Economic Evaluation of Regional Impacts for the Proposed Gateway Pacific Terminal at Cherry Point

Prepared for the Puget Sound Regional Council

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Public Financial Management, Inc.
Public Financial Management (PFM) is the nation’s largest independent financial advisor to state and local governments. PFM’s national reputation for independence, initiative and integrity is provided by more than 500 professionals in more than 35 offices across the nation – including Seattle. In 2011, PFM assessed the economic impact of the Gateway Pacific Coal Terminal on Whatcom County.

Parametrix
Parametrix is one of the top ten engineering firms in the Puget Sound area and has a long history of working with the Puget Sound Regional Council. Parametrix completed a 2012 study for the City of Seattle reviewing the impact of the proposed Gateway Pacific Terminal on rail traffic in Seattle.

HR&A Advisors, Inc.
HR&A Advisors is a national leader in economic development strategy – working on economic impact analyses across the nation. HR&A has completed economic impact analyses of large-scale economic development projects including ports, intermodal rail facilities, airports, brownfields redevelopments, and public parks. In the central Puget Sound region, HR&A was part of the team that developed the Seattle Central Waterfront Framework Plan for the City of Seattle.

Simpson Consulting
Simpson Consulting has a long and diverse portfolio of railway economics, strategic planning, network rationalization, passenger rail coordination and capital planning roles inside the railway industry and as a consultant to public agencies and private firms across the U.S. and Canada. The firm focuses on issues pertaining to growing public sector interest in both freight and passenger rail issues.
Executive Summary
Executive Summary

Project Summary

- SSA Marine (SSA) has proposed the development of Gateway Pacific Terminal – a full-service dry bulk commodity export-import facility on approximately 1,200 acres at a naturally occurring deep-water location in Cherry Point, Washington, approximately sixty miles north of Snohomish County.

- Upon completion of all construction and operational enhancements, the terminal’s total export capacity would be approximately 54 million metric tons of dry bulk commodities per year – making it the largest facility of its type on the west coast of the United States.

- At full build out (54 million metric tons of dry bulk commodities annually), the proposed terminal would add a total of 18 new trains per day (9 to the terminal and 9 from the terminal), each with an estimated train length of 8,500 feet, or 1.6 miles.

- The Federal government, State of Washington and Whatcom County determined that an Environmental Impact Statement (EIS) was required for the development of the terminal under the National Environmental Policy Act (NEPA) and Washington State’s State Environmental Policy Act (SEPA). Drafting of the EIS began in 2013, and it is estimated that completion of a final EIS will require approximately two years. Permitting decisions will not be finalized until after the completion of the EIS.

- Studies by Martin Associates and Finance & Resource Management Consultants both projected significant job growth as a result of the construction and operation of the terminal. Public Financial Management’s report found that while there were potential economic benefits to the terminal, there were potential costs as well – with a focus on the need for potential mitigation and the degree to which terminal construction and operation would put other sources of economic activity in Whatcom County at risk. Each report focused largely on impacts in and around Whatcom County.

- Studies by Parametrix and Community Attributes, Inc. focused on impacts in the City of Seattle. The Parametrix study identified risks related to projected increases in gate-down time at road crossings and the resulting negative effect on traffic flows to and from the waterfront area. The Community Attributes study identified a series of economic impacts. Potential benefits included a small portion of jobs related to project development – due, in part, to SSA’s location in Seattle. In addition, potential upgrades in rail capacity to meet new demand from the terminal could also benefit the Port of Seattle. The Community Attributes study, however, also identified costs related to value of travel time due to increased traffic (close to a half million dollars annually), the need for investments in mitigation and projected property value decline.
Regional Rail Profile

- Rail freight service in the Puget Sound region is largely provided by Burlington Northern Santa Fe (BNSF) and Union Pacific (UP). Service is provided along a north-south main line that runs roughly parallel to Interstate 5 and three east-west routes that cross the Cascade Mountains. In addition, a number of short-line railroads provide service that connects to these routes.

- Rail freight volume in the region has significantly increased over the years and is projected to continue increasing over the next twenty years – consistent with national and statewide trends. Between 1991 and 2010, rail freight volume traveling through Washington grew by 81 percent – from 64 million tons to 116 million tons.

![Annual Tons of Freight Moved by Rail in Washington State](chart1)

- The Washington State Department of Transportation projects that statewide freight rail volume will grow by an additional 130 percent by 2035. In the Puget Sound region, marine-related rail freight increased from under 20 million tons in 1998 to 32.6 million tons in 2010: marine related rail freight in the region is projected to grow by at least 52.2 million tons by 2030 – a 160 percent increase.

![Marine Freight Rail Tonnage Moving Through Puget Sound and Washington Coast](chart2)

- Most goods moving by rail through the state and the region are agricultural or farm products – including cereal grain and animal feed. Projected growth in rail freight...
volume is driven by an increase in dry bulk (non-grain) materials and containers.

- **Rail service is critical to the operations of the Ports of Seattle, Everett and Tacoma, which together account for $105.2 billion in export and import activity annually.** Port officials report that between 60 and 70 percent of all goods moving through the ports are moved, at least in part, by rail.

<table>
<thead>
<tr>
<th>Estimated Value of Goods Moved to/from Ports of Everett, Seattle and Tacoma by Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2012 Est. Value of Imports and Exports - Port of Tacoma, Port of Seattle, Port of Everett</strong></td>
</tr>
<tr>
<td>$105.2 billion</td>
</tr>
</tbody>
</table>

- **Rail service is also critical to Pierce, King, and Snohomish Counties’ $50 billion per year export market.** For example, transportation equipment accounts for more than 70 percent of metro area exports, most of this related to aerospace. Boeing, one of the area’s major transportation equipment manufacturers, relies on rail for transportation of parts.

- **The central Puget Sound region is also increasingly dependent on rail for the movement of people.** Between October 2012 and September 2013, there were 1.28 million Amtrak on/offs in Washington: more than 60 percent were at three of the state's most used stations that serve the region – Seattle (which, alone, accounted for nearly 50 percent of the statewide total), Tacoma and Olympia/Lacey. In 2012, there were more than 2.8 million boardings (riders) on the Sounder commuter rail service – up by 10.5 percent in one year: in 2013, boardings (riders) were up by approximately 9 percent through September. The State Rail Plan projects continued growth in passenger rail use through 2035.

- **Projections for increased rail freight volume do not include service to proposed new or expanded terminals in the Pacific Northwest.** In addition to the Gateway Pacific Terminal, there are proposed new terminals at Longview (Cowlitz County, Washington) and Port of Morrow (Oregon) and terminal expansion projects at Ridley Terminal, Fraser Surrey Docks, Neptune Terminal and Westshore Terminal (all in British Columbia). If all of these projects were approved and went forward to full build out, there could be more than 110 million additional metric tons of freight – mostly coal – to be transported on rail lines in or serving the Puget Sound region: this is the equivalent of nearly double the total volume of rail freight currently traveling through Washington. Within the central Puget Sound region, approximately 65.25 million metric tons (54 million metric tons of which would be attributable to Gateway Pacific Terminal) could be transported via rail.
Coal Volume that Could Move Through Central Puget Sound Region by Rail if all Projects Approved and Operated at Full Capacity

<table>
<thead>
<tr>
<th>Coal Volume that Could Move Through Central Puget Sound Region by Rail if all Projects Approved and Operated at Full Capacity</th>
<th>Annual Million Metric Tons¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway Pacific Terminal</td>
<td>54.0</td>
</tr>
<tr>
<td>Fraser Surrey Docks</td>
<td>8.0</td>
</tr>
<tr>
<td>Ridley Terminal (current contract volume potential)</td>
<td>2.5</td>
</tr>
<tr>
<td>Westshore Terminal (current contract volume potential)</td>
<td>0.75</td>
</tr>
<tr>
<td>Millennium Terminal (Longview)</td>
<td>0.0</td>
</tr>
<tr>
<td>Port of Morrow</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>65.25</td>
</tr>
</tbody>
</table>

*Assuming 25 percent of increased capacity
Note: Potential Canadian terminal volume may or may not move through region depending upon multiple variables

- The recent increase in Bakken crude oil being transported by rail is also not considered as part of projected increases in rail freight activity. Refineries located in the Puget Sound or at Cherry Point – the location of the proposed Gateway Pacific Terminal – are primary destinations for Bakken oil. Nationally, reliance on rail for the transport of crude oil has grown from 11,000 carloads in 2009 to approximately 400,000 carloads in 2013. More than 70 percent of Bakken crude oil is now transported by rail, compared to just 25 percent in 2012.

Regional Impacts

Domestic and International Trade

- The proposed Gateway Pacific Terminal would create jobs and generate spending and tax revenues. Two studies demonstrated that the construction and operation of the terminal will create direct, indirect and induced jobs as the result of construction and operation of the proposed terminal.

- Most of the jobs and spending would benefit Whatcom County rather than the central Puget Sound region. Due to the presence of a Project Labor Agreement and a sufficient potential workforce in Whatcom County residents, most jobs created by the Gateway Pacific Terminal would go to Whatcom County residents. Most project-related spending would also likely occur in the greater Whatcom County area.

- Though limited, the central Puget Sound region could benefit from SSA’s use of professional services (i.e. consultants, engineers, attorneys) in the region as well as its anticipated 12 new full-time equivalent hires in Seattle. In addition, most of the tax benefits resulting from the project would likely go to the State rather than local governments in Whatcom County. As a result, the central Puget Sound region – as well as other parts of the state – could see a positive direct fiscal benefit.

- The proposed Gateway Pacific Terminal will have an impact on rail freight capacity in the Puget Sound region. Upon the completion the terminal would add 18 trains per day to the Burlington Northern Santa Fe (BNSF) main line (9 to the terminal and 9 from the terminal), each with an estimated train length of 8,500 feet, or 1.6 miles.

¹ One metric ton is equal to 1.10231 U.S. tons (also known as short tons).
• Even without the proposed terminal, projected increases in rail freight volume are already expected to affect availability of rail capacity in the region.

• The degree to which additional train volume will affect rail freight capacity depends on both the precise routing of the trains and BNSF’s efforts to increase capacity to meet increased demand.

• If BNSF responds to increased demand by increasing capacity, the potential effect could be positive – as suggested by the Port of Seattle and two prior studies.
  o Rail capacity expansion could allow the region’s ports to move more goods and increase the region’s economic activity.
  o The region’s ports may become more economically attractive to shippers due to economies of scale and economies of scope.

• If BNSF is unable to increase capacity through investment, technology, efficiency or other means to meet demand, the terminal could contribute to constraints – even if on temporary basis – that could impact trade and related economic activity.
  o Current rail traffic could be constrained, costs could increase, there could be delays in shipments at the region’s ports, or some combination of these factors.
  o Passenger rail service could be disrupted, cost more, or both.
  o Capacity constraints could negatively affect a portion of the State’s 8.6 percent of export-related private sector jobs.
  o Capacity constraints could impede natural or planned growth at the region’s ports which, in 2012, imported and exported goods valued at over $105 billion.
  o Current commodities and passenger rail services could get “priced out,” “squeezed out,” delayed, or face increased costs due to a lack of capacity.

• Within the boundaries of the central Puget Sound region, the potential transportation impacts related to other coal export proposals are minimal compared to the potential transportation impacts related to the proposed Gateway Pacific Terminal.

• Additional capacity constraints could arise from additional train traffic transporting Bakken oil.

Transportation

• Gate-down time is a measure of the duration of time that a railroad crossing gate is down while a train passes. Gate-down time has the potential to increase congestion and delays to traffic at or near at-grade crossings if gates are down for long periods of time for passing trains.

• Existing gate-down time at at-grade crossings in the Puget Sound region’s BNSF rail corridor is approximately 13 minutes to 1 hour 20 minutes each day to allow trains to pass. This is distributed throughout the day.

• By 2035, without Gateway Pacific Terminal trains, regional gate-down time would increase between approximately 30 minutes to 2 hours 45 minutes per day depending on the location of the crossing.
With added train traffic from the proposed terminal, gate down time would increase by an additional 38 minutes to 1 hour 25 minutes on the north-south BNSF main line; by approximately 22 minutes to 1 hour 45 minutes on the Stevens Pass route between Everett and Chelan County; and by approximately 33 minutes to 50 minutes on the Stampede Pass route between Auburn and Kittitas County.

Future capacity constraints from added terminal-related trains on the region’s rail lines could interrupt passenger and freight train movements. This could result in a mode shift of commuters to bus or single occupancy vehicles, which could create additional delay and congestion on the region’s bus and highway systems.

Increased gate-down time and crossing blockages from trains traveling to or from the proposed terminal could result in longer average response times for emergency vehicles. Additional delay at approximately 21 at-grade crossings in the region could impact delivery of emergency response services due to close proximity of a fire station or emergency medical facility.

Access to transit services, such as park-and-rides and bus stops, could be impacted by delays at blocked crossings. Transit reliability could also be affected if blocked crossings prevented transit vehicles from reaching stations on schedule. A single train going to or coming from the proposed terminal could delay traffic for approximately 2 to 6 minutes while it passes through an at-grade crossing, which could occur an additional 9 to 18 times per day with added trains from the proposed terminal.

Pedestrian mobility and safety could be impacted at crossings located within regional growth centers, which would have high pedestrian activity. Impacts would be greatest in Seattle, Kent, Auburn, and Puyallup. Each of these communities would have at-grade crossings located within a regional growth center.

**Land Use**

Land use designations and long-range planning efforts could be influenced by increased train operations to and from the proposed terminal. Existing land uses and community goals that conflict with high volume freight corridors would have the greatest impacts. Conflicts could occur as a result of train noise and vibration, circulation and access impacts and safety concerns.

The value of properties adjacent to the rail corridor could decrease in value with additional trains from the proposed terminal. Past studies in the region and other areas of the country indicate that property values adjacent to rail lines are lower than comparable properties located farther away from rail lines.

**Environment**

Trains traveling to and from the terminal would likely create noise and vibration from operations and wayside horn use, which trains use before entering an at-grade crossing as a safety measure. Additional noise could impact public health and the overall quality of life for nearby residents.
• **Environmental justice populations in Kent and Seattle would have the highest disproportionate impacts from train operations.** Environmental justice populations in Everett, Auburn, Algona, Pacific and Fife would also be impacted by the additional trains traveling to and from the proposed terminal.

**Economic Analysis**

• **Time lost to personal and commercial journeys as a result of congestion from increased gate-down time has an economic cost.** It is possible to estimate the economic cost of increased gate-down time by constructing an analysis that considers annual traffic patterns and forecasted gate-down time for selected at-grade crossings.

• **Freight train traffic can negatively affect the value of residential and non-residential property located in close proximity to a railway line.** Prior studies have demonstrated that an increase in freight train traffic can reduce market value of affected properties by 5% to 7%.

• **By 2035, additional gate-down time from Gateway Pacific Terminal trains could result in an annual marginal economic cost to the central Puget Sound region.** The aggregate economic impact and geographic distribution of this economic cost will significantly depend on assumptions regarding the routing of trains traveling to and from the Gateway Pacific Terminal, most notably whether empty trains would be dispatched across the Stevens Pass and Stampede Pass branch lines.

• **By 2035, increased freight train traffic resulting from Gateway Pacific Terminal operations could result in a marginal reduction to residential property values in the central Puget Sound region.** The geographic distribution of this economic cost will significantly depend on assumptions regarding the routing of trains traveling to and from the Gateway Pacific Terminal, most notably whether empty trains would be dispatched across the Stevens Pass and Stampede Pass branch lines.

• **By 2035, increased freight train traffic resulting from Gateway Pacific Terminal operations could result in a marginal reduction to non-residential property values in the central Puget Sound region.** The geographic distribution of this economic cost will significantly depend on assumptions regarding the routing of trains traveling to and from the Gateway Pacific Terminal, most notably whether empty trains would be dispatched across the Stevens Pass and Stampede Pass branch lines.
Mitigation

- Mitigation measures can eliminate delays at crossings by allowing traffic or pedestrians/bikes to pass over or under railroad tracks. Mitigation measures would likely include grade separation of existing at-grade crossings.

- While grade separation can be a desirable solution, these improvements are typically very costly and involve substantial amounts of public funding. Grade separation projects would likely cost between approximately $50 million and $200 million each.

- Public funding for grade separation projects is currently difficult to acquire. Many grade separation projects will take years to complete while funds are located. Funds are awarded competitively among many other projects.

- Other mitigation measures could include grade crossing consolidation, signal timing optimization, the use of Intelligent Transportation Systems, crossing improvements and education/awareness programs. These measures could mitigate impacts to safety, accidents and emergency response and could reduce the total number of vehicles that would be impacted.

- Various long-range planning efforts, including work by the Washington State Freight Advisory Committee, have identified a number of at-grade crossings that need grade separation. Six crossings in the Puget Sound region are partially funded for grade separation improvements or are part of a project that would reduce impacts at the crossing. An additional 23 crossings have been identified as emerging crossings that will need to be addressed for crossing improvements after the year 2020.

- A total of 34 crossings have been identified as potentially benefitting from mitigation related to Gateway Pacific Terminal train impacts.

- Policy measures could also be used to mitigate impacts from Gateway Pacific Terminal trains. Recommended measures could include specific routing decisions such as using Stevens Pass or Stampede Pass for return trains and off-peak scheduling of trains.
Introduction
**Introduction**

In August 2013, Puget Sound Regional Council (PSRC) retained a team led by Public Financial Management, Inc. (the PFM Team) to provide a comprehensive, independent evaluation of the economic effects of the proposed Gateway Pacific Terminal on King, Kitsap, Pierce and Snohomish counties. In particular, PSRC asked Public Financial Management to assess both regional economic opportunities and risks created by the terminal’s construction and operation, including effects on the central Puget Sound region’s transportation system, current and future domestic and international trade, current and future land use and environmental issues. Additionally, PSRC charged Public Financial Management to identify potential mitigation strategies related to probable economic risks such as infrastructure improvements and policy recommendations.

The study’s purpose is to assist decision-makers and the public in weighing the economic pros and cons of the proposed terminal for the central Puget Sound region. The final study addresses the following topics identified in the scope of work:

1. **Project Summary**: A summary of the current project proposal and current available research, with an emphasis on the central Puget Sound region.
2. **Regional Rail Profile**: A discussion of what the region’s current and future rail traffic looks like and the role it currently plays in the region’s economy, addressing the following questions:
   - In what ways does the central Puget Sound depend on the region’s rail system for the current and future movement of people and goods?
   - What commodities are currently moving on the region’s freight rail system, and what likely changes may occur in the future?
   - How do imports and exports on the region’s freight rail system compare in terms of volume, commodity and value?
   - What other coal terminal projects are being proposed or built in the Pacific Northwest region, including Canada? What impacts would these projects have on the region’s transportation system?
   - Are there other proposals for commodity shipments through the Pacific Northwest region, such as Bakken Oil from North Dakota and Montana? What are the potential effects on the region’s rail transportation system?
3. **Regional Impacts**: A discussion of specific regional impacts:
   - **Transportation System – Effects on the Regional Transportation System**
     - What is the impact of an anticipated change in rail operations on surface movement of people and goods at grade crossings in the region? Are there other impacts throughout the regional transportation system?
     - How much travel delay will be experienced by people and goods at railroad crossings due to the project? Which at-grade crossings will be most highly affected?
     - What would be the effect of increased commodity trains on existing and future freight and passenger rail? Which and where?
   - **Domestic and International Trade – Effects on current and future trade throughout the regional freight and goods transportation system**
     - What will be the effect of the project proposal on regional employment in terms of direct and indirect jobs?
How will the project affect existing freight rail capacity? What are the impacts on existing and future domestic and international trade by the proposed project?

What other commodity terminal projects are being proposed or built in the Pacific Northwest region, including Canada? Independent of the proposed Cherry Point terminal, what effects, if any, would these projects have on the region’s transportation system?

- Land Use – Effects on current and future land use within the region
  - Will the project affect commercial and residential land use?
  - Will the project affect property values?

- Environment – Environmental effects
  - Will the project affect water and air quality?
  - Will minority and/or low-income populations experience disproportionately high and adverse effects from the project?

4. **Economic Analysis**: A discussion of the economic effects of the identified regional impacts.

5. **Mitigation**: Identification of additional infrastructure improvements or policies that may be required to support community and economic development, addressing the following questions:
   - What infrastructure improvements could mitigate identified effects? What is the opportunity cost of mitigation activity(ies)?
   - What policies could mitigate the identified effects?

In developing this report, the PFM Team reviewed extensive documentation including the project proposal, previous economic studies developed in response to the proposed Gateway Pacific Terminal, documents regarding the development of the project, Washington State data, academic and professional research pertinent to this report and published news reports. Sources of data and information are cited throughout this report in footnotes. In addition, the PFM Team has conducted a series of interviews and meetings with various stakeholders. A full list can be found in Appendix A.

It should be noted that failure to consider certain issues as part of this report and analysis should not be inferred as dismissing the importance of those issues. As with any such review, individual components of our analysis rely on the validity, accuracy, and comprehensiveness of the information supplied to us, and projections of future events and outcome are inherently uncertain and subject to change. Similarly, time and resources limit the ability to consider all factors.

On April 18, 2014, Pacific International Terminals sent a letter to Whatcom County and the Washington Department of Ecology in which it indicated its intent to construct the proposed Terminal in a single phase, as opposed to the originally proposed build out schedule. Pacific International Terminals’ revised on-line date is 2019.
Project Summary
Project Summary: In Brief

- SSA Marine (SSA) has proposed the development of Gateway Pacific Terminal – a full-service dry bulk commodity export-import facility on approximately 1,200 acres at a naturally occurring deep-water location in Cherry Point, Washington, approximately sixty miles north of Snohomish County.

- Upon completion of all construction and operational enhancements, the terminal’s total export capacity would be approximately 54 million metric tons of dry bulk commodities per year – making it the largest facility of its type on the west coast of the United States.

- The terminal would be built to handle 54 million metric tons of dry bulk commodities annually. It would add a total of 18 new trains per day (9 to the terminal and 9 from the terminal), each with an estimated train length of 8,500 feet, or 1.6 miles.

- The Federal government, State of Washington and Whatcom County determined that an Environmental Impact Statement (EIS) was required for the development of the terminal under the National Environmental Policy Act (NEPA) and Washington State’s State Environmental Policy Act (SEPA). Drafting of the EIS began in 2013, and it is estimated that completion of a final EIS will require approximately two years. Permitting decisions will not be finalized until after the completion of the EIS.

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Overview of Proposed Gateway Pacific Terminal

The Proposed Location

SSA Marine (SSA) through one of its subsidiaries – Pacific International Terminals, Inc. – is proposing to develop the Gateway Pacific Terminal (referred to as the “terminal” and the “proposed terminal” throughout the report), a full-service dry bulk commodity export-import facility on approximately 1,200 acres at a naturally occurring deep-water location in Cherry Point, Washington. The terminal is designed to accommodate ‘capesize’ ships in order to allow for the movement of a high volume of dry bulk commodities. Capesize ships, which take their name from the fact that they are historically too large to fit through locks of either the Panama or Suez Canals and therefore must travel via Cape Horn or Cape of Good Hope, are capable of carrying up to 250,000 dead weight tons of cargo.

Due to the natural deep-water at Cherry Point, the development does not include the need for dredging, making it an attractive site for a terminal receiving capesize ships. The Cherry Point location is also closer to Asia – and growing importers like China and India – when compared to other U.S. ports. As a result, it would likely take less time – and cost less – to ship goods between Asian markets and the terminal than it would to and from other ports. The result is a shorter duration (and associated lower cost) to deliver and return cargo.

Figure 1: The Central Puget Sound Region of Washington

Figure 1 highlights the terminal location along with the major communities within the central Puget Sound region – the focus of this analysis, which includes King, Kitsap, Pierce and

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2 The project team refers to SSA Marine and Pacific International Terminals, Inc. interchangeably throughout this report as “SSA.” The project team notes, as indicated in the text, that Pacific International Terminals, Inc. is a subsidiary of SSA Marine.

Snohomish Counties. The terminal site is located approximately 60 miles north of Snohomish County’s northern border traveling along I-5 – 15 miles north of the City of Bellingham and 17 miles south of the Canadian border.

The proposed site for the terminal is located in the Cherry Point Industrial Urban Growth Area, which is zoned for heavy-impact industrial use and currently occupied by other heavy industrial facilities. Other facilities currently operating within the Cherry Point industrial area are a BP Refinery, Alcoa-Intalco Works and a Phillips 66 Refinery (formerly known as ConocoPhillips). The BP Refinery handles 234,000 barrels of crude oil per day (at 44 gallons per barrel this equals approximately 10.3 million gallons per day) at their Cherry Point facility. Commodities shipped and stored on site include various grades of gas, liquefied petroleum gas, lubricants and motor oil. From January 2010 to December 2011, Phillips 66 processed 98,100 barrels of crude oil at their Cherry Point refinery. Alcoa-Intalco Works is an aluminum smelter facility. At full capacity, the facility produces 278,000 metric tons of aluminum per year; however, the facility is currently operating at approximately two-thirds capacity – producing 226,000 metric tons of aluminum per year. A graphical depiction of BP Refinery, Alcoa-Intalco Works and the Phillips 66 Refinery in relation to the terminal is shown in Figure 2, along with the placement of respective deep-water docks.

Figure 2: Cherry Point Industrial Urban Growth Area / Existing Facilities and Project Area

Source: Gateway Pacific Terminal website

7 BNSF’s Custer Spur line, seen in Figure 2 jutting west from the main line at Custer and heading south, was built specifically to serve the Cherry Point industrial area in the 1960s. The Custer Spur is a six mile long track that connects the Cherry Point industrial area to BNSF’s main line. Custer Spur currently serves all of the aforementioned facilities in the Cherry Point industrial area and would also serve the proposed Gateway Pacific Terminal.

If Gateway Pacific Terminal is developed, BNSF has proposed to make improvements to the Custer Spur line “to accommodate the number, length, and weight of trains.” These improvements include installing new terminal leads that would connect the Terminal’s tracks to Custer Spur, as many as three additional receiving and departure tracks that would each provide a holding area for an 8,500 foot train to avoid blocking traffic or other trains, and adding support tracks. The “holding areas” and support tracks consist of multiple components, such as a new rail embankments, bridges, new trackage and drainage structures. Custer Spur would have to be upgraded from a jointed track to a continuous-welded track to withstand the weight of the projected tonnage that the Terminal would handle. BNSF has also proposed to construct an additional track along the entire length of Custer Spur, depending on whether the Terminal continues to expand toward its maximum capacity.
Transport of Powder River Basin Coal to the Gateway Pacific Terminal

At full build out, with capacity to handle up to 54 million metric tons of dry bulk commodities per year, the terminal would add a total of 18 new trains per day (9 to the terminal and 9 from the terminal). Individual train length is anticipated to be 8,500 feet, or 1.6 miles.\(^8\)

Initially, upon project completion, coal will be the primary freight transported to the terminal. Previously, the project proposal called for a phased construction plan that would result in full operational capacity by 2026. Early agreements with Peabody Energy were to initially export up to 25 million metric tons of Powder River Basin coal per year from the terminal.\(^9\) The agreement provide Peabody with rights to throughput over the life of the operation of the terminal and the ability to expand capacity in future years.\(^10\) Updated project information in April of 2014 now states that SSA currently has a contract with commodity shippers reserving 75% of the final terminal capacity upon project completion. This updated information concludes that as a result of the 75% capacity contractual reservation by commodity shippers, a phased approach to construction is no longer necessary, and that construction will now occur in one phase, with full project completion occurring in 2019...

The Powder River Basin is a geologic structural basin in southeast Montana and northeast Wyoming. The top ten producing coal mines in the country are located in the Wyoming portion

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\(^8\) Project Information Document, p. 4-50.

\(^9\) Source: Pacific International Terminals

\(^10\) Source: Pacific International Terminals
of the Powder River Basin.\textsuperscript{11} Powder River Basin coal is unique, due to its close proximity to the surface (which makes it less costly to mine) and the massive size of the deposit.\textsuperscript{12}

The terminal would receive Powder River Basin coal via BNSF rail lines. BNSF’s main line runs north-south through the central Puget Sound region. The exact route that will be used to transport coal to and from the terminal has not been determined; however, there are three potential east-west routes to the BNSF north-south main line, which are discussed in more detail in the \textit{Regional Rail Profile} chapter of this report.

\textbf{Figure 4: Regional Rail Routes}

\includegraphics[width=\textwidth]{Figure_4.png}

\textit{Source: Port of Tacoma}

\textbf{Permitting Process to Develop the Gateway Pacific Terminal and Environmental Impact Statement}

In February 2011, SSA submitted a project information document to the State and Whatcom County “to provide the public, the [multi-agency permitting team], decision-makers, and other stakeholders, including affected Native American Tribes, with a detailed description of the proposed project, the potential environmental effects of the project, and measures incorporated into the proposed project to reduce such effects.”\textsuperscript{13}

SSA must obtain multiple permits from federal, state and local governments to develop the terminal.

\begin{flushleft}
\textsuperscript{11}U.S. Department of the Interior, Bureau of Land Management; \url{http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal.html}  \\
\textsuperscript{12}Scientific American website. \url{http://www.scientificamerican.com/article/powder-rive-basin-coal-on-the-move/}  \\
\textsuperscript{13}Project Information Document, p. 1-1.
\end{flushleft}
Examples of Required Permits\textsuperscript{14}

<table>
<thead>
<tr>
<th>Federal</th>
<th>State of Washington</th>
<th>Whatcom County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Water Act-related permits</td>
<td>National Pollution Discharge Elimination System Permits</td>
<td>Major Development Permit</td>
</tr>
<tr>
<td>NEPA permit</td>
<td>General Industrial Storm Water Permits</td>
<td>Shoreline Substantial Development Permit</td>
</tr>
<tr>
<td>Endangered Species and Mammal Protection-related Permits/Authorizations</td>
<td>Coastal Zone Management Consistency Determination</td>
<td>Zoning Variance</td>
</tr>
<tr>
<td></td>
<td>Clean Water Act-related Permit</td>
<td>SEPA Threshold Determination</td>
</tr>
</tbody>
</table>

After reviewing the proposal to develop the terminal, regulatory agencies determined that granting permits to proceed may result in significant impacts to the human environment as a result of the proposed action. The Federal government, State of Washington and Whatcom County determined that an Environmental Impact Statement (EIS) was also required.

In the case of the proposed terminal, a joint EIS is being prepared by federal, state and local agencies due to permit authorization requirements from all levels of government. Therefore, the EIS will fulfill requirements under both the National Environmental Policy Act (NEPA) and Washington State’s State Environmental Policy Act (SEPA). The NEPA and SEPA EIS process is occurring in a semi-coordinated manner on parallel tracks that will be combined near completion.\textsuperscript{15} Drafting of the EIS began in 2013, and it is estimated completion of a final EIS will require approximately two years. Permitting decisions will not be finalized until after the completion of the EIS.

The United States Army Corps of Engineers is responsible for ensuring compliance with NEPA. A Department of Army permit is required to discharge into U.S. waters under the Rivers and Harbors Act of 1899 and the Clean Water Act. Due to the proposed project’s plan to discharge dredged material into U.S. water, requiring a Department of Army permit. The Army Corps of Engineers is the Federal entity charged with reviewing the project for permitting status.

