FTA RESEARCH

FEDERAL TRANSIT ADMINISTRATION

Vashon Island Passenger-Only Ferry Study: Technology Demonstration Phase and Final Report

APRIL 2015

FTA Report No. 0089
Federal Transit Administration

PREPARED BY
Greg Lerner, King County Department of Transportation, Marine Division
Carla Leigh Sawyer, Progressions

WITH SUPPORT FROM
Mike Anderson, KPFF

U.S. Department of Transportation
Federal Transit Administration

COVER PHOTO

King County staff. All report photos courtesy of King County unless otherwise noted.

DISCLAIMER

Vashon Island Passenger-Only Ferry Study: Technology Demonstration Phase and Final Report

APRIL 2015

FTA Report No. 0089

PREPARED BY

Greg Lerner, King County Department of Transportation, Marine Division
Carla Leigh Sawyer, Progressions

WITH SUPPORT FROM

Mike Anderson, KPFF

SPONSORED BY

Federal Transit Administration
Office of Research, Demonstration and Innovation
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

AVAILABLE ONLINE

http://www.fta.dot.gov/research

Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
^oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^oC

REPORT DOCUMENTATION PAGE	*Form Approved* *OMB No. 0704-0188*

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY	2. REPORT DATE April 2015	3. REPORT TYPE AND DATES COVERED 2009 - 2014

4. TITLE AND SUBTITLE Vashon Island Passenger-Only Ferry Study: Technology Demonstration Phase and Final Report	5. FUNDING NUMBERS WA-26-7008

6. AUTHOR(S)
Greg Lerner, King County Dept. of Transportation, Marine Division
Carla Leigh Sawyer, Progressions

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESSE(ES) King County Dept. of Transportation, Marine Division 201 South Jackson Street Seattle WA 98104	8. PERFORMING ORGANIZATION REPORT NUMBER FTA Report No. 0089
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Federal Transit Administration Office of Research, Demonstration and Innovation East Building 1200 New Jersey Avenue, SE Washington, DC 20590	10. SPONSORING/MONITORING AGENCY REPORT NUMBER FTA Report No. 0089

11. SUPPLEMENTARY NOTES [http://www.fta.dot.gov/research]

12A. DISTRIBUTION/AVAILABILITY STATEMENT Available from: National Technical Information Service (NTIS), Springfield, VA 22161. Phone 703.605.6000, Fax 703.605.6900, email [orders@ntis.gov]	12B. DISTRIBUTION CODE TRI

13. ABSTRACT

This report summarizes work performed in earlier phases of this project to prepare for implementation of a County-operated passenger-only ferry service and documents the demonstration of three technology-based passenger ferry traveler information initiatives. The first two phases produced a policy study for County-operated passenger ferry service and a business and implementation plan for introduction of the service. The final phase evaluated opportunities for introducing technology to improve ferry traveler information, selected the most promising and feasible three technology options, and demonstrated and evaluated the three technology initiatives.

14. SUBJECT TERMS Passenger ferry traveler information technology, variable message sign, VMS	15. NUMBER OF PAGES 251

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGMENTS

The authors would like to acknowledge the King County Department of Transportation for their support of this project. Former and current King County Marine Division directors Scott Davis and Paul Brodeur provided leadership and support to the project. The authors would also like to thank Washington State Ferries for its participation in the vessel location project.

The project benefitted from the support and guidance of FTA, particularly Charlene Wilder for her involvement throughout the many phases of the project.

The feedback and suggestions offered by ferry riders throughout the project was invaluable. We thank them.

ABSTRACT

This report summarizes work performed in earlier phases of this project to prepare for implementation of a County-operated passenger-only ferry service and documents the demonstration of three technology-based passenger ferry traveler information initiatives. The first two phases produced a policy study for County-operated passenger ferry service and a business and implementation plan for introduction of the service. The final phase evaluated opportunities for introducing technology to improve ferry traveler information, selected the most promising and feasible three technology options, and demonstrated and evaluated the three technology initiatives.

EXECUTIVE SUMMARY

Washington State Ferries introduced modern-day passenger-only ferry service on Puget Sound in 1989. As revenue to support the Washington State Ferries diminished, the State decided to dedicate its revenue to auto ferry service, relinquishing passenger-only ferry service to local governments. The Federal Transit Administration (FTA) awarded King County a cooperative agreement to support development and analysis of information to help County leaders make informed decisions regarding the assumption of responsibility for passenger ferry service in the county and to demonstrate the use of technology to improve passenger-only ferry traveler information.

This project was undertaken in three phases:

- The Waterborne Transit Policy Study was completed in August 2005, leading King County to move forward with assuming responsibility for passenger ferry service in the county.
- The Business Plan and the Implementation Plan for Vashon Island Passenger-Only Ferry were developed in October 2006 and November 2007 to guide planning for and start-up of County-operated passenger ferry service.
- The technology demonstration phase of the project began in 2011 once passenger ferry service operation was fully implemented.

Three past reports have been completed for the first two phases of the project and are attached as Appendices A, B, and C. This report addresses the technology demonstration phase of the project.

Purpose and Approach

The demonstration phase of the Vashon Island Passenger-Only Ferry Study was designed to evaluate the feasibility and benefits of incorporating technological advances to increase passenger convenience and improve traveler information while also enhancing passenger processing. A variety of technologies was evaluated, such as Automatic Identification System (AIS) for vessel tracking, electronic fare collection, video monitoring and detection at the Water Taxi terminals, electronic communications, and web-based applications and social media networks. Opportunities to partner with or leverage existing and emerging public and private technology initiatives also were explored.

The project was conducted in four steps:

1. Identification of potential technology opportunities by examining other ferry system and transit agency use of technology, assessing rider and operator information needs, and defining an initial list of opportunities to evaluate further.
2. Structured assessment of potential opportunities.
3. Detailed design and implementation after the most promising technology initiatives were identified.

4. Evaluation of the implemented technologies, including identification of lessons learned.

Technology Initiatives Demonstrated

Three technology initiatives were demonstrated:

- On-Dock Traveler Information – Variable Message Sign (VMS)
- King County Water Taxi Website Improvements
- King County WaterTaxiWatch – Vessel Real-Time Location Application

To provide passengers with schedule and boarding information at the Water Taxi terminal in downtown Seattle, a variable message sign was installed close to where passengers first approach the ferry terminal at the junction of the sidewalk and the terminal entrance. This location offers key information before passengers traverse the length of the walkway out to the waiting area and boarding location. The sign rotates two displays, allowing next departure information on one screen and alerts or messages on the other screen. The variable message sign became available to the traveling public in June 2013.

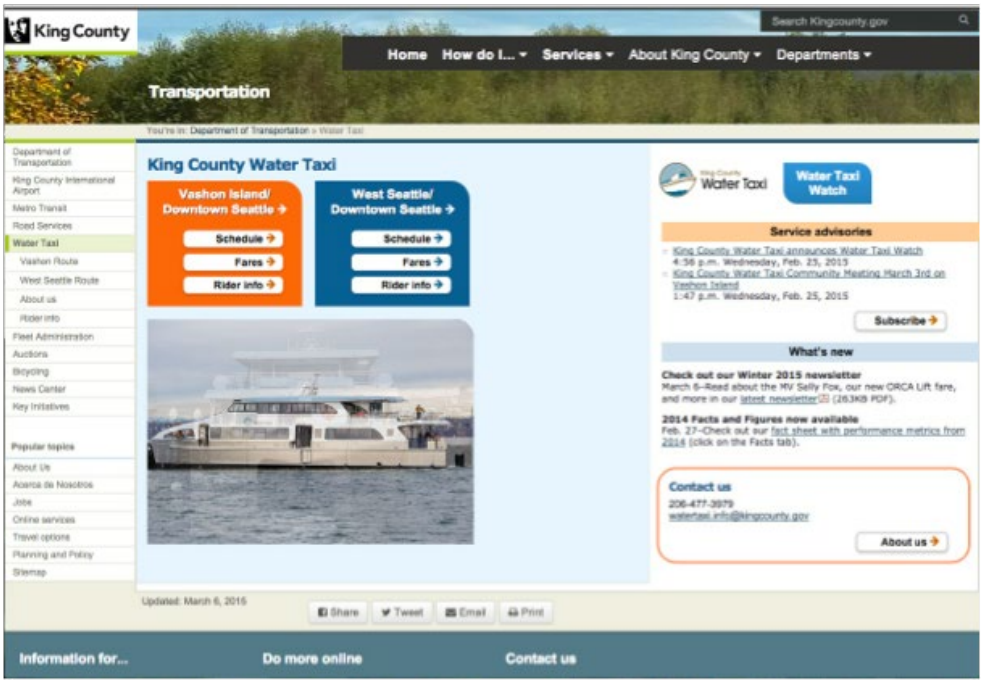
Figure ES-1

Pier 50 Variable Message Sign

To improve online passenger ferry information, the existing KCMD website was enhanced to be more streamlined and user-friendly. Water Taxi riders were surveyed to understand their traveler information preferences, and their preferences were incorporated with visual design principles to render a more functional display suitable to multiple screen sizes. The enhanced website was launched in September 2013.

Figure ES-2

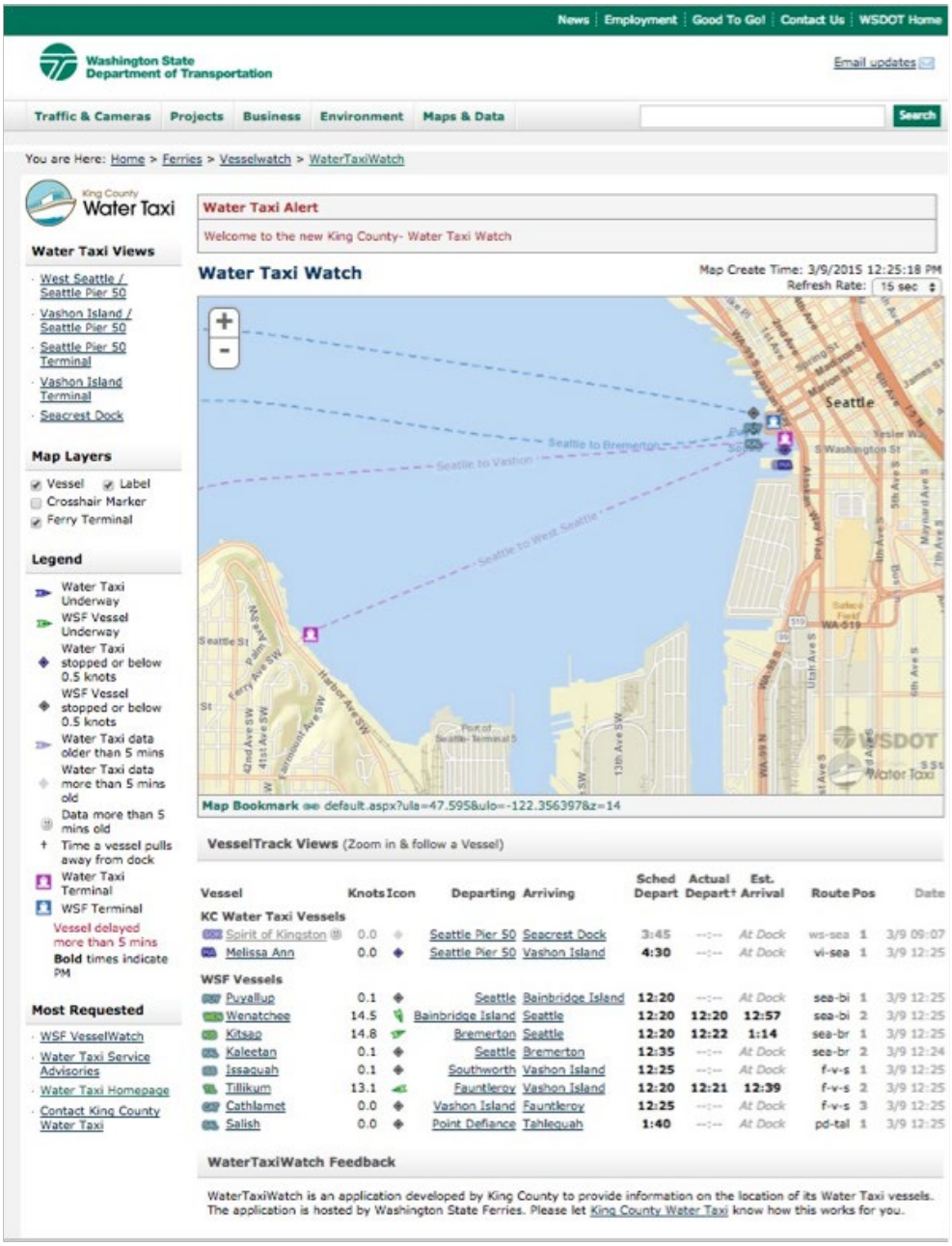
Enhanced KCMD Water Taxi home page



A real-time vessel location application was developed and linked to the King County Marine Division (KCMD) Water Taxi website. The application also provides departure and schedule information and is scalable to smaller handheld devices. WaterTaxiWatch is a unique view of the Washington State Ferries VesselWatch application. Users are oriented to the Water Taxi routes but can also view location and tracking information for WSF vessels on nearby routes.

Figure ES-3

King County WaterTaxiWatch page



Conclusion

The Vashon Island Passenger-Only Ferry Study led to the successful implementation of a robust, popular passenger-only ferry service that brings riders directly into downtown Seattle from other parts of the city and suburban King County without adding to roadway congestion. The objectives of the technology demonstration phase of the project were achieved. The three technology projects implemented demonstrated:

- A range of technology from lower-end technologies such as the variable message sign to more advanced technologies such as real-time vessel location and tracking applications.
- Technologies to address the needs of both experienced and infrequent users though just-in-time and trip planning information
- Information accessibility on both traditional desktop computing platforms and mobile devices.

Riders now have an array of enhanced options for traveler information, making the King County Water Taxi more easily accessible within existing KCMD operating resources. Although the demonstration project was not without challenges, delays, and course changes, an agency considering introducing similar technology will benefit from the experiences documented in this report.

The reader can access the two online technology initiatives through the King County Water Taxi website at http://www.kingcounty.gov/transportation/kcdot/WaterTaxi.aspx.

SECTION
1

Introduction, Background, and Objectives

History of Puget Sound Marine Transportation

Marine transportation has always been an essential mode of transportation for Puget Sound residents. Distances by water across the Sound can be less than half the distance on surface roads. At the turn of the 20th century, a number of privately-owned transportation companies carried passengers, freight, and mail on small steamers.

Figure 1-1

City of Seattle on the Seattle waterfront, circa 1890

Figure 1-2

Seattle waterfront, 1907

Known as the "Mosquito Fleet," this passenger ferry system operated between Seattle, Olympia, Tacoma, Bremerton, Vashon Island, Bainbridge Island, Port Townsend, Everett, Bellingham, and other smaller Puget Sound ports and across Lake Washington. By 1910, two million passengers were carried on the Mosquito Fleet each year. By 1929, only two companies, the Black Ball Line and Kitsap County Transportation Company, were providing ferry service on the Puget Sound, and the service had been consolidated to fewer routes using larger passenger vessels. Improvements in land-based transportation, such as highways and interurban rail, triggered a decline in demand for passenger ferry service. In 1935, the Kitsap County Transportation Company ceased operations, leaving the Black Ball Line in control of ferry service around and across the Puget Sound.

As the automobile became more popular, the demand for auto-carrying ferries emerged. At the same time, some communities, formerly connected most efficiently by water, began building roads between their communities, supplanting the need for passenger ferries. In the late 1930s, Captain Alexander Peabody, owner of the Black Ball Line, purchased 17 auto-carrying ferries from San Francisco Bay, as that region was phasing out ferries in favor of building bridges. These auto ferries replaced the remaining cross-Sound passenger ferry fleet. In 1951, the State of Washington bought the Black Ball Line for $4.9 million. Today, Washington State Ferries (WSF) is the largest ferry system in the United States, with 10 routes, 20 terminals, and 22 auto ferries. In 2013, it carried 22+ million riders and 10+ million vehicles.

The first modern-day experiment in passenger-only ferry service occurred in the summer of 1978, when WSF and Boeing operated a jetfoil on Puget Sound for six weeks. Although WSF found the jetfoil to be too expensive to operate, it did determine that high-speed passenger-only ferry service offered a viable means of reducing automobile use while promoting passenger travel.

Figure 1-3

Boeing jetfoil in Elliott Bay, Puget Sound

Photo courtesy of The Boeing Company

Passenger-only ferry service was not pursued again until 1984, when WSF cited passenger-only ferry service as a strategy for alleviating worsening traffic congestion and managing steadily-increasing ridership on its auto ferries. Highlighted in its 1990–2000 Long Range Plan, WSF recommended the introduction of passenger-only ferry service on three routes: Vashon Island to Seattle, Southworth to Seattle, and Bremerton to Seattle. In 1986, WSF purchased a catamaran passenger ferry, the Express (later renamed the Tyee) to operate between Bremerton and Seattle.

Figure 1-4
WSF's first passenger-only ferry, MV Tyee

Photo courtesy of Washington State Ferries

The popularity of this service prompted WSF to commission the construction of two mono-hull ferries, the MV Skagit and MV Kalama, and TO expand service by adding a Vashon-Island-to-downtown-Seattle route in 1990.

Figure 1-5
WSF's MV Skagit

Photo by Steven J. Brown

In 1998 and 1999, WSF introduced two 350-passenger high-speed passenger ferries, the MV Chinook and MV Snohomish, to increase passenger capacity and decrease crossing time on the Seattle-to-Bremerton route. Although the vessels were designed to minimize wakes, in 1999 property owners along the shoreline of Rich Passage, a narrow channel of water between Bremerton and Seattle, won an injunction to slow vessel speeds and thereby reduce wake-related impacts to the shoreline. With slower speeds and longer crossing times, the popularity of the Seattle-to-Bremerton passenger-only service diminished.

Figure 1-6
WSF's MV Chinook

Photo by Steven J. Brown

In 2003, responding to environmental concerns in Rich Passage, falling ridership, and diminishing tax revenues to support the costs of operations, the Washington State Legislature discontinued the Bremerton passenger-only ferry service. At the same time, it extended funding for the Vashon Island service through 2005, but expressed the intent to turn passenger-only ferry service operation over to the local government. To facilitate local control of passenger ferry service, the Legislature also enacted new statutory authority providing county and other local governments with the authority to operate ferry service and collect taxes to support the service. In 2005, the Legislature approved one final extension of funding for the Vashon-Island-to-Seattle service through June 2007, but at a reduced level of service.

Background and Project History

Responding to the Washington State Legislature's expressed intent to transfer responsibility for passenger-only ferry service to local governments, King County Metro updated its Six Year Transit Development Plan for 2002 to 2007. The update was to include a strategy to determine under what conditions and circumstances it might be appropriate for King County to invest and/or participate in passenger-only ferry service. Ferry service between Vashon Island and downtown Seattle has long been considered an essential transportation

mode for Vashon Island residents, for whom ferry service is the only means of traveling to and from the Island. However, with the shift in responsibility from the State to local governments, if passenger-only service from Vashon was to be retained, King County would have to step forward to fund and operate the service.

In 2005, King County Metro commissioned a policy study on waterborne transit for King County to provide County policymakers with information to make informed decisions about an investment in passenger-only ferry service. The Waterborne Transit Policy Study was conducted by the IBI Group and funded as Phase I of the Vashon Island Passenger-Only Ferry Study (see Appendix A).

To move forward with implementation of County-operated passenger-only ferry service, a number of approvals had to be secured and organizational steps completed. To secure State approval for assumption of the Vashon Island service, in 2006 the King County Council directed the King County Department of Transportation (KCDOT) to develop a business plan to be submitted to Washington's Governor, Christine Gregoire, as required by the Washington State Legislature. The IBI Group was engaged to prepare the plan. In 2007, following the Governor's acceptance of the business plan, the IBI group prepared an implementation plan for King County's operation of the Vashon-Island-to-Seattle passenger-only ferry route. Funded as Phase II of the Vashon Island Passenger-Only Ferry Study, the business and implementation plans addressed the following (see Appendices B and C):

- Governance and funding
- Vessel and terminal capital requirements
- Operations, including:
  - Crewing
  - Hours of operation
  - Service schedules
  - Vessel and facility maintenance
  - Program management and support
- Ridership and fare levels
- Fare revenue and local, state, and federal grant revenue
- Implementation and financial plan

In April 2007, the King County Ferry District (KCFD) was created to expand transportation options through water taxi services. The KCFD assumed responsibility for both the State-operated Vashon-Island-to-downtown-Seattle passenger-only ferry route and the Elliott Bay Water Taxi, previously operated as a seasonal service between West Seattle and downtown Seattle by a private operator contracted through King County Metro Transit. In July 2008, the KCFD

assumed responsibility for the Vashon-Island-to-Seattle passenger-only ferry route through a one-year operating contract with WSF. By September 2009, King County had established the in-house capability to operate passenger-only ferry service and assumed direct operating responsibility for the Vashon Island and West Seattle routes.

King County Marine Division and the Water Taxi Service

In 2007, KCDOT formed the Marine Division (KCMD) to manage and operate water taxi services in King County under contract to the KCFD. Reporting to the director of KCDOT, the KCMD director and a staff of six management and administration employees were charged with:

- Managing the daily operations of two water taxi routes, including the vessel and terminal operating and maintenance staff of 18
- Providing customer information and service
- Staffing and training vessel and terminal personnel
- Planning and managing the capital programs for vessels and terminals
- Providing all necessary general and personnel administrative functions
- Budgeting, controlling, and reporting all operating and capital expenditures

The KCMD operates two routes: Vashon Island to Seattle and West Seattle to Seattle. In 2014, more than 467,000 passengers were carried—184,500 on the Vashon Island route and 282,500 on the West Seattle route.

Figure 1-7
Vashon Island to Downtown Seattle route

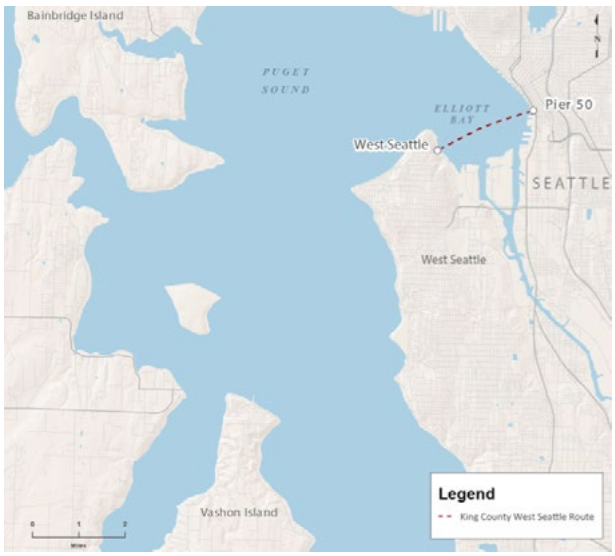


Figure 1-8
West Seattle to Downtown Seattle route

The Vashon Island route provides commuter-focused year-round weekday service during the peak morning and evening commute periods.

Table 1-1

Vashon Island and West Seattle Winter Daily Schedules

Leave Vashon	Leave Seattle
	5:30 AM
6:10 AM	6:38 AM
7:10 AM	7:40 AM
8:15 AM	–
–	4:30 PM
4:58 PM	5:30 PM
5:58 PM	6:30 PM
6:58 PM	

Leave West Seattle	Leave Seattle
–	6:00 AM
6:15 AM	6:30 AM
6:45 AM	7:00 AM
7:15 AM	7:30 AM
7:45 AM	8:00 AM
8:18 AM	8:30 AM
8:45 AM	–
–	3:45 PM
4:00 PM	4:15 PM
4:30 PM	4:45 PM
5:00 PM	5:15 PM
5:30 PM	5:45 PM
6:00 PM	6:15 PM
6:30 PM	6:45 PM
7:00 PM	

The West Seattle route provides commuter-focused weekday service during the morning and evening peak commute periods between November and March. From April through October, service is supplemented by extended mid-day and evening weekday service and all-day weekend service.

Table 1-2
West Seattle Extended Service Summer Schedule

Monday–Friday		Saturday–Sunday	
Leave West Seattle	*Leave Seattle*	*Leave West Seattle*	*Leave Seattle*
	6:00 AM		8:30 AM
6:15 AM	6:30 AM	9:00 AM	9:30 AM
6:45 AM	7:00 AM	10:00 AM	10:30 AM
7:15 AM	7:30 AM	11:00 AM	11:30 AM
7:45 AM	8:00 AM	12:00 PM	12:30 PM
8:15 AM	8:30 AM	1:00 PM	1:30 PM
8:45 AM	9:00 AM	2:00 PM	2:30 PM
9:15 AM	10:30 AM	3:00 PM	3:30 PM
11:00 AM	11:30 AM	4:00 PM	4:30 PM
12:00 PM	12:30 PM	5:00 PM	5:30 PM
1:00 PM	1:30 PM	6:00 PM	6:30 PM
2:00 PM	2:30 PM	7:00 PM	7:30 PM
3:00 PM	3:30 PM	8:00 PM	8:30 PM
4:00 PM	4:15 PM	9:00 PM	9:30 PM
4:30 PM	4:45 PM	10:00 PM	10:30 PM
5:30 PM	5:15 PM	11:00 PM	
6:00 PM	6:45 PM		
6:30 PM	7:30 PM		
7:00 PM	8:30 PM	Friday and Saturday evenings, special events	
8:00 PM	9:30 PM		
9:00 PM	10:30 PM		
10:00 PM	10:30 PM		
11:00 PM			

The KCMD operates from three terminal locations: Pier 50 serving as the downtown Seattle hub for both routes, on Vashon Island adjacent to the WSF auto ferry terminal, and at Seacrest Park in West Seattle.

Figure 1-9 *Pier 50, Downtown Seattle*

Figure 1-10

Vashon Island Terminal

Figure 1-11

Seacrest Park dock in West Seattle

Pier 50 is staffed with a marine information agent during evening commute periods year-round and throughout the day and on weekends between April and October. The Vashon Island and Seacrest Park terminals are self-service facilities with boarding and other static information signage. All three terminals are equipped with solar-powered, wireless ticket vending machines (TVMs) for single-fare purchases. Fares are collected by vessel crew during the passenger boarding process using a handheld portable fare processing device for prepaid media and a portable fare collection box for cash and single-fare tickets Nearly 70% of fares are paid with prepaid media or monthly passes loaded onto the regional fare collection card, ORCA (One Regional Card for All). Passengers can load regional or unique monthly pass products as well as stored value onto their ORCA card.

Figure 1-12

On-dock automated TVM

Figure 1-13

Portable fare transaction processing device for ORCA Cards

Scope of This and Prior Projects

This report focuses on the demonstration phase of the Vashon Island Passenger-Only Ferry Study project. The two earlier phases of the project are documented in previously-submitted reports and are included for reference as appendices to this report (see Appendices A, B, and C). The history of the three phases of the project was discussed in the previous subsection. The project objectives for each phase are identified below.

Phase 1: Waterborne Transit Policy Study

The purpose of the policy study was to provide policy makers with information to help make informed decisions about potential King County investments and participation in passenger-only ferry services. The policy study addressed three key policy questions:

1. Should King County invest or participate in waterborne transit, and if so, under what circumstances?
2. If investment or participation is warranted, what funding approach or approaches could be considered?
3. What operating approaches would best achieve county objectives and mitigate risks?

Phase 2: King County Business and Implementation Plans for the Vashon Island Passenger-Only Ferry

The purpose of the business plan was to document a plan for King County assumption of the Vashon Island Passenger-Only Ferry service from the Washington State Ferries. The business and implementation plans addressed:

- Characteristics and configuration of the proposed service
- Detailed descriptions of the service components
- A detailed plan for staged implementation
- A financial plan and financial pro forma through 2020

Phase 3: Technology Demonstration Project

The demonstration phase of the Vashon Island Passenger-Only Ferry Study was designed to evaluate the feasibility and benefits of incorporating technological advances to increase passenger convenience and improve traveler information, while also enhancing passenger processing. A variety of technologies were evaluated, such as AIS for vessel tracking, electronic fare collection, video monitoring and detection at the Water Taxi terminals, electronic communications, and web-based applications and social media networks. Opportunities to partner with or leverage existing and emerging public and private technology initiatives also were explored.

The objectives of this project phase were to:

- Conduct a needs and requirements assessment for new technology improvements to enhance traveler information and passenger processing.
- Analyze the design and implementation of new technologies or customer amenities for passenger-only ferries.
- Select one or more new technologies initiatives to be implemented as a demonstration project(s).
- Implement and evaluate the demonstrated technology initiative(s).

Prior Project Phases

The Vashon Island Passenger-Only Study resulted in three previous reports:

- Waterborne Transit Policy Study – Final Report August 2005
- King County Business Plan for the Vashon Island Passenger-Only Ferry – November 2006 and April 2007 Amendment
- King County Passenger-Only Ferry Project Implementation Plan – Briefing Paper, November 2007

These reports are attached as Appendices A, B, and C.

SECTION 2

Technology Demonstration Phase Approach

The approach to the technology demonstration phase of the project involved four steps:

- Analysis of technology opportunities
  - Review of other ferry and transit system use of passenger processing and information technology
  - Rider and operator needs assessment
  - Identification of potential technology applications
- Analysis and ranking of potential applications, and selection of technology applications to be implemented
- Design and implementation
- Evaluation and lessons learned

Analysis of Technology Opportunities

The first step in defining a traveler information and passenger processing technology demonstration project was to survey and analyze the universe of technology applications to identify the potential technology initiatives that might be relevant and implementable within the confines of the project scope and funding. To do this, the project team:

- Reviewed the use of passenger processing and information technology by other ferry and transit systems.
- Conducted a rider and operator needs assessment.
- Identified potential technology applications, issues, and challenges.
- Developed order-of-magnitude cost estimating.

Review of Use of Passenger Processing and Information Technology by Other Ferry Systems

Recent years have seen emerging technology deployed in a variety of ways in the public transportation sector and, more specifically, in marine transit. To leverage other transit operator experience with traveler information and passenger processing, a number of organizations were reviewed:

- Water Emergency Transportation Authority (San Francisco Bay area)
- New York Waterway
- British Columbia Ferry Service
- Steamship Authority (Nantucket and Martha's Vineyard)
- Stena Line (North Sea)
- Alaska Marine Highway System
- Washington State Ferries
- Tri-Met (Portland)

The review of other ferry and transit operators revealed many different ways in which technology is being applied to provide traveler information and improve passenger processing, such as:

- Links to relevant transit agencies on web pages
- Email updates and alerts for breaking news and service information
- Real-time departure information
- Website
- Ferry terminal monitors
- Newsfeed
- Text messages
- Information on Facebook and through Twitter
- Mobile applications
- GPS bus locator for shuttle buses
- Vessel position (AIS)
- Terminal status
- Webcams
- Wait times

Rider and Operator Needs Assessment

An opinion survey was conducted to develop an understanding of current and potential water taxi rider preferences for traveler information. The survey was administered during a two-week period to more than 600 riders of the King County Water Taxi's downtown Seattle-to-Vashon-Island route and walk-on/bus passengers on the WSF's Vashon-Island-to-Fauntleroy (West Seattle) route responding. The survey was extended to WSF riders because the Vashon-Island-to-Fauntleroy route provides an alternative method of traveling to downtown Seattle, and passengers on this route also likely are current occasional or potential Water Taxi riders.

The survey results revealed that currently-available traveler information is being used by a large percentage of riders, but that riders would like to see more information available through web-based applications and social media networks. Highlights of the survey results are noted below. The report on the survey, including the survey instrument, is available in Appendix D.

Current Information Sources

Although a number of current information sources are used by ferry riders, two sources were most frequently cited:

- Rider Alerts are used by the largest percentage of riders, mainly through email – 58% overall, 65% of Water Taxi riders; in total, 20% of riders receive text rider alerts on their phones.
- King County Metro Transit's Trip Planner (which includes Water Taxi routes in the route planner) is the second most frequently used source of traveler information – 24% of all riders, 25% of Water Taxi riders.

Requested Sources Not Currently Available

Riders noted two sources of traveler information, currently available for other ferry or transit operations, that they would like to be available for the Water Taxi:

- VesselWatch (WSF's AIS vessel-tracking website program) – 16% overall, 18% of Water Taxi riders.
- One Bus Away (a website program developed by the University of Washington that identifies the next bus based on your current location and destination) – 16% overall, 18% of Water Taxi riders.

Electronic Devices Used

More than half of all riders surveyed reported that they use mobile devices to access traveler information:

- Smartphone – overall 53% of riders, 57% of Water Taxi riders.
- Laptop or other mobile computer – overall 40% of riders, 43% of Water Taxi riders.
- Tablet computer – overall 11% of all riders, 12% of Water Taxi riders.

Requested Information Displays Locations

Riders expressed interest in locating traveler information displays in the terminals and onboard the water taxis:

- Overall 55% of riders and 60% of Water Taxi riders would like to see travel information displayed in Water Taxi terminals.

- Riders also expressed interest in traveler information displays onboard the Water Taxi, but with less frequency – overall 28% of riders, 32% of Water Taxi riders.

Requested Information at Display Locations

The four most frequently-requested types of rider information for display locations were:

- Real-time next departure- overall 46% of riders, 46% of Water Taxi riders.
- Published schedule – overall 30% of riders, 30% of Water Taxi riders.
- VesselWatch – overall 24%, 25% of Water Taxi riders.
- One Bus Away –overall 21% of riders, 21% of Water Taxi riders.

Working with KCMD operations and management staff, the results of the rider survey were weighed together with current facility conditions and passenger processing requirements to establish a consolidated list of needs to guide the technology demonstration selection process. In no particular order of preference, the needs identified were:

- Passenger processing improvements
- Customer boarding experience
- Real-time passenger information for ferry service
- Real-time passenger information for connecting services
- Better information and direction on passenger queuing

Potential Solutions

Building from the findings of the needs survey and interviews with KCMD operations and management staff, eight potential technology initiatives were identified for further consideration.

Boarding Information (with and without Audio)

Although most Water Taxi passengers are regular commuters, there are visitors, first-time riders, and passengers with disabilities who might need additional information regarding where and when to queue. During the evening commute period at the downtown Seattle Pier 50 terminal, it can be particularly challenging for inexperienced riders when several vessels on multiple routes depart in a short window of time. An infrequent rider may not understand the process and might create congestion in the boarding area and/or board the wrong vessel.

To improve the information available for passengers and the operational process of loading passengers, real-time departure and queue information could be provided via monitor(s). Real-time departure and queue information also could

be provided over loudspeakers on the deck. The audio and visual message that might be played could be something like, "West Seattle ferry now queuing in line A, estimated departure 5:10 PM." Components of this system would include physical signage for the different ferry queues (A, B, C, etc.), video monitors in the waiting area and near the TVMs, speakers on the dock, and software and computers to create and send the messages to the monitors and speakers.

Boarding Likelihood

Currently, the Pier 50 shoreside Marine Information Agents keep an unofficial passenger count and inform passengers of the estimated number in line and the likelihood of making the next departure. It might be helpful to provide passengers with high-level information about the number of passengers already waiting in line and the vessel passenger capacity. This would allow the shoreside crew to perform other essential duties. Components of this system might include an electronic sign (installed at the end of the pier, near the sidewalk), computer and software to drive the messages to the electronic sign, a wireless network, and a handheld device. The electronic sign would list the ferry run and departure time, and color code them (green – still boarding, yellow – within 10% of full capacity, red – 100% capacity, vessel full). The handheld device would allow the shoreside crew to change the capacity status (green, yellow, and red) without actually needing to stand at the end of the pier.

On-Vessel Real-Time Information for Connections

As some passengers' trips are actually multimodal, it may be helpful for them to know the real-time status of their vessel's anticipated arrival time and other transit options while they are on the vessel. This is particularly true for the passengers arriving at Vashon Island who need to catch a bus or another ferry. In addition to the real-time information, a longer-term solution might include mounting a camera in the bus bay so that a ferry passenger would know if the bus was present. The video image could stream constantly and be viewed on the vessel. Finally, it may be useful to have a link to VesselWatch, the highly-popular web-based application developed by WSF to provide real-time vessel location and schedule information. Although many passengers already may have applications (OneBusAway and VesselWatch) that link them to the information, it might be useful to have a monitor on the vessel that has links to real-time information sites. Components of this system would include a computer, a monitor, and an Internet connection.

Video-Detection for Passenger Counting

The vessel crew is responsible for the official passenger count and collecting fare payments. An automated method of counting passengers might free the vessel crew for other boarding duties, thus improving operation and shortening boarding time. It might be possible to install a video detection system for

counting passengers. The components of the system would include cameras, a computer, and software. The software would be configured to identify the motion of passengers (boarding or alighting) and a detection zone. However, for staff or passengers who walk back and forth in the detection zone, it will be difficult to get an accurate passenger count. It was concluded that current facility limitations preclude implementation of a video detection system that would be accurate enough to ensure compliance with vessel passenger capacity limitations. However, video detection could be planned for a new water-taxi facility where the boarding configuration can be designed to accommodate automated passenger counting.

Terminal Facility Cameras

It may be useful for passengers to be able to see conditions at Pier 50, such as the queue length, to help inform their decision about which Water Taxi sailing to take. These cameras would be focused only on passengers and would not support security purposes. The cameras would be mounted at Pier 50 or perhaps at the adjacent WSF terminal at Pier 52. The components of the system would include cameras, a camera control/management system, and a process to make the video available to the KCMD Water Taxi website.

Real-Time Vessel Location Information

Modeled on the popular WSF VesselWatch system, a vessel location tracking system that provides a map and graphical representation of where each Water Taxi vessel is as it crosses Puget Sound might provide useful information for riders as they make decisions about which trip to take. The application also would include a table of departure and arrival times, including color coding (red) when a vessel is late. The map and table would be generated from global positioning (GPS) information produced by the AIS that is fed into a known ferry schedule. It may be possible to add a graphical representation of each of the Water Taxi vessels on the Puget Sound map. This map could be displayed in the Pier 50 waiting area on monitor(s). Additionally, a link to the KCMD website could be added to VesselWatch page to make the connection between the two systems. KCMD could pursue development of this technology initiative in some form of partnership with WSF.

Social Media and Website Enhancement

This might be the opportunity for the KCMD to employ multiple social media channels in addition to an enhanced website to inform passengers of planned and unplanned events and make frequently-requested traveler information readily available. For example, King County Metro currently uses Facebook, Twitter, YouTube, Delicious, RSS (really simple syndication) feeds, and Have a Say. An enhanced website would make frequently-requested information easy to locate

and direct users to other information sources, such as rider alerts and real-time schedule information.

Smartphone Applications

This might be an opportunity for the KCMD to support Smartphone applications (through contests or just making the data available) so that third parties can develop applications for passengers. A likely subject for an initial smartphone application might be real-time vessel location information.

Project Selection Matrix and Scoring System

The eight potential technology projects were ranked using a structured process to select the specific technology initiatives to be advanced to design and implementation planning. An evaluation matrix and scoring system were developed featuring nine evaluation criteria. The criteria focused on cost, complexity, rider appeal, and operational improvements for each opportunity. The criteria addressing rider appeal and operational improvements received more weight than those related to cost and complexity.

An evaluation team was formed from members of the consultant team and selected KCMD staff and included a blend of ferry program and technology expertise. Participants were asked to evaluate each of the eight possible technology opportunities. The technology options scoring matrix is included in Appendix E.

Scoring guidance and weight factors for each criterion were as follows:

1. **Cost to Develop**

   Weight Factor: 8
   1 = Major investment (more than $1 million with no identified fund source)
   5 = No direct cost

2. **Time to Develop and Implement**

   Weight Factor: 8
   1 = Will require 12 months or more to implement
   5 = Can be implemented within 90 days

3. **Interdependency with Other Systems**

   Weight Factor: 6
   1 = Will require a high level of integration
   5 = Can be implemented stand-alone

4. Interdependency with Other Agencies

Weight Factor: 8
1 = Will require a high level of integration
5 = Can be implemented stand-alone

5. Complex or Difficult to Implement

Weight Factor: 10
1 = Complex technology, high risk environment, few successful implementations
5 = Simple, proven technology

6. Rider Demand for the Option

Weight Factor: 16
1 = No demonstrated rider demand
5 = Meets the preferences of more than 50% of the riders

7. Likely to Increase Ridership

Weight Factor: 12
1 = Unlikely to attract new riders
5 = 80% likely to attract new riders

8. Likely to Improve Current Riders' Travel Experience

Weight Factor: 16
1 = Unlikely to change rider travel experience
5 = Likely to improve the experience of 80% of current riders

9. Likely to Improve Operations

Weight Factor: 16
1 = Has no impact on terminal operations
5 = Significantly improves operating efficiency and effectiveness

Project Selection Results

The individual evaluators' scores were consolidated and filtered in a number of ways to develop a priority ranking for the technology opportunities. Although the priority order within the alternative rankings varied some, in all cases the same four technology opportunities rose to the top.

Table 2-1 *Technology Options Selection Evaluation Results*

Project Team Potential Solution	Score	Technology Team Potential Solution	Score
Boarding information with audio	2.60	Smartphone(mobile) applications	3.64
Boarding likelihood	2.37	Enhanced website/social media	3.43
Enhanced website/social media	2.04	Boarding likelihood	3.39
Smartphone (mobile) applications	1.93	Boarding information with audio	3.23

The rankings were filtered in the following ways:

- Technology-experienced evaluators only, for all criteria
- Ferry program evaluators only, for all criteria
- All evaluators, for all criteria
- All evaluators, for the rider appeal and operational improvement criteria

In all cases, the top four technology options were:

1. Boarding information with audio
2. Boarding likelihood
3. Smartphone (mobile) applications
4. Enhanced website and social media

All four technology options were advanced for design and implementation planning.

SECTION 3

Technology Demonstration Phase: Design and Implementation

The four top-ranked technology projects selected for potential design and implementation were subjected to a more thorough analysis for:

- Technical feasibility
- Acquisition considerations
- Ease of implementation including facility limitations
- Value to user
- Ongoing maintenance and support
- Operational challenges
- Acquisition, design, and implementation costs

From the initial four recommended projects, three were chosen for implementation:

- Boarding information would be provided through an on-dock variable message sign (VMS).
- An enhanced website would make frequently-requested information and real-time travel and schedule information available and would direct users to the traveler advisory system for service disruptions and other emerging events. (Implementation of social media programs beyond those available through other King County organizations was not pursued due to limited KCMD staff resources to maintain the programs.)
- A web-based, smartphone-scalable, real-time vessel location system would be developed.

Appendix F is the project definition document that was prepared to guide design and implementation of the three selected projects. Below are a summary description and a discussion of the design and implementation for each of the three elements.

On-Dock Traveler Information – Variable Message Sign (VMS)

It was decided that a VMS would be installed on the secure side of the white swinging gate (close to where the sidewalk and the terminal entrance meet) to provide passengers with schedule and real-time boarding information. This location was deemed the most advantageous because it would provide important schedule information before passengers traversed the length of the walkway out to the waiting area and boarding location.

Figure 3-1
VMS mounting location

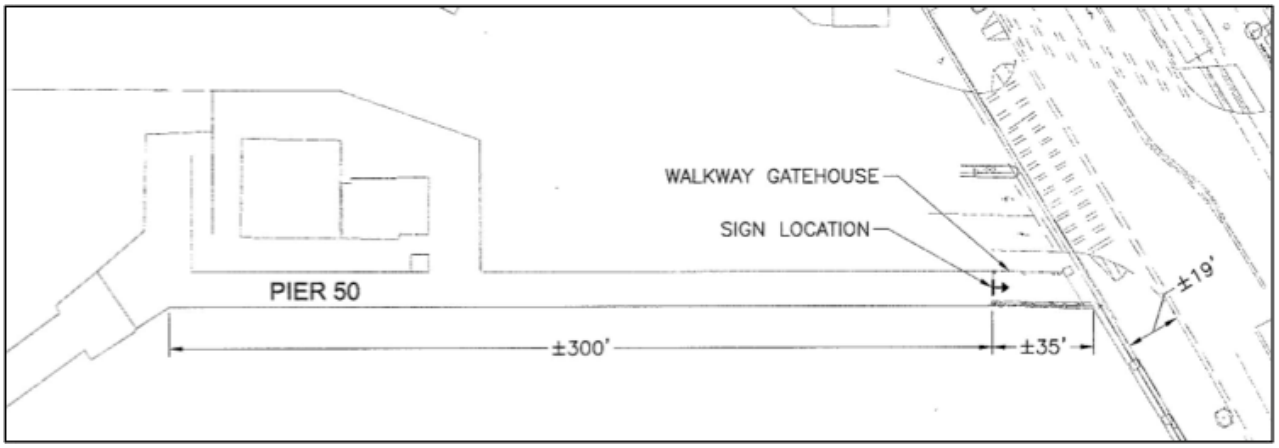


Figure 3-2 *Water Taxi Pier 50 dock site map with sign location*

Specifications were developed for the VMS, and a search of equipment manufacturers was conducted. The key specifications were:

- Large enough to provide 6 lines of text
- At least 24 tri-color characters per line
- Overall sign dimensions not to exceed 22 in. × 50 in. (55.88 cm × 127 cm)
- Resistant to extreme weather and environmental damage caused by salt water and high winds
- Programmable to display time-sensitive and schedule information

Although a survey of VMS manufacturers identified four possible vendors, upon further evaluation it was determined that only one could meet all key specifications. Therefore, acquisition of the sign proceeded as an approved sole-source procurement.

The selected sign was a 6-line, 21 in. × 48 in. (53.34 cm ×121.92 cm), tri-colored display Galaxy AF-6200 manufactured by Daktronics. The sign rotates two displays, allowing both next departure information and alerts and messages to be displayed.

Figure 3-3
VMS screens

Installation of the sign did not require an environmental review but did require a sign permit from the City of Seattle.

Following is the timeline for permitting, acquisition, and installation of the sign.

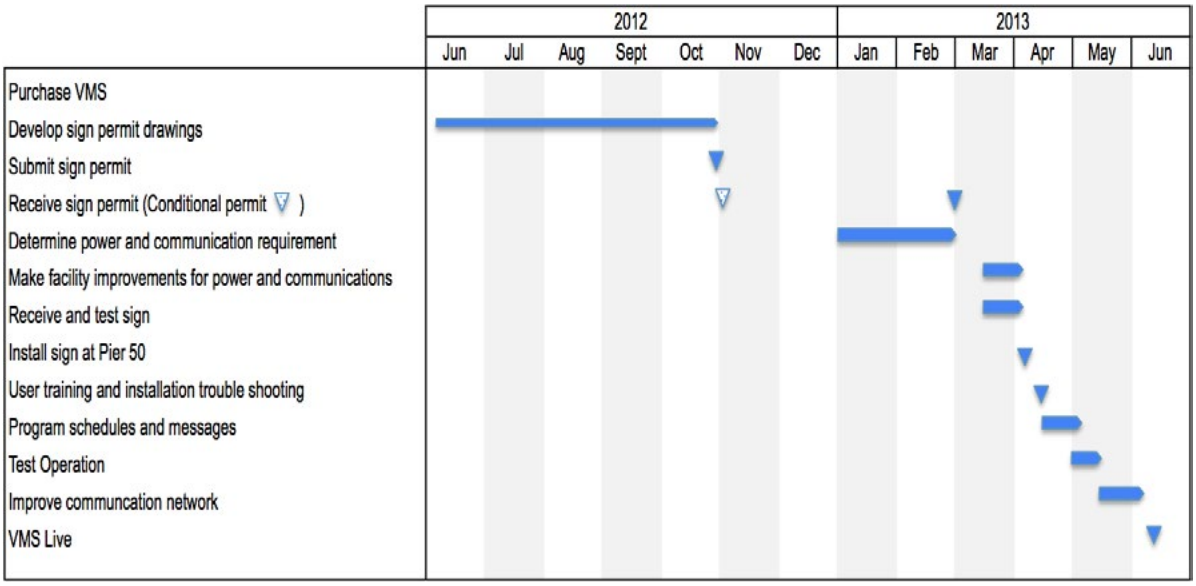


Figure 3-4 *VMS installation timeline*

Subsequent to installation of the VMS, two major construction projects on the Seattle waterfront, the City of Seattle Seawall Construction Project and the Washington State DOT's Alaskan Way Viaduct Tunnel Replacement Project, commenced. In May 2014, these construction projects altered streets and pedestrian access to the Water Taxi dock, requiring the sign to be relocated. The VMS was moved to face north for viewing from the temporary entrance during construction. The VMS was returned to its original location after the construction near the terminal was completed in January 2015.

Figure 3-5
Initial VMS location

Figure 3-6
VMS interim location

King County Water Taxi Website Improvements

Initial analysis of the existing KCMD website identified a number of enhancements that might be made to make it more streamlined and rider-friendly. A survey of riders was conducted to solicit user opinions about these possible enhancements and to identify users' content preferences (see Appendix G). Incorporating the analysis and user opinions, the following goals for enhancing the website were defined:

- Make key information more easily accessible
- Eliminate pages through menu drop-downs
- Reduce clutter and highlight the most frequently requested information
- Prominently display the most recent rider alerts, newsletters, and other rider information
- Display current Water Taxi vessel location information

Once the prototype of the enhanced website was completed, user testing was conducted with 11 King County employees, some of whom were Water Taxi riders. The test script asked users to answer a number of traveler information questions using the prototype website (see Appendix H). Observations during the testing were used to make refinements to the prototype before launching the new website on September 17, 2013 (see Appendix I).

Figure 3-7

Existing KCMD Water Taxi home page

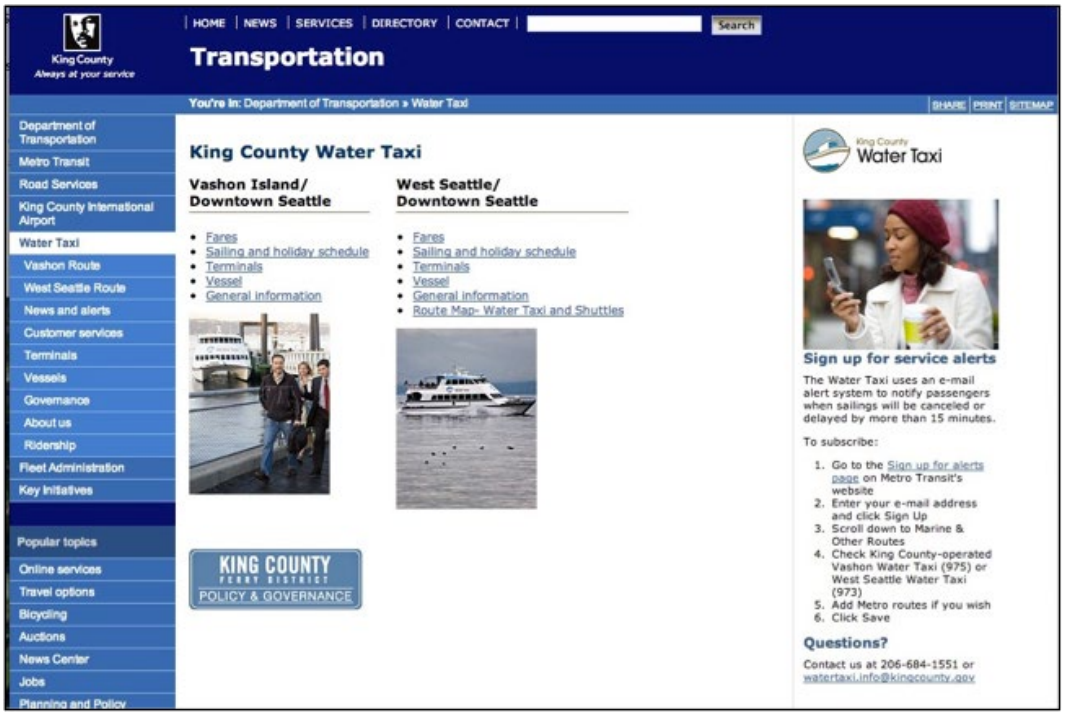


Figure 3-8

Enhanced KCMD Water Taxi homepage

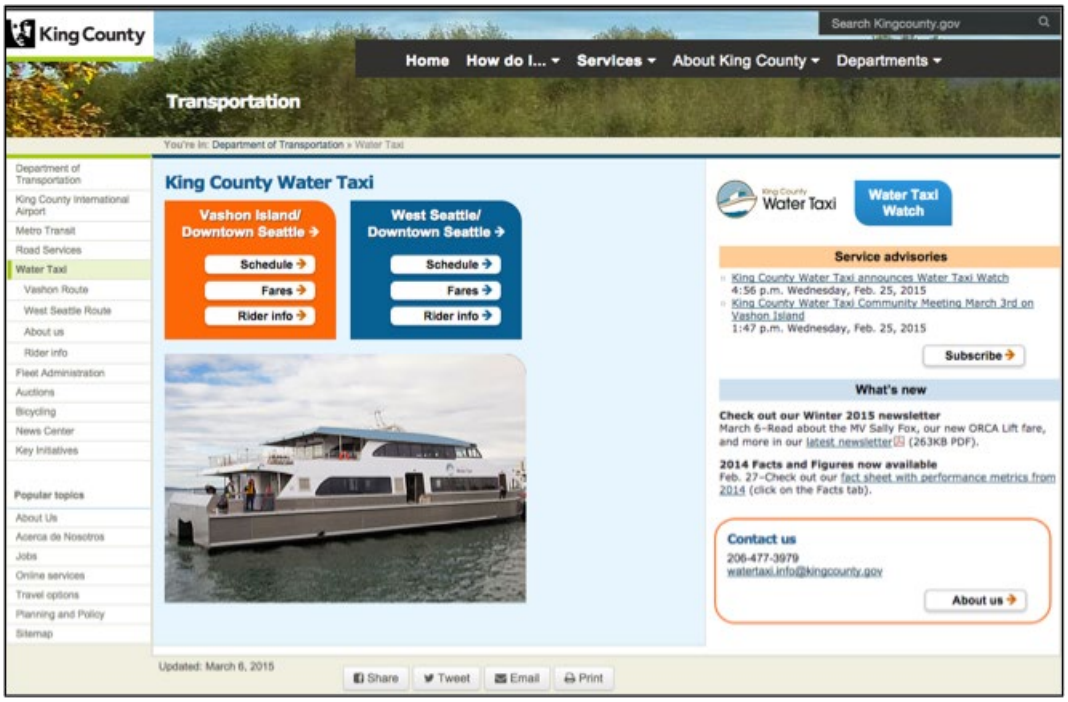


Figure 3-9

Enhanced KCMD website drop-down schedule display

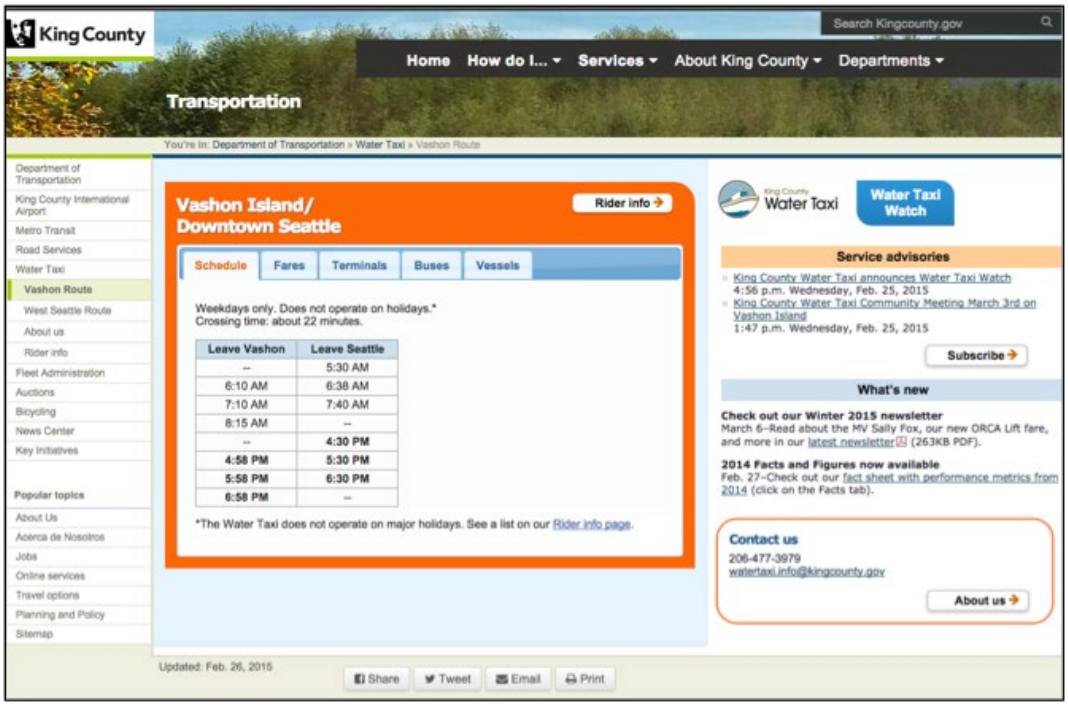
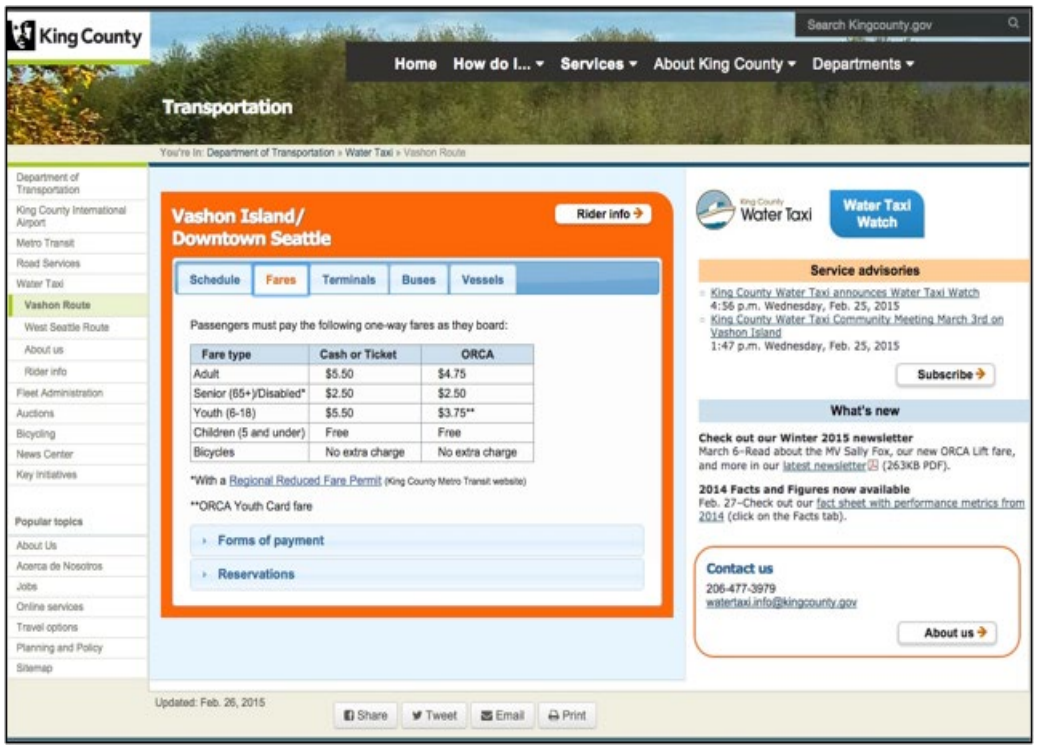


Figure 3-10

Enhanced KCMD website drop-down fare display

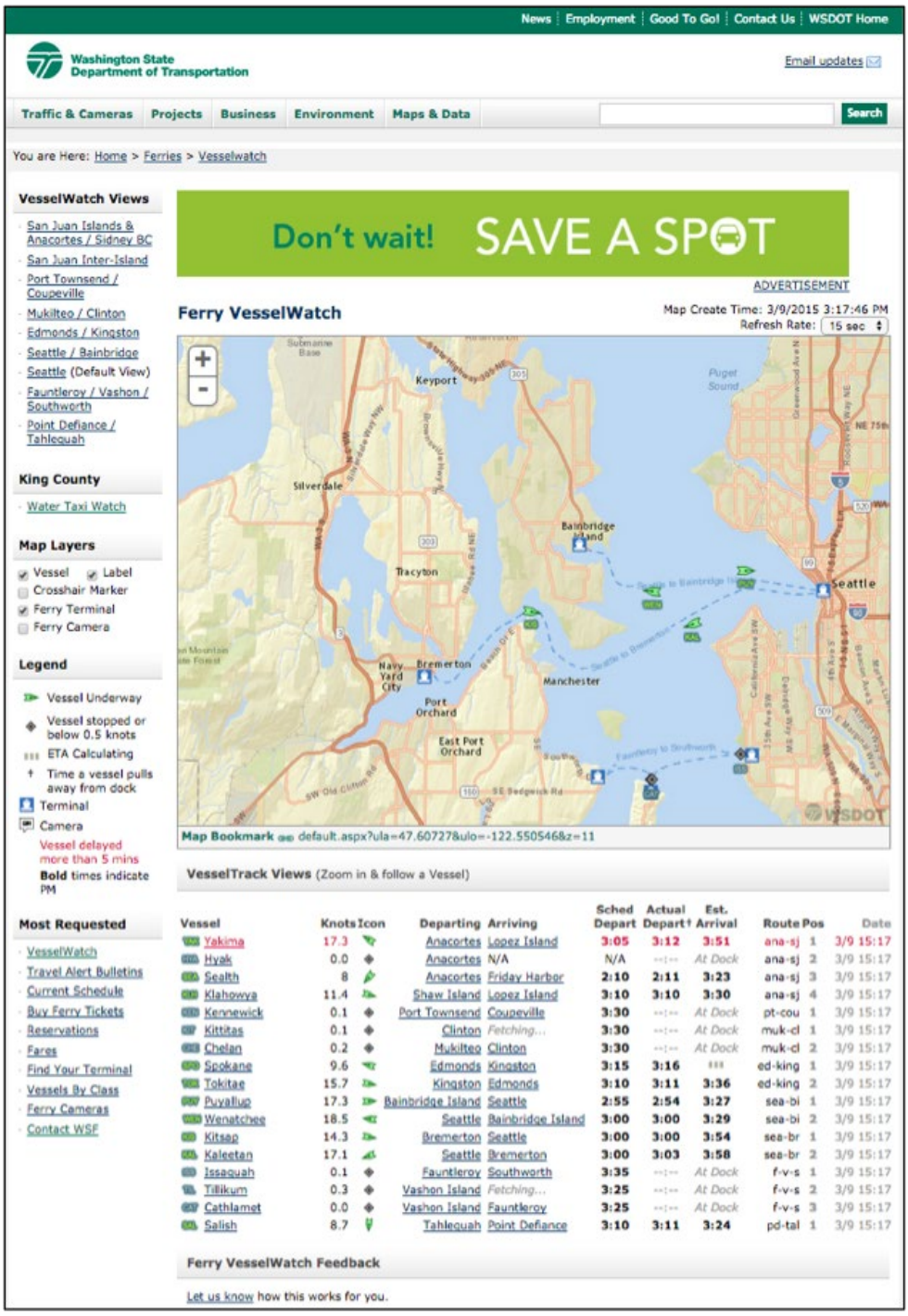


King County WaterTaxiWatch – Vessel Real-Time Location Application

Initially, it was envisioned that a mobile application displaying real-time vessel location information on a map and key traveler information would be developed. Upon further investigation with agency information technology staff, it was decided that the preferred approach would be to develop a vessel location application that could be embedded on the KCMD Water Taxi website and to build the website in a manner that would be scalable to smaller handheld devices. This would avoid the problems associated with developing and maintaining mobile applications for multiple devices and evolving operating systems.

