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# Willamette River Ferry Feasibility Study

## City of Portland River Renaissance Initiative

**FINAL REPORT**



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## Executive Summary

In February 2006, the City of Portland Office of Transportation (PDOT), Bureau of Planning (BOP), and River Renaissance Initiative (RRI) hired an independent consulting team to evaluate the feasibility of passenger ferry service on the Willamette River. This report details the results of that analysis; it evaluates the feasibility of two distinct types of ferry service:

- (1) Commuter operations designed to provide supplemental line haul service during peak hours from population centers on the Willamette River to downtown Portland.
- (2) Intracity circulator services (both year-round and seasonal) that would connect important destinations within Portland's Central City and provide river excursion trips for visitors and residents.

A wide range of variables related to service feasibility and start-up are included in the analysis, including: vessel types and capacity, terminal siting and development, market potential, operating and capital cost, funding, marketing and landside integration with public transit and pedestrian networks.

Evaluated against the broader goals of the River Renaissance Initiative and the Portland Bureau of Planning, there are a number of very real qualitative benefits that a Willamette River Ferry would create for the City of Portland, including:

- Getting residents and visitors on the river.
- Encouraging orientation of new development to the river.
- Enhancing visitors' experience and potentially increasing the number of annual visits to Portland's waterfront attractions and facilities.
- Promoting sustainable economic development.
- Promoting river and ecology education.

The following sections summarize report findings and recommendations on Commuter and Circulator (Excursion) services.

### **Commuter Service**

- Evaluated as a peak-hour commute mode that supplements existing public transportation offerings, water ferry service has two major disadvantages: (1) higher operating costs than existing bus modes and (2) expensive infrastructure (park-&-rides, terminals, docks, etc.) needs that support a limited passenger base.
- The estimated operating cost of a 100-passenger catamaran vessel, the best candidate vehicles for a peak-hour commuter service, is approximately \$210 per service hour or \$3.4 million dollars annually for the proposed commuter service.

Even with a proposed premium fare level (\$4.00 one-way), the service would demand a per passenger subsidy two to four times higher than bus and rail modes, making it difficult to justify public subsidy at this time.<sup>1</sup>

- *Commuter ferry service should not be pursued at this time due to high cost premiums over other modal options and expensive terminal construction that would be required to initiate service.* For such a service to be viable in the future one or more of the following will be required: (1) degradation of vehicular travel time on roadways parallel to the river that give a water-borne transit a distinct travel time advantage, (2) population increases of 10 percent or more in identified ferry markets that are more than 20-minutes from downtown Portland and do not have other high-capacity transit alternatives, (3) a significant change in development patterns (i.e., multi-acre, high-density residential or mixed-use development)<sup>2</sup> adjacent to the River at one or more of the proposed home-end terminal areas (i.e., Milwaukie, Lake Oswego, Oregon City, St. Johns, etc), (4) a change in cost structure that makes operating ferry service more competitive with bus and rail.

## Circulator Service

- A Seasonal Circulator designed to provide passenger excursions and connect Central City destinations during the peak visitor season (May through October) is the most cost-effective service evaluated and should be considered as an initial service offering. Such a service could be developed and operational within two to three years, given strong cooperation between the City, potential operators, waterfront land-owners and developers, and businesses.
- Based on estimated patronage for a Seasonal Circulator, an operating subsidy of \$0.34 per passenger trip or \$36,950 per year would be required to operate this peak-season/peak-hour service. There is potential for a private operator to make up this difference through private grants, the operation of private charter service, advertising revenue or the sale of vessel or terminal naming rights.
- A Year-Round Circulator that operated daily between the hours of 7:00 am and 6:00 pm would require an annual subsidy of over \$900,000, in the range of \$5.55 per passenger trip. High subsidy requirements would discourage any private operator from undertaking a year-round schedule.
- Operating cost estimates provided above do not include capital construction of terminal and dock facilities; these expenses would impact a private operator's performance if they were required to cover these costs. Only the OMSI dock is service-ready. Riverplace would require relatively moderate improvements and all other

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<sup>1</sup> Many stakeholders have indicated they view river transit as a good alternative because it would require less capital investment than rail. It is important to understand that transit capital and operations are funded through different sources and that federal operating funds carry a higher local match requirement. Capital cost savings may be irrelevant if the proposed service is not competitive for ongoing operating subsidy.

<sup>2</sup> For the purpose of this report, high-density refers to multi-acre development with average densities of 20 units per acre or higher.

docks would need to be newly constructed. Ongoing urban renewal and parks projects could be leveraged to develop several of these docks, including those at Ankeny, South Waterfront and the Pearl.

- There is an excellent opportunity to build, restore or acquire unique vessels that will attract excursion passengers and operate using environmentally friendly fuel technology. The historic vessels owned by RiversWest provide an attractive option for a Seasonal service or as supplemental vessels in a mixed fleet. Seeking grants and donations for the renovation of RiversWest's historic vessels may make the formation of a start-up fleet more viable and reduce the cost burden on potential private operators. Another excellent vessel design model for the Central City Circulator service is the vessel used by AquaBus and False Creek Ferries in Vancouver, BC. These attractive vessels are constructed of molded fiberglass, use a Volvo diesel engine, can accommodate 20 passengers, and travel at speeds of 8 to 9 knots. Seven vessels would be required to operate a Seasonal service with 15-minute peak headways. Estimated costs range from \$1.25 million for a mixed fleet that used the RiversWest vessels to \$1.75 million for an all-new fleet.
- The success of a Central City Circulator service will be reliant on the initiative of local champions. It is improbable that competitive regional transit funds would be allocated to support a visitor-oriented, Central City excursion service. Therefore, funding will need to come from a combination of fare revenue and local money generated through business contributions, grant funds and other creative funding mechanisms. A strong initiative to build a vision for the service and garner political and financial support will be needed.

# Chapter 1. Introduction & Evaluation Framework

## Project Overview

In February 2006, the Portland Office of Transportation, the Bureau of Planning and the River Renaissance Initiative (RRI) hired an independent consulting team to evaluate the feasibility of passenger ferry service on the Willamette River. This report is the result of that analysis; it evaluates the feasibility of two distinct types of ferry service: (1) an intracity circulator that would serve destinations within Portland's Central City and (2) a commuter operation designed to provide supplemental line haul service during peak hours from population centers on the Willamette River to downtown Portland<sup>1</sup>. A wide range of variables related to service feasibility and start-up are included in the analysis, including: fleet, terminal siting and development, market potential, operating and capital cost, funding, marketing and landside public transit integration.

For years, Portlanders have debated the value of passenger services operating on the Willamette River. Not only could such services offer promise for moving people without claiming expensive new rights-of-way, but they also present an opportunity to reconnect the City with one of its greatest natural assets. Throughout Portland's history, the Willamette River has been the backbone for industry and commerce; as a result, the City has turned its residential neighborhoods and recreation facilities away from the river. In recent years Portlanders have begun to recognize the unmistakable value of the Willamette River as an urban amenity. The Vera Katz Esplanade has created new access to the Riverfront east of downtown, rapid development at South Waterfront is transforming a riverside brownfield into an accessible waterfront neighborhood, planned improvements to Tom McCall Waterfront Park will improve the connection between Downtown/Old Town and the Willamette River, furthermore, development in the Pearl District is now reaching the river and will soon transform the waterfront between the Broadway and Fremont bridges. Increased business, residential and visitor activity on the riverfront increases the viability of river-based transportation services.

Among the many questions that this study seeks to answer are:

- What is the market for circulator and commuter ferry services?
- What service configuration would be provided to meet these demands?
- What resources are needed to make these services reality?
- Where would docking locations be feasible and appropriate?

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<sup>1</sup> This study does not evaluate water ferry service as a high capacity transit service that would replace all-day, high-frequency bus or rail service.

- Can landside infrastructure be sited and constructed in a cost-effective, environmentally friendly manner?
- What type of vessels will be used and what are the required maintenance facilities?
- What regulatory, environmental and development barriers exist to making Willamette River passenger ferry service a reality?

## Benefits of a Willamette River Ferry

This study attempts to use quantitative analysis to evaluate various elements of ferry service feasibility; however, there are a number of very real qualitative benefits that a Willamette River Ferry would create for the City of Portland. These include:

- **Getting citizens and visitors on the river!** Many Portlanders live their entire lives without ever traversing the river that runs through their City. Providing residents an opportunity to experience the river first hand could be a powerful tool for increasing environmental awareness and active preservation of this spectacular resource.
- **Encourage orientation of development to the river.** The City of Portland Sustainable Development Commission has identified riverfront development as an important means to preserve the river and the critical habitat it supports. While this may sound counterintuitive, new investment in riverfront properties will bring new opportunities to restore riparian areas and protect habitat on the Willamette River.
- **Increase tourism and enhance visitor experience.** Water ferry services in Vancouver, Victoria, San Francisco and the Puget Sound are all heavily used by visitors and tourists. Such a service in Portland would open up new opportunities to attract tourists and entertain visitors and conventioners, simply by providing access to an existing resource.
- **Promote sustainable economic development.** Transportation access is a critical component of business location and development decisions. The orientation of commercial development to transit has become common practice, exemplified by the Portland Streetcar's impact on the Pearl District. Similar benefits could be realized for waterfront businesses and landowners by bringing new customers to their door via regularly scheduled ferry service.
- **Promote river and ecology education.** A river ferry would provide school groups and environmental education programs a cheap and reliable way to view and experience the river, promoting this critical goal of the River Renaissance Initiative.
- **Provide transportation alternatives as roadway congestion increases.** Waterborne transit by ferry has proven highly successful in motivating certain types of commuters and inter-city travelers to leave their vehicles behind. As the 21st century begins, economic growth and vehicular traffic congestion in Portland is at an all-time high. Water passenger service reviewed in this report is not likely to have a major impact on congestion, but it does provide another alternative to roadway travel.



- **Safety and reliability.** Ferry systems in the United States have an unsurpassed record of safe and reliable operations, even during periods of natural disaster that shut down adjacent land transportation systems.<sup>2</sup>

## Review of Plans and Policies

Several key planning documents trace historic analysis of passenger service on the Willamette River and define current policy on river uses and riverfront development.

### **2005 State of the River Report, City of Portland, River Renaissance Initiative**

The River Renaissance began in 2000 as a community-wide initiative to clean up the Willamette River and promote the river as the centerpiece of Portland's economic and community well being. The 2005 State of the River Report describes the progress of the River Renaissance Initiative in cleaning up the Willamette River, and promoting programs and projects that are contributing to the revitalization of the Willamette River. The report is designed as a resource to measure the effectiveness of current efforts as well as outlining future investments and activities.

The 2005 report outlines an Action Agenda, which highlights projects that will aide in revitalization efforts in and along the Willamette River as well as other rivers and streams in Portland. One of those eighteen projects is this study; the Willamette Passenger Ferry Feasibility Study was proposed as a means to assess the feasibility of passenger ferry service along the Willamette River. The report also states the study would explore potential operational models, and ultimately guide decisions about the development of water-based passenger travel in Portland.

### **The River Plan - River Concept, City of Portland Bureau of Planning**

The River Concept is a synthesis of policy guidance pulled from river related planning over the last 10 years and applied to specific areas along the Willamette River. The River Concept is meant as a guide and summarizes adopted policy documents, but also presents policy discussions and actions. The purpose of the River Concept is to provide policy guidance for the development of a new River Plan. The Concept provides an overview of the planning process for the River Plan, and summarizes the three phases of development for the plan: the North Reach (work underway), followed by the South Reach and the Central Reach. The first part of the document describes past planning efforts and is guided by the River Renaissance Vision theme, and the second half provides the policy guidance for the development of the River Plan. The North Reach, or phase one of the River Plan, mentions efforts to implement a possible river taxi system as a means to provide

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<sup>2</sup> *FERRY TRANSIT SYSTEMS FOR THE TWENTY FIRST CENTURY: A Survey of the Social, Economic, and Environmental Influences and Impacts of Ferry Systems.* The Society of Naval Architects and Marine Engineers (SNMAC). January 10, 2000.

connections to downtown. As a part of its policy guidance for the North Reach areas, and the St. Johns/ North Beach area specifically, the River Concept notes that ferry service may be a means for connecting the area with downtown Portland and Vancouver.



Source: March 2006, The River Plan-River Concept Report, City of Portland, River Renaissance, Bureau of Planning.

### **2000 South Corridor Transportation Alternative Study, Metro<sup>3</sup>**

Between 1980 and 1993, the region undertook several System Planning and Pre-Alternatives Analysis studies in the North Corridor, South Corridor and Portland Central Business District. Both the North and South Corridors were identified in the RTP as High-Capacity Transit Corridors. In 1995 the Metro Council adopted the South/North Major Investment Study (MIS), which included a recommended locally preferred alternative to construct light rail between Vancouver and Clackamas. The 2000 South Corridor Transportation Alternative Study was a result of the failure of Measure 26-74, or the South/North Corridor light rail extension in 1998. The South Corridor study examined non-light rail transportation options responsive to community needs and travel demand in the South Corridor. The Metro study reviewed different alternatives for the South Corridor including: No-Build Alternative, Commuter Rail (radial and circumferential), High Occupancy Vehicle lanes, High Occupancy Toll lanes, Bus Rapid Transit, Busway, and River Transit.

Based on the findings of the *Evaluation Report* (Metro: October 2000), the South Corridor Study Policy Group (a committee of elected and appointed officials) narrowed the list of alternatives to be studied further in the South Corridor SDEIS. The group determined that HOV lanes, HOT lanes Commuter Rail and River Transit did not meet the studies Purpose and Need and should not be studied further. In addition, after hearing from citizen groups in Southeast Portland, Milwaukie and Clackamas County, the Policy Group decided that the SDEIS should examine both a revised Milwaukie Light Rail Alternative and an I-205 Light Rail Alternative.

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<sup>3</sup> South Corridor SDEIS, December 2002. Preface, p 2-4.

River Transit, as evaluated in this initial phase, would have operated between Oregon City and downtown Portland along the Willamette River. The proposed ferry stops were: the River District (Pearl), the Rose Quarter near West Burnside Street, Southwest Salmon Street, the North Macadam area, near the Sellwood Bridge and existing Jefferson Boat Launch dock in Milwaukie. The service as evaluated would have operated throughout the day with approximately five-minute headways during peak periods and ten-minute headways during the off-peak. Bus services would have been redesigned to serve as feeder routes to the water transit service, requiring expensive relocations of local transit centers to the riverfront in Oregon City, Lake Oswego, and Milwaukie. Bus service from Milwaukie and Lake Oswego to downtown Portland would have been eliminated under this proposal, with river transit serving as a high frequency trunk line. Park & Ride lots would be located at the Milwaukie, Lake Oswego, and Oregon City landings. River Transit was not selected for evaluation in the SDEIS due to comparatively low ridership projections and relatively high capital cost associated with transit center relocations.

The water transit service proposal evaluated in the South Corridor Study represents a radically different level of service than the peak hour commuter-oriented service that is proposed and evaluated in this report.

### **Waterfront Park Master Plan, Portland Parks & Recreation, River Renaissance Initiative and EDAW**

The Waterfront Park Master Plan is an update to the original 1975 Downtown Waterfront Park Plan. The plan update sets out a vision for the future of Waterfront Park, principles to guide fundamental goals and values of the Master Plan, concepts for development that show how specific projects should be guided by the principles defined, and recommendations for specific concepts for the six parts of the park. The update to the Master Plan outlines the River Renaissance Project and the “ambitious” vision the project has set for the Willamette River, as well as the key role Waterfront Park plays in that vision.

Most relevant to this planning effort, the Waterfront Park Master Plan describes how the park can accommodate future river transit service. The plan designates Ankeny Dock for replacement so a high volume ferry could be accommodated. The Master Plan also identifies Salmon Street Springs as a dock that should be improved for possible river transit, and identifies the site as a candidate for dock facility upgrades that could accommodate reservation and ticket services as well as customer waiting areas.

### **Lake Oswego to Portland Transit and Trail Alternatives Analysis, Metro**

As of the Spring of 2006, Metro is embarking on an analysis of high capacity transit and trail alternatives in the Portland to Lake Oswego Corridor. The first step of the corridor study will be to define a range of options to be considered for further analysis. Among the alternatives that could be considered are streetcar, bus rapid transit, busway, and water transit. After scoping is completed, Metro staff will analyze options and provide the public

and decision-makers with information to help narrow the wide range of alternatives to a few that best address needs in the corridor.

Metro and its project partners currently own what is known as the Willamette shoreline right of way, a former freight rail route between Lake Oswego and Portland. Until recently this corridor was used for an excursion trolley service. Transit options that use this right of way, with and without a trail component, and/or use the Highway 43 Corridor are likely to be considered during the alternatives analysis.

The outcomes of this study will have an impact on the viability of water transit service between Lake Oswego and downtown, but could also provide opportunity by orienting transit facilities closer to the waterfront. It should be stressed that the commuter service discussed in this report does not act as a replacement for needed high capacity service between Lake Oswego and downtown.

## Previous Water Transit Studies

As mentioned, the concept of water-based passenger service in the Portland area is not a new idea. As early as 1971 planners began examining the feasibility of regular water transportation service on the Willamette River. The 1971 ***Lower Willamette River Management Plan*** (updated in 1992) covers the 17.5 miles of the Willamette River within the City of Portland, from Kelly Point Park to just above the Sellwood Bridge. The plan provides policy direction and guidance for the Department of State Lands, which has regulatory and proprietary interests in the management of the river. The initial version of the plan examined the viability of water-based passenger service on the Willamette River.

***The Analysis of River Transit System Alternatives*** conducted in 1980 after the Metro Council adopted a resolution endorsing the study of water transportation. The purpose of the study was to determine whether a high-speed commuter river transit system demonstrated sufficient mobility, ridership or economic benefits to justify commissioning a full feasibility study. The study examined five potential water transportation alternatives. Just one of the five alternatives was determined to provide a travel time benefit over bus service. In all five cases, operating costs were nearly twice the cost of comparable bus service. The study did not recommend further evaluation of river transportation.

A later study, the ***River Access and Transportation Plan*** (1992), affectionately termed RATS, provided a more detailed assessment of water transportation on the Willamette River. Both plans identified the lack of viable docking facilities as challenges to implementing service, but were optimistic about the viability of passenger service on the Willamette River.

## Existing Passenger Vessel Services

Several private passenger vessel services operate on the Willamette and Columbia Rivers, providing specialty services to customers in both long cruise and short excursion trips. None of the services profiled in this section are designed to provide fixed schedule service to the general public nor would they compete with a water ferry service.

### Portland Spirit

The Portland Spirit provides lunch and dinner cruises to the general public and private parties along the Willamette River during the summer and early fall. The Portland Spirit also provides three different river tours during the summer on jetboats; these tours do not serve meals and are shorter trips. The cruises operate seven days a week; reservations are required. The Portland Spirit is a 150-foot yacht, which can seat 350 guests for a lunch or dinner cruise, or accommodates 540 guests for a reception type event. The Willamette Star is a 98-foot yacht, which is used primarily for private parties and seats up to 100 guests for a lunch or dinner, or 149 guests for a reception. The Crystal Dolphin is a smaller vessel which can seat up to 50 guests for lunch or dinner cruises or can accommodate 120 guests for a reception. The Outrageous Jetboat provides three different tours from July to September from downtown Portland to: the Columbia Gorge-Bonneville Dam, Astoria, or a Portland Bridges Cruise.



### Portland Rose Sternwheeler

The Portland Rose Sternwheeler provides reservation lunch or dinner cruises along the Willamette River year around. The Portland Rose can also be rented out to private charters, and can accommodate 120 passengers. The Portland Rose Sternwheeler has a second cruise, the Belle of the Ball, which is a two-hour cruise that operates from May 18th-September 4th and boards in Oregon City. The Rose and the Belle serve different clientele as the Rose operates year around and requires reservations, whereas the Belle operates during the summer months and provides day trips without reservations.



## Willamette Jet Boat Excursions

The Willamette Jet Boat Excursions offers one-or two-hour jetboat tours along the Willamette River to the general public and private parties. The tours operate daily from April to October between the hours of 10:00 AM and 6:00 PM. A one-hour tour starts at OMSI and travels to the Fremont Bridge; a two-hour tour starts at OMSI and travels to Oregon City. For a short time, Willamette Jet Boat Excursions operated a water taxi from OMSI to RiverPlace; however, passenger volumes were not sufficient to sustain operations.



