

# APPENDIX H

## Potential Ridership Demand for Puget Sound POF Study Route Profiles

*Prepared by BERK Consulting*

# PSRC Passenger-Only Ferry Study

## Potential Ridership Demand for Proposed POF Services

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### OVERVIEW AND APPROACH

BERK Consulting (BERK) estimated current ridership demand for seven different potential passenger-only ferry (POF) routes in Washington State. This report summarizes our methodology and findings. While there was some variation due to data availability, for all routes the basic approach to estimating ridership demand was consistent. There were three primary steps:

1. Determine how competitive the POF would likely be compared to other travel options.
2. Estimate the current demand for travel between the destinations served by the proposed route.
3. Estimate the percentage of travelers who would potentially select the new POF service.

It is important to note that this analysis focused on determining the share of *current* travel demand that might be captured by proposed POF services. It does not consider additional induced demand for travel that does not currently exist. Induced travel might include recreational trips or persons who make future home and/or workplace decisions based on the availability of POF service. Ridership on POF services often increases over time as more people organize their lives around the availability of the service.

### Routes Analyzed

Exhibit 1 shows the seven routes analyzed, including key information about the service profile. Six of the routes provide year-round commuter-focused service with three roundtrip sailings during the AM peak commute period, and another three roundtrips during the PM peak commute period. The last route from Bellingham to Friday Harbor is proposed as a seasonal service from mid-April to mid-October with four roundtrip sailings that are spaced throughout the day. This exhibit also includes the service region, which impacts the type of data available for estimating travel demand in Step 1, as described below.

## Exhibit 1. Proposed Routes Analyzed

Route	Service Type	Roundtrips Per Day	Service Region
Kenmore - UW WAC	Year-round commuter service (5 days per week)	6	Central Puget Sound Region
Kirkland - UW WAC	Year-round commuter service (5 days per week)	6	Central Puget Sound Region
Renton - UW WAC	Year-round commuter service (5 days per week)	6	Central Puget Sound Region
Renton - South Lake Union	Year-round commuter service (5 days per week)	6	Central Puget Sound Region
Tacoma - Downtown Seattle	Year-round commuter service (5 days per week)	6	Central Puget Sound Region
Clinton - Everett	Year-round commuter service (5 days per week)	6	Partially outside Central Puget Sound Region
Bellingham - Friday Harbor	Seasonal service for recreational travel (April 15 – October 15, 7 days per week)	4	Outside Central Puget Sound Region

## ANALYSIS OF PROPOSED ROUTES IN THE CENTRAL PUGET SOUND REGION

The methodology used for the five proposed routes within the four-county Central Puget Sound Region was consistently applied. For these routes, BERK collaborated with PSRC staff to leverage the availability of regional travel demand modeling software. PSRC maintains a regional travel demand model called SoundCast which estimates expected travel patterns and volumes from over 3,700 origin zones to destination zones within the region. The baseline model reflects conditions during an average weekday in 2018. Below we outline the three key steps used to estimate potential ridership demand.

### Travel-Time Competitiveness

We began by considering the total duration of a trip using the POF service compared to other transit modes serving the same corridor during peak commute period.<sup>1</sup> In many cases, the origin or destination is not the ferry landing itself, but rather a nearby transit stop or center. This makes for a fair comparison when transit centers are more centrally located to employment or activity destinations. The total trip durations for POF routes shown in Exhibit 2 are inclusive of sailing time, dwell time, and walk or transit times to the final destination.

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<sup>1</sup> This analysis averages the total trip time via transit during peak AM commute period and peak PM commute period, as estimated by Google Maps.

**Exhibit 2. Travel Times of Proposed POF vs. Competing Transit Service  
(West Seattle Water Taxi Included for Comparison)**

Route	Origin	Destination	Total Trip Duration (POF)	Total Trip Duration (Bus Transit)	Difference (POF-Bus)
Kenmore - Seattle (UW WAC)	Kenmore Park & Ride & NE Bothell Way	UW Station	46	47	-1
Kirkland - Seattle (UW WAC)	Kirkland Transit Center	UW Station	31	35	-3
Renton - Seattle (South Lake Union)	Park Dr NE & Garden Ave N	South Lake Union Streetcar & Terry Ave N	68	77	-9
Renton - Seattle (UW WAC)	Park Dr NE & Garden Ave N	UW Station	49	62	-13
Tacoma - Seattle (Downtown)	1501 Tacoma Ave S, Tacoma, WA	3 <sup>rd</sup> and Union	82	78	4
<b>Comparison Route:</b> West Seattle to Pier 50	SW Seattle St & California Ave SW	Pioneer Square Station	34	34	0

