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Boston Harbor National Park Service Sites Alternative Transportation Systems Evaluation Report

Final Report

Prepared for:

National Park Service
Northeast Region

Boston, Massachusetts

Prepared by:

John A. Volpe National Transportation Systems Center
in association with
Cambridge Systematics, Inc.
Norris and Norris Architects
Childs Engineering
EG&G

Cambridge, Massachusetts

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Jeffrey Bryan and Eric Plosky, Volpe NTSC
Samuel Lawton and Elizabeth Peart, Cambridge Systematics, Inc.
Charles Norris, Norris and Norris Architects
David Porter, Childs Engineering
Jane Lappin, EG&G

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14. ABSTRACT

This project puts forth a forward looking water-based transportation plan which would serve four NPS units in and around Boston Harbor: Boston Harbor Islands National Recreation Area, Boston National Historical Park, Salem Maritime Historic Site, and Adams National Historical Park. The report examines the existing conditions at the four NPS units in terms of park facilities, visitor circulation, access and inter-modal connections, water transportation service, dock and pier facilities, and information services. Volpe identifies specific transportation needs for each NPS unit, as well as prospective transportation routes between the units and Boston Harbor. Operating cost analysis and dock-site needs assessment are accounted for. Finally, the report provides recommendations for ongoing support of alternative water transportation.

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Table of Contents

Chapter 1: Background

In November 1996, Congress established the Boston Harbor Islands (BHI) national park area as a partnership between all levels of government, and the private and private non-profit sectors. The Boston Harbor Islands national park area is a conglomeration of 30 islands in the outer harbor of the Boston metropolitan area. Six of the Boston Harbor Islands are currently open for public visitation. The islands are accessed by passenger ferry service from one of three mainland access points: Long Wharf in downtown Boston; Hingham to the south; and Salem to the north.

A long-term transportation strategy is essential to the future viability of the Boston Harbor Islands national park area. Connections to other Boston area waterfront parks and local sites would greatly enhance the visitor's experience and provide for additional educational opportunities. Alternative transportation service would also help provide access to other National Park Service (NPS) areas in the vicinity of Massachusetts Bay. These include the Salem Maritime National Historic Site in Salem, the Adams National Historical Park in Quincy, and the Charlestown Navy Yard (part of the Boston National Historical Park). In general, these sites can be difficult to access due to traffic congestion and limited or inconvenient public transportation options.

This planning study assesses the current and future transportation needs of these four Boston area NPS sites and is organized as follows:

- **Chapter 1.0 – Background –** This section presents an outline of the report, an overview of the National Park Service's Alternative Transportation System (ATS) Program, objectives of the study and the role of the Advisory Committee throughout the process.

- **Chapter 2.0 – Existing Conditions –** This section reviews the existing conditions at each of the four NPS sites, including park facilities, visitor circulation, access and intermodal connections, water transportation service, dock and pier facilities, information services and results of focus group sessions.

- **Chapter 3.0 – Identified Needs –** This section identifies the specific transportation needs of each site.

- **Chapter 4.0 – Route and Operations Options and Analysis –** This section presents all routes options and identifies a short list of routes. Based on this short list, an assessment of market potential and evaluation of the operations and system characteristics is presented.

- **Chapter 5.0 – Dock Site Conditions Evaluation –** Site conditions are presented including navigation, environment, landside access, intermodal connections, survey, historic resource impact, property ownership and current uses. An evaluation of dock needs, such as piers and floats, breakwater, dredging, ADA access, landside support and site requirements is presented.

- **Chapter 6.0 – Operating Cost Analysis and Funding Opportunities –** This section provides an analysis of the potential costs of ferry operations, various management options, and an inventory of federal funding programs.

- **Chapter 7.0 – Supporting Programs –** This section presents specific recommendations for programs and policies to support water transportation and alternative transportation services including local trolley services, improved informational signage, marketing, and program funding.

Included in the Report Appendices is a detailed Framework for Marketing the Boston Harbor Islands.

1.1 ATS Program for NPS

This study of the Boston Harbor Parks was funded through the Federal Lands Highway Program and Alternative Transportation Program. In 1999, the U.S. Department of Transportation, through the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) undertook a nationwide study of alternative transportation system needs for the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), and the Bureau of Land Management (BLM). This project was initiated by the U.S. Congress through Section 3039 of the Transportation Equity Act for the 21st Century (TEA-21).

The lands managed by the Department of Interior's agencies (National Park Service, U.S. Fish and Wildlife Service, and Bureau of Land Management) receive many visitors each year. Some of the facilities are experiencing a level of use so high that it compromises the visitor experience and/or degrades the resource. This FHWA/FTA study addressed methods of improving visitor transportation services through analysis of the suitability of Alternative Transportation Systems (ATS). Since the completion of this study the FHWA through the Federal Lands Highway Program has initiated funding of alternative transportation planning studies and implementation projects for National Park Units. The National Park Service through this source of monies has funded this current study.

ATS are defined as transportation alternatives to the private automobile that cover a wide range of technologies and services, including various transit technologies, associated amenities and clean fuel vehicles. ATS should emphasize the use of clean fuel or other innovative technology; mitigate adverse impacts on cultural or natural resources; reduce congestion and pollution; improve the visitor experience; and, integrate the transportation planning activities with regional, state and local governments, and other public land management agencies. The ATS may also involve improvements to the existing transportation system such as travel demand management (TDM); congestion management; intelligent transportation systems; connecting the existing transportation network to bicycle paths or pedestrian paths; and, constructing roadway improvements such as lane widening, widening or adding shoulders, and improving pavement structure.

1.2 Objective of Current Study

The objective of this study is to develop a water-based transportation master plan that serves the needs of the four Boston area NPS sites and enables a long-term plan to go forward for improving access to the Boston Harbor Islands national park area and other NPS parks adjacent to the Boston Harbor: Boston National Historical Park, Salem Maritime National Historic Site, and Adams National Historical Park. The following specific objectives have been outlined in the scope of work for each park unit:

Boston Harbor Islands

- Recommend ferry routes and service characteristics for the short-, mid-, and long-term based on projected demand.
- Evaluate site conditions and develop concept designs for ADA-accessible ramp and dock systems for George's, Spectacle, Lovell's, Gallops, Grape and Bumpkin islands.
- Develop a marketing framework to increase visitor demand and awareness of the resources which could form the foundation of a marketing strategy.
- Recommend possible management operations for the water transportation service including funding strategies.
- Identify opportunities for improved signage.

Boston National Historical Park

- Develop a concept design for an ADA-accessible ramp and dock system at Pier 1 in Charlestown Navy Yard.
- Evaluate the use of Pier 2 as a ferry or water shuttle landing.
- Evaluate and recommend, as feasible, water ferry service between Charlestown Navy Yard and local cross harbor service, connections with the Freedom Trail at the North End, and connections with the Boston Harbor Islands.
- Recommend trolley bus service at Charlestown linking the visitor center, historic ships, the U.S.S. Constitution Museum, the docking piers and Bunker Hill Monument.
- Identify opportunities for improved signage.

Salem Maritime National Historic Site

- Evaluate the docking system being donated to NPS for adequacy as an accessible mooring and boarding facility at Central Wharf for visiting historic vessels, harbor tour boats and possible service to the Harbor Islands and other north shore destinations notably the affiliated areas within the Essex National Heritage Area.
- Develop a concept design for an ADA-accessible ramp and dock system for Central Wharf as a back up plan.
- Identify opportunities for improved signage.

Adams National Historical Park

- Evaluate and recommend expansion of the current trolley bus service between the NPS sites in Quincy: the Visitor Center, Adams Birthplaces, the Old House and the Church of the Presidents.
- Recommend connections between Adams NHP and ferry service to Boston Harbor Islands considering potential gateways at Fore River Shipyard, Souther Tide Mill, and Squantum Point/Marina Bay.
- Identify alternative scenarios for trolley bus service to connect potential BHI gateways, non-NPS historic sites in Quincy, and the Adams Visitor Center.
- Identify opportunities for improved signage.

1.3 Previous Studies

A significant amount of planning work has been completed since the mid-1980s for water and ground transportation in the inner harbor, the outer harbor and along its edge. A number of routes have been successfully implemented as a result of this work.

Several recent studies, in particular, have focused on the Boston Harbor Islands and water transportation issues of the Boston Harbor and have been significant resources in conducting this study:

- Boston Harbor Islands National Park Area, Draft Management Plan and Draft Environmental Impact Statement, prepared by the National Park Service for the Boston Harbor Islands Partnership, April 2000.
- Boston Harbor Islands National Park Area, Water Transportation Plan, by the Volpe Center and TAMS Consultants. Draft, June 1999.
- Boston Inner Harbor Passenger Water Transportation Plan, prepared for City of Boston, Boston Redevelopment Authority by TAMS Consultants with Bourne Consulting Engineering. January 2000.
- Federal Lands Study (1999) Reports:
  - Boston Harbor Islands National Park Area – Site Report
  - Boston National Historical Park – Site Report
  - Salem Maritime National Historic Site – Site Report
  - Adams National Historical Park – Site Report

A full bibliography of reports used as resources in this study is contained in Appendix A.

1.4 Advisory Committee Role

An ATS Boston Parks Advisory Committee was established at the beginning of this project as a decision-making body to review draft reports, provide feedback, and approve the planning recommendations. The ATS Committee is made up of the NPS Superintendents from the four Park Units and their chosen designees. The Committee decided on the final scope of the project at the beginning of the study and individual members have been involved in the planning and reviews of the transportation plans for their respective Parks. The Advisory Committee members include:

- George Price, Boston Harbor Islands
- Linda Haar, Boston Redevelopment Authority
- Diane Haynes, Massachusetts Department of Environmental Management
- Brian Broderick, Metropolitan District Commission
- Peter Steele, Boston National Historical Park
- Ruth Raphael, Boston National Historical Park
- Marianne Peak, Adams National Historical Park
- Caroline Keineth, Adams National Historical Park
- Steven Kesselman, Salem Maritime National Historic Site
- Colleen Bruce, Salem Maritime National Historic Site

Chapter 2: Existing Conditions

This section of the Evaluation Report reviews the existing conditions at the Boston Harbor Islands, the Boston National Historical Park, the Salem Maritime Historic Site, and the Adams National Historical Park including park facilities, visitor circulation, access and intermodal connections, water transportation service, dock and pier facilities, information services and results of focus group sessions.

2.1 Park Facilities: Overview, Visitation and Circulation

2.1.1 Boston Harbor Islands National Park Area

Overview

The Boston Harbor Islands national park area contains 30 islands with a surface area of 1,600 acres. The islands are glacial drumlins formed about 16,000 years ago. They range in size from 214 acres to less than an acre of bare-rock outcroppings. These islands are spread out over 50 square miles in Boston Harbor. The furthermost island, The Graves, is about 10 miles from Boston.

Table 2.1 presents a matrix of the 30 islands and the services available on each island. Ten of the islands are staffed either intermittently or full-time and offer a variety of services such as guided tours, picnic areas, hiking paths, camping sites, or historic structures. These include Bumpkin, Deer, Gallop's, George's, Grape, Little Brewster, Lovell's, Peddock's, Thompson, and World's End Islands. Spectacle Island, to be opened in 2002, is one of the largest Harbor Islands and will offer many visitor services. The major islands of Boston Harbor are shown in Figure 2.1.

Six of the islands are accessible by public water transportation. Passenger ferries serve George's Island. Water shuttles provides a continuous loop service between Bumpkin, Gallop's, Grape, George's, Lovell's, and Peddock's Islands.

There are seasonal visitor centers or information kiosks at Fort Warren on George's Island, Long Wharf in downtown Boston, and Hingham Shipyard.

Mission

According to National Park Service staff, when Congress designated the Boston Harbor Islands national park area in 1996, the NPS was not authorized to acquire lands and historic features that illustrate the significant role of the Boston Harbor Islands in the nation's history. The Congressional legislation establishing the park was intended to foster the goals of the current public and private land managers, including the Commonwealth of Massachusetts which began acquiring the islands in the late 1950s. In 1970, the Commonwealth passed legislation providing for the acquisition of selected islands for recreational and conservation purposes. The enabling legislation establishing the national park area was intended to encourage coordinated management of the park resources and to improve visitor programs. The legislation also established the Boston Harbor Islands Partnership "whose purpose shall be to coordinate the activities of the Federal, State, and local authorities and the private sector in the development and implementation of an integrated resource management plan for the recreation area." This 13-member Partnership is responsible for planning and coordinating the park's management and development.

Based on the 1996 Congressional legislation, the NPS sees its mission at the Park:

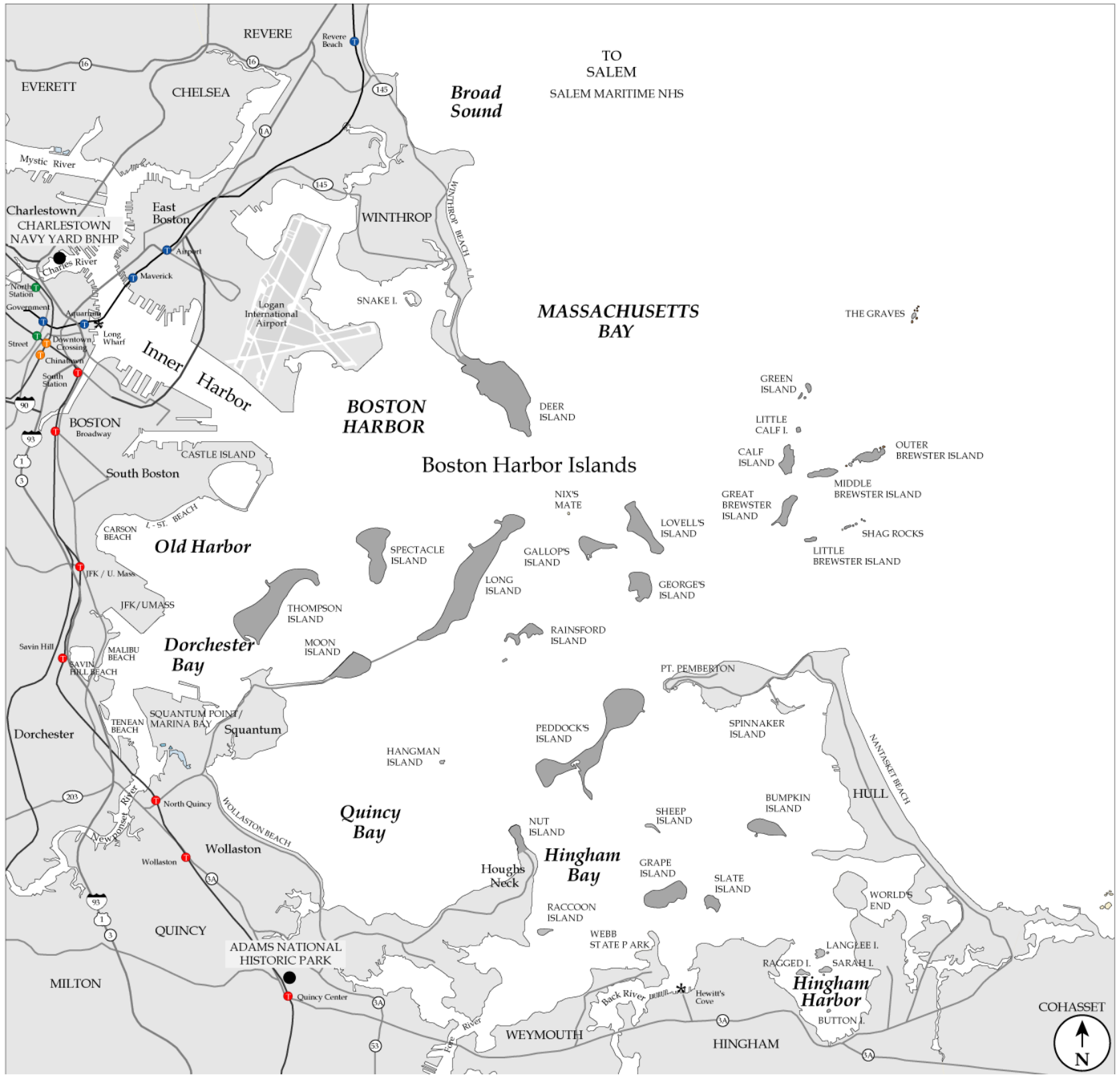
TABLE 2-1: BOSTON HARBOR ISLANDS CURRENT VISITOR SERVICES

Island	Acres*	Manager	Staffed (Intermittent)	Guided Tours	Lifeguard	Visitor Station	Drinking Water	Refreshments	Toilet Facilities	Picnic Areas	Hiking Paths	Camp Sites	Historic Structures	Passenger Ferry	Water Shuttle	Boat Slips	Vehicle Access	Open by Arrangement
Bumpkin Island	32.7	DEM	X	X		X			X	X	X	X	X		X			
Button Island	1.0	Town of Hingham									X							
Calf Island	22.4	DEM									X		X					
Deer Island	203.5	MWRA	**	X		X	X		X		X		X				X	X
Gallop's Island	26.9	DEM	X	X		X			X	X	X		X		X			
George's Island	41.3	MDC	X	X		X	X	X	X	X	X		X	X	X	X		
Grape Island	53.7	DEM	X	X		X			X	X	X	X	X		X			
The Graves	1.8	U.S. Coast Guard											X					
Great Brewster	23.9	DEM									X		X					
Green Island	1.7	DEM																
Hangman Island	0.3	DEM																
Langlee Island	5.2	Town of Hingham																
Little Brewster Island	3.1	U.S. Coast Guard	**	X									X					X
Little Calf Island	0.8	DEM																
Long Island	225.2	City of Boston											X					
Lovell's Island	51.9	MDC	X	X	X	X			X	X	X	X	X		X			
Middle Brewster Island	13.6	DEM											X					
Moon Island	45.7	City of Boston											X					
Nut Island	14.0	MWRA	**	X							X						X	X
Outer Brewster Island	20.1	DEM											X					
Peddock's Island	210.4	MDC	X	X		X			X	X	X	X	X	X	X			
Raccoon Island	3.6	DEM																
Ragged Island	4.1	Town of Hingham									X							
Rainsford Island	21.6	City of Boston											X					
Sarah Island	4.6	Town of Hingham																
Sheep Island	3.2	DEM																
Slate Island	12.7	DEM																
Spectacle Island (when open in 2002)	105.0	DEM & City of Boston	X	X	X	X	X	X	X	X	X			X	X	X		
Thompson Island	169.9	Thompson Is. Outward Bound	**	X			X		X	X	X		X	X				X
World's End	274.3	The Trustees of Reservations	X			X			X		X						X	

*Acreage derived from measurements in GIS by Environmental Data Center, University of Rhode Island.
**Full-time staff.

- To preserve for public use and enjoyment the lands and waters that comprise the Boston Harbor Islands national park area;
- To manage the recreation area in partnership with the private sector, the Commonwealth of Massachusetts, municipalities surrounding Massachusetts and Cape Cod Bays, the Thompson Island Outward Bound Education Center, and Trustees of Reservations, and with historical, business, cultural, civic, recreational and tourism organizations;
- To improve access to the Boston Harbor Islands through the use of public water transportation; and

FIGURE 2-1: BOSTON HARBOR AREA NATIONAL PARK SERVICE FACILITIES



- To provide educational and visitor information programs to increase public understanding of and appreciation for the natural and cultural resources of the Boston Harbor Islands, including the history of Native American use and involvement.

The consensus of the Partnership is that the major objective of the Park is the protection of resources. It has not yet set limitations on the use of the islands, but have begun a process for setting carrying capacity based on a scientific monitoring of resources and visitor use. Above all else, the partnership sees the islands as a living laboratory of coastal processes, and a teaching tool for future generations to learn how to care for our world in ways that are sustainable over time.

Visitation

Visitation was estimated at approximately 115,000 in 1998. This visitation is based on ridership on Park-sponsored ferry services and counts of private boats. About 80 percent of these visitors (92,500) arrived by ferry, while the remainder (22,500) arrived by private boats. About 19 percent of the visitors used the water shuttle services from George's Island to access Lovell's, Bumpkin, Gallop's, and Grape Islands. Visitation in 1997 was slightly higher at about 120,000 with similar distribution of arrival mode. Some projections indicate that visitation could increase fivefold over the next 10 years, although this is dependent on significantly increased levels of ferry service. Additional studies are needed to establish both the economic viability of increased service and the resource impacts of higher visitation levels.

A 1997 visitor survey indicated that 80 percent of the visitors to the Boston Harbor Islands national park area are from Massachusetts, and the remaining 20 percent are from outside the State. The survey also showed that 30 percent were first-time visitors, 34 percent had made one prior visit to the Park, and 37 percent had made more than two visits.

Internal Visitor Circulation

Except for Deer Island, Nut Island, and World's End, the Boston Harbor Islands can only be accessed by boat. Once on the islands, visitors walk on designated paths. The quality of these paths vary by island. Some paths are paved, others are cleared dirt trails. Circulation on the islands may be difficult for those with disabilities as the terrain is often hilly and many of the trails are dirt paths rather than paved sidewalks. The park visitors' brochure states, "The islands are not fully accessible for disabled visitors, but special arrangements can be made." A phone number is provided for details.

George's Island offers the most complete circuit of paved walkways. For example, a wide pier leads visitors from the boat and paved walkways toward Fort Warren. Paved paths are also provided within the Fort. Gallops Island has a walking path around the island and a brochure is available on the Island as a trail-guide for a 45-minute walking tour. Trails are also provided on Peddock's Island, one of the most densely wooded islands of the Harbor, Bumpkin, Deer, Grape, Lovell's, Thompson Islands and at World's End.

2.1.2 Boston National Historical Park

Overview

Boston National Historical Park (NHP), established in 1974, is an association of sites that together provide a coherent view of the City's role in U.S. history, with emphasis on the period leading up to and including the Revolutionary War. As stated in the Park's brochure, "each site brings to life the American ideals of freedom of speech, religion, government and self-determination." The major elements of the Boston NHP are the Freedom Trail, the Charlestown Navy Yard and the Bunker Hill Monument. The latter two sites, and the Dorchester

Heights Monument in South Boston, are the only three Park sites actually owned by the federal government. The Commonwealth of Massachusetts, the City of Boston, or private entities own the other sites.

The Freedom Trail is a 2.5-mile walking tour that connects 16 historic sites in downtown Boston and neighboring Charlestown. These include some of the most significant sites in early American history such as the Paul Revere House, the Old North Church, the Old State House, Copp's Hill Burial Ground, the Old South Meeting House, Faneuil Hall, the Massachusetts State House and the Boston Common.

The Charlestown Navy Yard is a 200-year-old historic shipyard located across the harbor from downtown Boston. It became part of the Boston NHP after the U.S. Navy closed operations there in 1975. The section of the Navy Yard owned by the NPS includes two historic ships, the U.S.S. Constitution and U.S.S. Cassin Young, a museum and a variety of industrial and residential buildings associated with the Naval presence in the Shipyard. The portion of the Navy Yard not owned by the NPS is under control of the Boston Redevelopment Authority (BRA) and is being developed as a mixed-use community. The Bunker Hill Monument is located about one-half mile north of the Navy Yard in a residential neighborhood.

Major initiatives of the Park include a recent Master Plan for the Freedom Trail that calls for improved signing, displays and interpretive opportunities. A new Visitor Center is being developed at the Bunker Hill Monument, a site that has been isolated from the rest of the Park.

Visitation

Since the Freedom Trail involves no admission to a single venue and brings visitors into contact with many non-historic attractions in downtown Boston, visitation is difficult to quantify. The Park estimates that total visitation for 1999 was 3,111,000 visitors compared 2,814,000 in 1998. Visitation has shown steady growth in the past years, with an increase of nearly 42 percent since 1996. Attendance for individual components of the Park in 1999 is shown in Table 2.2. Visitation is heaviest during the summer months of June, July, and August (42 percent of annual visitation in 1998), and lowest from December through February (nine percent of annual visitation in 1998). Visitation to the Park peaked in July at 447,000 and was at its lowest level in January with 65,000.

TABLE 2-2: BOSTON NATIONAL HISTORICAL PARK ATTENDANCE (1999)

Site	Attendance
Bunker Hill Monument	**188,400**
Faneuil Hall	323,000
Old North Church	556,400
Old South Meeting House	86,600
Old State House	80,900
Paul Revere House	229,300
Downtown Visitor Center	342,800
Charlestown Navy Yard	**1,385,400**
Constitution Museum	**284,800**
U.S.S. Constitution	**551,100**
U.S.S. Cassin Young	**351,200**
Navy Yard Visitor Center	**141,500**

Note: **Bolded** sites are located in Charlestown, others are located in Boston.

Internal Visitor Circulation

Pier 1 is the center of activity at the Yard. Both the U.S.S. Constitution and U.S.S. Cassin Young are berthed at Pier 1. During peak visitation, pedestrians, park service vehicles, and tour buses all utilize space on Pier 1. Once on site, visitors circulate by foot among the attractions.

The Bunker Hill Monument is located one-half mile from the Navy Yard. Typically, a visitor wishing to see both the Navy Yard and the Bunker Hill Monument will walk through the residential neighborhood of Charlestown up a fairly steep hill to the Monument. The Navy Yard is proposing a new trolley service to connect the Navy Yard to the Bunker Hill Monument.

2.1.3 Salem Maritime National Historic Site

Overview

Salem Maritime National Historic Site (NHS) is located along the waterfront of Salem, Massachusetts, 20 miles north of Boston. It was created in 1938 as the first NHS in the United States "to preserve for public use…certain lands and structures…by reason of their relationship to the maritime history of New England and the United States." The site documents the development of the Atlantic Triangular Trade during the Colonial era, the role of privateering during the Revolutionary War, and international maritime trade with the Far East that occurred after the Revolution.

The site includes nine acres in a densely developed urban area that contains a number of other tourist attractions, commercial enterprises, and residential neighborhoods. As a result, the NPS works closely with the City of Salem to promote tourism and address a variety of transportation-related issues.

The Salem Maritime NHS includes the following elements (see Figure 2.2):

- The main Visitor Center is located on New Liberty Street near the intersection of Essex Street in downtown Salem. The Center was completed in 1994 and orients visitors to the city of Salem and the Essex National Heritage Area, as well as to the NPS facilities. About six blocks separate the Visitor Center from the rest of the site. All other site features are located along Derby Street.

- Derby (1762), Hatch's (1819), and Central (1791) Wharves are the three remaining wharves from the more than 50 that once existed on the Salem waterfront. They are cleared of the warehouses that once covered them and serve primarily as open space. Central Wharf contains a small satellite Visitor Center located in an old warehouse (1805); the Wharf is also the current site of construction of a full-sized replica of the sailing vessel, Friendship, a 1797 merchant ship that sailed from Salem.

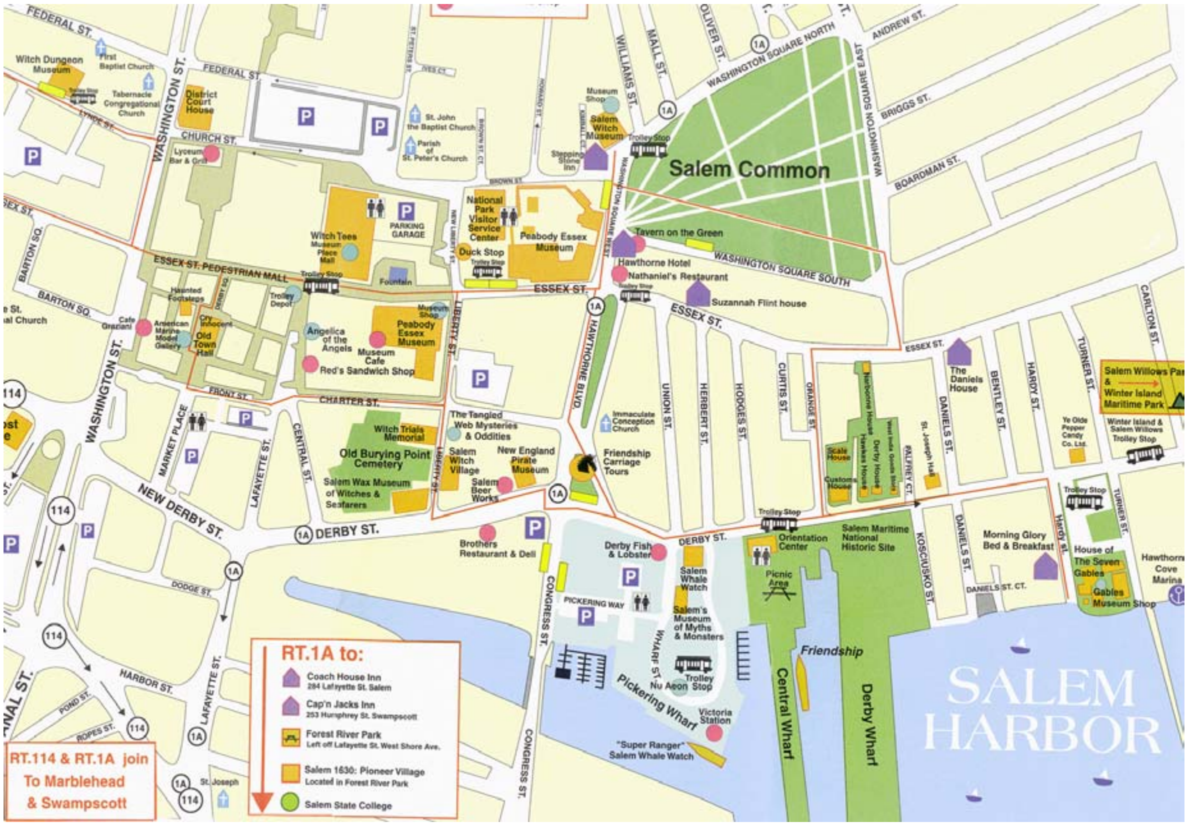
- The site includes two additional warehouses, the U.S. Government Bonded Warehouse (1819), and the Hawkes Warehouse (late 1700s). The Hawkes Warehouse was converted to a private home by shipyard owner Benjamin Hawkes in 1801 and is currently used as the Park's administrative headquarters.

- The Custom House (1819) has been restored and contains a number of exhibits highlighting the U.S. Government's role in the merchant trade.

- The Scale House (1829) is located behind the Custom House and contains a large scale similar to those used for weighing maritime cargo.

- The West India Goods Store (circa 1800) sold imported cargoes at retail. A cooperating association, Eastern National, now runs it as a retail store.

FIGURE 2-2: DOWNTOWN SALEM AND SALEM MARITIME NHS



- The Derby House (1762) was owned by Salem's most prominent merchant and shipper, Mr. Elias Derby, of the Federal period. It is the oldest surviving brick house in Salem.

- The Narbonne-Hale House dates from the latter part of the 17th century. It is currently unfurnished and is preserved by the NPS as a research site and for interpretive programs.

- The Polish Club (1909) served as a cultural and social center for the many Polish immigrants who have settled in Salem since the early part of the 20th century. The NPS has requested funding to renovate the building, but Congress has not yet approved it.

- The Derby Wharf lighthouse was completed in 1871 and is the only remaining structure on the Wharf.

The Essex National Heritage Area (ENHA), which was formed by Congress in 1996 and incorporates all of Essex County, has also become an important partner of the Park in promoting the full range of historic resources in the region. The ENHA covers 500 square miles and 34 cities and towns on the North Shore of Boston with thousands of historic sites, monuments, and districts. The National Park Service Regional Visitor Center in Salem is also the regional Visitor Center for the Essex National Heritage Area. It provides information on Salem, Beverly, Marblehead, and Danvers, as well as general information about the Essex Heritage area.

Visitation

Visitation to the Salem Maritime NHS has varied significantly through the 1990s. Between 1988 and 1998, the highest year recorded was 1992 when visitation reached 1,081,690; the following year visitation fell to a low of 543,000 visitors. In 1998, the year of most recent visitation data, visitation reached just over 802,000, the highest year since 1992. In recent years, October has been the peak month, accounting for 25 percent of the year's visitors, coinciding with the peak month for overall Salem tourism resulting from witch and Halloween-related activities.

Visitation to the Visitor Center is also recorded and has shown a consistent upward trend, with an increasingly higher percentage of NHS visitors using the Visitor Center. In 1993, the year before the opening of the new Visitor Center, visitation was 246,000. By 1998, visitation had increased to nearly 455,000. Part of the success of the Visitor Center is the availability of convenient parking across the street in the East India Street garage. However, parking near the Derby Street/Central Wharf sites of the NHS has always been limited. A large part of the recent increase has occurred during the month of October, as the number of witch-related tourist activities has increased. In 1998, October visitation was 143,000 or 31 percent of the annual total. August was the second busiest month with 74,000 visitors. The total visitation for June through September was 215,000 or 47 percent of the annual total.

The Salem Maritime NHS is one of a number of attractions in downtown Salem. A 1989 summer season Visitor Survey which included both the NHS and other sites in the City provided the following information:

- Salem draws from a national market, with 56 percent of visitors coming from outside of New England. The survey characterized 16 percent as local visitors (Essex and eastern Middlesex Counties) and another 28 percent as regional (the rest of New England).

- Sightseeing was the overwhelming trip purpose of persons surveyed (87 percent), with eight percent reporting they were visiting friends or relatives.

- Ninety percent (90 percent) arrived by automobile, three percent by train and four percent by bus.

- The vast majority spent less than one day in Salem (80 percent) and another 18 percent spent one to three days in the City. Nearly half of the visitors (49 percent), however, reported the length of their total trip away from home was four days or more.

- Other locations visited on the trip include Boston (56 percent), Rockport (20 percent), Lexington (14 percent), and Lowell (five percent).

- Sixty percent (60 percent) were family groups, 30 percent were friends traveling together and only four percent were part of a tour group. A majority of visitors (65 percent) were visiting Salem for the first time.

- Major factors attracting visitors to Salem were "witches" (84 percent) and early American history (74 percent). The Salem NHS, however, was visited by less than half the survey sample. Attractions in order of visitation were as follows:

  - Salem Witch Museum 69 percent
  - Pickering Wharf 66 percent
  - House of Seven Gables 65 percent
  - Essex Street Mall Pedestrian Mall 61 percent
  - Heritage Trail 45 percent
  - Salem Maritime NHS 42 percent
  - Witch House 30 percent

It is likely that the new Visitor Center and the improved level of information provided on the NHS, has increased the percentage of visitors using the site since that time.

The Friendship is a major new attraction that is expected to draw additional visitors to the site. The ship is currently being constructed on Central Wharf. When complete it will be anchored at Derby Wharf and interpretive tours provided for a fee. The ship will be available for periodic sailing trips as well.

Internal Visitor Circulation

The NHS is located in a densely developed urban area and circulation is provided primarily by sidewalks through residential and retail sections of Salem. Ninety percent of visitors arrive in Salem via automobile. Once visitors have parked their cars, however, circulation among the NHS sites and other Salem attractions is done primarily by walking, although trolley tours, duck tours and bicycle/rickshaw tours are all currently available from private vendors.

2.1.4 Adams National Historical Park

Overview

The Adams National Historical Park (ANHP), located in Quincy, Massachusetts, was added to the NPS in 1946 to honor the contributions of the Adams family to the United States. The Park today consists of four distinct properties:

- The birthplaces of John Adams and John Quincy Adams, which are located adjacent to each other on Franklin Street south of downtown Quincy. These properties were given to the NPS by the Quincy Historical Society in 1979.
- The "Old House," which was purchased by John Adams in 1781 and housed four generations of the Adams Family until 1927. This site includes several other buildings including an 1873 carriage house, a stone library and the adjacent Beale property.
- The United First Parish Church located in Quincy Center, which holds the burial crypt of both Presidents and first ladies.
- A temporary Visitor Center, which is housed in leased space in the President's Plaza complex in downtown Quincy.

The Adams NHP consists of the four sites described above, totaling 12.59 acres. The birthplaces and Old House are owned by the NPS, while the United First Parish Church remains an active congregation. The Park completed a General Management Plan in 1996 that emphasized development of a permanent Visitor Center, expanded interpretive programs, and continuation and enhancement of partnerships with other historic sites in the area.

The sites are separated from each other and surrounded by urban development. The Old House and birthplaces are located about one and one-half mile apart. The United First Parish Church is located across the street from the Visitor Center. The Church is located in the center of Quincy, in the center of a major traffic rotary. The Old House is located on the edge of a primarily residential neighborhood, while the birthplaces are surrounded by a dense neighborhood that includes both residential and commercial land uses. A complex and dense street network limits the ability of tourists to either drive or walk between sites. Off-street parking is not provided by the NPS at either the Old House or the birthplaces, and only limited on street parking is available.

Visitation

The Park is open to the public between mid-April and mid-November. Visitation to the Adams NHP is relatively low compared to other Boston-area parks but is growing rapidly. Visitation in 1998 was 65,600, representing an increase of 35 percent over 1995. Visitation through July 1999 was running 26 percent over 1998.

Internal Visitor Circulation

The Visitor Center is located adjacent to the Presidents Place Parking Garage and the MBTA Quincy Station on the Red Line.

The Park currently operates a shuttle system that links the birthplaces, the Old House and the Visitor Center. One rubber-tired trolley is operated through a contract with the Brush Hill Transportation Company. Visitors are encouraged to start their trip at the Visitor Center where they are provided information. Free validated parking is provided at an adjacent garage but there is a $2.00 per person charge for the tour. The trolley completes a loop of the Park sites every half-hour with tourists being taken first to the birthplace for a half-hour tour, and then to the Old House and its grounds where they are given another ranger-led tour. Rangers are in constant communication with each other and the trolley drivers and can reroute the trolley to accommodate large groups and other special requirements. Park rangers at the Visitor Center help balance out demands on the system and the resources on busy days. NPS staff have recently applied for funding to finance four additional trolleys.

2.2 Dock and Pier Facilities

The following descriptions provide an overview of all dock sites considered to potentially serve the NPS sites within the vicinity of Boston Harbor, their current conditions, and needed improvements. The inclusive list serves as a basis for selecting priority projects for further evaluation and analysis. The descriptions of sites and needs are based on discussions with unit administrators and park rangers, as well as on site visits to those sites.

2.2.1 Boston Harbor Islands (BHI) National Park Area

Of the 30 islands included in the Park, nine of the islands have dock facilities and are staffed either intermittently or full-time. These include Bumpkin, Deer, Gallop's, George's, Grape, Little Brewster, Lovell's, Peddock's, and Thompson. In addition, Long Island is staffed by the City of Boston, which uses portions of the north end for various recreational programs, and includes a dock facility. At present, none of the islands docks are accessible in terms of ADA and Massachusetts Architectural Access Board standards for marine facilities.

Six of the islands are currently served by regularly scheduled public water transportation routes. Passenger ferries from downtown Boston and Hingham serve George's Island. Water shuttles provide continuous loop service on two routes: 1) George's, Gallop's and Lovell's, and 2) George's, Peddock's, Bumpkin, and Grape Islands. The following long list of 11 islands was identified for preliminary analysis:

George's Island – George's Island has long served as the hub for the Harbor Islands with the largest single island visitation and most other island visitors passing through George's en route to other islands. The current protected basin serves a variety of uses including public ferry landings, park staff ferry access, and other private recreational vessels. The island topography is relatively flat and easily accommodates persons with mobility limitations. Until such time as Spectacle Island is fully open and operational, George's Island will continue to be the most active visitor destination and ferry hub for the islands. When Spectacle becomes fully active, the two islands are expected to share the role as equal hubs and complementary attractions.

The current dock basin works well in terms of providing a variety of semi-protected berths, and ample deck area for loading and unloading. However, many aspects of the pile supported wharf and wave attenuation system are

in need of repair and restoration or replacement. The MDC has conducted a conditions analysis of the terminal and has plans for remedial repair until more permanent reconstruction can take place. Several alternative plans have been prepared by Bourne Consulting Engineering to implement long-term solutions. The ferry access system is by way of an A-frame type hoist for a moveable gangway which in turn serves double deck ferries. The mechanical hoist is currently not operative and plans are in place to repair it. The pile supports and cross bracing for the outer wharf areas are in poor condition and also in need of repair. The wave attenuation fence has also deteriorated and is only partially effective in protecting the inner basin from wave action. Plans have been prepared to make interim repairs to stabilize the pier utilizing the current non-compliant ramp system. However, there is no consensus plan to provide suitable ADA access.

While there is ample space for the large numbers of visitors arriving or departing from the ferries during peak summer weekends, there are few amenities on or near the pier deck in terms of covered shelters, benches, or landscaping.

Spectacle Island – Spectacle Island, to be opened in 2002, is one of the largest Harbor Islands and will offer many visitor services. An "L" shaped concrete pile supported wharf has been completed, and a plan for attached floats and ramps has been designed to provide ferry berthing in time for the opening. The initial set of floats and ramps will provide berthing for one ferry at a time in a sheltered area on the shore side of the "L." The island pathway system and other facilities have been designed to be fully accessible for persons with mobility limitations. The floating dock facilities may need to be expanded as the Island begins to attract larger numbers of expected visitors, and as inter-island shuttle routes are added. Spectacle Island is projected to be the primary western transfer point for the inter-island shuttles, which may require additional on-float queuing space for waiting transfer riders. The "L" shaped pier design provides several optional locations for additional floats and ramps on the outside face that could provide the needed expansion berthing at such time as demand warrants.

Peddock's Island – The third largest of the harbor islands, Peddock's is intended to have a variety of attractions within the next few years. A new pier with accessible ramp and float system was installed in 1997. Intended for year-round use, the ramps and floats suffered damage during the first winter of operation and are currently planned for replacement with a more durable design. The island will serve as a third hub along with George's and Spectacle and is intended to be served both by mainland gateway routes as well as inter-island shuttle loops.

Lovell's Island – In close proximity to George's and long connected by inter-island shuttle, the Lovell's pier and float system are in need of both repair and expansion. The lightly built pier has deteriorating piles and cross bracing. Recent siltation has reduced water depth at the current float location and precludes shuttle landing in conditions of less than a half tide since the float bottoms out. Recent plans (1997 by Bourne Consulting Engineers) call for repair and strengthening of the existing pier along with extension of the pier to deeper water with a realignment of the existing gangway and float. The repairs are intended only as a temporary measure, and will not result in an accessible ramp and float which would still need to be added. The Lovell's Island topography is relatively flat and lends itself to unassisted visitor access via a central asphalt roadway, dependent on completion of the boardwalk from the wharf to the trail. At present the connecting pathway is sand and walking the short stretch can be difficult.

Gallops Island – The pier at Gallops Island is an inherently stronger structure and is in much better condition than that at Lovell's. The island is served by the same shuttle loop from George's as serves Lovell's. The pier end is in deep enough water for safe landing of vessels and does not face the erosion problems of nearby Lovell's. However, the steep ramp and float system currently in place does not meet ADA requirements or general Universal Design principles. The island topography rises steeply just beyond the end of the pier, and has limited capacity for unassisted access by persons with disabilities. An attractive and generously dimensioned gazebo-type shelter covering the inboard end of the dock provides an attraction for many visitors with its harbor views and summer breezes.

Bumpkin Island – Bumpkin Island is located in Hingham Bay and is served by the Hingham to George's shuttle loop. Although the island has a rich mix of flora and fauna and provides for camping, visitation to the island is relatively small. Access is provided by a "T" shaped pier with an attached ramp and float system which does not meet ADA or general safety standards. The pier location is somewhat exposed during the summer season and prevailing southwest winds owing to a relatively long fetch for 180 degrees around the end. The pier structure appears to be in fair condition. The gangway/ramp and floats are lightweight and can get tossed about by the wind and wave action. The exposed dock facility is not well suited to some of the larger ferries which sometimes serve as shuttles on this southern loop, in terms of float size, freeboard and stability. Some siltation has occurred to the south side of the pier, and either dredging or pier extension may needed.

Grape Island – Nearby Grape Island is served by the same ferry loop as Bumpkin, but enjoys considerably greater visitation. With a more natural variegated topography, gradually sloping grassy paths, and a more protected ferry landing, the island feels more hospitable than neighboring Bumpkin. The more gradual sloping pathways and relatively flat "lawn" just beyond the pier base and gazebo, make the island readily accessible by persons with mobility limitations. The pier and docking facility is nearly identical to that of Bumpkin Island. However, the landing conditions are considerably more protected with shelter by the mainland and several other islands. The channel access is relatively limited with shoal areas on either side. As with Bumpkin, the lightweight ramp and float system is not ADA-accessible and not suitable for the larger shuttle vessels.

Long Island – The City of Boston is currently preparing a masterplan to evaluate the feasibility of providing park facilities at the north end which has a national lighthouse and a variety of fortifications from different eras. The preliminary plans call for a new ferry landing at an as yet undetermined location, and access to the park area by boat. A granite pier exists and should be analyzed. The middle section of the island is dedicated to an institutional campus which would be kept separate and would use the existing bridge and road connections to the Mainland via Moon Island and Squantum. Until plans are more fully developed for the new park facility, it will be difficult to comment on ferry pier needs, other than to say that they should be compatible with those proposed for the other islands.

Deer Island – The visitor facilities at the MWRA water treatment facility include a museum and visitor center as well as the treatment facilities in close proximity to the existing ferry landing, as well as a perimeter trail system with spectacular ocean and harbor views along with associated recreational amenities. The pier and floating ferry dock do not currently meet accessibility standards, but does have adequate freeboard height and ample berthing capacity. Ferry services were provided as a requirement of the construction contract and have been phased out with completion of the treatment facility. However, there is likely to be an ongoing demand for ferry services by the combined cross harbor commuting employees of the treatment plant and visitors. Modifications to the dock facilities will be needed to meet ADA requirements, along with shelters and other user amenities.

Little Brewster – For the past two seasons Little Brewster has had an accessible ferry landing on loan from Massport and the Lewis Mall site in East Boston. It has served well for the periodic excursions to visit the historic Boston Light, and the panoramic views from outside the harbor entrance. It is assumed that while the successful ferry service will be maintained to the site, at some point a more permanent landing will need to be provided which also meets ADA and MAAB access requirements. The current visitation to Little Brewster is comparatively small since the ferry service is offered on a limited number of days each week, owing to island and resource capacity and the relatively long trip from downtown Boston. Future dock and support facilities will need to be designed to meet future service needs as well as to withstand the more exposed Massachusetts Bay site conditions.

World's End – World's End does not currently have a ferry landing. Access to the peninsula park has traditionally been via path and road access from the landside. Current plans do not include a ferry landing or ferry services to this Hingham site.

2.2.2 Boston Harbor Gateways

A large number of mainland gateway or "feeder" sites have been identified in response to existing ferry services as well as expressed interest by harbor communities and other park units. Each of the sites has been considered in terms of feasibility. For those sites which are currently serving or have recently served as ferry departure points, feasibility is based on recorded volumes of riders to the islands and likely future demands. For those sites not currently connected to the islands, an attempt has been made to consider the potential catchment areas and possible future demands based on projections of future visitation. The sites will also be matched with the proposed routes to test feasibility in Section 4.0. The Gateway sites are divided into three geographical zones which have differing navigation conditions and vessel requirements; 1) Inner Harbor sites, 2) Outer Harbor sites, and 3) Massachusetts Bay sites. The following list provides a brief description of each site in terms of current and potential roles as Harbor Island Gateways.

Inner Harbor Dock Sites

- **Long Wharf –** Long Wharf is currently the primary downtown Boston site serving approximately 80 percent of the ferry visitors to the islands. The site has been designated for over 20 years as the future Harbor Islands Gateway site and is intended to include a visitor information and orientation center. The current departure point is on the South Face from the Boston Harbor Cruises docks, while the permanent site would be on the north side of Long Wharf, as shown in the Boston Inner Harbor Passenger Water Transportation Plan (2000) prepared by the Boston Redevelopment Authority. Routes currently serve George's Island. Future routes will also serve Spectacle Island when it opens.

- **Lovejoy Wharf/North Station –** A potential shuttle link connection would connect North Station commuter rail and subway (Green and Orange Lines) to Long Wharf. Lovejoy Wharf is a five-minute walk from the North Station platforms. The existing terminal provides an fully accessible dock. Shuttle services are currently provided to Pier 4 in Charlestown and to Federal Courthouse and World Trade Center in South Boston, although these may be discontinued following completion of the Central Artery Project in downtown Boston.

- **Russia Wharf/South Station –** When the terminal is completed, a potential shuttle link can be provided to Long Wharf linking the South Station subway (Red Line and future Silver Line) and commuter rail lines to the downtown Gateway. The dock is designed to meet ADA and MAAB access standards. The dock is a five- to seven-minute walk from the South Station platforms.

- **Federal Court House –** The existing accessible dock on the South Boston Waterfront offers a potential shuttle link to the Long Wharf Gateway, and its scheduled departures for the Harbor Islands. A National Park Service visitor information center exists in the nearby arcade of the Courthouse. There may be security restrictions on using this facility.

- **World Trade Center –** The WTC site has potential for a shuttle link to the Long Wharf Gateway. Currently there is a small, accessible 60-foot ferry berth which is dedicated to the South Station shuttle which could be used. The BRA Inner Harbor Water Transportation Plan calls for a greatly expanded ferry dock facility on the southeast face. At such time as the larger dock is built, the site could possibly serve as a longer-term direct gateway route, when and if enough demand warrants. It should be noted that ferry shuttle links could be offered from all three of the South Boston Waterfront sites, but that longer-term direct Gateway ferry service to the Harbor Islands is likely to be from only one of the sites.

- **Pier 4/Navy Yard –** The existing MBTA dock and service provides the potential shuttle link to the proposed Long Wharf Harbor Islands Gateway for Navy Yard and Charlestown residents, as well as for linking Boston National Historical Park visitors to the central gateway terminal. The dock facility is not technically compliant with ADA since it was constructed prior to the setting of MAAB regulations. However it is ac-

cepted as one of the better dock facilities in the harbor and is actively used by persons with disabilities, and probably will not require modifications until major repairs and replacement of the fixed ramps are needed. The dock, which is in an exposed harborfront location, needs more weather protected waiting areas and a ticketing booth.

- **Fan Pier** – A new ferry terminal is proposed for the basin of the Fan Pier mixed use development project to be constructed on the site just east of the Courthouse. At such time as the dock is constructed, and new offices and residences are built and occupied, the site offers another potential Harbor Islands departure point along the South Boston Waterfront. Service to the Islands could initially be provided with short shuttle connections to the downtown Long Wharf Gateway. At a later date when and if demand increases sufficiently, the Fan Pier site could serve as a direct gateway to the islands. Initial development plans include a Harbor Islands visitor center to be located near the ferry landing.

South Shore Sites

- **JFK/U. Mass. –** The existing dock site next to the Kennedy Library has potential as a mainland gateway for linked service to Spectacle Island and other Harbor Island sites from Columbia Point and Dorchester neighborhoods. The U. Mass., State Archives and Library parking offer opportunities for park and ride, while bus connections to the Red Line Station provide transit links to the dock site. There is also new commuter rail access at the JFK station. From the dock, Thompson and Spectacle Islands are a short distance by water. The site could be connected to other Harbor Islands by shuttle as well as to the downtown. Management and use agreements would be needed with the Library and U. Mass./Boston. The site catchment area for island visitors overlaps somewhat with that for the Squantum Point/Marina Bay site.

- **Squantum Point/Marina Bay –** Existing limited schedule service was started inn the summer of 2000, as a Gateway to George's Island. The site offers potential as a future Gateway link from Quincy and the Southeast Expressway to Spectacle and Deer Islands (alternative to JFK/U. Mass.). The past summer operation handled less than an estimated two percent of ferry visitors to the Boston Harbor Islands. The dock requires considerable modifications to meet MAAB standards.

- **Hingham –** The existing dock at Hewitt's Cove in Hingham currently serves as the primary South Shore Gateway to the Harbor Islands. The dock is awaiting modifications to the ramp access in the form of wider gangways and an inclined elevator to meet access requirements. The Hewitt's Cove site and parking areas are owned by DEM and shared with the MBTA for downtown commuter ferry use during weekdays. There are also agreements to relocate and reconfigure the parking area as the site is redeveloped as a mixed residential, retail and marine complex. The site is expected to continue to provide both gateway and south shuttle loop services to George's and other Hingham Bay Islands.

- **Hull/Pt. Pemberton –** Located at the north western end of the Hull peninsula, the dock has recently been replaced with an ADA/MAAB compliant set of ramps and float. The dock site has ample parking which is shared by commuters and nearby restaurant patrons. A seasonal trolley bus links the dock with other residential, retail, and entertainment areas of the Hull community including Nantasket Beach. With a location close to Peddock's and George's, the dock location could serve as a secondary gateway link from Hull to the Islands, as well as a link from the harbor to Point Allerton, which historically ties in with the Islands as both a resource and as a destination. If Harbor Islands services are added to the current dock uses, a management pattern will need to be worked out with the Town of Hull, the dock owner**.**

- **Quincy/Fore River –** Another existing ferry service, Harbor Express, uses an accessible dock facility located at the Quincy Shipyard slip next to Route 3A. The current service connects the south shore to Logan Airport for air passengers and to Long Wharf for commuters. The service uses state-of-the-art 149-passenger bow-loading Catamarans. A 900-car parking area is within easy walking distance of the dock fa-

cility, for potential park and ride users. The service passes near Spectacle Island and offers promise of a potential connection when the island is open. Since the whole operation is privately owned and operated, any additional seasonal service would need to be negotiated separately with Harbor Express.

- **Scituate –** Located beyond Boston Harbor there are a number of other potential mainland gateways including Scituate. The harbor would need an accessible dock facility and a new ferry service as described in the recent Scituate Ferry Feasibility Study. The study concluded that a year-round commuter ferry would be possible with subsidy. If such a service were initiated, links to George's or Spectacle would have some potential as seasonal off-peak add-ons to the Scituate to Downtown route. There would be some concerns about peak weekend period parking availability.

North Shore Sites

- **Winthrop –** As an outer harbor community on the North Shore, Winthrop offers some potential for service to the Harbor Islands, also piggybacking on potential off-peak commuter services. Winthrop currently has neither dock nor ferry service. However, a recent feasibility study indicated that such services were feasible, and that a dock could be located at the current town parking area next to the Yacht Club. No details on the configuration of the proposed pier or services were available at the time of this report. It is an our understanding the feasibility study is completed and the town is hiring a Project Manager.

- **Revere Beach –** Immediately north of Winthrop, Revere Beach also envisions ferry services and a new pier on the ocean. Because the pier site is exposed to ocean wave action, and the ferries would need to operate in Mass Bay, such a service would require considerable capital investment to operate. The catchment area for riders from Revere might overlap with a Winthrop service and the trip would be somewhat longer. As with Winthrop, no details on the configuration of the proposed pier or services were available at the time of this report.

- **Lynn –** Harbor Islands services operated from Lynn for several years up until 1999, when they were terminated. The dock facility and parking still exist as a town landing. At the time the service was discontinued, the ridership was by far the least of the three Gateway sites, owing to an apparent lack of timely scheduled service and generally disinterested market. The remaining dock facility does not meet ADA/MAAB standards and would need substantial transformation before ferry service could be reinstated.

- **Salem –** Salem has offered Harbor Islands service on two occasions as a piggyback on downtown routes; during the demonstration service which ran during the summer of 1998 and during the 2000 season, effectively replacing the Lynn service as the North Shore Gateway. The operation from the Blaney Street dock is not ADA compliant, although plans have been prepared for converting the current ramp and float system. The service was terminated at the end of the 2000 season. An alternative site which is planned to be available with a fully accessible pier is Central Wharf at the Salem Maritime NHS.

2.2.3 Boston National Historical Park (Charlestown)

- **Pier 1 –** Private scheduled excursion ferry services by two operators have been running for a number of years to the Pier 1 site on Constitution Wharf. The dock facility located at the east end of the pier consists of a 30' by 100' World War II vintage barge which is in poor condition, and requires substantial annualized maintenance to keep afloat. Reuse of the float appears to be infeasible because of age and deterioration. The gangway system is inaccessible because of a combination of stair entry on the pier deck and excessive slope of the gangway at most tide conditions. In relationship to the *U.S.S. Constitution*, one of the most popular attractions in Massachusetts with over one million visitors annually, the dock location is well situated.

- **Pier 2 –** A second location which had been considered by the BNHP staff was an adjacent Pier 2 site. Plans were prepared to combine a restoration of the partially dilapidated pier with a new dock facility, but were stalled by the discovery of creosoted pilings which made removal difficult and costly because of environmental risks. The site is currently slightly further from the *Constitution*, but more centrally located for other BNHP resources at the Navy Yard.

- **Pier 4 –** The existing dock at Pier 4 has been described above as one of the Inner Harbor sites. It currently serves a useful function in bringing visitors to the BNHP, with its year-round, seven-day service. It also offers an affordable choice as fares are subsidized, and much less than the Pier 1 service fares. At such time as there are demands for more shuttle services to Pier 4, additional berthing space may need to be added at the eastern end of the existing float, in addition to the user amenities described earlier.

- **North End Freedom Trail Link Sites –** The BNHP staff has expressed a strong interest in providing a direct connection for Freedom Trail users to connect to Pier 1, from a location near North End Waterfront Park. Such a route would allow Navy Yard visitors to avoid the circuitous walk across the N. Washington Street Bridge or the longer trip past the locks. Several potential sites were considered:, all of which have logistic and/or cost factors to consider.

  - A new dock at the park next to the ball field.

  - A landing at the redeveloped Battery Wharf which is under construction, nearer the end of Hanover Street and other visitor attraction.

  - New landing at the existing fishing pier just north of the Washington Street Bridge.

  - Use of a reconfigured Lovejoy Wharf combined with an extended harborwalk under the N. Washington Street Bridge.

2.2.4 Salem Maritime National Historic Site

- **Central Wharf –** The site at outboard end of Central Wharf would provide a convenient location for a range of smaller visiting vessels, charter operations, and future North Shore shuttle routes between towns. The location on the eastern face would be next to the dredged basin which would allow deeper draft visiting vessels of 100 to 200 feet, as well as smaller ferries and historic vessels. The dock would need to be located so as not to interfere with the proposed site for the *Friendship* on the west face of Derby Wharf. The low deck elevation of Central Wharf helps reduce the length of the initial moveable gangways generally associated with accessible dock designs. The City of Salem is proposing to install an accessible multipurpose floating dock and ramps at the BNHP site, which would accommodate vessels of varying freeboard height including the four-foot height recommended by most ferry operators.

- **Derby Wharf –** As described above, the west face of Derby Wharf, the longer of the two, is effectively committed as the permanent berth for the *Friendship* and subsequent landside exhibits. Because of exposure to wind and wave and deposition of silt, the north face of Derby Wharf is not suitable for a ferry site or any other medium draft vessel.

- **Blaney Street Ferry Pier –** The Blaney Street pier is described above as a potential Harbor Islands site. Its location is not as suitable for BNHP visitors, as Central or Derby Wharves, due to its lack of proximity to visitor areas.