The U.S. Army Corps of Engineers will also consider environmental consequences to affected waterways that are localized to the project construction area and upland components that would result from the Custer Spur improvements proposal submitted by BNSF.\textsuperscript{16}

Because the BNSF project is directly related to the overall development of the terminal, the U.S. Army Corps of Engineers is preparing one analysis that includes environmental implications of both projects. According to a Memorandum of Record stating the U.S. Army Corps of Engineers’ scope of analysis, it will include projected impacts on water resources, biological resources, geological resources, aesthetics, land use, transportation, cultural resources and tribal treaty rights.

\textsuperscript{14} Project Information Document, p. 2-2.
Whatcom County and the Washington Department of Ecology are responsible for compliance with SEPA. Whatcom County has authority to issue or deny Major Project Permits and a Substantial Shoreline Development Permit, both required for the terminal to proceed. The County, along with the State Department of Ecology, will analyze localized rail impacts, possible effects on human health in Whatcom County and potential greenhouse gas emissions that may originate from the proposed terminal operations.

The Department of Ecology has authority to issue or deny Water Quality Certification and National Pollution Discharge Elimination System permits, both required under the Clean Water Act for the terminal project to proceed. Along with impacts specific to Whatcom County, the Department of Ecology will consider and analyze more far-reaching project impacts, by including “a detailed assessment of rail transportation on other representative communities in Washington and a general analysis of out-of-state rail impacts, an assessment of how the project would affect human health in Washington, a general assessment of cargo-ship impacts beyond Washington waters and an evaluation and disclosure of greenhouse gas emissions of end-use coal combustion.”

In order to determine the scope of analysis for the different government entities, there was an extensive public scoping period. During this period, public input was solicited to assist regulatory agencies in determining the breadth of the EIS. Public meetings were held, and comments were accepted online as well as in writing. The scoping process for the proposed terminal lasted for 121 days, and ended on January 22, 2013. A scoping report was released on March 29, 2013, summarizing over 125,000 comments. Comments were categorized to include, but not limited to, issues of concern, comments from agencies, state and local agency comments and comments from interest groups.

Development of the EIS report and analysis is underway. A draft of the joint EIS produced by the U.S. Army Corps of Engineers, the Department of Ecology and Whatcom County, will be shared with the public upon completion. During this time, feedback will be received and new findings and information may be incorporated into the final EIS. According to a joint release from the co-lead agencies, the final EIS is expected to be completed in approximately two years — or sometime in 2015.

**Current Available Research on the Proposed Gateway Pacific Terminal**

Since 2011, six studies have been conducted regarding the potential impact of the proposed Gateway Pacific Terminal. The below summaries provide an overview of the primary focal points of each study and the high-level findings associated with each study.

**Martin Associates**

Study Title: “The Projected Economic Impact of Bulk Coal Terminal at Cherry Point” (July 2011)

Funding Entity: SSA

Martin Associates completed a study in 2011, “The Projected Economic Impact of Bulk Coal Terminal at Cherry Point,” which analyzed the regional economic impacts of the Gateway Pacific Terminal. The study was based on the assumption that the terminal would begin operation in 2015 with permitting completed in 2012 and construction beginning in 2013. As the

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*18 EIS Scoping Summary Report. [http://www.eisgatewaypacificwa.gov/sites/default/files/content/files/GPT_Scoping_Report_0.pdf](http://www.eisgatewaypacificwa.gov/sites/default/files/content/files/GPT_Scoping_Report_0.pdf)*

*19 Additional discussion of the job-related findings of the Martin Associates and Finance & Resource Management Consultants reports is included in the Regional Impacts chapter of this report.*
EIS is not yet complete and the permitting phase is still in process, the timeline of the economic impact detailed in the report would need to be shifted forward several years. It is unclear if the timeline shift would place terminal operations in a significantly different economic environment that would necessitate a revisiting of the modeling assumptions.

The analysis focused on four areas of impact: business revenue, employment (direct, indirect and induced), personal earnings, and tax revenue.

Martin Associates used the U.S. Bureau of Economic Analysis’ Region Input-Output Modeling System multiplier for construction activity in Whatcom County and projected job growth related to the construction and operation of the terminal. The study projected 7.4 million person hours supported by direct Phase One construction (based upon input construction costs of $536 million) and 10.1 million person hours of indirect and induced activity.

The analysis estimated that the operation of the terminal, upon completion of Phase One, would create 294 direct jobs and 569 induced and indirect jobs, for a total of 863 annual jobs. The Martin report also estimated that upon completion of Phase One of construction, the terminal’s operation would annually generate approximately $12.0 million of local purchases and the total state and local tax benefits associated with Phase One operation would be approximately $8.1 million per year.

The study projected 1.8 million person hours supported by direct Phase Two construction (based upon input construction costs of $129 million) and 2.4 million person hours of indirect and induced activity. The analysis estimated that the operation of the terminal, upon full build out, would create 430 direct jobs and 799 induced and direct jobs, for a total of 1,229 annual jobs. Among the 430 direct jobs, the report estimated 213 would be members of the International Longshore and Warehouse Union, 66 would be railroad-related, 71 would be in maritime services, 44 would be terminal operators, and 36 would be for pilots and tugs. The Martin report estimated that upon completion of Phase Two of construction, the terminal’s operation would annually generate approximately $17.1 million of local purchases and the total state and local tax benefits associated with Phase Two operation would be approximately $11.2 million per year.

Finance & Resource Management Consultants
Study Title: “Review of Martin Associates Economic Impact Study” (October 2011)
Funding Entity: SSA

SSA retained Finance and Resource Management Consultants, Inc. to review the Martin Associates economic impact report. Finance and Resource Management Consultants used an impact analysis for planning (IMPLAN) modeling system to generate its employment estimates. The consultants used this input-output model to assess the assumed economic impact of Phase One construction costs of $536 million and Phase Two construction costs of $129 million.

The economic impact model yielded a total that is reported in person hours, but the consultants also described person hours in worker-years. They assumed 2,080 hours worked per worker-
year. The model calculations for Phase One of construction yielded an estimate of 1,648 direct job years and 1,318 induced and indirect job years.24 Phase Two construction yielded an estimate of 372 direct job years and 298 induced and indirect job years. Finance & Resource Management Consultants utilized Martin Associates’ estimate of direct job years created by operation of Phase One of the proposed terminal, and estimated that 576 induced and indirect annual jobs would result – for a total of 870 annual jobs (Martin estimated 863 annual jobs). Again using the Martin Associates’ estimate of direct jobs created by the operation of the terminal at full build-out, the consultants estimated that an additional 267 induced and indirect annual jobs would result – yielding a total of 403 annual jobs (Martin estimated 366 annual jobs). Combined, Finance & Resource Management estimated the total annual jobs created from the operation of Phase One and Phase Two of the proposed terminal was 1,273 (Martin estimated 1,229 annual jobs).25

The consultants found Martin Associates’ direct job growth projections to be reasonable. However, there was not consensus on the potential induced and indirect employment attributable to Phase One and Phase Two construction. Finance & Resource Management Consultants’ estimate of 1,318 indirect and induced construction job years from Phase One was 45.7 percent – or 1,109 job years – below that of Martin’s assessment of 2,427 job years. Due to this difference, and a slightly smaller direct construction of Phase One job years estimate (7.5 percent less, or 1,648 job years compared to Martin Associates’ projection of 1,781 job years), Finance & Resource Management Consultants’ estimate for total Phase One construction jobs was 29.5 percent below the Martin assessment (2,966 job years versus 4,208 job years). As Finance & Resource Management Consultants noted, the variance could be due to classifications used as well as the different input-output models used in each analysis.

A similar variation between Martin Associates’ projections and Finance & Resource Management Consultants’ projections continued in Phase Two construction and operation projections. Martin Associates estimated 429 direct job years resulting from construction of Phase Two and Finance & Resource Management estimated 372 direct job years – 13.3 percent lower. Martin Associates estimated that 584 induced and indirect job years would result from Phase Two construction, while Finance & Resource Management estimated a result of 298 indirect and induced job years – 49.0 percent lower. As a result, the Finance & Resource Management’s total Phase Two construction job year estimates were 33.9 percent below Martin Associates’ estimates (670 job years versus 1,013 job years). Again, as Finance & Resource Management Consultants noted, the variance could be due to classifications used as well as the different input-output models used in each analysis.

Parametrix
Study Title: "Coal Train Traffic Impact Study" (October 2012)
Funding Entity: City of Seattle

Parametrix’s October 2012 study for the City of Seattle sought to evaluate the impacts of coal

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24 According to Finance & Resource Management Consultant’s report, “[j]obs are workers hired per year, assuming a 2-year construction period and that labor is smoothed out so that the number of workers utilized in the first year is the same as the second.”
25 Project impacts were estimated in terms of job years – the number of employees needed to complete the project in one year – as well as person-hours. Construction-related jobs are shown as workers hired per year. Based on SSA’s projected construction costs, the initial two-year construction phase of the project would generate 3,400 direct job years and 3,800 indirect/induced job years. The first eight years of the proposed Terminal’s construction and operation are projected to yield 294 direct jobs per year and 573 indirect/induced jobs per year. The total estimated impact of the first ten years of the Terminal’s construction and operation, based on SSA’s projections, are 575 direct jobs per year and 838 indirect induced jobs per year.
train operations on existing train and traffic operations and affected stakeholders in the City's North Waterfront and South Downtown districts. The study identified economic stakeholders in the Seattle area affected by increased rail volumes and the potential effects on those stakeholders from increased rail traffic. The study identified risks related to projected increases in rail crossing gate-down time and the resulting negative effect on traffic flows to and from the waterfront area.  

The spacing and timing of the increased rail traffic related to the terminal is important to further understand the potential impact on traffic flows, rail traffic, passenger rail traffic and potential needs for mitigation. Parametrix's work for the City of Seattle assumed an even spacing of trains throughout any given 24 hour period, which resulted in the finding that train traffic would impact motor vehicle traffic at peak travel hours and potentially cause substantial delays. BNSF may or may not schedule the coal train traffic at equal intervals over a 24 hour period. BNSF, however, declined to provide information for Parametrix's work, so an equal interval model was used.

The study identified the possibility of grade separation at the most congested intersections as a possible mitigation strategy. In Seattle, grade separation at Broad and Holder Streets has been suggested in past studies; however, it would require substantial capital investment. The Parametrix study suggested that, if increased train traffic causes widespread traffic congestion and an increase in accidents, such improvements may be warranted in the future – particularly, if the negative societal and/or economic impacts of congestion exceed the cost of mitigation.

The study also noted several lower-cost mitigation strategies to bridge the gap. Installation of variable message signs warning drivers of delays and suggesting alternate routes could decrease the length of vehicle queues at down crossing gates. Installing double gates could decrease the incidence of improper vehicle crossings. In lieu of double gates, photo enforcement of down gates could also be utilized to decrease infractions. Improving pedestrian crossing visibility could also decrease the likelihood of improper pedestrian and bicycle crossings at down gates.

Community Attributes, Inc.
Study Title: "Economic Analysis of Proposed Coal Train Operations" (August 2013)
Funding Entity: City of Seattle

In August 2013, Community Attributes, Inc. produced an economic impact analysis of the proposed coal train traffic to the terminal on the City of Seattle. The study focused on three primary questions:

- What impact will the proposed coal train route have on operations, employment and sales for proximal businesses and industry including the Duwamish industrial site, the North Waterfront District and operations at the Port of Seattle?
- What does increased demand for Seattle’s rail infrastructure mean for future capacity?

28 Depending upon the spacing and timing of the increased rail traffic, the length of vehicle queues could be affected. Parametrix concluded that if the coal trains operate at 20 miles per hour or greater, the length of the queue would not be affected; however, with greater frequency of trains and unknown spacing of trains, queues may or may not fully dissipate prior to the next gate closure. Parametrix found that additional gate closures could result in increased improper crossings by pedestrians, bicyclists and/or vehicles. The study additionally identified a potential impact of increased rail traffic potentially constraining or blocking access for emergency vehicles.
• What additional infrastructure improvements or policy measures are required to support coal train operations or to mitigate coal train impacts?

This study found the primary economic beneficiaries of the terminal’s activity to be in areas closest to the Cherry Point. SSA is headquartered in Seattle, and increased revenue for the firm may result in a small positive impact in Seattle. In addition, an increase in state tax revenue generated from the terminal’s operation could benefit Seattle. The report also cites BNSF interviews that suggest increased rail traffic could lead to infrastructure improvements (privately funded) that may increase the competitiveness of the Port of Seattle.

Community Attributes’ interview with the Port of Seattle highlighted the potential benefit of increased train traffic which could lead to “triple-tracking” through the city. The increase in capacity could spur further investment at the Port and lead to a separation of commuter and freight rail lines. The Port does not anticipate increased bulk exports from Cherry Point to affect the current volume of exports from Seattle due to the different categories of product shipped from each port.

The report found that the addition of up to 18 coal trains per day running through the City – nine in each direction – has the potential to create several negative externalities which may impact business competitiveness, consumer spending, travel costs and quality of life for residents within the affected area.²⁹

The study analyzed current crossing data at the Broad, Holgate and Lander Street crossings using video recordings to estimate current traffic volumes and gate-down times in order to establish a baseline for the increase in coal train traffic. The study found that a potential increase in traffic delays at grade crossings would have a quantifiable effect on businesses and consumers in the affected area. To provide a dollar estimate of the impact of increased traffic delays, Community Attributes used a Value of Travel Time equation.³⁰ Based on an assumed increase of 18 coal trains per day, the cost due to traffic delays would be between $79,000 and $254,000 annually. It should be noted that this estimate is only for the three intersections studied, and an extrapolation of the increase in gate-down time across all eight affected crossings leads to a total estimated annual impact of between $384,000 and $455,000.³¹

Several mitigation strategies for alleviating projected traffic congestion caused by increased coal train traffic were included in the study. The Seattle Fire Department estimated that a traffic condition interface to better allocate emergency service vehicles in areas of high congestion would cost $150,000 to install. Additionally, if emergency response times to the North Waterfront and SODO³² increase to a level that warrants the relocation of Fire Station 14, the potential cost is estimated to be $9.5 million in addition to the cost of acquiring a site. Several reports have noted the possibility of constructing a grade separation at the Lander Street crossing, but that project is estimated to cost at least $100 million.

²⁹ The study found that the areas most affected by increased coal train traffic are the North Waterfront and the Duwamish industrial zone which includes the South Downtown (SODO) district. The four at-grade crossings impeding traffic flow to these areas are the Wall Street, Broad Street, Clay Street, and Vine Street crossings. 2011 Census data shows 16,973 jobs in the North Waterfront district with the highest concentration of jobs in the service industry. 2011 Census data shows 43,677 jobs in the SODO district with a higher concentration of both retail jobs and manufacturing/warehouse jobs.
³⁰ “The cost of time spent in travel including the costs to consumers of personal (unpaid) time spent on travel, and costs to businesses of paid employee time spent on travel.” Community Attributes Inc., p. 22
³² SODO is the acronym for Seattle’s South of Downtown neighborhood.
The study also found that residential property values in proximity to the coal train route in Seattle can be expected to decline between $117.5 million (5 percent of residential property values) and $282.3 million (12 percent of residential property values). According to Community Attributes, commercial property values can be expected to decline between $95 million (5 percent of commercial property values) and $133 million (7 percent of commercial property values). Industrial property values are expected to decline by roughly $59.4 million (5 percent of industrial property values). It is important to note that this decline may be offset (partially or fully) by property value increases in other areas of the city. A secondary issue related to property value decline is the concurrent decline in property tax revenue to the city and state. If the decline along the coal train route is not offset by gains in other areas, the effect of less property tax revenue can be expected to impact state and local budgets along the corridor.

Western Washington University’s College of Business and Economics
Study Title: “Coal Exports from the Pacific Northwest and the Economic Growth of the Northwest Economy” (June 2013)
Funding Entity: Washington State Farm Bureau

The Washington State Farm Bureau engaged Dr. Steven Globerman of Western Washington University’s College of Business and Economics to examine whether the growth of bulk exports in Washington would be a cost or benefit to the agricultural community.33

The report discussed benefits to state and national economies as a result of investments in bulk commodity terminals, specifically Gateway Pacific Terminal and Millennium Bulk Terminal at Longview. According to the report, previous research on the proposed terminals lacked emphasis on economic benefits to the state and nation as a whole – with a focus on local impacts that tend to be negative. This report focused on “upstream” benefits, such as higher incomes for expanding industries and lower costs for consumers in the regional and national economy.34 The study identified potential positive impacts on international trade for other bulk industries, such as agriculture, from increasing coal exports.

The report analyzed implications of increased efficiencies as the result of shippers’ capacity to share infrastructure. Efficiencies in capacity to share infrastructure may be seen as an economy of scale (when increased production of a good produces lower average unit cost of the good) due to the volume of goods handled by the two facilities which could allow shippers using those facilities to enjoy lower unit costs. Lower unit costs could potentially generate and grow the State’s international trade and associated economic benefits to producers and consumers. Additionally, the study indicated that to the extent the two terminals encourage or require investments in rail infrastructure, other customers of the rail lines may benefit and the investment would be more enticing to the rail line because it would create economic benefits for more than just the terminals (including the rail line).

Economies of scope (when it is cheaper to produce two or more products together than to produce each individually) were identified as an additional efficiency opportunity that may result from the proposed Gateway Pacific and Longview terminals. Both terminals would handle multiple commodities and, if it would be cheaper to process multiple types of bulk goods at the same port as opposed to building a separate, specialized terminal, the terminals may realize cost savings which could be passed along to shippers and consumers.35

35 The report indicates the benefit could arise from a port’s terminals sharing rail infrastructure and other services that would
The study suggested that, assuming increased efficiency equates to lower costs for shippers, higher profits may drive business activity, thereby creating jobs while allowing for higher incomes. Reduced shipping costs, as a result of increased capacity provided by the proposed terminals, may encourage increased export and import of bulk commodities other than coal, such as the agriculture, wood and metal. Bulk commodities originating in Washington would benefit the economy by increasing employment and income levels within the state. The report also noted that consumers would benefit from lower import costs of consumer products as a result of the additional terminals.

Public Financial Management, Inc.
Study Title: “The Impact of the Development of the Gateway Pacific Terminal on the Whatcom County Economy” (March 2012)
Funding Entity: Communitywise Bellingham

In November 2011, Public Financial Management was commissioned by Communitywise Bellingham to conduct an independent review of the potential economic impacts associated with the development of the Gateway Pacific Terminal. The report built upon the projections from the Martin Associates’ study, as well as the Finance & Resource Management Consultants’ review of the Martin report. However, Public Financial Management sought to expand the analysis to consider other factors that might affect the economic impacts of the terminal. The report also sought to quantify potential negative effects of terminal operation and the degree to which these effects may alter the net economic impact of the terminal. Finally, the report included a discussion of potential risks and benefits (projected by Martin and Finance & Resource Management Consultants) associated with terminal operation in terms of the importance of risk management in making policy decisions related to the terminal.

Public Financial Management utilized the Martin Associates and Finance & Resource Management Consultants economic analyses to outline the projected direct and induced employment in the Whatcom County region. The report then sought to put the job growth numbers in the context of the greater economic health of the region by exploring other potential impacts of the terminal’s construction.

The analysis suggested that to the extent that the development and operation of the terminal would lead to an increase in rail traffic in Bellingham and other parts of Whatcom County, there would be costs offsetting positive economic impacts – particularly given the number of active rail crossings in the city.

The report found that the terminal’s impact on other job growth and economic development strategies may be even more significant. To the extent that the terminal’s construction and operation could put other projected or planned growth at risk, it is possible that even if all of the projected employment benefits of the terminal were achieved, it could still have a net negative overall employment impact on Whatcom County’s economy. If the development and operation of the terminal led to the loss of more than 17 percent of projected job growth in Whatcom County between 2012 and 2021, or more than 13 percent in the ten-year period after construction begins, the result would be a net loss in employment in the county.36

The Public Financial Management report also concluded that the planned development and operation of the terminal could pose a specific risk to redevelopment plans for the Bellingham waterfront. State and local agencies have committed more than $40 million to the redevelopment of the former Georgia Pacific site in downtown Bellingham. The Port of Bellingham projected that over 25-30 years, redevelopment of the site could produce $1 billion in investment – including a net increase of 5,600 direct jobs alone. However, surface street access to the redevelopment area is bisected by the BNSF main line at several at-grade crossings. The redevelopment site is also located close enough to the main line to be negatively impacted by noise and vibration from increased train traffic. As a result, to the extent that development and operation of Gateway Pacific Terminal increases rail traffic and limits access to the waterfront, it could reduce the feasibility of redevelopment and reduce the number of resulting jobs.

Public Financial Management’s work indicated that the risk of offsetting reductions in projected job growth is largely due to train traffic. The operation of the terminal would lead to a significant increase in rail traffic through Whatcom County, especially through downtown Bellingham.

The report indicated that impacts to Whatcom County are most significantly represented in the City of Bellingham due to its role as the economic center of the county. Approximately 60 percent of all employment in the county is in Bellingham, and Bellingham businesses generate more than three-quarters of all retail sales in Whatcom County. In 2010, more than half of all revenue related to accommodation and food services, and more than half of all residential home sales occurred in Bellingham. Despite accounting for just 1.3 percent of total land in the county, 36 percent of total assessed county property value was in Bellingham.

Public Financial Management identified additional potential risks beyond the risks to baseline forecasted growth. These risks were related to tourism and the in-migration of skilled workers and entrepreneurs to the region’s economy. Again, these risks were related to both the projected increase in rail traffic and potential stigma associated with the transport of large amounts of coal through Whatcom County.

The report highlighted the fact that if the development of the terminal proceeds, steps can be taken to reduce the impact of additional rail traffic through re-routing of rail traffic, new overpasses or changes to the street grid. Those steps could increase the likelihood of net economic benefits for Whatcom County and Bellingham. Such steps, however, come at a cost that – to date – no party has assumed. To the extent that those costs are assumed by the public, it would reduce the net fiscal benefit of the terminal’s development to the public.

Finally, the report suggested that the majority of tax revenue generated by the construction and operation of the terminal would go to the State rather than local governments. This is based on SSA’s projections for the generation of tax revenue from the project and current respective tax rates for Bellingham, Whatcom County and Washington. If these projections and the current makeup of tax revenue are taken into consideration in tandem, the State would receive roughly 60 percent of tax revenue generated by the terminal during the first ten years of its operation.
Regional Rail Profile
Regional Rail Profile: In Brief

- Rail freight service in the Puget Sound region is largely provided by Burlington Northern Santa Fe (BNSF) and Union Pacific (UP). Service is provided along a north-south main line that runs roughly parallel to Interstate 5 and three east-west routes that cross the Cascade Mountains. In addition, a number of short-line railroads provide service that connects to these routes.

- Rail freight volume in the region has significantly increased over the years and is projected to continue increasing over the next twenty years – consistent with national and statewide trends. Between 1991 and 2010, rail freight volume traveling through Washington grew by 81 percent – from 64 million tons to 116 million tons.

- The State Department of Transportation projects that statewide freight rail volume will grow by an additional 130 percent by 2035. In the Puget Sound region, marine-related rail freight increased from under 20 million tons in 1998 to 32.6 million tons in 2010: marine related rail freight in the region is projected to grow by at least 52.2 million tons by 2030 – a 160 percent increase.

- Most goods moving by rail through the state and the region are agricultural or farm products – including cereal grain and animal feed. Projected growth in rail freight volume is driven by an increase in dry bulk (non-grain) materials and containers.
• Rail service is critical to the operations of the Ports of Seattle, Everett and Tacoma, which together account for $105.2 billion in export and import activity annually. Port officials report that between 60 and 70 percent of all goods moving through the ports are moved, at least in part, by rail.

**Estimated Value of Goods Moved to/from Ports of Everett, Seattle and Tacoma by Rail**

<table>
<thead>
<tr>
<th>2012 Est. Value of Imports and Exports - Port of Tacoma, Port of Seattle, Port of Everett</th>
<th>Minimum Est. Percentage of Goods to/from Ports Moved by Rail</th>
<th>2012 Est. Value of Goods Traveling on Rail to Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>$105.2 billion</td>
<td>60%</td>
<td>$63.1 billion</td>
</tr>
</tbody>
</table>

• Rail service is also critical to Pierce, King and Snohomish Counties’ $50 billion per year export market. For example, transportation equipment accounts for more than 70 percent of metro area exports, most of this related to aerospace. Boeing, one of the area’s major transportation equipment manufacturers, relies on rail for transportation of parts.

• The central Puget Sound region is also increasingly dependent on rail for the movement of people. Between October 2012 and September 2013, there were 1.28 million Amtrak on/offs in Washington: more than 60 percent were at three of the state’s most used stations that serve the region – Seattle (which, alone, accounted for nearly 50 percent of the statewide total), Tacoma and Olympia/Lacey. In 2012, there were more than 2.8 million boardings (riders) on the Sounder commuter rail service – up by 10.5 percent in one year: in 2013, boardings (riders) were up by approximately 9 percent through September. The State Rail Plan projects continued growth in passenger rail use through 2035.

• Projections for increased rail freight volume do not include service to proposed new or expanded terminals in the Pacific Northwest. In addition to the Gateway Pacific Terminal, there are proposed new terminals at Longview (Cowlitz County, Washington) and Port of Morrow (Oregon) and terminal expansion projects at Ridley Terminal, Fraser Surrey Docks, Neptune Terminal and Westshore Terminal (all in British Columbia). If all of these projects were approved and went forward to full build out, there could be more than 110 million additional metric tons of freight – mostly coal – to be transported on rail lines in or serving the Puget Sound region: this is the equivalent of nearly double the total volume of rail freight currently traveling through Washington. Within the central Puget Sound region, approximately 65.25 million metric tons (54 million metric tons of which would be attributable to Gateway Pacific Terminal) could be transported via rail.
Coal Volume that Could Move Through Central Puget Sound Region by Rail if all Projects Approved and Operated at Full Capacity

<table>
<thead>
<tr>
<th>Coal Volume that Could Move Through Central Puget Sound Region by Rail if all Projects Approved and Operated at Full Capacity</th>
<th>Annual Million Metric Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway Pacific Terminal</td>
<td>54.0</td>
</tr>
<tr>
<td>Fraser Surrey Docks</td>
<td>8.0</td>
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<tr>
<td>Ridley Terminal (current contract volume potential)</td>
<td>2.5</td>
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<tr>
<td>Westshore Terminal (current contract volume potential)*</td>
<td>0.75</td>
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<td>Millennium Terminal (Longview)</td>
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<tr>
<td>Port of Morrow</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>65.25</td>
</tr>
</tbody>
</table>

*Assuming 25 percent of increased capacity

Note: Potential Canadian terminal volume may or may not move through region depending upon multiple variables

- The recent increase in Bakken crude oil being transported by rail is also not considered as part of Washington State Rail Plan freight rail projections. Refineries located in the Puget Sound or at Cherry Point, the location of the proposed Gateway Pacific Terminal, are current destinations for Bakken oil – with future growth expected in shipments. Nationally, reliance on rail for the transport of crude oil has grown from 11,000 carloads in 2009 to approximately 400,000 carloads in 2013. More than 70 percent of Bakken crude oil is now transported by rail, compared to just 25 percent in 2012.  

37 One metric ton is equal to 1.10231 U.S. tons (also known as short tons).
38 Additional growth in freight rail volume resulting from the transport of Bakken oil is outside the scope of the economic and transportation analyses contained in this report.
Movement of Goods and People by Rail in the Central Puget Sound Region

The goal of the Regional Rail Profile is to provide policy makers and the public with an overview of the current state of the region’s rail system. The discussion includes freight and passenger data as well as the number and type of goods traveling on the region’s rail lines, based on current rail volumes. This helps inform discussions on the impact of the Gateway Pacific Terminal and other projects on rail capacity and the overall regional economy.

Regional Rail System in Central Puget Sound

The history of the central Puget Sound region is heavily intertwined with that of the railways. Railways dominated both passenger and freight transportation for the final four decades of the 19th century and the first half of the 20th century. Today, the vitality of the region’s port facilities is directly tied to the availability of reliable, efficient freight rail transportation.

Presently, the central Puget Sound’s rail system is a major component of the region’s economic success; it facilitates the transport of people and goods within and outside the four-county region. Manufacturers and industrial products firms rely on long-distance rail transportation as a more cost-effective means of accessing distant inland markets. Millions of riders annually use passenger and commuter rail systems that serve the region.

The presence of a number of rail main lines for both freight and passenger rail in Washington State and the central Puget Sound region provide critical access and economic opportunities to the region (see Figure 5 and Figure 6). Two large railroads dominate rail freight transportation in the western United States – Burlington Northern Santa Fe (BNSF) railway and Union Pacific (UP). BNSF dominates Washington state freight rail transportation – carrying nearly 80 percent of 2010 tonnage that traveled within the state.

One main line rail line travels north-south through the central Puget Sound region parallel to I-5. It is the backbone of the region’s rail system and travels the length of the entire state of Washington (and farther) from the Canadian border to Vancouver, Washington before continuing on to Oregon and California. In Washington, the route is operated by BNSF. Union Pacific has rights to operate from Vancouver, Washington to Tacoma, Washington and owns the line southward in Oregon and California. This corridor is used by BNSF and UP freight trains, and Amtrak and Sounder commuter rail trains.

Three east-west lines connect to the main line to allow trains to pass over the Cascade Mountains from points east, such as the nation’s largest rail hub in Chicago.

The three east-west lines that connect to the main line and allow trains to pass over the Cascade Mountains from points east are:

- **Stevens Pass Line**: The northern-most route connects Everett, WA and Spokane, WA. Presently, this line is BNSF’s primary route for intermodal traffic. According to a report prepared for the Pacific Northwest Rail Coalition, BNSF has indicated that, in the future, the Stevens Pass line will be reserved for intermodal and passenger traffic rather than for bulk trains.

- **Stampede Pass Line**: The middle or central route over the Cascade Mountains connects Auburn, WA to Pasco, WA. The steep grade over Stampede Pass makes it unsuitable

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for loaded bulk trains due to their weight and the tunnel height at Stampede Pass makes it unsuitable for double-stacked intermodal container trains. The Stampede Pass Line could, however, be used as a designated east-bound route for empty bulk trains and some east-bound single-stack container traffic to alleviate congestion on the southern-most route, the Columbia River Gorge. In a discussion with the Project Team, the railroad indicated that the use of heavy locomotives could potentially make the Stampede Pass a viable option for transport. Additionally, the railroad suggested it could re-route lighter trains traveling on the Columbia River Gorge line and send them over the Stampede Pass line to allow sufficient capacity for heavy bulk trains to travel on the Columbia River Gorge line.

- **Columbia River Gorge Line:** The southern-most route available for trains passing over the Cascade Mountains is along the northern bank of the Columbia River Gorge (within Washington State). In 2010, the Washington State Department of Transportation estimated that nearly 94 percent of all east-west bulk cargo rail traffic in Washington was transported using this route.

Short-line railroads provide a vital link to the BNSF, Union Pacific and the national rail network. Tacoma Rail, a city-owned rail operation, is the largest of these – it switches around 69,000 cars each year and operates around 200 miles of track in the Tacoma region. Short lines serve as sub-agents to the large network carriers, handling cars for rail clients on light-density lines.

