s Archaeological Field Unit revealed two successive retaining structure campaigns along the waterfront (Henderson 1988). The first, believed to date to 1564, consisted of earthfast posts (oak stakes) with wattlework (woven reeds) creating a revetment; the area within the wall was filled with river gravel to create a sloping wharf. This structure was likely intended to be temporary, allowing the stockpiling of materials for the creation of a more substantial retaining structure. A new stone quay wall was constructed in front of the wattle revetment within a few years. This stone wall was constructed atop timber pilings, and the area behind it was filled with soil from a nearby bluff (Ibid).

4.) Burford Wharf, Stratford

Towards the end of the medieval period, stone appears to have become the favored material for retaining structures rather than wood, due to the increasing shortage of timber in Britain. However, some examples of post-medieval landfill-retaining structures have been encountered. These tend to differ from the patterns observed for medieval period landfill-retaining structures in terms of construction method. AOC Archaeology Group at Burford Wharf in Stratford, England recently investigated a series of 18th- and 19th-century wharves along the former shores of the Channelsea River (Carew et al., 2009). These wharf structures were formed by linear wood revetment walls that consisted of timber posts onto which horizontal planks were nailed. The posts were sawn half- and quarter-round oak and imported softwood timbers. Tie-backs were placed at intervals of a few feet along the landward side, using wrought iron bolts and straps. Sand and gravel fills, including some ceramic artifacts, were contained within the wharf structure. The archaeologists that analyzed the Burford Wharf features considered them to be consistent with other timber examples of post-medieval timber retaining structures in Britain.

b. THE NETHERLANDS

1.) Waterlooplein Site, Amsterdam

The Waterlooplein site is located on the east bank of the River Amstel in central Amsterdam. The City of Amsterdam Office of Monuments and Archaeology excavated the site from 1981 to 1982. Timber landfill-retaining structures dating to the 16th century were uncovered and investigated. While no report was ever written on the excavation, photographs of the site appear to depict two parallel timber revetment walls, one of which appears to be constructed of closely spaced vertical squared-timber piles, and the other of stacked planks sandwiched between timber stakes or narrow piles. These parallel walls are connected by a third perpendicular plank wall (Ranjith Jayasena, pers. comm., February, 2009). This feature was linear in form and used piles and planks as primary structural elements.

2.) Merwede Bulkhead, Dordrecht

A wood bulkhead along the Merwede estuary in Dordrecht, built in phases between 1250 and 1550, was also investigated archaeologically, and was discussed in Jan Baart's book discussing archaeology in the Netherlands and Northern Europe (Baart et al, 1977). The approximately 109-yard-long linear bulkhead consisted of a line of wood piles separated from each other by a few feet, to which vertical planks had been fixed. The linear bulkhead appears to have been stabilized from both the landward and water side with perpendicular tie-backs. The structure appears to have relied on piles and planks as its primary structural elements.

c. NORWAY

1.) Finnegården 3a and 6a, Bergen, Norway

The Finnegården Project was completed in several stages. Finnegården 6a was excavated in 1981 by R. Dunlop in the rear of what is now the Hansa Museum, near the terminus of Vågen Bay, the main harbor in Bergen from the medieval period to the present. Finnegården 3a, excavated in 1982 by A. Golembnik, was located less than one block north of 6a (Myrvoll 1991).

At the Finnegården Site, a row of "timber boxe (caissons)," a term used to describe the crib form, presumed to be the foundations for a 13th century pier, were encountered at roughly 1.6 feet below sea level (Myrvoll 1991: 152). These five-foot-square caissons or cribs "were corner-timbered, filled with stones, and the construction was strengthened by vertical lock bars placed through slots in the timbers" (Ibid) (see **Figure 4.64**). A later 14th century phase of similar cell-form wharf foundations was also encountered at Finnegården. These measured roughly 16 feet square, were filled with earth and sand, and held in place with large vertical timbers.

2.) Domkirkegaten 6, Bergen, Norway

The Domkirkegaten 6 Site was excavated in 1987 by J. Komber, in coordination with A. R. Dunlop (Myrvoll 1991). This site was located roughly 1000 feet east of the Finnegården Site, also along the former waterfront of Vågen in Bergen. Features were encountered dating from the 12th century through the 16th century. From the earliest phase of the site, a small (3-foot-square) corner-timbered caisson (log-construction crib) was encountered. This caisson was sitting on what would have been a shoreline beach, just above sea level. A row of piles was encountered in association with the caisson. The piles were interpreted as a quay frontage, although the caisson's function was not clear.

A slightly later 12th century row of larger caissons was also encountered. These were placed roughly five feet apart, and would also have been built along a beach, just above sea level, and were interpreted as the foundations for a large quay. The caissons or cribs each measured roughly 8 by 11 feet. Some of the corner-timbered features were almost identical in construction to those found at the Finnegården Site, while others had double lock bars rather than single lock bars, to provide additional strength (Myrvoll 1991).

d. SOUTHERN AND MIDDLE ATLANTIC UNITED STATES

1.) Cheapside Wharf, Baltimore, Maryland

Cheapside Wharf in Baltimore was constructed in the late-18th century, when the developing port city witnessed an explosion of wharf construction and land filling (Norman 1987). Most wharves were owned privately but were overseen by a municipal body of Port Wardens. Documentary sources revealed that Cheapside Wharf was built from an earlier mid-18th century "quay" (Norman's use of the term) known as Harrison's Dock. In the 1780s, the wharf was considerably extended, once by 200 feet and shortly thereafter by 170 feet. Lots along the wharf were then leased to various parties who built warehouses on the wharf. The land around Cheapside wharf was extended and filled, and the former wharf was paved in the 1820s.

The excavation at the Cheapside Wharf site was carried out in 1984 by the Baltimore Center for Urban Archaeology on behalf of the Rouse Company and the City of Baltimore (Norman 1987). The project site was bounded by South Calvert, Pratt, Lombard, and South Streets. A portion of the north-south-oriented timber Cheapside Wharf was encountered, along with the former slip to the west of it, which was filled with "heavy clay" (Ibid: 67). An approximately 105-foot long section of the upper portion of the wharf was uncovered, consisting of a segment of the 200-foot-long extension of the wharf constructed in 1783. The timber wharf was described as consisting of two log-constructed timber-crib components: "lower logs," (which would have been built on shore and then sunk into place, and "topping logs" (which would have been constructed in place). The topping logs were found to be slightly displaced from the lower logs, likely due to drifting during construction, and the piles that were driven to hold the topping logs in place were driven into the fills contained within the lower logs. Although the excavation was able to expose the crib structure to a depth of only a few feet, deeper monitoring with a backhoe revealed that the structure extended at least 15 feet below the top of the cribwork. The cribs were filled with a relatively clean "assortment of locally occurring sand, silt, and clay" (Ibid: 74). Excavations in the adjacent slip revealed a much higher content of ceramics, leather, and other cultural materials, suggesting that the slip was used to deposit refuse, either over a period of time or in one filling episode.

Three sides of the wharf (east, west, and south) were uncovered during this excavation, an opportunity not afforded in many other excavations, in which only one or two faces of a wharf were exposed. The "topping logs" of the timber "crib" on the west side of the wharf were described as squared timbers of southern yellow pine (Ibid). Anchor piles, which braced the exterior of the wharf topping, were white oak. Interestingly, the timbers forming the east and south sides of the wharf were constructed not of squared timbers but of logs in the round. It was supposed that because these logs would not be seen after construction was complete, it was considered unnecessary to square the timbers.

The topping logs varied in length from 13-50 feet and "were spliced together with half lap joints which were secured with a wrought-iron pin through them" (Norman 1987: 69). The term "half lap joints" in this context was used to describe scarf joints used to lengthen the span of a timber course by joining two timbers end to end. In contrast, lap joints generally occur where two pieces of timber are perpendicular to each other.

The corners in the structure were joined with lap joints with a wrought-iron pin driven vertically into a hole in the joint (Norman 1987) (see **Figure 4.55B**). The technique is not out of keeping with log house construction, in which dowels or pegs were sometimes used to reinforce corner notching (Phleps 1982).

The internal bracing timbers (or tie-backs) in the crib were "not well studied"; however, it was observed that their placement followed no regular pattern (Norman 1987:78). Two types of brace were identified in the crib: cross-ties (i.e. perpendicular to the wall) and diagonal braces. The ends of the cross-ties were joined to the walls of the crib with "triangular tenons fitted into mortises prepared to receive them. They were then fastened in place with either a wooden trunnel or a wrought-iron pin. This type of mortise and tenon joint was often planned to occur in conjunction with a lap joint of the crib wall in order to permit both joints to be fixed with a single pin" (Ibid). Based on an accompanying illustration, the joint being described was actually a half-lap scarf joint in the wall, which was made to accommodate the flush dovetail end of the cross-tie. This notch is similar to several joints identified at Site 1 of the Washington Street Urban Renewal Area in New York (LBA 1987) and appears to spring more from the log-building tradition than from timber-framing. Diagonal braces or ties were found at the corners of the crib of both the topping logs and the lower logs; these ties were found "at every course of the lower logs, comprising a small triangular 'crib-within-a-crib'" (Norman 1987: 80). The diagonal braces consisted of 7- to 8-inch-diameter round logs, notched into the stacked logs in the walls. It was surmised that the lower logs would have required the rigidity of the strong diagonal bracing, as this portion had to hold together to be moved and sunk into place, rather than being constructed in situ like the topping logs.

A timber-crib extension to the south end of the wharf was also observed during excavation. This extension was "anchored to the preceding crib with a single, diagonal corner tie," an eight-inch-diameter yellow-pine member, "mortised into the top log of the south end of the preceding crib and presumably extended to the west bulkhead wall," which was inaccessible in this area (Norman 1987: 76).

2.) Keith's Wharf and Battery Cove, Ford's Landing, Alexandria, Virginia

Archaeological research at Ford's Landing on the Potomac waterfront in Alexandria, Virginia, including Phase I, II, and III investigations, was carried out by Engineering-Science from 1986 to 1993 (Engineering-Science 1993). Among the features encountered were two complexes of timber bulkheads, one dating to the 18th century, and one dating to the 19th century. Phase III documentation focused on the 18th-century (pre-1785) bulkheads, which were associated with the former Keith's Wharf.

The 18th-century timber bulkheads were not part of crib structures. Rather, they were stacked-log walls supported by tie-backs, and arranged to form the three walls of a projecting wharf (see **Figure 4.65A**). These walls consisted of stacked timbers, measuring an average of 1 foot-square, and either square-hewn or hewn on three sides (the interior face retaining bark). Runs of timber were lengthened using half-lap scarf joints. Both perpendicular tie-backs and diagonal braces were flush dovetail notched into open mortises in the tops of individual timbers in the face of the wall. The tie-backs were set at several angles, many angled downward, ranging from 6.5 to 19 degrees below horizontal (slopes of 13 to 34 percent) (though it was noted that the angles had likely shifted over time). The diagonal braces consisted of "boles," a term which the report used to mean logs in the round, ranging in diameter from 8.5 to 10 inches (Ibid). The dovetail notch with which they were secured to the bulkhead face was pinned (pegged), except in a few cases. The internal ends of the braces were attached to wood pilings or to horizontal deadmen (timber anchors). Along the internal (landward) face of the bulkhead wall were small-scantling long vertical timbers driven into riverbottom, referred to in the report as "alignment stakes." The stakes were placed 2 to 5 feet apart. They ranged from 2 to 3.5 inches in diameter, and were often of untrimmed wood with branch stubs. "Too small to have been structural, the posts probably served as alignment devices during construction" (Engineering-Science 1993: 151).

At the corners of the structure, where two bulkhead walls came together, perpendicular stacked timbers were joined using "cross-lap or saddle cut notches" measuring between 2 by 12 inches to 4 by 14 inches. No pins were incorporated into the notches; however, "two rectangular dowels or drift pins were observed 6½ feet to the west, reinforcing the horizontal position of the timber" (Engineering-Science 1993: 159). The ends of the wall timbers extended a short distance beyond the corner notches and were saw-cut on angles (Ibid).

The fill sampled within Keith's Wharf was relatively clean clayey sand, apparently redeposited subsoil, with a minimum of artifact inclusions.

3.) Roberdeau's Wharf, Harborside, Alexandria, Virginia

Archaeological investigations were carried out by Engineering-Science on behalf of the 400 South Union Street Joint Venture in the spring of 1989 on a 3.5 acre site on the Alexandria waterfront (Engineering-Science 1989). Roberdeau's Wharf, which was constructed prior to 1785, would have been built in a relatively shallow sheltered cove of the Potomac River south of Point Lumley.

A section of wood planking was uncovered which was believed to be a portion of the deck or top surface of the wharf. At the same level a feature was identified that consisted of "one or more layers of wood chips, shavings and sawdust saturated with a tacky, dark colored pine resin or pine tar" (Ibid: 90). The deposit was roughly 2 inches thick, and may have been either a wharf surface material, or a gradual inadvertent build-up of discarded materials. No wharf substructures were investigated as part of this excavation. It was assumed that "the wharf was built through a form of banking out, using bulkheads to extend the land toward the river channel" (Ibid: 93), and that the supposed linear features did not happen to be in the areas examined.

4.) The Meadows Site, Philadelphia, Pennsylvania

Archaeological investigation was undertaken at the Meadows Site in the late -1980s as part of the Pennsylvania Department of Transportation's Environmental Impact Statement for the I-95 Access Improvement Project. Initial research and field testing was performed by John Milner Associates and archaeological data recovery and a final report were produced by Louis Berger & Associates (1991). Located just south of the Penn's Landing Area in Philadelphia, the project area was historically part of a mid-17th century Swedish settlement. By the 1730s, wharves had been extended into the formerly inundated project area and filling had occurred. Subsequent filling episodes and wharf constructions occurred over the century that followed, and a battery and sugar refinery, among other developments, were constructed on the large project site (Ibid).

Field investigations resulted in the identification of multiple waterfront retaining structures. In one area, portions of a pre-1788 wharf identified as Lewis Wharf were exposed. In a second area, portions of the 1762-1788 Thomas Penrose Wharf were encountered, as were a set of timber steps which would have provided access to the Penrose slip. In a final area of investigation, two "abutting sections of massive log bulkheads" using wood pilings formed the south and west walls of a slip constructed before 1788 (Ibid: IV-3).

The Lewis Wharf was exposed for a length of 57 feet on its south (long) side, and a shorter distance at its east end. Three courses of logs were uncovered on the south side; these were spliced together with half-lap scarf joints. A perpendicularly aligned timber was found abutting the bulkhead wall and secured to it with a wood piling. Deep tests of the fill within the wharf revealed "beach-like sands not indigenous to the area" containing coral fragments and tropical shells, likely ballast, and dated to 1762-1788 (Ibid: IV-13).

The Thomas Penrose Wharf was examined in greater detail; however, a series of pilings from a subsequent building foundation, not associated with the wharf construction, truncated portions of the wharf and prevented complete exposure of the wharf features. The top of the wharf was encountered at four feet below ground surface. The wharf was constructed of round logs, which were notched together at the corners "in a Lincoln-log-like manner" (Ibid: IV-13). A 44.5-foot-long section of the face of the structure (referred to as the bulkhead) was uncovered. This was an eight-foot-tall structure consisting of seven courses of logs with traces of bark, which had been hewn flat only on the upper and lower faces. These were joined together along the length of the wall with relatively crude half-lap scarf joints "secured by wrought-iron barbed spikes" (Ibid: IV-15). A number of squared cross-ties with flush "dovetail and shoulder" tenons were notched into open housings at the junctions of stacked logs in the wall face. The cross-ties were exposed for up to 17 feet but, due to the intrusion of the later pilings, it could not be determined with certainty whether the cross-ties linked to the other side of the wharf or were secured by other means. It was considered very likely, however, that the cross-ties did connect to another wall paralleling the first and that the "bulkheads" essentially made up the four walls of a "crib" structure. In addition to the cross ties, several "tie back braces" were identified. These differed from the cross-ties in that they were fitted into the bulkhead face with "mortise and tenon joints" and extended eight feet into the fill behind the wall, their ends secured to deadmen placed parallel to the bulkhead wall using "metal pins." Wood piles were placed on either side of the braces to provide additional stabilization. These tie-backs "acted in concert with the cross logs by counteracting the tendency of the fill to push the bulkhead inward" (Ibid: IV-21). The fill inside the wharf consisted of sand gravel and large cobbles.

In association with the former location of a slip associated with Penrose Wharf was a series of timbers, all oriented in the same direction, "that appeared to have been deliberately laid in order to form a series of steps that gradually descended toward the Delaware River," and "probably served as a landing for industries in the vicinity" (Ibid: IV-9) The timbers were hewn and showed signs of having been reused, probably after an original function as structural members of a ship. A late-17th century cannon was also found in association with the walkway, which had probably been situated on the edge of the wharf.

Also encountered were two bulkheads, which formed both the south and west walls of a pre-1788 slip and the walls of the wharves that flanked the slip. The first was constructed of one-foot-diameter southern pine timbers, spliced together with half-lap scarf joints reinforced with "metal pins and spikes." The corner of the wall was notched "in a Lincoln-log-like manner" (Ibid: IV-30). The bulkhead wall was protected from damage by ships by the use of fender piles driven along its face. These were notched into the face of the wall and secured with spikes. Cross ties were notched into open mortises on the face of the wall with flush tenons. Once again, excavation behind (landward of) the bulkhead face was not possible, and therefore, it could not be confirmed whether the cross-ties connected to a wall on the other side of the wharf (making the structure a 'crib' form) or whether the cross-ties were simply stabilized braces that terminated in the fill (making the structure a linear bulkhead wall form). The other bulkhead wall forming a perpendicular side of the former slip would also have functioned as part of the Fisher Wharf (see **Figure 4.65B**). This consisted of two sections: one made up of six courses of square-cut oak and southern pine timbers, notched together at the edge in what the report refers to as a "Lincoln-log" fashion; and the other made up of horizontal planks which were fastened to the adjacent timber section with metal spikes. Fisher Wharf also appeared to be made up of 'crib' units, though once again, this could not be definitively confirmed.

e. NEW ENGLAND

1.) Faneuil Hall, Boston, Massachusetts

The excavation at the Faneuil Hall site in Boston was conducted in 1990-1991 by Louis Berger & Associates, with Michael Alterman as Principal Investigator and Richard M. Affleck as Field Director. The testing was conducted below the basement floor of Faneuil Hall, a National Historic Landmark building erected in 1742 and modified 1805-6 and 1898-9. The excavation encountered artifact-rich fill material and a spread-footer or structural support for a building dated to 1742. To a large extent, the 1999 report that presented the results of the Faneuil Hall excavations focused on interpretation of artifact deposits and building foundation construction; however, the filling of the land was also discussed (LBA 1999).

Faneuil Hall stands on what had been the Town Dock, which was essentially a large irregularly shaped slip, formed by a natural cove off the Charles River. The Town Dock was filled in between 1728 and 1729. According to the Technical Report for the investigations, the south half of the Town Dock was filled first by building some kind of retaining structure "from the southwest side of the swing bridge to the end of the wharf that extended northeast into the Town Dock from Dock Square" (LBA 1999: XI-I). The contained area was then filled over the course of eight months. The city government likely encouraged local residents and businesses to dump refuse into the dock at this time. Artifact-rich fills, containing ceramics, pipe fragments, shoe parts, leather scraps, and other refuse, support this theory.

The Faneuil Hall excavation did not encounter a fill-retaining structure, possibly because a linear retaining wall would have been used to retain the fill in the slip, and this might have been located just outside of the study area. (In this way, the results were similar to those of the Burling Slip Phase 1B excavation in New York City, which also occurred only within the fill of a slip.) The Faneuil Hall excavation, however, did encounter a timber feature four feet below the bottom of the Faneuil Hall basement, which was described as a "platform" made up of horizontal planks "pegged and nailed to narrow wooden sleepers that rested on top of, but were not fastened to, two rough-hewn logs measuring 1 foot by 1.4 feet in diameter, respectively" (Ibid: V-3). The function of this platform was not positively identified, though it was tentatively identified as a spread-footer for a no longer extant building predating Faneuil Hall. An alternative theory was also suggested that "the platform predates the 1728 landfill episode and was related to maintenance of the wharf associated with the Town Dock" (Ibid: XI-4).

2.) Derby and Central Wharves, Salem, Massachusetts

The Derby and Central Wharves in Salem, Massachusetts, were constructed during the second half of the 18th century. They were the subject of several cultural resources investigations, the most recent of which was an archaeological excavation undertaken by University of Massachusetts Archaeological Services (Mitchell T. Mulholland, Principal Investigator) and the

National Park Service (Dana C. Linck, Principal Investigator) in the late-1990s (Garman et al. 1998). Original sections of the Derby Wharf were identified as log-construction walls reinforced on the landward side with tie-backs. The slightly later Central Wharf, as well as a late-18th century addition to Derby Wharf, were also built using log-construction methods, but in crib rather than wall form.

3.) Mill Pond Site, Boston, Massachusetts

The Mill Pond Site, investigated by John Milner Associates in 2000, with Charles D. Cheek and Joseph Balicki as Principal Investigators, contained the remnants of a circa 1707 wharf, which had been located within an enclosed bay in the North End of Boston (Cheek and Balicki 2000). Excavations encountered a grillage-like structure consisting of stacked logs with no joinery present, which appeared to be part of the original wharf. A bulkhead dating to the late-18th century was also found, apparently part of a later rebuilding of the wharf, which may have obliterated an earlier bulkhead. This late-18th century bulkhead consisted of two parallel walls of stacked timbers, only three feet apart, connected to each other with short cross-ties, creating a modified crib form.

4.) Town Dock Wharves/ Dry Dock Site, Charlestown, Massachusetts

The Town Dock Wharves/Dry Dock Site contained several wharf segments ranging in date from as early as 1640 to 1835. It was investigated by the Institute for Conservation Archaeology in the 1980s, and subsequently the Public Archaeology Laboratory, Inc. in the 1990s (PAL Inc. 1994). The earliest wharf on the site had unfortunately been partially destroyed during subsequent waterfront construction. A line of cruciform tie-backs was all that remained from this 1640 building episode, indicating that the wharf had been a wall in form, stabilized with tie-backs. However, the construction method used to build the wall itself could not be determined. A later section of wharf, built in 1813, was a log-construction feature in crib form containing loose fills. Cross-ties within the crib structure were dovetail notched. Two sections of early-19th century plank-construction bulkheads were also found on the site. These consisted of stacked horizontal planks retained by piles. Although some nails were used to secure the planks to the piles, in general the planks were held in place by gravity and the pressure of the fill deposited on the landward side.

f. NEW YORK STATE

1.) SUCF Parking Structure, Maiden Lane, Albany

In 2002, Hartgen Archaeological Associates (with Karen Hartgen as Principal Investigator) completed a data recovery program along Albany’s Hudson River waterfront at the proposed State University Construction Fund (SUCF) parking structure site (Hartgen 2002). Albany was settled by the Dutch in the 17th century as the small town of Beverwyck, located adjacent to Fort Orange on the west bank of the Hudson River. The English assumed control of the town along with the rest of New Netherland in 1664. During the excavation, a number of waterfront features were documented dating from circa 1730 through 1790.

Among these features were timber bulkheads retaining fill to create new land on the west bank of the Hudson River. The first set of bulkheads encountered dated to the 1730s; the next parallel set of bulkheads to the 1760s; and a final segment of parallel bulkhead dated to the 1780s. A stockade wall constructed during the 1750s was also encountered. The stockade, consisting of closely spaced vertical timbers, will not be discussed further here, since it was built on dry land

(land that had been constructed roughly 20 years earlier). The 18th-century bulkheads are described briefly below.

The 1730s bulkheads actually consisted of an 80-foot-long segment of bulkhead, and an additional parallel bulkhead to the east (towards the river), which was considered an extension of the first. These early bulkheads were identified as being of “grillage” construction. The author of the report section, Christopher Kilkenny, considered this the simplest form of construction used on the site (Ibid). The grillage consisted of stacked continuous courses of logs, each course aligned perpendicular to the one above and below it, with stones used to fill gaps within and between courses. Kilkenny notes, “Although the timbers criss-cross like a crib support system, they differ because the timbers in the early bulkheads are simply stacked on top of each other with no joinery, no watertight bulkhead wall, and little room for soil fill in between timber layers” (Hartgen 2002: 6.43).

In general, the bulkheads of the 1760s and 1780s were constructed as a continuous linear structure paralleling the shoreline. The 1760s bulkheads, which were likely built as a municipal effort, showed more conformity of construction methods than the 1780s bulkheads, which varied according to historical ownership, exhibiting different construction techniques from lot line to lot line. In addition, several cross bulkheads were encountered, which connected to and ran perpendicular to the primary bulkhead alignment. These cross bulkheads were apparently constructed at lot lines, likely to retain fill until the primary bulkhead was extended further by the adjacent property owner.

Two different construction types were evidenced in both the 1760s and 1780s bulkheads, which Kilkenny identifies as “stacker construction” and “pile construction” (Hartgen 2002: 6.9). “Stacker construction” is analogous to the term “log-construction” used here, and “is comprised of joined lengths of stacked horizontal logs and support structures” (Ibid). “Pile construction consists of a row of adjacent vertical timbers driven into the river bottom” (Ibid).

Stacker construction examples on the site typically consisted of five to six courses of stacked logs creating a roughly five-foot high wall (see **Figure 4.66**). The logs were round pine timbers with slightly flattened upper and lower faces, joined along the length of the wall using half-lap scarf joints without pegs or fasteners. Various sections of bulkhead (from one property line to another) simply abutted; they were not joined together, and did not display corner notching. The bulkheads were supported from the rear (shore side) with diagonal braces or perpendicular shoring timbers keyed into the face of the bulkhead on the waterfront side and secured with horizontal deadmen in the rear (see **Figure 4.66B**). In some examples on the site, flat wood wedges were used to strengthen the meeting of the deadmen and the braces. The braces were keyed into the face of the bulkhead using a variety of simple notches. Some were flush-tenoned into open mortises in the top of a single course of timber. Others had sallied (pointed) ends notched into upper and lower timbers at the junctions of two wall courses.

Pile construction examples consisted of very tightly spaced vertical timbers creating a wall. These piles were generally round logs without bark (see **Figure 4.67A**). Where small gaps existed between piles, narrow wood planks had been wedged between them vertically to fill the space. Two different types of pile construction were documented on the site: pile driving and trench excavation. The “pile driving” method involved the use of piles with pointed ends that had simply been driven into the river sediment. The “trench excavation” method, in contrast, involved the excavation of a narrow trench in which a timber sill was laid. The piles, or vertical timbers, stood on this sill, but were not notched into it. The trench excavation method could likely be used only in areas with shallow or exposed riverbeds and was probably used to prevent piles from sinking too far into the silt.

Where pile construction was used to create the bulkheads along the 1760s and the 1780s waterfront, the fill was composed of large expanses of "stacked timber ricking," a term which Kilkenny uses to describe expanses of densely stacked logs lacking any joinery (see **Figure 4.67B**) (Ibid:6.49). The pine logs, which had bark and branch stubs intact, were of small scantling, being roughly five inches in diameter and seven feet long. The ricking "was probably deposited just before construction of the bulkhead and used to support the pile driver (Ibid). Unlike soil fill, the ricking would not erode without the bulkhead to keep it in place. The ricking was then left as fill once the pile driver had completed its task" (Ibid).[94]

A small section of "crib" construction was identified on the site. This was simply a "small diagonally-oriented bulkhead with a crib-style support system," which acted as a connector between two other bulkheads (Ibid: 6.47). The crib section was not described in detail. The SUCF site was relatively unique among the North American sites as displaying several construction methods, most of which were variations on a linear bulkhead form.

2.) Site 1 of the Washington Street Urban Renewal Area, Manhattan

The Archaeological Investigation of Site 1 of the Washington Street Urban Renewal Area was undertaken by Louis Berger & Associates, (with Joan Geismar as Principal Investigator), on behalf of Shearson Lehman/ American Express through the New York City Public Development Corporation (LBA 1987a). Unlike most of the other archaeological investigations of waterfront retaining structures in New York City, this investigation took place near the Hudson River (rather than the East River) waterfront. The project site was bounded by West Street on the west, Greenwich Street on the east, North Moore Street on the south, and Hubert Street on the north. Washington and Beach Streets also traversed the project site. The project site was filled during the first two decades of the 19th century.

Advance testing at Site 1 encountered no fill-retaining structures, and it was hypothesized that a fill-retaining structure, such as a bulkhead wall, would have been located west of the areas tested. Subsequent monitoring undertaken during the construction of foundations on the north side of Beach Street did reveal segments of a timber wharf, which would have run east-west through the middle of both project site blocks. These wharf segments were identified as being part of a "cobb wharf," (also referred to in the report as a "cobb crib wharf.") This appeared to be arranged in a "block-and-bridge" configuration, although it could not be positively identified as such, since only segments of the wharf were observed during monitoring. The fill retained in the project blocks was described as relatively clean, possibly a reflection of the period of construction, which was later than many of the East River sites, and post-dated clean fill ordinances that the City of New York implemented as a health initiative.

The segments of "cobb" wharf were described as "four-sided log forms or cribs filled with rocks and stone rubble" (Ibid: IV-2) (see **Figure 4.68A**). They were found immediately below a concrete basement floor, and may have been partly destroyed by the basement construction. The fill material found within the "cribs" consisted of "medium-sized rocks and occasional small-to-medium cobbles in a soil matrix of dark gray sandy silt" (Ibid: IV-11). Based on the descriptions

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[94] It should be noted that although small-scantling cordwood was found at the Assay Site, the cordwood was used in a manner very different from the "ricking" at the SUCF site. At the Assay Site, cordwood was used in the construction of the lower courses of a crib structure.

and graphic representations of the structures found at Site 1 (which make use of terminology that is not always consistent with terminology used in vernacular building), it appears that the wharf segments were built using stacked-log construction, employing both squared timbers and logs in the round.

The upper portions of the structure differed in construction from the lower portions. On the upper portions, most of the logs were left in the round, and were notched at the corners, using one of three methods identified in the report as: "a broad 'squared-off' notch," "a saddle notch," and "a crosslap with a treenail fastening" (Ibid:IV-21). "Treenail," which is a term sometimes used for the wood pegs used in timber-frame joinery, does not appear accurate in describing the feature illustrated in Site 1. Rather, this feature could be described as a wood stake, cog, or a "stabilizing rod" (identified in Myrvoll 1991 and Phleps 1987). The upper portions of the structure were built with wide spaces between timbers.

In the lower portion of the structure, the timbers were all squared, rather than being in the round. Unlike the wide-chinked upper portion of the structure, the lower portion was more tightly constructed; any gaps that existed were filled with thin boards. The timbers that made up the wall of the structure were lengthened using "half-lap" scarf joints (Ibid: IV-21). No corner joints were observed in the segments that were uncovered during monitoring. Perpendicular braces were lock-notched into the walls of the structure in a variety of ways, including flush L-tenons (identified in the report as "shouldered housings"); square tenons notched into scarf joints (identified in the report as "housing at cheek and shoulder of half lap"), and flush dovetail notches (Ibid). A "mitre joint" was also reported in one of the logs of the wall, which apparently accommodated a diagonal brace connecting to one of the perpendicular braces (Ibid). The report hypothesizes that the differences in construction between the upper and lower portion of the structure were designed to respectively arrest and cushion blows from docking ships. It is also suggested that the specific joint types used throughout the structure were chosen because of their flexibility and resistance in such situations.

It should be noted that the excavation also showed that piles of small-scantling wood were driven vertically into the river sediment to retain or guide the exterior wall of the structure. Further, several other joints were described, out of association with a particular location. These included sallied notches (which LBA identified as "wedge" or "V" notches) (Ibid); "half-lap" scarf joints held together with metal bolts; edge-halved saddle notches held in place with locating cogs or stabilizing rods (identified as "cross-laps with treenails") (Ibid).

3.) The Telco Block, Manhattan

The Telco Block is bounded by Fulton, Front, and Water Streets, and Burling Slip (John Street) near the East River waterfront in Manhattan. Field excavations were undertaken by Soil Systems, Inc., (1983) under the direction of Diana Rockman [Wall], Wendy Harris, and Jed Levin, in 1981. Portions of two mid-18th century wharves, the Van Cortlandt/Berrien Wharf and the Bowne/Byvanck Wharf, were encountered; both were identified as being of "cobb" construction.

The Van Cortlandt/Berrien Wharf was described as an east-west-oriented wharf along the north edge of the Schermerhorn Row Block (see **Figure 4.68B**). The portion of the wharf wall that was exposed consisted of ten stacked squared pine timbers. Two courses of perpendicular round logs were laid at three-foot depth intervals, creating platforms, which helped to contain the stone fill within the cribs or cells. The perpendicular logs making up the platforms were presumed to connect to another wall of timbers parallel to the wharf face; however, the purported location of the rear wall was not excavated. In addition to the log platforms, smaller-scantling cross-ties were notched into the timber wall at seemingly random intervals. They were inserted into a notch on the upper face of the stretcher timbers with "squared off notches" held with "vertical pegs."

The Bowne/Byvanck Wharf was built using sweetgum wood and the feature was filled with large cobbles. It was similar in construction to the Van Cortlandt/Berrien Wharf. A vertical guide post or "anchoring pile guide," was inserted through a notch in the south end of the southernmost north-south stretcher, and an analogous notch suggesting a missing post was located on the north end. The vertical posts braced the crib "by locking the outermost stretchers and headers" (Soil Systems 1983a: 65). Based on the description provided, these anchoring pile guides are reminiscent of the "lock bars" found in the multiple sites in Norway (Myrvoll 1991). The wharf also had cross braces, consisting of four east-west logs let into the north-south wall by means of "squared-off notches."

Two north-south-oriented plank bulkheads were encountered on either side of the Bowne/Byvanck Wharf. A third, east-west-oriented, bulkhead was also encountered. The bulkheads seemed to "mark the edge of a filled-in water lot or series of water lots" and "formed a single system" (Soil Systems 1983a: 68), probably serving to close off the water end of the former slip. They were constructed of 12 to 14-inch-wide horizontal planks supported by relatively small "uprights." The method by which the planks were fastened to the uprights was not described.

4.) The Assay Site, Manhattan

Excavations were carried out at the Assay Site in the early-1980s by Greenhouse Consultants; the results of these excavations and subsequent analysis were put forward in a report by Louis Berger Associates in 1990. The excavations were led primarily by Diana Wall and Roselle Henn. The Assay Site was located in and around Old Slip between Front and South Streets near the East River in Manhattan. Several waterfront retaining structures were identified at the Assay Site, including the east-west-oriented Bache's Wharf, identified as being of cobb construction, and two sections of another, north-south-oriented wharf, also identified as being of cobb construction (see **Figure 4.69**). Four bulkheads that incorporated vertical and horizontal planks and piles were also documented. All of the retaining structures were dated to the late-18th century; Bache's wharf appeared to pre-date the North-South Wharf.

Bache's Wharf was identified as being of cobb construction. Although the units of the structure were believed to be cribs, this could not be proven because only the north face of Bache's wharf was exposed, and therefore the structure could have been a linear revetment wall with tie-backs. Two sections (23 and 30 feet long) were exposed; the feature was approximately 8 feet high. The units were described as being constructed with stacked one-foot-square timbers (both round logs and squared timbers) creating a wall. It is not clear whether the corners of the structure were notched. Smaller cross-timbers were tied into the wall every few feet with "half dovetail and shoulder housings" (LBA 1990: IV-25). The ends of the cross-timbers were flush with the outer face of the structure. Vertical 'guideposts' were located near the ends of the structure. These were .35 feet square and were let in flush with the face of the horizontal timbers with a 'square notch.' Iron spikes may also have been used to fix these guideposts to the face.

The North-South-oriented Wharf likely linked Bache's Wharf with Gouverneur's Wharf. It was identified as a "cobb wharf." It consisted of two parallel sections of cribbing each roughly 15 feet (seven to eight timbers) high, and the top of the feature was roughly 2.5 feet below site datum. The cribs were constructed of round and squared corner-notched timbers (it is not clear what notch type was used) in a crib framework with apparently saddle-notched cross braces creating a series of four- to eight-foot-square cells. Some of the timbers showed clear signs of being reused, most notably a former ship's mast. Squared wood guideposts secured with metal spikes were used here too. A layer of smaller scantling wood was laid between the upper three courses of stretchers and between the lower two courses of stretchers. These split logs and small scantling timbers did not extend the full width of the cells, but did apparently serve to contain the stone fill.

Four timber bulkheads, or revetment walls, functioning as landfill-retaining structures, were also encountered at the Assay site. An east-west-oriented bulkhead at the junction of the North-South Wharf segments consisted of ten vertical planks retained by a rough-hewn horizontal timber. It appeared that the planks had been driven directly into the riverbed clay, and the timber served only to guide or retain them. An additional north-south-oriented 23-foot-long section of bulkhead consisted of five horizontal planks retained by square posts or stakes. No further information on fasteners or joinery used in this bulkhead was provided. Two additional east-west-oriented bulkheads were each constructed of horizontal planks retained on each side (but not fastened to) a series of wood stakes or pilings (LBA 1990).

5.) 175 Water Street, Manhattan

Soils Systems (1983b) conducted archaeological investigations at the 175 Water Street Site in the early-1980s. Joan Geismar was the Principal Investigator. The project site was located near the East River waterfront in Lower Manhattan, in the block bounded by Front, Water, and Fletcher Streets, and Burling Slip (John Street). At least part of the project site would have consisted of a mid-18th century wharf along the west (downtown) side of John Street (Burling Slip). The excavations at 175 Water Street identified a "wharf/grillage system," and the remains of an 18th-century merchant ship, incorporated into "cribbing" to retain fill (Ibid). The "grillage" complex was extensive, covering a large area. The top of the feature was only slightly above mean sea level. Based on photographs and drawings, the "grillage" complex appears to have consisted of continuous courses of round logs (see **Figure 4.53D**). Each course of logs was laid perpendicular to the one above and below it. The wood was identified as sweetgum and yellow pine; however, "no fastenings securing these constructions were observed" (Soil Systems 1983b: 702). Large cobbles and soil (dark grey/brown silty sand) were embedded in the timber "wharf" feature. Privy shafts and other shaft features relating to domestic occupation of the project lots had been cut through the timber 'grillage' in multiple locations.

The ship, which was given the name *The Ronson*, after the site developer, was either previously sunk *in situ* and subsequently incorporated into the fill, or was intentionally sunk in the location in order to add to the fill. "Apparently, this derelict ship was supported in its new role as cribbing by staggered piling" (Ibid: 692). In addition to these features, a bulkhead constructed of horizontal planks fastened (presumably nailed) to pilings was noted.

6.) Schermerhorn Row Block, Manhattan

Field testing was undertaken by S. Kardas and E. Larrabee from 1981 to 1983 in a project area in Lower Manhattan near the East River (Kardas and Larrabee 1991). The project site consisted of the block bounded by John Street (Burling Slip), Fulton Street (Beekman Slip), South and Front Streets. According to historic maps, a number of wharves extending perpendicular from the land into the East River would have passed through the project site, including Schermerhorn's Wharf and Bown's Wharf, likely constructed in the late-18th or early-19th century.

Test trenches, excavated in the cellars and backyards of the buildings occupying the project site, encountered timber crib structures roughly two feet below cellar floors. The retaining structure was described as “large logs” laid to create “boxes of cribbing, probably with some vertical pilings to stabilize” (Ibid: 277). These boxes were filled with “large and medium-sized rocks… placed in, around, and over the log cribwork” (Ibid). Very little detail regarding the construction of the timber features was recorded, apparently due to the limited views afforded within the small trenches and test units.

7.) Archaeological Monitoring at Joralemon and Furman Streets, Brooklyn

In 1979, Ralph Solecki undertook archaeological monitoring in connection with utility installation for the Red Hook Water Pollution Control project on the East River waterfront of Brooklyn Heights (Solecki 1981). The site was located a short distance west of the intersection of Furman and Joralemon Streets, near the 18th-century location of a small wharf structure built on the edge of a natural cove and the Livingston distillery, built into the East River on landfill.

The excavations encountered timber retaining structures, beginning at a little over five feet below ground surface, and extending below the water table to at least 12 feet below ground surface. Due to the narrowness of the trenches being monitored, a limited amount of detail on the construction of these features was recovered. Nevertheless, Solecki reported a series of timber cribworks, which he described as “box like structures,” each about six feet in width (Solecki 1981: 122). The cribs were filled with stones, “some as big as pumpkins, others like cabbages, and still smaller stones about the size of large oranges” (Ibid). Solecki also described a “bulkhead” built in association with the cribs, and formed of “large beams, one on top of the other” (Ibid: 122-3). The five or more timbers were hewn and measured roughly 14 inches square.

Solecki also synthesized notes that had been recorded by the tunnel inspector during the construction of the Furman Street Tunnel in the vicinity of Joralemon Street, which occurred without archaeological supervision. These notes present only a rough sketch of the sorts of landfill-retaining structures that may have been located in this area. The 43 tunnel inspector’s reports reviewed by Solecki reflected a large amount of timber cribwork encountered along the path of the tunnel, which was excavated to a depth of roughly 27 feet below ground surface. The reports recorded what appeared to be “the base of a cribbing works,” constructed of timbers measuring roughly six by eight inches thick (Solecki 1991: 126). They were “layered in log cabin style,” and were found in close association with large boulders (Ibid).

8.) Burling Slip, Manhattan

Archaeological testing was undertaken in the street and parking lot occupying Burling Slip (John Street) between Front and South Street, in an area measuring roughly 80 by 260 feet. The testing was undertaken by AKRF on behalf of the Lower Manhattan Development Corporation and the City of New York in November and December 2007 through 2010 (AKRF 2008 and McDonald pers. comm. April 2010). Michael Pappalardo and Molly McDonald served as Principal Investigators. Based on documentary evidence, the wharf immediately north of Burling Slip between Front and South Streets was built around 1790, and the Slip was filled around 1830.

Initial field testing identified no landfill-retaining structures within Burling Slip. However, during the subsequent implementation of an Unanticipated Discoveries Plan for the site, a wood landfill-retaining structure was encountered along the north edge of the slip, apparently the south side of the circa 1790 wharf. Under the direction of the archaeologist, an approximately 200-foot length of the timber feature was exposed to depths of up to 9 feet below ground surface (roughly

2 feet below the water table). The form of the feature was believed, but not confirmed, to be a wall with tie-backs rather than a cribbing block with cross-ties. The wall was constructed of stacked squared timbers ranging between 10 and 14 inches in diameter. Perpendicular tie-backs were positioned at irregular intervals along the north (landward) side of the wall notched into the rear face of the wall with square notches or lock notches. The north ends of the tie-backs were located outside of the project site and could not be exposed. Piles were located at irregular intervals along both the north and south sides of the wall, likely serving to reinforce the stacked log wall.

The fill within both the former wharf and the former slip areas contained artifact deposits including leather scraps and shoe parts, ceramics, and clam and oyster shells. No other landfill-retaining structures were found in Burling Slip, however, it was presumed that another linear bulkhead was probably located at the former mouth of slip (just east of the project site), which would have been constructed when the slip was filled around 1830.

6. DISCUSSION AND CONCLUSIONS

a. SYNTHESIS OF PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

The previously investigated pre-1850s landfill-retaining structures reviewed above suggest a number of patterns when analyzed in light of their essential construction characteristics (including structure material, fill material, form, structure type, and construction method) rather than the construction type categories (such as “crib,” “solid-filled,” and “cobb”) often relied upon in the past.

A review of archaeological investigations in Britain and Norway shows a clear distinction in landfill-retaining structure construction. In Britain, a small number of examples of log-construction crib-form structures have been documented dating to the Roman period. After the Roman period, however, no structures appear to have been identified that are of log construction or crib form. Medieval timber retaining structures are typically of timber-frame construction and take the form of braced retaining walls. Other British examples include retaining walls of earthfast post (pile) construction, stave (plank) construction, or masonry construction. In contrast, Norwegian examples have been of log-construction in a crib form. The construction methods used in landfill-retaining structures in medieval Britain and Norway, respectively, mirror the chief construction methods used to build other kinds of vernacular structures during the same period.

In North America, the vast majority of pre-1850 landfill-retaining structures documented are of log-construction, built in a crib form. Examples have been found in all regions along the eastern seaboard, from the Middle Atlantic states (including Cheapside Wharf in Maryland and the Meadows Site in Philadelphia), to New England (including the Central Wharf in Salem and the Town Dock Wharves in Charlestown), to New York (including the SUCF Parking Structure site Site 1 of the Washington Street Urban Renewal Project, the Telco Block, and the Assay Site). It should be noted that at several of these sites it could not be definitively confirmed that the retaining structure was a crib form rather than a braced wall form (including the Meadows Site, the Telco Block, and Bache’s Wharf at the Assay Site) because only one or two faces of the structure were exposed. Nevertheless, the log-construction crib appears to have been the most common approach to landfill-retaining structure construction across the Northeast Coast of North America before the mid-19th century.

Linear retaining walls of log construction braced from the landward side with tie-backs or diagonal braces have been documented at several sites, including the SUCF Parking Structure

Site in Albany and at Keith's Wharf in Alexandria, Virginia. At the SUCF Parking Structure Site these walls formed a continuous linear river shoreline, while at the Alexandria Site the walls were arranged to form the three sides of a wharf.

Other kinds of landfill-retaining structures documented in North American sites include linear timber bulkhead walls constructed of vertical or horizontal planks nailed to earthfast posts or piles. These kinds of features were documented at the Telco Block, the Assay Site, and 175 Water Street, but were limited to relatively short segments and in some cases were used to block the mouths of slips that were about to be filled in. The frequency with which this method was used to block slip mouths is not yet clear, since many excavations at slips (e.g., Faneuil Hall in Boston, Burling Slip in Manhattan, and Roberdeau's Wharf in Alexandria) have only encountered the unconsolidated fill that occupies the interior of former slip sites.

An unusual example of timber pile walls was encountered at the SUCF Parking Structure Site in Albany where a section of river shoreline was bulkheaded with a tightly spaced line of timber piles. This was backed on the landward side by extensive timber 'ricking,' stacked logs creating a platform for the pile driver and dually serving as a fill material. Stone retaining walls have been encountered at American sites, such as Derby Wharf in Salem, and documentary evidence suggests that stone walls were used with frequency in Boston. No clear examples of timber-framed construction have been documented in landfill retaining structures in the United States.

b. LANDFILL-RETAINING STRUCTURES IN A VERNACULAR ARCHITECTURAL CONTEXT

Through his analysis of waterfront structures in London, Gustav Milne (1991) has argued strongly that a close connection exists between landbound vernacular building and contemporaneous waterfront revetment construction. This parallel, he argues, persisted through the three primary developments in historic timber joinery in Britain, consisting of earthfast post construction, stave construction, and timber-frame construction. The intact medieval landfill-retaining structures are particularly significant for their potential to yield evidence on developments in carpentry during this period because no intact landbound examples of early medieval earthfast post construction survive, and few examples of medieval stave construction are extant. A number of waterfront revetments have been encountered in London that exhibit hybrid, apparently transitional, forms.

In comparing vernacular timber-framed buildings and timber landfill-retaining structures of the same period (ranging from the 1st to the 17th century), Milne concludes: "both types of structure, although clearly different in function, utilised the same range of techniques. That this approach differs from the methods employed by other specialist carpenters, such as boat builders, is also apparent" (Milne 1991: 116). Milne has further argued that "the waterfront installations in medieval London were erected by the same men who were responsible for timber building elsewhere in the city" (Ibid). This argument was based not only on parallels in construction and joinery but on several 14th and 15th century documentary references indicating that specific carpenters charged with constructing waterfront timber revetments were also responsible for the construction of sheds, watermills, and other structure types.

The same was most likely the case in North America until the close of the 18th century or slightly later. In their study of the Schermerhorn Row Block, Kardas and Larrabee (1991) suggest that the transition came during the period of a late-18th and early-19th century waterfront building boom in New York City: "It is suggested that this rapid growth of the waterfront required greater investment of capital, was accomplished by more standardized construction techniques, and was characterized by the emergence of specialist/contractors, as opposed to the earlier period when general craftsmen/carpenters included waterfront construction among their other building skills" (Ibid: 26). By the late-19th century it is well documented that, the construction of landfill-retaining structures in New York City appears to have been a specialized profession, not necessarily performed by individuals who were also actively employed in house construction or other sorts of carpentry. New York City government payroll records of the 1860s list "dock builders" employed by the City (Street Department of the City of New York 1863). Furthermore, the 1880 United States federal census records suggest that several hundred "dock builders" were living in New York and New Jersey in that year (US Census Bureau 1880). However, during the earlier period under examination here, from the 17th century through the beginning of the 18th century, it is likely that the construction of timber wharves and landfill-retaining structures was either performed by or overseen by individuals with experience in carpentry and the construction of other types of landbound structures. If this is the case, the comparison of landbound structures and landfill-retaining structures highlighted by Milne (1991) for medieval Britain is relevant in North America during this period as well.

In her 1983 paper on pre-20th century wharf construction, Andrea Heintzelman-Muego argues that "Close comparison of particularly the joinery detail in some of the English structures with that found in excavated wharf structures located along the Atlantic seaboard of the United States bear some uncanny similarities….[I]n the crib type wharf construction used in the United States…we begin to see similarities in material design and joinery detail to that found in England. Perhaps then, it can be reasonably deduced that locally excavated wharves are indeed traceable to earlier English architectural and structural designs" (Heintzelman-Muego 1983: 13).

Contrary to Heintzelman-Muego's observation, it is argued here that most historic American waterfront structures along the eastern seaboard differed considerably from medieval English examples in form, construction method, and joinery. A review of previous archaeological investigations has shown that, in post-Roman Britain, timber waterfront structures consisted primarily of timber-framed or plank-framed revetment walls, while most American examples used log-construction methods and relied primarily on the crib form. Some examples of braced retaining walls have been encountered in the United States; however, these were of log-construction rather than timber-frame construction.

American waterfront retaining structures instead exhibit more similarities to the Scandinavian examples discussed than to British examples. These similarities include the log construction technique, the crib form, and certain details of construction, such as saddle and half-lap corner notching, sometimes employing wood dowels driven through the notch. Vertical lock bars, wood stakes inserted into holes in the lower courses of timber, which served to stabilize the structure, represent another such construction detail. The lock bars encountered in Site 1 of the Washington Street Urban Renewal Area and the Telco Block in New York, for example, resemble those used in the Domkirkegaten and Finnegården sites in Norway. Still other aspects of the American retaining structures seem to draw from log-construction techniques rather than timber-framing traditions, such as the joint encountered in Site 1 of the Washington Street Urban Renewal Area and Cheapside Wharf in Maryland in which the end of a cross-tie was incorporated into a scarf joint assembly. This assembly was often used in log houses to accommodate members perpendicular to the main walls, such as floor joists or partition walls (Phleps 1982).

The evidence reviewed above supports the view that the construction of landfill-retaining structures in early North America can be seen as being part of the larger carpentry tradition that encompassed houses, barns, and other types of landbound structure. The use of joints and assemblies in landfill retaining structures that are also seen in specific vernacular building traditions supports the view that, in general terms, the same vocabulary of carpentry and joinery was being drawn from to create both types of structure. However, the correlation between the landbound buildings and landfill retaining structures appears to have been complex in early North America, and the construction method chosen to build vernacular landbound buildings in a given region does not always closely match that chosen to build wharves and other landfill retaining structures. In contrast to medieval Britain, where the construction methods used to build landfill retaining structures closely mirrored those used for landbound structures during the same period, it appears that North American carpenters were capable of drawing from multiple building traditions during this period, but often made different building decisions when approaching landbound and waterfront building projects.

In some parts of North America, such as New York and New England, where log-construction houses and barns were not as common as timber-framed ones, log-construction does appear to have been the standard approach to wharf construction. In other areas, however, where log-construction was more common, such as the southern and Middle Atlantic states, the similarities between landbound and waterfront structures were greater. This parallel was acknowledged by contemporary observers in several historical documents. In 1728, William Byrd recorded his observations on wharf construction in Norfolk, Virginia: "The Method of building Wharffs here is after the following Manner: They lay down long Pine Logs that reach from the Shore to the Edge of the Channel. These are bound fast together by Cross-Pieces notched into them, according to the Architecture of the Log-Houses in North Carolina. A wharf built thus will stand Several Years in spight of the Worm, which bites here very much, but may be soon repaired in a Place where so many Pines grow in the Neighborhood" (as quoted in Norman 1986: 10).

As discussed above, scholars have made compelling arguments linking colonial American log houses to Scandinavian log-building traditions used in the colonial Swedish and Finnish settlements in the Delaware Bay area. By the middle of the 18th century, settlers in Pennsylvania hailing from what is now Germany and neighboring regions brought their own log construction tradition to the Middle Atlantic. Although it was known and occasionally used by carpenters in New England and New York by the advent of the 18th century, it tended to be used only for temporary or lower-class structures in these regions.

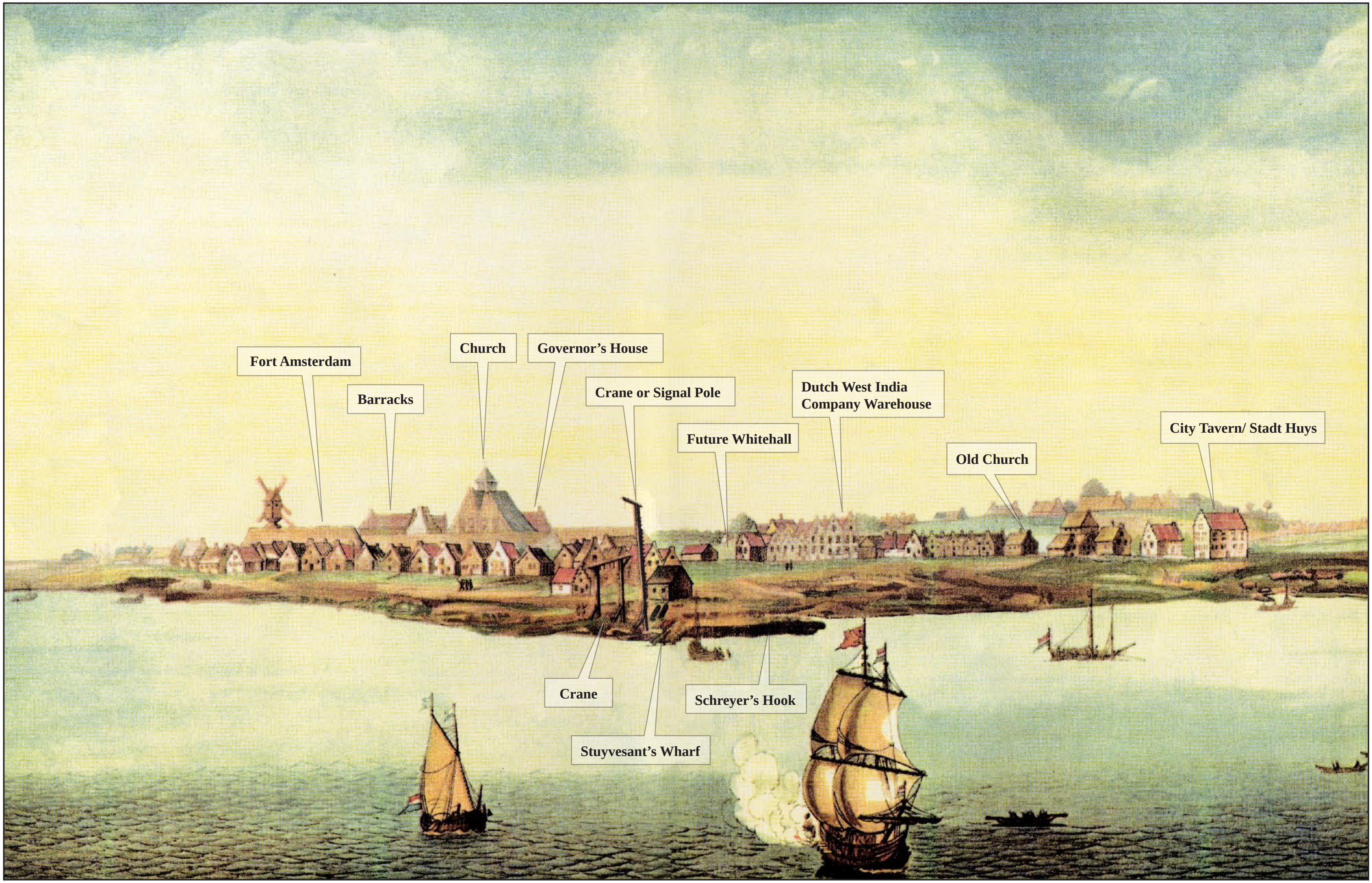
Methods of constructing waterfront structures in early North America may have their roots in Scandinavian building methods, possibly originating in the New Sweden settlement, and disseminated by carpenters and builders migrating south, north, and west. Slightly later, North American log construction was influenced by immigrants from what is now Germany, Switzerland, and neighboring areas. The ubiquitous use of the log-construction method for landfill retaining structures even in New England and New York supports the notion that carpenters in these regions were conversant in log-construction methods, though they seldom used them in applications other than wharves, outbuildings, or temporary structures. Further insight into the relationship between landfill-retaining structures and landbound vernacular construction methods may be gained through additional research on the individuals that constructed or oversaw the construction of early American wharves as well as continued archaeological investigation of fill-retaining structures in North America and comparisons with European precedents.

c. CONCLUSIONS

This section has argued for a revised approach to classifying waterfront retaining structures. It is suggested that some of the terms commonly used to describe waterfront structures in North America lack consistent definition or meaning, including the categories of "crib," "cobb," and "solid-filled" construction. Greater clarity may be achieved by making sharper distinctions between the categories of structure material, fill material, form, structure type, and construction method. Furthermore, a particular emphasis on a feature's construction method has the potential to yield meaningful insights, since vernacular construction traditions are imbued with certain cultural and developmental implications.

The use of stone to construct waterfront retaining walls prior to the mid-19th century is difficult to interpret due to the infrequency with which such structures have been archaeologically documented in North America. Most examples from this period have been found in Massachusetts. Both Edwin Small and Nancy Seasholes have suggested that timber was used in the earliest attempts at wharf building due to the abundance of timber. By the early-19th century, however, stone became the predominant material used on the Massachusetts waterfront, due to local advances in quarrying and likely to the simultaneous decline in timber supply. In 1917, a treatise on wharf building written by New York-based Carleton Greene proclaimed that stone was such a costly construction method that it was used only as "a facing of walls of the most monumental character" (Greene 1917:14). In apparently rare examples of pre-19th century stone retaining walls south of Massachusetts, such as the Battery Wall in New York, the use of masonry may be attributed to the structure's primary function as an important military fortification.

In terms of timber retaining structures, an initial review of archaeological data suggests that log-construction was by far the most common method used in North America prior to circa 1850, and most often manifested itself in the crib form. This method and form differs considerably from medieval British examples, and more closely resembles structures found in Norway. While Milne has shown that British landbound vernacular construction methods closely mirrored approaches to contemporary waterfront retaining structures, the relationship is more complex in New York City, which is not known for 18th- and 19th-century log-construction in landbound applications. The disparity may confirm that while log-construction methods, as well as timber-framing methods, were known to carpenters operating in New York City, log construction was viewed in this region as being reserved for utilitarian structures. A better understanding of the development and cultural origins of the log-construction crib and retaining wall may be achieved through additional research and documentation. ✷



Nieuw Amsterdam Ofte Nue Nieuw Iork opt' Teylant Man (The Prototype View), date depicted 1650-1653

Figure 4.1

Sheet-piling has not yet been installed along the shore in this area. Houses are huddled around the protective walls of Fort Amsterdam and the Church and the Governor's House can be seen inside the Fort and a windmill is in the distance

View of the Site of the Battery in 1656

Figure 4.2

4.26.10

The Castello Plan, depicting New Amsterdam circa 1660
Figure 4.3

SOUTH FERRY

4.26.10

Modern Shoreline

Modern Streets

Battery Wall Remnants

Whitehall Slip Remnants

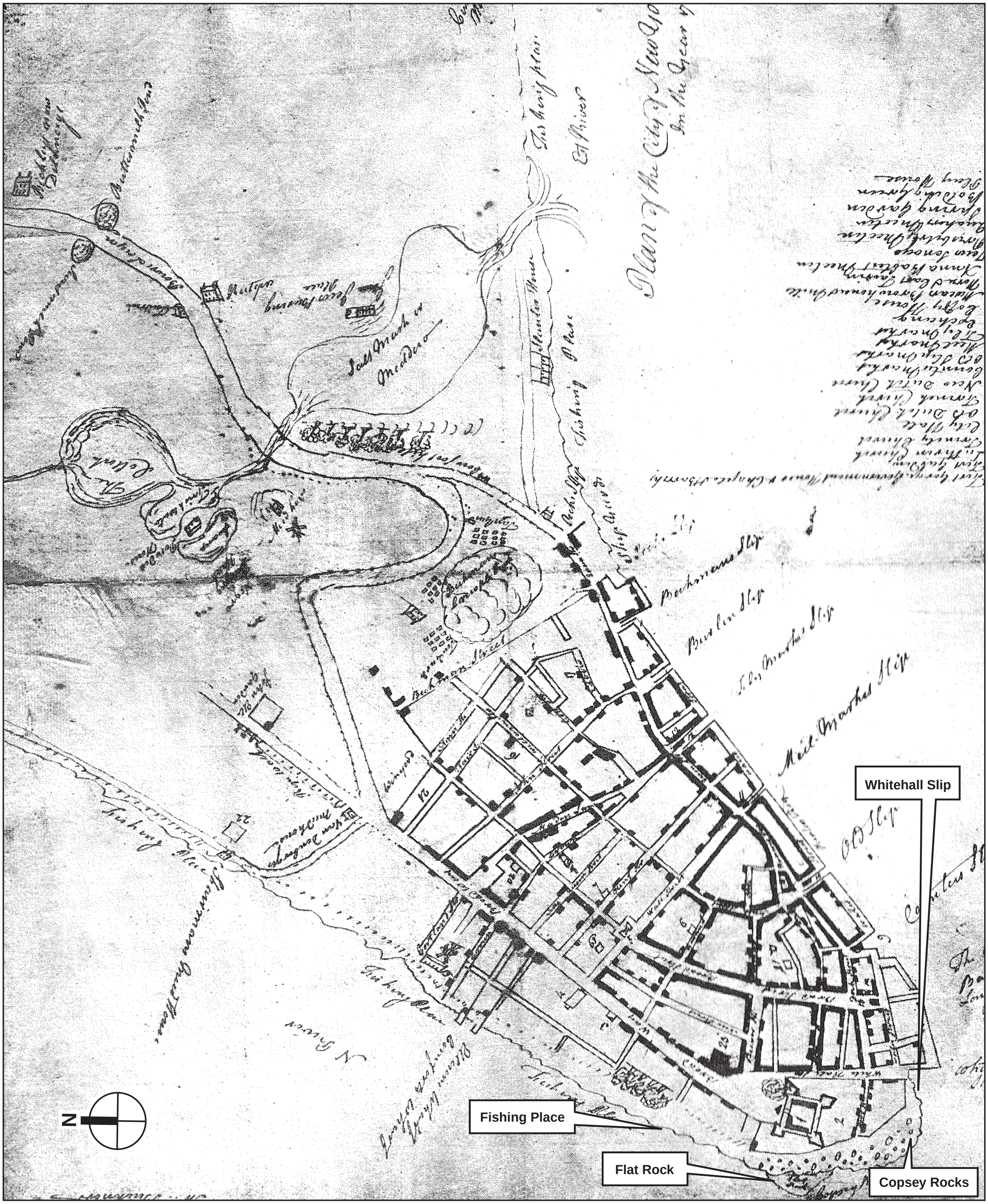
Project Corridor

0 100 200 FEET

SCALE

Plan of the City of New York, Reverend John Miller, *1695*

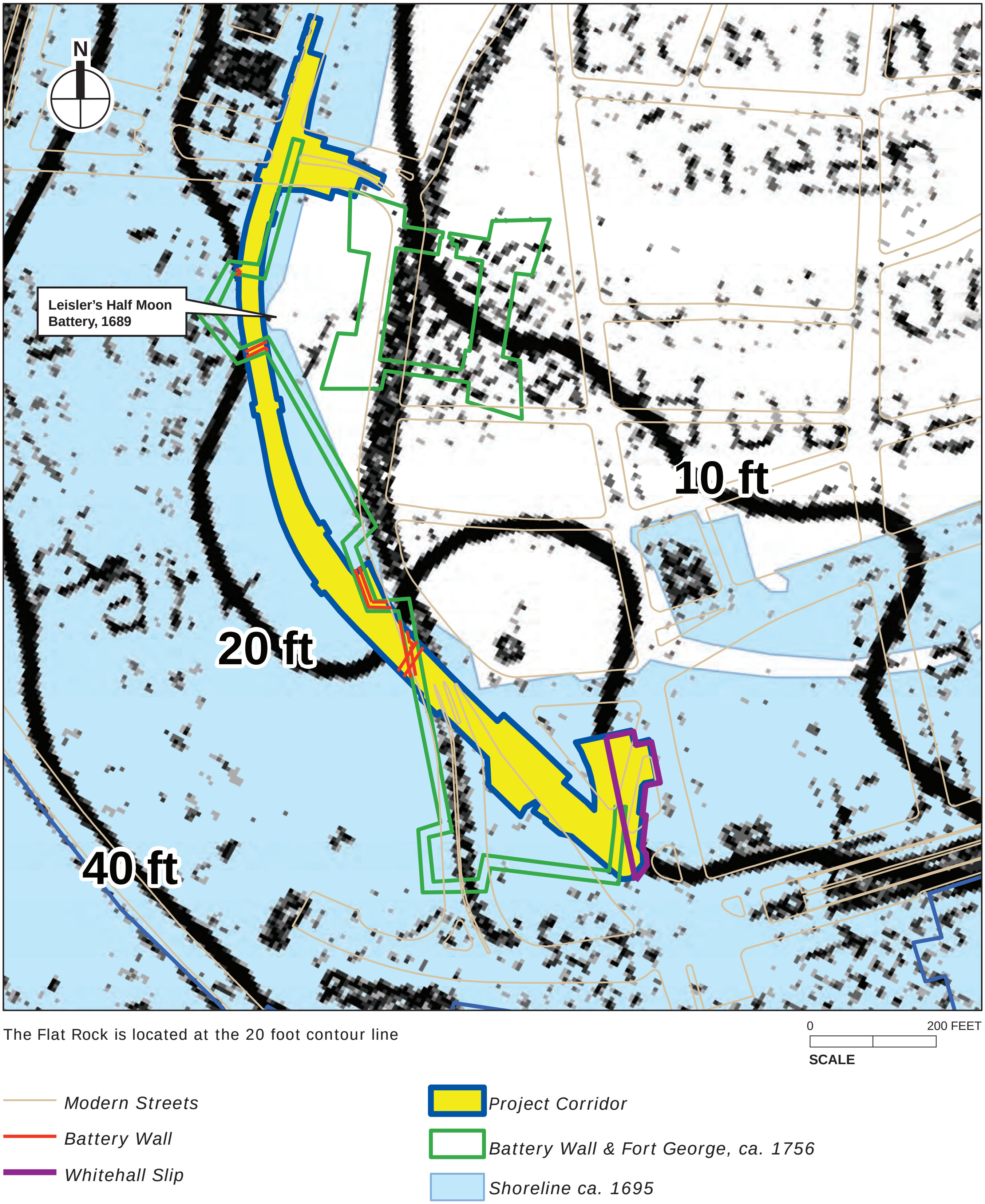
SOUTH FERRY **Figure 4.4**



This is the only historic map that identifies the Flat Rock's location

"Mrs. Buchnerd's Plan," 1735

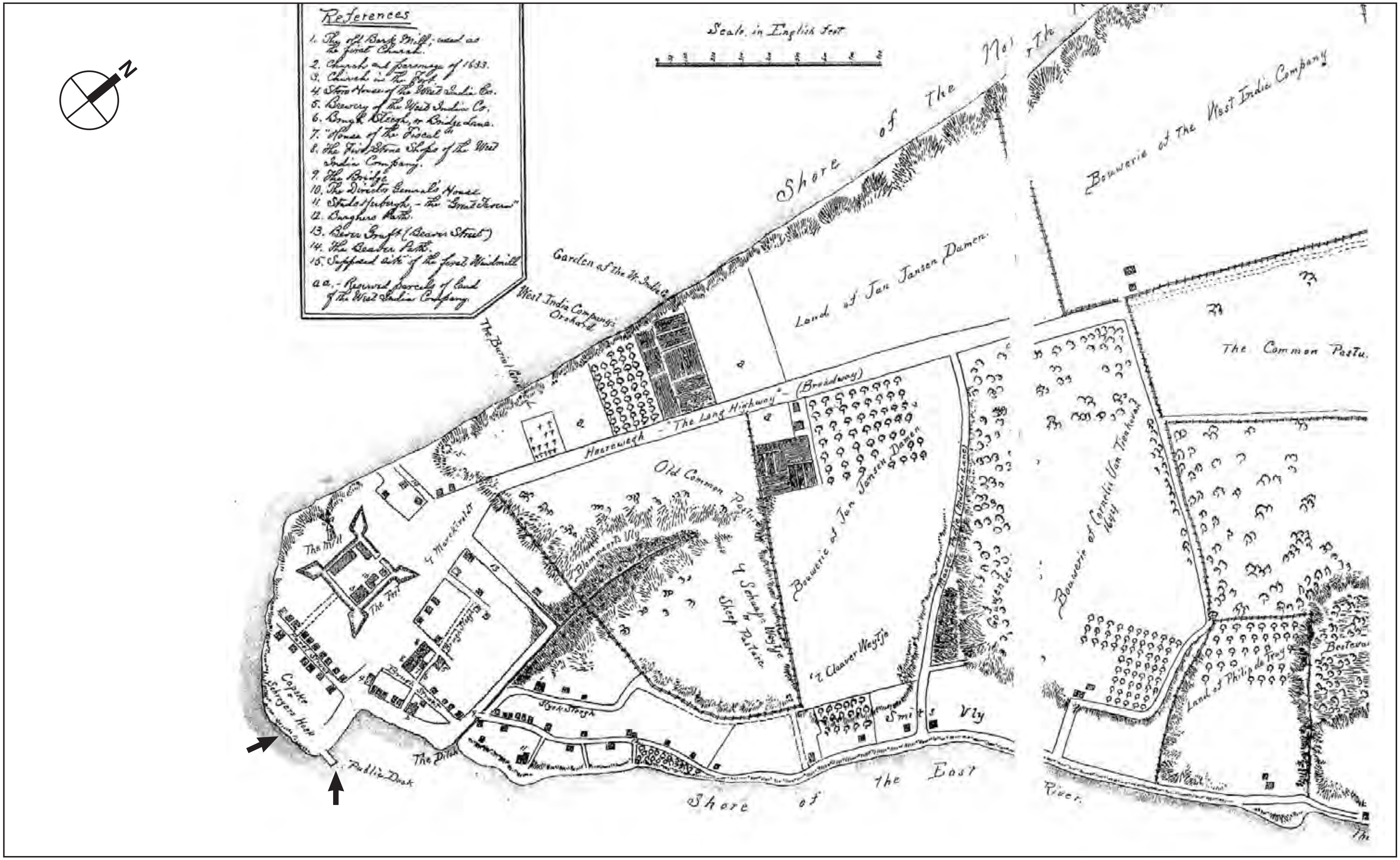
4.26.10



The Flat Rock is located at the 20 foot contour line

Compilation of Maps produced by Baskerville (1990), Dies (1756) and Miller (1695) with an Overlay of the Modern Street Grid

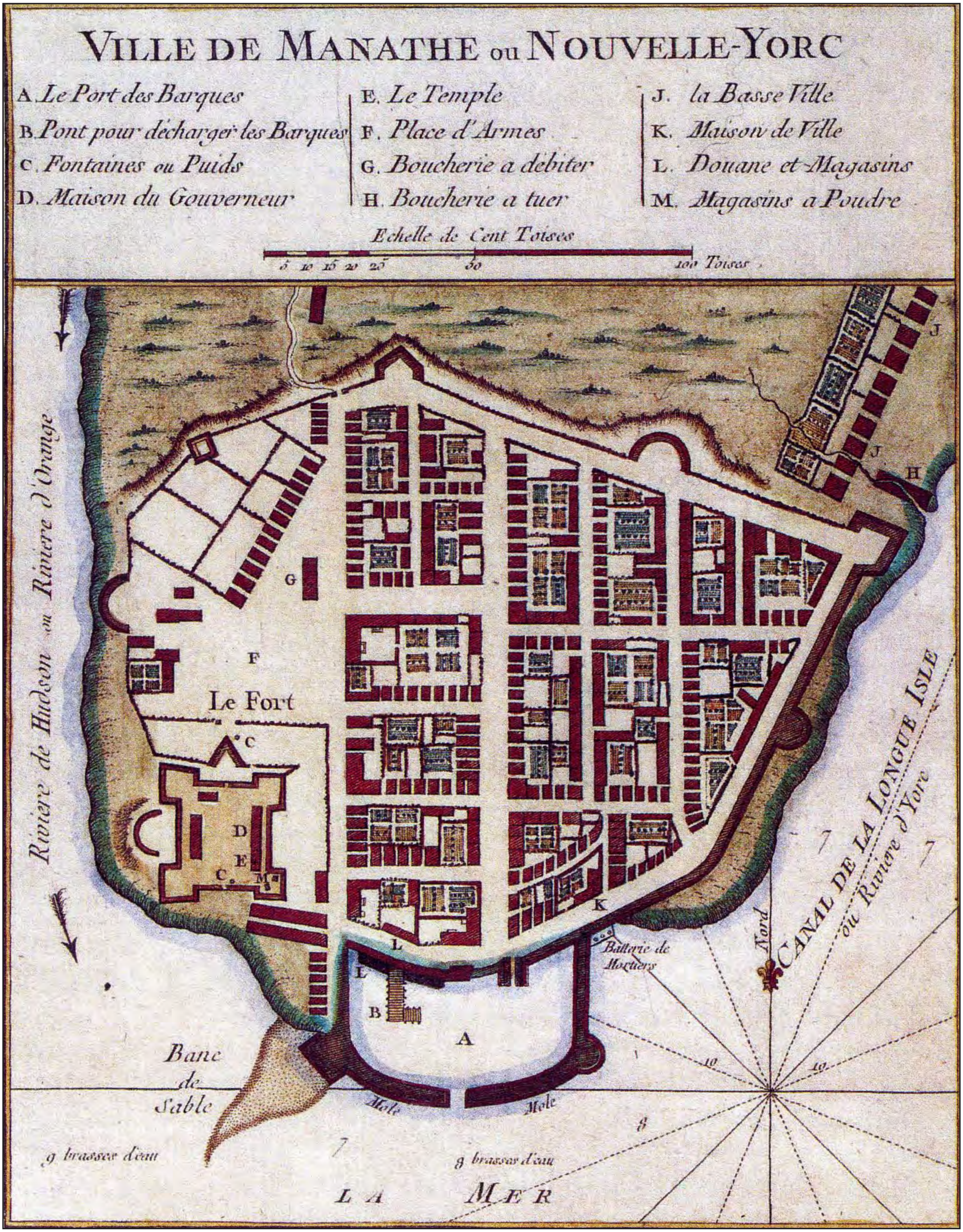
Figure 4.6



Capske or Schreyers Hoek and the Public Dock, also known as Stuyvesant's Dock, are identified

Plan of New Amsterdam about 1644, J.H. Innes, 1902

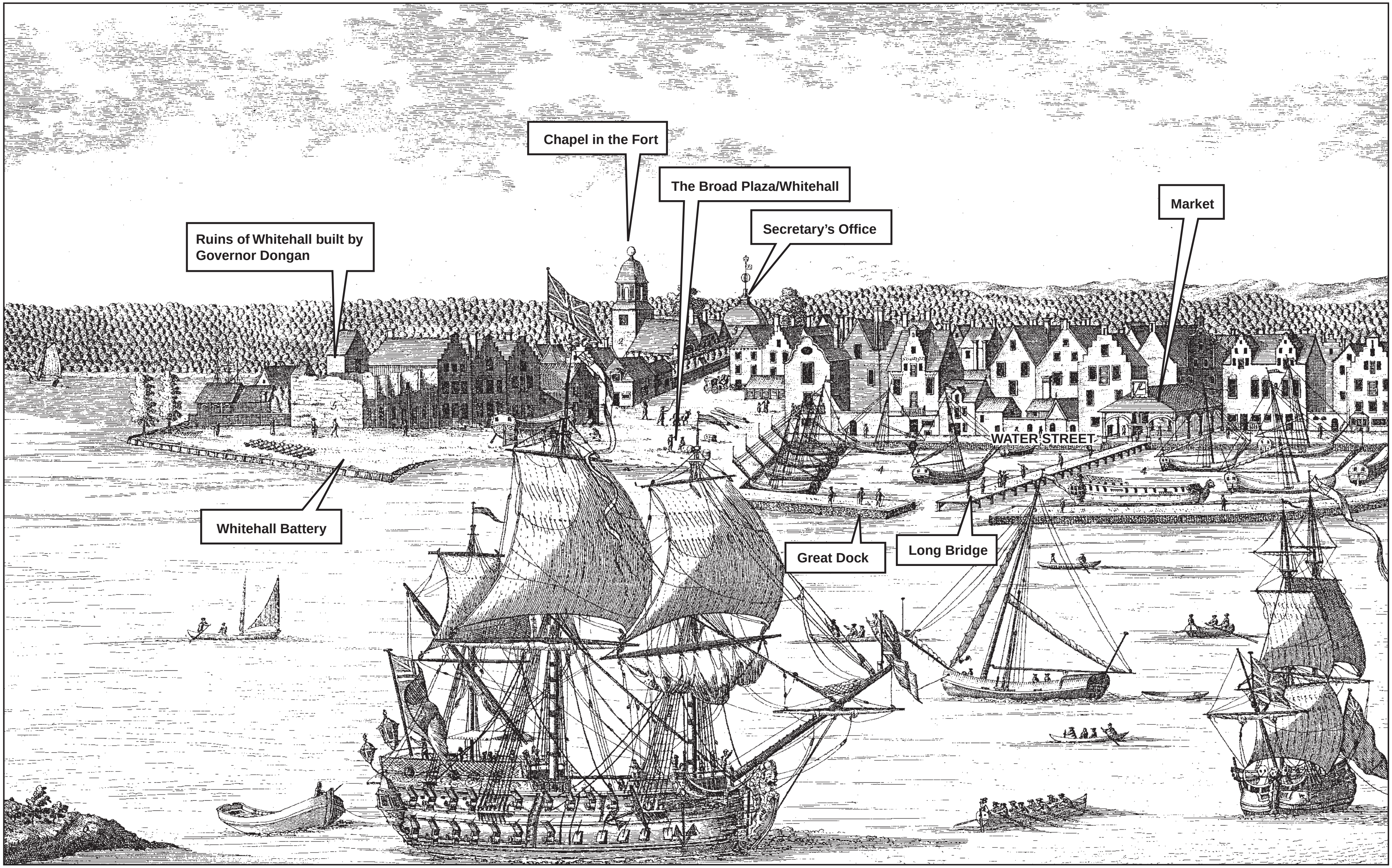
Figure 4.7



This French Map exaggerates the city's fortifications

Ville de Manathe ou Nouvelle-Yorc - circa 1693

Figure 4.8

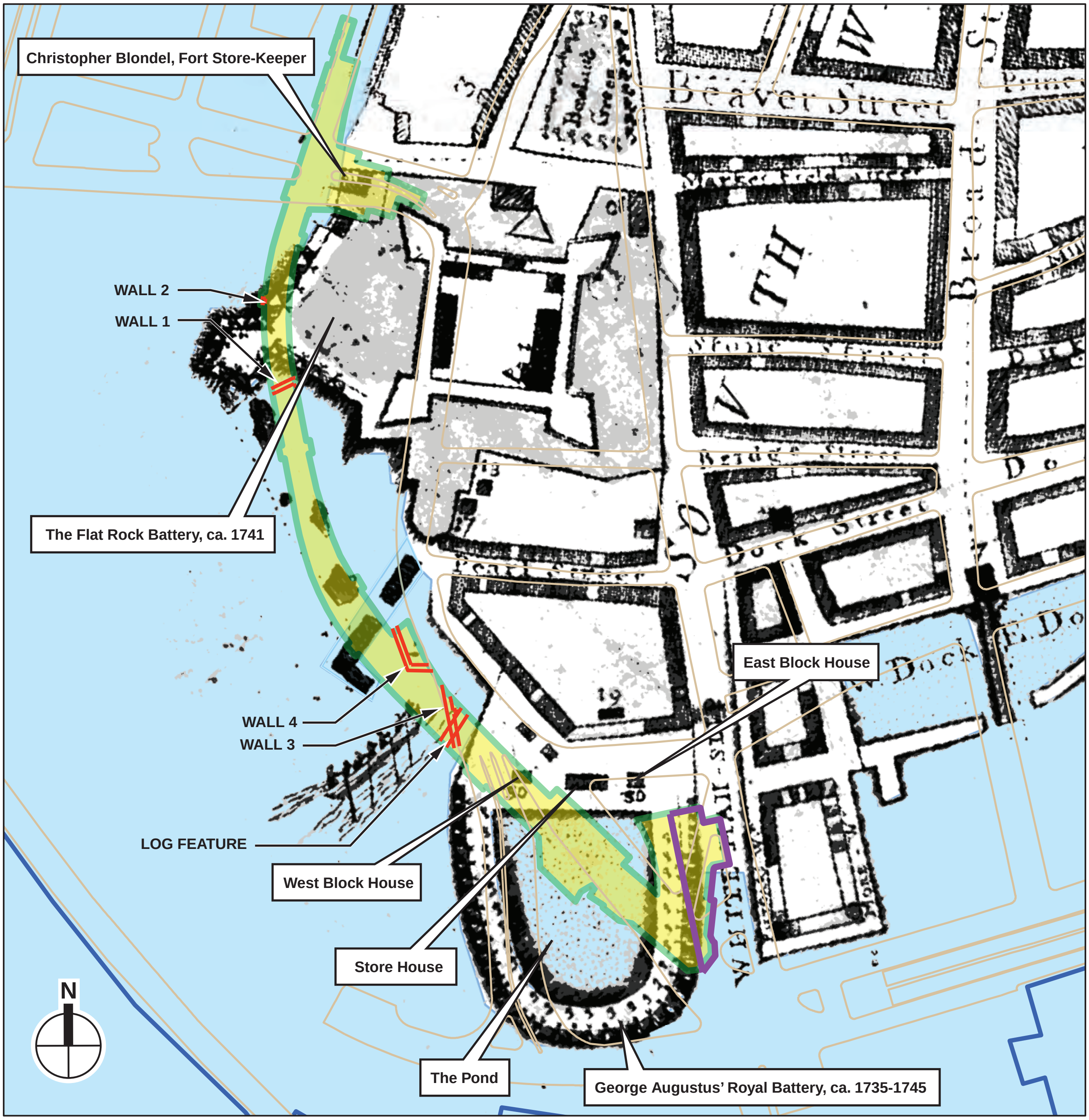


A South Prospect of the City of New York
Burgis, 1717
Figure 4.9

6.23.10

Plan of the City of New York,
Lyne and Bradford, 1728
Figure 4.10

6.23.10



A great deal of construction takes place in the 1730s and 1740s

Modern Shoreline

Modern Streets

Battery Wall

Whitehall Slip

Project Corridor

Plan of the City of New York from an Actual Survey
Francis Maerschalck, 1755
Figure 4.11

The Fort and Outworks are illustrated. A horseshoe-shaped battery is located on the right, just south of the Southwest Bastion of the Fort. A similar shaped battery or redoubt is depicted on the 1728 Lyne-Bradford Plan

1730 Carwitham View
Figure 4.12

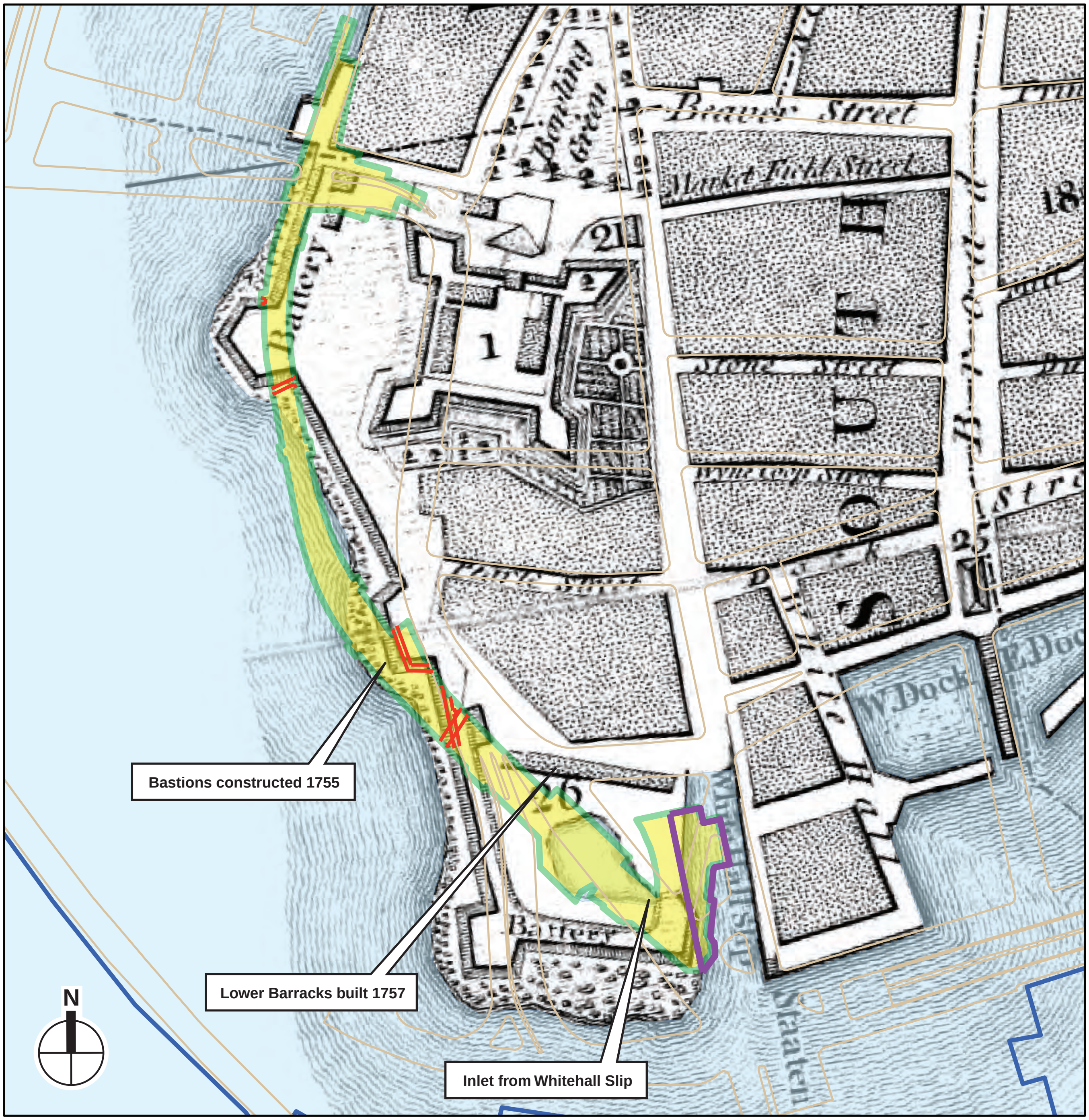
4.26.10

A Plan of the City and Environs of New York
(Grim's General Plan, depicting the city 1742-1744, David Grim, 1813

SOURCE: Seaholes 2003.

The Mole looks similar to the new Battery depicted on the Maerschalck Plan

Detail from 1743 update of
William Burgis's South East View of Boston Harbor
Figure 4.14



This map depicts the Bastions constructed in 1755. The Wall segments found by the archaeologists were constructed at this time. A narrow inlet between Whitehall Slip and the Pond can be seen in this view

0 100 200 FEET
SCALE

Modern Shoreline

Modern Streets

Battery Wall

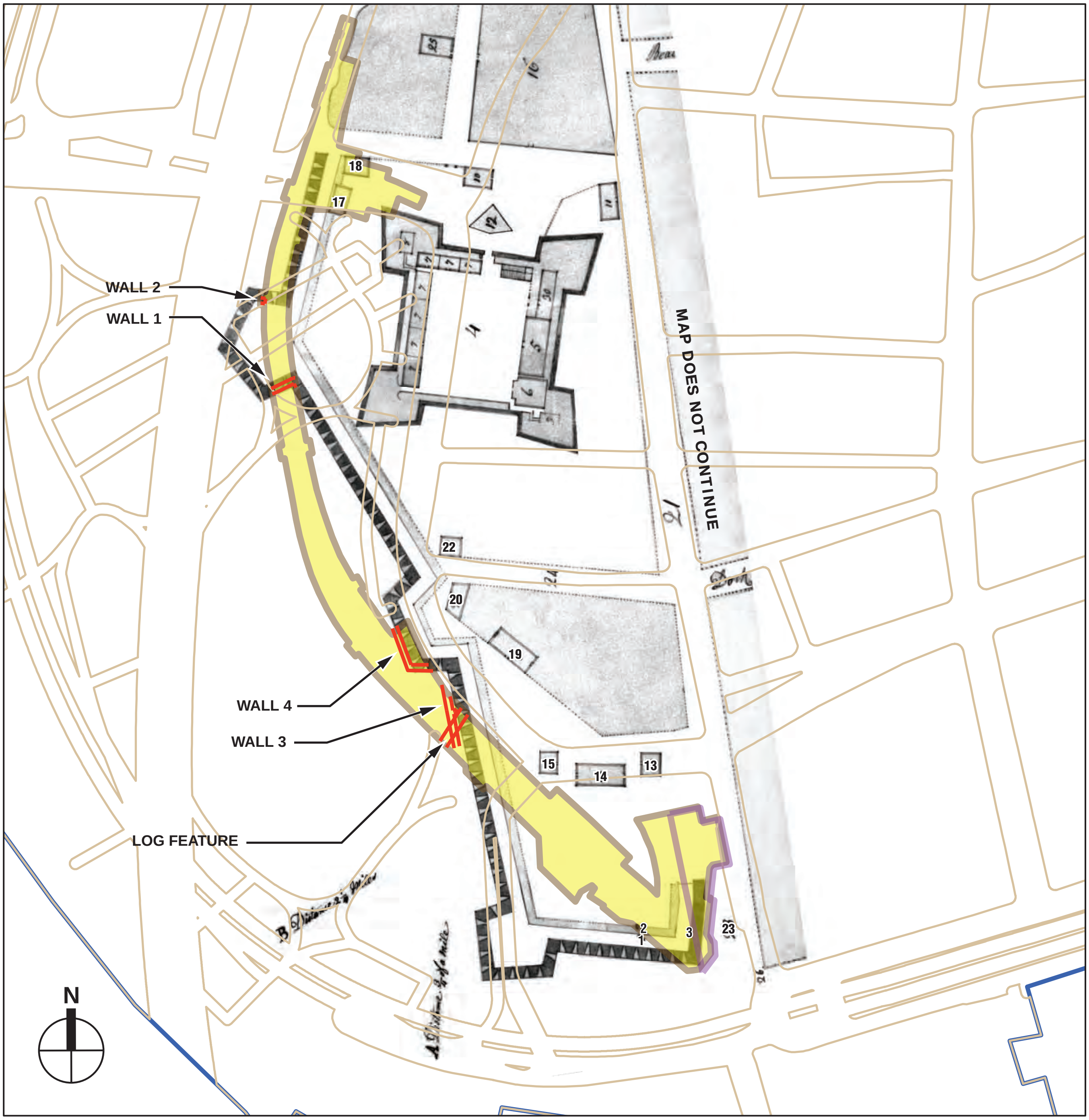
Whitehall Slip

Project Corridor

Plan of the City of New York, depicting 1766-1767.
Bernard Ratzen, 1776

Figure 4.15

6.23.10



John Dies was the Commissioner of Fortifications and was in charge of all the improvements to the Fort and Battery

0 100 200 FEET

SCALE

Modern Shoreline

Modern Streets

Battery Wall

Whitehall Slip

Project Corridor

1- The Depth of Platforms

2- The Breadth of the Ramparts

3- Barbet and Mounts 4 Cannon

13- East Block House

14- Province Store House

15- West Block House

17- North Store House

18- Mr. Blundle's House

19- Capt. Hunt's house

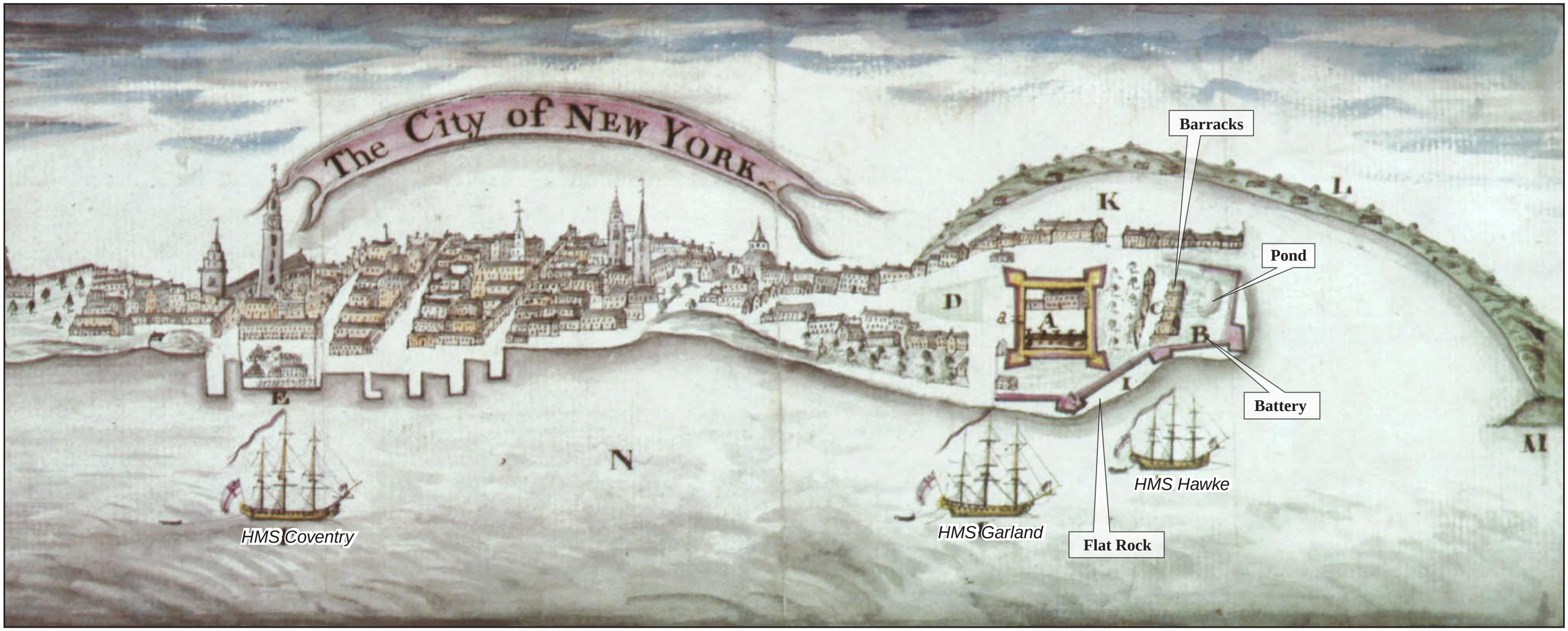
20- Capt. Rivitt's House

22- Still House

23- Whitehall Slip

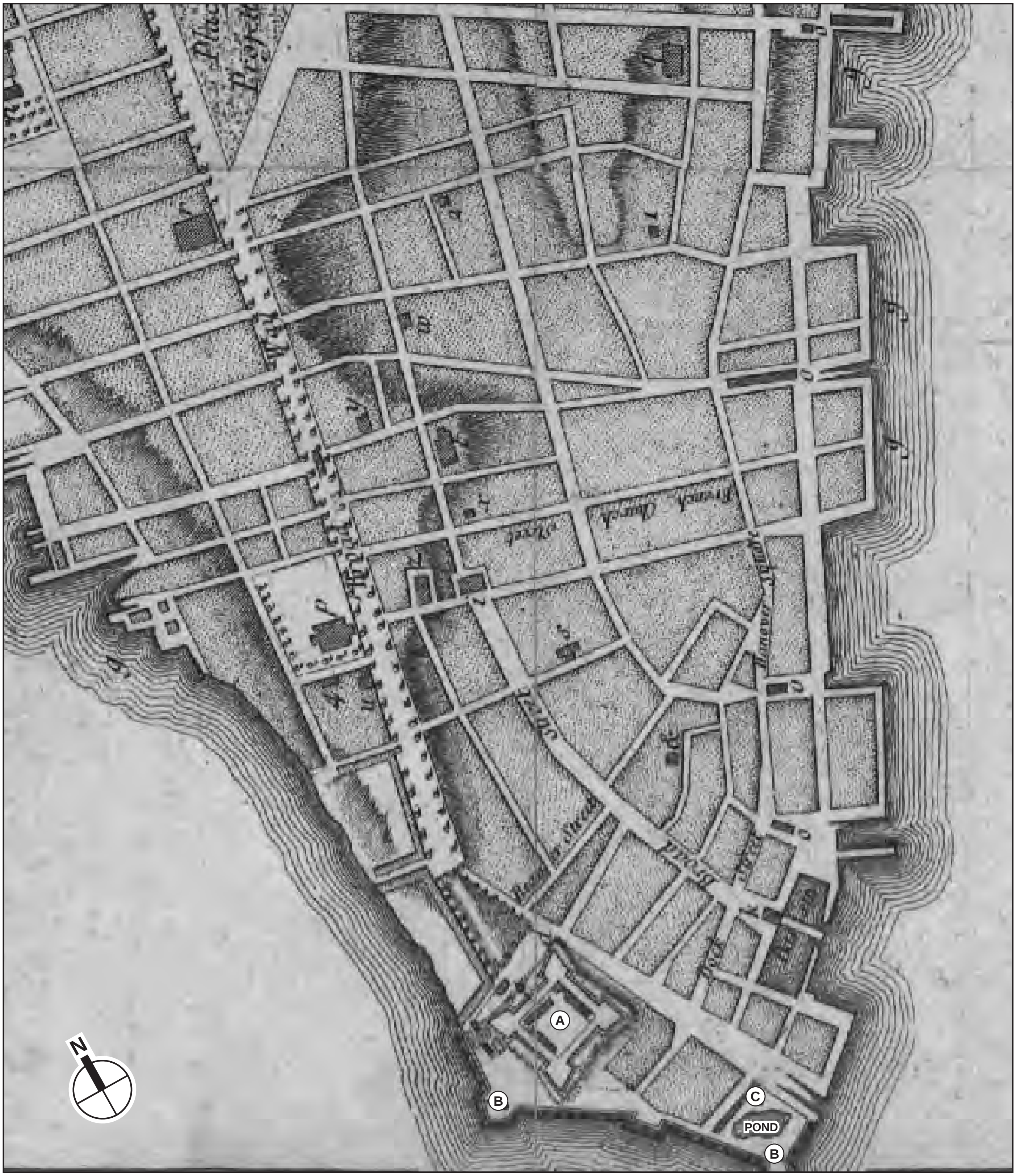
An Exact Draught of the Work Built this Year, as also of Fort George and the houses that have any Conection (sic) with the Batteries or Fort, John Dies, 1756

Figure 4.16



Perspective of the City of New York Showing the position of King George's fleet on Nov. 1, 1765 W. Cockburn, 1767

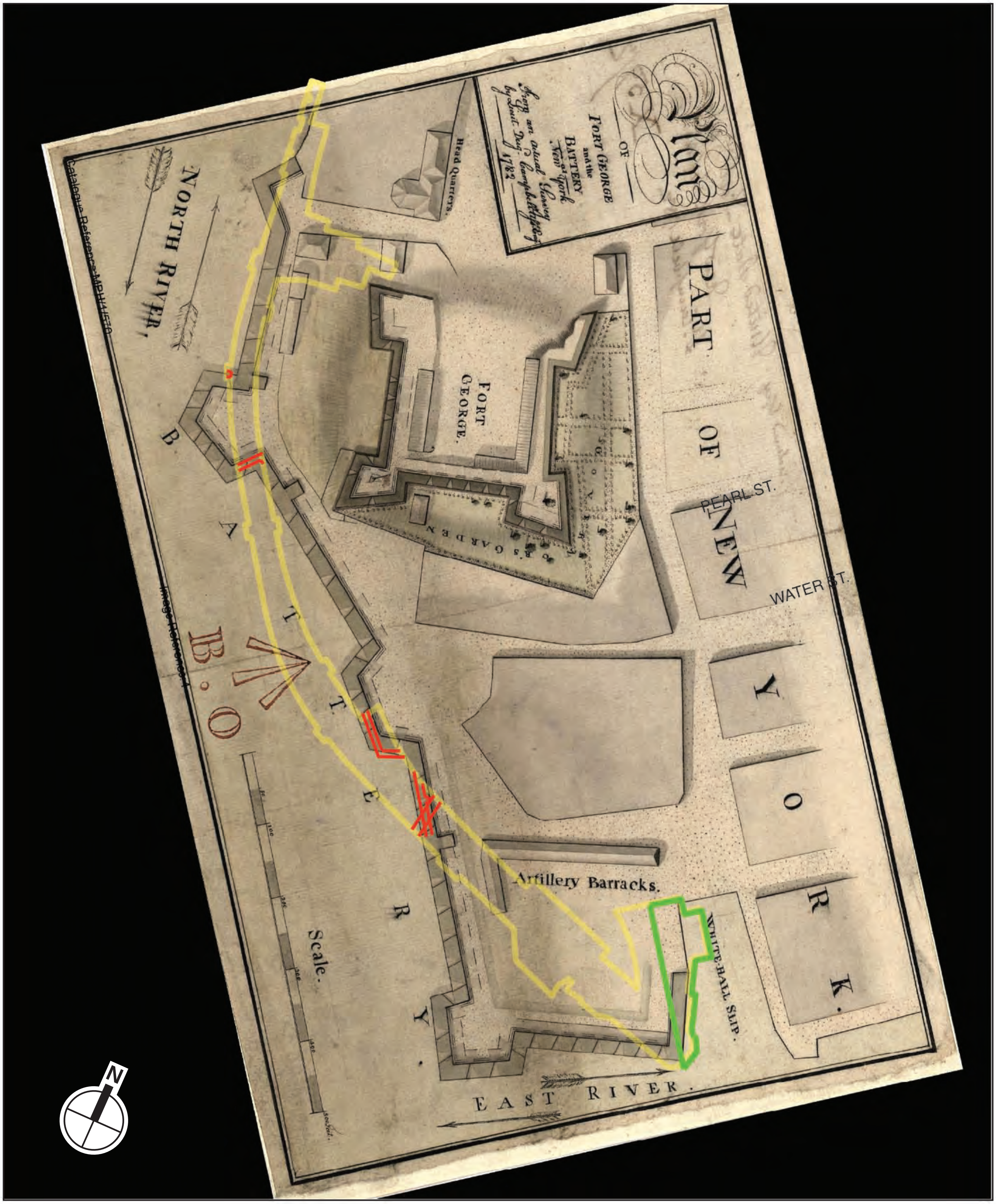
4.30.10



This map was surveyed during the Stamp Act riots. It depicts the Fort at letter “A,” the Batteries at letter “B,” and the Military Hospital at letter “C.” The Military Hospital was also used as a Barracks and is noted as such on the Ratzen Plan from the same time period. The Pond is also prominent in this view. Whitehall Slip appears to have a long dock in the middle of the slip that does not appear on any other view

A Plan of the city of New-York & its Environs
John Montresor, 1776 (Date Depicted 1766)

5.21.10



This detailed map shows the firing platforms and firing angles along the walls of the Battery

0 100 200 FEET
SCALE

Battery Wall

Whitehall Slip

Project Corridor

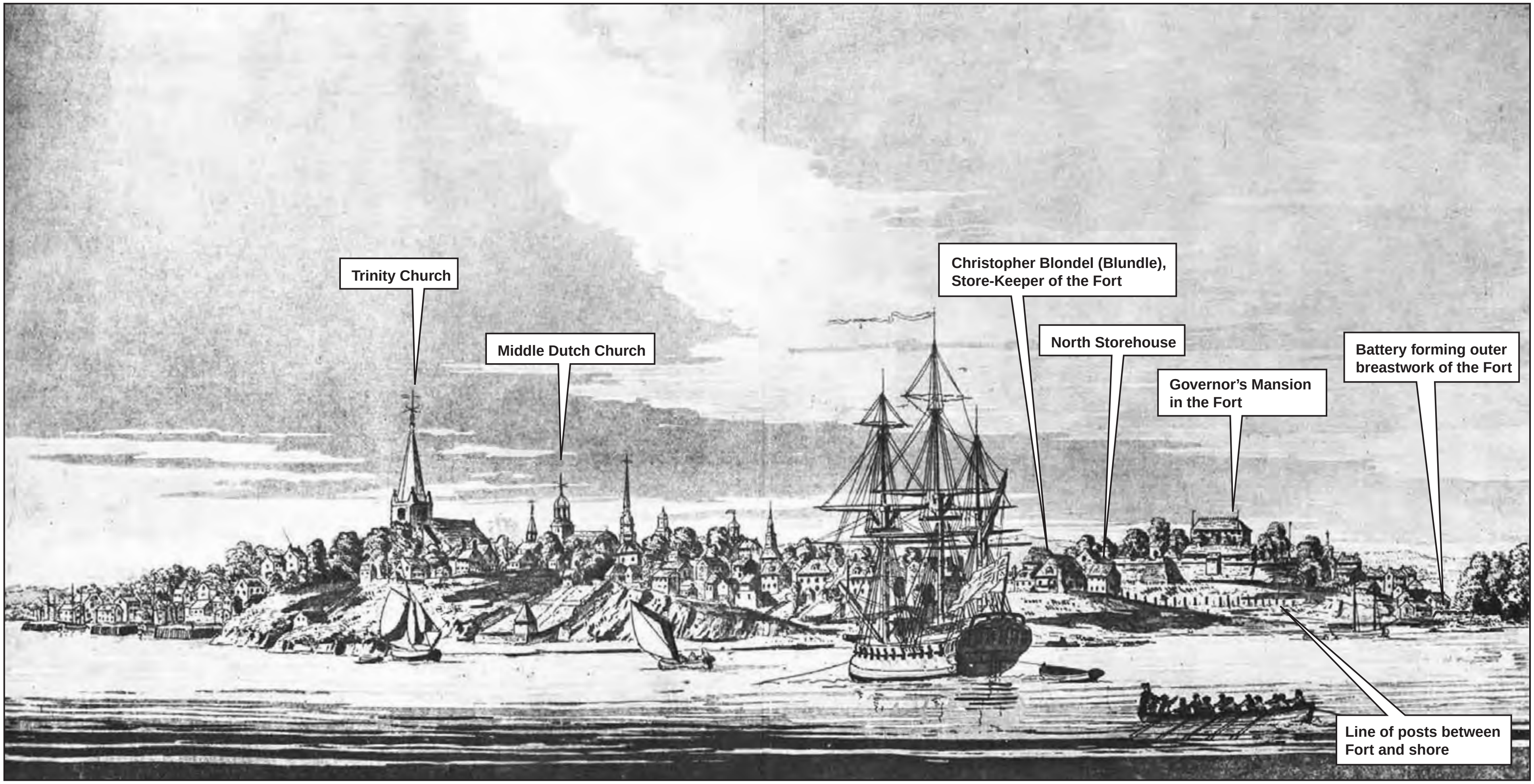
Campbell Map, 1782 – Plan of Fort George and the Battery at New York from an actual survey by Lieut. Dug. Campbell, Asst. Eng. in the year 1782

This map shows the extent of the Great Fire of September 1776 that started on Whitehall Slip one week after the British capture of New York City. The Fort and Battery were undamaged but a large swath of the city was destroyed

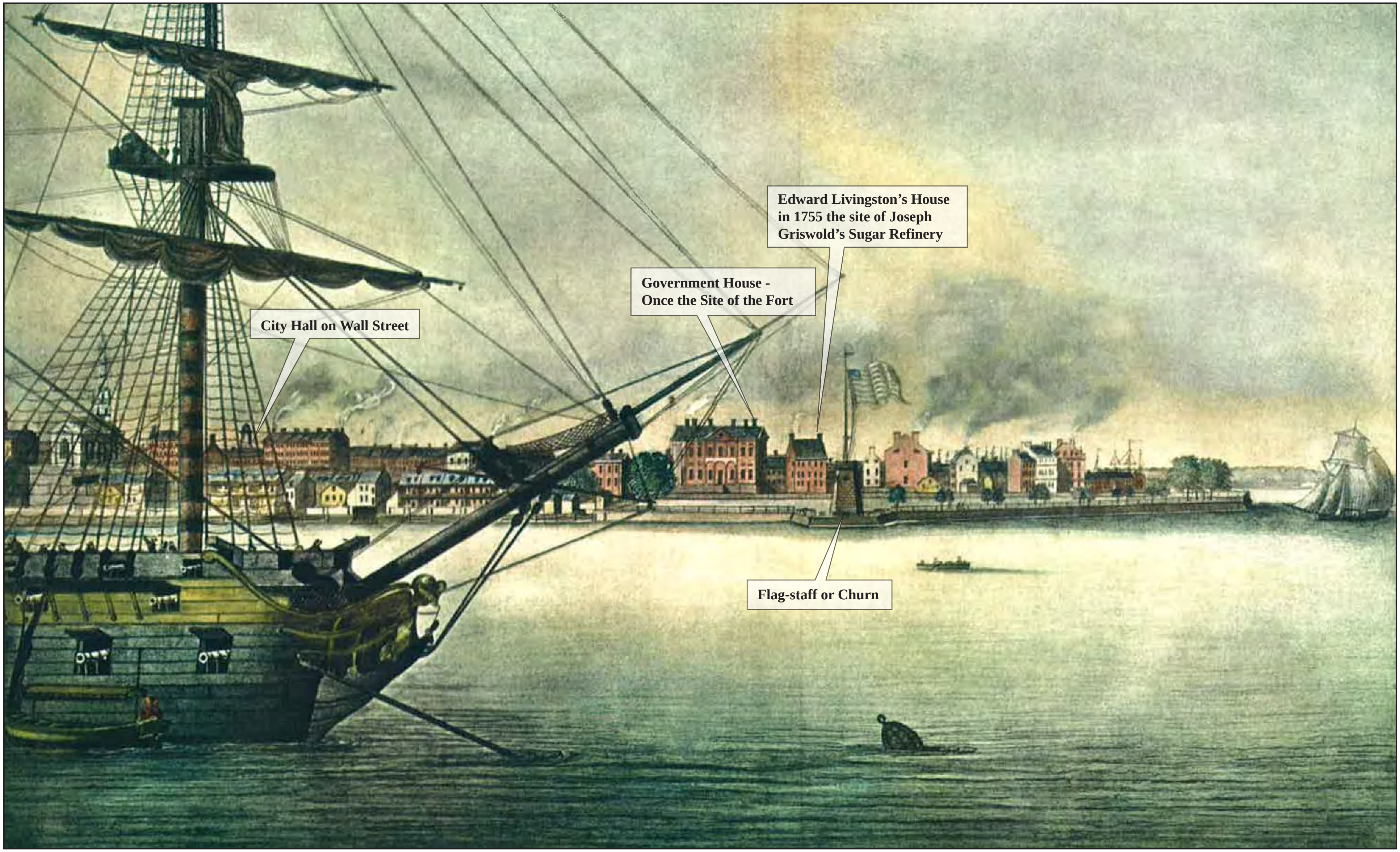
Burned Area

Built as a residence for the President of the United States, the cornerstone of Government House was laid on May 21, 1790 but the structure was not completed until the following year. The Capitol moved to Philadelphia before the house was finished

Government House circa 1793,
John Scoles, (Hayward version, c. 1852)
Figure 4.21

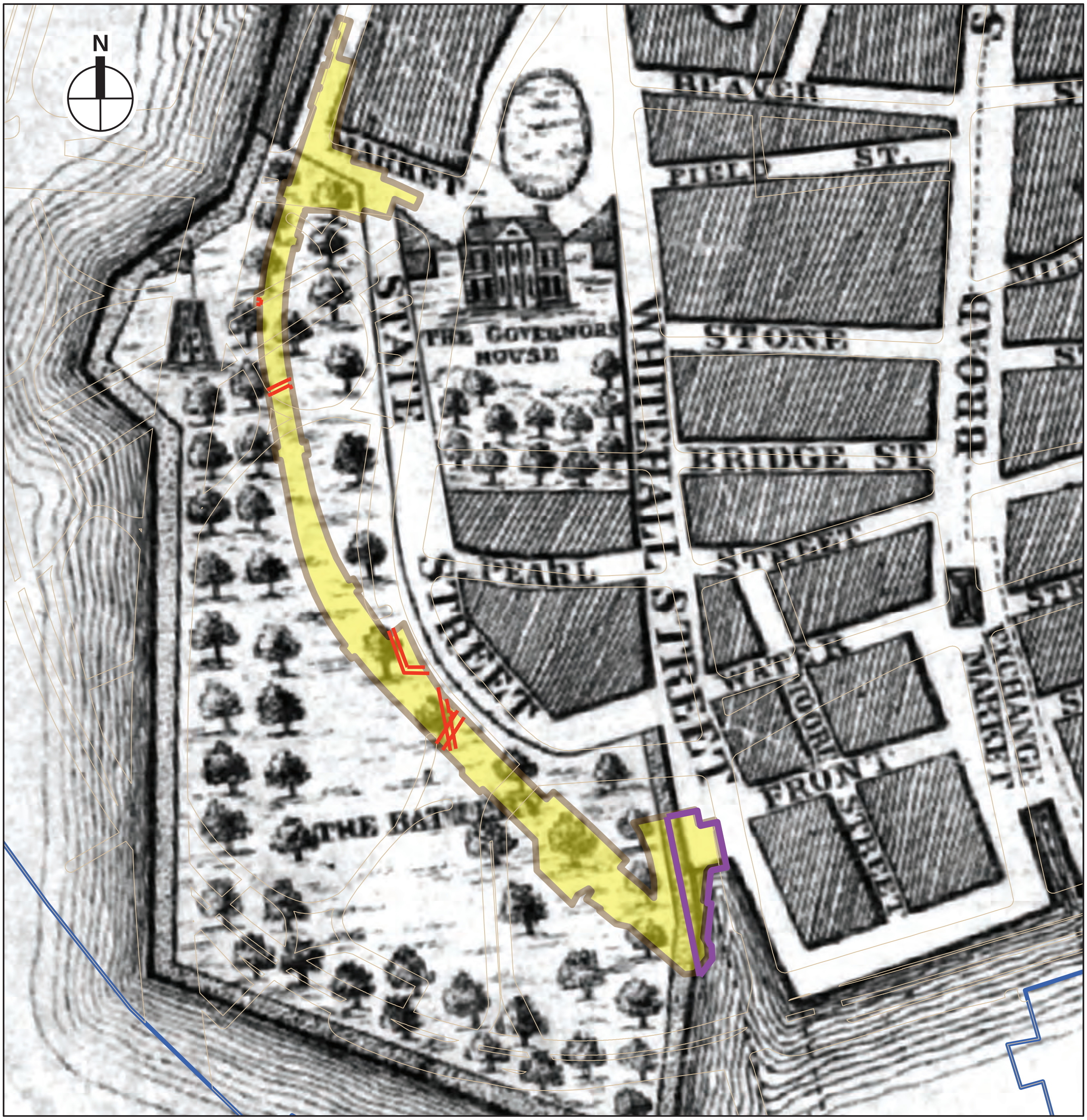


A View of New York from the Northwest before 1773
Figure 4.22



The Government House has been completed and the "mound" or embankment surrounding the Battery is finished. The fence around the Battery was constructed after August 1792

New York in 1796
Figure 4.23



The Battery is now a park as intended, and Whitehall Slip is filled in to just below Front Street.

Modern Shoreline

Modern Street

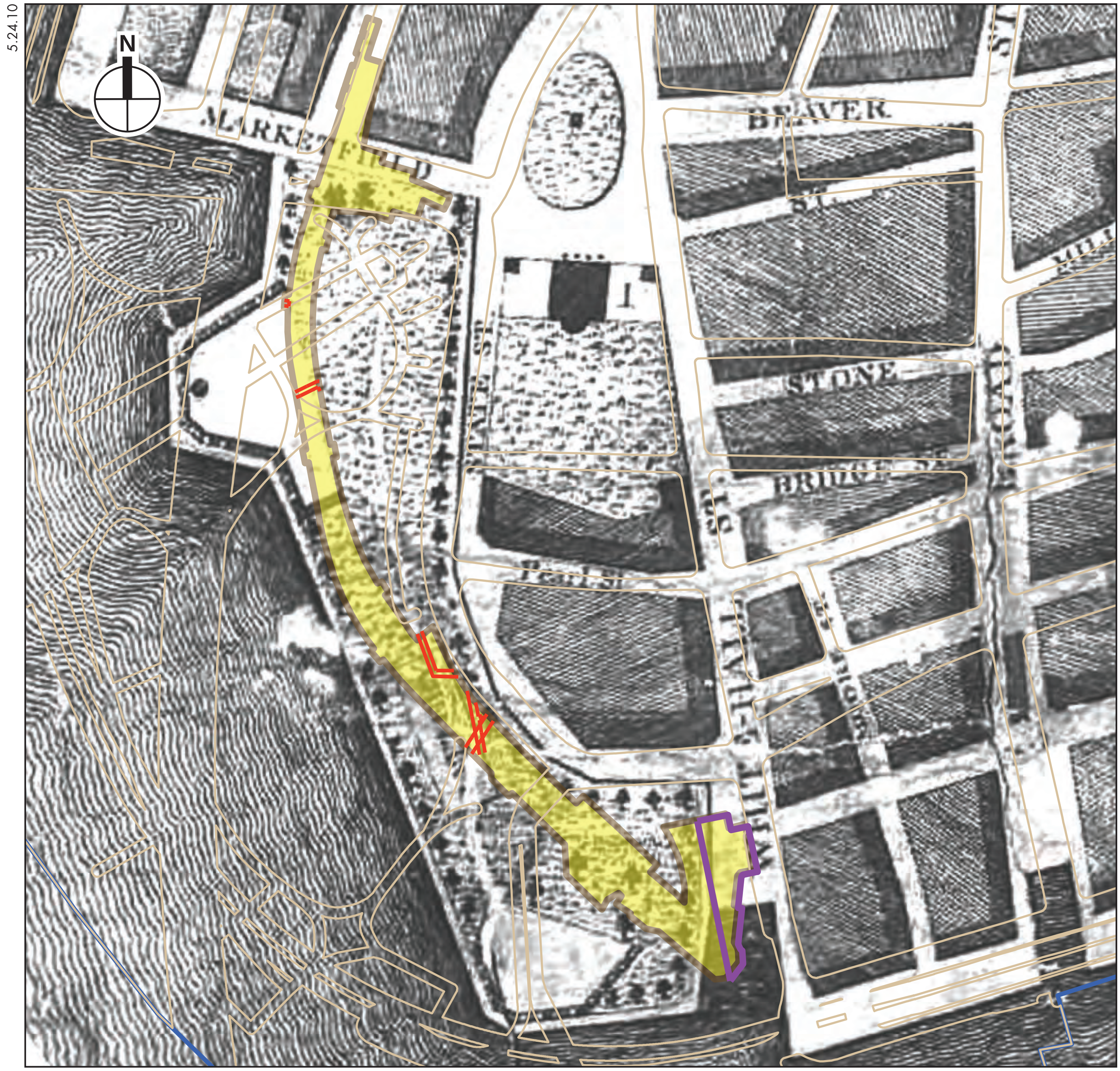
Battery Wall

Whitehall Slip

Project Corridor

A New and Accurate Plan of the City of New York, Benjamin Taylor and John Roberts, 1797

Figure 4.24



The original location of the Flag-staff or "churn" is depicted on a new battery

0 100 200 FEET
SCALE

Modern Shoreline

Modern Street

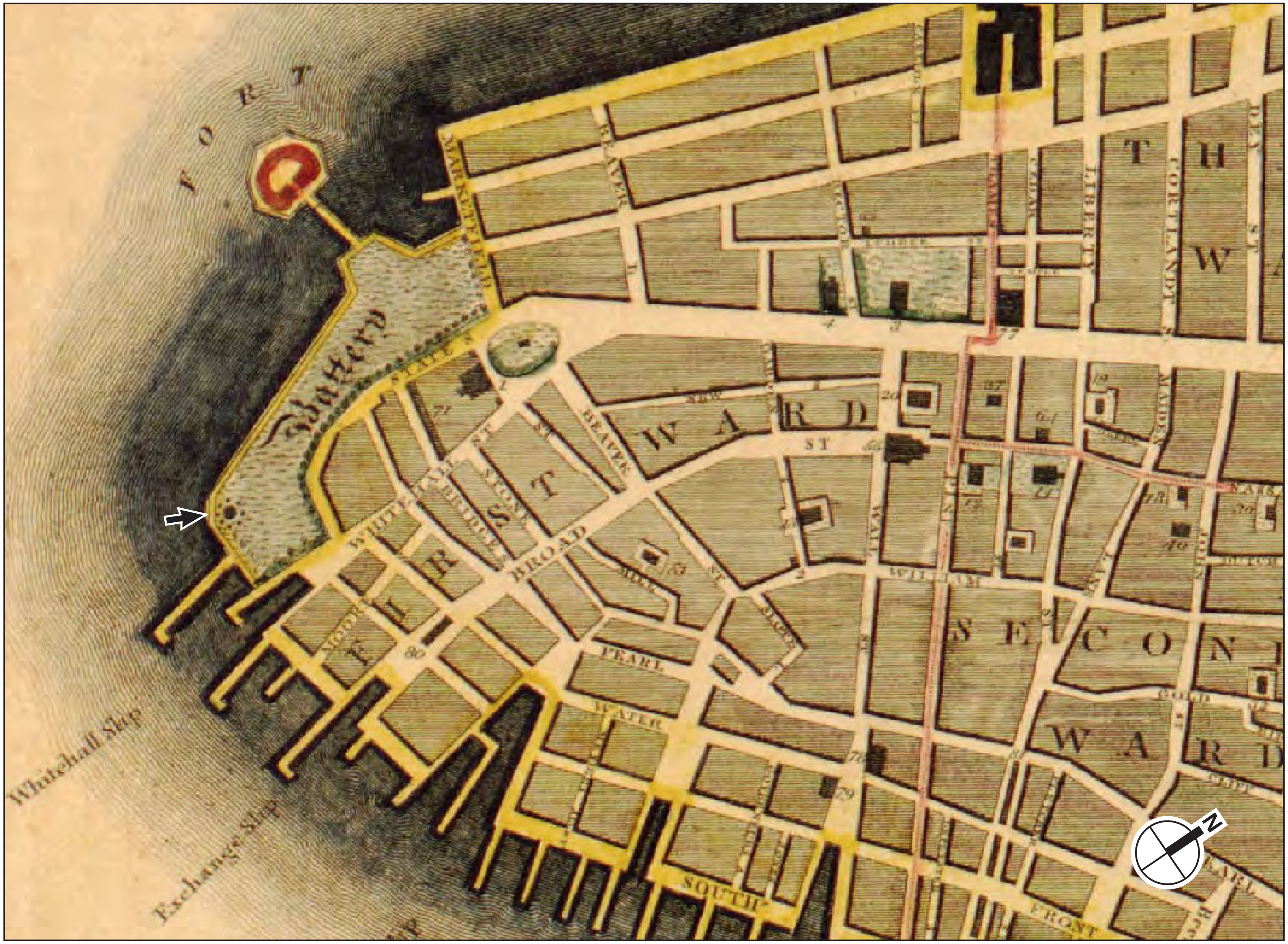
Battery Wall

Whitehall Slip

Project Corridor

Plan of the City of New York, drawn from an actual survey,
Joseph Mangin and Casimir Goerck, 1803
Figure 4.25

4.30.10



This map shows the new location of the Flag-Staff or "Churn" that was moved because it was in the way of the construction of the new South-West Battery. The new battery, later called Castle Clinton, is connected to the land by a long bridge

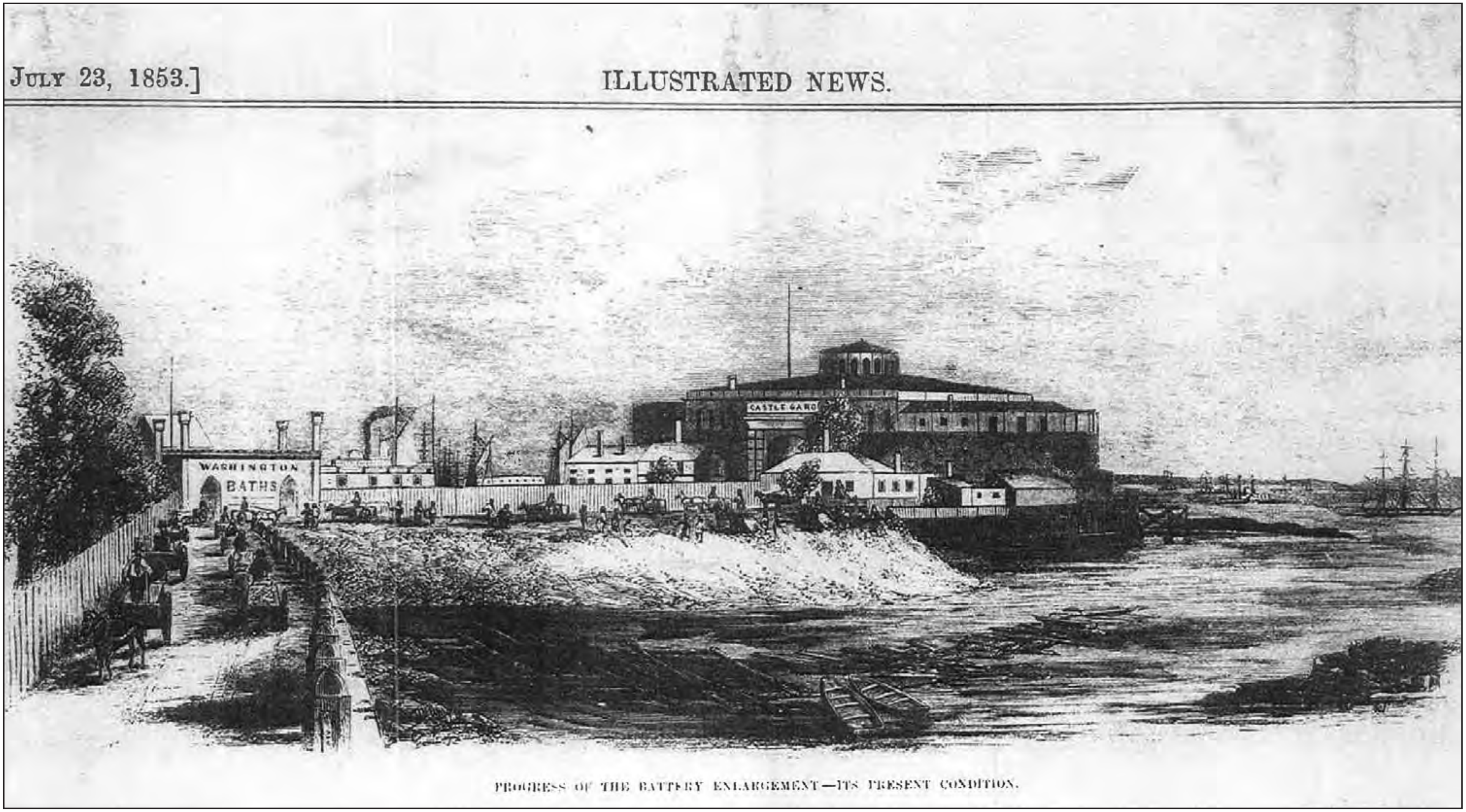
0 500 1000 FEET
SCALE

The Commissioner's Plan, William Bridges, 1811
Figure 4.26

4.30.10

This drawing is from the *Report in Favor of the Enlargement of the Battery*,
NYC Board of Asst. Aldermen, October 9, 1848

Proposed Enlargement of the Present Battery,
Daniel Ewen, September 1848
Figure 4.27



Wagonloads of fill are carted in to enlarge the Battery

A drawing from the *Illustrated News*, 1853

Figure 4.28

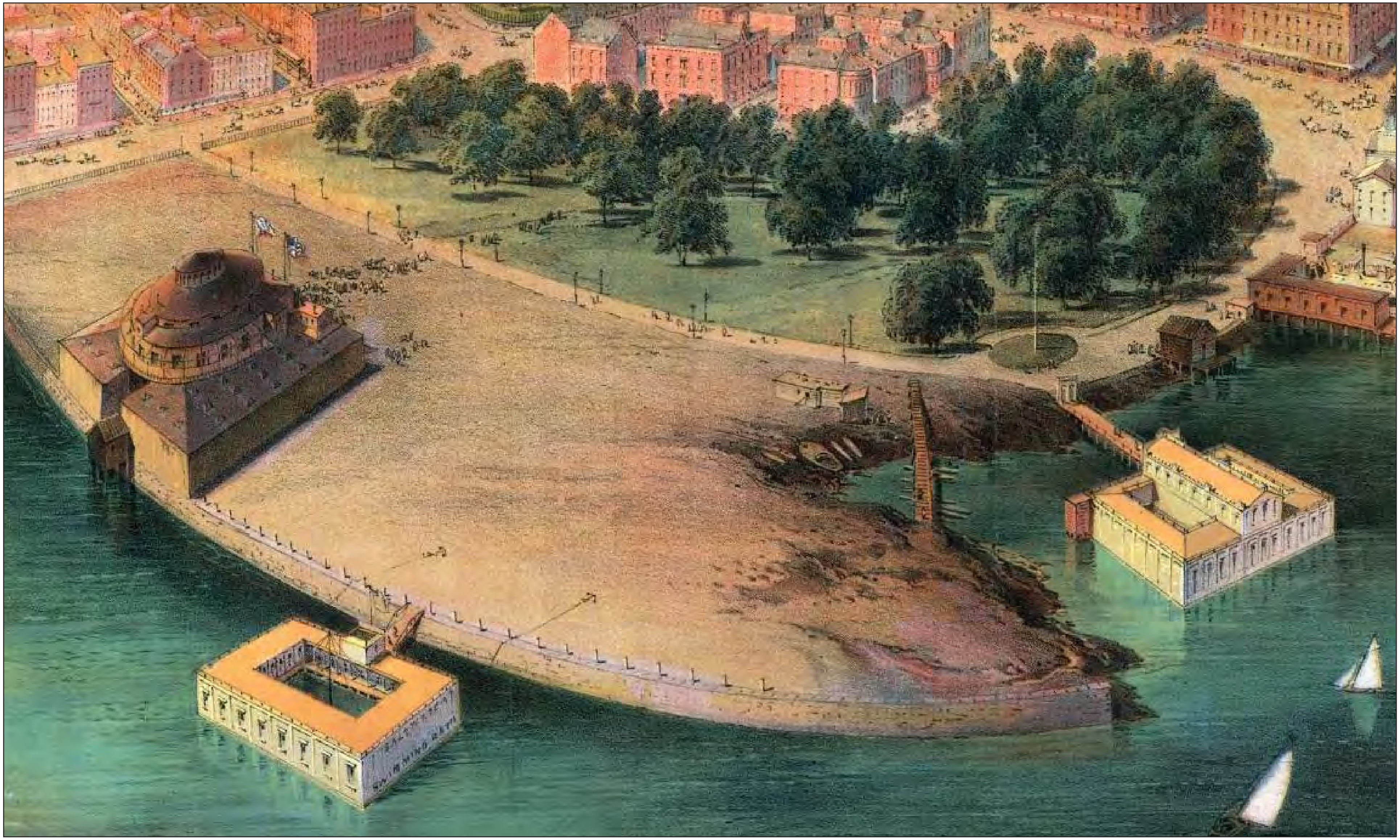
Source: Museum of the City of New York.

This view looks north toward Battery Place and documents continuous filling-in activities extending from the old sea wall (at right) into the Hudson River

Circa 1853 photograph showing the enlargement of the Battery
Figure 4.29

SOUTH FERRY

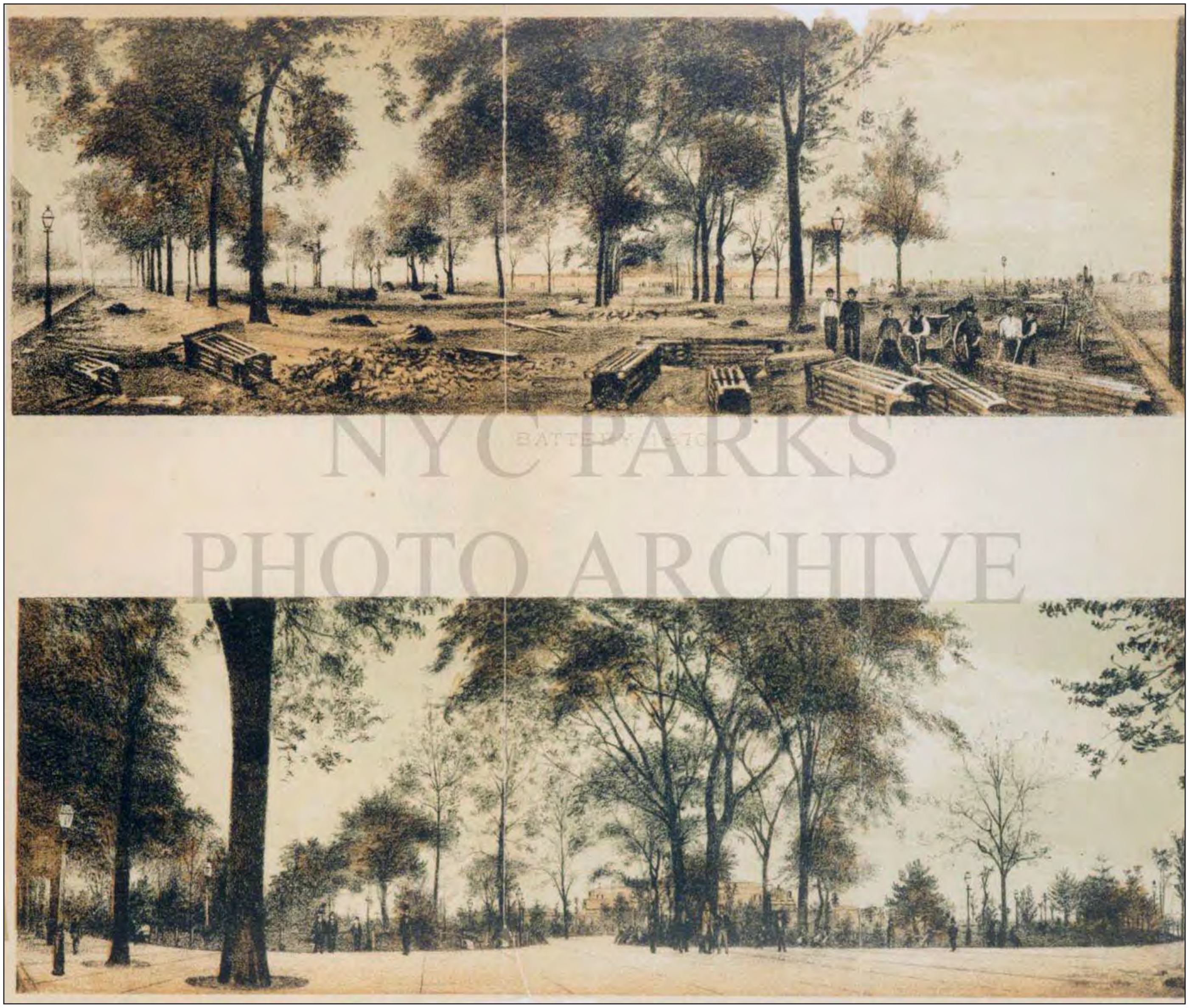
Plan of New York City Matthew Dripps, 1867
Figure 4.30



This lithograph illustrates a Battery Park that has not yet been completed. The Washington Baths are off shore in the Hudson River. Small boats line the beach of the unfinished portion of the Battery. A wooden foot bridge or pedestrian causeway of timber pile construction with a plank platform/deck over the cove also functioned as a mooring place for small craft

Manhattan 1869 View of Battery Park, published by
Manual of the Corporation of the City of New York 1869

Figure 4.31



These photographs show improvements to the Park in 1870-71. The objects on the ground are thought to be decorative corner posts for the Battery Park fence

Photographs from the Department of Parks and Recreation Archives

Figure 4.32

(259.)

The Officers and Men, are strictly enjoined to keep close to their quarters — No excuse will be admitted from either, for a neglect of it; and the rolls are frequently to be called over.

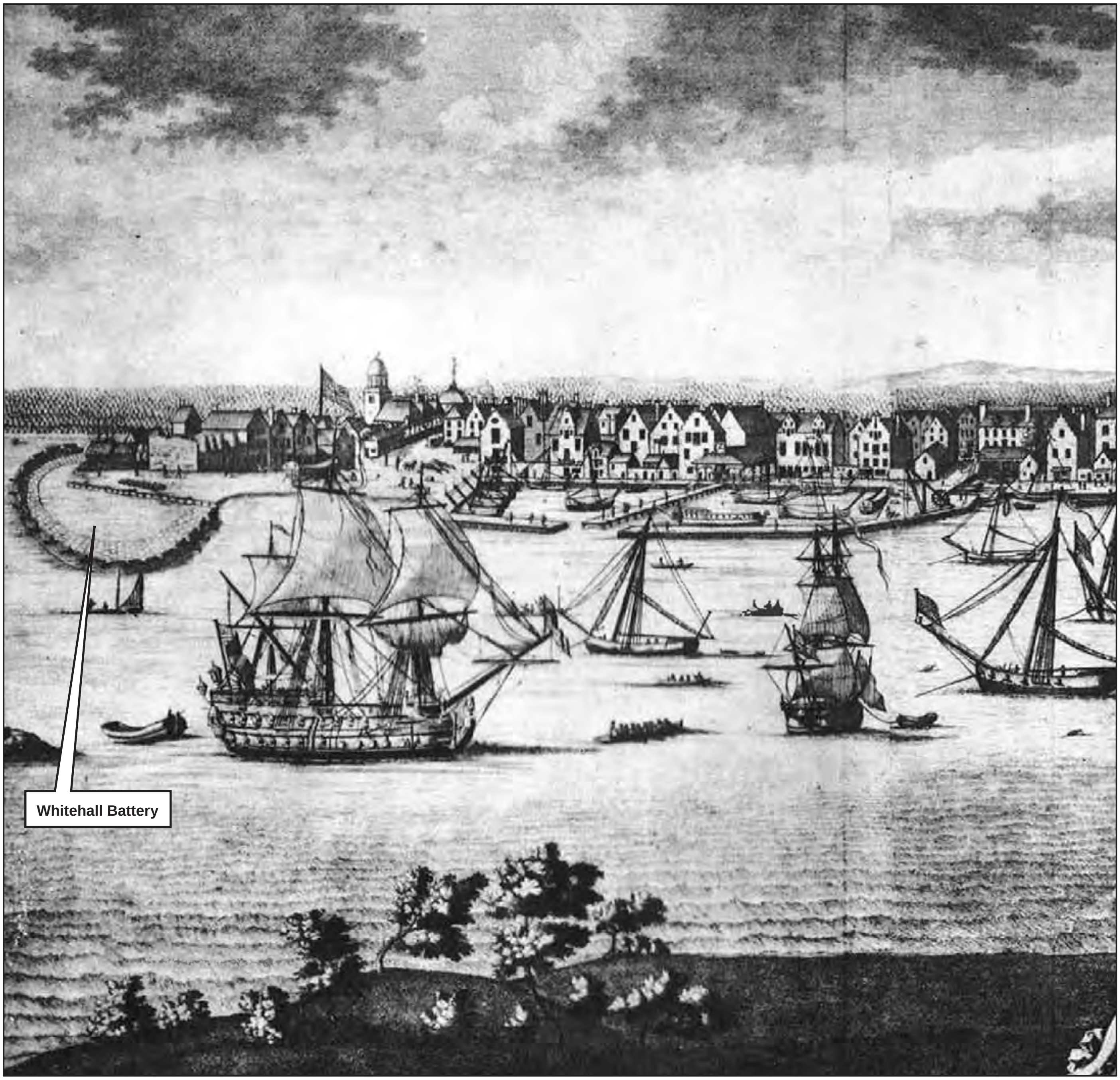
Head Quarters, New York, May 22nd 1776

Parole Washington. Countersign Gates.

The following are the names of the different Batteries, in and about this City — The Battery at the South part of the Town, the Grand Battery — The one immediately above it, Fort George — The one on the left of the Grand Battery, Whitehall Battery. That behind his Excellency General Washington's Head Quarters, the Oyster Battery. The circular Battery near the Brewhouse, on the North River, The Grenadier Battery. That on the left of the Grenadiers Battery The Jersey-Battery. The one on Bayards-hill, Bayard's Hill Redoubt. The one on the hill where General Spencer's Brigade is encamped Spencer's Redoubt, below this Hill on a Wharf, is a Fascine Battery called Waterbury's Battery. On the hill directly above it, is a Redoubt, near the Jews Burying Ground, by the name of Badlam Redoubt.

Andrew O'Brien Serjeant, and William Welch Corporal, both of Capt. O'Hara's Company in Col Nyckoop's Regt tried by a late General Court Martial, whereof Col Ritzema was President for "assaulting, beating, and dangerously wounding one "William Irvine" are both acquitted by the Court. The General approves the sentence, and orders the prisoners to be released immediately.

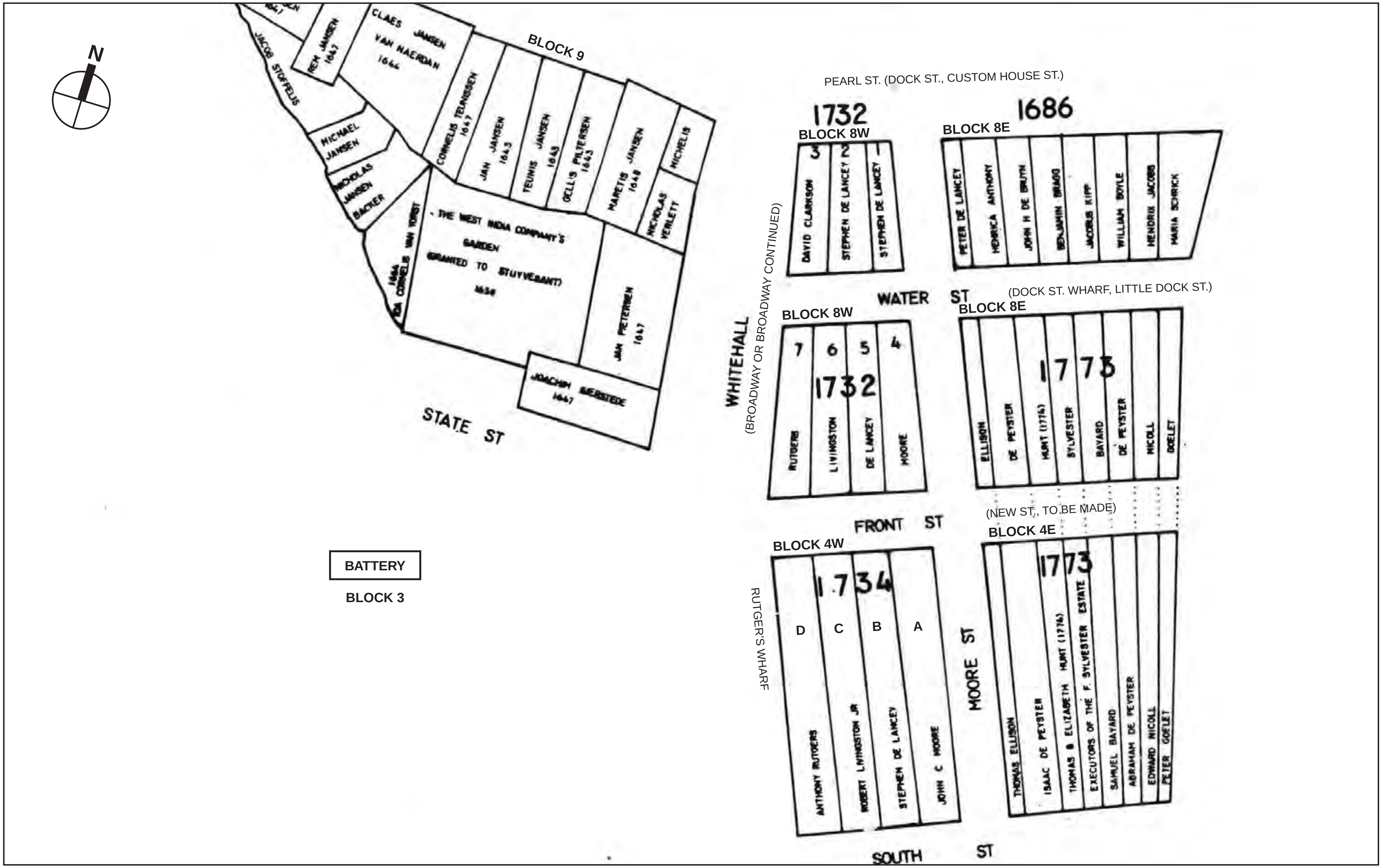
This May 26, 1776 document identifies the American batteries in and around the City of New York, prior to the British capture of the city



The Whitehall Battery erected circa 1734-41 is depicted

Detail of A South Prospect of Ye Flourishing City of New York in the Province of New York in America
The Bakewell reissue of the Burgis View, date depicted 1717-1746

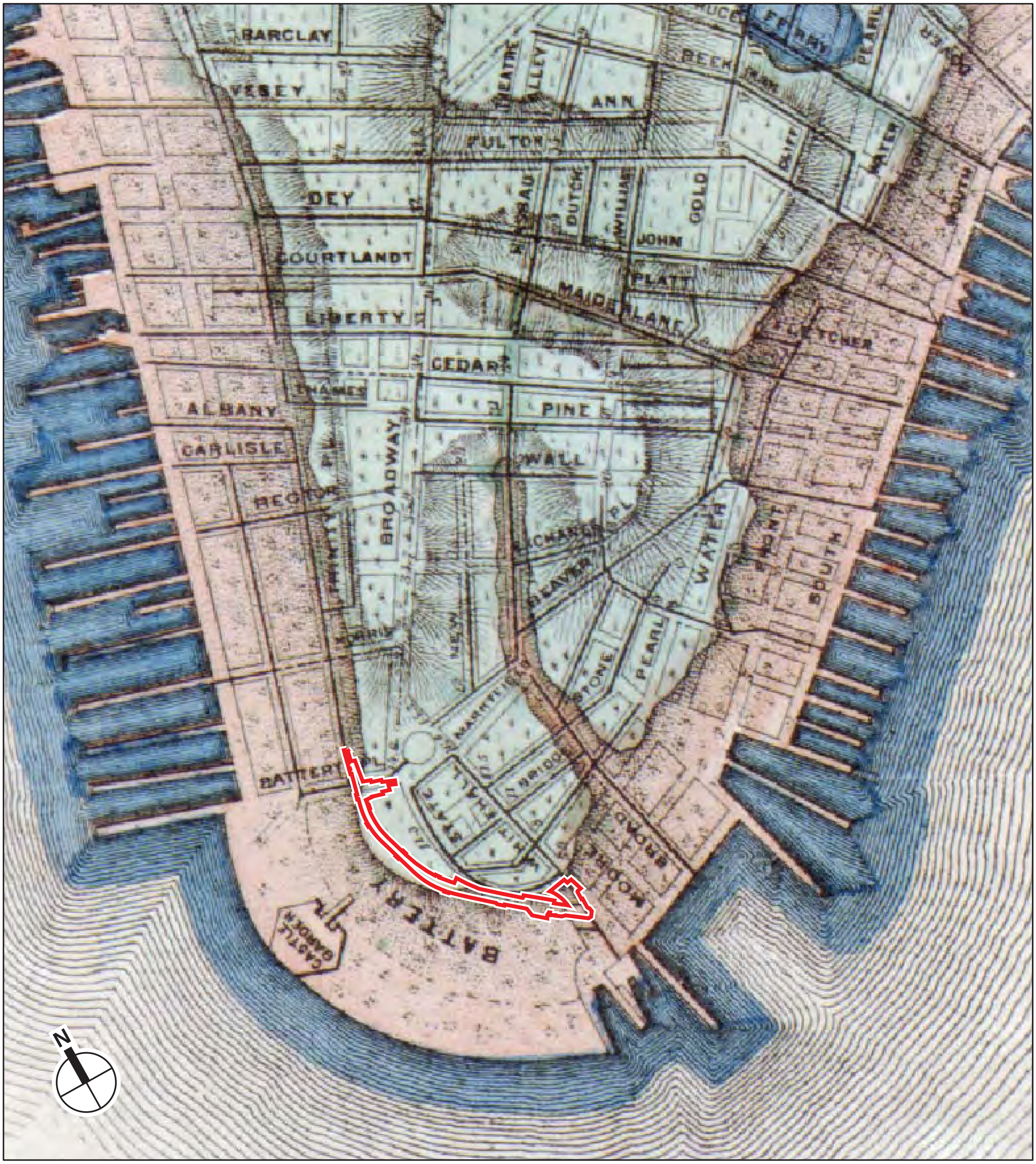
Figure 4.34



Both Blocks 8 West were created out of the "Broad Plaza" of Whitehall in 1732,
while Block 4 West was "made land" created out of the East River in 1734 (based on Plate II-2 in Grossman & Associates, Inc. 1987)

SOUTH FERRY

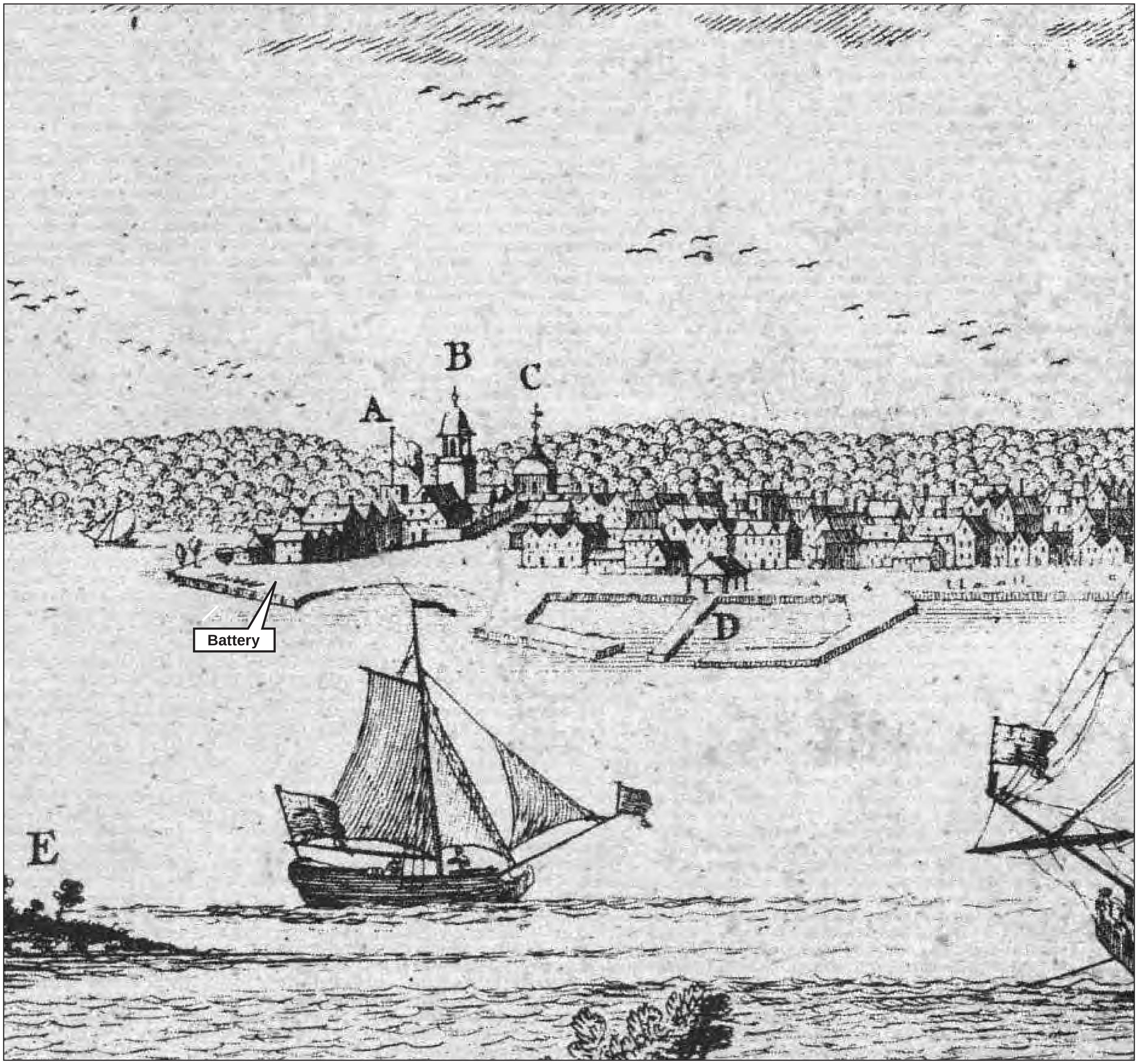
Water Lot Grants: Early Blocks and Lots along the east side of Whitehall Street
Figure 4.35



Project Corridor

Sanitary and Topographical Map of the City and Island of New York, Egbert Viele, 1865

SOUTH FERRY **Figure 4.36**



A was the location of the flag mount, now devoid of the flag that was depicted on the 1717 Burgis View; **B** is the Chapel in the Fort; and **C** is the Secretary's Office. The Battery at Whitehall is also depicted prior to the new construction

A Map of the British Empire in America. Henry Popple,1733

Figure 4.37

Hooker's New Pocket Plan of New York City. W. Hooker, 1824

Figure 4.38

City of New York Extending Northward to 50th Street, M. Dripps, 1852

SOUTH FERRY

Figure 4.39

Castle Garden is still in the water. Ferry boats, buildings, and stages line the area of Whitehall

Bird's eye view of New-York & Brooklyn, J. Bachman, 1851

Figure 4.40

This map shows the configuration of the Elevated Lines in Battery Park and those running down Whitehall Street to the ferries. The new U.S. Barge Office and the Governor's Island Ferry Slip are depicted directly off the Battery

0 100 200 FEET
SCALE

Atlas of the City of New York. Robinson & Pidgeon, 1885

Figure 4.41

The Hamilton and South Ferry Terminals constructed in
1864 were a major hub of early mass transportation

Source: Lightfoot, 1981

Horse drawn "buses" are lined up in front of the ferry terminal, awaiting passengers

Omnibuses Starting From South Ferry, 1861, Looking North From Whitehall Street

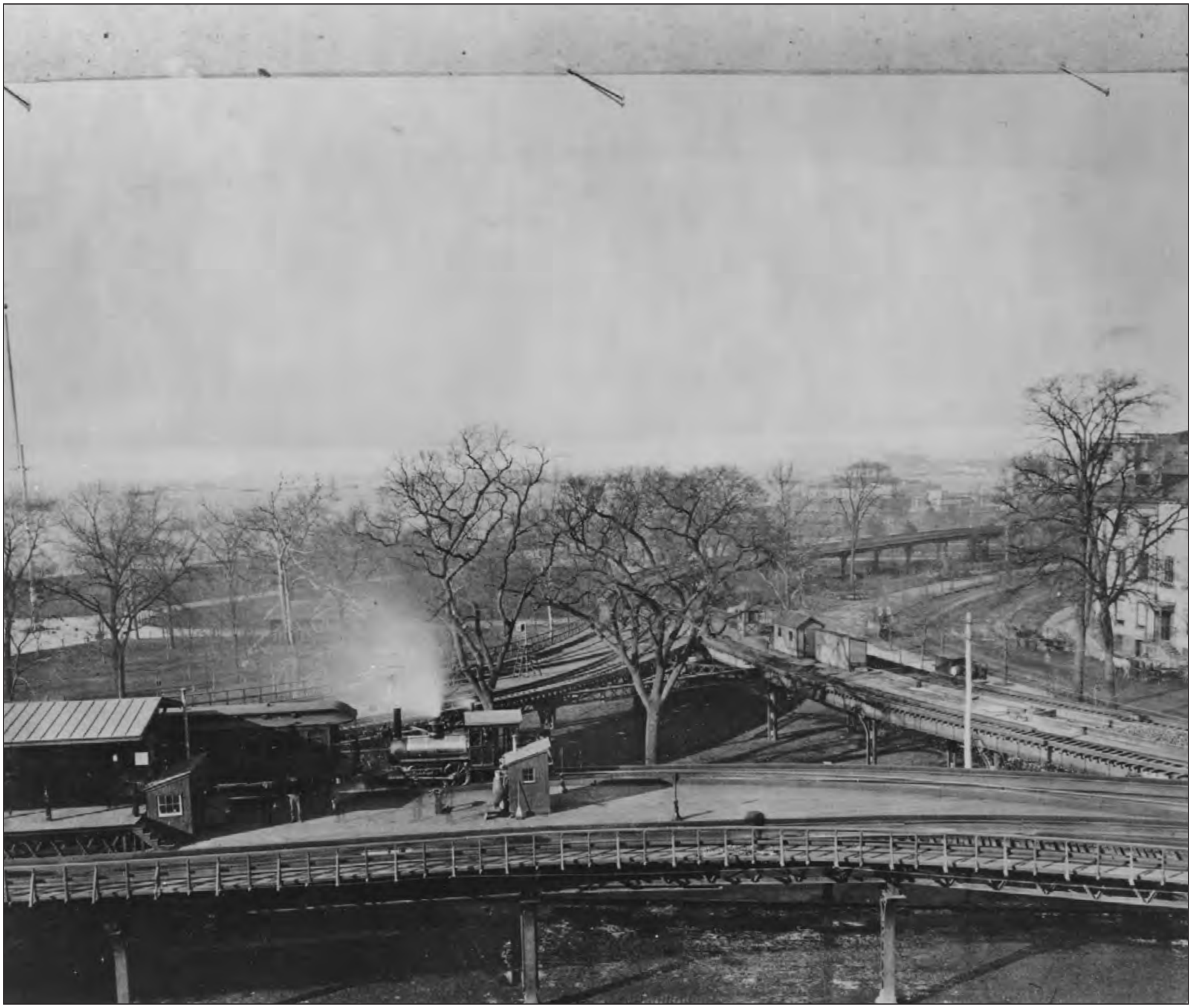
Figure 4.43

The Battery is nearly filled in and the ferry terminals are at the foot of Whitehall Street

The City of New York, Parsons and Atwater, *1876*

SOUTH FERRY

Figure 4.44



Source: New York Transit Museum

1890 – Battery Park: Terminal of Elevated Railroads Along Second, Third, Sixth, and Ninth Avenues

Figure 4.45

Source: New York Transit Museum

The elevated railroad line can be seen running along State Street to Whitehall Street and the South Ferry Station

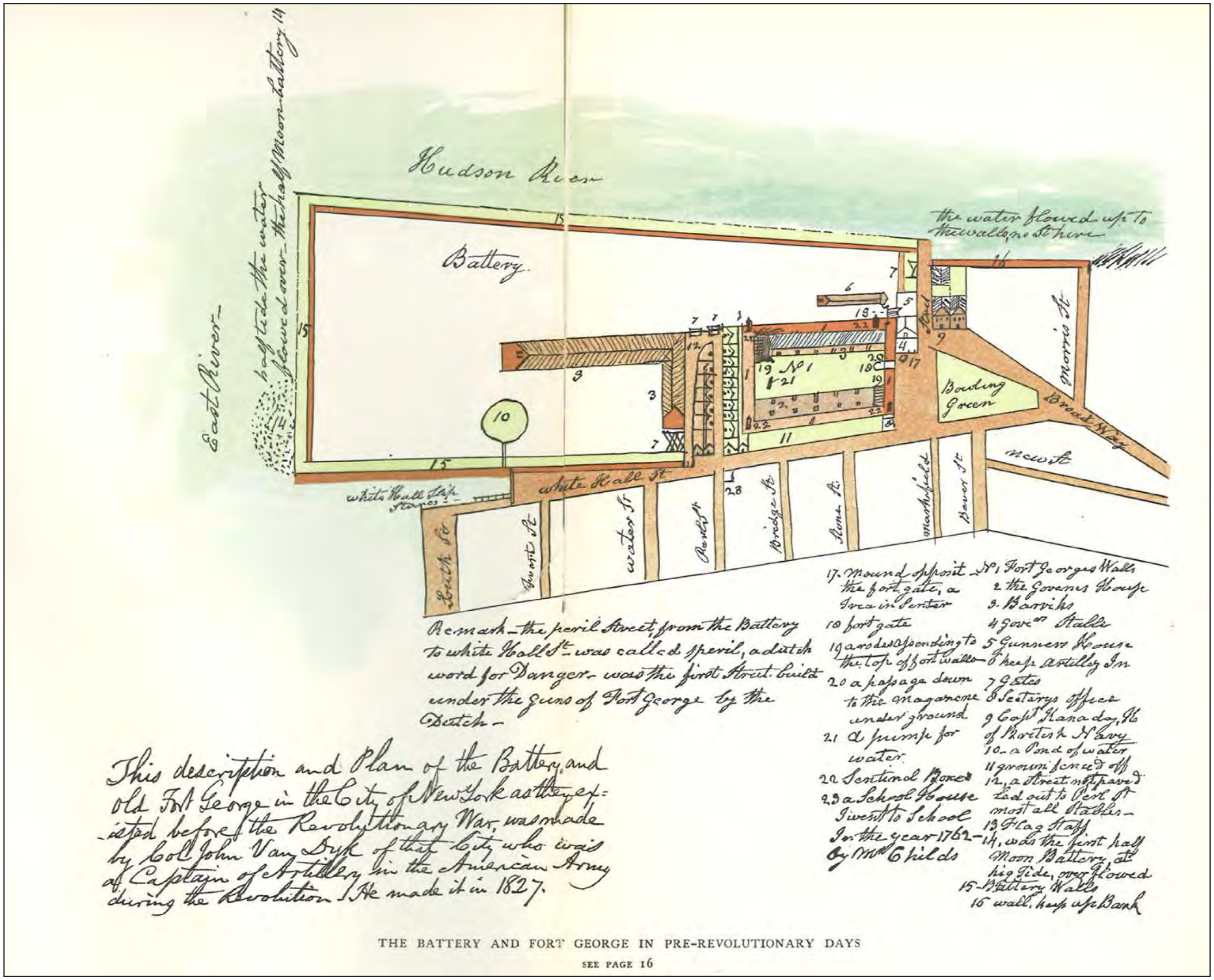
November 16, 1916: South Ferry Station

Figure 4.46

Source: New York Transit Museum

This photo is not dated but is believed to have been taken ca. 1897. It shows the South Ferry "Y."