The West Seattle Water Taxi is included in Exhibit 2 for comparison. It is a good example of an existing POF service that successfully draws ridership despite the availability of bus transit alternatives. Our travel time estimates indicate it takes about 34 minutes for somebody traveling between SW Seattle St & California Ave SW in West Seattle to Pioneer Square Station near Downtown if they use the Water Taxi, about the same amount of time it would take using the fastest Metro bus service option. Most of the proposed POF services offer some time savings compared to the fastest bus or rail transit alternative. The one exception is Tacoma to Seattle, which is a few minutes slower than competing transit service during typical rush-hour traffic conditions. Additionally, when evaluating travel-time competitiveness we consider how POF service has potential to provide more predictable and consistent travel times compared to travel on roadways subject to traffic. These findings are considered in Step 3 when we estimate the percentage of travelers who would potentially select the new POF service.

### Total Travel Demand

As noted above, PSRC's SoundCast travel demand model estimates the number of person-trips taken between individual origin and destination zones across the Central Puget Sound Region. To estimate total demand for travel we define market areas or geographic zones where residents could reasonably choose ferry service as part of their daily commute to or from Seattle. The methodology for determining the boundaries of these areas included three steps described below. A series of maps showing the assumed origin and destination market areas for each proposed ferry route is included at the end of this

appendix.

1. **Define destination market areas.** We first identified employment or activity centers that could potentially be destinations for commuters who use the new ferry service. These are typically defined as 20-minute walksheds from the ferry landing. However, some destination market areas assume the rider transfer to transit for the final leg of their trip after disembarking.<sup>2</sup>
2. **Compare travel time competitiveness.** We compared travel time for commuters via POF and currently available bus/rail transit options. This included the examples in Exhibit 2 as well as other potential origins where POF may be a competitive option for travel to destination market areas.
3. **Define origin areas.** The travel time competitiveness analysis enabled us to identify the approximate boundaries for origin market areas in which some residents may reasonably select the POF as part of their commute option. These areas typically assume an up to 20-minute drive from home to landing, clipping out areas where POF would not be a competitive option.

Next, PSRC staff used SoundCast output to sum the total travel demand (including all modes) between origin areas on one end of the ferry route and destination areas at the other end.

### Market Capture Rate Assumptions

Next, we estimated the potential POF capture rate for each route. This is the percentage of total current travel demand that we assume would select ferry service. To determine a baseline assumption, we calculated the West Seattle Water Taxi capture rate by comparing actual ridership data to the modeled travel demand from SoundCast for the year 2018. This work required defining origin and destination market capture areas using the same method as used for the proposed routes. The capture rate for this route was **6.4%**.

Next, we applied this same baseline market capture rate assumption to the proposed POF routes, with the percentage adjusted upward or downward based on time competitiveness with travel via bus or rail. Proposed POF routes that offer time savings to commuters got boost in capture rate. Those that provide a slower option received a lower capture rate assumption.

One additional assumption was required to account for a key difference between the West Seattle Water Taxi and the five proposed routes. The West Seattle Water Taxi provides 12 roundtrips daily between approximately 6:00am and 7:00pm. This analysis assumes the proposed POF routes only provide six daily round trips during commute periods. Our analysis found that 25% of West Seattle Water Taxi trips occur outside of peak commuting periods. So, to account for this difference, we scaled down our assumed market capture for proposed routes by 25%. The results of this analysis are shown in Exhibit 3.

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<sup>2</sup> It is notable that downtown Bothell (including nearby UW Bothell campus) is identified as a potential destination for travelers from Seattle. This reflects the availability of frequent transit service between the landing in Kenmore and Bothell, as well as the potential demand for bi-direction travel between the two UW campuses.

### Exhibit 3. Ridership Demand Estimates for Central Puget Sound Routes

Proposed Route	SoundCast average daily total travel demand (2018) <sup>3</sup>	Assumed market capture rate	Assumed % of ridership during commute hours	Daily Ridership Demand Estimate
Kenmore - Seattle (UW WAC)	10,488	6.5%	75%	510
Kirkland - Seattle (UW WAC)	11,888	6.9%	75%	620
Renton - Seattle (South Lake Union)	3,406	7.2%	75%	180
Renton - Seattle (UW WAC)	2,504	8.1%	75%	150
Tacoma - Seattle (Downtown) <sup>4</sup>	9,283	6.1%	75%	420

Source: PSRC, 2020; BERK, 2020.