## American West Steamboat Company

The American West Steamboat Company operates two steamboats, offering seven-day cruises that begin on the Willamette River. Both the Empress of the North and the Queen of the West begin on the Willamette River, travel east on the Columbia River and finally enter the Snake River to complete the cruise. Cruises begin on Swan Island at 4:00 PM and travel along the Willamette River during the dinner hour for about two hours before entering the Columbia River. The service operates year around. The Empress of the North has capacity for 230 passengers, and the Queen of the West has capacity for 150 passengers.



## Cruise West

Cruise West, like the America West tour, operates a seven-day cruise, The Spirit of Discovery, which begins in downtown Portland on the Willamette River, before traveling onto the Columbia and finally the Snake River. The Spirit of Discovery operates cruises in April and again from September to October, and the tour begins with a two hour dinner cruise along the Willamette River before continuing onto the Colombia River. Three different vessels provide the Voyage of Discovery cruise, the largest being 192 feet with an average speed of 13 knots, and ranging in capacity between 78 to 96 passengers. The Voyage of Discovery also travels along the Willamette River on the return trip back into Portland, usually in the morning on the last day of the cruise.



## **RiversWest**

It is also notable that RiversWest operated a limited trial service during the summers of 2002 through 2005. Small boats (10 passengers) were used to shuttle passengers back and forth across the river. The operation was successful, often turning away passengers at the docks. A survey conducted during the trial run showed that passengers were interested in a more permanent service, but also that many were riding for the experience and would not be regular users.

## Project Evaluation Criteria

A set of evaluation criteria was developed by the study team to guide the assessment of water-based passenger service feasibility on the Willamette River. Evaluation criteria developed for this study recognize extensive work by the River Renaissance Initiative and the Bureau of Planning to define key themes for the use, development and protection of the Willamette River. In summary, these five interrelated themes are:

1. Ensure a clean and healthy river system for fish, wildlife, and people.
2. Maintain and enhance the City’s prosperous working harbor.
3. Embrace the river and its banks as Portland’s front yard.
4. Create vibrant waterfront districts and neighborhoods.
5. Promote partnerships, leadership, and education.

Evaluation criteria developed for this study were categorized under these five primary themes. Figure 1-1 lists these criteria:

**Figure 1-1 Evaluation Criteria**

<b>1. Ensure Clean/Healthy River System</b>
Minimize environmental impacts (noise, wakes, gas waste, air pollution, etc.)
Minimize dredging
Maximize ecological benefits of structures on waterfront
Support updated Willamette River Greenway Plan (recreational access, etc.)
<b>2. Maintain &amp; Enhance City’s Working Harbor</b>
Minimize conflicts with commercial operations
Minimize conflicts with ship traffic
Maximize net economic benefits
<b>3. Embrace River as Portland’s Front Yard</b>
Minimize use conflicts (small craft, recreation, etc.)
Enhance tourist related activities on Willamette
Support dock and landside facilities compatible with neighborhood/area urban design
<b>4. Create Vibrant Waterfront Districts &amp; Neighborhoods</b>
Facilitate strong multimodal connections (pedestrian, bike, transit, auto)
Serve areas with greatest ridership potential (system and site specific)
Enhance Urban Renewal District planning/development
Enhance mobility/Improve circulation (intracity & intercity)
<b>5. Promote Partnerships, Leadership &amp; Education</b>
Attract new funding (local, state, & federal)
Support from local jurisdictions
Develop operating, marketing partnerships with regional service providers



## Characteristics of Successful Ferry Services

A Mid-twentieth century boom in highway and bridge construction led many historic passenger ferry services in North America to be replaced by landside bus or rail transit. Still, successful passenger ferry services operate in more than a dozen major urban areas throughout the United States and Canada. A review of systems operating today reveals several common characteristics:

- **Identifiable demand for service:** A successful operation must have a base level of demand to support the cost and regional benefits of operating the service. Island destinations such as Martha's Vineyard or Angel Island in the Bay Area are obvious ferry markets, since there is no land transportation alternative. Where there is competing land transport, passenger ferry services can be competitive only if there is high demand along the waterfront and/or geographic features that make water transit faster or more direct than landside options. Existing services in New York City and San Francisco are good examples. Ideally, a combination of customer uses is available at each dock to create a consistent demand for travel in both directions and at different times throughout the day.
- **Adequate physical infrastructure:** Passenger ferry service requires efficient connections between land and vessel. Since passenger origins and destinations are on land, substantial waterside and landside infrastructure development is required to ensure a successful service. Dock facilities adequate to accommodate passenger vessels and provide ADA access between the land and boats are often quite large and have specific requirements that make it difficult to retrofit existing facilities.
- **Waterside and landside infrastructure:** Passengers need covered waiting facilities on land as well as safe walkways to connect to other transportation systems and/or their final destination. Proximity to intermodal terminals, rail stops and major employment districts is important.
- **Park-&-Ride facilities in outlying neighborhoods:** In outlying neighborhoods where commuter ferry runs originate or stop, it is necessary to have adequate parking facilities for vehicle storage. This is particularly true where limited transit access exists; however, even where there is transit access to the ferry terminal, it is reasonable to expect that most commuter ferry passengers will drive to the terminal.
- **Attractive level of performance:** A commuter ferry service needs to provide an attractive level of service in terms of speed, frequency, reliability and experience. While ferries do attract customers who enjoy the "experience" of commuting on the water, even the most dedicated passenger will be sensitive to difference in travel time versus other competing modes.
- **Measurable economic or transportation benefit:** If ferry service is to be operated with public subsidy, it must be able to operate at a cost that is in line with other regional alternatives. Since per hour operating costs for ferry services are typically at a premium to bus or rail transit, passenger fares are often higher. Passenger demand and willingness to pay must exist to support a successful service that

measures competitively against other regional transit modes in terms of per passenger subsidy levels. Ferry services may also provide economic benefits to the community not directly related to transportation, including increased tourism, riverfront development or increased convention business. These factors should also be weighed when comparing more standard measures of efficiency, such as per passenger operating subsidy.

## Passenger Ferry Service Models

An examination of passenger ferry services in North America shows that one of four primary models can typically be used to justify their existence and ongoing operation:

- **Transportation based services** – Ferry services in cities that have established waterfronts and high concentrations of white-collar employment, such as San Francisco, Seattle, and New York, have relied on ferry transportation for decades. In some cases ferry service predates most other transportation modes. In these cases, the success of ferry service is due, in part, to its history but, more importantly, to the orientation of the Central Business District (CBD) to the water. Transportation based systems have remained successful where there are few competing options and where the commute is more comfortable and attractive than driving. Frequency, speed and reliability are the most important factors to success for services operating under this model. Typically, these services are part of a broader network of transportation options.
- **Travel time and reliability based services** – Ferry services, such as the Cross Sound Ferry between Long Island and Manhattan, are successful because they offer competitive travel times when compared to other modes. In this case, the trip is 40 minutes compared to 2.5 hours in a car. Travel time savings may be due to geography, avoiding traffic congestion or both. Riders on these services are often willing to pay a high premium for ferry travel because it provides a significant value in time savings.
- **Geography based services** – In Washington’s Puget Sound, Alaska, Maine and North Carolina, ferry systems operate successfully because geography provides few alternatives to connect important concentrations of employment and commercial activities. Island communities are often most dependent on ferry services and many of these types of services have disappeared in the last century as bridges and highways were built or improved. This type of service would not be applicable to the City of Portland as the City is not limited by geography, and provides many transportation options to connect with major employment and commercial activities.
- **Economic development based services** – This may be the least common justification for passenger ferry service, but there are examples of passenger ferry services developed to promote job creation or tourism. The Genesee River Service on Lake Ontario was developed to promote job creation, although the service has struggled financially. A number of tourism based ferry services are operating in North America including those serving Angel Island in the San Francisco Bay Area,

Grandville Island in Vancouver and a number of tourist sites in Victoria, BC. In many cases, the ferry service becomes a critical part of tourist experience and some sell excursion passes designed to allow passengers to ride the entire route without getting off.

The proposed Commuter Service falls primarily under the “Transportation Based Service” model, but may also have some advantages common to “Travel Time” reliant services. The proposed service is reliant on the connection between population centers served by Park-&-Ride facilities and the region’s primary employment center, Downtown Portland, provided naturally by the Willamette River corridor.

The proposed Central City Circulator service would fall primarily under the model of “Economic Development Based Services”; its success is likely to rely on the willingness of a private operator to run the service as well as financial support from private businesses.

## Passenger Ferry Service Markets

As described in the previous section, people are attracted to passenger ferry service for one or more of the following reasons: (1) it is the only transportation alternative available, (2) it is a fast and more reliable means of transport, (3) it provides a more interesting, enjoyable ride than land transportation alternatives, or (4) it serves as a destination or excursion service for visitors and sightseers.

This study identifies two distinct passenger markets for ferry service on the Willamette River: (1) line-haul commuters traveling to the Portland Central Business District from Oregon City, Lake Oswego and Milwaukie and (2) visitor and excursion passengers traveling between destinations within Portland’s Central City.

The two identified market types have distinct rider profiles that differ significantly from one another as well as from the profile of passengers on bus or rail transit. Each passenger type is profiled in greater detail later in Chapter 3 of this report. Each market type also has distinct operating requirements, fleet needs and landside amenity and facility needs (i.e., sheltered waiting areas, commuter parking, etc.).

Figure 1-2 shows the distinct operating requirements of the two market types.

**Figure 1-2 Market Types and Service Requirements<sup>4</sup>**

<b>Characteristic</b>	<b>Commute Market</b>	<b>Visitor/ Circulator Market</b>
Service Hours	Focus on peak commute hours	All day service – ridership peaks midday
Vessel Size	Class II Passenger Vessels – capacity 80 – 120 passengers	Small vessels – capacity 20 passengers
Vessel speed	Fast boats that compete with auto travel times (30 knot max.)	Slower boats with good visibility ideal (8 knot max ok)
Amenities Needed	Comfortable seating, warm indoor space, large bicycle storage capability, food service if possible, quiet operation, fast loading and unloading	Good visibility, covered seating area, interpretation if possible, bicycle storage
Seasonality	Year round - little variation	Reduced service in winter
ADA Accessibility	Yes	Yes
Typical Market Demographics	Mid to high include commuter, values time, willing to pay premium fare. High auto access rates at home end of trip require Park-&-Ride opportunities.	Visitor including local visitor who wants to connect to the river. Not as time focused as commute market. Ferry trips as part of experience. Some may ride for excursion purpose only.
Connections/Access	Ferry riders less likely to use existing transit modes, but may walk or bike longer distances for connections. Likely to drive 15+ minutes on home end and walk 10 to 15 minutes on work end.	Will walk or take transit from other Central City visitor sites. Local users may drive.  Not highly sensitive to time required to access ferry. Use may be one element of waterfront experience.

<sup>4</sup> Service markets were identified through a series of interviews with stakeholders and interest groups in the Portland area as well as peer system research, including the experience of systems in the Puget Sound, San Francisco Bay Area, British Columbia, New York, Chicago, Baltimore and elsewhere.

## Chapter 2. Review of Existing and Potential Landing Sites

During the week of March 13th, 2005, the Nelson\Nygaard consultant team met in Portland for a week to conduct a detailed field evaluation of the Willamette River corridor and to visit and review potential terminal sites. The team toured the Willamette River corridor from Oregon City to St. Johns by boat and visited potential terminal sites on land to review landside connection. The team used an evaluation system developed in advance of our site visits. The following primary evaluation criteria were used to assess the viability of potential terminal sites:

- Potential Ridership
- Waterside Access
- Upland Access
- Intermodal Access
- Support/Use Conflicts
- Capital Construction Costs

### Terminal Site Locations Evaluated

Figures 2-1 and 2-2 show the terminal sites evaluated by the consulting team during the field evaluation. The figures also indicate what passenger markets were considered at each location and whether any existing dock facility is present. The final column in Figure 2-1 notes the outcome of the evaluation, indicating whether a site was:

- Proposed for service;
- Eliminated, but considered to have short-term potential if certain landside developments or improvements are implemented; or
- Eliminated with no potential.

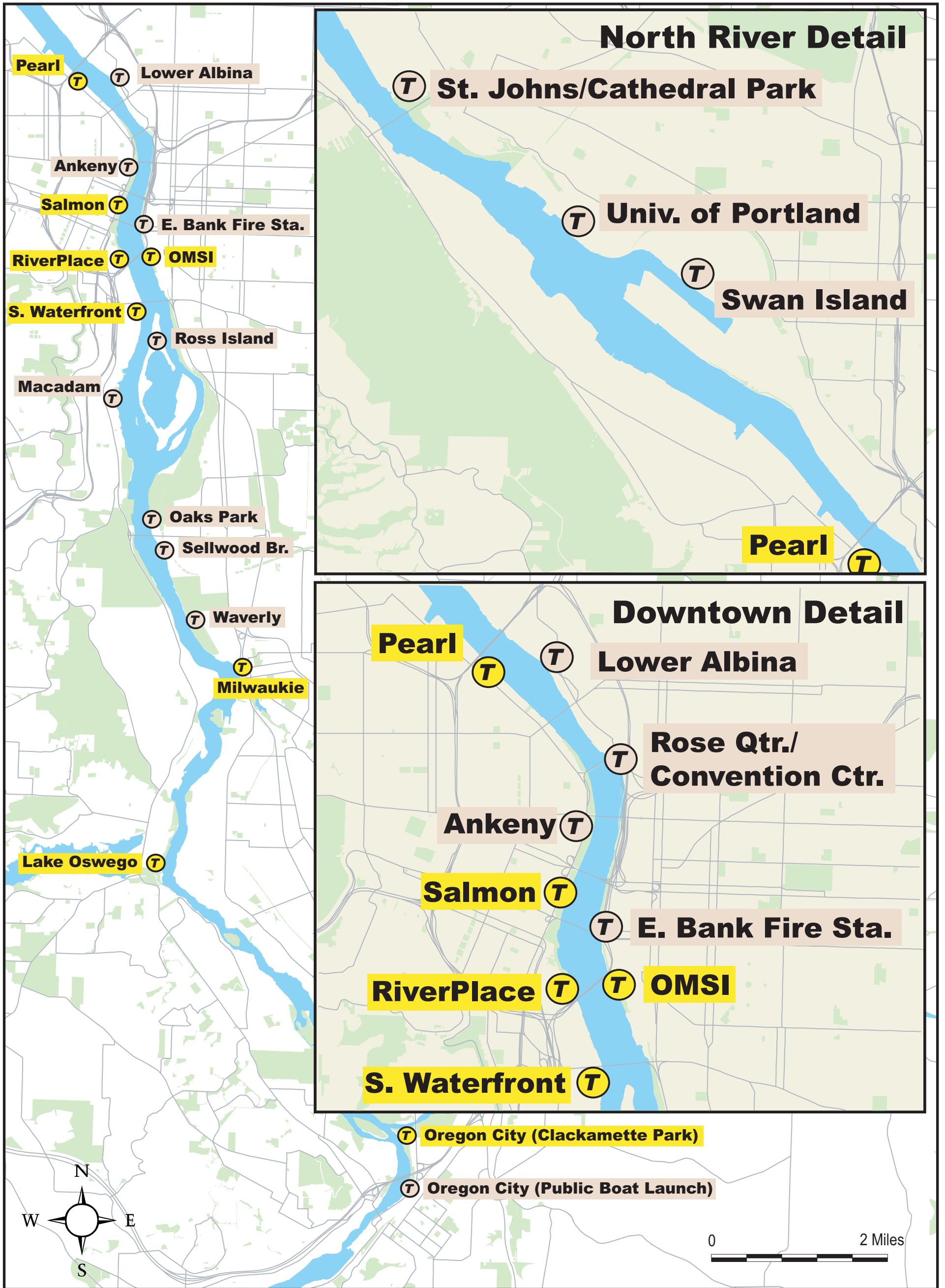
Figure 2-3 provides a detailed evaluation of terminal site locations based on field visits and a review of regional travel demand data. A 0 to 3 rating system is used for each evaluation category, 0 being the lowest possible rating and 3 being the highest. Scores for each category are totaled and a weighted average is developed for each potential terminal site. Ridership potential is weighted at five times other evaluation categories, since there is no incentive to invest in a ferry terminal where there is insufficient passenger demand to support the service. Low ratings in critical evaluation categories may be cause to eliminate an otherwise high ranking site. Some sites where there were obvious critical flaws, such as lack of public access, were eliminated prior to this evaluation.

**Figure 2-1 Terminal Sites Evaluated**

Potential Terminal Site	Existing Dock Facility	Commuter	Circulation/ Visitor/Tourist	Evaluation Status
Vancouver, WA		X		Eliminated
St. Johns/Cathedral Park		X		Eliminated
University of Portland		X		Eliminated
Swan Island	X	X		Eliminated
River District/Centennial Mill			X	Proposed
Lower Albina	X	X		Eliminated
Convention Center/Rose Quarter	X	X	X	ST Potential
Ankeny Dock/Market Site	X	X	X	ST Potential
Salmon Springs Fountain	X	X	X	Proposed
EB Fire Dock	X	X		ST Potential
OMSI	X		X	Proposed
RiverPlace	X	X	X	Proposed
South Waterfront (Gibbs)	X	X	X	Proposed
Ross Island			X	Eliminated
Oaks Park			X	Eliminated
Macadam District		X		ST Potential
Sellwood Bridge (south side)		X		ST Potential
Waverly Marina	X	X		Eliminated
Milwaukie - Riverfront Launch Area	X	X		Proposed
Lake Oswego - Riverfront Park Area	X	X		Proposed
Oregon City - Public Dock	X	X		Eliminated
Oregon City - Clackamette Park		X		Proposed

Note: ST Potential = Short Term Potential

# Figure 2-2 Terminal Site Location Map



**Figure 2-3 Terminal Site Location Evaluation Matrix**

	Maximum Score	City of Portland									Milwaukee	Lake Oswego	Oregon City	Vancouver
		Convention Center/Rose Quarter Dock	Ankeny Dock (Market Site)	Salmon Street	EB Fire Dock	OMSI	RiverPlace	Sellwood Bridge	South Waterfront	North Macadam	Milwaukee	Lake Oswego	Oregon City	Vancouver, WA
<b>1. Potential Ridership</b>		<b>1.67</b>	<b>1.33</b>	<b>2.33</b>	<b>1.67</b>	<b>1.50</b>	<b>1.67</b>	<b>1.83</b>	<b>2.33</b>	<b>1.33</b>	<b>1.83</b>	<b>1.50</b>	<b>1.17</b>	<b>1.17</b>
Commuters O/D to Central City	3	1	0	3	0	0	2	3	3	2	3	2	1	2
Other Strong Commute Market	3	1	0	2	2	0	1	2	2	2	2	2	1	1
Tourism and Visitation	3	3	2	3	3	3	2	0	2	0	0	0	0	0
Limited Competing Direct Transit to CBD	3	2	1	1	1	2	2	3	3	2	3	2	2	1
Competitiveness with Auto/Transit Travel Time	3	1	2	3	2	1	2	3	2	2	3	3	3	1
Reverse direction travelers	3	2	3	2	2	3	1	0	2	0	0	0	0	2
<i>SUBTOTAL</i>	18	10	8	14	10	9	10	11	14	8	11	9	7	7
<b>2. Waterside access</b>		<b>1.67</b>	<b>2.83</b>	<b>2.17</b>	<b>2.17</b>	<b>3.00</b>	<b>2.33</b>	<b>1.67</b>	<b>1.83</b>	<b>2.17</b>	<b>1.83</b>	<b>1.33</b>	<b>2.50</b>	<b>2.00</b>
Adequate water depth	3	3	3	3	3	3	3	3	3	3	2	1	3	3
Ease of navigation	3	3	3	3	3	3	3	2	3	3	3	1	3	2
Usable docking facility	3	1	3	1	1	3	2	0	1	2	2	1	3	1
Maintained channel	3	3	3	3	2	3	3	2	2	3	3	3	3	3
Sheltered berthing	3	0	2	1	2	3	2	1	1	2	0	1	1	1
Construction cost	3	0	3	2	2	3	1	2	1	0	1	1	2	2
<i>SUBTOTAL</i>	18	10	17	13	13	18	14	10	11	13	11	8	15	12
<b>3. Upland access</b>		<b>0.50</b>	<b>1.50</b>	<b>2.25</b>	<b>1.00</b>	<b>3.00</b>	<b>1.75</b>	<b>1.00</b>	<b>1.75</b>	<b>1.25</b>	<b>1.00</b>	<b>0.75</b>	<b>0.75</b>	<b>1.50</b>
Convenient parking area/ped & bike facilities	3	1	2	3	2	3	2	1	2	2	1	0	1	1
Proximity to pop./emp./activity centers	3	1	2	3	2	3	2	2	3	2	1	1	1	3
Convenient walkway to dock area	3	0	2	3	0	3	2	1	2	1	2	2	1	2
Existing useable building	3	0	0	0	0	3	1	0	0	0	0	0	0	0
<i>SUBTOTAL</i>		2	6	9	4	12	7	4	7	5	4	3	3	6
<b>4. Intermodal access</b>		<b>1.33</b>	<b>2.30</b>	<b>2.67</b>	<b>2.00</b>	<b>2.33</b>	<b>2.33</b>	<b>2.00</b>	<b>2.33</b>	<b>1.67</b>	<b>1.33</b>	<b>1.33</b>	<b>1.00</b>	<b>1.00</b>
Local bus or rail service availability	3	2	2	3	2	2	2	2	2	1	1	1	1	1
Road access	3	2	2	2	2	2	2	1	2	2	2	1	1	1
Pedestrian and bike access	3	0	3	3	2	3	3	3	3	2	1	2	1	1
<i>SUBTOTAL</i>	9	4	7	8	6	7	7	6	7	5	4	4	3	3
<b>5. Competing uses</b>		<b>2.67</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>2.67</b>	<b>2.67</b>	<b>2.67</b>	<b>2.67</b>	<b>2.00</b>	<b>1.33</b>	<b>2.33</b>	<b>2.00</b>
Minimal environmental impacts	3	2	3	3	3	3	2	2	2	3	2	1	2	2
Abutters' support	3	3	3	3	3	3	3	3	3	3	2	1	3	2
Lack of use conflicts	3	3	3	3	3	3	3	3	3	2	2	2	2	2
<i>SUBTOTAL</i>	9	8	9	9	9	9	8	8	8	8	6	4	7	6
<b>6. Costs</b>		<b>3.00</b>	<b>2.00</b>	<b>2.00</b>	<b>1.75</b>	<b>3.00</b>	<b>1.25</b>	<b>1.25</b>	<b>1.75</b>	<b>1.50</b>	<b>1.75</b>	<b>1.25</b>	<b>1.75</b>	<b>2.00</b>
Property purchase or lease	3	3	3	3	3	3	1	1	1	1	1	1	2	2
Site preparation	3	3	2	2	2	3	1	1	2	2	2	2	2	3
Upland construction	3	3	2	2	1	3	1	1	2	1	2	1	2	1
In-water construction	3	3	1	1	1	3	2	2	2	2	2	1	1	2
<i>SUBTOTAL</i>	12	12	8	8	7	12	5	5	7	6	7	5	7	8
<b>TOTAL WEIGHTED SCORE - Ridership Weighted at 5 times other factors</b>		<b>17.52</b>	<b>18.28</b>	<b>23.74</b>	<b>18.27</b>	<b>21.83</b>	<b>18.68</b>	<b>17.74</b>	<b>21.98</b>	<b>15.91</b>	<b>17.06</b>	<b>13.49</b>	<b>14.18</b>	<b>14.35</b>



