

Amtrak Cascades New Stop Evaluation - Auburn

**Final Report
September 2013**



**Washington State
Department of Transportation
Rail Division**

With technical support from: City of Auburn, Sound Transit and Amtrak

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Executive Summary



The Washington State Legislature directed the Washington State Department of Transportation (WSDOT) to study the feasibility of an Amtrak Cascades stop at Auburn, and to conduct a market analysis of adding or changing stops on the route. This opportunity comes at a challenging time for the program: while we are implementing \$800 million in capital projects that will greatly improve the service, we are also facing increasing operating costs that will strain our budget. It is against this backdrop that the New Stop Evaluation – Auburn study provides an analysis of a potential Auburn stop based on benefits and disadvantages for the service, corridor-wide. This approach is a first step toward establishing a transparent process for evaluating the many proposals for new stops. This technique will empower decision makers to consider how proposed changes to the service will affect the state’s goals to increase ridership and reduce costs.

The scope of work was a collaborative effort of the city of Auburn and WSDOT. The city of Auburn, Sound Transit and Amtrak provided guidance as members of the study technical team. This final report summarizes findings from the technical analyses completed as part of this effort.

Amtrak Cascades

Amtrak Cascades provides intercity passenger rail between Eugene, Oregon and Vancouver, British Columbia, also serving the major metropolitan areas of Seattle and Portland. It is sponsored by WSDOT, Oregon Department of Transportation and Amtrak. The Amtrak Cascades service is an important part of the state’s multi-modal transportation system: intercity passenger rail provides a vital alternative to travel on interstates and highways, and as an energy-efficient form of transportation with the lowest emissions for long-distance travel, the service is part of the state’s strategy for reducing vehicle miles traveled.

Opportunities and Challenges

WSDOT is currently expanding and improving the Amtrak Cascades service as part of the federally-funded High-Speed Intercity Passenger Rail program. Scheduled for completion in 2017, the improvements will reduce travel time between Seattle and Portland, improve on-time reliability, and add two additional daily round trips between Seattle and Portland for a total of six. These improvements will provide more convenience and better service for customers, and ridership gains are anticipated to occur as a result.

At the same time, state revenues are in decline and operation costs are increasing. Under the provisions of the Passenger Rail Investment and

The Legislature recognizes the funding challenges facing the intercity passenger rail program. The 2013-2015 Transportation Budget states: “In recognition of the increased costs the state is expected to absorb due to changes in federal law, the department is directed to analyze the Amtrak contract proposal and find cost saving alternatives.”

Improvement Act of 2008, which takes effect in October 2013, all short-distance Amtrak corridor services must become state supported routes. Washington and Oregon will absorb costs currently provided by Amtrak for the Cascades service, at significant additional annual subsidy.

In order for the state to endorse a service change and consider adding a stop, the change should further the state’s goals for increasing ridership and managing costs for the Amtrak Cascades program. We must demonstrate the change will not degrade the service – particularly, travel time reductions and reliability improvements to be produced by capital investments. WSDOT’s agreement with the Federal Railroad Administration commits us to reducing corridor travel time by 10 minutes; we cannot add time to the schedule.

Results – Adding a Stop at Auburn

Because this is a feasibility analysis, it is not the purpose of this study to provide a definitive “yes” or “no” to a new stop at Sound Transit’s Auburn Sounder Station. Rather, this effort establishes criteria to be used when considering a new stop and presents the findings based on data and analysis. Detailed findings are presented in Section 2 of this report.

**Baseline Scenario:
Funded Service in 2017**

Operational Feasibility	WSDOT’s capital program will improve current service by adding two round trips between Seattle and Portland, reducing travel time between Seattle and Portland by 10 minutes, and improving on-time performance to 88 percent in 2017. A Service Outcome Agreement has been signed with BNSF Railway for the improvements to reach these outcomes.
Customer Demand	WSDOT’s capital program is anticipated to produce significant ridership increases.
Station Suitability	Renovations to King Street Station in Seattle were recently completed, Tukwila station will have a permanent facility constructed, and the station in Tacoma will be relocated to the Freighthouse Square building at Tacoma Dome Station.
Inter-connectivity	The forecast indicates a system-wide increase to ridership and passenger miles traveled on the service 2012 numbers to the 2017 baseline. This corresponds with improvement to societal benefits: congestion relief, safety benefits, and environmental benefits.
Fiscal Viability	WSDOT’s federally funded capital program provides nearly \$800 million in federal funds to improve the service. There are also challenges: Changes in federal law are ending Amtrak’s subsidy for Amtrak Cascades in October 2013. The Washington Legislature recently cut the Cascades operating budget by \$1 million for the 13-15 biennium.

	Risk
	Does Not Meet Requirements
	Benefit
	Neutral Result
	Negative Result

	Scenario 1: Add Auburn to All Round Trips	Scenario 2: Tukwila: 4 Round Trips Auburn: 2 Round Trips
Operational Feasibility	 Does not meet requirements – Not compatible with service outcome agreement because new stop added schedule time between Seattle and Portland.	 A coordinated passenger train schedule is feasible and impacts to freight rail traffic are negligible.
Customer Demand	 No significant changes system-wide based on the analysis. Small changes in large through-markets, like Seattle to Portland, outweigh added ridership at Auburn.	 The “skip stop” provides fewer daily round trips at Tukwila and only two at Auburn. This is a lower level of service for customers, resulting in lower ridership
Station Suitability	 Risk: although the Sound Transit station already meets many of the needs for Amtrak Cascades, Sound Transit must approve use of the station and may require additional measures.	 Risk: although the Sound Transit station already meets many of the needs for Amtrak Cascades, Sound Transit must approve use of the station and may require additional measures.
Inter-connectivity	 Population near stations increased: within 10 minutes increased by 157,000 and within 30 minutes increased by 31,000.	 Improved access near Auburn is tempered by losses to ridership and societal benefits system wide.
Fiscal Viability	 No significant changes. Minor loss in revenue, minor decrease in benefit/cost ratio and farebox recovery.	 Lower ridership produces a loss in annual revenue. As a result, farebox recovery is lower and the required taxpayer subsidy would be greater.

Study Limitations and Remaining Questions

This initial feasibility study provides a valuable preliminary assessment of the viability of adding an Auburn stop to the Amtrak Cascades schedule, but it is not an exhaustive analysis. The following are a few of the remaining questions that could be considered in a subsequent study:

- **What is the effect of station parking on ridership?** The study assumes that parking is adequate at all existing stations and therefore does not evaluate parking differences at individual stations for potential effect on ridership. Future study could more closely examine the effects of parking by investigating the parking habits of existing Amtrak Cascades customers and assessing parking facilities based on performance measures.
- **How does roadway congestion affect the results?** Roadway congestion affects travel times in the Puget Sound region, particularly during commute hours. The designated catchment area

is not adjusted to account for heavy traffic volumes during peak travel periods. Future study could include sensitivity testing to examine in greater detail drive times to and from Amtrak Cascades stations and their effect on catchment area boundaries.

- **What would be required to secure approval from WSDOT's partners?** WSDOT must negotiate Amtrak Cascades changes with its partners in delivering the service: Oregon Department of Transportation, Amtrak, BNSF Railway, and Sound Transit. Additional work would be needed to identify and address the concerns of each of the partners.

Next Steps

This report marks the conclusion of the current feasibility study. The findings suggest potential next steps for developing corridor-wide policy for Amtrak Cascades as well as proceeding with additional investigation of adding an intercity passenger rail stop at Auburn.

Amtrak Cascades Policy

- New Stop Evaluation – Auburn study findings will be incorporated into the draft 2013 State Rail Plan.
- WSDOT will continue working on these criteria in cooperation with Oregon, British Columbia and other corridor partners to ensure a fair, objective process for considering requests for new stops. Together with ODOT, WSDOT will initiate a public process in late 2014 to formalize a new stop policy for the corridor after both states' rail plans are complete. In the meantime, the following interim policies will guide state action:
 - Washington and Oregon are working to manage their respective services together as a unified corridor. Both WSDOT and ODOT operating budgets are very constrained: the WSDOT operating budget for Amtrak Cascades was cut by \$1 million in 2013-2015. The agencies will work together to reduce station costs and implement other cost saving alternatives.
 - WSDOT and ODOT will evaluate proposals to add station stops based on benefits and disadvantages for the entire service. Evaluation criteria include: Consistent with State Rail Plan; Operational Feasibility; Customer Demand; Station Suitability; Interconnectivity Benefits; and Fiscal Viability.
 - The addition of a station stop should not degrade service or add uncompensated costs for WSDOT, ODOT, Sound

Transit, BNSF, UP, Amtrak or other partners in intercity passenger rail service.

- Rail planning budgets at WSDOT and ODOT are not sufficient to complete new stop studies without additional funds. Proponents should provide funding for new stop evaluation studies.
- Major service changes will not be implemented until after 2017 due to construction and service outcome agreement commitments.
- WSDOT should seek funding and resources needed to explore new operating models to increase ridership and manage costs. This analysis would investigate service changes such as:
 - Limited service, such as Seattle to Portland via Auburn, Tacoma and Olympia.
 - Eliminating stops or reducing service at marginal stops to gain travel time benefits for the corridor.

Further investigation of adding a stop at Auburn

- The city of Auburn should take the lead in developing a business plan (with support from WSDOT, Amtrak, Sound Transit, and other partners) that shows how losses would be avoided without additional cost to the state. The effort must include coordination with Sound Transit to identify any improvements or conditions that would be required for use of the facility for Amtrak Cascades. Analysis to determine BNSF's requirements for mitigation would be needed as part of any next steps.
- If a proposed Auburn station stop proves to be viable, WSDOT would need funding and staffing authorization for "pre-design" of station improvements and service. This level of analysis would be needed to develop an initial cost estimate and schedule for implementation. Additional funding for preliminary engineering, agreement negotiation and construction would be needed to implement the stop.

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Introduction

The Washington State Department of Transportation (WSDOT) has been directed by the legislature to conduct a study to examine the interconnectivity benefits of, and potential for, a future Amtrak Cascades stop in the vicinity of the city of Auburn along the Pacific Northwest Rail Corridor (PNWRC). The legislature also directed WSDOT to evaluate the new stop in the context of a corridor-wide market analysis. The scope of work was a collaborative effort of WSDOT and city of Auburn, and the city, Sound Transit and Amtrak provided guidance as members of the study technical team.

Operational Context

This assignment comes at a challenging time for the Amtrak Cascades service. WSDOT is delivering a nearly \$800 million, federally funded capital program to improve intercity passenger rail in the Pacific Northwest Rail Corridor. At the same time, state revenues are in decline and operational costs are increasing. Under the provisions of the Passenger Rail Investment and Improvement Act of 2008, which takes effect in October 2013, all short-distance Amtrak corridor services must become state supported routes. Washington and Oregon will absorb costs currently provided by Amtrak for the Cascades service, at significant additional annual subsidy.

In response to these challenges, WSDOT is pursuing numerous strategies to reduce costs and increase ridership. State policy guides this approach. Former Governor Gregoire’s Executive Order 11-04, Lean Transformation, directs state agencies to implement “Lean” methods and tools to create more value for customers with fewer resources.

In addition, WSDOT’s Moving Washington principles — operate efficiently, manage demand and add capacity strategically — provide a framework for making transparent, cost-effective decisions that keep people and goods moving and support a healthy economy, environment and communities. This guidance points to the need for WSDOT to “right-size” rail facilities and services to increase ridership and manage costs.



Station costs are an important part of this strategy. Amtrak Cascades currently stops at 18 stations between Vancouver, British Columbia (B.C.) and Eugene, Oregon (OR). Those stations are owned by a number of different entities and support passenger rail and other transportation services. The Amtrak Cascades program contributes either in part or in full to the cost of these stations: in Washington, these costs total \$4 million each year. WSDOT has identified station costs as an opportunity to reduce operating expenses.

What does this mean for evaluating the feasibility of adding an Amtrak Cascades stop at Sound Transit’s Auburn Sounder Station? In order for the state to endorse the change, the addition of the stop cannot interfere with service outcome agreements that commit to travel time reductions and reliability improvements to be produced by capital investments and should not degrade the service.

What is Amtrak Cascades?

The PNWRC is one of 11 rail corridors designated by the U.S. Department of Transportation for high-speed intercity passenger rail service. The service has been an increasingly strong component of the Pacific Northwest’s intermodal transportation system since the Amtrak Cascades’ inaugural run in 1994. In its 18 years of operation, the service has increased the number of daily round trips to four between Portland and Seattle; extended its geographic reach from Eugene, OR to Vancouver, B.C.; and grown the annual ridership from 180,209 in 1994 to 836,000 in 2012.

In the Pacific Northwest, Amtrak Cascades provides a unique service. Amtrak Cascades is distinct from other rail service, including commuter rail, such as Sounder in the Everett-Seattle-Lakewood area; and Amtrak Cascades is distinct from Amtrak’s long-distance services, such as the Coast Starlight and Empire Builder.