The vessel location system, known as WaterTaxiWatch, was modeled after the very popular WSF VesselWatch application, which features AIS vessel location information, next sailing times, actual departures, and estimated arrivals.

Figure 3-11
WSF VesselWatch page



King County Information Technology (KCIT) staff proposed to develop an application similar to the WSF VesselWatch using publically-available vessel location data (AIS) from Marine Traffic. The application would reside on the King County server. However, while testing the early application prototype, it was discovered that the data available from Marine Traffic was refreshed too

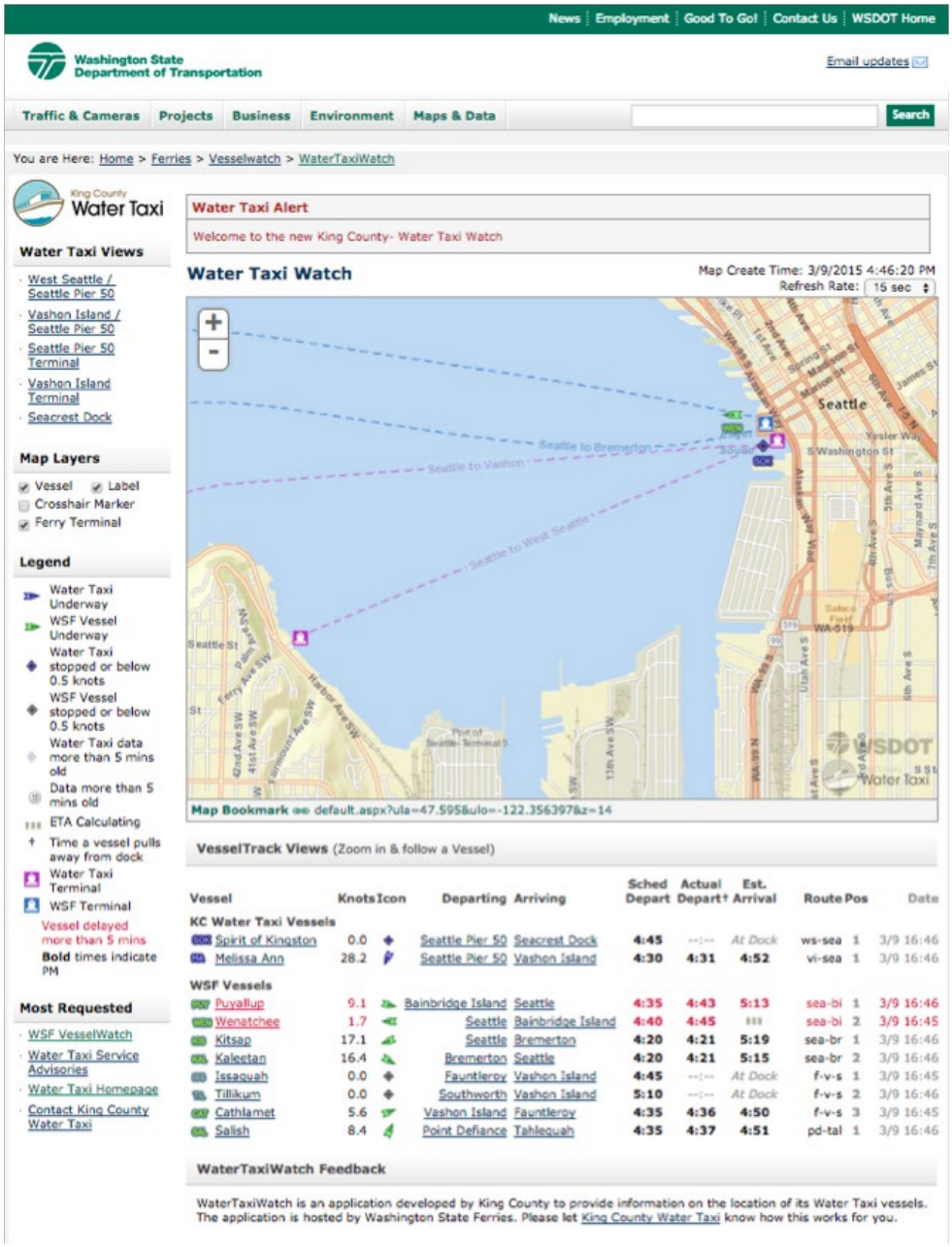
infrequently and that there were gaps in their coverage of Water Taxi routes. To resolve the data reliability problem, a feed was developed from WSF's robust vessel location database. During testing of the VesselWatch prototype with the WSF vessel location feed, it was determined the prototype application was inadequate and that KCIT resources were not available to redevelop the system to the project's requirements. A new approach was defined involving development of a Water Taxi custom view in the WSF VesselWatch application that would:

- Be branded for the Water Taxi
- Display all Water Taxi routes
- Display nearby WSF routes
- Provide next departure and estimated arrival information

The improved Water Watch application was completed and ready for system testing on October 30, 2014. King County employees participated in user testing over a one-week period to identify bugs and refinements. WSF information technology, and customer service staff also tested the systems and included a link to WTW from their VesselWatch page. The application was placed in production in January 2015 and officially introduced to the Water Taxi riders on February 25, 2015.

Figure 3-12

King County WaterTaxiWatch page



SECTION 4

Technology Demonstration Evaluation and Lessons Learned

Volpe Evaluation Protocol

The Vashon Island Passenger-Only Ferry project was undertaken in three phases. The first two phases addressed the feasibility of King County assuming responsibility for a passenger-only ferry service. A formal research hypothesis was not established for these phases. These two phases produced analysis and plans to guide the County during the decision making and service implementation process.

The third phase was designed to demonstrate the use of technology to improve traveler information and on-site passenger processing. As with the first two phases, a formal research hypothesis was not established. Rather, the Volpe National Transportation Systems Center was engaged by the Federal Transit Administration (FTA) to develop an evaluation protocol and conduct an evaluation for the demonstration phase of the study (see Appendix K). However, the Volpe contract expired and funding was exhausted before the demonstration projects were designed and implemented. Volpe was not available to conduct an evaluation. As noted in the Volpe evaluation report, "The intent is to use the evaluation protocol as a guide or framework for the evaluation, recognizing, however, that the evaluation needs to be flexible to adapt to unforeseen circumstances affecting project implementation, data availability and collection, and available resources."[1] Without dedicated evaluation funding, the KCMD project team undertook to define an evaluation approach using as much of the protocol as feasible with a small portion of reallocated project implementation funds.

The Volpe protocol identified four possible metrics that might be employed to evaluate the demonstrated technology:

1. Pre- and post-implementation ridership counts
2. Pre- and post-implementation elapsed boarding time
3. System reliability measures for the VMS, relying on calculation of measures such as mean time between failures and mean down time

[1] John A. Volpe National Transportation Center, "Vashon Island Technology Demonstration Evaluation Protocol," September 30, 2012, p. 1.

4. Comparison of the cost of the demonstrated technology to a calculated minimum value of information provided to the traveler, using willingness-to-pay values derived from other studies

In addition to these metrics, Volpe recommended that lessons learned be documented throughout the project to advise future implementation projects.

The KCMD project team reviewed the protocol prepared by the Volpe Center to identify metrics that were:

- Practical to implement in the available time
- Cost-justified in view of the overall project budget
- Likely to yield results that could be clearly attributed to the demonstration project and would not require a high degree of subjective or simplifying assumptions
- Likely to provide the KCMD and other transit operators useful insights into the process of identification, design, and implementation as well as the measured and perceived value of similar technology improvement initiatives

The following elements of a modified evaluation protocol were adopted:

- VMS Performance – The VMS will be evaluated for durability, reliability of visual elements, and passenger flow enhancement.
- Enhanced Website User Evaluation – Google Analytics data will be used to evaluate pre- and post-implementation user behavior on the KCMD website. A post-implementation user survey will be conducted for Water Taxi riders to access rider perceptions for ease of use and availability of information on the enhanced website.
- Lessons Learned – Learning experiences will be captured for the definition, design, development, and implementation phases of each technology project. Process improvements will also be identified.
- Second-Generation Enhancements – Recommended enhancements for the VMS and KCMD website will be identified.
- Ridership Growth – Ridership data pre- and post-implementation of the technology projects will be examined for changes in the level of ridership. It should be noted that there are many variables that effect ridership performance. Particularly with a relatively new service, it is difficult to isolate ridership growth attributable to a particular initiative from the typical ramp up of ridership observed with a new service.

The KCMD project team developed a data collection plan to implement the refined evaluation protocol. The data collection plan recognizes Volpe's caution that "We must reiterate, however, that the value of information must be balanced by the cost of acquiring it as part of the evaluation. Accordingly, as the demonstration planning evolves—and in light of unexpected circumstances—

some of the metrics proposed may not be implemented during the course of the evaluation."[2]

The data collection plan included the following:

- Review available equipment performance records and/or interview staff to collect information about the reliability of the VMS.
- Collect monthly and annual ridership information for a one-year period prior to a technology implementation and for one year after implementation.
- Collect Google Analytics data for a one-month period the year before implementation of the enhanced website and for the same one-month period after the implementation.
- Conduct a survey of rider post-implementation of the enhanced website to collect perceived benefit information.
- Document lessons learned and recommendations for future enhancements throughout the design, development, implementation, and post-implementation process.

On-Dock Traveler Information–VMS Evaluation and Lessons Learned

Evaluation of the VMS addressed four criteria:

- Durability and uptime of the system
- Ease of use of the operating system software and system performance
- Visibility and readability
- Passenger flow

Durability or Uptime of System

Overall, the Galaxy AF 6200 has proven to be a sturdy, weather-resistant piece of hardware that performs well in the high-wind, salty air marine environment. Over the 18-month demonstration period, only one hardware malfunction was experienced when one of the six text lines went dark.

Ease of Use of Operating System Software and System Performance

Although the system software is adequate, the KCMD application is probably pushing the software near or beyond its design parameters. Creating the display screens is a cumbersome process that required nearly 40 hours of shoreside agent time. There also have been intermittent communications and software problems. On multiple occasions, the system has seemingly spontaneously re-booted. Although the problem has not been diagnosed, it appears to be self-correcting and results in only brief disruptions of the display.

[2] *Ibid.*, p. 11

Visibility and Readability

The tri-color display is easily readable in nearly all light conditions from a distance of up to 50 yards, allowing passengers waiting to cross the busy thoroughfare in front of Pier 50 to view the information. The three colors allow the two routes to be color-coded for easy traveler reference. The sign cycles two displays at a pace that allows passengers to read the next departure and the following additional message. Travelers can process the information without excessive waiting between displays. The sign also displays alerts such as delayed vessel departures or canceled sailings.

Passenger Flow

Facility limitations preclude any systematic measurement of passenger flow or elapsed boarding time. The VMS display provides sailing schedule information at the head of the pier away from the more congested boarding area, which effectively eliminates conflicts that sometimes occurred when potential passengers seeking schedule information had to enter the boarding staging area to ask for information.

KCMD experienced record ridership during the summer of 2013 following the implementation of the VMS—a 14.6% increase over 2012 during the months of June, July, and August. Although many factors impact ridership, making it difficult to correlate increases to any one factor, it could be concluded that some of the increased ridership, particularly on the West Seattle route, is related to improved on-dock traveler information. It should be noted that the increase in ridership was managed without additional terminal staff, due, in part, to the availability of traveler information through the VMS. Customer service staff were free to focus on passenger processing immediately before and during boarding times.

VMS Lessons Learned

Lessons learned during the VMS phase of the project focused on two areas:

- Implementation
- Recommendations for future enhancements

Implementation

Variable message signs are a reasonably mature technology and are in widespread use in the transportation industry. Equipment installation was a routine assignment for the King County Signals Department. However, some challenges were encountered in establishing the appropriate communications network. During the initial test period, communications between the controller and the display frequently failed, preventing the display files from uploading to the sign. The problem was diagnosed as an inadequate communication capacity.

The problem was solved when the RS-422 cable was replaced with a higher performance Cat 5 cable.

Recommendations for Future Enhancements

The VMS sign would be a particularly valuable source of traveler information at unstaffed terminals such as Vashon Island and Seacrest Park. The current operating software can support multiple locations.

Although a single user is unlikely to have much leverage, enhancements to make the software more user friendly are recommended, such as:

- Improved functionality for creating screen displays that allow multiple screens to be created from a template.
- Improved calendar function that allows multiple monthly calendars to be established, incorporating holidays and unique events instead of requiring a manual re-set each month to include these.

King County Water Taxi Website Improvements Evaluation and Lessons Learned

Website Improvement Evaluation

Two metrics were established to evaluate the effectiveness of the website enhancements:

- Streamlining the website would result in fewer page views for each visitor because information was more centrally and readily available.
- Time spent per page view would increase because users would find the information they need in one location rather than having to navigate multiple pages.

To measure user behavior, Google Analytics were used to count page views for a sample month on both the old website and on the new, enhanced website. October 2013, the first full month after the launch of the enhanced website, was compared to October 2012. Overall page views in October 2013 were 19.8% lower than in October 2012. Eliminating general information page views and counting only travel information views, such as schedules and fares results in 23.3% fewer views after the enhanced page was introduced. This reduction in number of page views suggests that the new website is more streamlined and user-friendly than the old website.

Table 4-1 *Page Views Before and After Implementation of Enhanced Website*

Route	All Pages			Traveler Info Pages		
	October 2012	*October 2013*	*% Change*	*October 2012*	*October 2013*	*% Change*
Vashon	5,309	3,764	-29.1%	4,367	3,015	-31.0%
West Seattle	14,878	12,426	-16.5%	12,816	10,156	-20.8%
Total	20,187	16,190	-19.8%	17,183	13,171	-23.3%

Google Analytics also were employed to measure user time per page view. In the month after the enhanced website was launched, the average time per page view was 20+ seconds longer than for the same month in October 2012, suggesting users found more of the information they needed without migrating to additional pages.

Table 4-2

Average Time on Page (secs)

October 2012	October 2013	Change	% Change
60.91	86.17	25.25	41.5%

To supplement analytical data, a survey of users was fielded a few months after the website enhancements were implemented (see Appendix J). The survey asked riders who use the website to rate the website on four criteria:

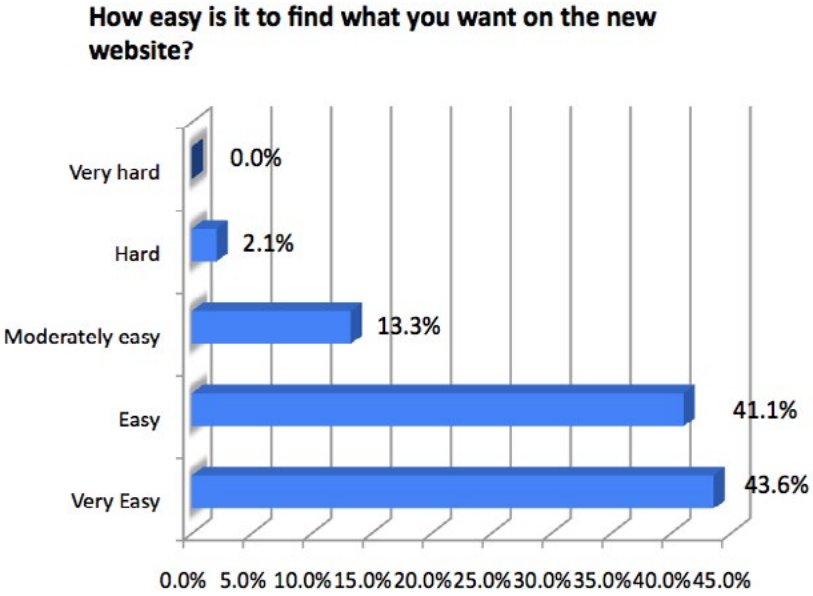
- Ease of locating information
- Information content
- Appearance and layout
- Time spent on the site

Survey respondents also were asked for suggestions for additional information and improvements. Analysis of the survey results revealed the following.

When asked how easy it was to find the information they wanted, 84.7% of respondents said either it was easy or very easy.

Figure 4-1

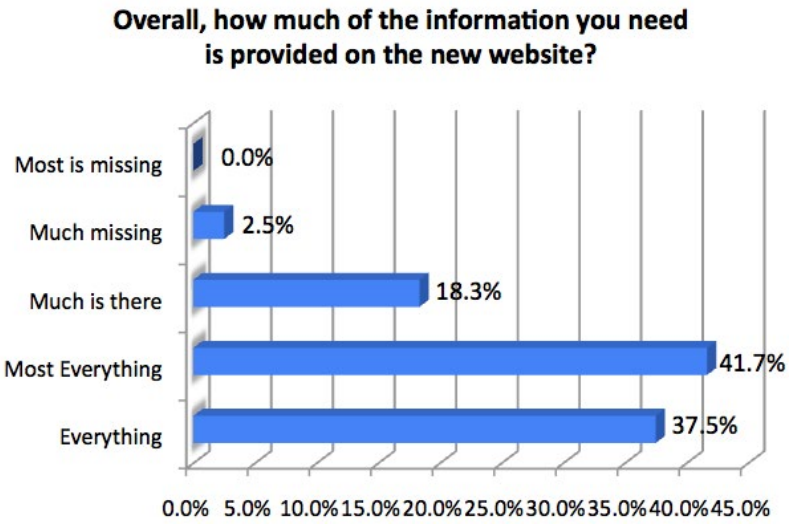
Ease of finding information on website



When asked how much of the information needed is provided on the website, 79.2% said everything or almost everything.

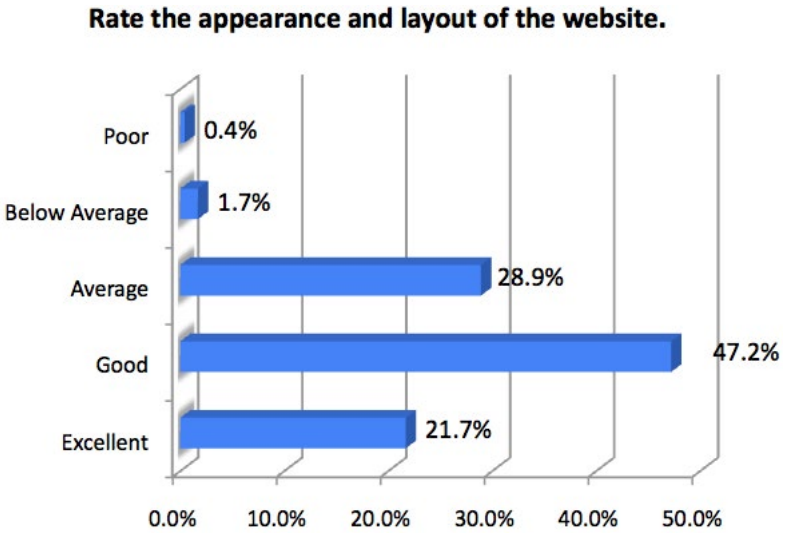
Figure 4-2

Amount of information on website



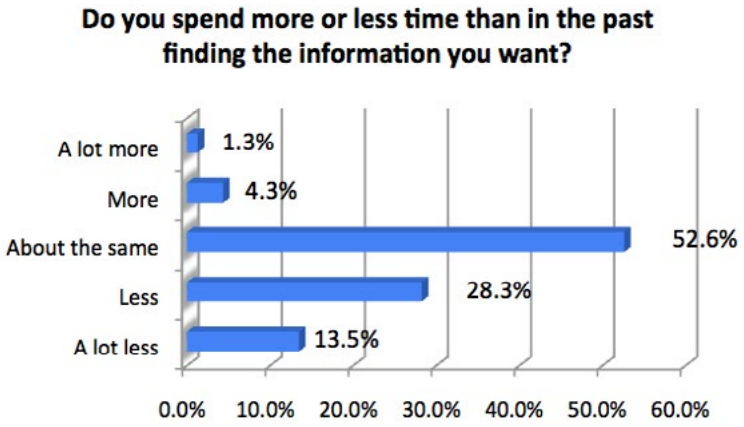
When asked to rate the appearance and layout of the website, 68.9% said it was good or excellent.

Figure 4-3
Website appearance



When asked if they spent more or less time finding information on the new website compared to the previous website, 41.8% said less and 52.6% said about the same.

Figure 4-4
Amount of time spent on website



From the post-implementation survey, it can be concluded that the enhanced website is easier to use, provides the desired information, is perceived favorably in terms of appearance and layout, and has not adversely impacted the time required to find information.

Website Improvement Lessons Learned

Lessons learned during the website enhancement portion of the project address:

- Communication with riders
- Mobile-friendly design
- Future website enhancements

Communication with Riders

Responses to the open-answer questions on the post-implementation survey indicated that some users are unaware of existing Water Taxi information sources that provide information about service disruptions, alternative travel options, and special events or extended service days. Although much of this information is prominently featured on the website, KCMD should consider feature tips for staying current in the periodic newsletters, on the VMS, and in on-board announcements.

Mobile-Friendly Design

As more riders rely upon mobile devices for Internet services and traveler information, it is important to design webpages that scale down easily to handheld device screens. Each iteration of the website design was tested on both full-screen and handheld screens to maximize readability and navigation utility on both platforms.

Future Website Enhancements

When a server-based dynamic service schedule function becomes available, the service schedule drop-downs on the website might be reformatted to look like a more traditional timetable with departure and arrival times. Currently, King County is in the process of transitioning all County webpages to a new County website. Once this transition is complete for KCMD and combined with the dynamic service schedule function, a calendar feature may be added that will allow users to pick a calendar date and view the specific service schedule for that date.

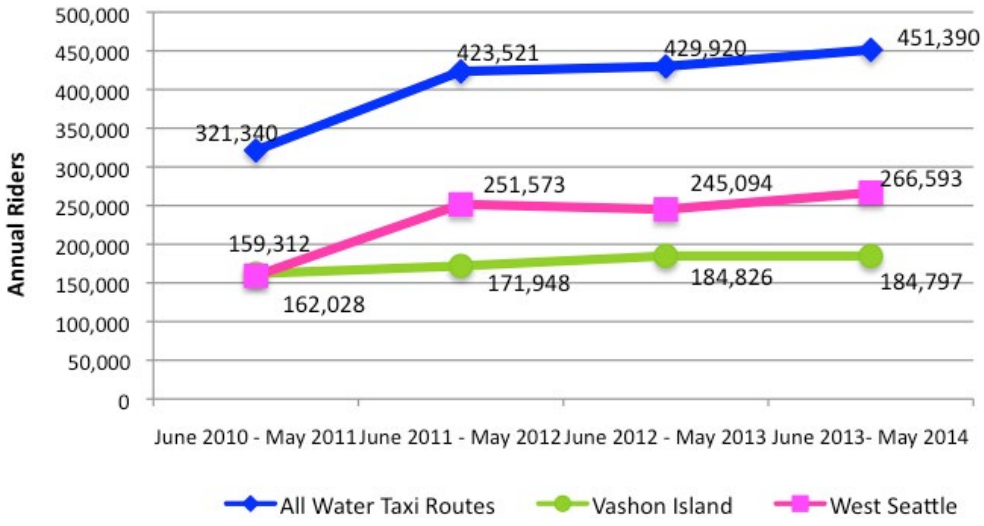
King County WaterTaxiWatch Evaluation and Lessons Learned

The King County WaterTaxiWatch portion of the demonstration project could not be evaluated because implementation of the application was not complete at the time this report was written.

Ridership Growth

Ridership data was collected for two 12-month periods (June–May) prior to implementation of the first technology improvement and for a one-year period following implementation of the VMS in June 2013 and the enhanced website in September 2013. Overall ridership increased by more than 20,000 riders, or 5%, in the year after implementation of the VMS and enhanced website. Although some portion of this growth may be attributed to improved traveler information, it is difficult to isolate this effect from other factors effecting ridership, such as weather, special events, and naturally-occurring increases in ridership.

Figure 4-5
Water Taxi ridership, June 2010–May 2014



SECTION 5

Conclusions

Overall, the Vashon Island Passenger-Only Ferry Study was a success, leading to the implementation of a robust, popular passenger-only ferry service that brings riders directly into downtown Seattle from other parts of the city and suburban King County without adding to roadway congestion.

The objectives of the technology demonstration phase of the project also were achieved. Three different technology projects were implemented that focused on three key considerations for design and implementation of traveler information technology:

- A range of technology from lower-end technologies such as the variable message sign to more advanced technologies such as real-time vessel location and tracking applications.
- The needs of both infrequent and regular riders of the Water Taxi were addressed by offering both just-in-time information and more general and trip planning information.
- Accessibility from both mobile and more traditional computing platforms was demonstrated with the two Internet-based projects, WaterTaxiWatch and the enhanced Water Taxi website.

Through the VMS at Pier 50, the enhanced Water Taxi website and WaterTaxiWatch, riders now have an array of enhanced information options for traveler information, making the King County Water Taxi more easily accessible within existing operating resources.

As a roadmap for how to determine the feasibility of and prepare an implementation plan for the start-up of passenger-only ferry service, the project offers valuable insight and a tested methodology. Although every service feasibility study is somewhat unique, this study provides a comprehensive template and constructive guidance on the requirements for start-up of a marine passenger transportation service. As a demonstration of technology to improve traveler information and passenger processing, it offers relatively low-cost technology solutions that may be viable for other transit agencies.

The project also demonstrates the shortcomings associated with stretching technology beyond its original purpose, the value of working closely with users who are intended to benefit from the technology, the importance of working with technology specialists who have developed an understanding of the user's needs and the technology infrastructure, and the value of working with other

transit agencies to leverage existing technology resources. Certainly, the next agency to deploy technology solutions similar to the ones demonstrated here will benefit from the learning curve established in this study.

GLOSSARY

AIS – Automated Identification System. An automatic tracking system used on ships by vessel traffic systems to locate and electronically exchange position data.

Black Ball Line – Founded in 1898 by Charles Peabody as the Puget Sound Navigation Company to provide ferry service on the Puget Sound. Assumed the name Black Ball Line in 1927.

Elliott Bay Water Taxi – Predecessor to the King County Water Taxi; provided service between downtown Seattle and West Seattle as a seasonal service.

Daktronics – U.S. company that manufactured the programmable variable message sign (VMS) installed as one of the technology initiatives for this project.

Google Analytics – A product offered by Google, Inc., that allows user behavior on public websites to be measured. The tool was used by KCMD to analyze pre- and post-enhancement user behavior on the KCMD Water Taxi website.

GPS – Global Positioning System. A satellite navigation system providing locations and time data anywhere on earth.

King County Council – The nine elected members of the King County Metropolitan Council oversee the government of King County, Washington.

KCDOT – King County Department of Transportation. A department of the municipality of King County, Washington, responsible for the arrangement of transportation services such as roads, transit, and passenger-only ferries.

KCIT – King County Information Technology. A department of the municipality of King County, Washington, responsible for the full range of information technology services to support all King County departments and staff.

KCMD – King County Marine Division. A division of the King County Department of Transportation charged with operation of the King County Water Taxi.

KCWT – King County Water Taxi. The system of passenger-only ferries operated by the King County Marine Division providing service from both Vashon Island and West Seattle to downtown Seattle, Washington.

Kitsap County Transportation Company – Founded in 1898 and originally known as the Hansen Transportation Company; a steamboat and passenger ferry company operating on Puget Sound until 1935.

Marine Traffic – A marine community-based project collecting and providing real-time vessel location data around the world.

Mosquito Fleet – A large number of private transportation companies operating small passenger and freight vessels linking waterfront communities around the Puget Sound, beginning in the 1830s.

MV – Motor Vessel. A marine vessel propelled by an internal combustion engine.

OneBusAway – A project started at the University of Washington to provide real-time transit information in the Puget Sound area. The system is built on open source software to encourage others to reuse and expand the application. The application is available on a number of computing platforms.

ORCA – The contactless, stored-value smart card used for payment of public transportation fares in the Puget Sound region.

Portable Fare Processing Device – Handheld electronic devices used to process ORCA smart cards for fare payment on the King County Water Taxi.

Rich Passage – A narrow strait in Puget Sound between Bainbridge Island and the Manchester area of South Kitsap that connects Bremerton to Seattle and the main waters of the Puget Sound; experiences a high volume of marine traffic.

Trip Planner – An online application provided by King County Metro Transit allowing riders to plan their trips on public transportation in King County using origination and destination addresses or locations.

VMS – Variable Message Sign. An electronic traffic sign used to provide current traveler information to motorists and passengers.

VesselWatch – An online application developed and maintained by Washington State Ferries to provide vessel location, schedule, and departure and arrival information for its ferry vessels.

WaterTaxiWatch – An online application developed by the King County Marine Division to provide vessel location, schedule, and departure and arrival information for its Water Taxis.

APPENDIX

A

King County Waterborne Transit Policy Study

KING COUNTY

WATERBORNE TRANSIT POLICY STUDY

SUMMARY REPORT

AUGUST 2005

1. INTRODUCTION

The Puget Sound region has a long history of waterborne transportation, with waterways such as the Puget Sound and Lake Washington being the first major transportation routes in the area. In the early days of King County, hundreds of steamships, collectively described as the Mosquito Fleet, plied the waters transporting people, lumber, mail, and everything else. However, improvements in land-based transportation in the 1930s, including both highways and interurban rail transit, led to the rapid decline and termination of the Mosquito Fleet.

Seattle Central Waterfront

Seventy years later, King County is looking at whether or not waterborne transit has the potential to augment the existing infrastructure to help provide reliable and sustainable mobility for King County residents and visitors.

In response, King County Metro, as part of the 2004 update to the *Six-Year Transit Development Plan for 2002 to 2007*, developed Strategy S-14 to determine under what conditions and circumstances it may be appropriate for King County to invest and/or participate in passenger-only ferry service. The purpose of this study is to provide policy makers with information to help make informed decisions about potential county investment and potential participation in passenger-only ferry services.

2. POLICY CONSIDERATIONS FOR THE COUNTY

Key policy questions and considerations for the county include:

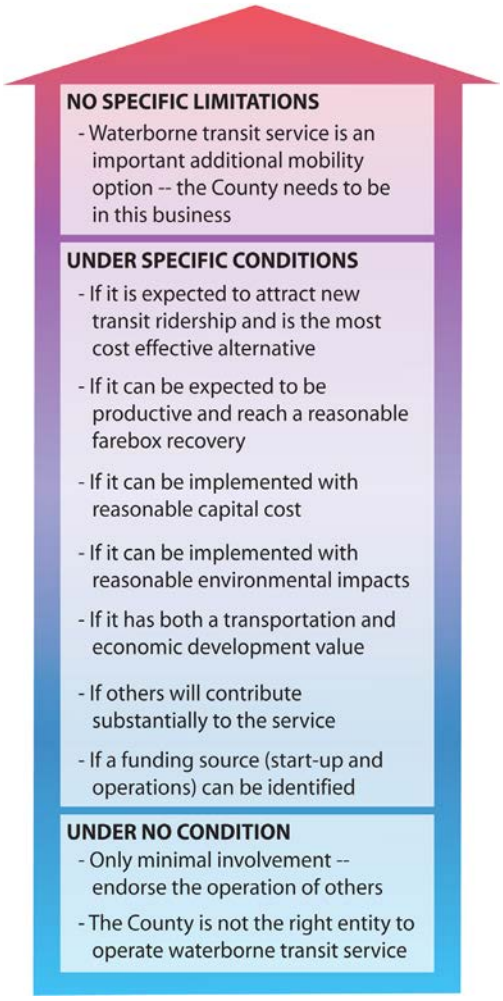
1. ***Should King County invest or participate in waterborne transit, and if so under what circumstances?***

2. ***If investment or participation is warranted, what funding approach or approaches could be considered?***

3. ***What operating approaches would best achieve county objectives and mitigate risk?***

SHOULD KING COUNTY INVEST OR PARTICIPATE?

Potential county participation levels ranging from no participation at all, through to potential inclusion of waterborne transit as a primary component of the public transportation network, are illustrated in the graphic to the left.



Range of King County Metro Participation Levels

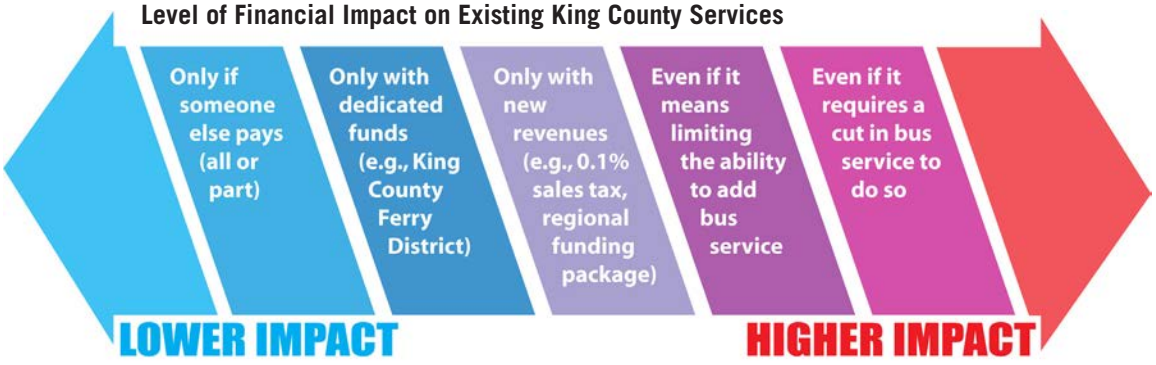
Findings from this study suggest that if participation in waterborne transit is considered by the county, it should only be under specific conditions. The availability of alternative public transportation modes, coupled with limited waterborne transit ridership potential in most markets, does not support a strategy of widescale implementation of passenger-only ferry service by the county.

WHAT FUNDING APPROACHES COULD BE CONSIDERED?

If a decision were made to invest in waterborne transportation, the next key question would be how to fund it. A range of potential funding options are presented below, presented in terms of those with the least impact on other King County transit services (i.e., new funding or full funding by others), to those with the greatest (i.e., use existing funding).

Although one option is to have someone else pay completely for passenger-only ferry service (e.g., the private sector), the analysis of the sample routes suggests that some level of public subsidy would be required for operation. That subsidy could come from existing funds (cuts in existing bus services or redirection of future funds to waterborne transit), or from new revenues such as an increase in the sales tax, a regional funding initiative, or dedicated funds such as creation of a Ferry District with authority to collect revenue from property taxes. The primary trade-off to be considered by the county is potential reductions in bus service versus raising new revenue from some or all of the county residents.

Level of Financial Impact on Existing King County Services



WHAT OPERATING APPROACHES COULD BE CONSIDERED?

Decisions about how to operate the service can be made on a system-wide basis, or on a route by route basis depending on county objectives and potential private and/or public partnership opportunities. The range of potential operating approaches are illustrated below, presented in terms of lowest to highest participation by the county.

The direct ownership approach would involve King County owning and operating the vessels, and possibly providing the terminals. This approach provides the highest level of control for the county, but raises questions about how to provide and retain skilled maritime labor (particularly if the service is seasonal), how to provide supporting infrastructure such as maintenance and refueling facilities, and what to do with the vessel if a route is found to be unproductive or is only seasonally operated.

If service is operated by a private company, options are available for the county to contract the work or undertake a public-private partnership. Contracting provides the county with a greater level of control (the county establishes all service and other parameters), but does not include incentives for the private provider to operate the service more efficiently or develop innovative ways of attracting customers. A public-private partnership provides opportunities for private sector incentive, but may require certain county guarantees such as guaranteed minimum cost recovery or exclusivity, and may reduce some of the county's control over operational aspects such as setting service levels or quality of service.

Potential Operating Approaches

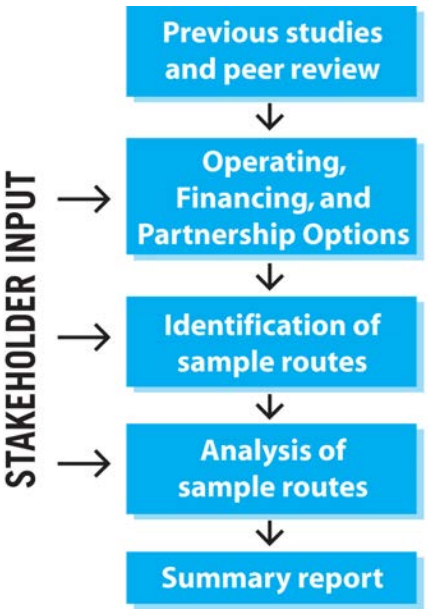
Under the public-public partnership approach, King County could consider partial funding of a passenger-only ferry service without direct operational involvement. An example is potentially supporting Washington State Ferries in its efforts to deliver passenger-only service to Vashon Island. Public-public approaches can also include partnerships with local cities to deliver terminal and dock infrastructure.

3. STUDY WORK ACTIVITIES

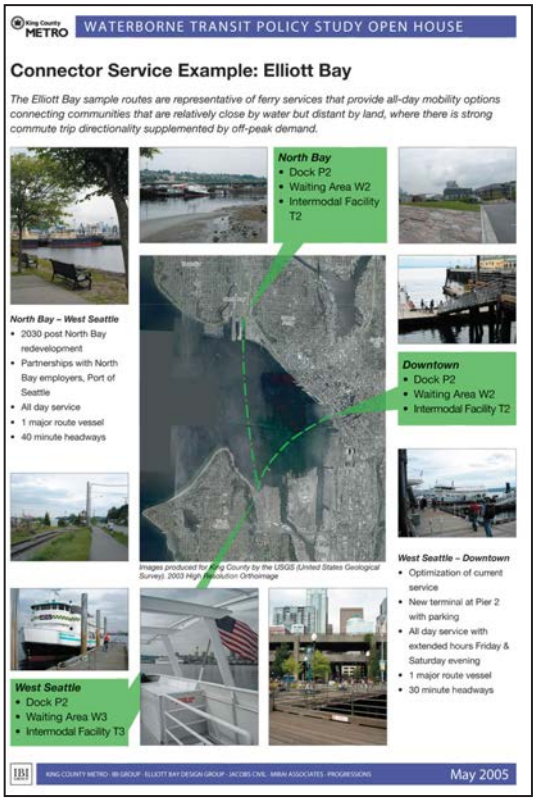
Work under this study included five primary activities:

1. A review of past studies relevant to waterborne transit in the Puget Sound region, and interviews with agencies having experience in waterborne transit. This provided a context for the study and valuable "lessons learned" from other agencies.
2. Identification of a range of potential options for delivering waterborne transit, including partnership strategies and associated advantages and disadvantages.
3. Identification of eight sample routes – two each in four potential waterborne transit market areas in the county – to illustrate potential operations, opportunities, and issues when considering, planning, or evaluating passenger-only ferry service.
4. An analysis of the sample routes to identify potential ridership, costs, and impacts to be considered by the county.
5. Preparation of this Summary Report

Project Work Activities



Example Open House Presentation Board



4. STAKEHOLDER CONSULTATION PROCESS

Stakeholder consultation was an integral part of this study. King County contains a broad group of residents and businesses with an interest in, and experience relevant to, waterborne transit. Stakeholders include neighbors of existing or potential routes, city governments, the Port of Seattle, private ferry operators, Washington State Ferries, ferry advocates, recreational water users, labor, and others.

Two stakeholder meetings with about 60 attendees were held at the project outset to identify key considerations for the study. Attendees included representatives from maritime industry, waterfront communities in King County, and agencies and organizations dealing with transportation issues.

Mid-way through the project, a half-day intensive workshop was held with a group of local city officials and private and public sector experts on waterborne transit to help identify specific technical and operational issues and considerations. Initial technical findings related to terminal design, vessel design, and potential route characteristics/performance. These were presented to the stakeholders in a follow-up open house and presentation.

The discussion of potential waterborne transit services with the stakeholders suggested some important considerations for the county:

- Decisions on where to offer waterborne transit services may be significantly constrained, or even driven by, the location of terminals. The waterfront areas on the major bodies of water within King County are generally highly developed, and attempting to site new terminals and facilities can be challenging from both a logistical and community impact perspective. The availability of terminals is perhaps the most important route planning criteria.
- Simplicity is a key to success. A recurring theme from both stakeholders and other agencies was to keep the service and infrastructure as simple as possible. Passengers are not expected to dwell at terminals for extended periods of time, and for the most part facilities equivalent to basic bus stops and platforms are sufficient for waterborne transit purposes.
- Partnerships are another key to success. Local stakeholders and other agencies with experience operating waterborne transit services highly recommend partnership models as ways to provide terminal infrastructure, deliver service, and share risk and reward. Partnerships can be public-private, or public-public.
- There is no single best approach for delivering waterborne transit services. Characteristics of the route, location and ownership of the terminals, opportunities for partnerships, risk, and route economics suggest that a model that might be applied to one route, may or may not be the best for other routes. This suggests that service planning may be very route specific, and that the county should make decisions at a route-level.

5. REGIONAL AND INDUSTRY EXPERIENCE

Over the past several decades, waterborne transit in the Puget Sound region has been extensively studied. Thirty previous studies were reviewed to ensure that the King County Waterborne Transit Policy study built upon the insights of earlier efforts.

This review of regional studies was complemented by interviews of eight private and public entities with passenger-only ferry systems in operation or design. The list of interviewees includes Washington State Ferries, Kitsap Transit, Coast Mountain Bus (operator of SeaBus in Vancouver, BC), Victoria Harbour Ferry, New York Water Taxi, San Francisco Bay Area Water Transit Authority, Vallejo BayLink Ferries, and Sydney Ferries (Australia).

The survey of other agencies and review of previous studies indicated that:

- There are a variety of different reasons for considering waterborne transit. In places like San Francisco, Vancouver (SeaBus), and New York, passenger-only ferries provide a link in the regional transit network and provide mobility options for users. In Victoria, BC, passenger-only ferries cater to tourists, ferrying them between different attractions around Victoria's Inner Harbor.
- The decision to implement passenger ferry service is sometimes founded on less traditional transportation goals that encompass a broader set of interests, such as economic development, tourism and recreation. Kitsap Transit and the New York Water Taxi are both examples of passenger-only ferry systems that are considered tools for economic development and revitalization.
- Waterborne transit has a unique appeal that people value. Information from the Elliott Bay Water Taxi and Vallejo BayLink Ferries, suggests that there is a segment of the traveling public that will choose to take waterborne transit over other modes because of its inherent appeal. Not surprisingly, this is most apparent in the summer where weather conditions create a pleasant overall experience.

6. OPERATING, FINANCING, AND PARTNERSHIP OPTIONS

The findings from the review of regional and industry experience were the starting points for the identification of key components of a waterborne transit system and a range of potential options for service delivery. Components and options were refined and expanded through input from the two Stakeholder Meetings held in early March 2005, and finalized using the knowledge of the consultant team.

In order to define potential service delivery options, five major components of waterborne transit were identified as follows:

1. **Participating entities.** This includes public and/or private entities that could potentially participate in the funding and/or operation of a waterborne transit service. Public entities include King County, Washington State, a Public Transportation Benefit Area, County Ferry District, or other public entity or construct. Private entities potentially include vessel operators, land or terminal owners/developers, and other private service providers.
2. **Facilities.** Terminals include the dock, gangway and passenger waiting area at each ferry stop. For larger terminals, there may also be upland facilities such as a parking area and bus stops.
3. **Vessels.** Vessels are classified in terms of elements such as passenger capacity, hull design, vessel speed, propulsion system, passenger amenities, etc. The optimal combination of characteristics varies depending on capacity and operational requirements, as well as an operating environment.
4. **Operational characteristics.** These include service characteristics such as headways, span of service, and number of stops; operational constraints such as speed limits, tidal issues, and congestion/local operational issues; crewing and vessel operational characteristics; and terminal operations and maintenance.
5. **Funding and financing.** Potential funding sources include fares, grant funds, new or increased taxes, contributions from public and private partners, developer fees, a ferry district, general operating funds, etc. Financing approaches include existing agency capital and operations funding, bond authority, leasing, and private financing.

6.1 Service Delivery Options

The following sections briefly describe four service delivery options identified in the study. Included is a general overview of each option, potential roles of relevant entities, and key potential advantages and disadvantages of each option.

PRIVATE OPERATION WITH PUBLIC ENDORSEMENT

Private operation with public endorsement would rely on the current regional maritime industry to define the route structure and level of service and to provide the full range of activities necessary for delivery of waterborne transit service. King County and other municipalities would have a limited role providing technical and political support to the privately operated service, but would assume no responsibility for the service offered and would not commit public funds to subsidize capital acquisition or operation of passenger ferry service.

ADVANTAGES	DISADVANTAGES
• The approach would minimize the financial impact to King County and would not divert current King County revenues from King County's transit commitments. • There would be little or no risk to King County because the private operator would assume all financial and operating risk. • This model of service (fee for service) would establish a principle of service provision that would enable transit and mobility service to be expanded in the region without general taxpayer involvement.	• Sustainability of the service is uncertain if not economically viable for the private provider. • King County's ability to influence development of the service and to coordinate service with overall King County transportation mission objectives would be limited. • Without access to public resources for landside infrastructure, the probability of a successful service would be reduced.

PUBLIC PRIVATE JOINT DEVELOPMENT

Public private joint development would combine the marine experience of a private sector operator with the transit experience of King County, who could provide a range of administrative and capital support. Both parties would need to be committed to the creation of a waterborne transit service. Other public entities, such as local cities or ports, could support the service by providing terminal facilities or funding.

ADVANTAGES	DISADVANTAGES
• This approach would allow King County to minimize financial and operating risk as the private operator would assume full responsibility for funding and managing the service. • King County would be afforded the opportunity to take full advantage of the private operator's waterborne transit experience, and would not need to develop in-house marine expertise. • King County could participate in service planning and have the ability to underwrite (potentially with other municipal partners) facilities and services consistent with county objectives.	• If King County were to make a commitment to the provision of waterborne transit, it may find itself locked into maintaining service if the private operator shut down due to financial hardship. • It may require a subsidy by the County to fund capital or operating costs. • King County may have limited ability to control the quality of service.

PUBLIC OWNERSHIP WITH CONTRACTED OPERATIONS

In this context, public ownership with contracted operations would expand the mission of King County Metro to include the provision of waterborne transit services. The role of the private sector, established through a contractual relationship with King County Metro, would be limited to vessel and terminal operations. This option would require public funding for part of the operational expenses and the capital components of the waterborne transit service.

Other public entities could partner with King County to assist with terminal provision and service funding. There is also a variation of this approach where another public agency manages the service, with King County as a funding partner.

ADVANTAGES	DISADVANTAGES
• By assuming ownership of the service, King County would control the level and quality of service, as well as determine cost recovery rates and set fares. • King County would be afforded the opportunity to take full advantage of the experience private operators bring to waterborne transit.	• King County would be committed to the provision of waterborne transit, and the county (potentially with other governmental partners) would assume full responsibility for all capital and operating costs. • New revenue sources would be required to fund capital investment and operations.

PUBLIC OWNERSHIP AND OPERATIONS

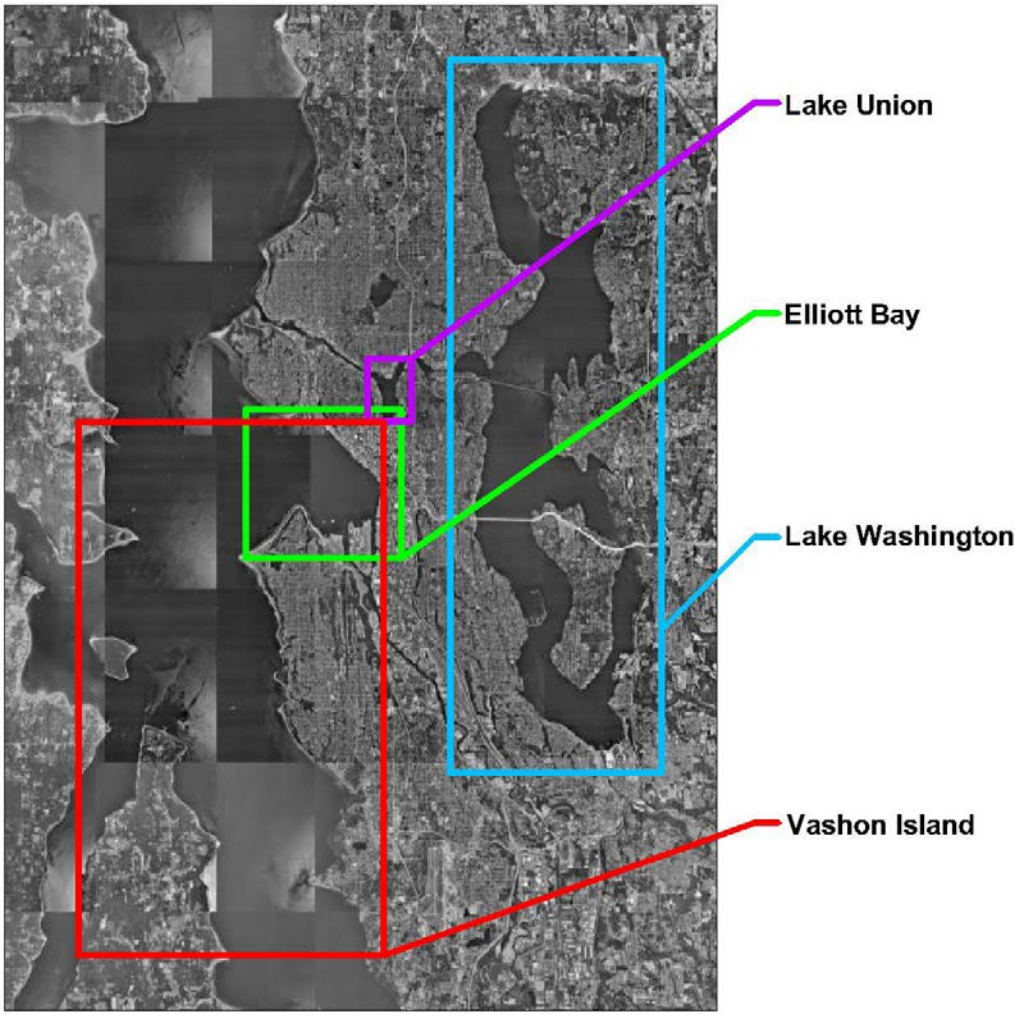
Public ownership and operations would increase the role of King County Metro to include the direct provision of waterborne transit service. King County Metro would utilize in-house staff to operate the vessels and terminals. Public partners could still potentially contribute terminal access or funding, but there would be little to no private involvement in service delivery.

ADVANTAGES	DISADVANTAGES
• By assuming ownership of the service, King County would control the level and quality of service. • King County would determine cost recovery rates and set fares. • King County could build partnership with other governmental entities to fund infrastructure and provide service.	• King County would increase its operating risk by taking full responsibility for a line of business that is outside of its current expertise. • King County may incur additional costs by assuming all program administration and management functions. • King County would assume full responsibility for all capital and operating costs including significant start-up cost for vessels, terminals, maintenance facilities, and other capital elements. • New revenue sources would be required to fund capital investment and operations.

7. SAMPLE ROUTES

The advantages, disadvantages, feasibility, and concerns regarding waterborne transit are highly route specific. In order to identify the range of issues and options that might be encountered, hypothetical sample routes were selected for analysis in four example market areas as identified below. Within each market, two sample routes were identified as described in the following sections.

Example Market Areas



7.1 Elliott Bay

The Elliott Bay sample routes are representative of ferry services that connect communities that are relatively close by water, where there is strong commute trip directionality supplemented by off-peak demand. The two sample routes include West Seattle to Downtown Seattle, and West Seattle to North Bay, as illustrated below.

Elliott Bay Sample Routes

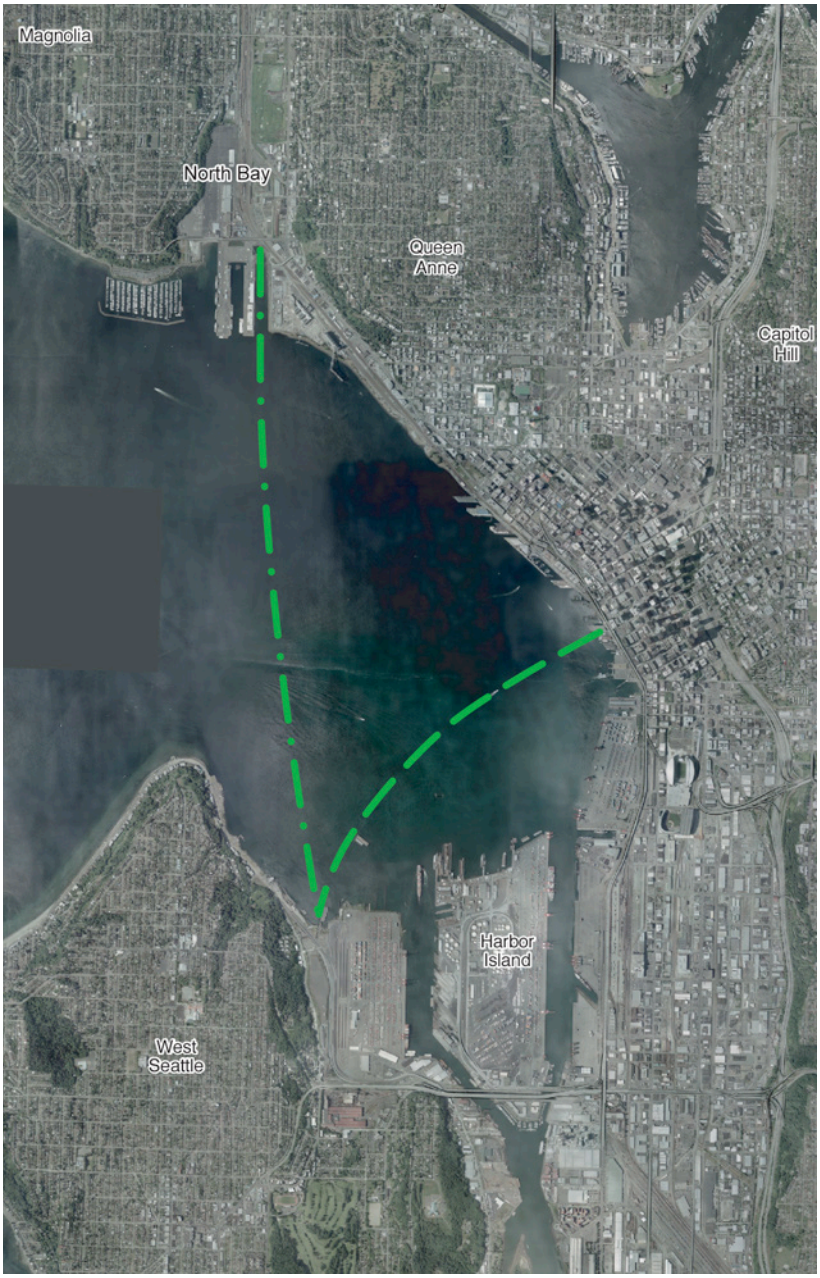


Image produced for King County by the United States Geological Survey. 2003 High Resolution Orthoimage

7.2 Lake Union

The Lake Union sample routes are representative of ferry services that provide mobility options – for recreation, business, and personal use – in an urban environment with multiple waterfront destinations and good land based connections. The two sample routes include a point-to-point service between the University of Washington and South Lake Union, and a circulator service that would potentially dock at multiple destinations around Lake Union, as illustrated below.