2.2.5 Adams National Historical Park (Quincy)

Three potential sites were considered as opportunities for linking Adams NHP with the Harbor Islands and Downtown Boston:

- **Quincy/Fore River –** The Harbor Express landing would have the benefit of being an accessible pier along with its companion dock at Long Wharf North. As described above, the site has the advantage of being fully operational, with routes going to downtown through the inner Harbor Islands. A trolley link with the Adams site could create a land and water experience, and travel alternative for visitors.

- **Squantum Point/Marina Bay –** The MDC-owned site has an existing dock and large supply of parking. The MDC wants to restore the site predominantly as a park area. A recent proposal is to relocate the heavy cruiser *U.S.S. Salem* from its current Fore River berth to this site as a more readily accessible and visible site during the reconstruction of the Fore River Bridge. If the vessel relocation takes place, there may also be more synergy for a restored Marina Bay ferry service. As described above the dock itself needs to be adapted for ADA access.

- **Souther Tide Mill –** The site is somewhat closer by land to the Adams House, but considerably further from downtown Boston or the islands than the other two potential sites. The tidal mill restoration will be a large undertaking since the wood structure is in such poor condition. (Of the three Adams NHP sites the Tide Mill appears to require the greatest amount of capital expenditure, as well as an untried ferry route, with limited potential as a commuter departure point.) Parking would be a challenge for any park and ride uses since the site is constrained. The quality of this facility is further compromised by adjacent Route 3A and abutting commercial uses.

2.3 Access and Intermodal Connections

2.3.1 Boston Harbor Islands

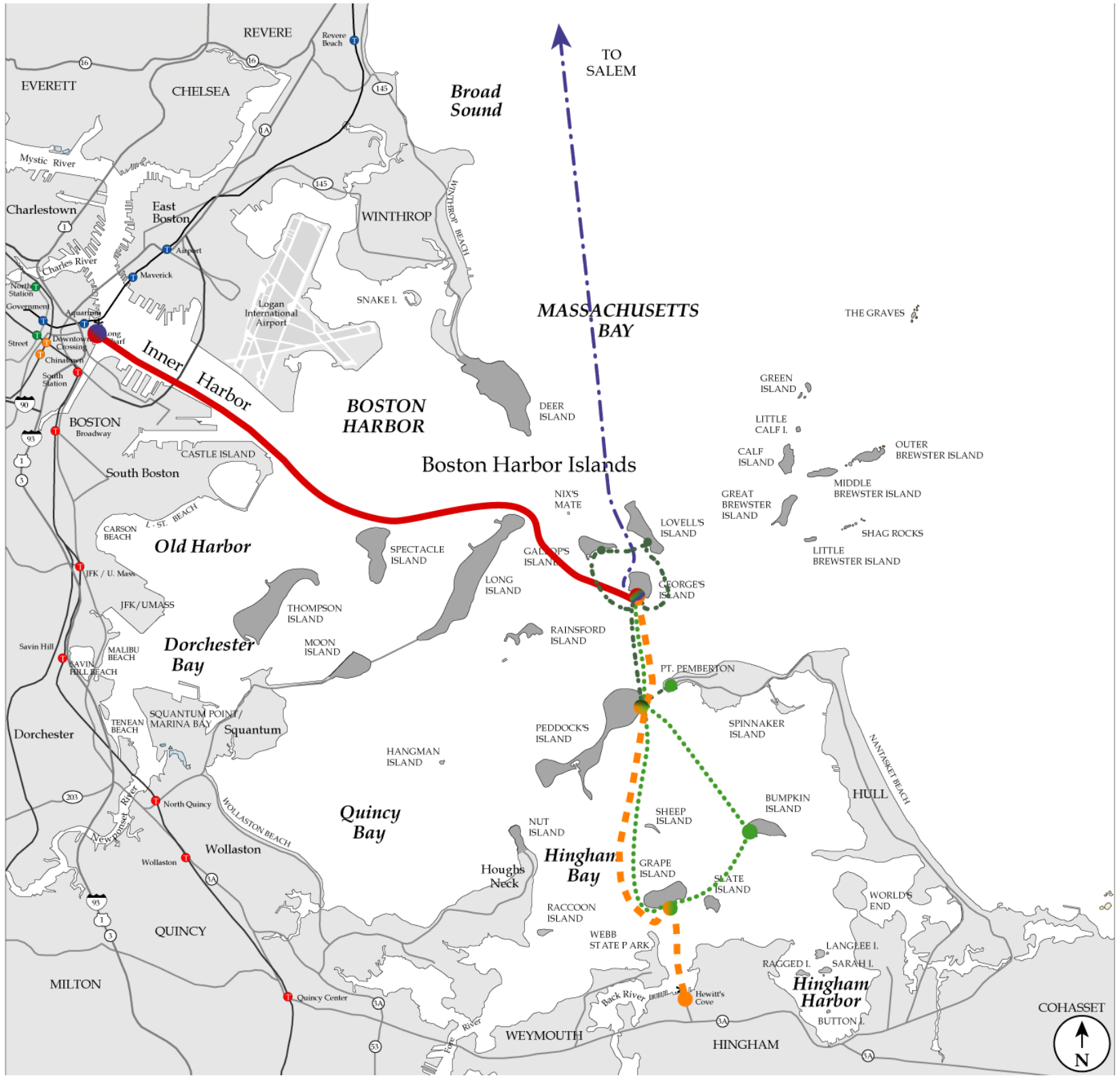
Three regularly scheduled ferry services are operated by Boston Harbor Cruises between the mainland and George's Island (see Figure 2.3): 1) from Long Wharf in downtown Boston, 2) from Hewitt's Cove in Hingham, and 3) Blaney Street terminal in Salem.[1] Previously, service from Heritage State Park in Lynn was available. In addition, there is an inter-island water shuttle provided free of charge to visitors on George's Island. Water transportation services are available between late April and early October.

Long Wharf in Boston is directly accessible to the MBTA transit system at the Aquarium Blue Line station and is within walking distance of many downtown Boston attractions. Highway access to Long Wharf via I-93 is convenient but nearby parking is only available at premium rates. The use of public transportation to access Long Wharf is encouraged in all Harbor Island literature. While the Aquarium stop is closed for renovation, temporary access to the wharf is through the State Street bus shuttle or walking from that station. The round-trip adult fare is $8.00.

Hewitt's Cove at the Hingham Shipyard is another departure point for water transportation to the Harbor Islands. Three daily ferry trips to George's are run during the summer. Located on Route 3A in Hingham, the shipyard has plenty of free parking. The round-trip adult fare is $8.00.

[1]Service from Blaney Street Wharf to George's Island and downtown was discontinued at the end of the 2000 season. Resumption of service is not planned at this time.

FIGURE 2-3: BOSTON HARBOR ISLANDS GATEWAY AND INTER-ISLAND LOOPS (EXISTING ROUTES)



1.1 Gateway Routes:

- Long Wharf to George's Island
- Hingham to Grape to Peddock's to George's to Hingham (Reverses direction in a.m. and p.m.) (Existing)
- North Shore to George's Island (New/Modify Existing)

1.2 Inter Island Shuttle Loops:

- North Loop – George's to Lovell's to Gallop's to Peddock's to Pt. Pemberton/Hull (Modified Existing)
- South Loop – George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Modified Existing)

From the Blaney Street pier in Salem, one ferry trip was available during the 2000 season to George's Island on weekends only. The Salem Ferry Landing is within walking distance to downtown Salem and the Salem Maritime National Historic Site. Ample parking is available at $2.00 per day. The round-trip adult fare was $16.

2.3.2 Boston National Historical Park

The Boston NHP sites throughout Boston are served by the Massachusetts Bay Transportation Authority (MBTA), the regional public transportation system for the Boston area. Freedom Trail sites are well served by the three rapid transit lines and one light rail line that converge on downtown Boston. In addition, the two major terminal stations of the MBTA commuter rail system, North Station and South Station, are located within walking distance of Freedom Trail sites. MBTA bus service, suburban express bus service, intercity bus service, and AMTRAK service are all available as well.

The Charlestown sites are also served by the MBTA, but the service is less frequent than in the downtown area and far more difficult for tourists to utilize. The Navy Yard and Bunker Hill Monument are both relatively long walks from the MBTA Orange Line stations in Charlestown. Local bus service is available but is oriented toward neighborhood residents, not the tourist market.

The MBTA also provides water transportation to Pier 4, which is located in the Navy Yard, and is about a five-minute walk from the Park. Service is provided to and from Long Wharf, which is located in the heart of the downtown, and Lovejoy Wharf, which is located near North Station. The service was originally provided for the growing population of Navy Yard residents, but has become increasingly popular with Park visitors. Park management indicates that many visitors who walk across the Charlestown Bridge from Boston to the Navy Yard do not want to walk back due to the distance and the lack of a good pedestrian environment on the Charlestown Bridge. Park personnel have been guiding these visitors to Pier 4 for their return trip, and increasing numbers of tourists have been using the service from the Boston side as well. The location of Pier 4 is shown in Figure 2.4.

While there are no surveys on the trip purpose of Pier 4 commuter boat passengers, Park personnel indicated that in peak season, 30 percent to 50 percent of riders may be using the service to reach the Navy Yard portion of the Park. Ridership on Pier 4 commuter boats in 1998 was 384,000.

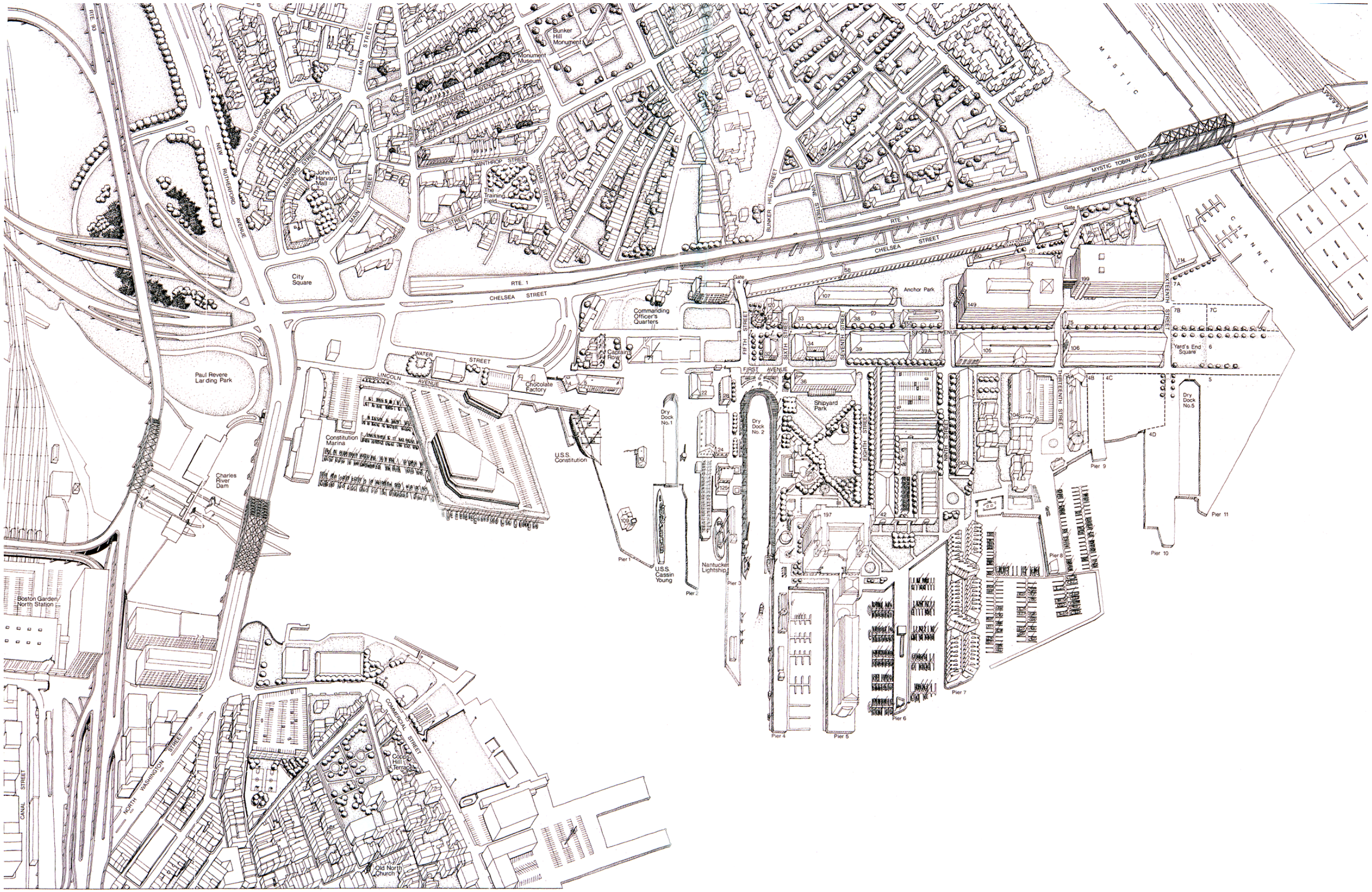
Private tour boat services also provide direct access to the Navy Yard, via Pier 1, which is located beside the Cassin Young. The two lines that use Pier 1, Massachusetts Bay Lines and Boston Harbor Cruises, together carried approximately 36,000 passengers to the Navy Yard during 1999. The temporary dock now in use at Pier 1 is shown in Figure 2.4.

Private tour surface services also comprise an important portion of existing Alternative Transportation Systems (ATS) usage at the Boston NHP. Historic rubber-tired trolley tours are a popular method of sightseeing in downtown Boston. Four private trolley companies provide service to the Navy Yard with annual ridership of over 347,000. In addition, over 154,000 persons arrive annually at the Navy Yard via tour bus. The visitation pattern for tour bus patrons is somewhat different than for other visitors, with nearly half of all tour bus passengers arriving in September and October.

2.3.3 Salem Maritime NHS

Salem's historic orientation has been to the water; as a result, road access has always been difficult. The City does not have direct access to Boston via limited access highway. Route 128, the closest limited access highway, is reached via two congested arterials, Lowell Street and Route 114. The city is also accessible via Routes 1, 1A, and 107.

FIGURE 2-4: NAVY YARD



The Massachusetts Bay Transportation Authority (MBTA) provides four bus routes that serve Salem. These include:

- **Route 450 –** Route 450 is an express bus between Salem Depot (the MBTA commuter rail station) and Haymarket Square in Boston with running times of 50 to 60 minutes.

- **Route 451 –** Route 451 is a local route that runs between Salem Depot and North Beverly. This route provides the closest MBTA service to the Salem Maritime NHS but is oriented toward local riders, not tourists.

- **Route 458/468 –** Route 458/468 is a local route that connects Salem Depot to Danvers Square and a major mall along Route 128.

- **Routes 455/459 –** Route 455 runs between Salem Depot and Haymarket in downtown Boston while Route 459 connects to Downtown Crossing in Boston via the Ted Williams Tunnel. Running times are 55 to 60 minutes for Route 455 and 72 to 82 minutes for Route 459.

Bus fare from downtown Boston to Salem is $2.75. There is also a commuter rail station in Salem, located about one mile from the head of Derby Wharf and about a third of a mile from the Visitor Center. One-way fare to Boston North Station is $3.00. Schedules and information services for both the bus and commuter rail service are not oriented toward tourists. However, since over half the visitors to Salem also visit Boston, there is clearly strong potential to increase use of these services.

Until the end of the 2000 season, water transportation service was provided between Long Wharf in Boston and the Blaney Street dock in Salem. Blaney Street is located off Derby Street about 2,000 feet from the head of Derby Wharf. A private boat operator, Boston Harbor Cruises, ran service between June 19 and October 31. There was five runs each way before Labor Day and two runs after Labor Day. The trip takes about one hour and 15 minutes each way and one-way fares are $9.00 for adults, $7.00 for seniors and $6.00 for children under 12. Round-trip tickets were discounted at $2.00 for adults and $1.00 for seniors and children. The service was oriented primarily toward tourists and occasional travelers, although the 7:00 a.m. trip to Boston and the 5:00 p.m. trip to Salem accommodates commuters.

A 1990 Transportation Plan for the NHS had identified a need for a shuttle service to link the new Visitor Center with the main portion of the NHS and other attractions along Derby Street. Following the opening of the Visitor Center, the NPS contracted for two shuttle routes that were free to users. The service cost the NHS approximately $60,000 to $70,000 per year and was funded out of the operating budget. However, the service was not considered a success and was discontinued after two summers. There were two major reasons for dropping the service. First, ridership was limited and the operating cost of $3.00 per passenger was not considered acceptable. Second, to the extent that patrons did ride the trolley, the number of pedestrians dropped, which local businesses perceived as negatively impacting their businesses. The NPS does not anticipate resuming this service. Trolley tours, duck tours and bicycle/rickshaw tours are all currently available from private vendors.

2.3.4 Adams National Historical Park

The Visitor's Center at the Adams NHP is located adjacent to the MBTA Red Line Quincy Center Station providing convenient access to the regional transit system. Highway access to Adams NHP is via I-93 to Route 3 to the Burgin Parkway. Quincy is also served by limited water ferry service – temporary service runs between Marina Bay and Deer Island primarily serving construction workers destined for the Deer Island water treatment facility and between Fore River Shipyard, Logan Airport, and Rowes Wharf. However, neither of these services provide convenient connections from the Quincy docks to Adams NHP.

2.4 Interconnections between NPS Sites

The Boston Harbor Islands are connected via water transportation to downtown Boston, but not directly to a site within the Boston National Historical Park or Freedom Trail. Long Wharf is located about one-quarter mile from Faneuil Hall. Visitors at the Charlestown Navy Yard are able to take water transportation to Long Wharf and transfer to another boat to access the Boston Harbor Islands. The schedules are not necessarily compatible for making this connection.

From Salem, five weekday ferry trips were scheduled to Long Wharf. During the weekend, four trips are provided. In summer 2000, one daily weekend trip was provided with a direct water connection between Salem and George's Island.

No water transportation connection is available from the Adams NHP in Quincy to any other of the NPS sites.

2.5 Water Ferry Services and Service Providers

Existing water transportation service to the Boston Harbor Islands is provided by Boston Harbor Cruises under contract to the Commonwealth.

Long Wharf Service – Passenger ferries operate from Long Wharf, Boston (near the Aquarium) to George's Island. The ride is 45 minutes. During the summer, ferries leave for George's Island every hour from 10:00 a.m. until 5:00 p.m. Return service from George's is also offered hourly. Once on George's' Island, visitors can board a free water shuttle which operates on a continuous circuit to the islands that are staffed, including Bumpkin, Gallops, Grape, Lovell's and Peddock's islands.

Approximately 80 percent of the visitors to the Boston Harbor Islands currently leave from Long Wharf. The round-trip ferry costs $8.00 for adults, $6.00 for children under 12, and $7.00 for seniors. The boats for this service can carry between 250 to 550 passengers.

Hingham Service – During the summer, three trips depart and return daily from Hewitt's Cove in Hingham. The one-way trip time is about one hour, and the boats do make interim stops at some islands between Hingham and George's Island. The boat for this service can carry 150 passengers.

Salem Service – From late June to early September 2000, one trip per day was operated on weekends between the Blaney Street dock in Salem and George's Island. The trip takes approximately one hour and the round-trip fare was $18. The future reinstatement of this service is not currently known.

Lynn Service – In the past, there has been one round-trip a day on weekends between Heritage State Park in Lynn and George's Island. However, as described above, this route was discontinued in 2000. There are currently no plans to restart this service.

Water Shuttle Service – During the peak season, there are two water shuttle loops that operate between 11:00 a.m. and 4:40 p.m. with island stops once an hour. The water shuttle service is timed to depart George's Island shortly after ferries from Long Wharf arrive so those visitors can make convenient transfers. From George's Island, water shuttle service take visitors to Bumpkin, Gallops, Grape, Peddock's, and Lovell's Islands and Pemberton Point in Hull.

All of the ferry services are unreserved, but are rarely filled to capacity. On rare occasions, ferry service may be interrupted because of poor weather.

The Department of Environmental Management (DEM) contracts for, but does not subsidize the ferry service. Originally, there were multiple vendors, but now there is just one contracted vendor providing the service. The

contract is due to end in about a year. New contract terms are being developed for a contract that will last three to five years, and re-institution of a multiple vendor arrangement is being considered. Integration of the Boston Harbor Islands service shuttle into the regular harbor passenger commuter service system is also under consideration.

Private Boats – Private boats may dock at George's Island free of charge on a first-come, first-served basis. Boaters can off-load at the floats at Gallop's, Lovell's, Grape, Bumpkin and Peddock's Islands but must anchor offshore and use available dinghies.

2.6 Information Services

Visitors to NPS facilities in the vicinity of Boston Harbor have a variety of sources of information about transportation services available to and within the park areas. These include:

- Telephone information;
- Brochures and maps;
- Internet web sites; and
- On-site visitors centers.

For visitors unfamiliar with public transportation services available in the Boston Metropolitan area, the Massachusetts Bay Transportation Authority (MBTA), the primary provider of public transportation throughout the region, offers telephone customer information services providing fare, schedule, and route information for the region's commuter rail, bus, and rapid transit services. This information is also available on-line at the MBTA web site as well as at many of the MBTA stations. The Yellow Pages phone directory for the Boston Metropolitan area also includes MBTA subway and commuter rail maps in addition to a full page of information devoted to the Boston Harbor Islands with a listing of facilities on each island, a ferry service map and transportation service phone numbers. Boston Harbor Cruises (BHC), the water ferry operator to the Boston Harbor Islands, also provides information via telephone, a web site, and brochures that are distributed at the ferry docks and at various tourist information booths and hotels in the Boston area. The MBTA web site also contains a link to the BHC site.

Information about transportation services is also available from the individual NPS facilities through web sites, brochures and maps describing park facilities, transportation services and access to and within the facilities, and at visitors centers at each of the park sites. Individual visitors centers are located at Salem Maritime NHS and Adams NHP. The Boston Harbor Islands have a National Park Area Discovery Center on Fan Pier at the new U.S. Courthouse. (However, this visitors center is not in the immediate vicinity of either Long Wharf, the primary point of embarkation to the Harbor Islands nor on George's Island.) The Boston National Historical Park operates two visitors centers, one on State Street in downtown Boston near the Old State House and the other at the Bunker Hill Pavilion at Charlestown Navy Yard. Each of the parks also operates a web site which provides maps and transportation information. Information is also available via phone and Internet web sites from various park operators, including the Metropolitan District Commission and the Massachusetts Department of Environmental Management. The Massachusetts Office of Travel and Tourism also maintains a web site with park information and links to the various transportation providers. A listing of relevant web sites is included in Appendix A.

2.7 Results of Focus Group Sessions

As one element of this study, focus groups were conduced to obtain information from Harbor Islands visitors and potential visitors regarding their experiences and perceptions relevant to existing transportation services and needs and their recreational preferences. This research was also intended to gather information relevant to the use of various information sources for gaining awareness and knowledge about the Boston Harbor Islands and associated transportation services. Additionally, the research addressed a number of secondary issues pertaining to:

- What travel and facility information is needed for trip planning purposes;
- What is the best way to deliver such information to visitors; and
- What are visitors' expectations and requirements for facility access and amenities?

In August 2000, three focus group sessions were held in Boston, Massachusetts. Separate groups were held consisting of residents who:

- Recently visited the Harbor Islands and live *inside* the City of Boston;
- Recently visited the Harbor Islands and live *outside* the City of Boston in either the North Shore, South Shore, or Western communities; and
- Have never or not recently visited the Harbor, and, have gone into Boston for recreational or entertainment purposes **and** visited a local, state or national park.

Participants in the first two groups (recent visitors who live inside or outside the City of Boston) were intercepted and recruited while waiting on the Long Wharf pier or on the Long Wharf ferry to the Harbor Islands. The non-visitor group was recruited by telephone from a database of individuals maintained by the focus group facility.

Based on a detailed analysis of the findings, the overall implications of this exploratory research are abundantly clear. These include:

Visitors Issues

- Visitors to the Harbor Islands are quite satisfied with the overall experience, where visitations to the Islands and the ferry ride itself are all part of the same experience.
- There appears to be three distinct segments with regard to why visitors are drawn to the Harbor Islands, the first being a "naturalistic" group, the second a "historical/recreational" group, and the third a "social/ recreational" group.
- There are a number of areas that can be improved to make the entire experience more enjoyable, such as the availability of specific facility resources and the offering of both educational and entertainment programs.
- Transit accessibility to the Long Wharf ferry is very easy although more signage is needed on station maps and at the Aquarium station.
- For auto travelers to the ferry, parking is a considerable obstacle to making the experience more pleasurable.

Non-Visitor Issues

- Unaided awareness of the Harbor Islands is low in spite of the fact that many of the non-visitors had been to the Islands at some point in their lives. But, once remembered, the experience is recalled as being very positive.

- There are a number of "hooks" that can be used to attract non-visitors back to the Islands which include the offering of more interactive educational programs, outdoor and ocean-related activities, and evening entertainment activities for adults.

- The cost of admission (ferry) is not a barrier to visitation since it is viewed as a "good value" compared to other competing attractions in the area.

- The primary obstacle to stimulating visits to the Harbor Islands is the perception that they are very difficult to get to regardless of mode taken (auto or transit) to a ferry service gateway.

Finally, there are a number of possible next steps that can be taken as an outcome of this exploratory research. The first will be to substantiate many of these observations and findings through the initiation of a more broad-based and quantifiable survey. Also, research is needed to evaluate the appeal of different programs and activities that can be used to entice first-time and repeat visitors to the Harbor Islands.

Chapter 3: Identified Needs

3.1 Overview

Based on the assessment of existing and future conditions, the Boston Harbor Islands and the other NPS facilities in the vicinity of Boston Harbor have their own individual needs for enhanced transportation services and support facilities. In addition, the NPS has a unique opportunity to provide for collaboration between these facilities through services which can enhance the existing and future interrelationship of the various sites. Given the proximity of the various NPS sites, their commonality of themes both historically and recreationally, and the opportunity to enhance the overall visitor experience in the area surrounding Boston Harbor, the apparent needs for the various facilities also encompass development of coordinated services and programs to facilitate this interrelationship. This section concludes with a discussion of criteria to be applied in the selection of water transportation dock sites and a short list of sites selected for further analysis.

3.2 General Needs of Individual Facilities

An initial assessment of the needs of individual facilities was developed in 1999 through the NPS ATS planning effort. The findings of that assessment for the sites in vicinity of Boston Harbor are stated in the following sections.

3.2.1 Boston Harbor Islands National Park Area

Alternative Transportation has significant potential to increase usage of the Boston Harbor Islands national park area. Through their planning efforts, the Boston Harbor Islands Partnership has identified a number of transportation-related needs that they would like to address in the coming years. These include:

- Dedicated "mainland side" gateway dock facilities with permanent ticketing, waiting, and information space. These would be located on piers that are reserved on a long-term basis so that there is continuity of service with potential changes of boat operators. Some of these gateways will be a major interface between the park and visitor at a landside location. Park identification will be strong with signage, visitor services, retail, and program experiences.

- Good connections between mainland gateway access points and public transportation services.

- Additional visitor parking facilities at one or more of the mainland gateway access points.

- Continuation of the free inter-island shuttle with a dedicated and predictable funding source.

- Upgrading transportation facilities to ADA and MAAB Accessibility standards.

- Uniform and clear signage directing visitors to the mainland access points, regardless of whether the visitors are coming by private automobile or public transportation. This includes signage on major arteries and at transit stations.

- Expanded ferry service that could include additional hours of service, increases in the frequency of service between ferry stops, and increases in the number of ferry stops. Currently, a single vendor provides service. Multiple vendors may represent enhanced services/opportunities for expansion. This will be essential when the new Visitor Center opens on Spectacle Island, potentially doubling the overall visitor capacity of the islands.

- Potential for independent on-call water taxi service.

Feasible transportation alternatives that could address the needs of the Boston Harbor Islands national park area, and that fall within the definition of ATS in this study include:

- Expanded ferry service including more departure points, increased operating frequency, specialized routes serving only certain islands and landside facilities;
- Increased number of gateways with connections to mainland transportation facilities; Salem and Quincy are two cities with National Historic sites that have expressed an active interest in connecting their parks with the Harbor Islands;
- Improved water shuttle services including better information, more frequent service and improved coordination of ferry and water shuttle schedules;
- Improved/expanded island facilities including enhanced dock facilities and establishment of visitor information center(s) on islands;
- Achievement of ADA compliance on both boats and docks;
- Improved information regarding the availability of the resource and transportation services including signage, advertising, tie-in with Freedom Trail promotion, coordination/joint promotion with the MBTA; and
- Detailed planning studies to determine the economic viability of alternative ferry and water shuttle service configurations, as well as the desired carrying capacity on each island.

3.2.2 Boston National Historical Park

A number of additional ATS needs for the Boston NHP have been identified to address both water and surface transportation as well as the needs of a variety of attractions within the Park:

- **Expanded Ferry Service at Pier 1 in the Navy Yard –** The current docking facility at Pier 1 is limited and difficult to use. The NPS would like an improved docking facility at this location that could serve both additional harbor cruise traffic and at least a portion of the commuter boat traffic. An additional need is a "Freedom Trail ferry" that would provide a more attractive and direct connection from the North End to the Navy Yard than the current Freedom Trail route across the Charlestown Bridge
- **Pier 2 Rehabilitation and Docking Facility –** The NPS would also like to provide docking facilities at Pier 2 in the Navy Yard. The primary purpose of this facility would be to serve as a Charlestown gateway to the Boston Harbor Islands national park area, but it could also be used as a commuter boat facility. Currently the only service to the Harbor Islands from Boston goes from Long Wharf, where both dock space, landside ticketing/informational areas are very difficult to obtain.
- **Dedicated Freedom Trail Trolley –** While there are a number of private trolley services that provide tours in downtown Boston, none specifically follow the Freedom Trail or dedicate their tours solely to the Park's historic sites. A 1996 Master Plan for the Freedom Trail called for a dedicated service to be run in partnership with the Freedom Trail Foundation. The NPS is currently working with the Foundation and the Old Town Trolley Company to implement this service. A tour fee will be charged with revenues to be shared among the Freedom trail sites.
- **Boston African-American National Historic Site –** This site is still in the developmental stage and plans are being developed for additional wayside and interpretive information. The NPS has identified a need for a small tour vehicle that can be used to provide site tours. A smaller vehicle is needed because of the narrow streets and limited available parking on Beacon Hill.

- **Improved Bus Parking Area in Navy Yard –** Tour buses operate in the Navy Yard but the current arrangement is not satisfactory. While there is adequate room for buses to turn, part of the area is still an active Navy Yard, creating safety issues and pedestrian conflicts. During periods of peak activity, buses tax the capacity of the Navy Yard and detract from the Visitor experience. The NPS is looking for a staging area outside of the main Yard, possibly in conjunction with new development taking place in Charlestown's City Square.

The alternatives described above have a variety of objectives. The Freedom Trail sites are well served by existing public transportation but have suffered from lack of a coherent image. The proposed Freedom Trail trolley will help to provide a strong link between sites in addition to a high-quality interpretive experience for the visitor. The trolley will also provide improved access to the Bunker Hill Monument and permit more visitors to benefit from the new Visitor Center. Development of a tourist shuttle service for the Boston African-American NHS would have similar benefits for a site that is not currently well known and needs a more coherent identity with the public.

Proposals for improved water transportation between Boston and the Navy Yard could provide a number of benefits. The current walk across the Charlestown Bridge between Copp's Hill in the North End and the Navy Yard is circuitous and is the least pedestrian-friendly portion of the Freedom Trail. Partial replacement of this link with ferry service would improve the visitor experience and provide an additional opportunity for interpretation, since this service roughly follows the route of Paul Revere's crossing from the North End to Charlestown. Improvements to Piers 1 and 2 in the Navy Yard would make the area an integral part of Boston's growing Inner Harbor transportation system. A direct link to the Boston Harbor Islands would help to increase visitation to both the Boston NHP and the Boston Harbor Islands national park area.

3.2.3 Salem Maritime National Historic Site

The Salem Maritime NHS has two significant ATS needs – improved information service for use of the MBTA and development of a water transportation docking facility within the NHS. Given the large number of out-of-state tourists who begin their trip in Boston, the commuter rail service has potential to serve more visitors. Elements required to accomplish this include:

- Improved information in Boston on schedules and fares; and

- An improved walking environment between the Salem train depot and the attractions of downtown Salem, including wayfinding information and directional signs.

The 1990 Transportation Plan prepared for the NHS recommended "promotion of visitor use of MBTA rail service by a marketing approach using a *'Salem Discovery'* package containing rail tickets, visitor guides and literature and a Salem 'passport.'"

Salem has identified a number of opportunities through its master planning process for the harbor. Salem harbor is a designated port area and the city's draft Harbor Plan proposes a new wharf for multipurpose marine transportation, including ferries, cruise ships, fishing boats, etc., to attract new businesses to the city. The proposed site is in the area of the Boston Edison power plant and the Blaney Street dock. However, to be eligible for the state funds that are earmarked for the new Salem wharf in the state harbor bond, the land must be in municipal ownership. Currently, that area is in private ownership, and the owners are now running their own ferry and transportation services.

The Commonwealth has provided the city with $225,000 in funding for construction of an accessible mooring and boarding facility for a ferry service. In the absence of other available locations, the NPS has agreed to accommodate the city's facility temporarily at Central Wharf. Since the city has decided not to run a ferry service in the year 2000, the NPS will use the facility to host visiting historic sailing ships. The current construction of

the Friendship at Central Wharf precludes other uses until about 2001. Congress has appropriated $704,000 in fiscal year 2000 toward the construction of accessible mooring and boarding facilities at the historic site. The temporary placement of the city's facility at Central Wharf will give the NPS the opportunity to test that design for accessibility and compatibility with the historic resources. The NPS would like to use the Central Wharf for visiting historic vessels, harbor tour boats, and similarly compatible transportation uses. Service to the Harbor Islands and other north shore communities such as Gloucester could also be provided.

The development of an information system to encourage use of the MBTA would be a cost-effective method of encouraging use of an existing service. While signing has been greatly improved since the opening of the new Visitor Center, negotiating the streets of Salem continues to be difficult. The large pool of potential visitors in downtown Boston represent an excellent opportunity to build upon the current market without attracting additional automobile traffic to the City.

Water transportation is another important component of this strategy. Improved water transportation service provides a way for both commuters and tourists to travel to and from Boston without further clogging regional highways. In addition, the site would provide a ferry landing for potential connections to Gloucester and other Cape Ann harbors in the Essex National Heritage Area. Combined with the opening of the *Friendship*, use of Central Wharf as a water transportation hub helps to reinforce Salem's traditional ties to the sea.

3.2.4 Adams National Historical Park

Alternative Transportation Systems (ATS) needs identified for the Adams National Historical Park include:

- Addition of a second trolley during busier times of the year to provide 15-minute rather than 30-minute headways. This would help to relieve schedule pressure and moderately increase the number of visitors who could be served.

- A trolley service between the Fore River shipyard and the Adams NHP. The Shipyard currently serves as the terminal for Harbor Express, which provides water transportation service to downtown Boston and Logan Airport. The United States Naval and Shipbuilding Museum and the U.S.S. Salem, a World War II heavy cruiser, are located at the Shipyard. A trolley linking the two tourist sites would benefit both the Adams NHP and the Shipyard by attracting Boston-based tourists to Quincy.

- Both the Shipyard and Marina Bay, a mixed-use waterfront development in North Quincy, are potential sites for water transportation to the Boston Harbor Islands national park area. The City of Quincy is strongly promoting this concept. A trolley service could also link the Adams NHP to Marina Bay if this became a gateway to the Harbor Islands.

- The MBTA Red Line and Old Colony-MBTA commuter rail system have stops in Quincy Center, within easy walking distance of the Visitor Center. While some visitors do use the system, there is little information at either the Boston or Quincy end to encourage usage and orient visitors. Since the Red Line has two branches, some visitors end up at the wrong location. Improved signing and information services in downtown Boston MBTA stations and at Quincy Center would promote use of these services by tourists.

The trolley service, which costs the NPS approximately $120,000 per year, is viewed as a necessity to meet visitor interpretive goals, provide a pleasant visitor experience and preserve the historic resources that the NHP features. The shuttle service enables the Park to interpret the story of the Adams family sequentially, beginning with a Visitor Center orientation, followed by the birthplaces and then the Old House. Since the ideal number of visitors on a single tour is limited (eight to 10 at the Old House and about 15 at the birthplaces), the shuttle system provides Park personnel a greater level of control. As discussed earlier, the shuttle also addresses the lack of parking at individual sites and the problems encountered by visitors in negotiating local streets.

Additional services proposed would have the following benefits:

- Addition of another trolley on the current route will enable more visitors to be served, improve visitor convenience by reducing waiting times and provide Park personnel more flexibility in managing the flow of visitors, particularly large groups. An additional trolley may also enable service to be provided to non-NPS historic sites in Quincy, and the Abigail Adams birthplace in Weymouth. Quincy has developed a Heritage Trail that includes colonial, maritime and industrial sites of interest.

- Trolley service to the Fore River Shipyard would provide a key link to the existing water transportation service to downtown Boston, in addition to a possible gateway to the Harbor Islands. This would help to promote the Park among the large base of tourists in downtown Boston and provide additional interpretive opportunities.

3.3 Specific Needs by Facility

Based on site visits to each facility, discussion with stakeholders including park management personnel, assessment of existing facilities and review of goals, objectives and planning studies, the following needs were identified and qualitatively prioritized for the NPS facilities:

3.3.1 Boston Harbor Islands National Park Area

Primary Needs

- **Water Transportation Services to Islands Designated for Visitor Use –** Improved access, frequency and quality of service with additional choices of landside departure points and island destinations.

- **Long Wharf/T Wharf –** Provide full ADA accessibility, adequate design specifications, and appropriate visitor amenities. (The Boston Redevelopment Agency is currently addressing this.)

- **George's Island –** Existing pier is in need of repair; provide full ADA accessibility; redesign/reconfiguration to accommodate greater capacity and more efficient circulation; provide appropriate visitor amenities.

- **Spectacle Island –** Reexamine pier design and recommend dock improvements to provide full ADA/MAAB access and berthing space to increase peak period capacity to support intent of establishing hub operations.

- **Lovell's Island –** Pier is in deteriorated condition; location has experienced severe erosion; will require new pier additions and an accessible dock facility.

- **Hewitt's Cove (Hingham) –** Review pier design for ADA specifications and determine adequacy of the current and proposed (relocated) parking supply.

Secondary Needs

- **Gallop's Island –** Review concept design for pier improvements; assess ADA accessibility.

- **Bumpkin Island –** Review concept design for pier improvements and ADA accessibility.

- **Grape Island –** Review concept design for pier improvements and ADA accessibility.
- **Little Brewster Island –** Review current dock design for pier improvements or replacement facility.

Tertiary Needs

- **Long Island –** Review dock location and vessel assumptions.
- **Deer Island –** Determine ADA accessibility needs.
- **JFK Library –** Determine ADA accessibility needs; consider as potential departure point to Spectacle Island.
- **Winthrop –** Review results of the consultant study of potential water transportation services from Winthrop.
- **Lynn –** Determine ADA accessibility needs; consider as potential departure point to North Shore.
- **Pt. Pemberton (Hull) –** Review current accessible dock facility in terms of new needs.
- **Revere and East Boston –** Consider as potential departure points.

3.3.2 Boston National Historical Park

Primary Needs

- **Pier 1 (Charlestown Navy Yard) –** Replace deteriorating Pier 1 float and gangway with ADA-accessible and higher capacity float facility to service inner harbor ferries and commercial operators.
- **Trolley Service (Charlestown Navy Yard and Bunker Hill) –** Establish internal trolley system to facilitate movement between newly renovated Bunker Hill facilities and Charlestown Navy Yard/Constitution Wharf.

Secondary Needs

- **Freedom Trail Water Shuttle (Old North Church/Copp's Hill and Charlestown Navy Yard) –** Provide easier access between North End and Charlestown Navy Yard via trolley or water shuttle.

Tertiary Needs

- **Pier 2 (Charlestown Navy Yard) –** Consider longer-term options for renovation of currently deteriorating pier and potential to serve tour boats.
- **Connections to Boston Harbor Islands –** Examine opportunities for direct or indirect linkage to Boston Harbor Islands.

3.3.3 Salem Maritime

Primary Needs

- **Central Wharf –** Examine current proposed design and consider enhancements to better accommodate visitors, provide better connections to landside attractions, and potentially to accommodate harbor tours and water ferry services to North Shore (Gloucester, Newburyport), Harbor Islands, and Boston.

Secondary Needs

- **Improved Signage –** Improve wayfinding signage to facilitate pedestrian movement from transit/commuter rail to key destinations (visitors center and waterfront).

3.3.4 Adams National Historical Park

Primary Needs

- **Enhanced Trolley Services –** Examine opportunities to increase capacity of existing service and provide expanded or additional routes to other historic sites in vicinity; examine opportunities for connecting service to water shuttle services at Fore River and/or Marina Bay/Squantum Point.

Secondary Needs

- **Ferry Service Connection to Boston Harbor Islands –** Examine potential for service to Harbor Islands from Fore River, Marina Bay/Squantum Point, or Souther Tide Mill.

- **Improved Signage –** Improve wayfinding signage to facilitate pedestrian movement from transit to key destinations (visitors center and historic houses).

3.4 Water Transportation Site Planning Standards and Dock Site Selection Criteria

Site planning standards for ferry terminals have been developed based on previous documentation, site visits, and interviews with park unit staff. These standards were identified to help in the selection of specific dock sites as well as to guide the concept plans for those sites selected. The dock site criteria were identified both as generic standards to be applied to all parks and resource locations, and also by park unit to assist in the selection of a short list of priority sites for further evaluation. The site-specific criteria included such factors as current dock conditions, existing or potential ferry services, extreme weather and exposure patterns, local navigation factors, historic dock locations, shoreline environmental conditions and projected seasonal use patterns. The more general criteria for site selection included unit-related factors such as park resource capacity, desired and historic visitation patterns, and achievable levels of accessibility for specific sites.

3.4.1 General Site Planning Standards and Dock Site Selection Criteria

The following planning standards and criteria are generic in the selection of the sites most suitable for ferry landing facilities, including mainland and island sites:

- Existing and historical dock sites with established waterway and/or landside access are favored over new sites that may require dredging, filling, or other significant environmental changes.

- Design Aesthetics: gateway and island sites should be attractive in design and user friendly in operation to provide visitor with an inviting, safe and comfortable environment.

- Docking facilities and ancillary functions should be designed to be efficient to maintain for both first costs and life-cycle costs.

- Docking facilities should be suitable to the needs of the seasonal operations.

- All dock facilities should be fully accessible and designed to meet ADA and MAAB standards.

- Dock site development and redevelopment may be phased based on priority and visitor demand.
- Dock sites should preferably be on public land owned by either the NPS or state or local public partner agencies; private ownership of dock sites entails complex lease and operations management arrangements, and public access may periodically be at stake.
- Dock site design needs to consider individual island recreational boating use including drop-off and dinghy dock location.
- Dock location choice must consider all local navigational, environmental, bathymetry (water depths and currents), and weather exposure conditions, for purposes of dock facility design and vessel landing conditions.

3.4.2 Boston Harbor Islands Site Standards and Dock Design Criteria

Standards for the dock sites at the Harbor Islands and at feeder mainland gateway sites are described in the Boston Harbor Islands Water Transportation Study of 1999. Since water transportation is the primary and only mode of access to the Harbor Islands a more extensive list of standards has been provided than for other park units.

Terminal Requirements

The nature of the Harbor Islands terminal system and mainland access points to the need for a variety of terminal types and configurations to meet different conditions and functions. Within this diversity, however, the goal is to provide the greatest consistency and continuity of experience possible for island visitors. Different terminal contexts and functional needs exist at the following locations. Volume of use and mode of access are factors in major terminal layout and design. The following types of gateways and island terminals are included in the array of sites to be selected:

- Inner Harbor Gateway(s);
- Other Mainland Gateways;
- Island Hubs;
- Secondary Island Docks; and
- Small Island Docks.

Mainland Gateways

Strategically located "gateways" at key points of embarkation to the Boston Harbor Islands provide a means of linking the various landside NPS facilities, key activity centers, and major transportation facilities with the Boston Harbor Islands. Based on the draft BHI General Management Plan, "mainland gateways…are, by definition, waterfront locations with docking facilities. They provide embarkation to the islands along with visitor orientation. Some gateway locations may be staffed and some may not be, and standards vary with the level of staffing." Currently, the key gateway to the Harbor Islands is Long Wharf in downtown Boston. As indicated in the draft Boston Harbor Islands Water Transportation Study, an important attribute of gateways is the need to be reserved on a long-term basis. Ferry terminals need to have long-term arrangements so that docking facilities are available for authorized island ferry and water shuttle providers. This will provide park visitors with assurance that terminals remain in the same location over long periods of time.

The following standards apply to all official gateways:

- **Long-Term Site Commitments and Control –** Mainland docking facilities need to be designated and reserved on long-term arrangements so that docking facilities are available for authorized island ferry and water shuttle providers. This will provide park visitors with assurance that terminals remain in the same location over long periods of time.
- **Public Dock Ownership –** It is preferable that docks and terminals be in public ownership.
- **Sited to Maximize Intermodal Access –** Mainland gateways should be located near public, multimodal transit systems including highways, bikeways, and ferries.
- **Parking –** Where feasible the gateways should also provide parking for island visitors.
- **Piers –** Mainland gateways should have a pier that accommodates regularly scheduled island transportation and meets other program requirements such as accessibility for the disabled.
- **Identity –** A uniform park identity sign package should be located at each gateway. It will include "entrance" signs, highway directional signs, and interpretive panels.
- **Visitor Amenities –** At a minimum seating and a shaded shelter should be present. Bathrooms, drinking water, and a refreshment stand are also desirable.
- **ADA/MAAB Accessibility and Universal Design –** All gateway locations must have fully accessible dock facilities.

Staffed gateways bring additional requirements:

- **Visitor Contact Station –** A point of contact for potential visitors should be made available. This staffed facility could "piggyback" on existing visitor facilities. It may also include exhibits and programs.
- **Sales –** Island-related retail sales areas should be present

General Island Dock Sites

The standards would apply to all existing and proposed islands already designated in the BHI Management Plan.

- **Seamless Pedestrian Connections –** Should be provided to island trail systems, visitor facilities, and ranger stations.
- **Life-Saving and Public Safety Equipment –** Access to dockside.
- **Directional Signage –** Strategically located to serve all attractions.
- **ADA/MAAB Accessibility and Universal Design –** All gateway locations must have fully accessible dock facilities.

Island Hub Sites

On the islands themselves, a system of transportation hubs which serve as key destinations and distribution points to facilitate transfers to water taxis is a critical component of an efficient system for distribution of visitors and management of the various ferry, shuttle, and water taxi services. General standards for these hubs, as listed in the draft Boston Harbor Islands Water Transportation Plan, are:

- **Pier and Dock Berthing Flexibility –** Designs and locations need to accommodate a variety of visitor vessels as well as island ranger and service needs.
- **Accessibility –** Piers and docks must meet state MAAB requirements that provide handicap accessibility on and off the mainland and inter-island shuttle boats.
- **Visibility –** Dock facilities should be easily visible, staffed visitor services and signage indicating activities on the island.
- **Information –** Readily available island ferry and water shuttle schedules.

Intermodal and Circulation Standards

Circulation standards are described for three site locations including downtown gateways, north/south shore gateways, and island dock sites as follows.

Downtown Mainland Gateway Terminal Sites:

- Commuter Rail links to North and South Station by land transit or ferry link.
- MBTA transit system link within a five-minute walk.
- Bus curbside stops; within a three-minute walk.
- Pedestrian connections to major work and tourist centers; within a 10-minute walk.
- Taxi curbside capability at nearest public way.
- Public parking availability within a three-minute walk (not to be provided by NPS)
- Sidewalk or Harborwalk connection to first public way.
- Service/public safety access to dockside.
- Directional signage between modes (needs to be increased, particularly through the duration of the Central Artery construction, in coordination with other ferry signage)
- Intermodal advertising for different public and privately operated services should be systematized and expanded from efforts initiated by the MBTA.

North/South Shore Mainland Gateway Terminal Sites:

- Bus curbside stops; at dockside or within a three-minute walk.
- Pedestrian connections to major work and tourist centers; within a 10-minute walk where applicable.
- Taxi curbside capability at dockside.
- Dedicated parking provided by NPS or partners available within a three-minute walk Sidewalk or Harborwalk connection to first public way.
- Service and public safety access to dockside.

- Directional signage between modes.
- Intermodal advertising for different public and privately operated services should be systematized and expanded from efforts initiated by the MBTA and/or local transit agencies.

Island Dock Sites

The criteria would apply to all existing and proposed islands already designated in the BHI Management Plan.

- Seamless pedestrian connections should be provided to island trail systems, visitor facilities, and ranger stations.
- Where possible, pedestrian connections should be fully accessible to meet ADA and MAAB standards. This may not be possible at all islands depending on topography and trail systems.
- Service and public safety access to dockside.
- Directional signage to all attractions.

3.4.3 Boston National Historical Park Site Standards and Dock Design Criteria

Dock sites for consideration were limited to those within the BNHP site at the Navy Yard. These include two existing dock sites at Pier 1 and Pier 4, and a proposed dock site at Pier 2. All general site standards listed in Section 3.4.1 above shall apply to the BNHP sites. Other standards to be applied to BNHP include the following:

- Existing dock sites should have priority over new dock sites.
- Additional sites may be added when visitor demand warrants.
- Connections to the harbor islands can be achieved through inner harbor shuttle links to the central Gateway at Long Wharf, particularly in the early phases.
- Visual links to a dock site from the primary visitor attraction, the *Constitution,* are important for encouraging ridership and can be achieved best at Pier 1.
- Visitation at the BHNP is year round and visitor amenities, such as protected waiting areas, at dock sites need to be designed for year-round use.

3.4.4 Salem Maritime NHS Site Standards and Dock Design Criteria

A single dock site was determined prior to the study initiative. All general site standards listed in Section 3.4.1 above shall apply to the Salem site. Other standards to be applied to the Salem wharves include the following. There are no additional site selection criteria included since there is no site selection required.

- Dock sites need to be compatible with the permanent in-water vessel exhibit, the *Friendship,* which will reside at Derby Wharf.
- The dock site at Central Wharf east needs to be located to take advantage of the dredged basin, but allow for navigation of other vessels including the *Friendship.*
- Dock use by ferries is likely to be seasonal, and visitor amenities need to be designed accordingly.

- Dock location and design must be flexible to accommodate the City built floating dock temporarily or permanently, as well as the possibility of a new dock facility.
- Parking will not be a requirement at the Salem pier.
- Preservation of the historic character of the wharf resources is important in terms of visual and physical impacts of the dock facility.

3.4.5 Adams National Historical Park Site Standards and Dock Design Criteria

The ferry component of the alternative transportation initiative has always been regarded as a secondary travel mode for the Adams unit. Therefore, only a basic set of site selection criteria has been prepared. All general site standards listed in 3.4.1 above shall apply to the Quincy sites. Other standards to be applied to the Quincy sites include the following:

- Dock site priority in the early phases may favor existing dock facilities with existing ferry operations.
- Dock sites should incorporate dedicated parking for Harbor Island access, and possibly for related commuter service to downtown Boston. The ferry services from Quincy are likely to be multipurpose depending on anticipated the size of the Adams NHP-related market demand and its ability to support a ferry operation.
- Multiple dock locations in the longer term may be possible, but also need to respond to Adams NHP-related ferry use demand.
- Trolley connections scheduled to meet the ferry schedule at dock side with direct connections to the Adams NHP site will be necessary, as public transit is not likely to coordinate with off-peak ferry schedules.

3.5 Recommended Short List of Dock Site Options

In order to focus on the most feasible dock site options, the long list of possible sites considered in Section 2.0 was evaluated against site planning standards and dock selection criteria. This initial screening reduced the list of sites to those that appear to have the greatest potential to best serve the four park units needs. Three subsets of selected sites were identified for each park unit to indicate relative levels of priority for implementation: 1) primary sites essential to core ferry service, 2) secondary sites which were found to be less critical for immediate implementation, and 3) tertiary sites which currently have no docks and/or harbor islands services, but which may be recommended for consideration as future, longer-range service locations. It should be noted that some existing dock sites were not included in the listing because they are already fully functional and meeting fundamental operating standards. An example of such a facility would be the dock at Peddock's Island.

Based on the park site needs described in Section 3.2 and the standards and criteria described in Section 3.4, the following short list of dock sites was developed for more detailed consideration:

Boston Harbor Islands National Park Area

The Boston Harbor Islands dock sites considered are listed below with their general level of priority indicated by the number in parentheses.

Harbor Islands sites identified for further study:

- **George's Island (1) –** The existing and projected harbor islands hub.
- **Spectacle Island (1) –** Nearing completion, a projected new harbor islands hub.

- **Lovell's Island (1) –** Although a smaller island and not a hub site, current pier and dock conditions are unusable, and need immediate attention to reopen the island to the public.
- **Gallops Island (2) –** A smaller island with a stable pier requiring new floating dock facilities.
- **Bumpkin Island (2) –** A smaller island with a stable pier requiring new floating dock facilities.
- **Grape Island (2) –** A smaller island with a stable pier requiring new floating dock facilities.

Islands which are part of the current ferry network but which were not included for further evaluation were Peddock's and Little Brewster, both of which have existing fully accessible dock facilities. Other island sites which will need new or replacement docks and which are projected for inclusion in future ferry route plans include Thompson, Long Island, and Great Brewster. It is recommended that these islands be evaluated in later studies.

Boston Harbor Gateways (Direct and "Feeder" Sites)

- **Long Wharf North (1) –** Designated as the major downtown gateway; new public dock facilities are currently being designed under a separate contract with the Boston Redevelopment Authority.
- **World Trade Center (2) –** A potential inner harbor feeder site to Long Wharf.
- **Pier 4/Navy Yard (2) –** An existing inner harbor feeder site to Long Wharf.
- **Hingham (1) –** The existing South Shore gateway site, with designs completed for dock improvements, pending construction.
- **Hull/Pt. Pemberton (2) –** An existing accessible dock with potential as a South Shore gateway.
- **Quincy Fore River (1) –** An existing accessible private dock with potential as a South Shore gateway.
- **Deer Island (2) –** Existing pier requires an accessible dock; potential to be both a North Shore gateway and an island destination.
- **JFK/U. Mass. (2) –** Existing dock facility needs modifications to become accessible; potential South Shore gateway.
- **Squantum Point/Marina Bay (2) –** Existing dock facility needs modifications to become accessible; potential South Shore gateway.
- **Lynn (2) –** Existing dock facility needs modifications to become accessible; former and potential future North Shore gateway.
- **Salem/Central Wharf (2) –** New dock facility needed to become accessible; potential North Shore gateway.
- **Salem/Blaney Street (2) –** Existing private dock facility needs modifications to become accessible; current North Shore gateway.

Boston National Historical Park (Charlestown)

- **Pier 1 (1) –** New accessible dock facility needed urgently to continue current and new inner harbor shuttle routes.
- **Pier 2 (2) –** A longer-term new dock location which requires substantial pier replacement as well as anew accessible dock.
- **Pier 4 (1) –** An existing accessible dock with year shuttle round service to downtown and Long Wharf.

Salem Maritime

- **Central Wharf (1) –** Receiving a new accessible dock from city on a temporary basis; requires new dock as replacement.

Adams National Historical Park (Quincy)

- **Quincy Fore River (1) –** An existing accessible private dock with potential as a South Shore gateway
- **Squantum Point/Marina Bay (2) –** Existing dock facility needs modifications to become accessible; potential South Shore gateway.

Excluded from further consideration was the Souther Tide Mill site which requires a new pier and dock facility and is poorly located as a ferry landing site.

Chapter 4: Analysis of Route Options and Market Demand

Alternative transportation routes and service operations were developed to identify the most promising services for each Park Unit, based on market demand and the potential to be financially self sufficient in order to minimize the need for ongoing subsidies. This section presents an analysis of these options and considers a broad range of potential routes by phases of Park development. Rather than assuming each phase is based on a specific development timeframe, the analysis is based on range of visitation expected to correspond to the operation of new park amenities and facilities. This range of service options is then narrowed down to the most promising for short- and medium-core routes, as well as longer-term options. Included in the initial identification of potential routes are existing water links such as the Boston Harbor Islands service from Long Wharf to George's Island, and the Boston National Historical Park routes from Pier 1 to Long and Rowes wharves. In addition, new routes are considered by Park Unit. These new routes include connections from existing terminal sites as well as from proposed new sites. Each description summarizes key issues pertaining to the market feasibility in establishing a new or modified route. Terminal access and infrastructure needs are described earlier in Section 3.0. Routes are then identified for further analysis which include those which appear most promising during the next 10-year timeframe, in anticipation of expanding park resources and attractions. Estimates of overall visitation for each market area are provided as a basis for assessing market potential of the various services. Estimated overall operating costs based on hypothetical operating scenarios are also provided by phase.

4.1 Route Selection Criteria by Park Unit

4.1.1 General Route Selection Principles and Criteria

In planning ferry routes for the four park units, there are general principles which apply to all National Park sites which are helpful in defining and recommending the most promising services.

- **Ferry routes should be designed to fill a specific transportation access purpose.** The proposed ferry routes are either the only means of access as in the case of the Boston Harbor Islands or a complementary means of access as in the case of the other three sites, which already have variations of landside access. Therefore the ferry routes should be planned in much the same manner as land-based transit, with regular schedules, service standards and amenities.

- **Routes and services may be phased in for each site in response to growing demand and availability of docks and landside facilities.** Visitation will change over time based on the phasing in of new services and facilities and implementation of marketing activities. As demand increases or markets change, new services will be warranted to accommodate these changes.

- **Routes and services should be designed to be economically self sufficient.** The routes and services should be planned to be supported by the fare structure and not reliant on public subsidies. In some instances demonstration projects for start-up services may require short-term financial support from public or private sources.

- **Ferry access needs to be affordable to all Park visitors.** The cost of island access should be affordable for a variety of user groups, taking into consideration the combined ferry, land transportation (transit and/or parking), and any additional programming or entrance fees. Fare structures need to be within range of all individuals, families and special groups of users. Affordable access for school age children within the Metropolitan Boston area is also a priority

- **Water transportation services should be accessible to all users and planned to meet all current and emerging state and federal ADA regulations.** Ferries and dock facilities should meet the service, safety, and environmental performance standards including ADA guidelines and Massachusetts Architectural Board Standards, as well as emerging federal guidelines for accessible vessels. Dock facilities need to accommodate various sizes of vessels and provide safe access on and off the vessels, including handicapped access.

- **Ferry service to the park areas is most likely to be seasonal in the New England climate.** The primary market demand for ferry services will be during the summer months followed by the shoulder seasons based on experience with the Harbor Islands services as well as other excursion and recreational ferry services.