## Terminal Facilities with Limited Short-Term Potential

Through our evaluation, several terminal locations were eliminated as viable docking sites for proposed services, but hold great potential were certain changes in land use or access to occur. The most important of these are:

- **Convention Center:** The siting and orientation of the convention center is a “missed opportunity” to connect to the river and to river-borne passenger transit. The existing dock facility provides access to the Eastbank Esplanade; however, the walk between the dock and the front door of the Convention Center is prohibitively long, uphill and unprotected from the elements. The walk does provide ramps that meet ADA requirements. The Portland Development Commission is currently working on a Development Vision for the Convention Center Blocks, which considers better access to the river. Improving this connection will be challenging due to major barriers including rail tracks and Interstate 5. If and when pedestrian improvements are made, this site would become a critical stop for a Central City Circulator Ferry and possibly for commute service. In the shorter term, expanding the dock facilities would allow for charter services for conventioners.



- **Ankeny:** The Ankeny site has good potential for excursion travel, particularly on weekends and daily if a public market is developed in the Ankeny Square area. This site was determined to be less desirable than Salmon Springs Fountain as a central city terminal for commuter ferries, largely due to pedestrian access to key employment sites in the CBD. This site should be added to the Central City Circulator Ferry when a full-time public market is implemented.



The Waterfront Park Master Plan envisions a new dock along the Waterfront at Ankeny.”

- **EB Fire Dock:** The Fire Dock site has one of the better existing dock facilities; however, there is little adjacent demand to support a regular stop. The site does have good potential for special events service, particularly to carry eastside residents to events at Riverfront Park on the west bank. In many ways, the EB Fire Dock is better positioned than OMSI to connect passengers to the Central Eastside district, the East Bank Esplanade, the Portland Boathouse and to transit service operating on the Hawthorne Bridge. As commercial activity in this area increases, this dock will become a viable terminal site.
- **Sellwood Bridge:** The Sellwood Bridge site was eliminated from initial considerations due to poor auto access and lack of parking on the east bank. There is great short-term market potential at this site due to upcoming reconstruction of the bridge, which will cause significant traffic delays in an already congested corridor. If a solution for commuter parking and access to a bridgehead terminal site can be solved, a Sellwood to downtown service might provide a pilot service opportunity, particularly if construction mitigation funds are available.



**Sellwood Bridge from east bank. Old Sellwood Ferry slip is visible on the west bank.**

- **Macadam District:** This relatively dense residential area could provide an important future docking location. In the short-term it was determined that there was limited benefit for commuters to use a ferry service over available bus transit alternatives. Limited opportunity for additional parking is a short-term downfall; however, the site does provide good pedestrian access to a significant residential population. This should be considered as a high priority expansion stop for a south river commuter ferry.



**Boat launch near Macadam district**

## Recommended Terminal Facilities– Opportunities and Challenges

A number of terminal locations were identified as critical to the operation of commuter ferry service, central city circulator service or both. The following section highlights these terminal locations and identifies key opportunities and challenges associated with serving each site. In some cases, major barriers or issues would need to be overcome to provide a viable connection between land transportation and ferry vessels. In almost all cases, significant dock and landside development would need to take place.

- OMSI is the only terminal facility “ready to go” for ADA access, larger vessels, ease of loading and unloading.
- New docks planned for Ankeny and South Waterfront could be designed to accommodate ferry vessels.
- Virtually all other facilities would need to be rebuilt or built totally new.
- The Centennial Mills Framework Plan which is currently being developed by the Portland Bureau of Planning and the Portland Development Commission (PDC), includes a dock as a component of the proposed redevelopment of the site.

## River (Pearl) District

Market Type	
Visitor/Excursion, Very Limited Commuter	
Opportunities	Challenges
<ul style="list-style-type: none"> <li>▪ Developing area with residents, employment and retail/entertainment opportunities</li> <li>▪ Opportunity to connect to planned Boardwalk</li> <li>▪ Could complement streetcar service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Streetcar is about 4 blocks away</li> <li>▪ No existing or planned dock facility<sup>1</sup></li> </ul>
Major Issues/Barriers	
Uncertainty about future of Centennial Mill site.	
Intermodal Connections	
Within ¼ mile:	
<ul style="list-style-type: none"> <li>▪ TriMet Line 16 (33/--) CBD to St. Johns/Expo Center</li> <li>▪ Northbound Portland Streetcar (17/13) Riverplace to Good Sam Hosp</li> </ul>	
Within ½ mile:	
<ul style="list-style-type: none"> <li>▪ TriMet Line 9 (10/15) CBD to NE 27th &amp; Saratoga via Broadway</li> <li>▪ TriMet Line 77 (17/17) Montgomery Park to Troutdale via Broadway</li> <li>▪ Southbound Portland Streetcar (17/13) Good Sam Hosp to Riverplace</li> </ul>	
Upland Access	
High quality bike and pedestrian access will be provided between Centennial Mills redevelopment and core of Pearl District per plans.	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service



Source: Portland River District Park System-Urban Design Framework Study-Portland Parks and Recreation, Peter Walker and Partners Landscape Architects, Opsis Architecture, January 16, 2001;  
[http://www.pdc.us/pdf/dev\\_serv/pubs/dev\\_riv\\_dist\\_urban\\_design\\_study.pdf](http://www.pdc.us/pdf/dev_serv/pubs/dev_riv_dist_urban_design_study.pdf)

<sup>1</sup> The Bureau of Planning and the PDC are currently conducting a public planning process to develop a Centennial Mills Framework Plan that will inform the redevelopment of this site. Consideration is being given to a dock in this framework plan.

## Salmon Springs Fountain

<b>Market Type</b>	
Visitor/Excursion, Commuter Terminal	
<b>Opportunities</b>	<b>Challenges</b>
<ul style="list-style-type: none"> <li>▪ Heart of the central city</li> <li>▪ Excellent multi-modal connectivity</li> <li>▪ Strong attraction to commute markets and visitors</li> <li>▪ Could be central city terminal location</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lack of direct transit connections for transferring commuters (bus and MAX services are within 2 to 6 blocks)</li> </ul>
<b>Major Issues/Barriers</b>	
Lack of quick transit connections for transferring commuters.	
<b>Intermodal Connections</b>	
<p>Within ¼ mile:</p> <ul style="list-style-type: none"> <li>▪ TriMet Line 4 (10/15) CBD to Gresham via Division</li> <li>▪ TriMet Line 6 (12/15) CBD to Vancouver via MLK/Grand</li> <li>▪ TriMet Line 10 (13/30) CBD to SE122nd &amp; Foster via Harold</li> <li>▪ TriMet Line 14 (7/12) CBD to SE Foster &amp; 94th via Hawthorne</li> <li>▪ TriMet Line 15 (7/15) CBD to Parkrose/Sumner TC via Belmont</li> <li>▪ TriMet Line 18 (45/-) CBD to NW Macleay &amp; Burnside</li> <li>▪ TriMet Line 31 (19/-) CBD to Estacada/Clackamas TC via Hwy 99</li> <li>▪ TriMet Line 32 (17/-) CBD to Milwaukie TC/Clackamas CC</li> <li>▪ TriMet Line 33 (15/15) CBD to Oregon City/Clackamas CC via Hwy 99</li> <li>▪ TriMet Line 41 (30/45) CBD to Sellwood via Hwy 99</li> <li>▪ TriMet Line 51 (17/60) CBD to SW Dosch &amp; Hamilton</li> <li>▪ TriMet Line 99 (15/-) CBD to Clackamas CC via Hwy 99</li> <li>▪ TriMet MAX (10/15) Beaverton/Hillsboro to Airport/Gresham</li> </ul>	
<p>Within ½ mile:</p> <ul style="list-style-type: none"> <li>▪ All Bus Mall Service</li> </ul>	
<b>Upland Access</b>	
<p>Very good bike and pedestrian connections, excellent proximity to downtown shops and employment and directly on Willamette Greenway. There is a ramp for disabled persons as well as steps from Salmon towards the ferry site. The dock would have to be adjusted for accessibility requirements, as existing ramp grade is too steep.</p>	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service



## RiverPlace

<b>Market Type</b>	
Visitor/Excursion, Commuter Terminal	
<b>Opportunities</b>	<b>Challenges</b>
<ul style="list-style-type: none"> <li>▪ Good mix of retail, residential and hotel mixed use allows for walk access to ferry</li> <li>▪ Existing dock may be useful</li> <li>▪ Strong recreational and tourist market in addition to short-hop commuters</li> <li>▪ Good connections with streetcar</li> </ul>	<ul style="list-style-type: none"> <li>▪ Connecting transit service is limited</li> <li>▪ Too close to central city for ferry commute to be competitive for commuters</li> <li>▪ Competition with other modes (bike, walk, bus and streetcar)</li> </ul>
<b>Major Issues/Barriers</b>	
Numerous existing water and waterfront uses may cause conflicts	
<b>Intermodal Connections</b>	
<p>Within ¼ mile:</p> <ul style="list-style-type: none"> <li>▪ TriMet Line 38 (30/-) CBD to Tualatin via Boones Ferry</li> <li>▪ TriMet Line 43 (20/30) CBD to Macadam District/Washington Sq</li> <li>▪ TriMet Line 54 (15/15) CBD to Beaverton TC via Beaverton-Hillsdale</li> <li>▪ TriMet Line 56 (15/15) CBD to Washington Sq</li> <li>▪ TriMet Line 95 (20/-) Lloyd District to Sherwood via I-5</li> <li>▪ TriMet Line 96 (12/-) CBD to Tualatin via I-5</li> <li>▪ Portland Streetcar</li> </ul>	
<p>Within ½ mile:</p> <ul style="list-style-type: none"> <li>▪ 9 (10/15)</li> <li>▪ TriMet Line 17 (15/15) CBD to SE 134<sup>th</sup> &amp; Holgate via Holgate</li> <li>▪ TriMet Line 19 (8/15) CBD to SE Mt Scott &amp; 112<sup>th</sup> via Woodstock</li> <li>▪ TriMet Line 35 (10/30) CBD to Oregon City via Hwy 43</li> <li>▪ TriMet Line 36 (30/60) CBD to Tualatin</li> </ul>	
<b>Upland Access</b>	
The site has good pedestrian, bike and auto access, right off Willamette Greenway and Riverplace Commercial developments. Riverplace is generally landlocked by the River and I-5 with major access via the Riverfront and Harbor Drive.	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service



## Oregon Museum of Science and Industry (OMSI)

Market Type	
Visitor/Excursion	
Opportunities	Challenges
<ul style="list-style-type: none"> <li>▪ 730,000 visitors each year</li> <li>▪ Busiest on weekends and holidays</li> <li>▪ Opportunity to connect visitors with the river – especially for school groups</li> <li>▪ Reaches local visitors and tourists</li> <li>▪ Reasonable location for connections to East Side jobs</li> <li>▪ High priority location</li> </ul>	<ul style="list-style-type: none"> <li>▪ Limited hours</li> <li>▪ Demand is seasonal</li> <li>▪ May be too close into central city for ferry commute to be competitive</li> </ul>
Major Issues/Barriers	
Demand limited to OMSI business hours and likely to fluctuate with seasonal demand	
Intermodal Connections	
Within ¼ mile:	
<ul style="list-style-type: none"> <li>▪ TriMet Line 31 (19/--) CBD to Estacada/Clackamas TC via Hwy 99</li> <li>▪ TriMet Line 32 (17/--) CBD to Milwaukie TC/Clackamas CC</li> <li>▪ TriMet Line 33 (15/15) CBD to Oregon City/Clackamas CC via Hwy 99</li> <li>▪ TriMet Line 41 (30/45) CBD to Sellwood via Hwy 99</li> <li>▪ TriMet Line 99 (15/--) CBD to Clackamas CC via Hwy 99</li> </ul>	
Within ½ mile:	
<ul style="list-style-type: none"> <li>▪ TriMet Line 6 (12/15) CBD to Vancouver via MLK/Grand</li> <li>▪ TriMet Line 10 (13/30) CBD to SE122nd &amp; Foster via Harold</li> <li>▪ TriMet Line 14 (7/12) CBD to SE Foster &amp; 94th via Hawthorne</li> </ul>	
Upland Access	
Excellent pedestrian and bike access along SE bikepath, even though the site is bordered by industrial development. Limited opportunity for pedestrian access to sites other than OMSI.	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service





## South Waterfront

Market Type	
Commuter, Visitor/Excursion	
Opportunities	Challenges
<ul style="list-style-type: none"> <li>▪ High density development including hotels and residential.</li> <li>▪ Opportunity for high walk mode share to terminal.</li> <li>▪ Dock facilities are already planned</li> <li>▪ Good connections to tram, streetcar, med center campus</li> </ul>	<ul style="list-style-type: none"> <li>▪ Need for another commute mode not obvious</li> <li>▪ May be too close to central city for ferry commute to be competitive</li> <li>▪ Competition with other modes (bike, walk, bus and streetcar)</li> </ul>
Major Issues/Barriers	
<p>Passenger ferry service focused on west bank destinations may compete with the Portland Streetcar</p> <p>Passenger ferry service to Lake Oswego may also compete with Portland Streetcar( or other high capacity mode) if an extension is built to Lake Oswego.</p> <p>No existing dock at this site, although one or two docks are planned for development</p>	
Intermodal Connections	
<p>Within ¼ mile:</p> <ul style="list-style-type: none"> <li>▪ None currently, future Portland Streetcar and OHSU Tram connections</li> </ul>	
<p>Within ½ mile:</p> <ul style="list-style-type: none"> <li>▪ TriMet Line 35 (10/30) CBD to Oregon City via Hwy 43</li> <li>▪ TriMet Line 36 (30/60) CBD to Tualatin</li> <li>▪ TriMet Line 43 (20/30) CBD to Macadam District/Washington Sq</li> </ul>	
Upland Access	
<p>South Waterfront redevelopment should provide high quality bike and pedestrian access via new street network and the Willamette Greenway. Similar to Riverplace, the site will be somewhat landlocked by the River and I-5 with auto access to the north and south off of Macadam Ave.</p>	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service.



## Milwaukie

<b>Market Type</b>	
Commuter	
<b>Opportunities</b>	<b>Challenges</b>
<ul style="list-style-type: none"> <li>▪ Ferry travel times very competitive for CBD trips</li> <li>▪ Possible mitigation during Sellwood bridge construction</li> </ul>	<ul style="list-style-type: none"> <li>▪ Riverfront land uses are not dense</li> <li>▪ Transit center not yet located and may not be on river</li> <li>▪ Limited opportunity to add required new parking</li> </ul>
<b>Major Issues/Barriers</b>	
Waterfront is public park; opportunities to construct a dock facility at sewage treatment site should be considered	
<b>Intermodal Connections</b>	
Within ¼ mile:	
<ul style="list-style-type: none"> <li>▪ TriMet Line 29 (40/60) Milwaukie TC to Clackamas Town Center</li> <li>▪ TriMet Line 31 (19/30) CBD to Estacada/Clackamas TC via Hwy 99</li> <li>▪ TriMet Line 32 (17/60) CBD to Milwaukie TC/Clackamas CC</li> <li>▪ TriMet Line 33 (15/15) CBD to Oregon City/Clackamas CC via Hwy 99</li> <li>▪ TriMet Line 70 (15/17) Rose Qtr TC to Milwaukie TC</li> <li>▪ TriMet Line 75 (15/15) St. Johns to Milwaukie TC via SE 39th</li> <li>▪ TriMet Line 99 (15/-) CBD to Clackamas CC via Hwy 99</li> <li>▪ TriMet Line 152 (30/60) Milwaukie TC to Clackamas Town Center</li> </ul>	
Within ½ mile:	
<ul style="list-style-type: none"> <li>▪ No additional connections</li> </ul>	
<b>Upland Access</b>	
The site is separated from downtown Milwaukie by McLoughlin Blvd (Hwy 99), creating some access issues for bike, pedestrian and auto modes. Dock is located in park setting with parking.	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service.



## Lake Oswego

<b>Market Type</b>	
Commuter, Limited Tourism	
<b>Opportunities</b>	<b>Challenges</b>
<ul style="list-style-type: none"> <li>▪ Ferry travel times very competitive for CBD trips</li> <li>▪ No current high capacity transit – study underway</li> <li>▪ Opportunity to connect to proposed streetcar/high capacity transit service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Transit connections not on river</li> <li>▪ No opportunity to build parking in new park facility</li> <li>▪ New dock planned, may not allow commercial vessels</li> </ul>
<b>Major Issues/Barriers</b>	
Private landholdings provide last opportunity for waterside parking, now that Foothills Park is complete.	
<b>Intermodal Connections</b>	
Within ¼ mile:	
<ul style="list-style-type: none"> <li>▪ None currently</li> </ul>	
Within ½ mile:	
<ul style="list-style-type: none"> <li>▪ TriMet Line 35 (10/30) CBD to Oregon City via Hwy 43</li> <li>▪ TriMet Line 36 (30/60) CBD to Tualatin</li> </ul>	
<b>Upland Access</b>	
Site would need to be located north of new park and public dock. Redevelopment could provide good access, but limited and circuitous access will make for a long walk to/from downtown Lake Oswego across State St. (Hwy 43).	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service.



