ATTACHMENT A

INTERIM REPORT ON FERRY EXPANSION OPTIONS FOR MARINE DIVISION

PREPARED FOR KING COUNTY MARINE DIVISION
BY KPFF CONSULTING ENGINEERS
WITH BERK CONSULTING, INC.
JULY 1, 2015

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EXECUTIVE SUMMARY

INTRODUCTION

The purpose of this study is to assess the viability and feasibility of passenger-only ferry expansion options in Puget Sound and Lake Washington. It was developed in response to a proviso in the 2015-2016 King County adopted budget.

EVALUATION METHODOLOGY

The methodology for this assessment builds upon work completed to date, with a focus on analyzing implementation of regular, year-round, commuter-based King County Water Taxi (KCWT) service at start-up and route maturity. The analysis is based on a three-step evaluation method.

The first step of the analysis identified 36 potential route combinations for analysis. The second step was to evaluate route time competitiveness to other transit options, with the third step to analyze operational cost and potential revenue generation at a start-up condition (2015), as well as a mature route condition (2025). A thorough ridership analysis was completed to inform revenue projections for each route. Operational costs were estimated using actual operating costs. Existing fare policy guidelines and standard county escalation factors were used to project mature route service costs and revenues.

SERVICE ASSUMPTIONS AND CHARACTERISTICS

The service level assumed for these expansion routes is similar to the existing Vashon Island route, which focuses on the AM and PM peak commuter hour ridership with no midday, extended evening or weekend service.

One important assumption in this report is the need for high speed vessels (35 knots[1]), necessary for the routes to be time competitive with other transit options. Vessel type is expected to be a 150-passenger (or less) vessel that is capable of meeting the speed requirements of each route, being highly maneuverable, and based on the ridership levels projected as part of this analysis in start-up and mature route conditions.

ROUTE EVALUATION

The route evaluation is comprised of two primary evaluation criteria leading to a recommendation of potential water taxi expansion routes. These criteria include overall time competitiveness (as compared to the other modes of travel) and net operating cost/required operating subsidy, which is determined by forecasting ridership and estimating fare revenue and then comparing projected fare revenue to operational costs, calculated as farebox recovery for each route.

Time Competitiveness

The time competitiveness was evaluated against the alternative transit mode commute times. Any route with a round-trip travel time differential of 40 minutes or less was considered time competitive and moved on to the next step in the analysis.

Generally, the water taxi is a longer trip than the competing modes of travel studied in this report (bus, light rail, and personal vehicles). The study identified that personal vehicle travel is generally faster than the water taxi but significantly more expensive with fuel costs, vehicle wear and tear, tolls and parking in downtown Seattle, which can range from $10 to $30 a day. Transit and personal vehicle travel times also experience more variability as they are subject to congestion on the road and highway networks.

The time competitiveness evaluation resulted in 11 of the 36 routes maintaining the 40 minutes or less total round-trip time differential. Those 11 routes were narrowed to seven as the University of Washington-Waterfront Activity Center (UW WAC) was identified as the west Lake Washington hub due to its location, destination draw and ability of passengers to make connections to other modes (Link light rail, bus, and regional trails).

[1] A knot is a unit of speed equivalent to one nautical mile per hour (or 1.15 miles per hour), used especially of ships, aircraft, and winds.

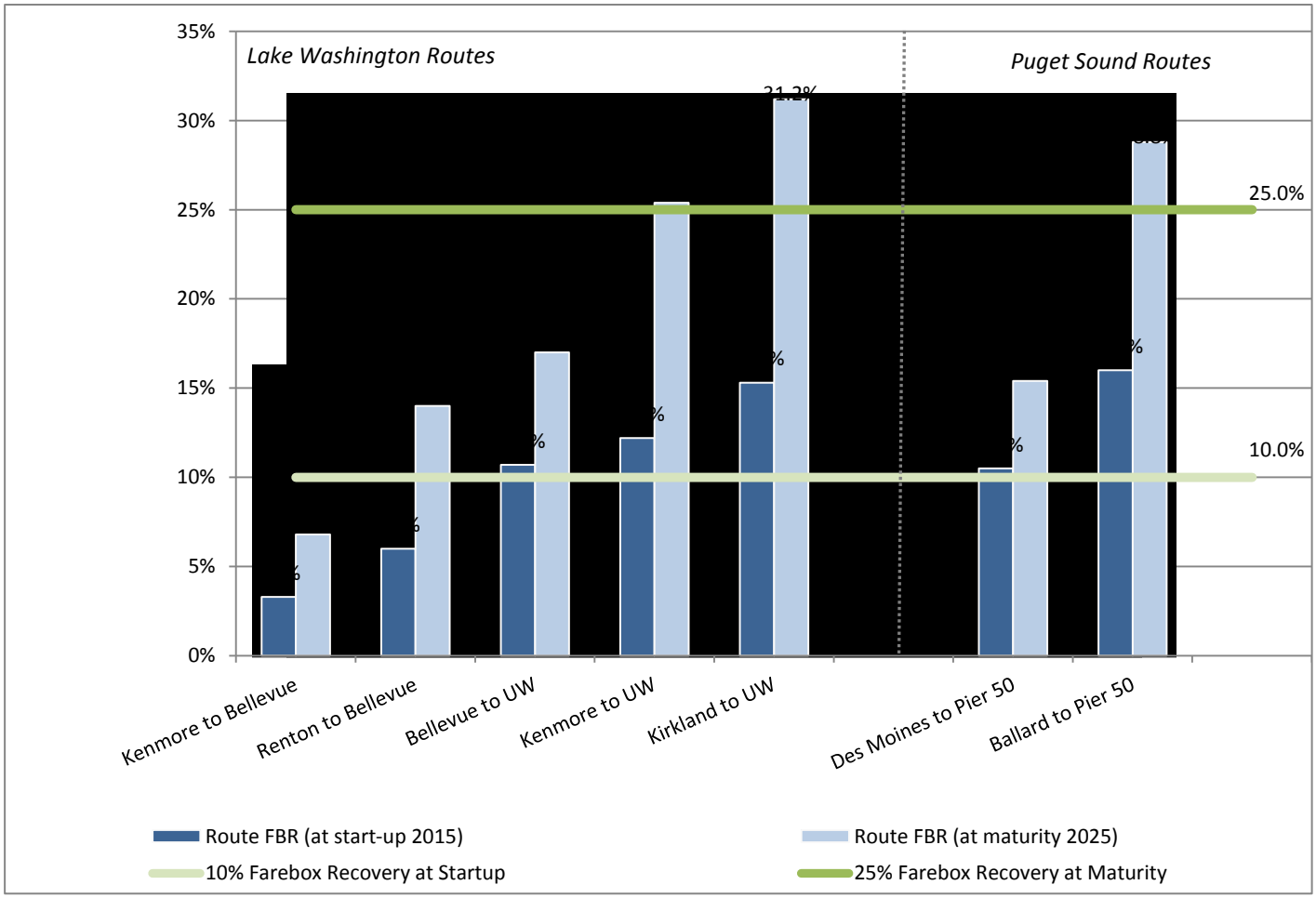
Cost of Operation

The next step in the analysis was to look at the net cost of operating each new route. Each route was measured at a start-up condition (2015) and a mature condition (2025).

Generally, each new proposed route has a similar operating cost, with the exception of fuel and shuttle costs, which vary by route.

When the data was compiled, natural breaks in the data were apparent in the 2015 farebox recovery rates and two routes had farebox recovery rates lower than 10 percent – and were eliminated from further analysis. For a mature route condition in 2025, a farebox recovery rate of 25 percent (established in King County policy) was used as the evaluation criteria. Three of the remaining routes met this criterion and are proposed for further consideration. Refer to Figure EX-1.

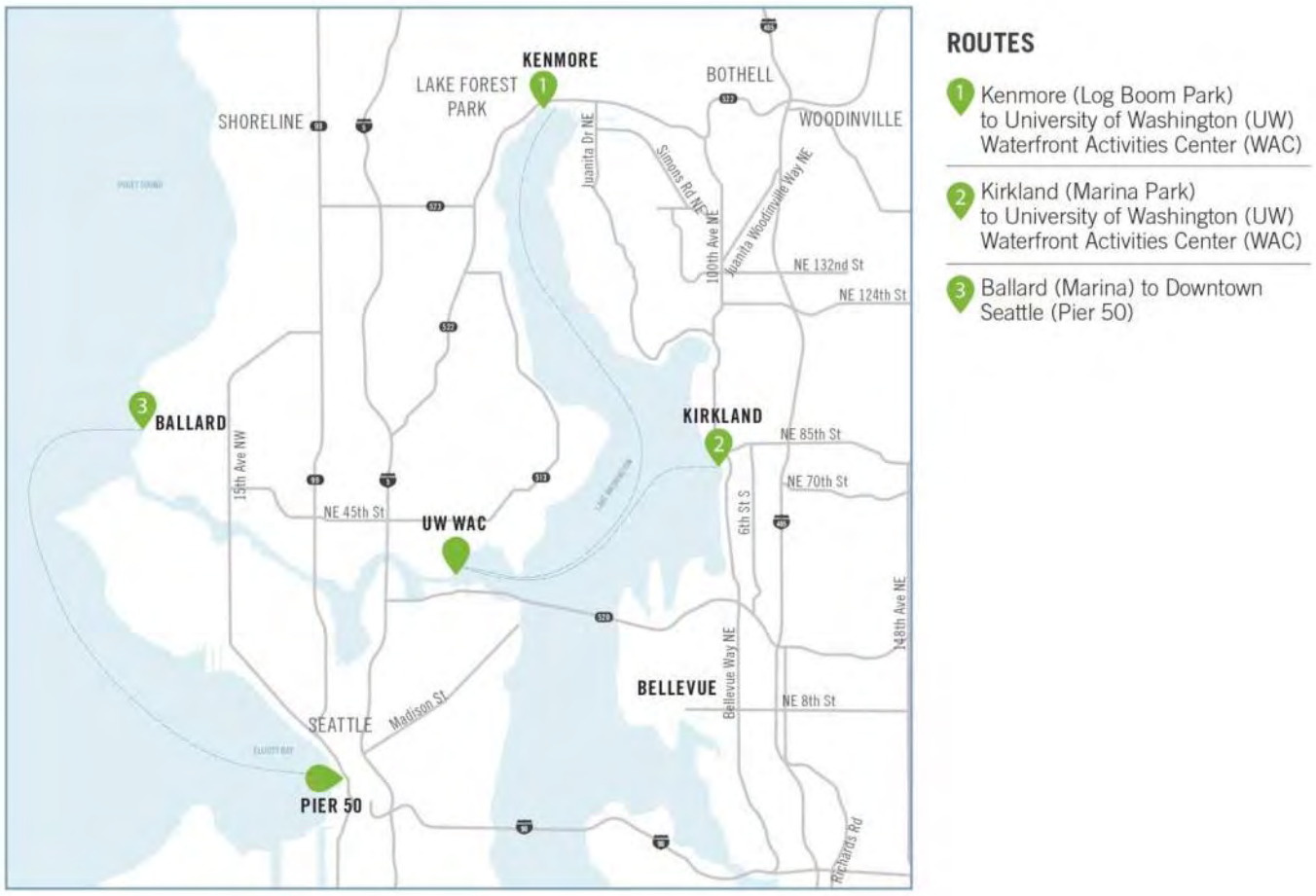
Figure EX-1: Farebox Recovery Projections by Route



The three routes which met the evaluation criteria and are proposed for further consideration include the following (please refer to Figure EX-2):

- Kenmore to University of Washington (Waterfront Activity Center)
- Kirkland to University of Washington (Waterfront Activity Center)
- Ballard to Downtown Seattle (Pier 50)

Figure EX-2: Routes Proposed for Further Consideration



IMPLEMENTATION REQUIREMENTS

Implementation requirements include the capital improvements needed to launch and maintain service, which include vessel and terminal infrastructure. The UW WAC terminal would require the most improvements, including a new in-water facility and upland improvements. All other terminals, including Kenmore, Kirkland, Ballard and Downtown Seattle (Pier 50) would require minimal in-water improvements as current infrastructure is in place.

AGENCY COORDINATION

Communication with potential terminal location jurisdictions and transportation planning agencies has occurred throughout this work to inform agencies on the purpose and evaluation process of this report, and most importantly to understand key issues or obstacles that are present or perceived. Planning to implement a new water taxi route would require substantial additional coordination to develop interagency agreements to address operational needs or other obstacles identified.

EQUITY AND SOCIAL JUSTICE (ESJ)

The interim report has defined an approach using a three-step evaluation method. Preliminary evaluation of data identifying ESJ populations in proximity to the routes studied indicates that existing and proposed transit alternatives are more convenient (time competitive) and have lower fares than water taxi service.

NEXT STEPS

The initial next step is to develop the final report due to King County Council by September 30, 2015, based on feedback and discussions about the results of the interim report. If an expansion route moves forward with planning for implementation, the environmental permitting process would be required, which includes additional public and agency coordination. The permitting approach for the improvements associated with each route would require a significant investment of time and money.

INTRODUCTION/BACKGROUND

INTRODUCTION

The purpose of this study is to assess the viability and feasibility of passenger-only ferry expansion options in Puget Sound and Lake Washington. It was developed in response to a proviso in the 2015-2016 King County adopted budget that stated, in part:

Of this appropriation, $150,000 shall not be expended or encumbered until the executive transmits both an interim and a final report on ferry expansion options and motions that approve the reports and the motions are passed by the council. The motions shall reference the subject matter, the proviso's ordinance, section and proviso number in both the title and body of the motion.

The reports shall include, but not be limited to, an assessment of passenger only ferry expansion options, consistent with the ferry district's strategic plan, that builds on new transit options that are projected to be delivered through Sound Transit's University Link and other funded regional transit expansions being delivered in the next decade.

This assessment should include assessments of facilities, service options and cost estimates for both capital and operations and community interest and readiness. The interim report shall summarize the work and results to date.[2]

BACKGROUND

In 1994, King County began operating demonstration Water Taxi service to West Seattle during the summer season (April-October). The King County Ferry District (KCFD) was formed in 2007 under authority granted by the Washington State Legislature in 2006.[3] In 2008, the KCFD contracted with the King County Department of Transportation's newly created Marine Division to operate service on the West Seattle and Vashon Island passenger-only ferry routes. Service on both routes has been operating year-round since 2010.

The State approved business plan for the KCFD included provision of passenger-only ferry service with growth over time. In mid-2009, an addendum to the interlocal agreement between the KCFD and King County Marine Division (KCMD) was adopted and authorized the KCMD to study 20 demonstration passenger-ferry routes and to plan for the rollout of five routes to be approved by the KCFD. Routes on Puget Sound and Lake Washington were analyzed with a focus on short-term, seasonal service requiring relatively little capital investment. The evaluation reviewed route options, estimated ridership, assessed infrastructure needs and community readiness/willingness to participate. In late 2009, in response to the economic recession, the KCFD directed the demonstration route study to be tabled and reduced the property tax levy beginning in 2010.

In spring 2014, the state passed legislation[4] authorizing the County to adopt an ordinance to assume the "rights, powers, functions, and obligations" of the KCFD. The King County Council, in a move to increase efficiency in the administration of Water Taxi service for the county, assumed the "rights, powers, functions, and obligations" of the KCFD[5] effective January 1, 2015.

In their new oversight role, the Council directed the KCMD to revisit the 2009 study and expand the analysis to incorporate potential new long-term, passenger-only route expansion opportunities, as outlined in the King County Ferry District Strategic Plan.

[2] King County Ordinance 17941 Section 94, P1
[3] Engrossed Senate Substitute Bill 6787
[4] Substitute Senate Bill 6216
[5] King County Ordinance 17935

King County Ferry District Strategic Plan Excerpt:

*"**Determine feasible routes for expansion of passenger-only service within King County.** The Demonstration Route Study from 2009 identified several potential new routes for expansion. However, the study needs to be updated and refined given changes in the regional economy and new factors. For example, the opening of the University of Washington light-rail connection starting in 2016 may make north Lake Washington routes, such as Kenmore to the University or Kirkland to the University more feasible. The route study should be updated prior to long-term funding decisions in order for any potential new routes or service to be considered as part of the District's future financial needs."*

The focus of this study is to:

- Summarize and build upon work completed to date;
- Analyze the impact of new transit options projected to be delivered in the region in the next decade (Sound Transit light rail, highway modifications, tolling, etc.); and
- Assess facilities, service options and cost estimates for both capital and operations along with community interest and readiness.

The approach for this study is outlined below, which builds upon work completed to date and, analyzes implementation of regular, year-round, commuter-based King County Water Taxi (KCWT) service at start-up and route maturity.

EVALUATION METHODOLOGY

The methodology to conduct the evaluation was based on a three-step evaluation analysis. Each step in the process served to gather and/or evaluate and eliminate potential expansion routes. Figure 1 graphically depicts the general project approach.

First step: Identify potential routes (36). This was done by drawing from past work along with input from water-side cities/communities possibly served by new service. Data was gathered from the existing and expected future local and regional transit systems to understand where transit connections would be best-suited for ferry service.

Second step: Evaluate route time competitiveness of future water taxi routes as compared to other modes of transportation (bus, express bus, light rail and personal vehicles).

Third step: Analyze ridership and farebox recovery. Those routes which had the highest benefit were then analyzed for ridership potential in a start-up and mature service condition. The ridership data was used to estimate potential revenue, which when compared to projected operating costs led to the calculation of farebox recovery. Farebox recovery (FBR) was the final evaluation criteria. Routes were examined based on a start-up and mature route FBR.

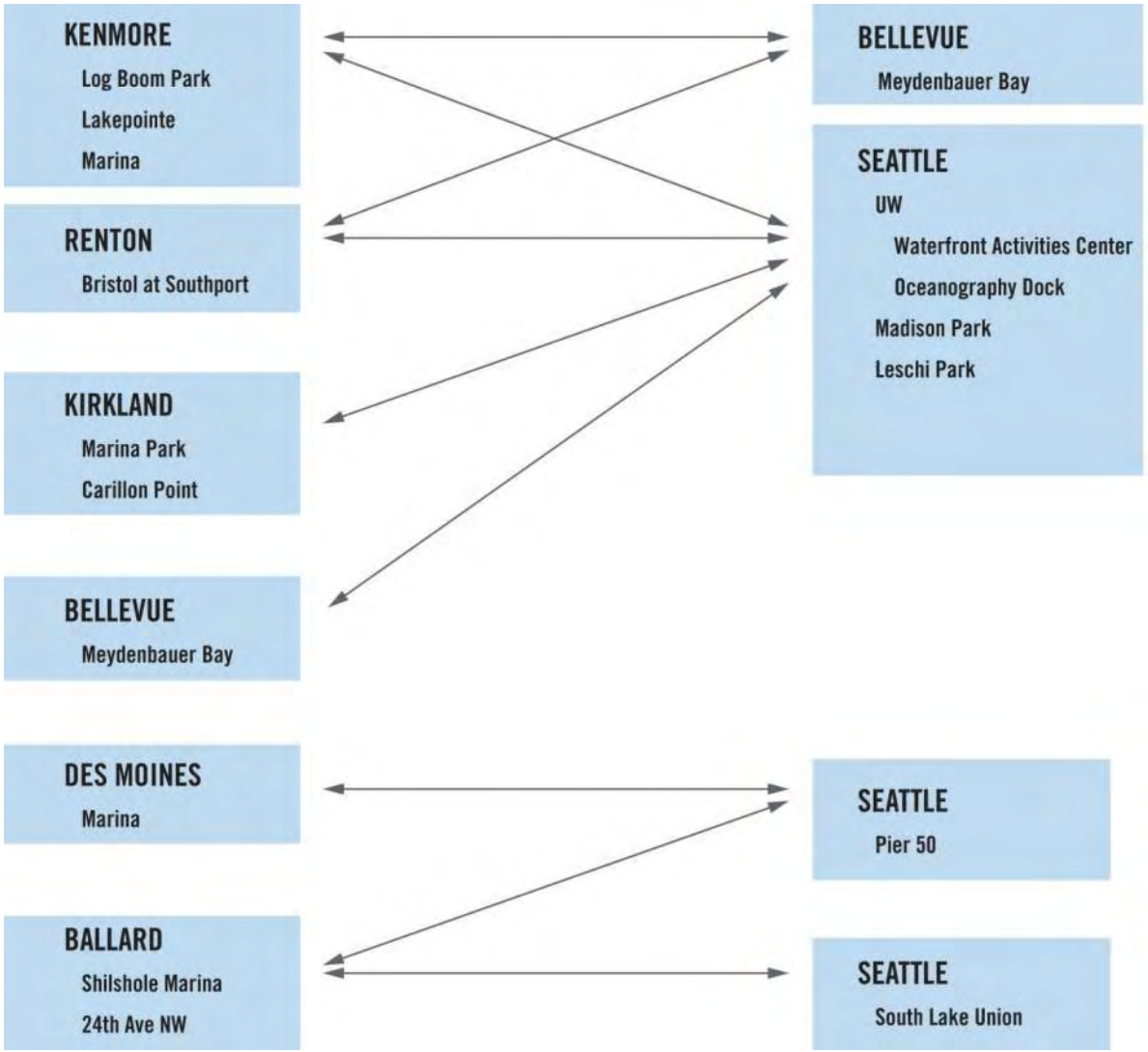
Figure 1: Evaluation Methodology Diagram

ROUTES IDENTIFIED FOR CONSIDERATION

FOCUS: Build upon work-to-date and identify routes to be considered in analysis.

Potential terminal locations were identified by the project team, building upon past work, updating for current conditions and input from waterfront cities/communities. The project team reached out to those cities/communities identified, as well as other known interested parties, to provide an opportunity to participate in identifying routes and provide feedback on potential terminals. Figure 2 lists the terminals identified for further analysis and consideration, which include 36 potential route combinations.

Figure 2: Terminal Locations Considered

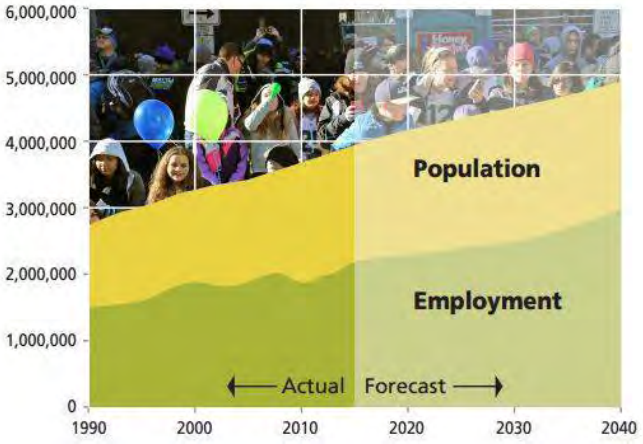


REGIONAL TRANSPORTATION IMPROVEMENTS

FOCUS: Analyzes the impact of new transit options projected to be delivered in the region in the next decade (Sound Transit light rail, new highways, tolling, etc.)

The Central Puget Sound region and King County is rapidly growing in both population and employment. This growth will put additional travel demands on the existing transportation system which is already experiencing high levels of congestion during the AM and PM peak periods. The KCWT is one mode of public transportation, integrated with the public transit network, working to relieve congestion pressure within the region and provide alternatives for commuters. Figure 3 illustrates the linear climb in population and employment projected over the next 25 years, which will have an impact on transportation systems in the region.

Figure 3: Expected Growth in Employment and Population



Source: "Status Report on the Region's Transportation System and Plans to Improve it," Puget Sound Regional Council, April 2015.

Cities, counties, state, local, regional transit agencies, and the Puget Sound Regional Council (PSRC) have been and will continue to collaborate on the long range transportation vision for our region. Currently, King County Metro, Sound Transit, Washington State Department of Transportation and the City of Seattle are in the process of studying, developing and updating their long range plans scheduled for completion over the next several years.

During the 2015 Legislative session, Sound Transit and Kitsap Transit were given new local options to seek additional funding. Sound Transit was authorized to seek voter approval for additional funding that would enable a Sound Transit 3 (ST3) program of improvements; ST3 is expected to be on the November 2016 ballot. Sound Transit is currently working with the community, transit agencies and other stakeholders to develop the package of improvements to be included in the ST3 proposal. Kitsap Transit was given the authority to form a new Passenger Only Ferry Service District inside their boundaries.

Transportation Activities between 2009 and Current Study

Since the previous study of demonstration routes completed in 2009, there have been multiple changes to the region's transportation system that will have influence on the viability of new water taxi routes. These changes include:

- Implementation of Bus Rapid Transit by King County Metro (six RapidRide lines) and Community Transit (SWIFT).
- The Great Recession which led to reduction in Sales Tax revenues and service cuts by transit agencies throughout the Puget Sound region. Since the end of the Great Recession, the economy has slowly started to recover, and higher sales tax revenues have enabled the restoration of some of the service hours cut.
- Approval by voters in the City of Seattle in the spring of 2015 to increase transit service within the City by about approximately10 percent.

Additionally, the state (WSDOT) began construction on the I-90 High Occupancy Vehicle (HOV) lane improvements and the SR 99 viaduct replacement projects. WSDOT also implemented the SR 167 High Occupancy Toll (HOT) lanes in 2008, on SR 520 in 2011, and will begin operations of HOT lanes on I-405 in the fall of 2015.

Transportation Improvements within the 10-year Planning Horizon

The following list includes current and potential transportation projects in the 10-year planning horizon that may have an impact on potential water taxi routes outlined in the previous section. These include Lake Washington routes and routes on Puget Sound from Ballard and Des Moines. Figure 4 on page 6 identifies the improvement projects along with the potential water taxi routes.

Regional Transportation Projects in Design/Construction (funded):
(Dates in parentheses are expected completion dates)

- University Link Extension (2016)
- South 200th Link Extension (2016)
- East Link Extension (2023)
- Federal Way Link Extension (2023)
- Northgate Link Extension (2021)
- SR 520 widening and bridge replacement between Seattle and Eastside (2017)
- I-90 two-way HOV project between Bellevue and Seattle (2017)
- I-405 widening and HOT lanes from Bellevue to Lynwood (2015)
- SR 99 Viaduct Replacement (2017)

The following list is meant to provide a broader context of other regional planning efforts that are being worked on as part of the ST3 funding package. However, these projects are currently unfunded and would not be completed until well after the 10 year planning horizon (2025).

Potential ST3 Projects (currently unfunded):

- Light rail extension from Downtown to Ballard
- Light rail or high capacity transit (HCT) from Downtown Seattle to West Seattle/Burien
- Light rail extension from Burien to Lynnwood
- HCT corridor from Downtown along Madison Street
- HCT corridor from SR 522 to SR 520
- Regional Express bus along 145th Street to SR 522
- Regional Express bus corridor from Woodinville to Bellevue

The list of funded regional transportation improvement projects provided a perspective from which to view and analyze the opportunities and challenges of future water taxi routes, in both route time competitiveness and ridership demand. This analysis will be discussed in more detail in the following section, Route Evaluation.

Given this inventory of regional transportation improvements, some general findings regarding connectivity and competitiveness of potential terminal locations are as follows:

Well served by existing or new HCT:

- City of Bellevue (bus and light rail)
- City of Renton (express bus)
- City of Kirkland (bus)
- UW Waterfront Activity Center (bus and light rail)
- South Lake Union (street car, bus)
- Ballard/24th Street (express bus)
- Des Moines area (light rail — in 2016)

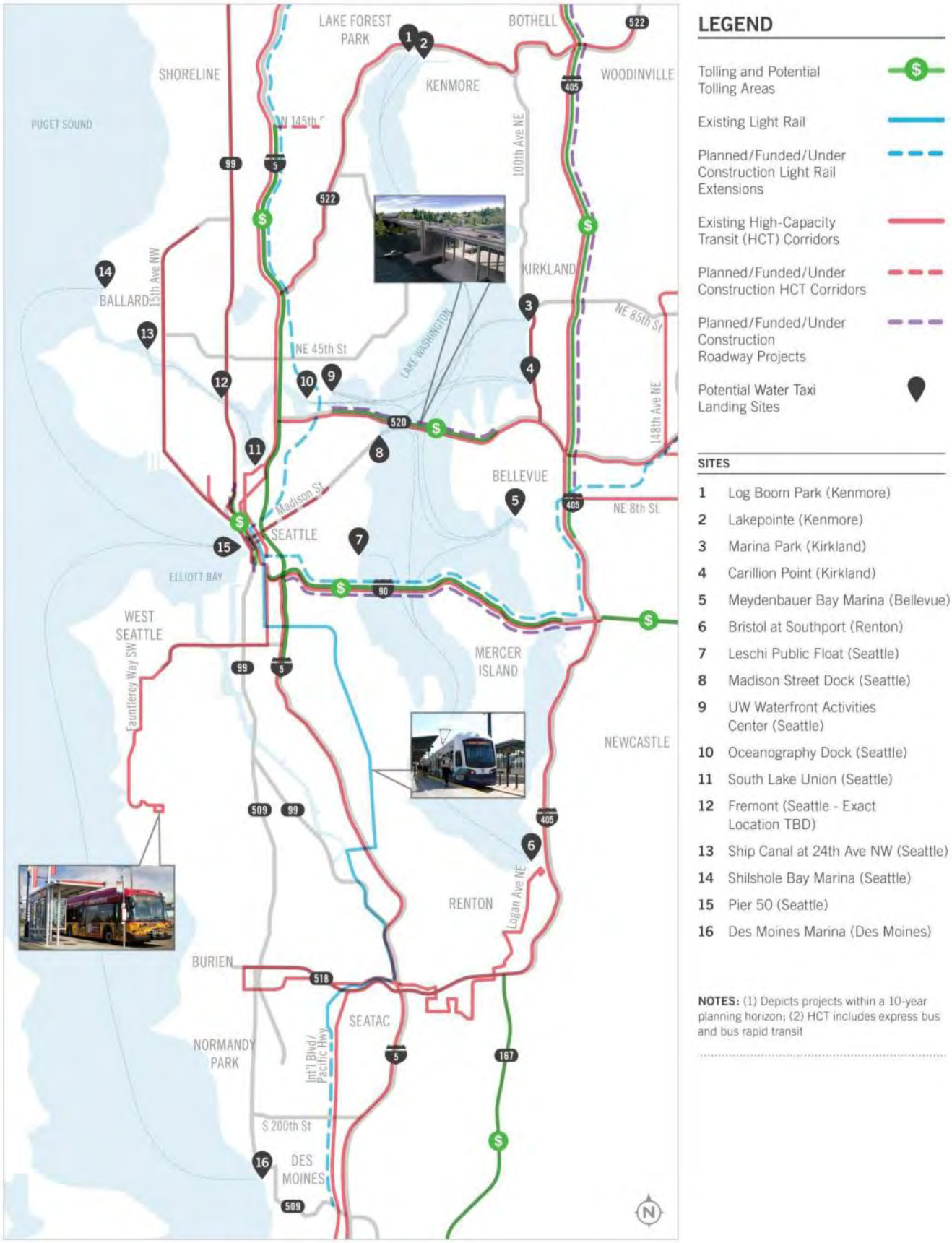
Limited modal connections and/or HCT:

- City of Kenmore
- Leschi Park (circuitous transit route due to geography)
- Madison Park (limited down to water, new HCT connections proposed at Madison and 23rd Avenue).
- UW Oceanography Dock (indirect connections to HCT and Link light rail options for water taxi users to reach Downtown Seattle.)
- Ballard – Shilshole Marina (marina disconnected from HTC and bus service)
- Des Moines Marina (Link light rail options are widely available for Des Moines commuters; however the Marina is somewhat isolated with limited connections.)

Figure 4 on page 6 provides an overview of improvement projects within the 10-year planning horizon, along with the locations of potential water taxi routes.

For the complete analysis of existing current and long-range transportation planning and improvement efforts within King County, please refer to Appendix A.

Figure 4: Regional Transportation Improvements Map



ROUTE EVALUATION

FOCUS: Analyze how new water taxi routes compare to other modes, how many will use the service and how much will it cost to operate. Assess service options and operating costs.

The route evaluation is comprised of two major criteria, which leads to a final recommendation of potential routes to pursue as expanded water taxi service. These criteria include overall time competitiveness (as compared to other modes of travel) and cost of operation, which is determined through the identification of projected revenue and operational costs.

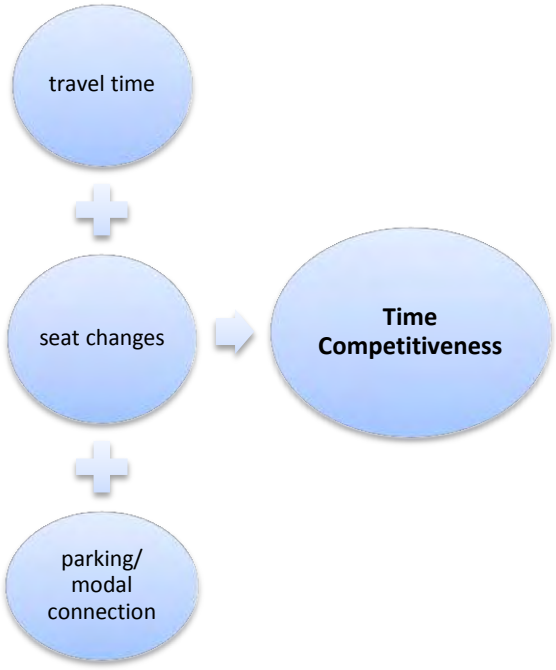
ROUTE TIME COMPETITIVENESS

Many factors contribute to the transportation mode choice of commuters, with some of the most important being total commute time, connections to other modes, predictability of travel, and cost.

Approach

What contributes to one site being more competitive than another are factors such as: surrounding land uses, pedestrian accessibility, multi-modal connectivity, parking availability and cost. Time competitiveness can be summarized by evaluating: travel time, parking availability/modal connections, and convenience of travel (ie. amount of transfers to another mode). Figure 5 depicts the relationship of these three elements, all contributing to the time competitiveness of a route.

Figure 5: Route Time Competitiveness Components



Current commute times, miles traveled during commutes, and seat changes were calculated using King County Metro and Google Map data. For comparison purposes, water taxi routes were based on a 35 knot[6] vessel cruising speed. An inventory of the King County Metro Park and Rides within the vicinity of the potential terminal location was determined and time competitiveness was calculated from this location. Fares were based on the 2015 KCWT ORCA[7] fare of $4.75 and the seat changes were assumed to begin once the commuter arrived at the nearest park and ride. Onsite parking was assumed at Lakepointe in Kenmore, Shilshole Marina in Ballard, Southport in Renton, and at the City of Des Moines Marina.

Land use compatibility was determined by reviewing local jurisdiction planning documents, such as local zoning, shoreline and comprehensive plan designations to see if the use was allowable. The full list of assumptions and backup data can be found in Appendix B.

Once the data was gathered, time competitiveness and commute trip cost was compared to transit (light rail, bus or a combination) and personal vehicle commute times.

Evaluation Criteria

Route time competitiveness was evaluated against transit commute times. While estimated travel times for personal vehicle commutes were gathered, this data was not used as an evaluation criterion. Any route with a round-trip travel time differential of 40 minutes or less was considered time competitive. A 40 minute round-trip time differential was chosen due the enhanced experience of riding a water taxi, a guaranteed seat, on-board restrooms, and great scenic views.

[6] A knot is a unit of speed equivalent to one nautical mile per hour, used especially of ships, aircraft, and winds.
[7] The ORCA card is a contactless, stored value smart card used for payment of public transport fares in the Puget Sound.

Findings

Findings of the route time competitiveness analysis can be classified into four major areas:

- Time competitiveness
- Cost competitiveness
- Parking
- Land use compatibility

Generally, the water taxi is a longer trip than the competing modes of travel studied in this report. Personal vehicle travel is generally faster but significantly more expensive with fuel costs, vehicle wear and tear, tolls and parking in downtown Seattle that can range from $10 to $30 a day. Transit and vehicle travel times also experience more variability as they are subject to congestion on the road and highway networks.

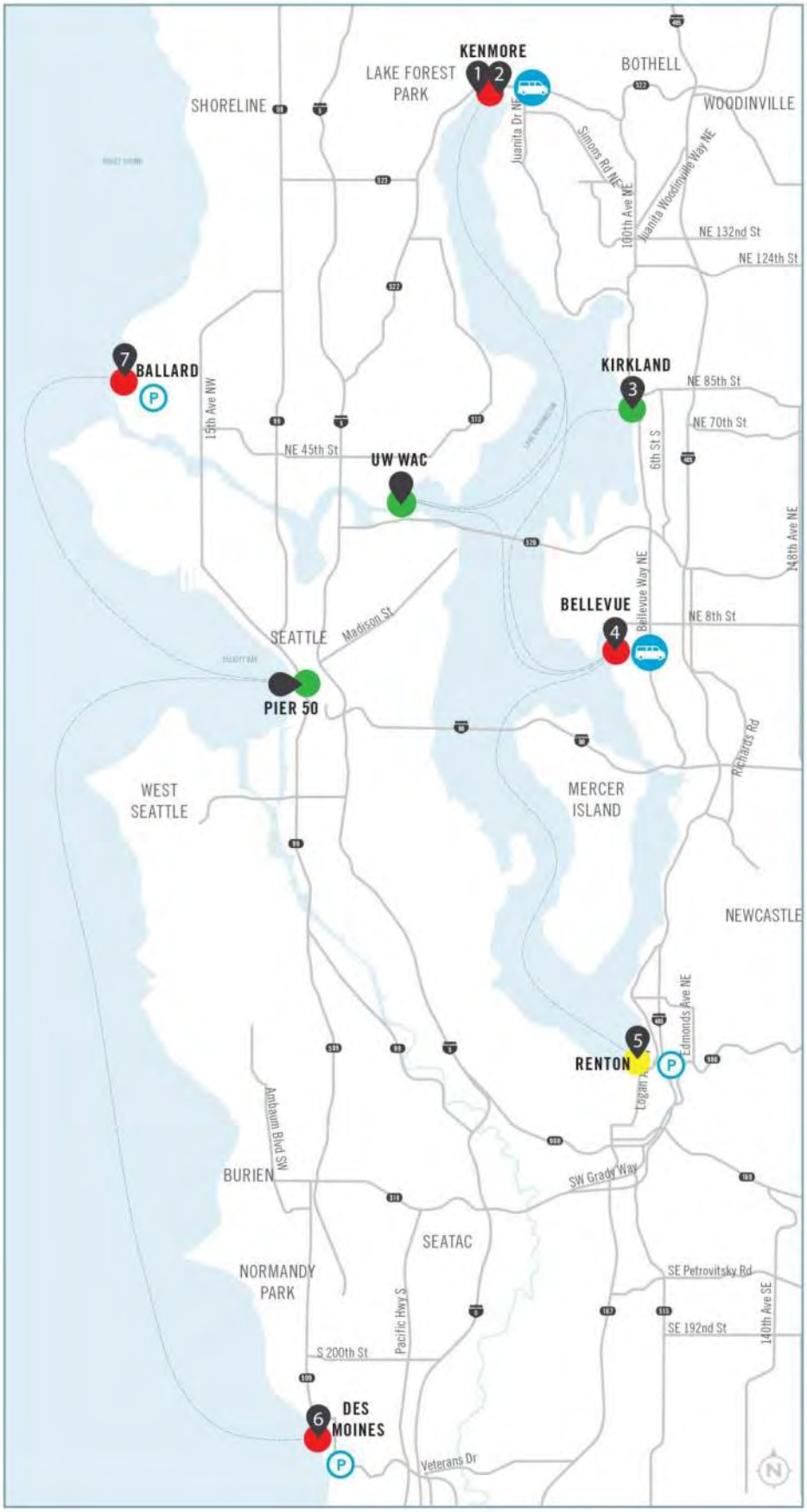
The time competitiveness evaluation resulted in 11 routes maintaining the 40 minutes or less total round-trip time differential. Those 11 routes were narrowed to seven as the University of Washington Waterfront Activity Center was identified as the west Lake Washington hub due to location, destination draw and ability of passengers to make connections to other modes (Link light rail, bus, and regional trails).

Table 1 below and Figure 6, on the following page, identify the seven routes that met the route time competitiveness criteria.

Table 1: Route Time Competitiveness Factors and Evaluation

Route	KCWT/Transit RT Time Differential (min)	KCWT/ Personal Vehicle RT Time Differential (min)	Transit/Pedestrian Connections	Parking Availability & Shuttle Requirements
Kenmore (Log Boom Park) to UW WAC	26 min	23 min	• Good connections at UW WAC • Moderate connections at Kenmore	Shuttle Required at Kenmore
Kenmore (Log Boom Park) to Bellevue	16 min	25 min	• Poor connections at Kenmore • Poor connections at Bellevue	Shuttle Required at both Kenmore and Bellevue
Kirkland (Marina) to UW WAC	21 min	50 min	• Good connections at Kirkland • Good connections at UW WAC	No Shuttle Required
Bellevue to UW WAC	38 min	56 min	• Good connections at UW WAC • Poor connections at Bellevue	Shuttle Required at Bellevue
Renton to Bellevue	13 min	12 min	• Moderate connections at Renton • Poor connections at Bellevue	Shuttle Required at Bellevue
Des Moines to Downtown Seattle (Pier 50)	39 min	30 min	• Poor connections at Des Moines Marina • Good connections at Downtown Seattle (Pier 50)	Parking Assumed at Des Moines Marina
Ballard to Downtown Seattle (Pier 50)	29 min	34 min	• Poor connections at Ballard • Good connections at Downtown Seattle (Pier 50)	Parking Assumed at Ballard (Shilshole Bay Marina)

Figure 6: Summary of Findings for Routes for Further Analysis



LEGEND

- Potential Landing Sites
- Parking at Terminal Assumed
- Shuttle to Serve Terminal Assumed
- Good Pedestrian/transit Connections
- Moderate Pedestrian/transit Connections
- Poor Pedestrian/transit Connections

Routes	Round-trip Time Differential*
1 Kenmore (Log Boom Park) to UW WAC	+26
2 Kenmore (Log Boom Park) to Bellevue Marina	+16
3 Kirkland (Marina Park) to UW WAC	+21
4 Bellevue (Marina) to UW WAC	+38
5 Renton to Bellevue (Marina)	+13
6 Des Moines (Marina) to Pier 50	+39
7 Ballard (Marina) to Pier 50	+29

* Total Round-trip Time Differential Between Water Taxi Route and Transit

Note: While a dedicated Shuttle was not assumed at UW WAC, there may be opportunities to partner with the UW to provide enhanced circulation and access to the Water Taxi Terminal

NET OPERATING COSTS

The next part of the route evaluation was to project the net operating cost for each expansion route. Each route was measured at a start-up condition (2015) and a mature condition (2025).

In order to analyze the cost of operating an additional water taxi route, cost of operation and potential revenue were calculated. These operation and revenue figures were based on a new service scenario much like that of the existing Vashon Island Water Taxi service. This is focused on providing service during the AM and PM commute periods on weekdays only. The potential service would provide three AM peak round-trips and three PM peak round-trips. Any new route would operate at a higher cruising speed (35 knots) than the existing Vashon route, which is necessary to maintain route time competitiveness.

Operating Costs

Operating costs were calculated for a route start-up condition using 2014 Marine Division actual costs, as well as a mature condition, which used standard County escalation factors for a 10-year planning horizon.

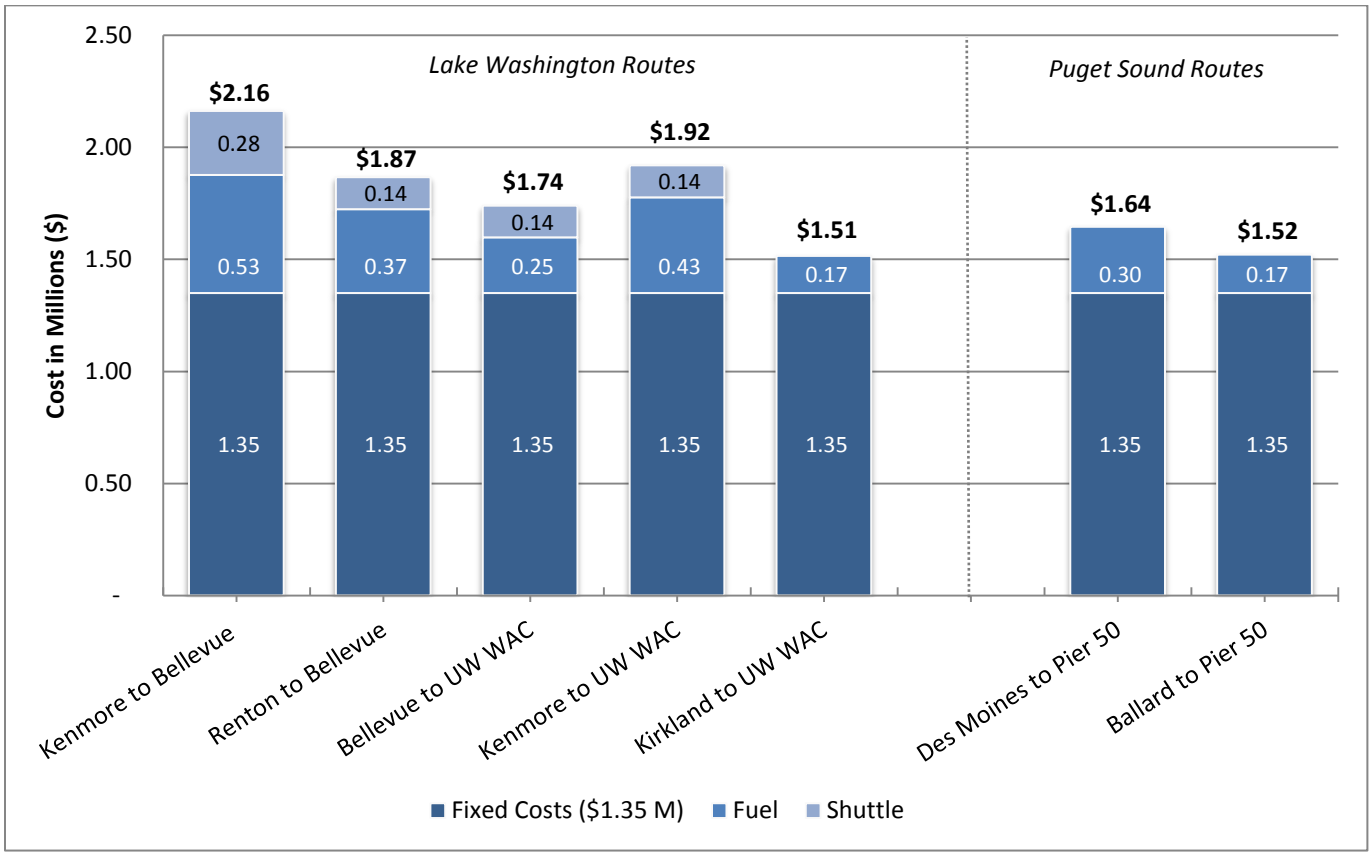
Operating expenses include route specific costs, such as crew labor, fuel, and shuttle costs, as well as a portion of the division's shared costs, which include maintenance, shoreside and terminal costs, management and support and county central rate costs. The operating costs do not include vessel lease costs for a new route because it is unknown whether a vessel would be leased or purchased to meet the needs of the route. This is further explained in the Implementation Requirements section under Vessel Requirements.

The cost estimates for a new route use the Vashon route as a model for maintenance and labor costs due to its being a year-round commuter service. Fuel costs are calculated based on specific route length and estimated fuel consumption rates and shuttle costs are estimated based on existing shuttle service in West Seattle. The shared costs are apportioned based on the operating hours of each route.

It is assumed that adding a third route to the system would not increase the management and administrative shared costs. This assumption would need to be validated once a route was determined and the specific needs of the route were identified. Any expansion greater than three routes would require the addition of maintenance and administrative shared costs.

Each new proposed route shares a similar operating cost, with the exception of fuel and shuttle costs, which vary by route. The operating costs for each potential route are shown in Figure 7. This figure illustrates the differences in the variable costs of fuel and shuttle along with the fixed costs associated with a new route, which includes all shared expenses and the crew labor.

Figure 7: Operating Costs per Route



Note: Fixed costs outlined above include: labor, maintenance and management/administrative costs.

Revenue

Start-up service year (2015) route revenue was calculated by multiplying the current ORCA fare by projected ridership. A fare realization factor of 86% was applied to the calculated route revenue to account for the actual apportioned revenues received, reduced fares and non-paying customers. The 2025 revenues were determined by multiplying projected ridership by the 2025 fares (which were escalated from 2015 using existing fare policy guidelines). The fare realization factor was also applied to the 2025 calculated fare revenue.

Assumed fares included: $4.75 for the start-up condition (the 2014/2015 ORCA fare for the Vashon route), as well as a projected ORCA fare of $7.25 (assuming a $0.50 increase every other year) for route maturity in 2025.

Ridership demand was calculated by reviewing commute characteristics of populations within the vicinity of the potential water taxi landing sites. Along with population information, ridership forecasts were developed by reviewing existing and future planned public transit options, route time competitiveness, travel demand models from PSRC, and past West Seattle Water Taxi commute ridership[8] growth patterns. Physical barriers to access were also considered, including traffic congestion, parking availability and accessibility for pedestrians and cyclists. The ridership demand model assumed a higher capture rate, or ridership growth in its first 10 years of service, with capture rates leveling off in the 2025 mature service condition. This was based on the experience in West Seattle, where ridership has grown over the years as people change their mode of travel due to service reliability, awareness and satisfaction.

[8] West Seattle was used as a baseline for ridership projections due to the geographic similarities of potential service expansion routes, with alternative modes of transportation competing for commuter ridership. The Vashon route, while similar in service schedule, requires ferry travel to get off the island and therefore, is not as representative as West Seattle.

Ridership demand was fairly consistent across the board for 2015 ridership. It is in the growth, or lack thereof, from 2015 to 2025 that sets some routes apart. This is mostly due to the transit improvements and enhanced options commuters have with light rail coming to Des Moines and Bellevue. Additionally, the access barriers in Bellevue, such as steep grades, distance from the employment center and disconnection from other transit modes hinder strong ridership growth, especially when there are more accessible commuter options. Table 2 below illustrates one-way trips by route in a start-up condition (2015) and in a mature service condition (2025).

Table 2: Projected Ridership in 2015 and 2025

Route	2015 Annual Ridership	2025 Annual Ridership
Kenmore to UW WAC	57,148	119,210
Kirkland to UW WAC	56,666	115,625
Ballard to Downtown Seattle (Pier 50)	59,433	107,175
Bellevue to UW WAC	45,579	72,357
Des Moines to Downtown Seattle (Pier 50)	42,473	61,998
Renton to Bellevue	27,433	56,986
Kenmore to Bellevue	17,640	31,347

Farebox Recovery Calculation

Farebox recovery is the percentage of operating expenses that are covered by passenger fares. It is calculated by dividing total fare revenue by total operating expenses. Those operating costs not covered by farebox revenues must be subsidized with tax revenues.

Projected route revenues and operating costs were used to calculate farebox recovery for each route individually and were then aggregated with KCWT existing routes to obtain a system-wide farebox recovery rate.

When the data was compiled, natural breaks were apparent in the 2015 farebox recovery rates resulting in two routes with farebox recovery rates lower than 10 percent. Those routes were eliminated from further analysis. For the mature service condition (2025), the farebox recovery rate target of 25 percent is projected to be achieved by three of the routes remaining from the initial screening processes. It is these three routes which are proposed for further consideration.

As part of the analysis, system-wide farebox recovery was also calculated to include a three-route system. This would include the existing West Seattle and Vashon Island routes along with one new route. Using this calculation all routes met or exceeded a system-wide farebox recovery of 25 percent upon route maturity in 2025. The complete ridership analysis and backup data for operational costs and farebox recovery can be found in Appendix C.

Figure 8 on the following page illustrates the farebox recovery calculation by route at start-up (2015) and route maturity (2025).

FINDINGS/ROUTES CONSIDERED FOR FURTHER EVALUATION

Based on the methodology outlined above, three routes met the evaluation criteria of route time competitiveness and farebox recovery. The difference between the three routes which met the criteria and the four routes which did not is significant, as illustrated in Figure 8 on the following page.

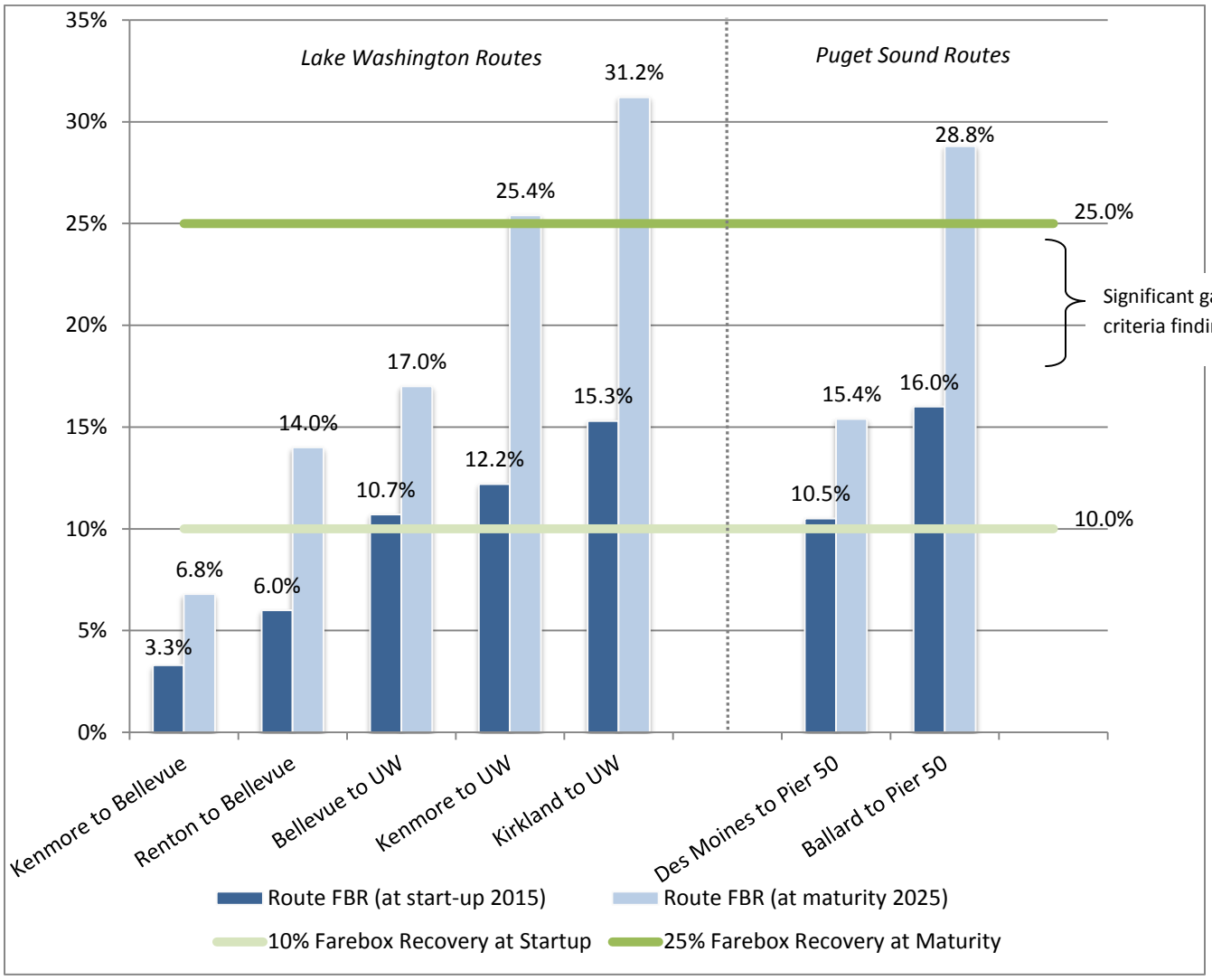
Lake Washington Routes:

- Kenmore (Log Boom Park) to UW WAC
- Kirkland (Marina Park) to UW WAC

Puget Sound Route:

- Ballard (Shilshole Marina) to Downtown Seattle (Pier 50)

Figure 8: Farebox Recovery Projections by Route



IMPLEMENTATION REQUIREMENTS

FOCUS: Assess facilities and capital costs.

Passenger-only ferries have specific terminal and vessel requirements and desired characteristics. It is important for passengers to easily find the queuing areas and to safely load and unload the vessels. Based on ridership projections, a 150-passenger vessel (or less) is recommended for each route. Each terminal location for the final proposed routes would require infrastructure improvements with varying capital costs.

PASSENGER-ONLY PROGRAMMING REQUIREMENTS

Typical programming requirements for water taxi service include:

- Vessels with appropriate speed and adequate capacity for passengers and bicycles
- In-water elements for mooring vessels with an adequate float and gangway to safely load and unload passengers, utilities for maintenance, and securing the vessel
- Upland improvements: signage and wayfinding measures to direct passengers, sufficient lighting, ADA accessible pathways, covered waiting areas, utility connections, and ticket vending machines

Figure 9 below illustrates the operations at the existing Water Taxi terminal hub in Seattle, serving the West Seattle and Vashon routes.

Figure 9: KCWT Downtown Seattle (Pier 50) Operations

Source: King County Marine Division

INFRASTRUCTURE IMPROVEMENTS PROPOSED

All proposed terminal locations, with the exception of Downtown Seattle (Pier 50), an existing Water Taxi terminal, would require in or over-water and upland improvements to begin service. Kenmore, Kirkland and Ballard have sufficient existing in-water infrastructure including floats and gangways and only require minor improvements including fenders, fixed ramps, transfer spans and cleats. However, UW WAC would need substantial improvements, including a new float and gangway.