- **New ferry routes should build on existing services and operations.** Boston has a substantial and diverse ferry network of routes and a large ferry fleet owned by multiple operators. New services should find ways of using the existing network to greatest advantage. In some cases, it may be useful to provide new park services as add-ons or "piggybacking" on existing routes, particularly when there is not a sufficient market for a stand alone, dedicated service. This technique has been successfully used for the Harbor Islands and other routes in the Boston area.

- **Outreach and marketing is necessary to inform visitors about ferry access to the Boston park sites.** Implicit in the intent to fully serve both the Metropolitan Boston resident and out of town visitor there should be multiple layers of public information, outreach to communities, and an effective marketing plan to provide public awareness of for ferry access to the parks. Cross marketing between park units should also be expanded, as new ferry links are initiated.

4.1.2 Boston Harbor Islands

The planning principles and route selection criteria for the ferry services to the Boston Harbor Islands are somewhat distinct from the other park units in the Boston region since water transportation is the only mode of access to most of the park resources. The basic principles and criteria were described in the "Boston Harbor Islands Water Transportation Study" prepared in 1999 for the National Park Service. The following criteria for routes expand on those principles.

- Phasing of new routes and services should be keyed to increased demand and introduction of new island resources and activities.

- Gateway routes should be added as demand builds up at a particular location, particularly within a given demographic area.

- Distribution of route demand is expected to follow recent historic patterns as visitation increases. Phasing and amounts of service provided as visitation increases should follow the pattern of a predominant market from the downtown gateway and secondary markets on the south and north shores.

- The "Hub and Spoke" pattern of mainland gateway and inter-island shuttle routes is well suited to the character and capacities of the Island resources.

- Water transportation should contribute to the overall experience of the Boston Harbor Islands. The ferry trip can be a pleasurable and educational experience introducing the visitor to the harbor and to island geography and history. Services should therefore be comfortable, safe, and reliable for all routes and during the full season of operations.

- Schedule and frequency of water transportation service should be matched to the visitor needs combined with the intended island carrying capacity as outlined in the Boston Harbor Islands

management plan. There needs to be a balance between maximizing access, so that a visitor is easily able to get out to and around the islands, with the need to preserve the natural resources.

- Gateways should be sited to maximize intermodal access. Mainland gateways should be located near public, multimodal transit systems including rail, bus lines, highways, bikeways, and ferries. Where feasible the gateways should also provide sufficient parking for island visitors.

- Mainland docking facilities need to be reserved on a long-term basis. The ferry terminals need to have long-term arrangements so that docking facilities are available for authorized island ferry and water shuttle providers. This will provide park visitors with assurance that terminals remain in the same location over long periods of time.

- Performance specifications are needed for ferry and water shuttle services. The specifications should address reliability of service and schedules, guidelines to ensure public safety, vessel wake and wash limitations for resource protection, and ADA accessibility.

- Ferry service management plans are needed to help define routes, schedules, and vessel requirements. Alternative management and concession strategies are needed for the Boston Harbor Islands to address such issues as dock management, concessions agreements, and route management.

- The inter-island shuttles are intended to operate as non-fare extensions of the paid gateway services. Immediate and long management plans are needed to define the amount of service and the routes for the no fare shuttle links. Shuttle links may be added or expanded as new resources are opened and as visitor demand increases.

4.1.3 Boston National Historical Park (Charlestown)

The water transportation needs for Boston National Historical Park contrast with those of the Boston Harbor Islands, since the primary travel mode for visitors is by land. Ferry services would be complementary to land-based modes including private auto, bus, trolley, and pedestrian access. The primary needs for BNHP involve short distance inner harbor shuttle ferry connections to the Downtown, major transit hubs at North and South Stations, and other inner harbor waterfront cultural institutions. In addition ferry services could provide a long-sought water link for the Freedom Trail from the North End to Pier 1 and the *U.S.S. Constitution*. Current excursion ferry services provide seasonal connections from Pier 1 to Long and Rowes Wharves in downtown Boston.

- Continue and enhance existing seasonal excursion links to downtown.

- Provide alternative water transit shuttle links to major transit hubs at North and South Stations to reduce traffic and parking impacts on the Navy Yard and Charlestown.

- Provide ferry links to other cultural institutions and visitor attractions around the Inner Harbor.

- Provide new cross harbor ferry links for the Freedom Trail.

- Provide ferry links to other National Park sites including the Boston Harbor Islands.

- Encourage seasonal and off-peak stops at Pier 1 “piggybacking” on other existing or new shuttle routes.

- Define management agreements to accommodate a variety of ferry services at Pier 1.

- Encourage visitors to use ferry services to Pier 4 in the Navy Yard.

4.1.4 Salem Maritime National Historic Site

The water transportation needs for the Salem Maritime National Historic Site also contrasts with needs for the Boston Harbor Islands and BNHP since primary travel modes are by land. The intent in Salem is to provide an opportunity for a variety of regularly scheduled or charter ferry services to land at Central Wharf. It is not intended that specific new scheduled services be recommended for Salem, but rather that a range of possible ferry uses be identified. Scheduled ferry service to downtown Boston was provided from the nearby privately operated Blaney Street landing. According to park officials, there is no intention currently by Salem Maritime to encourage service at Central Wharf. However there is an interest providing a public landing for a variety of visiting ferry and other vessels. Any ferry services would be complementary to land-based modes including private auto, bus, trolley, and pedestrian access.

The general route selection criteria cited in Section 4.1.1 should be applied to Salem Maritime National Historic Site services.

4.1.5 Adams National Historical Park (Quincy)

The Adams National Historical Park has expressed an interest in alternative waterborne transportation routes connecting the site via trolley and ferry to downtown Boston. The ferry service would complement existing land-based highway and transit access to the site. Potential dock locations are discussed in Section 5.0, including Quincy/Fore River at the current Harbor Express Terminal, and at Squantum Point/Marina Bay. The visitor experience of arriving by water is intended to be evocative of the routes that the Adams family might have taken prior to rail and highway availability. Preliminary market analysis indicates that the potential ridership would be insufficient to support stand alone services. However such services might be possible as add-ons to other services from those two sites. At present, Harbor Express operates a year-round triangular service connecting Quincy/Fore River to Logan Airport and Long Wharf.

The general route selection criteria cited in Section 4.1.1 should be applied to dedicated services to Adams National Historical Park.

4.2 Description of Route Options Considered by National Park Unit and Site

Each Park Unit has its own water transportation needs and potential for phased new services. The Boston Harbor Islands national park area is by its nature totally dependent on ferry services for public access, and therefore is described in greater detail than the other Park Units. The other Units including the Boston National Historical Park in Charlestown, the Salem Maritime National Historic Site and the Adams National Historical Park in Quincy are all accessed primarily by land, but would each benefit from supplementary ferry service. A broad range of potential water transportation route options was considered for each of the Park Units. These long lists of route options were then evaluated against route selection criteria and market demand analysis to determine the most advantageous and feasible among them. The long list of routes considered by Park Unit included the following.

4.2.1 Boston Harbor Islands

Ferry service to the Boston Harbor Islands has historically consisted of a combination of two types of seasonal routes: 1) mainland gateway to island routes, and 2) shuttle or water taxi services between the islands. It is expected that as Spectacle Island is opened, projected for 2002, and as new island resources and attractions are developed, that visitation will increase and that additional ferry services will be needed to meet increasing demands. It is also expected that as the on island resources and attractions expand and become more diversified, that some islands will require public access over an extended season, and in some cases, such as Spectacle

Island or Peddock's, may eventually evolve into year-round service needs. Potential expansion of existing routes and additional new routes could include the following:

Boston Harbor Gateway Routes

The function of the Gateway routes is to provide seasonal passenger connections to the Harbor Islands from a variety of mainland ferry terminal sites. Existing routes include Long Wharf in downtown Boston to George's Island and Hewitts Cove in Hingham to Peddock's and George's Islands.

Downtown/Inner Harbor to Islands

Long Wharf has been designated as the primary downtown gateway site, as described in the dock site section, because of its central location near transit, and its long-term use as the inner harbor gateway. Therefore it is projected that the majority of the downtown routes will depart from Long Wharf and that other points around the harbor would be connected by shuttle. As demand for access to the islands increased substantially over current levels in the longer term, other inner Harbor gateways might be considered.

- **Long Wharf to George's Island (Existing) –** The primary existing route operates from April through October. For the past five years the route has carried over 80 percent of all visitors to the islands. It provides connections to the subway system at the Aquarium stop on the Blue Line, and is close to many downtown attractions. The scheduled services connect with inter-island shuttle loops at the George's Island Terminal. The direct Blue Line intermodal connections will be suspended for the next 18 to 24 months during the renovation of the MBTA station.

- **Long Wharf to Spectacle Island and George's (New) –** When Spectacle Island opens (scheduled for 2002) it may be necessary to add a stop on the Long to George's route, as the most expedient way to provide frequent scheduled service to the new park resource. Feasibility of having all routes stop at Spectacle will depend on the volumes of visitors and peak time combined capacity needs with George's. At some times when demand is highest, separate routes may be needed from Long to Spectacle and George's, such as summer weekend evenings.

- **Long Wharf to Spectacle Island (New) –** As described above, separate direct services may be needed to the two "hub" islands, depending on seasonal and weekly demand cycles. During weekdays it may be possible to combine island hub service with scheduled through routes connecting two gateway sites such as Quincy/Fore River to Long Wharf by including stops at either or both of the two hub islands. Such a route would be Quincy/Fore River to Spectacle to Long Wharf and would work well during so called dead-head runs (return trips to pick up commuters) in the a.m. and p.m. peak periods, or during the off-peak weekday or weekend schedules.

- **World Trade Center/South Boston to Spectacle Island (New) –** A regularly scheduled service would need to have enough demand to justify such a route. Transit connections to World Trade all pass through the downtown and are less direct than at Long Wharf. For auto connections, parking availability and cost will be an issue during the weekdays, but might work during weekends if nearby lots are made available at reduced rates. Until there is greater buildout of hotels and residential, there is not likely to be sufficient demand generated internally by the South Boston waterfront area itself to financially support regularly scheduled service. On the other hand, when the new Convention Center opens there may be a substantial market based on out of town visitors, charters and special event ferry services.

- **Long Wharf to Spectacle Island to Deer Island (New) –** There may eventually be demand for through service from downtown to Deer Island at such time as programs and facilities expand to attract more visitors to the water resource center. There may also be some demand for extending the year-round commuter service from downtown to Deer Island, which had been operating successfully during the facility construc-

tion phase from Quincy's Squantum Point/Marina Bay. The two services could be combined to provide more ridership and service options for both park visitors and Deer Island employees.

- **Long Wharf to Fan Pier to Spectacle Island (Modified Existing) –** At such time as the proposed Fan Pier development area has a pier facility and is substantially built out, there may be enough demand to justify a stop on the Long Wharf to Spectacle Island route. If the combined demand from surrounding development and the Convention Center is sufficient, there may be direct service from Fan Pier to the Islands.

South Shore to Islands

Based on recorded ridership patterns over the past 10 years, the South Shore-based visitation to the islands has tended to comprise an average of 15 percent of the total number of seasonal ferry riders. Despite efforts in the last DEM solicitation for multiple gateways and operators from the South Shore, only one operator bid on the existing service from Hewitt's Cove in Hingham. A second South Shore service was introduced during the 2000 season from Squantum Point at Marina Bay to George's Island during the summer season and had disappointingly small ridership. Based on these factors, it is anticipated that Hewitt's Cove will remain the primary South Shore gateway until ridership demand increases substantially.

- **Hingham to George's Island (Existing) –** The service is offered at different frequencies through the park seasons. The 1,600-car parking area is owned by DEM and is filled predominantly by commuters during the week. DEM reserves the right to reserve spaces for Harbor Island visitors. There are times during the week when the lot is full of commuters, leaving only distant spaces at the far end for island visitors. There is less conflict with commuters on weekends, recreational boaters take up portions of the lot. A masterplan for redeveloping the site has been prepared which relocates the parking with a small increase in number of spaces, and the MBTA expects that there it may become a paid lot, with the potential for a future second deck.

- **Hingham to Peddock's to George's (Modified Existing) –** During the past season the service to George's Island added a stop at Peddock's after the dock facility was repaired. On selected summer season trips stops at Grape and Bumpkin Islands have also been added to complement the south shuttle loop. While the extra stops add some time to the trip to the relatively short run to George's, they do provide exposure and access to these underutilized resources in Hingham Bay. The Peddock's stop proved to be popular and is proposed to be included in the route in future years.

- **Hingham to George's Island to Spectacle Island (New) –** At such time as Spectacle Island is opened and demand builds up, the Hingham to George's route could be extended to provide direct access to Spectacle. The trip time would be somewhat longer due to the long and somewhat indirect water routes available.

- **Quincy/Fore River to Spectacle Island (New) –** There are some opportunities to add stops at islands on existing services which travel through on a daily basis. The harbor Express service from Quincy/Fore River is a prime candidate after Spectacle Island opens. The Harbor Express route serving Logan Airport and Long Wharf passes right by the new pier facility. Selected routes could provide connections from downtown and Quincy between peak commuter periods if there is excess capacity, and if the operator is interested.

- **Pt. Pemberton to Peddock's to George's (New) –** The short connection could be achieved in several ways. If there is sufficient demand a dedicated route could be added. As the point is located at the far end of Hull, and remote from the mainland road system, such an eventuality is unlikely. Several other possibilities exist. The existing Hull commuter service could add stops on the reverse "deadhead" runs in the a.m. and p.m. periods. Alternatively the connections could be easily added to the south shuttle loop, a variation which was successfully tried during the past season. In the short- and mid-terms, such an approach would seem to best match the demand levels. The site offers ample parking as well as a seasonal trolley link with Nantasket Beach and the rest of the Hull peninsula.

- **Squantum Point/Marina Bay to Spectacle (to Long Wharf) (New) –** When Spectacle Island opens, a connection from Squantum Point at Marina Bay would be desirable to serve Quincy residents as well as other inland communities served by the Southeast Expressway. It may be combined with a through service to downtown Boston in order to generate two-way traffic, and take advantage of a possible year-round commuter market. It should be observed that two previous commuter services have not been successful from the site, but the market may be changing. The availability of a portion of the existing MDC parking and pier facility may be an issue depending on the plans for the Squantum Point Park facility.

- **Squantum Point/Marina Bay to Spectacle to Deer Island (New) –** A variation on the through service would be to connect to Deer Island. The site has previously been used by a successful MWRA ferry operated during construction of the Deer Island facility as a traffic mitigation measure for commuting South Shore workers. There may be a combined market of commuting permanent Deer Island employees and Deer Island park visitors.

- **JFK/U. Mass. to Spectacle to Long Wharf (New) –** A similar pair of route options would exist from the JFK Library/U. Mass. dock to Spectacle and Long Wharf. The market would be somewhat different in that there is a transit link by bus to the JFK/U. Mass. Red Line and commuter rail stop, and good roadway access to Dorchester and other Boston neighborhoods north of the Neponset.

- **JFK/U. Mass. to Spectacle to Deer Island (New) –** As described above this might be a variation of the Spectacle to Long service. depending on rider demand growth, it may be able to combine two or more of these routes by alternating scheduled services during the day.

- **Scituate to George's (or Spectacle) to Long Wharf (New) –** A recent study indicated that year-round commuter ferry service was feasible from Scituate, and indicated the possibility of providing seasonal off-peak recreational services. If such a service were started, stops on such a route at either George's or Spectacle might be possible. Such a new gateway service is most likely to fall in the mid- to long-term time period. The service from outside the Boston harbor would require a seagoing ferry to handle the conditions in Massachusetts Bay.

North Shore to Islands

A variety of potential routes from North Shore Gateways may provide ferry access to the islands in the future. There is no obvious central departure point from the North Shore owing to the road network and multiplicity of smaller towns. With the exception of the Salem service which currently operates seasonally to George's Island and downtown, and the seasonal Gloucester to downtown route there are no services from the North Shore communities to the Boston Harbor. The following routes have been listed as having potential in the future, connecting to harbor island hubs most likely as "piggyback" routes attached to through routes to the downtown. A general constraint on such North Shore services has been the relatively long water distance of travel to the downtown compared to landside highway and rail routes.

- **Winthrop to Deer Island to Spectacle to Long Wharf (New) –** A feasibility study was recently completed indicating a market for regular ferry service from Winthrop to several inner harbor destinations and offering the possibility of intermediate stops at island hubs. Spectacle Island would be the most likely as it is en route to inner harbor destinations. The routes would primarily serve Winthrop residents since street access through the community and parking would be limited. Ferry service could be provided within the protected outer harbor at such time as an accessible landing is built with adequate adjacent parking.

- **Lynn to George's to Long Wharf (New) –** Ferry service operated from Lynn to George's Island for many years as the primary North Shore link to the Islands. The ferry landing offers ample parking and has good highway access to other North Shore communities. The ferry route passes through the more exposed Massachusetts Bay before entering the Outer Harbor, but is a much shorter route than those from Salem, Beverly

and Marblehead. Such a route could be revived and possibly combined with a downtown commuter service. The service to George's Island functions as a secondary "piggyback" service, and has accounted for modest numbers of visitors to the Island.

- **Salem to George's to Long Wharf (Existing) –** The current route has been operating for three years on a seasonal basis, offering stops at George's en route to Long Wharf. The service has shown some success based on two-way recreational use, with visitors from Boston being attracted to historic Salem combined with Salem area residents traveling to Boston in the other direction. Parking and access are somewhat limited at the current Blaney Street landing. With long-range plans for a new cruise terminal at the site as well as a potential landing at the Salem Maritime park, continuation of service would seem to be likely.

- **Salem to Spectacle to Long Wharf (New) –** Similar to the above described route would be a new service connecting from Salem to Spectacle Island as part of a through route to downtown. The Spectacle stop would be a somewhat shorter diversion from the through route, which could be a benefit to an operator on this relatively long distance loop.

Boston Harbor Islands Shuttle Routes

North Loop

- **George's to Gallops to Lovell's to Peddock's to Pt. Pemberton (Existing, although temporarily suspended in 2000) –** The current three stop route has proven popular with visitors in the past because of the short distance and frequent departure times. The two islands have contrasting environmental characteristics. As the new islands near George's have come on line, this route was expanded to include such attractions as Peddock's and Pt. Pemberton.

- **George's to Lovell's to Gallops to Spectacle to Peddock's (New) –** A further modification would be to include Spectacle Island after it has matured as a new attraction. The distance to Spectacle might make this an overly long round-trip for a shuttle.

- **George's to Lovell's to Gallops to Long to Spectacle (New) –** Another variation of the loop would be to add Long Island when this resource is opened. As with the above loop, this becomes and excessively long shuttle loop.

South Loop

- **Hingham to Grape to Bumpkin to Peddock's to George's (Existing) –** This route combines the Hingham to George's Gateway service with the shuttle function to the two islands which are passed close at hand. This route augments the existing long existing South Loop and provides more options for linking to those islands. Any gateway route functioning in this manner collects the full fare from island visitors at the gateway departure as if they were headed for a hub island, and then provides free transfers on subsequent trips.

- **Hingham to Grape to Peddock's to George's (Existing) –** This route is a variation of the above route which may be continued as a gateway route from Hingham until demand increases for extension to Spectacle.

- **George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Existing) –** The long-running southern loop has the advantage of covering all of the smaller resources in Hingham Bay as well as the larger Peddock's. The disadvantage is an overly long trip with the conventional slower vessel used and long waits between departures. In addition for those visitors to Grape Island, it has been frustrating coming and

going from Hingham and being required to transfer through the distant George's Island hub. Hence the addition of stops on the route described above.

- **Spectacle to George's to Peddock's to Bumpkin to Grape (New) –** A variation on the south loop would add Spectacle to the loop. This again would create an over long trip time, particularly with the slower shuttle craft.

- **Nantasket to Pt. Pemberton to Peddock's to George's (New) –** A restoration of the Nantasket ferry could stop at those islands en route to George's as it once did on its trip from Boston to the beach. Some dredging and dock modification would be needed at Nantasket to restore such service, and the route would most likely be a piggyback on a through service to downtown.

West Loop

- **Squantum Point/Marina Bay to Thompson's to Spectacle to Long Island –** When both Spectacle and Long Island are both open, a new combination shuttle and gateway route could operate between the Quincy site and the string of "western" harbor islands. The shuttle route would connect at Spectacle with service to George's.

- **JFK/U. Mass. to Thompson's to Spectacle to Long Island –** A variation on the above route would be a combination shuttle/gateway route departing from JFK/U. Mass. instead of Squantum Point. One or the other would operate, but not both.

4.2.2 Boston National Historical Park (Charlestown)/Boston Harbor Gateways

The Boston National Historical Park sees the need for expanding its inner harbor shuttle services beyond the two seasonal excursion routes to Pier 1 and the current Pier 4 shuttles. Several new shuttle services would be beneficial as alternative transportation choices for BNHP visitors including links to the two major transit hubs at North and South Station, connections to other inner harbor cultural attractions, and a direct connection for the Freedom Trail from the North End to Pier 1. While no specific new routes are recommended other than continuation of existing routes, the following array of routes could make use of an urgently needed replacement dock facility at Pier 1 as well as the existing MBTA dock at Pier 4.

- Long to Pier 1 (Existing): Private seasonal excursion service.

- Rowes to Long to Pier 1 (Existing): Private seasonal excursion service.

- Long to Pier 4 (Existing): Year-round MBTA service to the Navy Yard with a seven- to 10-minute walk from Park destinations.

- Russia/South Station to Pier 4 (New): Long committed as a mitigation for artery construction, a proposed new year-round MBTA/Central Artery service is expected to begin in the next two to three years.

- Lovejoy/North Station to Pier 1 to Pier 4 (New): The current Lovejoy to Pier 4 MBTA service could add a stop at Pier 1 during off-peak periods.

- North End Park to Pier 1 (New): A new dock would be needed for a Freedom Trail cross harbor link. It is possible that the existing excursion route operators might be persuaded to provide the service.

- Battery Wharf to Pier 1 (New): An alternative would be to seek an agreement with the developers of Battery Wharf to provide dock access for the same Freedom Trail link.

- Lovejoy/North Station to Pier 4 to World Trade Center (New): Another potential add-on to an existing route during off-peak periods might be feasible after the Convention Center and other South Boston development is completed.

4.2.3 Salem Maritime/Boston Harbor, Cape Ann, Mass Bay Gateways

There are a variety of potential ferry services that could use the proposed docks.

Downtown Boston and Harbor Islands

Several routes could connect Salem Maritime to downtown Boston through the Harbor Islands. As the demonstration service and the current operation have shown, the route has the advantage of a two-way market, carrying Salem-based residents, commuters and visitors into Boston and bringing Boston-based residents and visitors back to Salem. Salem links to the Harbor Islands add further riders to the mix.

- **Salem/Blaney Street to George's to Long Wharf (Terminated) –** The seasonal service operated from a private site which is a pleasant five to seven-minute walk from the Salem Maritime site. The route used a slower vessel than the catamaran used for the 1998 demonstration project and ridership has been somewhat less on the longer trip. Parking at the Blaney Street site was a major plus in terms of the variety of riders attracted.

- **Salem Central Wharf to George's to Long Wharf (New) –** This route is proposed as the current route has been terminated. The Central Wharf site has the advantage of being closer to central Salem attraction and the disadvantage of limited parking availability. Such a service would be initiated independently by a private operator and would not necessarily be solicited as a concession by the NPS.

Essex Heritage Area Park Sites

Several potential routes were identified which might link Salem Maritime to other Essex County sites on Cape Ann. All would be new services, also initiated by private sector operators. Such routes would most likely alternate as scheduled excursion routes on a seasonal basis.

- Salem/Central Wharf to Gloucester (New).
- Salem/Central Wharf to Manchester-By-The-Sea (New).
- Salem/Central Wharf to Beverly (New).
- Salem/Central Wharf to Beverly to Manchester to Gloucester (New).
- Salem/Central Wharf to Marblehead (New).

4.2.4 Adams National Historical Park (Quincy)/Boston Harbor Gateways

Ferry routes from Quincy sites would serve the Adams Park as a secondary or tertiary function as part of through service to downtown Boston. While no routes are recommended, two potential routes which could provide alternative transit to Adams include the following. Either routes would need to be connected to the park site through an expanded trolley system, which is described elsewhere in this report.

- **Long Wharf to Spectacle to Quincy/Fore River (Modification of Existing) –** The current Harbor Express services offer extensive year-round, seven-day-a-week services from Quincy to downtown Boston via Logan Airport. If some of the seasonal off-peak runs could stop at Spectacle Island, the route would offer

the added advantage of Harbor Island links. As a privately owned and operated operation, negotiations would be required with the operator to add such service. For purposes of Adams Park links to downtown Boston only, it would simply be a matter of providing a trolley link. Ample parking is available at the site and the dock is ADA-accessible, as are the bow loading catamaran ferries.

- **Long to Spectacle to Marina Bay (New) –** Establishing a new route requires an agreement with the MDC to allow for parking and seasonal service from the existing site, as well as a new accessible dock facility. At the time of this report, the City of Quincy was proposing to relocate the heavy cruiser *U.S.S. Salem* from it current Fore River site in the Quincy Shipyard to the Squantum Point site. If such a move takes place it would add another attraction at the site and the potential for further ridership on a ferry to downtown Boston. It is unlikely that the Adams Park visitation would provide more than a small proportion of the seasonal ridership needed to attract a ferry operation. The connection to Long Wharf in the downtown would probably also require a renewed interest in commuter and off-peak ferry service from Marina Bay and nearby residential areas in Quincy. Historically two such services have been unable to succeed for lack of ridership. However a combination of these new market segments might reverse the tide.

4.3 Short List of Routes and Phasing Options

Based on the route selection criteria and an assessment of the market demand for various routes, the following sets of routes were designated for each park area and organized into three phases or timeframes corresponding to various service improvements and enhanced amenities: 1) short-term, 2) mid-term, and 3) long-term. The timeframes may differ from one park area to another based on park-specific and other contextual factors.

4.3.1 Boston Harbor Islands National Park Area

Boston Harbor Gateway Routes and Inter-Island Loops by Phase

The short list of routes and phases of implementation for the Boston Harbor Islands are recommended based on the route selection criteria, discussions with the stakeholders and operators, and on field observations of the operations during the 2000 season.

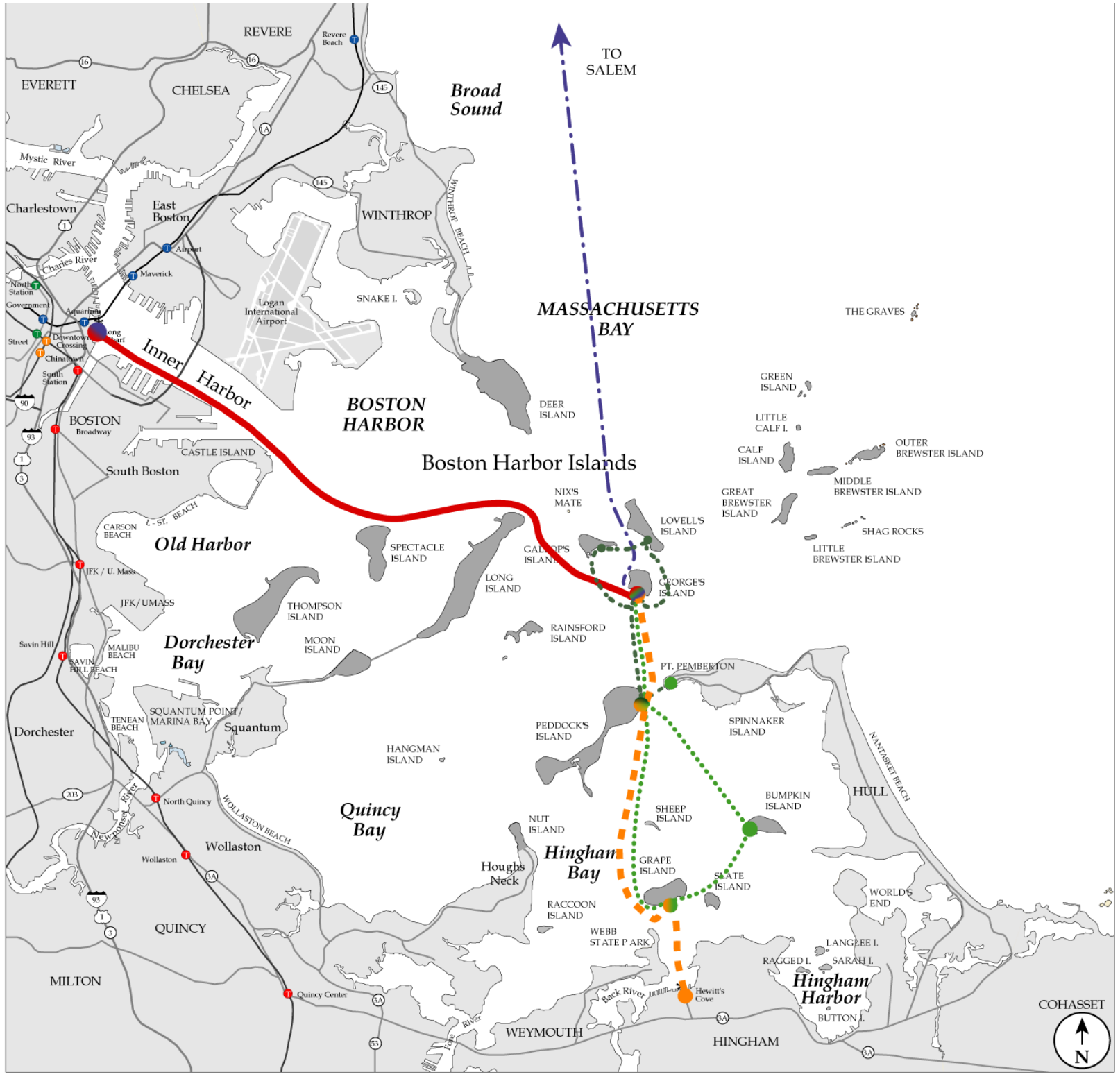
Phase I – Short-Term (Figures 4.1 and 4.2)

Operating Context – The short-term network would start in 2001 and continue until such time as Spectacle Island opened. The network is similar to the current operation with some variations. Routes would operate with existing ferry landing facilities.

Proposed Management and Contract Approach – The service would be operated as a contracted service with a publicly bid solicitation for a single operator for gateway and shuttle services. No additional fare would be charged for shuttle routes, with the single operator providing all services. A North Shore route would be optional and negotiable based on the operator selected, and the operator's interest in such a route.

- **Gateway Routes – Core Contract:**
  - Long Wharf to George's Island (Existing)
  - Hingham to Grape to Peddock's to George's to Hingham (reverses direction of direct route in a.m. and p.m.) (Existing)

FIGURE 4-1: BOSTON HARBOR ISLANDS GATEWAY AND INTER-ISLAND LOOPS (PHASE I – SHORT-TERM)



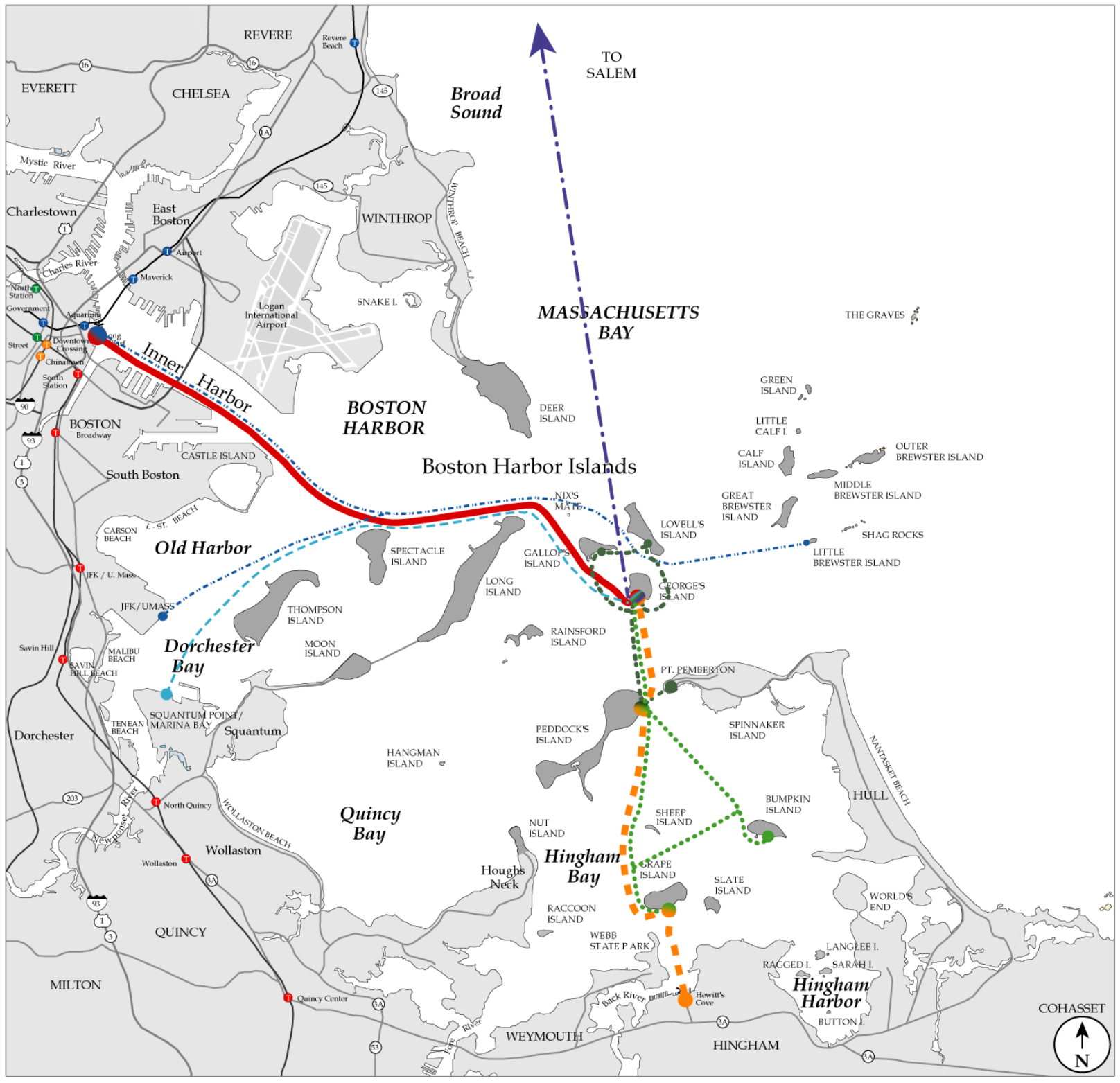
1.1 Gateway Routes:

- Long Wharf to George's Island
- Hingham to Grape to Peddock's to George's to Hingham (Reverses direction in a.m. and p.m.) (Existing)
- North Shore to George's Island (New/Modify Existing)

1.2 Inter Island Shuttle Loops:

- North Loop – George's to Lovell's to Gallop's to Peddock's to Pt. Pemberton/Hull (Modified Existing)
- South Loop – George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Modified Existing)

FIGURE 4-2: BOSTON HARBOR ISLANDS GATEWAY AND INTER-ISLAND LOOPS (PHASE I – SHORT-TERM WITH LIMITED SERVICED OPTIONS



1.1 Gateway Routes:

- Long Wharf to George's Island
- Hingham to Grape to Peddock's to George's to Hingham (Reverses direction in a.m. and p.m.) (Existing)
- North Shore to George's Island (New/Modify Existing)

1.2 Inter Island Shuttle Loops:

- North Loop – George's to Lovell's to Gallop's to Peddock's to Pt. Pemberton/Hull (Modified Existing)
- South Loop – George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Modified Existing)

1.3 Limited Service Route Options:

- Federal Courthouse to Little Brewster (Existing)
  Alternating with
  JFK Library/UMass to Little Brewster (Existing)
- Squantum Point/Marina Bay to Thompson's Island to George's (New)

- **Gateway Route – Optional:**
  - North Shore to George's (New/Modify Existing)
- **Inter-Island Loops:**
  - North Loop: George's to Lovell's to Gallops to Peddock's to Pt. Pemberton/Hull (Modified Existing)
  - South Loop: George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Modified Existing)
- **Limited Service Route Options:**
  - Federal Courthouse to Little Brewster

    Alternating with
  - JFK Library/U. Mass. to Little Brewster
  - Squantum Point/Marina Bay to Thompson to George's

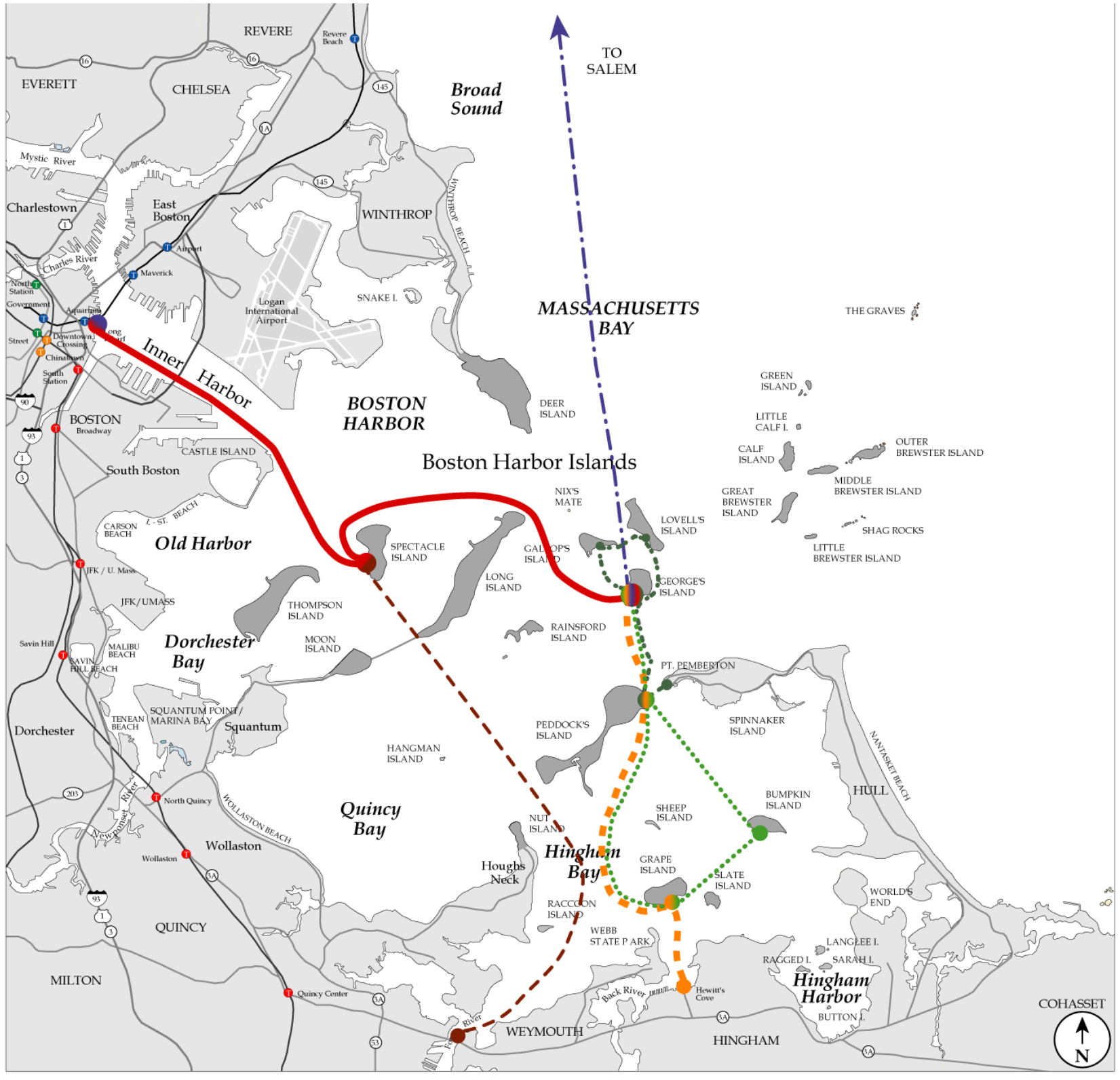
Phase II – Mid-Term (Figures 4.3 and 4.4)

Operating Context – The mid-term network would start in 2002 or 2003 depending on when Spectacle Island opens. The network is similar to the to Phase I and current operations with the addition of Downtown to Spectacle services. First priority new island ferry landings would be in place.

Proposed Management and Concessions Approach – The service would be provided as a concession with a single, or at most two, operators for gateway and shuttle services. The shuttle service would be attached to the Downtown Gateway operations contract as the more profitable, if two or more operators are selected, with contributions from the south shore and north shore operator(s). No additional fare for would be required for shuttle routes with the downtown operator providing all routes. North Shore routes would be negotiable based on the operator selected. Depending on the opening date of Spectacle Island, this contract could either be separate or combined with the Phase I contract.

- **Gateway Routes – Core Contract:**
  - Long Wharf to Spectacle Island and George's Island (New/Modify Existing)
  - Hingham to Grape to Peddock's to George's to Hingham (Reverses direction of direct route a.m. and p.m.) (New/Modify Existing)
- **Gateway Routes – Optional:**
  - Quincy/Fore River to Spectacle ((New/Modify Existing)
  - North Shore to George's (Existing/Phase I)
- **Inter-Island Loops:**
  - North Loop: George's to Gallops to Lovell's to Peddock's to Pt. Pemberton/Hull (Modified Existing)
  - South Loop: George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Modified Existing)

FIGURE 4-3: BOSTON HARBOR ISLANDS GATEWAY AND INTER-ISLAND LOOPS (PHASE II – MID-TERM)



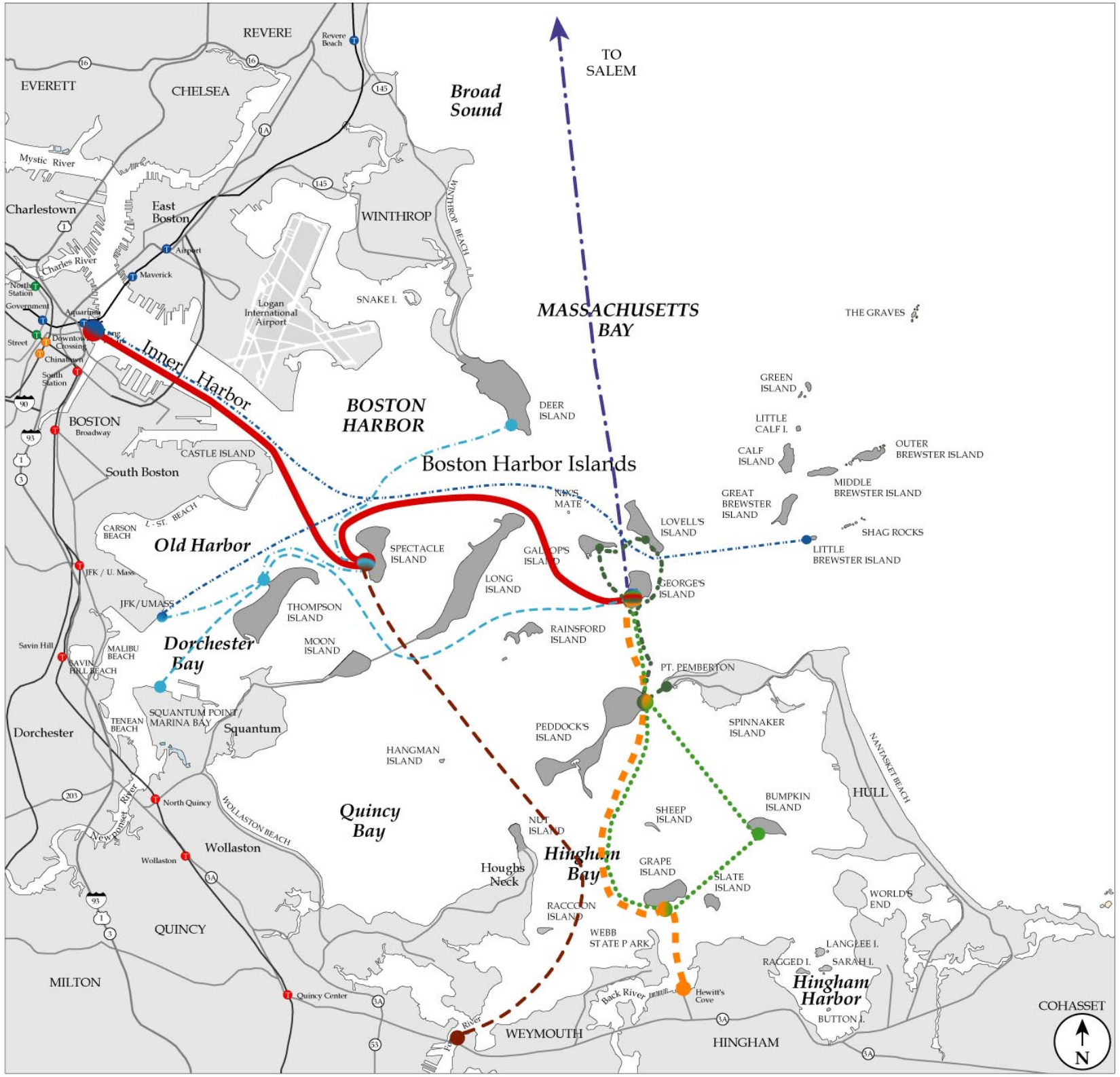
2.1 *Gateway Routes:*

- Long Wharf to Spectacle Island to George's Island (New/Modify Existing)
- Hingham to Grape to Peddock's to George's to Hingham (Reverses direction in a.m. and p.m.) (New/Modify Existing)
- Quincy/Fore River to Spectacle (New/Modify Existing)
- North Shore to George's Island (Existing/Phase I)

2.2 *Inter Island Shuttle Loops:*

- North Loop – George's to Gallop's to Lovell's to Peddock's to Pt. Pemberton/Hull (Modified Existing)
- South Loop – George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Modified Existing)

FIGURE 4-4: BOSTON HARBOR ISLANDS GATEWAY AND INTER-ISLAND LOOPS (PHASE II – MID-TERM WITH LIMITED SERVICE OPTIONS)



2.1 Gateway Routes:

- Long Wharf to Spectacle Island to George's Island (New/Modify Existing)
- Hingham to Grape to Peddock's to George's to Hingham (Reverses direction in a.m. and p.m.) (New/Modify Existing)
- Quincy/Fore River to Spectacle (New/Modify Existing)
- North Shore to George's Island (Existing/Phase I)

2.2 Inter Island Shuttle Loops:

- North Loop – George's to Gallop's to Lovell's to Peddock's to Pt. Pemberton/Hull (Modified Existing)
- South Loop – George's to Peddock's to Grape to Bumpkin to Peddock's to George's (Modified Existing)

2.3 Limited Service Route Options

- Federal Courthouse to Little Brewster (Existing)
  Alternating with
- JFK Library/UMass to Little Brewster (Existing)
- Squantum Point/Marina Bay to Thompson's Island to George's (New)
- JFK Library/UMass to Thompsons to Spectacle to Deer (New)

- **Limited Service Route Options:**
  - Federal Courthouse to Little Brewster

    Alternating with
  - JFK Library/U. Mass. to Little Brewster
  - Squantum Point/Marina Bay to Thompson to George's
  - JFK Library/U. Mass. to Thompson to Spectacle to Deer

Phase III – Long-Term (Figure 4.5)

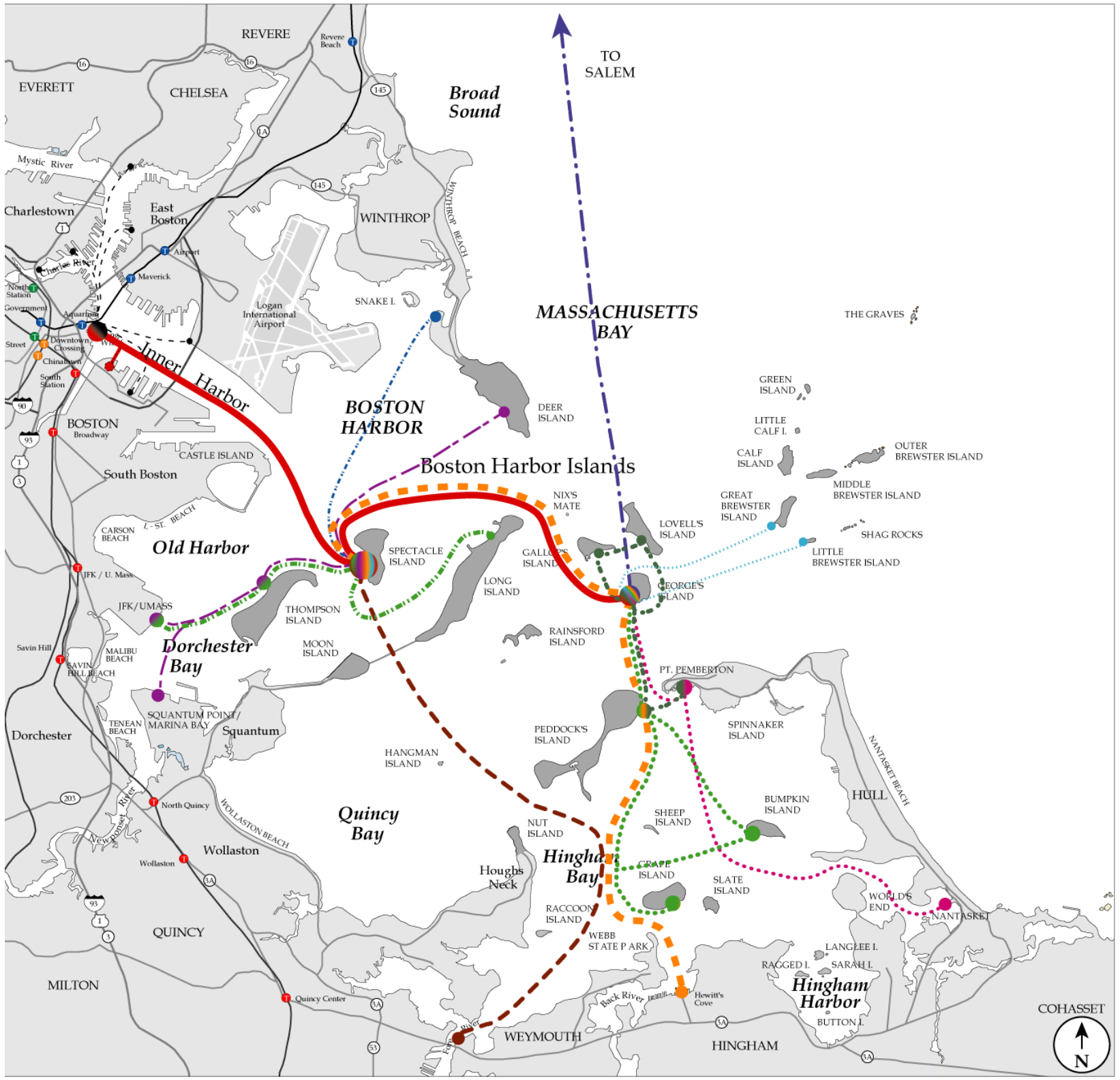
Operating Context – The long-term network would begin operation when major upgrades to services, attractions, and amenities significantly increase visitation and the Harbor Islands' operating season is extended. The startup date would be variable depending on the rate of ridership growth. The network would expand the Mid-Term routes with a variety of optional south shore and north shore gateway services, and modified shuttle loops to pick up new resources such as Long Island. Second priority new island ferry landings would be in place.

Proposed Management and Concessions Approach – The services would be provided as a concession to two or more operators for gateway and shuttle services. The shuttle service would remain attached to the still expanding Downtown Gateway operations contract, with proportional contributions from other operators. No fare would be charged for shuttle routes with operator providing all routes.

- **Gateway Routes – Core Contract:**
  - Long Wharf to Spectacle Island and George's Island (Existing/Phase II)
  - Hingham to Peddock's to George's to Spectacle Island (New – Mid- to Long-Term)
  - North Shore to George's (Existing/Phase II)
  - Quincy/Fore River to Spectacle (New/Modify Existing)
- **Gateway Routes – Optional:**
  - Squantum Point to Thompson to Spectacle to Deer Island (New)

    and/or
  - JFK/U. Mass. to Thompson to Spectacle to Deer Island (New)
  - Winthrop to Spectacle
  - Nantasket to Pt. Pemberton to George's
  - Long Wharf to Fan Pier to Spectacle
  - Other potential gateway routes as demand warrants including Inner Harbor, South and North Shore locations.

FIGURE 4-5: BOSTON HARBOR ISLANDS GATEWAY AND INTER-ISLAND LOOPS (PHASE III – LONG-TERM



3.1 Gateway Routes – Core Contract:

- Long Wharf to Spectacle Island to George's Island (Existing/Phase II)
- Hingham to Peddock's to George's to Spectacle Island (New – Mid to Long Term)
- Quincy/Fore River to Spectacle (New/Modify Existing)
- North Shore to George's Island (Existing/Phase II)

3.1B Gateway Routes – Optional:

- Squantum Point to Thompson to Spectacle to Deer Island (New) *and/or* JFK/U.Mass to Thompson's to Spectacle to Deer Island (New)
- Winthrop to Spectacle (New)
- Nantasket to Pt. Pemberton to Georges (Modified Existing)
- Long Wharf to Fan Pier to Spectacle (Modified Existing)
- Other potential gateway routes as demand warrants
  - Inner Harbor
  - South Shore
  - North Shore

3.2 Inter Island Loops:

- North Loop – Georges to Lovells to Gallops to Peddocks (to Pt. Pemberton) (Modify Existing)
- West Loop – Spectacle to Long Island to Thompson's (to JFK/UMass) (New)
- South Loop – Georges to Peddocks to Grape to Bumpkin to Peddocks to Georges (New/Modify Existing)

3.3 Limited Service Inter Island Loops:

- Georges to Little Brewster to Great Brewster (Paid Fare with Limited Schedule)

- **Inter-Island Loops:**
  - North Loop: George's to Lovell's to Gallops to Peddock's (to Pt. Pemberton) (Modify Existing)
  - West Loop: Spectacle to Long Island to Thompson (to JFK/U. Mass.) (New)
  - South Loop: George's to Peddock's to Grape to Bumpkin to Peddock's to George's (New/Modify Existing)
- **Limited Service Inter-Island Loop:**
  - George's to Little Brewster to/Great Brewster (Paid Fare with limited schedule)

Description of Boston Harbor Gateway Routes

Downtown Gateways

- **Long Wharf to George's Island (Existing – Short-Term Primary Island Service) –** As the most heavily used existing route, the route will need to be continued as a key dedicated hub route in the short term until Spectacle Island is opened. In the longer term, after Spectacle is opened, a direct service is likely to be needed periodically during peak summer weekend periods of Saturday and Sunday evening to handle the end of day crowds. With its immediate subway connection at Aquarium station to the Blue Line, the Long Wharf gateway will in all likelihood continue to be the most heavily used mainland departure point. During weekday commuter operations from the south shore, the Long to George's route can be combined or "piggybacked" with scheduled services from Hingham/Hewitts, Quincy/Fore River, Hull/Pt. Pemberton or other future routes that terminate at Long Wharf. During weeklong seasonal or commuter operations from the north shore, the Long to George's route can be combined or "piggybacked" with scheduled services from Salem, Lynn, Gloucester, or other origins that terminate at Long Wharf.

- **Long Wharf to Spectacle Island to George's Island (New – Mid-Term Hub Island Service) –** When Spectacle Island opens in 2002, the George's Island service could add a stop and provide frequent service to and from the Long Wharf gateway through all park seasons, and at all weekday and weekend periods. The segment of the route from Spectacle to George's would also serve as a high-capacity shuttle link. The mid- and long-term route would operate seven days a week during peak season and might be supplemented by peak weekend direct routes (Long to Spectacle and Long to George's). While the two hub stop service might be combined with other south or north shore commuter routes, such piggybacking may add too much trip time to the primary route to be effective. On weekends the vessel capacity may not be adequate to accommodate the combined loads

- **Long Wharf to Spectacle Island (New –Mid- to Long-Term Hub Island Service) –** When Spectacle visitation increases to current George's Island numbers, a dedicated direct service may be needed at peak summer periods, as well as during possible extended season and longer operating day periods. Since Spectacle Island represents a different type of park and recreation space and may have more extensive year-round visitor facilities, additional dedicated scheduled services may be needed. During the normal park operating season, such added services would not be considered to be a separate operation, but rather a scheduling variation of the base Long Wharf service.

- **Options for Long Wharf to Hub Island Services:**

  1. **Inner Harbor Feeder Shuttle Routes –** The use of shuttle routes to connect Inner Harbor neighborhoods with the primary services from Long Wharf to the Hub Islands will be necessary until island visitation demand warrants the addition of direct services from additional downtown gateways. This

will allow maximum scheduled service from the designated Long Wharf gateway. Existing shuttle routes providing links to Long Wharf include the seasonal Charlestown/Pier 1 service, the Charlestown/Pier 4 route with connections to Lovejoy/North Station and the Logan South/East Boston shuttle. Future shuttle connections could include links to World Trade Center, Federal Courthouse and Fan Pier in South Boston, Liberty Plaza/Central Square in East Boston, and a revived Cultural Loop service.

2. **Long Wharf to Fan Pier to Spectacle Island (New) –** Another variation of the basic Long Wharf Gateway service would be to include stops at Fan Pier at off-peak schedule intervals at such time as sufficient demand warrants. Like the previously described "piggyback" variations, this would not be a dedicated or separate route. This route is not recommended as part of the core ferry network, although it might be considered if demand warranted.

3. **Long Wharf to Spectacle to Deer Island (New) –** A year-round route from downtown to Deer Island might be needed to provide a transit option for MWRA employees after the construction phase ferry service is terminated. Inclusion of a stop at Spectacle during the park season would increase access, and the Deer Island link would allow for visitors to the MWRA operations, museum and recreation facilities. It appears unlikely that park facility visitation alone would justify a daily seasonal Deer Island service without the commuter rider component. Again, this route is not recommended as part of the core ferry network.

South Shore Gateways

- **Hingham (to Grape) to Peddock's to George's Island (Existing – Short- to Mid-Term, South Shore Hub) –** The current route provides the primary link to the Harbor Islands from the South Shore, and has typically carried approximately 15 to 20 percent of the island visitors. While there is dedicated parking for island visitors at the Hewett's Cove lot, the DEP rarely enforces any restrictions on weekday commuters. The future development masterplan for Hewitts Cove includes a slight increase in grade parking, and allows for doubling the capacity with future decking of the lot. However, the present parking facilities are sometimes oversubscribed during weekday commuter periods through the park season, and effectively can discourage park visitation from Hingham due to availability and distance of spaces from the dock. Weekend parking is more plentiful at present, but is likely to require enforcement measures in the future when seasonal marine recreation, shopping and restaurant users may be competing for spaces. On selected runs stops may be made at Grape Island to supplement the South Shuttle Loop. As described in the Long Wharf services, the Hingham to George's route may be piggybacked on scheduled commuter and weekend services from Hewitts Cove to Rowes Wharf as is currently provided, although it would be preferable to have the Long Wharf gateway as the downtown terminus. The route might well continue into the mid-term if demand for Spectacle is light in the first years after it opens. In this case, access from George's to Spectacle would be provided by the returning Downtown route.