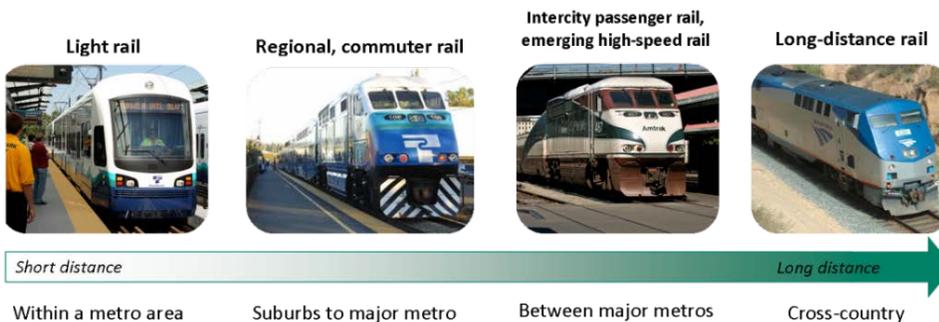
The Amtrak Cascades service is an important part of the state’s multi-modal transportation system. Intercity passenger rail provides a vital alternative to travel on interstates and highways, and as an energy-efficient form of transportation with the lowest emissions for long-



The Amtrak Cascades Corridor

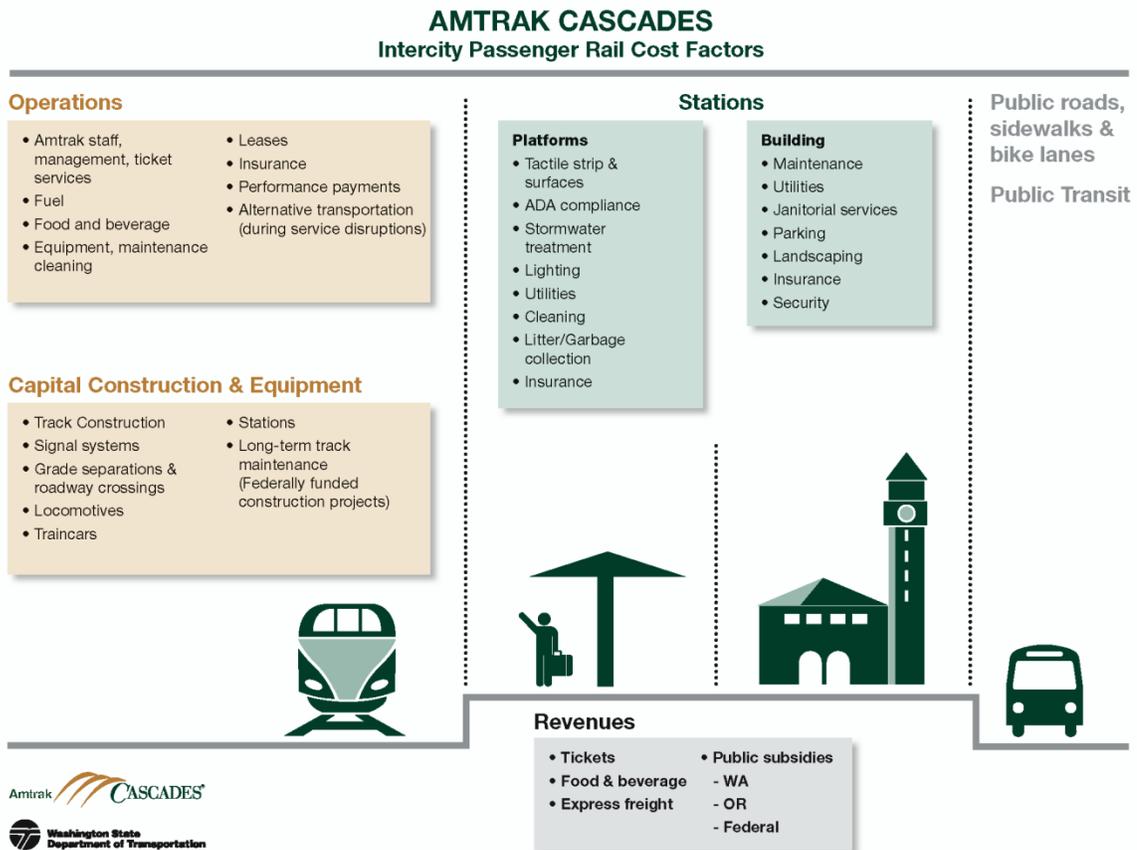
Choosing the right tool for the right job:

Which is the *right* type of passenger rail to serve your transportation needs?



distance travel, the service is part of the state’s strategy for reducing vehicle miles traveled.

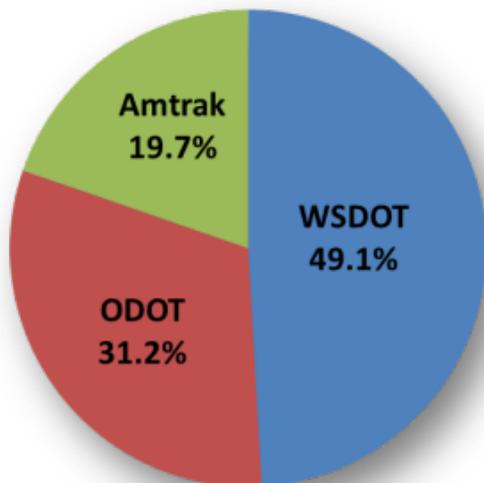
The Amtrak Cascades program requires functional partnerships from public and private entities including Washington, Oregon, British Columbia, Amtrak, two railroads, international customs and border control agencies, and a train manufacturer. These partnerships are managed through constant collaboration, service contracts and agreements. Other partnerships have equally important but less formal roles, such as Sound Transit, which shares infrastructure and provides complementary services with Sounder commuter rail, Link light rail, and bus service.



Amtrak Cascades ticket revenues support approximately 64 percent of operating costs. The remaining costs are provided through public subsidy. In 2008, Congress passed the Passenger Rail Investment and Improvement Act (PRIIA). The law makes significant changes to intercity passenger rail service and the role of states in providing that service. As a result, states will take on significant additional costs starting in October 2013. In the Pacific Northwest, that means that the states’ share of subsidies for Amtrak Cascades service will increase significantly starting October 1, 2013. The states will also be responsible for additional equipment and facilities costs.

Implementation of PRIIA means a greater financial burden on the states, but it also allows the states more flexibility in providing the service. The Oregon Department of Transportation (ODOT) and WSDOT will continue to contract with Amtrak. The states will have more control over operational decisions, business practices, costs and revenues. ODOT and WSDOT have worked, and will continue to work, closely with Amtrak and other high-speed rail corridor states to explore the implications of these changes and develop approaches to manage them.

Cost Sharing for 2011-2013 (Operating Costs) Based on Subsidy



Business Plan and Market Analysis

The legislature directed WSDOT to consider how the addition of a new stop fits into a broader strategy for increasing ridership and reducing costs for the Amtrak Cascades service based on a market analysis. The market analysis examines the Amtrak Cascades “product” and intercity travel “industry” to inform business decisions. Key questions addressed in this analysis include:

- What are the goals, requirements and constraints for the service?
- What needs must be addressed to increase ridership and/or reduce costs?
- What approaches are likely to address those needs to increase ridership or reduce costs in the future?
- How would adding, changing or removing stops address the needs and fit into those strategies?

Feasibility Study Approach

To effectively assess the proposal for a new stop, the study began by evaluating anticipated conditions in 2017, and then assessed changes likely to result from adding a stop at the Auburn Sounder Station. So, what will service look like in 2017? With High-Speed Intercity Passenger Rail Program improvements operationally complete, the following changes to service between Seattle and Portland will be in effect:

- **More frequency:** Amtrak Cascades stations in the Seattle to Portland corridor are each served by six daily round trips, an increase of two round trips.
- **Faster travel:** Total travel time is 3 hours and 20 minutes between Seattle and Portland, a 10-minute reduction.
- **Higher reliability:** 88 percent on-time performance, an increase of eight percent over the current minimum target.
- **Station improvements:** Permanent facility at Tukwila, upgraded facility at new location in Tacoma. Station improvements also include recent and upcoming improvements at King Street Station in Seattle.

Permanent Tukwila Sounder Station
Anticipated opening in 2014



www.soundtransit.org/x6844.xml

The New Stop Evaluation – Auburn study considers two scenarios for adding a stop at Sound Transit’s Auburn Sounder Station. The two Auburn scenarios were evaluated for changes relative to the baseline scenario. In order for Amtrak Cascades to operate at the Auburn Sounder Station, it would be necessary to coordinate with Sound Transit to secure any necessary approvals and agreements from the agency’s Board of Directors.

Scenarios

Baseline Scenario – Funded Service in 2017:

When capital improvements are completed in 2017, existing stations on the Seattle to Portland segment (including Tukwila) will be served 12 times daily, for six total round trips.

Scenario 1:

Add the Auburn Sounder Station to all round trips, in addition to the existing stops at Tukwila. Amtrak Cascades would stop at each station 12 times daily, for six total round trips.

Scenario 2:

Alternate stops between Tukwila and Auburn. This is also known as the “skip-stop” scenario. Amtrak Cascades service at Tukwila would be reduced to four round trips. Auburn would be served with two round trips.

These scenarios were tested on five evaluation criteria based on legislative direction, and were developed by WSDOT and the city of Auburn in the early phases of the study when the scope of work was established.

Evaluation Criteria

Operational Feasibility	Assess the effect of a stop at Auburn on travel time and reliability.
Customer Demand	Assess potential market demand for a stop at Auburn.
Station Suitability	Assess the strengths and challenges of Sound Transit’s Auburn Sounder Station as an Amtrak Cascades stop.
Interconnectivity Benefits	Assess the benefits of an Auburn stop compared to baseline conditions.
Fiscal Viability	Based on anticipated costs and revenues, is the effect of the new station positive, neutral or negative?

Study Limitations and Remaining Questions

This initial feasibility study provides a valuable preliminary assessment of the viability of adding an Auburn stop to the Amtrak Cascades schedule, but is not an exhaustive analysis. The following are a few of the remaining questions that could be considered in a subsequent analysis:

- **What is the effect of station parking on ridership?** The study assumes that parking is adequate at all existing stations and therefore does not evaluate parking differences at individual stations for potential effect on ridership. Future study could more closely examine the effects of parking by investigating the parking habits of existing Amtrak Cascades customers and accessing parking facilities based on performance measures.
- **How does roadway congestion affect the results?** Roadway congestion affects travel times in the Puget Sound region, particularly during commute hours. The designated catchment area is not adjusted to account for heavy traffic volumes during peak travel periods. Future study could include sensitivity testing to examine in greater detail drive times to and from Amtrak Cascades stations and their effect on catchment area boundaries.
- **What would be required to secure approval from WSDOT’s partners?** WSDOT must negotiate Amtrak Cascades changes with its partners in delivering the service: Oregon Department of Transportation, Amtrak, BNSF Railway, and Sound Transit. Additional work would be needed to identify and address the concerns of each of the partners.

New Stop Policy

The New Stop Evaluation – Auburn study establishes a methodology and process for considering potential new stops on the Amtrak Cascades corridor and represents a first step towards establishing a transparent, fair process for communities to follow. The findings will be incorporated as a draft into the 2013 State Rail Plan to encourage review and discussion. WSDOT will continue working in cooperation with Oregon, British Columbia and other corridor partners. We plan to initiate a public process in the next year to solicit input on this approach before formalizing an agency policy.

Report Outline

- Section 1: System-Wide Market Analysis
- Section 2: Feasibility of Adding a Stop for Amtrak Cascades at Sound Transit's Auburn Sounder Station
- Section 3: New Stop Policy
- Section 4: Conclusions

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Section 1. System-Wide Market Analysis

What is a market analysis?

A market analysis is a planning tool that evaluates a product and investigates industry characteristics and trends to inform business decisions. For the Amtrak Cascades, the market analysis defines the service as a “product,” explains how it compares to other travel choices, and describes how customers access the service. An important part of the analysis is a look at the intercity travel market: How much demand is there for intercity travel? Who is traveling? What influences a traveler’s choice of travel mode? The market analysis also looks at costs as a way to identify improvement strategies.

Why is WSDOT doing a market analysis?

The legislature directed the Washington State Department of Transportation (WSDOT) to perform the feasibility analysis for a station stop at Sound Transit’s Auburn Sounder Station in the context of a market analysis of the entire corridor. That means WSDOT must consider how adding a stop fits in with the state’s goals for the Amtrak Cascades service and how it would affect efforts to increase ridership and passenger miles, and manage costs. The market analysis documents those efforts and establishes a foundation for assessing the impacts of adding a potential Auburn stop.



Table 1-2 Elements of the Market Analysis

Product	What is Amtrak Cascades as a business product? What are the other products in the market, and how do customers choose between modes?
Distribution Channels¹	What are the various aspects related to distribution of Amtrak Cascades? What role do stations have in distribution?
Market Characteristics	What is the current market size of Amtrak Cascades, and can it be improved? What can market segmentation tell us about improving the service? What trends in the intercity travel market affect the future of Amtrak Cascades?
Industry Cost Structures	What are the important measures of fiscal viability? What can Amtrak Cascades do to improve its fiscal viability related to adding or changing stops?

