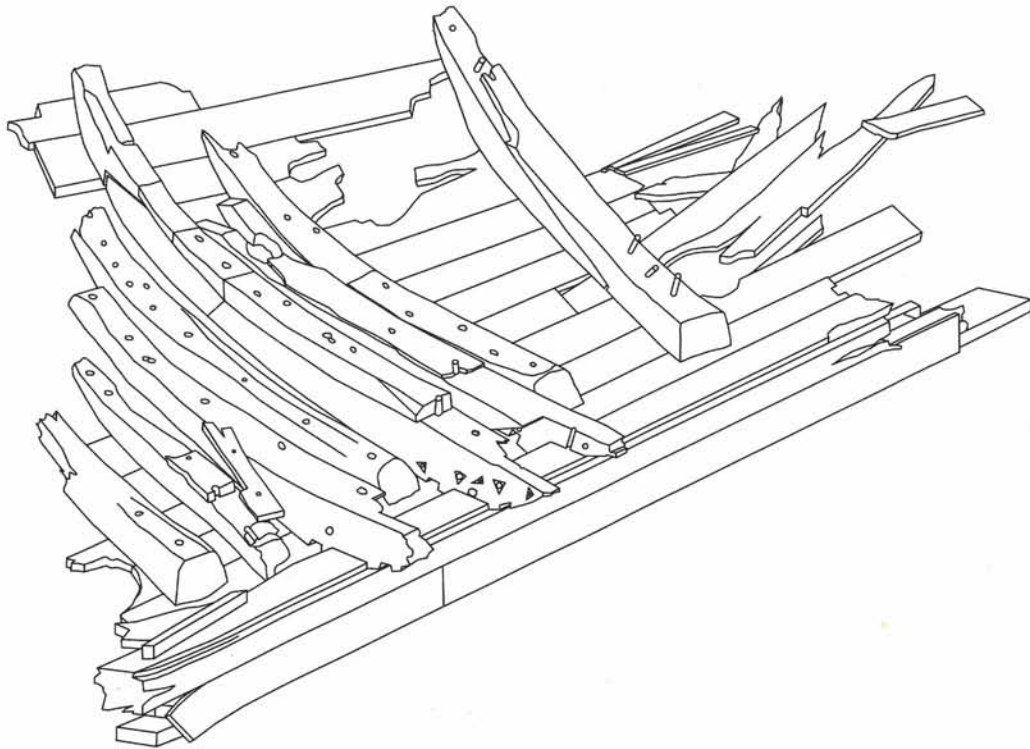


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PORTSMOUTH SHIPWRECK (44PM52)

*Archaeological Documentation of the Remains
of a Late Eighteenth- or Early Nineteenth-Century Vessel
Located in the Elizabeth River Ferry Docking Facility,
City of Portsmouth, Virginia*



Technical Report Series No. 6



2006

Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

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Virginia Department of Historic Resources
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ABSTRACT

During the excavation of a ferry docking facility on the Southern Branch of the Elizabeth River in downtown Portsmouth, Virginia, the remains of a wooden vessel were discovered. Construction crews uncovered two sections of the vessel approximately 20–25 ft. below the ground surface. As construction of the ferry facility necessitated removal of the wreck, Hampton Roads Transit contracted with Tidewater Atlantic Research, Inc. (TAR), of Washington, North Carolina, to develop a measured plan of the surviving vessel remains prior to their removal and document each significant element of the structure after removal. The archaeological documentation carried out by TAR was designed to meet the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended through 1992 (36 CFR 800, *Protection of Historic Properties*) and the Abandoned Shipwreck Act of 1987 (*Abandoned Shipwreck Act Guidelines*, National Park Service, *Federal Register*, Vol. 55, No. 3, December 4, 1990, pages 50116–50145). Results of the investigation mitigate construction related impacts to the resource by preserving the detailed architectural and construction-record associated with the surviving hull structure. Architectural and construction details suggest that the vessel was built and sank during the late eighteenth or early nineteenth century, probably during the Revolutionary War or perhaps the War of 1812. Unique construction features and unusual material suggest that the vessel was built locally for a limited purpose such as privateering, smuggling, or serving as an ersatz fire ship.

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ACKNOWLEDGEMENTS

Documentation of the shipwreck located in the Elizabeth River ferry docking facility at Portsmouth Virginia would not have been possible without the sensitivity for Virginia's maritime heritage exhibited by the City of Portsmouth and Hampton Roads Transit in Norfolk, Virginia. The authors would like to acknowledge both the City of Portsmouth and Hampton Roads Transit for their support of the investigation. We would also like to recognize Ms. Jayne Whitney for her coordination of the project. As is the case with most data salvage projects, the fieldwork was performed under very difficult circumstances. Without the industry and initiative of Roderick Mather and archaeologists Raymond Tubby and Jeff Morris the amount of salvaged data would have been considerably less than the amount of diagnostic information that was recovered. They were very ably assisted by Robert Church, Wayne Luscardi, and Nathan Henry during long hours in the muddy environment of the slip and in documenting timbers recovered from the vessel at Tidewater Atlantic Research in Washington. Robin Arnold's historical research, writing, and editorial supervision helped put the derelict into an historical context and make the Portsmouth report presentable. The authors would also like to thank Virginia Department of Historic Resources archaeologist David Hazzard for his efforts to bring the Portsmouth derelict to light by publishing the report as one of the Technical Report Series documents of the Virginia Department of Historic Resources. Without his interest and support and the editorial work of David Lewes access to the Portsmouth shipwreck data would remain limited to those with the capacity to ferret out obscure research reports.

Gordon P. Watts, Jr.

1: Introduction

In 1996, Hampton Roads Transit (HRT) began construction of a docking facility on the Portsmouth, Virginia, waterfront to accommodate ferry service between Portsmouth and neighboring city of Norfolk. During excavation of the fill within the confines of the docking facility, the remains of a wooden vessel were discovered. When construction crews halted excavation upon discovering that the structural material represented the remains of a vessel, only two sections of the hull remained intact approximately 20–25 ft. below the ground surface. The Virginia Department of Historic Resources (VDHR) was notified of the discovery, and that agency determined that the wreck met more than one of the criteria for nomination to the National Register of Historic Places and requested that the surviving structure be documented prior to continued excavation.

To develop and implement a plan to mitigate the impact of construction activities on the resource, HRT contracted with Tidewater Atlantic Research, Inc. (TAR), of Washington, North Carolina. Staff from TAR examined the wreck and formulated an approach to document the surviving vessel remains prior to their removal. The approach to mitigation included recovery and recording of each significant element of the surviving structure. In addition, a program of historical research was proposed to facilitate developing an historical context for the area and, if possible, to identify the vessel. That plan was accepted by the VDHR and HRT.

During the week of March 22–26, 1997, TAR personnel mapped the exposed structural remains. The section of the hull structure associated with

the bow was systematically disassembled after mapping, and each individual element was removed. To clear the way for excavation of the docking facility, diagnostic elements of the structure were transported to TAR for more thorough recording. Because the stern section of the wreck lay adjacent to the south side of the bulkhead it could not be excavated without undermining the structural integrity of the sheet pile. That section was mapped after the docking facility was flooded on April 23, 1997. When that material was removed on May 2, 1997, diagnostic elements of the structure were also transported to TAR for more comprehensive recording. At TAR each element of the structure was recorded using measured drawings, and those data were digitized using AutoCAD to support reconstruction and analysis.

All field, laboratory, and historical research was carried out under the direction of Gordon P. Watts, Jr., Principal Investigator. Roderick Mather served as Field Director and supervised all on-site project activities. Raymond Tubby and Jeff Morris served as project archaeologists, and Robert Church, Wayne Luscardi, and Nathan Henry served as Archaeological Assistants. Recording of the timbers at TAR was carried out by Wayne Luscardi, and the report was prepared by Gordon Watts, Roderick Mather, and Raymond Tubby.

Although the vessel could not be identified, evidence from the wreck and the historical record suggests that the remains are those of a late eighteenth- or perhaps early nineteenth-century ship. Construction material suggests that the vessel was locally built for some limited purpose such as privateering, smuggling, or perhaps to serve as a fire

ship. Architectural and construction details suggest that the vessel was built and sunk during the Revolutionary War or possibly the War of 1812. Historical research confirms that there was considerable naval and maritime activity at Portsmouth during both periods and numerous vessels were destroyed as a consequence. Cartographic research supports the Revolutionary War association. Filling along Portsmouth's Elizabeth River waterfront has been so extensive that prior to 1816 the site had been covered by sediment, and the southern portion was filled by new land.

PROJECT LOCATION AND DESCRIPTION

The Elizabeth River is a tributary of the James River located about 2 miles upstream from its confluence with the Chesapeake Bay. The Southern Branch of the Elizabeth River begins approximately nine miles upstream from the mouth of the Elizabeth River and winds through the heavily devel-

oped areas of Portsmouth and Norfolk. The river is tidal and serves as the northern terminus of both the Chesapeake and Albemarle Canal and the Dismal Swamp Canal. The Southern Branch of the Elizabeth River is navigable to the town of Great Bridge, a distance of 11 miles.

The vessel under investigation was found in a ferry docking facility under construction on the west bank of the Southern Branch of the Elizabeth River in downtown Portsmouth, Virginia (Figure 1). The docking facility lies at the east end of High Street beyond the intersection with Water Street (Figure 2). Remains of the vessel were found near the southeast side of the ferry docking facility underneath approximately 20–25 ft. of fill. The longitudinal axis of the keel was oriented with the bow to the north and the stern to the south adjacent to the south wall of the sheet pile bulkhead (Figure 3). Fill consisted of debris from a nearby railroad line, building material, dock and wharf structure, and river sediment.

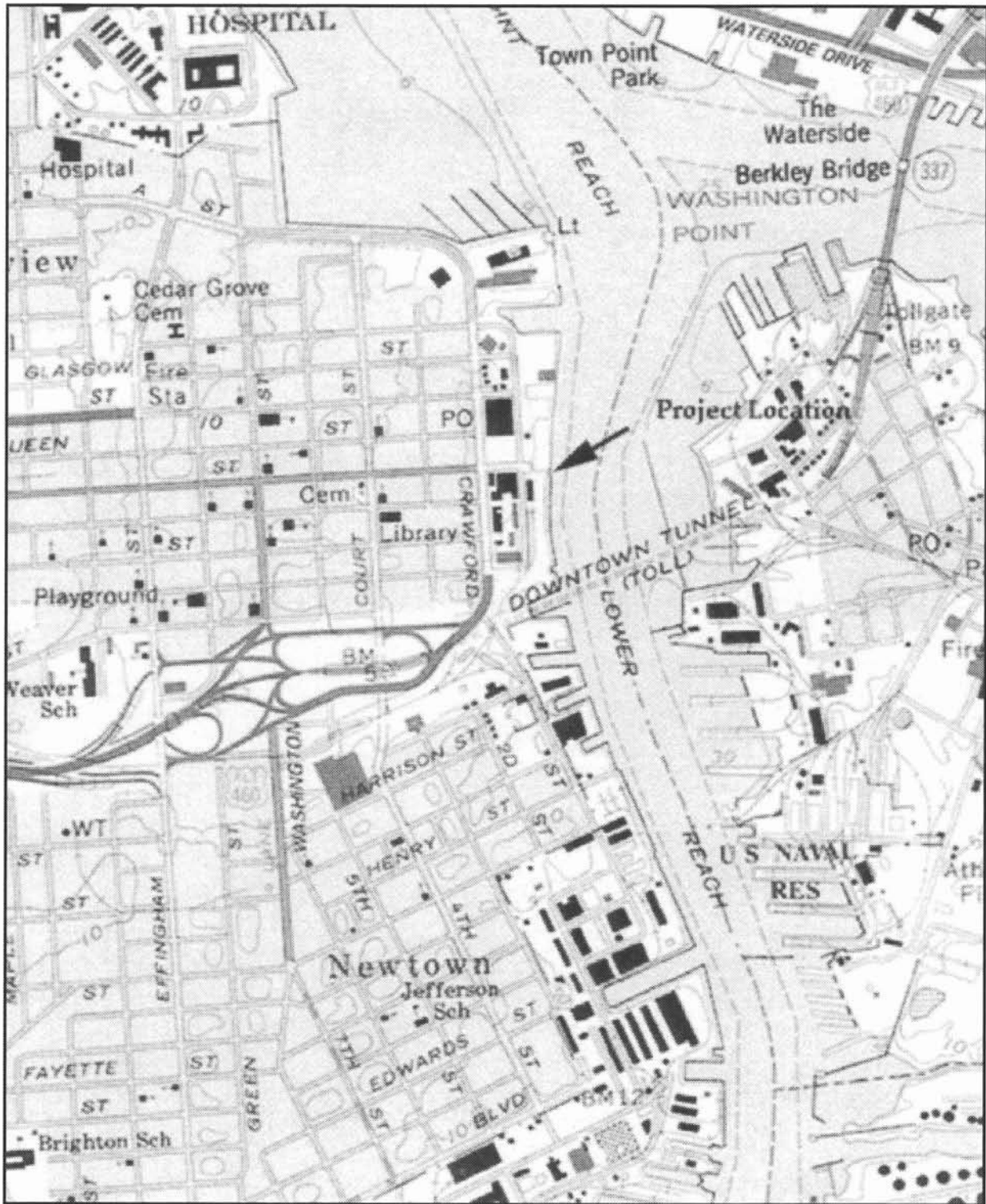


Figure 1. Location of the Elizabeth River Ferry Docking Facility at Portsmouth, Virginia.

2: Historical Background

HISTORICAL AND CARTOGRAPHIC RESEARCH METHODOLOGY

In order to accurately identify any areas of potential impact from the new dredging, construction, and disposal, TAR examined the cartographic and historical records preserved at repositories in the Norfolk, Richmond, and Washington, D.C., areas. In the Norfolk area, the historical and cartographic records of the Army Corps of Engineers (USACE), Norfolk District, were examined. The Annual Reports of the USACE were surveyed for relevant data concerning navigation and navigation improvements in the Southern Branch of the Elizabeth River. The collections of the Mariner's Museum were examined for additional maps and historical data concerning the study area. The City of Chesapeake public library (Central Branch) and other libraries in the surrounding counties were also surveyed for local historical data. In Richmond, material in the Virginia Archives and Virginia State Library was examined, and TAR consulted the Virginia SHPO to obtain a record of any sites in the archaeological site files maintained by that agency. Near Washington, D.C., the collections of the National Archives Cartographic Branch and the U.S. Coastal and Geodetic Survey (USCGS) were examined for historic maps and charts that include the study area.

To support an assessment of the potential for locating significant submerged cultural resources, an historical background was developed for the proposed project area. Since the proposed project area does not fall directly in one city or town, but lies on the outskirts of three separate areas (Nor-

folk, Portsmouth, and Chesapeake), historical information for these three areas was developed into a historic background for the project area. Historical research was designed in accordance with the requirements identified by the VDHR. Literature and archival investigations were initiated with a survey of secondary source materials associated with Virginia's historical development. The survey focused on the documentation of activities such as exploration, colonization, development, agriculture, industry, trade, shipbuilding, commerce, warfare, transportation, recreation, oystering, and fishing that would have been contributing factors in the loss of vessels or presence of other submerged cultural material in the vicinity of the proposed dredging, construction, and disposal areas. While examining each of these factors, special attention was devoted to activities associated with maritime commerce.

HISTORICAL CONTEXT

Exploration and Settlement of Virginia

The first European exploration of the Chesapeake Bay region was conducted by the Spanish. In 1561, Pedro de Menéndez de Avilés explored the bay christening it "Bahia de Santa Maria" (Tazewell 1982:17). In 1570, a group of Jesuits landed at Jamestown Island and established a mission on the York River. However, the mission's inhabitants were slaughtered by Indians in 1571 (Tazewell 1982:17).

The English arrived in the Chesapeake in 1607. Under the command of Captain Christopher Newport, a fleet of three ships landed at Jamestown

Island to established a colony for the Virginia Company. The colonists erected a fort on Jamestown Island and began to explore their new land. The objectives of the colony were to extract the land's mineral and agricultural wealth, and if possible, locate a route to the South Sea (Bruce 1895:1:16–17). When the mineral potential of the country failed to materialize, the colony turned to agriculture. The land that was cleared for the fort was soon planted with English wheat. The colonists also experimented, somewhat successfully, with a variety of fruits and vegetables such as melons, potatoes, pineapples, and oranges (Bruce 1895, 1:194). Despite these accomplishments, the settlers still relied heavily on the Indians to provide them with most of their sustenance.

While the establishment of the settlement on Jamestown Island was correct from a defensive viewpoint, it was a poor choice in terms of health and agricultural potential. The island and surrounding mainland consisted of disease ridden swamps. All but sixty of the colonists died during the “starving time” of the winter of 1609. Of the 7,000 colonists that came to Virginia between 1607 and 1624, only 1,249 were alive when the Virginia Company was dissolved (Tazewell 1982:22). To alleviate these problems, settlements were established in the more fertile and healthy regions upstream from Jamestown. By 1616, plantations were also established at Henrico, Bermuda, West, and Shirley Hundreds, Kecoughtan, and Dales Gift (Bruce 1895, 1:216). Counties were formed as the colony grew. The county of New Norfolk was formed in 1636, from a section of Elizabeth City County, one of the nine original shires in the Virginia Colony (Hanson 1969:224).

The Elizabeth River was named by Captain John Smith for the eldest daughter of James I during his explorations of the Chesapeake Region (Hanson 1969:7). During September 1608, Smith, accompanied by twelve men, left Jamestown in a small vessel to explore country south of Jamestown. He crossed Hampton Roads, sailed up the Elizabeth River, and found signs of

native habitation including cultivated garden plots. Captain Smith also noted that the river banks were “overgrown with the greatest pyne and firre trees wee ever saw in the country.” In 1620, a land grant petition was made by a shipbuilder named John Wood who asked for 400 acres to be located on the Elizabeth River “because thereon is timber fittinge for his turne and water sufficient to launch such ships as shall be there built.” No historical documentation of the Wood grant exists. The first recorded grant on the Elizabeth River was made in 1620 to Captain William Tucker who patented 650 acres at Seawell point (Butt 1961:1). Tucker's patent heralded the southward movement of settlers to the region.

The first English settlement along the Southern Branch of the Elizabeth River was the settlement of Berkley located on the peninsula between the Eastern and Southern Branches. That settlement was founded on 5 December 1619 by five cousins from Berkeley Castle, England (Hanson 1969:224). From 1619 settlement along the Southern Branch of the Elizabeth River increased sporadically until the eighteenth century.

As a natural consequence of the region's numerous streams which the settlers used for transportation and communication, vessel construction began as an economic response. While land owners frequently built small boats for transporting goods along the river systems of the Chesapeake Bay, they rarely constructed ships during the early seventeenth century. Various encouragements were offered by the General Assembly to colonists who built large vessels as it made the colony less dependent on British vessels. Thus in 1656 it was decreed that all ships owned exclusively by colonists were exempt from castle duties. Three years later a law passed stating that settlers transporting goods to ports other than those in English dominions in Europe would not have to pay tax on their cargoes if the vessels used were owned by Virginians alone. Additionally in 1661, 50 pounds of tobacco per ton were granted to every person in the colony who constructed a vessel large enough to make a

sea voyage. Finally in 1677, the owners of vessels built in Virginia and belonging to Virginians alone were relieved of all duties except those involving making entry, clearing, securing a license to trade, and securing bond to sail directly to England (Bruce 1935:2:432–436; King 1993:229).

Travel throughout the tidewater region was intimately tied to the water. The region is traversed by numerous rivers and creeks, which made journeys without any type of watercraft nearly impossible. As settlements throughout the region increased there was a demand for the creation of a system of public transportation. One of the first ferries on record was a private enterprise operated by Adam Thoroughgood between what became Norfolk and Portsmouth in 1636 (Evans 1957:37). This premier ferry consisted of a small skiff rowed by slaves. As the traffic increased, it became clear to the General Assembly that the system would have to be expanded and better regulated. In 1642, an act was passed calling for the establishment and maintenance of ferries and bridges. This act was later repealed and replaced with an order allowing each county to establish its own ferries (Evans 1957:38). In 1702, to encourage the creation of ferries to handle the ever growing water born traffic, the Assembly made all persons operating ferryboats free from public and county levies and free from such public services as musters, constables, clearing highways, and impressment.

By the late seventeenth century, the need to establish ports in Virginia was felt by legislators who recognized that the crown was not receiving all the taxes on trade goods that it was legally entitled. This resulted from the practice of plantation owners building boats, wharves, and warehouses on their own property and conducting business directly from home, thus circumventing customs inspectors. An act was passed in 1691 to change this situation but was suspended. Finally, in 1708, an Act for Ports of Entry and Clearance was passed with the goal of turning trading towns into ports

where all lading and unloading would take place (Evans 1957:34; Hening 1969:3:58–61).

In 1659, Captain William Carver occupied patents and planned to construct a city where modern Portsmouth stands (Hanson 1969:226). Carver, a master mariner and vessel owner, was actively engaged in Bacon's Rebellion and was hanged for treason by Governor Berkeley. All of Carver's land holdings were seized by the Crown, and construction of the city was delayed (Butt 1961:2). In 1716, 890 acres previously owned by Carver were granted to Lieutenant Colonel William Crawford along with an additional 239 acres. The land remained undeveloped until the town of Portsmouth was founded in 1752.

William Crawford [Craford, Crafford] was a wealthy merchant and ship owner. He was politically active and held numerous offices including: a Norfolk County judicial seat, House of Burgess membership, rank of Lieutenant colonel of the county militia, and high sheriff of the county (Butt 1961:2). In 1752, Crawford contacted the county surveyor, Gershom Nimmo, and with his assistance laid off the small town named Portsmouth after the English port city. Approximately 65 acres were designated for municipal use (Butt 1961:3).

Eventually, the Virginia General Assembly passed laws enabling Crawford to sell half-acre lots to the public. Crawford also donated the four corners of High and Court Streets to public use. A church, market, courthouse, and jail were designated to occupy the city block. Nimmo's original map set the town limits to Crawford's Bay to the north, Elizabeth River to the east, Crab Creek to the south, and Court Street to the west. A later map (whereabouts unknown) extended the city limits to the western boundary to Dinwiddie Street (Butt 1961:3). Crawford passed away in 1762, leaving a large portion of his estate, including unsold township lots to Thomas and George Veale. In 1763, land owned by Thomas Veale was annexed by Portsmouth, and the western boundary was extended to chestnut Street (Butt 1961:3).

During this same period, Charles Steuart left Norfolk and settled in Portsmouth. In May 1754, Steuart commented: "I intend to remove to Portsmouth, a new town on the other side of the river about a half mile from here, which is more convenient for navigation and equally convenient for any other business..." Steuart and other shrewd Scottish merchants purchased waterfront property and engaged in profitable shipping enterprises. Numerous wharves and warehouses were constructed along Portsmouth's harbor.

From its early days, the local economy thrived due to an abundant supply of timber and naval stores, shipbuilding, ship repair services and supplies, and maritime trade with the West Indies, Britain, and Europe (Butt 1961:3). Operations at the Gosport Navy Shipyard were initiated during this period. In 1767, Andrew Sprowle [Sproule], a prominent merchant and ship owner, purchased waterfront property south of Portsmouth and constructed the shipyard. Separated from Portsmouth by the then navigable Crab Creek stream, Gosport prospered as a private enterprise and also accommodated British naval vessels (Butt 1961:4).

Across the Eastern Branch of the Elizabeth River from Berkley, Nicholas Wise, a shipwright, bought 200 acres of land from Lewis Vandermillier in 1662. On 8 June 1680, the Virginia Assembly passed "An act for cohabitation and encouragement of trade and manufacture," that provided for the purchase of 50 acres of land from Nicholas Wise on the north side of the Elizabeth River to build a town (Shomette 1982:1, 4). The town of Norfolk, however, was not officially established until October of 1705 by the Virginia Assembly when it was designated as the Town of Norfolk and became an official port of entry (Shomette 1982:1, 4). In 1728, the boundaries of Norfolk were enlarged, and in 1736 the Borough of Norfolk was granted a Royal Charter (Hanson 1969:224).

From its founding, Norfolk had a strong maritime connection. William Byrd II visited Norfolk in 1728 and commented on its advantageous location for trade and navigation. Byrd observed that

Norfolk had already become a significant port, exporting beef, pork, flour, and lumber from the adjacent areas and North Carolina. At this time most of Norfolk's trade was with the West Indies (Hening 1969:6:214). William Byrd also described the number and types of vessels that could be found in the harbors at Norfolk trading. He stated that "there were near twenty brigantines and sloops riding at the wharves and often they have more" (Hening 1969:6:214).

Lord Adam Gordon visited the Norfolk area in 1765 and was impressed with the port stating "the Port of most traffick in Virginia, it contains above four hundred houses, has a depth of water for a Forty Gun Ship, or more, and conveniences of every kind for heaving down, and fitting out large Vessels, also a very fine Rope-Walk" (Gordon 1916:406). It was about the time of Lord Gordon's visit to Norfolk that the shipbuilding industry had begun to feature prominently in the Virginia Colony's economy. The rise in colonial shipbuilding was due to an abundance of timber in the colonies that allowed colonial shipwrights to build vessels at a fraction of the cost of their English counterparts. From the beginning, Norfolk shipyards were the leading shipbuilders in the colony (Kelso 1964:v). Between 1763 and 1774, Norfolk shipyards built approximately 180 vessels, an average of fifteen ships a year (Kelso 1964:22).

The vessels built during the Colonial era at the shipyards of Norfolk consisted of sloops, schooners, ships, brigs, and snows. These vessels tended to be larger than those built in other parts of the colony (Kelso 1964:22). Norfolk shipwrights did not limit themselves to the production of new vessels; the area became well known for its shipwrights' refitting and repairing skills. Because of the wide variety of ship construction and repair that took place in Norfolk, makers of ships' chandlery also figured prominently in the Norfolk economy (Kelso 1964:14).

In addition to the shipbuilding industry, settlers of the Elizabeth River area also began to make

use of the area's abundant submerged natural resources. In the early seventeenth century, the Virginia Company was granted control of the products of the sea. In 1680, however, the courts gave landowners the right to fish from their property. Despite the legal restrictions, it soon became necessary to regulate commercial oystering and fishing. In 1705, the House of Burgesses passed an act requiring licenses for fishing and oystering, but this was difficult to enforce. By 1780, oyster grounds were declared common to all residents (King 1993:341–351).

The Revolutionary War

The Portsmouth area was the site of several major events during the Revolutionary War. A series of invasions and occupations caused many townspeople to seek safe haven elsewhere. In April of 1775, Governor John Murray, Lord Dunmore, in fear of a rebel uprising, captured the provincial powder magazine at Williamsburg (Marshall and Peckham 1976:10). By the fall of 1775, governor Murray had accepted the hospitality of Andrew Sproule, an avowed Tory from Gosport. The governor's warships anchored in the Elizabeth River posed a continuous threat against the people of Portsmouth and Norfolk. Rumors of impending destruction prompted Loyalists from Norfolk to solicit protection from the Governor. As a result, Dunmore was forced to abandon Portsmouth and Gosport, and officially occupied the city of Norfolk on 23 November 1775 (Selby 1988:68).

Shortly before Dunmore occupied Norfolk, two companies of the 14th regiment were dispatched from Florida to assist him to gain control of the city. While trying to strengthen his position, Dunmore built a series of fortifications around Norfolk and offered freedom to slaves and indentured servants who would join the loyalist cause. This offer further eroded Dunmore's support in Norfolk (Marshall and Peckham 1976:10; Selby 1988:68). Dunmore also organized a small band of loyalists under the direction of John Goodrich

who carried out raids against plantations and ship landings (Selby 1988:68).

One of the fortifications that Dunmore built was a fort on the northern shore of the Southern Branch of the Elizabeth River near Great Bridge (Marshall and Peckham 1976:10). In response to a false rumor that Dunmore was marching to take Suffolk, Colonel William Woodford sent troops to Great Bridge to cut Dunmore off. The Virginians fortified the church at Great Bridge and erected breast works across the road between Great Bridge and the British fort (Selby 1988:70). With the Virginians and the British entrenched in their respective positions, a stalemate ensued. Both sides collected vessels on either side of the Southern Branch of the Elizabeth River, and a few minor skirmishes occurred at a ford five or six miles downstream of Great Bridge (Selby 1988:72).

These skirmishes continued until 9 December 1775, when the British, on hearing from a runaway slave that the Virginians only had a force of 300, decided to attack. Reveille had just been signaled, and the Virginians were ready when the British attacked. The battle took place on the causeway, and the Virginians held their fire until the British were almost in front of them. The British were repulsed and retreated back to their fort on the opposite side of the river (Selby 1988:73). Dunmore realized that he could not hold Norfolk and fled to a ship, while Woodford reclaimed Norfolk on 14 December 1775 (Selby 1978:74).