- **Hingham to Peddock's to George's to Spectacle Island (New – Mid- to Long-Term) –** At some point after Spectacle Island opens and sufficient demand develops, the current George's Island service could add a Spectacle stop. The route would provide frequent service to the hub islands from the Hingham gateway through all park seasons, and at all weekday and weekend periods. The segment of the route from George's to Spectacle would also serve as a high-capacity shuttle link. The mid-or long-term route would operate seven days a week during peak season. While peak period summer weekend loads might occasionally require added service, the expected ridership combined with parking limitations is unlikely to require dedicated George's or Spectacle runs. Piggybacking the two stop service on the commuter runs would also be possible but may add too much trip time to the service. Current a.m. and p.m. stops at both Grape and Bumpkin would add too much time to a two hub service, and would best be handled by the south shuttle loop connections to Peddock's.

- **Quincy/Fore River to Spectacle (New Mid-Term) –** The south shore connection to Spectacle Island could initially be provided with a seasonal stop on the existing Quincy/Fore River route which currently connects to Long Wharf and Logan Airport.

- **Options/Variations on the South Shore Routes (New – Mid- to Long-Term):**

  1. Squantum Point/Marina Bay to Thompsons to Spectacle to Deer Island (New – Long-Term): The route would provide peak-season connections to the nearby Thompson and Spectacle Islands as well as the cross harbor Deer Island depending on demand. The Squantum Point site does not have direct or clear roadway access to the regional highway network, although it is well connected to Quincy via Quincy Shore Drive. New signage and possible exit ramp modifications would be desirable from Route I-93.

  2. Squantum Point/Marina Bay to Spectacle to Long Wharf (New – Long-Term): A variation of the first route might be a revival of the year-round commuter route from Marina Bay to Downtown with a stop at Spectacle, subject to the same road access improvements described above and new intermodal links. Two previous efforts to run the commuter service have failed due to poor ridership.

  3. JFK/U. Mass. to Thompson's to Spectacle to Deer Island (New – Long-Term): A seasonal route would provide access by MBTA Red Line and bus connections and by park and ride. The route would offer Gateway service to Spectacle and Deer Islands for Harbor Islands visitors, but could alternate with a year-round commuter connection for Deer Island employees.

  4. JFK/U. Mass. to Thompson's to Spectacle to Long Island (New – Long-Term): A variation on the JFK to Deer route would serve a dual seasonal function of Gateway to Spectacle and West Shuttle Loop.

  5. Squantum Point/Marina Bay to Thompsons to Spectacle to Long Island (New – Long-Term): A variation of the JFK to Deer Island route would connect Marina Bay to Deer Island as a seasonal Gateway service to Spectacle, and could alternate with the JFK route. It is unlikely that there would be sufficient demand to support the two as separate competing routes.

  6. Nantasket to Spectacle to Downtown (New – Long-Term): Another potential Gateway route would be a piggy-back on a restoration of the through service from downtown to Nantasket.

  7. Scituate to George's to Downtown (New – Long-Term): At such time as a proposed commuter service from Scituate to Downtown Boston is initiated, a seasonal connection to the Harbor Islands could be included to either George's or Spectacle depending on visitor demand.

North Shore Gateways

- **Salem to George's to Long Wharf (New – Short- to Mid-Term) –** The North Shore route, possibly for Central Wharf, adds a seasonal stop at George's when demand warrants. Access to George's would provide shuttle links to other islands including Spectacle. This north shore service would be demand responsive, and would need to be piggybacked on a through route to Downtown. A variation of this route would be to stop at Spectacle Island after it opens instead of at George's.

- **Options/Variations of North Shore Service (Mid- to Long-Term) –** As with the South shore there are numerous North Shore communities which would like to initiate or revive Gateway service to the Harbor Islands, including Lynn, Revere Beach and Winthrop.

1. Lynn to George's (New – Long-Term).
2. Revere Beach to George's to Downtown (New-Long-Term).
3. Winthrop to Deer Island to Spectacle to Downtown (New – Long-Term).

Gateway Route Phasing

The following table indicates recommended phasing and operations management arrangements by route. Only potential core routes are included in the table.

TABLE 4-1: PHASING OF NEW FERRY ROUTES – BOSTON HARBOR ISLANDS GATEWAY ROUTES

Proposed Route	Operations Management	Phase I – Short-Term	Phase II – Mid-Term	Phase III – Long-Term Option
1. Long Wharf to George's Island	BHI/NRA Concession	●	–	–
2. Long Wharf to Spectacle Island and George's Island	BHI/NRA Concession	–	●	●
3. Hingham to Peddock's Island to George's Island	BHI/NRA Concession with DEM	●	●	–
4. Hingham to George's to Spectacle Island	BHI/NRA Concession with DEM	–	–	●
5. Quincy/Fore River to Spectacle Island	BHI/NRA with MWRA and Harbor Express	–	●	●
6. Squantum Point/Marina Bay to Thompson Island to Spectacle to Deer Island	BHI/NRA Concession with MDC	–	–	●
7. JFK/U. Mass. to Thompson to Spectacle to Deer Island	BHI/NRA Concession with JFK/U. Mass.	–	–	●
8. Salem (or other North Shore Gateway) to George's to Long Wharf	BHI/NRA Concession with Salem	●	●	●

Description of Boston Harbor Islands Shuttle Routes

North Loops

The North Shuttle Loop has recently experimented with inclusion of stops at Peddock's Island and occasionally at Pt. Pemberton in Hull. These changes have proven popular with visitors and are recommended for inclusion in the proposed modified route.

- **George's Island to Lovell's Island to Gallops Island to Peddock's Island to George's Island (New – Short-, Mid- and Long-Term) –** Modifications to the current North Loop would include Peddock's Island with occasional links to Pt. Pemberton to provide a limited gateway connection.

South Loops

The recommended South Loops will evolve over the phases in response to changing South Shore Gateway routes to Spectacle Island., and growing ridership demand from the South Shore to the South Bay islands.

- **Hingham to Grape to Peddock's to George's (Existing – Short- and Mid-Term) –** Includes a.m. and p.m. links to Hingham/Hewitt's. Continuation of the current loop adaptation of the gateway route is proposed until the Hingham to George's route is extended to Spectacle Island in the long term. It is also expected that the Peddock's and George's ridership will continue to grow and will preclude the longer trips.

- **George's to Peddock's to Bumpkin to Grape to Peddock's to George's (Modify Existing – Mid- and Long-Term) –** Modification of current South Loop to provide more service to Peddock's and the other South Loop islands.

- **Nantasket to Pt. Pemberton to Peddock's and George's (New – Long-Term) –** An additional loop could be added to link with Nantasket Beach at such time as demand is sufficient, and the through Nantasket service to Boston is restored. The channels and approaches to the dock at Nantasket may require dredging depending on the type of vessel used.

West Loops

The West Loop demand will grow as Spectacle Island comes on line and as visitation builds in the mid- to long-term. Access from Spectacle to the North and South Loops via George's would be provided by the through gateway services. The West Loops would connect Spectacle with such islands as Thompsons, Long, and Deer at such time as there was enough visitation to warrant regularly scheduled routes.

- **JFK/U. Mass. to Thompsons to Spectacle to Long Island (New – Long-Term) –** The route would connect those islands around Spectacle to the JFK/U. Mass. dock, with its parking and transit connections.

- **Squantum Point/Marina Bay to Thompsons to Spectacle to Long Island (New – Long-Term) –** The route would connect those islands around Spectacle to a modified Squantum Point dock, with its parking lot.

- **Squantum Point/Marina Bay to Thompsons to Spectacle to Long Island (New – Long-Term) –** A variation would be to alternate the JFK departure with service to Squantum Point if demand warrants. Both JFK and Squantum Point would also provide limited Gateway connections to Spectacle Island.

Shuttle Loops Phasing

TABLE 4-2: PHASING OF NEW FERRY ROUTES – BOSTON HARBOR INTER-ISLAND SHUTTLE ROUTES

Proposed Route	Operations Management	Phase I – Short-Term	Phase II – Mid-Term	Phase III – Long-Term Variations
1. North Loop: George's to Gallops to Lovell's to Peddock's to George's	BHI/NRA Concession	●	●	●
2. South Loop: Hingham to Grape to Bumpkin to Peddock's to George's to Hingham	BHI/NRA Concession With DEM	●	●	–
3. South Loop: George's to Peddock's to Bumpkin to Grape to Peddock's to George's	BHI/NRA Concession	●	●	●
4. West Loop: JFK/U. Mass. to Thompson to Spectacle to Long Island to JFK/U. Mass.	BHI/NRA Concessions	–	–	●

4.3.2 Boston National Historical Park (BNHP – Charlestown)/Boston Harbor Gateways

A short list of enhanced and potential routes is described to provide future access choices for BNHP visitors. The Charlestown waterfront is best served by ferry connections since the commuter rail and subway lines do not stop within walking distance of the Navy Yard and the BNHP visitor attractions. The following route options cover a wide range of access needs. The core routes would be those which are currently operating. Potential new routes stopping at a new Pier 1 facility could be operated as concessions by BNHP based on landing rights. Others which connect to Pier 4 may not be under the direct influence of BNHP, but can also play important roles in providing alternative transportation access to the historic sites. Figures 4.6 and 4.7 illustrate the short- and mid-term route options described below.

- **Long Wharf to Pier 1 (Existing – Short- and Mid-Term) –** The current route is part of an inner harbor ferry tour which serves as a more direct shuttle connection to BHNP and the Constitution than is provided by the Pier 4 shuttle. Continuation of this seasonal route is recommended perhaps as part of a waterborne Freedom Trail experience ("Two if by Sea"). The route is expected to continue as a private concession operation.

- **Rowes to Long Wharf Pier 1 (Existing – Short-, Mid-, and Long-Term) –** Basically the same as the Pier 1 to Long service provided by a different operator. It is also recommended that this route continue. The two routes might eventually provide the Freedom Trail shuttle link to North End Park, if fares and schedules can be coordinated between the operators and the BNHP as concessionaire.

- **Pier 4 to Long Wharf (Existing – Short-, Mid-, and Long-Term) –** The existing shuttle provides a useful and less costly alternative to the Pier 1 routes, but requires a longer 10-minute walk to the Constitution and other park attractions. Since the shuttle operates year-round and longer hours than the Pier 1 service, it is recommended that the service be continues. Since the current MBTA managed route is subsidized by the Central Artery Project as a mitigation measure, it may be necessary for the BNHP to join other interests in encouraging its continuation.

FIGURE 4-6: BOSTON NATIONAL HISTORIC PARK – INNER HARBOR SHUTTLE ROUTES (PHASE I – SHORT-TERM)

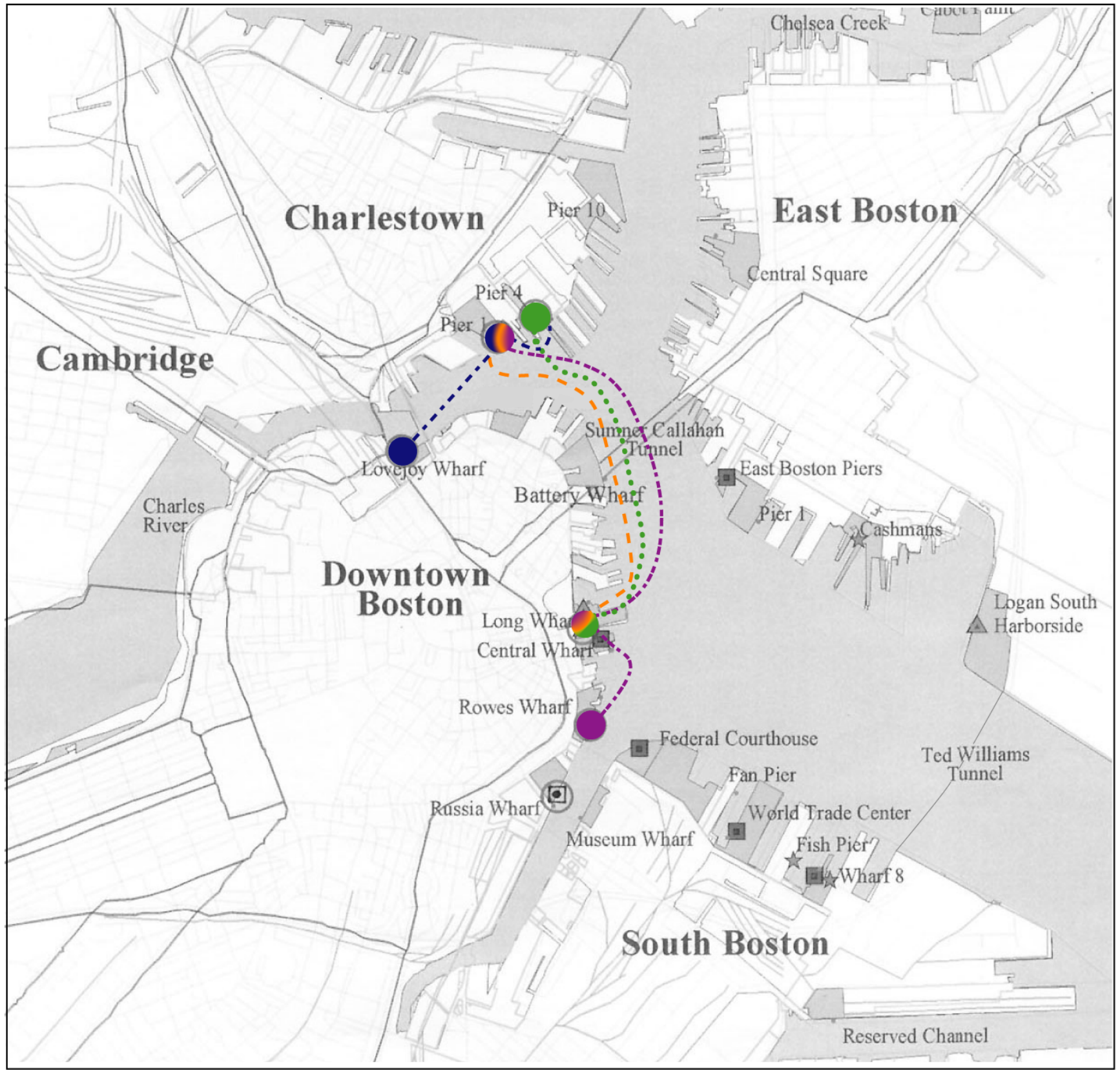
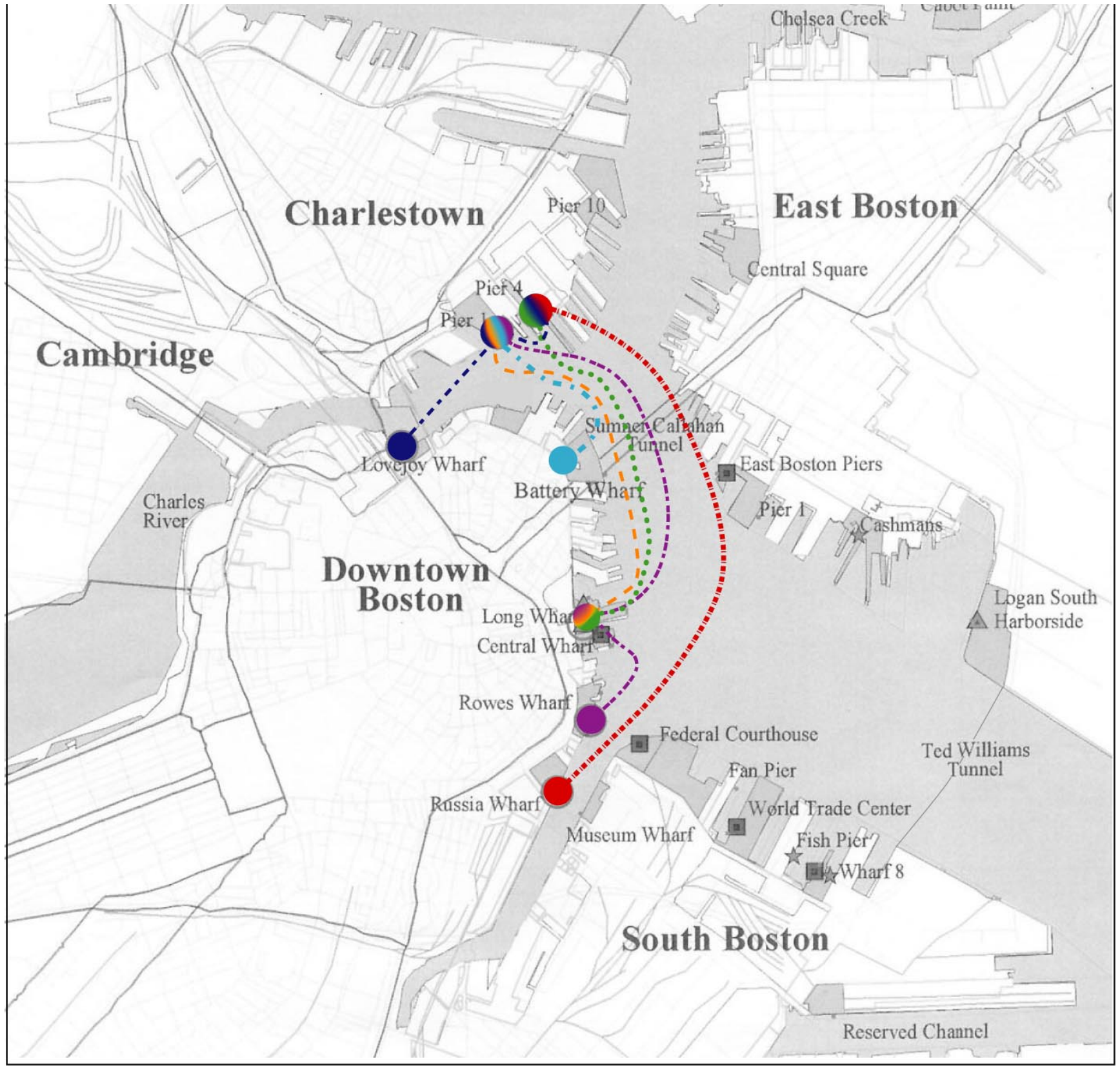


FIGURE 4-7: BOSTON NATIONAL HISTORIC PARK – INNER HARBOR SHUTTLE ROUTES (PHASE II – MID-TERM)



- **Pier 4 to Russia/South Station (New – Mid-Term) –** This shuttle route is scheduled for operation when the terminal is constructed near South Station. Another Central Artery mitigation service to be managed by the MBTA, the route will provide a useful link to South Station and provide good transit connections for metro area residents to the south and west. The BNHP is encouraged to support this service, particularly during weekend schedule periods to establish a new link to the major transit system.

- **Lovejoy/North Station to Pier 1 to Pier 4 (New – Mid- to Long-Term) –** Such a service could serve as an interim Freedom Trail link at such time as the pedestrian connection from the Harborwalk is completed as planned underneath the North Washington Street Bridge. The route could be a variation of the existing Lovejoy to Pier 4 service, and would use two existing docks plus the proposed new Pier 1 facility.

- **Pier 1 to North End Park/Battery Wharf (New – Long-Term) –** The route could be started when demand warranted, and when a new accessible dock could be added at either the North End Park site or at a nearby location such as the newly redeveloped Battery Wharf. The route would be more direct than either the current pedestrian connections or the interim Lovejoy connection.

BNHP Route Phasing

TABLE 4-3: PHASING OF NEW FERRY ROUTES – BOSTON NATIONAL HISTORICAL PARK (CHARLESTOWN)

Proposed Route	Operations Management	Phase I – Short-Term	Phase II – Mid-Term	Phase III – Long-Term Variations
Long Wharf to Pier 1	BNHP Concession	●	●	●
Rowes Wharf to Long Wharf to Pier 1	BNHP Concession	●	●	●
Long Wharf to Pier 4	MBTA	●	●	●
Russia Wharf/South Station to Pier 4	MBTA	–	●	●
Pier 1 to North End Park/Battery Wharf	BNHP Concession	–	–	●
Lovejoy Wharf/North Station to Pier 1 to Pier 4	MBTA With BNHP	–	●	●

4.3.3 Salem Maritime National Historic Site

The proposed new docking facility at Central Wharf would serve a variety of potential new ferry routes in addition to being used for a variety of other visiting vessels. While no specific routes are proposed for the Salem Maritime National Historic Site, several routes would seem to have greater likelihood of success than others. The new routes would need to be initiated by private operators and could be established with a concession agreement with the Salem NPS.

- **Salem Central Wharf to George's to Long Wharf (New – Mid- to Long-Term) –** The seasonal service could be maintained as the principal link from Salem to Downtown and from the North Shore to the Harbor Islands.

- **Salem/Central Wharf to Gloucester (New – Mid- to Long-Term) –** Of the potential Cape Ann routes, the Gloucester connection would seem to be the most promising as a seasonal service.

- **Salem to Beverly to Manchester to Gloucester (New – Mid- to Long-Term) –** As a variation of the Gloucester route, stops could be added on selected runs at the port towns of Beverly and Manchester en route.

Salem Maritime Route Phasing Options

TABLE 4-4: PHASING OF NEW FERRY ROUTES – SALEM MARITIME NATIONAL HISTORIC SITE

Proposed Route	Operations Management	Phase I – Short-Term	Phase II – Mid-Term	Phase III – Long-Term Variations
1. Salem/Central Wharf to George's to Long Wharf	SMNHS Concession	–	●	●
2. Salem/Central Wharf to Gloucester	SMNHS Concession	–	●	●
3. Salem/Central Wharf to Beverly to Manchester to Gloucester	SMNHS Concession	–	●	●

4.3.4 Adams National Historical Park (Quincy)/Boston Harbor Gateways

The Adams National Historical Park has an interest in developing a passenger water transportation link to downtown Boston and to the Harbor Islands which would replicate earlier routes of travel from the Quincy site. Two alternative candidate routes were identified which might be feasible. Each route would require an extension of the trolley route and synchronized schedules with vessel arrivals and departures to create a land and sea link. Each route would depend on multiple ridership markets to be financially feasible, since it is unlikely that the volume of Adams National Historical Park visitors arriving and departing by ferry would justify a dedicated service.

- **Quincy/Fore River to Spectacle to Long Wharf (New – Mid-Term) –** The current Harbor Express ferry service connects the Fore River shipyard site to Long Wharf and Logan Airport on a year-round, seven-day-a-week basis. The terminal is also immediately adjacent to the U.S.S. Salem, another historic site which attracts visitors to Quincy. (Note that a recent proposal would relocate the U.S.S. Salem to Squantum Point/Marina Bay during reconstruction of the Fore River Bridge.) There are several clear advantages of the Fore River ferry connection. The service is currently operating on a frequent schedule year-round at an affordable fare to Long Wharf. To provide a link to the Adams site it needs only a trolley and marketing to be operational. The disadvantage is that it does not follow the historic travel route.

- **Squantum Point/Marina Bay to Spectacle to Long Wharf (New – Long-Term) –** The alternative would be to secure dock privileges and parking from the MDC at the current Squantum Point park site at Marina Bay. The site at the mouth of the Neponset River is historically more likely to have been along an Adams

family water route. There are several challenges for the Squantum Point option. The MDC dock is not ADA-accessible and would need to be replaced. A new ferry route would need to be initiated at such time as sufficient ridership demand exists to justify service during at least the Spectacle Island season. Past attempts to operate a year-round weekday commuter service from Marina Bay have not been successful.

TABLE 4-5: PHASING OF NEW FERRY ROUTES – ADAMS NATIONAL HISTORICAL PARK

Proposed Route	Operations Management	Phase I – Short-Term	Phase II – Mid-Term	Phase III – Long-Term Variations
Quincy/Fore River to Spectacle to Long Wharf	BHI/NRA Concession with Harbor Express and MWRA	–	●	●
Squantum Point/Marina Bay to Thompson's to Spectacle to Long Wharf	BHI/NRA Concession with MDC	–	●	●

4.4 Boston Harbor Islands: Route and Vessel Operations Characteristics

4.4.1 Gateway Routes

The following operating characteristics were prepared to test the proposed routes against different vessel speeds and capacities. Table 4.6 includes all selected short-, mid- and long-term gateway routes. The following assumptions were made with regard to the route time calculations:

- Total travel time combines run time including slow speed zones, and stop times.
- Total travel time is for a single, one-way trip. Cycle time would be double the one-way trip time.
- Vessel speeds are for average cruising speed; i.e., a vessel's top speed would normally be 15 to 20 percent higher.
- Stop time includes 12 minutes for conventional vessels and eight minutes for new technology vessels, for higher capacity islands and gateways. Includes landing and departing.
- Stop times of 10 minutes for conventional vessels and seven minutes for new technology, vessels apply to lower capacity islands and gateways. Includes landing and departing.
- Landing and docking times assume that new, more efficient dock facilities are in place.
- Capacity requirements are adjusted for the difference between off-peak and peak seasonal operations.

TABLE 4-6: BOSTON HARBOR ISLANDS GATEWAY ROUTES – ROUTE AND VESSEL CHARACTERISTICS

Proposed Route (Number of Stops)	Phase	Route Distance (Nautical Miles)	Trip Time at 15 Knots (Run Time/Total Time)*	Trip Time at 20 Knots (Run Time/Total Time)*	Trip Time at 25 Knots (Run Time/Total Time)**	Vessel Speed/ Capacity Needed	Vessels Needed/ Maximum Headway
1. Long Wharf to George's Island (2)	1	6.4 nm	35 min	29 min	25 min	20 knots	2
			47	41	33	250/400	45 min
2. Long Wharf to Spectacle Island and George's Island (3)	2,3	7.0	38	31	27	20	2
			62	55	45	149/300	60
3. Hingham to Peddock's Island to George's Island (3)	1,2	4.6	26	22	19	20	2
			50	46	35	149/300	45
4. Hingham to George's to Spectacle Island (2)	3	8.8	43	34	29	20	2
			67	58	45	149/300	60
5. Quincy/Fore River to Spectacle Island (2)***	2,3	6.9	34	29	25	30	2
			46	39	33	149	60
6. Squantum Point/Marina Bay to Thompson Island to Spectacle to Deer Island (4)	3	5.6	30	25	22	20	1
			62	57	44	49/149	60
7. JFK/U. Mass. to Thompson to Spectacle to Deer Island (4)	3	5.1	26	21	18	15	1
			58	53	40	49/149	60
8. Salem (or other North Shore Gateway) to George's to Long Wharf (2)***	1,2,3	22	93	71	58	20	1
			105	83	66	149/250	3

* Conventional, existing vessels.

** New, low wake/wash, high maneuverability.

*** Assumes "piggybacking" on regularly scheduled through route.

4.4.2 Inter-Island Shuttle Routes

The following operating characteristics were prepared to test the proposed shuttle routes against different vessel speeds and capacities. Table 4.7 includes all selected short-, mid- and long-term inter-island shuttle routes. The following assumptions were made with regard to the route time calculations:

- Total travel time includes run time including slow speed zones, and stop times.
- Total travel time is for a complete shuttle loop.
- Vessel speeds indicated as options are for average cruising speed; i.e., a vessel's top speed would normally be somewhat higher (10 to 15 percent).
- A stop time of 10 minutes is assumed for conventional vessels and seven minutes for new technology vessels. This includes vessel berthing tie-up, unloading, loading, and casting off.
- Landing and docking times assume that new dock facilities are in place.
- Capacity requirements indicate the difference between off-peak and peak seasonal operations.

TABLE 4-7: BOSTON HARBOR ISLANDS SHUTTLE ROUTES – ROUTE AND VESSEL CHARACTERISTICS

Proposed Route (Number of Stops)	Phase	Route Distance (Nautical Miles)	Trip Time at 15 Knots (Run Time/Total Time)*	Trip Time at 20 Knots (Run Time/Total Time)*	Trip Time at 25 Knots (Run Time/Total Time)**	Vessel/Speed Capacity Needed	Vessels Needed
1. North Loop: George's to Gallops to Lovell's to Peddock's (5)	1,2,3	4.8 nm	29 min	19 min	14 min	20 knots	1
			69	59	42	49	60 min
2. South Loop: Hingham to Grape to Bumpkin to Peddock's to George's	1,2	5.0	30	20	15	20	1
			70	60	43	49	60
3. South Loop: George's to Peddock's to Bumpkin to Grape to Peddock's to George's	1,2,3	9.6	58	38	29	20	1
			108	88	64	49	90
4. West Loop: JFK/U. Mass. to Thompson to Spectacle to Long Island	2,3	8.7	52	35	26	20	1
			102	85	61	49	90

* Conventional, existing vessels.

** New, low wake/wash, high maneuverability.

4.5 Service Levels by Route

4.5.1 Gateway Routes

Service levels are calculated in hours of operation per year for Phases 1 and 2. Totals are shown in Table 4.8. Two options are shown for Gateway routes using 20 knot conventional vessels and using 25 knot advanced technology vessels (such as low wake and wash, water jet catamarans).

TABLE 4-8: BOSTON HARBOR ISLANDS GATEWAY ROUTES – SERVICE LEVELS BY ROUTE TYPE AND AREA SERVED

Proposed Route (Number of Vessels/Capacity)	Phase	Route Distance (Nautical Miles)	Seasons of Operation	One-Way/Round-Trip Time (with 20-Knot Vessel)	Hours of Service (Peak/Shoulder Season)	One-Way/Round-Trip Time (with 25-Knot Vessel)	Hours of Service (Peak/Shoulder Season)
A. Downtown Gateway Routes							
1. Long Wharf to George's Island (1@ 250 Shoulder, 2 @ 250 Peak)	1	6.4 nm	Peak, Spring, Fall	41 min	1,752 hr	33 min	1,752 hr
				82 min	824	66	824
2. Long Wharf to Spectacle Island and George's Island (1 @ 250 Shoulder, 2-3 @ 250 Peak)	2,3	7.0	Peak, Spring, Fall	55	2,220	45	1,752
				110	824	90	824
B. South Shore Gateway Routes							
3. Hingham to Peddock's Island to George's Island (1 @250 Shoulder & peak)	1,2	4.6	Peak Spring, Fall	46	632	35	632
				92	544	70	544
4. Hingham to George's to Spectacle Island	3	8.8	Peak Spring, Fall	58		45	
				116		90	
5. Quincy/Fore River to Spectacle Island (1 @ 250 Shoulder & peak)	2,3	6.9	Peak Spring, Fall	39	632	33	632
				78	544	66	544
6. Squantum Point/Marina Bay to Thompson Island to Spectacle to Deer Island	3	5.6	Peak Spring, Fall	57		44	
				114		88	
7. JFK/U. Mass. to Thompson to Spectacle to Deer Island	3	5.1	Peak Spring, Fall	53		40	
				106		80	
C. North Shore Gateway Route							
8. Salem (or other North Shore Gate-way) to George's to Long Wharf (2 @ 250)	1,2,3	22	Peak, Fall	83	158	66	158
				166	32	132	32
TOTAL	**1**				**3,942 hr**		**3,942 hr**
	2				**5,586 hr**		**5,118 hr**

4.5.2 Inter-Island Shuttle Services

Service levels are calculated in hours of operation per year for Phases 1 and 2. Two options are shown for Shuttle routes using 15 knot conventional monohull prop vessels and using 20 knot advanced technology vessels (such as low wake and wash, water jet catamarans).

TABLE 4-9: BOSTON HARBOR ISLANDS SHUTTLE ROUTES – SERVICE LEVELS BY ROUTE TYPE AND AREA SERVED

Proposed Route (Number of Vessels/Capacity)	Phase	Route Distance (Nautical Miles)	Seasons	One-Way/Round-Trip Time @ 15 Knots (Conventional)	Total Service Hours (Peak/Shoulder)	One-Way/Round-Trip Time @ 20 Knots (New Technology)	Total Service Hours (Peak/Shoulder)
1. North Loop: George's to Gallops to Lovell's to Peddock's (2 @ 49)	1,2,3	4.8 nm	Peak, Fall	69 min	876 hr	59 min	672 hr
				138	640	118	544
2. South Loop: Hingham to Grape to Bumpkin to Peddock's to George's (combined gate-way and shuttle loop)*	1,2	5.0	Peak, Fall	70	672	60	672
				140	224	120	224
3. South Loop: George's to Peddock's to Bumpkin to Grape to Peddock's to George's (2 @ 49)	1,2,3	9.6	Peak	108	672	88	672
				216	224	176	224
4. West Loop: JFK/U. Mass. to Thompson to Spectacle to Long Island (2-3 @ 49)	2,3	8.7	Peak	102	1,344	85	672
				204	672	170	224
TOTALS	**1**				**2,412 hr**		**2,112 hr**
	2				**4,428 hr**		**3,008 hr**

*Calculated as a Gateway route, not included in shuttle totals.

4.6 Estimation of Visitation by Phase and Market Area

In order to better understand the potential market demand for new water transportation services to serve the Boston Harbor Islands, estimates of future Harbor Island visitation were developed. Future visitation potential to the Boston Harbor Islands will be dependent on many factors, including marketing strategies, development or enhancement of island attractions and amenities, water transportation services, service speed, service schedule, and travel costs. Developing a complex visitation demand model to account for each of these factors was beyond the scope of this study. Generally, such models are derived from detailed user surveys that can be used to assess behavioral sensitivity to changes in existing conditions such as improved services and amenities. In the absence of such data, a simple growth trend model was developed to evaluate the relative demand for proposed water service connections based on assumed levels of development accounting for various service improvements and enhanced amenities. For each scenario, assumptions about annual visitation increases were made and applied to current visitation figures, yielding future projections. Based on observed visitation characteristics,

aggregate visitation was then distributed between the three Harbor Island Gateway areas – downtown, North Shore, and South Shore – as a basis for determining approximate market size for each Gateway and specific water transportation services from each Gateway. The trend model includes the period from year 2000 to year 2010.

4.6.1 Growth Assumptions

For the purpose of this analysis and consistent with the phasing of service improvements discussed in Section 4.3, build-out for each growth scenario assumes the following:

Low Growth – Only small increases in visitation and ridership are anticipated during the next one to two years, until such time as new attractions are implemented, and Spectacle Island is opened (expected in 2002). Low growth assumes incremental upgrades in programming and advertising and water transportation service levels consistent with Phase I and Phase II services as described in Section 4.3. Visitor focus would be on existing natural and historic resources with an emphasis on protecting resources. It is expected that the proportional split between downtown, South Shore, and North Shore gateways is likely to remain at approximately 85 percent, 10 percent, and five percent respectively, continuing recent patterns which have generally remained constant over the past five years.

Medium Growth – Increased visitation is anticipated with the addition of Spectacle Island and new attractions. Medium growth assumes incremental upgrades in programming and advertising and water transportation service levels consistent with Phase II service as described in Section 4.3. Spectacle Island would open in year 2002 and become a hub island. Peddock's Island would be developed with a conference center, opening in 2005. The visitor experience would focus on an exploration of nature and history. As in the Low-Growth scenario, the proportional split between downtown, South Shore, and North Shore gateways is likely to remain at approximately 85 percent, 10 percent, and five percent respectively.

High Growth – A greater increase in visitation is anticipated with the maturing of Spectacle Island, an extended season and the addition of new attractions. Spectacle Island would open in year 2002 and become a hub island. Peddock's Island would provide conference center facilities and experience substantial utilization. Major activities would be concentrated on larger islands and attractions would be developed to draw many visitors to the Islands, such as concerts, restaurants, etc. High-growth service assumes major upgrades in programming and advertising, and addition of new island resources, including Long Island. Water transportation service levels would be consistent with Phase III service as described in Section 4.3. The proportional ridership split between downtown and the north/south shore gateways may shift to a greater share of more south and north shore users. For the purposes of analyzing the High-Growth scenario, however, the downtown, South Shore, and North Shore gateways were assumed to be 85 percent, 10 percent, and five percent, respectively.

4.6.2 Methodology

In 1999, annual visitation to the Boston Harbor Islands, not including private watercraft, was 118,000. Annual growth rates, based on the development assumptions presented above, were calculated for each scenario as shown in Table 4.10.

TABLE 4-10: ANNUAL GROWTH ASSUMPTIONS

Year Ending	Low Growth	Medium Growth	High Growth
2000	3%	3%	3%
2001	3%	5%	5%
2002	5%	5%	5%
2003	5%	5%	8%
2004	5%	7%	8%
2005	5%	7%	10%
2006	5%	8%	10%
2007	5%	8%	10%
2008	5%	8%	10%
2009	3%	8%	10%
2010	3%	8%	10%

Under the low-growth scenario, projected growth in visitation over the 10-year period is 64 percent. By 2010, annual visitation would increase to 193,000.

Under the medium growth scenario, projected growth in visitation over the 10-year period is 110 percent. By 2010, annual visitation would increase to 248,000.

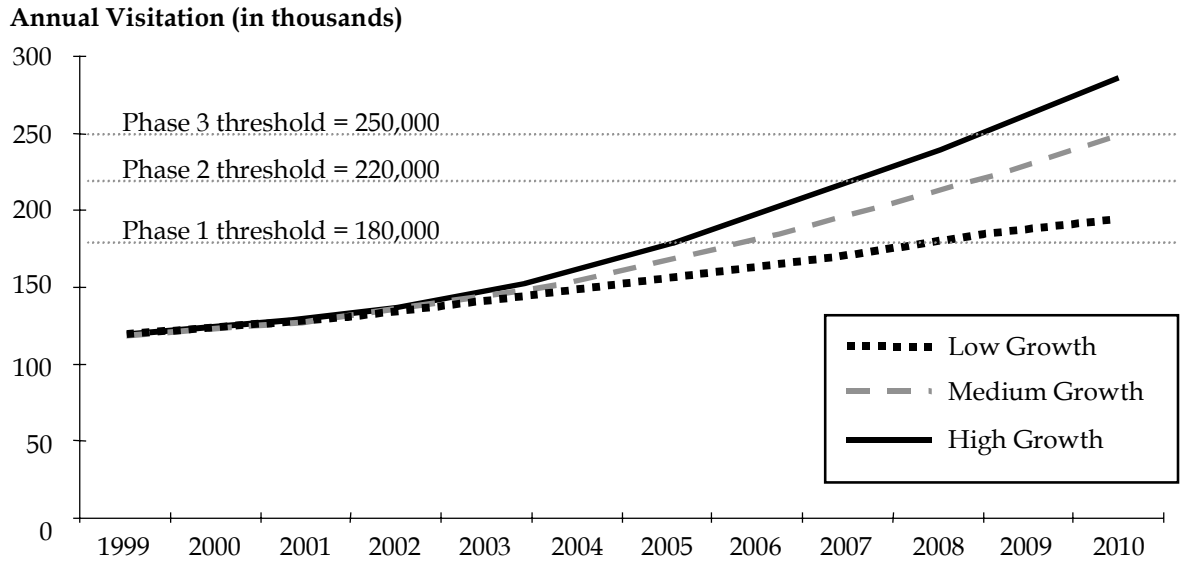
Under the high-growth scenario, projected growth in visitation over the 10-year period is 140 percent. By 2010, annual visitation would increase to 285,000.

Table 4.11 summarizes the visitation forecasts under each growth scenario, for years 2005 and 2010, for each market area. Figure 4.8 shows projected trends in visitation forecasts for each growth scenario over the next 10 years. The thresholds for Phase I, Phase II, and Phase III, as presented in Section 4.4, are also shown on Figure 4.8.

TABLE 4-11: ANNUAL VISITATION BY GATEWAY

	Low Growth		Medium Growth		High Growth	
	Year 2005	Year 2010	Year 2005	Year 2010	Year 2005	Year 2010
Downtown Gateway	131,750	164,050	141,950	210,800	148,750	242,250
South Shore Gateway	15,500	19,300	16,700	24,800	17,500	28,500
North Shore Gateway	7,750	9,650	8,350	12,400	8,750	14,250
Total	**155,000**	**193,000**	**167,000**	**248,000**	**175,000**	**285,000**

FIGURE 4-8: HARBOR ISLANDS VISITATION FORECAST



Geographic Distribution

Visitors using public water transportation to the Boston Harbor Islands will use one of the Gateway sites to reach the islands. Historical island visitation data indicates that about 85 percent of visitors arrive via water service from downtown Boston, 10 percent from the South Shore, and five percent from the North Shore. It is anticipated that the distribution of visitation over these locations will not change significantly even as visitation numbers increase. The focus to maintain existing gateway locations and not expand the number of gateway locations will tend to preserve the current geographic distribution. It is anticipated, however, that as visitation to the Islands increase, water transportation service will adapt to accommodate demand. For instance, if future conditions generate a demand higher than five percent from the South Shore, the water transportation system should be flexible enough to serve this demand. Table 4.12 summarizes the geographic distribution.

TABLE 4-12: GEOGRAPHIC DISTRIBUTION OF ANNUAL ISLAND VISITATION

Gateway Location	Percent
Downtown Boston	85%
South Shore	10%
North Shore	5%

Seasonal Distribution

The Boston Harbor Islands are generally opened from late April until early October. Based on current data, visitation peaks in the summer months with about 85 percent of annual visitors coming to the Islands between late June and early September. During the shoulder seasons, defined as late April to late June and early September to mid-October, about 15 percent of visitation occurs. Because this visitation pattern is dependent primarily on the weather, it will not change significantly in the future. Table 4.13 summarizes the seasonal distribution.

TABLE 4-13: SEASONAL DISTRIBUTION OF ANNUAL ISLAND VISITATION

Season	Percent
Off-Peak Season (shoulder) Late April to late June Early September to mid-October	15%
Peak Season Late June to early September	85%

Daily Distribution

To fully analyze operating and cost characteristics of the water transportation system, a daily distribution of visitation was developed based on existing data. During the off-peak season, the Islands are only open on week-ends with visitation evenly distributed on Saturdays and Sundays. During the peak season, the islands are opened daily. Weekends continue to have the highest visitation, at about 60 percent, with weekdays accounting for 40 percent of weekly visitation. Table 4.14 summarizes the daily distribution.

TABLE 4-14: DAILY DISTRIBUTION OF WEEKLY ISLAND VISITATION

Day	Percent
Off-Peak Season	
Saturday	50%
Sunday	50%
(no weekday service)	
Peak Season	
Monday	8%
Tuesday	8%
Wednesday	8%
Thursday	8%
Friday	8%
Saturday	30%
Sunday	30%

Table 4.15 shows the summary of projected annual, seasonal and daily visitation to Harbor Islands from each market area. Visitation figures are shown for year 2005 and year 2010.

TABLE 4-15: VISITATION BY GATEWAY (ANNUAL, SEASONAL, AND DAILY

	Low Growth		Medium Growth		High Growth	
	Year 2005	Year 2010	Year 2005	Year 2010	Year 2005	Year 2010
Downtown Gateways						
Annual Visitation	131,750	164,050	141,950	210,800	148,750	242,250
Seasonal Visitation						
Peak season (late June through early September)	111,988	139,443	120,658	179,180	126,438	205,913
Off peak (shoulder season)	19,763	24,608	21,293	31,620	22,313	36,338
Daily Visitation						
Peak season weekend day	3,054	3,803	3,291	4,887	3,448	5,616
Peak season weekday	814	1,014	878	1,303	920	1,498
Off-peak season day (weekends only)	760	946	819	1,216	858	1,398
South Shore Gateways						
Annual Visitation	15,500	19,300	16,700	24,800	17,500	28,500
Seasonal Visitation						
Peak season (late June through early September)	13,175	16,405	14,195	21,080	14,875	24,225
Off-peak (shoulder season)	2,325	2,895	2,505	3,720	2,625	4,275
Daily Visitation						
Peak season weekend day	359	447	387	575	406	661
Peak season weekday	96	119	103	153	108	176
Off-peak season day (weekends only)	89	111	96	143	101	164
North Shore Gateways						
Annual Visitation	7,750	9,650	8,350	12,400	8,750	14,250
Seasonal Visitation						
Peak season (late June through early September)	6,588	8,203	7,098	10,540	7,438	12,113
Off-peak (shoulder season)	1,163	1,448	1,253	1,860	1,313	2,138
Daily Visitation						
Peak season weekend day	180	224	194	287	203	330
Peak season weekday	48	60	52	77	54	88
Off-peak season day (weekends only)	8	11	9	14	10	16
TOTALS	154,250	193,000	167,000	248,000	175,000	285,000

Notes:

Peak season is defined as late June through early September.

Off-peak season is defined as late April through late June and early September through early October.

During peak season, it is assumed service is available weekdays and weekends.

During the off-peak peak season, it is assumed service is available weekends only.

Chapter 5: Dock Site Evaluation and Concept Designs

The preceding section discussed options for water transportation services based on overall service plans for connecting services between various landside departure points and destinations throughout Boston Harbor and the Harbor Islands. The following section discusses specific standards which must be considered in the development of individual dock and pier facilities at each of these locations. Specific needs are described in relation to each of the priority sites and, at the end of the section, detailed concept plans for the development of dock and pier facilities are presented.

5.1 Dock Site Conditions and Design Standards

5.1.1 Site Conditions Checklist

Navigation and Weather

The specific siting and design of dock facilities need to carefully consider prevailing navigation and weather conditions at each site. The dock sites being considered at the different park units involve a broad range of conditions from the protected and deep water inner harbor sites at the BNHP, to the more exposed sites at various Harbor Islands in the outer harbor area and at the Brewsters. The floating docks need to be sited for ease and safety of vessel landings, while at the same time being built to withstand the rigors of winter storms and extreme weather conditions from hurricanes. Fortunately many of the sites recommended on the short list have accommodated docks for many years and have a long navigational history to use as a base. The following navigation and weather factors need to be considered in the final siting and design of the dock facilities.

- Prevailing wind direction and speed, which creates windage on vessel berthing.
- "Fetch" or distance/direction of exposed open water conditions relative to a specific dock site, which can create localized wave conditions.
- Tide range; average and extremes.
- Channel locations and vessel traffic.
- Wave height range and conditions – average and extreme, seasonal changes, and local variations, such as the "bending" of waves around Deer Island from the harbor entrance.
- Ambient wave action within the harbor.
- Water depths and geotechnical data on bottom conditions affecting pile support conditions.
- Siltation patterns and dredging needs.
- Vessel specifications must meet combined navigation and weather conditions.
- Seasonal ferry use patterns and weather variations.

Environmental[1]

The specific siting and design of dock facilities needs to be compatible with environmental conditions at each site. Dock designs will need to be approved through the state and local permitting and regulatory procedures.

Impact on Wetlands and Wildlife Habitat

The siting of shoreline terminals, parking, and infrastructure essential to support ferry operations can potentially impact wetlands and wildlife habitat. As a result, docks should be sited and the system should be operated to: 1) avoid any significant impacts on existing wetlands, habitat, and wildlife; 2) assure no net loss of wetlands, habitat, and wildlife; 3) support and promote the intent of the National Park Service Unit goals, and 4) expand the total acreage of wetlands and habitat in the ecosystem should mitigation become an appropriate remedy as a result of an environmental assessment process.

Impact on Native Species

The long history of ferry operations both nationally and in Boston Harbor establishes that ferries have very little if any adverse impact on aquatic mammals, birds, fish, crustaceans, mollusks, or lower animal species, nor on species of aquatic plant life. In fact, the primary environmental threats to aquatic species are land vehicle operations and agriculture.

Water Quality

Ferry refueling and other operations involving the handling of potentially harmful products and materials are carried out under strict U.S. Coast Guard and Federal Environmental Protection Agency regulations prohibiting water pollution. It is also noteworthy that, in addition to federal regulations, industrial and marine facilities and operations are subject to Commonwealth of Massachusetts and local environmental regulations imposed by such agencies as the city of Boston Environment Department, water quality boards, and departments of fish and game.

Vessel-Related Environmental Factors

Wake and Wash

Wake and wash levels are regulated in harbor areas where the city's or towns have a harbormaster or other regulating body. The wake, or wash, behind a vessel can present serious problems. Shoreline waves generated by passing vessels should not significantly exceed the size and energy of naturally occurring waves in the area under consideration. Allowing for seasonal weather variations and the impacts of tidal action and currents, this is a proper, conservative yardstick. Special care needs to be taken by boat operators, especially during moon tides and high sea conditions, to minimize wake-caused erosion of fragile island resources. This is especially the case at the Hingham Gateway.

Reliable technical information is available on previous and existing vessels capable of good speed with minimal wakes. In addition new hull designs continue to be developed, particularly for high-speed vessels, expanding the scope of possible solutions. As new vessels are put into service, the wake-wash characteristics are being documented and serve as a database for new applications.

The basic question of speed is a vital consideration in the optimization of every ferry system plan. For strictly recreational travel purposes, high-speed ferries (30 plus knots) are not appropriate to serve the Boston Harbor

[1]Much of this environmental conditions discussion was adapted from: Society of Naval Architects and Marine Engineers, "Ferry Transit Systems for the Twenty-First Century," prepared for the Ad Hoc Ferry Transit Environmental Impact Panel, January 10, 2000, Jersey City, NJ.

Islands. Furthermore, the required routes may be too close to sensitive shorelines to permit, as an example, some of the current fast (in excess of 30 knots) catamaran designs. The wake problem on such routes can be diminished with less expensive and modestly powered conventional vessel designs, as long as the hull shapes are optimized for lower wakes.

Air Quality and Engine Emissions

Modern ferry engines generate exhaust emissions comparable to that of their counterparts in other transportation modes. Diesel powered ferries generate emissions similar to diesel powered trucks, buses, and locomotives. Engine emissions of concern to human health and the environment include NOx and sulfur oxides (SOx), both of which are serious constituents of smog; dioxins; global warming (greenhouse effect) gases; and particulate matter (soot). Many of these harmful products of combustion have been mitigated, particularly over the past 30 years, by advances in engine design and combustion technology, fuel refining, and the practical application of post-combustion equipment such as catalytic converters for exhaust systems. NPS policy strives for the least negative impact on the environment, and supports sustainable design and renewable energy in all aspects of park operations. BHI is working toward long-term ferry operation solicitations in support of this goal.

Emission Reduction Developments in Fuels

Compressed natural gas (CNG) shows great promise as the most environmentally benign fuel for future internal combustion engines. It can probably be utilized in buses, locomotives, and ferry vessel engines with identical beneficial impact on exhaust emissions. Experimental programs have already been initiated to demonstrate the practical feasibility of both CNG powered buses and vessels and to develop specifications for safe fuel storage, handling, and replenishment procedures. In fact, because of their smaller number, larger size, repetitive routes, and simpler terminal fueling facilities, ferries may prove to be better candidates for CNG fuel than bus fleets.

A natural gas powered ferry is currently being successfully operated by Tidewater Regional Transit in Norfolk, VA. Fraser River ferries in British Columbia have been operating on CNG since the early 1980s. In response to environmental quality concerns, construction of three new large ferries powered by liquefied natural gas (LNG) has begun in Norway. Additionally, the environmental impact of three proposed natural gas powered ferries was considered in a May 1999 study for Boston, Massachusetts.

If such alternative fuels are adopted for the ferry fleet, the location of fueling stations will need to be included in regional facility planning. It is most likely that such service facilities would be located in the Inner Harbor area where they would be accessible to the full ferry fleet.

Ferry Noise

Ferry engines generate noise like all other engines. Generally speaking, ferry engines are comparable in noise to, or at least no worse than, trucks, buses, locomotives, and aircraft. Engine noise level management, like wake management, is a consequence of vessel design and operating procedures. Modern noise abatement technology allows a wide variety of vessel options to achieve specified limits, and must be applied during the design optimization process to achieve satisfactory results. Recent high-speed ferry designs have been particularly successful in this regard, as simply one more important element of passenger comfort. Moderate speed vessels can benefit from similar treatment.

5.1.2 Dock Requirements and Design Standards

The dock requirements for different sites share many common needs. The following set of design standards are based on those prepared for the Boston Harbor Islands National Park Area Water Transportation Study (1999) and for the Boston Inner Harbor Passenger Water Transportation Plan (2000).

Piers and Floats

Different vessels have varying float and ramp needs. All of the following are likely to be needed at many of the mainland gateway and island terminals:

- Water taxi and public landing: approximately 2'-0" (can be provided with a smaller float and gangway from a higher 4'-0" float).
- Side loading ferries: approximately 3'-6" to 4'6" (average freeboard height of 4'-0" as a standard base float height meeting the needs of the majority of the Boston fleet).
- End loading catamarans: approximately 6'-0" to 6'-6" (these can be built up from a lower freeboard float).

Dock and ramp equipment should include the following:

- Lighting and convenience outlet;
- Non-skid surfaces;
- Covered gangways and ramps;
- Bollards, cleats, fenders, etc., for vessel tie-up;
- Railing system on larger floats;
- Life preservers;
- Ladder from water to float surface; and
- Schedule and information board.

Deck and pier equipment should include the following:

- Lighting and convenience outlet;
- Non-skid surfaces on approach paths;
- Covered waiting area;
- Schedule and information board;
- Emergency phone; and
- Flexible signage.

ADA Access

Few of the existing docks serving the Harbor Islands, BNHP, Salem, or Quincy meet either ADA or Massachusetts Architectural Board (MAAB) marine facility standards. The following requirements apply for access from deck level to transfer float:

- Access to meet MAAB and ADA requirements from sidewalk to deck level to boarding areas, usually floats, for average tide range of 9.5 feet is required for all terminals except service layover terminals, or those used by vessels under 40 feet in length or 20-passenger capacity. This includes all signage, wayfinding, and in-

formational systems. Several different gangway, ramp, and lift options may be used to accommodate different site conditions:

- Moveable (maximum slope = one in 20) and fixed ramps (maximum slope = one in 12);
- Moveable (maximum slope = one in 20) and elevator; and
- Moveable (maximum slope = one in 20) and rampalator.

- Where ADA access options 2 and 3 (limited capacity systems) are used, universal design access will also be provided from sidewalk to deck level to boarding level for all patrons; use of ramps with gradual slopes to accommodate travelers with luggage, elderly and parents with children for all scheduled ferry services. This requires ramp slopes not to exceed one in 12 for 10'-0" tide range.
- Gangway and ramp widths should also be sized for peak loading conditions. For example, at George's Island, a major hub, ramps, and gangways should be a minimum of five feet clear in width to allow two persons to pass comfortably.

Breakwater/Wave Attenuation

For more exposed dock locations, breakwaters or wave attenuation devices may be needed for access by ferries and smaller vessels, such as are found at George's Island and Spectacle Island in Boston Harbor. Dock designs will need to determine the benefit of such wave attenuators on a site by site basis as they affect the operation of various sized ferries.

Dredging

It is unlikely that docks will be located where significant dredging will be needed within the Boston Harbor area. In part, this is because the costs of sampling, analysis, and disposal of dredging spoils have become prohibitive. Future ferry docks will only be sited in locations where dredging is already being accomplished for other purposes (such as deep-sea vessel traffic) or where the water is of sufficient depth to sustain ferry operations without dredging.

Landside Support

In conjunction with the dock structure, certain amenities are required at each site in order to make the facility fully functional for the typical visitor. For mainland gateway sites, this includes provision of public transportation services and parking facilities. Most mainland sites will also require ticketing services. All sites should provide adequate waiting areas, information and directional signage in addition to pedestrian accessibility.

Dock Maintenance

The design of docks should include considerations of levels and schedules of maintenance and storage. Managing dock facility maintenance and storage for Harbor Island sites, for example has been a significant component of year-round resource deployment including staff and budget. Dock designs should include materials, component parts, and maintenance programs that simplify NPS and partner responsibilities from current practice.

5.2 Dock Site Conditions Analysis by Park Unit: Summary of Sites and Issues

The following section summarizes specific conditions and site characteristics which must be addressed in the development of dock and pier designs for individual sites. Much of this material is presented in preceding sections. The following summary is intended to identify key issues relevant to dock design at each of the sites selected for concept plan development.

5.2.1 Boston Harbor Islands National Park Area

Boston Harbor Islands – Island Sites – Island dock locations selected for concept-level dock design include the following:

- George's Island;
- Spectacle Island;
- Lovell's Island;
- Gallops Island;
- Bumpkin Island; and
- Grape Island.

Boston Harbor Mainland Gateways ("feeder" sites) – Sites selected for evaluation as mainland gateways include the following:

- Long Wharf North;
- World Trade Center;
- Pier 4/Navy Yard;
- Hingham;
- Hull/Pt. Pemberton;
- Quincy Fore River;
- Deer Island;
- JFK/U. Mass.;
- Marina Bay;
- Lynn;
- Salem/Central Wharf; and
- Salem/Blaney Street.