Overhead View of the South Ferry Third Avenue Elevated Line, Whitehall Street, Battery Park, and Ferry Terminals, ca. 1897



Source: Andrews, 1901

This description and plan of the Battery and Fort George as they existed prior to the Revolution, was made by Col. John Van Dyk in 1827. Van Dyk was a Captain of the Artillery in the American Army during the Revolutionary War

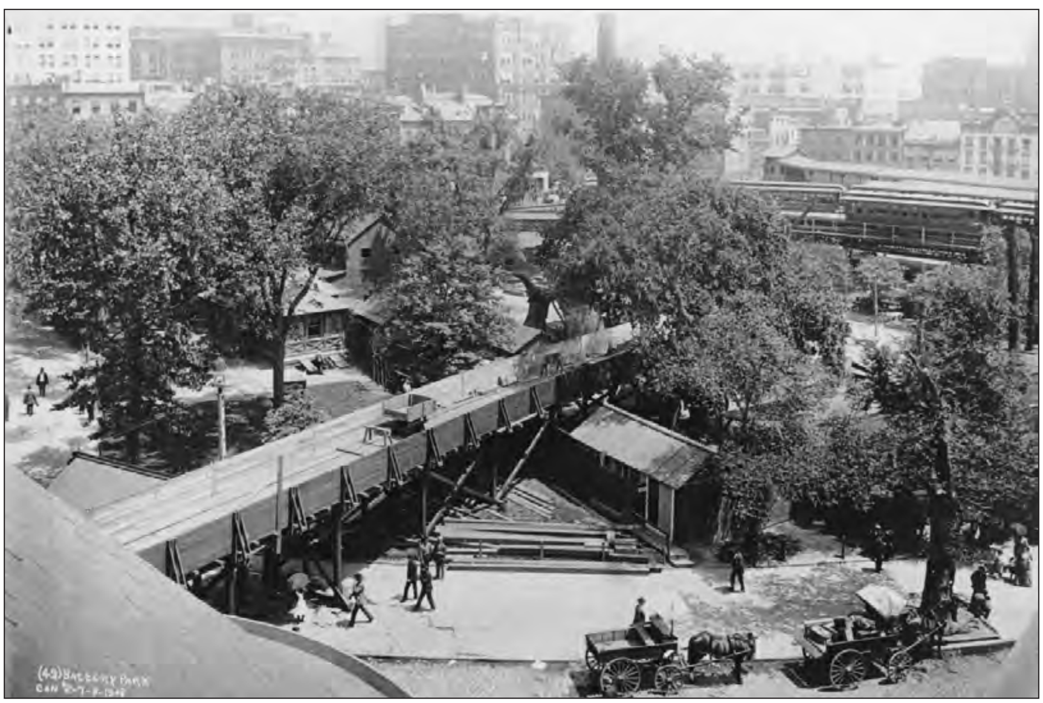
The Battery and Fort George in Pre-Revolutionary Days,
Col. John Van Dyk, 1827
Figure 4.48

Source: New York Transit Museum

The long bridge was used to transport dirt from Battery Park to river barges during excavations for the new subway

July 21, 1904 – Aerial view of Battery Park During Construction

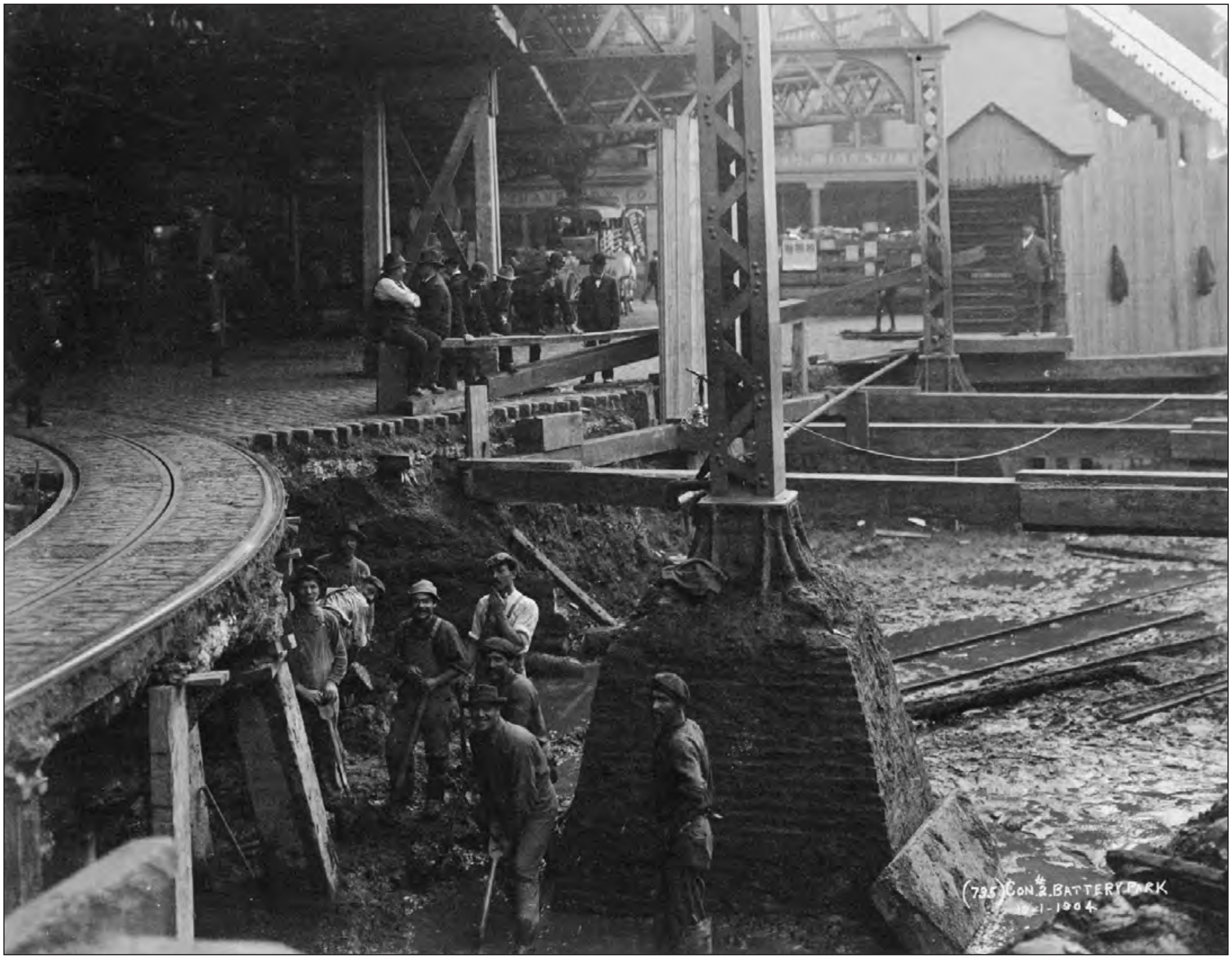
Figure 4.49a



Source: New York Transit Museum

July 8, 1903 – Construction in Battery Park

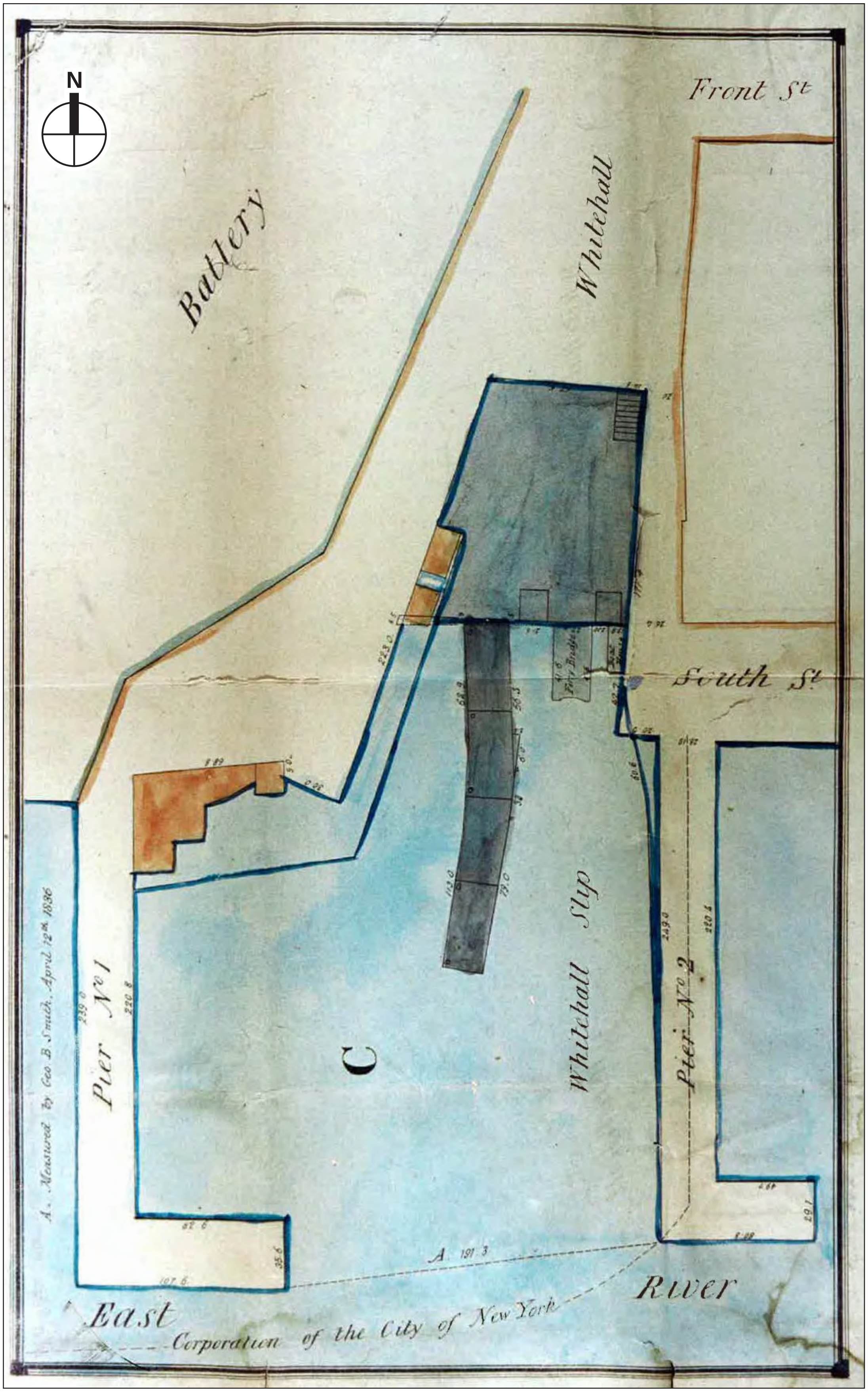
Figure 4.49b



Source: New York Transit Museum

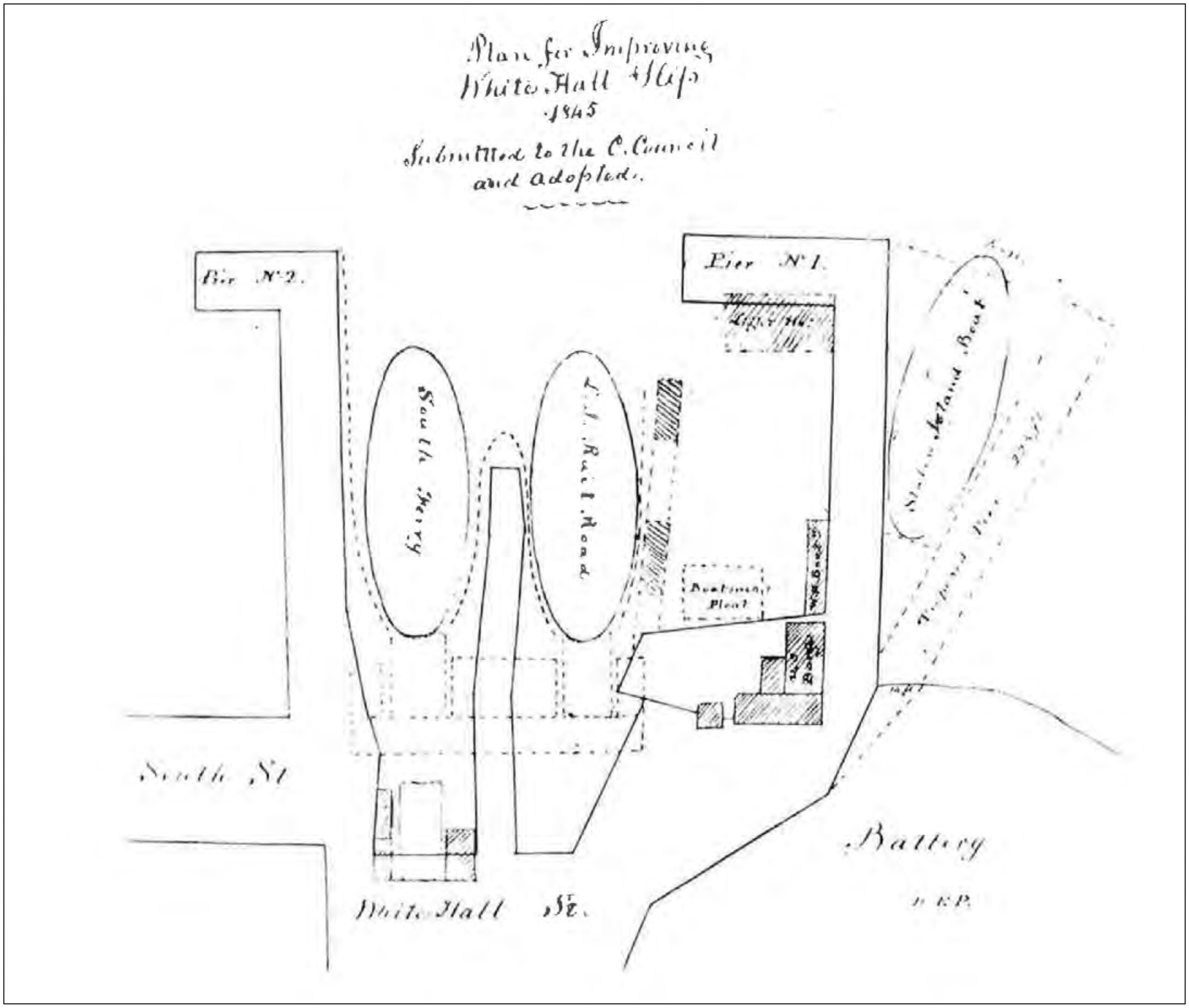
This footing is identical to one uncovered during contractor excavations for the new South Ferry Station

October 1, 1904 –
Brick El Footing Near The Staten Island Ferry Terminal

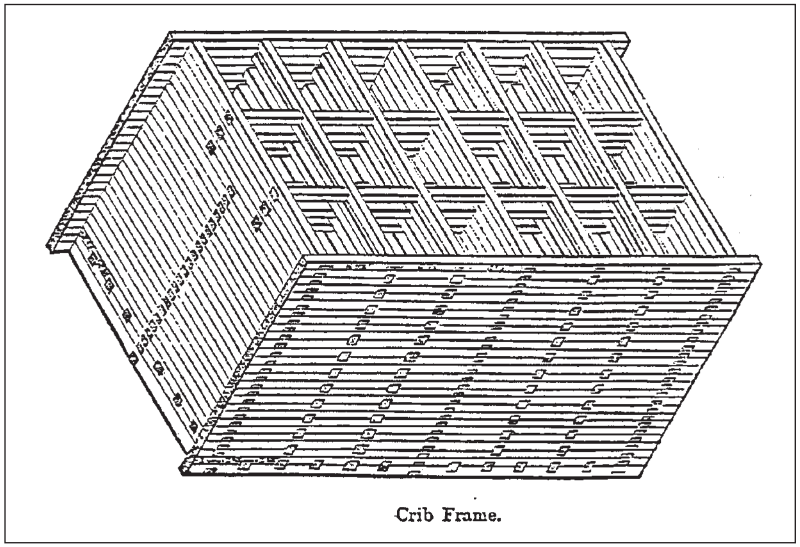


Proposed Improvements to the Battery in 1836

Figure 4.51

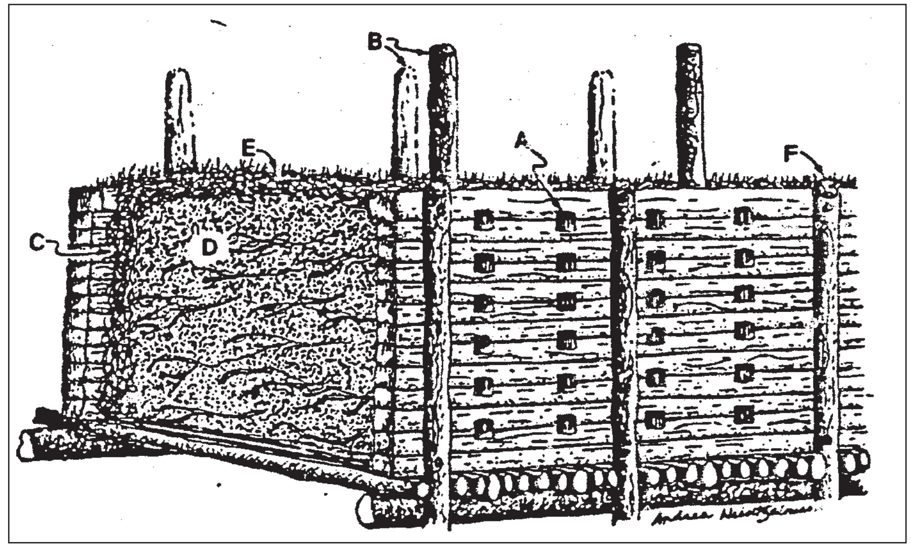


These plans for improvements between Piers 1 and 2 were
submitted to the Common Council and adopted



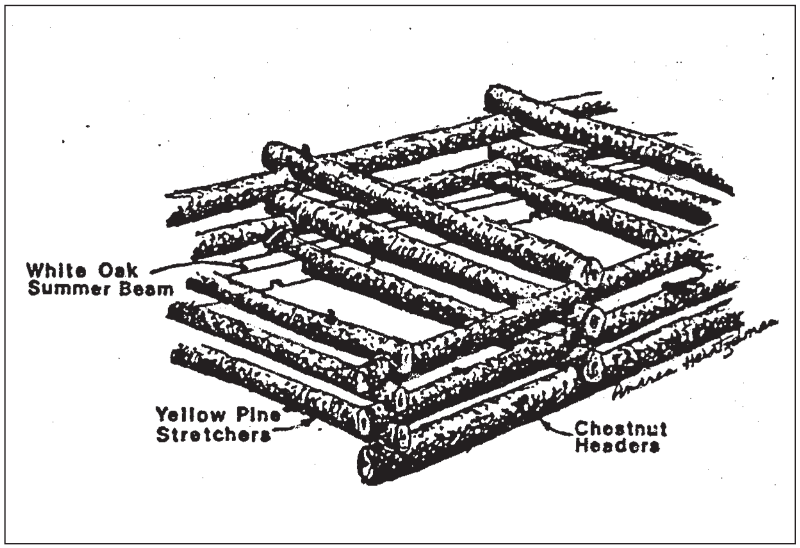
Source: Cunningam 1904

An Illustration of "crib" construction, illustrated by Cunningham in 1904, and reproduced in several subsequent reports **A**



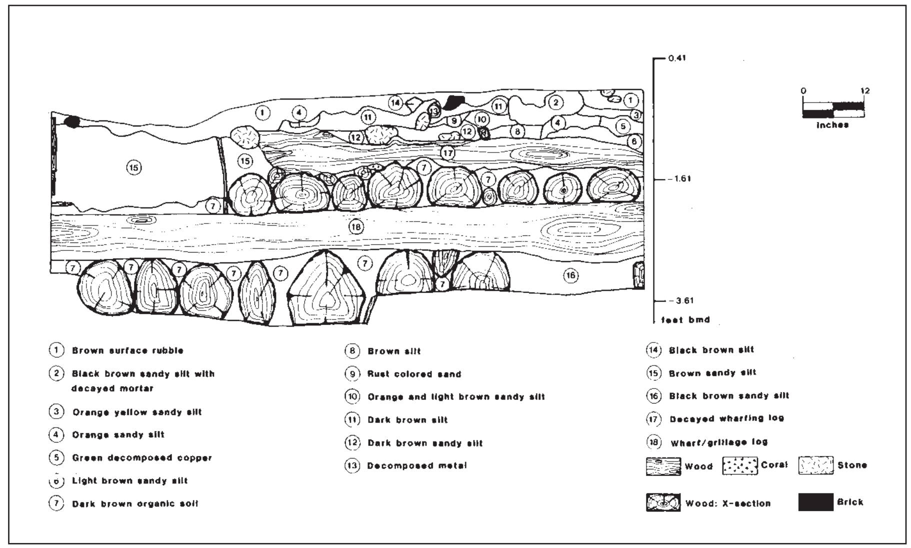
Source: Heitzelman 1985

An example of "solid-filled" construction, as put forth by Heintzelman **B**



Source: Heitzelman 1985

An example of "cobb" construction according to Heintzelman: a conjectural drawing of the mid 18th century Douglass wharf in New London, Connecticut **C**

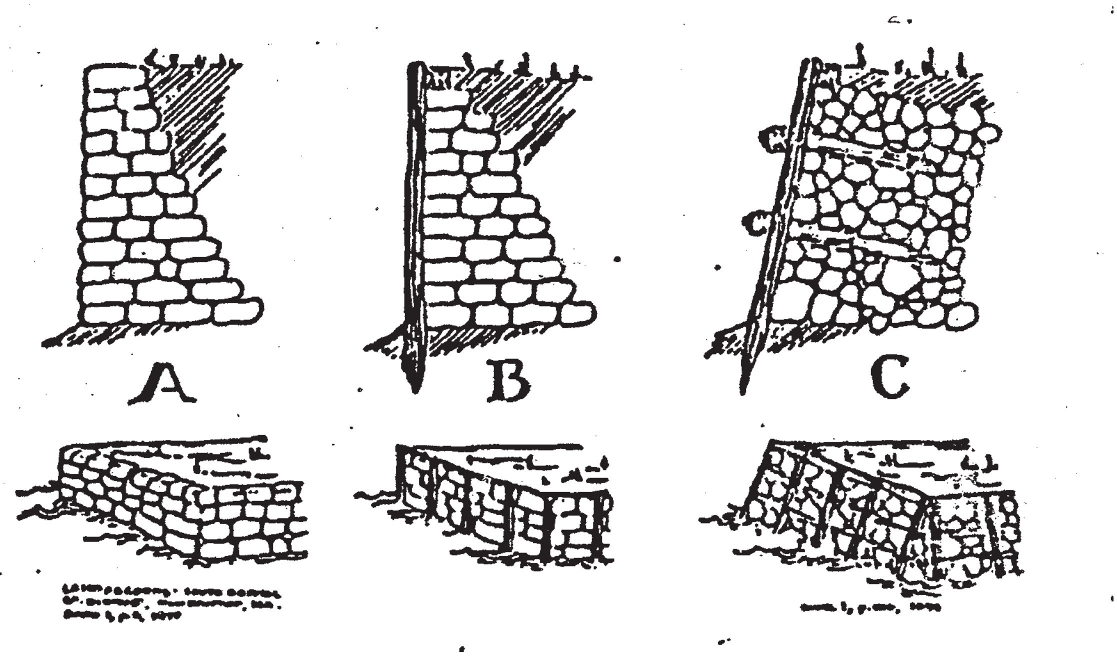


Source: Soil Systems 1983

A profile view of an example of "grillage" construction from 175 Water Street (Lot 23, Unit 4, West Baulk Profile) **D**

Landfill Retaining Structure Types, as Identified in Previous Reports

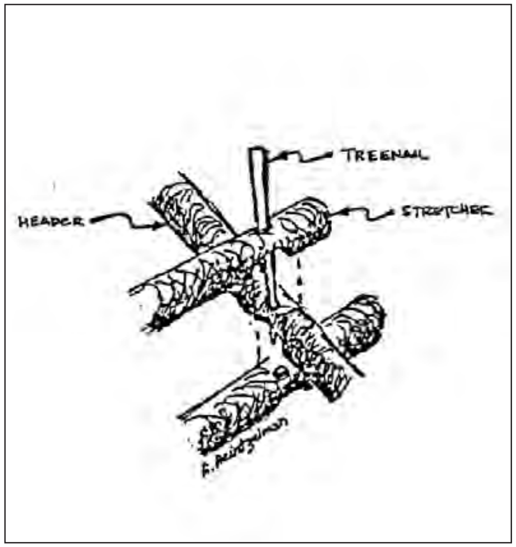
Figure 4.53



Source: Heitzeman 11985, reproducing Weinraub and Frank 1975

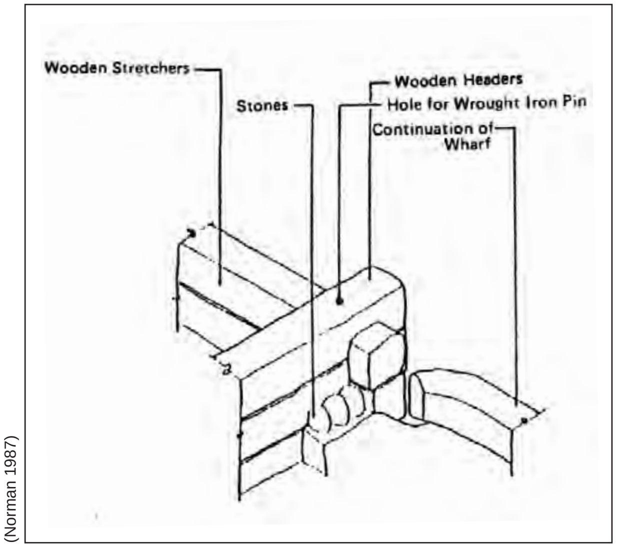
An Illustration of three early North American seawall types: (a) a plain dressed or semi-dressed stone wall; (b) Featuring an oak cap and fender piles; and (c) with piles and transverse fenders bolted to drifts.

Examples of Masonry Seawall types as Identified in Previous Reports



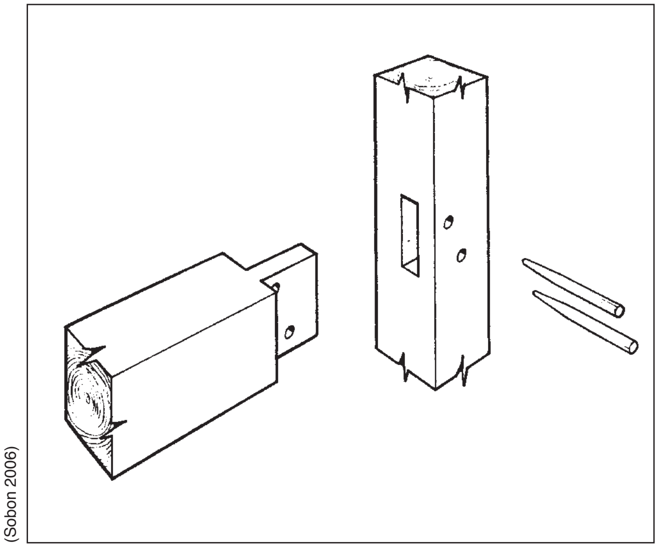
(Heintzelman 1985)

Heintzelman incorrectly identifies this joint as a "mortise and tenon with treenail." It could more properly be called a saddle notch with dowel **A**



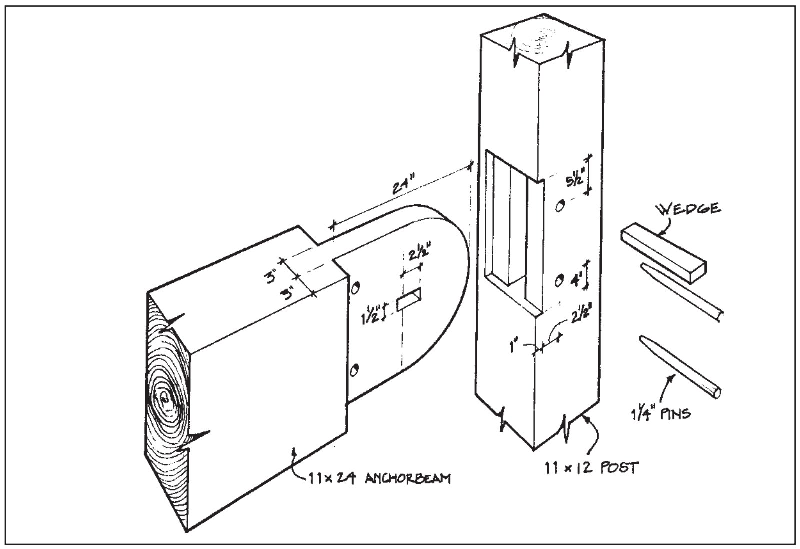
(Norman 1987)

This corner lock notch at Cheapside Wharf in Maryland was incorrectly labeled as a mortise and tenon joint **B**



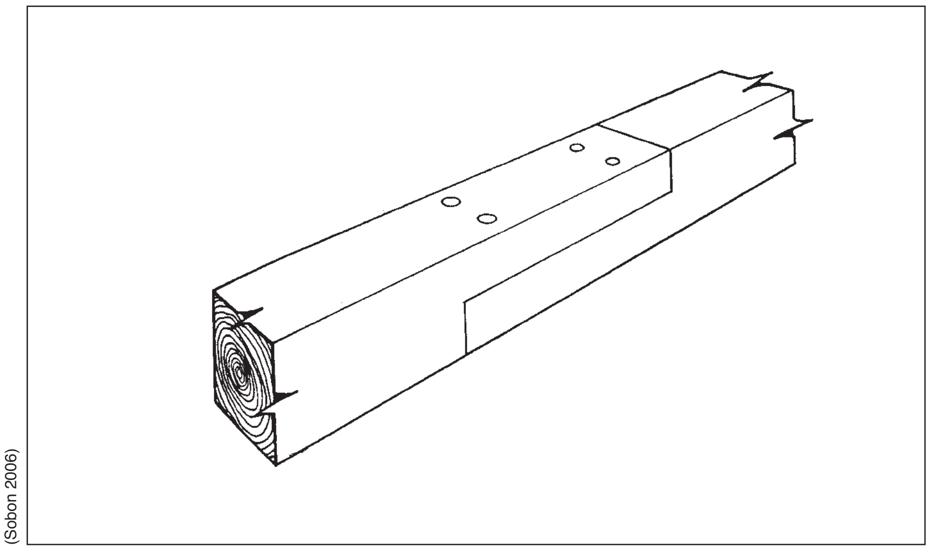
(Sobon 2006)

A basic rise and tenon joint with wood pegs **C**



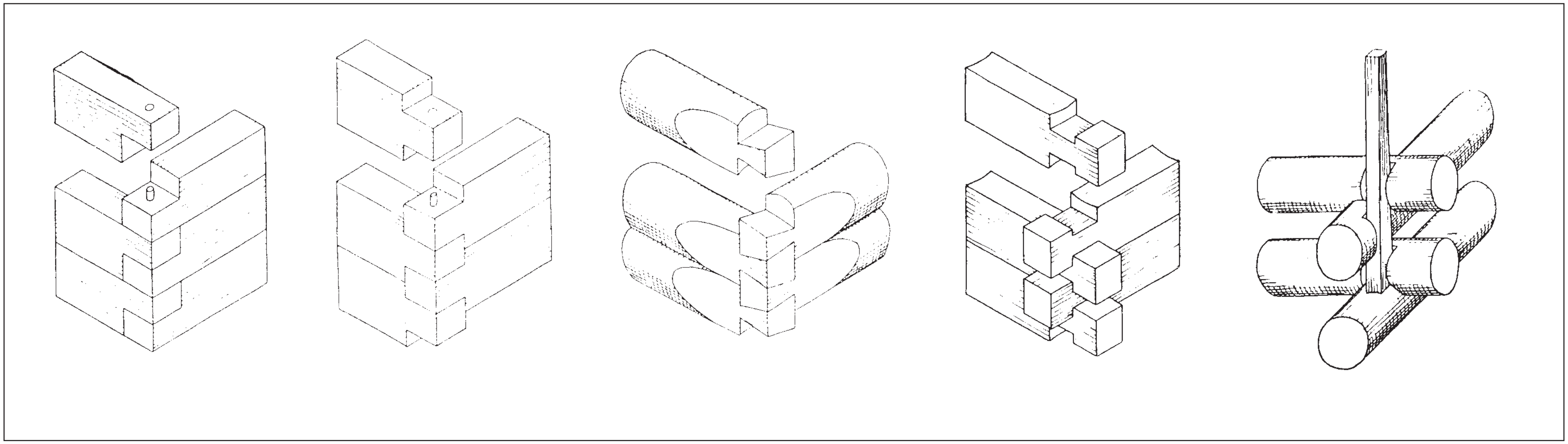
(Sobon 2006)

A through-tenon with wedge and pins. This joint is typical of Dutch timber-framed barns **D**



(Sobon 2006)

A halved or "half lap" scarf joint with four wood pegs. Scarf joints are used to splice two timbers together in the same alignment **E**

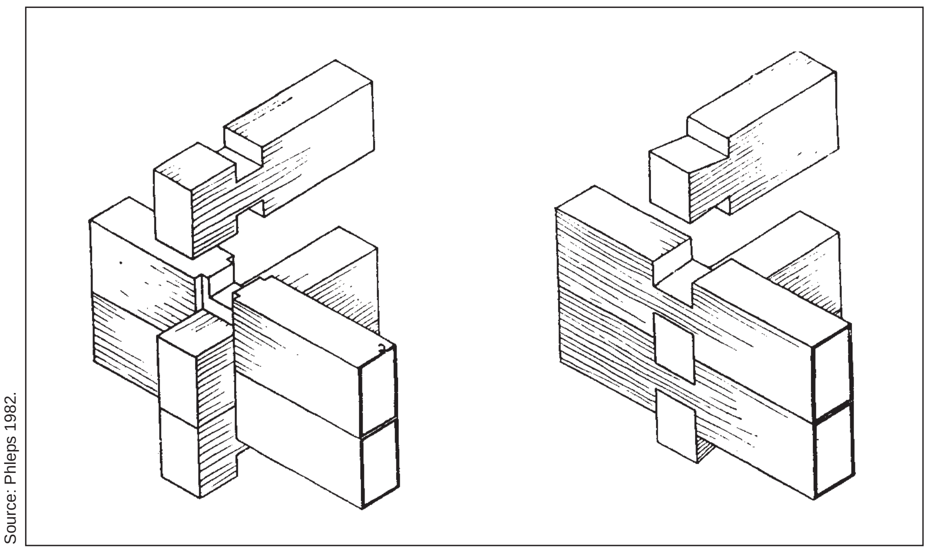


Source: Phleps 1982.

Examples of log-construction corner-timbering, including (from left to right) half-lap notches with wood dowels; square notches with wood dowels; dovetail notches; locked lap notches. The last assembly, which includes saddle notches and a vertical lock bar, was used in an underwater location in a building in Sweden **A**

Source: Jordan 1978.

The saddle-notched corner of an American log house **B**

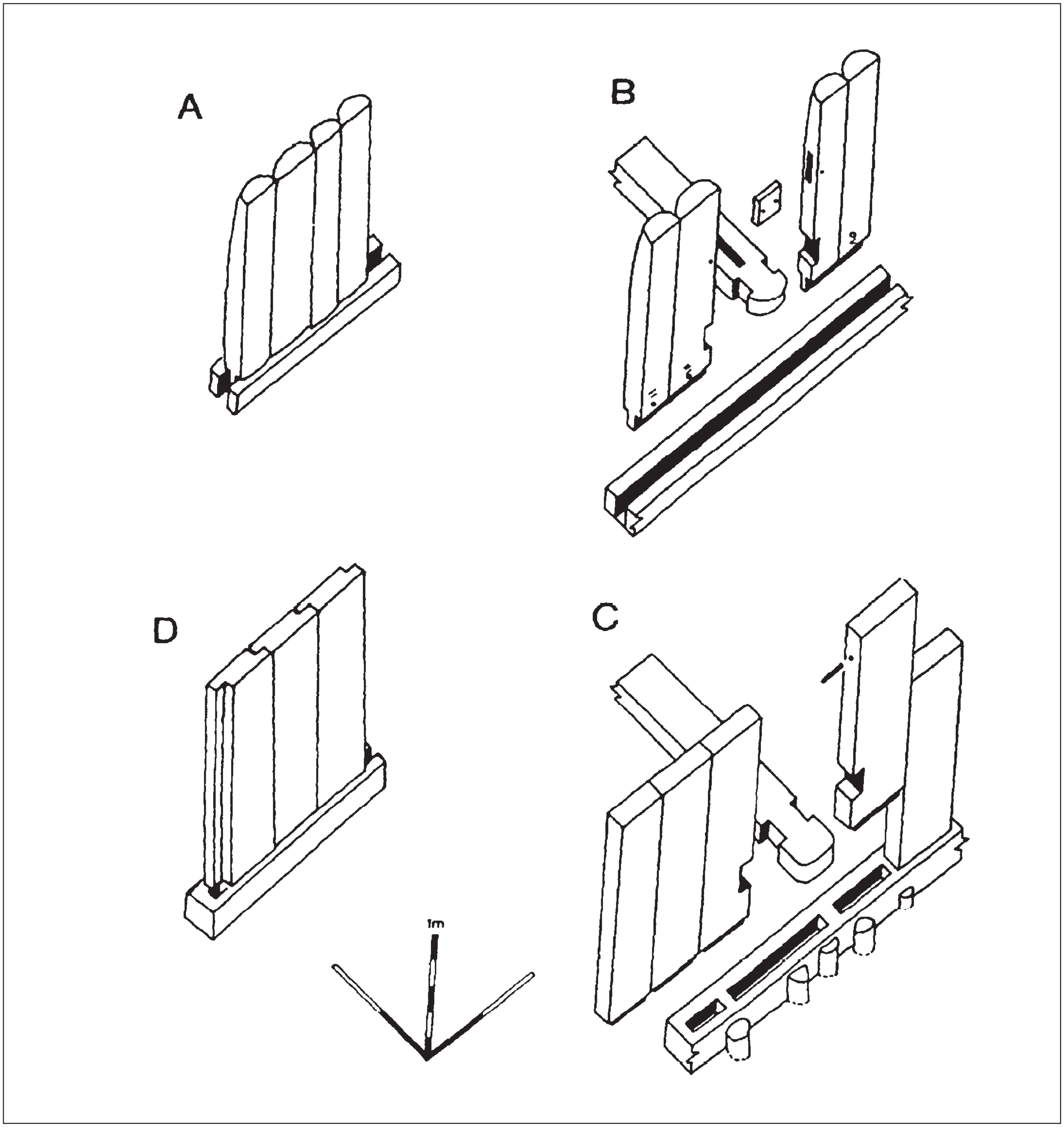


Source: Phleps 1982.

Examples of how partition wall were tied into exterior walls in log buildings - including a protruding locked lap notch (left) and a flush dovetail notch (right **C**

Examples of Log-Construction Corner Timbering

Figure 4.56

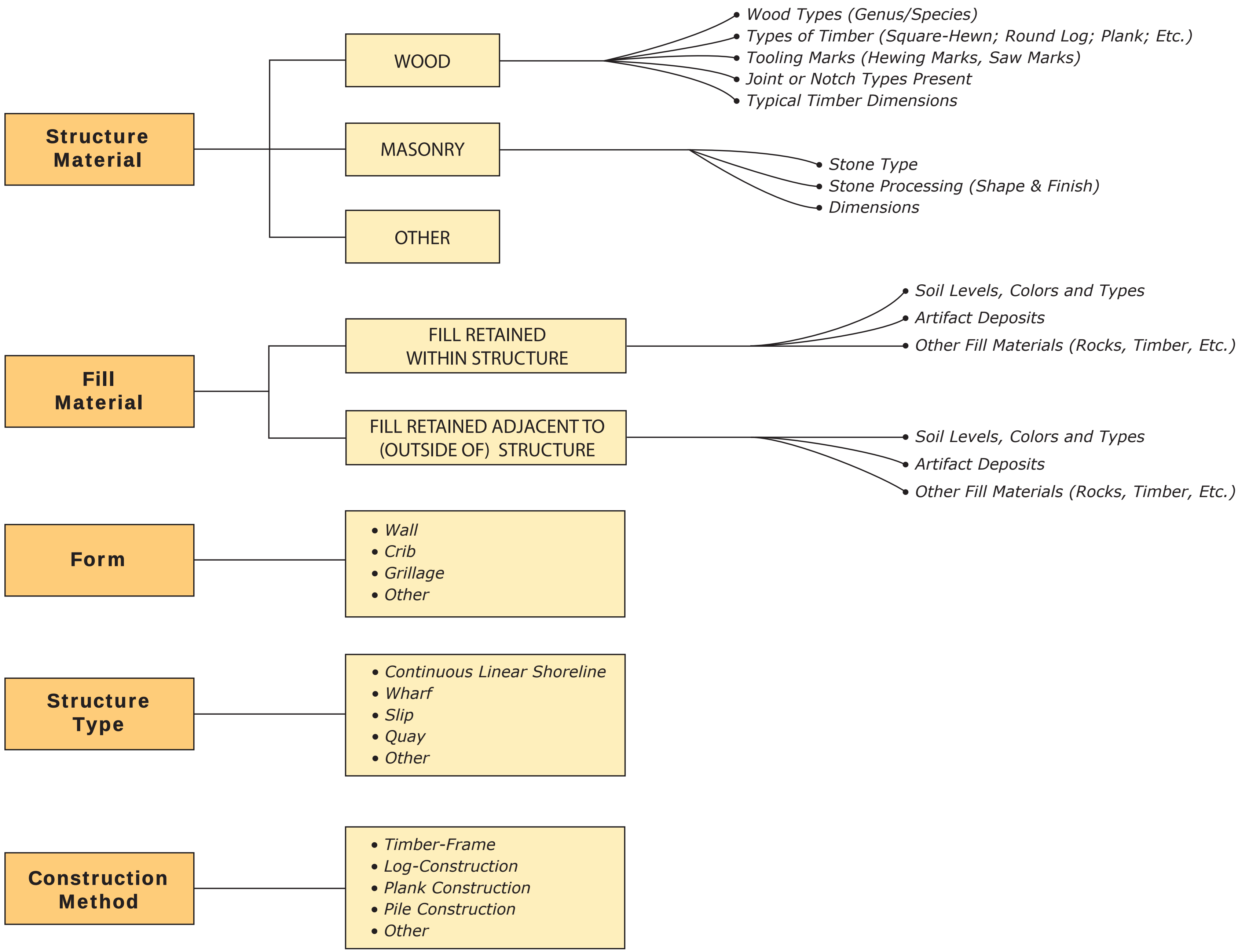


Source: Milne 1991

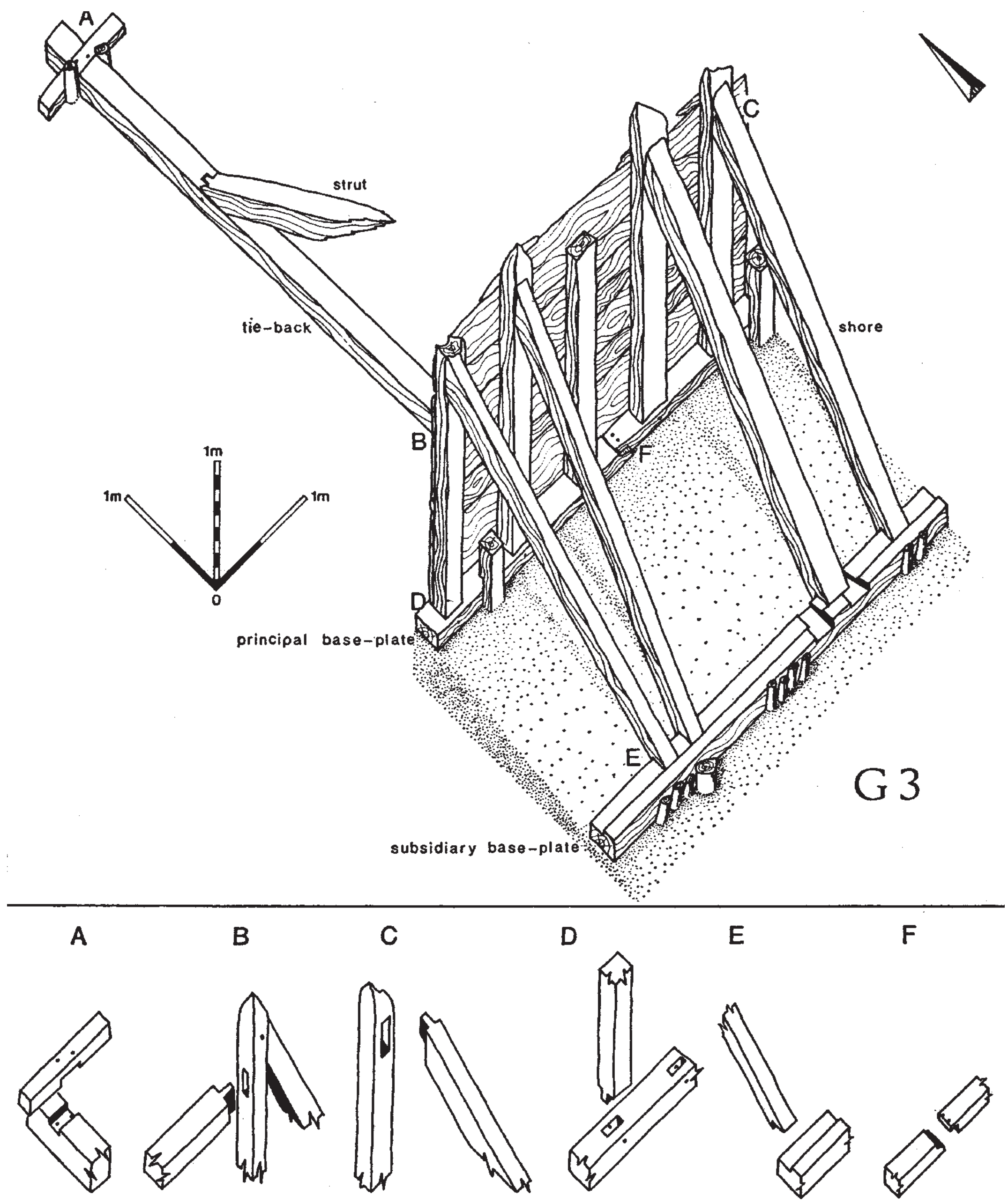
These examples of “stave” or vertical plank-frame construction were drawn from waterfront retaining walls in Britain, but adequately illustrate the assembly used in American plank-frame houses consisting of vertical boards notched into a groove in the sill beam. Sometimes reinforced with wedges (upper right), tongue-and-groove (lower left), or wood pins (lower right).

Plank Assemblies in Plank-Frame or Stave Construction

Figure 4.57



Landfill Retaining Structure Documentation Model
Figure 4.58

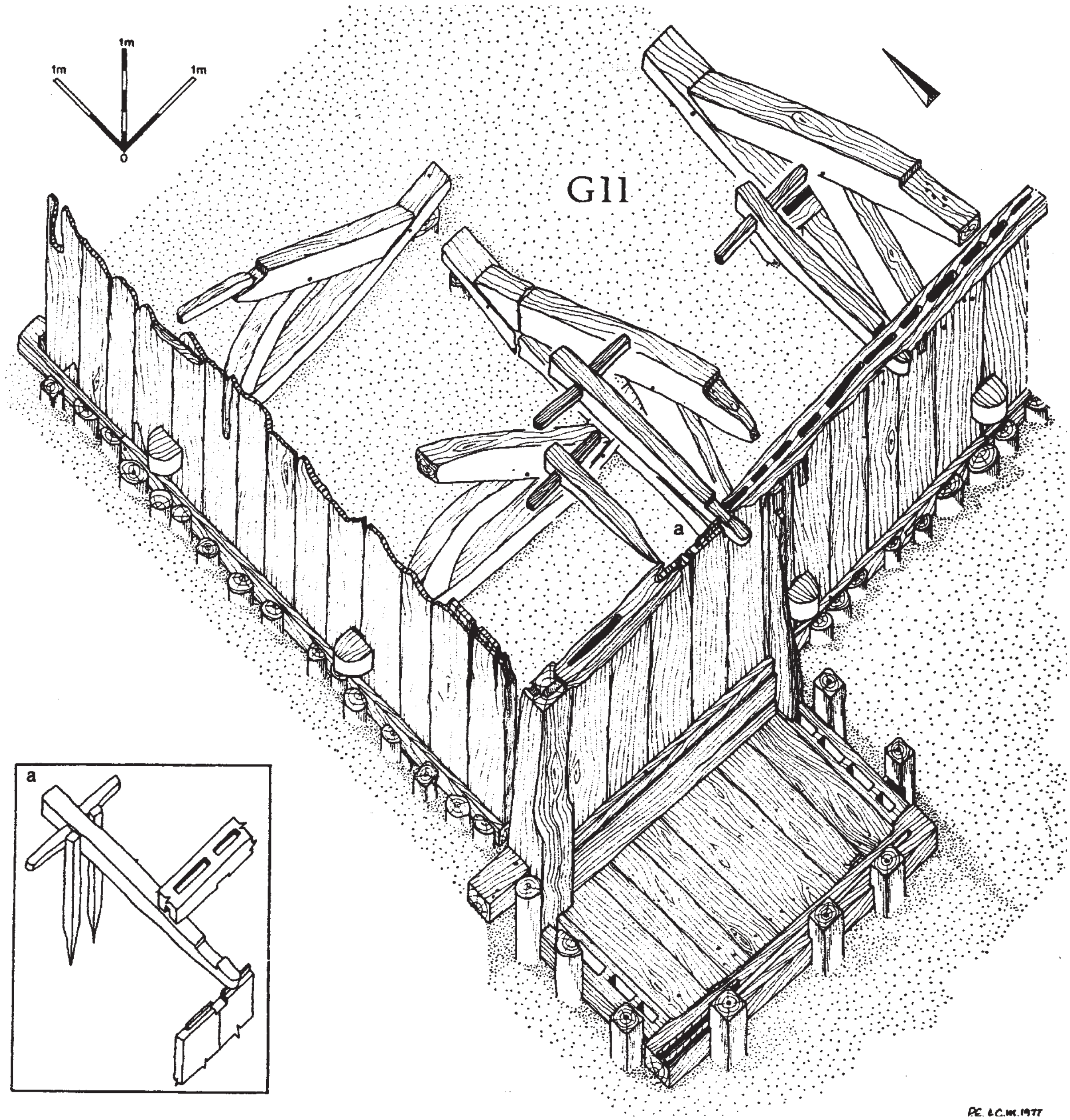


Source: Milne 1991

This is an example of a 13th century timber-framed revetment wall with both front and rear bracing. Below, the joint types found in the structure are illustrated, described as follows: "A, pegged half-lap; B, central face-tenon; C, chase-tenon; D, pegged central tenon; E, bird's mouth abutment; F, half-edged scarf with square vertical butts and two face pegs

Feature G3 from the Trig Lane Site in London

Figure 4.59

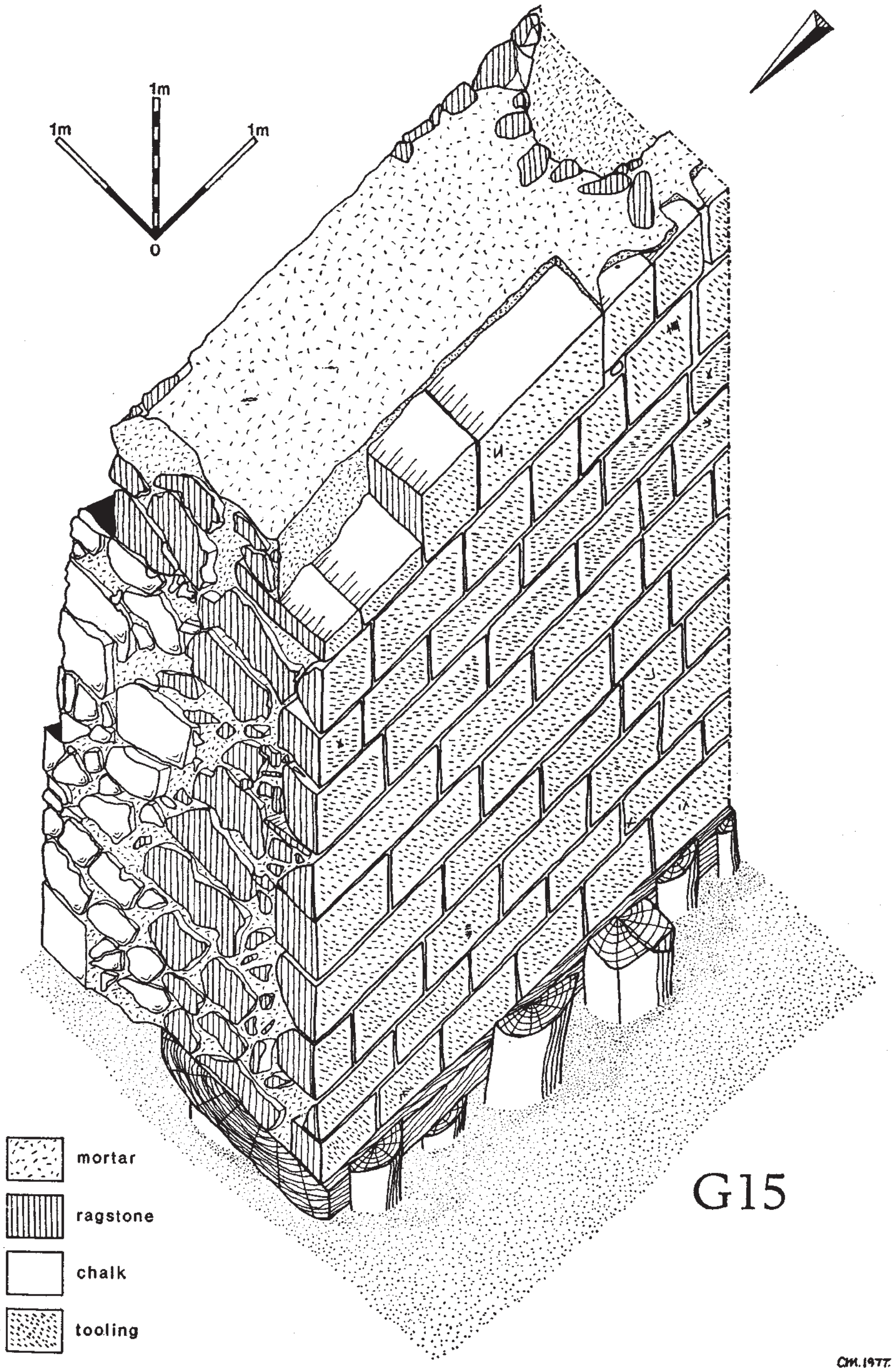


Source: Milne 1991

This is a 14th century stave (plank-construction) revetment wall with complex back braces. Note how the vertical boards are fit into grooves on sill plates and top plates. The posts and platform pictured at the bottom right were believed to serve as the base of a water tank

Feature G4 from the Trig Lane Site in London

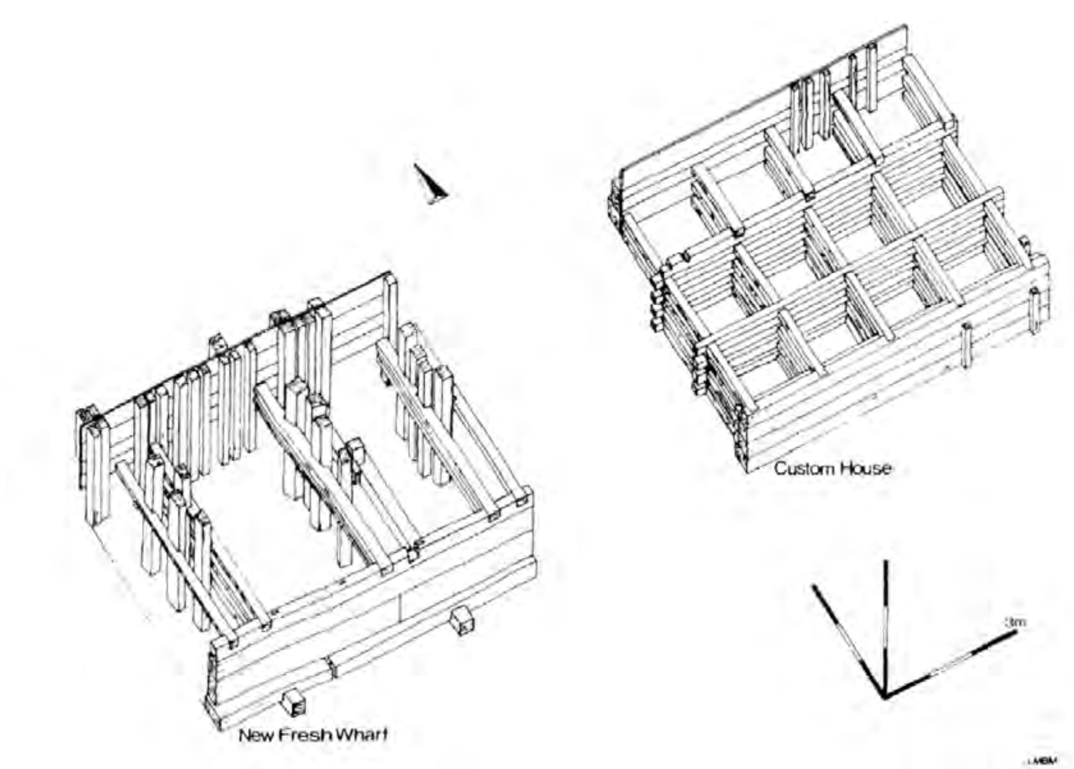
Figure 4.60



Source: Milne 1991

This is a ca. 1500 stone riverwall at the Trig Lane site in London. The wall was composed of a rubble core and a dressed front face and stood atop a timber raft supported by wood piles

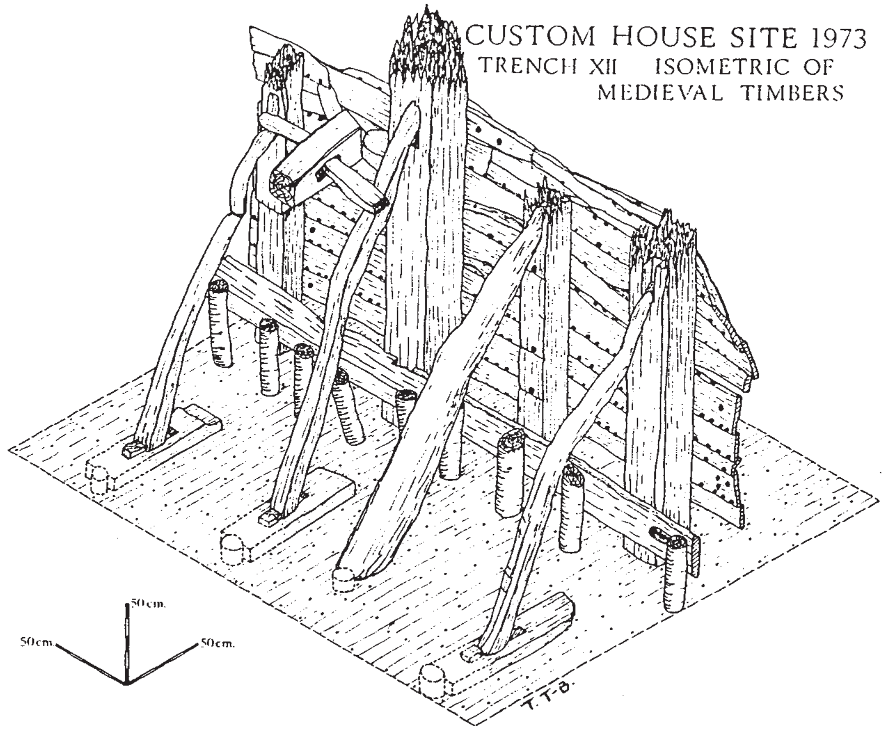
A projection of Feature G15



Source: Hobley 1981

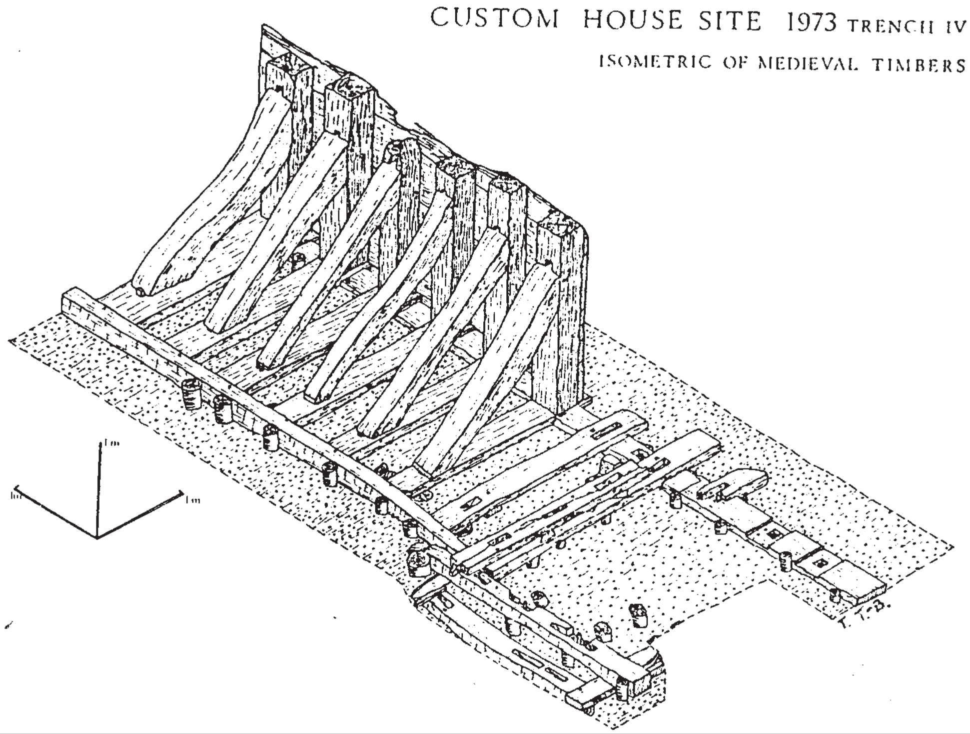
Projections of the Roman-period timber quay structures from the New Fresh Wharf Site (left) and the Custom House Site in London

Figure 4.62



Source: Tatton-Brown 1974

From the medieval Custom House Site in London, a rendering of an earthfast post (pile) revetment wall with diagonal back braces **A**

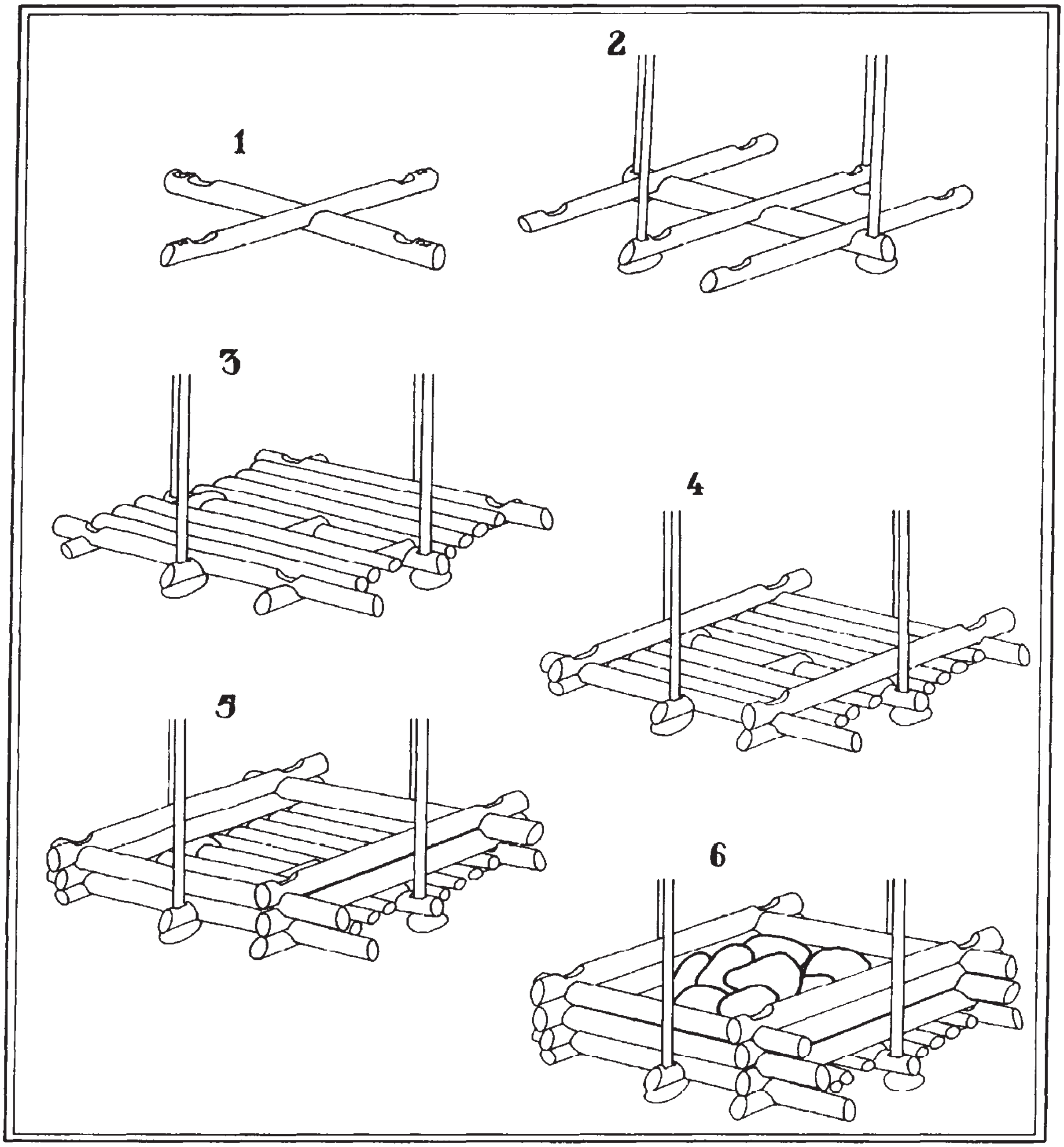


Source: Tatton-Brown 1974

Also from the Custom House Site, a timber-framed revetment wall with posts tenoned into a sill beam and perpendicular plates, and shored with diagonal back braces **B**

Revetment Walls at the Custom House Site in London

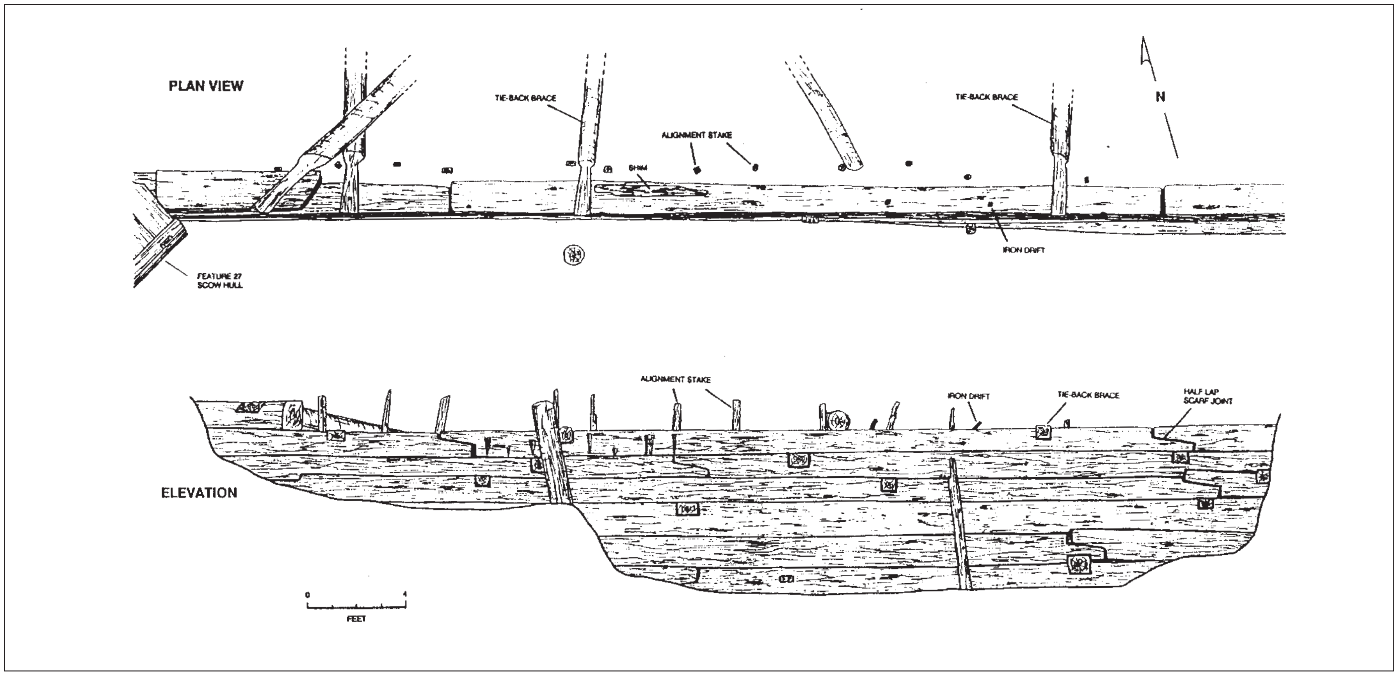
Figure 4.63



Source: Myrvoll 1991

The construction sequence of a caisson or crib, based on the medieval log-construction fill retaining structures found at the Finnegården 3 Site in Bergen, Norway

Figure 4.64



Source: Engineering-Science 1993

Plan and Elevation Views of the log-construction bulkhead wall at Keith's Wharf in Alexandria, Virginia. **A**
Note the diagonal braces flush-notched into the face of the wall

Source: Edward Morin

A view of the slip associated with Fisher's Wharf (1762-95) at the Meadows Site in Philadelphia. **B**
The log-constructed walls have fender piles and accommodated the ends of cross ties

Keith's Wharf, Alexandria, and Fisher's Wharf,
Meadows Site, Philadelphia

Figure 4.65

Source: Hartgen 2002

The outer face log-construction or 'stacker' bulkhead at the SUCF Parking Site in Albany. Note the scarf joint in the third course from the top, and the sallied end of a cross-tie notched into the upper and lower faces of the bottom two courses

A

Source: Hartgen 2002

Another view of a log-construction bulkhead wall at the SUCF Parking Structure Site, showing the diagonal back braces secured by deadmen (indicated by the arrow)

B

Log-construction Bulkheads at the SUCF Parking Structure Site in Albany

Figure 4.66

Source: Hartgen 2002

An example of a pile-construction bulkhead at the SUCF Parking Structure Site in Albany

A

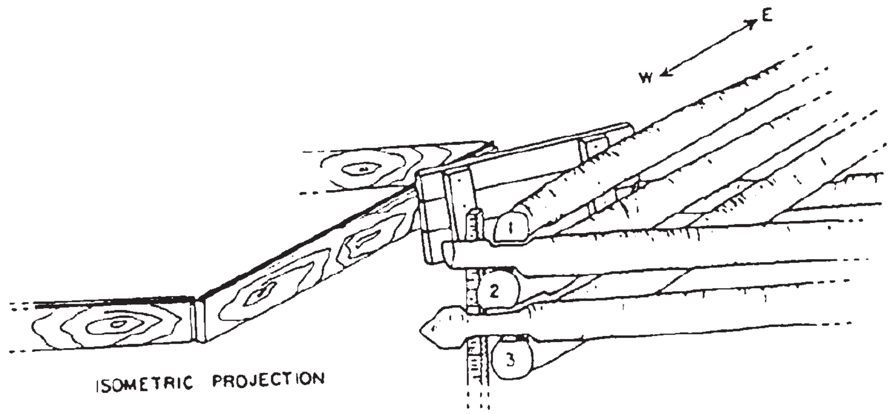
Source: Hartgen 2002

A view showing the timber "ricking" deposited to the rear of the timber pile bulkhead at the SUCF Parking Structure Site. This ricking consisted of stacked logs of small scantling, and is believed to have served both as a platform for the pile driver and as fill material

B

Pile-construction Bulkhead and Timber Ricking at the SUCF Parking Structure Site in Albany

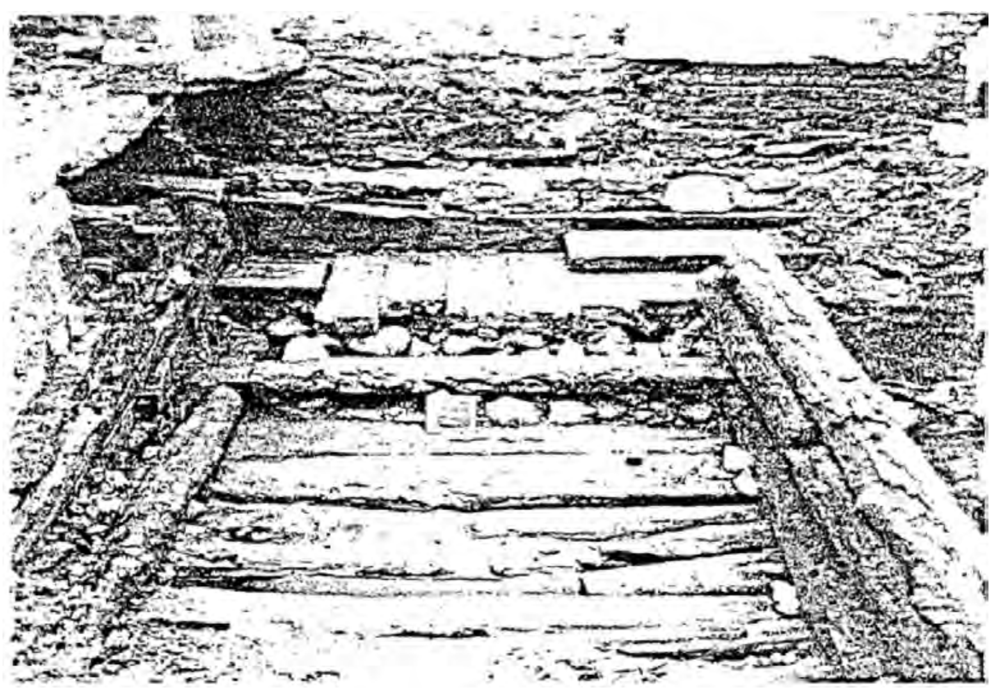
Figure 4.67



Source: LBA 1987

A drawing showing the corner assembly of a crib structure at Site 1 of the Washington Street Urban Renewal Area

A



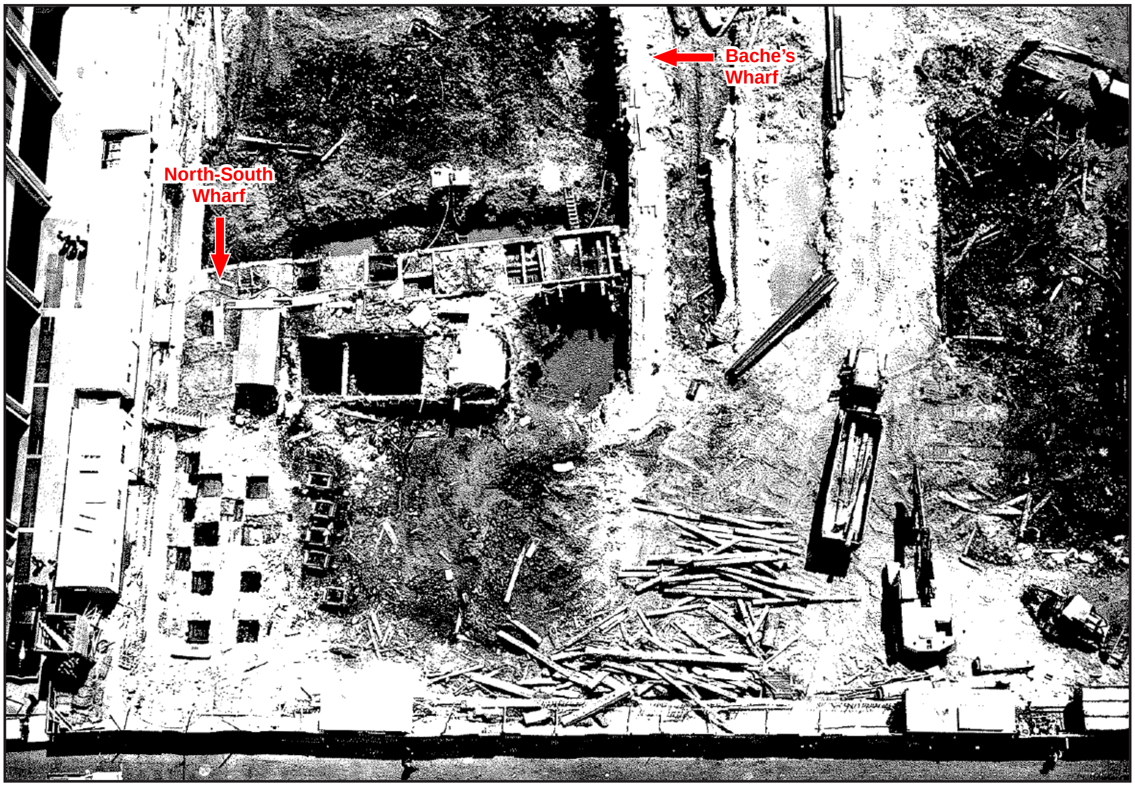
Source: Soil Systems 1983

An image of the “Cobb wharf” found at the Telco Block (Trench I). Note the crib form, the timber floor, and the large stones filling the crib

B

Crib Structures from Site 1 of the Washington Street Urban Renewal Area and the Telco Block in Manhattan

Figure 4.68



Source: Edward Morin

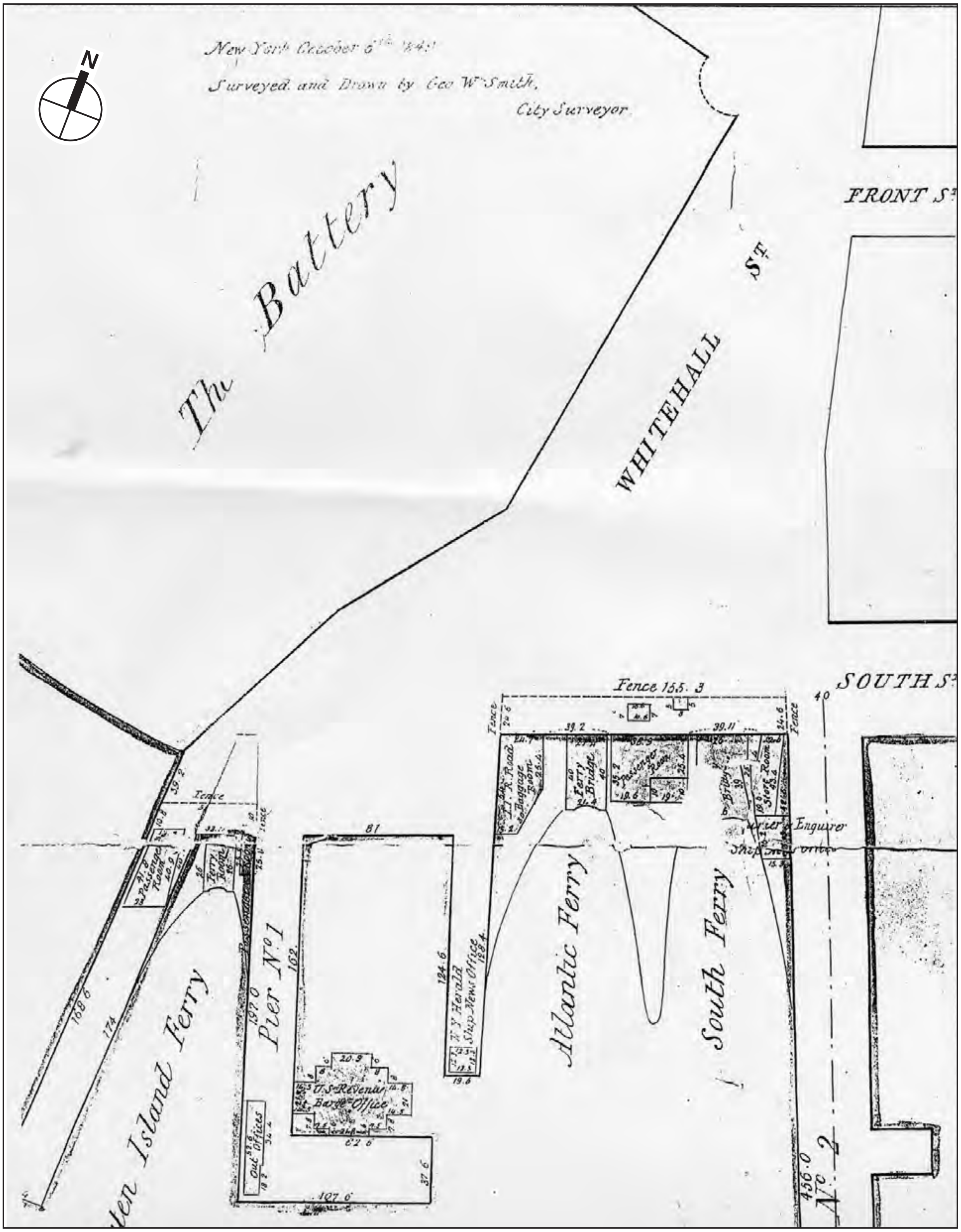
An aerial view of the Assay Site excavation. The crib form of North-South Wharf is visible in the center. The North-South Wharf is composed of two cribbing blocks. The upper block is two cells wide, while the lower block is one cell wide **A**

Source: Files of the New York State Museum

A view of the Assay Site, showing the two "cobb wharves" encountered at that site. Both log-construction wharves in crib form, Bache's Wharf is pictured on the left, and the North-South Wharf on the right. Note the small scantling timbers in the lower courses of the North-South wharf. These timbers did not extend through the entire crib, and appear to be a feature peculiar to the Assay Site **B**

The Assay Site, Manhattan

Figure 4.69

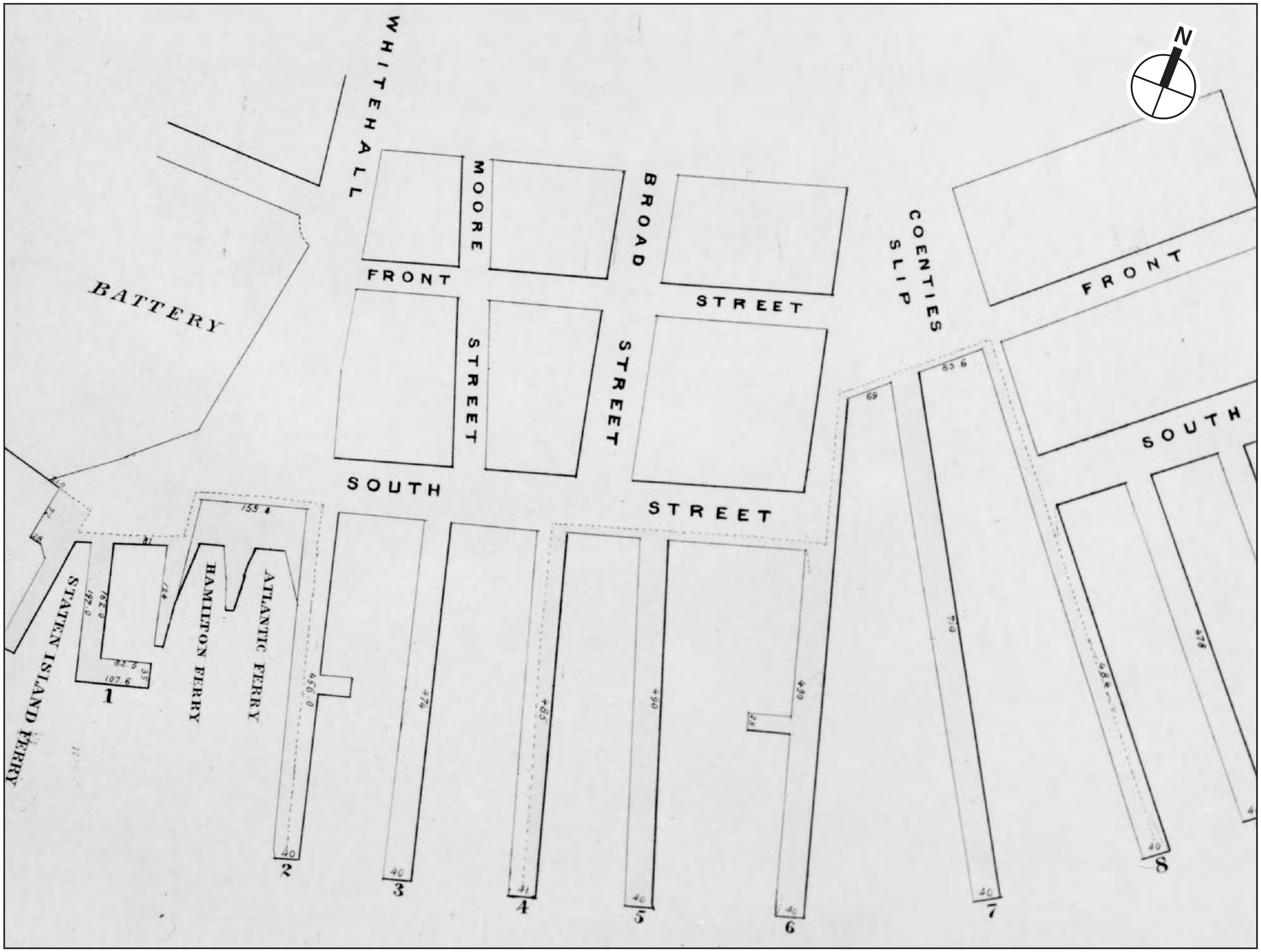


By 1849, Whitehall Slip had been filled in to the south side of South Street and improvements had been made, including a Barge Office, a pier for the Staten Island Ferry, Slips for the ferries to Brooklyn, passenger and baggage rooms and newspaper offices

0 80 FEET
SCALE

Map of the Waterfront, by George W. Smith, city surveyor, 1849

Figure 4.70



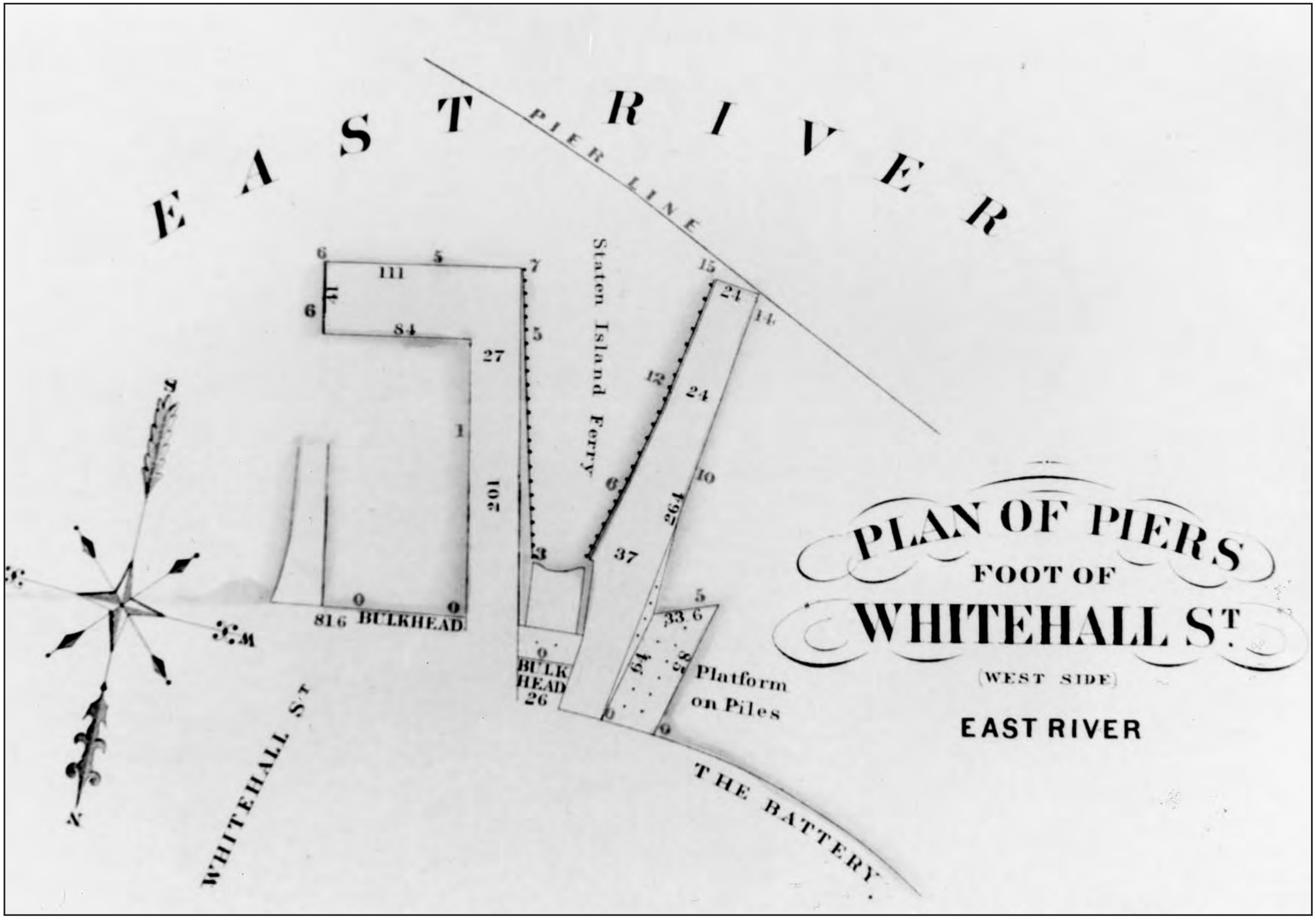
The 1855 map shows that what was once called the South Ferry is now known as the Hamilton Ferry

0 200 400 FEET
SCALE

Maps of the Wharves and Piers on the Hudson and East Rivers from the Battery to 13th Street, by Edwin Smith, city surveyor, 1855

Figure 4.71

SOUTH FERRY



"L"-shaped Pier No. 1was a block and bridge pier, 201 feet long and 27 feet wide.
It was in need of repairs although the bulkhead to the east was in good condition

0 80 160 FEET
SCALE

Plan of Piers foot of Whitehall St., West Side in *The Wharves, Piers and Slips Belonging to the Corporation of the City of New York*, Vol. 1: East River, Commissioners of the Sinking Fund, 1868

Figure 4.72

5.19.10

Courtesy New York City Parks Department

This composite map uses the 1766/67 Ratzer Plan, an 1848 Ewen map, and others to show the growth of Battery Park through landfilling

0 100 200 FEET

SCALE

Modern Shoreline

Modern Streets

Battery Wall

White Hall Slip

Project Corridor

Landfill Increments in Battery Park as drawn by the New York City Parks Department, after 1931

SOUTH FERRY

Figure 4.73

Chapter 5: Field Results

This chapter presents the archaeological component of the South Ferry Terminal project, both the fieldwork and its results. As the one technical report for all of the South Ferry Terminal excavations, all of the archaeological work be it conducted during Phase 1B testing/monitoring, during Phase 2 evaluations, or during Phase 3 data recovery, is discussed here. Information gained during all phases of the work is combined in this chapter, which presents the results of the Phase 2 evaluations at each feature, discusses the Phase 3 data recovery excavations for the Battery Wall and Whitehall Slip, and provides the results of the General South Ferry Terminal project monitoring. The technical aspects of the three phases of archaeological work are discussed here only as they may pertain to the level of effort expended in the field. **Chapter 2: B. Field Methods** described the process of excavation and how each phase of the project informed the next. In this chapter, summary data is presented to provide a complete compilation of the findings. Detailed descriptions of the Wall excavation units (EUs) and Whitehall Slip secant pile stratigraphy that were completed as part of the archaeological investigations are presented as **Appendix N**. A **Composite Map** based on many of the individual figures in this chapter is located in a separate envelope on the inside cover of this volume. This oversized document illustrates the geographic areas of the project corridor, the contractor's work locations as they pertain to the archaeological work, and the locations of archaeological features.

This chapter has sections for: A. Battery Wall (site A6101.015768), B. Whitehall Slip (site A6101.015598), and C. General South Ferry (site A6101.016196). Each section begins with a synopsis of the fieldwork at that site. The synopses are followed by detailed discussions of the findings[1], including non-unit contexts, stratigraphy, assignment of analytical and depositional units (AUs and DUs), and analyses performed.[2]

Here the results begin to speak for themselves and tell the story of the past. The artifacts discussed in this section relate to either specific aspects of the features or deposits discussed and/or their ability to provide a possible earliest deposition date of the soils in and around the features. The *terminus post quem* (TPQ) is the concept used to determine possible dates for

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[1] Detailed Wall excavation unit descriptions and Whitehall Slip secant pile stratigraphy data are located in **Appendix N**. However, all figures pertaining to the excavation of the Wall and Whitehall Slip whether referred to in Chapter 5 or **Appendix N** are located in Chapter 5.

[2] After the submission of the draft report, there was discussion about creating a table of proveniences to include in the final report data files, in addition to the provenience database, which would contain information on soil types and elevations by context. This was practical only for excavation unit contexts primarily because EU contexts were the only excavations completely within the jurisdiction of the archaeologists and thus excavated according to standard archaeological practices, but also because there would be little analytical usefulness for other contexts since they were mainly unassociated fill deposits. This data file is included in the **Appendix A** CD. Detailed information about soil colors, textures, and elevations is included in all the applicable sections of this chapter and/or **Appendix N** for both EU and non-EU contexts.

deposits. The TPQ of a context is based on the most recent beginning manufacture date of all the artifacts recovered from that context. For example, if a context contains one artifact with a date range of manufacture of 1800 through 1850 and one artifact with a date range of manufacture of 1900 through 1950, the TPQ of that context would be 1900.

Analytical Unit (AU) assignments were based on both field and artifact information. For most contexts, geographical position was the first consideration for assigning AUs (e.g., Wall 1 contexts were grouped into W1 AUs). The division of contexts into W1 AUs was based on their physical relationship to Wall 1. Whitehall Slip AUs were also assigned based on geographical position. AUs associated with the General South Ferry excavations were assigned in one of two ways. In cases where a catalog number was established for artifacts recovered from a context related to specific features or deposits, AUs were related to those features or deposits, either horizontally or vertically. AUs by strata within a feature were the preferred assignment. However, this was rarely possible given the nature of the features and deposits. The details are discussed within each section of this chapter. When stratigraphic associations were not possible, for artifact-bearing contexts not related to specific features or deposits, AUs were assigned based on horizontal position. In cases were artifacts were miscellaneous finds or from modern fill, a general AU was assigned. Depositional units are groups of analytical units based on their relationship to the Wall and to the Wall 3 log feature (see **Chapter 5: A.7. Battery Wall Depositional Units**, **B.5. Whitehall Slip Analytical Units**, and **C.2. General South Ferry Definition and Description of Analytical Units**).

Results from flotation and specialist analyst's reports have been incorporated into the discussion of pertinent contexts. The samples collected during fieldwork are discussed in relation to the contexts from which they were collected. They are mentioned in the detailed discussion of the excavation units **in Appendix N**, even if they were not processed, to give a complete presentation of the material(s) sampled.

A. BATTERY WALL

1. SYNOPSIS

The discovery of a mid-18th century stone wall buried approximately ten feet below the ground surface of Battery Park stimulated interest not only within the archaeological community, but also throughout the city and beyond. The Commissioner of the New York City Parks Department, Adrian Benepe, held a joint press conference with Mysore Nagaraja, president of MTA Capital Construction, to publicize the discovery of the Battery Wall and its importance to the city. National interest in the project resulted in requests for information from the media and interviews by the History Channel, Civil Engineering News and other outlets (see **Appendix M**).

As mentioned in earlier chapters, four truncated sections of what appeared to be one continuous colonial-era battery wall were identified during South Ferry Terminal excavations (see **Figure 2.3**). Although there were similarities, each section of Wall differed in regard to some physical details of its initial construction, how much of the Wall remained after it was truncated and buried, and the archaeological investigation's level of effort. A summary of these individual aspects is presented in **Table 5-1**.

In short, all four sections of Battery Wall were constructed by creating two parallel walls, or "faces", one directed toward the water and the other toward the city, with fill between them. However, what remained preserved in the ground varied. Beyond these simple observations, additional similarities and differences in construction were observed in the field. Later, during the analysis phase, these observations were tested and refined.

Field investigations for the Battery Wall focused on collecting data to address research questions centered around four specific goals; 1) understanding construction materials and techniques, 2) establishing the timeline of construction, 3) identifying environmental conditions, and 3) establishing the timeline of destruction, dismantling and burial (see **Chapter 3: Statement of Research Questions**). This synopsis presents the findings detailed in the Battery Wall section of this chapter using these four goals as a focus. Specialists' analyses are abstracted here to facilitate comparisons (stone and mortar; geochemical; pollen and phytolith; and human remains) with more detailed summaries presented in their own sections below (**Chapter 5: A.8.a.-c. Mortar Analysis, Pollen and Phytolith Analysis, and Geochemical Analysis**). All specialists' reports are appended in their entirety in **Volume II: Appendices**.

Following this synopsis, the data recovered from the Battery Wall excavations are presented in greater detail by Wall section (Walls 1 through 4). Within each Wall section's discussion, the Analytical Units (AUs) are described, details of each trench are presented, and other non-EU contexts are discussed. (The stratigraphy within each Excavation Unit (EU) is detailed in **Appendix N**). As this chapter continues, the Battery Wall data are then combined and presented by AU to paint a broader picture of the history of the Battery based on field results.

Table 5-1
Summary of Battery Wall Sections

	Wall 1	**Wall 2**	**Wall 3**	**Wall 4**
Depth Found* (highest–lowest)	9.1 – 11.3 feet bgs	9.6 – 11.7 feet bgs	4.4 – 8.2 feet bgs	8.2 – 16.0 feet bgs
Elevations Above/Below Sea Level (highest–lowest)	2.4 – 0.2 feet	2.5 – 0.6 feet	3.6 – -3.9 feet	-0.2 – -8.0 feet
Maximum Extant Wall Height	2.1 feet	2.0 feet	4.7 feet	3.4 feet
Average Width of Wall Segment	8 feet	8 feet	8.5 feet	8.5 feet
Average Length of Wall Segment and direction	43 feet east-west 6.5 feet north-south	4.5 feet east-west	85 feet north-south	65.5 feet north-south 33 feet east-west
Contains Bastion	Yes	No	No	Yes
Construction Method	Two stone faces with fill interior	Two stone faces with fill interior	Two stone faces with fill interior	Two stone faces with fill interior
Face Stones	Primarily sandstone	Primarily sandstone	Primarily Schist	Primarily Schist
Mortar	Still present joining face stones to each other and to bedrock	Still present joining face stones to each other and to bedrock.	Largely washed away below high water line	Largely washed away below high water line.
Foundation	Bedrock	Bedrock	Cobbles	Sand
Wooden Elements/ Features	None	None	Large log feature; Wall partially sheeted with wood on landward side.	Wall sheeted with wood on landward side.
Data Recovery Conducted	Yes	No	Yes	Yes
Number of Excavation Units Completed	18	0	16	4
Soil Screened for Artifact Recovery	Yes	No	Yes	Yes
Flotation Soil Samples Taken/Processed	35/All	No samples taken	58/All	No samples taken
Geochemical Study Samples Taken/ Analysis Conducted	27/5	No samples taken	83/19	No samples taken
Pollen or Phytolith Samples Taken/ Analysis Conducted	285/13 phytolith 4 pollen	No samples taken	211/12 phytolith	No samples taken

Note: * bgs = below ground surface

a. UNDERSTANDING CONSTRUCTION MATERIALS AND TECHNIQUES

When initially observed, the courses of stones in the faces of Walls 1 and 2 appeared more uniform than those in Walls 3 and 4, although the facing stones in all Wall sections were intentionally cut and laid. The stone types used and general appearance of Walls 1 and 2, located in the northern part of the South Ferry project corridor, were similar. Walls 3 and 4, located toward the center of the project corridor, also appeared similar to each other. This suggests there might have been more than one building episode and that different sections of the Battery Wall were built at different times, under different conditions, and/or by different individuals.

Further analysis indicates the stones used to construct Walls 1 and 2 were procured at a distance, while those used for Walls 3 and 4 were mainly local bedrock. Sturdy mortar was extant in Walls 1 and 2, while most of the mortar that once held Walls 3 and 4 in place had been washed out. Gravimetric analysis, performed on mortar from Walls 1, 2 and 4, also revealed differences in the samples from Walls 1 and 2 versus Wall 4. Petrographic analysis of samples from all Wall sections concluded Walls 1 and 2 mortars exhibited the most similarities to one another, while Walls 3 and 4 showed some divergent characteristics.

The stone and mortar analyses provide further support to the hypothesis that the Battery Wall sections were part of two different construction episodes. Observations made about the bastions, found at Walls 1 and 4, provide further evidence. The turn at the corner of the bastion on the landward side of Wall 1 was gentle, although it was sharp on the waterside of the Wall (see **Figure 5.4**). However the turn at the corner of the bastion of Wall 4 was sharp on both sides. To construct a curve, the builders of the Wall had to cut stones for two different purposes, one type for the corner and another for the remainder of the Wall. For the face of the Wall, square or rectangular stones would have been cut with right angles. For the gentle curve, stones had to be segregated and cut at varying angles, as they are for archways in building construction. Therefore, the presence of the gentle curve in Wall 1 indicates more time-consuming construction. This is further evidence for the theory these sections were not constructed at the same time. The presence of this gentle curve on the landward side of the corner connecting the bastion to the curtain wall could have been present for a number of reasons, both aesthetic and military. However, neither the historic documents nor the field data suggest why this gentle curve exists.

One unique aspect of construction associated with Wall 3 was a counterfort (buttress) found on its landward side. The presence of wooden planks sheathing part of Wall 3 and all of Wall 4 on their landward sides is another characteristic that distinguishes them from the Walls found in the northern part of the South Ferry project corridor. Wall 3 might also have been associated with a large pier-like log feature, possibly used as a platform. This feature was cut through to build Wall 3, however it is possible the two might have been used contemporaneously. Samples of the material remains of the Wall (and log feature) were taken and many have been analyzed.

During his visit to the temporary reconstruction of Wall 1 inside Castle Clinton on May 15, 2008, Patrick Brock, Professor of Geology at Queens College of the City University of New York, was consulted on the identification and possible source of the stones used to build the Battery Wall. He identified the southern face of Wall 1, that part which would have been exposed to tidal action, as primarily sandstone, likely originating in the Newark Basin across the Hudson River from Manhattan. The sandstone from that region used to construct Wall 1 was reddish in color. However, he also identified a number of lighter-colored sandstones that are not locally available. Dr. Brock suggested two hypotheses. Either these lighter sandstones were from further away, perhaps northern New Jersey or Pennsylvania, or they were originally from the vicinity of the reddish colored sandstone but their source has since been completely mined out. One of the stones on the southern face, near the corner where Wall 1 turned the southward, was feldspathic Fordham gneiss. Finally, Dr. Brock identified the bottom course of stone adjacent to the feldspathic Fordham gneiss on the western face at the southeastern end of Wall 1 as high grade schistose/gneissose. He explained that while schist and gneiss are generally distinctive, the local definition is problematic because of the complex geological history. This has to do with the number of times and ways the stone metamorphosed. The stones on the northern side of Wall 1, the landward face, were similar to those used in the southern face with a notable reduction in the amount of the lighter-colored sandstone.

Dr. Brock confirmed field observations regarding weathering of the stones on the southern face of the Wall, and also observed some weathering on stones used as part of the interior fill. From this, he concluded the Wall fill contained scavenged materials as well as some mined stones. The large boulder incorporated into Wall 1 is one example of scavenged material (see **Figure 5.1**). In geologic history, this boulder would have originated somewhere upriver and glacial action would have dragged it to its resting place in Lower Manhattan. Dr. Brock also observed some of the original mortar adhering to the boulder and, to a lesser extent, in a few other spots. He identified three different-colored stones used as inclusions or temper in the mortar. The two darker-colored inclusions are local; however, the lighter one is from northern New Jersey or Pennsylvania. Because of the presence of natural deposits of this type of material, Pennsylvania has since become a source for concrete production in modern times.

In addition to physically inspecting Wall 1, Dr. Brock also examined photographs of Wall 3 which were part of the Battery Park Conservancy exhibit "Walls within Walls" at Castle Clinton. While it was not possible to conduct the same high level of examination using photographs, Dr. Brock was able to offer a couple of observations. First, he agreed that most of the stones appeared to be schistose/gneissose, likely mined from local bedrock. Secondly, Dr. Brock is certain that mortar once existed between the Wall 3 stones. This is quite an important observation. It means that Wall 3 stones were not dry-laid but suggests that, unlike the mortar in Wall 1, little or no effort was made to ensure that the mortar used in the construction of Wall 3 would not wash away.

As stated in **Chapter 2: B. Field Methods**, JBCI conducted analyses of stone and mortar as part of their work on Wall documentation and disassembly. Their work focused on the architectural aspects of the Wall sections and applied analyses of the stones and mortar specific to the needs of architectural reconstruction (see **Appendix K**). Therefore, some of their interpretations differ from those presented by the mortar specialist who conducted scientific work for this report (see **Appendix G**).

JBCI conducted gravimetric analysis on mortar samples from Walls 1, 2, and 4. All samples were lime mortar and the sands used to make the mortar were probably local. The percentages of aggregate, fines, and acid solubles were consistent for the samples from Walls 1 and 2. However, the Wall 4 samples were not consistent. JBCI concluded there was enough variation in the samples from all three of the Wall sections to indicate that a separate mortar mix was used for each. Petrographic analysis was conducted for Wall 1 only, and did not reveal any shell particles in the lime mortar. Therefore, it was surmised that the lime was made from crushed rock, suggesting "sandy limestone as the original source for the lime" (see **Appendix K**: 43).

The JBCI work was supplemented with analysis conducted by John Walsh of Testwell Laboratories (see **Appendix G**). One mortar sample from each Wall section was subjected to petrographic examination. That sample and one additional sample from each Wall section were also subjected to chemical analysis. In addition, x-ray diffraction was conducted on one sample each from Walls 1 and 2, and sieve analysis was conducted on one sample each from Walls 1 and 3. All samples were common rock lime mortar having properties consistent with Inwood marble. Many similarities were identified in the various attributes of the mortar samples from Walls 1 and 2. Walls 3 and 4 mortars showed quite divergent characteristics, with Wall 4 having more in common with Walls 1 and 2 than with Wall 3 (Wall 4 was physically located between Walls 1 and 3).

However, all of the mortar samples appear to have been hot-mixed (i.e., they were crudely made and rapidly placed within the Wall while still hot). The sieve analysis demonstrated that the sand used to make the mortar for Wall 3 was much coarser-grained than that used for Wall 1. Additional details on the mortar samples are provided later in this chapter and in **Appendix G**.

Analysis of field results could not unequivocally determine the purpose of the Wall 3 log feature or the sheeting associated with Walls 3 and 4. The log feature, built circa 1734, was a grillage[3] form and either part of wharfage or a landing stage structure type (see sample documentation form for Landfill Retaining Structures in **Appendix C**). It is possible the log feature was part of a wooden platform used to construct an earlier battery or that it was part of that particular battery itself. The sheeting associated with the Battery Wall might have been related to its construction, whereby wooden sheeting was used to guide the stonemasons' work. It is also possible the sheeting was used for maintenance of the Battery Wall. There are historic references to cladding or sheeting installed at other batteries to protect the stones and mortar from weathering and related deterioration. In New York in 1768, the *New-York Gazette* referred to the decay of "wooden facing on the ramparts of the Battery." Although it is possible the sheeting found at Walls 3 and 4 is the facing described in 1768, this cannot be confirmed. Furthermore, there is no documentation to indicate the original purpose of the decayed facing or when it was installed (see **Chapter 4: A.11. The Stamp Act Period** for further discussion of Wall sheeting, as well as **Chapter 5: A.4.d. Wall 3** and **Chapter 5: A.5.c Wall 4**).

b. ESTABLISHING THE TIMELINE OF CONSTRUCTION

The evaluation of when the Battery Wall sections were constructed and when they were truncated and buried under fill was a collaborative effort. Establishing field protocols for excavation of units based on their relationship to the Wall enabled the collection of many artifacts with exact proveniences. Temporally diagnostic artifacts were used to establish deposition dates for the excavated soils. Information from historical documents and maps regarding the timelines of construction and demolition was also obtained. Additionally, dendrochronological analysis from the Wall 3 log feature provided the date of death for the trees used in its construction.

Depositional units (DUs) were assigned to all excavated soils associated with the Battery Wall. DUs correspond to the relationship of the excavated deposits to the Battery Wall sections and the log feature at Wall 3. Artifact TPQs were applied to all DUs that contained temporally diagnostic artifacts. Analyzing the site this way facilitated comparisons between Wall sections enabling identification of construction and demolition sequences. This analysis demonstrated that Wall 1 was built earlier than Walls 3 or 4. Although very few temporally diagnostic artifacts were recovered from Wall 1 and virtually none from Wall 2, the artifact TPQs support the

[3] Grillage is stacked log construction comprised of continuous perpendicular courses of timbers (see **Chapter 4: C.4. Classifying and Describing Landfill Retaining Structures**).

historical documentation. Documents indicate a probable circa 1741 construction date for Walls 1 and 2 and a circa 1755 date for Walls 3 and 4. Dendrochronological analysis of samples from the log feature at Wall 3 reveal those trees were cut in 1734, prior to the construction of any of the Battery Wall sections unearthed during the South Ferry Terminal excavations. This earlier date is consistent with the construction of an earlier battery of which the log feature may have been part. The sheeting at Walls 3 and 4 was put in place sometime after 1730, however very few temporally diagnostic artifacts were recovered from contexts associated with the sheeting. Walls 3 and 4 themselves were constructed circa 1755 and the sheeting would not have been present before that date.

c. IDENTIFYING ENVIRONMENTAL CONDITIONS

Phytolith and pollen analyses as well as chemical analysis of the soils (geochemistry) helped to establish environmental conditions at the time the Battery Wall was constructed and provided data on conditions over time in Battery Park. Twenty-five samples were analyzed for pollen and/or phytolith identification by Paleo Research Institute (PRI), and their report is appended here (see **Appendix E**). The processed samples represent parts of four columns: two each from Walls 1 and 3. Phytolith analysis was performed on all processed samples to potentially obtain information on grasses, food plants, moisture and sunlight. Only one column (from Wall 1) was tested for pollen on the assumption that data on trees would not be present from the time prior to the destruction of the Wall.

Phytolith analysis revealed the presence of grasses indicative of pasture or lawn at levels above the Wall and very little vegetation present adjacent to the Wall on the waterside, as was expected. The sediment between Wall 3 and the log feature was conducive to the growth of species that thrived in “shallow brackish wetland or estuary” environments, as opposed to species that do well in more disturbed settings, such as those seen in deposits on top of the log feature and the Wall (see **Appendix E**: 20). Brackish or marine species were found at levels beneath the Wall. Pollen present included that of oak, hickory, and chestnut trees.

Geochemical analysis was done on 24 samples taken from Battery Wall contexts. The complete report prepared by Geo-Sci Consultants, Inc. is attached as **Appendix I**. Five of the samples were from beneath Wall 1. Twelve were from a trench excavated at Wall 3. The other seven were from Wall 3 excavation units. The soil chemistry analysis identified deposits as fill, sandy alluvium, estuarine sediment, or possible terrestrial subsoil. Sandy alluvium was amassed over a relatively short period of time. Estuarine sediments come from low energy tidal settings such as a bottom deposit found in a tidal marsh. The possible terrestrial subsoil represents lower level sediment. These classifications are consistent with the stratigraphic analyses presented in the unit summaries in **Appendix N**. Additionally, a column of samples from Wall 3 helped establish an elevation for the transition from alluvium to terrestrial soils at approximately 9 feet below sea level. A more detailed summary of the samples analyzed for pollen, phytoliths and chemistry is provided later in this chapter in **Chapter 5: A.8. Mortar, Microbotanical, Geochemical Analyses and Human Remains**.

d. ESTABLISHING THE TIMELINE OF DESTRUCTION, DISMANTLING AND BURIAL

Demolition dates based on field and artifact data were more elusive because of the complexities of the fill deposits related to the expansion of the shoreline and to the creation and maintenance of Battery Park. The fill contained many artifacts with beginning manufacturing dates in the mid- to late-19th century. Analyses of the stratigraphy and artifacts suggest a post-1790 destruction date. Historical documentation indicates the Battery Wall was still being maintained as late as 1782. In 1790 orders were given to demolish the Fort. The demolition debris was used to fill in the Battery. It is likely the Wall was demolished and buried around that time. Dendrochronological analysis of logs related to the expansion of the shoreline in that area of Battery Park provides evidence that most of the logs came from trees cut in 1788 (see **Chapter 5: C.3.a. Cribbing and Piles**), thus confirming the time frame of destruction as circa 1790.

2. WALL 1

Wall 1 was identified during archaeological test trench excavation (ET 1)[4]. The Phase 2 archaeological excavations of Wall 1 documented the cross section of the Wall, including the stratigraphy of its soil matrix. The eastern segment of Wall 1 was determined to continue to the eastern limit of the South Ferry Terminal project corridor excavations. Fill above the truncated Wall was also screened for artifact recovery as part of the Phase 2 work. Excavations identified a sharp turn on the south side in the eastern end of Wall 1 representing the angle of a bastion, as well as part of the corresponding corner on the northeastern side of the Wall (see **Figure 5.1**). Rather than turning sharply, as the southern (waterside) face of the bastion did, the landward side face curved gently toward the east then southward. The entire extent of the curve was not within the South Ferry Terminal project corridor, however, enough was present to project the angle of curvature in relation to the sharp turn on the waterside of the Wall.

The fill remaining on top of the Wall when it was bisected measured from 4.5 to 5 feet[5]. From the beginning, it was noted the stratigraphy of the matrix surrounding Wall 1 was distinct to the north and to the south of the structural remains. The soils on the northern side of the Wall were predominately silty fills. The soils on the southern side of the Wall were predominately clean sands that appeared to be naturally deposited. The fill on top of the Wall was yellowish brown silty soil. Some mortar flecks were also noted in it.

The structural remains of the Wall originally documented in cross section measured from 1 to 1.5 feet high[6]. Wall 1 sat almost directly on the shallow bedrock, with the top of the truncated Wall approximately ten feet below present-day ground surface. This section of Wall was approximately eight feet wide and up to about two feet high, although the actual height varied with the contours of the bedrock. The stones along both Wall faces were a fine-grained rock. Part of the waterside face exhibited a patina, an indication of exposure to the elements at some point in time. While the stones along the waterside face were particularly uniform in appearance (see **Figure 5.2**), the landward side face was somewhat less so (see **Figure 5.3**). At least one large boulder was incorporated into the Wall itself on the landward side. Sturdy mortar was used to hold the Wall, including the large boulder, together. However, the mortar on top of Wall 1 was quite soft, as compared with the mortar on its face.

Wall 1 was ultimately exposed traversing the project corridor. Its extent within the project corridor was approximately 43 feet (45-foot corridor minus one foot on either side for the soldier piles and lagging which supported the contractor's excavations). The eastern section of Wall 1 made a turn toward the south, indicating this was a part of a bastion. Less than seven feet were

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[4] ET stands for a trench eight feet wide and XT for a trench six feet wide.

[5] An additional five feet of fill had been previously excavated.

[6] The original height measurement did not include the large boulder that had been incorporated into the construction of the Wall. The actual height of the Wall at the boulder was two feet.

exposed before the Wall would have continued southward outside of the South Ferry Terminal project corridor.

Data recovery excavations for Wall 1 included completing archaeological excavation units. Aside from the Wall itself, other related features were sought. Initial examination of the western profile of the archaeological trench ET 1 indicated there might have been a small remnant of a builder's trench. This deposit was examined in the EUs located on the waterside face of the Wall and was later determined not to be a builder's trench (see **Appendix N** discussion of EUs 4, 12, 13, and 14). One of the other goals of the data recovery was to identify any potentially intact land surfaces and, if they existed, to recover as much information as possible from those contexts. Because the Wall had been truncated before it was buried under fill, it was felt such land surfaces would not likely be preserved and thus should have priority if they were identified. In the end, the only potentially intact surface found was beneath Wall 1.

The Data Recovery Plan for Wall 1 included placing the first EU in the fill above the western half of the Wall to evaluate the thickness of the overburden (Dewberry 2005d). Based on this information, the contractor was instructed to mechanically remove 1.5 feet of soil under archaeological supervision. After removing the fill above the Wall, the archaeologists shovel scraped the surface to determine the level at which EUs should begin. A number of EUs were placed at specified locations in relation to the Wall. A total of at least 50 square feet in surface area was mandated in the Data Recovery Plan. However, a provision to add additional units, should the archaeologist see fit, resulted in 200.75 square feet of EUs being completed at Wall 1. This amounted to a total of 18 EUs completed as part of the Phase 2 evaluation and Phase 3 data recovery at Wall 1 (see **Figure 5.4**). Eleven of these units were at levels on top of the Wall (EUs 1 – 11). Eight were excavated either adjacent to the Wall or nearby (EUs 2, 3, 7, 15, and 16 on the landward side and EUs 12, 13, and 14 on the waterside). One EU (EU 17) was placed at the southeastern end of the Wall where the Wall face stones were not well preserved. This unit examined the fill within the Wall. Finally, one unit (EU 18) was excavated beneath the Wall, after it was removed, in the area where there was a depression in the bedrock. It should be noted that some of the units fall into more than one category regarding their relationship to the Wall itself (see the EU descriptions provided in **Appendix N**). In conjunction with excavation of these units, sampling of soils for potential flotation, geochemistry, and pollen and phytolith analyses was also conducted.

Once the excavation units on either side of Wall 1 were completed, the remaining soil was removed from both sides of the Wall, without additional screening for artifact recovery, to facilitate JBCI documentation and Wall disassembly. Soil samples for potential flotation or geochemical analysis were collected from interior fill during Wall disassembly. After disassembly, a final EU was completed in the soil beneath the Wall. That concluded the field portion of the data recovery effort at Wall 1.

A total of 169 contexts was established for Wall 1. Of these, 75 were from excavation units. Of the remaining 94, 33 were non-EU contexts with recovered artifacts, and the remaining 61 were flotation or soil sample contexts. An additional 286 soil samples were taken for possible pollen and/or phytolith analysis. The non-EU contexts were established primarily during Phase 2 excavations or during Wall 1 disassembly and are discussed separately below.

a. DEFINITION AND DESCRIPTION OF ANALYTICAL UNITS

The obvious distinction in the soils to the landward and watersides (north and south) of Wall 1, first documented during Phase 2 archaeological evaluation, led to the establishment of analytical units (AUs) based on the relationship of a particular context to the structural remains of the Wall itself. Eight AUs were established for Wall 1. These AUs were assigned to contexts with recovered artifacts, soils and/or samples. A total of 169 catalog numbers have been assigned for Wall 1 contexts (see **Table 5-2**).

Table 5-2
Analytical Units for Wall 1

AU	# Contexts	Location relative to Wall
W1 A	55	Above W1
W1 B	4	Above or inside W1*
W1 C	16	Above on the landward side of W1
W1 D	8	Above on the waterside of W1
W1 E	29	Below W1
W1 F	33	Inside W1
W1 G	4	Landward side of W1
W1 H	20	Water side of W1
Note: * These are contexts where the vertical locations are so close as preclude assigning to W1 A or W1 F.		

The AUs associated with Wall 1 can be grouped into two categories. One is on a vertical plane that goes from above the Wall through its interior to below the Wall (W1 A, W1 B, W1 F, W1 E). The other is on a horizontal plane that extends from the landward side though the inside to the waterside of the Wall (W1 G, W1 F, W1 H). Contexts located inside the Wall, in its fill, by definition, were located in both planes of analysis. The contexts located at elevations above the Wall can also be grouped into a horizontal plane (W1 C, W1 B, W1 D). These groupings are discussed in more detail below in regard to depositional units in **Chapter 5: A.7. – Battery Wall Depositional Units**.

b. EXCAVATION UNITS

Eighteen EUs were completed during Wall 1 excavations. **Table 5-3** identifies the dimensions of each, their AU assignments, the number of strata and the number of various soil samples that were taken. Strata numbers were assigned sequentially based on changes in soil color and/or texture. In all cases the stratum number increased incrementally with depth, unless otherwise discussed. For example, Stratum 2 is beneath Stratum 1, and Stratum 3 is beneath Stratum 2. **Figure 5.4** shows the location of EUs, except for EU 1 which was an exploratory unit that examined the depth of the fill above the Wall. Also see the **Composite Map** located on the inside cover. Detailed descriptions of the EUs are presented in **Appendix N**.

Table 5-3
Wall 1 Excavation Unit Size, Analytical Unit, Number of Strata and Soil Samples

EU	Dimensions (l x w x d)* In Feet	Analytical Unit	# Strata	# Pollen/ Phyto. Samples	# Geochem Samples	# Flotation Samples
1	2.5 x 1.5 x 1.8	W1 A	1	-	-	-
2	5 x 5 x 3.9	W1 C	3	46	-	3++
3	4 x 4 x 3.3	W1 A	6	45	-	-
4	5 x 6.5 x 3.5	W1 A	6	49+	-	3++
5	3 x 3 x 0.8	W1 A	3	-	-	-
6	3 x 3 x 1	W1 A	2	-	-	-
7	4 x 4 x 1.4	W1 C	1	-	-	-
8	3 x 3 x 1	W1 A	4	-	-	-
9	4.5 x 3 x 1.2	W1 A	2	-	-	-
10	5 x 5 x 0.8	W1 A	2	-	-	-
11	5 x 3 x 3.6	W1 A	2	51	-	3++
12	3 x 3 x 1.4	W1 H	5	15	-	2++
13	3 x 3 x 1.8	W1 H	3	20	-	2++
14	3 x 3 x 1.5	W1 H	3	20	-	3++
15	3 x 3 x 0.5	W1 G	2	-	-	-
16	3 x 3 x 1.1	W1 G	1	16	-	1++
17	2 x 1.5 x 1.2	W1 F	2	-	-	-
18	3 x 3 x 0.9	W1 E	2	23+	1++	-

Notes:
* l = length in the north-south direction
w = width in the east-west direction
d = depth
\+ Some of the samples have been processed for analysis
++ All of the samples have been processed for analysis

c. NON-EXCAVATION UNIT CONTEXTS

As described above, the initial evaluation of Wall 1 was done by manually scraping the ET 1 trench base and profiles surrounding the remains of the Wall, taking photographs, and creating measured drawings. Sampling and screening soil for artifact recovery from the Wall 1 cross section was also completed. Very few artifacts were recovered from those first contexts (Cats. 15768.244, .245, and .247). Temporally diagnostic artifacts include a sherd of British slipware (Cat. 15768.247) recovered from the soil on top of the bedrock between the two sections of Wall 1. This type of ware was imported into New York from 1670 to 1785. The soil scraped from the Wall fill contained a sherd of Chinese export porcelain and another of whiteware (Cats. 15786.244 and .245). The TPQ of this deposit is based on a whiteware sherd that was manufactured beginning in 1820. The completion of Phase 2 documentation included screening ten 5-gallon buckets of fill excavated from above the eastern half of Wall 1 (Cats. 15768.249 to .254). Temporally diagnostic artifacts from this deposit included two sherds of British slipware, and several tobacco pipes, including a Dutch pipe marked with a crowned L providing a TPQ of 1726 (Cat. 15768.253 and .254). This early evidence from the Wall indicates this section of the Battery was built no earlier than 1726, and it was destroyed and filled no earlier than 1820, a possible indication that either the truncated Wall remained exposed for decades beyond its destruction, or the fill above the Wall was augmented and continually churned for that duration.

Other non-EU contexts associated with Wall 1 fell into two main categories; either they were related to cleaning above or adjacent to the Wall (10 of 49 contexts) or from the removal of the Wall (33 of 49 contexts). However, only 13 of these were artifact-bearing proveniences, and the remainders were soils. Two main cleaning episodes occurred during the archaeological excavations. The first was to expose the top of the truncated Wall remains. This took place on November 25 and 26, 2005. The second cleaning episode was after the completion of the excavation units adjacent to the Wall to expose the faces of the Wall for their entire length. This took place mainly between November 28 and December 21, 2005, but additional cleaning of the Wall faces also took place prior to its removal, which began on January 26, 2006.

Flotation samples were taken from inside and beneath the Wall while it was being dismantled. All of the 18 samples taken during dismantling were processed. Samples for possible geochemical analysis were also taken during the Wall 1 dismantling. Four of these were processed. All four of them are from beneath the eastern half of Wall 1. Two were located on the north side and two on the south side of the Wall. The geochemical analysis characterizes all as mixed earthen fill. In general, the chemical signature was similar to that observed in the EU 18 sample. However, these Wall 1 samples tended to have slightly more organic matter and somewhat greater concentrations of potassium, magnesium, manganese, sulfur, strontium, and total barium than detected in the EU 18 sample; they are on par with the overall chemical profile of the fill samples analyzed from Wall 3 (see **Appendix I**).

3. WALL 2

Wall 2 was identified during hogging excavations in Battery Park directly to the north of the World Trade Center Memorial. Only a small piece of stone wall was present, measuring approximately 4.5 long by 8 feet wide. The highest part of this section of Battery Wall was two feet, but it dropped off sharply toward the east as the bedrock rose (see **Figure 5.11**). As mentioned in **Chapter 2: B. Field Methods**, hogging removed the majority of soil around and above Wall 2 and only Phase 2 level archaeological evaluation was completed there.

Construction techniques were documented and stone and mortar samples taken from Wall 2. Two mortar samples have been analyzed from Wall 2, one from the south face and the other from the top of the Wall. Very few temporally diagnostic artifacts were recovered from excavations associated with Wall 2 and these are more likely associated with Battery Park fill rather than the Wall itself. The TPQ is 1893 based on a piece of glass from a machine-made bottle (Cat. 15768.280).

4. WALL 3

The southernmost end of Wall 3 was identified during excavation of ET 4. Initially, only seven feet of the face were exposed and the remainder of that section of ET 4 contained stone rubble. During Phase 2 excavations, it was determined the rubble was actually Wall fill. Wall 3 was not constructed using the same type of stones as Walls 1 and 2, nor was it mortared in the same way. Furthermore, the topography of Lower Manhattan undulates and the bedrock at Wall 3 is significantly deeper than at Walls 1 or 2. Therefore, Wall 3 was not built directly on bedrock. However, many large water-worn boulders were apparently used either as a foundation or to stabilize this section of Wall. It is possible some of these stones may be the result of fill that had been added to the exterior of an earlier incarnation of the Battery (see **Chapter 4: A.7. Additional Work at the Battery and A.9. The Flat Rock Battery**). The stones that comprised

Wall 3 itself were generally cut schist, likely derived from the local bedrock. There was very little mortar found between the stones. They appeared to be dry laid and then covered with a layer of mortar at what was then the high water mark. However, the subsequent analysis suggests Wall 3 was mortared, but that it was not the same quality mortar as that used to build Walls 1 and 2 and therefore washed away. That some of the mortar had clearly washed out was evidenced by the dense trail of mortar on the waterside of Wall 3, documented during Phase 3 data recovery.

Another unique feature of Wall 3 is a possible counterfort, here documented to the east of the Wall. A counterfort is a type of buttress built to enhance the lateral strength of the Battery Wall and enforce it against potential oncoming fire. It appeared in plan view as a square protrusion from the eastern Wall face, on the landward side of Wall 3 (see **Figures 5.12** and **5.14**). Another interesting feature of Wall 3 is that it was partially lined with wooden sheeting on the landward side of the Wall (see **Figure 5.12**). These planks were approximately one inch thick. The sheeting appeared similar to the types of plywood forms used to pour concrete today. However, no metal fasteners were found. Metal fasteners could suggest a modern form or could potentially help date the construction of the sheeting. One piece of the sheeting had a wooden plug that might have been used as a fastener. Generally, planks seemed to have been overlapped and occasional small vertical pickets held them in place.

A total of 13 five-gallon buckets of soil excavated from what we now know to be the landward side of Wall 3 was screened for artifact recovery during the Phase 2 evaluation (Cat. 15768.365). Many temporally diagnostic ceramic sherds were recovered (n=23). Most of these had beginning manufacture dates of 1640 or 1670 (n=12); however, one whiteware sherd was also recovered. Since it is now known that the Wall predates the beginning manufacture date of whiteware (1820), it may be assumed other fill was also present in the archaeological trench from which the screened soils were recovered. This is not surprising since it was to be expected that the archaeological trench would contain fill dating from the time of the Wall truncation as well as the subsequent episodes of filling in Battery Park.

The Phase 2 archaeological excavations of Wall 3 also determined the height of the Wall and exposed its foundation. It was approximately 4 feet high at the highest point and was constructed on a foundation of cobbles and boulders. An exploratory unit (EU 22) completed at the beginning of the data recovery excavations exposed a section of the Wall face on the waterside of Wall 3 (see **Appendix N**). Therefore, since part of both faces of the Wall were identified, two trenches were hand excavated, one along the projected path of each face, to determine if the Wall continued toward the north. It did continue all the way north to the secant wall at the eastern edge of the South Ferry Terminal project corridor, a distance of up to 95 feet.[7] Once the top of the Wall faces had been exposed and excavation units dug as part of the data recovery, a series of logs was also identified. The logs were part of a larger feature that had been cut through to construct the Wall (see **Figure 5.13**).

The very large log feature was comprised of two possibly related components. The largest was a series of logs laid one next to the other and layered with a similar series of perpendicular horizontal logs, ultimately up to six layers high. The other log feature component was a series of five angled vertical piles approximately five feet to the north of the larger log feature on the

[7] Wall 3 was at an angle to the South Ferry Terminal project corridor, and therefore the two faces of the Wall were different lengths.

western side of Wall 3. The log feature likely predated the Wall, since some of the logs were found beneath Wall 3 after its removal. However, for purposes of analysis, this log feature has been combined with Wall 3 and included as part of the Battery Wall site (see **Chapter 2: B. Field Methods**).

The Supplement to the Data Recovery Plan (Dewberry 2006a) dictated the number of excavation units depending on the length of Wall present, as unearthed in the two hand-excavated trenches. As a result, 16 excavation units were completed as part of Phase 2 and Phase 3 excavations at Wall 3 (see **Figure 5.14** and **Appendix N** for descriptions of the excavation units). Five of these were situated along the waterside face (EUs 22, 26, 27, 27W, and 28). Seven were along the landward side face (EUs 20, 21, 24, 24A, 25, 25A, and 29). EU 29 was also abutting the counterfort, as was EU 30. One unit was placed entirely within the rubble fill (EU 23). Six of the excavation units were partially or entirely within the footprint of the log feature (EUs 24, 24A, 25, 25A, 27, 27W, and 32). One unit was excavated beneath the Wall (EU 32) and one beneath the log feature (EU 31). Once all excavation units adjacent to the Wall were completed, the soil abutting the Wall was removed to expose its entire face on both sides as well as the log feature's surface (see **Figure 5.15**). Once the entire Wall was documented by JBCI and the Wall, sheeting and logs removed, one unit was excavated beneath the Wall and one was excavated beneath the log feature. Samples of the sheeting were retained. The logs were sampled for potential dendrochronological analysis and the remaining sections of cut logs were stored with the Wall stones by JBCI (see **Appendix K**). Soils were sampled for potential geochemical, pollen, and phytolith analyses. This included a column of the deposit on the waterside of Wall 3 down to the depth of glacial boulders that was taken for potential geochemical analysis.

The contractor surveyed 75 points related to Wall 3 and the log feature. The elevations on the top of Wall 3 ranged from 3.9 feet below sea level near the utilities near the northern end of the Wall segment to 3.6 feet above sea level toward the southern end of the Wall where it was originally identified. The average elevation on the top of the log feature was 3.6 feet below sea level.

A total of 274 contexts were established for Wall 3. Of these, 124 were associated with excavation units. Of the remaining 150, 113 were non-EU artifact-bearing contexts and the others were stone or soil samples. An additional 211 soil samples were taken for possible pollen and/or phytolith analysis. The non-EU artifact-bearing contexts were mainly established during Phase 2 or during Wall 3 disassembly.

a. DEFINITION AND DESCRIPTION OF ANALYTICAL UNITS

Because Wall 3 was more complex than Walls 1 or 2, with the presence of a counterfort and the log feature, more analytical units were assigned to it. Thirteen AUs have been established for Wall 3 (see **Table 5-4**). However, the use of some of the same parameters as Wall 1 was necessary to enable combining all the Wall sections to assess depositional units later in this analysis. Therefore, analytical units relative to the Wall were assigned: W3 A (above or inside[8]), W3 B (waterside), W3 C (above on the landward side), W3 F (landward side), W3 I (below) and W3 M (inside). AUs were assigned to the log feature based on similar relationships to the water, the land and the Wall. Finally, an AU was assigned for miscellaneous finds associated with Wall

[8] The deposits recovered from the fill above the Wall and from that inside the Wall were combined for analysis of Walls 3 and 4 because these are contexts where the vertical locations are either precisely unknown or so close as to preclude splitting them.

3. This category was used primarily for contexts associated with cleaning related to contamination due either to the contractor's test wells or from utilities. Such contaminants had not been present at Wall 1.

Table 5-4
Analytical Units for Wall 3

AU	# Contexts	Location Relative to Wall and Log Feature
W3 A	32	Above or inside W3
W3 B	21	Next to W3 on the waterside
W3 C	4	Above W3 on the landward side
W3 D	19	Above log feature on the waterside
W3 E	36	Next to W3 and above log feature on the landward side
W3 F	28	Next to W3 and/or next to the counterfort on the landward side
W3 G	8	Next to log feature on the landward side
W3 H	10	Between W3 and log feature
W3 I	53	W3 or counterfort foundation and underneath W3
W3 J	6	Beneath log feature on the waterside
W3 K	27	W3 miscellaneous
W3 L	18	Inside log feature
W3 M	12	W3 dismantle, inside W3

b. TRENCHES

In addition to excavation units, four trenches were completed at Wall 3. Two of these (T1 and T2) were hand excavated to identify the Wall faces and their lengths during Phase 2 archaeological evaluation. The other two (T3 and T4) were machine excavated to recover data regarding the soils on the waterside of the Wall, including the mortar cap of the truncated remains of Wall 3 (see **Figure 5.14**).

Trenches 1 and 2 were placed to identify the possible extent of the faces of Wall 3 beginning from the location of the Phase 2 exploratory units and extending northward until they were obstructed by the then-existing utility lines. Trench 1 was located along the landward (eastern) face of Wall 3 and Trench 2 along the waterside (western) face of the Wall (see **Figure 5.16**). The data recovery plan explicitly stated that no soil was to be screened or retained from these trenches. However, a number of artifacts were opportunistically recovered during the hand excavation. A total of 22 artifacts was collected from Trench 1, 19 of which were temporally diagnostic ceramic and glass sherds. The TPQ of this collection (Cats. 15768.297, .316 and .354) is 1899 based on a machine-made bottle. No artifacts were collected during the excavation of Trench 2.

Trench 3 was a mechanically excavated trench at the western side (waterside) of Wall 3. It was placed in that location to identify the extent of the mortar cap that had already been documented covering the truncated remains or Wall 3. This cap extended for a distance of 15 feet west of Wall 3 in Trench 3 (see **Figure 5.17**). Large boulders, similar to those documented at the foundation of Wall 3, were also documented at the base of Trench 3. The mortar cap was covered with a series of fill and sand deposits with decreasing elevations toward the west (water).

Like Trenches 1 and 2, no screening for artifact recovery or collection of soil took place. However, a number of potentially temporally diagnostic artifacts were recovered from Trench 3 while trowel scraping the profile (Cats. 15768.301, .302 and .309). These include 16 ceramic and glass sherds with a TPQ for the collection of 1790 based on a pearlware ceramic sherd.

Trench 4 was a mechanically excavated trench located adjacent to the log feature and placed to expose the base of the logs and to recover soil samples for potential geochemical analysis. Three levels of logs were exposed at the southern end of Trench 4 (see **Figure 5.18**). The base of two of the angled vertical pilings (Pilings 2 and 3) was also exposed and documented. These were buried approximately 2.0 to 2.5 feet below the exposed ground surface, and were at about the same basal elevation as the log feature (approximately 4.4 feet below sea level).

A column of soil samples was taken every 0.3 feet beginning at elevation 7.2 feet below sea level. Sample 1 was 0.4 feet thick and was offset from the remainder of the column. Sampling was temporarily halted after Sample 9 was taken, due to safety concerns. At that point in time, Trench 4 was over six feet deep. When sampling resumed two weeks later, the column location was again shifted. By that point in time, the surrounding deposits had been excavated down to the level of Sample 9, making the area safe for reentry. A total of 20 soil samples was recovered from Trench 4. Twelve of the soil samples were processed for geochemical analysis, including Sample 9.

Three different chemical signatures, or deposit types, were identified for the Trench 4 samples. The upper six samples were characterized as sandy alluvium. Sample 9 was mixed earthen fill, and the lower five processed samples were characterized as possible terrestrial subsoil. The aberration that was Sample 9 is obviously due to contamination during the shift in column location while in the field. The shift from sandy alluvium to possible terrestrial subsoil occurred between Samples 7 and 11 (elevations 9.9 and 9.0 feet below sea level). The relative amounts of certain chemicals indicative of human influence vary between the upper and lower levels of the sample column. The upper levels had lower amounts of potassium, calcium and total phosphorus, but a greater amount of M3 phosphorus (see **Appendix I**). This is generally due to the differences in alluvial versus terrestrial deposits.

Although no artifact screening was required for Trench 4, five five-gallon buckets of soil from the upper strata of Trench 4 were screened for artifact recovery (elevation 2.9 to 3.4 feet below sea level). Three salt-glazed stoneware ceramic sherds provide a TPQ of 1720 (Cat. 15768.329). The next stratum down within Trench 4 contained a large concentration of shell, mostly clam. A few artifacts were recovered from the shell concentration, including a British slipware ceramic sherd providing a TPQ of 1670 (Cats. 15768.322 and .328). The base of the shell stratum was approximately 6.5 feet below sea level. A number of artifacts were also recovered from Trench 4 backdirt (Cats. 15768.327 and .330). These included many temporally diagnostic ceramic sherds. The TPQ of the backdirt is 1893 based on a machine-made bottle sherd.

c. EXCAVATION UNITS

Sixteen excavation units were completed at Wall 3. **Table 5-5** identifies the dimensions of each unit, the number of strata, and the number of various soil samples that were taken. Unlike Wall 1, and because of the particular complexities of Wall 3 and the log feature, the analytical units for Wall 3 were not necessarily assigned based on entire excavation units; rather, the strata and levels within each unit were assessed individually. Therefore, multiple AU assignments were made for some excavation units. A detailed discussion of each EU is provided in **Appendix N**.

Table 5-5
Wall 3 Excavation Unit Size, Number of Strata, Analytical Unit and Soil Samples

EU	Dimensions (l x w x d)* In Feet	# Strata	Analytical Unit	# Pollen/ Phyto. Samples	# Geochem Samples	# Flotation Samples
20	3 x 3 x 2.5	3	W3 F and I	-	-	-
21	3 x 4 x 2.2	2	W3 C and I	-	-	-
22	6.8 x 3.0 x 2.1**	3	W3 B and K	-	-	-
23	5 x 5 x 2.3	2	W3 A	-	3	4^{++}
24	3.6 x 3.6 x 2.7	4	W3 E and H	57	3	3^{++}
24A	3.6 x 3.4 x 5.8	4	W3 E and G	-	3	4^{++}
25	3 x 3 x 4	6	W3 E and H	52^{+}	9	8^{++}
25A	3 x 3 x 4	9	W3 E	-	-	-
26	3 x 3 x 2.8	6	W3 A, B, D, and I	30^{+}	5^{+}	5^{++}
27	3 x 3 x 5.9	4	W3 A and H	70	5	5^{++}
27W	3 x 3 x 4.3	7	W3 D	-	5	6^{++}
28	4 x 5 x 1.1	1	W3 B and I	2	1^{++}	1^{++}
29	3 x 3 x 2.9	8	W3 F and I	-	9^{+}	10^{++}
30	4 x 3.5 x 2.2**	8	W3 F and I	-	8^{+}	8^{++}
31	5 x 5 x 1.5	3	W3 J	-	-	-
32	4 x 4 x 1.2	3	W3 I	-	1^{++}	1^{++}

Notes:
* l = length in the north-south direction
w = width in the east-west direction
d = depth
** irregular shaped unit
$^{+}$ Some of the samples have been processed for analysis
$^{++}$ All of the samples have been processed for analysis

d. NON-EXCAVATION UNIT CONTEXTS

Approximately 55 percent of all Wall 3 catalog numbers were assigned to non-EU contexts (n=150). Six percent were assigned for trench excavations (previously discussed). Thirteen percent were assigned to proveniences related to the log feature or wood sheeting samples (n=35). Twelve percent were assigned to other samples (n= 34). The remaining catalog numbers were assigned to other artifact-bearing proveniences, including secant piles (n=76). The majority of these other proveniences are related to either the initial cleaning of Wall 3 prior to data recovery excavations, cleaning subsequently exposed parts of Wall 3, or to the dismantling of the Wall. Of these categories, the Wall dismantling provides the most useful data regarding possible dates of construction of this section of the Wall. The TPQ of the contexts examined during the Wall dismantling is 1765 based on two painted creamware sherds (Cat. 15768.342). This particular context was located in the upper courses of stone beneath the mortar cap of Wall 3 within the section documented by JBCI for later reconstruction in the new South Ferry subway station. Historic documentation indicates a construction date of circa 1755. Therefore the 1765 TPQ must be either associated with the destruction of the Wall, the result of repair, or of percolation.

Dendrochronological analysis was done on thirty-four samples from the log feature associated with Wall 3 and three samples of planks from Wall 3 sheeting. The complete report is attached as **Appendix H**. To paraphrase the results, absolute dates of death were established for twenty-three of the Wall 3 Log Feature samples. All of these were pitch pine. Twenty of the trees were cut in 1734, and three in 1733. No absolute dates of tree death could be established for the planks. However, the plank samples were all identified as white pine. In addition to examining the species of wood and determining dates or date ranges of death for the trees, the dendrochronological analysis also examined growth years of the trees and sources of the wood. These are discussed below with regard to the sheeting and log feature. Both processed and unprocessed log samples will remain in the custody of the Tree Ring Laboratory of the Lamont-Doherty Earth Observatory of Columbia University, where they will be available for future research. The plank samples which had been accessioned into the South Ferry Terminal artifact collection and temporarily sent for analysis will remain with the artifact collection.

1.) Sheeting

Part of the landward side of Wall 3 was formed with wooden sheeting. The sheeting was documented in EUs 29 and 30 and around the counterfort (see **Appendix N** and **Figure 5.14**). It extended to the northern limit of Wall 3, but was not found in the units to the south. It is possible that wooden sheeting had been used to form or guide construction of the Wall south of the counterfort, but that the sheeting was destroyed or removed when the Wall was truncated or repaired. It is also possible that no sheeting was used in that part of the Wall.

As seen in the excavation units and in the exposure of the Wall face stones, there were two courses of wooden planks. These measured approximately 10 inches wide and about one inch thick. They were not generally fastened together, but rather vertical pieces of wood were used to hold sections of sheeting planks together. These vertical members were only seen on the landward side of the sheeting, not along the Wall face stones. The sheeting was being supported on one side by the Wall itself and on the other by the vertical members. This indicates that the wood was placed either during construction or after the Wall was built, since there would not have been anything to support the sheeting in a vertical position if the Wall was not there.

Samples of the sheeting were retained for possible dendrochronological analysis. Although an absolute date cannot be established for the sheeting because it is missing the bark surface (and possibly outer tree rings), a date range for the death of the trees could potentially be established. Three of the planks were subjected to dendrochronological analysis. All are white pine. Only one of the samples provided a possible outer date. This 1674 date indicates the trees used to make the sheeting were cut after that time (see **Appendix H**). TPQs were also examined for sheeting related contexts. The TPQ for these Wall 3 sheeting contexts is 1730.

2.) Log Feature

A large log feature flanked part of Wall 3. The feature was at first thought to be cribbing or a section of a wharf or pier. According to the nomenclature established in **Chapter 4: C. Waterfront Landfill-Retaining Structures**, the log feature was a grillage form[9]. The structure type is a possible landing stage or platform. It was not clear during the initial stages of the field documentation what the structure was or its relationship to the Wall. However, when the Wall had been dismantled and the log feature documented beneath the Wall, it was observed that the log feature came first.

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[9] Grillage is stacked log construction comprised of continuous perpendicular courses of timbers (see **Chapter 4: C. 4.c.2. Grillage**).

Once excavation units were completed and the faces of the Wall exposed, the log feature was documented in three sections (see **Figure 5.41**). The section of the feature to the west of Wall 3 was exposed in its entirety at one time (see **Figure 5.15**). On the eastern side of Wall 3, there were utility lines that divided the excavation area for the log feature into two parts, and each section was exposed and documented separately (see **Figure 5.42**). The layering of the logs was evident to the eastern side of the Wall, as it was also observed in several of the excavation units, with three layers initially exposed. The elevations of the top of the log feature were different to the east and west of Wall 3. To the west of the Wall, the elevation on the top of the log feature was 1.7 feet below sea level, whereas to the east it was 0.5 feet above sea level. This is an indication of one of two possibilities. Either the log feature was built and/or truncated at varying depths, or the difference in elevation is due to the original topography which would have decreased toward the River. The feature contained up to six layers of logs and the bottom of the log feature was at an elevation of approximately 5.2 feet below sea level throughout.

Numerous field observations regarding the log feature were made in addition to documenting the layering of the logs. On the western side of the Wall, there was a gap in the top layer of logs. Approximately six logs appear to have been missing from the top layer only (see **Figure 5.15**). No evidence of when these logs might have been removed was recovered. In fact, it is not known if there were ever logs in this gap.

The bottom course of the log feature was not composed of continuous logs, as was true of all other layers, rather they were spaced between eight and fourteen feet apart east-west. Additionally, there were vertical pieces of wood (vertical lock bars), smaller in diameter than the horizontal members, which held the logs together (see **Figure 5.43**). The vertical lock bars, square in cross-section, were placed through slots near the ends of the horizontal logs on the bottom course of the log feature. One of these is seen in **Figure 5.40**. The ends of two of these logs were retained for the artifact collection (Cats. 15768.455 and .457) (see **Figures 6.9** – **6.11**). Examination of these pieces reveals they were hewn (see **Chapter 6: D.11. Inside Log Feature**).

In other cases, several logs were seemingly displaced along the edges of the Wall. The two logs on the left in **Figure 5.42** are among them. These two logs were exposed in EUs 24 and 25A and are likely part of the fill for a builder's trench for Wall 3 (see **Appendix N**). The builder's trench for the Wall would have been the part of the log feature that was cut to make room for the Wall. Additionally, it was noted that the upper layer of logs on the western side of the Wall were somewhat flattened or compressed, and that stones were filling the gaps, when they existed, between logs.

The other main field observation relates to a series of five angled vertical piles found to the west of the Wall and approximately five feet north of the log feature (see **Figure 5.44** wrapped in yellow caution tape). The angled vertical piles averaged 4.1 feet long and were also likely cut once they went into disuse. They were somewhat irregularly spaced, between 6.0 and 7.0 feet apart.

As described in **Chapter 2: B. Field Methods**, the logs were drawn in the field, each log was assigned and tagged with a unique number, the layer removed, and the process continued until the log feature had been entirely removed. Ultimately, there were four layers of logs to the west of the Wall and six layers to the east. As each layer of logs was removed, samples of soil were screened for artifact recovery. Of the contexts collected from above the log feature, there was considerable variation in TPQs, presumably related to various fill episodes. Additionally, the contexts representing the upper layer of logs probably contained contamination – later artifacts –

related to compaction of fill. As previously noted and depicted, there were gaps between the logs in the upper level. Although there were also small gaps in subsequent levels, percolation naturally decreases with increasing depth.

Fifty-five contexts are attributed to levels above the log feature. TPQs for these contexts range from the late-17th century to 1960. The 1960 TPQ comes from a context located near the utility lines east of Wall 3 (Cat. 15768.285). It seems quite likely the 1960 TPQ is associated with those utilities and not the log feature. Therefore, a more accurate assessment may come from looking at TPQs from within the layers of logs themselves. The TPQ for the first layer of logs on the western side of the Wall is 1710 based on two sherds of tin-glazed earthenware (Cat. 15768.321). On the eastern side of the Wall, the 1720 TPQ of the first layer is based on two salt-glazed stoneware ceramic sherds (Cat. 15768.337). Proveniences in between the layers of logs have a 1683 TPQ based on a Nottingham-type stoneware sherd (Cat. 15768.336). Three contexts represent the layer beneath the log feature, two of which are from EU 31. The TPQ of all these contexts is 1680 using an unmarked English tobacco pipebowl as the basis, whose shape was popular between 1680 and 1720 (Cats. 15768.339).

One hundred log samples were taken from the Wall 3 feature for possible dendrochronological analysis. Dendrochronological analysis was used to determine the species and date of death of the trees and to identify the possible geographic source(s) of the wood (see **Appendix H**). Thirty-four logs were analyzed. Thirty-three were pitch pine and the other was oak. Twenty-three samples, all pitch pine, contained the bark edge and were associated with solid tree ring chronologies, and therefore provided absolute dates. The date of death of the trees is 1734 for twenty of the samples and 1733 for the three others. These represent log feature layers 3 through 6. Logs from Layers 1 and 2 which were analyzed did not contain sufficient bark surface to provide absolute dates. The analysis also included two samples of the angled vertical piles. These indicate the trees used as these piles were also cut in 1734, reinforcing the interpretation that the piles were related to the log feature.

The figures in **Chapter 4: Historic Context** that relate to landfill-retaining structures all depict angled vertical members supporting types of walls (**Figures 4.59, 4.60, 4.63**, and **4.66**). This has led to speculation that the log feature may have had a wooden wall along its northwestern side. If a wall once existed, it is possible that it was used as a breastwork. The presence of possible breastworks along the log feature has in turn led to speculation that the log feature itself was part of George Augustus' Royal Battery, constructed circa 1734, which was at least partially built of wood (see **Chapter 4: A.6. George Augustus' Royal Battery**). Although there is no other supporting documentation for this claim, it is likely, to say the least, the log feature was in some way related to the circa 1734 battery. Another possibility is that the log feature was part of a wharf that was related to the Copsy Battery. A 1744 act to raise funds for repairs to the Copsy Battery refers to "the Wharf on the North West end of the said Battery" (see **Chapter 4: A.9. The Flat Rock Battery)**.

It is also intriguing to speculate about the possibility of the log feature being part of the Whitehall Slip Market Slip, although the data does not bear this out (see **Chapter 4: B.4. The Whitehall Slip Market and Slip**). The log feature had been cut into, seemingly for the purpose of constructing Wall 3. The landward side of the log feature was then covered with fill while the Wall was extant. Once the Wall had outlived its purpose and was no longer necessary, it was partially demolished and the surroundings filled to expand the shoreline. The entire log feature would have been covered in fill at that time.

5. WALL 4

A fourth section of the Battery Wall was identified during archaeological trenching to the north of Wall 3, (ET 4 and XT 6; see **Chapter 5: C.5. Project-Wide Fill Assessment; Figure 2.1** for ET and XT locations and **Composite Map**). However, because of the extensive length of Wall 3 compared to Walls 1 and 2 and the possibility that the South Ferry Terminal project corridor could contain additional lengths of Battery Wall in the area where Wall 4 was ultimately found, a ground-penetrating radar (GPR) survey was conducted to the north of Wall 3 (see **Figure 5.45**). That effort was not successful in identifying Wall 4.

Hagar-Richter Geoscience, Inc. was the geophysical consultant. The GPR equipment was first tested to see if it could identify additional sections of Wall 1 outside of the South Ferry corridor in a grassy area of Battery Park; it was hoped this data could then be used to calibrate the equipment to the appropriate depth for the Battery Wall. This test was unsuccessful. It is possible that either there was too much interference from underground utilities, or that there were no remains of the Wall in the area to the east of the South Ferry corridor swept with the GPR equipment, or the equipment could not penetrate the full ten-foot depth of the buried Wall. Because of the lack of success with the GPR equipment in the area of Wall 1, there was a lack of optimism about the ability of the equipment to be successful in the partially excavated construction site. Nevertheless, one GPR anomaly was identified in a partially excavated area located to the north of Wall 3 (see **Figure 5.45**). Evaluation of the anomaly was done with the contractor's laborers excavating by hand between two to four feet below the exposed surface (to elevation 6.1 feet below sea level) under archaeological supervision. No evidence of an additional section of Battery Wall was found. Several artifacts were recovered during the excavation from an elevation of approximately 5 feet below sea level. These included two creamware ceramic sherds which provide a TPQ of 1770 (Cat. 16196.169). The GPR survey was not able to identify Wall 4 itself. The anomaly was located on what is now known to have been the landward side of Wall 4, within what would have been the bastion. It is interesting that the elevation of the artifact concentration corresponds roughly with the elevation of the top of the truncated Wall 4.

When the Wall stones were initially exposed in the northern part of ET 4 and XT 6, it was from above, and they did not necessarily appear to be part of a wall. The section of ET 4 where Wall 4 was identified was sandwiched between the existing subway line to the west and modern utilities to the east (see **Figure 2.8**). As the top of the truncated Wall was exposed, it appeared to be a stone surface rather than a wall. The portion of Wall 4 found in XT 6 was actually part of the rubble fill in the interior of the Wall. The face stones were not present within XT 6 or ET 4.

Once archaeological work commenced, Wall 4 initially appeared very similar in character to Wall 3. It also appeared to be constructed mainly of dry-laid schist with a mortar layer near what would have been the high water line, and it had sheeting along the landward side. However, like Wall 1, Wall 4 contained part of a bastion and therefore was L-shaped. The side in the north-south direction measured 60 to 65 feet long, and the east-west section 26 to 39 feet. One unique aspect of Wall 4 was that it was underlain with sand as a foundation. In the southern part of Wall 4, the waterside face was up to approximately 3.4 feet high, the Wall having been truncated historically; however, only one foot of height remained in much of the western part of Wall 4.

The Phase 2 archaeological evaluation of Wall 4 included exposing and documenting the Wall. This helped determine that this section was part of a bastion. The Phase 2 work also documented the height of the Wall and exposed both its foundation and the wooden sheeting along its entire landward side face. A shallow trench (Trench 5) was excavated through the one-foot-high western portion of the Wall 4 bastion. This trench exposed the sand foundation.

Once both the top of Wall 4 along the western part of the bastion and the southern waterside face of the Wall had been exposed and the foundation identified, excavation units were dug as part of the data recovery. Data recovery work for Wall 4 included four excavation units and one mechanically-excavated trench (see **Figure 5.45**). Two of the units were within Trench 5, the trench excavated during the Phase 2 evaluation of Wall 4, and they enabled examination of the Wall 4 foundation (EUs 41 and 42). The other two units were on the landward side of the Wall (EUs 40 and 43). The JBCI removal of Wall 4 was also archaeologically monitored. Once removed, a trench (Trench 6) was excavated adjacent to the former Wall location, on its landward side, inside the bastion. Additionally, the contractor surveyed 23 points related to Wall 4. The elevations on the top of Wall 4 ranged from 4.2 feet below sea level near the excavation units to 0.2 feet below sea level at the high point south of XT 6.

Ninety two contexts were established for Wall 4. Of these, 24 were associated with excavation units. Thirty contexts were established during Phase 2 and general cleaning prior to data recovery. Twenty-three contexts were associated with the trench excavated after the removal of Wall 4, and eight with the Wall removal itself. The remaining contexts were either for samples of sheeting, mortar, or stone, or for miscellaneous finds. Although the Supplement to the Data Recovery Plan (Dewberry 2006a) did not require that any soil samples be taken from Wall 4, a sample of soil for potential geochemical analysis was taken from EU 40.

a. DEFINITION AND DESCRIPTION OF ANALYTICAL UNITS

Seven analytical units have been established for Wall 4 (see **Table 5-6**). As with the other Wall sections, AUs for Wall 4 were assigned based on their relationships to the Wall. Wall 4 has no contexts from the waterside of the Wall because that side had been previously destroyed during the construction of the ❹/❺ subway line and the area to the south of the bastion was not sampled per the Supplement.

Table 5-6
Analytical Units for Wall 4

AU	# Contexts	Location Relative to Wall and Log Feature
W4 A	8	Above Wall 4
W4 B	3	Above or inside Wall 4*
W4 C	12	Above Wall 4 on the landward side
W4 D	14	Next to Wall 4 on the landward side
W4 E	15	Wall 4 foundation or beneath Wall 4
W4 F	10	Inside Wall 4 or from dismantling Wall 4
W4 G	30	W4 miscellaneous

Note: * These are contexts where the vertical locations are so close as to preclude assigning to W4 A or W4 F.

b. EXCAVATION UNITS

Four excavation units were placed as part of Wall 4 data recovery. One of these, EU 40, was not completed because of safety concerns related to the contractor's work on the overhanging utilities. **Table 5-7** identifies the dimensions of each unit and the number of strata and soil samples taken. As with Wall 3, AUs were not necessarily assigned based on individual excavation units, but rather the strata and levels within each unit were assessed individually. Therefore, multiple AU assignments have been made for EU 43. A discussion of each excavation unit that was part of the data recovery is presented in **Appendix N**.

Table 5-7
Wall 4 Excavation Unit Size, Number of Strata, Analytical Unit and Soil Samples

EU	Dimensions (l x w x d)* In Feet	# Strata	# Pollen/ Phyto. Samples	# Geochem Samples	# Flotation Samples	Analytical Unit
40	4 x 3 x 2.1	3	-	1	-	W4 D
41	3 x 2.5 x 1.4	2	-	-	-	W4 E
42	3 x 2.5 x 0.9	3	-	-	-	W4 E
43	3 x 3 x 4.4	12	-	-	-	W4 C, W4 D, and W4 E

Notes:
* l = length in the north-south direction
w = width in the east-west direction
d = depth

c. NON-EXCAVATION UNIT CONTEXTS

Approximately 73 percent of all Wall 4 catalog numbers were assigned to non-EU contexts (n=68, including Trench 6, see below). As described above, the initial evaluation of Wall 4 mainly involved manual scraping of the exposed surface to document the physical extent of the Wall. While clearing the fill from a section on the top of the Wall, two buckets of soil were screened for artifact recovery. Very little cultural material was present in these two artifact contexts (n=14). This included a sherd of British slipware, a ceramic type imported into New York after circa 1670 (Cat. 15768.437). However, two other contexts were established as a result of material collected during cleaning the surface of the Wall. The TPQ of these is 1890, based on a sherd of decal-decorated whiteware; however, the context also contained a sewer pipe fragment (Cat. 15768.407). The majority of the remaining 26 contexts established prior to data recovery fall in the miscellaneous category (n=21). Additionally, one context was created for cleaning the Wall prior to drawing a profile. Two undecorated, unmarked, and undateable tobacco pipestems with 5/64" bore diameters[10] were recovered from the face of the Wall at that time (Cat. 15768.434). Other pre-data recovery contexts were assigned to samples of the wooden sheeting found on the landward face of the Wall.

Data recovery work for Wall 4, besides including excavation units, also included monitoring the Wall removal for storage and completing one mechanically-excavated trench, Trench 6, discussed below. Ten contexts were established during monitoring of Wall 4 removal for storage. One hundred thirty-seven artifacts were collected from these proveniences. The combined TPQ is 1770 based on one sherd of plain creamware (Cat. 15768.427).

Most of the remainder of the non-EU contexts, excluding those assigned for various samples, fall into either a general provenience or miscellaneous category (most often related to cleaning the Wall) or material collected during utility work monitoring. As expected, the cultural material

[10] Throughout this report, in cases where tobacco pipe bore diameters are the only aspect used to assign manufacture date ranges, these artifacts are excluded from determination of the TPQ for that deposit on the recommendation of Diane Dallal (see **Chapter 6: G.1.a. Stem Bore Diameters.**

collected from this fill represents a large variety of types and exhibits a wide range of manufacture dates, with the most recent beginning manufacture date being 1975 for an eyeliner pencil (Cat. 15768.415).

1.) Sheeting

The entire landward side of Wall 4 was lined with wooden sheeting[11], similar to that seen in part of Wall 3. Because the sheeting was so extensive at Wall 4, there was a better opportunity to document it.

In addition to noting the sheeting during Phase 2 archaeological work and in EUs 40 and 43 (see **Appendix N**), the entire extent of the sheeting was exposed for documentation after JBCI removed the Wall stones for storage. As first seen in the excavation units, and then when the entire extent was exposed after Wall removal, there were generally two courses of wooden planks (see **Figure 5.49**). However, three planks were present in part of the southern side of the bastion. Each plank measured approximately 10 inches high. However, there was enough variation to raise questions as to whether the boards were intentionally cut evenly and at the same width or not. The length of the planks also varied; however, about half of those present in their entirety and measured were approximately 14.9 feet long. The ends of the planks overlapped one another. The amount of overlap also varied from a minimum of 0.4 feet to a maximum of 1.1 feet. However, no other form of fastening was observed in the sheeting at Wall 4. Although there were vertical wood supports in sections of sheeting documented at Wall 3 on the landward side of the Wall, no such vertical members were found at Wall 4. Therefore, it is not clear what physical forces were holding the sheeting in place. In this case, it seems most likely that the Wall itself supported the sheeting, perhaps with soil holding the opposite side of the sheeting in place. It also may be possible that vertical members once existed, but were no longer extant at the time of excavation.

Six samples of the sheeting were subject to dendrochronological analysis. Two were pitch pine and four were white pine. A partial date was possible for only one sample, a piece of white pine. This tree died sometime after 1683 (see **Appendix H**). The TPQ of sheeting related deposits is likely 1740 based on a ceramic sherd recovered from EU 40 Stratum 8.

2.) Trench 6

One of the objectives of the Wall 4 data recovery was to examine the deposits at and below the level of the Wall to the depth of culturally sterile soil and to determine if any original ground surface and/or Native American deposits might still be present. This was accomplished by documenting a mechanically excavated trench at the location of the landward (eastern) side of the northern segment of Wall 4, after its removal (see **Figure 5.45**). As part of this work, soil was selectively screened for artifact recovery and a profile of the western side of the trench drawn (see **Figure 5.50**).

Trench 6 was located almost directly beneath the utility lines adjacent to the northern part of Wall 4 during work on the excavation units. The unstable fill beneath these utilities was removed and the utilities hung incrementally to enable Trench 6 excavation. Therefore, Trench 6 was excavated incrementally with soil profiles drawn for each section (see **Figure 5.51**). The trench was ultimately 62 feet long.

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[11] This wooden sheeting is defined as the planks found lining (or sheathing) part of the landward side of the Wall.

The stratigraphy within Trench 6 was generally comprised of five layers as follows from top to bottom: mottled fill, possibly burned fill, fine light gray sand, dark gray sand, and reddish gray sandy silt. The upper fill stratum contained a large amount of red brick, Stratum 3 on **Figure 5.50**. A large sample of these bricks was sent to Dr. Allan Gilbert of Fordham University, although none have yet been analyzed chemically (see **Appendix F**). The gray soils (Strata 5 and 6) contained a relatively large amount of shell, particularly the dark gray stratum (Stratum 6). This represented a natural alluvial deposit with shell beds, predominantly soft-shell clam. Many of the shells were still hinged together. Toward the northern end of Trench 6, additional stones of Wall 4 and a piece of the sheeting were encountered.

Nineteen contexts were established for Trench 6-related deposits. While approximately 600 artifacts were recovered, only one of these was prehistoric. That was a chert flake recovered from the possibly burned fill level (Cat. 15768.446). The majority of artifacts from Trench 6 were recovered from this fill stratum. The TPQ of these contexts is 1800 based on two glass bottle sherds (Cat. 15768.446). Soil sampled from the shell layers contained very little cultural material. Beside the shells themselves, only a peach pit and a mortar fragment were recovered (Cats. 15768.395 and .402). It would be expected that no cultural material would have been found within these contexts since they likely represent submerged or partially submerged shell beds. However, it would have been physically possible for cultural material to have percolated into the shell beds at a time when they might have been exposed at low tide.

6. OTHER WALL CONTEXTS IDENTIFIED DURING MONITORING

As part of the analysis of the Battery Wall, field records for monitoring were revisited for information on nearby mortar smears in soil deposits and/or cut stone concentrations identified earlier in the South Ferry Terminal project. This resulted in identifying more of what would have been Wall 2. In fact, the mortar along the western edge of Wall 2 was originally noted during the installation of the wooden lagging for the cut-off wall, more than a month earlier. A sample of it was taken at that time, and the location recorded in a sketch in the field notes (Cat. 15768.284).

During analysis, and after having determined that the Wall was constructed during the middle of the 18th century, non-Wall contexts were reevaluated to determine the possibility of their being associated with the Wall. Additionally, various features or possible features excavated during the Wall data recoveries that were grouped together as part of the Wall excavations were reconsidered to determine if this was a valid assumption. This section of the report examines these contexts and assigns them to the appropriate analytical units.

The 1766/67 Ratzen Plan was the historic map on hand during the fieldwork phase that most closely approximates the location of the four sections of Battery Wall unearthed during the South Ferry Terminal excavations (see **Figure 4.15**). This historic map was useful in determining where else within the South Ferry Terminal project corridor other sections of Wall might have been located, as well as where the Wall ran outside of the project corridor. Having a clear picture of the path of the Wall for its full extent also illuminates information regarding landfilling of the Battery.

a. ADDITIONAL WALL SECTIONS

A predictive model based on the Ratzer Plan overlay shows where additional Wall sections might be identified within and nearby the project corridor (see **Figure 5.52**). For analytical purposes, potential locations within the project corridor where findings are consistent with Wall elements or components have also been overlaid. Additional possible Wall contexts could have been located within the corridor at or to the north of Deck Beam 15 (see **Figure 5.53**), the location of Wall 2. As presented earlier, this part of the South Ferry Terminal project corridor contained shallow bedrock. Walls 1 and 2 both rested directly on bedrock. In places, the bedrock was at an elevation of only 3.8 feet above sea level, approximately five feet below ground surface. Very little of Wall 2 remained intact, likely due to the relationship of the Wall to the rising bedrock. As discussed above, mortar had been documented along the western side of the project corridor at a location later exposed as Wall 2.

Prior to the discovery of intact sections of Wall, several concentrations of mortar were identified on the bedrock during monitoring of contractor excavations in the area of northern Battery Park, north of Wall 2. During the analysis and reporting phase of this project, the possibility these mortar concentrations were actually remains of the Battery Wall was considered. Mortar concentrations were noted in ET 1 near Deck Beams 5, 6, 7, 8, 10, 11, and 12 as well as along the eastern edge of the corridor at Soldier Pile 8E.[12] Some cut schist, with mortar, large cobbles, and boulders, was also documented near the eastern edge of the project corridor between Soldier Piles 30E and 33E, immediately to the south of Wall 1(see **Figure 5.53** and **Composite Map).** All of these contexts have now been assigned to a general Battery Wall AU (GBW).

Other evidence of the Wall was identified earlier in association with a modern brick, barbeque-like park feature, found near Deck Beams 14 and 15. Upon revisiting photographs and drawings of this relatively modern feature, a line of cut sandstones is clearly apparent, as is mortar smeared on the bedrock (see **Figure 5.56**). Both were initially thought to be associated with the brick feature. The cut sandstones appeared to be aligned along their western edge, similar to those on the waterside of Wall 1. The mortar on the bedrock is toward the east and would then represent the former location of the Wall itself, assuming the width was a uniform eight feet, as seen in Walls 1 and 2.

Some of the artifacts collected in association with these contexts were recovered from within the mortar layer seen in the excavations in northern Battery Park. The contexts that represent the mortar and feature layers have a TPQ of 1790 based on a rosehead cut nail (Cat. 16196.062).

Throughout most of the area where additional Wall sections and/or mortar stains discussed here were identified, the bedrock was quite near the ground surface. In the case of the series of cut sandstones found in association with the brick feature near Deck Beams 14 and 15, the artifacts recovered are potentially associated with either the Wall or the brick feature. However, it is not possible to separate them at this time because they were collected and processed together. Therefore, the TPQ of 1893 (Cat. 15768.279) would likely derive from the brick feature or Park fill rather than the Wall, based on other Wall data.

b. SLABS

Two large sandstone slabs were documented during data recovery at Walls 3 and 4. They were located near the eastern secant wall between these two sections of Battery Wall, as well as between the secant wall and the utility lines (see **Figure 5.57**). The slabs were approximately 5

[12] Wall 1 was located beneath Deck Beams 27 – 29. Wall 2 was beneath Deck Beams 15 – 16. Wall 3 was beneath Deck Beams 1 – 6 and Struts 101 – 102. Wall 4 was beneath Struts 103 – 106. The numbers assigned by the contractor to soldier piles corresponded approximately to the deck beam numbers. Therefore, soldier pile 8E(ast) is located at Deck Beam 8 on the eastern side of the corridor (see **Figure 5.53**, **Figure 5.54**, and **Figure 5.55** and **Composite Map**). It should also be noted here that the contractor had Deck Beams numbered 1 – 19 in both the northern and southern parts of the South Ferry project corridor.

inches thick and fairly rectangular in shape. The northern of the two measured approximately 3.5 by 4.0 feet, and the southern 3.5 by 5.0 feet. Both were flat, as if formerly used as a surface or platform. Both were originally thought to be part of the Wall structure. These slabs were removed by crane and temporarily stored on the site with the logs from Wall 3 for possible storage with the other boxes of Wall stones. A sample of the sandstone from the slabs was taken for the archaeological collections (Cat. 16196.428). While in the field, JBCI discussed storing one or both of these slabs with the Wall 3 stones; however, it is not known if this was accomplished, and details are not provided in **Appendix K**.

The slabs were at an elevation of approximately 2.0 feet below sea level, approximately the same elevation as the top of the part of Wall 3 at its northern end and the elevation at the southeastern end of Wall 4 (see **Figure 5.58**). As the slabs were at the same approximate elevation as the truncated Wall, they could have been part of the fill added at (or after) the time the Wall was truncated. There was approximately nine feet between the two slabs. The stone slab soil matrix was loose dark gray to dark grayish brown sandy silt, with a large amount of water-worn cobbles. A sample of the matrix was screened for artifact recovery, and a TPQ of 1770 was assigned based on a plain creamware ceramic sherd (Cat. 16196.613).

Once removed, the slabs were measured in their entirety and examined in detail on both sides. The northern slab was beveled along its western edge. There was also a small circular rust stain on the top of the slab a few inches away from the beveled edge, possible evidence of metal having once been in contact with the slab over an extended period of time (see **Figure 5.59**). The bottom of the northern slab had a patina of mortar over most of its surface, possibly indicating it had been once been fixed in place. If that were the case, it was not found in its original location, as there was no *in situ* evidence of what the slab was mortared to. This is another indicator that the slabs were part of the fill and not a Wall-related feature.

The southern slab was less rectangular than the northern slab. It also had one beveled edge. This was along the eastern edge and was visible while the slab was *in situ*. It would be expected that the beveled edges of the slabs would have the same orientation if they were part of the same *in situ* feature, another indicator of their displacement. The beveled edge of the southern slab contained a substantial indentation, perhaps the result of intentional modification to the slab, located in the middle of that edge (see **Figure 5.60**). No evidence of metal or mortar adhesion was documented on the top surface. However, the bottom side of the southern slab was not in as pristine condition. Two large fractures along the layers of sandstone were evident (see **Figure 5.61**). Mineral staining visible on one of the fractures indicates the staining had occurred after the fracture, possibly a result of secondary burial within the fill. In addition, part of the bottom of the southern slab was blackened from fire. This blackened area was located on the opposite side of the slab from the indentation, and the two events may be unrelated.

Both stone slabs show evidence of displacement. It is possible the slabs were originally used in conjunction with the Battery; however, no data to support or refute this hypothesis was recovered during South Ferry Terminal excavations. The final interpretation of these slabs is that they were part of the fill used to create that portion of Battery Park after the Revolutionary War.

c. SECANT PILES

Wall 3 was located in a part of the site where secant pile sampling occurred. Secant pile sampling was conducted as part of the archaeological monitoring protocol for the South Ferry Terminal project in its early stages in order to identify concentrations of artifacts and, therefore, possibly features. Since the secant wall was constructed prior to the general site excavations, the secant piles were sampled well before any Battery Wall sections were identified. The secant piles in the footprint of Wall 3 in the east are SPs 2092 to 2104 (see **Figure 5.65**). Of those, two (2093 and 2097) were sampled for artifact concentrations, both along the east secant wall where Wall 3 was later identified. Secant piles within the footprint of where Wall 3 might have intersected the western South Ferry Terminal project cut-off wall (if the Wall had continued in that direction) were SPs 1026 to 1033. Among those, SPs 1029 and 1033 were sampled. No remains of Wall 3 were actually found along the western secant wall during any of South Ferry Terminal project excavations. Along the eastern secant wall within the footprint of the log feature, SPs 2077, 2081, and 2085 were sampled. SPs 1037 and 1041 were sampled at the western end of the log feature.

Sampling began at a depth of approximately five feet below ground surface (3 feet above sea level) and samples of soil were screened at intervals of approximately five feet until bedrock was reached. The truncated remains of the Battery Wall were at elevations of approximately 4 feet below sea level to 1 foot above sea level in those areas. That elevation range therefore corresponds to the second and third samples in each secant pile.

Along the eastern secant wall, the soils in SPs 2077, 2085, 2093, and 2097 were quite similar. Dark gray or dark grayish brown silty sand was recorded to a depth of ten feet below ground surface. The soil then became very dark gray sandy silt until 30 feet in SP 2077, 35 feet in SP 2093, and 40 feet in SP 2097. At that depth, the soil became greenish gray clayey silt, and this soil continued until bedrock. Slightly more variation in soil types was documented at the western secant wall. In SP 1029, the dark gray or dark grayish brown soil extended to the next sample before yielding to dark brown or dark yellowish brown sandy silt up to 20 feet below ground surface. At that depth the very dark gray or very dark brown sandy silt began. It continued for 10 feet when the greenish soil came up. Again, the greenish gray clayey soil continued until bedrock. No greenish soil was documented in SP 1033, and the soils in this secant pile were generally lighter in color than in the other secant piles discussed. While the greenish soil was present at the basal levels in SPs 1037 and 1041, the rest of the soils were not similar to those just described. SP 1037 went from very dark gray to brown to very dark grayish brown sandy silt before encountering the greenish gray clayey silt. SP 1041 contained the addition of reddish brown sandy loam in the middle sample, 15 to 20 feet below ground surface (12 to 17 feet below sea level). The bedrock was 48 feet below ground surface in SP 2077, 47 feet in 2083, 55 feet in SP 2097, 50 feet in SP 2093, 48 feet in SP 1029, 35 feet in SP 1033, 48 feet in SP 1037, and 51 feet in SP 1041.

A large amount of wood was noted in the field records for both SP 2093 and 2097. The concentration of wood became less at 20 feet below ground surface in SP 2093, but it continued through to bedrock in SP 2097. No temporally diagnostic artifacts were recovered from SP 2093. A sherd of Dutch-style buffware was recovered from SP 2097 between 10 and 15 feet below ground surface (corresponding to 7 to 2 feet below sea level and the approximate depth of the Wall) (Cat. 15768.570). This type of ceramic would have arrived in New York with the Dutch in the 1620s. Additionally, it may be inferred, based on other South Ferry Terminal project archaeological documentation, the large amount of wood found in these secant piles is associated in some way with the shoreline expansion.

A large amount of wood was also noted in SP 2081, within the footprint of the log feature, particularly in Level 3. However, this secant pile appears to have been contaminated by modern disturbance, evidenced by 21st century metal can fragments in all levels (Cats. 16196.260, .262, .263, and .264). SP 2085 also contained a large amount of wood in Levels 2 and 3. Here temporally diagnostic artifacts provide a TPQ of 1730 based on a glass wine bottle sherd (Cat. 16196.266). This date closely matches the construction date of the log feature.

Two secant piles were sampled from the area projected to be the western end of Wall 3 at the west secant wall. They did not contain the same large concentration of wood as those to the east. A concentration of sandstone was noted on the field records for the second sample from SP 1029 (2 to 7 feet below sea level). This would have been the level where remains of the Wall could have been found. However, a modern nail was also recovered from this sample, indicating there might have been some contamination of the deposit. The next five-foot sample of SP 1029 contained a concentration of cobbles. Cobbles and boulders were later documented to be the foundation for Wall 3. No temporally diagnostic artifacts were found in lower levels of SP 1029. SP 1033 did not contain the same correlates to the Wall as SP 1029. Most of the temporally diagnostic artifacts recovered from SP 1033 were from the second sample (2 to 7 feet below sea level). The TPQ of 1800 is based on a shell-edged pearlware ceramic sherd (Cat. 16196.217). No cultural material was recovered from depths greater than 12 feet below sea level; however, nine pieces of bark were recovered from the last sample at an elevation of approximately 27 feet below sea level (Cat. 16196.219).

The two secant piles sampled from the western side of the log feature both contained high concentrations of wood in Levels 3 and 4, from 7 to 17 feet below sea level. Very few temporally diagnostic artifacts were recovered from these secant piles. The TPQ of 1670 comes from a sherd of British slipware (Cat. 16196.226).

7. BATTERY WALL DEPOSITIONAL UNITS

Analytical units were assigned for each Wall section and for the log feature excavated with Wall 3. The AUs were defined by the relationship of a deposit to the Wall and/or log feature. That relationship is defined as the depositional unit (DU). **Table 5-8** relates the AUs for each Wall section to one another by DU.

Table 5-8
Analytical Units Grouped by Depositional Unit for the Battery Wall

AU				
Wall 1	**Wall 2**	**Wall 3**	**Wall 4**	**Location Relative to Wall and Log Feature (DU)**
W1 A	W2 A		W4 A	Above the Wall
W1 B		W3 A	W4 B	Above or inside the Wall
W1 D				Above the Wall on the waterside
W1 C		W3 C	W4 C	Above the Wall on the landward side
		W3 D		Above log feature on the waterside
W1 H		W3 B		Next to the Wall on the waterside
		W3 E		Next to W3 and above log feature on the landward side
W1 G		W3 F	W4 D	Next to the Wall on the landward side
		W3 G		Next to log feature on the landward side
		W3 H		Between W3 and log feature
		W3 L		Inside log feature
		W3 J		Beneath log feature
W1 E		W3 I	W4 E	Foundation and underneath the Wall
W1 F	W2 B	W3 M	W4 F	Wall dismantle, inside the Wall fill
		W3 K	W4 G	Miscellaneous

Previous sections of this report have presented the Battery Wall findings on a context-by-context basis. However, by ascribing DUs to each context a more cohesive interpretation of the Wall can be obtained. Here each AU is examined for all contexts within DUs. DUs are grouped by logical units as follows: 1) Above the levels of the Wall (both on the landward and watersides), 2) Inside the Wall[13], 3) Beneath the Wall, 4) On the landward side of the Wall (at all elevations), and 5) On the waterside of the Wall (at all elevations). Similar associations are used for the log feature: Depositional units 1) Above the log feature, 2) Inside the log feature, 3) Next to the log feature, 4) Between the log feature and the Wall, and 5) Beneath the log feature. For the purposes of this analysis, no EU Stratum 1, Level 1 contexts are included because of the potential for contamination with modern material prior to beginning the units, unless otherwise noted in the EU sections of this report. Furthermore, this analysis splits certain DUs so that some of the contexts can be grouped into multiple AUs in the following discussion (e.g., Fill Above the Wall includes the AUs directly on top of the Wall, as listed in **Table 5-8,** as well as deposits excavated at the same elevation adjacent to the Wall)[14]. The following is a presentation of each DU, or grouping of AUs.

a. ABOVE THE WALL

Analytical units associated with contexts assigned from deposits above the level of the truncated remains of the Battery Wall include W1 A, W1 C, W1 D, W2 A, W3 C, W4 A, and W4 C. These represent all or part of Excavation Units 1 through 11, 21, and 43, as well as 34 non-EU contexts (see **Appendix N**). After eliminating the Stratum 1, Level 1 contexts because of their potential for having been contaminated, the combined TPQ of the other EU contexts is 1864 based on one lamp chimney glass sherd recovered from EU 4 Stratum 6, Level 1 (Cat. 15768.024). However, more recent cultural material was recovered from the non-EU contexts, including coins with the dates 1995 and 2001, both from the same context (Cat. 15768.038), located next to EU 9. This location was also adjacent to the then unexcavated eastern cut-off wall. The soil along that side of the corridor was loose sand, and it is therefore conceivable that the deposit containing the coins was contaminated from material originating from that unexcavated slope.