Note that these are potential daily ridership demand estimates based on current (2018) travel patterns, as modeled in SoundCast. Other POF services in the Puget Sound area have shown gradual increase in ridership over the first few years as travelers learn about the service and adapt their commute habits to its availability. This can create new “induced demand” for POF travel that is not reflected in a 2018 model run of SoundCast, and can result in increased ridership demand as the service matures.<sup>5</sup> Additionally, some of the proposed routes include significant opportunity for new residential and commercial growth within the landing walkshed—or have already experienced growth since 2018. These changes could have significant impacts on potential travel demand, particularly if new residents or businesses make location choices based on the anticipated availability of POF service.

### Comparison to Previous Studies

Ridership demand potential for two of the proposed routes to Seattle (Kenmore and Tacoma) have been analyzed by BERK in recent studies. While those prior studies share a similar methodology, there are some key differences that help explain why the estimates vary. Here we briefly compare this study’s

<sup>3</sup> PSRC provided travel demand in one direction only. This analysis assumes each of those trips is one half of a round trip. Therefore we multiplied the one-direction travel demand estimates by two to get total daily travel demand in both directions.

<sup>4</sup> Note, the total average daily travel demand for Tacoma is revised upward from the raw output from SoundCast. In a 2018 study for Pierce Transit, BERK analyzed ridership statistics for routes 590, 594, and 595, all of which provide direct express service from stops in Tacoma to Downtown Seattle, with no stops in between. We also analyzed boardings at Sounder stations in the market area. Sounder does make some intermediate stops on the way to King Street Station in Seattle, however none of those stops serve employment centers and most riders disembark in Seattle. When we compared the combined northbound ridership on these routes (2,780) to the transit ridership estimated in SoundCast (1,286) we found a significant discrepancy. This prompted us to revise the SoundCast demand estimates to reflect actual conditions.

<sup>5</sup> While SoundCast does simulate household travel behavior, there are forms of induced travel demand that the model is not able to anticipate. For example, tourists or locals may decide to take POF trips purely for the recreational appeal rather than as a replacement for a trip they would otherwise make by another mode. Also, because the analysis was performed using the 2018 base year, the longer-term impacts of new ferry service, which could include land use and household location changes and their subsequent impacts on trip making, were not evaluated.

estimates to those published previously. We also describe differences between the studies that can explain the variance in results.

*Tacoma - Seattle (Downtown)*

In 2018, BERK analyzed ridership potential for POF service between three different landing locations in Tacoma with Downtown Seattle. This was a more detailed study that examined variables such as sensitivity to fare levels as well as weekend and recreational ridership potential. However, the estimates for total daily ridership in 2020 during the weekday commute period came out to 439. This is quite close to the 420 we estimate for 2018 in this study. The differences may be explained by the fact that SoundCast has been updated to reflect results of PSRC’s 2018 Household Travel Survey, whereas the previous version was based on 2014 travel survey responses. In the previous study we also projected ridership demand in Tacoma to reflect expected growth as of 2020. This study estimates ridership demand for 2018.

*Kenmore - Seattle (UW WAC)*

In early 2020, BERK completed a study of ridership potential for POF service between Lakepointe in Kenmore to the UW WAC. Exhibit 4 compares the average daily ridership estimates for 2019 and 2025 developed in the previous study to the 2018 ridership demand estimates developed in this study. The differences and similarities can be explained by the different orientation of the two studies.

The January 2020 study conducted for King County Marine Division focused on ridership forecasting and understanding how ridership was expected to ramp up over time as the new service becomes more established. Therefore, we evaluated how the market capture rate can increase over time by looking at historic ridership data for the West Seattle Water Taxi. The results of that study reflect the assumption that ridership during the baseline year is somewhat lower than total potential demand, given the time it takes for potential riders to learn about the service and adapt their own commute and travel habits.

In contrast, this PSRC study estimated potential ridership demand for the baseline year without forecasting or considering how ridership is expected to ramp up over time. Therefore, we did not discount the market capture rate during the baseline year. This explains why the baseline 2019 ridership estimate in the previous study is so much lower than the 2018 ridership demand estimate developed for this study. It also explains why this study’s 2018 ridership estimate is so close to the 2025 estimate found in the previous study. This is because the previous study assumed the POF would be firmly established by its fifth year of service and develop a market capture rate similar to that which is found today on the West Seattle Water Taxi.

**Exhibit 4. Comparison of Ridership Demand Estimates to Previous Study**  
**(Average Daily Ridership - AM and PM Commute periods only)**

	This study	King County Waterborne Transit Study (2020)	
	2018 ridership	2019 ridership	2025 ridership
Kenmore - Seattle (UW WAC)	510	294	511

## ANALYSIS OF OTHER PROPOSED ROUTES

This section presents the potential ridership demand methodology and findings for the two proposed POF routes that have landings outside of the four-county Central Puget Sound Region. For these routes we could not rely on SoundCast model outputs for estimating total demand for travel between market areas. Instead we relied primarily on ridership data from nearby Washington State Ferry (WSF) routes to estimate total current demand for travel. Then we utilized other sources of data to estimate the share of that total demand for travel that may be captured by the POF service. The methodology is described separately for each route.