Upland improvements at all locations would include signage and wayfinding, ticket vending machines, improved lighting, utility connections and security elements. UW WAC would require improvements to the walkway and the addition of a shelter.

Permitting would be required for each terminal location. The UW WAC is currently the only location identified in need of in-water work. The permitting effort required for terminal improvements includes federal, state and local construction permitting, as well as a broader programmatic environmental evaluation for new routes that is discussed in further detail in the “Next Steps” section of this report.

Figures 10 through 13 provide an aerial overview of each terminal location along with the recommended infrastructure improvements for each site.

Figure 10: UW WAC Proposed Infrastructure Improvements

- In-water work required: New float, gangway, piles, fenders, cleats, fixed ramp and transfer span
- Upland work: ADA walkway, shelter, signage/wayfinding, ticket vending machines, lighting, security elements (including cameras)

Figure 11: Kirkland Proposed Infrastructure Improvements

- In-water work required: Fenders, fixed ramp and transfer span
- Upland work: Signage/wayfinding, ticket vending machines, security elements (including cameras), and utility connections

Figure 12: Kenmore Proposed Infrastructure Improvements

- In-water work required: Fenders, cleats, fixed ramp and transfer span
- Upland work: Signage/wayfinding, ticket vending machines, lighting, security elements (including cameras), and utility connections

Figure 13: Ballard Proposed Infrastructure Improvements

- In-water work required: Fenders, fixed ramp and transfer span
- Upland work: Signage/wayfinding, ticket vending machines, security elements (including cameras), and utility connections

VESSEL REQUIREMENTS

Based on the ridership projections, a 150-passenger vessel (or less) that can sustain 35 knot cruising speeds is recommended. KCMD could lease a 150-passenger vessel or purchase a new or used vessel. It is likely a new vessel would be required due to the service speed requirements and the unavailability of such a vessel on the rental or used market.

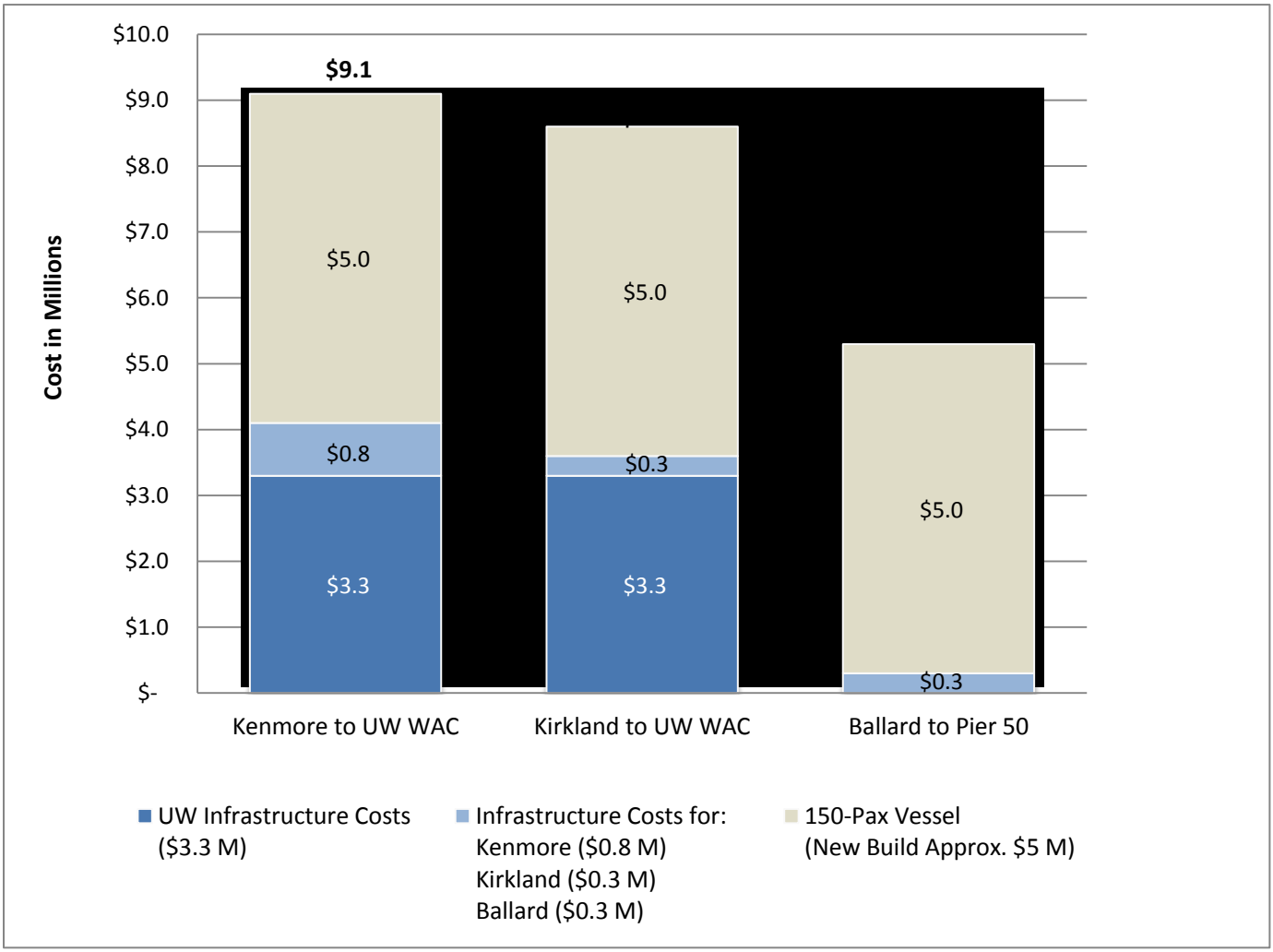
ESTIMATED CAPITAL COSTS

Capital cost estimates were based on high-level infrastructure requirements and would be refined further in a next steps design effort. With only minor improvements needed, the Ballard to Downtown Seattle (Pier 50) route would be the least expensive to implement, while the Kirkland to UW WAC and Kenmore to UW WAC have a fairly similar capital cost due to the extensive improvements needed at the UW WAC.

While there are options for vessel acquisition, such as lease, purchase used or commission new, it is anticipated a new commissioned vessel would be required. However, if there is an existing vessel on the market that meets the route profile criteria, it could be leased at an expected annual cost of approximately $420,000. Costs to purchase a vessel vary based on purchasing a new or used vessel, and the condition of the vessel. For this body of work, the higher cost is assumed, which includes the commissioning of a new vessel at an estimated $5 million. This vessel acquisition cost is assumed in estimated capital costs for each route.

Figure 14 below indicates the total capital costs for each route.

Figure 14: Estimated Capital Costs for Water Taxi Improvements



Note: The Ballard to Downtown Seattle (Pier 50) costs do not include improvements to UW WAC, as this terminal is not part of the proposed route.

MAINTENANCE, TIE-UP AND FUELING ASSUMPTIONS

KCMD currently performs daily maintenance activities at their maintenance barge located at Pier 48 in Downtown Seattle. This facility could be utilized for daily maintenance activities required for the Ballard to Downtown Seattle (Pier 50) route. However, vessels on Lake Washington routes are recommended to tie-up at Kenmore and/or Kirkland and be maintained daily with a mobile maintenance unit that can transport the crew to and from the terminal. Intermediate maintenance, that may take several days or longer, can be achieved at the KCMD maintenance barge, while heavy maintenance could be performed through existing King County contracts with local shipyards.

Fueling is available at multiple locations on Lake Washington and Lake Union to serve the Water Taxi. For the Ballard route, fueling could occur at Harbor Island, where the current Water Taxi fleet fuel.

IMPLEMENTATION SCHEDULE

Assuming city/community and agency partnership, each terminal location would require environmental permitting, design, and construction of the improvements prior to beginning a new water taxi service. Environmental permitting would be required at each terminal location and two approaches to initiating the environmental review process are described in the Next Steps section found on page 15. Once the environmental review process is complete, the Ballard to Downtown Seattle (Pier 50) route would require the shortest time to begin service with minor infrastructure improvements required at the terminal. The Kenmore to UW WAC and Kirkland to UW WAC routes would require the most extensive permitting, design and construction effort due to the requirement of new in-water infrastructure, including a new float and gangway at UW WAC terminal.

The full analysis on capital costs and infrastructure recommendations can be found in Appendix D. POF programming needs can be found in Appendix A.

AGENCY COORDINATION

FOCUS: Assess community interest and readiness.

EXTERNAL COMMUNICATION TO DATE

Agency coordination has occurred throughout the project. At project commencement, interest and information was sought from waterfront cities/communities on Lake Washington, as well as City of Seattle and City of Des Moines on Puget Sound. Some cities/communities expressed great interest in the project, whether they were fully in favor or had planning concerns, while some agencies did not choose to comment at that time. In the data gathering phase of the project, site visits were made to each terminal location identified for analysis.

Throughout the remainder of the project, meetings and telephone conversations occurred to inform the agencies of the study and to better understand the questions or concerns that surround having water taxi service in their community.

Table 3 on the following page outlines known key agency issues regarding future water taxi service in the three routes identified in this analysis. A complete log of agency coordination to date can be found in Appendix E.

In coordination with the transmittal of this interim report to the King County Council, all communities and agencies initially reached and those whom have been communicated with throughout the project have been updated on the interim report findings with community specific information and explanations for routes which did not make it through the analysis.

Table 3: Agency Coordination Key Issues Matrix *(continued on next page)*

Route	General Interest	Key Issues Identified
City of Kenmore	Very Positive	• Pedestrian connectivity • Sees as great benefit to the community
City of Kirkland	Neutral (phone conference held to discuss, awaiting formal response)	• Potential contributor to downtown parking congestion
University of Washington	Obstacles Identified	• Potential conflict with UW rowing program practice schedule • Coordination with the University's landscape architect • Ensure safe pedestrian connection from WAC to light rail station • Ensure safe pedestrian connection through participation in the development of waterfront trail enhancements providing direct connection from the WAC to the Medical Center • Coordinate operations with the WAC • Expressed interest in expanded game day service • Look at potential connections to University of Washington, Bothell Campus • UPass fare policy structured to not incur additional cost for higher priced service mode choice • Expanded public outreach
Port of Seattle	Positive, potential synergistic relationship if concerns are addressed.	• Conflicts with seasonal marina traffic • Parking to be managed • Potential positive synergistic relationship by offering service/opportunities for their customers and businesses on-site
City of Seattle	Neutral	• Ballard to Downtown may be an attractive additional transit route • Access to Shilshole Marina requiring additional car trips may be problematic from the likely park and ride nature of the facility • Desire to learn more about potential ridership demand and travel time

INTERNAL COORDINATION

There are many opportunities for enhanced service through the close coordination of the Marine Division and Metro operations. Metro is currently in the process of updating their long-range plan. This document should serve as a starting point for future coordination on how the two transit providers can support each other by way of scheduling and service.

EQUITY AND SOCIAL JUSTICE CONSIDERATIONS

"King County's Equity and Social Justice work is grounded in our 2010 'fair and just' ordinance, which requires us to intentionally consider equity and integrate it into our decisions and policies, our county practices and our engagement with communities. The ordinance also lays out definitions, structure and systems of accountability."[9]

The Marine Division is committed to equity and the application of Equity and Social Justice (ESJ) principles in the operation and management of passenger-only ferry service. In 2015, the Marine Division, in collaboration with King County Metro introduced low income fares on its existing routes. As the division delivers new water taxi vessels, much thought and work has gone into their design and construction incorporating accessibility features. This study provides an opportunity to integrate ESJ in the consideration and selection of new water taxi service expansion options.

[9]From the King County Equity and Social Justice Annual Report – November 2014

This interim report utilized a three-step evaluation process in considering water taxi service expansion options. Potential routes were identified for consideration and route time competitiveness with other public transportation options was calculated. This work was followed by the calculation of revenue potential, through ridership analysis, and operating costs. This process identified farebox recovery yielding three potential routes for further consideration – each with significantly higher ratings than the other routes considered.

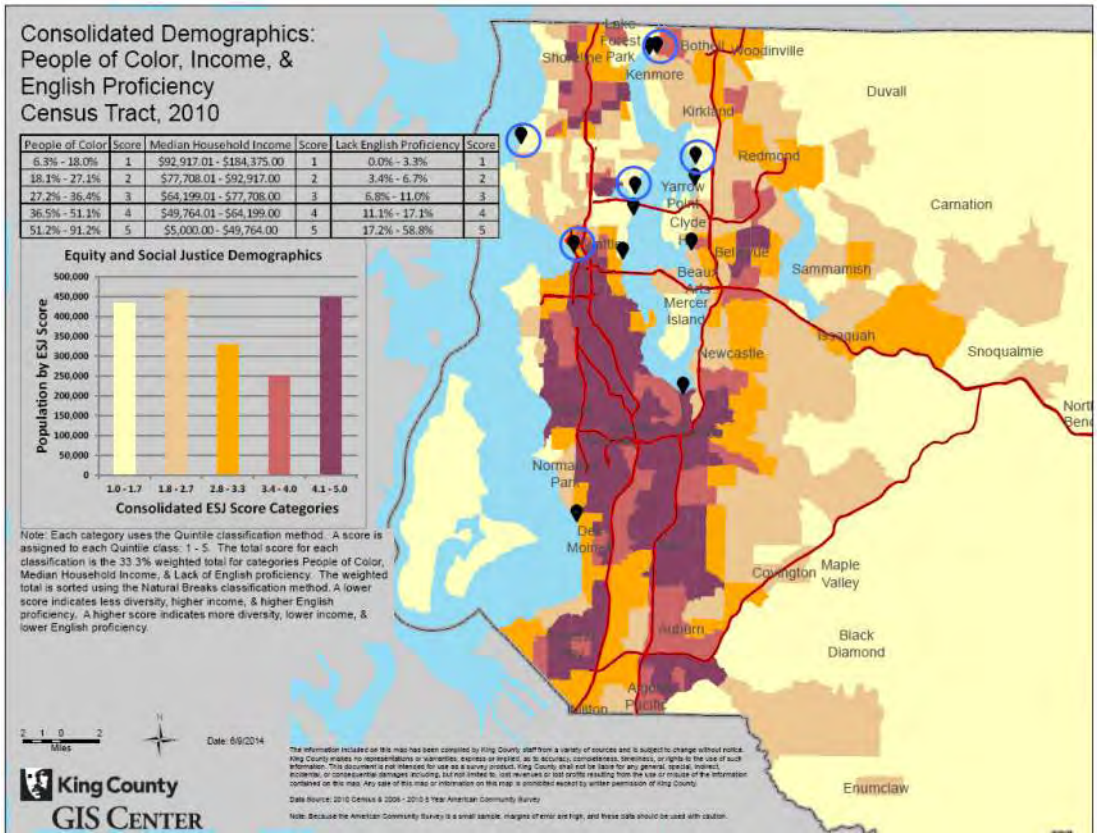
Using the concepts and metrics from the 2015 Determinants of Equity Report, a consolidated measure combining median household income, English proficiency, the incident rate of people of color was overlaid on a map showing possible shore-side (terminal) locations for routes considered (refer to Figure 15). Using this map, densities of ESJ populations within the water taxi ridership capture area are readily apparent. The terminals first considered in route competitiveness analysis are identified with black place markers; those terminal locations of routes recommended for further study are identified with a blue circle.

High ESJ densities are found around the identified commuter departure terminals and their associated capture areas of Renton and Des Moines. Under the first step of evaluation, five route combinations were analyzed from Renton and one from Des Moines. One of the routes from Renton and the route from Des Moines met the evaluation criteria of time competitiveness. These moved on to the next step in the analysis, which included ridership demand and cost analysis. These two routes are part of the thirty-six routes originally identified and also a portion of the seven routes carried for further evaluation.

As detailed in the report, the time competitive routes from Renton and Des Moines were then eliminated in the last step in the evaluation process due to the low ridership demand forecasted, which had a direct impact on the net cost of operation evaluation criteria.

The study shows that ESJ communities in proximity to routes included in this study currently have and will have (after implementation of Link light rail service) better transit alternatives available (on a service and cost basis) than the routes and service assumptions identified for future water taxi service. Fare rates are another consideration. The Metro low income fare of $1.50 compares favorably to the KCWT low income fare of $3.75 (for Vashon route).

Figure 15: Relationship of Route Locations Considered and Consolidated Equity and Social Justice Scores by Census Tracts



Source: King County Office of Performance, Strategy & Budget

NEXT STEPS

This interim report is intended to provide King County leadership with information to begin a conversation about the strategic direction for the KCWT over the next ten years. It is anticipated that there will be feedback, requests for further research and, as acknowledged above, the need to study the ESJ impacts on the analysis and findings that will be incorporated into the final report due to King County Council by September 30, 2015.

The final report will serve as the foundation for the next steps in identifying long-term expansion route opportunities. If the decision is made to proceed with water taxi route expansion, the planning and environmental documentation/permitting process would begin. Environmental review and approvals can be a time consuming process in the steps towards implementation. There may be several permitting strategies eventually outlined for this work. A conservative approach to the process has the likelihood of a lengthier review time, as outlined below.

One approach to initiating environmental review is to complete a combined programmatic State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA) determination for all routes under consideration. This process would include conducting additional, in-depth analysis (like biological and/or archeological assessments) to support the SEPA determination. Once the determination of environmental impact is made, agencies, tribes and the public will be notified about the potential water taxi routes and will be able to provide comments. Based on the comments received, mitigation measures might be developed to sufficiently address issues raised by concerned parties. This process is estimated to take approximately up to two years to complete, at which time, federal, state, and local environmental and construction permits can be obtained. King County has the ability to act as lead agency on the proposal and make their determination of environmental significance. This seems to be a very logical approach, given the several jurisdictions involved in the three proposed routes.

Another option is to complete the environmental review separately for each route. This process would require a similar level of effort for each route as well as an agency, tribal and public comment period. However, this option offers less flexibility to make choices between the three routes during the environmental review process since the environmental process was route specific as compared to the programmatic SEPA outlined above.

APPENDIX A

Task 1: Baseline Study and Route Identification

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TASK 1: BASELINE STUDY AND ROUTE IDENTIFICATION

Interim Report on Ferry Expansion Options for Marine Division

PREPARED FOR KING COUNTY MARINE DIVISION
BY KPFF CONSULTING ENGINEERS
JULY 1, 2015

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Appendices

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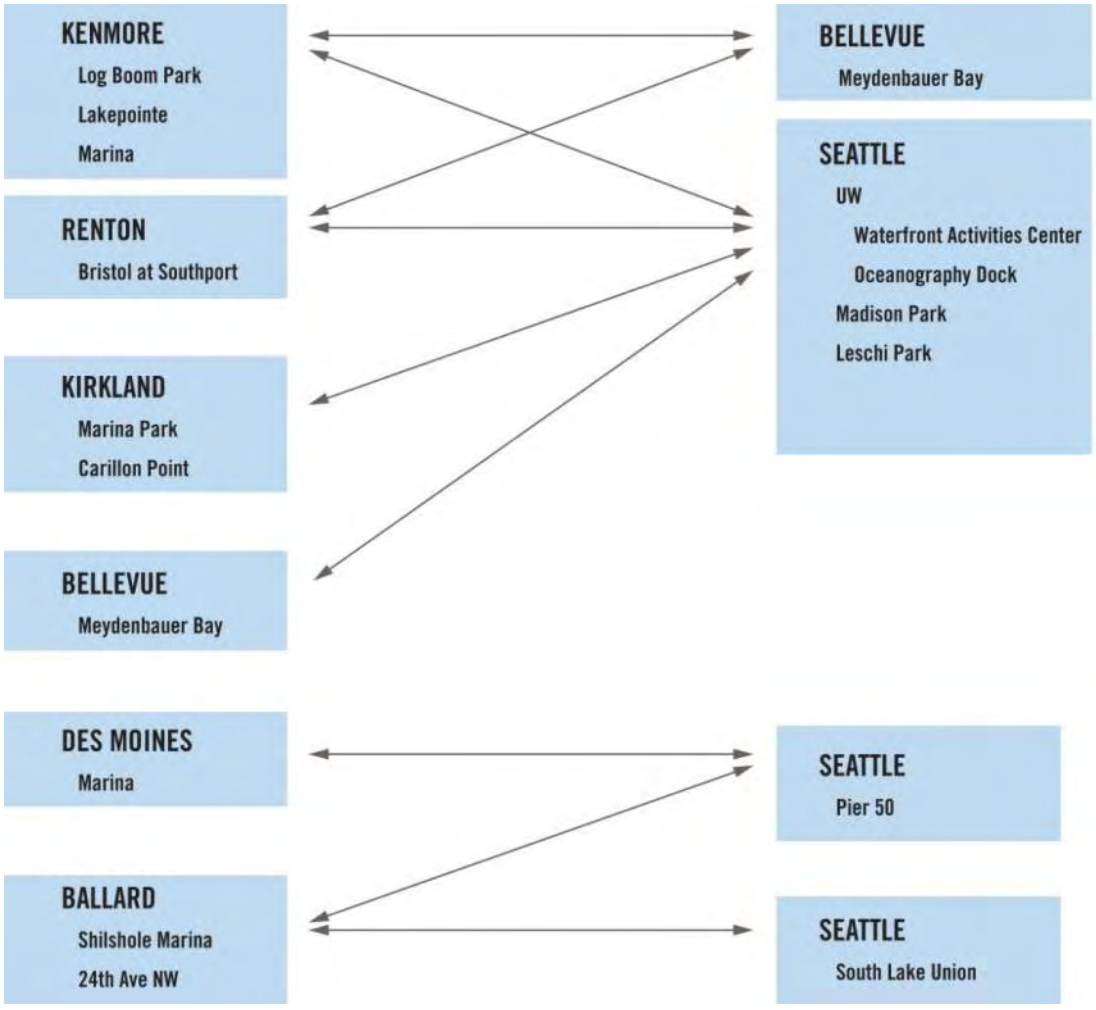
1. Introduction

The goals of this report are to identify routes for review in the Ferry Expansion Options Report for the King County Marine Division, develop a transportation project baseline within King County through review of transportation projects occurring within a10-year planning horizon, and outline the typical passenger-only ferry programming requirements.

2. Terminal Locations Considered for Review

Potential terminal locations were identified by the project team based on the previous Demonstration Route project. The project team reached out to those communities identified as well as other known interested parties to seek additional input and to add or replace any locations based on the information provided. Figure 1 identifies the potential terminal locations and route combinations considered.

Figure 1: Initial King County Water Taxi Routes Considered



3. Transportation Baseline Study

The King County Water Taxi (KCWT) is just one mode of transit offered in our congested region, with service from West Seattle and Vashon Island to downtown Seattle. Growth projections are forecasting a 42% population increase in King County by 2040,[1] which will increase traffic congestion and pressure on our public transit systems. Transit agencies with service within King County are actively working to increase passenger capacity of public transit. KCWT plays a vital role in the region's transportation network by improving multi-modal connections, relieving capacity pressures from other modes and, in some cases, providing a more direct route. The KCWT could provide further capacity through the expansion of the passenger-only ferry (POF) service where feasible. The purpose of this memo is to identify current, planned (funded) and potential (planned and not yet funded) transit service expansions, infrastructure improvements and roadway tolling plan which make up the planned transportation network of King County. Outlining and mapping the existing and planned regional transportation network will aid in the future effort to identify potential KCWT service expansion opportunities and challenges.

The major transportation agencies in the region include King County (Metro and the Marine Division), Sound Transit, Washington State Department of Transportation (WSDOT), and Seattle Department of Transportation (SDOT). Additionally, the Puget Sound Regional Council (PSRC) is a quasi-governmental organization that conducts research to inform policy decisions and provides guidance and leadership as it relates to regional growth and management strategies to local agencies.

In 2009, the PSRC prepared a Vision 2040 report that established long-range planning goals for the Puget Sound region. Vision 2040 reviews growth patterns and sets guidelines for communities in Puget Sound to encourage sustainable development. Additionally, the report establishes regional growth centers and sets targets for growth capacity within these areas that include Metropolitan Cities, Core Cities, and Larger Cities.[2] The following cities are located within the KCWT potential service area and are targeted to accommodate the stated growth in population and employment:

- Metropolitan Cities: Seattle and Bellevue – 32% of the population growth and 42% of employment growth.
- Core Cities: Kirkland and Renton – 22% of the population growth and 29% of employment growth.
- Larger Cities: Kenmore and Des Moines – 14% of population growth and 12% of employment growth.

In conjunction with Vision 2040, PSRC developed Transportation 2040 that provides a framework for long-range planning in the region and includes methods of integrating POF service and as a regional transportation action.[3,4] Transportation 2040 established goals and guidelines to develop stronger intermodal connections and increase high capacity transit (transit systems carrying high volumes of people) within areas designated as Metropolitan Cities and Core Cities.

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[1] *Vision 2040,* PSRC, December 2009, 19.

[2] *Vision 2040,* PSRC, December 2009, 20-22.

[3] *Vision 2040,* PSRC, December 2009, 87.

[4] *Transportation 2010,* PSRC, May 2010, 80-82.

Through PSRC establishing regional growth areas and subsequent growth strategies, transit agencies can use this information to guide long range transportation planning efforts. The following includes a list of the major transit agencies and the status of their long range planning efforts:

- PSRC will be engaging in an effort to update the Transportation 2040 document that will focus on increasing transit connections and include POF service. The report is anticipated for completion in 2018.

- King County Metro recently began the process of updating their long range plan with a 25 year planning horizon that is due for completion in December 2016.

- Sound Transit updated their long range plan in December 2014 that shapes the Sound Transit Ballot Measure 3 (ST3) that, if approved, secures funding for transportation projects. ST3 is anticipated to be considered by voters in November 2016.

- In 2012, SDOT prepared a Transit Master Plan providing a framework for long-range transportation planning through 2030. SDOT will be updating their Transportation Strategic Plan in coordination with the Comprehensive Plan update prepared by Seattle Department of Planning and Development in 2015 that includes a Transportation component.

- WSDOT transportation planning focuses on reducing congestion on state highways. In 2006, WSDOT prepared the Washington Transportation Plan 2007-2026 that focused on the budget challenges and statewide transportation goals. Each transportation project and program is individually evaluated. These projects have a direct effect on transportation patterns for King County.

Three agencies, King County Metro, Sound Transit, and SDOT have an integrated relationship for projects associated with each mode of transportation including bus, streetcar, and light-rail within the City of Seattle. While all agencies contribute to funding of transit projects, SDOT and King County typically own the respective transit system, Sound Transit constructs the project, and King County Metro is contracted to operate and maintain the system.[5] However, Sound Transit maintains the Link light rail. Based on the integrated relationship of these three agencies, long-range planning requires close collaboration throughout the planning process.

King County Marine Division who operates the KCWT plays an important role to increasing public transit capacity in King County. To determine where a new KCWT route might be viable, many factors must be considered including capacity of existing transit options and road systems, projected population growth, and accessibility to other forms of transit. Reviewing the long range planning documents and identifying planned projects of other transit agencies provides the information necessary for initial review of potential new routes. Viability of a new KCWT route is dependent on the capability of a KCWT to provide more direct service where other transit options might be lacking. Table 1 provides a list of potential viable routes under review.

The following section summarizes the planning process, current, planned and potential projects, and projects under construction for each transit agency within King County. This information is graphically represented in Appendix A, through a transportation planning map that indicates key transportation projects along with the potential KCWT routes considered within King County. Appendix B includes a schedule for each transportation agency's planning documents and major transit improvement projects.

[5] *Regional Transit Task Force Final Report and Recommendations,* King County Metro, October 2010, 3.

FINDINGS

King County Metro (bus, RapidRide)

King County owns and operates regular fixed-bus service, Bus Rapid Transit (RapidRide) and many park and rides around the region. Additionally, through agreements with other transit agencies, King County Metro operates the Sound Transit Regional Express bus service, Link light rail, and SDOT's South Lake Union Streetcar.[6] In collaboration with Sound Transit, King County Metro is in the process of updating their Long Range Plan to develop a vision and to set targets for the King County transportation systems over the next 25 years.

In 2014, Metro updated the Strategic Plan and Service Guidelines that prioritizes investments for transit projects. The Strategic Plan and Service Guidelines establish goals, identify areas of increased efficiency, provide performance measures, and set service level targets for Metro service. Along with increasing efficiency on regular bus routes, the Strategic Plan and Service Guidelines also recommend focusing investments and improvements on RapidRide corridors that have the highest potential for ridership and can accommodate high bus volumes. There are currently six RapidRide corridors within King County that served over 10 million riders in 2013.[7]

King County Metro and Sound Transit operate 130 park-and-rides within King County with capacity for over 25,000 vehicles.[8] These facilities provide access to transit and improve transportation connections. Many of the park-and-ride facilities are at capacity and the PSRC 2030 Update recommended increasing capacity to approximately 69,290 stalls to meet projected demand in 2030.[9]

Sound Transit (Link light rail, express bus service, commuter rail)

As a regional transit authority, Sound Transit provides multiple high capacity transit (HCT) services in Puget Sound including the Link light-rail system, high capacity bus rapid transit (BRT) and commuter rail. Sound Transit completed the update to their long-range plan in 2014 which establishes a basis for upcoming ballot measures. The Sound Transit Board approved the Updated Long-Range Plan in December 2014 and gave direction to prepare for the development of the ST3 to secure funding for project development.

Currently, the Board is reviewing projects included in the Updated Long-Range Plan to determine which projects will be included in the ST3. Projects included in ST3 will be identified through public outreach and additional review during 2015 and 2016 to be included on the November 2016 ballot.

Projects Planned/Funded or Under Construction (letter references correspond to routes identified in the Transportation Project Map in Appendix A):

- University Link Extension: Connecting light rail from Downtown Seattle to the University of Washington. The project is scheduled to begin operation in 2016. (A)

- East Link Extension: Extending light rail from Downtown Seattle across Lake Washington to Bellevue and Redmond. The project completion is projected for 2023. (B)

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[6] *King County 2013-2014 Transportation Budget,* King County F-136.

[7] *Key Data: 10-Year Summary,* King County Metro Transit, https://docs.google.com/spreadsheets/d/1Qyj31NiW1kc30GX9PCNrmnAn_EEmPn8WaUB_NMkYCQE/pubhtml

[8] *Transit Integration Report: Getting There Together,* Sound Transit and King County Metro, September 2014.

[9] *Destination 2030 Update,* PSRC, April 2007, iv.

- South 200th Link Extension: Extend light rail from SeaTac to South 200th Street, anticipated completion in 2016. (C)
- Federal Way Link Extension: Extend light rail from South 200th Street in SeaTac to Kent/Des Moines anticipated completion in 2023. (D)
- Northgate Link Extension: Extending light rail from the University District and Roosevelt to Northgate. Project completion is anticipated for 2021. (E)

Potential Projects Considered for ST3: [10]

- Light rail extension from Downtown to Ballard connecting to the University District (F)
- Light rail or HCT corridor from Downtown Seattle to West Seattle/Burien (G)
- Light rail extension from Burien to Lynnwood (H)
- HCT corridor from Downtown Seattle along Madison Street (I)
- HCT corridor from SR 522 to SR 520 via Totem Lake Urban Center and South Kirkland Park-and-Ride (J)
- Regional Express Bus corridor along 145th Street from I-5 to SR 522, and HCT corridor from I-5 to SR 522 (K)
- Regional Express bus corridor from Woodinville to Bellevue (L)

Seattle Department of Transportation (Streetcar)

Seattle Department of Transportation (SDOT) works closely with King County Metro and Sound Transit to collaborate on transportation improvements in the City of Seattle through funding opportunities and integrating planning efforts. SDOT owns the Seattle Streetcar with routes along South Lake Union to downtown Seattle and First Hill to Pioneer Square. However, operations for service are contracted to King County Metro. The 2012 Transportation Master Plan outlines the department's involvement in transportation improvements including short-term and long term goals, funding opportunities, and performance measures for improvements. Key recommended improvements identified in the SDOT plan include:

Projects Planned/Funded or Under Construction:

- Madison Street HCT corridor from 23rd Avenue west to downtown Seattle terminating at Colman Dock, preferably BRT. (M)

Potential Projects:

- South Lake Union to Roosevelt via the University District, preferably rail. (N)

[10] *Regional Transit Long-Range Plan Update Final Supplemental Environmental Impact Statement, Chapter 2 Alternatives Considered*, Sound Transit, November 2014, 2-24 and 2-25.

Washington State Department of Transportation (roadway improvements and tolling)

Washington State Department of Transportation (WSDOT) transportation projects are focused on state highways which play a major role in regional transportation and directly affect transit systems in King County. WSDOT has engaged in a number of projects to reduce congestion in the region. The PSRC Transportation Vision 2040 recommended moving toward a user-based funding approach which includes tolling. WSDOT implemented the first high occupancy toll (HOT) lane program on State Route (SR) 167 in 2008 as a pilot program and it currently remains. HOT lanes are dedicated lanes where vehicles are charged a dynamic toll rate that varies with congestion. Additionally, tolling began on all lanes of the SR 520 Bridge in December 2011.

Potential Projects (currently in the environmental review process):

- I-5 Express HOT Lane Tolling (O)
    - Currently in environmental review.

Projects Planned/Funded or Under Construction:

- SR 520 Bridge Replacement (P)
    - Currently a toll bridge.
    - New bridge includes a bike and HOV lane.
    - Final completion of the bridge is anticipated for 2017.
- I-90 Two-Way Transit and HOV Operations between Bellevue and Seattle (Q)
    - Adds two-lane center roadway for buses, carpools, and vanpools.
    - Construction to start early 2015.
    - Anticipated completion in mid-2017.
    - Project prepares the center roadway for the East Link light-rail extension.
- I-405 Widening and HOT lanes from Bellevue to Lynwood (R)
    - Anticipated to open late 2015.
    - Dual express toll lane system from Bellevue to Bothell/Woodinville.
    - Existing carpool lane from SR 522 to I-5 converted to express toll lane or HOT lane.
- Alaskan Way (SR 99) Viaduct Replacement Project (S)
    - Demolition of Alaskan Way Viaduct and construction of a tunnel.
    - Anticipated construction completion in 2016.
    - Tolling to begin 2016.

CONCLUSIONS

There are multiple transportation projects and transportation planning efforts currently underway within King County, each with similar goals of easing congestion and improving mobility in the region. The projects identified in the transportation planning documents reviewed include the following improvements:

- Improvements to existing road infrastructure:
    - Roadway widening for increased capacity or HOV/HTC dedicated lanes
    - Variable tolling
- New HCT service:
    - BRT and express bus service
    - Light rail extensions and connections

While these improvements will likely greatly enhance the transportation network, there are many connections that simply cannot be made due to the geography of the region. Transportation infrastructure is constrained by the natural features of the region, which include the water bodies of Puget Sound, Lake Washington and Lake Union. By adding POF service within these water bodies, communities will benefit from enhanced mode choice and connectivity.

Through review of the planning documents referenced in this memo, which have been graphically depicted on the Transportation Map in Appendix A, the following initial observations include:

General:

- Transportation projects are focused on improving connections from the east side of Lake Washington to Seattle as well as connecting cities along the I-405 corridor.
- Potential projects that do not currently have funding may not receive funding to be studied; or if funding is received, it is unlikely these projects would be operational within this 10-year planning horizon.

Initial observations for each potential KCWT terminal location are included in Table 1 that provides a matrix of potential upland opportunities and challenges for each site. This list is draft in nature and by no means represents a comprehensive comparison. This comparison represents observed opportunities and challenges as it relates to the transportation planning and infrastructure improvements identified in this memo.

Table 1: Initial Opportunities and Challenges for each Potential Terminal Location

Terminal Location	Opportunities	Challenges
(1) Log Boom Park (Kenmore)	Terminal locations are served by HCT concentrated along SR 522 and a POF could be used as an alternative to utilizing SR 522.	
(2) Lakepointe (Kenmore)	Terminal locations are served by HCT concentrated along SR 522 and a POF could be used as an alternative to utilizing SR 522.	
(3) Marina Park (Kirkland)	Marina Park is adjacent to the downtown Kirkland commercial core that could be a recreational destination.	Kirkland terminal sites are already served by existing HCT and are in close proximity to additional HCT along I-405; therefore, it could be challenging for POF service to be viable. Additionally, existing high capacity parking areas near bus connections could make it difficult for the POF to be viable.
(4) Carillon Point (Kirkland)	Ample parking opportunities.	Kirkland terminal sites are already served by existing HCT and are in close proximity to additional HCT along I-405; therefore, it could be challenging for POF service to be viable. Additionally, existing high capacity parking areas near bus connections could make it difficult for the POF to be viable.
(5) Meydenbauer Bay (Bellevue)	Bellevue has many existing and planned transportation options connecting to the downtown Bellevue Transit Center; however, the Meydenbauer Beach Park is within one-mile of the downtown Bellevue core and POF service could provide recreational POF service to reach this destination.	Bellevue has many existing and planned transportation options connecting to the downtown Bellevue Transit Center which is just over a mile walking distance to the potential POF terminal.
(6) Bristol at Southport (Renton)	Renton is served by HCT that connects to Link light rail near SeaTac; however, a POF could be a more direct transportation option to downtown Seattle.	
(7) Leschi Public Float (Seattle)	There are no HCT connections planned for Leschi; however, a shuttle service could improve connections and a central location from east Lake Washington terminal locations to downtown Seattle.	There are no HCT connections planned for Leschi; therefore, connections to downtown Seattle could be difficult.
(8) Madison Street Dock (Seattle)	The long term plans do not include a HCT connection to Madison Park; however, interagency coordination efforts could improve this connection and allow Madison Park to become a multi-modal connection hub for POF and bus service.	The long term plans do not include a HCT connection to Madison Park that might make connections to downtown Seattle difficult.

Terminal Location	Opportunities	Challenges
(9) UW Waterfront Activities Center (Seattle)	The UW Waterfront Activities Center will be well connected to other modes of transportation and could serve as a transportation hub for POF connections.	
(10) Oceanography Dock (Seattle)	The Oceanography Dock will be well connected to other modes of transportation and could serve as a transportation hub for POF connections.	Walking route is indirect to the light rail station.
(11) South Lake Union (Seattle)		There are multiple transportation options in downtown Seattle that would reduce the viability of routes within Lake Union.
(12) Fremont (Seattle – Exact Location TBD)		There are multiple transportation options in downtown Seattle that would reduce the viability of routes within Lake Union.
(13) Ship Canal at 24th Ave NW (Seattle)		There are multiple transportation options in downtown Seattle that would reduce the viability of routes within Lake Union.
(14) Shilshole Bay Marina (Seattle)	Ballard from Shilshole Bay is not planned to be served by other HCT modes and could be a viable mode of transportation with the lack of HCT connections.	
(15) Downtown Seattle (Pier 50)	In operation	In operation
(16) Des Moines Marina (Des Moines)		Because light rail will be located in close proximity to Des Moines, a POF may not be viable. Also, The City of Des Moines has voiced concern over POF parking at the marina.

4. POF Programming Elements

POF transportation is distinct, requiring carefully planned infrastructure and facilities to operate effectively and attract ridership. Programming criteria for the required infrastructure can be broken down into location elements, terminal facility elements, and vessel characteristics.

LOCATION ELEMENTS

Determining the appropriate location for new POF service requires thorough analysis of many factors including passenger and vessel accessibility to the terminal locations, travel time, and availability of existing infrastructure or constructing new terminal facilities that will attract passengers. Ultimately ridership will determine the viability of POF service, and planning terminal locations and facilities that will draw passengers is critical to a successful POF service.

Connectivity and Accessibility

When taking public transportation, most passengers prefer faster travel times and fewer transfers between transit modes to reach their destination. Therefore, it is advantageous for POF to offer direct service to employment hubs and/or an area with multiple modal connections (bus, light rail, bike paths, etc.) that will make the trip time competitive with many transportation options to a final destination. Coordinating with other transit agencies to improve connections to POF terminal facilities could improve modal connections. Additionally, integrating fare collection systems between transportation modes make these transfers easier and potentially more cost effective for passengers. The One Regional Card for All (ORCA) card provides seamless transfers for passengers between King County Metro and Sound Transit Link light rail and express bus service, as well as the King County Water Taxi West Seattle and Vashon Island to downtown Seattle routes.

Parking availability at or nearby the terminal is a key component to attracting passengers. Offering on-site parking at the terminal location would be the best way to attract riders. If this kind of parking is not available at the terminal, local parking facilities such as park and rides and shared parking such as church parking lots could be utilized. If sharing with a bus park and ride facility, providing designated POF parking could attract ridership. Whether designated parking is provided or not, a shuttle service to serve the shared park and ride facilities and transport riders to the waterfront to meet the water taxi would be required in many cases. The shuttle service should be aligned with the POF schedule to improve passenger accessibility.

Information

Providing passengers with easy access to information regarding the POF service can attract passengers by reducing anxiety of what to expect in their trip. Clear website information and mobile applications provide passengers with current POF schedules, rider information (including terminal locations and amenities), service interruptions and more.

Navigational Considerations

For commuting passengers, travel time is an important consideration when deciding which public transportation they will use. To be competitive with other modes of transportation, POF commuter routes must consider the most efficient path to reach the destination. It is important to identify and consider navigational challenges including slow-down areas and in-water impediments that restrict the vessel speed and slow down the route. Vessel congestion and water recreational activities vary within each body of water, with many in King

County that are frequently congested with vessels, float planes, kayakers, crew and paddle boarders, or are restricted to low speeds in locations of high congestion and near residences.

Land Use Compatibility and Availability

Future POF terminals should be compatible with surrounding land uses. This compatibility is partly related to the modal connections as described above, but also the surrounding land uses. Many terminal facility sites are located on public property including parks with existing docks. Terminal facility sites located on private property are typically adjacent to commercial uses including retail. Locating terminal facilities within parks and commercial areas is consistent with POF operations since these areas are destinations with better modal connections compared to residential and industrial areas.

Condition of Infrastructure and Improvements

Terminal infrastructures, both in water and out of water, are expensive assets. Identified locations for future POF service should leverage existing infrastructure where possible to lower initial investment costs. Most landing sites proposed have existing in-water infrastructure in place that would require modifications to be ADA compliant and operational. The exception would be the Kenmore Lakepointe site that would require new in-water and upland terminal facilities.

Providing terminal facility amenities can also attract passengers. Upland infrastructure including weather protection shelters with seating, ticket vending machines (TVMs), restrooms, and informational booths should be considered at each terminal facility location. Appropriately placed wayfinding elements are critical to guiding passengers to the POF terminal and continuing to their destination.

It is important passengers feel safe and secure arriving at the terminal, boarding and riding the vessel, as well as departing the vessel. Upland safety improvements include providing adequate lighting, proper siting of amenities, and monitoring the site for safety. Additionally, clear safety instructions onboard the vessel allows passengers to trust the crew has safety procedures under control.

Environmental Impacts

Environmental impacts associated with future terminal locations should be minimized as much as possible. This minimization can be achieved by utilizing existing in-water infrastructure when applicable or minimizing and avoiding impacts to environmentally sensitive areas with new infrastructure. Early coordination in the conceptual planning phase with the federal, state, and local agencies allow for anticipation of environmental requirements. During the conceptual design phase, environmental permitting requirements would identify potential environmental impacts and require impact minimization elements.

TERMINAL FACILITY ELEMENTS

Program requirements for a future POF facility include amenities that make the site accessible, functional, and enjoyable for riders. These amenities may include both in-water and upland improvements, enhancing the passenger experience and service functions, while working within the constraints of the sites.

- Float to accommodate berthing vessels with side loading.
- Gangway and float to accommodate passenger loading and unloading with a minimum width of 12 feet for two-way passenger traffic.

- Sufficient area for placement of approximately 2-foot by 2-foot TVMs. These TVMs are solar-powered and equipped with cellular communications; therefore hard-wired power and communications are not required.

- A location with communications and power will be needed to store the portable fare transaction processors (handheld ORCA readers).

- A location will also be required to retrieve and store cash (if an accepted form of payment) from the portable fare boxes. This would require a vault at one of the terminals, located in the agent's office. This would likely be required regardless of whether or not a contracted service is utilized.

- Trash and recycling receptacles.

- Pedestrian and bicycle accessible walkways, approximately 12 feet wide to accommodate loading and unloading of passengers.

- Drop-off location for transit and personal vehicles should be located as close as possible to water taxi passenger loading.

- Loading ramps, communication, electrical gates and lighting are required at each slip. Potable water, sewage pump out, and shore power would be required at tie-up locations only.

- Meet secure facility recommendations, which includes delineation between public space and authorized personnel space (partitions or gates), adequate lighting, security cameras and storage facilities for crew belongings are also required.

VESSEL CHARACTERISTICS

The size of the vessels is determined on ridership demand (capacity requirements) and service schedule (speed requirements). Other vessel design elements for consideration should be configuration and relationship to loading facilities, fuel consumption, ride quality, wake wash and general passenger amenities provided.

Configuration and Relationship to Loading Facilities

Doors and queuing should be arranged to allow for terminal turnaround, including passenger unloading and loading, to occur in seven minutes or less for a full load in both directions. This is the typical turn-around time currently achieved by the King County Water Taxi. Aisle widths, door widths, number of embarkation stations, passenger routes, and seats per row should be designed to optimize passenger flow for new vessels.

Vessel draft and freeboard are also a consideration on the relationship to loading facilities/infrastructure such as a pier, dock or float. The two water bodies in the study will have different needs due to their differing water level characteristics. The median low low water (MLLW) for Lake Washington is controlled by the Army Corps of Engineers and has minimal variation, whereas the Puget Sound can see a tidal range of more than 16 feet.

Fuel Consumption

To minimize overall operating costs, it is recommended that fuel efficient vessels be used wherever possible. However, there is often a tradeoff between vessel speed and vessel size and weight with fuel efficiency. Longer routes may require higher, less efficient speeds to meet schedule or in some cases lower speeds due to required slow downs, like in the Montlake Cut.

Ride Quality / Schedule Reliability

Weather conditions in central Puget Sound can often present challenges for smaller vessels. During winter storms, wind waves can approach 3 feet, with sustained winds exceeding 30 knots and gusts up to 50 knots.

Under these conditions, the vessels cannot maintain their calm water speed and must slow down, thus affecting schedule reliability. In severe weather, some vessels will not be able to operate. Conditions on Lake Washington are quite different than Puget Sound, however wind waves can be experienced in severe conditions. This kind of weather would likely impact operations.

Passenger Amenities

The following passenger amenities are outlined below in order of documented current King County Water Taxi rider preferences:

- Comfortable seating/Elbow Room
- Outdoor Seating
- Food/Beverages
- Wi-Fi
- Bike Racks

Additional design elements to consider:

- Electrical Outlets
- Tables
- Bathroom facilities should be available for both crew and passengers, on-shore where possible, and on the vessels.

Wake Wash / Wake Energy

Wake wash energy is likely not too much concern on most of the routes as the majority of the transit is primarily in open water. However, the majority of the lakefront is comprised of residential uses that may have concerns about impact to their property. Wake wash/energy issues will mainly affect the routes during the maneuvering portions of the run. Wake wash is managed in the Montlake cut area through regulated slowdowns (no wake zones).

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Appendix A

King County Transportation Project Map

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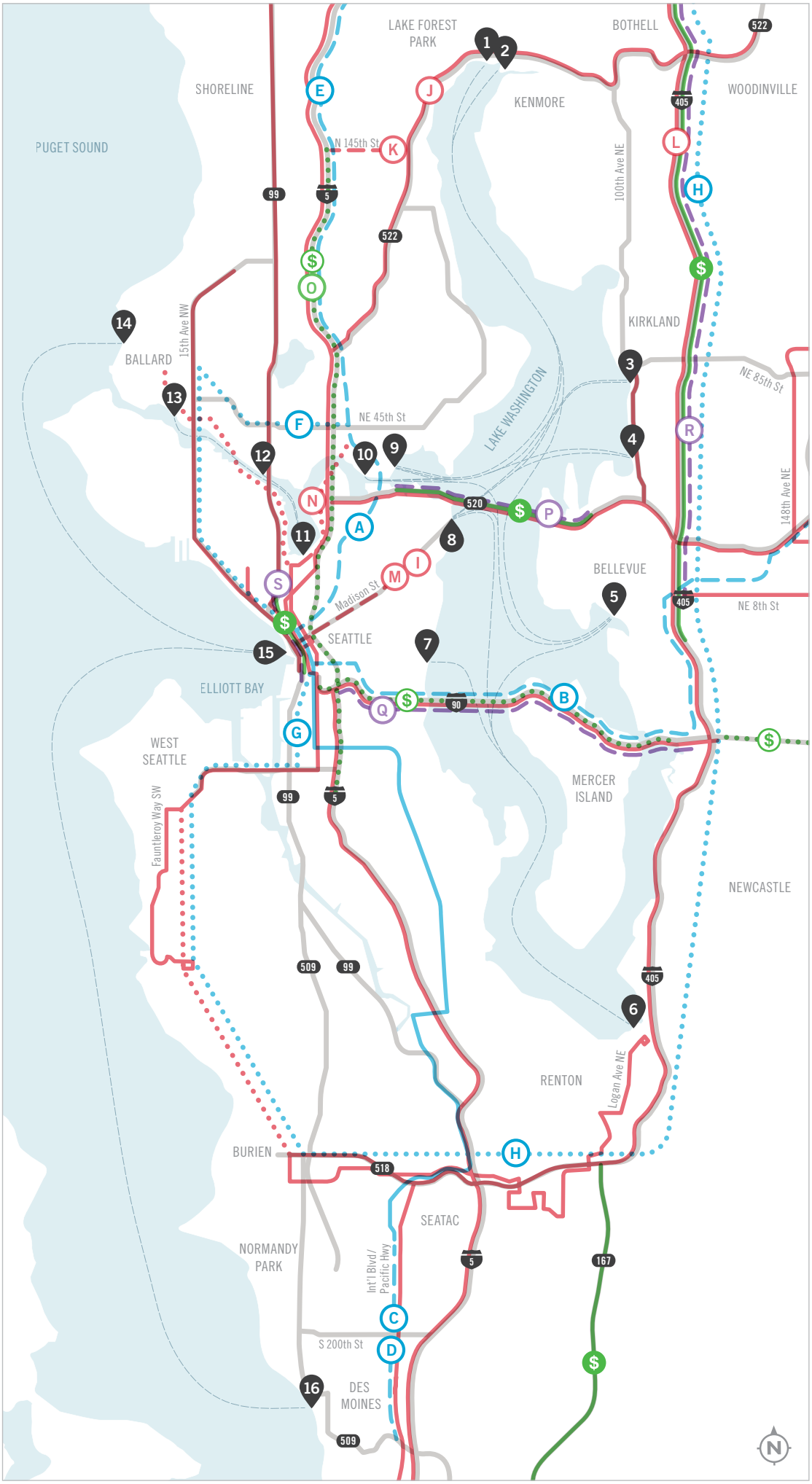

LEGEND

- Tolling Areas
- Potential Tolling Areas
- Existing Light Rail
- Planned/Funded/Under Construction Light Rail Extensions
- Potential Light Rail Extensions
- Existing High-Capacity Transit (HCT) Corridors
- Planned/Funded/Under Construction HCT Corridors
- Potential HCT Corridors
- Planned/Funded/Under Construction Roadway Projects
- Projects Described in Transportation Infrastructure Memo
- Potential Landing Sites

SITES

1. Log Boom Park (Kenmore)
2. Lakepointe (Kenmore)
3. Marina Park (Kirkland)
4. Carillion Point (Kirkland)
5. Maydenbauer Bay Marina (Bellevue)
6. Bristol at Southport (Renton)
7. Leschi Public Float (Seattle)
8. Madison Street Dock (Seattle)
9. UW Waterfront Activities Center (Seattle)
10. Oceanography Dock (Seattle)
11. South Lake Union (Seattle)
12. Fremont (Seattle - Exact Location TBD)
13. Ship Canal at 24th Ave NW (Seattle)
14. Shilshole Bay Marina (Seattle)
15. Pier 50 (Seattle)
16. Des Moines Marina (Des Moines)

NOTES: (1) Depicts projects within a 10-year planning horizon; (2) HCT includes express bus and bus rapid transit

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Appendix B

King County Transportation Project Schedules

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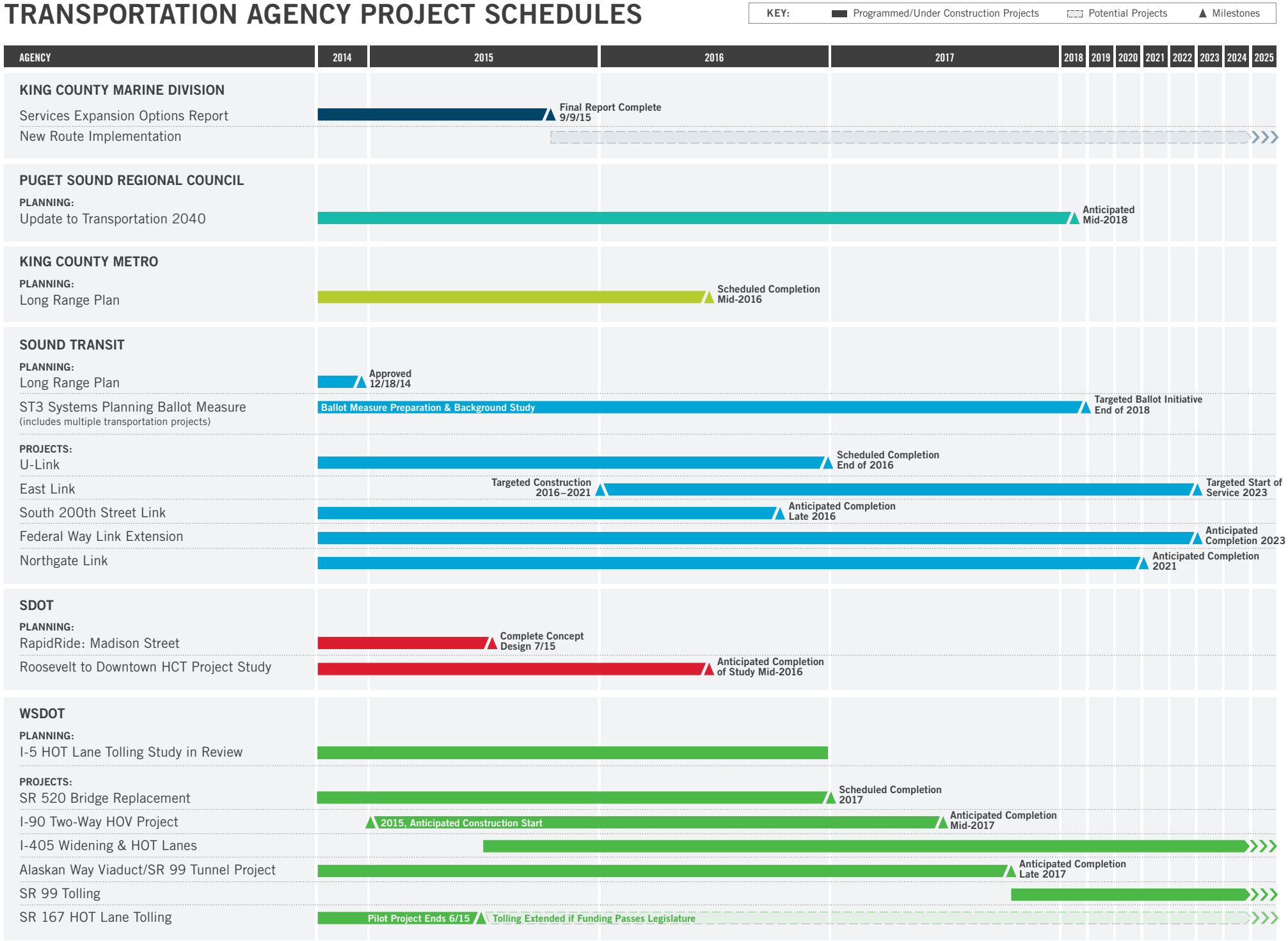
TRANSPORTATION AGENCY PROJECT SCHEDULES



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APPENDIX B

Task 2: Route Profiles

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TASK 2: ROUTE PROFILES

Interim Report on Ferry Expansion Options for Marine Division

PREPARED FOR KING COUNTY MARINE DIVISION
BY KPFF CONSULTING ENGINEERS
JULY 1, 2015

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Appendices

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1. Introduction

The purpose of this report is to outline the specific route profiles for each proposed route identified in the Task 1 Baseline Study and Route Identification Report and to identify the methodology and assumptions used to build these profiles. The ultimate goal of this analysis is to use the route profiles to assess which potential routes will move on for further analysis such as ridership demand and infrastructure needs.