## Oregon City

Market Type	
Commuter	
Opportunities	Challenges
<ul style="list-style-type: none"> <li>▪ Ferry travel times very competitive for CBD trips</li> <li>▪ No high capacity transit currently available, makes ferry attractive</li> <li>▪ Could attract riders from other upstream communities</li> <li>▪ Public dock facility exists, but in poor site</li> <li>▪ Possibility to jointly use parking at park</li> </ul>	<ul style="list-style-type: none"> <li>▪ Poor connections to other transit</li> <li>▪ Nearly all access by auto, requires parking</li> <li>▪ Less connection to central city than downstream communities.</li> </ul>
Major Issues/Barriers	
Consider service only with terminal parking facility., which would need to be provide in or adjacent to existing park.	
Intermodal Connections	
Within ¼ mile:	
<ul style="list-style-type: none"> <li>▪ TriMet Line 32 (17/30) CBD to Milwaukie TC/Clackamas CC</li> <li>▪ TriMet Line 33 (15/15) CBD to Oregon City/Clackamas CC via Hwy 99</li> <li>▪ TriMet Line 99 (15/--) CBD to Clackamas CC via Hwy 99</li> </ul>	
Within ½ mile:	
<ul style="list-style-type: none"> <li>▪ No additional connections</li> </ul>	
Upland Access	
Clackamette Park site is off of McLoughlin (Hwy 99) and bounded by I-205. Entry is walkable and bikeable but is some distance from downtown Oregon City and requires navigating I-205 infrastructure and crossing McLoughlin. Parking is provided for park and small boat launching activities.	

Note: numbers in parentheses represent typical peak/midday headways on connecting transit service.



## Other Markets

While not immediately within the scope of this project, the consultant team was asked to provide an opinion on the feasibility of passenger ferry service between Vancouver, WA and downtown Portland. Two critical factors drive the need for transportation alternatives between Vancouver and downtown Portland:

- High volume of peak hour travel to downtown Portland from Clark County;
- Heavy congestion on the Interstate Bridge and Interstate 5 between Vancouver and downtown Portland

An ongoing bi-state study, the Columbia River Crossing Study, is currently examining roadway and transit improvements to improve traffic capacity and travel times in this corridor. A preliminary transit options review conducted as part of this study evaluated passenger ferry service as one of several transit alternatives; however, ferry service did not pass the initial screening and is not being advanced as an alternative. The rationale for not continuing to study ferry service presented in the CRC screening report matches our team's preliminary analysis of Vancouver as a potential passenger ferry market, specifically:

- When travel distance and docking and boarding times are considered, ferry service is likely to be slower than the slowest land-based transit alternative and slower than auto traffic even with projected increases in congestion.
- The river corridors require significant out-of-direction travel; commute passengers are sensitive to out-of-direction travel and this would diminish ridership even if travel times were competitive.
- The river corridors do not allow for efficient service to the best intermediate markets. St. Johns is the only significant interim stop.
- Ferry service would require new infrastructure that is not compatible with investments to date in rail and bus modes.<sup>2</sup>

## Travel Distances and Times

Travel distance and most importantly travel time are critical factors for commuters when making travel decisions about routes and modes. Travel time is often much less important for excursion or tourist travelers, who may actually appreciate more time on the water. Figure 2-4 provides a summary of nautical distances between key terminal locations and travel times for each. Vessel speeds vary significantly between the larger, high-speed commuter boats and the smaller boats used for the Central City Circulator. These travel time calculations are used to develop operating plan alternatives in Chapter 3.

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<sup>2</sup> Draft Components Step A Screening Report. Columbia River Crossing Study. March 2006.

**Figure 2-4 Travel Distances and Times**

Segment	Distance between Terminals (Nautical Miles)	Speed (knots)	On-Water Travel Time	Loading & Unloading Time (each terminal)	Total Travel Time
<b>Central City Circulator</b>					
Pearl to Salmon Springs Fountain	1.6	8	12.0	4	16
Salmon to River Place	0.5	8	3.8	4	8
River Place to South Waterfront	0.72	8	5.4	4	9
South Waterfront to OMSI	0.6	8	4.1	4	8
OMSI to River Place	0.2	8	1.4	4	5
<b>Commuter</b>					
Oregon City to Milwaukie	5.3	23	13.8	10	24
Milwaukie to Salmon Springs Fountain	4.8	23	12.5	10	23
Lake Oswego to Salmon Springs Fountain	6.3	23	16.4	10	26

\*Speeds include average time for acceleration, deceleration, and maneuvering.

## Chapter 3. Operational Alternatives

This report reviews two separate operational scenarios for water transit in the Portland metropolitan area. They are as follows:

- A. Commuter Service:** Line-haul express service designed to carry commuters to Portland's Central Business District during peak commute hours.
- B. Central City Circulator Service:** Slower, short-hop service designed to carry tourists, excursion passengers and some commuters between major destinations in Portland's Central City.

### A. Commuter Service Alternative Assessment

#### Description of Service

In 2000, Metro completed the *South Corridor Transportation Alternative Study*. This study evaluated a number of high capacity transit corridor alternatives to serve the southern metropolitan area, including Milwaukie, Lake Oswego and Oregon City. Water transit was evaluated as an alternative to provide high capacity corridor service to this area, which would require frequent all day operations and the relocation of all major transfer facilities to the riverside. This study does not evaluate water transit as a high capacity, high frequency transit mode designed to provide direct connections with land-based transit. Rather, water transit is examined as a peak-hour commute service that would complement existing local and express bus services and help to reduce demand for vehicle travel between the southern metro area and the Portland Central Business District.

A peak commute service will have lower overall operational and capital cost than the service proposed in the South Corridor Transportation Alternatives Study, since it operates at less frequency during limited hours and will require no landside realignment of transit service or facilities. Significant capital investment will still be required to construct dock facilities and parking. Per passenger operating costs are also likely to be higher than other regional transit modes due to the specialization of the service and its limited market reach.

Several findings and assumptions were fundamental in developing the following Commuter Service Scenario:

- Portland's Central Business District is the only commute destination on the river that is large enough to justify direct commute service.
- The downtown bound commute market from points north of the CBD is not developed to the point where it would support an express commute service.
- Oregon City, Lake Oswego and Milwaukie are the only three markets with the density and river access to merit a commuter ferry terminal.

- There is no significant reverse commute to cities in the southern metropolitan area; therefore two-way peak service is not justified.
- Commuter water transit service would not compete for existing transit passengers. Ridership would come from a currently untapped market.
- Service must be direct or have very limited stops to be competitive.
- There is a need for some midday lifeline service to ensure commuters can return home during the midday.

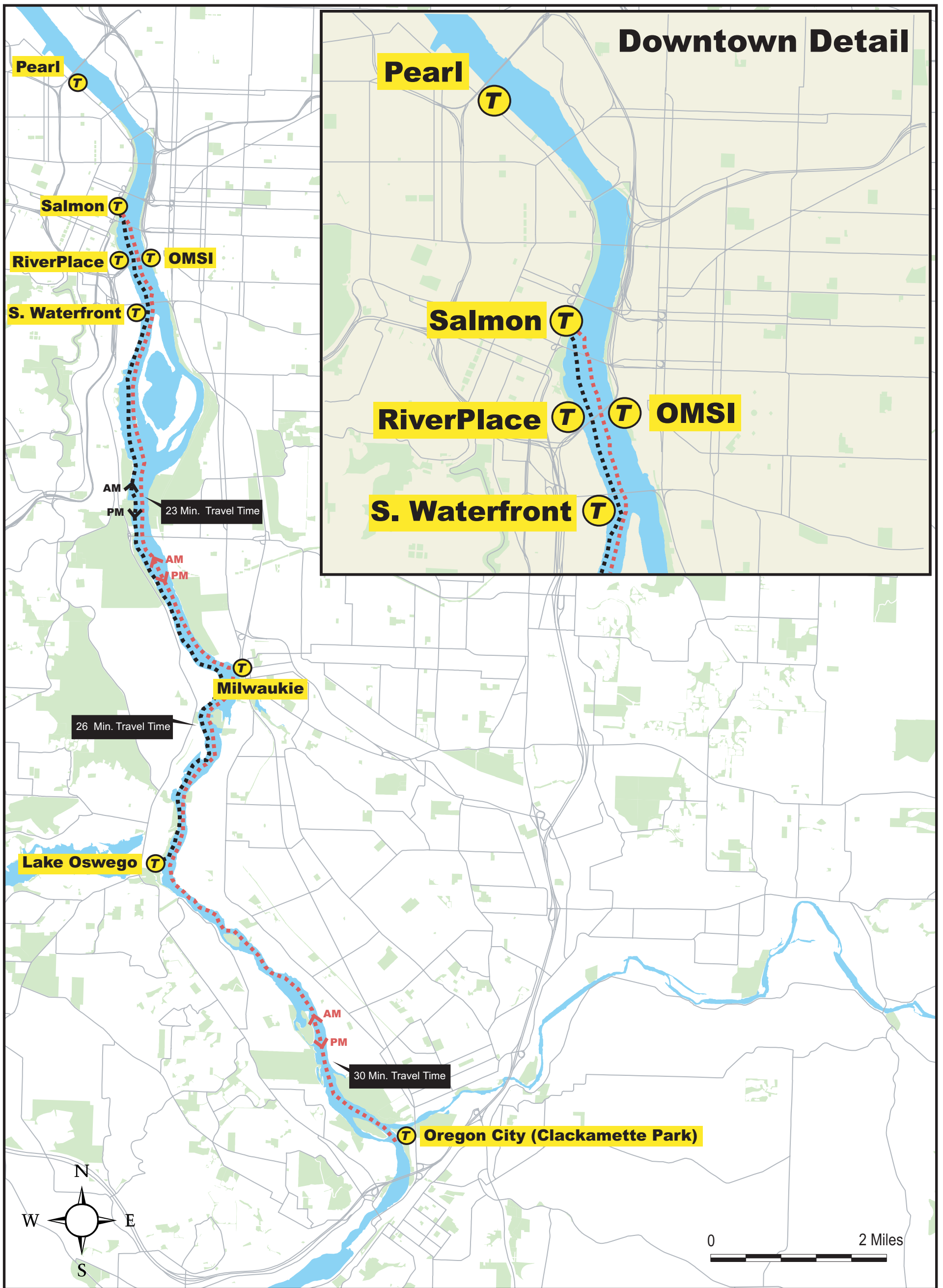
Based on an evaluation of potential ridership markets, regional travel patterns, land-use orientation to the river and other key factors, this section proposes an optimal commuter ferry service scenario. The following are basic parameters of the proposed Commuter Service.

- Direct or single stop service provided on two routes:
  1. Lake Oswego to Central Business District.
  2. Oregon City to Milwaukie to Central Business District.
- Service runs every 30-minutes during peak hours (6:00 AM – 9:00 AM & 4:00 PM – 7:00 PM).
- An additional two midday trips in each direction as a “safety net” for commuters.
- Vessels designed to carry 100 passengers, which would provide 600 seat capacity over peak period
- Requires five boats plus one spare.

Figure 3-1 provides an illustration of the proposed service.



# Figure 3-1 Commuter Services



- T** Proposed Ferry Terminal
- Proposed Ferry Route & Direction of Travel
- Vessels operate at 25 knots
- Vessels board and alight passengers in 4 minutes at each terminal, unless otherwise specified

## Typical Profile of Commute Ferry Rider<sup>1</sup>

Research and experience from ferry system operations show that commuter ferry passengers do not match the profile of bus or rail passengers. In fact, surveys of Golden Gate Ferry passengers in the San Francisco Bay Area showed that only 10% of ferry passengers would switch to another transit mode if ferry service was discontinued.<sup>2</sup> Ferry passengers tend to be less likely to transfer to another transit mode at either end of their trip, often choosing to walk significant distances. The following are characteristics that typify commute passengers on commuter ferry services in North America:

- “Upscale” higher income rider who chooses ferry over other transit modes for experience.
- Willing to pay a premium for ferry service over other transit modes.
- “Green rider” who appreciates the experience of being on the waterway.
- Largely a distinct market from other transit services; most passengers don’t transfer to other modes and would not use them as an alternative.
- Primarily access ferry by auto at home end, pedestrian access at destination end.
- Travel time is important, but not top priority.
- Frequency and service span are important, even when there are few alternatives.

## Markets and Potential Ridership

The scope of this study does not allow for detailed ridership modeling through the regional travel model maintained by Metro. Order of magnitude ridership estimates were developed using Metro travel model data developed for the *Lake Oswego to Portland Transit and Trail Alternatives Analysis* and ferry mode split from peer systems that offer both commuter ferry and bus service between the same origin and destination points.

For each proposed terminal, commute ridership to the Portland CBD was estimated using the following, data, methods and assumptions:

1. 2005 Base Year Home Based Work Trip data from the regional model (ESTCAR) was provided by Metro. Districts developed by Metro for the Lake Oswego AA were used in this evaluation.
2. Trip demand from the West Linn district was divided between Oregon City and Lake Oswego, assuming commuters in southern portions of West Linn would

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<sup>1</sup> Profiles of “typical” commuter ferry service patrons were developed in part through the consultant team’s professional experience in managing and working with ferry services and through the review of passenger ferry customer survey results. Collectively our team has conducted a number of customer surveys, including recent surveys of passengers on the Marin County Transportation District Ferry System in the San Francisco Bay Area.

<sup>2</sup> Based on Golden Gate Transit 2003.

travel to a terminal in Oregon City and those in the north to a terminal in Lake Oswego.<sup>3</sup>

3. It was assumed that an insignificant percentage of commuters destined for other Central City districts (Rose Quarter, Lloyd District, Southeast) would ride ferry service to downtown and transfer to a bus or rail service.<sup>4</sup>
4. Current transit mode share was subtracted from the total home based work trips for each market, assuming that these people would continue to use bus or rail transit. Surveys of ferry passengers in the Bay Area have shown that less than 10% of ferry passengers would use other transit services if ferry service were not available.
5. It is assumed that commute passengers are making round trips.
6. High and low estimates were developed based on a percentage capture of the remaining commute market (total – existing transit trips). These estimates were based on a review of peer services, with a primary focus on ferry service between Marin County, CA and downtown San Francisco. This presents one of the best peer comparisons, because both ferry and bus services are available to commuters and ferry services operate primarily at the peak. Ferry mode share between Marin and downtown San Francisco is 13% compared with 19% bus transit mode share. Auto travel times from Marin to San Francisco Ferry Terminal are less competitive with ferry travel than proposed services in the south Portland metropolitan area; therefore it is expected that ferry mode share in the Portland area would be slightly lower.

Figure 3-2 provides a travel time comparison between ferry and express bus services in Marin County and the transit mode split between bus and ferry. There is a clear relationship between travel time savings and increased ferry mode share.

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<sup>3</sup> This calculation was not made based on actual distribution of trip origins by TAZ or subdistricts within West Linn, rather the total West Linn to Portland CBD demand was halved.

<sup>4</sup> Experience in other cities that operate commuter ferry services is that a very small percentage of ferry passengers transfer to another transit mode at the destination end of their commute.

**Figure 3-2 Marin County – Commuter Ferry vs. Express Bus**

Route	Provider	Ferry Travel Time	Bus Travel Time	Ferry % of Transit Trips	Bus % of Transit Trips
Sausalito – Downtown San Francisco	Golden Gate Ferry/Blue & Gold Ferry (Ferry) <i>Golden Gate Transit (Bus)</i>	25-30 minutes	32-41 minutes	41%	59%
Larkspur – Downtown San Francisco	Golden Gate Ferry (Ferry) <i>Golden Gate Transit (Bus)</i>	30 minutes	35-44 minutes	73%	27%
Tiburon – Downtown San Francisco	Blue & Gold Ferry (Ferry) <i>Golden Gate Transit (Bus)</i>	30 minutes	60-69 minutes	90%	10%

Ferry mode split estimates used for this study are significantly more conservative than those shown above. Our estimates assume that the proposed service could capture at least 5% of the existing non-transit home based work trips and at maximum 10% of those trips.

Figure 3-3 provides a summary of estimated daily and annual ridership for each of the three key markets identified for ferry service.

**Figure 3-3 Commute Service Ridership Estimations (One-Way Trips)**

From Home End to CBD	Total HBW <sup>1</sup> Commute Trips	% on Transit	Daily		Annual	
			Market Potential – High (10%)	Market Potential – Low (5%)	Market Potential – High	Market Potential – Low
Oregon City/ West Linn	430	20%	66	32	16,340	8,170
Lake Oswego/ West Linn	2,205	24%	336	168	83,790	41,896
Milwaukie/ Gladstone	5,903	19%	956	478	239,072	119,536

1. HBW = Home Based Work Trips

Milwaukie/Gladstone has the best market potential for a ferry service; as estimated, a range of 119,000 to 239,000 annual commute trips would be made by ferry from this area. Lake Oswego also has the potential to generate enough ridership to support peak hour service, with 168 to 336 daily passengers or a range of 41,000 to 83,790 annual trips. Oregon City would be a minor market and could only be feasible if served by the same run as Milwaukie as is proposed.

It is assumed that the midday local runs would not capture more than a few percent of non-work trips to the CBD, since the service is designed primarily to provide a safety net for commuters who need to travel home during the midday. It would, however, allow passengers traveling for other reasons, such as medical appointments or shopping, to make round trips to downtown without spending the day. The service would also attract sightseers and tourists interested in traveling on the river. In addition to the commute travel estimated in Figure 3-3, we project an additional 20 to 30 daily passengers will use the midday service.

The scope of this study does not allow an in depth analysis of fare price elasticity and the impact of variable household income levels in the identified service markets. However, we can assume that as a population, residents of higher income communities such as Lake Oswego and West Linn would be less sensitive to price and may commute by ferry at slightly higher rates than Milwaukie or Gladstone, where median household income is lower. Travel time also plays an important role in trip decision-making and patrons will balance the cost and use of their time in transport. Ferry passengers in the Puget Sound and San Francisco Bay Area have indicated through surveys that they highly value in-transit time, because it allows than an opportunity to work, read or relax. Washington State Ferries now offer free wireless Internet on all ferries, allowing people to conduct business during their commute. The ability to comfortably work on a laptop computer, something not possible on a bus, could decrease many commuters' sensitivity to the fare premium.

## **Needed Capital Improvements and Costs**

An often-cited advantage to water transit service is the availability of the right-of-way and the ability to operate without constructing an expensive new running way. However, there are significant capital improvements required to safely and comfortably move passengers from landside facilities to passenger vessels. Metro's *2000 South Corridor Transportation Alternatives Study* estimated the capital costs of developing a water transit trunk line to be approximately \$93.4 million. This estimate was higher than the Bus Rapid Transit Alternative, but less than half that of Busway, High Occupancy Vehicle lanes or an Oregon City Circular Rail alignment.

The Commuter Service Scenario proposed in this report would not require major transit facility relocation required for a water transit trunkline, and therefore has lower overall capital construction cost requirements. The service would require new dock facilities at all terminal locations as well as passenger waiting facilities and new commuter parking.

This report provides order of magnitude cost estimates based on capital costs estimates and construction costs from similar projects. Comparative projects used to develop cost estimates included the following cost elements:

- Docks, floats and pilings;
- Ramps, walkways and walkway landings connecting docks to upland facilities;
- Structural components such as concrete and structural steel;

- Upland improvements including sheltered waiting area and lavatories;
- Commuter parking (surface paving and/or structure);
- Civil engineering and drainage;
- Electrical, lighting and other construction elements; and
- Contingency.

Figure 3-4 presents capital cost estimates for docks, upland facilities and commuter parking facilities. It is important to note that these are planning level estimates taken from other similar projects or construction estimates in Portland and other US cities. No conceptual design or engineering was done to develop these estimates. The following assumptions and sources were used in the development of capital cost estimates:

- Capital cost estimates from recent ferry dock plans or studies in Mobile Bay (Alabama), the San Francisco Bay (California) and in Portland (South Corridor Study) are adjusted based on local cost indices to develop the following order of magnitude costs.
- Costs represent the minimum level of improvements necessary for service start-up.
- Costs per stall for surface parking were estimated at \$12,000.
- Costs per stall for structured parking were estimated at \$20,000.
- No land acquisition costs are included in these estimates.
- Maintenance and vessel storage facility costs are considered separately.

**Figure 3-4 Capital Facility Cost for Commuter Service**

<b>Terminal</b>	<b>Dock, Ramps, Floats, Pilings</b>	<b>Upland Improvements</b>	<b>Parking Structure/ Surface Parking</b>	<b>Total Capital Cost</b>
Salmon Springs Fountain	\$500,000	\$150,000	\$0	\$650,000
Milwaukie	\$650,000	\$250,000	\$14,300,000	\$15,200,000
Lake Oswego	\$850,000	350,000	\$5,500,000	\$6,700,000
Oregon City	\$650,000	\$250,000	\$600,000	\$1,500,000
<b>TOTAL</b>	<b>\$2,650,000</b>	<b>\$1,000,000</b>	<b>\$20,400,000</b>	<b>\$24,050,000</b>

**Notes:**

All cost estimates are in 2006 dollars.

All costs are order-of-magnitude estimates.