When the context with the modern coins is removed from the list, the next non-EU set of TPQs are 1893 and 1890. One of these is associated with Wall 2, and the other with Wall 3. The Wall 2 context contains part of a machine-made bottle, which could have been manufactured between 1893 and 2005, and several other artifacts (Cat. 15768.280). The Wall 3 context is from the trench excavated to identify the landward face of the Wall. Here a machine-made bottle glass sherd provides a TPQ of 1899 (Cat. 15768.654).

In conclusion, the analytical units from the DU Above the Wall represent fill used to expand Battery Park in the mid- to late-18th century (see **Chapter 4: A.17. Continued Improvements at the Battery**). This is within the range of the cultural material recovered from the EU contexts. However, the non-excavation units contain more recent materials. The reasons for this are

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[13] The depositional unit 'Above or Inside the Wall' is not included in this discussion for reasons detailed in **Chapter 5: Footnote 7**.

[14] Grouping of the AUs in this way results in differences in TPQs in some cases when compared to **Chapter 6: Artifact Analysis** due to several factors. These are the elimination here of Stratum 1 Level 1 contexts and other potentially contaminated contexts, not using the DU Above or Inside of the Wall here because it is not precise enough, and putting more emphasis on artifacts from controlled EU contexts rather than from more opportunistic artifact collection methods (also because of precision).

related to the continued filling and landscaping of Battery Park over time and/or the inherent nature of non-systematic excavation.

b. INSIDE OF THE WALL

Analytical units associated with contexts assigned to deposits that represent Wall fill include W1 F, W2 B, W3 M, and W4 F. The only EU represented is EU 17 (see **Appendix N**). The rest of the contexts are non-excavation units. This is because most of the cultural material was collected during monitoring of the dismantling of the Walls. EU 17 was located along the edge of the South Ferry corridor in Wall 1, where no face stones were found (see **Figure 5.9** and **Figure 5.62**). If Stratum 1, Level 1 is eliminated from the analysis because of the potential for contamination, only 27 artifacts remain in the EU 17 collection. The TPQ of 1640 comes from two tin-glazed earthenware ceramic sherds (Cats. 15768.068 and .069). However, the low artifact count might have skewed that date.

Soil samples represent approximately 21 percent of Wall fill contexts. Of the remaining 47 contexts, 15 were stone and/or mortar samples and 25 were artifact-bearing proveniences associated with the dismantling of the sections of Battery Wall (40 percent). Only 58 temporally diagnostic artifacts were present. No temporally diagnostic artifacts were associated with the dismantling of Wall 1. The TPQ of Wall 3 contexts is 1765 based on two painted creamware ceramic sherds (Cat. 15768.342). However, the combined TPQ of these Wall dismantling deposits is 1770 based on a plain creamware ceramic sherd recovered during the dismantling of Wall 4 (Cat. 15768.427). This indicates that Wall 4 (and, by inference, the entire Battery) was constructed no earlier than 1770. However, the historic documentation says otherwise. It is possible that the few small artifacts (n=3) found within the fill had percolated into the Wall when repairs might have taken place circa 1770 (or soon thereafter) or that these artifacts are associated with the destruction of the Wall.

c. BENEATH THE WALL

Analytical units associated with contexts that represent deposits found beneath the Wall include W1 E, W3 I, and W4 E. These include all or part of Excavation Units 18, 20, 21, 26, 28 through 30, 32, and 41 through 43 (see **Appendix N**). Of those, EUs 18, 32, 41, and 42 were excavated entirely beneath the Wall. If EU 18 Stratum 1 Level 1 is eliminated from the analysis—because it was potentially contaminated as a result of the constant access/egress by construction crews due to the nearby dynamite blasting, coupled with continuous saturation with ground water—then the TPQ of the EUs beneath the Wall is 1720, based on a redware ceramic sherd recovered from beneath Wall 3 (Cat. 15768.202). However, only four temporally diagnostic artifacts were recovered from these unit contexts (excluding Stratum 1 Level 1 contexts).

Of the seven other EUs that had strata at or beneath levels of the Wall foundation, the TPQ of 1750 comes from a painted tin-glazed earthenware ceramic sherd found in EU 28 (Cat. 15768.175 (see **Appendix N**). This unit was excavated next to Wall 3 along the waterside, or west side, of the Wall. EU 26 had a deposit at a similar level that contained cultural material with a more recent beginning manufacture date; however, it was not included here because EU 26 experienced several episodes of flooding that could have contaminated the level from which this material was recovered[15].

[15] Again, the elimination of these potentially contaminated deposits may result in TPQ differences between Chapters 5 and 6.

A total of 97 proveniences was assigned to contexts beneath the Wall, including 66 non-EU contexts. Forty temporally diagnostic artifacts came from these non-unit contexts: 38 from Wall 3 and two from Wall 1. One, a flotation soil sample located on the exposed cross section of Wall 1 and taken during the Wall dismantling, could have been contaminated due to long-term exposure (Cat. 15768.263).

TPQs from contexts beneath the Wall which contain significant numbers of artifacts are represented only at Walls 3 and 4. The 1750 TPQ of these remaining contexts is provided by the tin-glazed earthenware ceramic sherd recovered from EU 28 (Cat. 15768.175). In conclusion, the AUs from deposits beneath the level of the Battery Wall date to the middle of the 18th century. However, these dates were exclusively from contexts associated with Walls 3 and 4. Historical documentation indicates these sections were constructed circa 1755 (see **Chapter 4: A.10. The French and Indian War Period**). Wall 1 only contained three temporally diagnostic artifacts from this DU, and two of those were from potentially contaminated contexts. The other has a TPQ of 1670 (Cat. 15768.247). This could indicate that Wall 1 was older than Walls 3 and 4. However, the small number of artifacts is likely to have skewed this date. Historical documentation indicates Walls 1 and 2 were likely built circa 1741.

d. LANDWARD SIDE OF THE WALL

Analytical units associated with contexts found on the landward side of the Wall sections are numerous because they encompass multiple DUs, including proveniences located at levels above the Wall itself and, in the case of Wall 3, above the level of the log feature and next to the Wall. These AUs are W1 C, W1 G, W3 C, W3 E, W3 F, W4 C, and W4 D. All or part of Excavation Units 2, 7, 15, 16, 20, 21, 24, 24A, 25, 25A, 29, 30, 40, and 43 are represented (see **Appendix N** and **Figure 5.4** and **Figure 5.14**) . The contexts above the level of the truncated Battery Wall (W1 C, W3 C, and W4 C) have also been discussed above. Like those contexts, all contexts representing the landward side of the Wall exhibited much variation and range of manufacturing dates in the cultural material they contained. This is as complex as, and a mirror of, the history of landfill in Battery Park.

TPQs for deposits associated with the landward side of the Battery exhibit a wide range of manufacture dates, the most recent being 1960 (Cat. 15768.285). However, only one artifact is represented with this date. The wide range still exists when removing those AUs previously discussed with DU Above the Wall. Clusters of artifacts with TPQs in particular decades were sought. No meaningful groupings were found based on artifact manufacture dates. Unfortunately, there is no clear distinction within the deposits of this DU to suggest particular fill is dated to a particular time based on the artifacts recovered. The fill contained too much variation in soil color and texture to be able to relate all soils of a particular color and texture across the Wall sites to one another.

e. WATER SIDE OF THE WALL

Analytical units associated with contexts found on the waterside of the Wall sections are, by definition, fill deposited after the Wall was destroyed during the time of the shoreline expansion. These AUs are W1 D, W1 G, W1 H, W3 B, and W3 D. W1 D was also discussed above as part of the contexts identified above the level of the Wall. All or part of Excavation Units 12, 13, 14, 15, 16, 22, 26, 27 West, and 28 are included here (see **Appendix N** and **Figure 5.4** and **Figure 5.14**). Thirty-four non-EU contexts are also included.

Like the fill contexts representing the landward side of the Wall, the TPQs from the analytical units on the waterside of the Wall are inconsistent, exhibiting a wide range of artifact manufacture dates. Within the EU contexts, the TPQ is 1770 based on six plain creamware ceramic sherds found at Wall 3 (Cats. 15768.148 and .169). The TPQ of Wall 1 EU contexts on the waterside of the Wall is 1740 based on one slip-decorated redware ceramic sherd (Cat. 15768.064). Temporally diagnostic artifacts from non-EU contexts have a TPQ of 1893 based on two machine-made bottle glass sherds recovered from Wall 3 (Cats. 15768.287 and .330). No temporally diagnostic artifacts were recovered from similar contexts associated with Walls 2 or 4.

f. THE LOG FEATURE

The log feature excavated in conjunction with Wall 3 was analyzed along with the Wall as part of a feature complex. The Wall cut through the log feature, as discussed above. Analytical and depositional units were assigned using similar criteria as were used for the Wall as follows: above the feature, next to it, inside of it, and beneath the log feature. Additionally, an analytical/depositional unit was assigned for the deposit between the Wall and the log feature. The dendrochronological analysis dated the logs to 1734. Therefore, since Wall 3 cut through the log feature, it is reasonable to suggest the Wall was built no earlier than 1734. Viewing the analytical units assigned to the log feature has helped refine the time period of the Wall construction and the filling of that area of Battery Park.

g. ABOVE THE LOG FEATURE

Two AUs, W3 D and W3 E, have been assigned for contexts located above the log feature. Both have been previously discussed in relation to the Wall. These AUs represent all or part of Excavation Units 24, 24A, 25, 25A, 26, and 27 West (see **Appendix N** and **Figure 5.14**), and 11 non-EU contexts. As with the Wall contexts on the landward side, there is a wide range of manufacture dates for the cultural material recovered from the fill on the landward side of the Wall above the log feature. The TPQ of 1960 is based on an aluminum wine bottle seal recovered while troweling the top of the logs (Cat. 15768.285). For the part of the log feature on the waterside of the Wall, the TPQ is 1893 based on a machine-made glass bottle sherd, also from a non-EU context (Cat. 15768.287). The EU contexts in this AU have a TPQ of 1770 based on a plain creamware ceramic sherd (Cat. 15768.169).

h. INSIDE THE LOG FEATURE

One AU, W3 L, has been assigned for the contexts associated with the deposits within the logs. No EUs were placed within the logs. It is known from the dendrochronological analysis that the logs were cut from trees in 1734. The artifact inventory bears this out, although with less precision. The TPQ of these contexts is 1720 based on six salt-glazed stoneware ceramic sherds and two slip-decorated redware sherds (Cats. 15768.288, .337, .348). However, analysis of the secant piles in this area provides a TPQ of 1730, even closer to the actual construction date of the log feature (Cat. 16196.266).

i. NEXT TO THE LOG FEATURE

One AU, W3 G, was assigned for contexts located next to the log feature, either to the north or the south. However, all of the contexts assigned to this AU were within part of EU 24A, and therefore on the landward side of the Wall (see **Appendix N** and **Figure 5.14**). The TPQ of these contexts is 1893 based on one sherd of machine-made bottle glass (Cat. 15768.122). This is similar to what was observed in the analytical units located on top of the log feature on the waterside of Wall 3.

j. BETWEEN THE LOG FEATURE AND WALL 3

One AU, W3 H, was assigned to contexts located between the log feature and Wall 3. This included parts of Excavation Units 24, 25, and 27, but no non-EU contexts (see **Appendix N** and **Figure 5.14**). This deposit represents the fill that might have been added after the log feature was cut through and the Wall constructed in the intervening space. The TPQ from the deposit on the landward side of this DU is 1740 based on a dark creamware ceramic sherd (Cat. 15768.130). However, the TPQ of the deposit on the waterside of Wall 3 is 1770 based on a creamware sherd recovered from flotation in EU 27 (Cats. 15768.156). Since the historic documentation indicates a construction date of circa 1755, it can be inferred that the more recent cultural material is either associated with fill that had later percolated down, or that the deposit was churned up during possible repairs. The artifact data is also a possible indication that filling occurred first on the landward side of the Wall.

k. BENEATH THE LOG FEATURE

One AU, W3 J, was assigned for proveniences beneath the log feature. This includes one EU (EU 31, see **Appendix N**) and two non-unit contexts. Very little cultural material was recovered from this AU. It contained only one temporally diagnostic artifact, a British slipware sherd with a beginning date of 1670 (Cats. 15786.198, .199, and .325). This date is prior to the dendrochronologically-based construction date of 1734.

8. MORTAR, MICROBOTANICAL AND GEOCHEMICAL ANALYSES AND HUMAN REMAINS

a. MORTAR ANALYSIS

As stated in **Chapter 2: B. Field Methods** and in **Chapter 5: A.1. Battery Wall Synopsis**, JBCI conducted mortar analysis as part of their work on Wall documentation and disassembly. Their work focused on the architectural aspects of the Wall sections and used analyses particular to architectural reconstruction needs (see **Appendix K**). Therefore, some of their interpretations differ from those presented by the mortar specialist who conducted scientific work for this report (see **Appendix G**).

JBCI conducted gravimetric analysis on mortar samples from Walls 1, 2, and 4. Gravimetric analysis was conducted on five samples from Wall 1 and two each from Walls 2 and 4. All samples were lime mortar and JBCI concluded the sands used to make the mortar were probably local. The percentages of aggregate, fines, and acid solubles were consistent for the samples from Walls 1 and 2. However, the Wall 4 samples were not consistent. JBCI concluded there was enough variation in the samples from all three of the Wall sections, indicating that a separate mortar mix was used for each. Petrographic analysis was conducted for Wall 1 only, and did not reveal any shell particles in the lime mortar. Therefore, it was surmised that the lime was made from crushed rock, suggesting "sandy limestone as the original source for the lime" (see **Appendix K**: 43).

The JBCI work was supplemented with analysis conducted by John Walsh of Testwell Laboratories (see **Appendix G**). One sample from each Wall section was subjected to petrographic examination. That sample and one additional sample from each Wall section were also subjected to chemical analysis. In addition, x-ray diffraction was conducted on one sample each from Walls 1 and 2, and sieve analysis was conducted on one sample each from Walls 1 and 3. All samples were common rock lime mortar having properties consistent with Inwood marble. **Table 5-9** presents the results of the petrographic analysis. Of the characteristics presented, Walls 1 and 2 show the most similarities. Walls 3 and 4 show quite divergent characteristics, with Wall 4 having more in common with Walls 1 and 2 than with Wall 3. However, all of the mortar samples appear to have been hot-mixed (i.e., they were crudely made and rapidly placed within the Wall while still hot). The sieve analysis demonstrated that the sand used to make the mortar for Wall 3 was more coarse grained than that used for Wall 1. Additional details on the mortar samples are provided in **Appendix G**.

Table 5-9
Results of the Petrographic Examination on Mortar Samples

	Wall 1	Wall 2	Wall 3	Wall 4
Friable	No	No	Moderately	Yes
Grain size	Medium	Medium	Coarse	Medium
Amount of binder	Abundant	Abundant	Paucity	Abundant
Point contacts between grains	No signif.	No signif.	Moderate	No signif.
Air content	3-4 %	3-4 %	Variable	3-4 %
Air distribution	Homogeneous	Homogeneous	Heterogeneous	Homogeneous
Consolidation level	Well	Well	Rough	Well
Void size	< 1mm	< 1mm	Varied	< 1mm
Binder coating	Well	Well	Incomplete	Well
Carbonation	Partial	Minor	Mostly	Partial

b. POLLEN AND PHYTOLITH ANALYSIS

Twenty-five samples were analyzed for pollen and/or phytoliths by Paleo Research Institute (PRI), and their report is appended here (see **Appendix E**). The processed samples represent parts of four columns: two each from Walls 1 and 3. The samples were from EUs 4 and 18 (both from Wall 1), and 25 and 26 (both from Wall 3) (see **Appendix N** and **Figure 5.4** and **Figure 5.14** for descriptions and locations for all EU locations discussed in this section**)**. Phytolith analysis was performed on all processed samples to potentially obtain information about grasses, food plants, moisture and sunlight. Although pollen analysis can provide data regarding trees, it was assumed there were either no or very few trees in the areas of the Wall at the time it was built and therefore there was no need to conduct pollen analysis. However, a column from EU 4, located in the fill above the level of Wall 1, was tested for pollen on the assumption that tree data would be present from the time after the Wall was buried and during the initial development of Battery Park.

The samples selected to process for phytolith analysis were chosen because of their positions relative to the Wall. In addition to a control sample taken from near Wall 1 at a higher elevation, one sample column from each of the major depositional units was selected: Above Wall 1 (EU 4), Beneath Wall 1 (EU 18), the Landward Side of Wall 3 (EU 25), and the Waterside of Wall 3 (EU 26). Using samples from both Walls 1 and 3 allowed comparisons of the vegetation and environmental conditions at both locations. This was completed for the AUs Above and Beneath the Walls by looking at DUs. Part of the column from EU 26 was also from levels beneath the Wall, enabling comparison with the EU 18 column for the DU Beneath the Wall. Similarly, the upper levels of EU 26 represented fill above the Wall, allowing comparison to the EU 4 column for the DU Above the Wall. Finally, processing of samples representing the DU Between the Log Feature and Wall 3 was also completed (EU 25).

In examining the DU Above the Wall, the control sample and the EU 4 samples exhibited a similar pollen profile, with the exception of a larger amount of cereal grain pollen in EU 4. This could be related to the presence of animals and their feed or manure. The use of the Battery for grazing has been documented (see **Chapter 4: A.9. The Flat Rock Battery)**. Prior to the turn of the 19th century, and during the 1820s, trees were planted in what is now Battery Park. Identified tree pollen includes oak, hickory, and chestnut, and pollen from the sunflower family was also present. Interestingly, all EU 4 samples contained *Vitis* pollen, woody vines consistent with grape. This is a possible indication of grape vines growing on the Wall.

Phytoliths identified at Wall 1 in EU 4 samples are similar to those found in the control. However, phytoliths representing wetland grasses are more abundant in the control, possibly indicating a reintroduction of native wetland species to the area after the Wall had been truncated and covered with fill. Moist soil conditions existed throughout the EU 4 column, although pasture or lawn grasses were more abundant in the upper levels. The PRI report indicates that fill was the result of rapid deposition.

Phytolith preservation in EU 18, representing the DU Beneath the Wall, was poor. Poor preservation can result from unnatural fill that is not conducive to plant growth. PRI identified possible crushed/pulverized mortar and/or brick as the source. Certainly the presence of decaying schist (bedrock) could have been a contributing factor.

Phytolith preservation in EU 25 (DU Between the Log Feature and Wall 3), on the landward side of the Wall, was good. Cool season grasses dominated; however, there was significant variation in other environmental factors among the samples. The upper levels of the EU 25 column contain grasses that “thrive in disturbed settings.” The middle and lower levels are indicative of a “shallow brackish wetland or estuary” (see **Appendix E**: 20).

A drier environment was found at the upper levels of fill at Wall 3, seen in samples from EU 26, while saltwater coastal sediments were present at the lower levels. There is no significant difference in the phytolith profiles between those samples taken from the waterside of the Wall to the landward side. However, total phytolith preservation was greater on the landward side of the Wall, salinity likely affecting the preservation level.

Comparison of the upper levels of EU 26 (Wall 3) to the EU 4 (Wall 1) column was completed to determine if any similarity exists in samples from the DU Above the Wall. Lawn or pasture grasses were predominant in that DU. This profile is also observed in the upper sample of EU 25 (Wall 3).

Samples from the DU Beneath the Wall were also compared, but with less success. Unfortunately, the samples from EU 18 were not conducive to phytolith preservation, as previously noted. However, the basal samples of EU 26 (DU Beneath the Wall) were suggestive of a marine environment. This confirms what has been shown in the stratigraphic analysis and in the historic documents.

c. GEOCHEMICAL ANALYSIS

Geochemical analysis was completed by Geo-Sci Consultants, Inc. on 24 Battery Wall samples. Their complete report is attached as **Appendix I**. Five of the samples were from beneath Wall 1. Twelve were from Trench 4 (Wall 3). The other seven were from Wall 3 excavation units. The geochemical analysis revealed four types of soils: fill, and three natural soils. The natural deposits were categorized as sandy alluvium, estuarine sediment, or possible terrestrial subsoil. Sandy alluvium was amassed over a relatively short period of time and could either be the result of samples located in an interior drainage or from a coastal action predating marine transgression. The estuarine sediments came from low energy tidal settings such as bottom deposits found in tidal marshes. The possible terrestrial subsoil represents lower level sediment.

All of the soil samples analyzed from Wall 1 were from the DU Beneath the Wall, and all were chemically defined as fill. This makes perfect sense in that Wall 1 was built directly on top of the bedrock. In order to construct a stable, level wall, the builders probably leveled the surface by adding soil (fill) to depressions or gaps in the bedrock. Other soil might have accumulated naturally over the centuries.

The soil samples from Wall 3 excavation units fall into the chemical signature of fill, sandy alluvium, or estuarine sediment, relative to their depth beneath the Wall. The processed soils from EUs 26, 28, and 30 were fill (see **Appendix N** and **Figure 5.4** and Figure **5.14** for descriptions and locations of all EUs discussed in this section). The deposit from EU 32 was sandy alluvium, and the soils processed from EU 29 were both estuarine sediments.

The 12 samples processed from Trench 4 (Wall 3) were selected to determine if the soil profile for a vertical column could be established. This successful exercise showed the upper levels of Trench 4 were sandy alluvium and the lower levels were terrestrial subsoil. One of the samples from the middle of Trench 4, however, was classified as fill. This was probably the result of contamination caused when the column was shifted at that level (due to safety concerns with the depth of the excavation). The transition from alluvium to terrestrial soils occurred at approximately 9.0 – 9.9 feet below sea level.

d. HUMAN REMAINS

Human remains associated with the Battery Wall excavation were interpreted by both the Medical Examiner’s Office and the project forensic anthropologist (see **Appendix J**). A minimum of five individuals is represented. This includes one individual whose remains were found in EU 1 and at least four individuals whose remains were found in EUs 4 and 10 (see **Appendix N** and **Figure 5.4**). The majority of the bones analyzed were associated with cranial elements of one of the individuals represented in the deposit from EUs 4 and 10. This was a robust “large, adult male of European ancestry who died between age 40 and 60” (**Appendix J**: 8). He was found to be malnourished during early childhood, as evidenced by an irregular growth pattern near the base of the cranium. This individual also contained evidence of osteoarthritis in the temperomandibular joint. There were two arthritic vertebrae also found in these units, but they cannot be definitively associated with the same individual. The post-cranial elements from these units, and EU 1, included those from two adults and two sub adults.

9. BATTERY WALL CONCLUSIONS

The goals of the research at the Battery, as defined in the data recovery plan and its supplement (Dewberry 2005d and 2006a), included understanding the construction materials and techniques; establishing a construction date for the Wall and determining environmental conditions at the time of construction; and establishing a timeline for the destruction and dismantling of the Battery. In addition, a schematic site profile illustrating Walls 1-4 and Whitehall Slip in relation to ground surface and sea levels can be see in **Figure 5.137**. All four sections of Battery Wall were constructed by creating two “faces” and then adding fill to the interior. The layers of stones in the faces of Walls 1 and 2 were more uniform than those in Walls 3 and 4, although the face stones in all Wall sections were carefully laid. The stone used and construction methods of Walls 1 and 2 were similar to one another, as were the stones and methods used in Walls 3 and 4. This was an initial indication that the northern part of the Wall might have been built at a different time than the southern part of the Battery. Some of the stones used in the construction of Wall 1 might have been procured at a greater distance than others. Walls 3 and 4 stones were primarily the same type as the local bedrock, indicating local procurement.

Walls 1 and 2 were primarily sandstone, and each course was found mortared to the other and also mortared to the bedrock that was its foundation. The foundation of Wall 3 was large cobbles and boulders; the foundation of Wall 4 was sand. The faces of both Walls 3 and 4 were primarily schist, the local bedrock. No mortar was evident amongst the stones on the faces of either Walls 3 or 4. However, mortar would have been present but of a less durable quality than seen at Walls 1 and 2, resulting in it being washed away with the tide. The mortar cap that remained at Wall 3 was evaluated to determine its extent. It was concluded that the mortar washed out to what would have been the high water line. Shells were found adhering to some of the stones in both Walls 3 and 4, including soft-shell clams, mussels, and oysters (Cats. 15768.385 and .421). These would have been from tidally submerged shell beds.

The turn in the bastion on the landward side of Wall 1 was gentle, whereas that in the bastion of Wall 4 was sharp. This is an indicator of more time-consuming construction at Wall 1. It also may be an indicator of a different construction design, and therefore possibly a different time of construction and/or different individuals involved in building the different Wall sections.

Mortar analysis indicated the mortar mixes were similar in all Wall sections. JBCI found similarities between the mixes in Walls 3 and 4, while Testwell found very slight differences in certain aspects of all the mortar samples analyzed. They concluded that Wall 4 mortar was more similar to Walls 1 and 2 than to Wall 3.

Wall 3 contained a counterfort (buttress) on the landward side. Part of Wall 3 and all of Wall 4 were sheeted with wooden planks on the landward side. The presence of some displaced sheeting in a stratum in the middle of an EU next to Wall 3 is a possible indication that this surface was exposed, either at the time the sheeting was originally placed or when the Wall was destroyed. No temporally diagnostic artifacts came from that stratum; however, the TPQ of the underlying stratum is 1730. Unfortunately, the dendrochronological analysis could not refine this, leaving a date prior to the construction of Wall 3. Therefore, the presence of the displaced sheeting does not contribute to dating the Wall. Historical documentation was also not able to determine the purpose or construction date(s) of the sheeting, although it is surmised that the sheeting is related to construction, or use, or protection of the Wall. There is a 1768 reference to "wooden facing on the ramparts of the Battery" decaying, but no indication of the purpose of this facing or when it was installed (see **Chapter 4: A.10. The French and Indian War Period**).

Wall 3 might have also been associated with the large pier-like log feature which was cut through to build this Wall section. However the foundation boulders and cobbles of Wall 3 did not extend to the log feature. Boulders and/or cobbles were not found beneath the log feature. As previously discussed, the log feature and Wall might have been used contemporaneously. Seeds recovered from flotation of EU contexts adjacent to and beneath the Wall are possible indicators of not only industrial-scale refuse disposal, but also of pre-Wall use of the shore.

The depositional units assigned, representing the relationship of the excavated deposits to the Battery Wall sections and to the log feature, make it possible to look at each Wall section for comparison of possible construction/demolition dates (see **Table 5-10**). The dates associated with Wall 1 are earlier than those associated with Walls 3 or 4. Only one AU for Wall 2 artifact-bearing contexts was assigned. This was for deposits above the level of the Wall. The deposits associated with all analytical units at levels above the Wall represent fill related to the creation and maintenance of Battery Park and do not provide much information regarding the time the Battery was built and in use. The analytical units associated with the DU for deposits beneath the level of the Wall and at its foundations provide a possible date after which each section was constructed. This implies that these sections of the Wall could not have been built prior to the TPQ date. These are 1670 for Wall 1, 1750 for Wall 3 and 1720 for Wall 4. The log feature was likely built in 1734 or 1735, based on dendrochronological analysis. This means it was probably extant when Wall 3 was in use, at least initially, because the possible construction date is so close to the construction date of the log feature. The artifact data implies that the feature was in existence for at least 15 years before it was cut through to make room for the Wall to be built through it. The interpretation is also supported by the historic data which shows Wall 3 at the log feature was built approximately 20 years later (circa 1734 – 1755).

Table 5-10
TPQs for the Battery Wall Depositional Units

TPQs*				
Wall 1	**Wall 2**	**Wall 3**	**Wall 4**	**Location Relative to Wall and Log Feature (DU)**
1864	1893	1899	1890	Above the Wall
-	-	1893	-	Above log feature on the waterside
1740	-	1770	-	Next to the Wall on the waterside
-	-	1960	-	Next to W3 and above log feature on the landward side
1680	-	1870	1950	Next to the Wall on the landward side
-	-	1893	-	Next to log feature on the landward side
-	-	1770	-	Between W3 and log feature
-	-	1720	-	Inside log feature
-	-	1680	-	Beneath log feature
1670	-	1750	1720	Foundation and underneath the Wall
1640	-	1765	1770	Wall dismantle, inside the Wall fill

Note: * Dates reflect the above text and may differ from those presented in Chapter 6: Artifact Analysis (see Chapter 5: Footnote 10

The environmental conditions at the time of construction are revealed through the identification of phytoliths in the deposits and, to a lesser extent, chemical analysis of the soils. The soil chemistry of the Wall 3 samples helped establish an elevation for the transition from alluvium to terrestrial soils at approximately 9 feet below sea level. Furthermore, the chemical profile of the sediments beneath the landward side of the Wall and adjacent to the log feature exhibited the chemical profile of estuarine sediment. Phytolith analysis revealed the presence of grasses indicative of pasture or lawn at levels above the Wall and little growth adjacent to the Wall on the waterside, as expected. The sediment between the Wall and the log feature was conducive to the growth of species that indicate “shallow brackish wetland or estuary” environments, as opposed to species that thrive in more disturbed settings, as seen in deposits on top of the log feature and the Wall (**Appendix E**: 20). Brackish or marine species were found at levels beneath the Wall.

The artifact and field data do not contribute materially to the establishment of a date of destruction of the Battery because the fill that covered the truncated Wall sections varies widely in soil type, as do the date ranges of manufacture of the cultural material in these deposits. Additionally, varying amounts of fill were documented on top of each Wall section. However, it seems the Wall was not immediately torn down and the area filled at the end of the Revolutionary War. Historic documentation indicates the battery was truncated and filled beginning in 1790. However, the fill directly above the truncated Wall remains has a TPQ of 1820. This late date could reflect the completion of the process or, more likely, be the result of churning soil for later landscaping or other modifications. In any case, it is intriguing to speculate about the state of the Wall in the intervening years between the end of the War of Independence and the time it was completely covered with fill.

B. WHITEHALL SLIP

1. SYNOPSIS

Whitehall Slip was the first major feature identified during the South Ferry Terminal excavations. It was located in the Peter Minuit Plaza area of the site, just in front (to the north) of the Staten Island Ferry Terminal. The Whitehall Slip excavations were located along the Whitehall Street side of the South Ferry Terminal project corridor, encompassing the entire Whitehall Street side of the new station area within Peter Minuit Plaza (see **Figure 2.3**). As presented in **Chapter 2: B. Field Methods**, non-removable decking had been previously installed in the eastern side of Peter Minuit Plaza (see **Figure 5.63**). The contractor was in the process of excavating adjacent to the decking when Whitehall Slip was identified.

Whitehall Slip was built primarily of log forms using timbers kept in the round, predominantly conifer, with log construction methods and crib forms. Grillage was also present in the northern parts of the Slip. The excavated portion within the South Ferry project corridor was part of the western side of a slip structure with water to the east for ship entry and docking. A stone embankment, likely a retaining wall or bulkhead, was found in line with the head of the Slip in part of the Whitehall Slip excavations.

The top of the Slip remains were at a depth of approximately 6.3 to 8.3 feet below ground surface (elevation 1.3 to 2.9 feet below sea level). The base of the Slip structure was generally another six feet below that. The initial cut measured between approximately 18 and 21 feet east to west, into the deck-covered area, and up to 50 feet north to south. When completed, excavated remains of Whitehall Slip measured over 200 feet long and up to 60 feet wide. The initially exposed part of the Whitehall Slip excavation was distinctive in the north as compared to the southern part of the cut. These distinctions were related to the types and sizes of logs present and the ways they were joined, as well as characteristics of the fill, and are described in detail below. In short, as determined by this analysis, they are related to differing time periods of Slip construction and filling.

Field investigations at Whitehall Slip consisted of the archaeologists cleaning exposed logs with shovels and trowels, sampling soil for artifact recovery from various locations relative to the logs, and measuring the logs for field drawings. Logs were then removed from the side, rather than from above because of the non-removable decking structure, in approximately five-foot wide increments and some logs were sampled for potential dendrochronological analysis. If additional logs were thus exposed, then archaeological documentation continued in the same manner until the edge of the Slip or the edge of the South Ferry Terminal project corridor was encountered.

The data recovery of Whitehall Slip was designed to collect data related to four research goals; 1) understanding construction materials and techniques, 2) establishing the timeline of construction, 3) establishing the timeline for filling, and 4) understanding the fill. This synopsis will present the findings detailed in the remainder of the Whitehall Slip section of this chapter using these four goals as a focus. Following this synopsis, the field results from Whitehall Slip will be presented, first looking at the types of cribbing and joinery throughout the excavation area, then the AUs will be defined, and details of the excavations presented. Results of the secant pile excavations are then presented followed by a discussion of the excavation details for each AU. Finally, conclusions regarding Whitehall Slip are offered.

a. UNDERSTANDING CONSTRUCTION MATERIALS AND TECHNIQUES

Dendrochronological analysis was productive in establishing the wood types and sources of the logs used to build Whitehall Slip. The logs were primarily conifers. Species included pitch pine, white pine, eastern hemlock, and oak. Analysis also included identification of the source region of the forests from which these trees may have been cut. The pitch pine samples were likely procured from the Albany area. It was more difficult to pinpoint the source of the white pine, however it likely came from within 400 miles of Lake Placid, New York. The eastern hemlock could have come from as nearby as New Paltz, New York. The Whitehall Slip oak sample could have been procured either from the Albany region or from the vicinity of Monmouth County, New Jersey. The complete report by Dr. William E. Wright is attached as **Appendix H**. His research has shown the woods in the New York City area had already been deforested by the 1730s and it was very common to ship logs down river from the Albany area at that time.

Construction techniques used at Whitehall Slip are described using the new five tier typology developed for this project based on vernacular building traditions (see **Figure 4.58** and **Chapter 4: C. Waterfront Landfill-Retaining Structures**). These levels of examination are material type, construction method, form, fill material, and structure type. Whitehall Slip was built primarily of logs with a stone wall in a line with the head of the Slip. The logs were left in the round with the bark attached. Most ends were cut into wedge shapes. Relatively few exceptions were noted and they were located in the southern part of Whitehall Slip, the more recent section. Log construction methods were used with some masonry construction in a line with the head of the Slip. Most of the stones used there were schist, the local bedrock. The log construction forms included crib blocks (open box-type forms) and grillage (solid stacked log forms)and the masonry construction was a wall. Structure type was predominantly a slip with part of a continuous shoreline structure that was in a line with the head of the Slip. Fill material, as it pertains to the typology, was a mix of large aggregate and refuse found amongst the log forms. There was no marked difference in the amount of refuse found in the fill based on location.

b. ESTABLISHING THE TIMELINE OF CONSTRUCTION

Identifying construction dates for Whitehall Slip was successfully accomplished using dendrochronological analysis. Dendrochronological analysis was done on 25 log samples and four planks associated with Whitehall Slip. Absolute dates of death were found for 14 of the log samples. Dated samples include pitch pine, white pine, and eastern hemlock. The part of Whitehall Slip excavated within the South Ferry Terminal project corridor was constructed in three episodes; circa 1734, circa 1785, and circa 1796. The specific location of each section is discussed below in relation to Whitehall Slip AUs.

c. ESTABLISHING THE TIMELINE FOR FILLING

Historical documentation concerning the filling of Whitehall Slip provides a basis for interpreting time frames, but, because of the lack of historic map detail and accuracy, and the somewhat enigmatic nature of the historic documents, the locations of various fill episodes are not entirely clear (see **Chapter 4: B.7. Filling in Whitehall Slip**). Three major filling episodes occurred at the portion of Whitehall Slip within the South Ferry Terminal project corridor; circa 1788, 1801-1809, and before 1845 (see **Figure 5.136**). To identify locations and possible fill dates, TPQs were sought from contexts amongst the log construction at different locations. The artifact data provides support for the dates identified in the historical record and enhances it by identifying locations of fill episodes. However, because the portion of Whitehall Slip excavated within South Ferry Terminal Project corridor was the western edge of the Slip structure, the precise locations of the fill deposited into the water of Whitehall Slip is only surmised based on artifacts that made there way into the log forms that were excavated. Therefore the fill locations depicted on **Figure 5.136** are approximate. The northernmost part of Whitehall Slip contains deposits with a TPQ of 1775, the central portion has a TPQ of 1795, and the TPQ from the southernmost part of Whitehall Slip is 1840. The locations of the deposits associated with these TPQs are presented in detail below in the AU discussion.

d. UNDERSTANDING THE FILL

Understanding the fill with regard to field results has more to do with identifying physical differences in the deposits themselves (i.e., soil textures, colors, etc.), whereas the interpretation of the fill itself is a research theme best suited for artifacts. Therefore, most of the discussion of this theme is presented in **Chapter 6: E. Whitehall Slip Analytical Units**.

Typical factors that complicate the analysis of fill deposits include unknowns regarding the source of fill and the extent of mixing of discrete fill deposits. In addition to those issues, archaeological excavations within the fill of Whitehall Slip were also complicated by modern intrusions that introduced their own fill, namely the large utility banks and footings associated with the elevated railway. Further, during its active life, the Slip was repeatedly dredged. All of these dynamics resulted in the identification of virtually no distinctive soils found horizontally across the Whitehall Slip site. Excavations relied on physical separation of collected cultural material to ascribe meaning to the fill. Ultimately, this was successful in enabling the project goals to be met; understanding construction materials and techniques, as well as establishing the timeline of construction and filling at specific locations within the Slip. Additionally, individual contexts have provided insight into materials found in the fill. These and their possible sources are discussed briefly below and in detail in **Chapter 6: E. Whitehall Slip Analytical Units**.

2. EXAMPLES OF WHITEHALL SLIP CRIBBING AND JOINERY

Whitehall Slip was constructed of grillage and cribbing blocks. As described in **Chapter 4: C.4.c. Form**, these blocks are comprised of a series of interlocking logs forming box-type structures called "cells." The log forms would have been sunk by being weighted down with stone and fill, thus expanding the shoreline. Each of the cells used at Whitehall Slip measured approximately five to seven feet across, and up to seven feet high. Many of the logs used in Whitehall Slip were cut directly from the base of the tree trunk, and their branches were removed. Some logs exhibited wedge-shaped ends. This type of cut could possibly be where the trees were felled or from a modification for unknown purposes. All of the logs remained in the round unless otherwise described below. Some logs exhibited log-shaped indentations, possibly the result of compression from the pressure of the logs and fill above. Others were deliberately notched to allow them to fit together into specific types of joints, some made more crudely than others. Occasionally, notches or cuts were observed in places on the logs that did not or could not fit together, a possible indication of reuse. No fasteners were documented in any of the Whitehall Slip log construction, although occasional vertical rods were documented (possible lock bars).

The field methodology generally precluded exposure of any block in its entirety. In only two instances were parts of more than one side of a form exposed. Therefore, use of the terms "grillage" or "cribbing" in describing the forms implies conjecture based on the construction method and structure type. The specific forms of grillage, cribbing, and joinery found at various parts of the Whitehall Slip excavations are discussed below in relation to analytical units. All logs were horizontal and stacked perpendicular by courses, unless otherwise described. Cross sections of 34 logs were cut for potential dendrochronological analysis, more than the 24 samples specified in the approved data recovery plan (Dewberry 2005c). All were processed and are discussed below. The complete report on the dendrochronological analysis is **Appendix H**.

3. DEFINITION AND DESCRIPTION OF ANALYTICAL UNITS

Observations in the field led to the definition of four possibly unique sections of Whitehall Slip based on construction forms, site access, location within the site, modern intrusions, and/or excavation date. These are, from north to south, WHS A, WHS B, WHS C, and WHS D (see **Figure 5.64**). WHS A is assigned to the northern extent of the excavation area, in the northeast corner of Peter Minuit Plaza, under the decking. It was separated from the other AUs by the then-existing stairs to the R/W subway. WHS B was the section of Whitehall Slip first identified. It was located just south of the R/W subway stairs. WHS C was located approximately halfway between the R/W subway stairs and the southern secant wall. The division between WHS C and WHS D is based on modern intrusions. There was an elevated rail footing located near Decking Column C 14, as well as a large duct bank. These intrusions divided the area south of WHS B almost in half. In addition to the modern intrusions, WHS C and WHS D were located at what would have been the separation of two sections of cribbing blocks.

These analytical units were assigned to contexts of recovered artifacts, soils, and samples, regardless of their depth or elevation within the site. The database does not accommodate multiple AUs (e.g., WHS A could not be further divided into upper and lower levels using a filter on the existing database) and therefore compilation of data based on depth was done manually and is presented in the discussion of secant piles and AUs that follow. In addition to AUs, the log samples were also identified by the collection dates. These dates were applied directly to the logs after sampling. This was the way logs were identified and marked in the field during Whitehall Slip excavations and then transmitted for dendrochronological analysis. The AUs were later provided for use in reporting (see **Appendix H**).

4. WHITEHALL SLIP SECANT PILES

Secant piles and decking columns were sampled as described in **Chapter 2: B. Field Methods**. The primary purpose of secant pile sampling was to identify concentrations of artifacts which could have been used to predict locations of deposits worthy of Phase 2 evaluation. However, the placement of the non-removable decking precluded further exploration until the general excavations began in the area of Whitehall Slip. One dense concentration of artifacts was identified during secant pile sampling in what was later identified as Whitehall Slip; located between SPs 114 and 120 in WHS C (see **Figure 5.65**). All of the secant piles within the footprint of the Whitehall Slip excavations contained shredded wood, an indicator of the presence of timber features.

The secant pile sampling also produced several individual artifacts, or classes of artifacts, of interest. One was a 1758 commemorative medal that had a hole pierced through it (Cat. 15598.099). The piece commemorates Admiral Boscawen's victory at Cape Breton in Louisbourg during the Seven Years War (see **Chapter 4: A.10. The French and Indian War**

Period and **Chapter 6: E.1. WHS A**). The medallion was recovered approximately 15 to 20 feet below the ground surface in WHS A (9.6 to 14.6 feet below sea level). Another compelling artifact recovered during sampling, also from WHS A, was a small rounded stone with an "X" or "+" incised on one side (Cat. 15598.096). This type of mark has been associated with West African ritual practices (see **Chapter 6: E.1. WHS A**).

Details of the stratigraphy within the secant piles are presented in **Appendix N**. Each level of the secant piles and decking columns was analyzed to determine the earliest possible deposition date (TPQ) (see **Table 5-11**). One would expect to see artifacts with earlier dates toward the bottom of the secant pile/column samples and more recent dates near the upper levels of the excavation.

Table 5-11
TPQs from Secant Pile/Decking Columns with Number of Contexts by Levels within Analytical Units

Level	WHS A	WHS B	WHS C	WHS D
2	1970 (n=14)	1970 (n=8)	1970 (n=16)	1970 (n=16)
3	1970 (n=14)	1970 (n=8)	1970 (n=16)	1940 (n=17)
4	1758 (n=13)	1899 (n=8)	1807 (n=15)	1970 (n=17)
5	1670 (n=12)	1893 (n=7)	1864 (n=10)	1820 (n=10)

A deviation is seen between more recent upper levels and older lower levels in the WHS C and WHS D samples. Part of the reason for the departure from the expected chronological sequence, as well as the reason late-20th century dates apply to at least the Levels 2 and 3 in all AUs (the approximate base of Whitehall Slip), has to do with not comparing apples to apples. Precise measurements of the depths of individual samples from the secant piles and decking columns cannot be known, as discussed in **Chapter 2: B. Field Methods**, because the augur did not contain a gauge and physical measurements were not possible for most samples. Therefore, it is possible that the soil from Level 5 in one sample may correspond to Level 4 in another. However, some generalizations about the depths and material remains within the samples can be made. Specifically, it may be assumed that the lowest level of these samples were from within, or below the fill that either created or filled Whitehall Slip. **Table 5-12** contains the artifact data from the basal stratum of the secant piles and decking columns. In cases where Level 5 was not present, Level 4 was selected as the basal stratum, etc.

Table 5-12
TPQs from the Basal Stratum of Secant Piles and Decking Columns in Whitehall Slip

AU	TPQ	# Contexts
WHS A	1670	14
WHS B	1893	8
WHS C	1970*/ 1864	17
WHS D	1893	20

Note: * One piece of a plastic bag was recovered; if a contaminant, then the next TPQ from this AU subset is 1864.

The data could be expected to provide a general time frame for the historic filling of the four analytical units within Whitehall Slip. However, based on the historical data (see **Chapter 4:**

B.7. Filling in Whitehall Slip), this is not the case. The field and artifact data from the secant piles and decking columns show a wide variation of possible deposition dates. One possible explanation is the lack of vertical control on the secant augur. Another possible explanation is contamination; likely because the augur normally spread all samples in the same pile. The TPQ from the northernmost AU, WHS A, is much earlier than the construction of that section of Whitehall Slip, and the TPQs from the other three sections are substantially later than the Slip was filled in. Therefore, while the secant pile sampling was successful in identifying concentrations of artifacts and possible wooden landfill-retaining structures, as well as documenting soil types, it was not successful in providing information on deposition dates of the fill in those locations. Additional analysis of the fill is provided below with the other excavation data from the AUs.

5. WHITEHALL SLIP ANALYTICAL UNITS

As previously presented, the methods of excavation and documentation for Whitehall Slip were the same for both the Phase 2 evaluation and Phase 3 data recovery (see **Chapter 2: B. Field Methods**). Exposed areas were manually cleaned, documented, drawn and photographed, soil was sampled for artifact recovery, and then sections of the log structure measuring approximately five feet wide were mechanically removed and logs sampled. If more of the Slip structure was exposed, the process was repeated.

Because the field methods did not vary, and no individual excavation units or other systematic archaeological units placed, there is no presentation here of such data. Analytical units for Whitehall Slip were assigned based on physical location within the South Ferry Terminal site, therefore the following discussion is grouped by AU. Excavations in each AU, as well as what was recorded for each, will be described. All exposed accessible sections of Whitehall Slip were drawn in the field, and samples of soil were screened for artifact recovery as specified in the approved data recovery plan (Dewberry 2005c). Twenty-nine locations were documented in this way. Multiple drawings were produced for some locations if they were very large or more complex; thus, a total of 41 drawings are listed as profiles in the drawing inventory (see **Figure 5.67** and **Appendix A**). In addition, numerous field notes contained sketches of various aspects of Whitehall Slip. Three hundred and seven catalog numbers were assigned for Whitehall Slip. This includes 298 artifact proveniences and eight soil samples collected for possible geochemical analysis, in addition to one concrete sample. The soils have not been processed, but have been kept with the collection. During the analysis and reporting phase of the South Ferry Terminal project, it was advised that soil from the Whitehall Slip fill would not lend itself to meaningful analysis which could advance the project's research goals (see **Appendix I**).

In the following discussion of Whitehall Slip AUs, there is an attempt to quantify the number of crib and grillage forms, and the wood types. However, since there was not a 100% sample, the number of these forms and types is relative. Furthermore, because the typology was not created until after the excavations were completed and only one side of the forms was available for documentation in most cases, form types were inferred based on construction method and structure type. Finally, the discussion of fill pertains to the use of the typology which categorized fill as either containing "large aggregate" such as stones, cobbles, or ballast, or "fine fill" such as sand, silt, and refuse (see **Chapter 4: C.4.b. Fill Material**).

a. WHS A

WHS A was located to the north of the then-existing R/W subway stairs and not accessible to the archaeologists until the stairs were demolished (see **Figure** 5.64). The structure of Whitehall

Slip in this northern area was built of both wood and stone. The samples analyzed from the log construction were exclusively pitch pine and were crib and grillage forms as part of the Slip. Fill consisted of large aggregate and refuse.

Parts of six cribbing blocks and grillage forms were documented at WHS A. One of the cribbing blocks contained a solid bottom platform. Other logs were also identified that might have been part of cribbing or grillage which were only partially preserved. Only one timber joint was observed at WHS A. This was a scarf joint documented at the base of the grillage structure; however, no evidence of how it was held together was present. In addition to the cribbing, a stone wall that would have been in a line with the head of the Slip was located in WHS A (see **Figure 5.68** and **Figure 5.69**). Data recovery of this AU took place from September 27 through October 3, 2005.

Once the first opening was jack-hammered through the north side of the R/W staircase, fill similar to the fill documented in the remainder of Whitehall Slip excavations was identified, although it was more disturbed. A sample of soil was screened for artifact recovery (Cat. 15598.065). It contained two creamware sherds, among a few other artifacts. The beginning date of manufacture for this type of creamware is 1770[16], indicating a possible 18th- century deposit. The following day, as more of the subway stairs were removed, part of a log crib was exposed. Contractor excavations and archaeological work proceeded from south to north in WHS A. The northwestern section was the last to be excavated.

When the first log form at WHS A was exposed, one log was clearly visible running in an east-west direction along the base of the excavation. The cut ends of four other logs were documented perpendicular to it, with three above and one below the east-west log (indicating the presence of a crib block form). No joinery was observed. In addition to the crib block form, there was a vertical piece of cut wood (a board), likely from the original construction of the subway stairs to the west, and a large amount of cobbles above and/or within the block, to the east of the vertical member. There was also some unarticulated cut stone to the east of the crib form. A concentration of brick debris was also noted above and/or within it. It is possible that the brick, like the vertical board, was related to the former subway stairs. Brick was used in the construction of the stairs, and similar wooden forms were documented along the southern edge of the R/W stairs prior to their removal.

Several samples of fill from the crib block were taken for artifact screening (Cat. 15598.066) but no temporally diagnostic artifacts were recovered. The soil beneath the crib block was very dark gray silty sand and was ultimately found at this depth throughout WHS A. It was the same soil that was previously documented in the secant pile sampling at these depths.

As mentioned above, one of the unique features in WHS A was a dry-laid, cut stone retaining wall that would have historically been located in a line with the head of the Slip (see **Figure 5.69**). A wooden drain was documented within the wall that would have kept the ground surface to the north of the Slip relatively dry. The drain measured 0.9 feet high by 1.1 feet wide and was made of four wooden planks. The drain was found filled with soil, some of which was screened for artifact recovery (Cat. 15598.160). Among other artifacts, two sherds of creamware were recovered, indicating a TPQ of 1770. Once the soil was removed for screening, the drain hole was probed and found devoid of additional soil. A measuring tape was inserted into the void for

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[16] Although creamware production began in 1762, it is not found in quantities until after 1770; therefore, the 1770 date is used for this report.

a distance of 12.5 feet before being obstructed by an unknown impediment. Four samples of the planks were taken for possible dendrochronological analysis (Cat. 15598.351). The bark edge and outer rings were not present; therefore, the date of death of the tree could not be established. However, growth rings for the year 1740 were present on one of the samples, indicating the drain was built no earlier than that year (see **Appendix H**).

Historic documentation identified a drain constructed in 1746 at the corner of Whitehall and Pearl Streets, one block to the north of the South Ferry Terminal project, providing confirmation that drainage was a concern in that location as it must have been all along the waterfront (**see Chapter 4: B.7. Filling in Whitehall Slip**). The stone embankment was four-and-a-half feet high and was faced with one course of flat cut stone. A 7.5-foot-long section was found approximately 8.8 to 13.3 feet below ground surface (elevations 3.3 to 7.9 feet below sea level). It was constructed of cut face stones, primarily schist, one course thick. The stones measured approximately five to six inches in height and varied considerably in width, with some as wide as 1.3 feet. Rubble stone and cobble fill were found behind the wall face. These fill stones were six to nine inches in diameter. A sample of soil was screened from this area (Cat. 15598.074) and a TPQ of 1775 was determined based on the beginning manufacture date of two painted pearlware ceramic sherds. Two vertical stakes were documented to the south of the stone wall. One was two-and-a-half feet high, and the other four feet high (see **Figure 5.68**). It is not clear if or how they are related to the Slip structure.

Additional log construction was documented to the west of the stone wall found in line with the head of the Slip. Although only one face of this section was visible, it appeared to be part of a grillage form (see **Figure 5.68**). The diameter of the logs was between 0.8 and 1.3 feet each. Those in the north-south direction were packed tightly, one directly next to the other, so that their cut ends were sticking out. There were three rows of logs in this direction, and two rows at a 90 degree angle to them (east-west). A sample of soil from between the logs was taken for screening (Cat. 15598.086). The soil beneath the grillage structure was the typical very dark gray silty sand. However, in this location, it contained a substantial amount of shell (Cat. 15598.085). Neither of the sampled contexts contained temporally diagnostic artifacts. However, there was some brick and a roofing tile fragment, an indication of either construction or demolition rubble.

An elevated railway footing was documented 13 feet to the northeast of the retaining wall. A series of smaller logs measuring approximately six inches in diameter was documented between the wall and the footing, roughly five-and-a-half feet northeast of the wall face. These logs all ran in a north-south direction and were stacked five high and three to five wide. This might have been part of a grillage form, but the remainder was not extant, therefore, the small logs could simply have been part of the fill. No evidence of how the logs were held together was present. A sample of soil from the base of these logs was screened for artifact recovery (Cat. 15598.083). The TPQ of 1770 for this deposit is based on one creamware sherd. This is also the area where the secant pile sampling produced a 1758 medallion commemorating the victory of British Admiral Boscawen over the French at the Fortress of Louisbourg in Nova Scotia (see **Figure 6.19** and **Chapter 6: E.1 WHS A**).

While the contractor was removing the headwall stones using a small backhoe, a series of vertical logs was observed behind the wall fill running along a line in an east-west direction. These logs could have been part of a form to contain the wall fill, or part of an earlier bulkhead. Alternatively, they might have been related to the previously documented series of small logs to the northeast.

Although the soil above the stone retaining wall appeared heavily disturbed, it also contained a relatively large amount of shell. A sample of the fill above the stone wall was screened for artifact recovery (Cat. 15598.159), as was soil from the base of the wall (Cats. 15598.070 and .073). The TPQ of the fill above the wall is 1775, based on one pearlware sherd. The TPQ of the deposit at the base of the exterior of the wall is 1770, based on two creamware sherds recovered from that context. As mentioned above, artifacts recovered from the wall fill and wall drain also possibly date to the 1775, suggesting that the retaining wall area found in a line with the head of Whitehall Slip was filled in the late-18th century, a date consistent with the historical record. Similar dates were attributed to the soils recovered from the adjacent log construction.

Historic documents indicate the northernmost part of Whitehall Slip was filled circa 1772-1774 (see **Chapter 4: B.7. Filling in Whitehall Slip**). Additional analysis of the area of the stone retaining wall as well as to the north of the wall was conducted to determine if the TPQs for these deposits could be associated with that time period. They could not. Even the northernmost reaches of WHS A have a 1775 TPQ for the fill, suggesting the area first filled was located to the north of the South Ferry project corridor. Samples from nine logs were taken from throughout WHS A for possible dendrochronological analysis. Seven of the recovered logs were viable and provided good and consistent dates. All were pitch pine. Six of the logs had good bark surface and show that the date of death of these trees is 1734. The other sample did not contain the outer bark surface, but dates to at least 1733. Results demonstrate the wharfing-out of the part of Whitehall Slip within the South Ferry project corridor had begun in 1734 or 1735; the filling-in at WHS A likely began no earlier than 1775. The relationship of the head of the Slip in 1782 to the project site is depicted in **Figure 5.136**, along with construction and filling episodes as identified during the analysis of the field results.[17]

b. WHS B

WHS B was located directly south of the former R/W subway stairs and was the first AU within Whitehall Slip to be documented (see **Figure 5.64**). Documentation began on August 22, as part of the Phase 2 evaluation of Whitehall Slip, and data recovery at WHS B was completed on September 12, 2005. The structure of WHS B was wood. Log construction forms documented include parts of one large cribbing block and two grillage structures. One cell of the large cribbing block contained a solid bottom platform. It is possible that another form was partially present at WHS B, and this triangular form is discussed in greater detail below. WHS B exhibited the greatest variety of wood species of all the Whitehall Slip AUs. Of the seven log samples analyzed, three were pitch pine, three were white pine, and one was oak. Fill at WHS B consisted of large aggregate and refuse.

A vertical square notch was documented in one log of the top course at the western end of the grillage, as if to receive a vertical lock bar. A possible lock bar was present at the eastern end of the contiguous cribbing block, although with no notching in the logs visible. Corner saddle notching was documented in some, but not all, layers of the cribbing. No timber joinery was documented elsewhere in the grillage at WHS B.

The WHS B section of the archaeological remains of Whitehall Slip, as they were first exposed, contained, or lacked, several notable components. There were no logs visible in the central part

[17] The overlay of the portion of the 1782 Campbell map depicted in **Figure 5.136** is based on field results and not GIS, therefore it differs slightly from **Figure 4.19**, the full Campbell map overlay. See **Chapter 2:A. Historical Research Methods** for a discussion of how the GIS map overlays are created.

of the initial exposure (see **Figure 2.10**). The largest logs first seen at WHS B were documented at the northern end, measuring approximately one foot in diameter. These were tightly packed in an east-west direction, suggesting a grillage form. The logs extended roughly from Decking Column C 6 eastward for approximately 13.5 feet (see **Figure 5.70**).

In the southern part of WHS B, there were initially far fewer logs exposed. Although there were a couple of large logs and a few smaller logs exposed there (see **Figure 2.10**), the more interesting aspect of this part of WHS B was that it contained brick and shell fill as well as cobbles. This is in contrast to the ubiquitous cobble fill seen elsewhere in Whitehall Slip. A concrete-encased duct bank was directly on top of the shell and cobbles, limiting access and making it physically dangerous to work beneath, as well as limiting the amount of soil which could be sampled for artifact recovery. This section of WHS B was located from Decking Column C 10 eastward, from 10 to 14 feet, to the duct bank, and then north for approximately ten feet.

Because WHS B was so different in the north and south, and because site logistics required that contractor equipment access had to be different in these two areas, they were approached differently. The southern end was approached from the west side, and the northern end from the south underneath the decking. This was the only opportunity the archaeological team had to document part of a plan view of Whitehall Slip.

In the north, the contractor worked under the direction of the archaeologists to remove the fill above the logs by hand. The archaeologists then cleaned the logs with shovels and trowels, sampled soil for artifact recovery, and measured the logs for field drawings. This approach of completing archaeological documentation established at WHS B—removing the logs for dendrochronological sampling, then proceeding another five feet either northward or eastward until the end of the Slip was encountered and archaeologically documented—was followed throughout the remainder of the Whitehall Slip excavations, in effect excavating from the side rather than from above.

As excavations progressed from the center of WHS B north toward C 6 and the R/W subway stairs, additional logs were exposed, as was a brick and concrete footing for the former elevated railway. However, the existing subway stairs were directly behind this first section, limiting progress to the north: these logs had been cut through during construction of the stairs (see **Figure 5.71**). The other ends of the logs in the northern section of WHS B are indicative of the cuts made when Whitehall Slip was created, some with wedge-shaped cuts clearly evident. The wood was in good condition, with some bark remaining on many logs, except for the upper two logs, which appeared quite worm-eaten, probably because they were historically between the high and low tides (logs at elevations 0.4 feet above to 1.6 feet below sea level).

The logs in the northern end of WHS B were six high, one on top of the other. The base of the pit at the bottom of the logs in this location was at elevation 5.6 feet below sea level (11 feet below ground surface). There were some small stones wedged between the logs. It is not clear if these stones were chinking or if they were lodged there due to the weight of the fill. A few additional partial logs were documented between Decking Column C 6 and the subway stairs. This area was triangular-shaped in plan view because of the angle of the stairs to the logs of Whitehall Slip. No perpendicular logs or vertical members were present in this part of WHS B, and it is tentatively identified as part of a grillage form based on the size, density and configuration of logs present.

Samples of soil from this section were screened for artifact recovery. The soil above the logs was mottled dark brown sand fill. Contexts from the top of the logs include Cats. 15598.079 and .347. The TPQ for this deposit is 1880 based on a machine-made iron spike. The soil between the logs was very dark gray silty sand (Cats. 15598.006, .018, .019, .078, and .162). The TPQ for this deposit is 1770 based on two creamware ceramic sherds. Contexts beneath these northern logs include Cat. 15598.077. No temporally diagnostic artifacts were recovered from this context. However, there were three pipestems whose manufacture cannot be narrowly dated.

The southern section of WHS B exhibited more variability than that documented to the north. Initially, there were only two larger-sized logs visible, of similar diameter and orientation to those documented in the northern part of WHS B (see **Figure 5.72**). There was also a series of four smaller diameter logs toward the eastern end of the large logs, each four to six inches in diameter. These were roughly at a 90 degree angle to the larger logs, although not articulated with them and extended northward toward the shell deposit (see the center of **Figure 2.10**). Because there was no articulation, no interpretation regarding their incorporation into a particular log construction form is suggested. These smaller logs were at an elevation just above the larger logs and beneath the concrete encased duct bank.

Removal of the duct bank facilitated safe entry and archaeological documentation. The dense oyster shell deposit located directly to the north of the smaller logs was approximately three feet thick and was found between 7.3 and 10.5 feet below ground surface (elevation 1.9 to 5.1 feet below sea level). It measured approximately eight feet north to south. Some of the shell was screened during the Phase 2 evaluation and was found to be devoid of artifacts. Additional screening during data recovery only produced one tin-glazed ceramic tile sherd with blue decoration (TPQ 1625) (Cat. 15598.014), and samples of the shell and wood were also retained from these contexts. The stratum beneath the shell deposit was densely packed fill containing cobbles, cut stone, and brick, and was approximately one foot thick. This stratum could represent possible construction/demolition debris and/or Slip fill. Screening produced many artifacts (n=219) (Cat. 15598.013). The TPQ of 1775 comes from one sherd of creamware and two pearlware sherds. This suggests that the shell deposit post dates 1775.

Once this section of Whitehall Slip was documented and the shell and construction/demolition debris was removed, additional log construction, both grillage and cribbing forms, was exposed between decking columns C 10 and C 11, extending eastward toward the secant wall. This section of Whitehall Slip was very large (ultimately over 40 feet long in an east-west direction) and consisted of at least two cribbing blocks and part of one or two grillage forms (see **Figure 5.73**). The northern section of the plan view shows the open cells of the two cribbing blocks and the adjacent grillage measuring approximately 25 feet east-west in the drawing. Some of the logs spanned multiple blocks, with individual logs ranging in length from as little as nine feet to as long as 28 feet, measured after removal. All logs were approximately one foot in diameter. Most of them had wedged-shaped ends. Many of the logs exhibited saddle notching at the corners where they articulated. The log labeled elevation “C” on **Figure 5.73** contains a vertical square notch. The log labeled elevation “I” abuts the west side of the possible vertical lock bar. Densely packed cobbles were frequently observed as the predominant fill component.

The grillage structure was built somewhat differently than those described in **Chapter 4: C.4.c.2. Grillage** where continuous courses of logs comprised all layers. This grillage structure at WHS B had four layers of logs. The plan view shows that part of the uppermost course was comprised of three logs in a continuous course. It also depicts the second course, north-south logs spaced approximately 7 feet apart. These extend approximately 1.5 feet beyond the north end of the block. Some of the densely packed cobbles can be seen near Decking Column C11. These cobbles, rather then logs, were present throughout the second layer between the two logs shown on the plan view. The bottom two layers of this grillage structure were continuous logs.

Adjacent to the grillage, there was an unusual wooden configuration comprised of a series of small, tightly packed logs, generally from three to five inches in diameter. It is possible these logs were part of the fill of another log form whose larger members were previously disturbed by a nearby elevated railway footing removed during the South Ferry excavations. Alternatively, they could have been related to a platform that might have been used in the construction of Whitehall Slip or to stabilize part of the cribbing or grillage forms.

A unique piece of triangular timber frame construction was also located in this part of WHS B (see **Figure 5.74**), to the west of the aforementioned small diameter logs and directly to the south of the two large logs depicted in **Figure 5.72**. This triangular arrangement of boards measured approximately five feet high, and the base was seven feet, although the bottom member was 11.8 feet long, extending approximately one foot to the east and 3.5 feet to the west. The wood on the two sides of the triangle were each five-and-a-half feet long. The boards were nine inches across. The triangle was fastened together by round wooden pegs measuring approximately 1.5 inches in diameter.

The arrangement exhibited several types of joinery. The longer member was fastened to the eastern of the two shorter members by a mortise and tenon joint held in place with two wooden pegs. The western of the two shorter members was attached to the base of the triangle with a pegged lapped half dovetail joint. The two shorter pieces were fastened at the top of the triangle with a peg. The pegged joint is likely a variant of a lap; however, it had been partially destroyed during the construction of the overhead duct bank and further damaged during machine removal, precluding a more precise identification. Two square notches were also present in the longer piece on the bottom side. One was located roughly in the middle of the triangle (see **Figure 5.74**), and the other to the west.

The soil inside the triangle was brown sandy silt, becoming grayer with depth, amid dense cobbles. Only two artifacts were recovered from a sample of the soil within the triangle (Cat. 15598.161). These were an undistinguished bottle glass sherd and a piece of painted stoneware with a beginning manufacture date of 1720. Many additional soil samples were screened for artifact recovery in other places within the southern part of WHS B. Contexts from directly on top of the Slip logs include Cats. 15598.028, .029, .030, .031, .032, and .163. Temporally diagnostic artifacts from these contexts include several sherds of creamware (post-1770). Contexts from the slip fill in this area include Cats. 15598.003, .004, .005, .011, .027, .034, .037 and .039. One sherd of dipt creamware with a beginning manufacture date of 1790 provides the TPQ for this deposit (Cat. 15598.011). Contexts from beneath the slip logs could date as early as 1720 based on two stoneware ceramic sherds (Cat. 15598.120).

In addition to screening soil for artifact recovery, soil was sampled for possible geochemical analysis from contexts above the Slip logs, in between the logs comprising the Slip structures and from beneath the Slip logs. None of this was processed for geochemical analysis, and the samples remain with the collection.

Dendrochronological analysis was done on seven viable logs out of the ten recovered from WHS B (see **Appendix H**). Three of these logs were pitch pine, three were white pine, and the other was oak. The date of death for one of the pitch pine samples is 1734. Another was missing the bark edge, thus precluding assigning an absolute date of death. The third was missing the bark edge, but provided a date of death post-1730. The oak tree sample could also only be partially dated, suggesting the tree was cut sometime after 1725. The pitch pine and oak samples were recovered from the northern part of WHS B and are in keeping with the dates for WHS A. The white pine in WHS B was recovered from the southern part of the AU. One sample was from a tree cut in 1784, and another from 1785. The third was missing the bark edge, but dated to after 1780. This is a confirmation of the field observation that construction forms were different in the north and south sections of WHS B, with the actual logs used in the construction cut a half-century apart. The inference here is that there were two different construction episodes; circa 1734 and circa 1785, because it is not conceivable that the logs were stockpiled for that length of time (see **Appendix H**).

c. WHS C

WHS C was located to the south of WHS B and was arbitrarily divided from WHS D based on modern intrusions (see **Figure 5.64**). Data recovery of WHS C took place between September 9 and September 16, 2005. The structure of WHS C was wood. Log construction was exclusively cribbing form. Parts of three cribbing blocks containing at least seven cells were documented. Three to four layers were present. Cells measured four- to six-feet across. As with the other sections of Whitehall Slip, all logs were in the round, and some of the logs had wedge-shaped ends, while others were cut straight. However, there was one squared timber documented toward the southern part of WHS C. Of the seven log samples analyzed, four were white pine and three were eastern hemlock. Fill consisted of large aggregate and refuse in a matrix of dark gray silt.

Almost all of the logs were connected with saddle joints (see **Figure 5.75** and **Figure 5.76**). At least one scarf joint was also present. Square cut notches were observed toward the southern part of WHS C; however, no cross members were present. This may be a result of the reuse of logs to construct or repair sections of cribbing or possibly a result of shifting due to the weight of the overlying fill. Measurements of these logs indicate a size range of from 10.5 to 29 feet in length and from 10 to 15 inches in diameter.

The one square cut horizontal timber documented at WHS C was located near Decking Column C 15, running in an east-west direction (see **Figure 5.65** for Decking Column locations). One end was resting on a vertical log, and the other was not visible (see **Figure 5.77**). It measured one-and-a-half feet square and 11.3 feet long, as noted upon its removal. There was a lap joint on one side measuring seven inches wide and cut three inches into the wood, located four feet from one end of the timber. At the midpoint of the wood, on the opposite side of the lap joint, was a possible mortise, also measuring seven by three inches. Once this member was removed, two vertical boards were exposed approximately six feet north of Decking Column C 15. They each measured eight inches across and 3.5 inches wide and were cut into picket-like shapes at the top. One was four feet high and the other 4.8 feet high. They were separated by six inches, and the fill between them was the typical very dark gray silty sand. The elevation of the top of these members was 0.1 feet below and 0.2 feet above sea level (5.5 and 5.2 feet below ground surface). After measurements and photographs were completed and these two boards removed, a brick feature was documented east of Decking Column C 15, abutting the secant wall. This was likely either part of an elevated railway footing, or another type of support that was documented during the excavation for the secant guide wall (see **Chapter 5: C.4.a. Brick Contexts**).

Another unique wooden component found at WHS C was a triangular arrangement of boards, similar to that documented in WHS B, observed at a distance of roughly 21 feet to its north. This section of Whitehall Slip was very unstable and not safe to enter to take measurements or photographs. The orientation of this triangle was similar to that in WHS B, leading to speculation that they were related. Based on their shape, one possibility was that these triangles might have been part of a building or shed roof; however, the extended length of the base documented in the WHS B example would have resulted in an unusual building configuration and therefore this interpretation was dismissed as unlikely. Another possible explanation is that the triangles have to do with an as yet unidentified landfill structure or form. This interpretation is problematic in that no visible connection between the two triangles was found. A sample of soil from between the triangles of WHS B and WHS C was screened for artifact recovery (Cat. 15598.038). It contained shells, both red and yellow brick fragments, mortar, shoe leather, and three ceramic sherds. The TPQ of the deposit is 1720 based on a piece of painted stoneware.

WHS C was also the location of the recovered concentration of hand-painted pearlware ceramic sherds which ultimately was contained in a footprint measuring close to 30 feet in diameter (Cats. 15598.053, .054, .055, and .056) (see **Figure 5.78**). These ceramics likely represent a dump site of a ceramic importer and are discussed in detail in **Chapter 6: E.3. WHS C**. A total of 472 painted pearlware sherds were recovered from seven non-secant pile/decking column contexts in Whitehall Slip. The majority of those ceramics are from Cats. 15598.053 and .056. The beginning manufacture date of these wares is 1795; however, other characteristics of this collection indicate a production date circa 1800 - 1810.

Two two-inch-thick strata containing fibrous decaying wood and shell separated by gray sandy silt were found beneath the cribbing block near decking columns C 11 and C 13. These were underlain with a stratum of brick debris in a matrix of gray silt that was underlain in part by a black, ashy burned stratum. The historic documentation indicates that fill was used from debris of fires that raged in the area in 1776 and 1845 (see **Chapter 4: A.13. The British Occupation of New York City** and **Chapter 4: B.5.a. The Ferries**). The burned stratum did not contain any temporally diagnostic artifacts. However, the overlying gray silt did. These include a creamware ceramic sherd with a beginning manufacture date of 1770, providing the TPQ (Cat. 15598.049). The burned deposit did contain predominately shell and wood; however, it also contained a clump of unidentifiable hair and shoe leather (Cat. 15598.041). A dense quantity of shoe leather was recovered from the gray silt above this stratum (Cat. 15598.049).

As with the other Whitehall Slip AUs, an attempt to identify possible deposition dates relative to the log forms was sought by analyzing TPQs from deposits above, amongst, and beneath the logs. Only artifacts from secant piles and decking columns were collected from deposits above the cribbing at WHS C. The TPQ of these is 1970 (**Table 5-11**). The fill within the cribbing structure was dominated by the painted pearlware deposit, however, one whiteware ceramic sherd provides the 1820 TPQ (Cat. 15598.054). Of the three contexts from fill beneath the log cribbing (Cats. 15598.041, 046, and .049), the TPQ of 1780 comes from a stamped stoneware sherd.

Samples from nine logs were taken from WHS C for potential dendrochronological analysis. Seven of these were viable; however, only four of them were able to provide absolute dates of death for the trees. These were two white pine samples, one from a tree that died in 1783 and the other from a tree that died in 1785, and two hemlock samples that died in 1796. A third hemlock sample provided poor dating on the outer rings and a possible date of death around 1801. The other two white pine samples did not have a bark edge and date to post-1768 and post-1780. As with WHS B, WHS C exhibits a dichotomy of construction dates; however, not as great. The white pine samples are consistent with a date of death by 1785, similar to the results of the white pine at WHS B. However, the eastern hemlock was cut more recently, 1796 or later. The instability of the fill at WHS C prevented access to enable the marking of logs prior to excavation, and therefore it is not known if the pine and hemlock were from the same or different parts of WHS C. The presence of several logs with square notches that did not correspond to cross members, indicating possible reuse, could also explain the later dates. If a repair was completed post-1796, the more recent logs could have been added to the earlier circa 1785 construction. Alternatively, the two dates could merely represent different construction episodes.

d. WHS D

WHS D was located in the southernmost part of the excavation area, at the southeastern corner of the South Ferry Terminal excavations in Peter Minuit Plaza (see **Figure 5.64**). The possible southern extent of the log construction of Whitehall Slip was documented approximately 12 feet north of the southern limit of the new South Ferry Station. Data recovery of WHS D took place from September 1 through September 21, 2005. As mentioned above, this AU was similar in construction appearance to WHS C and was defined by its location, arbitrarily divided from WHS C by modern intrusions, but at a break in cribbing blocks. Parts of five cribbing blocks, including 14 cells, were identified. Up to four layers were present. One large cribbing section included five cells (see **Figure 5.79** and **Figure 5.80**). Of the six log samples taken for potential dendrochronological analysis from WHS D, only four were viable. Two were pitch pine and two were white pine. Fill consisted of large aggregate and refuse.

Cells in the WHS D cribbing blocks ranged in length from five to seven feet long. One distinction between WHS D and WHS C is that numerous square timbers and other cut wood members were present in WHS D. One square log, three vertical rods, and one horizontal rod can be seen in **Figure 5.80**. Most of the WHS D logs had saddle notches, but, in contrast to WHS C, no square cut notches were documented at WHS D. WHS D had two possible scarf joints. However, it is also possible these were merely an overlap in the two separate cribbing blocks. One of these is depicted in the bottom course on **Figure 5.80**.

The fill matrix in WHS D was dark gray silt, as seen throughout Whitehall Slip. However, in parts of WHS D, brown sand was documented near the base of the cribbing blocks, above the silt. A layer of densely packed rock was documented in the middle layer of the cribbing at the northern end of WHS D. WHS D also contained more brick fragments within the fill than was recorded in other units of Whitehall Slip. Brick fragments were also regularly mentioned in the field records within the overburden deposits. This brick may be the remains of features related to the former cable and elevated railways that terminated at South Ferry (see below **Chapter 5: C. 3.c. Elevated Railway and Trolley Remains**).

Almost all of the artifacts from WHS D were recovered from the soil fill inside the cribbing. The TPQ of the fill in WHS D is 1840, based on two transfer-printed whiteware ceramic sherds (Cat. 15598.060). One context beneath the cribbing was screened for artifact recovery. It contained a British slipware ceramic sherd, providing a TPQ of 1670 for that deposit (Cat. 15598.059).

Two discrete artifact-bearing deposits were also investigated in WHS D. One was a shell deposit found near decking column C 20 at an elevation of 5.4 to 6.7 feet below sea level (10.8 to 12.1 feet below ground surface) (see **Figure 5.65**). In addition to shell, this deposit contained 92 other artifacts (Cats. 15598.062 and .063). The TPQ for the deposit is 1815 based on one whiteware sherd. The other discrete deposit contained an abundance of coffee beans and black cherry pits found from 11 to 13 feet south of decking column C 15 and from 7.8 to 10.8 feet below ground surface (2.4 to 5.4 feet below sea level). The pits and beans were likely from commercial processing waste (see **Chapter 6: E.4. WHS D**). Over 1,700 beans and pits were recovered from a sample of that deposit (see **Figure 5.81**). It also contained one creamware ceramic sherd, which provides the TPQ for the deposit of 1770 (Cat. 15598.082).

Samples of four logs from WHS D were subjected to dendrochronological analysis. Only one of the pitch pine and one of the white pine samples produced dates. The white pine sample was cut in 1796. The pitch pine sample was missing the outer bark surface, but contained a growth ring for 1797. These dates correlate nicely with those from the southern part of WHS C.

6. WHITEHALL SLIP CONCLUSIONS

The goals of the Whitehall Slip analysis, as defined in the data recovery plan, included defining the construction materials and techniques, identifying the timeline of construction and filling and understanding the fill itself.

Whitehall Slip was predominantly log construction made of logs kept in the round with their bark still present, with a few square-cut logs toward the southern part of the excavation. The Slip also contained a masonry wall in a line with its head for part of the distance. The wood throughout was predominantly pitch pine; however, the frequency of other wood types also increased toward the south. The forms included both grillage and cribbing blocks, but the grillage was found only in the northern sections of the Whitehall Slip excavations. Many joint types were identified, including scarf joints, saddle notched joints and lap joints. However, no increase or decrease in joint types throughout parts of the Slip was documented. Large aggregate fill and refuse was contained throughout.

Because it showed considerable internal variation, Whitehall Slip was at first presumed, and then proved through analysis, to be constructed over time from north to south. The TPQs of deposits associated with the log forms, as well as dendrochronological data on the dates of death of the trees used to build Whitehall Slip, were also examined (see **Table 5-13**). The logs date the construction of the Slip beginning after the trees died in 1734 at WHS A and the northern part of WHS B. The southern part of WHS B and some of WHS C were built with logs that were cut circa 1785. Other parts of WHS C and all of WHS D were constructed from trees that died circa 1796.

Table 5-13
TPQs Relative to Log Forms and Tree Death Dates by Analytical Unit at Whitehall Slip

AU	TPQ Amongst Log Forms	Tree Death Date(s)
WHS A	1775	1734
WHS B	1770 in north – 1790 in south	1734 and 1785
WHS C	1820	1785 and 1796*
WHS D	1840	1796**

Notes:
* Also possibly 1801, but not clear dating beyond 1775 for that sample
** One sample had a possible date of tree death at 1797

While the dendrochronological data can, by its nature, be unequivocal, the artifact data is more indicative of the trend for filling of Whitehall Slip. The TPQs of the four AUs increase as the AUs extend southward from WHS A to WHS D (with some slight overlap between WHS A and the northern part of WHS B). The dates presented in **Table 5-13** are consistent with three fill episodes within the portions of Whitehall Slip adjacent to those excavated as part of the South

Ferry Terminal project. The historical documents also show three fill episodes took place here; circa 1788, 1801-1809, and by 1845. Individual contexts that may provide insight into the types of fill and their possible source are discussed in more detail in the **Chapter 6: Artifact Analysis**.

C. GENERAL SOUTH FERRY

1. SYNOPSIS

General South Ferry excavations described in this section of the field results encompass all of the monitored areas that have not been included in either the Battery Wall or Whitehall Slip discussions. Had these two National Register eligible sites not been discovered, the General South Ferry archaeological investigations would have still produced very important data regarding the original topography, project area soils, and landfill. Furthermore, many smaller features and artifact-bearing deposits were identified within the project corridor, adding to our knowledge of factors physically associated with the growth of the City[18].

As with the Battery Wall and Whitehall Slip, analytical units have been assigned for features and deposits associated with the General South Ferry excavations based on the Areas of the site where they were identified. Areas here are those used in the provenience database (see **Table 5-14** and **Figure 2.2**). Features, strata bearing cultural material (cultural-bearing strata), and other deposits are all presented by grouping them in logical sections. Additionally, during analysis, other patterns within the deposits were sought. These are also presented. Finally, the project-wide fill is evaluated using AUs while discussing the specific types of contractor excavations that produced the data.

Table 5-14
General South Ferry Areas

Area	Abbreviation
Battery Place	BPL
Battery Park North	BPN
Battery Park South	BPS
Cobblestone Area/Coast Guard Access Road	CCG
Fan Plant Sheeted Pits	FPSP
Peter Minuit Plaza	PMP

Feature types investigated during the General South Ferry Terminal excavations include cribbing and piles, stone features, and historic transportation-related features. Investigations of cribbing and piles were undertaken in three locations; near Archaeological Test Trench ET 5 (see **Figure 2.1** for ET locations), underneath the Coast Guard Access Road (see **Figure 2.2**), and along the western cut-off wall of the South Ferry project corridor within Battery Park. Stone features included those near, and perhaps associated with, Whitehall Slip, and another concentration of stones, also in Peter Minuit Plaza[19]. Historic transportation-related features include remains of

[18] *ff*: As noted in **Chapter 2.B.1: Field Methods: Monitoring**, proveniences were often named using location information based on the contractor's terminology.

[19] A concentration of unarticulated large stones was found to the south of Wall 1 and was previously discussed in relation to the Battery Wall (see **Chapter 5:A.6. Other Wall Contexts Identified During Monitoring**).

the elevated railway, cable railway, and electrified street car system. Four cultural bearing strata had been identified in the field; brick contexts (or demolition debris), burned contexts, deposits with 17th-century artifacts, and shell contexts. These types of deposits had been documented or noted in the field at various places throughout the South Ferry Terminal project corridor. In addition to presenting the findings at those locations, results of analyses to identify other possible loci of these strata at other locations in the corridor is also presented. The presence or absence of loci of Native American materials and human remains were also investigated and are presented, as are the results of the work conducted at the Fan Plan Sheeted Pits in Peter Minuit Plaza where a concentration of possibly early cultural material was recovered. Last, but not least, the fill throughout the corridor was analyzed for soil types, depths of deposits, and artifact contents to determine what patterns and/or processes emerged. This post-field investigation has enabled reconstruction of the historic landscape as well as facilitated the critical evaluation of the historic map data.

The General South Ferry fieldwork, unlike the data recoveries conducted at the Battery Wall and Whitehall Slip, did not proceed guided by research questions, but rather by the goal of identifying potentially significant archaeological resources as defined in the ARMP and Monitoring Plan, although research questions have since been developed (**see Chapter 3: Statement of Research Questions**). These have to do with the shell deposits, identification of specific fill episodes and fill sources and the utility of examining artifacts recovered from fill contexts, and establishing/corroborating historic topography. Other post-field research questions for General South Ferry excavations have do with the evaluation of the processes and methods used to determine the successes and failures of the archaeological work at South Ferry Terminal. A discussion of the answers to those questions is presented in **Chapter 7: D. Evaluation of the Archaeological Plans and Field Methods**.

Highlights of the findings from the General South Ferry excavations are the identification of several features and the excavation of particular deposits. The features were the landfill-retaining structures found in Battery Park that date from circa 1790, possible remains of the Battery Pond, and part of a stone wall that may have been related to Whitehall Slip or to an early bulkhead. The particular deposits included three late-18th through early-19th century shell deposits. Excavation of the shell deposits provide a time frame for a little understood, but ubiquitous, deposit found at archaeological sites in lower Manhattan.

Many previously documented elevated railway footings and brick and metal features related to the trolley that terminated at South Ferry in the late-19th century were also identified. Fill deposits containing colonial bricks were also found throughout the South Ferry Terminal project corridor. Eight hundred forty-seven whole bricks were retained for Professor Allan Gilbert’s New York City Brick Archive at Fordham University. However, no specific demolition debris that could be related to particular buildings, locations, or time periods was identified, nor were any contexts representing burned deposits, the results of fires known historically to have raged in lower Manhattan. No deposits exclusively containing 17th-century artifacts were found. While some Dutch artifacts were recovered, none of the deposits from which they came can be considered 17th-century contexts. The same may be said regarding Native American materials and displaced human remains. The few Native American artifacts and fragmentary human remains were recovered from fill contexts at diverse places throughout the project corridor. The overall picture of the soil excavated from the South Ferry site is that of mixed fill that had been continually churned and added to over centuries. It is also likely that much of the original fill did not come from one source or contain primary refuse, but was instead composed of material that had already been disturbed. Possible original land surfaces were identified only within the southern portion of Battery Place, although natural marine and glacial deposits were identified consistently throughout the corridor at the deepest levels.

Data analyses were conducted to determine if specific soil types could be associated with a particular fill episode or period of filling. This analysis of the project-wide fill, with all its detail, paints a picture of the South Ferry Terminal project corridor fill as exceedingly inconsistent. No patterns among soil types, depths, locations, or TPQs emerged. The only logical conclusions are that either once the fill had been added, it had been subjected to so much additional disturbance that any fill patterns which may have once existed have long since vanished or that the sources for the fill were extremely varied and the batches of fill relatively small. However, it is most likely that a combination of these factors resulted in the field findings at the South Ferry Terminal site. These were further exacerbated by on-site disturbances from a variety of sources and projects such as Battery Park maintenance, construction and demolition of the elevated railway and trolley tracks, utility work, and construction of the earlier subway lines and the Brooklyn Battery Tunnel. However, in spite of the lack of discernible discrete deposits, some of the artifacts found were interesting in and of themselves. For example, the fragmentary Dutch and Dutch-style cooking pots, yellow bricks, roofing tiles, and tin-glazed wall tiles provide a unique picture of early New York. Additional details regarding the artifacts are presented throughout **Chapter 6: Artifact Analysis**.

2. DEFINITION AND DESCRIPTION OF ANALYTICAL UNITS

AUs associated with the General South Ferry excavations (those not associated with either the Battery Wall or Whitehall Slip) were assigned in one of two ways. In cases where artifact proveniences were established for contexts related to specific features or deposits, AUs were related to those features or deposits, either stratigraphically or spatially across the site. Stratigraphic AUs by feature were the preferred assignment; however, this was rarely possible given the nature of identification during monitoring and of these specific features and deposits themselves. When stratigraphic association by feature was not possible, spatial analytical units were assigned based on Area (see **Figure 2.2**). In cases where artifacts were miscellaneous finds or from modern fill, they were assigned a general AU.

Table 5-15 summarizes the AUs that have been assigned for the General South Ferry excavations. It lists the AU, the site area as listed in the provenience database “Area” field (also depicted in **Figure 2.2**), the section of this chapter where the context is discussed (when applicable), the TPQ, and a description of the deposit represented by the AU.

For deposits not associated with specific features or stratigraphic units, AUs were established to determine if discrete fill episodes could be identified. Two AUs were assigned for each Area to represent depths below ground surface for contexts where the vertical position is known. These are arbitrarily divided based on the depth of the finding and its location (see **Table 5-16**). For the locations where bedrock was relatively shallow, at the northern and southern ends of the South Ferry Terminal project corridor, an arbitrary one-third of total average depth of bedrock was used as a cut-off. For the locations in BPS and CCG where the depth of bedrock averaged almost 40 feet below ground surface, a one-third arbitrary split would not be practical for the analysis, since that would place the cut-off elevation for upper fill at a depth below the bottom of part of the Battery Wall remains in places. Therefore, for these two Areas, a depth of ten feet below ground surface was used as a cut-off, since this is the approximate depth of the top of Walls 3 and 4, the two Wall sections that were within CCG.

Table 5-15
Analytical Units for General South Ferry Contexts

AU	Area	Discussed in Results of Chapter 5 Section:	TPQ	Description
BP A	BPN, BPS	C.3.a. Cribbing and Piles – Cribbing Along West Cut-Off Wall	1820	Associated with large cribbing feature
BPL A	BPL	C.4.c. Deposits with 17th-century artifacts	1744	Charcoal stratum in Battery Place representing early fill.
BPL B	BPL	C.5.b. Project-Wide Fill Assessment – Soldier Pile Pits	1770	Reddish brown silt
BPL C	BPL	C.5.b. Project-Wide Fill Assessment – Soldier Pile Pits	1720	Basal silt
BPL D	BPL	C.5.b. Project-Wide Fill Assessment – General Excavations	1960	0 – 4 feet below ground surface
BPL E	BPL	C.5.b. Project-Wide Fill Assessment – General Excavations	1893	4 feet below ground surface to base of excavation
BPL F	BPL	C.4.g. Human Remains	1770	Original subway fill
BPL G	BPL	N/A	N/A	Miscellaneous fill, stray finds, utility fill, or backdirt
BPN A	BPN	C.5.b. Project-Wide Fill Assessment – General Excavations	1905	0 – 5 feet below ground surface
BPN B	BPN	C.5.b. Project-Wide Fill Assessment – General Excavations	1825	5 feet below ground surface to base of excavation
BPN C	BPN	N/A	N/A	Miscellaneous fill, utility fill, surface finds, and backdirt
BPS A	BPS	C.5.b. Project-Wide Fill Assessment – General Excavations	1921	0 – 10 feet below ground surface
BPS B	BPS	C.5.b. Project-Wide Fill Assessment – General Excavations	n.d.	10 feet below ground surface to base of excavation
BPS C	BPS	N/A	N/A	Stray or surface finds or subway fill
CCG A	CCG	C.3.a. Cribbing and Pies – Log Feature Under Coast Guard Access Road	1720	Inside the log feature matrix
CCG B	CCG	C.3.a. Cribbing and Piles – Log Feature Under Coast Guard Access Road	n.d.	Beneath the log feature
CCG C	CCG	C.3.a. Cribbing and Piles – Log feature Under Coast Guard Access Road	N/A	Miscellaneous log feature related contexts
CCG D	CCG	C.5.b. Project-Wide Fill Assessment – General Excavations	1985	0 – 10 feet below ground surface
CCG E	CCG	C.5.b. Project-Wide Fill Assessment – General Excavations	2000* (1770)	10 feet below ground surface to base of excavation
CCG F	CCG	N/A	N/A	Miscellaneous fill, backdirt, stray or surface finds, or utility fill
FPSP A	FPSP	C.4.e. Fan Plant sheeted pits	1740	Basal strata of FPSP – Battery Pond fill
FPSP B	FPSP	C.4.e. Fan Plant sheeted pits	1863	Middle strata of FPSP – Battery Pond fill
FPSP C	FPSP	C.4.e. Fan Plant sheeted pits	1950	Upper strata of FPSP
FPSP D	FPSP	C.4.e. Fan Plant sheeted pits	N/A	FPSP miscellaneous
PMP A	PMP	C.4.d. Shell Contexts	1775	EU shell deposits
PMP B	PMP	C.4.d. Shell Contexts	1845	Miscellaneous shell deposit related provenience
PMP C	PMP	C.3.b. Stone Features – Manhole 35B	1770	Stone wall similar to head of Whitehall Slip
PMP D	PMP	C.5.b. Project-Wide Fill Assessment – General Excavations	1985	0 – 8 feet below ground surface
PMP E	PMP	C.5.b. Project-Wide Fill Assessment – General Excavations	1990* (1845)	8 feet below ground surface to base of excavation
PMP F	PMP	N/A	N/A	Miscellaneous fill, backdirt, stray or surface finds, or utility fill
GSF	Any	N/A	N/A	Miscellaneous finds or general contexts with no horizontal or vertical control

Notes:
N/A = not applicable
n.d. = no date
* = more recent date includes secant piles and earlier date does not

Table 5-16
Basis for Establishing Cut-off Depths for AUs Not Associated with Features or Stratigraphic Units

Area	Average Excavation Depth	One-Third Average (rounded)	Cut-off Depth Used for Analysis
BPL	12	4	4
BPN	16	5	5
BPS	39	13	10
CCG	38	13	10
PMP	24	8	8

In addition to establishing two AUs for each Area to examine any possible similarities or differences in the fill and its contents by depth, a general AU was established for each Area. This was for material with no vertical control such as finds collected from backdirt. Finally, a general AU (GSF) was assigned for artifacts with no horizontal or vertical control such as stray finds.

3. FEATURES

This section of the report provides information on the field findings related to specific features. It identifies the analytical units used to provide meaning to the field data and begins to pull together a broader picture of the history of the South Ferry Terminal project corridor as these features generally span large areas. Cribbing and pile features include those found near Archaeological Test Trench ET 5, a log feature found under the Coast Guard Access Road, and log landfill-retaining structures found along the western cut-off wall of the South Ferry Terminal project corridor. A stone feature was found near Manhole 35B and another possible stone feature was identified in Peter Minuit Plaza. Finally, features associated with the elevated railway and trolley that once terminated at South Ferry are presented. The artifacts discussed in this section relate to either specific aspects of the features discussed and/or their ability to provide a possible earliest deposition date of the soils in and around the features.

a. CRIBBING AND PILES

Documents used during the planning phase of the South Ferry Terminal project indicated there was a high likelihood for finding remains of wooden landfill-retaining structures which had been part of the historic shoreline expansion of the area (see **Chapter 4: B.7. Filling in Whitehall Slip)**. In addition to Whitehall Slip and Wall 3 (previously discussed), several other sections of wooden log features were also identified during the South Ferry project excavations. There was a series of vertical piles in the area of one of the archaeological test trenches — ET 5 in Peter Minuit Plaza (see **Figure 5.82**). Possible cribbing was also documented under the Coast Guard Access Road in ET 4 (see **Figure 2.1** for ET locations). In the station area, logs were documented within the sheeted pits near the fan plant (see **Chapter 5: C.4.e. Fan Plant Sheeted Pits**). Finally, and most massively, along the western cut-off wall within Battery Park, a large complex of log forms was documented (see **Figure 5.82**).

1.) ET 5 Area Piles

ET 5 was the southernmost Archaeological Test Trench (ATT), and the results of its excavation are discussed in detail below. However, a series of eight vertical piles was documented in the vicinity of the ATT, which were then numbered 1 through 8 (see **Figure 5.82**). There were no horizontal logs or other cut wood associated with these piles. The piles were measured and a plan view and profiles were drawn in the field. A partially successful attempt at obtaining coordinates via GPS was completed and used in conjunction with triangulation to map the piles (see **Figure 5.83**). The top of the piles was approximately eight feet below ground surface (at sea level). The average height of the piles was less than five feet. Four strata were documented in relationship to these piles: yellowish-brown silty sand overburden fill, brown cobble-filled sandy silt, very dark gray sandy silt with shell, and dark gray sandy silt at the base of excavation. Samples of soil from the cobble-filled matrix were screened for artifact recovery. The collection was predominantly shell (44 percent) and wood or bark fragments (34 percent). Only one temporally diagnostic artifact was recovered, a Jackfield-type ceramic sherd (Cats. 16196.361, 378, 379, & 420). The beginning manufacture date is 1740.

The piles were logs whose branches had been stripped, similar to those documented nearby at Whitehall Slip, but here there was less bark remaining. Only two of the eight piles had a wedge-shaped end pointing up (Piles 5 and 6). The diameter of the logs was between eight and ten inches. The distances between the piles was measured (**Table 5-17**). There was no standard spacing documented. Only four of the piles were exposed and documented at a time, therefore there is no measurement for the distance between Piles 4 and 5.

Table 5-17
Distances Between Piles Near ET 5

Pile #	Distance Between:	Pile #
1	7.1’	2
2	5.4’	3
3	3.4’	4
5	2.4’	6
6	2.8’	7
7	1.5’	8

The wooden piles found in and near ET 5 were not assigned to a specific AU because few artifacts were recovered from the area. However, a TPQ of 1740 is associated with the lower strata and is consistent with that of the nearby FPSP area. Both are possibly related to the former Battery Pond (see **Figure 5.84**). More details on this are provided below in relation to non-feature deposits (see **Chapter 5: C.4.e. Fan Plant Sheeted Pits**).

2.) Log Feature Under Coast Guard Access Road

Contractor excavations in the area directly beneath the Coast Guard Access Road were done from the south using a front-end loader. This was because of traffic considerations. The plates covering the road could not be left open for long enough periods of time to permit excavations to take place using a backhoe from above, and there was not enough space for the backhoe to fit beneath the plates. The southern end of ATT ET 4 was located near Deck Beam 20 at the northern limit of Peter Minuit Plaza (see **Figure 5.55**). The front-end loader could excavate from that direction. A concentration of logs was documented within ET 4 approximately between Deck Beams 19 and 15 (south to north) (see **Figure 5.82**).

The log feature found beneath the Coast Guard Access Road was first identified as two logs documented in the profiles of ET 4 near Deck Beam 18 (see **Figure 5.55** for Deck Beam locations), one at seven feet below ground surface in the eastern profile and the other at 12 feet in the western profile (elevations 0.2 and 5.2 feet below sea level). However, no logs were documented within the machine cut at that point. As the excavations proceeded northward, a series of logs was documented in the eastern profile of ET 4, beginning near Deck Beam 17 (see **Figure 5.85**). Many of the logs were at 90 degree angles to one another. The diameters were generally smaller than those found at the Battery Wall, Whitehall Slip, ET 5, or the Fan Plant sheeted pits. Here the log diameters ranged from three to twelve inches.

ET 4 was closer to the eastern cut-off wall. At Deck Beam 18, it was only eight feet from the edge of the South Ferry corridor. The two concentrations of logs documented within the eastern profile between Deck Beams 17 and 15, depicted in **Figure 5.85**, had decreased concentrations of logs between them (see also **Figure 5.53** and **Composite Map**). The northern log concentration was approximately six feet long, and the southern approximately seven feet. Both were measured at elevations from 0.5 to 5.5 feet below sea level. No logs were observed in the west profile of ET 4. Furthermore, the western profile was extremely unstable, as is typical of fill deposits. However, in this case, the fill was even more unstable than that observed elsewhere near log features in the South Ferry Terminal project corridor. The logs did not continue north of Deck Beam 15. The three concentrations of logs were grouped together in the field as one log feature based on their proximity and the size of the logs used. The logs were not suitable for dendrochronological analysis because of their small size and limited numbers of growth rings, thus no log samples were taken. However, the TPQ of the recovered cultural material places the feature within the same time period as both Battery Wall and Whitehall Slip.

The soil matrix of the logs was very dark gray and very dark brown sandy silt. It was underlain with very dark gray silt to bedrock. Bedrock was encountered between 12 and 17 feet below ground surface in the Coast Guard Access Road (6.4 to 3.2 feet below sea level), almost immediately beneath the log feature. Samples of soil from both the matrix and the deposit beneath the logs were taken for artifact recovery, and a soil sample for possible geochemical analysis was taken from beneath the feature but has not been processed. Very few temporally diagnostic artifacts were recovered from these fill deposits, unlike at Whitehall Slip. Only two of the samples taken from the soil matrix produced temporally diagnostic artifacts. The TPQ of these collections is 1720 based on a white salt-glazed stoneware ceramic sherd (Cat. 16196.149). None of the soils taken from beneath the log feature contained temporally diagnostic artifacts. The majority of material recovered from these contexts was either shell (over 71 percent) or wood (18 percent).

Three analytical units have been assigned to deposits associated with the log feature documented beneath the Coast Guard Access Road. One represents the soil matrix of the feature (CCG A) and another the deposit beneath the feature (CCG B). The final AU represents miscellaneous contexts associated with the log feature (CCG C). Only CCG A contained temporally diagnostic artifacts which could be related to the feature fill. The TPQ of this collection is 1720. Therefore, the log feature is most likely associated with the landfill episode that took place circa 1734 when the earliest part of Whitehall Slip and the Wall 3 log feature were constructed.

3.) Cribbing Along the West Cut-Off Wall

Log construction cribbing or cribbing-like forms were found along the South Ferry Terminal project corridor in three places along the western cut-off wall in Battery Park, in both the northern and southern sections of the Park. In the north it extended from Deck Beam 36 (see **Figure 5.53** for DB 36 location) along the lagging southward, a location previously determined not sensitive for the preservation of archaeological resources (LBG 2004). Log forms were also documented in the area of Archaeological Test Trenches ET 2 in the middle and at the southern end in XT 5, a total distance of over 300 feet (see **Figure 5.82)**. The log structures in these locations, while extensive, were not contiguous. However, these sections were grouped together in the field as one feature based on their proximity, the size and condition of the logs used, and the construction techniques. The structure type was likely wharfage; however, only one side (or part of a second) was exposed. The lack of vertical elements and bracing is more indicative of a cribbing form. However, the irregular spacing of some of the unexposed cross members is problematic for that interpretation, although some locations do exhibit the regular spacing indicative of cribbing. While it is likely the form of these structures as a group was cribbing, there is a possibility that these were part of a bulkhead wall. In any case, this feature complex is referred to herein as "cribbing." Samples of the wood were taken from this large feature complex for potential dendrochronological analysis. These logs have been transferred to the Tree Ring Laboratory of the Lamont-Doherty Observatory of Columbia University and are discussed in more detail below.

Archaeological documentation of these logs in the field included mapping the locations on contractor drawings, taking measurements and completing field drawings, numbering the logs for sampling, and screening samples of soil for artifact recovery.

The upper level of logs was found at an average elevation of 1.6 feet below sea level. The cribbing contained from three to six stacked logs. The base of the cribbing was at an average elevation of 6.2 feet below sea level. There was no significant variation in the elevations from one section to the next. Unlike Whitehall Slip, some of the logs of the west cribbing were fastened with metal spikes. One was retained as a sample (Cat. 16196.106). Another contrast is the way in which the logs were cut. Virtually no wedge-shaped ends were encountered in the west cribbing. Many of the ends had been cut to form scarf joints and logs were laid thusly end to end. Square notches for possible lap joints were also documented, as were numerous hewn logs that were square in cross section (see **Figure 5.86**). Occasional vertical members—possible vertical lock bars—were found, similar to those that were documented in the log feature associated with Wall 3.

The northernmost section of cribbing was found entering the South Ferry Terminal project corridor south of Deck Beam 36 in the Battery Park North (BPN) part of the site (see **Figure 5.53** and **Figure 5.87**). The contractor's cut-off wall turned toward the west in that area, explaining why no cribbing was identified within the project corridor to the north. The cribbing here extended southward for over 30 feet, contained at least three cells, and was four logs high. At its southernmost extent, the cribbing was approximately 2.5 feet inside the project corridor. Therefore, only a small portion of the cribbing blocks were visible and available for documentation. The plan view shows cross members at approximately eight-foot intervals, indicating cribbing cells of that size. Only two of the logs were hewn. Several half-lap scarf joints and square notches were documented in this section of cribbing. A sample of the soil was screened for artifact recovery. The artifacts it contained have a TPQ of 1820 based on one whiteware ceramic sherd (Cat. 16196.534).

The centermost section of cribbing was the most extensive (see **Figure 5.88**). Not only did it extend in the north-south direction from Struts 123 through 119, a length of approximately 65 feet, it also expanded over ten feet into the project corridor in the east-west direction at its maximum. Although there was a larger section to document here, access to it was not always possible because of unstable soils exacerbated by frequent rain. However, when the excavation area was not accessible, documentation continued by drawing rough sketches and dropping measuring tapes into the site, as well as taking photographs.

The center section of cribbing had logs stacked three to four high. Here the cribbing cells were spaced closer to 6.5 feet (see **Figure 5.88)**. A solid platform was present along the bottom of at least part of the cribbing block. Once again, half-lap scarf joints, square notches, and hewn timbers were present. Only one soil sample was taken for artifact recovery, and no temporally diagnostic material was recovered.

The southernmost west cribbing section was up to six logs high. This area extended for a length of approximately 43 feet in the north-south direction. Here the cribbing cells were closer to 7.5 feet. As with part of the northernmost section of west cribbing, the structure did not extend into the project corridor more than one log. Once again, half-lap scarf joints and hewn timbers were present, as well as undressed logs (see **Figure 5.89**). The stratigraphy seen in the soil near the cribbing was surprisingly uniform throughout. Several samples of soil were taken for artifact recovery. The TPQ of this collection is 1807 based on a printed pearlware ceramic sherd (Cat. 16196.130).

Most of the west cribbing log samples taken were white pine (n=26); however, seven others were pitch pine. The dendrochronological analysis was successful on 21 of these log samples and indicates the trees were cut circa 1788 to 1790. Variation was seen in only the northern part of the west cribbing. In addition to containing a tree cut in 1788, one of the samples taken from the northern section of west cribbing was from a tree cut in 1734. Perhaps this was reused from the construction projects that included the nearby Wall 3 log feature and Whitehall Slip, whose analyzed logs also date from circa 1734. Another sample from the northern section of west cribbing dated to 1785, the same period that parts of Whitehall Slip were constructed.

One AU was assigned to all eight contexts associated with cribbing found along the west cut-off wall of the South Ferry Terminal project corridor (BP A). The TPQ of the deposit is 1820 (Cat. 16196.435). BP A is clearly associated with the large-scale landfilling operation that took place in the late-18th century. However, the later TPQ is a possible indication of the continued improvements to Battery Park in the 1820s (see **Chapter 4: A.17. Continued Improvements at the Battery**).

In general, the structure of the west cribbing was sturdier than the cribbing blocks documented at Whitehall Slip, with many cut joints and some metal fasteners. Historical documents describe plans for the construction of bulkheads in the area circa 1789 which were only partially completed at that time. It appears these plans may have not been fully carried out until closer to 1796, but the exact location along the then shoreline is not detailed (see **Chapter 4: A.15. After the Revolution**, and **A.17. Continued Improvements at the Battery**). The continuous linear shoreline structure type displayed by the west cribbing would serve the function of a "bulkhead" as described in the historic record. This, combined with the knowledge of the dates the trees were cut (1788 to 1790), is a possible indication that either the historic documents are misleading or that the logs were stockpiled for six years.

The placement of the west cribbing blocks was some distance out from the then shoreline, providing a large swath to fill, rather than sinking closer interval cribbing blocks. Furthermore, the fill here was relatively devoid of cultural material, perhaps an indication of the ability to obtain more suitable fill than was possible in the early-18th century. Alternatively, the clean fill ordinances of 1796 may have been a factor in obtaining the material used to create Battery Park in these locations.

b. STONE FEATURES

Several stone features, in addition to sections of Battery Wall, were documented during monitoring of excavations for the General South Ferry Terminal excavations. These included a stone retaining wall, which was part of Whitehall Slip (discussed in **Chapter 5: B.5.a. WHS A**), and other sections of a similar wall to the west of that, near manhole excavations (Manhole 35B). There were also several stone and mortar conglomerates in northern Battery Park and Battery Place which have been discussed in conjunction with the Battery Wall, as well as a concentration of cobbles found in the Fan Plant Sheeted Pits (see **Chapter 5: C.4.e. Fan Plant Sheeted Pits**). One other possible stone feature was evaluated in the field and was determined to be a pocket of fill.

1.) Manhole 35B

Manhole 35B (MH 35B) is located in Peter Minuit Plaza, approximately 20 feet east of the loop and 20 feet south of the secant wall (see **Figure 5.82**). As with the other utilities that were being kept active, MH 35B was supported while excavations took place around and beneath it. When the contractor was able to work on removing the soil at levels beneath this manhole, a series of stones was documented at a depth of approximately 8.9 to 13.2 feet below ground surface (2.7 feet to 6.2 feet below sea level). This is approximately the same depth as the stone wall found in line with the head of Whitehall Slip during data recovery excavations there.

The stone feature at MH 35B was identified sandwiched between and abutting the original excavations for the existing subway loop and the staircase to that station (see **Figure 5.90**). The total distance between those subway features was 25 feet, but (excluding approximately eight feet on either side of those features for historic construction related disturbance) less than ten feet of potentially undisturbed archaeological deposit existed. Further complicating the archaeological documentation of the stone feature was the limited access due to safety concerns. Contractor excavations had been taking place to the south of MH 35B and had already reached the depth of bedrock. The location of this manhole was in the last corner of this part of the site to be excavated, and work was conducted using a front-end loader. This equipment further destabilized the area, making access occasionally unsafe . The technician shown in **Figure 5.90** is standing on bedrock with MH 35B supported in wood and the remains of the stone wall above her head.

The stones were cut and dry-laid and were predominantly schist. They measured approximately 3 to 6 inches high and 6 to 13 inches wide (see **Figure 5.91**). The dry laid stones were on a foundation of boulders, similar to Wall 3. The largest of these measured 2.8 feet wide. Systematic removal of these stones was not possible due to their precarious position; however, upon removal of the eastern section of the feature, stone rubble was documented approximately 2.5 feet toward the north (the other side of the feature). The rubble consisted of cut schist and smaller cobbles in a matrix of black sandy silt with shell. The soil matrix of the cut stones was dark yellowish brown sandy fill. These findings are similar to the stone wall found in WHS A excavations (see **Chapter 5: B.5.a. WHS A**).

Samples of soil were screened for artifact recovery and three soil samples taken for potential geochemical analysis. None of the soil samples were processed. These were keyed to the field drawings. The combined TPQ of the artifact collection from contexts associated with this stone wall feature is 1770, based on seven creamware ceramic sherds (Cats. 16196.368 and .373). The TPQ of the deposit beneath the schist is 1720 based on a stoneware ceramic sherd (Cat. 15598.346).

The construction of this stone wall was similar to both Wall 3 and the wall documented in line with the head of Whitehall Slip during data recovery excavations there. The height of the preserved section of this stone wall was closest to that documented at Whitehall Slip, with the elevation at the top of the features almost identical. The MH 35B stone wall might have been related to the WHS stone wall based on proximity, construction, and fill (see **Figure 5.136**). MH 35B was assigned one AU (PMP C). The TPQ of PMP C, 1770, is also within the range of that from WHS A, the northern end of the Slip.

2.) Other Possible Stone Features

Only one other possible stone feature was identified in the General South Ferry excavations (excluding those discussed in the Battery Wall results). It was located in the new station area in Peter Minuit Plaza near the eastern side. A mass of unconsolidated stone was documented at approximately 15 feet west of the cut-off wall, near E62 to E67, at a depth of approximately 12 feet below ground surface (3 feet below sea level) (see **Figure 5.92**).

In additional to the stones, most of which were not cut, several pieces of planks of cut wood and wood shreds were observed. The soil matrix was extremely loose, with the surrounding matrix being sandy silt. Very little cultural material was found within the soil matrix. Only one temporally diagnostic artifact was recovered, a creamware ceramic sherd with a beginning manufacture date of 1770 (Cat. 16196.511). The presence of the cut planks with the stones, and the fact that the stone was unconsolidated, are indicators that the deposit was a part of the fill. However, it is not possible to conclusively date the deposit because of the dearth of artifacts.

c. ELEVATED RAILWAY AND TROLLEY REMAINS

South Ferry was formerly a hub for the elevated railway (the "El") from the 1870s through 1940, although it was not demolished until 1941. Remains of the El existed throughout the project corridor in the form of footings. A variety of footing types were observed, and documented to varying degrees. Elevated railway footings were previously determined not to be archaeologically significant and therefore were not documented in detail, and no analytical units have been assigned for these contexts. The South Ferry Terminal construction RFP contract drawings (Volume 7) depicted some of the known locations of footings (see **Figure 5.93** for an example highlighting the footings marked "to be removed"). Historic documentation of several types of footings, as well as historic photographs from the New York Transit Museum (see **Figure 5.105 and** LBG 2003: Figure 21), also exist.

Photographs document some of the details of the footing construction and variety as seen in the field (see **Figure 5.94**, **Figure 5.95**, **Figure 5.96**, and **Figure 5.97**). The footings generally expanded in cross-section with depth. Some were square in cross-section and others octagonal. Both brick and concrete footing types were observed. Several large concrete footings, the size of a small front-end loader, were found in the area where Walls 3 and 4 were later discovered (see **Figure 5.96**).

The footing found in the northeast corner of Peter Minuit Plaza during excavation of the perimeter trench still had much of the metal hardware attached (see **Figure 5.97**). This particular footing measured four feet across, plus another foot for the two bolts on either side. Different types of metal hardware were also observed (see **Figure 5.97** and **Figure 5.98**).

In addition to the elevated railway, streetcars (cable railway and electric) terminated at South Ferry from the 1870s through the turn of that century (see **Chapter 4: B.5.a. The Ferries**). The archaeological evidence of the cable railway and the electric street cars is identical. The cable railway came first, and that infrastructure was kept, replacing the cables with electrification. The Phase 1A report also has photographs depicting the street-level tracks. In addition to the tracks themselves, some of the brick foundations and yokes were also documented during South Ferry excavations in the station area (see **Figure 5.99**, **Figure 5.100**, **Figure 5.101**, and **Figure 5.102**). Representatives from the Roebling Chapter of the Society for Industrial Archaeology and the

New York City Transit Museum visited the site to assess these remains for accession to the Transit Museum. One of the yokes was ultimately salvaged by the Engineerium, a private collection maintained by Roebling Chapter member Gerry Weinstein. Other hardware which was originally part of the cable and/or electric systems was also removed during the South Ferry Terminal excavations (see **Figure 5.103**).

A 12-foot-long section of riveted metal was unearthed during the excavations for Decking Column 20 in Peter Minuit Plaza (see **Figure 5.104**). It had remnants of brick and mortar adhered to parts, indicating its relationship to the brick footings. The eastern end of the metal hardware was finished, and therefore did not likely continue in that direction when originally constructed. Three connected sections were extant, with empty spaces between them. The easternmost section was solid, and the other two were open beneath what could be described as a metal header or beam.

The brick foundations for the street cars are briefly discussed below in **Chapter 5: C. 4.a. Brick Contexts – Demolition Debris**. The 1916 photograph, also discussed in that section of the report, depicts some of the brick foundations, as well as a concrete footing for the elevated railway (see **Figure 5.105**). The remains of the brick cable/electric railway foundations were generally found buried only a foot or two below ground surface and were found exclusively within the part of Peter Minuit Plaza to the east of the then existing subway loop.

4. CULTURAL BEARING STRATA AND OTHER DEPOSITS

Much of the APE is made of fill deposited during various times throughout history. These deposits contained a variety of cultural material, much of it mixed, as would be expected for such a large area being filled over time. However, there were strata which contained a predominance of certain materials. Two of these cultural bearing strata stand out from the others as more pervasive. One is a stratum containing a large amount of colonial brick. Such strata were present at different locations throughout the South Ferry Terminal project corridor and it was not known at the time if they were in any way related, having only a preponderance of brick in common. A considerable amount of this brick (n=847) has been transferred to Allan Gilbert of Fordham University for analysis. Dr. Gilbert’s research focuses on chemical signatures of clay used in brick manufacturing. The other stratum is burned debris, possibly the result of using fill that came from the remains of a fire. Historic documentation of fires near Whitehall has been previously discussed (see **Chapter 4: A.13. The British Occupation of New York City**). Again, it is not meant to imply that burned strata found a various locations throughout the project corridor were necessarily related to one another. Determining possible associations was one of the goals of this analysis.

Another cultural bearing stratum of interest is a deposit in Battery Place where a concentration of 17th-century artifacts was identified. This deposit also contained a possible prehistoric pottery sherd. This material was found in a location near where the former Dutch fort might have been. The bedrock is quite shallow in that area, and remains of the fort were not identified during the South Ferry Terminal excavations. However, this stratum was thought to have potential to provide some insight into the material culture at that time in history.

In addition to these cultural deposits, there are shell-containing strata, mainly oyster, which are also pervasive throughout much of the South Ferry Terminal project corridor. Similar shell strata have also been documented in other excavations in Lower Manhattan. The stratum is generally devoid of artifacts. However, there were three locations where systematic archaeological excavation of the shell and the deposit beneath it were examined, also discussed below.

In addition to re-examining contexts originally identified in the field, other possible associations were sought by sorting the database in numerous ways to identify whether or not these cultural bearing strata were legitimate discrete analytical units and whether they existed elsewhere within the South Ferry Terminal project corridor. The analysis also incorporated other potential deposits that may have existed, but were not noted in the field. Other deposits discussed here include material found within the Fan Plant Sheeted Pits in Peter Minuit Plaza, Native American materials, and human remains. This section of the report provides information on the field findings related to these specific deposits. It identifies the analytical units used and interprets the findings associated with these cultural bearing strata or deposits.

a. BRICK CONTEXTS – DEMOLITION DEBRIS

Brick was collected from many fill contexts throughout the South Ferry Terminal project corridor for the specific purpose of informing Professor Allan Gilbert's New York City Brick Archive at Fordham University (see **Appendix F**). Eight hundred forty-seven bricks were collected and transferred to Dr. Gilbert. In addition, many other bricks were collected as part of the artifact collection of the South Ferry project. These were recovered from virtually every type of excavation context. As part of the analysis of the South Ferry field results, the artifact data was sorted to produce a list of catalog numbers that contained either whole bricks or large brick fragments from non-Battery Wall and non-Whitehall Slip contexts. This list was related to the provenience data sorted by location to identify potential contexts of demolition debris[20] which may represent fill of a particular time period, location, or type. Finally, these contexts/deposits were compared with each other to evaluate the possible relationship of the deposits and any consistencies that might emerge among them.

Six brick-containing contexts were established for locations in Battery Place (BPL). All were associated with excavation of soldier pile pits. The amount of fill in Battery Place is among the least throughout the South Ferry Terminal project corridor because of the shallow bedrock. Furthermore, the deposits under Battery Place have been covered with pavement, and thus relatively protected. Nevertheless, the brick-containing BPL contexts have complete vertical reach covering all levels of excavation. Bricks were recovered from depths varying between 3.5 feet to bedrock (5.5 feet above to 3.8 feet below sea level). The artifacts recovered from those deposits consistently date them chronologically from top to bottom with TPQ dates of 1899 to 1720 (Cats. 16196.049 and .039). However, very little else in the Architectural Group was recovered from these contexts. The lack of additional evidence of building demolition is another indication of this as a secondary deposit.

Using the criteria described above, one brick-containing context each was encountered in Battery Park North (BPN) and Battery South (BPS). The BPN context was toward the middle of Battery Park, at the southern end of ET 1. Many bricks were recovered from this deposit; however, no other artifacts were found, and therefore no deposition date can be estimated (Cat. 16196.576). The BPS context was from a deposit in a dewatering trench buried 4.5 feet below ground surface (Cat. 16196.109). In addition to brick and window glass, this deposit also contained two whiteware ceramic sherds that provide the 1820 TPQ.

[20]While adhered mortar is an indicator of destruction vs. construction debris, its absence is not conclusive (see **Chapter 6:C. Artifacts and Other Materials**), therefore, for the purposes of this analysis, no distinction is made.

Ten brick-containing contexts were recorded for the Cobblestone Area/Coast Guard Access Road (CCG (see **Figure 2.2** and **Composite Map** for locations)). Unlike the shallowly buried brick-containing contexts to the north, the CCG contexts are much deeper, possibly because of the bedrock contour. Therefore, there was more opportunity and space for filling in these locations, and therefore the stratigraphy is more complex. Bricks from CCG were recovered from deposits as deep as 15 feet below ground surface (approximately 7 feet below sea level). Contexts shallower than 10 feet below ground surface (2 feet below sea level) have a combined TPQ of 1985 based on an Ikea butter knife found during the excavation of the perimeter trench (Cat. 16196.164). If this possibly intrusive artifact is discounted, the latest manufacturing dates for this context are circa 1900, based on machine-made bottles and modern architectural tiles. This context also had the most additional material from the Architectural Group. The deepest brick-containing stratum from CCG has a TPQ of 1810 based on a porcelain ceramic sherd also recovered during secant pile excavation (Cat. 16196.319).

Wall 4 was also located in the CCG area of the South Ferry Terminal project corridor. A large concentration of brick was recovered from a fill stratum associated with that context. Much of this has been transferred to Professor Gilbert, although many samples were also retained with the artifact collection. A section of the brick stratum was excavated as part of EU 43 and is discussed with the Battery Wall EU Results in **Appendix N**. That analysis identified two brick-containing strata (5 and 7), one with a TPQ of 1740 and the other with a TPQ of 1860. This is possible evidence of multiple fill episodes, or that the brick originated from different contexts prior to being part of the fill in Battery Park.

The majority of the brick-containing strata examined for this analysis is located in Peter Minuit Plaza (n=84). Seventy of these are associated with the Whitehall Slip area, and 61 of those were established during secant pile sampling. The majority of those secant pile brick samples could be attributed to one of two sources. The first was a brick sewer that crossed the eastern secant wall and was first documented in the perimeter trench near WP 7 (see **Figure 5.106**). The other was from remains of the cable and elevated railways formerly located there.

Of the 14 non-WHS PMP brick-containing contexts, all but one are from the northwestern corner of PMP. Excluding the secant piles, the combined TPQ of those deposits is 1899 based on two sherds of machine-made bottle glass (Cat. 16196.438 and .499).

In conclusion, brick contexts are interpreted as part of the general fill, and thus no analytical units were assigned specifically for demolition debris related to former brick structures. Brick contexts were pervasive throughout the South Ferry Terminal project corridor; however, none of these concentrations could be related to specific demolitions. Contexts containing whole, almost whole, or large brick fragments that were not associated with cable or elevated railway features, sewers, or the fill above Wall 4, rarely contained similarly large quantities of other types of demolition debris. The exception was in the southern part of CCG and the northwestern part of PMP, where quantities of other demolition debris were also found. While the evidence of fill is pervasive, the types of materials contained within it do not fit a consistent pattern. Building demolition debris, although omnipresent, was not found in concentrations large enough to indicate the primary dumping location for wreckage of a particular structure or structures, with the possible exception of the debris found above Wall 4. This is one more indicator of the nature of the filling and re-filling that took place over the centuries throughout much of the South Ferry Terminal project corridor.

b. BURNED CONTEXTS

There was an impression in the field that strata of burned material existed at many places throughout the South Ferry Terminal project corridor. Historic documentation of fires in the vicinity has been previously discussed in **Chapter 4: A.13. The British Occupation of New York City.** One of the concentrations of burned material is discussed in more detail below in **Chapter 5: C.4.c. Deposits with 17th-Century Artifacts**. In order to facilitate the identification of other legitimate concentrations of burned material within the fill, the provenience and artifact databases were sorted to look at contexts that contained artifacts with evidence of burning (excluding used tobacco pipes and faunal bone/food remains which are burned with use) and/or artifacts from the Fuel Group. The Fuel Group contains cinder and coal. In some cases, when shell was described as burned/stained, it was still included in this analysis, although the discoloration may not have been due to fire but the result of cooking. Dense concentrations of shell have been noted in historic period deposits in many lower Manhattan archaeological sites and hypotheses put forth regarding their use as paving material. Shells are included here since they may relate to fires that affected the source or use of the shell if they were originally from non-food contexts. Otherwise, shell deposits are discussed below in their own section of this chapter.

A total of 3,743 artifacts fit into this category: 220 cinders, 610 coal fragments, 560 pieces of charcoal, 369 pieces of slag, and at least 1,984 artifacts with evidence of fire[21]. All of this cultural material combined comes from 485 contexts. As with the brick contexts, the databases for proveniences with burned material were filtered to determine which contexts contained burned materials and then compared to each other to see if patterns emerged during this analysis. An arbitrary cut-off of either 10 percent artifacts burned or 10 total burned artifacts (whichever places more contexts in this category) was used to identify proveniences with concentrations of burned material (n=134). In some cases, the artifact inventory included a grouping of artifacts where not all contained evidence of burning (i.e. artifact database comments column states "some burned"). As part of the approved laboratory procedures, some of these had been discarded prior to this analysis and therefore cannot be reevaluated (see **Chapter 2: B. Field Methods**). These contexts were included here regardless to ensure that any possible evidence of burning was evaluated. Another potential bias is the inclusion of contexts which have low total artifact counts. Twenty of the selected proveniences contained less than 10 total artifacts (15 percent of total contexts used). In the following discussion, when the low counts are a relevant factor, they are mentioned.

Eleven catalog numbers associated with proveniences in Battery Place contained artifacts associated with fire. These all came from the southern half of that area. Soldier Pile Pits (SPPs) 69, 70, and 71 were within the south sidewalk, toward the eastern end of the corridor. SPPs 50 and 51 were located at the western edge of the corridor from near the center of the road toward the south sidewalk (see **Figure 5.107**). Two other contexts were established during excavation for the southern of the two west-bound lanes of Battery Place, and one was from the southeastern girder column.

[21] Secant pile contexts containing burned brick fragments and clam shell fragments recovered, processed and discarded in the Dewberry lab according to established protocols generally note "some burned", thus precluding a precise count of all burned materials, therefore the number of burned artifacts presented here could be somewhat inflated. However the number of contexts is not.

The burned material from all of these Battery Place contexts was almost always coal, slag, or cinder (81 percent of burned material). Only two contexts contained other burned material. These were from Soldier Pile Pits 50 and 51 and include shells, a tobacco pipestem, and a stoneware ceramic sherd. This is one of the contexts discussed in more detail below in the **Chapter 5: C.4.c. Deposits with 17th-Century Artifacts**. Several of the burned contexts also contained temporally diagnostic artifacts. Of the three contexts within the center of Battery Place, the uppermost of those had a TPQ of 1893 based on a sherd of machine-made bottle glass (Cat. 16196.020). The lower strata did not contain any temporally diagnostic artifacts. SPPs 69 to 71 contained several temporally diagnostic artifacts. The upper stratum of these was very dark grayish brown silty sand and contained a piece of plastic providing a TPQ of 1950 for the deposit (Cat. 16196.051). The middle stratum was brown silty sand and contained a machine-made bottle glass sherd, providing a TPQ of 1893 (Cat. 16196.049). The basal stratum producing cultural material was yellowish brown silty sand and contained a sherd of pressed glass with a beginning manufacture date of 1864 (Cat. 16196.050).

Only two contexts from the area of Battery Park North (BPN) fit the selection criteria, and both had fewer than 10 total artifacts recovered. The more deeply buried of the two ET 1 contexts contained a pearlware ceramic sherd, providing a TPQ for the deposit of 1807 (Cat. 16196.095). However, only six artifacts were recovered from this context, including the coal fragment representing the burned material from this provenience. The other BPL context had an earlier TPQ, but also contained only one burned artifact, a shell (Cat. 16196.070). Because these contexts contained few artifacts, the date should not be applied more widely.

The Wall 1 area was also within BPN. It had 23 contexts fitting the selection criteria. The general BPN contexts were associated with the excavation of Archaeological Test Trench (ATT) ET 1. One was located just two feet below ground surface toward the northern end of ET 1, and the other directly on the shallow bedrock just to the north of where Wall 1 was discovered. Thirteen of the Wall 1 contexts (with burned material accounting for at least 10 percent of that context, or greater than ten artifacts associated with possible fire) were fill above the Wall. They provide a combined TPQ for the deposit of 1950 based on a piece of plastic recovered from EU 5, Stratum 1 Level 1 (Cat. 15768.025). Four of the other Wall 1 contexts with burned material were from deposits on the waterside of the Wall. The TPQ of these contexts is 1820 based on a whiteware ceramic sherd recovered from EU 12, Stratum 1 Level 1 (Cat. 15768.050). Two contexts, each containing burned material, were recovered from other Wall 1 contexts.

Battery Park South (BPS) had three contexts that fit the selection criteria for burned material. Two of these are associated with waterproofing for the original construction of the subway and are not indicative of any broader pattern of burned material within the fill (Cats. 16196.546 and .547). The bucket and shovel parts collected here, however, are a tangible reminder of the disturbances to Battery Park related to previous transportation projects (these artifacts are also discussed in **Chapter 6: F.6. Battery Park South**). The other burned context was associated with the cribbing along the western cut-off wall and is discussed above with the cribbing and piles.

The Cobblestone Area/Coast Guard Access Road (CCG) part of the South Ferry Terminal project had 15 contexts fitting the selection criteria for burned material. CCG was also the location of both Walls 3 and 4. Walls 3 and 4 had five and three contexts fitting the criteria, respectively. Although EU 23 (Wall 3) contained clear evidence of fire, likely from vegetation in place, none of the EU 23 contexts contained artifacts that exhibited evidence of the fire, except for some of the Wall stones themselves (see **Appendix N: Excavation Unit 23**). Of the five

Battery Wall contexts fitting the selection criteria, three were general collection contexts and assigned to the miscellaneous category in the analysis of the field results for the Battery Wall. Three other contexts are from foundation levels or beneath the Wall. The TPQ of these contexts is 1720 based on a salt-glazed stoneware ceramic sherd (Cat. 15768.079). One other context containing burned material is EU 43, Stratum 5 Level 1, fill above the level of the Wall on the landward side (Cat. 15768.217). This deposit contained 13 sherds of burned coarse earthenware (Cat. 15768.217). This is also a context that contained a preponderance of brick, as discussed above. The other Wall context was for the dismantling of Wall 4. This contained five pieces of charcoal, but no other evidence of burning (Cat. 15768.342).

The majority of the contexts showing evidence of burning that fit the selection criteria within CCG are from non-Wall-related deposits (n=15). All but two of these are from secant pile sampling. Four are from SP 1005, and the others are from SPs 1009, 1017, 1033, 2057, 2061, and 2073. The burned material in all cases is clam shell, brick, coal, charcoal, slag, or cinder. Only one other artifact, a burned or stained tobacco pipestem, was recovered. The TPQ of this stratum is 1970 based on a piece of plastic recovered from SP 1033.2 (Cat. 16196.216). TPQs for Level 3 and 4 deposits containing burned material are 1870 and 1775, respectively (Cats. 16196.249 and .250). These contexts are also discussed above in relation to Wall 3. One of the other two contexts in this category is miscellaneous finds from sewer backfill. The other is from the upper five feet of ATT excavation; evidence of burning is ten small charcoal fragments (Cat. 16196.145).

Approximately half of the contexts fitting the selection criteria for evidence of fire are located within Peter Minuit Plaza (51 percent, n=69). This includes 35 Whitehall Slip (WHS) proveniences and those are discussed above in **Chapter 5: B.5.c. WHS C**. Of the 14 non-WHS proveniences containing burned material, a variety of context types are represented. However, half were secant pile contexts (n=7). Most of those were from the second level (up to 10 feet below ground surface) and from the northern part of Peter Minuit Plaza. The majority of the burned material recovered from the secant pile samples is coal and slag (71 percent). The TPQ of the deposit comes from several pieces of plastic, which have a beginning manufacture date of 1970 (Cats. 16196.458 and .483). Secant piles are discussed in more detail below in **Chapter 5: C.5.b. Other Sources of Stratigraphic Data**.

Burned material was recovered from three other contexts, all within Peter Minuit Plaza; 1) excavation units associated with shell deposits, 2) perimeter or guide wall trenches, or 3) miscellaneous finds. The shell deposits are discussed in more detail below. Two of the perimeter trenches where burned material was recovered were located along the western perimeter in the vicinity of EU 100 (see **Figure 5.112**), one of the shell contexts discussed below. The other was located between WPs 11 and 12 in northern Peter Minuit Plaza near the tie-backs and secant piles that also contained evidence of fire (see **Figure 5.107**). The TPQ of the perimeter trench and guide wall deposits is 1818 based on two pearlware ceramic sherds (Cat. 16196.428). Two of the remaining four contexts that fit the criteria for burned material were from excavation of tie-backs to the secant wall in northern Peter Minuit Plaza. The TPQ of the tie-back deposits is 1899 based on a sherd of machine-made bottle glass (Cat. 16196.499). The final two contexts were from ET 5 and the upper level of a boring.

As with the Brick Contexts – Demolition Debris, numerous contexts containing possible evidence of fire were identified during the South Ferry Terminal project excavations with no clear pattern. Therefore, no specific AU was assigned, and these contexts are included later in the interpretation of the general fill. In conclusion, while numerous artifact-bearing contexts contained possible evidence of fire, there is no clear pattern as to the horizontal or vertical position of any of these deposits. However, there are a number of localized areas that may relate to this broad condition. The largest of these is within the northern part of Peter Minuit Plaza identified in secant pile excavations.

c. DEPOSITS WITH 17TH-CENTURY ARTIFACTS

A number of concentrations of possible Dutch cultural material (deposits with 17th-century artifacts) were identified during the South Ferry Terminal Project excavations. These locations have been reevaluated based on the artifact analysis. The two locations identified in the field as possibly of Dutch-period origin also contained more recent cultural material: Battery Place and Fan Plant Sheeted Pits. For this analysis, additional possible Dutch-period deposits were sought by looking at contexts that contained 17th-century cultural material to see if the remainder of the collection from those contexts is consistent with possible Dutch-period association.

1.) Battery Place

Battery Place was the most previously disturbed area of the South Ferry Terminal project corridor. The existing ❶ subway tunnel cuts through it, as well as numerous utilities and the sidewalk vaults associated with 1 Broadway. Nevertheless, this was the locus of the largest concentration of Dutch-related cultural material. The contractor’s soldier pile pit excavations in the western side of the South Ferry Terminal project corridor in the southern lane of Battery Place were the location of this locus (see **Figure 5.108**). The artifacts were found within Soldier Pile Pits 50 and 51 (SPPs 50 and 51). These pits were spaced at 10-foot intervals. They were located approximately 20 feet west of the existing ❶ subway tunnel.

As discussed above, soldier pile pits were generally hand excavated by the contractor within a previously excavated perimeter trench. Therefore, each pit had an opening elevation equal to the depth of the trench at that location. The trench was sheeted with wood prior to the excavation of the soldier pile pits. Specific depths varied. The initial sheeting of the trench at SPP 50 extended to six feet below ground surface, and to 4.5 feet at SPP 51. The pits were also shored during the progress of the excavations, thus further obscuring the soil profiles. The excavations were monitored, and soil removed was selectively screened for artifact recovery and stratigraphy recorded on forms.

SPP 50 contained three strata beneath the level of sheeting before encountering the bedrock. Bedrock was at a depth of 12.8 feet below ground surface. Stratum 2, the first stratum below the sheeting, was mottled dark yellowish brown silty sand. It was between 6.0 and 9.7 feet below ground surface. This was underlain with moist brown sandy silt to a depth of 11.0 feet; Stratum 3. The basal stratum, Stratum 4, was moist mottled brown and black sandy silt with charcoal flecking. Temporally diagnostic artifacts were recovered from all three strata. The TPQ of 1770 for Stratum 2 is based on a creamware ceramic sherd (Cat. 16196.037). The TPQ for both Strata 3 and 4 is 1720, based on two stoneware ceramic sherds (Cat. 16196.038 and .039).

SPP 51 contained two strata beneath the level of the perimeter trench sheeting before bedrock was encountered at 11.4 feet below ground surface. Stratum 2, the first stratum below the sheeting, was moist brown silty sand and extended to a depth of approximately 10.8 feet below ground surface. This corresponds to Stratum 3 in SPP 50. However, SPP 51.2 contained two creamware ceramic sherds, providing a TPQ for the deposit of 1770 (Cat. 16196.040). The basal stratum of SPP 51 was dark grayish brown sandy silt with charcoal flecking, similar to SPP 50.4. However, there was not an opportunity to screen a sample of that deposit because the contractor shoveled the soil directly behind their sheeting in order to stabilize it.

The basal stratum of SPPs 50 and 51 was interpreted in the field as a Dutch-period deposit; however, that interpretation is refuted by the analysis of the artifacts recovered. The charcoal found within the soil matrix is an obvious indication of burning; however, it was not initially clear if the fire was *in situ* or if the deposit was part of an early fill episode. The location of these soldier pile pits was overlaid on the Ratzen Plan (see **Figure 5.84**). This shows that the location of the SPPs was just offshore in 1766/67. The conclusion is that the archaeological deposit is a result of early landfilling efforts and not an *in situ* 17th-century deposit.

Neither of the adjacent soldier pile pits had evidence of the charcoal-containing stratum, nor did any other soldier pile pit in Battery Place. The localized nature of this deposit is a further indication that it was part of the fill. Regardless, and primarily because this was not confirmed in the field, the concentration of early cultural material recovered from within the charcoal filled stratum, directly on the bedrock, prompted the continuation of the search of this deposit during the general excavations in Battery Place. This deposit was identified as extending eastward for approximately eight feet. Samples of the soil were screened for artifact recovery. The TPQ of this deposit is 1744 based on a white salt-glazed stoneware ceramic sherd (Cat. 16196.016). This deposit also contained a sherd of prehistoric pottery (Cat. 16196.001). No structural remains were associated with this deposit.

Other possible Dutch-period contexts were also sought within Battery Place. Soldier pile pit 72, located in the eastern end of Battery Place, contained a Dutch-style buff-bodied ceramic sherd. However, the stratum from which it was recovered also contained a machine-made bottle sherd providing a TPQ of 1893 (Cat. 16196.054). Therefore, this context was not associated with the Dutch occupation of *Nieuw Amsterdam*.

Four secant piles were excavated for girder columns in the center of the road. These were all sampled for artifacts. The southeastern secant pile encountered bedrock at approximately 15 feet below ground surface, and the other three hit bedrock at 10 feet below ground surface. The soils were very dry in all four secant piles, unlike those documented in SPPs 50 and 51. No temporally diagnostic artifacts were recovered from these contexts. The basal levels contained only fragments of red brick, oyster shell, and a few shreds of wood, as well as a fairly thick sherd of hard paste porcelain that cannot be dated (Cats. 16196.009, .013 and .559).

2.) Fan Plant Sheeted Pits in Peter Minuit Plaza

The fan plant for the old South Ferry Station is located at the southern end of the new South Ferry Terminal project corridor within Peter Minuit Plaza, just inside the loop of the ❶ line. This was the location for a series of four contiguous sheeted pits (see **Figure 5.109**). They were hand-excavated by the contractor as part of their cut-off wall. The combined total length of the pits was approximately 35 feet.

Eight of the 25 contexts from the Fan Plant pits were identified as containing Dutch or possible-Dutch-period artifacts. However, when comparing the entire collection from each of these contexts, none of them is an actual candidate. The fill from one of the contexts also contained cultural material dating from the 20th century (Cats. 16196.348). Three others have TPQs in the mid- to late-19th century (Cats. 16196.338, .349, and .354). Another three contexts have TPQs from the late-18th to early-19th centuries (16196.335, .345, and .353). The other possible 17th-century context contained a tobacco pipestem with an end manufacture date of 1920 (Cat. 16196.350). Additional details on the Fan Plant pits are provided below in **Chapter 5: C.4.e. Fan Plant Sheeted Pits**.

3.) Other Possible 17th Century Contexts

The artifact inventory was sorted to determine if 17th-century contexts existed in areas that were not identified in the field. Nineteen contexts from all of the South Ferry Terminal artifacts contained temporally diagnostic material that was exclusively 17th century. However, four of these contained only that one artifact each (Cats. 15768.314, 16196.026, .041, and .107). Seven of the possible 17th-century artifact contexts were from general collections or miscellaneous finds and not stratified deposits, and therefore cannot be associated with a specific location or fill episode (Cats. 15768.238, .259, .289, .371, and 16196.067, .076, and .514). Of the remaining eight contexts, seven are associated with the Battery Wall. One of these was associated with Wall 1 excavations, EU 11, Stratum 2 Level 7 (Cat. 15768.049). This was a fill deposit on top of the truncated Wall remains with a TPQ 1820 based on a whiteware ceramic sherd from another Stratum 2 context (Cat No. 15768.044). One was from the fill on the landward side of Wall 4, also a context with more recent material from other catalog numbers. As presented in **Appendix N Excavation Unit 43**, this deposit had a TPQ of 1950 (Cat. 15768.220). Five of the possible 17th-century artifact contexts were associated with Wall 3. Four were from excavation units which all contained more recent deposits beneath the level where the only temporally diagnostic artifacts were from the 17th century (Cats. 15768.117, .160, .161, and .163). The other Wall 3 context was the top level of a secant pile that did not contain any other temporally diagnostic artifacts (Cat. 15768.570).

The final possible Dutch-period context was a fill context associated with Whitehall Slip (Cat. 15598.027). This context contained only one faunal bone and one tobacco pipestem, whose date is not absolute.

In conclusion, possible Dutch-period contexts were sought during the analysis of the South Ferry Terminal project by identifying concentrations of 17th-century artifacts. A charcoal stratum found within Battery Place was identified. Although it did not exclusively contain 17th-century cultural material, it was nonetheless quite early. This deposit, representing some of the earliest fill found during the South Ferry Terminal project excavations, was assigned one AU. BPL A has a TPQ of 1744 based on a stoneware ceramic sherd (Cat. 16196.016).

d. SHELL CONTEXTS

Deposits of shells, primarily oyster, have been documented at numerous archaeological sites in lower Manhattan. However, identification of deposition dates for these ubiquitous shell deposits has been elusive. The deposits generally contain very little soil and rarely contain artifacts. It has been speculated that the shells were used to pave streets in the 17th century. Pearl Street got its name from the mother-of-pearl inside the oyster shells that littered the shoreline at that time. It has also been said that shell was used as paving in the 18th and 19th centuries, and/or the shells are detritus from oyster- and clam-eating establishments along the waterfront at that time. A shell layer was documented at several locations within the South Ferry Terminal project corridor, prompting a systematic evaluation. Excavation units described here and not included in **Appendix N** were placed at three locations in an attempt to obtain data on the deposition date(s) and the possible use of or reason for the shell deposits (see **Figure 5.112**). Although no explanations for the shell deposits were identified during analysis, deposition dates from the mid-18th through early-19th centuries were identified. All dates come from similar soil types, although at varying absolute elevations.

Figure 5.112 illustrates that one of the locations analyzed was in a utility trench near the north secant wall (EU 102), one was in the west Raito wall trench (EU 101), and the other was in the perimeter trench at the western side of Peter Minuit Plaza (EU 100). Additional shell contexts have been identified in EU 41 at Wall 4 (see **Figure 5.45**), Trenches 4 (see **Figure 5.14**) and 6 (see **Figure 5.45**) and between C10 and C20 in Whitehall Slip (see **Figure 5.65**). These have been previously discussed in the appropriate sections of **Chapter 5: A. Battery Wall** and **B. Whitehall Slip**.

1.) Excavation Unit 100

EU 100 was excavated within the perimeter trench located along the west side within Peter Minuit Plaza (see **Figure 5.112)**. All soil excavated from this unit was screened for artifact recovery. The shell deposit was identified at the base of excavation, buried 5 feet below ground surface (elevation 1.8 feet above sea level) (see **Figure 5.113**). The rectangular-shaped unit measured 1.5 by 4 feet. Three strata were excavated. The shell deposit itself was excavated as Stratum 1, and it was approximately 0.6 feet thick. Stratum 2 was dark grayish brown silty fill. It was a thin lens measuring up to 0.2 feet thick. Stratum 3 was dark yellowish brown sandy silt. It was excavated up to an additional 0.3 feet and observed continuing through the base of excavation.

The TPQ of all three strata of EU 100 (Cats. 16196.535, .536 and .537) is 1820 based on one pearlware ceramic sherd. Over 50 temporally diagnostic artifacts were recovered from Stratum 1, the shell deposit itself. Over 680 shells or shell fragments, as well as almost 130 faunal bones or fragments, were also recovered. Stratum 2 produced 27 temporally diagnostic artifacts and also contained almost 100 shells or shell fragments and 70 faunal bones or bone fragments. Stratum 3 contained only two temporally diagnostic artifacts, 14 shells or shell fragments, and only three pieces of faunal bone or fragments (Cat. 16196.537).

2.) Excavation Unit 101

EU 101 was located at the northern side of Peter Minuit Plaza, immediately to the west of the #86E mark of the Raito wall and just inside the ❶ subway loop (see **Figure 5.112**). It was identified in the backhoe cut during hogging in that area. The shell was initially observed at a depth of seven feet below the ground surface (elevation 0.5 feet below sea level).

EU 101 was not excavated as a systematic unit, but rather soil was taken from the backhoe cut in three levels. These samples were screened for artifact recovery. The shell itself was found concentrated in two pockets within the excavation. The uppermost is Stratum 1, which was at a depth of from 7.0 to 7.7 feet below ground surface (0.5 feet above to 0.2 feet below sea level). The deeper shell pocket, Stratum 2, was at 8.5 to 8.9 feet below ground surface (1.0 to 1.4 feet below sea level). Stratum 3, the deposit identified at the base of the excavation, was at 9.7 feet below ground surface (2.2 feet below sea level). The soil matrix of Stratum 1 was yellowish brown sand. Stratum 2 was very dark grayish brown burned ashy silt. Stratum 3 was dark yellowish brown silty sand.

Stratum 1 contained no temporally diagnostic artifacts, but did produce 31 shells or shell fragments and only 1 faunal bone fragment (Cat. 16196.417). Stratum 2 contained only one temporally diagnostic artifact, a French brown faience ceramic sherd. Its beginning manufacture date is 1720 (Cat. 16196.418). Eleven whole or fragments of shells, but no faunal remains, were recovered from Stratum 2. Stratum 3 produced six temporally diagnostic artifacts, no shell, and four bone fragments. The TPQ of this deposit is 1750 based on a fragment of a tin-glazed earthenware wall tile (Cat. 16196.419).

3.) Excavation Unit 102

EU 102 was located in Peter Minuit Plaza near secant pile SP 0145 (see **Figure 5.112**). It was identified during monitoring of a trench to be used for new discharge lines, near the northern end of the Plaza. It was identified at only 1.8 feet below ground surface (elevation 3.6 feet above sea level). Like EU 101, EU 102 was not excavated as a systematic unit because the deposit was in a trench profile. A sample of one bucket of soil each was screened for artifact recovery from the shell stratum and the two strata beneath it (see **Figure 5.114**).

Stratum 1 was shell in a very dark grayish brown sandy silt matrix at a depth of 1.8 to 2.4 feet below ground surface (elevation 3.0 to 3.6 feet above sea level). Stratum 2 was brown sand, with some dark staining in spots. It was buried at a depth of 2.4 to 3.0 feet below ground surface (2.4 to 3.0 feet above sea level). Stratum 3 was brown silty sand and extended to a depth of 3.4 feet below ground surface (elevation 2.0 feet above sea level).

While almost 400 whole or fragmented shells were recovered from Stratum 1, it contained only one temporally diagnostic artifact, a piece of modern Styrofoam, possibly a contaminant. Very little other faunal material was recovered from EU 102. Stratum 2 produced 85 whole or fragmented shells and four temporally diagnostic artifacts. The TPQ of that collection is 1670 based on three mending British slipware ceramic sherds (Cat. 16196.509). Stratum 3 contained almost 30 whole or fragmented shells and a similar number of temporally diagnostic artifacts. This deposit was noted in the field as being artifact-rich. The TPQ of the Stratum 3 collection is 1770 based on a creamware ceramic sherd (Cat. 16196.510).

Two analytical units have been assigned to the shell-related contexts that were excavated within Peter Minuit Plaza. PMP A was assigned to contexts excavated as part of the three units which produced artifacts. These contexts collectively date from the mid-18th through early-19th centuries. Although three strata were documented within each unit, and there was considerable variation in the elevations between the units, the soil matrices were similar. The combined TPQ of the deposits at the base of the shell concentrations is 1775 based on a shell-edged pearlware ceramic sherd recovered from EU 100 Stratum 3 (Cat. 16196.537). PMP B was assigned for contexts that were in close proximity to PMP A, but that could not be stratigraphically associated with them. Of the three shell context excavation units, EU 100 seems somewhat unique in that it also contained a relatively large amount of other faunal material as well as of temporally-diagnostic artifacts. The faunal material is characterized as dietary refuse and contained a higher proportion of pig compared to cattle than other South Ferry AUs (see **Appendix D**). The artifact-richness of this deposit is in contrast to the types of shell deposits seen elsewhere which prompted this field evaluation. Perhaps EU 100 was associated with a different use or source than those other shell deposits, or than EUs 101 and 102.

e. FAN PLANT SHEETED PITS

As mentioned above in **Chapter 2: B. Field Methods**, the Fan Plant Sheeted Pits (FPSPs) were a series of four adjoining pits, similar to soldier pile pits, near the existing subway fan plant (see **Figure 5.109**). Each pit was four to seven feet wide. The total distance between the existing loop to the existing fan plant in Peter Minuit Plaza is 35 feet. This is the combined length of the four pits. The width of the individual pits ranged from six to 11 feet. Like the soldier pile pits, the excavation for the FPSPs began at the base of the perimeter trench. Here that was approximately eight feet below ground surface.

The pits were hand excavated by the contractor, and soil was selectively screened for artifact recovery (see **Figure 5.110**). In cases when the archaeologists were inside the pits taking measurements and documenting stratigraphy, artifacts were taken directly from the excavations. The artifacts from the FPSPs almost exclusively date from the second quarter of the 18th century (see **Chapter 6: F.1. Fan Plant Sheeted Pits**). In addition to containing many artifacts, possible cribbing and associated cobbles were also documented within these pits. The location of these pits was at what is now believed to have been near the edge of Battery Pond (see **Figure 5.84** and **Chapter 4: A.11. The Stamp Act Period** and **Chapter 4: B.7. Filling in Whitehall Slip**).

1.) Pit 1

Pit 1 was excavated in stages from June 6 through June 20, 2005. It was the northernmost of the FPSPs and was abutting the existing Fan Plant (see **Figure 5.109**). Pit 1 was square and measured approximately six feet on each side. The base of excavation was at 19.5 feet bgs at bedrock (12.5 feet below sea level). Five strata were documented within Pit 1, all modern fill. A duct bank was ultimately discovered near the base of Pit 1, providing evidence for the interpretation of the deposit as modern fill. The fill was described with depth as dark grayish brown, to dark yellowish brown, to very dark gray, to dark grayish brown at the base of excavation. The soil was sandy gravel becoming wetter with depth. Only one artifact provenience was established for Pit 1 (Cat. 16196.332). Four 19th-century ceramic sherds were opportunistically recovered from the fill and therefore they were not necessarily representative of the age of the deposit.

2.) Pit 2

Pit 2 was located roughly in the middle of the stretch between the loop and Fan Plant (see **Figure 5.109**). It was rectangular in shape and measured approximately 4.4 feet east to west and 6.4 feet north to south. It was excavated between June 14 and June 20, 2005. Like Pit 1, Pit 2 was described as modern fill. However, here the modern fill was confined to the northern part of the pit and appeared related to the existing utility trench. Sheeting from the original construction of the early utility line was documented crossing Pit 2, beginning at 8.4 feet bgs and extending to a depth of 16 feet (elevations 1.4 to 9.0 feet below sea level). Although the contractor had to excavate both deposits within the pit simultaneously due to size constraints, the archaeological team kept cultural material separate in these two parts of the pit, to the extent possible.

Five strata of potentially early fill were documented in the southern part of Pit 2. This part of the Pit contained brown sandy gravel, Stratum 1, from 8 to 12 feet bgs (elevation 1 to 5 feet below sea level). Large cobbles and boulders, up to 1.5 feet in diameter, began appearing at approximately 10 feet bgs (3 feet below sea level) and extended to the base of the brown stratum. This was underlain by very dark gray sandy gravel with clumps of silt, Stratum 2. A transition to all silt, Stratum 3, began at 12.4 feet bgs (5.4 feet below sea level). This was underlain with dark gray sandy gravel, Stratum 4, at 15 feet bgs (8 feet below sea level). No cultural material was observed beneath this depth. The basal stratum of Pit 2, Stratum 5, was dark gray sand. This stratum began at 18 feet bgs (11 feet below sea level), and monitoring of Pit 2 stopped after excavations of three additional feet, with no cultural material present and a marine deposit noted.

Temporally diagnostic artifacts were recovered from Strata 1 and 3. Stratum 1 contained 36 temporally diagnostic artifacts. The TPQ of Stratum 1 is 1860 based on a wire nail (Cat. 16196.338). Stratum 3 contained 26 temporally diagnostic artifacts. The TPQ of this stratum is 1970 based on a piece of plastic (Cat. 16196.334). However, the remaining temporally diagnostic artifacts from Stratum 3 have TPQs no more recent than 1740. It is likely that the plastic was an intrusion from the northern part of Pit 2, known to be modern fill.

3.) Pit 3

Pit 3 was the largest of the four pits, measuring 5 feet on the north side, 10 feet on the east, 6 feet on the south, and 12.5 feet on the west (see **Figure 5.109**). It was located abutting the existing subway loop and was excavated between July 18 and August 12, 2005. A large concrete-encased duct bank cross-cut the area of Pit 3 in an east-west direction. This constrained access, but provided a consistent datum for elevation measurements.

Five strata were documented in Pit 3. The upper stratum was brown sandy silt. Stratum 1 was identified at elevations between 3.0 to 3.5 feet below sea level. Stratum 2 extended to a depth of 4.5 feet below sea level. It was reddish brown mottled silt. Stratum 3 was a cobble-filled deposit and extended to a depth of elevation 6.5 feet below sea level. This was underlain by mottled very dark gray and dark gray silty sand that contained possible cribbing, Stratum 4 (see **Figure 5.111**). This extended to a depth of elevation 8.5 feet below sea level. This stratum also contained some clumps of grass in muck from 7.5 to 8.5 feet below sea level. No cultural material was identified below this depth. Stratum 5 was described as a marine deposit and was dark gray sandy silt with whole clams and crushed shell. Bedrock was encountered at approximately 11 feet below sea level.

The possible cribbing identified in the Pit contained sections of logs as well as cut lumber. The wood was not found in any discernible configuration, and therefore may or may not represent part of an actual landfill-retaining structure, but rather be part of the general fill. An alternative explanation for the presence of this wood is its possible association with the use of the Pond by carpenters and boat-makers to soak wood (see **Chapter 4: A.6. George Augustus' Royal Battery**). Two oak samples were subjected to dendrochronological analysis; however, absolute dates of death could not be established. One sample was cut after 1671, and the other after 1676.

Temporally diagnostic artifacts were recovered from Strata 2, 3 and 4. Stratum 2 contained a total of 177 artifacts, 90 of which were temporally diagnostic. The TPQ of Stratum 2 is 1950 based on one porcelain ceramic sherd (Cat. 16196.348). After this, the next latest artifact is a sherd of canary ware made between 1790 and 1835. Stratum 3 contained a total of 145 artifacts. Eighty-two of those were temporally diagnostic. Although Stratum 3 contained a prehistoric chert flake, the TPQ of this stratum is 1840 based on a printed whiteware ceramic sherd (Cat. 16196.349). Stratum 4 was excavated in two phases and the artifact contexts examined separately for each. The TPQ of Stratum 4.1 is 1863 based on a linoleum tile fragment (Cat. 16196.354). Stratum 4.1 contained 23 temporally diagnostic artifacts and a total of 118 artifacts. Stratum 4.2 contained a total of 20 artifacts, and eight of those are temporally diagnostic. The TPQ of Stratum 4.2 is 1720 based on a stoneware ceramic sherd (Cat. 16196.345).

4.) Pit 4

Pit 4 connected Pit 1 to the north with Pit 2 to the south (see **Figure 5.109**). It was rectangular in shape and measured eight feet north to south and seven feet east to west. It was excavated from July 20 through July 28, 2005. A series of five sewer discharge lines cross-cut the area of Pit 4 in an east-west direction. This constrained the excavations but, as with Pit 3, it also provided a datum.

The entire pit was described as modern fill. The soil was mottled brown and dark gray sandy silt with schist fragments. This fill was a continuation of that documented in Pit 1 and related to modern utility work. No artifacts were retained from Pit 4.

In conclusion, unlike the deposits documented at nearby Whitehall Slip, the fill in the FPSP area was likely from domestic garbage rather than commercial waste (see **Chapter 6: F.1. Fan Plant**

Sheeted Pits). Four analytical units have been assigned to the deposits in the Fan Plant Sheeted Pits. Three of these represent the vertical location within the pits, and the fourth is for miscellaneous contexts. FPSP A is assigned to contexts associated with the basal strata of the pits. When discounting the contamination evidenced by a piece of plastic, the TPQ of this deposit is 1740 based on a ceramic sherd recovered from Pit 2 (Cat. 16196.339). The middle strata of the FPSPs are assigned FPSP B. The TPQ of these contexts is 1863 (Cat. 16196.354). FPSP C is the upper strata of the pits. The TPQ of these deposits is 1950 (Cat. 16196.348). FPSP D contexts are miscellaneous finds with no vertical attribution. As discussed above in relation to cribbing and piles, the Fan Plant Sheeted Pits and the ET 5 piles are both possibly related to one another and to the former Battery Pond which was filled in 1773 (see **Chapter 4: A.11. The Stamp Act**).

f. NATIVE AMERICAN MATERIALS

Several Native American artifacts were recovered during South Ferry Terminal excavations. Thirty-two proveniences contained either prehistoric ceramics or lithics. This represents a total of 35 artifacts. Of those, 20 artifacts (57 percent), representing 16 contexts, are associated with the Battery Wall. Four of the proveniences with Native American cultural material are from Whitehall Slip contexts. Nine contexts with one artifact each came from General South Ferry excavations. No contexts contained Native American cultural material exclusively.

Battery Wall contexts that contained Native American cultural material are from Walls 1, 3, and 4 (n=20 prehistoric artifacts). Most of these are from fill contexts above or next to the truncated Wall. These contexts, therefore, postdate the Wall and are not exclusively prehistoric. However, Native American flakes or fragments were recovered from four contexts beneath the Wall, two each from Walls 1 and 3. Four of these six flakes came from flotation samples in contexts also containing historic period cultural material.

Wall 1 also contained Native American cultural material in contexts from levels above the Wall. Wall 3 contexts containing prehistoric cultural material came from a wider range of AUs, including two from above the level of the Wall itself. Six other contexts are assigned to AUs representing fill adjacent to the Wall. Two other contexts are from the AUs beneath the level of the Wall. Of those, one provenience is associated with an EU that was contaminated by flooding and, therefore, should not be included in the interpretation. The other is from an EU abutting the counterfort and log feature associated with Wall 3. Six other temporally diagnostic artifacts were recovered from this provenience, all dating to the historic period, with a TPQ of 1720 based on three salt-glazed stoneware ceramic sherds (Cat. 15768.196).

Whitehall Slip proveniences that contain prehistoric cultural material include four secant pile/decking columns from Levels 2 or 3 out of five. Historic period cultural material was also recovered from those contexts. TPQs for two of them are 1970 based on plastic (Cats. 15598.101 and .237). The other two have no temporally diagnostic material, but do have fragments of brick (Cat. 15598.096 & .212).

Of the nine contexts containing prehistoric cultural material that were collected during General South Ferry excavations, two were from backdirt contexts. All but one of the other contexts containing prehistoric material were located in the southern part of the project corridor. One prehistoric pottery sherd was recovered from Battery Place and was associated with an early fill deposit previously discussed (**Chapter 5: C.4.c. Deposits with 17th-century artifacts**) (Cat. 16196.001). One of the six remaining contexts was associated with the Fan Plant sheeted pits in Peter Minuit Plaza and was also discussed above (**Chapter 5: C.4.e. Fan Plant Sheeted Pits**)

(Cat. 16196.349). One other is from perimeter trench excavations in the Cobblestone/Coast Guard Access Road area of the site. As discussed in **Chapter 2: B. Field Methods**, perimeter trench excavations were no deeper than eight feet below ground surface. Therefore, it is not surprising that the TPQs of these contexts are not very early. The TPQ of this context is 1985 (Cat. 16196.164). Two other contexts containing prehistoric cultural material are from secant pile excavations recovered from Levels 2 and 3 of five (Cats. 16196.312 and .467). The TPQs of these are 1670 and 1680, respectively. Of the two remaining contexts that contained Native American cultural material, one was from an interior column pit excavated east of the existing Fan Plant in Peter Minuit Plaza. The artifacts from this context were opportunistically collected, rather than from screening for artifact recovery. The TPQ of the collection is 1920 based on a porcelain tile (Cat. 16196.386). The final context containing prehistoric cultural material was from a tie-back on the northeastern side of Peter Minuit Plaza. Three buckets of soil from approximately eight feet below ground surface were screened for artifact recovery. The TPQ of that collection is 1830 based on a pearlware/whiteware ceramic sherd (Cat. 16196.501).

In conclusion, while a number of contexts containing Native American cultural material were established, none of these was exclusively Native American. All were mixed with historic period fill, and thus no AUs were assigned specifically for Native American Materials.

g. HUMAN REMAINS

Redeposited human remains were recovered during the South Ferry Terminal project, primarily from two locations; one associated with Wall 1 and the other from subway tunnel fill in Battery Place. There were also several small fragments of human remains recovered from other fill deposits. The human remains recovered from subway fill in Battery Place, and those recovered from utility fill, were seen by the Office of the Medical Examiner while the fieldwork was underway. The ME's office determined them to have no "medicolegal" significance. The Wall 1 human remains were recovered from Excavation Units 4 and 10 and are discussed earlier in this chapter (**Chapter 5: A.8.d. Human Remains** and with the Battery Wall EU results in **Appendix N**).

Two human bones were recovered from fill above the existing subway in two different soldier pile pits (SPPs) on the south side of Battery Place on May 11, 2005. Monitoring excavations of subway fill was not part of the original archaeological protocol; however, it was added for these soldier pile pits once human remains had been identified in the backdirt pile. The subway was built in 1918. The subway fill was noted as containing a variety of artifacts dating from the 18th through 20th centuries. However, selective recovery of artifacts resulted in a combined TPQ of 1770 based on several creamware ceramic sherds (Cats. 16196.046, .047, and .049).

In addition to the human remains identified in the field, four fragments of human bone were identified during the analysis phase of the South Ferry Terminal project by the faunal consultant. These were separated and sent to the physical anthropological consultant along with all the other human remains. One of these was from a Wall 1 context (Cat. 15768.252), one from a Wall 3 context (15768.558) and the other two from utility fill (Cats. 16196.161 and 372).

Although redeposited human remains were recovered from several South Ferry Terminal project contexts, an AU was only assigned for the deposit associated with subway fill in Battery Place, BPL F. This AU was predominantly for the actual subway fill rather than for the human remains specifically. For the forensic analysis of the human remains from the project site, see **Appendix J**.

5. PROJECT-WIDE FILL ASSESSMENT

Stratigraphy was documented throughout the entire South Ferry Terminal project corridor in numerous locations at numerous depths. Profiles of trenches, both ATTs and other contractor trenches, were drawn, and field notes were taken. Stratigraphy within test pits, secant piles, soldier piles, borings, and all manner of other contractor excavations was also documented. The extent of documented stratigraphy was unparalleled for lower Manhattan archaeological sites.

The South Ferry Terminal project corridor is situated along the original Manhattan shoreline. Parts of the project corridor consist of original land surfaces, but most of the corridor is comprised of fill. The exact location of where that original land meandered in and out of the corridor was not possible to evaluate based solely on the historic maps because of the inherent problems of scale and distortion of overlays (see **Figure 4.36**). The South Ferry Terminal project has allowed an assessment of the actual locations and depths of the fill. This information has made possible the comparison of actual data to the historic maps, thus establishing a framework for evaluating their accuracy (see **Chapter 7: E.1.a. Documents and Maps**).

a. ARCHAEOLOGICAL TEST TRENCHES (ATTS)

Archaeological Test Trenches were the only opportunity to continuously document the stratigraphy within the project corridor throughout areas previously believed to be undisturbed (see **Figure 2.1** for locations of ATTs). As previously described, several sections of the Battery Wall were identified during excavation of ATTs, as were sections of log landfill-retaining features. All of these are discussed at various places elsewhere in this chapter. The following discussion pertains exclusively to the stratigraphy documented within the ATTs.

1.) ET 1

Archaeological Test Trench ET 1 was the northernmost of the ATTs. It was located within Battery Park from just south of the Battery Place sidewalk at approximately Deck Beam 4 southward to Deck Beam 36 (see **Figure 5.53**). This was a distance of approximately 265 feet.

The existing ground surface throughout the ET 1 excavation area was approximately 10 feet above sea level. The bedrock within ET 1 undulated somewhat with the highest elevations between Deck Beams 20 to 26, approximately 5 feet above sea level, an average depth of only five feet below ground surface. This was the location of the World Trade Center memorial globe. However, the general trend was more deeply buried bedrock from north toward south. The bedrock elevation at Deck Beam 4 was approximately 3 feet above sea level and went down to 10 feet below sea level at Deck Beam 36. As described in **Chapter 2: B. Field Methods**, ATT excavation began after the first five feet of soil had been removed. This left very little soil throughout much of the northern part of ET 1 to document. Only one lift[22] was required in ET 1 north of where Wall 1 was later identified. Archaeological trenching was stopped in the areas where Walls were discovered in lieu of data recovery excavations. The soils documented within ET 1 in the northern segment were consistently composed of fill. Mortar, in varying concentrations and depths, was a frequent inclusion. Some of the mortar-containing deposits could be associated with the Battery Wall and are discussed in **Chapter 5: A.6. Other Wall Contexts.** Other mortar-containing soils were associated with more recent fill episodes.

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[22] A lift is the maximum five-foot excavation increment used by the contractor for ATTs (see **Chapter 2: B. Field Methods**).

South of Wall 1, ET 1 excavations recommenced from approximately Deck Beam 31 southward. Here two lifts were excavated before encountering bedrock. **Figure 5.115** represents the stratigraphy documented over a 20-foot interval between Deck Beams 33 and 35. The profile represents approximately 13 feet of deposit beneath the level of the deck beams (elevations 6 feet above to 7 feet below sea level). Fill was noted throughout this cut, with several different soil types represented. The upper levels exhibited more variety in soil types than the lower levels. This difference could be associated with fill practices, related to the source(s) of the fill, a result of park work and other disturbances, or simply related to the different archaeological technician recording the profiles.

The mortar noted in the fill layers north of Wall 1 continued in the deposit to the south. Here, as it was to the north, the soil was dark yellowish brown silty sand. This was the only stratum where artifacts were recovered. The TPQ of the deposit is 1775 based on a pearlware ceramic sherd (Cat. 15768.068). The mortar deposit was underlain with dark yellowish brown fine silt, and then yellowish brown or strong brown coarse sand, dark yellowish brown very fine silty sand, and mottled brown fine sand. The basal stratum was also dark yellowish brown, but ET 1 was filled with so much water that this stratum was recorded as muddy fill. The trench retained water because it was directly on bedrock, with no place for the ground water to drain.

In addition to sampling artifacts from the mortar-containing stratum, artifacts were recovered opportunistically from other ET 1 contexts at numerous places. Those not recovered from the vicinity of Walls 1 or 2 exhibit a wide range of manufacture dates, as seen throughout the fill. These include a whole embossed milk bottle with a beginning manufacture date of 1905 recovered from the upper five feet of fill in Battery Park (Cat. 16196.088), as well as a pearlware ceramic rim sherd with a floral motif (TPQ 1807) recovered from directly above the bedrock in the area of Battery Park between Walls 1 and 2 (Cat. 16196.095).

2.) XT 1, 2, 3, and 4

Four six-foot-wide ATTs crossed ET 1 in northern Battery Park: XTs 1, 2, 3, and 4. These were each approximately 40 feet long. XT 1 was located at Deck Beams 9 to 10, XT 2 was at Deck Beams 16 to 17, and XT 3 was at Deck Beams 20 to 21 (see **Figure 5.53**). As discussed above, when Wall 1 was identified, ATT excavation stopped in lieu of data recovery. As a result, XT 4 was not excavated. Also discussed above was the proximity of bedrock to ground surface, the highest within the South Ferry Terminal project corridor. In both XT 1 and XT 2, bedrock was encountered at approximately six feet below ground surface (elevation 3.5 feet above sea level). The bedrock elevation at XT 3 was 5 feet above sea level. The first five feet of soil had been previously removed without trenching, as specified in the ARMP and CRMP. Therefore, no soil remained for the excavation of XT 3, and very little remained for XT 1 and 2 excavations.

The south profile of XT 1 shows two strata existed within the three-foot-high profile (see **Figure 5.116**). The upper stratum was dark grayish brown silty sand. The basal stratum, directly on the bedrock, was brown silty sand fill. Brick and mortar fragments were noted throughout. No artifacts were recovered from XT 1. Although not depicted on **Figure 5.116**, the bedrock was noted to slope downward toward the west in XT 1. Such was expected, as that is the direction of the water.

The south profile of XT 2 shows a maximum of three feet of soil, again with bedrock sloping down toward the west. A pipe and pipe trench fill were documented crossing XT 2 near the western end of the trench. The stratigraphy within XT 2 also contained many other discrete fill deposits; however, the stratigraphy can generally be described in three strata (see **Figure 5.117**).

The upper stratum is dark yellowish brown silty sand, some of which contained concentrations of mortar. The middle stratum, outlined in bold on **Figure 5.117**, was darker and siltier soil. The basal strata were dark yellowish brown fine sand. A few artifacts were recovered while cleaning the profile. These include a molded bottle glass sherd which provides the TPQ of 1840 (Cat.16196.610).

3.) ET 2

ET 2 was approximately 20 feet long and located along the mid-corridor within Battery Park, abutting and to the north of the existing ❶ loop. This was near Struts 119 and 120 (see **Figure 5.54**).

Excavations for ET 2 were documented in two lifts (see **Figure 5.118**). The first lift was from elevations 2.9 feet above to 2.1 feet below sea level. All strata were composed of fill. Stratum 1 contained a pocket of asphalt (Stratum 2), an indicator of a prior Park configuration. This was underlain with yellowish brown or strong brown sand. Strata 9 and 10 were brown silty sand fill, with fragments of brick and mortar noted. The remainder of the ET 2 excavation was part of the second lift, during its excavation possible log cribbing was encountered and ATT excavation stopped in lieu of documentation (see **Chapter 5: C.3.a. Cribbing and Piles**). The logs were first encountered in Stratum 10, brown sand, at an elevation of 3.6 feet below sea level. The soil became darker and siltier with depth and more cobbles, cut stone and schist were documented within and above the logs. No artifacts were recovered from ET 2 excavations.

4.) ET 3 and XT 5

ET 3 was located between the existing ❶ loop and the ❹/❺ subway line beneath Struts 107 to 111. XT 5 spanned half the width of the South Ferry Terminal project corridor from the west cut-off wall to ET3 near Strut 108 (see **Figure 5.54** and **Figure 5.119**). ET 3 was approximately 40 feet long, and XT 5 was approximately 25 feet long.

ET 3 was documented in three lifts, a vertical elevation change of approximately 12 feet (see **Figure 5.120**). The first lift was from elevations 1.6 above to 2.6 feet below sea level. The entire lift was one stratum: mottled dark yellowish brown sand fill with pockets of darker soil and decaying brick. There was a small gap between the first and second lifts. The second lift went down to an elevation of 8.5 feet below sea level. It contained four strata. The upper stratum was a continuation of the soil documented in the first lift. The second stratum was a thin lens of dark grayish brown silt. It was underlain by grayish brown sand. The lowest stratum was gray silty mud that contained some small clam shell fragments. There was some overlap between the second and third lifts, and that marine deposit continued in the bottom lift. Four additional strata were profiled in this lift, which extended to a basal elevation of 10.4 feet below sea level. The upper stratum in the third lift was reddish brown silt. It was underlain with fine brown sand, noted as being culturally sterile. A stratum of very dark gray silty sand with clam shell in the third lift corresponded to the lowest stratum in the second lift. The basal stratum in ET 3 was reddish brown sandy silt. No artifacts were retained from ET 3.

XT 5 was documented in two lifts, representing an 11.2-foot elevation change (see **Figure 5.121**). Each lift was approximately four feet, with a gap of close to three feet between them. An elevated railway footing was located at the eastern end of XT 5. The stratigraphy encountered was similar to that seen in ET 3. The upper strata were fill deposits, and the lower were marine deposits. The first lift of XT 5 was entirely fill, with brick fragments found in the soil near the base of the lift. The second lift was siltier from the start. Shell was predominant in the very dark gray silty sand (Stratum 11) at an elevation of approximately 8 feet below sea level. Two buckets of soil were screened from this stratum, and only two artifacts were recovered: a tobacco pipestem and a pearlware ceramic sherd (Cat. 16196.130). The pearlware provides a TPQ of 1807 for this deposit. The low artifact count should be considered in extrapolating that date to all fill in that portion of Battery Park, although it is consistent with dates from the west cribbing fill discussed in **Chapter 5: C.3.a. Cribbing and Piles**.

5.) ET 4

ET 4 was excavated from the south, near Deck Beam 19 in the Station area, northward for a distance of approximately 260 feet, to the area of Strut 106 at the northern end (see **Figure 5.55**). This is close to the same length as ET 1.

The preexisting ground surface was slightly undulating and elevations throughout the ET 4 area were somewhat lower than in ET 1, from approximately 6.8 feet above sea level in the south near Deck Beam 19 to a high of 8.2 feet between Deck Beams 1 and 8, and then the ground surface dipped slightly at the northern end of ET 4 near Strut 106. In contrast to ET 1, bedrock was substantially lower in ET 4. The highest bedrock elevations were encountered at 9.2 feet below sea level (16 feet below ground surface and approximately 15 lower than in ET 1) near Deck Beams 17 to 19 at the southern end of ET 4. Bedrock dipped sharply to the north, taking it below the elevation required to excavate the new South Ferry station by Deck Beam 6.