Lake Union Sample Routes

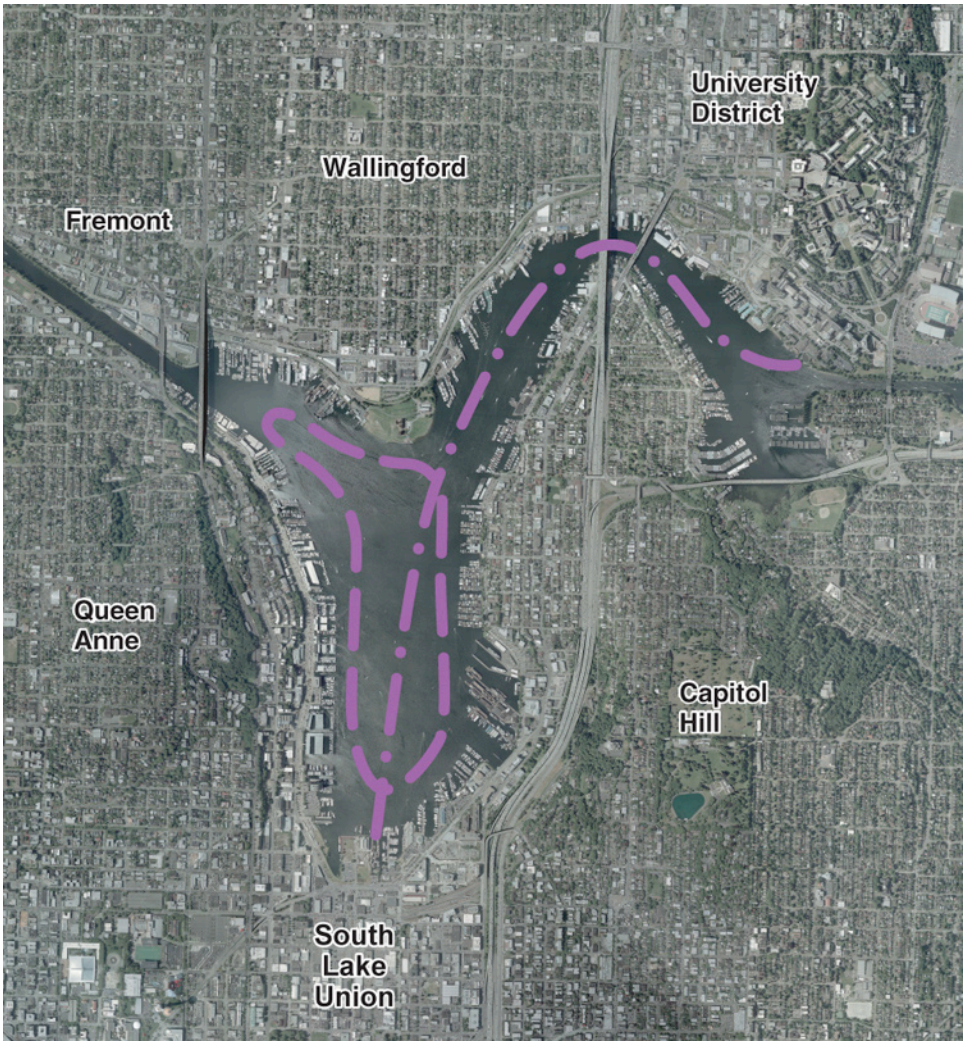


Image produced for King County by the United States Geological Survey. 2003 High Resolution Orthoimage

7.3 Lake Washington

The Lake Washington sample routes are representative of ferry services that are primarily focused on serving peak-period commute trips between surrounding lower density communities and a regional urban center, where viable land alternatives exist. The two sample routes identified include Kirkland to Seattle via the University of Washington, and North Renton to Seattle via Leschi, as illustrated below.

Lake Washington Sample Routes

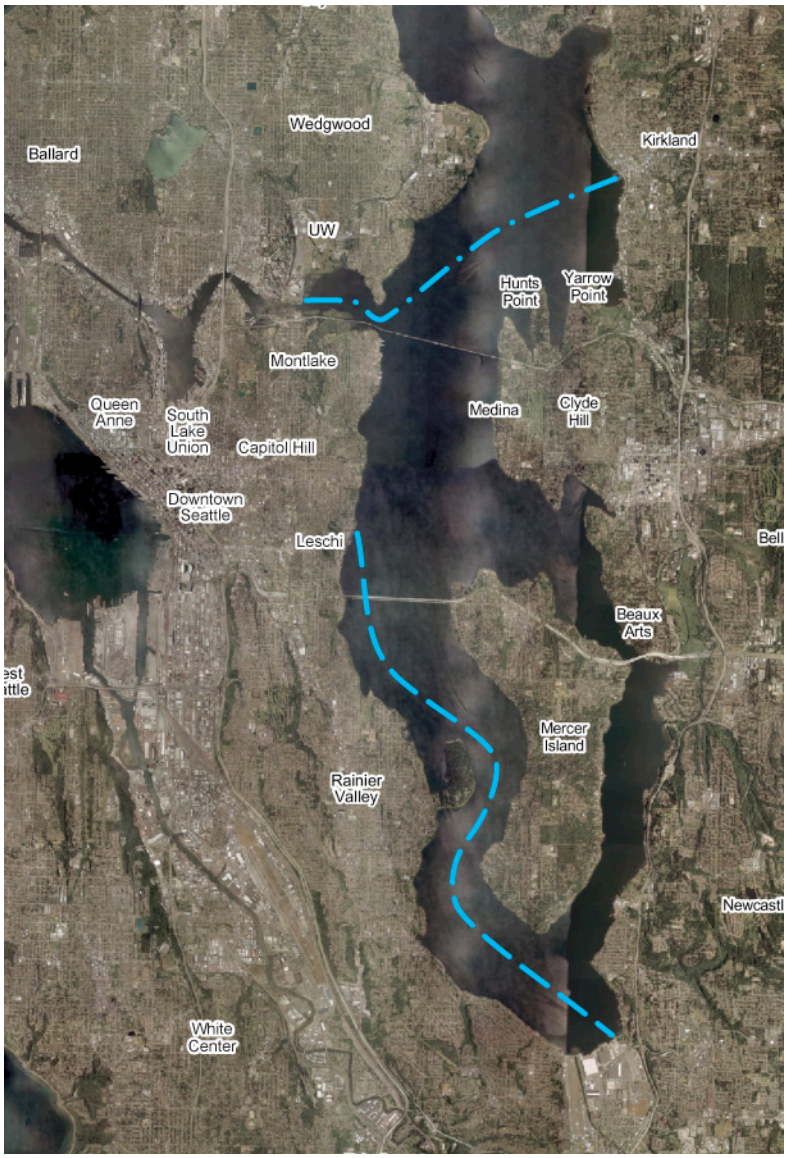


Image produced for King County by the United States Geological Survey. 2003 High Resolution Orthoimage

7.4 Vashon Island

The Vashon Island sample routes are representative of ferry services that are primarily focused on connecting surrounding communities with a regional urban center for peak-period commute trips where no direct land-based connection exists. The two sample routes are those identified in the Washington State Ferries *Ten-Year Passenger Strategy for Washington's Multimodal Ferry Transportation System*. They include a direct Vashon Island to Downtown Seattle route and a triangle route between Seattle, Vashon Island, and Southworth, as illustrated below.

Vashon Island Sample Routes

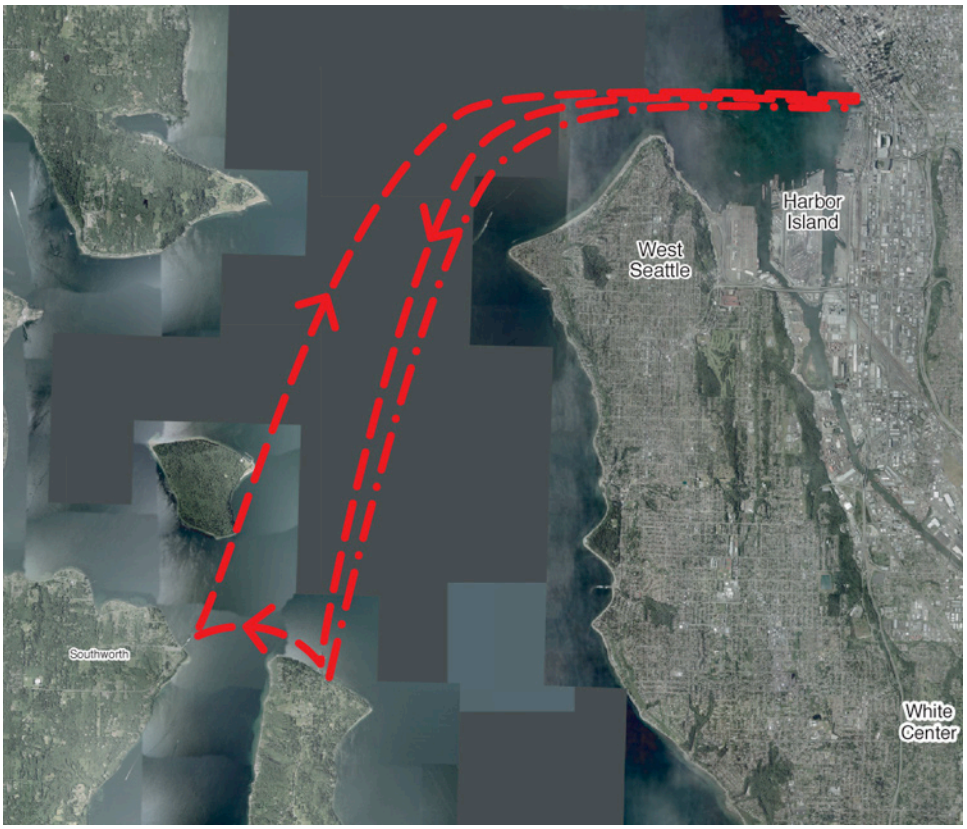


Image produced for King County by the United States Geological Survey. 2003 High Resolution Orthoimage

8. RELATIVE COSTS AND EFFECTIVENESS

In order to identify potential issues to be considered when evaluating potential passenger-only ferry services, hypothetical service, vessel, and terminal infrastructure scenarios were developed and analyzed for the sample routes. The analysis was designed to illustrate the magnitude and relative relationships between the sample routes in terms of potential ridership, vessels, types of terminal infrastructure, capital and operational costs, and revenue. Comparisons with King County bus operations are also provided to illustrate relative differences in various cost metrics.

For the purpose of this study, these scenarios assume procurement of all-new vessels and terminal infrastructure, and operation on a peak-period or all-day basis depending upon characteristics of the market and sample routes. The scenarios are not location-specific, and do not include site or land acquisition, maintenance facility, back-up vessel, or permitting costs; these would all need to be determined as part of any future route planning and design studies. The scenarios also assume labor rates and other baseline assumptions that are common to all of the sample routes. Actual costs may vary due to local considerations, and whether the service were provided by King County directly or through a private operator.

The analysis also does not identify cost reductions that might be realized by improving existing terminal or dock infrastructure, securing outside or private sector funding, or leasing a vessel. These would also need to be determined as part of any future route planning and design studies.

8.1 Service Assumptions

Sample route service assumptions – including service span and frequency – were developed based on a balance of the factors of vessel speed, number of vessels per route, competition from other modes, initial projected ridership demand, and anticipated passenger markets. Basic service assumptions included:

- Commuter services were assumed to have an eight hour service span, covering two four-hour peak periods (weekdays only).
- Connectors were assumed to operate for 12 hours a day (all-day service), five to seven days a week, with potentially four additional hours on Friday and Saturday evenings.
- Sailings were assumed every 30 to 60 minutes, depending on the route.

8.2 Ridership Projections

Potential waterborne transit ridership for the sample routes was estimated for the 2015 and 2030 planning horizons. For the Lake Union, West Seattle, and Lake Washington sample routes, ridership was modeled using the process described below. For Vashon Island, ridership projections from the Washington State Ferries report entitled *Ten-year Passenger Strategy for Washington's Multimodal Ferry Transportation System*, dated January 2005.

Forecasts were built up from three categories of riders:

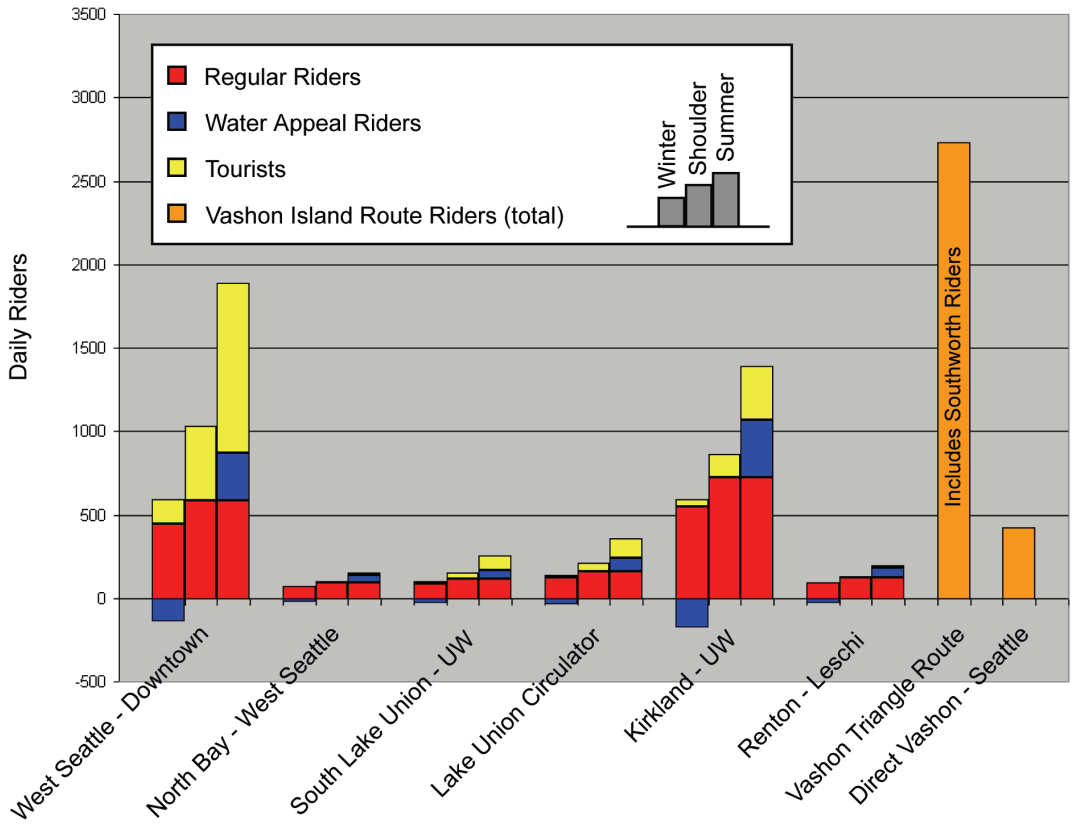
1. **Regular Riders**. Regular (non-recreational) riders were estimated using a version of the Puget Sound Regional Council's regional transportation model. This represents average non-recreational demand (home and work-based trips) with no seasonal variation.

2. **Water Appeal Adjustment**. To account for potential seasonal variations in regular ridership (the additional attractiveness of waterborne transit in the summer and the disutility of water travel in the winter), a "water appeal" factor was used to add or subtract from the modeled ridership estimates.
3. **Tourists**. The regional transportation model does not include tourist trips. In order to account for seasonal increases in potential waterborne transit services due to tourist demand, a "tourist demand" factor was used to further adjust the model estimates. The value of that factor depends on potential tourist attractions on either end of the route. For example, the West Seattle – Downtown Seattle route has high attractiveness as there are tourist activity centers on both ends.

In all cases, it was assumed that fares would be the same as comparable bus services. Premium fares could be charged for waterborne transit services, but this would reduce potential ridership.

The chart below highlights estimated waterborne transit ridership for 2015, broken down by sample route and ridership category. Daily ridership is projected for the winter season (November - March), shoulder season (April - May and September - October), and summer season (June - August). Vashon Island estimates are from the *Washington State Ferry Ten-Year Passenger Strategy* and are not broken down by season.

Projected Daily Ridership - Winter, Shoulder, and Summer 2015



For the modeled non-recreational trips – i.e. regular riders – approximately 75% of trips were projected to be from existing transit riders transferring to the passenger-only ferry, with the remaining 25% from new riders.

With respect to the tourist market, for the West Seattle – Downtown Seattle route it was estimated that up to half of the ridership would be comprised of tourists (based on data from the Elliott Bay Water Taxi). The West Seattle – North Bay, and Renton – Leschi sample routes were projected to have less than 10% tourist traffic. The other routes were estimated to have approximately 25-35% tourist riders.

Projected Total Annual Riders 2015 and 2030

Route	2015	2030
West Seattle – Downtown Seattle	387,300	245,600
North Bay – West Seattle	26,200	36,400
South Lake Union – UW	55,900	112,700
Lake Union Circulator	67,800 to 92,000	126,400 to 175,200
Kirkland – UW	223,700	285,200
Renton – Leschi	33,400	49,200
Triangle Route	709,790	841,400
Direct Vashon – Seattle	109,106	122,200

8.3 Cost Estimates

Cost estimates were prepared for each route, including vessel and terminal costs (all costs are in 2005 dollars). Vessel capital costs are based on shipyard costs for vessel construction (including labor and materials) plus an additional 15% to account for agency costs incurred during the purchase process. Costs for the Vashon Island sample routes are from the WSF study *Ten-Year Passenger Strategy for Washington's Multimodal Ferry Transportation System*. Costs for the other routes are for two basic vessel types:

1. A minor route vessel with a capacity of under 50 persons, designed for operation on Lake Union.
2. An 80-149 passenger vessel designed for operation on Lake Washington and/or Central Puget Sound.

The table below presents an estimate of total vessel capital costs. The number of vessels represents the number of vessels in service, and does not include potential spare vessels. Costs for the Vashon Island sample routes from the WSF study *Ten-Year Passenger Strategy* assume redeployment or sale of the WSF owned vessels CHINOOK and SNOHOMISH, as well as a spare vessel for the Direct Vashon - Seattle route, in their cost computations.

Estimated Vessel Capital Costs

Route	Number of Vessels	Capital Cost per Vessel	Total Vessel Cost
West Seattle - Downtown	1	$2,200,000	$2,200,000
North Bay - West Seattle	1	$625,000	$625,000
South Lake Union - UW	2	$625,000	$1,250,000
Lake Union Circulator	2	$625,000	$1,250,000
Kirkland - UW	2	$2,200,000	$4,400,000
Renton - Leschi	1	$2,200,000	$2,200,000
Triangle Route	2	Retrofit of existing vessels	$1,200,000
Direct Vashon - Seattle	1	$5,000,000	$3,080,0000

Terminal costs were estimated for different sizes of docks and waiting facilities as illustrated below. Route-level costs were determined by selecting terminal and facility sizes that were commensurate with projected demands.

Estimated Terminal Costs (by terminal size)

Category	Type	Capital Costs - Low	Capital Costs - High	Annual Maintenance Costs
	P1, Lake Pier	$133,000	$155,000	$3,700
	P2, Sound Pier	$2,633,000	$5,358,000	$16,600
	W1, Small Waiting Area	$60,500	$69,500	$6,500
	W2, Medium Waiting Area	$587,000	$978,000	$21,500
	W3, Large Waiting Area	$738,000	$1,141,000	$35,300
	T1, Pedestrian and Transit	$3,200	$5,200	$500
	T2, Non-motorized and Transit	$17,600	$22,100	$1,600
	T3, Integrated Facility	$471,000	$998,000	$19,000

8.4 Relative Cost Effectiveness

The following presents an estimate of the potential overall cost-effectiveness of each sample route. Costs for both Vashon Island services are per the *Ten-Year Passenger Strategy for Washington's Multimodal Ferry Transportation System.* The following costs do not assume any particular operating model, but instead represent a generic cost estimate using union labor rates. Depending on the operating model, actual costs may be higher or lower.

Estimated Cost Effectiveness (by route)

Route	Capital Costs	Annual Operating Costs	Annual Fare Revenue	Farebox Recovery
West Seattle – Downtown	$9.3 - $16.1 million	$1,063,100	$313,720	30%
North Bay – West Seattle	$7.7 - $14.5 million	$326,600	$21,230	7%
SLU – UW	$1.6 - $1.7 million	$624,400	$45,290	7%
Lake Union Circulator	$1.8 - $1.9 million	$696,600	$64,730	9%
Kirkland – UW	$6.2 - $7.0 million	$954,100	$181,190	19%
Renton – Leschi	$4.1 - $5.5 million	$507,500	$27,040	5%
Triangle Route	$3 million	$3,666,200	$2,697,200	74%
Direct Vashon – Seattle	$3.1 million	$1,062,800	$414,600	39%

Farebox recovery is based on the recovery of an average fare of $0.81[1], commensurate with the average fare collected on King County Metro buses considering the average of all cash, ticket, and pass fares. If a premium fare were charged, per person revenue would increase, but ridership would likely decrease. The Vashon Island services assume a recovery of $3.80 per one-way trip per the *Ten-Year Passenger Strategy for Washington's Multimodal Ferry Transportation System.*

To put this in context, a comparison was made between the passenger-only ferry routes and King County bus service.

Comparison with Bus Services

Operating Expense per Passenger Mile	
King County Bus Services	$0.69
West Seattle - Downtown	$1.75
North Bay - West Seattle	$4.78
South Lake Union - UW	$6.77
Lake Union Circulator	$4.10
Kirkland - UW	$1.21
Renton - Leschi	$2.43
Triangle Route	$0.62
Direct Vashon - Seattle	$1.30

Operating Expense per Boarding	
King County Bus Services	$3.50
West Seattle - Downtown	$2.74
North Bay - West Seattle	$12.47
South Lake Union - UW	$11.17
Lake Union Circulator	$8.72
Kirkland - UW	$4.27
Renton - Leschi	$15.19
Triangle Route	$5.17
Direct Vashon - Seattle	$9.74

On a per passenger-mile basis, King County bus services would in general be more operationally efficient. On a per-trip basis, the West Seattle – Downtown Seattle may have some efficiencies.

1 Source: King County fall 2004 revenue per boarding statistic.

8.5 Sample Route Analysis

The analysis of sample routes in the four market areas yielded the following overall findings:

- Ridership and revenue estimates assume that fares would be priced the same as for King County bus services, and that existing valid fare products such as Puget Passes, the U-PASS, and employer passes would be accepted for travel. Higher fares could potentially be charged for passenger ferry services, but would likely reduce ridership, particularly if existing bus passes were not accepted.
- Waterborne transit planning should consider three potential market groups: regular riders (traditional home, work, and school based trips), tourist and recreational riders, and riders who take passenger-only ferry service instead of other modes because of its inherent appeal and the overall experience.
- Vessels should be appropriately matched to the route. High performance (22-25 knot maximum speed), medium capacity (80-149 passengers) vessels appear to be best suited to routes across Lake Washington and Elliott Bay, and for service to Vashon Island. Larger capacity vessels (e.g., the 350-passenger class vessels operated by Washington State Ferries) may be appropriate for cross-sound routes with high demand.
- Smaller (under 50 passenger) vessels with a 10-13 knot maximum speed are best suited to routes such as Lake Union. Note that services on Lake Union and the west side of Lake Washington near the University of Washington have a seven knot speed limit.
- Alternative public transit options are available between the origins and destinations identified in the sample routes. For these routes, waterborne transit offers a mobility alternative to bus-based services, but does not appear to provide new, critical community connections.
- In almost all cases,[2] operating costs per vehicle mile and per passenger mile are higher for waterborne transit than for bus-based services.
- Depending on the route, operating expense per passenger boarding was estimated to be between $2.74 and $15.19. King County's average transit farebox recovery (considering all cash, pass and ticket uses) is approximately $0.81 per unlinked trip. Even if a premium fare could be charged for waterborne transit services, it is unlikely that a service could be operated without a subsidy.

9. NEXT STEPS

This study has identified important issues to be considered by the county when making policy decisions about waterborne transit. For a series of sample routes, it has also identified planning level cost and productivity parameters and trade-offs, and potential approaches to funding and operating waterborne transit should the county choose to move in this direction.

Suggested next steps include:

1. Use information in this study to make policy decisions in relation to the three key questions: deciding whether or not to participate, and if so under what circumstances; under what funding approaches; and under what operating approach(es). Decisions can be made system-wide, or on a route-by-route basis.
2. Use information contained within this study as input to any future discussions King County may have with Washington State Ferries with respect to the delivery of passenger-only service to Vashon Island.
3. For the Elliott Bay Water Taxi, consider the ridership projections and potential issues identified in this study in any decisions regarding continued operation of that service.
4. Use information contained within this study as input to any future route analysis or planning exercises.

2. Bus operating costs are estimated at $8.05 per vehicle revenue mile, and $0.69 per passenger mile. Operating costs for all ferry routes studied were higher than this, with the exception of the passenger mile cost for the Vashon Island triangle route which was estimated at $0.62 per passenger mile by WSF.

APPENDIX

B

King County Business Plan for the Vashon Island Passenger-Only Ferry

KING COUNTY BUSINESS PLAN for the VASHON ISLAND PASSENGER-ONLY FERRY

November 1, 2006

King County

KING COUNTY BUSINESS PLAN for the VASHON ISLAND PASSENGER-ONLY FERRY

CONTENTS

KING COUNTY BUSINESS PLAN for the VASHON ISLAND PASSENGER-ONLY FERRY

Executive Summary

The Washington State Legislature has directed that state funding for the Vashon Island passenger-only ferry service, currently operated by Washington State Ferries (WSF), end on June 30, 2007. Engrossed Second Substitute Bill (ESSB) 6787 provides that a county with a population greater than one million persons and a boundary on Puget Sound, that is proposing to create a ferry district, may submit a business plan to the Governor no later than November 1, 2006 for assumption of this service by the ferry district. King County meets these conditions and is submitting this business plan in response.

This business plan presents two alternatives for assumption of the Vashon Island passenger-only ferry service by a ferry district to be formed by King County. As required by ESSB 6787, each alternative is described in terms of: hours of operation, vessel needs, labor needs, proposed route, passenger terminal facilities, passenger rates, anticipated federal and local funding, coordination with Washington State Ferries, coordination with existing transit providers, long-term operation and maintenance needs, and a long-term financial plan. An initial implementation plan identifying key near-term actions for each alternative is also included.

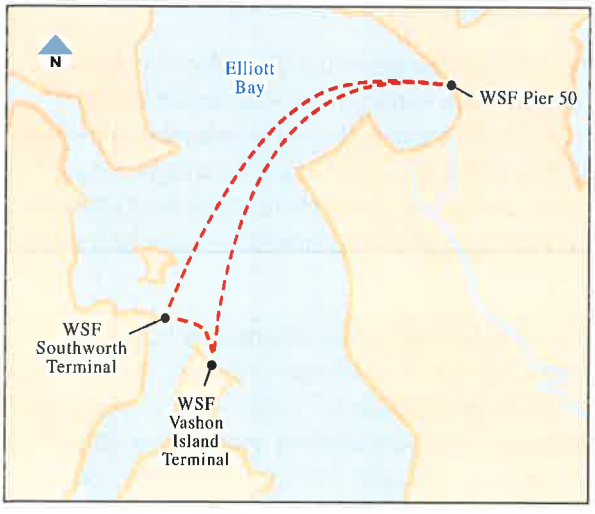
Route Alternatives

The two route alternatives identified for continued operation of the Vashon Island passenger-only ferry are as follows:

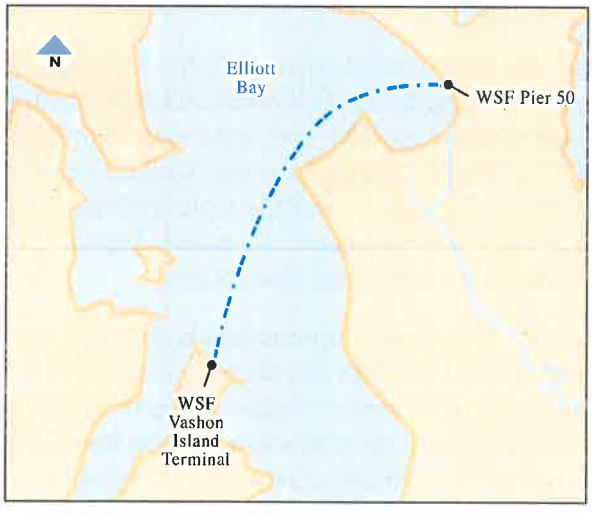
- A "triangle route" serving Vashon Island, Downtown Seattle, and Southworth (in Kitsap County). This route was identified as an option in the Washington State Ferries *Ten-Year Passenger Strategy for Washington's Multimodal Ferry Transportation System* (January 2005) and is the route preferred by King County.
- A "direct route" from Vashon Island to Downtown Seattle, similar to the existing WSF passenger-only service to the island.

Both route alternatives are described in detail in this business plan.

Alternative A: Triangle Route



Alternative B: Direct Route



The triangle route provides more convenient connections for Southworth passengers than the direct route, and as such offers greater market potential than the Vashon-only route. For these reasons, the triangle route alternative is preferred by King County. However, Washington State Ferries and Kitsap Transit have both indicated an interest in providing future direct Southworth-Downtown Seattle service. Kitsap Transit service from Southworth is dependent upon passage of a possible voter initiative in early 2007, while future WSF passenger/auto service would require new state funding that has not been identified at this time. Introduction of either service would negatively affect the feasibility of the triangle route by shifting Southworth passengers to the direct service.

Both routes require cooperation with Washington State Ferries for service coordination, terminal improvements, and land side intermodal connections. Additionally, the triangle route requires cooperation with Kitsap Transit to provide connecting transit service, and State and/or Kitsap County funding for identified Southworth terminal improvements.

Washington State Ferries and Kitsap Transit plans for providing direct Southworth-Downtown Seattle services must be clarified before the Ferry District can move forward with the triangle route alternative. Should the provision of direct Southworth-Downtown Seattle service by Washington State Ferries or Kitsap Transit prove likely, the most feasible passenger-only ferry alternative is expected to be the direct route.

Ferry District

Consistent with ESSB 6787 and RCW 36.54, and subject to King County Council approval, King County intends to create a ferry district ("Ferry District") to fund and oversee passenger-only ferry services, including the Vashon Island route. This Ferry District is expected to be established and its boundaries defined by May 2007, with a property tax levied by November 2007. Tax receipts would begin to be realized in the first quarter of calendar year 2008. It is not possible for such receipts to be collected and available before this time; commitment from the State would therefore be required to maintain the existing Vashon Island passenger-only service through June 30, 2008.

Under this plan, the Ferry District would assume responsibility for the Vashon Island service on July 1, 2008. The Ferry District would have overall governance, policy making, and funding responsibility, and the service would be branded as a King County/Ferry District service. The Ferry District would own principal capital assets (vessel and terminal improvements) that were paid for by the Ferry District and implemented to support the service.

The Ferry District would contract with the King County Department of Transportation (DOT) to plan and manage the service. King County DOT would in turn contract with Washington State Ferries to provide certain services related to vessel operations and passenger terminal operations and maintenance. This arrangement would enable the Ferry District to benefit from WSF's existing expertise, workforce, and economy of scale, as well as comply with the labor provisions of ESSB 6787. WSF participation in vessel and terminal operations is the most practical solution for initial operation of the service. The Ferry District's ability to migrate the service to in-house operations at any point in the future would be retained.

While the focus of this business plan is service to Vashon Island and potentially Kitsap County, the long-term viability of the Ferry District is dependent upon its ability to operate other future passenger-only ferry routes such as West Seattle to Downtown Seattle, Kirkland to the University of Washington, and other routes within or bordered by King County. Such services would increase overall mobility in the region, provide roadway construction mitigation, and provide a vital transportation link in the event of a major emergency or disaster. For example, a Kirkland

to University of Washington route could provide relief if the SR-520 floating bridge was out of service due to construction or a major disruption.

Terminals

Both route alternatives propose to utilize existing Washington State Ferries terminal facilities on Vashon Island and at Pier 50 in Downtown Seattle. This business plan identifies required near-term improvements (first three to four years of service) for both terminals to support ongoing operation of the service. The triangle route alternative requires the development of a new passenger-only ferry facility connected to the existing WSF terminal at Southworth. Design, permitting, and construction of this facility is anticipated to take between three and five years. Provision of the service to Southworth is dependent on the availability of these new facilities.

In the long-term (year five and beyond), it is expected that Washington State Ferries will conduct a major reconstruction of its existing Downtown Seattle facilities (Colman Dock redevelopment). The business plan assumes that the Ferry District will participate in the development of a new passenger-only terminal facility as part of that redevelopment, and that the facility may be shared with other Ferry District waterborne transportation services (e.g., the Elliott Bay Water Taxi).

The business plan assumes that Washington State Ferries will remain the owner of the existing terminal facilities at Vashon Island and Downtown Seattle. The business plan includes costs for passenger-only facility capital improvements at those terminals, as well as new passenger-only facilities (float, gangplank, and gangway) at Southworth. Any new capital facilities paid for by the Ferry District would be owned by the Ferry District. Lease agreements for use of the terminals would not include any charges to recover capital costs from the Ferry District.

With respect to operations and maintenance of the terminals, services related to this are expected to be provided by WSF under contract. The Ferry District would pay the marginal operating burden associated with WSF providing passenger-only facility operations and maintenance.

Vessels and Service

The business plan assumes the purchase of two 250-passenger vessels for the triangle route, or two 149-passenger vessels for the direct route. For either alternative, one vessel would be used for regular service while the other would function as a back-up vessel. Other options exist for providing back-up service (e.g., utilize the existing Vashon Island-Fauntleroy auto-ferry service, or possibly lease a vessel on a short-term basis), however provision of a second back-up vessel would provide the most reliable service and provides flexibility to add capacity if needed. While the new vessels are being procured (first three to four years of service), the business plan assumes that vessels of similar size and performance would be leased.

The current Vashon Island service has two sailings per peak period with a schedule that is less than optimal for Vashon Island residents. Both route alternatives provide an improved level of service with three sailings per peak period per peak direction, under a schedule optimized for commute travel. No mid-day or late evening sailings are anticipated at this time, as the demand is primarily during the commute periods.

Timing

Under either route option, implementation of service between Vashon Island and Downtown Seattle could begin immediately upon assumption by the Ferry District (i.e., mid-2008). Service to Southworth is not expected to be feasible before 2012, due to the need to construct a new passenger-only facility at that location.

Near term improvements to the Vashon Island and Pier 50 terminals can be made while the service is in operation, and it is assumed that there would be no interruption of service during Colman Dock reconstruction. All major capital investments (near and long term) for either route alternative are expected to be complete between 2012 and 2016, depending on the timing of the Colman Dock redevelopment.

Costs

This business plan contains cost breakdowns and pro forma financial statements for the two route alternatives. Capital costs (net of known available and projected funding) are estimated to be approximately $21.0 million for the triangle route, and $6.6 million for the direct route. Operating costs (net of fares and other revenue) are estimated at $2.4 million per year for the triangle route, and $1.6 million per year for the direct route.

The business plan is predicated on the ability of the Ferry District to issue bonds for capital financing, and collect property taxes to cover operating cost shortfalls. Estimated ad valorem tax rates of $0.0162 per $1,000 of assessed property value for the triangle route, and $0.0100 per $1,000 of assessed property value for the direct route, have been identified. Actual rates to be levied will be determined by the Ferry District, and are expected to be higher to support other routes and related services that the Ferry District may wish to provide.

Conditions for Assumption

The business plan is based on the Ferry District assuming service no earlier than July 1, 2008 (after tax revenues become available) and being able to establish agreements with King County DOT to provide certain management and administration services. King County DOT in turn would contract with Washington State Ferries to provide certain vessel and terminal services (though this could migrate to in-house operations in the future). The ability to assume service is also dependent upon the following conditions:

1. King County Council approving the establishment of the Ferry District.
2. The State committing to fund, operate, and maintain the existing WSF service through June 2008 (with no King County or Ferry District participation).
3. The net proceeds from the sale of the existing WSF Chinook class vessels being appropriated solely to the Ferry District, with distribution to begin as needed between 2007 and 2008.
4. The State negotiating an extension of the Masters, Mates & Pilots (MM&P) and Inlandboatmen's Union (IBU) supplemental passenger-only ferry agreements to ensure such agreements are in effect when service is assumed by the Ferry District.
5. The State committing to negotiate fair and reasonable agreements for the provision of any services that King County or the Ferry District may wish to subcontract to WSF. Although the Ferry District will govern, fund, and

own assets for the service, and King County DOT will provide management services, WSF operation of the vessels and terminals is the most practical solution, at least during an initial transition period.

6. The State clarifying that the Ferry District has the ability to use its tax revenue to fund connecting shuttle services and other landside improvements within King County.

7. The State taking legislative action to grant the Ferry District the authority to issue bonds and incur debt.

8. The State assuming responsibility for providing funding as needed to overcome any deficits between available federal and other outside funding and the costs of improvements to the Vashon Island and Downtown Seattle passenger-only terminal facilities.

9. The Ferry District being able to utilize outside shipyards for major vessel maintenance per current WSF practice, as well as make use of overnight tie-up and maintenance at a convenient location within the King County boundaries.

In the case of the triangle route alternative preferred by King County, the Ferry District's ability to deliver productive, efficient service is dependent upon three key external conditions that must be determined by early 2007:

1. An entity such as the State and/or Kitsap County funding the cost of construction of a new passenger-only terminal facility at Southworth. The analysis conducted in support of this business plan concluded that such a facility is required in order to support viable, long-term passenger-only ferry operations to Southworth.

2. The Ferry District having exclusive rights to operate ferry service between Southworth and Downtown Seattle. Such service may be provided in partnership with others, but its economic viability would be significantly impacted if direct Southworth to Downtown Seattle auto or passenger-only ferry services were implemented by others.

3. The State and Kitsap Transit committing to provide parking and transit connections at Southworth to support passenger-only ferry operations.

Should these three conditions prove unachievable, the Ferry District could alternatively proceed with direct Vashon Island to Downtown Seattle service (Alternative B). This option would provide a high level of service to Vashon Island, but would not directly connect to Kitsap County.

Introduction

This document presents a business plan for assumption of the Vashon Island passenger-only ferry service by a ferry district to be formed by King County. This passenger-only ferry route is currently operated by Washington State Ferries (WSF). However, the Washington State Legislature has directed that state funding for the route will end on June 30, 2007. Engrossed Second Substitute Bill (ESSB) 6787 provides that a county with a population greater than one million persons and a boundary on Puget Sound, that is proposing to create a ferry district, may submit a business plan to the Governor no later than November 1, 2006 for assumption of this service by the ferry district. King County meets these conditions and is submitting this business plan in response.

Two route alternatives have been identified for the long-term operation of a passenger-only ferry serving Vashon Island.

- A "triangle route" serving Vashon Island, Downtown Seattle, and Southworth (in Kitsap County). This route was identified as an option in the Washington State Ferries *Ten-Year Passenger Strategy for Washington's Multimodal Ferry Transportation System* (January 2005) and is preferred by King County.
- A "direct route" from Vashon Island to Downtown Seattle, similar to the existing WSF passenger-only service to the island.

This business plan is, in effect, two business plans in one document. The first half of the document focuses on the triangle route and the second half of the document focuses on the direct route. For each route, the following sections are provided to document the information required by ESSB 6787:

1. A brief overview of the characteristics and configuration of the service proposed
2. Detailed descriptions of the service components identified for inclusion in the business plan by ESSB 6787
3. A financial plan including a pro forma financial statement through the year 2020
4. A plan for the implementation of the service

The decision of which route alternative to pursue will be made at a later date. The triangle route is preferred by King County since it offers greater market potential as a result of providing more convenient connections for Southworth passengers than the direct route. However, Washington State Ferries and Kitsap Transit have both indicated an interest in providing future direct Southworth-Downtown Seattle service. Introduction of such service would negatively impact the feasibility of the triangle route by shifting Southworth passengers to the direct Southworth service. Should the provision of direct Southworth-Downtown Seattle service by Washington State Ferries or Kitsap Transit prove likely, the most feasible passenger-only ferry alternative for serving Vashon Island is expected to be the direct route.

Two sections precede the detailed route-specific business plan sections. Under either route alternative, the service would be owned, governed, and funded by the Ferry District. The legal basis, creation, functions, and timing of the establishment of the future Ferry District are discussed in the first section. The second section identifies the conditions that must be met for assumption of the service by the Ferry District.

Note that this business plan represents the initial planning effort for assumption of the Vashon Island passenger-only ferry service. Following creation of the Ferry District, additional detailed implementation, financial, and operational planning will be required.

Ferry District

Legal Basis

The original legislative authority for counties to operate ferries resides in RCW 36.54.010 and has been utilized by a number of counties over the years. In 2003 the State Legislature made significant statutory changes (ESHB 1853) to facilitate passenger-only ferry service by transit agencies and county ferry districts. In March 2006, the Legislature passed ESSB 6787 that again made changes relating to local government's provision of passenger-only ferry service stressing the importance of their role in the provision of service and establishing the passenger ferry account to assist in funding of local passenger ferry service.

Through ESHB 1853 and ESSB 6787, existing RCW 36.54 is amended to allow the legislative authority of a county to adopt an ordinance creating a ferry district in all or a portion of the area of the county, including the area within the corporate limits of any city or town within the county. Furthermore, a Ferry District created by King County is allowed, under specific conditions established in ESSB 6787, to assume the state operated passenger-only service from Vashon Island to Downtown Seattle. A Ferry District will have the authority to operate passenger-only service on the Vashon route and the ability to expand passenger-only service to Southworth if it meets these mandates, including receiving the Governor's approval of the requisite business plan and the Legislature's approval of Ferry District assumption of the service.

Creation

The King County Council must determine that it is in the public interest to create a ferry district to provide passenger-only service. If such a determination is made, creation of the Ferry District requires the adoption of an appropriate ordinance. The ordinance will include sufficient detail to establish a ferry district boundary (the geographical region of the taxing district), identify the governing board (the members of the King County Council, acting ex officio and independently) and an effective date for the creation of the Ferry District. Certain other related actions would follow, such as the establishment of a ferry fund and identification of the fund manager, i.e. King County Department of Transportation, as well as the process for abolishing the Ferry District.

Functions

The Ferry District will be a municipal corporation, an independent taxing authority, and a taxing district as defined in Article VII of the State Constitution and as such will have the authority to levy an ad valorem tax on all properties within the Ferry District at a rate up to $0.75 per $1,000 of assessed valuation. The Ferry District will also be a body corporate and possess all the usual powers of a corporation for public purposes including but not limited to the authority to hire employees, staff, and services; to enter into contracts; and to sue and be sued. The governing body of the Ferry District is statutorily identified as the King County Council, acting ex officio and independently. This body (the "Board") is the final legislative authority for the conduct of passenger-only service within its purview. It possesses all the powers as provided for in RCW 36.54.110 et seq. It will, as noted above, establish the tax rate and be responsible for the collection of revenue and payment of expenditures in support of passenger-only service. The Board will define service levels, establish tariff schedules, route structures, service providers, and monitor the success of the service delivery. King County and its related administrative structure will play an important part in provision of the Vashon passenger-only ferry as identified in the following business plan, as will other entities such as Washington State Ferries. However, they will do so under the direction of the Ferry District.

The Board will need both budgetary and staff support to fulfill its mission. There is a range of options for how the Board may employ King County and other contracted services. However implementation is accomplished, the legislative authority and responsibility for the passenger-only program will rest with the Ferry District.

Timing

A series of governance and funding related actions – by King County and the Ferry District, the Governor and State Legislature, the Washington State Ferries and possibly other counties – must occur prior to the Ferry Districts's assumption of Vashon ferry service on July 1, 2008.

Ongoing passenger ferry service is dependent upon a sustainable public subsidy for both capital investment and operations. The Ferry District has the ability to generate revenue through its authority to levy each year an ad valorem tax on all taxable property as provided in RCW 36.54.130. To ensure tax revenue can be realized during the first quarter of the 2008 calendar year in anticipation of service assumption in July of 2008, the ordinance creating the Ferry District should be in place by May of 2007. The decision on the actual taxing rate will be made by November of 2007. Once the Ferry District is created, work will continue to ensure passenger-only program implementation by July of 2008.

Conditions for Assumption

The business plan is based on the Ferry District assuming service no earlier than July 1, 2008 (after tax revenues become available) and being able to establish agreements with King County DOT to provide certain management and administration services. King County DOT in turn will contract with Washington State Ferries to provide certain vessel and terminal services (though this could migrate to in-house operations in the future). The ability to assume service is also dependent upon the following conditions:

1. King County Council approving the establishment of the Ferry District.
2. The State committing to fund, operate, and maintain the existing WSF service through June 2008 (with no King County or Ferry District participation).
3. The net proceeds from the sale of the existing WSF Chinook class vessels being appropriated solely to the Ferry District, with distribution to begin as needed between 2007 and 2008.
4. The State negotiating an extension of the Masters, Mates & Pilots (MM&P) and Inlandboatmen's Union (IBU) supplemental passenger-only ferry agreements to ensure such agreements are in effect when service is assumed by the Ferry District.
5. The State committing to negotiate fair and reasonable agreements for the provision of any services that King County or the Ferry District may wish to subcontract to WSF.
6. The State clarifying that the Ferry District has the ability to use its tax revenue to fund connecting shuttle services and other landside improvements within King County.
7. The State taking legislative action to grant the Ferry District the authority to issue bonds and incur debt.
8. The State assuming responsibility for providing funding as needed to overcome any deficits between available

federal and other outside funding and the costs of improvements to the Vashon Island and Downtown Seattle passenger-only terminal facilities.

9. The Ferry District being able to utilize outside shipyards for major vessel maintenance per current WSF practice, as well as make use of overnight tie-up and maintenance at a convenient location within the King County boundaries.

In the case of the triangle route alternative preferred by King County, the Ferry District's ability to deliver productive, efficient service is dependent upon three key external conditions that must be determined by early 2007:

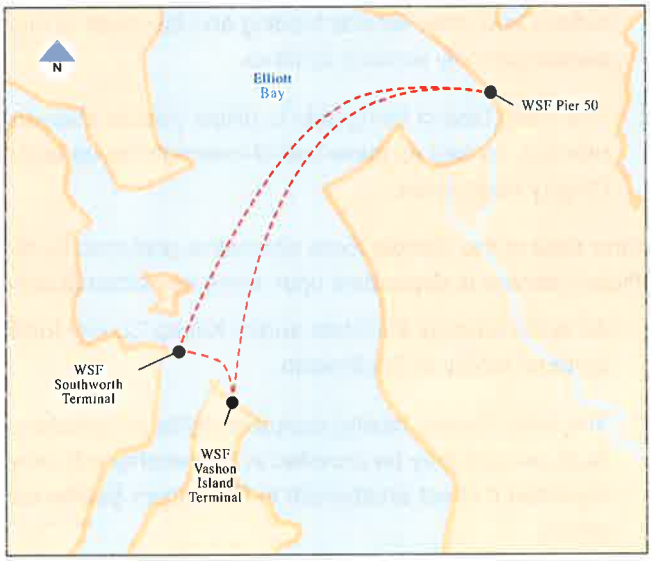
1. An entity such as the State and/or Kitsap County funding the cost of construction of a new passenger-only terminal facility at Southworth.

2. The Ferry District having exclusive rights to operate ferry service between Southworth and Downtown Seattle. Such service may be provided in partnership with others, but its economic viability would be significantly impacted if direct Southworth to Downtown Seattle auto or passenger-only ferry services were implemented by others.

3. The State and Kitsap Transit committing to provide parking and transit connections at Southworth to support passenger-only ferry operations.

Should these three conditions prove unachievable, the Ferry District could alternatively proceed with direct Vashon Island to Downtown Seattle service (Alternative B). This option would provide a high level of service to Vashon Island, but would not directly connect to Kitsap County.

Alternative A: Triangle Route



A.1 Triangle Route Service Concept

This section of the business plan provides an overview of the main attributes of the proposed triangle route passenger-only ferry service.

A.1.1 Governance and Funding

The Ferry District will assume responsibility for providing and funding a passenger-only ferry serving Vashon Island, Southworth, and Downtown Seattle. The Ferry District will be responsible for bond financing to cover projected capital costs, as well as for collecting property taxes to subsidize operating costs.

The Ferry District will have overall control over the service and ultimate responsibility for the service. The Ferry District will provide governance and policy making, including fare policies, service planning, and branding and identity, with some of these services assumed to be provided by King County DOT through an appropriate agreement. The Ferry District will also be able to establish partnerships and contractual relationships with other entities as appropriate. In addition, the Ferry District will own principal capital assets (vessel and terminal improvements) that are paid for by the Ferry District and implemented to support the service.

The State is expected to have a role in funding the start-up of the service. It is assumed the State will grant the Ferry District all funds from the proceeds of the sale of the vessels *Chinook* and *Snohomish*. In addition, the State will have ultimate responsibility for funding all terminal improvements.

The State and/or Kitsap County are expected to fund the capital costs of the Southworth terminal construction. Recognizing that the service would benefit the residents of Kitsap County, Kitsap County could also help subsidize its ongoing operation. For the purpose of this business plan, no specific operating subsidies have been assumed.

A.1.2 Operations

Through appropriate agreements, the Ferry District will contract with King County DOT to provide planning, administration, and other services. In turn, King County DOT will contract with WSF to operate the vessels and the terminals for at least the first several years of the service. This arrangement with WSF is the most practical solution for start-up of the service. In the long-term, the service could migrate to an in-house operation if desired (by the Ferry District directly or by contract with King County).

As the vessel operator, WSF must meet all regulatory requirements and will provide labor negotiations, dispatch, crew training, security, daily onboard vessel maintenance performed by the crew, payroll, and insurance related to vessel operations. As the terminal operator, WSF will provide terminal maintenance and operations, security, and fare collection.

The business plan assumes that a suitable overnight moorage location can be found in King County, and also assumes that major maintenance can be contracted out per current WSF practice. This would need to be confirmed as part of any future operations and implementation planning.

For the purpose of this business plan, it has been assumed that diesel fuel prices will be similar to those currently paid by King County Metro. WSF is expected to provide consumable onboard supplies as part of their operating agreement. The Ferry District would be responsible for any vessel hull insurance if required.

A.1.3 Capital Assets

Vessels

For the purpose of this business plan, it has been assumed that new vessels will be procured and that the use of the WSF vessels *Skagit* and *Kalama* will be discontinued at the time of service assumption. For the first few years (while the new vessels are being constructed), the Ferry District is expected to lease two 149-passenger vessels: one primary and one back-up. This capacity will be adequate, as service will only be provided between Vashon Island and Downtown Seattle until the Southworth passenger-only ferry facility is available (2012 +/-). It may be possible to continue use of the *Skagit* and *Kalama* for this initial period, however this is not the preferred option.

The new vessels will be 250-passenger class vessels with the following characteristics: side loading from one gangplank, approximately 97 feet long aluminum catamaran hulls, two engines and a two water jet propulsion system, restrooms (required on the triangle route because of the length of the service), and no food service. Capital costs could potentially be reduced by purchasing only one vessel, but this approach would risk negative impacts to service reliability.

This business plan is based on the existing WSF Chinook class vessels being sold and all proceeds (estimated at $8.5 million net, less sales costs) used to fund the purchase of new vessels and other start-up costs.

Terminals

Washington State Ferries will remain the owner of the existing terminal facilities. Any new capital facilities paid for by the Ferry District will be owned by the Ferry District. The Ferry District will lease use of the terminals. Recovery of any capital costs will not be included in the lease rate.

With respect to operations and maintenance of the terminals, services related to this will be provided by WSF under the appropriate agreements. The Ferry District will pay the marginal operating burden associated with WSF providing passenger-only facility operations and maintenance.

On Vashon Island, the Ferry District will lease exclusive use of the passenger-only ferry pier, gangway, and float, as well as shared use of the terminal building, ADA parking, and transit and pedestrian facilities.

In Seattle, the Ferry District is expected to have the option of leasing exclusive use of Pier 50 (including pier, passenger-only terminal "building," gangway, and float). In the near-term (within two to three years of service initiation) a new concrete float will be purchased to replace the existing steel float at Pier 50 (which has reached the end of its useful life). The terminal facilities for waiting passengers at Pier 50 will be renovated to allow continued use until the redevelopment of Colman Dock occurs. The gangplank (ramp from float to vessel) will be upgraded to comply with accessibility requirements and match the freeboard of the new vessels.

In the long-term, Pier 50 will be impacted by the planned expansion of Colman Dock. The Ferry District and WSF will work together to design a new passenger-only ferry facility as part of the Colman Dock redevelopment. It is anticipated that the triangle route will necessitate improvements in Seattle above and beyond those that would be required for a direct Vashon-Downtown Seattle route. These improvements would include a larger terminal building and pier at the new Colman Dock dedicated to passenger-only ferries. WSF will be responsible for construction and permitting of the new passenger-only terminal. Phased construction of a renovated and expanded Colman Dock is currently anticipated to occur between 2011 and 2016. During construction, WSF will be expected to provide a passenger-only ferry dock that is continuously available for use by the Vashon Island ferry.

Currently, passenger-only ferry facilities do not exist at Southworth. Provision of triangle route service is dependent upon the construction of a new passenger-only ferry docking facility at Southworth (as an extension of the existing WSF terminal). This facility is to include a new pier, gangway, float, and expansion of the existing WSF terminal passenger waiting area. Once the new passenger-only ferry docking facilities have been constructed, the Ferry District is expected to lease shared use of the terminal building, arrange for transit service with Kitsap County, and arrange for parking access from WSF.

A.1.4 Timing

Funding from the Ferry District is anticipated to become available by the first quarter of the 2008 calendar year, at the earliest. Between July 2007 and the end of fiscal year 2008 (June 2008), Washington State Ferries is expected to continue to operate the service consistent with current operations. It is expected that the Governor's operating budget request for WSF operations will include funding to cover passenger-only ferry operations through June 2008. The transitioning of system components from WSF to the Ferry District would begin after taxation revenue becomes available in 2008.

Construction of the Southworth terminal is anticipated to take three to five years following the Ferry District's assumption of the service in 2008. Until the Southworth terminal is constructed, the route will serve Vashon and Downtown Seattle only. Based on the timing of the Southworth terminal construction and procurement of new vessels, it is anticipated that the full triangle route could be implemented by 2012 or 2013.

A.2 Triangle Route Primary System Components

A.2.1 Hours of Operation

Service will be provided during the weekday morning and afternoon peak periods (6:00 to 9:00 AM and 4:00 to 7:00 PM respectively). Hours of operation for the crew will be 5:00 AM to 10:00 AM and 3:30 PM to 8:30 PM. Hours of operation for the traveling public will be approximately 6:10 AM to 9:10 AM and 4:10 PM to 7:10 PM.

Schedule

The triangle route is expected to have three peak direction sailings in the morning peak period and three peak direction sailings in the afternoon peak period (weekdays only). The first morning sailing departs Southworth at 6:10 AM and the last afternoon sailing departs Seattle at 6:30 PM. The crossing times – including loading, unloading, and slack time – are estimated to be approximately 10 minutes from Southworth to Vashon, 30 minutes from Vashon to Seattle, and 30 minutes from Seattle to Southworth, for a total round-trip time of 70 minutes. Note that the schedule accounts for the time required to load and unload a vessel carrying the maximum number of passengers. Each schedule also includes approximately 10 minutes of slack (14%) and conservative estimates have been used for the maneuvering distances and times. The full schedule is listed below.

Triangle Route Sailing Schedule		
Southworth to Vashon	Vashon to Seattle	Seattle to Southworth
6:10 AM	6:20 AM	6:50 AM
7:20 AM	7:30 AM	8:00 AM
8:30 AM	8:40 AM	
Seattle to Vashon	Vashon to Southworth	Southworth to Seattle
4:10 PM	*4:40 PM*	*4:50 PM*
5:20 PM	*5:50 PM*	*6:00 PM*
6:30 PM	*7:00 PM*	

Crew Hours

Based on the service schedule detailed above, the morning shift would begin at 5:00 AM. The crew is expected to spend 30 minutes checking the boat, warming up the engines, and performing other start-up tasks before getting underway at approximately 5:30 AM to deadhead to Southworth. After concluding the morning revenue service, the vessel would return to the mooring berth at approximately 9:30 AM, with the morning shift ending at 10:00 AM. Total labor hours for the morning shift would be five hours.

The afternoon shift would begin work at 3:30 PM. The crew is expected to spend approximately 10 to 15 minutes getting ready before heading to the Seattle dock. After concluding the afternoon revenue service, the vessel would deadhead from Southworth to the fuel berth at approximately 7:10 PM. The crew would have 50 minutes to fuel, return to the mooring berth, shutdown the vessel, load fuel and water, unload sewage and garbage, and clean the boat. The evening shift is expected to end at 8:30 PM, for a total of five labor hours.

The total number of daily labor hours for the crew onboard the vessel is expected to exceed eight hours in two four-hour blocks under normal operating conditions. As a result, two part-time shifts would be required. Each shift would be five hours long.

A.2.2 Vessel Needs

For the purpose of this business plan, the purchase of two new 250-passenger vessels has been assumed, with one primary vessel and one back-up vessel. Thirty-knot vessels would be optimum for the planned service schedule. It is anticipated that the vessels will use two engines with a two water jet propulsion system, be side loading with one gangplank, be approximately 97 feet in length, and contain restrooms for public use. The hulls will be a catamaran configuration constructed of aluminum. Food service is not planned. Fuel consumption is estimated to be approximately 4,150 gallons of No. 2 diesel fuel per week with the planned service schedule based on one vessel in service.

If it proves desirable to avoid the capital cost of a second vessel, it may be possible to lease a back-up vessel for use during scheduled maintenance of the dedicated vessel. However, it is unlikely that it would be possible to have a leased vessel provide back-up service for unscheduled maintenance; when these situations occur riders would need to use the WSF Southworth-Vashon-Fauntleroy auto-ferry and a King County Metro bus as there would be no passenger-only ferry service. If this option is pursued, the primary vessel should have a high level of system redundancy in order to maintain reliable service. Note that additional redundancy increases the vessel weight, and therefore capital and fuel costs for the vessel.

While the new vessels are being procured, this business plan assumes that leased vessels will be used to provide service between Vashon Island and Downtown Seattle. It has been assumed that two 149-passenger, 30 knot vessels will be leased (one primary and one back-up); vessels with these specifications are readily available. Note that the full triangle route will be implemented after 2012 once the Southworth passenger-only ferry facility has been constructed and the new 250-passenger vessels have been procured. While the service docks only at Vashon and Seattle the 149-passenger vessel capacity will be adequate.