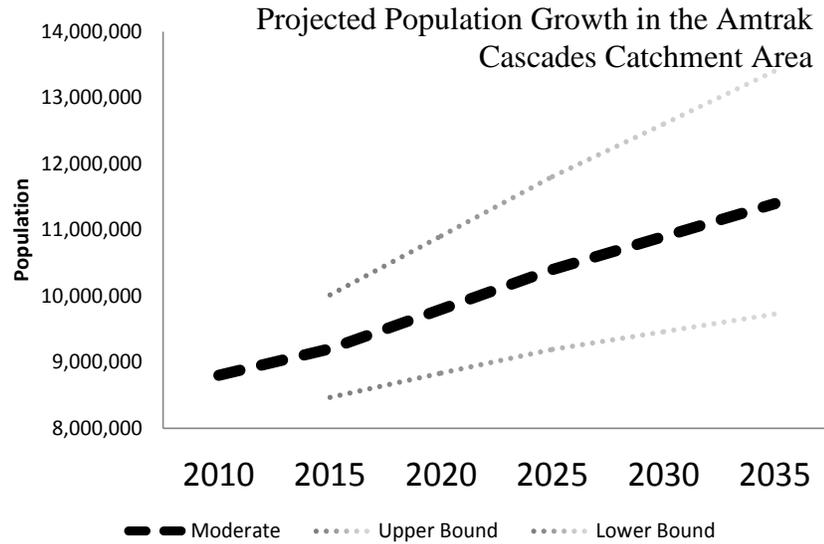
“SWOT” analysis is an investigation of **Strengths**, **Weaknesses**, **Opportunities** and **Threats**. A SWOT analysis can be carried out for a product, place, industry or person. It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieving that objective. The analysis helps identify opportunities to improve the product and market position relative to comparable options.

	Helpful	Harmful
Internal Origin (attributes of the service)	Strengths	Weaknesses
	<ul style="list-style-type: none"> • Comfortable ride. • Good value. • Easy access. • Northwest pride/Northwest experience. • Unique experience. • Public support. • “Green” travel option. 	<ul style="list-style-type: none"> • Substantial fixed cost is a constraint. • Lack of “last mile” connectivity, especially at destination. • Limited frequencies. • Increasing costs. • Inconsistent on-time performance reduces repeats and referrals.
External Origin (attributes of the environment)	Opportunities	Threats
	<ul style="list-style-type: none"> • Increasing traffic congestion. • Long waits for airport security. • Growing public interest in multi-modal travel. • High-Speed Intercity Passenger Rail capital program is making improvements. • Preclearance at the Canadian border allows in-transit customs. • Increasing fuel prices makes rail a more attractive mode. 	<ul style="list-style-type: none"> • Viable auto travel on I-5. • Bus options are low-cost and visible. • Lack of control over performance. • Washingtonians relatively unfamiliar with rail travel. • Reliability problems result in bad press. • Public concern about public investment in rail. • Competing public interests can lead to service constraints that harm ridership and fiscal viability.

¹ “For the purposes of the market analysis, “distribution” refers to strategies for connecting a given product to its customers.

Catchment Area Analysis/Drive-Time Population

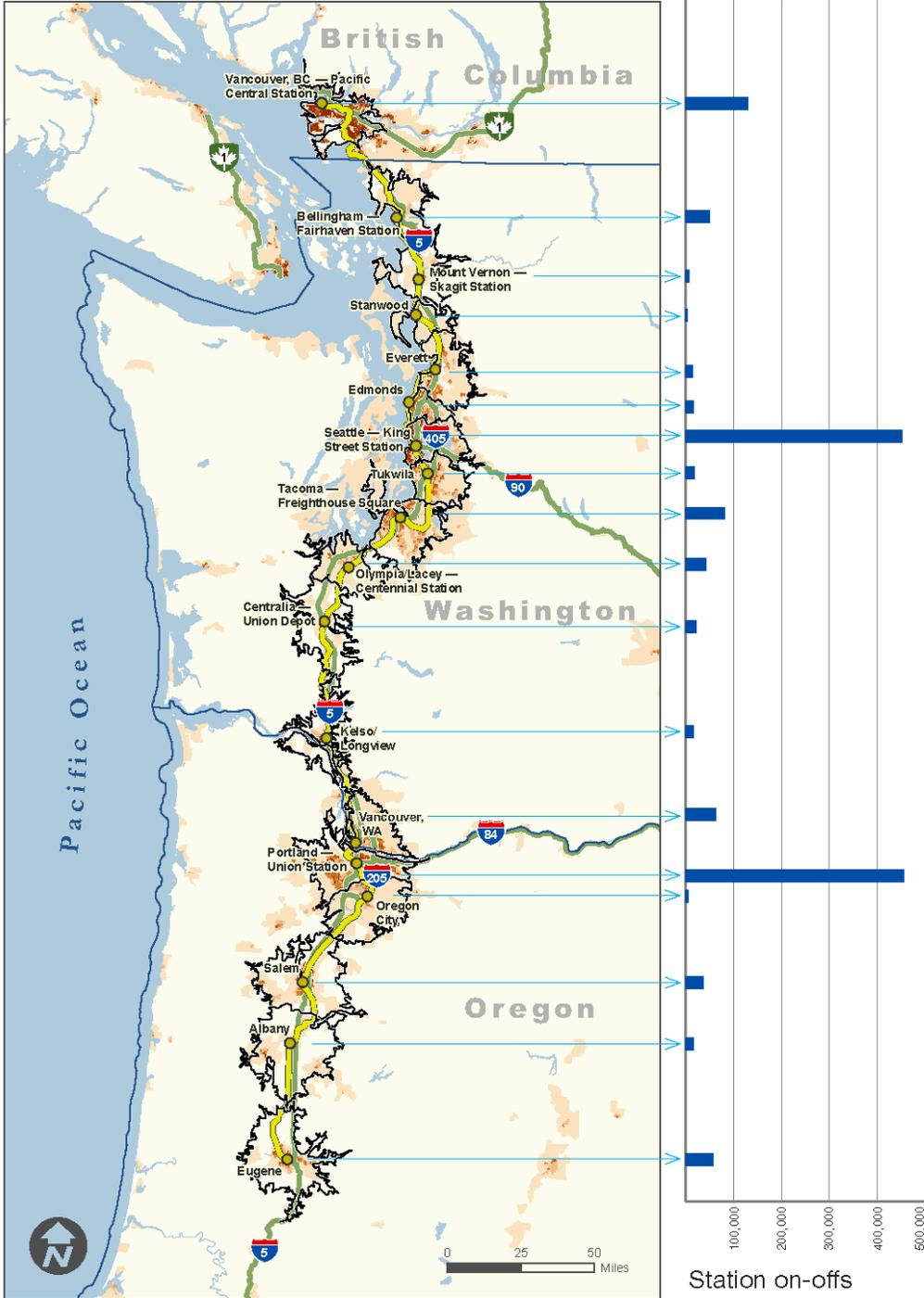
The “market” for Amtrak Cascades is defined in part by population in geographic proximity to train stations. Catchment area generally refers to an area or population from which a service attracts its customers. This analysis is based on previous research suggesting that Amtrak Cascades riders typically originate their trip within a 30-minute drive of a station.



To identify catchment areas, WSDOT calculated population and employment within 5, 10, 20 and 30 minutes driving time of existing stations. State and provincial forecasts were applied to population figures to obtain projections through 2035.

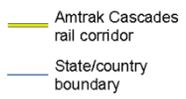
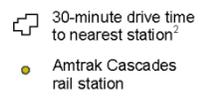
Based on 2010 census figures, our analysis suggests that the existing catchment area for Amtrak Cascades includes 8.7 million people in Washington, Oregon and British Columbia. Total catchment includes 4.3 million residents in Washington, or about two-thirds (64 percent) of the 6.7 million total statewide. In Oregon, the catchment area includes 2.4 million residents, or about two-thirds (63 percent) of the 3.5 million total statewide.

While no mathematical correlation has been established for Amtrak Cascades, there is a clear relationship between population density near a station and ridership at that station, as shown in the following graphic.



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Existing stops and 2010/2011 population density



¹ Population density derived from 2010 US Census and 2011 Statistics Canada

² Rail station drive times were calculated using ESRI StreetMap North America 2012 data with standard impedances.

Station on-offs
2012 Ridership by station based on the number of passengers who got on or off the train.

Market Analysis Key Findings

Findings	Implications for Service Planning
<p>State policy directs WSDOT to improve Amtrak Cascades through an incremental approach, and budget actions have supported this type of improvement. WSDOT has been very successful with this approach and has seen substantial ridership gains over time. Experience tells us that reliability (i.e. on-time performance), travel schedule flexibility and travel time improvements are important to attract and to maintain all travelers, including business travelers.</p>	<p>Reliability (i.e. on-time performance), travel schedule flexibility and travel time improvements have proven to be the most important determinants of ridership on Amtrak Cascades, and have been the most influential strategy for increasing ridership and revenue.</p>
<p>Catchment area analysis shows that existing stations provide good access to population and employment centers along the I-5 corridor. Nearly 8.8 million people live within a 30-minute drive of an Amtrak Cascades stop. That includes 2/3 of the total population of Washington State. There is a relationship between catchment area population/employment and the number of riders using a station.</p>	<p>Population/employment density and total catchment area population are indicators of station ridership. It is logical to focus efforts to increase ridership on areas where total population and population density are greatest.</p> <p>Operational changes, such as “skip stops” or “limited stop” schedules, may provide opportunities to extend service areas without increasing travel time. Alternatively, these operational changes may provide faster service between major markets if stations are not added.</p>
<p>Interconnectivity with other transportation hubs and local transportation networks is a strategic need for facilitating travel from trip origin to trip destination. Well-developed transit systems, and safe, convenient pedestrian and bicycle access, are beneficial for meeting connectivity needs of travelers.</p>	<p>Strategies to improve multi-modal connectivity at stations can improve convenience for customers and can help attract riders.</p>
<p>WSDOT has no data available to assess the impact of station attributes (such as parking) on ability to attract riders. An analysis of the existing system suggests that population is a much more important predictor of ridership than availability of parking or other station amenities.</p>	<p>Changes in service should be established based on a data-driven approach. Known factors are maximized to increase ridership, with costs minimized where possible.</p>

Other findings:

- Major changes in ridership correspond with major events, such as added round trips, improved travel time and record fuel prices.
- Changes at the end of the travel season are usually reflected in subsequent years (e.g. ridership increase from an added round trip in September 1999 between Seattle and Bellingham was reflected in 2000).
- There is a general growth trend with natural year-to-year variation in ridership (increase and decrease).
- Recent station additions have not proven to be major drivers of ridership increases. The three stations added since 1995 had a combined ridership of 41,000 in 2012. For comparison, Amtrak Cascades had 830,000 total riders, meaning added stations comprised of less than 5 percent of total ridership. Ridership at Tukwila was 27,000 – roughly two-thirds of the ridership at added stations.

The market analysis described above suggests an emphasis on the following strategies for increasing ridership and managing costs:

- Increase daily round trips between destinations.
- Reduce travel time between destinations.
- Improve on-time performance.
- Target areas with high population density and high total population.
- Address “last mile connectivity” by strengthening multi-modal connections at destination.
- Focus efforts to minimize operating costs where possible, including at stations.

How does adding a stop fit with these strategies?

- Adding or changing a stop should be done in the context of its system-wide effects. Costs should be weighed against changes to revenue and benefits.
- Underperforming stops should be evaluated for their contribution to the system.



Amtrak Cascades Timeline and Ridership Growth

Opportunities and Challenges for Adding New Stations

Opportunities	Challenges
<ul style="list-style-type: none"> • Potential for increased ridership from added catchment or improved access. Increased ridership generally translates into higher passenger miles traveled and higher revenue. • Potential for increased connectivity when strategically located with transportation networks. 	<ul style="list-style-type: none"> • Potential loss of ridership at adjacent stations due to overlapping service areas. • Potential loss of ridership at other locations due to increased travel time between city pairs that pass through the station. • Potential for reduced reliability due to complications at the station. Every stop along to corridor introduces schedule risk. Adding station stops increases that risk. • Once a station is established, there is an expectation that the station will remain at that location — even when it does not meet performance goals. • Risk of capital costs to accommodate Amtrak Cascades trains and customers. Consistent with standard benefit-cost methodology, these costs should be accounted over 20 years. • Risk of capital costs to mitigate impacts to freight traffic. These costs should be accounted over 20 years. • Potential for increased long-term station costs to maintain a presence at the stop. • Potential for increased train operational costs, such as fuel, maintenance, and wear and tear, for additional acceleration and braking required to perform station stops. • Stations placed in close proximity (generally less than 30 miles) spread the limited resources available for transit services.

Opportunities and Challenges for Removing an Existing Station

Opportunities	Challenges
<ul style="list-style-type: none"> • Potential increase of ridership at remaining, adjacent stations due to reducing the overlap of catchment areas. • Potential increase of ridership at other locations due to reduced travel time between city pairs that pass through the station. • Potential for increased reliability due to reduced complications at the station. Every stop along to corridor introduces schedule risk. Reducing station stops reduces the risk • Potential for reduced long-term station costs to maintain a presence at the stop. • Potential for reduced train operational costs, such as fuel, maintenance, and wear and tear, for reduced acceleration and braking required to perform station stops. • Stations placed in close proximity (generally less than 30 miles) spread the limited resources available for transit services. 	<ul style="list-style-type: none"> • Potential for reduced ridership and interconnectivity from reduced catchment or reduced access. Reduced ridership generally translates into lower passenger miles traveled and lower revenue. • Once a station is established, there is an expectation that the station will remain at that location — even when it does not meet performance goals. • Existing stations represent considerable public investment. Reduction or elimination of service at an existing station could be viewed as wasteful.