### Bellingham to Friday Harbor

Friday Harbor is currently served by a WSF route from Anacortes as well as several other modes, as shown in Exhibit 5. The proposed POF service from Bellingham would provide an additional option for travel between the mainland and Friday Harbor. While this route has potential to induce new demand for travel, looking at existing passenger-only ridership on ferries and flights to/from Friday Harbor is the best available measure of total existing demand for travel. For this study we focus specifically on the WSF route from Anacortes as the most comparable service with which the Bellingham route would compete. The other services appear to primarily focus on different traveler market segments.

**Exhibit 5. Travel Options to/from Friday Harbor with Peak Season Average Daily Ridership**

Option	Off-Island Origin/Destination	Average Daily Ridership	Notes
Washington State Ferry	Anacortes	930 (foot passengers only)	Foot passenger ridership varies considerably, peaking around 1,500 per day in July down to ~350 in April or October.
Victoria Clipper	Seattle	Capacity for 200	Only about ~60 riders disembark per day, and most return instead of staying overnight.
Cruise ships (combined)	Various	100-150	Peak season (likely mid-summer)
Kenmore Air	Seattle and Kenmore	100-150	Peak season (likely mid-summer)
San Juan Airlines	Bellingham and Anacortes	20-40	Peak season (likely mid-summer)
Private charter flights	Various	50	

Source: Washington State Ferries Traffic Statistics Riders Segment Reports (October 2018 through April 2018); San Juan Islands Visitor Study (Confluence Research and Consulting, 2018)

### Terminal Accessibility and Travel-Time Competitiveness

Unlike the commute-oriented services in the Seattle area, this service would be expected to draw significant recreational and vacation ridership from persons living across Washington State and much

further afield. The 2018 San Juan Island Visitor Survey includes a breakdown of visitors to the San Juan Islands by home location, shown below in Exhibit 6. While the survey does not estimate the proportion of ridership that are San Juan Island residents, we anticipate a much smaller share of those riders would travel without a personal vehicle due to the shortage of transit options in Anacortes or activities near the terminal.

The survey findings indicate many of the travelers bound for Friday Harbor come via the Seattle region, either because they live there, they are driving through from other western states, or because they are vacationers who arrive there by plane. Assuming the traveler drives a personal vehicle to park at the ferry landing, total travel time between Seattle and Friday Harbor via Bellingham (inclusive of driving and ferry ride) is almost identical to travel via WSF service from Anacortes. The main difference is the higher frequency of service available from Anacortes (7-8 roundtrips per day) compared to the proposed Bellingham service (4).

Travelers from the Seattle area that are not using a personal vehicle would have better options accessing the proposed ferry service in Bellingham, as the landing is located right next to an Amtrak station that also receives direct inter-city bus service via Greyhound. Transit options between the Seattle area and the Anacortes Ferry terminal are more limited. A private shuttle service runs between Sea-Tac Airport and Anacortes Ferry terminal (with transfer in Mount Vernon). Making the trip with public transit requires additional transfers and is relatively inconvenient.

The proposed Bellingham route would provide more convenient service to Friday Harbor for residents of Whatcom County and British Columbia, whether they arrive by car or transit. Bellingham is also served by direct flights from several cities across the western U.S., while the Anacortes airport has much more limited local service. This results in the potential for Bellingham capturing some out-of-state vacationers if a convenient airport shuttle were available.

### *Travel Demand and Market Capture Assumptions*

Exhibit 6 shows assumed average daily travel demand to/from Friday Harbor by home location. The calculations are based the 2018 San Juan Island Visitor Survey as well as average daily foot-passenger ridership on the WSF ferry from Anacortes to Friday Harbor (930 riders). Capture rate assumptions for each home location are based on our assessment of the relative accessibility of each terminal, frequency of service, and length of boat trip. These capture rate assumptions are used to develop ridership demand estimates for Bellingham.