**Figure 5: Rail Routes to the Central Puget Sound**
Reliance on Rail for the Movement of Goods Nationally, in Washington and in the Puget Sound

Nationally, over the last three decades, the amount of freight traveling by rail has increased dramatically as rail capacity has declined. As a result, ton miles – a ton of freight moved one mile – per mile of track tripled from 1980 to 2006; in essence, the railroads are more productive, moving more with less miles of track. An important reason for this result is that railroads are strategically divesting and abandoning unproductive lines.

While rail freight volume declined during the 2008-2009 recession, it has since rebounded. Figure 8 shows the effect of the recession on freight train activity from 2008 to 2014 as measured by actual number of revenue units (carloads or intermodal).

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43 Cambridge Systematics. “The National Rail Freight Infrastructure Capacity and Investment Study,” September 2007. The report was prepared commissioned by the Association of American Railroads on behalf of the National Surface Transportation Policy and Revenue Study Commission.
Washington and the central Puget Sound region have both experienced similar growth in the reliance on rail freight. Between 1991 and 2007, the amount of freight carried by rail in the state increased from 64 million tons to 116 million tons – growth of 81 percent. While rail freight volume declined during the 2008-2009 recession, rail freight tonnage in Washington has rebounded to pre-recession levels of volume.

In 2010, the State’s rail system handled approximately 116 million tons of cargo – with approximately half of that volume resulting from cargo imported to the state, while 16 percent of the volume was outbound. Of the 82 million tons of cargo traveling by rail that originated or terminated in the state, approximately 50 million tons flowed from domestic trade and approximately 32 million tons flowed from international trade.

Many of the freight rail trips in the Puget Sound are destined for the midwestern United States, specifically to or through Chicago, Minneapolis and the Ohio Valley. A common refrain in the central Puget Sound region is that approximately 70 percent of goods moved by rail are shipped to or through Chicago. This is supported by the fact that over 75 percent of all rail movement in the region is related to port activities and the movement of goods to or from the ports to points east to or through Chicago. Additionally, the presence of the UP rail line provides additional

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47 It is important to consider that higher volume (million tons) does not always equal more rail traffic. Bulk and general merchandise service types carry more tons per unit than the intermodal and auto service types.
48 Inbound flows: Rail movements that terminate in Washington; Outbound flows: Rail movements that originate in Washington; Through flows: Rail movements that neither originate nor terminate in Washington; Local flows: Rail movements that both originate and terminate in Washington.
access to move goods from central Puget Sound ports to locations in the mid-western and eastern United States.

**Figure 11: Freight Rail Flow to/from Washington (2010)**

![Rail Flow Diagram](source: Washington State Rail Plan via confidential 2010 STB Carload Waybill sample data)

**Economic Importance of Rail to Central Puget Sound Region**

While detailed data on the value of commodities traveling by rail is not easily obtainable, it is possible to articulate the value of rail freight to the regional economy by focusing on the role that rail freight plays in the region’s export and import activity.

Commodity flows in the central Puget Sound move primarily through the Ports of Seattle, Tacoma and Everett. Together, the Ports of Seattle and Tacoma are the third largest container hub in North America.\(^{49}\)

In 2012, the value of imports and exports at the Ports of Everett, Seattle and Tacoma totaled $105.2 billion -- $65.8 billion in imports and $39.4 billion in exports.\(^{50}\)

The ports estimate that approximately 60-70 percent of shipments are moved by rail. If just 60 percent of total export and import value at the ports were attributed to rail activity, the value of those commodities traveling through the three ports alone would exceed $63.1 billion a year.

While not all exports traveling through the Ports of Everett, Seattle and Tacoma are manufactured in the Puget Sound region, a portion of total exports are produced in the region. And key local manufacturers depend on rail access.

In 2012, when combined, King, Pierce and Snohomish Counties were the 5th largest export market in the United States, with shipments totaling $50.3 billion.\(^{51}\)

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\(^{50}\) U.S. Census Bureau Foreign Trade Division data.

\(^{51}\) The U.S. Department of Commerce defines the Seattle metropolitan area as King, Pierce and Snohomish counties.
accounted for more than 78 percent of all merchandise exports in the state. By far, the largest export sector in the region is Transportation Equipment – which accounted for $36.1 billion or 71.8 percent of the region total – a reflection of the presence of Boeing and the region’s strong aerospace industry.52

### Boeing and Rail Freight

Boeing transports fuselages used in the production of Boeing 737 aircraft via rail from Wichita, Kansas to Boeing’s Renton, Washington factory. The preferred transport route is on the BNSF rail line over Stevens Pass and to the main line through Seattle and then on to Renton. Currently, three to four fuselages are shipped on a single train approximately two times a week. Additionally, the Port of Everett serves as an important import facility for Boeing.

The Boeing Company is increasing their production of 737’s from 38 to 47 planes per month in 2014. As production increases, there will be increasing pressure to receive just-in-time parts at the airplane assembly plants. The Boeing Company opened their Mt. Baker facility between Mukilteo and Everett in 2008 to relieve pressure on the BNSF main line and to improve predictability of just-in-time parts delivery to the Everett factory. These deliveries occur approximately two times per week.

Oversized parts are transferred from barge to rail at the Mt. Baker facility and delivered to the Everett factory. The BNSF main line closes for approximately 10 to 15 minutes while the trains delivering parts exit the Mt. Baker facility. Right–sized parts from California are shipped via rail directly into the Everett factory.

Much of the export activity at the Port of Everett is related to Boeing. Oversized aerospace parts arrive at the Port’s terminals and are ultimately transported by rail from its Mount Baker Terminal to Boeing’s facilities.

### What Goods Travel by Rail?: Reliance on Rail by Commodity and Rail’s Role in Imports and Exports

Freight rail commodity data is notoriously difficult to profile for a specific region or urban area. Detailed information and data are proprietary. Carriers do report overall system traffic volumes to the U.S. Department of Transportation’s Surface Transportation Board. The Surface Transportation Board develops a waybill sample for rail freight shipments that may be provided, on a confidential basis, to state planning agencies for their use in public planning efforts.53 The federal government also provides data through the Freight Analysis Framework (FAF): FAF data, however, may be unreliable at the region-level, especially for the value of freight.

“The FAF does not provide local detail or temporal (seasonal, daily, or hourly) variation in freight flows that are typically necessary to support project planning. While statistical methods exist that allow analysts to disaggregate FAF data from FAF regions to counties or smaller areas, FHWA has not measured any of these methods to establish estimates of reliability or accuracy.”64

53 Waybills are forms used on railroads to help route each car from its point of origin to its destination.
54 The Freight Analysis Framework (FAF) is a compilation of data and products that provides estimates of freight shipped to (imports), from (exports), and within (domestic) the United States. http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/afaf3/userguide/
For our analysis, we rely on the 2007 and 2010 Surface Transportation Board Waybill sample data, assembled in redacted manner, by the Washington Department of Transportation. Additional data are from the regionally-organized port volume projections from the Pacific Northwest Marine Cargo Forecast Update and Rail Capacity Assessment and the Washington State 2013-2035 Rail Plan.55

According to the State’s 2013-2015 Rail Plan, on a tonnage basis, in 2010, approximately half of all rail traffic with a final destination in the state came from out of state. Most of this tonnage was associated with bulk commodities (e.g. agricultural products, crops, etc.). Additionally, the State’s 2013-2035 Rail Plan indicates that, in 2010, outbound traffic, trains that originate in Washington but terminate in another state, represented approximately 16 percent of all rail traffic – much of it associated with consumer goods in containers. The Rail Plan forecasts that this intermodal traffic will increase by 2035 to represent 18 percent of all traffic and more than double the tonnage (from nearly 20 million tons in 2010 to nearly 50 million tons in 2035).

Statewide in 2010, based on tonnage, more than 40 percent of commodities originating or terminating in Washington by rail were cereal grain (25 percent) or other agricultural products (17 percent): animal feed and products made up an additional five percent. Mixed freight made up 12 percent of rail freight volume; coal made up 12 percent of tonnage; waste and scrap made up 5 percent of tonnage; and no other commodity accounted for more than five percent of tonnage.56

**Figure 12: Top Rail Commodities by Tonnage (2010 actual and 2035 projected)**

Tonnage originated or terminated in Washington

According to 2007 Surface Transportation Board Waybill data compiled by the Washington Department of Transportation and published by PSRC, approximately 60 percent of all freight carried by rail for export from the central Puget Sound region were farm products – 16.5 million tons of a total 27.6 million tons. Nearly 55 percent, or 7.1 million tons, of the total 13.1 million tons of imported goods were miscellaneous mixed goods – which likely indicate containerized shipments that enter through regional ports and are shipped by rail to locations across the country.57

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Interviews with the regional ports approximately confirmed the 2007 commodity composition. The ports estimated that the highest volume commodities exported via rail include grains, animal feeds and other base-type commodities, paper, scrap metal, finished lumber, wine and Washington produce. The highest volume imports that move by rail are estimated to be consumer items such as electronics, furniture, apparel, auto parts and other manufactured items as well as crude oil, agricultural equipment, lumber, frozen meat and military equipment.  

58 Interviews Port of Seattle staff and Port of Tacoma staff.
Washington State’s 2006 Rail Capacity and Needs Study projected a total rail tonnage flowing through the Puget Sound region. While the pre-recession projection total for freight tonnage moving through the Puget Sound region was greater than the actual tonnage that flowed through the state in 2007, the proportionality of carload tons (bulk) to intermodal tons – over 80 percent of tonnage as carload (bulk) tons and less than 20 percent of tonnage as intermodal tons – carried through the Puget Sound region on the rail network provides another source for estimating rail freight volume by type flowing through the region.  

Finally, the Pacific Northwest Marine Cargo Forecast Update and Rail Capacity Assessment also provides actual data – as well as forecasts -- on cargo projected to move through public and private marine terminals on Puget Sound and the Washington Coast. The assessment uses different categories of commodities than the waybill data and the state data. Under both the moderate and high growth forecasts, increases in dry bulk cargo appear to drive future growth.

**Figure 15: Puget Sound & Washington Coast Freight Mixture Forecast Moderate Growth Scenario**

![Graph: Puget Sound & Washington Coast Freight Mixture Forecast Moderate Growth Scenario](source: 2011 Marine Cargo Forecast; graph by BST Associates)
Passenger Rail in the Central Puget Sound Region

Passenger rail service in central Puget Sound region connects major employment and population centers including Everett, Seattle and Tacoma. The region is served by inter-city, long-distance and commuter passenger rail services which operate on the BNSF main line. This service is critical to local and regional transportation access for tourists, commerce and residents.

The long-distance, multi-state passenger rail service is provided by Amtrak’s Empire Builder and Coast Starlight lines and inter-city passenger rail service is provided by Amtrak’s Cascades service. The Sound Transit Sounder service is a commuter rail service.

From October 2012 through September 2013, there were 1.28 million on/oﬀs (riders) on Amtrak in Washington. Three stations that serve passengers in the greater Puget Sound region – Seattle, Tacoma and Olympia/Lacey – were among the ﬁve most used stations in the state and accounted for more than 60 percent of all passenger activity in the state. 

<table>
<thead>
<tr>
<th>Station</th>
<th>Ons/Oﬀs</th>
<th>Percentage of Statewide Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seattle</td>
<td>640,054</td>
<td>49.9</td>
</tr>
<tr>
<td>Tacoma</td>
<td>126,027</td>
<td>9.8</td>
</tr>
<tr>
<td>Olympia/Lacey</td>
<td>63,065</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Amtrak Empire Builder stops at 11 stations in Washington. This long-distance passenger rail line connects Chicago to Seattle (northern leg) and Portland, Oregon (southern leg). The Empire Builder route splits in Spokane; the northern leg continues west over Stevens Pass through Everett to Seattle; and, the southern line travels southwest from Spokane through Pasco to Portland. In the central Puget Sound region, the Empire Builder stops at stations in Seattle, Edmonds and Everett. Ridership on the Empire Builder line peaked in 2008 at approximately 555,000 passengers: from October 2012 to September 2013, there were approximately 537,000 passengers: from October 2012 to September 2013, there were approximately 537,000 passengers.

61 NB BB refers to break and neobulk cargoes such as autos and logs.
62 Amtrak Sets Ridership Record and Moves the Nation’s Economy Forward, October 14, 2013.
passengers. Ridership is projected to increase in future years, reaching approximately 1.3 million annual passengers in 2035: approximately 404,000 riders in 2035 are projected to originate or terminate travel from Washington stations.63

**Figure 17: Amtrak Empire Builder Route Map**

**Amtrak Coast Starlight** is a long-distance, north-south line that connects Los Angeles, California with Seattle. Stops in the Puget Sound region include Tacoma, Olympia/Lacey and Seattle. The Coast Starlight stops at six stations in Washington. Ridership on the Coast Starlight service peaked in the 1990s with approximately 607,000 passengers: from October 2012 to September 2013, there were nearly 480,000 passengers. By 2035, ridership is projected to increase to increase to 1.2 million passengers – approximately 395,000 passengers would be from Washington and Portland.64

**Amtrak Cascades** stops at 12 stations in Washington and provides service between Vancouver, British Columbia, and Eugene, Oregon via Seattle and Portland. From October 2012 to September 2013, there were nearly 812,000 riders on the route. Currently, there are two daily northbound trains between Seattle and Vancouver, B.C. and four daily northbound trains between Portland and Seattle. In the southbound direction, there are two daily trains between Vancouver, B.C. and four daily trains between Seattle and Portland. The majority of passengers in Washington use King Street Station in Seattle (with over 461,000 on-offs [riders] in 2012).

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64 Ibid.
The Washington State Department of Transportation is investing nearly $800 million in federal funds through 2017 for critical rail infrastructure to support the Amtrak Cascades line. Projects include additional track capacity, such as the Point Defiance Bypass project, signal upgrades, corridor reliability improvements, safety improvements, station upgrades, new locomotives and track upgrades. The Point Defiance Bypass project would construct a new bypass line between Nisqually and the City of Tacoma. This would allow Amtrak to increase the frequency of daily passenger trains once the service transitions to the new bypass route.

Sounder service stops at 12 stations in central Puget Sound region. Sounder commuter rail service connects major Puget Sound employment and population centers during peak morning and evening commuting times. Sounder service is comprised of a north and south commuter line; the north line operates between Seattle and Everett, and the south line operates between Lakewood and Seattle. In 2008, voters approved Sound Transit 2, which funds long-term improvements and expansions to the Sounder system.

In 2012, there were more than 2.8 million passengers on Sounder – up by 10.5 percent from 2011. Through September 2013, ridership on Sounder was up by approximately 9 percent from 2012. Sounder ridership is projected to increase to approximately 5.8 million annual riders by 2035 – approximately 88 percent of the ridership growth is anticipated to occur on the south line due to the recently expanded commuter rail service between Tacoma and Lakewood. This expanded service to Lakewood, which began in 2012, is projected to increase ridership by 2,400 riders per day by 2030.

Passenger rail transportation is slated to play a growing role in personal mobility for residents of the Puget Sound region. The shared-track nature of Sounder commuter rail and intercity Cascades train services requires complex planning and negotiation with BNSF Railway, the owner of the relevant rail corridors for such trains. Long-distance Empire Builder and Coast Starlight trains make use of these same alignments. Capital investments that offset the capacity

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consumption of new trains are generally required as a condition of establishing new passenger operations. BNSF, for its part, commits to specific transit time and performance levels as part of such arrangements.

**Figure 21: Average Daily Passenger Train Trips, 2010 Actual & 2035 Projected**

![Average Daily Passenger Train Trips, 2010 Actual & 2035 Projected](image)

*Source: Washington State Department of Transportation*

**Future Growth is Projected**

Reliance on rail for the movement of goods is expected to continue to grow nationally, in Washington and in the Puget Sound.

In 2007, the Association of American Railroads projected that most of the nation's primary corridors would realize at least a 50 percent increase in the number of trains per day. From 2005 to 2035, routes highlighted in blue in Figure 22 are projected to have a 50-100 percent growth in daily trains and other routes, highlighted in black, were projected to see at least 100 percent growth in the number of trains per day.

**Figure 22: Percentage Growth in Trains per Day, 2005 – 2035**

![Percentage Growth in Trains per Day, 2005 – 2035](image)

*Source: Cambridge Systematics, Inc.*

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69 Future growth in ridership for Amtrak service was projected using Amtrak ridership models and Cambridge Systematics calculations. Sounder future ridership forecasts cited in the State Rail Plan used a linear growth rate through 2035.
The Washington State Department of Transportation projects statewide freight rail volumes will more than double by 2035 from the 2010 baseline as cargo tonnage is anticipated to grow by more than 130 percent during the period. This projection uses a compound annual growth rate of 3.4 percent for all commodities carried on the rail system. This forecast is based upon projected increases in export tonnage (a driver of freight rail demand), state population growth and the state’s per capita income level.

Figure 23: 2010 Actual and 2035 Projected Freight Trains Per Day, by Segment

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Change in Daily Freight Trains (#)</th>
<th>Change in Daily Freight Trains (%)</th>
<th>Gen. Merch. Trains CAGR 2010-2035</th>
<th>Intermodal &amp; Auto Trains CAGR 2010-2035</th>
<th>Bulk Trains CAGR 2010-2035</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>Auburn-Pasco</td>
<td>7</td>
<td>7</td>
<td>117%</td>
<td>117%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Everett-Vancouver, BC</td>
<td>&lt;5</td>
<td>10</td>
<td>67%</td>
<td>91%</td>
<td>3.1%</td>
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<td>Seattle-Spokane</td>
<td>27</td>
<td>31</td>
<td>163%</td>
<td>208%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Seattle-Portland</td>
<td>17</td>
<td>40</td>
<td>128%</td>
<td>170%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>


The projected increase in rail freight volume is also projected to result in increases in freight train movements in the state. In the central Puget Sound region, the number of daily freight trains is expected to grow by between 27 and 31 trains between Seattle and Spokane and by 17 to 40 trains between Seattle and Portland.

Summary in Growth (2010-2035) in Freight Train Movements

70 Washington State 2013-2035 Rail Plan and Rail Plan Technical Note 4a – Freight Forecasts and Capacity Analysis. Current and future freight demand was calculated in the Washington State Rail Plan using the Surface Transportation Board’s 2010 Carload Waybill Sample, a detailed historical record of freight traffic; the FHWA’s Freight Analysis Framework 3.3 (FAF 3.3), a dataset containing historical and projected freight flows for all major modes; and, the FRA/Oak Ridge rail networks, which describe the physical attributes of the rail network. Additional key inputs, including train counts, were provided by the railroads. An economic forecast developed by IHS underlies the analysis of future freight demand in 2035.

71 Particularly, dry bulk cargo exports are projected to increase by 2035. These goods are very convenient to ship by rail.

72 Includes BNSF and Union Pacific lines, all other data for BNSF lines only.
The long term growth of rail freight in the Puget Sound is demonstrated by data on the movement of marine related cargo by rail. A 2011 study commissioned by the Pacific Northwest Rail Coalition examined marine cargo traveling by rail to ports in Washington and Oregon. For the Puget Sound and Washington Coast ports, marine-related cargo on rail increased from under 20 million metric tons in 1998 to 32.6 million tons in 2010: the growth was consistent with national and state trends (including a similar dip in volume from 2008 to 2009).

A future projection of freight rail tonnage was included as part of the 2011 update to the 2009 Marine Cargo Forecast. The update contained moderate-growth and high-growth forecasts for marine-related rail traffic in the region. Under the moderate growth scenario, marine related rail traffic in the Puget Sound and Washington Coast region was projected to grow from 32.6 million tons in 2010 to 84.8 million tons in 2030. Under a high growth forecast, marine related rail traffic would grow from 32.6 million tons in 2010 to 131.6 million tons in 2030.

**Figure 24:**

![Puget Sound and Washington Coast Rail Traffic Forecast](source)

*BNSF Controls Rail Capacity Expansion*

Prior to 1980, railroads did not have flexibility to price and structure their operations. Following the bankruptcy of nine carriers, Congress passed the Staggers Rail Act of 1980 that largely deregulated the industry and lifted many of the constraints on the railroad companies.

The deregulation allowed the railroads to:

- Establish their own market-based rates unless the government determined there was not sufficient competition for rail services;

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73 The report was prepared at the request of the Ports of Everett, Seattle, Tacoma, Grays Harbor, Longview, Kalama, Vancouver and Portland.

74 The Marine Cargo Forecast includes a region containing the Puget Sound and Washington Coast. As a result, discrete data pertaining to the central Puget Sound region is not available from this data source.

75 The Staggers Rail Act of 1980 was named for Congressman Harley Staggers of West Virginia, who chaired the House Interstate and Foreign Commerce Committee. While the Act deregulated much of the industry, the government retained the authority to protect shipper and consumer interests against unreasonable pricing and conduct.
• Enter into confidential contracts with shippers that were not subject to government review;
• Determine what routes to use; and
• Assess what services to offer or not offer.

According to the Federal Railroad Administration, railroad market share as measured in revenue ton-miles declined from 56.1 percent to 37.5 percent in the 30-year period before 1980. After the passage of the Staggers Act, the market share stabilized and increased to over 40 percent. Railroad return on investment averaged nearly 8 percent between 1990 and 2009 – up from a 2 percent average in the 1970s. According to the Federal Railroad Administration, as financial conditions of the railroads improved, railroads collectively invested in infrastructure – over $6 billion since the mid-1990s. The Association of American Railroads reports that, since the Staggers Act took effect, average rail rates fell 45 percent and rail traffic volume nearly doubled.

![Figure 25: U.S. Freight Railroad Performance Since Staggers Act](image)

A 2006 Congressional Budget Office study suggested that rail freight carriers will meet increased demand through technology, efficiency and capital investment. Railroads make strategic investments in capacity expansions and, at times, have a harder time raising funds because the railroads bear the risks associated with building, maintaining and operating the infrastructure. For instance, if a railroad lays new track because it foresees sufficient demand, but the demand does not materialize, the railroad’s investment has little to no return and its capital costs were already expended. However, where sufficient demand and return on investment is likely, railroads have shown the willingness to invest in infrastructure and capacity expansions.

As the Congressional Budget Office study notes, investments are not only limited to infrastructure. Investments in technology – like enhanced control systems and more powerful, cleaner locomotives – and safety create opportunities for additional capacity. Any accident or safety concern can lead to an unplanned outage of the rail line, which impacts scheduling and economic activity. Railroads continue to invest in safety – like specially designed cars to carry

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crude oil – and technology to enhance capacity to the maximum volume that can safely travel on the railroad, to help improve reliability and profitability through enhanced rail capacity.

In 2013, BSNF planned to invest approximately $125 million in maintenance and rail capacity improvements/expansions in Washington – including construction of receiving and departure tracks at its Delta yard in Everett, signal upgrades for positive train control, and replacing nearly 175 miles of rail.  

Also important to the consideration of investment is whether federal, state and/or local governments commit to funding certain capacity enhancement investments in tandem or in complement with the railroad. State and federal funding often supports capital investments related to railroads for both freight and passenger service. For example, passenger rail is generally funded through state and federal funds. From state fiscal years 2002 to 2011, Washington invested $188.1 million in passenger rail capital funding. During the same period, the state invested $57.0 million in capital investments for freight rail.  

While the state and federal funds play an important role in rail funding, according to Washington’s State Freight Rail Plan, there is a significant “lack of dedicated reoccurring funding for rail infrastructure improvements at both the state and federal levels.” Approximately $1.8 billion of an estimated $2.0 billion in rail needs in the State’s Freight Rail Plan are unfunded. As a result, with many competing interests for federal and state funding, the railroads, when sufficient demand and return on investment warrant, primarily decide if rail infrastructure and capacity investments occur.

The increased demand for rail capacity presents a series of potential opportunities and risks for the central Puget Sound region as a result of whatever actions or lack thereof are taken by BNSF. The railroad noted in an interview with the Project Team that it believed it would be able to successfully manage any capacity constraints that arose through a variety of operational and/or infrastructure-related strategies.

Two principal scenarios provide the most likely outcomes resulting from increased demand for capacity.

- BNSF increases rail capacity to manage rail traffic
- BNSF does not increase rail capacity immediately or at all

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80 Washington State 2010-2030 Freight Rail Plan.
Other Proposed Coal Export Terminals and Terminal Expansion Projects in the Pacific Northwest

The above sections of the Regional Rail Profile discuss current use of rail in the central Puget Sound region and projections for future use. For the most part, these future projections do not account for new projected uses of rail in the region related to the proposed construction or expansion of coal export terminals. For example, projections in the Washington State Rail Plan specifically exclude the impact of coal export terminals:

“New coal export terminals proposed for construction in Washington state and elsewhere in the Pacific Northwest (including British Columbia) are not specifically included in the forecast. If completed, these projects could further increase the demands placed on the state’s rail system…”

In fact, multiple coal export terminal expansion or new construction projects have been proposed in the Pacific Northwest. Energy companies with ready supplies of coal (primarily from the Powder River Basin) have sought to increase coal exports – particularly as U.S. demand declined due to utilization of other energy sources such as natural gas and renewable sources. The proximity of the Pacific Northwest to Asia, along with deep water ports, makes the area attractive to coal exporters as they seek to transport coal to Asian countries.

There are three active coal terminal proposals in the U.S. Pacific Northwest. The proposed Gateway Pacific Terminal at Cherry Point in Whatcom County, Washington (described in detail in the first chapter of this report), the Millennium Bulk Terminal at Longview in Cowlitz County, Washington and at the Port of Morrow near Boardman, Oregon.

The proposed site for Millennium Bulk Terminals Longview (Longview) is in the southwest corner of the state. Longview Terminal, Ambre Energy and Arch Coal submitted a Joint Aquatic Resources Permit Application on February 23, 2012 to the state, Cowlitz County and the US Army Corps of Engineers. According to the application, the facility would be built in two stages. The first stage would be the construction of five rail lines, two docks, ship loaders and other infrastructure. In the second phase, additional stockpile pads and three more rail lines would be constructed. The Terminal is expected to cost nearly $650 million to develop.

Longview would have the capacity to export 44 million metric tons of coal per year. The coal to be exported would be sourced from the Powder River Basin. The EIS scoping period closed November 18, 2013 after receiving over 215,000 comments.

There is no information on the precise route – or rail line – to be used for transporting coal from the Powder River Basin to the proposed Longview Terminal. Both BNSF and Union Pacific rail lines provide potential routes to Longview. It is likely that the route to Longview would not travel

through the central Puget Sound region, but would add volume to the Columbia River Gorge line (16 trains per day, 8 traveling to the terminal and 8 returning from the terminal) that is used to transport items to the region.  

**Figure 26: Proposed Coal Terminals in Pacific Northwest**

In February 2012, Coyote Island Terminals, LLC, a subsidiary of Ambre Energy, applied for a Department of the Army permit to construct a new terminal at the Port of Morrow. The project would ship up to 8.8 million metric tons of Powder River Basin coal by rail, transfer the coal to barges at the Port of Morrow and send it down the Columbia River to be transferred to ocean-going ships headed to Asia.

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88 BNSF will control the ultimate route for trains traveling to/from the Terminal. While there is no indication of route options, it is possible - as raised as a potential for Gateway Pacific Terminal train traffic - that empty trains could return from Longview via the Stampede or Stevens Pass in order to create more capacity on the Columbia River Gorge line. If this transpires, additional rail traffic could result in the central Puget Sound region.

A thirty-day public comment period began March 6, 2012 and was extended an additional thirty days due to public request. Currently, the U.S. Army Corps of Engineers is preparing an Environmental Analysis, which will identify the significance of potential effects of the project. If the Environmental Analysis reveals there is potential for significant impacts to the environment, an EIS will become necessary under NEPA. Impacts would be stated, alternatives would be identified to eliminate those impacts and there would be a discussion of mitigation strategies.

The proposal calls for using both BNSF and Union Pacific rail lines to transport coal from the Powder River Basin to the Port of Morrow. The exact route of the approximately 16 additional trains per day is not definitive. There appear to be two options: via the Union Pacific rail line – which would travel west from the Powder River Basin through Wyoming and Idaho before entering Oregon -- and the BNSF rail line traveling west from the Powder River Basin through northern Wyoming, Montana and Idaho, before entering Washington via Spokane and traveling south via the Columbia River Gorge east-west line to reach the Port of Morrow. Like Longview, no trains would travel through the central Puget Sound region, but there could be more volume (potentially, an additional one or two trains per day) on the Columbia River Gorge line that is used to transport items to the central Puget Sound region.

In addition to the proposed new terminals in the U.S. Pacific Northwest, there are four active coal expansion projects in British Columbia.
Ridley Terminals Inc. will more than double its capacity once an expansion project is completed at the end of 2014. Currently, Ridley Terminals has capacity to handle 12 million metric tons of coal per year. Following completion of the expansion project, it will have the capacity to handle 25 million metric tons of coal per year. The terminal exported 11.8 million metric tons of coal in 2013, similar to the 11.7 million metric tons exported in 2012. The vast majority of coal exports were shipped to Asian countries.  

Construction of the expanded facility is currently in process. To date, the project has involved clearing of 44 acres of land, additional conveyors and new and improved rail infrastructure. Remaining components of the expansion are improvements to remaining infrastructure, along with introduction of select new equipment. The expansion is anticipated to cost $200 million.

Coal for Ridley Terminal has historically been sourced from mines in northern British Columbia, Alberta and Saskatchewan. In addition, Ridley Terminals entered into an agreement with Coalspur, a company that is currently developing the Vista coal deposit (313 million metric tons) in Canada for export. Vista has the potential to provide 12 million metric tons of coal a year for export when it is fully operational, with first production of up to 6 million metric tons of coal in 2015. Ridley Terminals has already signed contracts with Coalspur to export 10.7 million metric tons of Vista coal. Vista is serviced by Canadian National Railway. The following graphic displays the location of the Vista Coal Project and the Canadian National Railway route to Ridley Terminal in Prince Rupert.

**Figure 28: Vista Coal Project in Relation to Ridley Terminal & Canadian National Railway**
An agreement between St. Louis-based Arch Coal, Inc. and Ridley Terminals was announced on January 18, 2011. The terminal’s agreement with Arch Coal committed Arch to provide Powder River Basin coal to the terminal for five years – 2 million metric tons in 2011 and 2.5 million metric tons per year for the remainder of the contract.\(^{94}\) Canadian coal mines criticized the contract for not supporting Canadian exports over U.S. exports, given the terminal’s status as a government chartered entity.\(^{95}\) Ridley Terminal may only handle Canadian coal after the conclusion of the 5-year contract, as the terminal’s contracts and contract options (at the coal companies’ election) to export Canadian-mined coal could consume nearly 100 percent of its capacity and there appears to be little appetite to support coal exports from the Powder River Basin.

Neptune Bulk Terminal in Vancouver submitted a project permit to Port Metro Vancouver in June 2012 to expand their coal throughput capacity from 8.5 million metric tons to 18.5 million metric tons per year.\(^{96}\) Port Metro Vancouver approved the terminal’s $200 million expansion project in January 2013.\(^{97}\) The project consists of a new railcar dumper, new rail infrastructure, additional conveyors and replacement of aging infrastructure. It is expected to increase train traffic by one train per day.