TABLE 5-1: SUMMARY OF DOCK SITES AND ISSUES – BOSTON HARBOR ISLANDS

Dock Site	Existing Condition	Dock/Island ADA Access	Water Sheet Exposure	Dock Capacity Needs	Priority
George's Island	• Existing basin and docks – poor condition	• Limited access with A-frame • Island access good	• Long fetch to SW • Needs wave break repair	• Ferry • Shuttle • Private • MDC Staff • Service	• Hub Island • High-Priority • Phase 1
Spectacle Island	• New pier • New Marina floats	• Proposed mechanical ramp – needs additional ramps • Island full access	• Long SW fetch • Needs wave break	• Ferry • Shuttle • Private • DEM Ranger • Service	• Hub Island to open 2002 • High-Priority • Phase 2
Lovell's Island	• Old Pier and floats – poor condition • Pier extension needed • No access past season	• Pier needs ADA access • Island needs boardwalk links for full access	• Currents causing shoaling • Limited fetch exposure to east	• Shuttle • MDC • Service • Dinghy dock	• Secondary Island • Medium Priority • Phase 1
Gallops Island	• Good pier condition • Poor floats and ramps • Access limited by asbestos	• Pier needs ADA access • Island access very limited	• Protected pier location • Limited fetch exposure	• Shuttle • DEM • Service • Floating ranger station • Dinghy dock	• Secondary Island • Medium Priority • Phase 2
Bumpkin Island	• Fair pier condition • Poor floats and ramps	• Pier needs ADA access • Island access very limited	• Exposed landing conditions • Long SE/SW • Fetch	• Shuttle • DEM • Service • Floating ranger station • Dinghy dock	• Secondary Island • Lower Priority • Phase 2
Grape Island	• Fair pier condition • Poor floats and ramps	• Pier needs ADA access • Island needs hard surface trail links for full access	• Protected pier location • Limited fetch exposure	• Shuttle • DEM • Service • Floating ranger station • Dinghy dock	• Secondary Island • Medium Priority • Phase 2

TABLE 5-2: SUMMARY OF DOCK SITES AND ISSUES – BOSTON HARBOR ISLANDS MAINLAND GATEWAYS

Dock Site	Existing Condition	Dock/Upland ADA Access	Parking Available	Transit Links Available	Priority
Long Wharf North (1)	• New private berths at BHC • Public BHI gateway design complete 11/1/00	• Current dock not ADA compliant • New gateway will be compliant • Upland compliant	Various public parking decks (expensive)	Adjacent Blue Line (Aquarium); Trolley links; Excellent pedestrian links to downtown and waterfront	(1) High-priority; Requires completion of new BHI Gateway
World Trade Center (2)	• Current MBTA dock too small • Shuttle to Long potential	• Dock – No • Upland – Yes	Various public decks (moderate to expensive)	No; future Silver Line at 7 to 10-minute walk	(3) Requires building of proposed new docks
Pier 4/ Navy Yard	• Existing MBTA dock shuttle to Long	• Dock – Yes • Upland – Yes	No parking	No; good pedestrian links to Charlestown and BNHP	(2) Requires continued shuttle link to Long Wharf
Hingham	• Plans for accessible dock • Existing routes to George's and Rowes Wharf	• Dock – No • Upland – Yes	DEM parking along with MBTA commuter	Limited MBTA bus service	(1) Requires implementing of designed dock modifications, and parking management
Hull/Pt. Pemberton	• New dock • Existing commuter routes to Long Wharf	• Dock – Yes • Upland – Yes	Grade parking	Limited seasonal trolley link to Nantasket	(2) Routes could utilize existing facilities
Quincy/ Fore River	• Existing Harbor Express docks and parking	• Dock – Yes • Upland – Yes	Harbor Express lot	Limited MBTA bus service	(2) Requires agreement with operator, Harbor Express
Winthrop/ Deer Island	• Deer Island dock exists, but is not ADA compliant • Study complete for new Winthrop ferry landing • Existing worker ferry service to Deer to end	• Dock – No • Upland – Yes	Limited visitor parking at Deer Island	Limited MBTA bus service	(3) Requires ADA modification of existing Deer Island or new Winthrop dock and parking
JFK/ U. Mass.	• Dock exists, but not ADA-accessible • No existing ferry service	• Dock – No • Upland – Yes	JFK/Archives lot	Bus Link to Red Line at JFK/ U. Mass.	(3) Requires ADA dock mods
Marina Bay	• Dock exists, but is not ADA-accessible • Existing worker ferry service to Deer to end	• Dock – No • Upland – Yes	MDC lot	No	(3) Requires ADA dock mods
Lynn	• Dock exists, but not ADA-accessible • No existing ferry service	• Dock – No • Upland – Yes	Grade lot	Links to Blue line and Commuter Rail	(3) Requires ADA dock mods
Salem/ Blaney Street	• Dock exists, but not ADA-accessible • Existing ferry service to Long Wharf	• Dock – No • Upland – Yes	Blaney Street lot	No	(2) Requires ADA dock mods. Potential seasonal stops at George's or Spectacle

5.2.2 Boston National Historical Park (Charlestown)

Sites selected for concept-level dock design and further evaluation include the following:

- Pier 1; and
- Pier 4.

TABLE 5-1: SUMMARY OF DOCK SITES AND ISSUES – BOSTON NATIONAL HISTORICAL PARK

Dock Site	Existing Condition	Dock/Upland ADA Access	Existing/ New Routes	Vessel Capacity Needs	Priority and Phase
Pier 1	• Poor condition – needs replacement	• Dock – No • Upland –Yes	• Existing seasonal routes to Rowes and Long	• 49-100 pass	(1) Requires new accessible dock and ramp system
Pier 4	• Good condition; needs expansion for additional services	• Dock –Yes • Upland – Yes	• Existing shuttle service to Long Wharf and Lovejoy	• 49-100 pass	(2) Requires future expansion of berthing with added 100' float

5.2.3 Salem Maritime

The site selected for concept-level dock design and further evaluation is the following:

- *Central Wharf; and
- Blaney Street

(The Blaney Street facility is included for comparison purposes.)

TABLE 5-1: SUMMARY OF DOCK SITES AND ISSUES – SALEM MARITIME PARK

Dock Site	Existing Condition	Dock/Upland ADA Access	Water Sheet Limits	Vessel Capacity Needs	Priority and Phase
Central Wharf	• No Dock	• Low Deck Height	• Protected	• 49 to 149 for Gloucester	(2) Requires new dock or city-owned dock and new service
Blaney Street	• Private dock • 7 to 10-minute walk from SMP • Existing seasonal route to Long Wharf	• Existing Dock – No • Upland – No • Gravel parking area	• Protected	• 149 to 300 for BHI and Boston routes	(2) Requires ADA access and route modifications

5.2.4 Adams National Historical Park (Quincy)

Sites selected for concept-level dock design and further evaluation include the following:

- Quincy/Fore River; and
- Squantum Point/Marina Bay.

TABLE 5-1: SUMMARY OF DOCK SITES AND ISSUES – ADAMS NATIONAL HISTORICAL PARK (QUINCY)

Dock Site	Existing Condition	Dock/Upland ADA Access	Water Sheet Limits	Vessel Capacity Needs	Priority and Phase
Quincy/ Fore River	• Existing dock • Private ownership by operator • 900-car parking • Daily ferry service to Logan Airport and Long Wharf	• Dock: Yes • Upland: Yes • Terminal facilities fully accessible	• Protected slip at Quincy Shipyard • Temporary relocation beyond Route #A bridge construction	• 149-Passenger catamaran • Will require 3 vessels (1 + 2 existing)	(2) Requires operation and management agreement with current operator – Harbor Express
Squantum Point/ Marina Bay	• Existing dock • Owned by MDC and/or Modern Continental • Existing construction commuter service to Deer Island • 1,000-car parking area	• Dock: No • Upland: Yes	• Long fetch to north • Narrow approach channel	• 49-100 pass. Catamaran or monohull	(2) Requires addition of accessible float with ramps and gangways

5.3 Dock and Pier Facility Concept Designs

A series of concept designs for dock and pier facilities were prepared for specific sites discussed in the preceding section. These designs and the overall approach to their design is discussed in the following section. The designs are shown in Figures X-001A through X-012, presented at the end of this section.

5.3.1 Dock Site Design – A Standardized Component Approach

Objectives

The dock design challenges at the four park units suggested the need for a consistent system of access meeting MAAB standards in similar tide and navigation conditions. In considering the needs for dock facilities in different settings in response to interviews with NPS staff and site visits to the facilities, a set of objectives addressing common needs was established.

- A consistent dock access system from vessel to upland meeting MAAB standards would be beneficial within each park unit as well as between sites at different units. Currently there are too many different design solutions among those docks that meet accessibility requirements.
- A cost effective solution to the access and dock needs is needed in terms of capital costs. Funding for dock construction is scarce and the dollars available should secure the maximum number of dock installations for each phase of construction.

- The dock designs should optimize maintenance requirements for the different sites, particularly those island sites where maintenance and service poses more challenges.
- Dock systems should be durable enough to withstand extreme weather patterns during hurricane events and winter storms.
- Dock capacity should meet current and projected visitor demands, and should allow for expansion as demand increases.
- Dock solutions for ADA/MAAB access are likely to be quite different in character then current non-accessible installations.
- Provide a dock facility with berthing capacity and freeboard height to meet the needs of the largest number of vessels in the Boston fleet. The boarding height of most vessels is between 3'-6" an 4'6", or a median of 4"-0".
- Reuse existing pier structures to the degree feasible: avoid building new or replacement piers. The benefits include cost-effectiveness, reduction in landside changes, and ease of permitting.

Proposed Dock System Description

The concept that evolved was to explore a component dock system with a kit of interchangeable parts to be adapted to as many different site conditions as possible. The standard base unit design is shown in Figures X-006 and X-007. A typical plan is shown in Figure X-002, the application to Gallop's Island. The system developed by the project team consists of the following components:

- Standard steel barge base: 26' x 70' with a 4'0" freeboard height.
- Steel pile supports for the barge independent of pier structures: barge and fixed ramps would generally remain in the water year-round, but could be easily detached from the piles whenever needed for maintenance or remote storage.
- Fixed aluminum ramps on the barge consisting of 3 x 25' segments with a constant one in 12 slope.
- Moveable aluminum gangway at 100' in length: the long aluminum truss allows for a maximum slope of one to 20 during the normal tide range of 9'-8".
- Miscellaneous barge fittings including railings, cleats, signs, lifesaving equipment, etc.
- Pile supported platform connecting to existing piers, and supporting the gangway.
- (Optional) A-frame lift or davits on the pier to hoist the 100' gangway during the winter or bad weather (Figures X-011 and X-012).
- Add-on elements to the base structure might include a 2'-0" freeboard float for smaller vessels, and/or additional 4'-0" freeboard floats to expand dock capacity when needed.

Maintenance and Upkeep

The component system would have many advantages in terms of maintenance. The steel barge system would have extra thick steel plate and would require major maintenance on a 10-year cycle. It is recommended that all park units using the component dock collaborate on maintenance programs, using their collective equipment, staff, and financial resources to maintain the facilities. An extra barge unit might be kept on hand to be inter-

changeable with any of standard dock installations to allow the 10-year maintenance to be conducted independently. Other component hardware pieces include bolts, railings, lighting, and other stock elements. The independent pile and barge structure away from the existing wood piers will eliminate the current damage caused by boats landing against the face and should prolong the useful life of the existing older structures.

5.3.2 Dock Site Programs and Concept Designs (by Unit)

Based on the standardized component dock design package and reviews by various federal, state, and local agency stakeholders including NPS, DEM, MDC, EOTC individual applications were prepared for each of the selected sites. The designs are described below, highlighting specific program needs, phasing proposals and design requirements. Dock designs described below have been developed to a schematic level of design, with estimates of construction costs.

The preliminary dock cost estimates were prepared based on the concept design packages for each site as described below. Tables presenting the details of these cost estimates are presented in Appendix B. The tables include costs for all of the Boston Harbor Islands dock sites as well as proposed dock designs for the Salem Maritime Central Wharf and Boston National Historical Park/Navy Yard Pier 1. Since the design concept was to provide a system of dock components to cover the range of sites, similar sites are grouped together under one of four generic dock designs. Hence, cost references for individual sites described below may be similar. The cost estimates are based on year 2000 dollars, and include a 20 percent contingency based on the preliminary nature of the designs, as well as site engineering costs to cover the different conditions for each site. Final construction costs would need to be based on more fully developed designs and adjusted for cost indices at the time of actual construction. Final design and permitting costs are not included in the individual dock costs, but are estimated separately assuming the component approach would allow for economies of scale. The estimated costs for each site description are the recommended budget costs.

Boston Harbor Islands

George's Island (1) (Figure X-001A)

As key island hub site, the dock capacity and visitor handling capacity will need to be greater than other islands. A two gangway system is recommended to handle the peak crowds and multiple vessel departures. The standard barge berthing would be increased to a total of 150 feet by adding 10x40 float units. Small boat landings with lower freeboards would be handled at smaller floats inside the basin area.

- **Program Needs:**
  - Two 100' ramps to handle passengers for two vessels simultaneously and to allow two-way traffic.
  - Two additional 40' x 10' floats for multiple vessel berthing.
  - New pile supported pier extension to support the long gangway.
  - Repair and stabilization of the main pier structure.
  - Visitor waiting shelters on the main pier
- **Design Description –** The barge and gangways are proposed to be located on the outside face of the existing central pier. The new dock will provide a year-round landing which can be used for an extended season. The two 100' ramps can be lifted up onto the main pier during the winter months or in major storm events, by means of vessel mounted cranes and davits attached to the main pier. The floats could be detached and stored inside the basin if needed.

- **Recommended Phasing of Construction –** The George's Island dock is a high priority and would be a Phase 1 project.

- **Preliminary Construction Cost –** $950,000.

Spectacle Island (1) (Figure X-008A)

As the second island hub site when the island is opened in 2002, the dock capacity and visitor handling capacity will also need to be greater than other islands. The dock would be located on the north face of the new pier facility, with the ramps extending towards the shore. A two gangway system is recommended to handle the peak crowds and multiple vessel departures. The standard barge berthing would be increased to a total of 150 feet by adding 10x40 float units. Small boat landings with lower freeboards could be handled at smaller floats inside the recreational basin area.

- **Program Needs:**

  - Two 100' ramps to handle passengers for two vessels simultaneously and to allow two-way traffic.

  - Two additional 40' x 10' floats for multiple vessel berthing.

  - New pile supported pier extension to support the long gangway.

  - Visitor waiting shelters on the main pier.

- **Design Description –** The barge and gangways are proposed to be located on the outside face of the existing L-shaped pier. Like George's Island, the new dock will provide a year-round landing which can be used for an extended season. The two 100' ramps can be lifted up onto the main pier during the winter months or in major storm events, by means of vessel mounted cranes and davits attached to the main pier.

- **Recommended Phasing of Construction –** The Spectacle Island dock is a high priority and would be a Phase 1 project.

- **Preliminary Construction Cost –** $950,000.

Lovell's Island (1) (Figure X-003)

The base pier facility would be applied to a stabilized and extended Lovell's pier. The single long gangway would start midway along the wood pier and extend to the barge which would be laid across the face of the pier. A wider pier extension would be needed for the gangway support. Small boat floats could be attached to the end of the barge with a small ramp connection.

- **Program Needs:**

  - One 100' ramp to handle passengers for one shuttle vessel at a time.

  - One additional 15' x 10' float for small vessel berthing.

  - New pile supported pier extension to support the long gangway.

  - Pier stabilization.

  - New boardwalk connection from the end of the pier to the asphalt path system to provide full access to the island trail system.

- **Design Description –** The barge and gangways are proposed to be located on the outside face of the existing pier. The 100' gangway can be lifted up onto the main pier during the winter months or in major storm events, by means of vessel mounted cranes.

- **Recommended Phasing of Construction –** The Lovell's Island dock, which was not open in the 2000 season, is a high priority and would be a Phase 1 project.

- **Preliminary Construction Cost –** $650,000.

Gallops Island (2) (Figure X-002)

The base pier facility would be applied to the stable existing pier. Similar to Lovell's, the single long gangway would start midway along the wood pier and extend to the barge which would be laid across the face of the pier. A pier extension would be needed for the gangway support. Small boat floats could be attached to the end of the barge with a small ramp connection (not shown in plan), similar to the layout for Lovell's Island.

- **Program Needs:**

  - One 100' ramp to handle passengers for one shuttle vessel at a time.

  - One additional 15' x 10' float for small vessel berthing.

  - New pile supported pier extension to support the long gangway.

- **Design Description –** The barge and gangways are proposed to be located on the outside face of the existing pier. The 100' gangway can be lifted up onto the main pier during the winter months or in major storm events, by means of vessel mounted cranes.

- **Recommended Phasing of Construction –** The Gallop's Island dock addition is a second priority site and would be a Phase 2 project.

- **Preliminary Construction Cost –** $650,000.

Bumpkin Island (2) (Figure X-004)

The base pier facility would be applied to the stable existing pier. Similar to Lovell's, the single long gangway would start midway along the wood pier and extend to the barge which would be laid across the face of the pier. A pier extension would be needed for the gangway support. Small boat floats would be attached to the end of the barge with a small ramp connection (not shown in plan).

- **Program Needs:**

  - One 100' ramp to handle passengers for one shuttle vessel at a time.

  - One additional 15' x 10' float for small vessel berthing.

  - New pile supported pier extension to support the long gangway.

- **Design Description –** The barge and gangways are proposed to be located on the outside face of the existing pier. The 100' gangway can be lifted up onto the main pier during the winter months or in major storm events, by means of vessel mounted cranes.

- **Recommended Phasing of Construction –** The Bumpkin Island dock addition is a second priority site and would be a Phase 2 project.

- **Preliminary Construction Cost –** $650,000.

Grape Island (2) (Figure X-005)

The base pier facility would be applied to the stable existing pier. Similar to Lovell's, the single long gangway would start midway along the wood pier and extend to the barge which would be laid across the face of the pier. A pier extension would be needed for the gangway support. Small boat floats would be attached to the end of the barge with a small ramp connection (not shown in plan).

- **Program Needs:**
  - One 100' ramp to handle passengers for one shuttle vessel at a time.
  - One additional 15' x 10' float for small vessel berthing.
  - New pile supported pier extension to support the long gangway.

- **Design Description –** The barge and gangways are proposed to be located on the outside face of the existing pier. The 100' gangway can be lifted up onto the main pier during the winter months or in major storm events, by means of vessel mounted cranes.

- **Recommended Phasing of Construction –** The Grape Island dock addition is a second priority site and would be a Phase 2 project.

- **Preliminary Construction Cost –** $650,000.

Boston National Historical Park (Charlestown)

Pier 1 (Figure X-009)

The base pier facility would be applied to the south face of the existing concrete pier. Similar to several of the Harbor Islands installations, the single long gangway would start at the northeast end of the concrete pier face and extend to the barge which would be laid across the face of the pier. An additional barge section would be needed to receive gangway to switchback to the fixed ramps. A small pier extension would be needed for the gangway support. Water taxi floats could be attached to the north end of the barge with a small ramp connection (not shown in plan), similar to that shown for Lovell's Island.

- **Program Needs:**
  - One 100' ramp to handle passengers for one shuttle vessel at a time.
  - One additional 15' x 10' float for water taxi berthing.
  - New pile supported pier extension to support the long gangway.

- **Design Description –** The barge and gangways are proposed to be located on the outside south face of the existing pier. The 100' gangway would remain in place in the more protected inner harbor location to be available for year-round ferry use. For periodic barge maintenance, the dock components can be lifted up onto the main pier, by means of pier mounted cranes.

- **Recommended Phasing of Construction –** The Pier 1 dock replacement is a high priority, because of the deteriorated condition of the current barge, and would be a Phase 1 project.

- **Preliminary Construction Cost –** $600,000.

Salem Maritime

Central Wharf (Figure X-010)

The base pier facility would be applied to the stable existing historic wharf. Similar to the Spectacle Island proposal, the single long gangway would start midway along the east face of the wharf and extend to the barge which would also be parallel to the wharf. A wharf extension would be needed for the gangway support. Additional float units could be added to the north if additional berthing area was needed. Alternatively, small boat floats with a lower freeboard could be attached to the end of the barge with a small ramp connection (not shown in plan).

- **Program Needs:**

  - One 100' ramp to handle passengers for one shuttle vessel at a time.

  - New pile supported wharf extension to support the long gangway.

- **Design Description –** The barge and gangways are proposed to be located on the outside face of the existing pier. The 100' gangway would remain in place year-round in the protected basin between Central and Derby wharves.

- **Recommended Phasing of Construction –** The Central Wharf dock addition is a second priority site and would be a Phase 2 project, or whenever the city-owned dock scheduled to be installed at the site in 2001 was relocated.

- **Preliminary Construction Cost –** $650,000.

Adams National Historical Park (Quincy)

Squantum Point/Marina Bay

The potential exists to install a standard dock facility at the current location of the Squantum Point dock, by reusing the small pier at the shore end and attach a linear version similar to Central wharf in Salem. No design has been prepared for this site, but it is used as an example of how the accessible dock system could be applied to other ferry landing locations. The site is categorized as a Phase 2 priority. In the short- and mid-term, the existing accessible facility at Quincy/Fore River is recommended as the initial gateway landing for the Adams NHP.

- **Program Needs:**

  - One 100' ramp to handle passengers for one shuttle vessel at a time.

  - One 70'x 26' barge with fixed ramps.

  - Modifications to existing shoreside pier to support the long gangway.

- **Design Description –** The barge and gangways are proposed to be located in a linear organization extending from the existing pier segment in place of the current floats. While it is likely that the dock will remain operational year-round, the 100' gangway could be lifted up onto the pier and approach ramp during the winter months or in major storm events, by means of vessel mounted cranes.

- **Recommended Phasing of Construction –** The Squantum Point/Marina Bay dock replacement is a second priority site and would be a Phase 2 project.

- **Preliminary Construction Cost –** $600,000 (based on similarity to installation required at Navy Yard Pier 1).

FIGURE X-001A: GEORGE'S ISLAND PIER PLAN

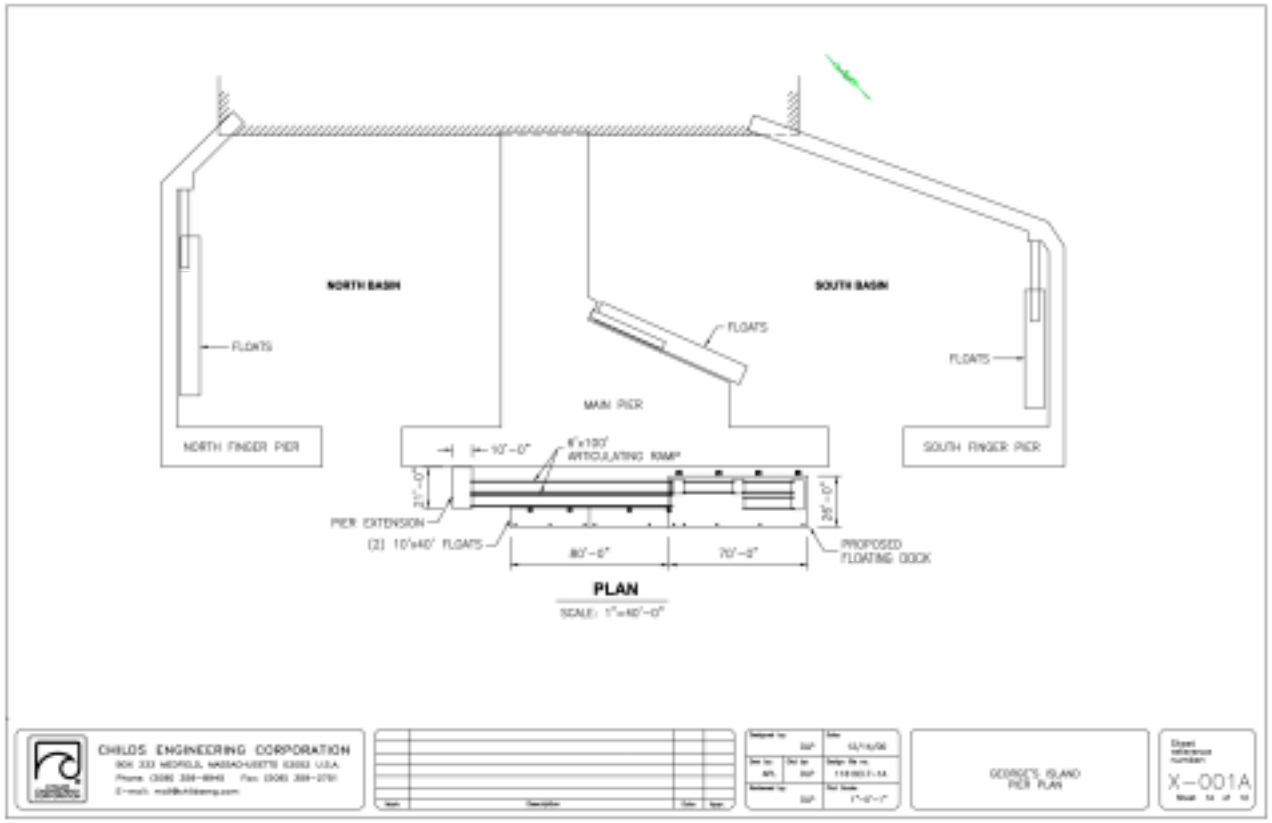


FIGURE X-002: GALLOP'S ISLAND PIER PLAN

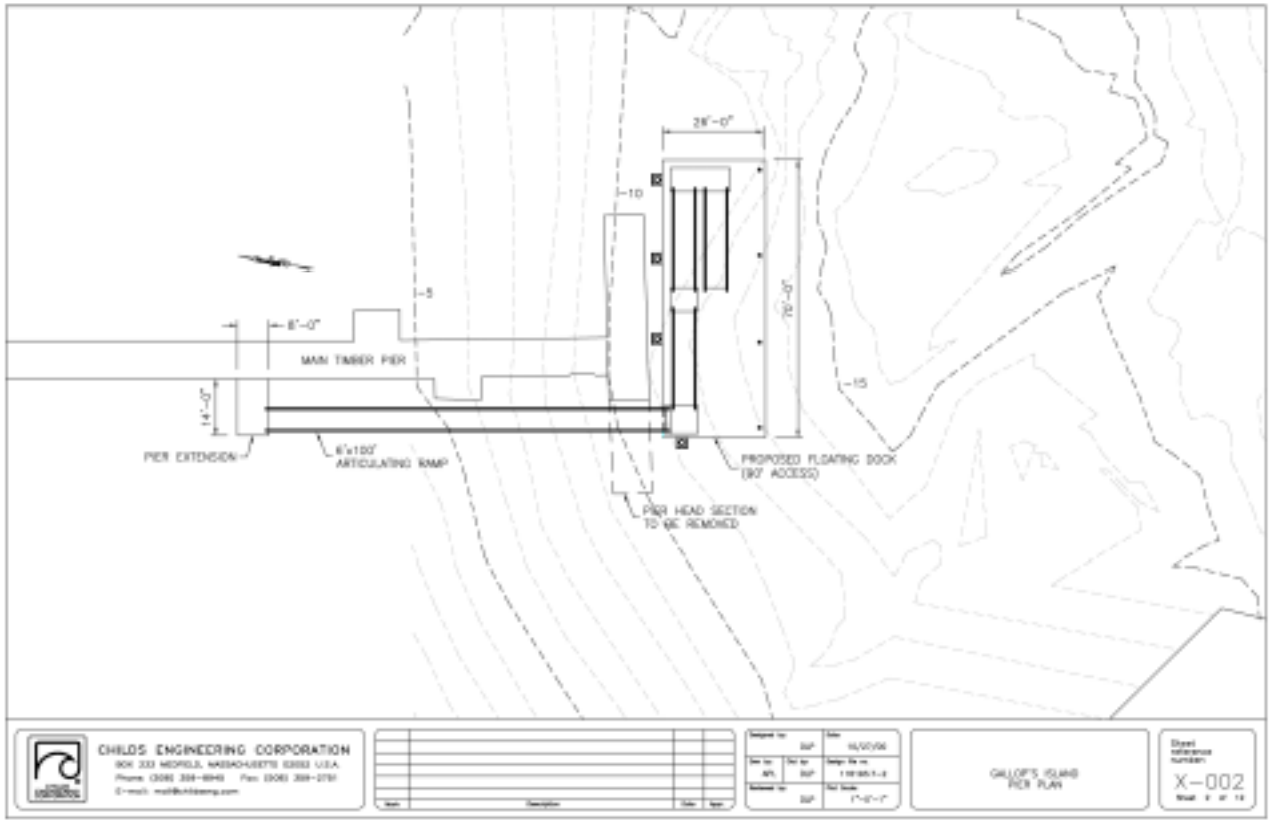


FIGURE X-003A: LOVELL'S ISLAND PIER PLAN

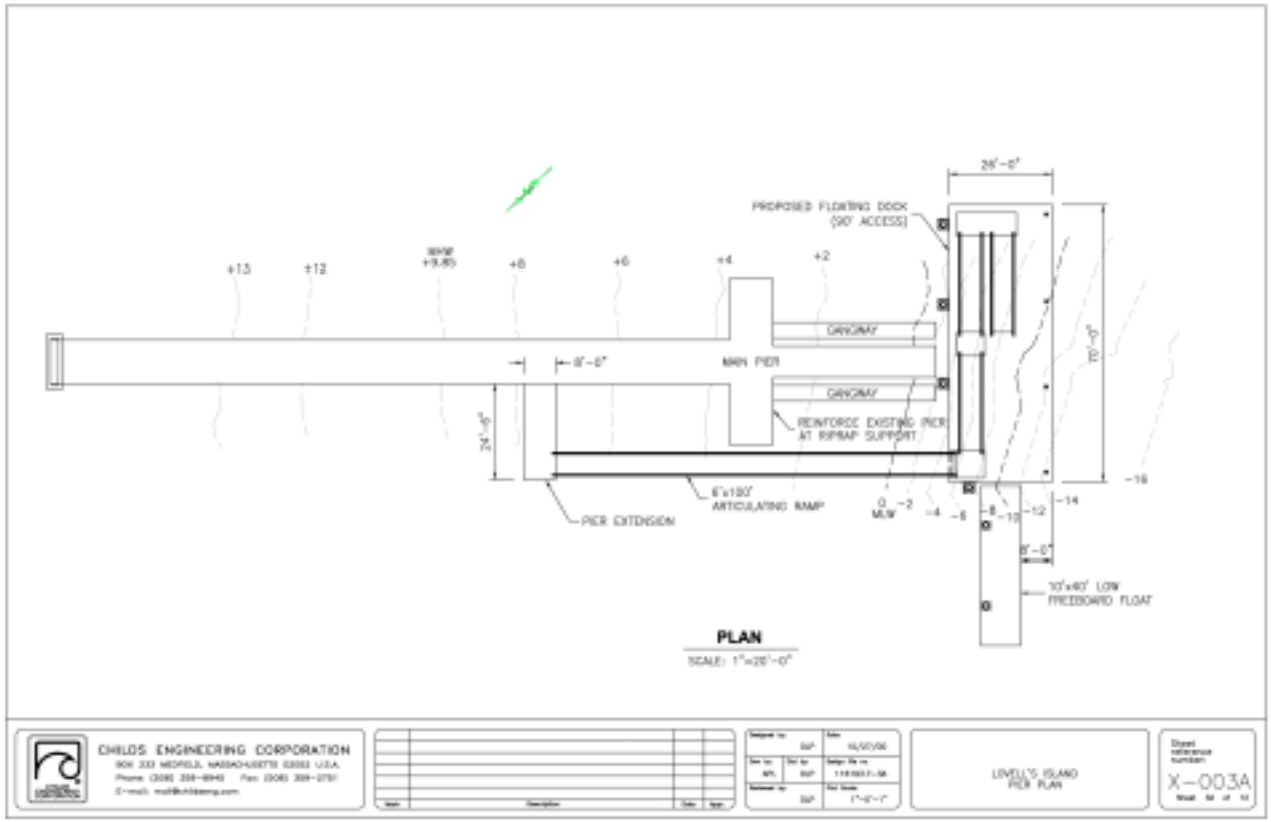


FIGURE X-004: BUMPKIN ISLAND PIER PLAN

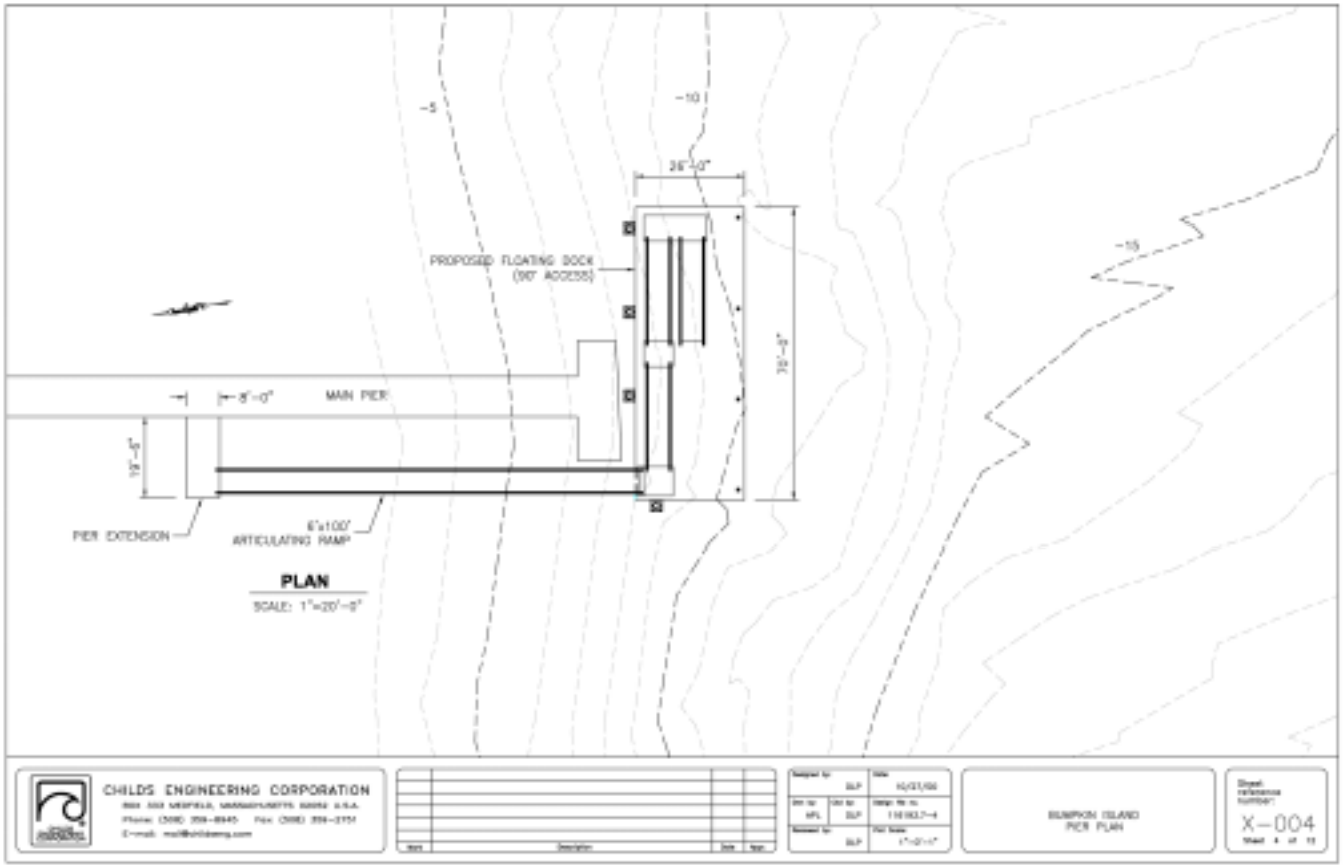


FIGURE X-005: GRAPE ISLAND PIER PLAN

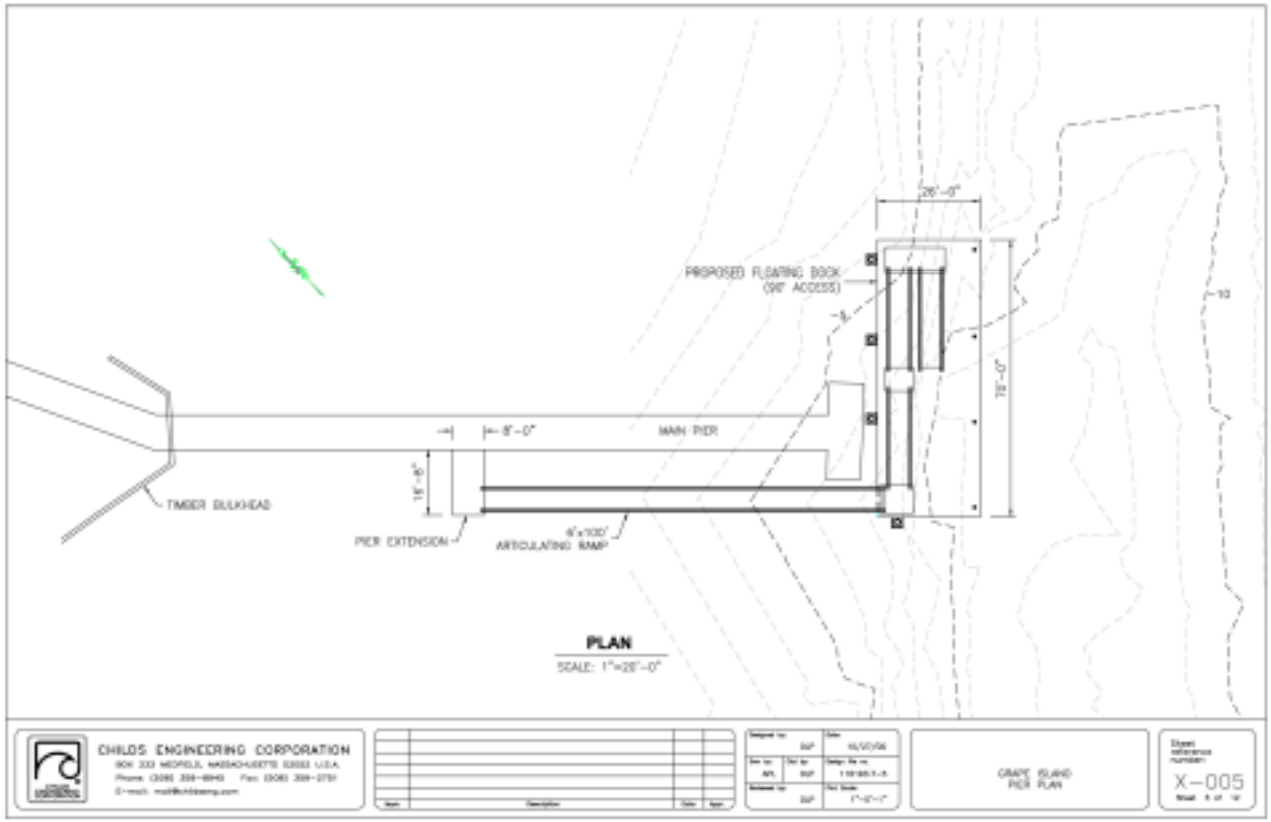


FIGURE X-006: PROPOSED STEEL FLOAT AND RAMPS

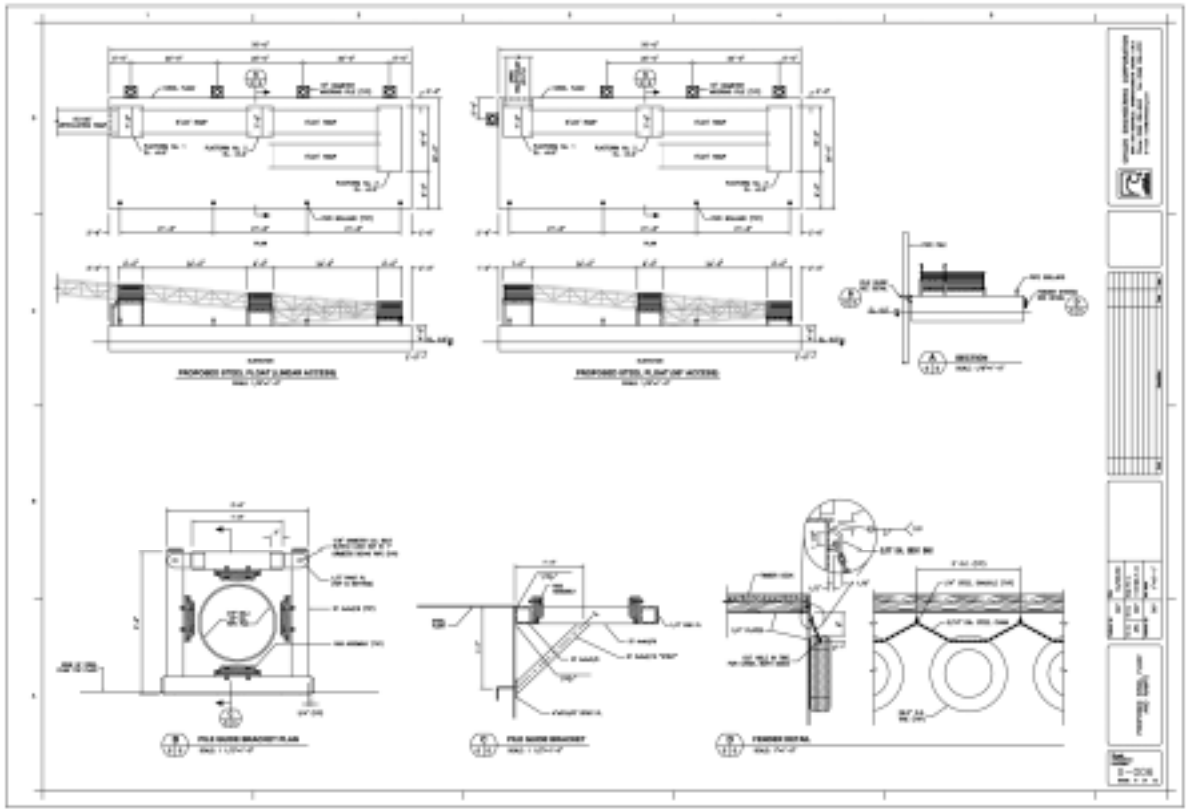


FIGURE X-007: FLOAT AND RAMP ELEVATIONS

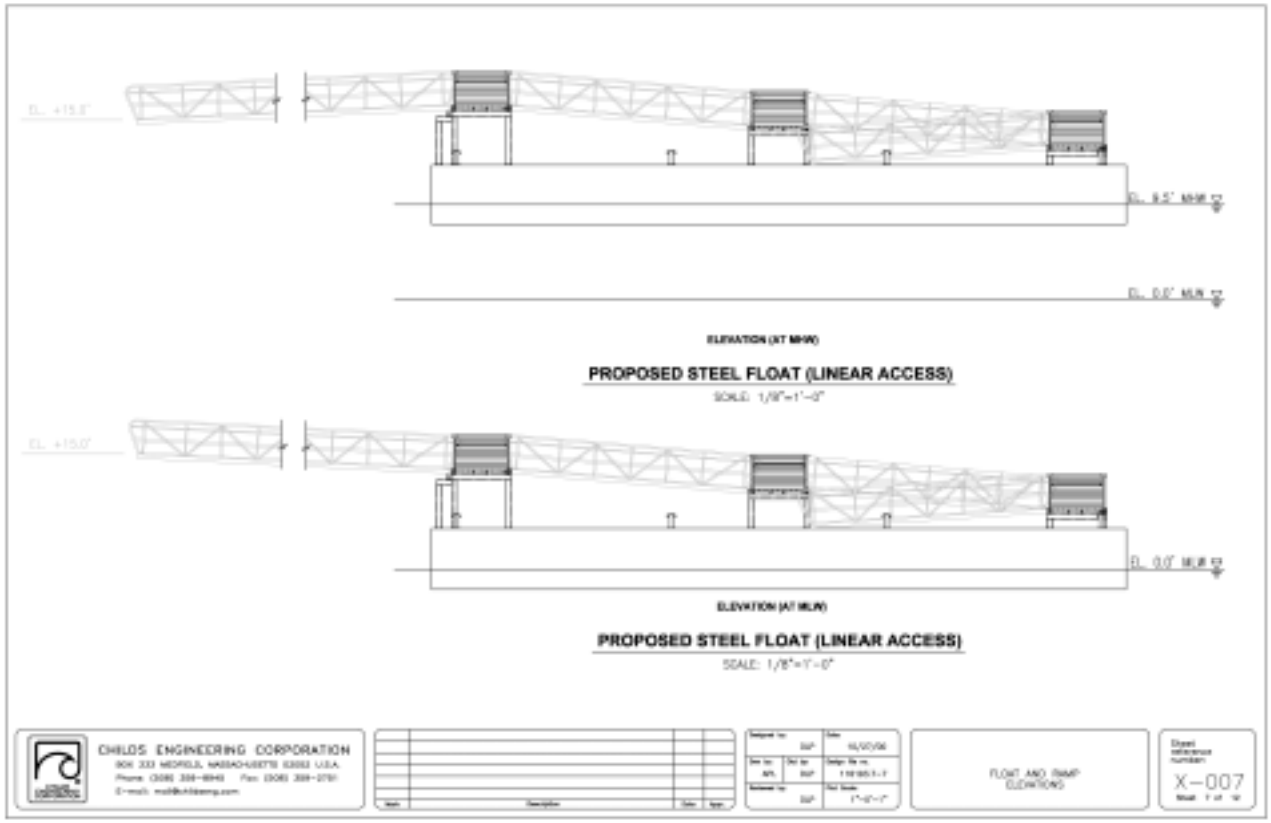


FIGURE X-008A: SPECTACLE ISLAND PIER PLAN

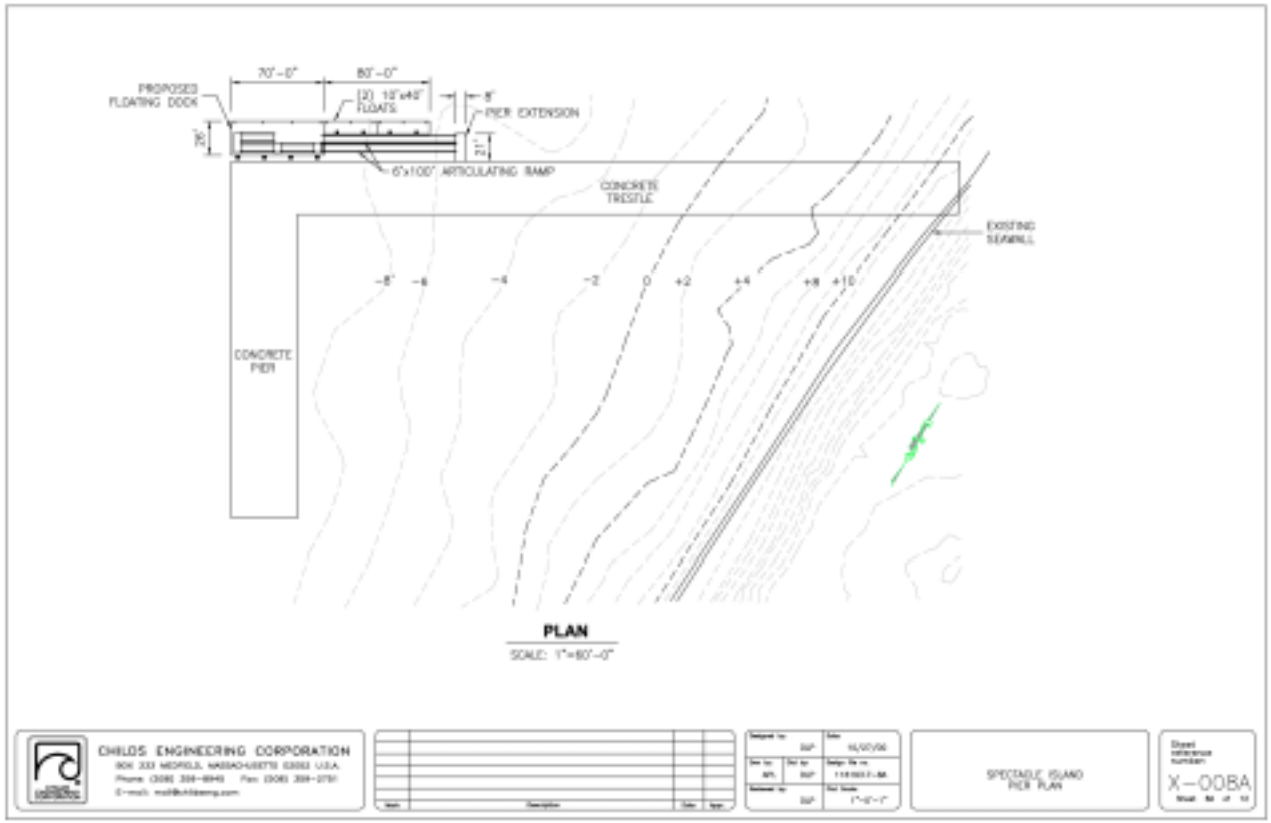


FIGURE X-009: PIER 1 PIER PLAN

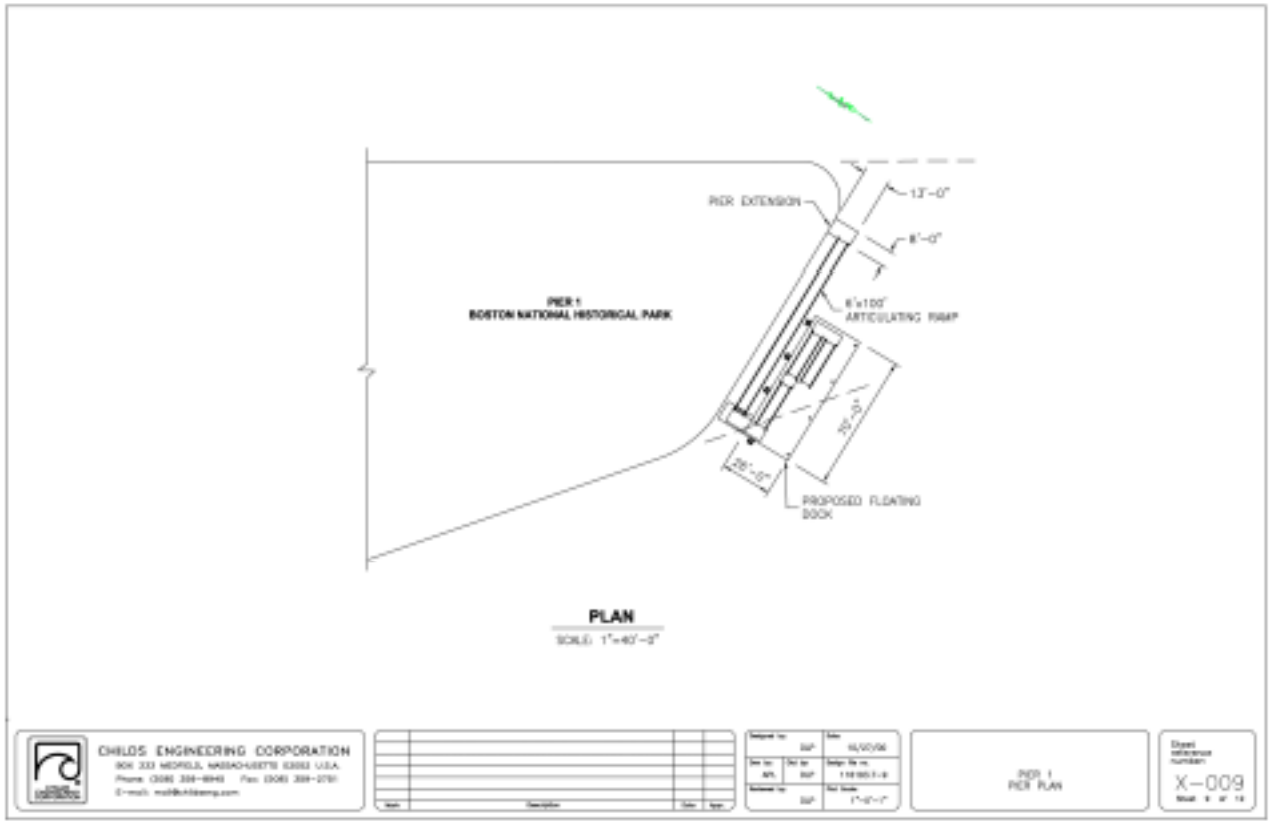


FIGURE X-010: CENTRAL WHARF, SALEM, MA

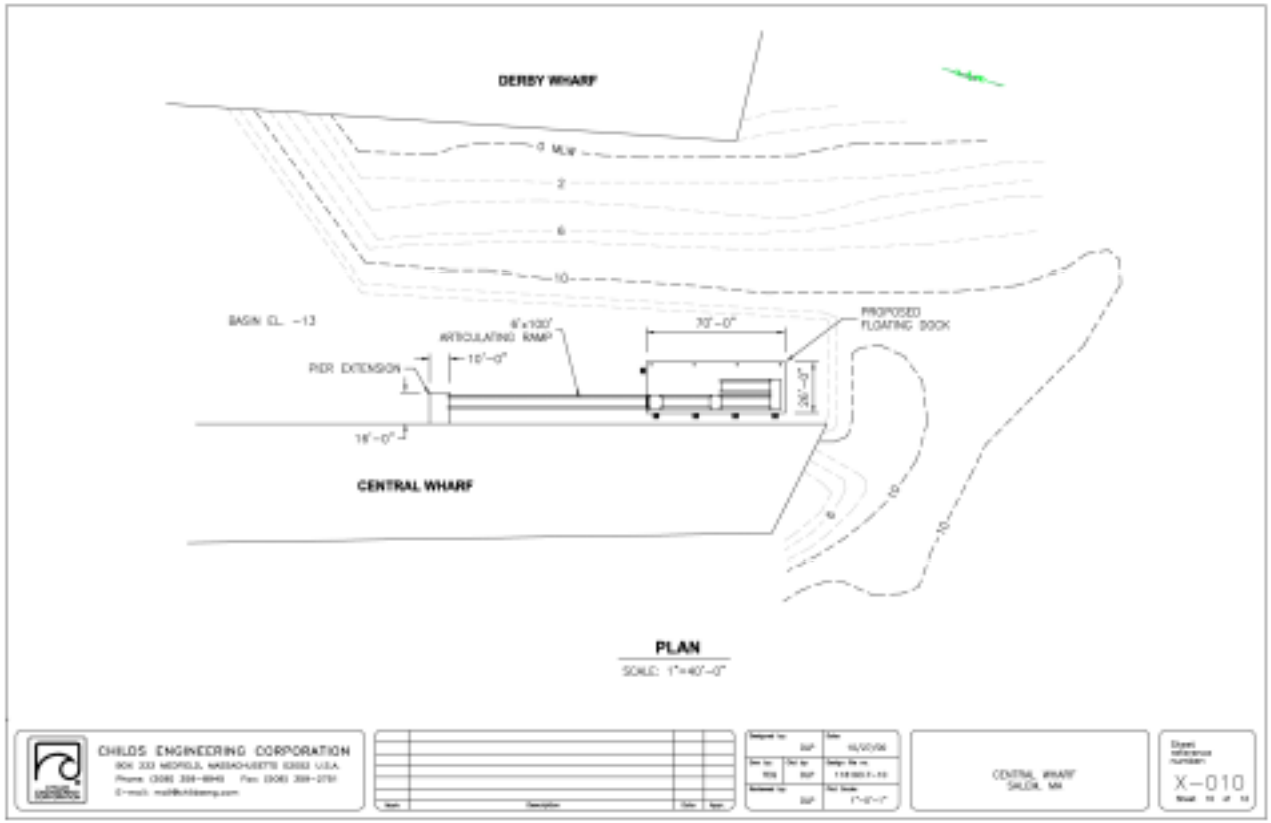


FIGURE X-011: A-FRAME RAMP SUPPORT, HARBOR ISLANDS

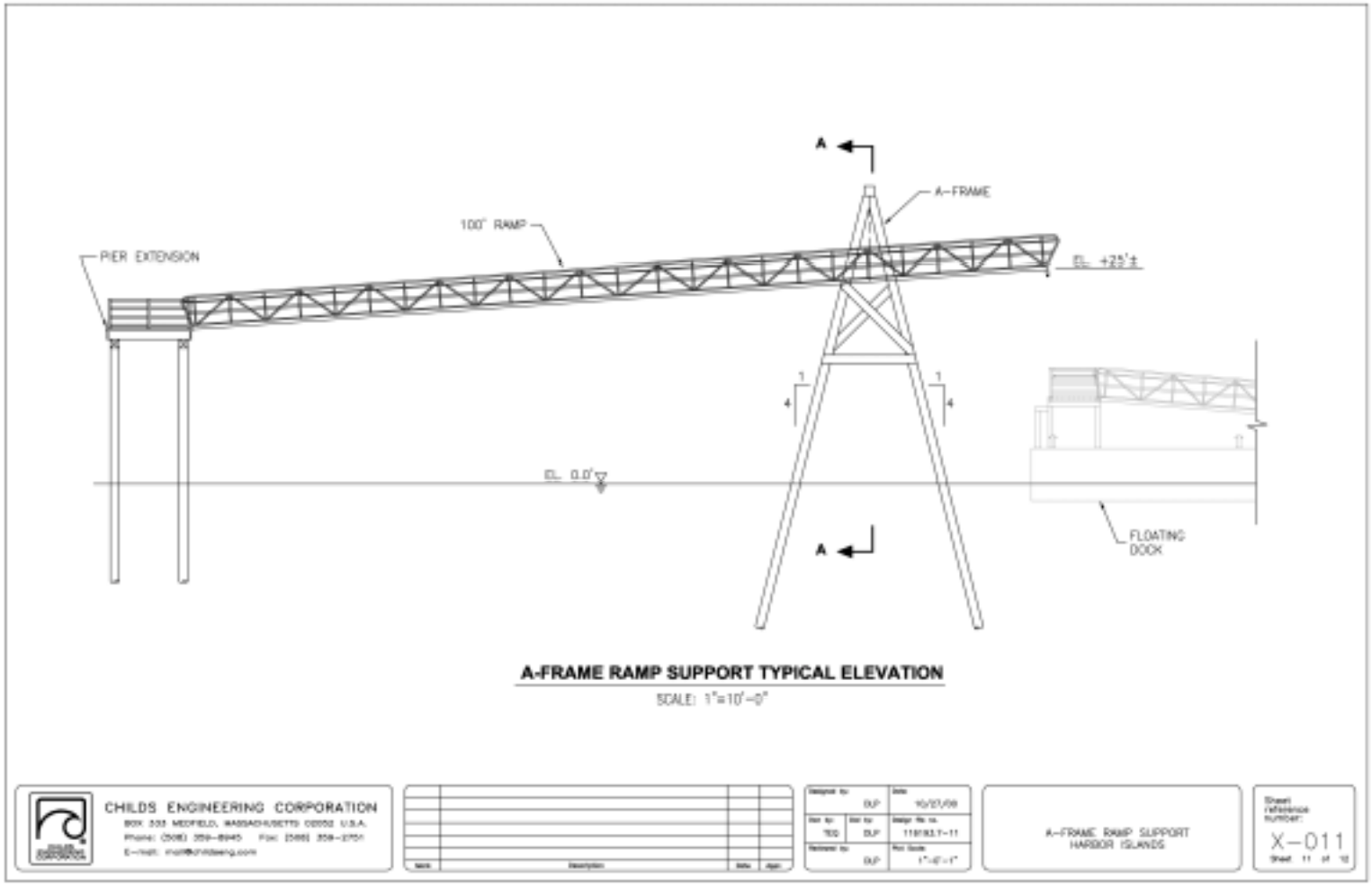
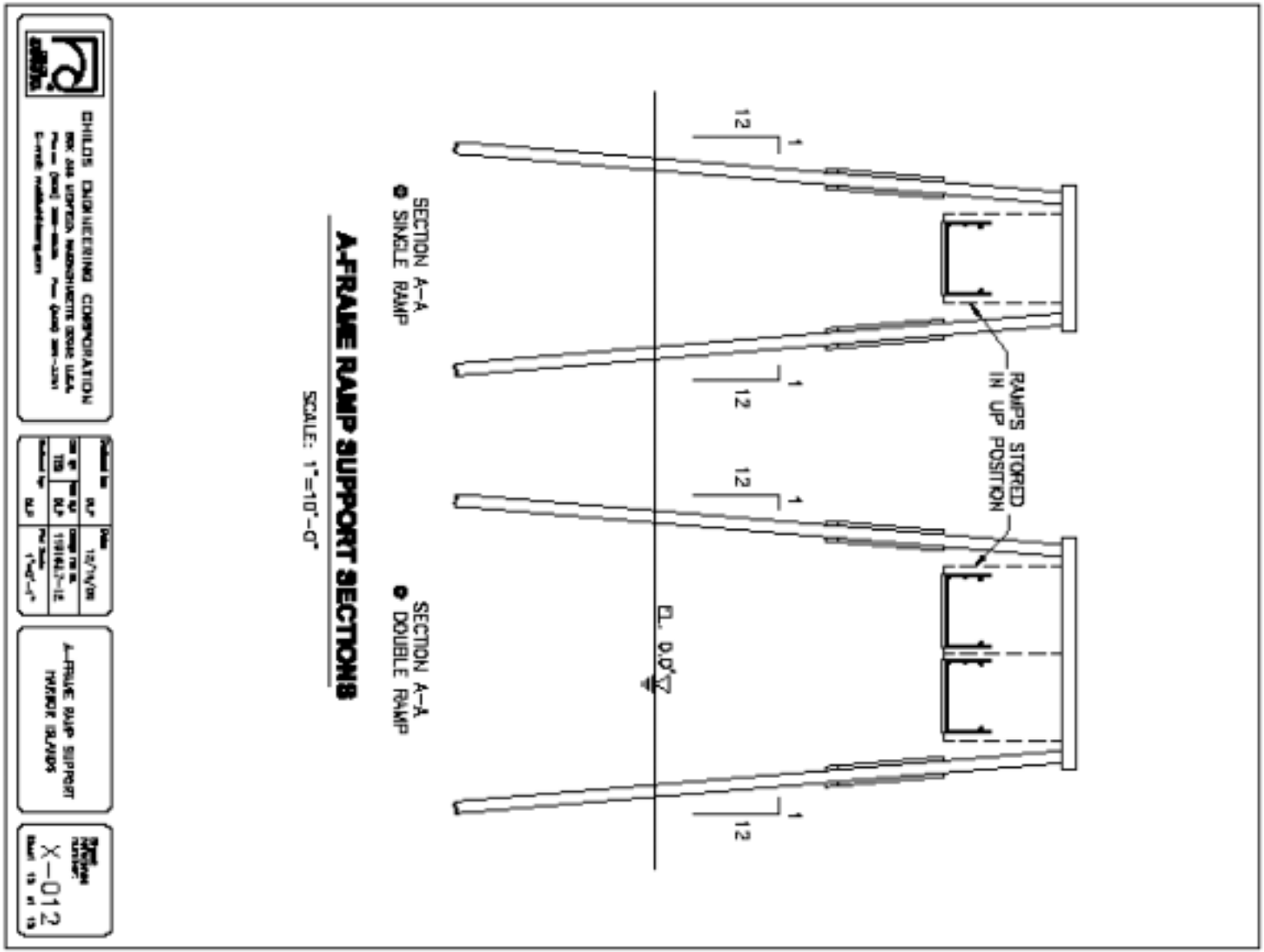


FIGURE X-012: A-FRAME RAMP SUPPORT SECTIONS, HARBOR ISLANDS



Chapter 6: Operating Cost Analysis and Funding Opportunities

The following chapter provides an analysis of the potential costs of ferry operations in support of the Boston Harbor Islands and surrounding NPS sites, given the different operating and growth scenarios discussed in the preceding chapters. Various management options and recommendations for the operation of the ferry system are then presented based on the findings of this analysis. The chapter concludes with a discussion of the federal transportation funding process and includes an inventory of potential federal funding programs to support operating and capital costs of ferry services.