The route profiles will include:

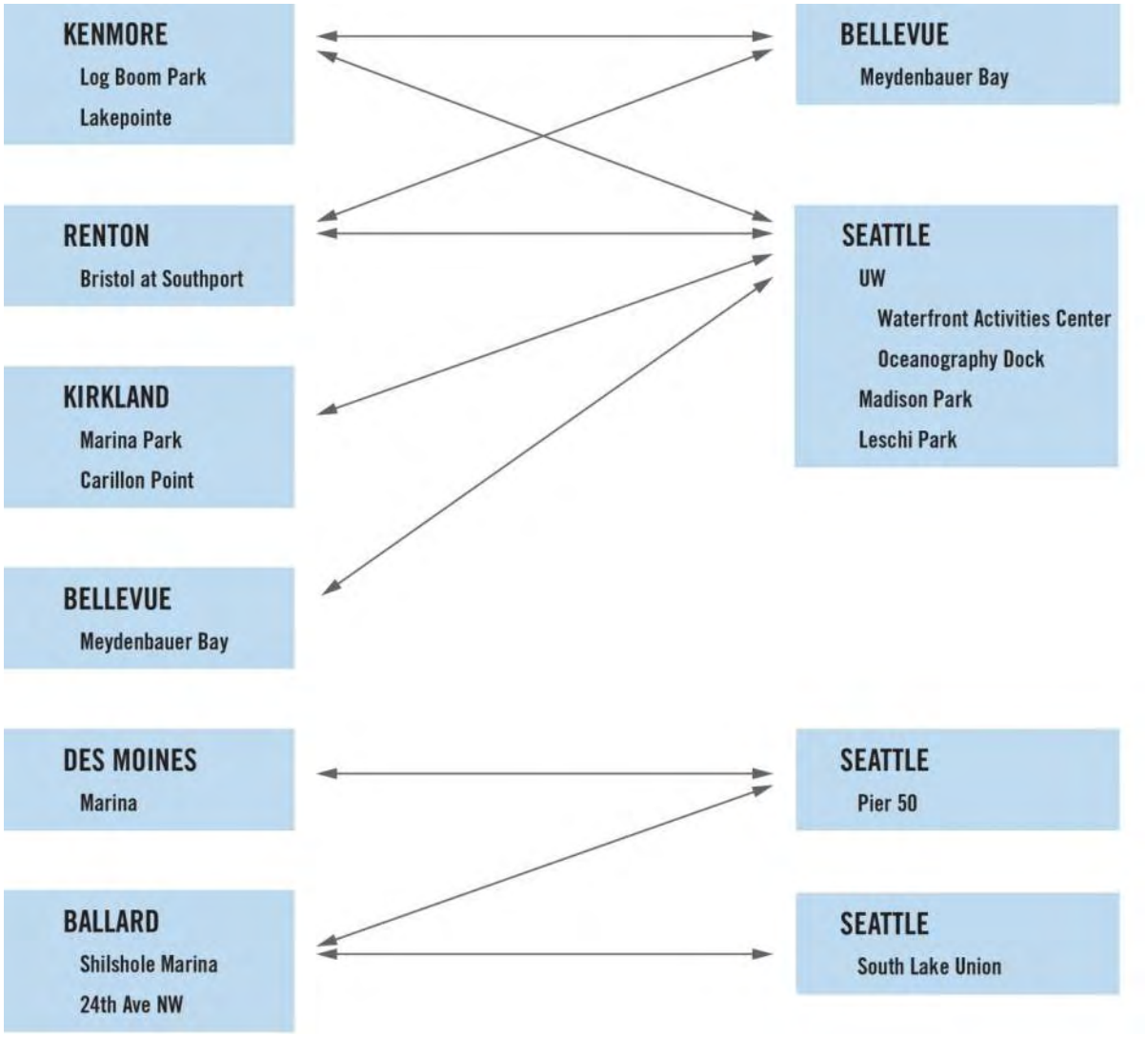
- Travel time and cost for
    - Passenger-only ferry (POF) service
    - Existing public transit service options[1] (bus, streetcar, Link light rail or a combination)
    - Personal vehicle trips
- Convenience factors, such as walking distance, potential shuttle needs and number of transfers required
- Land use compatibility of a water taxi terminal use with local regulations.

Figure 1 outlines the route profiles that have been evaluated, as identified in the Task 1 Baseline Study and Route Identification. It should be noted that while the figure identified the landside terminal locations for a proposed water taxi service, final destination were all assumed to be Downtown Seattle.

While the Task 1 report identified that terminal locations in Fremont were to be explored, adequate facilities could not be identified; therefore, a Fremont landing site was not included in this analysis. Additionally, Kenmore suggested the Harbor Village Marina as a potential landing site; however, based on the site inspection, the existing facilities would not be adequate for POF service due to accessibility issues and it was not included in this analysis.

[1] [1] Vanpool is another public transit option offered by King County. This mode of transportation was not identified in the competitive route profiles as the schedules are hard to compare to a scheduled service.

Figure 1: Potential KCWT Routes



2. Methodology

General route profile characteristics were evaluated by gathering the following information:

- POF route distances and travel times
- Travel times of other modes of transportation (bus, Link light rail, personal vehicle) from departure terminal to Downtown Seattle
- Required seat changes between modes
- Fares by mode
- Parking availability and accessibility at the terminal and/or potential shuttle requirements

For accurate comparisons between POF routes and current modes of transportation, assumptions were made for destination locations and commute periods[2]. The approach for gathering this data is described in summary below. For a comprehensive list of assumptions developed for this analysis, please refer to Appendix A.

POF Route Distances and Travel Times

POF headways or routes were determined to be the fastest, most direct route. Captains with experience navigating Puget Sound and Lake Washington provided insight to determine optimal routes and maneuvering time requirements. Travel time was calculated for four (4) cruising speeds including 28, 30, 35, and 38 knots and accounted for slow down zones (at 7 knots) at landing approach, under bridge crossings and other mandated slowdown zones. The 35 knot speed was chosen for comparison in the alternative mode time competitiveness analysis. This speed is higher than current King County Water Taxi operations, however consistent with speeds Kitsap Transit has used with its demonstration service from Bremerton to Downtown Seattle (Pier 50). This higher speed is required to make the mode competitive. It should be noted that all POF travel times include some form of transit once a landing site has been reached, except for two of the routes, from Des Moines and Ballard which arrive into Pier 50 in downtown Seattle. POF travel times are identified in Appendix C.

Travel Times of Competitive Modes

Currently, commuters travel to and from their destination via personal vehicle or public transit including Metro buses, Sound Transit Express buses, Link light rail, or a combination of modes. Transit route travel times were collected from the King County Metro trip planner and personal vehicular travel times were estimated using an average weekday peak period commute timeframe from Google Maps.

Many commuters traveling from the east side of Lake Washington to the central business district of Seattle park their vehicles at established park and rides and continue to Seattle via public transit.

Required Seat Changes

Seat changes are identified as a movement from one mode to another. In this analysis, the first seat change counted occurs after arrival at the park and ride, transit center or shuttle location pick-up. Walking times were calculated for all POF trips, either from a drop–off location to the POF queue at the pier or from the POF landing site to the next mode of transportation. For every route, the POF mode of travel requires at least two (2) seat changes.

Fares by Mode

Current fares were used to identify total cost per trip via other modes. Potential POF routes used the proposed 2015 King County Water Taxi ORCA fare of $4.25 for the Vashon Island Route. Costs for personal vehicle trips were calculated using the 2015 IRS Mileage Rate ($0.575) that includes fuel, wear and tear costs, and 2015 tolling rates.

[2] Commute period is identified as 8:00am arrival in downtown Seattle and departure time of 5:00pm.

Parking, Accessibility and Shuttle Requirements

Site visits were conducted at each identified terminal location to evaluate the current condition of in-water and upland infrastructure, as well as, to understand the accessibility and parking conditions at the site. Appendix F includes a profile for the current condition of each landing site.

On-site parking was assumed for the locations listed below. It should be noted that parking agreements have not been made with the local jurisdictions (where applicable) and in fact, some have expressed concern over shared parking in these locations. Parking was assumed for route competitiveness and, if parking is not possible, these routes may not meet time competitiveness measures.

- Renton (in the new Southport development currently under construction and located south of the existing dock. The development includes a 334,791sf hotel with 350 rooms; 724,520 square feet of Class "A" office space and 2,121 structured parking spaces[3].)
- Ballard (within the Shilshole Marina parking)
- Des Moines (within Des Moines Marina parking)

Where on-site parking was not assumed, the nearest park and ride of over 50 vehicles was used to calculate total trip time. This assumption was used in order to cut down on potential shuttle transit time from small park and ride to small park and ride to pick up passengers. Transit Centers with no parking were assumed in the urban areas of Downtown Kirkland and Bellevue. The Kirkland transit center is a short walk to the landing site and it is assumed a shuttle would be provided to and from the Bellevue Transit Center to the landing site.

3. Elimination Criteria

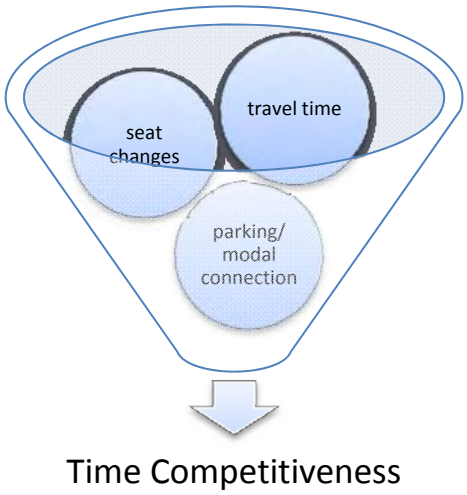
The initial scope of work identified three distinct elimination criteria: time competitiveness, convenience (seat changes) and parking/modal connections.

However, through our analysis; it became clear that convenience factors and parking/modal connections played an important role in the overall time competitiveness of a route. Therefore, rather than the criteria being three separate factors, two of the factors really determined why or why not a route was more time competitive than another. Figure 1 indicates how the three components contribute to the evaluation of time competitiveness.

For this analysis, time competitiveness is defined as equal to or less than a 40 minute total round-trip delta between a POF and the alternate mode of transportation.

[3] Renton Southport Development Information. http://www.secodev.com/

Figure 2: Elimination Criteria



4. Findings

There are four key overall findings that are identified in this analysis. These include:

- Time Competitiveness
- Cost Competitiveness
- Parking Assumptions
- Land Use Compatibility

Time Competitiveness

Overall, the time competitiveness analysis concluded that no proposed POF route would have a better total round-trip time than the competing modes in 2015 (bus, Link light rail or personal vehicle). In most cases, a personal vehicle is the fastest mode of transportation as of 2015. However, it should be noted that while average travel times identify the personal vehicle as the quickest form of transportation, this mode is often the most variable and unpredictable with accidents, special events and weather heavily contributing to vastly varying travel times which can double or triple the average trip time. Additionally, delay is only increasing on our region's highway systems. A 2013-2014 Puget Sound Regional Council study indicated that delay on our regions highways increased 25 percent from 2013 to 2014[4]. It is expected that this delay will continue to grow as our economy and population grow.

POF travel does not have the kind of variability in travel times as the personal vehicle, or even bus transit as travel on the water provides flexibility to go around a potential hazard. Severe weather can pose some delays for water travel; however those are rare and not expected for the Lake Washington routes specifically.

[4] PSCR, "Stuck in Traffic: 2015 Report" presentation, 3/16/15.

The following sites, identified in Table 1, meet the evaluation criteria for travel time competitiveness (identified as being no more than 40 minute longer than the round-trip transit time) for each route. This table identifies round trip time differential for POF vs. transit mode of travel, as well as, the total round trip commute time. The most time savings was found on the north/south routes from Renton to Bellevue and Kenmore to Bellevue, which uses the I-405 corridor as the alternative. The routes that just make the cut include Des Moines to Downtown Seattle (Pier 50) and Bellevue to Madison and UW WAC.

Please refer to Appendix C for more detailed information regarding trip time competitiveness calculations, including AM and PM on-way trip times and associated trip time comparisons.

Table 1: Round-Trip Time Differential

Route	Round-Trip Time Differential *(POF vs Transit)*	POF Total Round-Trip Time
Kenmore to UW WAC	26 Minutes	1 Hour 49 Minutes
Kenmore to Bellevue*	16 Minutes	1 Hour 39 Minutes
Kirkland to UW WAC	17 Minutes	1 Hour 36 Minutes
Kirkland to Madison	30 Minutes	1 Hour 45 Minutes
Kirkland to Leschi	27 Minutes	1 Hour 46 Minutes
Bellevue* to UW WAC	38 Minutes	1 Hour 43 Minutes
Bellevue* to Madison	38 Minutes	1 Hour 43 Minutes
Bellevue* to Leschi	33 Minutes	1 Hour 38 Minutes
Renton to Bellevue*	13 Minutes	1 Hour 16 Minutes
Des Moines to Downtown Seattle (Pier 50)	39 Minutes	1 Hour 41 Minutes
Ballard to Downtown Seattle (Pier 50)	29 Minutes	1 Hour 18 Minutes

Note: POF total round-tip time includes shuttle ride to the departure terminal (if needed), POF sailing and connection to arrival business district (Seattle or Bellevue) through transit or shuttle and the trip back to the original departure terminal.

The UW WAC landing site provides the most advantageous connection to the new UW Link light rail station with only a short 6-minute walk from the landing site to the UW Link light rail station. This connection makes this landing site the optimal site for a west side connection. Therefore, Leschi and Madison were eliminated from further analysis.

Log Boom Park in Kenmore was chosen over Lakepointe as the Kenmore terminal location due to the fact that Lakepointe is privately owned and timeframe for redevelopment of the site is currently unknown.

In Kirkland, Marina Park provides more connections to residential density, employment and transit connections (KC Metro Routes: 234, 235, 236, 238, 245, 248, 255 and ST 540) than the potential terminal at Carillon Point (served by KC Metro Routes 234 and 235) and therefore, Carillon Point was eliminated from further analysis.

Cost Competitiveness

In addition to the unpredictability of personal vehicle trip time, this mode is also the most expensive option for the rider, ranging from $2.50 to $11.91 one-way in gas, tolls, wear and tear, as well as, an additional $15 to $30 for all-day parking downtown. While a POF fare would be more expensive than the bus or light rail transit mode, it would be far less than driving and parking a personal vehicle in the City. As a passenger, the bus is the least expensive of the three modes. Table 2 provides the approximate costs for each commute tip by mode.

Table 2: One-Way Rider Cost by Mode

Proposed Route	POF	Transit	Personal Vehicle*
Kenmore to UW WAC	$5.25	$2.50	$8.11
Kenmore to Bellevue	$5.25	$2.75	$7.99
Kirkland (Marina) to UW WAC	$5.25	$3.25	$11.91
Kirkland (Carillon) to UW WAC	$5.25	$3.25	$8.98
Bellevue to UW WAC	$5.25	$2.50	$10.13
Renton to UW WAC	$5.25	$3.25	$10.18
Renton to Bellevue	$5.25	$2.50	$6.10
Des Moines to Downtown Seattle (Pier 50)	$5.25	$3.25	$9.78
Ballard to Downtown Seattle (Pier 50)	$5.25	$2.75	$3.22

**Note: Does not include downtown Seattle parking costs, which can range from $15.00 to $30.00 per day.*

Parking Assumptions

Parking availability is hard to come by at most of the terminal locations. The only sites which have some level of on-site parking opportunity are the future Lakepointe development in Kenmore, the future hotel/restaurant/office development in Renton, the Shilshole Marina owned by the Port of Seattle, and the Des Moines Marina, owned by the City of Des Moines. Lakepointe future development is unknown and is in private ownership and was therefore excluded from further analysis. The Port of Seattle has not been contacted to discuss the feasibility of parking availability for a POF at Shilshole Marina. The City of Des Moines has concerns about shared parking at the marina with their current community events that utilize that space, as well as potential redevelopment of the site.

Park and rides in the vicinity of the terminal locations currently reach capacity; therefore available parking would be a challenge at most of the terminal locations.

As mentioned in the methodology, parking was assumed at several terminal locations for route competitiveness. If parking is not possible at these locations where parking is assumed on-site (Renton, Ballard and Des Moines), time competitiveness will likely not be met. Refer to Appendix G for a map of existing park and ride locations.

Land Use Compatibility

Most land use plans do not specifically identify a POF facility as a planned use; however, most regulations allow for commercial transportation uses. POF terminal facilities are water dependant uses that are restricted by federal, state, and local land use and environmental regulations. Generally, all sites proposed for further analysis have water transportation compatible surrounding uses.

While jurisdictions have been notified of this work, specific conversations about proposed improvements have not yet been vetted or approved. Generally most agencies have shown support for the service. It is understood that land use processes locally, as well as, federal and state environmental review would occur prior to infrastructure construction occurs and service is provided.

5. Routes for Future Analysis

Routes identified for further ridership demand analysis include:

1. Kenmore (Log Boom Park) to UW WAC

   Log Boom Park in Kenmore is located along the Burke Gilman trail and nearby the Kenmore City center. The City continues to be very interested in future water taxi service to their jurisdiction. This route is very time competitive due to the congestion on highways 522 and I-5. Additionally, a connection to UW provides a direct destination connection, as well as a connecting location to Downtown Seattle to the south and north after Link Light rail expansion. This route provides a 26 minute round trip total trip time differential from the transit mode alternative and a 23 minute differential from a personal vehicle mode.

2. Kenmore (Log Boom Park) to Bellevue (Marina)

   Log Boom Park in Kenmore is located along the Burke Gilman trail and nearby the Kenmore City center. The City continues to be very interested in future water taxi service to their jurisdiction. This route is very time competitive due to the congestion on highways 522 and the 405 corridor. Future tolling on 405 provides additional unknowns about increase in corridor congestion. The connection at Bellevue Marina, however is comprised of a very steep slope down to the waterfront which could prove challenging for both pedestrians and shuttles. The City of Bellevue Comprehensive Plan is prioritizing improvements to the pedestrian connections from downtown Bellevue to Meydenbauer Bay. This route is the second most competitive of those analyzed at a 16 minute total round-trip time differential from the transit mode alternative and a 25 minute differential from a personal vehicle mode.

3. Kirkland (Marina Park) to UW WAC

   Kirkland Marina Park is located in the heart of downtown Kirkland. The Marina is just two blocks away from the Kirkland Transit Center. This route is very competitive of those analyzed, with a 17 minute round- trip time differential from the transit mode alternative, however a 46 minute differential from a personal vehicle mode. This comparison to the personal vehicle travel times could become more competitive when tolling is implemented on I-90 and traffic balances out between the two toll roads.

4. Bellevue (Marina) to UW WAC

   As mentioned in item #2 above, the Bellevue terminal location presents many challenges for pedestrians. While this route met the time competitiveness evaluation criteria (at a 38 minute differential), it is noted that the current plans to extend light rail to downtown Bellevue will provide an even more competitive mode of travel with connection to downtown Seattle, University of Washington and SeaTac Airport. This route has a 38 minute round- trip time differential from the transit mode alternative and a 56 minute differential from a personal vehicle mode.

5. Renton to Bellevue (Marina)

   The terminal site in Renton is located on private property owned by SECO Development Group. The Bristol at Southport is a luxury apartment complex which is located adjacent to the dock. The neighboring property is also owned by SECO and is currently being developed with a new hotel and office space. This route is very time competitive due to the congestion on the 405 corridor. Future tolling on 405 provides additional unknowns about increases in corridor congestion. The connection at Bellevue Marina, however is comprised by a very steep slope down to the waterfront which could prove challenging for both pedestrians and shuttles. This route is the most competitive of those analyzed at a 13 minute round-trip time differential from the transit mode and a 12 minute differential from a personal vehicle mode.

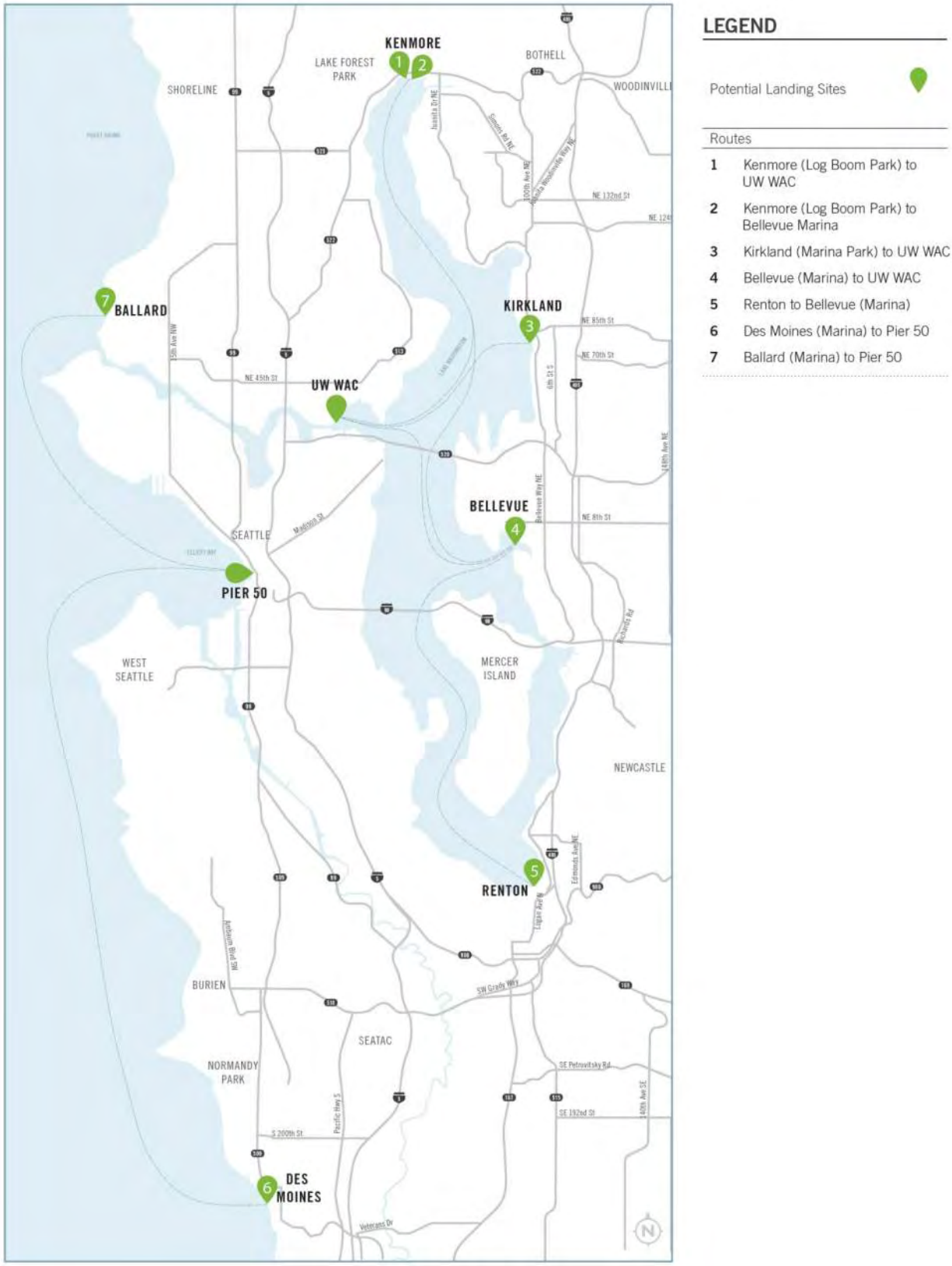
6. Des Moines (Marina) to Downtown Seattle (Pier 50)

   The terminal site in Des Moines is located in the Des Moines Marina. As mentioned previously in this report, parking was assumed on-site in order to make this a competitive route. If parking is not available on-site, this route would have a fatal flaw. While the travel time competitiveness was compared to current transit routes, Des Moines will have a Link light rail connection in 2023. Downtown Seattle (Pier 50) is the current Water Taxi terminal and has good pedestrian connections to surrounding employment and the Transit Tunnel. This route has a 39 minute round-trip time differential from the transit mode alternative and a 30 minute differential from a personal vehicle mode.

7. Ballard (Marina) to Downtown Seattle (Pier 50)

   The terminal site in Ballard is located in the Shilshole Bay Marina. Much like Des Moines, parking was assumed on-site in order to make this a competitive route. If parking is not available on-site, this route would have a fatal flaw as transit and pedestrian access to the Marina are very challenging. Pier 50 in Seattle is the current Water Taxi terminal and has good pedestrian connections to surrounding employment and the Transit Tunnel. This route has a 29 minute round- trip time differential from the transit mode alternative and a 34 minute differential from a personal vehicle mode.

Figure 3: Routes for Future Analysis



Appendix A

Assumptions

Travel Times:

- Loading and unloading of passengers will take a total of 7 minutes. That includes 4 minutes to load and 3 minutes to unload.
- Maneuvering time baseline is set to 1.5 minutes. This baseline is modified when identified that more or less time is needed by experienced KCMD Captains.
- POF travel times factored in walk time to the landing site and from the landing site to connecting transit. For example, there is a 3 minute walk from the drop-off location at the Kenmore Log Boom Park parking area to queuing. Similarly, a 6 minute walk time was calculated for the connection from UW Waterfront Activities Center (WAC) to the UW Link light rail station.
- Downtown Seattle destination/central business district can be defined as University Street Station at University Street and 3rd Avenue.
- The central business district of Bellevue defined as the Bellevue Transit Center at 108th Ave NE and NE 6th St.
- Commute periods: arrival at destination at 8:00 AM and departure time at 5:00 PM
- Vehicle and transit trips were calculated from the same point, either transit center or nearest park and ride with capacity of greater than 50 cars, unless on-site parking was assumed.
- Based on information received from Sound Transit, travel time between the UW Link light rail station and University Street Station is estimated to be approximately 10 minutes.
- Public transit travel times were calculated using Metro trip planner, which relies on transit schedules—planned for average delay, however does not take into account above average delay or special event delay.
- Personal vehicle trips were calculated at approximately 7:30 AM and 5:00 PM Tuesday through Thursday, with times (which include traffic) averaged over a two week period using Google Maps travel time.

Total trip travel times by mode where calculated using whole trip mode time from first point (transit center, park and ride or terminal) to downtown Seattle at 3rd Avenue and University. (i.e. shuttle to POF terminal, walk from drop off to queue, POF crossing, walk time to from POF terminal to transit connection, transit crossing.) “Just in time: departure of water taxi with no wait time on the dock was assumed.

Seat Changes or Transfers:

- Arrival to the first point in the commute was not considered a seat change (i.e. car or walk from home to transit center, park and ride or terminal)
- Driving a personal vehicle was not considered a seat change.
- Taking a shuttle to the POF terminal was considered one seat change.

Fares:

- Current 2015 Metro and Sound Transit fares were used to calculate transit mode cost.
- The highest fare in the transit trip was used for the max fare for the one-way trip.
- The 2016 KCWT Vashon Route fare ($5.25) was used as a placeholder to calculate potential POF fare.
- The 2015 IRS Standard Mileage Rate ($0.575) was used to calculate operating costs for personal vehicle mode of travel.
- 2015 peak toll rates were applied to trips across State Route 520.
- Parking fees were not included in trip calculation, which can range from $15.00 to $30.00 for 8 hours of peak period parking.

Parking Availability:

- Parking capacity at the terminal was evaluated during the site inspections and information received from agencies.
- On-site parking was assumed at Des Moines, Ballard, Lakepoint and Renton.

Shuttle Requirements:

- Park and rides within ¼-mile of the terminal were considered walkable and therefore would not require shuttle service.
- Terminals without parking available onsite or without a park and ride within ¼-mile of the site required a shuttle.
- When needed, shuttle travel time was calculated from the nearest park and ride (Kenmore) or transit center (Bellevue) to the landing site.
- Shuttle drop-off would occur at nearest possible point to the POF dock.

Appendix B

Site Evaluation Matrix

Route	Ownership	Time Competitive	Departure Site Access	Destination Transit/Ped Connections	Parking/Shuttle Needs	Other/Notes
Kenmore (Log Boom Park) to UW WAC	Public	●	◓	●	@ Nearest Park and Ride, Shuttle needed	Route moving forward in analysis
Kenmore (Log Boom Park) to UW Oceanography	Public	○	◓	○	@ Nearest Park and Ride, Shuttle needed	Is not time competitive, therefore eliminated
Kenmore (Log Boom Park) to Madison	Public	○	◓	◓	@ Nearest Park and Ride, Shuttle needed	Is not time competitive, therefore eliminated
Kenmore (Log Boom Park) to Leschi	Public	○	◓	◓	@ Nearest Park and Ride, Shuttle needed	Is not time competitive, therefore eliminated
Kenmore (Log Boom Park) to Bellevue	Public	●	◓	◓	@ Nearest Park and Ride, Shuttle needed	Route moving forward in analysis
Kenmore (Lakepointe) to UW WAC	Private (development timeframe unknown)	●	N/A	●	Parking is a possibility on-site as a part of site redevelopment	Development timeframe unknown, therefore eliminated. Log Boom is carried forward as Kenmore site
Kenmore (Lakepointe) to UW Oceanography	Private (development timeframe unknown)	●	N/A	○	Parking is a possibility on-site as a part of site redevelopment	Eliminated due to superior connection (due to light rail) at UW WAC
KEY		● Yes/Good	◓ Moderate	○ No/Poor		
Kenmore (Lakepointe) to Madison	Private (development timeframe unknown)	●	N/A	◓	Parking is a possibility on-site as a part of site redevelopment	Eliminated due to superior connection at UW WAC

Route	Ownership	Time Competitive	Departure Site Access	Destination Transit/Ped Connections	Parking/Shuttle Needs	Other/Notes
Kenmore (Lakepointe) to Leschi	Private (development timeframe unknown)	●	N/A	◓	Parking is a possibility on-site as a part of site redevelopment	Eliminated due to superior connection at UW WAC
Kenmore (Lakepointe) to Bellevue	Private (development timeframe unknown)	●	N/A	◓	Parking is a possibility on-site as a part of site redevelopment	Development timeframe unknown, therefore eliminated. Log Boom is carried forward as Kenmore site
Kirkland (Marina Park) to UW WAC	Public	●	●	●	No parking available No shuttle needed	Route moving forward in analysis
Kirkland (Marina Park) to UW Oceanography	Public	●	●	○	No parking available No shuttle needed	Walking route is indirect to the Link light rail station.
Kirkland (Marina Park) to Madison	Public	●	●	◓	No parking available No shuttle needed	Eliminated due to superior connection at UW WAC
Kirkland (Marina Park) to Leschi	Public	●	●	◓	No parking available No shuttle needed	Eliminated due to superior connection at UW WAC
Kirkland (Carillon Point) to UW WAC	Private (built out)	●	◓	●	Parking on-site	Eliminated due to superior connection at Marina Park, Kirkland
KEY		● Yes/Good	◓ Moderate	○ No/Poor		
Kirkland (Carillon Point) to UW Oceanography	Private (built out)	●	◓	○	Parking on-site	Walking route is indirect to the Link light rail station.
Kirkland (Carillon Point) to Madison	Private (built out)	●	◓	◓	Parking on-site	Eliminated due to superior connection at UW WAC
Kirkland (Carillon Point) to Leschi	Private (built out)	●	◓	◓	Parking on-site	Eliminated due to superior connection at UW WAC
Bellevue to UW WAC	Public	●	◓	●	No parking available Shuttle needed from transit center	Route moving forward in analysis

Route	Ownership	Time Competitive	Departure Site Access	Destination Transit/Ped Connections	Parking/Shuttle Needs	Other/Notes
Bellevue to UW Oceanography	Public	○	◓	○	No parking available Shuttle needed from transit center	Is not time competitive, therefore eliminated
Bellevue to Madison	Public	●	◓	◓	No parking available Shuttle needed from transit center	Eliminated due to superior connection at UW WAC
Bellevue to Leschi	Public	●	◓	◓	No parking available Shuttle needed from transit center	Eliminated due to superior connection at UW WAC
Renton to UW WAC	Private (under construction)	○	●	●	Parking assumed at development site	Is not time competitive, therefore eliminated
Renton to UW Oceanography	Private (under construction)	○	●	○	Parking assumed at development site	Is not time competitive, therefore eliminated
KEY		● Yes/Good	◓ Moderate	○ No/Poor		
Renton to Madison	Private (under construction)	○	●	◓	Parking assumed at development site	Is not time competitive, therefore eliminated
Renton to Leschi	Private (under construction)	●	●	◓	Parking assumed at development site	Eliminated due to superior connection at UW WAC
Renton to Bellevue	Private (under construction)	●	●	◓	Parking assumed at development site	Route moving forward in analysis
Des Moines to Downtown Seattle (Pier 50)	Public	●	◓	●	Parking assumed at Marina	Route moving forward in analysis
Ballard to Downtown Seattle (Pier 50)	Quasi Public	●	◓	●	Parking assumed at Marina	Route moving forward in analysis
Ballard (24th) to South Lake Union	Public	○	●	●	No parking, located near neighborhood center	Is not time competitive, therefore eliminated
KEY		● Yes/Good	◓ Moderate	○ No/Poor		

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Appendix C

POF Travel Time and Cost Summary

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Summary of Travel Time and Costs for Each Route (35 knots)

	Route	Total Trip Delta: delta POF/ Transit	Total Trip Delta: delta POF/Car	Total Trip Time: POF	Total Trip Time: Transit	Total Trip Time: Car	AM Commute by Mode: POF (35knt) Travel Time	AM Commute by Mode: Transit	AM Commute by Mode: Car	PM Commute by Mode: POF (35knt) Travel Time	PM Commute by Mode: Transit	PM Commute by Mode: Car	PM Delta: delta POF/ Transit	PM Delta: delta POF/Car	AM Delta: delta POF/ Transit	AM Delta: delta POF/Car	Cost (one-way): POF	Cost (one-way): Bus/Light Rail	Cost (one-way): Car*	Cost: delta POF/ Transit	Cost: delta POF/Car
1	**Kenmore (LB) to UW WAC**	0:26	0:23	1:49	1:23	1:25	54.8	39	43	54.8	44	42	10.8	12.5	15.8	11.4	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
	Kenmore (LB) to UW Oceanography	0:51	0:48	2:14	1:23	1:25	67.1	39	43	67.1	44	42	23.1	24.8	28.1	23.7	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
	Kenmore (LB) to Madison	0:46	0:44	2:09	1:23	1:25	62.0	39	43	68.0	44	42	24.0	25.6	23.0	18.6	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
	~~Kenmore (LB) to Leschi~~	0:43	0:40	2:06	1:23	1:25	61.1	39	43	65.1	44	42	21.1	22.8	22.1	17.7	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
2	**Kenmore (LB) to Bellevue**	0:16	0:25	1:39	1:23	1:14	49.7	41	36	49.7	42	38	7.7	11.7	8.7	13.7	$ 5.25	$ 2.75	$ 7.99	$ 2.50	$ (2.74)
	~~Kenmore (LP) to UW WAC~~	0:12	0:09	1:35	1:23	1:25	47.8	39	43	47.8	44	42	3.8	5.5	8.8	4.4	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
	~~Kenmore (LP) to UW Oceanography~~	0:24	0:22	1:47	1:23	1:25	60.1	39	43	47.8	44	42	3.8	5.5	21.1	16.7	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
	~~Kenmore (LP) to Madison~~	0:32	0:30	1:55	1:23	1:25	55.0	39	43	61.0	44	42	17.0	18.6	16.0	11.6	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
	~~Kenmore (LP) to Leschi~~	0:29	0:26	1:52	1:23	1:25	54.1	39	43	58.1	44	42	14.1	15.8	15.1	10.7	$ 5.25	$ 2.50	$ 8.11	$ 2.75	$ (2.86)
	~~Kenmore (LP) to Bellevue~~	0:05	0:14	1:28	1:23	1:14	43.7	41	36	44.7	42	38	2.7	6.7	2.7	7.7	$ 5.25	$ 2.75	$ 7.99	$ 2.50	$ (2.74)
3	**Kirkland (Marina) to UW WAC**	0:21	0:50	1:40	1:19	0:50	50.2	34	22	50.2	45	28	5.2	22.2	16.2	28.2	$ 5.25	$ 3.25	$ 11.91	$ 2.00	$ (6.66)
	~~Kirkland (Marina) to UW Oceanography~~	0:30	0:59	1:49	1:19	0:50	59.2	34	22	50.2	45	28	5.2	22.2	25.2	37.2	$ 5.25	$ 3.25	$ 11.91	$ 2.00	$ (6.66)
	~~Kirkland (Marina) to Madison~~	0:34	1:03	1:53	1:19	0:50	53.9	34	22	59.9	45	28	14.9	31.9	19.9	31.9	$ 5.25	$ 3.25	$ 11.91	$ 2.00	$ (6.66)
	~~Kirkland (Marina) to Leschi~~	0:31	1:00	1:50	1:19	0:50	53.1	34	22	57.1	45	28	12.1	29.1	19.1	31.1	$ 5.25	$ 3.25	$ 11.91	$ 2.00	$ (6.66)
	~~Kirkland (Carillon) to UW WAC~~	0:23	0:45	1:20	0:57	0:35	40.2	27	18	40.2	30	18	10.2	22.5	13.2	22.5	$ 5.25	$ 3.25	$ 8.98	$ 2.00	$ (3.73)
	~~Kirkland (Carillon) to UW Oceanography~~	0:39	1:01	1:36	0:57	0:35	48.2	27	18	48.2	30	18	18.2	30.5	21.2	30.5	$ 5.25	$ 3.25	$ 8.98	$ 2.00	$ (3.73)
	~~Kirkland (Carillon) to Madison~~	0:37	0:58	1:34	0:57	0:35	47.2	27	18	47.2	30	18	17.2	29.5	20.2	29.5	$ 5.25	$ 3.25	$ 8.98	$ 2.00	$ (3.73)
	~~Kirkland (Carillon) to Leschi~~	0:39	1:01	1:36	0:57	0:35	46.3	27	18	50.3	30	18	20.3	32.6	19.3	28.6	$ 5.25	$ 3.25	$ 8.98	$ 2.00	$ (3.73)
4	**Bellevue to UW WAC**	0:38	0:56	1:43	1:05	0:47	51.7	32	22	51.7	33	25	18.7	26.7	19.7	29.7	$ 5.25	$ 2.50	$ 10.13	$ 2.75	$ (4.88)
	~~Bellevue to UW Oceanography~~	1:03	1:21	2:08	1:05	0:47	64.0	32	22	64.0	33	25	31.0	39.0	32.0	42.0	$ 5.25	$ 2.50	$ 10.13	$ 2.75	$ (4.88)
	~~Bellevue to Madison~~	0:38	0:56	1:43	1:05	0:47	51.8	32	22	51.8	33	25	18.8	26.8	19.8	29.8	$ 5.25	$ 2.50	$ 10.13	$ 2.75	$ (4.88)
	~~Bellevue to Leschi~~	0:33	0:51	1:38	1:05	0:47	47.1	32	22	51.1	33	25	18.1	26.1	15.1	25.1	$ 5.25	$ 2.50	$ 10.13	$ 2.75	$ (4.88)
	~~Renton to UW WAC~~	0:49	0:52	1:56	1:07	1:03	58.1	31	32	58.1	36	32	22.1	26.5	27.1	26.1	$ 5.25	$ 3.25	$ 10.18	$ 2.00	$ (4.93)
	~~Renton to UW Oceanography~~	1:13	1:17	2:20	1:07	1:03	70.4	31	32	70.4	36	32	34.4	38.7	39.4	38.4	$ 5.25	$ 3.25	$ 10.18	$ 2.00	$ (4.93)
	~~Renton to Madison~~	0:49	0:52	1:56	1:07	1:03	58.1	31	32	58.1	36	32	22.1	26.5	27.1	26.1	$ 5.25	$ 3.25	$ 10.18	$ 2.00	$ (4.93)
	~~Renton to Leschi~~	0:37	0:41	1:44	1:07	1:03	50.5	31	32	54.5	36	32	18.5	22.8	19.5	18.5	$ 5.25	$ 3.25	$ 10.18	$ 2.00	$ (4.93)
5	**Renton to Bellevue**	0:13	0:12	1:16	1:03	1:03	37.6	23	30	38.6	40	34	-1	4	15	8	$ 5.25	$ 2.50	$ 6.10	$ 2.75	$ (0.85)
6	**Des Moines to Pier 50**	0:39	0:30	1:41	1:02	1:10	50.6	28	37	50.6	34	34	17	17	23	13	$ 5.25	$ 3.25	$ 9.78	$ 2.00	$ (4.53)
7	**Ballard to Pier 50**	0:29	0:34	1:18	0:49	0:44	39.4	21	20	39.4	28	24	11	15	18	19	$ 5.25	$ 2.75	$ 3.22	$ 2.50	$ 2.03
	~~Ballard to SLU~~	1:03	1:08	1:52	0:49	0:44	55.1	21	20	57.1	28	24	29	33	34	35	$ 5.25	$ 2.75	$ 3.22	$ 2.50	$ 2.03
	Key	< 40 min Delta					Fastest Travel Time			Fastest Travel Time							Lowest Cost			Less than $3	
																	*Does not include parking				

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Appendix D

POF Travel Times

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DRAFT CROSSING TIME MODEL

Note: For all variables with a base assumption, conditional formatting is set up to highlight assumptions that differ from the base value

		From Kenmore										From Renton					From Kirkland									From Bellevue				To Pier 50		
SLOW ESTIMATE	**Base Assumption**	**Kenmore LB- UW WAC**	**Kenmore LB- UW (OD)**	**Kenmore LB- Madison**	**Kenmore LB- Leschi**	**Kenmore LB- Bellevue**	**Kenmore LP – UW WAC**	**Kenmore LP – UW (OD)**	**Kenmore LP – Madison**	**Kenmore LP – Leschi**	**Kenmore LB- Bellevue**	**Renton – UW WAC**	**Renton – UW (OD)**	**Renton – Madison**	**Renton – Leschi**	**Renton – Bellevue**	**Kirkland (MP) – UW WAC**	**Kirkland (MP) – UW (OD)**	**Kirkland (MP) – Madison**	**Kirkland (MP) – Leschi**	**Kirkland (CP) – UW WAC**	**Kirkland (CP) – UW (OD)**	**Kirkland (CP) – Madison**	**Kirkland (CP) – Leschi**	**Bellevue – UW WAC**	**Bellevue – UW (OD)**	**Bellevue – Madison**	**Bellevue – Leschi**	**Des Moines – Pier 50**	**Ballard Marina –Pier 50**	**Ballard (24th)– SLU**
Total Route length (nautical miles)		8.65	9.15	8.20	10.30	10.57	8.80	9.30	8.35	10.45	10.72	12.55	13.05	11.10	8.46	7.32	4.15	4.65	3.60	5.70	3.75	4.25	3.20	5.30	4.87	5.37	3.47	2.57	10.35	5.80	3.40
Route length at max speed		7.40	7.40	7.40	9.65	9.97	7.40	7.40	7.40	9.65	9.97	10.95	10.95	10.75	8.06	6.97	3.52	3.10	3.00	5.25	2.65	2.65	2.55	4.80	3.52	3.52	3.37	2.42	9.35	5.30	2.90
Route length at reduced speed	0.00	0.95	1.45	0.50	0.30	0.30	0.95	1.45	0.50	0.30	0.30	1.50	2.00	0.25	0.25	0.25	1.25	1.45	0.50	0.30	0.95	1.45	0.50	0.30	1.25	1.75	0.00	0.00	1.00	0.50	0.50
Max Speed (knots)	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	7.00
Reduced Speed (knots)	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Time allowed for passenger loading (min)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Time allowed for maneuvers over first .15 mile (min)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Crossing time at max speed (min)		15.86	15.86	15.86	20.68	21.36	15.86	15.86	15.86	20.68	21.36	23.46	23.46	23.04	17.27	14.94	7.54	6.64	6.43	11.25	5.68	5.68	5.46	10.29	7.54	7.54	7.22	5.19	20.04	11.36	24.86
Crossing time at reduced speed (min)		8.14	12.43	4.29	2.57	2.57	8.14	12.43	4.29	2.57	2.57	12.86	17.14	2.14	2.14	2.14	10.71	12.43	4.29	2.57	8.14	12.43	4.29	2.57	10.71	15.00	0.00	0.00	8.57	4.29	4.29
Time allowed for maneuvers over last .15 mile (min)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Time allowed for passenger unloading (min)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Total Crossing Time		35.00	39.29	31.14	34.25	34.94	35.00	39.29	31.14	34.25	34.94	46.82	51.11	35.68	29.91	27.58	28.76	29.57	21.21	24.32	25.32	29.61	21.25	24.36	29.26	33.54	18.22	16.19	39.61	26.64	40.14
Margin for delay en route (% of crossing time)	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Margin for Delay Crossing Time		**35.00**	**39.29**	**31.14**	**34.25**	**34.94**	**35.00**	**39.29**	**31.14**	**34.25**	**34.94**	**46.82**	**51.11**	**35.68**	**29.91**	**27.58**	**28.76**	**29.57**	**21.21**	**24.32**	**25.32**	**29.61**	**21.25**	**24.36**	**29.26**	**33.54**	**18.22**	**16.19**	**39.61**	**26.64**	
Number of Crossings in 4 hr Window	210	**6.00**	**5.35**	**6.74**	**6.13**	**6.01**	**6.00**	**5.35**	**6.74**	**6.13**	**6.01**	**4.49**	**4.11**	**5.89**	**7.02**	**7.61**	**7.30**	**7.10**	**9.90**	**8.63**	**8.29**	**7.09**	**9.88**	**8.62**	**7.18**	**6.26**	**11.52**	**12.97**	**5.30**	**7.88**	

BASELINE ESTIMATE	**Base Assumption**	**Kenmore LB- UW WAC**	**Kenmore LB- UW (OD)**	**Kenmore LB- Madison**	**Kenmore LB- Leschi**	**Kenmore LB- Bellevue**	**Kenmore LP – UW WAC**	**Kenmore LP – UW (OD)**	**Kenmore LP – Madison**	**Kenmore LP – Leschi**	**Kenmore LB- Bellevue**	**Renton – UW WAC**	**Renton – UW (OD)**	**Renton – Madison**	**Renton – Leschi**	**Renton – Bellevue**	**Kirkland (MP) – UW WAC**	**Kirkland (MP) – UW (OD)**	**Kirkland (MP) – Madison**	**Kirkland (MP) – Leschi**	**Kirkland (CP) – UW WAC**	**Kirkland (CP) – UW (OD)**	**Kirkland (CP) – Madison**	**Kirkland (CP) – Leschi**	**Bellevue – UW WAC**	**Bellevue – UW (OD)**	**Bellevue – Madison**	**Bellevue – Leschi**	**Des Moines – Pier 50**	**Ballard Marina –Pier 50**	**Ballard (24th)– SLU**
Total Route length (nautical miles)		8.65	9.15	8.20	10.30	10.57	8.80	9.30	8.35	10.45	10.72	12.55	13.05	11.10	8.46	7.32	4.15	4.65	3.60	5.70	3.75	4.25	3.20	5.30	4.87	5.37	3.47	2.57	10.35	5.80	3.40
Route length at max speed		7.40	7.40	7.40	9.65	9.97	7.40	7.40	7.40	9.65	9.97	10.95	10.95	10.75	8.06	6.97	3.52	3.10	3.00	5.25	2.65	2.65	2.55	4.80	3.52	3.52	3.37	2.42	9.35	5.30	2.90
Route length at reduced speed	0.00	0.95	1.45	0.50	0.30	0.30	0.95	1.45	0.50	0.30	0.30	1.50	2.00	0.25	0.25	0.25	1.25	1.45	0.50	0.30	0.95	1.45	0.50	0.30	1.25	1.75	0.00	0.00	1.00	0.50	0.50
Max Speed (knots)	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	7.00
Reduced Speed (knots)	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Time allowed for passenger loading (mir	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Time allowed for maneuvers over first .15 mile (min)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Crossing time at max speed (min)		14.80	14.80	14.80	19.30	19.94	14.80	14.80	14.80	19.30	19.94	21.90	21.90	21.50	16.12	13.94	7.04	6.20	6.00	10.50	5.30	5.30	5.10	9.60	7.04	7.04	6.74	4.84	18.70	10.60	24.86
Crossing time at reduced speed (min)		8.14	12.43	4.29	2.57	2.57	8.14	12.43	4.29	2.57	2.57	12.86	17.14	2.14	2.14	2.14	10.71	12.43	4.29	2.57	8.14	12.43	4.29	2.57	10.71	15.00	0.00	0.00	8.57	4.29	4.29
Time allowed for maneuvers over last .15 mile (min)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Time allowed for passenger unloading (min)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Total Crossing Time		33.94	38.23	30.09	32.87	33.51	33.94	38.23	30.09	32.87	33.51	45.26	49.54	34.14	28.76	26.58	28.25	29.13	20.79	23.57	24.94	29.23	20.89	23.67	28.75	33.04	17.74	15.84	38.27	25.89	40.14
Margin for delay en route (% of crossing time)	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Margin for Delay Crossing Time		**33.94**	**38.23**	**30.09**	**32.87**	**33.51**	**33.94**	**38.23**	**30.09**	**32.87**	**33.51**	**45.26**	**49.54**	**34.14**	**28.76**	**26.58**	**28.25**	**29.13**	**20.79**	**23.57**	**24.94**	**29.23**	**20.89**	**23.67**	**28.75**	**33.04**	**17.74**	**15.84**	**38.27**	**25.89**	**40.14**
Number of Crossings in 4 hr Window	210	**6.19**	**5.49**	**6.98**	**6.39**	**6.27**	**6.19**	**5.49**	**6.98**	**6.39**	**6.27**	**4.64**	**4.24**	**6.15**	**7.30**	**7.90**	**7.43**	**7.21**	**10.10**	**8.91**	**8.42**	**7.18**	**10.05**	**8.87**	**7.30**	**6.36**	**11.84**	**13.26**	**5.49**	**8.11**	**5.23**

MEDIUM ESTIMATE	**Base Assumption**	**Kenmore LB- UW WAC**	**Kenmore LB- UW (OD)**	**Kenmore LB- Madison**	**Kenmore LB- Leschi**	**Kenmore LB- Bellevue**	**Kenmore LP – UW WAC**	**Kenmore LP – UW (OD)**	**Kenmore LP – Madison**	**Kenmore LP – Leschi**	**Kenmore LB- Bellevue**	**Renton – UW WAC**	**Renton – UW (OD)**	**Renton – Madison**	**Renton – Leschi**	**Renton – Bellevue**	**Kirkland (MP) – UW WAC**	**Kirkland (MP) – UW (OD)**	**Kirkland (MP) – Madison**	**Kirkland (MP) – Leschi**	**Kirkland (CP) – UW WAC**	**Kirkland (CP) – UW (OD)**	**Kirkland (CP) – Madison**	**Kirkland (CP) – Leschi**	**Bellevue – UW WAC**	**Bellevue – UW (OD)**	**Bellevue – Madison**	**Bellevue – Leschi**	**Des Moines – Pier 50**	**Ballard Marina –Pier 50**	**Ballard (24th)– SLU**
Route length (nautical miles)		8.65	9.15	8.20	10.30	10.57	8.80	9.30	8.35	10.45	10.72	12.55	13.05	11.10	8.46	7.32	4.15	4.65	3.60	5.70	3.75	4.25	3.20	5.30	4.87	5.37	3.47	2.57	10.35	5.80	3.40
Route length at max speed		7.40	7.40	7.40	9.65	9.97	7.40	7.40	7.40	9.65	9.97	10.95	10.95	10.75	8.06	6.97	3.52	3.10	3.00	5.25	2.65	2.65	2.55	4.80	3.52	3.52	3.37	2.42	9.35	5.30	2.90
Route length at reduced speed	0.00	0.95	1.45	0.50	0.30	0.30	0.95	1.45	0.50	0.30	0.30	1.50	2.00	0.25	0.25	0.25	1.25	1.45	0.50	0.30	0.95	1.45	0.50	0.30	1.25	1.75	0.00	0.00	1.00	0.50	0.50
Max Speed (knots)	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	7.00
Reduced Speed (knots)	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Time allowed for passenger loading (min)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Time allowed for maneuvers over first .15 mile (min)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Crossing time at max speed (min)		12.69	12.69	12.69	16.54	17.09	12.69	12.69	12.69	16.54	17.09	18.77	18.77	18.43	13.82	11.95	6.03	5.31	5.14	9.00	4.54	4.54	4.37	8.23	6.03	6.03	5.78	4.15	16.03	9.09	24.86
Crossing time at reduced speed (min)		8.14	12.43	4.29	2.57	2.57	8.14	12.43	4.29	2.57	2.57	12.86	17.14	2.14	2.14	2.14	10.71	12.43	4.29	2.57	8.14	12.43	4.29	2.57	10.71	15.00	0.00	0.00	8.57	4.29	4.29
Time allowed for maneuvers over last .15 mile (min)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Time allowed for passenger unloading (min)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Total Crossing Time		31.83	36.11	27.97	30.11	30.66	31.83	36.11	27.97	30.11	30.66	42.13	46.41	31.07	26.46	24.59	27.25	28.24	19.93	22.07	24.19	28.47	20.16	22.30	27.75	32.03	16.78	15.15	35.60	24.37	40.14
Margin for delay en route (% of crossing time)	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Margin for Delay Crossing Time		**31.83**	**36.11**	**27.97**	**30.11**	**30.66**	**31.83**	**36.11**	**27.97**	**30.11**	**30.66**	**42.13**	**46.41**	**31.07**	**26.46**	**24.59**	**27.25**	**28.24**	**19.93**	**22.07**	**24.19**	**28.47**	**20.16**	**22.30**	**27.75**	**32.03**	**16.78**	**15.15**	**35.60**	**24.37**	**40.14**
Number of Crossings in 4 hr Window	210	**6.60**	**5.81**	**7.51**	**6.97**	**6.85**	**6.60**	**5.81**	**7.51**	**6.97**	**6.85**	**4.98**	**4.52**	**6.76**	**7.94**	**8.54**	**7.71**	**7.44**	**10.54**	**9.51**	**8.68**	**7.38**	**10.42**	**9.42**	**7.57**	**6.56**	**12.52**	**13.86**	**5.90**	**8.62**	**5.23**

FAST ESTIMATE	**Base Assumption**	**Kenmore LB- UW WAC**	**Kenmore LB- UW (OD)**	**Kenmore LB- Madison**	**Kenmore LB- Leschi**	**Kenmore LB- Bellevue**	**Kenmore LP – UW WAC**	**Kenmore LP – UW (OD)**	**Kenmore LP – Madison**	**Kenmore LP – Leschi**	**Kenmore LB- Bellevue**	**Renton – UW WAC**	**Renton – UW (OD)**	**Renton – Madison**	**Renton – Leschi**	**Renton – Bellevue**	**Kirkland (MP) – UW WAC**	**Kirkland (MP) – UW (OD)**	**Kirkland (MP) – Madison**	**Kirkland (MP) – Leschi**	**Kirkland (CP) – UW WAC**	**Kirkland (CP) – UW (OD)**	**Kirkland (CP) – Madison**	**Kirkland (CP) – Leschi**	**Bellevue – UW WAC**	**Bellevue – UW (OD)**	**Bellevue – Madison**	**Bellevue – Leschi**	**Des Moines – Pier 50**	**Ballard Marina –Pier 50**	**Ballard (24th)– SLU**
Route length (nautical miles)		8.65	9.15	8.20	10.30	10.57	8.80	9.30	8.35	10.45	10.72	12.55	13.05	11.10	8.46	7.32	4.15	4.65	3.60	5.70	3.75	4.25	3.20	5.30	4.87	5.37	3.47	2.57	10.35	5.80	3.40
Route length at max speed		7.40	7.40	7.40	9.65	9.97	7.40	7.40	7.40	9.65	9.97	10.95	10.95	10.75	8.06	6.97	3.52	3.10	3.00	5.25	2.65	2.65	2.55	4.80	3.52	3.52	3.37	2.42	9.35	5.30	2.90
Route length at reduced speed	0.00	0.95	1.45	0.50	0.30	0.30	0.95	1.45	0.50	0.30	0.30	1.50	2.00	0.25	0.25	0.25	1.25	1.45	0.50	0.30	0.95	1.45	0.50	0.30	1.25	1.75	0.00	0.00	1.00	0.50	0.50
Max Speed (knots)	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	7.00
Reduced Speed (knots)	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Time allowed for passenger loading (min)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Time allowed for maneuvers over first .15 mile (min)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Crossing time at max speed (min)		11.68	11.68	11.68	15.24	15.74	11.68	11.68	11.68	15.24	15.74	17.29	17.29	16.97	12.73	11.01	5.56	4.89	4.74	8.29	4.18	4.18	4.03	7.58	5.56	5.56	5.32	3.82	14.76	8.37	24.86
Crossing time at reduced speed (min)		8.14	12.43	4.29	2.57	2.57	8.14	12.43	4.29	2.57	2.57	12.86	17.14	2.14	2.14	2.14	10.71	12.43	4.29	2.57	8.14	12.43	4.29	2.57	10.71	15.00	0.00	0.00	8.57	4.29	4.29
Time allowed for maneuvers over last .15 mile (min)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Time allowed for passenger unloading (min)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Total Crossing Time		30.83	35.11	26.97	28.81	29.31	30.83	35.11	26.97	28.81	29.31	40.65	44.93	29.62	25.37	23.65	26.77	27.82	19.52	21.36	23.83	28.11	19.81	21.65	27.27	31.56	16.32	14.82	34.33	23.65	40.14
Margin for delay en route (% of crossing time)	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Margin for Delay Crossing Time		**30.83**	**35.11**	**26.97**	**28.81**	**29.31**	**30.83**	**35.11**	**26.97**	**28.81**	**29.31**	**40.65**	**44.93**	**29.62**	**25.37**	**23.65**	**26.77**	**27.82**	**19.52**	**21.36**	**23.83**	**28.11**	**19.81**	**21.65**	**27.27**	**31.56**	**16.32**	**14.82**	**34.33**	**23.65**	**40.14**
Number of Crossings in 4 hr Window	210	**6.81**	**5.98**	**7.79**	**7.29**	**7.16**	**6.81**	**5.98**	**7.79**	**7.29**	**7.16**	**5.17**	**4.67**	**7.09**	**8.28**	**8.88**	**7.84**	**7.55**	**10.76**	**9.83**	**8.81**	**7.47**	**10.60**	**9.70**	**7.70**	**6.65**	**12.87**	**14.17**	**6.12**	**8.88**	**5.23**