Dunmore, his troops, and many loyalists continued to harass the colonists from their vessels in Norfolk Harbor. Several verbal exchanges were sent back and forth between the British troops in the harbor and the Virginians without incident until New Year's Day 1776. During the afternoon on New Year's Day, British ships opened fire on Virginian troops as they paraded, and sent several landing parties ashore to set fire to the city (Selby 1988:82). Surprising the British, the Virginians started to aid the British in burning the city. The city burned for three days and was almost totally

destroyed (Selby 1988:82). With expectations of naval support from New York, Dunmore crossed the Elizabeth River and established a post at Tucker's Mill Point (present Naval Hospital).

Minor skirmishes between the opposing forces continued through the beginning of February 1776. Due to Tory support from Portsmouth which supplied Dunmore with critical aid, Major general Charles Lee ordered American troops to Portsmouth in April 1776. Lee described Portsmouth as a "hotbed of toryism" (Butt 1961:5). Lee threatened to torch the city but eventually set fire to only prominent Loyalist properties. Later in the spring of 1776, after several attempts to solicit aid from other British Commanders to re-establish a foothold at Norfolk failed, Dunmore left the Elizabeth River area, eventually sailing to New York and then on to England (Eller 1981:97).

After the burning of Norfolk, the Virginians concentrated on building a navy to defend themselves. Andrew Sproule's Shipyard at Gosport was seized as a State Shipyard and the water front of the Elizabeth River turned its efforts to producing supplies to fight the war. Privateers also became important in Virginia's fight for independence. Nearly 100 Virginia vessels were given letters of marque between 1776-1783. This force of privateers greatly added to 27 vessels commissioned into the state navy to protect the mouths of the state's many rivers (King 1993:64).

From its founding, until its destruction during the Revolutionary War the Norfolk area grew as a port. Mariners carried on a brisk trade with Great Britain and the West Indies. Several of the Virginia-built vessel designs were of simple construction and very fast, making them suitable for running the British blockade during the war. During this period, the island port of St. Eustatius in the West Indies was the primary destination of these ships and the main source of supplies to Virginia traders.

The area surrounding the Southern Branch of the Elizabeth River was not out of jeopardy as long as the war continued. With the Virginia State Navy

in possession of the Gosport Navy Yard, Norfolk again became strategically important. The British turned their attention to the Norfolk area in May of 1779 when Commodore Sir George Collier arrived at the mouth of the Chesapeake Bay with 28 ships. Collier and Major General Edward Mathew aboard the HMS *Rainbow* conducted a raid up the Elizabeth River (Selby 1988:204). They led an amphibious assault on Fort Nelson which guarded Portsmouth and quickly occupied the fort. Collier and Mathew then struck at the Gosport Shipyard where they destroyed eight vessels. They pursued the vessels that tried to escape up the Southern Branch of the Elizabeth River, burning and capturing them as they fled (Selby 1988:205). In all, the British destroyed, captured, or burned 137 vessels during this raid on the Norfolk vicinity (Butt 1961:6; Eller 1981:446; Shomette 1982:31).

The Portsmouth area again became directly involved in the Revolutionary War in January of 1781 when Benedict Arnold established an operations base there for the British (Eller 1981:464-467). Arnold's ships, commanded by commodore Thomas Symonds, held forces of approximately 2,500 men. The General stationed his flagship, HMS *Charon*, near Crancy Island to block navigation on the Elizabeth River. Other British vessels were strategically stationed in the stream between Gosport and Hospital Point. Expecting an attack, Arnold instructed his men to build a fortress west of Portsmouth. Existing British maps indicate a crescent-shaped line of redoubts and blockhouses, mounted with cannon batteries extended along the line of present Washington Street from old Gosport Creek at Griffin Street to the river at Waverly Boulevard, near Dinwiddie Street. Arnold established headquarters at Patrick Robinson's home on the northwest corner of High and Middle streets. The sugar house on the south end of Crawford Street was designated for barracks and a prison (Butt 1961:8). This military infrastructure also was used by the British to facilitate raids up the James River.

During the five month period in which these raids took place, the remnants of the Virginia State Navy were either destroyed or captured (Eller 1981:467). The Portsmouth base that Arnold had established was turned over to Cornwallis 20 May 1781. The base was used by Cornwallis until August of 1781, when he completed his fortifications at Yorktown. Cornwallis moved his army to Yorktown and ordered the fortifications at Portsmouth to be destroyed (Eller 1981:494, 504).

When Cornwallis abandoned the Portsmouth base in August of 1781, the Norfolk vicinity's direct involvement in the Revolutionary War ended. The effects of the war greatly hampered Norfolk until the last British ships cleared the Virginia Capes at the end of the conflict because of the area's close association with the mouth of the Chesapeake.

War of 1812 and the Early Federal Period

While the James River region was becoming the center of trade in Virginia, its strategic location brought conflict to the area during the War of 1812. When war broke in 1812, the British targeted the area in hopes of cutting off the region's vital waterborne transportation and trade. To carry out this strategy, they intended to blockade the mouth of the Chesapeake Bay and occupy the port cities of Hampton and Portsmouth (Rubin 1977:92-93; Rouse 1986:66). The British arrived in the Chesapeake on 5 February 1813 with a fleet of seven warships under the command of Sire John Warren. When the fleet arrived, the inhabitants of the Hampton Roads region feared that the British would launch an assault on Norfolk. Instead, the British fleet anchored in Lynnhaven Bay and proceeded to block any commerce from entering or leaving the bay (Rouse 1986:66).

The Norfolk and Portsmouth region was not as devastated by the War of 1812 as it had been during the Revolutionary War, but again its location brought the war to the area. The British blockade cut severely into the region's commerce, and once again they attempted to take the Norfolk-

Portsmouth region due to its location at the mouth of the Chesapeake Bay (Rubin 1977:92-93). The British, however, had more complex plans than just blockading the Chesapeake Bay. The British attacked Craney island on 13 June 1813 in order to secure a position from which to attack the Gosport navy yard, the major the towns in the area and to capture or destroy the USS *Constellation*, which lay at anchor in the Southern Branch of the Elizabeth River. This initial attack failed, and on 25 June 1813 the British, under command of Admiral Cockburn attacked Newport News and then Hampton where they committed a number of atrocities (Shomette 1982b:11-12; Rouse 1986:9-12). Although the British withdrew shortly after the attack on Hampton, they left ships to administer the blockade of the Chesapeake until the end of the war (Rouse 1986:72).

The War of 1812 demonstrated once again the vulnerability of the Hampton Roads area to naval attack. As a direct result of the destruction carried out by the British during the war, several forts were built to prevent the reoccurrence of such an attack (Weinert and Arthur 1989:40, 43). Fort Monroe was built at Point Old Comfort in 1819, and Fort Calhoun, later renamed Fort Wool, was added to the area's defenses in 1830.

The Development of Canals, Steamboats, and Railroads

The idea of constructing a canal between the waters of northern North Carolina and southern Virginia via the Dismal Swamp began in the early eighteenth century. The idea was pursued by Patrick Henry, the first Governor of the Commonwealth of Virginia, and on 1 December 1787 the Virginia Assembly passed an act for construction of the canal pending the State of North Carolina passing a similar act. North Carolina, however, having reservations concerning the impact of the canal on their maritime commerce, did not pass the reciprocal act until November 1790. Actual construction of the Dismal Swamp Canal began in 1793 (Pugh and Williams 1964:3-5).

The original route of the Dismal Swamp Canal connected Deep Creek on the Elizabeth River to Joys Creek on the Pasquotank River. The canal was completed in 1805, but consisted of little more than a muddy ditch. The early vessels that used the canal were shingle flats 30–40 ft. long, 4–6 ft. wide, and drawing 18–24 in. of water. It was not until the War of 1812 that the value of the canal was realized, and improvements were made. The first vessel to navigate the canal other than a flat was a 20 ton boat that made the passage in June of 1814 (Pugh and Williams 1964:5–6).

Problems developed on the Deep Creek end of the canal during the early nineteenth century that prompted a change in the course of the Dismal Swamp Canal. Deep Creek had begun to silt up. To solve the problem, a canal was built from the Deep Creek end of the canal to Gilmerton, a small town farther down the Elizabeth River at the mouth of St. Julian Creek named for Governor Thomas Gilmer, of Virginia. The Gilmerton Division, as it came to be known, was completed in 1843 (Brown 1970:87–89). The addition of the Gilmerton Division improved the northern terminus of the canal significantly.

From 1896–1899, the Dismal Swamp Canal was rebuilt by the Lake Drummond Canal and Water Company. The reconstruction of the canal included the dredging, widening, and straightening of Deep Creek. The Gilmerton Division was kept in operation, but the new Deep Creek entrance became more widely used. The Gilmerton Division ceased operations in 1916 when a fixed Railway bridge was erected across its northern end (Brown 1970:137–140). Since 1916, the Gilmerton Division has been abandoned, but the lock gates at the St. Julian Creek entrance can still be seen.

Steamboats were introduced into the Norfolk area between the War of 1812 and the Civil War and slowly replaced sailing ships. They slowly became the workhorses of the Norfolk and Portsmouth region. The earliest steamboat to visit the Norfolk-Portsmouth region was the *Washington*,

which arrived in May of 1815. The *Powhatan*, the first steamboat designed for James River service, arrived in 1816 and began regularly scheduled service between Norfolk and Richmond (Emmerson 1947:1).

The steamboat quickly became an important mode of transportation in the Norfolk area. Regular lines were established with Baltimore and Richmond along with weekend and evening excursion trips. The shipbuilders of the Norfolk area also quickly became involved in the new technology. The first steamboat, to be built in the area was the *Norfolk*, built in 1817 (Emmerson 1947:1). The majority of passengers and trade, however, were still carried on packet lines consisting of locally owned and manned schooners well into the mid-nineteenth century.

It was also during this period that railways were first introduced to the Norfolk-Portsmouth area. In the 1850s an extensive network of railways was developed in Virginia. One of the first of these networks was an east-west line that connected Norfolk with the trans-Allegheny. The railways built during this period allowed for the Norfolk area to grow rapidly during the late nineteenth and early twentieth centuries. Coal from the Virginia mountains was transported to Norfolk where it was in turn shipped all over the world (Rubin 1977:121, 156).

The Civil War Period

The Norfolk-Portsmouth area again became a battleground during the Civil War. The Virginia secession convention voted on 17 April 1861 to secede from the Union (Robertson 1991:8). On the night of 20 April 1861, Federal forces, facing attack by Confederate troops, set the United States Navy Shipyard at Gosport ablaze. The Federals also burned or scuttled 12 vessels in the yard, including the steam frigate *Merrimack* (Shomette 1982:12–13). Union forces, however, were not able to complete the destruction of the shipyard before they were forced to abandoned the loca-

tion, leaving the shipyard and the remains of the vessels in Confederate hands.

Confederate forces took over the yard, gaining artillery and more gunpowder than the entire Confederacy had previously possessed (Robertson 1991:10). Shortly afterwards, they raised the frigates *Germantown*, *Merrimack*, and *United States* and the sloop *Plymouth*. Work was immediately begun on converting the *Merrimack* into the first Confederate ironclad ram (Shomette 1982:13). The Confederates also fortified Craney Island with 42 cannons to defend the Elizabeth River (Shomette 1982:13).

On 8 March 1862 the Confederate ironclad CSS *Virginia* (formerly the *Merrimack*), set out from the Gosport Navy Yard to challenge Federal vessels in the harbor at Hampton Roads. The *Virginia* easily cut through the Union vessels, destroying the USS *Cumberland* and forcing the USS *Congress* to surrender. The next day the *Virginia* steamed out of the Elizabeth River to attack the USS *Minnesota*, which had run aground during the previous day's fighting, but found the Union ironclad USS *Monitor* protecting the vessel. The ensuing battle was the first fought between two ironclad vessels. The two vessels exchanged shots most of the day, without either being able to do much damage to the other (Fowler 1990:84–88). At the end of the day the *Virginia* steamed back to the Gosport Navy Yard to have its ram fixed. The *Virginia* returned to Hampton Roads a couple of weeks later, but only fired a few shots at the *Monitor*. It was clear to the commanders of both vessels that the battle was to be decided on land, and not on the sea (Fowler 1990:84–88).

In the early months of 1862, the tide turned against the Confederates in the Hampton Roads area. By the end of January, General George B. McClellan had the largest army ever composed in the western hemisphere near Washington D.C. ready to retake Virginia. In mid-March, McClellan began his campaign up the Virginia Peninsula, and on 3 May 1862 the Confederates withdrew from Yorktown. Shortly after their retreat from

Yorktown, the Confederates decided that the Norfolk area was no longer a safe haven. Protected by the CSS *Virginia*, the Confederates withdrew towards Richmond (Fowler 1990:90–91). In order to prevent the CSS *Virginia* from falling into Union hands the Confederates attempted to lighten the ship so that it could be moved up the James River, but were unsuccessful. Commodore Josiah Tattnall chose to run the CSS *Virginia* on shore at Craney Island and fire the ship (Shomette 1982:14–15).

The Post Civil War Period

Immediately after the war, the Norfolk-Portsmouth area experienced the slow recovery characteristic of most postbellum southern towns, but this did not last long. The recovery of the coal industry brought new growth to the area, which in turn stimulated the revival of the shipbuilding industry, as new ships were needed to ship the coal that was brought to the Norfolk and Western Coal terminals at Lamberts Point (Rubin 1977:148). Other industries grew as a direct result of the coal industry, manufacturing everything needed to bring coal from the mountains to the shipping terminals along the Elizabeth River.

It was in this period that the export of oysters reached its peak as the seafood industry grew rapidly. Enforcement of early prohibitions against taking oysters with instruments other than hand tongs and against shipping oysters out of state found strength in 1859 with the appointment of oyster inspectors. The industry peaked during the 1920s, but then declined in the 1950s due to the oyster parasite MSX (King 1993:351–359).

Norfolk and Portsmouth again became a major military center in the late nineteenth century. At the Norfolk Navy Yard at Gosport, the country's first battleship was built between 1889 and 1892 and the aircraft carrier USS *Langley* between 1919 and 1922 (Hanson 1969:226). In 1917 the United States Navy established an operations and training base at Norfolk (Nesbitt 1993:87). The region grew considerably due to

the military establishments, and these industries, along with the large number of port facilities, kept the region booming during the Great Depression. During World War II the region became America's primary antisubmarine base and one of the primary assembly ports for shipping men and supplies to the European theater (Rubin 1977:174). After the war the area continued to play an important role in America's military might, eventually becoming one of the largest military ports in the world and home to the North Atlantic Fleet.

CARTOGRAPHIC RESEARCH

In addition to historical research, investigation of the Portsmouth shipwreck included an examination of cartographic sources. Maps examined during the cartographic survey were searched for information concerning the extent of land along the Portsmouth waterfront that was developed by filling the south of High Street and east of Craford's Street. Maps consulted included collections from the USCGS, the National Oceanic and Atmospheric Administration, the Cartographic Branch of the National Archives, and the USACE, Norfolk District. Several early maps that contain details of the Portsmouth water front have been used to document the riverfront development. Those maps relevant to documenting the expansion of waterfront land were digitized, and overlays were prepared on AutoCad. Historic map data was tied to a current U.S. Geological Survey 7.5 minute series map, Norfolk South Quadrangle. That map was photorevised in 1986. Data generated from the analysis of historic maps has been used to help establish the relative age of the Elizabeth River Docking Facility shipwreck.

The Town of Portsmouth, February 1752, prepared by Gershom Nimmo for Colonel William Craford (redrawn 1945)

This is one of the earliest plans of the town of Portsmouth. South of High Street the Nimmo plan clearly shows that the city waterfront in 1752

was only 265 ft. east of Craford's Street (later renamed Crawford). At the time of Nimmo's survey, the wreck site and that of the Ferry Docking Facility were well within the natural boundaries of the Elizabeth River (Figure 4).

A View of Portsmouth in Virginia from the East Side of the River, with Part of Norfolk Town & Powder Point, 1775

This 1775 map of Portsmouth illustrates the waterfront area, private homes, numerous warehouses and docks and the Gosport Navy Yard adjacent to Gosport Creek. A "publik" ferry facility was identified south of Powder Point at the east end of Ferry Street. South of High Street the 1775 plan clearly shows that the city waterfront had been extended by almost 100 ft. of fill deposited since the 1752 Nimmo plan. A building appears on the south side of a wharf structure that extends into the Elizabeth River. At the time of the 1775 map, the wreck site and the Ferry Docking Facility site were still well within the natural boundaries of the Elizabeth River (Figure 5).

Plan of Portsmouth on Elizabeth River from an exact survey made on 21st of January 1781 by James Straton, 2nd Lt. of Engineers

This map outlines strategies for the defense of Portsmouth. The plan includes the areas southwest of the city to be reinforced with redoubts, abatises to form stockades, and a covert glacis (incline) associated with the fortifications. A note estimates that a force of 2,000 will be necessary to defend the structure. Northwest of the city an "almost demolished" rebel work is shown. Although streets are not all identified, North, High, and Crawford are apparent. It is also apparent from the waterfront detail that north of High Street, the creation of additional land along the waterfront has been going on since the 1775 map of Portsmouth. However, at the time of Straton's survey, the wreck site and the Ferry Docking Facility location were still well within the natural boundaries of the Elizabeth River (Figure 6).

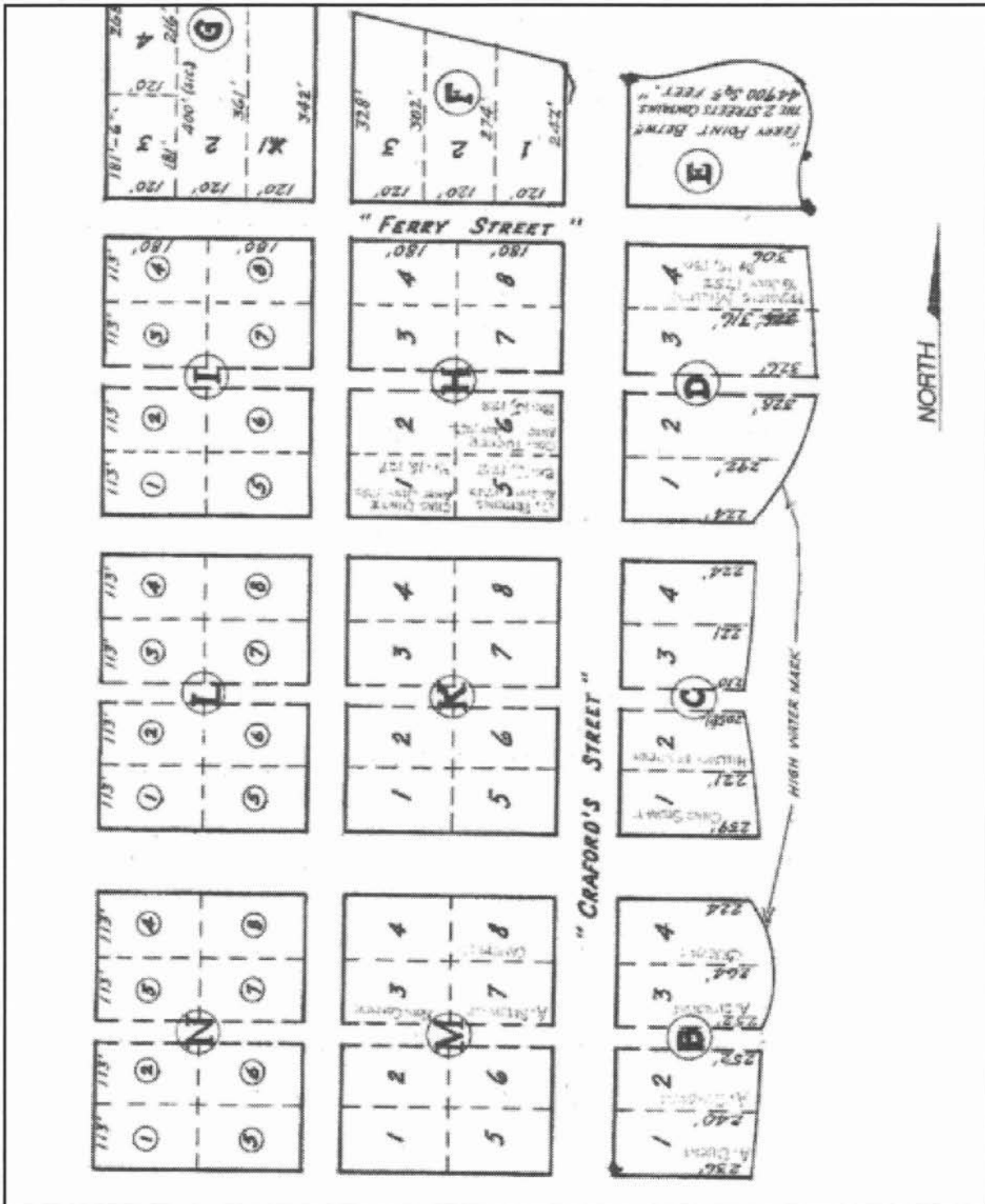


Figure 4. "The Town of Portsmouth, February 1752," prepared by Gershom Nimmo for Colonel William Craford (redrawn 1945).

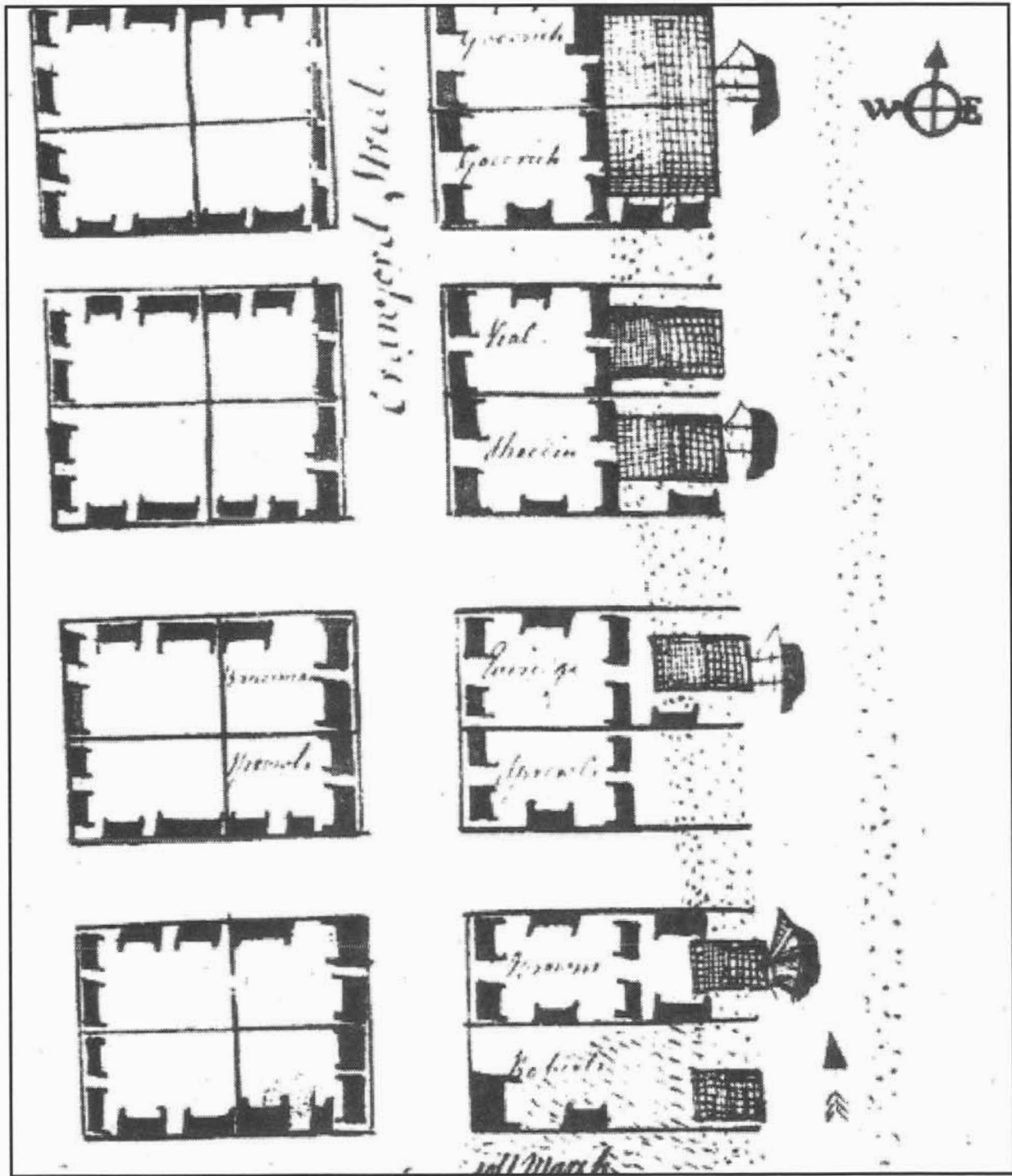


Figure 5. "A View of Portsmouth in Virginia from the East Side of the River, with Part of Norfolk Town & Powder Point," 1775.

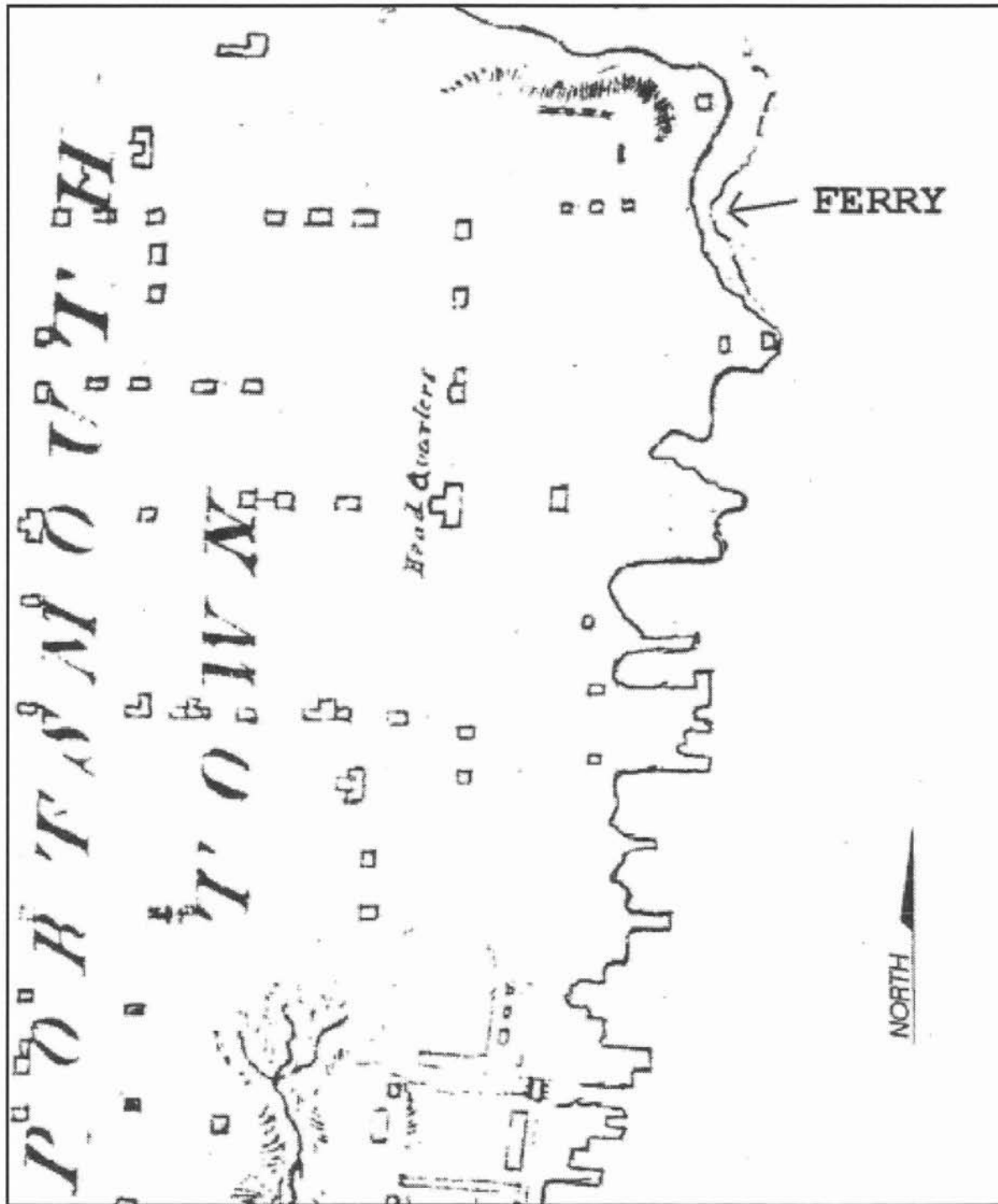


Figure 6. "Plan of Portsmouth on Elizabeth River from an exact survey made on 21st of Jan^{ary} 1781 by James Straton, 2nd Lt. of Engineers."