Two sections of Battery Wall, Walls 3 and 4, were identified during ET 4 excavations. Wall 3 was initially identified at Deck Beam 4. It diagonally spanned the distance from Deck Beam 6 to Strut 102. Per the ARMP, CRMP, and DATMP, ET 4 excavation was stopped for Wall 3 data recovery. ET 4 resumed north of Wall 3 at Strut 105, where Wall 4 was identified, again curtailing ATT excavation. Therefore, ET 4 excavation was generally confined to the area south of Deck Beam 6. A discussion of the stratigraphy around Walls 3 and 4 was presented above in **Chapter 5: A.4. Wall 3** and **Chapter 5: A.5. Wall 4**.

ET 4 excavations started in the southern end of the ATT. This area was beneath the Coast Guard Access Road, therefore space for excavation equipment was limited. As excavation continued, it became impossible for the front-end loader to access the ATT, as the bedrock rose in that very spot. ET 4 was then relocated toward the east, eight feet, from the eastern cut-off wall near Deck Beam 19, instead of the original 23 feet. A log feature was identified in the eastern profile of ET 4 at this location and was discussed earlier in this chapter (**Chapter 5: C.3.a. Cribbing and Piles**). Had the excavation been further to the west, as planned, unconsolidated fill would have prevented safe access to document these deposits. ET 4 was excavated in two lifts (see **Figure 5.122**). The upper lift was a series of fill deposits. Darker mottled sandy soils, including dark gray, dark brown, very dark grayish brown, and dark reddish brown, were noted in the upper strata of the lift. Those were underlain with fill characterized as brown fine sand (Stratum 3), some of which had sizable pockets of yellowish brown sand within them. Mortar lenses were occasionally recorded within Stratum 3 as well. The second lift contained three strata, the upper of which was a continuation of Stratum 3. Strata 6 and 7 were brown or dark brown sand. This was underlain by very dark gray silt (Stratum 8) that was encountered directly above the bedrock in the parts of ET 4 where bedrock was encountered.

Very few artifacts were recovered from ET 4 excavations that were not associated with either the Battery Wall or the log features. A fill lens containing a concentration of artifacts was identified near Deck Beam 17 in Stratum 2 at an approximate elevation of three feet below sea level. This deposit was sampled and contained several temporally diagnostic artifacts, the TPQ of which is 1780 based on a creamware plate sherd (Cat. 16196.135).

ET 4 also contained a dense concentration of historic demolition debris, mainly brick. It was in a loose matrix of mottled dark yellowish and dark grayish brown coarse sand (elevations 3.5 to 5.5 feet below sea level). This was located in the vicinity of Wall 4 in the northern part of ET 4 and was not found elsewhere in the project corridor. This is the same deposit that was documented as part of EU 43 Strata 6 and 7 (see **Appendix N**). The TPQ of those strata is 1950 based on a wire nail (Cat. 15768.220). One hundred seventy-nine whole, or mostly whole, bricks from this fill context were collected and transferred to Allan Gilbert of Fordham University. This represents 21 percent of all whole bricks transferred to Dr. Gilbert as part of the South Ferry collection. He will be analyzing a portion of these to determine the source of the clay used to make the bricks, and to incorporate the results into his New York Brick Archive. Information on the brick analysis is attached as **Appendix F**.

6.) XT 6 and 7

XTs 6 and 7 were associated with ET 4 (see **Figure 5.55**). XT 6 was approximately 20 feet long, and at the northern end of ET 4 and XT 7 was approximately 55 feet long toward the southern end of ET 4. XT 6 was not excavated because of the identification and data recovery of Wall 4. XT 7 was located crossing ET 4 at Deck Beam 13. It was excavated in two lifts. The stratigraphy was identical to that documented in ET 4. No artifacts were recovered associated with XT 7.

7.) ET 5

ET5 was approximately 45 feet long. It was located within Peter Minuit Plaza just inside of the existing ❶ loop and quite close to the Fan Plant Sheeted Pits. It was the southernmost of the ATTs (see **Figure 2.1** for ET 5 location). Contractor’s beams had been previously installed in this area, precluding excavation with a backhoe. Only the western profile was available for documentation. This was excavated in three lifts (see **Figure 5.123**).

Six main strata were documented in ET 5. Stratum 1, found at elevations between 0 and 3 feet below sea level, was dark yellowish brown silty sand. Stratum 2 was very dark gray silty sand, with fragments of decaying wood throughout (elevations 3 to 4 feet below sea level). Stratum 3 was also very dark gray silty sand, but did not contain the decaying wood fragments. However, Stratum 3 did contain a number of unarticulated bricks, both red and yellow, as well as a complete cannonball (Cat. 16196.380). The wood fragments were so dense at the northern end of ET 5 that they were assigned their own stratum, Stratum 4. Stratum 5 was made up predominantly of cobbles, which were approximately six inches or less in diameter. The soil matrix was brown sandy silt (approximate elevations 3 to 5 feet below sea level). Stratum 6 was very dark gray sandy silt that contained a concentration of shell (approximate elevations 5 to 6 feet below sea level). Stratum 7 was dark gray sandy silt resting on bedrock, to an elevation of approximately 9.5 feet below sea level.

A number of artifacts were recovered from the upper strata. Lift 1 (Strata 1 through 3) has a TPQ of 1790 based on a pearlware ceramic sherd (Cat. 16196.377). Lift 2 (Strata 4 through 6) has a TPQ of 1740 based on a Jackfield-type ceramic sherd (Cat No. 16196.379). Lift 3 contained Stratum 7 only, and did not contain any temporally diagnostic artifacts. The deposit produced mainly shell and wood (84 percent).

b. OTHER SOURCES OF STRATIGRAPHIC DATA

In addition to the ATTs, stratigraphy was recorded during monitoring of all other types of contractor excavations. The following mirrors the discussion of the various contractor excavation types previously discussed in **Chapter 2: B. Field Methods**; perimeter trenches, secant pile sampling, soldier pile and girder column pits, tie-backs, test pits/trenches, utility trenches, borings and geoprobes, and general site excavations.

1.) Perimeter Trenches

Perimeter trenches were generally 3 to 4 feet wide and 3 to 8 feet deep. In most parts of the South Ferry Terminal project corridor, this means the trenches were excavated through relatively modern fill. Some of the trenches revealed deposits or features that are of particular note, such as the shell deposit identified in the western perimeter trench segment in Peter Minuit Plaza, and the cable and elevated railway features identified in the eastern section of PMP. Those deposits and features were discussed above in the appropriate sections of this chapter. The following is a discussion of the deposits documented within trench segments that did not lead to further archaeological exploration (see **Figure 5.124**). It is organized from north to south within the project corridor.

Archaeological monitoring was completed for several segments of perimeter trench that were located within Battery Place. Excavations in the southeastern part of Battery Place (BPL) were the only location where perimeter trenching revealed soils that were fast land. The profile of the perimeter trench at the southeast corner is depicted here, showing these natural deposits at the base of the trench buried approximately five feet below the ground surface (elevation 7.8 feet above sea level) (Stratum 3 on **Figure 5.125**). This deposit continued from this southeast corner westward for approximately 35 feet. It was not documented in the perimeter trench to the north because an existing utility pipe crossed the trench at an angle, thus obscuring potential natural deposits. Similar soil was documented in the perimeter trench near what was later excavated for Soldier Pile Pits 64 and 50. SPP 64 is located to the west of where this soil was originally documented, also in the southern side of Battery Place. SPP 50 is discussed above in **Chapter 5: C.4.c. Deposits with 17th-century artifacts**.

MTA geologist Dr. Ajit Kumar Shah was consulted on this deposit because it did not seem possible to find a natural deposit undisturbed and buried at such a shallow depth under Battery Place. He relayed the geological soil formation processes that would have resulted in the deposit and confirmed this was indeed natural. A sample of the deposit was screened for artifact recovery, but it contained no cultural material.

A wide variety of fill deposits were documented in the perimeter trenches south of Battery Place throughout Battery Park and Peter Minuit Plaza. No natural soil deposits were encountered in any other perimeter trenches. Furthermore, no continuous homogeneity was identified within the fill documented in the perimeter trenches. A typical profile shows several pipes cross-cutting the trench as well as other fill layers (see **Figure 5.126**). An examination of the artifacts recovered from the fill deposits in PMP reveals the fill documented within the perimeter trenches was likely churned up on a frequent basis. TPQs from deposits with increasing depths are 1800, 1700, 1800, and 1845 (Cats. 16196.435, .424, .426, and .433). The lack of a trend of increasing age with depth is a further indicator of the mixed nature of the fill.

2.) Secant Pile Sampling

Secant piles were sampled throughout Peter Minuit Plaza (PMP), generally with every fourth pile sampled. Sampling continued through part of the Cobblestone Area/Coast Guard Access Road (CCG) and, to a limited extent, within Battery Place (BPL) (see **Figure 5.65**).

Stratigraphic cross sections of those secant piles sampled within Whitehall Slip are depicted and discussed in **Appendix N: Whitehall Slip Secant Pile Stratigraphy**. However, many more secant piles were sampled, and the analysis here extends the discussion of the fill stratigraphy throughout PMP and northward through part of CCG, and also up into BPL.

A line of secant piles was sampled along the eastern side of PMP. These, too, would have been within the footprint of Whitehall Slip. As with the rest of the Whitehall Slip stratigraphy, these exhibited a wide variation in soil types. However, similar generalizations can be made. The samples ranging in depth from about five to ten feet below ground surface (Level 2) were generally brown or dark brown. However, darker colors were observed toward the south, in the direction of the River. The soil became wetter and was often described as “mucky” in Level 3 (10 to 15 feet below ground surface). The color of these deposits was generally very dark brown or gray. Level 4 (15 to 20 feet below ground surface) was often described as reddish brown sandy silt. A fifth level (20 to 25 feet below ground surface) was generally encountered throughout this eastern side; however, it was not present in the southernmost of the secant piles sampled. When present, Level 5 was generally described as gray or greenish gray sandy clay. As was done for the secant piles in the rest of Whitehall Slip, the artifact inventory was sorted by secant pile level to determine if TPQs could be applied to the various fill deposits. There was very little uniformity; however, the dates became earlier with depth, as is expected. These dates were comparable to those of WHS AUs, and are listed in **Table 5-18**.

Table 5-18
Soils, TPQs, and their Analytical Units from Secant Piles Along the Eastern Edge of Peter Minuit Plaza in Whitehall Slip

Level	AU	Secant Pile/Cat. #	Soil Type	TPQ
2	WHS A – D	83 and 187 / 15598.231 and .339	Brown or dark brown fill	1970
3	WHS C	115 / 15598.262	Very dark brown or gray muck	1893
4	WHS D	83 / 15598.233	Reddish brown sandy silt	1893
5	WHS C	118 / 15598.271	Gray or greenish gray sandy clay	1770

A similar exercise has been done for the line of secant piles extending from the northeastern corner of PMP westward and then northward into CCG, for the line of secant piles along the southern side of PMP, and finally for those secant piles along the western side of CCG and those in BPL.

Along the southern boundary of the South Ferry Terminal project corridor within PMP, some of the secant piles were within fill related to Whitehall Slip, while others extended westward beyond the Slip. The stratigraphy within this transect differed slightly from the line of secant piles sampled along the eastern side of PMP in that the reddish soil was not present at all and the basal strata here was either very dark (black or dark gray) in the area of Whitehall Slip or light brown toward the western part of the transect (see **Table 5-19**).

The temporally diagnostic artifacts recovered from these deposits also have a wide range of manufacturing dates, although the non-Whitehall Slip contexts generally contain more modern material at deeper levels that the Whitehall Slip contexts. A wide array of artifacts was recovered from secant pile sampling, including ceramics, glass, shoe leather, musket balls, and a 1758 medallion. The medallion (discussed in more detail in **Chapter 6: E.1. WHS A**) was the subject of much interest when found. MTA Arts for Transit took photographs and one was included in a temporary exhibit at the Bowling Green Subway Station in 2006. It is now known that the medallion and many of the secant piles excavated in Peter Minuit Plaza were excavated through Whitehall Slip.

Table 5-19
Soils, TPQs, and their Analytical Units from Secant Piles Along the Southern Edge of Peter Minuit Plaza

Level	AU	Secant Pile/Cat. #	Soil Type	TPQ
2	WHS D and non – WHS	21, 45 and 47 / 16196.596, 15598.199, and .202	Brown or dark brown fill	1970
3	WHS D	45 / 15598.200	Very dark brown, black or gray muck	1790
	Non – WHS	25 / 16196.600	Grayish brown wet silty sand	1970
4	WHS D	41 and 47 / 15598.198 and .204	Black or very dark gray sandy silt	1795
	Non – WHS	21 / 16196.598	Gray or grayish brown sandy silt	1950
5	WHS D		Very dark sandy silt with clay	n.d.
	Non – WHS		Light brown sandy silt with clay	n.d.

Secant piles were also sampled from the northern part of PMP, east of the 1 line Loop. The eastern half of these were within AU WHS A. The soil types here were comparable to those documented for Whitehall Slip. Level 2 was generally brown sandy silt. Level 3 was gray muck. Level 4 was light brown or reddish brown silt. Level 5 was greenish gray clayey soil. A similar trend in soil types was also documented for the secant piles to the west of Whitehall Slip in this northern part of PMP. However, there were fewer secant piles here, making the comparison less statistically significant. The artifacts from all of these secant piles are identical to those derived from WHS A. TPQs for Levels 2 through 5 are 1970, 1970, 1758, and 1670, respectively.

The secant piles that extended from the northwestern part of PMP through CCG were generally deeper than those previously discussed. This matches the natural contour of the bedrock, which becomes deeper toward the north in this area. The secant piles on the eastern side were analyzed separately from those on the western side of CCG, although all of these secant piles exhibited a wide range of variation in soil types. Such variation is not surprising, since the distance these secant piles cover is approximately 365 feet on the eastern side alone, longer than the distances of the previously discussed sections of secant walls combined. In addition to the wide variation in soil types documented here, there was no localized consistency in soil types when isolating groups of secant piles in close proximity to one another. The only pattern that was observed in the PMP/CCG secant piles is in the basal strata. The base of excavation of these deeper secant piles was uniformly greenish gray clay and/or silty clay. Based on the depths, soil types and textures, and relative absence of artifacts, these basal deposits are not fill but natural marine deposits. TPQs for each level were identified and are shown below in **Table 5-20**, with the soil types associated with the particular deposit that provides the TPQ.

Table 5-20
Secant Pile Soil Types and TPQs by Level for Northern Peter Minuit Plaza and the Cobblestone Area/Coast Guard Access Road.

Level	Secant Pile/Catalog #	Soil Type	TPQ
2	1033 / 16196.216	Very dark grayish brown sandy silt	1970
3	2073 / 16196.249	Very dark gray silt	1870
4	1013 / 16196.187	Brown sandy silt	1720
5	178 / 15598.334	Greenish gray clay	1670

In contrast to the secant piles excavated in the southern part of the South Ferry Terminal project corridor, those excavated within Battery Place were quite shallow. Again, this follows the natural contour of the bedrock. Only two levels were reached for these four secant piles, excavated for girder columns (see **Figure 5.108**). The higher elevation also made for drier soil conditions. All the excavated soils were described as dry brown sandy silt. While three of these secant piles contained artifacts, none of them were temporally diagnostic.

3.) Soldier Pile and Girder Column Pits

Most of the soldier piles excavated for the South Ferry Terminal project were located in the northern part of the corridor, mainly within Battery Place (see **Figure 5.127**). These are areas where the bedrock is relatively shallow. The soldier pile pits were generally excavated to a depth of 8 to 15 feet below ground surface to bedrock, and were usually three feet square. A few of the pits within northern Battery Park were excavated by backhoe, although most were dug by hand. Three interior column pits were also excavated by hand in Peter Minuit Plaza.

A total of 53 soldier pile pits was monitored; 44 of these were within Battery Place. Soldier pile pits in Battery Place were excavated within the perimeter trenches. The perimeter trenches were sheeted with wood to shore them for safety after the stratigraphy was documented, thus upper profiles of the pits were generally obscured during excavation of the SPPs.

The soldier pile pits excavated in the northern side of Battery Place were excavated, abutting the sidewalk vaults of 1 Broadway, and were entirely comprised of fill related to construction of the vaults. Therefore, they are not included in this summary of the stratigraphy. Additionally, five of the SPPs were excavated in the fill above the existing subway, along the southern side of Battery Place. Monitoring of these was not originally part of the archaeological protocol, but was later added when a human bone was found in the subway fill backdirt. These soldier pile pits are discussed above in relation to human remains.

The stratigraphy within the remainder of the Battery Place soldier pile pits was somewhat variable, although not to the extent seen elsewhere in the South Ferry Terminal project corridor. The most common soil profile in the SPPs was reddish brown or dark yellowish brown fine silt, occasionally with some sand (Stratum 1). This was generally underlain by very dark grayish brown or dark grayish brown silt (Stratum 2) or bedrock. This profile existed in 13 of the 30 SPPs (SPP Nos.: 42, 46, 48, 50, 52, 54, 63, 65, 69, 74, 75, 80, and 81).

In addition to the SPPs, three girder column pits were hand excavated around the median of Battery Place. Two of these were composed entirely of fill from utility lines observed in the excavations. The other contained a profile that is a good example of the stratigraphy throughout the entire vertical column seen in many of the SPPs (see **Figure 5.128**). The reddish brown sand was encountered at a depth of 5.3 feet below ground surface (elevation 3.7 feet above sea level).

Five of the 13 SPPs contained temporally diagnostic artifacts in Stratum 2. Three of these contained artifacts which provide a TPQ of 1770 (Cats. 16196.010, .032, and .037). Another had an earlier date (Cat. 16196.041). SPP 48 (see **Figure 5.127** for location) contained 20th century material that, if discounted as an intrusion, would also result in a TPQ of 1770 (Cat. 16196.035). Three other contexts also had temporally diagnostic artifacts in Stratum 2 with a TPQ of 1720 (Cats. 16196.038, .039, and .042).

In the northern part of Battery Park, soldier piles were driven into the ground without excavation. However, this was not possible at the point where the bedrock became too deep. This corresponds to the location of Deck Beam 39 (seen at the bottom of **Figure 5.53**) and extends southward to connect with the secant wall. Four soldier pile pits were excavated in this area using a backhoe. The ground was very unstable and the pits were quite deep, up to 18 feet. Therefore, the archaeological crew was not permitted access to examine the stratigraphy. However, a couple of observations regarding stratigraphy were made. A deposit containing shell was observed at approximately 5 to 10 feet down. Wet cobbles were seen in the base of SPP 45ES (see top left of **Figure 5.129** for location).

All three interior columns in Peter Minuit Plaza were excavated within fill buried up to 5.9 feet below ground surface (0.5 feet below sea level). Artifacts were recovered from IC-2 and IC-3 (see **Figure 5.129** for locations). The TPQ is 1920 based on a porcelain tile (Cats. 16196.385 and .386).

4.) Tie-Backs

A tie-back is a type of bracing used to keep the secant wall from shifting before cross beams could be installed in Peter Minuit Plaza. These were angled metal poles that connected the secant wall to the bedrock. Excavations were only required for tie-back locations that were in previously unexcavated areas with existing utilities. Other locations were either drilled or installed after all soil had been removed during the monitoring of other contractor activities. Four tie-backs that required excavation were placed along the north secant wall (see **Figure 5.129**). These were numbered 3 through 6. Excavations for the tie-backs ranged in size from five feet wide to 15.5 feet long and were excavated to depths of 8 to 10 feet below ground surface. Ultimately, excavation for Tie-back 3 overlapped part of the footprint of Tie-back 4, and Tie-backs 4 and 5 were combined into one trench. Tie-back 6 was disturbed not only by the expected utility lines, but also by an elevated rail footing. Stratigraphy was recorded and artifacts recovered from selected deposits within the tie-backs.

By the nature of the tie-back excavations, utility fill was the primary expected deposit (see **Figure 5.130**). In general, earlier fill deposits were reached by approximately seven to eight feet below ground surface (elevation 1.6 to 2.6 feet below sea level). A lens of 18th-century brick debris was documented at this level in Tie-back 4/5. The soil beneath the brick was very dark grayish brown silty sand. This soil type was noted in Tie-backs 3, 4, and 5 at the base of excavations. The artifacts recovered from Tie-backs 4 and 5 at this depth include two stoneware ceramic sherds, which provide a TPQ for this deposit of 1720 (Cat. 16196.500). Although Tie-back 3 was also sampled at this depth, no temporally diagnostic artifacts were recovered (Cat. 16196.503). A higher concentration of cultural material was also observed in Tie-back 3 directly above the basal level. The artifacts recovered from this deposit provide a TPQ of 1893 based on a machine-made bottle glass sherd (Cat. 16196.502).

5.) Test Pits/Trenches

Test pits and trenches were excavated by the contractor to identify locations of existing utilities and subway structures. Therefore, they should have all been within the footprints of the disturbances created when these infrastructure components were originally installed. However, the test pits and trenches were monitored by the archaeologists to ensure that the contractor did not extend beyond the footprint of the previous disturbance and, if they did, to document the stratigraphy and/or archaeological findings. The plan for archaeological protocols for test pits, borings, and geoprobe excavations established the need to monitor seven test pit locations, those numbered TP 7, 8, 9, 12a, 12b, 12c, and 12d (Dewberry 2005a). The protocol also gave the archaeologist discretion to include other test pits that might have been added by the contractor, as appropriate. Test Pits 14a, 14b, 15c1, and 15c2 were among them.

Seven of the monitored test pits were within Battery Place (BPL): TPs 7, 8, 9, 12a, 12b, 12c, and 12d. The four others were within the Cobblestone/Coast Guard Access Road Area (CCG): TPs 14a, 14b, 15c1 and 15c2. **Figure 2.2** and the **Composite Map** illustrate geographic areas assigned to the South Ferry Terminal project for analytical purposes.

The BPL test pits are discussed here in the direction of west to east. Test Pit 7 was 15 feet long and three feet wide. It was excavated to a depth of 5.2 feet below ground surface (elevation 3.8 feet above sea level), exposing the existing subway at the western end of the trench and a duct bank in the center. All the soil was clean fill. TP 12c was a three-foot-square test pit and was excavated to a depth of five feet below ground surface (approximate elevation 4 feet above sea level). Stratified fill was noted in the bottom three feet of the excavation (see **Figure 5.131**). TP 12d was also a three-foot-square by five-foot-deep pit and it, too, contained stratified fill.

Test Pit 8 was another 15-foot-long trench excavated to a depth of five feet below ground surface (elevation 4 feet above sea level). Most of the fill was yellowish brown sand with brick demolition rubble. However, the base of that stratum was reached in the southern part of the trench where yellowish red sand was documented in the bottom of TP 8. No artifacts were recovered from this stratum. TP 8 was located directly to the north of the section of BPL perimeter trench where a deposit representing fast land was previously documented. Although that deposit was a somewhat darker color, it is possible that this yellowish red sand is related, based on its texture, proximity, and lack of cultural material.

Test Pit 9 measured seven feet north to south and four feet east to west and was only excavated to a depth of 3.5 feet below ground surface (elevation 5.5 feet above sea level). The pit contained a variety of utility lines, and was entirely comprised of utility fill. TP 12b was another three-foot-square, but it was excavated to a depth of only 1.6 feet below ground surface (elevation 7.4 feet above sea level). TB 12a was the last three-foot-square pit monitored in BPL. It uncovered a duct bank and was entirely clean sand fill.

All of the CCG test pits were in close proximity to one another, located directly across the street from 17 State Street, the location of New York Unearthed. Test Pit 14a measured 4.5 by 6 feet. A concrete duct bank was exposed to a depth of 4.7 feet below ground surface (elevation 3.3 feet above sea level). The soil beneath the duct bank was similar to the duct bank trench fill, although somewhat more sandy. It seems likely that the matrix was used as backfill when the utilities were installed. The base of excavation was a depth of 6.5 feet below ground surface (elevation 1.5 feet above sea level). TP 14b measured three feet north to south and 15.5 feet east to west, straddling the park fence. It was filled with numerous utilities, and clean sand fill was documented to a depth of six feet below ground surface (elevation 2 feet above sea level). Earlier fill was found to the base of excavation at 6.9 feet below ground surface (elevation 1.1 feet above sea level). Over 17 sherds of creamware were recovered from this deposit that provided a TPQ of 1770 (Cat. 16196.327).

Test Pit 15c1 was a five-foot-square. All of the excavated soil was modern fill through the entire depth of five feet (elevation 3 feet above sea level). TP 15c2 was also a five-foot-square. It uncovered so many pipes that the pit had to be relocated four feet to the north. There the entire pit was above the existing subway roof.

6.) Utility Trenches

Utility trench excavations were conducted by the contractor for two reasons: to find and expose existing utilities prior to relocation, or to install new utilities. Trenches that contained existing utilities were monitored by the archaeologists to ensure that the contractor did not extend beyond the footprint of the previously disturbed trench and, if they did, to document the stratigraphy. The utility trenches excavated for the purpose of relocation were similar in nature to the test trench excavations. Trenches for new utilities within Peter Minuit Plaza afforded documentation of the existence of various fills, including the dense oyster shell deposit previously discussed as part of EU 102 in **Chapter 5: C.4.d. Shell Contexts** and seen in **Figure 5.114**. Utility trenches elsewhere in the project corridor enabled the documentation of various fills.

New utility trenches were only completed for two purposes; either for sewer discharge in Peter Minuit Plaza or for dewatering wells in Battery Park along locations where the footprint of the South Ferry Terminal project corridor crossed the existing subway tunnels (see **Figure 5.129**). Existing utilities were exposed in many locations throughout the project corridor as part of utility relocation and/or removal.

The majority of the utility trenches were not very deep, since utilities are usually buried less than five feet below the ground surface. The excavations in Peter Minuit Plaza for the new sewer discharge line that exposed a dense concentration of shell were only three feet deep. In addition to the shell, several strata of fill deposits were also documented (see **Figure 5.114**).

Several trenches were excavated in Battery Park for the dewatering wells. These trenches averaged only five feet deep. Some of the brick and mortar demolition rubble discussed above in **Chapter 5: C.4.a. Brick Contexts – Demolition Debris**, can be seen at the base of excavation (see **Figure 5.132**). A sample of soil from the level above the demolition debris was screened for artifact recovery. The TPQ of the deposit is 1921 based on a porcelain ceramic sherd (Cat. 16196.129).

Utility trench excavation completed for relocation/removal revealed a multitude of fills. Artifacts were generally opportunistically collected from these contexts. TPQs for such fill deposits similarly span a large amount of time. The earliest TPQ comes from a context in State Street that had massive modern disturbance, as seen in **Figure 5.133**. This TPQ is 1720 based on a stoneware ceramic sherd (Cat. 16196.507). Other TPQs from utility trench contexts average 1863 (Cats. 16196.075, .170, .329, .330, 357, .358, .360, and .456).

7.) Borings and Geoprobes

As previously mentioned, a separate archaeological protocol was prepared for test pits, borings and geoprobes (Dewberry 2005a). For the borings, this included continuous sampling to 15 feet below ground surface. Any soils not retained by the geologist were available for screening for artifact recovery. Twelve borings were recorded this way and an additional five borings were piloted with the upper levels recorded but not completed by the contractor. Geoprobes were recorded similarly, but could not be screened. Thirty-three geoprobes were documented (see **Figure 5.134**).

In analyzing the stratigraphy of the borings and geoprobes, potential patterns that could be seen across the entire corridor were sought (see **Figure 5.135**). The brown sand first identified in the perimeter trenches as an indigenous deposit was identified in many of the borings and geoprobes. This was found at an average depth of 9.5 feet below ground surface, although there was great variety. In some cases there were other deposits noted sandwiched between brown sand. Therefore, the average depth of when the brown sand begins could be deeper. In any case, the base of the brown sand was at an average depth of 20.7 feet below ground surface. No temporally diagnostic artifacts were recovered from these deposits in the borings or geoprobes. However, fragments of shells were noted in many of the samples within the brown sand.

8.) General Excavations

There were two types of general excavations that have not previously been discussed in regard to stratigraphy: excavations for the top five feet of soil, and hogging. The ARMP (LBG 2004) specified that the top five feet of soil would be excavated at a normal construction pace while being archaeologically monitored. The ARMP assumed excavations would take the form of trenching throughout the entire project corridor. This was never the case. Trenching was only conducted in limited circumstances: Archaeological Test Trenches, perimeter trenches, test trenches and utility trenches. The contractor generally used a four-foot-wide bucket for the backhoe or the front-end loader for other excavations. A smaller bucket was in use during the hogging at which Wall 2 was identified. The front-end loader was in use when Whitehall Slip was identified.

The field notes and artifact catalog were analyzed to determine if any similar deposits were noted within proximity to one another, or if wider patterns or similarities existed across the project corridor. Six proveniences with vertical control were established for contexts within Battery Place (BPL) where temporally diagnostic artifacts were present. Five proveniences from Battery Park North (BPN), three from the Cobblestone/Coast Guard Access Road Area (CCG), and one from Peter Minuit Plaza (PMP) had vertical control with temporally diagnostic artifacts present (see **Figure 2.2** for general geographic locations). No patterns were observed in these deposits or in the artifacts which they contained.

In conclusion, during the analysis of the stratigraphy, only one soil profile pattern was identified. This was localized within Battery Place. It involved two strata that were often documented beginning at an approximate depth of five feet below ground surface (4 feet above sea level). Stratum 1 was reddish brown silt (BPL B) and contained artifacts with a TPQ of 1770 (Cats. 16196.010, .032, and .037). Stratum 2, when it existed, was very dark grayish brown or dark grayish brown silt (BPL C). Its artifacts have a TPQ of 1720 (Cats. 16196.038 and .042).

In addition to the identification of unique strata within Battery Place (see **Figure 5.127**) and a generalized brown sand documented throughout the project corridor in borings and geoprobes (see **Figure 5.135**), an analysis of proveniences by depth has been conducted to ensure that any pattern that did not emerge while examining the various soil types could be elicited. AUs based on depths below ground surface by Area were established for all contexts, not previously discussed in relation to other features, in order to facilitate discussion of project-wide fill. The depths used are presented in **Table 5-16**. **Table 5-21** summarizes the findings, eliminating the data from secant pile sampling because of the possibility of contamination.

Table 5-21
TPQs for Analytical Units by Area and Depth

	BPL	BPN	BPS	CCG	PMP
Upper Levels	BPL D-1960	BPN A-1905	BPS A-1921	CCG D-1985	PMP D-1985
Lower Levels	BPL E-1893	BPN B-1825	BPS B-n.d.	CCG E-1770	PMP E-1845

Table 5-21 shows that all upper levels have been affected by 20th-century disturbances. However, the lower levels display no clear connection between deposits found in similar relative vertical positions corridor-wide. Furthermore, none of the dates correspond to specific fill episodes. The obvious interpretation is of a pattern of filling and other disturbances that spanned centuries, bringing deposits from a variety of sources to a relatively large locale in relatively small loads.

c. FILL SUMMARY

The soil deposits found throughout the South Ferry Terminal project corridor were extremely variable in nature. Possible original land surfaces were identified only within the southern portion of Battery Place. However natural marine and glacial deposits were identified consistently throughout the corridor at the deepest levels.

Analyses were conducted to determine if specific soil types could be associated with a particular fill episode or period of filling. This was done be comparing soil types by depths and locations across the project corridor for deposits not associated with specific features, as well as looking at the recovered artifacts for TPQs that could be associated with them. No patterns emerged. Once the fill had been added, it had been subjected to so much additional disturbance related to projects such as Battery Park maintenance, construction and demolition of the elevated railway and trolley tracks, utility work, and construction of the earlier subway lines and the Brooklyn Battery Tunnel that any fill patterns which may have once existed have long since been obscured.

6. GENERAL SOUTH FERRY CONCLUSIONS

The goal of the General South Ferry excavations was to identify potentially significant archaeological resources. Documented features include landfill-retaining structures in Battery Park that date from circa 1790, possible remains of the Battery Pond, and part of a stone wall that may have been related to Whitehall Slip or to an early bulkhead. Three late-18th through early-19th-century shell deposits were also examined during the General South Ferry excavations, providing a time frame for these omnipresent deposits found at archaeological sites throughout lower Manhattan. Many previously documented elevated railway footings and brick and metal features related to the street cars that terminated at South Ferry in the late-19th century were also identified.

In addition to these features, numerous artifact-rich fill deposits were also unearthed. These were examined and documented and other possible loci of these cultural bearing strata were sought to no avail. Fill containing colonial bricks was found throughout the South Ferry Terminal project corridor, although no specific demolition debris related to particular buildings, locations, or time periods was identified. A large number of samples were retained for Professor Allan Gilbert’s New York City Brick Archive at Fordham University. While fires were known to historically have ravaged lower Manhattan and many burned artifacts and a few burned contexts were identified, no contexts representing these historic burned deposits were found. Nor were deposits exclusively containing 17th-century artifacts found, although Dutch-period artifacts were recovered. The presence of Native American materials and displaced human remains also prompted an investigation into the possibility that primary deposits of these materials may have been present. They were not. Stray human remains and Native American cultural material were recovered from fill contexts at diverse places throughout the project corridor.

Finally, project-wide fill was analyzed for soil types, depth of deposits, and artifact contents to determine what patterns and/or processes emerged. Data analyses were conducted to determine if specific soil types could be associated with a particular fill episode or period of filling. No patterns among soil types, depths, locations, or TPQs emerged. Original soil deposits were identified only within southern Battery Place. However, natural glacial and marine deposits were found at lower levels throughout the corridor. This post-field analysis has enabled some reconstruction of the historic landscape as well as facilitated the critical evaluation of the historic map data.

The only reasonable conclusion for this evidence, or lack thereof, is that once the fill had been added, it had been subjected to so much additional disturbance that any fill patterns which may have once existed have long since vanished. Disturbances were present from a variety of sources including Battery Park maintenance, construction and demolition of the elevated railway and trolley tracks, utility work, and construction of the earlier subway lines. Even analysis of the project-wide fill presented above, with all its detail, paints a picture of the South Ferry Terminal project corridor fill as exceedingly complex with no clear patterns — simply mixed fill that had been continually churned and added to over centuries. ✷

Photograph of eastern section of Wall 1 between Deck Beams 27 (left) and 28 facing east. Note the large boulder incorporated into the Wall structure and also the turn southward at the top of the photograph (November 26, 2005 – ID# 3447)

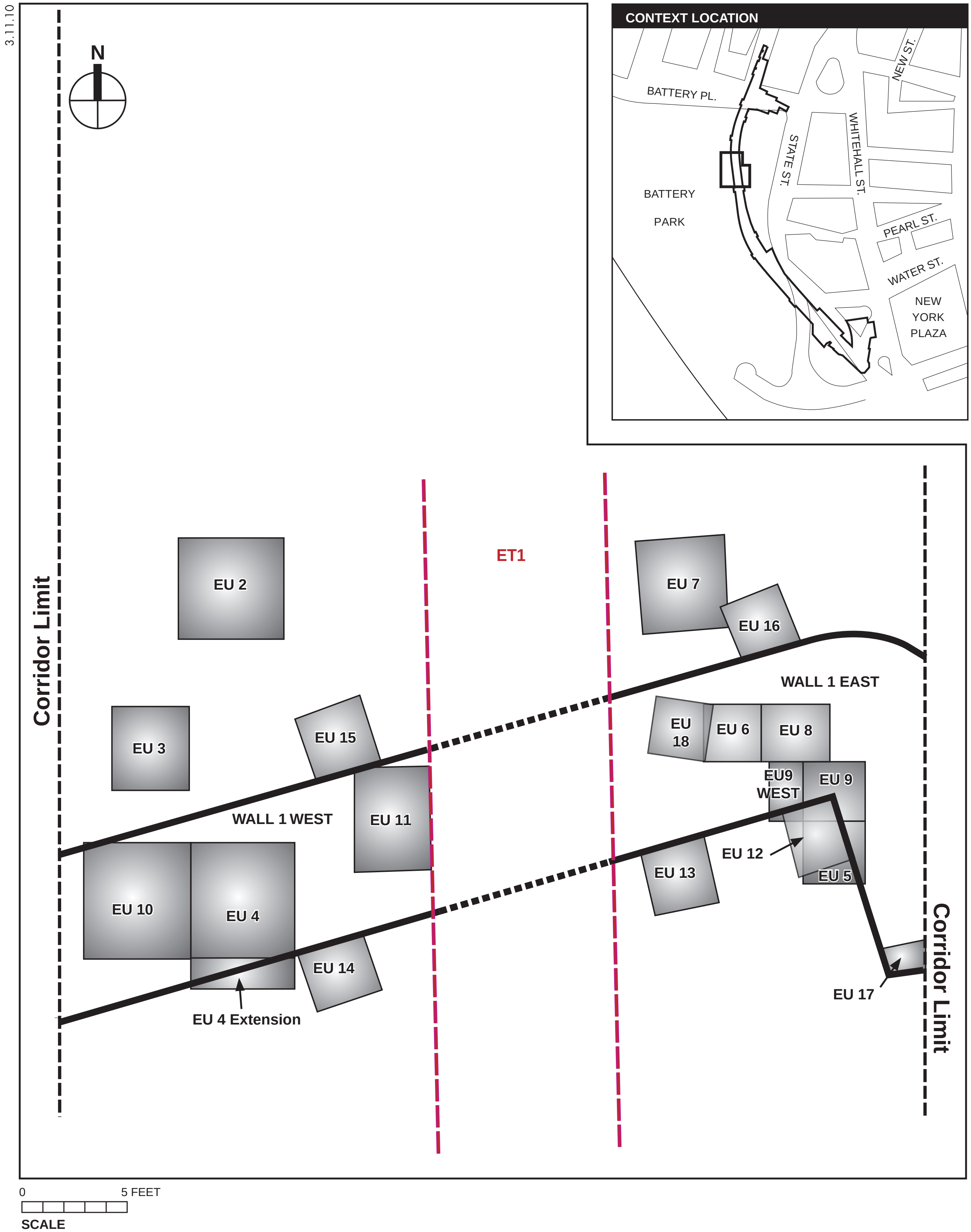
Figure 5.1

Photograph of eastern section of Wall 1 at the completion of Phase 3 data recovery excavations, after the entire face was exposed to the level of bedrock, showing the uniform nature of the stones used in the Wall construction, facing north (November 29, 2005 – ID# 3536)

Figure 5.2

Photograph of eastern section of Wall 1 after completion of EU 16 showing the less uniform stones in the northern Wall face, facing south (November 27, 2005 – ID# 3522)

Figure 5.3



Field Drawing ID#s 6 & 613: Plan view of Wall 1 showing the locations of excavation units

Figure 5.4

Photograph of EU 2 Stratum 1 Level 1 post mold feature in southwest corner (November 17, 2005 – ID# 3286)

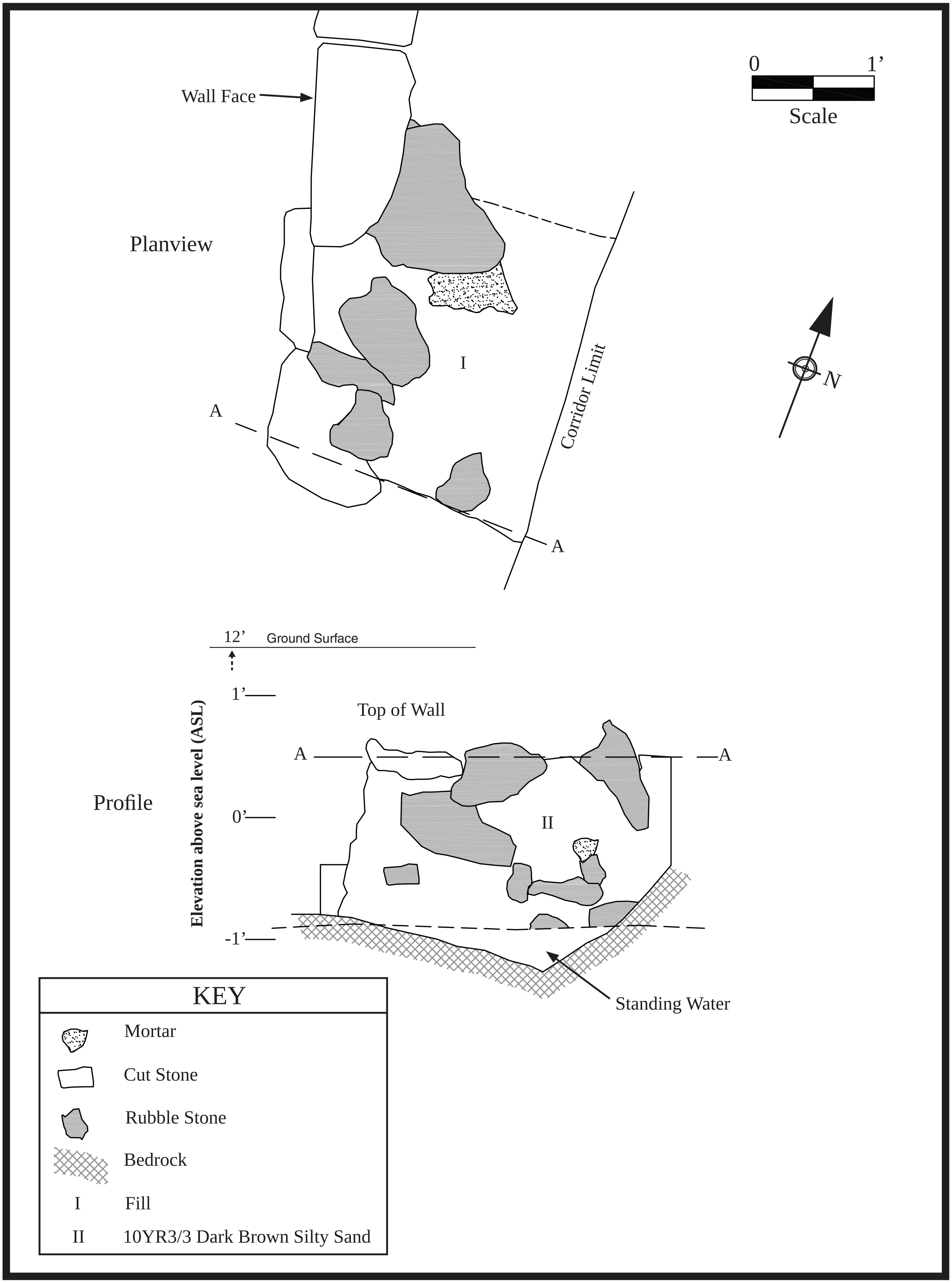
Figure 5.5

Photograph of closing view of EU 4 Stratum 2 Level 1 showing the human mandible (November 18, 2005 – ID# 3298)

Figure 5.6

Photograph of EU 10 facing north after exposure of human remains in the base of Stratum 2 Level 1 (November 21, 2005 – ID# 3399)
Figure 5.7

Photograph of EU 10 facing north after the exposure of human remains in the base of Stratum 2 Level 2 (November 23, 2005 – ID# 3416)
Figure 5.8

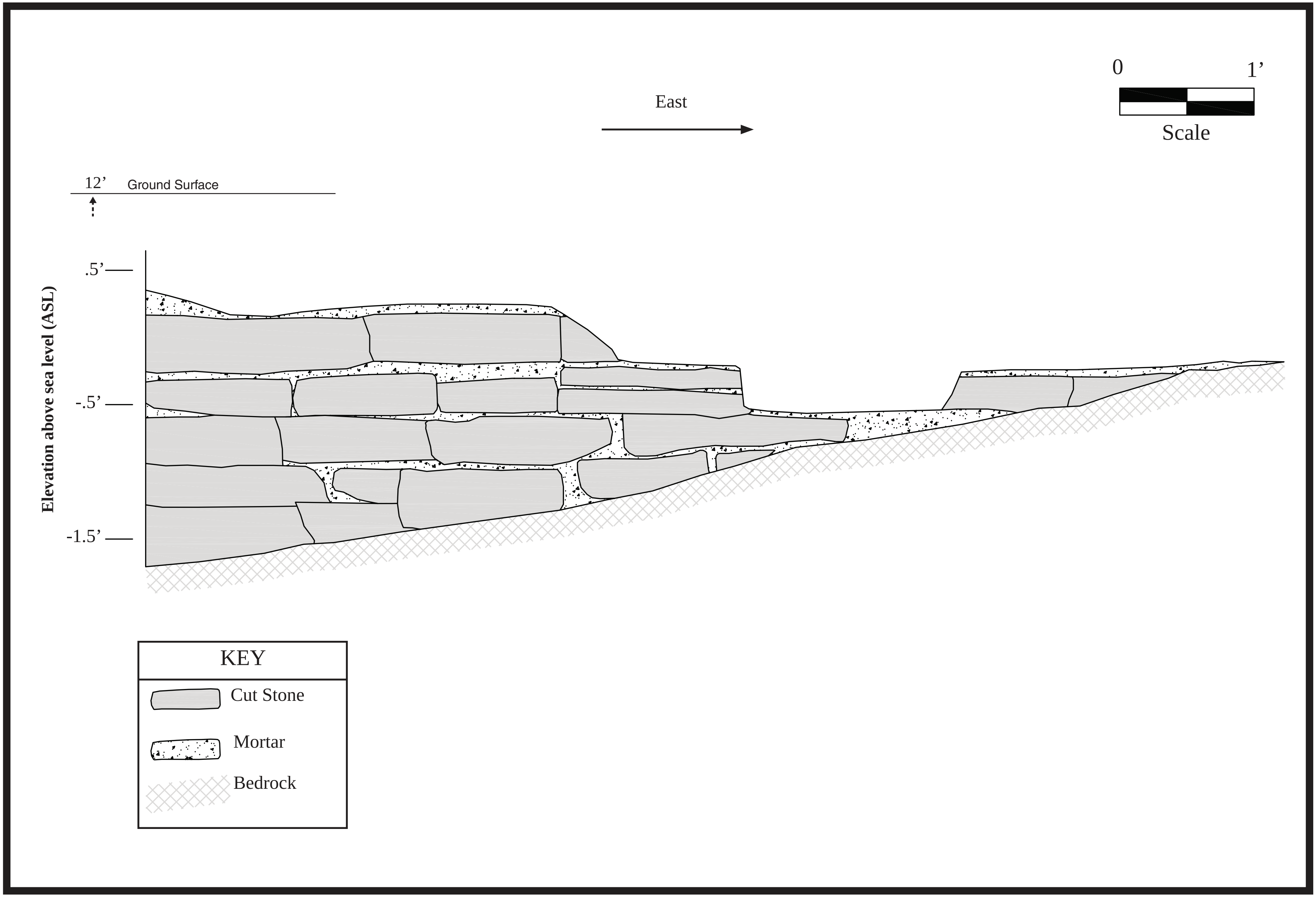


Field Drawing ID#s 5/612: North profile and plan view of EU 17

Figure 5.9

Photograph of EU 18 after the completion of Stratum 2 on the western half of the unit showing ground water pooling in the depression in the bedrock in the south center of the unit (January 31, 2006 – ID# 1049)

Figure 5.10



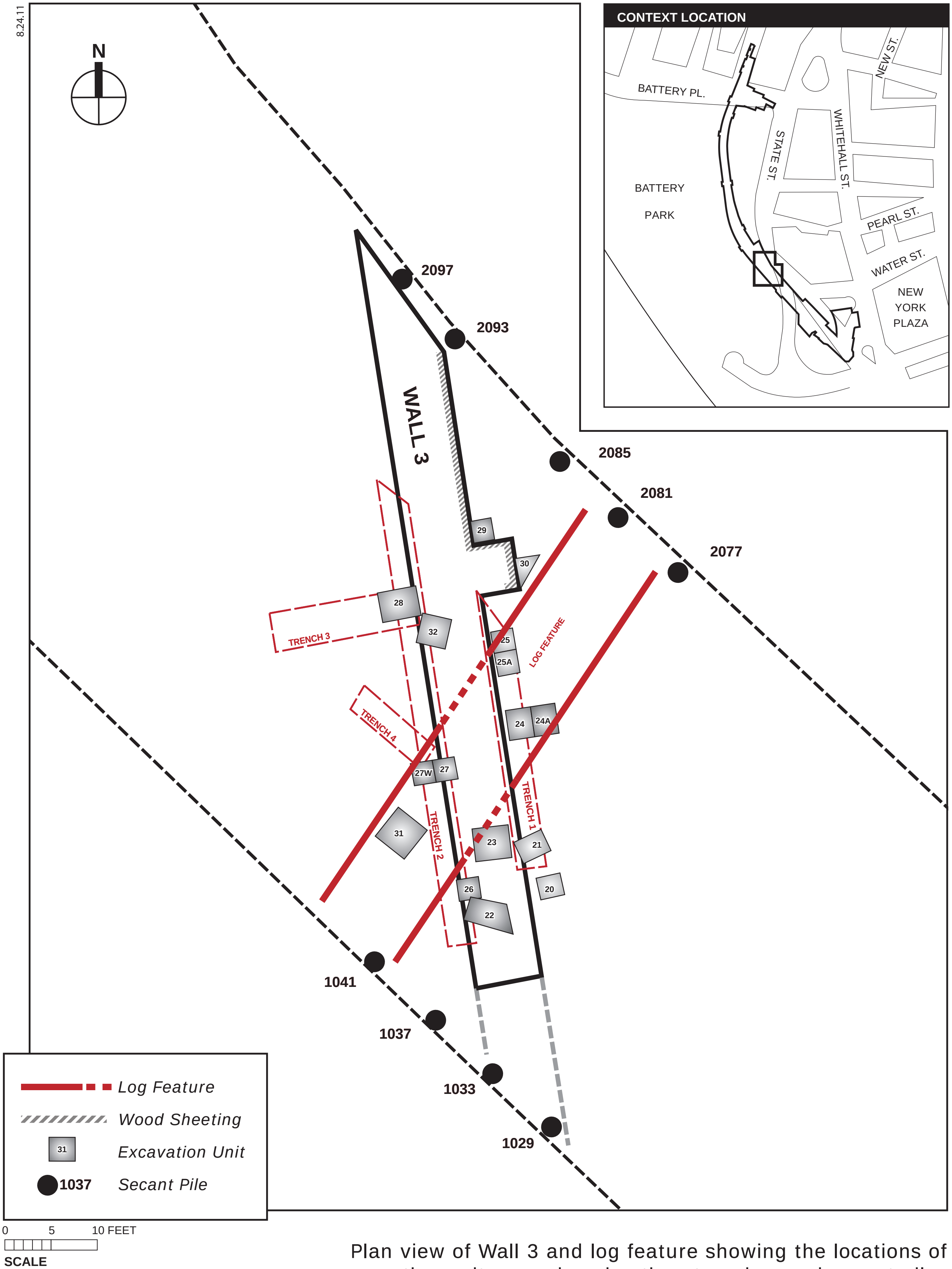
Field Drawing ID# 12: Profile of the south face of Wall 2

Figure 5.11

Photograph of the eastern end of Wall 3 facing south. Note the counterfort and sheeting (January 26, 2006 – ID# 871)
Figure 5.12

Photograph of the western face of Wall 3 facing north showing the log feature to the west of the Wall, as well as three of the five angled vertical piles, wrapped in yellow caution tape (February 1, 2006 – ID# 1079)

Figure 5.13



SOUTH FERRY

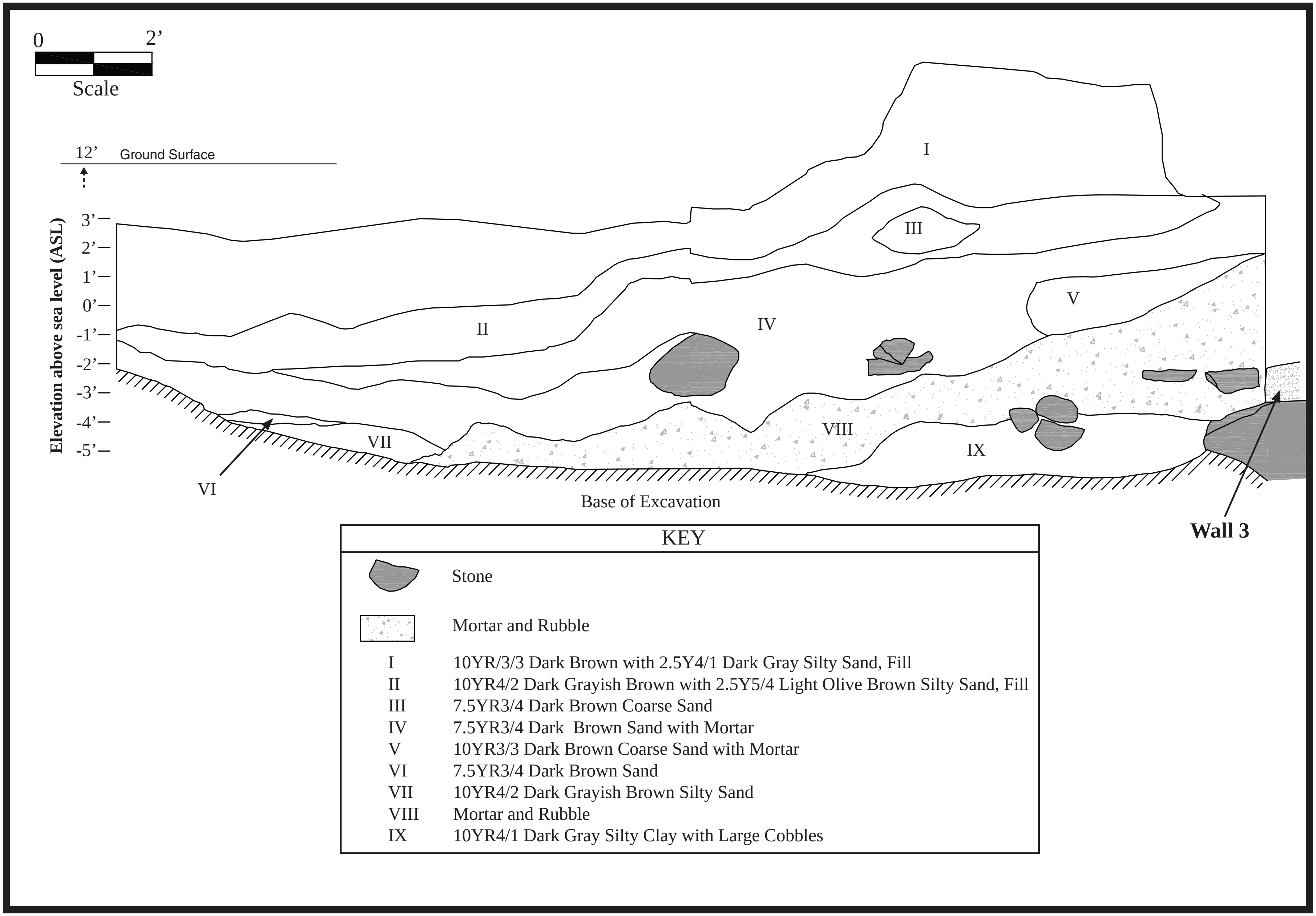
Plan view of Wall 3 and log feature showing the locations of excavation units, wooden sheeting, trenches and secant piles

Figure 5.14

Photograph of western face of Wall 3 and the associated log feature, facing southwest (February 1, 2006 – ID# 1093)
Figure 5.15

Photograph of northern end of Trench 1 facing north showing the exposed eastern face of Wall 3 with the utilities at the top of the frame at the shovel (January 9, 2006 – ID# 691)
Figure 5.16

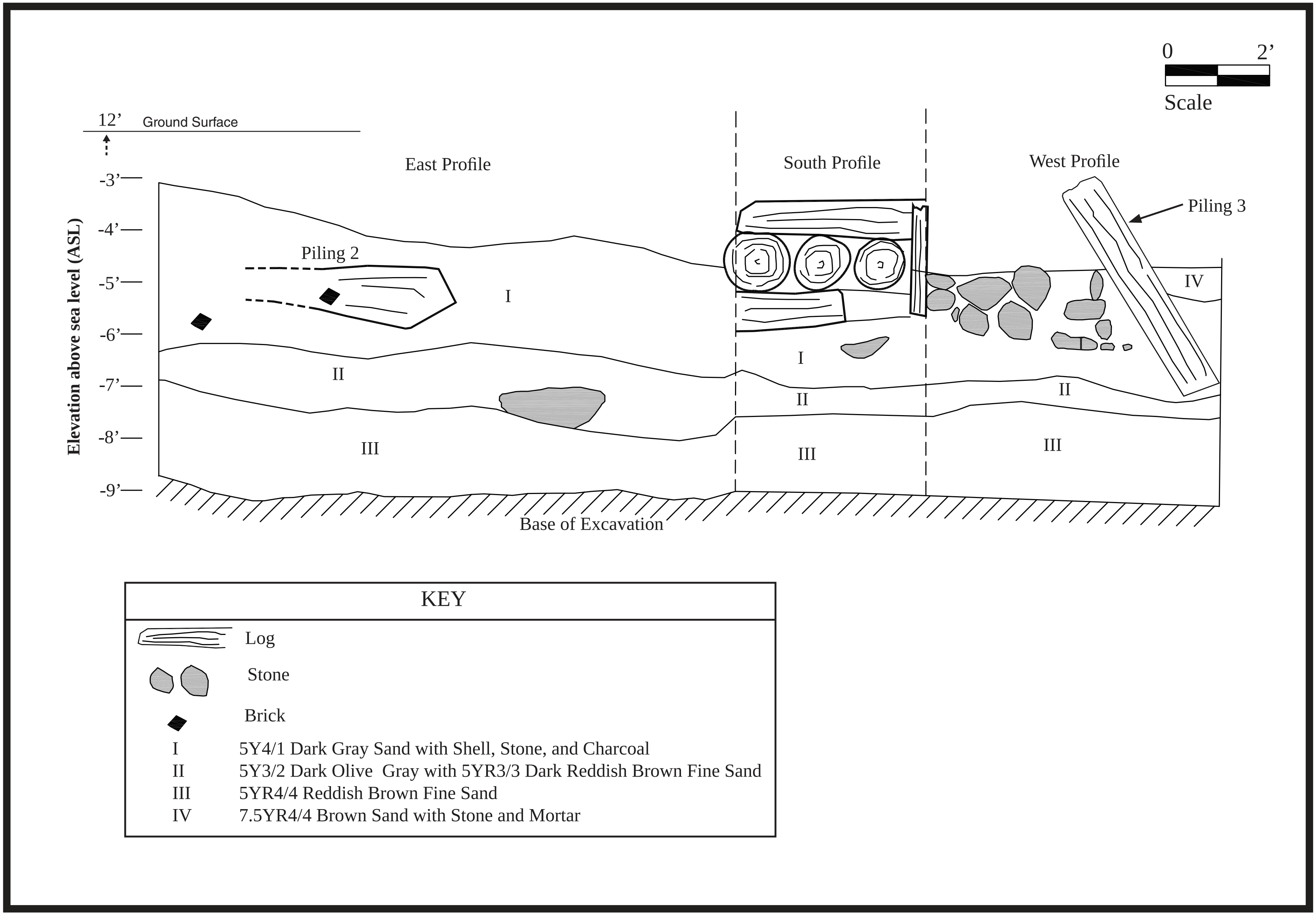
4.5.12



Field Drawing ID#s 408 & 409: North profile of Trench 3 showing the stratigraphy and its relationship to Wall 3

Figure 5.17

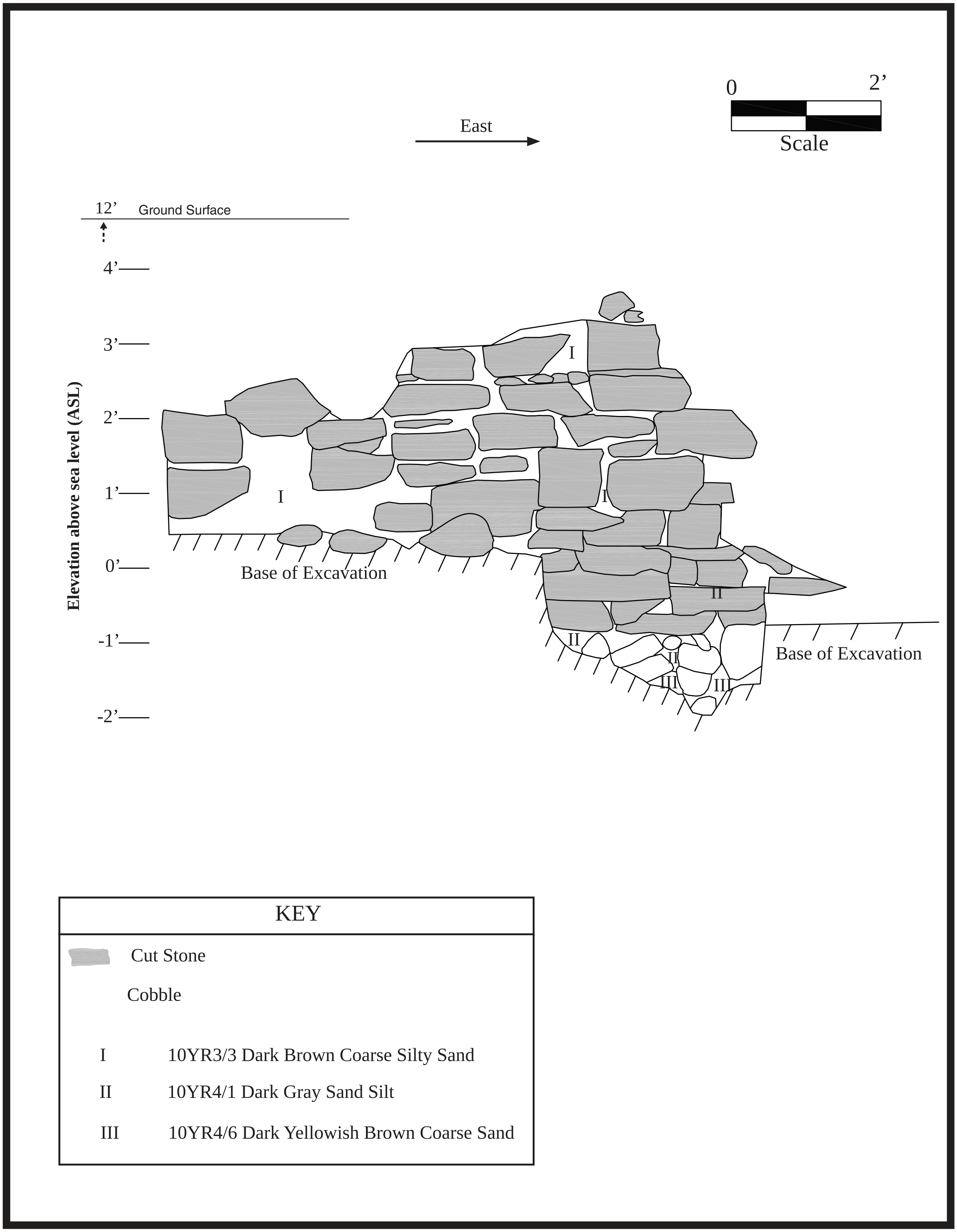
4.5.12



Field Drawing ID#s 387, 386 & 389: East, south and western profiles of Trench 4

Figure 5.18

4.5.12

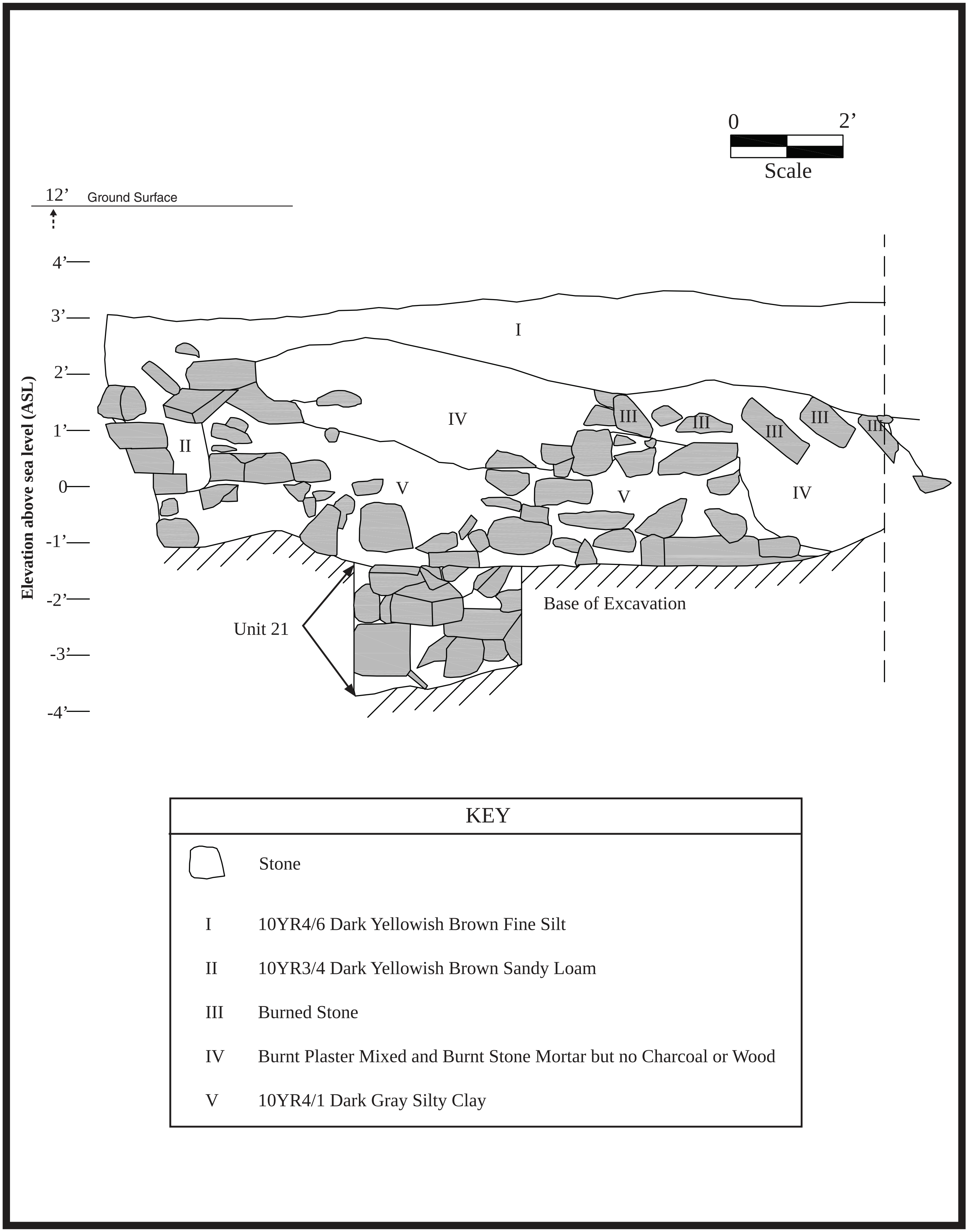


Field Drawing ID# 404: Profile of Wall 3 as it was first exposed and EU 20 at the completion of excavation

Figure 5.19

Photograph of EU 21 after completion with part of the face of Wall 3 exposed on the western side of the unit (top of the photo) (December 30, 2005 – ID# 549)

Figure 5.20



Field Drawing ID# 436: Profile of rubble in archaeological trench ET 4 with the addition of EU 21

Figure 5.21

Photograph of EU 22 after it was expanded, facing east
(January 4, 2006 – ID# 618)
Figure 5.22

Photograph of EU 22 at the completion of excavation, facing east, clearly showing the western face of Wall 3 and the rubble stone fill of the Wall
(January 9, 2006 – ID# 683)
Figure 5.23

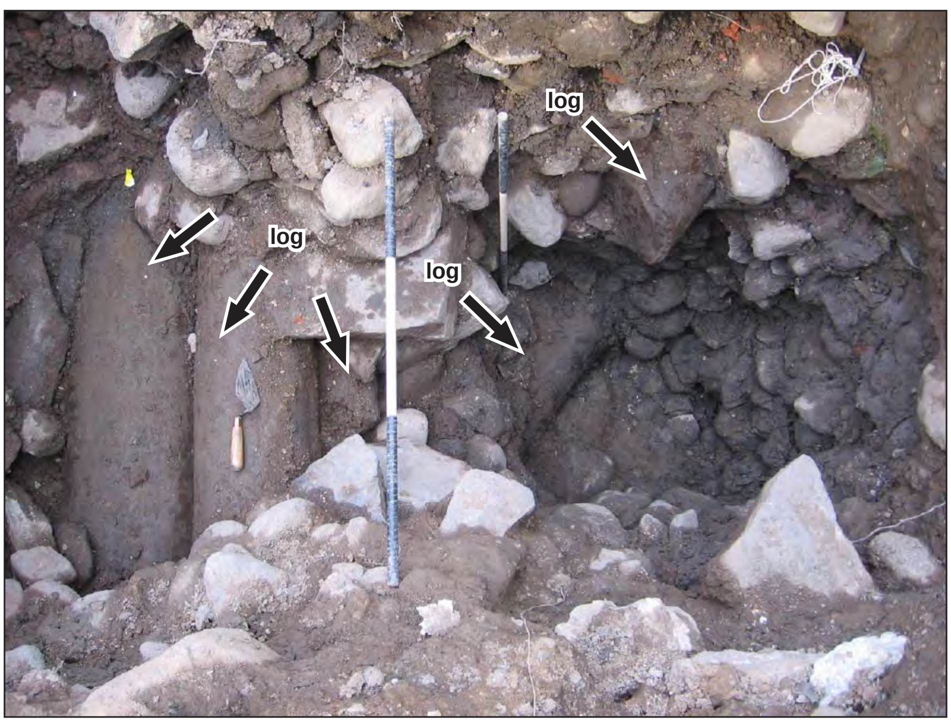
Photograph of EU 23 facing west, showing the large burned root exposed in Stratum 1. EU 22 is seen in the background surrounded by two-by-fours and sandbags to prevent flooding (January 9, 2006 – ID# 681)

Figure 5.24

Photograph of EU 24 during the excavation of Stratum 2, facing east (January 12, 2006 – ID# 39)

Figure 5.25

Photograph of EU 24 at the completion of excavation facing west, showing the logs in the bottom of the unit, the likely base of the Wall, and the partially collapsed unstable profiles (January 19, 2006 – ID# 769)
Figure 5.26

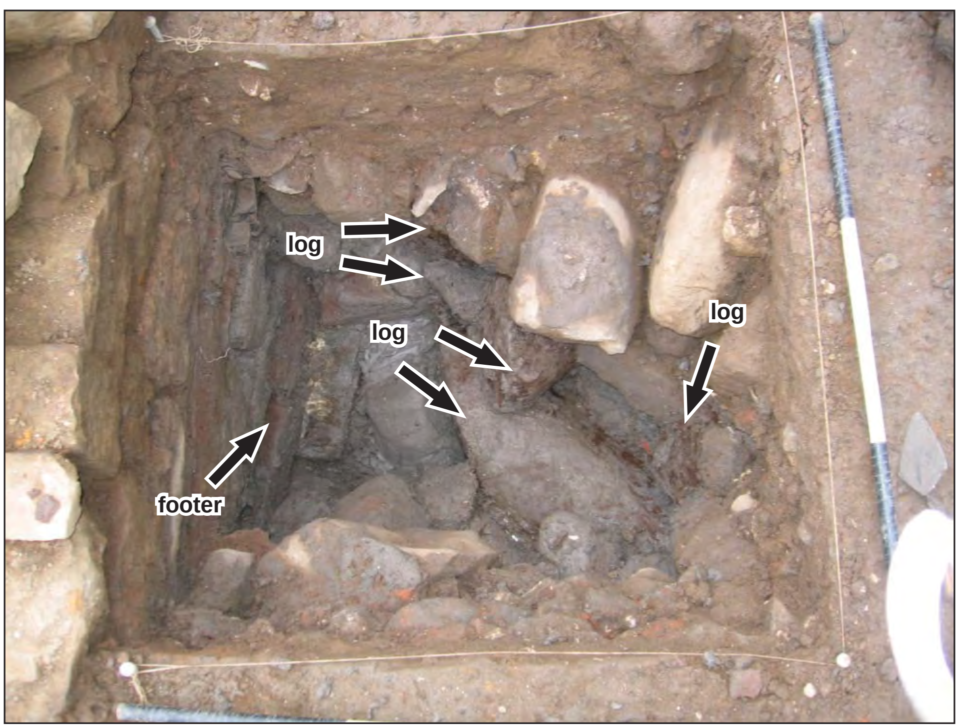


Photograph of EU 24 (left) and EU 24A (right) showing a number of exposed logs on the landward side of Wall 3 (January 25, 2006 – ID# 853)

Figure 5.27

Photograph of opening of EU 25 facing north, showing the Wall 3 face and the proximity to the existing utilities at the northeastern corner of the unit, top right corner of the photograph (January 11, 2006 – ID# 714)

Figure 5.28



Photograph of EU 25 facing north during the excavation of Stratum 6 showing a number of exposed logs and possible Wall footer (January 13, 2006 – ID# 60)

Figure 5.29

Photograph of EU 25 and EU 25A upon completion, facing north, with a three-foot vertical scale resting on the footer (January 24, 2006 – ID# 818)

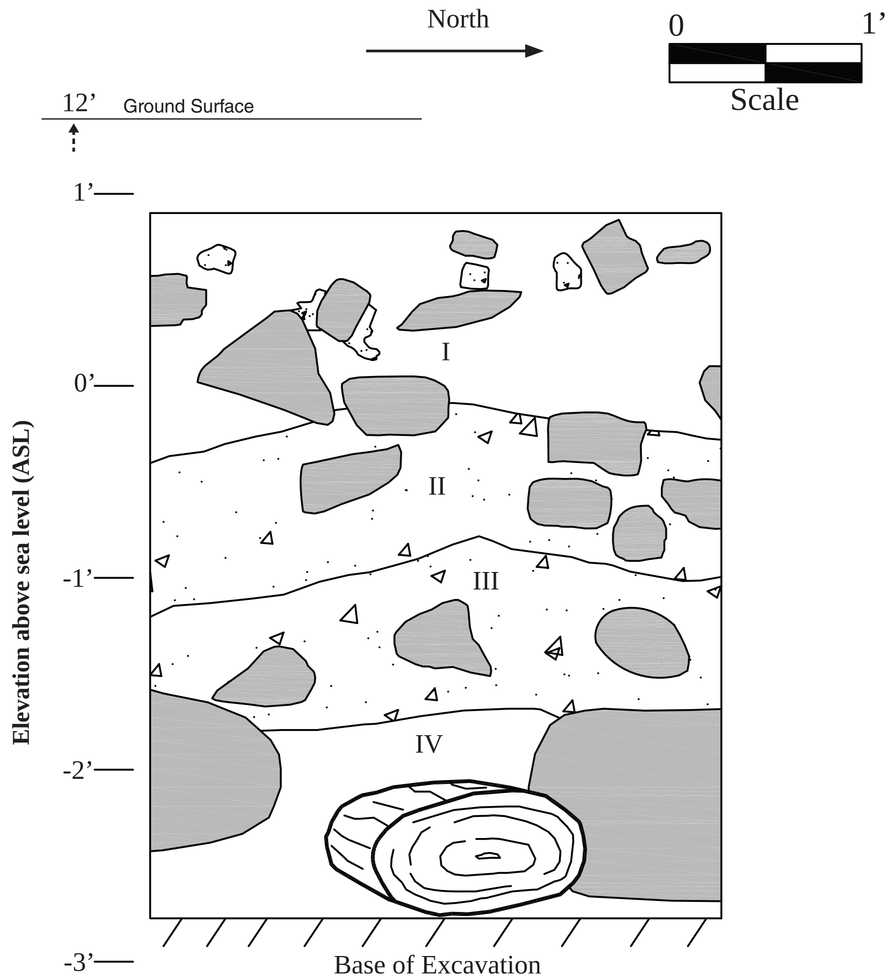
Figure 5.30

Photograph of EU 26 after excavation of Stratum 4, facing north, showing the exposed Wall 3 face on the right (January 13, 2006 – ID# 51)

Figure 5.31

Photograph of EU 27 at the top of Stratum 4,
facing north (January 17, 2006 – ID# 93)

Figure 5.32



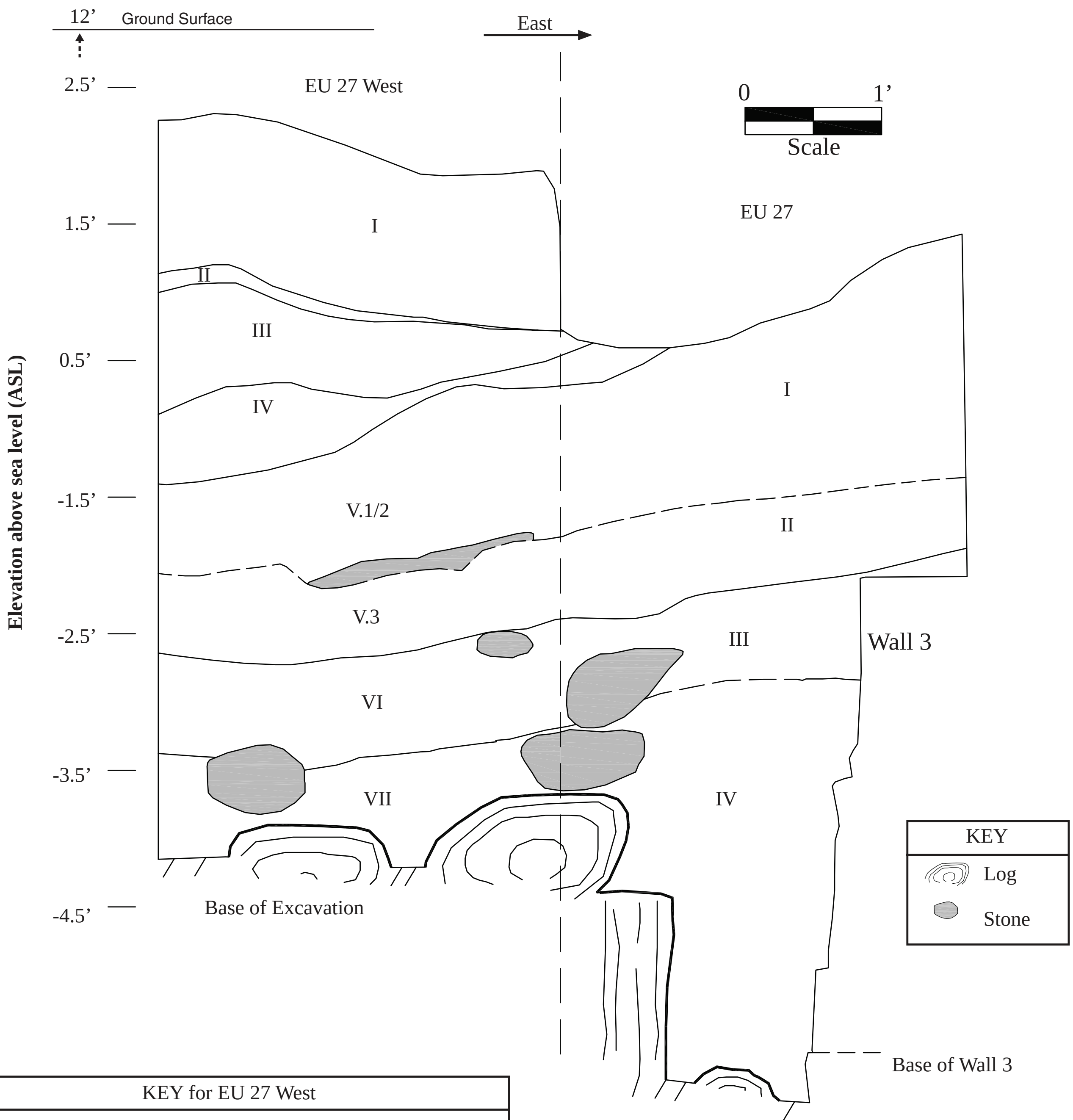
KEY

	Stones/Cobbles
	Log
I	10YR4/6 Dark Yellowish Brown with 10YR4/3 Brown Fine Sand and Silty Sand
II	10YR5/4 Yellowish Brown with 10YR8/1 White Medium Sand and Mortar
III	10YR4/4 Dark Yellowish Brown and 10YR5/1 Gray Silty Sand and Mortar
IV	10YR4/2 Dark Grayish Brown Wet Silty Sand

Field Drawing ID# 535: West profile of EU 27 at the completion of excavations

Figure 5.33

4.5.12



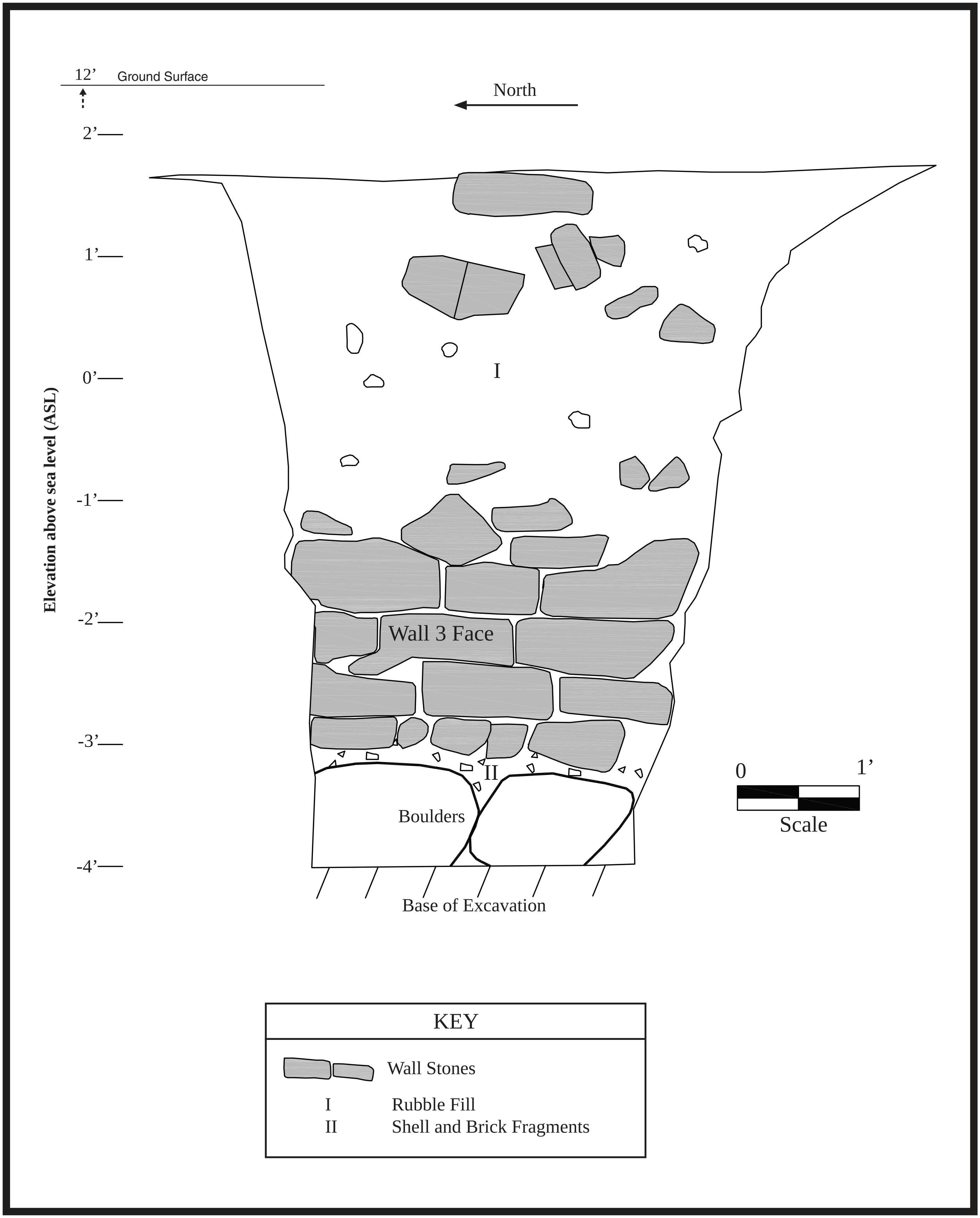
KEY for EU 27 West	
I	10YR3/6 Dark Yellowish Brown Sandy Silt
II	7.5YR4/4 Brown Silty Sand
III	10YR4/4 Dark Yellowish Brown Mottled with 10YR4/2 Dark Grayish Brown Silty Sand
IV	10YR4/2 Dark Grayish Brown Mottled with 10YR4/6 Dark Yellowish Brown Sandy Silt
V.1/2	10YR 4/2 Dark Grayish Brown Mottled with 10YR4/1 Dark Gray, Fine Sandy Silt with Mortar
V.3	10YR4/4 Dark Yellowish Brown Mottled with 10YR5/1 Gray Medium Sand with less Mortar
VI	10YR4/2 Dark Grayish Brown Silty Sand and Mortar
VII	10YR4/1 Dark Gray Wet Silty Sand

KEY for EU 27	
I	10YR4/6 Dark Yellowish Brown Mottled with 10YR4/3 Brown, Fine Sandy Silt
II	10YR5/4 Yellowish Brown Mottled with 10YR8/1 White Medium Sand with Mortar
III	10YR4/4 Dark Yellowish Brown Mottled with 10YR5/1 Gray Silty Sand and Mortar
IV	10YR4/2 Dark Grayish Brown Wet Silty Sand

North profile of EUs 27 and 27 West
Figure 5.34

Photograph of EUs 27 (top) and 27 West (bottom) after the completion of both units, facing east (January 26, 2006 – ID# 865)

Figure 5.35



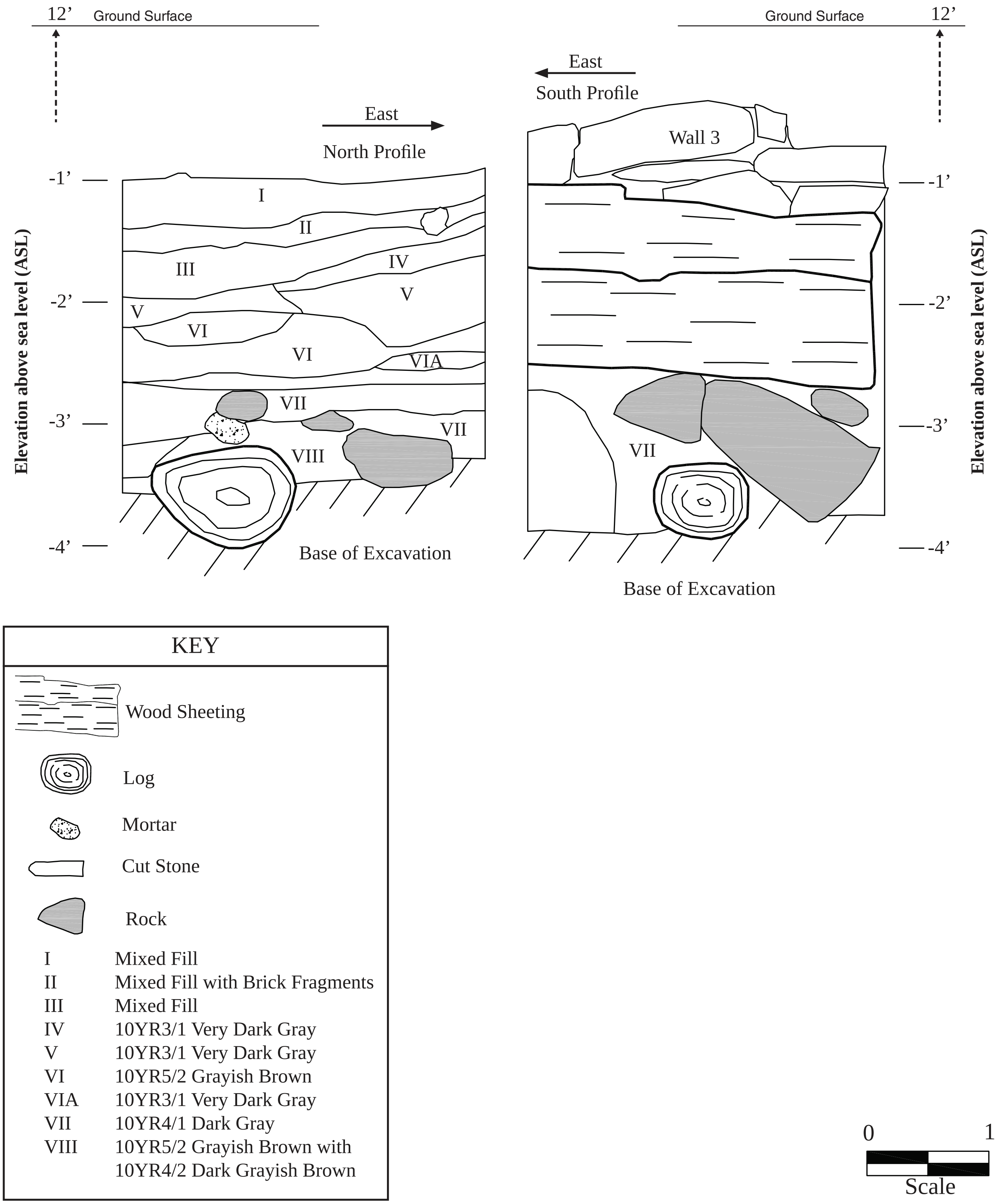
Field Drawing ID# 554: East profile of EU 28 showing the foundation of Wall 3

Figure 5.36

Photograph of EU 29 prior to excavation, facing south
(January 26, 2006 – ID# 870)

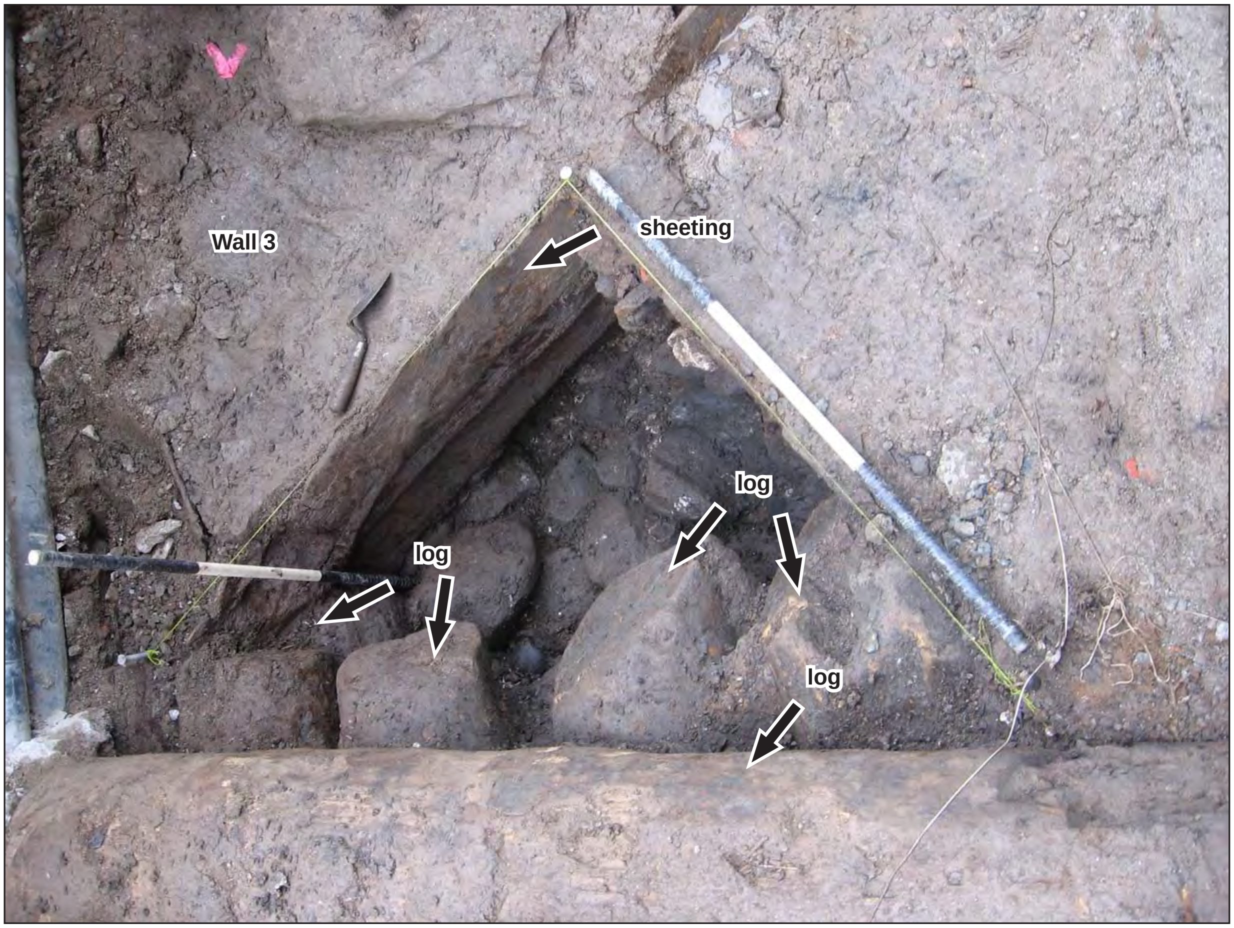
Figure 5.37

4.5.12



Field Drawing ID# 567: North and south profiles of EU 29

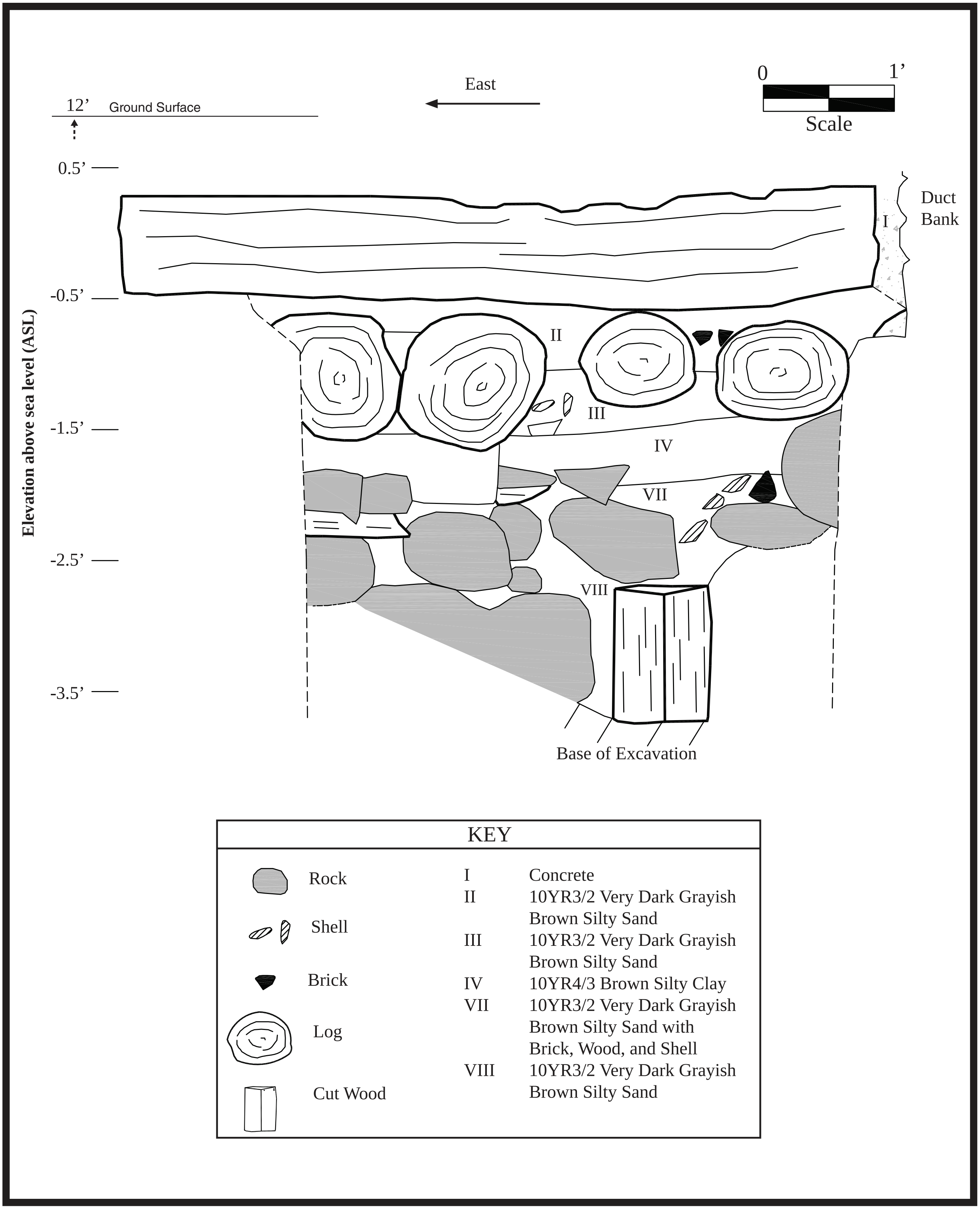
Figure 5.38



Photograph of EU 30 at the top of Stratum 8 facing northwest
(January 31, 2006 – ID# 1053)

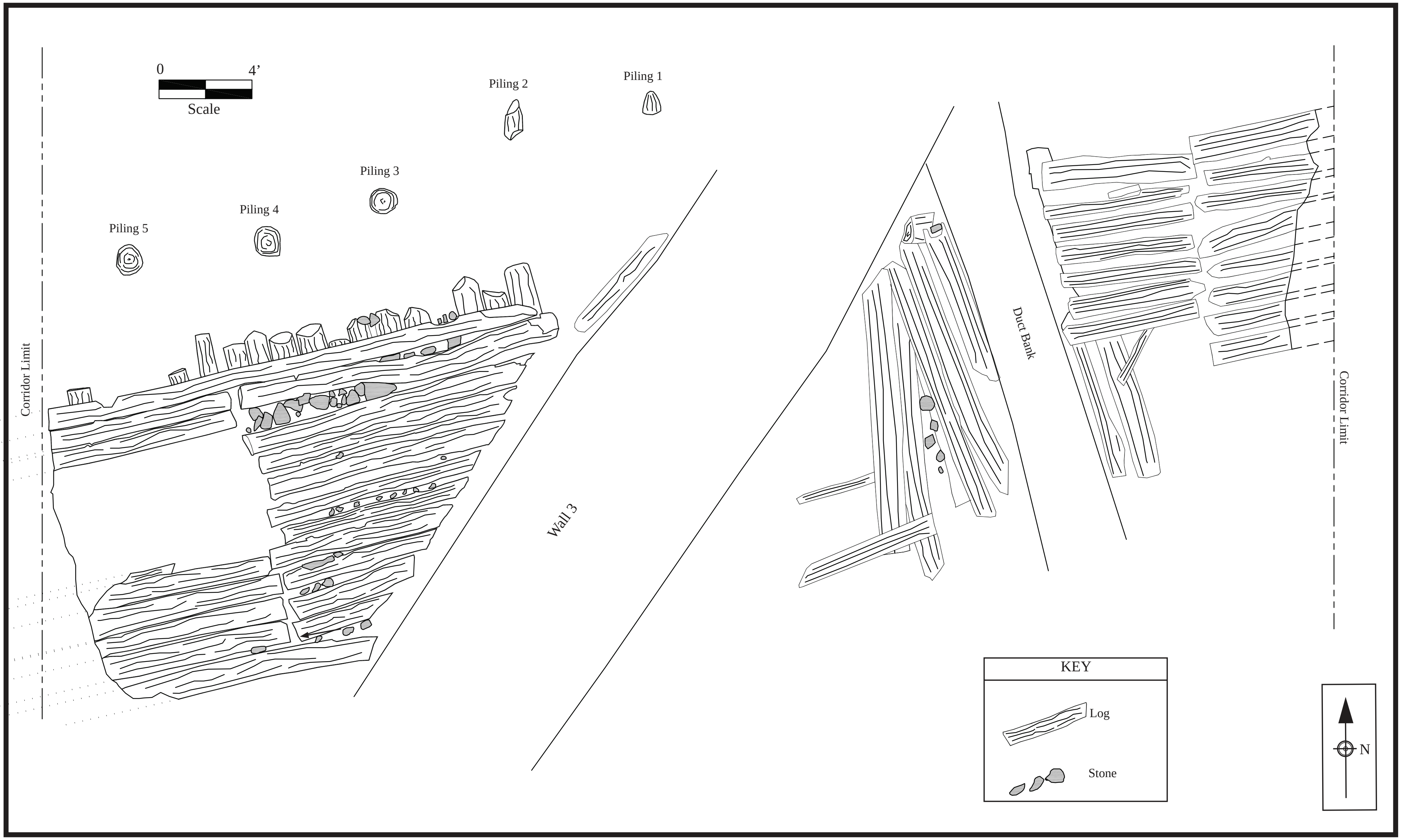
Figure 5.39

4.5.12



Field Drawing ID# 574: South profile of EU 30

Figure 5.40



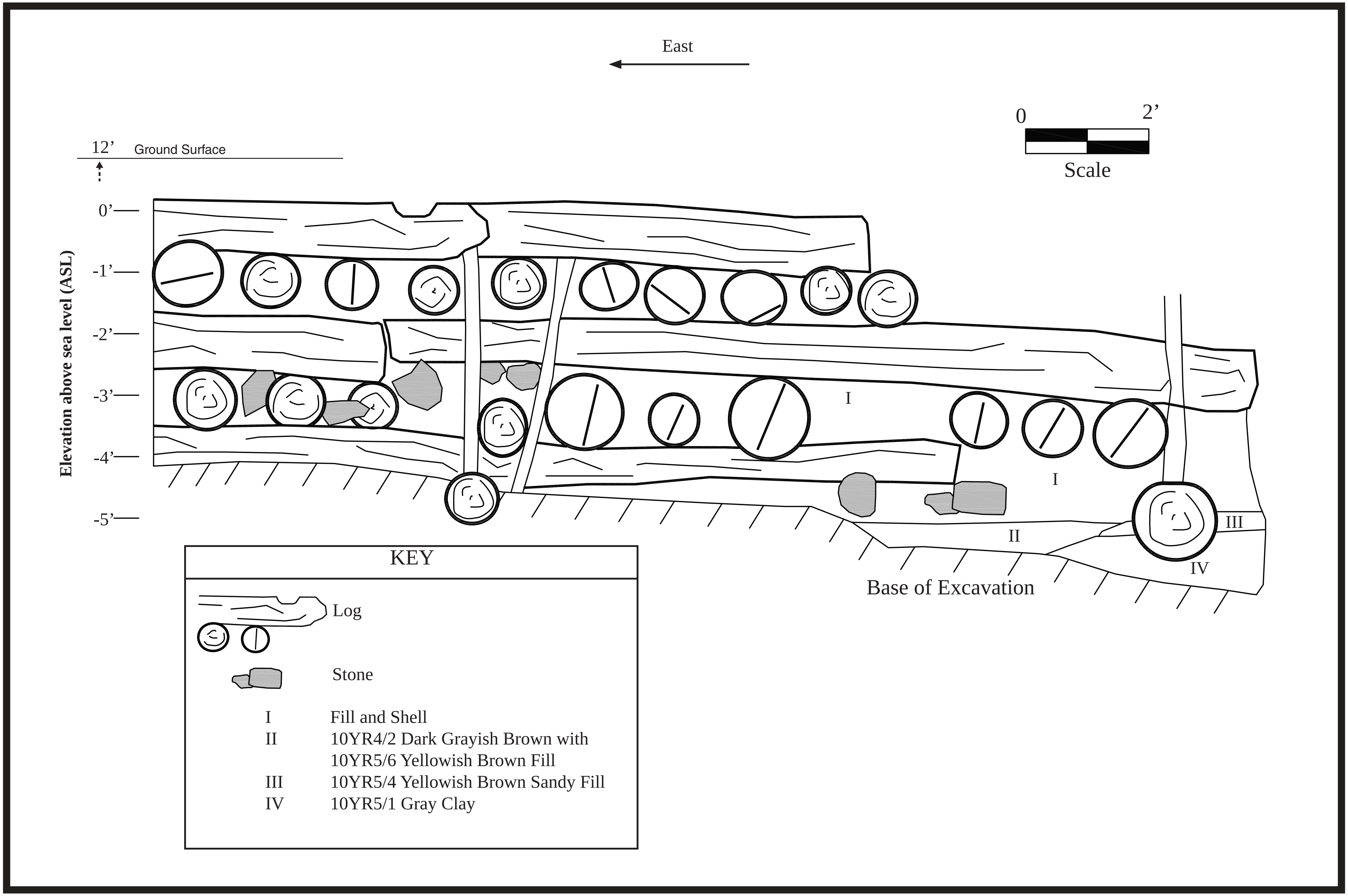
Field Drawing ID#s 63, 41 & 589: Three sections of the log feature as they were initially exposed.

SOUTH FERRY

Figure 5.41

Photograph of log feature to the east of Wall 3 showing it to be at least three logs high and with utilities cutting through it, facing northeast (January 30, 2006 – ID# 1034)

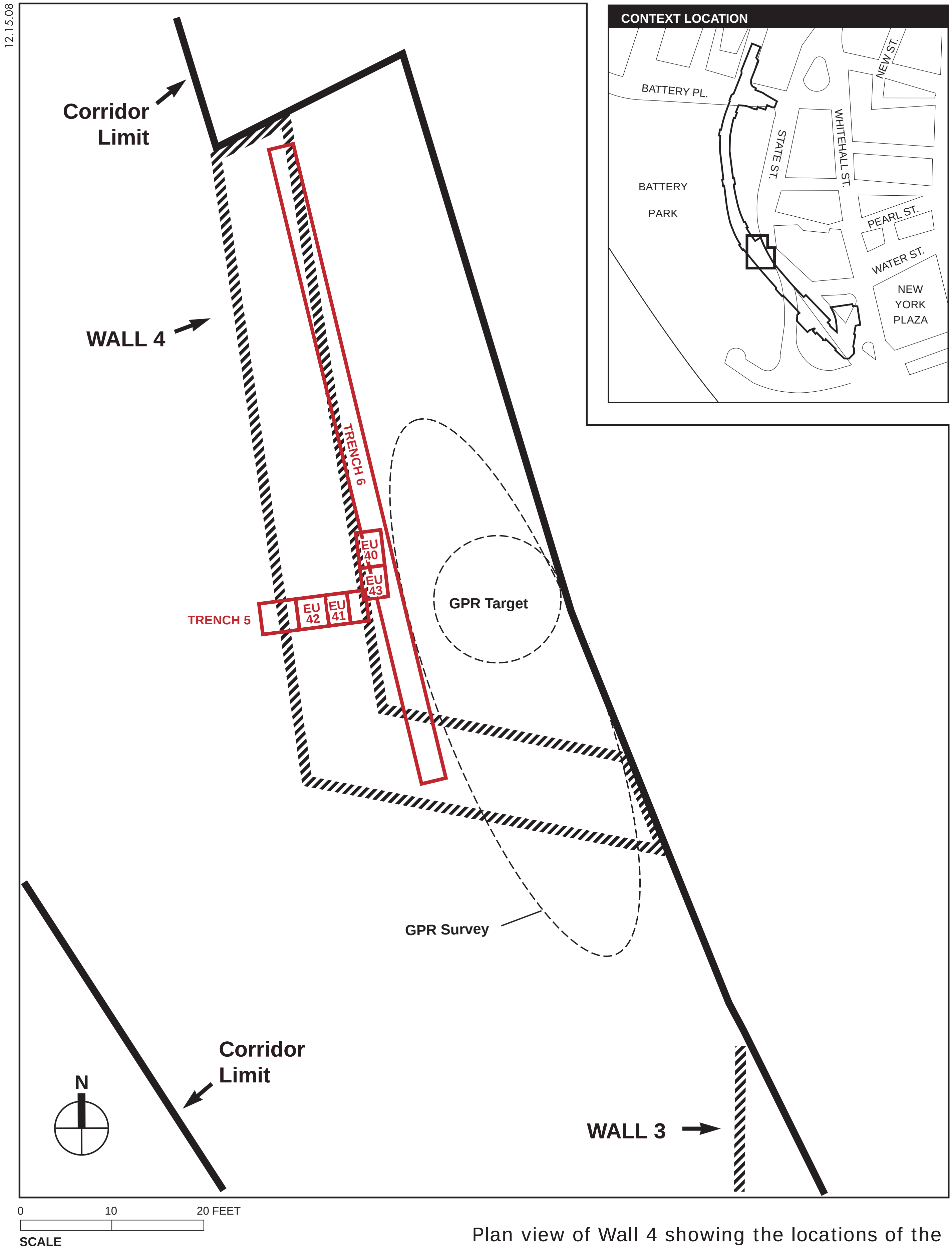
Figure 5.42



Profile of north face of the log feature to the east of Wall 3 showing six layers of logs and three vertical supports

Figure 5.43

Photograph of western side of Wall 3, facing southwest, showing many aspects of the log feature (February 2, 2006 – ID# 1101

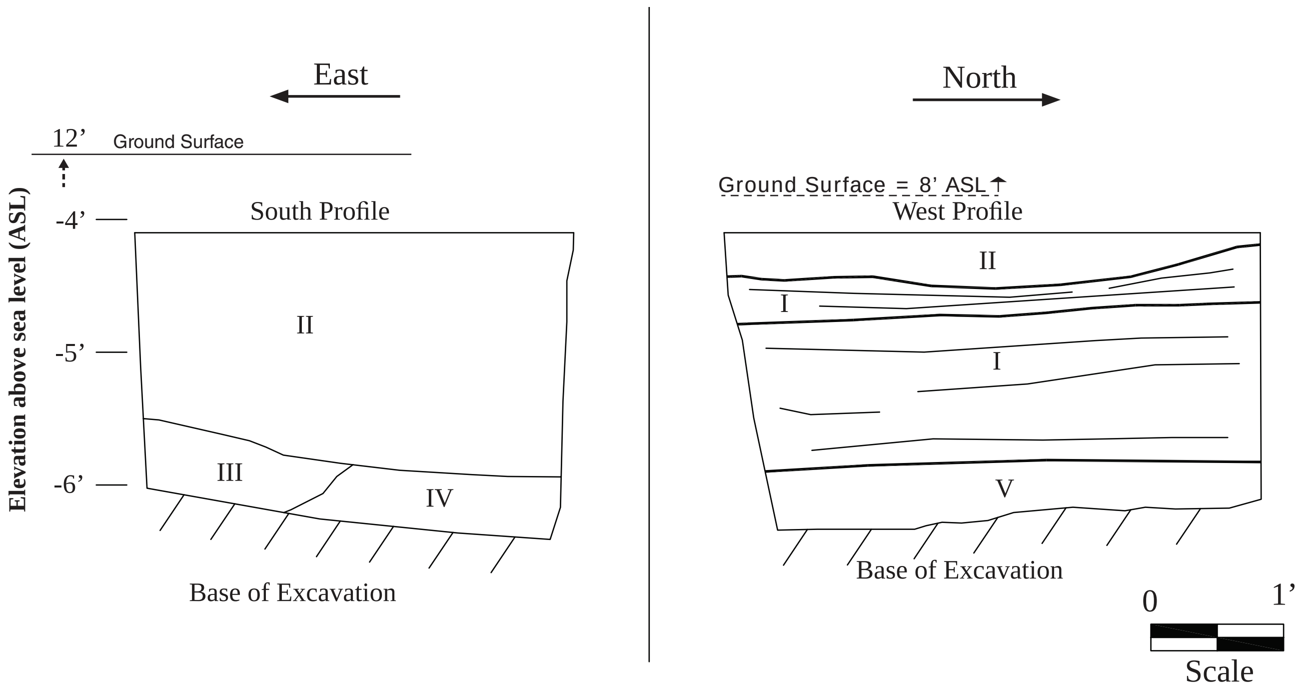


Plan view of Wall 4 showing the locations of the excavation units, trenches, and GPR survey

Figure 5.45

Photograph of EU 40 in the right side of the frame, beneath the utilities, facing northeast (Wall 4) (February 25, 2006 – ID# 1625)

Figure 5.46

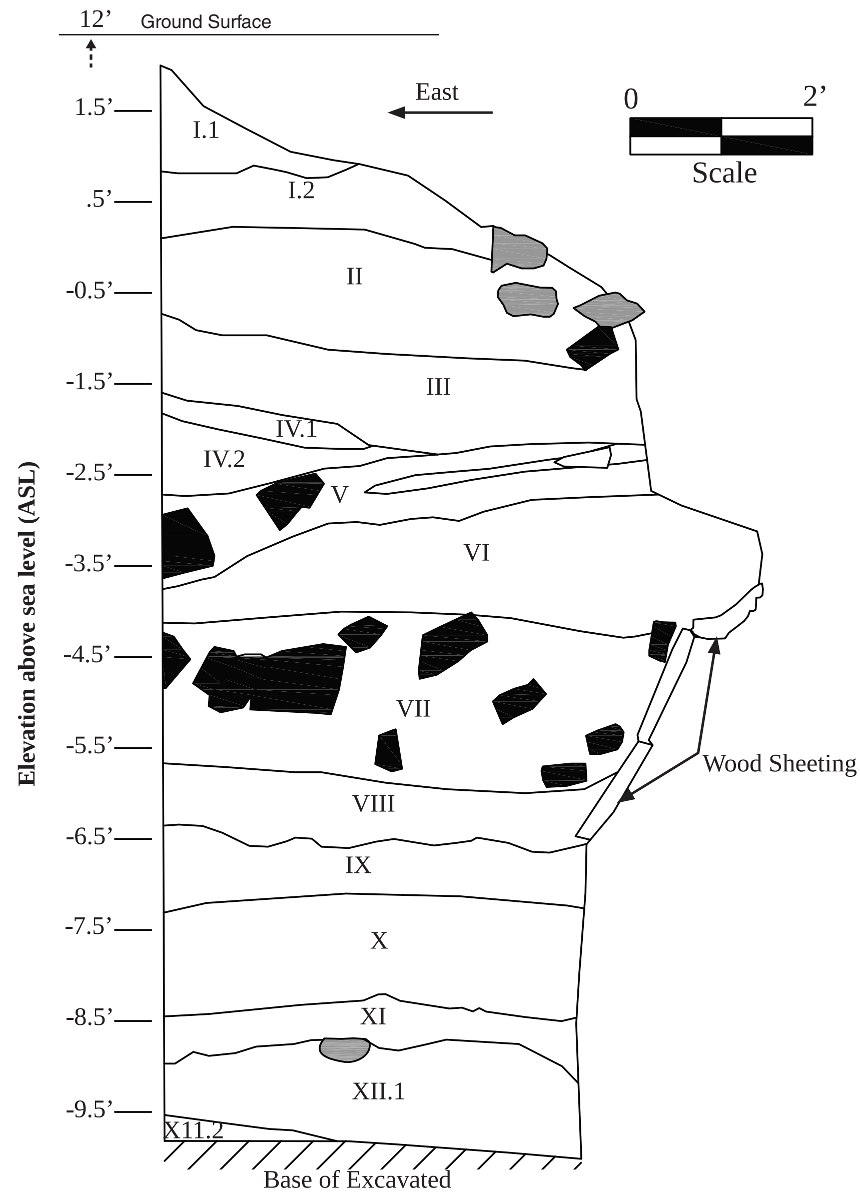


KEY	
I	Wood Sheeting
II	Mixed Fill
III	10YR4/2 Dark Grayish Brown Sand
IV	10YR5/2 Grayish Brown Sand
V	10YR3/6 Dark Yellowish Brown

Field Drawing ID# 262: South and west profiles of EU 40 (Wall 4)

Figure 5.47

4.5.12



KEY

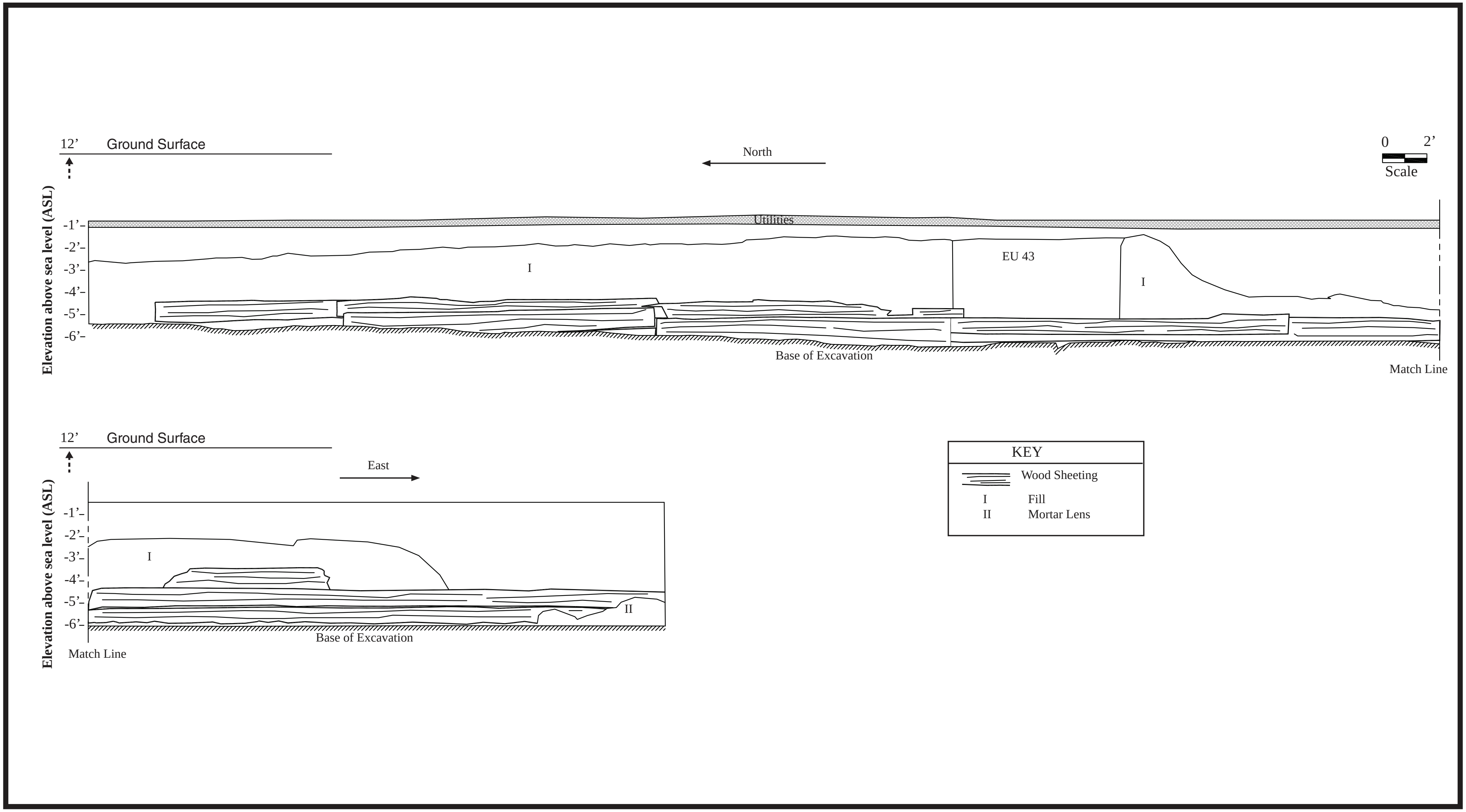
Rock

Brick

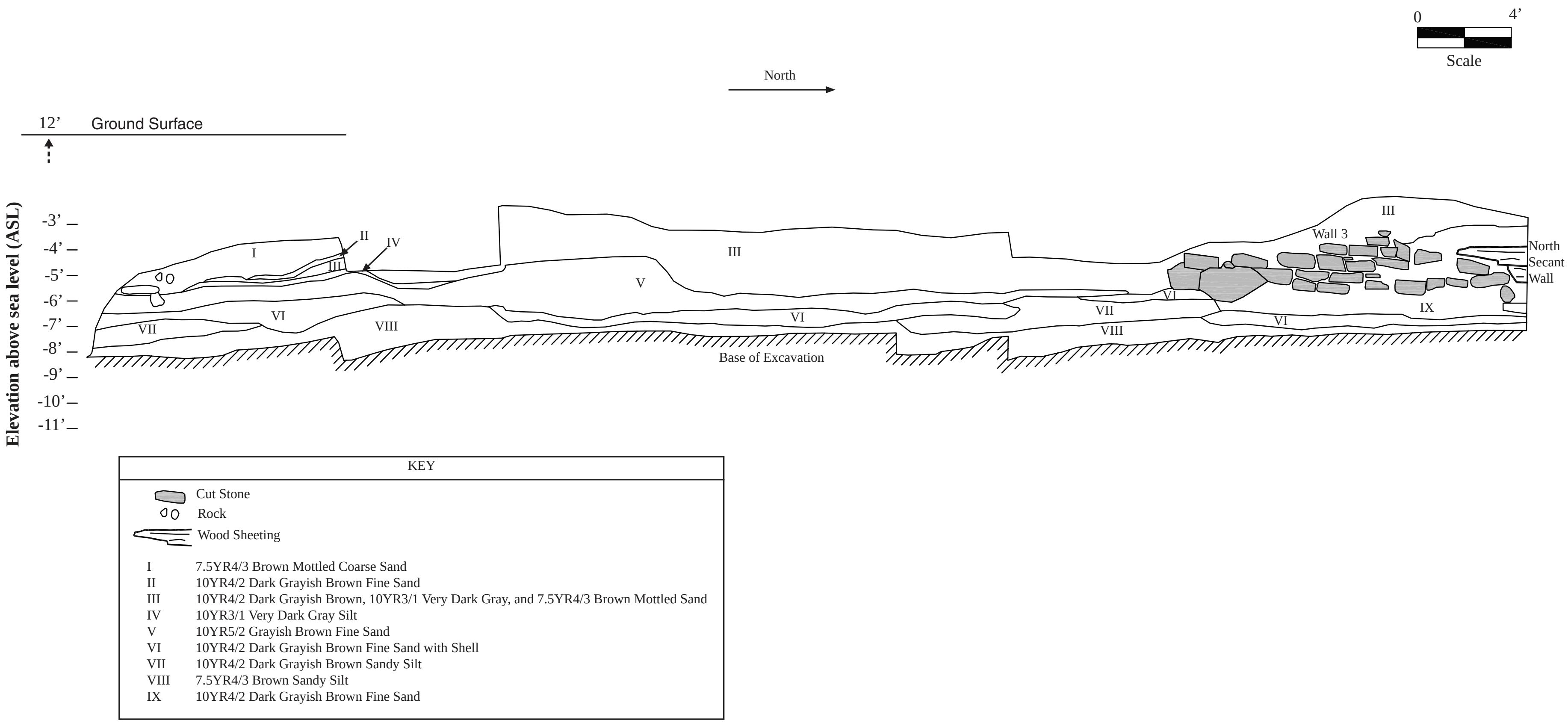
I.1	10YR3/2 Very Dark Grayish Brown Fine Silty Sand
I.2	10YR6/3 Pale Brown Very Loose Coarse Sand, Shell and Brick Fragments
II	10YR4/4 Dark Yellowish Brown and 10YR3/1 Very Dark Gray Sandy Clay Loam
III	10YR3/4 Dark Yellowish Brown Silty Sand, coarse
IV.1	10YR3/2 Very Dark Grayish Brown Silty Sand
IV.2	7.5YR4/6 Strong Brown Coarse Sand
V	10YR5/3 Brown Coarse Sand with Brick, Shell, Mortar, and Wood
VI	10YR3/6 Dark Yellowish Brown Coarse Sand
VII	10YR4/2 Dark Grayish Brown and 10YR4/3 Brown Silty Sand with Large Amounts of Brick, Burnt Wood and Mortar
VIII	10YR3/1 Very Dark Gray Sandy Clay
IX	10YR5/2 Grayish Brown Fine Sand
X	10YR4/2 Dark Grayish Brown Coarse Sand
XI	10YR2/1 Black Silty Sand with Shell and Pebbles
XII.1	10YR4/3 Brown Silt
XII.2	10YR3/2 Very Dark Grayish Brown Silty Clay

Field Drawing ID# 185: South profile of EU 43 at the completion of excavation

Figure 5.48



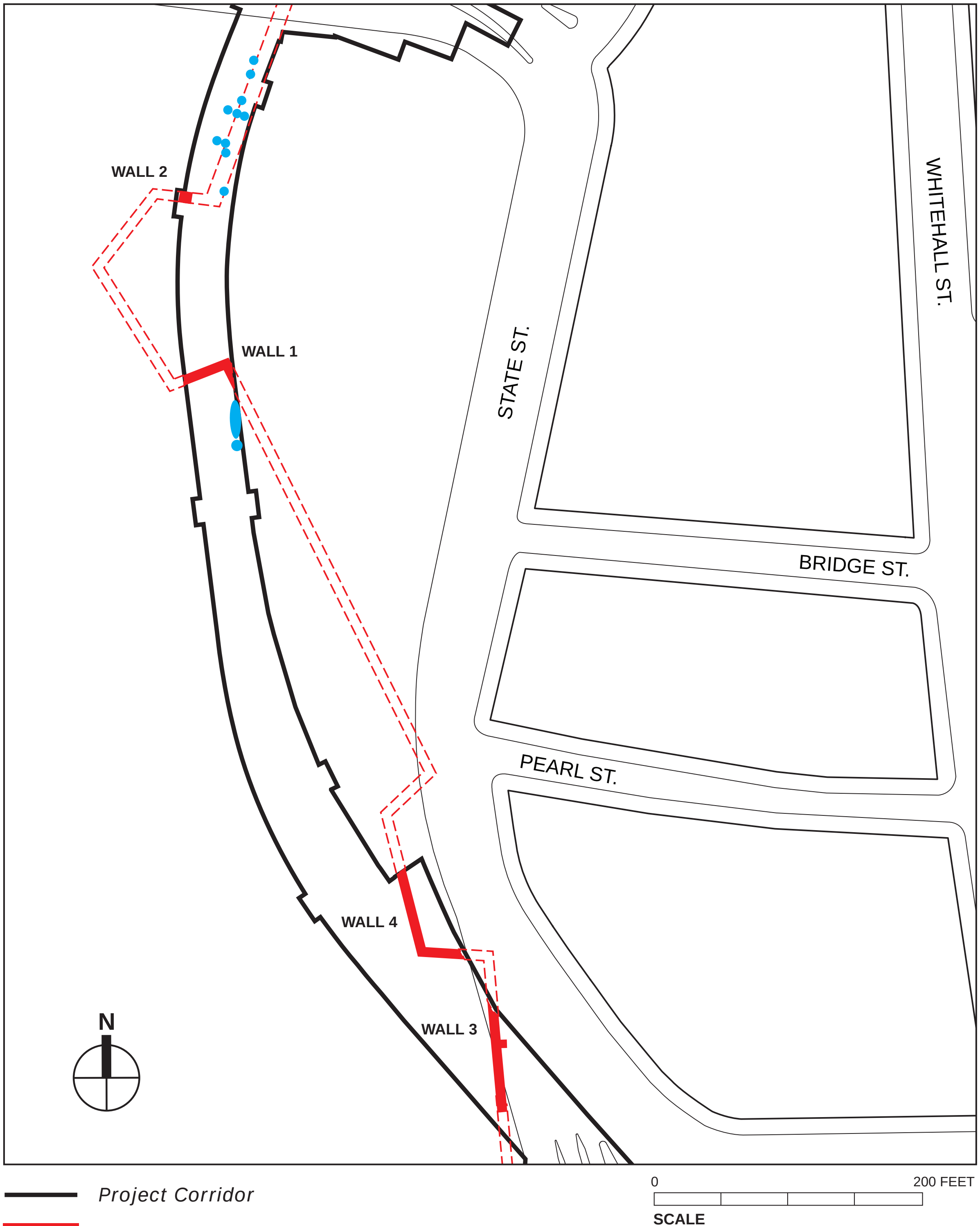
Field Drawing ID#s 137, 141, 621, 622, 623, 624 & 625: Wall 4 sheeting
Figure 5.49



Field Drawing ID#s 142-147:
Composite of the west profile of Trench 6
Figure 5.50

Photograph of Trench 6, west profile from 18 to 26 feet north of start
(March 10, 2006 – ID# 1900)

5.19.10



Project Corridor

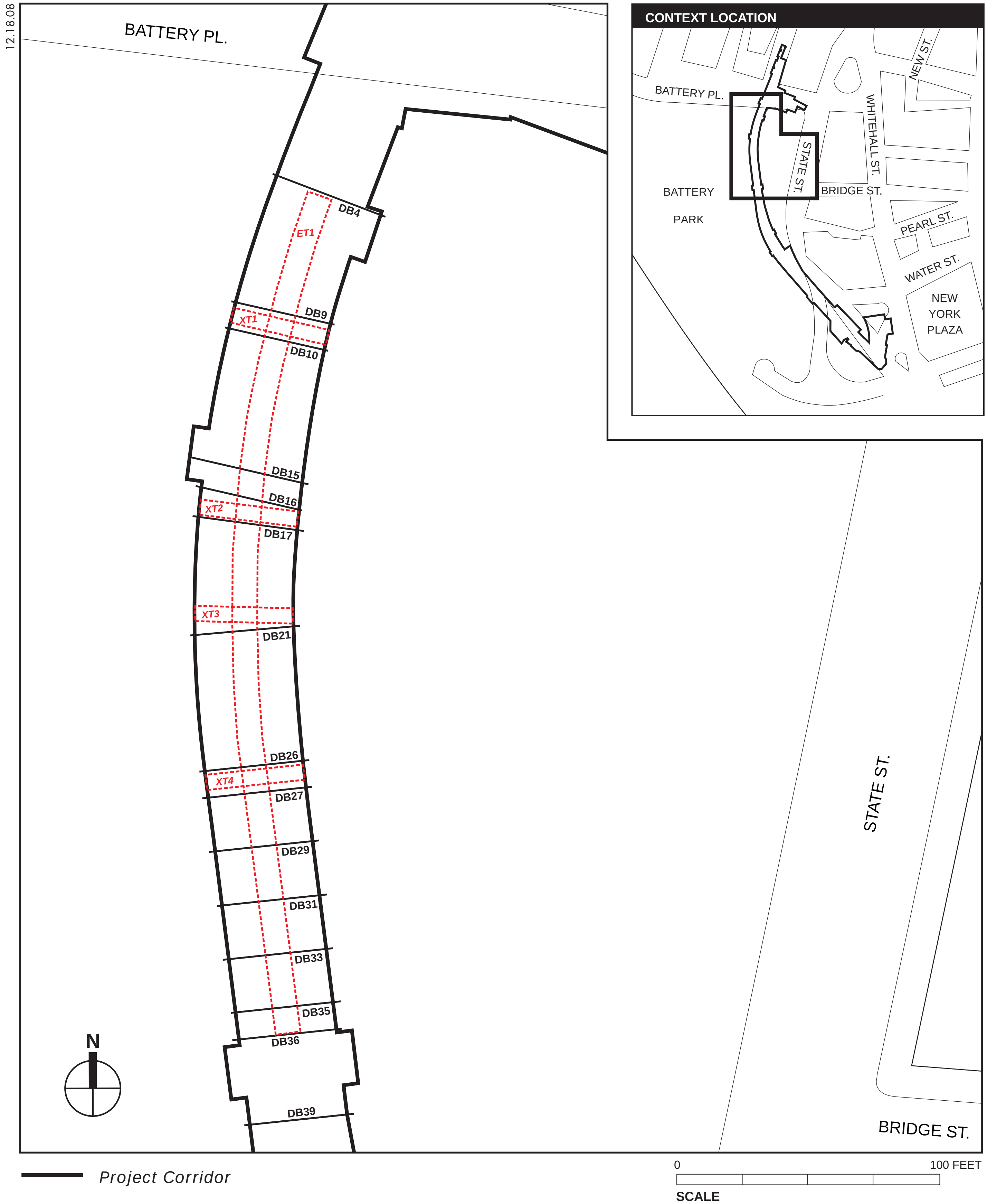
Battery Walls

Projection of Battery Wall location based on 1766/67 Ratzen Plan

Locations of other possible Wall Sections or related features

Composite of the locations of the four sections of Battery Wall with the addition of other possible Wall sections or Wall related features identified during analysis

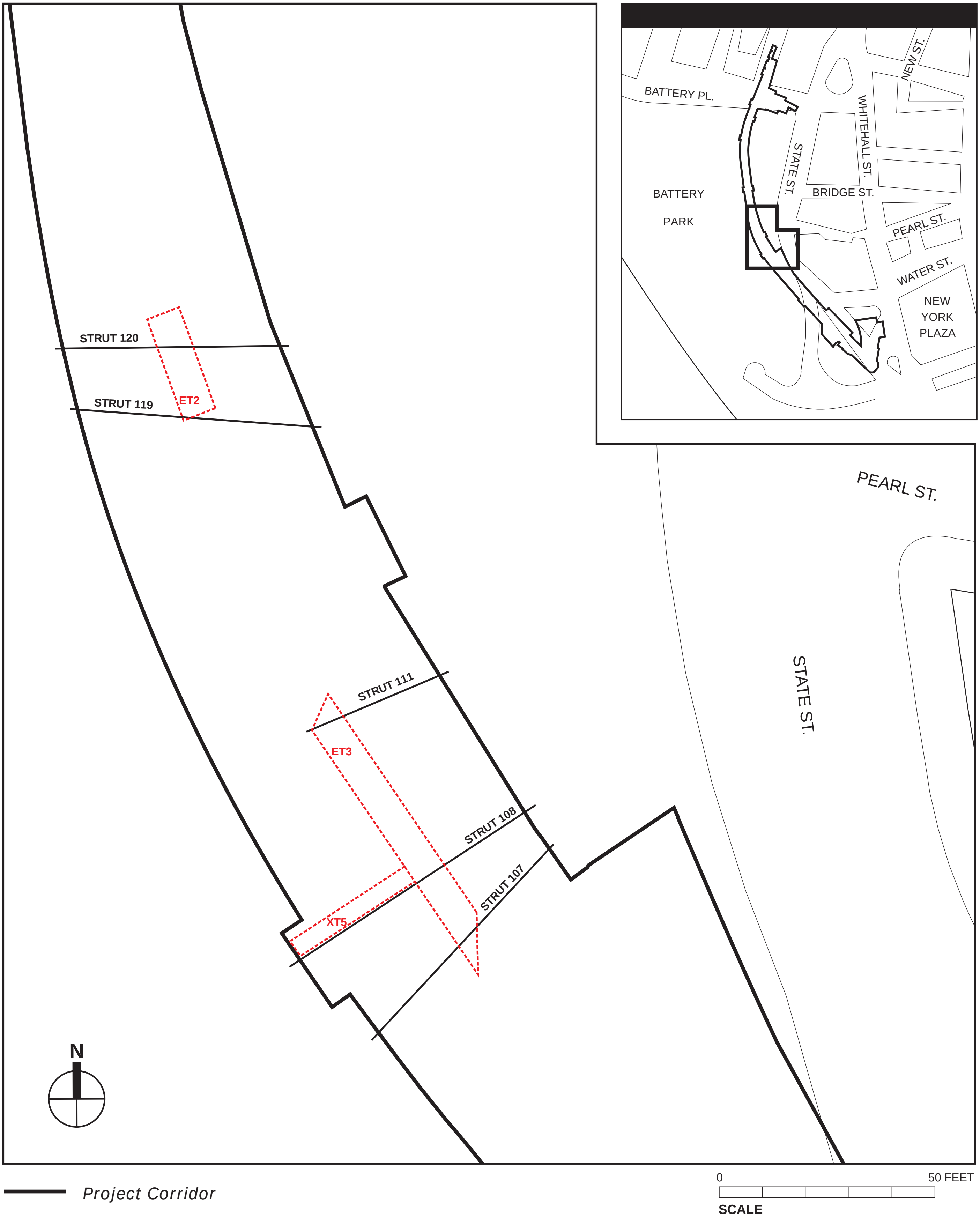
Figure 5.52



ET 1 and XTs 1-4 with appropriate deck beams

SOUTH FERRY **Figure 5.53**

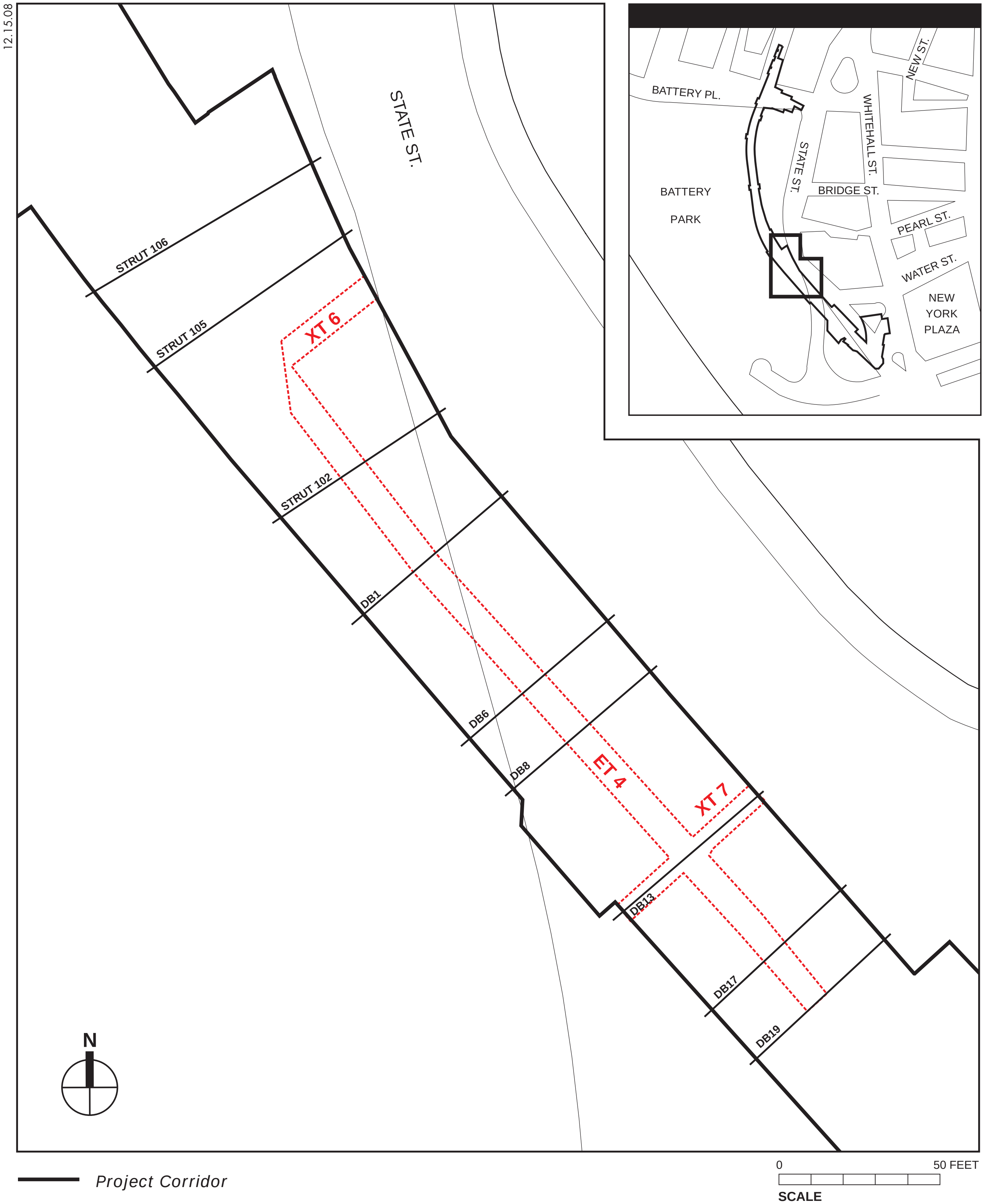
12.15.08



ET 2, ET 3, and XT 5 with appropriate struts

Figure 5.54

SOUTH FERRY



ET 4, XT 6, and XT 7 with appropriate deck beams and struts

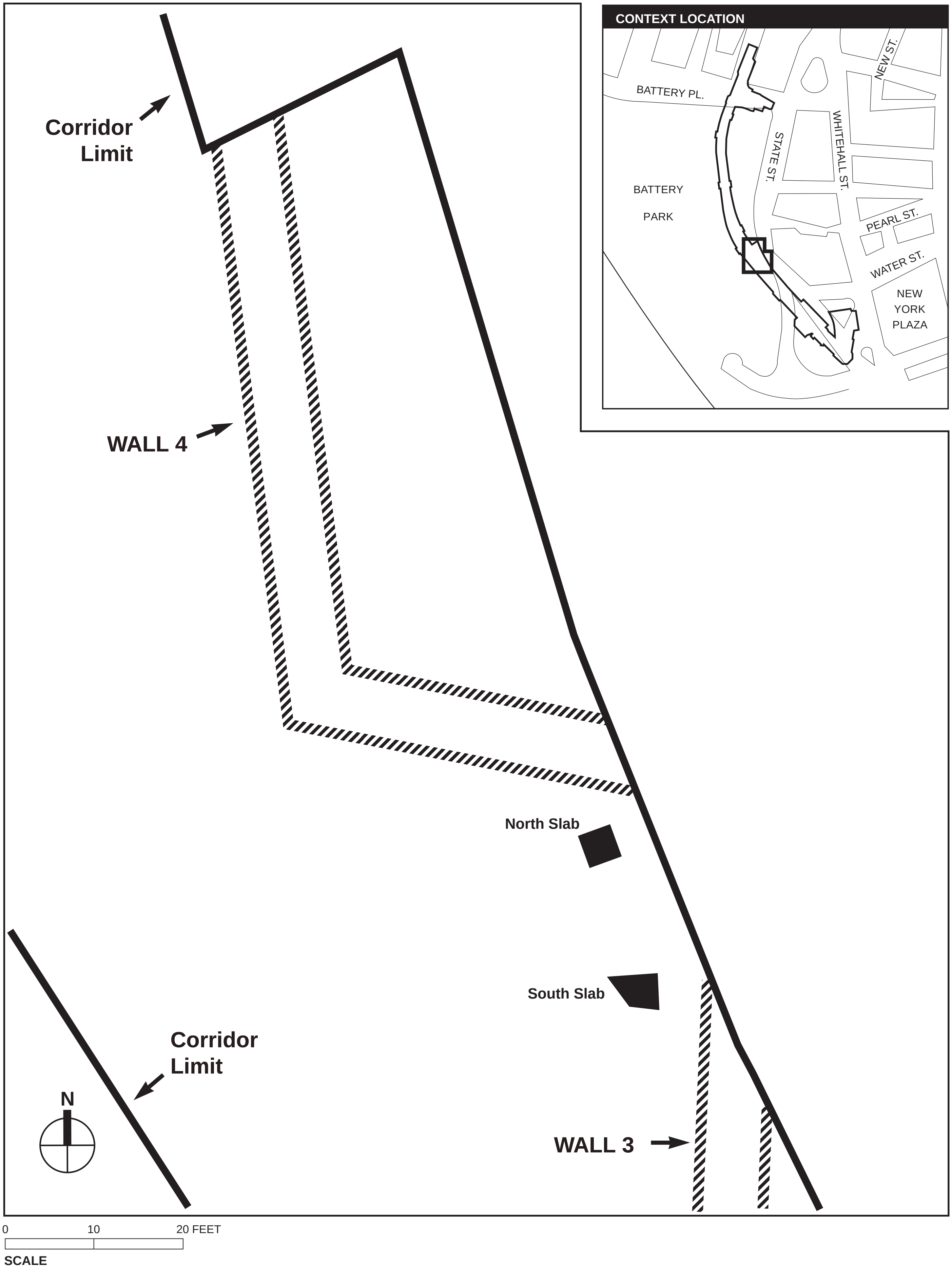
SOUTH FERRY

Figure 5.55

Photograph of relatively modern brick feature in northern Battery Park, possibly a barbeque, sitting directly on bedrock with the trowel pointing north and resting on a series of stones that are now interpreted as part of the Battery Wall (October 31, 2005 – ID# 2914)

Figure 5.56

12.15.08



SOUTH FERRY

Locations of stone slabs in relation to Walls 3 and 4

Figure 5.57

Photograph of top side of the northern sandstone slab after removal and cleaning showing the beveled edge and rust stain in the foreground (March 6, 2006 – ID# 1789)

Figure 5.58

Photograph of northern stone slab in situ in relation to Strut 103 (left), the secant wall (bottom) and the utility lines (top), facing west (February 22, 2006 – ID# STC-1500)

Figure 5.59

Photograph of top side of the southern sandstone slab after removal and cleaning showing the beveled edge and partial indentation in the foreground (March 6, 2006 – ID# 1785)

Figure 5.60

Photograph of bottom side of the southern sandstone slab after removal and cleaning showing the fractures, burning and rust stains (March 6, 2006 – ID# 1794)

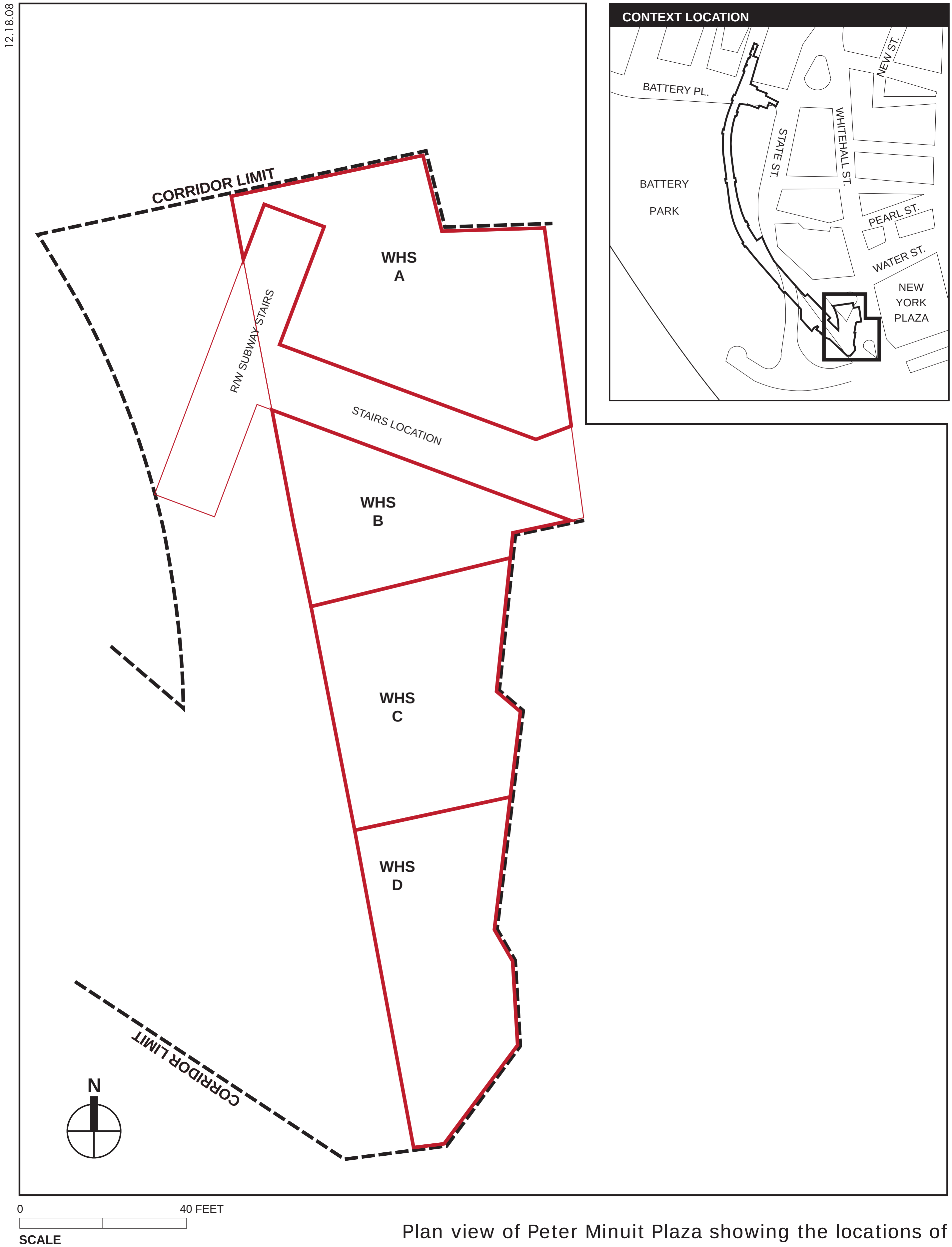
Figure 5.61

Photograph of EU 17 at the opening facing northeast. The vertical photo stick is resting on the unit and the horizontal stick is to the north of the unit (December 27, 2005 – ID# 450)

Figure 5.62

Photograph of installation of deck beams in the eastern side of the new station (July 11, 2005 – ID# 1251)

Figure 5.63

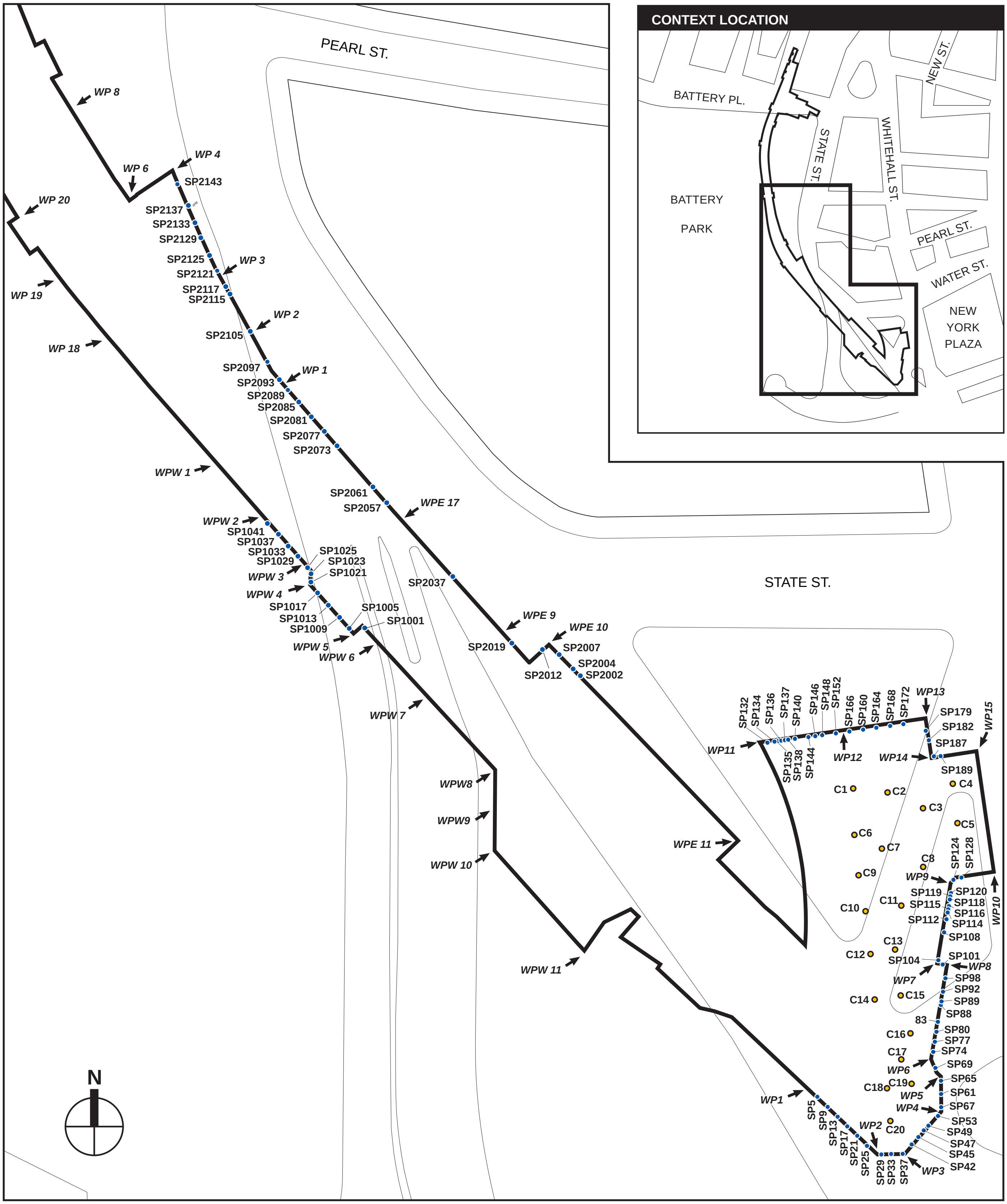


SOUTH FERRY

Plan view of Peter Minuit Plaza showing the locations of the four Whitehall Slip analytical units

Figure 5.64

7.21.11



Project Corridor

Secant Piles (SP)

WP Work Point

C1 Decking Column

SP67 Secant Pile

0 100 FEET

SCALE

SOUTH FERRY

Location of secant pile and decking column sampling throughout the South Ferry Terminal project corridor and work points in Peter Minuit Plaza

Figure 5.65

12.17.08

DECKING COLUMNS

East — West

FEET BELOW GROUND SURFACE	C5	C8	C10
0–5	NO SAMPLE	NO SAMPLE	NO SAMPLE
5–10	VERY DARK GRAY SILT	VERY DARK GRAYISH BROWN SILT	DARK GRAYISH BROWN SILTY SAND
10–15	DARK BROWN SANDY SILT	DARK BROWN SANDY SILT	DARK GRAYISH BROWN SANDY SILT
15–20	VERY DARK GRAYISH BROWN SANDY SILT	MOTTLED DARK BROWN +REDDISH BROWN SILTY SAND	MOTTLED DARK GRAYISH BROWN SILT
20–25	DARK BROWN SILTY SAND	PINKISH GRAY SILT	VERY DARK GRAY SILT

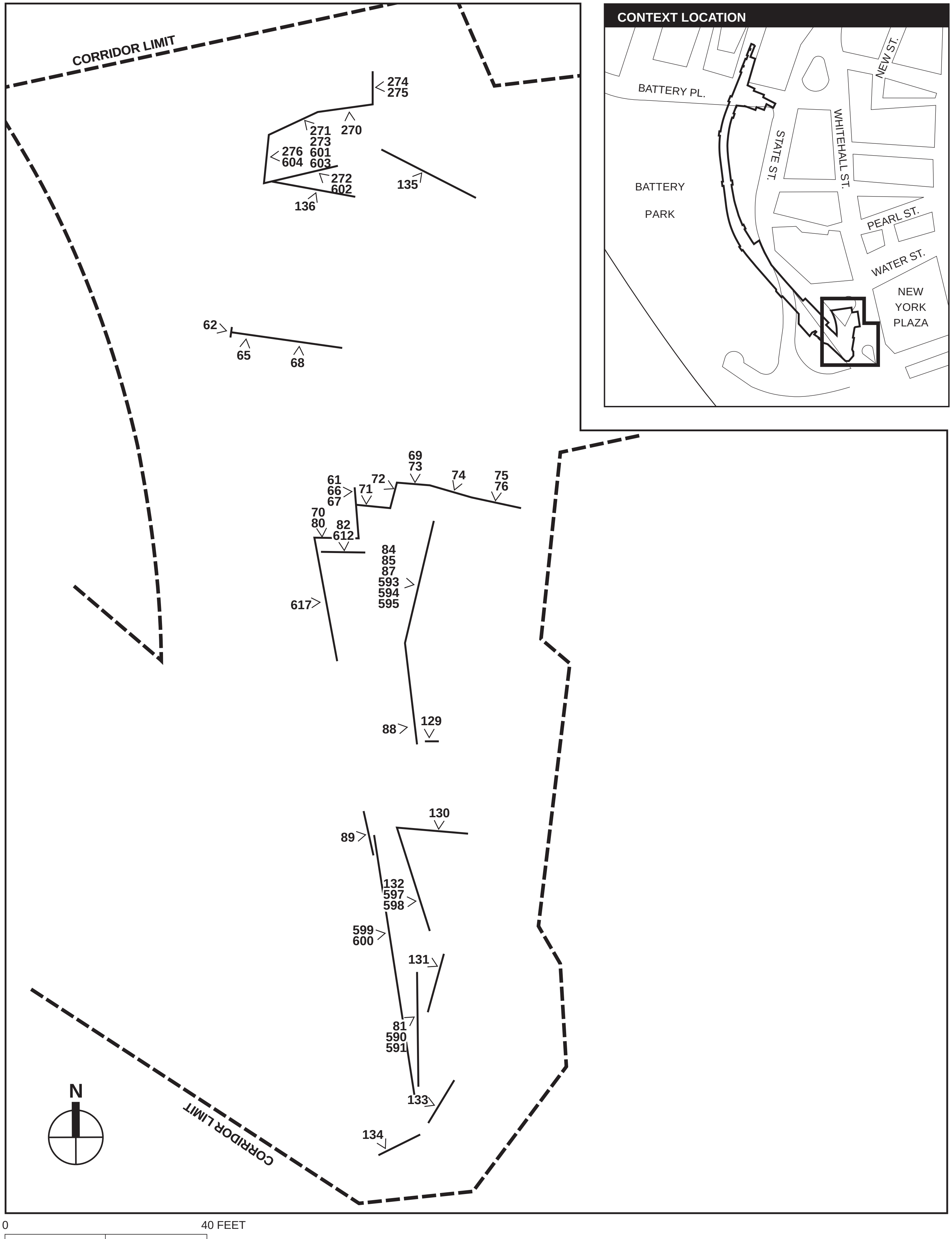
DECKING COLUMNS AND SECANT PILES

North — South

FEET BELOW GROUND SURFACE	C6	C9	C10	C12	SP37
0–5	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE
5–10	DARK BROWN SANDY SILT	VERY DARK GRAYISH BROWN SILTY SAND	DARK GRAYISH BROWN SILTY SAND	DARK BROWN SILT	VERY DARK GRAYISH BROWN SANDY SILT
10–15	DARK BROWN SANDY SILT	VERY DARK GRAY SANDY SILT	DARK GRAYISH BROWN SANDY SILT	GRAYISH BROWN SANDY SILT	VERY DARK GRAYISH BROWN SANDY SILT
15–20	DARK BROWN SILTY SAND	VERY DARK GRAY SANDY SILT	MOTTLED DARK GRAYISH BROWN SILT	GRAY SANDY SILT	MOTTLED VERY DARK GRAY + VERY DARK GRAYISH BROWN SANDY SILT
20–25	GRAYISH BROWN SANDY SILT	VERY DARK GRAY SANDY SILT	VERY DARK GRAY SILT		VERY DARK GRAY SANDY SILT

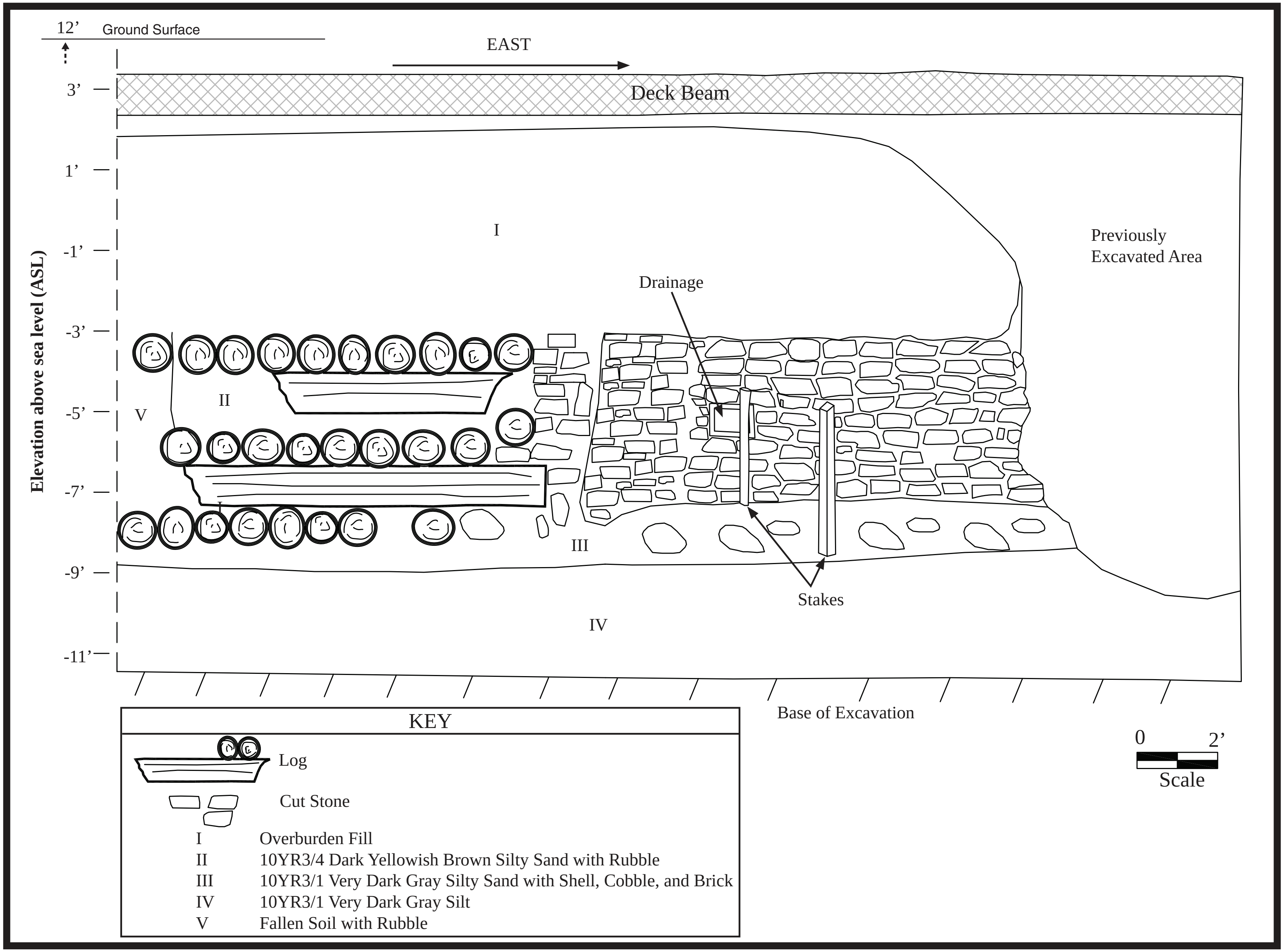
Representative stratigraphic cross sections
from decking columns and secant piles at Whitehall Slip
Figure 5.66

12.15.08



Plan view of Peter Minuit Plaza showing the locations of archeological profile drawings made in the field

SOUTH FERRY **Figure 5.67**



Field Drawing ID#s 270, 273, 603: North profile of WHS A north of Decking Columns C1 and C2 showing the stone wall in a line with the head of the Slip and log grillage

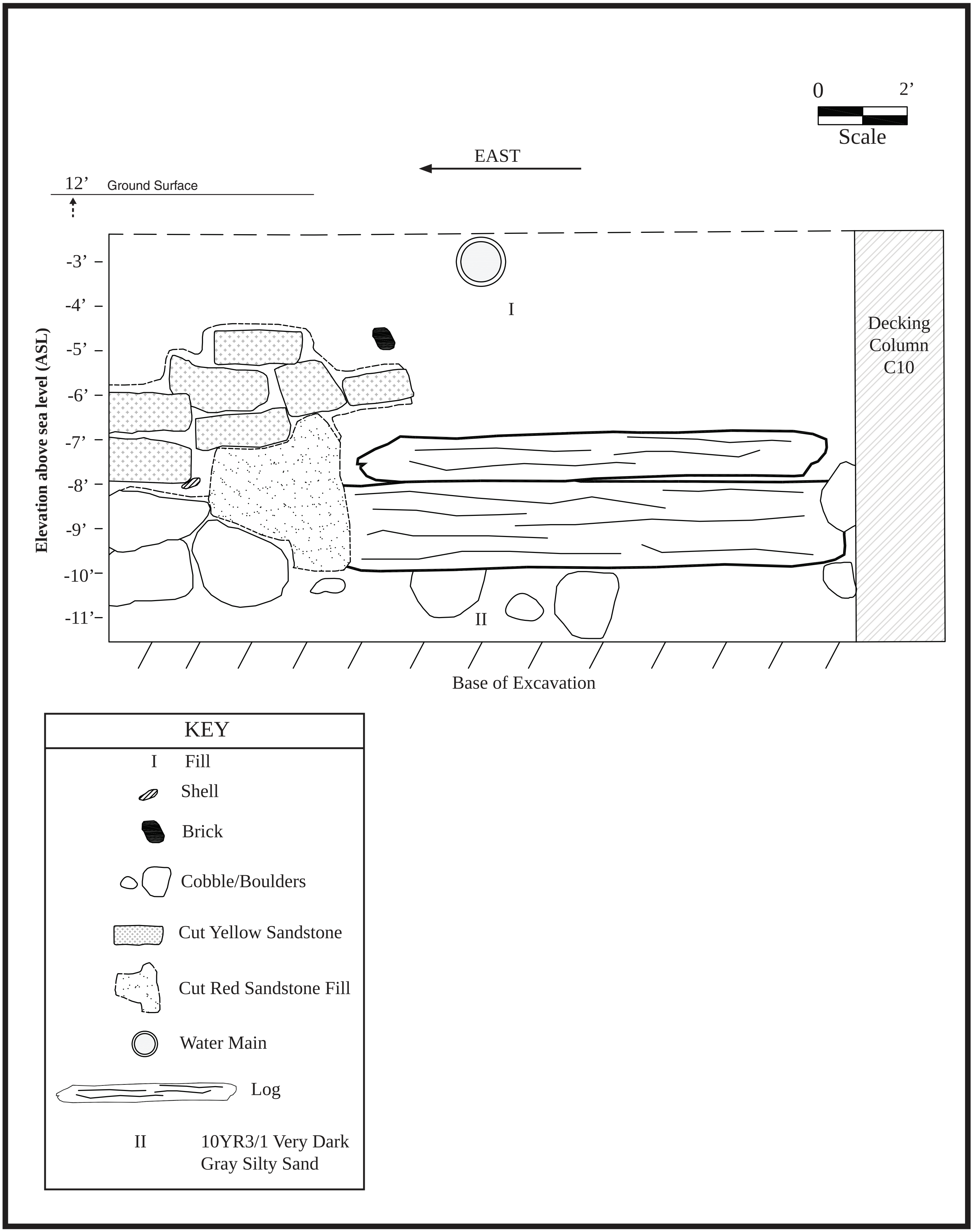
Figure 5.68

Photograph of the head of the slip and the stone retaining wall at the northern end of Whitehall Slip. Note the square drain in the center surrounded by laid cut stones and the more haphazard stones to the left (west) (September 30, 2005 – ID# 2495)
Figure 5.69

Photograph of the northern section of WHS B after it was first exposed and cleaned off, facing north. Note Decking Column C 6 to the left (west) and poor wood preservation of the upper couses (August 30, 2005 – ID# 1892)
Figure 5.70

Photograph of the northern section of WHS B showing the logs to the north (left) of Decking Column C 6 and the wooden sheeting of the subway stairs in the background facing northeast (August 30, 2005 – ID# 1896)

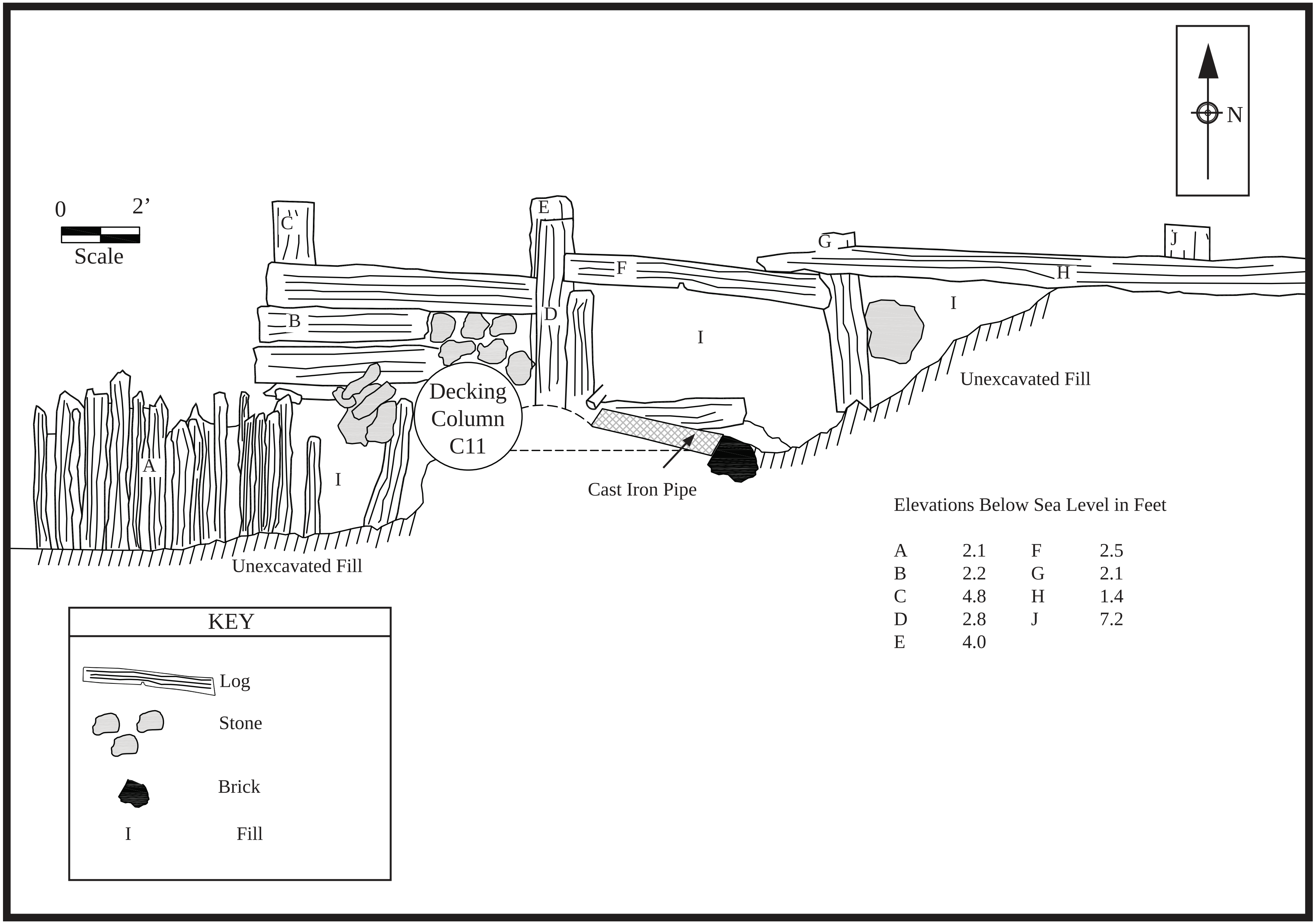
Figure 5.71



Field Drawing ID# 61: South profile of WHS B near Decking Column C 10
(See Figure 5.65 for Decking Column C10 Location)