Opportunities and Challenges for Limited-Stop or Skip-Stop Service²

Opportunities	Challenges
<ul style="list-style-type: none"> • Potential for reduced train operational costs, such as fuel, maintenance, and wear and tear, for reduced acceleration and braking required to perform station stops. • Improved travel time for city pairs passing through a skipped station. Potential for increased ridership between city pairs passing through a skipped station. If realized, this tends to result in increased revenue. The increased revenue could tend to outpace the increase in ridership, as each rider could, on average, be anticipated to travel further, and therefore buy higher value tickets. • Potential for increased reliability due to reduced complications at the skipped stations. Examples include delayed connecting busses and passenger boarding complications. • Potential for increased revenue and passenger miles by reducing travel time and improving on-time performance. 	<ul style="list-style-type: none"> • Potential loss of ridership and interconnectivity at city pairs associated with any skipped stations. Potential for further reduction in interconnectivity when the effects of skipped stations are compounded. • Potential for reduced travel schedule options for travelers at skipped stations. • Potential for ridership losses, even with gains in revenue and passenger miles.

² For the purposes of this market analysis, “express service,” “limited stop” and “skip-stop” service are considered synonymous. Each refers to a scenario where one or more stations are skipped on one or more scheduled trains within the corridor.

Section 2. New Stop Feasibility, Auburn Sounder Station



The primary focus of the legislative proviso was for the Washington State Department of Transportation (WSDOT) to examine the interconnectivity benefits of, and potential for, a future Amtrak Cascades stop in Auburn. Based on criteria developed collaboratively by WSDOT and city of Auburn, the analysis provides an assessment of the comparative benefits and disadvantages of adding a stop at Sound Transit’s Auburn Sounder Station starting in 2017.

Guiding principles

- The 2017 funded service schedule will provide the baseline for this evaluation.
- WSDOT must fulfill its commitment to the Federal Railroad Administration (FRA) to add two daily round trips between Seattle and Portland (for a total of 6) and achieve 88 percent on-time performance and 10-minute travel time savings by 2017.
- Construction of more than 10 major capital improvements in the next four years will affect freight and passenger rail operations in the corridor. To avoid additional disruption, we do not anticipate service changes before capital program completion in 2017.
- Amtrak Cascades service must align with goals and requirements of the federal high-speed rail program. The FRA describes the goal of the program this way: “The Obama Administration and Congress provided \$10.1 billion through the American Recovery and Reinvestment Act of 2009 and annual appropriations to provide rail access to new communities and improve the reliability, speed and frequency of existing lines. This strategic investment will help ensure America is equipped to win the future with the fastest, safest, and most efficient transportation network in the world.”³ Washington received nearly \$800 million in federal funds for Amtrak Cascades improvements.
- Adding or changing stops has ripple effects across the entire system, therefore metrics are based on a corridor approach to evaluate the net change against the baseline.
- WSDOT has been directed to reduce operating costs for Amtrak Cascades.

³ Federal Railroad Administration. *High-Speed Intercity Passenger Rail Program, Federal Investment Highlights*. March 4, 2013. Available online: www.fra.dot.gov/eLib/Details/L02848. Accessed May 25, 2013.

Approach

The feasibility study begins by evaluating anticipated conditions in 2017 and then assesses changes likely to result from adding a stop at Sound Transit's Auburn Sounder Station. What will service look like in 2017? With High-Speed Intercity Passenger Rail Program (HSIPR) improvements operationally complete, the following changes to service between Seattle and Portland will be in effect:

- **More service:** Amtrak Cascades stations in the Seattle to Portland corridor are each served by six daily round trips.
- **Faster travel:** Total travel time is 3 hours and 20 minutes between Seattle and Portland, a 10-minute reduction.
- **Higher reliability:** 88 percent on-time performance, an increase of eight percent from the current minimum performance target.

We anticipate an increase in ridership due to these improvements in service.

HSIPR funds will also contribute to construction of a permanent station facility at Tukwila and an upgraded facility at new location in Tacoma.

Tukwila Sounder Station

Permanent Station

Sound Transit is constructing a permanent station at Tukwila that will be used by Sounder commuter trains and Amtrak Cascades intercity passenger rail. WSDOT is providing grant funds to share in the costs for constructing a new parking lot (with 40 designated stalls for Amtrak Cascades), station platforms, transit waiting areas, and the installation of a real-time passenger information system at nearby Sea-Tac International Airport. Sound Transit will begin construction on the station in 2013, and is expected to open the facility in late 2014. This new station is part of the baseline for the study, New Stop Evaluation – Auburn.



Sound Transit, *Architectural renderings of Tukwila Station*. December 13, 2001. Available online: www.soundtransit.org/Projects-and-Plans/Tukwila-Sounder-Station/Tukwila-Sounder-Station-document-archive.

1997 Amtrak Station Site Analysis: Evaluation of Potential Intercity Passenger Rail Sites between Seattle and Tacoma

Amtrak initiated a study in 1997 when a need/opportunity was identified to add a suburban stop between Seattle and Tacoma for Amtrak Cascades. Amtrak contracted with Wilber Smith Associates (WSA) to review six commuter rail sites between Seattle and Tacoma that, while proposed at the time, are now served by Sounder. Puyallup and Boeing Access Road were judged too close to existing Amtrak Cascades stops. That left Tukwila, Kent, Auburn and Sumner as potential sites. At the time, WSA noted significant interest from Auburn officials for an Amtrak Cascades stop in their city. WSA analyzed population and employment within a 15-minute drive time of each station, and concluded that Tukwila would serve the greatest population and employment base of the four locations. Combined with other factors, including proximity to I-5, I-405, Sea-Tac International Airport and South Center shopping center, WSA concluded that Tukwila would make the best choice for an intercity passenger rail stop between Seattle and Tacoma.

The New Stop Evaluation – Auburn study considers two scenarios for adding a stop at the Auburn Sounder Station. It is important to note that in order for Amtrak Cascades to operate at the Auburn Sounder Station, it would be necessary to coordinate with Sound Transit to secure any necessary approvals and agreements from the agency’s Board of Directors

The legislature directed WSDOT to study the feasibility of adding a stop at Auburn. At the request of city of Auburn, the stop was also evaluated separately as a “skip stop.” This second scenario assumes some trips stop at Tukwila and others at Auburn.

Scenarios

Baseline Scenario - Funded Service in 2017:

When capital improvements are completed in 2017, existing stations on the Seattle to Portland segment (including Tukwila) will be served with 12 trains daily, for six total round trips.

Scenario 1:

Add the Auburn Sounder Station to all round trips, in addition to the existing stops at Tukwila. Amtrak Cascades would stop at each station 12 times daily, for six total round trips.

Scenario 2:

Alternate stops between Tukwila and Auburn. This is also known as the “skip-stop” scenario. Amtrak Cascades service at Tukwila would be reduced to eight trains daily, or four round trips. Auburn would be served with four trains daily, or two round trips.

These scenarios were tested on five evaluation criteria based on legislative direction and developed jointly by WSDOT and city of Auburn during development of the scope of work.

Criteria	Key Questions	Methodology
Operational Feasibility	Are changes consistent with the Service Outcome Agreement? How do the changes affect other trains?	WSDOT contracted with KPFF and Mainline Management to provide operational expertise for the study.
Customer Demand	How many riders can be expected to use the new station? How will total ridership change for the corridor?	Modeling for customer demand was performed by Amtrak’s consultant, AECOM. AECOM has supplied Amtrak’s ridership forecasts for years and the model serves as the industry standard for analysis of Amtrak passenger services nationwide.
Station Suitability	What site changes would be needed to serve Amtrak Cascades safely and efficiently?	WSDOT contracted with KPFF to perform a feasibility analysis of the physical attributes of the Sound Transit station at Auburn for compatibility with the needs of Amtrak Cascades, based on the <i>Cascades Corridor Station Design Criteria</i> , Amtrak station criteria, and comparisons with the recently designed station in Tukwila.
Inter-Connectivity Benefits	In what ways would the new station improve multi-modal connectivity for passengers?	WSDOT contracted with KPFF to perform an analysis of the interconnectivity benefits of a station at Auburn. This analysis also includes a measure of societal benefits as calculated in the 2008 WSDOT document <i>Amtrak Cascades Mid-Range Plan</i> .
Fiscal Viability	Based on anticipated costs and revenues, is the effect of the new station positive, neutral or negative?	The analysis evaluated ridership and revenue benefits based on three metrics — net change to benefit-cost ratio, change in subsidy, and change in farebox recovery. All three metrics are based on a corridor approach that examines the net change resulting from each scenario against the baseline.

2.1 Operational Feasibility

Assess the effect of a stop at Auburn on travel time and reliability

The purpose of the operational feasibility analysis was to evaluate the effect of adding a stop at the Auburn Sounder Station on the Amtrak Cascades schedule and on other trains.

It is important to note that schedule changes are subject to approval and concurrence by WSDOT’s partners, including the Federal Railroad Administration (FRA), BNSF Railway (BNSF), Amtrak and Oregon Department of Transportation (ODOT). WSDOT also works closely with Sound Transit to develop passenger rail schedules for the Pacific Northwest Rail Corridor.

Methodology

Operational feasibility was evaluated using a demonstration schedule for all passenger rail service in the Seattle to Portland corridor. The baseline reflects funded service in 2017: six daily round trips, travel time reduced by ten minutes and 88 percent on-time performance.

The state’s mid- and long-range plans call for additional service improvements in the future, reducing travel time between Seattle and Portland to 2 hours, 30 minutes by 2023.

Results

Scenario	Result
Baseline Scenario: Existing and Funded Service	WSDOT’s capital program will improve current service by adding two round trips between Seattle and Portland, reducing travel time between Seattle and Portland by 10 minutes, and improving on-time performance to 88 percent in 2017, consistent with the Service Outcome Agreement signed with BNSF Railway.
Scenario 1: Add Auburn to All Round Trips	The addition of five minutes to the schedule exceeds the travel time reductions specified in the Service Outcome Agreement.
Scenario 2: Four Round Trips at Tukwila (reduced from six daily round trips in the baseline) Two Round Trips at Auburn	Substituting the stops avoids adding time to the schedule. Incorporating Auburn into the schedule in a “skip stop” scenario appears feasible within the Service Outcome Agreement.

BNSF has indicated that the effects of adding a stop at Auburn would have negligible effects to freight operations, given the planned improvements expected to be in place by the end of 2017.

Service Outcome Agreement

As a condition of providing WSDOT nearly \$800 million to improve Amtrak Cascades, the Federal Railroad Administration (FRA) required the state and its partners to commit to specific performance improvements. The *Service Outcome Agreement*, signed by WSDOT, BNSF and Amtrak, commits to three outcomes:

- 10-minute reduction in travel time.
- Two additional round trips between Seattle and Portland
- 88 percent on-time reliability.

These outcomes are a condition of the \$800 million grant program. When implemented, they will provide excellent benefits for the service. If the partners fail to deliver on these commitments, the FRA could require the state pay back the \$800 million.

2.2 Customer Demand

Assess potential market demand for a stop at Auburn

The purpose of this analysis was to anticipate the number of passengers that would use the new stop, and compare total corridor ridership with the new addition to baseline ridership expected with funded service in 2017. There were two parts to the analysis:

- 1) Catchment area analysis based on drive-time population.
- 2) Ridership estimates based on Amtrak/AECOM modeling.

Catchment Area Analysis

The “market” for Amtrak Cascades is defined in part by population in geographic proximity to train stations. Individuals who live within a 30-minute drive of a station are considered part of the “catchment area” for Amtrak Cascades, based on previous research and FRA guidance.

Amtrak Cascades catchment covers most of the population in both Washington and Oregon (based on 2010 Census): most dense population areas along the I-5 corridor are located within a 30-minute drive of a station served by Amtrak Cascades. Total catchment in Washington and Oregon includes:

- Access to 4.3 million residents in Washington, or approximately two-thirds (64 percent) of the 6.7 million residents in Washington.
- Access to 2.4 million residents in Oregon, or approximately two-thirds (63 percent) of the 3.8 million residents in Oregon.

WSDOT defined a 30-minute drive-time “catchment area” around the Auburn Sounder Station to estimate the effect on total Amtrak Cascades catchment. The map on the next page illustrates the results.

Amtrak Cascades Catchment Area: 30-Minute Drive Time



 Catchment area with existing Amtrak Cascades stops

 Additional catchment area with stop at Auburn Sounder Station

The “catchment area” for Amtrak Cascades includes areas within a 30-minute drive of existing stations (or less). The existing catchment area encompasses approximately 3 million jobs and 8.7 million residents.

The addition of the Auburn stop extends the existing catchment area to the east and southeast. The extended 30-minute drive time boundary incorporates an area with approximately 7,000 jobs and 31,000 residents.

Ridership Estimates

WSDOT contracted with Amtrak's sub-consultant AECOM to perform ridership and revenue forecasting. AECOM is the premier analysis company for intercity passenger rail forecasting. Amtrak, and by extension WSDOT and ODOT, have used their services and proprietary model for years to perform similar analysis of service changes. The model is used for long-range planning and near-term scenario testing.