It is assumed that structured parking would be required in Lake Oswego and Milwaukie due to land constraints.

It is assumed that 650 stalls of parking are needed in Milwaukie, 250 stalls in Lake Oswego and 50 stalls in Oregon City.

A facility will also need to be purchased or developed for maintenance and storage of the vessels. If a local company was selected to operate this service, an existing facility could be used, thereby saving the costs of a new facility. We estimate \$1 to 2 million dollars would be required to develop a facility that included maintenance capacity and storage berths for five catamaran vessels.

Total costs of facilities required for a Commuter Service start-up are in the range of \$25 million dollars. These are order-of-magnitude costs and could vary significantly depending on how facilities are developed and over what time period. Including facility development as part of a private operating contract could significantly reduce the costs and timeframe associated with building docking and landside facilities. Local jurisdictions and/or private developers may also be interested in funding landside and dock facilities that increase connectivity and improve transportation options in their communities.

## Fare Options, Revenue Potential and Operating Plan Summary

This section presents a fare structure proposal, estimates revenue potential, projects operating costs and provides a summary of expected subsidy requirements.

### Proposed Fares

To match regional standards for per passenger operating subsidies, ferry systems typically charge a fare premium over bus or rail service. Figure 3-5 illustrates fares on peer systems and compares them to bus fares for a comparable trip where possible.

**Figure 3-5 Peer Commuter Ferry System Fare Comparison**

Peer Commute Ferry System	Fare (One-Way)	Discount (Disabled/Child/Student)	Approx. Travel Time	Bus/Rail Fare/One-Way)	Ferry Fare Premium
Golden Gate Ferries (Sausalito – San Francisco)	\$6.45	\$3.20	25 minutes	\$3.25	98%
Blue & Gold (Sausalito – San Francisco)	\$8.50	\$4.50	30 minutes	\$3.25	162%
Golden Gate Ferries (Larkspur – San Francisco)	\$6.45	\$3.20	30 minutes	\$3.95	63%
Golden Gate Ferries (Tiburon – San Francisco)	\$6.45	\$3.20	30 minutes	\$3.25	98%
Washington State Ferries	\$6.10	\$3.00	40 minutes	na	na
Cross Sound Ferry, CT (New London – Oregon Point)	\$15.50	\$5.00	90 minutes	na	na
Rhode Island (Providence to Newport)	\$8.00	\$6.00	60 minutes	na	na
Maine State Ferries (Rockland to North Haven)	\$4.25	\$2.25	20 minutes	na	na

It is common for ferry systems to have a fare premium of 50% to 200% over comparable bus fares. Travel from Oregon City, Milwaukie and Lake Oswego requires a 3-Zone ticket, which has a cash fare value of \$1.95. TriMet offers an Honored Citizen Fare for disabled citizens of \$0.80, a youth fare of \$1.30. We recommend the following fare structure:

- Adult One-Way Fare: \$4.00
- Disabled/Youth Fare: \$2.00
- Adult Monthly Pass: \$150.00 (10% discount)

## Projected Revenue

Based on ridership estimates presented earlier in this report, we can estimate annual revenue from purchased fares (see Figure 3-6). In doing so we use the following assumptions:

- Many regular commuters will use the monthly pass to receive a 10% discount.
- Youth and disabled ridership is likely to be low as this is primarily a commute-oriented service.
- The average one-way fare will be 15% lower than the adult fare (\$3.40).

**Figure 3-6 Projected Annual Fare Revenue**

Market	Ridership		Revenue	
	High Estimate	Low Estimate	High Estimate	Low Estimate
Oregon City – CDB	16,340	8,170	\$55,556	\$27,778
Milwaukie – CBD	83,790	41,896	\$284,886	\$142,446
Lake Oswego - CBD	239,072	119,536	\$812,844	\$406,422
Midday Local	7,650	5,100	\$26,010	\$17,340
<b>TOTAL</b>	<b>346,852</b>	<b>174,702</b>	<b>\$1,179,296</b>	<b>\$593,986</b>

## Operating Plan Summary and Costs

Operating costs vary based on vehicle type and size, as operator labor is a major component of total operating costs. For our analysis, crew costs were the only labor category considered as a separate cost; all shoreside labor was grouped as management. An operating costs assessment was done only for the preferred vessel type, identified in the “Vessel Options” section of this report – a 100 passenger catamaran hull ferryboat.

It should be noted that the U.S. Coast Guard’s local Captain of the Port dictates staffing of ferries. Our staffing analysis is based on what is typically required in other ports. It is possible that the local Coast Guard will require a different level of staffing based on the conditions on the Willamette River.

For planning purposes it is assumed that manning levels for the proposed Commuter Service would be:

- Captain: A USCG-licensed captain, experienced in high-speed ferry operations.
- Deckhand: An unlicensed crewmember who would assist with lines during docking and undocking and handle ticket collection.

Figure 3-7 shows the estimated wage costs for the required ferryboat crew.



**Figure 3-7 Estimated Wage Costs for Ferryboat Crew**

Category	Captain	Deckhand
Salary	\$50,540	\$24,605
Fringes and Taxes	\$19,624	\$9,983
Total Annual Cost	\$70,164	\$34,588
Annual Workdays (less holidays & vacation)	230	235
<b>Daily Cost</b>	<b>\$305.06</b>	<b>\$147.18</b>
<b>Hourly Cost (8 hrs/day)</b>	<b>\$38.13</b>	<b>\$18.40</b>

Source: IBJ Associates

Other key elements of Commuter Service operations researched in our development of operating cost estimates were:

- **Fuel price:** Since marine engines operate on diesel, the price of diesel fuel and taxes impact operating cost. An average price of \$2.60 per gallon of diesel fuel and \$8.00 per gallon for lube oil is assumed.<sup>5</sup>
- **Fuel consumption:** Can be assumed to vary with the cube of speed for that portion of the total fuel consumption to propel the boat. The propulsive percentage used to calculate fuel consumption for catamaran vessels is 50 percent. At an operating speed of approximately 25 knots, the proposed 100 – passenger catamaran would consume approximately 40 gallons per hour.<sup>6</sup>
- **Maintenance and repair:** These costs vary with the type and size of vessel and include basic preventative maintenance and major repairs such as drydocking and engine overhauls. Drydocking was assumed to be a two-year activity and engine overhauls are assumed to be required every four years. Annual maintenance and repair costs are estimated to average \$40,000 per boat.
- **Insurance:** Three types of marine insurance would likely be required to operate passenger vessel service on the Willamette River. These include:
  - Hull and Machinery insurance covers damage to vessels.
  - Protection and Indemnity insurance covers liability from injury to passengers or crew and accidental damage to other property.
  - Pollution insurance provides protection against the cost of a fuel spill clean up or other environmental mitigation.
- **Management:** Management of the service could be provided by a public agency or contract operator. Staffing requirements would be minimal during early years of operation. Based on industry experience, we estimate that management costs will be equal to approximately 20% of non-fuel operating costs.

<sup>5</sup> U.S. Gasoline and Diesel Fuel Prices, 04/24/06. Energy Information Administration. Eia.doe.gov.

<sup>6</sup> Estimated by Dan Yates of Portland Spirit based on his experience with vessel operation on the Willamette River.

- **Marketing and promotion:** Marketing and promotions will be critical to get the word out about the new service and to build ridership. These efforts could be handled by the entity operating the service or through a private contract with a marketing firm. In either case, developing good public information and service branding will be important to build public knowledge.
- **Ticketing:** Ticketing is typically handled on the boat. Landside ticket sales could be handled through existing facilities such as tourist centers and transit information booths.

Figure 3-8 provides an estimate of per hour operating costs for commuter operations using 100-passenger catamaran vessels.

**Figure 3-8 Per Hour Operating Costs for Commuter Service Operation**

Category	Operating Cost Per Hour	Proportion of Total Costs
Crew Costs	\$56.53	27%
Boat Costs *	\$15.00	7%
Total Fuel and Lube Costs	\$104.00	49%
Management Fee (20%)	\$35.11	17%
<b>Total Per Hour Cost</b>	<b>\$210.64</b>	<b>100%</b>

Note: Assumes 100 passenger catamaran vessel

\*Includes maintenance and ancillary operating costs. Capital costs are not included.

Source: IBJ Associates

The estimated per hour cost to operate service on the Willamette was low compared to many peer systems that operate on heavier waters and require additional crew. Blue and Gold services operating in the Bay Area (privately operated) had the lowest per hour costs, ranging between \$100 and \$200 per hour. Average per hour costs for Washington State Ferries, which operates passenger and vehicle ferries, was over \$450 per hour and in Marin County system costs topped \$1,000 per hour.

Figure 3-9 provides a summary of service hours required to operate the proposed commuter ferry service. At an estimated cost of \$210 per hour of service provided, annual operating cost requirements are approximately \$3.4 million.

**Figure 3-9 Operating Plan and Operating Costs**

Service Segment	Daily Runs	Daily Hours (Revenue + Deadhead)	Annual Hours	Cost Per Hour	Annual Operating Cost
Lake Oswego - CBD	8	24	6,120	\$210	\$1,285,200
Oregon City - Milwaukie - CBD	8	32	8,160	\$210	\$1,713,600
Midday Local	2	8	2,040	\$210	\$428,400
<b>Total</b>	<b>26</b>	<b>64</b>	<b>16,320</b>		<b>\$3,427,200</b>

### Operating Subsidy Requirements

Figure 3-10 shows operating subsidy requirements for the proposed Commuter Service. Farebox revenue will account for a relatively small percentage of required operating revenue, leaving 65% to 82% of the total cost to operate the Commuter Service to be funded by sources other than farebox revenue.

**Figure 3-10 Operating Subsidy Requirements**

	Annual Operating Cost	Fare Revenue High Estimate	Fare Revenue Low Estimate	Annual Subsidy Requirement (High Fare)	Annual Subsidy Requirement (Low Fare)
Lake Oswego - CBD	\$1,285,200	\$812,840	\$406,420	\$472,356	\$878,778
Oregon City -Milwaukie - CBD	\$1,713,600	\$340,440	\$170,220	\$1,373,158	\$1,543,376
Midday Local	\$428,400	\$26,010	\$17,340	\$402,390	\$411,060
<b>Total</b>	<b>\$3,427,200</b>	<b>\$1,179,290</b>	<b>\$593,980</b>	<b>\$2,247,904</b>	<b>\$2,833,214</b>

Per passenger operating subsidy levels for the proposed Commuter Service range from \$9.00 to \$19.00, depending on the level of ridership achieved. This subsidy level is in line with other commuter ferry services, but significantly higher than other regional transit modes. TriMet per trip subsidies average less than \$2.00 for bus and rail modes combined; this includes short intracity trips, which constitute the majority of system ridership and drive per passenger subsidy levels down.<sup>7</sup> Comparisons with per passenger subsidy levels on TriMet's longer haul express bus services may be more favorable.

### Vessel Options

Four different types of vessels - one monohull and three catamarans - were evaluated for use in Commuter Service on the Willamette River. Capacities ranged from 75 passengers to 149 passengers on the largest catamaran. Operating speeds ranged from 25 knots on

<sup>7</sup> National Transit Database. 2004 Agency Profiles, TriMet.  
[http://www.ntdprogram.com/NTD/Profiles.nsf/2004+30+Largest+Agencies/0008/\\$File/0008.pdf](http://www.ntdprogram.com/NTD/Profiles.nsf/2004+30+Largest+Agencies/0008/$File/0008.pdf).

the monohull ferry to 40 knots in the 75-passenger catamaran vessel. Many other ferryboat designs and configurations are available. It may be most appropriate to design a vessel that has the optimal combination of size, speed and passenger capacity for the Willamette River corridor.

In addition to catamaran hulls, some fast monohull designs were considered. The monohull designs typically have lower costs than catamarans, but have higher wakes, require more power to achieve the same speed and usually have deeper draft for a given passenger capacity.

The vessel that would best meet operating conditions and passenger load requirements for the proposed service is a catamaran. Catamaran hulls currently comprise the majority of faster operating ferry designs. An aluminum hull catamaran would be optimal because it includes the following characteristics:

- Separate hulls and wide beam provides good stability
- Lightweight aluminum hulls and superstructure are low maintenance and provide better fuel economy
- High speed operations up to 40 knots
- Low-wake design to minimize environmental impacts

The optimal vessel would have a passenger load capacity of approximately 100 passengers. Vessels in this class can be built to accommodate up to 149 passengers; however, this level of passenger capacity is not needed in the proposed corridor.

Used ferryboats could be purchased to initiate this service; however, it may be difficult to find five vessels that meet the requirements of a river operation, since few exist today in North America. The next most affordable option would be to buy new vessels that are in production and have already been designed. Buying a vessel that shipyard workers are familiar with will save on capital construction costs. New boats can also be designed and constructed to meet specific operating requirements for the Willamette River service. Unique design and production will add costs to the vessel purchase. A naval architect would need to be contracted to manage the design process and oversee the construction in a shipyard.

Figure 3-11 lists the acquisition costs for four different vessel designs. Only the two larger catamaran vessels (Chilkat Express and Grey Lady II) meet necessary operating requirements. The latter is the preferred vessel due to its higher passenger capacity.

**Figure 3-11 Estimated Capital Costs for Selected Vessels Types**

<b>Hull Type/ Description</b>	<b>Monohull Aluminum</b>	<b>Catamaran</b>	<b>Catamaran</b>	<b>Catamaran</b>
Designer/Builder	Zodiac	All American/ Mercury	All American/ Chilkat Express	Gladding Hearn/ Grey Lady II
Passenger Capacity	24	34	75	100
Operating Speed (knots)	25	30	40	33
Approximate Capital Cost Per Vessel	\$300,000	\$1,050,000	\$2,200,000	\$3,300,000
Ability to Meet Operating Requirements	Does not meet capacity, speed or low-wake requirements	Does not meet capacity requirements, does meet speed requirements	Meets capacity and speed requirements, but limited room for passenger growth	Optimal for passenger capacity and operating requirements

Source: IBJ Associates

**Vessel 2**



All American (Mercury)-Catamaran

**Vessel 3**



All American (Chilkat Express)- Catamaran

**Vessel 4**



Gladding-Hearn (Grey Lady II), Catamaran

## **Managing Vessel Wakes to Prevent Environmental Harm**

Vessel wakes can be potentially harmful to shallow water plant and animal life at the lower end of the aquatic food chain and, to a lesser extent, nesting birds along shorelines. A readily accepted standard of wake tolerance is that shoreline waves generated by passing vessels should not significantly exceed the size and energy of naturally occurring waves in the area under consideration.<sup>8</sup>

The size and energy of any particular vessel wake will vary with: hull length, beam, draft, and shape; speed; vessel type and shoreline composition (e.g., rocky, manmade rip-rap, or soft sediment, water depth, bottom contours, etc).<sup>9</sup> The recommended vessels are designed as low-wake boats and are able to produce a lower wake through the use of a catamaran hull. Regardless of the vessel type selected for service, a naval architect and/or marine engineer should be employed to design or inspect vessels before they are built or purchased for operation on the Willamette River.

## **Alternative Fuel Engines**

Marine engine requirements are well behind motor vehicle and bus engines in terms of their requirements for pollution controls. The Bay Area Water Transportation Authority recently purchased two of the first commercial diesel passenger boats with pollution control devices in the country. The development of biodiesel resources in the Portland area has sparked interest in this source for marine engine power. However, larger marine engines are typically warranted for a fuel mix that contains 20% biodiesel or less. Using straight biodiesel could invalidate engine warranties. While an alternative fuel powerplant would provide an additional marketing tool for the ferryboat operator, it is not recommended that a major capital investment be made in a relatively untested technology.

## **Strategies for Funding, Partnerships and Marketing**

Figure 3-12 indicates potential for funding, partnerships and marketing for the proposed Commuter Service. Some other relevant considerations that may add to the attractiveness of commuter ferry service at the locations include: the availability of a modal interchange (examined more fully earlier in this report); adjacent development; and synergistic factors. Synergistic factors encompass a broad range of land use, tourism and economic activities that could both benefit and support ferry service.

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<sup>8</sup> *FERRY TRANSIT SYSTEMS FOR THE TWENTY FIRST CENTURY: A Survey of the Social, Economic, and Environmental Influences and Impacts of Ferry Systems.* The Society of Naval Architects and Marine Engineers (SNMAC). January 10, 2000.

<sup>9</sup> *Ibid.*, SNAMC, 2000.

**Figure 3-12 Commuter Service Terminals**

Projects	Potential For (1=low, 5=high)			Other Considerations		
	Funding	Partnerships	Marketing	Modal Interchange	Adjacent Development	Synergistic Factors
<b>Dock/Terminal Site</b>						
St. Johns / Cathedral Park	1	2	2	None	City Park	Minimal
University of Portland	2	3	2	None	Below U of P	Possible
Swan Island	1	2	2	Ships, bus, auto	Industrial	Variable
Convention Center/ Rose Quarter	2	3	4	Light rail/ multi-use path	River walkway	Strong
Ankeny Dock / Market Site	2	4	4	Light rail	NW/Old Town	Public market
Salmon Springs Fountain	5	4	5	Light rail/ multi-use path	Downtown	Visibility
EB Fire Dock	2	3	3	None	Harbor/fire boats	Minimal
RiverPlace	3	5	5	Streetcar/ autos	Retail facilities	Popular
South Waterfront (Gibbs)	3	5	5	Streetcar/ tram	New development	Potential
Macadam District	2	3	4	Streetcar	Offices/condos	Potential
Sellwood Bridge	2	3	4	None	Condos	Potential
Lake Oswego - Foothills Park Area	4	4	5	Streetcar/ buses	Downtown/ parking	Upscale Community
Oregon City - Public Dock	3	4	4	Autos	Parking	City facility
Oregon City - Park	1	2	1	None	Park	Minimal

## Funding

Funding for Commuter Service operations would likely come from a mix of local, state and federal sources. The following sections outline some of the funding sources available for water transit capital development and operations.

### Federal and State Funding

Figure 3-13 provides a summary of potential funding sources and a description of eligible fund uses and restrictions.



**Figure 3-13 Funding Options for Passenger Ferry Service**

Source	Capital or Operating	Restrictions	Probability (L-low, M-medium, H-high)
<b>Federal Transit Administration</b>			
Urbanized Area Formula Grants	Capital & Operating Assistance	Urban areas over 50k eligible for formula based grants. This is important source for existing transit operations and would be difficult to use for new water transit service.	L to M – Full allocation in use for other transit services/projects
New/Small Starts Grants	Capital	Proven transportation benefit and community economic benefit. Ranked competitively against criteria and will compete with many national projects.	L – Highly Competitive
Job Access and Reverse Commute Grants	Operating	Proven benefit for job access or reverse commute potential	M to H – Allocated by formula through State DOT. Competitive with other local programs.
<b>Federal Highway Administration</b>			
Ferry Boat Discretionary Funds	Operating and Capital	Only eligible where there is no roadway alternative, for ferries carrying automobiles or for passenger ferry routes that are classified as part of state highway system.	L – M requires auto ferry or inability to construct alternative roadway. Could be used if route was classified as a state highway
Surface Transportation Program Funds	Capital	Available for a range of uses, including projects that reduce cold starts and support intercity transit	L – M available for priority capital projects. Would require project be supported through regional TIP process
Congestion Mitigation & Air Quality Funds	Capital & Operating	Available in air quality non-attainment areas. Gives priority to programs that have air quality/emissions reduction benefits	M – Vessel choice and ability to demonstrate air quality benefits are critical
Earmark Funds	Capital	Earmark funds are available for transit capital projects and vehicles/vessels	M – H depending on interest and strength of congressional delegation
<b>State Funding</b>			
None Identified			

Federal earmark funds may provide the best opportunity to get new funding for vessel purchases and capital improvements. Success in obtaining these funds will be reliant on the interest and success of Oregon's Congressional delegation. A number of other federal funding sources are available to support this type of project, but are either highly competitive or carry stringent project requirements. For example, SAFETEA-LU provides \$38 million in fiscal year 2005 and an increasing amount in each of fiscal years 2006 through 2009 for the construction of ferryboats and ferry terminals through the Ferry Boat Discretionary Fund Program. However, each year \$20 million is set aside for marine highway systems that are part of the National Highway System for use by the States of Alaska (\$10 million), New Jersey (\$5 million), and Washington (\$5 million). The remaining funds are available for funding other projects, but it is required that projects either carry passenger vehicles or be classified as part of the state highway system. This classification is typically given for areas that are not reachable by roadway.

Given the challenges associated with obtaining federal funds and limited state funding, the success of a future service will likely need to rely, in large part, on local funding.