Figure 5.72

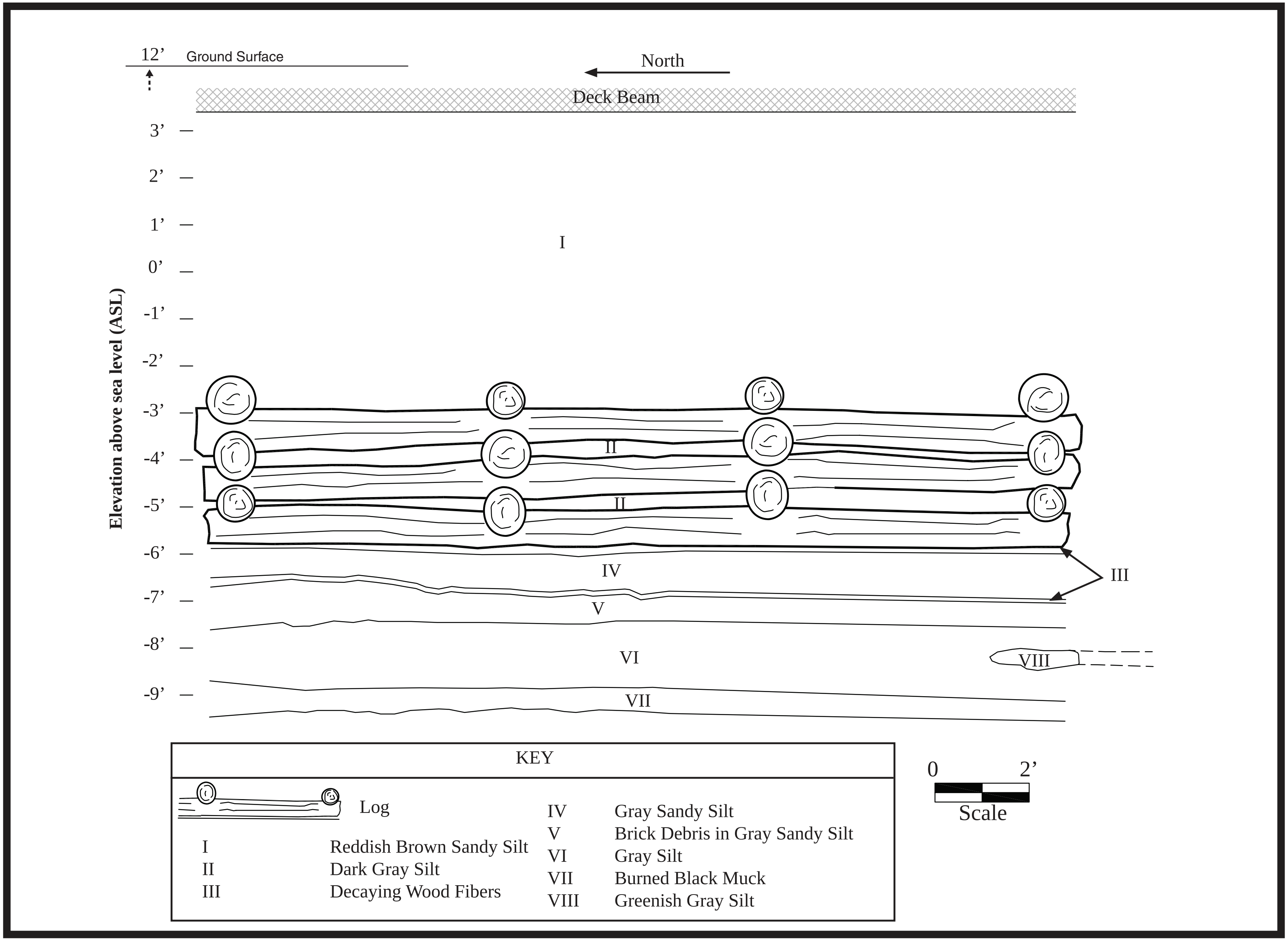
12.23.08



Field drawings ID#s 78 & 79: Plan view of WHS B from Decking Column C 10 eastward through C 11

Figure 5.73

Photograph of unique triangular feature in WHS B, facing south
(September 8, 2005 – ID# 2001)



Field Drawing ID# 85 & 593: East profile of a cribbing block with three cells, located between Decking Columns C 11 and C 13

Figure 5.75

Photograph of section of Whitehall Slip cribbing exposed between Decking Columns C 10 and C 11 facing southeast (September 13, 2005 – ID# 2131)

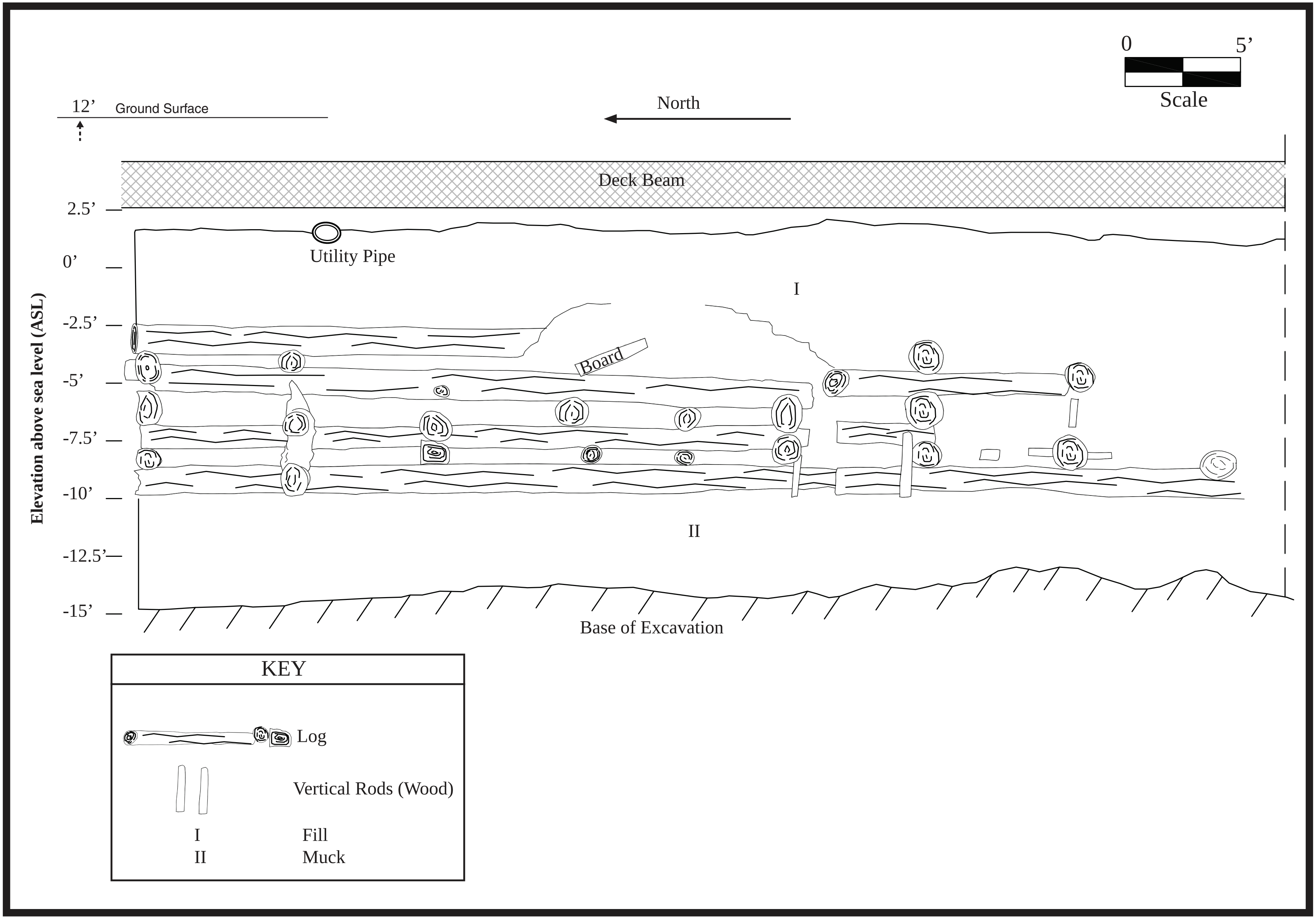
Figure 5.76

Photograph of a square cut timber on top of a vertical log among cribbing near Decking Column C 15, facing southeast (September 16, 2005 – ID# 2224)

Figure 5.77

Photograph of *in situ* polychrome pearlware ceramic deposit
in the fill of Whitehall Slip southeast of Decking Column C 14
(September 15, 2005 – ID# 2211)
Figure 5.78

Photograph of the northern end of WHS D southward from Decking
Column C 14 (left) facing east (September 20, 2005 – ID# 2278)
Figure 5.79

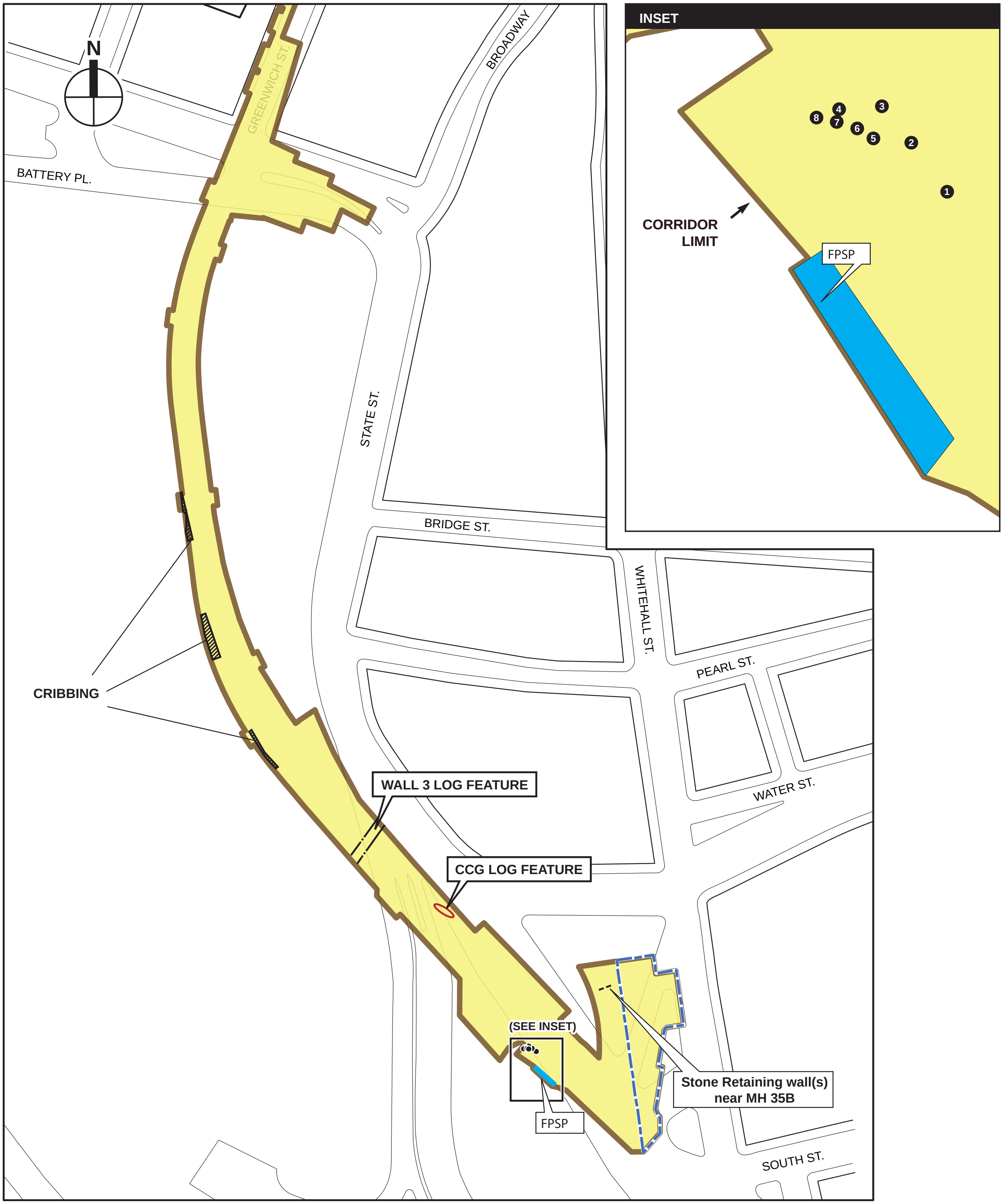


Field Drawing ID#s 599 & 600: East profile of log cribbing between Decking Columns C 14 and C 20

Figure 5.80

Photograph of cherry pits and coffee beans *in situ* at WHS D
(September 19, 2005 – ID# 2253)

Figure 5.81



Project Corridor
Whitehall Slip
Vertical Piles

FPSP *Fan Plant Sheeted Pits*
MH *Manhole*
CCG *Cobblestone Area Coast Guard Access Road*

0 400 FEET
SCALE

Drawing of the project corridor showing the locations of the described log and stone features

Figure 5.82

SOUTH FERRY

Photograph of GPS survey in progress at
Vertical Piles #5 – 8, facing northwest
(October 11, 2005 – ID# 2616)

Figure 5.83

Project Corridor

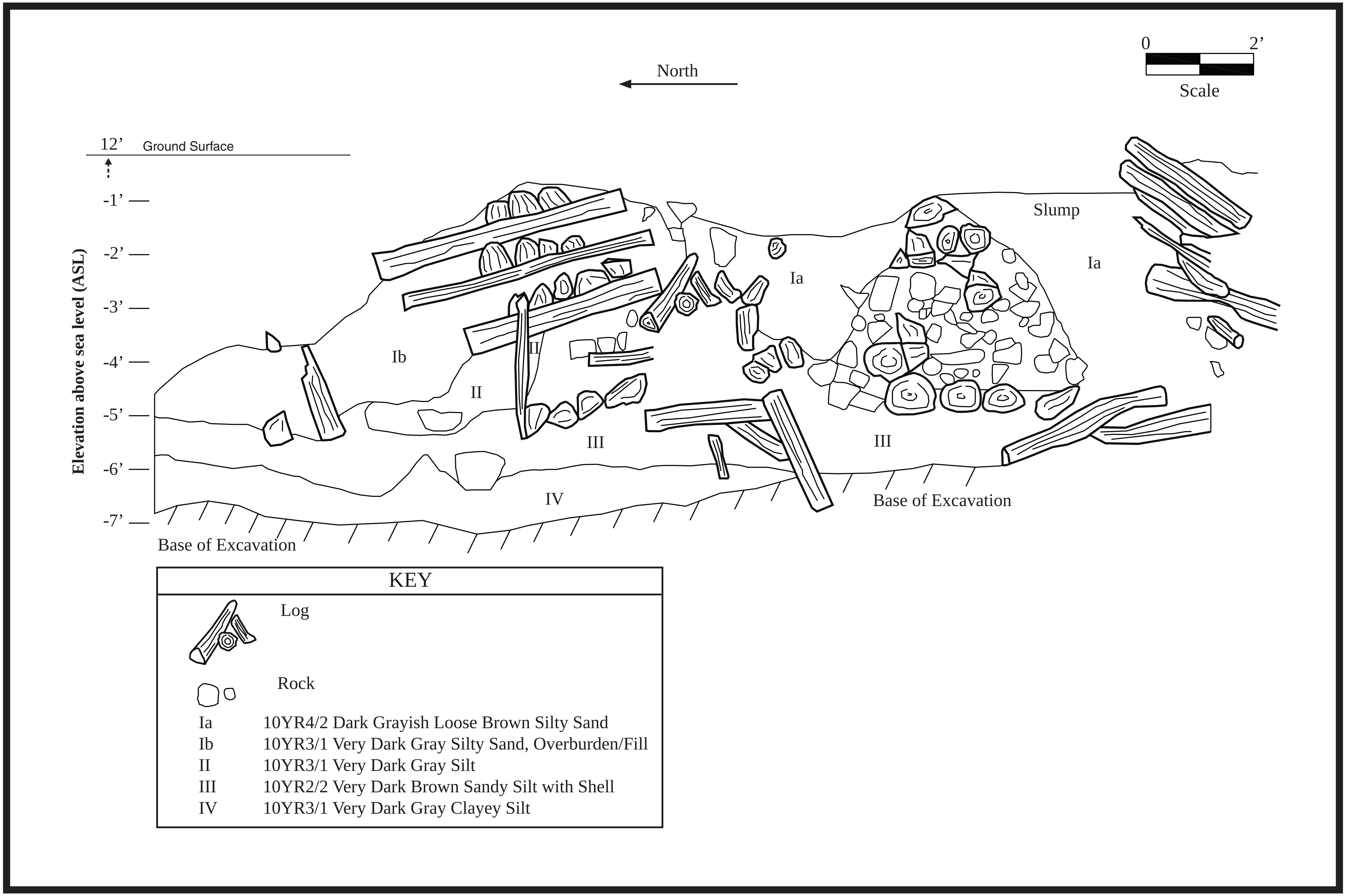
Battery Wall

Whitehall Slip

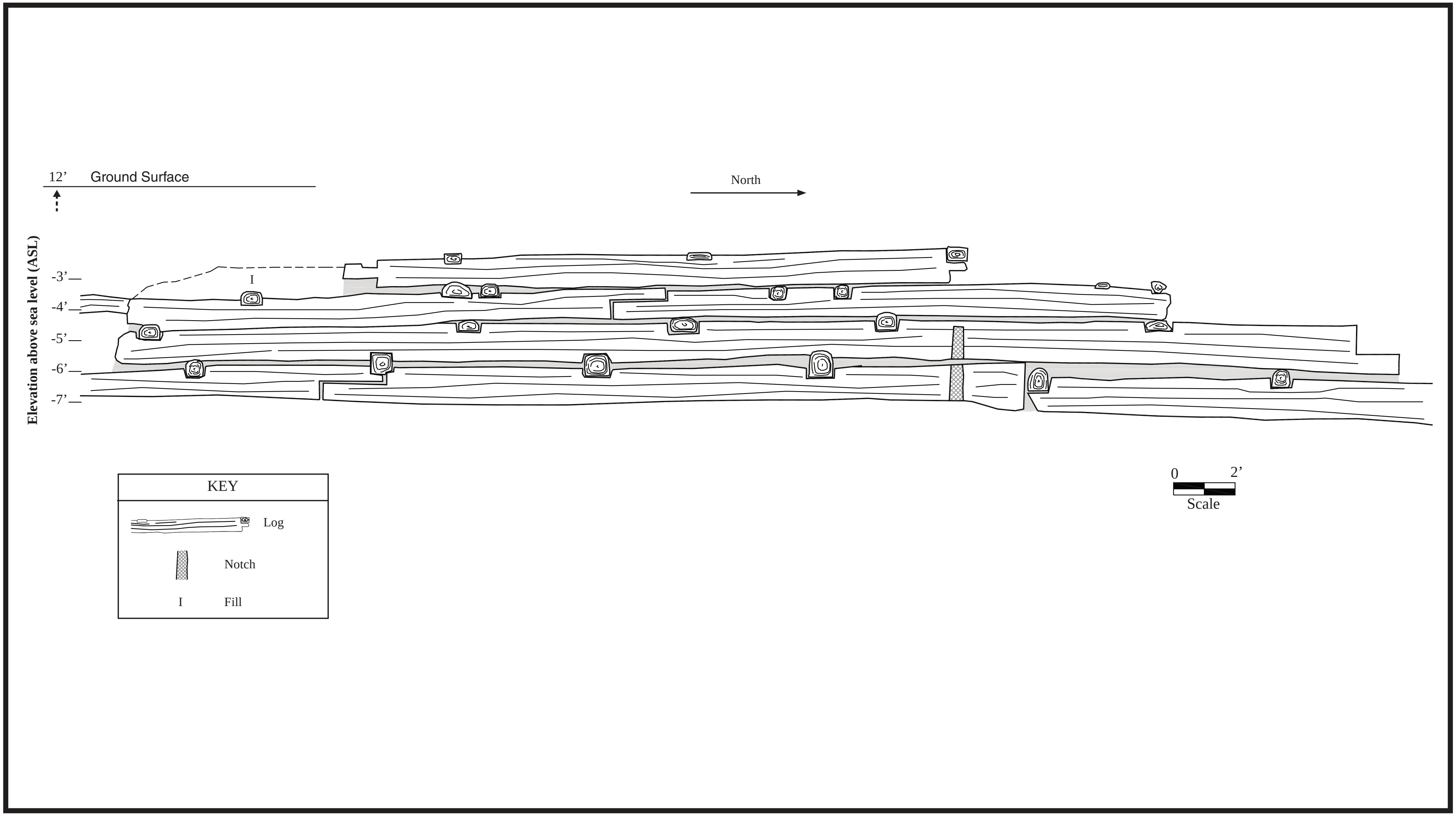
Vertical Piles

1766/67 Ratzen Plan overlay showing locations discussed in the General South Ferry Field Result

Figure 5.84

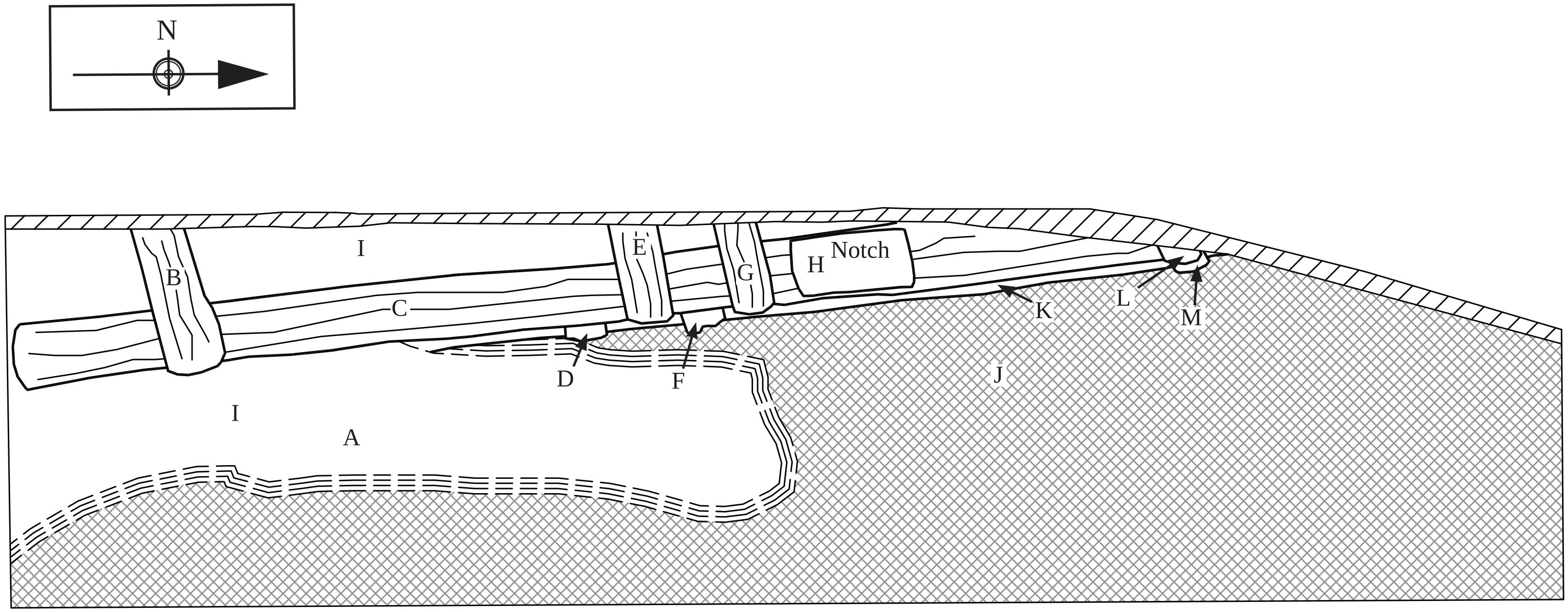


Field Drawing ID# 122: East profile of ET 4 between Deck Beams 15 and 17 showing the CCG log feature



Field Drawing ID# 367: West profile near Struts 120 – 123 showing log cribbing in Battery Park
Figure 5.86

12.23.08



KEY

Log

Bedrock

I Fill

Elevations Below Sea Level in Feet

A	-4	G	-2.7
B	-2.7	H	-3.4
C	-3	J	-9
D	-4	K	-4.2
E	-2.8	L	-2.8
F	-4	M	-4

0 2’
Scale

Field Drawing ID# 269: Plan view of the cribbing found to the south of Deck Beam 36 in Battery Park North

Figure 5.87

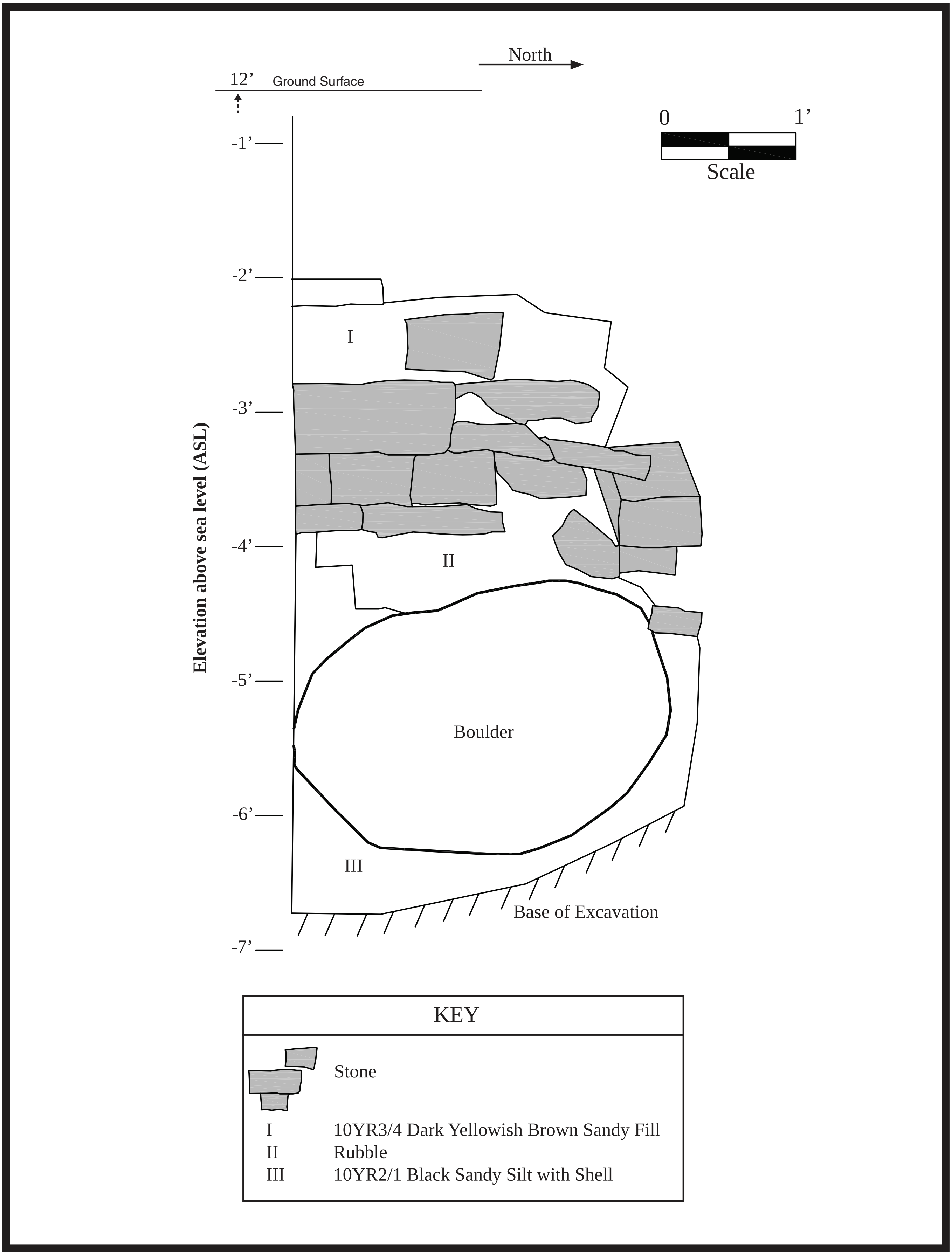
Photograph of documentation of cribbing in Battery Park
between Struts 120 – 122, facing west (See Figure 5.54)
(March 2, 2006 – ID# 1736)
Figure 5.88

Photograph of cribbing in southern Battery Park showing a scarf
joint (right) and a square saddle notch (left) in the bottom course
(February 28, 2006 – ID# 1685)

Figure 5.89

Photograph of archaeologist standing beneath the MH35B stone feature showing the wooden sheeting used during the original subway construction of the loop (left) and the partially demolished stairs (right), facing northwest. What remains of the stone feature is directly above the archaeologist's left shoulder and to the left of the hanging plastic (December 16, 2005 – ID# 334)

Figure 5.90

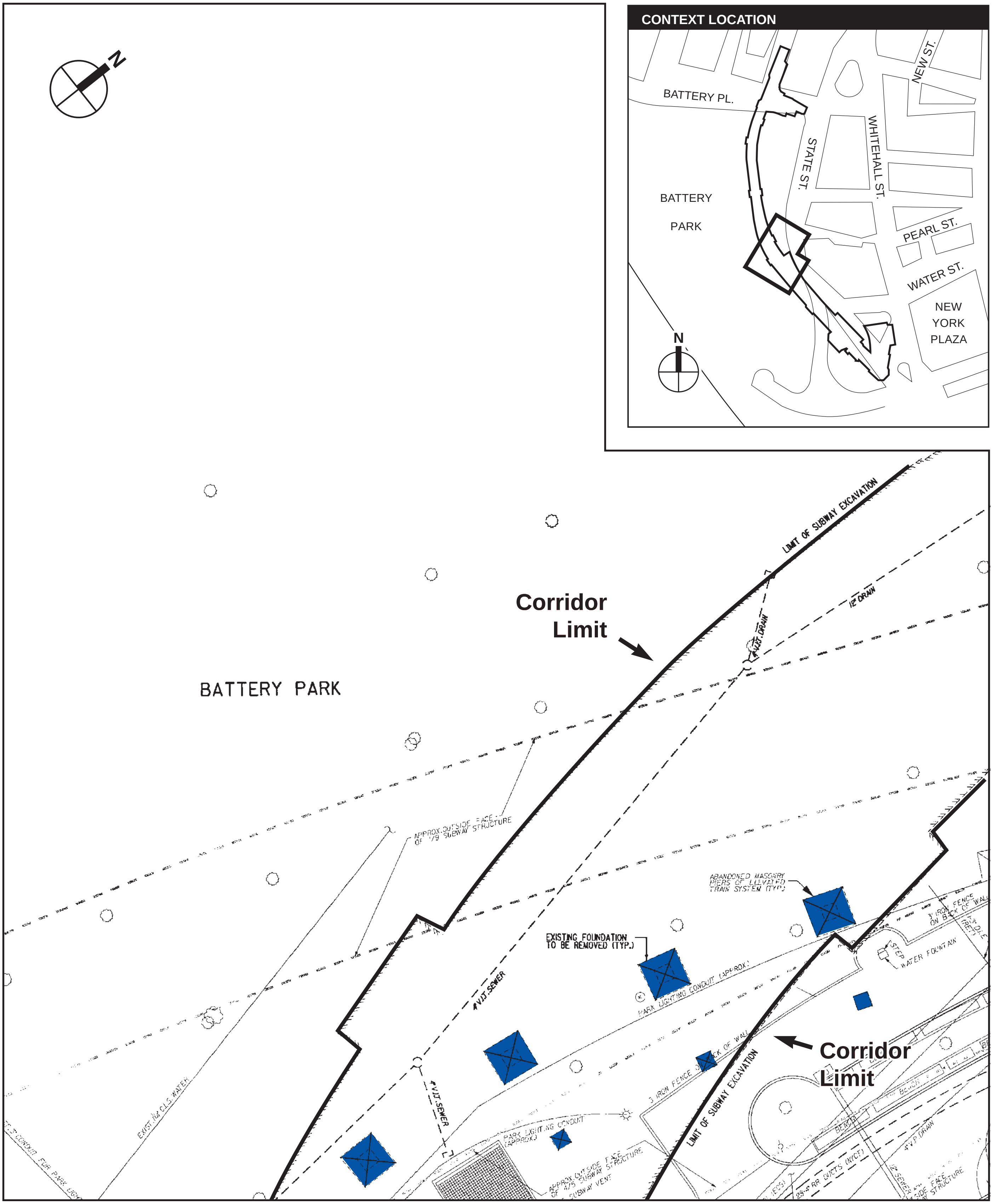


Field Drawing ID# 165: West profile of the stone feature near Manhole 35B

Photograph of stone fill near E65, facing south
(July 25, 2005 – ID# 1435)

Figure 5.92

4.30.10



Source: MTA/New York City Transit and Vollmer Assoc., August 15, 2005

Footing

0 40 FEET

SCALE

Existing Utility Plan - Area 6,
Drawing No. D-11 showing the locations of El footings

SOUTH FERRY

Figure 5.93

Photograph of brick Elevated Railway footing removed from Whitehall Slip excavations (August 23, 2005 – ID# 1771)

Figure 5.94

Photograph of octagonal brick Elevated Railway footing found during excavations in the southwestern corner of the CCG area (April 20, 2005 – ID# 793)

Figure 5.95

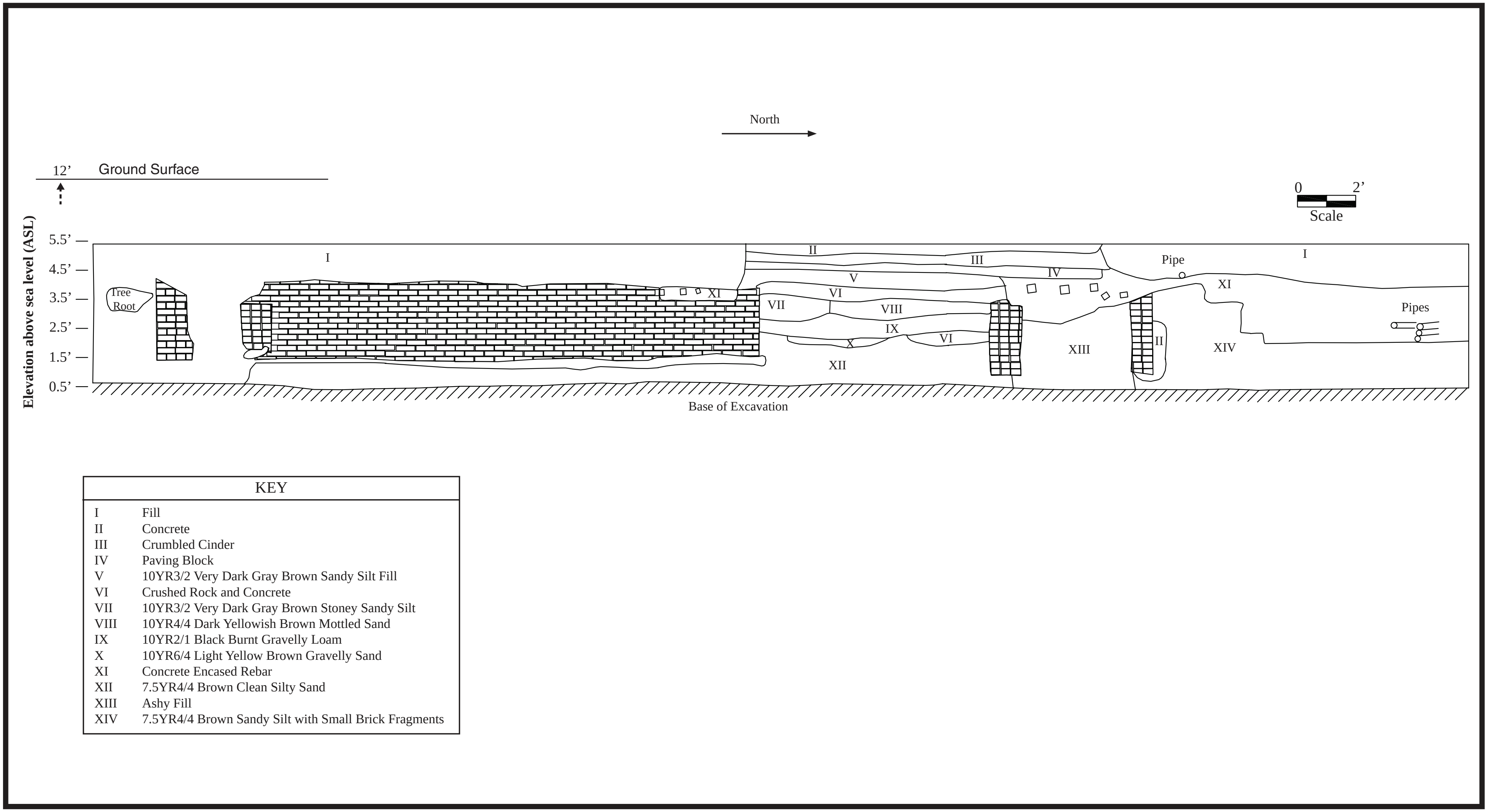
Photograph of four concrete Elevated Railway footings found in the southern end of Battery Park (February 9, 2006 – ID# 1201)
Figure 5.96

Photo credit: Tishman-Harris

Photograph of contractor dismantling an Elevated Railway footing in the northeast corner of Peter Minuit Plaza near Work Points 13 and 14
(See Figure 5.65 for Work Point Location)
(November 30, 2004 – ID# P1010001)
Figure 5.97

Photograph of metal fitting on top of a footing
found in the southwestern corner of the CCG area
(April 20, 2005 – ID# 796)

Figure 5.98



Field Drawing ID#s 264, 265, 280 & 281: West profile of the guide wall trench in Peter Minuit Plaza between Work Points 8 and 9 (See Figure 5.65)

Figure 5.99

Photo credit: Tishman-Harris

Photograph of a partial yoke after it was removed from the excavations, along with a piece of another possible yoke embossed "NYR" (November 26, 2004 – ID# P1010028)
Figure 5.100

Photograph of a whole yoke after it was removed from the excavations (May 18, 2005 – ID# 935)
Figure 5.101

Photo credit: Tishman-Harris

Photograph of brick remains of the cable railway foundations near WP 13 facing northwest (See Figure 5.65.for Work Point Location) (November 26, 2004 – ID# P1010025)

Figure 5.102

Photo credit: Tishman-Harris

Photograph of a possible switch from the Cable Railway along with other metal hardware, including possible pieces of rail (November 26, 2005 – ID# P1010032)

Figure 5.103

Photograph of possible metal form associated with the brick footings of the Cable Railway facing northeast (See Figure 5.65.for Work Point Location) (May 25, 2005 – ID# 979)

Figure 5.104

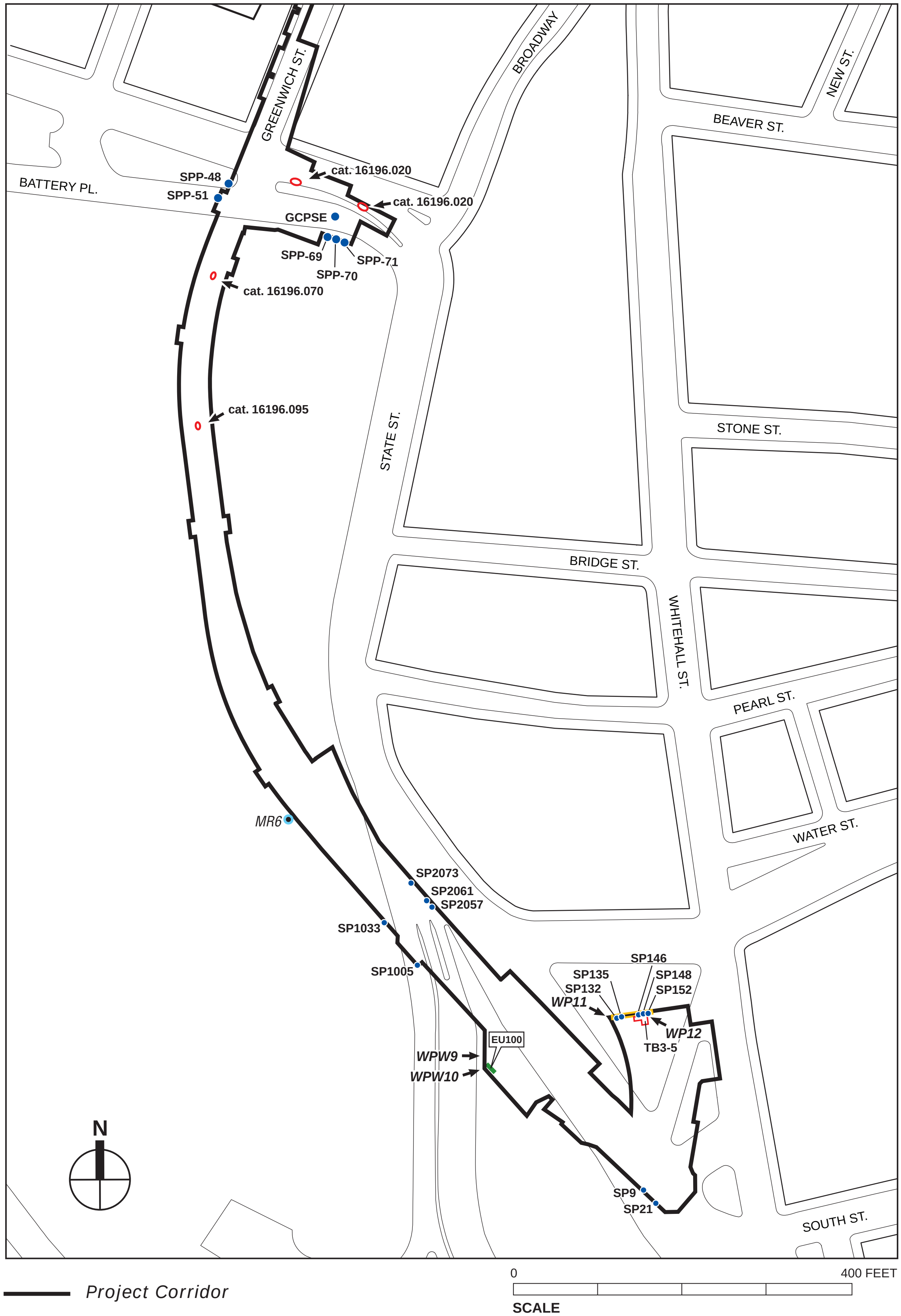
Source: New York Transit Museum

Photograph from 1916 showing cable railway car, tracks and brick foundations at Battery Place and Greenwich Street

Figure 5.105

Photograph of brick sewer near WP 7 facing southeast
(November 11, 2004 – ID# PB110006)

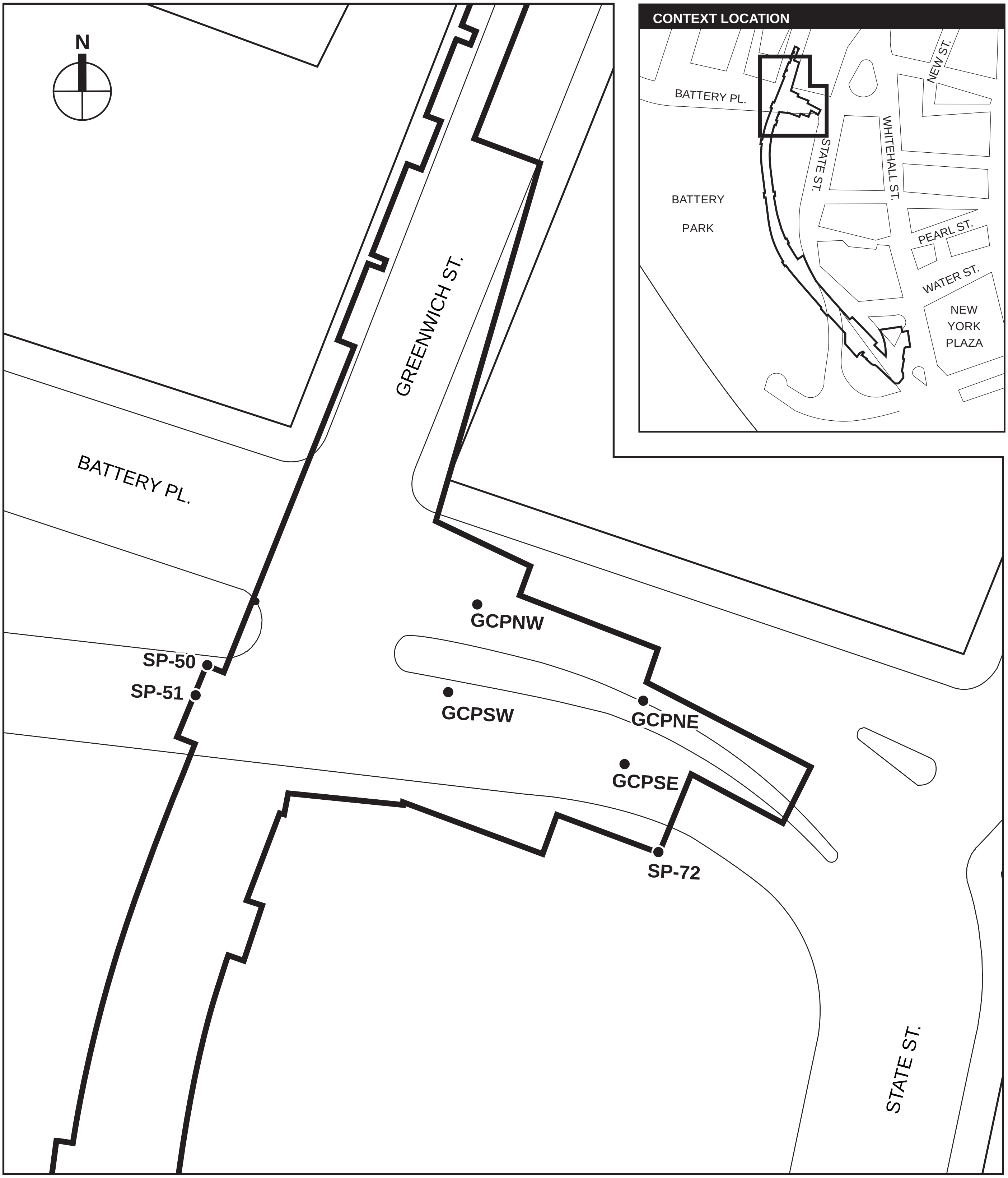
Figure 5.106



Locations where burned material was found in non-data recovery contexts

Figure 5.107

SOUTH FERRY



7.21.11

Project Corridor

SP-72 Secant Pile

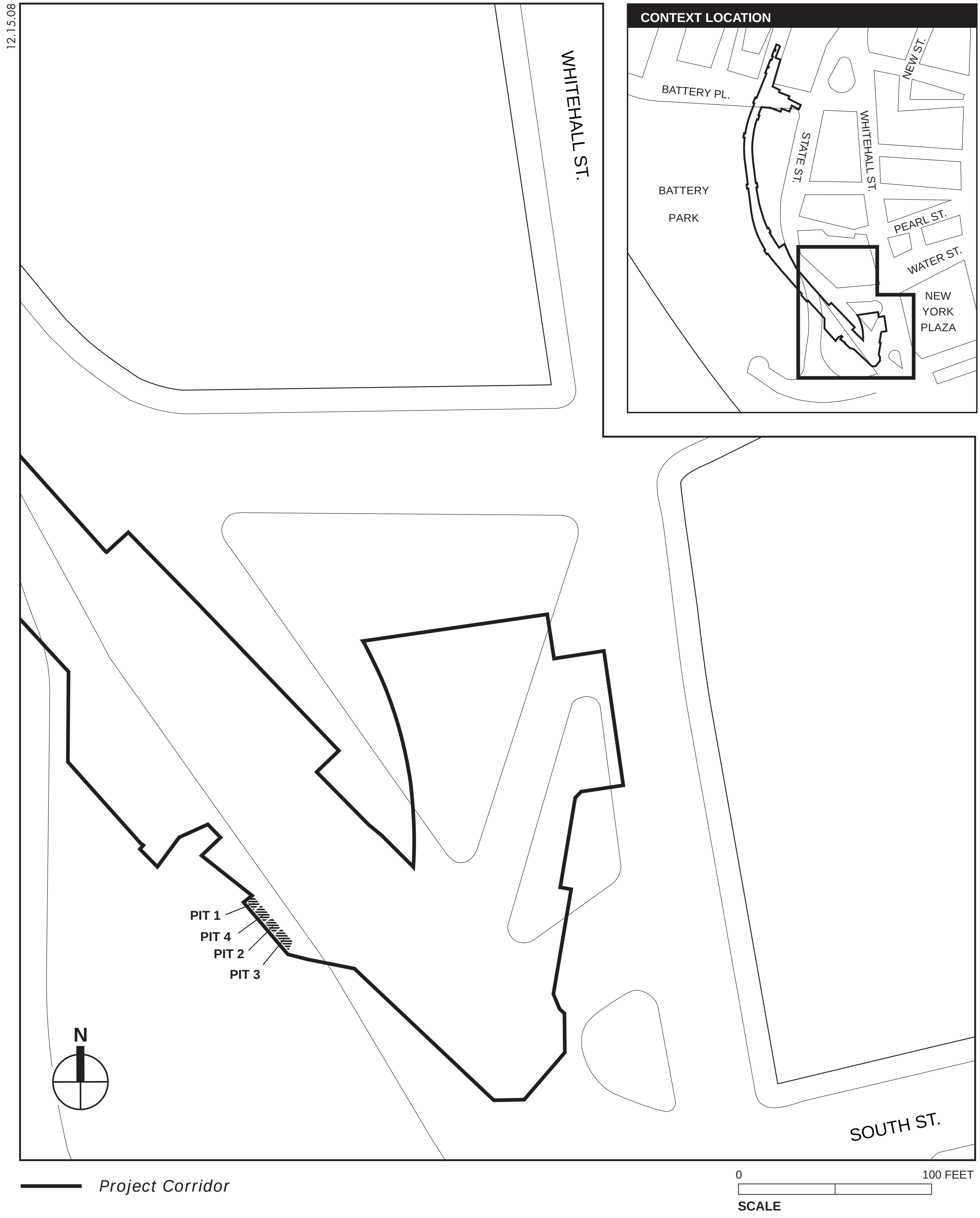
GCP ● Girder Column Pit

0 100 FEET

SCALE

Locations in Battery Place containing 17th-century artifacts

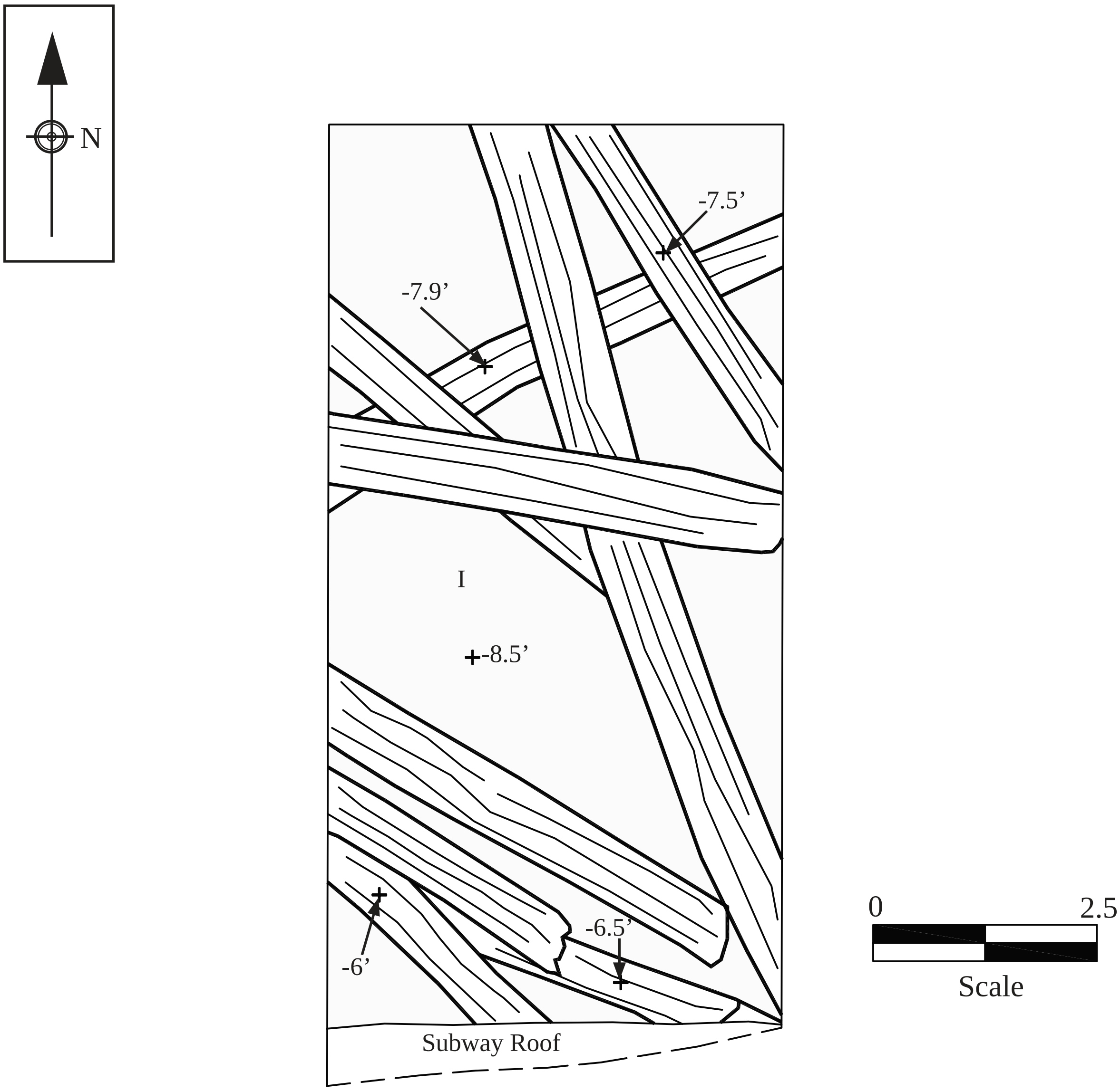
SOUTH FERRY **Figure 5.108**



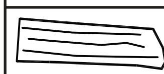
Fan Plant Sheeted Pits
Figure 5.109

Photograph of Fan Plant Sheet Pits Numbers 1, 4, and 2, facing south (July 18, 2005 – ID# 1347)

Figure 5.110



KEY



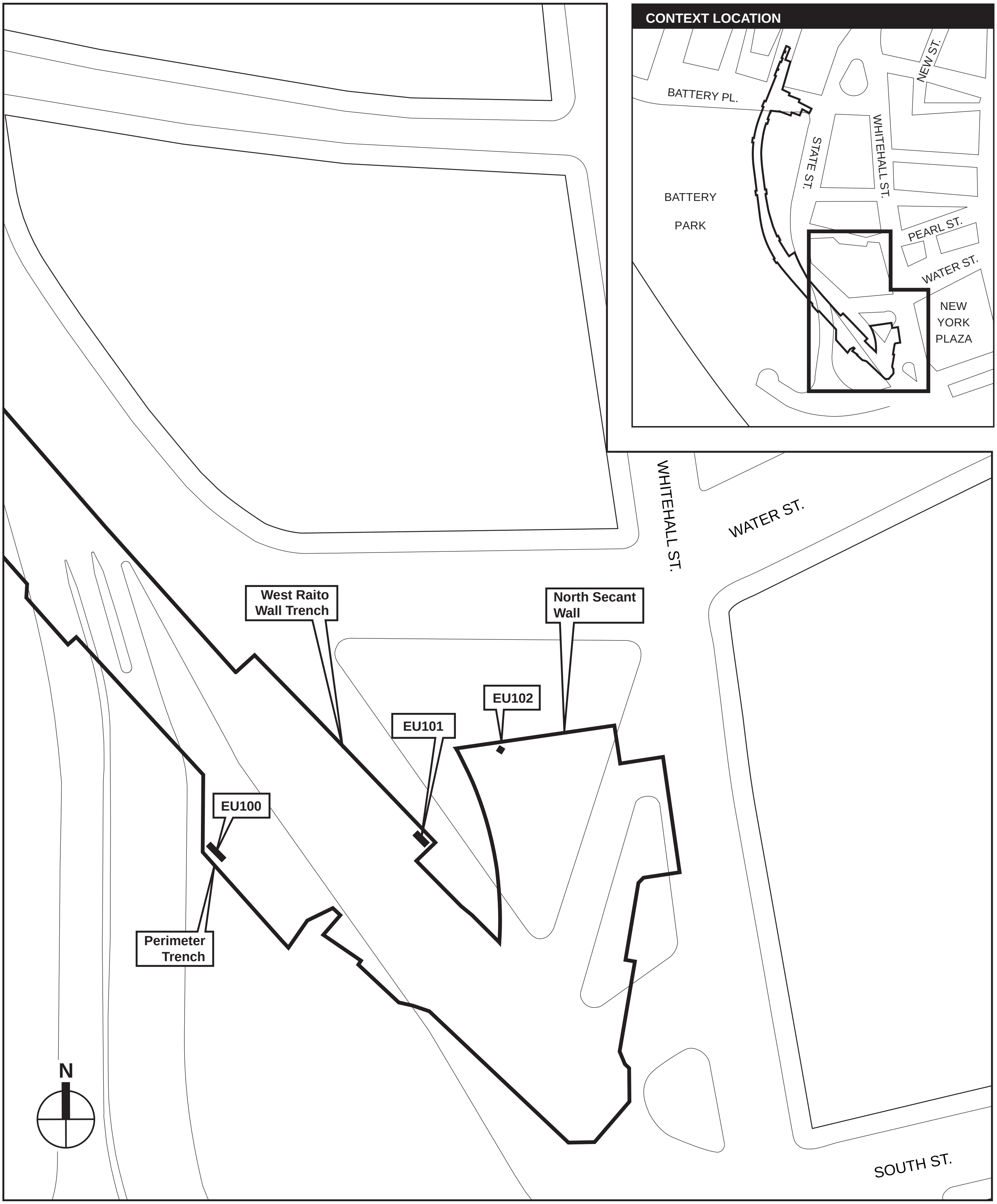
Log

+ Elevation in ASL

I 10YR3/1 Very Dark Gray with 2.5Y4/1 Dark Gray Very Wet Sandy Silt with Dark Gray Silt Inclusions.

Field Drawing ID# 161: Plan view of Pit 3 showing position of logs

Figure 5.111

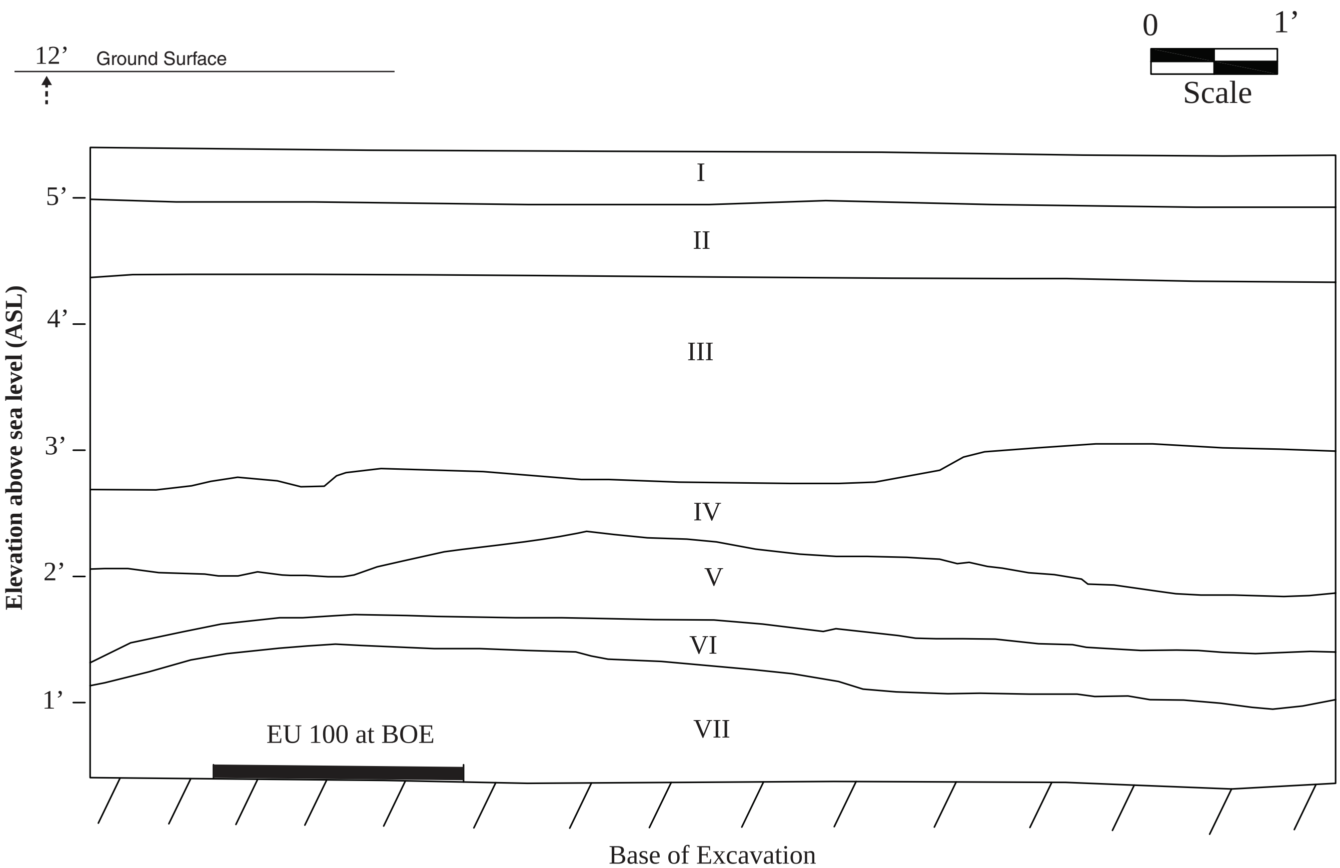


NOTE: (See 1.5-98) Shell Excavations

Project Corridor

Locations of three shell deposit excavations units

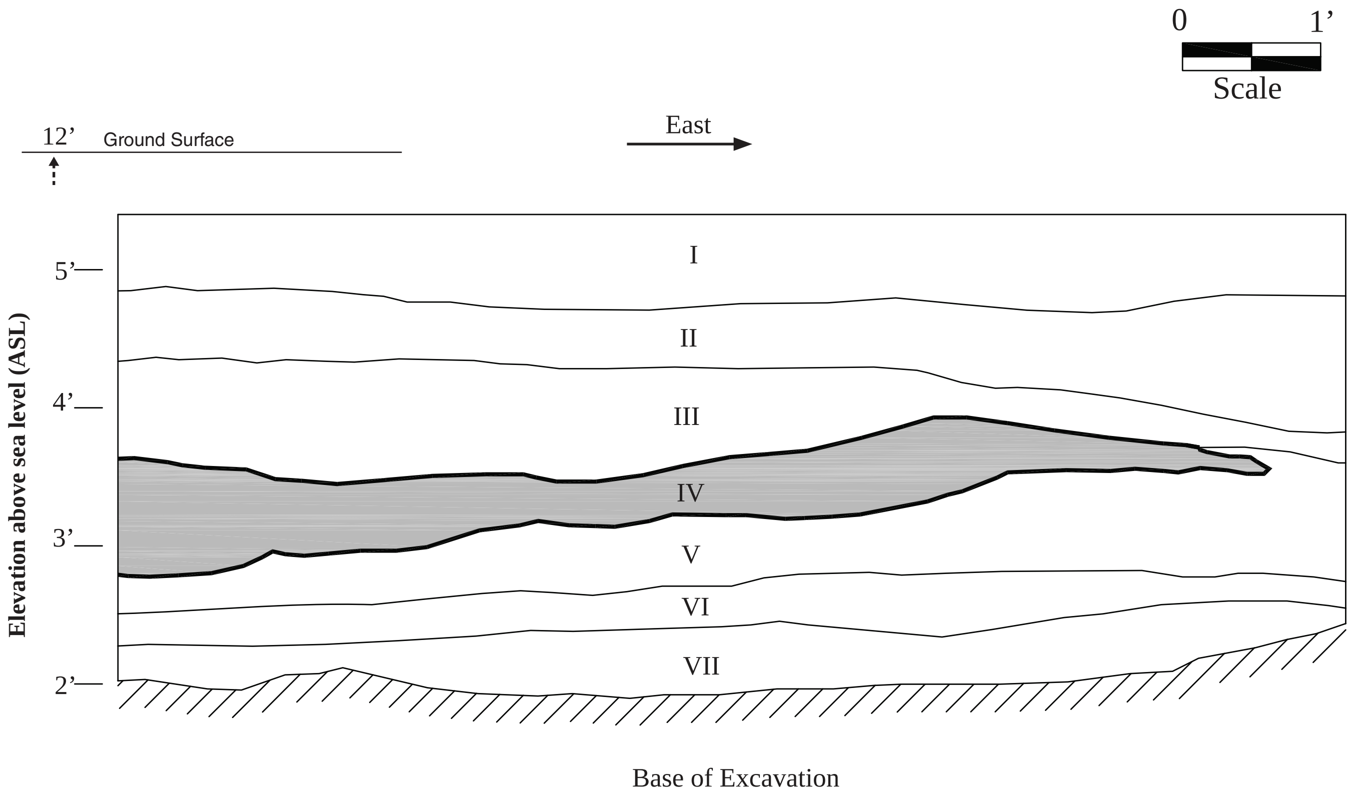
Figure 5.112



KEY	
I	Asphalt
II	Concrete
III	Mottled 7.5YR4/4 Brown Sandy Silt with 7.5YR2.5/1 Black Gravel Pockets
IV	10YR3/6 Dark Yellow Brown Brick Rubble
V	5YR4/4 Reddish Brown Sand with Rocks
VI	10YR8/4 Very Pale Brown Sand
VII	10YR2/2 Very Dark Brown Sand with Shell and Gravel

Field Drawing ID# 303: West profile of the perimeter trench showing the location of the EU 100 shell deposit

Figure 5.113



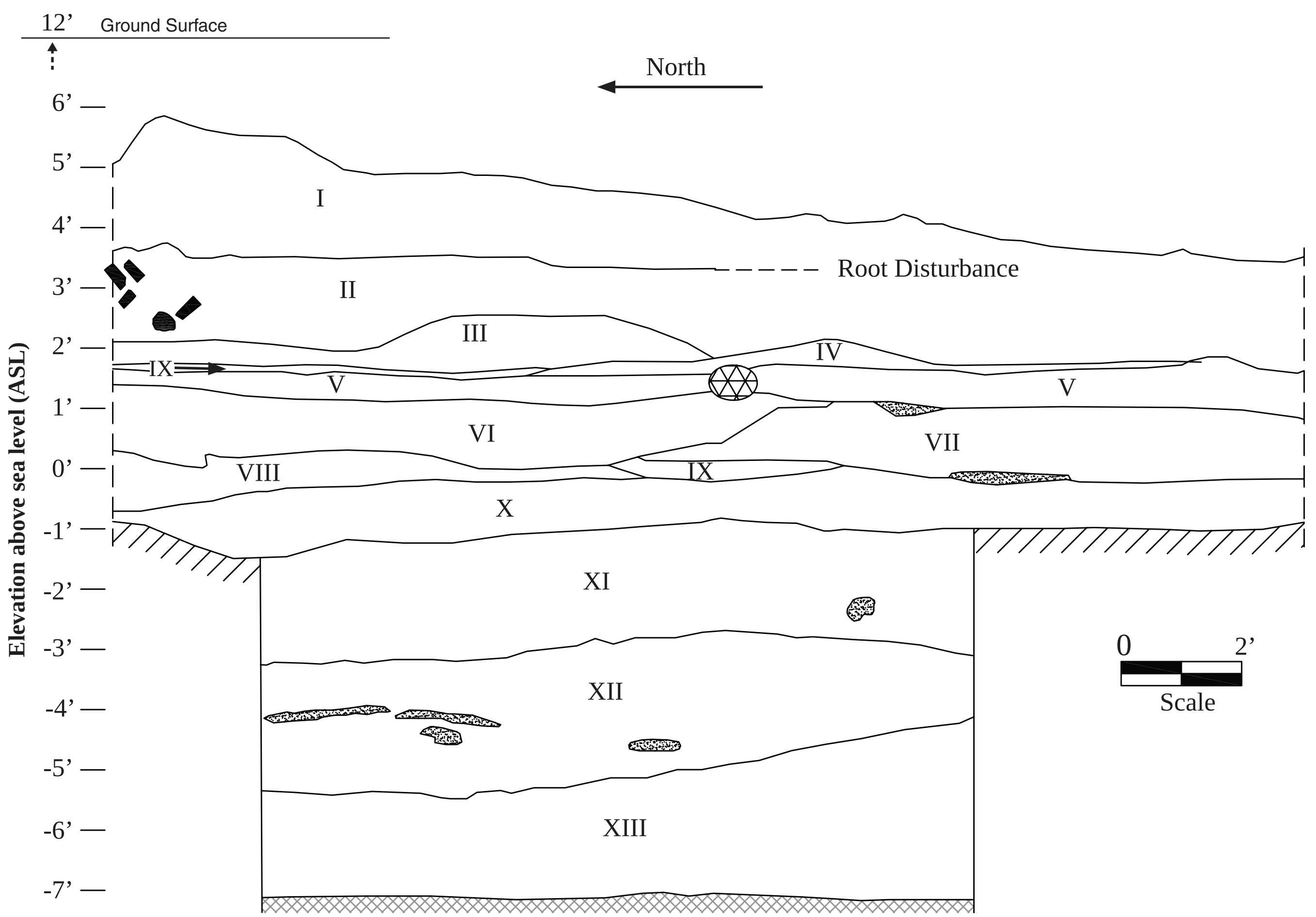
KEY

I	Concrete
II	10YR3/2 Very Dark Grayish Brown Sandy Silt
III	7.5YR4/4 Brown Sand
IV	10YR3/2 Very Dark Grayish Brown Sandy Silt with Shell
V	7.5YR4/3 Brown Sand
VI	10YR4/3 Brown Silty Sand
VII	Brick

Field Drawing ID# 167: North profile of the discharge line trench in the northern part of Peter Minuit Plaza showing the location of the EU 102 shell deposit

Figure 5.114

4.5.12



KEY

Mortar

Rodent Burrow

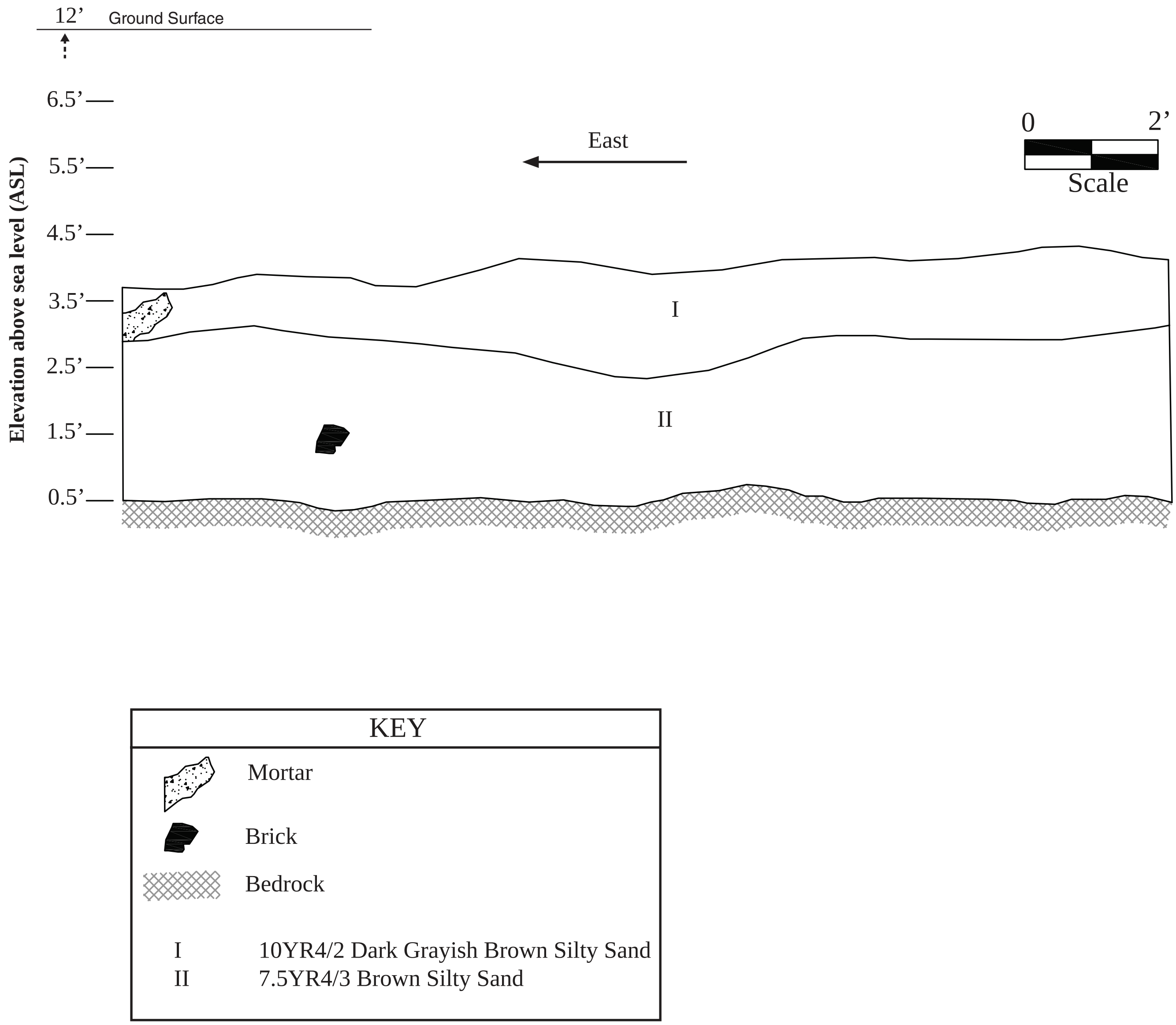
Brick

Bedrock

I	10YR3/4 Dark Yellowish Brown Silty Sand
II	10YR5/6 Yellow Brown Silty Sand with Brick and Mortar
III	10YR4/6 Dark Yellowish Brown Fine Silt
IV	7.5YR5/6 Strong Brown Sand
V	10YR4/6 Dark Yellowish Brown Fine Silt
VI	Mottled 10YR3/4 Dark Yellowish Brown Silty Sand
VII	10YR5/6 Yellowish Brown Coarse Sand with Pockets of 10YR4/3 Brown Sandy Silt
VIII	7.5YR4/6 Brown Coarse Sand
IX	10YR3/6 Dark Yellowish Brown Silty Sand
X	10YR4/6 Dark Yellowish Brown Very Fine Sandy Silt
XI	10YR4/3 Brown Fine Sand with Pocket of 5YR3/4 Dark Reddish Brown Coarse Sand
XII	10YR5/3 Brown Fine Sand with Pockets of 5YR3/4 Dark Reddish Brown Coarse Sand and 10YR5/6 Yellowish Brown Fine Sand
XIII	10YR4/6 Dark Yellowish Brown Silty Sand Fill
IX	Demolition Lens of Mortar Chunks Mixed with Surrounding Sediment

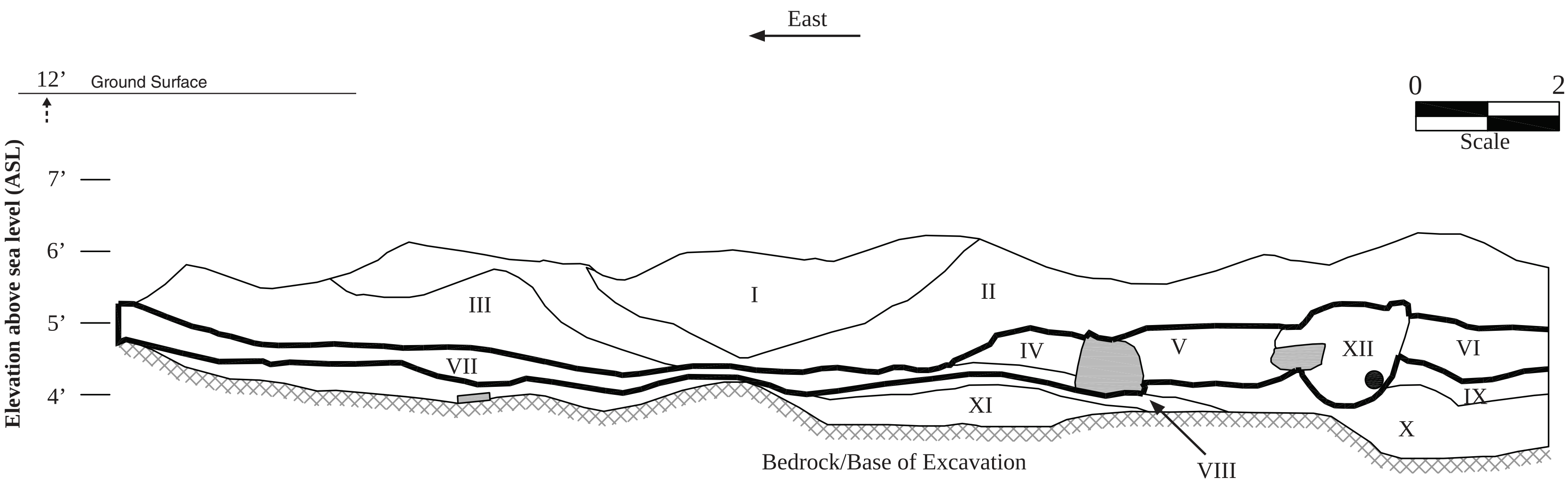
Field Drawing ID#s 108 & 92: East profile of ET 1 between Deck Beams 33 & 35

Figure 5.115



Field Drawing ID# 55: South profile of part of XT 1

Figure 5.116

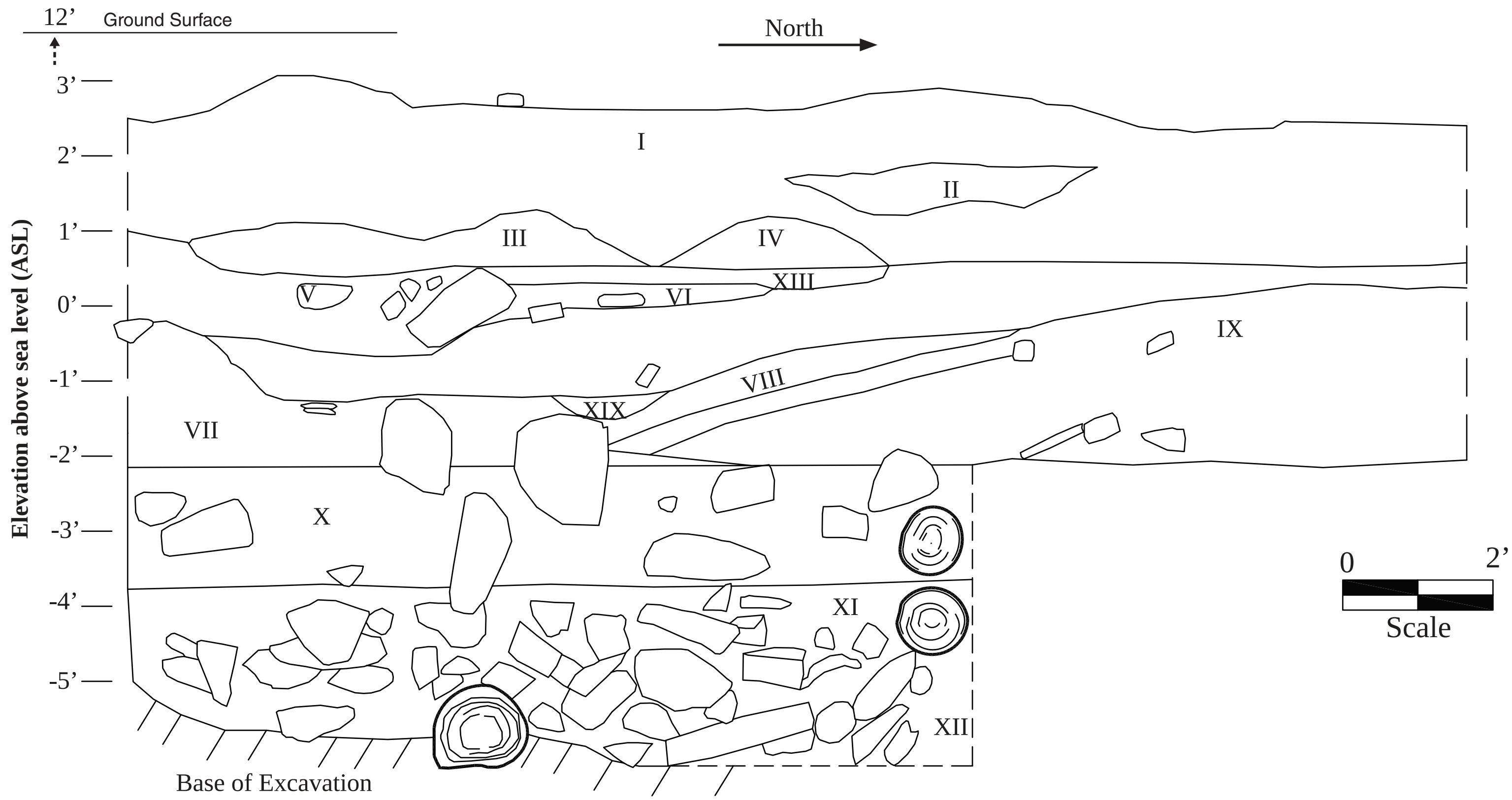


KEY

	Rock
	Pipe
I	10YR4/4 Dark Yellowish Brown Silty Sand with Mortar
II	10YR4/4 Dark Yellowish Brown Silty Sand
III	10YR4/4 Dark Yellowish Brown Silty Sand
IV	10YR3/2 Very Dark Grayish Brown Sandy Silt
V	10YR3/3 Dark Brown Sandy Silt
VI	10YR3/2 Very Dark Grayish Brown Sandy Silt
VII	10YR2/2 Very Dark Brown Sandy Silt
VIII	10YR4/4 Dark Yellowish Brown Silty Sand
IX	7.5YR4/6 Strong Brown Sand
X	10YR4/4 Dark Yellowish Brown Fine Sand
XI	10YR4/4 Dark Yellowish Brown Fine Sand
XII	Fill

Field Drawing ID# 57: South profile of part of XT 2

Figure 5.117



KEY			
◯	Log		
	Stone		
I	7.5YR4/4 Brown Sand with Cobbles	IX	10YR4/3 Brown Silty Sand with Mortar, Brick, and Stone
II	10YR4/1 Dark Gray Asphalt	X	10YR4/3 Brown Sand with Cobbles, Cut Stone, and Shist
III	10YR3/2 Very Dark Grayish Brown Asphalt	XI	2.5Y4/2 Dark Grayish Brown Sandy Silt with Cobbles,Cut Stone, and Shist
IV	7.5YR4/4 Brown Loose Sand	XII	10YR3/1 Very Dark Gray Sandy Silt with Cobbles,Cut Stone, and Shist
V	10YR5/4 Yellowish Brown Loose Sand	XIII	7.5YR4/6 Strong Brown Compact Sand, Stone, Cut Stone, Rock, Brick
VI	10YR5/4 Yellowish Brown Compacted Sand	XIX	7.5YR3/2 Dark Brown Silty Sand
VII	7.5YR4/6 Strong Brown Medium Sand		
VIII	10YR4/2 Dark Grayish Brown Silty Sand		

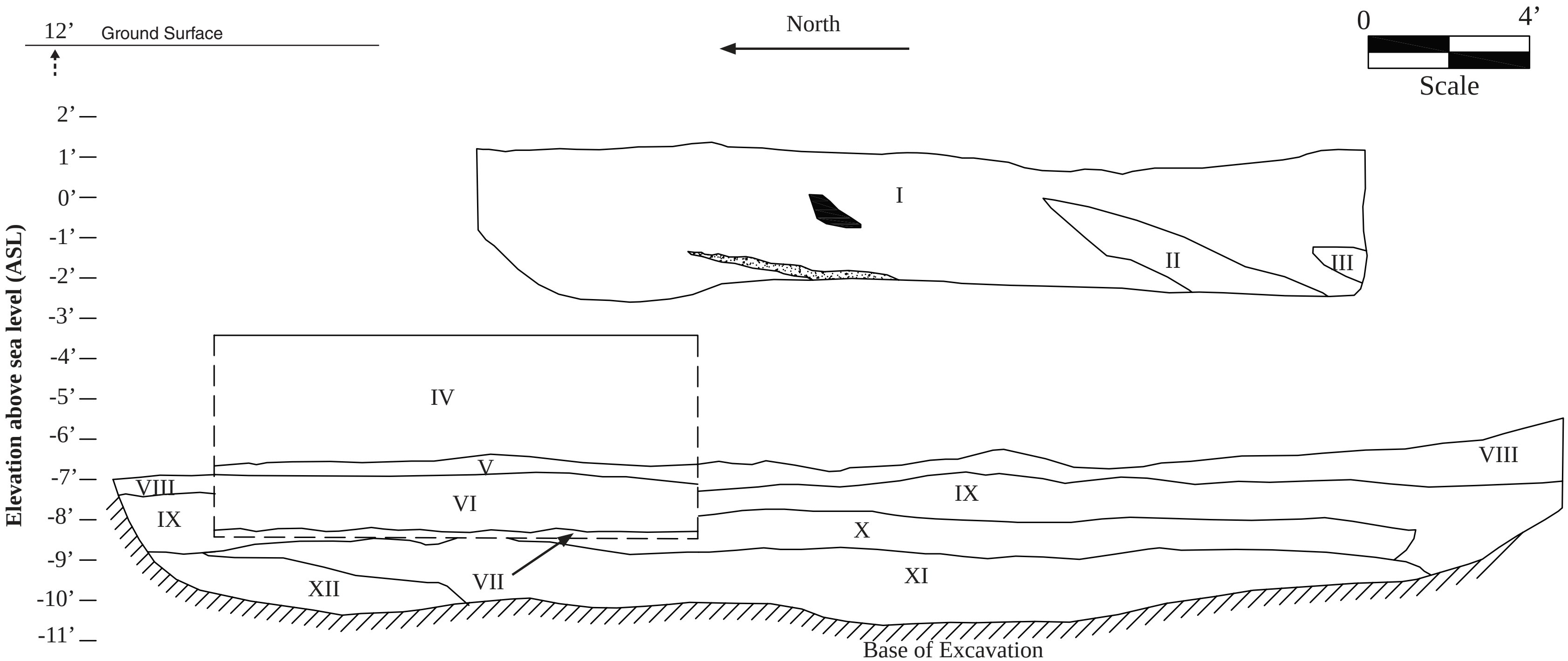
Field Drawing ID#s 126 & 360: West profile of ET 2

Figure 5.118

Photograph of XT 5 and the southern end of ET 3 after excavation of the third lift showing the proximity to Strut 108, facing east (February 24, 2006 – ID# 1552)

Figure 5.119

4.5.12

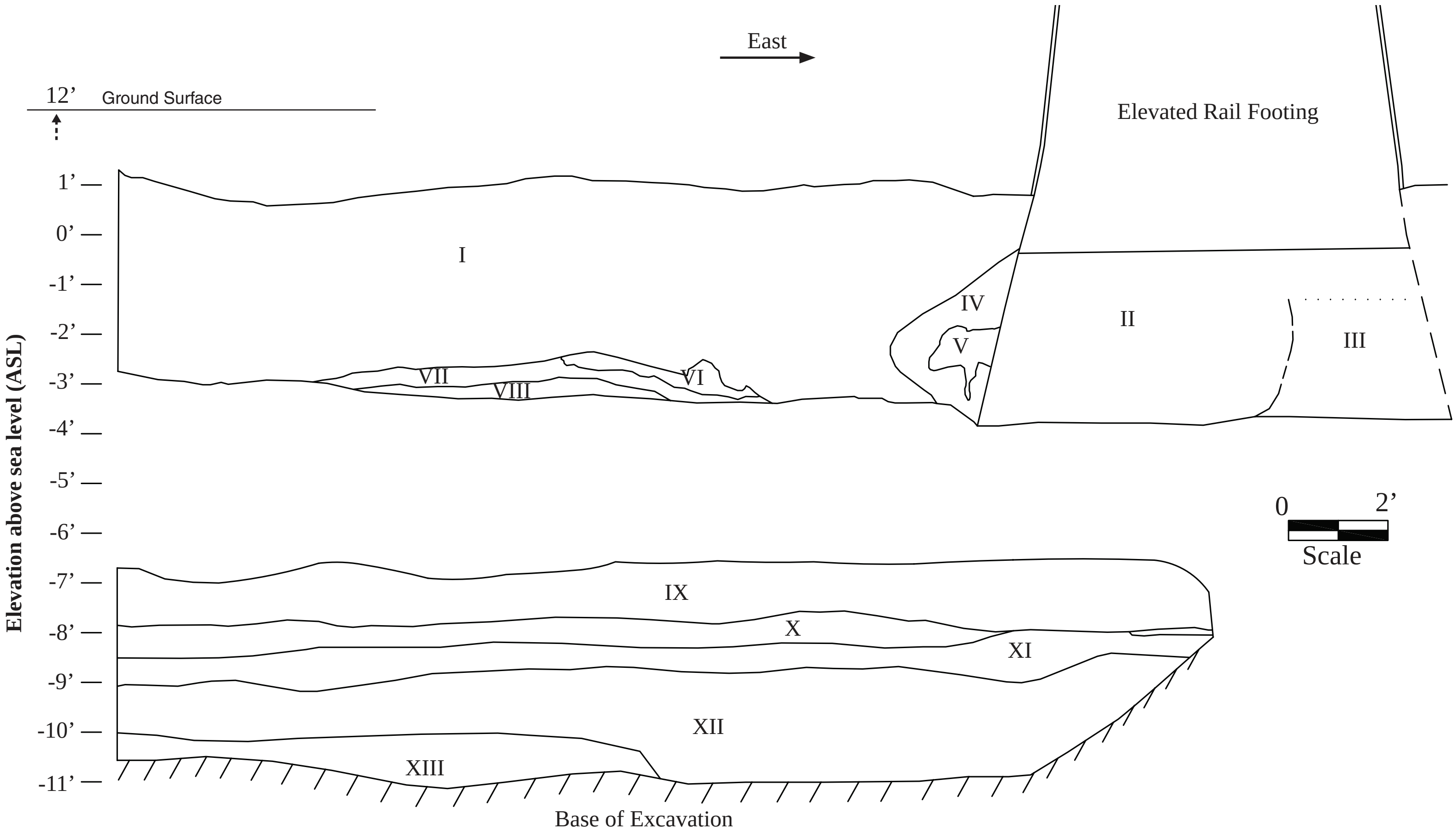


KEY

	Decayed Brick
	Brick and Mortar
I	10YR4/6 Dark Yellowish Brown Sand
II	7.5YR4/3 Brown Fine Sand
III	Silt with Brick
IV	10YR5/4 Yellowish Brown Silty Sand
V	10YR4/2 Dark Grayish Brown Silt
VI	10YR5/2 Grayish Brown Fine Sand
VII	10YR4/2 Dark Grayish Brown Silt with Some Shell
VIII	5YR3/4 Dark Reddish Brown Silt
IX	10YR4/3 Fine Sand with Fine Internal Layering
X	10YR3/1 Silty Sand with Shell and Bone
XI	2.5YR4/3 Reddish Brown Silt with Some Sand
XII	7.5YR4/2 Brown Clay with Stone

Field Drawing ID#s 48, 127 & 49: East profile of ET 3

Figure 5.120

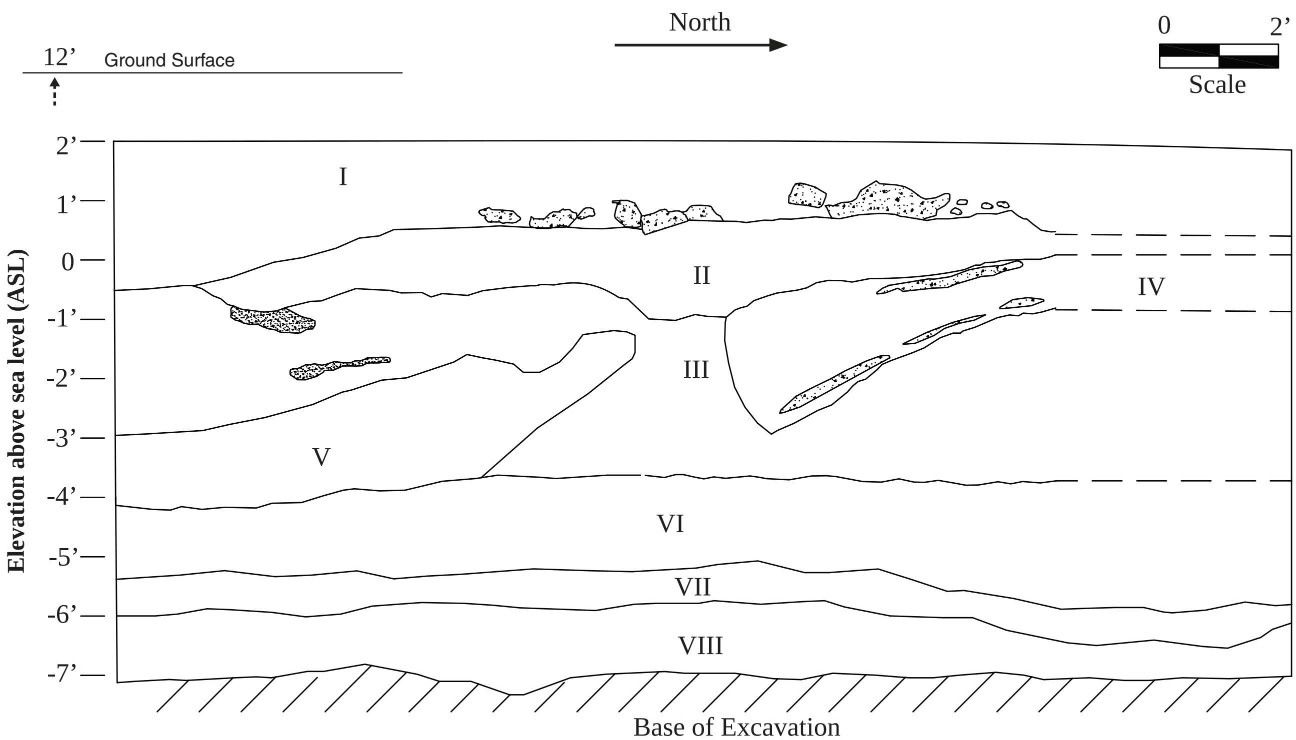


KEY			
I	10YR4/6 Dark Yellowish Brown Silty Sand	VIII	2.5Y4/2 Dark Grayish Brown Fine Silty Sand with 5YR4/4 Reddish Brown Sand
II	Mottled 10YR2/1 Black and 10YR5/1 Gray Silt	IX	5YR3/4 Dark Reddish Brown Silt
III	Unexcavated	X	2.5Y3/2 Very Dark Grayish Brown Clayey Silt
IV	10YR5/1 Gray Fine Sand	XI	10YR3/1 Very Dark Gray Silty Sand with shell
V	Gley 1 2.5/N Fine Silty Sand	XII	2.5Y4/1 Dark Gray Silty Sand
VI	2.5Y3/1 Very Dark Gray Fine Silty Sand with 2.5Y4/2 Dark Grayish Brown Fine Sand with Shell and Brick fragments	XIII	5YR4/4 Reddish Brown Silt
VII	2.5Y4/3 Olive Brown Fine Silty Sand		

Field Drawing ID#s 50, 51 & 53: North profile of XT 5

Figure 5.121

4.5.12



KEY

Mortar

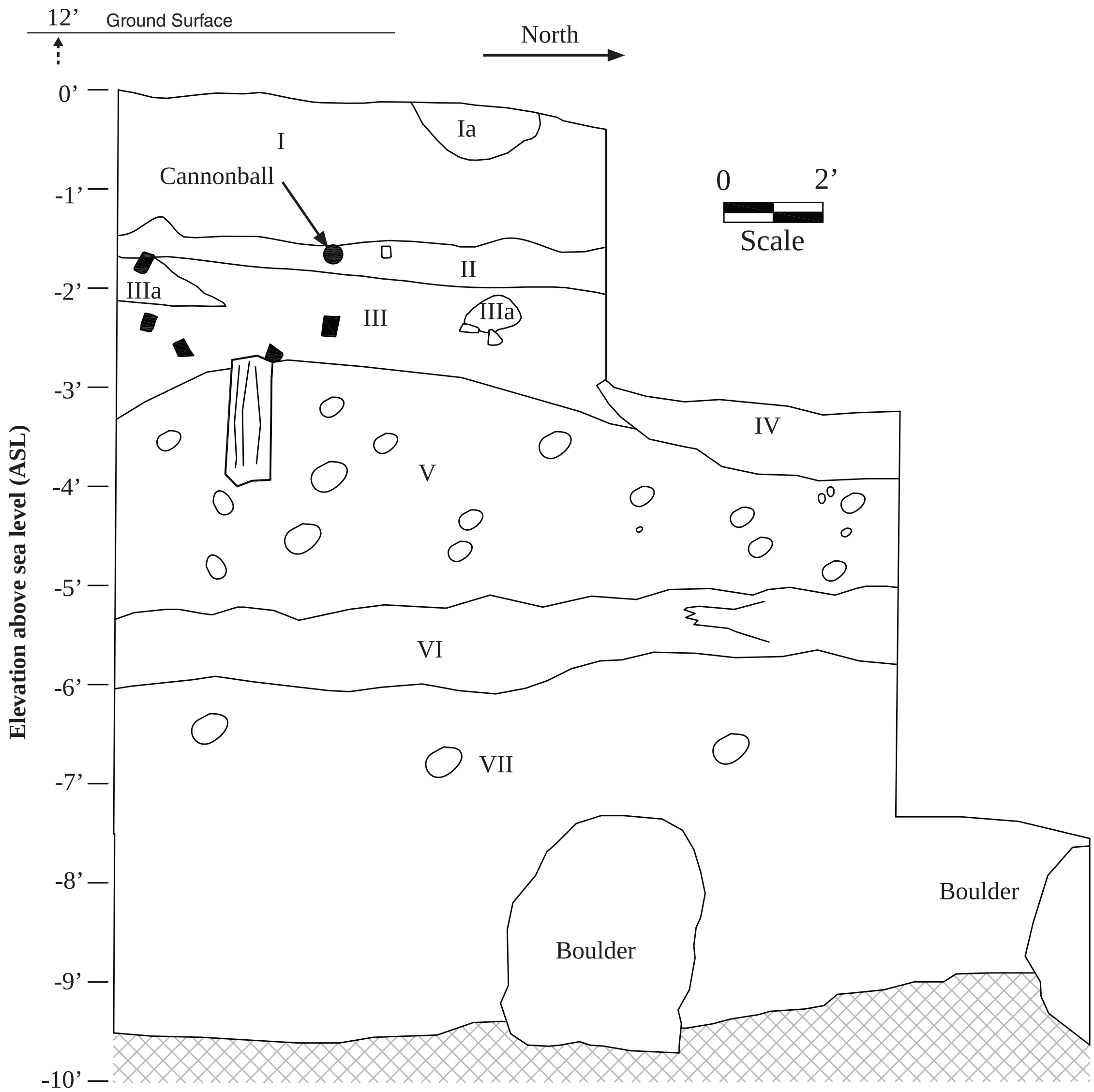
Concrete

I	10YR3/2 Very Dark Grayish Brown Silty Sand
II	5YR3/3 Dark Reddish Brown Sand
III	10YR5/3 Brown Sand
IV	10YR5/2 Grayish Brown Sand with Mortar and 10YR3/3 Dark Brown Lensing
V	10YR5/4 Yellowish Brown Sand
VI	10YR4/3 Brown Sand
VII	10YR3/3 Dark Brown Sand
VIII	10YR3/1 Very Dark Gray Clay with Cobbles

Field Drawing ID#s 115 & 116: West profile of part of ET 4

Figure 5.122

4.5.12



KEY

Cobbles

Log

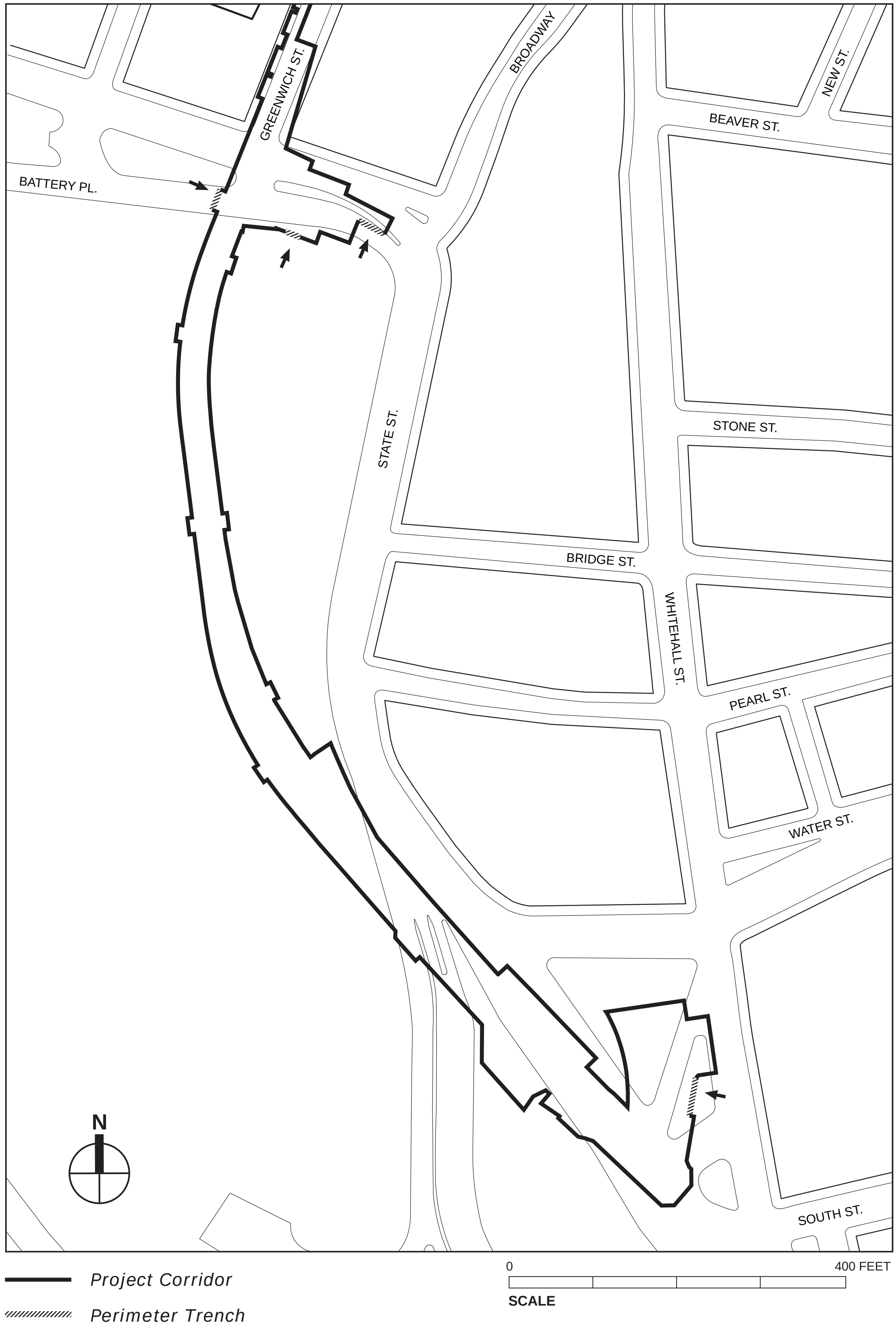
Brick

Bedrock

I	10YR4/4 Dark Yellowish Brown Silty Sand
Ia	2.5Y4/3 Olive Brown Silty Sand
II	10YR3/1 Very Dark Gray Silty Sand with High Density of Decaying Fragmented Wood
III	10YR3/1 Very Dark Gray Silty Sand
IIIa	10YR6/1 Gray Silty Sand with Ash
IV	Decomposed Wood
V	Cobbles in a Matrix of 10YR4/3 Brown Sandy Silt
VI	10YR3/1 Very Dark Gray Sandy Silt with Shell and some Decomposed Wood
VII	10YR4/1 Dark Gray Sandy Silt with Some Cobbles and Boulders

Field Drawing ID#s 227, 232 & 228: West profile of part of ET 5

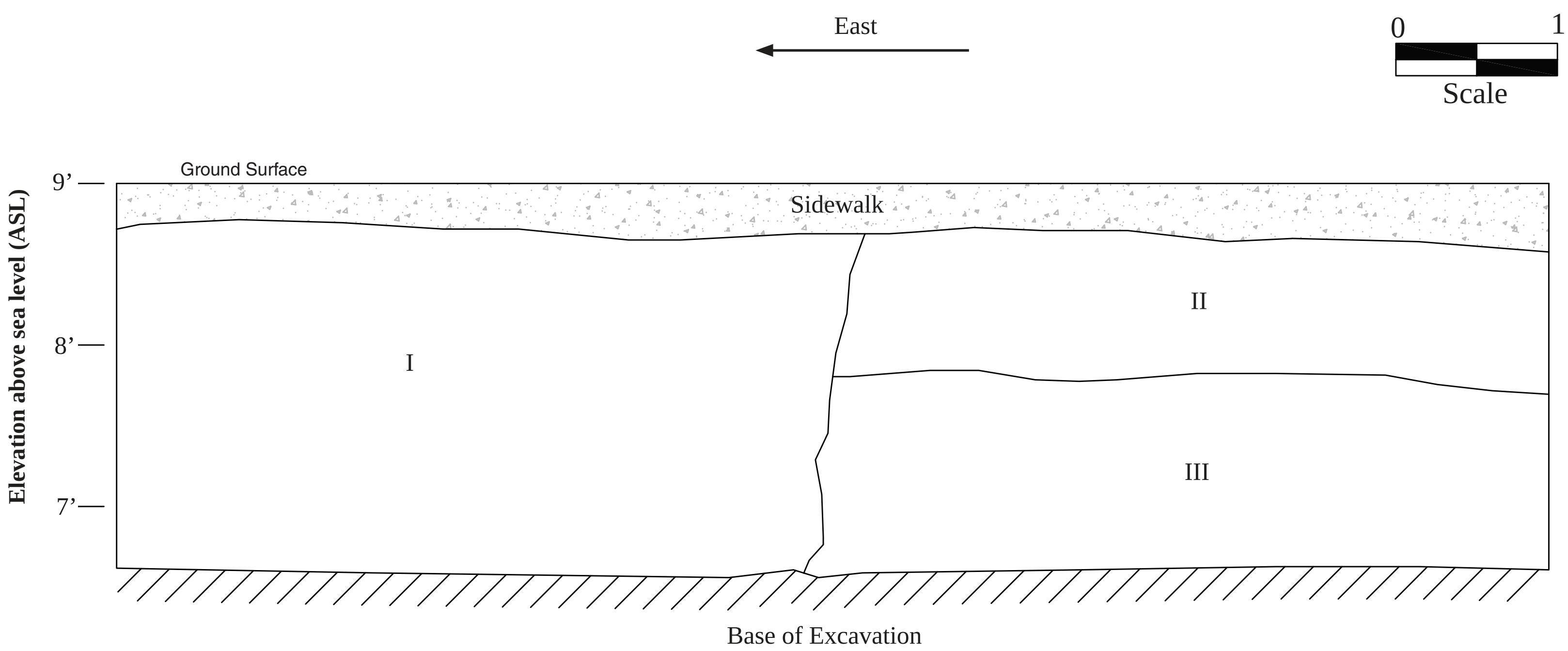
Figure 5.123



Locations of four perimeter trenches
whose stratigraphy are discussed in Chapters 5b and 5c

SOUTH FERRY

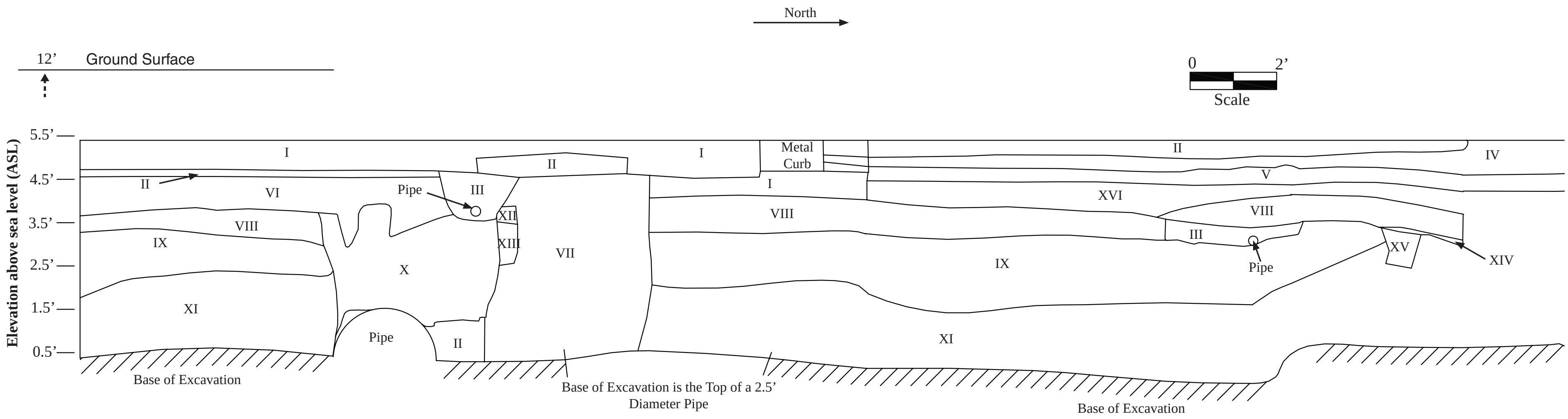
Figure 5.124



KEY

I	10YR4/3 Brown Fine Sand Fill
II	10YR3/3 Dark Brown Silty Sand Gravel
III	10YR4/4 Dark Yellowish Brown with 5Y4/4 Brown and 10YR3/2 Very Dark Grayish Brown Fine Sand

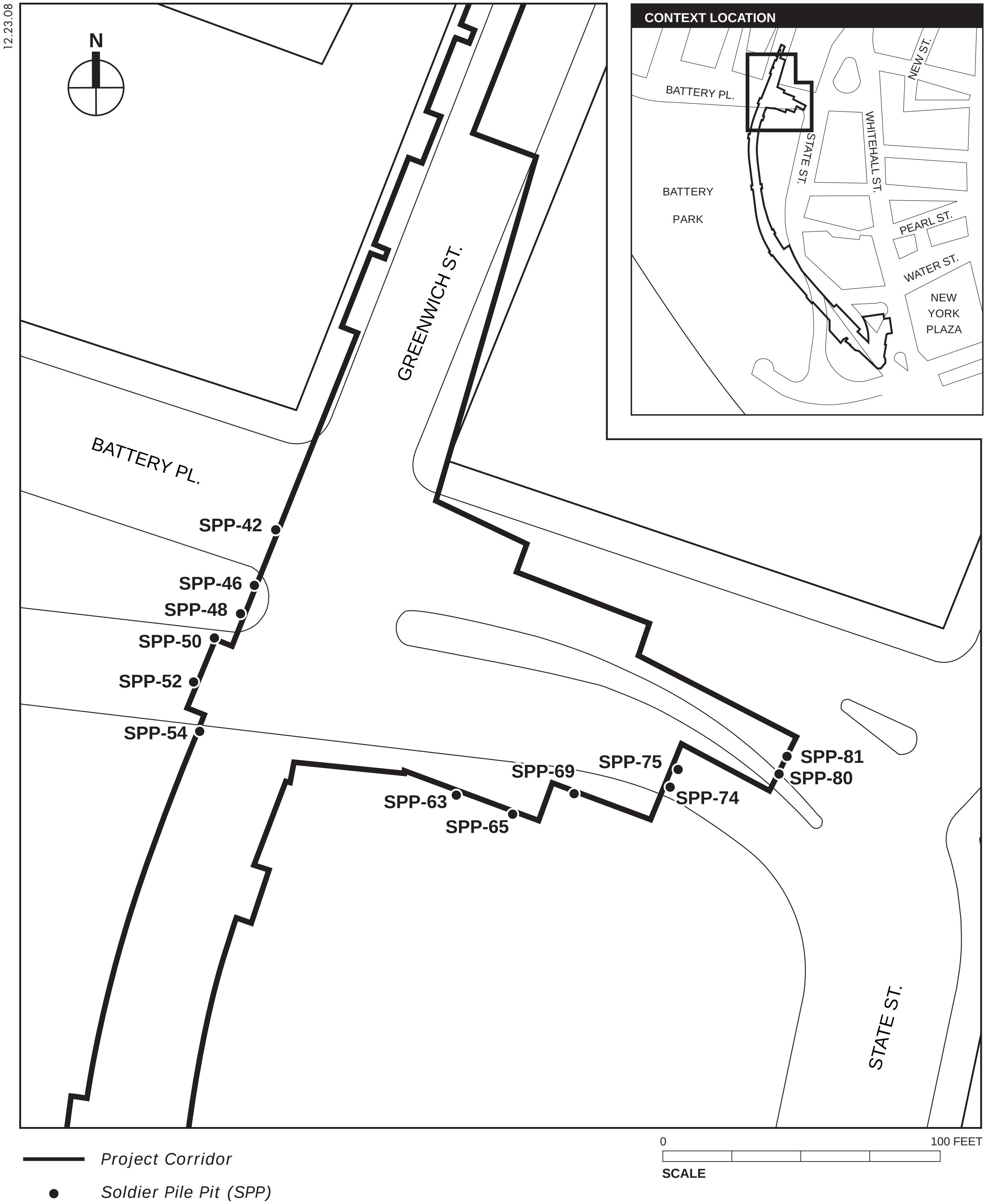
Field Drawing ID# 298: East profile of part of the Battery Place perimeter trench showing natural deposits
Figure 5.125



KEY	
I	Asphalt
II	Concrete
III	Pipe Trench Fill with Pipe
IV	Crushed Asphalt
V	Paving Block
VI	Gravel and Paving Blocks
VII	Fill
VIII	10YR3/2 Very Dark Gray Brown Sandy Silt
IX	7.5YR4/4 Brown Silty Sand
X	Pipe Trench Fill
XI	10YR3/3 Dark Brown Sandy Silt
XII	10YR3/2 Fill
XIII	7.5YR4/4 Fill
XIV	Decayed Wood
XV	Cement Block
XVI	Paving Base

Field Drawing ID#s 201 – 204: West profile of the perimeter trench in Peter Minuit Plaza between Work Points 6 & 8

Figure 5.126

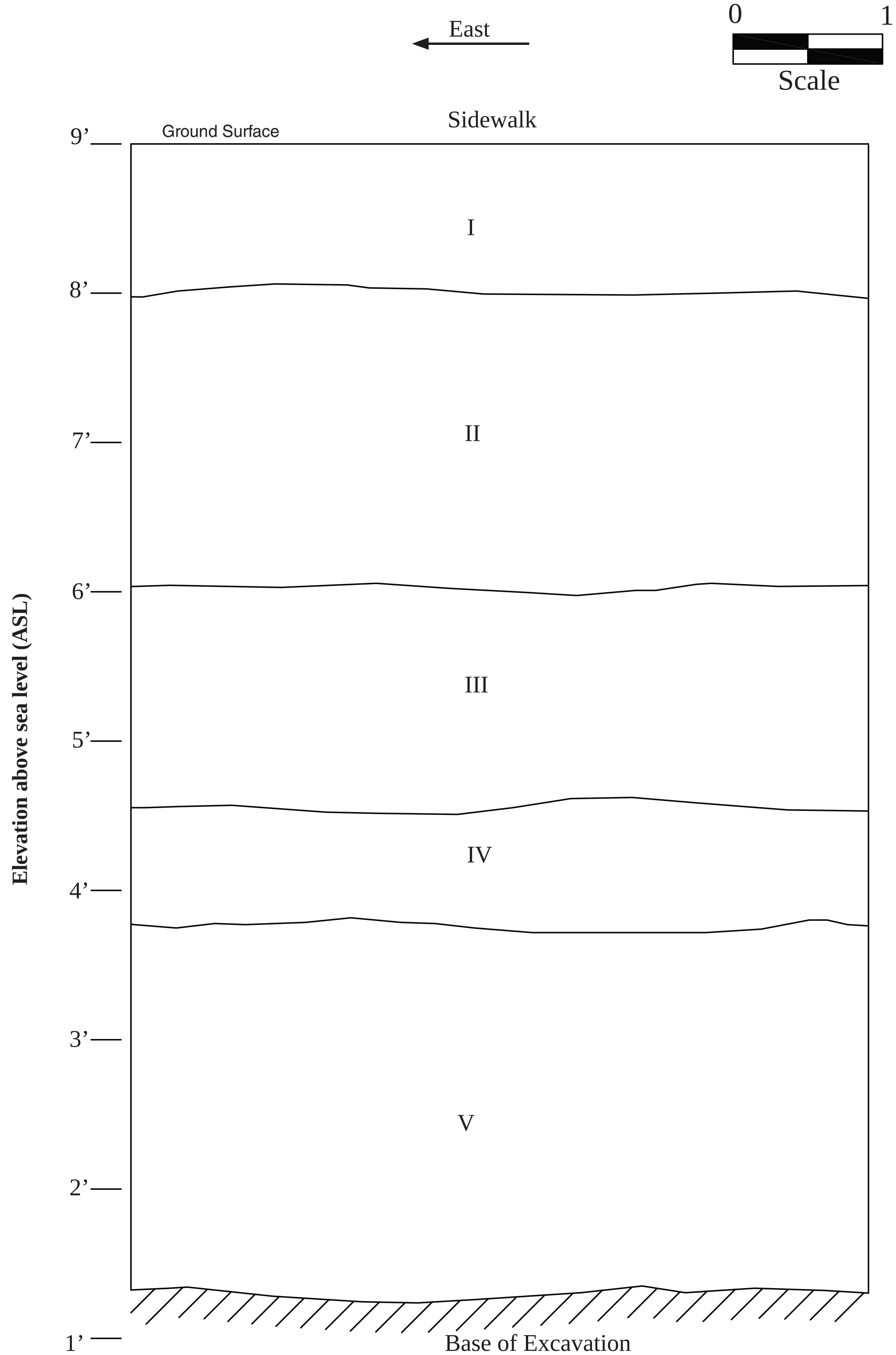


Locations of soldier pile pits in
Battery Place with similar soil profiles

SOUTH FERRY

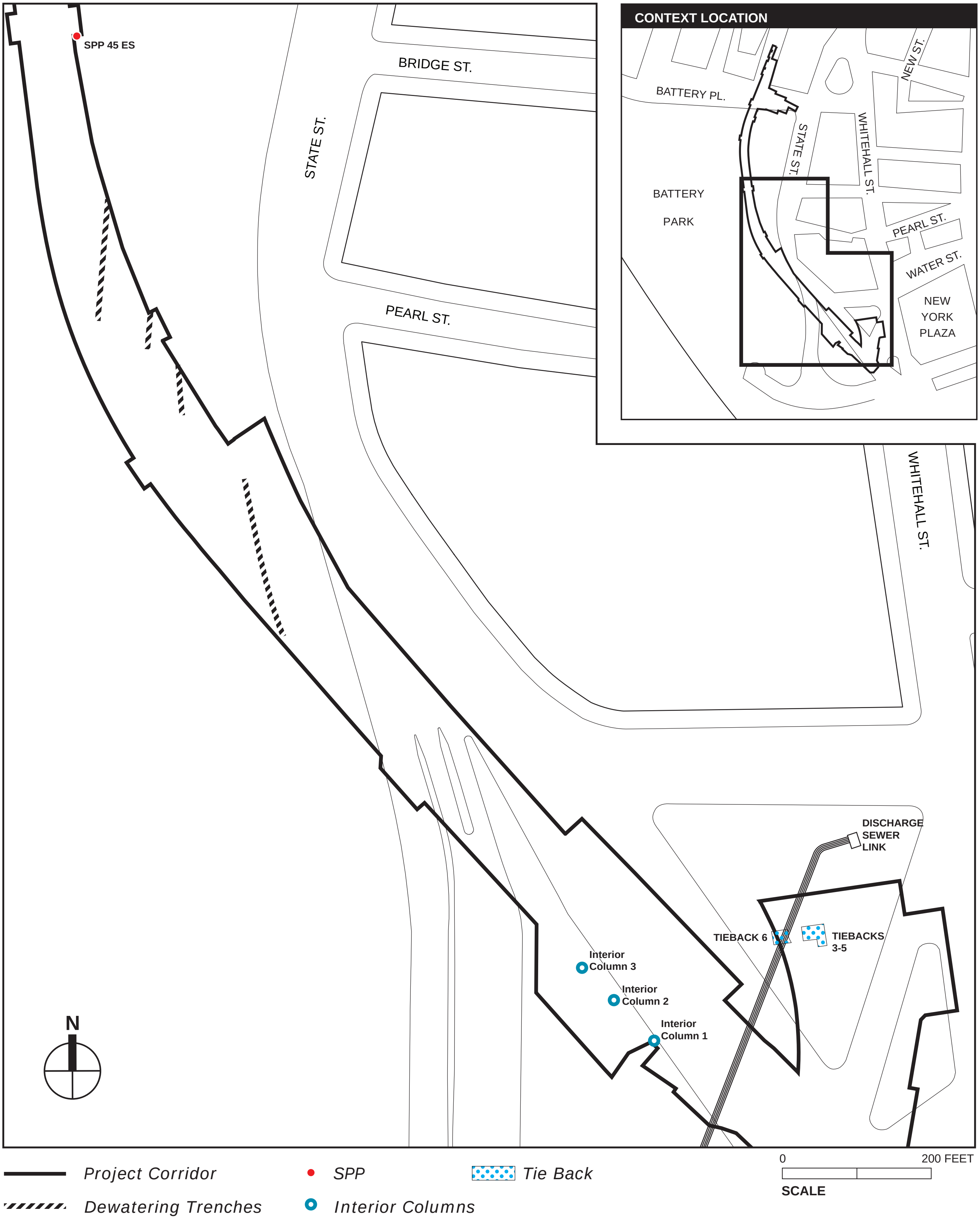
Figure 5.127

4.5.12



KEY	
I	Clean Sand
II	Stone and Shell Fill
III	10YR5/4 Yellowish Brown Fine Sandy Silt
IV	2.5Y6/2 Light Brownish Gray Silt
V	5YR4/4 Reddish Brown Fine Silt and Trace of Sand

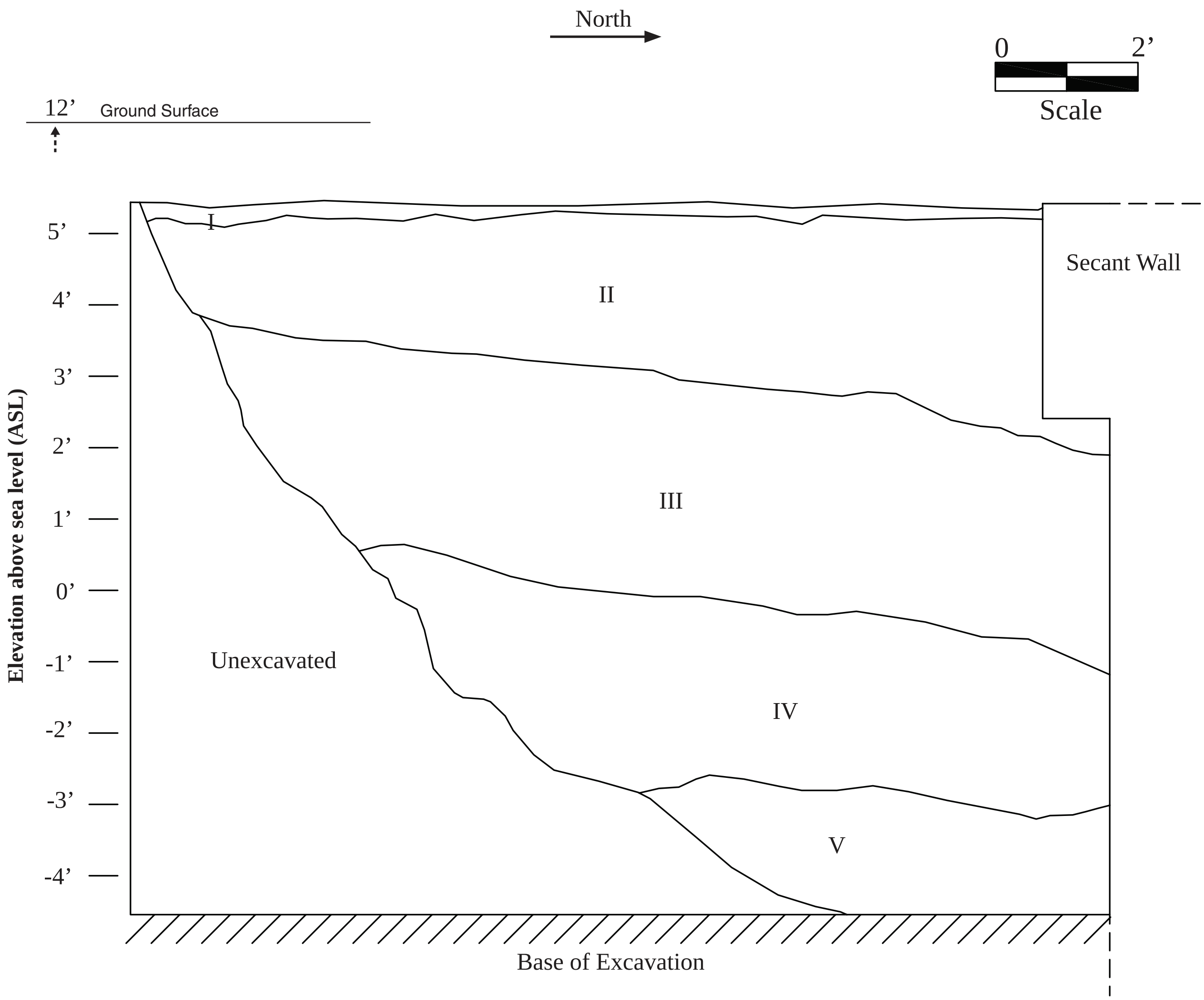
Field Drawing ID# 251:
South Profile of Girder Column Pit (GCP)-NE in Battery Place
Figure 5.128



Location of some excavations that provided stratigraphic data

Figure 5.129

4.5.12



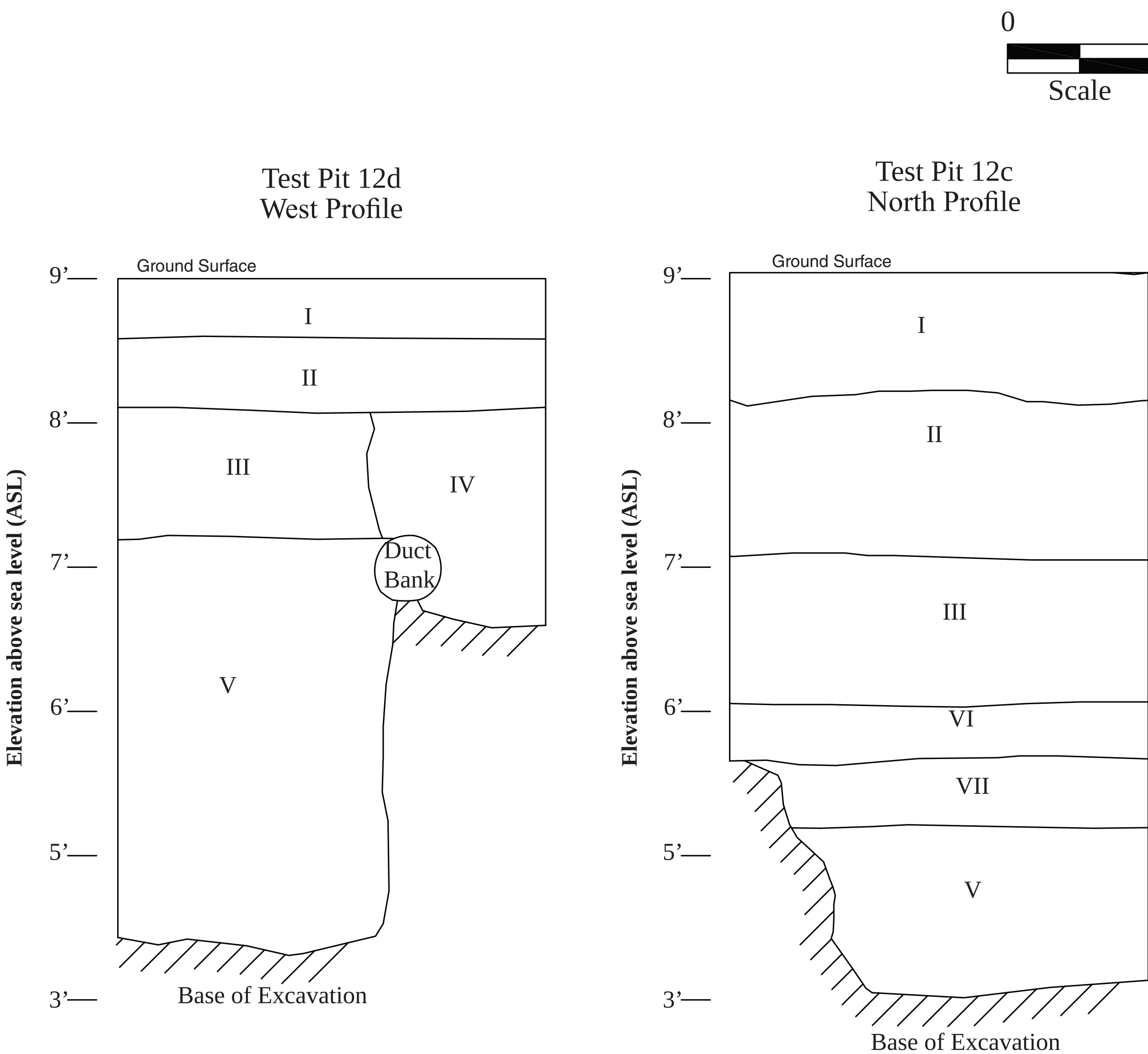
KEY

I	Gravel
II	10YR4/3 Brown Silt Sand, Modern Fill
III	10YR4/4 Dark Yellowish Brown Silty Sand
IV	10YR4/2 Dark Grayish Brown Silty Sand
V	10YR3/2 Very Dark Grayish Silty Sand

Field Drawing ID# 236: West profile of Tie-back #3

Figure 5.130

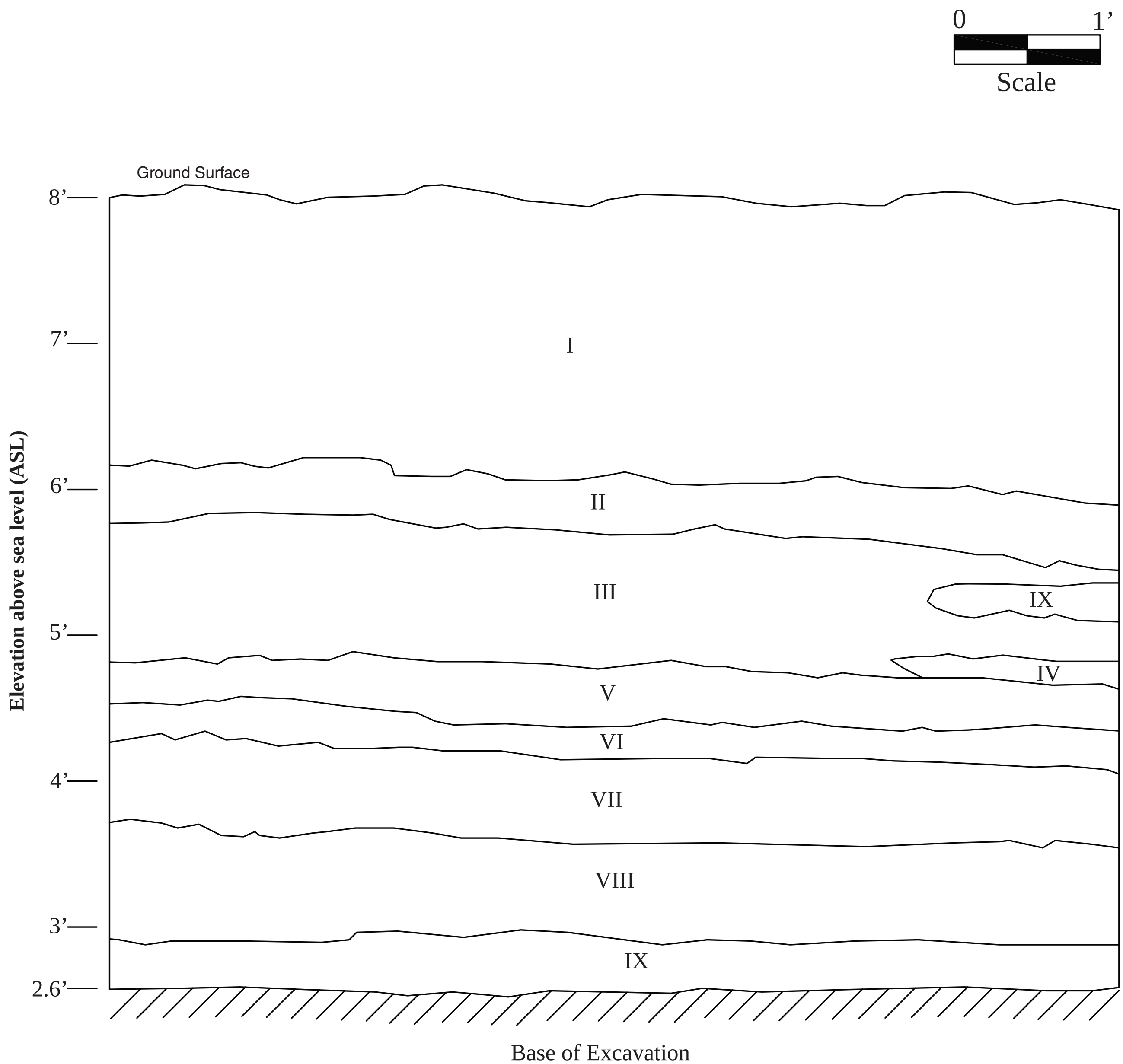
4.5.12



KEY	
I	Asphalt
II	Concrete
III	7.5YR4/3 Brown Silty Sand Fill
IV	10YR6/6 Brownish Yellow Sand Fill
V	10YR4/3 Brown Sand
VI	10YR4/2 Dark Grayish Brown Fill
VII	10YR4/4 Dark Yellowish Brown Fill

Field Drawing ID#s 253 & 254: North profile of TP 12c and west profile of TP 12d

Figure 5.131



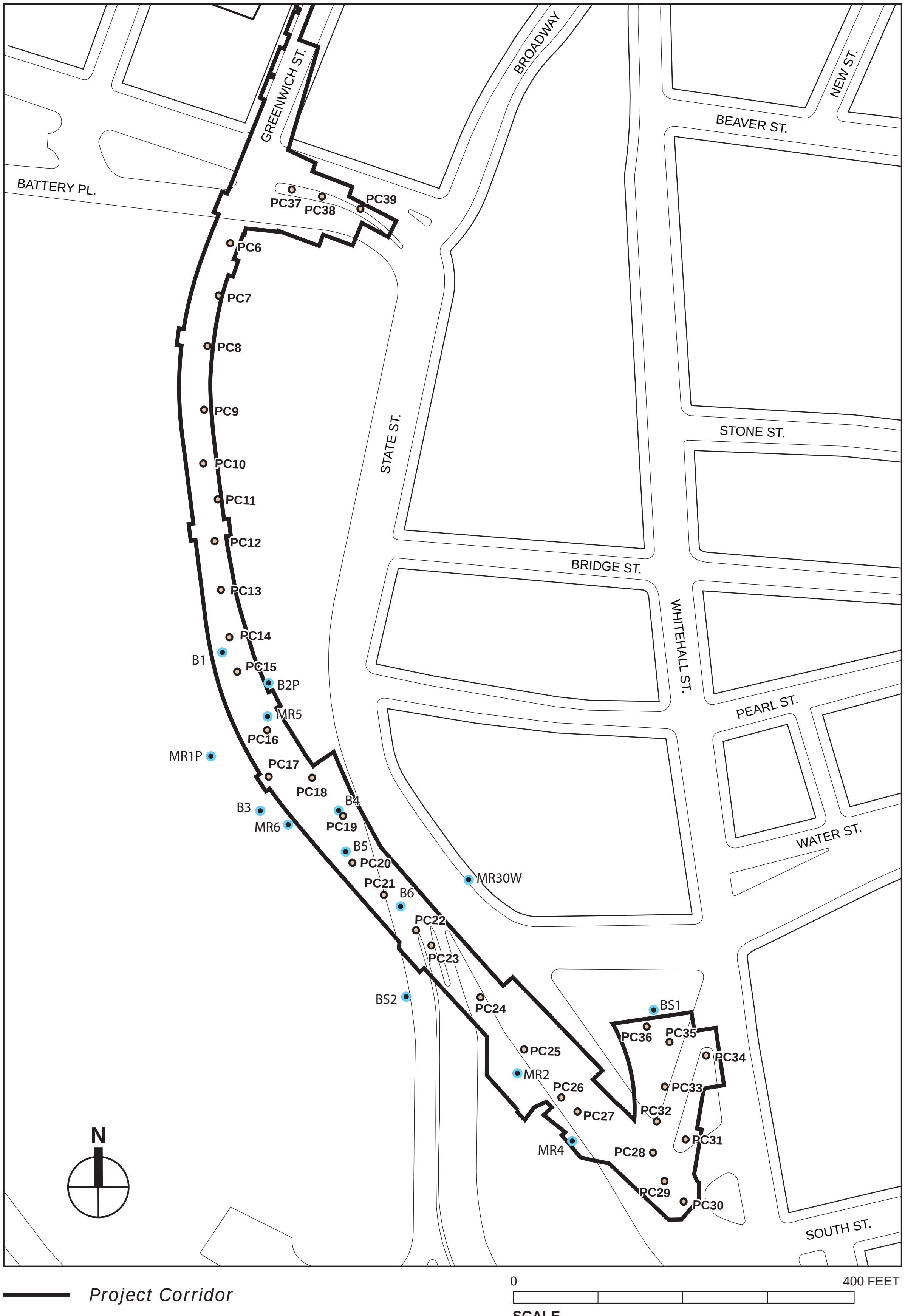
KEY	
I	10YR4/3 Brown Sandy Silt
II	10YR3/6 Dark Yellowish Brown Silty Sand
III	10YR4/2 Dark Grayish Brown Silt Sand
IV	10YR5/1 Gray Gravel
V	7.5YR5/6 Strong Brown Silty Sand
VI	10YR4/2 Dark Grayish Brown Silty Sand
VII	10YR5/6 Yellowish Brown Sandy Silt
VIII	10YR7/3 Very Pale Brown Mortar
IX	Mortar and Brick

Field Drawing ID# 212: West profile of a section of dewatering trench in Battery Park

Figure 5.132

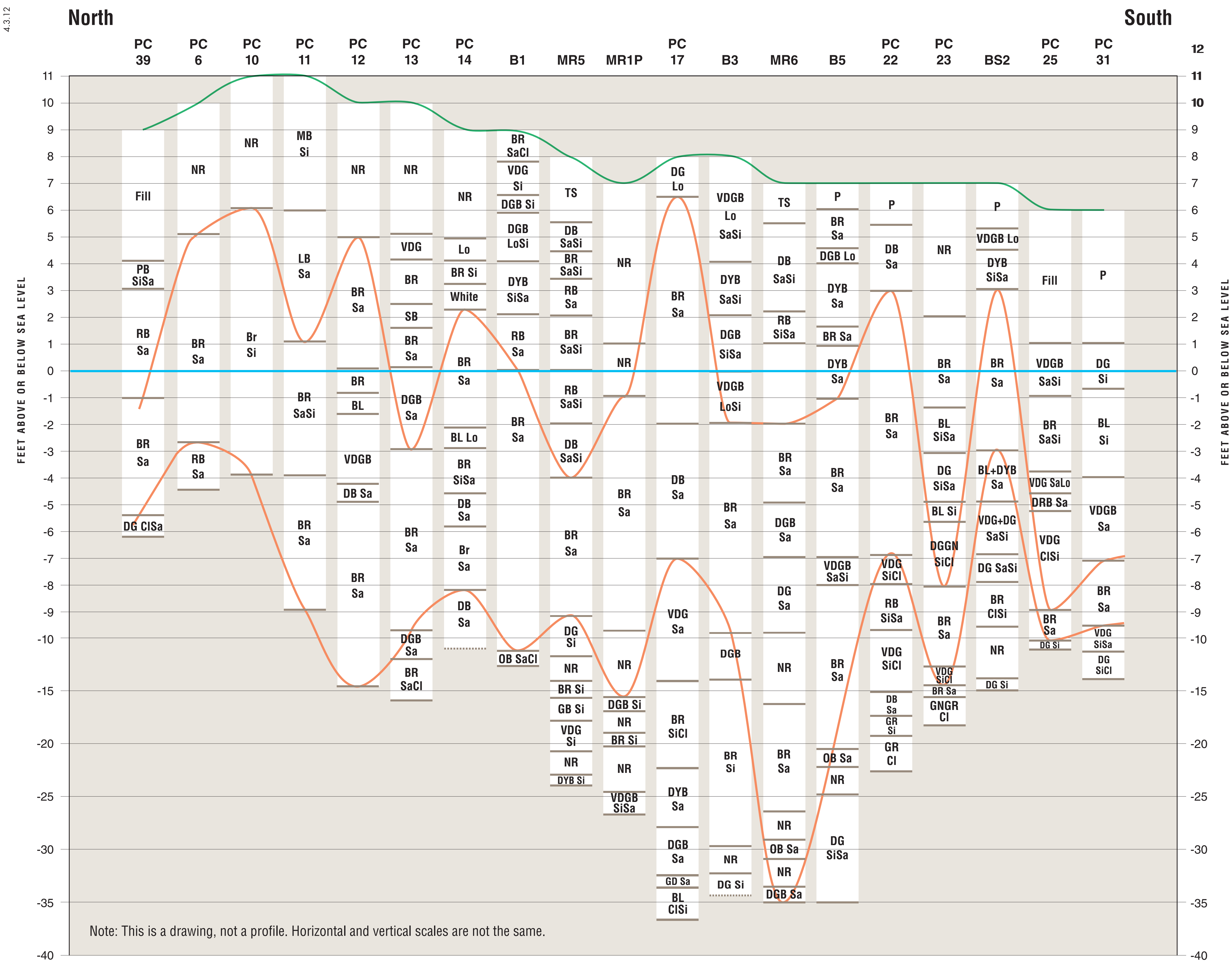
Photograph of utility trench excavation in State Street facing north (April 15, 2005 – ID# 759)

Figure 5.133



	Project Corridor
PC	*Geoprobe*
B	*Boring*
MR	*Mueser Rutledge Boring*

The locations of borings and geoprobes throughout the South Ferry Terminal project corridor
Figure 5.134



COLOR ABBREVIATIONS

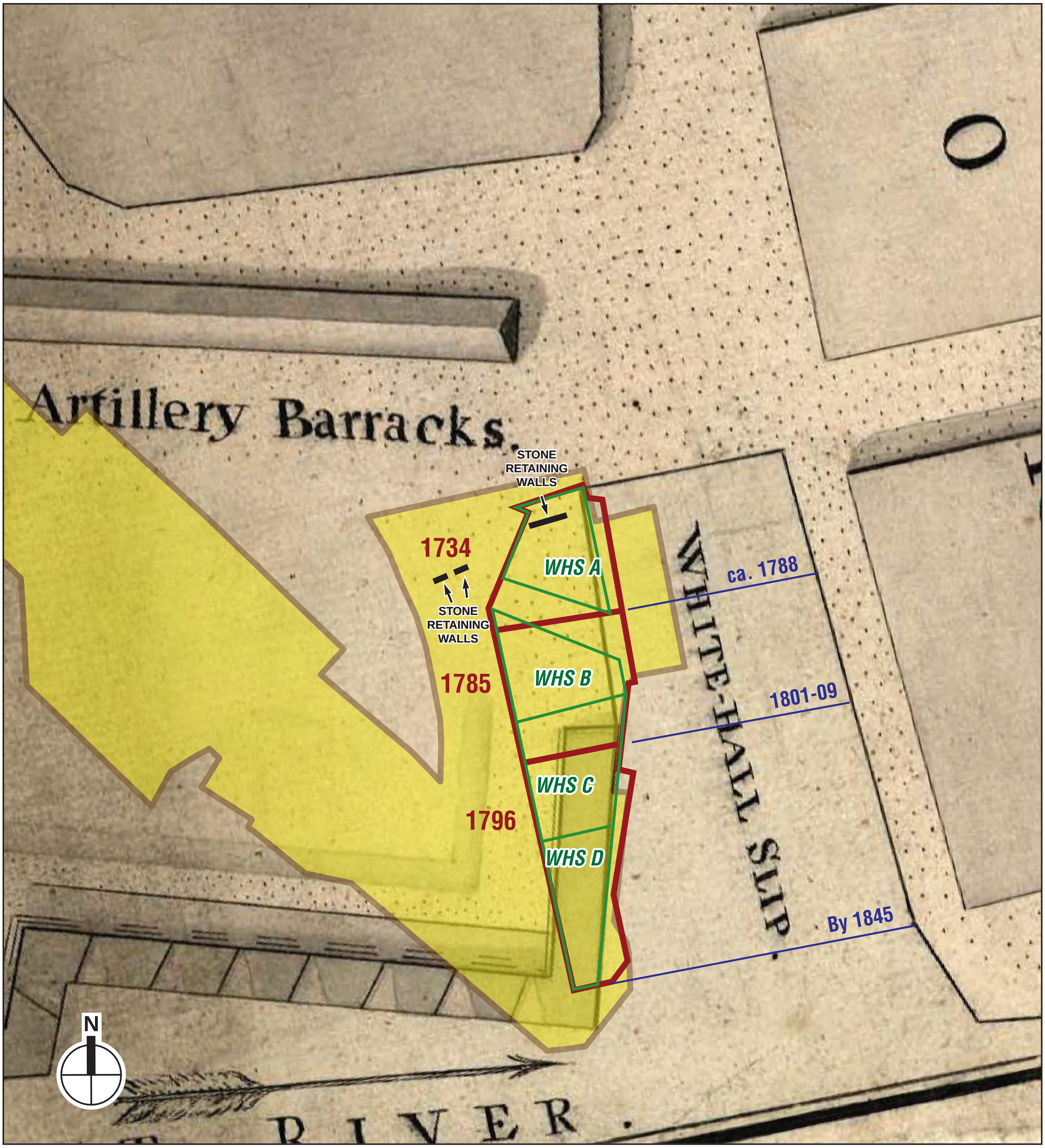
BL	Black
BR	Brown
DB	Dark Brown
DG	Dark Gray
DGB	Dark Grayish Brown
DGGN	Dark Grayish Green
DRB	Dark Reddish Brown
DYB	Dark Yellowish Brown
GB	Grayish Brown
GN	Green
GNGR	Greenish Gray
GR	Gray
LB	Light Brown
MB	Medium Brown
OB	Olive Brown
PB	Pale Brown
RB	Reddish Brown
SB	Strong Brown
VDGB	Very Dark Grayish Brown
W	White
YB	Yellowish Brown

TEXTURE ABBREVIATIONS

Cl	Clay
ClSa	Clayey Sand
ClSi	Clayey Silt
Lo	Loam
LoSi	Loamy Silt
P	Paving
Sa	Sand
SaCl	Sandy Clay
SaSi	Sandy Silt
Si	Silt
SiCl	Silty Clay
SiSa	Silty Sand
TS	Top Soil
NR	No Recovery or No Sample

Ground Surface
Sea Level
Boundary of Brown Sand

Schematic reconstructed soil profile based on data from borings and geoprobes
Figure 5.135



Project Corridor

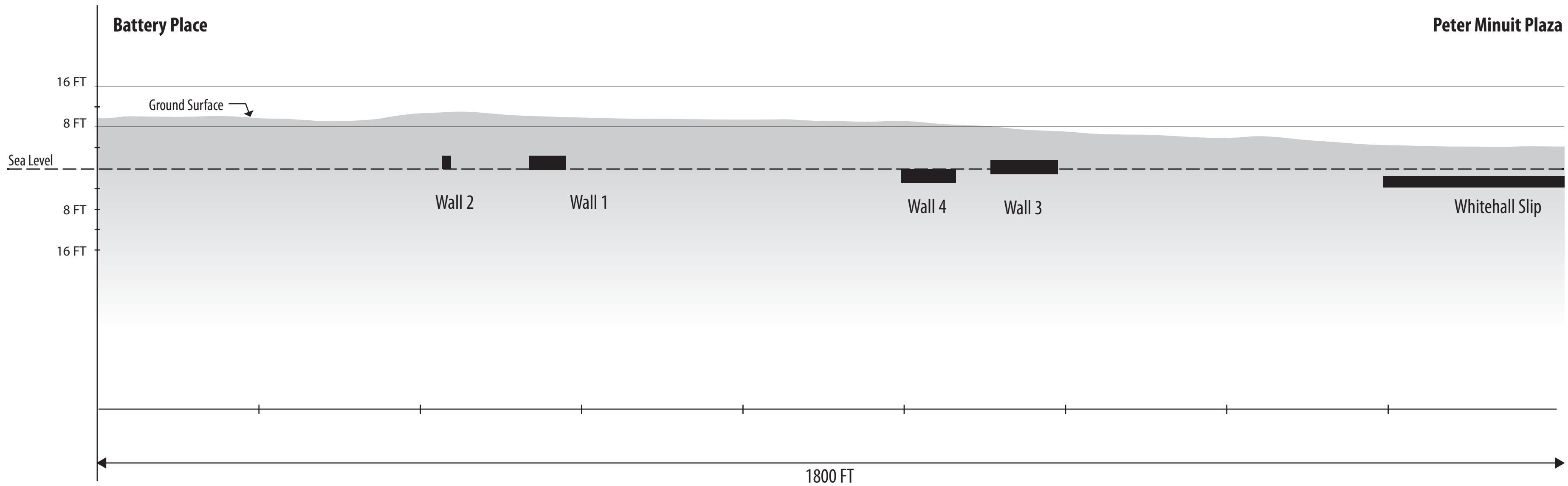
1734 Construction Date

WHS A Analytical Unit

ca. 1788 Fill Date

Part of 1782 Campbell Map with an overlay of the location of stone wall sections, Whitehall Slip AUs, Construction Cuts, and fill dates

Figure 5.136



Schematic site profile
Figure 5.137

A. INTRODUCTION

The artifacts recovered during the South Ferry Terminal excavations vary temporally and functionally; manufacturing dates range from the 17th through the 20th centuries and artifacts used in households, commercial establishments, and craft workshops are in the collection (see **Appendix A**). The artifacts and organic remains were recovered primarily from landfill deposits. As described in the previous chapters of this report, the site area was created along the shoreline by building walls and other landfill-retaining structures and filling the areas beneath, around, and above these structures with stone, soil, and refuse. Landfill deposits most frequently contain the type of refuse that archaeologists characterize as "secondary deposits," i.e., artifacts moved after they were discarded by the people who made them, used them, and threw them out. Thus, with some exceptions, these artifacts were not excavated from the places where they were used (*in situ* deposits) or originally discarded (primary deposits). The most notable exception is a primary deposit of damaged imported English ceramics found in Whitehall Slip, possibly discarded directly from the ship that brought them to New York. Part of the faunal and floral material also seems to have been primary refuse from artisans or butchers (see **Appendix D**) while a very few artifacts—for example the shovels found in the Battery Park South (BPS) area—are *in situ* refuse. In addition to the landfill deposits, some of the artifacts appear to have been deposited as sheet refuse. Sheet refuse is formed from casual or unintentional disposal of artifacts. Waterfronts have accumulated such deposits throughout history.

A characteristic of secondary refuse is the typically small size of the artifacts and the difficulty, or more usually impossibility, of mending objects between or even within contexts. Very few mends were apparent in the South Ferry assemblage, but those that were observed were noted in the Comments field of the database (see **Appendix A**). Quite a few of the artifacts were small-sized and many of the ceramic and glass sherds were too small for analysts to be able to determine the precise shapes of the vessels of which they were originally a part. For example, almost half of the British buff-bodied slipware sherds were described simply as "hollowwares" and an equal percentage of tin-glazed sherds were inventoried as "unidentified" in form.

Primary refuse, usually found in shaft features—privies, cisterns, and wells—in Lower Manhattan sites (Cantwell and Wall 2001 *passim*), is valuable to archaeologists because it yields information about specific households. Secondary deposits, unlike primary and *in situ* deposits, generally cannot be linked to specific individuals, households, or businesses, but do contain information about daily lives and cultural change on a wider scale. As noted in the report of the excavations at Seven Hanover Square (the first large-scale archaeological excavation of a New York City landfill site), landfill serves the same purpose as a village midden: it collects the garbage from a neighborhood or entire settlement (Rothschild and Pickman 1990). Individual idiosyncrasies are muted and it is possible to look at long-term trends in trade and consumer choice, among other issues. A number of landfill sites have been examined through major archaeological excavations in Lower Manhattan (Rothschild and Pickman 1990, Soil Systems

1983, Rockman et al 1983, and LBA 1987b and 1990a). Excavations of sites where private landowners were responsible for creating land from water lots have shown a considerable degree of variability in the types of artifacts used to fill in individual lots. Owners of the water lots used materials that came easily to hand from sources as close by as possible. For example, the main fish market for the city was located adjacent to the Seven Hanover Square Site and many fish heads and scales were recovered during the archaeological excavations there (Rothschild and Pickman 1990, Rothschild 1990). The South Ferry Terminal site, however, is the first archaeologically excavated site where the bulk of the landfill was created not by private individuals but by the municipality or other government institutions. The artifacts found in this fill had diverse sources, including redeposited domestic garbage, refuse from manufacturing goods or processing foods, and damaged merchandise.

B. REFUSE DISPOSAL PRACTICES AND REGULATIONS

One source of landfill available to governing institutions was garbage collected by licensed carters. The following section gives an overview of some of the published documents that detail the city's efforts to dispose of its trash as gleaned from the Minutes of the Common Council and early newspaper articles. These sources present vivid descriptions of the noisome conditions of the streets, docks, and slips of New York.

In the 1670s city officials licensed a limited number of carters or cartmen, thereby establishing them as the legitimate transporters of goods within the city. In return, the cartmen were required to perform public works that included repairing roads and carting "dirt" (an early term for trash). The New York City Common Council (NYCC) further ruled that each property owner was responsible for collecting all of their household's dirt once a week and the individual property owners were to place their dirt into the cart, as the cartman came past. The Council's minutes stated, all Persons within this Citty Are On Euery Saturday morning, when the Season of the Year And the weather will Permitt to Clean the Streetes. And Sweep the Dyrte before their houses, into heaps And Cause the Same to be Loaden And put into the Carts, weh are Apoynted to Carry Away the Same Under the Lyke Penalty (NYCC 1905 I: 137). Fines were to be levied against citizens who did not clean their property or who placed dirt in the streets on any day other than Saturday. Cartmen could be fined for refusing to cart dirt. The cleaning ordinances were published in the newspapers and reprinted at frequent intervals.

In 1731 the council passed specific laws prohibiting the dumping of animal and human excrement in the streets. The river was again named as the accepted dumping place. "Tubs of Dung, Close Stools or Pots of Ordure or Nastiness to be emptied into the river not the streets…Empty their Ordures into the River and no where else…" (NYCC 1905 IV: 102-103).

By the 1740s a group of citizens petitioned the assembly regarding the filthy conditions of the streets and slips. They also expressed concern that certain types of manufactures were allowed to continue within the city:

> …the said City has for this two or three years past, been visited with violent fevers, which not only carried off many of the inhabitants, but likewise obstructed their trade, and commerce, which it's conceived is occasioned by the filth and dirt lying in the streets and slips, in the heat of summer, together with offensive trades being carried on, and the hogs and dogs kept within the same (Stokes 1967, IV: 157).

The assembly responded in 1744 by passing "A Law to Remove and Prevent Nuisances within the City of New York." Providing a description of some of the noxious waste responsible for the odors it noted:

> The offensive smells are often occasioned, also, by the keeping of swine, the dye of hatters, the putrid materials of starch makers, the blood and garbage of small cattle killed within the city, the entrails of fish cast into the streets, and the filth and oyster-shells lying in cellars or yards of dwelling-houses (NYCC 1905 V: 118-21).

The law prohibited certain types of industries in the southern part of the city and limited the sale of certain types of meat and oysters to specific times of the year.

By the 1780s, the dumping of the city's filth into the rivers was causing unintentional infilling of the slips and docks, making it difficult for larger vessels to load and unload cargos. City officials attempted to end the dumping around slips and docks, at the same time authorizing the building of bulkheads to create new land and thus extend some of the slips out further into deeper water. Although dredging began in the area as early as 1753 (see **Chapter 4: B.7. Filling in Whitehall Slip)**, in 1791 the City purchased a dock/mud drudge, a machine to dredge the river bottom around the docks and slips, to deal directly with the problem of infilling. As described by Stokes (1967, V: 1280-1281):

> May 30 1791**:** The common council approves a report of the street committee…The same committee recommends a plan for cleansing the public slips, that it "may be effectually done and at a more reasonable rate than in any other manner by Means of a Machine called a Dock Drudge;" that "such a Machine belonging to the Corporation of Albany & lately employed for the purpose of removing the Obstructions at the Overslagh in Hudsons River near that city, is now in this City for sale and may be purchased at a reasonable rate." The board appoints a committee to examine "the Vessel or Dock Drudge," and buy it if in good condition. On June 10, the committee reported that it had bought the "Dock Drudge" for L 150, and directed its removal "to Mr. Hare's Ship yard".

Of particular interest to the current project is a request made in May 1786 for the filling of Whitehall Slip. This resulted in the following response by the Council in September of that same year:

> The Common Council finds that the health and convenience of the inhabitants require that a bulkhead be built across Whitehall Slip 80 feet farther into the river than where the old one stood and that the street be raised high enough to carry the water over the proposed new bulkhead. (NYCC 1917 VIII: 248).

Payment was made in October of 1786 for the construction of the breastwork across Whitehall Slip. On August 20, 1788, the Common Council paid for the filling in of the slip.

In 1791 the law prohibiting the disposal of dirt in the wharves and slips was revised and republished to make the public aware that more officials would be involved in the enforcement of the law.

> And the inhabitants of this city, and all others are also notified, that to prevent the filling of the public slips and wharfs of this city, by the throwing of filth and dirt therein, the law on that subject, an abstract whereof is herewith published,

> will be duly executed; and the public wharfinger, the measurers of lime, and the inspectors of firewood, are required to pay particular attention to this business, and to prosecute all offenders in the premises. *Extract from the law above alluded to viz.* And be it further ordained by the authority aforesaid, That if any person or persons shall take away any stones, earth, timber or ballast from or throw the same, or any oyster shells, ashes or other dirt whatsoever into, or keep any masts, yards, spars or other kind of timber, within any of the docks, wharfs, piers, keys or slips aforesaid every such person shall for each offence, forfeit and pay the sum of 20 shillings. (*Daily Advertiser* 6/27/1791:2).

The need to detail specific items such as timbers, ballast, shells and ashes suggests that much of the dumping was related to the shipping industry and originated from the docks and wharves.

In 1796 the newspaper the *American Minerva* published a letter from Richard Bayley to the Reverend Richard Channing Moore discussing the recent outbreaks of fever and conditions in the city. An excerpt of the letter (part of which is quoted in **Chapter 4: B. Whitehall Slip**) provides a description of the method of land filling used at Whitehall Slip:

> You may recollect that in the frequent conversations we have had on the subject of the last year's fever, I have been uniform in my opinion, as to the causes of its production, namely, the accumulation of every species of filth and perishable matter, on the low, new made grounds on the south side of the city, and the abominable custom of filling up slips and docks with similar materials; I have said that such causes, aided by a moist atmosphere and a hot sun, would not fail of producing the most baneful exhalations and that their effects must necessarily be felt by those who are more immediately exposed to their influence. The proprietors of the lots on the east side of White Hall Slip, carried out a bulk-head the last spring, with a view to extend the dock farther into the river. The dimensions of the dock are very considerable; and a maxim invariably adopted by the owners of the docks, is, that the cheapest mode of filling up is the best: accordingly carts were employed to collect such dirt and filth as all large and populous cities furnish in abundance; and with materials of this description was the dock filled up, and to give greater salubrity to the mass, there were occasionally added, dead horses, dogs, cats, hogs &c. & c.
>
> The exposure of White Hall, and indeed the whole of the west end of the city must be considered as naturally extremely healthy: The winds during the warm season, are commonly from the sea, and arrive at this part of the town uncontaminated by passing over unwholesome grounds. Yet such is the fact, that the poisonous exhalations which have abounded in that quarter during the warm weather in the beginning of this month, had so changed the air, that the inhabitants on the south side of Pearl Street, between the Old Slip and White Hall, almost all concur to their testimony, that the disagreeable effluvia has frequently obliged them, especially in the evenings, to close the windows on the south side of their houses, and in several instances gentlemen have assured us, that the offensive smell has been such as to occasion vomitings… The present exertions of the common council, in giving a new surface of wholesome earth to the dock at White-Hall will no doubt be productive of the greatest advantages to the inhabitants of that part of the city: and if the same measures were extended

> to other parts of the town there would be much less reason to apprehend a return of the dock fever. (Bayley 1796:3).

The following year, the *Minerva* published a portion of another letter by Dr. Bayley, which included calculations on the amounts of dirt and filth deposited in the dock at Whitehall Slip.

> The docks spoken of in the south eastern part of the city, which were in so loathsome a state, have been completed, and generally covered with a sufficient quantity of good earth, gravel or sand. – The grounds have been drained, or where that was not practicable, the surface has been rendered uniform, with clean earth; the vacancies under the stores which were built on piles, have been filled up in a proper manner, and the wharves have been kept free from rubbish and filth. In short, so much care and industry have been bestowed here to remove the nuisances that so generally abounded, that where a person was before almost suffocated with intolerable stenches – one may now pass, without experiencing the least offensive smell. – Let us see what has happened at the south-west part of the town. Between the White-hall and Exchange slip, a new dock has been made, running on an average 60 feet into the river; extending 458 feet in front, and 9 feet in depth. If nine square feet are calculated to be equal to a cart load, it will be found that 24,000 loads were necessary to fill up the dock, which were accumulating from July '95 to July '96. And what has been the nature of the materials employed for this purpose? It is difficult to answer the question, except in very general terms, namely, everything subject to decay and corruption. One third of the substance of this dock, may be computed to be lodged above the ordinary height of the tides; therefore, 8000 loads of these perishable materials were exposed to the action of the hot summer sun. In the month of April, of this year, I had frequent occasion to visit White Hall. The stench which already issued from the dock, was highly offensive; and on inquiry, I found that the matter which had been employed to make the new ground, consisted chiefly of the dirt which had been accumulating in the streets during the winter season; and that besides dogs, cats, hogs, &c. there had been actually two horses buried in the rubbish, which had died in the spring, in a small hovel erected on the margin of this nuisance. Reflecting on this state of things, at White Hall, and recollecting what had happened in another part of the city, under similar circumstances, I found my mind strongly impressed with the probable consequences; and was led from thence to converse with several individuals, of the corporation, on the subject. But nothing material could be done to guard against the supposed probable mischiefs. There was a contract between the proprietors of the ground and other individuals, for filling in that dock, with which the magistracy did not think themselves authorized to interfere, unless it was declared to be a nuisance on oath, or by the presentment of the grand jury. About the middle of June, the offensive smell arising from the new dock, and other nuisances in the neighborhood, were very generally observed, in that quarter of the city; and their effects were manifest in many who complained of head aches, sick stomachs, &c. & c… These are circumstances of great moment, and are entitled to serious consideration, if they are regarded only as causes which increase the malignity of diseases (Bayley 1797:2).

The dock and land mentioned in this article were not in the current project area, which did not cover the east side of Whitehall Slip, but it is probably safe to infer that similar fill was used in the parts of the slip within the project area.

New Yorkers sought to find causes for the devastating fevers that recurred during this period and formulated recommendations for their prevention. In January of 1799, a committee made up of members of the Chamber of Commerce, the Medical Society, and Commissioners of the Health Office presented their findings on the "causes of Pestilential disease" before the Common Council. Among the recommendations made in the report were:

> Heavy fines should be imposed on boatman and all other watermen, for casting the rubbish of their cargoes into any of the slips or docks, and on every inhabitant for similar offences. All water lots, ought to be filled up with wholesome earth and other solid materials to the outermost permanent line, before - of - next (NYCC 1917 II:503)

The *Daily Advertiser* published an updated version of the law regarding trash in June of 1801. The detailed listing of individual items suggests a continuation of old habits and difficulty with enforcement.

> And be it further ordained, that no person shall cast or lay in any street, lane or alley in the said city, any oysters, clams or other shell fish, shells of any kind, ashes, cinders, manure, offals, garbage, vegetables, rubbish, soil, straw, hay, litter, broken glass or earthenware, shavings, paper or dirt (except on the days above prescribed for sweeping and cleaning of the streets in the several parts of the said city above designated or for the purpose of immediate removal,)… And further that no person cast or lay any of the articles before enumerated, in any of the slips or docks in the said city, nor any human excrements either in such slip or dock, or in any street, lane or alley in the said city under the penalty of ten dollars for each offence (*Daily Advertiser* 6/2/1801:2).

These early accounts of the deposition of trash, methods of removal, and redeposit have implications for what is uncovered archaeologically. Much of the material recovered from the Whitehall Slip was probably broken elsewhere, swept up, deposited in piles, than shoveled into the dirt cart and carted to the slip for discard. While water currents and weather conditions would cause some movement of the materials and breakage, more mixing and breakage would have resulted from the repeated dredging of the slips beginning in the late-18th century.

C. ARTIFACTS AND OTHER MATERIALS

The following sections of this chapter summarize the artifact and faunal information (with the exception of tobacco pipes which are discussed separately in **Chapter 6: G. Tobacco Pipes**) by site and depositional unit (DU) for Battery Wall (Site 15768) or by site and analytical unit (AU) for Whitehall Slip (Site 15598) and the General South Ferry contexts (Site 16196). Some of the information is presented in graphic form (tables and figures) to facilitate intrasite comparisons. Given the fragmentary nature of most of the artifacts and faunal materials, these graphics are based on counts of the recovered pieces of building materials, dishes, bottles, tools, animals, etc. rather than on calculations of minimum numbers of vessels or individuals. The functional categories ("Groups") used are based on the work of Stanley South (1977). The Groups used in the present analysis are Activities, Architectural, Arms, Commercial, Electrical, Fauna (divided into Sub-Groups Shell and Bone), Flora, Fuel, Furniture, Hardware, Household, Industrial, Medical, Other, Personal, Prehistoric, Tack, Tool, Toy, Transportation, and Unknown. Information from the faunal (**Appendix D**), pollen, phytolith, and floral (**Appendix E**), mortar (**Appendix G**), and dendrochronological (**Appendix H**) analyses is incorporated into this chapter. The artifact inventory itself is **Appendix A**. **Table A-1** in Appendix A presents total numbers of artifacts and faunal and floral materials by AU.

The artifact assemblages from the three sites within the project area all contain large amounts of Architectural Group materials (27.6 percent of all artifacts and organic materials recovered). Architectural materials—bricks, window glass, roof and wall tiles, nails, mortar, plaster, etc.—can come from either destruction rubble or construction debris. It can be difficult to distinguish between the two unless there are obvious markers of each activity. For example, bricks and tiles from destruction debris will often have mortar still attached to their surfaces; construction debris often includes cut narrow pieces of window glass that are the result of trimming sheets of glass to fit individual panes. However, bricks without mortar, worked pieces of wood, broken pieces of window glass, short sections of window leads, and amorphous lumps of mortar or plaster could be the detritus of building activities or the remnants of demolished buildings. Destruction rubble has been a common component of all the major landfill sites in Lower Manhattan. It made up a large part of even the earliest (circa 1690 to 1692) landfill, as recovered at the Seven Hanover Square site (Rothschild and Pickman 1990). Construction debris has been found in mid-18th century contexts at the 175 Water Street site in the form of window glass trimming pieces and crown glass bull's eyes.

The most common type of object recovered during the current excavations was shell (28.2 percent by count[1] of all artifacts and organic materials), with oyster (*Crassostrea virginica*) the most abundant (almost 60 percent by count and 86 percent by weight of all types of shell) (see **Figure 6.1A**). Until the early-20th century, the waters around Manhattan were famous for the quality and quantity of their oysters. As a Dutch writer noted in the 1650s:

> Oysters are very plenty in many places. Some of these are like the Colchester oysters, and are fit to be eaten raw; others are very large, wherein pearls are frequently found, but as they [the pearls] are of a brownish colour, they are not valuable. The large oysters are proper for roasting and stewing. Each of these will fill a spoon [a tablespoon], and make a good bite. I have seen many in the shell a foot long, and broad in proportion (Van der Donck 1968: 56).

A mid-18th century visitor to New York, the Swedish naturalist Pehr Kalm, observed that New Yorkers used rakes to pull oysters up from their beds (Kalm 1987:126). In addition to immediate consumption in the city, oysters were pickled, potted, and sent to the West Indies or were fried in butter then covered with butter and potted like the pickled variety. Although New Yorkers told Kalm that oysters were best in months with an "r" in the name, some poor people reportedly lived all year long on oysters and bread alone. Oysters were abundant, although elderly people told Kalm that quantities were not as great as they had been in earlier times. Even so, oystering as an occupation flourished throughout the 18th and 19th centuries.

The next most common shellfish recovered were clams, both hard shell *Mercenaria mercenaria*—also called quahogs—(12.5 percent by count of all shell) and soft shell *Mya arenaria* (9.5 percent by count) (**Figures 6.1B** and **6.2A**). Both types prefer sandy or muddy

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[1] The shell counts given in this chapter are based, for the most part, on the numbers of hinge pieces present (see **Chapter 2:D. Post-Field Laboratory Methods**).

intertidal or subtidal flats. Quahogs, like oysters, can be gathered using rakes or can be treaded out or dug; soft-shell clams are usually dug. Kalm noted that New Yorkers ate clams baked in their shells, stewed in butter, boiled in chowders, or served on a platter with steak (Kalm 1987:154), although he did not specify if these were quahogs or soft-shell clams.

The Shell Group also includes many non-food species, in particular mud whelks (*Ilynassa obsoleta*) (**Figure 6.2B**), which make up 9 percent of the shell by count. These marine snails are scavengers found along the shoreline or in shallow water. Some were probably scooped up as inclusions in dredged soils used in the landfill and it is possible that some oysters and clams were similarly living atop or in such soils, and thus might not have been consumed. No intact buried oyster beds were reportedly encountered during excavations; a field observation supported by the absence of paired shells and the presence of opening marks on many oysters (see **Table A-2** in **Appendix A**). Beds of soft shell clams were noted, however, in several areas with sandy soil (see **Chapter 5: A.4.b. Trenches, C.4.d. Shell Contexts, and Appendix N**).

The Household Group was the third most common with almost 15 percent of all artifacts and organic materials. The majority of these artifacts consists of ceramic and glass sherds with manufacturing dates ranging from the 17th through the 20th centuries. Manufacturing date ranges for ceramic ware types are depicted here in graphic form as percent contribution probabilities, e.g., **Table 6-1**. The method used to create this analysis, a refinement of the mean ceramic date formula developed by Stanley South (1977), is found in Bartovics (1982). The Percent Contribution chart indicates the probability of a randomly selected sherd from a particular provenience being manufactured in a given year.

The formula used is:

$P=S/(N*D)$

Where P = probability contribution for one year

N = total number of datable sherds in the provenience

S = number of sherds of the ware type

D = range of manufacture in years

P is determined for each ware type with a unique date range (for example, 1744 to 1775 for scratch-blue decorated white salt-glazed stoneware). The value is then entered into each year of manufacture for that ware type. Each year's Cumulative Probability is determined by adding all the values of P for each ware type manufactured in that year. This Cumulative percentage value is then graphed for the range of years.