Norfolk Harbor, Va. Waters and shores of the Elizabeth River from Hampton Road to Norfolk and Portsmouth 1816 by J. G. Swift

The Swift map focuses on the configuration of the Elizabeth River but also contains details useful for tracing the evolution of the Portsmouth waterfront. The three streets most important streets for understanding waterfront development were mapped: High, North, and Crawford. The extent of land formed east of Crawford Street confirms that it is almost sufficient to support the construction of Water Street. The plan also indicates that by this time the site of the wreck and Ferry Docking Facility had been filled over and lay beneath the shoreline sediments (Figure 7).

Map of the City of Norfolk with Portsmouth & Gosport in 1850 by George P. Worcester, Civil Engineer

This map illustrates how extensive filling was during the nineteenth century. East of Water Street and south of the eastern end of High Street, the Ferry Landing was still open and in service, and the seaboard and Roanoke Railroad line serviced a dock structure south of the ferry slip. At the time of the 1850 map, the wreck site and the Ferry Docking Facility site were no longer within the natural boundaries of the Elizabeth River but were within the confines of the ferry landing facility at the eastern terminus of High Street (Figure 8).

Gray's Map of Portsmouth, Virginia in 1877

This map clearly documents waterfront features of the City of Portsmouth. The High Street Ferry Landing was still open and in service, and the Seaboard and Roanoke Railroad line still serviced a dock and depot structure south of the ferry slip. At the time of the 1877 map, the wreck site and the Ferry Docking Facility site were at least partially within the ferry landing facility (Figure 9).

An Atlas of Norfolk and Portsmouth, Virginia and Vicinity produced by C. M. Hopkins, Philadelphia, Pennsylvania in 1889

The 1889 Atlas of Norfolk and Portsmouth, Virginia and Vicinity provides a detailed record of the

late nineteenth-century waterfront. The ferry landing at the eastern terminus of High Street has been developed with the addition of two structures and a dock at the western end of the facility. At the time of the 1889 map the wreck site and the Ferry Docking Facility site were at least partially within the ferry landing facility (Figure 10).

Southern Branch of Elizabeth River Chart #451 produced by the U.S. Coast and Geodetic Survey in 1921

The 1920 Coast and Geodetic Survey Chart of the Elizabeth River clearly illustrates the Portsmouth, Virginia waterfront. The ferry landing at the eastern terminus of High Street has been partially filled and developed in conjunction with the railroad facility south of High Street and east of Water Street. At the time of the 1920 map, the wreck site and the southern portion of the Ferry Docking Facility and the wreck site were covered by fill (Figure 11).

Norfolk Harbor and Elizabeth River Chart #452 produced by the U.S. Coast and Geodetic Survey in 1929

The 1929 Coast and Geodetic Survey Chart of Norfolk Harbor and the Elizabeth River illustrates the Portsmouth waterfront. The ferry landing at the eastern terminus of High Street has been developed into a three dock facility and structure north of High Street and east of Water Street. At the time of the 1929 map, the southern portion of Ferry Docking Facility and the wreck site appear to have been re-excavated to accommodate the docks (Figure 12).

Norfolk Harbor and Elizabeth River Chart #452 produced by the U.S. Coast and Geodetic Survey in 1952

The 1952 Coast and Geodetic Survey Chart of Norfolk Harbor and the Elizabeth River illustrates that the Portsmouth, Virginia waterfront had been relatively stable since 1929. The three dock facility and structure north of High Street and east of Water Street remained unchanged. At the time of the 1952 map, the southern portion of Ferry Dock-

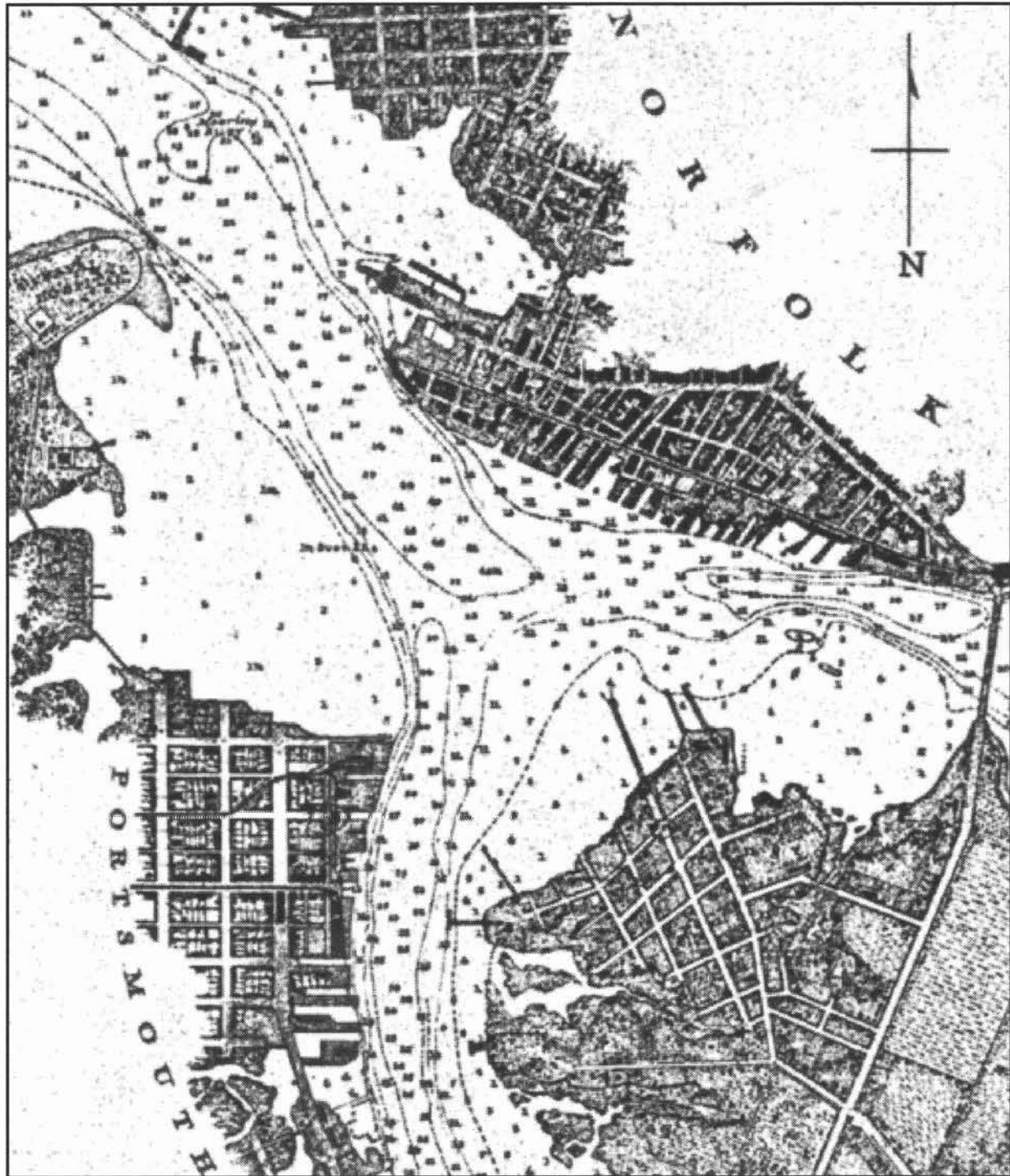


Figure 7. "Norfolk Harbor, Va. Waters and shores of the Elizabeth River from Hampton Road to Norfolk and Portsmouth 1816 by J. G. Swift."

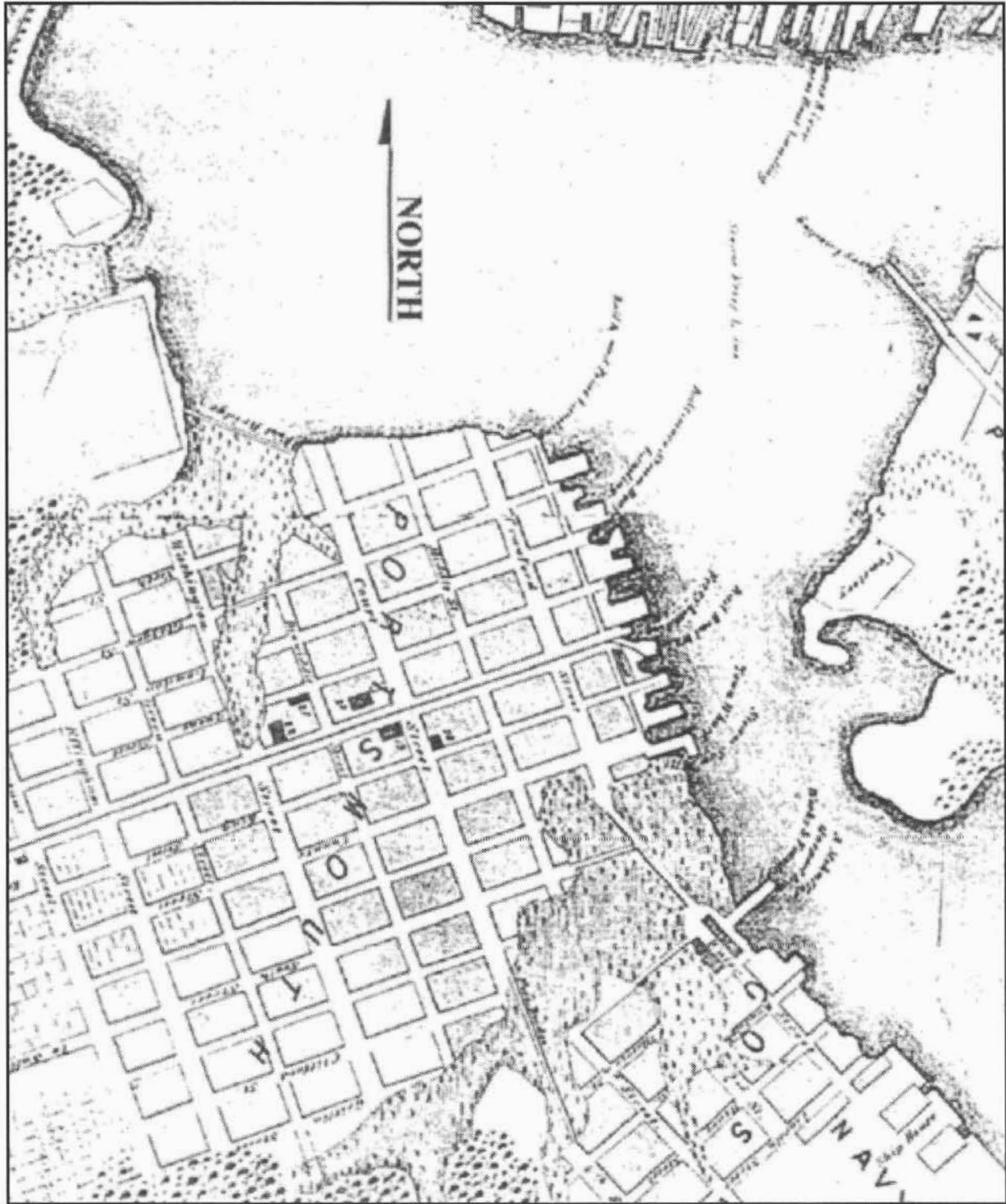


Figure 8. "Map of the City of Norfolk with Portsmouth & Gosport in 1850 by George P. Worcester, Civil Engineer."

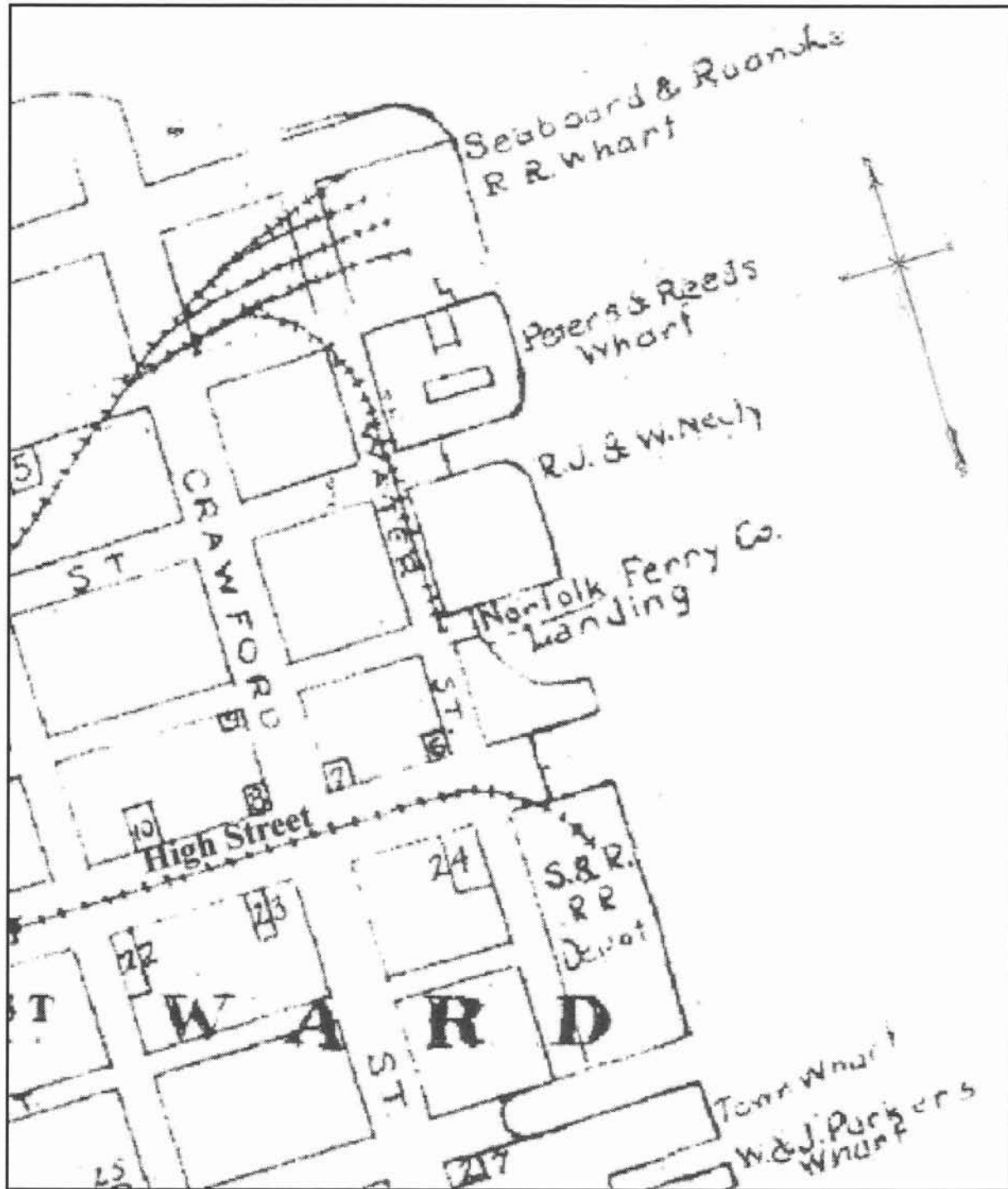


Figure 9. Gray's "Map of Portsmouth, Virginia in 1877."

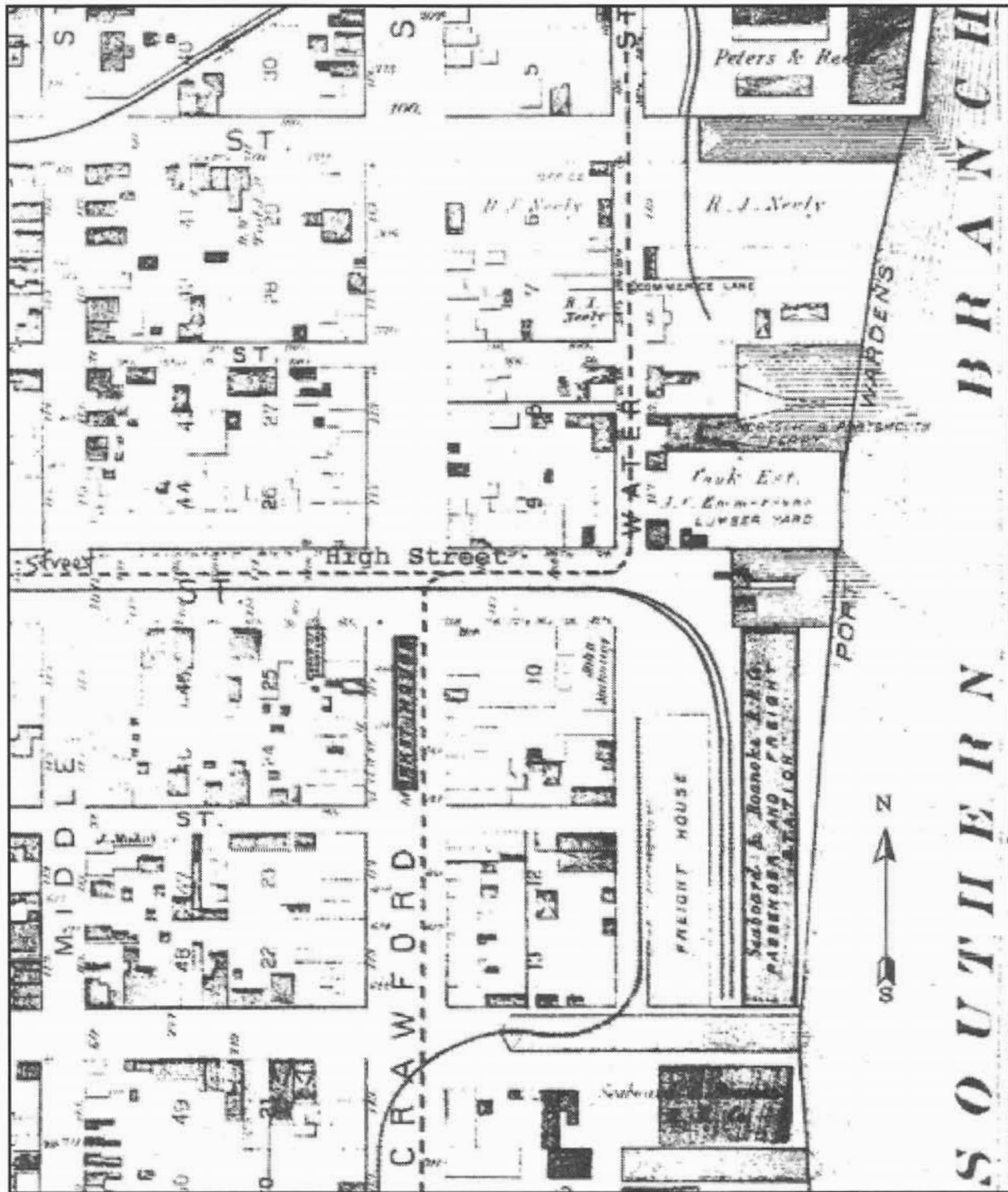


Figure 10. "An Atlas of Norfolk and Portsmouth, Virginia and Vicinity" produced by C. M. Hopkins, Philadelphia, Pennsylvania in 1889.

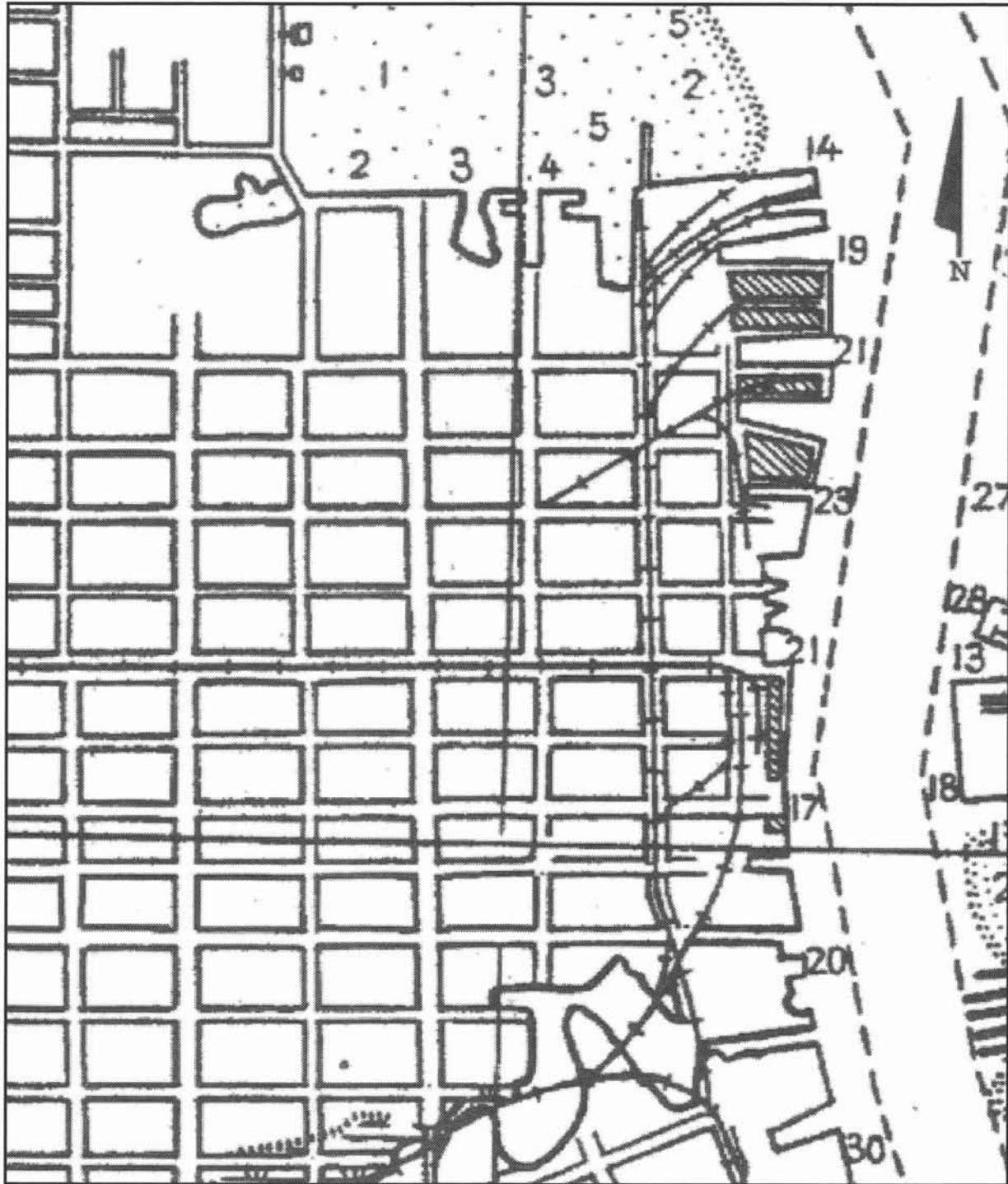


Figure 11. "Southern Branch of Elizabeth River Chart #451"
produced by the U.S. Coast and Geodetic Survey in 1921.

ing Facility and the wreck site appear to have been within the docking slips (Figure 13).

Norfolk South, Virginia topographic quadrangle produced by the U.S. Geological Survey in 1965. The 1965 Norfolk South, Virginia 7.5 minute Quadrangle confirms that the project site has been isolated from the Elizabeth River by a bulkhead. Behind the bulkhead, the ferry terminal slips that appear to have been in use between 1929 and 1952 have been filled and the associated structure removed. At the time of the 1965 map, the Ferry Docking Facility and the wreck site have been filled and isolated from the Elizabeth River by construction of a sheet pile bulkhead that survives (Figure 14).

IMPLICATIONS OF CARTOGRAPHIC RESEARCH

Cartographic research has confirmed that the Southern Branch of the Elizabeth River is a relatively stable river system. However, the shoreline of the river has been extensively altered along the Portsmouth waterfront (Figure 15). There the original waterfront, mapped in 1752, was altered by filling to increase the land area east of Craford's Street. South of High Street the Gershom Nimmo map of February 1752 clearly shows that the city waterfront in 1752 was 265 ft. east of Craford's Street. A View of *Portsmouth in Virginia from the East Side of the River, with Part of Norfolk Town & Powder Point, 1775* illustrates the waterfront area, private homes, numerous warehouses and docks, and the Gosport Navy Yard adjacent to Gosport Creek. South of High Street the 1775 plan clearly shows that the city waterfront had been extended by almost 100 ft. of fill deposited since 1752. Although the lack of reliably identified streets makes comparison difficult, the Plan of *Portsmouth on Elizabeth River from an exact survey made on 21st of January 1781* by James Straton, 2nd Lt. of Engineers confirms that north of High Street, the creation of additional land along the waterfront has been ongoing since 1775. By 1781, a series of

docks and wharves had been constructed along the Elizabeth River from Street south to Street.

After the War of 1812 and by the time of Swift's survey of the Elizabeth River in 1816, filling had been sufficient to support construction of another street east of Craford. That street was apparently constructed between 1816 and 1850 and was named Water Street. The Map of the *City of Norfolk with Portsmouth & Gosport in 1850* by George P. Worcester, Civil Engineer confirms that filling was extensive. East of Water Street and south of the eastern terminus of High Street, the Ferry Landing was still open and in service, and the Seaboard and Roanoke Railroad line serviced a dock structure south of the ferry slip. Gray's Map of Portsmouth, Virginia of 1877 clearly documents waterfront features of the City of Portsmouth. The High Street Ferry Landing was still open and in service, and the Seaboard and Roanoke Railroad line still serviced a dock and depot structure south of the ferry slip. At the time of the 1877 map, the forward portion of wreck was within the High Street ferry landing facility.

An Atlas of *Norfolk and Portsmouth, Virginia and Vicinity* produced by C. M. Hopkins, Philadelphia, Pennsylvania in 1889, provides a detailed record of the late nineteenth-century waterfront. The ferry landing at the eastern terminus of High Street has been developed with the addition of two structures and a dock at the western end of the facility. At the time of the 1889 map, the wreck site and the Ferry Docking Facility site were within the ferry landing facility. The 1920 Coast and Geodetic Survey Chart of the Elizabeth River clearly illustrates that the ferry landing at the eastern terminus of High Street has been partially filled and developed in conjunction with the railroad facility south of High Street and east of Water Street. The southern portion of the Ferry Docking Facility and the wreck site were covered by fill. Nine years later the 1929 Coast and Geodetic Survey Chart of Norfolk Harbor and the Elizabeth River confirms that the ferry landing at the eastern terminus of High Street has been developed into a

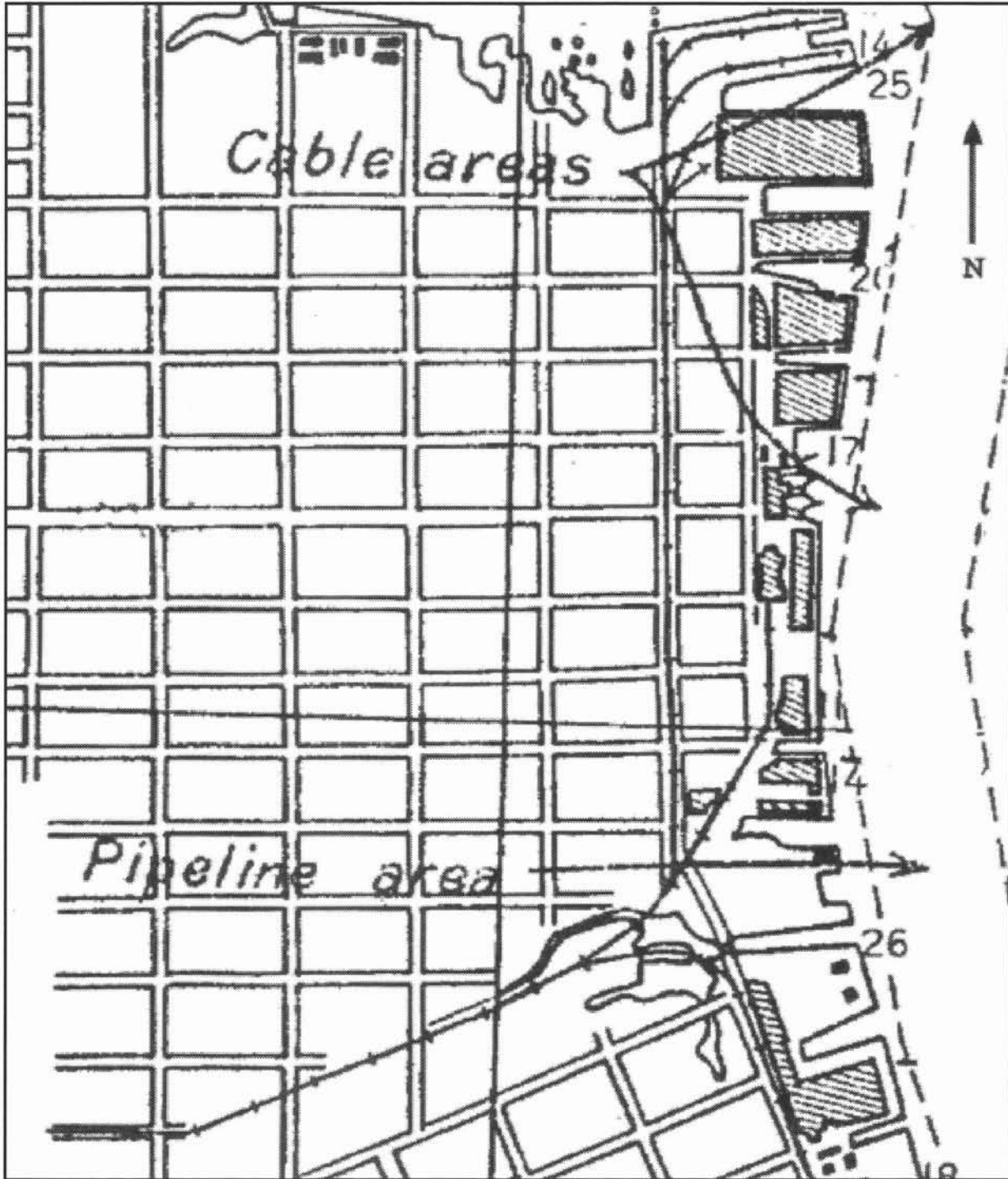


Figure 12. "Norfolk Harbor and Elizabeth River Chart #452"
produced by the U.S. Coast and Geodetic Survey in 1929.