Amtrak and AECOM are in the best position to conduct this analysis, given their nationwide experience with long-distance, high-speed and emerging high-speed rail service. This experience and expertise covers the Northeast Corridor, Pacific Surfliner, and all other Amtrak corridors throughout the U.S. The team is in the best position to make small changes in the model to reflect the service changes proposed under various scenarios. Detailed results are shown in Appendix A.

Results

- Scenario 1
 - Increase in total corridor ridership and decrease in total corridor revenue are negligible.
 - Tukwila ridership declines by 34 percent.
 - Ridership elsewhere on the corridor declines due to increased travel time.
 - It is estimated that approximately 22,000 riders would use the Auburn Sounder Station in 2017.
 - Combined, ridership at Tukwila and Auburn is 47,000, a 20 percent increase over Tukwila alone.
 - These findings suggest that the addition of the Auburn stop attracts riders currently using the Tukwila Station and adds new riders.
- Scenario 2
 - Decrease in corridor ridership is less than 1 percent.
 - The 0.86 percent decrease in corridor revenue results in a loss of \$400,000 annually.
 - Ridership at Tukwila declines by 49 percent.
 - It is estimated that approximately 9,000 riders would use the Auburn Sounder Station in 2017.
 - Combined, ridership at Tukwila and Auburn is 29,000, a 25 percent decline over Tukwila alone.
 - These findings suggest that reducing the number of round trips serving the stations reduces available capacity at each station and therefore results in a loss of ridership and revenue.

2.3 Station Suitability

Assess the strengths and challenges of the Sound Transit Station at Auburn as an Amtrak Cascades stop

Sound Transit designed and constructed its Auburn Sounder Station to provide access to its Sounder service and facilitate multi-modal connections. Sound Transit owns and operates the facility and is responsible for any decisions regarding the station. In order for Amtrak Cascades to operate at the Auburn Sounder Station, it would be necessary to coordinate with Sound Transit to secure any necessary approvals from the agency's Board of Directors.

In this feasibility analysis we evaluated existing conditions at the station and compared it to WSDOT station design guidelines to understand what capital improvements might be needed Amtrak Cascades were to operate at the station.



Methodology

Station design is part of the state's "Lean" approach to managing costs. Any capital improvements that might be recommended are only to ensure safe, effective Amtrak Cascades operations.

Sound Transit Auburn Station. Used with permission.

Results

Capital costs assessed as part of this analysis are for improvements that might be required to serve Amtrak Cascades at the station. The analysis revealed that these costs could include the following, organized from the highest to lowest probability of incurring the cost:

Improvement	Potential Cost Range	Probability
ADA upgrades	\$8,000 - \$25,000	High
Amtrak-specific signage	Up to \$90,000	High
Provisions for an Amtrak “Quik-Trak” ticket vending machine	\$61,000 - \$76,000	Medium
Amtrak-branded platform shelters	\$340,000 - \$720,000	Medium
Provide additional restrooms	\$330,000 - \$1,300,000	Low
Level boarding platforms	Up to \$12 million	Low

On-going station costs could include:

- Lighting needs
- Security needs
- Bus storage needs
- Shared space within parking garage facility (i.e. storage, utilities, information technology)
- Shared station amenities (i.e. bicycle racks, trash receptacles, drinking fountains, seating)

Findings

It appears that capital improvements associated with adding Amtrak Cascades service would be relatively low cost, but there are significant unknowns. Agreements with Sound Transit (the station owner), BNSF and others would be needed. There are a number of items that would require significant funding if constructed, but the risk that such improvements would be necessary is low to medium.

Station Suitability – City of Auburn Perspective

Provided by Joe Welsh, City of Auburn

History

Located roughly equidistant between Seattle and Tacoma and at the meeting point of the current BNSF rail line between Seattle and Portland and the Stampede Pass route to the east, Auburn has been an important passenger rail stop from the early 1900's until the 1980's, including 11 years under Amtrak.

The Auburn Passenger depot, which served the Seattle – Portland alignment, was located near the site of the current Sound Transit station. It closed in 1978. Passenger service to Chicago at the East Auburn Sounder Station ended in 1981.



Characteristics

Today Auburn has grown to a city of 72,000 and is still centrally located in what is now a densely populated area between Seattle and Tacoma. According to the U.S. Census, in 2010 over 560,000 people lived within 10 miles of the Auburn Sounder Station which is being studied as a potential Amtrak stop. The redevelopment of downtown Auburn is underway and the City of Planning and Development Department estimates that by 2017 800 new residents will live within 2 blocks of the Auburn Sounder station. The City anticipates at least 200 new residents within the next 18 months with the first redevelopment catalyst project underway. The catalyst four blocks located adjacent to the Auburn Sounder Station (to the east) are the beginning of the redevelopment efforts of the City. The City's goal is see continued urban redevelopment within our urban center.

At the Auburn Sounder Station campus, Green River Community College hosts classes while the main College campus has approximately 10,000 students within 2.5 miles east of the station, accessible by frequent transit service from the Sound Transit station.

Two major employers, the Multicare Auburn Medical Center (667 employees) and the City of Auburn (355 employees) are located within ¼ mile of the Auburn Sounder Station.

Most arrivals to downtown Auburn come typically by highway and the Auburn Sounder Station is well suited to access the region. The facility is adjacent to SR 18 (serving Federal Way, Covington, Maple Valley, Issaquah, and Snoqualmie) and has direct freeway access (via a ramp) to westbound SR 18. The station is located less than a quarter mile from SR 164 which serves the Muckleshoot Reservation and the Enumclaw Plateau, it is also one mile from SR 167 the Valley Freeway serving Kent, Renton, Sumner, and Puyallup.

Multimodal Transportation and Access

The Auburn Sounder Station is a major transit hub. Each weekday 495 bus trips operating on a total of eleven Metro, Sound Transit, and Pierce Transit routes visit the Auburn Station; approximately 2,500 bus riders board or alight at the station on a typical weekday. Many buses are timed to connect with Sound Transit commuter rail train arrivals and departures.

Direct bus service is available to and from destinations such as Green River Community College (via Metro Route 181 - 67 trips weekdays, 61 trips Saturday, 50 trips Sundays), Bellevue (via Sound Transit Route 566 – 60 trips weekdays), Federal Way and Puyallup (via Sound Transit Route 577/578 – 49 trips weekdays, 30 trips Saturday and Sunday), and Sea Tac Airport (via Metro Route 180 – 83 trips weekdays, 78 trips Saturdays, 72 trips Sundays). The connection from Auburn to Sea Tac Airport via the Route 180 operates every half hour weekdays, Saturday, and Sunday and does not require a transfer to reach the airport from Auburn

The close proximity of the station to local freeways (SR 18 and SR 167 and regional arterial SR 164) ensures more reliable bus access.

With its internal transit way and cross platform transfers to rail, the station is well suited as a future hub for intercity bus connections to Amtrak. Taxi service is also available at the station. Private shuttles such as those to Emerald Downs Raceway also call at the facility.

The station is best known as a commuter rail hub. Currently each weekday 18 Sounder trains call at the station and approximately 850 Sounder passengers use the station. Cross platform transfers are available to many Metro and Pierce Transit routes. Sound Transit also operates weekend special event trains via Auburn to the Seattle Mariners, Seattle Seahawks, and Seattle Sounders games.

Bike access to the station is best available via Main Street which connects the Station to the Interurban Trail to the west via a new sidewalk and bike lane improvements. To the east Main Street is marked with Sharrows as a shared bike lane facility and serves the largely residential area to the east. Downtown Auburn is a traditional square block patterned neighborhood with approximately 250 foot block length. The Auburn Sounder Station is largely surrounded by and connected to downtown and other areas by a completed pedestrian sidewalk system. It is possible to reach any point of the compass from the Auburn Sounder Station via this sidewalk system.

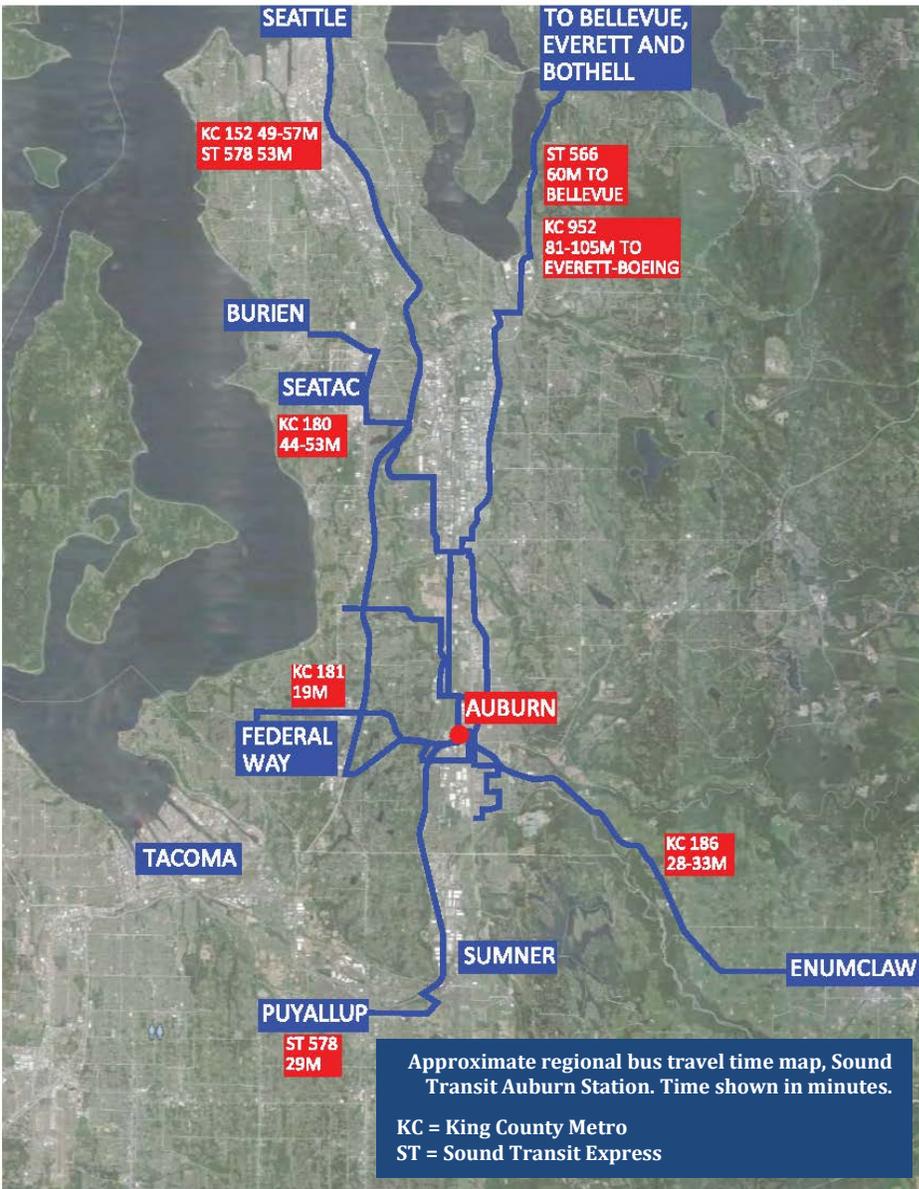
Parking

Immediately north of the Auburn Sounder Station, within 200 to 500 feet of the station, the City of Auburn has two municipal parking lots where a portion of the lot(s) could be dedicated to Amtrak riders. The city of Auburn has offered to provide parking for an Amtrak stop.

2.4 Interconnectivity Benefits

Assess the benefits of an Auburn stop compared to baseline conditions

The Legislature directed WSDOT to consider multi-modal connections and benefits in its evaluation of a potential Amtrak Cascades stop at the Auburn Sounder Station. This analysis includes documentation of non-motorized, transit and single-occupancy vehicle access to the station. The assessment also measures change in passenger miles traveled to assess corridor-wide interconnectivity benefits associated with adding the station.



Methodology

WSDOT contracted with KPFF to assess transportation network interconnectivity and societal benefits. An assessment of transportation network interconnectivity included documentation of routes near Sound Transit's Auburn Sounder Station, nearby attractions, and nearby transportation facilities such as transit centers and park and ride lots. Societal benefits were calculated according to methodology from WSDOT's 2008 Mid-Range Plan for congestion relief, safety improvement, and environmental benefit.

Results

Pedestrian access is accommodated well for the Auburn Downtown Area from Sound Transit's station in Auburn. The Super Mall is also reasonably accessible to pedestrians. Bicycle access at the station includes connecting buses with bicycle carrying capacity and close proximity to the Interurban Trail to the west with designated bike lanes on West Main Street connecting the Interurban Trail to the station.

Transit connections at the station include 18 Sounder trips daily and bus services provided by Sound Transit, King County Metro, and Pierce Transit. Passengers may access Amtrak Cascades and Amtrak Coast Starlight rail services via connections to Tacoma Station and King Street Station in Seattle. Amtrak Cascades is also accessible via Sound Transit's Tukwila Station.



Auburn has good highway access, notably to SR 18 and SR 167. Interstate access to I-5 is roughly five minutes away via SR 18, and I-90 near Snoqualmie is roughly 30 minutes away.