Coal for Neptune Terminal is sourced from Teck Resources Limited mines located in southeastern British Columbia. Teck has 46 percent ownership in the Neptune Terminal and sole rights to the terminal’s coal system. The mining company is currently able to produce approximately 30 million metric tons of coal per year. Canadian Pacific Rail has a ten-year agreement (through 2021) with Teck Resources to transport the coal to the terminal.\(^{98}\)

\textbf{Figure 29: Teck Resources Mines and Receiving Ports}

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\includegraphics[width=\textwidth]{teck_resources_mines_receiving_ports.png}
\caption{Teck Resources Mines and Receiving Ports}
\end{figure}

\begin{flushleft}
\textbf{Source: Teck Resources Limited}
\end{flushleft}

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\textsuperscript{94} Arch Coal News Release. \url{http://news.archcoal.com/phoenix.zhtml?c=107109&p=irol-newsArticle&ID=1517028&highlight}
\textsuperscript{95} \url{http://www.theglobeandmail.com/report-on-business/coal-producers-decry-ridley-terminals-decision/article1881479/}
\textsuperscript{96} \url{http://www.portmetrovancouver.com/en/projects/ongoingprojects/Tenant-Led-Projects/NeptuneTerminals.aspx}
\textsuperscript{97} \url{http://www.vancouversun.com/business/Port+Metro+Vancouver+approves+first+controversial+coal+export/7869281/story.html}
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Westshore Terminal at Roberts Bank is currently Canada’s number one coal exporter, with a capacity of 33 million metric tons of coal per year due to recent expansion of the terminal that added 4 million metric tons of capacity per year.\(^9\) Teck Resources Limited, a Canadian mining company, has a contract with Westshore Terminal to provide no less than 19 million metric tons per year through March 2021.\(^10\) A majority of coal handled by Westshore Terminal is exported to Asian countries, including Korea, China and Japan.

Westshore has agreements with several Canadian coal mining companies. In addition to the previously cited contract with Teck Resources to ship at least 19 million metric tons of coal per year, the terminal also has a contract with Coal Valley Resources Ltd. through 2022. Coal Valley shipped 2.7 million metric tons of coal from Westshore in 2011, 2.2 million metric tons in 2012 and 2.0 million metric tons in 2013. An agreement with Grande Cache Coal Corporation, which expires in March 2022, resulted in 1.1 million metric tons of coal in 2012 and 1.7 million metric tons of coal in 2013.

The terminal also has contracts with U.S. coal companies, lasting through 2022. U.S. coal accounted for 25 percent of Westshore’s 2012 throughput and, in 2013, accounted for approximately 31 percent of the terminal’s coal exports (9.3 million metric tons of the total 30.1 million metric tons exported).\(^11\)

![2013 Westshore Terminal Annual Coal Throughput](http://www.westshore.com/pdf/finance/2013/ar.pdf)

According to an infrastructure reinvestment project summary report released in December 2013, Westshore Terminal plans to invest $230 million over the next five years to make improvements to their facility.\(^12\) The terminal has submitted a project permit application to Port Metro Vancouver. The project would add conveyor systems, replace two stacker reclaimers (which load and unload coal), along with other infrastructure improvements. The project would make the terminal more efficient, while increasing the terminal’s capacity from 33 million metric tons to as much as 36 million metric tons per year. If the newly created 3 metric ton capacity is operational – which will not be until 2018 at the earliest – it would equate to one additional train traveling to the facility every two days.

Fraser Surrey Docks, an existing multipurpose marine terminal in Surrey, BC, proposed to construct a direct transfer coal facility. The project application calls for Fraser Surrey Docks to annually transfer up to 4 million metric tons of coal.\(^13\) The expansion project could lead to the

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Fraser Surrey Docks ultimately handling up to 8 million metric tons of coal per year; however, any volume of coal above 4 million metric tons per year would require an additional project application to, and subsequent approval by, Port Metro Vancouver.

**Figure 30:**
Proposed Fraser Surrey Docks Direct Transfer Coal Facility Route to Texada Island

![Map of Fraser Surrey Docks Direct Transfer Coal Facility Route to Texada Island](source: Fraser Surrey Docks)

The facility would transfer the U.S. mid-western coal, which would arrive to the Docks by BNSF rail lines, onto barges that would travel to Texada Island (northwest of Surrey in the Strait of Georgia) where the coal would be transferred to deep sea vessels for end use in Asia. Fraser Surrey Docks estimates that the addition of the coal transfer facility would result in one train movement per day (125 to 135 unit train car lengths). A presentation by Fraser Surrey Docks indicated that the daily loaded train would arrive at Fraser Surrey between midnight and 6am and the empty train’s daily departure would be between 4pm and 10pm.

As of April 2014, Port Metro Vancouver is reviewing the Fraser Surrey Docks application.
Additional New Proposed Commodity Shipments Through Pacific Northwest Region by Rail

In addition to new shipments of coal, the Washington State Rail Plan points to another potential new source of rail freight volume – shipment of crude oil from the Bakken Formation.\textsuperscript{104}

The Bakken Formation, located in parts of North Dakota, Montana and South Dakota, and the Canadian Provinces of Saskatchewan and Manitoba, is a thin but widespread unit consisting of shale and sandstone.\textsuperscript{105} The Bakken Formation contains crude oil and natural gas that can be recovered into wells by hydraulic fracturing (commonly referred to as “fracking”).

**Figure 31: Bakken Formation Area Map**

During the last decade, drilling in the Bakken has increased – North Dakota now produces more domestic oil than any other U.S. state except for Texas. In November 2005, North Dakota Bakken produced nearly 121,000 barrels of crude oil from 216 productive wells. In November 2013, the North Dakota Bakken produced 27.3 million barrels of crude oil from approximately 6,500 productive wells. Estimates suggest that the number of active wells could reach 50,000 and that as many as 14 billion barrels of crude oil could be removed in the next 20 years.\textsuperscript{106}

\textsuperscript{104} Washington State 2013-2035 Rail Plan.
As drilling in the Bakken increased in recent years, so too has the use of rail as a primary method for transporting crude oil. According to the Association of American Railroads, in 2009, U.S. Class I railroads transported approximately 11,000 carloads of crude oil. By 2011, that figure grew to 65,000 carloads, reached 235,000 carloads in 2012, and was approximately 400,000 carloads in 2013.\(^\text{107}\) The American Association of Railroads also notes that the majority of the crude oil transported by rail in 2013 traveled more than 1,200 miles from the central U.S. to refineries and terminals on the Pacific, Atlantic and Gulf coasts, which have traditionally been supplied by offshore wells, pipelines or tanker ships.

The growth in crude by rail is a direct result of the lack of pipelines connecting oil-rich areas in America’s heartland to the coasts. This pattern of quick growth played out in the Bakken, where there is no comprehensive pipeline system to transport crude oil to other parts of the country. A June 2013 Bloomberg Industries report indicates that 71 percent of Bakken crude oil is transported by rail compared to just 25 percent in January 2012. Only 20 percent of Bakken crude oil is transported by pipeline, a significant decline from 61 percent in 2011.\(^\text{108}\)

Growth in Bakken oil drilling and rail transport has had a direct impact on the Pacific Northwest, in part due to the low cost of transporting via rail in comparison to other parts of the country. The lack of pipeline capacity to the Pacific Northwest means that crude oil is moved by rail. At present, U.S. produced oil can only be refined at U.S. refineries\(^\text{109}\) – five are located at Cherry Point (where the proposed Gateway Pacific Terminal would be located) or in the Puget Sound:

- **BP Cherry Point Refinery** – located in Ferndale, is the largest refinery in the Northwest and can refine roughly 230,000 barrels of oil per day. The refinery has plans to expand railcar receiving and unloading facilities in 2014 that could result in the ability to receive 70,000 barrels of oil per day.
- **Phillips 66 Ferndale Refinery** – located south of Cherry Point, this refinery can process roughly 100,000 barrels of oil per day and has plans to build rail facilities that will accept 35,000 barrels per day.
- **Tesoro Refinery** – located in Anacortes, this refinery can process 120,000 barrels of oil per day and in 2012 a $60 million rail project was completed that allows the refinery to accept 50,000 barrels of oil per day.
- **Shell Puget Sound Refinery** – located in Anacortes, the region’s second largest refinery can process 145,000 barrels of oil per day and the refinery plans to make rail improvements that could result in the capacity to handle 60,000 barrels of oil per day.
- **US Oil Refinery** – located in the Port of Tacoma, the smallest refinery made an investment in rail capabilities to increase its ability to handle crude by rail in 2012.\(^\text{110}\)

In addition to the direct effect of increased transport of crude oil, there is a secondary effect resulting from an increase in railroad accidents. There have been at least 10 large crude by rail spills in the U.S. and Canada since March 2013, and more gallons of crude oil were spilled on railroads in 2013 – 1.15 million gallons – than the cumulative total from 1975 to 2012 (800,000 gallons).\(^\text{111}\) The most high-profile accident occurred in July 2013 when a train derailment and

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\(^{108}\) Ibid.


\(^{110}\) Sightline Institute, “The Northwest’s Pipeline on Rails,” October 2013. A May 2014 update of this report indicates that if all of the 11 refineries and oil terminals proposed in Oregon (1) and Washington (10) are built/expanded and operated at full capacity, an additional 12.3 loaded oil trains (and the potential for 12.3 empty trains per day) would travel on the rail lines. It is unclear what portion of this traffic would travel on the region’s rail lines. Additional research and analysis is necessary to further assess potential implications in the central Puget Sound region.

explosion in Quebec, Canada killed 47 people. In November 2013, a train carrying crude oil derailed and burst into flames in Alabama. A December 2013 collision between two trains led to the derailment of a train carrying crude oil in North Dakota. The incident sparked a large fire as multiple crude-carrying cars were engulfed in flames. In both instances, the trains were carrying Bakken crude oil, which unlike most crude oil is highly combustible prior to being refined.

The current fleet of rail tanker cars is also a concern to some industry experts because the vast majority of the nation’s fleet is built for nonflammable hazardous materials. While cars that have been introduced since 2011 are better protected, many railroad cars that were introduced earlier have not been upgraded to handle Bakken crude oil. The Association of American Railroads estimates that 85 percent of railcars that carry crude oil are unsafe and recommended a number of steps to increase safety, including upgrading tank cars built since 2011 and phasing-out older tank cars that have not been retrofitted.\footnote{112} As a result of growing concerns after the accidents in 2013, the U.S. Department of Transportation recently agreed to a deal with oil and rail officials to review routes for trains in high risk areas, increase transparency about the types of crude oil that is being transported and develop recommendations for improving tank car standards.\footnote{113}

\footnote{113}Ibid.
Regional Impacts
Regional Impacts – In Brief

Domestic and International Trade

• The proposed Gateway Pacific Terminal would create jobs and generate spending and tax revenues. Two studies demonstrated that the construction and operation of the terminal will create direct, indirect and induced jobs as the result of construction and operation of the proposed terminal.

• Most of the jobs and spending would benefit Whatcom County rather than the central Puget Sound region. Due to the presence of a Project Labor Agreement and a sufficient potential workforce in Whatcom County residents, most jobs created by the Gateway Pacific Terminal would go to Whatcom County residents. Most project-related spending would also likely occur in the greater Whatcom County area.

• Though limited, the central Puget Sound region could benefit from SSA’s use of professional services (i.e. consultants, engineers, attorneys) in the region as well as its anticipated 12 new full-time equivalent hires in Seattle. In addition, most of the tax benefits resulting from the project would likely go to the State rather than local governments in Whatcom County. As a result, the central Puget Sound region – as well as other parts of the state – could see a positive direct fiscal benefit.

• At full build-out of the terminal, rail freight capacity would be further affected – with a total of 18 new trains per day on the BNSF main line. At full build-out, the terminal would add an additional 18 trains (9 to the terminal and 9 from the terminal) with estimated train length of 8,500 feet, or 1.6 miles.

• Even without the proposed terminal, projected increases in rail freight volume are already expected to affect availability of rail capacity in the region.

• The degree to which additional train volume will affect rail freight capacity depends on both the precise routing of the trains and BNSF’s efforts to increase capacity to meet increased demand.

• If BNSF responds to increased demand by increasing capacity, potential effects that could be positive include:
  o Rail capacity expansion could allow the region’s ports to move more goods and increase the region’s economic activity.
  o The region’s ports may become more economically attractive to shippers due to economies of scale and economies of scope.
• If BNSF is unable to increase capacity through investment, technology, efficiency or other means to meet demand, the terminal could contribute to constraints – even if on temporary basis – that could impact trade and related economic activity.
  o Current rail traffic could be constrained, costs could increase, there could be delays in shipments at the region’s ports, or some combination of these factors.
  o Passenger rail service could be disrupted, cost more, or both.
  o Capacity constraints could negatively affect a portion of the State’s 8.6 percent of export-related private sector jobs.
  o Capacity constraints could impede natural or planned growth at the region’s ports which, in 2012, imported and exported goods valued at over $105 billion.
  o Current commodities and passenger rail services could get “priced out,” “squeezed out,” delayed, or face increased costs due to a lack of capacity.

• Within the boundaries of the central Puget Sound region, the potential transportation impacts related to other coal export proposals are minimal compared to the potential transportation impacts related to the proposed Gateway Pacific Terminal.

• Additional capacity constraints could arise from increasing rail volume transporting Bakken oil or other bulk commodities.

**Transportation**

• **Gate-down time is a measure of the duration of time that a railroad crossing gate is down while a train passes.** Gate-down time has the potential to increase congestion and delays to traffic at or near at-grade crossings if gates are down for long periods of time for passing trains.

• **Existing gate-down time at at-grade crossings in the Puget Sound region’s BNSF rail corridor is approximately 13 minutes to 1 hour 20 minutes each day to allow trains to pass.** This is distributed throughout the day.

• **Without Gateway Pacific Terminal trains, daily gate-down time in 2035 would increase to between 30 minutes to 2 hours 45 minutes per day depending on the location of the crossing.** This is due to the likely increase in future demand for freight and passenger rail service.

• **Both Stevens Pass and Stampede Pass rail lines may see an increase in rail volume and if BNSF decides to route empty rail cars on these lines daily gate down time would increase by 22 minutes to 1 hour and 45 minutes on the Stevens Pass route between Everett and Chelan County; and by 33 minutes to 50 minutes on the Stampede Pass route between Auburn and Kittitas County.**

• **Future capacity constraints from added terminal-related trains on the region’s rail lines could interrupt passenger and freight train movements.** This could result in a mode shift of commuters to bus or single occupancy vehicles, which could create additional delay and congestion on the region’s bus and highway systems.

• **Increased gate-down time and crossing blockages from trains traveling to or from the proposed terminal could result in longer average response times for**
**emergency vehicles.** Additional delay at approximately 21 at-grade crossings in the region could impact delivery of emergency response services due to close proximity of a fire station or emergency medical facility.

- **Access to transit services, such as park-and-rides and bus stops, could be impacted by delay at blocked crossings.** Transit reliability could also be affected if blocked crossings prevented transit vehicles from reaching stations on schedule. A single train going to or coming from the proposed terminal could delay traffic for approximately 2 to 6 minutes while it passes through an at-grade crossing, which could occur an additional 9 to 18 times per day with added trains from the proposed terminal.

- **Pedestrian mobility and safety could be impacted at crossings located within regional growth centers, which would have high pedestrian activity.** Impacts would be greatest in Seattle, Kent, Auburn, and Puyallup. Each of these communities would have at-grade crossings located within a regional growth center.

**Land Use**

- **Land use designations and long-range planning efforts could be influenced by increased train operations to and from the proposed terminal.** Existing land uses and community goals that conflict with high volume freight corridors would have the greatest impacts. Conflicts could occur as a result of train noise and vibration, circulation and access impacts, and safety concerns.

- The value of properties adjacent to the rail corridor could decrease in value with additional trains from the proposed terminal. Past studies in the region and other areas of the country indicate that property values adjacent to rail lines are lower than comparable properties located away from rail lines.

**Environment**

- **Trains traveling to and from the terminal would likely create noise and vibration from operations and wayside horn use,** which trains use before entering an at-grade crossing as a safety measure. Additional noise could impact public health and the overall quality of life for nearby residents.

- **Environmental justice populations in Kent and Seattle would have the highest disproportionate impacts from train operations.** Environmental justice populations in Everett, Auburn, Algona, Pacific and Fife would also be impacted by the additional trains traveling to and from the proposed terminal.
Introduction

This chapter contains four component sections that comprise the regional impacts detailed in the project scope:

1. **Domestic and International Trade** – Effects on current and future trade throughout the regional freight and goods transportation system.
   - What will be the effect of the project proposal on regional employment in terms of direct and indirect jobs?
   - How will the project affect existing freight rail capacity? What are the impacts on existing and future domestic and international trade by the proposed project?
   - What other commodity terminal projects are being proposed or built in the Pacific Northwest region, including Canada? Independent of the proposed Cherry Point terminal, what effects, if any, would these projects have on the region’s transportation system?

2. **Transportation System** – Effects on the Regional Transportation System.
   - What is the impact of an anticipated change in rail operations on surface movement of people and goods at grade crossings in the region? Are there other impacts throughout the regional transportation system?
   - How much travel delay will be experienced by people and goods at railroad crossings due to the project? Which at-grade crossings will be most highly affected?
   - What would be the effect of increased commodity trains on existing and future freight and passenger rail? Which and where?

3. **Land Use** – Effects on current and future land use within the region.
   - Will the project affect commercial and residential land use?
   - Will the project affect property values?

4. **Environment** – Environmental effects.
   - Will the project affect water and air quality?
   - Will minority and/or low-income populations experience disproportionately high and adverse effects from the project?
Regional Impacts: Domestic and International Trade:

The proposed Gateway Pacific Terminal’s construction and operation would have a variety of economic impacts – both positive and negative. The PFM Team was charged with reviewing four discrete areas of the effects of the proposed Gateway Pacific Terminal on the region’s current and future domestic and international trade. This section addresses the potential impacts associated with the four identified areas:

1. What will be the effect of the project proposal on regional employment in terms of direct and indirect jobs?
2. How will the project affect existing freight rail capacity?
3. What are the impacts on existing and future domestic and international trade by the proposed project?
4. What other commodity terminal projects are being proposed or built in the Pacific Northwest region, including Canada? Independent of the proposed Cherry Point terminal, what effects, if any, would these projects have on the region’s transportation system?

Effect of the Proposed Gateway Pacific Terminal on Regional Employment

Prior Studies

As discussed in detail in the Project Summary chapter of this report, two prior studies, one by Martin Associates and another by Finance & Resource Management Consultants, projected that construction and operation of the Gateway Pacific Terminal will create jobs and generate spending and tax revenues.114

Martin Associates used SSA’s provided input costs and business revenue to project the employment impact of the proposed terminal on direct jobs, indirect jobs and induced jobs.115

- **Direct jobs** are those jobs “directly generated by the movement of the bulk cargo via the terminal, as well as the current levels of business at the terminal.” Projected examples of direct jobs include railroad jobs moving cargo, International Longshore and Warehouse Union jobs and tug operators.116

- **Indirect jobs** are those jobs “created locally due to purchases of goods and services by firms, not individuals.” Projected examples of indirect jobs include jobs with firms providing office supplies, maintenance, parts and other services.

- **Induced jobs** are those jobs “created throughout the local economy because individuals directly employed by activity at the…Terminal…spend their wages locally on goods and services…” Projected examples of induced jobs include jobs related to food, housing and clothing purchases.

114 Summaries of the Martin Associates and Finance and Resource Management Consultants studies are included in the Project Summary section of this report.
116 Ibid.
117 Ibid.
Construction

Martin Associates used SSA’s provided input costs of $536 million for Phase One\(^ {118}\) construction and $129.0 million for Phase Two construction to project the employment impact of construction of proposed terminal on direct jobs, indirect jobs and induced jobs.\(^ {119}\)

The Martin Associates study reported that construction of the terminal to full build-out would create a total of 5,221 job years – approximately 2,200 direct job years and 3,000 indirect/induced job years.\(^ {120}\) The study projected that approximately 80 percent of construction job years would be generated in Phase One construction of the proposed terminal (approximately 4,208 job years). The direct jobs generated by Phase One construction would result in a projected $140.0 million of personal income (earnings) and an additional $191.0 million in re-spending/indirect personal income. Local purchases of construction supplies, support services and other services related to Phase One construction of the terminal were estimated to be $503.0 million.

Martin Associates projected that Phase Two construction of the proposed terminal would result in 1,013 job years – 429 direct job years and 584 indirect/induced job years. The direct jobs resulting from Phase Two construction were estimated to create $34.0 million in personal income (earnings) and an additional $46.0 million in re-spending/indirect personal income. The report estimated that local purchases of supplies and support services related to the construction of Phase Two would be $121.0 million.

The Martin Associates study indicated that, at full build out, the construction of the proposed terminal would generate approximately $92.4 million in state and local tax revenue – approximately $74.4 million from Phase One construction and an additional $18.0 million from Phase Two construction.

Operation

The Martin Associates study used SSA’s throughput assumptions to project operation of the terminal after Phase One construction would generate 863 annual jobs (294 direct jobs and 569 indirect/induced jobs) and result in annual personal income of $91.1 million. The 294 direct annual jobs were estimated to provide total projected annual earnings of $29.5 million (annual average salary of $100,300). The study projected that the 569 annual indirect/induced jobs would create re-spending and local consumption annual earnings of $56.5 million. The study estimated that local indirect personal income of $5.1 million would result from the terminal’s annual operation. Annual local purchases of related to Phase One operation of the terminal were estimated to be $12.0 million.

Martin Associates projected that 136 additional annual direct jobs and an additional 230 annual indirect/induced jobs would be created upon full build-out of the terminal. Combined, the operation of the terminal after Phase One construction and full build-out would create a total of 1,229 annual jobs (430 direct jobs and 799 indirect/induced jobs). At full build-out, the report projected that the terminal’s 430 direct annual jobs would generate a $40.8 million in annual earnings (average salary of approximately $94,900). The study projected that the 799 annual

\(^{118}\) Updated project information as of April 18, 2014 no longer includes two phases of construction.

\(^{119}\) Ibid.

\(^{120}\) Project impacts were estimated in terms of job years – the number of employees needed to complete the project in one year – as well as person-hours. Construction-related jobs are shown as workers hired per year.
indirect/induced jobs would create re-spending and local consumption annual earnings of $78.2 million. The report found that an estimated $7.3 million of local indirect personal income would result from the terminal’s annual operation. Annual local purchases of related to the operation of the terminal at full build-out were estimated to be $17.1 million.

Martin Associates found that nearly half of the direct jobs created from operating the terminal would be for members of the International Longshore and Warehouse Union. Approximately 16 percent of direct jobs would be related to maritime services, 15 percent of direct jobs would be associated with railroads, 10 percent of direct jobs would be terminal operators and 8 percent of direct jobs would be pilots or tugs helping to guide ships to/from port.

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<th>Martin Associates – Projected Direct Jobs, by Type</th>
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<td><strong>Category</strong></td>
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<td>Railroads</td>
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<td>ILWU</td>
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<td>Pilots/Tugs</td>
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<td>Maritime Services</td>
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<td><strong>TOTAL</strong></td>
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As discussed in the Project Summary chapter of this report, SSA retained Finance & Resource Management Consultants to review the Martin Associates analysis of employment impacts of the project.

As compared to Martin Associates, Finance & Resource Management Consultants estimated a nearly identical number of direct job years as a result of construction of the terminal at full build-out. However, their estimate of indirect/induced job years resulting from construction was nearly 1,400 job years fewer than the indirect/induced job years estimated by Martin Associates – varying from Martin Associates’ estimate by more than 46 percent.

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Comparison of Phase One and Two Construction Job Year Estimates

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<tr>
<th>Phase One and Phase Two Construction Assessments</th>
<th>Direct Job Years</th>
<th>Indirect/Induced Job Years</th>
<th>Total Job Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martin Associates</td>
<td>2,210</td>
<td>3,011</td>
<td>5,221</td>
</tr>
<tr>
<td>Finance &amp; Resource Management Consultants</td>
<td>2,020</td>
<td>1,616</td>
<td>3,636</td>
</tr>
<tr>
<td>Difference (¹)</td>
<td>(190)</td>
<td>(1,395)</td>
<td>(1,585)</td>
</tr>
<tr>
<td>Difference (%)</td>
<td>(8.6%)</td>
<td>(46.3%)</td>
<td>(30.4%)</td>
</tr>
</tbody>
</table>

Finance & Resource Management Consultants used Martin Associates’ estimate of 294 direct annual jobs created by the operation of Phase One to estimate that 576 indirect and induced jobs would be created by the operation of the terminal after Phase One construction – very similar to Martin Associates’ projected total of 863 indirect and induced jobs. Finance & Resource Management Consultants also used Martin Associates’ estimate of 136 direct jobs created by the operation of Phase Two to estimate that 267 indirect and induced jobs would be created from the additional operation of the terminal after Phase Two construction – 37 indirect and induced jobs more than Martin Associates’ projection.

Combined, Finance & Resource Management Consultants’ estimates of indirect and induced jobs created as a result of the operation of the terminal was 44 indirect and induced jobs greater than Martin Associates’ estimate (843 versus 799). Given that Finance & Resource Management Consultants used Martin Associates’ direct job estimates, their estimate of total jobs created (direct jobs plus indirect/induced jobs) from the operation of the terminal at full build-out was also 44 jobs more than Martin Associates’ projection (1,273 versus 1,229).

**Tax Revenue Generation Related to the Proposed Gateway Pacific Terminal**

Martin Associates reviewed the tax impact of the proposed terminal and defined tax impact as “tax payments to the state and local governments by firms and by individuals whose jobs are directly dependent upon and supported by (induced jobs) activity at the bulk terminal.” The definition includes tax revenue directly generated from the construction and operations of the terminal (i.e. sales tax from goods purchased during construction, etc.) and tax revenue indirectly generated or induced from construction and operation of the terminal (i.e. property taxes of those employed as a result of jobs created by the terminal, etc.).

Martin Associates projected Phase One construction to generate $74.4 million in state and local tax impact and Phase Two construction to generate $18.0 million of state and local taxes – for a total of $92.4 million in taxes over the construction periods.

Martin Associates also estimated the state and local taxes generated as a result of the operational phases of the terminal. After Phase One construction, Martin projected the terminal's
operation would create $8.1 million in additional state and local tax revenue on an annual basis. The $8.1 million in state and local tax revenue is due, in part, to an estimated additional $12.0 million in local purchases per year.

Upon full build-out, Martin Associates projected the terminal’s operation would generate an additional $3.1 million per year in state and local tax revenue above the amount generated from Phase One operation – for a total of $11.2 million per year at full build-out. The $11.2 million in state and local tax revenue is due, in part, to an estimated $17.1 million of local purchases per year ($12.0 million from Phase One, plus $5.1 million from Phase Two).

**The Central Puget Sound Region Will Not Realize Most of the Job Benefits and, Local Spending Associated with Construction and Operation of the Proposed Terminal**

Public Financial Management’s 2012 study found that most, but not all, of the projected jobs would likely go to Whatcom County residents, noting “[t]he construction of Gateway Pacific Terminal would be the subject of a project labor agreement with local labor unions, guaranteeing that all work on the site goes to a unionized labor force. Project labor agreements appear to reduce the use of non-local labor on major construction projects, both through explicit local hiring requirements and by reducing the use of ‘independent contractors’ as part of the labor force.”

The most recently available U.S. Census OnTheMap application data (2011) showed that 22.7 percent of jobs in Whatcom County were held by non-Whatcom County residents. The data also showed that more Whatcom County residents commuted outside of the County for work than non-Whatcom residents who commuted into the County for work. In 2009, the difference was estimated to be 2,918 individuals; as shown in the below graphic.

**Figure 32: Workers Commuting Into and Out of Whatcom County - 2011**

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126 It is possible that data from OnTheMap understates the effect of Whatcom residents who commute outside the County for work due to the Canadian border affecting its estimates.
Public Financial Management’s study estimated that Phase One construction would require approximately 1,700 construction workers per year. Public Financial Management found that peak construction employment in the Bellingham metropolitan statistical area, where Cherry Point is located, was 6,310 in 2006 – over 2,300 more construction jobs than existed in 2012. The study suggested that the majority of construction jobs during Phase One construction would be held by local workers due to the presence of the project labor agreement and sufficient local labor capacity.¹²⁷

While the project labor agreement would govern the direct jobs associated with construction of the terminal, it would have no bearing on the indirect and induced jobs resulting from the construction of the terminal. Public Financial Management’s report found that approximately 21 percent of all jobs in Whatcom County were held by non-Whatcom County residents. The report suggested a similar percentage of indirect and induced jobs from terminal construction and operation may go to non-Whatcom County residents.

Individuals commuting from the four-county PSRC region to Whatcom County for work in recent years appeared to comprise a small percentage of the total Whatcom County workforce. Data from the U.S. Census Bureau estimated that, on average for the five-year period of 2006-2010, approximately 1.5 percent of all jobs in Whatcom County were held by residents of King, Kitsap, Pierce and Snohomish counties.¹²⁸ Snohomish County residents were responsible for 60 percent of total central Puget Sound residents working in Whatcom County. Using this estimate, approximately 78 construction jobs (combined over Phase One and Phase Two) and 18 total annual jobs from operation of the terminal (combined over Phase One operation and full build-out) would go to residents of the four-county PSRC region.

**Central Puget Sound Region (County of Residence) to Whatcom County (County of Work)**

<table>
<thead>
<tr>
<th>County of Residence</th>
<th>Percentage of Whatcom County Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>King County</td>
<td>0.3%</td>
</tr>
<tr>
<td>Kitsap County</td>
<td>0.1%</td>
</tr>
<tr>
<td>Pierce County</td>
<td>0.2%</td>
</tr>
<tr>
<td>Snohomish County</td>
<td>0.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1.5%</strong></td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 5-year (2006-2010) American Community Survey data.

Community Attributes’ report for the City of Seattle also found the primary economic beneficiaries of the terminal’s activity to be in the areas closest to Cherry Point.¹²⁹ However, the study also reported that SSA is headquartered in Seattle and increased revenue for the firm may result in a small number of increased jobs and/or tax impact in the City and region. The report noted that SSA anticipates hiring up to 12 full-time equivalent employees based in Seattle to handle the day-to-day project management for the proposed new terminal,” with total annual compensation of $2.4 million.¹³⁰

¹²⁷ Updated project information as of April 18, 2014 no longer includes two phases of construction.
¹²⁹ A summary of the Community Attributes report is included in the Project Summary chapter of this report.
Similarly, SSA anticipates it would engage contractors, environmental engineers and other professionals to assist in pre-operation activities costing approximately $13 million. Additionally, the report cited an interview with BNSF suggesting that while BNSF does not anticipate a direct increase in employment in Seattle, increased rail traffic could lead to privately funded infrastructure investments that could increase the competitiveness of the Port of Seattle. The company indicated that it has sufficient capacity to “handle current and future freight and passenger volumes” and had, in 2012, plans to spend $106 million in the state to “enhance service to existing customers.”

The proposed Gateway Pacific Terminal will create a number of temporary jobs associated with the construction of the terminal and a smaller number of permanent jobs associated with the operation of the terminal. Most of these jobs, and the associated economic benefits, will occur outside of the central Puget Sound region.

**The Proposed Gateway Pacific Terminal is More Likely to Generate Positive Tax Benefits for the Central Puget Sound Region than Employment or Economic Activity**

Public Financial Management’s 2012 report estimated that most of the tax benefits from the project will likely go to the State of Washington, rather than local governments. The report cited U.S. Census Bureau data that indicated 60.8 percent of all general tax revenue in Washington went to the State. While the precise division of tax revenue generated by the terminal would depend on the types of tax revenue generated, sales and property tax revenue are two of the largest sources of State and local governments in Washington. As a result of the tax structure, most of the tax benefits will go to the State or to local property tax revenue in jurisdictions in the more immediate vicinity of Cherry Point.