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Appendix E

Route Competitiveness and Accessibility Data

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Route Competitiveness and Accessibility
Site: Kenmore - Log Boom Park

POF and Connection to Seattle/Bellevue Travel Time, Seat Changes, and Fare

UW: Washington Athletic Center											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			31.828571	AM	7:44	7:54	10	$ 5.25	54.83	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			31.8285714	$ 5.25	54.83	3	
UW: Oceanography Dock											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			36.114286	AM	7:44	7:54	10	$ 5.25	67.11	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			36.1142857	$ 5.25	67.11	3	
Madison Park											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Madison Park to Downtown				Summary of Route			
AM			27.971429	AM	7:22	7:47	25	$ 5.25	61.97	3	Metro RT 11
Bus/Express Bus from Madison Park to Downtown				POF				Summary of Route			
PM	5:14	5:45	31	PM			27.9714286	$ 5.25	67.97	3	Metro RT 11
Leschi											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Leschi to Downtown				Summary of Route			
AM			30.114286	AM	7:33	7:55	22	$ 5.25	61.11	3	Metro RT 27
Bus/Express Bus from Leschi to Downtown				POF				Summary of Route			
PM	5:01	5:27	26	PM			30.1142857	$ 5.25	65.11	3	Metro RT 27
Belleuve: Meydenbauer Bay											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Bellevue	Seat Changes	Comments
POF				Bus to Bellevue Transit Center				Summary of Route			
AM			30.662857	AM	7:54	7:55	1	$ 5.25	49.66	3	Metro 271
AM			30.662857	AM	7:57	7:59	2	$ 5.25	49.66	3	ST 550
Bellevue Transit Center to Dock				POF							
PM	5:04	5:07	2	PM			30.6628571	$ 5.25	49.66	3	Metro 271
PM	5:03	5:05	2	PM			30.6628571	$ 5.25	49.66	3	ST 550

Route Competitiveness and Accessibility
Site: Kenmore - Log Boom Park

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail to Seattle						
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Fare	Comments
AM	6:56	7:35	39	0	$ 2.50	ST Express Bus 522
AM	7:14	7:53	39	0	$ 3.25	Metro 312 Express
PM	5:04	5:49	45	0	$ 3.25	Metro 312 Express
PM	5:08	5:52	44	0	$ 2.50	ST Express Bus 522
Bus/Express Bus/Light Rail to Bellevue						
	Depart	Arrive	Travel Time to/from Bellevue	Seat Changes	Fare	Comments
AM	6:42	4:40	58	0	$ 2.75	Metro 234
AM	7:09	7:50	41	0	$ 2.75	Metro 342
PM	5:05	6:09	67	0	$ 2.75	Metro 234
PM	5:08	5:50	42	0	$ 2.75	Metro 342

Current Personal Vehicle Option Travel Time and Seat Change

Car	14.1 miles to Seattle					
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:17	8:00	43	0	$ 8.11	
PM	5:00	5:42	42	0	$ 8.11	
Car	13.9 miles to Bellevue					
	Depart	Arrive	Travel Time to/from Bellevue	Seat Changes	Cost	Comments
AM	7:24	8:00	36	0	$ 7.99	
PM	5:00	5:38	38	0	$ 7.99	

Route Competitiveness and Accessibility
Site: Kenmore - Log Boom Park

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
Bethany Bible Church 6214 Bothell Way NE	0.5	75	Limited, filled by 90% weekdays	Metro: 309, 312, 331, 342, 372 ST: 522
Kenmore Community Church 7504 NE Bothell Way	1.3	15	Limited, filled by 90% weekdays	Metro: 234, 244, 309, 312, 331, 342, 372 ST: 522
Kenmore Park & Ride 7346 NE Bothell Way	1.2	603	Limited, filled by 90% weekdays	Metro: 234, 244, 309, 312, 331, 342, 372 ST: 522

Route Competitiveness and Accessibility
Site: Kenmore - LakePointe

POF and Connection to Seattle/Bellevue Travel Time, Seat Changes, and Fare

UW: Washington Athletic Center											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			31.82857143	AM	7:44	7:54	10	$ 5.25	47.82857143	2	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			31.8285714	$ 5.25	47.82857143	2	
UW: Oceanography Dock											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			36.11428571	AM	7:44	7:54	10	$ 5.25	60.11428571	2	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			36.1142857	$ 5.25	60.11428571	2	
Madison Park											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Madison Park to Downtown				Summary of Route			
AM			27.97142857	AM	7:22	7:47	25	$ 5.25	54.97142857	2	Metro RT 11
Bus/Express Bus from Madison Park to Downtown				POF				Summary of Route			
PM	5:14	5:45	31	PM			27.9714286	$ 5.25	60.97142857	2	Metro RT 11
Leschi											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Leschi to Downtown				Summary of Route			
AM			30.11428571	AM	7:33	7:55	22	$ 5.25	54.11428571	2	Metro RT 27
Bus/Express Bus from Leschi to Downtown				POF				Summary of Route			
PM	5:01	5:27	26	PM			30.1142857	$ 5.25	58.11428571	2	Metro RT 27

Route Competitiveness and Accessibility
Site: Kenmore - LakePointe

Belleuve: Maydenbauer Bay											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Bellevue	Seat Changes	Comments
POF				Bus to Bellevue Transit Center				Summary of Route			
AM			30.66285714	AM	7:54	7:55	1	$ 5.25	44.66285714	2	Metro 271
AM			30.66285714	AM	7:57	7:59	2	$ 5.25	43.66285714	2	ST 550
Bellevue Transit Center to Dock				POF				Summary of Route			
PM	5:04	5:07	2	PM			30.6628571	$ 5.25	44.66285714	2	Metro 271
PM	5:03	5:05	2	PM			30.6628571	$ 5.25	44.66285714	2	ST 550

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail to Seattle						
	Depart	Arrive	Time to/from Seattle	Seat Changes	Fare	Comments
AM	6:56	7:35	39	0	$ 2.50	ST Express Bus 522
AM	7:14	7:53	39	0	$ 3.25	Metro 312 Express
PM	5:04	5:49	45	0	$ 3.25	Metro 312 Express
PM	5:08	5:52	44	0	$ 2.50	ST Express Bus 522
Bus/Express Bus/Light Rail to Bellevue						
	Depart	Arrive	Travel Time to/from Bellevue	Seat Changes	Fare	Comments
AM	6:42	4:40	58	0	$ 2.75	Metro 234
AM	7:09	7:50	41	0	$ 2.75	Metro 342
PM	5:05	6:09	67	0	$ 2.75	Metro 234
PM	5:08	5:50	42	0	$ 2.75	Metro 342

Current Personal Vehicle Option Travel Time and Seat Change

Car	14.1	miles to Seattle				
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM			43	0	$ 8.11	via I-522 and I-5
PM			42	0	$ 8.11	via I-522 and I-5
Car	13.9	miles to Bellevue				
	Depart	Arrive	Travel Time to/from	Seat Changes	Cost	Comments
AM			36	0	$ 7.99	Via I-405
PM			38	0	$ 7.99	Via I-405

Route Competitiveness and Accessibility
Site: Kenmore - LakePointe

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
Bethany Bible Church	0.5	75	Limited, filled by	Metro: 309, 312, 331, 342, 372
Kenmore Community Church	1.3	15	Limited, filled by	Metro: 234, 244, 309, 312, 331, 342,
Kenmore Park & Ride	1.2	603	Limited, filled by	Metro: 234, 244, 309, 312, 331, 342,

Route Competitiveness and Accessibility
Site: Kirkland - Marina Park

POF and Connection to Seattle Travel Time, Seat Changes, and Fare

UW: Washington Athletic Center											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			27.24857143	AM	7:44	7:54	10	$ 5.25	48.25	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			27.24857143	$ 5.25	48.25	3	
UW: Oceanography Dock											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			28.24285714	AM	7:44	7:54	10	$ 5.25	57.24	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			28.24285714	$ 5.25	57.24	3	
Madison Park											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Madison Park to Downtown				Summary of Route			
AM			19.92857143	AM	7:22	7:47	25	$ 5.25	51.93	3	
Bus/Express Bus from Madison Park to Downtown				POF				Summary of Route			
PM	5:14	5:45	31	PM			19.92857143	$ 5.25	57.93	3	
Leschi											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Leschi to Downtown				Summary of Route			
AM			22.07142857	AM	7:33	7:55	22	$ 5.25	51.07	3	
Bus/Express Bus from Leschi to Downtown				POF				Summary of Route			
PM	5:01	5:27	26	PM			22.07142857	$ 5.25	55.07	3	

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail						
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Fare	Comments
AM	7:22	7:56	34	0	$ 3.25	Metro RT 255
PM	5:03	5:48	45	0	$ 3.25	Metro RT 255

Current Personal Vehicle Option Travel Time and Seat Change

Car	14.1 miles via 520				17 miles via I-90	
	Depart	Arrive	Total Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:38	8:00	22	0	$ 11.91	520
AM	7:34	8:00	26	0	$ 9.78	90
PM	5:00	5:28	28	0	$ 11.91	520
PM	5:00	5:30	30	0	$ 9.78	90

Route Competitiveness and Accessibility
Site: Kirkland - Marina Park

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
Holy Spirit Lutheran Church 10021 NE 124th St	2.6	40		Metro: 234, 244, 255, 277
Houghton P&R 7024 116th Ave NE	1.9	470		Metro: 234, 245, 277, 342, 952, 981, 986
Kingsgate P&R 13001 116th Way NE	4.1	502	90% full by 9 AM weekdays	Metro: 235, 238, 244, 252, 255, 257, 277, 930
Kirkland Way P&R NE 85th St and Kirkland Way	1	20		Metro: 248
Korean Covenant Church of Kirkland 14220 Juanita/Woodinville	3.9	30		Metro: 238, 257
South Kirkland P&R 3677 108th Ave NE Bellevue	2.7	833	90% full by 9 AM weekdays	Metro: 234, 235, 249, 255, 981, 986 ST: 540

Route Competitiveness and Accessibility
Site: Kirkland - Carillon Point

POF and Connection to Seattle Travel Time, Seat Changes, and Fare

UW: Washington Athletic Center											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			24.18571429	AM	7:44	7:54	10	$ 5.25	40.19	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			24.1857143	$ 5.25	40.19	3	
UW: Oceanography Dock											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			28.47142857	AM	7:44	7:54	10	$ 5.25	48.19	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			28.4714286	$ 5.25	48.19	3	
Madison Park											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Madison Park to Downtown				Summary of Route			
AM			20.15714286	AM	7:22	7:47	25	$ 5.25	47.16	3	
Bus/Express Bus from Madison Park to Downtown				POF				Summary of Route			
PM	5:14	5:45	31	PM			20.1571429	$ 5.25	53.16	3	
Leschi											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Leschi to Downtown				Summary of Route			
AM			22.3	AM	7:33	7:55	22	$ 5.25	46.30	3	
Bus/Express Bus from Leschi to Downtown				POF				Summary of Route			
PM	5:01	5:27	26	PM			22.3	$ 5.25	50.30	3	

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail						
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Fare	Comments
AM	7:29	7:56	27	0	$ 3.25	Metro RT 255
PM	5:02	5:32	30	0	$ 3.25	Metro RT 255

Current Personal Vehicle Option Travel Time and Seat Change

Car	9 miles via		13.3 via I-90			
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:42	8:00	18	0	$ 8.98	Via 520
AM	7:36	8:00	24	0	$ 7.65	Via 90
PM	5:00	5:18	18	0	$ 8.98	Via 520
PM	5:00	5:27	27	0	$ 7.65	Via 90

Route Competitiveness and Accessibility
Site: Kirkland - Carillon Point

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
Holy Spirit Lutheran Church 10021 NE 124th St	4.1	40		Metro: 234, 244, 255, 277
Houghton P&R 7024 116th Ave NE	1.8	470		Metro: 234, 245, 277, 342, 952, 981, 986
Kingsgate P&R 13001 116th Way NE	4.9	502	90% full by 9 AM weekdays	Metro: 235, 238, 244, 252, 255, 257, 277, 930
Kirkland Way P&R NE 85th St and Kirkland Way	1.9	20		Metro: 248
Korean Covenant Church of Kirkland 14220 Juanita/Woodinville	5.4	30		Metro: 238, 257
South Kirkland P&R 3677 108th Ave NE Bellevue	1.3	833	90% full by 9 AM weekdays	Metro: 234, 235, 249, 255, 981, 986 ST: 540

Route Competitiveness and Accessibility
Site: Bellevue - Meydenbaur Bay

POF and Connection to Seattle Travel Time, Seat Changes, and Fare

UW: Washington Athletic Center											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			27.74857143	AM	7:44	7:54	10	$ 5.25	51.75	2	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			27.74857143	$ 5.25	51.75	2	
UW: Oceanography Dock											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			32.03428571	AM	7:44	7:54	10	$ 5.25	64.03	2	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			32.03428571	$ 5.25	64.03	2	
Madison Park											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Madison Park to Downtown				Summary of Route			
AM			16.77714286	AM	7:22	7:47	25	$ 5.25	51.78	2	
Bus/Express Bus from Madison Park to Downtown				POF				Summary of Route			
PM	5:14	5:45	31	PM			16.77714286	$ 5.25	57.78	2	
Leschi											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Leschi to Downtown				Summary of Route			
AM			15.14857143	AM	7:33	7:55	22	$ 5.25	47.15	2	
Bus/Express Bus from Leschi to Downtown				POF				Summary of Route			
PM	5:01	5:27	26	PM			15.14857143	$ 5.25	51.15	2	

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail						
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Fare	Comments
AM	7:24	7:56	32	0	$ 2.50	ST 550
PM	5:01	5:34	33	0	$ 2.50	ST 550

Current Personal Vehicle Option Travel Time and Seat Change

Car	11 miles via		11.6 via I90			
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:41	8:00	22	0	$ 10.13	520
AM	7:35	8:00	28	0	$ 6.67	90
PM	5:00	5:18	25	0	$ 10.13	520
PM	5:00	5:26	28	0	$ 6.67	90

Route Competitiveness and Accessibility
Site: Bellevue - Meydenbaur Bay

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
Bellevue Christian Reformed Church 1221 148th Ave NE	3.8	20		Metro: 221
Bellevue Foursquare Church 2015 Richards Rd	3.1	35		Metro: 240
Eastgate P&R 14200 SE Eastgate Way	4.5	1614	90% Filled by 9 AM	Metro: 212, 217, 221, 226, 240, 241, 245, 246, 271, 888, 989 ST: 555
Grace Lutheran Church NE 8th St & 96th Ave NE	0.4	50	90% Filled by 9 AM	Metro: 271
Newport Covenant Church 12800 SE Coal Creek Pkwy	4.6	75		Metro: 240, 245
South Bellevue P&R 2700 Bellevue Wy SE	2.3	519	90% Filled by 9 AM	Metro: 241, 249, 981 ST: 550, 555, 556, 560
St Andrew's Lutheran Church	4.7	20		Metro: 221, 245, 271
St Luke's Lutheran Church 3030 Bellevue Way NE	2.2	30		Car/Vanpool only
Wilburton P&R 720 114th Ave SE	1.6	186	90% Filled by 9 AM	Metro: 240, 246, 342, 952

Route Competitiveness and Accessibility
Site: Renton

POF and Connection to Seattle/Bellevue Travel Time, Seat Changes, and Fare

UW: Washington Athletic Center											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			42.12857143	AM	7:44	7:54	10	$ 5.25	58.13	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			42.1285714	$ 5.25	58.13	3	
UW: Oceanography Dock											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Light Rail from University Link Station to University Street Station Downtown				Summary of Route			
AM			46.41428571	AM	7:44	7:54	10	$ 5.25	70.41	3	
Light rail from University Link Station from University Street Station Downtown				POF				Summary of Route			
PM	5:00	5:10	10	PM			46.4142857	$ 5.25	70.41	3	
Madison Park											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Madison Park to Downtown				Summary of Route			
AM			31.07142857	AM	7:22	7:47	25	$ 5.25	58.07	3	
Bus/Express Bus from Madison Park to Downtown				POF				Summary of Route			
PM	5:14	5:45	31	PM			31.0714286	$ 5.25	64.07	3	
Leschi											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Bus/Express Bus from Leschi to Downtown				Summary of Route			
AM			26.46	AM	7:33	7:55	22	$ 5.25	50.46	3	
Bus/Express Bus from Leschi to Downtown				POF				Summary of Route			
PM	5:01	5:27	26	PM			26.46	$ 5.25	54.46	3	
Belleuve: Maydenbauer Bay											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Bellevue	Seat Changes	Comments
POF				Bus to Bellevue Transit Center				Summary of Route			
AM			24.59142857	AM	7:54	7:55	1	$ 5.25	38.59	3	Metro 271
AM			24.59142857	AM	7:57	7:59	2	$ 5.25	37.59	3	ST 550
Bellevue Transit Center to Dock				POF				Summary of Route			
PM	5:04	5:07	2	PM			24.5914286	$ 5.25	38.59	3	Metro 271
PM	5:03	5:05	2	PM			24.5914286	$ 5.25	38.59	3	ST 550

Route Competitiveness and Accessibility
Site: Renton

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail to Seattle						
	Depart	Arrive	Travel Time to/from Bellevue	Seat Changes	Fare	Comments
AM	7:20	7:51	31	0	$ 3.25	Metro RT 143
PM	5:17	5:53	36	0	$ 3.25	Metro RT 143
Bus/Express Bus/Light Rail to Bellevue						
	Depart	Arrive	Travel Time to/from Bellevue	Seat Changes	Fare	Comments
AM	7:24	7:47	23	0	$ 2.50	ST RT 560
PM	5:00	5:40	40	0	$ 2.50	ST RT 560

Current Personal Vehicle Option Travel Time and Seat Change

Car	17.7	via 99	12.4	via I-5		
	Depart	Arrive	Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:28	8:00	32	0	$ 10.18	via 99
AM	7:22	8:00	38	0	$ 7.13	via I-5
PM	5:00	5:32	32	0	$ 10.18	via 99
PM	5:00	5:37	37	0	$ 7.13	via I-5
Car	10.6	miles to Bellevue				
	Depart	Arrive	Travel Time to/from Bellevue	Seat Changes	Cost	Comments
AM	7:30	8:00	30	0	$ 6.10	
PM	5:00	5:34	34	0	$ 6.10	

Route Competitiveness and Accessibility
Site: Renton

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
City View Church 255 Hardie Ave SW	2	96		Metro: 101, 102, 107, 143
Fairwood Assembly of God 13120 SE 192nd St	6.7	25		Car/Vanpool only
Kennydale United Methodist Church 3005 Park Ave N	1.5	50	Fills to 90% by 9 AM weekdays	Metro: 111, 167, 342, 952 ST: 560
Nativity Lutheran Church 17707 140th Ave SE	5.8	49		Metro: 102, 148, 906 DART
New Life Church at Renton 15711 152nd Ave SE	4.8	25		Metro: 143, 907 DART
Renton City Municipal Garage 655 S 2nd St	1.6	150	Fills to 90% by 9 AM weekdays	Metro: Rapidride F, 101, 105, 106, 107, 143, 148, 153, 167, 169, 240, 342, 907 DART, 908 DART ST: 560, 566
Renton Fred Meyer 365 Renton Center Way SW	2.2	21	Fills to 90% by 9 AM weekdays	Metro: 101, 102, 107, 143
Renton Transit Center P&R Garage 232 Burnett Ave S	1.7	150	Fills to 90% by 9 AM weekdays	Metro: Rapidride F, 101, 105, 106, 107, 143, 148, 153, 167, 169, 240, 342, 907 DART, 908 DART ST: 560, 566
South Renton P&R S Grady Way and Shattuck Ave	2.3	373	Fills to 90% by 9 AM weekdays	Metro: 101, 102, 148, 153, 167, 169
St. Matthew Lutheran Church 2516 NE 16th St	1.2	128	Fills to 90% by 9 AM weekdays	Metro: 105, 111

Route Competitiveness and Accessibility
Site: Des Moines

POF and Connection to Seattle Travel Time, Seat Changes, and Fare

Pier 50											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Pier 50 to Downtown				Summary of Route			
AM			35.6	AM	7:45	8:00	15	$ 5.25	50.6	0	Walk from Pier 50
AM			35.6	AM	7:56	7:58	46.6	$ 5.25	46.6	2	Walk and bus to University St.
From Downtown to Pier 50				POF				Summary of Route			
PM	5:00	5:15	15	PM			35.6	$ 5.25	50.6	0	Walk to Pier 50
PM	5:01	5:04	47.6	PM			35.6	$ 5.25	47.6	2	Bus and walk from University St.

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail						
	Depart	Arrive	Total Travel Time to/from Seattle	Seat Changes	Fare	Comments
AM	6:59	7:56	57	1	$ 5.75	Link to Rapidride A
AM	7:16	7:44	28	0	$ 3.25	Metro 159
PM	5:01	5:34	57	1	$ 5.75	Link to Rapidride A
PM	5:13	5:47	34	0	$ 3.25	Metro 159

Current Personal Vehicle Option Travel Time and Seat Change

Car	17 miles					
	Depart	Arrive	Total Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:23	8:00	37	0	$ 9.78	
PM	5:00	5:34	34	0	$ 9.78	

Route Competitiveness and Accessibility
Site: Des Moines

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
Kent-Des Moines Park and Ride 23405 Military Rd S	2.6	370	Fills to 90% by 9 AM	Metro: 158, 159, 166, 192, 193, 197 ST: 574
Burien Transit Center 14900 4th Avenue SW	5.5	488		Metro: Rapidride F, 120, 121, 122, 123, 131, 132, 166, 180

Route Competitiveness and Accessibility
Site: Ballard - Shilshole Marina

POF and Connection to Seattle Travel Time, Seat Changes, and Fare

Pier 50											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				Pier 50 to Downtown				Summary of Route			
AM			24.37	AM	7:45	8:00	15	$ 5.25	39.37	0	Walk to downtown
From Downtown to Pier 50				POF				Summary of Route			
PM	5:00	5:15	15	PM			24.37	$ 5.25	39.37	0	Walk to downtown

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail						
	Depart	Arrive	Total Travel Time to/from Seattle	Seat Changes	Fare	Comments
AM	7:35	7:56	21	0	$ 2.75	Metro 17
PM	5:02	5:30	28	0	$ 2.75	Metro 18

Current Personal Vehicle Option Travel Time and Seat Change

Car	5.6 miles					
	Depart	Arrive	Total Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:40	8:00	20	0	$ 3.22	
PM	5:00	5:24	24	0	$ 3.22	

Route Competitiveness and Accessibility
Site: Ballard - Shilshole Marina

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
NA - Closest park and ride is Green Lake Park and Ride over 5 miles from the marina.				

Route Competitiveness and Accessibility

Site: Ballard - 24th Avenue NW

POF and Connection to Seattle Travel Time, Seat Changes, and Fare

SLU											
	Depart	Arrive	Travel Time (min)		Depart	Arrive	Travel Time (min)	Total Fare	Total Travel Time to/from Seattle	Seat Changes	Comments
POF				SLU to Downtown				Summary of Route			
AM			40.14	AM	7:26	8:00	34	$ 5.25	74.14	0	Walk to downtown
AM			40.14	AM	7:37	7:47	12	$ 5.25	55.14	2	Walk to bus to downtown
From Downtown to SLU				POF				Summary of Route			
PM	7:26	8:00	34	PM			40.14	$ 5.25	74.14	0	Walk from downtown
PM	5:05	5:19	14	PM			40.14	$ 5.25	57.14	2	Walk to bus from downtown

Current Public Transit Option Travel Time and Seat Change

Bus/Express Bus/Light Rail						
	Depart	Arrive	Total Travel Time to/from Seattle	Seat Changes	Fare	Comments
AM	7:35	7:56	21	0	$ 2.75	Metro RT 17
PM	5:02	5:30	28	0	$ 2.75	Metro RT 18

Current Personal Vehicle Option Travel Time and Seat Change

Car 5.6 miles						
	Depart	Arrive	Total Travel Time to/from Seattle	Seat Changes	Cost	Comments
AM	7:40	8:00	20	0	$ 3.22	
PM	5:00	5:24	24	0	$ 3.22	

Route Competitiveness and Accessibility
Site: Ballard - 24th Avenue NW

Parking Availability

Park and Ride Facilities				
Location/Address	Distance from Terminal (miles)	Parking Spaces	Capacity	Bus Connections
NA - Closest park and ride is Green Lake Park and Ride over 5 miles from the marina.				

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Appendix F

Landing Site Assessments

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Landing Site Assessment Matrix

Site Name: University of Washington - Waterfront Activities Center
Location/Address: The Waterfront Activities Center (WAC) is located at 3900 Montlake Blvd. NE, Seattle just south of Husky Stadium. The float is located at the southern end of the WAC, next to the Canoe House.

Description	Length	Width	Height
Ramp	15' 1"	7' 11'	
Dock/Float	110'	12'	
Freeboard*			1' 1"
Water Depth at Ramp*			8'

*Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	Yes			X	Wooden ramp is in fair condition but it includes three steps and should be replaced with a sloping ramp. Replace existing ramp with ADA compliant ramp. This will likely require the ramp to start further upland.
Railing	Yes		X		
ADA Accessibility	No			X	Due to the stairs, the ramp is not very accessible to ADA passengers.
Dock/Float	Yes		X		Wooden floating dock.
Dimensions (Approx.)	Yes	X			110' x 12 float allows room for either passenger loading or unloading. POF would likely interfere with other uses.
Freeboard	Yes			X	1' '1"
Fendering	No			X	Add fendering
Ladder	No			X	Add ladder
Railing	No			X	Add railing along at least one, but maybe both sides of the float.
Exposure	No	X			Facility is well sheltered in Union Bay.
Surface Condition	No			X	No existing vessel security measures. Fences and gates would interfere with other public uses.
Mooring Capability	Yes		X		Dock is likely adequate, but the cleats are inadequate to moor a 149 POF vessel.
Vessel Security	No			X	No existing vessel security measures. Fences and gates would interfere with other public uses.
In Water Work Required?	No	X			None.
Upland					
Accessibility					
General Assessment	No			X	There is a long distance between the marine facilities and major destinations at the University of Washington.
ADA Accessibility	No			X	There is a long distance between the marine facilities and major destinations at the University of Washington. Traffic barriers separate the parking area in front of the Canoe House from the path to the float.
Passenger Parking	No		X		There would be little demand for parking by riders since the University of Washington would be the destination for the majority of riders on this route. The University of Washington operates a large, pay parking lot on the south side of Husky Stadium. There is also a small amount of parking in front of the Canoe House.
Multi-Modal Connections					
Near Transit Stop	Yes	X			The Sound Transit University Link light-rail station will be opening in 2016 and is an approximately 6 minute walk from the WAC. While multiple bus routes serve the University District, the closest bus stop is .25 miles away from the landing site. Approximate trip time from the nearest bus stop serving downtown Seattle is 25-30 minutes.
Potential Shuttle Holding Area	Yes	X			Shuttle(s) could queue in parking lot.
Pedestrian Connections/ Trails	No			X	A trail extends west along the Montlake Cut and north along Union Bay, but is not the most direct route to major destinations. Pedestrian must walk through a large parking lot to Montlake Boulevard, across the street and further on to the destination. Also, plans to build a LINK light rail terminal at this site will create access and safety issues for POF riders.
Bicycle Facilities	Yes	X			This site provides easy access to the Burke Gilman Trail.
Sheltered Area or Potential Area	No		X		It may be possible to construct a shelter near the Canoe House.
Area for Signage, Customer Information and Ticketing	Yes	X			There is adequate area near the ramp to install customer signage, ticketing, and information.
Restrooms	Yes		X		Restrooms are provided at the WAC.
Safety					
Access and Egress from Dock/Ramp	No		X		Replacing the stairs with a ramp and paving the path to the ramp would increase safety.
Lighting	No			X	There is no lighting on the ramp or float. The area around the Canoe House has minimal lighting. Add lighting to the ramp and float.
Potential Conflicts with other Uses	Yes			X	This float and other surrounding floats are often used by non-motorized water craft. A passenger-only ferry could interfere with existing uses both on the water and upland facilities.

Landing Site Assessment Matrix

Site Name: University of Washington - Oceanography Dock			
Location/Address: Oceanography Dock at the University of Washington			
Description	**Length**	**Width**	**Height**
Ramp	N/A	N/A	N/A
Dock/Float	N/A	N/A	N/A
Small Wooden Dock w/ Seating & Bike Parking			
Freeboard*			1' 4"
Water Depth*			1' 7"
Concrete Walk - West End of Park			
Freeboard*			2' 10"
Water Depth at Ramp*			2' 10"

*Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No			X	Adequate marine facilities do not exist, so this cannot be evaluated. Install a new ramp if necessary. The length, width and grade of the ramp would be determined by the location of the new float.
Railing	No				
ADA Accessibility	No				
Dock/Float	No				
Dimensions (Approx.)	No				
Freeboard	No			X	Existing facilities are not adequate, so freeboard measurements are insignificant.
Fendering	No				Add fendering
Ladder	No				Add ladder
Railing	No				
Exposure	No	X			Facility is well sheltered in Portage Bay.
Surface Condition	No			X	No existing vessel security measures. Fences and gates would interfere with other public uses.
Mooring Capability	No				Mooring capability could be incorporated into the upgraded marine facilities. Include mooring capability in design of new dock or float.
Vessel Security	No			X	Since this location would not be used for overnight moorage, limited vessel security measures could be incorporated into the upgraded marine or upland facilities. Include vessel security measures in design of new marine facilities.
In Water Work Required?	Yes				The water depth at the small wooden dock and concrete walk is not adequate for a 149 passenger-only vessel. Construct a new ramp and float or dock large enough to accommodate a 149 passenger-only vessel. An adequately sized dock or float would be approximately 1000 square feet and would need to extend out into the Montlake Cut far enough to reach an area with sufficient water depth (8').
Upland					
Accessibility					
General Assessment	Yes	X			Viewpoint has adequate pedestrian circulation.
ADA Accessibility	No			X	There is a long distance between the marine facilities and major destinations at the University of Washington. Traffic barriers separate the parking area in front of the Canoe House from the path to the float.
Passenger Parking	No				There would be little demand for parking by riders since Sakuma Viewpoint would be the destination for the majority of riders on this route. Paid parking is available at the Boat Street Marina and at the lot on the corner of NE Pacific Street and NE Boat Street.
Multi-Modal Connections					
Near Transit Stop	Yes	X			Multiple bus routes serve the University District along NE Campus Parkway and NE Pacific Street, approximately .3 miles from the park. Multiple routes run every 15-20 minutes to downtown during peak periods. Trip time to downtown Seattle is approximately 20 minutes.
Potential Shuttle Holding Area	No			X	Existing parking and bike lanes block any potential shuttle holding areas. Shuttle service may not be necessary if most users' destinations are within the University District area.
Pedestrian Connections/ Trails	Yes	X			Surrounding streets include sidewalks and the site very close to the Burke Gilman Trail, University of Washington and University of Washington Medical Center.
Bicycle Facilities	Yes	X			NE Boat Street includes a bike lake and the site is very close to the Burke Gilman Trail. There are multiple bike racks in the vicinity of the viewpoint.
Sheltered Area or Potential Area	No			X	The uplands area is small and it is unlikely that a shelter could be added to area. It may be possible to include a shelter as part of new marine facilities.
Area for Signage, Customer Information and Ticketing	No			X	A small amount of signage, information, and ticketing could likely be incorporated into the uplands area or added to new marine facilities.
Restrooms	No			X	
Safety					
Access and Egress from Dock/Ramp	No				Adequate marine facilities do not exist, so this cannot be evaluated.
Lighting	No			X	While street lightening exists along NE Boat Street, the viewpoint does not include any lighting. Add lighting to viewpoint and include in the design of new marine facilities.
Potential Conflicts with other Uses	Yes			X	The viewpoint is small and just west of a busy restaurant and kayak rental facility. A passenger-only ferry could interfere with existing uses both on the water and upland facilities.

Landing Site Assessment Matrix

Site Name: Madison Park
Location/Address: Madison Street Dock at eastern end of Madison Street.

Description	Length	Width	Height
Ramp	30'	11'	
Dock/Float	60'	11'	
Freeboard*			2' 9"
Water Depth at Ramp*			11'

*Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	Yes		X		Wooden plank ramp.
Railing	No			X	
ADA Accessibility	Yes			X	
Dock/Float	Yes	X			Wooden fixed pier on piles.
Dimensions (Approx.)	Yes			X	The 60' x 11' dock is not be long enough to accommodate a 149 passenger vessel. The dock allows little room for either passenger loading or unloading. POF would likely interfere with other uses. Replace or expand dock. An adequately sized dock would be approximately 1000 square feet.
Freeboard	X	X			2' 9"
Fendering	No			X	Add fendering to new or expanded dock.
Ladder	No			X	Add ladder to new or expanded dock.
Railing	No			X	Adding a railing along the dock would increase passenger safety, but would interfere with other uses. Add railing along one side of the new or expanded dock.
Exposure	Yes			X	
Surface Condition	Yes		X		Ramp surface consists of wooden planks, some of which are uneven and deteriorating; planks include knots, gaps, and holes. Surface is slippery. If dock is expanded, replace approximately 20% of wooden planks. Cover top of dock with non-skid material.
Mooring Capability	No			X	Dock does not have cleats and is too small to accommodate moorage and existing uses. The existing dock may not be able to handle of the displacement loads of the vessel. Add cleats for temporary dockings to the new or expanded dock.
Vessel Security	No			X	No existing vessel security measures. Fences and gates would interfere with other public uses.
In Water Work Required?	No	X			None.
Upland					
Accessibility					
General Assessment	No			X	While the facility is just north of Madison Park, there are no sidewalks and a guardrail obstructs access. Remove or move guardrail, install a sidewalk on the south side of the street.
ADA Accessibility	No			X	The guardrail prevents wheelchair access. The street and grassy area to the south are sloped.
Passenger Parking	No		X		There would be little demand for parking by riders since Madison would be the destination for the majority of riders on this route.
Multi-Modal Connections					
Near Transit Stop	Yes		X		Route #11 runs along Madison Avenue to 43rd Avenue E approximately every 15 minutes during the peak period in the peak direction. Trip time to downtown Seattle is less than 30 minutes. Without additional service, ferry riders could overwhelm the existing service and/or total travel time may be too long to attract adequate ferry ridership. Recommend providing direct shuttle service, which would be faster than existing transit service, to downtown Seattle for ferry riders.
Potential Shuttle Holding Area	No			X	There are King County Metro bus pull-outs that could be used, but the shuttle would interfere with the existing service.
Pedestrian Connections/ Trails	Yes		X		Surrounding streets include sidewalks and there is a path through Madison Park.
Bicycle Facilities	No		X		
Sheltered Area or Potential Area	No			X	Uplands area is very limited. Additional facilities would reduce the street right of way.
Area for Signage, Customer Information and Ticketing	No			X	While the uplands area is very limited, signage, ticketing, and customer information could be added at the top of the ramp.
Restrooms	No				Likely in the park but could be seasonal.
Safety					
Access and Egress from Dock/Ramp	No			X	Lack of pedestrian and ADA facilities and existing guardrail make access and egress difficult.
Lighting	No			X	One street light between 43rd Avenue E and dock.
Potential Conflicts with other Uses	Yes & No			X	Due to the small size of the dock, the ferry could interfere with other uses.

Landing Site Assessment Matrix

Site Name: Leschi
Location/Address: Public float at 100 Lakeside Ave S at the north end of the small marina at Leschi Park at 201 Lakeside Ave S., Seattle.

Description	Length	Width	Height
Ramp	60'	10'	
Dock/Float	140'	50'	
Freeboard*			1'9"
Water Depth at Ramp*			10'5"

*Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	Yes		X		Wooden plank ramp with roofing material down the center as a non-skid measure.
Railing	Yes		X		Railing is on the outside of the ramp curb and does not meet ADA standards.
ADA Accessibility	Yes		X		It is likely that some passengers will require assistance due to the ramp grade and railing placement.
Dock/Float	Yes	X			Wooden fixed pier on piles.
Dimensions (Approx.)	Yes	X			140' x 50' allows sufficient room for passenger queuing, loading and unloading and vessel berthing space. Ferry may still interfere with other uses.
Freeboard	X				1' 9"
Fendering	Yes			X	Fendering is inadequate for a 149 passenger-only vessel. Replace fendering. Modifications to float edge, removal of exiting timber extruding from float edge, would be required to attach adequate fendering.
Ladder	Yes	X			Two ladders.
Railing	No			X	The south side has a fence along a portion of the dock.
Exposure	No	X			
Surface Condition	Yes			X	Dock surface consists of wooden planks, some of which are uneven and deteriorating; planks include knots, gaps, and slightly protruding nail heads. The strip of roofing material down the side of the dock is worn and torn. Replace approximately 10-15% of wooden planks. Cover loading and unloading area with non-skid material.
Mooring Capability	Yes		X		Dock includes 4 large cleats that are satisfactory for mooring a 149 POF vessel.
Vessel Security	No			X	No existing vessel security measures. Fences and gates would interfere with other public uses. None. No overnight moorage at this landing site.
In Water Work Required?	No	X			None.
Upland					
Accessibility					
General Assessment	Yes	X			
ADA Accessibility	Yes		X		
Passenger Parking	Yes		X		There would be little demand for parking by riders since Leschi would be the destination for the majority of riders on this route. City owned parking lots need to be restriped. Parking area near water is slightly sloped and there are areas of uneven pavement.
Multi-Modal Connections					
Near Transit Stop	Yes		X		Route #27 runs along Lakeside Ave South approximately every 20 minutes during the peak period in the peak direction. Trip time to downtown Seattle is approximately 20 minutes. Without additional service, ferry riders could overwhelm the existing service and/or total travel time may be too long to attract adequate ferry ridership. Recommend providing direct shuttle service, which would be faster than existing transit service, to downtown Seattle for ferry riders.
Potential Shuttle Holding Area	Yes	X			Shuttle(s) could queue in upper parking lot.
Pedestrian Connections/ Trails	Yes	X			There are sidewalks along Lakeside Avenue South and a trail through Leschi Park.
Bicycle Facilities	Yes		X		Lake Avenue South is signed bicycle route with a shared roadway, but there are no bike racks near the float. The I-90 regional trail is 1/2 mile south.
Sheltered Area or Potential Area	Yes		X		There is room for a shelter in the parking lot, but it would decrease the number of parking stalls.
Area for Signage, Customer Information and Ticketing	Yes	X			While there is no existing information board or kiosk, there is adequate area to add customer signage, ticketing, and information near the top of the ramp.
Restrooms	Yes	X			
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate POF vessel capacity.
Lighting	No			X	There is no lighting on the ramp or dock. The parking lot has one street light between the upper and lower lot. Install lighting on dock and ramp and possibly in the parking lot.
Potential Conflicts with other Uses	Yes		X		The ferry would dock close to the marina entrance, which could create potential conflicts with other users, especially during summer evenings.

Landing Site Assessment Matrix

Site Name: Kenmore - Log Boom Park
Location/Address: The park is located right off Bothell Way at 60th Place NE via 175th Street NE. This park is also called Tracy Owen Station Park.

Description	Length	Width	Height
Ramp	N/A	N/A	
Dock/Float	550'	9'	
Freeboard			2' 10"
Water Depth at Ramp*			10'

**Based on median elevation of the Lake Washington Ship Canal.*

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No				The dock extends directly from the shore and no ramp is required.
Railing	No				
ADA Accessibility	Yes	X			Concrete and wood fixed pier on piles.
Dock/Float	Yes	X			Wooden fixed pier on piles with non-skid surface over a majority of the dock.
Dimensions (Approx.)	Yes	X			550' x 9' with two piers that are 140' x 10' provides sufficient room for passenger queuing, loading and unloading and vessel berthing space. Ferry may still interfere with other uses.
Freeboard	Yes	X			2' 10"
Fendering	No			X	
Ladder	No			X	
Railing	No			X	
Exposure	Yes	X			Dock is oriented south.
Surface Condition	Yes	X			Conceret is level, in moderate condition and has limited non-skid properties. Cover loading and unloading area with non-skid material.
Mooring Capability	Yes	X			Wooden tie-offs are inadequate to moor a 149 POF vessel. Add cleats.
Vessel Security	No			X	No existing vessel security measures. Fences and gates would interfere with other public uses. Since it is highly likely that overnight moorage would be desired at this location, it may be necessary to designated one end of pier for POF use only and install a gate and fence.
In Water Work Required?	No	X			
Upland					
Accessibility					
General Assessment	Yes		X		Without shuttle service, the limited parking and distance to transit serivces may make access difficult for most passengers.
ADA Accessibility	Yes		X		Wide walkways and sidewalks with curb ramps. Both parking and transit could be difficult due to travel distances. The parking lot could be used for passenger drop-off.
Passenger Parking	Yes			X	There is some street parking along 175th Street NE. Owned by the City of Kenmore. Time limited. 46 general parking stalls and 2 ADA stalls.
Multi-Modal Connections					
Near Transit Stop	Yes		X		Multiple routes provide service along Bothell Way, but the roadway is up short but steep hill from the park. The Bethany Baptist Church Park and Ride is approximately .25 miles away and the Kenmore Park and Ride is approximately 1 mile away.
Potential Shuttle Holding Area	No			X	The park's parking area is too small to accommodate a full-sized bus. It may be possible to accommodate a shuttle further east on 175th Street NE. Since parking is limited near the site, it is likely that shuttle serivce would be required from a local park and ride.
Pedestrian Connections/ Trails	Yes			X	Located in a suburban residential area, which would limit the number of walk-on passengers. Some pedestrians may use the Burke Gilman Trail.
Bicycle Facilities	Yes	X			The located on the Burke Gilman Trail and near the Sammamish River Trail.
Sheltered Area or Potential Area	Yes		X		The park's uplands areas are of medium size and it unlikely that a shelter could be added to the facility without disrupting other uses. A small number of benches are located on and near the dock.
Area for Signage, Customer Information and Ticketing	Yes	X			There is adequate area in the vicinity of the dock to add customer signage, information and ticketing.
Restrooms	Yes		X		Portables.
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate POF vessel capacity.
Lighting	No			X	Install lighting.
Potential Conflicts with other Uses	Yes		X		There may be conflicts with other users of the public peir including boaters, birders and park users.

Landing Site Assessment Matrix

Site Name: Kenmore - LakePointe
Location/Address: Privately owned, commercial property at 6525 NE 175th Street, Kenmore.
Notes: Site is currently staging for 520 construction. Passenger-only ferry service would require all new infrastructure.

Description	Length	Width	Height
Ramp	N/A	N/A	
Dock/Float	N/A	N/A	
Freeboard*			N/A
Water Depth at Ramp*			N/A

*Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No				
Railing	No				Include railing on ramp and loading platform.
ADA Accessibility	N/A				
Dock/Float	No				
Dimensions (Approx.)	No				
Freeboard	No				
Fendering	No				
Ladder	No				
Railing	No				
Exposure	Yes	X			The area under consideration for POF berthing is on a short, small finger of water that extends northeast from Lake Washington.
Surface Condition	N/A				New infrastructure required.
Mooring Capability	No				Incorporate mooring capabilities into the upgraded marine faculties.
Vessel Security	N/A				Vessel security measures could be incorporated into the new marine or upland facilities.
In Water Work Required?	Yes				
Upland					
Accessibility					
General Assessment	N/A				
ADA Accessibility	N/A				
Passenger Parking	N/A				The Bethany Baptist Church Park and Ride is approximately 0.5 miles away and the Kenmore Park and Ride is approximately 1 mile away. Unless shuttles are provided, it is unlikely that passengers would use the park and ride.
Multi-Modal Connections					
Near Transit Stop	No			X	The closest transit stop is over 0.25 miles away. The Kenmore Park and Ride is appoximately 1 mile away.
Potential Shuttle Holding Area	Yes	X			If necessary, a shutle holding area could be incorporated into the on-site parking mentioned above.
Pedestrian Connections/ Trails	No			X	Located in a commercial area. Some pedesrians may use the Burke Gilman Trail.
Bicycle Facilities	Yes		X		The site is near the Burke Gilman Trail. Once a cyclist leaves NE 175h Street they must travel over poorly maintained parking lots and bare groun. No bike racks exist at the site.
Sheltered Area or Potential Area	Yes	X			There is adequate area on site to install a shelter, but it may not be necessary if the facility is developed into a park and ride. The specified area of installation would likely be cleared of existing vegetation or materials and prepped for installation.
Area for Signage, Customer Information and Ticketing	Yes	X			There is adequate area on site to install customer signage and information. Signage may also need to be added near 175th to direct new riders to the landing site.
Restrooms	No			X	
Safety					
Access and Egress from Dock/Ramp	N/A				
Lighting	No			X	Add lighting near boat ramp and in parking lot.
Potential Conflicts with other Uses	Yes		X		The site is currently used for 520 staging.

Landing Site Assessment Matrix

Site Name: Kirkland Carillon Point
Location/Address: Carillon Point, Kirkland, WA

Description	Length	Width	Height
Ramp	N/A	N/A	
Dock/Float	N/A	N/A	
Freeboard			N/A
Water Depth at Ramp*			N/A

**Based on median elevation of the Lake Washington Ship Canal.*

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No				The dock extends directly from the shore and no ramp is required.
Railing	No				
ADA Accessibility	Yes		X		The lack of a railing could be a problem for some passengers.
Dock/Float	Yes	X			Wooden fixed pier on piles with non-skid surface over a majority of the dock.
Dimensions (Approx.)	Yes	X			
Freeboard	Yes	X			
Fendering	No			X	Add fendering.
Ladder	Yes			X	
Railing	No			X	
Exposure	Yes	X			
Surface Condition	Yes	X			Dock surface does not include a non-skid surface but is in good condition.
Mooring Capability	Yes	X			
Vessel Security	No			X	No existing vessel security measures. Fences and gates could interfere with other public uses and would need to be negotiated with the City of Kirkland.
In Water Work Required?	No	X			
Upland					
Accessibility					
General Assessment	Yes	X			
ADA Accessibility	Yes	X			
Passenger Parking	Yes		X		Ample parking exists upland near the businesses at the marina.
Multi-Modal Connections					
Near Transit Stop	Yes	X			Bus routes, including local and express routes, serve Kirkland Transit Center, approximately .25 miles from the dock.
Potential Shuttle Holding Area	Yes		X		Shuttles could be staged near the Carillon businesses.
Pedestrian Connections/ Trails	Yes	X			Surrounding streets include sidewalks and there is a path north of the marina.
Bicycle Facilities	Yes	X			Lake Washington Boulevard includes marked bike lanes.
Sheltered Area or Potential Area	Yes				
Area for Signage, Customer Information and Ticketing	Yes	X			There is adequate area in the vicinity of the dock to add customer signage, information and ticketing.
Restrooms	Yes	X			Carillon Point has restrooms.
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate POF vessel capacity.
Lighting	Yes	X			
Potential Conflicts with other Uses	Yes		X		The ferry could create conflicts with other users of the marina.

Landing Site Assessment Matrix

Site Name: Marina Park

Location/Address: Marina Park at 25 Lakeshore Plaza Drive, Kirkland. The most likely location for POF service would be the end of the main pier. The City of Kirkland has also identified the public pier at the west end of 2nd Avenue S as another potential location. This public dock has similar marine attributes, but has not been

Description	Length	Width	Height
Ramp	N/A	N/A	
Dock/Float	400'	10'	
Freeboard			1' 8"
Water Depth at Ramp*			22'

**Based on median elevation of the Lake Washington Ship Canal.*

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No				The dock extends directly from the shore and no ramp is required.
Railing	No				
ADA Accessibility	Yes		X		The lack of a railing could be a problem for some passengers.
Dock/Float	Yes	X			Wooden fixed pier on piles with non-skid surface over a majority of the dock.
Dimensions (Approx.)	Yes	X			400' x 10' allows room for passenger queuing, loading and unloading. Ferry may still interfere with other uses.
Freeboard	Yes	X			1' 8"
Fendering	No			X	Add fendering.
Ladder	Yes			X	Ladder is in poor condition and needs to be replaced.
Railing	No			X	
Exposure	Yes	X			Dock is oriented south.
Surface Condition	Yes	X			The first 300' of dock surface is even and has adequate non-skid treatment. The remaining dock surface consists of wooden planks, some of which are slightly uneven; planks include small knots and very slightly protruding nail heads. Apply non-skid surface to remainder of the dock.
Mooring Capability	Yes	X			Dock includes cleats that are satisfactory for mooring a 149 passenger-only vessel.
Vessel Security	Yes			X	No existing vessel security measures. Fences and gates could interfere with other public uses and would need to be negotiated with the City of Kirkland. Add a security gate.
In Water Work Required?	No	X			
Upland					
Accessibility					
General Assessment	Yes	X			
ADA Accessibility	Yes	X			ADA parking stalls exist near the dock and access to the dock is provided via a dead-end roadway or sidewalks with curb ramps.
Passenger Parking	Yes			X	Parking in the area is intended for use by customers of local businesses. Street parking along Lakeshore Plaza Drive and other downtown streets is time limited.
Multi-Modal Connections					
Near Transit Stop	Yes	X			Multiple bus routes, including local and express routes, serve Kirkland Transit Center, approximately .25 miles from the park. Sound Transit route 540 runs every 12-15 minutes to the University District during peak periods. Trip time to/from the University District is approximately 30 minutes, which would compete with POF service if the other end of the Kirkland route was the University District.
Potential Shuttle Holding Area	Yes		X		Shuttles could be staged along Lakeshore Plaza Drive, but would temporarily obstruct parking in the chosen staging area.
Pedestrian Connections/ Trails	Yes	X			Surrounding streets include sidewalks and there is a path through Marina Park.
Bicycle Facilities	Yes	X			Lake Street includes marked bike lanes.
Sheltered Area or Potential Area	Yes		X		While there is room for a sheltered area, it would interfere with the other uses of Marina Park.
Area for Signage, Customer Information and Ticketing	Yes	X			There is an existing information board for the City of Kirkland and marina. There is adequate area in the vicinity of the dock to add customer signage and information. Ticketing could be added.
Restrooms	Yes	X			Marina Park has public restrooms.
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate POF vessel capacity.
Lighting	Yes	X			Parking, park and marine facilities near Argosy's moorage are well lit.
Potential Conflicts with other Uses	Yes		X		The ferry could create conflicts with other users of the marina and park, including the Argosy Kirkland Lake Tour and Waterways Cruises and Events, especially during summer evenings.

Landing Site Assessment Matrix

Site Name: Bellevue - Meydenbauer Bay Marina

Location/Address: Meydenbauer Bay Marina at 2 99th Ave NE, Bellevue. The most suitable slip is the uncovered slip at the very end of Pier 1.

Notes: This site is very high risk as the City of Bellevue did not include POF service in the their master plan for the Meydenbauer Bay Marina and surrounding area.

Description	Length	Width	Height
Ramp	N/A	N/A	
Dock/Float	131'	5'	
Freeboard*			3' 4"
Water Depth at Ramp*			18'

**Based on median elevation of the Lake Washington Ship Canal.*

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No			X	The dock extends directly from the shore and no ramp is required.
Railing	No				
ADA Accessibility	No				
Dock/Float	Yes				Wooden fixed pier on piles.
Dimensions (Approx.)	Yes		X		At 131' x 5', the dock is one of the narrowest being considered and there are obstructions that narrow the dock even further. Passengers would need to be staged uplands to avoid conflict with other users. The dock provides suficient vessel berthing space.
Freeboard	Yes	X			3'4"
Fendering	Yes			X	Fendering is not adequate for a 149 POF vessel and is likely the property of the current slip leasor. Add fendering.
Ladder	Yes	X			
Railing	No			X	Adding a railing along the dock would increase passenger safety. If a railing was added to both sides of the dock, it would interfere with access to the adjacent slip. Add railing along at least one, but possibly both sides of the dock.
Exposure	No	X			Facility is well sheltered in bay.
Surface Condition	No	X			Surface is even and well maintained. There are some small gaps between planks.
Mooring Capability	No	X			Dock include cleats that are satisfactory for mooring a 149 passenger-only vessel.
Vessel Security	No	X			Access to the float is restricted. Security measures at the slip could be added.
In Water Work Required?	No	X			
Upland					
Accessibility					
General Assessment	Yes			X	Access to the facility is along a small, residential street. Passenger loads could overwhelm the facility if a majority of the passengers do not arrive on foot or via bicycle or shuttle.
ADA Accessibility	No		X		There is an area that would be used to drop-off passengers near the entrance to the marina.
Passenger Parking	No			X	There would be little demand for parking by riders since Bellevue would be the destination for the majority of riders on this route. Owned by City of Bellevue, Parks Approximately 50 stalls adjacent to the marina, which could be inadequate for ferry passenger loads. None of the stalls are designated ADA. The City may not want the parking to be used by commuters.
Multi-Modal Connections					
Near Transit Stop	Yes			X	Bus service to/from the Bellevue Transit Center is available on 100th Avenue NE, approximately 2 miles from the marina and on NE 8th, which is more than .5 miles from the marina.
Potential Shuttle Holding Area	Yes		X		Parking lot could be used for shuttle holding.
Pedestrian Connections/ Trails	No			X	Roadway leading down to the marina on the north side is steep and does not include sidewalks. Several parking areas must be crossed when approaching the marina from the south. Most major destinations and employment centers are more than .5 miles away.
Bicycle Facilities	No			X	
Sheltered Area or Potential Area	No			X	The uplands area is small and it is unlikely that a shelter could be added to area. It may be possible to replace some of the parking stalls with a shelter.
Area for Signage, Customer Information and Ticketing	No		X		While the uplands area is very limited, signage, customer information, and ticketing could be added at the entrance to the dock.
Restrooms	Yes	X			
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate POF vessel capacity, although the narrow dock could impact operations.
Lighting	Yes		X		The marina has lighting, but it may need to be upgraded for POF service. The parking lot does not have any lighting
Potential Conflicts with other Uses	Yes			X	The marina facilities, include the docks and parking lot are small and POF service would likely create conflicts with other users and the suitable slips are currently under lease for private use. Also, the City of Bellevue is developing a master plan for the nearby park, marina and upland facilities, which does not include a POF. If this site is to be considered further, immediate coordination with the City of Bellevue is required.

Landing Site Assessment Matrix

Site Name: Renton - Bristol at Southport

Location/Address: The dock is adjacent to the Bristol at Southport apartments located at 1133 Lake Washington Blvd N., Renton. The dock is located next to 1083 Lake Washington Blvd N. Property is owned by Southport One LLC but public access is allowed.

Notes: Access to marine and upland facilities will require negotiations with Southport One LLC. Currently, Waterways Cruises and Events is allowed to pick-up/drop-off at the dock for privately chartered events.

Description	Length	Width	Height
Ramp	N/A	N/A	
Dock/Float	120'	20'	
Freeboard*			3'1"
Water Depth at Ramp*			9'

*Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No				
Railing	No				
ADA Accessibility	No				
Dock/Float	Yes	X			Wooden fixed pier on piles.
Dimensions (Approx.)	Yes	X			128' x 20' allows sufficient room for passenger queuing, loading and unloading and vessel berthing space. Ferry may still interfere with other uses.
Freeboard	Yes	X			3' 1"
Fendering	No			X	Add fendering
Ladder	Yes		X		
Railing	No		X		The 20' side of the dock includes a railing.
Exposure	Yes		X		Site partial sheltered by land mass to the east.
Surface Condition	Yes		X		Dock surface consists of wooden planks, some of which are uneven and deteriorating; planks include knots, gaps and some holes. Replace approximately 10% of wooden planks. Cover loading and unloading area with non-skid material.
Mooring Capability	Yes		X		No existing vessel security measures. Fences and gates would interfere with other public and private uses.
Vessel Security	No			X	None
In Water Work Required?	No	X			Standard maintenance requirements.
Upland					
Accessibility					
General Assessment	No		X		From the parking area, a dead end, private roadway could be used for passenger access to the dock. Access is also provided to the dock via Gene Coulon Memorial Beach Park from 7:00 a.m. to dusk.
ADA Accessibility	No			X	It is approximately 250' feet from the parking lot to the dock and there is a short, but steep driveway to negotiate.
Passenger Parking	Yes	X			Gravel parking lot managed by Diamond Parking, but owned by Southport One LLC. Parking is $7/day. The gravel lot transitions into a large empty lot owned by Southport One LLC that could be converted to parking. Prepare property to provide a designated parking area for POF riders. Non ADA stalls could be gravel to minimize improvements.
Multi-Modal Connections					
Near Transit Stop	No			X	The nearest bus stop is half a mile away.
Potential Shuttle Holding Area	Yes	X			The Southport One LLC owned property would be an appropriate site for shuttle holding. Shuttle service may not be required if sufficient parking is available.
Pedestrian Connections/ Trails	Yes	X			The site is adjacent to Gene Coulon Memorial Beach Park and near residential and commercial areas west of I-405.
Bicycle Facilities	Yes	X			The site is accessible via the Lake Washington Trail and the Cedar River Trail.
Sheltered Area or Potential Area	No			X	There is room for a shelter in the parking lot, but it would decrease the number of parking stalls.
Area for Signage, Customer Information and Ticketing	Yes	X			There is adequate area to add customer signage, ticketing, and information near the dock.
Restrooms	No			X	
Safety					
Access and Egress from Dock/Ramp	Yes	X			Directly adjacent to the dock is a pathway that leads to Gene Coulon Memorial Beach Park.
Lighting	No			X	There is only on light on the dock, and neither the pathway or parking lot have lighting.
Potential Conflicts with other Uses	Yes			X	The property is owned by a Southport One LLC, a development company, and is for the use of the development's residents and their guests. Public access is allowed during park hours. It is highly likely that POF passengers will create traffic, noise, light and other disturbances that could be disruptive to residents of the Bristol development. The POF could also interfere with public uses of the dock, such as fishing.