6.1 Boston Harbor Islands – Vessel Operations Model Assumptions and Characteristics

Purpose

An operations and cost model for future Boston Harbor Islands ferry operations was prepared to test such operations variables as growth in ridership, vessel fleet profiles and applications, operations costs and revenue projections. The purpose of the model was to identify key cost/revenue operating characteristics of the ferry system by phase, determine profitability for different visitor growth scenarios, and identify ferry management scenarios for future operations.

It should be emphasized that the operations model is intended to be an approximation of actual operations scenarios. It was developed as a planning tool and not as an actual operations formula to be taken literally. As such the model can be used to test other scenarios by adjusting the variables. For purposes of soliciting concession ferry services, however, it should be left to the operators to propose specific operations plans based on their own cost variables and market projections. While every effort has been made to use real operation-based data to build the model, the operations scenarios presented are hypothetical and should be used only as an approximate yardstick for Harbor Islands ferry services. Actual operations plans may vary somewhat from the scenarios presented in this section.

6.1.1 Summary of General Operations Assumptions

The ferry operations assumptions used in constructing the model are those reported in the sections of Chapter 4, Analysis of Route Options and Market Demand, which apply to the Boston Harbor Islands. The operating assumptions incorporate the criteria found in Chapter 4 and may be summarized as follows:

- Phasing of new routes and services should be keyed to increased demand and introduction of new island resources and activities. The three recommended phases were used for the operations model with approximate applicable dates:
    - **Phase I –** 2002-2003 or until Spectacle Island is opened to the public and requires regularly scheduled ferry service.
    - **Phase II –** 2003-2005 from the opening of Spectacle Island until such time as it becomes a major attraction on a par with George's in visitation.
    - **Phase III –** 2006-2010 in response to substantial increases in island attractions and growth of visitation.

- Distribution of route demand is expected to follow recent historic patterns as visitation increases. Phasing and amounts of service assumed follow the pattern of the predominant market from the downtown gateway and secondary markets on the south and north shores.

- Core system gateway routes are added as projected demand builds up at new locations. Current Downtown and Hingham gateways are maintained until Phase III, when sufficient demand warrants addition of Quincy Fore River and Salem/North Shore. While optional gateway routes may actually emerge earlier based on unanticipated new demands, a limited number of core system gateways are carried in the operations model.

- The "Hub and Spoke" pattern of mainland gateway and inter-island shuttle routes is maintained in the model.

- Schedule and frequency of water transportation service are assumed to match the visitor demand projections, combined with the intended island carrying capacity.

- Assumed gateways provide varying levels of intermodal access.

- Assumed mainland docking facilities need to be reserved on a long-term basis. The ferry terminals need to have long-term arrangements so that docking facilities are available for authorized island ferry and water shuttle providers.

- Performance specifications are assumed for ferry and water shuttle services, which differ somewhat from current operations. The vessel specifications assumed address capacity needs, variable operating speeds, reliability of service, public safety, vessel wake and wash limitations for resource protection, and ADA accessibility.

- Ferry service management plans are needed to help define routes, schedules, and vessel requirements. The findings from the operations model scenarios are intended to help define suitable management plans.

- The inter-island shuttles are assumed to operate as non-fare extensions of the paid gateway services.

- Fare levels for gateway services are generally assumed to be kept at comparable levels to the past season operations (at an average of $7.00 per round-trip per person prorated by adult, child, and senior fares) for the initial model run to test the operations costs and revenues. All costs and revenues are assumed to be year 2000 dollars.

6.1.2 Gateway and Shuttle Route Service Plans

The following operating assumptions were prepared to test the proposed routes against different vessel speeds and capacities. These routes are described in Chapter 4. The following assumptions were made with regard to the route time calculations:

- Total travel time includes run time including slow speed zones, and stop times.

- Total travel time is for a single, one-way trip. Cycle time would be double the one-way trip time.

- Vessel speeds are for average cruising speed; i.e., a vessel's top speed would normally be somewhat higher.

- For gateway routes, a stop time of 12 minutes was provided for conventional vessels and eight minutes for new technology vessels for higher capacity islands and gateways. A stop time of 10 minutes for conventional vessels and seven minutes for new technology, highly maneuverable vessels for lower capacity islands and gateways. Both include landing and departing time.

- For inter-island shuttle routes, a stop time of 10 minutes was provided for conventional vessels and seven minutes for new technology vessels. Both include landing and departing time.

- All landing and docking times assume that new dock facilities are in place.

6.2 Summary Description of Operations Model

6.2.1 Model Description

The following section explains the model used to analyze the hypothetical cost of providing expanded Boston Harbor Islands ferry service. A detailed discussion of the model is provided in Appendix C, including description of assumptions and data sources used in its application.

A detailed spreadsheet was constructed by the Volpe Center in order to evaluate different ferry-service alternatives and combinations of alternatives vis-à-vis boats, routes, operating seasons, operating hours, and other such factors. Since the data were provided in part by Boston Harbor operators, the base spread sheet remains proprietary at the operators' request. Separate sections of this spreadsheet contained data specific to the various boats, routes, and other variables examined.

Once the spreadsheet was constructed, it was twice duplicated, and the three separate files were used to compute the total cost of service for each of the three phases of service, one file per phase. In this way, it was possible to clearly keep track of the total cost, as well as other indicators such as the total operating hours and the total ridership capacity.

The model was constructed using a number of assumptions as described in Appendix C. Much of the foundation data were provided by and/or verified by current ferry operators and other transportation professionals.

The model includes operations scenarios for Gateway services as well as for inter-island shuttle services. The cost and revenue calculations by phase assume that there are only Gateway fares and the Shuttle operation would remain without fare and be included as part of the cost of the Gateway ticket.

6.3 Operations Scenarios and Findings

6.3.1 Operating Assumptions by Phase

General Assumptions by Phase

After the base operating model was set up and calibrated, the operations scenarios were developed by plugging in key variables by phase including vessel types by route, season duration and hours of operation, and ridership based on visitation projections from the market demand analysis. All three levels of visitation growth described in Chapter 4 were applied by phase, including low, medium and high levels. By applying three variations in visitation growth, a range of cost and revenue scenarios was generated.

Phase I – General operations for Phase I are similar to the current operations with a core system of two gateway routes (Downtown and Hingham) and two inter-island shuttle routes (north and south loops). The Salem/North Shore route is likely to continue as a peak season, weekend route but does not show enough ridership to be included in the core system. The limited service route options shown in Chapter 4 are not included in the operation scenario, since the operating costs of such routes would far outweigh the potential revenues. Phase I would cover the period from 2001 to 2002, or until Spectacle Island was open for its first full season. Vessels are assigned by capacity based on the market analysis distribution of visitors by season and by weekday or weekend,

as is the case for all phases. In general larger vessels are used on the peak weekends based on current use patterns. Current season and daily schedules are maintained in Phase I.

Phase II – General operations for Phase II include modifications of the gateway and shuttle services to provide service for Spectacle Island. They include an extension of the downtown route to include stops at Spectacle and George's. The two shuttle routes would remain the same. The limited schedule Salem and Quincy/Fore River routes are not included in the operations model since their operating costs would exceed their fare revenues. For the same reasons, the limited service routes shown in Chapter 4 are also not included. Phase II would cover the period from 2003 to 2005, from the first full season of Spectacle Island is open until it approaches full programming and visitation. Season and daily schedules are extended in Phase II.

Phase III – As projected visitation increases in the longer-term Phase III, additional gateway and shuttle services are added and the seasons and daily schedules are extended. As shown in Chapter 4, the Hingham gateway route is modified to eliminate Grape Island and include Spectacle Island. Gateway routes are added from Quincy/Fore River to Spectacle Island and from Salem/North Shore to George's Island. A new West shuttle loop is added. Optional routes are not included in the operations model. Phase III would cover the period from 2006 to 2010, as Spectacle and other islands operate with full programming and visitation.

Vessel Types and Characteristics

A mixture of vessel types were applied to the different routes by season. Since the current and projected demands vary so greatly from season to season and from weekday to weekend in peak season, the application of different capacity and speed vessels was intended to balance costs and revenues while still maintaining reasonable service levels. Table 6.1 describes the different vessel types and characteristics. The vessels described are all based on current Boston Harbor fleet examples. Only the fast catamaran represents a "new technology" type vessel, and is intended for application to the Salem route, the only designated route long enough to benefit from the higher speed operation. All others are assumed to be monohulls with appropriate modifications to meet the vessel specifications regarding such factors as wake and wash, ADA access, and passenger comfort.

TABLE 6-1: VESSEL DESCRIPTIONS

Boat Type	Passenger Capacity	Operating Speed (Knots)	Total Crew	Assumed Capital Cost
Off-peak shuttle	49	16	2	$ 600,000
Peak shuttle	100	20	2	$ 900,000
Small gateway	149	18	3	$1,300,000
Large gateway	349	18	5	$2,500,000
Fast gateway (catamaran)	250	25	4	$2,600,000

The average number of vessels applied by type in the model are shown in Table 6.2. For example, more vessels will need to be applied for each gateway route on peak summer weekends, particularly for the high-growth scenarios.

TABLE 6-2: VESSELS USED, BY PHASE

Boat Type	Phase I	Phase II	Phase III
Off-peak shuttle	2	2	3
Peak shuttle	3	3	4
Small gateway	2	2	3
Large gateway	2	2	3
Fast gateway (catamaran)	0	0	1

6.3.2 Operation Scenarios by Phase

Seasons and Days of Operation by Phase

The model assumes that the seasons and days of operation will increase with each phase. Table 6.3 shows the seasons and days of operation by phase. It should be noted that various routes may vary in the number of days service is offered. For example in Phase I, the Hingham service is only offered on weekends during the spring and fall off-peak seasons while the Downtown service is offered seven days a week during the off-peak times.

TABLE 6-3: SEASONS AND DAYS OF OPERATION BY PHASE

Season	Phase I	Phase II	Phase III
Off-peak – spring	May 1 to June 20 (51 Days)	April 15 to June 20 (66 Days)	April 15 to May 31 (47 days)
Peak – summer	June 21 to September 1 (72 Days)	June 21 to September 1 (72 days)	June 1 to September 1 (91 Days)
Off-Peak – fall	September 2 to October 7 37 Days	September 2 to October 15 (45 Days)	September 2 to October 31 (60 Days)
Total months and days per year	5.25 Months (160 Days)	6 Months (183 Days)	6.5 Months (198 Days)

Note: Seasons are approximate to determine the number of operation days.

Cost of Operations by Phase

The calculations of operations cost by phase on the operations model assumptions and variables described. For purposes of the scenarios developed, one set of operations costs per phase was generated. The operating hours were based on assumed daily route schedules. The hourly operating costs were derived by dividing the total operating costs by the total operating hours for all services. Table 6.4 summarizes the operating costs and hours of operation by phase.

TABLE 6-4: OPERATING COST AND OPERATING HOURS, BY PHASE

	Phase I	Phase II	Phase III
Gateway Operating Cost	$512,500	$623,300	$945,500
Shuttle Operating Cost	$138,400	$138,400	$259,600
Total Operating Cost	$650,800	$761,700	$1,205,000
Total Operating Hours	4,747	5,361	8,444
Hourly Operating Cost	$137.11	$142.09	$142.71

Note: Includes capital and operating costs.

Ridership and Revenues of Operations by Phase

The revenues realized were calculated by phase for three growth scenarios described in Chapter 4. Since the demand model projected growth only for the years 2005 and 2010, a new growth figure was generated for Phase I for the years 2001 and 2002. A modest growth rate of five percent was assumed over the present 2000 ridership for Phase I. As indicated in the assumptions description, the North Shore operating costs and ridership were included for limited peak weekend service for Phase III, but were not included for Phases I and II. The initial assumed average ticket price for all paid passengers was $7.00 to try to keep the costs on a par with those of the 2000 season. The operations model, however, accounted for overhead as a discount on the ticket price, resulting in a net take of $5.10. The overhead factor is likely to vary depending on the operator, and on any given operating year. Table 6.5 displays the Gateway ridership and revenue totals by phase based on the range of visitation projections. The table also includes the operating costs and profit or loss. Also included are the total annual vessel capacity figures for the operations base for each scenario in order to compare ridership with total numbers of seats available.

TABLE 6-5: SUMMARY OF GATEWAY FERRY GROWTH, OPERATIONS COST AND REVENUE SCENARIOS, BY PHASE – $7.00 AVERAGE TICKET PRICE

	Phase I (2001) (Capacity: 240,808)	Phase II (2005) (Capacity: 267,104)	Phase III (2010) (Capacity: 402,914)
Low-growth scenario	124,000 riders $632,400 revenue $650,800 op. cost **(-$18,400 loss)** **(-2.8%)**	145,950 riders $744,345 revenue $761,700 op. cost **(-$17,355 loss)** **(-2.3%)**	193,000 riders $984,300 revenue $1,205,500 op. cost *267,104* **(-$221,200 loss)** **(-18.3%)**
Moderate-growth scenario	124,000 riders $632,400 revenue $650,800 op. cost **(-$18,400 loss)** **(-2.8%)**	158,250 riders $807,075 revenue $761,700 op. cost **$45,375 profit** **6%**	248,000 riders $1,264,800 revenue $1,205,500 op. cost **$59,300 profit** **4.9%**
High-growth scenario	124,000 riders $632,400 revenue $650,800 op. cost **(-$18,400 loss)** **(-2.8%)**	175,000 riders $892,500 revenue $761,700 op. cost **$130,800 profit** **17%**	285,000 riders $1,453,500 revenue $1,205,500 op. cost **$248,00 profit** **20.6%**

Note: Does not include North Shore ridership or revenue estimates for Phases I and II.
Assumes average ticket price of $7.00, but includes overhead for a net return of $5.10 per paid passenger.

Once the model was run for the $7.00 average ticket price, and the revenues and operating cost compared for each ridership scenario, it became clear that keeping the ticket prices at current rates would result in operational losses for many of the low- and moderate-growth scenarios. The model was then used to test an average ticket price of $7.50 for the ridership scenarios. All variables remained the same including the schedule, ridership and operating costs. The results of the average $7.50 ticket price are shown in Table 6.6.

TABLE 6-6: SUMMARY OF GATEWAY FERRY GROWTH, OPERATIONS COSTS AND REVENUE SCENARIOS, BY PHASE – $7.50 AVERAGE TICKET PRICE

	Phase I (2001) (Capacity: 240,808)	Phase II (2005) (Capacity: 267,104)	Phase III (2010) (Capacity: 402,914)
Low-growth scenario	124,000 riders $682,400 revenue $650,800 op. cost **$31,600 profit** **4.9%**	145,950 riders $802,700 revenue $761,700 op. cost **$41,000 profit** **5.4%**	193,000 riders $1,061,500 revenue $1,205,500 op. cost **(-$144,200 loss)** **(-11.9%)**
Moderate-growth scenario	124,000 riders $682,400 revenue $650,800 op. cost **$31,600 profit** **4.9%**	158,250 riders $870,400 revenue $761,700 op. cost **$108,700 profit** **14.3%**	248,000 riders $1,364,000 revenue $1,205,500 op. cost **$158,500 profit** **13.1%**
High-growth scenario	124,000 riders $682,400 revenue $650,800 op. cost **$31,600 profit** **4.9%**	175,000 riders $962,500 revenue $761,700 op. cost **$200,800 profit** **26.4%**	285,000 riders $1,567,500 revenue $1,205,500 op. cost **$362,000 profit** **30%**

Note: Does not include North Shore ridership or revenue estimates for Phases I and II.
Assumes average ticket price of $7.50, but includes overhead for a net return of $5.50 per paid passenger.

The results of applying the $7.50 average ticket price improved profitability so that all growth scenarios were profitable according the model. However, a loss of 12 percent remained for the Phase III low-growth scenario. A marginal profit level of five percent or less appeared for four out of the nine scenarios, well below the desired 10 percent minimum. Therefore an $8.00 average ticket price was then tested to see if the profitability levels could be improved to acceptable levels for all growth scenarios. The results of this model run are shown in Table 6.7. Once again the ticket price was the only variable altered from the original model test.

TABLE 6-7: SUMMARY OF GATEWAY FERRY GROWTH, OPERATING COSTS AND REVENUE SCENARIOS, BY PHASE – $8.00 AVERAGE TICKET PRICE

	Phase I (2001) (Capacity: 240,808)	Phase II (2005) (Capacity: 267,104)	Phase III (2010) (Capacity: 402,914)
Low-growth scenario	124,000 riders $731,600 revenue $650,800 op. cost **$80,800 profit** **12.4%**	145,950 riders $861,100 revenue $761,700 op. cost **$99,400 profit** **13%**	193,000 riders $1,138,700 revenue $1,205,500 op. cost **(-$66,800 loss)** **(-5.5%)**
Moderate-growth scenario	124,000 riders $731,600 revenue $650,800 op. cost **$80,800 profit** **12.4%**	158,250 riders $933,700 revenue $761,700 op. cost **$172,000 profit** **22.6%**	248,000 riders $1,463,200 revenue $1,205,500 op. cost **$257,700 profit** **21.4%**
High-growth scenario	124,000 riders $731,600 revenue $650,800 op. cost **$80,800 profit** **12.4%**	175,000 riders $1,032,500 revenue $761,700 op. cost **$270,800 profit** **35.6%**	285,000 riders $1,681,500 revenue $1,205,500 op. cost **$476,000 profit** **39.5%**

Note: Does not include North Shore ridership or revenue estimates for Phases I and II.
Assumes average ticket price of $8.00, but includes overhead for a net return of $5.90 per paid passenger.

6.3.3 Summary of General Findings

General Findings

The essential findings from the three model applications using different average ticket prices included variable cost and revenue operations scenarios for each of the three phases. The total hypothetical profits shown for each phase and each ridership growth scenario. Because of the conservative nature of the operations model and assumptions used, the profitability margins of various scenarios may also be regarded as conservative. Table 6.8 shows a comparison of profitability by phase and growth scenario for each of the three ticket prices tested. Once again it should be noted that each of the model tests kept the same operating assumptions except for ticket price, including the key assumption that the Gateway ticket revenues would cover the inter-island shuttle cost of operations, and that no fare would be charged for the shuttle trips.

TABLE 6-8: SUMMARY FINDINGS OF RIDERSHIP/COST/REVENUE SCENARIOS, BY PHASE AND TICKET PRICE

	Phase I (2001) (Capacity: 227,788)			Phase II (2005) (Capacity: 267,104)			Phase III (2010) (Capacity: 402,914)		
	$7.00	**$7.50**	**$8.00**	**$7.00**	**$7.50**	**$8.00**	**$7.00**	**$7.50**	**$8.00**
Low-growth scenario	(-2.8%)	+4.9%	+12.4%	(-2.3%)	+5.4%	+13%	(-18.3%)	(-11.9%)	(-5.5%)
Moderate-growth scenario	(-2.8%)	+4.9	+12.4	+6	+14.3	+22.6	+4.9	+13.1	+21.4
High-growth scenario	(-2.8%)	+4.9	+12.4	+17	+26.4	+35.6	+20.6	+30	+39.5

Note: Results of model testing of average ticket prices of $7.00, $7.50, and $8.00.
Profit or (Loss) indicated as a percentage of operating costs.

Findings by Phase

Phase I (2001-2002) – Based on the cost model, the only profitable scenarios for the first phase of ferry operations, require an average ticket price of $8.00, which yields a profit of approximately 12 percent. With the projected modest ridership increases and the minimal gateway and shuttle schedule assumed is minimal for this short initial phase, there are no apparent variables which can be adjusted to keep the fares lower other than subsidizing the inter-island shuttle, as has been done for the past 2000 season. These findings suggest that the amount of service scheduled or allowed by concession needs to be carefully scheduled in the Phase I period in order to minimize operational subsidies until ridership increases.

Phase II (2003-2005) – In Phase II, the increased ridership expected from adding Spectacle Island as a new attraction requires a ticket price of $7.00, $7.50, or $8.00 depending on the growth scenario. While the proposed operation schedule is still relatively minimal for this phase, it can be covered with the varying ticket prices for each of the growth levels: $7.00 for high growth, $7.50 for moderate growth, or $8.00 for low growth. These findings suggest that the amount of service scheduled still needs to be carefully scheduled in the Phase II period

Phase III (2006-2010) – The findings for Phase III are somewhat more encouraging regarding profitability as the projected ridership increases are more substantial. However, even the $8.00 ticket price fails to support a profit for the low-growth scenario, and the $7.00 ticket price fails to support a profit at the moderate growth scenario. The expanded schedule of Gateway and shuttle services are needed to provide access to the resources projected to be open in Phase III. These findings suggest that the system can be supported by one of the three ticket prices depending on the growth level, but that additional services may be unprofitable.

6.4 Management Options and Recommendations

6.4.1 Summary Findings and Recommendations

The recommendations for management choices by phase are the result of the full system analysis that included the operations cost model as described in this Chapter, as well as the assessment of current and past operations, stakeholder interests, and the proposed route analysis. While the cost model is not intended to represent the actual reality of any given phase of projected ferry services, it does provide some insights into the management choices open to the Boston Harbor Island Partnership (the "Partnership"). Because of the many variables inherent in the complex network of transportation services, support facilities, island management, and evolving vessel operating factors, the recommendations are presented as a limited set of options rather than a precise list of actions. The key findings on which the management options are based include the following:

- Ferry operation cost feasibility is primarily dependent on substantial increases in visitation and paid fares to the islands, if the other variables of season length, islands served, ticket affordability, and frequency of service are to be maintained.

- Provision of timely capital improvements in docks and support facilities needs to be achieved independently of the ferry operation for the 10-year time horizon. Unless the visitation and ferry ridership increases at dramatically higher levels than projected, or the ticket prices are raised significantly, there does not appear to be extra profit in the ferry system that could be returned to the Island Alliance (or possibly the BHI Partnership) in the form of landing fees or other revenues. It will be enough of a challenge to have a ferry system that is self sufficient and capable of supporting the inter-island shuttle loops.

- The Partnership will need to carefully control and manage ferry concessions in order to achieve the desired economic self sufficiency of the transportation system.

- The Partnership will also need to control and manage the dock sites in order to be able to control the ferry concessions. Dock management requirements would include landings at all existing and new island sites and at core route Gateway sites including Downtown/Long Wharf and Hingham/Hewitts.

- For the Phases I and II when ridership increases are expected to be low to moderate, a return to a single operator concession contract for gateway and shuttle services may be the most cost effective management technique.

- For Phase III multiple-operator concessions may be more appropriate to the more complex route structure, but will only work without subsidy for the moderate to high ridership growth scenarios.

Specific recommended management options are summarized as follows by phase:

- **Phase I** (2001-2002) recommended management choices include several options:

    1. Single Operator/$8.00 Average Ticket

    2. Single Operator/$7.00 Average Ticket/Shuttle Subsidy

- **Phase II** (2003-2005) recommended management choices are similar to Phase I and include the following three options:

    1. Single Operator/$7.50 Average Ticket (Moderate or High Growth)

    2. Single Operator/$7.00 Average Ticket/Shuttle Subsidy (All Growth)

    3. Multiple Operators/$8.00 Average Ticket/Landing Fee for Shuttle (High Growth)

- **Phase III** (2006-2010) recommended management choices for an expanded core operation include a more complex array of options:

    1. Single Operator/$7.00 Average Gateway Ticket/$1.00 Shuttle Ticket (Low and Moderate Growth)

    2. Single Operator/$8.00 Average Ticket/Shuttle Subsidy (Low Growth)

    3. Single Operator/$7.50 Average Ticket (Moderate Growth)

    4. Single Operator/$7.00 Average Ticket (High Growth)

    5. Single Operator/$8.00 Average Ticket/Landing Fee (Moderate or High Growth)

    6. Multiple Operators/$8.00 Average Ticket/Landing Fee for Shuttle (High Growth)

6.4.2 Description of Recommended Management Options

Management options for the three phases were generated based on the findings of the cost model tests. The management options for the short duration Phase I operations are limited because of the low ridership levels expected, and recent experiences with actual ferry concession agreements. As the ridership growth projections increase in Phases II and III, the number of feasible management options increase, but begin to be differentiated by the growth scenarios for each phase. The following options are presented by Phase.

Phase I

The options for phase I are limited by the combination of low ridership and the need to continue to provide core-level services equivalent to current operations. The choices of management are differentiated by allowable average ticket prices and treatment of the shuttle service. Option 1 is analogous to the single operator concession contracts which were effective until the 1999 season. Option 2 is similar to the concession contract that resulted in the 2000 season, when multiple operators were sought in the RFP process but which ended up with a single major contractor.

- **Phase I** (2001-2002) recommended management choices include two options:

    1. **Single Operator/$8.00 Average Ticket –** A single operator would contract for core gateway and shuttle services with an allowance for increased average ticket price to $8.00. Sufficient revenue would be generated to include shuttle operations without subsidy.

    2. **Single Operator/$7.00 Average Ticket/Shuttle Subsidy –** A single operator contract concession for core gateway services would include the average ticket price kept at $7.00, combined with a partial shuttle subsidy allowance of approximately $84,000 to offset losses and allow for a 10 percent profit.

Phase II

The Phase II options are somewhat more varied since there are substantial differences in the ridership growth projections for Low, Medium or High growth levels. The options described need to be tied to different ridership levels, ticket prices, and resulting revenue levels. The ridership levels are generally still too low for most growth scenarios to provide an economically self sufficient system without either increased ticket prices and/or shuttle service subsidies.

- **Phase II** (2003-2005) recommended management choices are similar to Phase I and include the following three options:

    1. **Single Operator/$7.50 Average Ticket (Moderate or High Growth) –** A single operator would contract for core gateway and shuttle services with allowance for increased average ticket price to $7.50. This would produce sufficient revenue for reasonable profits at moderate and high-growth scenarios, but only a modest profit (five percent) at the low-growth scenario.

    2. **Single Operator/$7.00 Average Ticket/Shuttle Subsidy (All Growth Levels) –** A single operator would contract for core gateway services with average ticket prices kept at $7.00, combined with partial shuttle subsidy allowances of differing amounts depending on the ridership growth level. If the growth is at the low scenario level, a shuttle subsidy of approximately $94,000 would be needed to offset losses, and allow for a 10 percent profit. If the growth is at the moderate level, a subsidy of approximately $31,000 would be needed. With the high-growth scenario, sufficient revenues would be realized and no shuttle subsidy would be needed.

    3. **Multiple Operators/$8.00 Average Ticket/Landing Fee for Shuttle (High Growth) –** Multiple operators would contract for core and shuttle services with average ticket prices raised to $8.00. Operators would be required to pay a per passenger landing fee to the ferry operations managing entity over a contract specified moderate growth level. The fees would be used to pay for the shuttle concession operation. This management approach would only work for the high-growth scenario.

Phase III

With the increased levels of core service and resulting higher operating costs, combined with generally higher but still varying ridership growth scenarios, the array of management options becomes more complex. While the higher ridership and revenues allow for a wider range of choices including multiple operators, the individual options are largely tied to specific growth scenarios. This suggests that the contract management may need to include conditions requiring operators to submit annual audits of ridership, revenues and costs to determine such factors as changing shuttle subsidy levels, or landing fee requirements. Ridership patterns will be much more predictable closer to the actual years of operation, so that management options will in reality be subsets of the long list below. For example, the actual ridership in 2004 indicate that the ridership growth trends are toward the Moderate-Level Scenario, then ferry concession solicitations and agreements can be based on those limited options for that particular scenario.

- **Phase III** (2006-2010) recommended management choices for an expanded core operation include a more complex array of six options:

    1. **Single Operator/$7.00 Average Gateway Ticket/$1.00 Shuttle Ticket (Low and Moderate Growth) –** If the ridership levels remain at low or moderate levels and gateway ticket prices are to be kept at the equivalent of $7.00 average, additional ticketing for shuttle routes would be needed to cover the increased amount of inter-island service. The shuttle would be a self sufficient separate operator concession along with multiple-Gateway concessions and operators.

    2. **Single Operator/$8.00 Average Ticket/Shuttle Subsidy (Low Growth) –** Alternatively, if the ridership remained at the low growth, a single operator would contract for core gateway and shuttle services with allowance for increased average ticket price to $8.00. For the low-growth scenario, a shuttle subsidy of approximately $190,000 would be needed for the inclusive concession.

    3. **Single Operator/$7.50 Average Ticket (Moderate Growth) –** If the ridership increases to moderate levels, a single operator contract for core gateway and shuttle services could be used with allowance for increased average ticket price to $7.50. This would produce sufficient revenue for reasonable profits at moderate and high-growth scenarios, but would not work for the low-growth scenario.

    4. **Single Operator/$7.00 Average Ticket (High Growth) –** If the ridership increases to high levels, a single operator contract for core gateway and shuttle services could be used with allowance for the equivalent average ticket price of $7.00. This would produce sufficient revenue for reasonable profits at high-growth scenarios, but would not work for the moderate or low-growth scenario.

    5. **Single Operator/$8.00 Average Ticket/Landing Fee (Moderate or High Growth) –** Alternatively, if the ridership increases to high levels, a single operator contract for core gateway and shuttle services could be used with allowance for the equivalent average ticket price to increase to $8.00, with the requirement that the operator pay a per-passenger landing fee to the ferry operations managing entity over and above a contractually specified moderate growth level. This management approach would be the method for realizing income for maintenance or dock management over the long term. This approach would still produce sufficient revenue for reasonable profits in excess of 10 percent at the moderate and high-growth scenario, but would not work for the or low-growth scenario.

    6. **Multiple Operators/$8.00 Average Ticket/Landing Fee for Shuttle –** Finally, if the ridership increases to high levels, multiple-operator concession contracts for core gateway and shuttle services could be used with allowance for the equivalent average ticket price to increase to $8.00, and with the requirement that the operators contribute a $1.00 per passenger landing fee to be paid to the ferry operations managing entity which in turn would be used to pay for the shuttle concession.

6.5 Project Funding[1]

6.5.1 Federal Transportation Planning Process

The U.S. Department of Transportation (DOT) provides funding and technical support for Federal lands transportation systems through the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The FHWA currently provides the majority of technical support and administers the primary U.S. DOT funding programs for Federal lands ATS projects. The FTA primarily provides technical support to the FLMAs. Other U.S. DOT agencies available to assist the FLMAs include the Maritime Administration, the Federal Aviation Administration, the Federal Railroad Administration, the National Highway Traffic Safety Administration, the Federal Motor Carrier Safety Administration, and the Research and Special Programs Administration.

Federal regulations require metropolitan planning organizations (MPO) and states to develop long-range transportation plans in order to be eligible for Federal transportation funds. These long-range plans provide for the development and implementation of the intermodal transportation systems of States and metropolitan areas. The transportation plans are updated periodically and have a minimum 20-year forecast period. The MPOs and States also develop transportation improvement programs that include a priority list of all proposed FHWA- and FTA-funded strategies and projects to be carried out within a three-year period. The transportation improvement programs or TIPs are updated at least once every two years.

All NPS sites assessed for the Boston Harbor NPS Sites ATS study are within the Boston Metropolitan Planning Organization jurisdiction. MPOs are the federally designated forum for transportation planning in urbanized areas of over 50,000 population. The MPOs, in cooperation with states, transit operators, and with input from the public, develop the metropolitan transportation improvement programs (TIP). TIPs include the FHWA- and FTA-funded projects within the boundaries of the metropolitan planning area. All projects in Federal sites located within metropolitan planning area boundaries that are funded by the FHWA or the FTA must be included in the metropolitan TIP.

The statewide transportation improvement program (STIP) includes all FHWA- and FTA-funded strategies and projects within the boundaries of the State. Metropolitan TIPs are included within the STIP, either by reference or by incorporation into the STIP. Each State must submit the STIP to the FHWA and the FTA for approval at least once every two years. The STIP must be financially constrained by year which means that funding sources for each project are identified. All projects in Federal sites located within the State that are funded by the FHWA and the FTA, including the Federal Lands Highway Program (FLHP) discussed in the following section, must be included in the STIP. In order to accomplish this, each Federal Land Management Agency, including the National Park Service, develops a priority list of FLHP projects (FLHP TIP) for each appropriate State and MPO.

The FLH Division offices exercise the authority to approve FLHP TIPs developed by the FLMAs. After approval by the appropriate FLH Division office, the FLHP TIPs are then forwarded to the States and MPOs for inclusion into the STIP and metropolitan TIP. This assures that all FHWA- and FTA-funded projects and strategies are included in the statewide and metropolitan TIPs as required by Federal law, and also helps to ensure coordination between FLMAs, States and MPOs.

[1] Material in this section was summarized from: Cambridge Systematics, Inc., *Federal Lands Alternative Transportation Systems Study (Volume II): Financing Opportunities*, prepared for FHWA and FTA, October 2000.

6.5.2 FHWA and FTA Funding Options

Table 6.9 provides an overview of the funding programs relevant to the Boston Harbor NPS Sites under FHWA's Federal Lands Highway Program (FLHP). The FLHP funds are provided by the FHWA to the FLMAs for their use, but each program category has different requirements and restrictions. For the National Park Service, the FLHP provides the flexibility to fund ATS projects such as water transportation services. In fiscal year 2000, the NPS set aside $8.4 million for ATS projects. Table 6.10 provides an overview of other FHWA and FTA programs which have applicability to projects on Federal lands. The program funds in Table 6.10 are primarily provided to the States for distribution within their boundaries. To receive benefits from these funding programs, the FLMAs must partner with the States and/or other local governments, or transit operators. Therefore, the distinction between Table 6.9 and Table 6.10 is that FLHP funds are provided exclusively for FLMAs, while the other FHWA and FTA funding programs are broadly applied and FLMAs must compete with other non-FLMA organizations for these funds.

6.5.3 Additional Sources of Funding

In 1994, President Clinton issued Executive Order 12893, which established more cost-effective investment as a priority for the Administration and directed Federal agencies to seek greater private sector participation in infrastructure investment and management. Since that time, all Federal agencies have focused on ways to leverage Federal investments, thereby obtaining a higher return for Federal dollars invested, and are developing policies and programs to attract private sources of funding for investments in infrastructure.

Additional sources of funding encompass a broad range of revenue options and financing tools. These sources are used to expand the pool of resources available for funding infrastructure and accelerate the development of projects that might otherwise be held back due to funding limits from traditional sources. As a general rule, additional sources of funding do not represent new sources of Federal funds. Instead, they represent sources of revenue outside the traditional Federal funding programs which are used to supplement and leverage Federal sources.

Two categories of additional sources of funding are described in the remainder of this section: revenue sources and financing tools. Revenue sources are non-traditional, non-Federal sources that provide funding for specific transit projects. Financing tools are primarily mechanisms to leverage funds obtained from other sources.

6.5.4 Revenue Sources

A variety of revenue sources have the potential to provide funding for ATS projects. Following is a description of various options for funding transit needs. It is important to note that the amount of funding that might be raised depends to a large extent on the characteristics of the project or the program of projects being funded. The site location, the purpose for which funding is needed, and numbers of visitors all affect the likelihood of obtaining funding.

The revenue sources identified as part of this report include:

- User fees;
- Private sponsorships;
- Advertising;
- State and Local Funds;
- Fund raising and contributions; and
- State Infrastructure Banks.

TABLE 6-9: FEDERAL LANDS HIGHWAY PROGRAM

Program	Overview	Authorized Funding	Eligible Activities	Fund Distribution	Match	Comments	Planning, Capital, O&M
FHWA							
Federal Lands Highway Program (FLHP)							
Park Roads and Parkways (PRP) Program	The PRP program is the primary funding source provided by the U.S. DOT for the transportation network serving the National Park System. PRP program funds may be used to fund projects on public roads, including park roads and parkways. Park roads are public roads that are located within, or provide access to, an area in the National Park System with title and maintenance responsibilities vested in the United States; parkways are authorized by Congress on lands to which title is vested in the U.S. The program is jointly administered by the FHWA and the NPS.	2000 $165M 2001 $165M 2002 $165M 2003 $165M	1. PRP program funds may be used to fund transportation planning, research, engineering, and construction or reconstruction of any type of transportation project eligible for assistance under Title 23 that is within or adjacent to or provides access to the National Park System. These include, but are not limited to, roadway, bridge, transit, ITS, and pedestrian and bicycle facilities. 2. PRP program funds may be used as the non-Federal share for National Highway System Program, Congestion Mitigation and Air Quality Improvement Program, Surface Transportation Program, and Interstate Maintenance Program projects. 3. PRP program funds may be used as the non-Federal share for National Scenic Byways activities.	PRP program funds are distributed within the NPS in accordance with the 1983 FHWA/NPS interagency agreement, and the "FLHP, PRP Revised Funding Allocation and Project Prioritization Criteria" document. PRP program funding is composed of 3 categories. Each of these categories receives a specific amount of funding as agreed to by the FHWA and the NPS. Category I: 3R and 4R projects. The funding is distributed by formula to each region. Category II: Congressionally mandated projects. The funding is provided for specific projects. Category III: Alternative transportation systems planning and implementation. The funding is distributed through an annual call for projects. The Choosing By Advantage process is used to select projects.	Federal share is 100%	PRP program roadway and bridge improvement/ replacement projects are primarily undertaken on park roads and parkways. PRP program roadway and bridge improvement/ replacement projects, however, may be undertaken on other public roads, including State/locally owned and maintained roadways. Through policy developed by the FHWA and the NPS, pedestrian and bicycle facilities are only funded when associated with roadway improvement projects.	Planning Capital

TABLE 6-9: FEDERAL LANDS HIGHWAY PROGRAM (CONTINUED)

Program	Overview	Authorized Funding	Eligible Activities	Fund Distribution	Match	Comments	Planning, Capital, O&M
FHWA							
Federal Lands Highway Program (FLHP)							
Public Lands Highways – Discretionary (PLH-D) Program	The PLH-D Program is a discretionary funding program within the PLH Program. 34% of the total PLH funds are set aside for select discretionary projects The FHWA administers the PLH-D program.	2000 $83.6M 2001 $83.6M 2002 $83.6M 2003 $83.6M	PLH – D program funds may be used to fund any type of transportation project eligible for assistance under Title 23. Projects include, but are not limited to reconstruction of existing roads, preliminary engineering and design, ITS, planning studies, safety and visitor center enhancements.	FHWA issues annual calls for PLH – D projects. States submit project applications to the FHWA. Projects are selected for PLH-D funding by the FHWA from those candidate projects submitted by the States. Funds for selected projects are provided directly to the State transportation departments. Through agreement with the State, FLMAs may directly receive the PLH-D funds from the FHWA if projects they submit through the State are selected for PLH-D funding. The projects are selected on the basis of need as determined by the FHWA. Preference is given to those projects which are significantly impacted by Federal land and resource management activities. Preference is also given to projects which are proposed by States which contain at least 3% of the total public lands in the Nation.	Federal share is 100%	The PLH-D program may provide funds for projects on Federal lands; however, there is significant competition for the funds. Project applications must be submitted by the FLMAs to the State in which the project is located.	Planning Capital

TABLE 6-10: FHWA AND FTA PROGRAMS WITH POTENTIAL FOR FUNDING FEDERAL LANDS PROJECTS

Program	Overview	Authorized Funding	Eligible Activities	Fund Distribution	Match	Comments	Planning, Capital, O&M
FHWA							
Surface Transportation Program (STP)	The STP provides flexible funding that may be used by States and localities for projects on any Federal-aid highway (FAH). STP funds are provided to State departments of transportation. Transportation Enhancements is a subcategory of the STP program. 10% of the STP program funding is set aside for Transportation Enhancement activities. 10% of the STP program funding is set aside for safety programs funding elimination of hazards of railway-highway crossings and other hazardous locations on any public road.	2000 $5,592M 2001 $5,703M 2002 $5,795M 2003 $5,905M	STP funds may be used for the following activities: 1. Highway projects on the Federal-aid Highway system including rural arterials, rural major collectors, urban arterials, urban collectors; bridge projects on all public roads; transit capital projects; and public bus terminals and facilities. 2. Programs to reduce extreme cold starts. 3. Environmental restoration and pollution abatement projects. 4. Natural habitat mitigation. 5. Modifications of existing public sidewalks to comply with the Americans with Disabilities Act. 6. Infrastructure-based intelligent transportation system capital improvements. 7. Certain bicycle, pedestrian, and parking facility projects. 8. Certain other transportation-related projects.	STP funds are distributed to the States using the following formula: 25% based on total lane miles of FAH in the state as a % of total FAH lane miles in the U.S. 40% based on total VMT on lanes of FAH in the state as a % of total VMT on FAH in the US. 35% based on estimated tax payments attributable to highway users in the state paid into the Highway Trust Fund as a % of total payments. Projects are selected through the Statewide and metropolitan transportation planning processes.	STP projects are funded with an 80% Federal share and with a required 20% non-Federal share. When STP funds are used for Interstate projects, the Federal share can reach 90%. For certain projects that cross Federal lands, the Federal share can be 100%. FLHP and FLMA appropriated funds may be used as the non-Federal share for STP funded activities.	The ability to use FLHP and FLMA appropriated funds as the non-Federal share provides opportunities to build strong partnerships between the FLMAs and state/local governments. Project funding is very competitive.	Planning Capital Maintenance

TABLE 6-10: FHWA AND FTA PROGRAMS WITH POTENTIAL FOR FUNDING FEDERAL LANDS PROJECTS (CONTINUED)

Program	Overview	Authorized Funding	Eligible Activities	Fund Distribution	Match	Comments	Planning, Capital, O&M
FHWA							
Transportation Enhancements (TE) Program	TE activities are transportation-related activities designed to strengthen the cultural, aesthetic, and environmental aspects of the Nation's intermodal transportation system. TE program funds are provided to State departments of transportation.	10% of STP set-asides plus other mandated projects	TE activities must relate to surface transportation. Activities include, but are not limited to: 1. Provision of safety and educational activities for pedestrians and bicyclists. 2. Scenic or historic highway programs (including provision of tourist and welcome centers). 3. Establishment of transportation museums. 4. Environmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity. 5. Archeological planning and research. 6. Landscaping and other scenic beautification, historic preservation, rehabilitation, and operation of historic transportation buildings, structures, or facilities.	TE funds are administered through a process established by each State. Funds are typically programmed through the statewide or metropolitan transportation planning process.	TE activities are funded with an 80% Federal share and a required 20% non-Federal share. FLHP and FLMA appropriated funds may be used as the non-Federal share for TE funded activities.	Because of the aesthetic and environmental emphasis of the program, FLMAs, in partnership with State and/or local governments, often have projects that qualify for TE funds. Project funding is very competitive, because of the wide range of projects that are eligible.	Capital

TABLE 6-10: FHWA AND FTA PROGRAMS WITH POTENTIAL FOR FUNDING FEDERAL LANDS PROJECTS (CONTINUED)

Program	Overview	Authorized Funding	Eligible Activities	Fund Distribution	Match	Comments	Planning, Capital, O&M
FHWA							
Congestion Mitigation & Air Quality Improvement (CMAQ) Program	The CMAQ program funds projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and small particulate matter (PM_{10}) which reduce transportation-related emissions. CMAQ program funds are provided to State departments of transportation.	2000 $1,358M 2001 $1,385M 2002 $1,407M 2003 $1,434M	Projects include, but are not limited to: public transit investments, ITS projects, and non-motorized transportation projects such as the development of bicycle and pedestrian trails. Other eligible projects are extreme low-temperature cold start programs and Magnetic Levitation Transportation Technology Deployment program projects.	Funds are distributed to States based on population and severity of pollution with weighting factors for ozone and CO maintenance areas, CO non-attainment areas, and ozone submarginal areas. TEA-21 expands funding to PM_{10} non-attainment and maintenance areas and areas designated as non-attainment under the revised 1997 air quality standards. Projects are selected through the Statewide or metropolitan transportation planning process.	CMAQ projects are funded with an 80% Federal share and a required 20% non-Federal share. For projects that cross Federal lands, the Federal share can reach 100%. FLHP and FLMA appropriate funds may be used as the non-Federal share of the CMAQ projects.	The CMAQ program has limited applicability to Federal lands because of the air quality standards requirements, although many major parks such as the Great Smokies and Acadia have air quality problems. The CMAQ program is a good potential source for urban area sites but funding is very competitive. FLMAs must partner with State or local governments to obtain funding.	Capital

TABLE 6-10: FHWA AND FTA PROGRAMS WITH POTENTIAL FOR FUNDING FEDERAL LANDS PROJECTS (CONTINUED)

Program	Overview	Authorized Funding	Eligible Projects	Fund Distribution	Match	Comments	Planning, Capital, O&M
FTA							
Urbanized Area Formula Grants (Sec. 5307)	This program provides transit capital and planning assistance to urbanized areas with populations greater than 50,000. Operating assistance is also available to areas under 200,000.	**Authorized:** 2000 $2,923M 2001 $3,147M 2002 $3,371M 2003 $3,596M **Guaranteed:** 2000 $2,773M 2001 $2,997M 2002 $3,221M 2003 $3,446M	Section 5307 funds may be used for: Capital transit investments of land, technology, engineering, design, etc., for constructing or improving mass transit infrastructure and operations. Transit operating assistance to cover costs incurred in operating a transit program, including preventive maintenance for urbanized areas of over 200,000 population and operating and maintenance funds for urbanized areas of under 200,000 population. Projects that enhance mass transit use, such as bus shelters, landscaping, street furniture, historic preservation, etc.	Funds are allocated to areas with less than 200,000 based on population and population density. Funds are allocated to designated recipients in areas with more than 200,000 based on population, population density, and transit data. Designated recipients are public bodies that have the legal authority to receive and disperse Federal funds. The program provides operating assistance only to urbanized areas with a population less than 200,000. 1% is set aside for transit enhancement projects in urbanized areas of more than 200,000. Capital expenses definition includes preventive maintenance for areas over 200,000.	Typically 80% Federal share with required 20% non-Federal share. 90% Federal share with required 10% non-Federal match for cost of vehicle-related equipment to comply with the Clean Air Act Amendments or Americans with Disabilities Act. 95%/5% for transit enhancement projects providing bicycle access to mass transit. Another exception to the 80% Federal share is when flexible funds for certain FHWA programs are being used.	Most applicable to Federal lands located in urbanized areas under 200,000 such as national monuments and national historic parks and sites. Must coordinate with the designated recipient. FLMAs need to work with grantees to identify routes and services that benefit their sites. Modification of existing routes and services may be considered to service FLMA sites.	Planning capital

TABLE 6-10: FHWA AND FTA PROGRAMS WITH POTENTIAL FOR FUNDING FEDERAL LANDS PROJECTS (CONTINUED)

Program	Overview	Guaranteed Funding	Eligible Projects	Fund Distribution	Match	Comments	Planning, Capital, O&M
FTA							
Capital Investment Grants and Loans (Sec. 5309)	This program (formerly Discretionary Grants) provides transit capital assistance for new fixed guideway systems and extensions to existing systems (new starts), fixed guideway modernization and bus and bus-related facilities. Not a likely source of funding for the FLMAs.	2000 $2,501M 2001 $2,646M 2002 $2,841M 2003 $3,036M	New starts include fixed guideway systems, and the development of transit corridors and markets to support eventual construction of fixed guideway systems. Fixed guideway modernization is applied to maintain existing rail, trolley-bus, aerial tramway, inclined plane, cable car, people movers, ferryboats, motor bus operations, and high-occupancy vehicle lanes. Bus expenditures are available for new bus fleets and service expansion and other related facilities and services.	Funds are distributed as follows: 40% to fixed guideway modernization, 40% to new starts, 20% to buses. New starts and bus funds are discretionary. Fixed guideway modernization formula apportionment uses systemwide mileage based on data used to apportion the funding in FY 1998. At least 5.5% of the bus portion must go to non-urbanized areas.	Typically 80% Federal share with required 20% non-Federal share. 90% Federal share with required 10% non-Federal match for cost of vehicle-related equipment to comply with the Clean Air Act Amendments or Americans with Disabilities Act.	Section 5309 may be applicable to Federal lands trying to expand transit service and shuttle bus fleets. Section 5309 is not a likely source of funding for most FLMAs, due to competing needs of recipients. The best opportunities for FLMAs are from modification or extension of existing urban or rural transit routes.	Capital

TABLE 6-10: FHWA AND FTA PROGRAMS WITH POTENTIAL FOR FUNDING FEDERAL LANDS PROJECTS (CONTINUED)

Program	Overview	Authorized Funding	Eligible Projects	Fund Distribution	Match	Comments	Planning, Capital, O&M
FTA							
Clean Fuels Formula Grant Program	This program assists transit operators in the purchase of low-emissions buses and related equipment, construction of alternative-fuel fueling facilities, modification of garage facilities to accommodate clean-fuel vehicles, and assist in the utilization of biodiesel fuel. This program is not a likely source of major funding for the FLMAs.	2000 $200M 2001 $200M 2002 $200M 2003 $200M	Eligible projects include purchase of clean-fuel buses, construction, modification and/or leasing of associated facilities, and repowering or retrofitting of existing buses. Eligible technologies include compressed natural gas, liquefied natural gas, biodiesel fuel, battery, alcohol-based fuel, hybrid electric, fuel cell or other zero emissions technology.	The program provides funding only to grantees that apply, using a formula based on population, fleet size, bus passenger miles, and severity of air quality non-attainment. Establishes a cap on grants to any one recipient of $15 million for areas with less than 1 million and $25 million for areas of 1 million or more.	80% Federal share with required 20% state/local match.	A potential source of funding for small Federal lands projects involving shuttle buses. Relatively small total funding budget is primary constraint, so funding of major projects is unlikely. **No funds were appropriated for FY 1999 or 2000.**	Capital

TABLE 6-10: FHWA AND FTA PROGRAMS WITH POTENTIAL FOR FUNDING FEDERAL LANDS PROJECTS (CONTINUED)

Program	Overview	Authorized Funding	Eligible Projects	Fund Distribution	Match	Comments	Planning, Capital, O&M
FTA							
Ferry Boat Discretionary Program	The Ferry Boat Discretionary (FBD) Program provides a special funding category for the construction of ferry boats and ferry terminal facilities. The program was created through the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and reauthorized through FY2003 under the Transportation Equity Act for the 21st Century (TEA-21).	**1998** Competitive: $30M **1999** Competitive: $18M NHS Set-aside: $20M **2000** Competitive: $18M NHS Set-aside: $20M **2001** Competitive: $18M NHS Set-aside: $20M **2002** Competitive: $18M NHS Set-aside: $20M **2003** Competitive: $18M NHS Set-aside: $20M	This program is for the construction of ferry boats and ferry terminal facilities. Competitive funds are available for improvements where: • The ferry facility is providing a link on a public road (other than interstate) or the ferry facility is providing passenger only ferry service. • The ferry and/or ferry terminal is either publicly owned, publicly operated, or a public authority has majority ownership and the operation provides substantial public benefits. • The ferry does not operate in international water except for Hawaii, Puerto Rico, Alaska and for ferries between a state and Canada.	National Highway System (NHS) set-aside funds are to be used for marine highway systems that are part of the National Highway System in Alaska, New Jersey, and Washington. Competitive funds are impacted by obligation limitations imposed by TEA-21 meaning that approximately $14 million will be available for candidate projects each of fiscal years 2000 through 2003. Funding may increase or decrease each year depending on the obligation limitation calculation and on estimated receipts to the Highway Trust Fund.	In accordance with ISTEA, the Federal share of the costs for any eligible project under this program is 80%.	Several criteria are used to evaluate the submitted candidates for selection for the competitive portion of the FBD program. Although there are no statutory criteria and FHWA has not established regulatory criteria for selection of FBD projects, the following criteria are considered: • **Expeditious completion of project –** Consideration is given to requests that will expedite the completion of a viable project. This is a project's ability to expeditiously complete usable ferry boat or terminal facilities within the limited funding amounts available. • **State priorities –** The individual State priority (specifically those projects ranked number 1) has been the single most important criteria for initial selection. This is the first hard criteria applied to candidate projects. Without the individual States priorities, for States submitting more than one project, a candidate project from that State may not be included in those projects being recommended by the program office for selection. • **Leveraging of private or other public funding –** Because the annual requests for funding far exceed the available FBD funds, commitment of other funding sources to complement the requested FBD funding is an important factor. • **Amount of FBD funding –** The requested amount of funding is a consideration. Realizing the historically high demand of funding under this program, modest sized requests to allow more States to receive funding under this program are given added consideration. • **National geographic distribution of funding within the FBD program –** Consideration is given to selecting projects over time among all the States competing for funding. Because the concept of equity was important in the development of TEA-21, project selection will also consider national geographic distribution among all of the discretionary programs as well as congressional direction or guidance provided on specific projects or programs.	Capital

User Fees

A user fee is a fee charged to a user of a facility, which is used to cover or defray the cost of providing the facility or a specific service. In a transportation context, user fees include tolls, fares, and parking fees. Other user fees include permit fees, license fees, and use permits.

In any user fee arrangement, a determination must be made of the costs that the user fees are expected to cover. The fee may be structured to cover only operating costs, or capital as well as operating costs. Alternatively, a user fee may be structured to cover all or a portion of the cost of the ATS service or facility. In any event, a balance must be achieved between the costs to be covered and the impact of the fee on the demand for park visitation. Stated differently, user fees can be valuable in raising revenues, but the existence of a fee may also reduce the number of visitors to a facility. Federal lands sites can charge fares for riding ATS, similar to those charged by a traditional transit system. One of the problems with this is that average party size is relatively high, and fares can become expensive for families and large groups. If free parking is available at their desired destinations, they are likely to remain in their automobile rather than using mass transit. Family or group fares can be used to mitigate this problem.

Water transportation systems and trams are generally more successful in charging fees than traditional shuttle bus services. The current fee charged for the use of the ferry to the Boston Harbor Islands is $8.00 for adults. Elsewhere, such fees can be substantial such as the distance-based fares in Denali NP, which range from $12.50 to $31 for adults. The Manitou Island Transit Ferry at the Sleeping Bear Dunes NL charges $20 for a round-trip fare and the NPS charges an additional $7.00 for admission to the National Lakeshore. The ability to charge these higher user fees without inhibiting usage is limited to transit systems that are a desirable component of the visitor experience and that serve sites where other options for access are not available.

Recreational Fee Demonstration Program – This program was initially authorized by Congress in 1995 and subsequently extended through fiscal year 2001. The fee demonstration program permits participating Federal lands sites to retain 80 percent of fees charged for internal use. These fees have been used primarily to address deferred maintenance requirements, although some sites have used funds for transit needs. None of the sites covered under the study currently charges an entrance fee. Adams National Historical Park has used a $2.00 per person fee to help fund its trolley service. In general, the program has been regarded by the participating agencies as a success. Whether the funds derived from recreational fees can be used to support transit projects depends on other competing funding needs, the level of fees generated, the cost of transit improvements, and the extension of the Fee Demonstration Program.

Private Sponsorships

Private sponsorships have been used for many years as a means to raise funding for recreational and quasi-public purposes. They range from large corporate sponsorships to individual contributions. A sponsorship may be attached to a specific facility, such as a sports stadium, or a major event, such as the Olympic Games. Sponsorships are also used to support the ongoing work of special purpose organizations, such as the Colonial Williamsburg Foundation or the Nature Conservancy. The support provided through a sponsorship may be provided in the form of cash or in donations of products or services.

Private donors choose to provide financial support for one or both of the following reasons:

- To increase the visibility of the donor and to project a positive image. In this regard, providing financial support through a sponsorship can be viewed as a form of advertising. Most corporations provide sponsorships for this purpose.

- To demonstrate support for the goals and objectives of the recipient organization. Most individuals make contributions for this purpose.

Advertising

The public transit industry had some success in recent years by allowing advertising in stations, in bus shelters, and on transit vehicles. The general concept is that an organization may publicize itself or its programs in exchange for a fee. Higher advertising payments require that higher levels of visibility be granted. An advertiser may choose to do general image advertising or more targeted advertising (for example, a neighboring business may wish to place a sign in a nearby transit station). Another advertising possibility is through the Internet such as providing links to private transit provider web sites. Transit providers may be willing to pay for the exposure that links on FLMA Internet sites would provide. Any advertising at NPS sites or related to NPS facilities must be consistent with NPS policies.