If most of the tax benefits go to the state, data from the Washington State Office of Financial Management suggests that three of the four PSRC counties may realize additional benefits in revenue. The state’s data compares state expenditures made in each county to state revenues that come from each county. In Fiscal Year 2011, Kitsap, Pierce and Snohomish Counties all received a greater amount of state expenditures than their contribution to state revenues. King County, however, only saw a return of approximately 65 percent of its contributed state tax revenues. This data is not absolute in its suggestion that King County would not receive additional state expenditures as the result of the construction and operation of the proposed terminal, or that the other three counties would assuredly receive more state expenditures.

<table>
<thead>
<tr>
<th>County</th>
<th>% of State Total</th>
<th>Rank</th>
<th>% of State Total</th>
<th>Rank</th>
<th>Ratio of Expenditures to Revenues</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>King County</td>
<td>26.4%</td>
<td>1</td>
<td>40.5%</td>
<td>1</td>
<td>0.65</td>
<td>37</td>
</tr>
<tr>
<td>Kitsap County</td>
<td>3.4%</td>
<td>8</td>
<td>2.8%</td>
<td>9</td>
<td>1.22</td>
<td>25</td>
</tr>
<tr>
<td>Pierce County</td>
<td>12.5%</td>
<td>2</td>
<td>10.0%</td>
<td>2</td>
<td>1.26</td>
<td>23</td>
</tr>
<tr>
<td>Snohomish County</td>
<td>9.9%</td>
<td>3</td>
<td>9.6%</td>
<td>3</td>
<td>1.03</td>
<td>30</td>
</tr>
</tbody>
</table>

131 Other ports in the region were not specifically mentioned in the Community Attributes study because the scope of the report was specific to the City of Seattle; however, the same theory could potentially be extended to the other ports, but would warrant additional discussion.


The Community Attributes report for the City of Seattle also noted that there is some potential direct tax benefit to the central Puget Sound region. The study found that SSA, headquartered in Seattle, could transfer revenues from the terminal back to its Seattle headquarters resulting in a potential for additional spending within the city. The study also suggested that newly hired workers at the terminal could directly or indirectly lead to some potential increase in spending in Seattle and the State’s share of increased tax revenues may be partially redistributed to Seattle and could subsequently benefit the central Puget Sound region.
Effect of the Proposed Gateway Pacific Terminal on Existing Freight Rail Capacity and Existing and Future Domestic and International Trade

The Gateway Pacific Terminal Will Add Train Volume to Rail Routes Serving the Puget Sound Region

The precise route for the trains traveling to and from the proposed terminal is unclear. BNSF would likely route the coal trains via one of the three east-west rail lines in the state to connect it with the main line that runs north-south, parallel to Interstate 5, where trains would travel north to Cherry Point.

As detailed in the Regional Rail Profile chapter of this report, the three east-west lines that connect to the main line and allow trains to pass over the Cascade Mountains from points east are: Stevens Pass Line; Stampede Pass Line, and Columbia River Gorge Line

Figure 33: Regional Rail System – Rail Lines in the Central Puget Sound Region
Based on the characteristics of the routes, it appears that the Columbia River Gorge route and the north-south main line would be the most likely routes for trains transporting coal from the Powder River Basin to the proposed terminal.\textsuperscript{134}

During the project, BNSF informed the Project Team that it believes the Washington State Rail Plan, which is forecasted on a macro level, errs in making commodity-specific projections and references – particularly those related to coal export traffic and volume. As a result, the railroad indicated it believes the State’s Rail Plan, which used a base year of 2010 and did not incorporate projected volumes of bulk exports related to proposals in Cherry Point, Longview, and British Columbia, underrepresented the baseline of commodity and rail volume in the State.

BNSF submitted feedback to the Washington Department of Transportation regarding, what the railroad considered to be, the State’s inadequate measurement of commodity-specific projections related to coal. In an August 2013 letter, the railroad cited U.S. Energy Information Administration projections of coal export growth in the Western U.S. and British Columbia as the best source for which the State to base its coal-related capacity planning.\textsuperscript{135} The Washington State Rail Plan cited throughout this report did not utilize BNSF’s proposed methodology.

Additionally, the railroad stated to the Project Team that it believes it can manage capacity to deal with potential traffic constraints through various operational and technological fixes – directional running, using Stampede Pass and/or Stevens Pass, scheduling and routing enhancements – or through investments in infrastructure.

**Baseline Forecasts Project Freight Rail Volumes Will Increase In Future Years**

A summary of the primary projected freight rail forecasts findings includes:\textsuperscript{136}

- The Washington State Department of Transportation projects statewide freight rail volumes will more than double by 2035 from the 2010 baseline as cargo tonnage is anticipated to grow by more than 130 percent during the period.\textsuperscript{137}
- The increase in rail freight volume is also projected to result in increases in freight train movements in the state. In the central Puget Sound region, the number of daily freight trains is expected to grow by between 27 and 31 trains between Seattle and Spokane and by 17 to 40 trains between Seattle and Portland, OR.
- Under the moderate growth scenario, marine related rail traffic in the Puget Sound and Washington Coast region was projected to grow from 32.6 million tons in 2010 to 84.8 million tons in 2030. Under a high growth forecast, marine related rail traffic is projected

\textsuperscript{134} As cited in the *Regional Rail Profile* chapter, BSNF indicated to the project team that it could use heavy locomotives to make the Stampede Pass a viable option for transport. Additionally, the railroad suggested it could re-route lighter trains traveling on the Columbia River Gorge line and instead route them over the Stampede Pass to allow sufficient capacity for heavy bulk trains to travel on the Columbia River Gorge line.

\textsuperscript{135} Letter dated August 15, 2013 from Colleen K. Weatherford, BNSF Director of Public Private Partnerships, to Kerri Woehler, Washington Department of Transportation – Rail Planning and Strategic Assessment Manager.

\textsuperscript{136} A detailed analysis of projected freight rail volumes in future years is included in the *Regional Rail Profile* chapter of this report.

\textsuperscript{137} Washington State 2013-2035 Rail Plan and Rail Plan Technical Note 4a – Freight Forecasts and Capacity Analysis. Current and future freight demand was calculated in the Washington State Rail Plan using the Surface Transportation Board’s 2010 Carload Waybill Sample, a detailed historical record of freight traffic; the FHWA’s Freight Analysis Framework 3.3 (FAF 3.3), a dataset containing historical and projected freight flows for all major modes; and, the FRA/Oak Ridge rail networks, which describe the physical attributes of the rail network. Additional key inputs, including train counts, were provided by the railroads. An economic forecast developed by IHS underlies the analysis of future freight demand in 2035. This forecast is based upon projected increases in export tonnage (a significant driver of freight rail demand), state population growth and the state’s per capita income level. Particularly, dry bulk cargo exports are projected to increase by 2035. These goods are very convenient to ship by rail.
to more than quadruple by 2030 – growing from 32.6 million tons in 2010 to 131.6 million tons in 2030.

- The addition of 18 trains per day at full build-out would add additional freight volume to the region’s rail network.

Absent the expansion of rail capacity, it appears several of the region’s critical rail segments could be over capacity. According to the Marine Cargo Forecast, projected increases in rail freight volume are already expected to affect availability of rail capacity in the central Puget Sound region, particularly, between Seattle and Everett and Everett and Vancouver, BC. Based on a high growth scenario for freight volume, capacity on both segments will be constrained during peak days by 2020 and by 2023 and 2025 respectively on average days. Under the moderate growth scenario, there are no capacity constraints on the Everett to Vancouver segment until 2030 and no capacity constraints are projected on the Seattle to Everett segment.

Additional freight volume on rail lines could also impact activity in the central Puget Sound region. The Washington State Rail Plan (2013-2035) indicated that without considering potential train volume from the proposed Gateway Pacific Terminal and growth in Bakken oil trains, projected capacity on several lines rail segments within the region, or that could affect rail traffic in the region, will reach 100 percent or more of utilization by 2035:

- Pasco to Spokane – 170 percent utilization;
- Seattle to Spokane via Wenatchee – 150 percent utilization;
- Spokane to Hauser Junction, ID – 150 percent utilization;
- Vancouver, WA to Pasco – 140 percent utilization; and
- Seattle to Portland and Everett to Burlington – near 100 percent utilization.

With the addition of coal train movements to the proposed Gateway Pacific Terminal, the Tacoma/Olympia segment of track could reach 116 to 128 percent of capacity and the Seattle/Everett segment of track could reach 99 percent of capacity. Additional coal trains would also bring the Tacoma/Seattle segment near to full capacity. Both Sound Transit and Amtrak have service agreements with BNSF that secure passenger rail service. It is unknown how rail capacity constraints in the region could impact schedule reliability and/or service delivery of these passenger rail services, which provide public transportation services to millions of passengers per year. Other freight train operations could also suffer from future railway congestion. An increase in rail congestion could result in delays to delivery of goods and economic impacts to regional businesses.

As a result, if additional capacity is not added to handle the projected volume and the additional volume from the proposed terminal and Bakken oil, it could impact economic activity in the region. The primary routes that would be most affected, based on the Marine Cargo Forecast, are critical to the operations of three major port facilities in the central Puget Sound region – the Ports of Everett, Seattle and Tacoma. In 2012, collectively, the three ports imported and exported a total of $105.2 billion of cargo.

A report conducted for the City of Seattle noted that BNSF reported it did not anticipate the displacement of any other goods as a result of additional coal train volume.  

**Capacity Constraints**

As discussed in the *Regional Rail Profile* section of this report, economic and demographic

growth are projected to increase the demand for passenger and freight rail services. Changes in operational management of the system, significant track widening or other improvements may need to be implemented to ensure that the region’s existing rail lines can accommodate projected growth in demand for both passenger and freight rail.

As a result, select portions of the region’s rail lines may not have the capacity to meet future freight and passenger rail capacity needs. A lack of capacity could create congestion and restrict the amount of possible train volume on the rail lines – similar to a roadway that is at capacity. The result of insufficient capacity could disrupt passenger train services and freight rail operations. Capacity constraints on the region’s rail lines could also create additional gate-down time if trains were forced to wait to allow trains to pass or clear the tracks. Queuing of trains near at-grade crossings could result in at-grade crossings being blocked for longer periods of time.

However, in a letter from Matthew Rose, Chairman and CEO of BNSF Railway, to then-Governor Christine Gregoire, BNSF indicated it maintains and improves infrastructure to provide sufficient capacity to support current and future demand. BNSF also stated that it uses capacity management techniques, such as directional running to balance capacity needs. BNSF does not believe that capacity constraints will be a problem with the addition of trains to and from Gateway Pacific Terminal. Additionally, BNSF, and the Port of Seattle have pointed out that increasing productivity on the Pacific Northwest rail lines may accompany additional capital investment in infrastructure that would otherwise not be made based on existing passenger and freight demand.

The most recent Washington State Rail Plan includes an analysis of future railway capacity constraints in the State. The Rail Plan estimates that, by 2035, the segment of BNSF track between Tacoma and Olympia will be at approximately 105 percent of capacity, the Stevens Pass line will be at approximately 157 percent of capacity, and the Stampede Pass route will be at 33 percent of capacity.139The segment of track between Seattle and Everett is also estimated to be near full capacity by 2035.140 The research included in the 2011 Marine Cargo Forecasts & Rail Capacity Assessment aligns with the capacity constraint findings included in the Washington State Rail Plan.141 However, BNSF does not support the methodology used in the Washington State Rail Plan to predict future capacity, indicating a belief that bulk commodities may be underrepresented.

The capacity analysis included in the State Rail Plan does not include train volumes from proposed projects, such as the Gateway Pacific Terminal. By 2035, with the addition of train movements from the proposed terminal, the Tacoma/Olympia segment of track could be

### Track Utilization by Segment with and without Terminal-related Trains

<table>
<thead>
<tr>
<th>Segment of Track</th>
<th>Utilization without Terminal Trains 2035</th>
<th>Utilization with Terminal Trains 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everett to Stanwood on N/S Main Line</td>
<td>92%</td>
<td>164%</td>
</tr>
<tr>
<td>Seattle to Everett on N/S Main Line</td>
<td>76%</td>
<td>98%</td>
</tr>
<tr>
<td>Auburn to Seattle on N/S Main Line</td>
<td>70%</td>
<td>86%</td>
</tr>
<tr>
<td>Tacoma to Auburn on N/S Main Line</td>
<td>56%</td>
<td>73%</td>
</tr>
<tr>
<td>Tacoma to Olympia on N/S Main Line</td>
<td>105%</td>
<td>127%</td>
</tr>
<tr>
<td>Stevens Pass</td>
<td>157%</td>
<td>189%</td>
</tr>
<tr>
<td>Stampede Pass</td>
<td>33%</td>
<td>56%</td>
</tr>
</tbody>
</table>

between 116 to 128 percent of capacity and the Seattle/Everett segment of track could reach 98 percent of capacity, the Stevens Pass line could be at 189 percent of capacity, and the Stampede Pass line could be at 56 percent of capacity. Additional Gateway Pacific Terminal-related trains could also bring the Tacoma/Seattle segment near to full capacity.

The impact of capacity constraints could include:

- **Passenger Rail**
  - Future capacity constraints from additional commodity trains could result in disruption of scheduled Sounder and Amtrak service if commodity trains prevent commuter trains from operating during normal commute periods, unless capacity was added to the rail system in critical segments between Tacoma and Seattle.
  - Based on 2013 ridership, a service interruption to the South Line, Sound Transit’s busiest commuter rail line, would result in the disruption of approximately 11,590 commuters on an average weekday.\(^{142}\)
  - Passenger rail service could benefit from additional freight traffic if added freight demand stimulates private investment, by BNSF for example, in additional rail capacity in the region. Much of the passenger rail in the region operates on private rail lines, including the BNSF main line.

- **Freight Rail**
  - Freight train operations could suffer from future railway congestion due to over demand of the system, resulting in delays in delivery of goods and economic impacts to regional businesses.
  - If Gateway Pacific Terminal trains disrupt the ability of freight to move on Puget Sound regional rail lines, shippers may select alternate routing through other international trade gateways in North America.
  - Heavily used freight corridors could become saturated, resulting in delays and congestion for business and general purpose traffic.
  - Gate-down time could increase if Gateway Pacific Terminal trains forced freight trains to wait to pass or for the tracks to clear.
  - Added Gateway Pacific Terminal trains could impact major regional businesses, such as Boeing, that use freight to ship parts and goods.
  - The region could experience increased international trade in other commodities if added freight demand stimulates private investment in rail infrastructure and capacity, which could allow the central Puget Sound area to gain prominence as a freight gateway.

Even if the rail system was expanded between Tacoma and Seattle, there could be an interim time period during construction of improvements when impacts to existing commuter and freight rail service could occur.

**Figure 34: Rail Line Capacity Usage with and without Gateway Pacific Terminal**

\(^{142}\) Sound Transit Fourth Quarter 2013 Performance Report.
Effect of Rail Freight Capacity Issues on the Regional Economy: A Focus on Port Activity

As discussed in the *Regional Rail Profile* chapter of this report, two principal scenarios provide the most likely outcomes resulting from increased demand for capacity.

- BNSF increases rail capacity to manage rail traffic
- BNSF does not increase rail capacity immediately or at all

How BNSF addresses increases in demand for rail capacity will have an impact on port activity.

The region’s export and import activity is dependent on a strong freight rail system. In a report for the City of Seattle, BNSF “emphasized that rail is a critical component of Seattle’s global competitiveness...[and] 65-70% of all traffic through the Port of Seattle travels via rail.”

In 2012, when combined, King, Pierce and Snohomish Counties were the 5th largest export market in the United States, with shipments totaling $50.3 billion. The three counties accounted for more than 78 percent of all merchandise exports in the state.

In 2012, the value of imports and exports at the Ports of Everett, Seattle and Tacoma totaled $105.2 billion – $65.8 billion in imports and $39.4 billion in exports. By far, the largest export sector in the region is Transportation Equipment – which accounted for $36.1 billion or 71.8 percent of the region total – a reflection of the presence of Boeing and the region’s strong aerospace industry.

While not all exports traveling through the Ports of Everett, Seattle and Tacoma are manufactured in the Puget Sound region, a portion of total exports are produced in the region. Key local manufacturers, particularly Boeing, its suppliers and other aerospace companies, depend on rail access. For instance, Boeing opened its Mt. Baker facility between Mukilteo and Everett in 2008 to relieve pressure on the BNSF main line and to improve predictability of just-in-time parts delivery to the Everett factory.

The region’s ports have aggressive growth goals contained in their strategic plans that if impeded, would result in a net economic loss for the region. However, if capacity expansion allows the ports to achieve their long-term growth goals faster, the region could achieve an economic benefit from expanded job growth related to domestic and international trade.

**Port of Seattle**

The Port of Seattle estimated that its activities currently generate nearly 200,000 jobs in the region with payroll in excess of $6.8 billion. The Port’s cargo activity alone was estimated to support more than 21,000 jobs in 2013.

In 2012, the Port of Seattle adopted a strategic plan known as the “Century Agenda.” This 25-year plan calls for the Port to “add 100,000 jobs through economic growth led by the Port of Seattle, reaching a total of 300,000 port-related jobs in the region.” As part of the plan, the Port’s strategies to position the region as a premier international logistics hub include: growing seaport annual container volume to more than 3.5 million TEUs and tripling the value of outbound cargo to over $50 billion.

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143 Ibid.
144 The U.S. Department of Commerce defines the Seattle metropolitan area as King, Pierce and Snohomish counties.
145 U.S. Census Bureau Foreign Trade Division data.
147 [http://www.portseattle.org/about/commission/pages/century-agenda.aspx](http://www.portseattle.org/about/commission/pages/century-agenda.aspx)
148 The abbreviation TEU stands for “twenty-foot equivalent unit,” a measurement based on the volume of a standard 20-foot long intermodal container.
Port of Tacoma
The Port of Tacoma’s 2013 update to its 10-year Strategic Plan (2012-2022) set ten targets, including:149

- Double container volume to 3 million TEU
- Double dry bulk throughput to 12 million metric tons
- Increase break-bulk volume by 30 percent to 200,000 short tons
- Increase automobile import volume by 20 percent to 200,000 units
- Increase port-related direct jobs by 4,700 and port-related indirect jobs by 2,000

To meet its goals, the Port of Tacoma proposes to invest approximately $500 million, combined with an additional $1.5 to $2.5 billion in public and private investments, to improve facilities and infrastructure.

Port of Everett
The Port of Everett reports that it is the second largest port in Washington State by economic output – with nearly $12.6 billion in exports in 2012 and a trade surplus (exports greater than imports) of approximately $11.2 billion. Much of the export activity at the Port of Everett is related to the aerospace industry – particularly, Boeing. Oversized aerospace parts arrive at the Port’s terminals and are ultimately transported by rail to Boeing’s facilities.

The Port of Everett’s Strategic Plan reports that nearly 35,000 direct and indirect/induced jobs are supported by activity at the Port – nearly 13,800 of which are direct jobs. The Port estimates that an additional 20,000 jobs – not included in the 35,000 figure – are supported aerospace jobs with a close relationship to Port operations.150

Potential Impacts

Potential Impact: BNSF increases rail capacity leading to higher incomes for expanding industries, lower costs for consumers in the regional and national economy, and expanded domestic and international trade opportunities for the region’s ports and manufacturers.

BNSF may meet the projected increase in demand for additional rail capacity as long as it is profitable for them to do so. BNSF indicated that its ability to enhance capacity is not limited to capital projects. The railroad indicated to the project team that it believed it had sufficient options to manage capacity – including operational strategies such as directional running and, as needed, infrastructure investments.

BNSF has shown a commitment to expand rail capacity when the proper circumstances arise. In 2013, as part of its $4.1 billion capital investment program, BNSF announced $125 million in capital investments in Washington State. In February 2014, BNSF announced planned capital investments of $5 billion nationally during the calendar year – approximately a $1 billion increase over 2013 capital expenditures. More than $900 million of the $5 billion capital plan is for expansion and maintenance in the Northern Corridor – stretching from Chicago to the Pacific

150 The 20,000 job figure likely represents a significant portion of employment activities of Boeing and its suppliers.
Northwest. The Northern Corridor includes routes under potential consideration to transport coal from the Powder River Basin to Gateway Pacific Terminal and other proposed terminals and to transport oil from the Bakken formation to refineries on the west coast – including several near Cherry Point.

The Washington Farm Bureau study – summarized in the Project Summary chapter of this report – suggested that the proposed Gateway Pacific and Longview Terminals would lead to investment in additional rail capacity and “upstream” benefits, such as higher incomes for expanding industries and lower costs for consumers in the regional and national economy. The study identified potential positive impacts on international trade for other bulk industries, such as agriculture, from increasing coal exports.

The study also indicated that, to the extent the ports encourage or require investments in rail infrastructure, other customers of the rail lines may benefit and the investment would be more enticing to the rail line because it would create economic benefits for more than just the ports (including the rail line).

Port of Seattle staff also suggested that the construction and operation of the proposed terminal may lead to additional BNSF investment in the expansion of rail capacity – which would be seen as an economic and operational positive for the Port as it could move additional freight and cargo through its facilities. In the Community Attributes report, Port of Seattle representatives reported that capacity investments, such as triple-tracking and additional sidings, could help the Port become more attractive and competitive. Port representatives also suggested that if BNSF added a new track as a result of demand for capacity, the new track would allow for the separation of freight and passenger rail to reduce freight train delays due to freight trains giving right of way to passenger trains. Port representatives reaffirmed this opinion during the Project Team’s meeting with them.

Potential Impact: BNSF is unable to increase rail capacity. Constrained capacity leads BNSF to focus on the demands of its highest paying customers and the region’s ports are not able to facilitate projected import and export growth in domestic and international trade.

BNSF states that it has the ability to meet new rail freight demand through increased strategic capacity investments as well as by increasing operational efficiencies. Should the railroad be unable to do so, the effect of additional demand on the existing rail capacity would likely depend on the degree to which import and export activity is “squeezed out” or “priced out” of the market. With constrained capacity, BNSF might focus on the most profitable cargo, potentially affecting shippers of other cargo in ways that are unknown at this time. Smaller customers could find it harder to transport goods by rail and gain access to the region’s ports. The region’s ports could experience changes in commodities and freight volume depending upon the relative profitability of each type of good – all of which could have a negative impact on the region’s level of economic activity.

If BNSF is unable to increase capacity through capital investments or operational enhancements, and rail traffic grows at projected rates, including that from the proposed terminal, there may be risk to the projected growth in trade at regional ports.

152 A more detailed overview of the study is included in the Project Summary chapter of this report.
Any potential disruption to domestic and international trade natural trajectory or planned growth at the respective regional ports due to increased rail traffic limiting additional cargo movement, even if temporary, could cause a net loss to baseline growth and economic activity.

The proposed terminal could contribute to constraints on capacity that may impact trade and related economic activity. The Washington State Rail Plan (2013-2035) noted that “[a] decline in rail service may produce a shift in traffic to truck for high-value goods…[t]his would have several negative impacts to the state’s economy. Taxpayers would bear the costs for increased wear and tear and congestion on Washington’s roadways, and those increased costs could lead to rising prices or loss of trade and industry.”

Even if BNSF invests in capacity enhancements and implements operational efficiencies, some level of risk to domestic and international trade still remains for the central Puget Sound region – especially if such changes cannot keep pace with an increase in demand. Many rail infrastructure investments require a significant amount of time and money for completion. If the proposed terminal is approved and BNSF determines additional capacity investments are required, the railroad would have an estimated two-year period to invest in and construct any capacity enhancements from the time the terminal is approved before the first train would depart the Powder River Basin for Cherry Point.

BNSF may have sufficient time to complete any capacity-related investments it determines necessary and profitable. However, the timing and effective date of operational status of any capacity enhancements would likely be of great interest to the central Puget Sound region’s ports, businesses and citizens. A key component to understanding this potential impact is the presence of, or lack thereof, physical constraints that could limit the ability to expand capacity to a sufficient level on the main line. This would not necessarily affect capacity expansion through technology or efficiency, but could affect the degree to which capital investments make a difference in capacity expansion.

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**Surge in Rail Shipments of Oil Sidetracks Other Industries**

As recently as March 2014, increased oil traffic and cold weather caused deliveries of empty rail cars to farmers in the Midwest and Great Plains to run two to three weeks late.

BNSF is trying to remedy the delays; it is buying new locomotives, hiring new staff, even built a new track on top of frozen ground in North Dakota. However, the fixes are not instantaneous and BNSF suggested delays will likely last at least until April 2014.

Advocates for tougher rail regulations suggested that the delay, and its ripple effects, could cost shippers hundreds of millions of dollars, suggesting that capacity-related issues – even if temporary – can have a negative impact on economic activity.


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Potential Impact: Commuter and/or passenger rail services are squeezed out, transit times are delayed or disrupted, costs for passenger rail on the BNSF line increase, and/or some combination of these factors have a negative economic impact on the central Puget Sound region.

Passenger rail transportation is slated to play a growing role in personal mobility for residents of the Puget Sound region. The shared-track nature of Sounder commuter rail and intercity Cascades train services requires complex planning and negotiation with BNSF.

As noted in the Regional Rail Profile chapter of this report, three stations that serve passengers in the greater Puget Sound region – Seattle, Tacoma and Olympia/Lacey – were among the five most used stations in Washington and accounted for more than 60 percent of all passenger activity in the state. Seattle alone accounted for nearly 50 percent of all on/offs (riders) in the state. Additionally, Sounder ridership has increased in recent years and plays an important role in the commerce and personal travel.

Amtrak and Sounder ridership in the central Puget Sound region are each projected to grow through 2035. Most of the projected increase in Amtrak and Sounder ridership, and thus train volume, would likely occur in the central Puget Sound region.

To the extent that increased rail traffic related to the proposed terminal delays, disrupts and/or increases costs for passenger rail service, the region could experience negative economic impacts.

### Freight Impact on Passenger Rail in North Dakota and Minnesota

A potential challenge for projected passenger rail growth in the region can be seen in a recent example from North Dakota. Westbound Amtrak Empire Builder trains in North Dakota recently experienced delays requiring passengers being transported by bus instead of rail due to a BNSF decision to shift to one-way traffic through much of North Dakota.

Extreme cold was a short-term factor in the change, but the long-term issue was that BNSF lines saw about half of all new rail volume in 2013. As a result, capacity issues forced decisions that impacted passenger rail service. Additionally, freight rail traffic has disrupted Northstar commuter rail service in the Minneapolis area.

*Sources: Bakken.com; Star Tribune*

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154 Amtrak Sets Ridership Record and Moves the Nation’s Economy Forward, October 14, 2013.
Independent Effects of Other Proposed Coal Terminals on Region’s Transportation System

Most of the long-term projections of rail volume do not account for new potential uses of rail in the central Puget Sound region – such as the proposed Gateway Pacific Terminal, other proposed coal export terminals and the transport of Bakken oil. As a result, any potential traffic from the proposed Gateway Pacific Terminal and the six other proposed coal terminal projects/expansions discussed in the Regional Rail Profile chapter of this report were not included by the various forward looking projections. 155

Figure 35: Proposed Coal Terminals in Pacific Northwest

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155 As noted previously in this report, BNSF does not believe the State Rail Plan adequately addressed the coal-export volumes and has reservations about the State’s baseline forecasts, feeling they underrepresent actual experiences.
The central Puget Sound region and its transportation system could be affected to different degrees by the other coal terminal proposals.\textsuperscript{156}

**Millennium Bulk Terminal (Longview, WA)**

Sixteen trains per day are projected to travel to/from (8 in each direction) the Millennium Bulk Terminal. There is no information on the precise route – or rail line – to be used for transporting coal from the Powder River Basin to the proposed Millennium Bulk Terminal. Both BNSF and Union Pacific rail lines provide potential routes to the Longview facility. Depending upon the chosen route(s) for shipping coal from the Powder River Basin to the proposed terminal, capacity issues – if not sufficiently addressed – could create rail traffic implications for the central Puget Sound region. The most likely route for BNSF trains – though hardly definitive – is for Powder River Basin coal to be transported to Longview via the Columbia River Gorge line after entering Washington and traveling through Spokane. This route would not travel through the central Puget Sound region, but would add volume to the Columbia River Gorge line that is also used to transport items to the central Puget Sound region. If Union Pacific rail lines transport any coal trains to the proposed terminal, the most likely route would result in traffic moving mostly through Oregon.

**The proposed Millennium Bulk Terminal is unlikely to result in any additional rail traffic traveling through the central Puget Sound region.** However, the 16 additional trains would have an impact on rail traffic on the east-west rail corridor(s) in Washington, likely the Columbia River Gorge line for, at least, transport to the terminal, and points east of State borders – Sand Point, Idaho to Spokane, Washington and through Montana to the Powder River Basin – that also serve as important corridors for goods traveling to or from the central Puget Sound region and some of which may have capacity issues absent investment in capacity expansion

**Port of Morrow (near Boardman, OR)**

The Port of Morrow proposal calls for trains carrying coal to and from the Port to use both BNSF and Union Pacific rail lines. The exact route of the estimated three additional trains per day is not definitive. The most likely option for transporting the Powder River Basin coal to the terminal would be via the Union Pacific rail line – which would travel west from the Powder River Basin through Wyoming and Idaho before entering Oregon to reach the Port of Morrow.

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\textsuperscript{156} See the *Regional Rail Profile* chapter of this report for additional detail and discussion of Terminal proposals.
Like Longview, **no trains would likely travel through the central Puget Sound region.** However, the three additional trains could have an impact on rail traffic corridor(s) that also serve as important routes for goods traveling to or from the central Puget Sound region and some of which may have capacity issues absent investment in capacity expansion.

**Ridley Terminals**

Located on the far north coast of British Columbia, Ridley Terminals is the farthest proposed expansion from the central Puget Sound region – some 1,000 miles north of Seattle. After signing a 5-year contract (expiring in 2015) with the United States-based Arch Coal, Canadian coal mines criticized the Ridley for entering into the contract and not supporting Canadian exports over U.S. exports. Upon the expiration of the Arch Coal contract, no U.S. coal appears to be contracted to ship through Ridley. However, in a 2012 SEC filing, Arch Coal disclosed that they may export 5 million metric tons per year of coal from Ridley beginning in 2015. It is not clear if that is a contracted volume or simply an option.

Given the Ridley’s status as a government chartered entity, there is some thought that it may choose to only handle Canadian coal after the conclusion of export of Arch’s coal. Ridley’s contracts and contract options (at the coal companies’ election) to export Canadian-mined coal could consume nearly 100 percent of its capacity and there appears to be little appetite to support coal exports from the Powder River Basin.

**At this time, there appears to be little to no potential additional train traffic through the central Puget Sound region’s transportation system beyond the current status.** If any additional Powder River Basin coal were to be shipped to Ridley Terminals, the optimal route may not travel through the central Puget Sound region – or even through Washington State. A shorter alternate route is available to transport the coal to Ridley. The alternate route would travel through Montana before traveling on Canadian rail lines to arrive at Ridley Terminals.