Although not recommended, it may be possible to lease the WSF vessels *Skagit* and *Kalama* until the new vessels are ready to enter service. Lease costs for these vessels would likely be lower than lease costs for a 149-passenger vessel from an outside shipyard or other vendor. If the 25 knot *Skagit* and *Kalama* were used, it would not be possible to improve the service schedule to three round-trip sailings per peak period until the new vessels were put into service. As 250-passenger vessels, the *Skagit* and *Kalama* have higher crewing and fuel costs than leased 149-passenger vessels. Maintenance costs would also likely be higher and could be significant. These vessels are reaching the end of their useful lives, and already will be likely providing one more year of service than previously anticipated as a result of the Ferry District assuming responsibility for the service in 2008 rather than 2007.

A.2.3 Labor Needs

Labor needs include vessel crew, vessel maintenance, terminal operations staff, terminal maintenance, and management and support. Through the planning horizon, most labor needs will be contracted to WSF. Exceptions include vessel maintenance, some of which would be contracted to outside shipyards, and management and administration, a portion of which is expected to be provided by King County DOT.

Vessel Crew Configuration

The vessels are projected to operate with four deck crew members onboard. It is anticipated that these crew members will have the following classifications: one master, one mate, one able-bodied seaman (AB), and one ordinary seaman (OS).

The service plan will be based on the part-time shift crewing arrangement permitted by the supplemental MM&P and IBU passenger-only ferry agreements. It is assumed that all crew members will work part-time.

The planned service schedule cannot be provided in two four-hour shifts. With the planned schedule, it is anticipated that the full-time equivalent of five deck crew members will be required for vessel operations, plus three full-time equivalent oilers[1] (per WSF practice and the current MEBA labor agreement). Since operations will be contracted to WSF, WSF will handle temporary replacement labor to cover vacation days, sick days, and leave.

Vessel Maintenance Labor

Vessel maintenance consists of three types of maintenance: daily maintenance performed by the crew, overnight maintenance, and major maintenance. Daily maintenance is provided by the crew as part of their regular shift and includes tasks such as loading fuel and water, unloading sewage and garbage, and cleaning the boat. Overnight maintenance occurs at the moorage facility.

There are several types of major maintenance. Annually, each vessel will need to be drydocked for bottom cleaning, hull inspection, bottom painting, and minor machinery overhauls. A large number of facilities in the Seattle area can provide this service. The effort will take approximately one week. The back-up vessel will provide service while the primary vessel is in drydock. Every five to six years, the vessel will need a longer maintenance period for major machinery overhaul and interior furnishings maintenance and/or replacement. This greater effort will typically take approximately three weeks.

Terminal Operations Staff

Washington State Ferries will provide staff to collect revenue, manage passenger staging and boarding, and perform routine daily maintenance on-shore, such as janitorial duties, as part of their contracted responsibilities. Because the passenger-only ferry service will not operate throughout the day, it is anticipated that these terminal services will require a less than full-time workload for all terminal staff. Approximately 1.6 full-time equivalents (FTE's) is the estimated total terminal staff workload. WSF will perform these duties with staff that also support their auto ferry terminal operations, allowing the Ferry District to realize the efficiency of shared terminal staff. Per current WSF practices, it is expected that round-trip fares will be collected at the Seattle terminal from passengers traveling in the westbound direction.

Terminal Maintenance Labor

Operating agreements with WSF will require a thorough maintenance agreement for the passenger-only ferry facilities at Pier 50, Vashon Island, and Southworth. This agreement will need to identify the level of maintenance required for the piers, gangways, and floats. In addition, this agreement will need to prioritize all outstanding facility

1 *The current WSF 250-passenger vessels Skagit and Kalama are assigned an engineer with an oiler classification. However, the more complex WSF passenger-only fast ferries (the Chinook and Snohomish) have been assigned an assistant chief engineer. The new 250-passenger vessels will be faster and therefore more complex than the Skagit and Kalama. It is not clear at this time whether an oiler or assistant chief engineer would be required for the new vessels.*

maintenance deficiencies, establish yearly budget goals, and determine a time frame for discrepancy resolution. The maintenance agreement is expected to be updated annually.

Maintenance duties include inspection and certification of the floating ferry dock, bird control, re-lamping, periodic painting, maintaining non-skid surfaces, maintaining the barge fendering system, quarterly safety inspections, and correcting routine and urgent maintenance discrepancies that may arise from time to time. It is estimated that two FTE's will be required to fulfill all maintenance tasks.

King County Management and Support

A number of organizational units within King County are likely to be involved to some degree in support of both the set-up of the Ferry District, including development of an interagency agreement with Kitsap County for the Southworth portion of the service, and ongoing management of the service. An array of King County services – including central government (the County Executive and Council, budget office, and other central services), financial services, DOT administration, and human resources – will be charged to the waterborne transit program based on total expense or staffing levels. An estimate has been made of the likely overall staff impact, measured in full time equivalents. Approximately four and a half FTE's are anticipated during the first year start-up period and two FTE's on an ongoing basis. In addition, one FTE is expected to be required on an ongoing basis to oversee the capital program.

Additional labor will be required during program start-up to support vessel procurement and terminal improvements. This has been included in the capital costs for vessels (design, procurement, etc.) and terminals (design, engineering, permitting, etc.).

WSF Administrative Services

Washington State Ferries is expected to incur costs for indirect services such as labor negotiations, dispatch, crew training, payroll, and administrative services. WSF will likely apply an overhead charge to the direct vessel and terminal costs to account for these indirect costs. It is assumed that the overhead charge will not exceed the current rate WSF uses to distribute management and support charges to their other ferry routes.

A.2.4 Proposed Route

The triangle route is the route alternative preferred by King County. It serves terminals in Downtown Seattle, the north end of Vashon Island, and Southworth. To provide priority for Vashon Island residents, it is expected that the triangle route would operate in a counter-clockwise direction in the morning and a clockwise direction in the afternoon.

Establishment of service to Southworth is dependent upon the construction of suitable terminal facilities, projected to be completed between 2012 and 2013. Prior to that, service would be between Vashon Island and Downtown Seattle only.

Ridership Forecasts

Historic data has shown a steady decline in ridership on the current Vashon-Seattle passenger-only ferry. WSF generally tracks ridership in the westbound direction only (the direction in which riders pay). The majority of westbound travel occurs in the afternoon peak period. To date, 2006 PM peak ridership from Seattle has been

approximately 270 riders per day, with only two afternoon sailings from Seattle. This is down from approximately 330 PM peak riders in 2003 and 420 PM peak riders in 2001, with three sailings in the PM peak (out of a total daily sailing schedule of approximately eight round-trips). In addition to service cuts in 2005, there have been steady fare increases since 2001 of between 13% and 4% per year.

Total ridership on the current passenger-only ferry is partially composed of riders originating from Vashon Island and partially composed of riders originating from Southworth and transferring from the WSF Southworth-Vashon auto-ferry. Based on counts conducted by WSF in September 2006, the split is approximately 65% Vashon riders and 35% Southworth riders. Use of the current passenger-only ferry by Southworth riders is dependent on a convenient timed transfer between the Southworth-Vashon auto-ferry and the passenger-only ferry. A triangle route serving both Vashon and Southworth would eliminate this issue, maximizing ridership from Southworth and tapping potential latent demand.

Based on Puget Sound Regional Council projections, the population of South Kitsap County is anticipated to grow approximately 15% between 2006 and 2020, and the population of Vashon Island is anticipated to grow close to 2% during that same period.

Given the uncertainties surrounding ridership growth, a conservative approach has been taken to estimate future ridership. For the purpose of this business plan, ridership is assumed to grow proportionately to projected population growth in Vashon Island and South Kitsap County and fare levels consistent with the fares currently charged by WSF have been assumed. Note that the ridership estimate for 2010 reflects continued operation of the direct Vashon-Downtown Seattle route prior to the completion of the new passenger-only ferry docking facility in Southworth in 2012.

Triangle Route PM Peak Ridership			
	2010	**2015**	**2020**
Vashon Riders	242	244	245
Southworth Riders	42	147	157
Total Riders	284	391	402

Actual ridership could be lower or higher. Historic ridership has shown a decline in ridership that has corresponded with increases in fares and decreases in levels of service. Improved service levels, as proposed in this business plan, could increase ridership above projected levels. If the Ferry District chose to lower fares, this measure could also potentially increase ridership, possibly resulting in a net improvement in farebox recovery. Sensitivity tests were conducted on different ridership scenarios to ensure that all likely ridership levels could be accommodated with the assumed 250-passenger vessel capacity.

A.2.5 Passenger Terminal Facilities

The Ferry District is expected to lease the existing passenger-only ferry facilities in Seattle and Vashon from WSF, as well as share the use of certain facilities at Southworth. The Ferry District is expected to have the option of leasing exclusive use of the dedicated passenger-only ferry facilities, and shared use of facilities that are currently shared by passenger-only ferry and auto-ferry passengers (e.g., the terminal buildings at the Vashon and Southworth terminals). It is also expected that any facilities used by the Ferry District for the Vashon Island route

can be utilized by other Ferry District waterborne transportation services, such as use of the Downtown Seattle terminal by the Elliott Bay Water Taxi.

Lease costs would reflect WSF's ongoing operating costs, but would not reflect any recovery of capital costs. The lease arrangement is expected to include passenger-only terminal operations duties such as docking the ferry, assisting passengers on and off the vessel (including ADA passengers), terminal janitorial services (including pest control, grounds and bird control/cleanup), utilities, and correcting maintenance discrepancies.

Interim Seattle Improvements

The existing Pier 50 ferry dock requires near-term improvements to ensure operation until such time as Colman Dock is redeveloped and operational. The existing steel barge float at Pier 50 needs to be replaced. The float has reached the end of its useful life and may pose a capital cost risk.

A new concrete passenger-only ferry float will be constructed at Pier 50 to replace the existing steel float. The float will be designed in concert with the procurement of the new passenger-only ferry vessels to ensure compatibility and resolve accessibility non-compliance with the gangplank (vessel to float personnel transfer). Minor terminal building improvements are needed. These improvements consist of replacing the tension fabric of the passenger waiting area tent to extend the useful life of the fabric structure pending the Colman Dock redevelopment project.

New Facility in Conjunction with Colman Dock and Waterfront Redevelopment

The current passenger-only ferry terminal facility will be impacted by the planned expansion of Colman Dock. The Ferry District is expected to participate in the design of suitable passenger-only terminal facilities to be included in the redeveloped Colman Dock. The new float and gangway will be re-used in the Colman Dock redevelopment. WSF will be responsible for ensuring that there are no service disruptions to the passenger-only ferry as a result of the terminal construction.

Vashon Island Improvements

The existing "gangplank" (ramp from the ferry dock to the ferry boat) does not meet draft accessibility guidelines for passenger vessels.[2] Accessibility improvements to the gangplank from the new passenger-only ferry vessels to the existing float will be required in conjunction with the procurement and final configuration of the new passenger-only ferry vessels. It is assumed that environmental and permitting requirements will be minimal. No other major improvements are needed.

Southworth Facilities and Improvements

The triangle route will require construction of a new passenger-only ferry docking facility at Southworth. It is assumed that this facility will be constructed as an extension off of the existing WSF auto-ferry terminal. The new passenger-only ferry facility would include a concrete float, gangway, concrete pier, lighting, and expansion of the existing passenger terminal. The existing terminal building and pier would be extended south over the water to provide additional space for passenger-only ferry riders to wait without disrupting the WSF auto-ferry operation. Passenger-only ferry riders would exit the pier extension on a new walkway constructed along the perimeter of the existing terminal building to provide separation of passengers coming and going to the auto-ferries. Development of the new dock is anticipated to take at least three to five years, including planning, permitting, and construction. Extensive environmental study is anticipated, including an Environmental Impact Statement and a review of

2 *Draft Passenger Vessel Accessibility Guidelines and Supplementary Information dated July 7, 2006.*

impacts to endangered species under the Endangered Species Act (ESA). Permitting is expected to include environmental assessments such as the Corps of Engineers section 404 and the Shoreline Act.

The current upland transit facilities at Southworth may not be adequate to support the proposed triangle passenger-only ferry route. Additional parking demands are also anticipated. Kitsap Transit and WSF will be responsible for accommodating demand for transit service and park and ride use.

A.2.6 Passenger Rates

The estimated passenger fares (2006 dollars) for the triangle route are the same as WSF's current fares for the Vashon-Seattle passenger-only ferry route (the one exception is that no bicycle surcharge is proposed). These fare rates have been used as the planning assumption for this business plan. Actual rates will be set by the Ferry District as part of the development of Ferry District fare policies. It has been assumed that fares will be collected by WSF staff at the Seattle terminal in the westbound direction.

Rates identified for this business plan are detailed in the following table.

Triangle Route Fares		
Fare Type	**Fare**	**Percentage of Riders**
Full Adult Fare	$8.50	22%
Commuter Ticket	$7.20	53%
Monthly Pass	$116.20 per month, approximately $5.81 per trip	17%
Senior/Disabled	$4.25	4%
Youth (6-18)	$7.20	4%
Average Fare Realization	*$7.13*	

For business plan purposes, King County Metro passes and transfers have not been considered valid towards the cost of the passenger-only ferry fare, though it is recognized that the Ferry District may wish to consider this option further.

Note that in the pro forma financial statement, these 2006 rates have been inflated on an annual basis using the Implicit Price Deflator (IPD) for the purpose of calculating forecast fare revenue.

A.2.7 Anticipated Federal and Local Funding

Federal Funds

Currently available federal funds include approximately $700,000 from a 2004 congressional earmark and a 2006 congressional earmark of approximately $1.1 million that has been granted and obligated.

With respect to future funding, potential sources and levels of federal grant funds available for the triangle route have been identified. These include Section 7 fixed guideway funds, Section 9 modernization and capital investment funds, and the Ferry Boat Discretionary Fund. Future federal funding estimates included in this business plan are speculative and most grants are likely to be subject to regional and national competition.

State Funds

Subject to legislative appropriation, state funds are available from the passenger ferry account established by ESSB 6787 and funded by the sale of the *Chinook* and *Snohomish*. Marine surveys of these two vessels are not yet complete, but previous estimates of the value of the vessels have ranged between $3.0 and $4.9 million each. The financial forecast accompanying this business plan assumes that the entire proceeds from the *Chinook* and *Snohomish* will be appropriated to the Ferry District for the triangle route. The Washington State Department of Transportation has also been directed to establish a discretionary grants program to help support passenger-only ferry service. The future of this program is dependent on legislative action and available funding.

As a provision of this business plan, the State and/or Kitsap County is expected to ensure that the new Southworth passenger-only ferry terminal facility is fully funded. The State is also expected to provide funding for any terminal improvements at Vashon or Seattle that are not otherwise paid for with federal funds or other outside funding sources.

Kitsap County

This business plan assumes that all capital costs for the new passenger-only ferry terminal facility at Southworth will be funded by the State and/or Kitsap County. Kitsap County may also contribute to other funding needs, potentially including Seattle terminal capital contributions and subsidy of on-going operating costs.

Fare Revenue

Projected annual fare revenue for the triangle route is summarized in the following table. For planning purposes, the fare revenue assumptions are based on WSF's current fare rates and fare structure; actual fare rates and structure will be determined by the Ferry District following additional financial planning.

For the purpose of this business plan estimate, the 2006 average fare realization of $7.13 has been increased annually over the planning period at the same rate as inflation, using the Implicit Price Deflator (IPD) rate. Note that the revenue estimate for 2010 reflects anticipated ridership during continued operation of the direct Vashon-Downtown Seattle route prior to the completion of the new passenger-only ferry docking facility in Southworth in 2012.

Triangle Route Annual Fare Revenue			
	2010	**2015**	**2020**
Vashon Riders	$472,000	$523,000	$579,000
Southworth Riders	$81,000	$316,000	$369,000
Total Riders	$553,000	$839,000	$948,000

Property Tax Receipts

A major source of revenue for both operations and the capital investment plan will be Ferry District tax revenues collected through a property tax levy on land within the ferry district. Up to $0.75 per $1,000 of assessed valuation is allowed for ferry districts. The levy rate will be established at a level that allows the Ferry District to subsidize the cost of operations and to fund that portion of the capital investment program that is not funded by state and federal grants.

Based on the capital funding assumptions and other cost and revenue projections in this business plan, the assessed rate would be $0.0162 per $1,000 of assessed property value. Note that this levy rate is for support of the triangle route only. The actual levy rate to support multiple Ferry District services would be higher.

Advertising

Advertising on the vessels is expected to provide additional operating revenue, estimated at $25,000 per year (2008 dollars).

A.2.8 Coordination with Washington State Ferries

At least in the near-term, vessel operations and terminal operations and maintenance are expected to be contracted to Washington State Ferries, under King County DOT management. This arrangement will enable the Ferry District to benefit from WSF's existing expertise, workforce, and economy of scale. In the long-term, the service could be migrated to in-house operation at the Ferry District's direction.

An agreement will need to be established with Washington State Ferries for their vessel and terminal related duties. The agreement will define the operating responsibilities of Washington State Ferries, which will include meeting all regulatory requirements and providing vessel operations, labor negotiations, dispatch, crew training, security, daily onboard and terminal maintenance, fare collection, management of passenger staging and boarding, revenue collection, and payroll responsibilities. Additionally, protocols for notification, communication, contract management, and coordination will be carefully delineated. The commitment of resources to develop the contract will be significant for both parties as the details of how each necessary function will be deployed and coordinated are defined.

With operating hours and performance standards identified in the contract, actual daily operations will occur without the routine involvement of Ferry District or King County DOT staff. However, it is expected that a Ferry District or King County waterborne transit program manager will coordinate a number of regular functions with WSF such as service scheduling (to ensure that the corresponding crew scheduling and dispatch arrangements are made), customer service complaints and requests, service disruptions, and identification of maintenance needs. For terminal maintenance, a maintenance plan will be required that defines maintenance standards, activities, and responsibilities. This plan will also include an annual maintenance budget forming the basis for cost reimbursement. Service and fare coordination with WSF will be required as well.

A.2.9 Coordination with Existing Transit Providers

The Ferry District will coordinate with King County Metro Transit regarding bus transit services that impact and are impacted by the passenger-only ferry schedule. On Vashon Island, there are currently two routes that serve the Vashon ferry terminal: KCM 118 and KCM 119. Consideration will be given to modifying the service schedules to provide a timed transfer to all passenger-only ferry sailings.

Many walk-on passengers heading to Seattle from Vashon and Southworth who do not use the passenger-only ferry take the WSF auto-ferry to Fauntleroy and transfer to a King County Metro bus. The frequency and timing of service for the passenger-only ferry and the bus routes serving Fauntleroy will be managed together to optimize customer service and overall cost effectiveness.

At Southworth, the Ferry District will need to coordinate with Kitsap Transit regarding provision of additional bus transit service to the ferry terminal. This service will need to be conveniently timed for riders who wish to use the passenger-only triangle route.

A.2.10 Long-Term Operation and Maintenance Needs

Long-Term Vessel Needs

Between 2008 and 2020, ridership on the route is not anticipated to exceed the capacity of one 250-passenger vessel providing three peak period, peak direction trips per weekday. However, if actual ridership is higher than projected and overload conditions occur, several solutions are available:

- Accept the overload conditions for the short-term.
- Institute a ticket allocation and quota system to manage the number of riders from each destination.
- Increase the number of sailings by using the back-up 250-passenger vessel for regular service.

It is not expected that ridership demand would require the purchase of a third vessel under any likely growth scenario within the planning horizon of 2020.

It is assumed that the new vessels purchased will have a lifespan of approximately 25 years. After approximately 12 to 15 years of service, the vessels will need to be re-engined. Other vessel maintenance needs are identified under the Vessel Maintenance Labor section.

Long-Term Terminal Maintenance

Historically, WSF has performed periodic inspections of their passenger-only ferry facilities to identify and anticipate critical maintenance. In recent years, WSF's future in the passenger-only ferry business has been uncertain, and only the most critical maintenance needs have been addressed. Once the Ferry District assumes responsibility for the service, a higher level of regular annual maintenance will be performed with a more long-term outlook in mind.

Assuming a new concrete float is built for the Seattle passenger-only ferry terminal and a new dock constructed at Southworth, it is anticipated that the only foreseeable long-term terminal maintenance infrastructure concern would occur sometime after 2020. The passenger-only ferry pier extension, concrete float, and steel gangway (ramp from pier to float) at Vashon Island were put in service in 1990. The steel gangway at Pier 50 in Seattle was put in service in 1998. With regular maintenance, those structures are anticipated to last from 30 to 50 years. Therefore, replacement of any of the major facility components would likely not be needed until after 2020.

A.3 Triangle Route Financial Plan

This financial plan provides estimated capital costs and funding, annual operating costs and revenue, and a pro forma financial statement through 2020 for operation of the triangle route. Financial forecasts are premised upon assumption of the service in July 2008, with Vashon-Seattle operations beginning in July 2008 and expansion to Southworth occurring in 2012.

A.3.1 Capital Costs and Funding

Triangle route capital costs and estimates of funding for the route's capital program have been developed based on the following assumptions.

Vessel-Related Costs

Vessels

The base price of a 250-passenger capacity, 30 knot, 97 foot ferry was established through a survey of market prices for new construction. Based on this survey, $6 million per vessel in 2006 dollars is assumed. Design and procurement costs are assumed to be 20% of shipyard costs ($1.2 million per vessel). Note that the salvage value of the vessels after 25 years is likely to be roughly 20% of the initial shipyard cost ($2.4 million total for the two assumed vessels).

While new vessels are being procured, it is assumed that the Ferry District will lease two 149-passenger vessels. Based on industry experience, the lease rate will be approximately 18% of the vessels' capital cost. An annual lease rate of $540,000 per vessel is assumed.

Moorage Tie-Up

The annual costs of moorage have been estimated based on Port of Seattle rates for the south end of Harbor Island, which are currently $11.24 per foot plus utilities. Annual moorage expenses have been projected using an assumed boat length of 97 feet plus an additional 15% for utilities and other costs. Total annual estimated costs are approximately $15,000 per vessel.

Major Vessel Maintenance

The cost of mid cycle re-engining, estimated at $1.2 million per vessel in current dollars, has been amortized and classified as a capital cost.

Terminal Costs

Terminal rehabilitation and new construction costs have been estimated in 2006 using current industry experience. Recognizing current cost escalation experience in the marine construction industry, a cost escalation factor has been applied of 10% in 2007 and 5% each year thereafter. The capital expenditures identified for Seattle take into account the need to replace the existing steel float within the next three to four years, accessibility upgrades, and the major reconstruction planned at Colman Dock. At Vashon, the need for capital funds for accessibility upgrades has been identified. For Southworth, costs assume that a complete passenger-only landing facility will be constructed, and the existing WSF passenger terminal expanded by approximately 25% for passenger staging.

State Grants

It is assumed that the entire net proceeds from the sale of the *Chinook* and *Snohomish* will be appropriated to the Ferry District for the triangle route from the State's passenger ferry account. Marine surveys of these two vessels are not yet complete but previous estimates of the value of the vessels have ranged between $3.0 and $4.9 million each. The financial forecast assumes a value of $4.5 million for each vessel less sales and survey costs of slightly greater than 5%.

This business plan is predicated on the State and/or Kitsap County funding the construction of a new passenger-only ferry facility in Southworth (shown as both a cost and recovery in the analysis). The Ferry District will also expect the State to provide funding as needed to cover the difference between federal funding and the total cost of the Vashon and Seattle terminal improvements. State funding for the Vashon and Seattle terminals has not been included in the financial analysis.

Federal Grants

Currently available federal funds include approximately $700,000 from a 2004 congressional earmark and a 2006 congressional earmark of approximately $1.1 million that has been granted and obligated.

Assuming that the Vashon-Seattle route will not be considered a new start-up by FTA as a result of the Ferry District assuming responsibility for the service, and treating the additional miles added to expand the route to Southworth as a new start-up, the Vashon-Seattle portion of the service is expected to qualify for Section 7 funds as a fixed guideway route at the beginning of the next funding cycle in 2011 (although it is possible that the current earned allocation could be made available by the State to the Ferry District immediately upon assumption of the service) and the Southworth related miles will be included in the formula seven years later. These funds are allocated largely by formula for use in capital investments and have been estimated using forecast ridership, distance, service levels, and operating costs. This business plan assumes there will be an available mechanism for the Ferry District to make use of federal capital grant funds to subsidize operations and repay bond debt. A 5% discount has been applied for the cost of converting the capital grants to local operating funds. The business plan takes a conservative approach and does not assume receipt of any new federal competitive or earmark grants such as those available through Section 9 modernization and capital investment or the Ferry Boat Discretionary Fund.

Other County Financial Participation

Kitsap County could potentially provide financial support for construction of terminal improvements in Downtown Seattle, and subsidize a portion of the service operating costs. No financial participation from Kitsap County in subsidizing Downtown Seattle terminal improvement costs or route operating costs has been assumed in this business plan.

Capital Cost and Funding Summary

The following table provides a summary of the anticipated capital costs and funding for the service in 2008 dollars. The net capital shortfall identified in the table would be recovered through long-term debt.

Triangle Route Capital Costs and Funding		
Capital Costs	Vessels (Lease, Purchase, and Major Maintenance)	$22.6 million
	Seattle Terminal (Near-term)	$9.2 million
	Seattle Terminal (Colman Dock Expansion)	$8.4 million
	Vashon Island Terminal	$0.6 million
	Southworth Terminal	$17.2 million
	Overnight Moorage	$0.4 million
	Administrative (KC)	$3.5 million
	Total Capital Costs	**$61.9 million**
Funding	State Passenger Ferry Account (Proceeds from Sale of Chinook Class Vessels)	$8.5 million
	Other State and Local Government Funding (for the Southworth Terminal Facility)	$17.2 million
	Existing Federal Grants	$1.8 million
	Forecasted Federal Grants (Formula Earned Share Allocation Only)	$13.4 million
	Total Funding	**$40.9 million**
	Net Capital Surplus/(Shortfall)	**($21.0 million)**

A.3.2 Annual Operating Costs and Revenue

Triangle route annual operating costs and estimates of annual revenue have been developed based on the following assumptions.

Vessel Operating Costs

Labor

WSF 2007 weighted labor rates and overtime, plus special pay experience factors, were applied to a four person deck configuration that includes one master, one mate, one able-bodied seaman, and one ordinary seamen. The weighted labor rates account for the costs of vacation relief and temporary crew replacement. In addition, the MEBA contract specifies an oiler (engineer class) be assigned to the passenger-only ferries. Currently, WSF budgets a 24 hour engine room day and that same practice is observed in this vessel labor cost calculation. It is estimated that an engineer would need to devote approximately eight hours per week to deal with vessel maintenance and the associated paperwork for the passenger-only service.

Fuel

The current fuel price of $2.73 per gallon has been applied to the estimated fuel consumption for the 250-passenger capacity ferries.

Maintenance

Vessel maintenance costs were initially estimated using industry experience regarding maintenance of vessels of like size and characteristics. Costs include one week of annual maintenance (bottom cleaning, hull inspection, bottom painting, minor machinery overhauls, etc.) at $30,000 per vessel and three weeks every five to six years for major machinery overhaul and interior furnishings maintenance or replacement at $150,000 per vessel. A factor of approximately 50% has been applied to this estimate to allow for the uncertainty of the actual maintenance arrangements the Ferry District will make for overnight and routine maintenance.

Other

Other costs associated with operation of the vessels include items such as consumables, crew uniforms, communication, insurance, and worker and rider injury claims. These costs have been estimated using WSF's actual 2005 "other" cost experience as a percent of direct vessel costs and applying that ratio to the Ferry District triangle route's forecasted direct vessel operating costs.

Terminal Operating Costs

Labor

Because the passenger-only ferry service will not operate throughout the day, it is anticipated that the terminal services will require a less than full-time workload at each location and that WSF will perform these duties with staff that also support their auto-ferry terminal operations. Twelve hours a day for a ticket taker and one hour a day for a terminal supervisor are assumed for the combined three terminal operation. The WSF 2007 weighted labor rates for these positions are used for the base year calculation.

Maintenance

Terminal maintenance labor and materials will be provided by WSF. WSF expenditure records were reviewed as part of the development of the estimated annual terminal maintenance needs.

It is assumed the Ferry District will take a long-term view toward preservation of the passenger-only ferry capital assets. Regular and annual terminal maintenance needs incorporated into the cost estimate include:

- General clean-up of the passenger-only ferry facility and bird control (daily)
- General inspection for safety and inventory of maintenance needs (annual)
- Replace/repair mooring devices (mooring lines, rubber fenders, etc.) (as-needed)
- Replace/repair non-skid coatings on the decks of the ramps and floats (annual)
- Painting of steel structures and architectural elements (every five to 20 years)
- Inspections of the marine structures (piers, ramps, piling, etc.) (every one to two years)
- Inspections of passenger-only ferry floats and pumping of cells as-needed (twice yearly)

It is not anticipated that the concrete floats would require regular dry-docking for inspection over the course of their 30 to 50 year service life.

Other

Other terminal costs are forecast by calculating WSF's actual fiscal year (FY) 2005 systemwide costs experience for "other" terminal costs as a percent of direct terminal expenses and applying that ratio to the estimated direct terminal cost.

Management and Support Costs

Management and support requirements for the triangle route are composed of King County program management and support duties plus WSF administrative overhead.

King County Management and Support

A number of organizational units within King County are likely to be involved to some degree in support of both the set-up of the Ferry District and ongoing management of the service. An estimate of the likely staff level of effort in FTE's has been generated for each of these units. The additional effort likely to occur in the first year, 2008, is estimated separately from the ongoing level of support. An average staff rate (Business & Finance Officer III - grade 62 mid range - step 6) and a benefit load factor of 35% are applied to the combined total FTE's to estimate start-up and ongoing base costs in 2006 dollars.

Other management and support costs will be incurred from an array of King County services – including central government (the County Executive and Council, budget office, and other central services), financial services, DOT administration, and human resources – and charged to the waterborne transit program based on total expense or staffing levels using cost allocation factors supplied by the budget division. Contractor FTE's are not included in the calculation of those King County administrative charges based on FTE's.

WSF Contractor Overhead

WSF distributes management and support costs to their routes as a percentage of direct operating expenses. In FY 2005, the most recent year for which WSF route statements were available, the systemwide overhead rate was 18.2% of direct expenses. To estimate management overhead charges for contract operations, this overhead rate has been applied to the estimated direct WSF vessel and terminal operating costs to derive a WSF overhead cost for the triangle route.

Fare Revenue

Estimated fare revenue has been calculated based on projected PM peak ridership and an average fare realization of $7.13 per passenger round-trip, in 2006 dollars. This average fare realization is based on current WSF fares for the Vashon Island passenger-only ferry. Ridership is projected to grow in proportion to population growth on Vashon Island and in South Kitsap County. For planning purposes, the 2006 average fare realization of $7.13 has been increased annually over the planning period at the same rate as inflation, using the Implicit Price Deflator (IPD) rate.

Advertising Revenue

There will be opportunities to generate revenue by leasing advertising space onboard the ferry vessels. Potential advertising revenue has been estimated by extrapolating the average monthly advertising revenue collected on the Elliott Bay Water Taxi between May and August 2006 over a 12-month period.

Annual Operating Cost and Revenue Summary

The following table provides a summary of annual operating costs and revenue for the service. These cost and revenue estimates are in 2008 dollars.

Annual Costs and Funding		
Operating Costs	Vessel Operations	$1.91 million
	Terminal Operations	$0.38 million
	Administrative (KC & WSF)	$0.86 million
	Total Annual Operating Costs	**$3.15 million**
Revenues	Fare Revenue	$0.71 million
	Advertising Revenue	$0.03 million
	Total Annual Revenues	**$0.74 million**
	Net Annual Operating Cost Surplus/(Shortfall)	**($2.41 million/year)**

A.3.3 Subsidy

The capital costs and annual operating costs for the triangle route are anticipated to exceed the available capital program funds and annual operating revenue. As a result, an annual subsidy will be required to meet capital and operating funding needs.

Ferry District Tax Receipts

Property taxes may be levied for the Ferry District up to $0.75 per $1,000 of assessed valuation. The exact level to be assessed will be a function of the timing of capital expenditures, ongoing operating subsidies, and the cost of and ability to use bond financing. Without some form of debt financing, front-end capital requirements for the triangle route would dictate a much higher levy rate than would be required in later years to cover operating subsidies and capital replacement requirements. The Ferry District is anticipated to tax at a levy rate that would support other potential passenger-only ferry services in King County. However, for the purpose of developing a business financial plan, a levy rate of $0.0162 per $1,000 of assessed valuation has been identified for support of the Vashon Island service only. This rate would enable the Ferry District to retain a positive cash balance in every year and result in a minimal net cash balance position in 2020. The actual tax rate assessed by the Ferry District is expected to be higher and to support the operation of additional passenger-only ferry services.

Ferry District Funding Required

The following table provides a summary of funding requirements that will be met through Ferry District tax revenue. These estimates are in 2008 dollars.

Triangle Route Ferry District Funding		
Funding Required	Average Net Capital	$2.3 million
	Net Operating	$2.4 million
	Total Average Annual Funding Required	**$4.7 million**
Rates	Required Annual Average Ferry District Funding	$4.7 million/year
	Assessed Rate	$0.0162 per $1,000 of property value

A.3.4 Pro Forma Financial Statement

Cost Basis and Inflation

In most cases, initial cost estimates have been provided in 2006 dollars. A 3.5% inflation factor provided by King County has been used to inflate 2006 costs to 2007 and thereafter the June 2006 forecast for the annual Implicit Price Deflator (IPD) has been used. This inflation factor has been applied to all cost and revenue items.

Depreciation

Although the cost of maintaining and rehabilitating assets to achieve their anticipated useful life have been included, the pro forma financial statement does not account for depreciation nor establish a reserve for replacement of capital assets outside of the 2020 planning horizon.

Bond Funds

A rudimentary approach has been adopted for financing cash flow requirements. First, required cash flow levels have been estimated by creating cost pro forma statements that forecast capital and operating expenditures each year in the thirteen year period. The maximum cash requirement has then been identified and a single bond issuance for the maximum required cash flow level has been assumed in the first net cash shortfall year. This issuance has then been scheduled for repayment over the remaining years in the planning period using a standard repayment schedule. Six percent interest has been assumed. A more tailored bonding approach that may result in lower financing costs would likely be adopted once the proposed ferry service program and available tax revenue levels are more fully understood.

Performance Measures

The range of annual farebox recovery ratios, operating costs per rider, and operating subsidies per rider are provided in the following table. These measures are based on total annual one-way passenger trips and show the range over the planning horizon. Costs are in 2008 dollars.

Triangle Route Performance Measures	
Farebox Recovery Ratio	20% - 27%
Operating Cost per Rider	$14.70 - $19.60
Operating Subsidy per Rider	$10.80 - $15.60

Detailed Pro Forma Financial Statement

The following tables provide a detailed pro forma financial statement based on the assumptions described in the previous sections. The pro forma financial statement is for the years 2008 to 2020.

Triangle Route Pro Forma Financial Statement: Operations

Year		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	Fares	266,000	542,000	553,000	565,000	780,000	799,000	819,000	839,000	859,000	880,000	902,000	925,000	948,000
	Advertising	12,000	25,000	26,000	26,000	26,000	26,000	27,000	27,000	27,000	27,000	28,000	28,000	28,000
Total Operating Revenue		**278,000**	**567,000**	**579,000**	**591,000**	**806,000**	**825,000**	**846,000**	**866,000**	**886,000**	**907,000**	**930,000**	**953,000**	**976,000**
Direct Expenses	Direct Vessel Operating Expenses													
	Labor	290,000	589,000	599,000	792,000	808,000	824,000	840,000	855,000	872,000	888,000	905,000	922,000	940,000
	Fuel	197,000	401,000	408,000	632,000	644,000	657,000	670,000	682,000	695,000	708,000	721,000	735,000	749,000
	Maintenance	87,000	176,000	180,000	363,000	370,000	377,000	385,000	392,000	399,000	407,000	414,000	422,000	430,000
	Other	78,000	159,000	162,000	243,000	248,000	253,000	258,000	263,000	268,000	273,000	278,000	283,000	289,000
	Total	652,000	1,325,000	1,349,000	2,030,000	2,070,000	2,111,000	2,153,000	2,192,000	2,234,000	2,276,000	2,318,000	2,362,000	2,408,000
	Direct Terminal Operating Expenses													
	Labor	39,000	78,000	80,000	81,000	118,000	120,000	123,000	125,000	127,000	130,000	132,000	135,000	137,000
	Maintenance	66,000	134,000	136,000	139,000	226,000	231,000	235,000	240,000	244,000	249,000	253,000	258,000	263,000
	Other	20,000	40,000	41,000	41,000	42,000	43,000	44,000	45,000	46,000	46,000	47,000	48,000	49,000
	Total	125,000	252,000	257,000	261,000	386,000	394,000	402,000	410,000	417,000	425,000	432,000	441,000	449,000
Total Direct Expenses		777,000	1,577,000	1,606,000	2,291,000	2,456,000	2,505,000	2,555,000	2,602,000	2,651,000	2,701,000	2,750,000	2,803,000	2,857,000
Management & Support	King County Management & Support	455,000	298,000	304,000	309,000	315,000	321,000	327,000	332,000	338,000	345,000	351,000	357,000	364,000
	Contractor Overhead Charges	141,000	287,000	291,000	296,000	300,000	305,000	310,000	315,000	319,000	324,000	329,000	335,000	340,000
Total Management & Support		596,000	585,000	595,000	605,000	615,000	626,000	637,000	647,000	657,000	669,000	680,000	692,000	704,000
Total Operating Expenses		**1,373,000**	**2,162,000**	**2,201,000**	**2,896,000**	**3,071,000**	**3,131,000**	**3,192,000**	**3,249,000**	**3,308,000**	**3,370,000**	**3,430,000**	**3,495,000**	**3,561,000**
Net Operating		(1,095,000)	(1,595,000)	(1,622,000)	(2,305,000)	(2,265,000)	(2,306,000)	(2,346,000)	(2,383,000)	(2,422,000)	(2,463,000)	(2,500,000)	(2,542,000)	(2,585,000)
Ferry District Funding Required for Operations		1,095,000	1,595,000	1,622,000	2,305,000	2,265,000	2,306,000	2,346,000	2,383,000	2,422,000	2,463,000	2,500,000	2,542,000	2,585,000
Farebox Recovery		20%	26%	26%	20%	26%	26%	27%	27%	27%	27%	27%	27%	27%
Cost Per Rider		$18.69	$14.69	$14.92	$19.58	$15.37	$15.57	$15.78	$15.97	$16.18	$16.38	$16.59	$16.81	$17.03
Subsidy Per Rider		$14.89	$10.84	$11.00	$15.59	$11.34	$11.47	$11.59	$11.72	$11.84	$11.97	$12.10	$12.23	$12.36

Triangle Route Pro Forma Financial Statement: Capital

Year		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	Ferry District Funding	3,132,000	2,696,000	2,747,000	2,148,000	2,276,000	2,326,000	2,377,000	2,425,000	2,477,000	2,529,000	2,584,000	2,639,000	2,698,000
	State P.F. Account	2,133,000	4,266,000	2,133,000										
	State/Kitsap for Southworth	2,584,000	2,713,000	6,330,000	6,646,000									
	Existing Federal	1,816,000												
	Forecast Federal				1,231,000	1,256,000	1,216,000	1,240,000	1,262,000	1,286,000	1,310,000	1,335,000	1,626,000	1,658,000
	Total Capital Revenue	**9,664,000**	**9,675,000**	**11,209,000**	**10,024,000**	**3,532,000**	**3,542,000**	**3,617,000**	**3,687,000**	**3,763,000**	**3,839,000**	**3,919,000**	**4,265,000**	**4,355,000**
Expenses	Vessels													
	Vessel Lease	568,000	1,154,000	1,175,000										
	Acquisitions	1,284,000	1,304,000	6,639,000	6,768,000									
	Vessel Moorage Lease	12,000	24,000	29,000	35,000	36,000	37,000	37,000	38,000	39,000	39,000	40,000	41,000	42,000
	Major Maintenance	16,000	32,000	207,000	211,000	215,000	219,000	224,000	228,000	232,000	236,000	241,000	245,000	250,000
	Total Vessels	1,880,000	2,514,000	8,050,000	7,014,000	251,000	256,000	261,000	266,000	271,000	275,000	281,000	286,000	292,000
	Terminals													
	Seattle													
	Mod/Rehab	1,058,000	2,115,000	6,679,000										
	New Facility Construction				3,336,000	6,687,000								
	Total Seattle	1,058,000	2,115,000	6,679,000	3,336,000	6,687,000								
	Vashon													
	Mod/Rehab	62,000	548,000											
	Southworth													
	New Facility Construction	2,584,000	2,713,000	6,330,000	6,646,000									
	Total Terminals	3,704,000	5,376,000	13,009,000	9,982,000	6,687,000								
	Management and Support													
	Total	381,000	497,000	1,152,000	1,030,000	527,000	182,000	177,000	172,000	166,000	160,000	153,000	146,000	139,000
	Financing Costs													
	Total				1,565,000	1,439,000	1,306,000	1,165,000	1,015,000	856,000	687,000	507,000	317,000	114,000
	Total Capital Expenditures	**5,965,000**	**8,387,000**	**22,211,000**	**19,591,000**	**8,904,000**	**1,744,000**	**1,603,000**	**1,453,000**	**1,293,000**	**1,122,000**	**941,000**	**749,000**	**545,000**
	Net Capital	**3,700,000**	**1,287,000**	**(11,001,000)**	**(9,566,000)**	**(5,372,000)**	**1,798,000**	**2,014,000**	**2,235,000**	**2,471,000**	**2,717,000**	**2,977,000**	**3,516,000**	**3,811,000**
	Total Operations & Capital Expense	7,336,000	10,549,000	24,410,000	22,487,000	11,977,000	4,875,000	4,793,000	4,700,000	4,600,000	4,491,000	4,372,000	4,244,000	4,106,000
	Total Ferry District Funding	4,225,000	4,290,000	4,368,000	4,453,000	4,544,000	4,632,000	4,722,000	4,808,000	4,898,000	4,990,000	5,085,000	5,182,000	5,283,000
	Total Revenue	11,036,000	11,836,000	13,409,000	12,921,000	6,605,000	6,674,000	6,807,000	6,935,000	7,070,000	7,208,000	7,350,000	7,760,000	7,917,000
	Cash Balance	3,700,000	4,987,000	20,986,000	9,388,000	1,858,000	1,366,000	948,000	601,000	331,000	137,000	25,000	260,000	588,000

A.4 Triangle Route Implementation Plan

Pending acceptance of this business plan, there are a number of critical near-term actions that need to occur in order to ensure timely implementation of the proposed service.

A.4.1 Governance and Funding

A series of governance and funding related actions involving King County and the Ferry District, the State Legislature and the Governor, Washington State Ferries, and Kitsap County are anticipated over the next several years.

Ferry District Formation

Creation of a Ferry District is anticipated by May 2007. The Ferry District may be established before May 2007, in order to allow more time for development of all necessarily policies and required agreements involving King County DOT, WSF, and others to enable transfer of responsibility for the service in July 2008.

Ferry District Actions

A transition period of over a year is anticipated between submission of this business plan and full Ferry District assumption of the Vashon-Seattle portion of the service, with the route being extended to Southworth by approximately 2012, depending upon construction of new passenger-only terminal facilities. Actions to be undertaken by the Ferry District during that period include the following:

- Determination by the Ferry District Board of the Ferry District property tax levy rate. In order to begin receiving tax receipts before July 2008, the tax levy rate needs to be set by November 2007.
- To ensure an accurate estimation of subsidy requirements, it is desirable for the development of all appropriate agreements involving King County, WSF, Kitsap County, and others to occur prior to November 2007. It is anticipated that Ferry District planning and set-up activities for establishing a functional program will begin by April of 2007. Appropriate performance standards and reporting provisions will be established in the agreements to ensure the Board can execute its governing responsibilities.
- If the preceding actions occur as scheduled, Ferry District tax receipts would become available to support capital and operating needs beginning in the first quarter of the 2008 calendar year.
- Arrangement of debt financing to capitalize start-up of the triangle route by July 2008 is expected to occur after determination of the timeline for, and projected cost of, vessel acquisition and needed terminal work.

Once the Ferry District has been established, the ferry service program has been developed, all contracts agreed and implemented, and Ferry District funding has become available, the governance and funding components of the service will have effectively completed the transition to Ferry District provision of the service. This transition is anticipated to be complete in 2008. After the transition is complete, the Ferry District will have prime governance and funding responsibility for the service.

A.4.2 Capital Assets

Vessels

In the near-term, it is anticipated that the WSF vessels *Skagit* and *Kalama* will be replaced by two leased vessels upon assumption of the service by the Ferry District in July 2008. The process of securing the leased vessels will take approximately 12 months and will be started no later than June 2007.

In the longer term, it has been assumed that two new vessels will be procured under a four-year procurement process. This timeline includes one year to define the need, one year to advertise and bid the project, one year to build the boats, and one year for funding and any unforeseen delays. Based on this schedule, the new vessels could come online by 2012.

The vessels will receive major maintenance once a year. The maintenance tasks vary from year to year. Each year there is typically one week worth of major maintenance. Every five to six years there is approximately three weeks worth of maintenance. The Ferry District may request bids from all interested shipyards each year or set up a five-year term contract. Under a term contract arrangement, the Ferry District would select a set of qualified shipyards and then only accept bids from those selected shipyards during the term of the contract. Under either option, the process will take approximately four months from the preparation of the work list to completion of the work.

Terminals

In Seattle, the existing steel float will be replaced with a concrete float after the Ferry District takes over responsibility for the service. The time frame to complete the design, environmental review, and permitting for the new float is estimated to be approximately 12 to 18 months, followed by one year for bidding, float construction, and installation. The process will take place concurrent with the new vessel design, to ensure a close match between the height of the float and the freeboard of the new vessels. The new float should be in place between 2010 and 2011. Depending on WSF's schedule and progress on the reconstruction of Colman Dock, the new concrete float might be installed at its ultimate location, rather than at Pier 50.

Under current plans for the redevelopment of Colman Dock, the planning phase of the redevelopment is to occur through early 2007, the environmental impact process has been started in 2006 and will conclude in 2010, design will happen between 2009 and 2011, permitting will be completed in early 2011, and phased construction will begin in 2011 and conclude in 2016. The replacement of the current facility at Pier 50 with a new passenger-only ferry facility will fit within this timeline. The construction phasing of the auto-ferry portion of the Colman Dock redevelopment should be coordinated with the passenger-only facility improvements.

On Vashon Island, improvements to the gangplank are planned in order to increase accessibility. The design of these alterations will also happen concurrently with the new vessel design. It is estimated that the improvements to the gangplank can be accomplished in approximately 18 months. The new gangplank will be in use by 2012 and may be in use as early as 2010.

Construction of a new passenger-only ferry pier, gangway, float and terminal expansion at Southworth will take approximately three to five years. Extensive environmental study, including an Environmental Impact Statement and preliminary design, should commence immediately in July 2008 and complete in 2010. Detailed design and preparation of construction documents will occur in 2011 with construction completion occurring between 2012 and 2013.

Moorage and Maintenance Facilities

It is expected that it will take three to five months to secure overnight moorage facilities. The process of establishing the contract will be started no later than January 2008.

Alternative B: Direct Route

B.1 Direct Route Service Concept

This section of the business plan provides an overview of the main attributes of the proposed Vashon-Downtown Seattle passenger-only ferry service.

B.1.1 Governance and Funding

The Ferry District will assume responsibility for providing and funding a passenger-only ferry serving Vashon Island and Downtown Seattle. The Ferry District will be responsible for bond financing to cover projected capital costs, as well as for collecting property taxes to subsidize operating costs.

The Ferry District will have overall control over the service and ultimate responsibility for the service. The Ferry District will provide governance and policy making, including fare policies, service planning, and branding and identity, with some of these services assumed to be provided by King County DOT through an appropriate agreement. The Ferry District will also be able to establish partnerships and contractual relationships with other entities as appropriate. In addition, the Ferry District will own principal capital assets (vessel and terminal improvements) that are paid for by the Ferry District and implemented to support the service.

The State is expected to have a role in funding the start-up of the service. It is assumed the State will grant the Ferry District all funds from the proceeds of the sale of the vessels *Chinook* and *Snohomish*. In addition, the State will have ultimate responsibility for funding all terminal improvements.

B.1.2 Operations

Through appropriate agreements, the Ferry District will contract with King County DOT to provide planning, administration, and other services. In turn, King County DOT will contract with WSF to operate the vessels and the terminals for at least the first several years of the service. This arrangement with WSF is the most practical solution

for start-up of the service. In the long-term, the service could migrate to an in-house operation if desired (by the Ferry District directly or by contract with King County).

As the vessel operator, WSF must meet all regulatory requirements and will provide labor negotiations, dispatch, crew training, security, daily onboard vessel maintenance performed by the crew, payroll, and insurance related to vessel operations. As the terminal operator, WSF will provide terminal maintenance and operations, security, and fare collection.

The business plan assumes that a suitable overnight moorage location can be found in King County, and also assumes that major maintenance can be contracted out per current WSF practice. This would need to be confirmed as part of any future operations and implementation planning.

For the purpose of this business plan, it has been assumed that diesel fuel prices will be similar to those currently paid by King County Metro. WSF is expected to provide consumable onboard supplies as part of their operating agreement. The Ferry District would be responsible for any vessel hull insurance if required.

B.1.3 Capital Assets

Vessels

For the purpose of this business plan, it has been assumed that new vessels will be procured and that the use of the WSF vessels *Skagit* and *Kalama* will be discontinued at the time of service assumption. For the first few years (while the new vessels are being constructed), the Ferry District is expected to lease two 149-passenger vessels: one primary and one back-up. It may be possible to continue use of the *Skagit* and *Kalama* for this initial period, however this is not the preferred option.

In the long-term, the new vessels would replace the leased vessels. These will be simple 149-passenger class vessels: side loading from one gangplank, crew-only restroom (the route is short enough that public restrooms are not required, however in certain circumstances the crew restroom could be used), two engines with a two water jet propulsion system, and no food service. Capital costs could potentially be reduced by purchasing only one vessel, but this approach would risk negative impacts to service reliability.

This business plan is based on the existing WSF Chinook class vessels being sold and all proceeds (estimated at $8.5 million net, less sales costs) used to fund the purchase of new vessels and other start-up costs.

Terminals

Washington State Ferries will remain the owner of the existing terminal facilities. Any new capital facilities paid for by the Ferry District will be owned by the Ferry District. The Ferry District will lease use of the terminals. Recovery of any capital costs will not be included in the lease rate.

With respect to operations and maintenance of the terminals, services related to this will be provided by WSF under the appropriate agreements. The Ferry District will pay the marginal operating burden associated with WSF providing passenger-only facility operations and maintenance.

On Vashon Island, the Ferry District will lease exclusive use of the passenger-only ferry pier, gangway, and float, as well as shared use of the terminal building, ADA parking, and transit and pedestrian facilities.

In Seattle, the Ferry District is expected to have the option of leasing exclusive use of Pier 50 (including pier, passenger-only terminal "building," gangway, and float). In the near-term (within two to three years of service initiation) a new concrete float will be purchased to replace the existing steel float at Pier 50 (which has reached the end of its useful life). The terminal facilities for waiting passengers at Pier 50 will be renovated to allow continued use until the redevelopment of Colman Dock occurs. The gangplank (ramp from float to vessel) will be upgraded to comply with accessibility requirements and match the freeboard of the new vessels.

In the long-term, Pier 50 will be impacted by the planned expansion of Colman Dock. The Ferry District is expected to participate in the design a new passenger-only ferry facility as part of the Colman Dock redevelopment. WSF will be responsible for construction and permitting of the new passenger-only terminal. Phased construction of a renovated and expanded Colman Dock is currently anticipated to occur between 2011 and 2016. During construction, WSF will be expected to provide a passenger-only ferry dock that is continuously available for use by the Vashon Island ferry.

B.1.4 Timing

Funding from the Ferry District is anticipated to become available by the first quarter of the 2008 calendar year, at the earliest. Between July 2007 and the end of fiscal year 2008 (June 2008), Washington State Ferries is expected to continue to operate the service consistent with current operations. It is expected that the Governor's operating budget request for WSF operations will include funding to cover passenger-only ferry operations through June 2008. The transitioning of system components from WSF to the Ferry District would begin after taxation revenue becomes available in 2008.

B.2 Direct Route Primary System Components

B.2.1 Hours of Operation

Service will be provided during the weekday morning and afternoon peak periods (6:00 to 9:00 AM and 4:00 to 7:00 PM respectively). Hours of operation for the crew will be 5:30 AM to 9:30 AM and 3:35 PM to 7:35 PM. Hours of operation for the traveling public will be 6:20 AM to 8:50 AM and 4:15 PM to 6:45 PM.

Schedule

The Vashon-Seattle route is expected to have three peak direction sailings in the morning peak period and three peak direction sailings in the afternoon peak period (weekdays only). The first morning sailing would depart at 6:20 AM from Vashon Island, with the last afternoon sailing departing Seattle at 6:15 PM. The crossing time would be approximately 30 minutes – including loading, unloading, and slack time – for a total round-trip time of 60 minutes. Note that the schedule accounts for the time required to load and unload a vessel carrying the maximum number of passengers. Each round-trip schedule also includes six minutes of slack (10%) and conservative estimates have been used for the maneuvering distances and times. The full schedule is listed below.

Direct Vashon-Seattle Route Sailing Schedule	
Vashon to Seattle	Seattle to Vashon
6:20 AM	6:50 AM
7:20 AM*	7:50 AM
8:20 AM	*4:15 PM**
4:45 PM	*5:15 PM**
5:45 PM	*6:15 PM*

**Note that the schedule above is optimized for Vashon riders. The peak direction sailings marked with an asterisk do not support transfer of Southworth riders from the WSF Vashon-Southworth auto-ferry.*

Crew Hours

Based on the service schedule detailed above, the morning shift would begin work at 5:30 AM. The crew would spend 30 minutes checking the boat, warming up the engines, and performing other start-up tasks before getting underway at approximately 6:00 AM. After concluding the morning revenue service, the vessel would return to the mooring berth at approximately 9:00 AM, with the morning shift ending at 9:30 AM. Total labor hours for the morning shift would be four hours.

The afternoon shift would begin work at 3:35 PM, with the crew spending approximately 20 minutes getting ready before heading to the Seattle dock. After concluding the afternoon revenue service, the vessel would deadhead from Vashon to the fuel berth at approximately 6:35 PM. The crew would have 60 minutes to fuel, return to the mooring berth, shutdown the vessel, load fuel and water, unload sewage and garbage, and clean the boat. The evening shift is expected to end at 7:35 PM, for a total of four labor hours.

The total number of daily labor hours for the crew onboard the vessel is not expected to exceed eight hours in two four-hour blocks under normal operating conditions. This schedule could be supported by one full-time crew working a split shift or two part-time crews.

B.2.2 Vessel Needs

For the purpose of this business plan, the purchase of two new 149-passenger vessels has been assumed, with one primary vessel and one back-up vessel. Thirty-knot vessels would be optimum for the planned service schedule. It is anticipated that the vessels will use two engines with a two water jet propulsion system, be side loading with one gangplank, approximately 72 feet in length, and contain a head (restroom) for crew use only. The hulls will be a catamaran configuration constructed of aluminum. Public restrooms and food service are not planned (though a crew restroom will be available that could be used by passengers in an emergency). Fuel consumption is estimated to be approximately 2,640 gallons of No. 2 diesel fuel per week with the planned service schedule based on one vessel in service.

If it proves desirable to avoid the capital cost of a second vessel, it may be possible to lease a back-up vessel for use during scheduled maintenance of the dedicated vessel. However, it is unlikely that it would be possible to have a leased vessel provide back-up service for unscheduled maintenance; when these situations occur riders would need to use the WSF Southworth-Vashon-Fauntleroy auto-ferry and a King County Metro bus as there would be no passenger-only ferry service. If this option is pursued, the primary vessel should have a high level of system

redundancy to provide reliable service. Note that additional redundancy increases the vessel weight, and therefore capital and fuel costs for the vessel.

While the new vessels are being procured, this business plan assumes that the route will be operated using leased vessels. It has been assumed that two 149-passenger, 30 knot vessels will be leased (one primary and one back-up). Vessels with these specifications are readily available.

Although not recommended, it may be possible to lease the WSF vessels *Skagit* and *Kalama* until the new vessels are ready to enter service. Lease costs for these vessels would likely be lower than lease costs for a 149-passenger vessel from an outside shipyard or other vendor. If the 25 knot *Skagit* and *Kalama* were used, it would not be possible to improve the service schedule to three round-trip sailings per peak period until the new vessels were put into service. As 250-passenger vessels, the *Skagit* and *Kalama* have higher crewing and fuel costs than leased 149-passenger vessels. Maintenance costs would also likely be higher and could be significant. These vessels are reaching the end of their useful lives, and already will be likely providing one more year of service than previously anticipated as a result of the Ferry District assuming responsibility for the service in 2008 rather than 2007.

B.2.3 Labor Needs

Labor needs include vessel crew, vessel maintenance, terminal operations staff, terminal maintenance, and management and administration. Through the planning horizon, most labor needs will be contracted to WSF. Exceptions include vessel maintenance, some of which would be contracted to outside shipyards, and management and administration, a portion of which is expected to be provided by King County DOT.

Vessel Crew Configuration

The vessels are projected to operate with three deck crew members onboard. It is anticipated that these crew members will have the following classifications: one master, one mate, and one able-bodied seaman (AB).

The service plan will be based on the part-time shift crewing arrangement permitted by the supplemental MM&P and IBU passenger-only ferry agreements. Some crew members may work only one of the daily shifts, and others may work both shifts each day.

With the planned schedule, it is anticipated that three full-time equivalent deck crew members will be required for vessel operations, plus three full-time equivalent oilers[3] (per WSF practice and the current MEBA labor agreement). Since operations will be contracted to WSF, WSF will handle temporary replacement labor to cover vacation days, sick days, and leave.

Vessel Maintenance Labor

Vessel maintenance consists of three types of maintenance: daily maintenance performed by the crew, overnight maintenance, and major maintenance. Daily maintenance is provided by the crew as part of their regular shift and includes tasks such as loading fuel and water, unloading sewage and garbage, and cleaning the boat. Overnight maintenance occurs at the moorage facility.

3 *The current WSF 250-passenger vessels Skagit and Kalama are assigned an engineer with an oiler classification. However, the more complex WSF passenger-only fast ferries (the Chinook and Snohomish) have been assigned an assistant chief engineer. The new 149-passenger vessels will be faster and therefore more complex than the Skagit and Kalama. It is not clear at this time whether an oiler or assistant chief engineer would be required for the new vessels.*

There are several types of major maintenance. Annually, each vessel will need to be drydocked for bottom cleaning, hull inspection, bottom painting, and minor machinery overhauls. A large number of facilities in the Seattle area can provide this service. The effort will take approximately one week. The back-up vessel will provide service while the primary vessel is in drydock. Every five to six years, the vessel will need a longer maintenance period for major machinery overhaul and interior furnishings maintenance and/or replacement. This greater effort will typically take approximately three weeks.