### **Local Funding**

It is difficult to assess the funding potential of any one, several or all the Commuter Service facilities at this early stage of analysis. Some will be influenced by the proximity between a terminal site and other transit modes such as light rail or the streetcar. The presence of certain kinds of adjacent development such as in South Waterfront or RiverPlace, could trigger partnerships and funding opportunities. Synergistic factors such as the fortuitous timing of several developments in one area may positively influence opportunities for funding, partnerships, and joint marketing. One example is the potential for rapid development in the Old Town/China Town area, similar to the experience in the Pearl District just to the west. This is in the vicinity of the Ankeny Dock/Market site.

Outside Portland Central City, the site that currently has the most potential in terms of funding, partnerships and marketing opportunities is in Lake Oswego, where construction of a new dock could coincide with preliminary plans for dense new mixed use development and the development of new transit facilities east of downtown. There could be significant opportunity here to increase the local business economy and contribute to the regional tourism draw.<sup>10</sup>

It is likely that creative and non-traditional funding sources will be necessary to support the operations of a Commuter Service. In addition to the considerations cited above, other possibilities include:

1. PDC urban renewal funds for the terminal areas—the City could create a linked district or include the strategy in several of its district plans.
2. Funding to mitigate traffic congestion related to construction on the Sellwood Bridge.

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<sup>10</sup> Van der Voo, Lee, To Dock or Not To Dock, Lake Oswego Review, 04/06/06.

3. Subsidies for boat equipment to test new biofuel or fuel cell models.
4. Hotel/motel surcharge for operating costs or a small addition to the regional employment tax that helps fund TriMet.<sup>11</sup>
5. Funding from PG&E, Pacific Power, Northwest Natural, BPA, or Energy Trust of Oregon for innovative energy conservation use and technology, such as gas or energy-saving electric/hybrid engines and joint development of sites.
6. Land acquisition funding through the Brownfields restoration program.
7. A Local Improvement District (LID) for property owners who benefit from the service.
8. A not-for-profit organization to raise private funds and issue debt against future revenues.
9. An Oregon solutions project. The Mayor can request the Governor to develop a funding plan involving public, private, non-profit, academic, federal, state and local sources.
10. Earmarked funds secured by the Oregon Congressional delegation and possibly involving the State of Washington if a project benefits both Portland and Vancouver.

## Partnerships

As with funding, there are numerous opportunities for partnerships between the Commuter Service provider and the following public, private and non-profit entities:

- **Public**—Portland Development Commission, Tri-Met, Portland Streetcar, and cities of Lake Oswego, Milwaukie, and Oregon City.
- **Private**—Interested developers in adjacent areas such as South Waterfront and Old Town/China Town, owners of already developed property such as at RiverPlace, and operators of facilities such as the Rose Quarter.
- **Non-profit**—Portland Oregon Visitor's Association (POVA), Portland Business Alliance (PBA), Neighborhood Associations.

Sponsorship of terminals or vessels by private business could provide an opportunity to raise additional funds. Several streetcar operations in the United States, including Portland, use sponsorships to raise operating funds.

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<sup>11</sup> Like many of these options, increasing the hotel/motel tax would require a major regional initiative and comply with state laws regarding use of revenues from this source.

## Marketing

The potential for marketing the entire ferry passenger service or any specific terminal will be directly related to the type of partnerships discussed in the previous section. For example, in recognition of their tourist potential, Portland Oregon Visitor Association (POVA) officials say they are willing to assist with marketing the availability of ferry service in conjunction with other programs, which promote Portland to out of town visitors. The POVA is prevented from marketing programs or services within the Portland region.

As indicated by the high score given to the potential of partnerships and marketing terminals at RiverPlace and the South Waterfront (Figure 3-12 Commuter Service Terminals) we believe that the adjacent private developments create opportunities that deserve further exploration. Likewise, because of its accessibility to the heart of downtown's waterfront, the Salmon Springs Fountain is a likely attraction for funding, partnerships and marketing from a variety of public, private and non-profit sources.

## Summary of Commuter Ferry Service Scenario

The prior sections of this report provide a preliminary feasibility assessment of commuter ferry service between downtown Portland, Milwaukie, Lake Oswego and Oregon City. The assessment concludes that short-term ridership potential is moderate, the cost of operating the service is high compared to other regional transit modes and that significant dock and terminal construction would need to take place before service could commence. Despite these obstacles, commute ferry service has potential as one element in a family of transit services.

The following are key findings of our analysis:

- Commuter ferry passengers are typically higher income customers, who would not use other transit modes and are willing to walk significant distances at the destination end of their trip.
- Measured by metrics of demand and subsidy level compared with other regional transit services, the current market for commuter ferry service is marginal. However, ridership and financial support garnered from the tourist market could improve the short-term viability of such service.
- Significant capital improvements in the way of dock and terminal facilities would be required at all proposed commuter ferry locations. Cost could range from \$650,000 to \$1 million for docks and terminal facilities at each site.
- The short-term feasibility of commute ferry service is limited by landside constraints – parking and private land costs. Structured parking facilities in Lake Oswego and Oregon City could range from \$5 to \$14 million dollars excluding land costs.
- Milwaukie to the Portland CBD is the best market, this could be supplemented by a link to Oregon City. The Lake Oswego/West Linn to CBD market has a lower number of commute trips, but has demographics that fit typical passenger ferry

profiles and its market potential is likely to develop as the area grows and congestion worsens.<sup>12</sup>

- Operating subsidy requirements would be higher than bus and rail services now operating in the region. This is an important consideration as operating funds for public transportation are more difficult to generate than funds for capital construction and fleet purchases.
- A successful funding strategy for a commute ferry service would rely on the receipt of federal operating funds and passenger fares, but would also likely require other non-traditional sources of local funding.
- A number of groups recognize tourism opportunities from the proposed commuter and central city circulation services. Portland Oregon Visitor Association (POVA) officials say they are willing to assist with marketing the availability of both services in conjunction with their marketing efforts to promote Portland to out of town visitors

## B. Central City Circulator Service Alternative Assessment

### Description of Service

A number of major cities in North America operate water transit services designed to provide short hop service between important demand centers along an urban waterfront. In New York, Baltimore, Vancouver and Victoria, such services thrive providing connections between tourist attractions, commuter destinations and landside transit services. These services typically operate with smaller, slower vessels that don't require the large dock facilities needed for larger passenger ferries. For passengers on these services, the trip is often a critical part of the overall experience. Therefore, the scale and unique character of the vessel is important. Travel speeds are typically not critical to passengers, but service frequency is important where passengers are using the service to visit multiple destinations.

Several considerations or assumptions were fundamental in developing the following Central City Circulator Scenario:

- The initial service should build on strengths, using existing docking facilities where possible.
- The use of "unique" vehicles should be considered for demonstration service to attract attention and ridership.
- A base level of service should be provided all year, with incremental increases in summer, weekend and event service.

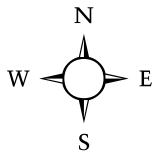
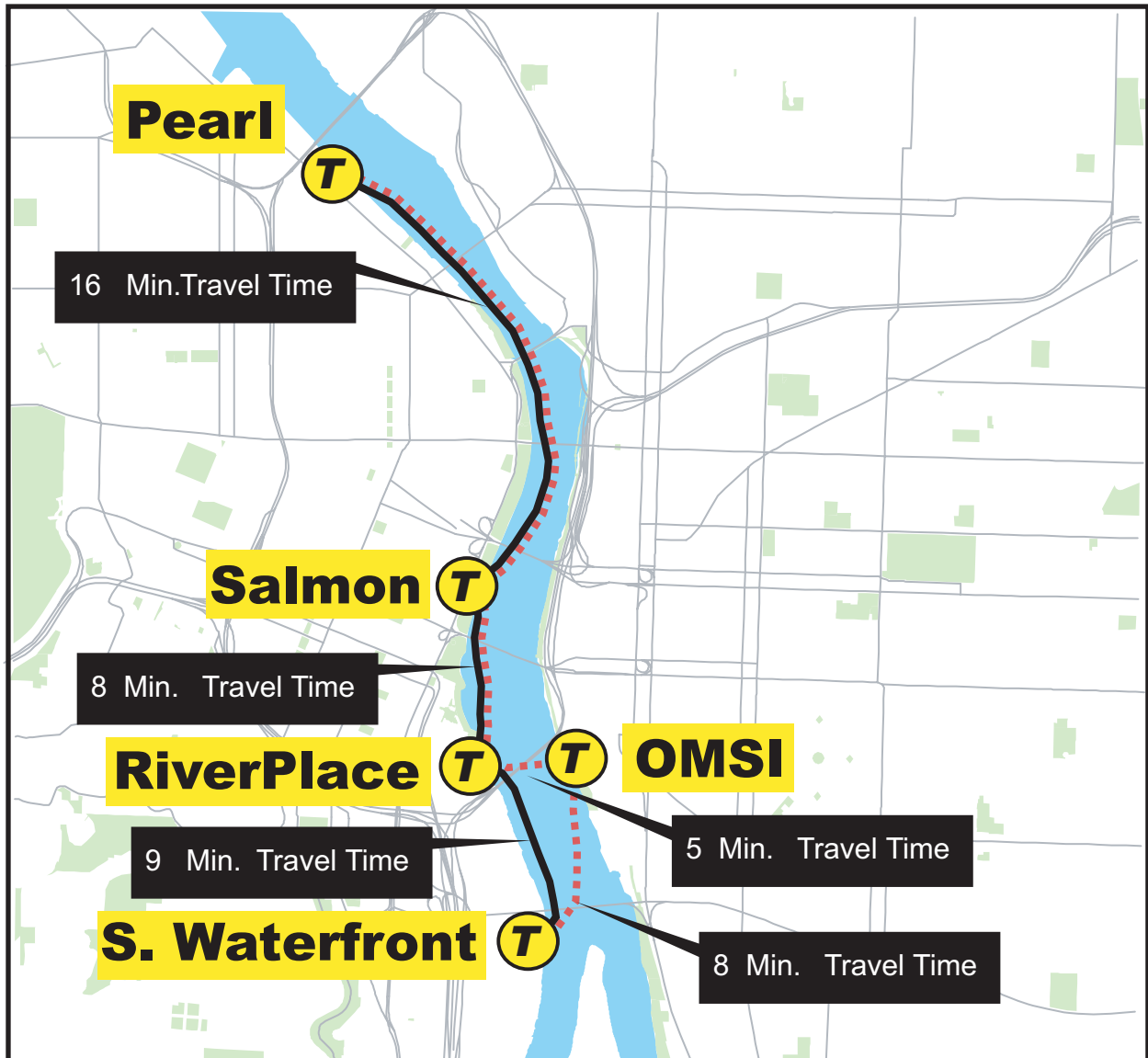
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<sup>12</sup> The construction of a rail or bus high capacity transit alternative between Lake Oswego and Downtown Portland could dampen future demand for water ferry service.

- Base operation would serve the Pearl, Ankeny (weekends), Salmon, River Place, OMSI (midday and weekends only), and South Waterfront.
- Event only service would be provided to the EB Fire Dock. This is a good docking location with an existing facility, but there is little adjacent demand during normal weekdays.
- The Convention Center is a desirable market, but access is too difficult to make ferry service to the existing Convention Center dock feasible. Planned pedestrian connections between the Convention Center and the riverfront would make this a key stop.

The proposed service illustrated in Figure 3-14 could operate under one of two scenarios:

- **Year Round Commuter & Excursion Service:** This service would be aimed primarily at excursion passengers, but would operate longer hours and during the winter months to service Central City commuters. Service details include:
  - Service every 30 minutes at Pearl, Ankeny (weekends only), Salmon Springs Fountain, River Place and South Waterfront.
  - Service operates from 7:00 AM to 6:00 PM.
  - Service runs 7 days per week.
  - Service to OMSI operates on limited daily schedule from 10:00 AM to 3:00 PM.
- **Seasonal Excursion Service:** This service would operate between May 15<sup>th</sup> and October 15<sup>th</sup> and would run only during the peak midday hours Thursday through Sunday. Service details include:
  - Service every 30 minutes on Thursday and Friday and every 15 minutes on Saturday and Sunday at Pearl, Ankeny, Salmon Springs Fountain, River Place, South Waterfront, and OMSI.
  - Service operates from 11:00 AM to 4:00 PM on weekdays and 11:00 AM to 6:00 on weekends.
  - Under this option the OMSI route becomes an integrated element of the circulator. The southern portion of the circulator would loop clockwise from Riverplace to OMSI to South Waterfront and back to Riverplace before continuing north.
  - Service operates Thursday through Sunday.



**T** Proposed Ferry Terminal

**—** Proposed AM & PM Peak-Hour Ferry Route

**⋯** Proposed Midday & Weekend Ferry Route

**Vessels operate at 8 knots**

**Vessels board and alight passengers in 4 minutes at each terminal, unless otherwise specified**

## Markets and Potential Ridership

### Typical Profile of Central City Circulator/Excursion Ferry Rider

Passenger ferry services designed to carry tourists and excursion passengers are successful where there are attractive destinations, such as Angel Island in the Bay Area, or where there are multiple tourist sites near the waters edge, as is the case in Vancouver and Victoria, BC. For passengers on these services, the trip is often a critical part of the overall experience. Therefore, the scale and unique character of the vessel is important. Travel speeds are typically not critical to passengers, but service frequency is important where passengers are using the service to visit multiple destinations. Some other characteristics that typify passengers on a tourist/excursion service are:

- The look and feel of the vessel is integral to experience.
- Speed is not essential, but value reliability and frequency.
- Visibility from boat is very important on the water.
- Unique vehicle, orientation, all help increase ridership.
- Ridership will follow visitor peaks and is likely to fall off significantly in winter.
- Will include “joy riders”, “experience enhancers”, and those choosing to use ferry for local circulation.
- Unique service can be marketed to hotels, conventions, and venue visitors.

### Estimating Ridership

There is no industry standard model for estimating ridership on excursion or tourist oriented ferry services. Our estimates are based on knowledge of peer systems and information collected about tourist activities in Portland’s central city districts. In a sense our estimates represent an “If you build it they will come” approach to determining ridership demand. The assumptions shown in Figure 3-15 about vessel capacity are used to determine patronage on the two proposed services.



**Figure 3-15 Circulator Vessel Utilization by Season (Estimate)<sup>13</sup>**

Season and Time of Day		Percent Capacity Utilized	
		Year –Round Service	Seasonal
Peak Season (June 15 – September 15)	Peak Hours	90%	90%
	Off Hours	60%	na
Shoulder Season (April 15 – May 15 & September 15 – October 15)	Peak Hours	70%	70%
	Off Hours	50%	na
Off-Season (October 15 – April 15)	Peak Hours	50%	na
	Off Hours	40%	na

**Note:** Peak hours are considered 11:00 to 6:00 on weekend and 11:00 – 4:00 on weekdays. Off hours are all others.

Based on these utilization rates we estimate that ridership on each of the proposed services would be as follows:

- Year-Round Commuter and Excursion Service = 165,000 annual passengers trips or 13,750 monthly
- Seasonal Excursion Service = 109,400 annual passengers trips or 21,888 monthly<sup>14</sup>

We compared projected use of these services to visitation rates at other major tourist attractions in and around downtown Portland (i.e., Chinese Gardens, OMSI, etc.). Our estimates are validated by rates of visitation at those attractions. For example, the Chinese Garden attracts over 200,000 visitors per year, which is higher than projected patronage on either Circulator alternative.

### **Needed Capital Improvements and Costs**

Like the Commuter Service Scenario, docking and landside facilities present the biggest obstacle to implementing the proposed Central City Circulator service. However, capital requirements for the Circulator are more minimal. Smaller vessels do not require large dock facilities like Class II commuter vessels and there is no need to build parking or extensive waiting facilities. Dock facilities and upland improvements to provide pedestrian and ADA connections to existing sidewalk networks are the primary capital needs. Planned docks at South Waterfront, Ankeny and Centennial Mills (preliminary) may provide needed facilities. The existing OMSI dock is the only existing facility designed to accommodate passenger vessels today and accessible to disabled passengers. RiverPlace has an existing dock, but would require upgrades to ramps and walkways to better accommodate people with disabilities.

<sup>13</sup> Utilization estimates are based on professional opinion and an anecdotal review of peer services. Because most relevant peers (ie. AquaBus and False Creek Ferries, BC) operate as competitive for-profit ventures, detailed information about patronage and revenue is not available.

<sup>14</sup> This analysis assumes that Seasonal service would operate for 22 weeks each year.

Figure 3-16 provides a summary estimate of capital cost improvements for implementation of the proposed Central City Circulator Service. These order of magnitude cost estimates are based on capital costs estimates and construction costs from similar projects. Comparative projects used to develop cost estimates typically include:

- Docks, floats and pilings.
- Ramps, walkways and walkway landings connecting docks to upland facilities.
- Structural components such as concrete and structural steel.
- Upland improvements including sheltered waiting area and lavatories.
- Civil engineering and drainage.
- Electrical, lighting and other construction elements.
- Contingency.

The following assumptions or sources were used in the development of capital cost estimates:

- Cost represents the minimum level of improvements necessary for service start-up.
- Costs are based in part on a visual assessment of each terminal site from the water and from the landside.
- It is assumed that no parking would be developed in conjunction with any Central City Circulator terminals. Primary access would be by foot, bike or transit.
- No land acquisition costs are included in these estimates.
- Maintenance and vessel storage facility costs are considered separately.

**Figure 3-16 Capital Cost for Central City Circulator Service Start Up**

Segment	Dock, Ramps, Floats, Pilings	Upland Improvements	Parking Structure/ Surface Parking	Total Capital Cost
River District (Pearl)	\$550,000	\$250,000	\$0	\$800,000
Salmon Springs Fountain	\$500,000	\$150,000	\$0	\$650,000
RiverPlace	\$400,000	\$150,000	\$0	\$550,000
South Waterfront	\$550,000	\$250,000	\$0	\$800,000
OMSI	\$250,000	\$75,000	\$0	\$325,000
Ankeny	\$550,000	\$150,000	\$0	\$700,000
<b>Total</b>	<b>\$2,800,000</b>	<b>\$1,025,000</b>	<b>\$0</b>	<b>\$3,825,000</b>

**Notes:**

All cost estimates are in 2006 dollars.

All costs are order-of-magnitude estimates.

Costs for Salmon Springs Fountain facilities are not in addition to those proposed for Commuter Service.

Capital facility cost requirements would not vary between the year-round and seasonal service options. Vehicle fleet requirements and cost do vary and are addressed in a subsequent section (Vessel Options).

If a commuter ferry service is developed before or in conjunction with the Central City Circulator, there will be an opportunity to use a joint maintenance and storage facility. More likely, the Central City Circulator fleet will need to be stored and maintained separately. Since it is likely that a Central City Circulator would be operated by a private contractor (see *Operating Entity Structure*), storage and maintenance can be built in to the solicitation process and be provided by the successful contractor. There may be an opportunity to leverage some of the listed facility improvements through current or planned development projects on the riverfront.

## Fare Options, Revenue Potential and Operating Plan Summary

Fare options for the Central City Circulator service should target tourist and excursion passengers. Figure 3-17 provides a summary of fare levels and categories for peer services that focus on intracity circulation and tourist travel. Most offer a day pass or excursion fare that allows passengers to use the service for sightseeing or as an outing service, debarking and boarding at their leisure throughout the day. Services such as the AquaBus and False Creek Ferries in Vancouver are privately operated service, indicating that they rely on fare revenue to cover 100 percent of operating expenses.

**Figure 3-17 Peer System Fare Levels**

Peer Circulator/Excursion Services	Fare (One-Way)	Discount (Disabled/Child/Student)	Excursion Fare (All Day)	Service Frequency	Primary Function	Public/Private
Vancouver SeaBus (2 Zone)	\$2.25	\$2.00	na	15 minutes	Local Transit/ Commute / Tourist	Public
Vancouver AquaBus (Horby Street to Science World)	\$2.00	\$1.00	\$11.00	15 minutes	Tourist / Commute	Private
False Creek Ferries (Granville - Yale Town)	\$2.50	\$1.25	\$12.00	15 minutes	Tourist / Commute	Private
False Creek Ferries (Granville-Science World Mini Cruise)	\$2.50	\$1.25	\$12.00	15 minutes	Tourist / Commute	Private
Chicago River Bus	\$2.00	\$1.00	na	15 minutes	Circulator / Commute	Private
Baltimore Water Taxi	\$3.00	\$1.50	\$8.00	20 minutes	Tourist / Commute	Private

We recommend a simple fare structure that would maximize revenue by focusing on the tourist and excursion markets (see Figure 3-18). Rather than offer a one-way fare, we recommend that the base fare allow passengers to make two trip segments. This will increase revenue as one-way travelers will still be required to pay \$4.00. A day pass/excursion fare would also be offered at a slight premium for those that wish to make multiple trips or simply use the trip as a river excursion.