State and Local Funds

State and local option taxes have been commonly used to finance transit system improvements. These include general sales tax surcharges or increments, in addition to more targeted taxes on tourist-related expenditures. Items subject to these taxes may include hotels, restaurants, rental cars, and tickets to events such as theatre, sports, concerts, and festivals. Such taxes often are difficult to implement but are well-suited to many sites that have strong links to gateway communities. Taxes on tourist-related expenditures can generate substantial revenues that are paid primarily by non-residents, and thus are politically more attractive than locally generated sources. Local option taxes are most likely to be a viable funding mechanism when a new ATS provides transit service for the local community, in addition to the Federal lands site.

Fund-Raising and Contributions

An alternative method of raising these funds is through direct contributions from local businesses. This may be feasible where businesses see a direct benefit from the implementation of transit in their communities. The Acadia NP Island Explorer system, for example, goes directly to the door of hotels and motels that provide a contribution to the system. While a voluntary system can avoid the political difficulties involved in implementing taxes, it is less stable and reliable over the long term.

"Friends" groups and support organizations contribute substantial sums of money to many of the major Federal lands sites. These contributions have been used primarily for trail and facility development but could be used for transit projects as well.

State Infrastructure Banks

The National Highway System Designation Act of 1995 authorizes 34 states, including Massachusetts, to set up infrastructure investment funds, known as State Infrastructure Banks (SIB), to make loans and provide assistance to surface transportation projects. This program is designed to give states the capacity to increase the efficiency of their transportation investment and significantly leverage Federal resources by attracting non-Federal public and private investment.[2] States have greater flexibility because they are allowed to pursue other types of project assistance in addition to the traditional reimbursable grant.

SIBs offer below-market rate subordinate loans, interest rate buy-downs on third-party loans, and guarantees, and other forms of credit enhancement. SIBs are created with Federal seed money and offer states and local partners greater flexibility regarding the financial management of transportation projects. Perhaps the strongest aspect of this program is the ability to leverage Federal funds. Eligible projects include both highway and transit capital investments.

[2] FHWA fact sheet for the State Infrastructure Bank Program and *Statewide Transportation Planning Under ISTEA: A New Framework for Decision-Making*, U.S. DOT, FHWA, and FTA.

6.5.5 Financing Tools

The funding sources described above individually and collectively provide a range of options that could generate additional funding for transit projects. Maximizing the benefit of additional funding will most likely require the use of other financing tools. What follows is a description of a series of financing tools that could be used to leverage revenues and finance transit projects. This is not intended to be an exhaustive list of every financing option that is available. Rather, the discussion provides an overview of the range of concepts and financing approaches that may be used to finance transit projects.

The financing tools described below include:

- Public-Private Partnerships;
- Bonds;
- Certificates of Participation (COP);
- Leasing; and
- Federal credit.

Public-Private Partnerships

A public-private transportation partnership is an agreement between a public entity and a private organization, which provides for coordinated actions to plan, finance, construct, operate, and maintain a transportation facility or system. There is a wide variety of models of public-private ventures, but the essential element of all of them is a sharing of responsibility for raising capital and project risk. By sharing responsibility, the public entity is able to reduce the direct cost to the government of the facility and encourage private investment. Franchises and concessions are forms of public-private partnerships under which a privilege is conferred upon an organization or an individual by a government to provide a service or operate a business. Franchises generally refer to the operation of public utilities while concessions refer to food, retail, or entertainment operations. Either could be used to describe operation of transportation services on Federal lands. A governmental entity could grant a private company the right to provide a specified service under a set of defined business conditions, which will ensure that the government receives the services it requires and the company providing them is able to make a reasonable profit. A franchise or concession might call for the private entity to make capital investments as well as providing ongoing operations, or it could be limited to maintenance and operations.

The primary benefit of franchises and concessions is the flexibility that they allow in providing service. Federal lands sites often experience varied seasonal demand patterns. A private entity could more easily adapt their schedule and labor force to such conditions. Also, using a franchise or concession from a private group means that the FLMA is buying existing service expertise and does not need to train their own staff or hire new staff to provide the necessary service.

For these types of public-private partnerships to be viable there needs to be a reasonable expectation that sufficient business can be generated to support the cost of providing the service. In addition, if one of the objectives is to transfer responsibility of the capital investment to the private sector, the term must be long enough for the investment to be fully amortized.

Bonds

Bonds are debt instruments issued for periods of more than one year with the purpose of raising capital by borrowing. The Federal government, states, cities, corporations, and many other types of institutions sell bonds. A

bond is generally a promise to repay the principal along with interest on a specified date (maturity). Bond principal and interest payments can be met either from dedicated revenues (such as the user feeds described above) or general tax revenues.

Certificates of Participation (COP)

A certificate of participation is a financing instrument in which an investor buys shares of lease revenues of an agreement made by a municipal or governmental entity, rather than purchasing a bond secured by those revenues. COPs are used when a State faces limits on its ability to increase taxes or issue other forms of debt (such as California's Proposition 13 limits). This instrument is used in the public transit industry to purchase equipment.

Leasing

A lease is a contract under which an owner of property or asset allows another party to use the property or asset for a specified period of time in exchange for payment of rent or of use fees. A lease may or may not include a purchase option under which the lessee can apply lease payments toward the purchase price of the property or asset being used.

The principal benefit of leasing is that it reduces the up-front cost of major capital purchases and allows payments to be spread out over an asset's useful life or planned period of use. It also allows for the use of capital assets for a limited period of time without having to acquire them outright.

Federal Credit

TEA-21 authorized a new Federal credit program, known as the Transportation Infrastructure Finance and Innovation Act (TIFIA), which is designed to support large, nationally significant transportation projects. TIFIA provides direct loans, loan guarantees, and standby lines of credit for large projects – those costing over $100 million.

The program provides secondary or subordinate capital, repaid from dedicated project revenue streams, for up to one-third of the project costs. The project's senior debt must be investment grade. TIFIA assistance is available to public or private entities seeking to finance, design, construct, and operate a major surface transportation project. Such entities include State departments of transportation, local governments, transit agencies, special authorities, special districts, railroads, and private companies or consortia. The program does not contemplate lending directly to other Federal agencies (i.e., outside the DOT), but may have applicability to ATS projects sponsored or undertaken by eligible organizations.

Given that the costs of projects proposed in preceding sections of this report for the Boston Harbor NPS sites are less than $100 million, the TIFIA program is not appropriate as a funding mechanism at this time.

6.5.6 Development of a Federal-Aid Highway Funded Ferry Project

Once a ferry boat or ferry terminal project is selected to receive either Federal-aid highway formula or discretionary funding, this project must be developed in accordance with Federal requirements and procedures that apply to Federal-aid highway projects. The Federal-aid highway funding is **not** provided as a direct grant to the ferry operator; rather, this funding is administered through the State transportation department which is responsible for ensuring that Federal requirements and procedures are followed.

One important requirement is that **Federal-aid highway funding can only be used to pay for costs incurred after the FHWA has authorized the State to proceed** with the work. Therefore, for any phase of work on the ferry project where it is intended to use Federal-aid funds, from preliminary engineering through right-of-way

acquisition to construction, prior authorization of this work by the FHWA is essential to allow for reimbursement of the Federal share of incurred costs.

As a ferry boat or ferry terminal project is developed, requirements from Federal highway statutes and other Federal laws must be satisfied. Several of the key requirements follow:

Environmental Review

A project must comply with the National Environmental Policy Act. This requires that each project be evaluated to determine its impact on the environment. Some projects involving rehabilitation or safety upgrades may have minor impacts and are considered Categorical Exclusions not requiring preparation of an Environmental Impact Statement (EIS) or an Environmental Assessment (EA). For those projects that are not a Categorical Exclusion, an EA is usually prepared. If the EA reveals that the impacts are not significant, then a Finding Of No Significant Impact (FONSI) is prepared. However, if there will be significant impacts, a draft EIS is prepared in cooperation with the State transportation department.

Right-of-Way Acquisition

Acquisition of needed right-of-way for a project must comply with the requirements of the Uniform Relocation Acquisition and Real Property Acquisition Policies Act of 1970 (as amended by Title VI of the Surface Transportation and Uniform Relocation Assistance Act of 1987). Every eligible resident who is displaced because of the project must be offered a comparable replacement dwelling that is decent, safe, sanitary, and adequate to accommodate the displaced person. Relocation advisory services are furnished and payments are made to cover costs incurred for moving, replacement housing, and certain incidental costs. Businesses, farms, and nonprofit organizations also are reimbursed for moving and related expenses.

Project Construction

- **Competitive Bidding –** The physical construction of a project is to be done by a contract awarded by competitive bidding unless some other method, such as force account, is approved by the FHWA as more cost effective. The State transportation department assures there is an opportunity for free, open, competitive bidding, including adequate publicity of the advertisement or call for bids.

- **Davis-Bacon Wage Rates –** The Davis-Bacon Act requires the payment of predetermined minimum wage rates on certain Federally funded contracts. It applies to all Federal-aid highway contracts exceeding $2,000 and located on a Federal-aid highway. If the ferry boat or ferry terminal project is not on a route functionally classified as a Federal-aid highway, then Davis-Bacon does not apply. The State transportation department planning office can provide information on the functional classification of a roadway or ferry system.

  For ferry boat projects involving the building, alteration and repair of a ship, the Department of Labor (DOL) position is that inclusion of Davis-Bacon requirements in the contract are only necessary if the location of contract performance is known when bids are solicited. If Davis-Bacon is not included in a ferry boat project, the DOL requires that the contract provisions include:

  - A statement clause that explains why the wage rate determinations are not included;
  - A reminder that the contractor must pay at the very least the Federal minimum wage rate;
  - A reminder that the contractor must submit weekly certified payroll statements; and
  - A reminder that the contractor must comply with all other DOL labor standards.

- **Buy America –** The Buy America provisions require the use of domestic steel and iron in Federal-aid highway construction projects. However, waivers can be granted by the FHWA. In February 1994 the FHWA issued a nationwide waiver of the Buy America requirements for certain steel items used in the construction of ferry boats. The items included in the waiver were marine diesel engines, electrical switchboards and switch gear, electric motors, pumps, ventilation fans, boilers, electrical controls, and electronic equipment. Not included in the waiver were products readily available in the United States, such as steel pipe and tubing, and galvanized steel products. Additionally, items not included in the waiver remain subject to the Buy America requirements.

Disadvantaged Business Enterprise (DBE)

The main objective of the DBE program is to ensure that DBE firms have an opportunity to participate in Federal-aid funded contracts. Each state's DBE program and its annual goals are approved by the FHWA. State transportation departments are required to meet statewide DBE goals as defined in their annual program. The DBE goals and contract special provisions may be inserted on individual projects as necessary to meet the state's annual goal.

Use of Engineering Consultants

Consultant contracts used to provide engineering and design-related services may be financed with Federal-aid highway funds. When this occurs, these consultant contracts must result from negotiations which utilize qualifications-based selection procedures, commonly referred to as the Brooks Act requirements. Qualifications-based selection procedures do not allow for price to be used as a factor in the selection process. States may enact their own statutes which govern consultant selection procedures. These procedures can be based on qualification, price, or any combination of the two. If enacted, State procedures take precedence over the qualification-based requirement in the Brooks Act. Local governments must use the same procedures used by the State. Additionally, contracting agencies may use small purchase procedures for the procurement of engineering and design services when the contract does not exceed $100,000, as specified in the Federal Highway Administration regulations (23 CFR 172). Small purchase procedures are the procedures that the State would use with its own funds for this type of purchase. If small purchase procurements are used, price or rate quotations shall be obtained from an adequate number of qualified sources.

Design-Build

The design-build method of contracting is an alternative to the traditional design-bid-build contracting method. With the design-build procurement, the contracting agency identifies the end result parameters and establishes the design criteria. The prospective bidders then develop proposals that optimize their construction abilities. The submitted proposals may be rated by the contracting agency on factors such as design quality, timeliness, management capability and cost, and these factors may be used to adjust the bids for the purpose of awarding the contract. Federal-aid highway funds may participate in design-build contracts when approved under Special Experimental Project SEP-14 (currently requires FHWA Headquarters approval) and awarded using competitive bidding procedures. In Massachusetts, this also requires a legislative exemption.

Maintenance

Federal highway law requires that all federally assisted projects be properly maintained. For ferry facilities, proper maintenance includes operating the ferry boats in accordance with Federal as well as State and local laws and regulations.

6.5.7 Implications and Conclusions

It is difficult to draw definitive conclusions on the potential for financing transportation services for Boston Harbor NPS sites through the funding options described in this report. However, it is clear that all the funding sources will be effectively utilized only if stakeholder agencies are knowledgeable of the availability and applicability of various sources, and have continuous, coordinated, comprehensive planning and project development processes integrated into their ATS programs. This includes a close working relationship with State and local governments, gateway communities, and private organizations.

6.5.8 Actions for Financing Options

Successful project financing is most likely to be achieved when developed in the context of the transportation planning process. The FLMAs, states, and MPOs are beginning to work more closely together throughout their transportation planning processes. This cooperation will leverage the expertise of State, regional and local transportation planners who can provide guidance and support through the entire planning and project development process, and in application of financing options. FLMAs are also often able to leverage funding through these relationships. Another benefit of this cooperation will be closer coordination between Federal lands site planning activities (e.g., NPS General Management Plans and Site Management Plans) and State, regional, and local transportation planning efforts. Recent draft NPS Management Policies, for example, define a brief rationale and process for developing transit options that has strong parallels to the State and regional process.

Once involved in the transportation planning and project development processes, there are a number of key financial planning activities that FLMAs need to initiate. Some of the key financial activities are:

- **Identify, with State, regional and/or local transportation agencies, sources of public funding that may be used for the project**. Site personnel should emphasize opportunities for leveraging funds. The ability to use certain FLHP funds to match other Federal sources is one of the more significant opportunities.

- **Develop an initial financing plan with State, regional, and/or local transportation agencies after funding needs are identified**. The initial plan would represent an optimal funding mix identified cooperatively between transportation agencies and site personnel. Once a "reality check" is provided on the likelihood of achieving this strategy, shortfalls can be identified, modifications made and different elements added.

- **Perform additional market studies for projects that will involve innovative finance options**. For more complex options, an independent financial advisor may be needed. These resources may be costly and can be better leveraged when transportation proposals are developed as part of sitewide planning efforts.

Chapter 7: Supporting Programs

In addition to the various water transportation needs for the Boston Harbor NPS sites discussed in the preceding chapters of this report, additional programs and services to support park operations and water transportation services were identified and analyzed in conjunction with this planning effort. The following chapter discusses these supporting programs, specifically addressing programs for improved information services and signage, overall marketing of the Harbor Islands, and visitor trolley services for Charlestown Navy Yard (Boston National Historical Park) and Adams National Historical Park (Quincy).

7.1 Information and Signage

It was readily apparent during the site visits conducted for this study that an essential element of a functional ATS system is lacking at the four NPS facilities, that being adequate signage to provide visitors with basic wayfinding information to link available ATS services and the various park facilities and destinations. As discussed in Chapter 2, all park sites in the vicinity of Boston Harbor are accessible via public transportation services provided by the MBTA. Furthermore, all water transportation services within Boston Harbor and to the Boston Harbor Islands are accessible through landside public transportation. However, there is a lack of conveniently available information and signage providing basic directions for the inexperienced traveler in the use of public transportation as a means of access.

Without this basic information, the functionality of ATS services is impeded. Information must be provided to the potential user including schedule and stop location and orientation to park sites in order to instill a sense of security that such service is reliable and functional. This inadequacy was readily demonstrated by the absence of any visible directional signage or information for Adams National Historical Park at the exit from the Red Line in Quincy Center, despite the fact that the visitor center is less than half a block from the station. Clear and complete signage is essential to enable park visitors to utilize those ATS services which are already available. As described in the preceding sections of this report, improved and systematic signage is also essential to support proposed **new** ATS transportation services. Fundamentally, without sufficient information and signage to facilitate the connection between alternative transportation services and the park facilities for visitors unfamiliar with the park environment, the provision of the new transportation services is a useless endeavor.

7.1.1 Basic Concepts[1]

Effective wayfinding tools are necessary to establish clear pathways directing the user from one point to another; in this case, connecting transportation services and park destinations. These tools should provide critical information in a readily understood format, utilizing simple visual clues to help visitors move into and through unfamiliar environments. This information must be placed at timely and appropriate decision-making points such as at key intersections, parking lots, and termini of transportation services. In the absence of this information, people may be forced to ask for directions, can potentially get disoriented or lost, and are liable to have a less pleasurable experience during their visit. As a result, visitation may be negatively affected.

An efficient wayfinding program defines clear pathways to key destinations through signs that are user-friendly and understandable. Users sense order and feel secure that they will arrive at their intended destination even if they have never been in the area previously. The most effective programs provide this orientation with the fewest number of signs, pavement markings, or symbols. Users generally have only a few moments to determine what to look for before proceeding beyond a decision point. Therefore the system needs to provide critical information quickly, clearly, and memorably. A hierarchy of signage can be used as an informational system with

[1]Material summarized from: Douglas, Frank, *Showing the Way – An Effective Wayfinding Strategy Integrates Signage with Other Architectural Elements*, Trade Press Publishing Company, 1999.

a consistent format and message. Wayfinding messages must be prioritized, indicating major destinations first, and sub-destinations as the visitors approaches the desired location. Signage can incorporate colors as a coding device, be dual-language, and utilize pictures or international style symbols. "You are here" mapping can provide additional security for the user, particularly in large facilities. Most importantly, signage must be consistent to signal to the user that they are using the same information system from location to location and to provide the site destinations with a clearly defined identify.

7.1.2 National Park Service Sign Manual[2]

In 1988, the National Park Service published a sign manual for use by Park managers as an aid to the implementation of the NPS Traffic Control Sign System Guideline and in arriving at management decisions regarding other park signing needs. The guide is intended to be used by Park managers, in conjunction with the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD), in the design of all vehicular and pedestrian traffic control signing and related devices. With a primary focus on Park **roads**, it stipulates that park roads "are not intended to provide fast and convenient transportation, nor designed or intended to serve as commuter routes or connecting links to the Federal and state highway systems." The manual also states that it is "long-standing NPS policy to minimally intrude upon the natural or historic setting in National Park System areas, and to avoid an unnecessary proliferation of signs, while striving to ensure for the safety of park visitors."

While this manual's primary focus is on signage for park roadways, certain planning principals are cited which are relevant to the development of signage for visitors using ATS services. In developing a signage plan, the manual indicates the following questions should be considered:

1. What does the visitor need to know?
2. Is guidance or a message needed?
3. If so, where is the message needed?
4. What message is needed?
5. How shall the message be presented (sign, symbol, exhibit, audio, or other means)?
6. Is the sign for drivers of vehicles, pedestrians, or both?
7. At what speed is the visitor traveling?

In order to be effective, the manual indicates that a sign must:

1. Fulfill a need;
2. Command the attention and respect of the user;
3. Convey a clear simple message; and
4. Give adequate time for a proper response.

[2]National Park Service, 1988 National Park Service Sign Manual, updated August 11, 1999.

To fulfill these requirements, the manual cites five basic considerations:

1. **Uniformity –** Similar situations should be treated in the same way;

2. **Design –** The device (or sign) should assure that features such as size, contrast, color, shape, composition are combined to draw attention to the device and produce a clear meaning;

3. **Placement –** The device must be within the sight of the user so it commands attention and provides adequate time for response;

4. **Operation –** The right device must be installed to meet requirements at a given location; and

5. **Maintenance –** Devices must be maintained to a high standard to assure that legibility is retained; if no longer needed, it should be removed.

7.1.3 Signage for Boston NPS Sites

While it is beyond the scope of this study to design a detailed, site-specific signage plan for each of the four NPS sites in the vicinity of Boston Harbor, certain needs have been identified which can be used to establish guidelines for the development of a comprehensive signage and information program. The purpose of this program would be to facilitate the use of Alternative Transportation Services, primarily MBTA public transportation services, as a viable means of access to and from park facilities.

Some basic considerations:

1. All parks, with the exception of the individual Harbor Islands are located in older, densely developed urban areas with complicated street systems that, in many cases, are not hospitable to pedestrians. These streets often experience high traffic volumes and may also entail difficult pedestrian crossings.

2. All Boston area NPS parks consist of multiple sites which are not in immediate proximity to each other.

3. Many visitors to the park sites are from outside of the Boston area and are therefore unfamiliar with the MBTA system and, in many cases, may be unfamiliar with the use of any type of public transportation services. This can contribute to a sense of insecurity and apprehension in using these services.

4. Visitors need understandable directions from the termini of their transportation services to the ultimate destination. They also need direction in the reverse direction from a given park site, to return to transportation services. The path the visitor takes in one direction may not be the same path in reverse, particularly if they are visiting multiple sites within a park.

5. The transportation service used by the visitor to arrive at the site may not always be the service by which the visitor will leave the site. In some cases, directions may also be needed to direct visitors to other transportation services such as trolleys or water ferries, not only to a specific park site or park destination.

6. Visitors to a specific park may also intend to visit other parks as part of their overall visit to the Boston area. Therefore information should be available for all facilities at each park visitors center and also on the available transportation services. This also raises the possibility of developing a consistent format for signage and materials to promote joint visitation including a comprehensive logo or emblem representing all Boston NPS sites.

7. Basic components of a signage/information system for each site would include a single or multiple display map at critical locations indicating the map's specific place location ("You are here") and directional signs at key decision points, directing the visitor to the next decision point, park site, or transportation facility.

7.1.4 Park-Specific Considerations

Apart from consideration of a unified signage and marketing plan (discussed in following section) addressing the comprehensive needs of the four NPS park areas in the vicinity of Boston Harbor, certain signage needs should be specifically addressed at each facility as follow:

Boston Harbor Islands National Park Area

1. Long Wharf, the current gateway to the Harbor Islands from downtown Boston, is located immediately adjacent to Aquarium Station on the Blue Line Rapid Transit Line. Signage should be posted within the station to direct visitors to the BHC ticket kiosk at Long Wharf. From the ticket kiosk, signage directing visitors to the BHI boats would be helpful. Signage to Aquarium Station and an MBTA system map should also be posted at the boat ramps for visitors disembarking from the Harbor Island boats. During Central Artery construction, detours and service closures should also be posted.

2. Directional signage to Long Wharf should be posted at bus stops along Atlantic Avenue for the Route 6 bus route, as well as at Haymarket (Green and Orange Lines) and Government Center (Green and Blue Lines) Stations and South Station (Red Line and Commuter Rail).

3. A general map of downtown Boston should be displayed near the boat ramps at Long Wharf, indicating the location of all public transportation services in the vicinity and basic schedule and fare information. This map should also identify the Freedom Trail (BNHP) and the location of water taxi services between downtown Boston and Charlestown Navy Yard.

4. At the hub islands, George's and Spectacle, signage should be posted which indicates the schedule for the ferries and water shuttles with descriptions of each of the island stops (including ADA accessibility). This signage should also include a map of the entire Harbor Island system which indicates the visitor's location.

5. As new gateways are established, compatible signage should also be provided including the schedule and destination of the ferries and water shuttle connections and a map of the Harbor Island system.

Boston National Historical Park (Charlestown Navy Yard and Bunker Hill)

1. Signage directing potential visitors to the Navy Yard and Bunker Hill Monument should be posted at North Station (Green and Orange Lines, Commuter Rail) and at Bunker Hill Community College (Orange Line) Station.

2. Signage directing visitors to Navy Yard sites should be posted at bus stops in City Square and within the Navy Yard for the Route 93 bus route. Signage or car cards could also be posted on appropriate bus routes.

3. Signage should be posted at the ramps to both Pier 1 and Pier 4 indicating the location of BNHP sites at the Navy Yard and Bunker Hill Monument and all public transportation services in the vicinity of the boat ramps.

4. A general map of the Charlestown Navy Yard and vicinity should be displayed at a central location in the Navy Yard such as outside the Visitors Center, indicating the location of BNHP sites at the Navy Yard and Bunker Hill Monument and all nearby public transportation services including Piers 1 and 4.

5. Information should be posted (maps, fares, and schedules) describing all MBTA Rapid Transit transportation services in the vicinity of the Freedom Trail and water ferry services to Piers 1 and 4 and the Harbor Islands at all BNHP Freedom Trail visitors centers (Boston Common, State Street Visitors Center, Faneuil Hall kiosk, and Bunker Hill Pavilion).

6. Assuming a Lovejoy to Pier 1 route, there should be signage at the last stop(s) of the Freedom Trail in the North End (e.g., Old North Church) indicating the continuation of the route to Charlestown both by foot and the water shuttle alternative with schedules.

7. Informational signage and brochures could be placed at the Downtown departure piers for water shuttles going to both Piers 1 and 4 (e.g., Russian Wharf, Long Wharf, etc.)

Salem Maritime Historic Site

1. Signage should be posted at the Salem Depot Commuter Rail station directing visitors to the National Park Visitor Service Center on New Liberty Street. Informational signage should also be posted at the Commuter Rail station and the city pier to inform visitors of the range of attractions encompassed by the Salem Maritime National Historic Site. Information should also be posted at the station regarding the location and schedule of water ferry services to downtown Boston from Salem Harbor.

2. The Visitor Service Center on New Liberty Street should have posted commuter rail schedules, fare information, and a map and directions indicating the location of the Salem Depot commuter rail station.

Adams National Historical Park

1. Signage should be posted at the Quincy Center Red Line Rapid Transit station directing visitors to the National Park Visitor Service Center on Hancock Street. Information should also be posted regarding the availability of trolley services to access the ANHP sites including frequency of service, location of stops, and the specific facilities which can be accessed.

2. As new trolley or shuttle services are established, compatible signage should also be provided including schedules and maps with identification of ANHP.

7.2 Marketing Needs

In parallel to the analysis of alternative transportation services for the Boston Harbor NPS sites, an effort was made to better understand the needs of park visitors in terms of how decisions are made to visit park sites, what information is needed prior to and while visiting the parks, and how to inform the visitor about available transportation services. A focus of this effort was the identification of marketing opportunities with the objective of increasing overall park visitation. This effort resulted in a report entitled "Marketing the Boston Harbor Islands National Park Area," which is included in the study report as Appendix D. This report identifies and prioritizes those marketing activities that are most critical to increasing Park visitation. The study was undertaken to provide:

- A general overview of marketing;
- Market insight from qualitative research with Park customers and non-customers; and
- Recommendations for marketing activities from the focus group findings that can be acted upon this year for increased attendance in the 2001 season.

The paper is organized into four sections: 1) *Introduction* provides the background for the paper and the problem statement; 2) *What Is Marketing* provides the reader with a general introduction to marketing concepts, terms, and activities; 3) *Marketing Insights from Qualitative Research* presents marketing-related findings from three focus groups convened in Boston in August 2000; and 4) *Conclusions and Recommendations* uses the findings from the focus groups to describe marketing activities ordered according to the expected impact on visitation. This brief summary focuses on findings and recommendations.

Three focus groups were convened in Boston in August 2000. Focus groups were selected for the study because marketing research begins with listening to customers talk. Participants in Group One had recently visited the Harbor Islands and live *inside* the City of Boston or one of the adjacent communities (e.g., Brookline, Charlestown, etc.). Participants in Group Two had recently visited the Harbor Islands and live *outside* the City of Boston, but within Route 128. Participants in Group 3 were not Park visitors, but were defined as potential Park customers based on lifestyle characteristics. The primary marketing objectives of the research were to:

- Gain insight into customer characteristics;
- Learn what benefits customers gain from Park use;
- Learn what occasions a Park visit; and
- Identify obstacles to Park use.

Boston Harbor Islands national park area customers are typically groups of families and friends. The Park provides a recreational outing that promotes relationship among the family or friendship group members. While there were no students among the respondents, school groups also appear to be a significant customer segment. Because the focus group respondents were recruited from among Boston and its environs, no generalization can be made about the residence of Park visitors. It is hypothesized that most are local to the region, but this bears follow-up with data from quantitative surveys.

Overall, the Park provides a destination that enables families and friends to share fun and enjoy the relationship that they have with one another. They also enjoy sharing the experience with other visitors to the Park, which provides an enhanced sense of community. Customers describe the Park as a destination with just enough in the way of attraction to provide a focus for the visit, but not so much structure as to interfere with making one's own fun, as is the case with a commercial theme park. The features of the Park that all customers valued most include safety, cleanliness, affordability, accessibility, no commercial elements, and natural beauty.

The three most frequently cited obstacles to Park use were lack of information, parking fees, and the amount of time required to organize the trip and to get to the Park. Obstacles were cited in relation to life stage, familiarity with downtown Boston, and familiarity with the Park. Both customers and non-customers said that it was difficult to get detailed information about the Park, its facilities, and transportation to the Park. Lack of easy access to detailed information about all aspects of the Park, combined with downtown construction activities, pose significant obstacles to Park use.

Customers and potential customers want to be able to dial a phone number or enter a web site address and have all of their Park destination questions answered. Those questions include:

- Directions to the ferry for all modes of transport and from local parking lots;
- Parking lot locations and costs;
- Transit fees;
- All Park-related fees;
- Length of lines for tickets and the ferry;
- Ferry and water taxi schedules;
- Availability of food (and type) and water;

- Availability and location of shelters;
- Restrooms and diaper changing facilities; and
- Handicapped accessibility.

The most critical challenge facing the Park is the need for increased and improved communications with consumers. There simply aren't enough people who know about the Park and have been to the Park to generate the desired level of visitation. With the exception of the metropolitan coastal communities, the boating community, and boat commuters, the islands that comprise the Park are not visible and accessible to large numbers of residents, like other outdoor recreation sites.

The single most important investment that the Park can make for increased visitation is in improved communications, advertising, and public relations. This is a costly endeavor, in staff time, in consulting fees, and in media purchases, but it is the single greatest barrier to increased visitation. More information about the Park needs to appear in local public media, including newspapers, magazines, radio shows, television, and web sites. The information should increase residents' awareness of the benefits of a visit to the Park, its location, and how to reach it.

7.3 Trolley Services

Depending upon the size of the site, surrounding environment, and distribution of amenities, trolley services can provide an effective means of facilitating access to park sites from primary transportation services or support internal circulation. The following section discusses plans for enhanced trolley services at Adams National Historical Park and new trolley services at Charlestown Navy Yard.

7.3.1 Adams National Historical Park

Existing Trolley Service

As discussed in Chapter 2, the Adams National Historical Park (NHP) currently operates a trolley linking the Adams birthplaces, the Old House and the Visitors Center. This service is provided by Brush Hill Transportation Company through a contractual agreement with the Adams NHP. Table 7.1 presents general information on Adams NHP visitation and the Park's trolley operation.

Adams NHP is currently seeking funding to purchase two trolleys to operate this service on a 15-minute headway. Large school groups and tour groups are currently discouraged from using the trolley, since they would overwhelm the single trolley. These groups instead often travel to the sites in their own vehicle. Two trolleys will both relieve the schedule pressure and allow many of these groups to be incorporated into the trolley tour.

Due to a lack of visitor profile data and because success of the trolley system is dependent on many factors, such as convenience, cost, and marketing, it is difficult to estimate future ridership and is beyond the scope of this study. Therefore, to estimate potential trolley operations and costs, three hypothetical ridership scenarios reflecting a range of usage were developed, as summarized below:

- Scenario A with 12,000 riders per year – current ridership;
- Scenario B with 18,000 riders per year – a 50 percent increase over current ridership; and
- Scenario C with 24,000 riders per year – a 100 percent increase over current ridership.

TABLE 7-1: ADAMS NHP GENERAL INFORMATION

Annual Visitation to Adams NHP (1999)	Total = 86,000 General visitors = 40,000 School tours = 11,000 Other organized tours = 35,000
Annual Growth in Visitation to Adams NHP 1989-1999 (last 10 years) 1995-1999 (last 4 years)	 13% per year 20 % per year
Seasonal Visitation to Adams NHP – *Estimated* Peak Off-Peak	 65% 35%
Existing Trolley Service Stops	• NPS Visitors Center/United First Parish Church • Adams Birthplace • Old House
Percent of Visitors Using Trolley (1999)	47% of general visitors, or about 12,000 riders per year
Existing Trolley Route Length – Round-trip	3 miles
Average Trolley Speed from Adams NHP observations	9 mph
Existing Trolley Headway	30 minutes
Existing Daily Ridership – *Estimated* Peak Day Off-Peak Day	 120 riders per day 60 riders per day

Table 7.2 shows operating characteristics and costs for each scenario, including a "break-even" fare – the fare required to cover 10-year life-cycle costs. Even under Scenario C, with a doubling of current ridership, it is anticipated that two trolleys will be sufficient to meet the needs of the Adams NHP.

Operations Alternative Options

Based on the experience of the Park staff and validated by this study, the Adams NHP requires two vehicles in operation daily to service the four Adams sites: the Visitor Center, the birthplaces, the "Old House," and the Church of the Presidents. To effectively operate a two-vehicle system will require three vehicles overall to be able to maintain a spare. The current available level of funding for transportation services is $135,000. Five options to expand the current system have been considered.

Option 1 – Discontinue Service

Under this option the contract with the current company would not be renewed, and service to visitors would not be provided by NPS. The visitor experience would be poor. The visitation would be substantially reduced. Given the proven success of the current trolley program and the potential unmet demand, this option is not seen to be viable.

Option 2 – Contract to a Third Party to Provide Vehicles, Drivers, and Maintenance

The annual contracted cost for one vehicle, a driver, and maintenance, as Adams NHP has done to date, is approximately $130,000. This option, without additional funding, will provide service for only one trolley, which does not meet the current visitor demand.

TABLE 7-2: EXISTING TROLLEY ROUTE WITH TWO TROLLEYS

	Scenario A	Scenario B	Scenario C
Annual Ridership *Total on Two Trolleys*	12,000 (existing)	18,000	24,000
Daily ridership Peak days (35 days) Off-Peak Days (170 days)	 120 60	 178 92	 237 122
Proposed Headway	15 minutes	15 minutes	15 minutes
Required Number of Trolleys	2	2	2
Capital Cost of Trolley *36-Person Capacity*	$250,000	$250,000	$250,000
Annual Operation and Maintenance (O&M) Cost *Based on 205 Days of Operation and $50 per Hour[1] for O&M* Operation and Maintenance per Trolley Storage and Maintenance Facility Costs **Total O&M for Two Trolleys**	 $ 82,000 $ 20,000 **$184,000**	 $ 82,000 $ 20,000 **$184,000**	 $ 82,000 $ 20,000 **$184,000**
"Break-even" Fare *Such that Life-Cycle Costs over 10 Years = $0* • Covering Capital and O&M Costs • Covering O&M Costs Only	 $20.20 $15.33	 $13.46 $10.22	 $10.10 $ 7.67

[1]Based on national average rates for comparable systems.

The annual cost of this service contract has increased substantially over the years of prototype service. For example, in FY 1995 the service contract for one vehicle and driver was $60,000 and in FY 2000 it was $130,000 – an increase of 54 percent in a five-year period. In addition, the pool of qualified bidders is quite limited. Of the three potential qualified bidders, it has been determined that their bids are within a few hundred dollars of each other. The capital cost of equipment is the reason why greater competition in the open market does not exist. The quality of drivers under contract varies, and they do not provide quality interpretation of the resource.

Were additional funds made available to the Park, the contracted service could expand to two vehicles through a modification to a base contract. Contracting for an increased level of service to two trolleys would double the contract cost to approximately $260,000. The availability of a backup vehicle would be the contractor's responsibility. Experience has shown that the ability for even a large contract operator to have a backup readily available is problematic. As such, the shortfall in funding for two vehicles through contract is $130,000. As there is no obvious source for a funding increase of this magnitude, this option is not seen to be viable.

Option 3 – NPS Buys the Equipment and Obtains Drivers and Maintenance through a Service Contract(s)

In this scenario the Park Service purchases the vehicles and contracts with a bus service to operate and maintain the vehicles. The assumption with this option is that the bus companies would be willing to contract with Adams NHP for a significantly lower cost to the park. In fact, the Northeast Region Contracting Division has concluded through communication with the current operator that **no cost savings** are realized under this option. The contractor would charge essentially the same amount for service support **with and without** the vehicles. The reason given is that they believe that their capital costs for their fleet is a fixed amount. The cost of the

large operator contract thus is $130,000 per vehicle and $260,000 for two. No appreciable savings is estimated to be achieved under this option.

It may be possible to solicit bids for this "driver/maintenance services only" and determine if small or new operations might be interested in such a contract. A possibility of savings may or may not exist if small or new operators were attracted to such a solicitation. There is some risk for a new operator taking over the service in terms of reliability of service. We expect that small operators may research this matter with larger operators and that the cost may not be dramatically reduced. As with the existing contract option above, the quality of drivers varies and interpretation of the resource is not provided. Given the lack of savings with the current large operators and uncertainty about the costs and reliability of a smaller or new operation, this option is not seen to be viable.

Option 4 – Hire Permanent or Term Employees to Run the Trolleys

Options 4 and 5, as opposed to the above scenarios, envision the Park to take over the entire cost and effort of operating and maintaining the trolley system. This staffing model is similar to how Lowell NHP operates their trolley and canal boats. Option 4 looks at the cost of hiring three permanent employees, and Option 5 examines hiring seasonal staff.

The current General Management Plan for Adams NHP allows for the increase in permanent FTE. Hiring permanent or term employees, with commercial licenses, to operate the trolleys will cost between $13.68 to $16.01 per hour plus FERS at an addition 40 percent, or $22.41 per hour maximum.[3] For example, the current NPS cost for trolley operators at Lowell NHP is in the mid-range at Wage Grade 6, or $14.28. This would be $179.31 per day and cost a total of $36,759 per driver for the proposed 205-day schedule. Two drivers with a backup of an additional one for emergency conditions or three would be $110,277 for the 205-day season associated with the shuttle.

Fuel is estimated to be about $6,500 per year (i.e., $2.00 per gallon of diesel, multiplied by four miles per gallon, multiplied by 16 daily trips, multiplied by two trolleys, multiplied by 205 days per season). Oil changes can be contracted out to a "Jiffy Lube" type service estimated for the three trolleys at $1,500. Cleaning services can also be contracted out also estimated at an additional $1,500 per annum. The vehicles from the GSA schedule have warranties for three years and assume low maintenance in the beginning of the life cycle, but can be estimated conservatively at $1,000 per vehicle per year for a total of $3,000. Total fuel and maintenance costs can then be estimated at $12,500. Insurance is not required for vehicles operated by the federal government even those that have "non-federal" passengers. The costs therefore do not include insurance, although more research in this area may be warranted.

The remainder of the year, or 160 days, would need to be covered, and this cost would be an additional $28,690 per employee, or a total of $86,070. The trolley season could be extended to better serve the school group visitors, and the vehicle staff, fully trained, could be used to improve staffing with the visitor programming. Total annual permanent or term staff costs (3) would then be $196,297. If the $12,500 associated with support costs of fuel, oil, and limited maintenance are included, there is a shortfall of $73,800 ($208,797 minus $135,000).

The permanent and term employees could be selected and trained to provide accurate and complementary interpretation of the resources. This would be an advantage over the current contract service approach, and help to integrate the trolley experience into the overall understanding of the resource by the visitors.

This option is similar to the successful Lowell NHP program and offers interpretative advantages. The ability of the park to reprogram current funds in the short term is possible but less than ideal. Over the longer term, an increase to base funding would be solicited to maintain this scenario. This option is a second choice.

[3]Based on FY 2001 Federal pay scales.

Option 5 – Hire Temporary Seasonal Employees

This option is very similar to Option 4, but substitutes temporary seasonal employees for the permanent or term employees. Hiring temporary seasonal employees, with commercial licenses, to operate the trolleys will cost $13.68 to $14.28 per hour plus 7.65 percent, or $14.73 to $15.33 per hour total cost. This would be $117.81 to $122.65 per day and $24,152 per driver. For three temporary seasonal staff for the 205 days, the cost would be $72,152. In addition, a permanent park employee would acquire a commercial driver's license to be able to move the vehicles during the off-season as needed.

The balance of funds from $135,000, or $58,652, will easily cover the estimated costs associated with operation and maintenance of the three vehicles $12,500). A service contract would be let for oil changes and for cleaning of the vehicles as stated above. As under Option 4, there is no insurance required for government vehicles.

There is some risk of not being able to find qualified drivers for each season and of retraining about the resources that may be required. However, it is felt that a core of drivers could be found that would provide continuity. Given the potential cost savings and the viability within the current available funds, this option is considered to be of primary consideration.

Additional Support

Storage of the vehicles, under Options 4 and 5, is possible at an NPS site on the Old House property. Currently the area used as a Park Service maintenance facility has sufficient space to accommodate the vehicles on- and off-season. Adams NHP will also be negotiating with the City of Quincy for off-season storage.

Recommended Option

Sustaining the shuttle operation to take care of the Park's immediate proven and documented need for two vehicles in operation and with one as a backup will be achieved by appropriately licensed seasonal employees (Option 5).

Additional Funding Requirements

Planning Funds to Refine Vehicle Choices – Funds will be needed to specify shuttle service and vehicle requirements to ensure that the vehicle type, the operating facilities, and any other equipment needs are appropriately addressed. Secondly, this scope of work should include assistance in negotiations with GSA, vehicle, and wireless communication system manufacturers, Estimated cost is $25,000.

Concept for a Heritage Trolley Service

Quincy has numerous attractions related to not only the Adams family, but its historical ties to both the granite and maritime industries. The City of Quincy and Adams NHP are considering an outreach trolley route(s) that would connect the many of these heritage attractions, including a stop at the Adams NHP Visitors Center. Potential other stops include the Fore River Shipyard, the Quincy Homestead, the Josiah Quincy House, Wollaston Beach, and Marina Bay, as well as MBTA transit stations. Discussions between the city, business stakeholders, and the Park have also focused on stops at current and planned hotels.

Adams NHP needs to further explore and define viable service options and long-range partnership options for developing cooperative visitor transportation services in the Quincy area. There is a need to develop and select preferred transportation routes and service options compatible with the needs of the Park and the Quincy stakeholders to serve the Quincy visitor/tourist. Secondly, the stakeholders need to define and initiate an economically viable management structure such as a transportation management association that could operate the system.

The National Park Service does not operate the Quincy Homestead, and the Josiah Quincy House and their hours of operation vary. The Fore River Shipyard currently serves as the terminal for Harbor Express, which provides water transportation service to downtown Boston and Logan Airport. The United States Naval and Shipbuilding Museum and the U.S.S. Salem, a World War II heavy cruiser, are located at the Shipyard, although the U.S.S. Salem may soon be moved to Marina Bay. Both the Shipyard and Marina Bay, a mixed-use waterfront development in North Quincy, are potential sites for water transportation to the Boston Harbor Islands national park area.

The ridership on heritage trolley route(s) is dependent upon many factors, including the coordination of schedules of the various sites, intensive marketing of the route, and financial support from potential private partners. Further planning needs to be conducted to determine the level of interest, funding sources, and potential ridership for this route. As a preliminary exercise to help guide future discussions, capital and operating costs associated with this potential service were developed based on general assumptions about the service. These assumptions are shown in Table 7.3.

TABLE 7-3: PROPOSED HERITAGE TROLLEY OPERATING ASSUMPTIONS

Proposed Trolley Service Stops	• Abigail Adams Birthplace • Fore River Shipyard • NPS Visitors Center • Quincy Homestead • Josiah Quincy House • Wollaston Beach • Marina Bay
Trolley Route Length – Round-trip	16 miles
Average Trolley Speed	17 mph
Cycle Time per Trolley	59 minutes
Proposed Trolley Headway	30 minutes
Seasonal Visitation on Heritage Trail Peak Season (14 weeks) Off-Peak (14 weeks)	 65% 35%

Table 7.4 summarizes the capital and operating costs associated with the heritage trolley for a range of ridership projections. Note, as in the analysis of the existing trolley route, that there is no analytical basis for the ridership projections and they are shown for illustrative purposes only to show a range of possible situations. This service is proposed to operate on a 30-minute headway. At an average travel speed of 17 mph, the round-trip cycle time is estimated to be 59 minutes, allowing two trolleys to meet the headway requirement. However, if average speeds fall below 17 mph, a third trolley may be required to maintain the schedule.

TABLE 7-4: HERITAGE TRAIL TROLLEY COSTS

	Scenario I	Scenario II	Scenario III
Annual Ridership – *No basis for ridership projection. Shown for illustrative purposes only.*	12,000	18,000	24,000
Daily ridership – *Estimated*			
Peak Season Day	98	246	493
Off-peak Season Day	51	127	254
Proposed Headway	30 minutes	30 minutes	30 minutes
Required Number of Trolleys	2	2	2
Average Speed	18 mph	18 mph	18 mph
Cycle Time	59 minutes	59 minutes	59 minutes
Cost of Trolley – 18-Person Capacity			
Capital Cost per Trolley	$175,000	$175,000	$175,000
Operating and Maintenance Cost	$50 per hour	$50 per hour	$50 per hour
"Break-Even" Fare			
Such that Life-Cycle Costs over 10 Years = $0			
• Covering Capital and Operating/Maintenance	$18.31	$12.27	$9.16
• Covering Operating/Maintenance only	$14.90	$ 9.98	$7.45

7.3.2 Charlestown Navy Yard (Boston National Historical Park)

The Charlestown Navy Yard and Bunker Hill Monument are located at the northern end of the Freedom Trail. Often, a Freedom Trail visitor arrives at these sites late in the day after seeing many downtown attractions. Visitors may be tired and forego the one-half-mile walk from the Navy Yard to Bunker Hill. The walk from the Navy Yard is through a densely developed residential neighborhood, up a fairly steep hill. Visitors who choose to drive to the Monument find limited on-street parking.

To make the link between these two sites more appealing, the Charlestown Navy Yard is studying the potential of trolley service between the Navy Yard to the Bunker Hill Monument. The purpose of this analysis is to estimate the costs associated with such a service. Presented below are three proposed Bunker Hill trolley routes providing service between the Navy Yard Visitors Center and the Bunker Hill Monument. Table 7.5 summarizes the operating characteristics of these routes.

- **Proposed Route 1 – Navy Yard Visitors Center to Bunker Hill Monument via Monument Avenue and Pleasant Street –** Route 1 would connect the current Navy Yard Visitors Center to Bunker Hill Monument via Warren Avenue, Monument Avenue, to Monument Square. This route would return to the Visitors Center via Pleasant Street, Main Street, and Warren Avenue. See Table 7.5 for operating characteristics. In the future, the route would be modified to serve the new Visitors Center near the U.S.S. Constitution.

- **Proposed Route 2 – Navy Yard Visitors Center to Bunker Hill Monument via Monument Avenue and Bunker Hill Street –** Route 2 follows the same route as Route 1 to the Bunker Hill Monument, but returns via Bunker Hill Street rather than Main Street. This routing might be preferable to Route 1 since trolley trips would be distributed onto streets both north and south of the Monument. From the current Visitors Center, this route would generally follow Warren Avenue, Monument Avenue, Monument Square, Lexington Street, Bunker Hill Street, and Chelsea Street back to the Visitors Center. See Table 7.5 for operating

characteristics. In the future, the route would be modified to serve the new Visitors Center near the U.S.S. Constitution.

- **Proposed Route 3 – Navy Yard Visitors Center to Bunker Hill Monument to MBTA Station –** Route 3 would connect the Navy Yard Visitors Center to the Bunker Hill Monument and continue onto the MBTA Orange Line Station at Bunker Hill Community College on Austin Street. This route would provide a convenient connection from the MBTA system to the Bunker Hill Monument and Navy Yard. One option is to have this route operate in a counter-clockwise fashion which serving the Navy Yard Visitors Center, the Bunker Hill Monument, the MBTA Station, and back to the Visitors Center. From the current Visitors Center, this route would generally follow Warren Avenue, Monument Avenue, Monument Square, Pleasant Street, Warren Avenue, Austin Street, MBTA Station, and return to the Navy Yard via Main Street, and Warren Avenue. It is anticipated that such a route could be used by local residents and employees within the area. See Table 7.5 for operating characteristics. In the future, the route would be modified to serve the new Visitors Center near the U.S.S. Constitution.

TABLE 7-5: OPERATING CHARACTERISTICS OF PROPOSED BUNKER HILL ROUTES

	Route 1	Route 2	Route 3
Routing	Via Warren Street, Monument Street, Monument Square, Pleasant Street, and Main Street	Via Warren Street, Monument Street, Monument Square, Lexington Street, Bunker Hill Street, and Chelsea Street	Via Warren Street, Monument Street, Monument Square, Pleasant Street, Main Street, Austin Street, MBTA Station, Austin Street, Main Street, and Warren Street to Navy Yard.
Major Stops	• CNY Visitors Center • Monument Square	• CNY Visitors Center • Monument Square	• CNY Visitors Center • Monument Square • MBTA Station at Community College
Proposed Headway	15 minutes	15 minutes	15 minutes
Round-trip Travel Distance	About 1.0 miles	About 1.0 miles	About 2.0 miles
Average Travel Speed	10 mph	10 mph	10 mph
Round-Trip Travel Time, Including Layover and Recovery	About 7.5 minutes	About 7.5 minutes	About 15 minutes

Ridership Scenarios

In 1999, annual visitation to the Charlestown Navy Yard was 1.38 million visitors and Bunker Hill Monument had 188,000 visitors. It is unknown how many of these visitors go to both sites. A Freedom Trail Shuttle Tour, with stops at the Freedom Trail sites and major hotels, was operated this past year by Minuteman Trolley Tours in partnership with the Freedom Trail Foundation. While this route did serve the Navy Yard, it did not provide service to the Bunker Hill Monument. An effort was made to obtain ridership data from the operator, but it is unknown how many riders used this trolley to access the Navy Yard.

Due to a lack of visitor profile data and because the success of the trolley is dependent on many factors, such as convenience, cost, and marketing, it is difficult to accurately estimate future ridership. Instead, a range of ridership projections, as summarized below, has been analyzed to estimate the relative costs. It is anticipated that these estimates will be used by the Charlestown Navy Yard to further study the potential of the routes.

- **Scenario A –** Under this scenario, about 69,000 annual riders would use the trolley. This represents five percent of existing Navy Yard visitation.

- **Scenario B –** Under this scenario, about 138,000 annual riders would use the trolley. This number represents 10 percent of existing Navy Yard visitation.

- **Scenario C –** Under this scenario, about 277,000 annual riders per year would use the trolley, representing 20 percent of existing Navy Yard visitation. Because existing annual visitation to the Bunker Hill Monument is about 188,000, it is implied under Scenario C that the Bunker Hill Monument would experience a significant increase in annual visitation. Such an increase may be achievable with aggressive marketing and linkage between the Navy Yard and other Freedom Trail attractions.

The analysis assumes that trolley service would operate during the seven-month period from April through October, during which about 85 percent of annual visitation to the Navy Yard and Bunker Hill occurs.

Table 7.6 shows ridership and costs associated with Route 1 and Route 2 for each scenario. A "break-even" fare – the fare per rider required to cover 10-year life-cycle costs has been calculated. This fare can be used to judge the scenarios relative to each other and to determine if such a service is even feasible. Two break-even fares were calculated – one to cover the sum of the capital and operating/maintenance (O&M) costs and another to cover just O&M costs, such as might occur if a vehicle was acquired through grant money.

TABLE 7-6: RIDERSHIP AND COSTS OF ROUTES 1 AND 2

	Scenario A	Scenario B	Scenario C
Annual Ridership	60,000	138,000	277,000
Daily Ridership			
Peak Days (68 days)	488	978	1,963
Off-Peak Days (145 days)	252	504	1,011
Proposed Headway	15 minutes	15 minutes	15 minutes
Required Number of Trolleys	1	1	2
Capital Cost of Trolley – *20-Person Capacity* (for Required Number of Trolleys)	$170,000	$170,000	$340,000
Annual Operation and Maintenance (O&M) Cost *Based on 213 Days of Operation and $50 per Hour[1] for O&M.*			
Operation and Maintenance	$ 85,000	$ 85,000	$113,000
Storage and Maintenance Facility Costs	$ 20,000	$ 20,000	$ 20,000
Total O&M for Required Number of Trolleys	**$105,000**	**$105,000**	**$133,000**
"Break-even" Fare per Rider *Such that Life-Cycle Costs over 10 years = $0*			
• Covering Capital and O&M Costs	$1.82	$0.91	$0.63
• Covering O&M Costs Only	$1.53	$0.77	$0.48

[1]Based on national average rates for comparable systems.

Because Route 3 is a longer route and would require additional trolleys (as compared to Route 1 or Route 2), cost information for Route 3 is presented separately in Table 7.7.

TABLE 7-7: RIDERSHIP AND COSTS OF ROUTE 3

	Scenario A	Scenario B	Scenario C
Annual Ridership	60,000	138,000	277,000
Daily Ridership Peak Days (68 Days) Off-Peak Days (145 Days)	 488 252	 978 504	 1,963 1,011
Proposed Headway	15 minutes	15 minutes	15 minutes
Required Number of Trolleys	2	2	3
Capital Cost of Trolley – *20-Person Capacity* (for Required Number of Trolleys)	$340,000	$340,000	$510,000
Annual Operation and Maintenance (O&M) Cost *Based on 213 Days of Operation and $50 per Hour[1] for O&M.* Operation and Maintenance Storage and Maintenance Facility Costs **Total O&M for Required Number of Trolleys**	 $171,000 $ 20,000 **$191,000**	 $171,000 $ 20,000 **$191,000**	 $198,000 $ 20,000 **$218,000**
"Break-even" Fare per Rider *Such that Life-Cycle Costs over 10 Years = $0* • Covering Capital and O&M costs • Covering O&M Costs Only	 $3.35 $2.77	 $1.67 $1.38	 $1.00 $0.79

[1]Based on national average rates for comparable systems.

Internal Navy Yard Trolley

While the proposed Bunker Hill trolley route would serve primarily Bunker Hill tourists, another proposed service would serve visitor, employee and tourist trips internal to the Navy Yard. This route would operate between the Navy Yard Visitors Center, Pier 4, and the public parking garage located on Thirteenth Street. Additionally, trolley stops could be designated along Chelsea Street to serve the Ropewalk, and on First Avenue serving the Chain Forge. Operating characteristics of the internal Navy Yard trolley are shown in Table 7.8. It is beyond the scope of this study, however, to estimate ridership for such a service.

TABLE 7-8: OPERATING CHARACTERISTICS OF PROPOSED INTERNAL SHUTTLE

Routing	**Via First Avenue, Eighth Street, First Street, Thirteenth Street, Chelsea Street, Fifth Street First Street**
Major Stops	• Navy Yard Visitors Center • Pier 4 • Parking Garage on Thirteenth Street • Potentially other internal sites within Navy Yard such as Rope Walk and Chain Forge
Proposed Headway	15 minutes (schedule to be coordinated with water shuttle at Pier 4)
Round-trip Travel Distance	About 1.5 miles
Average Travel Speed	10 mph
Round-trip Travel Time, Including Layover and Recovery	10.5 minutes

The water transportation service at Pier 4 operates between Pier 4 and downtown Boston on a 15-minute headway during peak times and 30-minute headways during off-peak times and on weekends. It is recommended that the internal Navy Yard trolley be coordinated with operation of the Pier 4 water shuttle.

Depending on the operating plan, is may be feasible to combine the internal shuttle route with one of the Bunker Hill routes into a composite route. Because the estimated round-trip time on the internal trolley is 10.5 minutes and is a maximum of 14.5 minutes for the Bunker Hill routes, it would be possible to operate as one route with a travel time of 25 minutes. With a 30-minute headway, one vehicle could service this combined route. The ridership demand, however, may warrant a more frequent service.

Appendix A

Previous Studies

Previous Studies

Boston Harbor Islands National Park Area

- *Boston Harbor Islands Visitor Survey, A Report to Boston Harbor Islands Partnership Education and Program Committee*. By The Harbor Visions Crew '97, November 1997.
- *Boston Harbor Islands National Park Area, Water Transportation Study*, Draft by the Volpe Center and TAMS Consultants, June 1999.
- *Economic Impact of the Boston Harbor Project*. Cambridge Systematics, Inc., July 1990.
- *Boston Inner Harbor Passenger Water Transportation Plan*, prepared for City of Boston, Boston Redevelopment Authority by TAMS Consultants with Bourne Consulting Engineering. January 2000.
- *Boston Inner Harbor Water Transportation Study – 1994*, prepared for the MHD and CA/T by TAMS Consultants and Cambridge Systematics. February 1994.
- *Boston Inner Harbor Water Transportation Study*, prepared for Massport, EOTC, Legislative Special Committee on Marine Transit, MBTA and MDPW by TAMS Consultants and Charles Norris. October 1989.
- *Massachusetts Ferry Project*, prepared for Massachusetts EOTC by Boelter and Associates. August 1997.

Adams National Historical Park

- National Park Service. Adams National Historical Park General Management Plan. December 1996
- Adams National Historical Park Fact Sheets
- Quincy 2000 Corporation. Quincy Area Market Guide. 1997

Boston National Historical Park and Boston African-American National Historic Site

- David Dixon/Goody Clancy, The Freedom Trail: A Framework for the Future, prepared for the National Park Service, May 1996.
- Boston National Historical Park Visitation Reports, 1996-1999.
- *Transportation Study*, prepared for the Boston National Historical Park by Richard E. Hangen and Associates, Inc., May 1981.

Salem Maritime National Historic Site

- Environmental Tourism Strategies for the North Shore Task Force, spring 1996.
- Essex Heritage Project Action Plan (excerpt), 1996.
- Essex National Heritage Area, pamphlet, circa 1998.
- Salem Maritime National Historic Site visitation statistics, NPS, 1999.

- Salem Maritime National Historic Site, map and assorted visitor materials, NPS, 1996.
- Salem Maritime, Site Plan and Environmental Assessment (draft), NPS, April 1991.
- Transportation Plan, Salem, Massachusetts, The Salem Project, October 1990.
- Visitor Study of Salem, Massachusetts and the Salem Maritime National Historic Site – 1989, May 1990.