Example: using a simple ten sherd collection (showing only five years)

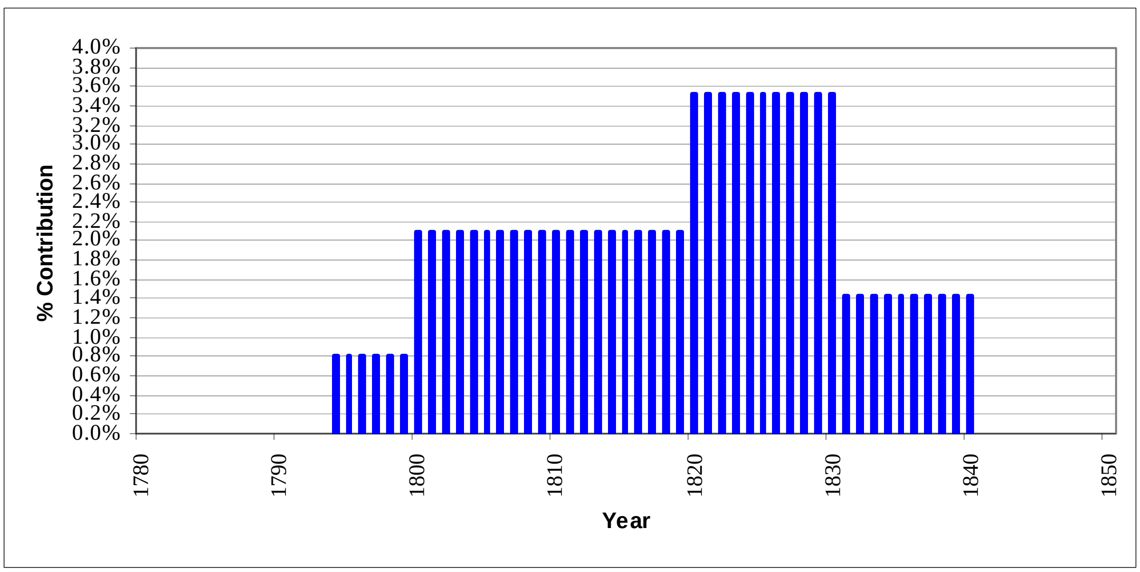
Ware	Total	Begin Date	End Date	Range	Percent	1797	1798	1799	1800	1801
Pearlware, Plain	3	1794	1830	37	0.8108%	0.8108%	0.8108%	0.8108%	0.8108%	0.8108%
Pearlware, Painted	4	1800	1830	31	1.2903%	0.0000%	0.0000%	0.0000%	1.2903%	1.2903%
Pearlware, Shell Edge	3	1820	1840	21	1.4286%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
	10					0.8108%	0.8108%	0.8108%	2.1011%	2.1011%

The graph below shows a cumulative chance of 100 percent for 1794 to 1840, 96 percent for 1800 to 1840, 82 percent for 1800 to 1830, and 39 percent for 1820 to 1830.

For many of the South Ferry DUs and AUs, ceramic ware type distribution is heavily weighted by British Buff-Bodied Slipwares, the most common type of ceramic sherd found in the project area. This ware's long manufacturing date range (1670 to 1785) is reflected in the generally similar contours of many of the Ceramic Percent Contribution Graphs, particularly in the Battery Wall area.

The high numbers in the Floral Group (approximately 13 percent of all artifacts and organic materials) were due in part to the huge amounts of particular seeds found in one context (Cat. 15598.082) and in some of the flotation samples: Cat. 15598.082 (Whitehall Slip, Area D) had 1,296 black cherry pits and 432 charred coffee beans; two flotation samples associated with Wall 3 contexts (Cats. 15768.159 and .201) had 598 and 114 raspberry/blackberry seeds, respectively. These seeds are discussed below along with the other artifacts from these contexts and in **Appendix E**. The Floral Group also included many pieces of wood and bark found in the areas around Whitehall Slip and the Battery Wall.

Table 6-1
Sample Ceramic Ware Percent Contribution Chart



The Personal Group (3 percent of all objects) is dominated by white clay smoking pipes. These are mentioned in the AU and DU discussions but are described in detail later (**see Chapter 6: G. Tobacco Pipes**).

The *terminus post quem* (TPQ) dates noted in the rest of this chapter are most often derived from ceramic sherds but occasionally other types of artifacts are the latest things in each DU or AU. For most AUs and DUs, both the TPQ date and the next latest dates are listed in order to avoid distortions caused by the intrusion of later artifacts into contexts that had already been formed[2].

[2] For this reason and others detailed in **Chapter 5: Footnote 13**, dates cited as TPQs for certain Aus, DUs, or contexts may differ slightly in a few cases between Chapters 5 and 6.

For instance, information from historical documents has shown that sections of the Wall were built at different times during the second and third quarters of the 18th century, yet later artifacts were found in many Wall contexts. As noted in **Chapter 5:A.9 Battery Wall Conclusions**, these later artifacts could have made their way into the contexts around the Wall during later repairs. Other possible sources of artifacts that post-date the main activities that created the project area are secondary landfilling and various construction activities, in particular the early-20th century construction of the subway.

D. BATTERY WALL DEPOSITIONAL UNITS

The artifacts from contexts associated with Wall sections 1 through 4 will be discussed as DUs in the order presented in **Table 5-8**. DUs are AUs grouped by their relationship to the Wall (see **Table 5-8**). Most of these deposits were fills created at different times as the Battery Wall and Battery Park were built and altered (see **Chapters 4: Historic Context** and **5: Field Results**). The artifact data strongly suggest that most or all of the soils used for fill included refuse from earlier periods. Artifact counts, types, and dates vary between the DUs, as is to be expected.

1. ABOVE THE WALL—AUS W1 A, W2 A, AND W4 A.

Artifacts found in this DU have temporal characteristics of secondary deposits. If two very recent (1995 and 2001) pennies found in Cat. 15768.038 (adjacent to EU 9) and a piece of plastic from Stratum 1 Level 1 in EU 5 (Cat. 15768.025) are excluded, the TPQ for this DU is 1893, although the majority of the dated artifacts were manufactured during the late-17th and 18th centuries (see **Appendix A** and **Table 6-2;** also see **Appendix N** for individual EU descriptions[3]). Many of the dated artifacts have long manufacturing date ranges but there is a preponderance of early materials and 15 of the 16 (without coins) artifacts with the shortest date ranges (less than 50 years) date to the 17th and 18th centuries. The exception is an early-19th century transitional pearlware/whiteware sherd. A few contexts, in particular those from areas outside the EUs, contain artifacts with disparate manufacturing dates: the most extreme example is a 1723 George I halfpenny found in the same context as the 1995 and 2001 pennies.

Table 6-3 depicts the relative proportions of artifacts and faunal materials found in this DU by functional group[4]. The Faunal-Bone and Architectural Group artifacts are the most numerous. The great majority of the artifacts in the Architectural Group are pieces of brick and mortar (see **Appendix A**). The bricks include fragments from both red and yellow types.

Organic debris—bone, shell, and charcoal—is common in this DU: AU W1 A in particular has the largest number of bone fragments of any AU (see **Appendix D**) and a large amount of oyster shell, particularly from contexts in EUs 3, 11, and 4. The total weight of oyster shell from AU WI A is over 18 kilograms, with almost 10 kilograms coming from EU 3, over 3.6 from EU 11, and almost 3 from EU 4. These three EUs also contain large amounts of dietary bone refuse, primarily from the domestic mammal triad of cattle, sheep, and pigs with smaller amounts of various fish and birds. The floral remains consist, for the most part, of pieces of charcoal.

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[3] Detailed descriptions of the Wall excavation units (EUs) and Whitehall Slip secant pile stratigraphy that were completed as part of the archaeological investigations are presented as Appendix N.

[4] On this and the following graphs, the number used for "faunal-bone" is the total number of fragments (TNF) rather than the minimum number of units (MNU).

Table 6-2
Percent Contribution Graph for DU Above the Wall
325 Dated Ceramics

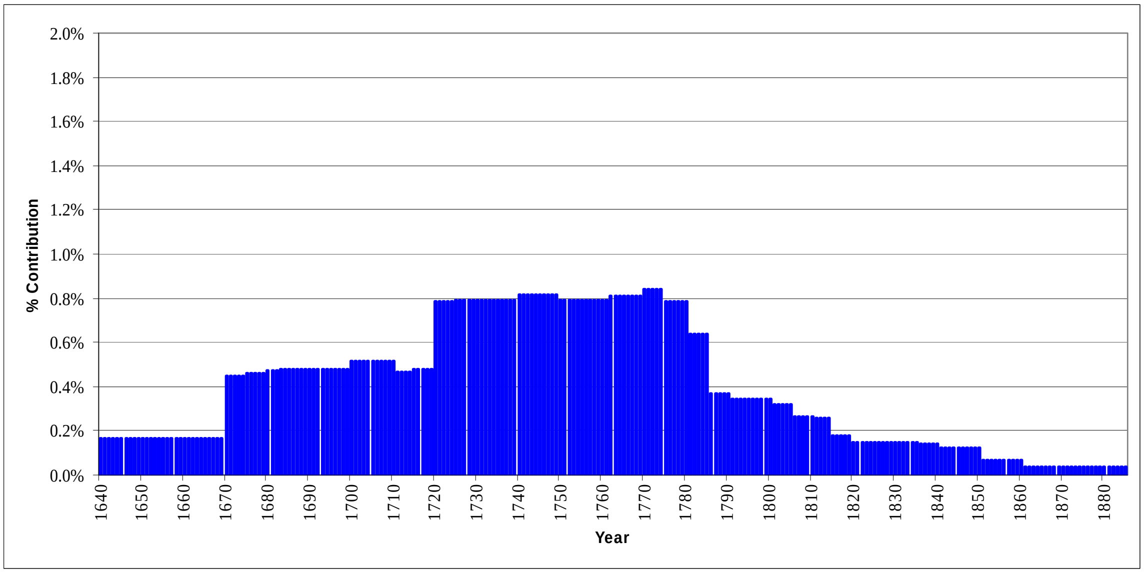
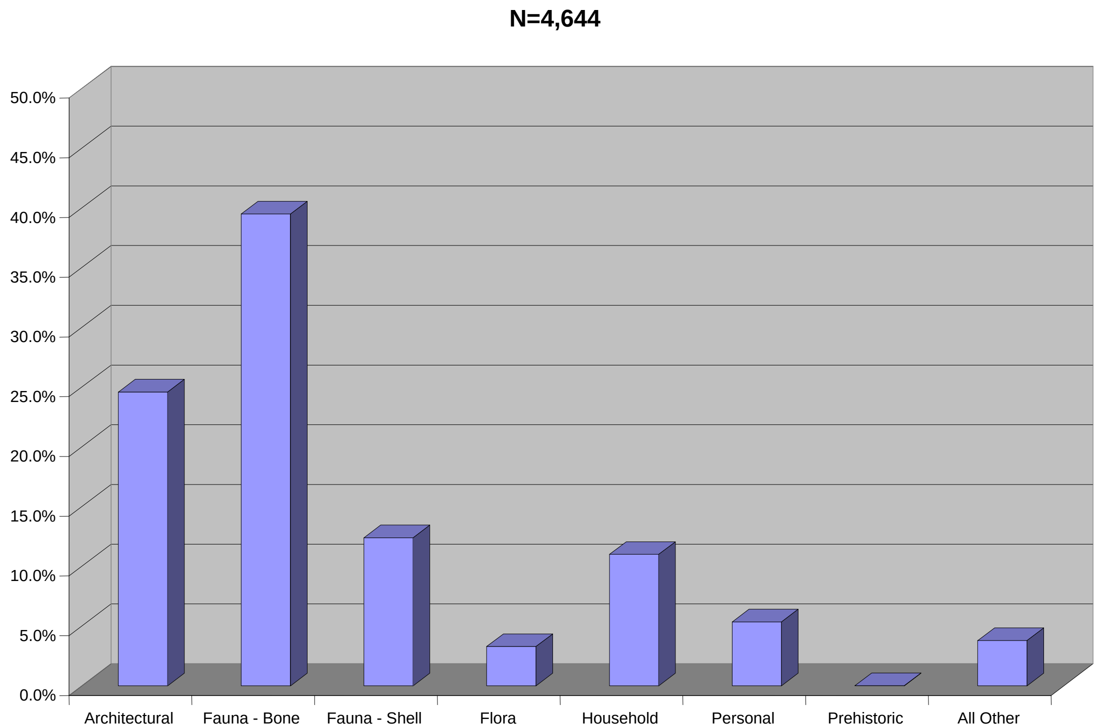


Table 6-3
DU Above the Wall Functional Groups



The context with the largest number of bone dietary elements is EU 3, Stratum 4, Level 1 (Cat. 15768.017). This context has 446 bone fragments representing 142 cuts of meat. It also contains at least 96 oyster shells weighing almost 5 kilograms. Marie-Lorraine Pipes, the faunal analyst, (see **Appendix D**) is of the opinion that these bones were most probably refuse from an eatery of some kind. The presence of the large number of oyster shells supports this interpretation, as oysters would have been served in most New York City eating establishments. Eighty-one of the oysters in this context are complete enough for their growth rings to be counted: they range in age from 1 to 12 years old with the majority (51) at 5, 6, or 7 years **(Table A-2** in **Appendix A)**. Their average length is approximately 6 cm (about 2.5 inches). This is less than the current legal limit of 3 inches for oysters and is indicative of the heavy exploitation of oysters in New York City waters. Some of the oysters are much longer—the largest is an 11+-year-old specimen at 15 cm and there are a number between 11 and 13 cm. Many of the shells show marks where their ends have been hacked off in order to get at the meat. Hacking is faster and requires less skill than shucking (in which a knife or similar tool is inserted between the shell halves to pry them open) but can splinter the shell and leave shell residue in the oyster meat. Only four shells have obvious shucking marks but some of the unmarked shells could have been opened so skillfully that they were left undamaged. At the other end of the skill spectrum, two shells have large rectangular hack marks from an axe. Shucked oysters might have been for consumption on the half shell while hacked ones might have been for oyster stews or other dishes where the meat was taken out of the shell before cooking. No artifacts were found in this context, which indicates the deposit was composed only of organic refuse. The other context in this DU (EU 4, Stratum 6, Level 1, Cat. 15768.024) with a large amount of bone does not have very high numbers or weights of oyster or other edible shellfish. Cat. 15768.024 was described in the field as a small pocket of soil with charcoal flecking (see **Chapter 5:A.5.a Definition and Description of Analytical Units**). No artifacts were found here but a number of shell fragments from clams, oysters, and mussels as well as barnacles and other non-food shellfish and a fragment of a crab claw were recovered from the flotation sample.

Three pollen and six phytolith samples from EU 4 were sent for specialized analyses (see **Appendix E**). Tree pollens, especially from hickory, chestnut, and oak trees, are common. The presence of grape pollen indicates the growth of vines, possibly naturally occurring wild types. Pollen from weedy shrubs and herbaceous plants such as ragweed, asters, dandelions, and chicory contributes to the picture of the Battery as a not-particularly manicured (in the modern garden sense) open space. Fungal spores from animal dung and cereal grain pollen might be the result of using the Battery as a cow pasture or of manuring the ground to increase its fertility (see **Appendix E**). The phytoliths found include both festucoid-types and native wetland grasses. The festucoid types might be from American beach grass, a dune stabilizing plant common along the East Coast, but they could also be from common lawn grasses. Phytoliths from reeds and other coastal plants were also found. The presence of siliceous fossils from diatoms whose habitat is moist soils (wetlands or shallow lakes) or marine environments along with sponge spicules could be a marker for dredged soils used as landfill. Alternatively they could indicate constantly moist soil conditions.

In contrast to the large amount of faunal debris, food microfloral (pollen or phytolith) and macrofloral remains (seeds and pits) are not common in this DU. No seeds or pits were recovered and the only food pollen identified (the grains mentioned above) might have been food for animals rather than people.

Ceramic sherds are the most common ware in the Household Group and British buff-bodied slipware sherds are the most common ceramics. This ware type has a long date range (circa 1670 to 1785) and vessels for cooking and consumption (dishes) and drinking vessels (mugs and drinking pots) were used in almost every British colonial household during the 18th century (see **Figures 6.3A** and **6.3B)**. The next most common ware type is the locally made functional equivalent of these imported vessels: lead glazed red earthenwares, sometimes decorated with slip but more often simply covered with a brown- or black-colored lead glaze. Red earthenwares were made in New York from the 17th through the 19th centuries; some can be more tightly dated by their particular decorations or forms but none of these sherds is large enough for such distinctions to be made. The third-most common ware type—gray-bodied salt-glazed stoneware—was also locally made (see **Figure 6.4A)**. Archaeologically recovered local stonewares are most often found in food storage (jugs and jars), drinking (mugs), and sanitary (chamber pots) forms; although most of the sherds are too small for identifications of forms, sherds from jars, jugs, and a mug were identified. The mug in this DU has an incised checkerboard pattern, a common decoration seen on at least two other mugs from the South Ferry project. The local stonewares were made circa 1725 to 1830.

The majority of the other Household Group ceramics were manufactured in the 18th century, including—for the table and for tea—tin-glazed earthenwares, Chinese porcelains, and white salt-glazed stonewares. A smaller number of sherds from some earlier wares was also found: Dutch red- and buff-earthenwares made circa 1625 to 1710 and two sherds of tin and lead glazed vessels (this ware is called "maiolica" by Dutch archaeologists) made circa 1625 to 1675. The glass sherds in this Group are small; most are too fragmentary to determine their manufacturing method and shape, although some were identified as early (circa 1630 to 1740) onion-shaped free-blown bottles. A small number of ceramic and glass artifacts with later date ranges is within the Household Group: four whiteware sherds, at least one made after 1890; a post-1893 machine-made bottle; and two post-1864 glass sherds.

Except for six pins, two beads, a bone button, a buckle, and the coins mentioned above, the Personal Group artifacts consist of pieces of white clay smoking pipes. Most have very long date ranges but some were manufactured during the 17th century, including one of the smallest pipebowls ever excavated in New York City (see **Chapter 6: G. 2.a. Deposition Unit Above the Wall**). Most of the pipes manufacturing date ranges span the 18th century but some are confined to the 17th century.

The artifacts in the "All Other" Group on **Table 6-3** include both dark gray/black and honey-colored gunflint flakes and a honey-colored gunflint (gray/black gunflints are most often made of English flint and honey-colored of French flint (Noël Hume 1982:220). Coal and cinder fragments, found scattered throughout the excavation units, are also in this Group. Coal was occasionally used as a fuel in New York City during the 18th century but it became very common only after the development of canal transportation early in the second quarter of the 19th century, which made Pennsylvania coal a cheap, readily available commodity.

Industrial artifacts (i.e., those associated with manufacturing) are also included in the All Other Group. Identifiable by-products of manufacturing are not very common in the project area (except for horn cores, as noted in **Appendix D**) but this DU has 17 sherds from at least 4 red earthenware sugar molds. New York City had a number of sugarhouses during the 18th century and all used conical earthenware sugar molds to refine raw sugar. (See **Chapter 6: E.3. Analytical Unit** WHS C, below, for a description of the how these vessels were used in sugar refining.) The sugar molds in this DU all came from EU 4 (Strata 2, 5, and 6). Two other Industrial artifacts were found in EUs 3 and 11: a flat, dark gray blob of fired clay with a heavy coating of greenish glaze (EU 3) and a pebble with glaze (EU 11), both likely to be debris from a salt-glaze potter's kiln.

Human bone (not included in **Table 6-3**) was also found in this DU, in EU 1 Stratum 1 and EUs 4 and 10 Strata 2. The report of the analysis of these bones can be found in **Appendix J**. The presence of human remains probably indicates that at least one source of the fill used for Battery Park was land around an old church which had a cemetery (also see **Chapter 4: A.16. Demolition of the Fort**). Lower Manhattan in the 17th and 18th centuries had numerous churches and burial grounds, of which only a few—for example Trinity and St. Paul's on Broadway—still exist. When churches closed or were relocated, human remains were not always disinterred for reburial and could have inadvertently been included in soil moved to other locations.

The artifacts in DU Above the Wall had been moved and redeposited, possibly more than once, from their original places of disposal before they became part of the fill above the Wall. The majority were manufactured and used during the 18th century, although some earlier and a few later artifacts are part of the excavated deposit. The large amount of faunal material, notably in AU W1 A, is unusual, compared to other DUs. There is some indication that this particular dietary bone was from 18th-century deposits, as the pieces are chopped and cleaved rather than sawed. The lack of floral food remains and the absence of weathering and scavenger marks on the bone suggest that this was not an area where fresh garbage was routinely deposited, although the large amounts of oyster and clam shell in EUs 3, 4, and 11 might indicate the disposal of this particular type of refuse.

2. ABOVE OR INSIDE THE WALL—AU W1 B, W3 A, AND W4 B

Compared to the previous DU, there are far fewer artifacts and pieces of faunal material (n=954)[5] in this DU and their distribution among the Functional Groups is different in one respect: there is less bone and shell and thus relatively more architectural materials. The 1962 TPQ is from an intrusive aluminum pull tab from EU 27 Stratum 2; the next latest dates are 1800 from a sherd of a 19th-century stoneware bottle and 1790 from a sherd of pearlware and a cut nail. The dated ceramics, however, show the same 18th century concentration (**Table 6-4**).

The Architectural Group encompasses almost half of the 954 artifacts (**Table 6-5**). The high count in this Group is largely due to the many pieces of mortar recovered. This Group includes the same types of artifacts (red and yellow bricks, roof and wall tiles, mortar, and nails) as in DU Above the Wall with the addition of pieces of cut sandstone (four gray and three red, many with mortar still adhering to their surfaces) associated with the Wall. Pieces of stoneware sewer pipe were found in four contexts in AU W3 A.

[5] Relative number of artifacts among DUs is not necessarily an indication that different amounts were present, as this can also be the result of differential artifact collection based on data recovery field strategies.

Table 6-4
Percent Contribution Graph for DU Above or Inside the Wall
(94 Dated Ceramics)

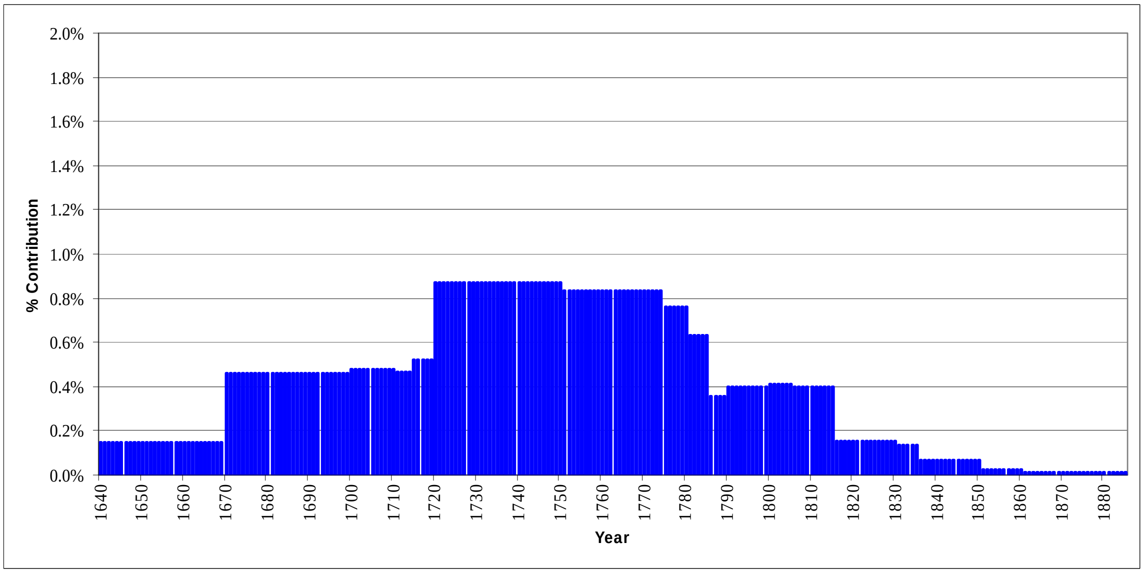
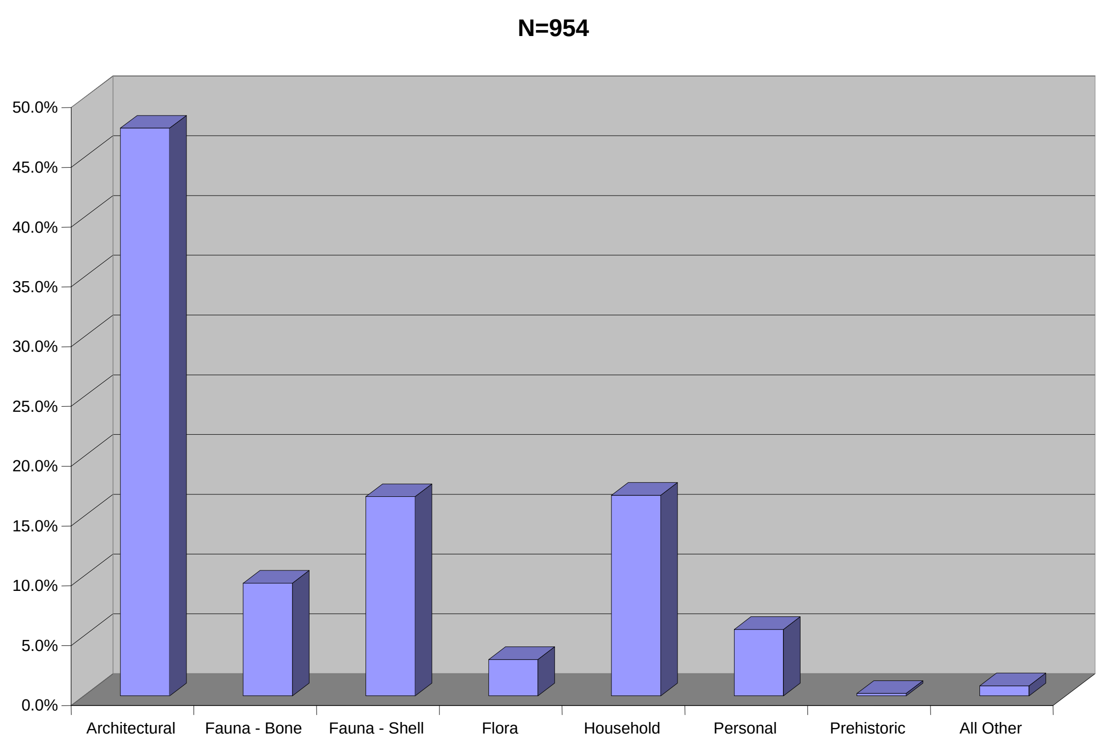


Table 6-5
DU Above or Inside the Wall Functional Groups



British buff-bodied slipwares are again common in the Household Group, although there is an equal number of sherds (n=30) from locally made salt-glazed stoneware vessels. One of the stoneware mug sherds has a sprigged King George medallion, a decoration common on German mugs made for the English market (see **Figure 6.4B**). The New York City stoneware potters worked in the Germanic tradition and used some of the same motifs; this sprigged design resembles one excavated at the African Burial Ground so might be locally made (Janowitz 2008). Two other stoneware sherds in this DU also have distinctive decorations: one, probably a mug, has a checkerboard design used by both American and German potters; the other has a sprigged stylized lion (see **Figure 6.5A**), a motif seen on 17th- and 18th-century German jars and chamber pots. Based on their overall body color and texture, both vessels were probably made in Germany but might possibly have been particularly fine New York City products. The other ceramics in this DU are the same types and forms as in the previous one.

The glass includes pieces from both onion (pre-1740) and dip-molded (post-1730) bottles. One of the bottles, from Cat. 15768.391, is represented only by its base. This base, which has a fairly high kick-up and a sand pontil, has a mark scratched on its interior. This mark could be a sign of ownership or could possibly be a variation of the Bakongo cosmological symbol as discussed below in **Chapter 6: E.1. Analytical Unit WHS A**. The Personal Group artifacts are white clay smoking pipes, a pin, a button, and pieces of shoes or boots. The button, made of bone, had a covering of copper, now decayed, and has been stained green/aqua by the disintegrating metal. The shoes are too fragmentary for identification of their forms. One of the pipes is marked "**NICHO/*LAS/BRIS**," probably for William Nichols, who worked in Bristol circa 1730 to 1776.

The distribution of species within the Faunal-Shell Group differs from the previous DU; although oyster is still by far the most common (approximately 1.4 kilograms from at least 70 individuals), there are large amounts of soft shell clam (approximately 0.35 kilograms from 41 individuals), and quahogs (0.2 kilograms from at least 11 individuals). Soft shell clamshells are much thinner and consequently weigh much less than oysters or hard shell clams and their preservation is generally poorer. Clams of both types live in soft bottoms in intertidal and subtidal waters and thus do not generally share beds with oysters, which prefer to attach themselves to subtidal, firm surfaces, such as hard, sandy bottoms, rocks, pilings, and, failing other options, other oysters.

The bone from this DU comes from chicken, goose, fish and domestic mammal species, the most common being cattle. Most of the bone is stained and the relatively high frequency of cattle foot bones probably indicates commercial waste, perhaps from tanning (see **Appendix D**).

The phytolith samples from this DU yielded remains of the same types of grasses as in DU Above the Wall, however no diatoms or sponge spicules were identified (see **Appendix E**).

The artifacts in DU Above or Inside the Wall are similar to those in DU Above the Wall. Most came to the site as part of the fill used to create Battery Park and their manufacturing dates are much earlier than the dates of their final deposition. The main difference between the two DUs is the much smaller proportion of bones and shell in DU Above or Inside the Wall.

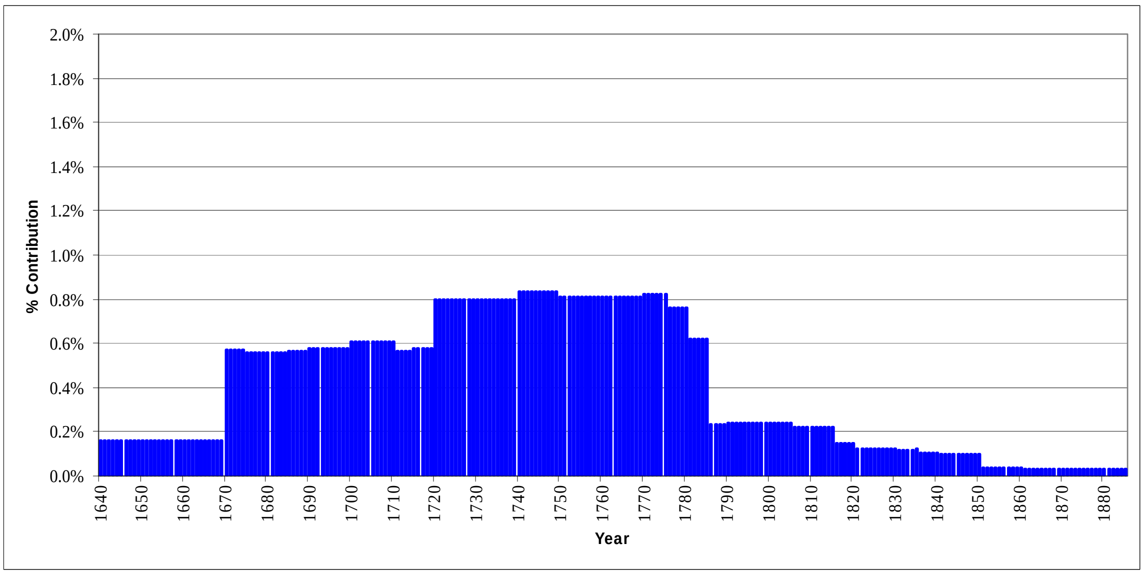
3. ABOVE THE WALL ON THE WATER SIDE—AU W1 D

This DU has only nine artifacts: seven smoking pipes, one brick bat, and one piece of mortar. One smoking pipebowl has what appears to be an English 18th-century shape but the mark on the base of the heel (probably a crowned L) could be from a Dutch maker. Based on this mark, the bowl has been dated circa1726 to 1821. The other pipe fragments have even longer date ranges.

4. ABOVE THE WALL ON THE LANDWARD SIDE—AU W1 C, W3 C, AND W4 C

The 1927 TPQ for this DU comes from three pieces of safety glass, possibly from a vehicle window. The next latest dates are 1899, from a small, complete, machine-made bottle, and 1880, from a dust-pressed porcelain insulator. A post-1835 stoneware bottle and a post-1800 aqua glass bottle both could have been made into the 20th century. After these artifacts, the rest of the artifact beginning manufacturing dates are from the 17th and 18th centuries, as was the case with the previous DUs, with the majority of manufacturing dates falling within the 18th century (**Table 6-6**).

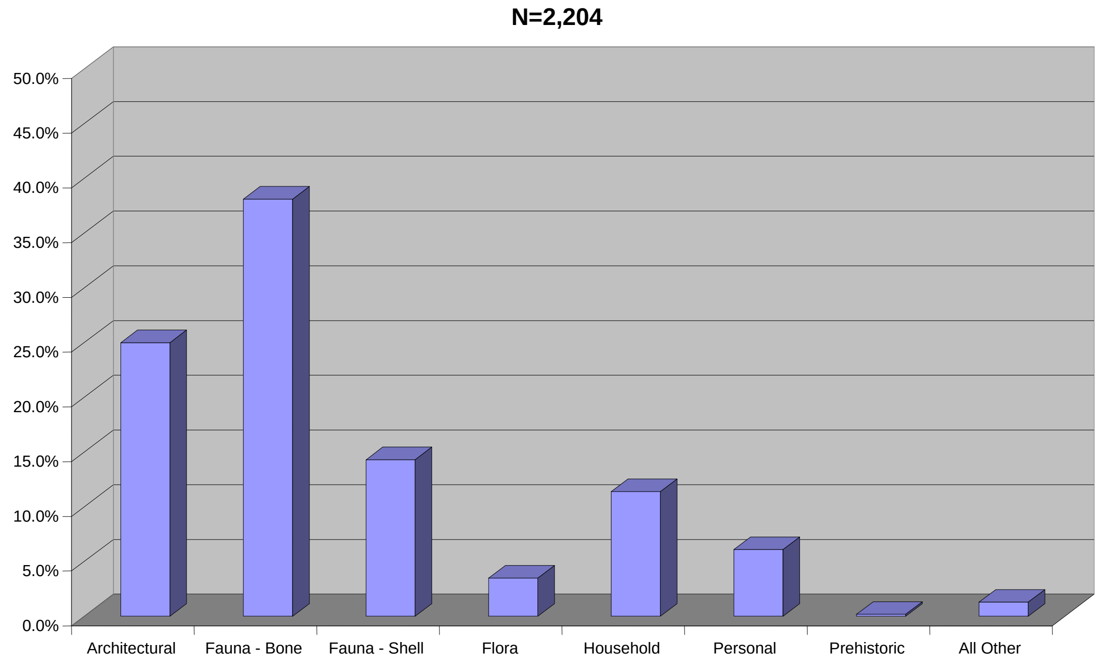
Table 6-6
Percent Contribution Graph for DU Above the Wall on the Landward Side
133 Dated Ceramics



Although the Architectural Group is the most abundant, organic materials (bone and shell) are relatively abundant in this DU (**Table 6-7**). The bone is similar to that in DU Above the Wall as far as species present is concerned but the body parts present are somewhat different, particularly for sheep (see **Appendix D**). Domestic mammals dominate the assemblage. Oyster, the majority of which came from EU 2 near Wall 1, is by far the most common shell with approximately 12.3 kilograms from at least 250 individuals (see **Appendix A**). These oysters, in general, are larger than those in DU Above the Wall; they average 8.6 cm in length and almost 6 years in age. The oldest is over 15 years old and could not be measured because its end had been hacked off. Only 82 oysters have obvious hack marks and no shuck marks were noted, possibly because of the skill of the oyster shuckers. There are also 19 quahogs (0.3 kilograms) and single specimens of soft shell clam and mussel. As in DU Above the Wall, the food remains in this deposit appeared to be mainly from dietary refuse from individual households or from eateries.

The Architectural Group artifacts are the same types as in the previously discussed DUs: red and yellow brick, mortar, plaster, window glass, and nails. In addition, this DU has twenty-four sherds from roofing tiles and five pieces of tin-glazed (delftware) wall tiles. One of these is large enough to show its ox head corner pattern and has a stylized tulip in the center.

Table 6-7
DU Above the Wall on the Landward Side Functional Groups



Artifacts in the Household Group also follow the same patterns as the previous DUs: a preponderance of British buff-bodied slipware sherds; significant amounts of locally made stoneware and redware sherds; and some tin-glazed earthenwares and Chinese porcelains. One of the redware sherds is possibly a kiln waster, as it is over-fired and has a break partially covered with glaze, characteristics of vessels damaged during firing. If the damage was not severe enough to prevent utilization of such vessels, they might still be sold as seconds. A tin-glazed base sherd, most likely from a plate, has a hole pierced through the footring, probably for hanging the vessel as an ornament. Tin-glazed plates were often used for both eating and decoration, as can be seen in many Dutch 17th century genre paintings in which they are shown displayed on mantelpieces and cupboards.

The identifiable glass in the Household Group consists of wine bottles—both post-1730 dip-molded and circa 1630 to 1740 onion shaped—and a few pieces from stemwares and lamp chimneys. The lamp chimney pieces are small and it is not possible to determine their manufacturing method and dates, but they are likely to be from the 19th or early-20th centuries.

A wine bottle seal (unattached to its vessel) was found in Cat. 15768.005 (EU 02 Stratum 1, Level 2). Wine bottle seals were used to identify the owners of bottles, especially when they were sent to merchants to be filled. Seals found in colonial contexts usually have their owner's initials, but the motif on this seal is a shield quartered by a cross surrounded by a beaded border and a raised edge (see **Figure 6.5B**). On the ends of the cross were fleur-de-lys-like elements and a scallop shell was in each quarter. This form of cross is called a "cross florry" in heraldry. At first, analysts speculated that this seal might have some connection to Spanish wine, because this device uses symbols associated with St. James the Greater, whose relics are reputed to be buried in Santiago, Spain in a wine-producing region. However, when a picture of this seal was shown to David Burton, a London specialist in these artifacts, he noted that variations of the cross florry with scallop shells are on the coats of arms of several noble English families, including Fletcher of Scotland. Colonel Benjamin Fletcher was the governor of New York between 1692 and 1697. Fletcher was one of New York's many colorful governors. Although he did much that was positive for the colony, including repairing the church in the fort and building the first Trinity Church, he was recalled to England under suspicion of colluding with the pirates that frequented the city at that time. Several years after his recall to England, a number of the influential men of the city petitioned to have Fletcher's coat of arms removed from his pew at Trinity Church and in the fort because he was not entitled to bear arms, being of low birth[6]. This is the only artifact from the site that can be attributed to a specific individual.

The Personal Group consists of white clay smoking pipes, a small domed copper alloy button with a loop shank, and pieces of shoes or boots. One sole still has wooden shoe nails attached. The pipes include a Bristol heelless bowl with a mark in a cartouche, probably made in the shop of one of the three generations of Robert Tippets working in Bristol between 1660 and 1722. Another 18th-century style bowl might have been made in either Bristol or London, while a 17th century bowl could have come from London or from Gouda in the Netherlands. The white clay smoking pipes, as discussed in **Chapter 6: G.2.d. Depositional Unit Above the Wall on the Landward Side**, can give information about trading patterns as well as individual and community preferences in smoking gear.

The All Other Group includes several interesting artifacts. One is a small round disc made of lead with nine holes punched though its body. Its use is unknown, but it could have functioned as a filter of some sort or could have been an insert in the spout of a watering can. A small printer's type, for a lower case A, was also found. Artifacts classified as Arms are subsumed within this Group and consist of lead shot recovered from a flotation sample and two flakes of gray flint, possibly from gun flints. One flake is small, but the other is larger and has a brown band and a clear bulb of percussion. Flakes could have been generated when gun flints were retouched or reworked into strike-a-lights. Four other flakes were found in this DU but have been classified in the Prehistoric Group based on their lithic types: chalcedony, chert, and jasper. These flakes are all very small.

The Industrial artifacts within the All Other category are scraps of leather from an unidentified manufacturing process (es). Leather was used not only for footwear, but also for tack (e.g., reins, bridles, saddles, etc.), machine parts, buckets, purses, and many other objects. Scraps too small for use were discarded and, if in a suitable depositional environment, could be preserved for archaeological recovery. The other Industrial artifact is a partial kiln pad with a distinctive tri-armed shape associated with the New York City stoneware potters. The potters made flat circular clay pads in sizes to fit over jar mouths then cut out three ovals to create tri-armed discs. Excavations at the African Burial Ground, where the potters dumped some of their kiln debris,

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[6] His son regularized the situation, as noted in an entry in Burke (1864:362):

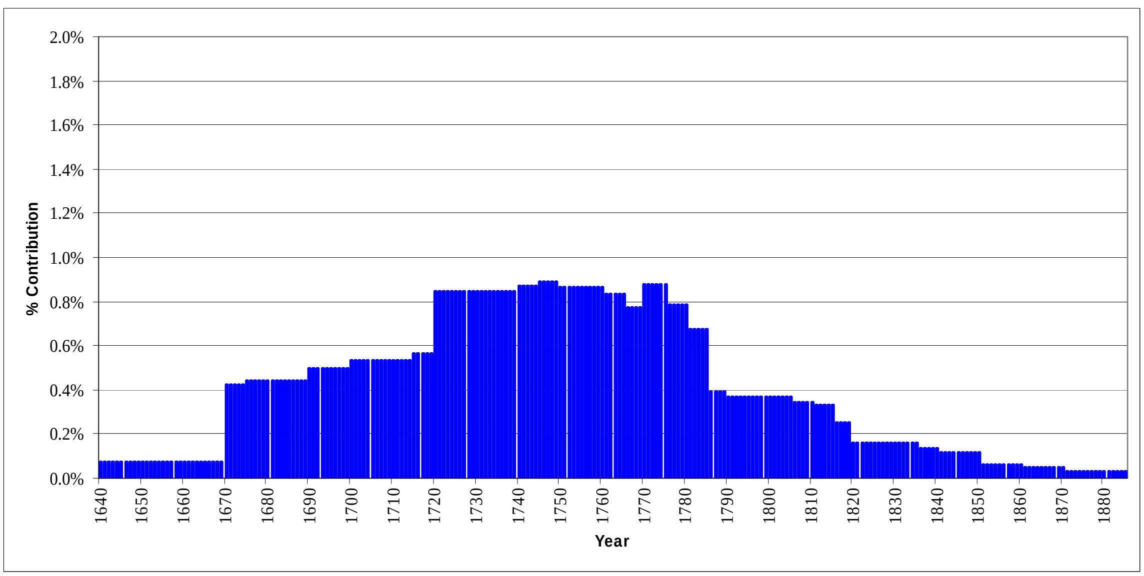
> Fletcher (Low Bashir, co. Westmeath); Reg. Ulster's Office, to Benjamin Fletcher, son and heir of Col. Benjamin Fletcher, Captain-General and Governor-in-Chief of the province of New York, province of Pennsylvania, and county of Newcastle, and Vice-Admiral of the same, who was son and heir of William Fletcher Esq. (slain at Gloucester, 3 Sept 1643), and of Abigail Vincent, his wife, dau. and heiress of Henry Vincent, Esq., London). Sa. A cross flory betw. four escallops ar. Quartering Vincent, viz., az. A chev. Betw. three quatrefoils slipped ar. *Crest* – An arm in armour embowed, holding in the gauntlet an arrow all ppr. Point or. *Motto*—Per angustum.

uncovered a number of these broken tri-armed pads (Janowitz 2006). The presence of only one pad in the fill around the Wall indicates that kiln debris was not used routinely here as landfill. The pad was probably moved to the site as part of soils taken from another area of the city, as was the majority of the artifacts recovered during the present excavations.

5. ABOVE LOG FEATURE ON THE WATERSIDE—AU W3 D

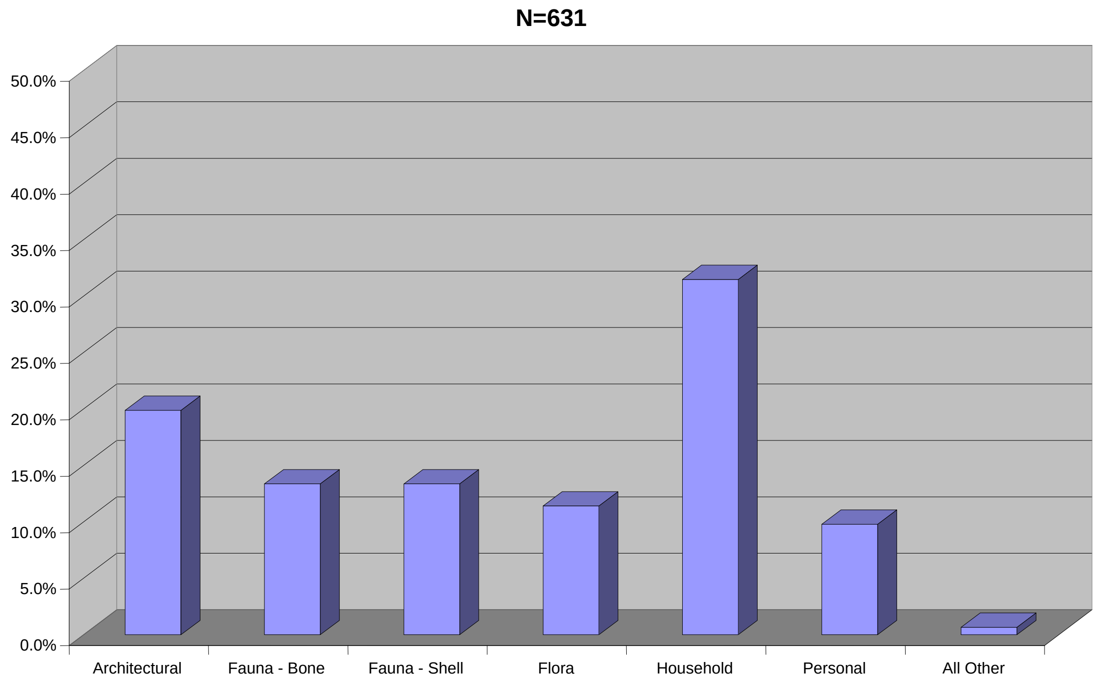
The 1893 TPQ for this DU comes from a sherd of a machine-made bottle. The next latest date is 1850 from a piece of sanitary porcelain (a fragment of a sink, toilet, or bath tub). Both artifacts, found in the area north of DB 4 (Cat. 15768.287) could have been included in soils used for the latest fills within Battery Park. The next latest dates are 1820 and 1790 from one sherd each of whiteware and pearlware found during monitoring above the Wall (Cat. 15768.294). Within the excavation units, the TPQ is 1770. The ceramic percent contribution chart (**Table 6-8**) is similar to those for the previous DUs with a concentration of manufacturing dates in the 18th century and the usual spike in the graph caused by the 1670 introduction of British buff-bodied slipware. The most closely dated artifacts are a bottle seal with the date "1726" and a small English stoneware sherd with Littler's Blue glaze, made circa 1750 to 1765.

Table 6-8
Percent Contribution Graph for DU Above Log Feature on the Waterside.
95 Dated Ceramics



This DU differed from the previous ones in having a higher percentage of Household Group artifacts (**Table 6-9**). Within this Group, ceramic ware types are somewhat different than in the previous DUs because there are no Dutch or Dutch-style cooking vessels. (In general, this DU has few artifacts with manufacturing date ranges confined to the 17th and earliest 18th centuries; the only such artifacts are 11 pipestems with wide-bore diameters.) This absence of Dutch vessels could be due to the small number of artifacts in this DU (n=631) or could indicate few early sources for the fill deposited in this area.

Table 6-9
Above Log Feature on the Waterside Functional Groups



There are some unusual artifacts within the Household Group. One is a circa 1730 to 1860 dip-mold-made bottle base with oyster and barnacle shells attached to its kick-up (see **Figure 6.6A**). This bottle must have been exposed on the bed of a bay or estuary long enough for oyster spats to attach themselves and start to grow. Oyster spats will attach themselves to any solid object in their underwater environment but once attached they cannot move. The oysters found attached to the bottle died at ages of approximately one or two years old; their presence here could indicate that this context (EU 27 West Extension, Stratum 7, Level 1, Cat. 15768.170, directly on top of the log feature) was underwater on the harbor bed for at least a couple of years or that the soil in this context was taken from another underwater context.

Mug sherds from this DU are interesting: pieces from one probable mug, made in England of a ware type called "Midlands Mottled" (circa 1670 to 1750) were found in EU 27 West in Stratum 7, Levels 1 and 2, in ET4, north of DB 4 (Cat. 15768.313), and in the area north of DB 4 (Cat. 15768.287), showing the distribution of artifacts within the DU. Another mug, stoneware with incised stripes filled in with cobalt blue, was most probably made in New York City. A separate sherd, also made by the New York stoneware potters, was possibly a waster, as its body has a deep crack filled with the brown slip used on vessel interiors.

The Architectural Group artifacts include the usual red and yellow brickbats and fragments and two whole yellow bricks (see **Figure 6.6B**). Neither has any sign of mortar or other evidence of use.

The relatively high count of shell and floral remains in this DU is partly due to the numbers of these materials recovered from the flotation samples. The high floral count is chiefly due to the presence of 45 pieces of bark from the flotation samples. The shell from flotation includes 15 mud whelk shells, a type of snail found, as the name suggests, on muddy intertidal and subtidal bottoms. These snails are scavengers who feed on dead fish and shellfish, among other things.

The bone includes elements from cattle, sheep, and pigs along with single bones from a deer (a molar) and a horse (a water-worn toe bone) and remains from at least two fish, one identified as sheepshead. Sheepshead, also known as tautog or blackfish, was a preferred species in early New York City as its diet of shellfish gave it a distinctive flavor (Van der Donck 1964:56).

The Personal Group is composed exclusively of white clay smoking pipes. One has the edge of an illegible maker's mark in a cartouche, but all the rest are unmarked and undecorated. The All Other Group includes an earthenware toy—a rim sherd from a pan or dish made of mixed yellow- and red-firing clays covered with a lead glaze with green blotches.

6. NEXT TO THE WALL ON THE WATERSIDE—AU W1 H AND W3 B

The latest dating artifact in this DU is a very small fragment of an emerald green machine-made bottle manufactured after 1935. From EU 28 Stratum 1 Level 1, it is almost certainly intrusive. The next TPQ is 1820, from a single whiteware sherd found in EU 12 Stratum 1, Level 1 followed by two pearlware and several creamware sherds. The overall pattern of ceramic manufacturing date ranges is similar to that of DU Above the Log Feature and shows a concentration of manufacturing date ranges between 1720 and 1820 (see **Table 6-10**).

The distinguishing characteristic of DU Next to the Wall on the Waterside is the amount of shell found here (**Table 6-11**). Unlike most of the other DUs where oyster is the dominant species, the shell here—in particular in Cat. 15768.328, a sandy gray layer in Trench 4—is primarily soft shell clam (**Table 6-12**). As already noted, soft shell clam is much less durable than oyster so preservation is generally not as good. This DU also has a number of Atlantic drills, mud whelks (again, particularly in Cat. 15768.328) and periwinkles, (all from the flotation sample from Cat. 15768.148, EU 26 Stratum 5, Level 1) as well as oysters, quahogs, and mussels.

Mud whelks, as noted above, dwell close to the shoreline and are scavengers. Periwinkles (various species in the genus *Littorina*) are herbivores that generally live in the area between high and low tide and eat by scraping algae and organic debris from rocks, oyster shells, or other hard surfaces. Atlantic drills (*Urosalpinx cinerea*) are predators who feed on shellfish, oysters in particular; the small holes they leave in oyster shells can be seen on many of the South Ferry specimens. In archaeological excavations, large numbers of Atlantic drills are generally an indication that the context where they were recovered was a natural oyster bed buried by a man-made deposit, usually during landfilling. The context (Cat. 15768.328) where the majority of the drills and mud whelks were found also included 16 oyster shells and 143 soft shell clams. This context was described as a sandy layer and it is quite possible that this area was the site of a natural clam bed that developed after the Wall was constructed. Two of the oysters, aged at 6 and 15 years, have hack marks but the others are aged less than 2 years and have no discernable opening marks. The hacked oysters, along with the artifacts and floral materials found here, are likely to be refuse deposited over the Wall onto the clam bed.

Table 6-10
Percent Contribution Graph for DU Next to the Wall on the Waterside
103 Dated Ceramics

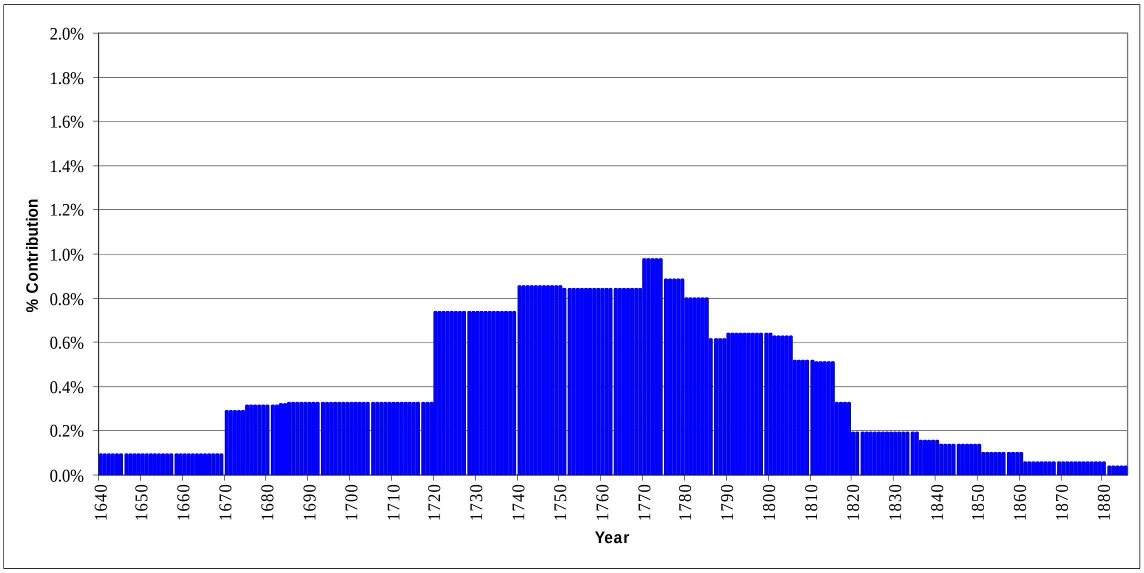


Table 6-11
DU Next to the Wall on the Waterside Functional Groups

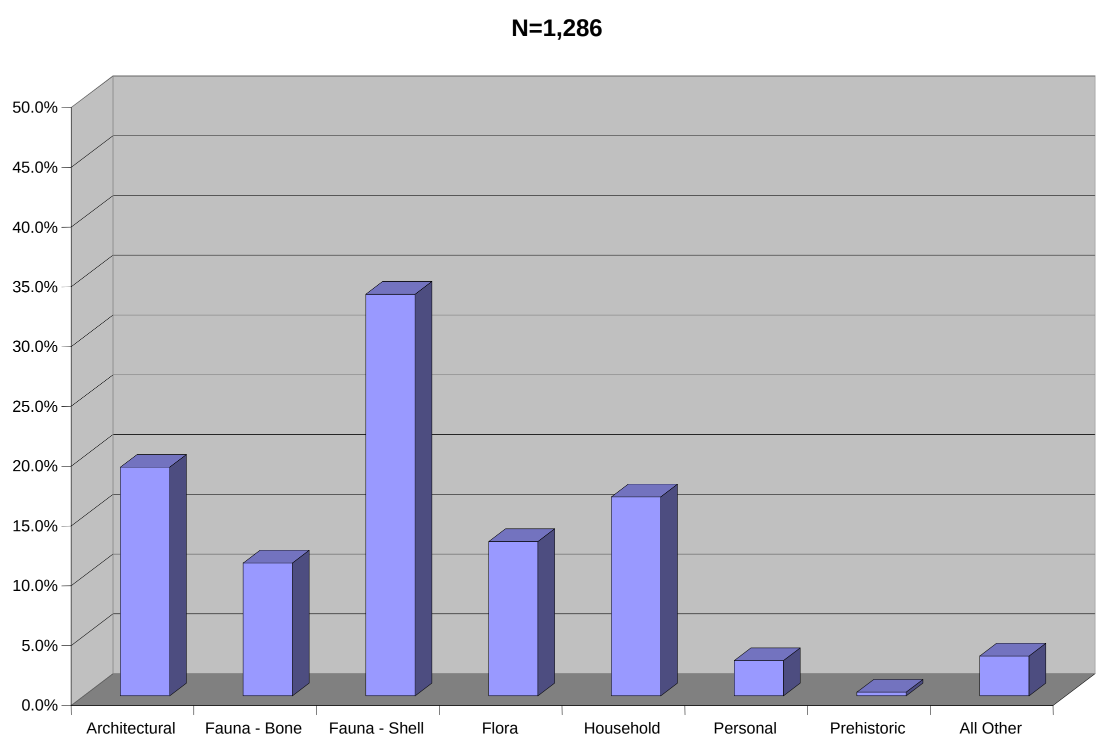


Table 6-12
Shell Species from Next to the Wall on the Waterside

Species	Number*	Weight (kg)
Clam, Soft Shell	201	0.9
Oyster	101	2.4
Whelk, Mud	57	-
Clam, Quahog	29	0.5
Periwinkle	17	-
Whelk, Atlantic Drill	14	-
Mussel	8	0
Scallop	2	< 0.1
Unidentified	2	-
Jingle	1	-
Total	432	

Note: * Minimum number of individuals based on hinge pieces

Thirty-nine small pieces of charcoal and 27 pieces of bark contribute to the high count in the Floral Group, but the most numerous objects in this Group are 84 jimson weed seeds recovered from a flotation sample (Cat. 15768.64, EU 14 Stratum 3, Level 1) and identified by Paleo Research Institute (PRI) (see **Appendix E**). Jimsonweed (*Datura stramonium*, also known as thorn apple) is a poisonous annual weed that grows in "dung-heaps, the roadsides and commons, and other places where a rank soil is created by the deposited refuse of towns and villages" (Grieve 1982 as cited in **Appendix E**). A better description could not be found for landfill. Jimson weed, with its large oval leaves and large white trumpet-shaped flowers, is a hardy plant and can be found growing along roadsides in many regions[7]. The weed has been cultivated and used for its analgesic or hallucinogenic properties, but is dangerous because overdose and poisoning easily occurs; it is harmful to all animals and the seeds can be toxic to domestic fowl if they are accidentally mixed with grain. Thus, it was probably not a plant that would have been encouraged to grow on any well-tended land.

The Architectural Group artifacts consist of red and yellow brick pieces, red earthenware roof tiles, window glass, nails, mortar, and pieces of cut stone, possibly from truncation of the Wall itself. Two of the cut stones (one sandstone and one granite) still have mortar adhering to their surfaces. Pieces of two drainage pipes were also recovered. One, from Cat. 15768.174 (EU 28 Stratum 1, Level 1), is made of salt-glazed stoneware and is flat—possibly a drain tile rather than a round enclosed pipe. Their presence is indicative of post-depositional disturbance.

In the Household Group, stoneware sherds are the most numerous, rather than the British buff-bodied slipwares that dominate most areas of the site. Most of the salt-glazed stonewares were probably made in New York City although one sherd, from Cat. 15768.086 (EU 22 Stratum 1, Level 1) has part of a sprigged medallion similar to those seen on German bottles (bellarmines or bartmanns). The slip, body, and glaze on this sherd, however, are like New York examples. The white bodied salt-glazed stonewares, on the other hand, were made in England. Unlike the locally made stonewares, the English vessels were primarily made in tea and table forms.

[7] A large, apparently flourishing, jimson weed plant was observed during the summer of 2008 (by one of the authors of this report) growing out of an interstice in the concrete central median of the Cross Bronx Expressway.

Vessels made in other ware types include tin-glazed earthenwares and Chinese porcelains. Most of the sherds of all ware types in this deposit are small and their forms cannot be specifically identified. One interesting sherd (Cat. 15768.064, EU 14 Stratum 3, Level 1), probably from a small bowl, was most likely made either in the Philadelphia area or in New York City by a potter working in the Philadelphia style: the white slip under a yellow lead glaze on the interior of this shape of vessel is a distinguishing characteristic of this region.

The Personal Group is again mostly composed of white clay smoking pipes. One is a bellied bowl with a rouletted rim and a heel mark of a gauntlet, possibly made by the Gauntlet family of Wiltshire, England between 1651 and 1698 (see **Chapter 6: G.2.f. Next to the Wall on the Waterside**). The All Other Group includes a fragment of cloth, possibly felt, recovered from Cat. 15768.050 (EU 12 Stratum 1, Level 1), and a clump of unidentified matted fiber from Cat. 15768.086 (EU 22 Stratum 1, Level 1).

7. NEXT TO W3 AND ABOVE LOG FEATURE ON THE LANDWARD SIDE—AU W3 E

This DU includes artifacts that indicate it was disturbed in the recent past; the latest artifacts are a piece of PVC pipe (post-1952) (Cat. 15768.107, EU 24A Stratum 1, Level 3) and an aluminum seal from a wine bottle, probably post-1960 (Cat. 15879.285, Filling in Wall Assoc. w/ Timbers between Telephone Utilities & East Wall). A number of pieces of machine-made bottles (post-1893) were found in EUs 24 and 25 (Strata 1 and 2). The DU also includes 17th century artifacts: a smoking pipestem with a motif of fleur-de-lys in diamonds and a deep-blue-colored tin-glazed sherd. The ceramic percent contribution graph (see **Table 6-13**) illustrates that the majority of the ceramics were manufactured during the late-17th and 18th centuries.

The Architectural Group contains almost 50 percent of the artifacts in this DU (see **Table 6-14**) due to the unusually large number of pieces of red brick recovered from EUs 24 and 25 and window glass fragments in EU 25. Other artifacts in this Group include some yellow brick pieces, pieces of red earthenware roofing tiles, nails, mortar, plaster, and water or sewer pipes made of stoneware and earthenware.

The Household Group is dominated by sherds of British buff-bodied slipware, many too small for identification of their forms; those that can be identified are dishes and drinking vessels. The next most common group, salt-glazed stoneware, also consists primarily of small sherds but one sherd—decorated in cobalt blue with a swag and tassel motif along the rim (from Cat. 15768.311, Log Cleaning in Duct Bank N/E of ET4)—is large enough to be identified as a pan made in New York City. Another stoneware sherd, part of a mug from Cat. 15768.113, EU 24A Stratum 2, Level 2, has a sprigged band of diamond-shaped bosses colored purple; a very similar mug sherd, but with blue diamonds alternating with the purple, was found in Cat. 15768.351 (W3 K, Miscellaneous DU) (see **Figure 6.7A**). These elaborately decorated mugs were most probably imported from Germany during the 18th century. A very small tin-glazed sherd was almost certainly imported from the Netherlands: it has a deep blue glaze on both surfaces with an unidentified yellow painted motif (Cat. 15768.127, EU 25 Stratum 4, Level 1) (see **Figure 6.7B**). Vessels with this distinctive glaze and painting were made in both Haarlem and Rotterdam during the 17th century (Hurst, Neal and Van Beuningen 1986**)**. Most of the glass pieces in this DU are from a variety of bottles but one, from Cat. 15768.112, EU 24A Stratum 2, Level 1, is a base sherd from a lead glass decanter. It has a molded diamond motif and shows heavy use-wear marks.

Table 6-13
Percent Contribution Graph for DU Next to W3 and Above Log Feature on the Landward Side
163 Dated Ceramics

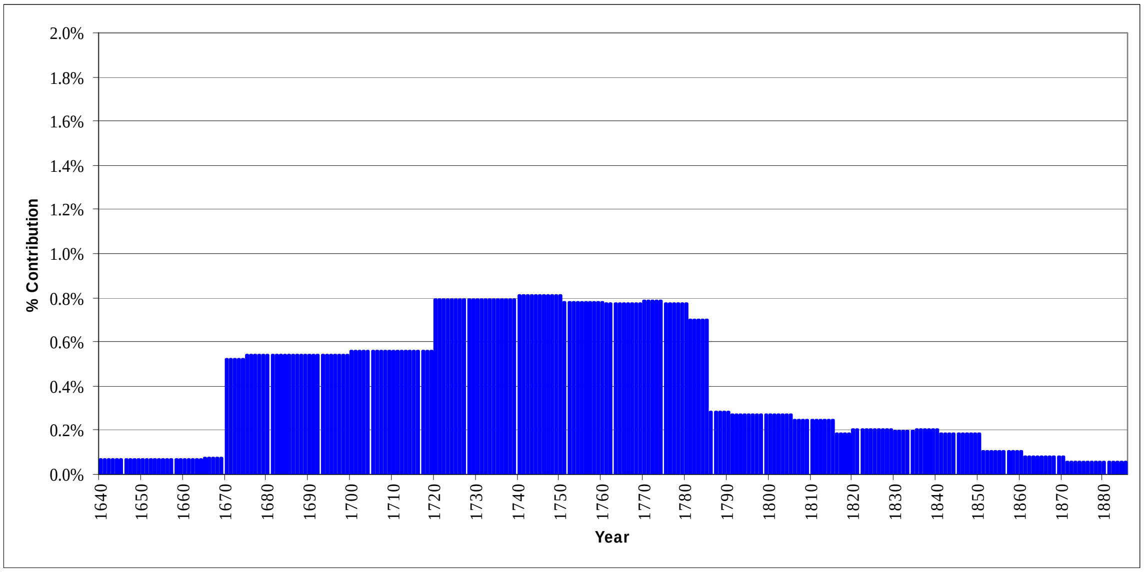
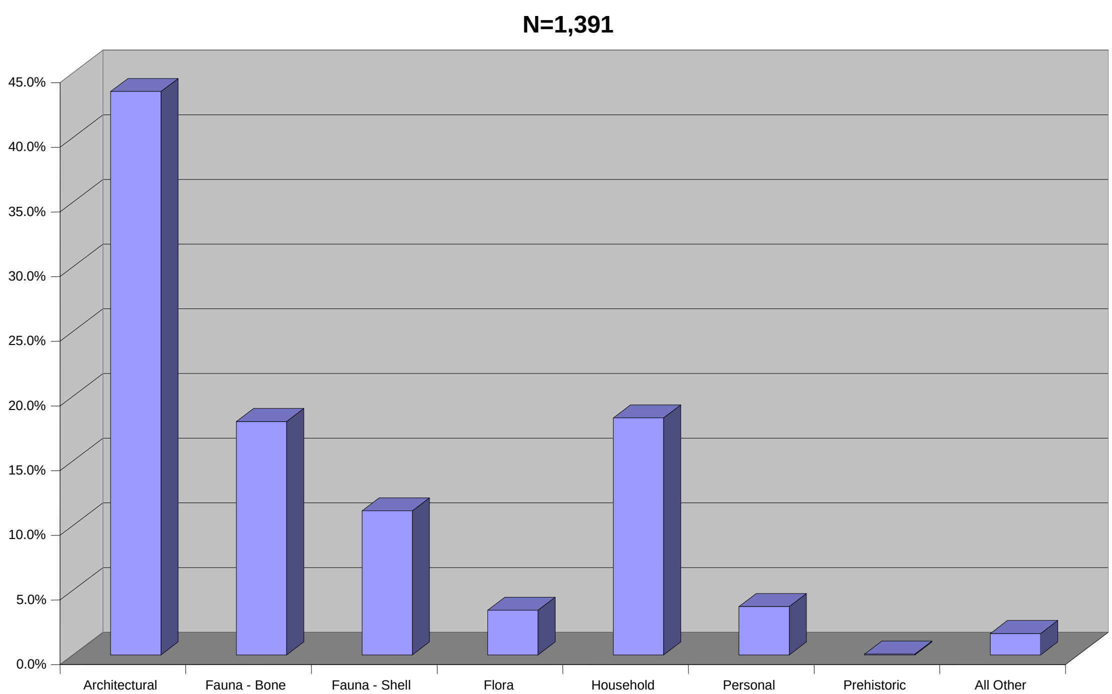


Table 6-14
DU Next to W3 and Above Log Feature on the Landward Side Functional Groups



The Personal Group is made up of one piece of shoe leather, a straight pin, and smoking pipe fragments. One of the pipestems has an elaborate tulip motif with tendrils and dotted flowers; this pipe, from Cat.15768.127, EU 25 Stratum 4, Level 1, was made in Chester, England between 1627 and 1760.

The food bone in this DU is one of the larger collections from the site (see **Appendix D**, **Table 3**). The bones include the usual domestic species but is somewhat unusual because there are more pig than sheep meat elements identified (although cattle is still the most common). The bone is considered to be mostly dietary refuse with possibly a small amount of processing (butcher's) waste. The majority of the shell is also dietary waste. Oyster is the dominant species with a small amount of quahog and one soft shell clam identified. The 72 oysters whose ages can be measured range from 2 to 10 years in age with an average of about 5.4 years. Many have hack marks and a few have shuck marks; two have both.

Samples from this DU (from EU 25) were sent for phytolith analysis. Phytoliths from lovegrass (*Eragrostis* sp.), which does well in disturbed environments, and from bristlegrass or foxtail (*Setaria* sp.), which tolerates a wide range of habitats and also grows well on disturbed soils, were identified.

8. NEXT TO THE WALL ON THE LANDWARD SIDE—AUS W1 G, W3 F, AND W4 D

The depositional unit Next to the Wall on the Landward Side has only three artifacts with manufacturing dates in the 19th or 20th centuries. The latest artifact, a modern nail in good condition from Cat. 15768.220 (EU 43 Stratum 7 Level 2), dates after 1950 and is possibly associated with a utility line installed in the 1960s. The next, a small piece of clear, non-lead bottle glass from Cat. 15768.177 (EU 29 Stratum 2 Level 1) was probably made after 1870. The last is a transfer printed whiteware plate sherd from Cat 15768.365 (Sediments South of the Wall) made circa 1820 to 1870. The rest of the artifacts in this DU are either not dated or were made during the 17th or 18th centuries, although the end manufacturing dates for some of the ceramic ware types extend into the 19th century (see **Table 6-15**).

The artifacts in this DU are distributed less unequally among the Functional Groups than in most other DUs (see **Table 6-16**). This is due to several factors: the large number of bark and wood pieces in the Flora Group; a similarly large number of red brick, mortar, and plaster fragments; high counts of oysters and whelks; many small scraps of decayed shoes; and the relatively small amounts of Household refuse.

The Architectural Group includes many pieces of red brick, mortar, and plaster along with some yellow brick fragments, roofing tile, a little window glass, and a few nails. This Group, however, also includes a number of sawn planks, samples of sheeting found against Walls 3 and 4 (see **Chapter 5: A.4.d.** and **A.5.c. Non-Excavation Unit Contexts**). A number were sent for dendrochronological analysis, however none proved suitable for this technique as their outer surfaces are not preserved.

The bark and wood pieces in the Floral Group are not related to these planks; instead they were probably part of the logs comprising the log feature. Cats. 15768.192 (EU 30 Stratum 4, Level 2) and 15768.180 (EU 29 Stratum 5, Level 1) had the largest amounts of bark, while the greatest numbers of wood fragments were from Cats. 15768.176 (EU 29 Stratum 1, Level 1), 15768.192 (EU 30 Stratum 4, Level 2), and 15768.185 (EU 29 Stratum 7, Level 1).

Table 6-15
Percent Contribution Graph for DU Next to the Wall on the Landward Side
127 Dated Ceramics

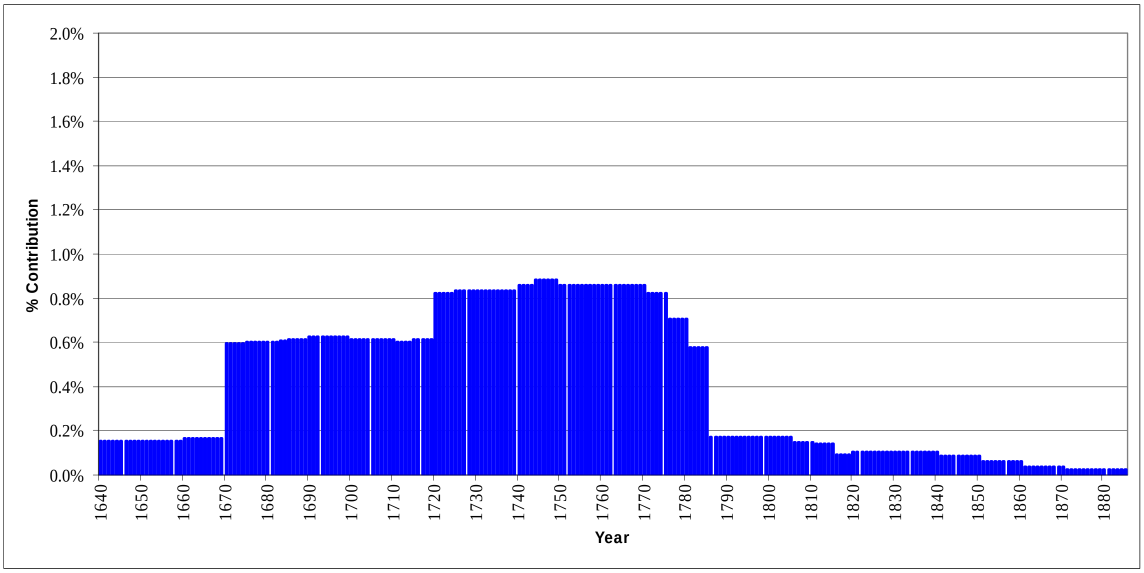
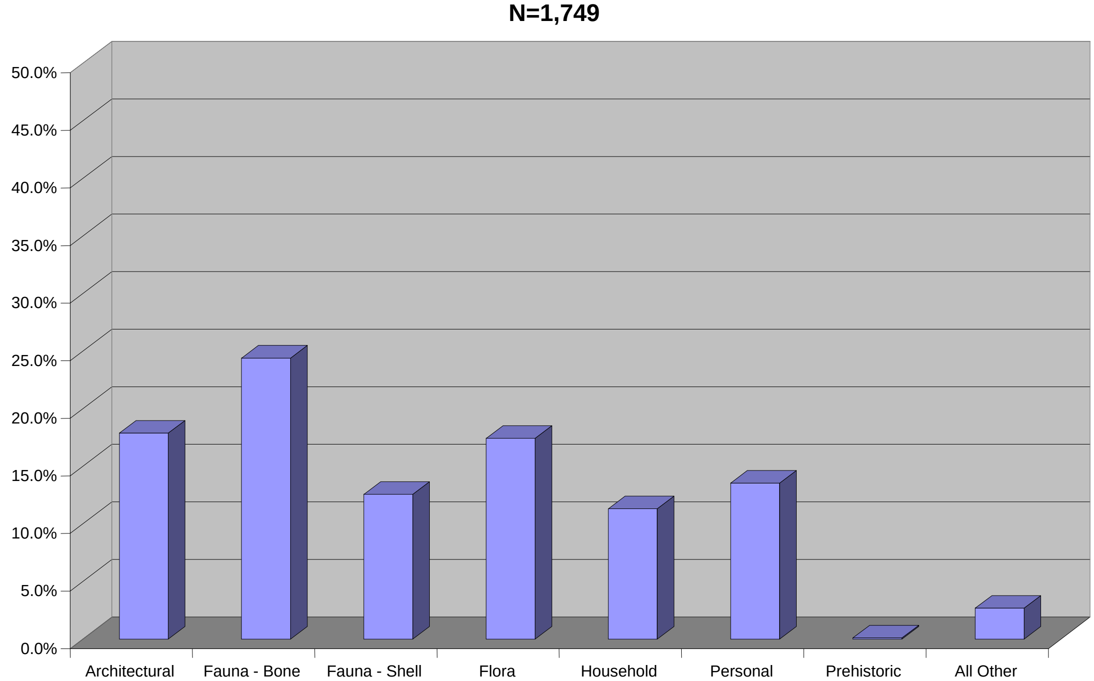


Table 6-16
DU Next to the Wall on the Landward Side Functional Groups

N=1,749



The Personal Group includes 128 pieces of shoes; 94 are from Cat.15768.222 (EU 43 Stratum 8, Level 1); these consist of sole fragments from two different size shoes along with many very small leather fragments. Part of the sole from the heel end of another shoe, with punched holes for sewing the shoe together, was found in Cat. 15768.403 (Artifacts Found While Excavating Under Conduits Between Struts 5 and 6). The rest are unidentifiable fragments. Some cut pieces of leather, probably scrap pieces from manufacturing shoes or tack, are also in this DU (in the Industrial Group, subsumed in the All Other Group on **Table 6-16**). A sherd from a ceramic crucible and a larger one from a ceramic sugar mold are also classified in the Industrial Group.

Most of the Household Group artifacts are similar to these artifacts in other DUs. However, within the Household Group (dominated as usual by British buff-bodied slipwares) there is an unusual sherd. This sherd, from Cat. 15768.178 (EU 29 Stratum 3, Level 1), has a grayish buff body, a greenish yellow glaze and a line of small beads at what might be its shoulder. The other buff-bodied yellow-glazed sherds found in the project area were most probably made in the Netherlands, but this sherd has a different colored and textured body and the beading is unusual. It was possibly made in France or Germany but is too small for determination of its shape. Two other sherds come from German-made vessels, both salt-glazed stoneware jugs with medallions (see **Figure 6.8A**). One, from Cat. 15768.417 (Bastion Inside Wall 4), has a sprigged medallion with a geometric pattern; the other, from Cat. 15768.390 (EU 40) has a poorly applied cracked medallion. This manufacturing defect would not have affected the utility of the vessel but might have been reason enough to send it to a far-off market. A smoking pipe with a manufacturing defect was also found in Cat. 15768.222 (EU 43 Stratum 8, Level 1); this rim sherd has a line of rouletting on the side of the bowl rather than around the rim.

The majority of the bone in this DU by count comes from AU W3 F (n=206) but the most complete and identifiable bones are from AU W4 D (n=181 fragments representing 105 meat cuts) (see **Appendix D**). The bone in AU W4 D includes both dietary and processing waste and possible commercial waste (in the form of two horn cores and two foot bones from cattle). The dietary waste shows a high number of repetitious cuts, notably cattle loin, rib, sirloin and round roasts and stew from the hind shank. There are also a number of bones from sheep hind leg roasts (leg of mutton). Identified fish are cod, red snapper, and salmon. Ms. Pipes, the faunal analyst, hypothesized that the repetition of cuts is a possible indication of refuse from an eatery. The artifacts found in this AU give some support to this supposition. The two German-made jugs, three tin-glazed plates, at least four stoneware and two earthenware mugs[8], and perhaps the pipes could have been tavern rather than domestic refuse. The relative lack of bottle glass, however, weighs against this interpretation. The majority of the shell in this DU came from AU W3 F rather than W4 D, although most in W3 F are weathered and in poor condition. Oyster is again by far the most common type in the DU (at least 127 individuals). Ages range from 1 to 13 years with an average of about 4 years. Many of those above 3 years old have hack marks. Thirty of the 38 mud whelks and 11 of the 12 Atlantic drills were found in Cat. 15768.222 (EU 43 Stratum 8, Level 1, AU W4 D), which also contained obvious food rubbish: pecan, hazelnut, and coconut shells; cherry, peach, plum and melon/squash seeds; and 40 percent of the bone fragments from AU W4 D. There are few artifacts in this context, with the exception of 94 leather fragments from at least two different shoes. Whatever the origin of the dietary residue in

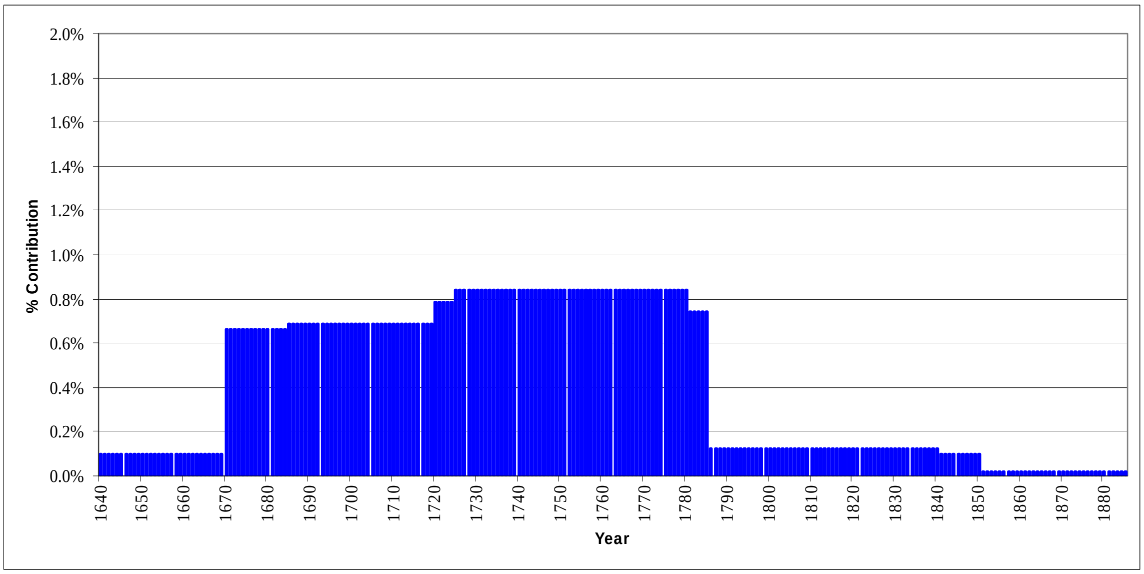
[8] Sherd counts for these types of vessels are higher in the inventory (see **Appendix A**) because the counts given here are an assessment of the minimum number of vessels represented by these sherds.

AU W D—household, tavern, or some communal eatery such as a barracks—it was either mixed with soil taken from the shore or was deposited on the bay bottom.

9. NEXT TO LOG FEATURE ON THE LANDWARD SIDE—AU W3 G

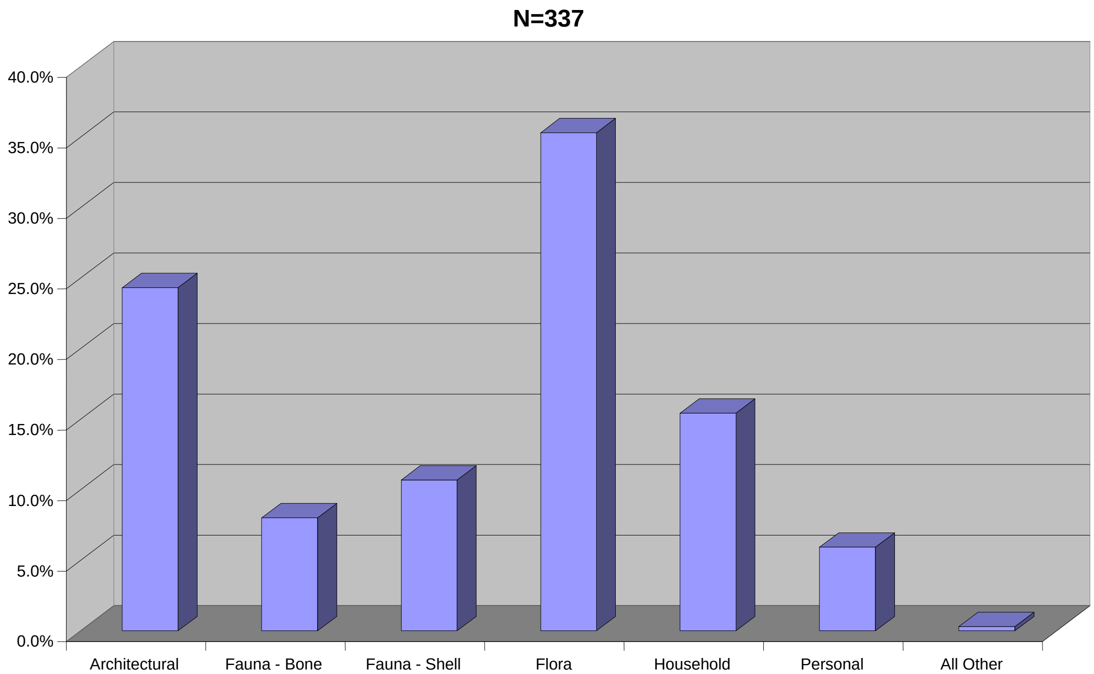
This DU has few artifacts, the most numerous of which are pieces of wood and bark. The only modern artifact is a piece of a post-1893 machine made bottle from Cat. 15768.122 (EU 24A Stratum 4, Level 1). Only 29 dated ceramics were recovered from this DU, 19 of which are British buff-bodied slipwares whose long manufacturing date range of 1670 to 1785 skews the ceramic percent contribution graph even more than usual (**Table 6-17**).

Table 6-17
Percent Contribution Graph for DU Next to Log Feature on the Landward Side
29 Dated Ceramics



A sizable proportion of the artifacts in this DU are pieces of wood and bark (n=110), including many small pieces recovered from flotation samples; all are from EU 24A, Strata 2, 3, and 4. As noted in **Appendix N: Battery Wall Excavation Units**, logs were found in these strata and the wood and bark come from this log feature. The 82 artifacts in the Architectural Group (**Table 6-18**) consist primarily of brick, plaster, and window glass, all probably destruction debris used as landfill. In addition to the British buff-bodied slipwares, the Household Group artifacts include the same general types of ceramics as in other DUs. The bottle glass is fragmentary but most probably came from dark green/black glass wine bottles. One cork was recovered from a flotation sample. The Personal Group Artifacts are smoking pipe fragments. The Fauna-Shell Group is dominated by oysters. Only one mud whelk shell was found, indicating the oysters were most probably dietary refuse rather than natural beds.

Table 6-18
DU Next to Log Feature on the Landward Side Functional Groups



10. BETWEEN WALL 3 AND LOG FEATURE—AU W3 H

This DU has relatively few artifacts but a disproportionate number of floral remains. This DU is made up of the soils in the narrow gap, found on both the landward and watersides of the Wall, between the stone Wall and the cut log feature (see **Appendix N: Wall Excavation Units**). The soils apparently would have begun to accumulate in the 1750s after the log feature was cut to accommodate this section of the Wall. The TPQ artifact is a post-1770 creamware[9] sherd (Cat. 15768.156, EU 27 Stratum 4, Level 1); after that there is a circa 1740 to 1780 dark creamware sherd with a sprigged motif (Cat. 15768.130, EU 25 Stratum 4, Level 3), a circa 1740 to 1770 clouded glaze plate sherd (Cat. 15768.157, EU 27, Stratum 4, Level 2), and a number of post-1720 or 1730 ceramic and glass artifacts from various strata in all three EUs. There are no exclusively 17th century artifacts although some of the tin-glazed sherds and smoking pipe pieces have 17th century beginning dates (see **Appendix A** and **Table 6-19**). EUs 24 and 25 were on the landward side of the Wall and EU 27 on the waterside. Based on the TPQ dates, it is possible that the deposit on the waterside was formed somewhat later than that on the landward side.

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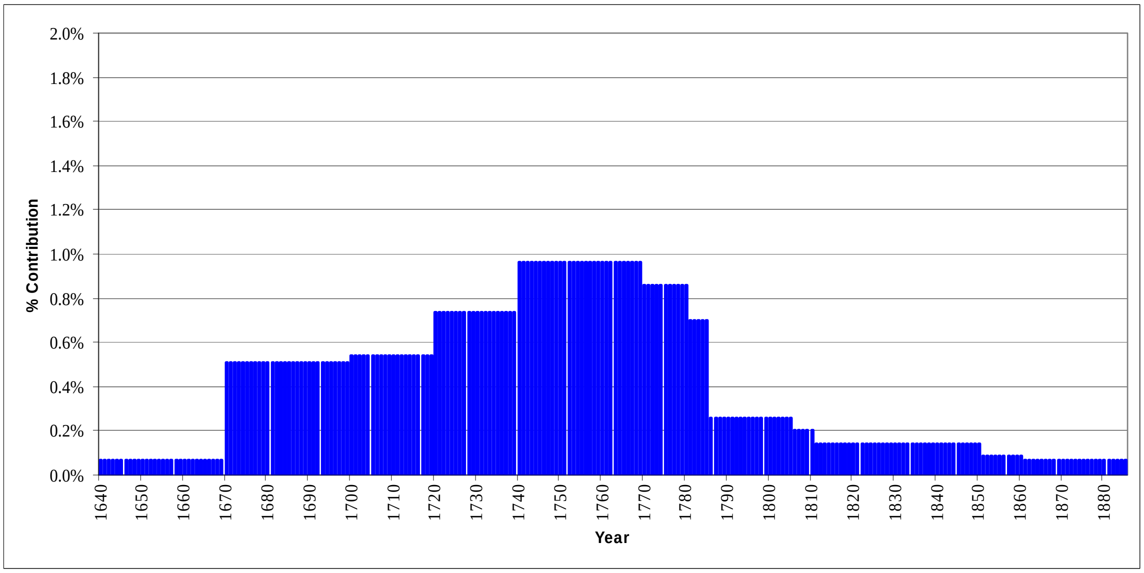
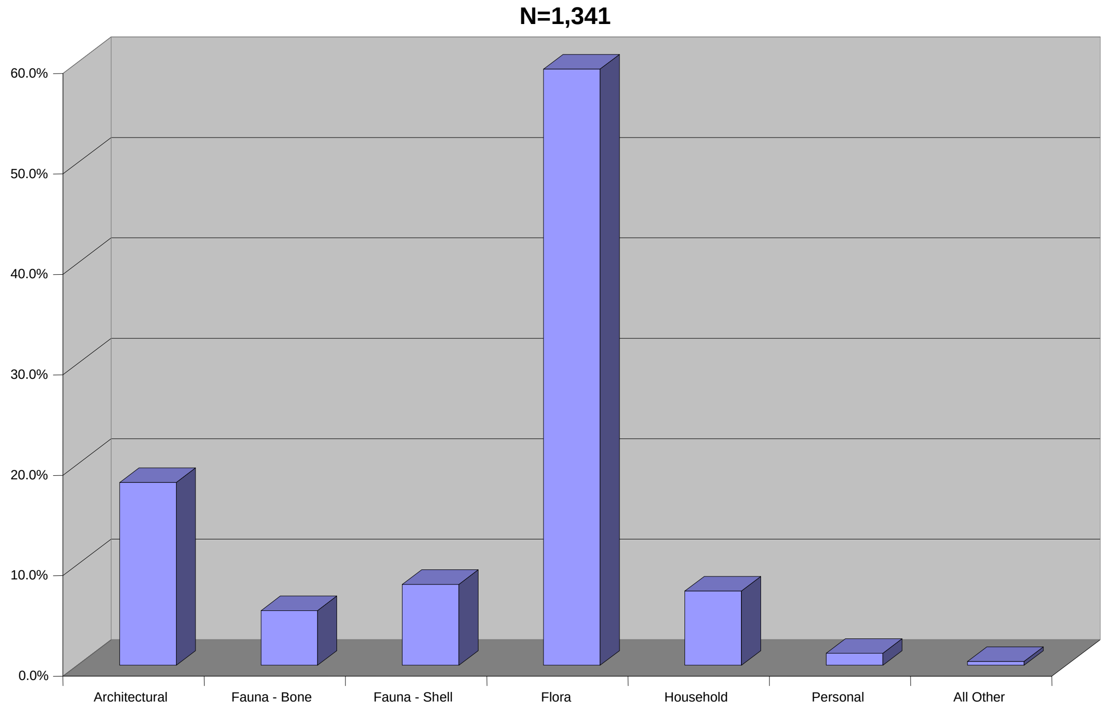
[9] The absolute beginning date of manufacture for creamware in Staffordshire, England is 1762 (Noël Hume 1982:125-126); however documentary evidence, as compiled by Ann Smart Martin, places the date of its wide scale introduction to North America as ca. 1770 (Martin 1989 and 1994). Therefore, on the advice of George L. Miller, a member of the analytical team, 1770 was used as the beginning date for creamware for this project.

Table 6-19
Percent Contribution Graph for DU Between Wall 3 and Log Feature
41 Dated Ceramics



The extraordinary number of floral specimens heavily influenced the Functional Groups percent graph (see **Table 6-20**). The most numerous specimens are 698 raspberry/blackberry seeds from Cat. 15768.159 (EU 27 Stratum 4, Level 5). These seeds, along with the rest of the light fraction from flotation of this context, were sent to PRI for analysis (see **Appendix E**). Plant fragments from flotation include seeds from a great variety of both food and weedy plants. In addition to the raspberries/blackberries, fruit seeds from strawberries (over 250 from the light fraction), figs, mulberries, elderberries, blueberries, grapes, cherries, watermelon, plums, and perhaps huckleberry are present (see **Appendix E, Table 3**). Mint and pokeweed might also have been eaten and flax could have been used for its oil or for its fibers. Weed seeds are well represented: various marsh sedges (over 200 seeds from the light fraction), bulrushes and smartweeds/knotweeds (over 300 seeds) that prefer wet soils were identified along with amaranth, goosefoot, purslane, dock, jimsonweed, nightshade, chickweed, and clovers—all plants that prefer a drier habitat. Juniper, tulip poplar, spruce and American hophornbeam tree parts were found. Fragments of bark and uncharred wood chips from pine along with some larger pieces of pine and white oak were interpreted as parts of the log feature itself. The logs taken for dendrochronological analysis (see **Appendix H**) were identified as *Pinus rigida* (pitch pine) and oak, confirming this interpretation, although only one log is oak and the rest are pine. PRI identified charcoal from maple, buckeye, ash, tulip popular, pine and oak (including a white oak) and plum/cherry. The charcoal might have been from ashes swept out of fireplaces and incorporated into soils used as fill. A few fragments of coal were also found in the light fraction.

Table 6-20
DU Between Wall 3 and Log Feature Functional Groups



The presence of such a large number of berry seeds is usually an indication of nightsoils, either *in situ* in a privy or where nightsoils were deposited after privy cleaning. For 19th century and earlier deposits, such seeds are almost invariably accompanied by indications of human parasites, especially egg cases. PRI analyzed a selected number of samples for evidence of human parasites (*Trichuris* sp. eggs) and found them in only one, the control sample taken near Wall 1 (see **Appendix E**). Cat. 15768.159 was not one of the samples analyzed for parasites so, in spite of the large numbers of small seeds that could pass through the human digestive tract, it is not possible to positively identify this deposit as nightsoil. Nevertheless, it is possible that this area of the Wall was where privy cleaners emptied their tubs or where people defecated, either formally in a public privy or informally over the Wall. If the seeds in this sample did not come from nightsoil, they might be the remains of processing foods for commercial purposes, such as making jellies, or this might have been an area where household refuse was dumped, although the small number of bones present (see **Appendix D**) argues against this. Alternatively, the seeds might be from spoiled market refuse, although no vegetable seeds or plant parts were identified, which would be expected in an area where market refuse was dumped.

Among the flotation remains identified by PRI are some non-human generated items, including sclerotia (the resting forms of certain fungi that have a symbiotic relationship with trees) as well as insect parts, eggs, and a pupa fragment. The sclerotia could have been present in soils used as fill. The insect parts could have been carried into the fill along with dietary refuse, either as part of spoiled market refuse or with food remains that had remained in the open long enough to accumulate insects, or they could have been present in nightsoils.

Shell pieces weighing approximately 0.6 kilograms from at least 39 oysters, at least 12 soft shell clams weighing approximately 0.02 kilograms, at least 11 quahogs weighing approximately 0.2 kilograms, and two mussels were collected. Many of the shells are fragmentary and none are paired, which suggests food refuse rather then natural beds. Many of the oysters are too fragmented and weathered for determination of age, but those that could be measured are between one and eight years old, with the majority at four or five years. Hack marks are present on eight of the oysters. There is a difference between the landward EUs (24 and 25) and the waterside EU (27) in that all but one of the 16 mud whelks and all seven of the periwinkle shells were found in EU 27, which supports the supposition that the landward area in back of the Wall began to be filled shortly after or as the Wall was built while the other side remained under water.

The phytoliths from this DU (from EU 25, Strata 5 and 6) include a diverse assemblage of diatoms and sponge spicules characteristic of a shallow brackish wetland or estuary (see **Appendix E**). Grass phytoliths from species tolerant of brackish water were also identified.

The relatively few non-floral or faunal objects in this DU consist of the same types of artifacts as in the previous deposits, with a few differences. There are no appreciable differences between the landward and waterside EUs. The Architectural Group artifacts are fragmentary (except for three yellow brick bats) and include more window glass than most other DUs, in part due to the high number of glass fragments found in the flotation samples. The Household Group artifacts, as noted above, do not include any very early or very late types. One unusual artifact is a piece of an English leaded wineglass stem (wineglass stems in general are not common in the site collection) with a twisted enamel line and bubble motif, manufactured circa 1725 to 1780. This piece, from Cat. 15768.156, EU 27 Stratum 4, Level 1, is very small but distinctive.

11. INSIDE LOG FEATURE—AU W3 L

This DU contains only a small number of artifacts (302). No artifacts with late beginning dates of manufacture are among them although many have long manufacturing date ranges, particularly the ceramics (see **Table 6-21**) and smoking pipes. The TPQ is 1720, based on the presence of a number of imported English white and locally made gray salt-glazed stoneware sherds. Only two artifacts, both pipes, have manufacturing date ranges of under 50 years. The first is an English-made elbow bowl, similar to one illustrated by Walker (1977:1543) that he dated 1690 to 1720 (Cat. 15768.337 Log Feature Layer 1). The other is a whole English bowl with a broken heel from Cat. 15768.339 (Log Feature Layer 3) that might have been made circa 1680 to 1720.

The Architectural Group is the most numerous and interesting (see **Table 6-22)**. Log 92 (Cat. 15768.457) is a 12.5 inch-diameter log hewn flat on two parallel sides; its thickness between the hewn edges is 9.5 inches (see **Figures 6.9** and **6.10)**. Near the tip it was hewn down to 10 inches by 9.5 inches. The end was cut with an axe or adze into a beveled V shape diagonally across the rectangular cross section. A mortise hole 3.5 by 4.5 inches was cut to accommodate a rectangular timber 3 inches by 4 inches held in place by a wooden peg. The end of this timber has broken off and the end of Log 92 was sawn off in the field, exposing at least 63 rings on the log's surface. If this log, like the others from the Log Feature, was cut in 1733 or 1734, it would have started growing sometime before 1673/1674. Log 92 is pine, but the rectangular timber piece might be a hardwood.

Table 6-21
Percent Contribution Graph for DU Inside Log Feature 36 Dated Ceramics

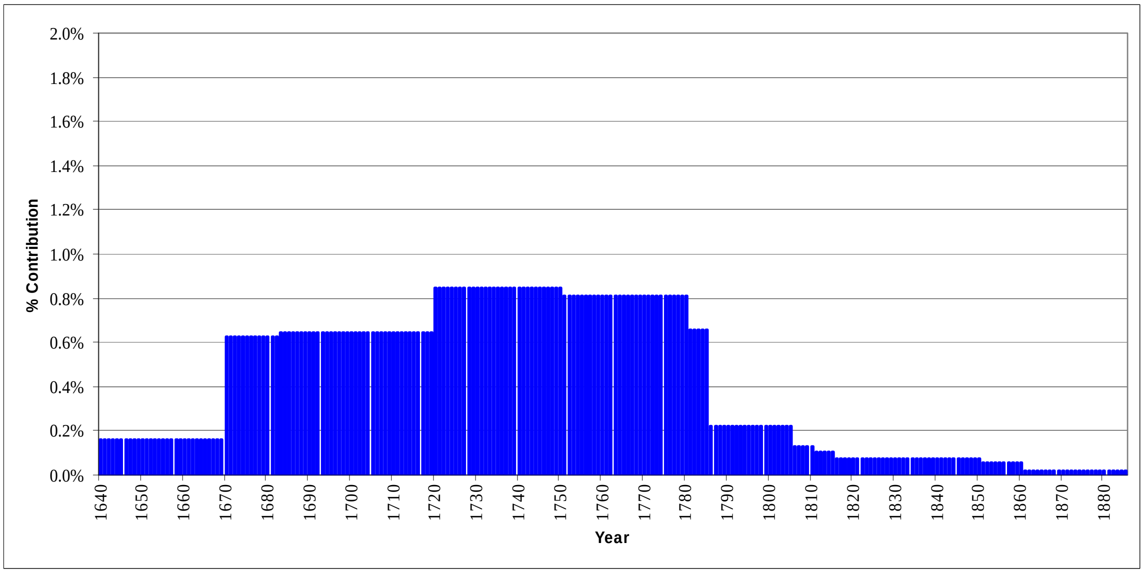
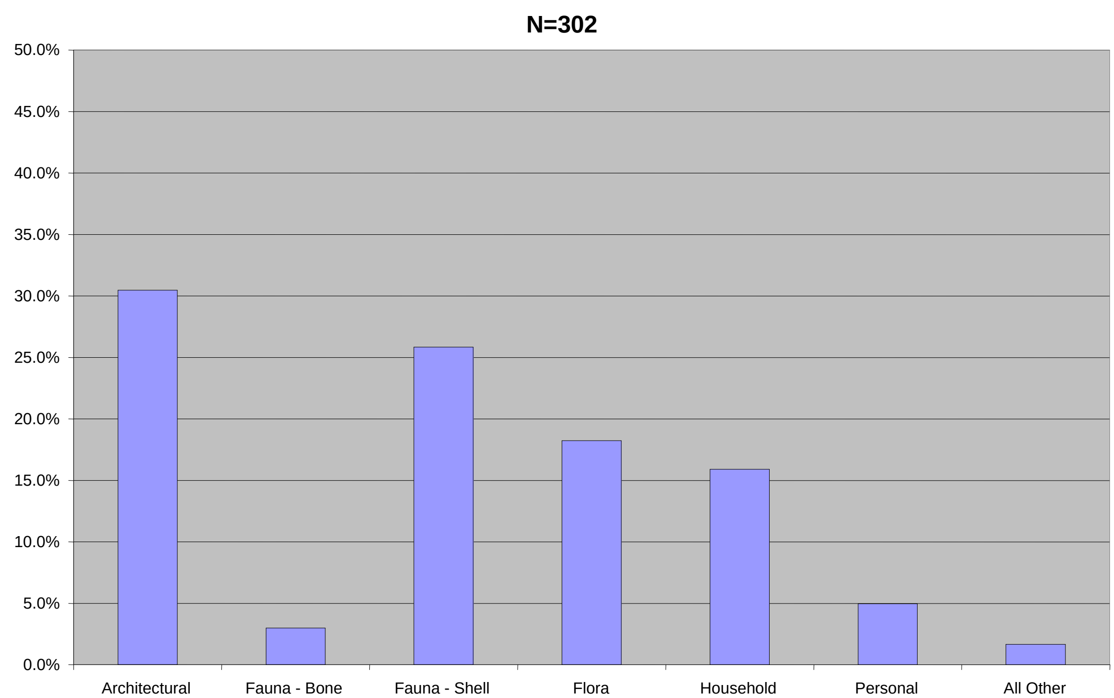


Table 6-22
DU Inside Log Feature Functional Groups



Log 93 (Cat. 15768.455) is 12.5 inches in width and 9.5 inches thick and has been hewn on three sides (see **Figure 6.11**). It also has a mortise hole (3.5 by 4.75 inches) near its tip, but there is no timber remaining here, although a peg (probably made of a hardwood such as oak or hickory) remains in a hole drilled through the log into the mortise hole. Another long peg or dowel protrudes from one of the flattened sides but does not pass through the log. The tip of this log is somewhat deteriorated but it appears to have been hewn roughly flat, not beveled like Log 92. A section from this log was sent for dendrochronological analysis: it was identified as coming from a pitch pine tree (*Pinus rigida*) that started growing in 1653 and was cut in 1734.

In addition to these logs, the Architectural Group includes small pieces of red and yellow brick and fragments of window glass, mortar, plaster and roofing tile, all probably destruction debris.

There are few bones in this DU but a relatively large amount of shell from edible species. Oyster is the most numerous (at least 44 individuals weighing approximately 0.8 kilograms), followed by quahog (at least 13 weighing about 0.1 kilograms), and soft shell clam (at least 16 weighing about .04 kilograms); there is one mussel shell and four mud whelks. Most of the shell, as can be seen in the high individual to weight ratios, is fragmentary. Only six oysters could be aged and three of these showed just one year's growth. Eight have hack marks.

The Floral Group is dominated by 46 pieces of bark (species unidentified but almost certainly from the log feature and thus probably pine) but also contains seven cherry and one peach pits as well as a seed from the squash/melon family. Because no excavation units were in this DU, no flotation samples were taken and no microfloral specimens were available.

The Household and Personal Group artifacts are unremarkable, with the exception of the two pipes noted above. The Household ceramics include sherds of British buff-bodied slipwares, redwares, local and imported stonewares, tin-glazed earthenwares, and Chinese porcelains. There are only five small glass sherds.

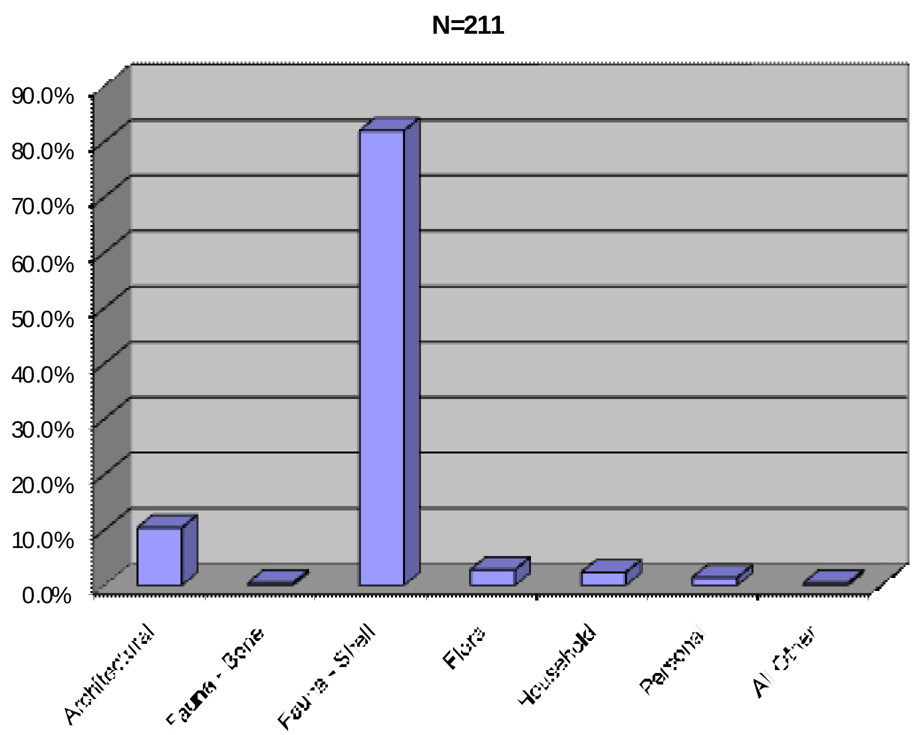
12. BENEATH LOG FEATURE—AU W3 J

Very few (n=211) artifacts were recovered from this DU. Only one ceramic sherd (of British buff-bodied slipware) and three pipestem fragments were assigned dates; all have long manufacturing date ranges extending from the last years of the 17th though the 18th century for the sherd and into the 20th for the pipes. (Pipestem dates are based on bore diameters if no decoration or mark is present. Some bore diameters were made for very long periods of time and do not make good dating tools.)

Over 80 percent of the objects in this DU are shell, both edible and non-food species (see **Table 6-23).** Soft shell clams make up the great majority of the edible species (at least 107 individuals weighing 1.1 kilograms) and there are 40 whelks (28 mud whelks and 12 Atlantic drills). Only 18 oysters (0.3 kilograms) and six quahogs (0.2 kilograms) were recovered and only one oyster has hack marks. The oysters are aged between one and ten years and some are very fragmentary.

The floral remains consist of single pits from a cherry and a peach and two pieces of plum pit, a squash/melon seed, and a piece of a fungus, probably a species that grew on wood. The only bone found was a partial cow molar.

Table 6-23
DU Beneath Log Feature Functional Groups



This deposit appears to be from an estuarine environment, i.e. the bay bottom before the log feature was built. The artifacts and floral material and some of the edible shellfish remains probably accumulated there from casual disposal of garbage along the shoreline and its subsequent dispersal by tidal and other aquatic forces. The majority of the shellfish, however, in particular the soft shell clams, were probably from a natural bed that predated the feature.

13. FOUNDATION AND UNDERNEATH THE WALL—AU W 1 E, W3 I, AND W4 E

The deposits in this DU will be discussed separately by AU, as the Wall sections were built at different times and on different substrata (see **Chapter 5:A.9. Battery Wall Conclusions**). Wall 1 is earliest (circa 1741) and was constructed almost directly on bedrock. Wall 3 was built on a foundation of boulders and cobbles and Wall 4 on a sand foundation, both circa 1755.

Only 192 artifacts and pieces of faunal materials were found in AU W1 E and of these 36 are fragments of mortar and eight are small pieces of brick. The area appears to have been contaminated to some extent during excavation by flooding and construction activities (see **Appendix N: Excavation Unit 18**); the latest artifact is a post-1940 yellow plastic tube, possibly for electrical wiring, from Cat. 15768.073 (EU 18 Stratum 1, West). Only two other artifacts, a British slipware sherd and a tiny fragment of smoking pipe, can be dated. The pipebowl is fluted, a decorative technique that began circa 1770 and continued into the early-20th century. Only ten bone and one hard shell clam fragments were found.

AU W4 E contained 372 artifacts and pieces of faunal material. The TPQ of 1720 is from a finely made black-glazed red earthenware sherd, possibly from a teapot. Only three other artifacts were given dates: a sherd from a Fulham-style stoneware mug made in England between 1690 and 1775, a pipestem (circa 1650 to 1850) and a tin-glazed sherd (circa 1640 to 1780). The black-glazed vessel could have been made throughout the 18th and well into the 19th centuries, thus these dates are not very precise.

Almost 70 percent of the objects in this AU are shells (see **Table 6-24**), including 72 mud whelks, 17 jingles, and 9 Atlantic drills. Jingles (*Anomia* species), like oysters, attach themselves to hard surfaces such as rocks and other shellfish. EU 43 Strata 9 and 10 (Cats. 15768.223 and .224) had especially large numbers of mud whelk, jingles, soft-shell clams, and oysters. Only one of the oysters from Stratum 9 and two from Stratum 10 have hack marks. Two contexts from Trench 6, (Cats. 15768.395 and 402) are included in this AU; in the field (see **Chapter 5:A.5.c. Non-Excavation Unit Contexts**) the presence of many soft shell clams was noted, particularly in Cat. 15768.402 (Stratum 6, a dark gray sand). The clams from Trench 6 were not collected, however, so do not appear on the inventory (see **Appendix A**) nor on **Table 6-24**. Taken in conjunction with the shells that were collected from the excavation units, the clams most probably indicate that Wall 4 was built on sands that were a natural shell bed. Some land-derived refuse was mixed with these sands: a small amount of food bone fragments, peach pit and coconut fragments, the hacked oysters, fragments of an iron barrel hoop, and some destruction/construction debris (several small pieces of brick, plaster, and roofing tile). A small, slightly oval, smooth pebble was also found in EU 43 Stratum 10. This might have been completely natural but might also have been used as a gaming piece. Ten pieces of shoe leather were in Stratum 9 (shoe pieces were also found in the overlying Stratum 8, AU W4 D).

Table 6-24
AU W4 E Functional Groups

Group	Count	Percentage
Activities	5	1.3%
Architectural	28	7.5%
Fauna-Bone	13	3.5%
Fauna-Shell	257	69.1%
Floral	49	13.2%
Household	6	1.6%
Personal	11	3.0%
Unidentified	3	0.8%
Total	**372**	**100.0%**

The TPQ for AU W3 I is a small post-1820 whiteware sherd from Cat. 15768.149 (EU 26 Stratum 6, Level 1). A piece of a coarse red earthenware sewer pipe, probably dating to the 19th or even 20th centuries, was found in Cat. 15768.078 (EU 20 Stratum 2, Level 2). After these dates, there are several post-1770 artifacts (four creamware sherds, all from the same context as the whiteware sherd), a number of post-1730 bottle sherds (including 20 sherds from one English wine bottle in Cat. 15768.186, EU 29 Stratum 7, Level 2), and many post-1720 imported and locally made salt-glazed stoneware sherds from various contexts. The wine bottle with 20 sherds was possibly made between 1730 and 1750, based on its shape and basal sag. Several ceramic sherds also have 1750 or earlier end manufacturing dates, including a finely potted tin-glazed vessel, probably a teacup (Cat. 15768.175, EU 28 Stratum 1, Level 2), and four sherds of Midlands Mottled earthenware. Midlands Mottled earthenware is generally found as mugs but these sherds are too small for identification of their form. They were found in four different EUs (20, 21, 30, and 32, all from Strata 1 or 2 except for Stratum 8 in EU 30) so it is likely they came from more than one vessel. The most closely dated artifact was a pipestem, from Cat. 15768.349 (East of Wall), decorated with six rows of rouletted bands with coggled teeth; it was probably made in the Netherlands between 1680 and 1700. Many such pipes were recovered during the archaeological excavations of the circa 1670 to 1706 Kings Tavern nearby on Pearl Street (Rothschild, et al. 1987).

AU W3 I has many more artifacts than the others in this DU and they are distributed differently among the Functional Groups (see **Table 6-25**). Shell is still the most numerous but it does not dominate the assemblage as in AU W4 E, in spite of the presence of 135 mud whelks, 19 barnacles, 17 Atlantic drills and another 17 periwinkles. Of the 192 or more oysters here, 28—ranging in age from 2 to 11 years—have hack marks. One has a shuck mark but the majority has no hack or shuck marks. These unmarked specimens range in age from less than one year to 11 years, but most are in the 1 to 3 year range. At least 70 quahogs, 50 soft-shell clams, 29 mussels, and 1 scallop were also in this AU. The shell assemblage is thus composed of both dietary deposits and non-food species.

Table 6-25
AU W3 I Functional Groups

Group	Count	Percentage
Activities	1	<0.1%
Architectural	338	17.1%
Arms	1	<0.1%
Fauna-Bone	170	8.6%
Fauna-Shell	581	29.4%
Flora	540	27.4%
Household	250	12.7%
Other	1	<0.1%
Personal	63	3.2%
Prehistoric	3	0.2%
Toy	1	<0.1%
Unknown	25	1.3%
Total	**1974**	**100%**

The bone is interesting because it has certain characteristics that point toward refuse from an eatery: the assemblage includes two nearly complete cattle pelvic bones with cut marks from two individuals and a number of beef and mutton stew and roast cuts (see **Appendix D**). The large size of the roasts represented by the pelvic bones would be excessive for a single household but would be suitable for a tavern or other establishment that supplied food to many people. The oysters and clams from this AU would also have been common items on New York eateries' bills of fare.

The floral material could have come from either an eatery or a simple household. It includes over 100 raspberry/blackberry seeds; grape, fig, strawberry, and melon/squash seeds; peach, plum and cherry pits; and shell fragments from coconut, walnut, and hickory. Whatever the source(s) of this food refuse, it was left out long enough to attract insects, as remains from beetles and a maggot casing were identified in flotation samples from Cats. 15768.187 (EU 29 Stratum 8, Level 1) and 15768.201 (EU 32 Stratum 1, Level 1). Some of the bones were gnawed by scavengers and were weathered, another indication of exposed food refuse.

In addition to the food remains, 325 pieces of wood, bark, and charcoal were recovered, 145 of them from EU 21 Stratum 2 (Levels 1 and 2, Cats. 15768.082 and .083). Of these 145, 103 were small pieces of bark, 3 were charcoal, and the rest were fragments of wood, none of which showed saw or other marks. In the Faunal Group, a fossilized shark tooth and four pieces of coral were found.

The Architectural Group consists primarily of red and yellow brick but there is also window glass (some of it trimming pieces from making windows) and mortar, though no roofing tiles and only one fragmentary wall tile. These artifacts could have come from either destruction or construction debris. One complete yellow brick from Cat. 15768.335 (Base of Wall) has visible shell temper, including one small but complete oyster shell (see **Figure 6.8B).**

The Household Group, although relatively small, has some interesting artifacts. Most of the ceramic and glass artifacts are too small for identification of their precise shapes, but the presence of ceramic ware types often used for mugs (in particular the Midlands Mottled earthenware and the salt-glazed stonewares mentioned above) as well as a number of sherds from bottles (including the circa 1730 to 1750 vessel) could support the supposition that some of this refuse comes from a tavern. The 1730 to 1750 English wine bottle (Cat. 15768.186, EU 29 Stratum 7, Level 2) was made in a dip mold and has some basal sag. Over half of the bottle is extant, an unusual situation for this site. One bottle sherd, also from Cat. 15768.186, has an incised design on its interior in the shape of a star or asterisk. This is likely the work of someone altering the sherd after it was broken, either idly or to use this piece as some sort of marker. One tin-glazed sherd was definitely altered for use as a gaming piece or marker. From Cat. 15768.175 (EU 28 Stratum 1, Level 2), it was a round piece—now broken—made from the flat base of a plate or bowl.

A thick piece of clear lead glass, possibly the base to a tumbler or decanter, a sherd of a tin-glazed punch bowl with a polychrome floral motif, and a sherd from a candlestick made of British slipware could have come from a tavern or household. In the Personal Group, the smoking pipes, which are often plentiful in early tavern deposits, are not distinctive except for the rouletted stem in Cat. 15768.349 (the same context that included the two cattle pelvic sections). Pieces of at least two shoes, one with a rounded toe, are also in this context.

The geochemical analysis of a soil sample from Cat. 15768.149 (EU 26 Stratum 6, Level 1) showed a chemical profile characterized as mixed earthen fill (see **Appendix I**)**.** This stratum also had a large number and diversity of diatoms and sponge spicules that indicate a brackish or marine environment as well as partially charred plant material (see **Appendix E**). Soils from other excavation units in this AU had different chemical signatures (see **Table 6-26)**.

All these contexts contained artifacts (**Appendix I** discusses other geochemical samples taken for Wall 3 from Trench 4 but no artifacts were included in these samples). It appears that the soils used to create a substratum for Wall 3, and the artifacts contained therein, came from a variety of places, including both estuarine and terrestrial sources.

Table 6-26
Chemical Signature Information from Appendix I for AU W3 I EUs[10]

AU	Cat #	Deposit Type	EU
W3 I	15768.149	Mixed earthen fill with shell	EU 26 Str 6, Lev 1
W3 I	15768.175	Mixed earthen fill with artifacts	EU 28 Str 1, Lev 2
W3 I	15768.186	Estuarine sediments with wood and charcoal	EU 29 Str 7, Lev 2
W3 I	15768.187	Estuarine sediments	EU 29 Str 8, Lev 1
W3 I	15768.195	Mixed earthen fill	EU 30 Str 7, Lev 1
W3 I	15768.196	Sandy fill with shell and wood	EU 30 Str 8, Lev 1
W3 I	15768.201	Gray sandy alluvium	EU 32 Str 1, Lev 1

14. WALL DISMANTLE, INSIDE THE WALL FILL—W1 F, W2 B, W3 M, AND W4 F

As with the previous DU, this deposit will be discussed by AU. There are differences between the dates of the artifacts found in the four AUs as well as in their Functional Groups (see **Table 6-27**) No excavation units were placed entirely within the Wall fill so contexts will be identified by their catalogue numbers.

Table 6-27
Wall Dismantle AUs Functional Groups

Analytical Unit	Group	Count	Percentage
W1 F	Architectural	64	48.1%
W1 F	Fauna-Shell	17	12.8%
W1 F	Fauna-Bone	15	11.3%
W1 F	Flora	19	14.3%
W1 F	Household	12	9.0%
W1 F	Personal	3	2.3%
W1 F	Unknown	3	2.3%
W1 F Total		**133**	
W2 B	Architectural	25	100.0%
W2 B Total		**25**	
W3 M	Architectural	68	28.0%
W3 M	Fauna-Shell	69	28.4%
W3 M	Fauna-Bone	40	16.5%
W3 M	Flora	21	8.6%
W3 M	Household	33	13.6%
W3 M	Personal	12	5.0%
W3 M Total		**243**	
W4 F	Architectural	54	39.4%
W4 F	Fauna-Shell	40	29.2%
W4 F	Fauna-Bone	4	2.9%
W4 F	Flora	1	0.7%
W4 F	Household	29	21.2%
W4 F	Personal	8	5.8%
W4 F	Unknown	1	0.7%
W4 F Total		**137**	
Grand Total		***538***	

[10] For a full description of these EUs, see **Appendix N**.

The TPQ artifact for AU W1 F is from a sherd of transfer-printed whiteware made between 1820 and 1870 (although the sherd, from a baker or a nappie, shows considerable wear so is unlikely to be from the early part of this date range). It was found in Cat. 15768.244 (ET1 Beam 27-28, 6.5 feet Below Beam Among Mortar & Rock).

A deposit immediately adjacent to this one (Cat. 15768.245, East ET1 Wall Beams 27-28, 6.5 feet Below Beam From Between Mortar and Rock) has a sherd from a post-1785 Chinese porcelain plate with the Canton motif and an obvious kiln adhesion. This sherd was probably made between 1785 and 1830 but could have been deposited many years after its manufacture. The kiln adhesion made this vessel second quality but it would probably have still been more expensive than earthenwares. A sherd from an Albany-slipped stoneware jar (post-1805 to circa 1900) was found in EU 17 Stratum 1 Level 1 (Cat. 15768.067).

AU W 2 B has only 25 artifacts: brick, mortar, and cut sandstone pieces (with mortar attached). Two mortar samples from this area (Cats. 15768.553 and 554) were among those sent to Testwell for analysis. The results are discussed in **Appendix G**. To briefly summarize the results, all the mortar samples from the South Ferry project were made with rock lime, possibly made from Inwood Marble which outcrops on Manhattan, rather than oyster shell lime.

AU W3 M has by far the most artifacts in this DU, although only seven could be assigned dates. Its TPQ is 1765, from a sherd of painted creamware (Cat. 15768.342) manufactured between 1765 and 1810. The next latest beginning dates are 1720 from two salt-glazed stoneware sherds from Cats. 15768.344 and 15768.332.

The Architectural Group artifacts include red and yellow brick pieces, window glass, mortar (30 pieces from Cat. 15768.346, which account for almost half the objects in this group), an iron pipe, and cut stone. Oyster, quahog, soft-shell clam, and mussel, much of it in small pieces, were found. Only one mud whelk is in this AU. The relatively abundant bone (see **Table 6-27)** is in small pieces; only cattle and sheep could be identified to the species level but a variety of foods are represented (see **Appendix D**). Only one bone has a butchery mark and a few are calcined (burned to the point of becoming white) but none are gnawed.

In the Household Group, the TPQ rim sherd from a creamware teacup has beaded molding with a red and black painted floral motif on the exterior and a delicate red and black vine design beneath the rim on the interior. One burned piece of a stemware is too fragmentary for identification of any decoration that might have been present on the whole wineglass. The Personal Group consists of a bead and pipestem fragments. The only measurable pipestem is very badly weathered and rust stained. The glass bead (Cat. 15768.346) is a white oval with red and blue stripes. Only six glass beads were found from the entire project area (three were from the Wall 3 area—AUs W3 B, W3 H, and here in W3 M) and all have different decorations (see **Appendix A**).

The TPQ for AU W4 F is a rim sherd from a creamware saucer made between 1770 and 1810 (Cat. 15768.427). The next latest artifact, from the same context, is a sherd of white salt-glazed stoneware with scratch blue decoration, which dates this sherd to between 1744 and 1775. The deposit also has some earlier artifacts, namely a circa 1620 to 1710 pipestem and a circa 1640 to 1730 onion-shaped wine bottle.

The Architectural Group includes at least some destruction debris, as evidenced by the presence of a whole red brick with attached mortar (Cat. 15768.389). One of the five tin-glazed wall tiles (all from Cat. 15768.427) is complete enough to identify its blue-painted motif (see **Figure**

6.12A): Christ on the cross being offered a vinegar-soaked sponge to alleviate his thirst (John 19:29). Biblical scenes were frequently used as motifs on wall tiles.

The shell is dominated by oysters (29 of the 40 specimens recovered). During field excavations, the oysters from Cats. 15768.385 and .421 were observed to be attached to the Wall. Not surprisingly, none had hack or shuck marks, although none are paired, as might have been expected in a natural deposit. Four are aged at two years and the remaining 24 at one year.

In addition to the creamware and white salt-glazed TPQ sherds, the Household Group ceramics from AU W4 F include two very water worn redware sherds (also from Cat. 15768.427). Other ceramics are sherds from one or two British slipware porringers (small handled bowls) or drinking pots and at least one tin-glazed plate. Pipestem fragments are the only artifacts in the Personal Group.

15. MISCELLANEOUS AUS—W3 K AND W4 G

The two AUs will be discussed separately. Both had relatively high percentages of Household and Personal Group artifacts, probably because many of the contexts in this DU are miscellaneous finds encountered while cleaning the Wall surfaces or from contaminated contexts (see **Table 6-28**).

Table 6-28
Miscellaneous Wall AUs Functional Groups

	W3 K		W4 G	
Group	**Count**	**Percentage**	**Count**	**Percentage**
Architectural	56	13.4%	83	13.7%
Arms	0 (0.0%)	0 (0.0%)	1	0.2%
Flora	16	3.8%	1	0.2%
Hardware	3	0.7%	1	0.2%
Household	138	33.0%	283	46.7%
Personal	75	17.9%	149	24.6%
Industrial	3	0.7%	4	0.7%
Tool	1	0.2%	0 (0.0%)	0 (0.0%)
Medical	1	0.2%	3	0.5%
Fauna-Shell	52	12.4%	16	2.6%
Fauna-Bone	72	17.2%	62	10.2%
Fuel	1	0.2%	0 (0.0%)	0 (0.0%)
Transportation	1	0.2%	0 (0.0%)	0 (0.0%)
Unknown	0 (0.0%)	0 (0.0%)	3	0.5%
TOTAL	**419**		**606**	

AU W3 K shows evidence of recent disturbance in EU 22: a dime made in 2000 is in Cat. 15768.090 (EU 22 Stratum 2, Level 3) and a quarter from 1971 in Cat. 15768.089 (EU 22 Stratum 2, Level 1-2). This latter context also contains a piece of post-1927 safety glass, probably from a vehicle. These artifacts likely entered EU 22 during flooding caused by construction activities (see **Appendix N: Wall Excavation Units**). A post-1893 machine-made bottle and a post-1820 whiteware sherd were found in Cat. 15768.305 (Wall 3 Cleaning). The majority of the ceramics, however, have pre-1750 beginning dates of manufacture (see **Appendix A**). Earlier artifacts include two sherds of Dutch-style earthenwares (circa 1620 to 1710), a maiolica dish base sherd, (see **Figure 6.12B)** and several 17th century pipestems.

Household Group artifacts include several interesting objects. The first is a sherd from a British buff-bodied slipware dish made on a drape mold into which a design had been cut (the remaining design appears to be part of a face) (see **Figure 6.13A**). The raised design on the vessel was highlighted with slip after it was removed from the mold. Plates like this were made in England circa 1670 to 1730 (Barker 1993:15). A sherd from an overfired and warped redware vessel with three trailed slip lines, probably made in the New York metropolitan area, is in ET 4 (Cat. 15768.558). A much more elegant vessel is from Cat. 15768.350; this large Chinese export porcelain creamer, probably in a helmet shape (only part of the base remains), is painted in a bright cobalt blue (see **Figure 6.13B**). Helmet-shaped creamers were popular in the latest 18th and early-19th centuries.

A large salt-glazed stoneware jar from Cat. 15768.358 was made either in New York City or in New Jersey (see **Figure 6.14A**). The **pomegranate** motif seen on this jar is associated with the Kemple family (Goldberg et al. 2008). The first Kemple probably worked with the Crolius and Remmey families in New York City before setting up his own small pottery in Ringoes, New Jersey (Springsted 2004). This jar also has a large kiln scar on its shoulder where a kiln pad used to separate stacks of pots in the kiln adhered to it. The side under the scar is pushed in, most likely from the weight of an adjoining vessel.

A different kind of vessel was placed in the Industrial Group. This large red earthenware foot (see **Figure 6.14B**) is probably from a syrup jar, the large vessel used to hold a sugar cone mold while it drained. At least some syrup jars, according to illustrations in Diderot's *Encyclopedia* (Gillispie 1987, Plate 41 Fig. 7) had multiple feet rather than solid bottoms. This unglazed foot has heavy wear on its base, probably from sliding across a rough surface.

The Personal Group is made up of some unusual artifacts as well as some interesting smoking pipes. A Revolutionary War-era button from Cat. 15768.090 (EU 22 Stratum 2, Level 3) is marked "**USA**" (see **Figure 6.15A**). This is an enlisted man's pattern; similar buttons have been found on circa 1778 to 1782 campsites in the Hudson Highlands and in New Jersey (Troiani 2001). The 20 pieces of shoe leather in this AU come from at least two shoes. Both have intact soles and heels with wooden pegs. Two copper alloy shoe buckles were also found (see **Figure 6.15B**). One is much more delicate than the other, but both were well made.

The smoking pipes include an early (circa 1620 to 1660) heeled belly bowl with a rouletted rim and a circa 1655 to 1739 stem with a marked heel. The mark is probably "**II**" in a circular banded cartouche and was probably made either in the Netherlands circa 1655 to 1690 or in Bristol circa 1707 to 1739.

The relatively few Architectural Group artifacts include some large yellow brick bats, smaller red brick pieces, pieces of wall and roofing tiles, mortar, a few pieces of window glass, and a heavy railroad-type spike. The five yellow bricks measure from 1.3 to 1.6 inches high and 3.1 to 3.3 inches wide. The only one complete enough for length measurement is 6.8 inches long.

Most of the shell is from the edible species oyster, quahog, and soft-shell clam. Two of the oysters have hack marks. Only five mud whelks and no other marine snails were recovered. One of the mud whelks (from Cat. 15768.356, Wall 3 Cleanup) was found inside a two inch long section of a one-half inch diameter iron tube of unknown function.

The bone is remarkable because of the high frequency of pieces that could be identified by species and skeletal element (i.e., it is less fragmentary than most of the bone from this site). Cattle are the most common and include both dietary and some tanner's processing waste (see **Appendix D**).

AU W4 G has even higher percentages of Household and Personal Group artifacts than W3 K (see **Table 6-28)**. The latest artifact is an eyeliner pencil (blue colored) from Cat. 15768.415 (Wall 4 Surface Find). Based on its condition, it had been in the ground for a while. The next latest is a bottle made between 1940 and 1945 in the Owens-Illinois Clarksburg West Virginia plant (Toulouse 1971:170 & 395) from Cat. 15768.404 (Near Utility Lines). After this are a post-1893 bottle and two post-1880 spikes.

The Household Group includes a base with a foot from a small Dutch-style redware cook pot (see **Figure 6.16A**) from Cat. 15768.426 (ET 4). Small three-footed cooking pots (sometimes called *grapen*) are distinctive Dutch food preparation and service vessels and have been found at all the 17th century sites excavated in Lower Manhattan (Janowitz 1993). A redware pan, from Cat. 15768.405 (Wall 4) has a pulled foot that is also seen on Dutch-style vessels see **Figure 6.16B**). These vessels could have been made in New York in a Dutch style or could have been imported from the Netherlands. A very lightly glazed stoneware pipkin handle (see **Figure 6.17A**) from the same context was almost certainly made at a New York City pottery.

A handle sherd from a well-potted and finely decorated tin-glazed porringer (see **Figure 6.17B**) could have been made in the Netherlands or in England (Cat. 15768.404). Sherds from two tin-glazed plates were found (Cats. 15768.435 [XT 6] and 15768.430 [Surface Collection]). The plate from 15768.435 has the same chinoiserie motif as a vessel from Cat. 15768.442 (AU W4 D) (see **Figure 6.18A**). The plate from 15768.430 is painted with double lines surrounding "… D 3," part of a motto or caption, probably from a numbered series of illustrations. Other tin-glazed vessels include a punch bowl with a robin's-egg blue glaze and a blue painted landscape motif, probably made in England between 1700 and 1750, from Cat. 15768.404, and another bowl with a blue painted chinoiserie border from Cat. 15768.413 (Wall 4 Area Stray Finds). An unusual dish rim sherd from Cat. 15768.408 (XT 6 Cleaning) is missing part of its tin glaze. Where the glaze has flaked off, a series of shallow notches or rouletted marks is visible, but the glaze has completely filled them in so they are not visible on the glazed sections. This unusual treatment was possibly designed to make the glaze adhere better to the rim, as tin-glazed vessels often show glaze flaking at the rim.

Two artifacts made of bone could have been used in the household or in some craft activity. One is a small carved bone handle (Cat. 15768.410 Trench 6 Cleaning) with a hole drilled through the end for suspension. The handle could have been for a tool, a brush, or a kitchen utensil. The other, from Cat. 15768.432 (XT 6), is a modified cattle ulna section that could have been used as a punch of some sort (see **Figure 6.18B**).

The Personal Group consists of smoking pipes, shoe parts, and a wig curler (made out of the same white ball clay as smoking pipes). The smoking pipes, which range in date from the 17th through the 19th centuries, are discussed in detail in **Chapter 6: G.2.o. Miscellaneous**. The wig curler, from Cat. 15768.429 (Wall 4 Area Cleaning), is the only one found at the site. The shoe parts come from at least one small shoe and one large shoe or boot.

The Architectural Group includes 11 tin-glazed tiles, one of which, from Cat. 15768.410, appears to be a floor tile rather than for the wall. Its reddish dark buff body is unusually thick (slightly less than one inch) and it has heavy wear on its face (see **Figure 6.19A**). Tin-glazed floor tiles are rare but another possible one was in Cat. 16196.532. These floor tiles were probably manufactured in the 17th century. At the other end of the time scale, a well-fired modern red brick with holes through it to decrease the weight came from Cat. 15768.388 (XT 6 Cleaning).

Not much shell was recovered from AU W4 G: a few oysters, quahogs, and mussels along with four mud whelks. One of the oysters is more than 15 years old. The bone, as in AU W3 K, has a higher than usual amount of identifiable pieces. Cattle are the most common and include dietary refuse as well as some possible commercial waste in the form of feet (possibly from tanners' waste) and repetitive meat cuts (leg roasts, possibly from an eatery). Sheep bones also show repetition of leg roast cuts. Bones from chicken, duck, and goose as well as unidentified fish are also present.

E. WHITEHALL SLIP ANALYTICAL UNITS

The deposits near Whitehall Slip were divided into four AUs, based on their position within the excavations and construction methods of the fill-retaining structures (see **Chapter 5: B.3. Definition and Description of Analytical Units**). The artifacts from these AUs are similar in many respects but there are definite differences between the assemblages from each AU, as can be seen in **Tables 6-29**, **6-31**, **6-33**, and **6-34**.[11] The following section describes the artifacts found in the four AUs and discusses potential sources for the deposits used to make this land. The TPQ dates for the AUs are significantly later than the dates of construction for these areas and reflect subsequent additions to the landfill and disturbances during the course of the area's various uses during the 19th and 20th centuries.

1. WHS A

WHS A was located at the northernmost section of the excavated area (see **Figure 5.64**, the **Composite Map** and **Figure 5.136.** A number of very recent artifacts (post-1970 plastic fragments) were found in the secant pile and decking column excavations included in this AU. The contractor's method for these excavations did not provide accurate depth data (see **Chapter 5: B.4. Whitehall Slip Secant Piles and Appendix N: Wall Excavation Units and Whitehall Slip Secant Pile Stratigraphy**), therefore artifacts from many different periods of the area's use were included in these samples and their dates do not reflect the initial dates of the deposits. In addition to the very late artifacts, the secant pile and decking column soils included some earlier 20th century artifacts, such as machine made bottles, and several mid- to late-19th century objects. Drainpipes that could have been manufactured anytime between 1805 and the mid-20th century were in Cat. 15598.340 (10 feet Below Deck) and SP [secant pile] 187.3 (Cat. 15598.084) (see **Figure 5.65** and the **Composite Map** in pocket on inside cover). After these dates, all the artifacts that could be dated were manufactured during the 17th, 18th, and early-19th centuries. The earliest artifacts found were two pieces of red earthenware floor tiles;

[11] Approximately 90 percent of the Whitehall Slip contexts were initially processed in the field lab set up by Dewberry. Hand written worksheets about the artifacts they contained were filled out with information about their identification, count, and weight and certain ones were photographed and discarded (see **Chapter 2: C. Artifact Methods and Storage During the Field Effort**). Information about the discarded artifacts was transcribed into the final Access database; these artifacts appear in **Appendix A** with the note "Discarded in the Dewberry lab" in the Comments Field. Because this was a preliminary analysis and its purpose was simply to identify concentrations of cultural material, descriptions of these artifacts were not as detailed as those on the subsequent artifact inventory, which has resulted in a large number of artifacts in the "Unknown" functional group (included in the "All Other" Group in **Table 6-29,** etc.). For example, 1,240 objects identified as "slag" were discarded but no descriptions of their material composition(s) were noted, so these were included in the "Unknown" group, as they could have been industrial by-products, coal clinkers, or other materials.

although they were probably made during the 17th century, they could have remained in place as architectural elements within old buildings well into the 18th or even 19th century before being deposited as destruction debris. Pearlware (circa 1775 to 1830/40) and creamware (circa 1770 to 1820) sherds were recovered from many different contexts.

Architectural Group artifacts account for over 40 percent of all the artifacts and organic materials from this AU (see **Table 6-29**). 1,861 pieces of red brick dominate this group (only 90 yellow brick fragments were found in WHS A). **Table 6-30** shows the contexts with the greatest quantities of red brick (all secant pile and decking column contexts; field collection methods for these contexts account for these large numbers). Many of the pieces are quite small, as can be seen by comparing their weights with their counts.

One of the bricks, from Cat. 15598.342 (SP 0189.2) has the partial mark "**HUT**…" probably for Hutton, a brick-making firm near Kingston that operated from 1890 to the 1960s (http://brickcollecting.com/hudson.htm). According to Allan Gilbert (pers. comm. 2006), this is a very common brick brand in New York City. Many of the bricks found in WHS A were probably once part of the columns or foundations for the streetcar tracks (see **Chapter 5: C.4.a. Brick Contexts – Demolition Debris**).

Other artifacts in the Architectural Group include small amounts of window glass, mortar, and plaster (see **Appendix A**). Two of the plaster pieces (from Cats. 15598.092 and .097, C02.2 and C04.2) have a layer of green paint on their surfaces. Material identified as concrete was discarded in the Dewberry lab; for the secant pile contexts, this concrete probably came from the overlapping concrete secant piles themselves (see **Figure 5.65** and **Composite Map**).

Table 6-29
AU WHS A Functional Groups

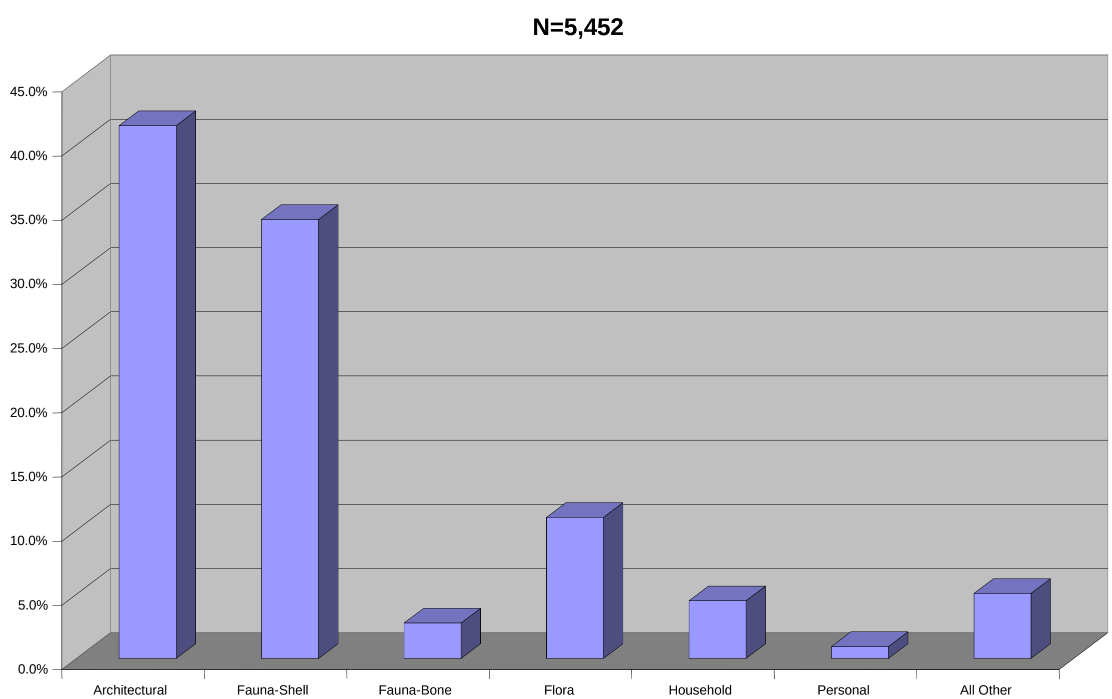


Table 6-30
Contexts from WHS A with the Greatest Amounts of Red Brick Pieces

Description	Cat.Number	Weight (kg)	Count
C01.3	15598.089	2.9	54
SP 0178.2	15598.331	1.9	83
SP 0189.3	15598.343	1.6	116
C01.3	15598.089	1.1	1
C04.3	15598.098	1.1	135
SP 0187.3	15598.340	.8	156
C03.2	15598.095	.7	105
SP 0189.2	15598.342	.7	35
SP 0172.3	15598.329	.7	26
SP 0182.3	15598.336	.65	139
C04.2	15598.097	.6	107
SP 0182.2	15598.335	.5	42
C02.3	15598.093	3.7	139

Oyster is exponentially the most common shell by both weight (4.2 kilograms) and count (1,376 pieces[12]) followed by quahog (.36 kilograms and 173 pieces) and soft shell clam (.15 kilograms and 166 pieces). Many of the oysters have hack marks and a few have shuck marks (**Appendix A, Table A-2**). The oysters range in age from 1 to 16 years with an average age of 2.3 years. Both the 16-year old specimens have hack marks. Twelve Atlantic drills and 112 mud whelks were also found; almost half of the mud whelks (n=55) are from Cat. 15598.066 (Civetta Area, from Between Timbers West of C2) and another 16 are from Cat. 15598.093 (near C2), which also has the largest number (318) of oyster shell pieces. Cat. 15598.093 also has a very unusual artifact, perhaps connected to fishing: a strip of lead wrapped around an unknown core and beaten into a ball shape, possibly for use as a net weight.

Other organic debris consists of animal bone along with fruit, vegetable, and nut remnants. Not many pieces of bone were found in WHS A, although one horn core and eight skull pieces from cattle indicate some butcher's and horner's waste. The fruits are cherry, peach, and plum pits, some squash or melon seeds, two hazelnut shell fragments and one almost complete pecan shell. The high percentage of Flora Group objects in WHS A is due to the large amount of shredded wood pieces in the secant pile and decking column excavations, particularly from Columns 1 and 5, a result of cutting through the Slip's log construction.

The Household Group includes, as noted above, artifacts with a wide variety of manufacturing dates. Ceramic manufacturing dates peak in the late-18th century, the period when creamware and pearlware vessels were the most popular table- and teawares. Almost all of the ceramic sherds are too small for identification of their form. Glass is more common in this AU than in most other AUs in the project area, due to the presence of pieces of late-19th- and 20th-century bottles. None of these pieces is embossed with makers' or retailers' marks and most bottles are represented by only one or a few sherds.

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[12] Ratios of count to weight for shellfish for the Whitehall Slip site are relatively higher than for the Battery Wall and the South Ferry Terminal sites because many shell fragments without hinges were counted and discarded in the field lab. During the post-field analysis by URS, as noted in **Chapter 2: D. Post-Field Laboratory Methods**, only pieces with hinges were counted but all pieces were weighed.

The Personal Group is not large, as there are few smoking pipe pieces (n=23) in this AU. It includes, however, two interesting buttons, both from Cat. 15598.093 (C02.3) and a unique artifact. One of the buttons, 3 cm in diameter and made of brass, has wires through its four holes that form an "X" on the face. The other, made of white metal, is 1.8 cm in diameter and was stamped "**31**" (see **Figure 6.15A**). This size and number has been identified as an enlisted man's button from a member of the British 31st Regiment of Foot; a very similar one was found at Putnam Creek, N.Y., site of part of the Battle of Saratoga (Trioani 2001:42). Even though some companies of the 31st Regiment took part in this important battle, the regiment was never stationed in New York. The 31st came to the Americas in 1765 and was stationed first in Florida and then on the island of St. Vincent in the Caribbean. In 1776, they were transferred to Quebec, where they remained until their 1787 departure for England. The companies that fought at Saratoga under General Burgoyne surrendered with the rest of the British forces and remained prisoners until 1781, when they rejoined their fellows in Quebec (*ibid.* and RollofHonour.com). The presence of this button in the fill is thus not easily explained. New York City was home to various British troops over the course of the 17th and 18th centuries and was occupied by the British between their capture of the city in 1776 and their evacuation in 1783, but the 31st Regiment of Foot was apparently never stationed here.

The unique Personal Group artifact is a medal or token found in Cat. 15598.099 (C04.4) (see **Figure 6.19B**). This white metal (pewter) disc was made to commemorate the July 1758 British capture of the Fortress of Louisbourg after prolonged bombardment and a siege of over a month. Louisbourg, on Cape Breton Island, Nova Scotia, was established as a French colonial settlement in 1713. In 1745, troops from New England captured the Fortress but it was returned to France by treaty in 1748. Another British assault in 1758, under the direction of General Jeffrey Amherst and Admiral Edward Boscawen, recaptured the Fortress, the military center of the French in Atlantic Canada and guard the entrance to the St. Lawrence River. After capturing the Fortress, the British blew it up in order to prevent it ever again falling into French hands by treaty or by capture. Taking Louisbourg enabled British ships and troops to advance on Quebec City the following year, effectively ending France's role in Canada. This token celebrates Admiral Boscawen's part in the British victory. On the obverse is "**ADML. BOSCAWEN . TOOK . CAPE BRETON**" with a portrait of the admiral; on the reverse is "**LOUISBOURG**"/ **IUL 26 1758**" with a view of the battle. The token has been roughly pierced for suspension, possibly as a necklace or as a decoration for a watch chain. Part of it has been double struck, i.e., a mistake was made and the token was struck twice with the die. This can be seen by looking closely at the word "took": the "T" is obscured and one "O" is intertwined with another.

The design on the Whitehall Slip medal is identical to one illustrated in the *American Historical Record and Repertory of Notes and Queries* for 1872 (Lossing 1872:77) where it is identified as a gold medal presented to Admiral Boscawen by King George in honor of Boscawen's role in the victory.[13] A copy of this medal, made in brass, is in the collections of the British National Maritime Museum (called there a counter) (http://www.nmmprints.com/image.php?id=393055).

An online newsletter of the Medal Collectors of America states the victory at Louisbourg was such a popular event in England that large quantities of cheap brass copies of the King's

[13] The American Numismatic Society's web page illustrates a medal, struck on Admiral Boscawen's own orders and probably at his expense, with very different, classically inspired motifs. This medal was made in gold for Boscawen himself and his top commanders, in silver for other officers, and bronze for enlisted men (Hoge n.d.).

Boscawen medal were reproduced for the general public (Medal Collectors Advisory of America 2005). Another source (Betts et al. 1894) adds that reproductions were also made in pewter, an inexpensive alloy of tin and other metals that imitates silver as brass does gold. The Whitehall Slip medal, however, is made of material that archaeologists describe as "white metal," a term used for combinations of lead and/or tin with other metals in varying proportions; white metal contains proportionately less tin than pewter and is thus even cheaper.

The Whitehall Slip medal might have been purchased by a member of the general public or might have been the possession of a sailor or soldier who fought at the battle. A small number of American rangers and artificers fought alongside British regular troops during the battle but it is impossible to tell if an American or a Briton owned this token. Piercing the token probably signified its owner valued it enough to wear it as a personal adornment or as a sign of his own involvement in this famous victory, even though the object itself would not have had much monetary value, given its base metal composition (and perhaps the inaccuracy of its manufacture).

The All Other Group includes all artifacts not in the Architectural, Fauna, Flora, Household, or Personal Groups. The relatively high percentage of artifacts in this group reflects the number of asphalt, "slag," and "concrete" pieces discarded in the Dewberry field lab. Within this Group, however, is an unusual artifact, a broken pebble with an "X" or a "+" scratched into one surface, found in Cat. 15598.096 (C03.3) (see **Figure 6.20A**). Examination with a magnifying glass shows the mark was scratched into the pebble after it was already broken. The mark on this pebble might be a West African, specifically Bakongo, cosmological symbol, as suggested by Diana Wall for a spoon found with an "X" or "+" mark at the Seven Hanover Square site (Cantwell and Wall 2001:240-241). The spoon was found in river bottom deposits and Wall, following research by Leland Ferguson in the South, postulated that it was used to hold sacred materials, in the same manner as colonoware bowls in that region. Colonoware bowls with these markings have been found most often on river or stream bottoms, where they were deposited as part of rituals concerned with connections between earth and water and, by extension, the living and the dead. This pebble could not have held anything but its smooth, perfectly divided shape might have had a similar significance for the person who marked it and put it into the water. The bottle base found in Cat. 15768.391 (see **Chapter 6: D.2. DU Above or Inside the Wall** and **Figure 6.5A**) with its deep kickup would have been a suitable container for sacred materials but the mark scratched into it is somewhat ambiguous. It could be interpreted as a crudely drawn Bakongo cosmogram (and given the difficulty of cutting a mark into the sloping surface of this glass base it would have taken some skill to create a regular design) but it might also have been a poorly drawn fish or some other design entirely.

The artifacts in WHS A are a mixture of objects from the original land made when Whitehall Slip was constructed along with artifacts introduced during later transportation-related activities on this property and, most likely, items introduced during slip-repair and filling work. The assemblages from the secant pile and decking column excavations show a great range of types of artifacts and of manufacturing dates. The artifacts from some of the more controlled excavations might be more reflective of the original landfill. Cats. 15598.070, .073, .074, .083, and .160 are all associated with the excavation of a stone wall found in a line with the head of the Slip. If these contexts are considered as a separate sub-AU, their TPQ is 1775, based on the presence of two pearlware sherds from Cat. 15598.074. Six sherds of post-1770 creamware were found in four of the contexts. Proportions of objects within the Functional Groups differ from the overall AU totals as shown in **Table 6-29**: over 20 percent of the artifacts and organic materials are in the Household Group, less than 15 percent are Architectural, and the shell comprised approximately 17 percent. The glass in the Household Group from these contexts consists of mold blown rather than machine-made bottle pieces. The ceramic ware types in order of frequency are redware (n=8), creamware (n=6), tin-glazed (n=3), white salt-glazed and pearlware (n=2), and Chinese porcelain and British slipware (n=1). Conversely, within the entire AU, British slipwares are the most numerous sherds, as they were in most of the Battery Wall AUs.

2. WHS B

AU WHS B was located to the south of AU WHS A; stairs leading to the old entrance to the R/W subway line separated the two (see **Figure 5.64** and **Composite Map**). WHS B contains the smallest number of artifacts. The main reason for the relatively small assemblage is the low number of secant pile and column contexts in this AU (see **Chapter 5: B.4. Whitehall Slip Secant Piles**, **Appendix N**, **Figure 5.65** and **Composite Map**). Artifact types and manufacturing date ranges are similar to those in WHS A. The latest artifacts are post-1970 pieces of plastic and a pull top from an aluminum can, all from secant pile or decking column excavations (see **Appendix A**). Post-1890 machine-made bottles and pressed ceramic tiles were found in these same locations. The most tightly dated artifact is a Dutch pipebowl, made in Gouda between 1858 and 1874 (Duco 2003:189), found in Cat. 15598.110 (C07.2). Creamware sherds were found throughout the AU, particularly in contexts not associated with the secant piles and decking columns.

The most numerous Functional Group in AU WHS B is Fauna-Shell (see **Table 6-31**). As with WHS A, oyster is the most numerous: by weight it is almost 90 percent of the shell and by count it is approximately 67 percent. By count, soft shell clam is next (21.4 percent) but by weight quahog is second (11.2 percent). One hundred sixty-seven mud whelks and fifty-four Atlantic drills were found. There is not a strong correlation for the presence of mud whelks and drills with oysters in the same contexts except for Cat. 15598.126 (C11.3), which has 73 mud whelks, 14 Atlantic drills, and 133 oyster fragments. This was not a natural riverbed context, however, because many of the oyster shells have hack marks and none are paired.

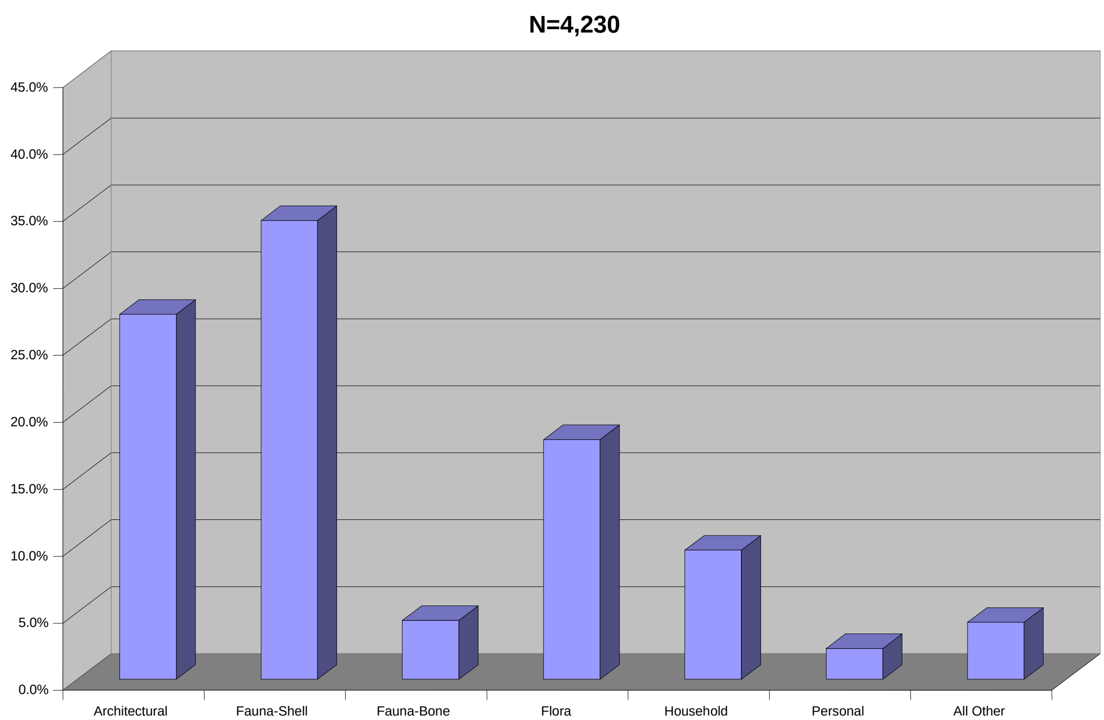
The oysters in WHS B include the oldest found in the project area. Cat. 15598.026 (Among Logs) has one oyster between 25 and 27 years old and another 20 years old. Both have hack marks. Cat. 15598.014 (Shell Layer near C10) has an individual that was about 19 years old, also with a hack mark. Cat. 15598.014, the shell layer, is described in **Chapter 5: B.5.b. Analytical Unit WHS B** as approximately eight feet long and three feet thick and almost devoid of artifacts. Only a small sample of the shell was taken back to the lab so the presence of hack and/or shuck marks and the ages of the other individuals cannot be determined, although it is likely that the deposit was derived from either an eatery serving oysters in quantity or from a processing station preparing oysters for preservation and shipping. The context beneath the shell layer (Cat. 15598.013) was about one foot thick and contained a variety of artifacts including many—cobbles, cut stone, brick, and window glass—common in destruction rubble. The TPQ for Cat. 15598.013 is 1775. It seems that this section of land was made primarily with bulky unwanted materials. Oystering was an important and wide spread industry in Manhattan during the 19th century and disposal of the piles of shell generated presented a challenge to oystermen. The opportunity to deposit a large amount of shell in an approved location was probably welcomed.

The bone food remains from WHS B are primarily dietary waste. They include some repetitive meat cuts for cattle, sheep, and pigs and meat bearing elements for chicken, goose, and pigeon (see **Appendix D**, **Table 14**). Many of the bones have evidence of exposure to heat (i.e., cooking) and a few show evidence of being gnawed by rodents or canines, indicating that they were exposed for a time as garbage accessible to scavengers. The contexts with the largest numbers of bones are Cats. 15598.011 (near C9 & C10) and 15598.013, the large mixed deposit underneath the shell layer east of C10. Cat. 15598.011, like Cat. 15598.013, contains a variety of types of artifacts; its TPQ is 1790.

The Flora Group in WHS B, like that in WHS A, is dominated by pieces of bark and wood fragments from the decking column and secant pile excavations. The food remains are fragments of hazelnut, English walnut, hickory, and pecan shells; squash/melon seeds; and peach, plum, and cherry pits. The cherry pits are the most numerous and most are probably black cherry. Ten of the thirty-four cherry pits came from Cat. 15598.126, the context with the large amounts of mud whelks, drills, and oyster shell fragments.

The Architectural Group artifacts consist, for the most part, of destruction debris, in particular bricks. There are also some red earthenware roofing tiles, window glass, and some wall tiles. The wall tiles consist of both tin-glazed and modern pressed porcelain specimens, a good indication of the mixed time period of the fill materials. One of the pieces of window glass is colorless, a characteristic of modern window glass, while another is 18th-century crown glass.

Table 6-31
AU WHS B Functional Groups



Even though there are fewer artifacts overall in WHS B, there are almost twice as many ceramic sherds (n=257) as in WHS A (n=132), probably because more domestic refuse was included in the fill. The earliest dated artifact in WHS B is a sherd of 17th century German salt-glazed stoneware decorated in a style associated with the town of Höhr in the Rhineland (Reineking-

Von Bock 1971). Höhr-style vessels, most frequently round mugs, were made of a fine, very light gray-firing clay left uncolored but decorated with sprig molded and incised motifs, often floral as in this example from Cat. 15598.003 (Among Logs). Sherds of this ware have been found at other sites in New York City but they are not common.

Creamwares are the most common ceramic sherds in WHS B, followed by red earthenwares, British Buff-Bodied Slipwares, and locally made gray salt-glazed stonewares. One of the red earthenwares, from Cat. 15598.013, is a rim sherd from a very large jar with an unusual shape: the rim is everted over a square collar, possibly for reinforcement. The jar might have been intended for use as a syrup jar during sugar refining (sugar refining is discussed below in **Chapter 6: E.3. Analytical Unit WHS C**). It might have been discarded before it was used as it had a crack into which glaze ran during its firing, possibly reducing the strength of the rim.

The glass in the Household Group consists almost entirely of bottle glass sherds, from modern ones to 18th-century black glass English bottles. One of the black glass sherds, from Cat. 15598.079 (Near C6) appears to have been flaked on one edge to form a tool, possibly a scraper.

The Personal Group, unlike WHS A, includes a number of smoking pipe fragments, almost all undecorated. The 19th-century Dutch pipe noted above, from Cat. 15598.110 (C07.2), has a rouletted motif on the stem and a crowned “16” on its base. A pipebowl from Cat. 15598.005 (Among Logs) is undecorated but its heelless shape indicated it was made circa 1680 to 1710. Other artifacts in this Group include 46 pieces of shoes or boots, all too fragmentary to determine their shapes or sizes.

The All Other Group includes one of the two complete cannon balls recovered during the entire South Ferry Terminal project excavations (**Figure 6.20B)**. This one, from Cat. 15598.025 (Near C10) is a six-pound solid shot ball weighing 2.505 kilograms. As noted in **Chapter 4: 11. The Stamp Act Period to the Revolution**, the Battery was not only a place where cannon were kept and fired on various occasions but it was also shelled by the British in 1775 in the preliminary hostilities that led up to the Revolutionary War. The other, larger (4.9 kilograms), cannon ball was found in Cat. 16196.380 (ET 5), in the Peter Minuit Plaza area, near Whitehall Slip.

3. WHS C

As was the case with WHS A and B, the TPQ for WHS C is 1970, based on the presence of plastic in the secant pile and decking column excavations. A number of 19th- and 20th-century bottle and lamp chimney pieces and a few post-1815 ceramic sherds also came from these deposits.

AU WHS C contains one of the most interesting deposits from the entire South Ferry project: tea- and tablewares made of pearlware decorated with painted, dipt (i.e., slip decorated), and other motifs. When this deposit was first examined, it was obvious that some of the sherds could be mended within and between contexts, therefore the sherds were crossmended and minimum numbers of vessels (MNVs) were calculated for Cats. 15598 .045, .053, .054, .055, and .056 in WHS C; Cats. 15598.024, .057, .058, .059, .060, and .062 in WHS D; and Cat. 15598.050 in WHS A. The WHS D and WHS A contexts were included in the crossmending and assignment of MNVs because these activities took place at the beginning of the analytical process, before AUs were established. After analysis was completed, however, it was apparent that the pearlwares which made up the bulk of this deposit are infrequent in WHS D and absent in WHS A. Several other contexts within WHS C (in particular Cats. 15598.262, .265, .266, and .269 from secant piles 115, 116, and 118) have smaller amounts of these sherds but the five crossmended contexts (15598.045 and .053 through .056) contain the bulk of the assemblage.

The deposit of sherds as encountered in the field was approximately 30 feet long and 2 feet thick (**Chapter 5: B.5.c. Analytical Unit WHS C** and **Figure 5.78**).

The ceramic assemblage from Cats. 15598.045, .053, .054, .055, and .056 consists of 973 sherds from at least 117 vessels. Although other types of ceramic wares are present in these contexts, pearlware vessels are the most common type recovered: 86 vessels, of which 75 are either painted or dipt. The pearlware vessels are all from one deposit, a dump of unwanted or unusable items. This type of dump deposit is identified by two primary characteristics: it has multiple vessels of the same form and pattern and none of the vessels shows any signs of use wear (such as scratches from forks and knives, scoop marks from spoons, or abrasions from stacking). Such dumps are rare[14] and are valuable time capsules. Although this particular assemblage is not representative of the entire range of vessels imported to New York—hollowwares (cups and bowls), which appear to have a greater propensity to break than flatwares (plates), are by far the most common vessel type—it gives us a snapshot of the English ceramics imported into the city in the early-19th century.

This remarkable collection of ceramics was almost certainly either broken in transport across the Atlantic or broken after landing but before they could be sold at retail; as a result they were discarded by the New York City merchant who received them or by their shipper. Merchants in New York during the 19th century could be importers, who ordered goods directly from manufacturers or wholesalers in Europe, or jobbers, who bought goods at auction from ships arriving in the port. Selling goods at auction was an important commercial activity at the time and the area along Pearl Street near the docks was the location of many auction rooms, as can be seen in contemporary newspaper notices. Other auctions took place in coffee houses, especially the Tontine Coffee House on Pearl St. near Broad St., or in the street outside auction rooms if items were bulky.

In 1799, as noted in **Chapter 6: B. Refuse Disposal Practices and Regulations**, a joint committee composed of members of the Common Council, the Chamber of Commerce, and the Medical Society, along with the Commissioners of the Health Office, was formed to investigate the latest round of "pestilential diseases" that had scourged the city. Among their suggestions to reduce the likelihood of another epidemic were proposed regulations for goods in the wharf district. One referred to the apparently common practice of selling goods at open-air vendues:

> The open space between Water Street and the head of the Old Slip is recommended as a proper place for the sale of ship's tackle and materials, earth ware [sic] in crates, hogsheads or bulk, and every other place for the sale of those articles at auction whether damaged or not, should be prohibited (NYCC 1917 XVIII:503).

Whether intended for a sale located inside an auction house or outside in the street or at a dock, this assemblage of pearlware vessels was found to be damaged and was discarded nearby as part of the fill used to close this part of Whitehall Slip.

Pearlware is the name given by 20th century ceramic historians to a white-bodied earthenware made in England, predominantly in Staffordshire, between about 1775 and 1830 (Noël Hume 1969). During this period pearlware and creamware (a cream-colored white-bodied earthenware developed by Josiah Wedgwood in the early-1760s and manufactured until about 1820) vessels were the most common tea- and tablewares in almost all parts of the British trading sphere (Noël Hume 1982). Sherds of pearlware and creamware are found throughout British North America from the Caribbean to the North Atlantic.

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[14] The only other such New York City dumps known to the authors were found at the Seven Hanover Square (Rothschild and Pickman 1990 and Pipes 2003) and 175 Water Street (Soil Systems 1983b) sites.

Creamware was generally undecorated, although more expensive versions, such as the set commissioned by Catherine the Great of Russia, could be hand painted. It owed its visual appeal to its classical lines and simple elegance and its almost universal popularity to Josiah Wedgwood's superb marketing skills and British economic dominance (Mankowitz 1980). Unlike creamware, pearlware was almost always decorated, first in blue in imitation of Chinese porcelain, later (after 1795) in polychrome colors with European-style designs (Miller et al 2000, Miller and Earls 2008). As the decorators of tin-glazed wares had done before them, decorators of early pearlwares (sometimes referred to as "China glaze" wares) sought to make their vessels appear as close as possible to expensive blue-painted Chinese porcelains. Creamware, because of its yellowish color, was not a good medium for blue-painted motifs but pearlware, which had cobalt blue added to the glaze and sometimes also to the body, provided a suitable background for painted motifs. When the fashion for blue-painted wares ebbed, pearlware decorators turned for inspiration to the polychrome floral motifs favored by European porcelain painters. The European-style floral motifs were painted in earth-tone colors of yellow, green, brown, and orange as well as with blue (see **Figure 6.20B**). Most motifs were delicate and rather simple but some could be quite elaborate and bold. Other popular decorative motifs on pearlware included various shell edge patterns colored blue or green on plates, sponged patterns on both plates and hollowwares, and slip decorations (dipt) on hollowwares.

At least 95 pearlware vessels are in the dump assemblage from WHS C and D; at least 61 have polychrome-painted motifs and another 15 are dipt (see **Table 6-32**). Fourteen of the dipt and 60 of the painted vessels are from WHS C. All but one of the polychrome-painted floral patterns are small-scale motifs very similar to those identified at many other sites within the Northeast and Mid-Atlantic (e.g., Rothschild and Pickman 1990, Pipes 1993, and LBA 1997). The most common pattern in WHS C and D (see "Pearlware Pattern 101" in **Appendix A** and **Table 6-32**), however, is unusual. It has two large yellow tulips with green leaves and brown highlights accompanied by sprigs of branches, leaves, and flowers (see **Figure 6.21A**). There are at least 15 small bowls, 2 saucers, and 1 teacup in this pattern. None of the vessels could be completely mended, at least partly because sherds from the blank areas between the decorative elements could not be identified. (In addition, sampling of the deposit in the field was probably biased toward decorated sherds.) All but one of the bowls have spiral-fluted bodies, an elegant characteristic most often found on pre-1820 vessels (Miller and Earls 2008).

Multiple vessels with motifs 102, 106, 107, and 105 (see **Figures 6.21B**, **6.22A**, and **6.22B**) are also present. All of these motifs are variations on the theme of delicate floral designs. Some of the vessels have decorators' tally marks on their bases (see **Figure 6.23A**). Decorators were paid by the piece rather than by the hour and kept track of their output using simple marks such as those seen here. Decorators copied the motifs from a master design shared by several painters and the different hands of the various painters are revealed in the slight differences seen on some vessels (see **Figure 6.23B**).

One other unusual motif (PW Pattern 109) is on only one saucer sherd (see **Figure 6.24A**). This motif is a dark brown band with yellow stars, very reminiscent of contemporary motifs on some Chinese export porcelains.

Table 6-32
Pearlware Vessels from WHS C and WHS D

AU	Primary Decoration	Pattern Motif	Object Form	MNV	Count
WHS C	China Glaze, Painted	Chinese Landscape	Saucer	1	2
WHS C	China Glaze, Printed	Chinese Landscape	Bowl	1	3
WHS C	China Glaze, Printed	Unidentified	Saucer	1	1
WHS C	Dipt	Banded	Bowl	1	1
WHS C	Dipt	Banded	Hollowware	1	8
WHS C	Dipt	Checkerboard	Bowl, Punch	12	20
WHS C	Painted	Unidentified	Bowl	1	1
WHS C	Painted	PW Pattern 101	Bowl	14	65
WHS C	Painted	PW Pattern 101	Saucer	2	11
WHS C	Painted	PW Pattern 101	Teacup	1	4
WHS C	Painted	PW Pattern 102	Saucer	4	42
WHS C	Painted	PW Pattern 102	Teacup	11	31
WHS C	Painted	PW Pattern 103	Saucer	1	2
WHS C	Painted	PW Pattern 103	Teacup	1	1
WHS C	Painted	PW Pattern 104	Saucer	1	1
WHS C	Painted	PW Pattern 105	Saucer	2	5
WHS C	Painted	PW Pattern 106	Saucer	4	102
WHS C	Painted	PW Pattern 106	Teacup	4	35
WHS C	Painted	PW Pattern 107	Bowl	2	6
WHS C	Painted	PW Pattern 107	Saucer	5	25
WHS C	Painted	PW Pattern 108	Saucer	1	1
WHS C	Painted	PW Pattern 109	Saucer	1	2
WHS C	Painted	PW Pattern 110	Saucer	1	1
WHS C	Painted	PW Pattern 111	Saucer	1	4
WHS C	Painted	Unidentified	Saucer	1	67
WHS C	Shell Edge	Even Scalloped, Straight Lines	Plate	6	29
WHS C	Shell Edge	Octagonal-Pseudo Scallop	Plate	2	3
WHS C	Shell Edge	Rococo	Plate	2	7
WHS C	Shell Edge	Rococo	Platter/Dish	1	1
WHS C	Sponged	Probably Pea Fowl	Teacup	1	1
WHS C	Sponged & Painted	Probably Pea Fowl	Saucer	1	3
WHS C	Sponged & Painted	Pea Fowl	Teacup	3	31
TOTAL:				**91**	
WHS D	Dipt	Common Cable	Hollowware	1	1
WHS D	Painted	PW Pattern 107	Tea Pot	1	1
WHS D	Shell Edge	Unscalloped, Straight Lines	Plate	1	1
TOTAL:				**3**	

Twelve other bowls from WHS C are dipt punch bowls with rouletted bands (see **Figure 6.24B**). Their decoration was created by dipping the vessels in different colored slips (liquid clays) and, in the case of the rouletted bands, cutting away some of the slip after it had dried to create a pattern. These bowls are slightly larger than the floral-patterned bowls. Small bowls could have been used as large teacups or as slop bowls to receive the dregs of tea leaves emptied from teacups before filling with fresh tea. The floral-patterned small bowls match cups and saucers and are thus teawares. The dipt bowls, however, are identified as punch bowls based on their larger size and on their unique motif. Punch made of rum (or whiskey or brandy), water, sugar, and lemons was a very common beverage in the 18th century but it fell out of favor during the 19th. These bowls could have been used for mixing and drinking punch; alternatively they might have been intended for use as eating vessels for soups, stews, or porridges. Mid-19th century archaeological ceramic assemblages sometimes include slip-decorated, small (5 to 6 inch rim diameter) bowls probably intended for individual consumption of semi-liquid foods. During the 18th century, porringers, usually made of lead-glazed red earthenwares, served the function of individual eating bowls. When and why the transition between locally made red earthenware porringers and imported slip-decorated bowls took place is unclear but the Whitehall Slip vessels might be examples of early eating bowls rather than punch bowls.

Other pearlware vessels that are probably part of the dump are listed on **Table 6-32**. The peafowl cups and saucers are painted and sponged using the same palette as the floral-patterned vessels. The shell-edged plates, with both blue and green rims, have a variety of rim patterns. Blue shell-edged wares had an extraordinarily long period of manufacture (from the late-18th through the mid- to late-19th century) but the patterns found in WHS C are the earlier varieties. The rococo-edged plates and platter in particular were made between 1775 and 1815.

The size, shape, and style of decoration of the floral-patterned teacups suggest the pearlware vessels from this importer's dump were manufactured between circa 1800 and 1810. Evidence for the beginning date comes from the vessels' decorations: none of the cups and only one of the saucers have Chinese porcelain-style blue painted motifs. Such "China glaze" vessels were the dominant type of painted pearlware from circa 1775 to 1800 (Miller and Hunter 2001). The estimate of the end date is based on both the size and the shape of the teacups. Staffordshire potters' price fixing lists from the late-18th into the 20th centuries list two basic teacup sizes (Miller 2000:100). The most common was the "London" size and the other was the larger "Irish" or "Breakfast" size. Creamware cups of the London size originally held one third of a pint and came 36 to the potter's dozen (Ibid:106). Following the end of the first Napoleonic Wars there was a major deflation of prices that caused English pottery and other goods to become cheaper. As a result, the Staffordshire potters increased the size of their vessels, but without changing the names of the two sizes (Miller and Earls 2008). The dominant cup shape before 1810 was the round Chinese teacup shape. In 1810, a new angular shape was introduced called the "London" shape, which created some confusion because now there was "London shape" and "London size." Most of the earlier Chinese teacup-shaped teas would fit with room to spare inside the new London shape cups. All of the teacups from the WHS C dump are of the smaller Chinese teacup shape. The absence of any London shape cups suggests the vessels were manufactured before the War of 1812 and possibly before the Embargo of 1807. Three sherds from a China glaze saucer with a post-1807 printed design are in Cat. 15598.056 but their association with the dump pearlwares cannot be established and it is possible they were part of later additions to the fill in WHS C.