**Figure 3-18 Proposed Fare Structure**

Fare Category	Adult	Youth/Disabled Discount
Base Fare (2 Trip Segments)	\$4.00	\$2.50
Day Pass/Excursion Fare	\$6.00	\$3.00

**Potential Revenue Based on Ridership Projections**

- Fares are as follows:
  - \$4.00 basic pass that includes up to two trip segments
  - \$2.50 discount pass for children and persons with disabilities
  - \$6.00 day pass for adults
- An average fare of \$3.50 per passenger or about \$1.75 per one-way trip is assumed

Using an average per rider fare of \$3.25 or \$1.75 per trip, fare revenue estimates are as follows:

- Year-Round Commuter and Excursion Service - \$288,750
- Seasonal Excursion Service - \$229,800

**Operating Cost Assumptions**

- The proposed Central City Circulator service will primarily serve tourists and local excursion passengers. Given the market demand for this service, it is unlikely that regional public transportation funds will be available to support ongoing operations. Like its peers, the service will need to be operated by a private company. Private operators can typically achieve lower operating costs than publicly run services. The estimated operating cost for both scenarios is \$75.00 per hour<sup>15</sup>:

**Figure 3-19 Annual Operating Costs**

	Annual Hours of Operation	Cost Per Revenue Hour	Total Annual Operating Cost
Year-Round Service	16,000	\$75	\$1,200,000
Seasonal Service	3,036	\$75	\$227,700

**Subsidy Requirements**

To attract a private operator interested in operating a Central City Circulator service, they will need to develop a viable business plan that allows them to at least break even in early years of operation. The calculations in Figure 3-20, which illustrate subsidy requirements, show that fare revenue will fall far short of operating expenses for the Year-Round service, at least in the early years of operation. Estimated subsidy requirements for the S<sup>16</sup>easonal service are much lower, at just \$0.34 per passenger trip.

<sup>15</sup> Operating costs assume that vessels are designed with rear controls so that they can be manned by one captain. If a deckhand is required by the US Coast Guard operating costs could increase significantly.

<sup>16</sup> These subsidy requirements do not include financing for capital facility costs including terminals, vessels, etc. A private company required to make these purchases/improvements would be faced with a much higher margin between fare revenue return and total operating and capital expenditures.

### Figure 3-20 Circulator Subsidy Requirements

Cost-Revenue-Subsidy	Year-Round Service	Seasonal Service
Annual operating costs	\$1,200,000	\$227,700
Estimated annual fare revenue	\$288,750	\$190,750
Operating subsidy required	\$915,750	\$36,950
<b>Subsidy per passenger trip</b>	<b>\$5.55</b>	<b>\$0.34</b>

Any significant increase in passenger fares would have a negative impact on overall ridership, and as such does not provide a viable way to eliminate the operating revenue gap. There may, however, be other ways for a private operator to offset operating costs, including: selling advertising on the vessels, selling naming rights to vessels, or operating charter services for private groups.

### Vessel Options

Vessel requirements for the Central City Circulator are vastly different than the Commuter Service. Central City Circulator vessels would operate at relatively low speeds, no more than 8 knots, and would travel very short distances. Making more frequent stops, vessels would need to be designed to accommodate relatively quick boarding and alighting and allow for wheelchair and bicycle access. Passenger capacity for these boats should be between 20 and 25 passengers. The best vessel model for the Central City Circulator service is the boat design used by AquaBus and False Creek Ferries.<sup>17</sup> in Vancouver, BC. These molded fiberglass boats are constructed locally (in Vancouver), use a Volvo diesel engine, can accommodate 20 passengers, and travel at speeds of 8 to 9 knots.



20-passenger "AquaBus" in Vancouver, BC.

<sup>17</sup> These vessels are appealing because of their durability, stability of ride, size and passenger capacity, relatively low construction and maintenance costs, covered seating and visual appeal.



False Creek Ferries vessel operating in Vancouver, BC.

The Jones Act<sup>18</sup> and US Coast Guard requirements do not allow vessels constructed in Canada to be used for service in the United States. However, the design and construction of vessels for the Central City Circulator service provides an opportunity to employ local naval architects and shipbuilders in developing a vessel fleet. There are several shipyards in the Portland area capable of producing these smaller vessels. Estimated cost for a vessel of this type, including design and construction is approximately \$250,000.<sup>19</sup> The four vessels required to operate the proposed Circulator service would cost approximately \$1 million.

There are a number of other smaller passenger vessels available that meet the basic specifications of this service. It may be possible to purchase new or used production models of these vessels, or apply a similar design to a locally constructed vessel. The selected vessel should have the following characteristics:

- Operating speed of 7-10 knots;
- Fully covered passenger area that can accommodate a minimum of 20 passengers;
- Low wake design to minimize conflicts with small craft;
- Accessibility for wheelchair loading and ease of passenger movement to and from dock;
- Bike rack storage; and
- Controls located in rear to allow for operations with less crew.

The use of diesel engine technologies on ferry boats allows for the application of cleaner fueling alternatives. RiversWest is currently exploring the use of biodiesel engines on renovated historic vessels. Most marine diesel engines can use a biodiesel fuel mixture. Very few have been tested under long-term operations on a pure biodiesel fuel.

<sup>18</sup> The **Jones Act** is a United States Federal statute requiring U.S.-flagged vessels to be built in the United States, owned by U.S. citizens, and documented under U.S. laws. In addition, all officers and 75% of the crew must be U.S. citizens.

<sup>19</sup> Average of cost estimates provided by multiple ferry boat companies, including Bay Area Water Transit Authority, False Creek Ferries and AquaBus (Vancouver, B.C). Cost estimates ranged from \$150,000 (\$US) for a vessel comparable to those used by AquaBus to \$350,000 for a production model 20 passenger water taxi vessel constructed in the Bay Area.

## RiversWest Historic Vessels

RiversWest has purchased a fleet of historic ferryboats from the National Park Service. These vessels operated for many years on Crater Lake, but were eliminated due to diesel pollution in the lake. RiversWest is now restoring the historic vessels for passenger operation. Once restored, the boats are planned to have the following specifications:

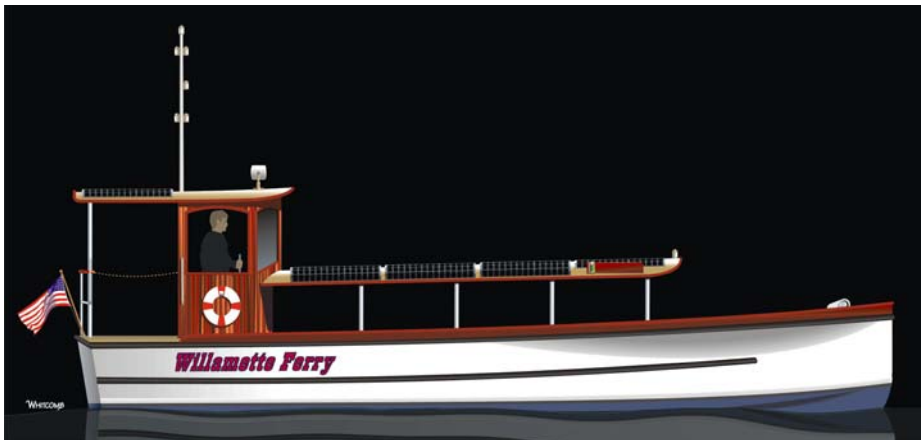


Vessel still in service at Crater Lake

- Maximum operating speed of for 7-8 knots;
- Biodiesel engine;
- Solar panels for electric power;
- 49 passenger capacity;
- Partially covered passenger seating area (rain covers will be provided);
- Bike racks; and
- Wheelchair access using dockside lift equipment.

These vessels provide a viable option for a start-up fleet or for a more permanent fleet if service is operated only during the peak season. The vessels have historic significance to Oregon and may attract maritime and boat enthusiasts that otherwise would not use the service. The historic vessels do have a few disadvantages for year-round service. The lack of full weather cover would be a disincentive to passenger use during cold and rainy weather. Vessel maintenance costs are also likely to be higher given their age and the unique characteristics of the powerplants (biodiesel and solar).

The historic vessels could also be used effectively as supplement vessels for weekend or event service. Much like the historic replica trolleys that are interspersed in weekend service on the Portland Streetcar line, these historic vessels could be use in place of regular vessels or to supplement service on the busiest days of the year.



Prototype drawing of Solar-Biodiesel launch designed by RiversWest

Source: [www.riverswest.org](http://www.riverswest.org)



## Strategies for Funding, Partnerships and Marketing

Figure 3-21 depicts the potential for funding, partnerships and marketing for Central City Circulation terminals. As in the discussion of Commuter Service terminals, included in the table is an assessment of other considerations such as the availability of a modal interchange, adjacent development and selected synergistic factors that indicate how well central city circulation terminals and adjacent developments may enhance each other.

**Figure 3-21 Central City Circulation Locations**

Projects	Potential For (1=low, 5=high):			Other Considerations:		
	Funding	Partnership	Marketing	Modal Interchange	Adjacent Development	Synergistic Factors
<b>Dock/Terminal Site</b>						
Convention Center/Rose Quarter	2	3	4	Light Rail/multi-use path	River walkway	Strong
Ankeny Dock/Market Site	2	4	4	Light Rail	NW/Old Town	Public market
Salmon Springs Fountain	5	4	5	Light Rail/multi-use path	Downtown	Visibility
RiverPlace	3	5	5	Streetcar/multi-use path	Retail facilities	Popular
South Waterfront (Gibbs)	3	5	4	Streetcar/tram	New development	Potential
OMSI	3	5	5	Auto/multi-use path	OMSI	Strong
River District/Centennial Mill	3	4	5	None	Maritime Museum	Potential
Ross Island	2	2	3	None	None	Unknown
Oaks Park	3	4	4	None	Parking	Potential

### Funding

In many ways, the potential for funding Central City Circulator terminals is similar to the Commuter Service terminals. However, for the former, the participation of the tourist, convention, and visitors industry is greater. In addition to the creative funding sources discussed in the previous section, portions of the hotel and motel tax, which is devoted to the promotion of visitations to Portland, may be available. However, there would need to be additional study completed to show a clear nexus between the implementation of service and increased visitor activity. In addition, a broad network of hotels, restaurants and other businesses rely on tourists and convention attendees. There is a potential for funding several terminals because of these factors, for example at the Convention Center/Rose Quarter and South Waterfront.

The potential to receive competitive state or federal operating grants is low for this type of service. Ongoing operating funds would need to rely heavily on fare revenue, other

revenue generated by a private operator and support from local government and businesses. One advantage this type of service has over a commuter line is that schedules can be adjusted to meet seasonal or daily demand, thereby increasing the percentage of total operating revenue returned through the farebox. For example, focusing operations on weekends, event and festival days could allow service to be supported entirely through fare revenue.

### **Partnerships**

The public, private and non-profit entities cited in the portion of this report that discusses Commuter Service terminals apply here as well. The implementation of Circulator service would merit a particularly in-depth exploration of partnership and financial support by businesses and development groups that own property or businesses along the waterfront. For example, businesses in RiverPlace or developers in South Waterfront may be interested in supporting a ferry service that they could, in turn, market to their customers/residents. Additionally, business may be interested in naming rights or on vessel advertising to target ferry passengers.

### **Marketing**

Note the high scores in Table 3-19 given to partnerships and marketing potential for South Waterfront, RiverPlace, Salmon Springs Fountain and the River District/Centennial Mill. The latter is included because of the potential of remodeling the Mill into a maritime museum. In addition to its tourist appeal as a museum, it can have a positive effect on a nearby ferry. POVA will assist in marketing the Central City Circulator ferry and terminal system, to out of town visitors, and would coordinate marketing efforts with existing partners and programs.

### **Summary of Central City Circulator Service**

The success of a Central City Circulator service will be reliant on the initiative of local champions. As illustrated in this analysis there are funding and operational barriers to overcome, which vary depending on the scope of service. The proposed Seasonal Service is more likely to be viable for a private operator, particularly if other revenue generating activities are possible. Seasonal operations require approximately one-fourth the passenger subsidy of a Year-Round service. Given the right combination of public support and private sector innovation this operating subsidy gap could be closed. Opportunities such as the sale of advertising, operation of charter service and the sale of vessel naming rights could raise additional revenue and make the service viable for a private provider. If the challenge of developing a viable business model to support the service can be overcome, there is unanimous opinion that a Central City Circulator service would be a popular and beneficial attraction for Portland's Central City.

A number of terminal and dock improvements would be needed to start service on the proposed Circulator route. Currently, only one of the proposed terminal sites (OMSI) is equipped to handle small boat docking and passenger loading. Riverplace has a good

dock and would require relatively minor modifications to conform with ADA regulations. Almost all other sites require completely new dock facilities; development projects at or near several of these sites may provide important opportunities to leverage new docks that meet passenger loading specifications. These facilities would need to receive public sector funding or be constructed through a public-private partnership. Since there is no (or very limited) profit margin associated with operation of the proposed service, no private operator would be willing to fund privately the construction of terminal and docking facilities.

The following are key findings from our analysis of a Central City Circulator service:

- It is difficult to estimate ridership for this type of service with precision – but logic suggests there is a good market during the peak tourist season. Riverfront activities and visitation drops significantly in the winter months, suggesting that off-season ridership would be much lower.
- With the exception of OMSI and Riverplace, all proposed terminal sites would require new dock facilities or major improvements to existing facilities.
- Both Year-Round and Seasonal services would require some subsidy; however, per passenger subsidy requirements for Seasonal service are 75% lower.
- The proposed service will not be competitive for state or federal transit operating funds and will need to be set up as a private venture with some local business or government support.
- There are a number of service adjustments or supplemental services that a private operator could use to decrease revenue shortfall, including operating charter services, running reduced hours during the midday, operating event or festival service, and/or only operating during summer months.
- Service could be much enhanced by a daily public market at Ankeny or improved connection to the Convention Center. Providing regular service at these locations with good landside connections would improve ridership significantly and increase financial viability.
- Central City Circulator vessels would operate at relatively low speeds, no more than 8 knots, and would travel very short distances. Making more frequent stops, vessels would need to be designed to accommodate relatively quick boarding and alighting and allow for wheelchair and bicycle access. Passenger capacity for these boats should be between 20 and 25 passengers. The best vessel model for the Central City Circulator service is the boat design used by AquaBus and False Creek Ferries in Vancouver, BC. These molded fiberglass boats are constructed in Canada, use a Volvo diesel engine, can accommodate 20 passengers, and travel at speeds of 8 to 9 knots.
- The historic vessels owned by RiversWest are viable for start-up service and/or use permanent fleet vessel for Seasonal service. They could also be integrated into a larger fleet as supplemental vessels, much the way historic streetcar replicas are used on holidays and weekend on the Portland Streetcar line. However, ADA

accessibility issues and lack of fully covered passenger areas make them impractical for long-term service.

- There is opportunity for both public and private funding to develop terminal and dock facilities. However, public operating funds for this type of service are scarce. A successful operating model will include private side management and operations, and will be reliant on farebox revenue and contributions from private businesses or ancillary services operated by the management company.
- There is significant interest in a Circulator service from regional tourist groups and riverfront business interests, presenting opportunities for casual marketing and marketing partnerships.

# Chapter 4. Regulatory, Management and Land Use Issues and Impacts

## Regulatory Evaluation

Operating a ferry service on the Willamette River is subject to federal, state and local regulatory requirements. For passenger vessel services, the primary regulatory agency is the US Coast Guard. It is responsible for establishing and enforcing regulations for safety, security and environmental protection. The Coast Guard has the responsibility to oversee multiple aspects of operations and vessel design and safety, including: manning, materials, design, construction, licensing, training, inspections and safety certification. The consultant team met with three representatives of the US Coast Guard Marine Inspection unit in March 2006 to discuss regulatory issues surrounding passenger ferry service on the Willamette River.<sup>1</sup> Key inputs from the USCG included:

- Upstream conflicts, where initial service is proposed, are relatively minor. The biggest issue being potential conflicts with private fishing boats.
- Navigability downstream from Portland can be a problem, primarily for maneuverability in river with conflicts from large ships (no services are proposed upstream).
- Issues for passenger ferry operations on the Columbia River are more severe, including: wake issues with private houseboats, conflicts with hog lines and safety issues with barge/passenger vessel collisions.

A number of other agencies including the Environmental Protection Agency, the Federal Communications Commission, Fish and Wildlife Service, Occupational Safety and Health Administration, and the Department of Health and Human Services have small roles in regulating aspects of passenger vessel service. However, there is no indication that regulations in place through these agencies would impede service on the Willamette River.

State regulation of waterways and water borne transportation is handled by the Oregon Department of Transportation, Board of Maritime Pilots. Oregon Revised Statutes Chapter 776, Title 58 (Shipping and Navigation) and Chapter 856 of the Oregon Administrative Rules are the governing rules and statutes for maritime operations in Oregon. The Port of Portland, the City of Portland, the City of Milwaukie, the City of Lake Oswego and the City of Oregon City all have a direct regulatory responsibility and interest in water and landside development and operations along the Willamette River.

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<sup>1</sup> **Niles Seifert**, Chief, Prevention Department; **Russ Berg**, Senior Marine Inspector; **Chris Lumpkin**, Petty Officer, Waterways Management Branch.

There do not appear to be any major regulatory obstacles to the operation of passenger vessel service on the Willamette River. One important consideration for terminal development is a State Marine Board prohibition on commercial uses at docks funded with state monies. An example of the impact of this regulation is the inability for a commuter ferry service to dock at a new facility being designed and constructed by the City of Lake Oswego.

## Impact On Tourism and Development

### **Qualitative Evaluation Of Impacts From Stakeholder Interviews**

Interviews conducted with those who speak for the tourism industry reflect support and excitement about the prospect of a commuter passenger ferry service and a central city circulator service. While the latter would be more attractive to those with interest in tourism, both would be desirable additions to the range of choices available for tourists and visitors coming to Portland.

A May 23, 2005 letter from the Executive Vice President of Sales and Marketing for the Portland Oregon Visitors Association (POVA) to the City of Portland River Renaissance Initiative stated:

*“The proposed ferry service sounds like a fun, creative way to complement the progress already made toward this goal (of reducing the number of cars on city streets) by TriMet’s MAX light rails system and the Portland Streetcar. As well, this could help Portland join the ranks of great cities (Seattle, Vancouver, Victoria, San Francisco, Baltimore, London, Amsterdam, Paris, etc.) that have seized the benefits of making water transportation available for residents, visitors and businesses alike.”*

This statement from POVA is similar to comments received from others close to Portland’s tourism trade. There is an evident eagerness to achieve greater utilization of the Willamette River. The ferry and circulator services could be meaningful steps toward that objective.

### **Quantitative Evaluation Of Relevant Tourism Data**

Quantitative data for tourist and convention visitors in Portland are summarized below.

- Portland Central City had 1.524 million hotel booking nights in 2005. It can be assumed that there are approximately 1.5 visitors per room, equaling 2.28 million visitors per year
- There were 230,000 conventioner visits in 2005
- Portland Classical Chinese Garden attracted 160,000 visitors in 2005

- Oregon Museum of Science and Industry had 760,000 admissions for FY 2004-2005
- There are currently five cruise/vessel operation companies providing tour services on the Willamette River. All require advance reservations and most provide extended trips, not short-hop service:
  - Portland Spirit
  - Portland Rose Sternwheeler
  - Willamette Jet Boat Excursions
  - American West Steamboat Company
  - Cruise West
- Major music, art and crafts, and brew/wine festivals attract a large number of visitors to Tom McCall Waterfront Park

Based on available data it appears that the most useful service for tourists will be an excursion ferry service that links major attractions, residential neighborhoods, shopping and event sites and mass transit connections within the Central City, including:



Pearl District/River District<sup>2</sup>



The Oregon Convention Center



Ankeny Plaza (urban renewal area)



OMSI

<sup>2</sup> Photo source: Hoyt Street Properties website.



Salmon Springs Fountain &  
Tom McCall Waterfront Park



River Place



South Waterfront<sup>3</sup>

The development of a linked system of excursion ferry services in the Central City could encourage the following:

- More intensive development and redevelopment of areas adjacent to the terminal facilities.
- Increased marketing potential for the Central City.
- Improved links between the Convention Center/Rose Garden Arena to the West Central City and its attractions.
- An additional attraction that could help the Convention Center and other businesses market Portland's Central City.
- Better linkages between the east and west banks of the river for access to employment opportunities.