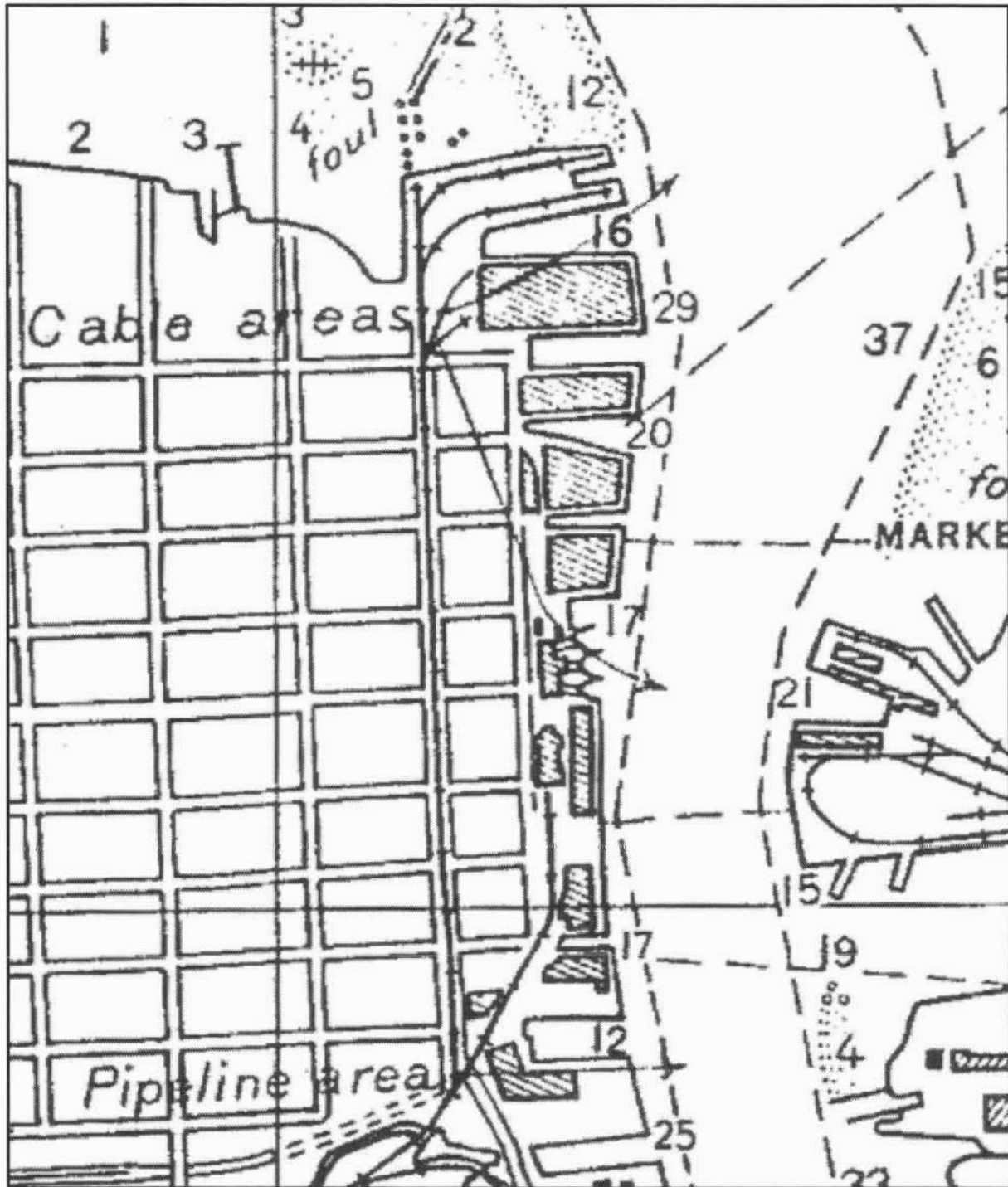


Figure 13. "Norfolk Harbor and Elizabeth River Chart #452" produced by the U.S. Coast and Geodetic Survey in 1952.

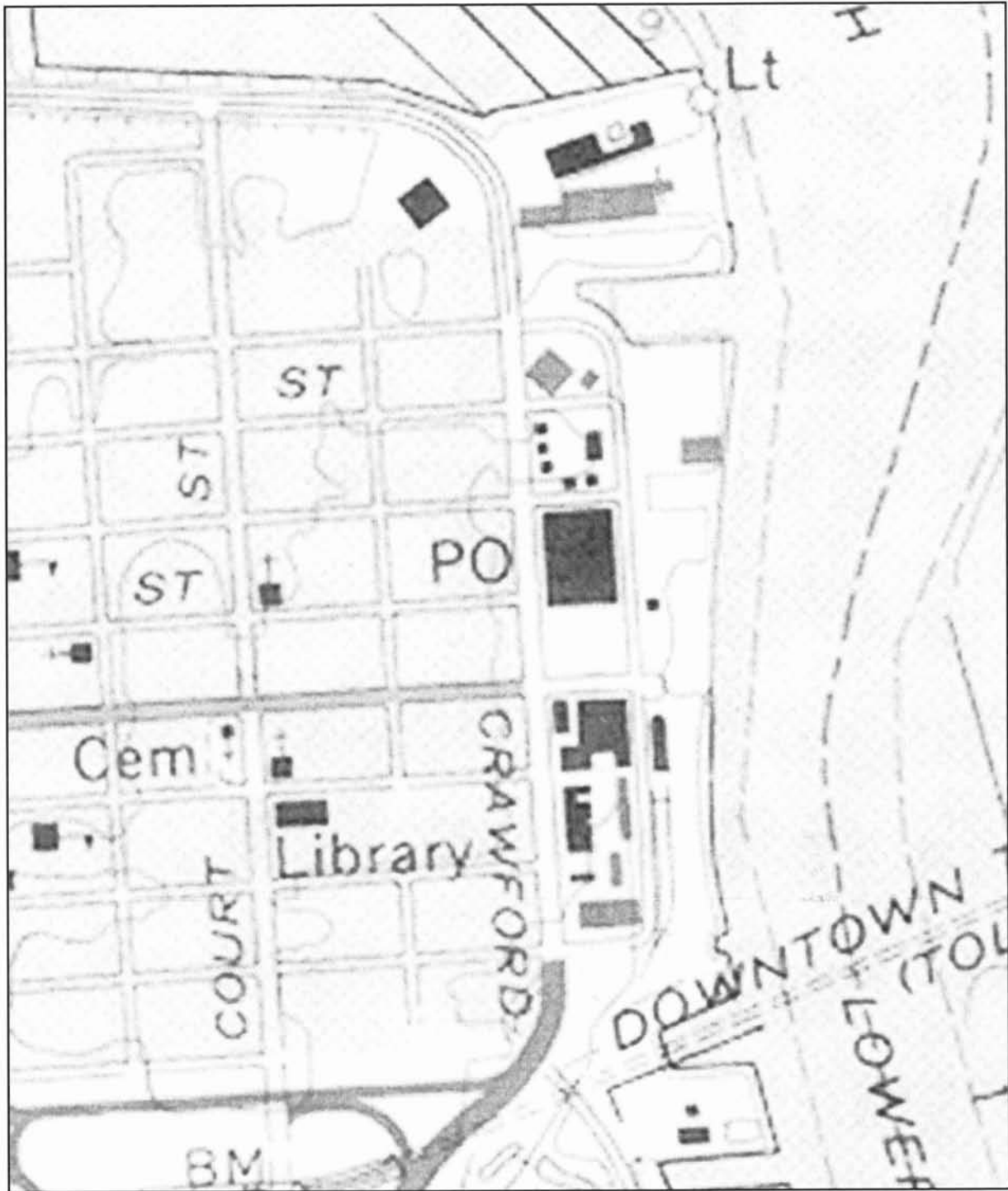


Figure 14. "Norfolk South, Virginia" topographic quadrangle produced by the U.S. Geological Survey in 1965.

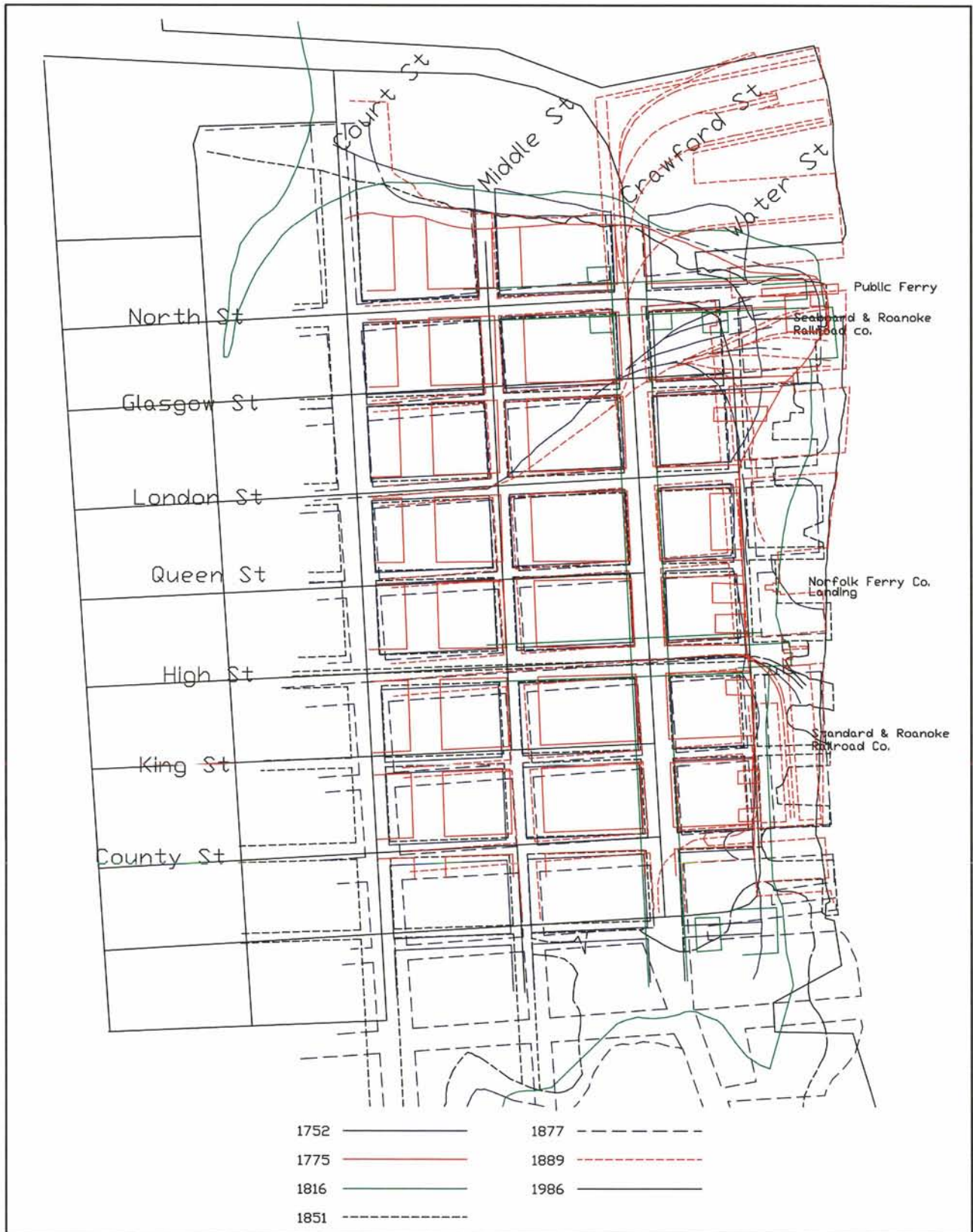


Figure 15. Historic map overlay of Portsmouth, Virginia, waterfront.

three dock facility and structure north of High Street and east of Water Street. The three dock facility and structure north of High Street and east of Water Street remained unchanged through 1952. By 1965, the Norfolk South, Virginia 7.5-minute quadrangle confirms that the project site and the wreck had been isolated from the Elizabeth River by a waterfront bulkhead. Behind that bulkhead the ferry terminal slips that had been in use since 1929 have been filled.

Cartographic and archaeological research indicates that the site where the ship sank was well within the navigable channel of the Elizabeth River in the eighteenth century. The chronology established by cartographic research suggests that the Elizabeth River Ferry Docking Facility vessel was lost prior to 1816. By that date the southern portion of the hull had been covered over by new land created behind a bulkhead, and by 1889 the bow had also been enclosed behind a bulkhead associated with improvements to the ferry slip. Because of the presence of slips associated with the operation of ferries that docked at the eastern end of High Street, the northern portion of the wreck was covered only by fill and bottom sediments until the third quarter of the nineteenth century. Between 1952 and 1965, the ferries ceased operation, the waterfront was bulkheaded, and the site was covered by fill material.

SHIPWRECK SIGNIFICANCE AND RESEARCH POTENTIAL

Shipwrecks in the Southern Branch of the Elizabeth River have considerable historical and archaeological value. Vessels lost during the seventeenth century represent sources of data concerning exploration and the earliest permanent settlements along the James River. Evidence of colonial development and the Revolutionary War survive in association with shipwreck sites of the eighteenth century. Nineteenth-century vessel remains document one of the most dynamic periods of United States maritime history, during which dramatic

changes took place in the design and construction of ships. During the Civil War, a great deal of naval activity took place in the Hampton Roads area in which many Union and Confederate vessels were sunk. Much of this activity occurred along the Southern Branch of the Elizabeth River. Evidence of modern ship development and the ultimate decline of American maritime power survives in the remains of twentieth-century shipwrecks including the last working sailing vessels as well as steamers and warships.

The remains of shipwrecks provide valuable opportunities to examine and reconstruct important aspects of our maritime heritage that frequently have not survived in the written historical record. Well into the twentieth century, shipwrights continued to build vessels without the benefit of plans or documentation. Although the displacement of shipwrights by engineers in the nineteenth and twentieth centuries brought increasing documentation, much of that evidence has not survived. This makes shipwrecks one of the most important sources of data concerning the evolution of vessel architecture and construction.

Ships and small vessels were also the most important element of the trade and transportation system until the late nineteenth century. They were an essential component of European exploration and development of the western hemisphere. Because of the instrumental role vessels played in that historical process, their remains contain an important record of the evolving insight into shipboard life that permits the reconstruction of historic lifeways. Material carried as cargo reflected the evolution of the economic system that supported European development of North America. Cargo also reflects the development of technologies associated with virtually every aspect of life along the Atlantic seaboard.

Historic research confirmed the importance of the Southern Branch of the Elizabeth River as an avenue of commerce and transportation. This research, in conjunction with cartographic surveys, documented numerous shipwrecks within the

Southern Branch of the Elizabeth River. During the Revolutionary War, a minimum of 137 vessels were destroyed in the Norfolk-Portsmouth vicinity. Historical documentation does not provide specifics as to the name and exact location of these vessels, but the Southern Branch of the Elizabeth River is noted as the primary location where they were destroyed.

3: Description of the On-Site Investigation

THE FORWARD SECTION

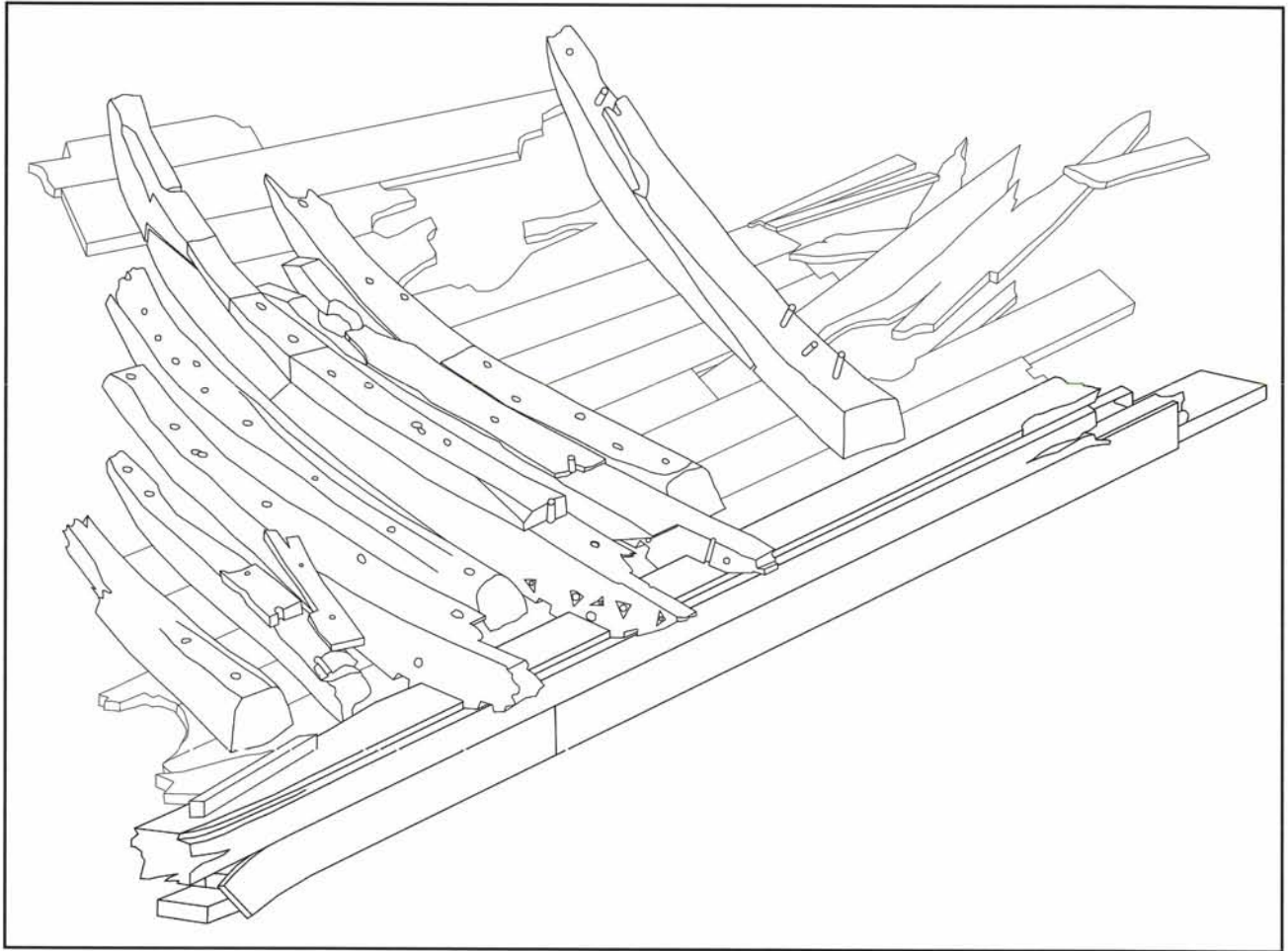
Because the forward section of wreck structure created an obstacle to continued excavation of the ferry slip, that section of wreckage became the first priority for documentation (Figure 16; see Figure 3). In the forward section of the vessel the remaining mud and overburden was removed by shovel and trowel (Figure 17). Once the structure was completely cleared a baseline was established along the outer edge of the keel. From this baseline a grid system of 3-x-3-ft. squares was established over the site (Figure 18). Both the wreck and the grid system were shot in by transit by the surveyors from Tidewater Construction Company and tied into datums for the construction site. Measurements of all structure components were taken by pulling a tape along one axis of the grid and extending a T-square along the other. A plumb bob was used to guide the T-square to the position of each measurement (Figure 19). All planks, frames, fasteners, keel, keelson, and other structural timbers were recorded in this fashion. Photographs were taken of every phase of the work including the exposing of the wreck and its subsequent recording. After the wreck was fully recorded each timber was labeled, and the structure was disassembled. Timbers were transported to facilities at TAR for more thorough documentation (Figure 20).

RECORDING THE STERN SECTION

Because the aft section of wreck structure lay adjacent to the southeast corner of the sheet pile bulkhead only limited excavation could be

accomplished prior to flooding the docking facility (Figure 21; see Figure 3). Although extensive excavation would have undermined the integrity of the sheet pile, Dave Hazzard of the VDHR was able to expose approximately 1–3 ft. of the stern section of the vessel (Figure 22). Those remains consisted of the keel, keelson (Figure 23), and the run of plank and frame to beyond the turn of the bilge (Figure 24). A baseline was established along the bulkhead and a grid set up over the surviving aft hull structure. Both the wreck and the grid system were shot in by transit by the surveyors from Tidewater Construction Company and tied into datums for the construction site. Measurements of all exposed vessel structure were taken by pulling a tape along the baseline axis and extending a T-square out from that axis. A plumb bob was used to guide the T-square to the position of each measurement. All planks, frames, fasteners, keel, keelson, and other structural timbers were recorded in this fashion.

Excavation of the stern resumed once the ferry facility was flooded. Overburden, much of it washed into the stern section during flooding, was removed by 4 in. induction dredges and 3/4 in. jet probes. It was quickly apparent that the vessel was covered in dense clay and layers of brick and railroad iron, and that the remaining vessel could not be totally uncovered before excavation resumed. Excavation efforts were redirected to exposing the deadwood and keelson as far aft as possible. Increasing concentrations of historic construction debris, railroad iron, and clay halted excavation after exposing 12 ft. of the keelson and deadwood. A baseline was established over the



• *Figure 16. Isometric projection of the forward section of wreck structure.*

Figure 17. Forward section of wreckage exposed by excavation.





Figure 18. Mapping grid assembled over forward section of hull structure.



Figure 19. Mapping forward section of wreckage.



Figure 20. Loading elements of the wreck structure for transportation to TAR facilities.

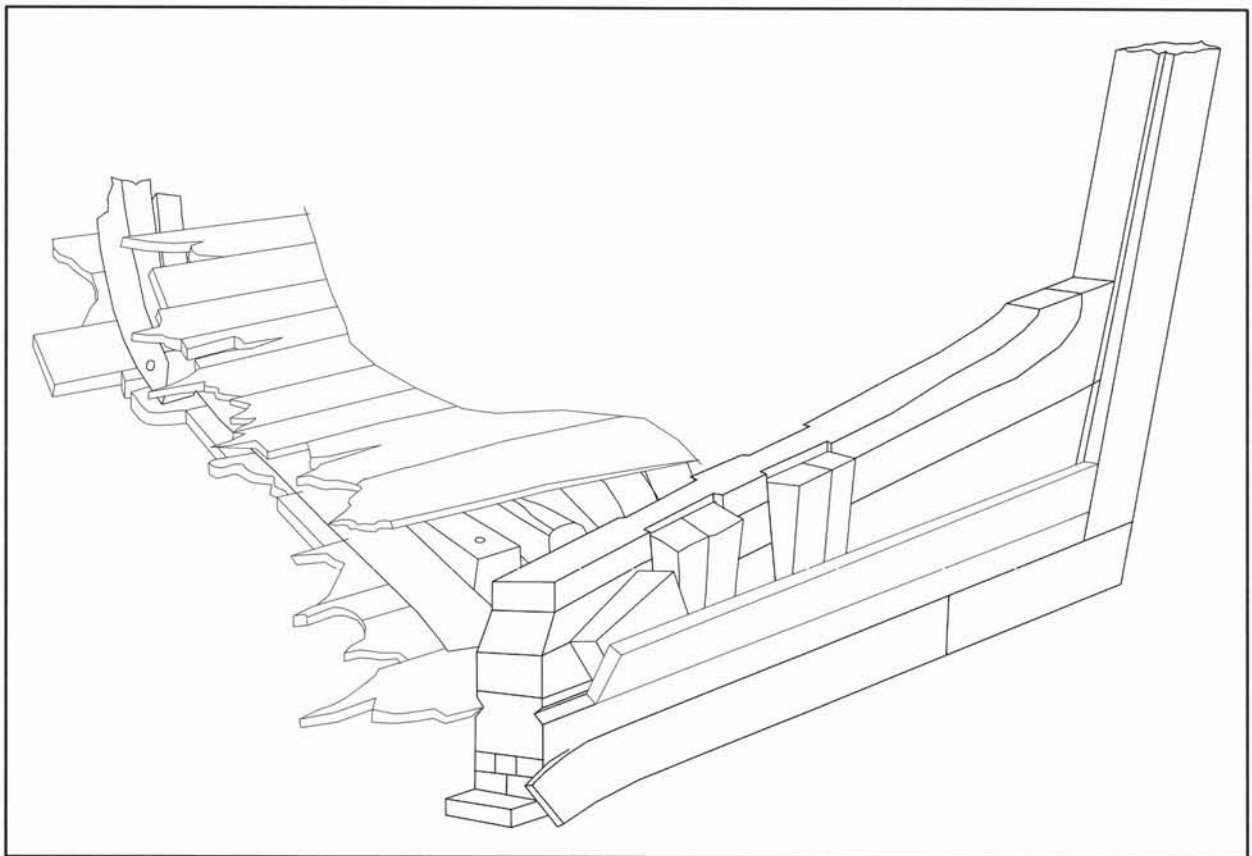


Figure 21. Isometric projection of the aft section of wreck structure.



Figure 22. Exposed stern section of wreckage.



Figure 23. Aft keel, deadwood, cant frames, ceiling and hull planking.



Figure 24. Intact ceiling planking on the starboard side of the stern section of wreckage.

keelson and deadwood, and measurements were taken of all structural elements exposed by dredging and jetting.

Once the facility was flooded and the remaining sheet pile bulkhead between the river and the docking facility had been cut away, construction excavation resumed. The remains of the stern were removed using a clamshell and placed on a barge. TAR personnel examined the recovered structural remains on the barge and selected all of the diagnostic material for transportation to TAR facilities in Washington, North Carolina. At TAR each diagnostic element of the structure was documented. Using a grid similar to that employed in recording the in situ hull remains, each element of the structure was drawn to scale (Figure 25). Scale drawings of each diagnostic timber included both molded faces and one sided surface. Drawings of each element of the structure were digitized using AutoCAD.

DESCRIPTION OF THE VESSEL STRUCTURE

Shipwreck remains discovered at the Elizabeth River Docking Facility consisted of two sections of the hull structure (Figure 26). The longitudinal axis of the keel was north to south. The bow sec-

tion of hull structure was found 35 ft. north of the stern. That section was associated with the forward end of the keel and the stem scarf. It consisted of the starboard side of the hull and contained fragments of the keel, false keel, starboard frames, ceiling, and hull planking (see Figure 16). The stern section lay adjacent to the southeast bulkhead. Like the bow section the stern section consisted of the starboard side of the hull and contained fragments of the keel, false keel, deadwood, starboard frames, ceiling, and hull planking (see Figure 21). As the wreck lay on its starboard side the surviving structure consisted of the keel, false keel, deadwood, sternpost, starboard frames, hull planking, and ceiling. Elements of the starboard side of the hull that originally lay between the bow and stern had been destroyed prior to documentation. The bow forward of the apron had been destroyed by pilings associated with the construction of a wharf or similar structure during the nineteenth century. Some of the disarticulated floors and futtocks from the midships section were also recovered and documented.