**Exhibit 6. Daily Travel Demand (April to October) to/from Friday Harbor by Home Location**

Home Location	% of Total Visitors in SJI Survey	Assumed Average Daily Travel Demand	Assumed Market Capture Rate (Bellingham POF)	Ridership Demand Estimate (Bellingham POF)
Western Washington	40%	373	20%	75
Eastern Washington	4%	39	10%	4
Other Western States	27%	252	15%	38
Remainder of U.S.	22%	205	10%	20
Canada	3%	22	95%	21
International (other than Canada)	4%	39	10%	4
Total		930		~160

Sources: Washington State Ferries Traffic Statistics Riders Segment Reports (2018); San Juan Islands Visitor Study (Confluence Research and Consulting, 2018); BERK, 2020.

## Clinton to Everett

The proposed route between Clinton and Everett required a different methodology for estimating ridership demand. While Friday Harbor is well established as a walkable destination for recreational travel, Clinton offers far less activity for a visitor arriving on foot. In the reverse direction, the Everett waterfront is developing as a regional destination. Yet it too lacks the walkability or density of attractions to draw a significant number of visitors on foot. Therefore, we evaluated this route primarily for its potential to support commuter travel.

To begin, we analyzed home and workplace data from Census OnTheMap<sup>6</sup> to calculate the number of people who live within a 30-minute drive of either landing and work within a 20-minute walk of the opposite landing. This resulted in a total of 3 persons. We also collected data about expected development on the Everett waterfront to account for job and housing growth in the walkshed during the next few years. This growth is expected to nearly triple the number of jobs in the walkshed. However, tripling the number of people who currently make that commute results in only 9 persons.

Like the Bellingham to Friday Harbor route, there is an existing WSF service connecting Clinton to the mainland in Mukilteo, about eight miles to the south of the proposed terminal in Everett. Therefore, WSF foot passenger ridership statistics for the Clinton-Mukilteo route provide one potential indicator of total demand. There were about 1,400 average daily foot passengers between Clinton and Mukilteo in July 2019. However, many of these passengers are assumed to board the Sounder heading south towards

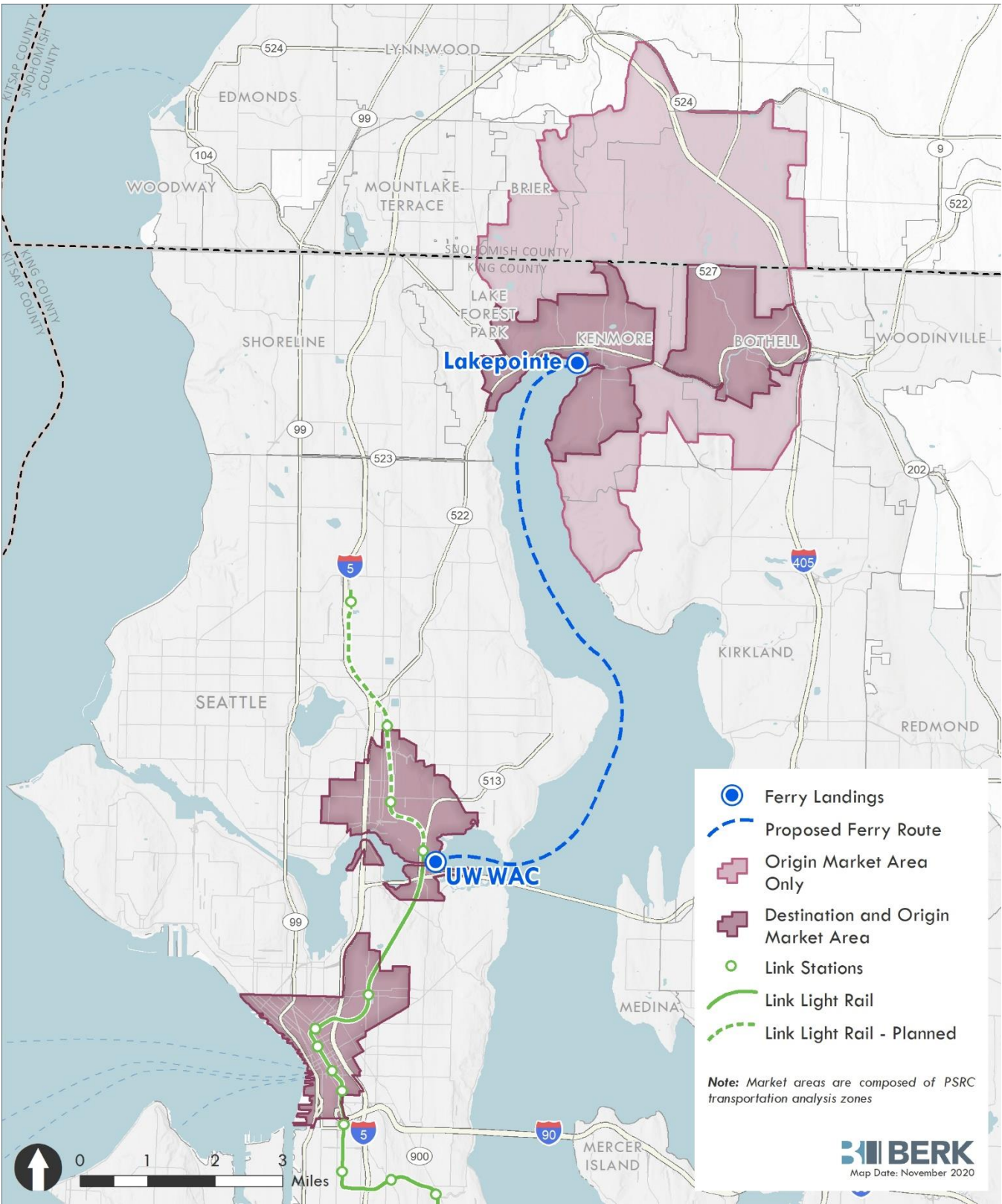
<sup>6</sup> Source: U.S. Census Bureau, Center for Economic Studies. <https://onthemap.ces.census.gov/>