<sup>3</sup> Photo source: Oregon Health Science University website.



- Improved access to important tourist sites in the Central City.
- Improved circulation and linkages to multi-modal transportation systems (car, Amtrak, streetcar, light rail, bus, bicycles, pedestrian, and water-based ferry systems).

## **Urban Renewal Areas and Development Impacts**

Excursion and commuter ferry services will have different impacts on urban development adjacent to the river. Both forms of ferry service can be encouraged by urban renewal districts planning and financing techniques.

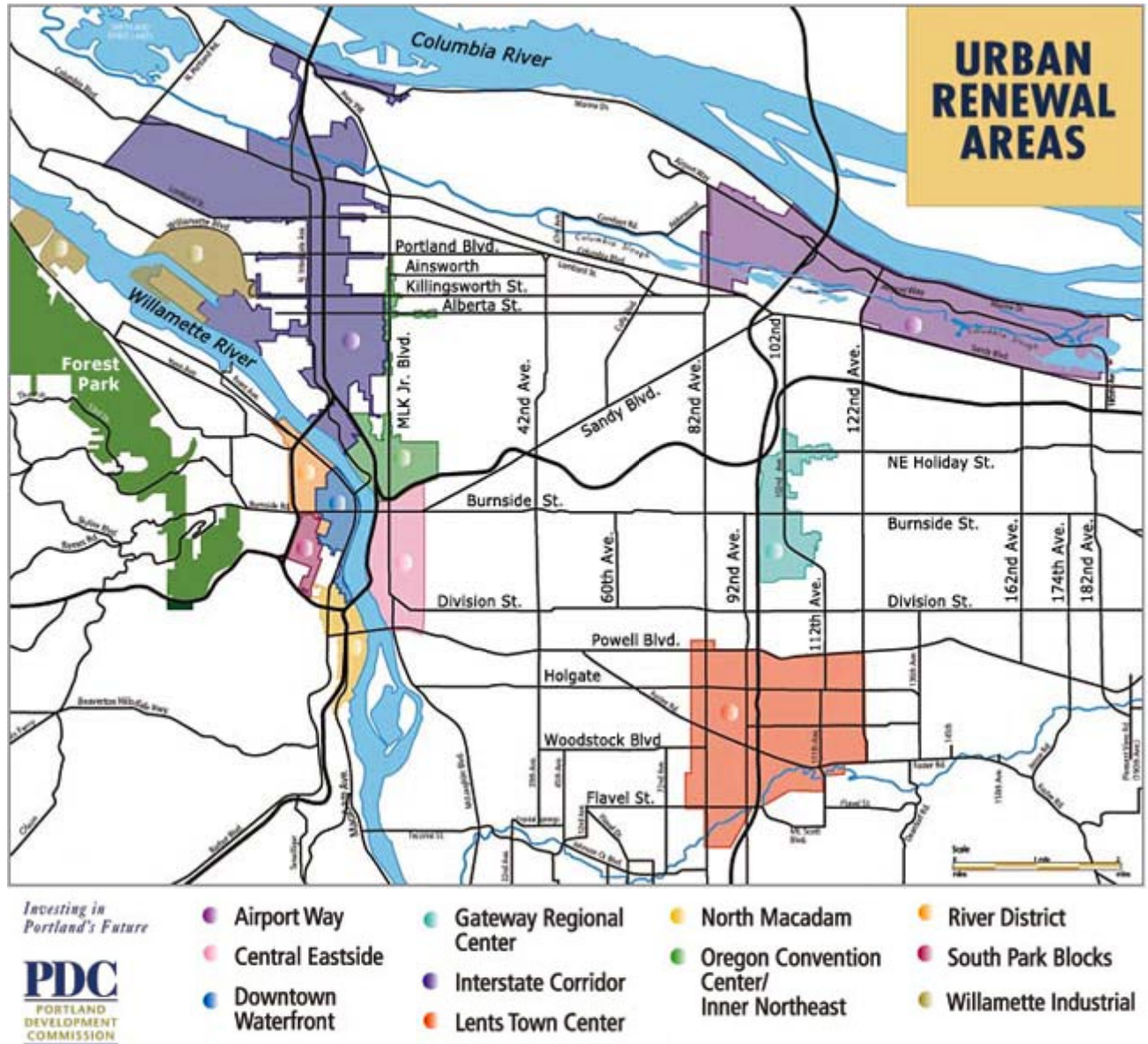
Increased activity and improved transportation and access are critical factors for developers, particularly in waterfront areas where road access is limited. Combined with other factors, excursion ferry service has the potential to encourage hotel/motel and residential development along the shores of the Willamette River, especially in station areas and where there are strong links to mass transit and current facilities such as the Convention Center/Rose Garden Area.

Commuter ferry service could play a role in bringing more intense, transit-oriented residential and commercial development to the Willamette River near station areas and where there are strong links to mass transit.

Current urban renewal areas (see Figure 4-1) where there is the potential to stimulate or benefit from ferry service development include:

- River (Pearl) District
- Downtown Waterfront
- North Macadam/ South Waterfront
- Central Eastside
- Willamette Industrial

**Figure 4-1 Urban Renewal Areas<sup>4</sup>**



Portland has been a national leader in transit-oriented development (TOD). TOD's are areas that support mixed-use residential and commercial development designed to maximize the efficient use of land through high levels of access to public transport. Significant new development along the riverfront, including the Pearl District/Old Town and South Waterfront (North Macadam), create new opportunities for water-transit oriented development. As developers increasingly realize the demand for development on riverfront properties, the demand for new transportation options in these areas will

<sup>4</sup> Source: Portland Development Commission website.

increase. New residential and commercial development on the river should increase the economic viability and appeal of water transit. In the interim, planners working in these urban renewal districts should work to develop docking facilities and pedestrian access that will allow water transit to be easily integrated in the future.

## Evaluation Of Peer Experience

There are a few examples of peer experience that appear relevant to development of an excursion ferry service in the Central City for tourist-related services.

- False Creek Ferry Company in Vancouver, BC, provides ferry service among major tourism destinations, e.g., Granville Island, Aquatic Center, Vanier Park (Maritime Museum, Vancouver Museum, H.R. Macmillan Space Center), Stamps Landing, Science World and OMNIMAX Theater, and Yaletown). Service is frequent and there are four ferry routes with over 1 million passengers per year.
- Angel Island Ferry provides access from San Francisco and Tiburon to Angel Island in the San Francisco Bay resulting in 160,000 visitors per year to Angel Island State Park. Service operates just twice a day.
- Alcatraz Island Ferry provides access from San Francisco to Alcatraz Island for over one million visitors per year. The service operates several times per day.

Portland does not have an Alcatraz Island-type destination and Angel Island is a unique attraction with only pedestrian and bicycle access once Angel Island is reached.

The False Creek Ferry system has partial comparability to Portland's situation. Portland has about 2.2 million visitors to the city annually whereas Vancouver has approximately 6 million visitors. The False Creek Ferry service links many of Vancouver's destination-quality tourist attractions. It appears likely that Portland could achieve a portion of Vancouver's excursion ferry ridership given current and emerging attractions along the river. Improved connections to the Convention Center from the water, the development of a daily public market at Ankeny Square and the emergence of waterfront neighborhoods in South Waterfront and the Pearl District could all significantly boost ridership potential for a Central City Circulator.

## Operating Entity Structure

No general public, fixed schedule passenger vessel services operate in the Portland metropolitan area today. The implementation of either the proposed Commuter or Central City Circulator services (or both) would require the designation or formation of a governing body or private sector initiative. There are a number of possibilities for developing operations and management capacity for passenger vessel service, ranging from a free market approach to complete government control. The following five scenarios provide an illustration of the range of management options:

- Privately Owned and Managed
- Privately Owned and Managed with Government Subsidies
- Government Owned and Privately Managed
- Government Owned and Managed with Contracted Crews and/or Maintenance
- Government Owned and Managed

The following sections discuss these alternatives as they relate to Commuter and Central City Circulator operations. Each model has possible alternative structures depending on existing and future industry-governmental relationships, ownership of assets, placement of managerial control, and governmental locus of regulatory oversight as a public utility.

### **Privately Owned and Managed**

The most **free market** organizational structure gives full autonomy to each ferry company to purchase, own, design, finance, and build ferries, terminals, and property; to operate and maintain these assets; and to set schedules, rates and collect fares – all with no public oversight except through governmental safety, environmental, and general business laws and regulations.

A minor exception would be the regulation of **operating rights** to certain terminals. If granted exclusively, these rights could be considered an asset from the ferry company's point of view. However, these rights can also add regulatory constraints to economic, financial, operational, mechanical, or other aspects of the ferry business that are considered to impact the public interest.

### **Privately Owned and Managed with Government Subsidies**

In this organizational model, public governmental assistance is introduced with financial support, either directly or indirectly. Direct support can be in the form of public grants for capital improvements or for operating expenditures. Capital improvements such as ferry purchases, upgrades of existing fleets, terminal construction, upgrades of existing terminals, or purchases of property for the ferry company to use would be eligible to receive public subsidies. Indirect support can be in the form of low cost leases on public facilities and services for maintenance, fuel, personnel, training, insurance, financing, and other elements at low or no cost.

The ferry company would maintain managerial control of the service with whatever constraints are imposed by the government(s) providing the subsidies and oversight. This model allows the use of government funding with limited staffing and management responsibility.

## **Government Owned and Privately Managed**

Under this model, a public entity owns the ferry service and contracts out to a private operating company for management and operation of the service. The vessels, terminals, and property would generally be owned by the government entity, but a variation would allow some facilities to be provided by the management company. These could be vessels owned or chartered by the company or the use of terminals or a maintenance facility operated by the ferry management company.

## **Government Owned and Managed with Contracted Crews and/or Maintenance**

Under this model, ferry service is owned and managed by a government entity but hires crew and/or maintenance services from an independent company. This differs from the preceding model in that the public agency maintains management responsibilities including boat and crew scheduling, ticket sales and collections, public relations, and other support functions.

## **Government Owned and Managed**

This is the purest public sector model, with the ferry operation owned, managed, and operated by a public entity that accepts total responsibility to own property; to purchase, own, design, finance, and build ferries, terminals, and maintenance facilities; to operate and maintain these assets; and to set schedules, rates and collect fares. Oversight and regulatory conditions would be either self-imposed or provided by a higher public authority. In most peer cities, ferry services are operated by a regional transit district or a municipal or state department of transportation.

The following two sections discuss the most appropriate operating models for Commuter and Central City Circulator operations:

### **A. Commuter Operations**

The economics of operating the proposed Commuter Service dictate that a public management model is likely to prevail. Since commuter operations will require significant subsidy, private companies will not be interested in operating the service as a for-profit venture. Two management models are most appropriate:

- Government owned and privately managed
- Government Owned and Managed with Contracted Crews and/or Maintenance.

Federal capital funds will be needed to acquire expensive fleet vessels and operations will require substantial subsidies, some of which will need to come from federal and state operating grants. Like most public transportation services, without public support this service is not feasible. Since private companies cannot apply directly for federal and state

operating grants or capital funds, a public agency must be the primary operating entity for Commuter Services.

At the same time, no public agency in the Portland area has experience operating water-borne passenger vessel service. The investment in staffing and resources needed for a public agency to prepare itself to fully manage and operate a passenger ferry service would be substantial. Therefore, contracting management and operations or at minimum the operation of the service to a private operator experienced in passenger vessel operations would reduce costs and provide rapid access to experienced professionals.

## **B. Central City Circulator**

Based on our assessment of finances and passenger markets, two operating entity models are appropriate for the Central City Circulator:

- Private operation (owned and managed)
- Publicly subsidized service, privately managed.

Most other peer systems of this type, such as False Creek Ferries and AquaBus in Vancouver, BC, operate as private for-profit ventures. While our analysis determined it would be unlikely that a Central City Circulator service would be profitable in the initial years of operation, there may be other ancillary ventures, such as excursion services, that could subsidize passenger operations. It will be more difficult to justify public funding, particularly from competitive operating fund sources, for a Central City Circulator that largely carries tourist and excursion passengers than for Commuter Service.

If public subsidies do become available for the operation of this service, through an improvement district or other sources, oversight of the program will likely fall under a local public agency. In this case, it is advisable that the governing agency solicit a private contractor to manage and operate the service. A private contractor is likely to be able to achieve lower operating and maintenance costs and to provide maintenance and operating facilities at a lower cost.

## **Land Use Planning and Development**

Encouraging cities to incorporate standards for dock construction and riverside land use planning activities that support land to boat connections will be critical in the realization of a Willamette River passenger service. Since almost all recommended terminal locations need a completely new dock and often new parking and landside pedestrian connections, any initiatives that encourage private developers to provide usable facilities will reduce capital costs and lower barriers to service provision. Specifically, standards that require or encourage the following will be important:

- Landside connections to dock facilities that meet requirements of the Americans with Disabilities Act, including:

- Ramp or walkway incline
- Ramp or walkway width
- Handrails
- Provision of elevator (if ramp incline does not meet ADA standards);
- Dock placement that encourages connectivity to public transportation and landside transportation options;
- Development of upland facilities that include covered waiting areas and handicapped accessible public restrooms;
- New dock facilities are built to accommodate ferryboats, meeting standards for:
  - Length
  - Moorage
  - ADA access
  - Loading
  - Materials
  - Floatation
  - Security;
- Dock placement in areas that require minimal or no dredging (water depth);
- Dock placement that limits conflicts with other vessels and adjacent uses; and
- Capital funding plans that ensure new dock facilities are not built with sources that include restrictions on commercial uses.

## Chapter 5. Summary and Conclusions

This report evaluates the feasibility of passenger ferry service on the Willamette River. The study seeks to address service demand and operational feasibility for two distinct passenger markets: (1) commuters - particularly those traveling from suburban locations bound for Portland's Central Business District and (2) circulators - visitors, excursion passengers and commuters circulating between locations in Portland's Central City. The following are general findings from the study as well as specific findings on the feasibility of Commuter and Central City Circulator services.

- Evaluated against the broader goals of the River Renaissance Initiative and the Portland Bureau of Planning, there are a number of very real qualitative benefits that a Willamette River Ferry would create for the City of Portland, including:
  - Getting residents and visitors on the river.
  - Encouraging orientation of new development to the river.
  - Enhancing visitors' experience and potentially increasing the number of annual visits to Portland's waterfront attractions and facilities.
  - Promoting sustainable economic development.
  - Promoting river and ecology education.
- Vessel types, facilities, service frequencies and other operational requirements to meet demand for the two service types are dramatically different, leaving limited opportunity for joint service operations.
- The biggest obstacle to implementation of both Commuter and Circulator service is the lack of useable docking and terminal facilities. With few exceptions these facilities would need to be newly constructed and would carry a high initial capital cost. Only the proposed Salmon Springs Fountain (Central City) terminal could be used jointly for both service types.

### **Commuter Service**

- Eighteen terminal site locations were evaluated as potential Commuter Service sites, ranging geographically from Vancouver, WA to Oregon City. Just four terminal sites were determined to have short-term potential for a commuter ferry operation. These include Oregon City, Lake Oswego, Milwaukie and a destination terminal at Salmon Springs Fountain. No service north of downtown Portland was determined to be viable at this time.
- The short-term feasibility of commuter ferry service is limited by landside constraints – parking and private land costs. Significant capital improvements in the way of dock and terminal facilities would be required at all proposed commuter ferry locations.



- Based on profiling of ferry commuters, it is determined that service would be best designed as peak direction service with six daily runs in each direction. The following are basic parameters of the proposed Commuter Service.
  - Direct or single stop service provided on two routes:
    1. Lake Oswego to Central Business District,
    2. Oregon City to Milwaukie to CBD;
  - Service runs every 30-minutes during peak hours (6:00 AM – 9:00 AM & 4:00 PM – 7:00 PM);
  - An additional two midday trips in each direction as a “safety net” for commuters;
  - Vessels designed to carry 100 passengers, which would provide 600 seat capacity over the peak period; and
  - Requires five boats plus one spare.
- Commuter Service in Oregon City, Lake Oswego and Milwaukie would rely on auto access, requiring significant investment in commuter parking facilities. In these three locations as well as at Salmon Spring Fountain, new docks, ramps and waiting terminals would need to be constructed. Total capital costs for all dock, upland and parking facilities are estimated at approximately \$24 million dollars. An additional \$1 to \$2 million dollar investment may be required to build a vessel storage and maintenance facility.
- Operational costs of a 100-passenger catamaran vessel would be approximately \$210 per service hour or \$3.4 million dollars annually for the proposed service. Given a proposed adult fare of \$4.00, just 18 to 35 percent of total operating costs would be recovered through fares. Per passenger operating subsidies for commuter ferry service will be higher than those for regional bus and rail services.
- A successful funding strategy for a commute ferry service would rely on the receipt of federal operating funds, and passenger fares, but would also likely require other non-traditional sources of local funding.
- A number of groups recognize great tourist potential from both commuter and central city circulation services. Portland Oregon Visitor Association (POVA) officials say they are willing to assist with marketing the availability of both services to potential visitors from outside the region.

## **Central City Circulator Service**

- The proposed Central City Circulator service will primarily serve tourists and local excursion passengers, although some commuters within the Central City may use the service. An analysis of market demand shows that it is unlikely that competitive regional transit funds would be allocated to support this service. Funding will need to come from a combination of fare revenue and local money generated through business contributions, grant funds and other creative funding mechanisms. In

short, the success of a Central City Circulator service will be reliant on the initiative of local champions.

- Eleven docking sites in and near downtown Portland were evaluated as potential terminals for a Central City Circulator service, spanning the river from Swan Island to Oaks Park. Six sites were selected for initial operations including the Pearl, Ankeny (weekends), Salmon, River Place, OMSI (midday and weekends only), and South Waterfront. With the exception of OMSI and Riverplace all would require new dock facilities. Conventioneers could be an important market for the Circulator service; however, the long and unprotected pedestrian connection between the Convention Center and the river preclude this as a feasible docking site.
- Two operation scenarios were examined for the Circulator, a Year-Round Commuter and Excursion Service and a Seasonal Excursion Service.
  - **Year-Round Commuter & Excursion Service:** This service would be aimed primarily at excursion passengers, but would operate longer hours and during the winter months to service Central City commuters. Service frequencies would be every 30 minutes with stops at the Pearl, Ankeny (weekends only), Salmon Springs Fountain, River Place OMSI and South Waterfront.
  - **Seasonal Excursion Service:** This service would operate between May 15<sup>th</sup> and October 15<sup>th</sup> and would run only during the peak midday hours Thursday through Sunday. Service would be available every 30 minutes on Thursday and Friday and every 15 minutes on Saturday and Sunday at Pearl, Ankeny, Salmon Springs Fountain, River Place, OMSI and South Waterfront.
- Seasonal Excursion service is much more cost effective and should be considered as an initial service offering. Although estimated patronage would not produce enough fare revenue to fully cover operating costs, it would require an operating subsidy of just \$0.34 per passenger trip or \$36,950 per year. The Year-Round service would demand an annual subsidy of over \$900,000, in the range of \$5.55 per passenger trip. These estimates do not include capital, which would impact a private operator's performance were they required to cover these costs.
- Like its peers, the service will need to be operated by a private company. Private operators can typically achieve lower operating costs than publicly run services. It is estimated that it will cost \$75.00 per hour of service<sup>1</sup> to operate a 20-30 passenger vessel with a single captain.
- There may be other important opportunities for an operator to generate additional revenue, such as private charter service, advertising revenue or the sale of vessel or terminal naming rights.
- There is an excellent opportunity to build, restore or acquire unique vessels that will attract excursion passengers and operate using environmentally friendly fuel

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<sup>1</sup> Operating costs assume that vessels are designed with rear controls so that they can be manned by one captain. If a deckhand is required by the US Coast Guard operating costs could increase significantly.

technology. The historic vessels owned by RiversWest provide an attractive option for a Seasonal service that did not run during the rainy winter months or as supplemental vessels for a larger fleet. Another excellent vessel design model for the Central City Circulator service is the boat used by AquaBus and False Creek Ferries in Vancouver, BC. These molded fiberglass boats are constructed locally, use a Volvo diesel engine, can accommodate 20 passengers, and travel at speeds of 8 to 9 knots. Seven vessels would be required to operate a Seasonal service with 15 minute peak headways, costing an estimated \$1.75 million.

- There is interest in a Circulator service from regional tourist groups and riverfront business interests, presenting opportunities for casual marketing and marketing partnerships.