Terminal Operations Staff

Washington State Ferries will provide staff to collect revenue, manage passenger staging and boarding, and perform routine daily maintenance on-shore, such as janitorial duties, as part of their contracted responsibilities.

Because the passenger-only ferry service will not operate throughout the day, it is anticipated that these terminal services will require a less than full-time workload for all terminal staff. Approximately 1.2 full-time equivalents (FTE's) is the estimated total terminal staff workload. WSF will perform these duties with staff that also support their auto ferry terminal operations, allowing the Ferry District to realize the efficiency of shared terminal staff. Per current WSF practices, it is expected that round-trip fares will be collected at the Seattle terminal from passengers traveling in the westbound direction.

Terminal Maintenance Labor

Operating agreements with WSF will require a thorough maintenance agreement for the passenger-only ferry facilities at Pier 50 and Vashon Island. This agreement will need to identify the level of maintenance required at the piers, gangways, and floats. In addition, this agreement will prioritize all outstanding facility maintenance deficiencies, establish yearly budget goals, and determine a time frame for discrepancy resolution. The maintenance agreement is expected to be updated annually.

Maintenance duties include inspection and certification of the floating ferry dock, bird control, re-lamping, periodic painting, maintaining non-skid surfaces, maintaining the barge fendering system, quarterly safety inspections, and correcting routine and urgent maintenance discrepancies that may arise from time to time. It is estimated that 1.25 FTE's will be required to fulfill all maintenance tasks.

King County Management and Support

A number of organizational units within King County are likely to be involved to some degree in support of both the set-up of the Ferry District and ongoing management of the service. An array of King County services – including central government (the County Executive and Council, budget office, and other central services), financial services, DOT administration, and human resources – will be charged to the waterborne transit program based on total expense or staffing levels. An estimate has been made of the likely overall staff impact, measured in full time equivalents (FTE's). Approximately four FTE's are anticipated during the first year start-up period and two FTE's on an ongoing basis. In addition, one FTE is expected to be required on an ongoing basis to oversee the capital program.

Additional labor will be required during program start-up to support vessel procurement and terminal improvements. This has been included in the capital costs for vessels (design, procurement, etc.) and terminals (design, engineering, permitting, etc.).

WSF Administrative Services

Washington State Ferries is expected to incur costs for indirect services such as labor negotiations, dispatch, crew training, payroll, and administrative services. WSF will likely apply an overhead charge to the direct vessel and terminal costs to account for these indirect costs. It is assumed that the overhead charge will not exceed the current rate WSF uses to distribute management and support charges to their other ferry routes.

B.2.4 Proposed Route

The direct route will serve terminals in Downtown Seattle and the north end of Vashon Island only.

Ridership Forecasts

Historic data has shown a steady decline in ridership on the current Vashon-Seattle passenger-only ferry. WSF generally tracks ridership in the westbound direction only (the direction in which riders pay). The majority of westbound travel occurs in the afternoon peak period. To date, 2006 PM peak ridership from Seattle has been approximately 270 riders per day, with only two afternoon sailings from Seattle. This is down from approximately 330 PM peak riders in 2003 and 420 PM peak riders in 2001, with three sailings in the PM peak (out of a total daily sailing schedule of approximately eight round-trips). In addition to service cuts in 2005, there have been steady fare increases since 2001 of between 13% and 4% per year.

Total ridership on the current passenger-only ferry is partially composed of riders originating on Vashon Island, and partially composed of riders originating in Southworth and transferring from the WSF Southworth-Vashon auto-ferry. Based on counts conducted by WSF in September 2006, the split is approximately 65% Vashon riders and 35% Southworth riders. Use of the passenger-only ferry by Southworth riders is dependent on a convenient timed transfer between the Southworth-Vashon auto-ferry and the passenger-only ferry.

Based on Puget Sound Regional Council projections, the population of South Kitsap County is anticipated to grow approximately 15% between 2006 and 2020, and the population of Vashon Island is anticipated to grow close to 2% during that same period.

Given the uncertainties surrounding ridership growth, a conservative approach has been taken to estimate future ridership. For the purpose of this business plan, ridership is assumed to grow proportionately to projected population growth in Vashon Island and South Kitsap County and fare levels consistent with the fares currently charged by WSF have been assumed. Ridership from Southworth has been adjusted to reflect the number of sailings that would support transfer of Southworth riders from the WSF auto-ferry. With the current WSF sailing schedule and the proposed passenger-only ferry sailing schedule, one PM peak sailing would support transfer of Southworth riders. In addition, the ridership estimate assumes that the Southworth market will be served by a direct Southworth-Seattle WSF auto-ferry after 2015, and that all Southworth-originating passengers would transfer to that service. The Southworth market may be served by a direct Southworth-Seattle service sooner if Kitsap Transit initiates a direct passenger-only ferry.

Direct Route PM Peak Ridership			
	2010	2015	2020
Vashon Riders	242	244	245
Southworth Riders	42	44	0
Total Riders	284	288	245

Actual ridership could be lower or higher. Historic ridership has shown a decline in ridership that has corresponded with increases in fares and decreases in levels of service. Improved service levels, as proposed in this business plan, could increase ridership above projected levels. If the Ferry District chose to lower fares, this measure could also potentially increase ridership, possibly resulting in a net improvement in farebox recovery. External factors could also impact ridership. If WSF changed the schedule of the auto-ferries providing a connection between Vashon Island and Southworth to better coordinate with the passenger-only route, ridership from Southworth could be expected to increase. Sensitivity tests were conducted on different ridership scenarios to ensure that all likely ridership levels could be accommodated with the assumed 149-passenger vessel capacity.

B.2.5 Passenger Terminal Facilities

The Ferry District is expected to lease the passenger-only facilities in Seattle and Vashon Island from WSF. The Ferry District is expected to have the option of leasing exclusive use of the dedicated passenger-only ferry facilities, and shared use of facilities that are currently used by passenger-only ferry and auto-ferry passengers (e.g., the terminal building at Vashon Island). It is also expected that any facilities used by the Ferry District for the Vashon Island route can be utilized by other Ferry District waterborne transportation services, such as use of the Downtown Seattle terminal by the Elliott Bay Water Taxi.

Lease costs are expected to reflect WSF's ongoing operating costs but not reflect any recovery of capital costs. The lease arrangement is expected to include passenger-only terminal operations duties such as docking the ferry, assisting passengers on and off the vessel (including ADA passengers), terminal janitorial service (including pest control, grounds, and bird control/cleanup), utilities, and correcting maintenance discrepancies.

Interim Seattle Improvements

The existing Pier 50 ferry dock requires near-term improvements to ensure operation until such time as Colman Dock is redeveloped and operational. The existing steel barge float at Pier 50 needs to be replaced. The float has reached the end of its useful life and may pose a capital cost risk.

A new concrete passenger-only ferry float will be constructed at Pier 50 to replace the existing steel float. The float will be designed in concert with the procurement of the new passenger-only ferry vessels to ensure compatibility and resolve accessibility non-compliance with the gangplank (vessel to float personnel transfer). Minor terminal building improvements are needed. These improvements consist of replacing the tension fabric of the passenger waiting area tent to extend the useful life of the fabric structure pending the Colman Dock redevelopment project.

New Facility in Conjunction with Colman Dock and Waterfront Redevelopment

The current passenger-only ferry terminal facility will be impacted by the planned expansion of Colman Dock. The Ferry District is expected to participate in the design of suitable passenger-only terminal facilities to be included in

the redeveloped Colman Dock. The new float and gangway will be re-used in the Colman Dock redevelopment. WSF will be responsible for ensuring that there are no service disruptions to the passenger-only ferry as a result of the terminal construction.

Vashon Island Improvements

The existing "gangplank" (ramp from the ferry dock to the ferry boat) does not meet draft accessibility guidelines for passenger vessels.[4] Accessibility improvements to the gangplank from the new passenger-only ferry vessels to the existing float will be required in conjunction with the procurement and final configuration of the new passenger-only ferry vessels. It is assumed that environmental and permitting requirements will be minimal. No other major improvements are needed.

B.2.6 Passenger Rates

The estimate passenger fares (2006 dollars) for the direct route are the same as WSF's current fares for the Vashon-Seattle passenger-only ferry route (the one exception is that no bicycle surcharge is proposed). These fare rates have been used as the planning assumption for this business plan; actual rates will be set by the Ferry District. It has been assumed that fares will be collected by WSF staff at the Seattle terminal in the westbound direction. Rates identified for this business plan are detailed in the following table.

Direct Route Fares		
Fare Type	**Fare**	**Percentage of Riders**
Full Adult Fare	$8.50	22%
Commuter Ticket	$7.20	53%
Monthly Pass	$116.20 per month, approximately $5.81 per trip	17%
Senior/Disabled	$4.25	4%
Youth (6-18)	$7.20	4%
Average Fare Realization	*$7.13*	

For business plan purposes, King County Metro passes and transfers have not been considered valid towards the cost of the passenger-only ferry fare, though it is recognized that the Ferry District may wish to consider this option further.

Note that in the pro forma financial statement, these 2006 rates have been inflated on an annual basis using the Implicit Price Deflator (IPD) for the purpose of calculating forecast fare revenue.

B.2.7 Anticipated Federal and Local Funding

Federal Funds

Currently available federal funds include approximately $700,000 from a 2004 congressional earmark and a 2006 congressional earmark of approximately $1.1 million that has been granted and obligated.

4 *Draft Passenger Vessel Accessibility Guidelines and Supplementary Information dated July 7, 2006.*

With respect to future funding, potential sources and levels of federal grant funds available for the Vashon-Seattle service have been identified. These include Section 7 fixed guideway funds, Section 9 modernization and capital investment funds, and the Ferry Boat Discretionary Fund. Future federal funding estimates included in this business plan are speculative and most grants are likely to be subject to regional and national competition.

State Funds

Subject to legislative appropriation, state funds are available from the passenger ferry account established by ESSB 6787 and funded by the sale of the *Chinook* and *Snohomish*. Marine surveys of these two vessels are not yet complete, but previous estimates of the value of the vessels have ranged between $3.0 and $4.9 million each. The financial forecast accompanying this business plan assumes that the entire proceeds from the *Chinook* and *Snohomish* will be appropriated to the Ferry District for the Vashon-Seattle route. The Washington State Department of Transportation has also been directed to establish a discretionary grants program to help support passenger-only ferry service. The future of this program is dependent on legislative action and available funding.

It is expected that the State would provide funding for any terminal improvements at Vashon or Seattle that are not otherwise paid for with federal funds or other outside funding sources.

Fare Revenue

Projected annual fare revenue for the direct route is summarized in the following table. For planning purposes, the fare revenue assumptions are based on WSF's current fare rates and fare structure; actual fare rates and structure will be determined by the Ferry District following additional financial planning.

For the purpose of this business plan estimate, the 2006 average fare realization of $7.13 has been increased annually over the planning period at the same rate as inflation, using the Implicit Price Deflator (IPD) rate. It is assumed that riders from Southworth will be served with some form of direct service between Southworth and Downtown Seattle prior to 2020, resulting in a loss of revenue from Southworth rider fares at that point.

Direct Route Annual Fare Revenue			
	2010	**2015**	**2020**
Vashon Riders	$472,000	$523,000	$579,000
Southworth Riders	$81,000	$95,000	$0
Total Riders	$553,000	$618,000	$579,000

Property Tax Receipts

A major source of revenue for both operations and the capital investment plan will be Ferry District tax revenues collected through a property tax levy on land within the ferry district. Up to $0.75 per $1,000 of assessed valuation is allowed for ferry districts. The levy rate will be established at a level that allows the Ferry District to subsidize the cost of operations and to fund that portion of the capital investment program that is not funded by state and federal grants.

Based on the capital funding assumptions and other cost and revenue projections in this business plan, the assessed rate would be $0.0100 per $1,000 of assessed property value. Note that this levy rate is for support of the direct route only. The actual levy rate to support multiple Ferry District services would be higher.

Advertising

Advertising on the vessels will provide additional operating revenue, estimated at $25,000 per year (2008 dollars).

B.2.8 Coordination with Washington State Ferries

At least in the near-term, vessel operations and terminal operations and maintenance are expected to be contracted to Washington State Ferries under King County DOT management. This arrangement will enable the Ferry District to benefit from WSF's existing expertise, workforce, and economy of scale. In the long-term, the service could be migrated to in-house operation at the Ferry District's direction.

An agreement will need to be established with Washington State Ferries for their vessel and terminal related duties. The agreement will define the operating responsibilities of Washington State Ferries, which will include meeting all regulatory requirements and providing vessel operations, labor negotiations, dispatch, crew training, security, daily onboard and terminal maintenance, fare collection, management of passenger staging and boarding, revenue collection, and payroll responsibilities. Additionally, protocols for notification, communication, contract management, and coordination will be carefully delineated. The commitment of resources to develop the contract will be significant for both parties as the details of how each necessary function will be deployed and coordinated are defined.

With operating hours and performance standards identified in the contract, actual daily operations will occur without the routine involvement of Ferry District or King County DOT staff. However, it is expected that a Ferry District or King County waterborne transit program manager will coordinate a number or regular functions with WSF such as service scheduling (to ensure that the corresponding crew scheduling and dispatch arrangements are made), customer service complaints and requests, service disruptions, and identification of maintenance needs. For terminal maintenance, a maintenance plan will be required that defines maintenance standards, activities, and responsibilities. This plan will also include an annual maintenance budget forming the basis for cost reimbursement. Coordination will also be required on policy matters such as fare adjustments or schedule changes (to either the passenger-only ferry or WSF auto-ferry services) that may impact the ability of Southworth riders to transfer between the WSF Southworth auto-ferry and the passenger-only ferry.

B.2.9 Coordination with Existing Transit Providers

The Ferry District will coordinate with King County Metro Transit regarding bus transit services that impact and are impacted by the passenger-only ferry schedule. On Vashon Island, there are currently two routes that serve the Vashon ferry terminal: KC 118 and KC 119. Consideration will be given to modifying the service schedules to provide a timed transfer to all passenger-only ferry sailings.

Many walk-on passengers heading to Seattle from Vashon and Southworth who do not use the passenger-only ferry take the WSF auto-ferry to Fauntleroy and transfer to a King County Metro bus. Following Ferry District assumption of the passenger-only ferry, there may be an increase in transit ridership at the Fauntleroy terminal by Southworth riders who can no long make a convenient connection to the passenger-only ferry. There may also be a decrease in transit ridership at the Fauntleroy terminal by Vashon riders who now have access to more conveniently timed passenger-only ferry sailings. The frequency and timing of service for the passenger-only ferry and the bus routes serving Fauntleroy will be managed together to optimize customer service and overall cost effectiveness.

B.2.10 Long-Term Operation and Maintenance Needs

Long-Term Vessel Needs

Between 2008 and 2015, ridership on the route is not anticipated to exceed the capacity of one 149-passenger vessel providing three peak period, peak direction trips per weekday. After 2015, a drop in ridership is expected, when the direct WSF Southworth-Seattle auto-ferry begins operations. However, if actual ridership is higher than projected and overload conditions occur, several solutions are available:

- Accept the overload conditions for the short-term.
- Modify the schedule to encourage Southworth riders to take the Vashon-Fauntleroy auto-ferry and a King County Metro bus rather than the passenger-only ferry.
- Increase the number of sailings by using the back-up 149-passenger vessel for regular service.

This range of solutions provides the Ferry District with flexibility to respond to changing ridership demands. It is not expected that ridership demand would require the purchase of a third vessel under any likely growth scenario within the planning horizon of 2020.

It is assumed that the new vessels purchased will have a lifespan of approximately 25 years. After approximately 12 to 15 years of service, the vessels will need to be re-engined. Other vessel maintenance needs are identified under the Vessel Maintenance Labor section.

Long-Term Terminal Maintenance

Historically, WSF has performed periodic inspections of their passenger-only ferry facilities to identify and anticipate critical maintenance. In recent years, WSF's future in the passenger-only ferry business has been uncertain, and only the most critical maintenance needs have been addressed. Once the Ferry District assumes responsibility for the service, a higher level of regular annual maintenance will be performed with a more long-term outlook in mind.

Assuming a new concrete float is built for the Seattle passenger-only ferry terminal, it is anticipated that the only foreseeable long-term terminal maintenance infrastructure concern would occur sometime after 2020. The passenger-only ferry pier extension, concrete float, and steel gangway (ramp from pier to float) at Vashon Island were put in service in 1990. The steel gangway at Pier 50 in Seattle was put in service in 1998. With regular maintenance, those structures are anticipated to last from 30 to 50 years. Therefore, replacement of any of the major facility components would likely not be needed until after 2020.

B.3 Direct Route Financial Plan

This financial plan provides estimated capital costs, annual operating costs, revenue, and a pro forma financial statement through 2020 for operation of the direct route. Financial forecasts are premised upon assumption of the service in July 2008.

B.3.1 Capital Costs and Funding

Direct route capital costs and estimates of funding for the route's capital program have been developed based on the following assumptions.

Vessel-Related Costs

Vessels

The base price of a 149-passenger capacity, 30 knot, 72 foot ferry was established through a survey of market prices for new construction. Based on this survey, $3 million per vessel in 2006 dollars is assumed. Design and procurement costs are assumed to be 20% of shipyard costs ($600,000 per vessel). Note that the salvage value of the vessels after 25 years is likely to be roughly 20% of the initial shipyard cost ($1.2 million total for the two assumed vessels).

While new vessels are being procured, it is assumed that the Ferry District will lease two 149-passenger vessels. Based on industry experience, the lease rate will be approximately 18% of the vessels' capital cost. An annual lease rate of $540,000 per vessel is assumed.

Moorage Tie-Up

The annual costs of moorage have been estimated based on Port of Seattle rates for the south end of Harbor Island, which are currently $11.24 per foot plus utilities. Annual moorage expenses have been projected using an assumed boat length of 72 feet plus an additional 15% for utilities and other costs. Total annual estimated costs are $11,000 per vessel.

Major Vessel Maintenance

The cost of mid cycle re-engining, estimated at $750,000 per vessel in current dollars, has been amortized and classified as a capital cost.

Terminal Costs

Terminal rehabilitation and new construction costs have been estimated in 2006 using current industry experience. Recognizing current cost escalation experience in the marine construction industry, a cost escalation factor has been applied of 10% in 2007 and 5% each year thereafter. The capital expenditures identified for Seattle take into account the need to replace the existing steel float within the next three to four years, accessibility upgrades, and the major reconstruction planned at Colman Dock. At Vashon, the need for capital funds for accessibility upgrades has been identified.

State Grants

It is assumed that the entire net proceeds from the sale of the *Chinook* and *Snohomish* will be appropriated to the Ferry District for the direct Vashon-Seattle route from the State's passenger ferry account. Marine surveys of these two vessels are not yet complete but previous estimates of the value of the vessels have ranged between $3.0 and $4.9 million each. The financial forecast assumes a value of $4.5 million for each vessel less sales and survey costs of slightly greater than 5%.

The Ferry District will expect the State to provide funding as needed to cover the difference between federal funding and the total cost of the Vashon and Seattle terminal improvements. State funding for the Vashon and Seattle terminals has not been included in the financial plan.

Federal Grants

Currently available federal funds include approximately $700,000 from a 2004 congressional earmark and a 2006 congressional earmark of approximately $1.1 million that has been granted and obligated.

Assuming that the Vashon-Seattle route will not be considered a new start-up by FTA as a result of the Ferry District assuming responsibility for the service, the Vashon-Seattle service is expected to qualify for Section 7 funds as a fixed guideway route at the beginning of the next funding cycle in 2011 (although it is possible that the current earned allocation could be made available by the State to the Ferry District immediately upon assumption of the service). These funds are allocated largely by formula for use in capital investments and have been estimated using forecast ridership, distance, service levels, and operating costs. This business plan assumes there will be an available mechanism for the Ferry District to make use of federal capital grant funds to subsidize operations and repay bond debt. A 5% discount has been applied for the cost of converting the capital grants to local operating funds. The business plan takes a conservative approach and does not assume receipt of any new federal competitive or earmark grants such as those available through Section 9 modernization and capital investment or the Ferry Boat Discretionary Fund.

Capital Cost and Funding Summary

The following table provides a summary of the anticipated capital costs and funding for the service in 2008 dollars. The net capital shortfall identified in the table would be recovered through long-term debt.

Direct Route Capital Costs and Funding		
Capital Costs	Vessels (Lease, Purchase, and Major Maintenance)	$11.4 million
	Seattle Terminal (Near-term)	$9.2 million
	Seattle Terminal (Colman Dock Expansion)	$5.6 million
	Vashon Island Terminal	$0.6 million
	Southworth Terminal	n/a
	Overnight Moorage	$0.3 million
	Administrative (KC)	$2.7 million
	Total Capital Costs	**$29.8 million**
Funding	State Passenger Ferry Account (Proceeds from Sale of Chinook Class Vessels)	$8.5 million
	Existing Federal Grants	$1.8 million
	Forecasted Federal Grants (Formula Earned Share Allocation Only)	$12.9 million
	Total Funding	**$23.2 million**
	Net Capital Surplus/(Shortfall)	**($6.6 million)**

B.3.2 Annual Operating Costs and Revenue

Direct route annual operating costs and estimates of annual revenue have been developed based on the following assumptions.

Vessel Operating Costs

Labor

WSF 2007 weighted labor rates and overtime, plus special pay experience factors, were applied to a three person deck configuration that includes one master, one mate, and one able-bodied seaman. The weighted labor rates account for the costs of vacation relief and temporary crew replacement. Although the envisioned vessel can sail with the lower paid Bos'm rather than the mate, WSF current practice and contract requirement is to use a mate. In addition, the MEBA contract specifies an oiler (engineer class) be assigned to the passenger-only ferries. Currently, WSF budgets a 24 hour engine room day and that same practice is observed in this vessel labor cost calculation. It is estimated that an engineer would need to devote approximately eight hours per week to deal with vessel maintenance and the associated paperwork for the passenger-only service.

Fuel

The current fuel price of $2.73 per gallon has been applied to the estimated fuel consumption for the 149-passenger capacity ferries.

Maintenance

Vessel maintenance costs were initially estimated using industry experience regarding maintenance of vessels of like size and characteristics. Costs include one week of annual maintenance (bottom cleaning, hull inspection, bottom painting, minor machinery overhauls, etc.) at $15,000 per vessel and three weeks every five to six years for major machinery overhaul and interior furnishings maintenance or replacement at $75,000 per vessel. A factor of approximately 50% has been applied to this estimate to allow for the uncertainty of the actual maintenance arrangements the Ferry District will make for overnight and routine maintenance.

Other

Other costs associated with operation of the vessels include items such as consumables, crew uniforms, communication, insurance, and worker and rider injury claims. These costs have been estimated using WSF's actual 2005 "other" cost experience as a percent of direct vessel costs and applying that ratio to the Vashon-Seattle route's forecasted direct vessel operating costs.

Terminal Operating Costs

Labor

Because the passenger-only ferry service will not operate throughout the day, it is anticipated that the terminal services will require a less than full-time workload at each location and that WSF will perform these duties with staff that also support their auto-ferry terminal operations. Eight hours a day for a ticket taker and one hour a day for a terminal supervisor are assumed for the combined terminal operation. The WSF 2007 weighted labor rates for these positions are used for the base year calculation.

Maintenance

Terminal maintenance labor and materials will be provided by WSF. WSF expenditure records were reviewed as part of the development of the estimated annual terminal maintenance needs.

It is assumed the Ferry District will take a long-term view toward preservation of the passenger-only ferry capital assets. Regular and annual terminal maintenance needs incorporated into the cost estimate include:

- General clean-up of the passenger-only ferry facility and bird control (daily)
- General inspection for safety and inventory of maintenance needs (annual)
- Replace/repair mooring devices (mooring lines, rubber fenders, etc.) (as-needed)
- Replace/repair non-skid coatings on the decks of the ramps and floats (annual)
- Painting of steel structures and architectural elements (every five to 20 years)
- Inspections of the marine structures (piers, ramps, piling, etc.) (every one to two years)
- Inspections of passenger-only ferry floats and pumping of cells as-needed (twice yearly)

It is not anticipated that the concrete floats would require regular dry-docking for inspection over the course of their 30 to 50 year service life.

Other

Other terminal costs are forecast by calculating WSF's actual fiscal year (FY) 2005 systemwide costs experience for "other" terminal costs as a percent of direct terminal expenses and applying that ratio to the estimated direct terminal cost.

Management and Support Costs

Management and support requirements for the Vashon-Seattle service are composed of King County program management and support duties plus WSF administrative overhead.

King County Management and Support

A number of organizational units within King County are likely to be involved to some degree in support of both the set-up of the Ferry District and ongoing management of the service. An estimate of the likely staff level of effort in FTE's has been generated for each of these units. The additional effort likely to occur in the first year, 2008, is estimated separately from the ongoing level of support. An average staff rate (Business & Finance Officer III - grade 62 mid range - step 6) and a benefit load factor of 35% are applied to the combined total FTE's to estimate start-up and ongoing base costs in 2006 dollars.

Other management and support costs will be incurred from an array of King County services – including central government (the County Executive and Council, budget office, and other central services), financial services, DOT administration, and human resources – and charged to the waterborne transit program based on total expense or staffing levels using cost allocation factors supplied by the budget division. Contractor FTE's are not included in the calculation of those King County administrative charges based on FTE's.

WSF Contractor Overhead

WSF distributes management and support costs to their routes as a percentage of direct operating expenses. In FY 2005, the most recent year for which WSF route statements were available, the systemwide overhead rate was 18.2% of direct expenses. To estimate management overhead charges for contract operations, this overhead rate has been applied to the estimated direct WSF vessel and terminal operating costs to derive a WSF overhead cost for the Vashon-Seattle ferry service.

Fare Revenue

Estimated fare revenue has been calculated based on projected PM peak ridership and an average fare realization of $7.13 per passenger round-trip, in 2006 dollars. This average fare realization is based on current WSF fares for the Vashon Island passenger-only ferry. Ridership is projected to grow in proportion to population growth on Vashon Island and in South Kitsap County. For planning purposes, the 2006 average fare realization of $7.13 has been increased annually over the planning period at the same rate as inflation, using the Implicit Price Deflator (IPD) rate.

Advertising Revenue

There will be opportunities to generate revenue by leasing advertising space onboard the ferry vessels. Potential advertising revenue has been estimated by extrapolating the average monthly advertising revenue collected on the Elliott Bay Water Taxi between May and August 2006 over a 12-month period.

Annual Operating Cost and Revenue Summary

The following table provides a summary of annual operating costs and revenue for the service. These cost and revenue estimates are in 2008 dollars.

Direct Route Annual Operating Costs and Revenues		
Operating Costs	Vessel Operations	$1.30 million
	Terminal Operations	$0.25 million
	Administrative (KC & WSF)	$0.58 million
	Total Annual Operating Costs	**$2.13 million**
Revenues	Fare Revenue	$0.53 million
	Advertising Revenue	$0.03 million
	Total Annual Revenues	**$0.56 million**
	Net Annual Operating Cost Surplus/(Shortfall)	**($1.57 million/year)**

B.3.3 Subsidy

The capital costs and annual operating costs for the direct route are anticipated to exceed the available capital program funds and annual operating revenue. As a result, an annual subsidy will be required to meet capital and operating funding needs.

Ferry District Tax Receipts

Property taxes may be levied for the Ferry District up to $0.75 per $1,000 of assessed valuation. The exact level to be assessed will be a function of the timing of capital expenditures, ongoing operating subsidies, and the cost of and ability to use bond financing. Without some form of debt financing, front-end capital requirements for the direct route would dictate a higher levy rate than would be required in later years to cover operating subsidies and capital replacement requirements. The Ferry District is anticipated to tax at a levy rate that would support other potential passenger-only ferry services in King County. However, for the purpose of developing a business financial plan, a levy rate of $0.0100 per $1,000 of assessed valuation has been identified for support of the Vashon Island service only. This rate would enable the Ferry District to retain a positive cash balance in every year and result in a minimal net cash balance position in 2020. The actual tax rate assessed by the Ferry District is expected to be higher and to support the operation of additional passenger-only ferry services.

Ferry District Funding Required

The following table provides a summary of funding requirements that will be met through Ferry District tax revenue. These estimates are in 2008 dollars.

Direct Route Ferry District Funding		
Funding Required	Average Net Capital	$0.8 million
	Net Operating	$1.6 million
	Total Average Annual Funding Required	**$2.4 million**
Rates	Required Annual Average Ferry District Funding	$2.4 million/year
	Assessed Rate	$0.0100 per $1,000 of property value

B.3.4 Pro Forma Financial Statement

Cost Basis and Inflation

In most cases, initial cost estimates have been provided in 2006 dollars. A 3.5% inflation factor provided by King County has been used to inflate 2006 costs to 2007 and thereafter the June 2006 forecast for the annual Implicit Price Deflator (IPD) has been used. This inflation factor has been applied to all cost and revenue items.

Depreciation

Although the cost of maintaining and rehabilitating assets to achieve their anticipated useful life have been included, the pro forma financial statement does not account for depreciation nor establish a reserve for replacement of capital assets outside of the 2020 planning horizon.

Bond Funds

A rudimentary approach has been adopted for financing cash flow requirements. First, required cash flow levels have been estimated by creating cost pro forma statements that forecast capital and operating expenditures each year in the thirteen year period. The maximum cash requirement has then been identified and a single bond issuance for the maximum required cash flow level has been assumed in the first net cash shortfall year. This

issuance has then been scheduled for repayment over the remaining years in the planning period using a standard repayment schedule. Six percent interest has been assumed. A more tailored bonding approach that may result in lower financing costs would likely be adopted once the proposed ferry service program and available tax revenue levels are more fully understood.

Performance Measures

The range of annual farebox recovery ratios, operating costs per rider, and operating subsidies per rider are provided in the following table. These measures are based on total annual one-way passenger trips and show the range over the planning horizon. Costs are in 2008 dollars.

Direct Route Performance Measures	
Farebox Recovery Ratio	21% - 27%
Operating Cost per Rider	$14.70 - $20.70
Operating Subsidy per Rider	$10.80 - $16.00

Detailed Pro Forma Financial Statement

The following tables provide a detailed pro forma financial statement based on the assumptions described in the previous sections. The pro forma financial statement is for the years 2008 to 2020.

Direct Route Pro Forma Financial Statement: Operations

Year		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	Fares	266,000	542,000	553,000	565,000	578,000	592,000	605,000	618,000	533,000	544,000	555,000	567,000	579,000
	Advertising	12,000	25,000	26,000	26,000	26,000	26,000	27,000	27,000	27,000	27,000	28,000	28,000	28,000
Total Operating Revenue		**278,000**	**567,000**	**579,000**	**591,000**	**604,000**	**618,000**	**632,000**	**645,000**	**560,000**	**571,000**	**583,000**	**595,000**	**607,000**
Direct Expenses	Direct Vessel Operating Expenses													
	Labor	290,000	589,000	599,000	611,000	623,000	636,000	648,000	660,000	672,000	685,000	698,000	711,000	725,000
	Fuel	197,000	401,000	408,000	416,000	424,000	433,000	441,000	449,000	457,000	466,000	475,000	484,000	493,000
	Maintenance	87,000	176,000	180,000	183,000	187,000	190,000	194,000	198,000	201,000	205,000	209,000	213,000	217,000
	Other	78,000	159,000	162,000	165,000	168,000	171,000	175,000	178,000	181,000	185,000	188,000	192,000	195,000
	Total	652,000	1,325,000	1,349,000	1,375,000	1,402,000	1,430,000	1,458,000	1,485,000	1,511,000	1,541,000	1,570,000	1,600,000	1,630,000
	Direct Terminal Operating Expenses													
	Labor	39,000	78,000	80,000	81,000	83,000	85,000	86,000	88,000	89,000	91,000	93,000	95,000	96,000
	Maintenance	66,000	134,000	136,000	139,000	141,000	144,000	147,000	150,000	153,000	155,000	158,000	161,000	165,000
	Other	20,000	40,000	41,000	41,000	42,000	43,000	44,000	45,000	46,000	46,000	47,000	48,000	49,000
	Total	125,000	252,000	257,000	261,000	266,000	272,000	277,000	283,000	288,000	292,000	298,000	304,000	310,000
Total Direct Expenses		777,000	1,577,000	1,606,000	1,636,000	1,668,000	1,702,000	1,735,000	1,768,000	1,799,000	1,833,000	1,868,000	1,904,000	1,940,000
Management & Support	King County Management & Support	403,000	298,000	304,000	309,000	315,000	320,000	326,000	332,000	338,000	344,000	351,000	357,000	363,000
	Contractor Overhead Charges	141,000	287,000	291,000	296,000	300,000	305,000	310,000	315,000	319,000	324,000	329,000	335,000	340,000
Total Management & Support		544,000	585,000	595,000	605,000	615,000	625,000	636,000	647,000	657,000	668,000	680,000	692,000	703,000
Total Operating Expenses		**1,321,000**	**2,162,000**	**2,201,000**	**2,241,000**	**2,283,000**	**2,327,000**	**2,371,000**	**2,415,000**	**2,456,000**	**2,501,000**	**2,548,000**	**2,596,000**	**2,643,000**
Net Operating		(1,043,000)	(1,595,000)	(1,622,000)	(1,650,000)	(1,679,000)	(1,709,000)	(1,739,000)	(1,770,000)	(1,896,000)	(1,930,000)	(1,965,000)	(2,001,000)	(2,036,000)
Ferry District Funding Required for Operations		1,043,000	1,595,000	1,622,000	1,650,000	1,679,000	1,709,000	1,739,000	1,770,000	1,896,000	1,930,000	1,965,000	2,001,000	2,036,000
Farebox Recovery		21%	26%	26%	26%	26%	27%	27%	27%	23%	23%	23%	23%	23%
Cost Per Rider		$17.98	$14.69	$14.92	$15.15	$15.40	$15.64	$15.88	$16.12	$19.36	$19.68	$20.02	$20.36	$20.71
Subsidy Per Rider		$14.19	$10.84	$10.99	$11.16	$11.32	$11.49	$11.65	$11.81	$14.94	$15.19	$15.44	$15.69	$15.96

Direct Route Pro Forma Financial Statement: Capital

Year		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	Ferry District Funding	1,566,000	1,054,000	1,075,000	1,099,000	1,125,000	1,150,000	1,175,000	1,199,000	1,127,000	1,150,000	1,174,000	1,198,000	1,224,000
	State P.F. Account	2,133,000	4,266,000	2,133,000										
	Existing Federal	1,816,000												
	Forecast Federal				1,231,000	1,256,000	1,216,000	1,240,000	1,262,000	1,286,000	1,310,000	1,335,000	1,360,000	1,387,000
	Total Capital Revenue	**5,515,000**	**5,320,000**	**3,208,000**	**2,330,000**	**2,381,000**	**2,366,000**	**2,415,000**	**2,461,000**	**2,413,000**	**2,460,000**	**2,509,000**	**2,558,000**	**2,611,000**
Expenses	Vessels													
	Vessel Lease	568,000	1,154,000	588,000										
	Acquisitions	632,000	641,000	3,265,000	3,328,000									
	Vessel Moorage Lease	12,000	24,000	24,000	25,000	25,000	26,000	26,000	27,000	27,000	28,000	28,000	29,000	29,000
	Major Maintenance	16,000	32,000	141,000	144,000	147,000	150,000	153,000	156,000	159,000	162,000	165,000	168,000	171,000
	Total Vessels	1,228,000	1,851,000	4,018,000	3,497,000	172,000	176,000	179,000	183,000	186,000	190,000	193,000	197,000	200,000
	Terminals													
	Seattle													
	Mod/Rehab	1,058,000	2,115,000	6,679,000										
	New Facility Construction				2,234,000	4,478,000								
	Total Seattle	1,058,000	2,115,000	6,679,000	2,234,000	4,478,000								
	Vashon													
	Mod/Rehab	62,000	548,000											
	Total Terminals	1,120,000	2,663,000	6,679,000	2,234,000	4,478,000								
	Management and Support													
	Total	220,000	329,000	638,000	442,000	387,000	154,000	151,000	149,000	146,000	143,000	140,000	136,000	132,000
	Financing Costs													
	Total				985,000	906,000	822,000	734,000	639,000	539,000	432,000	319,000	199,000	72,000
	Total Capital Expenditures	**2,568,000**	**4,843,000**	**11,335,000**	**7,158,000**	**5,943,000**	**1,152,000**	**1,064,000**	**971,000**	**871,000**	**765,000**	**652,000**	**532,000**	**404,000**
	Net Capital	**2,947,000**	**477,000**	**(8,127,000)**	**(4,828,000)**	**(3,562,000)**	**1,214,000**	**1,351,000**	**1,490,000**	**1,542,000**	**1,695,000**	**1,857,000**	**2,026,000**	**2,207,000**
Total Operations & Capital Expense		3,889,000	7,005,000	13,536,000	9,399,000	8,226,000	3,479,000	3,435,000	3,386,000	3,327,000	3,266,000	3,200,000	3,128,000	3,047,000
Total Ferry District Funding		2,608,000	2,648,000	2,696,000	2,749,000	2,805,000	2,859,000	2,915,000	2,968,000	3,023,000	3,080,000	3,139,000	3,199,000	3,261,000
Total Revenue		6,835,000	7,482,000	5,408,000	4,570,000	4,665,000	4,693,000	4,786,000	4,874,000	4,870,000	4,962,000	5,057,000	5,153,000	5,255,000
Cash Balance		2,948,000	3,423,000	12,297,000	6,188,000	1,267,000	1,038,000	858,000	723,000	540,000	402,000	314,000	275,000	288,000

B.4 Direct Route Implementation Plan

Pending acceptance of this business plan, there are a number of critical near-term actions that need to occur in order to ensure timely implementation of the proposed service.

B.4.1 Governance and Funding

A series of governance and funding related actions involving King County and the Ferry District, the State Legislature and the Governor, and Washington State Ferries are anticipated over the next several years.

Ferry District Formation

Creation of a Ferry District is anticipated by May 2007. The Ferry District may be established before May 2007, in order to allow more time for development of all necessarily policies and required agreements with King County DOT, WSF, and others to enable transfer of responsibility for the service in July 2008.

Ferry District Actions

A transition period of over a year is anticipated between submission of this business plan and full Ferry District assumption of the direct Vashon-Downtown Seattle service. Actions to be undertaken by the Ferry District during that period include the following:

- Determination by the Ferry District Board of the Ferry District property tax levy rate. In order to begin receiving tax receipts before July 2008, the tax levy rate needs to be set by November 2007.
- To ensure an accurate estimation of subsidy requirements, it is desirable for the development of all appropriate agreements involving King County, WSF, and others to occur prior to November 2007. It is anticipated that Ferry District planning and set-up activities for establishing a functional program will begin by April of 2007. Appropriate performance standards and reporting provisions will be established in the agreements to ensure the Board can execute its governing responsibilities.
- If the preceding actions occur as scheduled, Ferry District tax receipts would become available to support capital and operating needs beginning in the first quarter of the 2008 calendar year.
- Arrangement of debt financing to capitalize start-up of the direct route by July 2008 is expected to occur after determination of the timeline for, and projected cost of, vessel acquisition and needed terminal work.

Once the Ferry District has been established, the ferry service program has been developed, all contracts agreed and implemented, and Ferry District funding has become available, the governance and funding components of the service will have effectively completed the transition to Ferry District provision of the service. This transition is anticipated to be complete in 2008. After the transition is complete, the Ferry District will have prime governance and funding responsibility for the service.

B.4.2 Capital Assets

Vessels

In the near-term, it is anticipated that the WSF vessels *Skagit* and *Kalama* will be replaced by two leased vessels upon assumption of the service by the Ferry District in July 2008. The process of securing the leased vessels will take approximately 12 months and will be started no later than June 2007.

In the longer term, it has been assumed that two new vessels will be procured under a four-year procurement process. This timeline includes one year to define the need, one year to advertise and bid the project, one year to build the boats, and one year for funding and any unforeseen delays. Based on this schedule, the new vessels could come online by 2012.

The vessels will receive major maintenance once a year. The maintenance tasks vary from year to year. Each year there is typically one week worth of major maintenance. Every five to six years there is approximately three weeks worth of maintenance. The Ferry District may request bids from all interested shipyards each year or set up a five-year term contract. Under a term contract arrangement, the Ferry District would select a set of qualified shipyards and then only accept bids from those selected shipyards during the term of the contract. Under either option, the process will take approximately four months from the preparation of the work list to completion of the work.

Terminals

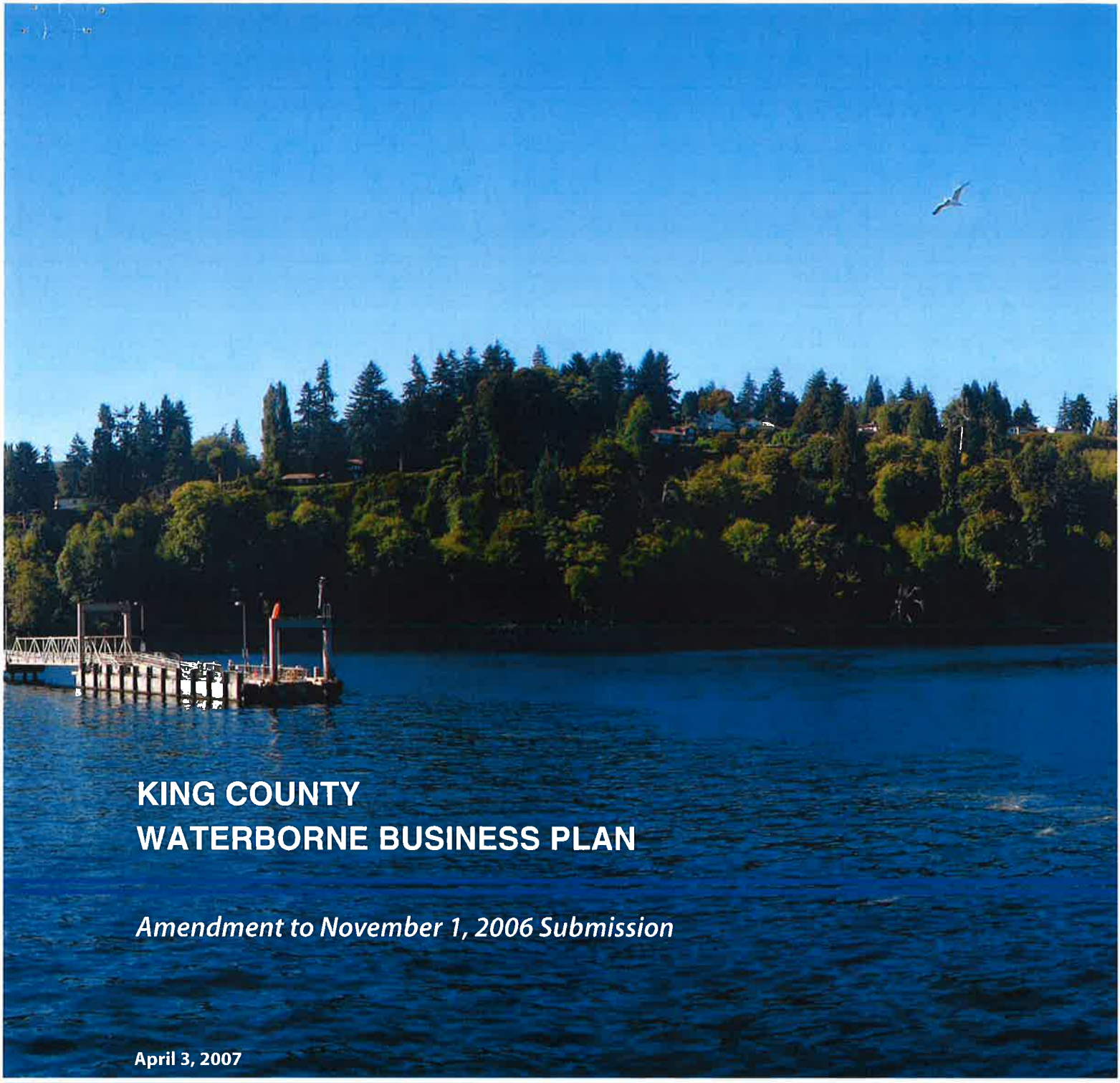
In Seattle, the existing steel float will be replaced with a concrete float after the Ferry District takes over responsibility for the service. The time frame to complete the design, environmental review, and permitting for the new float is estimated to be approximately 12 to 18 months, followed by one year for bidding, float construction, and installation. The process will take place concurrent with the new vessel design, to ensure a close match between the height of the float and the freeboard of the new vessels. The new float should be in place between 2010 and 2011. Depending on WSF's schedule and progress on the reconstruction of Colman Dock, the new concrete float might be installed at its ultimate location, rather than at Pier 50.

Under current plans for the redevelopment of Colman Dock, the planning phase of the redevelopment is to occur through early 2007, the environmental impact process has been started in 2006 and will conclude in 2010, design will happen between 2009 and 2011, permitting will be completed in early 2011, and phased construction will begin in 2011 and conclude in 2016. The replacement of the current facility at Pier 50 with a new passenger-only ferry facility will fit within this timeline. The construction phasing of the auto-ferry portion of the Colman Dock redevelopment should be coordinated with the passenger-only facility improvements.

On Vashon Island, improvements to the gangplank are planned in order to increase accessibility. The design of the accessibility improvements will also happen concurrently with the new vessel design. It is estimated that the improvements to the gangplank can be accomplished in approximately 18 months. The new gangplank will be in use by 2012 and may be in use as early as 2010.

Moorage and Maintenance Facilities

It is expected that it will take three to five months to secure overnight moorage facilities. The process of establishing the contract will be started no later than January 2008.



KING COUNTY
WATERBORNE BUSINESS PLAN

Amendment to November 1, 2006 Submission

April 3, 2007

King County

King County Waterborne Business Plan

Amendment to November 1, 2006 Submission

Introduction

This document presents an amendment to the ***King County Business Plan for the Vashon Island Passenger-Only Ferry*** submitted by King County to the Governor of the State of Washington on November 1, 2006.

Since the original business plan was submitted, King County and the State have had extensive discussions regarding ongoing provision of the Vashon Island passenger-only ferry (POF) service. From those discussions, a revised concept has been identified where King County (through a Ferry District) would provide financial support for the existing Washington State Ferries service from July 1, 2008 through June 30, 2009, and then take over the service as an in-house operation starting July 1, 2009. This document summarizes changes to the November 1 business plan that have resulted from those discussions, focusing on provision of Direct Vashon Island - Seattle Service as documented in Alternative B of the business plan. The remaining business plan parameters and assumptions remain unchanged.

Revised Service Concept

The following presents a summary of King County's revised service concept for assuming the Vashon Island passenger-only direct ferry service between Downtown Seattle and Vashon Island.

1. Governance and Funding

The Ferry District will assume responsibility for providing and funding a passenger-only ferry service between Vashon Island and Downtown Seattle. The Ferry District will be responsible for bond financing to cover projected capital costs, as well as for collecting property taxes to subsidize operating costs.

The Ferry District will have overall control over, and ultimate responsibility for the service. The Ferry District will provide governance and policy making including fare policies, service planning, and branding and identity, with some of these services assumed to be provided by King County DOT through an appropriate agreement. The Ferry District will also be able to establish partnerships and contractual relationships with other entities as appropriate. In addition, the Ferry District will own principal capital assets (vessel and terminal improvements) that are paid for by the Ferry District and implemented to support service.

The State is expected to have a role in funding the start-up of the service. The State is also expected to grant the Ferry District funds from the proceeds of the sale of the vessels Chinook and Snohomish, as well as participate in all identified terminal improvements.

2. Operations

Through appropriate agreements, the Ferry District will contract with King County DOT to provide planning, administration, and other services. In turn, King County DOT will contract with WSF to operate the vessels and the terminals for the period July 1, 2008 through June 30, 2009. As the vessel operator, WSF must meet all regulatory requirements and will provide labor negotiations, dispatch, crew training, security, daily onboard vessel maintenance performed by the crew, payroll, and insurance related to vessel operations. As the terminal operator, WSF will provide terminal maintenance and operations, security, and fare collection.

Beginning July 1, 2009, the Ferry District will contract with King County DOT to operate the vessels. King County will be responsible for hiring the employees necessary to provide in-house operations of the service. The Ferry District will continue to contract with WSF for terminal operations and maintenance at the Vashon Island and Pier 50 terminals on an ongoing basis.

The business plan assumes that a suitable overnight moorage location can be found in King County when the service converts to in-house operation, and also assumes that major maintenance can be contracted out per current WSF practice. This would need to be confirmed as part of any future ferry service operations and implementation planning.

For the purpose of this business plan, it has been assumed that diesel fuel prices will be similar to those currently paid by King County Metro. WSF is expected to provide consumable onboard supplies as part of their operating agreement through June 30, 2009. The Ferry District will be responsible for any vessel hull insurance if required.

3. Capital Assets

VESSELS

For the purpose of this business plan, it has been assumed that new vessels will be procured and that the use of the WSF vessels Skagit and Kalama will be discontinued at the time King County assumes the service in July 2009. Once the service is converted to King County in-house operation, the Ferry District is expected to lease two 149-passenger vessels (one primary and one back-up) for the first few years while new vessels are being procured.

In the long-term, two new vessels (one primary and one back-up) would replace the leased vessels. These will be simple 149-passenger class vessels: side loading from one gangplank, crew-only restroom (the route is short enough that public restrooms are not required, however in certain circumstances the crew restroom could be used), two engines with a two water jet propulsion system, and no food service.

This business plan is based on the existing WSF Chinook class vessels being sold, with all proceeds (estimated at $8.5 million net, less sales costs) used to fund the purchase of new vessels and other start-up costs.

TERMINALS

Washington State Ferries will remain the owner of the existing terminal facilities, although any new capital facilities paid for by the Ferry District will be owned by the Ferry District. The Ferry District will lease use of the terminals. Recovery of any capital costs will not be included in the lease rate. With respect to operations and maintenance of the terminals, services related to this will be provided by WSF under the appropriate agreements. The Ferry District will pay the marginal operating burden associated with WSF providing passenger-only facility operations and maintenance.

On Vashon Island, the Ferry District will lease exclusive use of the passenger-only ferry pier, gangway, and float, as well as share use of the terminal building, ADA parking, and transit and pedestrian facilities.

In Seattle, the Ferry District is expected to have the option of leasing exclusive use of Pier 50 (including pier, passenger-only terminal "building", gangway, and float). In the near-term (within two to three years of service initiation) a new concrete float will be purchased to replace the existing steel float at Pier 50 (which has reached the end of its useful life). The terminal facilities for waiting passengers at Pier 50 will be renovated to allow continued use until the redevelopment of Colman Dock occurs. The gangplank (ramp from float to vessel) will be upgraded to comply with accessibility requirements and match the freeboard of the new vessels.

In the long-term, Pier 50 will be impacted by the planned expansion of Colman Dock. The Ferry District is expected to participate in the design of a new passenger-only ferry facility as part of the Colman Dock redevelopment. WSF will be responsible for construction and permitting of the new passenger-only terminal. During construction, WSF will be expected to provide a passenger-only ferry dock that is continuously available for use by the Vashon Island ferry.

4. Timing

Funding from the Ferry District is anticipated to become available by the first quarter of the 2008 calendar year, at the earliest. Between July 2007 and the end of the fiscal year 2008 (June 2008), Washington State Ferries is expected to continue to operate the service consistent with current operations. It is expected that the Governor's operating budget request for WSF operations will include funding to cover passenger-only ferry operations through June 2008.

Beginning July 2008, the Ferry District will fund and contract with WSF to continue operating the existing service through June 2009. It is expected that WSF will operate the service during this period using the existing WSF vessels Skagit and Kalama, operating under the current service schedule.

Starting July 1, 2009, the Ferry District will assume full responsibility of the Vashon Island passenger-only ferry service. Operational responsibility of the service will transition to King County, who will provide the service through in-house operations under contract to the Ferry District. King County will negotiate new labor agreements with the appropriate unions to take effect on July 1, 2009.

Updated Participation Conditions

The ability for a King County Ferry District to assume responsibility for the Vashon Island passenger-only ferry service is dependent on the following conditions:

- State commitment to operate and fully fund the Seattle-Vashon route through June 30, 2008.
- State commitment to operate the Seattle-Vashon route under contract to the King County Ferry District, maintaining the existing vessels and service levels from July 1, 2008 through June 30, 2009. The service would be funded by the Ferry District but would continue to be branded as a WSF service during this period.
- Ongoing access and use of the Vashon and downtown Seattle passenger-only ferry terminals. This includes continued provision of a downtown Seattle passenger-only ferry terminal in the area of Pier 50 to Pier 52.
- Granting of all proceeds from the sale of the two Chinook class to the Ferry District in January 2008. The expectation is that the State would maximize the sale proceeds.
- Near-term state investment of approximately $350,000 for minor capital improvements to the terminals (e.g., ADA upgrades at Vashon) while negotiations continue regarding more significant capital improvements.
- Extension of the supplemental labor agreements with the Masters, Mates & Pilots union and Inlandboatmen's Union through June 2009.
- Legislative authorization releasing the King County Ferry District from the provisions of the current Washington State Ferries maritime union labor agreements and allowing the Ferry District to negotiate new labor agreements to come in effect when the Ferry District fully assumes the service in July 2009.
- Legislation clarifying that:
    - The Ferry District has the ability to use its property tax revenue to also fund connecting shuttle services and other landside improvements within King County.
    - The Ferry District has the authority to issue bonds and incur debt.
- Authorization to utilize outside shipyards for major vessel maintenance, as well as make use of overnight tie-up and maintenance at a convenient location within King County boundaries.

Revised Business Plan Assumptions

This section presents updated assumptions regarding King County's operation of the direct Vashon Island - Seattle service starting July 1, 2009. The following assumptions, as documented in the November 1 business plan, remain unchanged:

- Hours of Operation
- Vessel Needs
- Vessel Maintenance Labor, Terminal Operations Labor, and Terminal Maintenance Labor
- Proposed Route
- Passenger Terminal Facilities
- Passenger Rates
- Federal Funds, Fare Revenue, Advertising
- Coordination with Existing Transit Providers
- Long-Term Operation and Maintenance Needs
- Capital Costs and Funding
- Vessel Fuel and Maintenance Costs, Terminal Operating and Maintenance Costs, Fare Revenue, Advertising Revenue

Elements of the business plan that have been revised are as follows:

- The Ferry District would assume full responsibility for the service on July 1, 2009, and would contract with King County DOT to crew the vessels using King County employees under a King County labor agreement. For the period July 1, 2008 through June 30, 2009, Washington State Ferries would continue to operate the service with financial assistance from King County.

- The only services that would be contracted on an ongoing basis to Washington State Ferries would be terminal operations and maintenance of facilities owned and/or managed by WSF.

- In-house operation would require organizational capabilities within the Ferry District and King County DOT to manage marine labor including safety and security training, new dispatching and payroll functions, and new worker insurance coverage specialization. Costs identified in the November 2006 business plan have been adjusted accordingly

- Crew costs have been revised to include both a primary and relief crew (both in-house), with the relief crew consisting of an additional master and able bodied seaman. The relief crew does not at this time include an additional oiler position, as the Coast Guard does not require that this position be filled to place the vessel in service.

- The Ferry District levy rate has been adjusted to reflect the revised costs noted above.

Cost Comparison - Direct Route

FINANCIAL COMPARISON

			Original Direct Route Cost Estimate	Revised Direct Route Cost Estimate
Capital Costs and Funding (2008 dollars)	Capital Costs	Vessels (Lease & Purchase)	$11.4 m	$11.4 m
		Seattle Terminal (Near-Term)	$9.2 m	$9.2 m
		Seattle Terminal (Colman Expansion)	$5.6 m	$5.6 m
		Vashon Island Terminal	$0.6 m	$0.6 m
		Overnight Moorage	$0.3 m	$0.3 m
		Administrative	$2.7 m	$2.7 m
		Total Capital Costs	**$29.8 m**	**$29.8 m**
	Funding	State Funding (Sale of Chinook Vessels)	$8.5 m	$8.5 m
		Existing Federal Grants	$1.8 m	$1.8 m
		Potential Federal Grants	$12.9 m	$12.9 m
		Total Funding	**$23.2 m**	**$23.2 m**
		Long-Term Debt	*$6.6 m*	*$6.6 m*
Operating Costs and Funding (2008 dollars)	Operating Costs	Vessel Operations	$1.30 m/yr	$1.51 m/yr
		Terminal Operations	$0.25 m/yr	$0.25 m/yr
		Administrative	$0.58 m/yr	$0.96 m/yr
		Total Operating Costs	**$2.13 m/yr**	**$2.72 m/yr**
	Revenue	Fare Revenue	$0.53 m/yr	$0.53 m/yr
		Advertising Revenue	$0.03 m/yr	$0.03 m/yr
		Total Operating Revenue	**$0.56 m/yr**	**$0.56 m/yr**
		Net Operating Cost Surplus/(Shortfall)	*$1.57 m/yr*	*$2.16 m/yr*
	Funding Required	Average Net Capital	$0.8 m/yr	$0.8 m/yr
		Net Operating	$1.57 m/yr	$2.16 m/yr
		Total Annual Funding Required	**$2.37 m/yr**	**$2.96 m/yr**
Rates Measures		Farebox Recovery Ratio	24%	19%
		Operating Cost per Rider	$14.50	$18.50
		Operating Subsidy per Rider	$10.71	$14.71
		Required Total Ferry District Funding	$2.37 m/yr	$2.96 m/yr
		Assessed Rate (per $1,000 of property value)	$0.0100	$0.0121

APPENDIX

C

King County Passenger-Only Ferry Project Briefing Paper

KING COUNTY PASSENGER-ONLY FERRY PROJECT BRIEFING PAPER

November 7, 2007

King County

Contents

KING COUNTY PASSENGER-ONLY FERRY PROJECT BRIEFING PAPER

Executive Summary

This briefing paper presents a proposed operating, capital investment, and financial plan for the operation and funding of a passenger-only ferry system by King County on behalf of the new King County Ferry District. The plan is presented for Ferry District Board consideration as the Board moves forward with creation of the passenger-only ferry system and determines a levy rate to support that system.

Under this plan, the system would be governed and funded by the Ferry District and operated by King County. Proposed services include assumption of two existing passenger-only ferry routes (the Elliott Bay Water Taxi serving West Seattle to Downtown Seattle, and the Vashon Island route serving Vashon Island to Downtown Seattle), as well as up to five new routes to connect other communities within King County.

For planning purposes, the new routes under consideration include three Lake Washington Routes (Kirkland to Seattle, Kenmore to Seattle, and Renton to Seattle), and two new Puget Sound Routes (South Puget Sound to Seattle and Shilshole to Seattle). These routes are preliminary and have been identified for planning purposes only; the actual routes and implementation timing would be determined by the Ferry District. It has also been assumed that each of these new routes would start as a demonstration service, moving to permanent service if the demonstration proved successful.

The primary purpose of this document is to present the operations and capital investment plans to the level necessary to estimate expected costs, revenues, and a projected property tax levy rate in order to begin funding services in 2008. Senate Bill 6787 authorized King County to submit a business plan for assumption of the Vashon Island route from Washington State Ferries. The County's business plan was accepted by the State in April 2007, with the understanding that the King County Ferry District would begin funding of the service in July 2008 and start in-house operations in July 2009.