jobs in Seattle or bus transit service heading to other employment centers. So, to better understand the number of people who may be headed north to Everett, we reached out to Everett Transit to obtain passenger data for the bus route (#18) that picks up at the ferry landing and heads directly to employment locations in and near downtown Everett. The average daily AM boardings at the ferry landing is 27 one-way passengers.

Based on these findings we estimate the average daily ridership demand (both directions) to be about 80. This includes modest expectations for roundtrip recreational travel by visitors to the Everett waterfront.

# MARKET AREA MAPS FOR PROPOSED ROUTES IN THE CENTRAL PUGET SOUND REGION

Exhibit 7. Kenmore (Lakepointe) to Seattle (UW WAC) Assumed Market Areas



**Exhibit 8. Kirkland to Seattle (UW WAC) Assumed Market Areas**

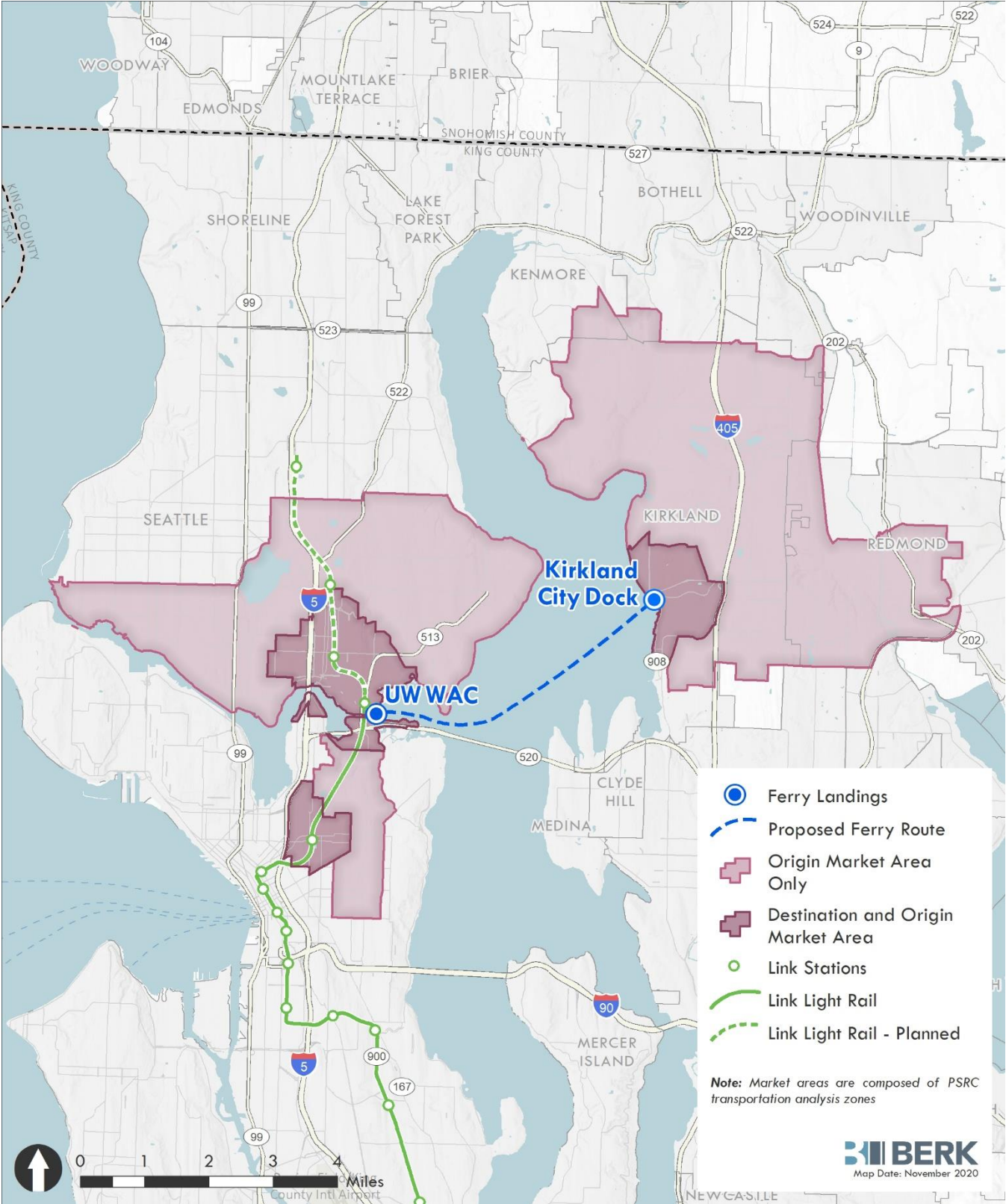


Exhibit 9. Renton to Seattle (South Lake Union) Assumed Market Areas

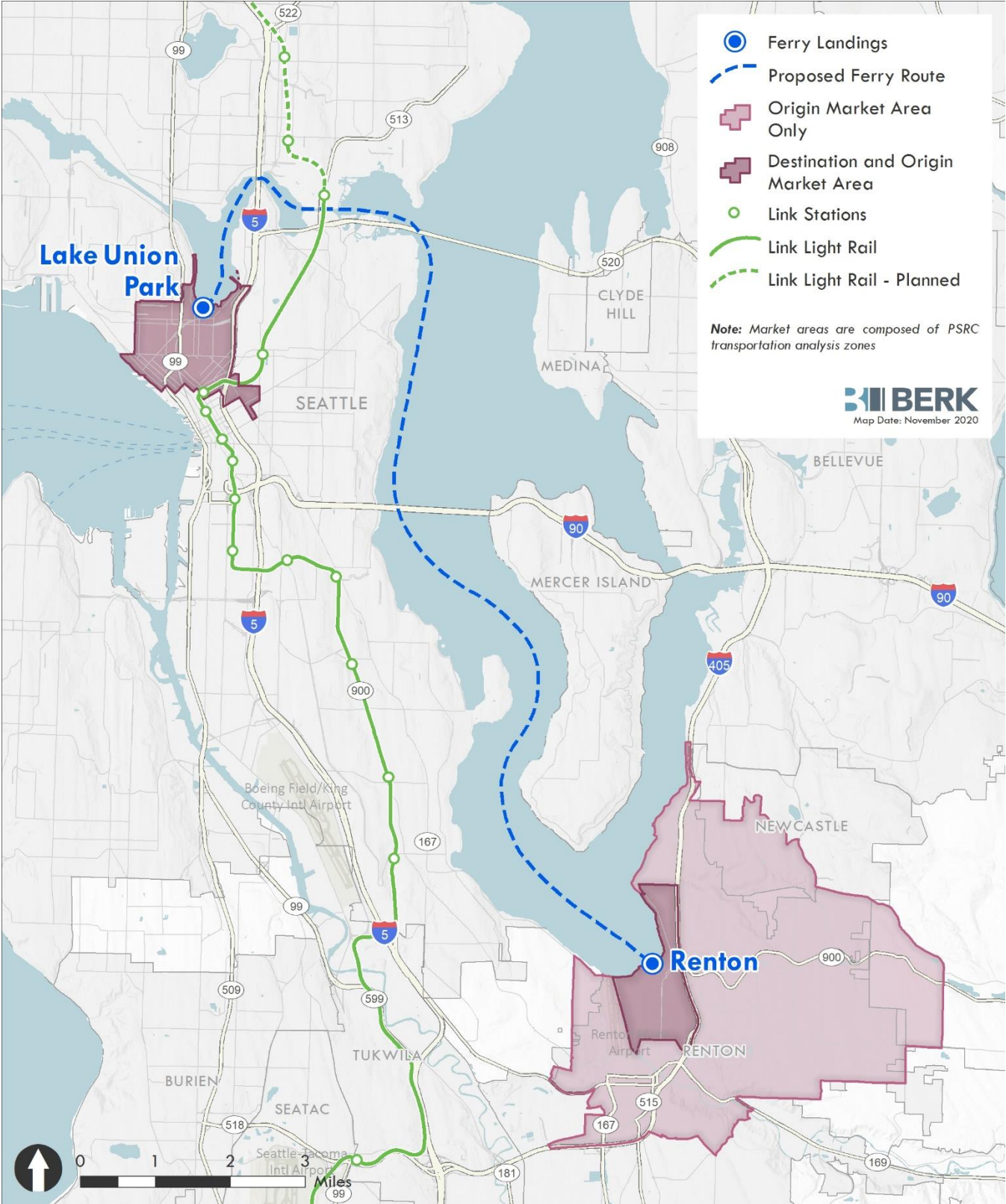
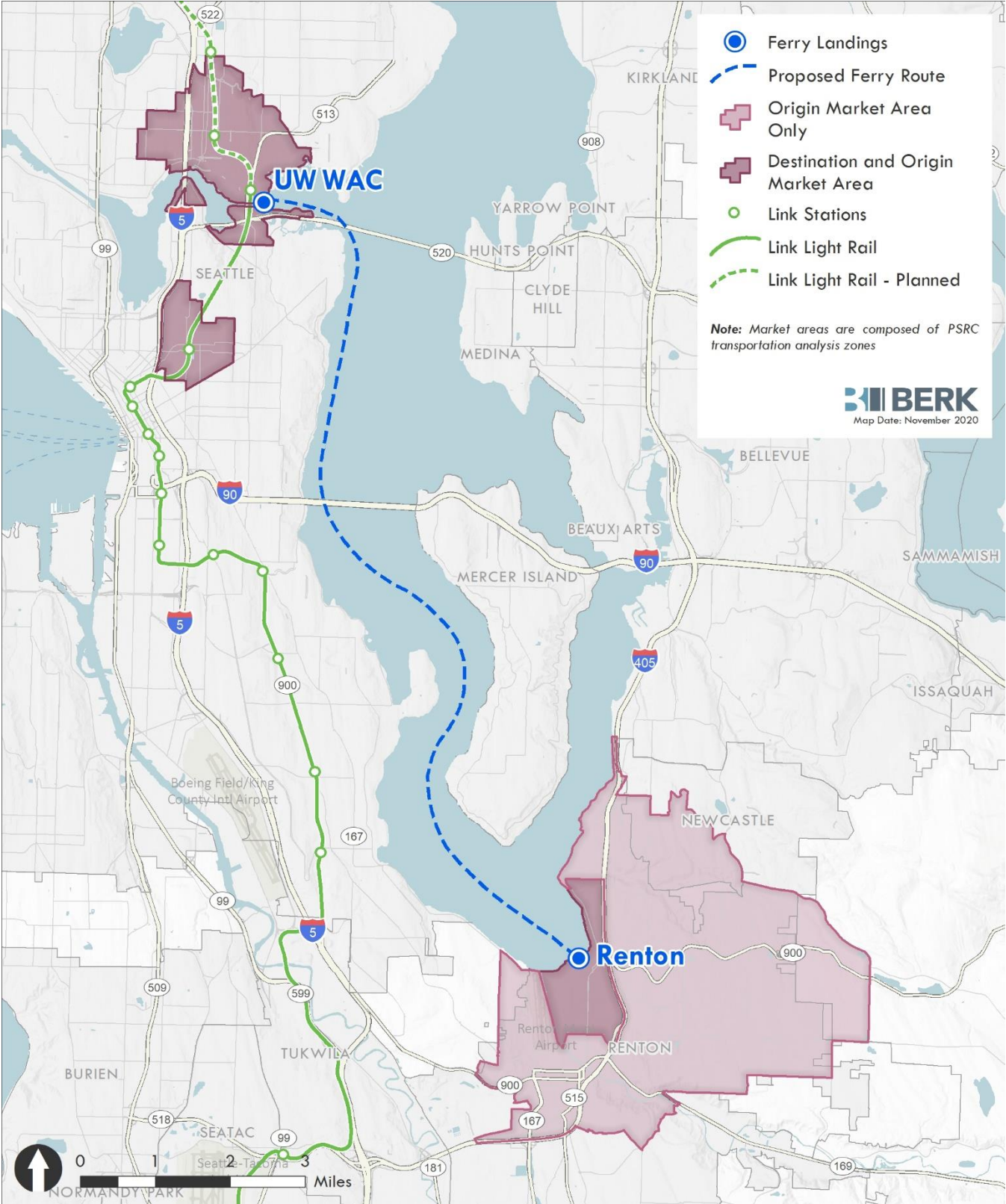


Exhibit 10. Renton to Seattle (UW WAC) Assumed Market Areas



**Exhibit 11. Tacoma to Seattle (Downtown) Assumed Market Areas**