**Westshore Terminal**

Westshore Terminal at Roberts Bank is currently Canada’s number one coal exporter, with a capacity of 33 million metric tons of coal per year due to recent expansion of the terminal that added 4 million metric tons of capacity per year.\(^{157}\) Cloud Peak Energy entered into a long-term throughput contract with Westshore through 2023. The contract requires Cloud Peak to “pay for a minimum quantity of coal to be transported on the railway or through the port regardless of whether [Cloud Peak] sell[s] any coal.”\(^{158}\) In 2013, Cloud Peak exported nearly 4.7 million tons of coal from Westshore.\(^{159}\) Teck Resources Limited, a Canadian mining company, has a contract with Westshore Terminal to provide at least 19 million metric tons per year through 2016.\(^{160}\) The terminal has plans to increase its annual throughput capacity up to 36 million metric tons, though it is unclear whether the excess capacity would be consumed by Canadian coal mines, U.S. coal mines, or even utilized at all upon operational completion in 2018.

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The expansion of Westshore Terminal is unlikely to result in significant additional rail traffic traveling through the central Puget Sound region beyond the current six daily trains (three to Westshore and three from Westshore).

Fraser Surrey Docks

Fraser Surrey Docks proposed direct transfer coal facility could handle up to 4 million metric tons of coal – and ultimately reach an annual capacity of 8 million metric tons of coal. The coals, sourced from the mid-western United States (likely the Powder River Basin) would travel on the BNSF rail lines to the Fraser Surrey Docks. The route would likely include rail lines in the central Puget Sound. At an annual volume of 4 million metric tons, the project expansion is estimated to cause one train trip to and from the facility. Each train would be approximately 125-135 unit train car lengths (approximately 7,555 feet, or 1.4 miles).

The expansion of Fraser Surrey Docks to include a direct transfer coal facility could result in two additional trains (one to the facility and one from the facility) through the central Puget Sound on a daily basis.

Neptune Terminal

Canadian coal company Teck Resources has the sole, exclusive rights to the coal system facilities at Neptune. Available data suggest Teck will retain exclusive usage of terminal capacity. Canadian Pacific Rail has a ten-year agreement (through 2021) with Teck Resources to transport the coal to the terminal. No U.S. coal exports appear likely at Neptune Terminal and, thus, no resulting impact is projected to the central Puget Sound region’s transportation system.

Regional Impacts: Transportation System

This section of the report evaluates potential impacts that could arise due to train operations related to the proposed Gateway Pacific Terminal. The impacts analyzed include those to existing rail traffic, roadway traffic operations, land use patterns and values, and affected stakeholders in the central Puget Sound region.

Effects of the Proposed Gateway Pacific Terminal on the Regional Transportation System: Impact of anticipated change in rail operations on surface movement of people and goods at grade crossings

The following analysis assumes that trains traveling to and from the proposed terminal would operate on the BNSF rail lines in the central Puget Sound region. At-grade crossings on the Union Pacific rail lines were not evaluated as part of this study. The specific route that trains would use between the Powder River Basin and the proposed terminal has not been determined, although inbound trains would likely access the BNSF main line via the Columbia River Gorge route. It is possible that loaded trains may travel to the terminal via the Columbia River Gorge route and empty trains could return to the Powder River Basin along the Stevens Pass or Stampede Pass routes.

Gate-down time is a measure of the duration of time that a railroad crossing gate is down while a train passes. Long periods of gate-down time have the potential to increase congestion and cause delays to traffic at or near at-grade crossings. As shown in Figure 36, there are 101 at-grade crossings along the BNSF main rail lines in the central Puget Sound region that could be affected by increased rail traffic related to the proposed terminal. Of these 101 crossings, 77 of them are in the region’s cities and towns, with 70 of these crossings located in communities selected in this study for further economic analysis. Seventy of the 101 BNSF mainline at-grade crossings are located on the north/south BNSF main line, 26 at-grade crossings are located on the east/west BNSF rail line across Stevens Pass, and five at-grade crossings are located on the east/west BNSF rail line across Stampede Pass.162

Daily gate-down time at at-grade railroad crossings would increase with the proposed Gateway Pacific Terminal project. The amount of the increase is dependent on the length of each train, the speed of the train, and how many daily train trips are scheduled. According to terminal documents, trains serving the Gateway Pacific Terminal at Cherry Point would be approximately 1.6 miles long by 2035 with approximately 18 train trips per day (9 trains traveling to and 9 trains traveling from the terminal).163

Crossings by Community

<table>
<thead>
<tr>
<th>Community</th>
<th>Number of At-Grade Crossings</th>
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</thead>
<tbody>
<tr>
<td>Stanwood</td>
<td>1</td>
</tr>
<tr>
<td>Marysville</td>
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<tr>
<td>Mukilteo</td>
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</tr>
<tr>
<td>Seattle</td>
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</tr>
<tr>
<td>Kent</td>
<td>8</td>
</tr>
<tr>
<td>Auburn</td>
<td>4</td>
</tr>
<tr>
<td>Sumner</td>
<td>5</td>
</tr>
<tr>
<td>Puyallup</td>
<td>7</td>
</tr>
<tr>
<td>Tacoma</td>
<td>3</td>
</tr>
<tr>
<td>Steilacoom</td>
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</tr>
<tr>
<td>Unincorporated</td>
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<table>
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<th>Community</th>
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</thead>
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</tr>
<tr>
<td>Snohomish</td>
<td>1</td>
</tr>
<tr>
<td>Monroe</td>
<td>5</td>
</tr>
<tr>
<td>Sultan</td>
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</tr>
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<td>Gold Bar</td>
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<tr>
<td>Skykomish</td>
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<tr>
<td>Unincorporated</td>
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<table>
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<tr>
<th>Community</th>
<th>Number of At-Grade Crossings</th>
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</thead>
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<tr>
<td>Covington</td>
<td>1</td>
</tr>
<tr>
<td>Maple Valley</td>
<td>1</td>
</tr>
<tr>
<td>Unincorporated</td>
<td>2</td>
</tr>
</tbody>
</table>

162 Final crossing count provided by PSRC
The table at right summarizes the number of crossings located in each community included in this evaluation. The crossing locations in the table are listed by geographic location from north to south on the BNSF main line followed by crossings on Stevens Pass and Stampede Pass at the end of the list.


**Gate-Down Time Methodology**

Gate-down time was calculated by summing the total crossing time per train based on length and speed at the crossing. Trains were assumed to be the following average lengths:

- Freight train: 0.8 miles long
- Passenger train: 400 feet
- Gateway Pacific Terminal train: 1.6 miles

All trains (freight, passenger, and terminal-related trains) were assumed to be traveling at 75 percent of the allowable speed at the crossing. Data for the allowable speed at each crossing in the study area was collected from the USDOT Crossing Inventory database. It was assumed that all crossings in the study area had a crossing width of approximately 50 feet and that there was a 20 second lead time and 10 second lag time during which gates were down but the train was not passing through the crossing.

The following is an example of how gate-down time is calculated at a crossing:

- Allowable speed at the crossing is 40 mph, so trains would travel through the crossing at 30 mph (40 mph x .75).
- A freight train would create approximately 2.1 minutes of gate-down time per crossing event.
- A passenger train would create approximately 0.67 minutes of gate-down time per crossing event.
- A terminal-related train would create approximately 3.7 minutes of gate-down time per crossing event.
- The gate-down time per train type was multiplied the volume of that train type at the crossing.
  - If there were 10 freight trains, 3 passenger trains, and 9 terminal-related trains, the daily gate-down time would be approximately 56 minutes (21 minutes+2 minutes+33 minutes).

Varying speeds at crossings and the different lengths of train have a substantial impact on the daily gate-down time at each crossing in the study area. A detailed The methodology for developing the gate-down time is included in Appendix B of this report.
Figure 36: Regional At-Grade Crossing Locations
**Existing Coal Train Operations**

Much of the current coal traveling through the central Puget Sound region travels from the Powder River Basin for export from Westshore Terminal in Roberts Bank (south of Vancouver, BC). There is no definitive source available that details the exact number of coal trains that currently travel through the central Puget Sound region to Westshore. However, some sources indicate that approximately two to six coal trains per day currently operate through the region.\(^{164}\)

**Existing Gate-Down Time**

Currently, depending upon the location of a given crossing, there are approximately 6 to 30 daily freight train movements.\(^{165}\) Crossings with passenger rail movements currently experience between 2 and 30 daily passenger rail trips.\(^{166}\) Gate-down time at at-grade crossings in the region vary by crossing. The variation in times range from approximately 13 minutes to 1 hour 20 minutes each day. Gate-down times by crossing and rail line are shown in Figures 37, 38 and 39. Train crossings occur throughout the day, so the amount of gate-down time experienced for any one train crossing event would be a portion of the above mentioned total.

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\(^{165}\) Washington State 2013-2035 Rail Plan.

\(^{166}\) Ibid.
The Steilacoom crossing has a high ratio of freight to passenger movements (31 freight trains vs 10 passenger trains). Passenger trains create substantially less gate-down time because they are much shorter in length than freight trains. An additional factor in the high gate-down time is a slower max speed at the Steilacoom crossing (50 mph maximum – it is assumed that trains travel at 75% of that speed, or 37.5 mph). Crossings in Tacoma and Puyallup generally have a lower ratio of freight to passenger trains (13 freight, 28 passenger trains) and max speeds are about 20 mph faster at most crossings than the Steilacoom crossing.

Figure 37: Existing Daily Gate-Down Time at At-Grade Crossings on BNSF Line in the Central Puget Sound Region (displayed north to south)
Figure 38: Existing Daily Gate-Down Time at At-Grade Crossings on the Stevens Pass BNSF Line in the Central Puget Sound Region (displayed west to east)
WSDOT predicts that, by 2035, freight rail and passenger rail service in the central Puget Sound region will increase from existing conditions. In 2035, projections indicate daily freight train volumes at crossings will increase to a total of between 13 to 71 trains depending on the location of the at-grade crossing from the current 6 to 30 movements at crossings. At-grade crossings north of Seattle, passenger train volumes are anticipated to be similar to existing conditions with between 2 and 14 passenger train trips per day. South of Seattle, passenger train volumes are predicted to grow by approximately 4 trains per day, which is due to expanding Sounder service between Lakewood and Seattle. This would bring daily passenger train volumes to between 14 and 32 passenger trains each day depending on the crossing, an increased from the current 10 to 28 passenger trains per day. With the predicted freight and passenger train volumes in 2035, daily gate-down time at at-grade crossings...
would be between approximately 30 minutes and 2 hours 45 minutes per day depending on the location of the crossing. The resulting increase would be between 13 minutes and 1 hour 35 minutes depending upon the location of the crossing. Figures 40, 41 and 42 show the daily gate-down time by crossing location without Gateway Pacific Terminal train operations. The time at which crossings would occur during a given day is uncertain and could change frequently – even from day to day. Train crossings could be dispersed throughout the day, similar to existing conditions, but no definitive information or projections are available.

Figure 40: 2035 Daily Gate-Down Time at At-Grade Crossings on the North-South BNSF Main Line in the Central Puget Sound Region without Gateway Pacific Terminal Trains (displayed north to south)
Figure 41: Daily Gate-Down Time at At-Grade Crossings on the Stevens Pass BNSF Line in the Central Puget Sound Region without Gateway Pacific Terminal Trains (displayed west to east)
Figure 42: 2035 Daily Gate-Down Time at At-Grade Crossings on the Stampede Pass BNSF Line in the Central Puget Sound Region without Gateway Pacific Terminal Trains (displayed west to east)
Travel delay experienced by people and goods at railroad crossings due to the proposed Terminal

*Gate-Down Time in 2035 with the Gateway Pacific Terminal Project*

Upon full build out of the Gateway Pacific Terminal, 18 trains (9 trains in each direction) per day would travel through the central Puget Sound region.\(^\text{171}\) The trains, each 1.6 miles long, would add approximately 30 miles of train traffic to the region’s rail lines on a daily basis. This study assumes that train traffic related to the proposed terminal would be equally distributed throughout the day as shown in Figure 43.\(^\text{172}\) At this time, it is unclear what time of day train traffic would travel to and from the proposed terminal.\(^\text{173}\)

**Figure 43: Daily Distribution of Existing Trains with Added Trains**

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\(^\text{171}\) If trains traveling from the Terminal return to the Powder River Basin via Stevens or Stampede Pass, nine trains (instead of 18) would travel along the BNSF main line between south Pierce County and Everett or Auburn, which would reduce impacts from trains at crossings along the north-south main line.

\(^\text{172}\) SDOT Coal Train Traffic Impact Study 2012.

\(^\text{173}\) This study assumes that Gateway Pacific Terminal trains would be equally distributed throughout the day. An assumption of equal distribution provides for a conservative analysis of the impacts from Gateway Pacific Terminal trains.
By 2035, with the addition of trains from the proposed terminal, approximately 22 to 103 train crossings at at-grade crossings in the central Puget Sound region may occur every day depending on the location of the crossing. This includes the following approximate crossing projections of up to:

- 43 crossings per day between Everett and Skagit County on the north-south BNSF main line (18 due to the terminal);
- 82 to 95 crossings per day between Seattle and Everett on the north-south BNSF main line (18 due to the terminal);
- 95 crossings per day between Auburn and Seattle on the north-south BNSF main line (18 due to the terminal);
- 80 to 95 crossings per day between Tacoma and Auburn on the north-south BNSF main line (18 due to the terminal);
- 103 crossings per day between Thurston County and Tacoma on the north-south BNSF main line (18 due to the terminal);
- 53 to 73 crossings per day between Everett and Chelan County if empty trains return on the Stevens Pass route (9 due to the terminal).
- 8 to 103 train crossings at at-grade crossings in the central Puget Sound region may occur every day depending on the location of the crossing. This includes the following approximate crossing projections of up to:
- 22 crossings per day between Auburn and Kittitas County if empty trains return on the Stampede Pass route (9 due to the terminal). This would reduce the number of daily crossings between Auburn and Thurston County by 9 trains.

The above predicted number of train crossings includes all freight, passenger and terminal-related train trips in 2035. With train traffic from the proposed terminal, the daily gate-down time in 2035 could increase by between approximately:

- 38 minutes and 1 hour 25 minutes between Everett and Skagit County on the north-south BNSF main line;
- 48 minutes and 1 hour 25 minutes between Seattle and Everett on the north-south BNSF main line;
- 38 minutes between Auburn and Seattle on the north-south BNSF main line;
- 38 minutes and 55 minutes between Tacoma and Auburn on the north-south BNSF main line;
- 55 minutes between Thurston County and Tacoma on the north-south BNSF main line;
- 22 minutes and 1 hour 45 minutes between Everett and Chelan County if empty trains return on the Stevens Pass route. This would reduce the daily gate-down time between Everett and Thurston County by between 20 and 45 minutes depending upon the location of the crossing; and
- 33 minutes and 50 minutes between Auburn and Kittitas County if empty trains return on the Stampede Pass route. This would reduce the daily gate-down time between Auburn and Thurston County by between 20 and 30 minutes.

On average, terminal-related train traffic may cause a 65 percent increase in daily gate-down time. Figures 44, 45 and 46 show the daily gate-down time that may occur with additional terminal-related train operations.
Figure 44: 2035 Daily Gate–Down Time on the North-South BNSF Main Line with Gateway Pacific Terminal Train Operations (displayed north to south)
Figure 45:

2035 Daily Gate–Down Time on the Stevens Pass BNSF Line with Gateway Pacific Terminal Train Operations (displayed west to east)

The marginal increase in daily gate-down time shown in the above figure may or may not occur from Gateway Pacific Terminal operations. An increase in daily gate-down time at crossings on the Stevens Pass Line would occur only if BNSF routes empty trains returning to the Powder River Basin along the Stevens Pass Line. This would result in an additional 9 train movements per day at these crossings.
The marginal increase in daily gate-down time shown in the above figure may or may not occur from Gateway Pacific Terminal operations. An increase in daily gate-down time at crossings on the Stampede Pass Line would occur only if BNSF routes empty trains returning to the Powder River Basin along the Stampede Pass Line. This would result in an additional 9 train movements per day at these crossings.
Other impacts of the Proposed Gateway Pacific Terminal Throughout the Regional Transportation System in the Central Puget Sound

Increased gate-down time and crossing blockages could occur from trains going to or from the proposed terminal. Blockage occurs when trains are in the crossing and prevent vehicles and pedestrians from crossing the rail line. In segments of the rail line that would be more highly congested, such as between Steilacoom and Tacoma, this could occur more frequently.

Terminal-related trains could cause crossing blockages and gate-down times to increase an additional 9 to 18 times per day. Each Gateway Pacific Terminal train could take between 2 and 6 minutes to clear a crossing, which could add 18 to 108 minutes of daily gate-down time to affected crossings.

**Impacts to Emergency Services**

Increased gate-down time or crossing blockage could result in longer average response time for emergency vehicles. Fire and medical emergency vehicles responding to an emergency may encounter increased wait times at at-grade crossings due to increased train traffic, including trains related to terminal operations. Fire stations or hospitals located within close proximity to an at-grade crossing may be among the most severely impacted emergency response facilities. With additional trains related to the proposed terminal, emergency response vehicles could experience additional crossing delays of 2 to 6 minutes per train crossing event.

Potential impacts to emergency service delivery were evaluated by assessing proximity to at-grade crossings. The evaluation categorized each at-grade crossing based on the impact on emergency service response times using the following definitions:

- **High impact**: at-grade crossings that had a hospital or a fire station within a half-mile radius. Emergency service providers would likely be impacted by congestion and delay from additional train traffic related to the terminal. Emergency responders would have to wait for crossings to clear during a train event and would be less able to take an alternate route.
- **Moderate impact**: hospitals and fire stations within a one-mile radius of an at-grade crossings would likely experience a moderate, or medium, impact from congestion and delay related to additional train volume related to the proposed terminal.
- **Low-direct impact**: at-grade crossings that had a hospital or fire station located within close proximity to the one-mile buffer were estimated to experience a low direct impact since crossing delay could impact emergency service delivery, but responders would likely be able to take an alternate route.
- **Low-indirect impact**: At-grade crossings that had a low-indirect impact did not have a hospital or fire station located within close proximity (beyond a one-mile buffer). Emergency response could be impacted if an accident occurred near one of these at-grade crossings. It was determined that there could be some impact but it would not be directly related to proximity to an at-grade crossing.

There are 21 different at-grade crossings in the region in close proximity to hospitals and fire stations (see Appendix C). This includes crossings located in Stanwood, Marysville, Seattle, Kent, Auburn, Sumner, Puyallup, Monroe, Sultan, Index, Skykomish, and Ravensdale. More detail on emergency response impacts specific to each community is included in the ‘Impacts by Community’ section included later in this section. Figures 47, 48 and 49 show the locations of fire stations and hospitals in the central Puget Sound region.
Figure 47: Emergency Services near Everett, WA
Figure 49: Emergency Services near Tacoma, WA
**Impacts to Transportation Access**

Increased gate-down time could impact access to public transportation facilities in the region. Facilities that could be impacted include:

- A park-and-ride facility near Grove Street between Cedar Avenue and State Avenue in Marysville;
- Ferry terminals near the crossings at SR 104/Main Street and Railroad Avenue in Edmonds, and at Union Avenue near Commercial Street in Steilacoom; and
- Passenger train terminals near crossings along the Edmonds waterfront, in downtown Kent, in downtown Auburn, and in downtown Puyallup.

A single train going to or from the proposed terminal could delay vehicle traffic for approximately 2 to 6 minutes while it passes through a crossing. At full build out, this could occur between 9 to 18 times per day.

**Impacts to Pedestrian Safety and Mobility**

The development of the proposed terminal could impact pedestrian traffic at at-grade crossings in the region. Many at-grade crossings are used by pedestrians on foot or bicycle. Additional train movements could disrupt pedestrian activity by reducing connectivity — in essence, changing the flow of pedestrian traffic due to reduced accessibility. Several at-grade crossings in the Seattle waterfront area have between 250 and 315 pedestrian crossings during the PM peak hour.\(^\text{174}\) Other crossings in other downtown or tourist areas of communities along the rail lines in the Puget Sound region could have similar pedestrian volumes. Additional crossings by terminal-related trains could impact a high volume of pedestrians at these crossings.

At-grade crossings located inside designated regional growth centers, such as in Seattle, Kent, Auburn, and Puyallup, would have the greatest impact to pedestrian safety and mobility. In PSRC’s Vision 2040, designated regional growth centers are areas that are characterized by compact, pedestrian-oriented development. These designated centers are locations where a higher concentration of future population and employment growth can be anticipated. Regional growth centers will have a concentration of people and jobs and should provide improved access and mobility for pedestrians, bicyclists, and transit. Pedestrian mobility and safety impacts would be greatest in:

- the Seattle waterfront
- downtown Kent
- downtown Auburn, and
- downtown Puyallup.

Each of these communities has at-grade crossings located within a regional growth center.

\(^{174}\) SDOT Coal Train Traffic Impact Study 2012.
Regional Impacts: Land Use

Effects of the Proposed Gateway Pacific Terminal on Commercial and Residential Land Use and Property Values

This section of the report analyzes the potential impacts to existing land use in the central Puget Sound region due to trains traveling to and from the proposed terminal, including impacts to regional land use designations, community character and property values.

Impacts to Land Use Designations

Additional train traffic in the central Puget Sound region related to the proposed Gateway Pacific Terminal could influence longer term comprehensive plan designations and zoning in residential and city center areas. Existing land uses and community goals that conflict with high volume freight corridors would experience the greatest negative impact. Conflicts could arise as a result of train noise and vibration, circulation and access impacts, and safety concerns. However, it is not currently possible to calculate the marginal impact to land use designations caused by trains traveling to and from the proposed terminal because freight train volumes are expected to increase by 2035 even without the development of the proposed Gateway Pacific Terminal.

The following impacts serve as examples of possible impacts from an increase in rail traffic attributable to the proposed terminal.

A previous traffic study that analyzed impacts from Gateway Pacific Terminal train movements indicated that there could be notable traffic and accessibility impacts to areas of the City of Seattle.\textsuperscript{175} Impacted areas would include the SODO and Waterfront neighborhoods. As a result of increased train movements and congestion at at-grade crossings, residential and commercial zoned areas could be impacted. Reduced access, congestion and impacts to traffic and pedestrian circulation from increased train volumes – including trains traveling to and from the proposed terminal – would be incompatible with residential and commercial activities. Other communities along the corridor, including the cities of Kent and Edmonds, would have similar impacts to existing long-term planning efforts in city centers and residential and commercial zoned subareas.\textsuperscript{176}

A second study indicated that City of Seattle planning efforts, such as the Transportation Element and Freight Mobility Strategic Action Plan, identify the importance of local freight access for business vitality, which could be diminished with increased Gateway Pacific Terminal train movements through Seattle.\textsuperscript{177} Increased train operations related to the proposed terminal could impact business vitality in commercial and manufacturing zones. Reduced access and circulation caused by increased train operations could also directly conflict with long-term city planning efforts for economic and community viability in areas where trains would be operating.

Increased rail track use, and congestion and blockages at at-grade crossings along the corridor would conflict with long-term planning efforts for the region’s waterfronts. Much

\textsuperscript{175} SDOT Coal Train Traffic Impact Study 2012.
\textsuperscript{176} City of Kent Downtown Subarea Action Plan 2014; Port of Edmonds Harbor Square Master Plan 2012.
of the rail corridor in the Puget Sound region extends along the region’s shores, especially north of Seattle and south of Tacoma. Throughout the corridor, many communities have invested in the transformation of their waterfronts from industrial to commercial and tourist areas as a step towards sustainable economic and community vitality. A study conducted by Communitywise Bellingham found that access to the waterfront in Bellingham could be impacted by terminal-related train traffic in the rail corridor that travels through Bellingham. Increased freight rail traffic to and from the terminal could have similar impacts in the central Puget Sound region as those discussed in the Communitywise Bellingham study.

**Impacts to Property Values**

The value of residential and commercial properties adjacent to the rail corridor could decrease in value due to additional freight rail traffic – including traffic traveling to and from the proposed Gateway Pacific Terminal. Prior studies in the central Puget Sound region and other areas of the country suggest that residential and commercial property values adjacent to freight rail lines are generally lower than comparable residential and commercial properties located farther from freight rail lines. A variety of factors related to train operations are cited to lower property values. Factors include increased traffic congestion, reduced quality of access, perceptions of diminished safety, increased noise, and air pollution.

A 2012 study suggested the following impacts to property values in the region as a result of increased freight rail traffic traveling to and from the proposed terminal:

- North of Everett, single-family residential properties could suffer a five to twenty percent decrease in value.
- Commercial properties north of Everett could experience a five to ten percent reduction in property value.
- Properties of all types south of Everett could be valued at approximately three to five percent less than similar properties in the region once trains begin traveling to and from the Gateway Pacific Terminal.

This study also concluded that there could be a total of 21,548 tax parcels impacted by terminal-related trains. These were properties located within 600 feet of the BNSF main line railroad tracks. The study concluded that these properties had a total aggregated assessed value of $26.6 billion.

A 2011 study concluded that home values near a high volume freight corridor decreased on average by approximately two percent. However, the study also concluded that property values not near the rail line could increase, which could minimize the net impact to the region. If the theory holds true in the central Puget Sound region, the development of the proposed terminal could result in some residential property owners experiencing decreased property values (generally those closest to the rail line) while other residential properties may not be affected or could even increase. It is unclear if any potential increase would offset the reductions in property values closer to the rail line.

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179 ClimateSolutions Increased Train Traffic and Real Estate Values: A study of the potential impact of increased train traffic on property values resulting from the proposed Gateway Pacific Terminal at Cherry Point, WA Eastman Company File No. 2036.1 2012.
180 ClimateSolutions 2012.
181 Ibid.
182 Ibid.
183 Michael Futch Examining the Spatial Distribution of Externalities: Freight Rail Traffic and Home Values in Los Angeles 2011.
A literature review included in the Point Defiance Bypass Project Socioeconomic and Environmental Justice Discipline Report evaluated economic impacts on value for properties located near a rail line. The conclusions from the literature review indicated that there may be a discount for houses within approximately 984 feet of the tracks. However, another study indicated that the issue was nuisance noise from train horns and that discounts in home values were not due specifically to the proximity of the home to tracks.

Some communities, such as the City of Tacoma, have replaced train horns at intersections with wayside horns to reduce the impact of noise and vibration for residents living near at-grade crossings. Wayside horns are located at at-grade crossings to focus the audible safety warning to the traffic at the intersection as opposed to the louder, broadcast sound generated by a train horn. When local jurisdictions banned the use of train horns at crossings, there was a measurable increase in accidents. In response to the need to balance nuisance noise and safety, the use of wayside horns has increased. There is insufficient available data to know if the use of wayside horns could have a different effect on home values as compared to the use of train horns.

Additional noise, related to the trains traveling on tracks, would likely have similar effects on property values as the train horns. The use of quieter tracks, such as continuous welded rail, minimizes track noise measurably and thus would be expected to have a smaller impact to local property values.

Noise from increased freight trains traveling to and from the proposed terminal could also impact public health and quality of life for community members.

184 WSDOT Point Defiance Bypass Project Socioeconomic and Environmental Justice Discipline Report 2011.
185 Ibid.
Regional Impacts: Environment

Potential Effects of the Proposed Gateway Pacific Terminal on Water Quality, Air Quality, and Minority and Environmental Justice Populations

This section of the report provides the potential impacts to the environment in the central Puget Sound region from additional train volume serving the proposed Gateway Pacific Terminal; potential impacts include regional water and air quality, and disproportionate impacts on low-income and minority populations.

As discussed in the Project Summary section of this report, the U.S. Army Corps of Engineers, the Washington State Department of Ecology, and Whatcom County are developing an environmental impact statement to document the impacts of the proposed terminal. A draft EIS is scheduled to be completed in 2015. That document will include a full description of the environmental impacts of the project.

The draft EIS and final EIS will provide greater detail than time or budget allow for this report. The limited nature of the potential environmental impacts included in this section of the report are possible examples of regional environmental effects from rail traffic related to the proposed terminal and should not be interpreted as providing a comprehensive or exhaustive evaluation of potential impacts.

Impacts to Water and Air Quality

Much of the rail corridor in the region that could be used by terminal-related trains is situated along the shoreline between Seattle and upper Snohomish County and between Tacoma and lower Pierce County. Any negative impacts to water quality could adversely affect tourism and the fishing industries in the central Puget Sound region.

Air quality in the central Puget Sound region could also be adversely impacted by terminal-related train operations. It is likely that diesel emissions would increase – though likely at minimal levels compared to current emissions from all diesel emissions sources – with additional trains traveling to and from the proposed terminal. A study conducted by the National Cancer Institute and the National Institute for Occupational Safety and Health found that those who are exposed to diesel exhaust are three times more likely to contract lung cancer.\(^\text{186}\) Additional research found that trains cause a significant increase in diesel exhaust emissions in neighborhoods near a rail corridor – making this a potential issue of interest for heavily settled areas in the region.\(^\text{187}\) According to the Puget Sound Clean Air Agency, rail represents approximately 3% of the total diesel exhaust in the Puget Sound region.\(^\text{188}\) Diesel exhaust is a source of PM\(_{2.5}\), a type of air pollution that is a concern for public health. PM\(_{2.5}\) is a term for particles found in the air that are less than 2.5 micrometers in diameter and are considered to be the most harmful to human health.\(^\text{189}\) Common sources of PM\(_{2.5}\) come from combustion activities, such as from motor vehicles, power plants, and wood burning. PM\(_{2.5}\) is

\(^{186}\) Attfield, Schleiff, Lubin, Blair, Stewart, Vermeulen, Coble & Silverman Diesel Exhaust in Miners Study 2012


\(^{189}\) [http://www.epa.gov/pmdesignations/faq.htm#0](http://www.epa.gov/pmdesignations/faq.htm#0)
linked increased instances of asthma, vascular disease, hypertension, and cancer.\textsuperscript{190} \(\text{PM}_{2.5}\) pollution could increase in the central Puget Sound region with increased train movements as part of the project proposal for Gateway Pacific Terminal. However, the U.S. Environmental Protection Agency has established standards for locomotives that will reduce PM emissions by as much as 90% when fully implemented. These standards apply at varying levels depending on the date the locomotive engine was manufactured, with the most stringent standards applied to engines built in 2015 or later (http://www.epa.gov/oms/locomotives.htm). Further, the Washington State Department of Ecology’s 2011 Comprehensive Inventory shows that locomotives represent less than 1% of the state’s PM2.5 emissions.\textsuperscript{191}

In 2009, the Tacoma-Pierce County area was classified as a nonattainment area for \(\text{PM}_{2.5}\) pollution because levels of this pollutant had exceeded the national standard. The major contributor in this area to elevated \(\text{PM}_{2.5}\) emissions and the ultimate violation of the standard was winter-time wood burning. In 2012, the U.S. Environmental Protection Agency approved a Clean Data Determination for the Tacoma-Pierce County nonattainment area, which had demonstrated that the area has been attaining the standard in recent years. It is important to note that a \(\text{PM}_{2.5}\) maintenance plan is currently being developed by the Washington State Department of Ecology, in coordination with the Puget Sound Clean Air Agency and the Puget Sound Regional Council. The maintenance plan, expected to be released for public comment and submitted to EPA for approval later this year, will contain a complete inventory of \(\text{PM}_{2.5}\) emissions within the area, including residential wood smoke, industry, on-road mobile sources, and other sources including locomotives and dust.