Landing Site Assessment Matrix

Site Name: Des Moines Marina

Location/Address: Des Moines Marina located at 22307 Dock Street, Des Moines. The most likely location of POF service is the end of the northern most floating pier close to the entrance to the marina.

Description	Length	Width	Height
Ramp	37'	3'7"	
Dock/Float	136'	7'	
Freeboard*			1'3"
Water Depth at Ramp*			24'

*From 2009 Demonstration Route Analysis

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	Yes		X		Wood and steel ramp with non-skid treatment down the middle of the ramp.
Railing	Yes	X			Ramps includes hand railings.
ADA Accessibility	Yes		X		It is likely that some passengers will require assistance because the railings are too high (3' 6") for ADA and the grade of the ramp is relatively steep. Near the end of 2010 the City of Des Moines is installing a new ramp that is more ADA compliant.
Dock/Float	Yes	X			Wood and concrete floating pier is in good condition.
Dimensions (Approx.)	Yes	X			136' x 7' slip float is narrow and is obstructed by several piles along the north side float. The berthing space is sufficient for a 149 POF vessel, but the pile may interfere with placement of the gangplank and the gangplank may interfere with access to the adjacent slip. Passengers would need to queue upland to minimize conflict with other users on the ramp and float.
Freeboard			X		1' 3"
Fendering	No			X	Add fendering.
Ladder	No			X	Add ladder.
Railing	No			X	Adding a railing along the float would increase passenger safety. If a railing was added to both sides of the float, it would interfere with access to the adjacent slip.
Exposure	Yes	X			The marina is located behind a breakwater.
Surface Condition	Yes	X			The float surface is even and has adequate non-skid qualities.
Mooring Capability	Yes		X		The float include cleats, but they are not sufficient for mooring a 149 POF vessel.
Vessel Security	No			X	No existing vessel security measures. Fences and gates could interfere with other public uses. Since It is highly likely that overnight moorage will be desired at this location, it may be necessary to designate both slips at the end of the float for POF use only and install a security gate and fence.
In Water Work Required?	No	X			None.
Upland					
Accessibility					
General Assessment	No	X			Adjacent parking and passenger holding areas.
ADA Accessibility	No	X			It may be necessary to designate additional ADA parking stalls near the ramp.
Passenger Parking	Yes			X	The marina has free on-site parking. To the north of the marina office there are approximately 200 parking spots plus 4 ADA spots. 3 of the ADA spots are not close to the ramp to the proposed POF float. The City of Des Moines has plans to re-strip the lot, which will increase the number of parking spaces. There are additional lots to the south of the marina office. Use of on-site parking would need to be negotiated with the City of Des Moines.
Multi-Modal Connections					
Near Transit Stop	No			X	The closest transit stop is almost half a mile away from the float but there is service every 10-15 minutes in the peak direction during peak periods. The Kent-Des Moines Park and Ride is 3 miles away and the Burien Park and Ride is 6 miles away.
Potential Shuttle Holding Area	Yes	X			The parking lot provides ample area for shuttle holding, but shuttle service may not be necessary if parking capacity is not exceeded.
Pedestrian Connections/ Trails	Yes		X		The marina is surrounded by multi-family and commercial zoning and adequate sidewalks exist in and around the marina.
Bicycle Facilities	Yes		X		Although the Regional Green River Trail is three miles away, the surrounding area has many relatively low-traffic streets and bike racks are available at the marina. The Des Moines section of the Lake-to-Sound Trail, which will terminate at the Des Moines Marina, begins construction in 2009.
Sheltered Area or Potential Area	No			X	There is room for a shelter in the parking lot, but it would decrease the number of parking stalls.
Area for Signage, Customer Information and Ticketing	Yes	X			There is adequate space close to the ramp for customer signage, ticketing, and information.
Restrooms	Yes	X			
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate POF vessel capacity.
Lighting	No		X		Lighting appears adequate for POF service.
Potential Conflicts with other Uses	Yes & No		X		The ferry would dock close to the marina entrance and fuel dock, which could create potential conflicts with other users, especially during summer evenings.

Landing Site Assessment Matrix

Site Name: Ballard Shilshole Bay Marina

Location/Address: 7001 Seaview Avenue NW, Suite 100. The site visit documents the conditions at the southern most dock, "Dock A," and Slip 12, which is one of the slips that could accommodate a passenger-only ferry vessel. Other slips could be considered.

Description	Length	Width	Height
Ramp	67'	5'	
Dock/Float	100'	6'	
Freeboard			1'4"
Water Depth at Ramp*			21'

*From 2009 Demonstration Route Analysis

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	Yes	X			Concrete and steel ramps, one at each of the pier, are in excellent condition. Passenger access and egress could use separate ramps to minimize conflicts.
Railing	Yes	X			Ramps includes hand railings and decorative enclosures that extend beyond the railing.
ADA Accessibility	Yes		X		It is likely that some passengers will require assistance.
Dock/Float	Yes				
Dimensions (Approx.)			X		100' x 6' slip float is narrow and is obstructed by 1 pile at the mid-point of the float. The berthing space is sufficient for a 149 POF vessel, but the pile may interfere with placement of the gangplank and the gangplank may interfere with access to the adjacent slip.
Freeboard			X		
Fendering	No			X	Add fendering.
Ladder	No			X	Add ladder.
Railing	No			X	Adding a railing along the float would increase passenger safety. If a railing was added to both sides of the float, it would interfere with access to the adjacent slip. Add railing along at least one, but maybe both side of the float.
Exposure	Yes	X			The marina is located behind a breakwater and Dock A is further sheltered by the Henry L. Kotkins Pier, which is also a seawall.
Surface Condition	Yes	X			The float surface is even and has adequate non-skid qualities.
Mooring Capability	Yes	X			Float include cleats that are satisfactory for mooring a 149 POF vessel.
Vessel Security	Yes		X		Access to the ramp and float is restricted. Security measures at the slip could interfere with access to the adjacent slip.
In Water Work Required?	No	X			None
Upland					
Accessibility					
General Assessment	Yes				
ADA Accessibility	Yes	X			No ADA parking stalls near the ramp. F53 Identify and mark ADA parking stalls.
Passenger Parking	No			X	Limited parking available along Seaview Avenue NW. The parking lot is owned by the Port of Seattle and has approximately 120 parking stalls intended for marina parking. There is a high potential for POF parking and general marina parking.
Multi-Modal Connections					
Near Transit Stop	No			X	No transit service.
Potential Shuttle Holding Area	Yes	X			Shuttle(s) could queue in parking lot.
Pedestrian Connections/ Trails	Yes	X			There is a bike trail, that could be used by pedestrians and sidewalks along Seaview Avenue, but the surrounding areas are not conducive to generating walk-on passengers.
Bicycle Facilities	Yes	X			There is a bike trail along Seaview Avenue that provides access to other local trails including the Burke Gilman Trail and Myrtle Edwards Trail.
Sheltered Area or Potential Area	Yes	X			There is a large open space at the top of "Dock A, " which could accommodate a shelter if the shelter did not interfere with emergency vehicle access.
Area for Signage, Customer Information and Ticketing	Yes	X			While there is no existing information board or kiosk, there is adequate area to add customer signage and information near the top of the ramp. There is adequate space close to the ramp to place ticket vending equipment. Install customer signage, information, and ticket vending equipment.
Restrooms	Yes	X			Shilshole Bay Marina has public restrooms in the Marina Office.
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate passenger-only vessel capacity.
Lighting	Yes		X		There is lighting along the Henry L. Kotkins Pier that runs parallel to "Dock A," but it may not be sufficient for passenger-only ferry service. Add lighting if required.
Potential Conflicts with other Uses	Yes		X		The POF could create conflicts with other users, especially during summer evenings.

Landing Site Assessment Matrix

Site Name: Ballard - Ship Canal at 24th Ave NW

Location/Address: Southern terminus of 24th Avenue NW in the street right of way. The closest intersection is 24th Avenue NW and NW 54th Street

Description	Length	Width	Height
Ramp	N/A	N/A	
Dock/Float	270'	17'	
Freeboard*			2'8"
Water Depth at Ramp*			22'

*Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	No				
Railing	No				
ADA Accessibility	Yes		X		Ramp needs to be fixed.
Dock/Float	Yes				Wooden fixed pier on piles.
Dimensions (Approx.)	Yes		X		270' x 17' allows room for some passenger queuing, loading and unloading, and vessel berthing space.
Freeboard	Yes		X		2' 11"
Fendering	No			X	Add fendering
Ladder	No			X	Add ladder
Railing	No			X	
Exposure	Yes	X			Site is well shelter.
Surface Condition	Yes		X		Dock surface consists of wooden planks, some of which are uneven and deteriorating; planks include knots, gaps and some holes. Replace approximately 10% of wooden planks. Cover loading and unloading area with non-skid material.
Mooring Capability	Yes	X			Float include cleats that are satisfactory for mooring a 149 POF vessel.
Vessel Security	No			X	No existing vessel security measures. Fences and gates would interfere with other public uses.
In Water Work Required?	No	X			None
Upland					
Accessibility					
General Assessment	No			X	Upland area consist of 24th Avenue NW, public parking and access to adjacent businesses. The dock access point is narrow and poorly maintained.
ADA Accessibility	No			X	The dock is at the end of the street right of way and tis separated from the street by three traffic post barricades that would not allow a wheelchair to pass.
Passenger Parking	Yes	X			There is free parking along 24th Avenue NW and Shilshole Avenue NE. A pay parking lot at 5300 24th Ave NW includes 120 parking stalls which may be accessed from Shilshole Avenue NE. There is a driveway between the parking lot and the dock that could be used for pedestrian access.
Multi-Modal Connections					
Near Transit Stop	Yes		X		Multiple routes, including the 17, 18 and 44, travel along NW Market Street and/or 24th Avenue north of NW Market Street. The first bus stop is less than .25 miles from the dock. Trip time to/from Seattle is approximately 30 minutes by bus, which would compete with POF service.
Potential Shuttle Holding Area	No			X	Shuttle service could be provided along Shilshole Ave NW, but signage would need to be added to resrict parking. The pay parking lot could also be used, but there may be a fee associated with such use.
Pedestrian Connections/ Trails	No		X		While the site is not far from Historic Ballard, the immediate vicinity is industrial and many nearby streets lack pedestrian facilities.
Bicycle Facilities	Yes		X		The site is approximately 1 mile from the current terminus of the Burke Gilman Trail. The City of Seattle's plan to extend the Burke Gilman Trail through Ballard would improve bicycle access.
Sheltered Area or Potential Area	No			X	There is a large open space at the top of "Dock A, " which could accommodate a shelter if the shelter did not interfere with emergency vehicle access.
Area for Signage, Customer Information and Ticketing	No			X	While the uplands area is very limited, signage, fare equipment, and customer information could be added at the top of the dock.
Restrooms	No			X	
Safety					
Access and Egress from Dock/Ramp	No			X	Poor. The area immediately adjacent to the dock and to the northwest of the top of the dock would need to be redesigned.
Lighting	No			X	There is one street light at the top of the dock. It would not be sufficient for POF service.
Potential Conflicts with other Uses	No			X	Uplands, POF service could potentially interfere with normal public parking use, adjacent business access. POF service could also interfere with public access to the marine facilities.

Landing Site Assessment Matrix

Site Name: South Lake Union

Location/Address: South Lake Union Park at 860 Terry Avenue N. The dock is just west of the Naval Reserve Building, next to the Historic Ships Wharf.

Description	Length	Width	Height
Ramp	26'	9'	
Dock/Float	205'	10'	
Freeboard			1' 4"
Water Depth at Ramp*			18'

Based on median elevation of the Lake Washington Ship Canal.

Facilities	Yes/ No	Assessment			Considerations/Proposed Improvements
		Good	Fair	Poor	
Marine					
Ramp	Yes	X			Wood ramp in excellent condition
Railing	Yes		X		The ramp is not very long and grade is very slight.
ADA Accessibility	Yes		X		The lack of a railing could be a problem for some passengers.
Dock/Float	Yes	X			Wood and concrete pier on piles. In excellent condition.
Dimensions (Approx.)	Yes	X			205' x 10' allows room for passenger queuing, loading and unloading. Ferry may still interfere with other uses.
Freeboard	Yes		X		1' 4"
Fendering	No			X	Add fendering.
Ladder	Yes	X			Two ladders.
Railing	No			X	
Exposure	Yes			X	Dock is surrounded by an open park to the south and west.
Surface Condition	Yes	X			Dock is even and smooth, but does not have a non-skid treatment. Add non-skid treatment.
Mooring Capability	Yes	X			Dock includes cleats that are satisfactory for mooring a 149 POF vessel.
Vessel Security	Yes			X	No existing vessel security measures. Fences and gates would interfere with other public uses.
In Water Work Required?	No	X			
Upland					
Accessibility					
General Assessment	Yes	X			Uplands area consists of a park facility with gravel and paved trails. Construction is scheduled for completion in Spring 2010 and would not interfere with demonstration route service.
ADA Accessibility	Yes	X			No ADA parking stalls near the ramp. F53 Identify and mark ADA parking stalls.
Passenger Parking	No			X	There would be little demand for parking by riders since South Lake Union would be the destination for the majority of riders on this route. Owned by the City of Seattle. The parking is time limited and intended for users of the park facility.
Multi-Modal Connections					
Near Transit Stop	Yes	X			Multiple bus routes serve the South Lake Union Area. A Seattle Streetcar stop is located .2 miles from the dock and provides service every 15 minutes to downtown and the Fred Hutchinson Cancer Research Center.
Potential Shuttle Holding Area	No			X	It is unlikely that shuttle service would be required for this landing site.
Pedestrian Connections/ Trails	Yes	X			Sidewalks and trails are part of the park development and surrounding streets include sidewalks. The Cheslahud Lake Union Loop runs through the park
Bicycle Facilities	Yes	X			The Cheslahud Lake Union Loop runs through the park and provides access to the Burke Gilman Trail.
Sheltered Area or Potential Area	No			X	It is unlikely that City of Seattle would allow a sheltered area to be added to the park.
Area for Signage, Customer Information and Ticketing	Yes	X			There is adequate area near the dock to install customer signage, information and ticketing.
Restrooms	Yes		X		Restrooms are available in the Naval Reserve Building from 8:30 a.m. to 5:30 p.m.
Safety					
Access and Egress from Dock/Ramp	Yes	X			Facilities are of an adequate size and structure to safely accommodate POF vessel capacity.
Lighting	Yes		X		Low light are incorporated in the dock and the South Lake Union Park plan calls for lighting within the park. Additional lighting may be required on the dock.
Potential Conflicts with other Uses	Yes			X	The POF could create conflicts with other users of both the park and marine facilities, especially during summer evenings. It should also be noted that South Lake Union supports significant recreational and commercial traffic, including float planes. Conflicts with other users of the lake are highly likely.

Appendix G

Park and Ride Locations

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LEGEND

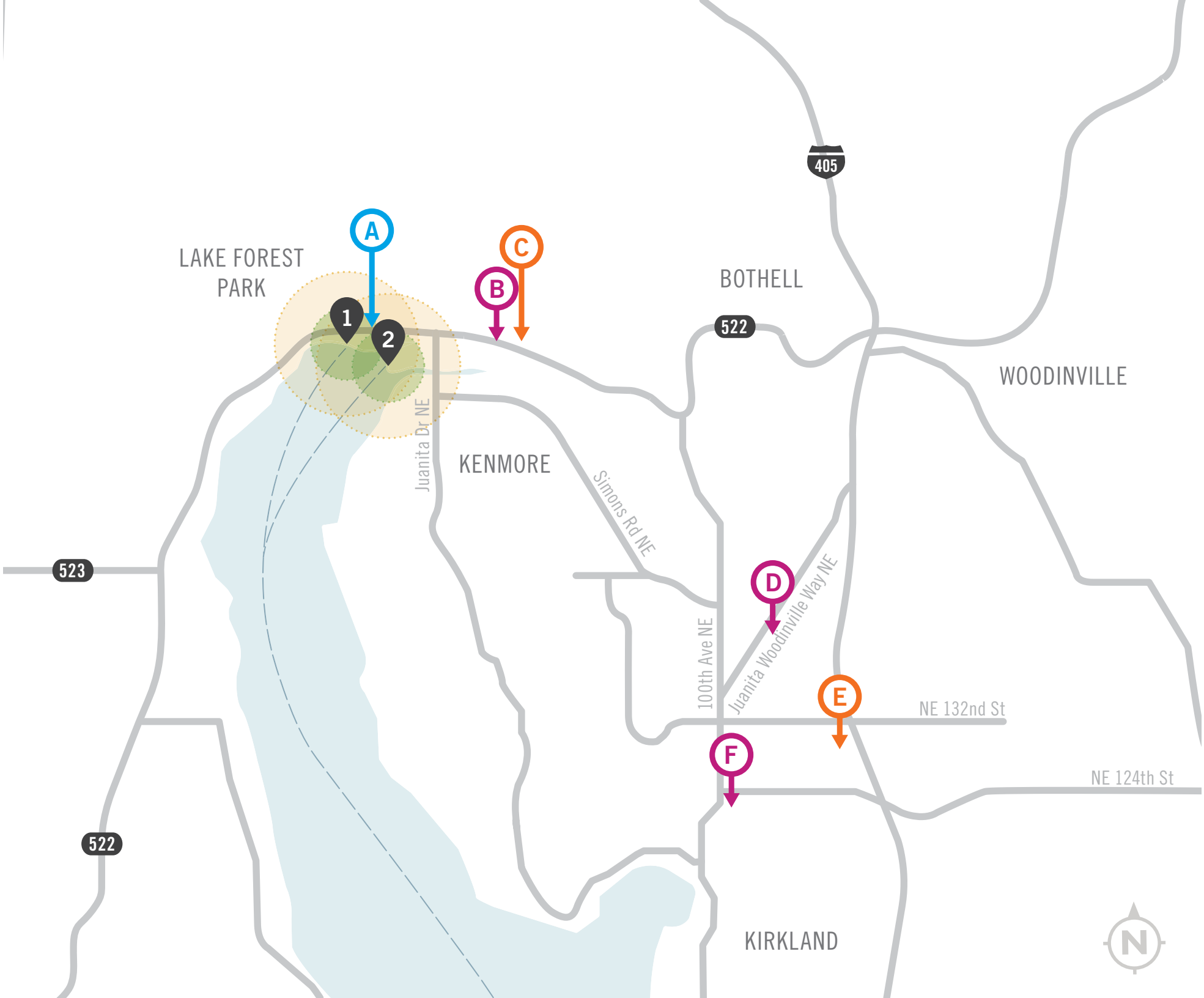
- 1/4 Mile Radius
- 1/2 Mile Radius
- Potential Landing Sites
- Park-and-Ride, <50 Parking Spaces
- Park-and-Ride, 50–200 Parking Spaces
- Park-and-Ride, 200+ Parking Spaces

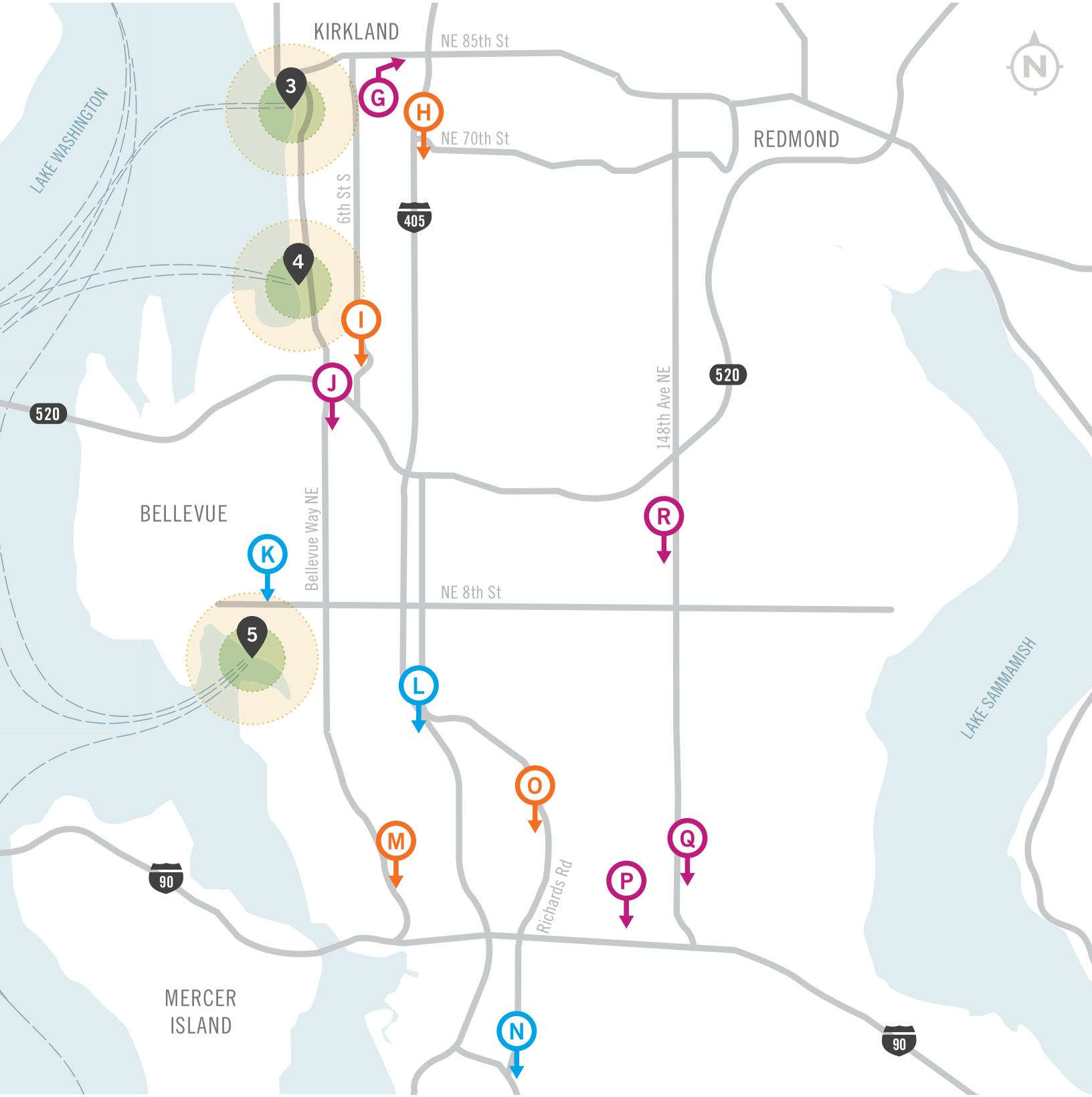
LANDING SITES

1 Log Boom Park (Kenmore)
2 Lakepointe (Kenmore)
3 Marina Park (Kirkland)
4 Carillion Point (Kirkland)
5 Maydenbauer Bay Marina (Bellevue)
6 Bristol at Southport (Renton)
7 Leschi Public Float (Seattle)
8 Madison Street Dock (Seattle)
9 UW Waterfront Activities Center (Seattle)
10 Oceanography Dock (Seattle)
11 South Lake Union (Seattle)
12 Fremont (Seattle - Exact Location TBD)
13 Ship Canal at 24th Ave NW (Seattle)
14 Shilshole Bay Marina (Seattle)
15 Pier 50 (Seattle)
16 Des Moines Marina (Des Moines)

PARK-AND-RIDES

A Bethany Bible Church (Kenmore)
B Kenmore Community Church (Kenmore)
C Kenmore Park-and-Ride (Kenmore)
D Korean Covenant Church (Kirkland)
E Kingsgate Park-and-Ride (Kirkland)
F Holy Spirit Lutheran Church (Kirkland)
G Kirkland Way Park-and-Ride (Kirkland)
H Houghton Park-and-Ride (Kirkland)
I South Kirkland Park-and-Ride (Kirkland)
J St. Luke's Lutheran Church (Bellevue)
K Grace Lutheran Church (Bellevue)
L Wilburton Park-and-Ride (Bellevue)
M South Bellevue Park-and-Ride (Bellevue)
N Newport Covenant Church (Bellevue)
O Eastgate Park-and-Ride (Bellevue)
P Bellevue Foursquare Church (Bellevue)
Q St. Andrew's Lutheran Church (Bellevue)
R Bellevue Christian Reformed Church (Bellevue)
S Kennydale United Methodist Church (Renton)
T St. Matthew Lutheran Church (Renton)
U Renton Transit Center Park-and-Ride Garage (Renton)
V Renton City Municipal Garage (Renton)
W City View Church (Renton)
X Renton Fred Meyer (Renton)
Y South Renton Park-and-Ride (Renton)
Z Fairwood Assembly of God (Renton)
AA Nativity Lutheran Church (Renton)
BB New Life Church (Renton)
CC Kent-Des Moines Park-and-Ride (Des Moines)
DD Burien Transit Center (Des Moines)


LAKE FOREST PARK
BOTHELL
WOODINVILLE
KENMORE
KIRKLAND
Juanita Dr NE
Simons Rd NE
100th Ave NE
Juanita Woodinville Way NE
NE 132nd St
NE 124th St
405
522
523
522
A
B
C
D
E
F
1
2
N


KIRKLAND
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LAKE WASHINGTON
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NE 70th St
REDMOND
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148th Ave NE
BELLEVUE
Bellevue Way NE
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MERCER
ISLAND
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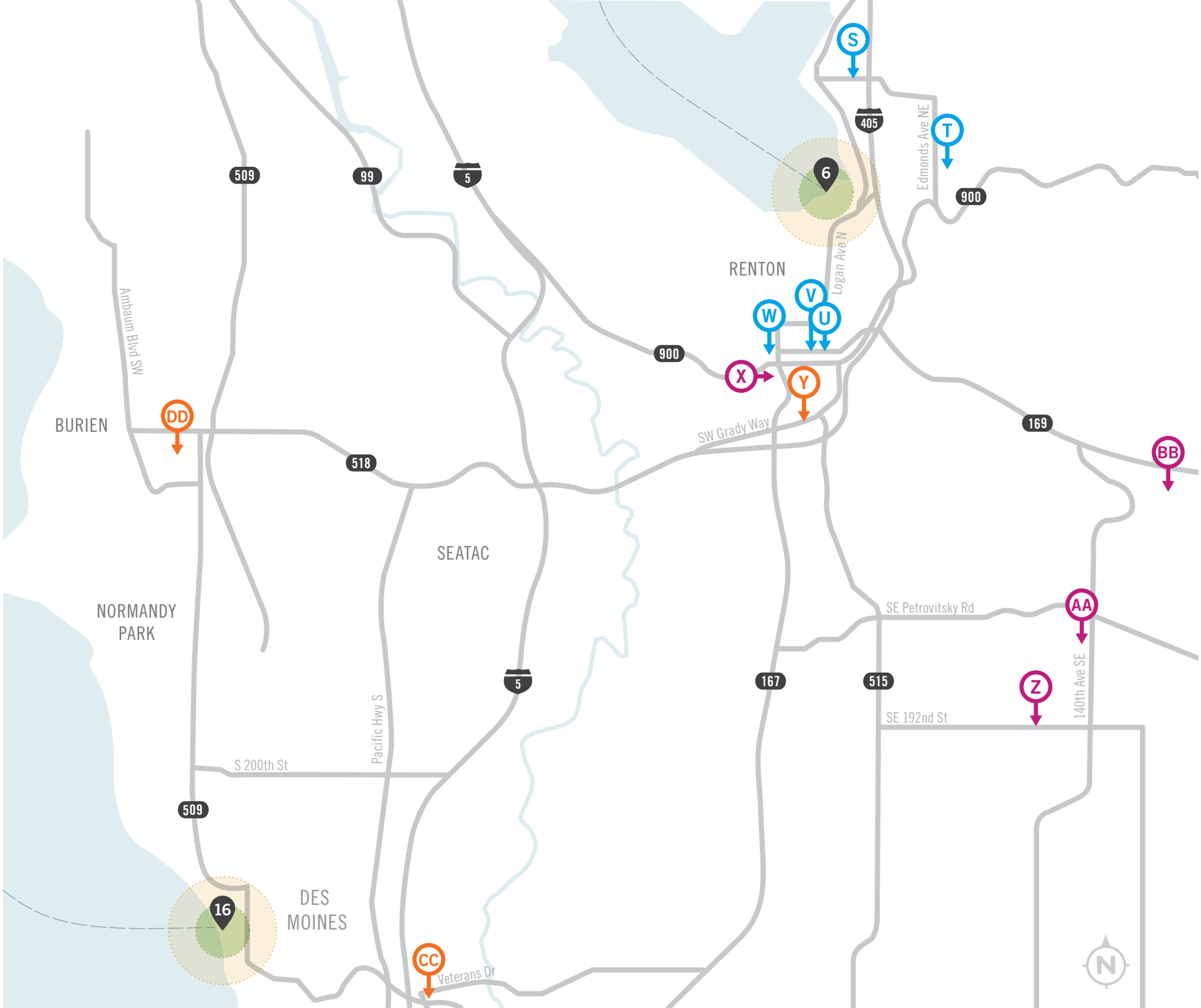
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RENTON
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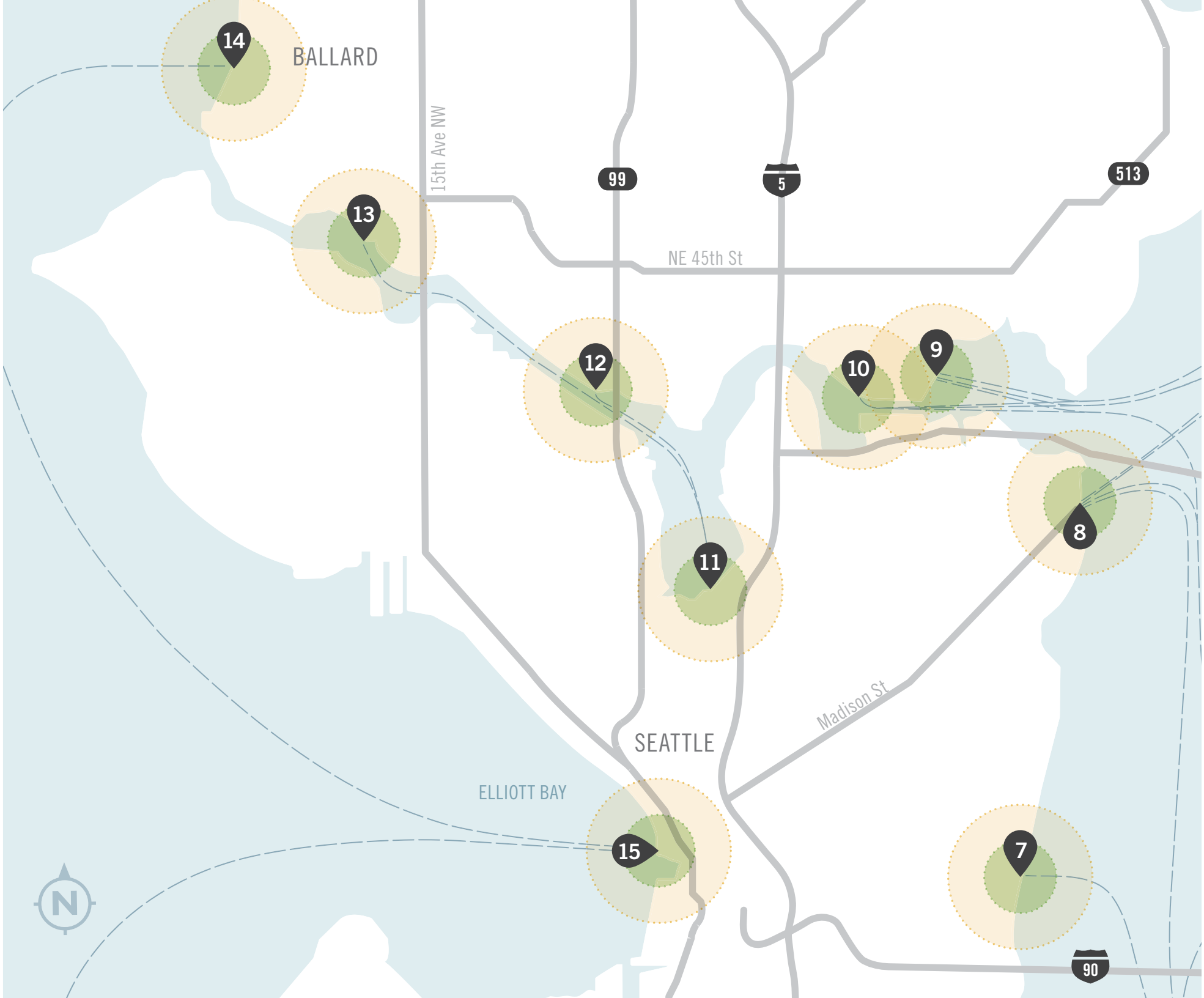
Ambaum Blvd SW
BURIEN
DD
SW Grady Way
169
BB
518
SEATAC
NORMANDY
PARK
SE Petrovitsky Rd
AA
5
167
515
Z
140th Ave SE
SE 192nd St
Pacific Hwy S
S 200th St
509
16
DES
MOINES
CC
Veterans Dr
N


14
BALLARD
15th Ave NW
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NE 45th St
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Madison St
SEATTLE
ELLIOTT BAY
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90
N

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APPENDIX C

Task 3: Ridership Assessment and Analysis

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TASK 3: RIDERSHIP ASSESSMENT ANALYSIS

Interim Report on Ferry Expansion Options for Marine Division

PREPARED FOR KING COUNTY MARINE DIVISION
BY KPFF CONSULTING ENGINEERS
WITH BERK CONSULTING, INC.
JULY 1, 2015

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Appendices

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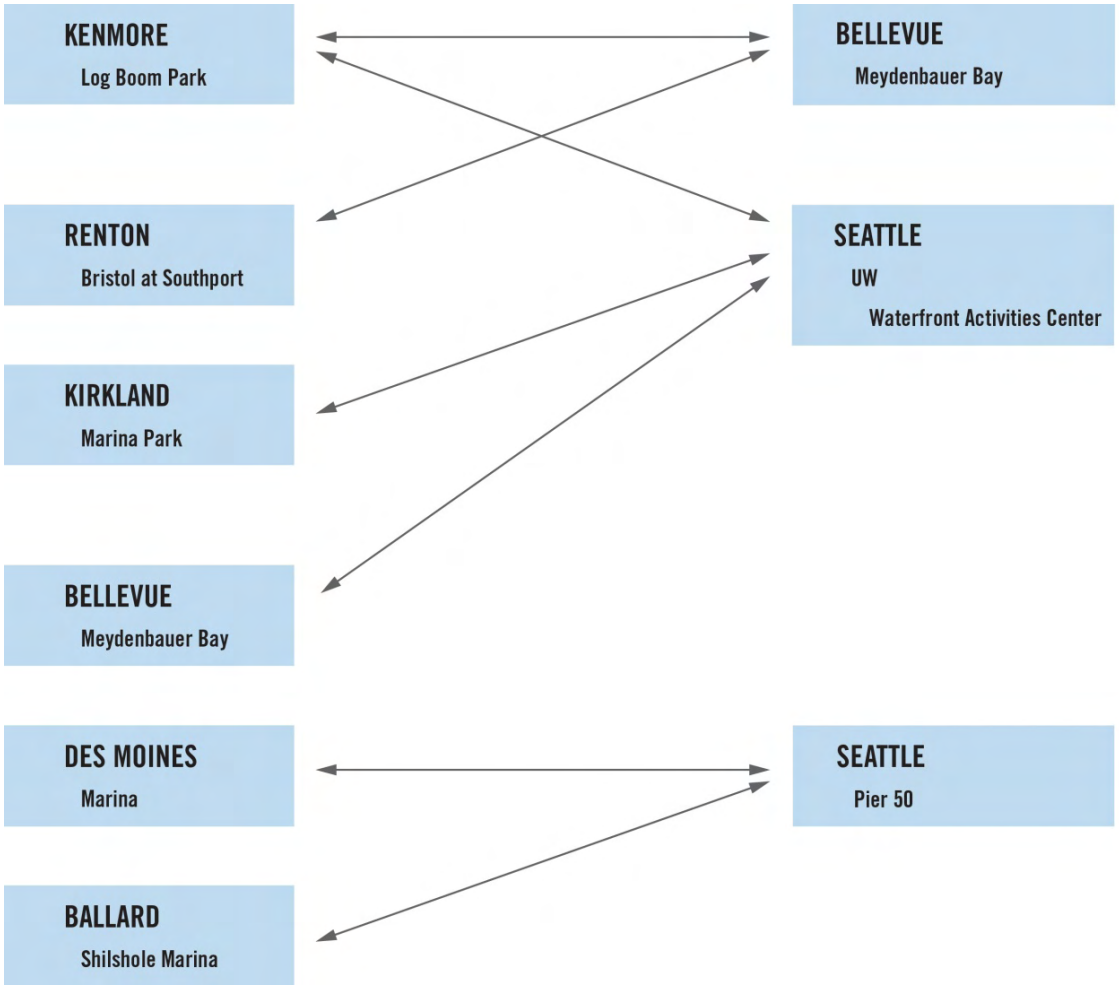
1. Introduction

The purpose of this report is to outline the steps taken to assess the ridership demand for the 7 routes carried forward, outline the approach for evaluation and identify those routes that will continue to infrastructure analysis.

Figure 1 outlines the routes evaluated for ridership demand, as identified in the Task 2, Route Profile Report.

Figure 1: Routes Identified for Ridership Analysis



2. Methodology

In order to assess the routes projected ridership, ridership demand was calculated by the Berk Consulting. The results were then used to calculate farebox recovery for each route individually and also as a three route water taxi system. This farebox recovery finding was then used to identify those routes which would move on to further analysis. Three routes identified in Figure 1 above, with exception of Renton to Bellevue, had a high enough farebox recovery to move to the next phase of review. Please refer to the analysis below.

Ridership Analysis

This report will outline the basic structure of the ridership analysis. For a thorough documentation of ridership methodology and findings, please refer to Appendix A, Ridership Forecast.

Ridership demand was calculated by reviewing commute characteristics of populations within the vicinity of the potential water taxi landing sites. Along with population information, ridership forecasts were developed by reviewing existing and potential public transit options, route time competitiveness data outlined in Task 2, travel demand models from Puget Sound Regional Council (PSRC), and historical West Seattle Water Taxi ridership.

Each terminal location was assigned a geographic boundary based on the transportation options available to commuters near the terminal and potential barriers to easily accessing the terminal location. The capture area was weighted based on the likelihood a population would choose the water taxi (given route competitiveness with other modes of transportation) and potential barriers to access including traffic congestion approaching the terminal, parking availability at the terminal, and accessibility for pedestrians and bicyclists.

The ridership analysis also forecasted a capture rate of passengers anticipated to use the water taxi out from the capture area. As this would be a new mode of public transportation, there can be a period of time for commuters to familiarize themselves with a new transit option. To account for this period of time, Berk used the 2010 West Seattle/Pier 50 capture rate to project the capture rate for a new route.

Each potential landing site provides opportunities for recreational riders to explore the area around the ferry terminal. Generally, recreational ridership increases during the summer months. Therefore, recreational and seasonal ridership variations in service were also factored into the annual ridership projections for weekday service.

Farebox Recovery Analysis

Farebox recovery is a calculation of the fraction of operating expenses that are met by fares paid by passengers. It is calculated by dividing the system, or routes total fare revenue by total operating expenses.

Farebox recovery calculations in this study were based off of King County Marine Division's 2014 actual operating expenses. Operating expenses include route specific costs, such as fuel, shuttle costs and crew labor, as well as a portion of the divisions fixed costs, which include administration/management labor and maintenance. Shared costs can be broken down into administrative costs and route-based costs (maintenance). It is assumed that adding a third route to the system would not increase the administrative fixed costs. This assumption would need to be validated once specific route needs are identified. However, any increase above three routes would require the addition of administration/management and maintenance needs and therefore costs. The division of fixed costs is portioned based on the operating hours of each route. For the purposes of this study, any new route proposed would be commute only service, much like that of the current Vashon to Downtown Seattle (Pier 50) schedule. Therefore, route specific costs, as well as the shared costs are modeled from the existing Vashon proportioned costs.

Start-up service year (2015) route revenue was calculated by multiplying the current ORCA fare by projected ridership. A fare realization factor of 86% was applied to the calculated route revenue to account for the actual apportioned revenues received, reduced fares and non-paying customers. The 2025 revenues were determined by multiplying projected ridership by the 2025 fares (which were escalated from 2015 using existing fare policy guidelines). The fare realization factor was also applied to the 2025 calculated fare revenue.

3. Elimination Criteria

The elimination criterion for this analysis was based on farebox recovery calculations for the stand alone route in a 2015 (route start-up) and then 2025 (route maturity) ridership scenario. For 2015 ridership, natural breaks were apparent in the 2015 farebox recovery rates resulting in two routes with farebox recovery rates lower than 10 percent. Furthermore, routes which did not meet a mature farebox recovery of 25[1] percent or greater in 2025 were eliminated. The 25 percent or greater threshold for farebox recovery was based on current established King County policy.

4. Findings

Findings can be categorized into two pieces: ridership and farebox recovery. Farebox recovery is in part, guided by the projected ridership for each route. Table 1 provides a summary of 2015 and 2025 high forecast annual ridership projections for the seven routes reviewed.

Ridership Analysis

Generally, 2015 (start-up) ridership numbers begin in a similar range. Once the routes reach maturity in 2025, some routes show greater growth, while others remain stagnant. Kenmore, Kirkland and Ballard continue to show ridership growth, while Bellevue and Des Moines have limited growth. For these two routes, this trend is in part due to the other competing modes that are offered near Des Moines and Bellevue, which include Link Light Rail, and regular and express bus service. Kenmore and Ballard do not have substantial upgrades to the transportation infrastructure planned and, therefore, riding a water taxi becomes a more competitive mode. As for Kirkland, the new 520 bridge will be in operation with its associated tolling. The proximity of the Kirkland marina to the UW WAC and the water taxi's system reliability make this route a very competitive option.

Table 1: Annual Ridership Growth by Route, 2015 and 2025

Route	2015 Annual Ridership Forecast	2025 Annual Ridership Forecast	Percent Growth
Kenmore (Log Boom Park) to UW WAC	57,148	119,210	109%
Kirkland (Marina Park) to UW WAC	56,666	115,625	104%
Bellevue (Meydenbauer Bay Marina) to UW WAC	45,579	72,357	59%
Des Moines (Marina) to Downtown Seattle (Pier 50)	42,473	61,998	46%
Ballard (Shilshole Bay Marina) to Downtown Seattle (Pier 50)	59,433	107,175	80%

*Note: While ridership numbers were calculated based on a 2015 year, service would not begin in 2015 as funding, terminal improvements and agreements would need to be reached with the terminal facility jurisdiction.

To put these numbers in perspective, the West Seattle route has experienced 84 percent growth in ridership from 2010, when King County took over service of the route to 2014 (4 year maturity). This route continues to

[1] 25 percent is the system-wide target for farebox recovery for King County Metro and the current Water Taxi routes and used as a guide in this analysis. However, Metro and the Water Taxi have been exceeding this target since 2009. (http://metro.kingcounty.gov/am/reports/annual-measures/financial.html)

experience growth, however, some of that growth can be attributed to recreational ridership, which is not applicable for the commute-only service proposed on these new routes.

Farebox Recovery Analysis

Farebox recovery calculations allow us to use the ridership projections in a meaningful way and provide a fuller understanding the financial impact of supporting new routes. As ridership reaches more mature levels, farebox recovery rates increase between 2015 and 2025. Once the data was plotted, natural breaks occurred between routes.

At system start-up (2015), five routes meet a FBR of 10 percent, which include: Kenmore to UW, Kirkland to UW, Bellevue to UW WAC, Des Moines to Downtown Seattle (Pier 50) and Ballard to Downtown Seattle (Pier 50). Refer to Table 2 below.

At system maturity (2025), three routes meet or exceed the established King County farebox recovery policy target of 25 percent. The routes that met this criterion include: Kenmore to UW, Kirkland to UW WAC, and Ballard to Downtown Seattle (Pier 50). Refer to Table 2 below for route specific farebox recovery at startup (2015) and at system maturity (2025). Cells highlighted in green indicate that those routes meet or exceed the evaluation criteria.

Table 2: Farebox Recovery Growth Projection, 2015 and 2025

Route	Stand-Alone Farebox Recovery (at start-up 2015)*	Stand-Alone Farebox Recovery (at maturity 2025)*
Kenmore (Log Boom Park) to UW WAC	12.2%	25.4%
Kirkland (Marina Park) to UW WAC	15.3%	31.2%
Bellevue (Meydenbauer Bay Marina) to UW WAC	10.7%	17.0%
Des Moines (Marina) to Downtown Seattle (Pier 50)	10.5%	15.4%
Ballard (Shilshole Bay Marina) to Downtown Seattle (Pier 50)	16%	28.8%

5. Routes for Future Analysis

Routes identified for further infrastructure analysis include:

- Kenmore (Log Boom Park) to UW WAC
- Kirkland (Marina Park) to UW WAC
- Ballard (Shilshole Bay Marina) to Downtown Seattle (Pier 50)

Appendix A

Ridership Report

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KING COUNTY MARINE DIVISION

Water Taxi Alternatives Ridership Forecast

June 3, 2015

BERK

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Seattle, WA 98121
www.berkconsulting.com

TABLE OF CONTENTS

1.0 OVERVIEW AND APPROACH

This report evaluates seven alternative water taxi routes in order to develop average daily and annual ridership forecasts for the years 2015, 2025, and 2040. The routes evaluated include:

- Kenmore (Log Boom Park) to University of Washington (WAC)
- Kenmore (Log Boom Park) to Bellevue (Marina)
- Kirkland (Marina) to UW (WAC)
- Bellevue (Marina) to UW (WAC)
- Renton (Southport) to Bellevue (Marina)
- Des Moines (Marina) to Pier 50
- Ballard (Marina) to Pier 50

As with the 2009 pedestrian ferry route analysis[1], this study first analyzed ridership statistics for the West Seattle/Downtown Water Taxi to determine potential market capture rates for commute travel to employment centers. Following that analysis three primary factors were used to forecast commute ridership for each route alternative:

- Accessibility of the terminal to potential customers
- Market demand in the travel corridor
- Travel time competitiveness of ferry routes compared to bus/rail transit

The primary data source used for the commute ridership forecasts is travel demand model output from the Puget Sound Regional Council (PSRC). This data summarizes peak AM person-trips between origin and destination zones throughout King County and nearby areas by mode of travel (single occupancy vehicle, carpool, transit, and other). This study analyzed data from different model outputs that reflect anticipated land use and transportation conditions in 2010, 2025, and 2040.

Recreational ridership is forecasted separately using a different methodology under the assumption that all recreational trips are induced[2] and would not be reflected in PSRC's travel model data. The analysis considers key differences between the Water Taxi service and destination characteristics compared to the proposed route alternatives in order to estimate recreational ridership potential and growth for each route.

2.0 WEST SEATTLE/DOWNTOWN WATER TAXI ANALYSIS

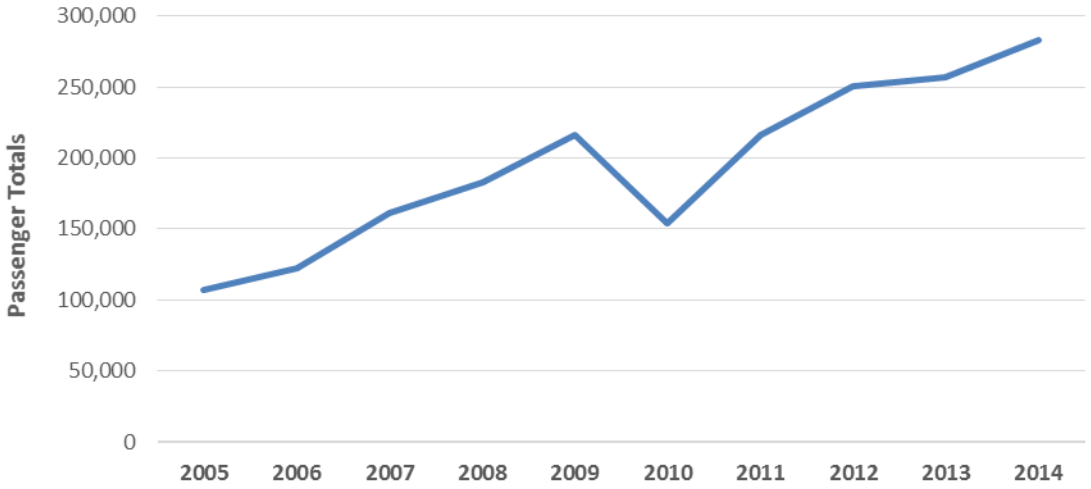
The West Seattle to Downtown water taxi began sailings in 2005 as a seasonal service (April – October) and extended to a year-round service in late 2010. Exhibit 1 shows annual ridership as a steadily growing trend since 2010. In 2014, the water taxi carried over 282,000 passengers, the highest ridership since the route began.

---

[1] KPFF Consulting Engineers 2009. *King County Ferry District Demonstration Project Technical Studies and Implementation: Refined Route Analysis*. Release date: June 30, 2009.

[2] "Induced" trips are trips which would not have otherwise happened if the service were not available. Since these trips would not reflect regular trip making patterns, they would not be expected to be reflected in regional travel model output.

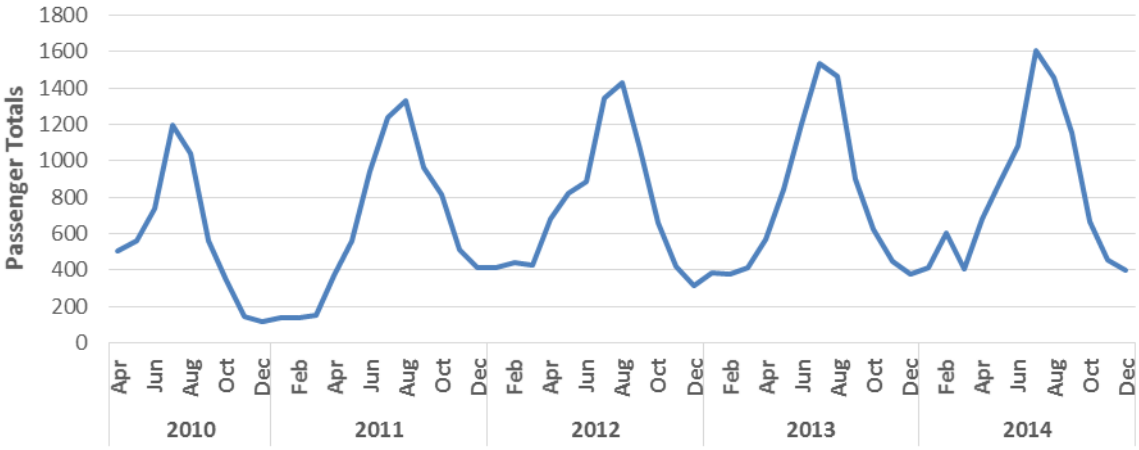
Exhibit 1. Annual Ridership, West Seattle/Downtown Water Taxi



Source: King County Marine Division, 2015; BERK, 2015

Water taxi ridership varies significantly by season due in part to the large number of summer recreational passengers. Exhibit 2 shows average West Seattle Water Taxi daily ridership from 2010 to 2014.

Exhibit 2. Average Daily Ridership, West Seattle/Downtown Water Taxi

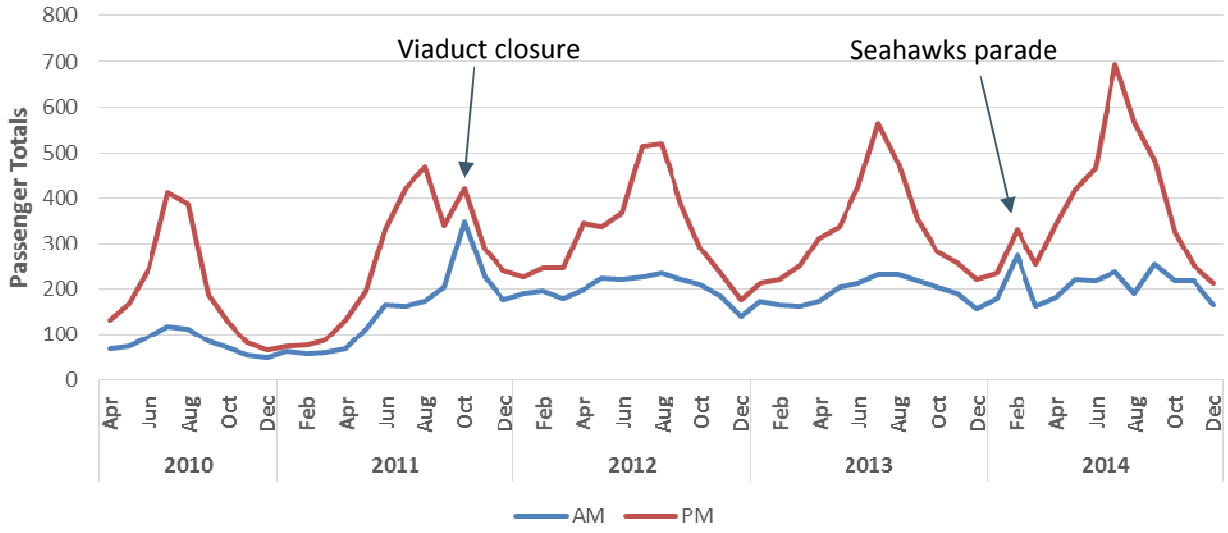


Source: King County Marine Division, 2015; BERK, 2015

One way to differentiate commute ridership from recreational ridership is to analyze passengers by time of sailing. Exhibit 3 show peak period commute ridership for weekday travel by month during 2010 – 2014. The AM peak period includes sailings from 6:00 – 8:45 AM while the PM peak period includes sailings from 3:45 – 6:45 PM. AM peak ridership (shown in blue) has remained fairly steady since mid-2011, with the exception of slight seasonal variation, the October 2011 Alaskan Way Viaduct closure and February 2014 Seahawks parade. PM peak period ridership, on the other hand, shows a great deal of seasonal variation as well as growth from year to year. This study assumes all AM peak period trips are

associated with commute travel and that additional PM peak period trips are for recreational travel. Therefore, to estimate daily commute ridership this study doubles AM peak period ridership. All other trips are assumed to be for recreational purposes. These assumptions are consistent with the findings of a 2008 survey of West Seattle/Downtown Water Taxi passengers.[3]

Exhibit 3. Commute Ridership, West Seattle/Downtown Water Taxi Peak



Source: King County Marine Division, 2015; BERK, 2015

Currently, the West Seattle/Downtown Water Taxi provides weekend service during the summer sailing season of April through October. Ridership data from a peak travel week in 2014 (August 4 – 10) indicates that weekend ridership can exceed weekday ridership during the peak summer months. Average daily weekday ridership during this period was 1,678 while average daily weekend ridership was 2,307.

3.0 COMMUTE TRAVEL LEVEL OF DEMAND

To summarize the total potential demand for ridership, BERK analyzed the volume of AM peak commute trips between each route's origin and destination market areas. This section describes the methods used to identify the geographic boundaries of origin (home) and destination (workplace) travel market areas. It also describes the travel model data used to summarize current and future market demand in each route corridor.

3.1 Data Source – PSRC Travel Model Output

The person-trip counts reported in this study are based on outputs of PSRC's travel demand forecasting model. This data summarizes morning peak (6:00 AM - 9:00 AM) person-trips by mode of travel between origin and destination zones throughout King County and nearby areas. This study analyzed data from different model outputs that reflect current or anticipated land use and transportation network

[3] See KPFF Consulting Engineers 2009. *King County Ferry District Demonstration Project Technical Studies and Implementation: Refined Route Analysis*. Release date: June 30, 2009.

conditions in 2010, 2025, and 2040. The impacts of current and future toll rates, transit fares, parking costs, and congestion are all considered when determining whether the trip produced by a given household will select to travel via single occupancy vehicle, carpool, transit, or non-motorized (bicycle and pedestrian trips combined). Also considered are the socio-economic characteristics of individual households such as income, which can also have an influence on mode choice. These factors combined sometimes result in a decline in total trips between zones of interest despite a growth in housing and employment.[4]

The PSRC trip data is grouped by Traffic Analysis Zones (TAZ), which are geographic areas used in transportation modeling. The size of a TAZ scales with the density of the population and jobs within a specific area, and can range from the size of a few city blocks in dense urban areas to several square miles in suburban areas, or more in rural areas. Trips are summarized by origin and destination TAZ pairs; therefore, it is possible to summarize the total volume of peak AM trips from one part of King County to another, isolating travel patterns in corridors of interest.