FORWARD SECTION

Keel

The forward section of wreck structure was associated with the starboard side of the hull that measured 20 ft. long along the keel and 18 ft. wide across the starboard side (see Figure 16). Most prominent among the surviving structural elements

was the keel (Figures 27 and 28). It measured 16 ft. 5 in. long and was sided 11 1/2 in. and molded 13 1/2 in. The top of both sided surfaces contained a rabbet for the 3 in. thick garboard strake. At the forward end of the keel the rabbet rises slightly to suggest the proximity with the apron, gripe, and stem. On the top of the keel, rebates had been cut into the sides above the rabbet to facilitate seating the floors and half floors (Figure 29). A 3/4 in. drift bolt was employed to attach each of the floors to the keel. The bottom of the after end of the keel had a 22 in.-long by 4 in. wide rebate cut 2 in. deep into the structure. Sacrificial pine planking 1 in. thick was positioned over felt and tar to protect the sides of the keel. The sheathing was attached with small square iron nails placed in a staggered diagonal pattern.

False Keel

A false keel had been attached to the bottom of the keel (see Figures 16 and 28). The false keel measured 17 ft. long and was sided 11 1/2 in. and molded 11 in. (Figure 30). Unlike the keel, the section of false keel was composed of four planks.

The lower two planks were 4 in. thick and 11 1/2 in. wide. The sides of the aft end of the bottom plank were cut away to leave a tenon 4 in. wide and 3 in. long to provide a scarf joint with the next plank aft. The upper of the two lower planks had a 4-in.-wide, 3-in.-deep mortise cut out of the forward end to provide a scarf joint with the next plank forward. The upper planks measured 3 in. thick. The port plank measured 3-3 1/2 in. wide, and the starboard plank measured 7 1/2 in. wide. A space varying from 1/2 to 1 in. wide separated the two planks and helped make up the 11 1/2 in. sided dimension of the false keel. The planks of the false keel were fastened using 3/8 in. square shank iron spikes. The upper two planks were attached to the bottom of the keel. The upper 4 in. plank was fastened to the planks attached to the keel, and the bottom 4 in. plank was fastened to the upper 4 in. plank. A random staggered pattern was used in fastening the elements of the false keel. Like the keel, the false keel was protected by 1 in. pine sheathing over felt and tar, and attached with small square iron nails placed in a staggered diagonal pattern.



Figure 25. Timber documentation.

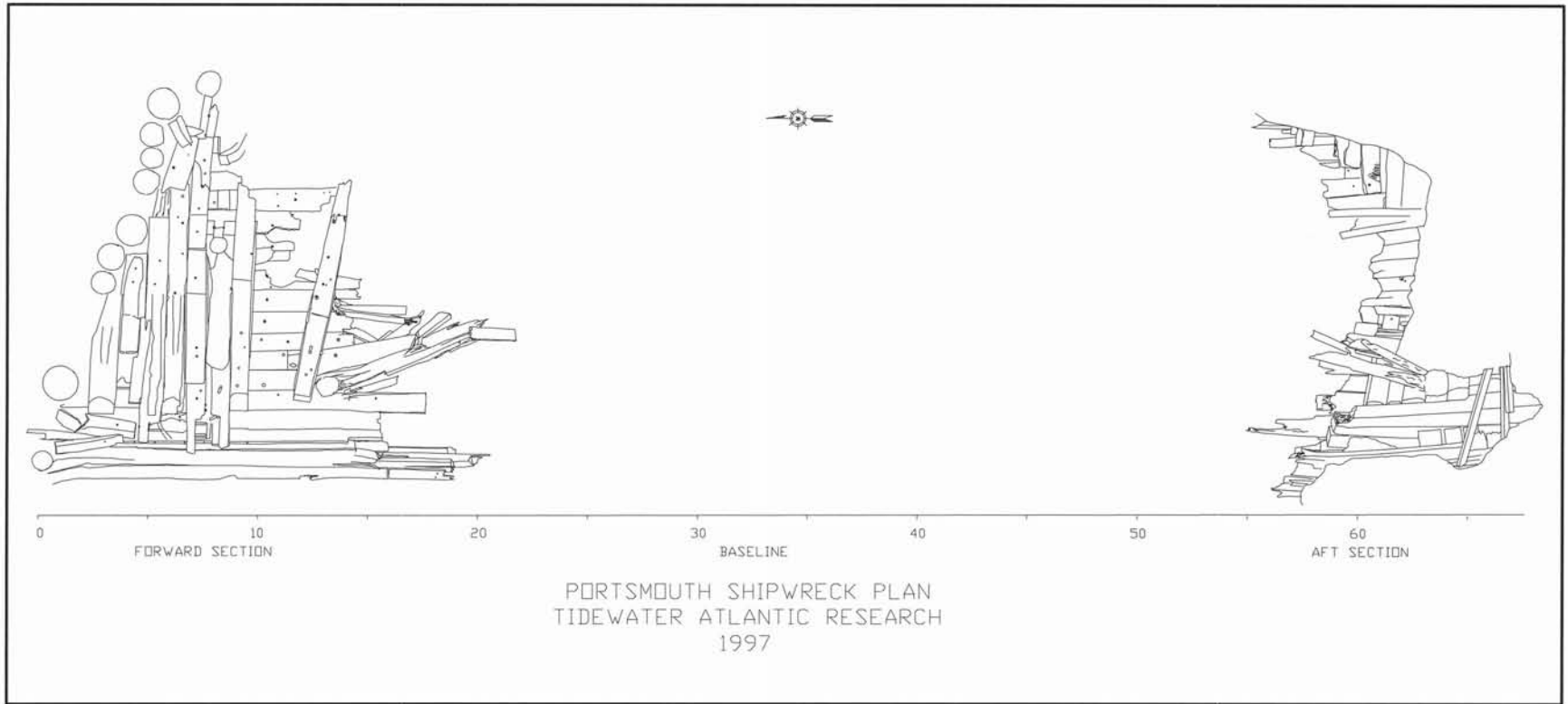


Figure 26. Plan of the surviving wreck structure.

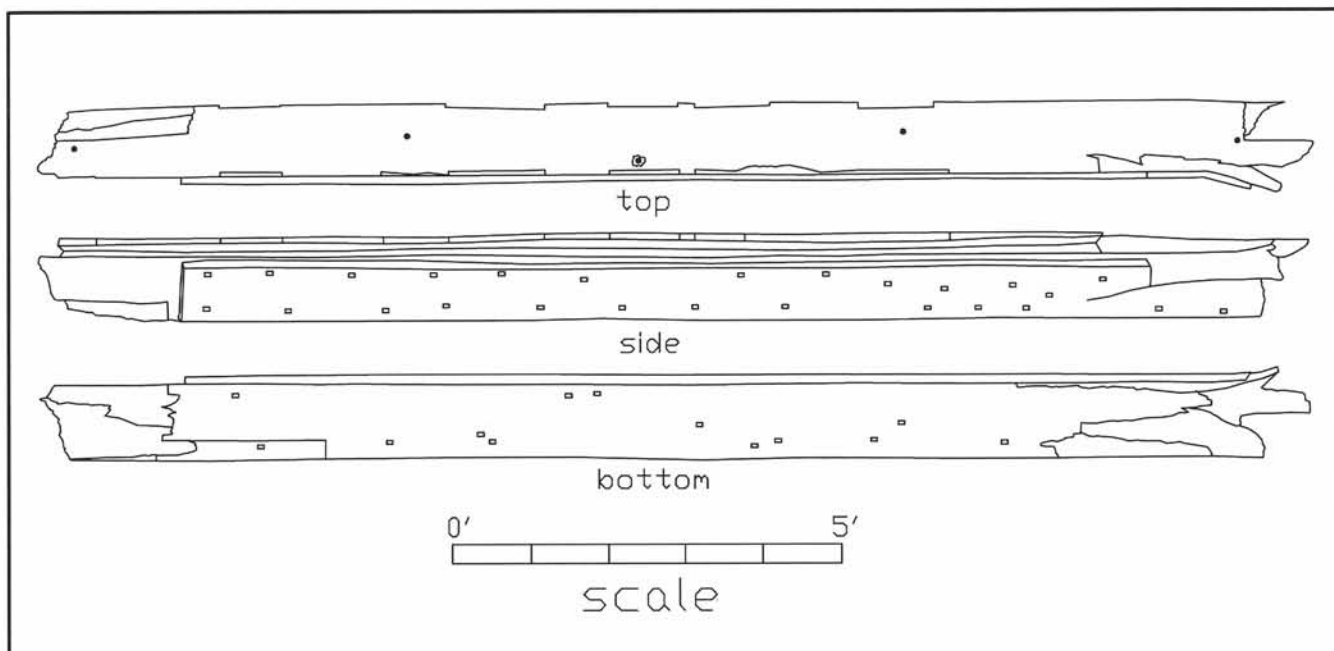


Figure 27. Facets of the keel.



Figure 28. Forward section of the keel and false keel with sheathing.



Figure 29. Forward section of the keel showing rebates for the floors and the starboard garboard strake.

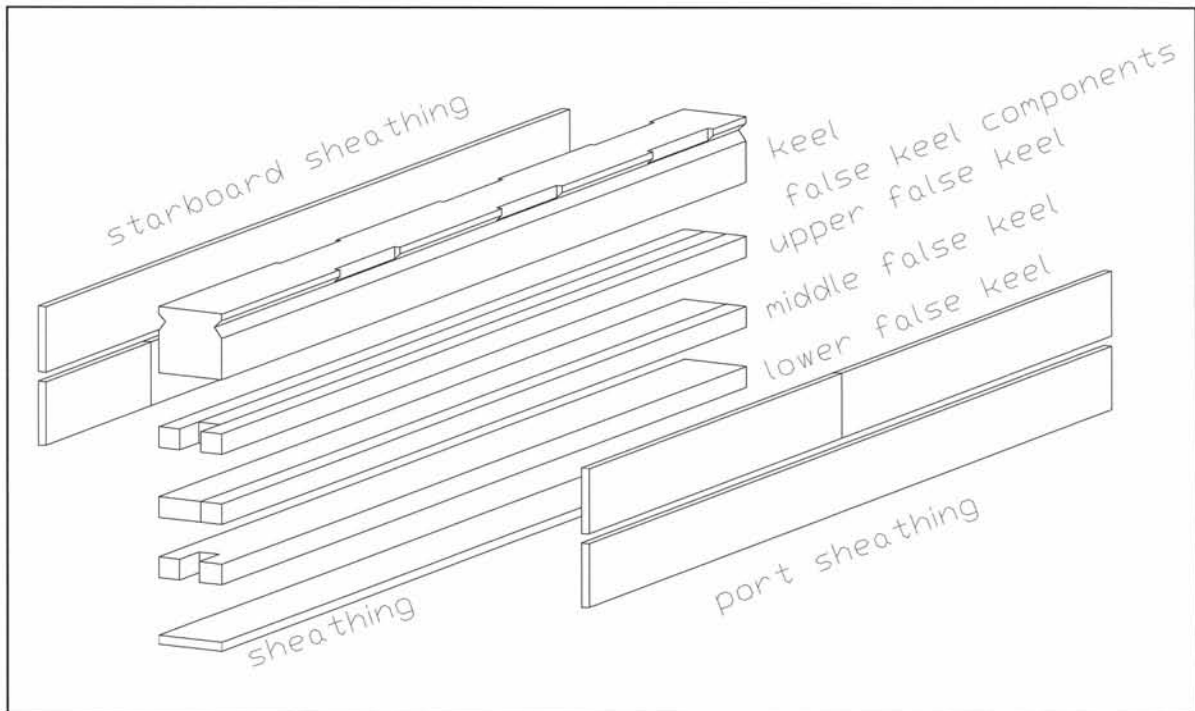


Figure 30. Elements of the false keel.

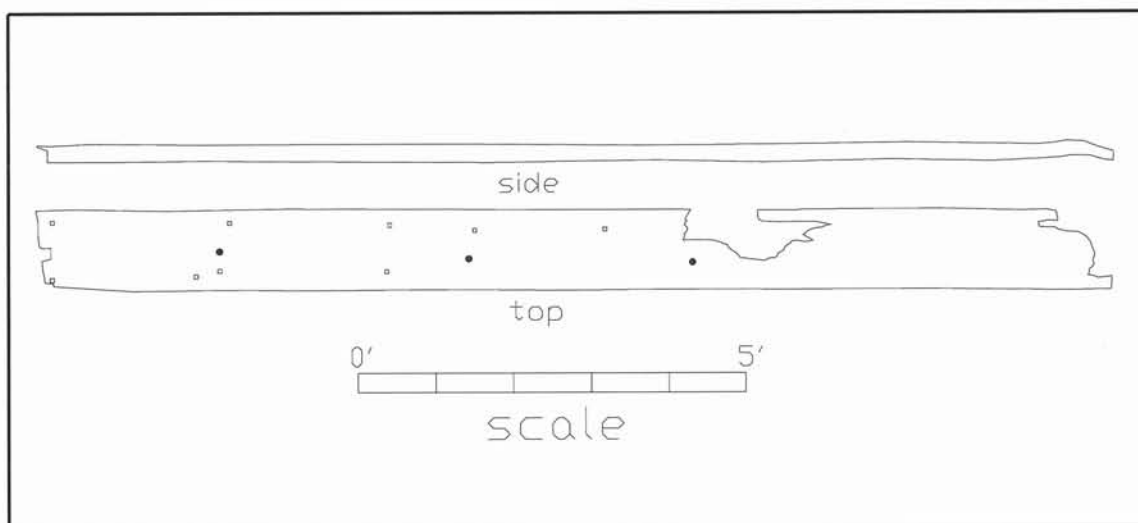


Figure 31. Facets of the garboard strake.

Garboard Strake

On the starboard side of the keel the garboard strake remained seated in the rabbet (see Figures 16 and 28). The surviving remains of the garboard measured 13 ft. 9 in. long (Figure 31). Although the plank was originally 12 in. wide and 3 in. thick, the side adjacent to the keel had been beveled to fit into the rabbet, leaving the interior surface only 10¹/₂ in. wide. The aft end of the garboard was also unusually scarfed and mortised to accommodate the next plank aft. Both ³/₄ in. drift bolts peened over 1¹/₂ in. roves and ³/₈ in. spikes had been used to attach the garboard to the floors and half floors. No fasteners attached the garboard to the keel.

Planking

Planking on the starboard side of the bow section consisted of the remains of 12 strakes. Those planks measured 3 in. thick and varied in width from a 2 in. stealer to the 12 in. garboard strake. Tool marks on the planks indicated that they had been cut using a pit saw and partially dressed using an adz. Planks were attached using a combination of 1¹/₂ in. trunnels and ³/₈ in. spikes (Figure 32).

The following table provides the width of each plank:

PLANK	WIDTH (IN.)
Garboard	12
P2	7 ⁵ / ₈
P3	7 ¹ / ₂
P4	7 ¹ / ₄
P5	7 ⁵ / ₈
P6	8 ¹ / ₄
P7	9 ¹ / ₈
P8	2
P9	9 ¹ / ₈
P10	7
P11	8 ⁷ / ₈
P12	8 ³ / ₈

Frames

A total of seven frames remained in association with the forward section of wreckage (see Figure 16). Three of those were half floors notched over the keel to accept companion half floors from the port side of the hull (see Figure 28). The remain-

ing five in situ frames were futtocks or were composed of more than one futtock.

FRAME 1

Frame 1 was a 5-ft.-10-in. futtock (see Figure 16). The sided dimension varied from 14 in. at the inboard end to 12 $\frac{1}{2}$ in. outboard before the timber was broken (Figure 33). The futtock was molded from 10 $\frac{1}{2}$ to 14 in. at the inboard end. Both the top and bottom of the futtock contained the remains of fasteners used to attach bilge ceiling and hull planking. Pine was used to fashion the futtock.

FRAME 2

Frame 2 was composed of a small futtock and two fillet pieces (see Figure 16). The futtock measured 7 ft. 6 in. long. It was molded 9–10 in. and sided from 10 $\frac{1}{2}$ to 12 in. (Figure 34). The outboard

end was undercut diagonally to accommodate an adjoining futtock. Both the top and bottom of the futtock contained the remains of fasteners used to attach bilge ceiling and hull planking. Pine was used to fashion the futtock. Two fillet pieces had been employed in conjunction with Frame 2 to bring the molded dimension up to the level of the bilge ceiling (Figure 35). The first was 4 ft. 3 in. long, 7 in. wide, and 1 $\frac{3}{4}$ in. thick. Both the top and bottom of the fillet contained the holes that were used for trunnels and a drift bolt used to attach bilge ceiling. The second was 4 ft. 1 in. long, 10 in. wide, and 2 $\frac{3}{4}$ in. thick. Both the top and bottom of the fillet contained a trunnel and the holes that were used for trunnels and a drift bolt used to attach bilge ceiling. A triangular depression had been cut at the drift bolt to start the spoon drill (Figure 36). Pine was used to fashion both fillets.



Figure 32. Forward section of the keel and false keel with sheathing.

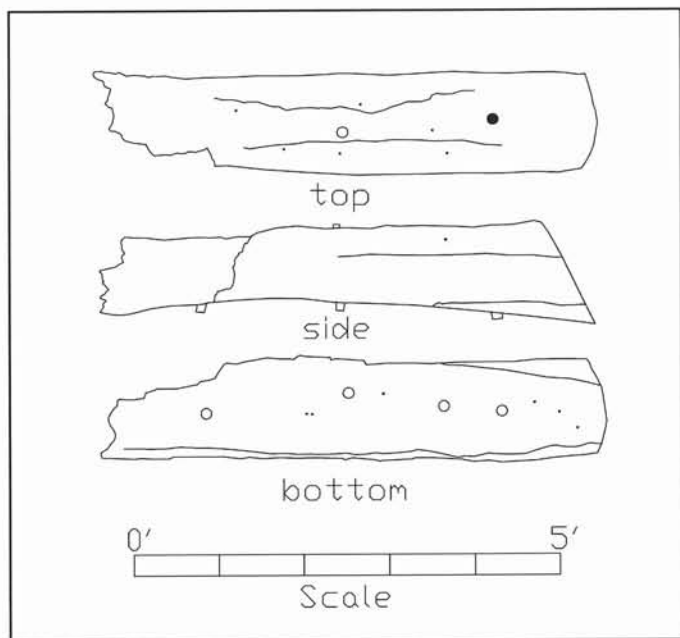


Figure 33. Facets of Frame 1.

Figure 34. Facets of Frame 2.

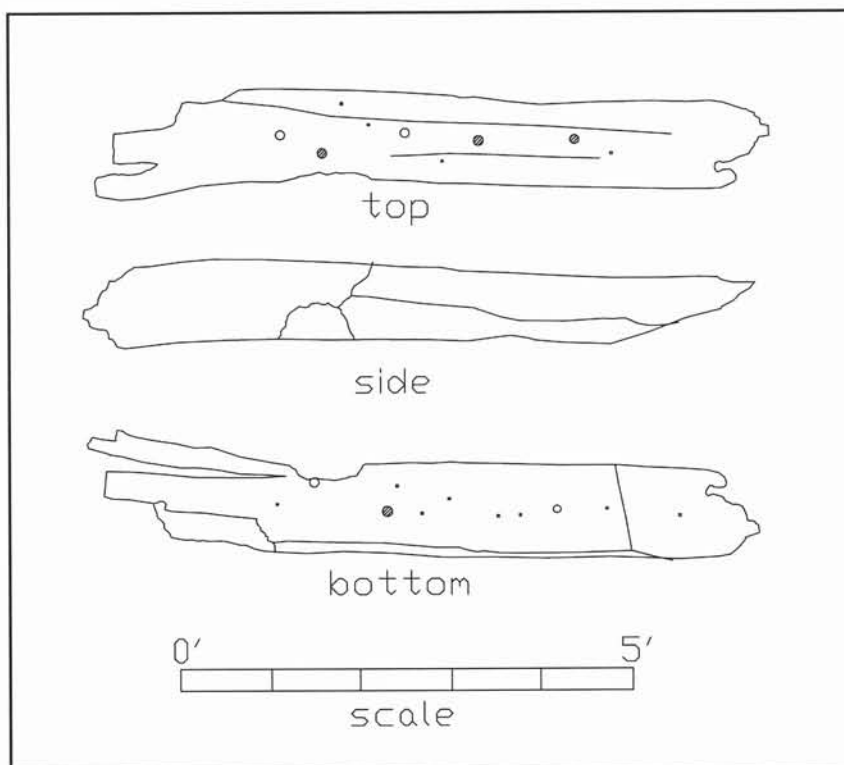




Figure 35. Top Fillets used to level the bilge ceiling.



Figure 36. Triangular notch to start a spoon bit.

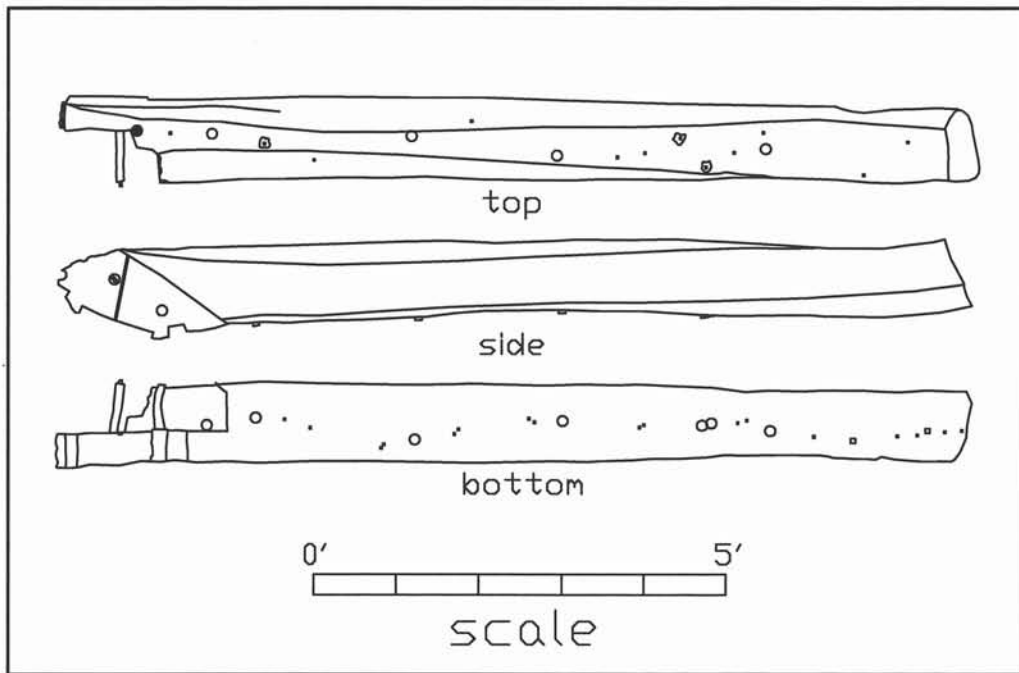


Figure 37. Facets of Frame 3.

FRAME 3

Frame 3 was composed of a half floor 11 ft. 1 in. long (see Figure 16). It was molded from 10 to 12 in. and sided from 10 to 12 in. (Figure 37). The inboard end of the half floor was notched diagonally on the aft face to accept a port half floor. Immediately outboard of either end of the rebate for the keel, the bottom of the half floor was notched to create limbers 2 in. deep and 3 in. wide. A rebate was also cut in the inboard end to accommodate the keel. Fastener remains in the rebate for the port half floor included both trunnels and $3/4$ -in. iron bolts. Over the keel and limber rebates, triangular cuts had been made in the forward face of the half floor to serve as starter holes for drilling for the trunnels and drift bolts that attached the port half floor.

FRAME 4

Frame 4 was an 11-ft.-3-in. futtock rebated on the outboard molded surface to accept a fillet piece (see Figure 16). The sided dimension varied from

11 in. at the inboard end to 9 in. at the outboard end (Figure 38). The top and bottom of the futtock and fillet piece contained the remains of fasteners used to attach bilge ceiling and hull planking. Both the futtock and fillet piece were fashioned from pine.

FRAME 5

Frame 5 was composed of a half floor, a futtock, a futtock fragment, and several fillet pieces (see Figure 16). The half floor was 9 ft. 7 in. long, and was molded from $5\frac{1}{2}$ to 9 in. and sided 10 in. (Figure 39). The inboard end of the half floor was notched diagonally on the aft face to accept a port half floor (Figure 40). Immediately outboard of either end of the rebate for the keel, the bottom of the half floor was notched to create limbers 2 in. deep and 3 in. wide. A rebate was also cut in the inboard end to accommodate the keel. Fastener remains in the rebate for the port half floor included both trunnels and $3/4$ -in. iron bolts. Over the keel and limber rebates, triangular cuts had been made in the forward face of the half floor to serve

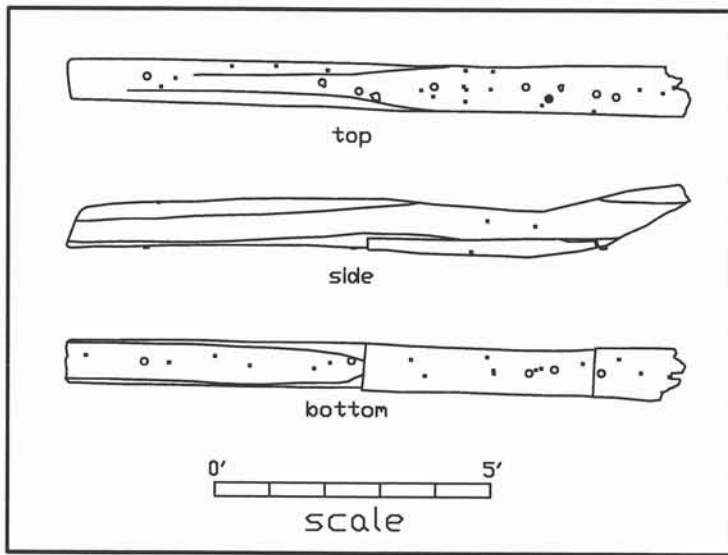


Figure 38. Facets of Frame 4.

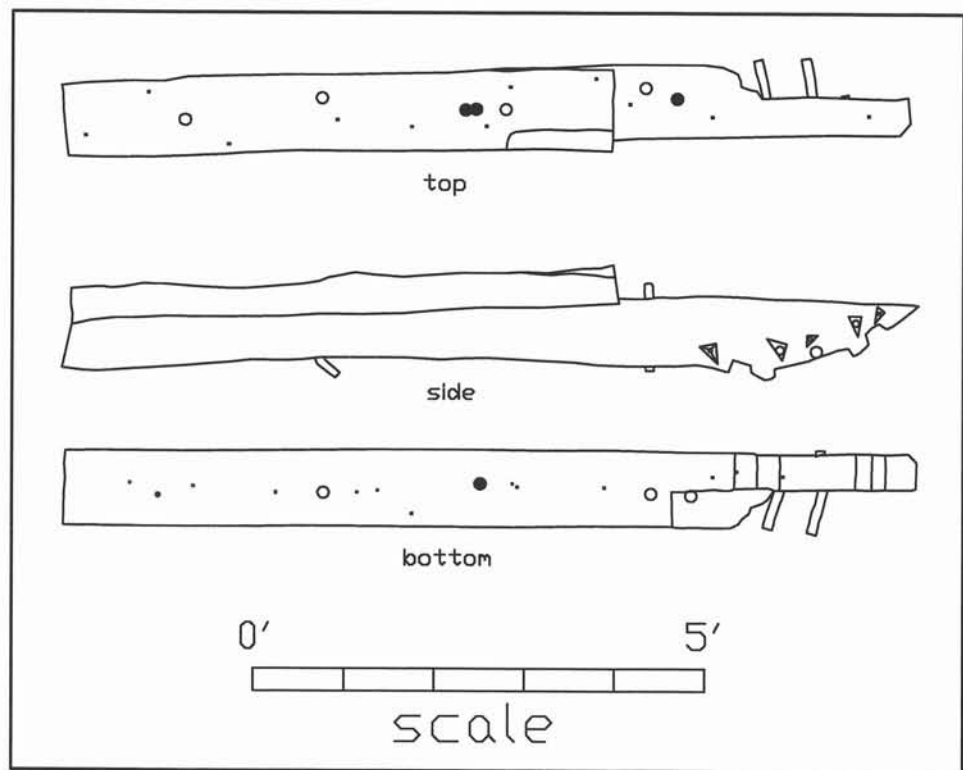


Figure 39. Facets of Frame 5.



Figure 40. Scarf in a starboard half floor to accept a port half floor.

as starter holes for drilling for the trunnels and drift bolts that attached the port half floor. The outboard end of the half floor was fitted with a rider sided 10 in. and molded from 4 to 5½ in. The top and bottom of the half floor and rider contained the remains of fasteners used to attach bilge ceiling and hull planking. Both the half floor and futtock were fashioned from pine.

The outboard end of the half floor was butted against a short futtock that made up most of the turn of the bilge (Figure 41). That futtock was 5 ft. 2 in. long and was sided 9 in. and molded from 6 to 10 in. The outboard end of the futtock was cut to form a diagonal scarf that matched the attached second futtock. A wedge-shaped fillet piece under the inboard end of the futtock and a second fillet piece under the center of the futtock helped

achieve the desired molded dimension. Three horizontal trunnels suggest that the futtock was paired with an alternating futtock to strengthen the turn of the bilge as it was fashioned without compass timber. Like the face of the half floor, triangular cuts had been made in the forward face of the futtock to serve as starter holes for drilling for the trunnels. The futtock and both fillet pieces were fashioned from pine.