Societal benefits were calculated for congestion relief, safety improvement and environmental benefit. These values were calculated based on the net change resulting from each scenario. Due to lower passenger miles traveled in the AECOM forecasts, societal benefits for Amtrak Cascades were reduced in both scenarios.

Comparison of Interconnectivity Benefits

	Scenario 1: Add Auburn to All Round Trips		Scenario 2: Four Round Trips at Tukwila, Two Round Trips at Auburn	
	<i>Change Compared to Baseline</i>		<i>Change Compared to Baseline</i>	
	20 years	Annual	20 years	Annual
Congestion Relief	(\$6,268,000)	(\$313,400)	(\$37,682,000)	(\$1,884,100)
Safety Improvement	(\$124,000)	(\$6,200)	(\$747,000)	(\$37,350)
Environmental Benefit	(\$346,000)	(\$17,300)	(\$2,083,000)	(\$104,150)
Total	(\$6,738,000)	(\$336,900)	(\$40,512,000)	(\$2,025,600)

Findings

If added as a stop to Amtrak Cascades, Sound Transit’s Auburn Sounder Station provides improved access to a largely suburban area near SR 18 and SR 164. As a well-developed transit hub, the Sound Transit Station at Auburn provides good transit connections to nearby communities and to regional destinations such as Seattle, Bellevue and Sea Tac Airport.

Societal benefits are decreased for both scenarios, with a significant decrease for Scenario 2.

In terms of interconnectivity, a reduction in service at Tukwila (determined by customer demand) suggests a significant reduction to interconnectivity at Tukwila for both scenarios. A net ridership loss system-wide for Scenario 2 suggests any interconnectivity benefits at Auburn for that scenario are tempered by reduced interconnectivity elsewhere.

2.5 Fiscal Viability

Based on anticipated costs and revenues, is the effect of the new station positive, neutral or negative?

The fiscal viability element of the analysis evaluates ridership and revenue benefits relative to costs, including station upgrade capital costs, station operating costs, and service operating costs. Adding or changing access points has ripple effects across the entire system. For this reason, all metrics are based on a corridor approach: we evaluated the net change resulting from each scenario against the baseline.

Methodology

The effects of adding or changing stops extend beyond location(s) being considered for stop changes, and have ripple effects through the entire system. Three metrics were evaluated against the baseline to measure improvement (or downgrade) in benefit/cost ratio (B/C), annual subsidy and farebox recovery.

Capital costs were estimated for pre-construction, construction and mitigation. Due to the unknown nature of many variables, a risk-based approach was used to quantify costs. Following standard WSDOT practice, the 60th percentile cost was used to represent all capital costs combined, and then capital costs were distributed over a 20-year period.

Results

Two scenarios were analyzed for this study. Scenario 1 adds Auburn to all stops on the corridor. Scenario 2 adds Auburn to new trains only, effectively alternating trains between Auburn and Tukwila in a “skip-stop” fashion. The following two tables summarize each scenario according to the values in the spreadsheet and associated assumptions.

Scenario 1 Summary

Element	Finding
Change in B/C Ratio (must be positive)	Small Reduction –\$6.7 million in societal benefits lost over 20 years. Corridor benefit-cost is reduced.
Change in Annual Subsidy (should be negative)	Small Change – Addition to average annual subsidy of \$100,000 per year.
Change in Farebox Recovery (should be positive)	Minor Change – Decrease in average farebox recovery of 0.1 percent.
Conclusions	Result is negative, but relatively small. Benefit-cost ratio for the scenario is zero. Annual subsidy increases by \$100,000 per year.

Scenario 2 Summary

Element	Finding
Change in B/C Ratio (must be positive)	Reduction - \$40.5 million in societal benefits lost over 20 years. Corridor benefit-cost is reduced.
Change in Annual Subsidy (should be negative)	Addition to average annual subsidy of \$540,000 per year.
Change in Farebox Recovery (should be positive)	Decrease in average farebox recovery of 0.6 percent.
Conclusions	Result is negative. Benefit-cost ratio is zero, and Farebox Recovery is reduced. Annual subsidy increases by \$540,000 per year.

Findings

- Scenario 1
 - Risk: If this scenario were evaluated for funding, it would fail to meet the requirements for a project benefit/cost ratio of greater than 1. Some costs are not quantified.
 - Benefit/cost ratio and farebox recovery are relatively unchanged.
 - A projected \$30,000 net annual loss in ticket revenue in 2017 (resulting from reduced passenger miles and revenues corridor-wide) is further compounded by increased cost to the state under PRIIA, which results in increased state subsidies and lowered farebox recovery.
 - Reduced service at Tukwila reduces the value of investments by WSDOT and the FRA at Sound Transit's Tukwila Sounder Station.
- Scenario 2
 - Risk: If this scenario were evaluated for funding, it would fail to meet the requirements for a project benefit/cost ratio of greater than 1. Some costs are not quantified.
 - A projected \$400,000 net annual loss in ticket revenue in 2017 is further compounded by increased cost to the state, which results in increased state subsidies and lowered farebox recovery.
 - The combination of reduced revenues, increased costs, and reduced societal benefits results in a lower benefit/cost ratio for the entire service.
 - Reduced service at Tukwila reduces the value of investments by WSDOT and the FRA at Sound Transit's Tukwila Sounder Station.

2.6 Assessment

It is not the purpose of the New Stop Evaluation – Auburn study to provide a definitive “yes” or “no” to adding a station stop at Auburn. Rather, the study is intended to develop criteria and provide data that can inform future decision making. Detailed results of the analysis are provided in separate technical reports. Key findings are highlighted in the tables below.

Scorecard for Baseline Scenario – Existing and Funded Service

Evaluation	Description
Operational Feasibility	WSDOT’s capital program will improve current service by adding two round trips between Seattle and Portland, reducing travel time between Seattle and Portland by 10 minutes, and improving on-time performance to 88 percent in 2017. A Service Outcome Agreement has been signed with BNSF Railway for the improvements to reach these outcomes.
Customer Demand	WSDOT’s capital program is anticipated to produce significant ridership increases.
Station Suitability	Renovations to King Street Station in Seattle were recently completed, Tukwila station will have a permanent facility constructed, and the station in Tacoma will be relocated to the Freighthouse Square building at Tacoma Dome Station.
Inter-connectivity	The forecast indicates a system-wide increase to ridership and passenger miles. This corresponds with improvement in societal benefits: congestion relief, safety benefits, and environmental benefits.
Fiscal Viability	WSDOT’s federally funded capital program provides nearly \$800 million in federal funds to improve the service. There are also challenges: Changes in federal law are ending Amtrak’s subsidy for Amtrak Cascades in October 2013. The Washington Legislature recently cut the Cascades operating budget by \$1 million for the 13-15 biennium.

Scorecard for Scenario 1 – Add Auburn to All Round Trips in 2017

Evaluation	Results	Description
Operational Feasibility		Does not meet requirements – Not compatible with service outcome agreement because new stop added schedule time between Seattle and Portland.
		- Added schedule time to accommodate a stop at Auburn
		- Adding Auburn to a coordinated passenger train schedule appears feasible.
		- Analysis by BNSF indicates that adding a stop at Auburn provides a negligible effect to freight operations.
Customer Demand		No significant change system wide.
		- Ridership increases found from adding Auburn are offset by losses elsewhere.
		- Risk: Adding an additional stop in close proximity to Tukwila and Tacoma may not be consistent with federal requirements or expectations for Intercity Passenger Rail (contrast with commuter service).
Station Suitability		Risk: although Sound Transit’s Auburn Sound Station meets many of the needs for Amtrak Cascades, Sound Transit must approve use of the station and may require additional measures.
		- Risk: FRA level boarding requirements are relatively untested. If approval of variance from level boarding for freight operations is rejected, then additional capital costs would be incurred.
		- Risk: Use of the Auburn Sounder Station must be coordinated with Sound Transit and approved by the agency’s Board of Directors.
		- The existing Sound Transit Station at Auburn appears to meet needs for Amtrak Cascades with minimal capital costs.
		- Additional capital and operating expenses for Amtrak Cascades are anticipated for adding service at Auburn.

	Risk
	Does Not Meet Requirements
	Benefit
	Neutral Result
	Negative Result

Inter-Connectivity		Population near stations increased: within 10 minutes increased by 157,000, and within 30 minutes increased by 31,000.
		- Auburn is centrally located for residents along SR 18 and the mid-Green River Valley. Several communities have issued letters of support for an Amtrak Cascades stop in Auburn.
		- Transit connections at Auburn are moderately developed for serving nearby communities.
		- City of Auburn has indicated the feasibility of accommodating overnight parking for Amtrak Cascades customers at nearby city lots.
		- Societal benefits are relatively unchanged.
		- Forecast reductions in ridership at Tukwila lessen the value of interconnectivity at that station, which is balanced by the gains at Auburn.
		- The increased benefits of interconnectivity are served to largely low density population centers. The two largest cities, Kent and Federal Way, are already served by Amtrak Cascades at the Tacoma Dome Station and the Tukwila Sounder Station in the 2017 baseline.
Fiscal Viability		No significant changes. Minor loss in revenue, minor decrease in benefit/cost ratio and farebox recovery.
		- Risk: If this scenario were evaluated for funding by standard WSDOT procedures, it would fail to meet the requirements for a project benefit/cost ratio of greater than 1.
		- Benefit/cost ratio and farebox recovery are relatively unchanged relative to baseline service.
		- A projected \$30,000 net annual loss in ticket revenue in 2017 is further compounded by increased cost to the state under PRIIA, which results in increased state subsidies and lowered farebox recovery.
		- Forecasted reductions in ridership at Tukwila would reduce the value of investments by WSDOT and the FRA at Sound Transit's Tukwila Station.

Scorecard for Scenario 2, “Skip-Stop” – Four Round Trips at Tukwila, Two Round Trips at Auburn

Evaluation	Results	Description
Operational Feasibility		A coordinated passenger train schedule is feasible and impacts to freight rail traffic are negligible.
		- Adding Auburn to a coordinated passenger train schedule appears feasible.
		- Analysis by BNSF indicates that adding a stop at Auburn provides a negligible effect to freight operations.
Customer Demand		The “skip stop” provides fewer daily round trips at Tukwila and adds two at Auburn. This is a lower level of frequency for customers at these stops, resulting in lower ridership.
		- Due to lowering service at Tukwila and only adding two round trips at Auburn, annual ridership is anticipated to drop by nearly 10,000 per year in 2017.
		- Risk: Adding an additional stop in close proximity to Tukwila and Tacoma may not be consistent with federal requirements or expectations for Intercity Passenger Rail (contrast with commuter service).
Station Suitability		Risk: although the Sound Transit station already meets many of the needs for Amtrak Cascades, Sound Transit must approve use of the station and may require additional measures.
		- Risk: FRA level boarding requirements are relatively untested. If approval of variance from level boarding for freight operations is rejected, then additional capital costs would be incurred.
		- Risk: Use of the Auburn Sounder Station must be coordinated with Sound Transit and approved by the agency’s Board of Directors.
		- The existing Sound Transit Station at Auburn appears to meet needs for Amtrak Cascades with minimal capital costs.
		- Additional capital and operating expenses for Amtrak Cascades are anticipated for adding service at Auburn.

	Risk
	Does Not Meet Requirements
	Benefit
	Neutral Result
	Negative Result

Inter-connectivity		Improved access near Auburn is tempered by losses to ridership and societal benefits system wide.
		- Auburn is centrally located for residents along SR 18 and the mid-Green River Valley. Several communities have issued letters of support for an Amtrak Cascades stop in Auburn.
		- Transit connections at Auburn are well developed for serving nearby communities.
		- City of Auburn is willing to provide overnight parking for Amtrak Cascades customers at nearby city lots.
		- Reduced passenger miles traveled results in lower societal benefits and is likely to increase vehicle miles traveled.
		- Forecast reductions in ridership at Tukwila lessen the value of interconnectivity at that station. These losses are not offset by gains at Auburn.
		- The increased benefits of interconnectivity are served to largely low density population centers. The two largest cities, Kent and Federal Way, are already served by Amtrak Cascades at the Tacoma Dome Station at Freighthouse Square and the Tukwila Sounder Station in the 2017 baseline.
Fiscal Viability		Lower ridership produces a loss of annual revenue. As a result, farebox recovery is lower and the required taxpayer subsidy would be greater.
		- Risk: If this scenario were evaluated for funding by standard WSDOT procedures, it would fail to meet the requirements for a project benefit/cost ratio of greater than 1.
		- A projected \$400,000 net annual loss in ticket revenue in 2017 is further compounded by increased cost to the state, which results in increased state subsidies and lowered farebox recovery.
		- The combination of reduced revenues, increased costs, and reduced societal benefits results in a lower benefit/cost ratio for the entire service.
		- Forecasted reductions in ridership at Tukwila reduce the value of investments by WSDOT and the FRA at Sound Transit's Tukwila Station.

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Section 3. New Stop Policy

The Washington State Department of Transportation (WSDOT) is pursuing numerous strategies to reduce costs and increase ridership in order to maintain service levels without additional taxpayer subsidy. These efforts are consistent with state policy that directs WSDOT and other state agencies to implement Lean Management methods and tools to create more value for customers with fewer resources. This guidance points to the need for WSDOT to focus on the specific requirements of Amtrak Cascades customers and service, and to achieve the goal of faster, more frequent service with schedule reliability. Establishing a transparent, fair process for evaluating new stop proposals is an important part of implementing that guidance for the benefit of the Amtrak Cascades service, interested communities and Washington taxpayers.