This study seeks to forecast ridership for the years 2015, 2025, and 2040. PSRC does not provide data for the year 2015. Therefore, trip volumes for 2015 are estimated using the following formula:

2015 Trips = 2010 trips + ((2025 trips – 2010 trips)* 0.4)

The ratio of projected King County population growth from 2010 – 2015 to PSRC's forecasted population growth from 2010 – 2025 is 0.4 or 40%. Essentially it assumes that each TAZ has achieved approximately 40% of its progress towards the 2025 household and population targets assumed in the PSRC land use and travel demand model.

A limitation of this approach is that the 2025 travel model assumes the introduction of additional highway tolling and other changes the transportation network, which are not in effect as of 2015. As a result, this method of estimating 2015 trip counts may underestimate total trips in some zones. Similarly, transit trips could potentially be overestimated if the model is forecasting a shift to transit as a result of network changes that have not yet taken place in 2015.

Finally, PSRC produces different versions of travel model output based on different assumptions about the trip-making patterns of households in the future. This study analyzed two different travel model outputs each for the years 2025 and 2040. Essentially, one forecast assumes greater reductions in trip making per household than the other. By analyzing data from each forecast BERK is able to produce two different ridership forecasts for each year, which we call "Low" and "High". These are described later in the Appendix.

3.2 Selection of Origin and Destination Market Areas

To measure level of demand, it is necessary to define the geographic boundaries of origin and destination market areas for each route alternative.

- Origin markets are defined as the catchment area of all household locations for which the ferry route may provide a reasonably competitive alternative to current and future transit options.

[4] PSRC produces different versions of travel model output based on different assumptions about the trip-making patterns of households in the future. This study analyzed two different travel model outputs each for the years 2025 and 2040. Essentially, one forecast assumes greater reductions in trip making per household than the other. By analyzing data from each forecast BERK was able to produce higher and lower end forecasts of commute ridership potential.

- Destination markets are employment/activity centers that are attractors of daily commute trips.

Origin Market Areas

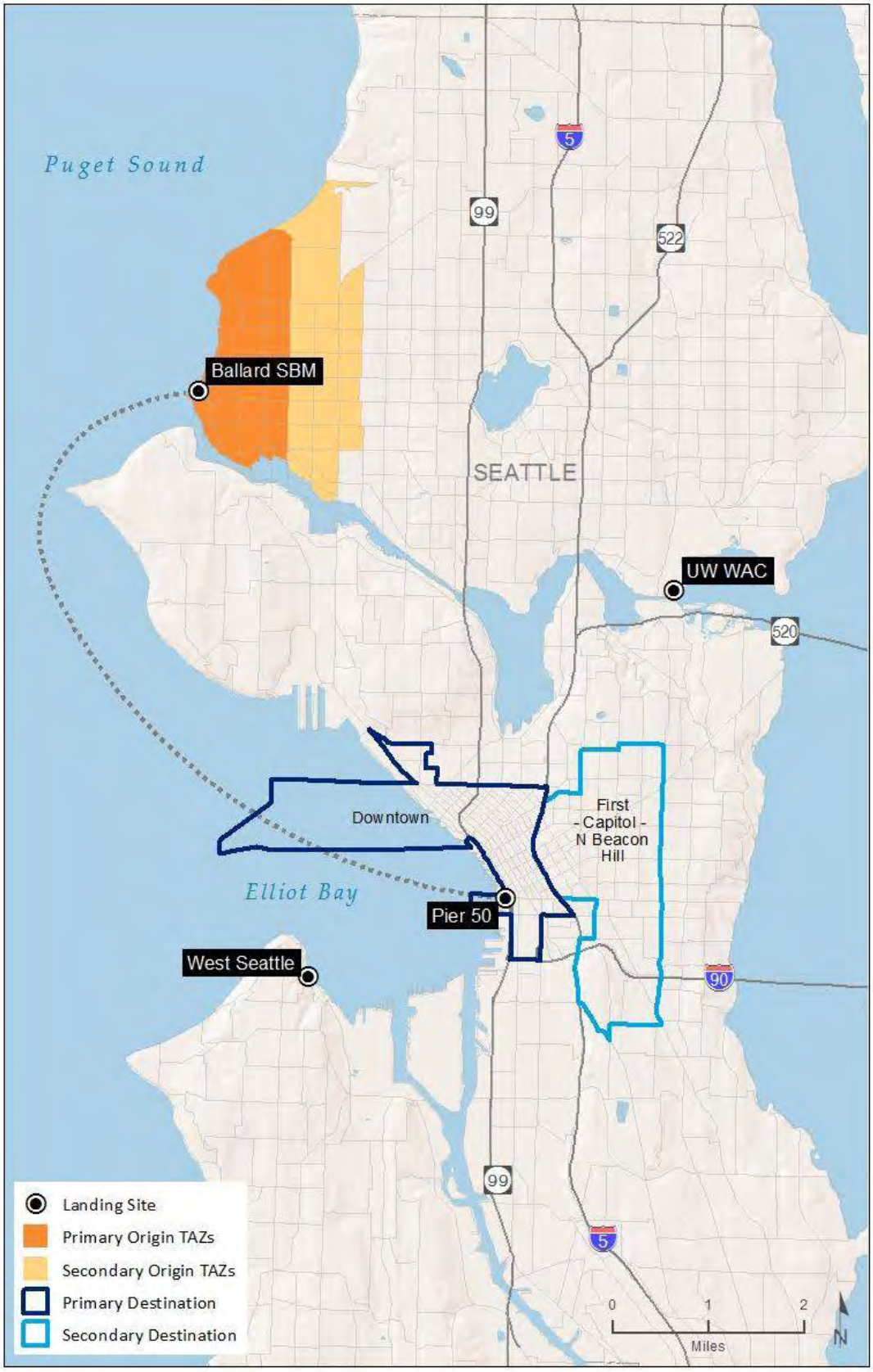
Origin market areas are defined for all ferry landings because many routes are expected to have at least some bi-directional commute travel. Each origin market is divided into two or three segments, depending upon the presence or absence of a park-and-ride facility. Primary market areas include all TAZs within two mile of the landing site. Secondary market areas include TAZs within a 10-minute uncongested drive from the landing site. For ferry landings that include park-and-ride lots, tertiary market areas are created to take into account due to the increased accessibility for passengers arriving by automobile. Tertiary areas included TAZs within a 15-minute uncongested drive of the landing site.

The resulting market areas were then scaled back by eliminating TAZs too close to the destination. This was done under the assumption that potential riders would not travel away from their destination to access the ferry. Drive-time contours from the destination were used as a guide to eliminate TAZs where potential riders would have to back-track or drive significantly out of their way to get to the landing site. Similarly, capture areas were scaled back where ferry travel time competitiveness compared to transit options diminished significantly. Examples include areas east of 15th Street NW in Ballard and TAZs intersecting the SR 520 corridor in Kirkland and Bellevue's market areas.

In addition, select TAZs were also eliminated from a market area if barriers not captured by the GIS would make it unreasonable for potential riders to consider the ferry route. For example, the ship canal was considered a barrier (especially for walking and biking) for the Ballard market area. Even though a few TAZs south of the canal in Magnolia were not screened out by the drive-time mask, it was still unreasonable that riders would take a ferry from the Shilshole Marina to Downtown if they lived south of the canal.

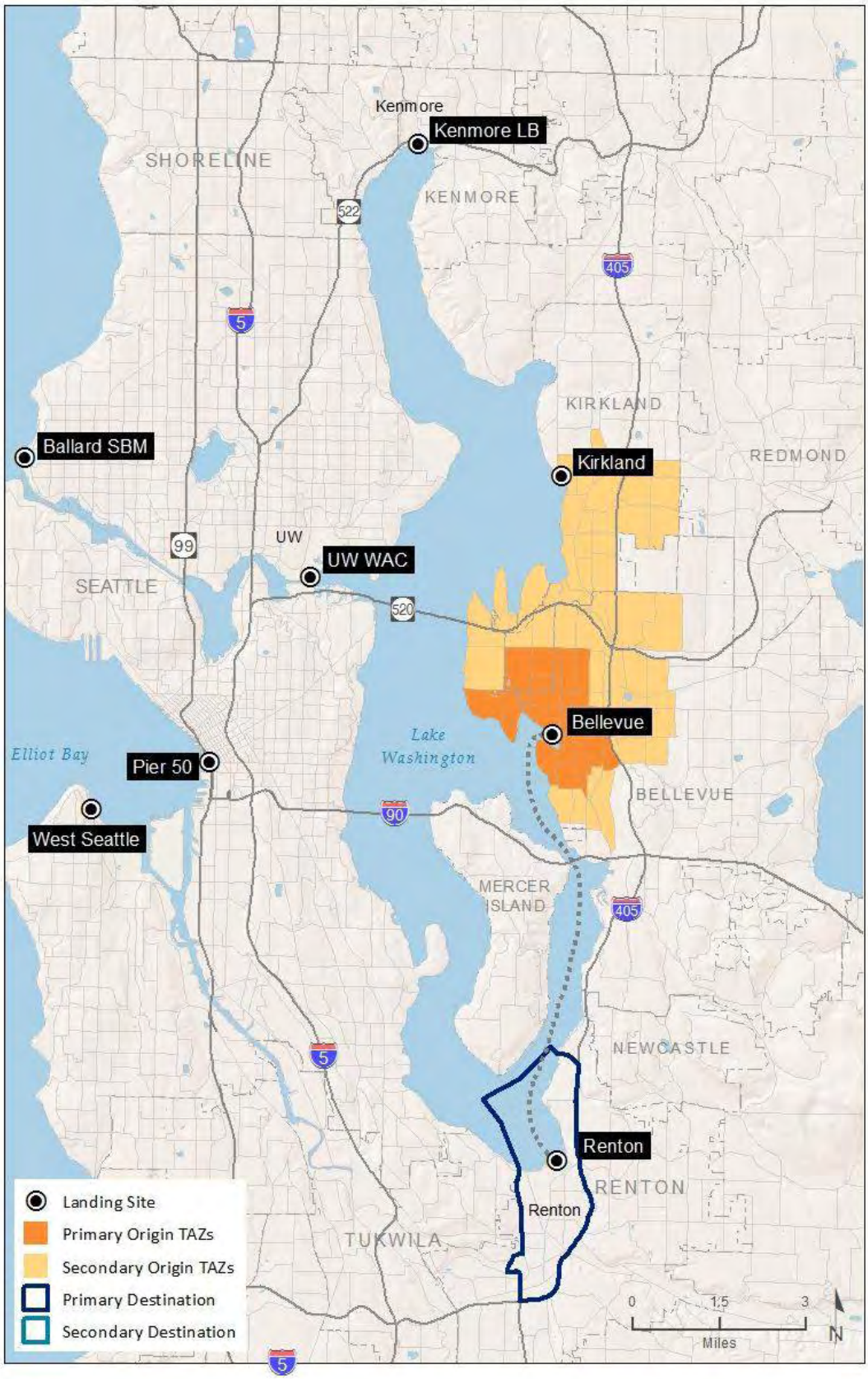
Exhibit 4 through Exhibit 14Exhibit 12 show the origin market areas and associated destination market areas for each point of origin. UW and Bellevue have differentiated origin market areas based on route. These are displayed in separate maps. Exhibit 15 shows the origin and destination areas for West Seattle, as a comparison.

Exhibit 4. Ballard SBM Origin and Destination Market Areas



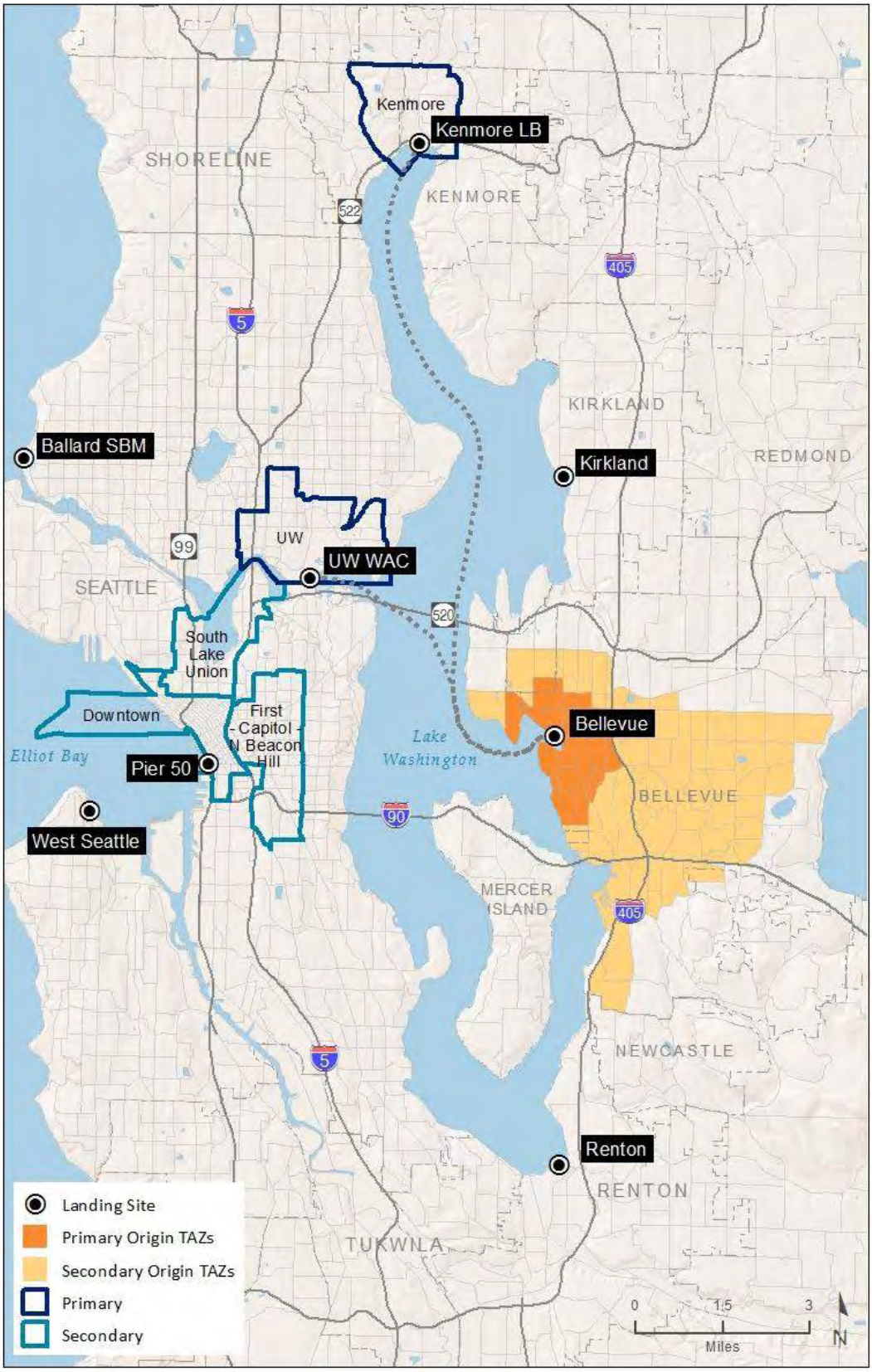
Source: BERK, 2015

Exhibit 5. Bellevue Origin and Destination Market Areas (Renton Route)



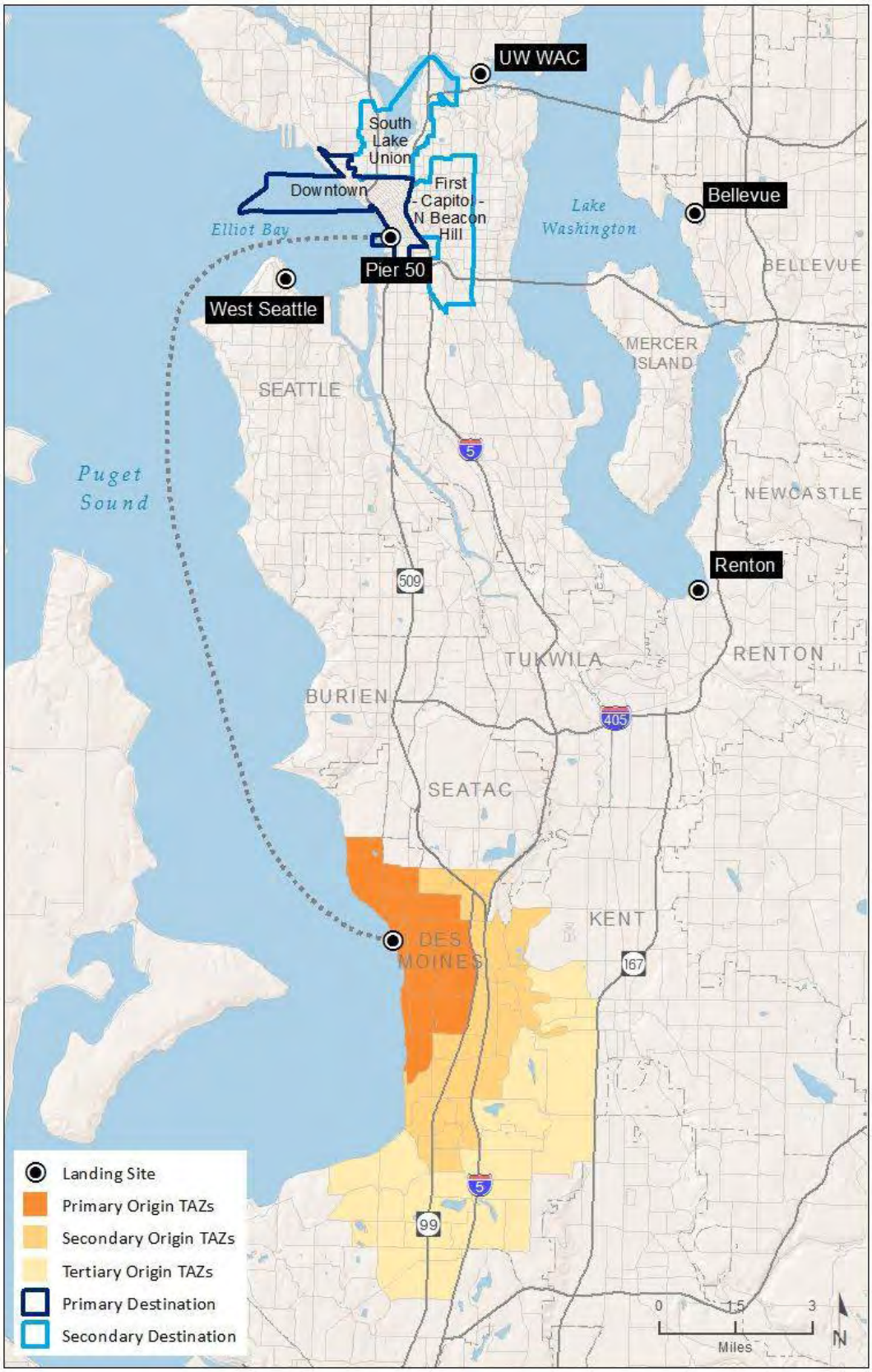
Source: BERK, 2015

Exhibit 6. Bellevue Origin and Destination Market Areas (UW and Kenmore Routes)



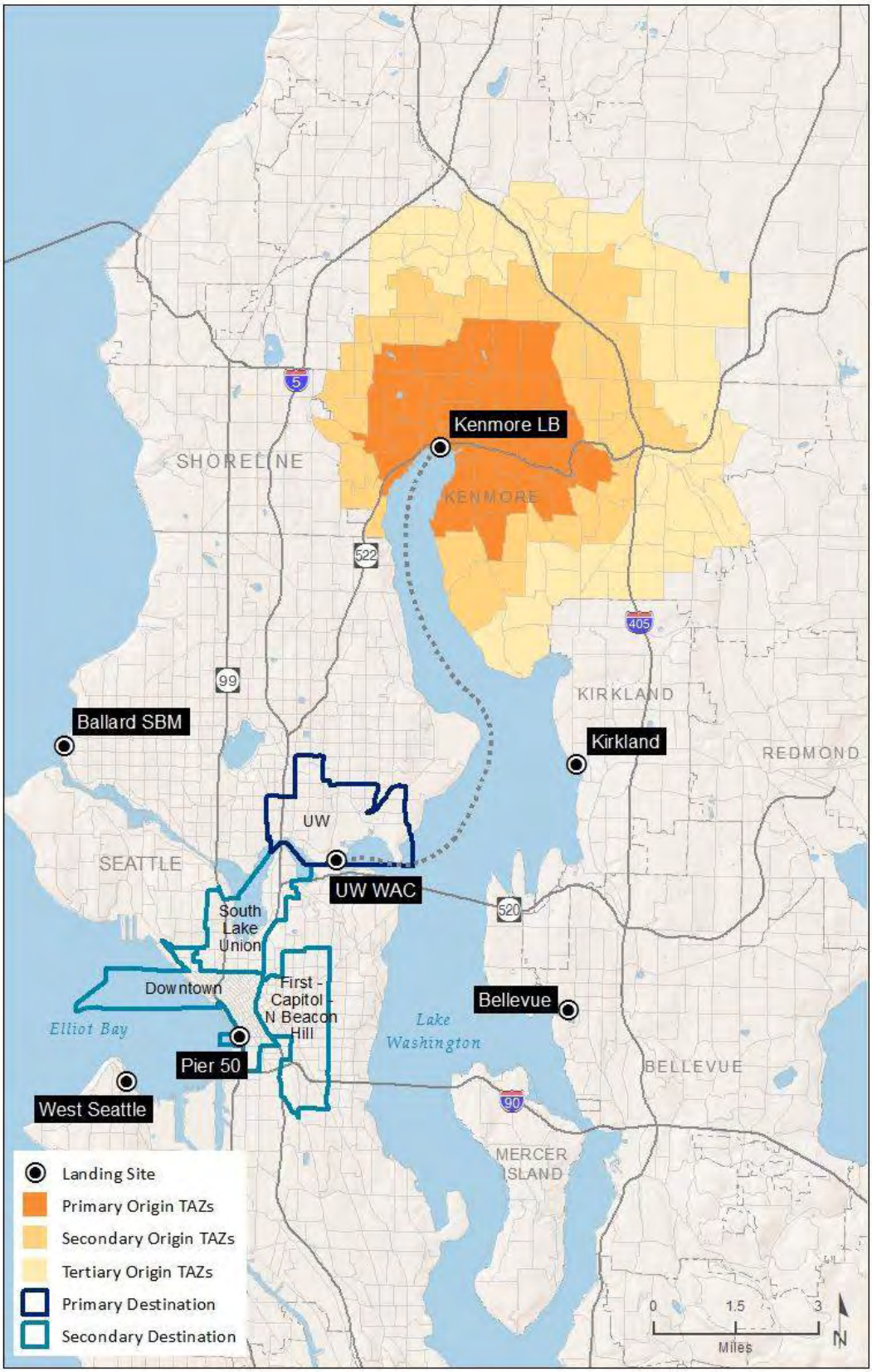
Source: BERK, 2015

Exhibit 7. Des Moines Origin and Destination Market Areas



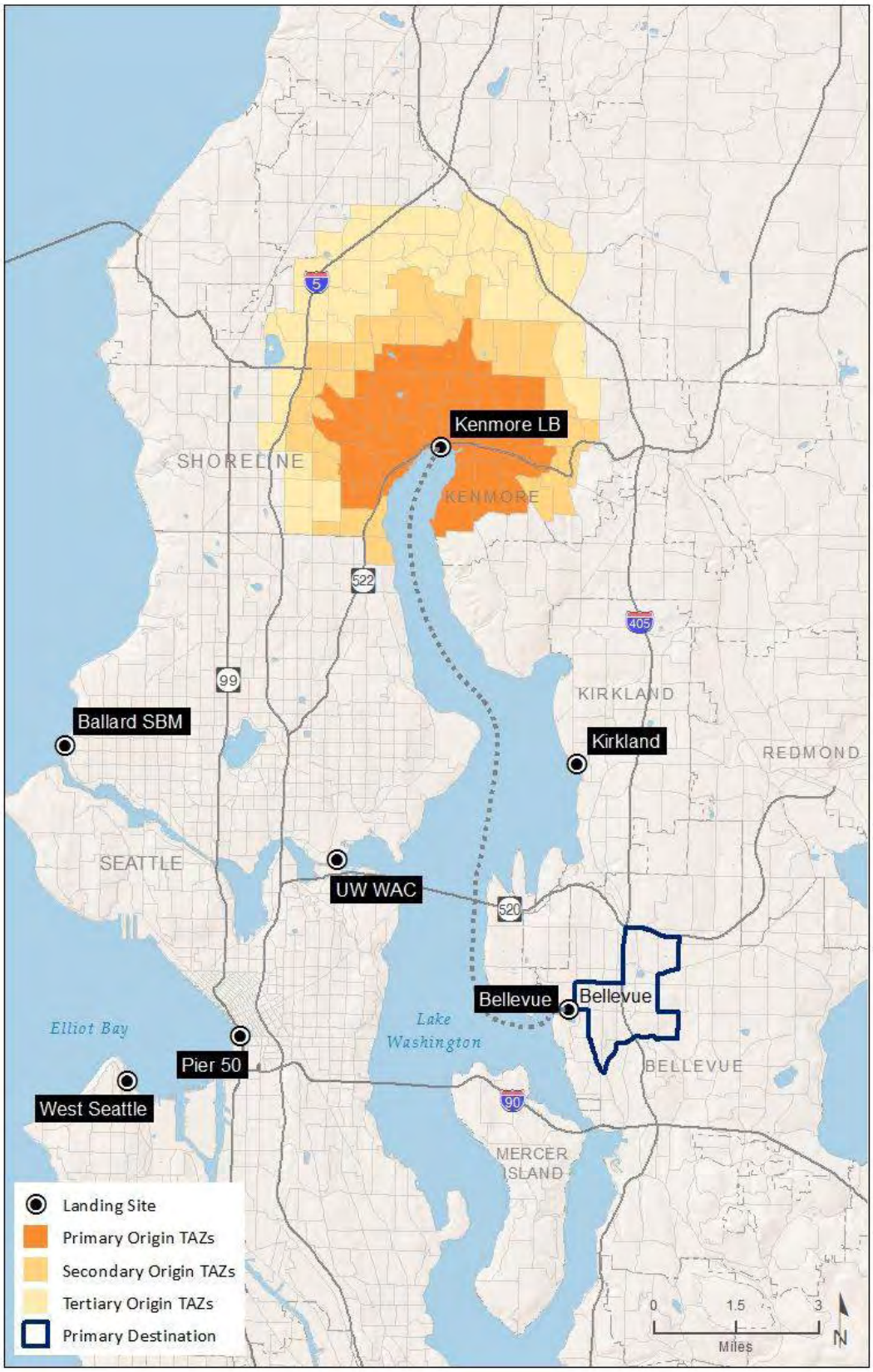
Source: BERK, 2015

Exhibit 8. Kenmore Origin and Destination Market Areas (UW Route)



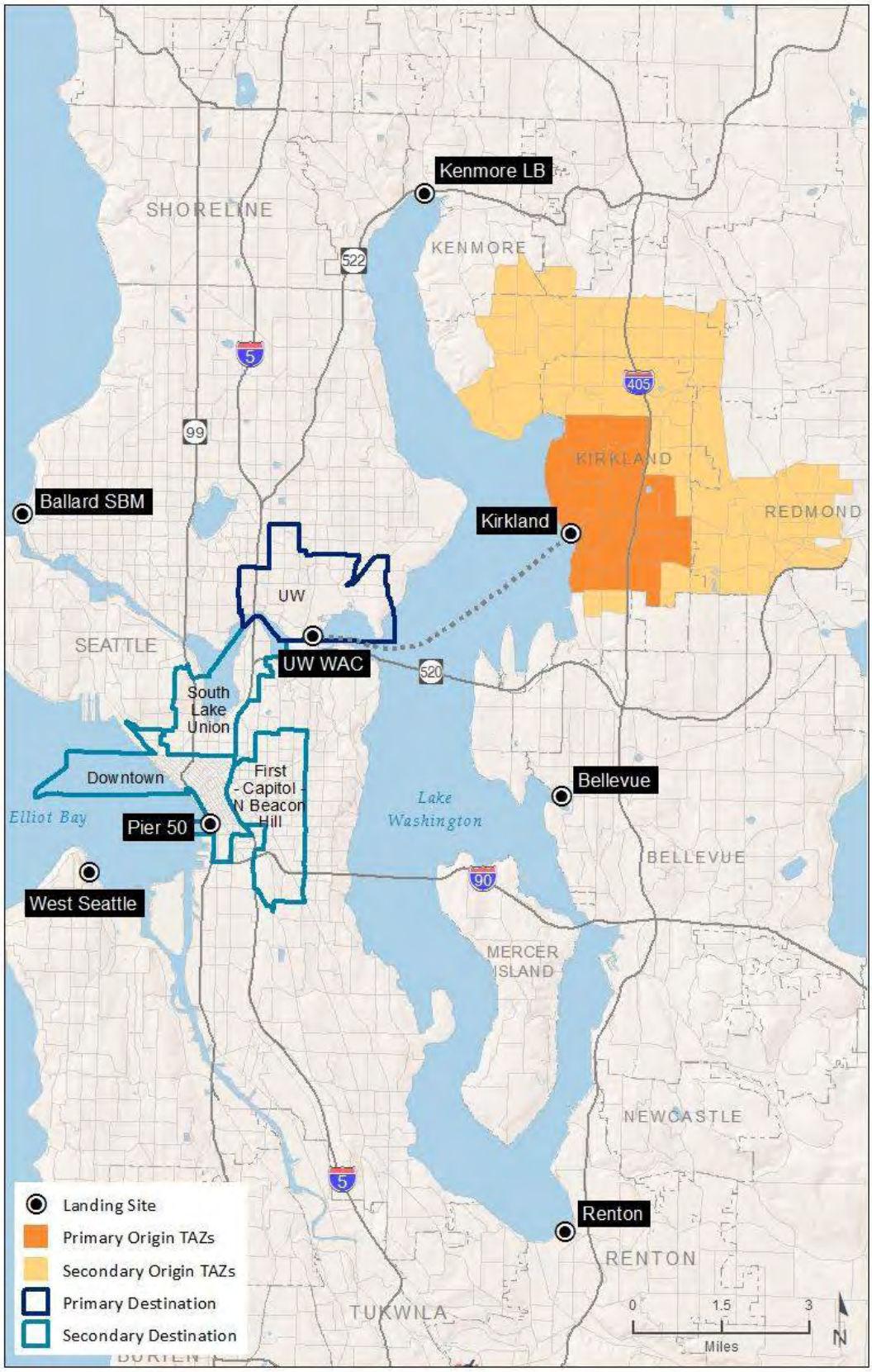
Source: BERK, 2015

Exhibit 9. Kenmore Origin and Destination Market Areas (Bellevue Route)



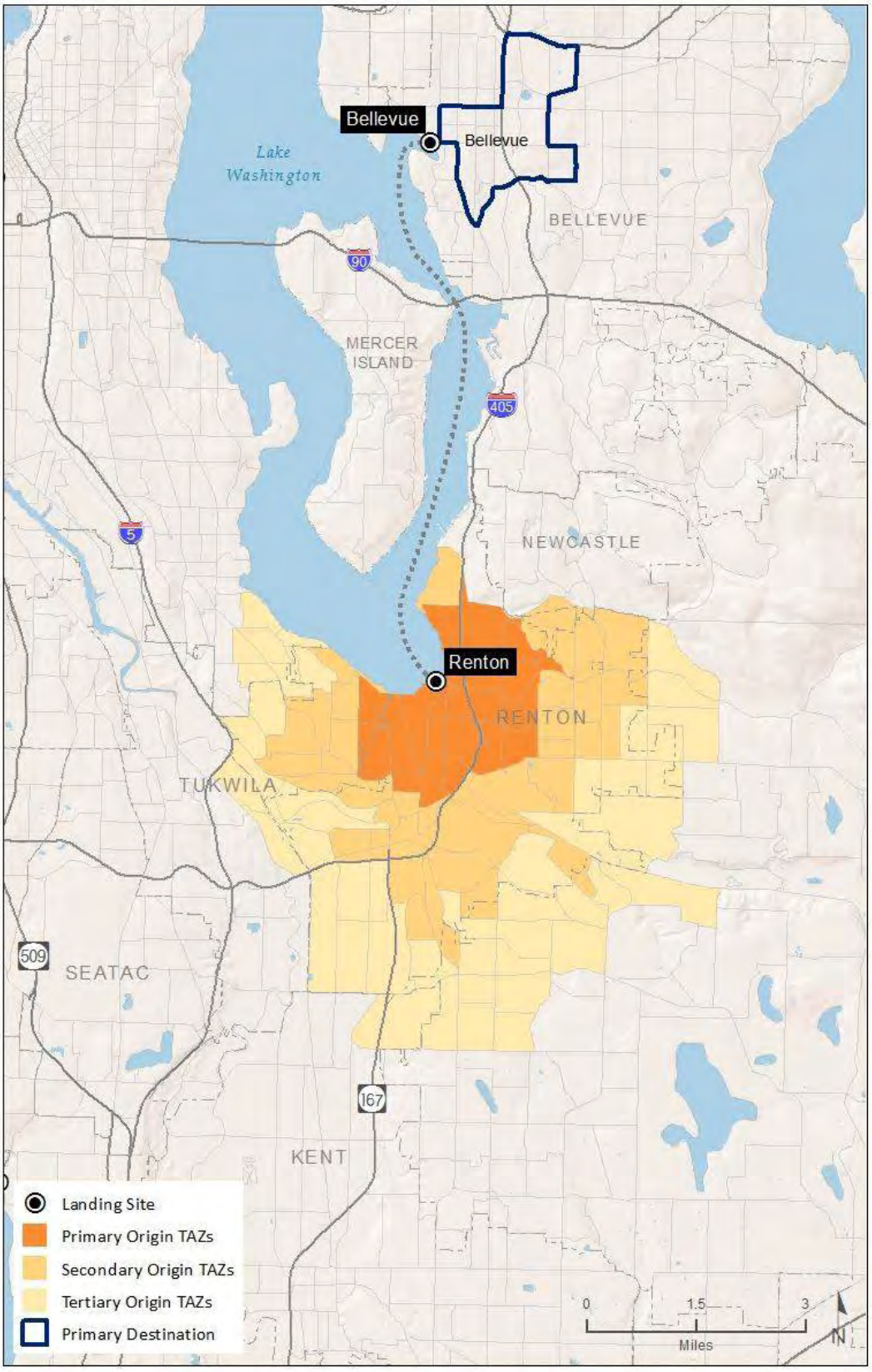
Source: BERK, 2015

Exhibit 10. Kirkland Origin and Destination Market Areas



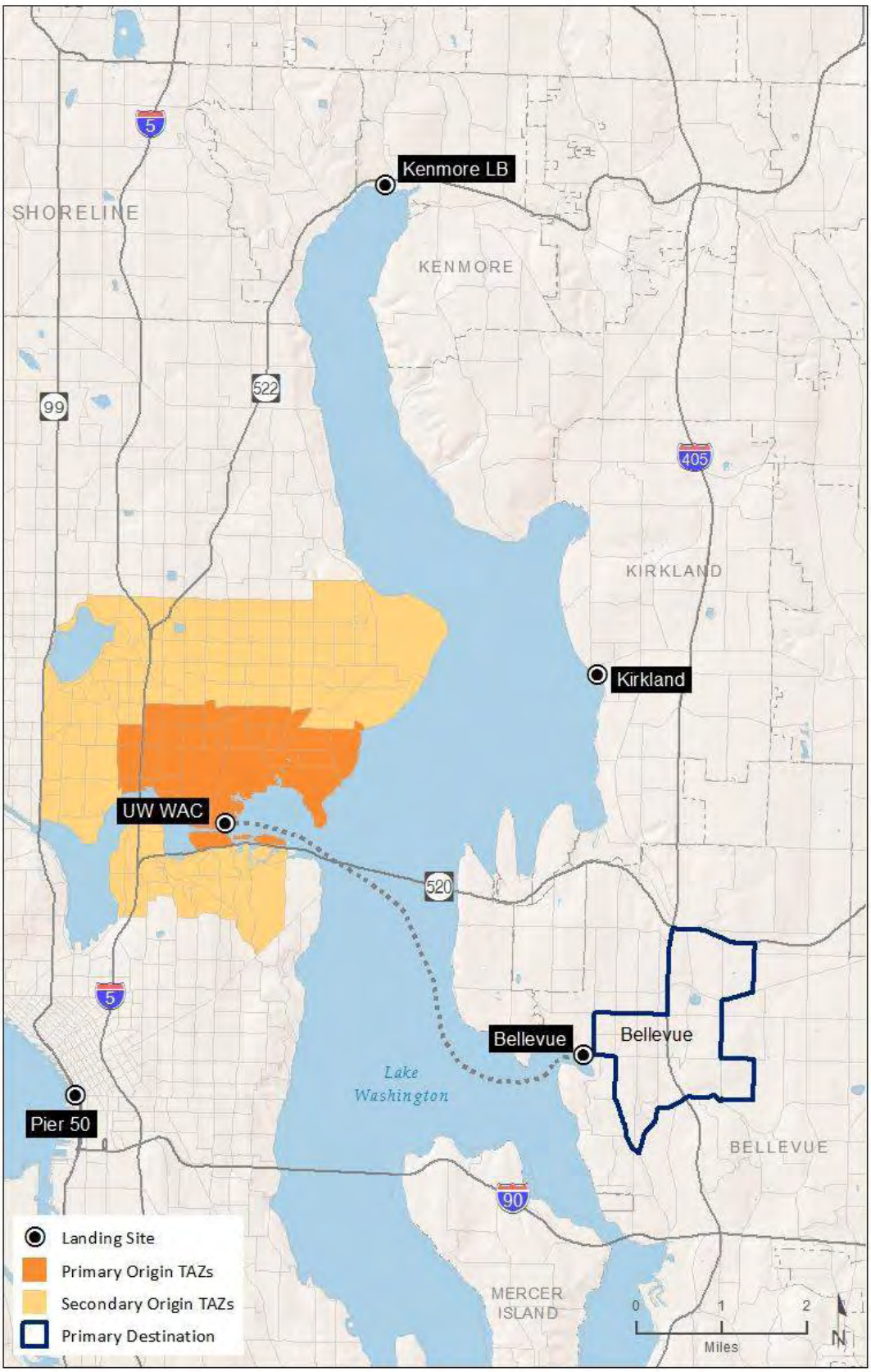
Source: BERK, 2015

Exhibit 11. Renton Origin and Destination Market Areas



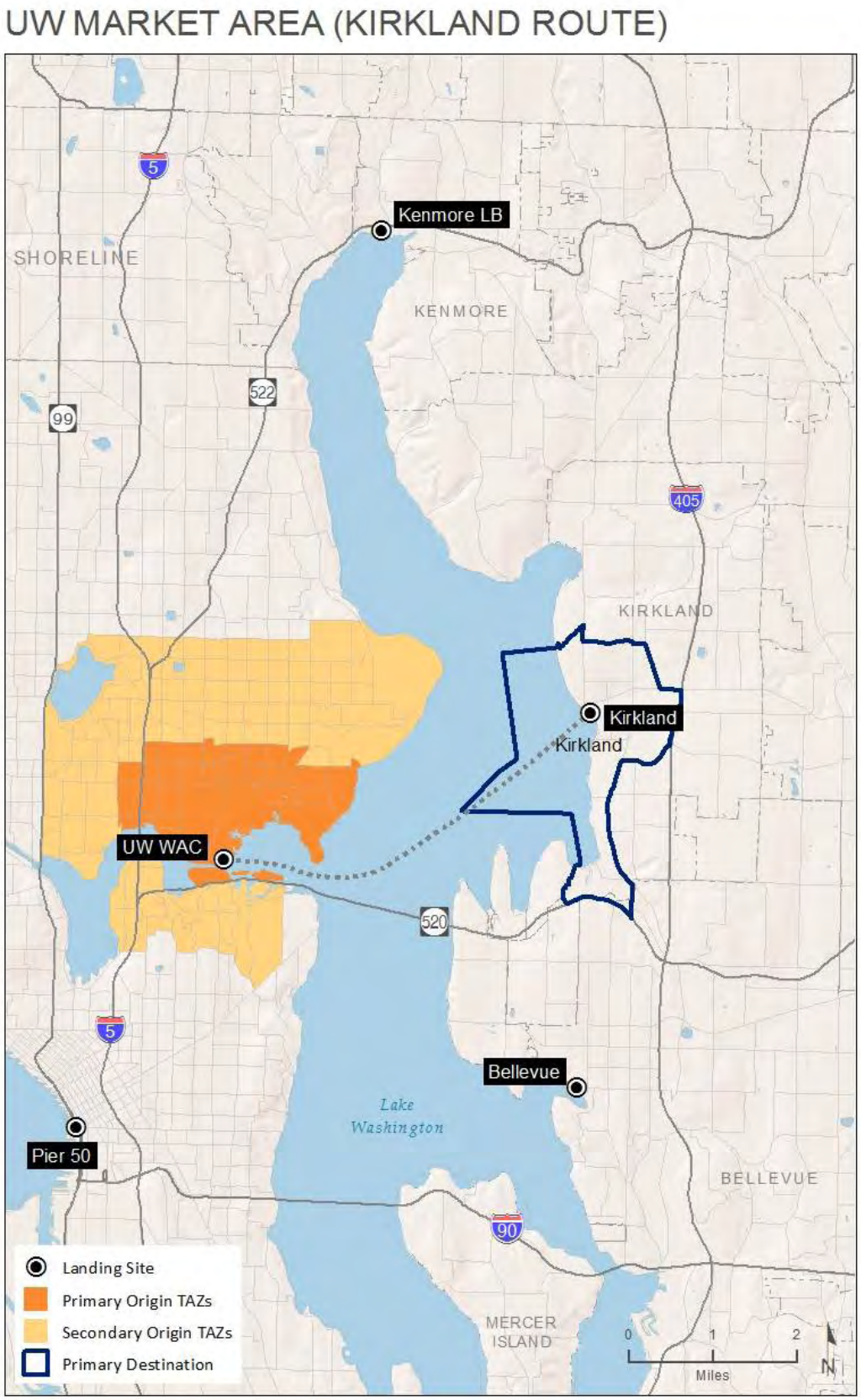
Source: BERK, 2015

Exhibit 12. University of Washington Origin and Destination Market Areas (Bellevue Route)



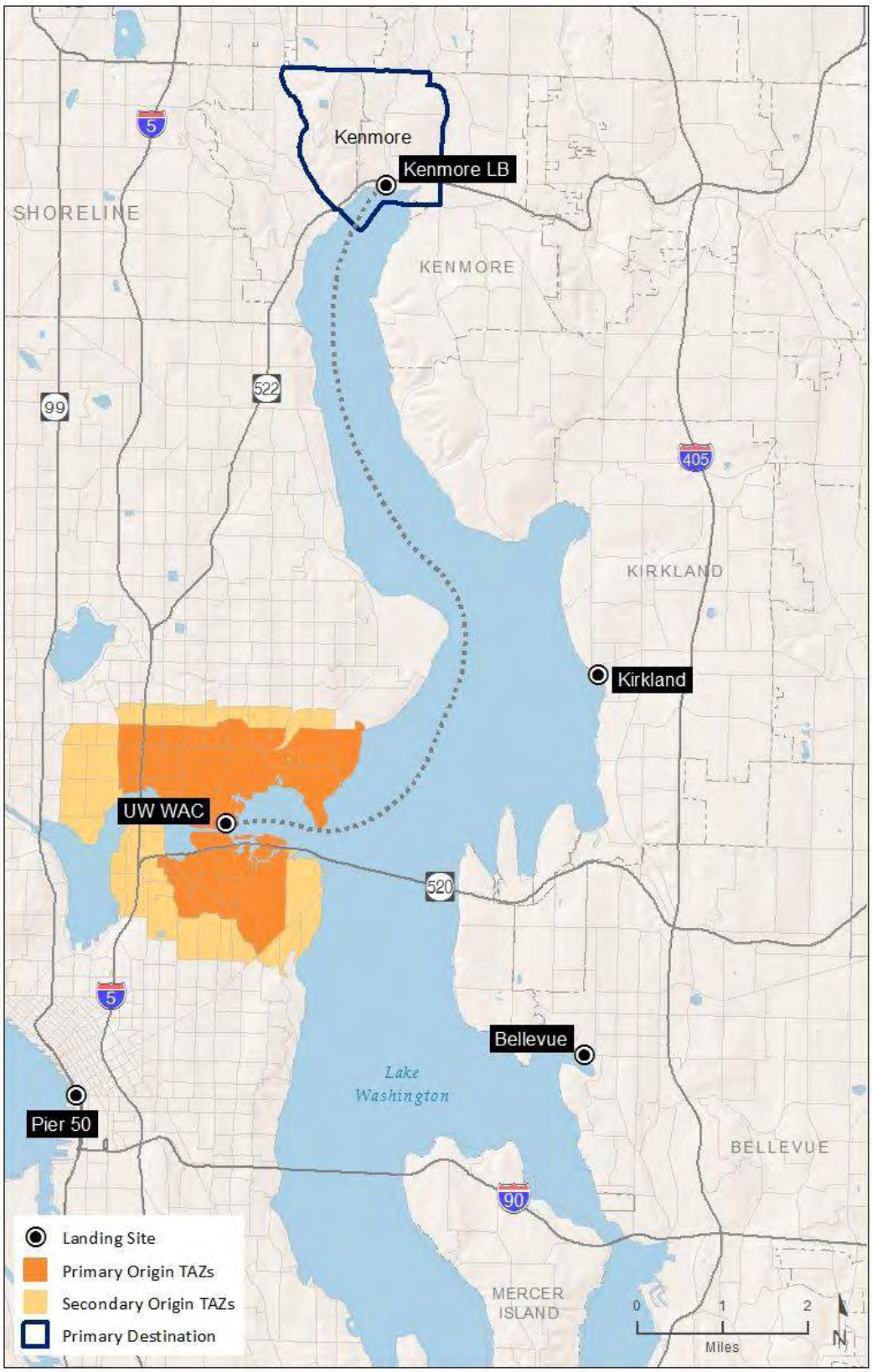
Source: BERK, 2015

Exhibit 13. University of Washington Origin and Destination Market Areas (Bellevue Route)



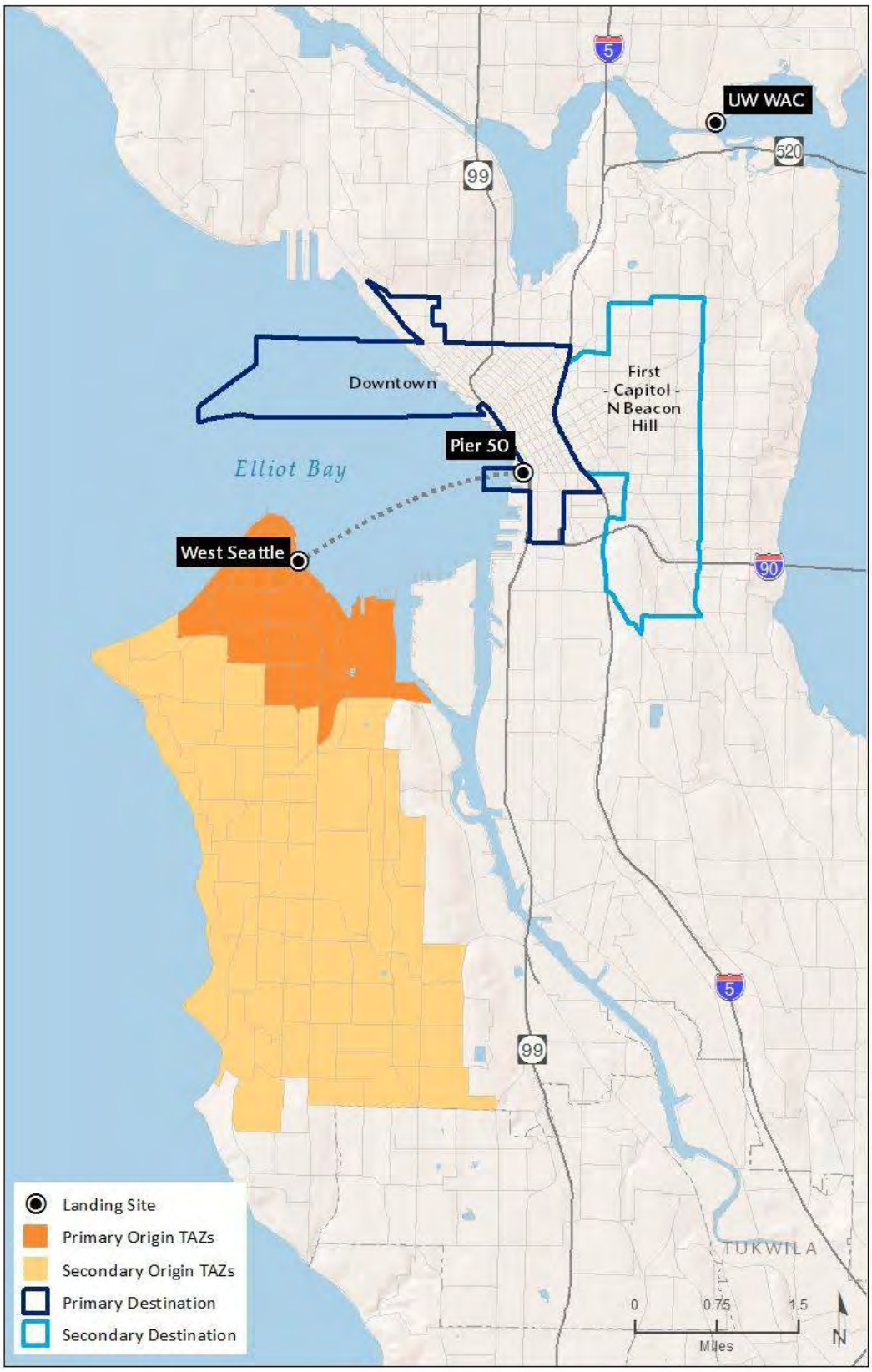
Source: BERK, 2015

Exhibit 14. University of Washington Origin and Destination Market Areas (Kenmore Route)



Source: BERK, 2015

Exhibit 15. West Seattle Origin and Destination Market Areas



Source: BERK, 2015

Destination Market Areas

Destination markets emphasize areas of higher employment and are smaller than origin market areas to account for the fact that passengers must travel on foot, bicycle, or transit transfer to get to their final destination. Each ferry route is associated with one primary destination market area, which contains the ferry landing. Some ferry routes are also associated with secondary destinations. Travel to these secondary destinations would require a transfer to another form of transit or a longer bike ride from the ferry landing for a passenger traveling with a bicycle. Secondary destinations are also less competitive than primary destinations when compared to transit travel time. Exhibit 16 lists primary and secondary destinations by route alternative. The location of destination market areas are mapped in Exhibit 4 through Exhibit 14.

Exhibit 16. Primary and Secondary Destinations by Route Alternative

Route Alternative	Primary Destinations	Secondary Destinations
West Seattle – Pier 50	*Downtown Seattle* *West Seattle*	*South Lake Union* *First Hill/Capitol Hill/North Beacon*
Ballard SBM – Pier 50	Downtown Seattle Ballard	First Hill/Capitol Hill/North Beacon
Des Moines – Pier 50	Downtown Seattle Des Moines	South Lake Union First Hill/Capitol Hill/North Beacon
Kenmore LB – UW WAC	UW Kenmore	South Lake Union Downtown Seattle First Hill/Capitol Hill/North Beacon
Kirkland – UW WAC	UW Kirkland	South Lake Union Downtown Seattle First Hill/Capitol Hill/North Beacon
Kenmore LB – Bellevue	Bellevue Kenmore	*None*
Bellevue – UW WAC	UW Bellevue	South Lake Union Downtown Seattle First Hill/Capitol Hill/North Beacon
Renton – Bellevue	Bellevue Renton	*None*

Source: BERK, 2015

3.3 Market Area Summary

Exhibit 17 summarizes estimated total population by origin market area and proposed route alternative for 2015. Note that some origin market areas change for different route alternatives. For instance University of Washington has a larger primary market area population for the UW WAC - Bellevue route than for the UW WAC - Kenmore route because the market areas cover different TAZs. Generally, routes with tertiary market areas have the greatest total population. Routes with more limited market areas such as Ballard have the least population.

Exhibit 17. Estimated Population by Origin Market Area, 2015

Origin Area	Route	Estimated Population, 2015			
		Primary	Secondary	Tertiary	Total
West Seattle	West Seattle – Pier 50	17,595	57,066	-	74,661
Ballard	Ballard SBM – Pier 50	17,161	25,375	-	42,537
Bellevue	Bellevue - Renton	27,481	36,920	-	64,401
Bellevue	Bellevue – UW WAC	27,481	53,352	-	80,832
Des Moines	Des Moines – Pier 50	34,916	32,211	59,721	126,848
Kenmore	Kenmore LB – UW WAC	41,356	58,920	73,934	174,210
Kenmore	Kenmore LB – Bellevue	31,482	53,855	45,345	130,683
Kirkland	Kirkland – UW WAC	23,360	82,483	-	105,843
UW	UW WAC - Bellevue/Kirkland	43,054	72,737	-	115,792
UW	UW WAC - Kenmore	35,648	44,994	-	80,642
Renton	Renton – Bellevue	33,706	39,402	56,265	129,373

Source: BERK, 2015

Exhibit 18 summarizes estimated employment for the year 2013 by destination market areas. Unlike origin market areas, destination markets do not change in size by route alternative. Downtown Seattle, South Lake Union, and Bellevue have the greatest estimated employment. Kenmore and Ballard have the least.

Exhibit 18. Estimated Employment by Destination Market Area, 2013

Destination Area	Estimated Employment
West Seattle	8,767
Ballard	2,841
Bellevue	71,425
Des Moines	4,675
Downtown	115,023
First - Capitol - N Beacon Hill	56,842
Kenmore	1,636
Kirkland	17,428
Renton	24,183
South Lake Union	81,494
UW	46,109

Source: PSRC, 2015; BERK, 2015

3.4 Findings – Commute Travel Level of Demand

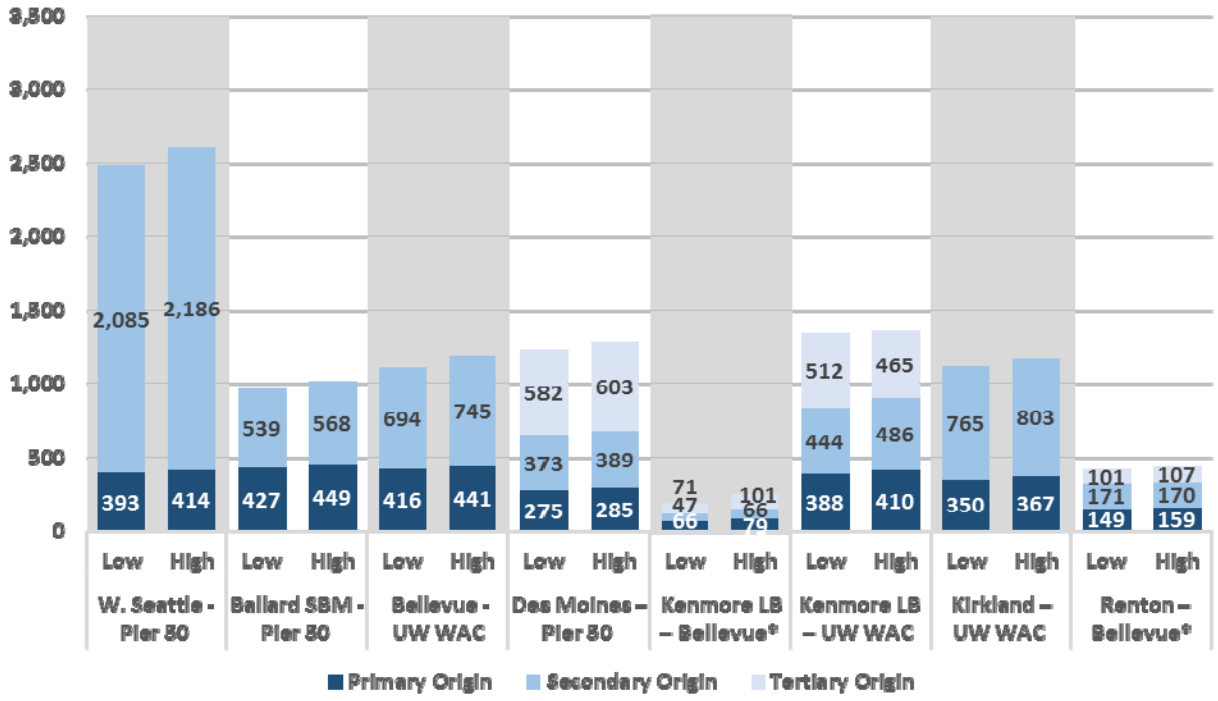
Exhibit 19 through Exhibit 21 summarize level of demand for the West Seattle/Downtown Water Taxi as well as for each proposed route alternative for the years 2015, 2025, and 2040. This analysis treats pedestrian ferries as a form of transit. PSRC travel model data forecasts total demand for transit travel between origin and destination TAZs during the peak AM commute period. So this study measures demand as total peak AM transit trips between origin market areas and potential destinations for each proposed ferry route alternative.

As discussed previously, BERK analyzed two different sets of PSRC travel model output data to calculate a range of possible demand depending upon future household trip making habits. Therefore, two bars are shown for each route: one representing each forecast (Low and High). The 2015 forecast does not show significant difference between the Low and High bars due to greater certainty about near-term travel patterns. By 2040, the difference between the Low and High forecasts becomes more noticeable.