The final futtock was attached to the first by a diagonal scarf that butted on the outer molded surface. The remains of the outboard futtock were 3 ft. 5 in. long and was sided 9 in. and molded from 6 to 7 in. The outboard end was cut diagonally to accept another futtock. The futtock was fashioned from pine.

FRAME 6/7

Frame 6/7 was the aftermost frame that had not been dislodged by excavation (see Figure 16). It was composed of a half floor forward and first futtock aft (Figure 42). The half frame and futtock were attached by horizontal trunnels and iron drift bolts. The floor and futtock set were 12 ft. 6 in. long. The half floor was molded from 8 to 12 in. and sided 11 in. The attached first futtock was molded from 10 to 12 in. and sided 10 in. The inboard end of the half floor was notched diagonally on the forward face to accept a port half floor. Immediately outboard of either end of the rebate for the keel, the bottom of the half floor was notched to create limbers 2 in. deep and 3 in. wide. Fastener remains in the rebate for the port half floor included both trunnels and ¾-in. iron bolts. The top and bottom of the half floor and futtock contained the remains of fasteners used to attach bilge ceiling and hull planking. Both the half floor and futtock were fashioned from pine.

FRAME 8

Frame 8 was the aftermost futtock and had been partially dislodged by excavation (see Figure 16). It was 10 ft. long and was molded from 7 to 9 in. and sided 10 in. (Figure 43). A fillet piece was em-



Figure 41. First futtock at the turn of the bilge.

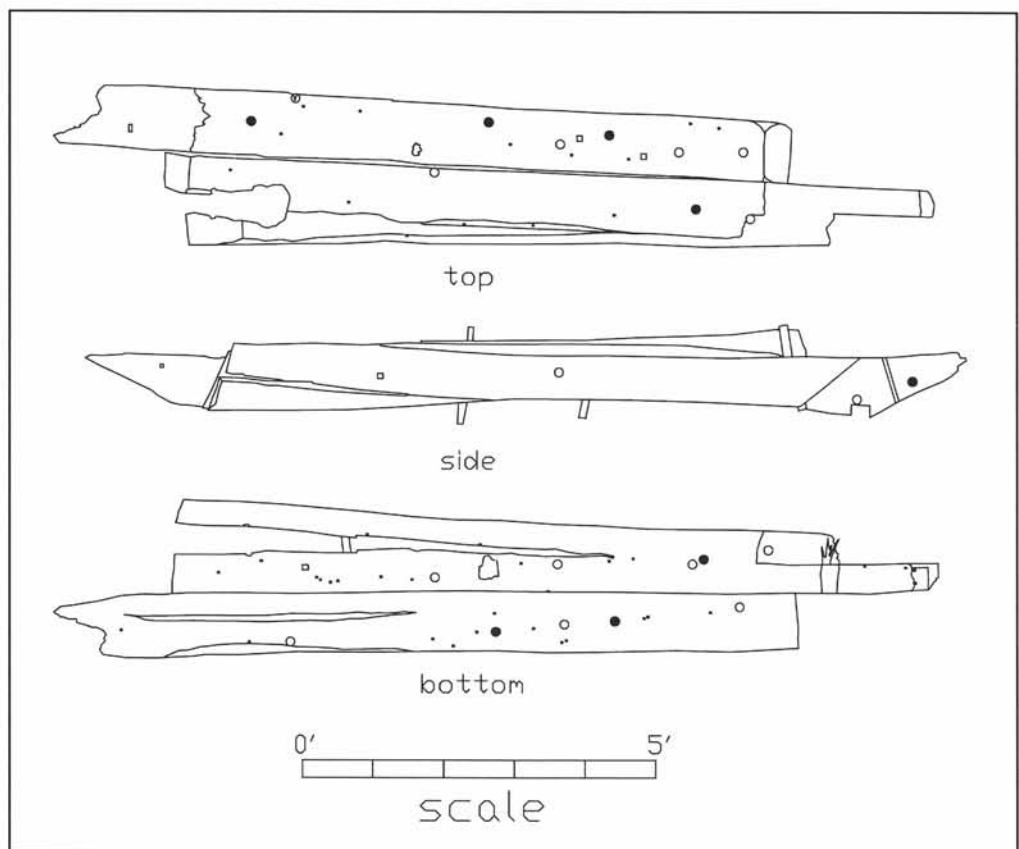


Figure 42. Facets of Frame 6/7.

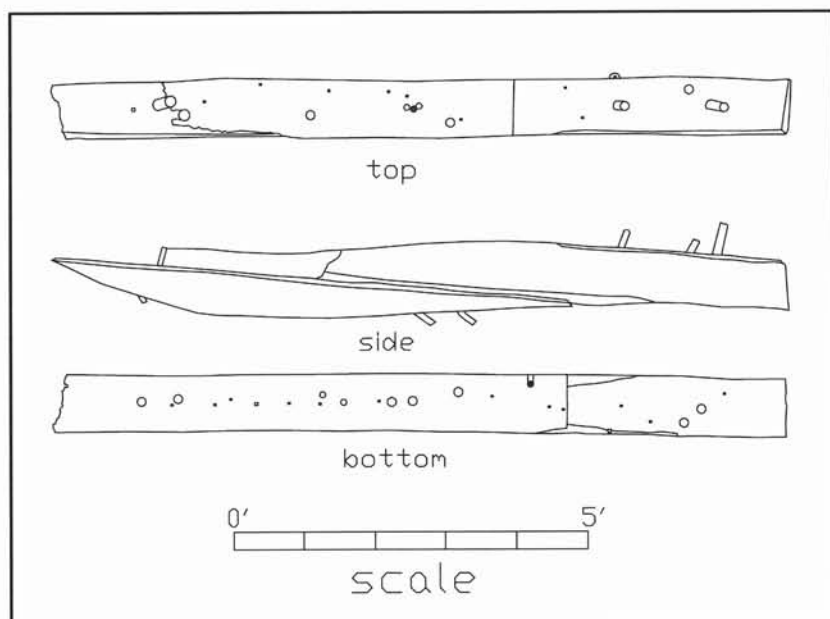


Figure 43. Facets of Frame 8.

ployed under the frame to achieve the desired contour of the hull (Figure 44). A second fillet piece was apparently fitted to the top of the inboard end of the frame. Although it was missing, three trunnels used to secure it survived. The top and bottom of the frame contained the remains of fasteners used to attach bilge ceiling and hull planking. Both pieces of the frame were fashioned from pine.

Ceiling

Seven fragments of bilge ceiling survived in association with the forward hull remains (see Figure 16 and 41). Those intact planks were located along the turn of the starboard bilge. With one exception, the forward end of each plank was broken by a cluster of pilings driven through the hull structure. The largest ceiling plank, C1, was 6 ft. 6 in. long, 10 in. wide, and 2½ in. thick (Figure 45). It was lightly fastened to the frames by two trunnels and six ¾-in.-square shank spikes.

AFT SECTION

Keel

The aft section of wreck structure was associated with the starboard quarter and measured 15 ft. long

along the keel and 19 ft. 6 in. wide. Most prominent among the surviving structural elements was the keel, false keel, deadwood, and sternpost assembly (Figure 46). The keel measured 14 ft. 9 in. long and was sided 8 in. and molded 12 in. at the forward

end of the deadwood (Figure 47). The top of both sided surfaces contained a rabbet for the 3-in.-thick garboard strake. Sacrificial pine planking 1 in. thick was used over felt and tar to protect the sides of the keel. The sheathing was attached with small square iron nails placed in a staggered diagonal pattern. Pine was used to fashion the keel.

Deadwood

Deadwood associated with the stern section of the wreck consisted of three timbers (see Figure 46). The first deadwood timber, Deadwood 1, rode on top of the keel. Two additional pieces of deadwood, Deadwood 2 and Deadwood 3, were placed consecutively on top of the first timber. Each consecutive piece of deadwood was attached to the previous piece by a combination of ¾ in. iron drift bolts and ½ in. spikes. The deadwood was not through bolted.

DEADWOOD 1

The first piece of deadwood rode on top of the keel and was butted against the sternpost (see Figure 46). It was 13 ft. 6 in. long and was sided 11 in. at the forward end and 6½ in. at the aft end (Figure 48). The molded dimension varied from 8 in. at the forward end to 12 in. at the aft end.



Figure 44. Bottom fillet employed to contour the turn of the bilge.

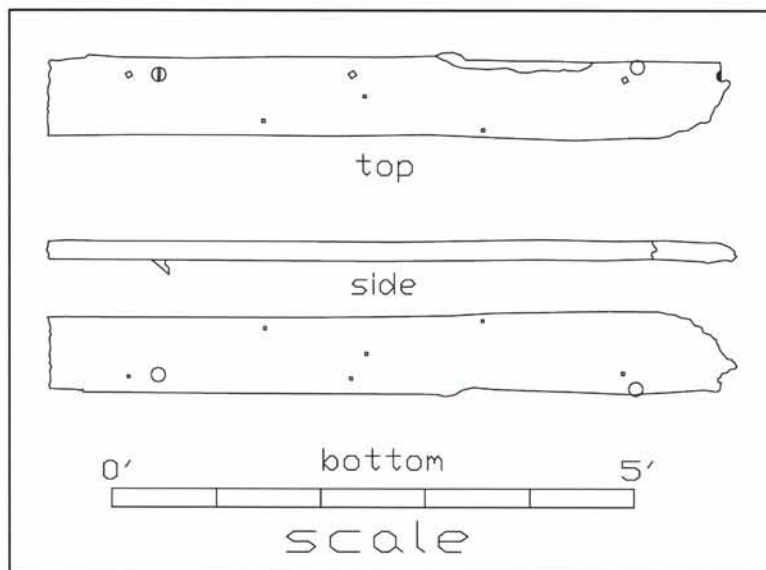


Figure 45. Facets of Ceiling Plank C1.

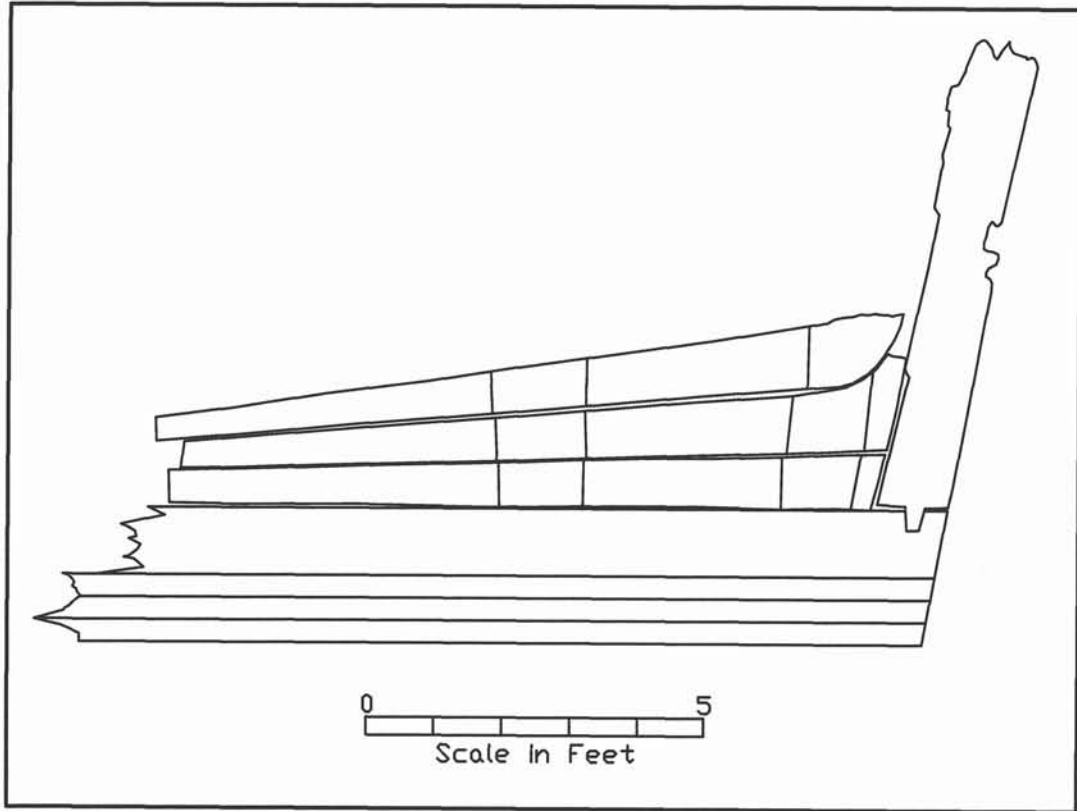


Figure 46. Elements of the keel, false keel, deadwood and sternpost assembly.

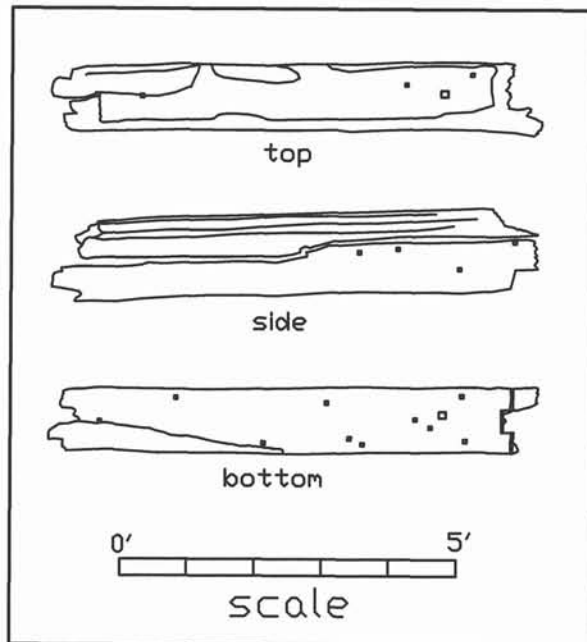


Figure 47. Aft section of keel structure.

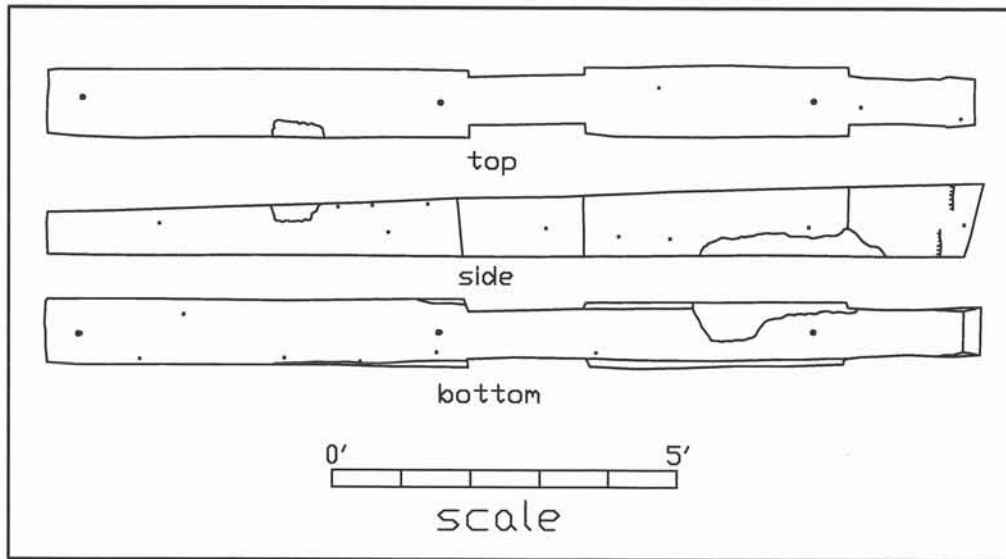


Figure 48. Facets of Deadwood 1.

The aft end was cut diagonally to accommodate the rake of the sternpost. Two rebates were cut across each side of the timber. The first extended from 6 ft. 2 in. to 7 ft. 9 in. aft of the forward end, and the second extended from 11 ft. 7 $\frac{1}{2}$ in. to 13 ft. aft of the forward end. At the aft end of the timber, the sided dimension reflected the location of a made rabbet. The top and bottom of Deadwood 1 contained evidence of both $\frac{3}{4}$ in. drift bolts and $\frac{1}{2}$ in. spikes employed to secure the timber to the keel and the next deadwood timber. The sides of the timber contained evidence of $\frac{1}{2}$ -in. spikes used to attach the cant frames. Pine was used to fashion Deadwood 1.

DEADWOOD 2

The second piece of deadwood rode on top of the first and also butted against the sternpost (see Figure 46). It was 14 ft. 1 in. long and was sided 11 in. at the forward end and 8 in. at the aft end (Figure 49). The molded dimension varied from 6 $\frac{1}{2}$ in. at the forward end to 24 in. at the aft end. The aft end was cut diagonally to accommodate the rake of the sternpost and swept up to form the stern knee. Two rebates were cut across each side of the timber. The first extended from 6 ft. 2 in.

to 7 ft. 9 in. aft of the forward end, and the second extended from 11 ft. 7 $\frac{1}{2}$ in. to 13 ft. 4 in. aft of the forward end. At the aft end of the timber, the sided dimension reflected the location of a made rabbet. The top and bottom of Deadwood 1 contained evidence of both $\frac{3}{4}$ in. drift bolts and $\frac{1}{2}$ in. spikes employed to secure the timber to the keel and the next deadwood timber. The sides of the timber contained evidence of $\frac{1}{2}$ in. spikes and $\frac{1}{2}$ in. trunnels used to attach the cant frames. Pine was used to fashion Deadwood 2.

DEADWOOD 3

The third piece of deadwood rode on top of the second, and the aft end was cut in a rising arc to lodge against the sternpost knee formed by the second deadwood timber (see Figure 46). The forward end of Deadwood 3 contained a 3-in.-wide 3 $\frac{1}{2}$ -in.-deep mortise for the keelson (Figure 50). It was 13 ft. 6 in. long and was sided 11 in. at the forward end and 9 in. at the aft end. The molded dimension varied from 5 $\frac{1}{2}$ in. at the forward end to 15 in. at the aft end. Two rebates were cut across each side of the timber. The first extended from 6 ft. $\frac{1}{2}$ in. to 7 ft. 9 in. aft of the forward end, and

the second extended from 11 ft. 7½ in. to the end of the timber. At the aft end of the timber the sided dimension reflected the location of a made rabbet. The top and bottom of Deadwood 1 contained evidence of both ¾-in. drift bolts and ½ in. spikes employed to secure the timber to the keel and the next deadwood timber. The sides of the timber contained evidence of ½ in. spikes and 1½ in. trunnels used to attach the cant frames. Pine was used to fashion Deadwood 3.

False Keel

A false keel was also attached to the bottom of the surviving keel structure in the stern (see Figure 46). The false keel measured 17 ft. long and was sided 12 in. and molded 12½ in. (see Figure 30). Like the forward section of false keel, the aft section was composed of several planks. The bottom plank was 4 in. thick and 12 in. wide. On the forward end, the bottom plank had a 4-in.-wide, 3-in.-deep mortise cut into of the forward end to provide a scarf joint with the next bottom plank forward. Two 6-in.-wide, 4½-in.-thick planks were fastened atop the bottom plank. The upper section of the false keel was composed of three 4-x-4-in.

planks. The planks of the false keel were fastened using ¾-in.-square shank iron spikes. The upper two planks were attached to the bottom of the keel. The upper 4-in. plank was fastened to the planks attached to the keel, and the bottom 4-in. plank was fastened to the upper 4-in. plank. A random staggered pattern was used in fastening the elements of the false keel. Like the keel, the false keel was protected by 1-in. pine sheathing over felt and tar and attached with small square iron nails placed in a staggered diagonal pattern. Pine was used to fashion each element of the false keel.

Sternpost

The base of the sternpost was also preserved at the site (see Figure 46). It measured 9 ft. long and was sided 11 in. and molded 15 in. (Figure 51). The base of the post was cut at an angle of 12 degrees and contained a 5-in.-long, 4-x-4-in. tenon to fit in a mortise in the keel. A 3-in.-wide, ½-in.-deep rebate for the lower gudgeon strap was cut into the sides of the post 16 in. above the keel. A second 3-in.-wide, ½-in.-deep rebate for another gudgeon strap was cut into the sides of the post 6 ft. 7½ in. above the keel. Both sides of the base of

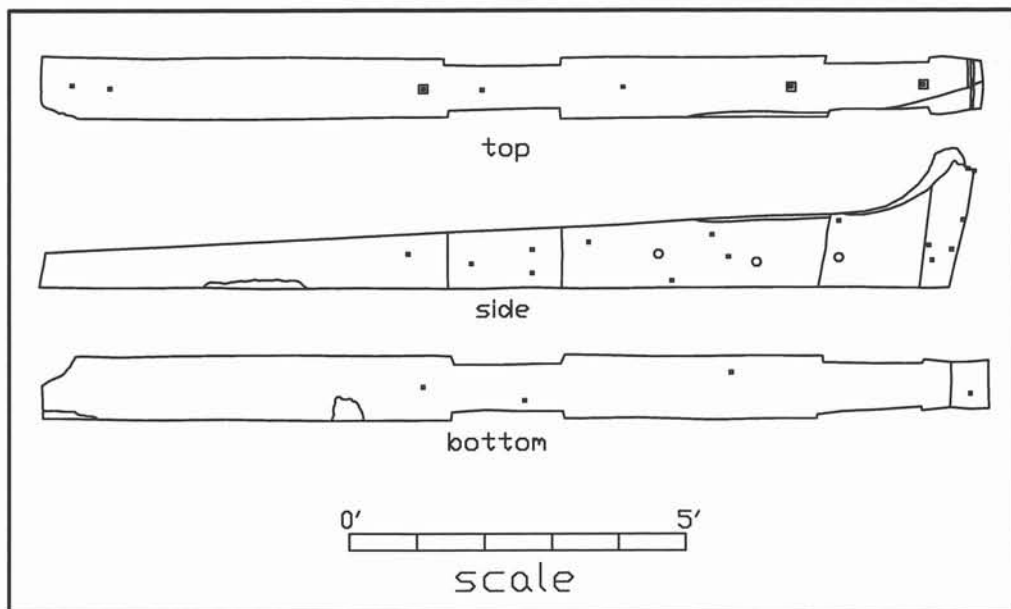


Figure 49. Facets of Deadwood 2.

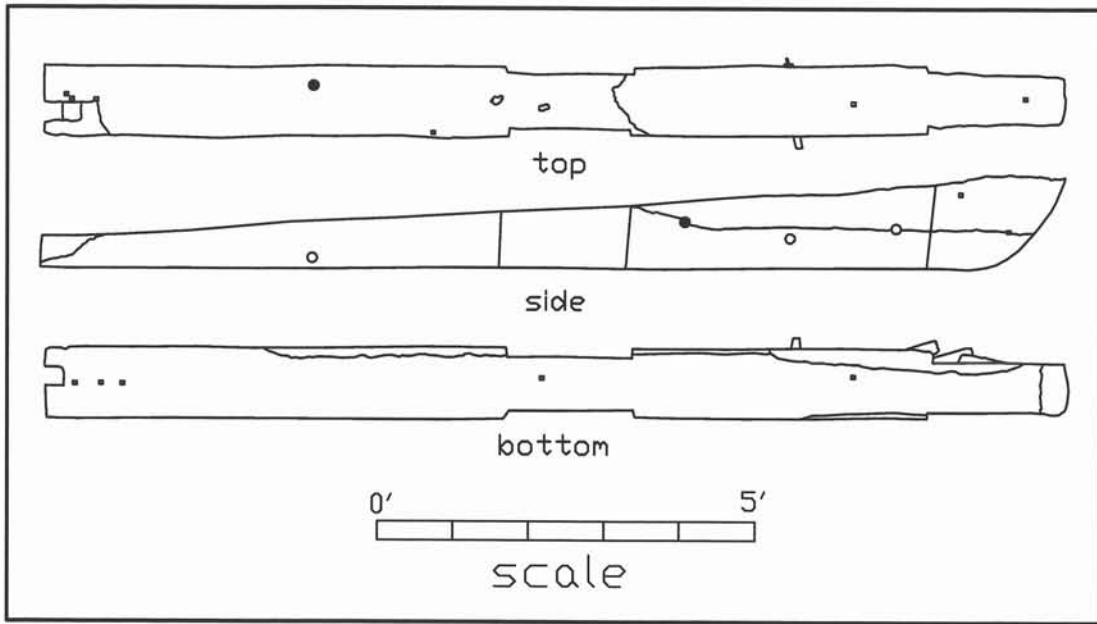


Figure 50. Facets of Deadwood 3.

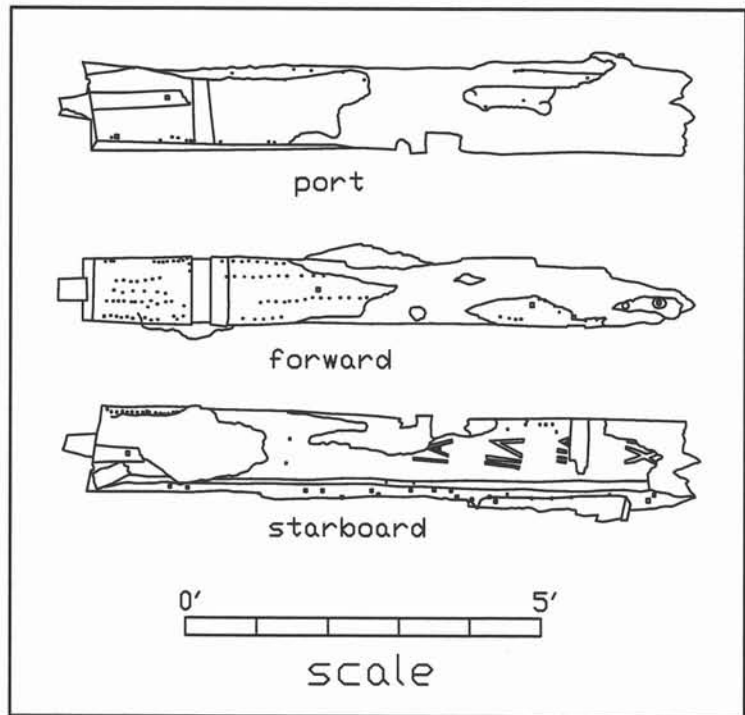


Figure 51. Facets of the sternpost.

the sternpost were rebated for a 1/2-in.-thick, 3-in.-wide fish plate. On the starboard side of the sternpost, the Roman numerals VI, VII, VIII, and IX were used to identify the draft. A series of 3/4-in. drift bolts had been employed to fasten the sternpost to the deadwood. The remains of lead sheathing and tacks employed to attach sheathing were readily apparent on both sides and the aft face of the post.

Garboard Strakes

At the forward end of the deadwood, the garboard strakes remained in close association with the rabbet (see Figures 21 and 23). The surviving remains of the starboard garboard measured 12 in. wide and 3 in. thick (see Figure 31). Although the port garboard may have originally measured 12 in. wide and 3 in. thick, the side adjacent to the keel appeared to have been beveled to fit into the rabbet leaving the interior surface only 9 1/2 in. wide and the exterior surface 11 in. wide. Both 3/4 in. drift bolts peened over 1 1/2 in. roves and 3/8 in. spikes had been used to attach the garboard to the half floors. No fasteners attached the garboard to the keel. Pine was used to fashion the garboard strakes.

Planking

Planking on the starboard side of the stern section consisted of the remains of 10 pine strakes (see Figures 21, 23, and 24). Those planks measured 3 in. thick and varied in width from 7 in. to the 12 in. garboard strake. Planking on the port side of the stern section consisted of the remains of two strakes. Those planks were 3 in. thick, and the garboard measured 11 in. wide and the second strake 10 1/2 in. wide. Tool marks on the planks indicated that they had been cut using a pit saw and partially dressed using an adz. Planks were attached using a combination of 1 1/2 in. trunnels and 3/8 in. spikes. The following tables provide the width of each plank:

STARBOARD PLANKS	WIDTH (IN.)
Garboard	12 in.
P2	12 in.
P3	10 in.
P4	8 1/4 in.
P5	8 in.
P6	9 in.
P7	10 in.
P8	10 in.
P9	11 in.
P10	8 in.
P11	10 in.
P12	8 in.

PORT PLANKS	WIDTH (IN.)
Garboard	11 in.
P2	10 1/2 in.

Ceiling

Ceiling on the starboard side of the stern section consisted of the remains of six pine strakes (see Figures 21, 23, and 24). Those planks measured 2 in. thick and varied in width from 4 in. to 1 in. Ceiling planking on the port side of the stern section was entirely missing. Tool marks on the planks indicated that they had been cut using a pit saw and partially dressed using a plane. Planks were attached using a combination of 1-in. trunnels and 3/8-in. spikes. Much of the ceiling had been destroyed by pilings driven through the stern of the wreck. The following table provides the width of each plank:

STARBOARD CEILING PLANKS	WIDTH (IN.)
S1	4 in.
S2	4 in.
S3	10 in.
S4	8 in.
S5	11 in.
S6	10 in.