Interim Policy

Until a formal process is adopted, the following policies will guide consideration of new stops:

- Washington and Oregon are working to manager their respective services together as a unified corridor. Both the WSDOT and ODOT operating budgets are very constrained: the WSDOT operating budget for Amtrak Cascades was cut by \$1 million in 2013-2015. The agencies will work together to reduce station costs and implement other cost saving alternatives.
- WSDOT and ODOT will evaluate proposals to add station stops based on benefits and disadvantages for the entire service. Evaluation criteria include: Consistent with State Rail Plan; Operational Feasibility; Customer Demand; Station Suitability; Interconnectivity Benefits; and Fiscal Viability.
- The addition of a station stop should not degrade service or add cost for WSDOT, ODOT, Sound Transit, BNSF, UP, Amtrak or other partners in intercity passenger rail service.
- Rail planning budgets at WSDOT and ODOT are not sufficient to complete new stop studies without additional funds. Proponents should provide funding for new stop evaluation studies, including costs for state participation.
- Major service changes will not be implemented until after 2017 due to construction and service outcome agreement commitments.

Qualitative and Quantitative Analysis

Communities that wish to propose a new stop for Amtrak Cascades should be prepared to take a lead role in the analysis. The following are several elements that WSDOT considers important elements of a new stop evaluation.

Qualitative Analysis

- Consistency with State Goals
 - Must comply with applicable state and federal laws.
 - Must comply with the Service Outcome Agreement for Amtrak Cascades associated with federal grants.
 - Implement state law directing public investments in transportation to support economic vitality, preservation, safety, mobility, the environment and system stewardship (RCW 47.04.280).
 - Provide more efficient, predictable, reliable and cost-effective movement of people and goods.
 - Provide faster, more frequent Cascades Corridor service with schedule reliability along the I-5 corridor (WSDOT's "Long-Range Plan for Amtrak Cascades," 2006).
 - Implement Lean Management methods and tools to create more value for customers with fewer resources.
 - Employ WSDOT's Moving Washington principles: Operate efficiently, manage demand and add capacity strategically.
 - Decrease the annual per capita vehicle miles traveled consistent with state law (RCW 47.01.440).
- Operational Feasibility
 - Proposed schedule changes must be logistically possible.
 - Proposed schedule changes must meet commitments to the Federal Railroad Administration (FRA) and others.
 - Proposed schedule changes must meet WSDOT policy goals and stage of service development.
- Customer demand
 - Placeholder value(s) for station on and offs must be in line with reasonable comparisons to similar stations.
- Station Suitability
 - Station changes must meet WSDOT commitments.
 - Added stations must meet applicable laws and regulations.
 - Added stations should meet the Cascades Corridor Station Design Criteria with appropriate right-sizing (evaluated with placeholder on and off value):
 - Arrival/departure area requirements.
 - Building requirements.
 - Platform requirements.



- ☑ Interconnectivity Benefits
 - Station changes should provide equal or better access to transportation networks and transportation hubs, such as interstates, major airports and ferry terminals. This evaluation will be in the context of strategic value for Amtrak Cascades.
- ☑ Fiscal Viability
 - Initial evaluation for fiscal viability will result in “likely pass,” “likely fail,” or “further analysis required.”

Quantitative Analysis

- ☑ Operational Feasibility
 - WSDOT will pursue operational modeling with the host railroad(s) to determine what impacts (if any) will need to be mitigated. Mitigation costs will be included in financial viability.
 - Enacted schedule changes must be negotiated with Oregon, Amtrak, Sound Transit, host railroad(s) and other parties as required.
- ☑ Customer demand
 - WSDOT will pursue ridership and revenue modeling with Amtrak to determine changes to ridership and revenue. Revenue changes will be included in financial viability. Passenger mile results will be used to assess interconnectivity benefits.
- ☑ Station Suitability
 - Station owners must consent to station changes.
 - Station changes must meet WSDOT commitments.
 - Added stations must meet applicable laws and regulations.
 - Added stations should meet the Cascades Corridor Station Design Criteria with appropriate right-sizing:
 - Arrival/departure area requirements.

- Building requirements.
 - Platform requirements.
- ☑ Interconnectivity Benefits
 - Station changes will provide equal or better access to transportation networks and transportation hubs, such as interstates, major airports and ferry terminals. This evaluation will be in the context of strategic value for Amtrak Cascades.
- ☑ Fiscal Viability
 - Project benefit/cost ratio exceeds 1. This corresponds with an increase to the net corridor benefit/cost ratio (i.e. positive sign).
 - Net corridor subsidy is decreased (i.e. negative sign).
 - Net corridor farebox recovery is increased (i.e. positive sign).
 - Net Washington State subsidy is decreased (i.e. negative sign).

Other Considerations

- Changes in stops may include eliminating, adding or relocating station stops for some or all trains passing the station(s).
- Only public agencies may submit proposals for analysis. A proposal must have endorsement from the station owner to be considered for evaluation.

Detailed analysis for potential new station stops

A feasibility assessment is only the first in a series of steps that would be necessary if a new stop were to be added to the Amtrak Cascades service. The purpose of the feasibility evaluation is to examine the business case and determine whether there is sufficient benefit to the service to proceed. Once that decision is made, it would be necessary to initiate an engineering design process to determine requirements and develop schedules and cost estimates. Likely elements in that process are described below.

- **Pre-design:** A pre-design study would be the most appropriate next step following completion of the current new stop evaluation. Typical outcomes for a pre-design study include: scope (less than 10 percent design); conceptual cost; right-of-way needs; risk analysis; inventory of environmental documentation requirements; inventory of required permits and anticipated contractual agreement requirements; stakeholder coordination and public outreach; determination of roles and responsibilities; and funding strategy. Such an effort would likely take up to 18 months to complete and could cost as much as \$250,000.

- **Preliminary engineering:** A pre-design study would help move the effort along, but would not be enough to develop a construction-ready design. Preliminary engineering would be required to proceed with a project. Preliminary engineering typically includes: detailed design and cost estimate; construction schedule; complete environmental documentation; complete contractual agreements; permits; and right-of-way acquisition (if required). The cost of a preliminary engineering could be 10 percent of total construction cost or more, depending on the scale and type of work. The effort could take as much as 24 months to complete.
- **Implementation:** Construction of improvements could not take place until necessary approvals were obtained (WSDOT, FRA, BNSF Railway, and Sound Transit), preliminary engineering was completed and adequate funding secured. In addition, WSDOT will not implement any new station stops to the Amtrak Cascades service before completion of the American Recovery and Reinvestment Act of 2009 capital program in 2017, due to construction impacts associated with those projects.

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Section 4. Conclusions

What We Learned

- For the state to endorse the addition of a new stop, the service change cannot interfere with service outcome agreements that commit to travel time and reliability benefits which will be produced by capital investments.
- The addition of a station stop should not degrade service or add cost for WSDOT, ODOT, Sound Transit, BNSF, UP, Amtrak or other partners in intercity passenger rail service. The Washington State Department of Transportation (WSDOT) is not in a position to accept a change that would increase uncompensated costs for the service.
- The state's strategy to provide additional daily round trips, supported by the federally-funded High-Speed Intercity Passenger Rail Program, is an effective way to increase ridership. Changes that undermine the benefits of additional frequencies may result in a ridership loss, not because of increased travel time, but a decrease in travel schedule options at a single station.
- The proposed criteria developed for the New Stop Evaluation – Auburn study address many of the important issues, but are not exhaustive. A more detailed analysis would be needed to address nuances, such as parking, that might have an effect on ridership.
- It is important that WSDOT refine and formalize evaluation criteria to assist in future decision-making about adding, changing or eliminating stops. An objective method is needed not only to help the state achieve its goals for the Amtrak Cascades service, but also to provide communities with a fair, transparent process to follow.

Next Steps

- New Stop Evaluation - Auburn study findings will be incorporated into the draft 2013 State Rail Plan.
- WSDOT will continue working on evaluation criteria in cooperation with Oregon, British Columbia and other corridor partners to ensure a fair, objective process for considering requests for new stops. Together with ODOT, WSDOT will initiate a public process in late 2014 to formalize a new stop policy for the corridor after both states' rail plans are complete. In the meantime, the

interim policies listed on page 43 of the report will guide consideration of new stops.

- WSDOT should seek funding and resources needed to explore new operating models to increase ridership and manage costs. This should include an evaluation of existing stops and investigate service changes such as:
 - Limited service, such as Seattle to Portland via Auburn, Tacoma and Olympia.
 - Eliminating stops or reducing service at marginal stops to mitigate time loss of more productive stops.

City of Auburn may consider the following actions in response to study findings.

- The city of Auburn should take the lead (with support from WSDOT, Amtrak and Sound Transit) in developing a business plan that shows how losses would be avoided without additional cost to the state.

The study could consider a skip stop scenario involving a less productive stop along the corridor. The effort must include coordination with Sound Transit to identify any improvements or conditions that would be required for use of the facility for Amtrak Cascades. Analysis to determine BNSF's requirements for freight mitigation would be needed as part of any next steps.

- If a proposed Auburn station stop proves to be viable, WSDOT would need funding and staffing authorization for “pre-design” of station improvements and service. This level of analysis would be needed to develop an initial cost estimate and schedule for implementation. Typical outcomes for a pre-design study include: scope (less than 10 percent design); conceptual cost; right-of-way needs; risk analysis; inventory of environmental documentation requirements; inventory of required permits and anticipated contractual agreement requirements; stakeholder coordination and public outreach; determination of roles and responsibilities; and funding strategy. Such an effort would likely take up to 18 months to complete and could cost as much as \$250,000.

Appendix

- A. List of supporting technical reports
- B. Ridership and revenue summary detail tables
- C. Catchment area/drive time analysis summary detail tables

Appendix A

List of Supporting Technical Reports

1. Baseline report
2. System-Wide Market Analysis
3. Operational Feasibility
4. Customer Demand Forecasting
5. Drive-Time Population and Catchment Area Analysis and Maps
6. Station Suitability
7. Parking Issue Brief
8. Interconnectivity Benefits
9. Fiscal Viability
10. Partnering and Stakeholder Collaboration

For copies of the technical reports, please contact the WSDOT Rail Division at 360.705.7900 or rail@wsdot.wa.gov.

Appendix B

Detailed Ridership Discussion

The following table summarizes the customer demand analysis findings. The analysis was performed by AECOM Transportation.

Table B-1 2017 Forecast Results

Route	Annual Totals (2017)					
	Baseline		Scenario 1		Scenario 2	
	Ridership	Ticket Revenue	Ridership	Ticket Revenue	Ridership	Ticket Revenue
Cascades						
North of Seattle	194,402	8,862,657	194,402	8,862,657	194,402	8,862,657
Thru Seattle-Tacoma Segment	625,833	26,612,099	617,793	26,317,124	625,833	26,612,099
Tukwila, WA	40,585	1,548,710	26,832	1,024,363	21,412	817,161
Auburn, WA	0	0	22,493	791,322	9,473	329,549
South of Tacoma	308,180	9,490,534	308,180	9,490,534	308,180	9,490,534
	1,169,000	\$46,514,000	1,169,700	\$46,486,000	1,159,300	\$46,112,000

Source: AECOM

Table B-2 Analysis of 2017 Forecast Baseline and Scenario 1

Market Group	Baseline	Scenario 1	Net Change	Net New Riders	Net Reduced	Estimated Shift
North of Seattle	194,402	194,402	-	-	-	-
Thru Seattle-Tacoma Segment	625,833	617,793	(8,040)		8,040	-
Tukwila	40,585	26,832	(13,753)	8,740	-	13,753
Auburn	-	22,493	22,493		-	
South of Tacoma	308,180	308,180	-	-	-	-
Total	1,169,000	1,169,700	700	8,740	8,040	13,753

Source: AECOM & WSDOT Rail Division

The “Thru Seattle-Tacoma Segment,” which includes all travel between Seattle (including stations to the north) and Tacoma (including stations to the south), is negatively impacted by the additional travel time required in Scenario 1 for the added stop at Auburn. This key market represents a significant portion of Amtrak Cascades ridership (more than 53 percent) and ticket revenue (over 57 percent) in the Baseline. Although the decline in ridership and ticket revenue is only about 1 percent within this market, the impact to the Cascades route is significant because of the size of the market representing more than half of the total Cascades ridership. This sensitivity to travel time is consistent with the historical and projected market response to travel time improvements in the Cascades corridor.

In Scenario 1, some Tukwila station activity is diverted to the Auburn station and the Auburn station also attracts new incremental ridership and ticket revenue not served under the Baseline. This net gain, however, is offset by the through-market losses. Note that the reduction to the markets through the Seattle-Tacoma segment is a conservative reduction since only 5 of the 12 trains (6 round trips) saw the full effects of added travel time. Modeling the full effects of

increased travel time on all 12 trains would likely magnify the effects of ridership losses in markets traveling through the Seattle-Tacoma segment.