The plan summarized in this briefing paper assumes that the Ferry District would establish an agreement with the King County Department of Transportation for the provision of services directly related to the implementation, operation, and day-to-day administration of the system. The Department of Transportation would form a new Marine Division, which would have primary responsibility for the passenger-only ferry services.

The costs generated in this plan for the existing routes were based on extensive preliminary engineering and planning related to the vessels, terminals, and operations proposed. Cost estimates are based on site visits, concept developments, industry research, and local research of the availability of vessels and terminals. The cost estimates incorporate all anticipated administrative costs related to King County's delivery of the service. However, these costs do not include the Ferry District's internal administrative and support costs. Projected costs for the new routes are based on the cost estimates generated for the existing routes.

Based on the analysis summarized in this document, the proposed services could be provided with a levy rate of $0.055 per $1,000 of assessed value. The plan covering both existing and new routes includes total 10-year capital costs of $140.9 million and capital funding of $22.8 million, and total operating costs for the 10-year period of $127.5 million with operating revenue of $19.5 million. Annual operating costs for all seven routes by 2017 would be approximately $19.6 million with $4.0 million in annual operating revenue. The new routes are estimated to cost $1.2 million per year during the demonstration phase and $2.2 million per year per route once they move to in-house operations.

Introduction

The Puget Sound region has a long history of waterborne transportation, with waterways such as the Puget Sound and Lake Washington serving as the first major transportation routes in the area. The prevalence of waterborne transportation declined as major improvements were made in land-based transportation in the early twentieth century. However, in recent years as the roads and highways in the region have increasingly reached full capacity, there has been renewed interest in waterborne transportation, particularly passenger-only ferries.

Starting in 1997, King County operated a passenger-only ferry from West Seattle to Downtown Seattle, called the Elliott Bay Water Taxi. The service has been funded annually and operated on a contracted demonstration basis. Service has been provided most years since 1997, with service limited to the summer months for all years except 2001-2002.

King County began consideration of an increased role in waterborne transportation in 2005, with the publication of the King County *Waterborne Transit Policy Study*. This study included the potential for continuation of the existing Elliott Bay Water Taxi service, as well as the evaluation of potential other routes across Lake Washington, Lake Union, and Puget Sound.

More recently, the County considered assuming operation of the Vashon Island passenger-only ferry from Washington State Ferries (WSF). The 2006 Washington State Legislature enacted Senate Bill 6787, which in part authorized King County to submit a business plan to the Governor for the assumption of the Vashon Island passenger-only ferry. The County submitted a business plan in November 2006, a revised version of which was accepted by the State in April 2007.

On April 30, 2007, a new county-wide Ferry District was formed in King County with a mandate to consider the delivery of passenger-only ferry services serving destinations in King County. The Ferry District is the governing body for the proposed King County passenger-only ferry system and has authority to levy property taxes for the provision and operation of these services. In order to meet the agreed schedule for transfer of the Vashon Island service, the Ferry District would need to make a final determination of the tax levy amount prior to November 30, 2007. The levy rate must cover the needs of the two existing passenger-only ferry routes that the Ferry District would assume responsibility for (Downtown Seattle to Vashon Island and Downtown Seattle to West Seattle), the new routes (five proposed), and land-based shuttles to serve the routes.

Consultant Team

A consultant team was contracted by King County to prepare operational, capital investment, and financial analysis for the proposed passenger-only ferry system. The members of this team have extensive experience in the passenger ferry business, as well as a track record of successful projects for King County dealing with passenger-only ferries.

Firm	Role	Expertise
IBI Group	Prime Consultant, System Planning	Prime consultant on a number of passenger ferry projects for King County since 1999, including the 2005 *Waterborne Transit Policy Study* and the *King County Business Plan for the Vashon Island Passenger-Only Ferry*.

Elliott Bay Design Group	Vessels	Naval architects. Team members each bring over two decades of experience in the marine industry.
Fast Ferry Management	Operations	General Manager for Vallejo Baylink Ferries in the San Francisco Bay Area.
Moffatt & Nichol	Terminals	Led by former Washington State Ferries Manager of Terminal Operations.
Progressions	Finance	Former Washington State Ferries Director of Finance and Administration plus former Washington State Ferries Chief Financial Officer/Deputy Director/three time Acting Director.

Objectives

In support of the implementation of the proposed passenger-only ferry system, the objectives of this briefing paper are to:

1. Outline a robust operations and capital investment plan, and the financial implications of that plan, to enable the King County Ferry District to begin funding the Seattle to Vashon Island service in 2008, assume direct in-house operation of that service in 2009, support ongoing operation of the Elliott Bay Water Taxi, initiate several additional routes, fund connecting shuttle services, and conduct studies of potential routes.

2. Provide financial analysis for the purpose of setting a levy rate by November 30, 2007.

Outline of the Briefing Paper

This briefing paper is divided into five main chapters. The System Overview provides a quick summary of the overall system concept. The Existing Routes Service Plan describes anticipated service parameters for the Vashon Island and Elliott Bay Water Taxi routes. The Existing Routes Operations Plan identifies the main operational assumptions for the Vashon Island service and the Elliott Bay Water Taxi. The Existing Routes Capital Investment Plan provides a description of the facility and vessel investments proposed to support the operational plan for the existing routes.

The New Routes section identifies the assumptions and parameters, operating and capital, that were used to generate an estimate of the financial requirements of these additional services. The Financial Plan summarizes the projected costs and revenues of the two existing routes and five potential new routes, and identifies the levy rate that would be needed to support those services.

System Overview

The King County Ferry District (KCFD) would assume responsibility for the operations of the two existing passenger-only ferry services linking Downtown Seattle to Vashon Island and West Seattle, and would also assume responsibility for up to five new routes which, for the purpose of this plan, include Kirkland to Seattle, South Puget Sound to Seattle, Kenmore to Seattle, Shilshole to Seattle, and Renton to Seattle.

For planning purposes, it has been assumed that the Kirkland route would start service in July 2009, followed by the South Sound route, the Kenmore route, the Shilshole route, and then the Renton route, with a new route

starting each year. Actual routes and implementation timing would be determined by the Ferry District. For planning purposes, it has been assumed that each of these new routes would start with a two-year demonstration period followed by a third year for transition of the route to permanent, in-house service.

All ferry service would be managed by a new King County Marine Division with administrative support coming from various King County agencies and departments. Ferry operations would be conducted with King County owned (or leased) vessels operated and maintained by King County.

The services described in this paper would initially utilize ferry terminal facilities owned by others, and made available for King County use through leases or other cooperative agreements. The KCFD would make capital investments in existing and new facilities as needed.

Existing Routes Service Plan

Routes

The Vashon Island route is 8.12 nautical miles (nm) in length covering the distance from Pier 50 in Seattle to the passenger-only boarding float located at the Washington State Ferry dock facility on the northern end of Vashon Island.

Weather and marine traffic permitting, the route can be run at a service speed of 30 knots, covering the one-way distance in approximately 16 minutes. Allowing 3 minutes of maneuvering time out of Pier 50, and into the Vashon Island berth, the route can comfortably be scheduled for a one-way total trip time of 30 minutes.

The Elliott Bay Water Taxi (EBWT) route is 1.69 nm in length covering the distance from Pier 50 in Seattle to the passenger-only boarding dock currently located at Seacrest Park in West Seattle.

Weather and marine traffic permitting, the route can be run at a service speed of 20 knots, covering the one-way distance in approximately 5 minutes. Allowing 3 minutes of maneuvering time out of Pier 50, and into the West Seattle berth, the route can comfortably be scheduled for a one-way total trip time of 15 minutes.

Schedules

The overall level of service to be provided to Vashon Island and West Seattle would be determined by the KCFD Board. Draft schedules have been prepared based on current levels of service, direction provided by King County Staff, and stated preferred sailing times from surveys conducted on the Vashon passenger-only ferry and the Elliott Bay Water Taxi in August 2007.

Vashon Island

Service would be provided during the weekday morning and afternoon peak periods (approximately 6:00 to 9:00 AM and 4:00 to 7:00 PM respectively). The Vashon Island - Seattle route is expected to have three peak direction sailings in the morning peak period, and three peak direction sailings in the afternoon peak period (weekdays only). The first morning sailing would depart at 6:30 AM from Vashon Island, with the last afternoon sailing departing Seattle at 6:40 PM. A draft schedule for financial planning purposes is attached; this schedule may be revised prior to service implementation.

Elliott Bay Water Taxi

During the warmer months (April-October), all-day service would be provided seven days a week, with some variation in the hours of operation between the different days of the week. Weekday service would begin at 6:30 AM Monday through Thursday, with the last sailing at 7:15 PM. On Friday and Saturday, service would be extended until 11:00 PM in the evening, while Saturday and Sunday service would begin at 9:00 AM, with Sunday service ending around 7:00 PM.

During the winter (November-March), service would be offered weekday peak periods only. Morning service would run from approximately 6:30 AM to 9:00 AM and from approximately 4:30 PM to 7:00 PM. A draft schedule for financial planning purposes is attached; this schedule may be revised prior to service implementation.

Existing Routes Operations Plan

Program Management and Administration

Management and support requirements for the Ferry District marine operations would be composed of King County program management and support duties plus Washington State Ferries administrative overhead for 2008-09.

King County Management and Administration

This plan assumes that King County would create a new division within the Department of Transportation, the Marine Division, with primary responsibility for ferry service operations. The Marine Division would be headed by a General Manager who would have overall responsibility for the ferry system, would be the lead on customer services and strategic planning, and would have overall oversight of all operations. Three managers would report directly to the General Manager. The Operations Manager would be responsible for daily operations management, serve as the Port Captain, act as the Security & Safety Officer, and have responsibility for regulatory compliance. The Operations Manager would also be responsible for training and certification of captains and deckhands. The Maintenance Manager would be responsible for the planning and execution of vessel and facilities maintenance. The Administrative Manager would coordinate administrative and interdepartmental activities and relations, providing an interface with other departments of King County.

A number of organizational units within King County are likely to be involved to some degree in support of both the set-up of the Ferry District and King County Marine Division, and ongoing management of the service. These organizational units include: the King County Prosecuting Attorney's Office, Procurement and Contract Services, Office of Information Resource Management, Office of Risk Management, Office of Regional Transportation Planning - Grants Management, Governmental Relations, DOT-Finance, Finance & Business Operations, DOT-Transit, Human Resources, and Engineering Services. A draft organizational chart is provided as an attachment to this document. For financial planning purposes, an estimate of the approximate staff level of effort in Full-Time Equivalents (FTEs) has been generated for each of these units, and the cost of these interagency services estimated using an average staff cost. Standard King County overhead rates for human resources, central government, and other indirect services have been used to estimate indirect management and support costs for the King County Marine Division.

Additional labor would be required during program start-up to support vessel procurement and terminal improvements. This has been included in the capital costs for vessels (design, procurement, etc.) and terminals (design, engineering, permitting, etc.).

Contractor Overhead

During the period from July 2008 through June 2009, when the Ferry District would be funding the Vashon passenger-only ferry (with WSF operating it under contract) Washington State Ferries would be expected to incur costs for indirect services such as dispatch, crew training, payroll, and administrative services. WSF would likely apply an overhead charge to the direct vessel and terminal costs to account for these indirect costs. It has been assumed that the overhead charge would not exceed the current rate WSF uses to distribute management and support charges to their other ferry routes.

Vessel Operations

For at least the first two years of operations the plan assumes that the KCFD would utilize leased vessels to serve the routes outlined above. Given the marketplace for leased vessels, certain operational compromises may be required. Therefore, a transitional service may need to be implemented prior to optimizing service.

As soon as feasible, KCFD would purchase new ferry vessels that would be designed to meet the specific operational needs of the routes. New vessels would provide a higher level of operational and financial efficiency. New vessels would also assist KCFD in building a reliable and value-added transit service.

To provide for ultimate flexibility and financial efficiencies, to enhance safety and operator familiarity, and to minimize maintenance, wear and tear, and training costs – it is recommended that three identical vessels be procured to serve the two routes identified above. Vessels would be specified to carry 149 passengers and be operated by a crew of three.

A four-engine catamaran style vessel could be procured that can operate at 30 knots on four engines on the Vashon Island route, or just as easily operate at 20 knots on two engines on the West Seattle route. With three identical vessels, the vessels could be rotated between routes in order to spread out machinery hours and reduce costs. The third vessel would be held in reserve each day to serve as a backup vessel. While in reserve status, the maintenance crews would be able to perform preventative maintenance or repairs on the third vessel. Similarly, the service would be covered while a vessel underwent United States Coast Guard required drydockings or other heavy maintenance or repairs that would take the vessel out of service.

Each vessel should be identical in all respects. This would enhance both crew and passenger familiarity, and help minimize the need for spare parts, equipment, furnishings, and components. Identical vessels can be docked, secured with mooring lines, and have their passenger boarding ramps all rigged in the same fashion. Ultimately, this approach would result in much safer ferry operations.

Operating Labor

This section summarizes the consultant's recommendations based on best industry practice. Actual staffing levels and duties could be modified based on future collective bargaining.

It has been assumed that each vessel would be manned by a crew of three in accordance with the United States Coast Guard Certificate of Inspection for each vessel. For financial analysis purposes, a crew complement of one licensed Master and two deckhands is assumed. One of the deckhands would be designated as the senior deckhand.

Master

The Master (or Captain) would have complete and total responsibility for navigation, operation, safety, security of the vessel, his/her assigned crew, and the passengers carried. The Captain would serve as the Vessel Security Officer, perform log keeping and complete required reports, conduct training, drills, etc. The Captain would be responsible for preparing the assigned vessel for service, operating the vessel on the assigned route and schedule, and preparing the vessel for turnover to the next crew or for nightly tie-up. The Captain would also be responsible for all external communications to King County staff and other outside agencies as required.

Deckhands

The deckhands would assist the Captain as required, and would play a role in all aspects of vessel operation under the direction and supervision of the Captain. Primarily they would assist in vessel preparation, handle mooring lines, rig passenger boarding ramps, board passengers, verify fares, conduct security and safety sweeps, clean the vessel, replenish consumables, provide first line customer service, and assist with fueling, taking on water, pumping sewage, rigging shore power, etc. The deckhands would serve as lookouts, assist the Captain with vessel operation, and participate in training and drills.

For each assigned crew, there would be a deckhand qualified to serve as senior deckhand. The senior deckhand would be so noted in the vessel log, and would have the additional responsibility to assume command of the vessel if at any time the Captain became unable to fulfill his/her duties.

The vessel crews would report directly to the King County Marine Division Operations Manager, who would also serve as Port Captain. The relationships are depicted in the organizational chart attached.

Shift assumptions for the two in-house routes are as follows:

	Vashon Island Route	Elliott Bay Water Taxi
Shifts	• One 40-hour split shift	• Two 40-hour shifts plus two 20-hour shifts for summer service (April-Oct) • One 40-hour split shift (Nov-Mar)

Fuel

Fuel consumption is a function of hours of operation, vessel cruise speed, voyage profile and installed horsepower. For the proposed fleet, average engine loads were approximated for each route. Using these values, average weekly and annual fuel consumption for each route was then calculated. For financial planning purposes, the fuel price has been set at the same level as that used by King County Metro Transit: $2.70 per gallon in 2009. For later years, this price has been increased at the same rate as inflation, using the Implicit Price Deflator (IPD) rate.

Fuel consumption rate assumptions are as follows:

	Vashon Island Route	Elliott Bay Water Taxi
Fuel Consumption	• 90 gallons per hour	• 74 gallons per hour

Other Operating Costs

Other costs associated with operation of the vessels include items such as consumables, crew uniforms, communication, insurance, and worker and rider injury claims. For in-house operation, the WSF vessel cost model has been adapted for the 149 capacity vessel operating profile. Other operating costs have been estimated using the vessel cost model and supplemented with current estimates of insurance costs for 149 passenger vessels.

Vessel Maintenance

Maintenance plans for leased or owned vessels would be similar. Vessel maintenance items from the least complex to the most complex include simple on-board daily maintenance, periodic maintenance and trouble shooting and annual vessel overhaul and inspection. Descriptions of these activities follow:

1. Daily Maintenance – Vessel daily maintenance consists of cleaning the vessel, performing routine maintenance on vessel equipment and other items necessary to keep the vessel in an operable and presentable condition for its prescribed use. Typically these tasks would be performed by the vessel crew.

2. Propulsion System Heavy Oil Change – This includes changing engine oil, lube oil, as well as changing fuel and oil filters. The schedule for this type of maintenance would be based upon the number of hours between changes as determined by the engine manufacturer and vessel owner.

3. Annual Vessel Dry-docking – Annual vessel inspections, dry-docking and US Coast Guard inspection would require each vessel to be taken out of service for approximately two weeks each year. Included in this dry-docking period is inspection and minor repair of systems, interior outfit and vessel coatings.

4. Propulsion System Major Maintenance – As with the heavy oil changes, the schedule for this type of maintenance is based upon engine hours. Propulsion system major maintenance items include:

    - Top End Overhaul – Includes replacement of turbocharger, water pump, and other rotating engine components as necessary.

    - Major Engine Overhaul – This is a complete overhaul of engine.

Vessel maintenance and repairs would be carried out by the combined efforts of King County employees (Assistant Engineers and Oilers) and by outside vendors and marine repair facilities. Costs for both of these have been included in the financial analysis.

Most preventative maintenance and light repairs would be accomplished by the Assistant Engineers and Oilers working on the vessels daily under the direction of the King County Marine Division Maintenance Manager (the Maintenance Manager would also serve also as the Port Engineer). The relationships are depicted in the organizational chart attached.

Assistant Engineers and Oilers would be on duty during all hours of vessel operation. They would assist Captains with morning vessel preparations, mid-day crew changes, and nightly shut down of the vessels. They would communicate with each on-coming and off-going captain and receive verbal and/or written reports regarding any vessel maintenance issues.

Otherwise, during normal vessel operations they would perform preventative maintenance and light repair work on the backup vessel. At all times they would be available to assist an operating vessel with any maintenance issue that might arise during the course of vessel operations. They would also monitor and assist with any vessel maintenance or repair work being performed by outside vendors or marine repair facilities.

Routine preventative maintenance and light repairs for most vessel systems would be accomplished by in-house staff. This would be the most cost effective alternative, and over time would build a core of maintenance knowledge and expertise in-house.

Certain specialized preventative maintenance and repairs are most efficiently and effectively performed by outside vendors. Items such as radars, VHF radios, GPS navigation systems, and some of the more complex machinery maintenance items require outside vendors who have the requisite tools, training, and experience. The Marine Division staff should arrange for on-call maintenance contracts with qualified vendors to perform these services. Heavy preventative maintenance and repairs, such as vessel drydocking and engine overhauls, should be contracted out via competitive bid to local qualified marine repair facilities.

Maintenance Labor

This section summarizes the consultant's recommendations based on best industry practice. Actual staffing levels and duties could be modified based on future collective bargaining.

The Assistant Engineers and Oilers employed by King County would not be assigned to any particular vessel. Rather they would be shore-based and would work on vessels as assigned or directed by the Port Engineer.

Assistant Engineer

This position would require an extensive working knowledge of ferry vessels, marine propulsion equipment, auxiliaries, and associated systems.

The Assistant Engineers would assist the Captains with vessel startup each morning, and be available to assist the Captains of each vessel in operation that day should any maintenance issue arise. Otherwise the Assistant Engineer would perform preventative maintenance and light repairs on the backup vessel as assigned by the Port Engineer.

The Assistant Engineer would take daily reports on maintenance issues from the Captains at crew change, take actions as necessary, and communicate fully with the Port Engineer and the oncoming Oiler for turnover. All maintenance and repair work should be documented and logged.

Oiler

This position would require a base working knowledge of ferry vessels, marine propulsion equipment, auxiliaries, and associated systems. The Oiler would receive a briefing from the Assistant Engineer at the beginning of the Oiler's shift/end of the Assistant Engineer's shift, and work with him/her during shift overlap. The Oiler would assist Captains with vessel startup after any crew change, and vessel shut down each evening, and would be available to assist the Captains of each vessel in operation should any maintenance issue arise.

After vessel shut down, the Oiler would check fluid levels, add fluids as necessary, clean bilges, change oil and filters, and perform any other machinery or equipment checks as directed. Otherwise the Oiler would perform preventative maintenance and light repairs on the backup vessel as assigned by the Port Engineer.

The Oiler would take daily reports on maintenance issues from the Captains at crew change or vessel shut down, takes actions as necessary, and ensure turnover of maintenance issues to the oncoming Assistant Engineer (next morning) and the Port Engineer as necessary. All maintenance and repair work should be documented and logged.

Terminal Operations

KCFD would need to operate at least three terminals in order to provide the planned ferry service to Vashon Island and West Seattle. It is anticipated that at the outset, facilities would either be leased or operated under some form of cooperative agreement with Washington State Ferries (WSF) for Pier 50 in Seattle, and the passenger-only loading facility at Vashon Island. Similarly, an arrangement might be required with the City of Seattle for operations to Seacrest Park in West Seattle.

Eventually, KCFD may acquire some of these facilities or build new facilities in their place. Also, there are plans to acquire or construct a ferry maintenance facility in the Harbor Island/Duwamish area.

Pier 50 would be open during all hours of ferry operations and would be staffed by a Customer Service Representative. All outlying passenger terminals would be un-staffed.

At Pier 50, the public entrances would be opened by the staff at the appropriate hour and queuing and fare verification would take place as all outbound passengers arrive to board the vessels. Upon arrival of ferries in Seattle, the deckhands would unlock arrival gates to allow inbound passengers to leave, and then the deckhands would load the outbound passengers and verify fares. Gates leading to the passenger float would always be locked and secured unless passengers are actively being loaded or unloaded. Meanwhile, the public areas (non-revenue) of the Pier 50 terminal would be open to the public and monitored by the Customer Service staff.

During all hours, the outlying terminals would be gated and locked with security measures in place. During operating hours, ferries would arrive at these terminals from Seattle and one of the deckhands would unlock the gates and allow disembarking passengers to exit the facility. After passengers unload, the deckhands would verify fares and load passengers for the next scheduled departure, and lock the gates after passenger loading completes.

Staff

This section summarizes the consultant's recommendations based on best industry practice. Actual staffing levels and duties could be modified based on future collective bargaining.

The Pier 50 terminal would be staffed during all hours of ferry operations by a Customer Service Representative. This could be accomplished with two full time positions and one part time position. It has been assumed that staffing would be reduced on a seasonal basis, commensurate with the sailing schedule of the routes that dock at Pier 50.

The proposed scheduling would allow for shift overlap on Fridays, Saturdays, and Sundays, when the West Seattle service currently sees large numbers of first time ferry riders (tourists and leisure travelers).

The Customer Service Representative (CSR) would be the only position in the marine division that would not require ferry-specific experience or skills. This would be strictly a customer service position whose primary responsibility would be to answer customer questions and assist customers in having a positive ferry experience.

The person should possess excellent communication skills, and have the people skills necessary to efficiently and adroitly assist customers with their various needs, questions, and concerns.

Additionally, the CSR would generally maintain watch over the facility at Pier 50, restock consumable materials, provide lost and found services, and maintain the facility by performing light cleaning and housekeeping functions. The CSR would maintain records, logs, and reports as required. Additionally, the CSR would communicate as required with the ferry boat crews, maintenance crews, and the management staff.

The CSR would report directly to the King County Marine Division Operations Manager, who also serves as Port Captain. The relationships are depicted in the organizational chart attached.

Other Terminal Operating Costs

Other terminal costs, including utilities, have been estimated using Washington State Ferries and industry experience for similar facilities.

Terminal Maintenance

This section summarizes the consultant's recommendations based on best industry practice. Actual staffing levels and duties could be modified based on future collective bargaining.

Terminal facilities that would be owned by the KCFD would need to be maintained by King County employees, or through facilities assistance from other King County agencies or departments, or by outside vendors or contractors as discussed below.

Terminal facilities that would be leased by KCFD from others should include provisions for terminal maintenance from the lessor, or be maintained by King County employees, or through facilities assistance from other King County agencies or departments, or by outside vendors or contractors, depending on the preference of KCFD and the arrangement with the lessor. No dedicated terminal maintenance staff positions are envisioned in either the near or far term. For KCFD terminals, the vessel maintenance staff would have the collateral duty of performing all basic preventative maintenance and light repairs.

If the scope of preventative maintenance or repairs exceeds the expertise of the vessel maintenance staff, the Marine Division Maintenance Manager (working with the rest of the management staff) would arrange for preventative maintenance or repairs by others. If the maintenance or repair needs could be efficiently addressed by other King County agencies or departments, then those arrangements would be made, and agreements or policies would be put in place for ongoing support. If the scope of preventative maintenance or repairs exceeded the expertise of all King County maintenance assets, then the management staff would contract for assistance from outside waterfront/marine construction and repair providers.

Basic preventative maintenance and light repairs would be accomplished by the vessel maintenance staff. This work includes items such as:

- Safety and security inspections
- Greasing equipment
- Changing light bulbs
- Periodic wash down of all surfaces
- Lubrication of locks and hinges
- Repair of mooring lines and fittings
- Repair of lifelines and fittings
- Inspecting fire safety equipment
- Minor painting and preservation
- Minor piping and electrical repairs
- Annual inspection of voids

Heavy maintenance and repair would most likely be accomplished by other King County agencies or departments, or by outside vendors under contract including:

- Large scale painting or preservation projects
- Replacing light fixtures or re-wiring facilities
- Major piping repairs or replacements
- Drydocking of floats
- Diver inspections
- Structural repairs to floats, knees, fenders, pilings, gangways, ramps

Ridership

Vashon Island Route

Historic data has shown a steady decline in ridership on the current Vashon-Seattle passenger-only ferry. WSF generally tracks ridership in the westbound direction only (the direction in which riders pay in the WSF system). The majority of westbound travel occurs in the afternoon peak period. Afternoon peak ridership in 2006 was approximately 270 riders per day, with only two afternoon sailings from Seattle. This is down from approximately 330 PM peak riders in 2003 and 420 PM peak riders in 2001, with three sailings in the PM peak (out of a total daily sailing schedule of approximately eight round-trips). In addition to service cuts in 2005, there have been steady fare increases since 2001 of between 13% and 4% per year.

Total ridership on the current passenger-only ferry is partially composed of riders originating on Vashon Island, and partially composed of riders originating in Southworth and transferring from the WSF Southworth-Vashon auto-ferry. Based on counts conducted by WSF in September 2006, the split is approximately 65% Vashon riders and 35% Southworth riders. Use of the passenger-only ferry by Southworth riders is dependent on a convenient timed transfer between the Southworth-Vashon auto-ferry and the passenger-only ferry.

Based on Puget Sound Regional Council projections, the population of South Kitsap County is anticipated to grow approximately 15% between 2006 and 2020, and the population of Vashon Island is anticipated to grow close to 2% during that same period.

Given the uncertainties surrounding ridership growth, a conservative approach has been taken to estimate future ridership. For financial planning purposes, ridership has been assumed to grow proportionately to projected population growth in Vashon Island and South Kitsap County. Ridership from Southworth has been adjusted to reflect the number of sailings that would support transfer of Southworth riders from the WSF auto-ferry. With the current WSF sailing schedule and the proposed passenger-only ferry sailing schedule, one AM peak sailing and one PM peak sailing would support a convenient transfer of Southworth riders.

	2008	2010	2012	2014	2016
Annual Ridership	157,300	158,000	159,100	160,100	161,200

Actual ridership could be lower or higher. Historic ridership has shown a decline in ridership that has corresponded with increases in fares and decreases in levels of service. Improved service levels, as proposed in this plan, could increase ridership above projected levels. External factors could also impact ridership. If WSF changed the schedule of the auto-ferries providing a connection between Vashon Island and Southworth to better coordinate with the passenger-only route, ridership from Southworth could be expected to increase. On the other hand, ridership could decrease if a direct Southworth-Downtown Seattle ferry was implemented. No loss of Southworth riders due to implementation of a direct ferry connection between Southworth and Downtown Seattle has been assumed to occur in the planning horizon of this analysis. However, WSF could potentially implement a direct auto-ferry connection as early as 2015 or another entity could provide a direct passenger-only ferry connection from Southworth to Downtown Seattle.

Elliott Bay Water Taxi

Actual ridership counts were used as the basis for future ridership projections. Data was available for 1998-1999 and 2001-2007. May 2001 to September 2002 was the only period with ridership data for continuous, year-round service. Ridership data was only available for the months of April to June for 2007.

Ridership projects for the summer months were developed by applying an average growth rate to the per monthly ridership of the preceding year. For the months May and June, 2007 ridership counts were used as the base year. For the months July, August, and September, 2006 ridership counts were used as the base year. Ridership was projected to grow at a rate of 5% per year. This rate is the average ridership growth rate on the Elliott Bay Water Taxi for the years 2001-2007. Note that the actual year-to-year growth rate has varied significantly – from a 37% reduction in ridership to a 31% increase in ridership.

A different method was used to develop ridership projections for the off-season months. In the one year with year-round service, October 2001 to September 2002, the month with the highest ridership was August. August is also the month with the highest ridership when the average ridership per month is calculated based on all available ridership data. A ratio was calculated for each off-season month (October to April) of riders per month compared to the riders per month for August. This relationship was reproduced in the ridership projections – with ridership in the off-season months based proportionally on the August ridership for that year.

For the first couple years of service before the service would become year-round, ridership projections were adjusted to account for the actual months of operation.

	2008	2010	2012	2014	2016
Annual Ridership	167,600	191,000	210,200	232,200	256,000

Fares

Fare Collection

The fare collection system would be same for both the Vashon Island and West Seattle routes although the fare structure for each route would most likely be route-specific, reflecting different distances and operating costs. Fare collection at Pier 50 would occur for both destinations and fares would be collected from passengers traveling in both directions. Currently WSF only collects fares from passengers heading west (out of Downtown Seattle), while the Elliott Bay Water Taxi collects fares from passengers heading in both directions.

Under consolidated service, tickets for either Vashon Island or West Seattle would be purchased from vending machines that accept debit or credit cards at any of the three terminals. Passenger waiting areas would not be secured (passengers with tickets for separate destinations would not be segregated from each other, or from passengers without tickets). Smart card reader machines would be located on the floats as close to the boarding gangplanks as possible.

Once a vessel arrived at a terminal, a crew member would open a security gate and would monitor the smart card ticket readers as passengers board the vessels. The smart card readers are needed to deduct a fare from the Regional Fare Coordination System smart cards and to give an indication to the crew member at the vessel door that the card is valid and the fare has been successfully deducted. Passengers wishing to pay with exact change may do so on the vessel at a cashbox (similar to bus cashboxes in that crew members would not need to handle cash and only exact change would be accepted). All cash money would be handled and counted off site. It would not be necessary to provide secure rooms for safes or accounting purposes.

Fare Rates

For financial planning purposes, this analysis assumes fares consistent with the current Elliott Bay Water Taxi and Vashon passenger-only ferry fares. Other fare assumptions include:

- One-way fares on all routes (including Vashon Island)
- No seasonal peak/off-peak pricing (year-round fares)
- Pricing on a route-by-route basis
- No bicycle surcharge
- Participation in regional fare integration initiatives such as Puget Pass and smart card

The current fare rates are identified in the following tables.

Vashon Island - Downtown Seattle Route (one-way fares)	
Fare Type	Fare
Full Adult Fare	$4.25
Commuter Ticket	$3.60
Monthly Pass	$116.20 per month, approximately $2.90 per trip
Senior/Disabled	$2.10
Youth (6-18)	$3.60

Elliott Bay Water Taxi (one-way fares)	
Adult	$3.00
Youth (6-17)	$3.00
5 years and under	Free
Senior/Disabled	$3.00
Riders with valid Metro transfer	$1.00
Valid King County or Regional pass	No charge

The KCFD would establish actual fare rates. The KCFD may choose to adjust the fares to provide common discount categories that are consistent with other King County transit services.

Fare Revenue

Average fare realization rates have been calculated for both routes.

	Vashon Island Route	Elliott Bay Water Taxi
Average Fare Realization	$3.57	$1.46

For the purposes of this analysis, the 2007 average fare realization for the routes has been increased annually over the planning period at the same rate as inflation, using the Implicit Price Deflator (IPD) rate. The inflated fare realization has been multiplied by the projected ridership for each year to calculate predicted fare revenue.

Other Revenue

There may be opportunities to generate revenue by leasing advertising space aboard the ferry vessels. Potential advertising revenue has been estimated by extrapolating the average monthly advertising revenue collected in 2006 on the Elliott Bay Water Taxi.

Existing Routes Capital Investment Plan

Capital investments for the King County ferry system would include investments in vessels, passenger terminals, and a vessel moorage and maintenance facility.

Vessel Leases

Due to the level of service desired for each route, calculated voyage profiles initially indicate that the required cruise speeds for the EBWT and Vashon Island routes has been identified to be 20 KTS and 30 KTS, respectively. Cruise speeds in this range for passenger-only service indicate that high-speed catamarans would be a good type of candidate vessel to serve each of these routes. In addition, a back-up vessel would be needed to serve these routes in the event of a primary vessel being removed from service. The lease for this vessel should be initiated about the same time as the leases of the primary vessels. The following steps would need to be undertaken to secure leased vessels:

- Establish a final set of specifications for the leased vessels covering both fundamental requirements and optional desirable features.

- Prepare a vessel lease (bare boat charter) agreement stating KCFD desired terms and conditions. This document should include identification of all required insurance coverage and identify which party would obtain coverage.
- Develop a proposal evaluation process, based on required and optional vessel requirements. Include appropriate weighting for lease cost, vessel delivery costs, terminal compatibility, fuel economy, and passenger amenities.
- Create a request for proposal and bid package, identify potential bidders and conduct a bidder's conference to present the evaluation process and to answer bidder questions.
- Evaluate vendors and proposals, including inspection of candidate vessels based on conformance with bid package and evaluation criteria.
- Negotiate final lease agreements and obtain all required licenses, certificates of insurance, and certificates of inspection.

Vessel lease costs consist of lease rates, vessel delivery, potential modifications to the vessel to improve accessibility, and vessel restoration costs at the end of the lease.

- Vessel Lease Rates – Lease rates are assumed to be basic bare boat charter rates. These rates can vary greatly depending on availability of vessels, current vessel location, age of vessel, etc. Benchmarks for estimating annual lease rates range from a percentage of the depreciated value of a new vessel including markup (similar to a vehicle lease agreement), to 20% of the quoted sales price of a used vessel presently in service or being brokered for sale.
- Vessel Delivery – Many appropriate vessels found in a recent survey are located on the East Coast. It is difficult to predict where the vessels would be found ultimately that match the KCFD route requirements. Additionally, to accommodate timely delivery of a vessel located on the East Coast, extended delivery times may be necessary.
- Vessel Modifications – Terminal compatibility is an issue that would need to be dealt with in the near term. Typical high speed catamaran vessels have freeboards (the distance from the water to the top of the deck) of 3.5 to 4.5 feet. The current terminal floats have freeboards of approximately 5.8 to 5.5 feet at Pier 50 and Vashon Island, and 1.8 feet at Seacrest Park. Modifications may be made to the Seacrest Park float to match its freeboard height with the Pier 50 and Vashon floats. However, in order to ensure that the vessels are accessible and can accommodate loading and unloading of wheelchairs, some vessel modifications may be required. Assumed costs include engineering, equipment, fabrication, and installation costs.
- Vessel Restoration – Vessel restoration costs are those costs necessary to restore the vessel to its condition at the time of lease, other than normal wear and tear. This includes removal and restoration of the accessibility modifications as well as any repairs necessary to return the vessel to its original condition.

Vessel Acquisitions

This plan assumes that the KCFD would acquire a fleet of three vessels that would optimally suit the requirements of the EBWT and Vashon Island routes. Acquisition of three vessels would enable the KCFD to operate each on a rotation: providing service on the EBWT route, the Vashon Island route, and acting as a back-up vessel. Design

and construction of these vessels would take place during the period for which vessels would initially be leased. The main vessel acquisition tasks are as follows:

- Vessel Design – The basic steps of vessel design that are done by a design agent include concept design, preliminary design and contract design. For this type of vessel, approximately 6 – 12 Months would be required to develop design through to contract design. This design would be to a sufficient level of detail that construction costs could be estimated and shipyards could provide construction cost proposals.
- Vessel Construction – Vessel construction would require a period in the range of two to two-and-one-half years. This would include any time required for detail engineering to be done for completion of system definitions and construction planning.

Vessel Acquisition Specifications

This section highlights key acquisition criteria that relate to both leased vessels and new vessels. As described in the discussion above, detailed specifications for both leased vessels and new vessels would be developed prior to releasing any request for proposal documents or commencing with a new vessel design.

- Passenger Rating – 149 passengers, maximum. This capacity maximum would eliminate much of the Transportation Security Administration security requirements.
- Terminal Compatibility – Vessels would need to be compatible with terminals. For leased vessels this may require some modifications to the vessel in order to accommodate loading and unloading of passengers if vessel and terminal freeboards are mismatched. For new vessels, specifications would be developed to ensure vessel freeboards match with the terminal configurations at the time the new vessels would be brought on line.
- Accessibility – Vessel would need to have, or be modified to allow, an accessible path of travel that meets width and sill-height requirements for wheelchairs.
- Bicycle Capacity – Vessels would need to be able to accommodate 10 – 20 bicycles.
- Vessel Cruising Speed – For leased vessels this speed can be matched to the individual routes as dictated by the voyage profiles (20 KTS for the EBWT and 30 KTS for the Vashon Island route and backup vessels). For new vessels this speed would be 30 KTS for all vessels.

Terminals - Pier 50

Existing Conditions

The passenger-only ferry terminal at Pier 50 is located immediately south of the WSF major auto ferry terminal at Colman Dock/Pier 52. Pier 50 was built in 1992, and a new temporary steel barge landing float and ADA gangway installed in 1998. The temporary float was installed with the understanding that its life-span would be for 5 to 10 years (ten years in 2008). The facility consists of a 110 foot by 32 foot steel barge landing float (freeboard of 5.8 feet) with two operating slips, a 135 foot gangway , and a pier. Electrical shore power, sewage pump-out, and water access are available on the float.

Berthing and Slips

Pier 50 is moderately protected from northerly wind and storms and is somewhat susceptible to southerly storms. The two operating slips enable the vessels to berth at either slip depending on weather and navigational conditions. The second slip also allows for two overnight tie-up slips and one daytime tie-up slip for vessels.

Passenger Waiting

The existing commuter waiting area is a temporary, tension-fabric tent structure used for passenger waiting and ticketing. The tent structure is in need of repair and improved lighting. Bathroom facilities consist of three portable toilets. A small outdoor seating area for commuters exists. An uncovered entrance/departing portal and gate is located at the landward side of Pier 50 along Alaskan Way. Passengers entering the facility from this portal purchase one-way tickets to Vashon Island from ticketing machines located inside the tent or from the ticket agent in the ticket booth.

Pier 50 is not a "stand alone" terminal as many support functions are located at WSF's adjacent Colman Dock/Pier 52 main terminal (terminal supervisor office, the agent, trash and recycling compactors, storage, and employee parking).

Emergency Egress

Although Pier 50 is conveniently located to downtown Seattle, the egress during peak unloading of the passenger-only vessel is problematic. Pedestrians exiting the passenger-only ferry dock can be in conflict with auto ferry traffic, as the main auto-ferry entrance and exit to Colman Dock is immediately adjacent to the Pier 50 entrance/exit portal. Currently, a Washington State Patrol officer is often stationed (on foot) at this intersection during peak periods to help manage pedestrian and vehicle traffic.

Security

A security system with cameras has been installed at Pier 50, and is currently maintained by WSF. No navigational lighting is in place on the existing ferry dock.

Multi-modal Access

The Pier 50 location does have multi-modal advantages. Transit and taxi connections are easily shared with Colman Dock/Pier 52. Metro buses stop along the curb of Alaskan Way to the north. Riders walking to and from destinations in the Seattle Central Business District enjoy a relatively easy grade from the water into town. Dock locations further north along the Elliott Bay waterfront face a much steeper grade. Dock locations to the south are a corresponding further walking distance to major central business district destinations.

Bicycle Staging and Storage

Two bicycle racks are located outside of the tent. Passengers can also store their bicycles at the WSF bicycle compound located close to the main WSF terminal on Pier 52.

Parking

There is no dedicated commuter parking near Pier 50, but there is a wide range of transportation options within walking distance (Metro Transit, Amtrak and Sounder trains, other WSF ferry routes). Passenger parking is available in nearby private lots.

WSF staff and crew can utilize WSF employee parking at Pier 52 and a few spots are available in the triangular parking space at Pier 50. Crew and office space is available at the main WSF terminal at Pier 52 along with additional storage space if necessary (currently some storage space is available at Pier 50).

Accessibility

WSF provides personal assistance to individuals with disabilities who may require help in negotiating the route between the ferry and the pier. The Colman Dock/Pier 52 facility does have an ADA pick-up/drop-off parking along Alaskan Way just north of Pier 50.

The elevation change from the ferry pier to the floating ferry dock across the gangway generally meets the tolerances as outlined in the revised draft Passenger Vessel Accessibility Guidelines and Supplementary Information dated July 7, 2006 (except for the lowest tides). The gangplank, however, is not in compliance.

Proposed Improvements

The County would negotiate with WSF to lease the Pier 50 facility. It is currently assumed that the dock structure at Pier 50 (built in 1990 through 1992) would not need immediate structural repair or upgrades for any of the near-term improvements, and that an off site tie-up and maintenance facility would be available for at least the WSF maintenance barge and one vessel (in the near-term, Pier 50 would be able to provide overnight tie-up slips for up to two passenger-only vessels).

The following terminal improvements have been proposed for Pier 50:

- Maintenance and repair of the barge, the gangway, and the timber pedestrian access pier would be completed as identified in the 2005 WSF Terminal Structural Inspection report for the Seattle passenger-only ferry terminal.
- Two new ADA compliant gangplanks for boarding the vessels would be installed on the float, with one gangplank to be located on either side of the float
- Installation of a new emergency exit gate east of the terminal tent structure. This would increase the number of egress routes at Pier 50.
- Installation of security cameras at the terminal. Camera feed directly to the County offices from the terminal would be considered.
- Lighting and communications within the terminal building tent structure would be improved.
- Replacement of the existing tent structure with a new tent structure. The existing turnstiles would be removed thereby increasing the area of indoor passenger waiting from 800 square feet to 2530 square feet in the new tent. The existing furnishings, such as benches and snack and newspaper vending machines, within the tent structure would be retained. The existing portable toilets would remain on-site for passengers and staff. The existing information booth (approximately 6 feet by 8 feet) would be retained and moved.
- Two ticket vending machines would be installed in the new tent structure and four smart card reader machines would be installed on the landing float (two reader machines located on either side of each gangplank).
- Installation of an information rack in the new tent structure would provide Ferry Service information along with other transit information (ferry and bus route schedules and fare information). King County staff would manage this rider information.

- Negotiation with WSF for use of their existing terminal-generated garbage and recycling facilities. Vessel-generated refuse would be handled at Pier 50 and/or the overnight tie-up and maintenance facility.
- Completion of signage and wayfinding upgrades as all terminals would share a coordinated branding scheme. Consistent wayfinding signage between all Ferry District terminals would be essential.
- No additional parking spaces would be incorporated into near-term improvements at Pier 50. The existing opinions of cost assume that the County would be able to utilize an off-site property as a maintenance facility thereby eliminating employee parking spaces required at Pier 50. Vessel and terminal crew would park off site, but nearby to Pier 50, until a permanent tie-up and maintenance facility became available, at which point vessel crew would park at this site.
- A new 110 foot by 40 foot concrete float (with a freeboard of 5.8 feet) would replace the existing steel barge, currently close to the end of its useful life. The replacement float would still accommodate two slips and would continue to provide shore power, sewer pump-out, and water supply. Although the tie-up and maintenance facility would have access to these utilities, the cost to maintain these utilities at Pier 50 is minimal. Access at Pier 50 would allow crews to utilize mid-day non-peak times to empty vessel sewer tanks/top off vessel water tanks without taking vessel to off site facility (improves efficiency, minimizes unnecessary mid-day trips to off site facility).

No new crew, storage, parking, or office space would be installed at Pier 50 as it is assumed that these facilities would be provided at the off site overnight tie-up and maintenance facility.

Terminals - Vashon Island

Existing Conditions

The passenger-only ferry route between Vashon Island and Seattle is a state operated route utilizing WSF's facilities on the northern end of Vashon Island and downtown Seattle's Pier 50. The passenger-only terminal on Vashon was built in 1988 and consists of a concrete barge landing float, gangplank, and ferry pier (concrete trestle). The terminal gains many passengers who travel from Southworth in Kitsap County to Vashon Island on the WSF auto-ferry route and then transfer to the passenger-only ferry direct to Seattle.

The passenger-only ferry facility, adjacent and west of WSF's auto docking terminal, has two operating slips located on a 109 foot by 34 foot concrete float (freeboard of 5.5 feet). The access pier has a security gate and an exit gate. The landward headframe facilitates maintenance by allowing the gangway to be lifted off the float and "hung" while the float is removed for repairs.

The existing utilities supporting the passenger-only dock consist of electrical service for overhead lighting. An emergency generator supports both the auto ferry terminal and the passenger only dock during power outages. No sewer, water, or ferry shore power exists.

Berthing and Slips

The terminal at Vashon Island is exposed to northerly wind and storms. Therefore, two operating slips enable the vessels to berth at either slip depending on the navigational conditions. The north-south orientation of the float minimizes exposure to waves. A wind sock is located on the headframe of the waterward float between the offshore guide piles to assist the vessel captain with navigation.

Passenger Waiting

A small terminal building used as a commuter waiting area is shared with the auto-ferry commuters including an outdoor seating area (approximately 890 square feet). The building, located at the water end of the trestle, contains restrooms, small offices, and some sitting area. There are no toll booths. The walkway to the passenger-only ferry entrance/exist is illuminated, as is the float, but the walkway is not covered and no marine navigational lights exist on the passenger-only float.

Emergency Egress

The existing emergency egress for passengers from the outdoor waiting area or the indoor passenger waiting area includes an entrance gate to a sidewalk or through the indoor passenger waiting area.

Multi-modal Access

The Vashon Island Terminal supports bus commuters to and from the terminal via two Metro bus routes located next to the terminal building. Sufficient pier space exists for buses to turn around and drop commuters directly in front of the commuter waiting area. A sidewalk or walkway to the WSF terminal building exists where pedestrians are separated from traffic by a raised asphalt curb. Bicycle parking and storage at Vashon Island Terminal is minimal (one rack).

Parking

Parking options include private and municipal lots near the terminal, as well as five Metro Park & Ride lots throughout Vashon Island, which are served by bus routes that stop at the ferry terminal. One of King County's lots is located within walking distance of the terminal.

Accessibility

At the Vashon Island terminal, WSF provides personal assistance to individuals with disabilities who may require help in negotiating the route between the ferry and the terminal. Two dedicated parking spots are available for ADA parking up to a 7-hour maximum. During peak hours, drop-off/pick-up on the dock for disabled walk-on passengers is not allowed.

Generally, elevation change from the bus and passenger pick-up/drop-off to the ferry dock is minimal; however, at low tide the ramp to the ferry dock exceeds the 1:12 tolerances as outlined in the revised draft Passenger Vessel Accessibility Guidelines and Supplementary Information dated July 7, 2006. The gangplank is not in compliance.

Proposed Improvements

Improvements would include very few within the existing WSF terminal building, as it has been assumed that King County would negotiate with WSF to share their passenger waiting indoor area, ADA and service vehicle parking areas, and passenger restrooms.

The following terminal improvements have been proposed for the Vashon Island terminal:

- Maintenance and repair of the float, guide piles, concrete access pier deck, float fendering system, topside railings, gangway, and the concrete access pier would be completed as identified in the 2006 WSF Terminal Structural Inspection report for the Vashon Ferry Terminal Express. The inspection identified facility

maintenance deficiencies and a site visit determined that the overall appearance of the passenger-only dock is currently poor. Overdue painting and corrosion can be readily seen and attributed to the weather conditions, general wear, and exposure to the elements.

- Utilities, lighting, and communications on the float would be improved.
- Two ticket vending machines would be installed within the covered outdoor waiting area and four smart card reader machines would be located on both sides of the float (two on either side of each gangplank).
- Installation of a new security gate closer to the top of the gangway. This would provide more waiting space along the trestle and reduce the time it would take for vessel staff to open a gate to allow passengers to begin loading.
- Two new ADA compliant gangplanks for boarding the vessels, one gangplank to be located on either side of the float.
- Negotiation with WSF for use of their existing terminal-generated garbage and recycling facilities. Vessel-generated refuse would be handled at Pier 50 and/or the overnight tie-up and maintenance facility.
- Installation of an information rack area within the covered outdoor waiting area. King County staff would manage this rider information.
- Completion of signage and wayfinding upgrades as all terminals would share a coordinated branding scheme. Consistent wayfinding signage between all Ferry District terminals would be essential.
- Installation of one Bosun's locker on the float for the storage of spare lines

Terminals - West Seattle

Existing Conditions

The City of Seattle owns and operates a public dock and hand-carry small boat launch, fishing pier, vehicle parking area and other facilities in West Seattle known as Seacrest Park. The Seacrest Boathouse (kayak rental facility) and restaurant are located upland of the public fishing pier and boat launch dock. One of the most popular SCUBA areas is also located at Seacrest Park. Diving is not permitted within 150 feet of the ferry float landing on the pier. No utilities are located on the float.

Currently the County contracts for the Elliott Bay Water Taxi to provide passenger-only ferry service from West Seattle to the downtown Seattle waterfront (docks at Pier 55) to provide a transportation alternative to the congested West Seattle bridge. The City provides the public with access and egress to the Elliott Bay Water Taxi service by allowing the Elliott Bay Water Taxi operator to use the Seacrest Park dock.

Berthing and Slips

The EBWT docks along the northeast side of the City's 155 foot by 13 foot wooden dock with one operating slip (freeboard of 1.8 feet). The dock is removed from the site each fall to minimize damage from southerly winter storms.

Passenger Waiting

No covered waiting area is available for waiting passengers, although a small fish and chips stand nearby does have some indoor seating available. Picnic tables are located outdoors and the gangway and float are uncovered. Passengers wait on the float until boarding begins and the area consists of an outdoor standing area. Fares are collected by a crew member (exact change required) each way as passengers board the vessel.

Emergency Egress

Emergency egress consists of the one gangway to the waiting area on the existing float.

Security

A low, rail-height gate at the top of the gangway provides security, no cameras are installed, and no navigational lighting or passenger lighting is in place on the dock. The luminaries on the adjacent fishing pier provide limited illumination of the float used by the EBWT.

Multi-modal Access

The Seacrest Park Terminal is served by special ferry shuttles from Seacrest Park to the West Seattle Junction and to Alki and SW Admiral Way, as well as two Metro bus routes.

Parking

There is no dedicated commuter parking at the terminal; the small lot adjacent to the terminal is for short-term (two hour) use only. Some limited non-restricted parking is available on nearby streets. Two bicycle racks are located outside of the City Park Building. ADA parking, pick-up/drop-off is available in the short-term City lot.

Accessibility

The gangway to the float is a narrow grated aluminum, 3.5 foot by 50 foot gangway. The elevation change from the top of the gangway to the floating ferry dock does not meet the tolerances as outlined in the revised draft Passenger Vessel Accessibility Guidelines and Supplementary Information dated July 7, 2006. The gangway becomes quite steep at low tide due to its short length.

Proposed Improvements

Improvements would include those necessary to provide year-round service between Downtown Seattle and West Seattle. The terminal facility would need to be able to weather winter storms. Currently the existing timber float is removed each fall and re-installed each spring as it would unlikely survive winter storms.

The following terminal improvements have been proposed for the West Seattle terminal, to be implemented as soon as possible:

- Replacement of the two timber floats with two temporary concrete floats (freeboard of the floats to be 2.0 feet). The temporary floats would be designed so as to conform to the current float footprint to minimize permitting time and requirements. The associated replacement guide piles would not be increased in size or number. Due to the low freeboard of the temporary float, it may be necessary to close the facility during storms that could wash waves over the float's deck. Because the pilings would not be larger in diameter, the King County would need to keep a watchful eye during winter months to avoid float damage.

- Installation of a timber raised boarding platform and ramp to accommodate high freeboard vessels.
- One new ADA compliant gangplank for boarding the vessels to be located on the end of the raised boarding ramp.
- Addition of a covered outdoor waiting area (approximately 500 square feet).
- Utilities, lighting, and communications on the float would be improved.
- Installation of an information rack in the covered outdoor waiting area. King County staff would manage this rider information.
- Two ticket vending machines would be installed within the covered outdoor waiting area and two smart card reader machines would be located on the waterward side of the float (to be installed on either side of the location of the new gangplank).
- Negotiate with the Parks department to continue handling terminal-generated garbage and recycling on site as is done today.
- Completion of signage and wayfinding upgrades as all terminals would share a coordinated branding scheme. Consistent wayfinding signage between all Ferry District terminals would be essential.

Improvements that would be needed to construct a permanent terminal facility at Seacrest Park at some point in the future have been identified. The costs for these improvements have been included in the financial analysis. Construction of a permanent West Seattle terminal at a location other than Seacrest Park is currently under consideration. If the decision is made to construct a permanent terminal facility at a location other than Seacrest, the funds identified for the improvements at Seacrest would be available for investment at the other site. The improvements could be made in the future if the West Seattle terminal site does not change from its existing location at Seacrest Park:

- Relocation of the passenger-only float further south or northwest, away from the fishing pier and the Seattle Parks float.
- Replacement of the concrete float with a new wider 40 foot by 100 foot concrete float (freeboard of 5.5 feet) and a new gangway ramp. The replacement float would still accommodate one slip.
- Relocation of the covered waiting area and ticket vending and reading machines to the east end of the park or slightly northwest of the existing entrance gate.
- Installation of one Bosun's locker on the float.
- Replacement of the existing gate with an improved security gate.

Moorage and Maintenance Facility

Leasing

Concurrent with the delivery of leased vessels, the County would lease approximately 180 feet of pier frontage from a water frontage owner, such as the Port of Seattle, for the WSF maintenance barge. The WSF barge would be moored at this site and the third vessel would tie-up to the barge.

The October 2007, un-escalated lease cost was quoted at $1 per foot or $2 per foot if work would be done on the moored vessel. As light maintenance activities would occur on both the WSF maintenance barge and the tied-

up vessel, the lease rate used in the affiliated magnitude of cost was $2 per foot. It has been assumed that the waterfront parcel would include at least 50 feet of adjacent upland space to accommodate a trailer large enough for three offices, crew lockers, meeting room, and one unisex ADA restroom.

The necessary near-term improvements would include:

- Set-up, lease, and breakdown of a 12 foot by 50 foot portable building
- Installation of an ADA ramp and a stairway for access
- Installation of security fencing
- Lighting and utility installation for the yard and portable building
- Water, sewer, and shore power hook-up for the WSF maintenance barge and third vessel
- Minor parking area improvements for an existing paved area

As soon as practical, it is recommended that a permanent moorage and maintenance facility be constructed that would provide tie-up for all three vessels as well as office space and crew facilities for the King County Marine Division. For the purposes of this analysis several potential sites for a permanent moorage and maintenance facility in the Harbor Island/Duwamish area were evaluated.

A permanent moorage and maintenance facility could be provided if the following investments were made at an appropriate site:

- Installation of a 100 foot by 15 foot by 13 foot concrete float (freeboard of 5.5 feet). The float would be moored perpendicular to the shore and would be accessible from land via a new 60 foot by 4 foot aluminum gangway ramp.
- Some dredging may be required to deepen the berthing area for the WSF barge and passenger-only vessels. This dredged material has been assumed to be unsuitable for open water disposal and would need to be disposed of at an upland facility.
- Installation of a security system.
- Lighting and utility installation/upgrades for the yard.
- Water, sewer, and shore power hook-up for the WSF maintenance barge and vessels.
- Modifications to an adjacent yard to provide employee and service vehicle parking and space to moor the WSF maintenance barge (also perpendicular to the shore).
- Establishment of the maintenance facility offices within an existing building. The new offices would accommodate four offices, a locker/crew room, a meeting/training room, a shop, storage, and men's and women's restrooms with showers. The space requirements for this entire area would be approximately 2000 square feet.

Potential Future Capital Investments

Additional capital investments have been identified that the KCFD may wish to implement at some point in the future. These consist of additional investments at Pier 50, Vashon Island, and West Seattle to improve customer comfort, information, and accessibility.

Pier 50

- Installation of an electronic panel (to provide bulletins and real-time information) to waiting passengers. Staff would be required to manage rider information. Live feed of vessel position to the terminal would also be considered.
- Evaluation and upgrade of camera systems, gates and communications to law enforcement and/or King County offices.

Vashon Island

- Replacement of the existing gangway to the float with a longer gangway (would ensure a slope of 1:12 or less at all tides). Ramps and landings on the float would also be replaced. The gangway replacement would require that the float be moved from its present location approximately 15 degrees west in order to allow construction to commence while one side of the float remained in operation. It would operationally important to keep this float shift to a minimum so that the float would not be moved broadside to waves coming out of the north, where an extremely long fetch exists. An environmental benefit for this minimum shift would that the eelgrass to the west of the passenger-only facility would not be, or at least would be minimally, impacted.
- Evaluation and upgrade of camera systems, gates and communications to law enforcement and/or King County offices.
- Installation of an electronic panel (to provide real-time information) to waiting passengers. Staff would be required to manage rider information. Live feed from the vessel directly back to the terminal would also be considered.

West Seattle

- Evaluation and upgrade of camera systems, gates and communications to law enforcement and/or King County offices.
- Installation of an electronic panel (to provide real-time information) to waiting passengers. Staff would be required to manage rider information. Live feed from the vessel directly back to the terminal would also be considered.

Capital Investment Administrative Services

In addition to the program management costs identified as operating expenses, King County applies a number of indirect rate charges based on capital expenditures. Central Government Overhead, Financial Services, and Department of Transportation Administration indirect rates have been applied to the proposed capital expenditures for purposes of the financial analysis.

Capital Funding

State Funding

Subject to legislative appropriation, state funds are available from the passenger ferry account established by ESSB 6787 and funded by the sale of the Washington State Ferries vessels Chinook and Snohomish. It is assumed that the entire proceeds from the sale of the Chinook and Snohomish would be available to support King County

operation of the Vashon Island service. The most recent estimate of the selling price of the two vessels is $4.5 million each. Sales and survey costs are assumed to be slightly greater than 5% and have been netted against the estimated combined sale price of $9 million. The net funding anticipated from the sale of the two vessels is $8.5 million.

Existing Federal Grants

Currently available federal funds include approximately $600,000 from a 2004 congressional earmark ,and approximately $1.1 million from a 2005 congressional earmark. Additionally, $1 million from the Ferry Boat Discretionary Fund awarded in 2007 as part of the Lake Washington Urban Partnership award is included in the forecast.

Potential Federal Grants

With respect to future funding, potential sources and levels of federal grant funds available for the Vashon Island route and Elliott Bay Water Taxi have been identified. Approximately $0.5 million in Ferry Boat Discretionary funds have been identified for 2008. Formula grant funds (5309(FG)/5307) are anticipated to be available beginning in 2008 for the Vashon Island route and in 2014 for the Elliot Bay Water Taxi.