Park Web Sites

http://www.nps.gov/boha/	NPS BHI official web site
http://www.bostonislands.com/	In depth web site
http://www.bostonharborcruises.com/	Boston Harbor Cruises (with ferry schedules)
http://www.mass-vacation.com/harbor.html	Mass. Office of Travel and Tourism (with links to some transportation providers)
http://www.mbta.com/	MBTA (MBTA schedules with link to BHC)
http://www.nps.gov/sama/	Salem Maritime National Historic Site
http://www.nps.gov/adam/	Adams National Historical Park
http://www.nps.gov/bost/	Boston National Historical Park

Appendix B

Cost Estimates for New Dock Facilities

COST ESTIMATE

DATE PREPARED: Dec-00

SHEET 1 OF 5

ACTIVITY AND LOCATION: HARBOR ISLANDS ACCESS

NEW FLOATING DOCK

BASE SYSTEM WITH A-FRAME / DAVIT
(LOVELL'S, GALLOP'S, GRAPE, BUMPKIN, SALEM CENTRAL WHARF)

CEC JOB NUMBER: 1161-93.7

ESTIMATED BY: DLP

STATUS OF DESIGN: _X_ PED ___ 35% ___ 65% ___ 100% ___ FINAL ___ OTHER

IDENTIFICATION NUMBER:

CATEGORY CODE NUMBER:

JOB ORDER NUMBER:

ITEM DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	MATERIAL COST UNIT COST	MATERIAL COST TOTAL	LABOR COST UNIT COST	LABOR COST TOTAL	ENGINEERING ESTIMATE UNIT COST	ENGINEERING ESTIMATE TOTAL
STEEL FLOAT	1820	SF.					$110	$200,200
FENDER & BOLLARDS	1	L.S.					$20,000	$20,000
PILE GUIDES	4	EA.					$2,000	$8,000
MOORING PILES	4	EA.					$8,000	$32,000
MAIN RAMP	1	EA.					$75,000	$75,000
SHORT RAMPS	3	EA.					$12,000	$36,000
PLATFORMS	2	EA.					$10,000	$20,000
PLATFORM	1	EA.					$15,000	$15,000
A-FRAME / DAVIT*	1	EA.					$60,000	$60,000
PIER EXTENSION	200	SF.					$300	$60,000
SITE ENGINEERING	1	EA.					$15,000	$15,000

SUBTOTAL = $541,200

CONTINGENCIES 20% = $108,240

TOTAL ESTIMATED COST = $649,440

RECOMMENDED BUDGET COST = **$650,000**

* Davit costs may be less depending on pier condition

COST ESTIMATE

DATE PREPARED: Dec-00

SHEET 1 OF 5

ACTIVITY AND LOCATION: HARBOR ISLANDS ACCESS

NEW FLOATING DOCK

BASE SYSTEM WITH 2 FT. FREEBOARD
ADD ON FLOAT (LOVELL'S, GALLOP, GRAPE, BUMPKIN)

CEC JOB NUMBER: 1161-93.7

ESTIMATED BY: DLP

STATUS OF DESIGN: _X_ PED ___ 35% ___ 65% ___ 100% ___ FINAL ___ OTHER

IDENTIFICATION NUMBER:

CATEGORY CODE NUMBER:

JOB ORDER NUMBER:

ITEM DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	MATERIAL COST UNIT COST	MATERIAL COST TOTAL	LABOR COST UNIT COST	LABOR COST TOTAL	ENGINEERING ESTIMATE UNIT COST	ENGINEERING ESTIMATE TOTAL
STEEL FLOAT	1820	SF.					$110	$200,200
FENDER & BOLLARDS	1	L.S.					$20,000	$20,000
PILE GUIDES	4	EA.					$2,000	$8,000
MOORING PILES	4	EA.					$8,000	$32,000
MAIN RAMP	1	EA.					$75,000	$75,000
SHORT RAMPS	4	EA.					$12,000	$48,000
PLATFORMS	2	EA.					$10,000	$20,000
PLATFORM	1	EA.					$15,000	$15,000
A-FRAME / DAVIT*	1	EA.					$60,000	$60,000
PIER EXTENSION	200	SF.					$300	$60,000
ADD ON FLOAT	400	SF.					$60	$24,000
ADD ON FLOAT MOORING	1	L.S.					$5,000	$5,000
SITE ENGINEERING	1	EA.					$15,000	$15,000

SUBTOTAL = $582,200

CONTINGENCIES 20% = $116,440

TOTAL ESTIMATED COST = $698,640

RECOMMENDED BUDGET COST = **$700,000**

* Davit costs may be less depending on pier condition

COST ESTIMATE

DATE PREPARED: Dec-00

SHEET 1 OF 5

ACTIVITY AND LOCATION: HARBOR ISLANDS ACCESS

NEW FLOATING DOCK

GEORGE'S / SPECTACLE ISLAND

CEC JOB NUMBER: 1161-93.7

ESTIMATED BY: DLP

STATUS OF DESIGN: _X_ PED ___ 35% ___ 65% ___ 100% ___ FINAL ___ OTHER

IDENTIFICATION NUMBER:

CATEGORY CODE NUMBER:

JOB ORDER NUMBER:

ITEM DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	MATERIAL COST UNIT COST	MATERIAL COST TOTAL	LABOR COST UNIT COST	LABOR COST TOTAL	ENGINEERING ESTIMATE UNIT COST	ENGINEERING ESTIMATE TOTAL
STEEL FLOAT	2620	SF.					$110	$288,200
FENDER & BOLLARDS	1	L.S.					$40,000	$40,000
PILE GUIDES	8	EA.					$2,000	$16,000
MOORING PILES	8	EA.					$8,000	$64,000
MAIN RAMP	2	EA.					$75,000	$150,000
SHORT RAMPS	3	EA.					$12,000	$36,000
PLATFORMS	2	EA.					$10,000	$20,000
PLATFORM	1	EA.					$15,000	$15,000
A-FRAME / DAVIT*	1	EA.					$80,000	$80,000
PIER EXTENSION	210	SF.					$300	$63,000
SITE ENGINEERING	1	EA.					$10,000	$10,000

SUBTOTAL = $782,200

CONTINGENCIES 20% = $156,440

* Davit costs may be less depending on pier condition

TOTAL ESTIMATED COST = $938,640

RECOMMENDED BUDGET COST = **$950,000**

COST ESTIMATE

DATE PREPARED: Dec-00

SHEET 1 OF 5

ACTIVITY AND LOCATION: HARBOR ISLANDS ACCESS

NEW FLOATING DOCK

NPS NAVY YARD

CEC JOB NUMBER: 1161-93.7

ESTIMATED BY: DLP

STATUS OF DESIGN: _X_ PED ___ 35% ___ 65% ___ 100% ___ FINAL ___ OTHER

IDENTIFICATION NUMBER:

CATEGORY CODE NUMBER:

JOB ORDER NUMBER:

ITEM DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	MATERIAL COST UNIT COST	MATERIAL COST TOTAL	LABOR COST UNIT COST	LABOR COST TOTAL	ENGINEERING ESTIMATE UNIT COST	ENGINEERING ESTIMATE TOTAL
STEEL FLOAT	1940	SF.					$110	$213,400
FENDER & BOLLARDS	1	L.S.					$20,000	$20,000
PILE GUIDES	4	EA.					$2,000	$8,000
MOORING PILES	4	EA.					$8,000	$32,000
MAIN RAMP	1	EA.					$75,000	$75,000
SHORT RAMPS	3	EA.					$12,000	$36,000
PLATFORMS	2	EA.					$10,000	$20,000
PLATFORM	1	EA.					$15,000	$15,000
PIER EXTENSION	200	SF.					$300	$60,000
SITE ENGINEERING	1	EA.					$10,000	$10,000

SUBTOTAL = $489,400

CONTINGENCIES 20% = $97,880

TOTAL ESTIMATED COST = $587,280

RECOMMENDED BUDGET COST = **$600,000**

COST ESTIMATE

DATE PREPARED: Dec-00

SHEET 1 OF 5

ACTIVITY AND LOCATION: HARBOR ISLANDS ACCESS

NEW FLOATING DOCK

BASE SYSTEM FINAL DESIGN AND PERMITTING COSTS

CEC JOB NUMBER: 1161-93.7

ESTIMATED BY: DLP

STATUS OF DESIGN: _X_ PED ___ 35% ___ 65% ___ 100% ___ FINAL ___ OTHER

IDENTIFICATION NUMBER:

CATEGORY CODE NUMBER:

JOB ORDER NUMBER:

ITEM DESCRIPTION	QUANTITY NO.	QUANTITY UNIT	MATERIAL COST UNIT COST	MATERIAL COST TOTAL	LABOR COST UNIT COST	LABOR COST TOTAL	ENGINEERING ESTIMATE UNIT COST	ENGINEERING ESTIMATE TOTAL
BASE FLOAT SYSTEM DESIGN	1	EA.					$50,000	$50,000
PERMITTING *	1	EA.					$40,000	$40,000
SITE ENGINEERING COSTS MUST BE INCLUDED								
FOR EACH INDIVIDUAL LOCATION								

SUBTOTAL = $90,000

* ANTICIPATES ALL LOCATIONS PERMITTED AT ONE TIME
IF EACH LOCATION PERMITTED SEPARATELY COST WOULD INCREASE

RECOMMENDED BUDGET COST = $90,000

Appendix C

Description of Vessel Operations Model

Description of Vessel Operations Model

1.1 Model Description

The following is an explanation of the model used to analyze the hypothetical cost of providing expanded Boston Harbor Islands ferry service. Assumptions and data sources are listed and described in detail as appropriate.

A detailed spreadsheet was constructed by the Volpe Center in order to evaluate different ferry-service alternatives and combinations of alternatives vis-à-vis boats, routes, operating seasons, operating hours, and other such factors. Since the data were provided in part by Boston Harbor operators, the base spread sheet remains proprietary at the operators' request. Separate sections of this spreadsheet contained data specific to the various boats, routes, and other variables examined.

Once the spreadsheet was constructed, it was twice duplicated, and the three separate files were used to compute the total cost of service for each of the three phases of service, one file per phase. In this way, it was possible to clearly keep track of the total cost, as well as other indicators such as the total operating hours and the total ridership capacity.

The model was constructed using a number of assumptions as described below. Much of the foundation data were provided by and/or verified by current ferry operators and other transportation professionals.

The model includes operations scenarios for Gateway services as well as for inter-island Shuttle services. The cost and revenue calculations by phase assume that there are only Gateway fares and the Shuttle operation would remain without fare and be included as part of the cost of the Gateway ticket.

1.2 Route Profiles

Data on route profiles were taken from Chapter 4 for the three phases of route implementation. Note that no special provision was made for dedicated Salem or Quincy/Fore River routes. Although they may in reality have to be piggybacked on regular commuter services, the model treats them as standalone routes, and calculates operating costs for the segment of the route which would serve the Harbor Islands.

For purposes of simplification, three "speed categories" were created:

1. Less than 17.5 knots;

2. Between 17.5 knots and 22.5 knots; and

3. Greater than 22.5 knots.

This simplification made it possible to flexibly interpret the route travel-time data provided (since travel times were not provided for every speed).

The model was constructed so that route base information may be changed, added, or deleted at any time. Subsequent sections of the spreadsheet will automatically update themselves to reflect the new route information.

1.3 Vessel Profiles

Most of these data were provided and/or verified by current ferry operators; some vessel information derives from earlier ferry studies.

Fuel-consumption computations are based on an earlier model constructed by the Volpe Center. To estimate fuel consumption, the concept of "slow speed" is introduced: "slow speed" is meant to account for the average speed of a vessel while not at service speed. In other words, in this model, a vessel must either be at idle, at "slow speed," or at service speed. "Slow speed" includes docking and undocking time, navigation in restricted-speed zones, etc. It is assumed that "slow speed" for all vessels is four knots, although this speed can easily be changed, and the model will automatically recompute for the new figure.

All boats are assumed to be under mortgage: 15 years, with equal annual payments, at an interest rate of 10 percent. These assumptions may be adjusted per boat or for an entire fleet, as necessary; such adjustments can help to fine-tune the model for a smaller, start-up operator (who might have higher interest rates or other mortgage arrangements) or for larger, more established operators (who might have lower interest rates or fewer boats under mortgage). However, it is important to note that down payments, and other start-up costs that might be associated with a new operator, have *not* been factored into this model.

Hull and personal/indemnity insurance per boat is figured at 2.5 percent of the replacement value of the boat; this number, too, may be altered per boat.

1.4 Gateway Route Operating Cost Profile

Each route/boat combination is calculated separately in the model; the spreadsheet, on being provided with the name of a route and the name of a boat, automatically figures the boat's travel time on that route based on the route information mentioned earlier.

The number of round-trips per day is not calculated by the model but must be entered manually. This is a safe-guard to ensure proper boat scheduling. In other words, for example, if a boat can manage the Long Wharf to George's Island round-trip in 94 minutes, it might still be scheduled to run only four trips per day, to enable regular clockface scheduling with departures every two hours on the hour.

There are five kinds of days: off-peak weekdays, off-peak weekend days, peak weekdays, peak weekend days, and days of no service. Naturally, only the first four types of day are of interest to the model.

Once the model has been provided with the number of round-trips for each boat on each route, on each of the four kinds of day, the spreadsheet, drawing upon the table above, is then able to calculate that boat's total number of round-trips per year on that route.

Then, based on the boat's speed and fuel-consumption characteristics, the model automatically calculates a total annual consumables cost (fuel and lubricant) for the given route-boat combination. Diesel fuel price is figured at $1.00 per gallon; this may be altered if energy prices fluctuate, or to reflect a smaller or larger operator, who may have to pay a different price for fuel. Figures are also assumed for lubricant cost and the lubricant-to-fuel consumption ratio.

Crew information is taken from the selected boat's information as provided. Each type of day (peak weekday, peak weekend day, off-peak weekday, off-peak weekend) is calculated separately, because crew hours may vary depending on the type of day. The crew works for the boat's total operating time, which is calculated by multiplying the boat's round-trip time by the number of round-trips scheduled per day, plus whatever time is added to pad the schedule in order to enable clockface scheduling (this "schedule padding" time must be entered manu-

ally for each type of day on each route), plus a block time per day during which the boat is prepared for, or taken out of, daily service. (This block time is assumed to be a percentage of total boat operating time.) Crew pay rates are also stored in the model; again, they may be adjusted as conditions warrant. Summing total pay for each of the four types of service days yields a total annual pay cost for each route-boat combination.

To determine maintenance cost for each route, the boat's total number of operating hours on the route over the course of the year is calculated by adding its total service time (including schedule padding time) for each of the four kinds of service days. Based on an assumed hourly maintenance charge (and depending on whether the boat is a monohull or catamaran), a total maintenance cost for each route-boat combination is derived.

Based on the boat's total annual operating time on this route, and on its total number of annual operating hours (including non-Harbor Islands ferry service), fractional capital and insurance costs – the part of capital and insurance costs attributable to this route – are calculated. Each boat must have its total annual operating time entered manually; this number will vary by boat, depending on whether a boat is engaged in other business (such as charters, dinner cruises, etc.), but is at present universally assumed to be 3,000 hours.

The total annual route cost comprises crew pay, consumables cost, maintenance, and capital and insurance costs. General/administrative costs, dockage fees, and publicity charges are actually not included but are deducted from the average ticket price, as those costs are assumed to grow linearly with passenger boardings. The average ticket price (the average adult fare less discounts and other concessions attributable to children, seniors, families, and other non-full-fare boardings) is entered separately; based on the general/administrative costs, dockage fees, and publicity charges assumed, the average ticket price is reduced to a figure used to calculate total annual revenue potential for each route.

Refreshments revenue is not considered as part of this revenue.

1.5 Shuttle Route Operating Cost Profile

Essentially, this is calculated in the same way as gateway operating costs, except that ridership capacities are not included in the eventual total figure, and revenues are not calculated, as the shuttles are intended to be free services.

However, because the average ticket price on the shuttle is therefore zero, this model does not calculate the general/administrative costs, docking fees, and publicity costs of the shuttle services, because the model now bases those on passenger revenues, which here do not exist. One possible remedy is to assume that these costs are accounted far as part of the gateway-route costs or are otherwise negligible. Otherwise, it may be appropriate to consider the shuttle operating costs, as calculated, slightly understated.

1.6 Totals

Based on the total cost of all possible gateway and shuttle route-boat combinations, total costs are calculated for all gateway services, all shuttle services, and all services combined. This is the estimated total annual cost of ferry service. Separate totals are calculated for each phase (using a separate model for each phase).

Total annual passenger capacity per phase is computed by summing the number of gateway round-trips per year per phase. Ridership projections, based on data provided by the consultant, are in all three phases a fraction of total capacity, as one would expect.

Similarly, there are two revenue figures calculated: one for total annual revenue potential, which corresponds to a 100 percent load factor, and one for estimated revenue at the forecast ridership levels. (Actually, there are

three separate ridership forecasts – for low, moderate, and high growth – and separate revenue totals are calculated for each.)

Also, by summing the total number of service hours by all routes (gateway and shuttle) and dividing the total cost of service by this figure, an aggregate hourly cost of service is produced.

Appendix D

Marketing the Boston Harbor Islands National Park Area

Marketing the Boston Harbor Islands National Park Area

1.1 Introduction

1.1.1 Background and Problem Statement

The Boston Harbor Island National Park has a goal of increasing the annual number of visitors to the Park from their current level of approximately 125,000 to 500,000 over the next five years. By comparison, the Aquarium reports 1.3 million visitors during a full 12-month season. Assuming that there is greater visitation to the Aquarium during the May through September months that include school vacation and the summer tourist season, the visitation goal that the Park has set for itself is roughly equivalent to the actual visitation of its neighboring attraction, the Aquarium.

The Island Alliance, the not-for-profit partnership for the Boston Harbor Islands, is actively pursuing a number of initiatives in support of the visitation goal, and towards a related goal of generating revenue for the Park. The Park has an active Marketing Committee that has addressed branding, signage, and promotion. The Park is currently in the process of gathering and evaluating a variety of different suggestions for large and small development projects that would help to increase visitation and provide revenue. Staff is pursuing funds for marketing research to support better-informed marketing decisions in the future. However, in the near term, the Park has a limited budget with which to accommodate advertising, outreach, and new program development. And, as a non-profit cum government agency, the Park staff does not include an experienced marketing manager who can provide a marketing strategy.

1.1.2 Overview of Paper

The purpose of this paper is to provide the Park with:

- A general overview of marketing;
- Market insight from qualitative research with Park customers and non-customers; and
- Recommendations for marketing activities, based on the focus group findings, that can be acted upon this year for increased attendance in the 2001 season.

Section II, What is Marketing, provides the reader with a general introduction to marketing concepts, terms, and activities. Section III, Marketing Insights from Qualitative Research, presents marketing-related findings from three focus groups convened in Boston in August 2000. Section IV, Recommendations, uses the findings from the focus groups to describe marketing activities, ordered according to the expected impact on visitation, which can be addressed in the near term within a limited budget.

1.2 What Is Marketing?

> *"Marketing is so basic that it cannot be considered a separate function. It is the whole business seen from the point of view of its final result, that is, from the customer's point of view.…Business success is not determined by the producer, but by the customer."*
>
> Peter Drucker

The purpose of this section is to provide the reader with an introduction to the marketing perspective and some of the activities that comprise a marketing strategy. For those who have not worked with marketing, or otherwise understand its terminology, this section frames the observations and recommendations in the **Findings and Recommendations** sections that follow it.

1.2.1 Marketing Concepts

Marketing asks: Who are our customers? What are the benefits that our service provides to our customers? What do they value? Do customers face any obstacles to purchasing or using our service? How can we adjust our offering to better meet customer's interests and values, while still serving our corporate goals? And, how can we communicate with our customers, so that they are motivated to purchase (or otherwise use) our services?

Marketing is often misunderstood to mean advertising and public relations. While the marketing strategy should include advertising and public relations decisions, marketing should inform nearly every product development and distribution decision an organization makes.

This section defines some key marketing concepts. The following section "Components of a Marketing Program" defines some practical marketing activities.

Needs, Wants, Demands

It is important to discriminate among needs, wants, and demands. People need food, water, shelter, safety, belonging, and esteem. Wants are desires for specific satisfiers of needs. When we need food, we may want a Burgher King Whopper to satisfy that need. Wants are shaped by social forces and institutions. Demands are wants for specific products that are backed by the ability and willingness to buy them. Many people want a Mercedes, but only a few are able and willing to buy one. The term "needs" is often used colloquially to refer to "wants."

To identify potential customers, companies must identify people who are both able and willing to buy their product. Marketers influence customer demand by making their product appropriate, attractive, affordable, and easily available to target consumers.

Products

A product is anything that can be offered to satisfy a need or a want. For the purposes of this paper, a product is defined to include goods, services, and ideas. The importance of products lies not so much in owning them as in obtaining the services or benefits they provide. We buy a microwave oven because it supplies cooked foods. Similarly with services, we buy a ticket to a movie when we want to be entertained; we attend a lecture when we want intellectual stimulation. The job of marketing is to sell the benefits that come from the use of their service or product, not the product itself.

Value, Cost, and Satisfaction

How do consumers choose among the many products that might satisfy a given need? They make choices that maximize personal *value*.

Suppose you need to travel 3 miles to and from work each day? You could satisfy the need for transportation by walking, driving or taking transit. Walking is free, and it is good exercise in fine weather, but during the winter, it is too cold. Your car is quick and provides the opportunity to port children and groceries, but workplace parking is expensive. Transit is slower than driving, but less expensive, and you can read while en route. Which mode will provide the most *satisfaction* to you at the least overall *cost*?

In this instance, you choose a combination of walking and transit, because it optimizes the various benefits you seek: outdoor exercise, low costs, and productive use of en route time. This selection provides you with the most *value*, defined as satisfaction of customer requirements at the lowest possible cost of acquisition, ownership, and use.

Marketers seek to understand the their customers' values so that they can ensure that their product provides the right combination of benefits (or, satisfaction) in relation to its total cost.

Markets

The concept of exchange leads to the concept of a market: a market consists of all the potential customers sharing a particular want who are willing and able to engage in exchange to satisfy that want.

Traditionally, a market was a place that buyers and sellers gathered to exchange their goods. Economists use the term to refer to a collection of buyers and sellers who transact over a particular product or product class; hence, housing market, grain market, bond market, etc. Marketers see the buyers, or customers, as constituting the market. Businesspeople use the term "market" colloquially to cover the various groupings of customers. They talk about the youth market, the French market, the designer shoe market, and so on. The term market is also extended to refer to non-consumer groupings, such as the voter market and the blood donor market. One of the marketing challenges that every company has to address is which markets they will select to compete in with their products and services, as this selection will determine how the product's benefits are presented and priced.

1.2.2 Components of a Marketing Program

Marketing uses research to identify characteristics and values of existing customers, and then take the perspective of the customer to make decisions about:

- Product features and functionality;
- Competitive analysis and positioning;
- Packaging;
- Prices and promotion;
- Selection of sales channels; and
- Advertising and public relations.

Customer Segmentation, or "Who Is Our Customer?"

Central to any marketing program is the question of "who is our customer?" Marketing research uses a variety of survey approaches to identify and understand existing customers. That information is then used to identify other individuals with profiles similar to existing customers who, by virtue of their similar needs, interests, and values, have good potential to become customers.

The simplest technique for identifying existing customers is by intercept at time of purchase. Manufacturers enclose mail-back product warrantees to obtain customers' names and addresses for later survey. Amusement parks may intercept customers during their time in the park. While especially true of park visitors, all surveys need to be respectful of customers' time, and should be as short as possible. Some survey techniques, like focus groups, pay customers a stipend for their time; most written surveys offer some incentive as motivation to customers to return a completed questionnaire.

Customer questions can be sorted into three general groupings: sociodemographic information, attitudes and values, and product satisfaction. This grouping of questions is used in both qualitative research, such as focus groups, and for quantitative surveys, such as written surveys.

- Sociodemographic questions include questions about the customer's age, sex, family status, children's ages, level of education, media preferences, and additional questions, such as ownership of a car or a boat, that might be relevant to the company's product.

- Attitudes and lifestyle questions are designed to learn why customers make different choices under different circumstances. These questions enable the researchers to form hypotheses about what influences a customer to choose one service over another, and to inform packaging and advertising decisions.

- Product satisfaction questions explore the customer's experience with the service. What benefits was the customer seeking when she chose your service? Has your service met her expectations? If not, why not? If your service has met her expectations, how can you best serve her needs again in the future?

Statistical analysis enables the marketing researcher to identify the values, attitudes, and lifestyles of customers, in an exercise known as segmentation. ***Segmentation*** brings major customer groupings into focus. For example, in a segmentation analysis of potential traffic information services customers, we identified three major customer segments: high-income married men in high-technology jobs; working women with children and mobile phones; and, a group we called "web-heads" because they were so enamoured of web-based technology. This information allows the company to begin adapting their services to better meet customer needs, to package and promote the product, and to make an effective choice of media for advertising, public relations, and other customer communications.

Product Features and Functionality

The second marketing question is "What features and functionality should our product provide to best meet the needs of our customers?" Companies that are able to adapt their products or services to better match their customers' interests (or, to add greater value) gain competitive advantage. In the context of a service, the producer would want to consider such questions as

- What is the fundamental service we provide? Homeruns may deliver groceries, but the fundamental service is timesaving: Homeruns makes it easier for customers' to make more efficient use of their time.

- Are the service's features and functionality aligned with the fundamental purpose of the service? If it is a convenience service, such as online grocery shopping, is it fast, easy, and convenient to use? To what extent can the service's features and functionality be improved to increase shopper convenience?

In the context of a park, the fundamental service is recreation. The agency would want to ensure that the Park's features, and the entire approach to the Park was fun, easy, relaxing, and safe. It is useful to consult customer surveys (including focus groups) to identify ways to align all aspects of the Park experience with customers' primary expectations.

Competitive Analysis and Positioning

Having determined who are the customers and what benefits the different customer segments seek from the service, it is necessary to look outward, to competitors' services, to determine how your service should be positioned on the market in relation to its competitors. Positioning is a strategic activity that uses knowledge of the competitors' services, benefits, and shortfalls to define how your own service will be presented to the public. The goal of this analysis is to define a strong position, where the differences between your product and your competition's is immediately apparent, and to provide a compelling presentation for the consumer to make a

decision in favor of your product. The positioning analysis also identifies complementary services, and provides the basis for creating packages that combine your services with those of other companies, for mutual growth.

A positioning analysis answers the following questions:

- What do our customers consider to be the core benefits of our service?
- Where else would they go to obtain the same benefits? Who are our competitors?
- Are there any obstacles to their obtaining services from us? From our competitors?
- What aspects of our service are better aligned with their values and the benefits they seek by comparison with our competitors?
- Are there complementary services offered by other companies that, when combined in a sales package with our services, strengthen the value and appeal of our services?
- Having identified a competitive market position, how do we present ourselves so that the comparative advantages of our service are immediately apparent to our significant customer segments?

Packaging

The term packaging refers not only to the box that contains the product (where it is a physical object), but also how the service is combined with others services to create greater value for the customer, and greater custom for the business. In the information services business, it is rare for one type of information to be sold alone; generally, the consumer subscribes to a set of services, with the various service packages configured to meet different price points and different interests. Cable television sells its services this way. In the travel and tourism business, packages are a combination of air and ground transportation, hotel, and other enhancements, such as city tours, or shopping discount coupons. In the context of the Park, a package would have to take into consideration the origins and interests of the customers: a combined trolley tour or Aquarium admission plus ferry ticket to the Boston Harbor Islands might enhance the appeal of both activities.

Packages always cost less than their component parts; that's a big part of their value. The value to the participating companies is increase in custom: customers who might think about visiting only one of the attractions will now visit both, because of the discount and the ease of access.

Packaging can also be used to refer to the creation of targeted visitor modules, such as specialized visitor guides for school children between the ages of nine and 12, or a specialized module for Civil War enthusiasts. These modules "package" the Park experience for consumers with special interests or for significant segments.

Pricing

At its most basic, pricing refers to the amount of money a customer pays to receive services. The price should cover the costs of manufacture, plus a profit to the business owner(s). Prices are set to attract customers to the product. Prices may be set far above actual costs, as with SUVs and high-end perfumes, or the price may be a fraction of a cent above actual cost, as with commodities such as wheat and oil. The difference in pricing reflects (among other things) differences in the customers' objective in making the purchase, in the way the products are purchased, and the prices set by competitors.

Admission to the Boston Harbor Island National Park is free, but access to the Park incorporates several different kinds of cost to the consumer, most of which is beyond the Park's control: the cost of parking or the MBTA,

the ferry, and the amount of time required to prepare for the outing. These elements will be discussed at greater length in the Findings and the Recommendations sections.

Selection of Sales Channels

All components of a marketing strategy must be aligned with the customer's values and the benefits they seek from the service. In its simplest form, this means that a convenience service should be convenient to purchase. Selection of sales channels also relates to positioning and existing purchase patterns: you would not sell a luxury good in a discount context, and you would not select supermarkets as the channel for selling airline tickets.

As an interesting example of an industry-wide shift in sales channel, airline tickets used to be sold through travel agents, who received a percentage of each sale as commission. This (and other sales incentives) aligned the interests of the agents with the airlines, and maximized both airline profits and agencies' earnings. The Internet has proven to be such a ubiquitous and satisfactory medium among airline passengers, and it is so cheap to manage, that the airlines have abandoned travel agents as commissioned sales agents, and now provide incentives directly to the passengers to encourage them to make greater use of the Internet as a sales outlet.

It should be easy for consumers to purchase tickets to recreational services. When selecting sales channels, it makes sense to learn from consumers where they would expect to be able to make the purchase, and where they currently purchase similar services. It is wise to offer consumers more than one channel for their purchase. And, it is critical that the sales channel be seamlessly connected to the gate, so that customers with "e-tickets" need only show ID to gain entry. For recreational activities where the list of primary benefits includes ease-of-use, it should also be possible for the consumer to purchase access at the same moment as they enter the Park, without the need to make any advanced arrangements.

Advertising and Public Relations

Advertising is the primary means for communicating with customers. Typically, advertising involves development of an advertising campaign (messages and images) and payment for placement of advertisements in appropriate publications (print, broadcast, and Internet). Different messages and images, placed in different media, are used to communicate with different customer segments. For example, to communicate with the parents of young children, one might place an ad in the Boston Parents' Paper (and on their web site).

Advertising venues should be selected with a formula in mind that balances the size of the targeted audience that the publication reaches with the cost of the ad. The fewer the number of eyes that see the publication, the less it should cost. Customers generally need to see or hear reference to the service at least twice before they act on the inclination to purchase. So, it can more effective to have ads in a lot of smaller publications, with the expectation that customers will see the ad in more than one place, than to buy one expensive ad in a big publication. It is always more effective to combine an ad series with an editorial series.

Public relations generally concentrates on methods of communicating that do not involve a fee for service, such as sponsorship of an event that is expected to make many potential customers aware of the service and its benefits. Public relations typically include activities such as newspaper and magazine articles, lobbying, speeches, company publications, and program sponsorship. In contrast with advertising, a public relations approach to communicate with parents would mean placing an article in the Boston Parents' Paper. As with advertising, and with all marketing-related activities, a public relations plan should be developed as part of an overall marketing strategy.

1.3 Marketing Insights from Qualitative Research

Survey research methods have two broad categories: quantitative and qualitative. ***Quantitative research*** uses large-scale surveys with the objective of sizing (for example) a particular behavioral trend, customer segment, value, behavior, or intent**.** ***Qualitative research*** is designed to explore ideas, values, attitudes, behaviors, and motivations in depth. Qualitative methods include one-to-one interviews and focus groups. The term "focus group" is applied colloquially to nearly any sized group of people engaged in a facilitated discussion, however in the context of marketing research it has very specific design and approach requirements. Focus group findings cannot be generalized from the sample to the entire population, but the findings are frequently substantial enough to merit investments in new programs. ***Focus groups were selected for the Boston Harbor Islands national park area study because marketing research must begin with listening to customers talk.***

1.3.1 Approach

Three focus groups were convened in Boston on August 29 and 30, 2000. Participants in Group 1 had recently visited the Harbor Islands and live *inside* the City of Boston or one of the adjacent communities (e.g., Brookline, Charlestown, etc.). Participants in Group 2 had recently visited the Harbor Islands and live *outside* the City of Boston in North Shore, South Shore, or West of Boston communities. Participants in Group 3 were defined as potential Park customers: they had either never visited the Park or not visited in the last five years, had gone into Boston for outdoor recreational or entertainment purposes in the past eight months, and had visited a local, state or national park within the past 12 months.

Participants in the first two visitor groups (live inside or outside the City of Boston) were intercepted and recruited while waiting on the Long Wharf pier or on the ferry to the Harbor Islands. The non-visitor group was recruited by telephone from a database of individuals maintained by the focus group facility. *It should be noted that none of the Park visitors intercepted on the Salem, Quincy, or Hingham ferries were willing to travel to focus groups in Boston.* This situation limits our observations about customer segments and about travel access to the Park from those three gateways.

In order to qualify for participation, individuals had to be a head of household over 18 years of age with at least a high school education, and not employed by the Park Service, or any Boston Harbor Island-related business. Additionally, an effort was made to insure that about two-thirds of the participants were parents with children under 17 years of age, one-quarter were single with no children, and one-quarter were non-Caucasian. Finally, there was an equal mixture of both male and female residents in each session. Despite screening, the owner of the Park's food concession was included in Group 1; he did not contribute to the discussion related to the food service.

These were the first focus groups convened with Park customers for marketing insight, and so the marketing-related objectives were fairly broad. The objectives of the research were to:

- Gain insight into customer characteristics;
- Learn what benefits customers gain from Park use;
- Learn what occasions a Park visit;
- Identify obstacles to Park use;
- Learn what travel and facility information is needed for planning a trip to the Park;

- Identify visitors' (and non-visitors') expectations and requirements for facility access and amenities; and
- Learn which media to use to communicate with current and potential customers

The hypotheses that informed the organization and approach to the focus groups were as follows:

- The Park's customers are primarily people who live in easy proximity to the ferries;
- The Park is primarily a family destination;
- Customers value the environmental aspects of the Park;
- Customers enjoy the historical significance of the Park;
- Potential customers include people who live within easy driving distance of Boston, already use Boston for entertainment and recreation, and go to outdoor recreational sites elsewhere in the region; and
- Potential customers include people who live or work in close proximity to the Hingham, Salem, or Quincy gateways, or use the Hingham ferry to commute to work in Boston.

The three groups lasted approximately two hours each. John Iacoviello, Ph.D., Cambridge Systematics, Inc. (CS), Cambridge, Massachusetts, facilitated the three groups. Dr. Iacoviello used a discussion guide developed jointly by CS and Volpe Center research staff. This report is based on the three focus group discussions and draws from and makes reference to the report written from that discussion by Dr. Iacoviello. The two reports highlight different findings, and are complementary.

1.3.2 Findings

The findings presented here represent a synthesis of what the participants said during the facilitated discussion.

Who Are the Customers?

Boston Harbor Islands national park area customers are groups of families and friends. It is a recreational outing that promotes relationship among the family or friendship group members. Focus group respondents included married and single people from all life stages, some with young children, some with grandchildren, and some without children. The Park is clearly a destination to be shared with someone whose company you enjoy.

Primary customer segments appear to be:

- Families with children;
- Grandparents with children;
- Small groups of retirees;
- Courting singles;
- Two or more married couples without children;
- School groups;

- Boston residents and greater Boston residents; and
- By extension (although not by direct evidence) Hingham, Greater Hingham, Salem, and Greater Salem residents.

Several of the adult respondents first came to the Park as children, with their school class.

Children and grandchildren were frequently cited as the motivator for a trip to the Park. As customers, children seemed to come in all age groups: infants, toddlers, early grammar school, middle grammar school, and middle school. It could not be ascertained from the focus groups whether teenagers comprise a visitor group, either as part of their family, their schools, or on their own. A visitor survey performed by the University of Vermont, currently in analysis, should provide conclusive data on this point. This survey should also provide conclusive data on visitor residence, and help to address the limitations of the focus groups.

Customers live within easy transportation distance of the Park. A previous survey of visitors suggests that one third of all visitors are from within Boston, another third from greater Boston, and a third from outside of greater Boston. Because the Park is a destination for residents who have guests visiting from out of town, it is likely that customers are primarily residents, not independent tourists.

What Are the Benefits to Customers from Park Use?

Customers come to the Park to enjoy its natural beauty and tranquility. Several respondents remarked that people become polite and friendly once they are in the Park. The Park offers an unusual type of outdoor recreation, with its combination of ferry, ocean, and conveniently located island isolation. Park customers said they had fun.

Families with children come to the Park for shared fun in a safe, clean, affordable, attractive, outdoor environment. Parents in the focus groups prioritized safety, convenience, and affordability. Their trip to the Park was enhanced by the historic elements of the islands, and for those with older children, the fort had great appeal, but history – as it is presented in the Park today – was not cited as the primary benefit of their visit.

Older people who made the trip with friends (without children) described the benefits of their visit to the Park as serenity, tranquility, and beauty. As with the family groups, they appreciated the historical element, and it added to the Park's attraction as a destination, but it did not feature as a primary benefit.

Courting singles need attractive destinations as a backdrop for their developing relationship. The entire Park experience provides that benefit.

Overall, the Park provides a destination that enables families and friends to share fun and enjoy the relationship that they have with one another. They also enjoy sharing the experience with other visitors to the Park, which provides an enhanced sense of community. Some respondents were motivated by the historic elements, others by children who love the fort. Customers describe the Park as a destination with just enough in the way of attraction to provide a focus for the visit, but not so much structure as to interfere with making one's own fun, as is the case with a commercial theme park. The features of the Park that all customers valued most include safety, cleanliness, affordability, accessibility, no commercial elements, and natural beauty.

What Occasions a Park Visit?

Respondents did not address this question directly. However, it is clear from the conversations that good weather, a desire to be out of doors, a desire to spend time away from commercial influences (i.e., shopping malls), and the need to provide structure for recreational time with children, friends, or family all contribute to the motivation for taking a trip to the Park. Residents bring out-of-town visitors to the Park, so the need to en-

tertain visitors may motivate a trip. Equally, it is clear that there are no fixed associations with the Park in terms of a certain kind of holiday, event, excursion, or personal milestone. The most frequently identified occasion for a Park visit was a school trip.

What Are the Obstacles to Park Use?

Lack of information, access, cost, and time were the three most frequently cited obstacles to Park use. Obstacles were cited in relation to life stage, familiarity with downtown Boston, and familiarity with the Park.

Both customers and non-customers said that it was difficult to get detailed information about the Park, its facilities, and transportation to the Park. One respondent related a sequence of phone calls she made to different authorities when trying to get a camping permit. Lack of easy access to detailed information about all aspects of the Park is a significant obstacle to Park use.

Boston resident customers took transit to the Park. Those who traveled with children said that the need to carry food, water, and accessories to the Park via transit created more of a chore than a similar outing to other urban outdoor destinations. Some customers said that their trip to the park is a once a year event because of the advance planning and packing, combined with the amount of time required to get to the Park. Park customers from outside of Boston either drove or took transit. Those who drove were very familiar with the area, knew where to go for the ferry, and knew less costly places to park their cars.

Non-customers, that is those who had not been to the Park at all, or not in the past five years, found the construction around the waterfront to be a deterrent for a trip to the Park. Uncertainty about how to use transit and about parking locations and prices were cited as obstacles to use. Older respondents cited the high cost of parking and the need for handicapped accessibility as obstacles. Non-customers with children were concerned that the trip would be convenient and reasonably priced; parking costs are also an obstacle to families. One mother made it clear that she values simplicity in her outings and wants to make the fewest possible trip preparations.

When asked why they did not make more frequent trips to the Park, customers suggested that the combined preparation and travel time made the Park a more challenging destination. This was less true of singles and other adults who were unencumbered by children. However, overall travel time to Long Wharf and onto the main island causes visitors to feel that they must make at least a half a day trip out of their visit.

What Travel and Facility Information Is Needed for Planning a Trip to the Park?

Customers and potential customers want to be able to dial a phone number or enter a web site address and have their entire Park destination questions answered. Those questions include:

- Directions to the ferry for all modes of transport and from local parking lots;
- Parking lot locations and costs;
- Transit fees;
- All Park-related fees;
- Length of lines for tickets and the ferry;
- Ferry and water taxi schedules;
- Food concessions and type of food available;

- Water and electricity availability;
- Availability and location of shelters;
- Restrooms and diaper changing facilities;
- Handicapped accessibility;
- Camping permits and detailed information with which to plan a camping trip in the Park;
- Equipment rental; and
- Special programs, such as guided tours, lectures, or concerts.

What Amenities and Services Do Customers Want?

Customers do not want to see the natural beauty of the Park marred by development and commercialization, however there is a desire for better-developed services. The items discussed included better signs – both on the islands and on Long Wharf – more vibrantly presented historical programs, better food services, drinking water, and detailed maps and brochures. Some participants thought it would be great to have volleyball and other games available on George's island. Others suggested a boat rental for sea kayaks and other appropriate small boats. Several customers agreed that the Park should include foods that could make it more of a destination, such as fried clams. Finally, a couple of different respondents suggested the addition of evening programs, such as concerts, dances, and sound and light shows.

Which Media Are Most Likely to Reach Current and Potential Customers?

Word-of-mouth and school trips were the most frequently cited ways that customers learned about the existence of the Park. Customers who had grown up in Boston had been to the Park on a school trip. Customers with friends who grew up in Boston heard about the Park from them. One mother, who had not been to the Park herself, knew about it from her son's school trip. While school trips do not qualify as media in an outreach campaign, they seem to offer a useful venue for bringing students' families and friends to the Park.

Nearly all of the respondents in all three groups said they had access to the Internet and used it to locate information. The Internet may rival television as the most powerful medium available for marketing products and services. Part of its power is in the immediacy of the interaction between the user and the information on the site. It is a two-way medium, and users expect to be able to get quick responses to their email requests. However, the Internet demands continuing involvement with the web site by Park staff; with the decision to develop a web site there must be a commitment to regular customer correspondence, site maintenance, and information updates.

When participants were asked where they look for ideas and information on recreation, several mentioned the AAA magazine and newsletter. These member service publications offer articles on destinations throughout the region, and are considered credible sources of information by subscribers.

While the daily newspapers were not the first media that participants mentioned, they all cited the Boston Globe or the Boston Herald as a popular source for information on weekend and leisure time activities. Seasonal destination articles in the Calendar section of the Globe, or the corresponding section of the Herald, are a useful way of reminding residents of the unique pleasures an outing to the Park.

At least one participant said that she looks in the community section of Yellow Pages when she needs information about a park or other public recreation destination.

1.4 Conclusions and Recommendations

1.4.1 Conclusions

In concluding, we should revisit the marketing framework presented at the beginning of this paper, take inventory of where the Park stands in terms of having the information and resources needed for a marketing program, and consider how it should proceed towards the goal of increased visitation. These are the basic components of a marketing plan:

- Identification of significant customer segments, including the customers' appreciation of the Park's value to them;
- Adaptation/development of product features and functionality in line with customers' interests;
- Competitive analysis and positioning;
- Packaging: creating visitors' packages to meet the interests of known significant segments, and packaging the Park Service with complementary services to increase the reach of the Park to new customers;
- Pricing and promotion to attract customers;
- Selection of sales channels that align with customers' expectations; and
- Advertising and public relations to increase customer awareness and visitation.

Customer Knowledge

The Park has two useful recent customer studies that provide sufficient insight to support marketing endeavors in the near term. First, the three focus groups convened by Cambridge Systematics and the Volpe Center (August 2000) have provided depth of insight into why and how customers visit the Park, what obstacles exist to Park visitation, and general suggestions for improvements to product and information. Second, a soon to be released visitor survey performed during the summer 2000 season by Robert Manning, University of Vermont, will provide actual demographic profiles, as well as attitudes and values towards the Park, and type of outing (traveling with family or friends, and for what purpose).

In a complementary economic development study being performed with the Sedway Group, the Park has received suggestions from community leaders for future revenue-generating projects. The projects selected for development from these suggestions will also help to form the Park's long-term marketing strategy.

No further customer research is required to support the recommendations provided below. However, the University of Vermont study should be consulted for the demographic profiles of visitors. If there are many families with small children visiting the Park, it suggests that a higher priority should be placed on the development of age suitable playgrounds and games areas.

Research should be incorporated into plans for the summer of 2001 to update existing information, to explore new questions and programs, and to assess the value of this year's outreach activities.

Product Features and Functions

While no new product features or functions are needed to increase visitation in the near term, it is suggested that the recommendations offered by the focus group respondents be addressed as soon as conveniently possible. These are features that are askew with their expectations and distract from the Park experience. Over time, such

improvements generally equate with increased return visits. Priority should be given to addressing those features (or lack of features) that are perceived as obstacles to visits, with second priority to those features that constitute enhancements.

Competitive Analysis and Positioning

Competitive analysis is used to assess where one's own service stands in consumers' eyes in relation to similar services. The results are used in making decisions that differentiate your service from that of your competitors.

This report does not systematically addresses competitive analysis and positioning. It would be a useful exercise for the staff and the board, as it would help to put the Park into the broader context of all similar recreational services in greater Boston, and may help to identify new potential customers and new ways of packaging and presenting the Park. It does not need to be a first tier priority to increase visitation rates this season, but it will provide useful insight for a longer-range marketing strategy. Competitive analysis combined with analysis of market trends in recreation and tourism are two critical first steps in developing a full marketing plan. Such an analysis is central in the selection of major investment program, such as being developed with the Sedway Group.

Packaging

The information received through current research is sufficient to support preliminary packaging efforts. In prioritizing activities towards increased visitation in 2001, packaging projects should be second to an advertising and public relations campaign. It is useful, and it will help to carry the message long after the advertising is gone, but if a trade off is required, pursue other outreach projects first, and put packages into place for later in the 2001 season, or for 2002.

Visitor modules that package the Park for special interests should also be placed into the second category of importance. Availability of such packages will increase the appeal of the Park for many who wonder what there is to do at the Park, but in and of themselves, such modules will not make an appreciable difference in the near term visitation rates. Future market research will be helpful in selecting the themes for the first modules.

Pricing and Promotion

Price sensitivity varies depending upon the income and situation of the individual consumer being queried. Focus group respondents indicated that the price of admission to the Park, the ferry ticket, was priced fairly and did not constitute a barrier to a visit. However, related "costs" of a visit, including overall travel time and parking may be creating a "price" barrier. Once a consumer has made a visit to the Park and has had direct experience of its value, the logistics of a return trip may seem less onerous.

It would be worthwhile to explore the issue of price further by issuing promotional "two-fer" coupons and tracking customers' responses. At its simplest, a strong response to coupons suggests that price matters, but it may also signal that a "deal" is motivational. The cost of a promotion includes coupon design, printing, mailing (if distributed by mail), distribution (other venues), and lost revenue. Coupons should be deployed following an advertising or public relations campaign, and should take place in the first half of the season so that there is time to reap the benefit of return visits.

Sales Channels

There does not appear to be any present need to establish other sales outlets beyond the existing ticket offices. Feedback from focus groups suggests that the location of the ticket sales could be better marked, as there are a number of places on the wharf to buy tickets to different attractions. Once the Park develops marketing rela-

tionships with other complementary attractions, it will be necessary to establish shared sales outlets with those venues.

Advertising and Public Relations

The most critical challenge facing the Park is the need for increased and improved communications with consumers. There simply are not enough people who know about the Park and have been to the Park to generate the desired level of visitation. With the exception of the metropolitan coastal communities, the boating community, and boat commuters, the islands that comprise the Park are not visible and accessible to large numbers of residents, like other outdoor recreation sites. It does not abut any neighborhood. There are no well-established events tied to the Park that keep it in the public eye on an annual basis. It does not feature in any long-beloved children stories. The single most important investment that the Park can make for increased visitation is in improved communications, advertising, and public relations. This is a costly endeavor, in staff time, in consulting fees, and in media purchases, but it is the single greatest barrier to increased visitation.

1.4.2 Recommendations

The following marketing recommendations are intended to be achievable with limited staff and resources. They are derived from the focus groups discussions. While ongoing customer research is strongly recommended, there is enough useful customer information from the focus groups for the agency to begin addressing marketing needs now. The recommendations are not intended to be all-inclusive. Use the information provided in this report, in combination with other current reports, to develop more tactics for bringing the Park into the public eye and enhancing the quality of the customers' Park experience.

The recommendations are prioritized towards the goal of increasing Park attendance. It is clear from the focus groups that the biggest obstacle to greater attendance is lack of awareness 1) of the Park itself, and its features and benefits, and 2) how to get to the Park. The cost of Park admission also poses a barrier, not because of the price of the ferry ticket, but rather because of the cost of parking, the time required to prepare for a trip to the Park, and the overall time required getting to and from the Park (including land travel). In a more secondary – but still meaningful – position are program elements that would enhance the Park experience for the dominant customer segments, such as a playground recreational area for younger children, fun historical programs for older children, and destination enhancements that would provide older visitors with a reason to choose the Park over other, more easily accessed outdoor recreation.

Advertising, Outreach, Public Relations

- **Increase public awareness of the benefits of a visit to the Boston Harbor Islands National Park Area**

The greatest obstacle to increased Park attendance appears to be lack of awareness among potential Park customers. More information about the Park needs to appear in local public media, including newspapers, magazines, radio shows, television, and web sites. The information should increase residents' awareness of the benefits of a visit to the Park, its location, and how to reach it.

Local residents dominate the Park's current customer mix. Rather than look elsewhere for new customers, initial media activities should focus on the local tourist – the families and friends who seek a convenient afternoon excursion that will fit into their schedule and their budget, and still make them feel like they've crossed to another shore.

One magazine that comes immediately to mind as a popular source for information on in-city tourist destinations is Boston Magazine. It is effective at reaching a certain segment of the greater Boston and visitor population, but it is not recommended as a good value for advertising dollars unless used as part of an integrated, targeted, well-endowed public relations and promotion plan.

All of the Boston resident customers took transit to the ferry. Transit billboards during the spring and summer seasons with photographs of the harbor islands and an easy to remember phone number and web site address should help to increase transit riders awareness of the Park and its proximity to the Aquarium MBTA stop. Similarly, the Park should investigate transit-related advertising opportunities to capture the Hingham, Quincy, and Salem commuter communities.

Newspaper and radio articles describing the Boston Harbor Islands national park area experience are free of advertising costs. It is possible to develop relationships with the editorial staff of Boston, neighborhood, and college newspapers and radio stations, as well as regional publications like the AAA newsletter, where Park staff provides the photos and the story to meet the themes and interests of the publication's or broadcast audience. Investigate publications directed to "seniors." This segment has more time to spend on recreational activities, and they are frequently interested in exploring new destinations. Similarly, the large student population of Boston's universities should not be overlooked. Always use the Park logo in print media and always provide the Park phone number and web site address.

Seasonal advertising in newspaper and newsletters is useful. Advice from a public relations or advertising specialist should inform the size, content, and placement of ads. All outreach, regardless of placement or type, should include the Park logo and the Park phone number and web site address.

Because school groups generate so much customer awareness, materials should be developed for students to bring home, to reach the families of students. Other organized groups offer customer outreach opportunities, namely church and temple groups, senior groups, and community center groups. In each case, it is likely that there are regional publications or newsletters that could be used with an article or advertising to reach these potential customers. Always include the Park logo, web site address, and phone number in all print.

Investigate the cost of a web site consultant to help ensure that the Park web site pops up on the first search engine screen of any related key word search, such as Yahoo, Ask Jeeves, Northern Lights, or Alta Vista. Use several different search engines and appropriate key words to search for the Boston Harbor Islands national park area. Clean out the outdated sites that are no longer maintained.

Investigate the cost of retaining a public relations firm for the purpose of developing a structured outreach campaign. A public relations strategy marries marketing with public communication. An integrated campaign developed by a professional takes into account the messages, the audiences, media placement, cost, coordination, and timing. Where customer awareness is critical to the enterprise, funding for a structured public relations program is money well spent.

- **Improve information describing Park facilities and services**

The following list includes all information recommendations made by visitors and non-visitors during the focus groups. Many felt that the lack of easily accessed information of this type was an obstacle to a Park visit.

- Directions to the ferry for all modes of transport
- Parking lot locations and costs
- Transit fees
- All Park-related fees
- Access maps and maps of the Park
- Length of lines for tickets and the ferry
- Ferry and water taxi schedules

- Food concessions and type of food available
- Alcohol availability and policy
- Water and electricity availability
- Usefulness of a flashlight (for exploring the fort)
- Availability and location of shelters
- Availability, content, and location of first aid station(s)
- Restrooms and diaper changing facilities
- Information addressing Park safety for children
- Handicapped accessibility
- Camping permits and detailed information with which to plan a camping trip in the Park
- Equipment rental
- Information describing special programs, such as guided tours, lectures, or concerts, and activities for kids

- **Improve availability of en route information describing access to the Park**

Customers need to be able locate information about the park pre-trip, to plan their trip, and en route, to make choices as they go. Some customers begin planning their trip to the Park several days or weeks in advance; others are more spontaneous and may begin their trip mid-transit. Information describing the Park, its facilities, events, transportation access, and history should be located at each junction of an individual's journey. In addition to the web site and telephone information, pamphlets and signs should be placed in nearby MBTA stations, parking lots, at the Aquarium, on the dock, in the boat, and on the island. Focus group respondents suggested that maps and water taxi schedules be located on Long Wharf and on the islands.

Respondents also expressed a need for more information describing points of interest on the islands and along the boat route to George's Island. This information could be made available on the dock, on the boat, and on the islands.

- **Address access obstacles explicitly**

Seniors and the physically disabled need explicit access information for every leg of the trip, for parking, for every modal transition, for all bathroom facilities, and for moving about on the islands themselves. Information about the location and availability of benches and shelters is also helpful. Seniors are a significant segment of the population with a lot of time available for recreational pursuits, and merit special attention as a customer segment of the Park.

- **Expand existing school programs**

A large proportion of the focus group participants had first heard of the islands through a school trip, or through a friend who had been on a school trip. This program should be expanded.

- **Reach out to local church groups and other recreational affinity groups with tailored Park programs**

Retired people join organized church, synagogue, or other affinity groups for greater structure and social interaction. Such groups have committees that plan outings for the group to such destinations as theatre, Atlantic City, and Cape Cod. The Park should develop programs with these groups, similar to those for school groups (but with different needs and interests taken into account), to bring organized groups to the Park. As with the school groups, this group has the potential to generate additional visits from family members.

Promotions

- **Offer promotions**

While the price of the ferry does not pose an obstacle for current customers, and the other costs of access are much higher (and beyond Park control), people are motivated by sales and discount coupons. There are several ways to use promotions. For example, a two-for-one coupon distributed to current visitors, in media advertisements, and in direct market mailings, good for travel on weekdays and during the off-season, would encourage greater Park use during low-demand periods, and bring existing customers back to the park for repeat visits. A two-for-one coupon without restrictions would encourage visits generally. If the coupons are to be distributed to non-visitors, it is critically important that the coupons include the address of the ferry, the web site, and an information phone number for further information on Park access.

Packaging

- **Create a package in cooperation with the Aquarium, and with the Trolley tours**

Visitors to the Aquarium and the Trolley tours have successfully addressed many of the obstacles reported by focus groups respondents: they have located the wharf, they have paid for parking or navigated the MBTA, and they are willing to pay a comparatively high ticket price for an outing.

- **Develop specialized web-based programs for different customer segments**

According to a recent article in the Boston Globe, ~50 percent of households in greater Boston have access to the Internet. Thirty to 50 percent of the focus groups respondents said they used the Internet for information. All respondents expressed interest in the Park's historical elements and in learning more about history while at the Park. While it may be possible to provide more tour professionals at the Park, one way of providing historical programs and tours is through the Park web site.

Programs should be developed and packaged to meet the interests and sophistication of the significant customer segments. For school aged children, the programs could be enhanced with learning exercises, and treasure hunts, drawing exercises (e.g., connect the dots to draw the lighthouse), and similar types of games that the Park could support. A bounded keyword search would allow customers to choose keywords from a list, and be offered access to all of the programs that address that particular theme.

Product Features

- **Improve the quality of food services available in the Park**

The existing food service is considered adequate among those customers who brought picnics or other food with them to the Park. It was disappointing to those who were not prepared. One of the respondents pointed out that food could become part of the destination by adding seafood or something unusual (and very good) to the menu. Some of the respondents remembered fried clams from a particular clam shack on a Boston beach as a motivator for visiting that beach. While food is clearly not a significant motivator for current customers, the quality and

selection of the food could be enhanced to improve customer satisfaction and the appeal of the Park, and as a destination enhancement that may provide a competitive advantage when consumers consider the park in comparison with other recreational facilities.

Public Relations

- **Develop programs that associate the Park with a public event**

The esplanade is the place for fireworks and the Boston Pops on the Fourth of July; Prudential Center is host to the Christmas Tree lighting ceremony; Copley Square is where you go for ice sculptures on New Year's eve; each of these are examples of a location firmly associated with a public event. Local press routinely schedule coverage of the events. Families plan outings with the destination as a centerpiece, such as Christmas shopping followed by the tree lighting ceremony. The Park would benefit from developing such a association by increased patronage at the time of the event, and by bringing new customers to the Park through the event, by increased patronage at other times during the season. Even with good advertising, such an event takes years to securely establish itself in the Boston landscape of events.

- **Develop programs that make the Park an attractive destination to celebrate a private occasion**

While many people have established rituals for observing birthdays, anniversaries, and reunions, others are on the lookout for something novel, but convenient. One example of this is children's birthday parties. Many parents agonize over the problem of creating a satisfying birthday experience for their children; one that can be planned and produced without too much disruption of existing schedules, and at a reasonable price. Create packaged programs for birthday celebrations for ages seven to 12. Offer different themes for different ages; include catering, party favors and balloons, boat transportation, clowns, and games. One challenge to this particular package is the need to provide equally satisfying alternative activities for rainy days.

Product Features

- **Begin the Park experience on the ferry**

Park customers consider the ferry to be part of the entire experience of visiting the island(s). Several respondents suggested that a guide be present on the ferry to provide information on points of interest to those who are interested, or to engage the children in something constructive in preparation for their Park visit.

- **Sell Park paraphernalia on the boats and on the island**

Visitors want to be able to buy a memento of their visit to the Park. Also, the weather may change, and visitors may have need to buy a sweatshirt, a hat, or an umbrella. Some paraphernalia does double duty as advertising. Coffee mugs or water bottles can be useful visual reminders of a great time; or, they can be a cue for a conversation with a coworker about the Park.

- **Improve camping permit system, supplies, and information**

Two members of the first focus group had camped in the Park during the past summer. One had been to the Park more than once before. They arrived by transit with their gear and children. They spoke at length on the need for better planning information and easier access to camping permits. In addition, they recommend that the Park provide:

  - Carts for hauling gear;
  - Drinking water;

- Ice;
- Permit information by phone and on the web site;
- Water taxi schedules; and
- Information about Park security.

Plan Ongoing Marketing Research

In a customer-driven endeavor, it is critical to remain attuned to your customers' experience and opinions of your service. Market research should be an ongoing effort, integrated into annual planning and product development cycles. For example, track the number of user sessions on the Park web site. Use that as a measure of the effectiveness of other outreach efforts, including placement on search engines. Periodically, place a customer satisfaction survey on the web page. Use the survey for customer feedback on the Park, and on web page. Plan an annual visitor intercept survey to stay up to date with customers' experience of the island, and customer segments. Where funds are limited, produce a few focus groups each summer (as was done this year) to listen to customers talk. One question that was unanswered by the August focus groups was what occasioned a decision to visit the park; that question should be addressed in future focus groups for a better understanding of what it is that actually moves customers from their homes to the Park.

It is ill advised to undertake any type of market research work without the assistance of a qualified research consultant. Inexperienced staff easily mismanages both qualitative and quantitative research, and bad information is worse than none.

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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