Frames

Only one frame with associated futtocks and the lower ends of four cant frames could be documented in association with the starboard side of the aft section of wreckage. That complete frame was located on the starboard side at the forward end of the deadwood. It consisted of a first, second, and third futtock, which were exposed in the sediment profile. Excavation along the deadwood revealed the lower portions of three additional starboard cant frames. On the port side of the deadwood, one disarticulated and three in situ cant frames were exposed by excavation. Those frames were mapped prior to flooding of the docking facility. Any additional frames that survived in association with the stern section of wreckage were destroyed in the process of removing that section of the hull after flooding.

FRAME S1

Frame 1 consisted of a first, second, and third futtock (see Figure 21). The first futtock was 7 ft. 6 in. long (Figure 52). The sided dimension varied from 12 in. at the inboard end to 10 in. outboard before the diagonal scarf. The futtock was molded from 15½ in. at the inboard end on the deadwood to 8½ in. at the diagonal scarf. The second futtock was 5 ft. 6 in. long. The sided dimension was 10 in., and the futtock was molded from 8 in. at

the inboard end at the diagonal scarf. The length of the third futtock could not be determined. However, the sided dimension was 10 in., and the molded dimension was 8 in. at the inboard end. Two fillet pieces were employed on top of the inboard end of the frame. The lower piece measured 4 ft. 6 in. long, was sided 10 in., and was 4 in. thick. The top fillet piece was 5 ft. 6 in. long, was sided 10 in., and varied from 6 in. thick inboard to ½ in. outboard. Pine was used to fashion the elements of Frame S1.

FRAME S2

Frame S2 was a cant frame attached to the starboard side of the deadwood without a rebate (see Figure 21). The sided dimension was 7 in., and the molded dimension at the deadwood was 21 in. Pine was used to fashion Frame S2.

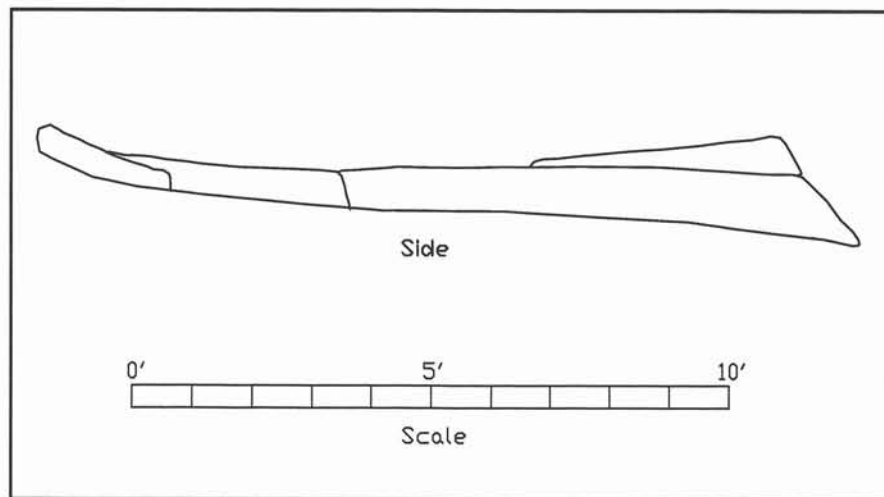
FRAME S3

Frame S3 was a cant frame attached to the starboard side of the deadwood without a rebate (see Figure 21). The sided dimension was 13 in., and the molded dimension at the deadwood was 20 in.. Pine was used to fashion Frame S3.

FRAME S4

Frame S4 was a cant frame attached to the starboard side of the deadwood without a rebate (see

Figure 52. Configuration and forward face of Frame S1.



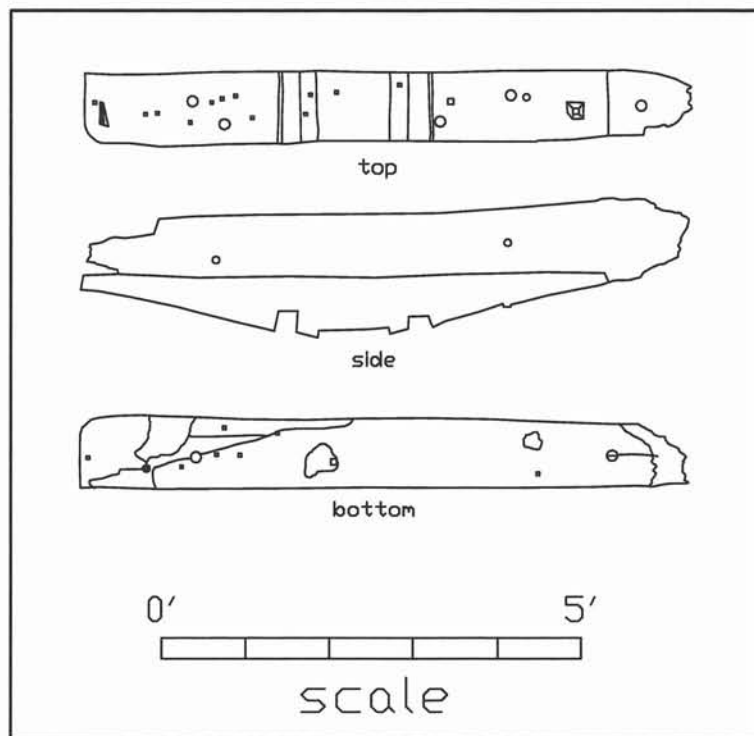


Figure 53. Facets of Disarticulated Floor 2.

FRAME P3

Frame P3 was an articulated cant frame attached to the port side of the deadwood without a rebate (see Figure 21). The length of the remainder of the frame was 1 ft. 11 in. The sided dimension was 9 in., and the molded dimension at the deadwood was 17 $\frac{1}{4}$ in. Pine was used to fashion Frame P3.

DISARTICULATED TIMBERS

A number of disarticulated timbers were recovered from the Ferry Docking Facility. Although the majority consisted of floors, futtocks, and planks, several fillet pieces and the remains of a mast were also recovered.

Disarticulated Floors

DISARTICULATED FLOOR 2

Disarticulated Floor 2 was composed of two timbers that measured 7 ft. 3 in. long. Both timbers were sided 11 in. (Figure 53). The lower timber was 6 ft. 5 in. long, and the molded dimension was 7 $\frac{1}{2}$ in. on top of the keel. The bottom of the timber contained a 1-in.-deep, 11-in.-long rebate for the keel. Limbers had been cut 3 in. outboard of either side of the keel rebate. Both limbers measured 3 in. wide, and one was cut 3 in. deep while the other was cut 2 in. deep. The ends of the bottom timber were intact and had been cut 2 $\frac{1}{2}$ in. thick on one end and 1 $\frac{1}{2}$ in. thick on the other. The bottom face of the bottom timber contained evidence that iron spikes and trunnels had been employed to fasten hull planking. One iron bolt was centered in a square cut out to serve as a starter

Figure 21). The sided dimension was 9 $\frac{1}{4}$ in., and the molded dimension at the deadwood was 18 in.. Pine was used to fashion Frame S4.

FRAME P1

Frame P1 was a disarticulated cant frame that had been attached to the port side of the deadwood without a rebate (see Figure 21). The length of the remainder of the frame was 3 ft. 2 in. The sided dimension was 12 in., and the molded dimension at the deadwood was 21 in. Pine was used to fashion Frame P1.

FRAME P2

Frame P2 was an articulated cant frame attached to the port side of the deadwood without a rebate (see Figure 21). The length of the remainder of the frame was 2 ft. 7 in. The sided dimension was 11 in., and the molded dimension at the deadwood was 20 in. Pine was used to fashion Frame P2.

hole for a spoon drill. The angle of deadrise was 15 degrees.

The top timber measured 7 ft. 1 in. long and was also sided 11 in. The bottom of the top timber had been cut on one side to overlap the end of the bottom timber. The other end of the top timber was broken but probably also lapped the bottom timber. The top of that end was rebated 3 in. deep and at least 9 in. long to accept a futtock. The sides of the top timber contained the remains of two $3/4$ in. iron drift bolts used to attach associated half floors. That evidence suggests that the floor may have been used in one of the mold frames. The top of the top timber contained the remains of iron spikes and trunnels used to attach bilge ceiling. Both the floor timbers were fashioned from pine.

DISARTICULATED FLOOR 3

Disarticulated Floor 3 was composed of two timbers that measured 8 ft. 6 in. long (Figure 54). Both timbers were sided from $11\frac{1}{2}$ to 12 in. The lower timber was 8 ft. 3 in. long, and the molded dimension was $8\frac{1}{2}$ in. on top of the keel. The bottom of the timber contained a $1/2$ in. deep, 11 in. long rebate for the keel. Limbers had been cut 3 in. outboard of either side of the keel rebate. Both limbers measured 3 in. wide, and one was cut 2 in. deep while the other was cut $1\frac{1}{2}$ in. deep. The ends of the bottom timber were intact, and both had been feathered into the top timber. The bottom face of the bottom timber contained evidence that iron spikes and trunnels had been employed to fasten hull planking. The angle of deadrise was 15 degrees.

The top timber measured 8 ft. $3\frac{1}{2}$ in. long and was also sided from $11\frac{1}{2}$ to 12 in. The bottom of the top timber had been shaped to conform to the top of the bottom timber. The top of one end was rebated 2 in. deep to accept a futtock. The top of the top timber contained the remains of one iron spike and trunnels that were used to attach bilge ceiling. Both the floor timbers were fashioned from pine.

DISARTICULATED FLOOR 5

Disarticulated Floor 5 was composed of two timbers that measured 12 ft. 8 in. long (Figure 55). Both timbers were sided 10 in. The lower timber was 6 ft. 2 in. long, and the molded dimension was 6 in. on top of the keel. The bottom of the timber contained a 2-in.-deep, 11-in.-long rebate for the keel. Limbers had been cut 3 in. outboard of either side of the keel rebate. Both limbers measured 3 in. wide, and one was cut 3 in. deep while the other was cut 2 in. deep. The ends of the bottom timber were intact and had been cut $1\frac{1}{2}$ in. thick on one end and 1 in. thick on the other. The bottom face of the bottom timber contained evidence that iron spikes and trunnels had been employed to fasten hull planking. The angle of deadrise was 15 degrees excluding the hollow outboard of the garboard strake.

The top timber measured 12 ft. 8 in. long and was sided from 10 to $10\frac{1}{2}$ in. The bottom of the top timber had been shaped to conform to the top of the bottom timber. The top of one end was cut down 1 in. to accept a top fillet piece. The top of the top timber contained the remains of one iron spike and trunnels that were used to attach bilge ceiling. Both the floor timbers were fashioned from pine.

DISARTICULATED FLOOR 6

Disarticulated Floor 6 consisted of the bottom timber from a set of two that formed a floor (Figure 56). It measured 7 ft. 3 in. long and was sided 11 in. The bottom of the timber contained a 2- to $1\frac{1}{2}$ in. deep, 10 in. long rebate for the keel. Limbers had been cut 3 in. outboard of either side of the keel rebate. Both limbers measured 3 in. wide, and one was cut 3 in. deep, while the other was cut 2 in. deep. The ends of the bottom timber were broken off, precluding the possibility of determining their configuration and association with the missing top timber. The bottom face of the bottom timber contained evidence that iron spikes and trunnels had been employed to fasten hull planking. The top of the timber contained the re-

Figure 54. Facets of Disarticulated Floor 3.

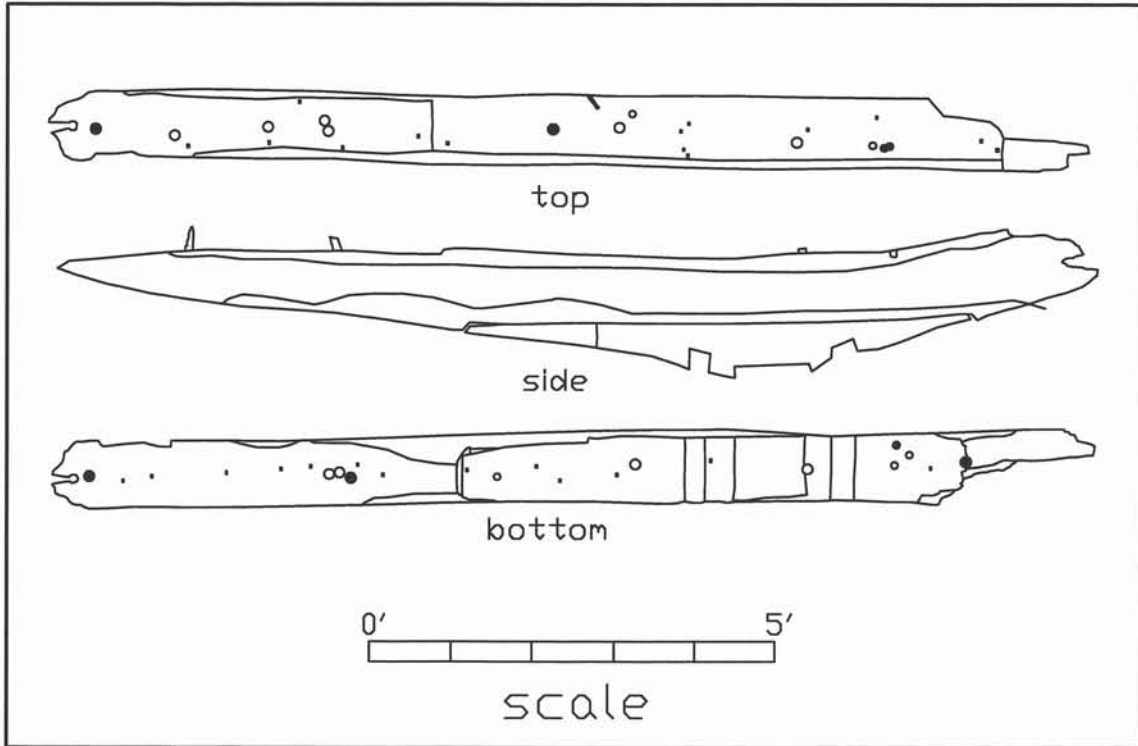
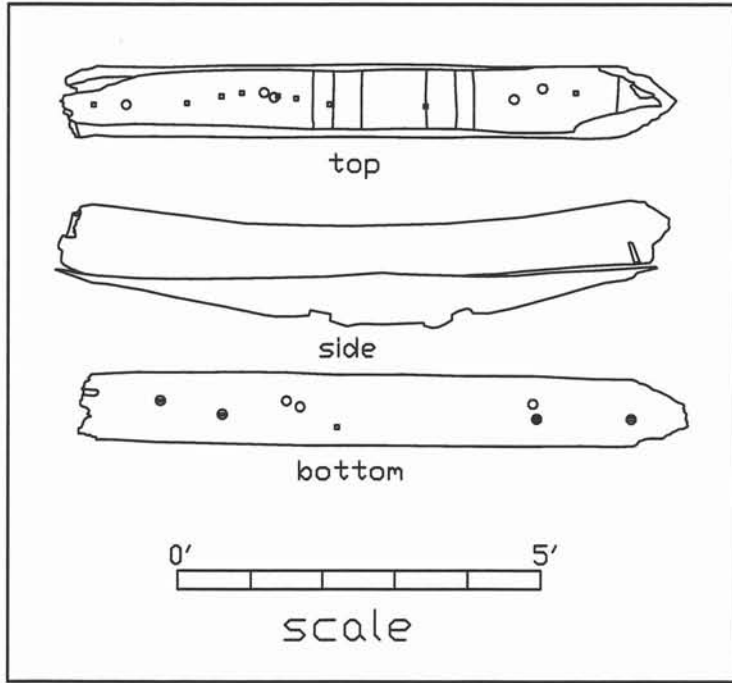


Figure 55. Facets of Disarticulated Floor 5.

mains of one iron spike and trunnels that were used to attach the top timber and planking. The angle of deadrise was 15 degrees excluding the hollow outboard of the garboard strake. Pine was used to fashion the timber.

DISARTICULATED FLOOR 7

Disarticulated Floor 7 consisted of the bottom timber from a set of two that formed a floor (Figure 57). It measured 8 ft. 4 in. long and was roughly sided to a maximum of 10 in. The bottom of the timber contained a 1½ in. deep, 10 1/2 in. long rebate for the keel. Limbers had been cut 2½ in. and 3 in. outboard of either side of the keel rebate. Both limbers measured 3 in. wide, and one was cut 3 in. deep while the other was cut 2½ in. deep. One end of the bottom timber was broken off precluding the possibility of determining its configuration and association with the missing top timber, but the other was diagonally cut off 1½ in. thick. The bottom face of the bottom timber contained evidence that iron spikes and trunnels had been employed to fasten hull planking. The top of the timber contained the remains of several iron spikes and trunnels that were used to attach the top timber and planking. The angle of deadrise was 15 degrees. Pine was used to fashion the timber.

DISARTICULATED HALF FLOOR 1

Disarticulated Half Floor 1 was composed of a half floor and both top and bottom fillet pieces (Figure 58). The half floor was 12 ft. 2½ in. long and was molded from 14 in. adjacent to the keel to 10½ in. at the turn of the bilge. The frame was roughly sided from 9 to 10

in. The inboard end of the half floor was cut diagonally, and the outboard end was cut horizontally to interface with a futtock. The top of the inboard end of the timber contained a top fillet 3 ft. 3 in. long and molded from 7 in. near the keel to 3 in. at the outboard extremity. The molded dimension was roughly 9 in. Trunnels were employed to attach the top fillet to the half floor. A bottom fillet 7 ft. 11 in. long was employed to help shape the outer molded surface. It was also attached to the half floor by trunnels. The top and bottom of the half floor and fillets contained the remains of iron spikes and trunnels used to attach bilge ceiling and hull planking. Both the half floor and the futtocks were fashioned from pine.

DISARTICULATED HALF FLOOR 2

Disarticulated Half Floor 2 was 8 ft. 6½ in. long and was molded from 15 in. adjacent to the keel to 9 in. at the outboard end (Figure 59). The frame was roughly sided from 9 to 10 in. The inboard end was cut diagonally, and the outboard end was cut vertically to interface with a futtock. The top

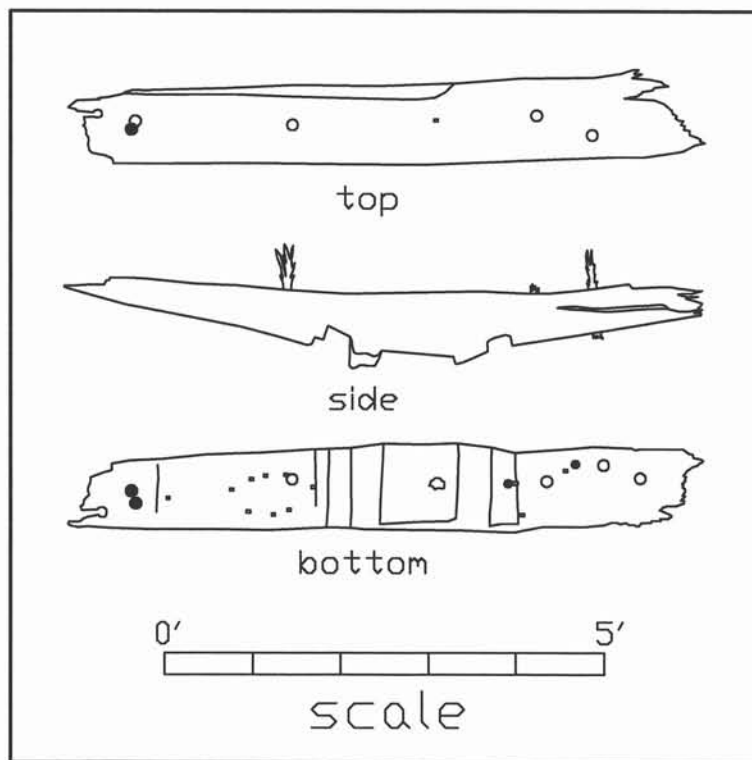


Figure 56. Facets of Disarticulated Floor 6.

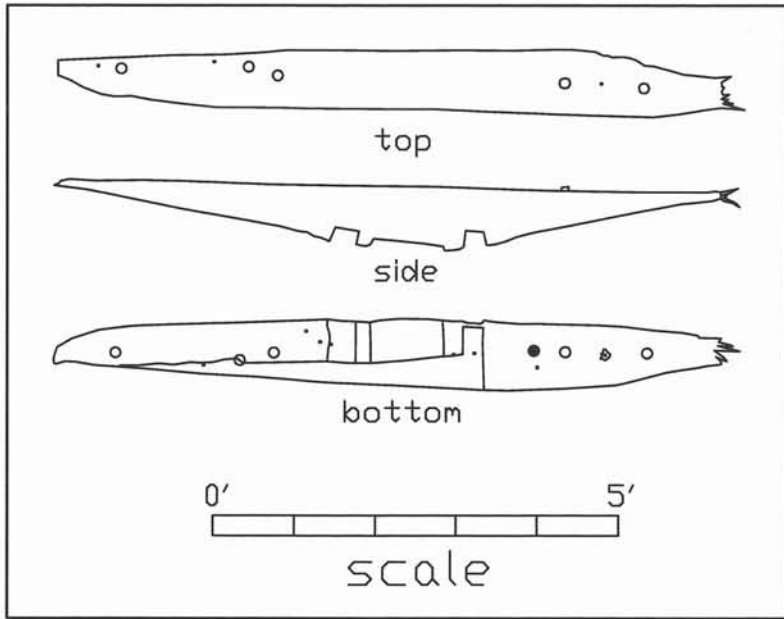


Figure 57. Facets of Disarticulated Floor 7.

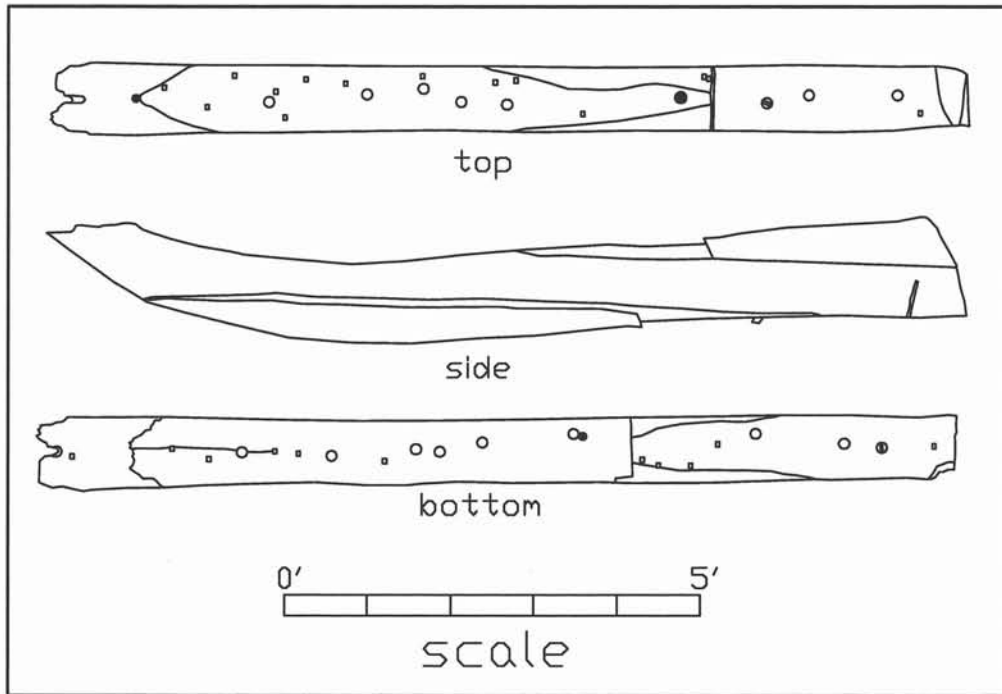


Figure 58. Facets of Disarticulated Half Floor 1.

and bottom of the half floor and fillets contained the remains of iron spikes and trunnels used to attach bilge ceiling and hull planking. Pine was used to fashion the half floor.

DISARTICULATED HALF FLOOR 3

Disarticulated Half Floor 3 was 6 ft. long and was molded from 21 in. adjacent to the keel to 5 in. at the outboard end (Figure 60). The frame was roughly sided from 9 to 10 in. The inboard end was cut diagonally, and the outboard end was cut vertically to interface with a futtock. The top and bottom of the half floor and fillets contained the remains of iron spikes and trunnels used to attach bilge ceiling and hull planking. Pine was used to fashion the half floor.

DISARTICULATED HALF FLOOR 4

Disarticulated Half Floor 4 was composed of a half floor and both top and bottom fillet pieces (Figure 61). The half floor was 14 ft. 11 in. long and was molded from 10 in. adjacent to the keel to 8 in. at the outboard extremity. The frame was roughly sided from 9½ to 11½ in. The inboard end of the half floor was cut diagonally, and the outboard end was broken. The top of the inboard end of the timber contained a top fillet 3 ft. 1½ in. long and molded from 5½ in. near the keel to 2 in. at the outboard extremity. The molded dimension was roughly 9½ in. Trunnels were employed to attach the top fillet to the half floor. A bottom fillet 2 ft. 11 in. long was employed to help shape the outer molded surface. It was also attached to the half floor by trunnels. The top and bottom of the half floor and fillets contained the remains of iron spikes and trunnels used to attach bilge ceiling and hull planking. The sides of the timber contained the remains of two ½ in. iron spikes and trunnels used to attach associated futtocks. That evidence suggests that the floor may have been used in one of the mold frames. Both the half floor and the futtocks were fashioned from pine.

Disarticulated Futtocks

DISARTICULATED FUTTOCK 1

Disarticulated Futtock 1 was a curved bilge futtock (Figure 62). It measured 7 ft. 7 in. long and was roughly sided to a maximum of 10½ in. One end of the futtock contained a rebate for a scarf or scarf chock, and the other was cut off perpendicular to the axis of the timber. The outer molded face of the futtock contained evidence of the combination of iron spikes and trunnels had been employed to fasten hull planking. The inner molded surface contained the remains of several iron spikes and trunnels that were used to attach the top timber and planking. The sides of the top timber contained the remains of two ¾-in. iron drift bolts used to attach associated half floors. That evidence suggests that the floor may have been used in one of the mold frames. Pine was used to fashion the timber.

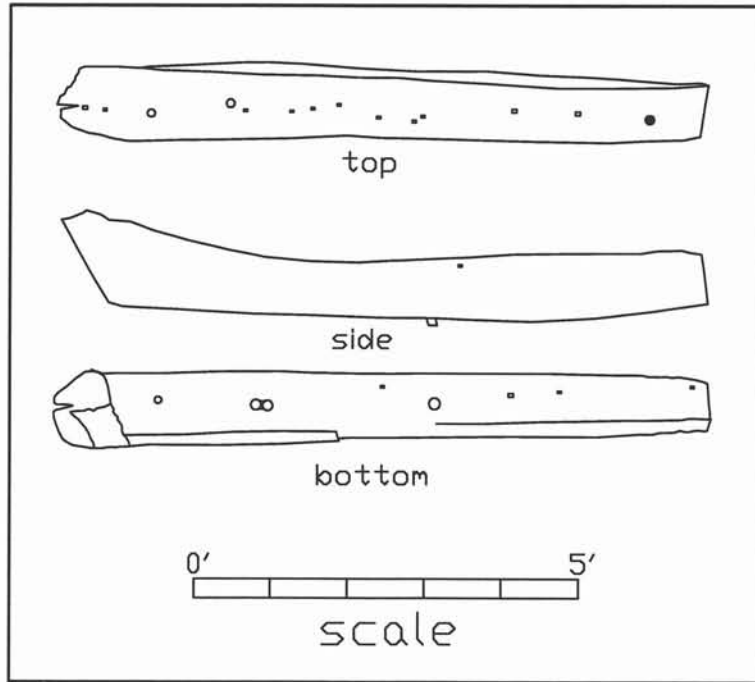
DISARTICULATED FUTTOCK 8

Disarticulated Futtock 8 was a curved bilge futtock. It measured 4 ft. long and was roughly sided to a maximum of 10 in. (Figure 63). Both ends of the timber were broken. The outer molded face of the futtock contained evidence of the trunnels that had been employed to fasten hull planking. The inner molded surface contained the remains of one iron spike and trunnel that were used to attach the ceiling. The sides of the top timber contained the remains of one ¼ in. iron spike and one trunnel used to attach associated half floors. That evidence suggests that the floor may have been used in one of the mold frames. Pine was used to fashion the timber.