New Routes

Five new routes have been proposed:

- Kirkland - Seattle
- South Puget Sound - Seattle
- Kenmore - Seattle
- Shilshole - Seattle
- Renton - Seattle

For planning purposes, it has been assumed that the Kirkland route would start service in July 2009, followed by the South Sound route, the Kenmore route, the Shilshole route, and then the Renton route, with a new route starting each year. Actual routes and implementation timing would be determined by the Ferry District.

Analysis for the new routes is at an early preliminary stage. Assumptions have been made for financial planning purposes based on the detailed analysis conducted for the existing routes. This section describes the assumptions that have been made regarding the new routes for the purpose of the financial analysis.

Additional analysis would be needed to prepare for implementation of these routes as demonstration services and on a permanent, in-house basis. This analysis would include assessment of potential terminals, passenger market analysis, travel time assessment, and schedule development.

Service Plan

For financial planning purposes, assumptions have been made for the hours of operation of the new routes. It has

been assumed that the five proposed new routes would have peak-period, weekday service only, utilizing a split-shift crewing arrangement, with four-hours per shift. Detailed analysis of the new routes has not yet been conducted to determine likely travel times. Therefore, no proposed schedules have been prepared. The number of sailings that would be possible within the identified hours of operation would be dependent on a number of factors including the length of the route and constraints on vessel speed and availability of existing docks and floats.

Operations

For planning purposes, it has been assumed that each of these new routes would start with a two-year demonstration period followed by a third year for transition of the route to permanent, in-house service.

Demonstration Phase

Given the tentative nature of a demonstration service, the demonstration phase may include contracted operation of the routes. For financial planning purposes, it is assumed that the contractor for the demonstration service would be responsible for vessel and terminal operations, as well as for providing and maintaining the vessel used for the service. The routes would use existing terminal facilities. A small allowance has been included for minor terminal maintenance. An allowance has also been included for the internal King County costs for administering the contract.

The demonstration routes would be studied and a determination made regarding their viability as permanent services.

Permanent Service

Based on the criteria the King County Ferry District would develop, successful demonstration routes would be transitioned to permanent, in-house services. For financial planning purposes, the annual operating costs for these new in-house routes have been assumed to be the same as the annual operating costs of the Vashon Island route, a service with the same hours of operation as those proposed for the new routes.

Ridership and Fare Revenue

Detailed analysis of passenger markets and travel patterns has not been conducted for the new routes. Given the uncertainties regarding ridership, no fare revenue has been assumed for the demonstration phase of the new routes. As a result, actual net operating costs for the demonstration routes may be somewhat lower than calculated in this analysis.

Once the new routes move to in-house service, fare revenue consistent with the Vashon Island route has been assumed for the purpose of the financial analysis. It is anticipated that only those routes with sufficiently high ridership levels would be transitioned from demonstration to permanent in-house service.

Capital Investments

A number of capital investments would be required to support the implementation of the new routes. It has been assumed that no capital investments would be made for the demonstration phase of each route. However, once it has been determined that a route would move to in-house service, vessel and terminal investments would be made to prepare for the transition.

Vessels

At the conclusion of the demonstration phase, the Ferry District would need vessels for the operation of the new in-house routes. It is proposed that the new routes use the same type of 149-passenger vessel as is proposed for the existing routes. By using the same vessels for the whole fleet, vessel maintenance would be simplified and maintenance cost savings could be realized, as compared to a fleet with a mix of vessels. Capital costs would also be reduced, as the construction of the additional vessels could be added as an option on the initial contract. This approach would save design and other up-front costs for the new vessels.

Terminals - Pier 50

It is assumed that the South Puget Sound and the Shilshole routes would dock at Pier 50. The following terminal improvements would be needed to accommodate the waiting passengers from the two existing routes plus the two new routes:

- Replacement of the tent structure with a new building. New furnishings for the building would be installed. It is anticipated that a two story structure would be required to accommodate the waiting passengers by the time all four routes would be in operation.
- The building would replace the portable toilets with men's and women's restrooms, and would include a janitor's closet and a storage room as janitorial services would be required.
- Utility configuration would be completed for the new terminal building.
- The outdoor passenger waiting area of approximately 760 square feet would remain the same.

Other Terminals

Detailed terminal analysis has not been conducted for the other terminals that would be needed for the new routes. For the five new routes, additional terminals would be required in the following locations:

- Kirkland
- Seattle on Lake Washington
- South Puget Sound (Des Moines, Tacoma, or Gig Harbor)
- Kenmore
- Shilshole
- Renton

High level, order of magnitude cost estimates have been developed for each terminal based on industry experience of terminal construction costs in the Puget Sound and Lake Washington contexts.

Moorage

Separate moorage facilities would be needed for the Puget Sound routes and the Lake Washington routes. With the addition of three new vessels for two new Sound routes, the moorage and maintenance base established for the existing routes would need to be expanded. Construction of one new float is assumed for financial planning purposes.

A satellite moorage facility would be needed in Lake Washington for the Kirkland, Kenmore, and Renton routes. For financial planning purposes, it has been assumed that a suitable facility could be leased.

Financial Plan

The financial plan forecasts operating and capital costs and revenue for the ten year period beginning in 2008 and extending through 2017. Initially the plan assumes State operation of the Seattle Vashon route and contractor operation of the Elliot Bay Water Taxi. Starting in approximately 2009 both routes are expected to be operated directly by the Ferry District, through a contracted arrangement with King County. The start of in-house EBWT service is dependent on the completion of dock improvements that are required for winter service. These improvements would be complete no later than 2010.

The new routes would begin with demonstration services and then move to in-house service. The first route would start as a demonstration in July 2009, with an additional route starting each year through 2013. In 2012, the first new route would move to in-house service. By July 2016, the King County Ferry District would be operating seven permanent routes - the two initial existing routes plus the five new routes.

Operating Costs and Revenue

Based on the assumptions outlined in the Existing Routes Operations Plan and New Route Operations sections, a detailed cost analysis was prepared for the 10-year planning horizon. Estimates of annual operating costs and operating revenue are summarized in the following tables. The first table summarizes the annual operating costs for operating the existing routes, plus the overall program management and administration costs that are associated with operating the passenger-only ferry system. The second table identifies the typical annual operating cost for each new route, showing both the demonstration phase costs and the in-house service costs. The third table summarizes the operating revenue assumptions. The annual operating costs below reflect a full year of operations for a route.

Existing Route Annual Operating Costs

Annual Operating Costs		
	Vashon Route Allocated Costs	
	Operating Costs	$1.7 million/year
	Shuttle Costs	$0.3 million/year
	EBWT Route Allocated Costs	
	Operating Costs	$2.9 million/year
	Shuttle Costs	$0.5 million/year
	System-Wide (Shared) Costs	
	Program Management and Administration Costs	$1.5 million/year
	Total Existing Route Annual Operating Costs	**$6.9 million/year**

New Route Additional Operating Costs Per Route Per Year

Annual Operating Costs	**Demonstration Phase Costs (per route per year)**	
	Operating Costs	$0.7 million/year
	Shuttle Costs	$0.3 million/year
	Route Study Costs	$0.15 million/year
	Administrative Overhead	$0.05 million/year
	Total Demonstration Phase Annual Operating Costs	**1.2 million/year**
	New Route Permanent Service Costs (per route per year)	
	Operating Costs	$1.6 million/year
	Shuttle Costs	$0.3 million/year
	Program Management and Administration Costs (additional per route costs)	$0.1 million/year
	Total New Route Permanent Service Annual Operating Costs	**$2.0 million/year**

Annual Operating Revenue

Revenue	Projected Fare Revenue, Existing Routes (Vashon Island Route and EBWT)	$0.9 million/year
	Assumed Fare Revenue, New Routes (per route per year)	$0.6 million/year
	Advertising Revenue	$0.05 million/year

Capital Costs and Funding

Based on the assumptions outlined in the Existing Routes Capital Investment Plan and the New Routes Capital Investment sections, a detailed cost analysis was prepared for the 10-year planning horizon. Estimates of total capital costs and funding are summarized in the following tables. The first table identifies the anticipated capital costs for the existing routes, including shared system costs. The second table provides estimates of the capital costs associated with each proposed new route. These costs are additive costs - they are additional costs above the costs associated with the existing routes. The distribution of costs for the new routes is linked to the assumed order of implementation. The third table summarizes anticipated capital funding. All values are in 2009 dollars.

Existing Route Capital Costs - 10-Year Total

Capital Costs	**Vashon and Elliott Bay Water Taxi Routes**	
	Vessels (three) (lease, purchase, major maintenance)	$23.9 million
	Vashon Island Terminal	$2.4 million
	West Seattle Terminal	$8.0 million
	Pier 50	$5.9 million
	Moorage/Maintenance Facility	$12.8 million
	Administrative	$2.5 million
	Total Capital Costs	**$55.5 million**

New Route Additional Capital Costs

Capital Costs	
Vessels	
Primary (5)	$35.1 million
Back-up (2)	$11.9 million
Kirkland Route Allocated Costs	
Kirkland Terminal	$4.9 million
Seattle Terminal	$4.9 million
South Puget Sound Route Allocated Costs	
South Puget Sound Terminal (Des Moines, Tacoma, or Gig Harbor)	$4.1 million
Pier 50 Upgrades	$3.6 million
Kenmore Route Allocated Costs	
Kenmore Terminal	$5.1 million
Shilshole Route Allocated Costs	
Shilshole Terminal	$3.0 million
Pier 50 Upgrades	$3.7 million
Moorage Upgrades (Harbor Island/Duwamish Area Facility)	$4.0 million
Renton Route Allocated Costs	
Renton Terminal	$5.1 million
Total Capital Costs	**$85.4 million**

Capital Funding

Funding	
State Funding (Sale of WSF Vessels)	$8.5 million (estimate)
Existing Federal Grants	$2.7 million
Potential Federal Grants	$11.6 million
Total Other (Non-FD) Funding	**$22.8 million**

Levy Rate

The financial analysis concludes that the proposed operations plan and capital investment plan can be implemented with a levy rate of $0.055 per $1,000 of assessed value, with levy collections commencing in 2008.

APPENDIX

D

Transportation Survey: Vashon Water Taxi Riders

King County

Transportation Survey: Vashon Water Taxi Riders

Prepared for King County Marine Division
by Gilmore Research Group

King County Transportation
201 S. Jackson St
Seattle, WA 98104
Phone: 206-684-1551

March 2012

TABLE OF CONTENTS

Background and Objectives

The King County Marine Division is interested in receiving input from Vashon Water Taxi riders and Washington State Ferry Vashon – Fauntleroy riders regarding technology enhancements and rider amenities that may encourage ridership of the Vashon Water Taxi.

The objectives of this study are to:

- Understand travel patterns of riders including pre-boarding behavior and frequency of travel
- Explore information preferences of travelers

Methodology

The population sought after for this study includes individuals who travel from Seattle to Vashon Island. In order to reach this population, the sampling frame includes all passengers who ride the Vashon Water Taxi and walk-on passengers as well as passengers who were on buses on the Washington State Ferry (WSF) Vashon-Fauntleroy route. Gilmore Research intercept interviewers approached passengers waiting for the Water Taxi, passengers at the Vashon ferry terminal in the morning, and at Pier 50 in the afternoon. On the WSF Vashon – Fauntleroy ferry interviewers rode the ferry and approached foot passengers as they boarded and also approached passengers who were riding the bus. Interviewers had both paper questionnaires and post cards with unique pin numbers for an online survey available to give to passengers. Passengers had two options; to complete the survey on paper or to go online.

A total of 639 surveys were completed by riders on the Vashon Water Taxi and the WSF Vashon – Fauntleroy ferry.

- 466 surveys were completed on the Water Taxi (73%).
- 173 surveys were completed on the WSF ferry (27%). Of these, three opted to complete the survey online.

The intercepts were conducted on February 16th, and 21st through 23rd, however questionnaires were completed online through February 27th.

Disposition Report for Data Collection

	February 14th Peak to Seattle			February 21st Peak to Vashon		
	6:10am	7:10am	8:15am	4:30pm	5:30pm	6:30pm
Completed Questionnaires	70	136	107	59	47	39
Total Number of Passengers	77	150	120	128	132	92
% of All Riders on Sampled Trips	91%	91%	89%	46%	36%	42%

	February 14th Reverse trip to Vashon			February 21st Reverse trip to Seattle		
	5:30am	6:38am	7:40am	4:58pm	5:58pm	6:58pm
Completed Questionnaires	1	0	2	3	2	0
Total Number of Passengers	1	0	3	10	2	0
% of All Riders on Sampled Trips	100%	NA	67%	30%	100%	NA

Analyst Notations

Due to the nature of a self-administered questionnaire, base sizes can vary from question to question as respondents choose to or inadvertently skip questions. The percentages noted in this summary report reflect all respondents who answered the question. Please refer to the banner tables for exact base sizes for each question.

The Washington State Ferry (WSF) references are related only to the Southworth-Vashon-Fauntleroy route. The Water Taxi is always in reference to the Vashon Water Taxi.

Due to rounding, the percentages in the graphics do not always add to exactly 100%.

All noted differences between subgroup populations (gender, age, etc.) are significant at the 95% confidence level.

Summary of Findings

Pre-Departure Behavior

Four out of five travelers live and start their commute on Vashon Island (81%). One out of six begin their trip in Southworth (16%), with only a few starting in Fauntleroy (3%) or Pier 50 in Seattle (1%).

- Those who have used the Water Taxi in the past 30 days are more likely to live on Vashon Island (84%) than those who haven't ridden the Water Taxi in the past 30 days (66% live on Vashon).

When riding the ferry, commuters, on average, leave their home 27 minutes before the ferry is scheduled to depart.

- Travel time does vary by departure location. Those living on Vashon leave slightly earlier (28 minutes prior) than those who leave from Southworth (24 minutes prior) or Fauntleroy (25 minutes prior).

At the end of the day, on average, travelers leave their workplace, school, or other business 32 minutes before the scheduled departure to leave out of Pier 50 in Seattle and 46 minutes before departure when leaving out of Fauntleroy.

Travelers typically arrive at the terminal around 12 minutes before departure on Vashon Island and 17 minutes before departure at Pier 50 in downtown Seattle.

- Students usually give themselves more time at each terminal, with 21 minutes prior to departure at the Vashon Island terminal and 22 minutes prior to departure Downtown.

Summary Table: Average Times in Minutes from Departure Terminal		Vashon Island	Downtown Seattle	Fauntleroy	Southworth
	(Base)	*(511)*	-	*(17)*	*(101)*
Leave home before departure		28.2	-	25.3	24.1
	(Base)	-	*(475)*	*(270)*	-
Leave work/school before departure		-	32.5	46.3	-
	(Base)	*(476)*	*(459)*	-	-
Arrive at terminal before departure		11.5	17.3	-	-

Water Taxi Use

When asked about purposes for using the Water Taxi, specifically, more than three out of four travelers use the Water Taxi for work purposes (78%). Four out of ten use the Water

Taxi to "return home" (40%), 13% use it to travel for recreation, 7% for medical or other appointments, 4% for school, and 11% say they do not use the Water Taxi.

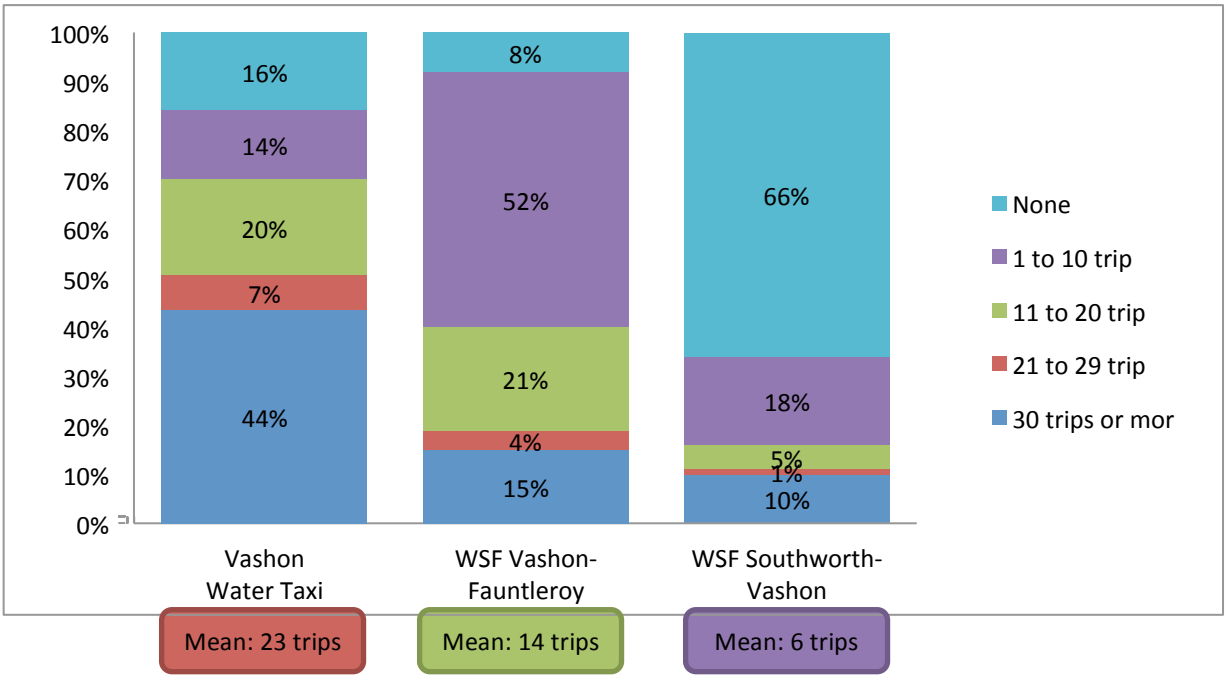
- Males are more likely than females to use the Water Taxi for work (82% vs. 74%).

Trips on Vashon Island/Seattle Route

In the last 30 days, the average traveler took 23 trips on the Water Taxi (approximately 11.5 round trips). At least four out of five respondents reported using the Water Taxi for at least 30 single trips in the past month (44%). One-third of passengers interviewed take the Water Taxi less than 20 times in a month. Roughly one out of seven respondents have not ridden the Water Taxi in the past 30 days.

Most travelers who start their day at the Vashon (87%) or Southworth (82%) terminals have ridden the Water Taxi in the past 30 days, while only 7% of those who start their day at Fauntleroy have ridden the Water Taxi in the last month.

The chart below shows that those riding the Vashon Water Taxi ride on a more regular basis, where the WSF Vashon-Fauntleroy route is used less frequently, possibly for those not regularly leaving the Island. Two-thirds of this population have not taken the WSF route traveling from Southworth to Vashon Island in the past 30 days (66%).



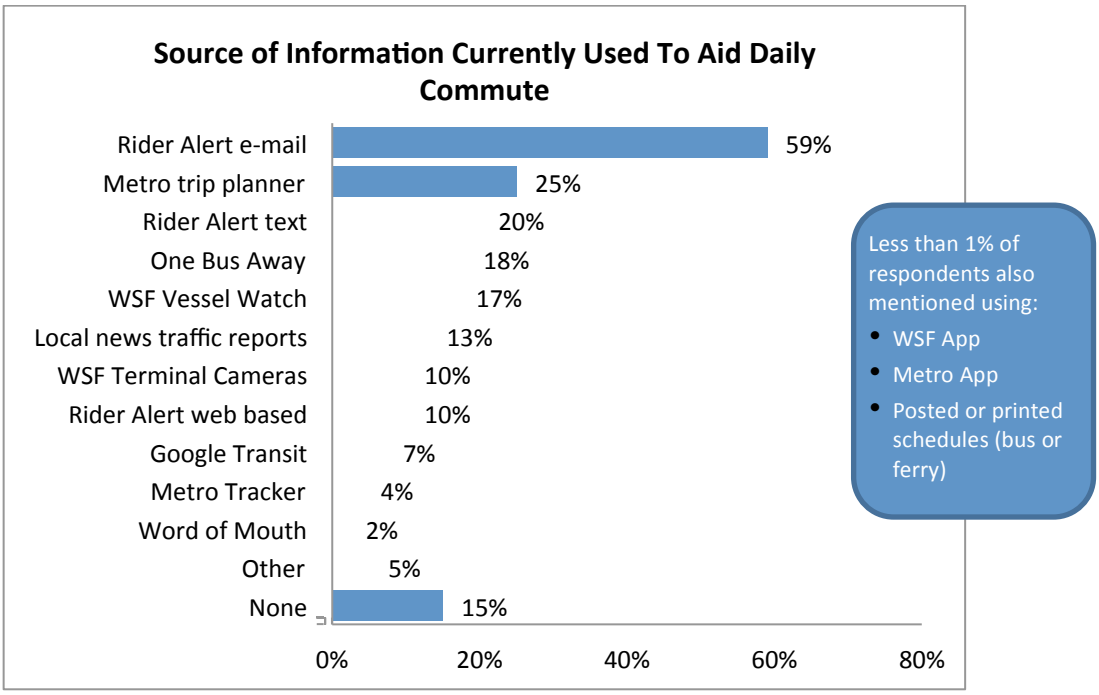
Transportation to Water Taxi Terminal

Travelers use various means to bring them to the Water Taxi terminals. On Vashon Island, the primary methods of travel are the bus (47%) or driving their own vehicle and parking at the terminal (46%). On the Seattle side, the majority of commuters are able to walk to/from their destination from the Water Taxi terminal (84%), but the bus is still used by 30% of commuters on the Seattle side as are bicycles (11%). Respondents were allowed multiple responses to this question.

	Vashon Island	Downtown Seattle
(Base)	*(508)*	*(512)*
Bus	47%	30%
Private vehicle parked	46	2
On foot	15	84
Ferry	12	<1
Bike	10	11
Private vehicle drop-off	10	-
Vanpool	1	2
Don't take Water Taxi	1	-
Other	2	3

Travelers Information

The Rider Alert information is used by the largest percentage of commuters, who mainly utilize the Rider Alert e-mails (58%). The information used is a combination of being alerted (Rider Alerts) and looking into the status on their own (Trip planner, One Bus Away, traffic reports). One out of five travelers receive Rider Alert text messages on their phones (20%).



Respondents were asked which sources of information (that are not currently available for the Water Taxi) would be useful for travelers when preparing to ride the Water Taxi. One out of five respondents would like to access Water Taxi information on the application "One Bus Away" (21%) and one out of five would also like to see the Water Taxi on "Vessel Watch" (20%). Others mentioned the Metro Trip Planner (15%), Terminal Cameras (12%),

Facebook (8%), and Twitter (6%) as helpful information sources for the Water Taxi. Four out of ten did say they do not feel any additional sources of information are necessary (42%).

Ideally, commuters would like to see the real time of the next departure displayed publicly more than any other information (67%). A published vessel schedule (44%), Vessel Watch (35%), and One Bus Away (30%) are also requested to be on public display. A few commuters requested having cancellation notices (2%), capacity counts or how close a ferry is to being full (2%), delay notices (1%), and weather or wind conditions (1%) posted for traveler information.

Accessing Information Regarding Travel

When looking up traveler information, respondents are likely to use several electronic devices. More than half use their smart phone (55%), half check information before leaving their home or office on a desktop computer (50%), and 41% look up information on a laptop or mobile computer. Tablets (11%) and cellular (not smartphones) phones (8%) are less common devices to use for travel updates.

Outside of electronic devices, it would be most helpful for travel information to be posted in public at Water Taxi terminals (80% agree). There is also support for information to be displayed on other transit vehicles or ferries (45%) or on board Water Taxi ferries (41%).

Reasons for Not Riding the Water Taxi

Nearly three out of ten respondents identified themselves as individuals "not riding the Vashon Water Taxi on a regular basis" (29%). The two most frequently mentioned reasons for not riding the Water Taxi regularly are because the schedule is not convenient for them (41%) and because it is easier for the traveler to reach their destination by riding WSF (38%). Just over a quarter of those who aren't regular riders shared a concern that the Water Taxi will overload before they are able to board (27%). The cost (17%), lack of transit connection options (16%), and fact that some travelers aren't regular commuters (10%) are also reasons for not being a regular rider on the Water Taxi.

Additional Comments from Respondents

Roughly half of all respondents opted to share an additional comment related to the Water Taxi (n=323). Almost one-third of those who commented said they love the Water Taxi and want it to continue service (31%). A few requested that the capacity on the boats be increased (18%), the schedule include weekends (13%), the boats travel more frequently (13%), and that the schedule offer later evening runs (11%).

A handful of travelers made each of the following comments regarding the Water Taxi:

- Better connections (bus/ferry/taxi) would be nice
- Want more information on the plans for the new dock
- Don't want to be left behind at the dock

- Would like a covered shelter to wait for the ferry
- Free WIFI on Water Taxi
- Want a direct route from Southworth to Downtown Seattle
- Expand midday boat schedule
- Expand morning boat schedule
- Water Taxi is better than WSF
- Riders love the ferries
- Want notification of capacity
- Send out cancelled run alerts as soon as possible
- Provide food/drinks
- Are reliable
- Lower the cost
- Add more seating.

Respondent Demographics

Just over half of respondents are male (58%) and the average age of those interviewed is 48.6 years old.

When looking at differences between Water Taxi Riders and non-riders, the age of non-riders is significantly younger than those who ride the Water Taxi. When looking at the average number of trips taken on the water taxi, the under 25 age group averages only 9 trips per 30 days, a significantly lower number than the average of 22 trips for all travelers.

	Total	Water Taxi Riders	Non-Water Taxi Riders
(Base)	*(623)*	*(513)*	*(92)*
Gender			
Male	58%	59%	55%
Female	42	41	45
Age			
1 to 34	12%	9%	22%
3 to 44	19	20	12
4 to 54	33	35	21
5 to 64	31	31	31
6 and older	5	4	9
Average	*48.6*	*49.1*	*46.6*

Conclusions

Individuals who live and work on Vashon Island are pleased with the Water Taxi service and more than four out of five travelers interviewed have used the Water Taxi in the past month. The Water Taxi is used mostly to travel to or for work, and those traveling for work use the Water Taxi more, on average, than those traveling for recreation or other appointments.

The Water Taxi is used more frequently by travelers than the WSF Vashon-Fauntleroy route, indicating that the Water Taxi may be used by daily commuters and WSF could be used for

daily (non-routine) trips. Those who do not consider themselves "regular riders" of the Vashon Water Taxi shared that the schedule is not always convenient for their travels or their destination is easier to access from the WSF terminal.

Water Taxi and WSF riders typically give themselves more time to get to the ferry on their return trips (typically afternoon/evening trips) than in the morning trips. They also arrive at the Downtown Seattle terminal with more time before departure than they allow themselves before departure at the Vashon Island terminal.

Transportation to the terminals also varies by location. Those traveling to the Vashon docks are likely to travel by bus or personal vehicle, while those leaving from the Downtown terminal typically travel to and from the terminal by foot.

For communication, Rider Alert emails are more popular than any other method. Most travelers access information by smart phone, desktop computer, or laptop, but riders still see value in displaying information in Water Taxi terminals. Some Water Taxi commuters would like for Water Taxi information to be available on the One Bus Away Application or on Vessel Watch. It would also be beneficial for real-time departure data to be publicly displayed.

APPENDIX

Copy of Paper Questionnaire is on following two pages.

King County Water Taxi

Seattle Vashon Water Taxi Traveler Information Survey

Your input is needed. The King County Water Taxi is exploring ways to improve traveler information for the downtown Seattle-Vashon route. To design a system that really works for our riders and potential riders we need to know more about your travel patterns and information preferences. Please take a few minutes to complete this survey.

Your participation is important and is greatly appreciated. Your travel information and opinions will remain strictly confidential. When you finish the survey, please hand it back to any on-board survey personnel.

1. When you leave your home which ferry terminal do you depart from first?

☐ Vashon Island ☐ Pier 50-Seattle
☐ Southworth ☐ Fauntleroy

2. On average, how many minutes before a scheduled ferry departure do you leave your home to travel to the ferry terminal? _____ minutes

3. On average how many minutes before the scheduled ferry departure do you leave your workplace/school or other departure location to travel to the ferry terminal?

_____ minutes to Fauntleroy _____ minutes to Pier 50-Seattle

4. How many minutes before the scheduled departure do you *typically* arrive at the terminal?

_____ minutes on Vashon Island _____ minutes at Pier 50-downtown Seattle

5. For what purpose(s) do you ride the Water Taxi? *Check all that apply.*

☐ Work ☐ Return home
☐ School ☐ Other (*write in*) _____
☐ Recreation ☐ Do not ride water taxi
☐ Medical or other appointments

6. How many times have you ridden the King County Vashon Water Taxi – Vashon route in the last 30 days? *Count a round trip as two times.* ____ times

7. How many times have you ridden the Washington State Ferries *Vashon-Fauntleroy* route in the last 30 days? *Count a round trip as two times.* _____ times

8. How many times have you ridden the Washington State Ferries *Southworth-Vashon* route in the last 30 days? *Count a round trip as two times.* _____ times

IF YOU DID NOT RIDE THE WATER TAXI IN THE LAST 30 DAYS GO TO QUESTION 11 ON THE OTHER SIDE.

9. How do you travel to the Water Taxi terminal on Vashon Island? *Check all that apply.*

☐ Bus ☐ Bike
☐ Ferry ☐ On Foot
☐ Vanpool ☐ Other (*write in*) _____
☐ Private vehicle and parked
☐ Private vehicle dropped off

10. How do you travel to the Water Taxi terminal in Seattle? *Check all that apply.*

☐ Bus ☐ Private vehicle ☐ On Foot
☐ Ferry ☐ Bike ☐ Other (*write in*) _____
☐ Vanpool

PLEASE TURN PAGE

11. What sources of traveler information do you currently use to aid your daily commute? *Check all that apply.*

- ☐ Rider Alert e-mail
- ☐ Rider Alert text
- ☐ Rider Alert- web based
- ☐ WSF Vessel Watch
- ☐ WSF Terminal Cameras
- ☐ Local new traffic reports
- ☐ Metro trip planner
- ☐ One Bus Away
- ☐ Metro Tracker
- ☐ Google Transit
- ☐ Other (*write in*) _____
- ☐ None

12. What sources of traveler information, not currently available for Water Taxi routes, would be useful to you when you prepare to travel on the Seattle-Vashon Water Taxi? *Check all that apply.*

- ☐ Vessel Watch
- ☐ Terminal Cameras
- ☐ One Bus Away
- ☐ Metro Trip Planner
- ☐ Twitter
- ☐ Facebook
- ☐ Other (*write in*)_____
- ☐ None

13. What electronic devices do you use to access traveler information?

- ☐ Desktop computer
- ☐ Laptop or mobile computer
- ☐ Tablet computer
- ☐ Smartphone
- ☐ Cellular phone
- ☐ Do not use electronic devices

14. In addition to your own personal electronic devices, would it be useful to you to have traveler information available in public displays at the following locations? *Check all that apply.*

- ☐ At Water Taxi terminals
- ☐ On board the Water Taxi
- ☐ On other transit vehicles or ferries

15. What sources of information would you like to see on public display? *Check all that apply.*

- ☐ Vessel Watch
- ☐ Published Vessel Schedule
- ☐ Realtime Next Departure
- ☐ One Bus Away – Transit
- ☐ Other(*write in*)_____

16. Are you? ☐ Male ☐ Female

17. How old are you? _____ years

18. If you are NOT riding the Vashon Water Taxi on a regular basis, please indicate the reasons: (*Choose as many as you like*)

- ☐ Schedule is not convenient for me
- ☐ Concerned that the Water Taxi will overload before I board
- ☐ It is easier to reach my final destination by riding WSF
- ☐ Transit connections are not good for me
- ☐ Cost
- ☐ Other (*write in*)_____

19. Is there anything else you would like to share?

_____

_____

THANK YOU VERY MUCH FOR YOUR HELP.

APPENDIX

E

Technology Options Scoring Matrix

Criteria Weight	8	8	6	8	10	16	12	16	16	
	1 Cost to develop and Implement	2 Time to develop and implement	3 Interdependency with other systems	4 Interdependency with other agencies	5 Complex or difficult to implement	6 Rder demand for option	7 Likely to increase ridership	8 Likely to improve current riders' travel experience	9 Likely to improve operations	**Total Points**
Raw Score										
Technology Deployment										**0**
4.1.1 Boarding Information										**0**
4.1.2 Boarding Likelihood										**0**
4.1.3 On-Vessel Real-Time Connection Information										**0**
4.1.4 Video Detection for Passenger Counting										**0**
4.1.5 Terminal Cameras										**0**
Partnership										
4.2.1 Integration with VesselWatch										**0**
4.2.2 Social Media										**0**
4.2.3 Smartphone Applications										**0**
Weighted Score										
Technology Deployment										
4.1.1 Boarding Information				0		0	0	0	0	**0**
4.1.2 Boarding Likelihood				0		0	0	0	0	**0**
4.1.3 On-Vessel Real-Time Connection Information				0		0	0	0	0	**0**
4.1.4 Video Detection for Passenger Counting				0		0	0	0	0	**0**
4.1.5 Terminal Cameras				0		0	0	0	0	**0**
Partnership										
4.2.1 Integration with VesselWatch				0		0	0	0	0	**0**
4.2.2 Social Media				0		0	0	0	0	**0**
4.2.3 Smartphone Applications				0		0	0	0	0	**0**

APPENDIX

F

Demonstration Project Definition and Phased Implementation Plan

DEMONSTRATION PROJECT DEFINITION AND PHASED IMPLEMENTATION PLAN

King County Water Taxi

Prepared for
King County Marine Division

Prepared by
KPFF

In cooperation with

Parsons Brinckerhoff

13 August, 2012

Version 1.1

TABLE OF CONTENTS

1. Purpose of Document

1.1. Introduction

As a subtask under the King County Ferry District Passenger-only Ferry Routes (Contract T03079T), KPFF and Parsons Brinckerhoff (PB) are studying technology to enhance the Vashon Island Passenger-Only Ferry service with a focus on passenger processing systems (operational improvements) and enhanced traveler information (passenger amenities). This demonstration project definition will provide clarity around the technology demonstration project, issues and challenges, timeline, and proposed budget.

2. Technology Demonstration Project – Boarding Information

The boarding information project will provide passengers with schedule and boarding lane assignment information via on-dock variable message signs (VMSs), updated KCMD website, and a Smartphone application.

2.1. On-Dock

The on-dock portion of the project will provide passengers with schedule and boarding information on the dock at Pier 50 via one variable message sign (VMS), located on the secure side of the white ornamental fencing (close to where the sidewalk and the dock meet

VMS mounting site is shown below:

The VMS will be large enough to display 6 lines of text, where the first line of text would provide header information, the next four lines of test would provide scheduled sailing information for the ferry runs, and the final line of text could provide ad-hoc or customer-focused information. A sample VMS panel message might look as follows:

VASHON ISLAND 5:30PM LANE A

W SEATTLE 5:45PM LANE B

Or

DEST LN TIME

VASHON IS B 5:30PM

W SEATTLE A 5:45PM

Additionally, fixed message signs will be installed to clearly identify the boarding lane locations.

2.2. KCMD Website Improvements

The KCMD website improvement portion of the project will include real-time vessel arrival or vessel positioning using output from VesselWatch or MarineTraffic.com, terminal site maps, frequently asked questions (FAQs), other transportation services. Optional improvements might include adding Facebook notifications (assuming they can be easily added to the email alert stream) and passenger count by ferry (delayed at least 30 minutes).

2.3. Smartphone / Mobile

The Smartphone portion of the project will include providing information that is currently on the website (schedules and general information) and developing a real-time vessel arrival information or vessel positioning application using output from VesselWatch or MarineTraffic.com and will have a link to a mobile-friendly version of the KCMD website.

3. Issues and Challenges

While all of the issues and challenges listed below are relevant to this technology demonstration project, both procurement process and permitting have the greatest potential impact to how and when the project moves forward.

3.1. Procurement Process/Project Complexity

This demonstration project integrates common information elements onto a number of information dissemination platforms. There will be a procurement package for each of the three projects listed above.

3.2. Permitting

It is anticipated that the on-dock portion of this project will require KCMD to submit plans to the City of Seattle's Department of Planning and Development (DPD) for permit application review. So far, the DPD has recommended a shoreline substantial development ("use") permit, sign, electrical, and building ("improvement") permits, and a SEPA (State Environmental Protection Act) checklist. The City estimated that it will take 4-6 months to obtain a use permit

and 1-2 weeks to obtain improvement permits. The project team's research showed 6-8 weeks to obtain improvement permits. Additionally, the project team is not convinced that a shoreline substantial development permit will be required as the use has already been granted.

In order to begin the permitting process, regardless of what permits will ultimately be required, a Preliminary Application Form (PAF) will need to be completed and submitted to the DPD along with a site plan indicating the location of the project. Additionally, the DPD suggested that a Statement of Financial Responsibility/Agent Authorization and Section B of the Contractor Disclosure Form be completed and submitted with the PAF.

Application forms for all the permits recommended by DPD and the SEPA Checklist are included in Appendix 1.

Within the design team, we are not convinced that a use permit is required or that this work constitutes substantial development. Therefore, the project team suggests the following actions:

1. Engage in an informal conversation with WSF permitting expert regarding permitting of Pier 50 and what experience they have working with the City permitting office.
2. Write a letter to the City explaining that KCMD will not be submitting a shoreline substantial development permit request, list the reasons why, and list the permit applications KCMD will be pursuing.
3. Go forward with the improvement permitting and SEPA activities.
4. Consider requesting temporary permits as this is a demonstration project.
5. Consider a backup plan where Smartphones and the KCMD website are the only information delivery methods. The project team recognizes the equity issue that may be raised with only a KCMD website and Smartphone solution and would only recommend this as a last resort to moving forward with a demonstration project.

3.3. Marine Environment

The salty and wet marine environment is destructive to equipment and devices installed outdoors. The project will need to protect, as much as possible, the equipment from the elements by mounting them in NEMA (National Electrical Manufacturers Association) rated stainless steel boxes. These boxes and equipment increase the overall cost of the construction/implementation.

3.4. Washington State Ferries (WSF) Review/Coordination

WSF owns Pier 50 and therefore, any changes KCMD intends to make will need to be reviewed and approved by WSF. There is an intent to work collaboratively on this project, and this review and approval process has been included in the proposed timeline.

3.5. NTCIP Compliance

There is a national standard for interoperable VMSs represented by the National Transportation Communications for ITS (Intelligent Transportation Systems) Protocol – NTCIP. In order to ensure that the VMSs can be run via open platform software and used by any group within King County, and to be compliant with the regional ITS architecture, it is recommended that NTCIP-compliant VMSs are used in this demonstration project.

3.6. Structural Research

The project team made some preliminary assumptions regarding where and how to mount the VMSs. As-built plans obtained from WSF provided information needed to design the VMS mounting hardware at the ornamental fencing.

4. Updated Timeline

The timeline assumes a 6 week cycle for permitting and concurrent review by WSF and the City permit review. The schedule also assumes ordering the signs simultaneously with the City permit review. The permit recommendations of the City's DPD will require further discussion amongst the project team regarding the project definition and project timeline.

See Appendix 2 for the updated timeline

5. Budget

The budget is based on the assumption that the VMSs can be mounted to existing structural elements and will not require a separate support structure.

See Appendix 3 for the proposed budget.

Appendix 1 – Permit Background Information

Department of Planning and Development
CAM Client Assistance Memo 209
Seattle Permits
— part of a multi-departmental City of Seattle series on getting a permit

Master Use Permit Application Requirements for Shoreline Permits

Updated May 11, 2006

This Client Assistance Memo (CAM) summarizes Seattle Master Use Permit (MUP) application requirements for shoreline permits, including substantial development permits, shoreline variances, special uses and shoreline conditional uses. **Applicants should read the entire document carefully before submitting an application.**

Shoreline permits are elements of the Master Use Permit system administered by DPD. Shoreline permit regulations are required by the Shoreline Management Act of 1971, as amended, Chapter 90.58 of the Revised Code of Washington (RCW). This state law requires local governments to establish a program consistent with rules adopted by the state Department of Ecology (DOE) for the administration and enforcement of the permit system titled State of Washington Shoreline Master Program Guidelines.

Accordingly, the City has adopted regulations for the shorelines of the City in the Seattle Shoreline Master Program. Those regulations are contained in Chapter 23.60 of the Seattle Municipal Code.

Permit Requirements

A Shoreline Substantial Development Permit is required for projects that propose to undertake a "substantial development" within the "Shoreline District" as defined by the Seattle Shoreline Master Program.

Substantial development is generally defined as any development, the total cost or fair market value of which exceeds five thousand dollars ($5,000), OR any development that materially interferes with the normal public use of the water or shorelines of the City, unless it is exempt from the requirement.

EXEMPTIONS—State law specifically exempts certain types of development from the requirement to obtain a Substantial Development Permit. See CAM 209A, *Shoreline Substantial Development Exemptions Application Instructions*, to determine if your project may be exempt. If your project is exempt, you must obtain a written confirmation from the DPD Shoreline Exemption Officer before any other required City of Seattle, state or federal permit can be issued.

The City's shorelines (designated the "Shoreline District") include Seattle's saltwater shorelines, Salmon Bay, Lake Union, the Ship Canal, Lake Washington, Green Lake, and the Duwamish River, PLUS all "associated wetlands" of these waters. By definition, associated wetlands comprise an area extending 200 feet landward, as measured on a horizontal plane from the ordinary high water mark, floodways, river deltas and flood plains associated with such areas, and generally swamps, marshes, bogs and similar areas.

Other Permits Required

The Shoreline Substantial Development Permit **does not** take the place of any other required permit or review. A project or development may also require, among others, a building or grading permit, a variance or conditional use, an Environmentally Critical Areas (ECA) review, a State Department of Ecology Water Quality Certification, Hydraulic Project Approval (HPA), a lease from the State Department of Natural Resources, and/or a federal Army Corps of Engineers' permit for work in navigable waters of the U.S. A listing of the more common permits or approvals that may be required is provided for your convenience in Appendix B.

What To Do Before Making an Application for a Substantial Development Permit

Presubmittal Conference

DPD strongly encourages applicants to have a presubmittal conference with a Land Use Planner. These staff members can assist and advise applicants on shoreline regulations at any stage of a project's devel-

City of Seattle
Department of Planning and Development (DPD)
www.seattle.gov/dpd
Applicant Services Center Phone: 206-684-8850
700 Fifth Avenue, Suite 2000 Fax: 206 233-7866
P.O. Box 34019
Seattle, WA 98124-4019

DPD Project Number

Site Address: _____
Legal Description/Tax Number: _____
Property Owner's Name: _____
Address: _____
Phone Number:

PLEASE COMPLETE SECTION: A OR B, AND SIGN THE FORM.

A. REGISTERED CONTRACTOR DISCLOSURE

To be completed as soon as a contractor has been selected, but prior to the start of any work authorized under the permit noted above.

☐ Owner/lessee to serve as contractor for all work
☐ Prime Contractor
Firm Name: _____
Contact Name: _____
Address: _____
Phone Number: _____
Contractor License:

B. DECLARATION IN LIEU OF GENERAL CONTRACTOR REGISTRATION

State of Washington)
County of King)

I, _____, state as follows:
(Print name as signed)

I have made application for a building permit from the City of Seattle, Washington.

1. I understand that state law requires that all building construction contractors be registered with the State of Washington. The exceptions to this requirement are stated under Section 18.27.090 of the Revised Code of Washington (RCW), a copy of which is printed on the reverse side of this affidavit.
2. I understand that prior to issuance of a building permit for work that is to be done by a contractor, the City of Seattle must verify either that the contractor is registered by the State of Washington, or that one of the exemptions stated under RCW 18.27.090 applies.
3. In order to provide verification to the City of Seattle of my compliance with this requirement, I hereby attest that after reading the exemptions from the registration requirement of RCW 18.27.090, I consider the work authorized under this building permit to be exempt under No. (see reverse for a full list), and will therefore, not be performed by a registered contractor.
4. I understand that I may be waiving certain rights that I might otherwise have under state law in any decision to engage an unregistered contractor to perform construction work.

_____
Applicant's Signature

_____, 20
Date signed

Revised 9/27/10

City of Seattle
Department of Planning and Development
Mailing Address: 700 5th Ave, Suite 2000, PO Box 34019, Seattle, WA 98124-4019
Phone: (206) 684-8464 **Fax:** (206) 684-8113
Website: www.seattle.gov/dpd **Permit Counter Email:** otcpermits@seattle.gov
ASC Hours: M / W / F 8:00-4:00 & Tu / Th 10:30-4:00

PERMIT APPLICATION

Electrical
NO Plan Review

Work Site Address: _____ **Zip:** _____

Work Activity Location *(floor#, apt#, suite#, etc.)* **:** _____

Occupancy: ☐ **Single Family** ☐ **Multi-Family** ☐ **Commercial** ☐ **Institutional** ☐ **Industrial**

Description of Work: _____

_____

☐ **UFER GROUND** ☐ **UFER GROUND TESTING - Requires Associated Construction Permit #:** _____

☐ **"GET STARTED" - Conditional Work Permit - Requires Associated Plan Review Permit #:** _____

WORK SITE OWNER/TENANT INFORMATION	CONTRACTOR INFORMATION
☐ **Owner** ☐ **Tenant**	**State License #:** _____
Name: _____	**Contractor Co Name:** _____
Phone: (_____) _____	**Contact Name:** _____
Fax: (_____) _____	**Phone:** (_____) _____
Address: _____ **Apt/Ste:** _____	**Fax:** (_____) _____
City/State: _____ **Zip:** _____	**Address:** _____ **Apt/Ste:** _____
	City/State: _____ **Zip:** _____

CONNECTIONS	QTY
Light Fixtures (luminaires)	
Switches	
Receptacles	
*Fixtures (Commercial)	
Residential Fans (Exhaust)	
Track Lighting (Total Feet)	
Multi-Outlet Assembly (Total Feet)	
Smoke Detectors (Hard Wire)	

MOTORS (HSPWR)	QTY

ELECTRIC HEAT (KW)	QTY

DEVICES & BRANCH CIRCUITS	QTY
Dimmers (Commercial) >2000 Watts	
Furnace (Non-Electric)	
Dedicated Appliance Circuits (15-25 Amps)	
Dedicated Appliance Circuits (30-50 Amps)	
Floodlights (Commercial Parking Lot, Pole Type)	
Sign Circuits	

SERVICE - MAIN PANEL (AMPS)	QTY

FEEDERS - SUB PANEL (AMPS & VOLTS)	QTY

TRANSFORMERS (KVA)	QTY

RENEWABLE ENERGY SYSTEM (Over 26KW - Plan Review Req'd)	QTY
0KW TO 6KW	
7KW TO 26KW	

ELECTRIC VEHICLE CHARGING STATIONS (Over 400 amps req's plan review)	QTY
Level 2A 120-240V (Amps: ____)	
Level 2B 120-208V (Amps: ____)	
Level 3 277-480V (Amps: ____)	

TEMP POWER SF/D
Assoc. Bldg Permit #: _____
Amperage: _____

**Note: Lighting summary is required for installation of lights in commercial, Institutional and Industrial occupancies.*

FIRE ALARM

F/A Plan Review is required for new F/A systems (or when adding, replacing, or relocating 7 or more devices/control units).

F/A CONTROL UNITS _____
F/A DEVICES _____

LOW VOLTAGE & COMMUNICATION SYSTEMS

LOW VOLTAGE SYSTEM:	CONTROL UNITS _____ DEVICES _____	***COMMUNICATION SYSTEM:***	CONTROL UNITS _____ DEVICES _____

I certify that the work to be performed under this application will be done in conformance with the City of Seattle Municipal Code.

Signature: _____ **Date of Application:** _____
Contractor or Owner (or Authorized Agent)

PAYMENT & MAILING INSTRUCTIONS:
☐ **Mail checks w/ appliance to:** DPD, P.O. Box 34019, Seattle, WA 98124-1234
☐ Charge my escrow (ADA) account # _____
☐ Credit Card payment, call (_____) _____
☐ Fax Permit (_____) _____ ☐ Hold permit for Pick-Up
☐ Email Permit to: _____

DPD USE ONLY:
Permit #: _____
Permit Fee: _____

Revised: January 2011 (see note about fax/email requests on reverse)

City of Seattle
Department of Planning and Development (DPD)
700 Fifth Ave., Suite 2000, P.O. Box 34019
Seattle, WA 98124-4019
www.seattle.gov/dpd

Phone: 206-684-8850
Fax: 206-233-7866
E-mail: dpd_asc_support@seattle.gov

PRELIMINARY APPLICATION FORM [PAF]

Project #: _____
Date: _____

APPLICATION:

Project Address: _____

Description of Work: _____

_____

PERMIT TYPE:		ATTACH 1 SITE PLAN (min 8½" x 11"; max 36" x 48")
☐ **Construction:**		
☐ Addition to Existing Structure		Basic Site Plan
☐ Interior Alterations	☐ Tenant Improvements (T.I.)	Location / Vicinity Plan
☐ Voluntary Seismic Upgrade		Not Required
☐ Emergency Repairs	☐ Temporary	Preliminary Site Plan
☐ New Building		Preliminary Site Plan
☐ **Grading Only**	☐ **Demolition Only**	Preliminary Site Plan
☐ **Land Use (MUP)**		Preliminary Site Plan

DEVELOPMENT SITE:

Legal Description: _____

_____

King County Assessor's Parcel Numbers (APNs) : [contact 206-296-7300] _____

Common Building Name: _____ DPD Building Identifier: _____

Are you: Splitting an existing development site? ☐ Yes ☐ No Combining development sites? ☐ Yes ☐ No

LAND USE (MUP) PROJECT COMPONENTS:

☐ Administrative Conditional Use ☐ Administrative Design Review
☐ Early Design Guidance / Design Review ☐ Streamlined Design Review
☐ Shoreline Substantial Development ☐ Rezone ☐ SEPA ☐ Variance
☐ Other: ☐ Other:

GREEN BUILDING INFORMATION

Are you interested in participating in a green permitting program? ☐ Yes ☐ No

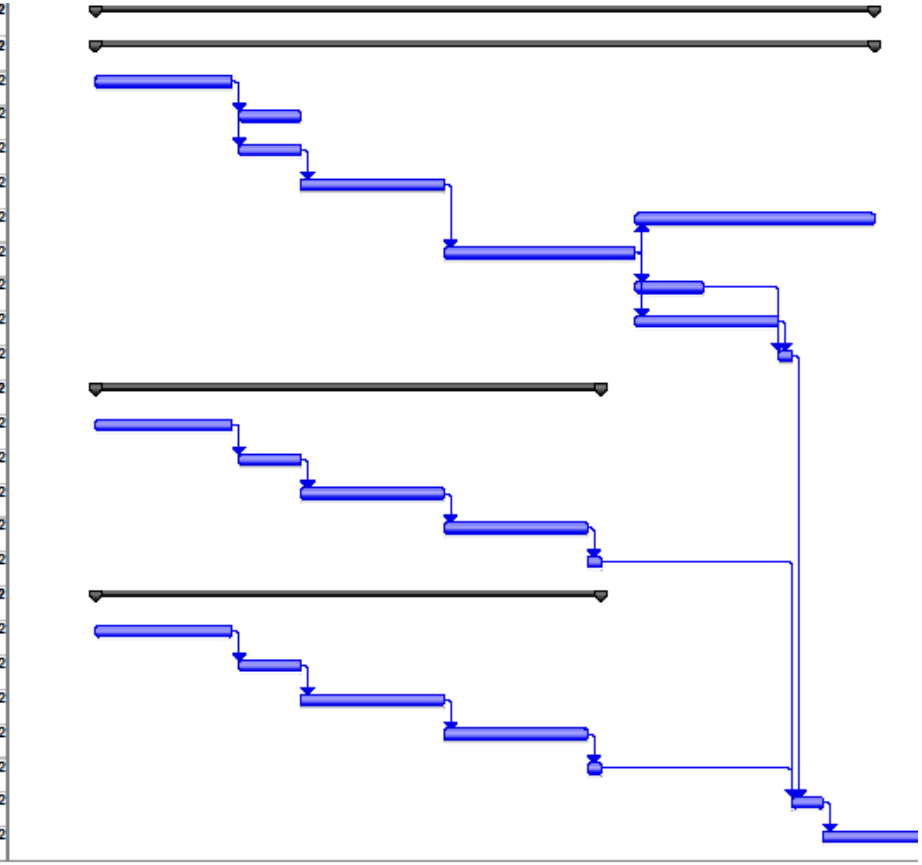
If yes, select appropriate box:

☐ Priority Green Expedited ☐ Priority Green Facilitated ☐ Other:

*For more information, see submittal requirements in *"5 Steps for Successful DPD Application Submittal"*

Appendix 2 – Proposed Timeline

1		**Boarding Information Demonstration Project**	**164 days**	**Mon 5/7/12**
2		**On Dock**	**164 days**	**Mon 5/7/12**
3		Develop Plans and Requirements for 3 Procurement Pkgs	30 days	Mon 5/7/12
4		Team Review and Acceptance of Plans and Requirements of 3 Procurement Pkgs	14 days	Mon 6/18/12
5		WSF Review	14 days	Mon 6/18/12
6		Solicit Contractors and Vendors	30 days	Fri 7/6/12
7		Order VMSs and Static Signs	10 wks	Fri 10/12/12
8		Seattle Permit Review/Acceptance	8 wks	Fri 8/17/12
9		Hardware Installation	14 days	Fri 10/12/12
10		Software Implementation	30 days	Fri 10/12/12
11		System Testing	2 days	Fri 11/23/12
12		**Social Media**	**106 days**	**Mon 5/7/12**
13		Develop Requirements	30 days	Mon 5/7/12
14		Team Review and Acceptance of Plans and Requirements	14 days	Mon 6/18/12
15		Solicit Contractor	30 days	Fri 7/6/12
16		Update Website	30 days	Fri 8/17/12
17		System Testing	2 days	Fri 9/28/12
18		**Smartphone**	**106 days**	**Mon 5/7/12**
19		Develop Requirements	30 days	Mon 5/7/12
20		Team Review and Acceptance of Plans and Requirements	14 days	Mon 6/18/12
21		Solicit Contractor	30 days	Fri 7/6/12
22		Write Application	30 days	Fri 8/17/12
23		System Testing	2 days	Fri 9/28/12
24		Overall Project System Testing	7 days	Tue 11/27/12
25		Evaluation	60 days	Thu 12/6/12



Project: demo project
Date: Fri 4/20/12

Task — Progress — Summary — External Tasks — Deadline
Split — Milestone — Project Summary — External Milestone

Appendix 3 – Proposed Budget

BOARDING INFORMATION

Project Description Cost Estimate

On-Dock Equipment	Unit	Unit Cost	Quantity	Cost	Notes
Dockside VMS	EA	$ 12,088.00	1	$ 12,088	2.1" characters, tri-color, NEMA 4X, 6 lines 32 characters, 1 inter-character space
Ornamental Fencing MountingSupports/Brackets	EA	$ 780.00	1	$ 780	$500 material/ 4 hrs of labor @$70/hr
1.5" RGS Conduit	LF	$ 14.00	300	$ 4,200	300-foot conduit for power
1.5" RGS Weatherhead	EA	$ 120.00	2	$ 240	
#8 Conductor	LF	$ 1.00	1125	$ 1,125	Power and ground to VMS
RS422 Cable	LF	$ 2.00	50	$ 100	Comm to VMSs
RS232 Cable	EA	$ 10.00	1	$ 10	Comm between desktop and converter
Signal Converter (RS232 to RS422)	EA	$ 100.00	1	$ 100	
Desktop computer	EA	$ 1,000.00	1	$ 1,000	Desktop and monitor
Wireless System	EA	$ 500.00	1	$ 500	
Fixed Message Signs (for queues)	EA	$ 200.00	3	$ 600	might be possible to have KC sign shop create these signs
Software Upgrade for NTCIP Compliance	LS	$ 1,500.00	1	$ 1,500	
Software Implementation	LS	$ 20,000.00	1	$ 20,000	
Power and communications	LS	$ 500.00	1	$ 500	power & data cables
Installation & Testing	LS	$ 8,400.00	1	$ 8,400	

Subtotal	$ 51,143
VMS Shipping	$ 140
Sales Tax (9.5%)	$ 4,872
Contingency (20%)	$ 10,229
On Dock Equipment Subtotal	$ 66,400

Smartphone Application	Unit	Unit Cost	Quantity	Cost	Notes
Smartphone Application	EA	$ 7,500.00	1	$ 7,500	

Subtotal	$ 7,500
Contingency (20%)	$ 1,500
Smartphone Application Subtotal	$ 9,000

Social Media	Unit	Unit Cost	Quantity	Cost	Notes
KCMD Website Update	EA	$ 10,000.00	1	$ 10,000	

Subtotal	$ 10,000
Contingency (20%)	$ 2,000
Social Medial Subtotal	$ 12,000

Boarding Information Subtotal	$ 77,155
Contingency (20%)	$ 13,729
Boarding Information Grand Total	$ 90,883

Permits	
Electrical	$ 640
Sign	$ 1,000
Shoreline Substantial Development (if needed)	$ 2,500

APPENDIX

G

Water Taxi Website Improvement Rider Survey

Water Taxi Website Improvement – Rider Survey

1. Do you use the King County Water Taxi website ? (www.kingcounty.gov/WaterTaxi)

   Yes No (if no skip to question 3)

2. What feature(s) of the website do you use? For example schedules, fares, news and alerts, etc. (If more than one, please rank in order of use with one being most frequently used)

3. What feature(s) not currently available would you like to see on the website? (If more than one, please rank in order of how frequently you would use it, with one being most frequently used)

4. What features do you think occasional riders or tourists would use?

5. Do you have any other comments or suggestions about the Water Taxi website?

Need more space? Use the back.

APPENDIX

H

Water Taxi Website User Testing Questions

Water Taxi Website User Testing Questions

Name: **Date:**

Please answer the following questions using only information you find on the test website.

1. When is the first sailing from Vashon? Now from the Vashon time table find the first sailing from West Seattle on Friday morning?

2. What is the name of the ferry that operates on the West Seattle route?

3. How much is the fare for a ride on the Vashon Water Taxi?

4. What is the address of the Water Taxi terminal in West Seattle?

5. Does the Vashon Water Taxi operate on the Friday after Thanksgiving?
   Yes No

6. Is there parking at the West Seattle terminal?
   Yes No

7. Can I take my bike on the ferry?
   Yes No

8. What is the date of the most recent newsletter?

9. Can I pay my fare with a check?
   Yes No

10. What bus can I ride to or from the Vashon terminal?

11. Can I pay my fare in cash?
    Yes No

12. Find the name of one of the captains.

13. Find the average number of riders on the 6:30 pm Friday sailing to Vashon.

14. What if my ORCA PugetPass value is lower than the fare?

15. Is there a 12:08 p.m. shuttle departure from the West Seattle Terminal to the West Seattle Junction?
    Yes No

Please answer the following questions after you have completed the user test.