Time lag between manufacture and discard of the pearlware vessels was probably short, given the circumstances of breakage before use: once the vessels were broken they had no commercial value and thus there was no reason to retain them. The names of their manufacturer and importer cannot be determined. Maker's marks are rare on pearlware and the only mark on any of the vessels, on a plate with a green shell-edged decoration, is "**David Dunderdale Castleford Pottery Co.**" along with an impressed plate-maker's mark. Dunderdale was in business from about 1790 to 1820 (Godden 1964:224) and his products have been found on other New York City sites, including the pearlware dump from the Seven Hanover Square site (Rothschild and Pickman 1990).

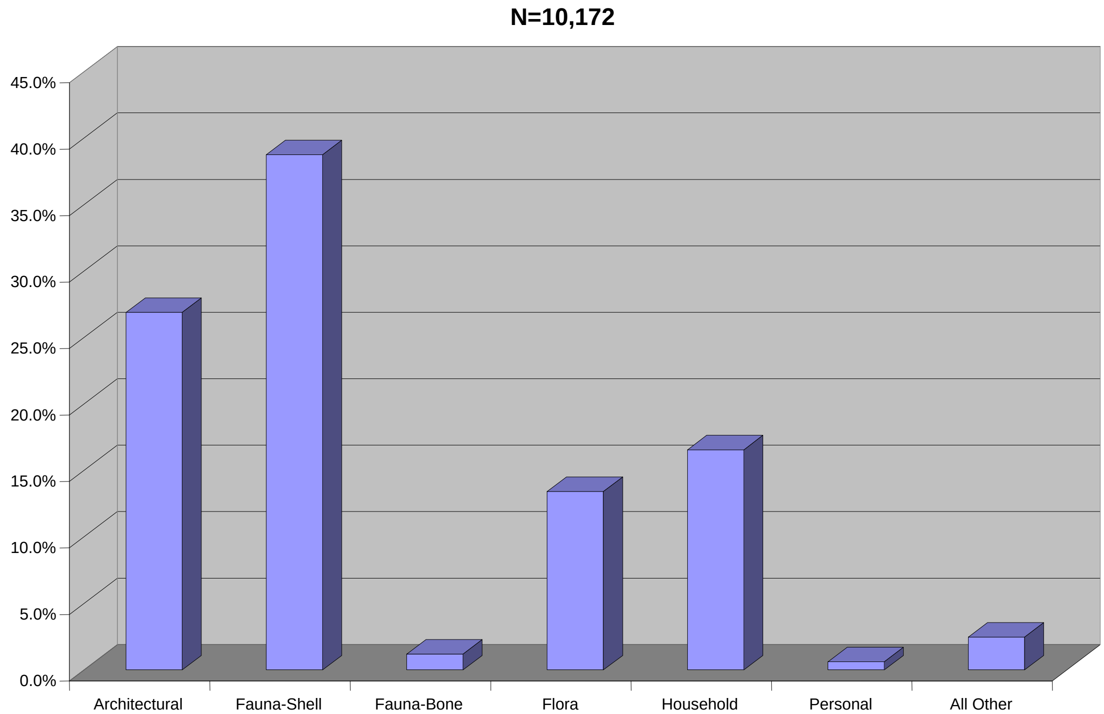
Other ceramics from the crossmended contexts are probably not connected to the pearlware dump, with the exception of some of the creamware plates and bowls (the same potters made and the same merchants sold both creamware and pearlware vessels). Three matching plates with Royal rim patterns from this deposit have no evidence of use-wear and thus are probably part of the dump. The other identified vessels are fragmentary (all are under 10 percent complete and many are less than 2 percent complete) and include red earthenwares, Chinese porcelains, and locally made salt-glazed stonewares.

Other artifacts in the Household Group include scattered sherds of earlier ceramic ware types (British buff-bodied slipwares and tin-glazed wares) and dip-molded bottles. Cats. 15598.269, .262, and .266 (which, as noted above, include floral-painted pearlware sherds) have fifteen sherds of non-lead glass, one molded and four engraved, which probably are Bohemian-type glass. Dealers in ceramics generally also sold a variety of household goods, especially glass tablewares, and these vessels could be connected to the pearlware dump.

Sherds from several ceramic vessels—sugar molds and a syrup jar—associated with sugar manufacturing (and thus in the Industrial Group, included in the All Other Group on **Table 6-33**) were found in Cats. 15598.53, .54, and .55. New York City was the site of many sugarhouses where raw sugar imported from the West Indies or other places was refined into white sugar, a very valuable commodity. Sugar refining in the 18th and early-19th centuries was not yet mechanized. Cane syrup was boiled, usually on the sugar-producing plantations themselves, and the resulting coarse product was shipped to refiners, often located in large coastal cities (Barr et al. 1994, LBA 1999, Regaldo-Saint Bernard 1986). Refiners packed this raw sugar into wide-mouthed conical sugar molds of various sizes and placed a cap of wet clay or a mixture of egg whites, ox blood, etc., atop the sugar. The molds were then placed tip down into sturdy jars, often with reinforced rims, called syrup jars. The conical sugar molds were made of unglazed red earthenware in various sizes with a single hole in their tips through which the liquid drained, carrying impurities away with it (see **Figures 6.25A** and **6.25B**); the syrup jars were glazed on their interiors. Sugar could be refined in this way once or several times, depending upon the desired fineness of the finished product. According to an illustration in Diderot's *Encyclopedia*, in order to extract the sugar from the mold, the vessel was inverted and a sturdy rod inserted into the drain hole to push the cone-shaped compacted dry sugar (called a sugar loaf) out, a process that put stress on the mold (Gillispie 1987, Plate 41). The interiors of sugar molds were very smooth and sometimes had a thin white slip applied; both features were designed to allow the dried sugar loaves to be more easily pushed out. One syrup jar was recovered along with the sugar molds. This vessel has very thick walls but the base is thin with a tall tooled foot. Another possible syrup jar, from Cat. 15598.013 in WHS B, has "G.C." stamped on the base (see **Figure 6.26A**), a very unusual occurrence on any red earthenware. This mark might have been for the owner of a sugarhouse rather than for a potter, but so far no owner or potter with these initials has been identified, although a man named Joseph Griswold had a sugarhouse close to Battery Park in 1755 (see **Figure 4.23**).

In spite of the large number of ceramic sherds in WHS C, the Faunal-Shell and Architectural Groups are still the largest (the greatest numbers of both groups are from the secant pile and column excavations). The food-related shell is again dominated by oyster (2,636 pieces weighing 8.2 kilograms) followed by soft shell clam (214 pieces weighing .08 kilograms), quahog (177 pieces weighing .8 kilograms), and, rather unusually, mussels (278 pieces weighing .06 kilograms). Ninety-seven Atlantic drills and 482 mud whelks were also recovered. The largest number of oysters come from Secant Piles 115 and 116, which also contain rather large amounts of both kinds of clams, mussels, and mud whelks. Secant Piles 112 and 114 also are rich in shell fragments. The contexts associated with the pearlware dump are relatively free of shell.

Table 6-33
AU WHS C Functional Groups



Architectural Group artifacts are also not plentiful in the pearlware dump contexts but are concentrated in other areas of the AU. Unlike other areas of the site, the Architectural Group in WHS C contains many pieces of window glass (n=613) weighing .3 kilograms. Cat. 15598.241 (SP 96.3) has 207 pieces and Cat. 15598.256 (SP 112.3) has 154 pieces. Cat. 15598.241 has an additional 40 cut pieces identifiable as crown window glass; all the glass in this context is probably construction debris. Other cut pieces of crown glass were found in Cats. 15598.242 (SP 96.4), 15598.247 (SP 104.2), and 15598.256 (SP 112.3).

As noted in **Chapter 5: B.4. Whitehall Slip Secant Piles and Appendix N**, a stratum of brick debris in a gray silt matrix was found beneath the cribbing near decking columns C11 and C13. Most of this brick was not brought into the lab, however. The contexts with the most retained red brick are Cats. 15598.243 and 244 (SP 101.2 and .3), 15598.265 and .266 (SP 116.3 and .4), and 15598.262 (SP 115.2-3). The later context also has yellow brick.

In the Personal Group, WHS C has only 8 pieces of smoking pipes and 53 pieces of shoe leather, 34 of which were from Cat. 15598.049, between C11 and C13 in the stratum of brick debris. Most, possibly all, of these pieces are part of a single shoe with a very worn sole.

The small bone assemblage in WHS C is composed mainly of dietary refuse and commercial waste (three horn cores). The assemblage is varied and includes mammal, bird, and fish bones.

4. WHS D

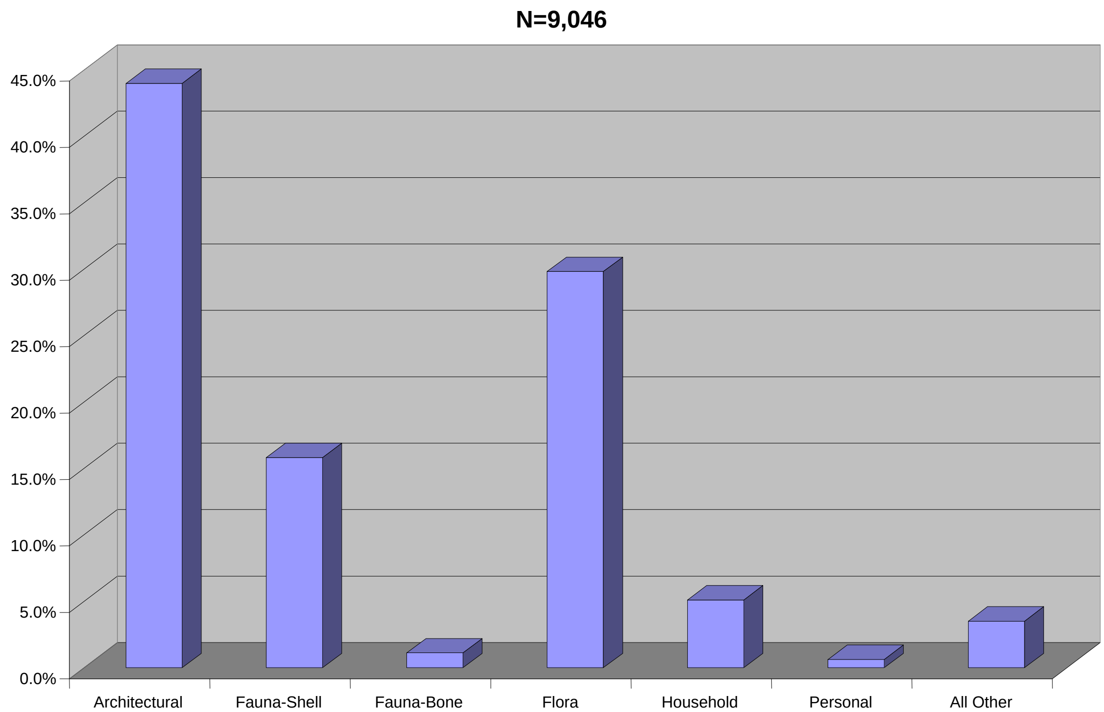
The 1990 TPQ for WHS D comes from a piece of plastic printed "**. . . midnight on 30th day a . . ./ . . . Passed back . . ./ Card guaranteed by MTA to correspond . . . With the wrap . . .**" This artifact, from Cat. 15598.220 (SP 74.3), is obviously intrusive but was not discarded because of its association with the MTA. Other post-1970 pieces of plastic were found in the upper levels of a number of the secant pile excavations. Post-1893-machine-made bottles are in Cats. 15598.208 (SP 53.2), .233 (SP 83.4), .192 (SP 37.2), .232 (SP 83.3), .196 (SP 41.2), and .199 (SP 45.2). The earliest artifact is a sherd from a Dutch-style green-glazed red earthenware vessel from Cat. 15598.200 (SP 45.3).

Architectural Group artifacts dominate the artifact assemblage in WHS D (see **Table 6-34**). Red brick fragments are the most common artifact type in this group. Cat. 15598.224 (SP 77.2) has 431 pieces weighing over 5 kilograms and Secant Piles 49, 80, 83 have contexts with between 100 and 200 pieces weighing between .08 and 2.5 kilograms. As noted in **Chapter 5:B.5.d. Analytical Unit WHS D**, the brick here might be related to features associated with the cable and elevated railways that terminated in this area. Yellow brick is present in small numbers throughout the AU. Plaster and mortar are also found in many contexts but particularly in Cats. 15598.206 (SP 49.3), .208 (SP 53.2), and .196 (SP 41.2). Several of the plaster pieces are complete enough to show all three layers (the scratch, brown, and finish coats) and one, from Cat. 15598.221 (SP 0074.3) retained its green paint and appeared to have some remnants of wallpaper (see **Figure 6.26B**). Window glass is present but not in the same quantities as in WHS C.

The Floral Group is so large in WHS D because one context, Cat. 15598.082 (South of C15), contained 1,296 black cherry pits and 432 coffee beans, which came from a sample of the deposit identified in the field (see **Figure 5.81**). Twenty other charred coffee beans were found in Cat. 15598.139 (C16.4) and single cherry pits were scattered throughout the AU. The TPQ for Cat. 15598.139 is 1820, based on the presence of one whiteware sherd, but that for .082 is 1770, from one creamware chamber pot rim sherd. The only other objects in Cat. 15598.082 are a grape seed and two fragments that are possibly burned cloves.

These pits and beans are probably waste from commercial processing of food. The coffee beans are charred, either from poorly supervised (or over-enthusiastic) roasting or from a fire. (Eight pieces of charcoal were recovered from Cat. 15598.139 but none of the other artifacts are burned.) Their burned state made them unsuitable for grinding and brewing. The cherry pits, on the other hand, had been processed before they were discarded. The pits were identified as black cherry (*Prunus serotina*) by PRI (see **Appendix E**). Black cherry is a native tree that grows freely throughout the eastern United States in mixed hardwood forests or in open areas. The wood is valued for its color. The fruits themselves are dark purple, small (less than 3/8-inch diameter) and form in easily harvested clusters. At the present time, black cherries are an important natural source for cherry flavorings in foods. Formerly, and still in some rural areas, they were commonly used for making jelly, jam, syrup, brandy, and wine, although the wine does not age well. The method for using them is to boil, steep, or soak the berries, strain the juice through a sieve or jelly bag, then discard the contents of the jelly bag. The deposit in WHS D was the result of the disposal of the contents of at least several large jelly bags. The pits could have come from home processing of cherries, but, given the number of pits and their location in the fill, it is more likely that a confectioner or other food processor used the fill as a convenient dumping ground.

Table 6-34
Whitehall Slip AU D Functional Groups



The shell in WHS D is similar in species present and proportions to the other Whitehall Slip AUs: oyster (847 pieces weighing 4.4 kilograms); soft shell clam (180 pieces weighing .07 kilograms); quahog (150 pieces weighing .7 kilograms); and mussels (40 pieces weighing .01 kilograms). None are concentrated in any particular context. The 179 mud whelks are also not concentrated in any one area within the AU, although 30 were found in Cat. 15598.200 (SP 45.3). One unusual shell was found in Cat. 15598.023 (a miscellaneous find between decking columns C18 and C20) (see **Figure 6.27A**). This pink conch shell, probably collected somewhere in the Caribbean, has a number of saw marks and part of the outer shell has been removed in strips, probably to make buttons possibly to make wampum or other beads. Wampum was an important artifact in early New York (Cantwell and Wall 2001:132-133). Made by the Lenape from the columna (central cores) of local whelk shells (for white beads) and the purple part of quahog shells (for the more valuable purple beads), it effectively became the currency of New Netherland and its importance continued during English control for the remainder of the 17th and into the 18th century. The Dutch turned wampum and its production into a commodity subject to the laws of the marketplace. Europeans or their dependent Native communities might have used this shell in the commercial production of wampum, although its use in button production is more likely. No other artifacts were collected with it, although its collection location suggests a possible relationship with other contexts in the vicinity of C18 and C20, which have a TPQ of 1800 (from Cat. 15598.020).

The Household Group, as already noted, includes a few ceramic sherds associated with the pearlware dump in WHS C. One dump-associated vessel is a teapot lid painted with the same floral sprig motif as in pearlware pattern 101 (the tulip motif) (see **Figure 6.22A**). However, this lid was not fluted, (as were most of the pattern 101 vessels), and floral sprigs could be used with different main motifs. The lid has a painter's tally mark in the form of three dots in a triangle on its underside.

In addition to the dump vessels, a number of other English tea- and tablewares from Cats. 15598.057, .058, .059, .060, and .062, were crossmended and given MNVs as part of the initial analysis of the pearlware deposit. These contexts are not part of the dump but they nonetheless contain some interesting vessels, including a number of transfer-printed whitewares. Whiteware is the name given to the wares that succeeded pearlwares beginning circa 1815 to 1820. The differences between pearlware and whiteware are evolutionary not revolutionary and are often a matter of degree. Whitewares, however, often have printed decoration and/or makers' marks that can provide fairly narrow manufacturing date ranges.)

The ceramic TPQ for WHS D is 1900, based on one small sherd from Cat. 15598.227 (SP 80.2) that appears to have been made in the 20th century, but a more solid TPQ date for the ceramic vessels in this AU is circa 1840 to 1850: The post-1900 sherd is small and its date is not based on a dated makers mark or decoration but the 1840 date came from a transfer printed plate (from Cat. 15598.060, South of C17) decorated with the pattern for "**Father Matthew, The Great Advocate for Temperance**" (see **Figure 6.27B)** (Snyder 1997:19) made by William Adams (Furniss et al 1998:68). Father Theobald Matthew was a Capuchin friar who founded an influential temperance movement in Cork, Ireland in 1838. He came to the United States between 1849 and 1851, traveling to 25 states and administering the temperance pledge in 300 cities. The vessel could date from the period of his American tour. The style of this purple printed plate also suggests a date somewhere between circa 1840 and 1855. This pattern was also found at the Five Points site, where there was a large population of Irish immigrants (Cantwell and Wall 2001:220). A number of other printed vessels was identified in this same context (Cat. 15598.060), including small pieces of three matching plates printed in red with the "**Pergamus**" pattern (see **Figures 6.28A** and **6.28B**), part of the "Holy Bible" series made by Job and John Jackson, in business between 1831 and 1835 (Coysh and Henrywood 1989:107). Their Holy Bible series may have been aimed at the religious revivals that swept the United States in the 1830s. Other fragmentary vessels are two matching purple printed plates with an unidentifiable exotic landscape pattern. A brown printed plate has a motif that includes a parrot in a cage; its printed mark is incomplete, but might be "**Avery**" by an unknown maker. Another vessel in this context is a small sherd from a London-shaped cup; printed in black in the "**Spanish Convent**" pattern (see **Figure 6.29A**), another William Adams product. This pattern is listed in an 1835 invoice of ceramics sent by Adams to a Philadelphia importer (Furniss et al 1998:121). All of these vessels were probably redeposited secondary household refuse.

The glass in the Household Group includes some bottles manufactured during the 20th century as well as some made during the 18th and early-19th centuries. A piece of an English cut lead glass wine stem made between 1715 and 1750 was found in Cat. 15598.020 (C18-C20).

The Personal Group consists of white clay smoking pipe pieces and fragments of shoes. The pipes include many with wide date ranges and one with the very narrow range of 1698 to 1713. This pipebowl, from Cat. 15598.024 (C18-C20), marked **EVA/NS** in a cartouche on the right side of the bowl, was made in Bristol, England by Isaac Evans. Among the shoes is a pointed-toe shaped sole with both inner and outer leather layers from Cat. 15598.036 (Near C18). Its shape is long and narrow (11.75 inches long, 3.25 inches at the widest part, and 2.75 inches at the widest part of heel) and the stitching holes are still visible (see **Figure 6.29B**).

Coal (included in the All Other Group) is more common in WHS D than in any other AU in the project area. The 123 pieces of coal and 29 coal cinders were found in many contexts in this AU but particularly in Cats. 15598.200 (SP 45.3) and .145 and .146 (C 19.2 and .3). All but three of the contexts with coal and/or cinder are secant pile or decking column excavations (see **Appendix A**).

Cattle remains are the most numerous of the bone fragments. Some of the meat cuts have been sawed, a butchery technique that became common during the early-19th century. Taken in combination with the dates of the printed ceramic vessels and the relatively high amounts of coal, the sawed bone points to a mid-19th century date for deposits in this AU, which is later than the construction date for Whitehall Slip in this area (circa 1796) but agrees with the circa 1845 date for the final filling of the Slip. It appears that additional landfill was added to areas surrounding the Slip at the same time the Slip itself was filled.

F. GENERAL SOUTH FERRY ANALYTICAL UNITS

Manufacturing date ranges for the artifacts from the General South Ferry deposits (Site 16196) are very widespread (see **Table 6-15**): artifacts from the early-17th through the late-20th centuries were found in deposits of household waste, demolition rubble, construction debris, and what appeared to be casual disposal of rubbish. The majority of contexts were mixed, i.e., they contained artifacts from different time periods and types of deposits. This section will discuss the site by AUs within each separate Area.

1. FAN PLANT SHEETED PITS

Four large excavation pits were placed in the area near the existing fan plant in Peter Minuit Plaza, the former location of a man-made pond or basin associated with the construction of George Augustus's Battery (see **Chapter 4: A.6. George Augustus' Royal Battery 1734-35** and **Chapter 5: C.4.e. Fan Plant Sheeted Pits**). The Pond, whose exact usage has not been determined, was created probably in 1734/1735 and was filled circa 1773. The artifacts in this part of the site (Area FPSP) were secondary refuse, undisturbed after their deposition here as fill; their source(s) most likely was domestic garbage. The small size and fragmentation of the artifacts precludes their being primary refuse (garbage deposited directly from a household). The artifacts were probably deposited as primary refuse near where they were used and later moved to where they were excavated as part of landfilling activities, i.e., they were inadvertent inclusions in the soils used as fill. Although they cannot be assigned to a particular household or even neighborhood, they have information about the community as a whole during the time of their manufacture and use.

The FPSP area was divided into four AUs, based on their vertical position within the pits (for AUs FPSP A, B, and C) or the lack of vertical attributions (FPSP D). FPSP A was located at the bottom of the deposit with FPSP C at the top. Most of the artifact-bearing contexts came from Pit 3. All of the AUs include some artifacts that post-date the 1773 fill but these are from were scattered locations and are in low numbers (except for FPSP D, discussed below) which is not unexpected (see **Table 6-13** and accompanying discussion).

The composition of the artifacts within the AUs is not particularly similar with respect to Functional Groups (see **Table 6-35**), although in general there are fewer Architectural Group artifacts and shell pieces and more Household, Personal, and bone refuse than in the Battery Wall and Whitehall Slip AUs.

Table 6-35
Fan Plant Sheeted Pits Functional Groups

Group	Artifact count/percentage by Functional Group			
	FPSP A	FPSP B	FPSP C	FPSP D
Architectural	29 (17.0%)	42 (11.0%)	13 (7.3%)	3 (4.4%)
Fauna-Bone	39 (22.8%)	102 (26.7%)	40 (22.3%)	0 (0.0%)
Fauna-Shell	16 (9.4%)	38 (9.9%)	3 (1.7%)	0 (0.0%)
Flora	9 (5.3%)	13 (3.4%)	1 (0.6%)	0 (0.0%)
Fuel	1 (0.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Hardware	0 (0.0%)	0 (0.0%)	1 (0.6%)	0 (0.0%)
Household	37 (21.6%)	121 (31.7%)	88 (49.2%)	44 (64.7%)
Industrial	0 (0.0%)	4 (1.0%)	2 (1.1%)	1 (1.5%)
Other	0 (0.0%)	0 (0.0%)	1 (0.6%)	0 (0.0%)
Personal	37 (21.6%)	59 (15.4%)	29 (16.2%)	19 (27.9%)
Prehistoric	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (0.0%)
Unknown	3 (1.8%)	2 (0.5%)	1 (0.6%)	1 (1.5%)
TOTAL:	**171**	**382**	**179**	**68**

a. FPSP A—BASAL STRATA OF BATTERY POND FILL

This AU contains only 171 artifacts and pieces of organic material. The Household Group artifacts consist of a variety of ceramic ware types, including British buff-bodied slipware, locally made red earthenwares and salt-glazed stonewares, and tin-glazed sherds. The latest artifact is a spout from a refined earthenware teapot with a molded fern-like pattern and a rich green glaze. This type of pottery was made in England between 1740 and 1770. The glass consists of dark green bottle sherds and one molded wine glass stem, made of lead glass, along with a fragment of milk glass. The Personal Group contains white clay smoking pipes, all with long manufacturing date ranges, and 16 shoe leather fragments. The bone is mainly dietary refuse, although pieces of sheep skull are present. Cattle bones are the most numerous but sheep, pig, chicken, goose, passenger pigeon, and cod were also identified.

The small Architectural Group is dominated by pieces of window glass, however three pieces of sawn wood from Pit 3 are in this category. These are sections of timbers collected in the field and sent for dendrochronological analysis. Two of the logs were oak: one is about 7.25 inches in diameter and the other is about 12.5 inches. Unfortunately neither has its final growth ring and all that could be determined was that one was cut after 1671 and the other after 1676. The third timber had been sawed, probably by hand, into a square shape, approximately 9 by 9 inches and 3 to 3.25 inch thick. It might have been part of a framing timber for a structure.

b. FPSP B—MIDDLE STRATA OF BATTERY POND FILL

FPSP has the most artifacts of the AUs within the Fan Plant area. The Household Group artifacts are the most numerous and include both 17th- and 18th-century vessels, among which are three sherds of Dutch-style buff-bodied earthenware with yellow lead glaze. One of the sherds is a ring handle from a flat pan or colander and the other two might be part of the same vessel. This vessel was probably made before 1700. A sherd from another early (circa 1660 to 1730) vessel is made of British buff-bodied slipware decorated with “jeweled” drops of white slip on a line of trailed brown slip, possibly forming part of a letter on the exterior of a mug or drinking pot. An even earlier (circa 1620 to 1675) vessel, a plate or shallow dish, is represented by a single sherd with tin glaze on the face and lead glaze on the reverse. The remaining decoration on the face consists of single lines of yellow and purple. This type of ware preceded entirely tin-glazed vessels in the Netherlands and was most often decorated in polychrome colors. A number of sherds with tin-glaze on both surfaces were also found, among which is one with robin's egg blue glaze, a feature of some English 18th-century vessels. Two sherds from a handled teacup, a rather rare form in tin-glazed vessels because the tin glaze did not withstand heat well, has a large-scale floral decoration (see **Figure 6.30A**). This cup was probably made circa 1725 to 1775. Other 18th-century vessels are a Chinese export porcelain bowl sherd with a style of decoration often called Batavian (because of its association with the Dutch Indonesian settlement): a brown slip was applied to the exterior of vessels and blue underglaze or polychrome overglaze motifs were painted on the interior and sometimes in cartouches left uncolored on the exteriors. These vessels are most usually dated circa 1740 to 1780 in the Northeast, although their manufacturing date range was longer. A circa 1725 to 1780 English-made vessel of Astbury ware, represented by one sherd, is probably a small jar, or possibly a tea caddy, with a rolled rim. Two sherds of blue printed pearlware, one very small, and one of whiteware were 19th-century additions to the fill. The larger pearlware sherd is from a plate, possibly decorated in the Willow pattern. The whiteware sherd is a hollowware, possibly a teapot or pitcher, with a molded angular shape and an unidentifiable pattern. Angular shapes for tea- and tablewares were popular at mid-century (circa 1840 to 1870).

Only a few glass artifacts were recovered from FPSP B but two of the four whose forms could be identified are from early vessels: onion-shaped bottles made between 1630 and 1740. One of the others is a neck from a circa 1730 to 1860 bottle and the other is a sherd from a square case bottle. Case bottles, made in a square shape to fit securely into compartments in packing cases, have a long manufacturing date range and are not uncommon in 17th century deposits. One unusual metal artifact was also found: a piece of a three-legged iron cooking pot. This large pot—the remaining section is over 7 inches long—has one foot remaining. The foot itself is angled and is 2 inches tall toward the center of the pot and 2.5 inches tall at the outer edge. Preservation of this metal pot was probably due to the waterlogged condition of the deposit.

The Personal Group, as in FPSP A primarily composed of white clay smoking pipes and shoe leather, also has some 17th century artifacts. Two pipebowls are marked with different styles of the "**HG**" monogram, the mark used by Hendrick Gerdes, working in Amsterdam between 1668 and 1688. Pipes marked "HG" have been found at several New York City sites (see **Chapter 6: G.1.d. Decorative Elements**), apparently as a result of Gerdes's connections to merchants who imported goods to North America. Two decorated stems have rouletted motifs that were also probably of Dutch 17th century manufacture.

The Architectural Group includes a few modern intrusions (a wire nail and a piece of linoleum) but consists mainly of demolition debris that might have come from 17th- or early-18th century structures: red earthenware roofing tiles, red and yellow bricks, and window glass. Two sherds of tin-glazed tiles were found. One has two sketchily painted swans or large ducks; the other, with an unidentifiable motif, has wear on its surface, possibly indicating it was used as a pill tile or possibly as the result of cleaning with an abrasive substance.

Two mending sherds from a sugar mold and two pieces of iron slag make up the Industrial Group. Both sugar mold sherds have dark, reduced cores, a feature not uncommon on these vessels. However, this mold is unusual in having a narrow collar at the rim.

The shell in FPSP B includes pieces of Caribbean conch shells. None show signs of being worked and one has a piece of coral adhering to it. These shells might have been included in ballast picked up in the West Indies and dumped in New York to be replaced by saleable commodities, such as wood. The native shell consists of small amounts of oyster, both types of clams, and mud whelks.

The bone from FPSP B is more numerous but less varied than that in FPSP A (see **Appendix D**). Cattle and sheep are the most common species. Most of the bone is dietary waste but there are also remnants from commercial activity in the form of cattle and sheep fore and hind feet. Chicken is the only identified bird and sheepshead the only identified fish.

c. FPSP C—UPPER STRATA OF BATTERY POND FILL

FPSP C contains only 179 artifacts, of which almost half are in the Household Group. The earliest artifact in this AU is a sherd of Dutch-style buff bodied earthenware. The latest is a sherd of a modern, probably post-1950, hard-paste porcelain mug with a decal motif. Other post-1773 ceramics are another sherd of hard-paste porcelain (from a saucer) and a sherd decorated with transfer printing over a bright yellow glaze. This "canary ware," often used for small mugs intended for children, was made in England between 1780 and 1840. Other ceramic ware types in this AU are British buff-bodied slipwares, locally made red earthenwares and salt-glazed stonewares, Chinese porcelain, tin-glazed earthenwares, and English and German stonewares. The latter two types were probably made before 1775. One of the red earthenware vessels has a ring handle parallel to the rim in a Dutch style; this vessel appeared to be made of local clay, possibly by a Dutch-trained potter for Dutch-American consumers. Two other red-bodied sherds have traces of slip that might indicate they were decorated in a distinctive Lower Delaware Valley style used by many potters in the Philadelphia region and by Jonathan Durrell, a Philadelphia potter who came to New York City during the last quarter of the 18th century (Ketchum 1991:80). In this style of decoration, interiors of small red earthenware bowls, and occasionally other vessels, were covered with white slip, either entirely or in a petaled pattern, and dark brown blotches or streaks were added to the overall yellow glaze. These vessels are rare in New York City archaeological assemblages but extremely common in areas within the Philadelphia sphere of influence (Janowitz 1997). In addition to these two, only five other similarly decorated sherds were identified from the South Ferry Terminal project: one from a miscellaneous unprovenienced find, one from a perimeter trench near W6 (AU CCG D), one from Whitehall Slip (AU WHS B), and two from Wall 1 (AUs W1 A and H).

White clay smoking pipes are the only artifacts in the Personal Group. All but three have long date ranges. A stem with four rows of rouletting and a row of pointed dentate milling was probably made in the Netherlands during the 17th century. One bowl, with the initials **N/M** on either side of its heel, was probably made between 1689 to 1730, either in Bristol or Gloucester. Another bowl is marked "**RT**" facing the smoker with "**R/TIP/PET**" in a cartouche on the side, the mark of three generations of Bristol pipe makers working between 1660 and 1722.

The small Architectural Group is composed of fragments of roofing pan tile, red brick pieces, one piece of window glass, and two badly deteriorated nail fragments. A small wrought iron pintle hinge is in the Hardware Group. The Industrial Group consists of two sherds from a sugar mold.

The three pieces of shell in FPSP C are one fragment each of quahog and soft shell clam and the central part of a conch shell, probably from a local variety of whelk. This columna section has no obvious cut marks. The only identifiable species in the bone assemblage are cattle and sheep.

d. FPSP D—MISCELLANEOUS CONTEXTS FROM THE FAN PLANT SHEETED PITS

With 68 artifacts, this is the smallest of all the Fan Plant assemblages. No organic material was recovered and almost 65 percent of the artifacts are in the Household Group. This skewed distribution is at least partly the result of circumstances in the field, as most of this AU consists of artifacts sampled from the backdirt pile.

The Household Group includes several early-19th century printed pearlwares: four sherds from three different vessels—a platter and two plates—printed in dark blue negative patterns (in which the motif appears as white areas on the dark background) made between 1818 and 1835 (often referred to as "Old Blue"); and a sherd from a blue-printed Willow-pattern platter and a small sherd with an unidentifiable blue printed pattern, both made circa 1807 to 1835. A late-19th through mid-20th century porcelain teapot sherd was possibly made in Japan. Two sherds from a case bottle made between 1850 and 1920 (based on its lack of both a pontil mark and machine-made seams) was also recovered. Other ceramics in this group include a red earthenware foot from a Dutch-style cooking pot with heavy wear on its bottom surface, a sherd from a Fulham-type stoneware mug, made in England between 1690 and 1775, and a sherd from a kiln-damaged Midlands Mottled mug. This mug, made in England between 1670 and 1750, cracked during firing with glaze filling in the cracks. The vessel probably was still functional but it is of second-quality, a possible incentive to ship it off to the colonies. The five pieces of glass in this AU include one from an onion bottle and another from a dip-molded bottle.

The Personal Group has 11 pieces of leather and eight white smoking pipe fragments, none distinctive. The Architectural Group consists of two red earthenware pan tile fragments and a piece of concrete. The Industrial Group has one piece of miscellaneous slag.

2. PETER MINUIT PLAZA ANALYTICAL UNITS

The artifacts from contexts in Peter Minuit Plaza were varied in their frequencies and functional groups (see **Table 6-36**).

Table 6-36
Peter Minuit Plaza Functional Groups

Group	Artifact count/percentage by Functional Group					
	PMP A	**PMP B**	**PMP C**	**PMP D**	**PMP E**	**PMP F**
Activities	1 (0.0%)	0 (0.0%)	0 (0.0%)	5 (0.1%)	0 (0.0%)	5 (0.2%)
Architectural	173 (8.6%)	34 (11.5%)	9 (18.4%)	1088 (29.0%)	680 (21.8%)	153 (7.3%)
Arms	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)	0 (0.0%)
Electrical	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.1%)	0 (0.0%)	4 (0.2%)
Fauna-Bone	225 (11.2%)	0 (0.0%)	3 (6.1%)	194 (5.2%)	90 (2.9%)	41 (2.0%)
Fauna-Shell	1352 (67.1%)	232 (78.6%)	12 (24.5%)	1377 (36.6%)	1507 (48.4%)	72 (3.4%)
Flora	4 (0.2%)	0 (0.0%)	0 (0.0%)	233 (6.2%)	331 (10.6%)	10 (0.5%)
Fuel	38 (1.9%)	17 (5.8%)	0 (0.0%)	75 (2.0%)	96 (3.1%)	4 (0.2%)
Furniture	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.1%)	1 (0.0%)	0 (0.0%)
Hardware	0 (0.0%)	0 (0.0%)	0 (0.0%)	12 (0.3%)	2 (0.1%)	1 (0.0%)
Household	148 (7.3%)	12 (4.1%)	23 (46.9%)	545 (14.5%)	246 (7.9%)	1687 (80.8%)
Industrial	0 (0.0%)	0 (0.0%)	0 (0.0%)	13 (0.3%)	2 (0.1%)	30 (1.4%)
Medical	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)
Other	1 (0.0%)	0 (0.0%)	0 (0.0%)	38 (1.0%)	16 (0.5%)	0 (0.0%)
Personal	7 (0.3%)	0 (0.0%)	2 (4.1%)	100 (2.7%	55 (1.8%)	71 (3.4%)
Prehistoric	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)	1 (0.0%)	1 (0.0%)
Tool	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)
Transportation	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)	1 (0.0%)	0 (0.0%)
Unknown	65 (3.2%)	0 (0.0%)	0 (0.0%)	72 (1.9%)	85 (2.7%)	7 (0.3%)
TOTAL:	**2014**	**295**	**49**	**3758**	**3114**	**2088**

a. PMP D (0 TO 8 FEET BELOW GROUND SURFACE), PMP E (8 FEET BELOW GROUND SURFACE TO BASE OF EXCAVATION), AND PMP F (MISCELLANEOUS FILL, BACKDIRT, STRAY OR SURFACE FINDS, OR UTILITY FILL)

The artifacts from AUs PMP D, PMP E, and PMP F will be discussed together because the artifacts in each AU have similar manufacturing date ranges and ware types. AUs PMP A and B are associated with deposits of shell and contained few artifacts; PMP C is associated with a stone wall found in line with the head of Whitehall Slip; PMP D, PMP E, and PMP F are general contexts within Peter Minuit Plaza (see **Table 6-13** and accompanying discussion). These will be discussed first.

AUs PMP D, PMP E, and PMP F contain artifacts with a wide range of manufacturing date ranges. Artifacts made in the 20th century include many pieces of recent plastic of various sorts. The late-dating architectural artifacts are probably from destruction debris: sherds from pressed porcelain floor tiles, a piece of a porcelain sink or water closet, plate glass, and pressed porcelain insulators. A number of modern bottles are probably from casual disposal of refuse in the area. One pale green 6 oz. bottle has remnants of a white and red applied color label for "**CANADA DRY/SPUR**" on one side and "**MANUFACTURED AND BOTTLED BY M.H. MYERS BEVERAGES**" on the other (see **Figure 6.30B**). On the base is the Owens-Illinois trade mark and a date code for 1935 or 1945 and mold number "**G2043**" (Toulouse 1971:403). Spur was Canada Dry's entry in the cola wars and, based on the number of advertising ephemera available on the Internet, it was heavily promoted in the 1940s. An earlier milk bottle (see **Figure 6.31A**) is embossed "**P.J. SCANLON/28/WASHINGTON/STREET/NEW YORK**." Dates for this dairy have not yet been located.

Bridging the 19th and 20th centuries is a glass insulator from Cat. 16196.505 (Tieback #5) marked "**W BROOKFIELD/45 CLIFF/NY**." Information about this firm, a leading manufacturer of glass insulators at this time, can be found at various Internet sites compiled by insulator collectors. From comparing their information, the most reliable and detailed seemed to be http://www.myinsulators.com/glass-factories/brookfield.html. The Brookfield firm which made this insulator was established in Bushwick, Brooklyn in the 1860s and at first made only bottles. They soon began production of glass insulators for telegraph lines and by the 1880s most of their production was in this field. The company maintained a business office in Manhattan, located at 45 Cliff St. between 1882 and 1890, although it is possible that molds with "45 Cliff" continued to be used after the office was moved to Fulton St. in 1890. The firm continued in business until the early-1920s.

No ceramic housewares with exclusively 20th century dates were recovered. Some ware types have date ranges that extend into the 20th century but all of these were likely made during the 19th century, based on their dates of greatest popularity. Some of these vessels are made of white granite, a ware type that often has datable embossed patterns, although the sherds in these AUs are too small for identification of their patterns. Other ceramics are circa 1860 to 1920 bottles made of British stoneware dipped in Bristol-type slip; such bottles were often used for beer. One circa 1850 to 1920 brown stoneware master inkbottle is stamped "**. . .POTTERY/ NEAR DERBY/ . . . & J. ARNOLD/ LONDON**." The full stamp would have been "J. Bourne & Son/Derby Pottery near Derby/P. & J. Arnold/London" (Godden 1964:89-90). Bourne bottles for Arnold ink are not uncommon in 19th-century east coast archaeological assemblages. An earlier (1833 to 1850) Bourne's bottle stamped "**GUARANTEED NOT TO ABSORB/ BOURNES/IMPROVED VITREOUS STONE BOTTLE**" was a miscellaneous find in PMP F.

A cluster of second to third quarter of the 19th-century transfer printed tea- and tablewares is in PMP D, PMP E, and PMP F. Printed patterns were one of the most popular decorative techniques for dishes from the beginning of the century until after the Civil War (Miller and Earle 2008). Several of the printed patterns are on at least two vessels but there was no clustering in their distribution, which might have enabled researchers to identify discrete deposits. Matches were found between patterns on teacups and saucers and between plates and other plates and platters but no teawares matched any tablewares. Matched sets of tea- and tablewares did not become common until later in the century, so the distribution of patterns in these AUs is not unusual. The PMP vessels are made of whiteware, for the most part, and some have makers' marks, which narrow their date ranges. One purple printed plate is marked "**T.J. & J. Mayer/ Rural Scenery/ Prize Medal**." This design, illustrated in Williams (1978:404), probably refers to a prize granted at the Crystal Palace Exhibition of 1851 to the Mayer brothers, who worked in Staffordshire from 1843 to 1855 (Godden 1964:424). Thus, the vessel was likely made between 1851 and 1855. Another **T.J. & J Mayer** mark, without a pattern name, is on the underside of the rim of another vessel. A partial mark for the Burslem, Staffordshire, firm of Thomas Godwin, in business between 1834 and 1854 (Ibid:278), is on a plain base sherd.

Another cluster of slightly earlier vessels was found in the same AUs, with most in PMP F. They are primarily pearlwares and were manufactured from about 1815 to 1845. One plate or platter sherd has a distinctly New York motif (see **Figure 6.31B**): a picture of the **Chancellor Livingston** steamboat, which plied the waters of the Hudson between Albany and New York City from 1816 to 1828. The Chancellor Livingston was one of the products of the partnership between Robert Fulton and Robert R. Livingston, a member of the politically and socially prominent New York family (Friends of Clermont 2005). The maker of this sherd has not been identified. At least one English potter, Enoch Wood, made vessels with a "Chancellor Livingston" steamboat pattern but his design does not match this one (Larson 1975:27).

Some other vessels also have identifiable patterns by so-far unidentified makers. At least two circa 1820 to 1845 plates have a blue printed pattern identified as "**Village Church**" by an unknown maker (Williams 1978:705, Snyder 1997:115). Both are from Cat. 16196.448 (PT 94). A platter and a plate from Cat. 16196.399 (a miscellaneous find context) has the "**Kaskerat**" pattern (see **Figure 6.32A**). This view, part of a series of scenes in the Ottoman Empire by an unknown potter, possibly John and William Ridgway (Coysh and Henrywood 1982:270 and 1989:150), was taken from a series of engravings published by Luigi Mayer in 1810 titled *Views in the Ottoman Dominions*.[15] The source view does not include the flamboyant horseman pictured on this sherd, but was otherwise faithfully reproduced by the engraver of the design used on these vessels. Kaskerat was the name of a city now in Romania; other city or village views used by the unknown potter were "Near Bucharest," "Pera," "Pioccolo Bent," and "Ciala Kavak"

Two vessels have identified makers and unidentified designs. One blue printed saucer has the circular impressed mark "**Adams Warranted Staffordshire**" with an eagle in the center, a mark used between 1804 and 1840 (Godden 1964:21 Mark 19). The design includes a man handing a birdcage to a woman as they stand in front of a Tudor-style cottage. A plate base sherd, from the R. & J. Clews firm, has a mark that includes "**STONE/CHINA**," a term used by some Staffordshire potters in the early-19th century for wares that were neither stoneware nor china

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[15] Reproduced in the New York Public Library's Digital Library, at:
http://digitalgallery.nypl.org/nypldigital/dgkeysearchresult.cfm?parent_id=

(porcelain). The blue printed motif on this vessel has not been identified but it shares general decorative characteristics with vessels in Clews' circa 1818 to 1835 Hudson River and American City view series.

A number of Old Blue decorated vessels are in this cluster of tea- and tablewares (see **Figure 6.32B**) Old Blue, as noted above, was popular in the Northeast circa 1818 to 1835. None of the patterns could be identified by name[16] but some of the borders are very similar to ones used by Enoch Wood, one of the main manufacturers and exporters of Old Blue vessels. Most of the vessels are teacups and saucers but plates and a few serving vessels were identified. Several vessels, specifically teacups and saucers, have the same patterns.

A number of pearlwares plates have embossed rims. This type of rim decoration was an elaboration of shell edge plates and was common between 1820 and 1835 (Miller, et al. 2000). At least four plates with the same "**fish scale beneath feathers**" embossed pattern come from Cat. 16196.374; three have blue painted edges and one has green. Another two (one blue, one green) with a slightly different embossed fish scale pattern come from Cat. 16196.397 from the same general area. Three more with another slight variation of the fish scale motif (two blue, one green painted) come from Cat. 16196.454. All three contexts are from the area of the East Waler Trench in PMP F. This style of border was made by a number of Staffordshire potters, including Enoch Wood and William Adams.

Among the other embossed rim vessels are three blue-painted plates with fern-like motifs that match a waster sherd collected from the R. & J. Clews site in Cobridge, Staffordshire (Miller, pers. comm. 2007). The Clews firm might have been the manufacturers of another plate with an embossed wheat and grass motif. These possible Clews vessels are from various locations included in PMP F. Four or five plates, painted blue or green, have the rope and acanthus pattern; all of these come from the East Waler area.

An unusual creamware plate or dish sherd comes from the same area. It is unusual because it has evidence of other than culinary activities: heavy use wear on its face and mortar on all its surfaces. The parent vessel of this sherd had a very thick body, a possible reason for its selection for a secondary function.

Ceramic vessels from the turn of the 19th century in these AUs are primarily plain creamwares with some painted, dipt, and shell-edged pearlwares; some Chinese porcelains; and a scattering of other wares from many different contexts. The Chinese porcelains are mainly teawares but plates and dishes were also identified, including one with painted blue flowers on the marley, a brown line around the rim and blue lines on the exterior beneath the rim. Earlier 18th-century vessels include one saucer and two or three teacups of Batavian-style Chinese porcelain. English white salt-glazed plates with dot and diamond, barleycorn, and dot-diamond and basket patterns were found in various contexts, although most are from PMP D.

Coarse earthenwares (British buff-bodied slipwares and local red earthenwares) and local salt-glazed stonewares were found throughout PMP D, PMP E, and PMP F. The British slipwares, as already noted, were made circa 1670 to 1785. The local red earthenwares were made from the 17th until the middle of the 19th century and the stonewares were made from about 1720 to 1840. Styles of decoration on complete or at least partially complete vessels can often narrow

[16] Later (post-1830) printed patterns are generally easier to identify than earlier ones because the later ones are more likely to include a pattern name on the vessel itself, allowing collectors to compile lists and images of these patterns and their makers.

manufacturing date ranges for these wares but the South Ferry sherds are generally too small for more precise dating. One exception is a British slipware sherd from a dish made on a drape mold that had a pattern; the areas on the dish defined by the molded pattern were filled in with dark and light brown slips. This vessel was probably made between 1670 and 1730 (Barker 1993:15). Another more tightly datable sherd was from a large, probably bulbous-bodied, stoneware jar or jug. The neck area is undecorated but starting at the shoulder is a cordon (a narrow incised band) filled-in with blue, followed by a band of diagonal rouletting and a band of slightly larger-sized straighter rouletting. Similar decorations have been found on waster sherds from the African Burial Ground site in Manhattan where the products of the Crolius and Remmey families of potters were deposited between about 1720 and 1760 (Janowitz 2008). A pan or bowl sherd is almost certainly a waster as it has glaze on a broken edge. This everted-rim vessel has a series of blue lines perpendicular to the rim edge, another early design used by the Manhattan potters.

No Dutch-style earthenwares were recovered but a sherd from a German salt-glazed bartman bottle (also called bellarmines) made between 1620 and 1700 has a sprigged seal of an unidentified coat of arms, probably the arms of a European city. A 1620 to 1675 tin and lead glazed plate base sherd has a broad, flat, circular foot ring, a common feature on these vessels (see **Figure 6.33A**). This vessel is somewhat unusual because it was painted only in blue, even though its motif was a European-style floral and fruit design (see **Figure 6.12B**); tin and lead glazed vessels (maiolicas) are most often painted in vivid polychrome colors. A completely tin-glazed sherd with a reddish brown body and finely painted floral design in black filled in with blue was probably made in France during the 18th century (see **Figure 6.33B**).

The most unusual artifact from these AUs is the cannon ball found in ET 5. As noted above in the discussion of the Whitehall Slip cannon ball, this is a 4.25 inch, 6 pound ball.

b. PMP A (SHELL CONTEXTS), PMP B (SHELL CONTEXTS), AND PMP C (MANHOLE 35 STONE WALL)

AUs PMP A and PMP B have many of the same types of ceramics as in PMP D, PMP E, and PMP F but in smaller numbers. PMP A (n=2014) has many more artifacts than PMP B (n=295). One interesting vessel is a canary ware[17] child's mug, made between 1790 and 1835, with a bright yellow glaze, a copper luster band beneath the rim, and a black printed sheep. An unusual sherd is of French brown faience (often, somewhat erroneously, referred to as Rouen faience). This 1720 to 1800 base sherd has a bright red body, no footring, heavy wear on the base, and dark brown lead glaze on the exterior with white tin glaze on the interior. Brown faience has been fairly rare on Manhattan sites and this is the only such sherd recovered from the South Ferry excavations.

Other interesting artifacts are a piece of a purple-painted tin-glazed wall tile that appears to have been cut into a 1.5 by 1 inch rectangle, possibly for use as a gaming piece, and a piece of heavy iron wire, plated with white metal and bent to form a decorative element, perhaps for a heavy piece of furniture but more likely for a fence.

The shell in PMP A and PMP B consists predominately of oyster with some quahog and a few jingles and barnacles (see **Appendix A: Table A-2**). It was not from a natural deposit: none of the shells are paired and many have hack marks (only two were identified with shuck marks).

[17] Canary ware has a refined light-colored earthenware body, essentially the same as pearlware, but a yellow glaze.

Ages of those with complete growth rings are from 1 to 17 years old with an average age of slightly less than 5.5 years; most are 3 to 7 years in age. The beds from which the oysters came seem to have been under some stress as many of the shells have bore holes and some have attached worm tubes.

PMP C has few artifacts (34 artifacts, 12 pieces of shell, and 3 bone fragments), although the ceramic vessels in particular are relatively more complete than in other areas and their manufacturing date ranges are concentrated in the late-18th through early-19th centuries. Creamware plates are the most common objects and provide the 1770 TPQ. One smoking pipe with a very thick stem was probably made in the 17th century. The creamware plates and soup plates have Royal pattern and feather edge rims. One of the feather edge plates is very well made with crisp molding and no signs of crazing or staining. Sherds from two separate tin-glazed punch bowls have blue painted, probably chinoiserie-style, motifs. A tall shoe heel made up of multiple layers of leather held together with wooden pegs, one almost 2 inches in length, is part of this assemblage.

3. COAST GUARD ACCESS ROAD ANALYTICAL UNITS

a. CCG A (LOG FEATURE UNDER COAST GUARD ACCESS ROAD, INSIDE LOG FEATURE MATRIX) AND CCG B (BENEATH THE LOG FEATURE), CCG C (MISCELLANEOUS LOG FEATURE RELATED CONTEXTS)

Three AUs (CCG A, CCG B, and CCG C) were assigned to deposits associated with the log feature in this area (see **Table 6-13** and accompanying discussion). These AUs have few temporally diagnostic artifacts. Contexts in CCG A have large amounts of brick and wood fragments. CCG B contexts contain only shell (predominantly mussel and soft shell clam), bark, and one piece each of brick, mortar, and red earthenware (see **Table 6-37**). Only two artifacts were collected from CCG C, a sherd of a sugar mold and a red earthenware jar sherd. This jar sherd is unusual because it has a fragment of iron wire wound around the body just below the rim, probably in an attempt to keep a cracked jar from breaking apart.

Table 6-37
Coast Guard Access Road Functional Groups

Group	Artifact count/percentage by Functional Group					
	CCG A	**CCG B**	**CCG C**	**CCG D**	**CCG E**	**CCG F**
Architectural	42 (10.8%)	2 (2.7%)	0 (0.0%)	707 (34.3%)	562 (17.6%)	28 (10.8%)
Arms	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)	0 (0.0%)
Fauna-Bone	40 (10.3%)	5 (6.8%)	0 (0.0%)	0 (0.0%)	161 (5.0%)	10 (3.8%)
Fauna-Shell	146 (37.5%)	52 (71.2%)	0 (0.0%)	626 (30.3%)	1980 (62.0%)	2 (0.8%)
Flora	130 (33.4%)	13 (17.8%)	0 (0.0%)	118 (5.7%)	271 (8.5%)	0 (0.0%)
Fuel	3 (0.8%)	0 (0.0%)	0 (0.0%)	22 (1.1%)	15 (0.5%)	1 (0.4%)
Furniture	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)	0 (0.0%)	0 (0.0%)
Hardware	0 (0.0%)	0 (0.0%)	0 (0.0%)	8 (0.4%)	0 (0.0%)	0 (0.0%)
Household	23 (5.9%)	1 (1.4%)	1 (50%)	460 (22.3%)	126 (3.9%)	200 (76.9%)
Industrial	0 (0.0%)	0 (0.0%)	1 (50%)	20 (1.0%)	5 (0.2%)	0 (0.0%)
Other	0 (0.0%)	0 (0.0%)	0 (0.0%)	8 (0.4%)	21 (0.7%)	0 (0.0%)
Personal	4 (1.0%)	0 (0.0%)	0 (0.0%)	41 (2.0%)	31 (1.0%)	7 (2.7%)
Prehistoric	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.1%)	0 (0.0%)	1 (0.4%)
Unknown	1 (0.3%)	0 (0.0%)	0 (0.0%)	40 (2.4%)	23 (0.7%)	11 (4.2%)
Total:	**389**	**73**	**2**	**2063**	**3196**	**260**

b. CCG D (COAST GUARD ACCESS ROAD 0-10 FEET BELOW GROUND SURFACE), CCG E (10 FEET BELOW GROUND SURFACE TO BASE OF EXCAVATIONS), AND CCG F (MISCELLANEOUS FILL, BACKDIRT, STRAY OR SURFACE FINDS, OR UTILITY FILL)

Cat. 16196.164 (PT 32) in AU CCG D contains a great variety of artifacts with manufacturing date ranges from the 18th through the 20th centuries. The TPQ artifact is a post-1985 IKEA butter knife. The earliest artifacts are some tin-glazed sherds and some circa 1620 to 1710 white clay smoking pipe stems. Destruction debris (red and yellow bricks, window glass, and mortar) is common. One unusual architectural item is a piece of a decorative tile or molding, made of earthenware with a floral motif, possibly in an art deco style (see **Figure 6.34A**). Art deco motifs can be seen on many Manhattan buildings constructed during the 1920s and 1930s.

Within the variety of artifacts in Cat. 16196.164, however, a group of English-made blue printed pearlware and bone china vessels manufactured between 1807 and 1835 (probably more narrowly between 1818 and 1835, based on their decorations) stands out. These vessels include both tea- (cups and saucers) and tablewares (plates and platters) and a chamber pot. The London-shaped bone china vessels (two saucers and a teacup) all have the same very dark design, indicating they come from a set (see **Figures 6.34B** and **6.35A**). The chinoiserie design is very dark, especially on the teacup, but on the saucer the chinoiserie waterscape with houses motif can be seen. Sherds from two other bone china vessels—a London-shaped slop bowl or breakfast cup (a large teacup) and a small teapot or bowl—are undecorated except for a gold band around the rim of the cup and the base of the possible teapot.

A number of printed pearlware vessels were recovered. All of them have blue or dark blue floral, landscape, or genre motifs but the only indication of matching vessels is two plates with the same unidentified dark blue floral design. Two of the other patterns were identified. One is the "**Christ Church, Oxford**" motif (see **Figure 6.35B**), attributed to John and William Ridgway's Oxford and Cambridge College Series (Coysh and Henrywood 1982:84). Another has the "spread eagle and floral" border (see **Figure 6.36A**) used by Joseph Stubbs on his plates with views of the environs of New York City (Halsey 1974:169-176). This plate has the partial mark "**Hu … East**," possibly for "**Hurl Gate, East River**," a pattern made by Stubbs.[18] One small cup plate (a vessel used under a cup in lieu of a saucer) has a distinctive genre design (see **Figure 6.36B**) that includes a spotted dog lying down in front of a horse; in spite of its distinctive motif, the pattern has not been illustrated in any available references. The vessel has no makers' mark but it does have a tally mark for its decorator in the form of dots in a square.

One undecorated base sherd—probably from a shell-edged tureen or dish—has the impressed circular mark, "**A. STEVENSON, STAFFORDSHIRE**." It was made between 1816 and 1830 (Godden 1964:596). The chamber pot, a somewhat unusual vessel form for printed decoration, has a floral motif (see **Figure 6.70**). One vessel, a drainer, is a possible link between Cat. 16196.164 and the printed vessels in PMP D: like the vessels in Cat. 16196.448, the drainer has the "**Village Church**" pattern.

AUs CCG E and CCG F also contain a wide variety of artifacts with disparate manufacturing date ranges but without any notable concentrations of any one type of artifact. CCG E does have a large number of shells, predominantly quahog but also oyster and non-food species (barnacles, n=156, and mud whelks, n=153). Pieces of edible whelk shell are also present; one is a center core (columna) with a cut across the shell, possibly evidence of wampum production. Two

[18] Hurl Gate was another term for Hell's Gate in the East River.

pieces that make an almost complete common music volute shell, a marine snail found in the Caribbean, are in this AU. The pieces are water worn and slightly sun bleached, probable indications the shell was exposed on a beach whose sand was used as ballast. CCG E also has a musket ball that appears to have been chewed and a small knob or finial made of bone carved in a floral motif.

CCG F has almost no shell and few architectural artifacts, most likely because artifacts in this AU were opportunistically collected from backdirt or as stray finds. Household artifacts are the most common objects. One oval pharmacy bottle, made between 1867 and 1910, based on the manufacturing technology (a slug plate on a mouth blown bottle) is embossed "**THE CORPORATION OF/ HEGEMAN & CO./ MANUFACTURING CHEMISTS/ NEW YORK**." A July 31, 1905 article in the *New York Times* noted the Hegeman Corporation had stores "from the Battery to Harlem" where, among other items, patent and propriety medicines were sold (*New York Times* 7/31/1905:5). The article was written to mark the opening of "one of the largest and finest day and night drug stores in the world" in the New York Times building on 42nd Street between Broadway and 7th Avenue. The firm was to use part of its space, where it occupied part of the building's ground, subway, and sub-basement levels, to manufacture soda fountain delicacies to be served on site. The firm had a candy department and a pharmacy "ordered on approved modern lines, and will be an exact counterpart of the prescription department in the main office, store, laboratory, and manufacturing plant of the corporation at 200 Broadway[19], in the Hegeman Building. A complete line of patent medicines will be handled…" The article noted the firm was founded in 1827 (incorporated sometime after 1878) by William Hegeman, who studied in Heidelberg. It credited Hegeman with starting "the movement which resulted in establishing the first College of Pharmacy" in New York City. In addition it claimed that "Many of the pharmacy laws of the State also are traced to his energy and initiative" (Ibid).

Another interesting artifact from CCG F is a large sherd from a blue-painted Chinese porcelain punch bowl. The sherd shows considerable wear at the rim, probably from long use with a lid, and its body is carved with a floral design on the interior. Glaze fills in the design but the floral motif is discernible and would have made this a visually appealing and expensive vessel. Another distinctive sherd is from a large platter decorated with a dark blue print by the firm of Joseph Stubbs (1822 to 1835) in their "**spread eagle**" rim pattern.

4. BATTERY PLACE : BPLA (CHARCOAL STRATUM IN BATTERY PLACE), BPL B (REDDISH BROWN SILT FROM SOLIDER PILE PITS), BPL C (BASAL SILT FROM SOLIDER PILE PITS), BPL D (0 TO 4 FEET BELOW GROUND SURFACE), BPL E (4 FEET BELOW GROUND SURFACE TO BASE OF EXCAVATION), BPL F (ORIGINAL SUBWAY FILL), AND BPL G (MISCELLANEOUS FILL, STRAY FINDS, UTILITY FILL OR BACKDIRT)

In general, only relatively small amounts of artifacts and organic materials were recovered from the contexts in these AUs (**Table 6-38**).

[19] 200 Broadway today is near Fulton Street.

Table 6-38
Battery Place Functional Groups

Group	Artifact count/percentage by Functional Group						
	BPL A	**BPL B**	**BPL C**	**BPL D**	**BPL E**	**BPL F**	**BPL G**
Activities	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (1.0%)	0 (0.0%)	0 (0.0%)
Architectural	41 (30.1%)	7 (10.1%)	4 (9.8%)	26 (10.8%)	135 (43.1%)	9 (23.1%)	6 (12.5%)
Commercial	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (1.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Fauna-Bone	12 (8.8%)	6 (8.7%)	11 (26.8%)	19 (7.9%)	6 (1.9%)	2 (5.1%)	12 (25.0%)
Fauna-Shell	43 (31.6%)	5 (7.2%)	0 (0.0%)	14 (5.8%)	27 (8.6%)	9 (23.1%)	3 (6.3%)
Flora	1 (0.7%)	0 (0.0%)	0 (0.0%)	2 (0.8%)	9 (2.9%)	0 (0.0%)	0 (0.0%)
Fuel	0 (0.0%)	3 (4.3%)	0 (0.0%)	60 (24.9%)	6 (1.9%)	1 (2.6%)	0 (0.0%)
Hardware	1 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Household	27 (19.9%)	26 (37.7%)	19 (46.3%)	74 (30.7%)	62 (19.8%)	15 (38.5%)	20 (41.7%)
Other	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.4%)	9 (2.9%)	0 (0.0%)	1 (2.1%)
Personal	9 (6.6%)	20 (29.0%)	7 (17.1%)	1 (0.4%)	27 (8.6%)	3 (7.7%)	5 (10.4%)
Prehistoric	1 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Toy	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.1%)
Unknown	1 (0.7%)	2 (2.9%)	0 (0.0%)	41 (17%)	29 (9.3%)	0 (0.0%)	0 (0.0%)
Total:	**136**	**69**	**41**	**241**	**313**	**39**	**48**

In AU BPL A, a charcoal stratum, red brick pieces and oyster and quahog shell are the majority of the artifacts and organic materials recovered. Dark green and black bottle glass sherds are the most common non-architectural or faunal objects; most are too small for identification of their manufacturing technique (either free blown or mold blown) but one sherd probably comes from an onion-shaped free-blown bottle made between 1630 and 1740. The TPQ artifact is a small sherd of burned and rust-encrusted scratch-blue decorated white salt-glazed stoneware made between 1744 and 1775. Most of the dated artifacts were made during the 18th century, although some (e.g. pipestems) have end dates that extend into the 20th century. Three gray-bodied salt-glazed stoneware sherds are likely to have been made in Manhattan between circa 1720 and 1815. Two have brown slips on their interior surfaces. The other has an applied floral sprig made in a mold and highlighted with blue after it was attached to the body. One of the brown-slipped sherds is water worn and has a small piece of Atlantic drill shell attached to its interior as part of a rust concretion. Many of the other artifacts are rust stained but only the TPQ sherd was obviously burned. There is thus probably no direct association between the artifacts and whatever event created the charcoal in this context although they were deposited together as part of the fill in this area.

The artifacts and faunal materials found in AU BPL B, from soldier pile pits, include a complete queen or pink conch (*Strombas gigas*) that is approximately 8 inches long. This species is native to the Caribbean and the shell's surface is badly weathered and cracked. It might have been a souvenir or novelty discarded along with other refuse or it might have been included in sand ballast brought from the West Indies. A distinctive artifact is a tin-glazed sherd with an unidentifiable motif painted in green and brown; the color of the glaze, paint, and body suggest it was made in Spain or Portugal or one of the Iberian colonies.

AU BPL C, basal strata of soldier pile pits, contains only 30 fragmentary artifacts (and 11 pieces of bone) but those that could be dated were manufactured during the 17th, 18th, or early-19th centuries, including locally made salt-glazed stoneware, a redware dish with combed slip decoration, and an early pipestem.

Among the artifacts from AU BPL D are a number of sherds of Chinese export porcelain from SPPs 71 and 72 (Cats. 16196.053, .054, and .055). Twenty-one sherds mend to form an almost complete plate with a poorly painted "**Canton**" motif in underglaze blue (see **Figure 6.37B**). Plates with such sketchy motifs were not common until after the Revolution when direct trade between China and the United States was established. At least one other plate and two saucers in these same contexts also have underglaze blue Asian-style motifs, while a bowl painted in overglaze polychrome colors has a small-scale European-inspired floral motif. These designs were also common after the Revolution into the early-19th century. However this AU includes at least four 20th century machine-made bottles: a small soda bottle embossed "**7 FL.OZ. NO DEPOSIT, NO RETURN**"; a small beer bottle embossed on the base "**AHK/88/75/M**"; and a complete Old Spice bottle embossed "**20**" on the base. Old Spice was introduced as a product in 1938.

AU BPL E, a mixture of soldier pile pits and other general contexts, had the largest number of objects of the Battery Place AUs (n=313), although 93 of the artifacts were brick fragments discarded in the Dewberry field lab. The AU is mixed: the latest artifact is a fragment of a machine-made bottle, the earliest artifacts are 17th century pipestem fragments, and sherds of 18th- and 19th-century ceramics are included. The most notable artifact is a sherd from a Nottingham stoneware mug with a crowned "**WR**" in a circular cartouche impressed into the body. In 1700, during the reign of William III, a law was passed in England that required tavern, inn, and public house keepers to serve ale only in containers of standard size—i.e., a pint should be a pint. The king's initials were marked on mugs of all sorts to show that they were of the required size, even after William was succeeded by Queen Anne. Another, later (circa 1815-1900), British stoneware in this AU is a small brown bottle, probably for ink.

BPL F was defined as fill associated with the construction of the original subway in the project area; few objects were collected from the soldier pile pits in this AU but they included two separate human femurs from SPPs 57 and 61. These were not from the same individual, as one was from a juvenile. As noted in **Chapter 6: D.1. Above the Wall**, the fill for the subway probably included materials from an old churchyard.

Although AU BPL G, composed of miscellaneous and stray finds, utility fill, or backdirt, has only 48 artifacts and pieces of organic materials, these include several whole bottles, ranging in date from the 18th century to the present. The oldest is a small (3 inches high) dark green dip mold-blown hexagonal bottle, possibly used for snuff; a hand-carved cork remained in its interior. An aqua semi-automatic machine-made seltzer or mineral water bottle (circa 1899 to 1920) with a rounded bottom is embossed "**RYLANDS/ BARNSLEY**" surrounding "**4**." Ryland was an English bottle maker who patented a screw top in 1889 (Potten 2002). This bottle, however, had a cork closure. A screw top closure is on an amber wine bottle embossed "**4/5 PINT**" around the heel and "**7/WINE**" and "**K**" in a keystone on the base. The "K" and keystone were the trademark of the Knox Glass Bottle Company, based in Pennsylvania and in operation between 1917 and 1968 (Toulouse 1971:293 and Lockhart 2004). This bottle was made after 1935, based on the stippling on its base. The latest bottle was a complete **Pepsi** bottle with a "bottle cap"-style logo, used between 1962 and 1965, according to the company web site.

5. BATTERY PARK NORTH: BPN A (0 TO 5 FEET BELOW GROUND SURFACE), BPN B (5 FEET BELOW GROUND SURFACE TO BASE OF EXCAVATION), AND BPN C (MISCELLANEOUS FILL, STRAY FINDS, UTILITY FILL OR BACKDIRT)

Of the three AUs in this area, BPN A had by far the most artifacts (see **Table 6-39**).

Table 6-39
Battery Park North Functional Groups

Group	Artifact count/percentage by Functional Group		
	BPN A	**BPN B**	**BPNC**
Architectural	7 (2.9%)	33 (54.1%)	5 (6.3%)
Fauna-Bone	6 (2.5%)	7 (11.5%)	6 (7.5%)
Fauna-Shell	1 (0.4%)	9 (14.8%)	1 (1.3%)
Fuel	1 (0.4%)	1 (1.6%)	0 (0.0%)
Hardware	1 (0.4%)	0 (0.0%)	0 (0.0%)
Household	216 (90.8%)	8 (13.1%)	60 (75.0%)
Industrial	0 (0.0%)	0 (0.0%)	1 (1.3%)
Medical	0 (0.0%)	0 (0.0%)	1 (1.3%)
Personal	4 (1.7%)	3 (4.9%)	4 (5.0%)
Unknown	2 (0.8%)	0 (0.0%)	2 (2.5%)
Total:	**238**	**61**	**80**

AU BPN A, like some of the AUs in Peter Minuit Plaza, has a number of sherds from printed pearlware vessels, in particular in Cat. 16192.102 (DB40-41). This context differs from the PMP ones, however, because it also has many sherds of blue painted, and a few sherds of polychrome painted pearlware. The blue painted floral and geometric motifs are on teawares and bowls; the earth-toned polychrome floral motifs are on bowls. One China-glaze bowl has a chinoiserie-style landscape design. The printed sherds are all in blue; their particular motifs are not complete enough for identification of patterns, except for two sherds that are probably from a **Willow** motif plate. Cat. 16196.088 (ET 1, General Find) has two sherds from a blue printed chamber pot or large bowl with a pastoral landscape scene that includes two cows, a man with a pitchfork, cottages, and a sailboat. At least three blue shell-edged plates and a platter are also in Cat. 16196.102. In addition to the blue painted and printed pearlwares, creamware tablewares and blue-painted Chinese porcelain tea- and tablewares (in particular plates) were recovered. The vessels in this context could represent one dumping episode of household refuse: they are consistent with tea- and tableware ceramic assemblages that have been found in other early-19th century contexts. Two redware vessels are included in this context. Both are plates, not a common redware form in New York City, and both are decorated with a covering light slip and sponged blotches of brown. Slip-decorated redwares were much more common in the Philadelphia region than in New York and these two vessels add a slightly unusual aspect to the Cat. 16196.102 assemblage.

BPN A also has one of the more striking wall tiles. From Cat. 16196.090 (South of DB 40), this tile fragment shows **Moses** with the tablets on which were written the Ten Commandments (see **Figure 6.38**). Moses is depicted with horns, an artistic convention widely used during the early modern period.

The majority of the artifacts in BPN B are Architectural: fragments of red brick, mortar, plaster, and seven fragments of cut stone, one with mortar still adhering to it. The Household artifacts include single blue printed pearlware and whiteware sherds.

The latest artifact in BPN C is a complete **Pepsi** bottle made, according to the date code on its base, in 1946. The bottle came from a water pipe trench in ET 1 and is obviously associated with the creation or repair of this trench. The contexts in this AU include artifacts with manufacturing dates ranging from the 17th through the 19th centuries: Dutch maiolica, some early smoking pipes, whiteware, and white granite vessels. One roofing tile is more complete than most of the others at the site and has a definite under-curved edge and mortar on one surface.

6. BATTERY PARK SOUTH : BPS A (1 TO 10 FEET BELOW GROUND SURFACE), BPS B (10 FEET BELOW GROUND SURFACE TO BASE OF EXCAVATION), AND BPS C (STRAY OR SURFACE FINDS OR SUBWAY FILL)

Table 6-40
Battery Park South Functional Groups

	Artifact count/percentage by Functional Group		
Group	**BPS A**	**BPS B**	**BPSC**
Architectural	72 (29.1%)	1 (8.3%)	8 (16.7%)
Commercial	0 (0.0%)	0 (0.0%)	1 (2.1%)
Fauna-Bone	9 (3.6%)	0 (0.0%)	35 (72.9%)
Fauna-Shell	34 (13.8%)	5 (41.7%)	0 (0.0%)
Flora	33 (13.4%)	5 (41.7%)	0 (0.0%)
Fuel	7 (2.8%)	0 (0.0%)	0 (0.0%)
Household	78 (31.6%)	1 (8.3%)	1 (2.1%)
Personal	3 (1.2%)	0 (0.0%)	0 (0.0%)
Tool	0 (0.0%)	0 (0.0%)	3 (6.3%)
Unknown	11 (4.5%)	0 (0.0%)	0 (0.0%)
Total:	**247**	**12**	**48**

The count of materials in BPS A (see **Table 6-40**) is inflated by the 32 pieces of wood fragments found in these contexts (the other object in the Flora Group is a seed pod from a sweet gum tree) and the 33 oyster shell fragments, and the 34 brick fragments, also discarded in the field lab. The remaining artifacts vary widely in date ranges (both British slipware and white granite sherds were recovered) and are fragmentary. One more complete vessel is a straight-sided porcelain demitasse cup, made after 1921 probably either in Germany or Japan, with an orange luster glaze and a polychrome printed motif in a reserve. The printed design shows children playing. Such vessels were popular between the wars.

The small assemblage from BPS B is not notable. One piece of a plank (the Architectural Group artifact) has parallel marks from a reciprocal saw.

Some of the artifacts from AU BPS C—three shovels and a coal scuttle in the Tools and Household Groups—are derived from construction work for the existing 4/5 subway line in the project area. The coal scuttle is made of galvanized iron and had a lift handle on one end; the handle has two iron pieces with a spike on each end for attachment into the wooden part of the handle. At the bottom of the scuttle is an amorphous mass, probably burned or melted, made up of various materials, including tar and nails and possibly paint and plaster. The tar was possibly used for waterproofing and the other things might have become embedded in the still-viscous tar after the scuttle was discarded.

The most complete shovel is flat-nosed with a wooden shaft and part of a D-shaped wooden handle. "**NY CO**" is branded on the shaft. A D-shaped handle is all that remains of another shovel and the last consists of only a steel round-nosed blade stamped "**CAST STEEL**" with an illegible maker's mark. The blade is welded to a V-shaped piece that forms the socket for the shaft. Based on their relative sizes, the handle and the round-nosed blade are from two different shovels.

7. OTHER ANALYTICAL UNITS: BP A (CONTEXTS ASSOCIATED WITH CRIBBING ALONG THE WEST CUT-OFF WALL) AND GBW (GENERAL CONTEXTS ASSOCIATED WITH THE WALL, EXCAVATED BEFORE THE WALL WAS DEFINED)

Table 6-41
BP A Functional Groups

Group	Artifact count/percentage
Architectural	5 (5.7%)
Fauna-Shell	58 (66.7%)
Flora	5 (5.7%)
Household	6 (6.9%)
Personal	9 (10.3%)
Unknown	4 (4.6%)
Total:	**87**

Contexts in AU BP A were located in both Battery Park North and South. The high shell count (see **Table 6-41**) is due primarily to the presence of 34 mud whelks and 13 soft shell clams. No bone was recovered and it is likely that some of the contexts sampled a natural shell bed. The latest datable artifact is a single fragment of whiteware and there are also two sherds each of pearlware and creamware here. The Architectural artifacts include a hand-wrought nail from Cat. 16196.534, associated with removal of log in DB36-39.

Table 6-42
GBW Functional Groups

Group	Artifact count/percentage
Architectural	228 (29.5%)
Fauna-Bone	27 (3.5%)
Fauna-Shell	381 (49.3%)
Flora	40 (5.2%)
Fuel	7 (0.9%)
Household	54 (7.0%)
Personal	27 (3.5%)
Toy	1 (0.1%)
Unknown	7 (0.9%)
Total:	**773**

Contexts in AU GBW were located in Battery Park North and the Coast Guard Access Road area. The most common artifacts are red brick fragments and oyster and soft shell clams. The Flora group (see **Table 6-42**) consists of wood and bark fragments and one spherical object that might have been a desiccated black walnut or possibly a small wooden ball. The Household artifacts include 18th- and early-19th-century ceramics but also two machine-made bottles, although the bottles were found in backdirt and an amorphous feature that might represent a recent disturbance. The Personal Group, except for a metal button, is made up of pipes, which are discussed below.

G. TOBACCO PIPES

1. INTRODUCTION

Pipes exist in at least two dimensions. The first is strictly utilitarian—the pipe is designed to hold tobacco that is then smoked. The second is social—all the relevant variables that enable one to define it as a pipe, impart to it a complex social meaning that is interpretable by the user and the group to which he or she belongs. Smoked or displayed in an emblematic way, pipes can indicate variations in class, ethnicity and group affiliation (Cook 1989 and Dallal 2004b). Pipes can also communicate ideological values (Alexander 1986). Some of the makers' marks and decorative motifs acknowledge mythical and historical events of the past. By marking pipes, pipemakers commit buyers "to loyalty and obligation in the future" (Schneider and Weiner 1989:3). Because they are easily broken and their period of utilization short, they are also sensitive temporal indicators of site occupation periods—hence their importance to archaeologists.

The large numbers of clay tobacco pipes recovered from archaeological sites in New York City demonstrate that people loved to smoke. Many of these pipes were marked with distinctive icons consisting of pictorial symbols or initials. These motifs are so distinctive in style and placement, that they are considered valid temporal indicators for site occupation periods. These motifs were eventually transformed along with the shape of the pipe into nationally and ethnically specific icons. Several aspects of the pipe enable the archaeologist to use it as a dating tool. First, there was a gradual, uneven, although continuous, reduction in smoke hole diameters through time. Second, stylistic changes to the bowl occurred. Finally, pipemakers often labeled their products with distinctive marks. These marks can be traced to pipemakers working during particular periods of time in particular cities. Pipes marked **HG**, for example, were made by Hendrik Gerdes who was working in Amsterdam between 1668 and 1688. Therefore, an archaeological deposit containing HG pipes cannot date before 1668 nor date much later than 1688.

a. STEM BORE DIAMETERS

In 1954, Harrington published his observations that smoke hole diameters consistently changed through time. He noted that older pipes had relatively larger boreholes through their stems than more recent ones, which were narrower. He illustrated this gradual reduction of size from 1620 to 1800 on a bar graph expressed in percentages. Based upon Harrington's research, Binford (1962) devised a "straight line regression formula that could be applied to statistically large enough samples of pipestems to arrive at a single date, theoretically the median figure for the occupation period of the sample" (Walker 1977:9).

Binford's formula has been applied, too often misused, and extensively discussed since its original publication. In working with the Williamsburg, Virginia collection, Audrey Noel Hume (1963) demonstrated that a minimum of 900 stem fragments was needed to produce reliable results. She established that the Binford formula was unreliable for dates preceding 1670 and post-dating 1760. Stems from later sites tended to yield dates that were consistently too early as they progressed towards the 19th century. Walker (1977) explained the phenomenon as the result of a proliferation in the types and styles of pipes due to an increase in production. He further noted that bore holes could not have continued to contract indefinitely without great difficulty in drawing smoke through the stem. Harrington (1954) and Binford (1962) also recognized the limitations of pipestem dating techniques for mixed Dutch and English samples of stems. The mean date formula was based upon size variation in English pipes and could not be assumed to be directly applicable to pipes of Dutch manufacture. However, the analysis of the pipe collection from the Broad Financial Center site in lower Manhattan showed that mean dates calculated from distinct stratigraphic units containing a mixture of Dutch and English 17th century pipes, correlated well with ceramic and glass TPQ dates (Greenhouse Consultants 1985). Although fairly reliable mean dates have been produced using significantly smaller samples than 900 stems, any attempt at dating deposits with less than 25 stem fragments would be irresponsible. It is always better to use the style of the bowl, makers' marks, and motifs to date a particular sample.

b. BOWL MORPHOLOGY

The pipemaking industry began in England and the generally accepted date for the initial manufacture of clay pipes in London is circa 1580. The earliest clay pipes found in London date circa 1603. Many had makers' marks on the bases of their heels that include the oak leaf, fleur-de-lis, Tudor Rose, Gauntlet, or the pipemaker's initials (Oswald 1960). These early pipes, often called "fairy bowls," had swollen bellies, which contracted slightly at the rim and were attached to thick stems at an obtuse angle. Bowls became larger in the mid-17th century reflecting a reduction in the cost of tobacco and the fact that people were becoming habituated to smoking it (Duco 1981). The wide angle between the bowl and stem was retained for nearly a century until the angle was reduced and the bowls sat more erectly on thinner stems. This change in the relationship of bowl to stem is a valid criterion for pipe dating (Omwake 1967). During the 18th century, however, Dutch bowls evolved into thinner, conical shapes, although the wide angle between the stem and bowl was retained. In general, by the early-18th century, stems were thinner and longer, bellies on bowls had disappeared, and pipes were larger with gently curving outlines . By the 19th century, most pipes were upright on their stems. Because the shape of the pipe has consistently changed through time, this fact is of primary importance in dating clay pipes. In addition, due to stylistic criteria, pipes can often be attributed to a specific country and/or city of origin.

c. MAKERS' MARKS

Pipemakers' often stamped their products with distinctive marks. These typically consisted of the pipemaker's initials, which can be traced to specific pipemakers working within a specific period of time in a particular city. Many pipe researchers in the Netherlands, Great Britain and elsewhere have conducted studies of the pipemaking industries of their respective regions. Archaeological evidence has supplied proof that many of these regional products were exported to the American colonies.

Marks had the status of chattel and were bought, sold, rented and inherited. Therefore, a pipemaker's initials or other type of mark cannot always be assigned to one specific individual. Widows worked at their husbands' businesses after they were gone and often continued to use their husbands' marks. In addition, several generations of pipemakers might have had the same mark and the same initials. Three generations of Robert Tippets, for example, all used the same mark(s). Double sets of initials such as **RC** and **PW** on the same pipe, suggest a partnership between two pipemakers. And another manufacturer might copy a mark that had acquired prestige decades or even centuries earlier.. For example, the **TD** mark initially used by Thomas Dormer of London circa 1748 to 1770, was copied by many pipemakers in numerous countries throughout the 19th century. In fact **TD** pipes were so popular that the "TD" became synonymous with the term for a "clay pipe."

Three types of marks were used by Dutch pipemakers. Similar to their British counterparts, the Dutch used their initials, sometimes crowned and sometimes joined together. Seventeenth century Dutch makers' marks were often representations of biblical or mythic figures (e.g., mermaids, King David), objects or animals (e.g., trumpet, bell, pipe), trades (e.g., trowel, tight-rope walker), facets of everyday life (e.g., milkmaids carrying buckets) or comical figures (e.g., Jacob on the dung heap) (Duco 1982). Numbered marks, crowned and uncrowned were also popular.

The position of the mark often has chronological significance. The earliest marks were stamped on the underside of the heel. Occasionally, the mark was on the stem. In London circa 1670, the placement of the mark shifted to both sides of the heel (Oswald 1951). Mid- to late-17th- and early-18th century pipes made in Bristol, England, can be identified by the distinctive cartouche or roundel located on the right side of the bowl coupled with impressed initials stamped into the back of the pipebowl as it faces the smoker. These marking styles are so distinctive, it has been argued (Dallal 1993) that pipes reaching Boston prior to 1730 were imported, almost exclusively, from London, whereas pipes reaching New York City were imported, almost exclusively from Bristol, England. That Bristol pipes were still being exported to New York in the mid-18th century can be seen in the following advertisement in the *New York Mercury*, published on March 22, 1756 (p. 1): "To be sold by Thomas White, at his store in the house of Mrs. Farara, in Queen-street, within two doors of the sign of the Bible & Crown, a parcel of choice Bristol short pipes, by the box."

The movement of the mark from the underside of the heel where it is nearly invisible, to the back and side of the bowl where it faces the consumer and perhaps potential consumers, suggests a growing awareness of advertising as a marketing strategy and a change in the way business was done (Dallal 1995).

d. DECORATIVE ELEMENTS

Decorated pipes can be dated to periods of time when certain styles were in vogue. For example, a rouletted line just under the rim of the bowl was popular throughout the 17th century and went out of style circa 1710 (McCashion 1979). During the 17th century, ornamentation was mostly on the stems and included lines of rouletting, cogs teeth, Bristol diamonds, dots, zigzag lines and other types of motifs.

Elaborately decorated Dutch bowls were also manufactured during the first half of the 17th century, as well as theme pipes. Walter Raleigh pipes, for example, were popular with sailors and depicted Raleigh (sometimes called Jonah) being spat out by a crocodile or whale-like creature. "Orange" pipes depicting rulers or other motifs related to the house of Orange, were also common (Duco 1981). During the second half of the 18th century, elaborately molded bowls were popular in England. These were decorated with heraldic figures, Masonic emblems, Royal Arms, and Prince of Wales' feathers. Relief-molded bowls with ribs or flutes flourished throughout the 19th century. One specific motif, commonly found on London sites and dating between circa 1790 and 1830 was a leaf decoration along the mold seams (Walker 1966). However, these leafy decorations have also been recorded from archaeological deposits that post-date 1850 in Philadelphia, Wilmington and Brooklyn (LBA 1990b and 1991 and Geismar 1992). During the 19th century, there was "a marked resemblance in many styles, implying mold makers delivering patterns from an order book with modifications to suit customers' requirements" as was the case with architectural pattern books (Oswald 1975:10). The result of this "borrowing" was that styles characteristic of one manufacturing region were often imitated in other regions and/or time periods.

e. SOUTH FERRY TERMINAL PIPE ASSEMBLAGE

One thousand four hundred and seventy (1,470) pipe fragments were recovered from the South Ferry Terminal project site. In general, the pipes are fragmentary and of ordinary or poor quality. Many specimens appear to be crudely or hastily manufactured, which can be indicative of mass production, worn molds and cheap prices. The quality of the assemblage suggests that inferior pipes or seconds were being dispatched to the colonies. The majority show evidence of use-wear suggesting the pipes were smoked, dropped and broken, then discarded as trash, and do not represent saleable merchandise broken in transit during commercial ventures and then discarded. Commercial goods do not show evidence of use wear. Many pipe fragments are also blackened on their exteriors, again suggesting that they had been thrown into trash heaps and burned before becoming part of the South Ferry landfill.

The presence of belly bowls and thick, large-bored stems (7/64", 8/64" and 9/64") with typical 17th century decorations indicate the presence of 17th century refuse in the fill at the site. Seventeenth century makers' marks include: **EB** (1), **HG** (2), ***DA** (1), **SH** (1), **MTS** (1), **II** (1), **Tudor Rose** (1), **three-leaf clover** (1), and the **Hand** (1). Most of these are 17th century Dutch marks from Amsterdam and Gouda. English pipes are also present but their bowl shapes and date ranges typically span the late-17th through early-18th centuries. These include elbow-shaped Export pipes made for the export trade and other types from Bristol. Bristol was a major pipe-making and export center at that time and many of the late 17th- through early-18thcentury pipes that could be identified were from Bristol. Mid-to-late-18th-century pipes at the site were attributed to Bristol but also to Chester, London, and Liverpool in England. Pipes marked with the pipemaker's initials or some other representation, such as a daisy, on either or both sides of the heel, were popular in London beginning circa 1770 (Atkinson and Oswald 1969). At the South Ferry Terminal site, such marks include: **S/H**, **H/N**, **T/D**, **S/F**, and crowned **W/M**.

Seventeenth century stem decorations include rouletting, rouletted runs of dots, "cogs teeth" or zig-zag lines, and fleur-de-lys. No stems decorated with Bristol diamonds are present. The Bristol diamond as a decorative motif went out of fashion about the mid-17th century, although it is often present in deposits dating to the third quarter of the 17th century, suggesting that New York was a backwater town at the time and hopelessly out of date with the latest trends from Europe. Since the Bristol diamond was a typical 17th century Bristol motif and Bristol (along with Gouda in the Netherlands) was a major pipe making center, the decorative motif's absence at the site might suggest that most of the English pipes dating to the late-17th to early-18th centuries cluster toward the latter part of that date range.

The most extensive pipe deposits came from the area of the Battery Wall and the greatest densities were associated with Walls 1, 3, and 4. The greater number of pipes recovered is directly related to the intensity of data recovery operations in those areas — more of the soils were screened for artifacts. However, not many pipes were recovered from Whitehall Slip, despite the fact that data recovery was conducted. This might suggest that cleaner fill materials were used to fill in the area around the Slip than were used to fill in Battery Park. In addition, the Slip was periodically cleaned and dredged (See **Chapter 4: B. Whitehall Slip**).

Very few diagnostic 19th-century pipes were recovered at the site. Due to the fact that few complete bowls are present in the assemblage, it is difficult to say how many 19th century pipes are present. Most stems recovered at the site have 4/64" and 5/64" bore diameters. These were the predominating bore sizes during the 19th century. However, pipestem bores have very wide date ranges and 4/64" and 5/64" bores were also manufactured in the 17th and 18th centuries. Specimens that can be attributed to the 19th century are those with definitive 19th-century bowl shapes and/or those marked in a typical 19th-century manner with particular motifs used by the large pipe manufacturing firms. Fragments decorated in styles popular in the 19th century, such as flutes, ribs or floral motifs, were tentatively assigned to the 19th century due to the fact that these styles had their beginnings rather late in the 18th century and would have taken a while to catch on. Fluted/gadrooned or ribbed pipes, for example, first appeared in London circa 1790 but retained their popularity throughout the entire 19th century. Many of these pipes are also decorated with leaves in a vertical line along the mold seams of the bowls for the purpose of disguising the seams. The decoration was common to pipes made in London between 1790 and 1830 but manufacturers in other cities and countries soon followed suit and these botanical motifs also continued throughout the 19th century.

Unfortunately, in only very few instances did 19th-century pipes at the site contain makers' marks that could be attributed to individual pipemakers and it is exactly this kind of data that would have provided relatively firm manufacturing dates and/or information about the city of manufacture.

Pipes that can be positively attributed to the 19th century include three Dutch specimens. Makers' marks are the **Swordsman** (1), **Crowned 16** (1) and **INGOUDA** (1). A **Peter Dorni-style** pipestem with its typical oak-leaf decoration and a TPQ of 1850 is also present but could have been made nearly anywhere, especially in Germany, the Netherlands or England. There are also several pipes marked **TD** that could not be definitely attributed to the 19th century because TD pipes were first introduced in London circa 1748. Only six fluted pipe fragments were recovered at the South Ferry Terminal project site. Fluted bowls became popular circa 1790 and rapidly became the most common type of pipe in the 19th century (Walker 1983). Archaeological sites containing 19th century strata usually have many TD and fluted pipes. The fact that there are so few identifiable 19th-century pipes at the South Ferry Terminal site, especially in the Battery Park fill, suggests a pre-1790 date for much of the fill, especially in the areas associated with the Wall. We know from historical documents that the Fort was torn down and the park filled with these materials circa 1790 and that the Lower Barracks and storehouses were also demolished about this time (see **Chapter 4: A. 16. Demolition of the Fort**). It was thought that many of the artifacts, therefore, should predate 1790 and that the fill should contain artifacts from the Fort, the Battery Wall, the Barracks/Hospital, the Store House, Pond, and Thomas Elde's House, all part of the Fort's surrounding acreage. However, analysis of other types of artifacts (see **Chapter 6: D. Battery Wall Artifacts**) has shown that 19th- and even some 20th-century artifacts were present in the fill which suggests a great deal of disturbance and/or the presence of later fill episodes. It was necessary to begin to think of the fill as a "village midden" packed with all of the things New Yorkers routinely wore, ate, sold, and used (see **Chapter 6: A. Introduction**).

f. THE CUSTOMHOUSE PIPES

A small, little-known but fortuitous excavation at the Custom House, just outside the project area took place in 1972 when Ted Robinson of the Metropolitan Chapter of the New York Archaeological Association noticed a contractor's excavation trench 5 feet 4 inches deep by 2 feet 9 inches wide by 4 feet10 inches long, to the right of the main entrance of the Custom House as it faces Bowling Green. Aware that the Custom House was the original site of Fort Amsterdam, Mr. Robinson had good reason to be interested in this trench. He noted mammal and fish remains throughout the disturbed soil but, in the south wall of the trench, Mr. Robinson observed an undisturbed pit or occupation layer 41 inches below ground surface (bgs). The majority of the artifacts observed in that layer fell within the period circa 1665 to circa 1685 (McCashion and Robinson 1977). Among the artifacts recovered were 90 pipe fragments, "including five practically whole bowls and eighty measurable specimens (Ibid:4)." It is assumed that Mr. Robinson obtained permission to examine the trench more closely and to remove some of the artifacts. John McCashion and Robinson (Ibid:4) subsequently reported that pipemakers' marks included **HG**, **EB**, the **bell**, ***Wapen van Zeeland*** (lion rising from the waves of the sea which represents the Arms of the District of Zealand), and a **mulberry** pipe. Stem decorations included typical 17th century variants such as rouletting, rouletted runs of dots, and fleur-de-lys. Of the **EB** marked pipes, two were of the funnel-elbow type and one of those pipes exhibited reversed letters suggesting an unskilled, bored or illiterate apprentice rushing to fill an order "to meet the sudden sailing dates the Dutch were known for deciding on from time to time" (Ibid:7).

The Custom House pipes are similar to several types recovered from the South Ferry Terminal project site. For example, **EB**, **HG** and **Mulberry** pipes are present (see **Chapter 6: G.4.f. Battery Park South; G.4.a.2. FPSP; G.4.d. Battery Place)**. The mulberry pipe found by Robinson was identical to the South Ferry Terminal site specimen and could have been made in the Netherlands or England. McCashion noted that "a variety of dotted bowl sidemarks in relief appear on many different Dutch bowl styles throughout almost the entire period of Dutch pipemaking and they are described as variants on the Tudor rose theme, grapes or orange trees" (Ibid:7). In England, pipes decorated in this manner are known as the Mulberry Tree and dates for these cluster between 1650 and 1700 (Ibid).

2. BATTERY WALL PIPES DEPOSITIONAL UNITS

The clay tobacco pipes from contexts associated with Battery Wall segments 1 through 4 are discussed as DUs composed of AUs from the different Wall segments (see **Table 5.8**). It is clear from **Chapter 4: Historic Context,** that many fill episodes were associated with the construction, repair and renovation of the Wall and the creation of Battery Park. The tobacco pipes and other artifacts recovered at the South Ferry Terminal project site indicate that the fill contained refuse from earlier periods.

a. ABOVE THE WALL—AUS W1 A, W2 A, AND W4 A

Two hundred and thirty-nine pipe fragments were recovered from the fill above the Wall. Most were recovered in the area above Wall 1. Diagnostic pipes include 17th century Dutch or English stems (Cats. 15768.014 and 15768.023) decorated with bands of rouletting **(**see **Figure 6.41B)** and rouletted bands of dots that were made in the Netherlands (Cats. 15768.014, 15768.017, and 15768.020**)**. Seventeenth century Dutch and/or English belly bowls (Cat. 15768.016) are also present **(**see **Figure 6.42E)**, as well as export pipes made in England **(**Cats. 15768.017 and 15768.236) **(**see **Figure 6.39 A)**, a complete bowl with rouletting under the rim (1690 to 1720), and a bowl fragment from Bristol marked **R/TIP/PET** in a side cartouche (1660 to 1722) (Cat. 15768.017). A discussion of Tippet pipes can be found later in **. 6: G.2.o.1 W3 K**.

A heeled belly bowl (6/64") (Cat. 15768.017) probably from Gouda with rouletting below the rim **(**see **Figure 6.42F)** and a maker's mark **(uncrowned SH**) on the base of the heel, and probably dating 1630 and 1635 is also present **(**see **Figure 6.40 Bottom)**. This pipe could have been made by any of the following pipemakers: Steven Hendrickse (1630 to 1646), Theuntgen

Willems or his widow (1646 to circa 1660), or Sander Robbertsz. (1667 to 1685) (Duco 2003:160). Given the shape of the pipe, it is probably Robbertsz[20]. Also present is a tiny belly bowl less than an inch high, decorated with a rouletted rim (Cat. 15768.046) **(**see **Figure 6.42C).** This tiny bowl might be the smallest pipebowl recovered to date from an archaeological site in New York City. It is possible it is a toy but it is also possible that it is a very early pipe. Early pipes were small for several reasons. According to pipemaker Steven Bray, the earliest pipes were small because tobacco was unwashed and extremely harsh (Bray[21], pers. comm. 1996). As discussed in less detail directly above in this chapter, these rather primitive pipes, called “fairy bowls” because of their small size, had swollen bellies which contracted slightly at the rim and were attached at an obtuse angle to thick, crudely made stems (Oswald 1960 and Le Cheminant 1984). Bowls grew larger in the mid-17th century, reflecting a reduction in the cost of tobacco, as well as habituation to tobacco’s effects on the body. The small South Ferry bowl recovered above Wall 1 is of a shape dating circa 1610 to 1640 (Noël Hume 1982) and could be Dutch. Other pipes found in the fill above Wall 1 include a heelless pipe (5/64”) with a cartouche located on the right side of the bowl as it faces the smoker (Cat. 15768.236) **(**see **Figure 6.39F).** This particular style of marking is indicative of Bristol pipemakers. Inside the cartouche is a double set of initials, **RC/PW (**see **Figure 6.43A)**. Pipe analysts date pipes with this mark between 1690 and 1710 and assume the double set of initials represents a partnership between two as-yet-unidentified Bristol pipemakers (McCashion 1979). Many pipemakers with the initials RC and several with the initials PW were working in Bristol during this time period (Price, et al. 1979). Several pipes with this identical mark were recovered from the Broad Financial Center Site located on Pearl Street between Whitehall and Broad Streets, not far from the South Ferry site, and two specimens were recovered at the Stadt Huys site (Greenhouse Consultants, Inc. 1985; Rothschild, et al. 1987).

Three bowls recovered above Wall 1 are of a shape which suggests they were manufactured in England between 1680 and 1720 **(**Cats. 15768.236, 15768.238, and 15768.239**) (**see **Figure 6.44G)**.

One heeled stem (5/64”) in the fill above Wall 1 is marked with a flower, a **daisy on a leafy stalk**, on the right and left sides of the heel (Cat. 15768.248) **(**see **Figure 6.43B)**. The pipe was probably made in London in the 18th century. Beginning circa 1680 and continuing throughout most of the 18th century, London pipemakers often marked their pipes on the sides of the heel or spur. In fact, a pipe similar to the South Ferry Terminal project site example but marked with a **daisy** and **fleur-de-lys** on either side of the heel was recovered at the Faneuil Hall site in Boston on a Type 25 bowl (1700 to 1770) (LBA 1999).

Only ten pipe fragments were recovered from the fill above Wall 2. A single diagnostic pipestem (5/64”) decorated with a band of pointed triangles above rows of hand-applied rouletting is probably part of a 17th- or 18th-century Dutch pipe (Cat. 15768.280). A similar stem is discussed and pictured below (see **Chapter 6: G.4.b.1. PMP A, PMP B and PMP C** and see **Figure 6.62B**.

Eight pipe fragments were recovered above Wall 4 and include a small bowl fragment stamped **T**, perhaps for the name “Tippet” (Cat. 15768.407). A pipemaker’s initials stamped on the

[20] Adding a period to abbreviate a name is a Dutch convention. “Robbertz.,” for example stands for Robbertzen. Quite literally, it means Robert’s son.

[21] Mr. Bray makes reproductions of pipes using the tools of the time period.

section of the bowl that faces the smoker is a typical Bristol style of marking pipes. Although this specimen was probably manufactured by one of the Robert Tippets working in Bristol between 1660 and 1722, other pipemakers had last names beginning with the letter "T." Therefore, it was not possible to tell if this pipe was made by a member of the Tippet family or by some other pipemaker. Also present above Wall 4 was a stem (5/64") (Cat. 15768.418) containing two or more tiny, scallop-shaped shells **(**see **Figure 6.45)**. One shell appears to be embedded in the clay and the other is attached to the outer part of the stem. It is possible the stem was submerged in water for a long period of time or that the shells were part of the original clay and eroded out. It is unusual for whole shells to be integrated into pipe clay and this phenomenon has never been reported at archaeological sites in lower Manhattan.

All of the pipes above the Wall date to the 17th and 18th centuries and include stems with typical 17th-century decorations, Dutch and English belly bowls, late-17th to early-18th century heeled and heelless bowls, and makers' marks from the period. Also present is the tiny bowl dating to the first half of the 17th century. Makers' marks include the **daisy on a leafy stalk**, uncrowned **SH**, and the **RC/PW** partnership mark. Smoking pipes in the fill above the Wall come from London, Bristol, Amsterdam, and Gouda.

b. ABOVE OR INSIDE THE WALL—AUS W3 A AND W4 B

Forty-five pipe fragments were recovered. A number of diagnostic pipes are present including two early stem fragments with 8/64" and 9/64" bore diameters (1620 to 1680). The stem with the 9/64" bore as very thick, indicative of an early pipe (1620 to 1650) (Cat. 15768.296). Another early stem is decorated with a single band of rouletting (Cat. 15768.151) and was made in England or the Netherlands during the 17th century. Rouletting as a decorative motif consists of dashed lines in a horizontal row applied with a special tool and is a common 17th century stem decoration.

Two diagnostic pipes were recovered during Wall 4 removal. One (4/64") is comprised of two fragments that mend to form a pipe with a very long spur, approximately .25-inch-long (Cat. 15768.381). This pipe is similar to Type 19 illustrated by Walker and dated 1690 to 1750 (1977) **(**see **Figure 6.39B)**. The other, from the same context, is a stem marked **NICHO/*LAS/BRIS (see Figure 6.40A)**. Each group of letters on the stem, (here shown separated by a slanted line), is situated on a discrete line and separated from the next line by a band of clay. The letter N is backwards, probably the result of an illiterate or bored apprentice or journeyman working in the shop. This pipestem is attributed to pipemaker William Nicholas, working in Bristol between 1730 and 1776 (Price, et al. 1979). Nicholas was apprenticed to pipemaker James Jenkins[22] in 1723—and Jenkins' products have also been recovered at New York City archaeological sites—but Nicholas had completed his apprenticeship by 1730 when he married Mary Buckler. At that time, Nicholas went into business for himself. In 1735 he was fined for making pipes larger than the agreed upon size that had been set by the mold-size agreement that Nicholas and other Bristol pipemakers had signed. In 1742, Nicholas married Elizabeth Witts. He ran afoul of the law once more in 1765 when he was charged with having the "flews of his pipe kilns…. built in an unsafe manner" (Ibid: np). Nicholas died in 1776.

[22] Pipes made by James Jenkins have been recovered at archaeological sites in New York City, namely the Broad Financial Center (Greenhouse Consultants, Inc. 1985) and 175 Water Street sites (Soil Systems 1983).

c. ABOVE THE WALL ON THE WATER SIDE—AU W1 D

Only **s**even pipe fragments were recovered. A single diagnostic pipe consists of a bowl with a rouletted rim and **crowned L** at the base of the heel (Cat. 15768.254). The upright shape of the bowl is similar to pipes made circa 1700 to 1770 in England. Eighteenth century Dutch pipes that reached New York are generally conical in shape and recline backward on their stems. The **crowned L** pipe is similar to the more upright English Type 25 shape dating circa 1700 to circa 1770 and English pipes made during the Revolutionary War period (see **Figure 6.44C**). The maker's mark at the bottom of the heel is definitely Dutch, however. Several Gouda pipemakers owned the **crowned L** mark in the 18th century beginning in 1726 with Cornelis Luijenburg (1726 to 1730), followed by Cornelis de Ligt (1730 to 1745), Jacob de Licht (1745 to 1753), Frans Verzijl (1753 to 1781) and other members of the Verzijl family until 1821, when members of the Stomman family purchased the mark. From 1832 on, members of the Van der Want family owned it and continued to use it until 1925 and the demise of P. Van der Want Gzn. (Duco 2003). A 1910/1920 catalogue from the Van der Want factory does not illustrate the exact pipe but it is clear that the company was producing many different style pipes at that time. Unfortunately the maker's mark could not be photographed because it was very small and badly weathered.

d. ABOVE THE WALL ON THE LANDWARD SIDE—AUS W1 C, W3 C, AND W4 C

Ninety pipe fragments were recovered from this DU. Most were recovered from AU W1 C. Several early diagnostic pipes were present including a Tippet pipe fragment possibly dating circa 1660 to 1722 (Cat. 15768.030) and a 17th century belly bowl with a three-lettered maker's mark **MTS** with three dots in relief below the initials on the base of the heel (Cat. 15768.003) **(**see **Figure 6.46A)**. Three-lettered marks are generally representative of 17th century Dutch pipes but Atkinson and Oswald (1969) also noted pipes with three initials at English sites, concluding that those specimens were of 17th century London origin and represented the initials of a husband and wife. McCashion (1979), however, documented an **MTS** mark from the Blowers Oneida site (OND-1) in New York State, dating it between 1620 and 1630. He suggested it was made by "Matt Thias Stafford," an Englishman working in Amsterdam circa 1622 to 1625 until possibly later (Ibid:91). A search for another pipemaker with those initials was unsuccessful (Duco 2003; Jackson, et al. 1974; and Atkinson and Oswald 1969). McCashion's date is very early for New York City sites. However, it is somewhat in line with the tiny pipe found above Wall 1.

A pipe with the initials **H/N** on either side of the heel was probably made in London during the 18th century but no pipemaker with those initials could be found (Cat. 15768.030) (see **Figures 6.47A and B)**. Initials on the right and left sides of the heel is a London style of marking but is not entirely unknown in Bristol. Price, et al. (1979) identified a pipemaker named Henry Noades working in Bristol between 1681 and at least 1697.

Quite a few of the pipe fragments in this deposit had been smoked and many were charred on the exterior suggesting they derived from trash deposits that were probably incorporated into the fill.

e. ABOVE LOG FEATURE ON THE WATER SIDE—AU W3 D

Sixty pipe fragments were recovered. Only one tentatively diagnostic pipe is present, therefore a mean date of 1712 was calculated based on 48 stems. The majority of the bore holes are 5/64" (44 percent), followed by 6/64" (31 percent), 7/64" (23 percent) and finally, 4/64" (2 percent). A small bowl remnant with a portion of the outer ring of a cartouche on the right side of the bowl is present (Cat. 15768.171). Pipes marked with a cartouche on the right side of the bowl are generally attributed to Bristol, England and this style of marking was prevalent from the mid-17th through late-18th centuries. Additional classification would rely on an identification of the name or initials.

As a rule, the pipes are fragmentary but several mend. A number of pipe fragments are also badly weathered. Ten mouthpieces (18 percent of the stems), are also present, a greater number than in any other DU. One stem has bite marks (Cat. 15768.294).

f. NEXT TO THE WALL ON THE WATER SIDE—AUS W1 H AND W3 B

Thirty-two fragments were recovered. The single diagnostic pipe is a belly bowl with a rouletted rim and a ***Hand*** mark stamped on the base of the heel (Cat. 15768.259). The bowl is very similar in shape to Atkinson and Oswald's (1969) English Type 13 dated 1660 to 80 **(**see **Figure 6.42 G).** It also shows similarities to McCashion's "early Dutch belly bowls" as does the ***hand*** mark at the base of the heel. It is identical to a pipemark he identified as a "hand" or "glove" from the Caughnawaga site in New York State and attributed to an unknown Amsterdam pipemaker working between 1670 and 1680 (McCashion 1979:134).

The ***Hand*** mark at the base of the South Ferry Terminal site pipe (Cat. 15768.259) is identical to a Gouda mark illustrated by Duco (2003:145) **(**see **Figure 6. 46B)**. There are similar marks using the shape of the hand. The **Gauntlet** is one such mark. It is a glove made of chain mail or leather and to "throw down the gauntlet" is an expression still used today. The **gauntlet** was one of the earliest English makers' marks. To complicate matters, there was even a family of English pipemakers named Gauntlet in Amesbury, Wiltshire, working from 1651 to 1698, who used that mark as their trademark (Atkinson and Oswald 1962). The Gouda ***hand*** mark that was identical to the South Ferry specimen was owned by members of one family, the De Vriendts or De Vriends, for 63 years (Duco 2003). Gouda pipemakers owning this mark included Jonas Jansz. de Vriendt (1660 to 1696), his widow Trijntje Jacobs van Leeuwen (1696 to 1700), their son Jacobus (1696 to 1700) who used it with his mother's permission, Jan Jasz. de Vriend (1700 to 1709), Jacobs Jonasz. de Vriend (1709), and Cornelis Jansz. de Vriend (1709 to 1723) (Duco 2003:145). Similar to the **crowned L** pipe above, the shape of the pipe suggests it is English while the mark suggests it is Dutch. The pipe also appears to have been polished or burnished in the manner of Gouda pipemakers and is of good quality, although the mark has been sloppily applied.

A single **gauntlet** or ***hand***-marked pipe was recovered at the Seven Hanover Square site in lower Manhattan and dated to the third quarter of the 17th century (Rothschild and Pickman 1990). Pipes with the **hand**, **glove** or **gauntlet** mark were also recovered at 17th century Onondaga sites and dated to the third part of the 17th century (Bradley and De Angelo 1981).

Many of the pipes (19 percent) in this DU are charred on the exterior as if they had been burned as trash.

g. NEXT TO W3 AND ABOVE LOG FEATURE ON THE LANDWARD SIDE—AU W3 E

Fifty pipe fragments were recovered. A mean date of 1737 based on 35 pipestems was calculated. Six of the 50 fragments (12 percent) are burned or charred. Fragments with obvious use-wear comprise 16 percent of the sample. One pipe is water worn. Many of the pipe fragments from this DU are small, badly broken, weathered and evidence some charring.

Several diagnostic pipes are present including a bowl fragment stamped **RT** at the front of the bowl. It was manufactured by one of the Robert Tippets (I, II, or III) in Bristol between 1660 and 1722 or by an anonymous pipemaker at a later date (Cat. 15768.099). One early pipestem (7/64") (Cat. 15768.110) is decorated with a **fleur-de-lys in diamond,** a typical 17th century Dutch motif.

Eighteenth century diagnostic pipes are also present. One stem (5/64") (Cat. 15768.127) is ornately decorated with a **Tulip motif with tendrils and dotted flowers and bands of dotted squares** in relief (see **Figure 6.48A**). It also included bands of rouletting. This pipe was manufactured in Chester, England between 1720 and 1760 and is closest in design to pattern #70 in Rutter and Davey (1980:177). The first half of the 18th century marked the rapid rise of the Chester pipe industry (Davey 1985). Until recently, Chester pipes went unrecognized and therefore unrecorded in most New York City archaeological site reports. For example, the opportunity to re-examine a collection of clay tobacco pipes artifacts excavated in the 1980s, indicated that approximately 70 stems decorated with Chester motifs including the Arms of the County of Chester were unknowingly recovered from the 175 Water Street Site in the early-1980s (Dallal 1999). Seventeen more were tentatively identified as "possible" Chester pipes. Although the ceramics and glass from the 175 Water Street site had been analyzed in detail by the original archaeologists at the time,, pipes were simply "tabulated by bore size, bowl decoration, and, when possible, country of origin," and "non-feature pipes were identified only as decorated or undecorated pipebowls or stems" (Soil Systems 1983:314). The artifacts from the 175 Water Street site were donated to the South Street Seaport Museum in 1989 and a subsequent study of the pipes from the site was undertaken (Dallal 1999).

The Chester Arms consist of three wheat sheaves and a sword. In addition to the Arms, many Chester stems are elaborately decorated with motifs popular with Chester pipemakers who were noted for their florid iconography: tulips and tendrils, hearts and fleur-de-lys, zoomorphic designs and stars. Grooved spiral stems were also relatively common (see **Chapter 6: 4.e. Battery Park North**). Chester stamps and motifs generally date c.1710 to c.1790 (Rutter and Davey 1980).

h. NEXT TO THE WALL ON THE LANDWARD SIDE—AU W1 G, W3 F, AND W4 D

Eighty-eight pipe fragments were recovered. Diagnostic pipes include a heeled pipestem (4/64") with the initials **H/S** on the left and right sides of the heel (Cat. 15768.076). Pipemakers in London often put their initials on the sides of the heel, especially in the 18th century. The pipe could have been made by Henry Stokes of London. There is not much information about Stokes except that he took an apprentice in 1682 (Atkinson and Oswald 1969) (see **Figure 6.49A** and **B**). It is also possible it was made by another pipemaker as many with those initials were working in England throughout the 17th and 18th centuries. A bowl fragment marked **R/TIP/_ET** (Cat. 15768.365) was also recovered and probably made by Robert Tippet I, II, or III in Bristol, or by one of their plagiarists between 1660 and the third quarter of the 18th century.

Another diagnostic pipe (6/64") (Cat. 15768.442) consists of a heeled bowl of a shape designated Type 15 (1700 to 1770) by Noël Hume (1982). Finally, what is probably a "second" was recovered from EU43 Stratum 8, Level 1 (Cat. 15768.222). Instead of applying rouletting below the bowl rim—the usual place for such decorations—, an apprentice or workman, haphazardly missed his mark and applied rouletting to the side of the bowl while the clay was still relatively malleable.

i. NEXT TO THE LOG FEATURE ON THE LANDWARD SIDE—AU W3 G

Twenty fragments were recovered. None is diagnostic. Bores ranged from 5/64” to 7/64” but there are not enough stems present to calculate a mean date.

j. BETWEEN WALL 3 AND LOG FEATURE—AU W3 H

Fifteen pipe fragments were recovered. None is diagnostic, although there are some 17th century beginning dates. Stem bores range between 4/64” and 6/64” with the majority being 6/64”; however, not enough are present to calculate a mean date. The paucity of pipes could be related to the fact that this might have been a dumping area for nightsoils either *in situ* or as privy cleanings.

k. INSIDE LOG FEATURE—AU W3 L

Fifteen pipe fragments were recovered from strata within the log feature. A clunky, English elbow or export bowl (7/64”) (Cat. 15768.337) similar, if not identical, to an elbow bowl illustrated by Walker (1977:1543) (1690 to 1720) is present. Another English bowl (5/64”) (Cat. 15768.339) (see **Figure 6.39E**) was similar to a style made in Northeast England circa 1680 to 1720 (Parsons 1964).

l. BENEATH LOG FEATURE—AU W3 J

Three pipestem fragments were recovered; none is diagnostic. One stem (Cat. 15768.199) is probably unsmokeable. During the manufacturing process, the stem wire that formed the 5/64” smoke hole poked through the outer stem wall leaving a hole and rendering the pipe unusable. This deposit probably represents the casual deposition of garbage along the shoreline.

m. FOUNDATION AND UNDERNEATH THE WALL-- AUS W1 E, W3 1, AND W4 E

Forty-two pipe fragments were recovered beneath the Wall. Forty of those fragments were recovered from W3 I. One diagnostic Dutch stem decorated with six bands of rouletting and “cogs teeth” probably dates to the 17th century (Cat. 15768.349) (see **Figure 6.41**). A number of such stems were recovered from the Stadt Huys site in deposits associated with the Kings Tavern (circa 1670 to 1706) (Rothschild, et al. 1987). A tiny gadrooned or fluted fragment was recovered below Wall 1(Cat. 15768.263). Fluted, ribbed and/or gadrooned bowls began to be manufactured circa 1770 but did not become popular until circa 1790 and this type of molded decoration was the most common of any pipe decoration throughout the 19th century. This small fragment has a wide date range from the late-18th through early-20th centuries. A single pipe fragment—a thick, water-worn stem with a 6/64” bore diameter (Cat. 15768.225)—also has a wide date range, circa 1650 to 1850.

n. WALL DISMANTLE, INSIDE THE WALL FILL—AUS W1 F, W2 B, W3 M, AND W4 F

A total of 21 pipe fragments were recovered. Three were retrieved from the interior side of Wall 1. One stem (5/64”) with part of the bowl attached is part of an English heelless bowl dating from the late-17th through early-18th centuries (Cat. 15768.244). It was either sold as a “second” or thrown away as the stem had a manufacturing defect. The boring wire was pushed so close to the outer portion of the stem that it nearly poked through the clay.

Eleven pipe fragments were recovered from the dismantling of Wall 3; none is diagnostic. One mouthpiece is so badly weathered it appeared to be decorated (Cat. 15768.343).

o. MISCELLANEOUS ANALYTICAL UNITS—W3 K AND W4 G

A total of 173 pipe fragments were recovered from miscellaneous contexts associated in some way with Walls 3 and 4. The discussion below treats Walls 3 and 4 separately.

1.) W3K

Forty-eight pipe fragments were recovered from miscellaneous deposits associated with Wall 3. Among them is a heavily weathered and cracked heeled belly bowl (7/64") (Cat. 15768.351) with a line of rouletting around the rim (see **Figure 6.42D**). The shape of the bowl suggests an early, circa 1620 to 1650, date. The pipe was recovered from Wall 3 between the utility ducts and was retrieved from the backdirt pile.

Another diagnostic fragment consists of a heeled stem (8/64") (Cat. 15768.358**)**. At the base of the heel is the mark **II** in a circular, banded cartouche (see **Figure 6.50A**). It is possible that James Jenkins of Bristol made this pipe sometime between 1707 and circa 1739. Jenkins apprenticed with William I and Mary Tippet beginning at a date between 1700 and 1707 (Price, et al. 1979). He married May Cox in 1714 and the couple produced pipes until circa 1739 (Walker 1977). The Jenkins' were Quakers (Walker 1977) and their son John was also a pipemaker (Price, et al 1979). James Jenkins signed the Bristol mold size agreement as did William Nicholas (see **Chapter 6: G.2.b. Above or Inside the Wall**). However, Jenkins, whose products have been found at other sites in New York City, did not mark the bases of the heels of his products. Therefore, it is more likely that this is a Gouda **II** mark, dating between 1650 and 1690 (Duco 2003). Pipemakers using this mark include Jan Jonaszn. de Vriend (1650 to 1678) and Jan Jacobsz. van der Aerden (1655 to 1690) (Ibid).

A Tippet pipebowl (7/64") with either a heel or spur[23] is stamped **RT** facing the smoker (Cat. 15768.372) (see **Figure 6.39C** and **Figure 6.50B**). The shape of the bowl is similar to a style of pipe manufactured 1660 to 1690 (Walker 1977). It is possible that this pipe was made in Bristol, England by Robert Tippet I or his son Robert Tippet II between 1660 and 1722. Robert Tippet I obtained his freedom[24] in 1660 by marrying Joan Thomas. He was deceased by 1687 when his widow took an apprentice (Price, et al. 1979). Their son, Robert Tippet II, baptized 1660, was free in 1678 and married Sarah Vinson in 1687. In 1695, Robert Tippet II was living with his mother Joan, wife Sarah, and his children, Robert Tippet III,[25] Susanna and Sarah. Another son, John, was baptized in 1702. In 1708, Tippet II was chosen as a Deacon of the Lewins Mead Meeting House, a non-Conformist Chapel. After his first wife's death in 1717, Tippet II married Mary Driver. He died in 1722. His son Robert Tippet III was free in 1713 but died in 1715.

2.) W4G

One hundred twenty-five pipe fragments miscellaneously associated with Wall 4 were recovered. Three plain, undecorated bowls were recovered. One has a spur (5/64") (Cat.

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[23] That particular portion of the pipe had broken off and it could not be determined if it had been a heel or spur.

[24] An apprentice was required to faithfully serve the terms of his contract of indenture. The Master fed, clothed, trained and lodged the trainee. Once the trainee had completed his apprenticeship, he was "free" of his legal obligation and the Master generally provided him with clothes, tools or money. Pipemaking apprenticeships generally lasted seven years.

[25] He was baptized on July 4, 1692.

15768.383) and another is heelless (5/64") (Cat. 15768.384), but both are of a shape identified as No. 9C in Walker (1977) and dated between circa 1680 and 1730. The third undecorated bowl (Cat. 15768.425) is an elbow-shaped American export pipe probably made in England for the American market. It has a rouletted rim and dates circa 1680 to 1730.

Two Tippet pipes are also present: a bowl fragment stamped **RT** (Cat. 15768.393) (see **Figure 6.50B**) and another with the Bristol side cartouche mark **R/_TIP/_T**[26] (Cat. 15768.420). This pipe was probably manufactured in the shop of Robert Tippet I, II, or III between 1660 and 1722 when the last remaining Robert (II) died, or by one of the Tippet plagiarizers. Another Bristol pipe recovered is a heeled model (5/64") (Cat. 15768.425) with overlapping **WW**s on the base of the heel **(**see **Figures 6.39D** and **6.52A)**. William Williams I (1651 to circa1693-4) or William Williams II (1708+) was probably the manufacturer. The bowl shape is closest in style to #15 in Walker (1977) dating 1700 to 1770; therefore, either of the Williams' could have been the maker. Not much is known about William Williams I. He was free in 1651 and was a founding member of the Bristol Pipemakers' Guild in 1652. He was probably dead by 1694 (Price, et al. 1979). William Williams II, also of Bristol, apprenticed with his mother and was the brother of pipemaker Abraham Williams. He was free in 1708 but no further information about his life exists (Ibid).

A single 17th century Dutch stem (6/64") decorated with rouletted bands, dentate milling and circles in relief was also recovered (Cat. 15768.420). A red clay mouthpiece with a 7/64" bore diameter was also found during cleaning around the face of Wall 4 between the utilities and the East Secant Wall (Cat. 15768.399) **(**see **Figure 6.51A)**. Red clay pipes are often locally made, occasionally by Native Americans and at times by colonists using imported molds. Red pipes have been found in the Chesapeake region "but seem first to occur with general frequency beginning circa 1670" (Pogue 1991:17). However, there is no evidence to suggest that early New York City pipemakers were producing such pipes. In the 19th century, red clay pipes made in Powhattan and Appomattox Counties in Virginia had a reputation for their superior absorbent and porous qualities (Zorn circa1892). Pipe companies like the Akron Smoking Pipe Co. were also producing them in Ohio but there were also cottage industries in this area that sold or traded their products to the Akron Company.

Other diagnostic pipes include a heavily utilized bowl fragment (Cat. 15768.404) with a **fluted** base and **floral and beaded** decoration in relief on the back of the bowl (see **Figure 6.51B)**. Fluted pipes began to be popular circa 1790 and continued in their popularity until the about the 1870s, although they were made well into the early-20th century. Another is a heelless bowl (4/64") that probably dates to the late-18th or early-19th century (Cat. 15768.432) because of its upright posture. It is decorated with a floral pattern **(**see **Figure 6.52B)**.

Another find is a stem (4/64") (Cat. 15768.435) marked **BRAD/LEY***, made by John Bradley of Broseley, Shropshire, England, circa 1740 to 1760 (Wharton 1980; Atkinson 1975) **(**see **Figure 6.53A)**. A stem (4/64") from this same provenience marked **T/D** on either side of the heel could have been made by Thomas Dormer working in London 1748 to 1770, or one of the many other pipemaking firms in other countries that also used this mark (Cat. 15768.432) up until the early-20th century. The orientation of the initials along the same plane of the stem was a common style of marking used by pipemakers of East London during the second half of the 18th century

[26] The underlined spaces represent missing letters.

(Reckner and Dallal 2000). An example of this type of T/D mark can be seen in **Figure 6.57A and B**.

Another pipe is a heeled bowl (5/64") most similar to Type 25 in Walker (1977) and dating 1700 to 1770 (Cat. 16196.063**)**. It is marked **TD** with a decorative floral device above and below the initials inside a circular cartouche made up of slanted incised lines **(**see **Figure 6.65B).** This pipe is similar to pipes from French and Indian and Revolutionary War Period sites, and from the Fortress of Louisbourg in Nova Scotia (Walker 1971). Walker states that pipes with this device found at Louisbourg were unlikely to date earlier than the mid-1750s.

3. WHITEHALL SLIP PIPES ANALYTICAL UNITS

The deposits were divided into four AUs based on construction methods and position within the Slip (see **Chapter 5: Field Results**). Few pipes (105) were recovered in the Whitehall Slip deposits and they comprise an assortment of late-17th through 19th-century specimens. Based on its position, it was assumed that WHS A was the segment closest to the foot of Whitehall Street, from when the Slip was first constructed circa 1734/35. However, there were no significant differences in the pipe material recovered from the separate components of WHS A, WHS B, WHS C, and WHS D. The dates do not reflect the initial dates of deposit. Dredging, the addition of new piers, trash swept off the docks, etc. would be reflected by disturbance in the soils (see **Chapter 4: B. Whitehall Slip**). A description of the clay tobacco pipes recovered from each of the four AUs is provided below.

a. WHS A

A total of 23 fragments were recovered. One pipebowl (Cat. 15598.160) consists of three mendable fragments and although not enough of the pipe is present to establish a credible date of manufacture, enough of the bowl is there to suggest that it had been made in the Netherlands sometime during the 18th or 19th century. All stem bores in WHS A have measurements of 4/64" and 5/64" which also provides a wide date range for manufacture of 1680 to 1920. One bowl rim fragment is charred on the exterior and two stems show obvious use wear. These specimens suggest that trash had been dumped into the Slip or was part of the fill near the Slip.

b. WHS B

Whitehall Slip B was located south of WHS A. Forty-six pipes were recovered. Stem bores range from 4/64" to 7/64" suggesting a 300-year date range (1620 to 1920). The bowls also exhibit a wide range of dates. One heelless, unmarked, English bowl (4/64") was made circa 1680 to 1710 (Cat. 15598.005) and has a manufacturing defect. A small piece of clay, called *dottle*, obstructs the bore hole at the stem/bowl juncture. It was created during the manufacturing process as the boring wire was pushed through the stem and then pulled out to create the smoke hole. During this process, a tiny clump of clay lodged between the bowl and stem, partially blocking the smoke hole. This pipe might have been sold as a "second" or could have been discarded as unusable and tossed away.

A tiny fluted bowl fragment with a very wide date range of circa 1770 to 1920 is also present (Cat. 15598.011), as is a single bowl marked **T/D** on the left and right sides of the heel (5/64") (Cat. 15598.079) **(**see **Figure 6.57A and B)**. The TD pipe is closest in shape to Atkinson and Oswald's (1969) Type 26, dating 1740 to 1800. Finally, a 19th-century Dutch bowl (5/64") with a row of rouletting beneath the rim and a **Crowned 16** in relief at the base of the bowl (Cat. 15598.110) was manufactured in Gouda by *Firma Gebroeders van der Want*[27] between 1858 and 1874 (Duco 2003) **(**see **Figure 6.53B)**. This fine quality pipe exhibits burnishing marks and definite use-wear.

c. WHS C

Only six pipe fragments were recovered. None is diagnostic. One bowl fragment is decorated with a floral motif but the specimen is too worn to reveal the pattern (Cat. 15598.259). A broad date range of 1700 to 1870 was established for this pipe based on its shape.

d. WHS D

Thirty pipe fragments were retrieved from the fill. Stem bores range from 4/64" through 7/64." Three diagnostic pipes are present, all from Cat. 15598.024. The first is a heeled specimen (5/64") bearing a cartouche on the right side of the bowl which contains the name **EVA/NS (**see **Figure 6.54A).** There were several pipemakers named Evans working in Bristol during the 17th and 18th centuries. Isaac Evans, the son of pipemaker William Evans I or II, was one of the most prominent. He was elected Master of the Bristol Pipemakers' Guild in 1710.

Isaac was a good friend and possible partner of Robert Tippet II and bequeathed one guinea each to Tippet and his daughter Sarah in his will (Price, et al. 1979). Evans might have been in business as early as 1698, when he became a freeman, until his death in 1713. Another Bristol pipemaker, Llewellin Evans, apprenticed with James Fox until 1661 at which time he opened his own business (Ibid). Llewellin Evans married twice: to Mary with whom he took several apprentices including Henry Artus and Samuel Fishpell, and to second wife Elizabeth with whom he took apprentices Robert Gray, Jacob Beekes, William Taylor, Devereaux Jones I[28] and John Hollister. Llewellin Evans died in 1688.

Other pipemakers named Evans included William Evans I and William Evans II; perhaps they were cousins. They apprenticed with the same woman, although at different times, and their fathers were both weavers. William Evans I was the son of Llewellin Evans, a weaver, and William Evans II, was the son of William Evans, also a weaver. William I apprenticed with pipemaker Jane Wall in 1653 and was free in 1660. William II apprenticed with Wall beginning in 1660 but after her death in 1661 was turned over to Robert Tippet I and his wife Joan, and was free in 1667 (Price, et al. 1979). Further information uncovered by Roger Price and Reg and Philomena Jackson could apply to either William Evans (Ibid). In 1672, one of them was charged with beating his apprentice. Between 1681 and 1685 one was charged with buying and selling merchandise (yarn, stockings, hats, poultry and eggs) for erecting market stalls that caused impediments to others who were trying to sell their wares, and for selling merchandise at exorbitant rates. It is possible that one or the other of the cousins, or both, were using family

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[27] Van der Want was in business until 1939 when the hardships of World War II resulted in the closing of the factory.

[28] In 1687 Devereaux Jones ran off with a suit of clothes belonging to another apprentice. This event does not seem to have affected Jones' career as a pipemaker however, since pipes made by Devereaux Jones were recovered at the Broad Financial Center site, a few blocks from the South Ferry Terminal project site (Greenhouse Consultants, Inc. 1985)

connections to sell woven goods and yarn as well as poultry and eggs in addition to making pipes.

In 1685, one of the William Evans was bound to Robert Kirke of the island of Jamaica for four years, possibly as punishment for his many scrapes with the law. Records show that one or both of the William Evans was living in Bristol in 1689 and 1696, and that one, along with a partner and described as "stockingmen," were charged with "keeping standings by the high Cross as being a great annoyance and hindrance to the Markett" (Ibid: np). Additional charges were filed in subsequent years. A William Evans was also mentioned in pipemaker Isaac Evans'[29] 1713 Will, where it was noted that he owed Isaac's son £100.

Any one of the Evans family could have produced the pipe recovered from WHS D between circa 1660 and 1713. All of the Evans discussed above made pipes that have been found at New York City's archaeological sites and elsewhere. It seems likely, however, that the pipe marked **EVA/NS** in WHS D was made by Isaac Evans. He was Master of the Bristol Pipemakers' Guild and a good friend and probable partner of Robert Tippet whose products were found at the South Ferry Terminal site.

Other diagnostic pipes in the WHS D fill include a 17th century stem fragment decorated with rouletted runs of dots. Finally, a heeled pipebowl (4/64"), burned on the exterior as if it had been in a fire and also exhibiting use wear, was recovered with a thick clump of burned material—possibly tobacco—present inside the bowl **(**see **Figure 6.39G)**. The bowl's shape is similar to Atkinson and Oswald's (1969) London Type 27, dating circa 1780 to 1820.

4. GENERAL SOUTH FERRY PIPES

Artifacts from the General South Ferry site deposits had wide manufacturing date ranges although there were pockets of relatively unmixed deposits.

a. FAN PLANT SHEETED PITS ANALYTICAL UNITS

The area near the existing fan plant in Peter Minuit Plaza, excavated as four large pits, was the former location of a man-made pond or basin of unknown usage. It was formed circa 1735 during construction of George Augustus's Royal Battery that continued until circa 1745. The pond was filled in 1773 (see **Chapter 4: A.6.a. The Battery** and **A.6.b. The Pond**). The artifacts found in this area of the site are secondary refuse (probably domestic garbage) that was deposited as fill. These artifacts "were probably deposited as primary refuse near where they were used and later moved to where they were excavated as part of landfilling activities, i.e., they were inadvertent inclusions in the soils used as fill" (see **Chapter 6: F.1. Fan Plant Sheeted Pits)**.

1.) FPSP A—Basal Strata of Battery Pond Fill

A total of 21 pipe fragments were recovered. The only bit of diagnostic pipe information comes from a tiny heeled bowl fragment whose morphology suggests a late-17th or early-18th century date (Cat. 16196.334).

[29] It is not clear if this William Evans is Isaac's father or perhaps a cousin.

2.) FPSP B—Middle Strata of Battery Pond Fill

Forty-four pipe fragments were recovered from this middle stratum of the Battery Pond Fill. Diagnostic pipes include two pipes marked **HG** manufactured by Hendrik Gerdes in Amsterdam between 1668 and 1688. One Dutch elbow bowl (6/64") has the initials **HG** inside concentric circles at the base of the bowl, just where it joins the stem (Cat. 16196.338**)** (see **Figure 6.63A**). Hendrik Gerdes, a thirty-six year old sugar-bowl or sugar-mold potter, married Edward Bird's widow, Anna Maria van der Heijden (Heide) in 1668 and began making pipes marked **HG** (see EB above) (De Roever 1987 and Duco 1981).

The other Hendrik Gerdes product is a heeled stem fragment (6/64") with a **crowned HG mark** in a beaded cartouche at the base of the heel (Cat. 16196.338) (see **Figure 6.63B**). Gerdes produced pipes until his death in 1688. According to Duco (2003), however, the crowned HG mark was owned by Hendrick Gloudijse Marte between 1694 and 1715. It is not known who, if anyone, used the HG mark between Gerdes' death in 1688 and its purchase by Marte in 1694, although it is likely it was Gerdes' widow.

Two 17th century stem fragments decorated with **rouletted runs of dots w**ere also present in the Pond fill. One has a 6/64" bore diameter (Cat. 16196.354) and this specimen has bands of rouletting interspersed with alternating rows of larger and smaller dots. The other stem (Cat. 16196.349) has a 5/64" bore and is decorated with generic rouletting and same-sized dots. Both stems were made in the Netherlands during the 17th century.

Other diagnostic pipes from Cat. 16196.349 include partial bowls—one of a possible late-18th or early-19th century shape and another closer to the English Type 9C manufactured 1680 to 1710 (Walker 1977)**.**

3.) FPSP C—Upper Strata of Battery Pond Fill

Twenty-nine pipe fragments were recovered in the upper strata of the Fan Plant sheeted pits. One Type 25 bowl (4/64") (Cat. 16196.348) dates between 1700 and 1770 and is marked with the initials **N/M** on the left and right sides of the heel (see **Figure 6.64A and B**). Possible makers are Nicholas Mortimore I or II of Bristol operating between 1689 and 1730 (Price, et al. 1979) or Nicholas Mathews originally of Gloucester but working in Bristol (Ibid). Another is pipemaker Nathaniel Moore of London, who was free in 1668 (Atkinson and Oswald 1969). The pipe is completely rust stained and has been burned on the exterior. Another Bristol pipemaker is represented by a bowl rim fragment stamped **RT** facing the smoker and a cartouche marked **R/TIP/PET** on the right side of the bowl (Cat. 16196.348.501). Tippet pipes were manufactured from 1660 until the Revolutionary War period.

In addition to the English pipes there is a 17th century Dutch stem (5/64") decorated with four rows of rouletting and a row of V-chain milling (Cat. 16196.348) (see **Figure 6.62B**) (Hurry and Keeler 1991).

4.) FPSP D—Miscellaneous Contexts

Most of the artifacts were sampled from the backdirt pile. Eight pipe fragments were recovered but none is diagnostic.

b. PETER MINUIT PLAZA ANALYTICAL UNITS

1.) PMP A, PMP B, and PMP C

Seven pipe fragments were recovered from AU PMP A, shell deposit excavation units. It is possible that these pipes represent a dumping episode of seconds or unsellable pipes. Two of the seven are defective. The first is a pipebowl with a manufacturing defect of double bore holes through the stem that join midway and come together as one large bore hole (Cat. 16196.419). The shape of the pipe is consistent with Atkinson and Oswald's (1969) Type 25 dated 1700 to 1770. The other stem is also defective (5/64"), compressed and nearly flat, possibly due to an extremely worn mold (Cat. 16196.509). It could not have been smoked.

No pipes were recovered from AU PMP B, miscellaneous shell related contexts.

Although three pipes were recovered from AU PMP C, the stone wall at Manhole 35B, none is diagnostic.

2.) PMP D—0-8 Feet Below Ground Surface

Sixty-four pipe fragments were recovered. Similar to the shoddy pipes of AU PMP A, a bowl with a rouletted rim, the **Arms of the City of Gouda** on the left side of the heel and a **crowned D** at the base of the heel has dottle or clay inside the bore hole (Cat. 16196.432). Unfortunately, the mark is nearly illegible and could not be photographed. The pipe is probably unsmokeable. In 1739/40, Gouda passed a law permitting pipemakers to put special marks on their pipes to indicate quality. "Gouda pipes came in three classes—ordinary, fine and porcelain" (Walker 1977:268). In 1739 permission was given pipemakers to differentiate porcelain pipes from others by adding the Gouda Coat of Arms (also called the Gouda shield). In 1740, permission was given to mark fine and ordinary pipes with the Gouda shield, surmounted by the letter "S." The letter "S" stands for *slegte*, which means "ordinary" in Dutch. There is some confusion as to which symbol denotes which class of pipes. Helbers and Goedewaagen (1942), for example, state that fine pipes were to have one shield and ordinary pipes marked with the shield *and* the letter "S." Porcelain (the finest) pipes were to be left unmarked. Some pipes were marked with two shields and one "S," while others had two "Ss," one on either side of the heel. Though pipe analysts may disagree on the above matter, it is certain that pipes with these markings cannot date earlier than 1739 or 1740.

The South Ferry specimen was probably made by one of the Van Leeuwens in Gouda between 1745 and the end of the 18th century (Duco 2003). Jan Prince *en Cie*, 1865 to circa 1898 owned this mark in the second half of the 19th century (Duco 1978) but the shape of the pipe suggests a late-18th century date. Cornelis van Leeuwen owned the **crowned D** mark from circa1780 until his death sometime prior to 1803 (Ibid).

One heeled Bristol pipe (5/64") of poor quality has a blank cartouche on the right side of the bowl (Cat. 16196.466). The shape of the bowl dates it circa 1720 to 1780 (Walker 1977) (see **Figure 6.44D**). Several **fluted** pipe fragments are also present. The most complete fluted bowl (4/64") has vertical milling around the rim and is of very poor quality (Cat. 16196.448). **A sheaf of wheat** set between **floral decorations** on the left side of the bowl and an illegible decoration (possibly another wheat sheaf with floral decoration) on the right side are present, as are **leaf decorations** along the front and back mold seams (see **Figure 6.66B)**. This use of vertical rows of leaves to obscure mold seams began in the late-18th century (Oswald 1961:56) and leaves along mold seams were common on pipes found at London sites dating between 1790 and 1830 (Walker 1966). However, as can be seen in archaeological samples and in late-19th century tobacconists' catalogues, this motif was also used to decorate pipes throughout the 19th century. The spur of the South Ferry pipe contained a **tiny circular mark** on the right and left sides. Circular marks such as these are present on **heeled** pipes made by Fiolet of St. Omer, France, according to an undated catalogue published by the company sometime after 1830 (Fiolet, post 1830). Fiolet was in business until 1921. However, the pipes illustrated by Fiolet are undecorated. The South Ferry specimen has a **spur**, not a heel like the French pipes. For both that reason and the fact that it is decorated, it is probably not French but rather of Chester, England origin. Wheat sheaves like the one decorating this pipe are representative of Chester and were incorporated into the Arms of the County of Cheshire of which Chester is a part. The Arms comprise three wheat sheaves and a sword (Rutter and Davey 1980). The shape of the South Ferry pipe and its decorative motifs suggests that it might have been made in Chester, England between 1810 and 1840. Other diagnostic pipes in this DU include a heeled stem (5/64") with a **three-leaf clover** [*klaverblad*] mark on the base of the heel (Cat. 16196.481) (see **Figure 6.67A**). Many Gouda pipemakers used this mark including Pieter Dammasz. Krijger (1660 to 1701), Dirck Pietersz. Krijger (1717), Jan Arijse Danens (1720 to 1758) and Abraham van der Spelt (1734 to 1758) who rented the mark from Danens. After 1758, Jan Arisje Danens used it until his death in 1778 when his widow used the mark (1778 to 1781) (Duco 2003). Other Danens relatives followed between 1781 and 1800 when Pieter van Geelen purchased the mark. He quickly rented it to pipemaker Jan Scholten for 17 years but started using it himself between 1817 and 1840 (Ibid). As can be seen, the mark had a long lifespan and was used, rented, sold, bequeathed and/or rented from one pipemaker to another between 1660 and 1840 (Ibid). At least two identical clover marks were found at the 175 Water Street site in the original mid-18th century landfill into which a small privy had been dug (Feature 42.9) (Soil Systems 1983 and Dallal 1999).

Three **TD** pipes were also recovered from PMP D. All are slightly different but all date between circa 1750 and circa 1780 (Alexander 1983:202-204). The first (5/64") (Cat. 16196.501**)** is a heeled pipe with a denticulate circular cartouche facing the smoker (see **Figure 6.44 C** and **Figure 6.67B**). The initials **TFD** are present and surmount a ribbon or banner-like device that is not unlike a winged grave marker design. The letters and motif are enclosed within a rouletted circle. Unlike most TD pipes, the heel is unmarked. Based on these or similar pipes documented at many sites, Alexander (1983) suggests a date of circa 1750 to 1780. The second specimen (4/64") is marked with the letters **T/D** on the left and right sides of the heel (Cat. 16196.501). A rouletted or denticulated circular cartouche with the letters, **TD s**tamped into the bowl as it faces the smoker along with the winged or banner-like motif with three molded dots below the initials marks the pipe (**Figure 6.68 Top**). The third TD pipe (5/64") is also a heeled type and a **crowned T** and **crowned D** are located on the sides of the heels (Cat. 16196.501). Eighteenth century London pipes are often marked with crowned initials. The letters **TD** are stamped at the front of the bowl and a banner or winged device with dots is situated above and below the initials. The entire mark is enclosed by a half-rouletted, half-slashed cartouche **(**see **Figure 6.68B)**.

TD pipes were the most popular pipe of the 19th century and are thought to have been first made by London pipemaker Thomas Dormer and possibly a son (working 1748 to 1770). "The original style continued to be produced up to the time of the American Revolution (1775 to 1783) on the evidence of material from Revolutionary War sites" (Walker 1983:37). The mark was plagiarized by many pipemakers from Norway to Japan and the TD mark appears to have been particularly popular with Glasgow pipemakers during the second half of the 19th century.

Finally, in this AU is a 17th century Dutch rouletted stem (5/64”) (Cat. 16196.445). The decorative motif consists of three lines of rouletting and one row of dots, which is then repeated (see **Figure 6.69A**).

3.) PMP E—8 Feet Below Ground Surface to Base of Excavation

Thirty-three pipe fragments were recovered. None is diagnostic.

4.) PMP F—Miscellaneous Fill, Backdirt, Stray or Surface Finds or Utility Fill

Fifty-eight fragments were recovered. The pipes span the 17th through 19th centuries and include a very thick 17th century stem (4/64”) (Cat. 16196.386) and another with an 8/64” bore and single row of rouletting (Cat. 16196.403). These stems could have been made in England or the Netherlands.

Several English type bowls are present including a whole heeled bowl (6/64”) with a slight belly (Cat. 16196.402) that is closest in shape to Type 14 (Walker 1977) dating circa 1680 to 1710 (see **Figure 6.39H**). Another bowl is a heelless model with a faintly rouletted rim. It is similar to Oswald’s Type 9C dating circa 1680 to 1710 (Walker 1977) (Cat. 16196.446). A third is another English belly bowl (6/64”) that roughly corresponds to pipes manufactured between circa 1630 to 1730 (Cat. 16196.454).

Nineteenth century pipes are represented by a **fluted** pipebowl fragment with alternating broad and narrow “ribs” and slashed lines instead of leaves across the rear mold seam, indicative of a cheaper model (Cat. 16196.395) (see **Figure 6.69B**). There is also a stem (5/64”) decorated with molded rows of oak leaves in the Peter Dorni style (Cat. 16196.401) (see **Figure 6.70A)**. Dorni pipes generally post-date 1850. The original manufacturer of Dorni pipes is thought to be Peter Dornier who worked in northern France circa 1850 (Walker 1983). However, Kugler (1989) states that Peter Dorni pipes originated with an 18th-century German pipemaker named Peter Dorn who was working in Grenzhausen in the Westerwald region of Germany. Further research by Kugler turned up several family members named Peter Dorn. He suggests that when pipes are marked Peter Dorni, they have probably been made by others trying to “cash in” on the popularity of Peter Dorn’s pipes (Ibid).

Creator aside, the pipes were of good quality and pleasant appearance and, like the TD pipes, were copied by other firms in Glasgow, Gouda and Germany (Ibid). Dorni-type pipestems are decorated with oak leaves and parallel bands in relief. Often they are marked **PETER/DORNI**. The stem from the South Ferry Terminal site, however, did not include Dorni’s name.

Also present is a 19th-century Dutch pipe (Cat. 16196.406) (see **Figure 6.44H**) with a cartouche facing the smoker inside of which is the distinctive icon, the ***krijgsman*** or swordsman (see **Figure 6. 70B**). While the mark has a long history reaching back to 1670, the shape of the bowl indicates that it is a 19th-century pipe, probably dating to the second half of the century. It was manufactured by one of the Van Essens between 1848 and 1865 or by *Firma P. & W.F.C. van Essen* (1865 to 1881) or *Firma W.F. van Essen* (1881 to 1887) (Duco 2003).

A 19th-century screw-in bit or mouthpiece made of bone was also recovered (Cat. 16196.385). The mouthpiece has a threaded tenon, which would have fit into the shank portion of the stem (see **Figure 6.71**). Threaded stems are often found on briar pipes which became popular after the Civil War circa 1865 when they began to displace meerschaum pipes. Briar pipe bits were most often made of hard rubber (vulcanite), amber or amber substitutes such as Bakelite and celluloid compositions (Werner 1922).

c. COAST GUARD ACCESS ROAD ANALYTICAL UNITS: CCG A, CCG B, CCG C, AND CCG D

Four pipes were recovered from AU CCG A, from among the log feature under the Coast Guard Access Road. None is diagnostic. No pipes were recovered from either CCG B or CCG C, other contexts associated with that log feature.

Thirty-eight pipe fragments were recovered from AU CCG D, 0 – 10 feet below ground surface in CCG. Diagnostic pipes include a nearly complete Tippet pipe made in Bristol, England (Cat. 16196.145**) (**see **Figure 6.59A).** A cartouche applied to the right side of the bowl is marked **R/TIP/PET** in relief and the initials **RT** were stamped on the front of the bowl, facing the smoker (see **Figure 6.59B**). This pipe could have been made by one of the Robert Tippets (I-III) between 1660 and 1722 when the last of the Roberts (Tippet II) died. Although other pipemakers continued to use this mark well into the Revolutionary War period, the shape of the South Ferry Terminal Project pipe suggests a late-17th early-18th century date, and therefore, one of the three Tippets.

Another diagnostic pipe (5/64") consists of a portion of a bowl with a heel marked **T /D** on the left and right sides of the heel (Cat. 16196.164)**.** Although the bowl is too fragmentary to date with any accuracy, it sits upright on its stem and probably dates to the 18th or the 19th century. A partial American export bowl dating circa 1720 to 1820 and made in England is also present (Cat. 16196.164). The pipe is similar in style to No. 18 illustrated in Walker (1977). The stem is unmeasurable.

Finally, a bowl fragment stamped **_E** (Cat. 16196.185**)** facing the smoker was recovered**.** Unfortunately the first letter of the pipemaker's initials is missing (see **Figure 6.60A**). The location of the mark suggests that the pipe was made in Bristol in the late-17th to early-18th century. Many Bristol pipemakers had last names beginning with E and the many potential Evans are discussed above. Edwards was another common surname. Joseph Edwards I began working in Bristol circa 1747. He worked with his son, Joseph Edwards II, until Edwards I died in 1794. His son continued the business until 1823 (Price, et al. 1979). Joseph Edwards II was an exporter of pipes to North America and advertised as such in 1799, along with Anna Viner, Samuel Richards and John Carey (Jackson, et al. 1974) (see **Figure 6.60B**). A bowl made by Edwards was recovered from the nearby 175 Water Street site (Soil Systems 1983 and Dallal 1999).

Twenty-two pipe fragments were recovered from AU CCG E, ten feet below ground surface to the base of excavation. Two are water worn. The single diagnostic pipe (Cat. 16196.175) is a partial bowl with a long spur, designated Type 26 and dated circa 1740 to 1800 in Walker (1977) (see **Figure 6.44F**).

Six fragments were recovered from AU CCG F, miscellaneous CCG contexts, and two are diagnostic. The first consists of a heeled stem (5/64") marked **F/S** on either side of the heel with a crown above each initial (Cat. 16196.158) (see **Figure 6.61A and B**). An initial on either side of the heel, sometimes surmounted by a crown is generally an 18th century London phenomenon (Atkinson 1965). Crowned London pipes, which are rather rare on American sites according to Atkinson and Oswald, were common in the Faneuil Hall, Boston pipe assemblage and represented 19 percent of the marked pipes. At least three pipemakers with these initials were working in London during the 17th and 18th centuries: Fernando Smith circa 1642, Francis Saywell, circa 1688, and Francis Stray, circa 1732 (Atkinson and Oswald 1969). Since crowned initials were an 18th century phenomenon, it is likely that particular pipe was manufactured by Stray. Two pipes made by George Stray (working 1717 to 1763 in London (Oswald 1951:57) were recovered from the Fanueil Hall site in Boston (LBA 1999). It is possible that Francis and George Stray were related.

A stem fragment (5/64") marked **W.MORGAN.LIV** was made by William Morgan Sr. or Jr. of Liverpool (Cat. 16196.327) (see **Figure 6.62A**). Morgan Sr. was in business from 1767 to 1796 and William, Jr. until 1803 (Walker 1983). Two William Morgan pipes were unearthed at the Five Points site in Manhattan (Reckner and Dallal 2000). Another was recovered from a large rectangular stone privy dated circa 1807 at the 175 Water Street site in lower Manhattan (Feature 41) (Dallal 1999). The Liverpool pipe industry expanded along with the slave trade and Liverpool pipes replaced Chester pipes that were used to trade with West Africa (Walker 1977).

Six fragments were recovered from AU GBW/CCG. One Dutch-style bowl fragment has large roulettes below the rim that might have been molded, which suggests a 19th century date (Cat. 16196.133). Pipes with large roulettes, no matter where they were manufactured, were generally referred to as Holland-style pipes in the manufacturers' catalogues.

d. BATTERY PLACE ANALYTICAL UNITS: BPL A, BPL B, BPL C, BPL D, BPL E, BPL F, AND BPL G

Nine pipes were recovered from AU BPL A, an early fill deposit, including a single diagnostic stem with a large bore diameter of 8/64" (Cat. 16196.039). This stem is decorated with a long, narrow row of four **diamond-shaped lozenges** containing **fleur-de-lys** and another row of two fleur-de-lys on either side of the long row. Unfortunately, the decorative motif is too faint to be photographed. Designated *Type 4: multiple scattered fleur-de-lys in a linear pattern*, (Dallal 1995:72), 14 of these stems were recovered at the Stadt Huys site (Rothschild, et al. 1987). The South Ferry specimen is Dutch and was made in the 17th century when the motif was popular. The archaeological literature describes a fluorescence of fleur-de-lys and other stem decorations at the beginning of the 17th century. These motifs began to wane in popularity by mid-century and all but disappeared by the 17th century's close. Archaeological evidence from the Stadt Huys (Ibid), Seven Hanover Square (Rothschild and Pickman 1990) and the Broad Financial Center sites (Greenhouse Consultants, Inc. 1985), however, reveal that the popularity of the fleur-de-lys continued throughout most of the 17th century. The evidence also indicates that the various fleur-de-lys types had bore diameters of all sizes.

Fleur-de-lys is the French name for a variety of lily. It is the symbol of the Virgin Mary and became the chief emblem of the kings of France. It has been suggested that pipemakers may have "adapted the fleur-de-lys symbol to idealize tobacco plants" (Tatman 1985:370-371). The similarity of the lily to the flower of the tobacco plant lends credibility to such a hypothesis. The transformation of the symbol of the lily into the tobacco plant makes sense given the long association of the fleur-de-lys with Catholicism and France, the enemies of Protestant England and the Netherlands—the very locations where the pipemaking industry commenced at the end of the 16th century. The association of the fleur-de-lys with royalty, e.g., Queen Elizabeth I and her support of the tobacco trade, may be another factor. The diamond-shaped lozenge is also significant as a symbol. It was customary for a woman's arms to be displayed on a lozenge-shaped shield. Fleur-de-lys motifs on 17th-century pipestems are almost always confined within a lozenge, the shape in heraldry traditionally confined to women. It is interesting, too, that most pipe decorators were women. The fleur-de-lys as a symbol has a long tradition of association with women, as a symbol of the Virgin Mary, emblazoned on the lozenge which represents a woman's lineage and as expressions of women's handiwork (Dallal 1995).

Nineteen pipe fragments were recovered from AU BPL B, a reddish brown silt deposit. The most interesting is a complete bowl (7/64”) decorated on both sides with a **mulberry tree** motif (Cat. 16196.037**)** (see **Figure 6.56A**). Hurry and Keeler (1991:63) described the mark as “series of raised dots forming a triangle with a linear stem below, on either side of the bowl.” This motif has been found on 17th century English pipes, but the South Ferry Terminal Project bowl’s shape does not conform to any recorded in English typologies, although it has the texture and appearance of an English pipe. It is possible that the bowl is a forerunner of the conical Dutch styles popular in the 18th century. A spurred bowl fragment decorated with a **mulberry tree** motif on the right and left sides of bowl was recovered from Feature 3.9 at the 175 Water Street Site (Soil Systems 1983) and dated c.1660 to 1690 (Higgins 1985). Mulberry pipes also appear in Chester (Davey 1985). It is also worth mentioning that McCashion and Robinson (1977) recovered a Mulberry pipe from a 1665 to 1685 context near the Custom House at the foot of Broadway in New York City, close to the South Ferry Terminal site[30]. The Custom House (present day Museum of the American Indian) sits on the site of Fort George, although at the time the pipe was manufactured, the fort was called Fort Willem Hendrick and/or Fort James. McCashion and Robinson (1979) attributed this specimen to an unknown Dutch or English pipemaker (see **Chapter 6: 1.f. The Custom House Pipes**).

A 17th century rouletted stem (8/64”) made in England or the Netherlands was also recovered but does not mend with the mulberry pipe (Cat. 16196.037). A heeled pipe with a 7/64” bore diameter, similar to Type 21 in Walker (1977) and dating circa 1680 to 1710 is also present (Cat. 16196.035).

Seven pipe fragments were recovered from AU BPL C. None is diagnostic. Only one pipe fragment was recovered from AU BPL D: a mouthpiece fragment with a 5/64” bore.

From AU BPL E, four feet below ground surface to the base of excavation, twenty-six pipe fragments were recovered including a stem with a 7/64” bore decorated with a four-in-diamond fleur-de-lys pattern (Cat. 16196.040)**.** Unfortunately this stem is badly worn and the decorations nearly illegible so could not be photographed. This pattern was designated Type 5 by Bradley and DeAngelo (1981) and is stamped with four separate fleur-de-lys. Each one is within its own separate diamond-shaped lozenge, which together form one large lozenge filled with fleur-de-lys. This stem dates to the 17th century and was probably made in the Netherlands. Thirty-six stems with this Type 5 decoration were recovered from the Seven Hanover Square site, 43 from the Stadt Huys site, and six from the Broad Financial Center site in lower Manhattan (Dallal 1995).

Two pipe fragments are present in AU BPL F, but neither is diagnostic. A single stem with a 6/64” bore diameter is water worn, however, and has possible teeth marks near the mouthpiece end of the stem (Cat. 16196.048).

Among the five pipes recovered from AU BPL G, miscellaneous contexts from BPL, one is English and of good quality (7/64”). It is identical to Oswald’s Type 8b (1961) dating circa 1680 to 1720 (Cat. 16196.022) (see **Figure 6.44B**). A piece of an export pipe (6/64”) made in England for the American market is also present and has the same circa 1680 to 1720 date range (Cat. 16196.060).

[30] The site of the Mulberry pipe discovery was “just outside the fort near an old well and close to the north road leading to the fort” (McCashion and Robinson 1977:9).

e. BATTERY PARK NORTH ANALYTICAL UNITS: BPN A, BPN B, AND BPN C

Four pipes were recovered from AU BPN A. The most significant is a complete heeled bowl (6/64") with rouletting around the rim (Cat. 16196.101) (**see Figure 6.42 A**). At the base of the heel is a maker's mark consisting of a star above the initials **DA** (*DA met ster)* (see **Figure 6.56B**). This was the mark of Daniel Andriesz, working in Gouda between 1670 and 1675 (Duco 2003).

Three pipes were recovered from AU BPN B. A pipestem (6/64") with broadly grooved spirals and rouletting along the raised spiral edges is present (Cat. 16196.095) (see **Figure 6.58**). Spiral stems were manufactured in Chester, England in the late-17th through the 18th centuries. They were also popular in the Netherlands during the 17th century. A spiral stem from Chester was recovered from the 175 Water Street site (Soil Systems 1983). However, that specimen, like most Chester pipes, is elaborately decorated with spiraled grooves in which there had been added dots in relief, flowers and tear drops and even, perhaps, a border decoration (Dallal 1999).

Four undiagnostic pipes were recovered from AU BPN C.

Twenty-one fragments were recovered from AU GBW/BPN. One diagnostic pipe (7/64") is a partial bowl with a heel stamped with a **Tudor Rose** at the base of the heel (Cat. 16196.062) (see **Figure 6.65A**). The Tudor Rose on the base of the heel was one of the earliest makers' marks applied to pipes in England and the Netherlands. The significance of the rose as a symbol derives from the end of the Wars of the Roses (1485) when the white rose of the House of Lancaster and the red rose of the House of York were combined in a single two-color flower, the Tudor Rose. The most popular 17th century maker's mark was the crowned Tudor Rose. To pipemakers who left England and brought their craft with them to the Netherlands, the Tudor Rose was a symbol of Elizabeth Tudor, "Good Queen Bess," and an era when smoking and pipemaking had not been subjected to the restrictions imposed by James I. Thousands of English pipemakers were reduced to penury due to the King's policy of granting monopolies to his favorites. To English pipemakers who immigrated to the Netherlands, the crowned Tudor Rose was the symbol of an era of freedom and prosperity (Duco 1981). On Dutch pipes, the Tudor Rose often signified that the pipemaker was English (Dallal 1995).

Other makers' marks from this AU include a pipebowl (5/64") stamped **RT** facing the smoker with a Bristol-style cartouche on the right side of the bowl, inside of which is the maker's name, **R/TIPP/ET** (Cat. 16196.096) (1660 to circa 1780).

f. BATTERY PARK SOUTH ANALYTICAL UNITS: BPS A, BPS B, AND BPS C

Three pipes were recovered from AU BPS A. None is diagnostic. No pipes were found in AUs BPS B and C.

A complete 17th century bowl with an 8/64" stem bore (Cat. 16196.107) (see **Figure 6.42B**), a rouletted rim, and an uncrowned **EB** mark stamped on the base of the heel (see **Figure 6.54B**) was recovered from AU BP A. Tobacco pipemaker, Edward Bird [*Eduwart Burt]*, an Englishman from Surrey, was working in Amsterdam between 1630 and his death in 1665. His widow and his son, Evert, survived him and used the mark until 1672 when it came into the possession of Adriaen van der Cruis. Van der Cruis owned the mark until 1719, at which time it was inherited by *his* son, Adriaen van der Cruis de jonge [the younger or junior], who owned it until 1724 (Duco 2003). Although Van der Cruis the elder was the owner of the EB mark in 1672, Jacobus Jansz. de Vriend rented it at that time and the mark was used until at least 1683 (Ibid). The uncrowned **EB** mark was the most prevalent of the **EB** types found at the Stadt Huys site (Rothschild, et al. 1987 and Dallal 1995).

EB pipes are often found in the same strata as pipes marked **HG.** This is almost certainly because Edward Bird's widow, Anna Maria van der Heide, married potter Hendrik Gerdes in 1664 at which time Gerdes began making pipes. He continued manufacturing pipes until 1688 and his wife, Bird's widow, continued to maintain her association with the pipe brokers who exported her products to the colonies. One of these brokers might have been Adriaen van der Cruis (De Roever 1987).

It is intriguing that the name De Vriend or De Vriendt has surfaced relative to several makers' marks found at the South Ferry Terminal project site: the *Hand* mark owned by Jacobus Jonasz. De Vriend in 1709 and the II mark owned by Jan Jonaszn. De Vriend, 1650 to 1678 (see above).

Of the nine fragments recovered from AU GSF, three are English heeled pipes. Two can be dated circa 1680 to 1710 based on their shapes (Cat. 16196.532) (see **Figures 6.44E** and **6.44A**). The bores are 5/64" and 6/64". The third (6/64") (Cat. 16196.530) is similar to pipes made in England between 1680 and1720.

A stem (5/64") from this AU marked **INGOUDA** in a horizontal line along the stem below a line of rouletting was probably manufactured by the Prince firm in Gouda (16916.532.504) (see **Figure 6.66A**). Gerrit Prince *en Zoon* was in business from circa 1833 until at least 1850 (Duco 1978) and Jan Prince *en Cie* operated from circa 1833 until at least 1865 and possibly as late as 1898 (Walker 1983 and Reckner and Dallal 2000). The pipe could also have been manufactured by another well-established Gouda family firm, A. Sparnaaij [Sparnaay]. Adrianus Spernaaij is listed in guild records as early as 1783 (Duco 1978) but members of the Sparnaay family made pipes until 1899 (Walker 1983). Both firms generally marked their products with the family name on one side and INGOUDA on the other. Several pipes marked INGOUDA were recovered from the 175 Water St. site. One from a privy was dated 1799 to 1830 (Soil Systems 1983 and Dallal 1999).

A diagnostic heel fragment (6/64"), marked with a **crowned W on the left side of the heel and a crowned M** on the right side, was manufactured in the London shop of one of four William Manbeys circa 1681 to 1770 (Cat. 16196.532) (Atkinson and Oswald 1969). Unfortunately the mark is nearly illegible and therefore is not illustrated here. A heeled bowl with a **WM** mark and ribbons or wings on the bowl facing the smoker and a crowned **W/M** on either side of the heel was recovered at the 175 Water Street Site in lower Manhattan (Dallal 1999). Manbey pipes were also recovered at the Faneuil Hall site (LBA 1999).

H. SUMMARY

The great majority of the artifacts from the South Ferry project come from secondary refuse deposited as part of landfilling activities. The artifacts, with the exception of some wood, stone, and mortar pieces, were not directly related to either the Battery Wall or to Whitehall Slip, i.e., their function at the site was to provide fill material. Building demolition debris (bricks and mortar; roofing, wall, and floor tiles; and window glass) is included in this secondary refuse. Other artifacts were manufactured for use in domestic, commercial, and industrial settings. Manufacturing dates ranged from the 17th through the 20th (and in a few cases into the 21st) centuries. Analysis of these artifacts as assemblages associated with depositional or analytical units has helped create a picture of how the land within the project was created and altered; examination of individual artifacts has provided examples of material culture used by New Yorkers over the past 400 years. In the following chapter (see **Chapter 7: Conclusions and Recommendations**) information from the artifacts will be used to address the research questions presented in **Chapter 3: Statement of Research Questions**. ✷

A. Oyster *(Crassostrea virginica)* Shells, from Cat. 15768.220, Entry 30

B. Quahog (Hard Shell Clam—*Mercenaria mercenaria*) Shells, from Cat. 15768.224, Entry 14

A. Soft Shell Clam (*Mya arenaria*) Shells, from Cat. 15768.224, Entry 15

B. Eastern Mud Whelk (*Ilyanassa/Nassa obsoleta*) Shells, from Cat. 15768.224, Entry 10

A. British Buff-Bodied Slipware Drinking Pot, Mug, or Porringer Sherds, from Cats. 15768.358 (Entry 7), .431 (Entry 11), .427 (Entry 13), and .445 (Entries 16 and 20)

B. British Buff-Bodied Slipware Dish Sherds, from Cat. 15768.431 (Entry 8), .444 (Entry 11), and .445 (Entry 12)

A. Locally Made Salt-Glazed Stoneware Jar Sherd with Blue at Base of the Handle and Part of a Blue Spiral Motif, from Cat. 15768.431, Entry 21

B. At left, Salt-Glazed Stoneware Mug Sherd with part of a “GR” Medallion, Probably Locally Made, from Cat. 15768.300, Entry 8. At right, Salt-Glazed Stoneware Jug or Mug Sherd with a Sprig-Molded Lion, Probably German-Made, from Cat. 15768.381, Entry 10

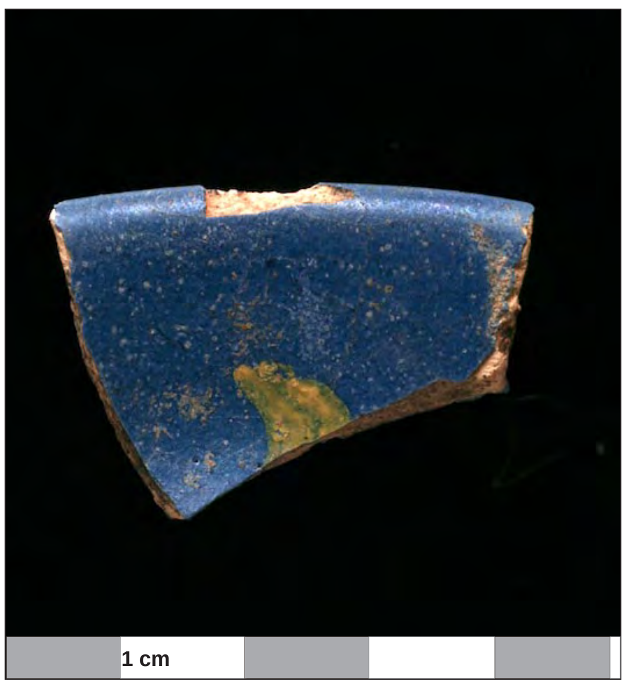
A. Three views of an English bottle base with a scratched mark. Cat. 15768.391 Entry 9

B. Glass Bottle Seal with the (Contested) Arms of Col. Benjamin Fletcher, from Cat. 15768.005, Entry 1

A. Bottle Base with Attached Oysters and Barnacles,
from Cat. 15768.170, Entry 13

B. Yellow Brick, from Cat. 15768.170, Entry 18

A. German-Made Salt Glazed Stoneware Mug Sherd with Sprig-Molded and Painted Diamond Bosses, from Cat. 15768.351, Entry 26



B. Blue-Colored Tin Glazed Sherd, Probably Made in Haarlem or Rotterdam, from Cat. 15768.127, Entry 2

A. German-Made Salt-Glazed Stoneware Jug Sherds with Sprigged Medallions, from Cat. 15768.390 (Entry 1) on the left and Cat. 15768.417 (Entry 13) on the Right

B. Yellow Brick with Oyster Shell Inclusion, from Cat. 15768.335, Entry 1

Timber (“Log 92”), from Cat. 15768.457, Entry 1, Side View

Timber (“Log 92”), from Cat. 15768.457, Entry 1, Back View

Timber (“Log 93”), from Cat. 15768.455, Entry 1

A. Tin Glazed Wall Tile Depicting A Scene from the Crucifixion, from Cat. 15768.427, Entry 1

B. Tin and Lead Glazed Blue Painted Sherds, from Cat. 15768.357, Entry 2 (Top) and 16196.388, Entry 2 (Bottom)

A. British Buff-Bodied Slipware Dish Sherd with Molded Pattern, from 15768.358, Entry 10

B. Chinese Export Porcelain Base Sherd, Possibly from a Helmet-Shaped Creamer, from Cat. 15768.350, Entry 1

A. Salt-Glazed Stoneware Chamber Pot with Pomegranate Motif, Possibly Made by the Kemple Potters, Ringoes, New Jersey, from Cat. 15768.358 Entry 1. Note Scar from a Semi-Circular Kiln Pad

B. Unglazed Red Earthenware Foot, Possibly from a Syrup Jar, from Cat. 15768.351, Entry 9

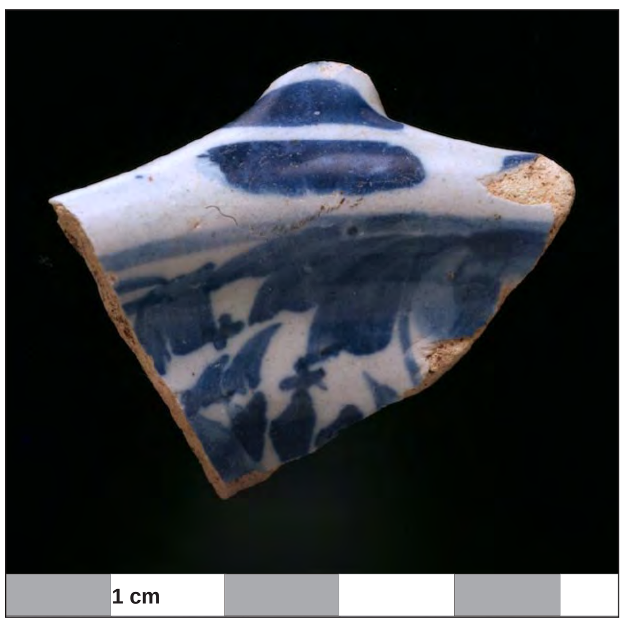
A. At Left, Continental Army Button, from Cat. 15768.090, Entry 8. At Right, Enlisted Man's Button from the English 31st Regiment of Foot, from Cat. 15598.093, Entry 14

B. Cast Copper Alloy Shoe Buckles. At Left, from Cat. 15768.352, Entry 1. At Right, from Cat. 15768.295, Entry 1

A. Foot and Base from a Red Earthenware Dutch-Made or Dutch-Style *Kookpot* (Cookpot), from Cat. 15768.426, Entry 16

B. Pulled Foot Sherd from a Red Earthenware Dutch-Style Pan, from Cat. 15768.405, Entry 2

A. Salt-Glazed Stoneware Pipkin Handle, Probably Locally Made, from Cat. 15768.430, Entry 9. Note the Very Light Salt Glazing



B. Blue Painted Tin Glazed Porringer Sherd with Handle, from Cat. 15768.404, Entry 4

A. Blue Painted Tin Glazed Plate Rim Sherds. Clockwise from the Top: Cats. 15768.435 (Entry 17), 15768.134 (Entry 1), 16196.338 (Entry 1), 15768.445 (Entry 24), 16196.348 (Entry 21), and 15768.442 (Entry 19

B. Modified Cattle Ulna, Possibly Used as a Punch, from Cat. 15768.432

A. Blue Painted Tin Glazed Floor Tiles. At Left, from Cat. 16196.532, Entry 13. At Right, from 15768.410, Entry 2

B. Medal Commemorating the Capture of Louisbourg by British Forces, from Cat. 15598.099, Entry 1

A. Pebble Marked with an X or Cross, from
Cat. 15598.096, Entry 2

B. Polychrome Painted Pearlware Saucers, from
Cat. 15598.045, Entries 67 and 69

A. Polychrome Painted Pearlware Bowl Sherds, from Cat. 15598.053, Entry 7, with Pearlware Pattern 101 (the Large Tulip Motif)

B. Polychrome Painted Pearlware Saucer and Teacup Sherds, from Cat. 15598.056, with Pearlware Pattern 102

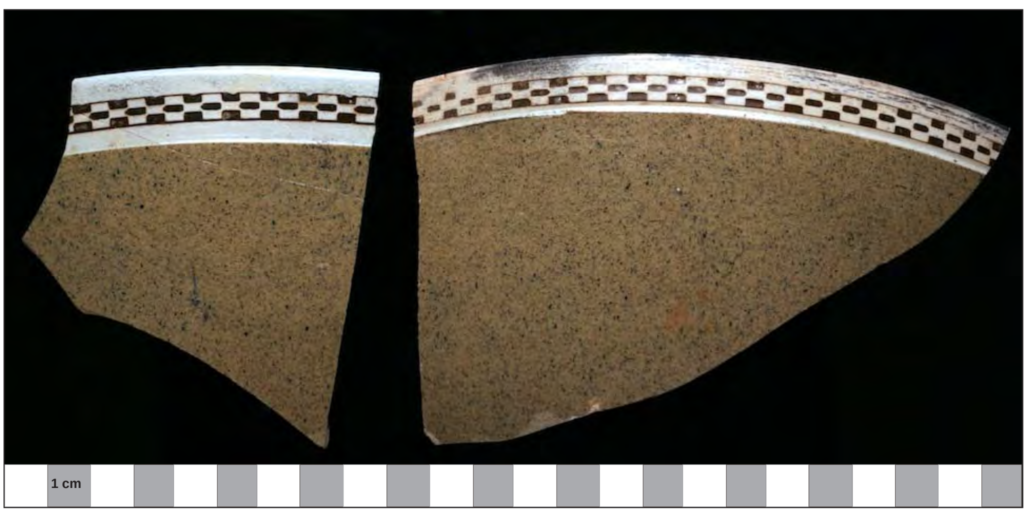
A. Polychrome Painted Teapot Lid, from Cat. 15598.058, Entry 64, with Pearlware Pattern 107

B. Polychrome Painted Saucer, from Cat. 15598.056, Entry 48, with Pearlware Pattern 106

A. Exteriors of Polychrome Painted Bowl Bases, from Cat. 15598.053, with Various Decorators' Tally Marks (Pearlware Pattern 101)

B. Interiors of Polychrome Painted Bowl Bases (see Figure 6.42) Showing Variations on the Interior Motif of Pearlware Pattern 101

A. Polychrome Painted Saucer Rim Sherd, from Cat. 15598.045, Entry 73, with Pearlware Pattern 109



B. Dipt Pearlware Punch Bowl Rim Sherds, from Cat. 15598.053, Entries 166 and 167

A. Side View of Sugar Mold, from Cat. 15598.053, Entry 236

B. Tip End View of Sugar Mold, from Cat. 15598.053, Entry 236

A. Base Sherd, Probably from a Syrup Jar, from Cat 15598.013, Entry 37

B. Plaster with Paint and Possible Remnants of Wall Paper, from Cat. 15598.221, Entry 8

A. Pink Conch Shell with Saw Marks, from
Cat. 15598.023, Entry 1

B. Red Printed Whiteware Plate Sherd with the “Father Matthew” Pattern, from
Cat. 15598.060, Entry 178

A. Red Printed Whiteware Plate Sherds with the “Pergamus” Pattern, from Cat. 15598.060, Entries 180 and 181

B. Red Printed Whiteware Plate Base Sherd with the “Pergamus” Pattern Name, from Cat. 15598.060, Entry 180

A. Black Printed Whiteware Teacup Sherd with the “Spanish Convent” Pattern, from Cat. 15598.060, Entry 179

B. Shoe Sole with Inner and Outer Layers from Cat. 15598.036, Entry 1. Note Stiching Holes on the Inner Layer (At Top)

A. Blue Painted Tin Glazed Teacup Sherd, from
Cat. 16196.338, Entry 6

B. Front and Back Views, Canada Dry “Spur” Soda Bottle, from Cat. 16196.517, Entry 1

A. Scanlon Milk Bottle, from
Cat. 16196.438, Entry 53

B. Blue Printed Whiteware Sherd Showing the
“Chancelor [sic] Livingstone” on the North
[Hudson] River, from Cat. 16196.402, Entry 29

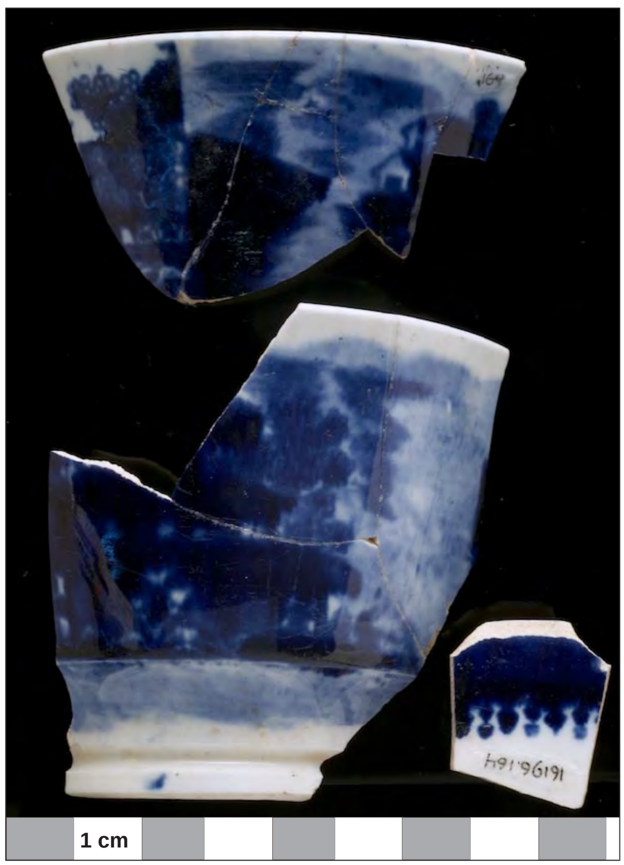
A. Blue Printed Pearlware Platter Sherds with the "Kaskerat" Pattern, from Cat. 16196.399, Entry 9

B. Dark Blue Printed London Shape Pearlware Teacup, from 16196.403, Entry 50

A. Backs of Base Sherds from Tin and Lead Glazed Vessels, from Cat. 15768.357, Entry 2 (Top) and 16196.388, Entry 2 (Bottom). (See Figure 6.21 for Vessel Faces)

B. Blue and Black Painted Tin Glazed Sherd, from Cat. 16196.445 Entry 20

A. Terra Cotta Architectural Decorative Element, from Cat. 16196.164, Entry 16

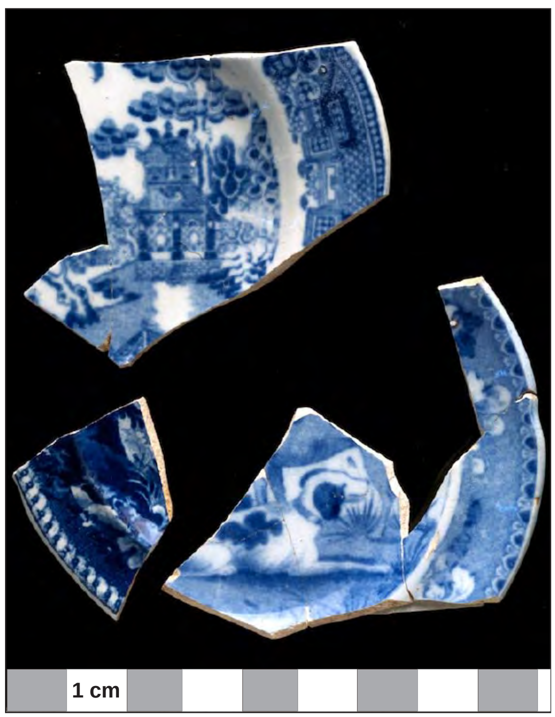


B. Dark Blue Printed Bone China London-Shape Cup Sherds, from Cat.16196.164, Entry 67

A. Dark Blue Printed Bone China Saucer, from Cat.16196.164, Entry 69

B. Blue Printed Pearlware Plate Sherds with the "Christ Church, Oxford" Pattern, from Cat. 16196.164, Entry 78

A. Dark Blue Printed Pearlware Plate Sherds with the “Spread Eagle and Floral” Border used by Joseph Stubbs, from Cat. 16196.164, Entry 83



B. Blue Printed Pearlware Sherds from Small Plates, from Cat. 16196.164, Entries 86, 75, and 89

A. Blue Printed Pearlware Chamber Pot Sherds, from
Cat. 16196.164, Entry 87

B. Chinese Porcelain Plate Painted with the “Canton” Motif, from
Cat. 16196.055, Entry 3

Tin Glazed Wall Tile with Scene of Moses with the Ten Commandments, from 16196.090, Entry 1

- A. English export bowl (7/64”), rouletted rim, 1690-1720, from above the Wall (15768.236.501).
- B. Type 19 English pipe dated 1690-1750 from above or inside Wall (15768.381.500)
- C. Bristol pipe (5/64”) ca. 1660-1690, stamped **RT**. Probably made by one of the Robert Tippets working in Bristol (15768.372.500), from W3K - Misc.
- D. English pipe (5/64”) marked **WW** on base of heel. Probably made by one of two William Williams’ of Bristol, 1651-1708+ (15768.425.503), from W4 G.
- E. Pipe (5/64”) made in Northeast England ca. 1680-1720, from inside log feature (15768.339.500).
- F. Bristol heelless pipe (5/64”) with side cartouche marked **RC/PW** denoting a partnership between two unknown pipemakers ca. 1690-1710, from above the Wall (15768.236.503).
- G. Heeled English pipe possibly filled with charred tobacco, ca. 1780-1820, from WHS D (15598.024.502).
- H. Heeled bowl (6/64”) with slight belly (16196.402.500), ca. 1680-1710. Dutch or English, from PMP F.