MAST

The base of a mast was also found among the excavation debris and recovered. It was 7 ft. 8 in. long and had a diameter of 16 in. at the base and 12 in. at 5½ ft. above the base (Figure 64). Although round at the top, the mast had two rough

facets at the base. The bottom of one of those facets had the remains of two $\frac{1}{4}$ in. iron spikes. An offset tenon on the bottom of the mast measured 12 in. long and $2\frac{1}{2}$ in. wide. Unlike most of the wood on the vessel the mast was fashioned from oak.



*Figure 59. Facets of
Disarticulated Half Floor 2.*

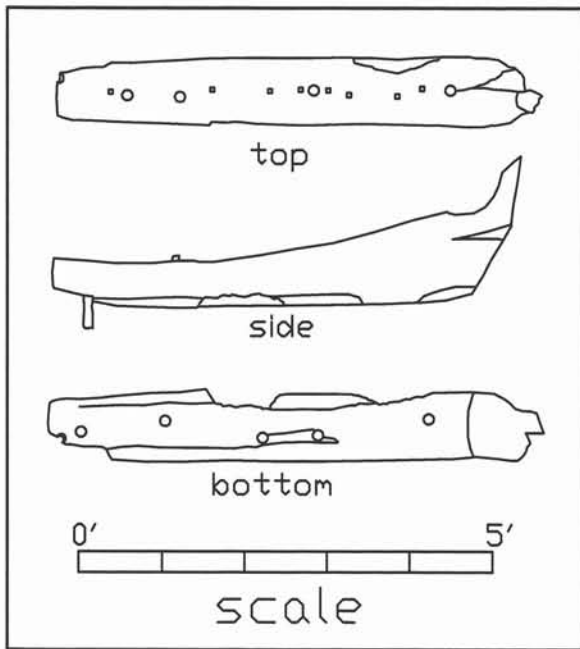


Figure 60. Facets of Disarticulated Half Floor 3.

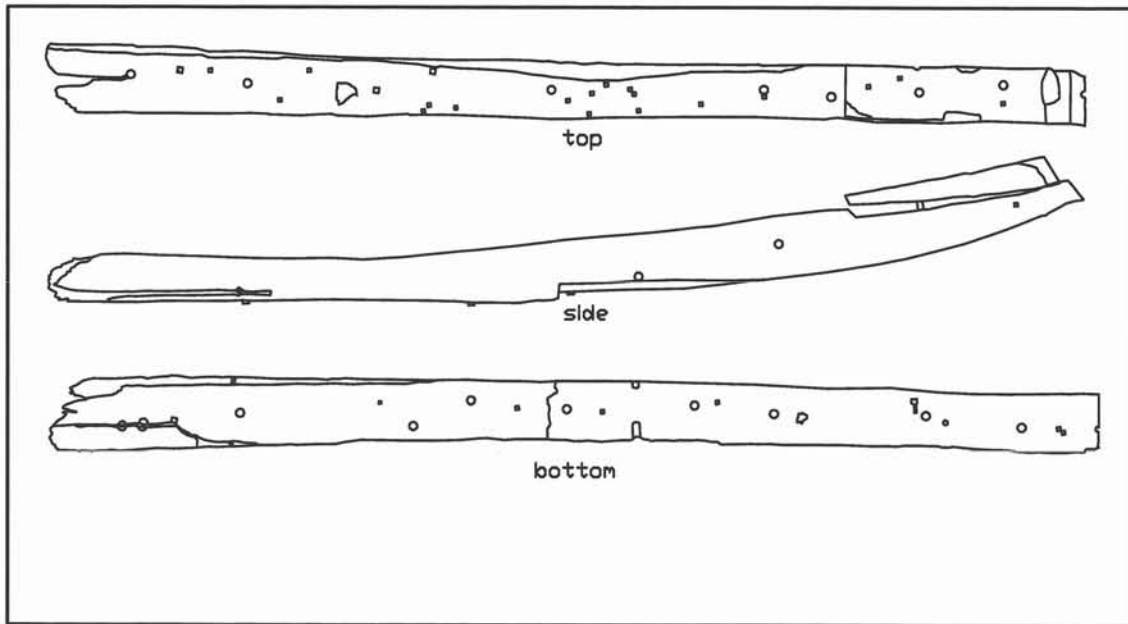


Figure 61. Facets of Disarticulated Half Floor 4.

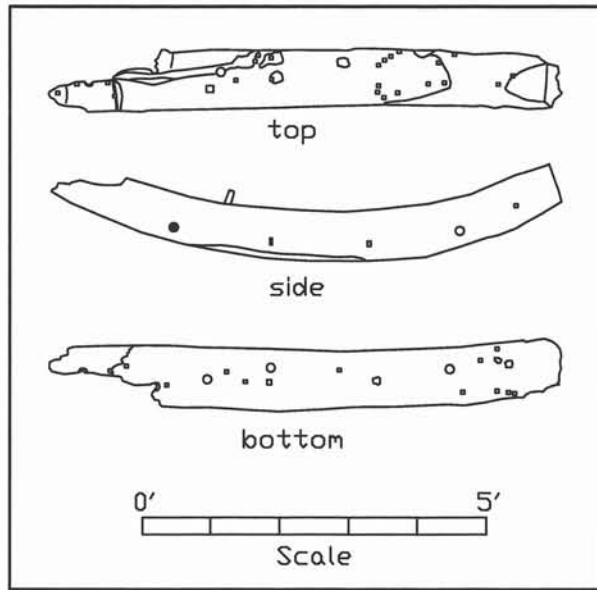


Figure 62. Facets of Disarticulated Futtock 1.

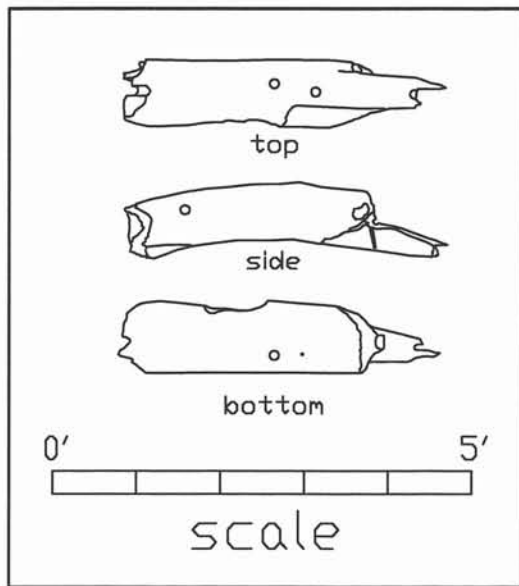


Figure 63. Facets of Disarticulated Futtock 8.

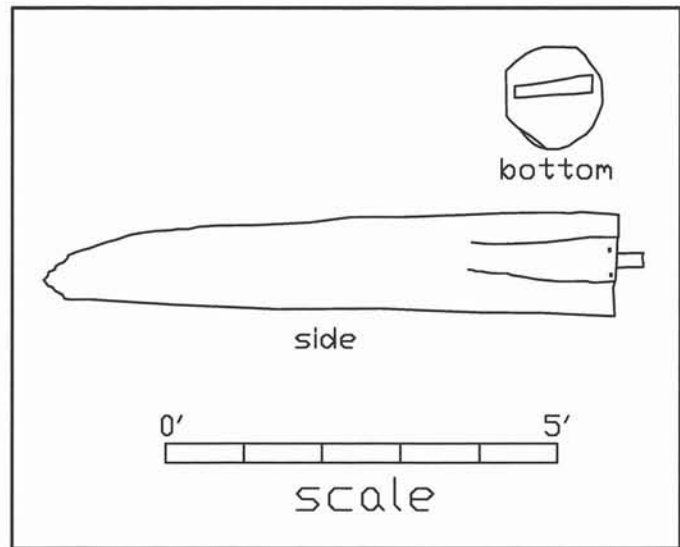


Figure 64. Facets of disarticulated mast.

4: Conclusions

Historical data indicated that the Southern Branch of the Elizabeth River had a long history of maritime activity. The river has been the site of settlements since the early days of the Virginia colony. Settlements along the Southern Branch of the Elizabeth River followed in the wake of growth spurred by the tobacco industry during the seventeenth century. During the middle of the eighteenth century, Norfolk was established primarily as a port and shipbuilding center, taking advantage of the river's increasing trade with the West Indies and British Isles. The Elizabeth River's commercial potential grew during the nineteenth century with the development of the Gosport Naval Yard, the Dismal Swamp Canal, steamships, and the numerous railroads that connected Norfolk with the central and western sections of the state. This extended history of human activity, combined with a stable riverine environment supports a high potential for well preserved archaeological resources.

Cartographic research confirmed that the west shoreline of the river has been extensively altered along the Portsmouth waterfront. There the original waterfront was altered by filling to increase the land area east of Craford's Street. By 1775, the city waterfront had been extended by almost 100 ft. of fill deposited east of Craford's Street since 1752. By 1781, a series of docks and wharves had been constructed along the Elizabeth River from Ferry Street south to South Street. After the War of 1812, filling had been sufficient to add another street east of Crawford. That street was named Water Street. In 1850, the Ferry Landing was still open and in service, and the Seaboard and Roanoke Railroad line serviced a dock structure south of

the ferry slip. Although the nature of the landing facilities at the terminus of High Street changed through time it remained operational until the area was bulkheaded and filled prior to 1965.

Cartographic and archaeological research indicates that the site where the ship sank was well within the navigable channel of the Elizabeth River in the eighteenth century. Sediments at the site, cartographic sources, and analysis of the structural remains of the Portsmouth Ferry Docking Facility shipwreck confirm that the vessel rolled over on its starboard side and sank into the river bottom sediments prior to the deposition of fill that by 1820 extended the Portsmouth waterfront around the wreck location. Because of the presence of slips associated with the operation of ferries, part of the wreck was re-exposed until the third quarter of the twentieth century. Between 1952 and 1965, the ferries ceased operation, the waterfront was bulkheaded, and the site was covered by fill material. The chronology established by cartographic research suggests that the Elizabeth River Ferry Docking Facility vessel was lost prior to 1820 when the wreck site was isolated by fill. Unfortunately, no diagnostic artifacts could be absolutely associated with the hull remains to help establish a more specific date.

Although the amount of surviving hull structure available for analysis was limited to small sections at the forward and aft ends of the keel (Figure 65), some conclusions can be drawn from the extant vessel fabric. From the 70 ft. length of the keel, it is apparent that, given a traditional sweeping stem, the ship was perhaps 82 ft. long between perpendiculars. Although determining the beam

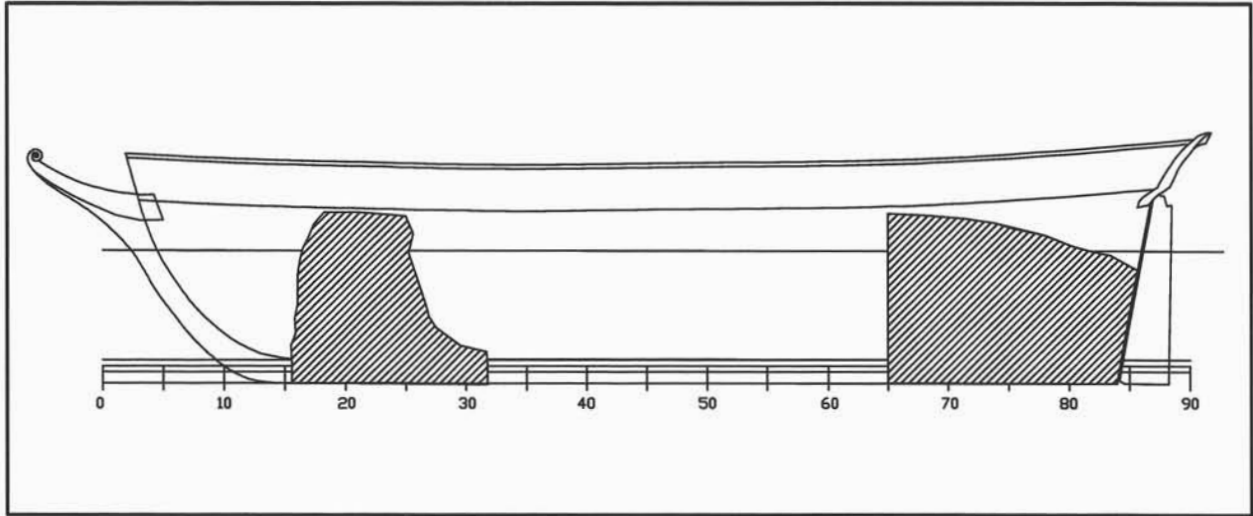


Figure 65. Hull profile showing surviving sections of hull structure (shaded).

was impossible, reconstruction of the hull configuration using the disarticulated floor with the least amount of deadrise and the only available bilge futtock, a beam of 26 ft. might be considered reasonable. The remains of the sternpost and sides of the hull fore and aft indicate that the depth of hold must have been in the vicinity of 9 ft. with only one deck.

Although only minimal evidence survived at the site, a reconstruction of the hull lines was also attempted. Those lines were generated using the length of the keel, configuration of the deadwood, and reconstructed profiles of the hull (Figure 66). The deadwood and sternpost provided critical evidence concerning the configuration of the stern. Unfortunately, a line of pilings associated with the ferry dock at the end of High Street destroyed most of the bow. The configuration of the stem had to be based on late eighteenth-century design traditions. A sweeping stem that extended from the forward end of the keel was adopted. That stem configuration can be found in the design of schooners and brigs similar in size to the wreck under examination (Figure 67).

Three hull profiles were developed. One of those was reconstructed using data from Frame 6/7 in the forward section of wreckage (Figure 68). A

second was reconstructed using data from the frame exposed at the forward end of the deadwood (Figure 69). The midship section was fabricated using data from the disarticulated floor with the least amount of deadrise and a disarticulated futtock that represented the turn of the bilge (Figure 70).

Based on the length of the keel, the stern configuration, a hypothesized bow, and three reconstructed profiles, the generated water lines suggested that the vessel had relatively flat floors and less deadrise than might be considered to have been the norm based on historical evidence. The hull appears to have been relatively full both fore and aft, although the remains of the deadwood and cant frames aft and the forward frames in the bow section of wreckage confirm a fine run aft and a hollow forefoot forward. Amidships the hull appears to have been full, with as little as 10 degrees of deadrise. Futtocks from the turn of the bilge confirm that the bilge was full and rounded. No doubt to facilitate sailing to windward, the keel was extended an additional 12 in. by a false keel. With a 2-ft. keel below the hull, that configuration might have produced a draft of 9 to 10½ ft.

The framing pattern was impossible to establish except at the bow and the stern. In the bow forward of the last floor, a series of half floors were

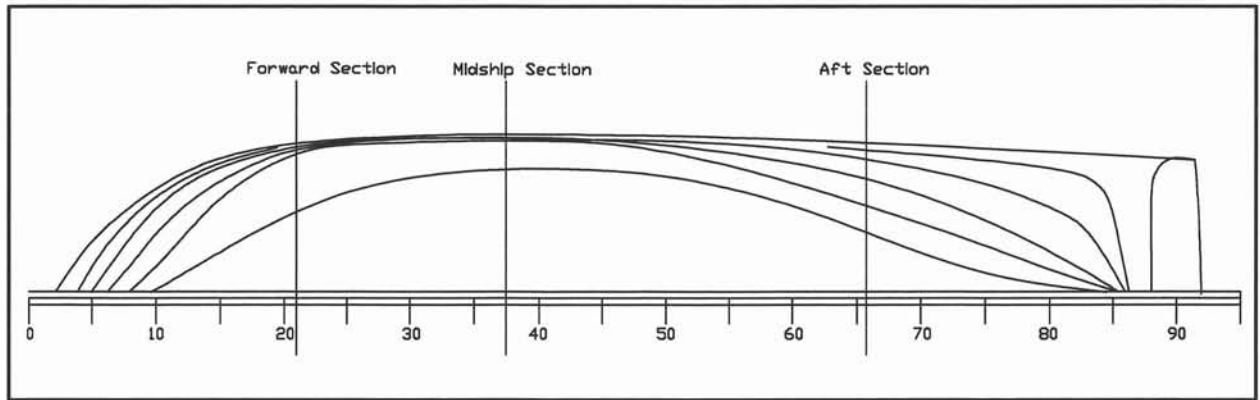


Figure 66. Waterlines generated from surviving structural evidence.

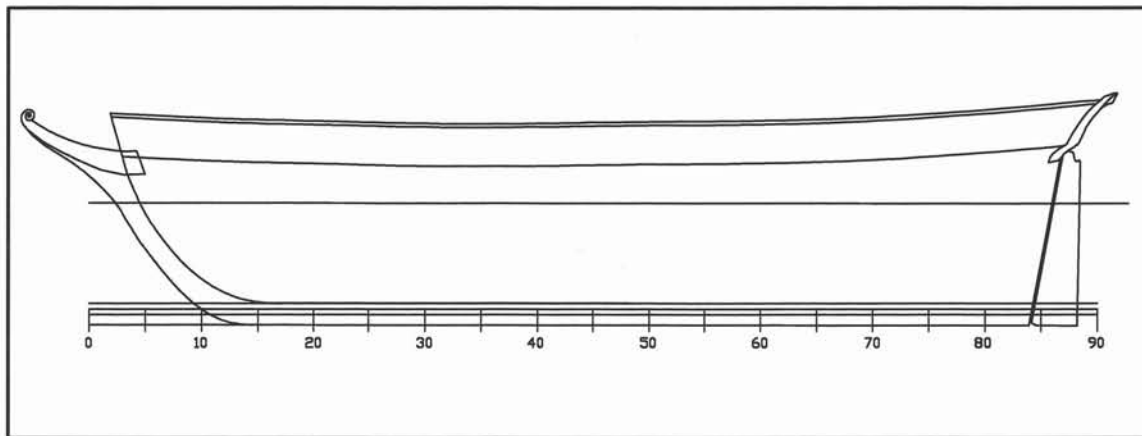


Figure 67. Hull profile generated using data from surviving hull structure and historical evidence associated with late eighteenth-century vessel design.

Figure 68. Reconstructed forward section at Frame 6/7.

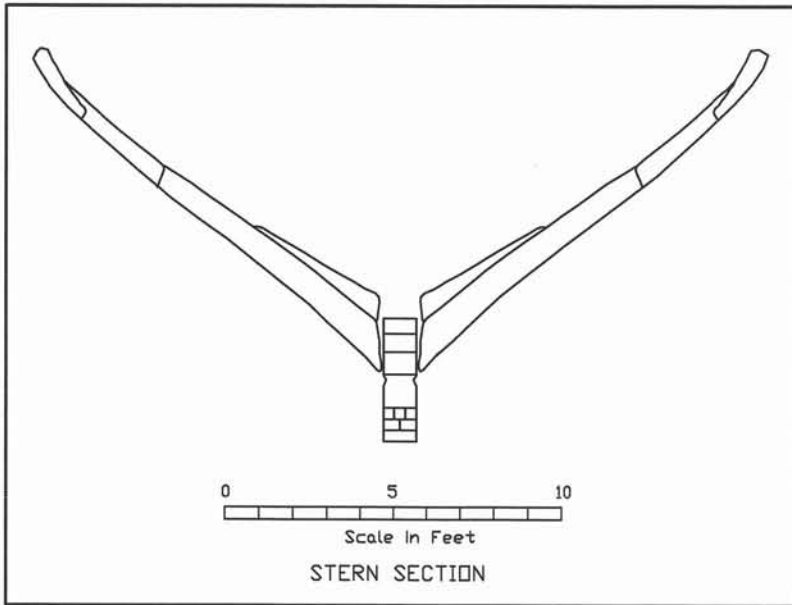
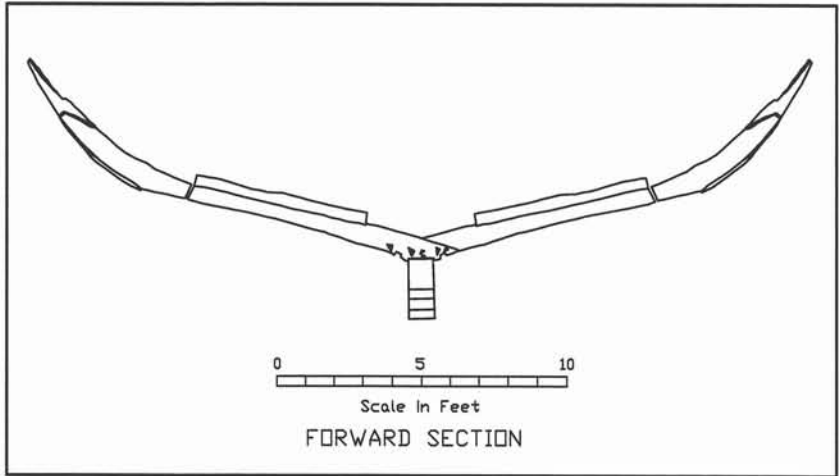
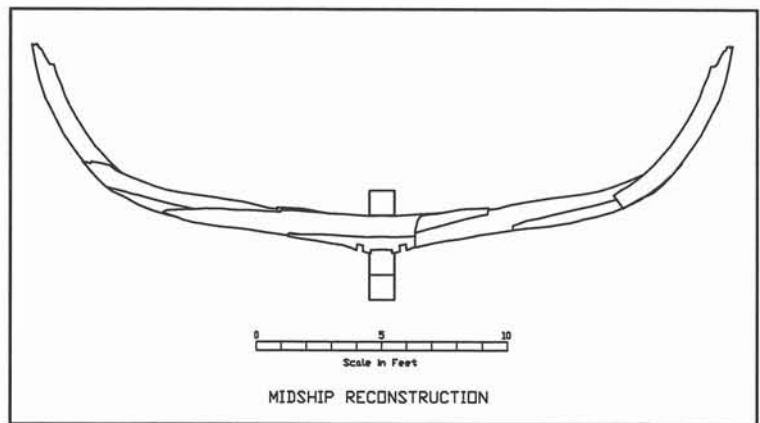


Figure 69. Reconstructed aft section at the forward end of the deadwood.

Figure 70. Reconstructed midship section generated from a disarticulated floor, half floor, and futtock.



employed rather than cant frames rebated into dead wood. Those half floors lapped each other over the keelson and were secured both to each other and to the deadwood below them. In the extreme bow, deadwood probably supported traditional cant frames. In the stern aft of the last floor, traditional half floors were employed. The final floors forward and aft and their associated futtocks had been fastened horizontally, suggesting that they were designed to serve as mold frames. One of the disarticulated floors recovered at the site also contained horizontal fasteners, suggesting the molded frames were employed to establish the shape of the hull.

Several disarticulated half floors suggest that the framing pattern between the bow and the stern may have resembled the Anglo-American pattern similar to that documented in the Revolutionary War collier transport *Betsy* excavated at Yorktown, Virginia (Broadwater 1997), a similar vessel examined in Bermuda (Watts and Krivor 1995), and a third excavated and documented in Savannah Harbor (Watts 1996). That pattern of framing is characterized by floors that have bottom fillets and half floors that are set off the keel/keelson and have top or bottom fillets to help shape the lower hull.

One of the more curious aspects of the vessel's construction was the fact that pine was used to construct virtually all of the surviving hull structure. The most conspicuous element of the vessel, the mast, was of oak, not pine. It is possible that the oak "mast" was not associated with the wreck or did not serve as a mast. While the vessel's design and construction confirm that the builder was certainly a highly skilled shipwright, it is obvious that the material employed in construction would have been considered second rate. Both historical and archaeological evidence confirms that oak would have been the preferred material for both frames and planking at the time that the Portsmouth shipwreck was constructed. As oak was still plentiful in the Norfolk area, it would not seem that a scarcity of material was the reason for using pine. To provide protection from teredo worms,

the hull was sheathed in 1-in. pine over a layer of tar and felt.

The use of pine, especially in the framing, might suggest that the builder had been charged with building a vessel for a unique purpose. At the time that the Portsmouth vessel appears to have been lost, the American colonies were in revolt. The military activities associated with that revolt disrupted normal trade and created demands for extraordinary trading activities. One of those activities might provide a rationale for the material used in construction of the Portsmouth wreck. It is possible that the Portsmouth vessel was constructed out of inexpensive pine because the ship's owner envisioned a limited objective or a relatively brief but useful working life for the vessel. For example, the owner may have wanted to employ the ship as a privateer. If a vessel more suitable for privateering was captured, the Portsmouth vessel could be abandoned without significant loss. The vessel may have also been built for smuggling. One trip through the British blockade to the West Indies and back could more than pay for the ship and return a handsome profit. In the event that the ship was captured the loss would be less than that incurred if the ship had been built of oak. A fast windward hull and rig would have been advantageous for either purpose.

Two less likely scenarios include construction of the ship for use as a fire ship and/or gunboat. The use of fire ships was a common military strategy in the eighteenth century. If the Portsmouth vessel was intended to serve as a fire ship, pine might have been employed as it burns faster and hotter than oak. Construction of the Portsmouth vessel for use as a fire ship might also explain the fact that the hull was only lightly fastened by the standards of the day. The false keel might have been helpful in maintaining the desired vessel track, and the oak mast might have been employed so that the spars and rigging would last as long as possible before collapsing.

Construction of the Portsmouth vessel for use as a gun boat remains the least likely possibility. Although ersatz gunboats were built and used in almost every contemporary naval conflict, the use of pine and light fasteners in the Portsmouth shipwreck does not support even that temporary purpose. Other gun boats built during the period have survived including two row galleys sunk in the Chickahominy River that have been examined archaeologically. Both were constructed of oak and were well fastened in the traditional manner. That suggests both oak and iron were available in sufficient quantities to merit their use in gunboat construction.

In the final analysis, it is not possible to determine the identity or the purpose for the Portsmouth vessel. The design and framing pattern suggests it was built during the last quarter of the eighteenth century or possibly early in the first quarter of the nineteenth century. While there were no clearly associated artifacts to facilitate dating, tool marks are pre-industrial, consisting of axe, adz, plane, sash saw, and pit saw marks.

While the material employed to construct the Portsmouth vessel was unusual, it is apparent that the ship was designed and constructed by an experienced shipwright. The lines suggested by the surviving hull structure indicate a design for a fast windward sailor. A schooner or brig rigging plan appears to be the most likely for the vessel. A schooner rig could have been combined with the hull to make an excellent smuggler or privateer. Both of those vessel types would have been engaged in temporary high risk businesses where minimizing investment in the ship would have been easily justified.

The design and configuration of the hull suggest that the vessel could accommodate a fore-and-aft rig. The false keel suggests that the builder was interested in sailing to windward. In all likelihood, that would suggest that the vessel was schooner rigged. That rig was highly popular at the time, and there is historical evidence that schooners were being built in the area and that several were de-

stroyed as a consequence of British raids. The fact that there is evidence of fire damage on portions of the wreck structure also supports this theory.

In the final analysis the Portsmouth shipwreck represents a unique example of eighteenth-century ship construction. In all likelihood, it would have been a single-decked vessel, either schooner or possibly brig rigged. Although clearly built by a skilled shipwright, it was fashioned from pine, a material considered to be substandard. It was also so lightly fastened that it could not have stood up to extended oceanic operations. Both the material and the fasteners suggest it was constructed with a limited concept of use possibly associated with privateering or smuggling, or perhaps to accomplish a secondary military objective.

In spite of the unusual nature of construction and the fact that the vessel cannot be specifically identified, the wreck can be considered significant. The age and geographical location of the wreck confirms an as yet undefined association with the maritime history of Portsmouth. There can be little doubt that the vessel was constructed by a local shipwright for some purpose associated with the events of the late eighteenth or early nineteenth century. Because the economic, political, and military atmosphere of the American Revolution and the War of 1812 created unusual demands on the citizens of Portsmouth, the unusual construction features of the wreck may represent a reflection of the stress of war. Because the vessel was built by a skilled shipwright, the remains also preserved an important architectural and construction record of both Anglo-American shipbuilding traditions and a record of how those traditions were adapted in response to the demands of an economy in conflict. Through documentation of the surviving remains of the Portsmouth vessel, that record has been preserved and construction-related impacts mitigated.

The discovery of the Portsmouth vessel also confirms that the waterfront east of Crawford Street should be considered a highly sensitive area with the potential for containing other shipwreck

resources. Similar evidence for extensive land development also occurs in other cities such as New York where the Ronson shipwreck was discovered in 1980 (Rosloff 1986), Quebec City where several eighteenth-century bateaux were discovered (Crisman 1988:132–133), Richmond, Virginia, where over 60 James River bateaux were found along the waterfront (Crisman 1988:137–138; Terrell 1992), Savannah, Georgia, where numerous vessels have been discovered on Fig Island (Watts 1996), and San Francisco where vessels associated with the Gold Rush of 1849 have been discovered under city streets (Johnston 1988:240).

In every case, the shipwrecks were located underneath highly developed areas several blocks inland from existing waterfronts (Smith 1981; James Allen 1996, pers. comm.) Evidence from those sites confirm that areas of developed land associated with waterfront expansion have a high potential for shipwreck resources. Where development or redevelopment will impact those areas, a program of historical research and deep archaeological testing should be required to ensure that important resources are not inadvertently destroyed.

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