Table B-3 Analysis of 2017 Forecast Baseline and Scenario 2

Market Group	Baseline	Scenario 2	Net Change	Net New Riders	Net Reduced	Estimated Shift
North of Seattle	194,402	194,402	-	-	-	-
Thru Seattle-Tacoma Segment	625,833	625,833	-	-	-	-
Tukwila	40,585	21,412	(19,173)	-	9,700	-
Auburn	-	9,473	9,473	-	-	-
South of Tacoma	308,180	308,180	-	-	-	-
Total	1,169,000	1,159,300	(9,700)	-	9,700	-

Source: AECOM & WSDOT Rail Division

In Scenario 2, service is split between Auburn and Tukwila, and forecast ridership and ticket revenue at these stations is lower compared to Scenario 1. When compared to Scenario 1, Scenario 2 has the following results:

- Reduces Tukwila frequency by 33 percent and station ridership declines by 21 percent.
- Reduces Auburn frequency by 67 percent and station ridership declines by 57 percent.

This sensitivity to service frequency is consistent with historical market response to changes in frequency.

The net change from the baseline is a reduction of 9,700 riders in scenario 2. With a net reduction in ridership within the Tukwila-Auburn markets, it is difficult to estimate how many riders are added by providing access at Auburn, or how many riders are shifted from Tukwila to Auburn. The table above only indicates the net loss. There is no change to markets through the Seattle-Tacoma segment.

See the Customer Demand technical report for more information.

Appendix C

Changes in Catchment Area: Population and Employment

WSDOT performed a catchment analysis to calculate population and employment within a 30-minute drive of individual stations. The following tables contain data from the US 2010 and the Canadian 2011 census. Changing stops at Auburn results in three scenarios: a baseline scenario with existing stations and two scenarios which add Auburn in some way.

Table C-1 All Scenarios Drive-Time Population (All Stations)

Drive-Time	Baseline	Add Auburn	Difference	% Change	Cumulative	Cumulative %
0 to 5 minutes	1,063,191	1,100,427	+37,236	+3.50%	+37,236	+3.50%
5 to 10 minutes	2,222,051	2,341,927	+119,876	+5.39%	+157,157	+4.78%
10 to 20 minutes	3,666,406	3,615,594	-50,812	-1.39%	+106,748	+1.53%
20 to 30 minutes	1,778,567	1,703,015	-75,552	-4.25%	+30,748	+0.35%
Total	8,730,213	8,760,959	+30,748	+0.35%	+30,748	+0.35%

Source: WSDOT GIS and WSDOT Rail Division

The total of all stations within the catchment area is in the previous table. Access to stations is measured by catchment area. Total access is increased by 0.35%, or 31,000 residents, over the baseline scenario. All changes are in the Seattle to Tacoma vicinity. The following tables focus on that geographic area.

Table C-2 Baseline Scenario Drive-Time Population Seattle to Tacoma

Drive-Time	Seattle	Tukwila	Auburn	Tacoma	Total
0 to 5 minutes	124,286	18,763	N/A	62,671	205,720
5 to 10 minutes	285,197	192,346	N/A	159,632	637,175
10 to 20 minutes	366,717	297,131	N/A	451,657	1,115,505
20 to 30 minutes	168,245	70,344	N/A	203,940	442,529
Total	944,445	578,584	N/A	877,900	2,400,929

Source: WSDOT GIS and WSDOT Rail Division

Table C-3 Scenario 1 & 2 Drive-Time Population Seattle to Tacoma

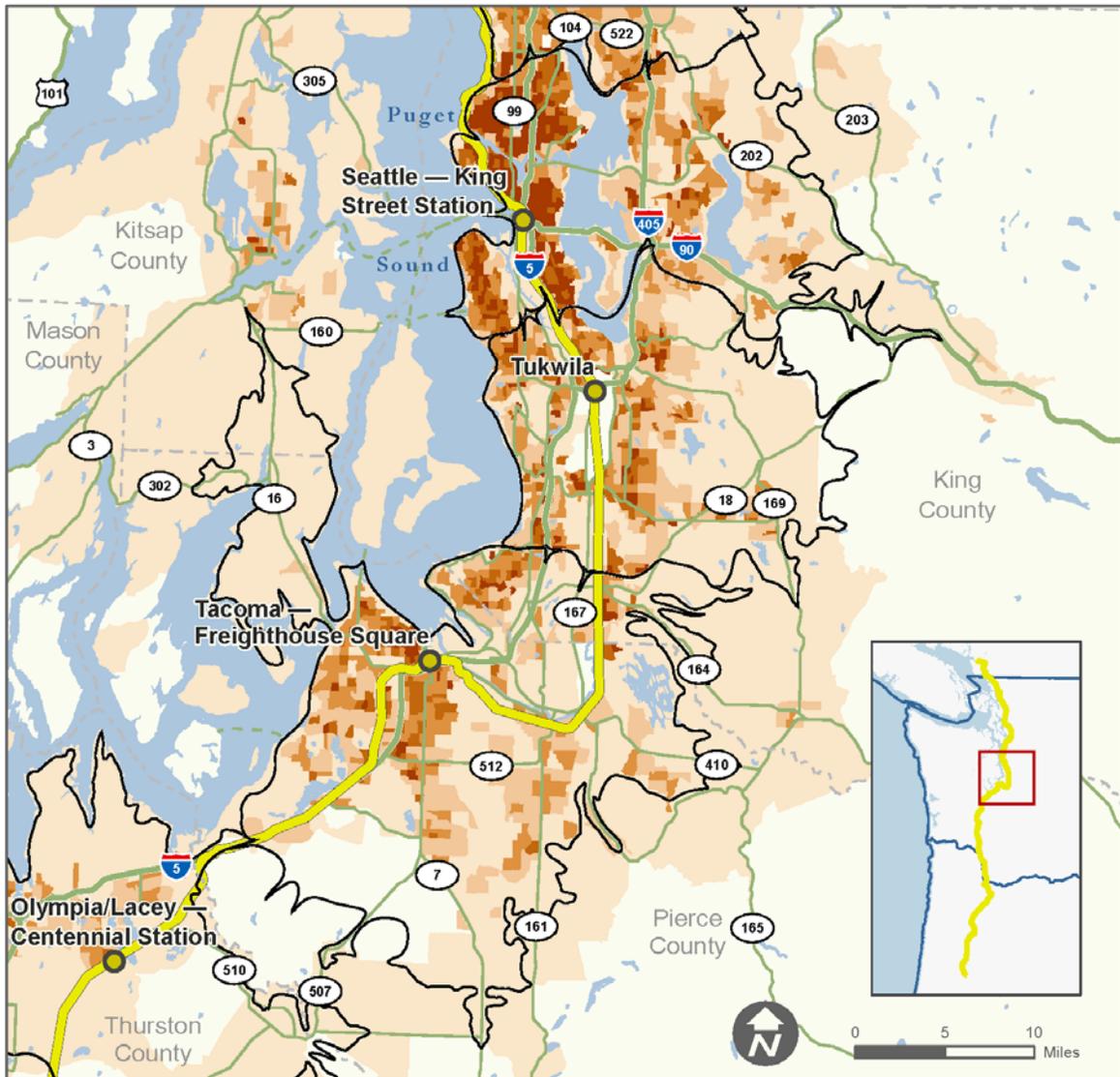
Drive-Time	Seattle	Tukwila	Auburn	Tacoma	Total
0 to 5 minutes	124,286	18,763	37,236	62,671	242,956
5 to 10 minutes	285,197	191,707	120,864	159,283	757,051
10 to 20 minutes	366,717	168,108	238,002	291,866	1,064,693
20 to 30 minutes	168,225	4,304	62,117	132,331	366,977
Total	944,425	382,882	458,219	646,151	2,431,677

Source: WSDOT GIS and WSDOT Rail Division

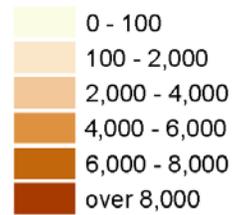
Note that while Auburn station is the closest station to 458,000 residents, 427,000 of those residents were previously in the Tukwila or Tacoma catchment areas. Population within 10-minutes of a station is increased by 157,000 residents, with net decreases in the 10- to 30-minute range.

Amtrak Cascades Population Density and Service Areas

Existing Stops and
2010 Population Density



People per square mile¹



30-minute drive time extent²
to nearest station

● Amtrak Cascades rail station

— Amtrak Cascades rail corridor

--- County boundary

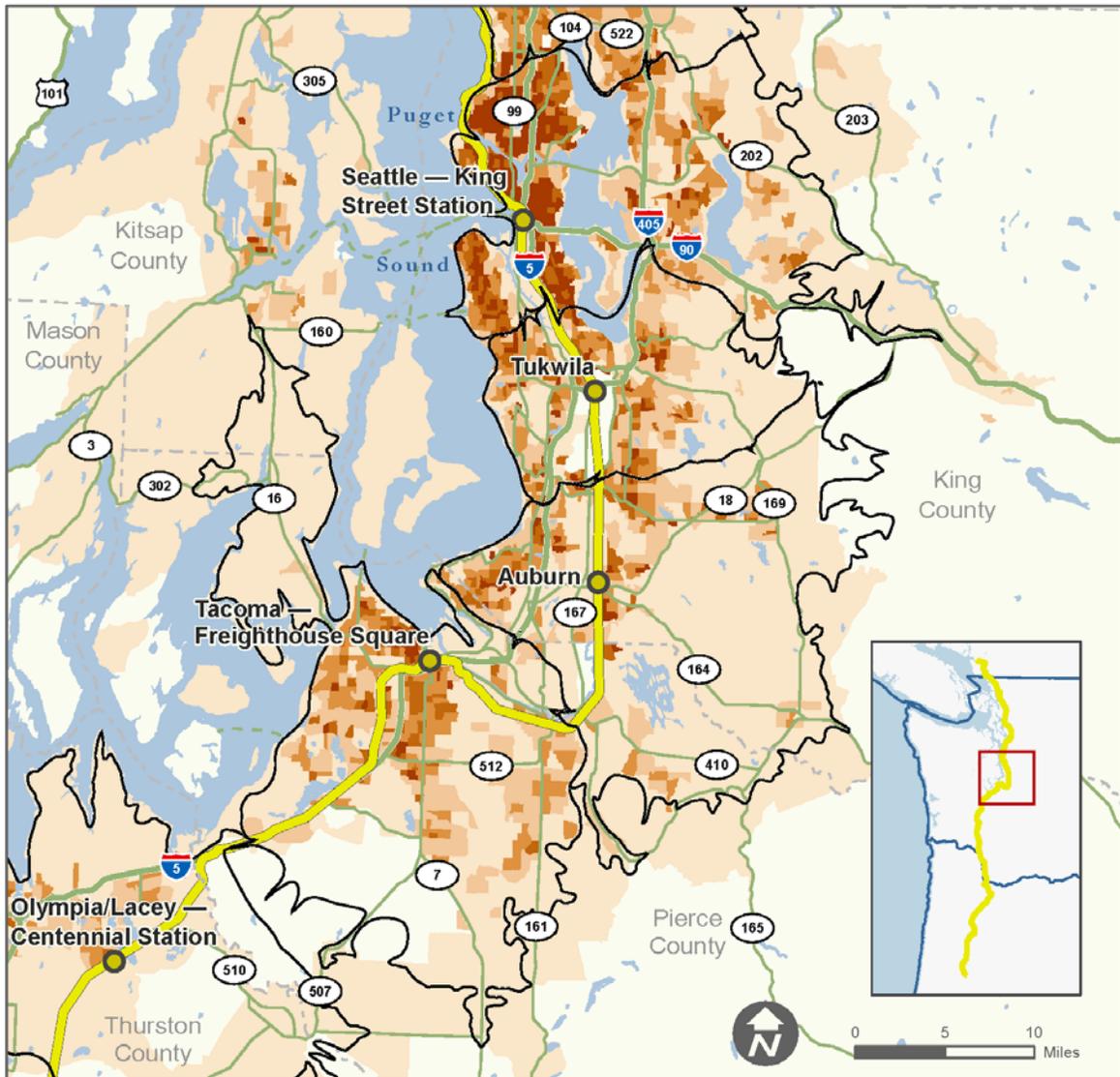
¹ Population density derived from 2010 US Census

² Rail station drive times were calculated using ESRI StreetMap North America 2012 data with standard impedances.

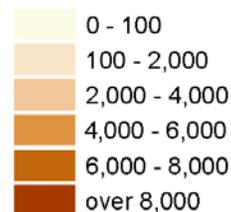


Amtrak Cascades Population Density and Service Areas

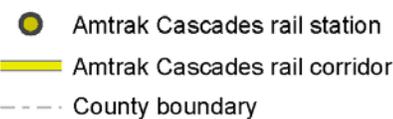
Existing Stops plus Auburn and
2010 Population Density



People per square mile¹



30-minute drive time extent²
to nearest station



¹ Population density derived from 2010 US Census

² Rail station drive times were calculated using ESRI StreetMap North America 2012 data with standard impedances.



\\wsdot\loc\hq\Group\RC\RD\GIS_Branch\GIS_Carto\Products\Custom\Rail\Office\Products\MXD\Carto_Pop_Inset_2000.mxd brackeh@wsdot.wa.gov Sources: WSDOT, ESRI 2012 08/05/2013

This map was generated to show the effects of catchment under scenarios adding Auburn as a potential stop.