Figure 6.39

A. Stem marked **NICHO/*LAS/BRIS**, William Nicholas of Bristol, 1730-1776. Note the backward “N,” possibly the result of an illiterate worker. From above or inside the wall (15768.381.501)

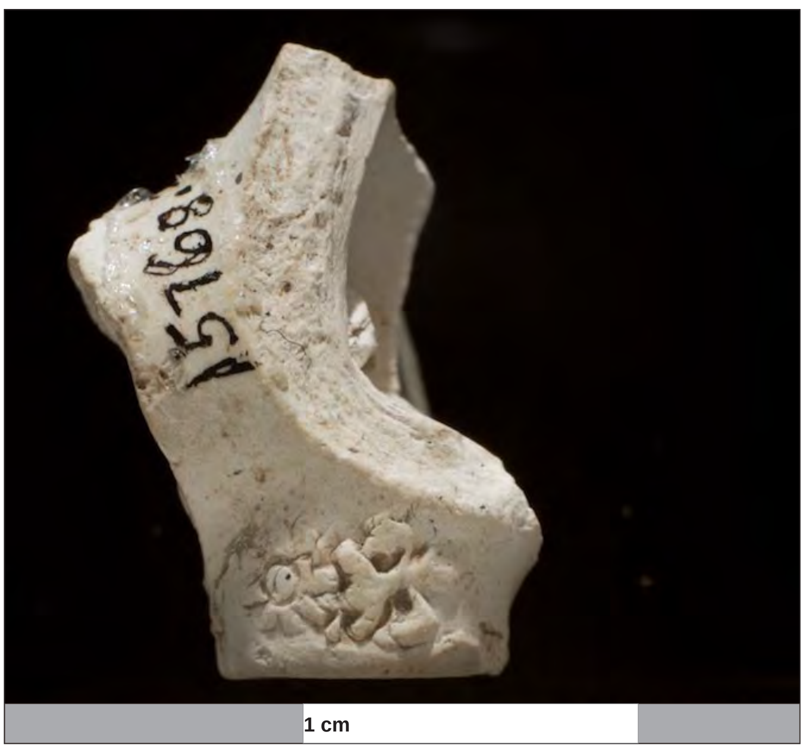
B. Dutch belly bowl marked **SH** probably made by Sander Robbertz. 1660-1685 (15768.017.515), from above the Wall (see Fig. **6.104F** for bowl shape)

Two 17th century stems. Dutch stem on the left decorated with cogs teeth and six rows of rouletting (15768.349.500), from foundation and underneath the Wall. On the right is a typical Dutch or English rouletted stem (15768.023.500), from above the Wall

- A. Gouda pipe marked ***DA** made by Daniel Andriesz, 1670-1675, from Battery Park North A – 0-5'bgs (16196.101.501).
- B. Amsterdam pipe (8/64") marked **EB** made by Edward Bird, 1630-1672, from Battery Park A - South (16196.107.500).
- C. Tiny Dutch belly bowl, possibly a toy, 1610-1640 from above the Wall, (15768.046.501).
- D. Heavily utilized, weathered and cracked belly bowl (7/64") with rim rouletting, ca.1620-ca.1650, from W3K-Misc. (15768.351.506).
- E. Possible English belly bowl (7/64") with incised line below rim and large oval heel, from above the Wall. Obvious use-wear is present (15768.016.502).
- F. Heeled belly bowl (6/64") made in Gouda, rouletting below rim and **SH** on base of heel. Probably made by Sanders Robbertz. ca. 1660-1685, from above the Wall (15768.017.515).
- G. Dutch or English belly bowl, ca. 1670-1680, from next to the Wall on the water side (15768.259.500).

Figure 6.42

A. RC/PW mark. A double set of intitials might represent a partnership between as-yet unidentified Bristol pipemakrs, ca.1690-1710, from above the Wall ((15768.236.503)



B. Mark on the right and left sides of the heel, **Daisy on a Leafy Stalk**, made in London, ca. 1680-ca.1770, from above the Wall (15768.248.504)

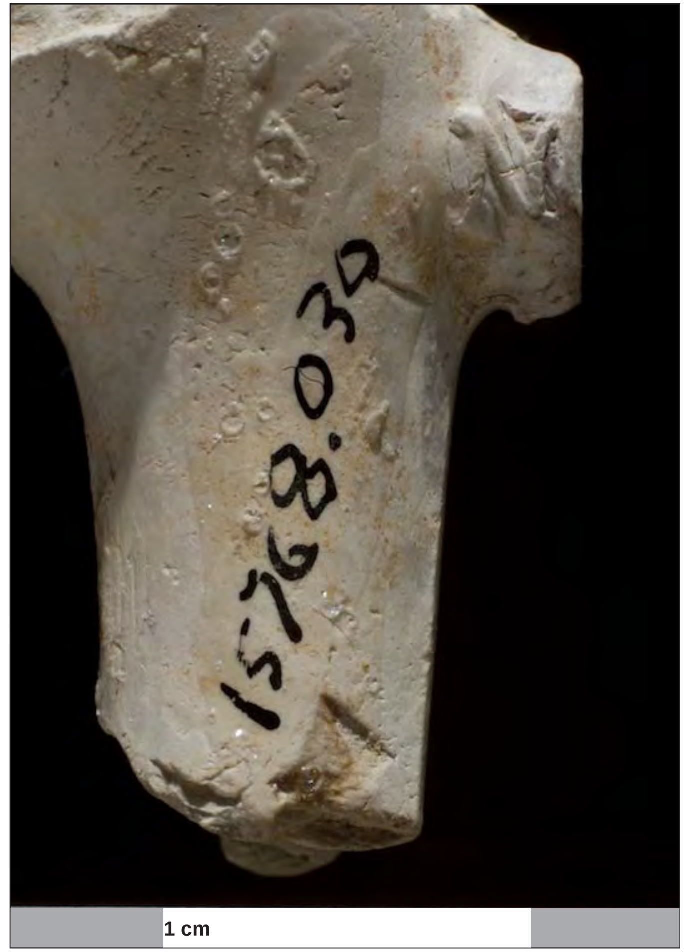
- A. Heeled English pipe (6/64”), ca. 1680-1710 (16196.532.505), from General South Ferry.
- B.Good quality English pipe (7/64”), 1680-1720 (16196.022.500, from Battery Place G.
- C.Heeled pipe (5/64”) with **TFD** mark (16196.501.500), from Peter Minuit Park D.
- D.Heeled Bristol pipe (5/64”) of poor quality with a blank cartouche on the right side of the bowl (16196.466.500), ca. 1720-1780. From Peter Minuit Park D.
- E.Heeled English pipe (5/64”), ca. 1680-1710 (16196.532.503), from General South Ferry.
- F.Type 26 English bowl (5/64”) with a long spur and dating 1740-1800 (16196.175.501), from CCG E.
- G.Dutch heeled pipebowl (5/64”), marked with ***Hand*** mark on base of heel, ca. 1680-1720 (15768.239.505), from above the Wall.
- H.Dutch pipe marked with the ***krijgsman*** or swordsman, 1848-1887 (16196.406.500), from PMP F.

Tiny shells adhering to and some embedded in this pipestem from above the Wall (15768.418)

A. Maker's mark **MTS**, possibly Matthias Stafford working in Amsterdam, 1622-1630, from above the Wall on the landward side (15768.003.507)

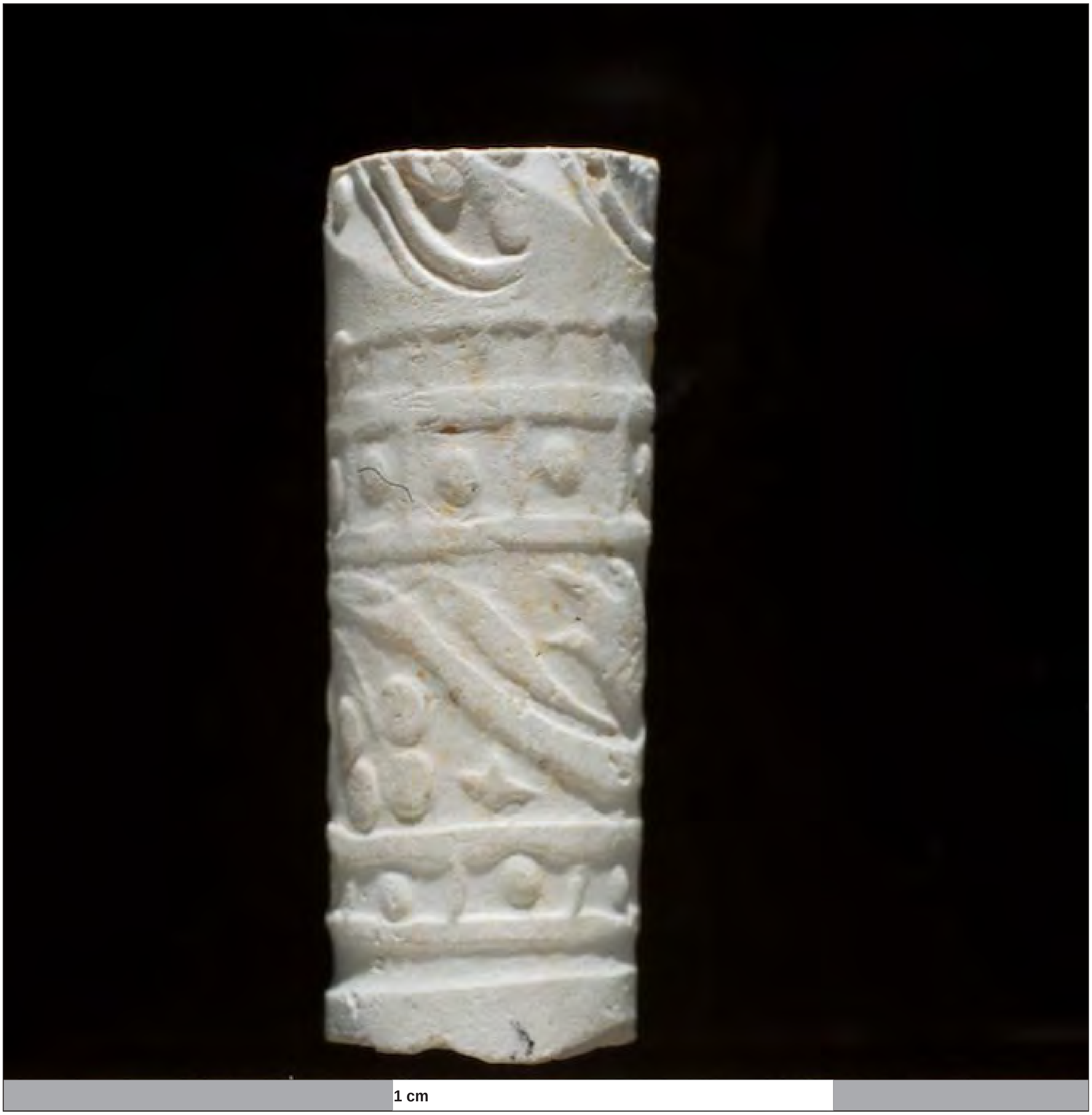
B. Close-up of ***Hand*** mark, probably made by one of the De Vriendt family of pipemakers in Gouda. De Vriendts owned the mark for 63 years between 1660 and 1723. The pipe's shape dates the object to ca.1680-1720 (15768.259.500), from next to the Wall on the water side

A



B

English pipe with initials **H / N**, probably made by Henry Noades of Bristol 1681-ca.1697 or an unidentified pipemaker from London (15768.030.500) from next to the Wall on the water side



Stem (5/64") decorated with a Tulip motif with tendrils, dotted flowers and bands of dotted squares in relief. Made in Chester, England, 1720-1760 (15768.127.500), from next to Wall 3 and above log feature on the landward side (W3E)

Possibly made by Henry Stokes of London ca.1682 or another, as yet unidentified, pipemaker (15768.076.502), from next to the Wall on the landward side

A. Pipe marked **I I** on base of heel, probably made in Gouda by Jan Jonasz. De Vriend 1650-1678 or Jan Jacobsz. van der Aerden 1655-1690 (15768.358.500), from W3K-Misc.

B. Close-up of typical **RT** stamp. Robert Tippet I, II and III were Bristol pipemakers working between 1660 and 1722. The pipe bowl (5/64″) is of a shape dating ca. 1660-1690; see Figure 6.101C (15768.372.500). From W3K-Misc.

A. Red clay stem mouthpiece (7/64”), possibly locally made during the 17th or 18th century (15768.399.501). Similar red clay pipes were found in the Chesapeake area. From W4G-Misc.

B. Fluted and decorated pipe, post 1790 (15768.404.503)/ From W4G-Misc.

A. Overlapping **WWs**. William Williams I 1651-ca. 1694 or William Williams II 1708+ of Bristol (15768.425.503). From W4G-Misc.

B. Heelless bowl (4/64") decorated with floral motifs, late 18th or early 19th century (15768.432.503). From W4G-Misc.

A. Pipestem marked **BRAD / LEY*** made by John Bradley of Broseley, Shropshire, England ca.1740-1760.
From W4G-Misc.

B. Crowned 16 mark on a pipe bowl (5/64") made by *Firma Gebroeders van der Want* of Gouda, 1858-1874 (15598.110.500), from Whitehall Slip B

A. Heeled pipe (5/64″) made by one of several pipemakers named Evans between 1660 and 1713. The mark ***EVA/NS**** is in a side cartouche. Probably made by Isaac Evans (1689-1713), Llewellin Evans 1661-1688, William Evans I 1660-1694) or William Evans II (1667-1713) (15598.024.500, from Whitehall Slip D

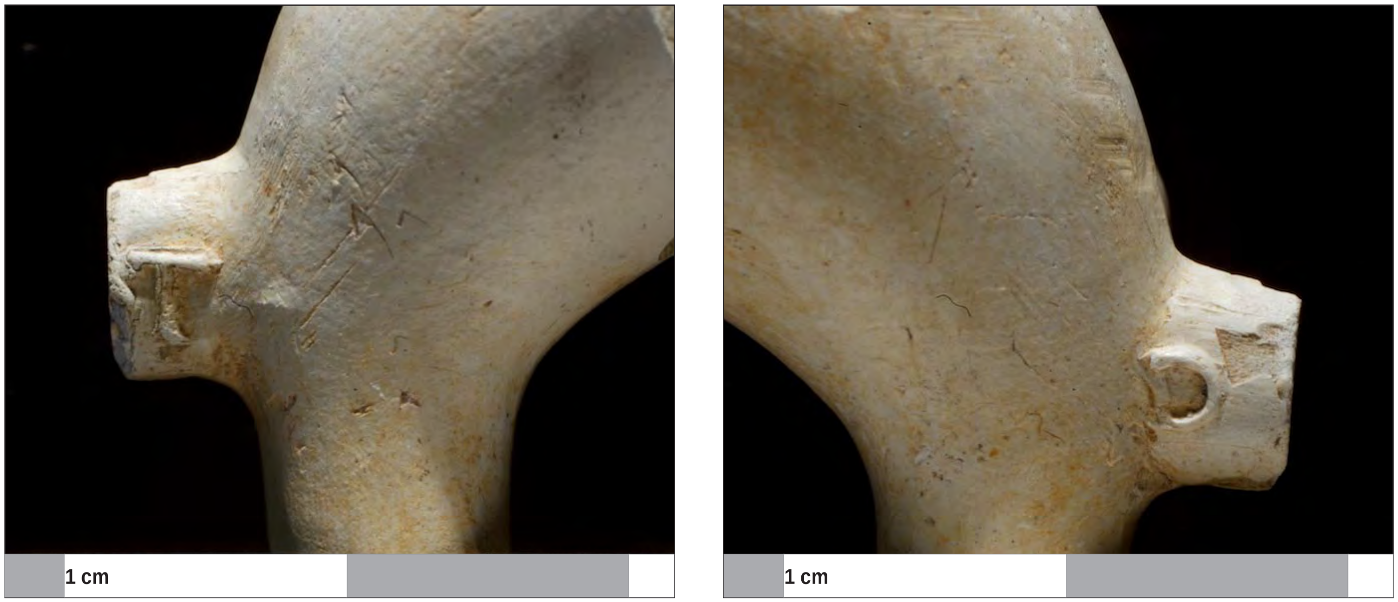
B. Close-up of **EB** mark (8/64″). Possibly made in Amsterdam by Edward Bird between 1630 and 1665 or his son, Evert, 1665-1672 (16196.107.500) (see Figure 6.42C for bowl shape), from Battery Park A (South)

Charred pipe (4/64”) filled with charred material, possibly tobacco, ca.1780-1820 (15598.024.502). Pipe exhibits use-wear on the interior, from Whitehall Slip D

Figure 6.55

A. Mulberry pipe (7/64”), probably English, 1660-1690 (16196.037.500), from Battery Place B

B. Close-up of ***DA** mark of Daniel Andriesz. of Gouda, 1670-1675 (16196.101.501). See Figure 6.104A for bowl shape, from Battery Park North A



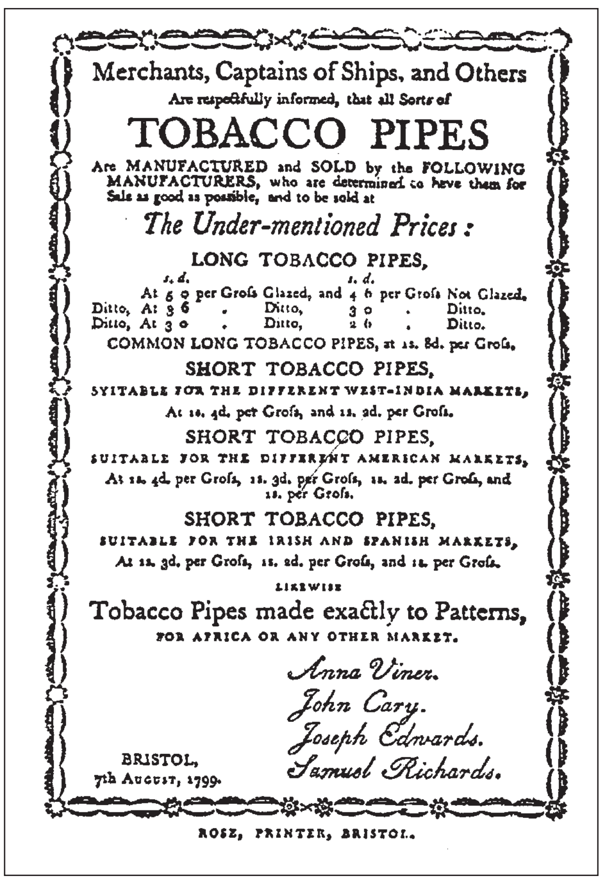
T / D mark on either side of the heel, 1740-1800 (15598.079.502), from Whitehall Slip

Spiral pipestem (6/64”) from the Netherlands or Chester, England, 17th or 18th century (16196.095.500). Other Chester pipes from the South Ferry Terminal Project site date 1740-1760. From Battery Park North B, layer overlying the bedrock.

A. Complete Tippet pipe made by Robert Tippet I, II, or III of Bristol, England, 1660-1722 (16196.145.500), from CCG D

B. Close up of the name **R / TIP / PET** in a cartouche on the right side of the bowl from the above pipe (16196.145.500). This is a typical Bristol way of marking pipes, from CCG D

A. Surname initial of Bristol pipemaker _**E**; many pipemakers with last names beginning in “E” were working in Bristol. This pipe might be a product of Joseph Edwards 1747-1823 or one of the many Evans’ between 1660 and 1713 (16196.185.500), from CCG D



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Joseph Edwards.
Samuel Richards.

BRISTOL,
7th August, 1799.

ROSE, PRINTER, BRISTOL.

B. This flyer names Anna Viner, John Cary, Joseph Edwards and Samuel Richards who were making pipes for the American market in 1799

Advertisement from the Pipe Makers Book
(Jackson and Price 1974:84)

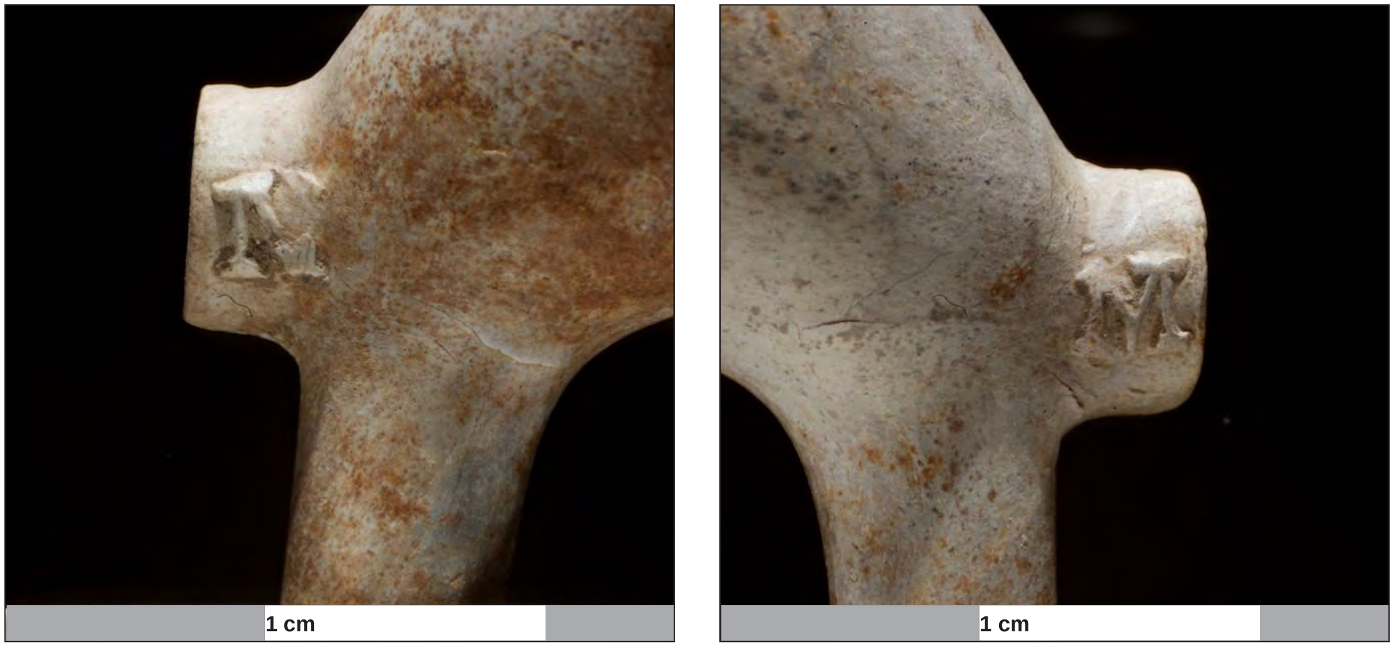
Heeled stem (5/64") marked **F / S** on either side of the heel with a crown above each initial (16196.158.500), possibly Francis Stray ca. 1732, from CCG F

A. Stem fragment (5/64”) marked **W.MORGAN.LIV** made by William Morgan Sr. or Jr. of Liverpool (16196.327.500). Morgan, Sr. in business 1767-1796 and William, Jr. until 1803. The Liverpool pipe industry expanded along with the slave trade and Liverpool pipes replaced the Chester pipes that were used to trade with West Africa. From CCG F

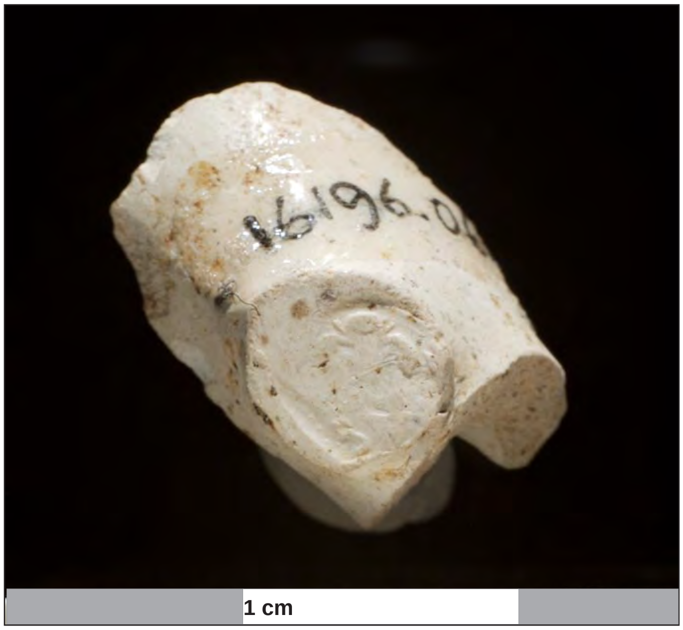
B. A 17th century Dutch stem (5/64”) decorated with four rows of rouletting and a row of dentate or V-chain milling (16198.348-502), from FPSP C

A. Dutch elbow bowl (6/64″) marked **HG** within concentric circles at base of bowl. Hendrik Gerdes of Amsterdam, 1668-1688 (16196.338.500), from FPSP B

B. Heeled stem fragment (6/64″) with **crowned HG** in beaded cartouche at base of heel (16196.338.501). Hendrik Gerdes produced pipes from 1668 until his death in 1688. Between 1694 and 1715, this mark was owned by Hendrick Gloudijse Marte. It is not known who used the HG mark between Gerdes' death in 1688 and its purchase by Marte in 1694, although it is likely it was Gerdes' widow. From FPSP B



Type 25 bowl (4/64”), (1700-1770), marked with the initials **N / M** on the left and right sides of heel (16196.348.500). Possible makers could be Nicholas Mortimore I or II of Bristol operating between 1689 and 1730 or Nicholas Mathews originally of Gloucester but also working in Bristol prior to 1715. The pipe was completely rust stained and burned, from FPSP C



A. Partial bowl (7/64”) with a **Tudor Rose** mark at the base of the heel (16196.062.501). The Tudor Rose was one of the earliest and most popular maker’s marks in England and the Netherlands in the 17th century, from GBW/BPN

B. Heeled bowl **(5/64”)** marked **TD** with a floral, ribbon or winged decorative device above and below the initials inside a circular cartouche made up of slanted incised lines (16196.063.501). Similar to pipes from French and Indian and Revolutionary War Period sites and from the Fortress of Louisbourg, no earlier than the mid-1750s, from GBW/BPN

A. Stem (5/64”) marked **INGOUDA** (16196.532.504). Probably manufactured by one of the Prince firms between ca. 1833-ca.1898 or by A. Spaarnay 1783-1899 in Gouda. From General South Ferry

B. Fluted pipe (4/64”) with vertical milling around rim (16196.448.500) and a sheaf of wheat between floral decorations on the side of the bowl, ca. 1810-1840. Leaf decorations present along the front and back mold seams. Wheat sheaves are representative of the County of Cheshire of which Chester is a part. From PMP D

A. Stem (5/64″) with **three-leaf clover [klaverblad]** mark on base of heel (16196.481.503). Many Gouda pipemakers used this mark between 1660 and 1840, however, it is likely the producer of the pipe was Pieter Dammasz. Krijger (1660-1701), from PMP D

B. Denticulated circular cartouche facing smoker (16196.501.500). Initials **TFD** are present and surmount a ribbon or banner-like device that is not unlike a winged grave marker design, ca. 1750-1780. From PMP D

A. Pipe (4/64”) marked with rouletted or denticulated cartouche with **TD** stamp and a winged or banner-like motif with three molded dots below the initials (16196.501.501). The letters T/D on the left and right sides of the heel, ca. 1750-ca.1780, from PMP D

B. Heeled pipe (5/64”) with **TD** stamped at front of bowl and banner or winged device with dots above and below. Enclosed by half-rouletted and half-slashed cartouche (16196.501.502). TD pipes first made by London pipemaker Thomas Dormer and possibly a son working 1748-1770; original style produced by others through American Revolution and by many thereafter. From PMP D

A. Seventeeth century Dutch (5/64”) stem. Decorative motif consists of three lines of rouletting and one row of dots, which is then repeated (16196.445.502), from PMP D

B. A fluted pipe bowl fragment with alternating broad and narrow “ribs” and slashed lines instead of leaves across the rear mold seam, indicative of a cheaper model (16196.395.500), from PMP F

A. Stem (5/64”) decorated with **molded rows of oak leaves** in the Peter Dorni style (16196.401.500), post 1850. The original manufacturer of Dorni pipes is Peter Dornier who worked in northern France ca. 1850 or German pipemaker Peter Dorn. Like TD pipes this style was copied by firms in Glasgow, Gouda and Germany, from PMP F

B. Dutch pipe marked with the ***krijgsman*** or swordsman, in a cartouche facing the smoker (16196.406.500). Manufactured by one of the Van Essens between 1848 and 1865, *Firma P. & W.F.C. van Essen* (1865-1881), or *Firma W.F. van Essen* (1881-1887), from PMP F (Duco 2003: 136)

1 cm

19th century bone threaded mouthpiece (16196.385.500), from PMP F

Chapter 7: Conclusions and Recommendations

To quote Charles Gehring (2001:5), "New York City has become an influential megalopolis because it fulfills the three basic requirements of all successful real estate: location, location, and location.… the Island of Manhattan offers not only a natural ice-free harbor midway along the coast of North America, it is also situated at the mouth of the Hudson and Mohawk river systems—for years the sole access to the interior of the continent below the Saint Lawrence River, the main artery of New France." European settlement on the island began not far from Battery Park. Over the years that Manhattan was a colony, the cultural landscape of Battery Park became decidedly militaristic, although due to the sheer beauty of the location, civilians apparently strolled around and on top of the Walls without being arrested. The current archaeological excavations have uncovered not only the remnants of the military fortifications but also artifacts associated with other uses of the area.

This chapter is organized by site: Battery Wall, Whitehall Slip, and General South Ferry. Each site's section presents a summary of the findings, drawing upon the material contained in **Chapters 4: Historic Context**, **5: Field Results**, and **6: Artifact Analysis**. These summaries are arranged by research theme and address the research questions stated in **Chapter 3: Statement of Research Questions**. They are followed by an evaluation of the South Ferry Terminal archaeological plans and field methods. Conclusions are presented regarding the project's contributions to the history of New York City and to the practice of urban archaeology, ending with recommendations for suggested future research and for the conduct of future projects, as they may be informed by the various aspects of the South Ferry Terminal excavations.

A. BATTERY WALL

Research questions for the Battery Wall were centered around four goals: 1) understanding construction materials and techniques; 2) establishing the timeline of construction; 3) identifying environmental conditions; and 4) establishing the timeline of destruction, dismantling and burial of the Battery. Answers to the research questions related to understanding the depositional sequence of Battery Park once the Wall and Fort were destroyed are also included below in **4. Establishing the Timeline of Destruction, Dismantling and Burial**. For a list of the individual research questions, **see Chapter 3: Statement of Research Questions**.

1. UNDERSTANDING CONSTRUCTION MATERIALS AND TECHNIQUES

The research questions about construction techniques and materials of the Wall were concerned with the types of stone and mortar used, building technologies, possible repairs, and comparisons of the Wall to other known batteries of the period.

All four sections of Battery Wall documented during the South Ferry Terminal project were constructed by creating two "faces" and then adding fill to the interior, a typical mid-18th century construction technique. The stones used in the Wall faces were primarily from local sources. A number of stone quarries existed within traveling distance of lower Manhattan and although the exact types of stone they contained is mostly unknown (one had limestone), nearly all are identified in newspaper advertisements of the time period as “building stone” or “stone fit for building” (N-Y Gazette 2/16/1767:4; N-Y Gazette and Weekly Mercury 2/29/1668:4) (see **Chapter 4: 11. The Stamp Act Period to the Revolution**).

The faces of Walls 1 and 2 were primarily sandstone, the majority of which was probably transported by water to Manhattan from New Jersey. Two types of sandstone were identified: the typical, reddish-colored sandstone that comes from across the Hudson River in the Newark Basin of New Jersey and lighter-colored sandstone of unknown origin that was more frequently found on the waterside of the Wall. In addition to sandstone, Walls 1 and 2 also contained a small quantity of Fordham gneiss, from the Bronx. The faces of Walls 3 and 4 were constructed of stone commonly known as Manhattan schist, the local bedrock. Some weathering was documented on stones used in the waterside face of Wall 1, as well as on some of the interior fill stones. While weathering might be expected on exterior stones, especially those facing the water, the fact that the interior fill between the two wall faces also exhibited characteristics of weathering suggests that the Wall fill contained scavenged materials in addition to quarried stones. Scavenged material also included a large boulder incorporated into Wall 1 (see **Figure 5.1**).

One face stone was found protruding from Wall 3 near the southern end of the Wall on the landward (east) side (see **Figure 2.7**). The stone, which measured 1.2 feet wide by 0.8 feet high by 2.3 feet long, projected from the face of the Wall by approximately one foot. Although it was initially postulated this stone might have been part of a feature within the Wall, such as an anchor or part of a platform for artillery, or a support for the Wall itself, it was concluded during the course of excavation that this stone was once flush with the other face stones, but became dislodged during the original dismantling of the upper levels of the Wall. This was supported by evidence of a gap in the surface of the truncated Wall 3 when it was first exposed.

It was initially unclear if the stone rubble found during ET 4 excavation associated with Wall 3 was part of the Wall fill or if it was part of another feature or fill episode. As discussed in **Appendix N: Wall 3 Excavation Units**, it became apparent during data recovery excavations that the stone rubble was indeed part of the Wall 3 fill. The specific source of the rubble used in the Wall 3 fill is not known, but, as already noted, is a combination of larger pieces of stone left over from construction, smaller stone chips from the Wall construction, and scavenged stones.

Some of the stones in the rubble were burned and it was at first thought that materials from a burned building might have been incorporated into the fill. However, it was determined that the burned stones were simply a byproduct of an *in situ* fire that likely took place after the Wall was truncated and buried. The presence of a large burned root supported the finding that the fire took place in vegetation that grew out of either the remains of the Wall or in the overlying fill. There is no historical documentation or physical evidence that trees grew on top of the Wall itself while it was extant. Therefore, any tree or shrub would have grown in the soil that was used as fill above the truncated Wall.

At Walls 1 and 2, each remaining course of stone was found mortared to the other and also mortared to the bedrock that was its foundation. However, no mortar was immediately apparent between the stones on the faces of either Walls 3 or 4. Upon closer inspection, however, it was concluded that mortar was also used in the construction of these Wall segments, but it was of a less durable quality than the mortar used at Walls 1 and 2. This resulted in the mortar being washed away by tidal action. Only mortar used in courses above the high water mark remained, as a cap to the truncated Walls 3 and 4.

Mortar samples were collected from all Wall sections. Tested samples showed each was common rock lime mortar with a siliceous, natural sand component and was "crudely" mixed (see **Appendix G**). Petrographic examination of samples from each Wall section revealed similarities between mortars from Walls 1 and 2. The mortar analyzed from Wall 3, the southernmost of the four sections excavated, was somewhat different. The mortar analyzed from Wall 4 had characteristics in common with all other samples from the other Battery Wall sections. In the field, the mortar in Walls 1 and 2 appeared much more sound (harder and more solid) than that found at Walls 3 and 4. The petrographic analysis bore this out in that it showed negligible friability at Walls 1 and 2, moderate at Wall 3, and quite friable at Wall 4. The aggregate sand had medium grain size and an abundance of binder in Walls 1, 2 and 4. In contrast, Wall 3 had a paucity of binder and coarse grain size. As a result, the mortar used to construct Walls 3 and 4 had been severely eroded, leaving the appearance of very little mortar or even possibly dry-laid stone.

Comparison of the Wall mortars to mortar samples from other sites was not part of the scope of this investigation and therefore was not conducted by the mortar analyst, Testwell, Inc. (see **Appendix G**). A search of the literature during preparation of the South Ferry Draft Technical Report (July 28, 2010) indicated that few mortar analyses had been conducted at other 18th-century military sites. It is, therefore, significant that the results of the Battery Wall mortar analysis are now available for comparisons by future researchers.

Jablonski Berkowitz Conservation, Inc. (JBCI) compared the Battery Park Walls to two 18th-century forts along the eastern seaboard – Fort Mifflin in Pennsylvania and Fort Frederick in Maryland (see **Appendix K**). JCBI stated that the general configuration of the walls from all three sites was consistent with mid-18th century fortification building methods. All were constructed with dressed stone exteriors and contained rubble fill. However, the sites were not completely analogous: the Battery Walls were approximately eight feet thick while those of Forts Mifflin and Frederick ranged from two to four feet wide. Forts Mifflin and Frederick were also "well mortared" (**Appendix K**: 45), while not all of the Battery Walls appear to have been so. Mary Dierickx, Raymond Pepi and Sidney Horenstein evaluated a number of mid-17th to early-18th century stone foundation walls from the Seven Hanover Square site in New York City and concluded that traditional building methods such as "coursed stone rubble construction and mortar of earth and lime" were used (Dierickx et al. 1982:1). At the Seven Hanover Square site, "various sizes of stone were laid up in rough courses, or layers, in thick mortar, to create a serviceable, and apparently long-lasting [foundation] wall" (Ibid). This method of construction differed from that of the Battery Walls 1 and 2 which had carefully cut and dressed stones; however, it was similar to Walls 3 and 4. Additionally, the foundation walls at Seven Hanover Square initially appeared to be dry-laid, similar to Walls 3 and 4. The mortar analysis indicated that the Hanover Square walls were laid up with a mixture of clay, earth, sand and lime mortar (Ibid: 2) but that the clay had washed out. This type of mortar mix would not have been recommended for construction such as the Battery Walls which would have been exposed to the elements and needed to hold up under enemy fire.

The mortars from the two New York City sites may be different but the building stone is similar. The early walls at Hanover Square were made of brownstone (a form of sandstone), schist and boulders, all available locally (Ibid). The Battery Walls, however, were much more carefully laid up than those at Hanover Square, which were local stone laid up in coarse rubble in an earth and lime mortar with mud pointing (Ibid). Although this is a technique of the late-17th or early-18th century, traditional construction methods such as these continued for centuries.

The study of the Battery Walls by Testwell, Inc. (see **Appendix G**), Dr. Patrick Brock, and the archaeologists, indicated that similar mortar and construction methods were used to build Walls 1 and 2. Although the face stones in all Wall sections were carefully laid, the courses of stone in the faces of Walls 1 and 2 were more uniform than those of Walls 3 and 4. This was one of a number of physical indicators that the four sections of Wall were from two different construction episodes, although it was not initially clear if that was because they were built by different individuals, used different designs, or if they were constructed at different times.

As previously mentioned, some of the stones used in the construction of Walls 1 and 2 might have been procured outside of Manhattan, while the stones in the faces of Walls 3 and 4 were primarily the same type as the local bedrock, indicating more local procurement. Additionally, the different sections of the Wall were constructed on different sub-strata. Walls 1 and 2 were built directly on top of bedrock with very little soil between the bedrock and the Walls. The bedrock at this location was located near the surface and provided a natural platform for Walls 1 and 2. Wall 3 was built on boulders and large cobbles and Wall 4 on a base of sand. Historic documentation shows that boulders and possibly sand occurred naturally in those locations. Thus expediency appears to have been an important consideration in Battery Wall construction. The off-shore Copsey Rocks suggest the presence of a rocky shore as is illustrated by Ratzen (see **Figure 4.15**) and others. Although some of these larger rocks would have been very difficult to move using 18th-century technology, cranes existed at the time and manpower and draft animals were accessible. (The current South Ferry Terminal excavations required a crane to lift some of the larger Wall 3 foundation boulders, as well as the large boulder incorporated into Wall 1). The presence of boulders and large cobbles would not necessarily provide a level foundation but their use may have been a necessity. It is also possible that cobbles and boulders were part of the fill that had been previously added to this area of the Battery. On the other hand, sand is easy to level, although not necessarily the most stable surface.

Although it is the only historic map to do so, the circa 1693 Franquelin plan shows a large sandbar in the area that would have been near Wall 4 (see **Figure 4.8**), Perhaps this natural landmark, if it still existed in the mid-1750s, (or if it existed at all) (see **Chapter 4: A.3. Governor Fletcher's Whitehall Battery**), would have been an acceptable site and building surface. In each case, the use of the naturally occurring ground surface indicates a certain level of pragmatism in colonial construction design. It is interesting that Dierickx, Pepi and Horenstein (1982:10) in their architectural analysis of the foundation walls from the Seven Hanover Square site, said that "the questions of a sand source available to the early European builders on Manhattan Island has not been satisfactorily answered." The sand collected near the late-17th to early-18th century walls at the Seven Hanover Square site "is the only recently documented sand supply on Manhattan that resembles sand recovered from seventeenth, eighteenth, or nineteenth century mortars from the same vicinity" (Ibid). They concluded that at least some of the Hanover Square mortars were "native to the site" (Ibid). More significantly, the correlation between the *in situ* sand collected at Hanover Square and building mortar sand establishes a precedent for the use of local sources available to the masons of the time period, again confirming the level of pragmatism of New York City builders.

Initial examination of the western profile of ET 1 raised the possibility of the presence of a small remnant of a builder's trench for the Wall. This deposit was examined in the excavation units located on the southern side of the Wall and was later determined not to be a builder's trench. The absence of a builder's trench is one indication that the Walls were built on existing ground surfaces. Again, expediency seems to have been the concern when selecting the locations for foundations: bedrock at Walls 1 and 2, large cobbles and boulders at Wall 3, and sand at Wall 4.

Walls 1 and 4 each contained evidence of a bastion and each bastion was constructed differently. Bastions generally protrude from a curtain wall as arrow-shaped projections facing the water. Sometimes demi-lunes or crescent-shaped fortifications were constructed between two bastions and were installed to defend the curtain wall or an entrance. The landward side turn of the Wall 1 bastion was gentle, although sharp at the water side; whereas, the turn at the corner of the bastion at Wall 4 was sharp on both sides. To construct a gentle curve, the builders of the Wall had to cut stones for two different purposes, one type for the corner and another for the remainder of the Wall. Square or rectangular stones would have been cut with right angles for use in the faces. For the gentle curve, stones would have been segregated and cut at varying angles, as they are for archways in building construction. Therefore, the presence of the gentle curve indicates more time-consuming construction took place at Wall 1, another indication these sections represent different construction episodes. The reason for using one type of construction method versus the other is not known. Neither the historic documents nor the field data suggest why this gentle curve exists. Its location and orientation do not suggest it was part of a demi-lune or half- moon.

Wooden sheeting was found on the landward sides of Walls 3 and 4. Its purpose was probably to protect the Wall from deterioration and/or constant repairs, as documented at other contemporaneous sites where stone walls were “clad” with planks to protect them from the effects of the elements (see **Chapter 4: A.11 The Stamp Act Period**). The South Ferry Terminal sheeting generally consisted of two planks, one above the other, with overlapping ends. Occasional vertical supports were present on the landward side. Only one possible wooden peg fastener was documented. Dendrochronological analysis was applied to nine samples of sheeting. Both white pine and pitch pine were present, but it was not possible to establish a narrow date range for the death of the trees. Only two of the samples were partially datable (one each from Walls 3 and 4), one with the presence of growth rings for the year 1674 and the other for 1683. The samples were from trees cut sometime after those dates but this information does not assist in narrowing down the date to any degree since those dates are significantly earlier than construction of the Battery Wall itself.

In 1742 funding was provided to repair the outside of George Augustus’ Royal Battery with “good Sound Oak Plank” because it had been damaged by ice the previous winter (Stokes 1967, IV: 574 and New York State 1894, III: 203). It is not clear if these planks refer to facing or cladding on one side of a stone battery or if the planks were the actual walls of that battery. This 1742 time period predates the 1755 construction of Walls 3 and 4 where the sheeting was found. Other historic documents dating to 1768, after the Walls were built, refer to decaying “wooden facing on the ramparts of the Battery” and there is a possibility that the documents refer to the sheeting found during the archaeological excavations. As mentioned above, it was common to use pine planks or cladding to prevent or protect from climate-related deterioration. Numerous instances of cladding or sheeting installed to buffer the walls at the Island Battery guarding the Fortress of Louisbourg have been documented (Krause 2006). The presence of the sheeting at Walls 3 and 4 is another characteristic that distinguishes it from Walls 1 and 2.

Wall 3 contained two other unique elements: a counterfort (buttress) on the waterside and a log feature of unknown function that predated the Wall, on either side of it, somewhat perpendicular to and beneath the Wall. The counterfort measured approximately 6 feet wide and protruded from the landward face of Wall 3 for an approximate distance of 4.5 feet. While counterforts are depicted on at least one historic map (see **Figure 4.19**), none are shown in the location of the Wall 3 counterfort which suggests the map might be inaccurate in this instance.

The log feature found associated with Wall 3 was built of logs cut in 1733 and 1734, thus predating the 1755 Wall. This twenty-year span is relatively small and therefore it is possible the two were contemporaneous for at least part of their existence and maintained a functional relationship. However, the Wall 3 log feature is not depicted on any historic map or lithograph and there is no mention of the feature in historic documents, therefore the exact function of the log feature and its relationship to the Wall is unknown. It is possible it was a landing stage or platform in use before the Wall was extended into the area (s**ee Chapter 4: A.6.a. George Augustus' Royal Battery**). There was some speculation that the log feature might have been part of the earlier battery. George Augustus' Royal Battery was constructed in 1734/1735 and the timbers of the log feature were cut in 1734. Landfilling activities reportedly took place between Whitehall Street and present-day Battery Place in preparation for construction of the new Battery. Although it is likely that some of that work was undertaken, historic maps show the area of the Wall 3 log feature under water as late as 1755 (see **Figure 4.11**). The 1755 map by Maerschalck could be incorrect, however. Although there is no definitive evidence as to the material used to construct the circa 1734 battery, it is known that after the foundations for George Augustus' Royal Battery on the rocks at Whitehall were completed, Governor Cosby laid the first stone of the platform on July 16, 1735. This implies the platform, at least, was made of stone.

It is also curious that five angled vertical piles were found in association with the northern side of the log feature on the landward side of Wall 3. Landfill-retaining structures depicted in several Chapter 4 figures contain this type of diagonal back brace supporting wooden walls of various forms (see **Figures 4.59, 4.60, 4.63, and 4.66**). Therefore it is possible the angled vertical piles found in the field once supported a wooden wall situated along the north side of the log feature. Such a wall could have served a number of purposes including shielding the men who may have been protecting the city by providing them with cover to shoot from, as is usual for batteries.

The dendrochronological analysis of the log feature samples provided data regarding the types and sources of wood used in its construction. All but one of the logs analyzed were pitch pine and the other was oak. The pitch pine samples were likely procured from within 100 miles north or west of Albany and sent down the Hudson River for use at the Battery.

Some of the cultural material collected during the dismantling of Walls 3 and 4 suggests that repairs to the Walls had been made because the beginning manufacture dates of some artifacts are later than the construction date of the Wall. An overglaze painted creamware ceramic sherd, recovered from the upper levels of stones during the dismantling and documentation of Wall 3, is a type manufactured beginning in 1765. Therefore, either there was a repair to this section or the artifact percolated into the Wall fill over time. A creamware ceramic sherd recovered during the dismantling of Wall 4 has a beginning manufacture date of 1762[1], also possibly indicating repair or percolation.

Documentary evidence indicates that the Battery was in a constant state of construction, demolition and repair but, while cultural material with manufacture dates more recent than those of the original construction of the Wall may be indications of repairs, nothing in the size, shape or placement of the stones in the vicinity of the artifacts recovered from either Wall 3 or Wall 4

[1] As noted in **Chapter 6: Footnote 8**, the beginning date of manufacture for creamware was 1762, but 1770 is used in this report because this is the date after which creamware became common in North America.

indicates a renovation or repair. Photographs of these sections have been reexamined to look for evidence of repairs to the face of the Wall that may have been missed during fieldwork, but none could be detected. That is not to say it was not possible but rather, if a repair was done, it was done so well as to look like the original construction. Thus, although repairs to the Battery Wall probably took place, none could be physically detected during the archaeological field work. The cultural material collected, however, suggests the possibility of at least one repair each at Walls 3 and 4.

One of the major threats during the colonial period was the threat of seaborne attacks by European forces. At first, places like *Nieuw Amsterdam*/New York were lonely outposts, isolated from one another and from their mother countries. Forts and other defensive works were constructed at the edges of the land, using whatever local materials were available and copying European forms. Governor Clinton complained mightily in the 1740s that construction was haphazard and workmanship shoddy. The British attempted to use engineers attached to the military during the French and Indian War period. During the Revolution, the Americans relied on French-trained engineers. It was not until after the Revolutionary War that a comprehensive, integrated system of defense was put in place.

A detailed comparison of the Battery Wall sections to other known examples of batteries from the time period, both archaeological and extant, was not possible because very little information about the construction methods of 18th-century batteries exists in the archaeological record or in the English literature. After Paul Huey examined the South Ferry Walls (see **Appendix L**), he thought of the stone walls of Fort St. Frederic, constructed at Crown Point by the French beginning in 1734. In response to its construction, the English built a new stone fort at Albany in 1735. Huey noted that forts in the English colonies during this time period were generally “simple enclosures built with vertical log stockade or stone walls, often with corner bastions” (**Appendix L**: 4). He did not make mention of batteries. References consulted during the South Ferry analysis regarding construction of batteries did not contain anything about specific building methods in the 18th century (although there was plenty of information about Civil War Period batteries a century later). It is possible that 18th-century French engineering manuals that are not readily available could contain such information, but translation of foreign language materials was beyond the scope of the present South Ferry analysis. Finally, an unsuccessful search was made for other archaeologically excavated 18th-century stone batteries. Most site reports and papers related to military archaeology have focused either on other types of fortifications or on material culture. For example, one 18th-century half-moon battery in Charles Town, South Carolina was made of brick and therefore not analogous to the South Ferry site finds. The Island Battery that guarded the entrance to the Fortress of Louisbourg on Cape Breton, Nova Scotia was a mortared rubble wall with no backing and, therefore, not as substantial as the Battery Wall in New York City, “being naked at the back and boarded to keep the stone work together” (Krause 2006).

Traces of 18th-century period fortifications have been uncovered in New York City during the 20th century – Fort Washington and British encampments around the Dyckman Farm (Calver and Bolton 1950) and Fort Independence in the Bronx built in 1775-1776 by the Americans and documented by Lopez, Wisniewski, Cohn and Trowbridge who found parts of two stone foundation walls, probably officers’ quarters (Lopez 1978). Details of the fort’s construction are unknown, however, and none of the above-mentioned military fortifications survive today. Another small fortification, Blockhouse #1, is located in the northern part of Central Park. Although the current structure was built in 1814, excavations and mortar analysis conducted in

1995 by Columbia University suggested that the foundation dates to the circa 1776 British occupation of Manhattan (Jerome 2010).

2. ESTABLISHING THE TIMELINE OF CONSTRUCTION

The 1766-1767 Ratzen plan (see **Figure 4.15**) used in the Phase 1A map analysis (LBG 2003) and during the field effort closely approximated the archaeological findings and informed the data recovery excavations. The presence of the Battery Wall segments depicted on the Ratzen plan indicates the segments were extant by 1766-1767. It was necessary, however, to determine when the Wall or Wall segments were built and by whom.

Documentary and cartographic evidence were crucial in establishing the dates of construction of the four segments of Battery Wall. Evidence suggests Walls 1 and 2 are part of the 1741 Flat Rock Battery; Walls 3 and 4 were erected in 1755 when bastions and a connecting wall were constructed to link the Battery at Whitehall with the Flat Rock Battery which was located approximately on a line with Stone Street if it would have extended into the Park.

To summarize the research presented in **Chapter 4: Historic Context**, the Fort at the foot of present-day Broadway was called Fort Amsterdam by the Dutch and Fort George by the English, although there were other names for the Fort at various times. Designed by a Dutch West India Company military engineer in 1626, the site was chosen to command the East and Hudson Rivers. Throughout its long history, the Fort and its series of supporting batteries survived in alternating states of construction, renovation, and decay, until they were ultimately demolished circa 1790 and the debris incorporated into present-day Battery Park.

The archaeologists tried to determine if they had found one of the outer walls of the early Fort or an early colonial-era seawall. Using documentary and cartographic evidence supplemented by geographic information systems (GIS) technology (see **Chapter 2: Historic Methods**), they applied the city grid, project corridor CAD drawing, and the coordinates of the Wall segments found in Battery Park as a series of overlays to the 1660 Castello Plan (see **Figure 4.3**), and other historic maps. Evidence showed that the wall segments could not have been constructed during the period of Dutch control as the project corridor is located in a portion of the site that was then under water. Written records confirmed this, as did artifact TPQ analysis.

Additional batteries were constructed just outside the project area under English rule. For example, Jacob Leisler constructed a seven-gun, half-moon shaped battery on a "flat rock[2]" west of the Fort in 1689 (Gilder 1936:26). It is illustrated on the revised Miller Plan (1695) but, as noted, is located just outside the project corridor (see **Figure 4.4**). In 1693, Governor Benjamin Fletcher concluded it was imperative to build a new battery and chose a site on the Copsey Rocks in the East River. This battery was the 15-gun Whitehall Battery constructed at the foot of Whitehall Street. Miller's 1695 map shows its location but the GIS overlay confirms it is situated well outside the project corridor.

An Act of the New York Assembly in 1734 dictated the Battery and its surrounding waters should be set aside for military purposes and kept free of commercial development. This same Act charged that a new battery be constructed on the Copsey Rocks off Whitehall in the cheapest and speediest manner possible. This battery would replace Governor Fletcher's 1693 Whitehall

[2] The Flat Rock was an outcrop of bedrock along the Hudson River shoreline and is mentioned again in 1741, as a prime spot for a fortification (see **Figure 4.5**).

Battery. The material used to construct this battery is unknown, but it is likely the South Ferry Terminal log feature found at Wall 3 was either part of the 1734 battery or related to its construction in some way. The new battery was to adjoin the land already there and extend as far as present-day Battery Place. When completed, the new battery was christened George Augustus' Royal Battery. Although portions of this fortification, including a segment of a large pond, were located within the project corridor, Walls 1 through 4 found by the archaeologists were not part of this construction, as the area where they were later found was still under water at that time, based on map evidence.

The 1754/55 Maerschalck Plan (**Figure 4.11**) shows George Augustus' Royal Battery in the shape of a half-moon. Its eastern flank lies along the western side of what became Whitehall Slip. The interior space of the half-moon was filled with water. This water-filled area, historically called the Pond, shrank over time through filling and, by 1767, the Ratzen Plan (see **Figure 4.15**) shows a greater amount of solid ground, a smaller body of water, and a number of improvements, including barracks (also a part-time hospital), and a storehouse. The "new" Battery of 1734 was already in poor condition by 1738 and the Commissioners of Fortifications laid a quantity of large stones around the outside to secure the Foundation while filling up the inside of the Battery an additional 20 feet. It is likely Commissioner of Fortifications John Roosevelt's enslaved servant, Quack, was among those who labored on this project (Horsmanden 1744) (see **Chapter 4: A.8. The Hard Winter-1740 to 1741**). In 1741, the Assembly allotted £600 to build an additional 20-gun battery on the Flat Rock behind Fort George. This new battery was constructed near the area where Jacob Leisler constructed his half-moon battery on a flat rock approximately 50 years earlier. It is likely Walls 1 and 2 found by the archaeologists were part of this new circa 1741 Flat Rock Battery. The Assembly also directed that additional landfilling take place along the inside of George Augustus' Royal Battery and two Block Houses erected on either side of an existing Storehouse. These structures were located just outside the project corridor. Additional improvements to George Augustus' Royal Battery and the Flat Rock Battery took place in 1744 and 1745.

Renovations continued and in 1755, bastions and a connecting wall were constructed between George Augustus' Royal Battery and the Flat Rock Battery. The work undertaken in 1755 is illustrated in the unpublished 1756 John Dies' map from the British National Archives which claims to be *An Exact Draught of the Work Built This Year* (see **Figure 4.16**). Archaeological Walls 3 and 4 date to this circa 1755 construction period.

The construction of each of the batteries effected a change in the landscape and topography of the area between present-day Battery Place and Whitehall Street. This was especially apparent during landfilling activities conducted for many of the batteries, the Pond, and Whitehall Slip.

Although very few temporally diagnostic artifacts were recovered from Wall 1 and none from Wall 2, the artifact TPQs support the historical documentation. The 1750 TPQ for artifacts found beneath Wall 3 quite closely approximates the 1755 construction date. Dendrochronological analysis of samples from the log feature at Wall 3 reveal its trees were cut in 1734, prior to the construction of any of the archaeologically recovered Wall sections. This earlier date is consistent with the date of construction of the earlier battery, George Augustus' Royal Battery, of which the log feature may have been a part. The political conditions that were the reason for the construction of the fortifications in the project area and the military activities that took place at the Battery were not well represented in the artifact assemblage. Only a few military-related artifacts were recovered from Battery Wall excavations: two cannon balls, two musket balls, some lead shot, and pieces of gun flints. Two military buttons were found, but these were probably not directly related to the Battery Wall. In addition, no evidence of gun emplacements was found during the field excavations of any of the Battery Wall sections.

a. WHO BUILT THE WALLS?

When the first eleven enslaved Africans arrived in *Nieuw Amsterdam* in 1626, they were employed on public projects. One of their tasks was to cut and haul palisades for defensive walls and another was to labor on the city's military fortifications. When the English threatened to take New York in 1664, Governor Stuyvesant sent 25 of the company's slaves, assisted by a troop of soldiers, to labor at the City's works.

When Governor Fletcher designed his new battery to command both Rivers in 1693, he ordered all able-bodied men not presently in the militia, including Indian and Negro slaves, to repair the fortifications in the city or find replacements to labor in their place or they would be fined three shillings (NYCC 1905, I: 354). Fletcher also asked the city council to order the inhabitants of the Out Ward and of Roosevelt and Wards Islands to cut down "86 cord of stockadoes of 12 foot in length and have them ready to be conveyed to the city of New York" (Ibid). He called it "A Necessary Work" (NYCC 1905, I: 339). It is likely these "stockadoes" were used to build landfill structures and a platform to support the new Whitehall Battery.

As additional fortifications were constructed, the Military employed engineers to design what they called "the works" and men called "artificers" (skilled craftsmen attached to the military) to construct them. Civilian workers – carpenters, glaziers, provisioners of lime, stone and timber – were also hired by the Commissioners of Fortifications. Enslaved New Yorkers also worked on the fortifications. Enslaved workers were often "hired out to local employers and to the municipal government" (Foote 1991:51). We know the name of one of the slaves, Quack, who worked on the "new" Battery in 1740/41 (Horsmanden 1744).

While it is common knowledge that men were involuntarily impressed into the British Navy when sailors were needed, it is not commonly known that civilians were also impressed to labor on public works. On May 3, 1755, a law was passed that allowed the impressments of ship and house carpenters for the building of bateaux (flatboats used on the river for the ferrying of animals and people). When Governor DeLancey in 1755 ordered bastions constructed between George Augustus' Royal Battery (called Copsy or Copsey Battery at that time) and the Flat Rock Battery, the Commissioner of Fortifications, John Dies, was ordered to impress workmen for the Fortifications. Battery Walls 3 and 4 were constructed at this time.

Finally, during the Revolutionary War, a military unit, the Black Pioneers, composed of escaped slaves from the south who joined the British army because they were promised freedom, were deployed to New York City where, among other key tasks, they provided labor and assisted the carpenters in building fortifications to defend the city against the rebellious Americans. It is evident that soldiers and civilian residents of New York City, free and enslaved, white, black and Native American, contributed to the construction of the military fortifications in New York City, including the Battery Walls found by the archaeologists.

The Revolutionary War had tremendous influence on the lives of free and enslaved persons of African descent. Wartime promises and expectations of freedom led thousands of slaves to flee to the British lines. Many achieved freedom in Nova Scotia and elsewhere after the British evacuated New York City. Others believed American promises that the new government would ensure their freedom if they served the patriot cause. They were grievously disappointed when General Washington worked to ensure their return to their previous owners and servitude.

3. IDENTIFYING ENVIRONMENTAL CONDITIONS

The initial research questions had included the possibility of using soil samples taken from levels beneath the Wall to conduct soil dating; however, during the analytical phase of the project, the geochemical consultant advised that this technique was not feasible with these types of soils, i.e. landfill (see **Appendix I**). However, soil samples from Walls 1 and 3, some from contexts beneath the Wall, were processed for both geochemical and phytolith analyses, providing data about soil types and environmental conditions over time in Battery Park.

Unfortunately, no original ground surface was identified in the soils on the landward side of the Wall; therefore, soil deposits were not available to examine data about environmental conditions at the time of construction. Nevertheless, pollen present in samples taken from above the level of the truncated Battery Wall tells us the trees growing on the Battery after 1790 included oak, hickory, and chestnut. Phytolith analysis of those deposits revealed the presence of grasses indicative of pasture or lawn at levels above the Wall and, as expected, little growth adjacent to the Wall on the waterside.

Phytolith analysis of a complete column of soil from Wall 3 also provided some environmental indicators, in addition to identifying the estuarine environment at the base of the column. Although there was significant variation among the samples within the column, cool season grasses dominated. The upper levels indicated a disturbed context, such as fill. This analysis also helped establish an elevation for the transition from alluvium to terrestrial soils at approximately nine feet below sea level.

The geochemical analysis of the deposits from beneath Wall 3 provided the most telling evidence of the condition of the soils at the time of construction. This analysis showed that similar deposits from similar elevations in close proximity to one another contained two different types of chemical signatures. The EU 29 Stratum 7 soil (along the landward side of Wall 3) was characterized as estuarine whereas the EU 30 Stratum 7 soil (east of the counterfort on the landward side of Wall 3) was brackish fill (fill material deposited in brackish water). Because these two types are similar, this could be a physical indication that some of the fill had already been placed in the estuary, something we also know from the historic documents.

Soil samples from levels beneath Wall 3 also revealed a wetland or estuary environment. The presence of wetland-type soil only a short distance away from fill deposited in brackish water indicates that the drop-off toward the water seen in the historic topography was not so sharp as to preclude the growth of vegetation. Seeds recovered from flotation of excavation unit contexts adjacent to and beneath the Wall are not related to the historic natural environment, but rather to the fill. They are possible indicators of not only industrial-scale refuse disposal but also of pre-Wall use of the shore.

The geochemical analysis of the sample from beneath Wall 1 (EU 18 Stratum 2 Level 1) had a chemical signature similar to fill samples from other parts of the site, leading to the conclusion that fill was added to the surface of the bedrock upon which Wall 1 was built, probably to create a level surface. The deposit beneath Wall 1 was not conducive to the preservation of phytoliths, possibly because of the nature of the fill used.

Different sections of the Wall were built on different foundation materials, as noted above, which is also informative about the environment and topography during the time of construction. The field data corroborated what was known from the historic data. Bedrock was used as a foundation when it was nearest the ground surface (Walls 1 and 2 and, earlier, Jacob Leisler's Half-Moon Battery). Boulders and large cobbles were likely present in the area of the then offshore Copsey Rocks and conveniently used as a foundation for Wall 3. Many large water-worn boulders were apparently used either as a foundation or to stabilize this section of the Wall. It is also possible some of these stones may be the result of fill that had been added to the exterior of an earlier manifestation of the Battery (see **Chapter 4: A.7. Additional Work at the Battery – 1738-1739**). In 1739, orders were given "to cause a sufficient quantity of large Stones to be laid around the outside of the Battery, somewhat higher than the lower part of the framework to secure the foundation" (New York State 1894, III: 14-15). Although Wall 3 was built 20 years later, it is possible a similar method was used to secure the foundation or that some of those earlier stones were still present.

It is also possible there was a sand bar in the area and it was used as a foundation to build Wall 4. As previously noted, a French map dating circa 1693 indicates that a sand bar was present at the foot of the Battery, west of Whitehall (see **Figure 4.8**). However, sand bars are notoriously transitory; this sand bar is not illustrated on any other map of the time period and the French map is known to be an inaccurate representation of lower Manhattan. Nevertheless, sand was undoubtedly present along the shoreline in the area and easily accessible.

During the initial excavations of Wall 1, the soils to the north of the Wall were observed to be different from those to the south and it was presumed that the northern soils represented the landward side and the southern, the waterside. While it is true that the northern side of the Wall is the landward side and the southern the waterside, there does not appear to be any difference in the soils. The initial impression is likely more a factor of the topography and the natural accumulation of fill from high to low ground.

Environmental conditions at the time of the destruction of the Wall can be evaluated through the identification of phytoliths. Phytolith analysis revealed the environment generally supported cool weather grasses; a drier environment was indicated at upper levels with wetland characteristics at lower levels. Such conditions were expected since the samples were part of the fill.

4. ESTABLISHING THE TIMELINE OF DESTRUCTION, DISMANTLING AND BURIAL

An unpublished map in the British National Archives dated 1782, when the city was a British garrison, is the only extant map illustrating the Fort devoid of one of its walls (see **Figure 4.19**). When General George Washington came to the unhappy conclusion that Lower Manhattan could not be held against superior British forces, he ordered the northeast and northwest bastions of Fort George facing Broadway torn down so the British could not use the Fort against the city.

In June 1789, the city wrested control of the land at the Battery, Fort, and Governors Island from the state. The Legislature adopted a resolution "that the ground upon which the Fort stood should be reserved for public use, and that a house for the use of the President of the United States should be erected upon part of it" (Smith 1972: 21-22). State funds were used to remove the part of the Fort that obstructed Broadway and to erect bulkheads from approximately Battery Place to the Flat Rock[3]. These bulkheads would "receive the dirt from the Fort and thus enlarge the area of the Battery" (Ibid). In addition, the Lower Barracks and other buildings on the Battery were to be demolished. Some of the materials from the Barracks were used to build a

[3] The Flat Rock was approximately on a line with Stone Street if the street had extended into Battery Park.

new Watch House in front of City Hall[4] but the rest was likely used to fill in the Battery and State (Copsey) Street. In 1790, the New York City Common Council applied to the state legislature for funds with which "to effect the compleat removal of the Earth, & Stone & leveling the Ground at the Fort & Battery so as to accommodate the Building to be erected there for the use of the Government and also to continue the Wharf or Bulkhead, in the River, to the Corner of the Battery at Whitehall Slip" (NYCC 1917 I: 833). An Act of the State Legislature that same year officially marked the establishment of the Battery as a park space (Stokes 1967, I: 417). The stone from the Fort was used for the foundations of the Government House whose cornerstone was laid on May 21, 1790 (Ibid), while the earth was used for filling in the adjoining Battery Park (Andrews 1901: 20) (see **Figure 4.21**).

Various episodes of filling took place after the Battery Wall was truncated in 1790. The archaeological data indicates this was a complex process with fill potentially coming from numerous sources. No discrete fill episodes were detectible. However, most of the fill was deposited by the mid-1890s and contained many artifacts with beginning manufacturing dates in the mid- to late-19th century. It was concluded in **Chapter 5: A.8.b. Pollen and Phytolith Analysis** that the filling after the destruction of Wall 1 was relatively rapid.

The depositional sequence for Battery Park, once the Walls were demolished is both simple and complex. The Battery Wall was destroyed by truncating it to the level which was found by the archaeologists, approximately 10 feet below ground surface as shown on **Figure 5.137**. Walls 1 and 2 were found roughly resting at sea level, while the remains of Wall 3 straddled sea level and the Wall 4 archaeological remains were found entirely below sea level (**see Table 5-1**). The area was subsequently filled but over the years, the fill was churned and augmented and churned again, an unknown number of times. That simple process has created a complex deposit which at first appears chaotic, but analysis has shown that the bulk of the fill covering the Wall segments was from prior to 1900. The subsequent additions over time were a result of Park-related work and large-scale construction projects including the elevated railway, the Brooklyn Battery Tunnel, and two different subway lines.

Dendrochronological analysis of logs related to the expansion of the shoreline in Battery Park tells us the trees used to build the landfill-retaining structures were cut in 1788, confirming the time frame of destruction and subsequent filling as circa 1790. As stated directly above, one definite source of fill in 1790 was the soil and demolition debris from the Fort and included the substantial mound of earth the Fort sat upon as well as materials from the Fort itself. The sources of later fill are unknown; as the Park expanded, filling took place throughout the 19th and even into the 20th century (see **Chapter 4: A.17. Continued Improvements at the Battery**).

In the field, the soils on top of the truncated Battery Wall at both Walls 1 and 3 appeared to be different in profile from those adjacent to the Wall. Stratigraphic analysis indicates these locations sloped toward the water. Topography of the bedrock at Wall 1 was generally a downward slope toward the southwest in the direction of the water. This was originally noted in the soil boring bedrock data and then observed in the profile of the cross-section of the Wall in Archaeological Test Trench ET 1. The slope would have been a factor in the accretion of soil, both water born and from fill, leading to the speculation that there was a different fill episode above the Wall from that adjacent to it. However, a large variety of soil types was represented, most of which derived from fill. This variety was also seen in the artifacts recovered from the

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[4] City Hall was located at Broad and Wall Streets at that time.

units excavated along the waterside of Walls 1 and 3. The southern side of Wall 3 also contained some water-born deposits that were a mix of natural soils and fill from which many soft-shell clam and whelks were recovered. Wall 1 was associated with a similar kind of filling, but with less accumulation because of the high bedrock in that area. Although there was no bedrock present at the base of Wall 3, there was a tendency of a downward slope toward the water.

B. WHITEHALL SLIP

Research questions for Whitehall Slip centered around four themes, with the first two similar to the research goals developed for the Battery Wall: 1) understanding construction materials and techniques, 2) establishing the timeline of construction of the Slip, 3) establishing the timeline of filling, and 4) understanding the fill. Specific research questions can be found in **Chapter 3: Statement of Research Questions**.

1. UNDERSTANDING CONSTRUCTION MATERIALS AND TECHNIQUES

The western side of Whitehall Slip was excavated as part of the South Ferry Terminal project. When completed, the excavated remains of Whitehall Slip measured over 200 feet long and up to 60 feet wide. The Slip was predominantly log construction made of logs kept in the round with bark intact, although there were a few square-cut logs toward the southern part of the excavation. The log forms included both grillage and cribbing blocks, but the grillage was found only in the northern sections of the Whitehall Slip excavations. Large aggregate fill and refuse was contained throughout all log forms. The Whitehall Slip area also contained a masonry wall in a line with the head of the Slip, likely part of a bulkhead. This wall was one stone thick with most of the stones being schist, the local bedrock. The landward side of that wall contained rubble stone fill.

The Whitehall Slip cribbing blocks generally contained multiple cells, although none was exposed in its entirety at any one time during the South Ferry Terminal excavations. All logs were horizontal and stacked perpendicular by courses. Between three to six courses were present, however most portions contained four courses. The top of the Slip was encountered at a depth of approximately 6.3 to 8.3 feet below ground surface (elevation 1.3 to 2.9 feet below sea level). The base of the Slip structure was generally another six feet below that.

Many of the logs used to build the Slip exhibited wedge-shaped ends, likely where the trees were felled. The wood throughout was predominantly pitch pine; however the frequency of other wood types increased toward the south. Other types included white pine, eastern hemlock, and oak. As illustrated in **Table 7-1**, WHS A samples were exclusively pitch pine, but no pitch pine was among the WHS C samples. Eastern Hemlock was only present in the WHS C samples and oak only in WHS B.

Table 7-1
Number of Types of Wood Samples by Analytical Unit

AU	Pitch Pine	White Pine	Eastern Hemlock	Oak
WHS A	7	-	-	-
WHS B	3	3	-	1
WHS C	-	4	3	-
WHS D	2	2	-	-

The predominant use of pine in the construction of Whitehall Slip is consistent with wharf construction as documented at archaeological sites in New York and elsewhere in the United States (see **Chapter 4: C.5. Landfill-Retaining Structures Documented in Previous Archeological Excavations).** Pitch pine in particular can grow in poorer soil, but both pitch and white pine grow relatively fast and were, and still are, ubiquitous in the Northeast, making them readily available to the builders of Whitehall Slip. It is possible these woods were chosen, at least in part, because of their resistance to marine borers, but this is not certain. While the behavior of marine borers would have been known in the 18th century, it cannot be determined if this knowledge was applied to the Whitehall Slip wood choices in particular.

No evidence of any preservative was found on the logs themselves or in the surrounding soils, which were generally characterized as silts. The logs were in very good condition, due to their submersion in water and consequent lack of oxygen or anaerobic conditions. No destruction by shipworms or other biological agents was noted by the wood analyst, although the archaeologists noted some worm-eaten logs in WHS B (see **Chapter 5: B.5.b. WHS B** and **Appendix H)**.

Dendrochronological analysis also included identification of the source region of the forests from which these trees may have been cut. The pitch pine samples were likely procured from the Albany area. The other types were from the areas of Lake Placid and New Paltz, New York. It is also possible some of the trees came from New Jersey. In general, the logs appear to have been used specifically for the construction of Whitehall Slip. However, several unmatched notches were documented in WHS C. These could be an indicator of reuse, but could also be the result of logs shifting after construction or even of repair. The evidence is inconclusive.

Wooden planks found during the initial excavations were merely part of the fill, but other planks were later unearthed which formed a drain in the stone wall found in line with the head of the Slip (see **Figure 5.69**). Samples of these drain planks were subjected to dendrochronological analysis. Two were pitch pine and two were white pine. None had the bark edge present and therefore absolute dates of death could not be established. However, one white pine sample had a growth ring for the year 1739 and one of the pitch pine samples had the 1740 growth ring. These dates are several years beyond the initial construction date of the Slip. Therefore, it seems most likely the drain was added as an improvement sometime after that section of the Slip was built circa 1734.

Several different types of landfill-retaining structures were encountered at Whitehall Slip. One of those consisted of log-construction cribbing blocks divided into multiple cells. In some cases, these structures had timber floors and, in one case (WHS B) the cribbing featured possible vertical lock bars that may have been notched into the lower courses of timber. Log-construction cribbing blocks are one of the most common types of landfill-retaining structures found at other 18th and early-19th century Manhattan archaeological sites. The use of timber platform floors is also not uncommon, as, for example, at the mid-18th century Van Cortlandt/Berrien Wharf at the Telco Block (Soil Systems 1983a). Vertical lock bars are slightly less common; however, they were documented at two Manhattan sites: Site 1 of the Washington Street Urban Renewal Area (LBA 1987a) and the Bowne-Byvanck Wharf at the Telco Block (Soil Systems 1983a). As noted in **Chapter 4: C.5.b.1. Finnegarden 3a and 6a, Bergen, Norway**, vertical lock bars have also been found in medieval log-construction crib wharves in Scandinavia.

Grillage complexes were also encountered at Whitehall Slip. This form of log construction has been less frequently documented in previous archaeological excavations. Grillage complexes dating to the mid-18th century were encountered at the 175 Water Street site in Manhattan (Soil

Systems 1983b) and an 18th-century grillage feature was also documented at the SUCF Parking Structure Site in Albany (Hartgen 2002).

In addition to the log-construction crib and grillage forms, a stone retaining wall was noted in line with the head of Whitehall Slip. This is likely a bulkhead type of wall. A similar wall, perhaps even part of the same construction episode, was found during the General South Ferry Terminal excavation less than 50 feet to the west.

In WHS B, a series of small tightly packed timbers of small scantling were encountered. Due to disturbance, the original extent and function of the component could not be ascertained. However, the collection of logs may have been used as fill material or as part of a construction platform. Previous archaeological excavations in Manhattan do not appear to have documented similar features. However, the deposit may be similar to the timber "ricking" documented at the SUCF Parking Structure Site in Albany.

Two triangular timber-framed features were also noted at Whitehall Slip (WHS B and WHS C). It was not clear whether these features were constructed as part of a landfill-retaining structure or were merely part of the fill itself. The features may have been part of a narrow timber-framed building. Based on a review of previous archaeological excavations in the United States, no references have been found to similar features.

Many types of joinery were identified as part of the Whitehall Slip, including scarf joints, saddle notches and lap joints. Scarf joints were the only joint type documented in the northern part of the excavations (WHS A). Corner saddle notches were more prevalent in the southern parts of the excavation area, from WHS B southward. Only WHS C and WHS D had logs with square notches. A possible vertical lock bar was documented in WHS B, as well as a vertical square notch. However the two were not directly related. No other joint types were identified.

Cleaning and dredging of the Slip during its existence was recorded in the historic documents (see **Chapter 4: B.7. Filling in Whitehall Slip**) but the extent of any excavation and/or dredging needed to construct the Slip could not be determined from either the historic record, field results, or the artifact analysis. Inconsistencies in the artifact TPQs, however, support the conclusion that dredging did take place after the Slip was built. The first recorded instance of the cleansing or dredging of Whitehall Slip was in 1753 (NYCC 1905, V: 393), another episode took place in 1760 (NYCC 1905, VI: 218), and on March 20, 1797, the Common Council ordered Whitehall Slip "dug out" and deepened (NYCC 1917, II: 331). Additional dredging episodes occurred throughout the 18th century and a mud or dock drudge purchased by the city in 1791 allowed public slips to be cleaned more effectively. (NYCC 1917, II: 33, 399-400)

2. ESTABLISHING THE TIMELINE OF CONSTRUCTION

The South Ferry Terminal project was successful in establishing dates of construction of Whitehall Slip. The west side of Whitehall Slip, (the portion excavated during the South Ferry Terminal project), was initially formed during construction of George Augustus' Royal Battery in 1734/35. Historic documents and maps indicate this battery was built to replace the earlier Whitehall Battery at the foot of the west side of Whitehall Street. George Augustus' Royal Battery extended farther into the river and some landfilling was undertaken in conjunction with this development project (see **Figure 4.11)**. The east side of Whitehall Slip was formed as the result of landfilling that began in 1734 and which extended the shoreline along the east side of Whitehall Street out into the East River (see **Figure 4.35**). These construction episodes, one military and one commercial, formed an inlet or slip, called Whitehall Slip (see **Chapter 4:B.2.**

The Creation of Whitehall Slip). City records verify that Whitehall Slip was first constructed in 1734/5. The documentary evidence is corroborated by the dendrochronological analysis, which assumes the Slip would have been constructed soon after the trees were cut, possibly the year following the final growth ring present. Three distinct episodes of construction were found: 1734/5, 1785/6, and 1796/7 (see **Table 5-13**).

Modification of the original Slip took place as the shoreline evolved. The three construction episodes identified via dendrochronology can be applied to specific sections of Whitehall Slip. **Figure 5.136** depicts the WHS analytical units with the location of the three construction episodes clearly delineated. WHS A and the northern part of WHS B were built from trees cut circa 1734. The southern portion of WHS B and part of WHS C were constructed from trees cut circa 1785 and part of WHS C and all of WHS D with trees cut circa 1796.

Historical documents indicate that many improvements to the Slip took place. Most were in the form of repairs to the wharves and ferry stairs after storms, the construction of new bulkheads and piers for the ferries, and the construction of ferry or commercial support structures such as baggage and waiting rooms, toll houses, ferry bridges, and newspaper offices. In fact, the construction of a bulkhead may explain the post-1734 date for the wood used in the drain of the stone wall found in line with the head of the Slip.

In 1785, the docks and ferry stairs associated with the Staten Island Ferry were badly damaged in a winter storm. In 1801 a new pier was constructed from the inner part of Whitehall Slip into the River alongside the Battery, outside of the South Ferry Terminal project corridor. This pier was constructed for the use of the Staten Island and Elizabethtown ferries. In 1805, the ferry stairs along the east side of the Slip were moved to the end of the Slip. By 1805, 20 to 30 small ferry boats were using Whitehall Slip, in addition to hay and manure boats and “prize” vessels that tied up at the Slip. In 1816, a portion of land under water between the Battery and the west pier of Whitehall Slip was set aside for a steamboat wharf. Several ferry bridges were also constructed for the landing of passengers and animals. A toll house was constructed alongside one of the bridges and a 10-foot piece of the Battery was “taken off” and thrown open to the dock (NYCC 1917, VIII: 740). A bulkhead was sunk from the southwest corner of the Battery to the west pier of Whitehall Slip. This triangular piece of ground was filled up with earth and used as a carriage stand. It was not clear if this particular bulkhead was within the project area, as the maps provide conflicting information. However, the field data indicates this parcel was not part of the Whitehall Slip excavations since the most recent logs analyzed were cut in 1796.

3. ESTABLISHING THE TIMELINE OF FILLING

In 1820, ferry owners complained that the city had not made repairs to the L-shaped pier at the foot of the Battery and another short pier to the east of the Battery. The city had also promised to widen the shipping lane between the Battery and Whitehall Slip. In 1822, a bulkhead was constructed at Whitehall Slip adjoining Pier No. 1 (the L-shaped pier outside of the project area) and the “middle Pier” at the center of the Slip (within the project area). In 1823, ferry owners of the steamboat *Atlanta*, which was to provide service to Staten Island and Elizabeth, extended the bulkhead and constructed one or two small structures to store baggage. Additional buildings were constructed in 1828-1830. In 1835, the ferry landings were improved and the ferry facilities at the Slip were enlarged in the mid-19th century. Proposed changes in 1845 included straightening the bulkheads between the piers and constructing new ferry support structures on the piers.

Historical documentation concerning the filling of Whitehall Slip provides a basis for interpreting time frames, but, because of the questionable accuracy of historic maps and their lack of detail for the periods in question, the locations of various fill episodes are not entirely clear (see **Chapter 4: B.7. Filling in Whitehall Slip**). Eighteenth century cartographers and surveyors gave Whitehall Slip short shrift. The earliest reference to filling in the Slip occurred on November 13, 1772, when several freeholders and inhabitants living near the Slip petitioned the city for permission to fill it in (NYCC 1905, VII: 389). On April 27, 1774 the Common Council ordered the filling of Whitehall Slip to be completed as it had "become a very great Nusance [sic] to the Neighborhood" (NYCC 1905, VIII: 27-28). Documents indicate three major filling episodes occurred at the portion of Whitehall Slip within and adjacent to the South Ferry Terminal project corridor: circa 1788, 1801-1809, and prior to 1845. In 1845 plans were being made to fill in the Slip to the south side of South Street (south of and beyond the South Ferry Terminal excavations), a process completed in 1848 or 1849.

To identify locations and dates of various fill episodes, TPQs were sought from contexts associated with the various log structures or in between the logs of the crib/grillage structures at different locations. The artifact data provides support for the dates identified in the historical record. The field data provides the previously elusive locations for these fill episodes. Fill dates by location are depicted in graphic form on **Figure 5.136**. The northernmost part of Whitehall Slip contains deposits with a TPQ of 1775, the central portion has a TPQ of 1795, and the TPQ from the southernmost part of Whitehall Slip is 1840.

While it has been possible to identify three fill episodes and their locations within the structures that comprised the sides of the Slip, the South Ferry Terminal project corridor did not contain evidence of the method or techniques used to fill the Slip. This is because the former navigable interior of the Slip is located outside of the project corridor. Despite this fact, it is interesting that fill associated with those three massive filling projects was found within the structures earlier used to create the western side of the Slip. While we may never know for certain, it is possible that during the useful life of the Slip there were sizable gaps in the log forms that comprised the west side of Whitehall Slip. When the Slip was ultimately filled in, additional landfill was needed in those locations. The cause of the apparent migration of fill materials between the interior of the Slip and the structures forming the sides of the Slip could also be attributed to tidal action. Similar findings about fill migration have been documented at Burling Slip (Molly McDonald, pers. comm. 2010).

4. UNDERSTANDING THE FILL

The Whitehall Slip fill was a combination of large aggregate and refuse. The aggregate was generally composed of cobbles but also contained some cut stone. There was no marked difference in the amount of refuse found in the fill based on location relative to Whitehall Slip. Many factors resulted in the identification of virtually no distinctive soils being found horizontally across the Whitehall Slip site. These include the very nature of the fill itself, as well as the intrusion of modern disturbances, and excavation methods, to name a few. Excavations at Whitehall Slip relied on physical separation of collected cultural material to ascribe meaning to the fill. Ultimately, this was successful in enabling the project goals to be met: understanding construction materials and techniques, as well as establishing the timeline of construction and filling at specific locations within the Slip. Additionally, individual contexts have provided insight into materials found in the fill and identification of information about commerce has also been productive.

The refuse contained a wide variety of cultural material from building demolition debris to personal items. The building demolition debris included numerous pieces of brick, mortar, and plaster as well as window glass, roofing tile fragments, and pieces of drainpipes made of various materials. The personal artifacts were comprised mainly of shoe parts and smoking pipe fragments. Both of these types of items could have been part of redeposited domestic refuse, as were the pieces of table- and teawares and food preparation vessels found in the fill. No specific household or households can be identified as the source(s) of these artifacts.

The sources of the fill used in the Slip were varied. Based on documents, sources of fill included soil, domestic and commercial trash, and remains of burned and demolished buildings, as well as every type of filth imaginable, including the carcasses of dead animals. The artifacts that survived their deposition in the Slip were derived from demolition debris, commercial refuse, and domestic garbage. The demolition debris could have come from any area of the city, although it is likely that it came from fairly near the site, as the effort to transport such heavy materials would have been considerable. The commercial refuse had several sources. An earthenware importer/dealer or a ship's factor (the agent responsible for the cargo on a merchant vessel) could have directed the disposal of the pearlware vessels. Commercial food processors were the source of the oyster shell, coffee beans, cherry pits, and sugar molds. The domestic garbage apparently came from multiple sources: manufacturing date ranges were varied (from the 17th through the 19th centuries) and many more vessels were present than would be expected from a single household or even several households.

When the research questions were originally postulated, it was considered a possibility that artifacts related to shipbuilding might be recovered. Hunt's Shipyard was located at the foot of Whitehall Street in the early-18th century (see **Figure 4.10**) and, although just north of the project corridor, it was thought that artifacts associated with the shipyard might be present in the fill. However, no artifacts that could be linked to shipbuilding or shipyards were identified. If such artifacts were originally deposited as part of the fill, they did not survive their time in the ground. Organic materials, such as rope or cloth, were not preserved in the Slip fill and most of the recovered metal artifacts, particularly those made of iron, were badly corroded and had lost their shapes and identities. In addition, no shipyard-related features were present in the Whitehall Slip excavations, although two triangular timber-framed features that could represent a shed roof were found. The shed would have measured twenty-one feet long and seven feet wide. However, even if these were part of an *in situ* structure formerly located along the Slip, there is no evidence they are related to a shipyard.

a. COMMERCE IN NEW YORK CITY

The largest category of artifacts found in the fill of Whitehall Slip was English-made refined earthenwares: pearlware teacups, saucers, and bowls. These vessels, described in **Chapter 6: E.3. WHS C** and **E.4. WHS D** were a commercial rather than a domestic deposit. They were deposited as a group, based on their physical proximity to each other in the ground; they show no signs of use-wear; and there is a high degree of redundancy in their decorations (i.e. the same pattern is seen on multiple vessels). These vessels were probably broken in transit, either during their Atlantic voyage or in the process of moving them from the ship that brought them to New York to the place where they were to be sold. Many merchants had their shops or auction rooms in the area of the docks and these damaged goods were disposed of in what was probably a convenient near-by location.

A large amount of oyster shell was in the Slip fill, notably in a layer approximately eight feet long and three feet thick near decking column C10 (see **Figure 5.65**). This shell was probably commercial detritus from an eatery (a tavern or a large oyster stand) or from processing oysters for preservation. During the 18th and 19th centuries, New York's bounty of oysters was smoked and/or pickled and packed in ceramic jars or other containers for export to oyster-poor locations, an activity that generated considerable amounts of shell waste, some deposited in this location.

Commercial processing of other types of food was evident in another deposit from the Slip area, as a layer of charred coffee beans in WHS D. Over 400 coffee beans were collected as a sample from this layer along with a sample of almost 1,300 black cherry pits. The coffee beans were evidently over-roasted and discarded as unusable; the cherry pits were the remains left after extracting cherry juice for processing, possibly into jelly or wine (the fruit's skins would have been discarded with the pits but the skins decomposed). Both coffee bean roasting and fruit processing were likely to have taken place in the neighborhood. In addition to these organic remains, sherds from several sugar molds and two syrup jars were in the Slip fill, providing evidence for another commercial food processing activity, i.e. sugar refining.

During the colonial period, major pipemaking centers were located in Amsterdam and Gouda in the Netherlands and London, Bristol, Chester and Liverpool in England. The clay tobacco pipes recovered at the South Ferry Terminal site indicated that New York merchants were trading with each of these cities. Many pipes appeared to be "seconds" or of a lesser quality. There was no indication the pipes were locally made, suggesting that pipemakers and merchants were dumping inferior goods on the colonial market.

C. GENERAL SOUTH FERRY

Features documented during the General South Ferry site excavation monitoring include landfill-retaining structures in Battery Park that date circa 1790, possible remains of the Battery Pond (circa 1734 to circa 1773), and part of a stone wall that may have been related to Whitehall Slip and/or an early bulkhead. Three late-18th through early-19th century shell deposits were also examined during the General South Ferry excavations, providing a time frame for these omnipresent deposits found at archaeological sites throughout lower Manhattan. Many previously documented elevated railway footings and brick and metal features related to the street cars that terminated at South Ferry in the late-19th century were also identified. No specific research questions for the General South Ferry excavations had been established prior to construction. The ARMP (Archaeological Resource Management Plan), as is standard archaeological practice, states that research question be developed for data recoveries only. During the analysis phase, however, a few research questions were formulated, similar in nature to those posed for the Battery Wall and Whitehall Slip (see **Chapter 3: Statement of Research Questions**).

1. UNDERSTANDING FILL AND HISTORIC TOPOGRAPHY

Analyses have been conducted to determine if specific soil types could be associated with a particular fill episode or period of filling. It was not possible to identify specific fill episodes or sources of fill through the analysis of the data from the general excavation monitoring of the South Ferry Terminal project. Once the fill had been added, it had been subjected to so much additional disturbance related to projects such as Battery Park maintenance, construction and demolition of the elevated railway and trolley tracks, utility work, and construction of the earlier subway lines, that any fill patterns which may have once existed have long since been obscured.

Although no specific fill episodes or patterns among soil types were identified, the deposits found in Peter Minuit Plaza at the Fan Plant Sheeted Pits and within Archaeological Test Trench ET 5, were determined to be related to the filling of the Battery Pond. Strata within the Fan Plant Sheeted Pits, at the southern end of the South Ferry Terminal project corridor, exhibited a chronology of cultural material culminating with a deposit near the base of the excavation that has a TPQ of 1740. This is also the TPQ for ET 5. This is not inconsistent with the date for completion of the filling of the Battery Pond in 1773, as presented in **Chapter 4:A.6.b. The Pond.** Concentrations of certain types of fill material were noted in the field. Post-field analysis has examined the validity of these observations and looked for patterns within the broader context of the site. Such field-observed possible deposits included those containing exclusively 17th-century artifacts, brick contexts, demolition debris, burned contexts, and oyster shell concentrations. In the end, the analysis showed that there were no exclusively 17th-century contexts and that the contexts containing large amounts of brick, demolition debris, or burned material had no pattern within the fill of the site.

The reason(s) for the dense oyster shell layers found in the South Ferry fill have not been definitively determined. Dense oyster shell concentrations found in historic period deposits at locations elsewhere in Lower Manhattan have been somewhat of an enigma to archaeologists. Some deposits, such as those found at the lowest levels in the Seven Hanover Square excavations, were probably riverine beds covered over by landfill (Rothschild and Pickman 1990). Others were more likely to have been remains of oysters eaten locally or preserved for export. While the oyster industry and oyster eating habits of New Yorkers have been well documented, it is not clear if the archaeological remains are merely the detritus of meals and food preservation or if they represent the reuse of shell for another purpose such as pavement. Very little cultural material has been found within the shell layers excavated elsewhere, as is the case here. The artifacts recovered from the South Ferry Terminal project shell deposits collectively date from the mid-18th through the early-19th centuries with a TPQ of 1775. No additional research or documentation was found that could help clarify the purpose(s) of the shell deposits, if there were any beyond the simple purpose of garbage disposal.

Original soil deposits were identified only within southern Battery Place. This may have been the result of several factors unique to Battery Place: the bedrock is relatively shallow and portions of this area of the site consisted of fast land while other portions were filled relatively early in the 18th century and then paved over. However, natural glacial and marine deposits were found at lower levels throughout the corridor. The basal elevations of the four sections of Battery Wall provide a good indication of the relative position of the soils at the time of original construction and hence of the original topography of the area. While it is possible the original construction involved some excavation of soil or addition of fill material to create a level surface to build upon, it is logical to conclude such soil movements would have been minimal. The reasoning varies by location. At Walls 1 and 2, the Battery was constructed nearly directly on top of the bedrock. With bedrock so close to the surface, even if not directly exposed, there would have been nothing, or next to nothing, left to excavate and very little reason to add soil or fill. At Walls 3 and 4, the bedrock was deeply buried. The Commissioners of Fortifications would probably have been aware of this, being mostly local individuals, and would have made no attempt to construct directly on the deeply buried bedrock. The foundation of Wall 3 consisted of water-worn cobbles and boulders. The rocky shore documented in **Chapter 4: A.2. The Early Batteries** is the most likely candidate for the source, although stone was also brought in from elsewhere during various 18th-century-repairs of the Battery (see **Chapter 4: A.9. The Flat Rock Battery**). However, it is also possible some of the stone was included in fill brought in some years earlier to fill in space on the exterior of the previous incarnation of the Battery. Archaeologists noted that some of the boulders beneath Wall 3 were quite large and others smaller and more easily moved. This section of the Wall seems to have been constructed most expeditiously and therefore minimal excavation or movement of existing stone would have been expected. Wall 4 had a sand foundation. The stratigraphy documented at levels directly beneath the Wall indicates that while sand was present, the deposit directly beneath the Wall was either brought to that location to make a level base for building the Wall or the *in situ* sand was made level and then became darker and grayer over time due to either moisture related to its position directly beneath the Wall stones or from decayed and washed out mortar that would once have been present.

a. UTILITY OF ARTIFACT INFORMATION FROM FILL

In the same way that artifacts collected from the plow zone on a rural site can give broad date ranges and can include artifact types not found in controlled excavations, artifacts from fill contexts can provide information about a site, even when, as was the case during monitoring excavations of the fill in the South Ferry Terminal project corridor, artifact collection has been opportunistic and sampling not uniform. The quantity of artifacts recovered from one area of the Corridor is not necessarily comparable to another. Larger numbers of artifacts were recovered from contractor's backdirt early in the project compared to later excavations because the contractor began work at the site, within Peter Minuit Plaza, prior to having a carting subcontractor in place. Initially, excavated soil was placed in large backdirt piles accessible to the archaeologists to pick through. Later, excavated soil was placed directly in large dump trucks to be carted away without the opportunity for the archaeologists to examine it. Not only did this result in more artifacts being collected initially, but also in the differential collection of artifacts with earlier manufacture dates. Although these were not ideal situations for collecting representative samples of artifacts from fill, the artifacts collected did provide chronological data and did help to characterize the types of fill present.

In addition to contributing to chronological and fill type analyses, some artifacts from the fill were unique or were collected from what appeared to be discrete deposits. Two groups of circa 1805-1835 blue transfer-printed refined earthenwares within Peter Minuit Plaza (PMP) and the Cobblestone Area/Coast Guard Access Road (CCG) were particularly interesting. The vessels from the PMP area were made of pearlware and included both the small sherd with the "Chancellor Livingston" steamboat pattern (**Figure 6.31B**) and the large sherd from a platter with the flamboyant "Kaskerat" pattern (**Figure 6.32A**) as well as sherds from a number of other blue-printed tea and table vessels and embossed-rim plates. The vessels from CCG (**Figures 6.34B through 6.35A**) were printed pearlwares and bone china (a type of porcelain made in Great Britain); many, including the bone china cup and saucers, had printed patterns in very dark blue, a style popular between 1818 and 1835. Both of these deposits might have come from single households.

Unique artifacts collected from fill contexts include types not found elsewhere in the project area: for household goods, sherds of French brown faience, Iberian- or Mexican-made maiolica, a foot from an iron cooking pot; and a Dutch-style ring handle from a vessel that appears to have been made from local red earthenware clay. Distinctive smoking pipes from the 17th century were also found in the fill, including an EB pipe and stems with rouletted decoration, along with later pipes from known makers, such as William Morgan (1767-1796) from Liverpool and a pipe made between 1833 and 1865 in Gouda, probably by a member of the Prince family. Some unique fauna specimens were found only in the fill, namely bones from a brown rat, and pheasant bones.

Some exhibit-worthy artifacts were also recovered from monitoring, in particular the late-19th and 20th-century whole bottles and some tin-glazed tiles. While recovering artifacts for exhibits is generally not a research goal for an archaeological project, it is nevertheless an important part of cultural resource management archaeology, as artifacts do much to inform and interest the public.

D. EVALUATION OF ARCHAEOLOGICAL PLANS AND FIELD METHODS USED FOR THE SOUTH FERRY TERMINAL PROJECT

Based on what has been presented thus far in this report, South Ferry Terminal archaeological work was extremely successful. Two National Register of Historic Places eligible features were identified and placed within their historic context. The large number of recovered artifacts was analyzed providing meaning to the fill. Landfill-retaining structures were documented, described, and compared to other examples resulting in a recommendation for consistent terminology and recording for these features as identified within archaeological sites for this and future projects. Despite these achievements, there were some difficulties related to the plans, execution of the plans, and excavation methods used.

South Ferry Terminal was the first large New York City construction project where archaeological monitoring was used exclusively as the field technique for identification of potentially significant resources. This was considered controversial by some from the very beginning of the planning stages of the South Ferry Terminal project. This report would be remiss if it did not present a discussion of the validity of this technique and its success at fulfilling the requirements of the Programmatic Agreement.

Like the previous sections pertaining to the three South Ferry Terminal sites, questions were developed to organize the discussion (see **Chapter 3: Statement of Research Questions**). The answers to these questions are grouped into a summary of the plans and methods, an evaluation of their effectiveness, and, finally, suggested improvements.

1. SUMMARY OF PLANS AND METHODS

Work on the South Ferry Terminal project archaeological effort began long before any of the authors of this report were involved. The Louis Berger Group was responsible for conducting the Phase 1A archaeological documentation of the South Ferry Terminal project corridor and for drafting the ARMP (LBG 2003 & 2004). Robert Kuhn was the representative from the NYSHPO to the project at that time. Ajay Singh was the Chief Environmental Sustainability Officer at MTA Capital Program Management (MTACC) working on the South Ferry Project. Dewberry-Goodkind, Inc. was hired to implement the ARMP in the field. Shortly after Dewberry came on board and hired Linda Stone, RPA as Principal Investigator, Robert Kuhn left his position at NYSHPO and Douglas Mackey assumed those responsibilities for the project. After the field project ended, Linda Stone left Dewberry and Ajay Singh left MTACC. He was replaced with Audrey Heffernan. The contract for the completion of the analysis and reporting was awarded to AKRF who hired URS Corporation and Linda Stone, RPA as subconsultants (see **Chapter 1: History of the Project**).

The ARMP and Programmatic Agreement which guided the project, along with the Request for Proposal (RFP) and the Dewberry proposal, are discussed here. In order to provide more complete information on the development of the project prior to the involvement of the authors of this report, the Environmental Assessment (EA) was consulted **(**Appendix G: Agency Coordination and Correspondence: http://www.mta.info/capconstr/sft/documents/appendices/appendix_g.pdf), at the suggestion of LPC during the analysis and reporting phase of the South Ferry Terminal project. Here were found two sets of Meeting Notes regarding the development of the archaeological approach: one dated February 24, 2004 and the other April 1, 2004[5]. The February meeting was held at the MTACC offices and attended by seven representatives of MTACC, one from FTA, one from NYSHPO, one from LPC, as well as the MTACC consultant for transportation and planning design and two representatives from LBG, the archaeological consultant. The April meeting was held at the New York City Landmarks Preservation Commission offices and attended by seven representatives of MTACC, one from FTA, one from NYSHPO, four from LPC, one from LBG, as well as three representatives of the New York City Department of Parks and Recreation (NYCDPR), and two from the Battery Park Conservancy.

The February notes include a discussion of the inability to conduct pre-construction archaeological testing due to the tight project schedule, although MTACC did present an alternative whereby archaeological testing could have been conducted within Battery Park prior to construction and then backfilled. This approach was dismissed, however, because the MTACC Engineer explained the difficulties related to the need for shoring trenches and dewatering. MTACC indicated the construction contract would be design-build and could therefore be more flexible regarding potential archaeological findings. They stated the contractor bid documents would include “a list of pre-determined actions the contractor would need to take if resources were encountered.” The MTACC transportation and planning design consultant stated two different actions would be required of the contractor: what would be needed during construction and what would be needed should potentially significant archaeological resources be encountered. The NYSHPO stated monitoring during construction was not the ideal approach and mentioned several of the risks. According to the Meeting Notes, these included the possibility that the approach was in violation of Section 106 which requires that archaeological testing be performed during the planning process. An example of a case in another project was presented as a way to overcome this challenge to the South Ferry Terminal approach and it was decided to include appropriate language in the South Ferry Programmatic Agreement. Discussion about the potential for the fieldwork to become confrontational between the archaeologists and the contractor ensued and it was decided the contract needed specificity regarding who would have authority in what types of situations and how conflicts should be resolved. The NYSHPO stated “the archaeologist must have control of the schedule” and that detailed descriptions of how testing and monitoring would be conducted and how much time they would take, were necessary for the ARMP. Further discussion centered on the need to hire a construction contractor that had experience working with archaeologists and archaeological resources.

LPC stated the subject of the April meeting was “to discuss the risks and benefits with testing before construction” because it did not believe MTACC made a successful case at the February meeting. The point regarding limited pre-construction testing was belabored, as evidenced by multiple mentions in the Meeting Notes. MTACC persisted in its position, adding that the construction of a cut-off wall could only be done by the contractor during construction and

[5] Two LPC memos dated July 9 and August 4, 2004, and a letter dated September 3, 2004, outlined objections to the communications protocol.

therefore the archaeological work would have to be done during construction. The NYSHPO stressed that any archaeological findings during construction would result in project delays. The NYSHPO and LPC stated the ARMP must "reflect the appropriate course of action" and the contractor specifications must explain the "excavation restrictions" for work in archaeologically sensitive areas. The NYCDPR stated they were supportive of any approach recommended by LPC. NYSHPO, LPC and the Parks Department all asked to see drafts of the ARMP and contract specifications, and to have the opportunity to comment, prior to the actual contract bid, because all expressed concern the ARMP "may not be sufficient to protect archaeological resources." MTACC agreed to use "whatever excavation machines and methods may be needed for addressing potential archaeological issues" and stated the "contractor would always follow the suggestions of the MTACC engineers." LPC added that it "may be useful for the excavation contractor to work with an archaeologist during the time when the methods of construction excavation are being developed, to ensure that the approach is conducive to the project's archaeological sensitivity." By the end of this meeting, it was agreed archaeological work would be conducted during construction and monitoring would substitute for pre-construction testing with "close coordination" between the contractor and the archaeologist.

The ARMP was ultimately produced on July 23, 2004. However, there must have been some revisions on September 10, 2004 because the on-line version Glossary, Tables, and References possesses the later date[6]. The Programmatic Agreement was signed between July 28 and August 10, 2004. As discussed in the meetings, the ARMP specified monitoring during construction to identify potential archaeological resources. The document identified potential resources and depicted locations for expected findings where monitoring would be required, and also contained time frames for conducting various types of archaeological work. The ARMP also specified the size of scoops for backhoe buckets and the size of the buckets themselves. A communication protocol was also presented. This dictated the "archaeological consultant will communicate … directly to the NYCT engineer, who will then, in real time, advise the contractor…To ensure real-time communication among the contractor, NYCT Engineer and archaeological consultant, a NYCT Engineer will be assigned to inspect the same location concurrently with the archaeological consultant" (LBG 2004: 5). While not ideal, this plan was theoretically workable and the parties agreed to it with the exception of LPC who, as a consulting party, in memos (7/9/04, 8/4/04) and a letter to MTACC (9/3/04) strongly objected to the procedure (LPC 8/9/10). MTACC contracts require a single point of contact (the "NYCT Engineer") for communications with the contractor. Despite its objection, LPC was only a Consulting Party, therefore it was ultimately not LPC's decision to make. In order to cover incidences of disagreements that could arise, provisions for dispute resolutions that had been discussed in the meetings were also included in the ARMP. However, these were limited to disputes with the MTACC, "Since the archaeological consultant and contractor are not directly communicating with one another, disputes between these two parties would not occur" (LBG 2004: 7). Presumably to ensure the contractor understood the archaeological requirements, and to satisfy LPC's request to have the contractor work with an archaeologist during the time when their methods would be developed, the ARMP also required the contractor prepare a Cultural Resources Management Plan (CRMP) subject to review by MTACC, NYSHPO, and LPC.

The language in the Programmatic Agreement (PA), as opposed to that detailed in the ARMP, relates more to general principles. It was signed by the FTA, MTACC and NYSHPO. LPC is

[6] http://www.mta.info/capconstr/sft/documents/attach_c_armp.pdf

mentioned as a "consulting party" but is not a signatory to the PA. This document states, "All project activities and plans affecting Historic Properties are subject to consultation by SHPO, LPC and the Delaware Nation prior to MTACC approval" (FTA, et al 2004: 3). The General Requirements include having an archaeologist monitor "on-site, for all ground intrusive activities throughout the entire project corridor" (Ibid: 2). In addition, "an MTA Engineer will be assigned to inspect the same location concurrently" (Ibid). There is also a reference to "requirement to cooperate with the [archaeologist] … included in all design and construction contracts" (Ibid). Additional aspects of the fieldwork are also mentioned, including MTACC insuring adequate time is allotted for archaeological investigations and that these are handled appropriately. In addition to covering aspects of fieldwork, the PA also discusses what to do in the event of unexpected discoveries and how to handle the curation and reporting phase after the completion of the excavations.

These two documents, the ARMP and the PA, along with the Request for Proposal/Scope of Work (RFP) and its response, guided the project from the start of fieldwork. The "Description of Work to be Performed" in the RFP states the archaeological consultant "shall identify, develop and implement the necessary engineering and scientific methods, practices, procedures and resources to ensure conformance with the applicable requirements of the National Historic Preservation Act, New York State Historic Preservation Commission[7] and New York City Landmarks Preservation Commission" (MTA et al, 7/22/04:2). Although the document suggests work may take place at multiple locations simultaneously, the RFP states an average of only two archaeologists would be required at any time, for a total of 80 man hours per week with 10 additional archaeologists available within 24 hours notice. It also identifies categories of Additional Work Orders, should archaeological resources be identified, called "Type I" and "Type II" responses[8] (Ibid:4).

The successful proposal, prepared by Dewberry with Linda Stone, RPA, was based on drafts of the ARMP and PA and advised it would be "most prudent to have the selected team have final review/comment" of the ARMP and suggested alteration of the time frames for archaeological inspection and documentation (Dewberry 2004c: n.p). The proposal also made it clear that it was Dewberry's interpretation that they would be involved in preparing or providing advice on the development of the CRMP and that the contractor would prepare only the section pertaining to their excavation methods. The proposal also mentioned the use of the NYAC Monitoring Guidelines[9] as an important component of managing the archaeological work. According to the NYAC Monitoring Guidelines, "For projects in which monitoring is being proposed, a written protocol or monitoring plan should be prepared and agreed to by the consulting archaeologist, the review agency archaeologist, the undertaking agency representative, the developer (where applicable), and the construction contractor" (NYAC 2002: 1). In its description of monitoring, the proposal highlighted the lack of distinction between "monitoring" and "mechanically-assisted archaeological excavation" in the Draft ARMP and suggested this should be refined in the Monitoring Plan that would be developed for the South Ferry Terminal project (Dewberry 2004c: n.p.). The other key feature of the proposal is that it presented the plan to have the 80

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[7] The New York State Historic Preservation Office.

[8] These "Type" responses are not predefined archaeological terms, but rather a way for MTA to allocate funds for additional manpower. In general, a "Type I" response would be called for archaeological evaluations (Phase 2 excavations) and a "Type II" response for data recoveries (Phase 3 excavations).

[9] http://nyarchaeology.org/mainpages/about/MonitoringStandards.htm

man hours of monitoring supplemented with a backup team of archaeologists, provided by John Milner & Associates, Inc. (JMA)[10], who would handle data recoveries and some of the archaeological evaluations (Phase 2 excavations) while the core team provided by Dewberry continued to handle the day-to-day monitoring.

Upon award of the contract for fieldwork, Dewberry was assigned to work with the contractor already in place for the New York City Economic Development Corporation (NYC EDC) project in the area of the Staten Island Ferry Building, apparently because this contractor was responsible for the secant pile subcontractor. Prior to reporting for field duty, Dewberry prepared a testing and monitoring plan for secant piles and contractor work in Peter Minuit Plaza (Dewberry 2004a). One of the key features of this plan was a refinement of the communication protocol previously described in the ARMP. That initial monitoring plan gave the archaeologist "authority to instruct the equipment operator, through direct simultaneous communication with the NYCT Engineer on-site, to remove soils systematically in levels and to temporarily halt excavations should potentially significant archaeological finds be encountered" (Dewberry 2004a: 3) Again, this is not the ideal way to communicate, but it was the only variation of such language to which MTACC would agree[11]. Shortly after that plan was approved, Dewberry prepared a plan for evaluating potentially significant finds in Peter Minuit Plaza (Dewberry 2004b). While the work was underway on the secant piles within Peter Minuit Plaza, Dewberry prepared a monitoring plan for work on the excavation of the perimeter trench, borings, and geoprobes (Dewberry 2005a) in conjunction with the start of the South Ferry Terminal work by the design build contractor, Schiavone/Granite Halmar (SGH).

Once the primary contractor was on board, SGH began work on the CRMP by early March 2005. SGH hired Ecology and Environment, Inc. to prepare the CRMP[12]. It was submitted to MTACC who then solicited comments from Dewberry. The initial draft provided a good-faith effort to address archaeological concerns; appropriate comments were provided by Dewberry to MTACC. However subsequent drafts, of which there were at least five, did not expand upon that initial version, but rather became less and less like a plan for cultural resources and more like a legal document. The draft dated March 30, 2005 was the last to have the name Ecology and Environment, Inc. attached to it. The final draft is dated May 26, 2005.

The final CRMP is somewhat successful in defining the contractor's means and methods. However the document shows a lack of understanding of archaeological concerns and does little more than parrot the ARMP, stating "The archaeological and historic preservation team will monitor the project excavation activities as specified in the ARMP and PA." Additionally, confusing language regarding communications is included; for example, the CRMP states the MTACC Engineer provides directives to the archaeologist, implying the engineer has responsibility for identifying potential archaeological resources.

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[10] After JMA responded to the first call for surge support, they found they were no longer able to participate in the South Ferry Terminal project. The MTA contract did not allow for a substitution to be made and therefore Dewberry handled all subsequent evaluations and data recoveries in-house, including Whitehall Slip and Battery Wall, with additional personnel provided by other subconsultants (see **Chapter 1: History of the Project**).

[11] MTA relied on the clause in the ARMP, "… The archaeological consultant and contractor are not directly communicating with one another…" (LBG 2004: 7).

[12] At that time, Ecology and Environment, Inc. had a staff archaeologist as part of their team working on the CRMP; however he did not have input into the final CRMP.

The Draft Archaeological Testing and Monitoring Plan (DATMP) prepared by Dewberry (2005b) was an attempt to clarify some of the CRMP issues while incorporating information on the construction means and methods. This document was prepared according to the NYAC Monitoring Guidelines and addresses all eight elements required of monitoring plans.[13] Initially submitted in March 2005, MTACC comments were incorporated and the document revised and returned to MTACC for submission to NYSHPO and LPC on July 7, 2005, the anticipated start date for the contractor's excavations described in their CRMP. In addition to the monitoring protocols as they relate to specific types of contractor excavations, the DATMP also contains information on the types of responses that would require additional archaeological manpower, as described in the original MTACC request for proposal and Dewberry proposal.

2. EVALUATION OF EFFECTIVENESS

The following evaluation of the effectiveness of the South Ferry archaeological work addresses two types of issues: those related to logistics and those related to the previously established protocols and field methods. The discussion of the logistics issues is relatively short as these types of problems are not uncommon on archaeological sites and all were addressed and resolved while in the field. However, the remainder of this evaluation of effectiveness, a much lengthier portion, concerns the archaeological protocols and methods, beginning with a critique of the plans discussed above and continuing with an appraisal of their implementation, successes, and failures. Finally, there are suggested improvements: lessons learned from the South Ferry Terminal archaeological project that can be applied to other projects in the future.

a. LOGISTICAL ISSUES

Logistical considerations involving archaeological work conducted on construction sites are important. Conducting archaeological work at a construction site can be dangerous. The moment that most captures this point is when one of the archaeologists was seriously injured during the data recovery of Wall 4. Less serious logistical problems at South Ferry Terminal included: inadequate lighting during nighttime work and during daytime work under decking, inability of the contractor to outfit a backhoe with a plate to cover its teeth, inability to use a backhoe in certain situations, inadequate excavation techniques for archaeological purposes with a front-end loader, unsafe air quality while working under decking during concrete jack-hammering, inadequate drainage in the excavation area of Whitehall Slip, and inadequate drainage of test wells. Resolutions to these logistical problems were addressed as they arose in the field. The archaeologist would bring up the issue with MTACC. MTACC would attempt to resolve the issue, often by bringing a member of the contractor's team into the discussion. If the archaeologists were not satisfied with the outcome, they would ask MTACC to also consult with the archaeological reviewers at NYSHPO and LPC. In some cases the archaeologists' positions were upheld; in others the contractor's were accepted.

Inadequate lighting during nighttime work was a constant problem for all excavations conducted after the sun set. This is not a problem unique to the South Ferry Terminal site. The problem at

[13] The eight elements are briefly: 1) the authority of the archaeologists to halt excavations, 2) time required by archaeologist, 3) assumptions used to prepare time estimates, 4) nature of archaeological work, 5) what will be done if further archaeological investigation is needed, 6) assistance required from construction personnel, 7) what is to be done if construction plans change, and 8) what post-field effort will be conducted.

South Ferry Terminal was dealt with by the contractor providing 500 watt halogen lights. However, there were times when there were not enough halogen lights present, such as when larger areas were being excavated or when lights broke. During these relatively brief intervals, only the light of the backhoe illuminated the excavations. Ideally, archaeological work should be conducted during daylight hours because, even when adequate halogen light is provided, the quality of that light is not optimal for archaeological work, in particular for identification of changes in soil color.

Inadequate lighting during daytime work under decking was less of an issue. When the archaeologist requested MTACC to resolve the low daytime lighting issue, the contractor provided the same halogen lights used for nighttime work and, when possible, removed decking from areas where the archaeologists were working.

Archaeologists prefer to work with a backhoe that is outfitted with a plate covering its teeth. The use of the plate is most helpful when excavation does not include profuse boulders or cobbles. Many of the soil strata in Battery Park would have been particularly conducive to use of the plate for excavation of ATTs. Nevertheless, the contractor contended that it was not possible to use a backhoe with a plate for ATTs, even though such a machine was in use on other areas of the site.

There were locations within the South Ferry Terminal project corridor where the contractor could not fit a backhoe and used a front-end loader to excavate. From an archaeological perspective, the main problem with this is that the operator would excavate by undermining the trench or excavation profile, thus destabilizing it. When a profile is not stable, it is either unsafe to undertake archaeological documentation or not possible to do so due to loose soil and unclear stratigraphy. This problem was referred to the NYSHPO and LPC. The NYSHPO stated that it is possible to use a front-end loader in a way that is conducive to the archaeologists' successful work and instructed the contractor to employ a machine operator capable of doing so. However, this instruction did not occur until after Wall 4 had been removed and most of the monitoring at South Ferry Terminal completed.

One of the main problems working in Peter Minuit Plaza, particularly at Whitehall Slip, was the presence of silica dust in the excavation area. Not only does silica dust pose a health hazard, it also creates light diffraction patterns on photographs. This is the main reason that very few good quality photographs of Whitehall Slip exist. The contractor was jack-hammering the concrete secant wall at the same time the archaeologists were expected to document excavations under the decking. The Peter Minuit Plaza decking was not removable which exacerbated the situation.

Inadequate drainage in Peter Minuit Plaza was also a major field complication. This was true for both the archaeologists and the contractor. A secant wall was supposed to keep the area dry but it was not possible to do so while soil was present. It was only after excavation reached bedrock, at approximately 22 feet below ground surface in that area, that it remained relatively dry. The contractor had to constantly pump water from Peter Minuit Plaza. Even when the area was free of standing water, the mud was so thick and pervasive that it was common for anyone entering the area to sink up to his or her ankles making it difficult to negotiate the site. The presence of the muck also created soil instability, leaving many locations unsafe to enter. Although almost 30,000 artifacts were recovered from Whitehall Slip, it is likely this number would have been greater if the excavation area was more stable and consistently safe for archaeologists to enter. Suggestions for stabilizing the area, allowing for more effective archaeological work, as well as other options for MTACC to consider as alternatives to monitoring in future projects are presented below in **Chapter 7: D.2.c. Suggested Improvements**.

Another issue related to dewatering had to do with the contractor's test wells located near Wall 3 excavations (see **Appendix N: Wall 3 Excavation Units**). This resulted in the contamination of several strata within units during Wall 3 data recovery. The MTACC solution to this was to place sand bags around the units and although this was somewhat successful, several strata were still contaminated. Undertaking the test well work after the Excavation Units (EUs) had been completed would have prevented the contamination from rendering those contexts unusable for analysis.

Logistical problems encountered during the South Ferry Terminal excavations, such as conducting archaeological work at night or under decking plates with low light, were addressed in the field, with varying levels of success. Although a great amount of archaeological information was gathered, there were two major instances where nighttime work and low light affected the results of the archaeological work. These were the bisection of Wall 1 during nighttime archaeological monitoring and the documentation of Whitehall Slip under non-removable decking which created low light conditions despite the installation of artificial lighting by the contractor.

b. PROTOCOLS AND METHODS

One of the more fundamental lessons learned from the South Ferry Terminal archaeological project is related to the fact that archaeological work was conducted during construction with a problematic communication protocol (see **Chapter 7: D.1. Summary of Plans and Methods**). This point cannot be emphasized enough. Conducting archaeological work during construction should only be undertaken when all other options are exhausted. In hindsight there were several ways that archaeological work could have preceded construction in certain areas. For example, Battery Park was fenced off early in the project and the southern portion was used to store contractor equipment. This area was well-drained, had the deepest bedrock, and would not likely have pooled ground water or flooded at the depths of the archaeological resources. Had ATT excavation been undertaken at that time, sections of the Battery Wall would have been discovered prior to construction and that outcome would have been more desirable for all concerned.

The remainder of this discussion is organized in the order that various South Ferry Terminal project approaches were discussed at planning meetings and/or guiding documents prepared. It does not discuss aspects of the project to which the archaeologists were not privy and about which they had second hand information (i.e. language contained in the contract documents, bid selection criteria, etc.).

A review of the Meeting Notes from the early planning stages of the South Ferry Terminal archaeological work indicates that many contingencies were considered. MTACC anticipated the design build contract would allow for maximum flexibility in scheduling archaeological work in conjunction with contractor excavations. They agreed to use "whatever excavation machines and methods" were necessary to accomplish the project goals and assumed that the contractor would always follow the suggestions of the MTACC engineers. However, there were times when MTACC engineers would defer to the contractor regarding construction issues and this detrimentally affected the archaeological resources, such as when the contractor did not cover the backhoe bucket teeth with a plate.

It is unfortunate that the South Ferry Terminal contractor had no prior archaeological experience and that the CRMP was prepared without direct input from Dewberry's archaeologists. This would have facilitated communication between the contractor and the archaeologists from the beginning of the process. The importance of coordination between the archaeologists and the contractor and defining which group had control in specific types of situations was discussed at the planning meetings, as were potential restrictions on the contractor's excavations. Concern was expressed regarding potential construction delays due to archaeological findings and the possibility for confrontations between the contractor and archaeologist was raised. However, no effective protocols or means of resolving conflicts were adopted.

The inadequacy of the communication protocol cannot be overstated. It was predicated on having MTACC engineers at each excavation location where an archaeologist was present. While the project began with one MTACC engineer and two archaeologists working in one location, the situation changed once SGH was hired. After that point, there were not enough MTACC engineers on site to oversee each archaeological area while also performing their engineering duties, their primary responsibility.

Although the communication protocol was well-intentioned, it turned out to be very impractical, at least in part due to the inadequate number of field engineers. Further complicating problems with the communication protocol was the lack of directive on dispute resolution. While language concerning this is present in the ARMP, it is limited to disputes between MTACC and either the archaeologist or the contractor and not between the archaeologist and the contractor, as had been discussed at the earlier meetings.

In addition to communication problems, there were some inherent problems with the ARMP, the PA, and the CRMP. The potential inadequacy of the ARMP was discussed in the project planning meetings. The ARMP contains an adequate level of detail for a plan of its type; however, the initial impression of the document was that it was not written by an experienced New York City field archaeologist or had been subsequently edited by someone unfamiliar with some of the details unique to this situation. Telltale signs include the recommendation of a specific GPS device that was known to have limited success in Manhattan, and the assumption that the contractor would be excavating trenches exclusively. On any large excavation, it is unlikely that a contractor would want to be restricted to trench excavation. Another, more fundamental, assumption written into the ARMP is that the contractor would excavate exclusively with a backhoe and that "scoop" size would therefore be relevant. Again, an experienced field archaeologist would have known the contractor wants flexibility in the type of equipment they choose. At South Ferry Terminal both backhoes and front-end loaders were employed. Finally, the ARMP does not distinguish between "monitoring" and "mechanically-assisted" excavation (as in the ATT excavations). Guidelines for archaeological monitoring (NYAC 2002), had been relatively recently developed at the time the ARMP was written and were then under NYSHPO review[14]. The importance of distinguishing between these two types of excavation was addressed in the NYAC Monitoring Guidelines (2002). Had the author(s) and/or editor(s) of the ARMP been more familiar with New York City fieldwork and the Monitoring Guidelines, some of these issues may have been averted or more effectively addressed at an earlier point in time.

The ARMP contains specific limits concerning the time frame for archaeological excavations, specifying that data recoveries would be completed within ten calendar days. Wall 1 data

[14] The Guidelines had already been reviewed and recommended by the NYSHPO archaeologists and were in their legal department at that time. The Monitoring Guidelines were distributed to NYAC members and were widely discussed in the archaeological community, resulting in further distribution to those with an interest in applying the Guidelines to specific projects.

recovery excavations took place from November 17 to November 27, 2005, including weekends and the Thanksgiving holiday. Wall 1 removal, however, was conducted from January 26 to January 30, 2006. In the intervening time, the PA signatories and LPC discussed preserving the Wall stones and MTACC hired an architectural conservator, who put together a conservation plan, which was reviewed by the signatories and LPC, time which could have been used to ease the archaeological data recovery schedule. However, there was some flexibility to the ten-day limit when it was necessary for construction purposes. For example, data recovery at Whitehall Slip, conducted prior to that for Wall 1, took place over a six week period because it was not practical for the contractor to dewater the site sufficiently to allow the archaeologists uninterrupted access to the site.

The PA is also subject to differing interpretations on some issues. The most important is that it gives the cultural resources management team (CRM) and the archaeological inspector the authority to notify NYSHPO and FTA if a recommendation or directive was not immediately followed[15]. Interpreted in the spirit in which it was intended, this would mean the archaeologist could call NYSHPO and/or FTA directly without the participation of MTACC in the discussion. However, MTACC created its own CRM that was headed by an MTACC representative and included several MTACC employees and the PI from Dewberry. MTACC stated this meant the archaeological inspector was part of the "CRM" and could therefore only act as a member of the team, thus controlling any communication with the review agencies. The archaeologist was only allowed to speak with the representatives from NYSHPO and LPC with an MTACC representative from the CRM present. For the purposes of decision making, having MTACC, and sometimes its contractor, present streamlined the approval process in a few specific cases and, if a request came from NYSHPO to speak independently with the archaeologist regarding technical issues, permission was granted. Nevertheless, the lack of immediate direct communication between the archaeologists in the field and NYSHPO resulted in risks to the archaeological resources, at least at Whitehall Slip, where it would have been helpful to have NYSHPO and LPC visit the excavations while in progress to provide technical assistance regarding possible improvements.

The CRMP as a road-map for construction fails on one main point. Design-build, by its very nature, is a fluid process. Changes are constantly made. However, the CRMP did not contain any language regarding revisions to construction plans, their distribution, or a mechanism for archaeological comment and/or action. That omission caused problems for the archaeologists and review agencies on multiple occasions, particularly early in the project. Furthermore, the CRMP contained a flow chart of personnel within the project hierarchy that placed the archaeologist in a subordinate position to construction personnel.

The main question about the efficacy of the methods used for the South Ferry Terminal excavations concerns the appropriate use of monitoring to locate archaeological resources. In general, the archaeological community believes that monitoring is an inadequate field technique for identifying prehistoric resources, although it is possible to identify surfaces on which prehistoric features may exist via monitoring. It is also an inappropriate technique for identifying many historic resources. The main types of archaeological resources, however, that were expected to be present at the South Ferry Terminal site—fortifications, slips, wharves and bulkheads—were all potentially large enough to be exposed but remain *in situ* after backhoe excavation monitoring, even if the backhoe removed part of these features during identification,

[15] LPC, being a consulting party and not a signatory of the PA, was not included.

as happened at Wall 1 in the course of excavation of ET1. Successful identification of expected archaeological resources was proven with the discovery of Whitehall Slip and four sections of Battery Wall. In these cases, monitoring as a substitute for pre-construction testing was effective. Any problems with monitoring as an archaeological tool to identify these large-scale subsurface remains were related to nighttime work and low light conditions, coupled with the size of the machinery. However, identification of archaeological remains of less substantial structures outside Fort George, such as the Elde/Blondel storehouse, east and west blockhouses, and/or the Lower Barracks (military hospital), using construction monitoring is more problematic. In the case of the South Ferry Terminal project, none of these features was identified and it may not be possible to identify such features during monitoring. It is possible the remains of these smaller buildings were not identified because they were not present within the project excavations, had been destroyed by previous subsurface activities, or were constructed without substantial foundations, thus leaving no remains large enough to be observed during monitoring. If, for example, they were originally built with earth-fast post construction, it would be unlikely that evidence of such structures could be identified archaeologically during monitoring. It must be concluded that monitoring complicates the identification of more ephemeral structural remains, especially during night construction activities when the use of inadequate artificial lighting renders detection more difficult. It is also not ideal for the identification of large scale historic resources as can be seen by the accidental bisection of Wall 1.

c. SUGGESTED IMPROVEMENTS

Common archaeological practice is that pre-construction testing should always be the first approach to a project. Both NYSHPO and LPC requested this approach in the project planning meetings. When it is not possible to access a site prior to construction, monitoring is normally proposed. This was the stated situation in the case of South Ferry Terminal. Nevertheless, alternatives to the "either-or" approach could have been more seriously considered. The South Ferry Terminal project corridor was so large that the contractor was not always working simultaneously throughout the entire project area. In hindsight, a more archaeologically sound approach would have been to conduct limited pre-construction testing in the most sensitive and driest areas of the site while the contractor went about its excavations in other areas. Monitoring could then have been used appropriately in less sensitive areas and/or as a follow-up to testing.

Certain aspects of the South Ferry Terminal project could have been improved. Suggestions for improvements, including some presented here, were made during the course of the field project and others have been added in retrospect. In no special order, the suggested improvements to the protocols, methods, and implementation of the archaeological work include, but are not limited to:

- MTACC could be better prepared to handle logistical problems if they consult with an archaeologist during the planning stages to address potential issues and possible solutions, including realistic approaches to pre-construction testing, conducting archaeological work in wet conditions or at night, and creating effective communication protocols
- Distribution for comment of the archaeological RFP to NYSHPO, LPC, and/or an archaeological consultant
- Distribution for comment of draft contractor bid documents as they pertain to archaeology to NYSHPO, LPC and the archeological consultant (if already on board)
- Distribution for comment of contract language regarding archaeology to NYSHPO, LPC and the archeological consultant (if already on board)

- Contract language to convey that if contractor deliberately undermines the archaeological process, serious sanctions will be imposed and those sanctions detailed
- Distribution of the finalized bid documents and contract language pertaining to archaeology to NYSHPO, LPC and the archeological consultant (if already on board)
- As an alternative to monitoring, MTACC should consider planning for pre-construction archaeological work to take place after the contractor installs a cut-off wall to keep the excavation area dry, but prior to the contractor beginning project excavations in those archaeologically sensitive areas
- Use of a finalized and agency-approved Monitoring Plan to which the contractor is held accountable
- Selection of a contractor with archaeological experience or, when not possible, requiring an archaeologically experienced subcontractor
- Use of a construction manager with archaeological experience, either in-house or as a consultant
- Provide archaeological sensitivity training to all construction and engineering staff, both to MTACC personnel and to their contractor
- Require that the contractor work with the MTACC archaeological consultant, as well as with their own archaeological consultant, to develop the CRMP and/or a Monitoring Plan
- Provide opportunity for MTACC field archaeological consultant to comment on and have appropriate comments incorporated into the final ARMP (if already on board)
- Timely notification of design-build changes to NYSHPO, LPC and, especially, the archeological consultant
- Provide notification of, including details of, all correspondence, both written, via telephone, and meeting minutes between MTACC, NYSHPO, LPC, and the archaeological consultant to all four parties to ensure all are operating with the same plans and objectives
- Planning documents should not preclude the archaeological consultant from contacting the SHPO and LPC archaeologists independently and directly as they deem fit, not only to discuss significant finds and data recoveries, but also to apprise them of the ongoing work and less significant finds that may hold some interest
- Ensure the ARMP is written and/or edited by an experienced New York City field archaeologist
- Archaeological needs should be given priority during scheduling
- MTACC engineers should not be required to act as go-betweens for their contractor and archaeologists
- Practical communication protocols should be established enabling direct communication between the archaeologist and the contractor
- Ensure the Construction Manager complies with the archaeological commitments as conveyed by the Chief Environmental Sustainability Officer
- Advance planning for the use of planking, rafts, raised flooring, or other appropriate means to provide archaeologists access over the mud to water-logged areas and explore the use of alternative methods to keep areas dry, such as hay bales, sand bags, additional pumps, or other more creative measures using the contractor’s expertise in working in these difficult environments.

- If archaeological monitoring cannot be avoided, every effort should be made to prohibit nighttime excavation in archaeologically sensitive areas. Contract specifications should clearly state the constraints on nighttime work so that disputes can be avoided. In the absence of appropriate provisions in the contract documents, the contractor should be required to re-sequence his work to avoid excavating in archaeologically sensitive areas at night.
- Archaeological concerns regarding site conditions should be given highest priority, and NYSHPO and LPC should be notified by MTACC about site condition issues immediately.

One of the positive outcomes of the South Ferry Terminal archeological work has been a revision of the NYAC Monitoring Guidelines to include a requirement for direct communication between the archaeologist and the equipment operator and for thorough consideration of logistical issues, such as altering construction schedules so that archaeological work can take place during daylight hours. Furthermore, a provision to insure that each project is reviewed on a case-by-case basis was also included, limiting the ability to make decisions based mainly on comparisons to other projects without regard to their different circumstances. These revisions to the Monitoring Guidelines were accepted by the archaeological community in a forum on urban archaeology in New York State held at SUNY Binghamton in 2006 and are now adopted by members of the New York Archaeological Council as an amendment to their Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State (NYAC 1994) which are used by the NYSHPO.

E. CONCLUSIONS

The South Ferry Terminal Project contributed to current appreciation and understanding of New York City’s history in several ways. It provided an opportunity to use the colonial and post-colonial past to provide a narrative of events that took place on this valuable piece of Lower Manhattan real estate and to discover more about the cultural and natural transformations of the land throughout the centuries.

The two significant finds unearthed during the South Ferry Terminal project, the Battery Wall and Whitehall Slip, show that important archaeological resources, tangible evidence of our collective past, can in fact remain preserved, buried beneath our feet. The Battery Wall is the oldest example of defensive works to survive in Manhattan and predates the Revolution. Whitehall Slip was created in the early 1730s when commercial developers purchased “water lots” and constructed land, buildings, streets, and wharves that formed the east side of the Slip. The west side of Whitehall Slip, (the side found by the archaeologists), was created in 1734/1735 when present-day Peter Minuit Plaza was developed for defensive purposes and a large battery was constructed on the Copsey Rocks. This battery was called George Augustus’s Royal Battery after King George II. (see **Figure 4.11**) This enlargement of the Battery and its expansion farther out into the East River paralleled the land building that created the east side of Whitehall Slip.

The South Ferry Terminal project is the first New York City archaeological site to combine archaeological analysis with dendrochronological analysis. Just as significantly, the project necessitated a synthesis of the documentary and map data concerning the construction of fortifications at the tip of Manhattan, specifically the Wall and included some new information that had not been available to previous researchers (see **Chapter 4: A.10.b. John Dies’ Map and A.12. The Revolutionary War Period**). Dates of construction of the Wall were determined and the political and military reasons for its presence, renovation, and demolition were elucidated.

1. THE PROJECT'S CONTRIBUTIONS TO NEW YORK CITY'S HISTORY

a. DOCUMENTS AND MAPS

Pre-park history was, and is again, all but invisible within the Battery Park landscape. It is most easily accessible through the archival record in the form of documents, maps, prints and photographs. The discovery of the Battery Wall constructed in the mid-18th century was a reminder of the strategic importance of this area of Manhattan. Today, Castle Clinton remains as a physical reminder of the War of 1812. The archaeological finds are reminders that physical traces of New York's distant past remain buried beneath the city's buildings, parks and streets. Physical traces of additional historic resources may still remain buried in the Park although most were probably obliterated when the Park was created; others were affected by later modifications such as subway construction. Nevertheless, the South Ferry Terminal Project has shown that there is still a reasonable chance that at least some of the pre-Park history is still preserved below the ground. The proof of this must await the results of further archaeological studies but this project and its amazing finds can serve as a starting point.

Although the people of the 17th through 19th centuries left behind a great wealth of written documentation about some aspects of their lives, there is little documentation about the construction methods of 17th- and 18th-century landfill-retaining structures and military fortifications. Documents and maps helped tell the story but the discovery of the actual timbers of the landfill-retaining structures and the carefully constructed stone Walls of the Battery provided the most valuable information as well as the impetus to conduct further research. The post-field analysis has allowed some reconstruction of the historic landscape as well as facilitated the critical evaluation of the historic map data. Documents and maps were critical to this research. Many inconsistencies and inaccuracies were noted in historic maps of New York City during the course of this research. To name a few, the unrevised Miller 1695 map places Leisler's Half-Moon Battery approximately two blocks to the north of its actual location west of the Fort. The map was later revised and the newer, more accurate edition is included in this report (see **Figure 4.4**). The 1693 French Franquelin Plan, *Ville de Manathe ou Nouvelle-Yorc* (see **Figure 4.8**) was found to be largely fiction. It depicts New York as a heavily fortified city, surrounded by strong walls and batteries. Structures on the Battery, south of the Fort, are not accurately represented. The Great Dock is illustrated with a narrow inlet which would present difficult entry for any ship. The map also inaccurately shows a large wharf, possibly part of the Great Dock, sitting on the rocks at the foot of and to the west of Whitehall Street and a great sand bar at the foot of Whitehall Street and the Battery. Although there may have been a sandbar in the vicinity, New York was far from being a powerful fortress at the end of the 17th century. Historic documents paint a more accurate portrait of the inadequacies of the city's defense system. Although some dire descriptions of the city's defenses might be exaggerated and can be attributed to a new governor's desire to acquire additional defense appropriations, enough descriptions exists to indicate that the poor state of New York City's defenses was true.

The Ratzer/Ratzen Plans of the City of New York in 1766/1767 (see **Figure 4.15**) accurately depict the location of the Battery Wall, while erroneously situating the head of Whitehall Slip at Water Street, approximately one block north of where it was known to be at that time and where it is depicted on other maps of the general time period. The Lyne-Bradford map (see **Figure 4.10**) is skewed and locates the project corridor closer to the shore than it really was circa 1728, especially when compared with Maerschalck's 1755 map (see **Figure 4.10**) which shows the Walls within the project corridor approximately 50 to 100 feet from shore. Maerschalck's map is the only one to show an L-shaped dock or wharf at the foot of Pearl Street, while Lyne-Bradford is the only map to show Hunt's Shipyard at the foot of Whitehall Street.

The French and Indian War (1755-1763) brought important new developments to the mapping of New York. Prior to 1755, the British military was not heavily involved in the surveying and mapping of the province. A turning point came with the appointment in 1756 of John Campbell, Earl of Loudoun, as commander of British forces in North America. Loudoun was a cautious and systematic general, who recognized the value of good maps as guides to military operations, and one of his first acts was to request from Cadwallader Colden a detailed map of New York (Allen 2007). When Colden replied that no good map of New York existed, Loudoun decided to remedy the situation by having the army undertake the creation of better maps (Ibid).

The discovery in the British National Archives of two unpublished maps of Fort George and the Battery from two different time periods—one dating circa 1756 by John Dies, Commissioner of Fortifications in New York City, and the other by British Captain Douglas Campbell dating 1782—was significant because the maps provided accurate measurements of the Battery, additional information, and also assigned names to several previously mapped but unlabeled structures situated in the project corridor and vicinity in the 18th century. However, the Dies' 1756 map (see **Figure 4.16)** is a good example of the problems inherent in even the most "accurate" of maps. Although it appeared to be an "Exact Draught" as far as the locations of the Battery Wall, bastions, and street locations are concerned, the curtain wall and bastions are depicted as being 20 feet thick, nowhere near the actual 8 ½ foot thickness of the archaeological Wall. In addition, the Pond, filled in 1773/4 is missing from this 1756 map, although documents state it was still extant. Likewise, the 1782 Campbell map from the British archives seems accurate until one notices the counterfort in the wrong place and the walls depicted as too thick.

One of the most significant archaeological discoveries at the South Ferry Terminal project site was the Whitehall Slip. Constructed in the 1730s, it developed into one of the largest, busiest, and most important slips in a city filled with slips. The earliest portion of Whitehall Slip was created in 1734 when commercial developers purchased lots west of the Great Dock[16] and created land and constructed buildings, streets, and wharves that ultimately led to the formation of the east side of the Slip. The west side of the Slip, located within the South Ferry Terminal project corridor, was created about the same time, when the area was developed for defensive purposes and George Augustus' Royal Battery replaced Governor Fletcher's Whitehall Battery on the Copsey Rocks in the East River.

Written documentation about the Slip is vague and unclear and 18th-century surveyors and cartographers did not have much interest in its details. Most maps positioned the head of the Slip at approximately Front Street. Despite Common Council minutes that note various fill episodes over time, the Taylor-Roberts map indicates that the head of the Slip was located just south of present-day Front Street as late as 1797 (see **Figure 4.18**). The 1845 *Plan for Improving White Hall Slip Submitted to the C. Council and Adopted* finally showed that Whitehall Slip had been filled in to the north side of South Street.

[16] Shortly before the Revolutionary War, the Great Dock was filled in and new East and West Basins were constructed south of Front Street. These were filled prior to 1797 as part of the work conducted to extend the shoreline to South Street.

Historical documents mentioned wharves and landfilling episodes in the Slip which were not always depicted on maps. The evidence provided by archaeological data recovery, including the dendrochronological analysis, provided more accurate information which helped fill the gaps in the historical record. As just described, the generally accurate 1766/1767 Ratzen Plan (see **Figure 4.15**) depicts the head of the Slip too far north, at Water Street, while the Montresor map from the same time period, known to be less-accurate, provides greater detail and more accuracy in this instance, when depicting the Slip (see **Figure 4.18**). In fact, it is the only 18th-century map to show a long middle pier in the center of the Slip, similar to that depicted on much later maps.

b. WATERFRONT LANDFILL-RETAINING STRUCTURES TYPOLOGIES

The practice of creating new land in waterfront locations has been carried out in North America since the 17th century. In recent decades, archaeological field investigations have recorded a considerable number of landfill-retaining structures. These provide a growing body of data on how such features were constructed. Previous investigations pioneered the study of construction methods and created typologies for the classification of these features. Considerable progress has been made in describing, interpreting, and contextualizing landfill structures.

However, some confusion in interpreting the established typologies has impeded the description and interpretation of fill-retaining structures. This confusion, which has often been recognized by archaeologists, appears to arise in part from vague definitions and blurred categories characterizing the various construction types. The research conducted for this report sought to identify the problems in existing typologies and to suggest a revised approach to describing and classifying landfill-retaining structures. This report argues that by relating landfill-retaining structures to vernacular building traditions, they may be more accurately described and more meaningfully contextualized.

The report reviewed recent archaeological scholarship on landfill-retaining structures and previously established construction typologies. It also provided a basic overview of some of the principal vernacular building traditions of North America and Europe, which served as a context for describing, evaluating, and contextualizing landfill-retaining structures. A revised approach to classifying and describing landfill-retaining structures and their components has been presented. This classification guide emphasizes the location of structures within a vernacular building tradition, and the accurate categorization of the various aspects of their construction, such as material, construction method, form, and structure type.

Based on a review of previous archaeological studies, the construction characteristics of the timber landfill-retaining structures documented at the South Ferry Terminal site, including log-construction cribs and grillage, appear to be in keeping with timber landfill-retaining structures found at other sites in New York City and elsewhere in North America during the 18th century.

c. EXCAVATIONS

Excavations of sections of the Battery Wall added another type of data to the investigation of its history. While research conducted to determine the history of the Wall has provided us with a synthesis and some new data about its construction timeline, nothing has spoken louder than the physical evidence itself.

It was possible to document and save the construction materials actually used to build the Battery Walls and to share them with the general public in exhibits at Castle Clinton and Grand

Central Terminal, and in a permanent exhibit in the new South Ferry Station. Walls 1 and 2 were primarily sandstone and Walls 3 and 4 were made from the local bedrock, Manhattan schist. The Wall sections were approximately 8 feet thick, although the historic maps depict differing widths. Samples of mortar were also retained from the field and analyzed, showing similar lime mortar mixes in all four Wall sections. However, the mortar holding Walls 1 and 2 in place was sound and remained *in situ* while that of Walls 3 and 4 was friable and much of it had washed away prior to burial. Other differences were noted in the construction layout of the bastions found at Walls 1 and 4. A corner connecting the bastion to the curtain wall was present at both locations. However, the landward side corner found at Wall 1 had a gentle curve, while that found at Wall 4 was sharp and angled.

These field findings, combined with the construction dates identified through historic documents, tell us something about the availability of funding, the amount of time required to build the Battery, and possibly the organization of labor, at those particular points in history. In 1741, when Walls 1 and 2 were built, there must have been more funding and/or manpower available to procure stone from across the Hudson River and to create a sound mortar mix than there was in 1755 when Walls 3 and 4 were constructed using local stones and friable mortar. This despite the fact that Governor Clinton was exasperated by the quality and snail-like pace of constructions, repairs and improvements to the city's defenses and complained to the Lords of Trade in 1746. The following quote reminds us that things have not changed all that much in 250 years.

> In the fortifications they have everywhere employed Men entirely ignorant of the art, who have no more pretence to knowledge than the meanest plowman, and have squandered away large sums of money with no other view than can appear, but in being useful to Relations, or to such persons as they thought could serve them in future Elections. The works have been so manifestly absurd that they have been in most places altered, & rebuilt at their own desires (O'Callaghan 1856-61, VI: 462).

The physical evidence can also be interpreted related to the amount of time necessary to complete construction. One suspects that more time and coordination was required to get the sandstone from New Jersey to New York City. This is also true of creating the gentle curve found present on the interior corner of Wall 1. It would have been more time consuming to cut the stones into the different shapes and lay them in the pattern used to create the curve, circa 1741, than it would have been to cut and lay all rectangular stones as was done in 1755. Historical records talk of impressed labor used to build the Walls, supplementing the military forces, and civilian artisans both free and enslaved, as well as artificers attached to the military, providing supplies and labor. Perhaps more labor, or more skilled labor, was available for the construction of Walls 1 and 2 than for Walls 3 and 4.

The presence of a large log feature predating the construction of Wall 3 remains an enigma. With no historic documentation describing its construction or use, the best guess is the log feature was either part of or related in some way to the creation of George Augustus' Royal Battery. The physical evidence found at Whitehall Slip also helped refine the historic record. The South Ferry Terminal excavations enable establishment of the locations of three episodes of filling using a combination of field findings, historic documents, and artifact analysis. These fill episodes occurred circa 1788, circa 1801-09, and not later than 1845. Historic maps are inconsistent in their depiction of the head of the Slip over time. The South Ferry Terminal excavations have defined the precise locations of the three episodes of Slip construction that took place within the project corridor: 1734/35, 1786/87, and 1796/97, using dendrochronological analysis. This was the first time dendrochronology had been used on an archaeological site in Manhattan. Furthermore, the South Ferry Terminal work has provided new insight into the construction of landfill-retaining structures. Research conducted for the project has resulted in the establishment of a system of consistent classification terminology for these types of features. The log structures that comprised the western side of Whitehall Slip, the section excavated at South Ferry, showed considerable variation and change over time. Pitch pine was used throughout the Slip, but the later sections were built using a wider variety of wood types. The earliest part of the Slip contained grillage, but no grillage was present in the later sections. Grillage uses more logs than cribbing. Perhaps the increasing deforestation of the Hudson Valley was responsible for the change in construction forms at Whitehall Slip, or perhaps different building traditions came into play, or maybe the change of forms in the construction was due to a combination of these factors.

d. ARTIFACTS

One of the generally accepted goals of archaeology is to recreate daily life from a past time. The artifacts recovered during the excavations at South Ferry Terminal can be used to make the City’s past tangible and available to present-day New Yorkers.

Some of the most informative artifacts from the project area were pieces of building demolition debris found in many contexts but particularly in those associated with the Wall. These artifacts, although fragmentary, show what the city looked like in the 17th and 18th centuries to the eyes of its residents and visitors. Extant illustrations, such as those referred to in **Chapter 4: Historic Context**, (see **Figures 4.1, 4.3, 4.9, 4.17**), do not provide the color and texture these artifacts do. The bricks, both red and yellow, the roofing tiles, and the tin-glazed wall tiles can bring the past to life.

Red and yellow bricks were recovered from many different contexts. The red bricks were most probably made locally; the yellow bricks were probably made in The Netherlands. Yellow-burning earthenware clay used for bricks is characteristic of clay deposits in The Netherlands while the majority of earthenware clays in the New York metropolitan area burn red. Red bricks are ubiquitous on 18th- and 19th-century archaeological sites but no other archaeological project has contributed so many samples to the New Netherland/New York brick archive housed at Fordham University. When these samples are submitted for inductively coupled plasma emission spectroscopy (ICP) analysis, they should greatly increase understanding of the sources for bricks used in New York City and provide information about the brick trade. Yellow bricks have been found on many Manhattan sites but this assemblage of yellow bricks includes many relatively complete examples and two unique bricks: one with an oyster shell inclusion and one with a scratched tally mark. There was also a red/orange brick (probably New York made) with the paw prints left by a dog who ran over drying bricks in the brick yard (see **Figure 7.1a**)

Dutch-style roofing tiles made of red earthenware were found in many contexts but particularly in some associated with Wall 1 and the Fan Plant Sheeted Pits area . Some were unglazed while others had black lead glaze. They could have been made in The Netherlands (where red- not yellow-burning clay was commonly used for roof tiles) or in New York by Dutch-trained artisans. These Dutch-style pan tiles were attached to rafters to provide water tight, long lasting roofs. Tile roofs had the advantage of durability but they were heavy, perhaps the main reason they fell out of common use. Roofing tiles have been found in all Manhattan landfill sites, including the earliest ones filled during the 1690s (Rothschild and Pickman 1990 and LBA

1987b) and the tiles from the current project expand our knowledge of the variations found in this form and the date ranges of its use.

Although not as numerous as the roofing tiles, pieces of red earthenware floor tiles, probably also made in The Netherlands, were found in Whitehall Slip and General South Ferry contexts. On their upper (walked on) surfaces, red earthenware floor tiles were covered with a light slip and then lead glazed, which created a yellow appearance. On some, the lead glaze was colored green; several 17th-century Dutch genre paintings (for example, *The Pantry* by Peter de Hooch) depict floors with a checkerboard pattern of alternating yellow- and green-surfaced tiles. Earthenware floor tiles would have provided a sturdy, easily cleaned pavement that would be effective in keeping out the damp, an especially useful feature on newly filled land.

Sherds from many different tin-glazed wall tiles were recovered. Tin-glazed tiles were commonly used around fireplaces and at the base of walls, as can be seen in Dutch 17th- and 18th-century paintings, existing colonial-era houses, and museums, such as the Dutch-American interiors recreated in the Metropolitan and Brooklyn Museums. Tiles had a variety of blue- or purple-painted scenes, including children's games, fantastic creatures, soldiers, flowers, or genre scenes. The identifiable scenes illustrated on the excavated wall tiles include biblical scenes and some partial landscapes that might also be biblical scenes. Scenes from the Bible were popular motifs for decorative tiles because they told stories most people would know and would teach their children; the tiles from the South Ferry Terminal site expand our knowledge of what early residents of Manhattan had as decorations in their homes. As mentioned in **Chapter 6: Artifact Analysis**, tiles with scenes of Christ on the cross and Moses with the Ten Commandments were found. Another tile illustrated a story not from the Bible but from the life of one of the early Church fathers, St. Jerome (see **Figure 7.1b**). While St. Jerome was living in a monastic community, a wounded lion appeared at the monastery with a thorn deeply embedded in his paw. After St. Jerome removed the thorn and the lion was healed, he served the monastery by acting as shepherd for the brothers' donkey, but one day merchants passing by stole the donkey while the lion napped. The brothers blamed the lion for they thought he had eaten the donkey. The next year, however, the same merchants came into the area again and the lion, recognizing his donkey, attacked them, leading the donkey and the merchants' camels back to the monastery. Christ on the Cross, Moses with the Ten Commandments, the faithful lion, and other sacred and secular pictures on tin glazed tiles would have provided sources for family conversations and lessons in early Manhattan.

In addition to the wall tiles, two thick-bodied tin-glazed sherds might have been from floor rather than wall tiles. Tin-glazed floor tiles were made in The Netherlands during the 17th century but they are not common in North American archaeological contexts and the discovery of two at South Ferry Terminal is unusual.

The interior walls of many early Manhattan houses were plastered. Plastered walls generally had three applied layers: a "scratch" base coat; a thick "brown" coat; and a smooth, thin "finish" coat. The finish coat could be painted, whitewashed, or even covered with wallpaper. Several chunks of plaster were recovered from around the Wall and in the General South Ferry excavations that show these three layers of plaster.

Considered as a group, the architectural artifacts provide hands-on information about colonial New York City. New York City retained its Dutch appearance well into the 18th century, with its brick buildings roofed with red or black pan tiles and their interiors floored with colorful yellow and green tiles and blue-and-white wall tiles around fireplaces.

The artifacts recovered during the South Ferry excavations, in particular those from the ceramic dump in Whitehall Slip, also contributed to knowledge about commercial activities in New York City. While the outlines of trade between England and New York are well documented, the details were often not recorded. The vessels in the dump show the patterns and styles of goods coming into the city during a narrow time period. Considering another type of artifact, the smoking pipes showed that trade with Chester was more common than previously known. For other commercial activities, oyster shell deposits, as noted above, are common features of Manhattan archaeological sites. However no other archaeological project in the city has systematically measured as large a sample of oyster shell as has been done with the South Ferry Terminal collection. This information is useful in itself as it provides data about size, age at death, and methods of processing and it will be useful in the future for comparative purposes.

In general, archaeologists strive to use artifacts to study community- or culture-wide patterns of behavior but the examination of artifacts that can be linked to specific individuals or events can also be informative. Three such artifacts were found at the South Ferry Terminal site: a bottle seal belonging to Colonel Benjamin Fletcher, an early English governor of the colony; a medallion commemorating a famous victory of British forces over those of France at Louisbourg in Canada; and a pebble possibly marked with an African cosmological symbol. Although the identities of the people who possessed this token of victory or who marked the pebble are unknown, they and the bottle seal remind us that people, acting within the constraints of their particular culture, are responsible for the formation of archaeological deposits.

2. THE PROJECT'S CONTRIBUTION TO URBAN ARCHAEOLOGY

The archaeological excavations undertaken for the South Ferry Terminal project have contributed to the practice of urban archaeology and to the general public's awareness of this specialized type of archaeology. The project brought urban archaeology to the attention of the public, both within New York City and outside the metropolitan area, demonstrating that significant archaeological resources remain in modern urban settings, even one of the most intensively developed and densely populated cities of the modern world. The South Ferry Terminal project has made New Yorkers more aware of their past and their city's history by allowing them to see the physical remains of that history on television, in newspapers and in exhibitions in Battery Park, Grand Central Terminal and the new South Ferry station, as well as at lectures presented for the public and the production of a public report.

The important methodological contributions of the South Ferry Terminal project to urban archaeology are twofold. First, the unprecedented use of monitoring as the primary technique for identification of significant archaeological resources was shown to be an effective field methodology, under specific circumstances. The use of monitoring as a substitute for pre-construction field testing proved that large features could be successfully identified and excavated. However, the project was not without its flaws and it was concluded that parts of the site could have, in fact, been tested prior to construction and that other aspects of the archaeological project could have been improved upon, in particular establishing more workable and flexible communication protocols.

The second contribution to archaeological methodology is the development of a typology for describing and documenting landfill-retaining structures that will be a useful tool for future projects. The systematic typology for recording landfill-retaining structures presented as part of this report will undoubtedly help standardize how these features are recorded and described. Reports of previous excavations in New York and other waterfront cities used different terms for the same sorts of structures and their joinery, making cross-site comparisons difficult and obscuring both similarities and regional variations. Use of the South Ferry typology should greatly reduce these difficulties.

Finally, from a research perspective, information about the features and artifacts found during the excavation of the South Ferry Terminal project will be available to future students of New York's---and other cities'---physical, commercial, and social history.

F. RECOMMENDATIONS

1. FUTURE RESEARCH

Several areas which were outside the realm of the data analysis for the South Ferry Terminal project could provide avenues for future research which could yield more information than is presented in this report.

For the Battery Wall, one avenue for additional research relates to identification of the source of the lighter-colored sandstone found in the southern face of Wall 1. It may be possible to determine if the source of this stone was somewhat farther afield, perhaps from Pennsylvania, or if it was a relatively local stone from across the Hudson in New Jersey from a quarry that has long since been completely mined, or from another location. The use of stone to construct waterfront landfill-retaining walls prior to the mid-19th century is difficult to interpret due to the infrequency with which such structures have been archaeologically documented in North America. However, reinterpretation of stone features such as the Battery Wall, which, in places, also retained landfill, could shed light on the use of masonry relative to a structure's primary function (e.g. important military fortification) and whether that use changed over time, changed based upon location, or changed due to other factors.

Comparative mortar analysis with other 18th-century sites such as the 18th-century foundation of Blockhouse #1 in Central Park, Fort Mifflin, and the Island Battery in Nova Scotia, and with examples from Britain, could provide information on whether the mortar mixes used were indicative of broader patterns of mortar composition and use. These mortars from military sites could also be compared to mortar from foundation walls or shaft features from civilian building projects and their similarities and differences noted. Another area of analysis could be the collection of *in situ* sand from archaeological sites to determine if these sands are present in mortar samples collected from stone and brick features at that site or in the vicinity.

Research into and translation of French military engineering manuals relating to construction methods used during the French and Indian War period (mid-18th century) could also provide additional information about the Battery Wall. Further research on wooden battery construction could provide insight and meaning to the Wall 3 log feature.

While many 18th-century documents exist in libraries and archives in the United States and on-line, it is possible additional information exists in foreign repositories that only a physical search might reveal. Additional research at repositories in England for documents relative to the Battery Wall could provide information not available in the United States.

Additional mapping and map analysis could also be conducted. A historic contour map similar to Viele's with data based on South Ferry findings could provide an interesting and useful tool for future work in the vicinity.

Many questions remain concerning the organization of labor for the design and building of public and private development projects in late-17th through mid-18th century New York. Enslaved persons, artificers attached to the military and civilians (some of them impressed), were building and repairing the fortifications. Were these considered civil or military projects or a combination of the two? How was this work coordinated by the Commissioners of Fortifications? Were impressed white individuals, such as carpenters, paid to work on the fortifications or to build bateau? How were suppliers of wood, stone and other building materials selected? The names of individual suppliers and carpenters, masons, glaziers, etc. working on these projects could be collected from Common Council minutes, payment records, and other, as yet unidentified, documents. The minutes note individual payments for tasks such as repairing and filling in various slips. Using genealogical and other data, is it possible to discover further details about the background and ethnicity of these individuals? Would this information permit us to make further assumptions about vernacular colonial building traditions and methods? Since it is not clear if the person noted as paid in the Council minutes used hired laborers, information about actual laborers might be elusive. It is also assumed enslaved individuals brought skills learned elsewhere to New York City. Are these skill sets verifiable in the stone, bricks, timber and mortar of the fortifications themselves and is there evidence of African and/or Caribbean building traditions incorporated in these structures?

Research could be conducted with regard to the similarities and differences concerning 18th-century-fortifications elsewhere in North America and the Caribbean. The finds themselves could be compared to fortifications in England, France, and The Netherlands. It could also be useful if a form similar to the landfill-retaining structure form developed for this report (see **Appendix C**) could be developed to standardize the recording of military fortifications.

Pollen analysis of Battery Park fill samples collected but not yet analyzed could provide additional data, potentially documenting changes to the Battery over time and during its transition from military to park use.

The inductively coupled plasma emission spectroscopy (ICP) analysis of samples of brick has not yet been conducted. Once completed, this will tell us about the source(s) of the clay used to manufacture bricks recovered during the South Ferry Terminal excavations, providing important information on manufacturing and trade patterns.

A redware Dutch-style ring handle recovered from Battery Pond fill could have been locally manufactured. This sherd could be analyzed, at a future time, to determine its chemical composition in order to establish where it was made; if it were made in New York in a Dutch style this would be an important piece of data for the study of the development of an Old World craft—potting—in a New World setting.

With regard to the human remains found during Wall 1 excavations, it may be possible that DNA analysis could provide associations for some of the bones and fragments enabling population identification of particular individuals.

Many sites with landfill deposits have been excavated in Lower Manhattan. It could be informative to compare the artifacts from these deposits, particularly from the 175 Water Street (Soil Systems 1983b), Telco (Soil Systems 1983a), and Assay (LBA 1990a) sites, all filled during the mid- to late-18th century, to the landfill deposits from South Ferry Terminal. Private owners were responsible for creating the land at these sites but creation of land at the Battery was under the direction of the municipality. Did landfill sources utilized by private individuals differ from those used by public entities? Was more or less commercial waste used in publicly created landfill? Was organic garbage a greater or lesser part of private landfills? The artifact collections from these sites, now housed at the New York State Museum, were analyzed in the 1980s. Since that time, computer databases have advanced considerably and it is now possible to record a number of attributes for each artifact in an electronic, easily accessible and manipulated, format, such as the Microsoft *Access* database used here (see **Appendix A**). Artifact data from these older sites was entered into simple databases that are not completely comparable with present-day inventories. Re-inventorying the old collections to present-day standards would be time-consuming but worthwhile. However, even without such an intensive re-analysis, it should be possible to compare artifacts from these sites in gross terms to those from the present excavations.

In terms of landfill-retaining structures, systematic field documentation of these features focusing on various basic attributes (including structural material, fill material, form, structure type, and construction method) is recommended. A sample documentation form for landfill-retaining structures has been provided in **Appendix C**.

More thorough research and analysis on the builders of timber landfill-retaining structures in the 17th and 18th centuries could yield insight into the cultural influences on landfill-retaining structure construction and the connection between vernacular architecture and retaining structures. Where possible, it could be useful to determine whether the individuals performing or overseeing the work were carpenters and whether they had a particular ethnic or cultural affiliation. This information could shed light on the connection between vernacular building techniques and wharf construction and could also provide a better understanding of the emergence of dockbuilders as a specialized professional group, which likely came about circa 1800 in New York City. Where private owners of water lots may have had input into the construction of landfill-retaining structures, the cultural affiliation of these individuals should be noted where possible.

Finally, prior to the South Ferry Terminal project excavations, the remains of the cable and elevated railways were determined to be non-significant features. Therefore, the archaeological team was not required to do anything more than document the locations of these features when time allowed. As an important part of the early transportation network of our city, however, it may be worthwhile to have a policy regarding how these elements should be treated in future excavations. While some documentation exists on the types of footings and yokes utilized and their general locations within the city, extant examples of these relics are dwindling. It could be useful for the NYSHPO and LPC to create a policy for these types of resources.

2. FUTURE PROJECTS

While the South Ferry Terminal excavation monitoring was successful in identifying large historic features, a need for improvement was noted. One of the unstated goals of the South Ferry Terminal archaeological work was to provide a more solid framework for conducting similar projects in the future. Monitoring for future projects could be improved by designing creative alternatives to site access so that extensive or limited pre-construction testing could be completed. The South Ferry Terminal project field methodologies were established well ahead of time, which is a laudable approach. However, the contractor hired had never worked with archaeologists before and this was often a cause for problems which were not always easily resolved because both the contractor and the MTACC were required to abide by rigid contracting language and excavation protocols. These problems were compounded by convoluted and impractical communication protocols. Archaeology is a fluid process with all excavations being informed by what came before and rigid protocols are often not workable.

For future projects, the MTACC contracting process and field protocols for construction excavation should be flexible enough to accommodate both proper archaeological work and safe and practical construction practices. Furthermore, any monitoring project would be best served by having MTACC assign contracting officers and construction management personnel who are experienced in archaeological protocols, practices, and methods on projects. When this is not possible, training should be provided to the MTACC personnel well in advance of preparing any project documents or issuing any construction contracts that include archaeological monitoring. This training should also be provided to MTACC field engineers who are heavily relied upon as intermediaries in the field. It would also be helpful to have an archaeological training seminar for the MTACC and their contractor to explain what may be expected with regard not only to archaeological findings but also how archaeological work and the archaeological process are conducted, what the archaeologists do, and how their work will dove-tail with the construction and site activities. Such training was recommended by Dewberry early in the South Ferry Terminal project but was rejected because it was not part of the contract. An atmosphere of cooperation and communication at every level should be striven for. Archaeological work does not have to be a burden or a sticking point.

If one were to select the top five problems with South Ferry Terminal archaeology that should be modified for future projects, they would be: 1) ineffective communication protocols that prohibited the archaeologist and contractor from communicating directly and prohibited the archaeologist from communicating with the review agencies independently of the MTACC; 2) MTACC's use of employees who had no experience in working with archaeologists, archaeological requirements, or archaeologically sensitive sites; 3) hiring a contractor not experienced in working with archaeologists or on archaeologically sensitive sites; 4) lack of flexibility of the MTACC contract with their contractor to adjust schedules, equipment, or work locations based on real time archaeological findings; and 5) better time management and time coordination between the contractor and archaeologist that could redirect contractor manpower to areas or tasks that did not require archaeological effort while the archaeological work was being conducted in other areas. Addressing these problems and ensuring they are corrected on future projects will improve many aspects of archaeological work and of overall project management. ✷

A. Dutch Yellow Brick from Battery Park North with Dog Paw Print

B. Tin Glazed Wall tile with Scene from the Life of St. Jerome

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