The issue of potential impacts from fugitive coal dust is one that is still being researched. Concerns exist that coal dust could have an impact on non-attainment areas and populations with health issues (e.g. asthma) and the degree to which those issues are concentrated in low income and high minority neighborhoods, could adversely impact environmental justice populations.\textsuperscript{192} It is critical to note that the issue of fugitive coal dust and its potential impacts would require additional analysis beyond the scope of this report. Current research is not available to precisely describe the location, types and size of potential impacts from fugitive coal dust escaping from trains traveling to the proposed Terminal. However, as noted, work is currently being conducted by the Puget Sound Clean Air Agency and the Washington State Department of Ecology for the Tacoma-Pierce County \(\text{PM}_{2.5}\) Maintenance Plan, including an analysis of all sources of \(\text{PM}_{2.5}\) emissions in the area as they relate to meeting and maintaining federal air quality standards. Also as noted, the EIS for the proposed terminal is being conducted in coordination with Ecology and other resource agencies, which will include greater detail on potential impacts.

**Impacts to Environmental Justice Populations**

Environmental justice populations are defined as low-income and minority populations. Generally, economic development and other large project developments are reviewed to quantify any disproportionate impact on these populations and attempt to mitigate negative impacts if possible. Generally, environmental justice populations are considered to be disproportionately impacted if:\textsuperscript{193}

- Low-income or minority populations would predominantly bear the adverse effect; or

\textsuperscript{190} http://www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf
\textsuperscript{191} (http://www.ecy.wa.gov/programs/air/EmissionInventory/AirEmissionInventory.htm).
\textsuperscript{193} http://www.fhwa.dot.gov/Environment/environmental_justice/ej_at_dot/order_56102a/index.cfm
• Low-income or minority populations would suffer the adverse effect, and the adverse effect would be considerably more severe or greater in magnitude than the adverse effect suffered by the general population.

Census tract data in the central Puget Sound region was used to assess minority and low-income characteristics in the study area.

Environmental justice impacts for low-income populations were evaluated by census tract. The evaluation categorized each at-grade crossing based on the impact to low income populations using the following definitions:

• **High impact**: at-grade crossings with more than 50 percent of the population below the poverty line were considered to be the most disproportionately impacted by increased rail traffic related to the proposed terminal (score of 3).
• **Moderate impact**: at-grade crossings in census tracts with between 25 and 50 percent of the population below the poverty would have a moderate, or medium, impact from increased rail traffic related to the proposed terminal (score of 2).
• **Low impact**: crossings located in census tracts with between 10 and 25 percent of the population below the poverty level would have a low impact from increased rail traffic related to the proposed terminal (score of 1).
• **Limited to no impact**: crossings in census tracts with less than 10 percent of the population below the poverty line would not be disproportionately impacted by increased rail traffic related to the proposed terminal (score of 0).

Environmental justice impacts for minority populations were also analyzed by census tract. The evaluation categorized each at-grade crossing based on the impact to minority populations using the following definitions:

• **High impact**: at-grade crossings with more than 50 percent minority population were considered to be the most disproportionately impacted by increased rail traffic related to the proposed terminal (score of 3).
• **Moderate impact**: at-grade crossings in census tracts with between 25 and 50 percent minority population would have a moderate, or medium, impact from increased rail traffic related to the proposed terminal (score of 2).
• **Low impact**: crossings located in census tracts with between 10 and 25 percent minority population would have a low impact from increased rail traffic related to the proposed terminal (score of 1).
• **Limited to no impact**: crossings in census tracts with less than 10 percent minority population would not be disproportionately impacted by increased rail traffic related to the proposed terminal (score of 0).

The ratings for impacts to low-income and minority populations were combined into a total environmental justice impact rating using the following definitions:

• At-grade crossings that had scores between five and six would be highly impacted by increased train traffic traveling to and from the proposed terminal.
• A medium impact was defined by a score between three and four.
• Crossings that were rated between one and two would have a low impact.
• Crossings that had no impact were rated at zero.

**Environmental Justice Impact Rating Criteria**
Figures 50 through 55 show the concentration of minority and low-income populations by census tract in the central Puget Sound counties. Environmental justice populations that would be most likely to experience the highest disproportionate impacts related to increased rail traffic to and from the proposed terminal would be located in:

- Kent, at S 212th Street and 77th Avenue S, near which there are census tracts with 25 to 35 percent of residents below the poverty level and with more than a 50 percent minority population.
- Seattle, near the industrial district, in which there are four crossings in census tracts with 25 to 35 percent of residents below the poverty level and with more than 50 percent minority population.

Environmental justice populations in Everett, Auburn, Algona, Pacific and Fife could also have a moderate disproportionate impact from the increased train traffic related to the terminal.

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<td>25% - 50% Minority Population</td>
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Environmental justice populations are defined by the combination of the minority and low-income populations as follows:

- No Impact: No more than 10% minority population and no more than 10% low-income population.
- Low Impact: Between 10% and 25% minority population and between 10% and 25% low-income population.
- Medium Impact: Between 25% and 50% minority population and between 25% and 50% low-income population.
- High Impact: More than 50% minority population and more than 50% low-income population.
Figure 50: Low-Income Populations – Snohomish County
Figure 51: Minority Populations – Snohomish County
Figure 53: Minority Populations – King County
Figure 54: Low-Income Populations – Pierce County
Figure 55: Minority Populations – Pierce County
Community-Specific Impacts
And Opportunities
The Community-Specific Impacts and Opportunities Associated with the Proposed Gateway Pacific Terminal

Introduction

While the prior sections of this report have focused on regional impacts as they relate to domestic and international trade, transportation access, land use and the environment, the final section attempts to provide economic analysis at the level of individual communities that may be impacted by the Gateway Pacific Terminal – specifically, by the projected increase in rail traffic. The number of at-grade crossings, vehicle volumes, train volumes, daily gate-down time, development and community composition – among other factors – would likely result in differing levels and types of impacts by community.

Even with respect to the projected increase in rail traffic, the analysis contained in this section is not intended to be comprehensive. Other cities may be affected and, within some cities, not all crossings are analyzed – nor is the analysis meant to be exhaustive – there may certainly be economic impacts other than those identified in this analysis, including localized effects of some the regional economic impacts identified in earlier sections of the report.

Given the limited scope of the analysis, the project team – in consultation with PSRC staff – selected a variety of crossings for analysis in order to show the economic impact for representative crossings with higher and lower vehicle volumes in both large and small cities as well as near various types of property types (e.g. residential, commercial, etc.).

The limited scope also meant that a community by community analysis of total economic impact was impractical. Economic impacts from gate-down time and property value change were selected as impacts that were likely to be common for all cities that will be affected by the increase in rail traffic. It was also possible to quantify these impacts using a methodology that was both supported by research and in a manner that was replicable.

Thus, while not dispositive in answering the question as to the total impact in the region or even in individual communities, the analysis below provides elected officials, stakeholders and the public with a sense of what the impacts would be at the community level, a methodology for how those impacts can be determined and a means of quantifying the impacts.

The analysis looked at 15 Puget Sound region cities that will likely see an increase in rail traffic due to the Gateway Pacific Terminal Project. Each selected community is located on or near to a freight route that could experience an increase in freight train traffic as a result of Gateway Pacific Terminal operations. These communities, which are located in Snohomish, King, and Pierce counties, vary in their geography, population, economic performance, and predominant land use. With limited exception, crossings in unincorporated areas of the region were not evaluated for economic analysis.
BNSF Main Line
- Stanwood
- Marysville
- Edmonds
- Seattle
- Kent
- Auburn
- Sumner
- Puyallup
- Tacoma
- Steilacoom

Stevens Pass Line
- Everett
- Snohomish
- Monroe

Stampede Pass Line
- Covington
- Maple Valley

Similar economic impacts to those analyzed for the selected communities are also likely to be observed at other locations in Snohomish, King, and Pierce counties. Although a limited number of communities were selected for evaluation as part of this analysis, comparable impacts might occur in similar jurisdictions, and unincorporated areas that were not selected for analysis in this chapter.

The economic analysis for each community consists of the following sections:

- A demographic and economic overview;
- A discussion of the impacts in each community, based on the crossing-by-crossing analysis contained in the regional impact analysis related to transportation;
- A quantification of the costs of increased gate-down time at some or all of the grade crossings in the community; and
- A discussion of potential losses in property value in and around the community resulting from increased rail traffic.

In addition, for each community, there is a discussion of the potential for mitigation opportunities for some or all of the affected crossings in the community.

**Estimating the Economic Impact of Increased Gate-down Time**

The United States Department of Transportation publishes periodic research papers that offer guidance on how to assess the economic impact of transportation projects that affect travel times. In order to develop a methodology for estimating community-specific economic impacts of the Gateway Pacific Terminal that would result from increased gate-down time, the project team reviewed recent economic literature that identifies two categories for valuation when estimating the economic cost of additional travel time: “personal” time and “commercial” time.194

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194 U.S. Department of Transportation documentation refers to these concepts as “leisure” and “business” time. For the purpose of
“Personal” time covers all voluntary personal travel, including commutes to work.
“Commercial” time covers all travel that is required in the course of performing job functions, such as deliveries and service calls.

As discussed in the Project Summary chapter of this report, the August 2013 Community Attributes report similarly analyzed the economic impacts to the City of Seattle that would result from increased coal train traffic, including the economic impact of congestion from increased gate-down time. Community Attributes estimated that the economic cost of increased gate-down time at three grade crossings would range between $79,000 and $254,000 per year, and extrapolated its findings to estimate an annual impact of between $384,000 and $455,000 per year for a total of eight grade crossings in the city.

The Project Team reviewed the characteristics of all crossings in the communities selected for analysis, and determined that an economic analysis focusing on gate-down time for 37 of the 70 total crossings in these 15 communities would provide a representative picture of the economic effects for different locations in the central Puget Sound region. Characteristics evaluated included:

- 14 crossings in cities with population over 100,000, 9 crossings in cities with population between 60,000 and 100,000, 7 crossings in cities with population between 25,000 and 60,000 and 6 crossings in cities with population less than 25,000.
- 7 crossings with average daily traffic volume between 20,000 and 40,000 vehicles annually, 14 crossings with average daily traffic volume between 10,000 and 20,000 vehicles annually and 15 crossings with average daily traffic volume between 700 and 10,000 vehicles.
- 5 crossings in primarily industrial areas, 29 crossings in primarily commercial areas, 1 crossing in a primarily residential area and 1 crossing in a primarily open space area.

The project team collected the following data for each of the crossings analyzed:

- Average daily vehicular traffic volume per crossing (2035);
- Percentage of trucks in daily vehicular traffic volume per crossing (2035);
- Total incremental delay from gate-down time that is attributable to the Gateway Pacific Terminal (2035); and
- Inflation-adjusted hourly estimates of the Value of Travel Time for cars and trucks published by the Puget Sound Regional Council.

These data differ from those used in Community Attributes report, which used Seattle Department of Transportation data on observed queue lengths at each grade crossing to estimate the number of vehicles at each grade crossing that would be impacted by increased gate-down time. In the absence of observed data on queue length for all 37 grade crossings analyzed, this analysis instead relies on average daily forecasted traffic volumes for each grade crossing. It is important to note that this method is only an approximation, as two key points are not known: the exact scheduling of the additional trains, and the hourly distribution of traffic at each grade crossing.

The project team developed a four-step methodology to estimate the economic impacts of this study, this report will use the terms “personal” and “commercial” time to minimize confusion.
increased gate-down time for both personal and commercial trips.

- The project team estimated the total number of personal and commercial travelers per day that would pass through each grade crossing. To estimate the number of personal travelers, the project team multiplied the number of cars that passed through each grade crossing by an average number of occupants based on analysis of U.S. Census Bureau data. Details on the calculation per county are shown in Appendix D. To estimate the number of commercial travelers, the project team multiplied the number of trucks that passed through each grade crossing and assumed a single occupant for each. Details on the percentage of trucks in forecasted traffic at each grade crossing are shown in Appendix D.

- Next, the estimate of additional forecasted gate-down time was translated into a percentage of each 24-hour day and applied to the total number of personal and commercial travelers, which was used to estimate the number of personal and commercial travelers that would be impacted by the increase in gate-down time at each grade crossing. The forecasted incremental gate-down time for each grade crossing is shown in Appendix D.

- The 2008 estimates on the value of travel time published by the Puget Sound Regional Council were used to calculate the daily cost of increased gate-down time to each personal and commercial traveler. This analysis assumes a value per hour of $19.24 for personal travel, and a value per hour of $48.78 for commercial travel. These values have been aligned with the Consumer Price Index to account for inflation between 2008 and 2013.

- Finally, the aggregate daily cost per grade crossing was calculated by multiplying the total number of impacted personal and commercial travelers by the estimated daily cost of increased gate-down time per personal and commercial traveler for each of the 36 crossings. The aggregate annual cost per grade crossing was calculated by multiplying the aggregate daily cost by 260 to reflect impacts observed during the working week.

Annualized calculations for the economic cost of increased gate-down time at each grade crossing only consider weekday travel. Although similar but reduced economic impacts may also be observed during weekends, over time weekday traffic patterns will likely change as travelers pursue new routes to avoid congestion. An annual calculation that is limited to weekday travel alone offers a way to roughly approximate the impact of these factors.

**Estimating the Effect of Gateway Pacific Terminal Train Traffic on Property Values**

Environmental impacts on property values are not commonly included as part of economic impact analyses. Local real estate markets are highly complex systems, and any environmental effect which results in a negative change in value in a given area may spur a corresponding positive increase in value in another area, resulting in transference of value and no net impact. Furthermore, many factors influence changes in real estate market value, and this study neither considers nor establishes the relative significance of potential impacts of increased coal train frequency on broader market conditions and property sales.

Still, there is support for the proposition that increased rail traffic can have an impact on the value of properties that are proximate to the affected rail lines. According to BNSF,
projected traffic from 18 coal trains per day will not significantly exceed train traffic levels in the region previously observed in 2006. Further study would be required to determine whether freight trains carrying coal would have a comparatively larger impact on nearby businesses located elsewhere in the four-county central Puget Sound region than freight trains carrying other materials.

The project team consulted two primary sources of economic literature to establish the range of impacts on property values that can result from increased freight train traffic. The first, an academic paper, evaluated the impact of increased freight train traffic on nearby residential property values in the Cleveland metropolitan area that was published in *The Appraisal Journal* in 2004. The second, a recent study of the economic impacts of the Gateway Pacific Terminal project, analyzed the project’s likely impacts on a range of land uses. The project team also reviewed the methodology of the August 2013 Community Attributes report that evaluated the impacts of increased coal train service on proximate property values in Seattle.

In this analysis, high-level impacts resulting from the marginal increase in freight train traffic on proximate residential and non-residential property are estimated by first applying the aggregate impact ranges identified in the above studies to summary real estate data, and then applying a percentage factor that represents the incremental increase in train traffic resulting from Gateway Pacific Terminal operations. In comparison, the Community Attributes report assessed the impact of increased coal train traffic on property values in Seattle using a parcel-based approach and aggregate impact factors. While this approach is beyond the scope of this regional assessment, the project team utilized an alternate and simplified approach to permit a high-level approximation of the project’s impacts at the community level.

The project team estimated the impacts of the marginal increased freight train traffic from the Gateway Pacific Terminal on nearby residential property values by applying high-level findings of the impacts from *Appraisal Journal* study to local data from the American Community Survey and the U.S. Census Bureau.

- For each community, the project team identified census block groups located within a 750-foot buffer of the proposed Gateway Pacific Terminal route, and calculated the percentage of aggregate land area that fell within this buffer. As cited above, this buffer size matches that of the 2004 *Appraisal Journal* study.

- Next, the project team estimated the value of affected residential property for each municipality by applying this percentage to the aggregate value of housing across the selected census block groups.

- The project team then multiplied the value of affected residential property for each municipality by a range of 5 to 7 percent to calculate the estimated aggregate impact of freight train service on nearby property values.


The project team estimated the impacts of increased freight train traffic from the Gateway Pacific Terminal on nearby non-residential property values by applying high-level findings of the Eastman Company study to extracts of data from CoStar, a proprietary real estate database, and County assessments of market value.198

- The project team consulted CoStar to identify all non-residential properties that are located within a 1,000-foot buffer of the proposed Gateway Pacific Terminal route. As cited above, this buffer size matches the maximum buffer size for comparable analyses described in the Eastman Company study.

- Next, the project team matched each of the properties selected from CoStar with assessment data from Snohomish, King, and Pierce counties to establish the market value.

- The project team then summed the estimated market value to generate an aggregate estimate for the municipality of affected property for each land use. For further details, please refer to Appendix D.

- The project team then multiplied the aggregate estimated value for each land use by 5 percent to calculate the estimated aggregate impact of the Gateway Pacific Terminal on non-residential property values.

Again, it is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report. The impact on property values caused by the Gateway Pacific Terminal and the increase in associated train traffic is difficult to quantify in the aggregate across the four-county region because of the transferable nature of property values. While properties proximate to the train tracks may see a decline in property value, properties in the area that are not directly affected by the train tracks may see an increase in demand and property value.

**Mitigation Analysis for Selected Crossings in the Puget Sound Region**

At-grade crossings along the main rail lines in the Puget Sound region were inventoried and analyzed for the impacts that could occur at each crossing from added freight train traffic traveling to and from the proposed Gateway Pacific Terminal.

The mitigation analysis focused on the most highly impacted crossings based on a variety of factors including delay to freight and general purpose traffic, safety, environmental justice and emergency response impacts.

The factors that were used to quantify the total impacts included:

- Average daily traffic volumes in 2035;
- Maximum daily train volumes in 2035 including train traffic related to the proposed terminal;

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198 CoStar, a proprietary, industry-standard source for commercial, industrial, and retail market data, was used as the basis for this analysis. CoStar is widely used by brokers, developers and analysts to assess and evaluate local real estate market conditions, and its classifications of non-residential property accurately reflect its current use.
• 2035 daily delay/gate-down time;
• Increase in gate-down attributable to trains traveling to and from the proposed terminal;
• Freight class of the roadway;
• Accidents per year;
• Impacts to emergency services; and
• Impacts to environmental justice populations.

A detailed table containing the full results is included in the Appendix C to this report.

The Project Team reviewed all 70 crossings in the selected communities for this study in the central Puget Sound region for transportation impacts. The Project Team selected 34 grade crossings for mitigation analysis in the 15 communities under review. This included:

• 13 crossings in cities with population over 100,000, 7 crossings in cities with population between 60,000 and 100,000, 7 crossings in cities with population between 25,000 and 60,000 and 7 crossings in cities with population less than 25,000.
• 7 crossings with average daily traffic volume between 20,000 and 40,000 vehicles, 17 crossings with average daily traffic volume between 10,000 and 20,000 vehicles and 10 crossings with average daily traffic volume between 700 and 10,000 vehicles.
• 5 crossings in primarily industrial areas, 26 crossings in primarily commercial areas, 2 crossings in primarily open space areas and 1 crossing in a primarily residential area.

The table beginning on page 135 summarizes the crossings that could be impacted based on the identified characteristics in this study. The crossing locations in the table are listed by geographic location from north to south on the BNSF main line followed by crossings on Stevens Pass and Stampede Pass at the end of the list.

Crossings that did not have a freight classification were generally excluded from the table to focus on crossings that could impact freight mobility in the region. A few crossings that did not have a freight classification were included in the table because of a low performance on other characteristics, such as average daily traffic volume, and impacts to environmental justice and emergency response. Crossings that have been identified in other regional and state planning efforts for improvement have also been included in this list.

Crossing evaluation criteria was developed based on the performance of the crossing using the identified data shown in the table. State and regional staff and elected officials can use this table as a starting point to discuss prioritizing crossings for grade separation improvements and funding. Evaluation criteria included:

• Projected average daily traffic volumes in 2035;
• Maximum train volume in 2035;
• 2035 daily gate-down time;
• Marginal increase in gate-down time from Gateway Pacific Terminal trains;
• Freight classification;
• Accidents; 199
• Impacts to emergency services;
• Environmental justice populations; and

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199 The Federal Railroad Administration reports accidents by million train miles or normalized by fiscal year. This differs from reporting accidents per year, which was done in this report. The rating scale for accidents per year included in the table provides a relative scoring of accident rates in the central Puget Sound region.
• If crossing would be located in a high pedestrian activity area.

Crossing characteristics with a high impact or lower performance were ranked lower. For example, a crossing that had a high average daily traffic volume would rate lower for this characteristic than a crossing with a low average daily traffic volume. A crossing with a high average daily traffic volume would impact a greater number of vehicles and would be a greater priority for capital improvements. Similarly, a crossing with a low indirect impact to emergency services would rank at a low impact or higher performance level than a crossing with a high impact to emergency services.

It is important to note that at this time, the precise route of trains traveling to and from the proposed Gateway Pacific Terminal is unknown. Various route options exist and, depending upon the route utilized by BNSF, the impacts to specific communities in the central Puget Sound region could vary.
### At-Grade Crossings: Opportunities for Improvement and Mitigation in the Central Puget Sound Region

<table>
<thead>
<tr>
<th>USDOT Crossing Number</th>
<th>City</th>
<th>Cross Streets</th>
<th>2035 Average Daily Traffic Volume</th>
<th>Truck %</th>
<th>2035 Max. Daily Train Volumes (Gateway Pacific Terminal Trains/Total Trains)</th>
<th>2035 Daily Delay/Gate-down Time with Gateway Pacific Terminal trains(min)</th>
<th>2035 Marginal Increase in Daily Delay/Gate-down Time from Gateway Pacific Terminal trains (min)</th>
<th>2035 Marginal % Increase in Gate-down Time from Gateway Pacific Terminal</th>
<th>Freight Class</th>
<th>Impact to Emergency Services</th>
<th>Accidents/Year</th>
<th>Impacts to Envr. Justice</th>
<th>High Ped. Activity Area</th>
<th>Planned Grade Separation Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>084687C</td>
<td>Stanwood</td>
<td>271st St NW &amp; Marine Drive</td>
<td>10,483</td>
<td>5%</td>
<td>18/43</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>X</td>
<td>High</td>
<td>0.13</td>
<td>Low</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>084669E</td>
<td>Marysville</td>
<td>172nd St NE/SR531 &amp; 19th Drive NE</td>
<td>21,161</td>
<td>5%</td>
<td>18/43</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>T3</td>
<td>Low Direct</td>
<td>0.05</td>
<td>Low</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>084654P</td>
<td>Marysville</td>
<td>116th St NE &amp; Smokey Pt Blvd</td>
<td>25,966</td>
<td>3%</td>
<td>18/43</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.08</td>
<td>Low</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>084650M</td>
<td>Marysville</td>
<td>88th St NE &amp; Old Hwy 99</td>
<td>38,742</td>
<td>6%</td>
<td>18/43</td>
<td>95</td>
<td>55</td>
<td>138%</td>
<td>T3</td>
<td>Low Direct</td>
<td>0.14</td>
<td>Low</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>084646X</td>
<td>Marysville</td>
<td>Grove St b/w Cedar Ave &amp; State Ave</td>
<td>11,019</td>
<td>6%</td>
<td>18/43</td>
<td>95</td>
<td>55</td>
<td>138%</td>
<td>T4</td>
<td>High</td>
<td>0.03</td>
<td>Low</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>084640G</td>
<td>Marysville</td>
<td>SR528-4th Ave &amp; Cedar Ave</td>
<td>36,526</td>
<td>8%</td>
<td>18/43</td>
<td>145</td>
<td>86</td>
<td>147%</td>
<td>T3</td>
<td>High</td>
<td>0.09</td>
<td>Low</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>084630B</td>
<td>Marysville</td>
<td>1st St &amp; Cedar Ave</td>
<td>5,246</td>
<td>11%</td>
<td>18/43</td>
<td>145</td>
<td>86</td>
<td>147%</td>
<td>T4</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>085445K</td>
<td>Edmonds</td>
<td>SR104-Main St &amp; Railroad Ave</td>
<td>7,742</td>
<td>6%</td>
<td>18/82</td>
<td>135</td>
<td>48</td>
<td>55%</td>
<td>T3</td>
<td>Low Indirect</td>
<td>0.46</td>
<td>Low</td>
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<td>Low</td>
</tr>
<tr>
<td>085439G</td>
<td>Edmonds</td>
<td>Dayton St &amp; Railroad Ave</td>
<td>12,940</td>
<td>4%</td>
<td>18/82</td>
<td>135</td>
<td>48</td>
<td>55%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.26</td>
<td>Low</td>
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<td>Low</td>
</tr>
<tr>
<td>085414L</td>
<td>Seattle</td>
<td>Broad St &amp; Alaskan Way</td>
<td>11,528</td>
<td>7%</td>
<td>18/95</td>
<td>229</td>
<td>86</td>
<td>61%</td>
<td>T2</td>
<td>Low Indirect</td>
<td>0.28</td>
<td>Medium</td>
<td>X</td>
<td>Low</td>
</tr>
<tr>
<td>08 5583Y</td>
<td>Seattle</td>
<td>S Holgate near Third Ave</td>
<td>8,961</td>
<td>9%</td>
<td>18/95</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>T3</td>
<td>Medium</td>
<td>0.20</td>
<td>High</td>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>

**KEY TO RANKING**

- **HIGH IMPACT/LOWER PERFORMING**
- **LOW IMPACT/HIGHER PERFORMING**
<table>
<thead>
<tr>
<th>USDOT Crossing Number</th>
<th>City</th>
<th>Cross Streets</th>
<th>2035 Average Daily Traffic Volume</th>
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<th>2035 Max. Daily Traffic Volume (Gateway Pacific Terminal Trains/Total Trains)</th>
<th>2035 Daily Delay/Gate-down Time with Gateway Pacific Terminal trains(min)</th>
<th>2035 Marginal Increase in Daily Delay/Gate-down Time from Gateway Pacific Terminal trains (min)</th>
<th>2035 Marginal % Increase in Gate-down Time from Gateway Pacific Terminal</th>
<th>Freight Class</th>
<th>Impact to Emergency Services</th>
<th>Accidents/ Year</th>
<th>Impacts to Envir. Justice</th>
<th>High Ped. Activity Area</th>
<th>Planned Grade Separation Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>085584F</td>
<td>Seattle</td>
<td>S Lander/3rd near Occidental Ave</td>
<td>18,420</td>
<td>15%</td>
<td>18/95, 156</td>
<td>55</td>
<td>55%</td>
<td>T3</td>
<td>Medium</td>
<td>0.60</td>
<td>High</td>
<td></td>
<td>Y^200</td>
<td></td>
</tr>
<tr>
<td>085586U</td>
<td>Seattle</td>
<td>Spokane St WB &amp; 2nd Ave S</td>
<td>7,014</td>
<td>12%</td>
<td>18/95, 156</td>
<td>55</td>
<td>55%</td>
<td>T1</td>
<td>Medium</td>
<td>0.31</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>085587B</td>
<td>Seattle</td>
<td>S Spokane St EB &amp; 2nd Ave S</td>
<td>10,122</td>
<td>12%</td>
<td>18/95, 156</td>
<td>X</td>
<td>55%</td>
<td>X</td>
<td>Medium</td>
<td>0.31</td>
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<tr>
<td>085625H</td>
<td>Kent</td>
<td>S 212th St &amp; 77th Ave S</td>
<td>32,446</td>
<td>14%</td>
<td>18/95, 116</td>
<td>38</td>
<td>49%</td>
<td>T2</td>
<td>Medium</td>
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<td>Y^201</td>
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<tr>
<td>085629K</td>
<td>Kent</td>
<td>W James St &amp; 1st Ave N</td>
<td>22,956</td>
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<td>18/95, 116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.19</td>
<td>Medium</td>
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</tr>
<tr>
<td>085633A</td>
<td>Kent</td>
<td>W Smith St &amp; 1st Ave N</td>
<td>18,980</td>
<td>2%</td>
<td>18/95, 116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.39</td>
<td>Medium</td>
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<td>X</td>
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</tr>
<tr>
<td>085640K</td>
<td>Kent</td>
<td>SR516-Willis St &amp; Railroad Ave S</td>
<td>25,905</td>
<td>6%</td>
<td>18/95, 116</td>
<td>38</td>
<td>49%</td>
<td>T2</td>
<td>High</td>
<td>0.09</td>
<td>Medium</td>
<td></td>
<td>Y^202</td>
<td></td>
</tr>
<tr>
<td>085642Y</td>
<td>Kent</td>
<td>S 259th St &amp; 1st Ave S</td>
<td>2,776</td>
<td>6%</td>
<td>18/95, 116</td>
<td>38</td>
<td>49%</td>
<td>T3</td>
<td>High</td>
<td>0.05</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>085655A</td>
<td>Auburn</td>
<td>Main St West &amp; 1st St NW</td>
<td>10,258</td>
<td>4%</td>
<td>18/95, 116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>High</td>
<td>0.16</td>
<td>Medium</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>101387L</td>
<td>Sumner</td>
<td>Puyallup St near E Valley Hwy E</td>
<td>3,369</td>
<td>10%</td>
<td>18/95, 116</td>
<td>38</td>
<td>49%</td>
<td>T3</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td></td>
<td></td>
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<tr>
<td>085691V</td>
<td>Puyallup</td>
<td>15th St SE &amp; E Pioneer Ave</td>
<td>15,101</td>
<td>6%</td>
<td>18/80, 97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.19</td>
<td>Low</td>
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<tr>
<td>085694R</td>
<td>Puyallup</td>
<td>5th St SE &amp; Spring St</td>
<td>13,251</td>
<td>7%</td>
<td>18/80, 97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.10</td>
<td>Low</td>
<td></td>
<td>X</td>
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<tr>
<td>085695X</td>
<td>Puyallup</td>
<td>3rd St SE &amp; E Main Ave</td>
<td>17,370</td>
<td>7%</td>
<td>18/80, 97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.00</td>
<td>Low</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

^200 [http://www.seattle.gov/transportation/southlanderdraft.htm](http://www.seattle.gov/transportation/southlanderdraft.htm)
<table>
<thead>
<tr>
<th>USDOT Crossing Number</th>
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<th>Impact to Emergency Services</th>
<th>Accidents/Year</th>
<th>Impacts to Envir. Justice</th>
<th>High Ped. Activity Area</th>
<th>Planned Grade Separation Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>085696E</td>
<td>Puyallup</td>
<td>Meridian St &amp; W Stewart Ave</td>
<td>14,763</td>
<td>6%</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.31</td>
<td>Low</td>
<td>X</td>
<td></td>
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<tr>
<td>085699A</td>
<td>Puyallup</td>
<td>5th St NW &amp; W Stewart Ave</td>
<td>14,631</td>
<td>6%</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.11</td>
<td>Low</td>
<td>X</td>
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<tr>
<td>085743K</td>
<td>Tacoma</td>
<td>S 19th St West &amp; Wilton Rd</td>
<td>10,774</td>
<td>6%</td>
<td>18/80</td>
<td>107</td>
<td>44</td>
<td>69%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.11</td>
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<tr>
<td>085755E</td>
<td>Steilacoom</td>
<td>Union Ave near Commercial St</td>
<td>777</td>
<td>25%</td>
<td>18/103</td>
<td>191</td>
<td>55</td>
<td>41%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.14</td>
<td>Low</td>
<td></td>
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<tr>
<td><strong>Stevens Pass Line</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>084605T</td>
<td>Everett</td>
<td>Pacific/Chestnut &amp; Eclipse Mill Rd</td>
<td>12,446</td>
<td>12%</td>
<td>9/73</td>
<td>186</td>
<td>86</td>
<td>30%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.03</td>
<td>Medium</td>
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<tr>
<td>084577S</td>
<td>Snohomish</td>
<td>Airport Way &amp; Lowell Snohomish River Rd</td>
<td>1,960</td>
<td>9%</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>T3</td>
<td>Medium</td>
<td>0.09</td>
<td>Low</td>
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<td></td>
</tr>
<tr>
<td>084564R</td>
<td>Monroe</td>
<td>SR203-Lewis St &amp; E Stretch St</td>
<td>17,866</td>
<td>9%</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
<td>37%</td>
<td>X</td>
<td>Medium</td>
<td>0.06</td>
<td>Low</td>
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</tr>
<tr>
<td>084560N</td>
<td>Monroe</td>
<td>E Main St &amp; Butler St</td>
<td>12,575</td>
<td>12%</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
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<td><strong>Stampede Pass Line</strong></td>
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<td></td>
</tr>
<tr>
<td>085234N</td>
<td>Kent</td>
<td>Covington Way S near 164th Place SE</td>
<td>2,580</td>
<td>5%</td>
<td>9/22</td>
<td>61</td>
<td>33</td>
<td>122%</td>
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<td>Medium</td>
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<tr>
<td>085233G</td>
<td>Maple Valley</td>
<td>216th Ave SE &amp; SE 283rd St</td>
<td>1,209</td>
<td>5%</td>
<td>9/22</td>
<td>61</td>
<td>33</td>
<td>122%</td>
<td>T3</td>
<td>Medium</td>
<td>0.08</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For those crossings where mitigation is a priority, there are a number of possible mitigation measures that could reduce transportation impacts from Gateway Pacific Terminal trains traveling through the central Puget Sound region.