Each bar is divided into three segments, corresponding to primary, secondary, and tertiary origin market areas (primary being the closest and tertiary the furthest from the ferry landing). Demand from each of these market area segments is treated differently in the ferry ridership forecasting analysis, as discussed later in this Appendix. In 2015, many of the proposed routes have similar demand within their primary market areas. The exceptions include Kenmore – Bellevue, Renton – Bellevue, and Des Moines – Pier 50. Much larger difference can be seen when comparing the secondary and tertiary market demand. The West Seattle – Pier 50 route has the highest demand overall in 2015. The next two highest demand routes (Kenmore – UW and Des Moines – Pier 50) benefit from the inclusion of tertiary market areas due to the availability of parking. Routes that do not include Downtown Seattle as a primary or secondary destination show the lowest overall demand. These include Renton – Bellevue and Kenmore – Bellevue.

Exhibit 19. Level of Demand by Proposed Route – High and Low Forecasts

Total Transit Trips from Origin Market Areas to Destination Market Areas, AM Peak Period, 2015

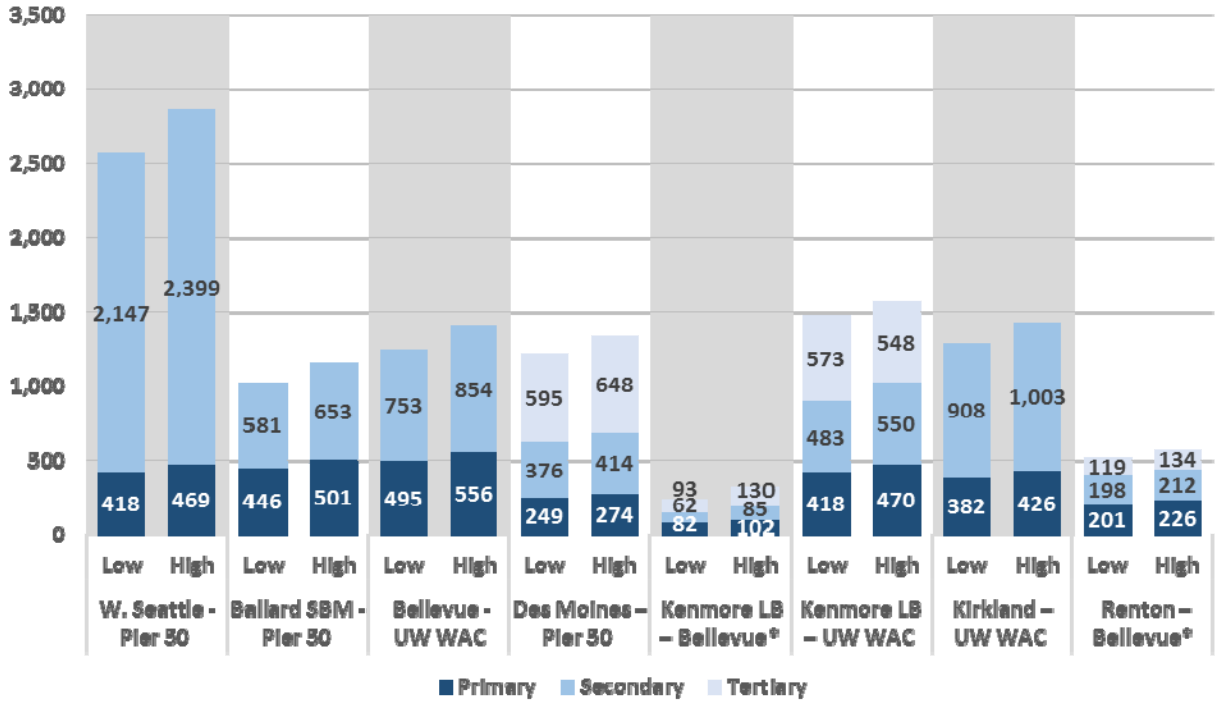


Note: Routes with an asterisk (*) do not have secondary destinations.

Source: PSRC, 2015; BERK, 2015

Exhibit 20. Level of Demand by Proposed Route – High and Low Forecasts

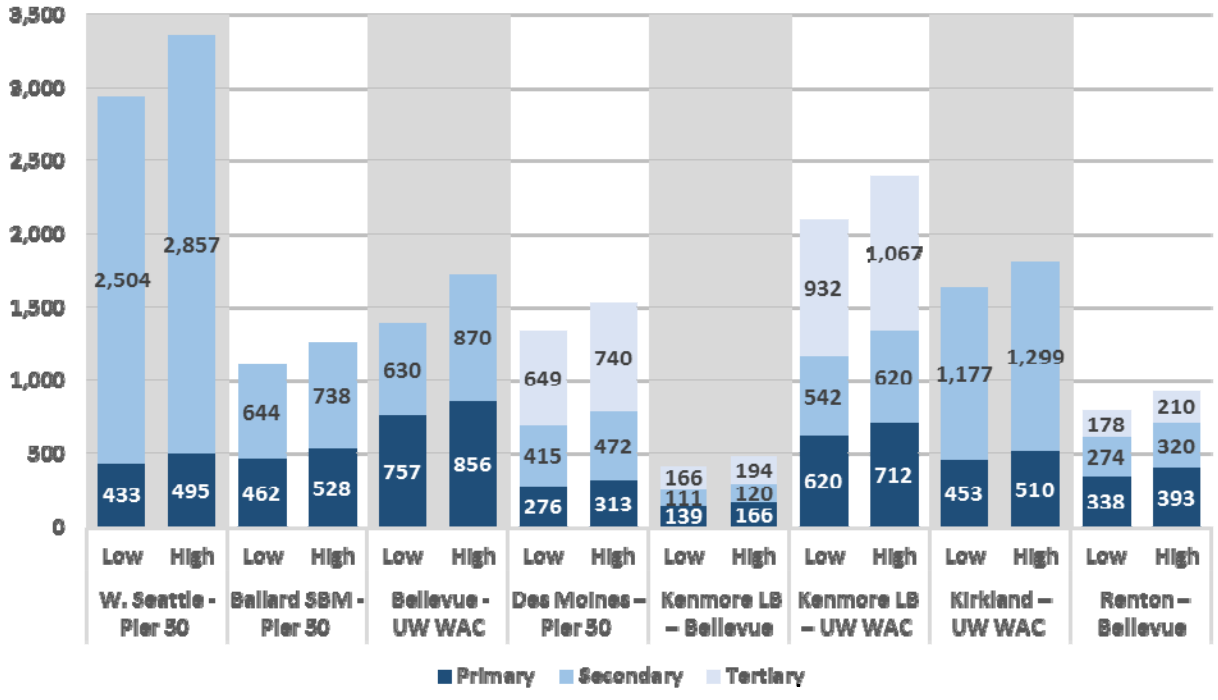
Total Transit Trips from Origin Market Areas to Destination Market Areas, AM Peak Period, 2025



Source: PSRC, 2015; BERK, 2015

Exhibit 21. Level of Demand by Proposed Route – High and Low Forecasts

Total Transit Trips from Origin Market Areas to Destination Market Areas, AM Peak Period, 2040



Source: PSRC, 2015; BERK, 2015

By 2040, demand for transit travel grows for all proposed route alternatives. However, this growth is more rapid for some routes. The routes with the fastest percentage growth in demand are the ones with the lowest demand overall: Kenmore – Bellevue and Renton – Bellevue. Routes landing at Pier 50 show the slowest growth in demand. Routes from the north and east side of Lake Washington to UW all show moderate to rapid growth in demand. By 2040, the Bellevue – UW route will have the largest primary origin demand of all proposed route alternatives. Kenmore – UW also emerges with the second largest primary market demand and largest demand overall among the proposed route alternatives.

4.0 COMMUTE RIDERSHIP FORECAST

This study breaks ridership forecasts into two components: commute ridership and recreational ridership. Section 4.0 focuses on the commute ridership component.

4.1 Commute Ridership Capture Rate

Commute ridership for each route alternative is forecasted based on the assumed percentage share of travelers that choose to ride the ferry out of the total market demand for transit travel from the origin market areas to the destinations served. The best available information regarding potential capture rates can be derived by estimating actual capture rates for the West Seattle/Downtown Water Taxi. Commute ridership capture rates for the proposed route alternatives are expected to vary based on the relative travel time competitiveness of their service compared to other transit options, as will be discussed later.

This study begins with the assumption that market capture rates will be highest for trips starting in the primary origin market area (TAZ closest to the origin ferry terminal) and ending within the primary destination area. Therefore, the analysis began by estimating a "base" market capture rate just for trips from West Seattle's primary origin market area and ending in Downtown Seattle. This capture rate is estimated using actual AM peak West Seattle/Downtown Water Taxi ridership data for 2010 and 2014 as well as estimated level of demand (peak AM transit trips) for the same years.[5] However, not all commute passengers on the West Seattle ferry route are assumed to be traveling to downtown destinations. The actual origins and destinations of water taxi passengers is unknown. Therefore, for the purpose of estimating base capture rates, this study assumes that 71% of peak morning commute passengers start their trip within the primary origin market area and are bound for downtown destinations, while the remaining 29% have different origins and/or destinations.

[5] As discussed previously, "level of demand" refers to total transit trip during the AM peak period from primary origin area TAZ to primary destination area TAZ. 2010 demand is calculated directly from 2010 PSRC travel model output. 2014 demand is estimated in a similar method as used for 2015, described under Data Source on page 4.

Exhibit 22 shows base market capture rates estimated for the West Seattle/Downtown Water Taxi.

Exhibit 22. West Seattle/Downtown Water Taxi Market Capture Rates

	2010	2014
Average daily peak AM ridership, summer season (April – Oct)	103	217
Total transit trips from West Seattle primary origin market area to primary destination market area (Downtown Seattle)	307	311
Assumed percentage of all peak AM ridership to start in primary origin market area and end in primary destination market area (Downtown Seattle)	71%	71%
Estimated market capture rate for trips starting in primary origin area and ending in Downtown Seattle (Base market capture rate)	24%	49%

Source: King County Marine Division, 2015; PSRC, 2015; BERK, 2015

By comparing ridership and base market capture rates for 2010 and 2014, it is clear that the West Seattle Water Taxi has increased its share of potential travelers over time as customers have become more familiar with the service and its potential utility for commute travel. It is not realistic to assume that new ferry routes would achieve the 2014 Water Taxi base capture rate on opening day. Therefore, this study uses the Water Taxi's 2010 capture rate as a proxy for the potential base capture rate for a new route's first year of operation. The 2014 Water Taxi base capture rate is considered by this study to be the potential base capture rate for a water taxi system that has reached its maturity.

Even though 2010 is five years after the inception of the West Seattle water taxi service, there are certain reasons why it is appropriate to use 2010 as a proxy for the year one base capture rate for new routes. Firstly, in 2010 the Water Taxi was relocated from Pier 55 to Pier 50. Ridership dropped significantly that year[6], likely in part as a consequence of the move and change in system operator. Both new and existing passengers needed to reacquaint themselves with the new service and new landing location to determine how it meets their commute needs. Secondly, Water Taxi service was a new concept to Seattle area commuters when it was introduced in 2005. Today, the water taxi has been around for over a decade and has been established as a reliable option for some commuters.

It is also necessary to estimate market capture rates for trips that start in a secondary or tertiary origin market area and for trips that end in a secondary destination. This study assumes that these rates will be lower due to the increased travel time necessary to reach the ferry terminal and/or reach the final destination after the ferry trip. This increased travel time reduces the likelihood that ferry travel will be the most convenient or attractive option in comparison to bus/rail transit or another mode of travel. Estimated capture rates for trips in these categories are calibrated to reproduce the actual 2014 ridership counts for the West Seattle/Downtown Water Taxi.

[6] Annual ridership in 2010 was similar to that in 2007, as shown in Exhibit 1.

Exhibit 23 shows relative market capture rates for trips by category.

Exhibit 23. Relative Market Capture Rates by Trip Category

Capture Rate	Trip Origin	Trip Destination
Highest (Base rate)	Primary	Primary
	Primary	Secondary
	Secondary	Primary
	Secondary	Secondary
	Tertiary	Primary
Lowest	Tertiary	Secondary

Source: BERK, 2015

Not all proposed route alternatives will be able to achieve the same capture rates as the West Seattle/Downtown Water Taxi. Base capture rates are expected to vary based on the relative travel time competiveness[7] of commuting via ferry when compared to bus or rail transit.

Exhibit 24. Baseline Travel Time ComparisonExhibit 24 summarizes travel time competitiveness of ferry travel versus public transit with a focus on three employment center destinations. For Lake Washington routes landing at UW WAC, travel time competitiveness is measured in two ways: trips to the UW Medical Center, and trips to University Street Station in downtown Seattle due to the relative ease of transfer to the UW light rail station scheduled to open in 2016. The West Seattle/Downtown Water Taxi route is provided for comparison.

Exhibit 24. Baseline Travel Time Comparison

Baseline percent difference in travel time: Bus/Rail transit compared to ferry

	Destination		
Route Alternative	UW Med Center	University Street Station (Downtown)	Bellevue Transit Center
West Seattle - Pier 50		2%	
Ballard SBM - Pier 50		-38%	
Bellevue - UW WAC	-27%	-37%	
Des Moines – Pier 50		-39%	
Kenmore LB – UW WAC	17%	-24%	
Kenmore LB – Bellevue			-16%
Kirkland – UW WAC	-12%	-21%	
Renton – Bellevue			-17%

Source: KPFF, 2015; BERK, 2015.

Only one proposed route offers a travel time savings when compared to travel on bus or rail: Trips from Kenmore to the UW Medical Center. The remainder of routes are less competitive in comparison to

[7] The methodology for analyzing travel time competitiveness for commute travel was introduced earlier in this report.

bus/rail, to varying degrees. Kenmore to UW is also the only route that is more competitive than the West Seattle/Downtown Water Taxi.

Relative travel time competitiveness is used as the primary basis for determining the base market capture rate for each proposed route alternative. The base rates are calculated by increasing or reducing the West Seattle/Downtown Water Taxi base capture rate proportionally to the travel time competitiveness of the proposed route alternative. For instance, the base rate for the Ballard SBM – Pier 50 is assumed to be 38% lower than the West Seattle – Pier 50 rate. Likewise, the base rate for the Kenmore – UW WAC route is assumed to be 17% higher than the West Seattle – Pier 50 rate. Additional adjustments to market capture rates were made to account for terminal area characteristics that are expected to impact the attractiveness of a route for commute travel. Exhibit 25 shows base market capture rates for each proposed route alternative with West Seattle provided as a comparison. Note that the 2015 rates reflect the reduced capture potential during the initial year of service.

Exhibit 25. Assumed Base Market Capture Rates by Proposed Route Alternative

	Year of Ridership Forecast		
Route Alternative	**2015**	**2025**	**2040**
West Seattle - Pier 50	49.3%	49.3%	49.3%
Ballard SBM - Pier 50	14.8%	30.7%	30.7%
Bellevue - UW WAC	15.7%	32.6%	32.6%
Des Moines – Pier 50	14.5%	27.2%	27.2%
Kenmore LB – Bellevue	17.8%	37.1%	37.1%
Kenmore LB – UW WAC	27.7%	57.6%	57.6%
Kirkland – UW WAC	20.8%	43.2%	43.2%
Renton – Bellevue	17.7%	36.7%	36.7%

Source: BERK, 2015.

Characteristics of terminal locations that are anticipated to affect the attractiveness of routes for commute travel are discussed below.

Landing Area Characteristics Affecting Commute Ridership Potential

Pier 50 / Downtown Seattle

Downtown Seattle is the largest employment center in the region and is assumed to be the destination of nearly all morning commute trips on routes that include Pier 50. The landing is located near the south end of downtown Seattle. The surrounding streets all include sidewalks, cross walks, and excellent network connectivity for ease of pedestrian travel. Pedestrians must climb a hill for trips to downtown. However, the grade is not nearly as steep at Pier 50 as it is further north on the waterfront. Due to the high employment density of downtown, a great number of jobs are within an easy walk of the terminal. Jobs on the northern end of downtown would require a longer walk or bus transfer. Due to the large number of bus routes traversing the area, nearly all major job site within the downtown or secondary destination market areas (South Lake Union and First Hill/Capitol Hill/North Beacon) could be reached with a single bus transfer. However, all transfers would require additional walking time from the ferry terminal. Conversely, commuters arriving by bus or rail would be less likely to require a transfer for travel to employment sites downtown. And those requiring a transfer would likely not have as far a walk to reach the transfer point as would a traveler arriving by ferry.

The additional time required to travel to many downtown job sites is reflected in the travel time competitiveness calculations. Ferry travel time includes a 15 minute walk to University Street Station in

the center of Downtown Seattle whereas bus/rail travel time assumes the rider will disembark at University Street Station requiring no additional walk time to the job site. For routes destined for Pier 50, market capture rates for trips to secondary destinations (South Lake Union and First Hill/Capitol Hill/North Beacon) are discounted by 66% from the base to reflect the diminished travel time competitiveness of ferry travel for reaching these destinations and relative inconvenience of making transfers compared to travelers arriving by bus or rail.

Ballard / Shilshole Bay Marina

While Ballard is a minor employment center in the Seattle region, Shilshole Bay Marina is located about 1.5 miles from the neighborhood commercial center and industrial jobs along the waterfront. Therefore, it is anticipated that the majority of commute travel will use Ballard SBM as the point of origin. The Ballard terminal would have onsite parking, which would allow driving ferry riders the ability to drive and park their car at or near the ferry terminal. Bikers and pedestrians can also access the potential Ballard ferry terminal via the Burke-Gilman trail, which is located nearby.

The most densely populated portions of Ballard along NW Market Street and 15th Avenue NW feature frequent bus service direct to downtown. Therefore many Ballard residents would likely find commute travel by bus to be a faster and more convenient option for most downtown job sites. However, for some Ballard residents ferry travel may be an attractive option, particularly for those living in the northern and western portions of the neighborhood where buses travel times are significantly higher.

The origin market areas for Ballard reflect the travel time competitiveness compared to transit as well as the fact that the street network provides limited points of access to the ferry landing, extending travel times. No tertiary market area is included, despite the presence of parking, due to the assumption that commuters in tertiary areas would have to travel too far out of their way to access the terminal.

Bellevue – Meydenbauer Bay Marina

Bellevue is anticipated to be both an origin and destination point for commute travelers. The terminal is located at Meydenbauer Bay Marina and would have no onsite parking. A shuttle bus would be available to take passengers to/from the Bellevue Transit Center (approximate 6 minutes away). The ferry terminal is located along a residential street making passenger drop off and pick up difficult, and also risks creating local traffic problems. Additionally, the drop-off passenger point to the ferry terminal would be near the entrance to the marina. Passengers would then have to walk down a steep grade road without sidewalks to get on a ferry. Conversely, passengers destined for Bellevue would be faced with a steep climb up the hill to reach the shuttle.

The Bellevue Transit Center is a major regional transit hub and provides access to at least 20 Metro and Sound Transit bus lines. It is also located in the heart of Downtown Bellevue which features a high density of employment. Many ferry travelers could walk to work sites from the transit center without requiring an additional bus transfer.

Market capture rates have been adjusted downward to reflect the difficulty in accessing the Bellevue ferry terminal and steep hill climb required for potential ferry passengers. Additionally, the market capture rate for secondary destinations (including Downtown Seattle) is further reduced after 2025 to reflect the opening of Link Light Rail and the increased competitiveness of this transit option when compared to ferry travel.

Des Moines

The Des Moines Marina is located in downtown Des Moines. The Des Moines Terminal would have onsite parking, which would give ferry drivers the ability to drive and park their car at or near the ferry

terminal. There are adequate sidewalks around the marina for travelers arriving by foot. Commuters could also access the potential Des Moines ferry terminal via three different bus routes. Additionally, the Des Moines Creek Trail provides direct access to the marina for bicycle commuters.

This ferry route would compete directly with bus service to Downtown Settle via the Kent-Des Moines Park and Ride (3 miles away), which features frequent transit service during peak commute periods. Furthermore, Link Light Rail is funded to expand service to Kent/Des Moines. Due to the anticipated improved competitiveness of this new rail service, the base capture rates for Des Moines is adjusted downward in the 2025 and 2040 forecasts.

Kenmore – Log Boom

The Kenmore - Log Boom Terminal is located on the Kenmore Waterfront. The terminal would have no onsite parking, and this study assumes a shuttle from the Kenmore Park and Ride, which would take approximately 4 minutes. There is a small parking lot to facilitate passenger drop off and pick up. Sidewalks and walkways are available for travelers arriving on foot. However, a pedestrian would have to walk up a short but steep hill to access the nearest transit stop, which provides access to six different bus routes. Finally the terminal is well suited to provide access to commuters arriving by bicycle, as the Burke Gilman Trail, which runs through Log Boom Park.

No special market capture adjustments are made to account for Kenmore Log Boom landing area characteristics.

Kirkland

The terminal is located at the Kirkland Marina Park in the Kirkland Central Business District. There would be no onsite parking, and there is no shuttle assumed for this route. Parking in the surrounding streets is time limited, but there are some nearby commercial lots that offer all day rates. The Kirkland Transit Center is an eight minute walk from the terminal and offers access to several bus routes. There are ample sidewalks and street connectivity in the surrounding neighborhood to facilitate accessibility to foot passengers. Commuters destined for Kirkland could walk to jobs in the central business district or transfer to a bus at the Transit Center to neighboring employment centers.

No special market capture adjustments are made to account for Kirkland landing area characteristics.

Renton – Southport

The Renton Southport terminal is located at the Gene Coulon Memorial Park, north of Downtown Renton. The Renton ferry terminal would have onsite parking available to ferry passengers. From the parking lot, passengers would access the terminal through a dead end, private roadway. Access is also provided to the dock via Gene Coulon Memorial Beach Park from 7:00 a.m. to dusk. The City of Renton has plans to connect the waterfront and anticipated new waterfront development to the Bus Rapid Transit corridor at the Park Avenue and 757th Avenue intersection and business district. This would greatly facilitate pedestrian access to the terminal from the surrounding area. The terminal is also accessed via bike on the Lake Washington Trail and the Cedar River Trail. Commuters arriving by bus would need to walk a half mile from the nearest stop.

While Renton is assumed to primarily serve as the origin for commute trips to Bellevue, the terminal is located within walking distance to the Boeing facility and jobs at The Landing (a nearby commercial and mixed use development). Additional commercial development is planned in the waterfront area, and could be well served by the ferry terminal.

No special market capture adjustments are made to account for Renton landing area characteristics.

University of Washington – Waterfront Activities Center

The University of Washington (UW) terminal is located at the UW Waterfront Activities Center on the south end of campus near Husky Stadium, and a six minute walk from the new Link light rail station. The terminal would have no onsite parking. However, the area is well served by connecting transit as well as the nearby Burke-Gilman Trail.

Commute passengers disembarking at UW could walk or bike to job sites on the campus, UW Medical Center, or in the University District. Given the peripheral location of the terminal, walk times would range from 5 to 25 minutes depending upon the work site. Several bus transfers would also be available at the Link light rail station. Commuters bound for Downtown or Capitol Hill could also transfer to the light rail which is expected to offer frequent and rapid service.

Travel time competitiveness for trips to Downtown is assessed assuming a transfer at the light rail station. Due to the relative ease of transfer to the light rail, the market capture rate for trips to secondary destinations (Downtown Seattle, First Hill/Capitol Hill/North Beacon Hill) are based on travel time competitiveness when compared to bus/rail transit with only a modest (10%) additional reduction in rate to account for the additional seat change.

Findings - Commute Ridership Forecast

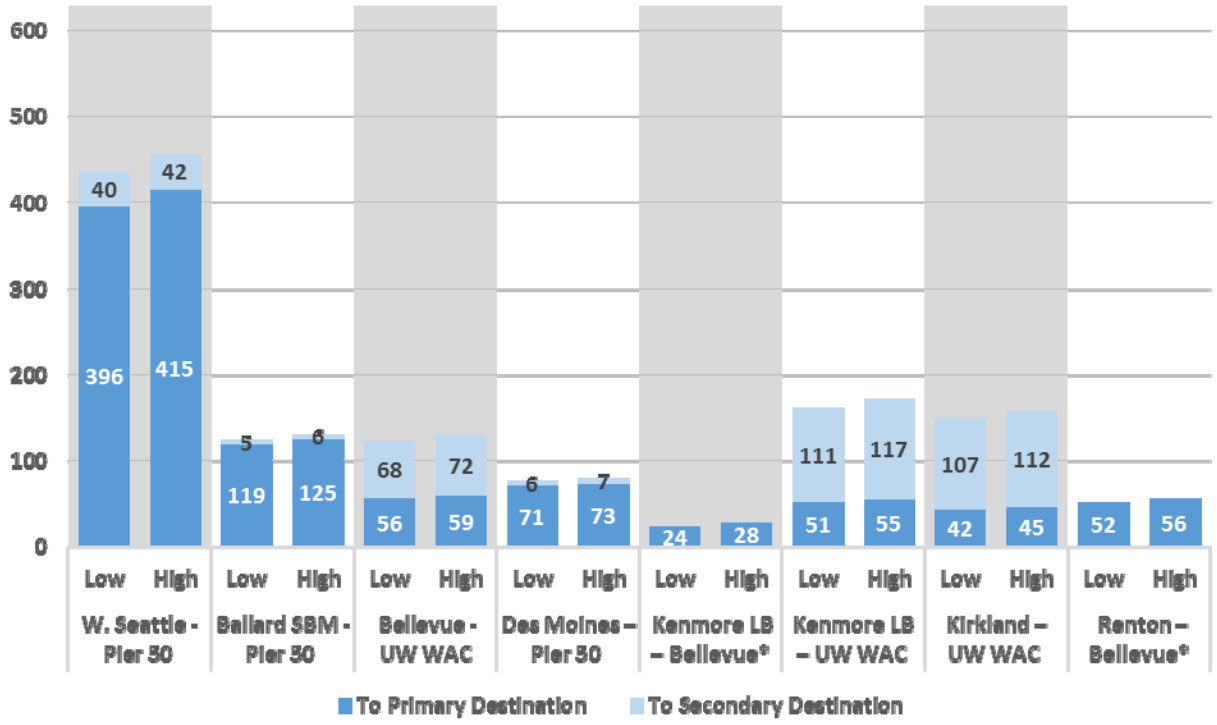
Exhibit 26 through Exhibit 28 show forecasted daily commute ridership for the West Seattle/Downtown Water Taxi and each proposed route alternative. For each route the Low and High forecast are displayed, indicating a range of assumptions about future travel behavior in the PSRC travel model data. This range is more pronounced in the 2025 and 2040 forecasts. Furthermore, these forecasts reflect average daily commute travel during the summer season.[8]

In 2015 all of the proposed route alternatives are forecasted to have significantly less daily commute ridership than the existing West Seattle – Pier 50 route, reflecting the assumption of reduced market capture rates during the initial year of service. Among the alternatives, Kenmore – UW has the highest ridership forecast with between 163 and 173 forecasted daily commute trips. Kirkland – UW is not far behind with 150 – 157 daily commute trips. Both Ballard – Pier 50 and Bellevue – UW are forecasted to have approximately 130 daily commute riders. Des Moines – Pier 50, Renton – Bellevue, and Kenmore – Bellevue all are forecasted to have significantly lower ridership.

The forecasted ridership increases significantly in 2025 and 2040 for all routes, reflecting the greater market capture rate expected for a mature ferry service as well as increased demand for travel. By 2040 Kenmore – UW is forecasted to have the highest commute ridership with 536 to 618 daily trips, surpassing West Seattle – Pier 50. The next strongest route is Kirkland – UW with 418 to 470 daily trips.

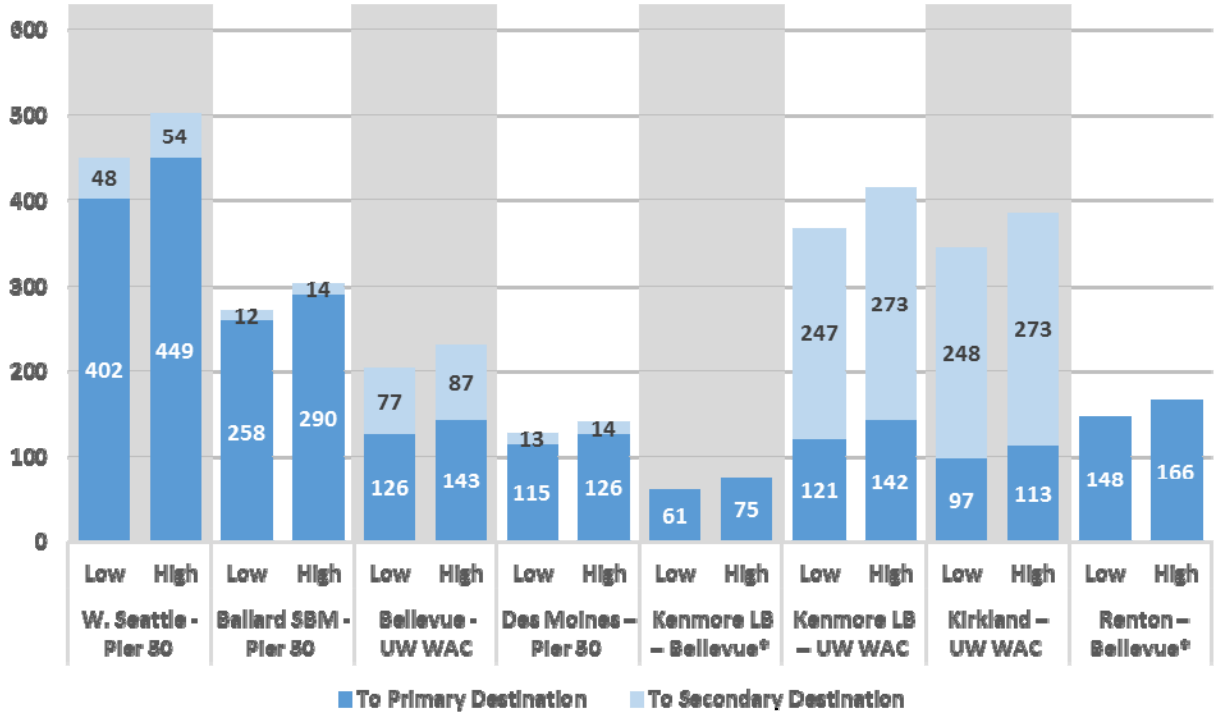
[8] Ridership data for the West Seattle/Downtown Water Taxi shows an 8% decline in commute ridership during the non-summer season (Late October – Early April). Annual ridership forecasts (shared later) reflect this diminished ridership in the off season.

Exhibit 26. Daily Commute Ridership Forecast, 2015 (Summer Season)



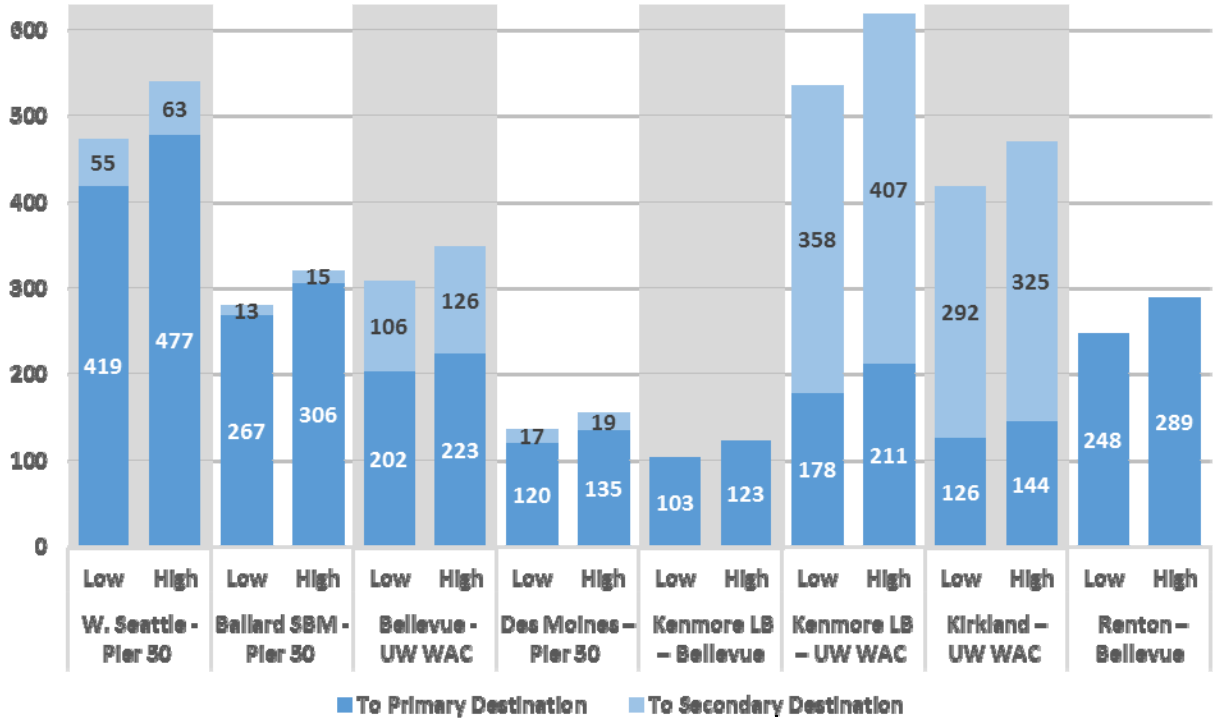
Source: BERK, 2015

Exhibit 27. Daily Commute Ridership Forecast, 2025 (Summer Season)



Source: BERK, 2015

Exhibit 28. Daily Commute Ridership Forecast, 2040 (Summer Season)



Source: BERK, 2015

5.0 RECREATIONAL RIDERSHIP POTENTIAL

As discussed, a significant share of the West Seattle/Downtown Water Taxi is assumed to be for recreational purposes. Exhibit 29 shows estimated average daily recreational travel on the West Seattle/Downtown route, based on an analysis of 2014 ridership data. The greatest amount of recreational travel occurs on weekends. However, there is also significant recreation ridership during summer weekdays. Offseason recreational ridership, as would be expected, is much lower.

Exhibit 29. Average Daily Recreational Ridership: West Seattle/Downtown Water Taxi, 2014

Time Period	Ridership
Summer weekend	1,400
Summer weekday	642
Offseason weekday	55
Offseason weekday as a percentage of summer weekday	9%

Source: BERK, 2015

The proposed route alternatives are not assumed to offer weekend service targeted to recreational passengers. Therefore, this study seeks to forecast only weekday recreational travel for routes by comparing their features to the West Seattle/Downtown route. Two criteria are discussed below: number of daily roundtrip sailings, relative attractiveness of landings for recreational travel.

5.1 Number of Daily Roundtrip Sailings

One key difference between the current West Seattle/Downtown Water Taxi and the proposed route alternatives is the number of roundtrip sailings per day. The West Seattle route features 19 roundtrip sailings Monday through Thursday and 23 roundtrip sailings on Friday[9]. In comparison, the proposed route alternatives are each assumed to offer six roundtrip sailings per day: three during the AM peak commute period and three during the PM peak commute period. Analysis of weekday ridership during a busy week in August 2014 shows a steady flow of passenger trips in both directions of travel from mid-morning onward, with a peak in late afternoon.

This study assumes that recreational ridership potential on the proposed route alternatives decreases in direct correspondence to the decreased number of daily sailings. The route alternatives would provide less options for sailing times, and also less time for recreation at the point of destination for trips that occur in the peak PM hours.

5.2 Appeal of Landing Areas for Recreational Travel

Route alternatives can also be differentiated by the attractiveness of the landing areas for recreational trips. The West Seattle/Downtown route has a number of assets to attract recreational travel. Downtown Seattle has a great number of destinations within a relatively short walk of the landing, including sports stadiums, museums, Pioneer Square, and Pike Place Market. Travelers to West Seattle can enjoy a waterfront stroll, bike ride, or free shuttle to Alki Beach as well as a great number of beachside dining and recreation options. In this section, we discuss the relative appeal of each proposed landing location and rank them in terms of relative recreational appeal.

1. Pier 50

Pier 50 is located in downtown Seattle. With a walk score of 96, visitors can walk to a plethora of dining, entertainment, and cultural attractions. Along the waterfront, the Seattle Aquarium and the Seattle Great Wheel are among some of the many attractions. The Pioneer Square neighborhood is also easily accessible from the Pier 50 terminal, which includes Pioneer Place as well as many different types of restaurants and art galleries. Visitors can also walk or bike to Century Link (half a mile) or Safeco field (just under one mile).

2. Ballard – Shilshole Marina

The Shilshole Marina is located on the western end of Ballard. Visitors can walk or bike three quarters of a mile north along the Burke Gilman Trail to Golden Gardens, one of Seattle's most popular beaches. A few waterfront restaurants are located a short walk to the south. For cyclists and recreational trail enthusiasts, the Burke Gilman Trails offers access to Downtown Ballard and destinations to the east.

3. Kirkland – Marina Park

The landing is located in the Kirkland Central Business District within walking access to restaurants, shops, galleries, and parks. The Kirkland Art Center is also located within a short walk. During the summer months, the Kirkland Marina Park has a Wednesday Farmers' Market, and a summer concert series.

[9] On Fridays as well as weekdays with evening Sounders, and Seahawks games, the schedule expands to offer 4 additional roundtrip evening sailings.

4. University of Washington – Waterfront Activities Center

The Waterfront Activities Center is adjacent to the Husky Stadium parking lot, offering easy access to game day events as well as the soon-to-open Link Light Rail stop for trips bound for downtown. The WAC rents rowboats and canoes to the public for exploring Lake Washington and the nearby Arboretum. The Burke Gilman trail is one quarter mile away. Visitors can also walk to the University of Washington and The Ave, the commercial heart of the University District.

5. Renton – Southport

The landing is located adjacent to Gene Coulon Memorial Beach Park, which includes picnic shelters, playground equipment, tennis courts, a horseshoe pit, sand volleyball courts, an interpretive botanic walk, a fishing area and summer swimming area. The park also provides bike access to the Lake Washington Loop Trail. A commercial district, a short walk inland to the south, offers several restaurants, retail shops, and a movie theater. Additionally, a planned waterfront development is expected to add additional entertainment, shopping, and dining opportunities as well as a hotel and convention center, which is reflected in Renton's 2025 and 2040 year recreational ridership forecasts.

6. Kenmore – Log Boom Park

Visitors can explore Log Boom Park, the fishing pier, and waterfront viewpoints. Visitors also have easy access to the Burke Gilman trail for long walks, cycling and trail runs. Across Bothell Way, there are a few restaurants within easy walking distance. However, they do not offer waterfront appeal.

7. Des Moines

The landing is located in downtown Des Moines, in the marina and next to Des Moines Beach Park. Visitors can walk to a few restaurants, one of which is located on the waterfront. The park provides easy access to the Des Moines Creek Trail, offering six paved miles, which leads to four additional miles of mountain bike trails.

8. Bellevue – Meydenbauer Bay

Visitors would need to climb up a hill and walk just under quarter of a mile to access Meydenbauer Beach Park, which includes a fishing dock, play area, picnic tables, restrooms, paved pathways, and a beach with designated swimming area. Visitors could also walk a half mile through residential streets to Bellevue Square for shopping and dining opportunities.

5.3 Recreational Ridership Forecasts

2014 recreational ridership on the West Seattle/Downtown route is used as the base from which to scale recreational ridership potential of the proposed route alternatives. Each route is then given a score based on the number of peak PM sailings and relative attractiveness of each landing area for attracting recreational trips. The results for 2015 are shown in

Exhibit 30. Recreational ridership in 2025 and 2040 is then projected based on total forecasted population growth in King County, as shown in Exhibit 31 and Exhibit 32.

Exhibit 30. Recreational Ridership Forecast, 2015

Route	Weekday (Summer)	Weekday (Offseason)	Weekend (Summer only)
W. Seattle - Pier 50	642	55	1,400
Ballard SBM - Pier 50	184	16	N/A
Des Moines – Pier 50	154	13	N/A
Kenmore LB – Bellevue	72	6	N/A
Kenmore LB – UW WAC	102	9	N/A
Kirkland – UW WAC	123	11	N/A
Renton – Bellevue	92	8	N/A
Bellevue - UW WAC	92	8	N/A

Source: BERK, 2015

Exhibit 31. Recreational Ridership Forecast, 2025

Route	Weekday (Summer)	Weekday (Offseason)	Weekend (Summer only)
W. Seattle - Pier 50	706	61	1,540
Ballard SBM - Pier 50	223	19	N/A
Des Moines – Pier 50	111	10	N/A
Kenmore LB – Bellevue	186	16	N/A
Kenmore LB – UW WAC	87	7	N/A
Kirkland – UW WAC	124	11	N/A
Renton – Bellevue	149	13	N/A
Bellevue - UW WAC	111	10	N/A

Source: BERK, 2015

Exhibit 32. Recreational Ridership Forecast: 2040

Route	Weekday (Summer)	Weekday (Offseason)	Weekend (Summer only)
W. Seattle - Pier 50	770	66	1,680
Ballard SBM - Pier 50	265	23	N/A
Des Moines – Pier 50	133	11	N/A
Kenmore LB – Bellevue	221	19	N/A
Kenmore LB – UW WAC	103	9	N/A
Kirkland – UW WAC	148	13	N/A
Renton – Bellevue	176	15	N/A
Bellevue - UW WAC	133	11	N/A

Source: BERK, 2015

6.0 TOTAL DAILY AND ANNUAL RIDERSHIP FORECASTS

Exhibit 33 through

Exhibit 35 provide average daily and annual ridership forecasts for the years 2015, 2025, and 2040. Average daily ridership estimates are for weekdays only and combine both commute and recreational passengers. Annual ridership estimates are calculated assuming weekday service only and no service on seven major holidays. Annual ridership estimates also include assumptions about seasonal reductions in recreation and commuter ridership during the non-summer period, based on trends observed in West Seattle/Downtown Water Taxi ridership. Forecasts for the West Seattle – Pier 50 route includes summer weekend ridership as well, boosting the annual ridership numbers accordingly.

Exhibit 33. Daily and Annual Ridership Forecast, 2015

Route	Low Forecast			High Forecast		
	Average Daily Weekday Ridership		Annual Ridership	Average Daily Weekday Ridership		Annual Ridership
	Summer	Offseason		Summer	Offseason	
W. Seattle - Pier 50	1,078	457	283,105	1,099	476	288,234
Ballard SBM - Pier 50	309	131	57,878	315	136	59,433
Bellevue - UW WAC	216	122	43,865	223	129	45,579
Des Moines – Pier 50	231	84	41,820	234	87	42,473
Kenmore LB – Bellevue*	96	28	16,538	100	32	17,640
Kenmore LB – UW WAC	265	159	54,759	275	168	57,148
Kirkland – UW WAC	273	149	54,798	280	156	56,666
Renton – Bellevue*	144	56	26,562	148	60	27,433

Source: BERK, 2015

Exhibit 34. Daily and Annual Ridership Forecast, 2025

Route	Low Forecast			High Forecast		
	Average Daily Weekday Ridership		Annual Ridership	Average Daily Weekday Ridership		Annual Ridership
	Summer	Offseason		Summer	Offseason	
W. Seattle - Pier 50	1,156	475	304,218	1,209	524	317,035
Ballard SBM - Pier 50	494	268	99,096	527	299	107,175
Bellevue - UW WAC	315	197	66,009	341	221	72,357
Des Moines – Pier 50	314	134	58,943	326	145	61,998
Kenmore LB – Bellevue*	148	64	27,887	162	77	31,347
Kenmore LB – UW WAC	492	350	107,779	539	393	119,210
Kirkland – UW WAC	494	331	105,936	534	368	115,625
Renton – Bellevue*	259	145	52,457	277	163	56,986

Source: BERK, 2015

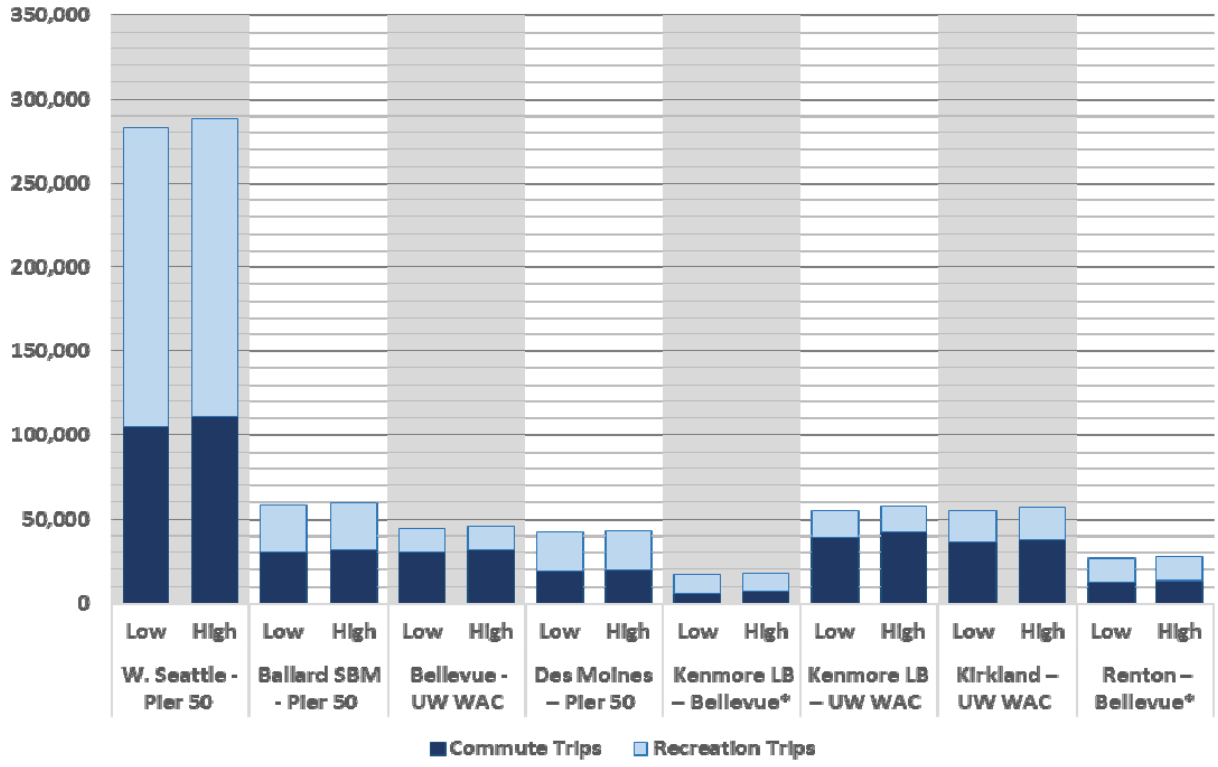
Exhibit 35. Daily and Annual Ridership Forecast, 2040

Route	Low Forecast			High Forecast		
	Average Daily Weekday Ridership		Annual Ridership	Average Daily Weekday Ridership		Annual Ridership
	Summer	Offseason		Summer	Offseason	
W. Seattle - Pier 50	1,244	502	327,726	1,311	564	343,914
Ballard SBM - Pier 50	546	281	107,920	586	318	117,645
Bellevue - UW WAC	441	295	94,657	482	333	104,584
Des Moines – Pier 50	357	145	66,315	375	161	70,710
Kenmore LB – Bellevue*	206	104	40,448	226	122	45,373
Kenmore LB – UW WAC	683	506	151,963	766	582	171,911
Kirkland – UW WAC	595	401	127,862	646	448	140,332
Renton – Bellevue*	381	240	80,099	422	278	89,995

Source: BERK, 2015

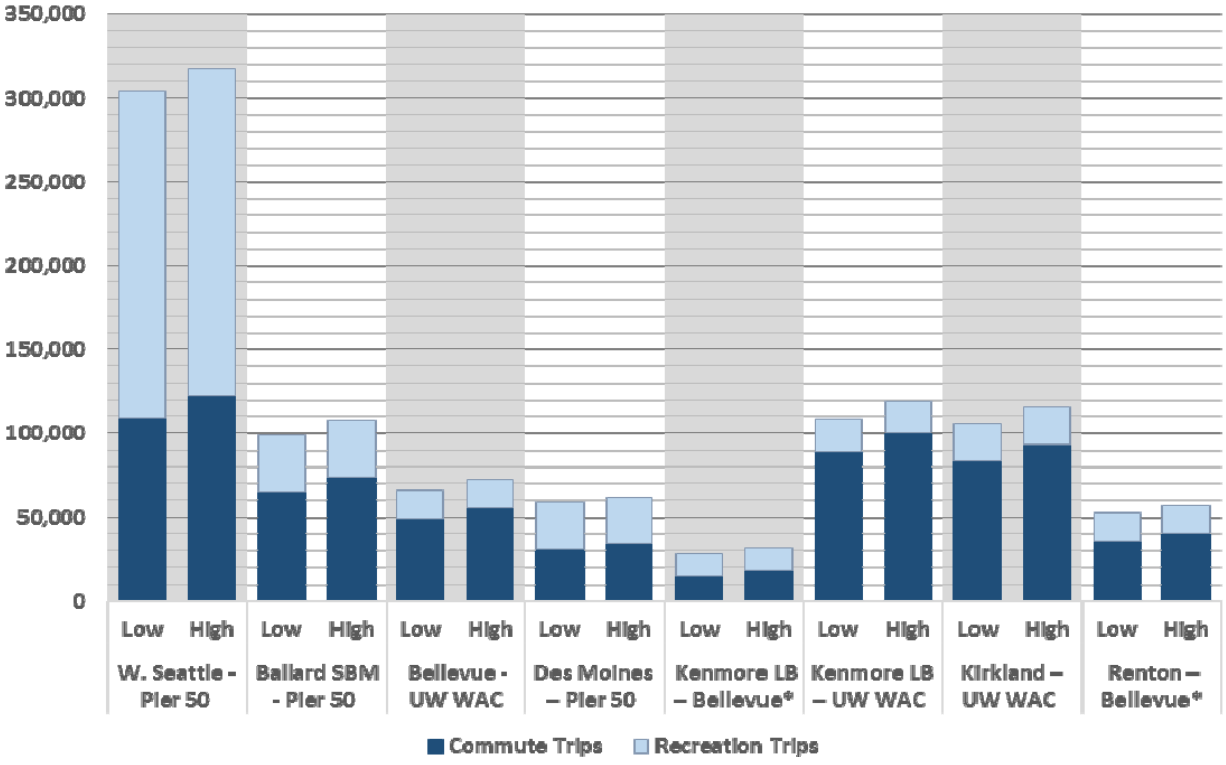
Exhibit 36 through Exhibit 38 compare total annual ridership among route alternatives and the West Seattle/Downtown Water Taxi for the three forecast periods. As with previous charts, they show both Low and High forecasts for each route. Each bar is broken into commute ridership and recreational ridership segments. In 2015, Ballard – Pier 50 is forecasted to have the greatest annual ridership, followed closely by the Kenmore – UW and Kirkland – UW routes. These three routes continue to show the greatest annual ridership potential in 2025 and 2040. However both the Kenmore – UW and Kirkland – UW routes show greater growth in annual ridership in 2025 and 2040, overtaking the Ballard route.

Exhibit 36. Annual Ridership Forecast, 2015



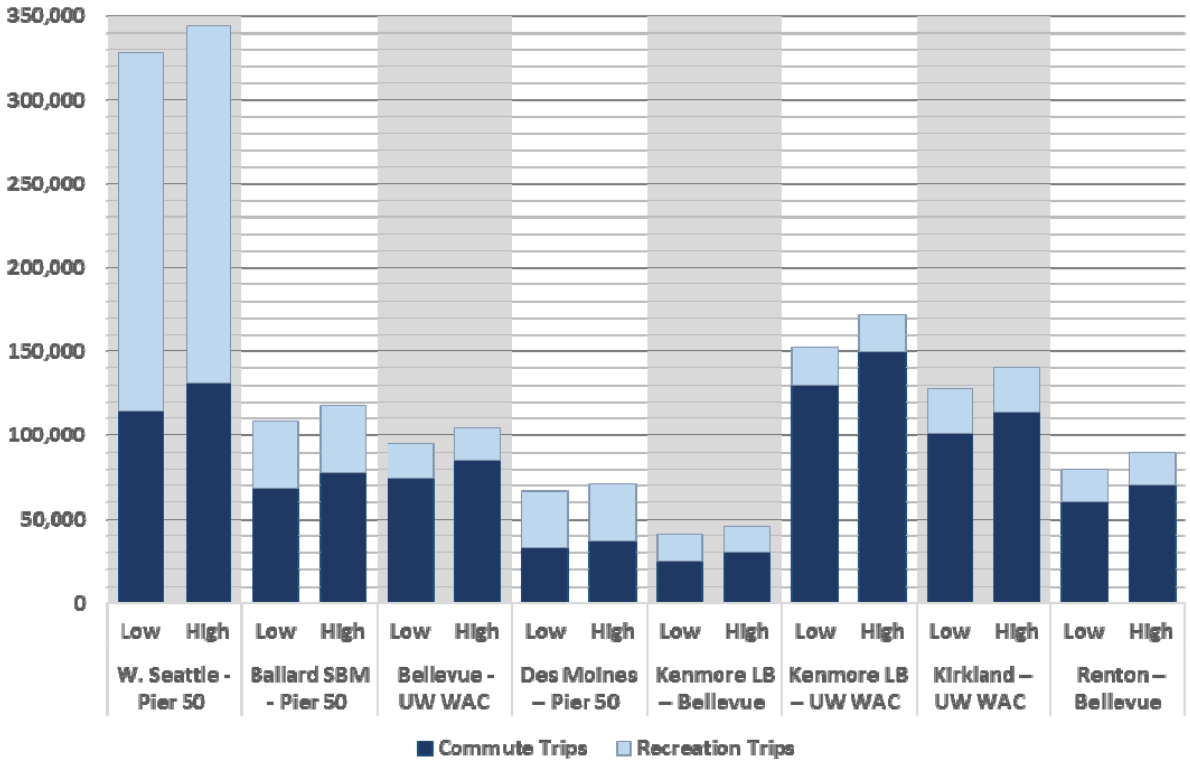
Source: BERK, 2015

Exhibit 37. Annual Ridership Forecast, 2025



Source: BERK, 2015

Exhibit 38. Annual Ridership Forecast, 2040



Source: BERK, 2015

APPENDIX D

Task 4: Infrastructure Assessment

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TASK 4: INFRASTRUCTURE ASSESSMENT

Interim Report on Ferry Expansion Options for Marine Division

PREPARED FOR KING COUNTY MARINE DIVISION
BY KPFF CONSULTING ENGINEERS
JULY 1, 2015

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Appendices

1. Introduction

Based on the findings in the Task 2: Route Profiles report and Task 3: Ridership Assessment and Analysis, this assessment provides vessel specifications, maintenance recommendations, infrastructure improvements, and high-level cost estimates for the following routes:

1. Kenmore (Log Boom Park) to University of Washington – Washington Athletic Center (UW WAC)
2. Kirkland (Marina Park) to UW WAC
3. Ballard (Shilshole Marina) to Downtown Seattle (Pier 50)

Each terminal location would require some level of improvements to accommodate POF programming needs which range from minor improvements to existing in-water infrastructure to a whole new facility. POF programming elements were identified as part of the baseline study in Task 1 and include:

- In-water improvements: improvements to existing floats or a replacement float, mooring improvements to accommodate vessels, boarding ramps, improved lighting, communication infrastructure, security elements, and utilities at the tie-up locations.
- Upland improvements: signage and wayfinding, ticketing machines, lighting, ADA accessible pathways, covered shelter, and utility connections.

2. Parking and Shuttle Requirements

One of the critical components in determining the feasibility of the Ballard to Downtown Seattle (Pier 50) route is the availability of parking at the terminal. The Task 2 Route Profile Analysis identified that park and rides are not located near Shilshole Marina in Ballard making parking a requirement for route competitiveness. The availability of parking will be determined through discussions with the Port of Seattle and the City of Seattle in the continued outreach effort. If parking cannot be accommodated on-site, this would be a fatal flaw for the site.

Additionally, Log Boom Park in Kenmore does not have adequate parking for a POF service, and the nearest park and ride with adequate capacity is located over one mile from the terminal. Therefore, a shuttle would be required to transport passengers between the Kenmore Park and Ride and Log Boom Park.

Kirkland Marina Park is located within walking distance to the downtown Kirkland Transit Center. Therefore, parking on-site is not required and a shuttle would not be provided for new water taxi service.

3. Vessel Requirements

The appropriate vessel size for a water taxi route is determined by potential ridership and frequency of sailings. The US Coast Guard has specific safety and security requirements for different vessel classes including a minimum level of crew for different types of vessels and security infrastructure needs for different vessels classes. Therefore, choosing vessels with adequate capacity to accommodate the projected ridership and future demand can influence staffing levels and security infrastructure improvements.

Capacity and Design Criteria

Based on the ridership analysis, up to a 150-passenger vessel would accommodate ridership projections at each route through 2025. Using a 150-passenger vessel only requires a crew of three per US Coast Guard requirements. This is a similar size vessel currently utilized on the West Seattle Route.

Bicycle capacity should be considered for at least 10 percent of the passengers. Storage of bicycles should be located outside near the boarding stations to reduce time for bicycles to board and disembark the vessel.

150-passenger vessels could be accommodated at most terminal locations with modifications to the existing infrastructure. The majority of site locations would require designing boarding stations for the float or pier to facilitate expedited loading and unloading of passengers to maintain the route schedule.