1. Overall, how easy was it to navigate the website?

1	2	3	4	5
Not easy				Very easy

2. Do the pictures in the slideshow on the main page change at a comfortable pace?
   Yes No

   If no, would you like them to change…
   Slower Faster

3. Do you have suggestions for how the site might be improved?

4. Was there anything you found particularly annoying?

5. Is there information you believe should be on the website that is not available on the test website?

APPENDIX

I

Water Taxi Website User Testing Observations

Water Taxi Website User Testing Questions

Name: *Eleven users were tested.* **Date:** *August 7, 2013*

Please answer the following questions using only information you find on the test website.

1. When is the first sailing from Vashon? Now from the Vashon time table find the first sailing from West Seattle on Friday morning?

All users found the answer to the Vashon question quickly.
- *Most users chose the Schedule button in the Vashon badge.*

Finding the West Seattle sailing time took some users a little longer.
- *Most used the back key(4) or used the left navigation bar(5) to select West Seattle then either chose schedule from the badge or used the default drop down on schedule.*
- *One user use the breadcrumbs bar.*

Comments:
Hum….leaving versus departure.
Is this arrive? No it's the departure. When does the water taxi arrive?
The back arrow doesn't always take me back to the home page.
Why is some of the schedule in red?
It would be better if the schedule were laid out like Metro with departure, arrival, departure.
What is mid day?

2. What is the name of the ferry that operates on the West Seattle route?

All users found this answer but a few used several clicks to do it.
- *Those who figured out the badge would take them to the route accordion, drop down used that feature to select the vessel tab.*
- *Three users started with the About Us option on the left nav bar*
- *One user opened the newsletter PDF and scanned through it.*
- *All users eventually found the vessel tab under the badge*

Comment:
There is not an option for additional information on the badge drop downs.
The location is not intuitive. It is nested, not located at the top.

3. How much is the fare for a ride on the Vashon Water Taxi?

All users answered this question quickly.
- *Most used the fare button on the Vashon Badge.*

Comments:
Is the U-Pass accepted for payment on the water taxi?- Couldn't find the answer.

A picture of the location of the vending machine would be helpful.

4. What is the address of the Water Taxi terminal in West Seattle?

All users found this answer
Most used the West Seattle badge then selected the drop down for Docks
A couple used the left nav bar to get to West Seattle.

Comments:
The address should link to Google maps or something similar
Dock and terminal is not obvious. WSF uses terminals.
I didn't realize the badge was a hyperlink to the route tabs.

5. Does the Vashon Water Taxi operate on the Friday after Thanksgiving?

Yes No

All users found this answer relatively easily.

- *Most selected the schedule button on the Vashon badge.*
- *A couple used the left nav button for Vashon which defaults to the schedule tab.*
- *Two user did not see the text at the bottom of the schedule at first and it took a them a while to scroll down.*
- *There was some confusion about the term holidays as it applies to the Friday after Thanksgiving.*

6. Is there parking at the West Seattle terminal?

Yes No

All but one user were able to answer this question

- *Most used the West Seattle badge and selected Docks first time*
- *A couple of users tried the Map tab first*
- *The user who could not answer the question tried both the map and searched around looking for another option but did not try Docks.*

Comments:
I am really drawn to the bricks.
I didn't realize the whole brick was clickable.
Is Seacrest the same as West Seattle?
A link to a map like Google Maps would be helpful.

7. Can I take my bike on the ferry?

Yes No

Only two of the eleven users found the answer directly(without inference).

- *Only one found it one their first hunt.(A Marine Division employee)*
- *One user found his way to the page but there was a glitch and the page did not display.*
- *Most users searched around a bit trying one of the badges first.*

- *Many of the users selected the vessel tab and read through the vessel description more than once before noticing the vessel bike capacity and assuming therefore they could take their bike aboard.*
- *At least one user tried the About Us button*

Comments:
Oh, wow….not schedule, not fare, not subscribe. Maybe About Us. No. Maybe KC Policy Governance. Customer Service, that would be silly.
I don't know.

8. What is the date of the most recent newsletter?

All users were able to answer this question.

- *Most users took some time before they thought to look to the right.*
- *Two users tried the subscribe button first*

Comments
The display on the right doesn't grab my attention. The colors are faint.

9. Can I pay my fare with a check?
   Yes No

All users were able to answer this question correctly.

- *They were familiar with the fare button on the badge and used one of these to get to fares, then read "Forms of Payment".*

Comments:
What about credit cards? (Dod not find the information about TVM accepting debit and credit cards)
There is a decision point for a question like this. Which Route?

10. What bus can I ride to or from the Vashon terminal?

All users were able to correctly answer this question quickly.
Most clicked on the Vashon badge then selected "Buses"

11. Can I pay my fare in cash?
    Yes No

All users were able to correctly answer this question quickly.
Most users selected the Vashon badge to select" Fares" and then "Forms of Payment."

Comments:
Where did I see that? I saw it somewhere before.

12. Find the name of one of the captains.

Only one user did not find the answer to this question.

- *The user who didn't find the information was looking for "About Us" but never looked to the left nav bar.*
- *A couple of users tried the newsletter thinking there might be a feature article there.*
- *Three users tried one of the badges looking at the tabs there. Two tried the vessel tab.*

A couple of users
Comments:
I expect crew information on the route display.
I would want the crew information on the route button.
Good question.
Where did I see that?

13. Find the average number of riders on the 6:30 pm Friday sailing to Vashon.

All but two users eventually found the correct answer.

- *Two users opened the newsletter but found only total riders.*
- *Five users first selected the Vashon badge and looked through the tabs there for ridership information.*

Comments:
This information would be helpful to gauge overloads
That's cool having the overload information right there (Regular rider)
The term ridership doesn't mean anything to me.
Three users also tried the Customer Service button.

14. What if my ORCA PugetPass value is lower than the fare?

All users were able to correctly answer this question.

- *Nine users selected fares for one of the routes read through the forms of payment section then clicked on the link to Customer Service to find the Paying Your Fare section and then read the ORCA to find the answer.*
- *Two went straight to customer service then selected Forms of Payment.*

15. Is there a 12:08 p.m. shuttle departure from the West Seattle Terminal to the West Seattle Junction?

Yes No

All users found the answer to this question relatively quickly.

- *Most users selected the West Seattle badge and then clicked on the Buses tab.*
- *One user first clicked on schedules and then selected Buses.*

Comments:
Hum….must be the 773
There was some confusion about reading the schedule.
Seacrest should say West Seattle also on the bus schedule.
How do the shuttles connect with ferry arrivals and departures?
It would be nice to see both the ferry schedule and the shuttle schedule in one table.

Please answer the following questions after you have completed the user test.

1. Overall, how easy was it to navigate the website?

1	2	3	4	5
Not easy				Very easy

Total points was 45. The average score was 4.1.

2. Do the pictures in the slideshow on the main page change at a comfortable pace?

Yes	No	
Six	*Three*	*Two didn't notice.*

If no, would you like them to change…

Slower	Faster

3. Do you have suggestions for how the site might be improved?

1. *Add a hot link to Metro trip planner .*
2. *The left nav is less useful than the badges –there should be links from the badges to other info now in left nav.*
3. *Often found myself going places I had seen in other searches and would not have thought to go there otherwise. (About us, Customer Service)*
4. *The service advisory section gets lost on the right side. It should pop more.*
5. *It should be clear that the badges are links.*
6. *Works well when you know which route. Not so good for non-route specific information.*
7. *There are more cross linking opportunities where the logic is not strong.*
8. *The shuttle schedule could be linked with the ferry schedule.*
9. *Add arrival times to the ferry schedule.*
10. *The "rules" should be obvious on the home page.*
11. *Accompanying as a personal care attendent should be covered in the fare section.*
12. *I expect to see arrival times on the schedule not just the next departure.*
13. *The badges are good but it is can be confusing getting to the general information pages.*
14. *I completely ignored the headings on the right side. Too much text and not enough eye catching graphics.*
15. *The right hand side information is "too far away" and not distinctive.*
16. *The information on the right didn't grab my attention ad was "faint"*
17. *The border between the center and the right sections prevents me from moving my eyes right.*
18. *Not clear what the subscribe button is.*
19. *A map tab should be added for Vashon.*

4. Was there anything you found particularly annoying?

1. The customer service information was hard to find. It's not easy to get back to it.
2. Finding the information about parking should have been easier.
3. The service advisory information fades into the back ground.
4. Having the other department stuff in the left nav bar.
5. The left nav bar looks like a lot of other departments.
6. Seemed like there were a couple of extra clicks.
7. Is access to the ridership information user friendly enough?
8. Where do I stow my bike.
9. The font was too small,
10. The back button took me to transit a few times.

5. Is there information you believe should be on the website that is not available on the test website?

1. *Content about right.*
2. *I really like the tabs for each route.*
3. *Where do I get a ticket.*
4. *You get pigeon holed with information on the badges. Other information should be easy to find.*
5. *The tabs on the badges are nice.*
6. *Amenities information like nearby food, restrooms and what's available on board.*
7. *Information about pets on board.*
8. *I like that the info is concise and tailored. I was not overwhelmed. Also like that it is grouped by route.*
9. *Maybe include growl alerts.*
10. *Amenitiy information like Can I eat there? Are there bathrooms? Should be included.*
11. *Local attraction information for tourist should be included.*
12. *Are the service alerts not important any more?*
13. *Need a link to trip planner which should include the Water Taxi routes.*
14. *Vessel location/watch available through a smartphone would be useful- especially when it's foggy.*
15. *You have got it covered.*

APPENDIX

J

King County Water Taxi Post-Implementation Website Survey

King County Water Taxi

King County Water Taxi Website Survey

Recently the King County Water Taxi launched a new website designed to make water taxi information, such as schedules, fares, ridership history, and terminal amenities, more easily accessible. Please help us evaluate the new website by answering the questions below.

1. Have you used the Water Taxi website since September 15? (check one)

   ☐ Yes ☐ No

   If yes, about how many times? _____times

2. How easy is it to find what you want on the new website? (circle your choice)

5	4	3	2	1
Very easy		Moderately		Very Hard

3. Overall, how much of the information you need is provided on the new website? (circle your choice)

5	4	3	2	1
Everything		Much is there		Most is missing

   Is there other information you would like to see on the website?

4. Rate the appearance and layout of the website (circle one)

5	4	3	2	1
Excellent		Average		Poor

5. Not counting time to familiarize yourself with the new website, do you think you spent more or less time than in the past finding the information you wanted? (circle your choice)

5	4	3	2	1
A Lot Less		About the same		A Lot More

6. Do you have any suggestions for improvements to the website.

The following questions are <u>optional</u> but will help us understand a little more about our riders.

7. Are you? ☐ Male ☐ Female
8. How old are you? _____
9. On average, how many times a week do you ride the Water Taxi?

   (Count a round trip as two times)_____ times

10. Which route do you usually ride? ☐ West Seattle ☐ Vashon

Thank You

APPENDIX

K

Vashon Island Technology Demonstration Evaluation Protocol

U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center

Vashon Island Technology Demonstration Evaluation Protocol

"It is far better to have an approximate answer to the right question than a precise answer to the wrong question…"
John Hauser

David Spiller, MS. Trans. Eng.
September 30, 2012

Prepared for Federal Transit Administration
Office of Mobility Innovation
Division of Research, Demonstration and Innovation

Source: King County Marine Division staff

Table of Contents

1. Purpose of Document

The purpose of this document is to set forth the evaluation protocol for the Vashon Island Passenger-Only Ferry (POF) Technology Insertion Demonstration project. An evaluation protocol – simply put – lays out the key objectives for the Technology Insertion demonstration project, and a systematic approach to measuring the degree to which these objectives are realized. Because the demonstration project takes place in an uncontrolled environment, the evaluation needs to - at best - control for external or exogenous factors and - at least - be cognizant of such external influences before conclusions as to cause-effect can be reasonably reached. ***The intent is to use the evaluation protocol as a guide or framework for the evaluation, recognizing however that the evaluation needs to be flexible to adapt to unforeseen circumstances affecting project implementation, data availability and collection, and available resources.***

2. Evaluation Frame of Reference

Although the evaluation will be focused on the impacts associated with the technology that is implemented under the demonstration project, it is important that information be collected and summarized describing the context within which the demonstration is implemented. This includes:

- History and chronology of project
- Multi-modal transportation network and the role and function of water taxi services within the Puget Sound region
- Vashon Island ferry service characteristics (e.g., schedules of departures at each terminus, type of vessel, and days of operation).
- Demographics of passengers[1]
- Profile of average vessel passenger load (averaged over season) by departure run by day of week by season

External or exogenous factors can confound any determination of cause-effect. Accordingly, it is important throughout the demonstration phase to monitor the following:

- Any change in route configuration, service frequency or span of service affecting Metro feeder buses 118 and 119 serving Vashon Island terminus; and Metro feeder buses 16, 66 and 99 serving Pier 50 in Seattle[2].
- Operational or emergency alerts that disrupt the normal schedule of operations for Vashon Island
- Out-of-service events for the technology system

[1] Both gender and age are available from the Water Taxi Survey initiated in April, 2012. Additional user surveys may be necessary to develop a full demographic profile.

[2] Seattle feeder buses will be more challenging to track due to a high density of lines proximate to the terminus. Also, loss of ride free zone in September 2012 may have an impact.

- Any other external event likely to have an impact on the travel patterns of passengers using the Vashon Island POF, particularly including weather and seasonal effects, and other travel mode events.

3. Technology Demonstration Project Description

A full history and chronology of the Vashon Island Passenger-Only Ferry (POF) Service project and its evolution over time is not presented here but should be a part of the Evaluation Report. In September 2011, consensus was reached among King County Marine Division (Grantee), the Federal Transit Administration (FTA- Grantor), and US DOT/Volpe Center (Technical support to FTA) to use the remaining grant funds to develop and implement a demonstration project focused on technology insertion to "enhance traveler information and passenger processing system". The technology insertion demonstration project – as defined by the Consultant team to King County Marine Division – is articulated as follows[3]. It is the net result/ decision of a technology scan that generated a set of multiple possibilities, each of which was evaluated by the Consultant team, King County Marine Division staff and the US DOT/Volpe Center using a consensus-based set of criteria[4].

Technology Demonstration Project – Boarding Information

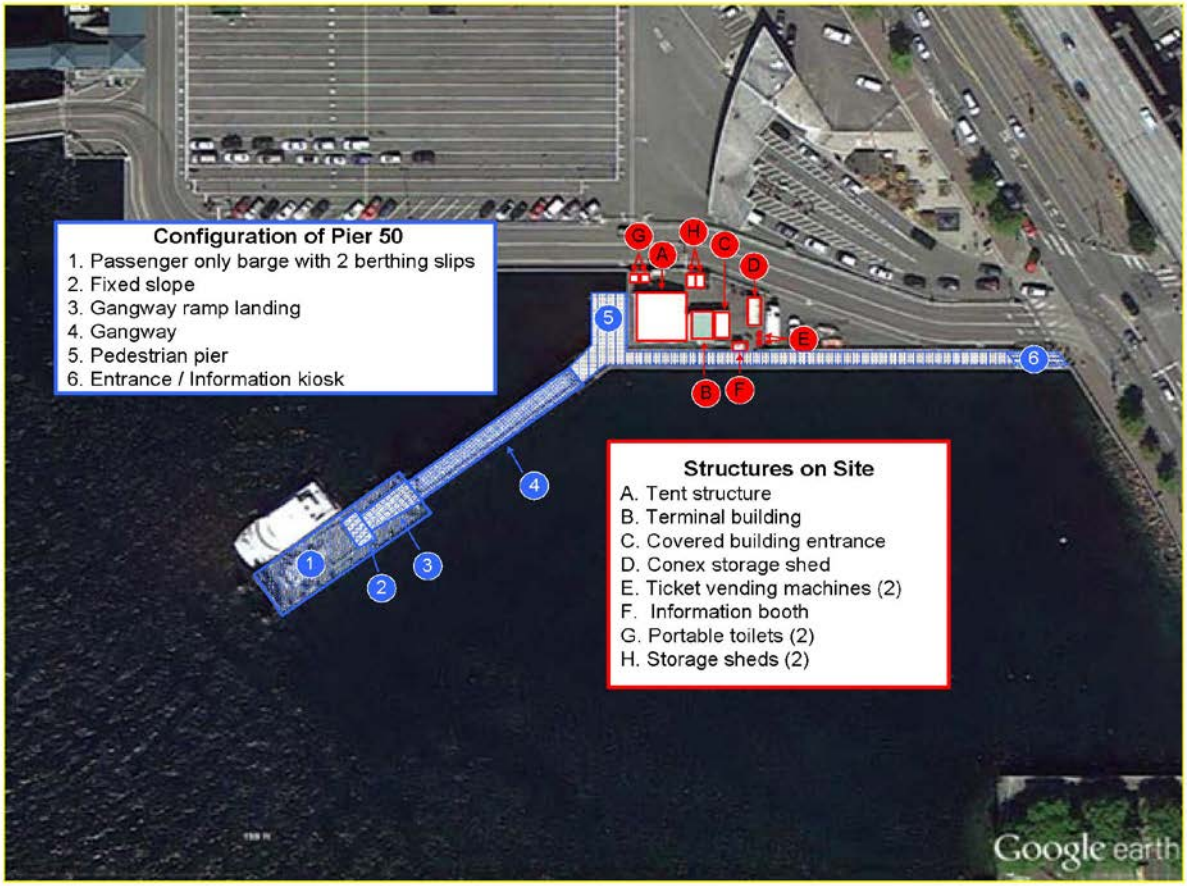
The boarding information project will provide passengers with *next sailing departure* and boarding lane assignment information via an on-dock variable message sign (VMS), updated KCMD website, and a Smartphone application.

On-Dock

The on-dock portion of the project will provide passengers with schedule and boarding information on the dock at Pier 50 via one VMS. Figure 1 illustrates a site plan for Pier 50, including the location of all structures[5].

[3] See KPFF and Parsons Brinckerhoff, **Demonstration Project Definition**, 30 April 2012.
[4] The set of criteria included: cost to develop and implement; time to develop and implement; interdependency with other system; interdependency with other agencies; complex or difficult to implement; rider demand for alternative (option/feature); likely to increase ridership; likely to improve current riders' travel experience; and likely to improve operations.
[5] Note: Items D and H will likely be removed once KCMD establishes its maintenance facility at pier 48.

Figure 1. Pier 50 Site Plan



Source: King County Marine Division staff

The VMS will be installed on the secure side of the white ornamental archway (close to where the sidewalk and the dock meet).

The VMS mounting site and a view of Pier 50 as seen by a passenger approaching from the dock to street- side are shown below:

Source: King County Marine Division staff

The VMS will be large enough to display at least 4 (and maybe 6) lines of text with 24 (and maybe 32) characters per line, where the first four lines of text would provide scheduled sailing information for the Vashon Island, West Seattle, Kitsap and possibly Kingston ferry runs. The additional lines of text could be used for other types of messages. A sample VMS panel might look as follows:

VASHON ISLAND 5:30PM LANE A

W SEATTLE 5:45PM LANE B

Or

DEST LN TIME

VASHON IS B 5:30PM

W SEATTLE A 5:45PM

KINGSTON C 5:30 PM

KITSAP RP1 D 6:43 PM

(Scrolling message sign showing alerts and/or upcoming events)

Additionally, fixed message signs will be installed to clearly identify the boarding lane locations.

KCMD Website Improvements

The KCMD website improvement portion of the project will include adding a Twitter feed for the GovDelivery alert program. The KCMD website will not show the on-dock information listed above (queue lane assignment and *next departure sailing*), but will display the posted schedule and real-time vessel arrival or vessel positioning using output from VesselWatch or MarineTraffic.com, and may include adding Facebook notifications (assuming they can be easily added to the email alert stream).

Smartphone

The Smartphone portion of the project will include providing information that is currently on the website (schedules and general information) and developing a real-time vessel arrival information or vessel positioning using output from VesselWatch or MarineTraffic.com.

4. Demonstration Objectives

According to the Operational Concepts paper[6], the main goal is to get passengers the right information, at the right time, and using the right media. It is expected that this will improve the passenger experience, through offering operational improvements, and ultimately increasing ridership. Accordingly, technology insertion for real-time boarding information systems is intended to serve these objectives:

- Reduce schedule uncertainty and queuing confusion, and improve convenience of the service for passengers
- Provide information presently given by the Information Agents (Info Agents), freeing them for additional customer service opportunities and better passenger experience
- Increase operational efficiency of ferry service by reducing total boarding time[7]
- Increase ferry ridership through highlighting *next departure time* and capturing casual riders and tourists
- Achieve a better balance of vessel loads across peak-period ferry runs by inducing a fraction of passengers to shift their preferred departure time, thereby reducing overflow counts of passengers unable to load a given peak-period ferry run (running at full capacity)[8]

[6] See KPFF and Parsons Brinckerhoff, **Operational Concepts**, 20 March 2012.
[7] Note that measuring total boarding time for the first Vashon peak PM run could be compounded by the presence of additional scheduled boarding time because it is the first PM ferry run.
[8] This currently is being done to some extent on the King County Marine Division (KCMD) web site; average ridership counts for peak commuter runs are displayed.

5. Insights on Impacts of Real-time Transit Traveler Information (TTI): Synthesis of Research

A substantial body of research has accumulated over the last twenty years on the impacts and value of real-time traffic and transit information systems. This evidence has been based on field operational tests, system evaluations of behavioral adaptations indicative of revealed preferences, simulations, and user surveys (indicative of perceptual, attitudinal and stated preferences). The focus here is on real-time transit information systems as being most relevant to the Vashon Island Technology Demonstration project. Only one source has been found that examines a ferry operations real-time information system – the Edmonds Ferry Terminal Traveler Information System[9]. This will be discussed further under Section 6 – Measures of Effectiveness (MOEs), Hypotheses, and Analysis Methodology.

Studies have demonstrated that both mobile applications and fixed real-time arrival signage induces reductions in both actual and perceived wait times at stops[10]. Many systems claim an increase in ridership or frequency in the number of weekly trips taken after the provision of real-time information, but there is also some quantitative evidence to this effect. OneBusAway indicated ~ 30 percent of users reported an increase of 1+ trips a week for non-commute purpose, with 15 percent reporting an increase of 1+ trips per week for commuting to work[11]. Surveys of users of Southampton's Stopwatch project (which provides bus arrival time information via variable message signs at bus stops) indicate that ~ 3% of riders state an intention of using the bus system more often[12]. London's Countdown system has been found to generate a minimum of 1.5% new revenue[13]. With the introduction of the Phoebus system in Brussels and Angouleme, increased ridership ~5.8% was observed on bus lines equipped with real-time information about waiting times. This is consistent with other trials in Liverpool and Turin, with increases between 5% and 6% and 3% respectively for each set of trials at each site on lines equipped with at-stop displays[14].

Even when there are no observed behavioral adaptations on the part of travelers (e.g., change in route, mode or time of departure), multiple studies indicate that users still derive value and utility from the provision of real-time information measured by an increase in satisfaction with and convenience of transit, a reduction in uncertainty, anxiety and frustration, and increases in perceived safety at stops[15]. The evidence is based not only on the consistency of responses across multiple user surveys at multiple

---

[9] See J. Kopf, J. Nee, J. Ishimaru, and M. Hallenbeck, *ATIS Evaluation Framework*, Washington State Transportation Center, May 2005.
[10] See B. Ferris, K. Watkins, and A. Borning, "OneBusAway: Results from Providing Real-Time Arrival Information for Public Transit," paper presented at CHI 2010, April 10-15, 2010; and K. Dziekan and K. Kottenhoff, "Dynamic at-stop real-time information displays for public transport: effects on customers," *Transportation Research Part A*, 41(6): 489-501, 2007.
[11] J. Kopf et. al., ibid.
[12] See **Strategies for Improved Traveler Information**, TCRP Report 92, 2003.
[13] R. Smith, S. Atkins, and R. Sheldon, "London Transport Buses: ATT in Action and the London Countdown Route 18 Project," Proceedings of the First World Congress on Applications of Transport Telematics and Intelligent Vehicle-Highway Systems, Paris, November 30-December 3, 1994, pp. 3048-3055.
[14] See R. Libbrecht, ed., **Overview of Programme-Level Achievements in the Area of Public Transport**, European Road Transport Telematics Implementation Coordination Organization, 1995.
[15] See C. Schweiger, **Real-Time Bus Arrival Information Systems: A Synthesis of Transit Practice**, TCRP Synthesis 48, 2003; and **Strategies for Improved Traveler Information**, TCRP Report 92, 2003. Also, see Charles River associates, **User acceptance of ATIS Products and Services: A Report of Qualitative Research**, prepared for US DOT/ITS Joint Program Office, January 1997.

sites, but also in the growth in usage after initial system implementation measured by medium interface counters. For example, during the month of August 2009, OneBusAway answered some 37,291 phone calls from 2,313 unique callers, responded to 10,567 SMS queries from 1,771 unique users, and handled 89,154 webpage visits from 15, 971 unique visitors[16].

Real-time transit arrival information also has a distinct advantage and benefit to operators. The location subsystem which provides the input data stream to the arrival/departure prediction algorithms also provide tracking and vehicle asset visibility to the transit dispatch center – allowing better operational control of the route and network. Archived data permit better planning and scheduling of transit services, including achieving a better balance between demand and supply of transit services.

A number of studies have attempted to estimate the willingness-to-pay for information by travelers. Willingness –to-pay is a useful construct since it is a measure at both the individual traveler level and at a system-level of at least a lower bound on the value of such information systems. In a stated choice experiment conducted to examine both the relative importance travelers place on specific public transport information content, and the willingness-to-pay for it, results indicated that customers were willing to pay 25.5 cents per minute for real-time information accessed via the web[17]. As part of the TravInfo field operational test, a stated preference survey was conducted of 1000 Bay Area residents. Sixty –six percent of the respondents sought travel information, and, of these information seekers, 71 percent were willing to pay for an ATIS (average $3.84 per month, or $0.74 per call)[18]. In a field experiment conducted in the Twin Cities metropolitan area, 100 drivers, given pre-trip real-time travel time information with varying degrees of accuracy, drove four of five alternative routes between a pre-selected origin-destination (OD) pair. Other factors affecting route choice – such as trip purpose, travel time, distance, number of stops, delay aesthetics, level of commercial development and individual traveler characteristics – were controlled. The results of the field experiment showed that travelers were willing to pay up to $1 per trip for pre-trip information that was accurate and reduced the sense of uncertainty for the traveler[19].

6. Measures of Effectiveness (MOEs), Hypotheses, and Analysis Methodology

In general, a single set of measurements (for example, taken while the demonstration is in operation) will be insufficient for assessing the impact of the demonstration, since it will not provide any yardstick with which to interpret the measurements. Ideally, the evaluation should follow a "before-after with Control Group" design. The uniqueness of this demonstration, however, precludes a matched 'Control' – a ferry system with similar physical (e.g., terminal configuration), operational and passenger usage characteristics,

[16] J. Kopf et. al., op. cit.

[17] See E. Molin and H. Timmermans, "Traveler expectations and willingness-to-pay for Web-enabled public transport information services, " *Transportation Research Part C* 14 (2006), pp. 57-67.

[18] See L Wolinetz, A. Khattak, and Y. Yim, "Why will some individuals pay for travel information when it can be free?: Analysis of a Bay Area Traveler Survey," *Transportation Research Record 1759*, pp. 9-18.

[19] See L. Zhang and D. Levinson, "Determinants of Route Choice and the Value of Traveler Information: A Field Experiment," presented at the 85th Annual Meeting of the Transportation Research Board, January 22-26, 2006.

but without the boarding information system. Accordingly, a 'before-after' design is necessary to establish an appropriate baseline for comparison. Therefore, the demonstration project needs to allow for a certain number of months to collect certain baseline measurements prior to officially starting the demonstration and 'turning-on' the real-time boarding information system via its multiple media dissemination outlets.

Baseline measurements need to be collected for the following (based on the proposed metrics evaluation articulated below):

- Historical ridership (and derived year-to-year changes) by vessel departure time
- Total boarding time for the Vashon Island service (sample of full capacity ferry runs only)

The evaluation has three main components: (a) Passenger and Operator impacts; (b) impacts with respect to reliability, availability, maintainability metrics (RAM) for the real-time boarding information system; (c) 'lessons learned' with respect to implementation process (e.g., permitting and procurement), and policy and institutional arrangements. A fourth component is also suggested because of the simplicity and elegance of the approach, and the paucity of data needed to implement the approach. ***We must reiterate, however, that the value of information must be balanced by the cost of acquiring it as part of the evaluation. Accordingly, as the demonstration planning evolves – and in light of unexpected circumstances – some of the metrics proposed may not be implemented during the course of the evaluation.***

Passenger and Operator Metrics

- Real-time boarding information (including departure times) will induce an increase in ridership (and revenue)

Hypothesis: Null: There is no detectable difference in ridership.

Alternative hypothesis: There is a detectable and significant (in a statistical sense) positive difference in ridership.

Data collection: Data will be collected on historical year-to-year difference (Δ) in ridership, and on the year-to-year difference in ridership post demonstration intervention (if positive). Additionally, live counts for a sample of days will be made

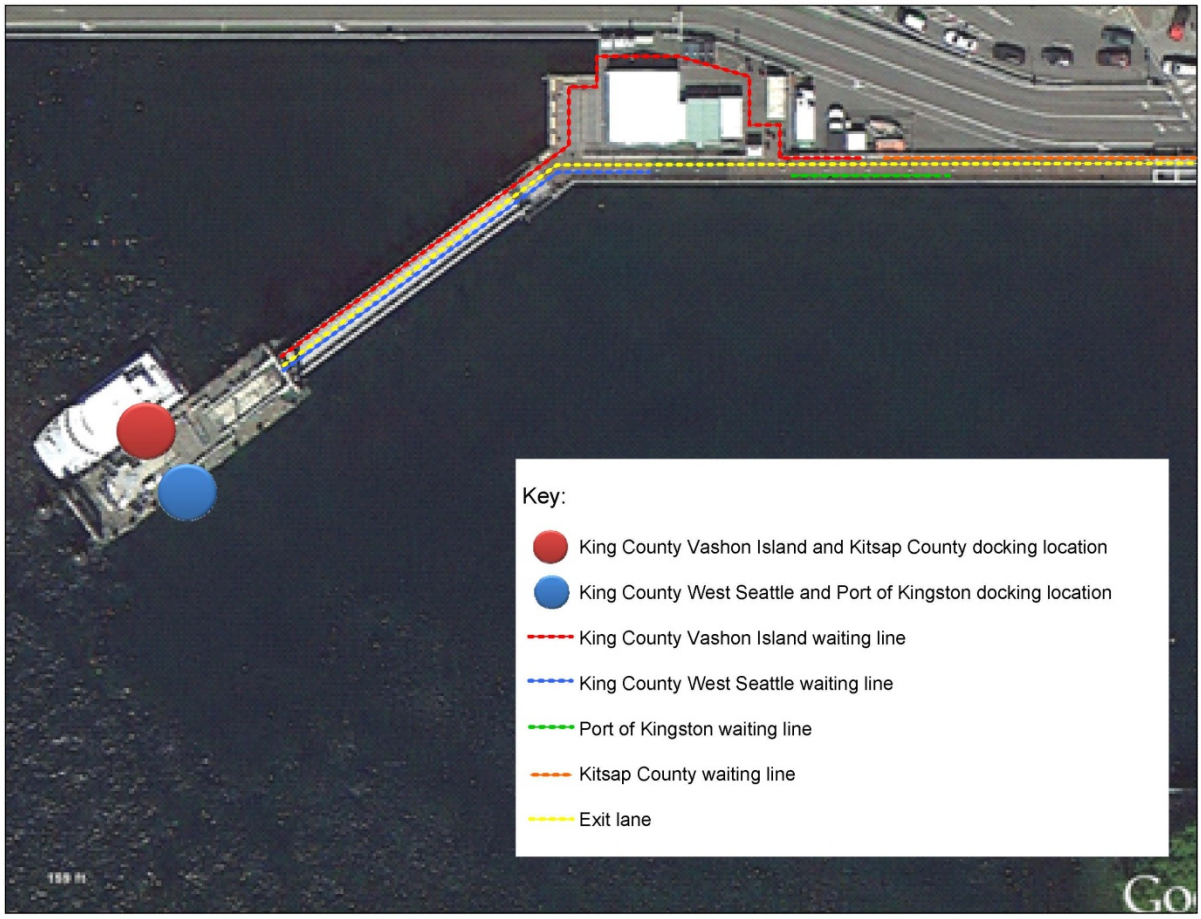
Analysis: The historical differences in ridership will be plotted against time, and a best fit time trend regression fitted to the data. Confidence bounds (at 95% level) will then be constructed for the fitted time trend line. A statistical test will then determine whether the demonstration difference in ridership falls within or outside the confidence bounds[20].

Live counts for a sample of days during the demonstration period will be compared to historical ridership counts for the same sample set of days pre-demonstration period.

[20] Note: It is important to factor vessel capacity constraints into the analysis.

- Message content will indicate location of boarding queue for each ferry operation (4) served by Pier 50. This should provide better coherence for the boarding queue, and more efficient use of the limited pier space, reducing interference between queues serving distinct ferry services. In effect, the scheduled departure time information giving boarding queue location is intended to allow passengers to self-organize and implement on-the-ground non-interfering queue formations that mimic the intended plan (see Figure 2).

Figure 2. Pier 50 Queue Allocation for Multiple Ferry Services



Source: King County Marine Division staff

Hypothesis: Null: There is no measurable difference in the total boarding time for ferry runs at full capacity

Alternative hypothesis: The better coherence in the queue, by providing guidance to passengers, results in a reduction in total boarding time for ferry runs at full capacity.

Data collection: Because total boarding time is dependent on the number of passengers who board, only near full capacity runs will be sampled. Baseline data will be collected

to measure the start and end times[21] – thus calculate the total boarding time – for a sample of ferry runs at near full capacity. Similar data will be collected during the demonstration. To the extent possible, weather and season will be used as 'control' factors to stratify the data and control for weather effects and seasonal effects as they relate to the number of tourists within the boarding queue who are likely to slow the boarding process due to unfamiliarity. Similarly, vessel runs with extraordinary fare processing delays due to lack of use of the OCRA card need to be identified and controlled, so that the effect on total boarding time due solely to better queue discipline induced by the boarding information system (i.e., the VMS) is isolated. Therefore, great care must be taken in censoring the samples (pre-demonstration and demonstration) to account for these factors (weather, season, fare processing delays). The total boarding time to load the first 100 passengers may be a better MOE because few runs are at the capacity level (150 passengers), and the first peak period PM run has more time to board to begin with. It may also be that data should be collected for the West Seattle Route which is less dominated by the high share of commuter passengers associated with the Vashon Island service, and therefore may be a better measure of the effect that enhancement to queue discipline induced by the VMS has on total boarding time.

Analysis: Mean total boarding time and the variance of total boarding time will be calculated for each select stratified sample (full ferry runs only). A difference of mean and a difference of variance test (assuming a Gaussian or normal distribution for the total boarding time for full capacity ferry runs) will be made to detect whether the null hypothesis is accepted or rejected. Alternatively, a distribution-free method using the Sign Test[22] can be used to compare the individual total boarding time values in each sample to determine whether or not the null hypothesis is accepted or rejected.

- Usage statistics are a good measure of utility and access to information. For each medium the demonstration should embed usage counters in the applications, particularly for the web medium and for the mobile application. Any initiation of a WAP (wireless application protocol) request for real-time departure information for Vashon Island ferry runs should be automatically captured by the application (and transmitted to a central server for aggregation) in a usage log. For the VMS signage, a survey instrument will be used to capture the relative frequency that patrons scan the sign prior to each departure (e.g., never, rarely, often, every time).

- Operational alerts that result in a delay of departure could induce a shift by passengers to an earlier or later departure run, resulting in a higher than typical' vessel load for that ferry run.

Hypothesis: There is no change in behavior resulting in a diversion to an earlier or later ferry run on the part of passengers in reacting to real-time messages indicating a delayed departure.

[21] Measurement can be made by the boarding agent using a simple stopwatch.
[22] See Bernard Ostle, *Statistics in Research*, 2nd Edition, 1963, p. 466.

Alternative hypothesis: Some portion of passengers reacts to the operational alert indicating a delayed departure for a specific ferry run by diverting to the run prior to or after the impacted ferry run.

Data collection: Logs will be kept of all operational alerts indicating a delayed departure[23], with an indication of the departure time for the ferry run impacted. Historical data on vessel loads for the ferry runs prior to and after each impacted run will be collected[24].

Analysis: Three types of analyses[25] will be conducted, provided there are sufficient evaluation resources to do so. A subset of the analyses articulated below may be necessary.

(1) User survey – questions will be asked to ascertain whether passengers modify their behavior to divert to an earlier or later ferry run relative to their preferred departure time in the presence of operational alerts indicating a delay for their preferred departure run. The fraction of passengers who exhibit this behavior will be determined as well.
(2) Box Plots illustrating mean and 25% and 75% quartile limits will be developed for the historical vessel load data for ferry runs before and after ferry runs impacted by the sample of operational alerts indicating delayed departure. The data points for the sample of operational alerts for the vessel load for the prior and after ferry runs will be plotted on the same Box Plot, and conclusions will be drawn as to the overall systemic pattern (e.g., all of the vessel loads when an operational alert is issued indicate a vessel load on the prior run that exceeds the mean historical value, suggesting some degree of diversion to that run).
(3) Dixon's Test[26] – a statistical test to determine outliers in a small data set – will be constructed to test whether the vessel load in the prior or after ferry run– relative to the ferry run subject to a real-time operational alert indicating a delayed departure - constitutes a statistical outlier. If the test indicates that the data point is a statistical outlier, then the null hypothesis is rejected (i.e., no adaptive, diversionary change in passenger behavior) in favor of the alternative hypothesis (i.e., a fraction of passengers divert to the other ferry run (prior or after) sufficient to raise the average vessel load beyond the normal variation in vessel load for that departure time.). The Dixon test will be applied to all vessel load data points in the sample representing the set of ferry runs for which a real-time operational alert indicating a delayed departure time was issued.

[23] Only operational alerts tied to a delayed departure run will be included in the data sample. Cancelled departure runs will be excluded from the analysis.
[24] Note: Reliability and on-time performance of the Vashon Island ferry service is already high (> 90%) so the ability to collect data on ferry runs subject to an alert indicating substantial delay may be limited. Accordingly, it may not be possible to quantify the impact of passenger diversion to prior or later ferry runs based on the receipt of informational alerts.
[25] Vessel capacity restraints are the current driver (and a fairly effective one) in distributing riders between sailings. The evaluation will have to carefully conduct the analyses and draw conclusions that tease out the differential effect that the information provided to riders has relative to existing vessel capacity limits in inducing any shift to ferry runs prior to or after the riders' preferred ferry run.
[26] See Environmental Protection Agency, **Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance**, March 2009, EPA 530/R-09-007, pp. 12-8 to 12-10, available at http://www.epa.gov/osw/hazard/correctiveaction/resources/guidance/sitechar/gwstats/unified-guid.pdf

System Reliability, Availability, Maintainability Metrics[27]

A critical part of the evaluation is to assess the operational performance of the technology as a system. Standard reliability, availability and maintainability metrics (RAM) should be developed based on data characterizing the operational performance of the hardware, software, and integrated real-time boarding information system. It should be noted, however, that the relatively short duration of the demonstration, and the limited number of equipment (e.g., a single VMS) deployed may limit the utility of the data collected.

Reliability – Mean Time between Failure (MTBF) should be calculated[28]. This is a fundamental measure of reliability of repairable systems. It represents the average time during which all subsystems perform within their specified limits, during a particular measurement period under stated conditions.

Maintainability – Mean Downtime (MDT) should be calculated. This measures the mean or average time that a system is not operational due to repair or preventive maintenance.

Availability – Ratio of 'uptime' to 'total time' (A = uptime/total time). Uptime is the duration during which the system is fully functional. Total time is the total measurement period.

'Lesson Learned' and Implementation Process

The third component of the evaluation is to fully document the implementation of the system– including organizations involved and respective roles and responsibilities - for the purpose of deriving 'lessons learned' that can improve the process (e.g., eliminate bottlenecks) for future implementations. Issues raised by the demonstration, and assessment of the transferability of the evaluation impacts and results to other sites and ferry operations should be made. A full lifecycle cost accounting should be made articulating both capital costs, and operational and maintenance costs (especially, communication costs). Based on both the evaluation of impacts, and user feedback, suggestions should be made for improvements to the real-time information boarding system for a 'second-generation' system. An example of a survey instrument used to capture this type of assessment data for five advanced transportation information systems (ATIS) implemented in Washington State is given in Appendix 1[29].

Edmonds Ferry Terminal ATIS Evaluation Approach (the fourth component)

The Edmonds Ferry Terminal ATIS was one of five federally funded intelligent transportation systems (ITS) deployments in Washington State in 1999 that were evaluated by the Washington State Transportation Center[30]. As part of that effort, the

[27] See **DOD Guide for Achieving Reliability, Availability, and Maintainability,** March 2005**;** and "Reliability Basics: Availability and the Different Ways to Calculate it," at http://www.weibull.com/hotwire/issue79/relbasics79.htm .
[28] It is quite possible, given only one VMS and the duration of the demonstration, that MTBF is incalculable. There may not be any failure.
[29] See J. Kopf, J. Nee, J. Ishimaru and M. Hallenbeck, **ATIS Evaluation Framework**, Washington State Transportation Center (TRAC), May 2005.
[30] Ibid.

research team reviewed quantitative methods for establishing the benefits (e.g., safety and mobility) which could serve as a basis for investment and prioritization of project programming. One of the key conclusions of that review was that quantitative analysis based on traveler behavioral adaptation required multiple assumptions and estimates about traveler behavior that typically vary with the traveler, trip purpose, location, device, and particular situation. Both large samples, and an expansive data collection effort would be needed.

An alternative evaluation framework – simple and elegant - was therefore proposed and implemented. The alternative framework does not require assumptions regarding traveler behavior in response to information (i.e., change in mode, route, departure time, trip frequency, destination, or whether the trip is made at all). The methodology assumes that additional knowledge about a trip has inherent value, regardless of whether or how the traveler responds. The minimum value of the ATIS deployment can be considered the value of the information provided by the system. The value of traveler information results from a reduction in uncertainty, which leads to improved decisions and more effective actions.

The steps in the approach are:

- Determination of the initial costs and annual operation and maintenance costs of the ATIS
- Estimation of the number of people who access the information
- Use of a range of values based on the literature for a willingness-to-pay per information message for information that reduces uncertainty (See Table 1 for a representative set of studies)
- Benefit calculation to yield the graph below showing the years- to- breakeven, given the benefit calculation (# of users X value per user) and the cost of the ATIS

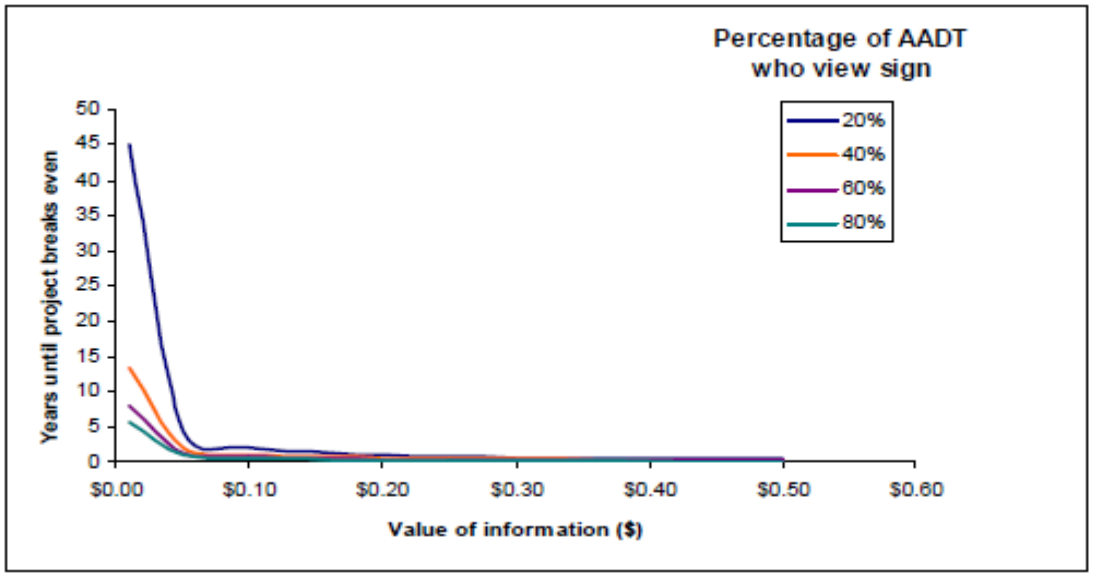


Figure 3. VMS benefit forecast: years until project benefits equal project costs
Source: J. Kopf, J. Nee, J. Ishimaru and M. Hallenbeck, **ATIS Evaluation Framework**, Washington State Transportation Center (TRAC), May 2005, Appendix B, p. B-14.; Note: AADT = average annual daily traffic.

Table 1. Willingness-to-Pay Studies: The Value of Information

Table B-2. Values of information

Source	Valuation
London Transport phone or message service *Parker and Glaysher 2002*	$0.75 - $1.00
San Francisco phone service *Wolinetz 2001*	$0.74
London Transport Countdown for buses *Smith et al. 1994*	$0.45
Bay area traveler advisory *Khattak and Prokopy 2003*	$0.25
Australia phone service *Kim and Vandebona 1999*	$0.25
Boston SmarTraveler *Polydoropoulou et al. 1997*	$0.10

Source: See J. Kopf, J. Nee, J. Ishimaru and M. Hallenbeck, **ATIS Evaluation Framework**, Washington State Transportation Center (TRAC), May 2005.

7. Data Collection Plan

A data collection plan specifies the what, when, how and sample size for collecting relevant data items necessary to support the evaluation. It is anticipated that a detailed data collection plan will be developed to guide the evaluation as the details of the demonstration project are further refined. This section is limited to presenting a synoptic summary table of the core data items, and sources/methods for collecting these items.

Table 2. Core Data Items

Data Item	**Sources/Methods**
Vessel passenger loads by departure run	Internal records, King County Marine Division
Boarding Information System costs	Procurement documents, internal King County Marine Division records, invoices for power and communication services
Usage counts (web site, mobile application)	Software-embedded counters by the application development team
Usage counts (VMS)	Intercept passenger survey
Total boarding time	Sample of full capacity runs: observer stop-watch calculations (start and end times recorded)
Value-of-information	Parametric variation, bounded by values reported in the literature
System RAM metrics	Maintenance logs
'Lessons learned' and implementation process	Intercept passenger survey
Qualitative passenger perceptions	Intercept passenger survey

8. Next Steps

This *Vashon Island Technology Demonstration Evaluation Protocol* is the product of a series of coordination and collaboration sessions. As such, it fully reflects the comments and feedback from King County Marine Division and their Consultant Team. Although it will serve as a general framework going forward, to advance the project a series of 'next steps' is advisable. These are articulated below:

- Formation of a peer advisory panel or technical advisory committee (TAC) would be a natural next step to provide appropriate guidance and feedback on the demonstration and its evaluation.
- King County Marine Division and their Consultant Team need to develop a formal demonstration plan outlining in more specificity the technology to be demonstrated, and the sequence of implementation steps to assure its operability for testing and evaluation. This should include a schedule.
- Baseline data needs to be collected.
- An expanded Evaluation Plan – making refinements as appropriate to the Evaluation Protocol - needs to be in place once the Demonstration Plan is complete.
- Resources need to be allocated to assure that the Evaluation can go forward.

References

R. Casey and J. Collura, **Evaluation Guidelines for the Advanced Public Transportation Systems Operational Test**, FTA-MA-26-0007-94-2, January 1994.

C. Heaton, C. McCall, and R. Waksman, **Evaluation Guidelines for Service and Methods Demonstration Projects**, DOT-TSC-UMTA-76-8, February 1976.

J. Schwenk, **Evaluation Guidelines for Bus Rapid Transit demonstration Projects**, DOT-MA-26-7033-02.1, February 2002.

R. Fries, A. Dunning, and M. Chowhury, "Traveler's Value of Real-Time Transit Information," TRB 2009 Annual Meeting CD-ROM.

J. Jariyasunant, D. Work, B. Kerkez, R. Sengupta, S. Glaser and A. Bayen, "Mobile Transit Trip Planning with Real-Time Data,", TRB 2010 Annual Meeting CD-ROM.

"Frequently Asked Questions on AIS and Real-Time Ship Observation," accessed at http:// www.marinetraffic.com/ais/faq.aspx

W. Fan and R. Machemehl, "Do Transit Users Just Wait for Buses or Wait with Strategies," *Transportation Research Record No. 2111*, 2009, pp. 169-176.

F. Zhang, Q. Shen, and K. Clifton, "An Examination of Traveler Responses to Real-time Bus Arrival Information Using Panel Data," TRB 2008 Annual Meeting CD-ROM.

S. Mehndiratta, C. Cluett, M. Kemp, and J. Lappin, **Transit Watch® - Bus Station Video Monitors: Customer Satisfaction Evaluation – Metropolitan Model Deployment Initiative: Seattle, Washington**, DTFH61-96-C-00077, January 2000.

T. Littman, **Valuing Transit Service Quality Improvements**, Victoria Transport policy Institute, November 2001.

J. Kopf, J. Nee, J. Ishimaru and M. Hallenbeck, **ATIS Evaluation Framework**, Washington State Transportation Center (TRAC), May 2005.

L. Zhang and D. Levinson, "Determinants of Route Choice and the Value of Traveler Information: A Field experiment," TRB 2006 Annual Meeting CD-ROM.

L. Wolinetz, A. Khattak, and Y. Yim, "Why Will Some Individuals Pay for Travel Information When It Can Be Free," Transportation Research Record No. 1759, 1999.

A. Khattak, Y. Yim and L. Prokopy, "Willingness to pay for travel information," *Transportation Research Part C*, Vol. 11, 2003, pp. 137-159.

A. Tsirimpa, A. Polydoropoulou and C. Antoniou, "Development of a latent Variable Model to Capture the Impact of Risk Aversion on Travelers' Switching Behavior," *Journal of Choice Modelling*, 3(1), 2009, pp. 127-148.

E. Molin and H. Timmermans, "Traveler expectations and willingness-to-pay for Web-enabled public transport information services," *Transportation Research Part C*, Vol. 14, 2006, pp. 57-67.

K. Dziekan and K. Kottenhoff, "Dynamic at-stop real-time information displays for public transport: effects on customers," *Transportation Research part A*, Vol. 41, 2007, pp. 489-501.

S. Doshi, **Designing a Multi-Modal Traveler Information Platform for Urban Transportation**, MSME Thesis, Georgia Institute of Technology, December 2010.

S. Maclean and D. Dailey, "Real-time Bus Information on Mobile Devices,".

B. Caulfield and M. O'Mahony, "An Examination of the Public Transport Information Requirements of Users," *IEEE Transactions on Intelligent Transportation Systems*, Vol. 8, No. 1, March 2007.

G. Lyons, E. Avineri, S. Farag and R. Harman, Strategic Review of Travel Information Research, Centre for Transport and society, September 2007.

"Real-Time Arrival Information: It Really Pays Off – Seattle Transit Blog," accessed at http://seattletransitblog.com/2009/09/01/real-time-info-pays-of/

L Cham, G. Darido, D. Jackson, R. Laver and D. Schneck, **Real-time Bus Arrival Information Systems Return-on-Investment Study**, August 2006.

Battelle Memorial Institute, **White Paper on Literature Review of Real-time Transit Information Systems**, prepared for the Federal Transit Administration, August 2002.

M. Raman, C. Schweiger, K. Shammout and D. Williams, **Guidance for developing and deploying Real-time Traveler Information Systems for Transit**, FTA-OH-26-7017-2003.1, April 2003.

Y. Yim, A. Khattak and J. Raw, **Traveler Response to new Dynamic Information Sources: Analyzing Corridor and Area-Wide Behavioral Surveys**, California PATH Working Paper, UCB-ITS-PWP-2004-4, February 2004.

C. Chorus, E. Molin and B. Van Wee, "Use and Effects of Advanced Traveler Information Services (ATIS): A Review of the Literature," *Transport Reviews*, Vol. 26, No. 2, March 2006, pp. 127-149.

Multisystems, Inc., **Strategies for Improved Traveler Information**, TCRP 92, 2003.

C. Schweiger, **Real-time Bus Arrival Information Systems: A Synthesis of Transit Practice**, TCRP Synthesis 48, 2003.

C. Schweiger, **Use and Deployment of Mobile Device Technology for Real-time Transit Information: A Synthesis of Transit Practice**, TCRP Synthesis 91, 2011.

B. Ferris, K. Watkins and A. Borning, "OneBusAway: Results from providing Real-Time Arrival Information for Public Transit," *Association of Computing Machinery (ACM) CHI 2010 Proceedings*, April 10-15, 2010, Atlanta, Georgia.

L. Basford, C. Burke and M. Pickett, "Bus Real-Time Passenger Information Business Case Research," unpublished project report PR/T/148/02, *Transportation Research Laboratory (TRL) Limited*, September 2003.

A. Polydoropoulou, D. Gopinath and M. Ben-Akiva, "Willingness to Pay for Advanced Traveler Information Systems: SmartTraveler Case Study," *Transportation Research Record No. 1588*, 1996.

Appendix 1. Sample ATIS Survey Instrument

Introduction

***Brief introduction:**
*Just as background, the information that we're gathering is part of an evaluation of five ATIS-related ITS earmark projects around the state, of which the ___ traveler information project is one. We have two objectives: **One** is to develop an understanding of ATIS issues for all project stages, including planning, design, implementation, O&M, and agency or institutional issues, and try to develop guidelines and lessons learned that would be useful for future ATIS-related projects. **Second**, we're reviewing the results of all these ATIS-related ITS earmark projects around the state, with the goal of developing a standardized method of evaluating the benefits of traveler information in a way that might also provide useful inputs to the state priority programming and funding processes.

We would like to get your perspective on the development and operations of the ATIS enhancements for the ___.

Do you have any questions for us before we get started?

A. Project background
B. System features
C. System operations
D. System usefulness
E. Public response
F. Project management
G. Lessons learned

A. Project Background: (Why was the project developed?)

First, could you describe your position, and nature of your involvement in the development of this traveler information system?

What were the **primary issues** that originally prompted the development of this project, and what were the **primary objectives** that the system was designed to achieve?

a.
b.
c.

Were there any other participants in this project besides WSDOT (public and private sector, e.g., WSDOT, city, chamber of commerce, other state agencies, contractors):

What were their roles in the project (build, operate, maintain, advise, etc.)

Approximate cost breakdown (design, construction, O&M)

B. System Features: (What was the original plan, and what was eventually built?)

Planned:

Next, we want to just review the system features that were originally planned, and which were built:

In the original concept for this project, what were the primary system functions and physical components (ITS hardware and software, and other components):

a.
b.
c.

Built:

What system components were eventually built:

a.
b.
c.

(During the design and construction process, were any of the principal system components modified, removed, or added compared to the original design? Or did the basic design remain unchanged?)

C. System Operating Process: (How, and how well, does the system function)

SKIP IF NO INFO:

First, we have some questions about how the system is typically used, e.g.,
(Alternatively: Could you describe how the system was designed to be used, e.g.,)

What is the decision making process for posting/updating info via VMS or HAR:
To start: what is the nature of the monitoring process
(sequence of events that leads to posting info)
what personnel are involved, your role
what types of situations or data tend to initiate the process of sending traveler info (VMS and HAR)
how frequently does monitoring take place (periodic or constant)
What is the decision-making flow; who makes the call on posting

threshold for determining that you should send VMS/HAR traveler info (length of delay, type of events, queues)
how long does decision-making process usually take
what type of information is posted (queues, wait time, schedule change advisories) Other, e.g., incidents?

How frequently is the system used?
When is the system typically used (year-round, highly seasonal variations)?
Do variations affect system staffing?

What types of posted data are or can be routinely archived (message content, time stamps, system status/down time)?
Are the VMS and HAR messages usually logged?

Describe the level of O&M effort required to support the system.
(Who has responsibilities, level of staffing req'd)

How are the new systems integrated with existing ITS infrastructure or information sources, e.g., existing ATIS devices, WSDOT Regional office, etc.?

Has system use changed over time since the initial deployment, e.g., in terms of

Usage:
Frequency of use
Types of information given to travelers
Process:
Type of data that you monitor
Level of staff effort for O&M

Were there any unexpected technical performance results, either good or bad, in terms of:

Technical

a. The functionality of the system
b. Technical performance of the hardware components

O&M

c. O&M issues

Coordination and staffing

d. Coordination between agency partners
e. Unexpected staffing requirements or other staffing issues

Do you interact with other local agencies?

Overall, what is your level of satisfaction with technical system performance, in terms of

Equipment:
reliability
Infrastructure locations (usefulness to traveler, as well as maintenance access)
Ease of use for the operator (WSDOT, etc.):
Information flow (e.g., does the system/process, from detection to posting of info, facilitate a timely response)
Quality of the traveler information:
Message accuracy (sufficient sources to make a decision)
Message timeliness (e.g., does the system facilitate timely response)

Does the completed project meet the original technical specifications?

Are there any notable strengths, weaknesses or limitations of the resulting system (either the technology and the organizational interactions)?

D. System Usefulness and Project Objectives: (Does the system meet its **transportation** objectives?)

To what extent has the system met its original objectives (from question 1)

a. transportation
b. organizational
c. other

Changes in traveler behavior, either measurable long-term, or individual examples
Have there been any noticeable changes in traveler behavior or traffic patterns since the system was implemented? If so, what kind? (e.g., reduced demand during congestion, shift in demand to alternate routes, changes in tourism levels)

Were there any unexpected transportation effects, either good or bad:

a. transportation
b. organizational
c. other

Usefulness within WSDOT? Vs. public benefit?

E. Response from the Public and Others: (What is the response to the project?)

What type of feedback, if any, have you received regarding the performance or usefulness of the system:

a. From the public
b. From other public agencies
c. Any other groups

Have there been any specific lessons learned, or changes made, as a result of this feedback?

F. Project Management: (How successful was the project implementation process?)

During the planning, design, and construction phases, were there any unexpected technical or project management issues or events, either good or bad, related to

a. Technical implementation
b. Relationships with the contractor
c. Coordination between agency partners

Did any of those issues eventually affect

a. Project scope (functions, devices)
b. Project budget
c. Schedule

If so, how?

Was the project completed according to the original schedule and budget?
(Estimated and actual completion dates)

If not, what were the principal sources of schedule and budget changes?

G. Lessons Learned:

This project

In hindsight, is there anything you would have done differently for your project, or suggestions you would recommend for future projects of this type, in terms of:

(ITEMIZE)

a. System functionality that was implemented
b. System technology or vendor choices that were made
c. Project management or agency coordination
d. O&M logistics or division of responsibilities
e. Anything else?

Other projects

Are there any suggestions you would offer to an agency considering a similar type and scale of ATIS project in the future:

f. System functionality
g. System technology or vendor choices
h. Project management or agency coordination
i. O&M logistics
j. Anything else?

Any other general comments about the project?

For follow-up questions, is there anyone else that you would recommend we talk with about the project?

U.S. Department of Transportation

Federal Transit Administration

U.S. Department of Transportation
Federal Transit Administration
East Building
1200 New Jersey Avenue, SE
Washington, DC 20590
http://www.fta.dot.gov/research