Vessel Costs

King County has two options for acquiring a vessel(s) for a new route which include lease or purchase. Currently, King County leases the Melissa Ann for the Vashon to Downtown Seattle (Pier 50) route that is a 172-passenger vessel for $32,000 per month or $384,000 annually (using 2015 costs).

There are multiple options to purchase a 150-passenger vessel including purchasing a previously used vessel or constructing a new vessel to add to the King County fleet. The cost estimate for a previously used vessel varies based on the amount of useful life remaining for the vessel as well as maintenance costs. An older vessel with higher use will be cheaper to purchase but would likely have higher maintenance costs; whereas a more expensive used vessel will have a longer estimated lifespan. Estimated costs for these options are provided in Table 1.

Based on the Task 2 findings for route competitiveness, a new vessel would need to sustain a cruising speed of 35 knots. Recently, Kitsap Transit purchased the Rich Passage 1 (RP1) that is a 118-passenger vessel that is capable of high speeds that produces a lower wake. This vessel type would be feasible given ridership demand projections for the new proposed routes, refer to Table 1.

Table 1: Vessel Acquisition Costs (2015 dollars)

Vessel Proposed	Est. Cost ($)
Previously Used 150-Passenger	$1 M to 3.5 M
Rich Passage (RP) 1	$5.8 M
New 150-Passenger	$4.5 to 5.5 M

Maintenance Facilities

Vessels require frequent maintenance to operate safely, reliably, and efficiently. Typically, maintenance occurs on a daily basis to ensure the vessels are operating properly and ready for service the next morning. For the current King County routes, this daily maintenance occurs at the County's owned maintenance facility located at Pier 48 adjacent to the Water Taxi at Downtown Seattle (Pier 50). This maintenance facility would be available for the Puget Sound routes for tie-up in the evening perform daily maintenance. However, the maintenance barge is not easily accessible for daily access by vessels serving Lake Washington routes. Therefore, the vessels operating on Lake Washington would tie-up daily at the east side terminal locations including Kenmore and Kirkland. A mobile maintenance van could transport maintenance crew in the evening to the vessel tie-up locations to perform this daily maintenance.

In addition to daily maintenance, vessels require heavy maintenance to ensure the engine and associated systems function properly and so that useful life of the vessel is extended. The Puget Sound routes would use the maintenance barge at Pier 48 in Downtown Seattle for heavy maintenance. The Lake Washington routes could use Pier 48 maintenance barge for heavy maintenance activities or utilize an existing King County contract with Pacific Fishermen on Lake Union.

Berthing/Tie-Up and Fueling

Tie-up locations should be protected from the inclement weather and provide utility connections to remove the sewage and trash collected from the daily operation as well as refresh the vessel with potable water. It is proposed that the east side terminal locations would be the tie-up location for the Lake Washington routes. Additionally, it is proposed the vessels operating the Puget Sound routes would tie-up at the Pier 48 maintenance barge and/or Downtown Seattle (Pier 50).

There are multiple fueling locations on Lake Washington and Lake Union that could fuel a water taxi. This includes locations at the Morrison's North Star Marine on Lake Union, and Yarrow Bay in Kirkland, and Seattle Boat located at Newport Yacht Basin Marina in Bellevue.

Emergency Response Capability

POF vessels have the unique ability to be highly maneuverable and able to access many docking locations. As such, they can assist in emergency situations that require immediate response for example where bridge access has been compromised. The King County Water Taxi could aid in evacuating people in an emergency such as the Water Emergency Transportation Authority (WETA) ferries did in the 1989 Loma Prieta Earthquake in San Francisco and the evacuation of Manhattan by the Staten Island Ferries during the 9/11 attacks..

4. Terminal Infrastructure Improvements

As part of the initial baseline analysis, POF programming needs were identified that focus on passenger accessibility and safety as well as supporting the operational needs for the vessels and crew. At a minimum, each terminal location will require passenger boarding structures (transfer span and ramps), sufficient tie-up infrastructure for vessels, passenger signage and wayfinding, security improvements, and ADA accessibility improvements. Specific in-water and upland improvements are identified in Table 2 and described for each site in the following section.

Table 2: Summary In-water and Upland Infrastructure Improvements

Improvements	Terminal Locations			
	UW WAC	Kenmore	Kirkland	Ballard
In-water				
New Float	X			
New Piles	X			
New Gangway	X			
Fenders	X	X	X	X
Cleats	X	X		
Fixed Ramp/Transfer Span	X	X	X	X
Upland				
ADA Walkway	X			
Shelter	X			
Signage/Wayfinding	X	X	X	X
Ticket Vending Machines	X	X	X	X
Lighting	X	X		
Security	X	X	X	X
Utility Connections		X	X	X

UW WAC

UW WAC has an existing float and gangway currently used for recreational use. This older infrastructure would need to be replaced to accommodate a 150-passenger water taxi. Figure 1 includes an aerial photo and overview of the existing infrastructure and proposed improvements at the UW WAC.

Figure 1: UW WAC Improvements

For a new water taxi route to be operational at UW WAC, a new float 80-feet-long by 20-feet-wide float would be required. The float can be oriented perpendicular to the shore to accommodate the berthing of two vessels simultaneously if needed. The new float would include fendering and cleats to secure the vessel to the float. Additionally, a fixed ramp and transfer span would be required for safely loading and unlading passengers. Along with a new float, new piles and new gangway would be required to support a larger float. Security improvements would need to be installed including cameras to monitor activity on and around the vessels.

It is assumed that this in-water infrastructure would be a shared-use facility to be used by UW during non-commute hours.

Upland improvements to UW WAC may include constructing a shelter for passengers to wait for the next sailing protected from inclement weather, as well as improvements to the current paved pathway to be ADA compliant. Additional improvements may include lighting, signage and wayfinding measures for passengers to easily navigate to and from the water taxi. Ticket vending machines would also need to be installed for passengers to purchase tickets prior to boarding the vessel.

Kenmore

There is an existing pier at Kenmore that is currently used for recreational use associated with Log Boom Park. Only minor improvements would be required to begin water taxi service at this location. See Figure 2 for the current infrastructure and improvements required for beginning water taxi service at this location.

Figure 2: Kenmore Improvements

The existing pier at Log Boom Park can accommodate a 150-passenger vessel with minor in-water modifications including adding fendering and cleats securing vessels for tie-up. A transfer span and fixed ramp will also be required on the existing pier for safely loading and unloading passengers. Additional security measures required would include adding fencing and gates to protect the vessel from unauthorized boarding of the vessel as well as cameras to monitor activity on and around the vessels.

Upland improvements to Log Boom Park would include adding lighting for security, as well as, signage and wayfinding measures for passengers to easily navigate to and from the water taxi. Ticket vending machines would also need to be installed for passengers to purchase tickets prior to boarding the vessel.

Since the water taxi would tie-up at Log Boom Park in the evening, utilities (including potable water, sewage, trash collection, and shore power) would need to extend from the shore location where vessels tie-up.

Kirkland

The existing facilities at Kirkland Marina Park are currently used for vessel moorage and would require minor improvements to begin water taxi service from this location. Figure 3 indicates the existing facilities and proposed improvements required for water taxi service.

Figure 3: Kirkland Improvements

Since vessels of a similar size to the 150-passenger vessels currently moor at the marina, only minor modifications to the pier would be required. These modifications include adding fendering and cleats for vessel tie-up. A transfer span and fixed ramp would be required on the existing pier for safely loading and unloading passengers. Additional security measures required include adding fencing and gates to protect the vessel from unauthorized boarding of the vessel as well as cameras to monitor activity on and around the vessels.

Upland improvements to Marina Park would include adding signage and wayfinding measures for passengers to easily navigate to and from the water taxi. Ticket vending machines would also need to be installed for passengers to purchase tickets prior to boarding the vessel.

Ballard

The Shilshole Marina currently accommodates vessels of similar scale to a 150-passenger vessel. Therefore, only minor improvements would be required for a water taxi service to operate from this location. The vessel would likely tie-up to H-Pier within the Shilshole Marina. Figure 4 provides an aerial view of the existing facilities as well as the location of the minor improvements required for water taxi service.

Figure 4: Ballard Improvements

Since vessels of a similar size to the 150-passenger vessels currently moor at the marina, only minor modifications to the pier would be required. These modifications would include adding fendering and cleats to the float for vessel tie-up. Additionally, a transfer span and fixed ramp would be required on the existing float for safely loading and unloading passengers. Additional security measures required include adding fencing and gates to protect the vessel from unauthorized boarding of the vessel as well as cameras to monitor activity on and around the vessels.

Upland improvements to Shilshole Marina would include adding lighting for security as well as signage and wayfinding measures for passengers to easily navigate to and from the water taxi. Ticket vending machines would also need to be installed for passengers to purchase tickets prior to boarding the vessel.

5. Capital and Operating Costs

As part of the initial baseline analysis, POF programming needs were identified that focus on passenger access, vessel requirements, and maintenance facilities. Table 3 provides a cost summary that includes estimates for capital improvement costs and operating costs for each route. The following sections include a detailed description of the capital cost estimates and operating cost estimates.

Table 3: Capital and Operating Costs per Route

Route	Capital Costs[1]	Annual Operating Costs[2]
Kenmore to UW WAC		
UW WAC	$3.3 M	
Kenmore	$0.8 M	
Total	**$4.1 M**	**$2.4 M**
Kirkland to UW WAC		
UW WAC	$3.3 M	
Kirkland	$0.3 M	
Total	**$3.6 M**	**$1.6 M**
Ballard to Downtown Seattle (Pier 50)		
Ballard	$0.3 M	
Downtown Seattle (Pier 50)	$0	
Total	**$0.3 M**	**$1.6 M**

Note:
1. Site improvement costs only. Does not include vessel acquisition costs.
2. Estimated using 2014 King County information and includes $420,000 annual lease costs based on the Melissa Ann. Includes shuttle cost estimates for Kenmore.

Capital Costs

Infrastructure requirements identified for each site require varying levels of capital cost. The capital improvement costs would be required for a new to be operational and are preliminary, high-level cost estimates. Appendix A provides a detailed cost estimate with specific improvements for each site. Based on the conceptual level of design, the contingency for variation in cost is calculated at 30%. As the conceptual design becomes more refined and there is more certainty of the specific design elements, the contingency is reduced.

Operating Costs

By adding one additional service route to the current KCWT service, additional administrative staff would not be required. Therefore, the administrative costs would be dispersed between the three routes. Operations costs include administrative costs, vessel crew, and maintenance costs. Using 2014 financial data from King County, the annual operating costs include operations, maintenance, for an additional service route is identified in Table 3.

6. Permitting, Design and Construction

POF terminal facilities are water dependant uses that are restricted by federal, state, and local land use and environmental regulations. Additionally, water dependent facilities have specific design and construction considerations.

Permitting

The each potential landing site has existing in-water facilities and requires varying levels of modification requirements to become operational. Kenmore, Kirkland, and Ballard have existing docks that need railing, ladders, and/or fendering to support a POF. The federal, state, and local review process for these over-water infrastructure improvements is typically straight-forward and approval can be issued within six months.

Landing sites that would require more substantial in-water work including the UW WAC require more comprehensive federal, state, and local review.

Projects that require federal funding have to complete the federal environmental review process through the National Environmental Policy Act (NEPA). Some minor projects qualify for a Categorical Exclusion (CE) to the full review process of an Environmental Impact Statement (EIS). Early coordination with the federal agency making this determination would indicate which projects qualify for the CE.

Construction of sheltered areas and other minor upland improvements (i.e. way finding or ticketing machines) also require local agency approval for consistency with the Shoreline Management Act and/or building codes.

Design

Each site would require design of the modifications to the existing facilities. This includes engineering and architectural work required for the improvements. UW WAC would require the most engineering and architectural work for construction of a new float and gangway.

Each transfer span and fixed ramp needs to be designed to properly fit with the vessel and the pier or float where the vessel is mooring. This requires specific engineering and design for stability and efficient operations when passengers are loading and unloading.

Construction

Construction of the improvements would be completed once permits are issued. King County has a procurement process for construction projects that begins after building permits are issued. This timeframe is built into the schedule for implementation.

Schedule

The timeframe for implementing these routes is dependent on the time needed for environmental review, design, permitting and construction. See Appendix B for a conceptual design, permitting and construction schedule for each route.

Appendix A

Capital Cost Improvement Spreadsheets

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KPFF COST ESTIMATE			UW - WAC			
Improvements	**Quantity**	**Unit**	**Unit Cost (KC)**	**TOTAL COST**	**NOTES**
Overwater Improvements					
Gangway (tidal locations)	-	LS	$300,000	$0	
Gangway (freshwater locations)	1	LS	$75,000	$75,000	24' x 6'
Upper Gangway Support	1	LS	$75,000	$75,000	
Float	1,600	SF	$300	$480,000	70' x 20'
Transfer Span	1	EA	$1,000	$1,000	
Fixed Ramp	1	EA	$2,500	$2,500	
Fendering (fixed vertical, D-Rubber on Wide Flange, installed)	-	EA	$2,500	$0	
Fendering (pneumatic, 22" x 57", Polyform F-11)	6	EA	$500	$3,000	
Cleats (hardware + installation)	4	EA	$500	$2,000	
Ladder	1	EA	$500	$500	
Railing	-	LF	$125	$0	
Furnish 36" Steel Guide Piles (4 @ 100' ea)	4	LF	$400	$1,600	
Furnish 36" Batter Pile (4 @ 120' ea)	4	LF	$400	$1,600	
Bubble Curtain/Enviro Observation	-	LS	$60,000	$0	
Pile Driving Costs	4	EA	$5,000	$20,000	
Upland					
Plumbing (Deck Drainage)	-	SF	$5	$0	
Electrical (Lighting)	-	SF	$15	$0	
Railing	-	LF	$125	$0	
Signage and Way Finding	1	EA	$75,000	$75,000	
Shelter	200	SF	$200	$40,000	
Ticketing	2	EA	$10,000	$20,000	
Grading/Paving	5,000	SF	$100	$500,000	Rough estimate
Sewage Forcemain	-	LF	$50	$0	
Electrical Service Extension	-	LF	$100	$0	
Electrical Submeter	-	EA	$15,000	$0	
Shore Power (Float and Gangway only)	-	LS	$15,000	$0	
Potable Water Submeter	-	EA	$15,000	$0	
Potable Water Service Extension	-	LF	$100	$0	
Fire Service	-	LF	$160	$0	
Communications & Data Allowance	1	LS	$50,000	$50,000	
Security Needs					
Security System (gates, fencing and monitoring system)	1	LS	$20,000	$20,000	
Subtotal of Costs				*$1,368,000*	
Mobilization (calculated based on subtotal of above construction items)				$137,000	
			10%		
Subtotal				*$1,505,000*	
General Provisions (calculated based on subtotal of construction and mob)					
Environmental Costs			$500,000	$500,000	
Construction Management and Administration (on construction + environmental costs)			6%	$120,300	
Contingency (on construction + environmental costs)			30%	$601,500	
Tax (on construction only)			9.5%	$142,975	
Subtotal of General Provisions				*$1,364,775*	
Subtotal with General Provisions				***$2,869,800***	
Design Engineering (% of total construction costs)			15%	$431,000	
Grand Total				**$3,301,000**	

KPFF COST ESTIMATE			Kenmore - Log Boom Park			
Improvements	**Quantity**	**Unit**	**Unit Cost (KC)**	**TOTAL COST**	**NOTES**
Overwater Improvements					
Gangway (tidal locations)	-	LS	$300,000	$0	
Gangway (freshwater locations)	-	LS	$75,000	$0	
Upper Gangway Support	-	LS	$75,000	$0	
Float	-	SF	$300	$0	
Transfer Span	1	EA	$1,000	$1,000	
Fixed Ramp	1	EA	$2,500	$2,500	
Fendering (fixed vertical, D-Rubber on Wide Flange, installed)	-	EA	$2,500	$0	
Fendering (pneumatic, 22" x 57", Polyform F-11)	6	EA	$500	$3,000	
Cleats (hardware + installation)	4	EA	$500	$2,000	
Ladder	1	EA	$500	$500	
Railing	-	LF	$125	$0	
Furnish 36" Steel Guide Piles (4 @ 100' ea)	-	LF	$400	$0	
Furnish 36" Batter Pile (4 @ 120' ea)	-	LF	$400	$0	
Bubble Curtain/Enviro Observation	-	LS	$60,000	$0	
Pile Driving Costs	-	EA	$5,000	$0	
Upland					
Plumbing (Deck Drainage)	-	SF	$5	$0	
Electrical (Lighting)	-	SF	$15	$0	
Railing	-	LF	$125	$0	
Signage and Way Finding	1	EA	$75,000	$75,000	
Shelter	-	SF	$200	$0	
Ticketing	2	EA	$10,000	$20,000	
Grading/Paving	-	SF	$100	$0	
Sewage Forcemain	500	LF	$50	$25,000	
Electrical Service Extension	500	LF	$100	$50,000	
Electrical Submeter	1	EA	$15,000	$15,000	
Shore Power (Float and Gangway only)	1	LS	$15,000	$15,000	
Potable Water Submeter	1	EA	$15,000	$15,000	
Potable Water Service Extension	500	LF	$100	$50,000	
Fire Service	500	LF	$160	$80,000	
Communications & Data Allowance	1	LS	$50,000	$50,000	
Security Needs					
Security System (gates, fencing and monitoring system)	1	LS	$20,000	$20,000	
Subtotal of Costs				*$424,000*	
Mobilization (calculated based on subtotal of above construction items)				$43,000	
			10%		
Subtotal				*$467,000*	
General Provisions (calculated based on subtotal of construction and mob)					
Environmental Costs			$20,000	$20,000	
Construction Management and Administration (on construction + environmental costs)			6%	$29,220	
Contingency (on construction + environmental costs)			30%	$146,100	
Tax (on construction only)			9.5%	$44,365	
Subtotal of General Provisions				*$239,685*	
Subtotal with General Provisions				***$706,700***	
Design Engineering (% of total construction costs)			15%	$107,000	
Grand Total				**$814,000**	

KPFF COST ESTIMATE			Kirkland - Marina Park				
Improvements		**Quantity**	**Unit**	**Unit Cost (KC)**	**TOTAL COST**	**NOTES**
Overwater Improvements						
	Gangway (tidal locations)	-	LS	$300,000	$0	
	Gangway (freshwater locations)	-	LS	$75,000	$0	
	Upper Gangway Support	-	LS	$75,000	$0	
	Float	-	SF	$300	$0	
	Transfer Span	1	EA	$1,000	$1,000	
	Fixed Ramp	1	EA	$2,500	$2,500	
	Fendering (fixed vertical, D-Rubber on Wide Flange, installed)	-	EA	$2,500	$0	
	Fendering (pneumatic, 22" x 57", Polyform F-11)	6	EA	$500	$3,000	
	Cleats (hardware + installation)	-	EA	$500	$0	
	Ladder	1	EA	$500	$500	
	Railing	-	LF	$125	$0	
	Furnish 36" Steel Guide Piles (4 @ 100' ea)	-	LF	$400	$0	
	Furnish 36" Batter Pile (4 @ 120' ea)	-	LF	$400	$0	
	Bubble Curtain/Enviro Observation	-	LS	$60,000	$0	
	Pile Driving Costs	-	EA	$5,000	$0	
Upland						
	Plumbing (Deck Drainage)	-	SF	$5	$0	
	Electrical (Lighting)	-	SF	$15	$0	
	Railing	-	LF	$125	$0	
	Signage and Way Finding	1	EA	$75,000	$75,000	
	Shelter	-	SF	$200	$0	
	Ticketing	2	EA	$10,000	$20,000	
	Grading/Paving	-	SF	$100	$0	
	Sewage Forcemain	-	LF	$50	$0	
	Electrical Service Extension	-	LF	$100	$0	
	Electrical Submeter	-	EA	$15,000	$0	
	Shore Power (Float and Gangway only)	-	LS	$15,000	$0	
	Potable Water Submeter	-	EA	$15,000	$0	
	Potable Water Service Extension	-	LF	$100	$0	
	Fire Service	-	LF	$160	$0	
	Communications & Data Allowance	1	LS	$50,000	$50,000	
Security Needs						
	Security System (gates, fencing and monitoring system)	1	LS	$20,000	$20,000	
Subtotal of Costs					*$172,000*	
Mobilization (calculated based on subtotal of above construction items)					$18,000	
				10%		
Subtotal					*$190,000*	
General Provisions (calculated based on subtotal of construction and mob)						
	Environmental Costs			$20,000	$20,000	
	Construction Management and Administration (on construction + environmental costs)			6%	$12,600	
	Contingency (on construction + environmental costs)			30%	$63,000	
	Tax (on construction only)			9.5%	$18,050	
Subtotal of General Provisions					*$113,650*	
Subtotal with General Provisions					***$303,700***	
Design Engineering (% of total construction costs)				15%	$46,000	
Grand Total					**$350,000**	

KPFF COST ESTIMATE			Ballard - Shilshole				
Improvements	**Quantity**	**Unit**	**Unit Cost (KC)**	**TOTAL COST**	**NOTES**
Overwater Improvements					
Gangway (tidal locations)	-	LS	$300,000	$0	
Gangway (freshwater locations)	-	LS	$75,000	$0	
Upper Gangway Support	-	LS	$75,000	$0	
Float	-	SF	$300	$0	
Transfer Span	1	EA	$1,000	$1,000	
Fixed Ramp	1	EA	$2,500	$2,500	
Fendering (fixed vertical, D-Rubber on Wide Flange, installed)	-	EA	$2,500	$0	
Fendering (pneumatic, 22" x 57", Polyform F-11)	6	EA	$500	$3,000	
Cleats (hardware + installation)	-	EA	$500	$0	
Ladder	1	EA	$500	$500	
Railing	-	LF	$125	$0	
Furnish 36" Steel Guide Piles (4 @ 100' ea)	-	LF	$400	$0	
Furnish 36" Batter Pile (4 @ 120' ea)	-	LF	$400	$0	
Bubble Curtain/Enviro Observation	-	LS	$60,000	$0	
Pile Driving Costs	-	EA	$5,000	$0	
Upland					
Plumbing (Deck Drainage)	-	SF	$5	$0	
Electrical (Lighting)	-	SF	$15	$0	
Railing	-	LF	$125	$0	
Signage and Way Finding	1	EA	$75,000	$75,000	
Shelter	-	SF	$200	$0	
Ticketing	2	EA	$10,000	$20,000	
Grading/Paving	-	SF	$100	$0	
Sewage Forcemain	-	LF	$50	$0	
Electrical Service Extension	-	LF	$100	$0	
Electrical Submeter	-	EA	$15,000	$0	
Shore Power (Float and Gangway only)	-	LS	$15,000	$0	
Potable Water Submeter	-	EA	$15,000	$0	
Potable Water Service Extension	-	LF	$100	$0	
Fire Service	-	LF	$160	$0	
Communications & Data Allowance	1	LS	$50,000	$50,000	
Security Needs					
Security System (gates, fencing and monitoring system)	1	LS	$20,000	$20,000	
Subtotal of Costs				*$172,000*	
Mobilization (calculated based on subtotal of above construction items)				$18,000	
			10%		
Subtotal				*$190,000*	
General Provisions (calculated based on subtotal of construction and mob)					
Environmental Costs			$20,000	$20,000	
Construction Management and Administration (on construction + environmental costs)			6%	$12,600	
Contingency (on construction + environmental costs)			30%	$63,000	
Tax (on construction only)			9.5%	$18,050	
Subtotal of General Provisions				*$113,650*	
Subtotal with General Provisions				***$303,700***	
Design Engineering (% of total construction costs)			15%	$46,000	
Grand Total				**$350,000**	

Appendix B

Implementation Schedules

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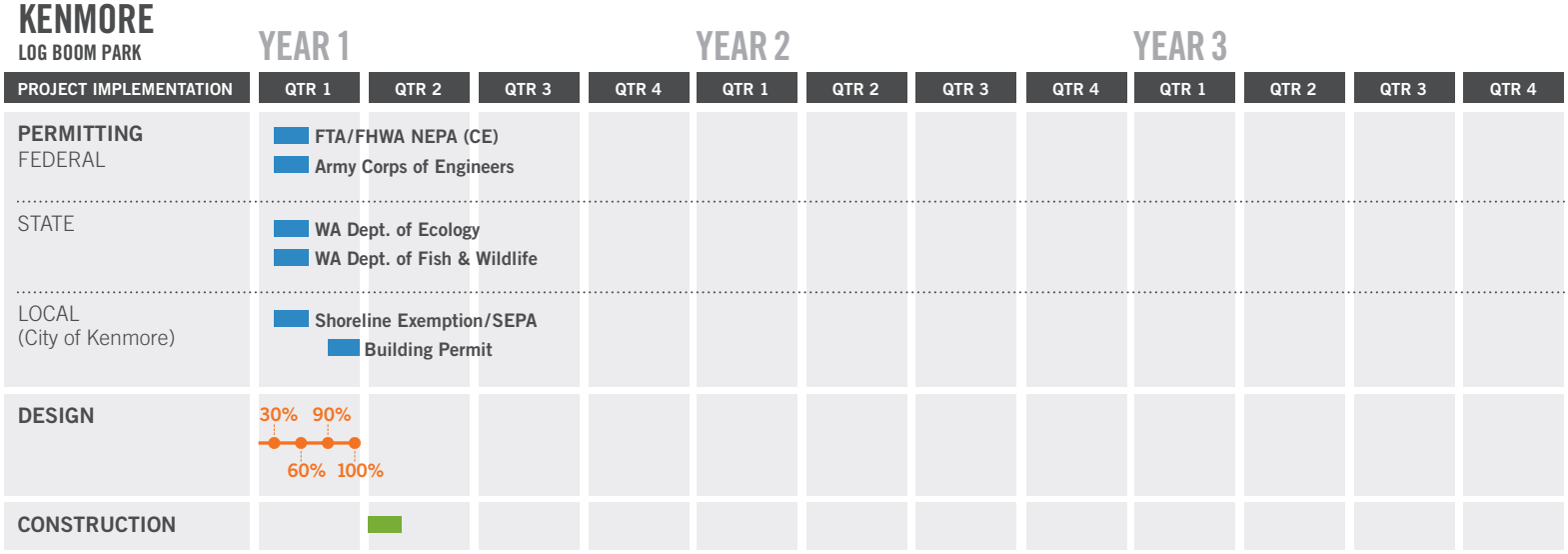
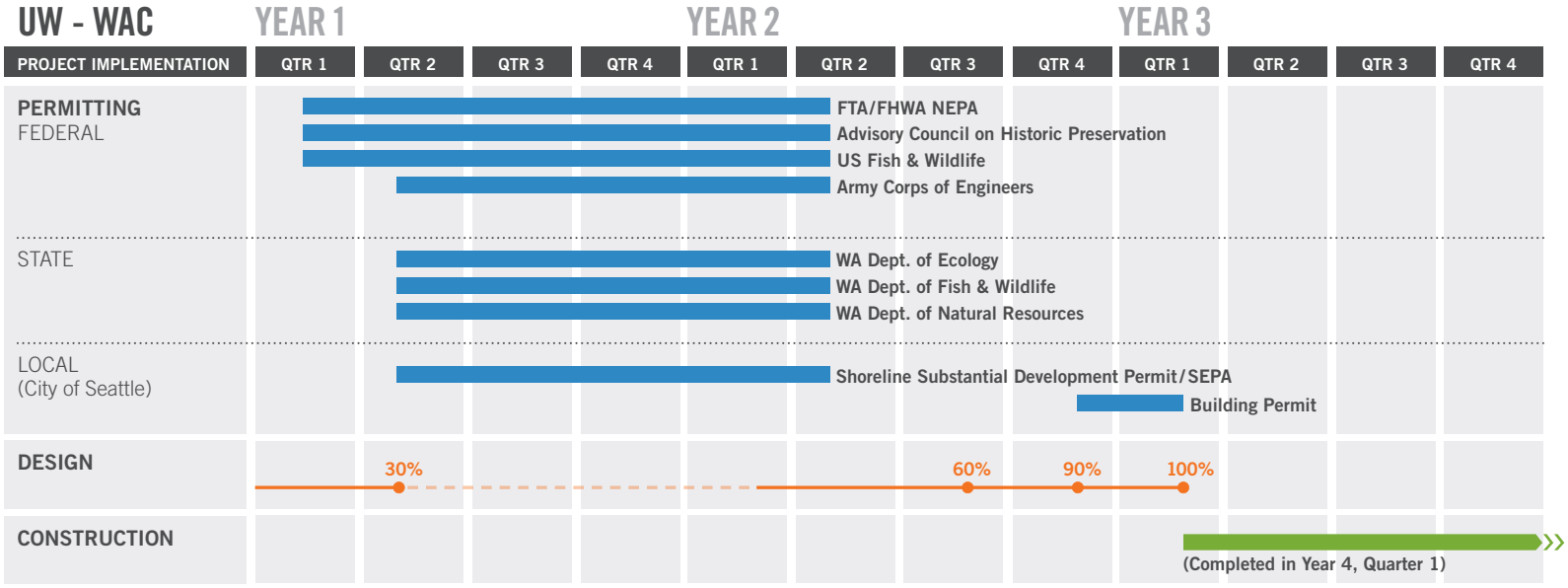
KENMORE TO UW-WAC

KENMORE
LOG BOOM PARK

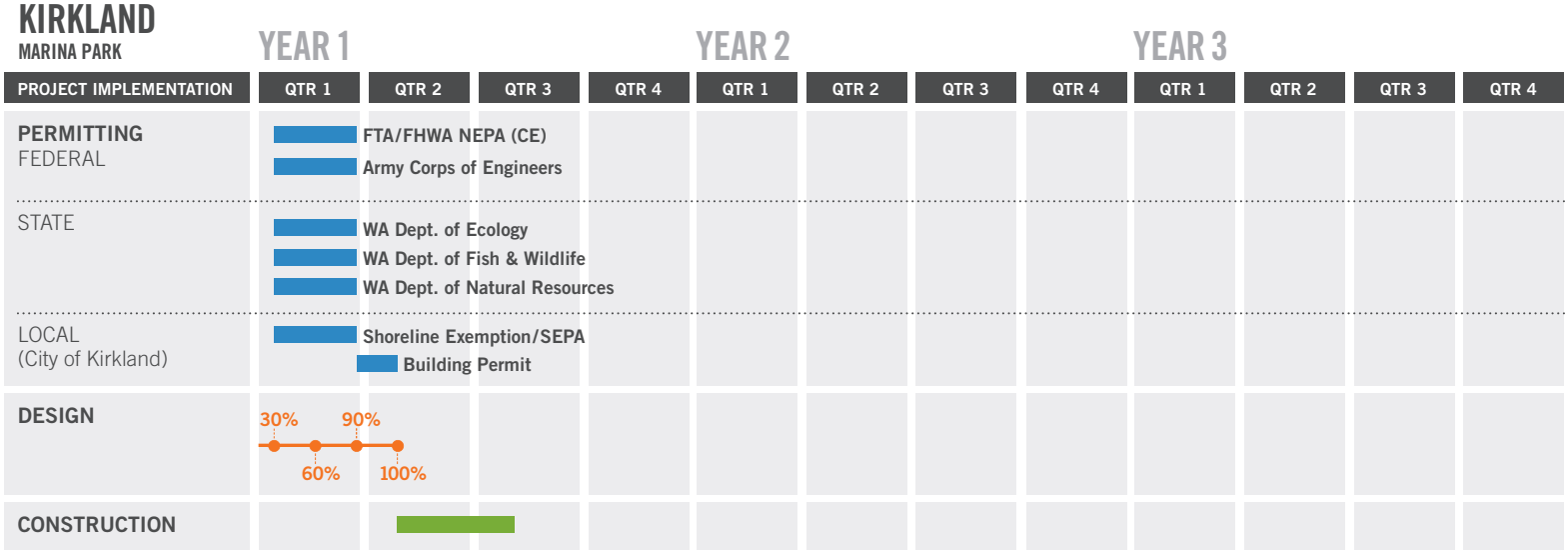


UW - WAC

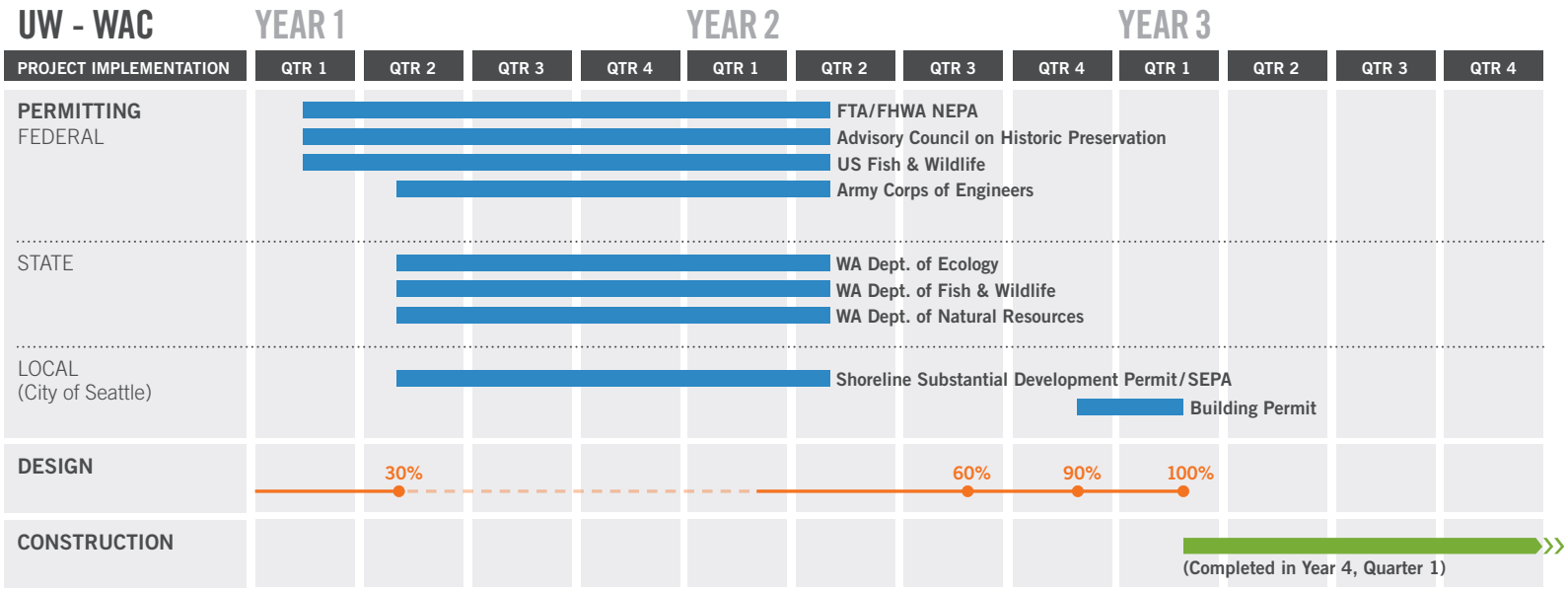


KIRKLAND TO UW-WAC

KIRKLAND
MARINA PARK



UW - WAC



BALLARD TO DOWNTOWN SEATTLE (PIER 50)

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APPENDIX E

Task 5: Outreach

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TASK 5: OUTREACH

Interim Report on Ferry Expansion Options for Marine Division

PREPARED FOR KING COUNTY MARINE DIVISION
BY KPFF CONSULTING ENGINEERS
JULY 1, 2015

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List of Tables

Appendices

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1. Introduction

The purpose of this memo is to outline the outreach efforts to date, which include conversations, meetings and some outstanding coordination with potential terminal location jurisdictions.

2. Outreach to Date

On February 19, 2015, email communication was sent to communities of potential terminal locations, which introduced the project and asked for their feedback regarding potential water taxi terminal landing sites. The list of outreach recipients can be found in Appendix A and consisted of all Lake Washington communities, as well as City of Seattle and the City of Des Moines, King County Council and regional/local transportation agencies. The communication can be found as Appendix B of this memo.

Since that time, several communities have been in contact with our planning team (Refer to Appendix A). The project team then began site visits and held additional follow-up meetings with agencies.

On April 23, 2015 a second email communication was sent to the waterfront communities previously identified in the first wave of outreach. The purpose of this outreach was to update and inform on where the plan was and the progress that had been made to date. This correspondence outlined the seven routes that had been identified for ridership analysis, which included:

1. Kenmore (Log Boom Park) to University of Washington (Waterfront Activity Center)
2. Kenmore (Log Boom Park) to Bellevue (Marina)
3. Kirkland (Marina Park) to University of Washington (Waterfront Activity Center)
4. Bellevue (Marina) to University of Washington (Waterfront Activity Center)
5. Renton (Southport) to Bellevue (Marina)
6. Des Moines (Marina) to Downtown Seattle (Pier 50)
7. Ballard (Shilshole Marina) to Downtown Seattle (Pier 50)

Concurrently with the transmittal of the interim report to the King County Council, each community will be notified regarding the findings and recommendations of the interim report. This correspondence is in letter/email format, specific to each city/community/organization.

3. Feedback Received to Date

Three final routes met the evaluation criteria, which include:

1. Kenmore (Log Boom Park) to University of Washington (Waterfront Activity Center)
2. Kirkland (Marina Park) to University of Washington (Waterfront Activity Center)
3. Ballard (Shilshole Marina) to Downtown Seattle (Pier 50)

Of these routes, the following Table 1 identifies the general concerns and attitudes interpreted from meetings and correspondence to date. Formal feedback has been provided by the City of Kenmore and University of Washington and is included in Appendix C. Meetings were held with the City of Kirkland and the Port of Seattle. The City of Kirkland asked to send formal comments, which have not yet been received. The key issues gathered from those meetings have been outlined in Table 1 below. The City of Seattle provided initial feedback via email.

Table 1: Agency Coordination Key Issues Matrix

Route	General Interest	Key Issues Identified
City of Kenmore	Very Positive	• Pedestrian connectivity • Sees as great benefit to the community
City of Kirkland	(awaiting formal response)	• Users parking in downtown and adding to congestion
University of Washington	Obstacles Identified	• Potential conflict with UW rowing program practice schedule • Coordination with the University's landscape architect • Ensure safe pedestrian connection from WAC to Light Rail station • Ensure safe pedestrian connection through participation in the development of waterfront trail enhancements providing direct connection from the WAC to the Medical Center • Coordinate operations with the WAC • Expressed interest in expanded game day service • Look at potential connections to UW Bothell • UPass fare policy structured to not incur additional cost from premium service mode choice • Expanded public outreach
Port of Seattle	Positive, potential synergistic relationship if concerns are addressed.	• Conflicts with seasonal marina traffic. • Parking to be managed • Believes H dock is a better, more central location to be considered • Potential positive synergistic relationship by offering service/opportunities for their customers and businesses on-site
City of Seattle	Neutral	• Ballard to Downtown may be an attractive additional transit route • Access to Shilshole Marina requiring additional car trips may be problematic from the likely park and ride nature of the facility • Desire to learn more about potential ridership demand and travel time

Appendix A

Service Alternatives Outreach Log

Agency/ Jurisdiction	Initial Outreach List (2/19/15) Correspondence email from Paul Brodeur sent to:	Initial Outreach Response from Agencies (includes contact Info)	Second Outreach to waterfront communities 4/23/15 from Kristen Kissinger sent to:	Correspondence Log
City of Kenmore	Mayor David Baker dbaker@kenmorewa.gov City Manager: Rob Karlinsey rkarlinsey@kenmorewa.gov Community Development Director: Debbie Bent dbent@kenmorewa.gov Development Services: Bryan Hampson bhampson@kenmorewa.gov	City Manager, Rob Karlinsey official City letter response, approved by City Council. NANCY K. OUSLEY ASSISTANT CITY MANAGER CITY OF KENMORE, WA 425.398.8900 OFFICE 206.604.6217 MOBILE	Nancy Ousley	3/3 Formal response from City Manager, approved by Council 3/26 Site Visit and Meeting with Assistant City Manager Nancy Ousley, Planning and Community Development Director Debbie Bent and Public Works Director Kristen Overleese
City of Lake Forest Park	City Administrator, Pete Rose prose@ci.lake-forest-park.wa.us Mayor Mary Jane Goss mgoss@ci.lake-forest-park.wa.us	Mary Jane Goss Mayor City of Lake Forest Park 206.957.2801 - Office 206.255.3564 - Cell	Mary Jane Goss	Follow-up emails with Mayor to answer questions, no formal meeting or call scheduled.
City of Mercer Island	Noel Treat Noel.Treat@mercergov.org Scott Greenberg	None	Noel Treat Scott Greenberg	None
City of Kirkland	Mayor Amy Walen awalen@kirklandwa.gov City Manager: Kurt Triplett ktriplett@kirklandwa.gov Parks and Community Services Director: Jennifer Schroder JSchroder@kirklandwa.gov Planning and Community Development Director:	None	Eric Shields	6/18 meeting with: *Kathy Brown* *Director* City of Kirkland, Department of Public Works P 425.587.3802/Cell 425.457-0047 kbrown@kirklandwa.gov and David Godfrey DGodfrey@kirklandwa.gov

	Eric Shields EShields@kirklandwa.gov			
City of Bellevue	Mayor Claudia Balducci cbalducci@bellevuewa.gov City Manager: Brad Miyake bmiyake@bellevuewa.gov Development Services Director: Mike Brennan	Kevin McDonald, AICP Senior Transportation Planner/Bellevue Transportation Department /425.452.4558/ kmcdonald@bellevuewa.gov	Kevin McDonald	General email Correspondence 6/15 Meeting with Kevin McDonald
City of Renton	Mayor Denis Law denis.law@renton.wa.gov Department of Community and Economic Development Administrator: Vincent cvincent@rentonwa.gov	Jim Seitz Transportation Planning and Programming Manager Transportation Division Tel 425-430-7245 jseitz@rentonwa.gov	Jim Seitz	3/26 Meeting on-site with Jim Seitz
City of Des Moines	Mayor Dave Kaplan dkaplan@desmoineswa.gov City Manager: tpiasecki@desmoineswa.gov Parks Director: Patrice Thorell pthorell@desmoineswa.gov Planning Manager: Denise Lathrop dlathrop@desmoineswa.gov	Michael Matthias Asst. City Manager / Economic Development Director City of Des Moines, WA 206.870.6554 *mmatthias@desmoineswa.gov*	Michael Matthias	3/9 Conference call with: Assistant City Manager and Economic Development Director Michael Matthias, City Manager Tony Piasecki, Harbor Master Joe Dusenbury and Parks Director Patrice Thorell
City of Seattle	Mayor Ed Murray ed.murray@seattle.gov Planning Director: Diane Sugimura Diane.Sugimura@seattle.gov Parks Acting Superintendent: Chris Williams Parks Acting Deputy Superintendent: Susan Golub . golub@seattle.gov Andrew Glass Hastings Andrew.GlassHastings@seattle.gov	Direct email to the mayor and Planning Director failed.	Maria Koengeter Diane Sugimura	7/9/15 Andrew Glass Hastings emailed response with comments.
County	Councilmember Dembowski	None		

Council	rod.dembowski@kingcounty.gov Staff:Elizabeth.evans@kingcounty.gov			
County Council	Councilmember Phillips larry.phillips@kingcounty.gov Staff:BrynDel.Swift@kingcounty.gov	None		
County Council	Councilmember Lambert kathy.lambert@kingcounty.gov Staff:April.sanders@kingcounty.gov	None		
County Council	Councilmember McDermott joe.mcdermott@kingcounty.gov Staff:Shannon.braddock@kingcounty.gov	None		
County Council	Councilmember Hague jane.hague@kingcounty.gov Staff: Kimberly.nuber@kingcounty.gov	None		
County Council	Councilmember Gossett larry.gossett@kingcounty.gov Staff: Michelle.clark@kingcounty.gov	None		
County Council	Councilmember Dunn reagan.dunn@kingcounty.gov Staff: Tom.goff@kingcounty.gov	None		
County Council	Councilmember von Reichbauer pete.vonreichbauer@kingcounty.gov Staff: cynthia.spellecy@kingcounty.gov and sara.smith@kingcounty.gov	None		
County Council	Councilmember Upthegrove dave.upthegrove@kingcounty.gov Staff: Jeff.muhm@kingcounty.gov	None		
PSRC	Stephen Kiehl skiehl@psrc.org	None		
Sound Transit	Trinity Parker trinity.parker@soundtransit.org ric.ilgenfritz@soundtransit.org	None		Follow up with Andrea Burnett regarding ST long range plans. Ryan Bianchi (Roosevelt/Ballard) and Page Johnson (ownership questions)
WSF	Ray Deardorf deardorf@wsdot.wa.gov	None		
King County	Paul Brodeur paul.brodeur@kingcounty.gov Chris O'Claire	N/A (internal coordination on-going)		

	christina.oclaire@kingcounty.gov Chris Arkills Chris.Arkills@kingcounty.gov Bill Greene Bill.Greene@kingcounty.gov			
University of Washington	Josh Kavanagh Transportation Director joshkav@u.washington.edu	3/2 email from Josh outlining he would be happy to provide us with any information we need.	Josh Kavanagh	5/4 Meeting with Josh 5/28 Meeting with Department Representatives: Josh Kavanagh (Transportation) Kristine Kenney (Planning) Steve Kennard (Real Estate) Jim Seagren (Recreation Sports) Stephanie Rempe (Architect) Sally Clark (Community Relations) and Daniel Erickson (Intercollegiate Athletics) 6/9 call with Aaron Hoard (Community Relations) 6/12 Response letter authored by Aaron Hoard with input from departments. 6/15 call with Bob Ernst (women's crew coach) and Paul Brodeur (concerns addressed in format UW response)
SDOT	Scot Kubly scott.kubly@seattle.gov	None		
Port of Seattle				6/18 Conference Call with Marina manager Tracy McKendry and long range planner Joseph Gellings

Appendix B

Initial Outreach Letter (Feburary 19, 2015)

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King County
Department of Transportation
Marine Division
M.S. KSC-TR-0816
201 South Jackson Street
Seattle, WA 98104-3856

February 19, 2015

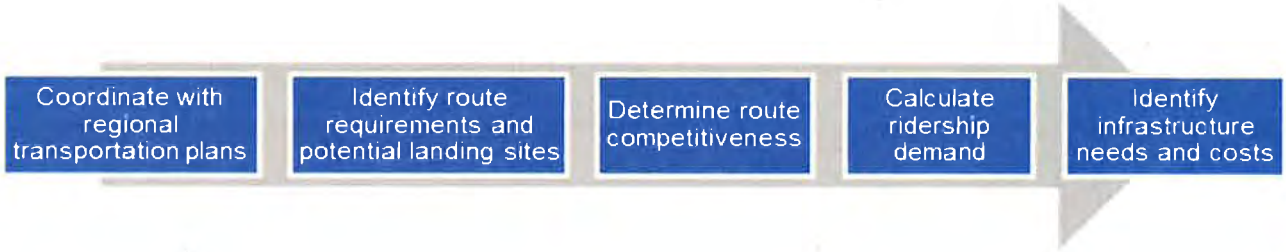
Dear Community Representative:

RE: Water Taxi Service Expansion Options Report

Your community has been included in a broad list of potential sites for expanded King County Water Taxi (Water Taxi) service. We would like to request your early assistance and expertise to inform the initial examination of potential Water Taxi routes. Transit agencies in the Puget Sound region are planning and developing exciting new transit-oriented improvements with the expansion of Sound Transit's Link Light Rail and updating the King County Metro Long Range Plan. In coordination with these planned improvements, the King County Marine Division (KCMD), a division of King County Department of Transportation, would like to improve multi-modal connections by utilizing King County waterways and expanding the current Water Taxi service.

The Water Taxi currently serves West Seattle and Vashon Island from downtown Seattle. Based on recommendations in the 2014-2018 KCMD Strategic Plan, the King County Council authorized the development of a report to identify feasible routes for expansion of the current Water Taxi service. KCMD is in the beginning stages of reviewing potential route opportunities for expanded Water Taxi service.

The intent of the report is to review multiple route options and conduct in-depth analysis of routes with the highest likelihood of success through review of existing infrastructure, ridership demand, route competitiveness, and other factors. The following includes a sequential list of report elements and route criteria:



Your early involvement in the process will be invaluable to determine the feasibility of routes. Information you can provide that will assist in the route selection could be:

- Community interest in Water Taxi service.
- Potential landing sites in your area and potential destinations for the Water Taxi.
- Transit-oriented development plans specific to your community.
- Parking opportunities (i.e. churches, lots, garages, etc.) nearby a potential landing site.

Please consider the information above as it relates to your community and provide any information you

think would be helpful in our analysis to our consultant KPFF Consulting Engineers, Attn: Kristen Kissinger (kristen.kissinger@kpff.com) by March 5, 2015. We appreciate your assistance to direct the review of potential Water Taxi service expansion and look forward to working with you on the common goal of improving transportation opportunities in our community.

Sincerely,

Paul H Brodeur

Paul H. Brodeur
Division Director
King County Marine Division

Appendix C

Agency Response Letters

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City Of Kenmore, Washington

March 3, 2015

Paul H. Brodeur, Director
King County Marine Division
M.S. KSC-TR-0816
201 South Jackson Street
Seattle, WA 98104-3856

Dear Mr. Brodeur:

Thank you for including the City of Kenmore in the Water Taxi Expansion Study. Please include Kenmore as a community that is very interested in seeing a water taxi station located in our city.

Community Interest

Located on the north end of Lake Washington, Kenmore is a strategic location for passenger ferry service. Kenmore's State Route 522 is a major cross-lake corridor, carrying more than 40,000 vehicles per day. SR 522 has seen increased demand and congestion since 520 bridge tolling was installed. Population and economic growth have also added congestion pressures to the SR 522 corridor.

The Burke Gilman Trail runs along Lake Washington's north shore through Kenmore and would complement passenger ferry service given the high volumes of bicyclist and pedestrians that utilize the trail every day. The benefit of a trail and water taxi connection is the potential reduction of parking required.

Kenmore residents and those from surrounding Northshore communities use Kenmore as a major transit point as they commute to Seattle and the East Side (designated regional centers). Tech workers, university faculty, and many other employment sectors are represented among the multitude of Kenmore and Northshore commuters. Given the difficult drive down the I-5 and I-405 corridors, we believe many Northshore commuters would welcome an alternate method of transporting themselves to work.

In addition, Bastyr University provides a well-used shuttle service between Kenmore and Seattle, and a water taxi would likely be an attractive alternative and supplement to this service.

Potential Landing Sites in Kenmore and Potential Destinations from Kenmore

Potential landing sites in Kenmore include the Lakepointe property (privately owned) via the Kenmore Navigation Channel, the public wharf at Harbor Village Marina, and the public pier at Log Boom Park.

Potential water taxi destinations from Kenmore include the University of Washington campus and the new University of Washington Light Rail Station, both of which are on the Montlake Cut. Other destinations could include drop off points at South Lake Union, Leschi, and the Madison Park dock, all of which are in proximity to bus routes to downtown Seattle. We also recommend exploring additional destination points on Lake Washington, including downtown Kirkland and as far south as Renton.

Transit-Oriented Development Plans in Kenmore

Sound Transit's long range plan has identified Kenmore for future High Capacity Transit. In addition, the City has been upgrading its transit facilities along SR 522 in phases, including new and widened bus-only lanes and upgraded bus stops. The next major phase of SR 522 improvements will be under construction this spring. Kenmore is also home to a large Metro Transit Park & Ride and serves as a major Metro Transit bus corridor. Later this year the City will be adopting a new Transit Oriented Development overlay district that reinforces the City's planned concentration of pedestrian oriented mixed-use development at intensities that support and would be supported by multi-modal transportation options.

Parking Opportunities Near Potential Landing Sites

The Lakepointe property, though privately owned, has the most potential for parking, given its current flat, undeveloped state. Plans for this 45-acre waterfront site include high density residential and commercial uses. As for the Log Boom Park pier and Harbor Village wharf locations, additional parking would need to be constructed and/or acquired. There is untapped opportunity for additional on-street parking along NE 175th Street at these potential landing site locations, and there are also neighboring commercial parking lots that are underutilized.

Again, we appreciate this opportunity to be included in this study, and we are happy to assist. Please see us as a resource, and we look forward to next steps.

Sincerely,

Rob Karlinsey
City Manager
City of Kenmore

CC: Kristen Kissinger, KPFF

UNIVERSITY of WASHINGTON
OFFICE OF REGIONAL & COMMUNITY RELATIONS

June 12, 2015

Kristen Kissinger, AICP
Project Manager, KPFF
1601 5th Avenue, #1600
Seattle, WA 98101

RE: UW comments on King County Water Taxi Report

Dear Ms. Kissinger:

Thank you for briefing the University of Washington on the draft King County Water Taxi Alternative Service Options Report. We appreciate the opportunity to provide comments on this report. The following provides a summary of issues we have heard from internal stakeholders at the University.

Although there is some interest in new ferry service to campus, there are significant concerns about the impacts this may create for the UW's rowing program. There are between 300 and 150 UW rowers out on the water on any given day. They typically practice 6-9am and 2:30-6pm. This overlaps almost exactly with the proposed timeframes for ferry operation. The majority of their practice occurs between the tip of Laurelhurst and University Bridge, which intersects with the proposed ferry routes. It is the rowing program's belief that this service will create disruptive wakes and conflicts in the area regardless of boat design or operational assurances. If these impacts cannot be mitigated to their satisfaction, it is unlikely that the University will approve service to campus.

If King County can satisfy the rowing program's concerns, there are a number of other issues that would need to be addressed for new ferry service to land on campus. These include:

- Any design for improvements would need to be closely coordinated with the University Landscape Architect to make sure these compliment the University's activities and character and don't detract from the serene quality of the adjacent wetlands and waterfront. Minor elements like parking, signage, etc. will need to be fully coordinated if the project proceeds. We would also need signage and/or bollards to prevent public vehicle access to the dock area for drop-off and pick-up.

- A pedestrian connection to the Sound Transit station would be a great benefit for the University, providing a better sense of connectedness for the Waterfront Activities Center to campus. However, this is not easily done because of the steep grades between the two locations, so it would need to be carefully designed to ensure pedestrian safety through the parking lots.

218 Gerberding Hall Box 351243 Seattle, Washington 98195-1243 206/221-7684 FAX: 206/685-1201 ahoard@uw.edu
www.washington.edu/community/

- A number of ferry passengers would travel to the south campus, including the UW Medical Center and Health Sciences facilities. A single enhanced connection to the Sound Transit station would not benefit these users because it would force an out-of-direction connection versus a direct connection along an improved waterfront trail. We have performed other transportation studies on the UW campus relevant to inefficient, out-of-direction connections and the end result shows an increase in behavior that is unsafe (i.e. illegal mid-block crossings, travel paths with poor sight lines and heavy vehicular traffic). We want to support safe travel and therefor would want to see enhanced connections to both the station and along the waterfront trail.

  We would request collaboration to develop the 2.1 mile waterfront trail inclusive of both pedestrian and bicycle infrastructure to provide exceptional accessibility and connectivity. We believe, at minimum, there should be assistance with the permitting process which should include the waterfront trail and any necessary permitting to make all necessary improvements to the dock site for this new transportation service. Additional funding may also be needed for this trail.

- The Waterfront Activities Center (WAC) believes this service can coexist with their current small boat operations. However, that would need to be carefully coordinated with your boat captains to ensure the safety of these recreational boaters.

- The docks at the WAC would need to be rebuilt to accommodate this new service, current small boat users and existing boat moorage on football game days. The ferry use cannot reduce space for small boat use or game day moorage. Milfoil in the area around the dock would need to be evaluated and mitigated to ensure taxis can safely access the dock.

- The University would need to negotiate a temporary license with King County to use UW property or docks as long as the water taxis is in service. There would need to be some form of compensation from the County, either a direct payment or perhaps through construction of a new dock or improvements on UW property.

- The University would request King County to consider expanding service for Husky football games if it's logistically and financially feasible.

- The University would want analysis done on connecting this service to UW Bothell. It's likely that some students, staff and faculty would use the service as a connection to the north part of the Burke-Gilman Trail. Water taxis should have room to accommodate bicycle commuters. UW Bothell is interested in possible Metro service connections to the Kenmore dock.

- We are concerned that riders who shift from bus service to the ferries will increase the costs for our U-PASS contract without creating a better outcome in trip reduction. This can be resolved operationally, either through a reduced fare for U-PASS members OR limiting the cost to the UW of the Metro fare and charging a supplemental fare directly to the user. We would need a commitment to one of these in the agreement in order to minimize financial risk going forward.

- There are a number of other waterfront users around the University – including private rowing clubs, houseboats and waterfront home owners. It is very important for the University to maintain good relations with its neighbors, so we would require King County to fully engage these people to make sure they are comfortable with the proposed ferry service and their concerns are addressed.

Thank you again for providing us with the opportunity to give comments on this study. If you have any questions or would like to speak with us further about this, please feel free to contact me directly.

Sincerely,

Aaron Hoard
Deputy Director
UW Regional & Community Relations

CC: Mike Anderson, KPFF
Paul Brodeur, King County Marine Division
Kristine Kenney, UW Landscape Architect
Jim Seagren, UW Waterfront Activities Center
Robert Ernest, UW Rowing
Stephanie Rempe, UW Intercollegiate Athletics
Anna Stock, UW Real Estate
Daniel Erickson, UW Intercollegiate Athletics
Josh Kavanaugh, UW Transportation
Elisabeth McLaughlin, UW Transportation
Rebecca Barnes, UW Architect
Sally Clark, UW Regional & Community Relations
Kelly Snyder, UW Bothell