*Mitigation measures would likely include grade separation of existing at-grade crossings,* which can eliminate delays at crossings by allowing traffic or pedestrians/bikes to pass over or under railroad tracks. Grade separation could also improve safety, reduce impacts to emergency response, reduce delays on freight classified routes, and reduce railway-roadway accidents. While grade separation can be a desirable solution, these improvements are typically very costly and involve substantial amounts of public funding. Grade separation projects could cost approximately $50 million to $200 million each.203

Public funding for grade separation projects is difficult to secure. A variety of traditional funding sources, such as the Federal Highway Trust Fund, TIGER grants, and Freight Mobility Strategic Investment Board (FMSIB), are awarded in highly competitive processes and are often insufficient to provide the amount of funds required to complete a grade separation project. Many grade separation projects will take years to complete while available funds are located.

*Other mitigation measures could include grade crossing consolidation.* At-grade crossings that are redundant (other crossings nearby allow access to the same roads or areas), are not designated emergency routes, or have low traffic volumes could be closed to reduce impacts from Gateway Pacific Terminal trains.204 However, it is likely that such actions would increase the impacts by shifting vehicle volumes to the nearby crossings. Crossings that could be considered for closure would need to be assessed for potential impacts to other crossings prior to final closing.

*Signal timing could also be used to mitigate delay and congestion experienced by vehicles at at-grade crossings.* Signal timing is the process of optimizing the operations of signalized intersections so that vehicles, pedestrians, and bicyclists are moved in the most efficient manner possible.205 Signals could be optimized to ‘flush,’ or move vehicles, pedestrians, and bicycles through the street system near an at-grade crossing. This could reduce the total number of people impacted by gate-down time. Optimized signal timing could also ensure that vehicles, pedestrians, and bicyclists that are not traveling in the direction of a blocked at-grade crossing would receive more green time while a train passes. Signal timing could provide some safety and emergency response mitigation by reducing the number of impacted vehicles, potential for accidents, and by providing increased green time to traffic moving away from the at-grade crossing.

*Intelligent Transportation Systems (ITS) could also be used to reduce impacts from Gateway Pacific Terminal trains at at-grade crossings in the region.* ITS uses information technology and communications to manage traffic in a safe, coordinated and efficient manner. ITS could be used in the form of advanced signage and warnings to alert drivers that a train is approaching an at-grade crossing. This could allow vehicles, pedestrians, and bicyclists to choose alternate routes to avoid a blocked at-grade crossing. Utilizing ITS could reduce the total number of affected vehicles and reduce emergency response impacts by allowing emergency responders to use alternate routes. Safety could also be improved through advanced warnings by reducing the number of potential conflicts and accidents. ITS could also be used to monitor

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203 This range is for contextual purposes only. The actual cost for a grade separation project will vary by specific project. This range should not be used for planning purposes and is included for contextual purposes only.
205 http://www.ite.org/signal/index.asp
illegal crossings and to enforce traffic laws at at-grade crossings. Over time, this could reduce illegal crossings and improve safety at the crossing.

**Upgrades and improvements to at-grade crossings could also help mitigate impacts from increased train movements.** Associated actions could include new signals, active warning devices, signage, lighting, full-width gates, and automated or wayside horns. These types of improvements could help to prevent illegal crossings and to ensure that vehicles, pedestrians, and bicyclists are aware that a train is approaching the at-grade crossing. This could help to reduce accidents and improve safety at the at-grade crossings.

**Education and community awareness programs are also frequently used by BNSF to educate drivers, local law enforcement, and truck drivers on crossing safety.** BNSF targets high risk populations, such as new drivers, adult drivers, and professional drivers. These programs can help make community residents more aware of crossing safety measures and allow law enforcement to better understand methods for enforcing traffic laws at crossings. Educational programs could be provided in communities in the region that have at-grade crossings to improve safety and mitigate the risk of accidents.

Policy measures could also be considered to mitigate impacts from Gateway Pacific Terminal trains. Potential additional policy measures for consideration may include:

- **Scheduling train traffic for lower volume time periods:** BNSF could schedule train movements to occur during non-peak hours, such as midday or evening time periods. This could reduce delay and congestion during peak hours, which are characterized by higher vehicle and train volumes at most at-grade crossings. This may result in more frequent crossing events during non-peak hours and could have the potential to impact the ability of the transportation system to fully recover if crossing events occurred too closely together. Queued vehicles may have to wait for several crossing cycles before being able to continue past the at-grade crossing.

- **Directional train running:** BNSF could use directional train running to relieve congestion on the north-south BNSF line, which has the highest number of at-grade crossings. Instead of using the north-south BNSF line for returning empty trains, the Stampede or Stevens Pass line could be used. This might help to reduce capacity issues and delay impacts on the busy north-south corridor. At-grade crossings on the Stampede and Stevens Pass lines may experience more impacts, but the overall impact might be less since there are fewer crossings on these lines.

<table>
<thead>
<tr>
<th>Crossings by Rail Line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>North-South BNSF</td>
</tr>
<tr>
<td>Stevens Pass</td>
</tr>
<tr>
<td>Stampede Pass</td>
</tr>
</tbody>
</table>

• **Working with Congress to expand the Section 130 program**: The Washington State Freight Advisory Committee recommended in its 2014 Freight Folios that the Federal Government work with Congress to expand the Section 130 program, which provides State funding for grade crossing improvements and separations. Expanded funding opportunities could allow more grade separation projects to be implemented over a shorter time span.

• **Consider future rail growth in grade separation projects**: Grade separation projects could consider future rail growth during the design process. Designs could consider two or more tracks to accommodate future rail traffic. This may help to alleviate rail capacity issues in the future and avoid costly reconstruction of grade separated roadway or rail structures.

• **Reducing construction of new at-grade crossings**: Road projects could avoid the construction new at-grade crossings along the corridor except where there is no other feasible alternative. This might help to reduce additional locations that could be impacted by Gateway Pacific Terminal trains.

Finally, it is also important to note that current long-term planning efforts include grade separation projects and construction of new at-grade crossings, which would affect impacts at crossing locations throughout the central Puget Sound region. Several at-grade crossings analyzed in the inventory are included in local and regional plans for grade separation or as emerging locations for other improvements, such as in local comprehensive plans, the Washington State Rail Plan, the Washington State Freight Advisory Committee, Transportation 2040 and PSRC’s Fast Corridor Program. Crossings that are included in current planning efforts are designated with a “Y” in the last column of Appendix C.

At-grade crossings in Seattle and Kent are included in regional plans for grade separation projects. Many comprehensive plans in communities with at-grade crossings also have policies that encourage improvements and grade separation of at-grade crossings when possible, but do not specifically identify crossing locations for improvement.

The Federal Highway Administration restricts the construction of new at-grade crossings unless there is no other viable alternative. This policy is supported by BNSF. While the preference, and general mandate, is to plan and build grade separated crossings, in certain locations it is possible that projects proposed in the future could include additional at-grade crossings along the BNSF main line. Any additional at-grade crossing would create new impacts in the communities where crossing projects would be located.

Partial funding has been secured for some planned roadway/rail grade separation projects in the region, but additional funding is required to advance construction. The following projects have been identified as a first priority in various plans for crossing improvements or grade separations:

• S Lander Street/3rd Avenue near Occidental Avenue in Seattle (085584F): current estimated cost of approximately $167.3 million. This project is currently on the FMSIB deferred list due to a lack of funding.

207 [http://www.fmsib.wa.gov/fac/FACApril2014/Final%20Draft%20Folio%202014_0412v2.pdf](http://www.fmsib.wa.gov/fac/FACApril2014/Final%20Draft%20Folio%202014_0412v2.pdf)

• S 212th Street and 77th Avenue S in Kent (085625H): this project is included on the FMSIB list and is estimated to cost approximately $42 million.  
• SR 516/Willis Street and Railroad Avenue S in Kent (085640K): currently estimated at approximately $23 million and is included on the FMSIB list.  
• Lowell-River Road/Lenora Street and S 1st Avenue in Everett (084594H): included in the City of Everett 2014-2019 TIP with an estimated expenditure of $1.8 million.  
• 116th Street NE and Smokey Point Boulevard in Marysville (084654P): construction of the 156th Street Interchange ($45 million) will relieve freight use on current at-grade crossing.  
• SR 528/4th Avenue and Cedar Avenue in Marysville (084640G): current freight route over this crossing will be de-emphasized.

Other crossings in the Puget Sound region have been identified by the Washington State Freight Advisory Committee as emerging crossings that will need to be considered for improvement.

• 172nd Street NE/SR 531 and 19th Drive NE in Marysville (084669E)  
• 88th Street NE and Old Highway 99 in Marysville (084650M)  
• SR 104/Main Street and Railroad Avenue in Edmonds (085445K)  
• Dayton Street and Railroad Avenue in Edmonds (085439G)  
• Broad Street and Alaskan Way in Seattle (085414L)  
• Wall Street and Alaskan Way in Seattle (085410J)  
• S Holgate Street near Third Avenue in Seattle (085583Y)  
• S Spokane Street Westbound and 2nd Avenue S in Seattle (085586U)  
• S Spokane Street Eastbound and 2nd Avenue S in Seattle (085587B)  
• W James Street and 1st Avenue N in Kent (085629K)  
• Meeker Street and Railroad Avenue N in Kent (085636V)  
• Main Street near Fryar Avenue in Sumner (085683D)  
• 15th Street SE and E Pioneer Avenue in Puyallup (085691V)  
• 3rd Street SE and E Main Avenue in Puyallup (085695X)  
• Meridian Street and W Stewart Avenue in Puyallup (085696E)  
• 5th Street NW and W Stewart Avenue in Puyallup (085699A)  
• Union Avenue near Commercial Street in Steilacoom (085755E)  
• Airport Way and Lowell Snohomish River Road in Snohomish (084577S)  
• SE Fryelands Boulevard and Stevens Pass Highway in Monroe (084571B)  
• SR 203/Lewis Street and E Stretch Street in Monroe (084564R)  
• E Main Street and Butler Street in Monroe (084560N)  
• Covington Way S in Kent (085234N)  
• 216th Avenue SE and SE 283rd Street in Maple Valley (085233G)
City of Stanwood  
Snohomish County

Demographic and Economic Overview

Stanwood is a city in Snohomish County. The median household income in Stanwood is seven percent lower than that of the four-county region, although median home prices are 11 percent lower than Snohomish County and 18 percent lower than the four-county region.

<table>
<thead>
<tr>
<th>Demographics of Stanwood, WA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stanwood, WA</strong></td>
</tr>
<tr>
<td>Population (2012)</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
</tr>
<tr>
<td>Employment (2013)</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Thirty percent of Stanwood residents work within Snohomish County, with only 13 percent commuting to Seattle or Bellevue. Nearly eight in ten employed residents travel to work via single-occupancy vehicle journeys, with negligible use of public transportation.

**Impacts to Stanwood (Snohomish County)**

**Impact location(s):** There is one at-grade crossing on the north-south BNSF main line in Stanwood that could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. The crossing is located on Cedarhome Drive and Florence Road.

**Surrounding property type(s):** Currently, there is active commercial and industrial development near the at-grade crossing. Additionally, an Amtrak station is located just north of the crossing.

**Freight classification:** This crossing is not located on a classified freight route.

**Vehicle traffic:** In 2035, it is predicted that there could be a daily average of approximately 10,500 vehicles traveling over the crossing. The methodology for estimating future traffic volumes is included in Appendix B.

**Train volume and gate-down time:** It is estimated that there could be approximately 43 trains per day with 18 trains traveling to or from Gateway Pacific Terminal. The marginal increase in gate down time at the Stanwood crossing due to terminal-related rail traffic could be approximately 38 minutes (a total of approximately 68 minutes of daily gate down time in 2035).

**Emergency responders and hospitals:** The City of Stanwood Fire Department is located within a half-mile of the crossing, which could result in high impacts to emergency service response due to increased freight rail traffic from the operation of the proposed terminal.

**Environmental justice populations:** Impacts to environmental justice populations would be low.

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215 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.

216 Analysis of 2012 data from the American Community Survey.
**Affected Grade Crossing for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line, which passes directly east of downtown Stanwood and demarcates the edge of the commercial core, will carry trains traveling to and from the proposed terminal. The main line in Stanwood is home to an Amtrak station offering passenger rail service to Seattle and Vancouver, B.C. Directly north and south of Stanwood, the BNSF main line passes through an agricultural area, with minimal commercial or residential development.

One grade crossing in Stanwood was evaluated for economic impacts from increased freight rail traffic as a result of the Gateway Pacific Terminal. This crossing (271st St NW and Marine Drive) sits at the heart of downtown Stanwood and is located next to the Stanwood Amtrak station. The location of the crossing is shown in Figure 56 and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate-Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stanwood</td>
<td>271st St NW &amp; Marine Drive</td>
<td>10,483</td>
<td>5 percent</td>
<td>38 minutes</td>
</tr>
</tbody>
</table>

**Figure 56: Location of Train Route, Grade Crossings, and 750-ft Buffer in Stanwood, WA**

Source: ESRI, Project Team
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to 18 trains per day to the BNSF main line in Stanwood. In 2035, this would represent up to 42 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Stanwood.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above grade crossing that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $40,000.

- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $5,000.

- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $45,000 and an annual per-capita cost of approximately $7.00.

Effect of Increased Freight Train Traffic on Property Values

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Stanwood, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $2.3 million to $3.3 million.

- In 2035, for nearby non-residential property in Stanwood, a high-level analysis of aggregate real estate data suggests that the marginal increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $800,000.

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217 Journeys of this type include commuting, personal errands, and leisure travel.
218 Journeys of this type include deliveries, service calls, and other business-related trips.
219 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
Mitigation in Stanwood (Snohomish County)

The crossing included in the mitigation analysis in Stanwood on the north-south line has the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>271st St NW &amp; Marine Drive</td>
<td>No</td>
<td>No</td>
<td>3</td>
<td>No</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Potential mitigation measures at this crossing could include intersection improvements such as signalization or additional lighting, signal timing optimization, and/or ITS. This could help to reduce impacts to emergency response, safety and accidents.

220 US Department of Transportation Crossing Inventory Information.
City of Marysville  
Snohomish County

Demographic and Economic Overview

Marysville is a city in Snohomish County. Due to an influx of new residents and annexation of nearby property, the city’s population has more than doubled between 2000 and 2010. To the south, Marysville’s downtown features a mixture of commercial and retail uses; along the I-5 corridor to the north, land uses alternate between agriculture, a moderate amount of single-family housing, and large-format shopping centers. The median household income in Marysville aligns with that of the four-county region, although median home prices are 20 percent lower than Snohomish County and 27 percent lower than the four-county region.

Demographics of Marysville, WA

<table>
<thead>
<tr>
<th></th>
<th>Marysville, WA</th>
<th>Snohomish County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>60,200</td>
<td>714,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$65,600</td>
<td>$68,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$248,000</td>
<td>$312,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>14,400</td>
<td>221,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$31,000</td>
<td>$47,000</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Twenty-five percent of Marysville residents commute to Everett and another 18 percent of the City's residents commute to Seattle, Bellevue, or Redmond.221 Nearly eight in ten employed residents travel to work via single-occupancy vehicle journeys, with negligible use of public transportation.222

Impacts to Marysville (Snohomish County)

Impact location(s): There are thirteen at-grade crossings on the north-south BNSF main line in Marysville that could be impacted by Gateway Pacific Terminal trains:

- 172nd Street NE and SR 531
- 136th Street NE and Old Highway 99
- 128th Street NE and Old Highway 99
- 124th Street NE and Old Highway 99
- 122nd Street NE and Old Highway 99
- 116th Street NE and Smokey Point Boulevard
- 104th Street NE and 42nd Avenue NE
- 88th Street NE and Old Highway 99
- 80th Street NE
- Grove Street between Cedar and State Avenues
- Cedar Avenue and Delta Avenue
- SR 528 and Cedar Avenue
- 1st Avenue and Cedar Street

Surrounding property type(s): The majority of at-grade crossings in Marysville are surrounded by commercial development with some open space and residential development.

221 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
222 Analysis of 2012 data from the American Community Survey.
Freight classification: Five of the at-grade crossings in Marysville are located on T3 or T4 freight routes. A T3 freight route is classified by WSDOT as a truck freight route that serves a gross tonnage of 300,000 to 4 million tons per year. A T4 freight route serves a gross tonnage of 100,000 to 300,000 tons per year.

Vehicle traffic: In 2035, it is predicted that daily vehicle traffic volumes could exceed 10,000 at five of the crossings.

Train volume and gate-down time: In 2035, approximately 43 trains per day could travel through Marysville, with 18 traveling to or from the proposed terminal. Daily gate down time could increase by approximately 38 minutes to 1 hour 25 minutes from terminal-related rail traffic (a total daily gate-down time in 2035 of between 1 hour 10 minutes and 2 hours 25 minutes).

Emergency responders and hospitals: Emergency services could be highly impacted by the terminal-related rail traffic. Two at-grade crossings in Marysville are located within close proximity to fire stations.

Environmental justice populations: Impacts to Environmental Justice populations would be low at all crossings.

Affected Grade Crossings for Economic Analysis

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line which passes through the city’s core will serve trains traveling to and from the proposed terminal. In the south of Marysville, the main line passes through the commercial core, then proceeds northward amidst residential and limited commercial development. The main line then extends parallel to Old Highway 99, passing by a series of shopping centers and light commercial development. In the north of Marysville, development near the main line becomes less dense and agricultural uses become more prevalent.

Thirteen grade crossings in Marysville would be affected by increased freight rail traffic as a result of the Gateway Pacific Terminal, and seven of these were selected for evaluation of economic impacts. One crossing (SR 528 – 4th Ave) serves as the spine of downtown Marysville, and three other crossings (172nd Street, 116th Street, and 88th Street) are located within ½ mile of major shopping centers located to the north of downtown Marysville and adjacent to I-5. The location of the two crossings is shown in Figure 57, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

Grade Crossings Evaluated for Economic Impacts in Marysville, WA

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marysville</td>
<td>172nd St NE/SR531 &amp; 19th Drive NE</td>
<td>21,161</td>
<td>5 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Marysville</td>
<td>116th St NE &amp; Smokey Pt Blvd</td>
<td>25,966</td>
<td>3 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Marysville</td>
<td>104th St NE &amp; 104th St NE</td>
<td>1,643</td>
<td>14 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>4</td>
<td>Marysville</td>
<td>88th St NE &amp; Old Hwy 99</td>
<td>38,742</td>
<td>6 percent</td>
<td>55 minutes</td>
</tr>
<tr>
<td>5</td>
<td>Marysville</td>
<td>Grove St b/w Cedar Ave &amp; State</td>
<td>11,019</td>
<td>6 percent</td>
<td>55 minutes</td>
</tr>
</tbody>
</table>

Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.

223 http://www.wsdot.wa.gov/freight/FGTS/default.htm
224 http://www.wsdot.wa.gov/freight/FGTS/default.htm
225 Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal would add up to 18 trains per day to the BNSF main line in Marysville. In 2035, this would represent up to 42 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Marysville.

Economic Impact of Increased Gate-down Time
Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above selected seven grade crossings that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $1.3 million.\(^\text{226}\)
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $241,000.\(^\text{227}\)
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $1.5 million and an annual per-capita cost of up to $25.00.

**Effect of Increased Freight Train Traffic on Property Values**\(^\text{228}\)

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Marysville, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $21.6 million to $30.3 million.
- In 2035, for nearby non-residential property in Marysville, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $12.7 million. It should be noted, however, that the effects of increased gate-down time at high-volume intersections near to shopping centers may generate additional economic impacts, although quantifiable estimates of these impacts have not been calculated.

**Mitigation in Marysville (Snohomish County)**

The selected crossings included in the mitigation analysis in Marysville on the north-south line have the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>172nd St NE/SR531 &amp; 19th Drive NE</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>116th St NE</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>No</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

\(^{226}\) Journeys of this type include commuting, personal errands, and leisure travel.

\(^{227}\) Journeys of this type include deliveries, service calls, and other business-related trips.

\(^{228}\) It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.

\(^{229}\) US Department of Transportation Crossing Inventory Information.
Some impacts at the SR 528/4<sup>th</sup> Avenue and Cedar Avenue and the 116<sup>th</sup> Street NE and Smokey Point Boulevard crossings will be relieved by nearby roadway projects. The SR 529/I-5 Interchange Expansion project will de-emphasize the freight route on SR 528/4<sup>th</sup> Avenue, which will mitigate some impacts from Gateway Pacific Terminal-related trains on truck freight movement. The SR 528/4<sup>th</sup> Avenue and Cedar Avenue rates lower on several of the criteria, with impacts in average daily vehicle volumes, marginal increase in gate-down time and impacts to emergency services categories (see table beginning on page 135). The 156<sup>th</sup> Street Interchange project is anticipated to reduce traffic on 116<sup>th</sup> Street NE, which could improve safety and delay for some drivers at the 116<sup>th</sup> Street NE and Smokey Point Boulevard crossing.

The remaining crossings in Marysville rate moderately well on most criteria, with impacts in the average daily vehicle volume and emergency services categories. The 172<sup>nd</sup> Street NE/SR531 and 88<sup>th</sup> Street NE crossings have been identified as emerging crossings by the Washington State Freight Advisory Committee. In the interim, impacts at these crossings in Marysville could be mitigated by improving crossings with lighting, signalization, signal optimization, and/or ITS. This could improve safety, impacts to emergency services, and reduce the total number of vehicles impacted.
The at-grade crossing in Mukilteo was not selected for additional economic or mitigation analysis because the crossing is primarily used as a pedestrian crossing and is not located on the ferry access road.

**Impacts to Mukilteo (Snohomish County)**

*Impact location(s):* The north-south BNSF main line travels through Mukilteo along the shore of Puget Sound. There is one at-grade crossing in Mukilteo that could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. The crossing is not located on the ferry access road for the ferry serving Mukilteo.

*Surrounding property type(s):* This crossing is located on Mukilteo Lane in a primarily commercial and residential area.

*Freight classification:* This crossing is not located on a classified freight route.

*Vehicle traffic:* Currently, this crossing is primarily used as a pedestrian crossing. The crossing was decommissioned pending safety improvements, so any pedestrian crossings here are considered illegal.233

*Train volume and gate-down time:* In 2035, it is estimated that there could be approximately 82 daily trains with 18 trains from the operation of the proposed Gateway Pacific Terminal. Daily gate-down time could increase by 51 minutes from trains traveling to or from the terminal (a total daily gate-down time of approximately 2 hours and 25 minutes in 2035).

*Emergency responders and hospitals:* There would be a low indirect impact to emergency response at this crossing. There are no hospitals or fire stations located within proximity to the crossing.

*Environmental justice populations:* There would be low impacts to environmental justice populations at this crossing.

Edmonds
City of Edmonds  
Snohomish County

**Demographic and Economic Overview**

Edmonds is a city in the southwestern corner of Snohomish County. Its proximity to the Seattle central business district and scenic views of Puget Sound contribute to median home values that outperform the County and are among the highest in the four-county region. Similarly, the median household income of Edmonds residents is among the highest in Snohomish County, nine percent higher than the four-county region. According to the U.S. Census Bureau, Edmonds experienced population growth of less than one percent from 2000 to 2010.

### Demographics of Edmonds, WA

<table>
<thead>
<tr>
<th>Demographics of Edmonds, WA</th>
<th>Edmonds, WA</th>
<th>Snohomish County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>39,900</td>
<td>714,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$73,000</td>
<td>$68,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$395,000</td>
<td>$312,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>13,600</td>
<td>221,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$38,000</td>
<td>$47,000</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

*Source: 2012 American Community Survey, ESRI Business Analyst, PSRC*

Forty percent of employed Edmonds residents work in Seattle, Bellevue, or Redmond, and seven out of ten residents commute to work via single-occupancy vehicle.234 While a Sounder commuter rail station opened in 2003, less than one percent of employed residents commute to work via rail.235

**Impacts to Edmonds (Snohomish County)**

*Impact location(s):* Two at-grade crossings in Edmonds on the north-south main line could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. The crossings are located on Railroad Avenue at Dayton Street and at Main Street.

*Surrounding property type(s):* Development near the crossings is primarily commercial. The Kingston-Edmonds Ferry Terminal and the Sounder/Amtrak Edmonds Station are located directly adjacent to the Main Street crossing.

*Freight classification:* The Main Street crossing is located on a T3 freight route and also crosses the only entrance/exit to the Edmonds Ferry Dock.

*Vehicle traffic:* It is predicted that average daily vehicle volumes could be approximately 13,000 at the Dayton Street crossing and approximately 7,700 at the Main Street crossing.

*Train volume and gate-down time:* In 2035, there could be 82 daily trains with 18 trains as a result of the operation of the proposed Gateway Pacific Terminal. Daily gate-down time could increase by approximately 48 minutes due to trains traveling to or from the terminal (for a total daily gate-down time of 2 hours and 15 minutes).

---

234 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
235 Analysis of 2012 data from the American Community Survey.
Emergency responders and hospitals: At both crossings, there would be a low indirect impact to emergency response.

Environmental justice populations: There would be low impacts to environmental justice populations at these crossings.

Affected Grade Crossings for Economic Analysis

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line, which passes along the city’s western waterfront edge, will carry trains traveling to and from the proposed terminal. The main line also supports Sounder commuter rail service as well as Amtrak intercity service which stop at Edmonds Station. As mentioned, Washington State Department of Transportation operates a regular cross-sound ferry service between Edmonds and Kingston from a terminal that is located next to the rail station. Main Street, the commercial spine of the city, starts at the ferry terminal with density of development increasing at a moderate pace with increased distance from the waterfront. In addition, four city parks are located within one-quarter mile of the grade crossings and railroad line.

Two grade crossings on the proposed BNSF main line for the Gateway Pacific Terminal would be impacted by the proposed project. Both of these crossings link the ferry terminal and railroad station complex to State Route 104 and Interstate-5. All passengers using the ferry service must pass through the first of the two crossings. In 2013, the Edmonds-Kingston ferry had approximately 3.9 million passengers. The location of the two crossings is shown in Figure 58, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Edmonds</td>
<td>W Dayton Street &amp; Railroad Ave</td>
<td>12,940</td>
<td>4 percent</td>
<td>48 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Edmonds</td>
<td>Main Street &amp; Ferry Dock</td>
<td>7,742</td>
<td>6 percent</td>
<td>48 minutes</td>
</tr>
</tbody>
</table>

236 WSDOT 2013 Washington State Ferries Traffic Statistics Rider Segment Report. Additionally, a May 2012 memorandum from Gibson Traffic Consultants to the City of Edmonds noted that “[m]itigation…may require a complete relocation and rebuild of the Ferry Terminal and would likely involve significant expense. Note the prior plans to relocate the Ferry Terminal have been put on hold indefinitely with 20-30 year timeframes being discussed.”

http://www.coaltrainfacts.org/docs/Cherry-Point-Coal-GTC-Edmonds-Final.pdf
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal will add up to 18 trains per day to the rail line in Edmonds. In 2035, this would represent up to 22 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Edmonds.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above two grade crossings.
that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $123,000.\textsuperscript{237}
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $15,000.\textsuperscript{238}
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $138,000 and an annual per-capita cost of up to $4.00.

**Effect of Increased Freight Train Traffic on Property Values\textsuperscript{239}**

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Edmonds, an analysis of aggregate American Community Survey and U.S. Census data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $28.6 million to $40.1 million.
- In 2035, for nearby non-residential property in Edmonds, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $3.5 million.

**Mitigation in Edmonds (Snohomish County)**

The crossings included in the mitigation analysis in Edmonds on the north-south line have the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR104/Main St &amp; Railroad Ave</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Dayton St &amp; Railroad Ave</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The crossings in Edmonds were not low performing (see table beginning on page 135). However, the Washington State Freight Advisory Committee has identified both of the crossings in Edmonds as emerging at-grade crossings that will need to be considered for mitigation.

\textsuperscript{237} Journeys of this type include commuting, personal errands, and leisure travel.
\textsuperscript{238} Journeys of this type include deliveries, service calls, and other business-related trips.
\textsuperscript{239} It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
\textsuperscript{240} US Department of Transportation Crossing Inventory Information
The Edmonds Crossing Project, a City of Edmonds project, would move the existing ferry terminal at Main Street to a location south of downtown Edmonds and construct a new grade separated road over the rail line. This would reduce traffic at the at-grade crossings in Edmonds, which could mitigate some of the impacts at these crossings. In the interim, these crossings could be mitigated using intersection improvements such as signalization or additional lighting, signal timing optimization, and/or ITS. This could help to reduce impacts to emergency response, safety and accidents. These crossings are also critical to nearby transit facilities. Delay for passengers accessing these facilities could also be mitigated using the previously mentioned measures. In May 2012, Gibson Traffic Consultants noted that “[m]itigation…may require a complete relocation and rebuild of the Ferry Terminal and would likely involve significant expense. Note the prior plans to relocate the Ferry Terminal have been put on hold indefinitely with 20-30 year timeframes being discussed.”

243 http://www.coaltrainfacts.org/docs/Cherry-Point-Coal-GTC-Edmonds-Final.pdf
City of Seattle  
King County

Demographic and Economic Overview

Seattle is the largest city in King County. A diversity of sectors contribute to its strong economic performance, ranging from aerospace to software and international exports.

Seattle features a broad range of land uses which include single-family homes, extensive multi-family residential development, hotels, retail districts, and high-rise office towers. In the north, residential development is predominant, particularly along the city’s western shore. The density of commercial, residential, and retail development in Seattle’s central business district outpaces all other cities in the central Puget Sound region. In the south of the city, a substantial amount of light industrial development runs roughly in parallel to Sea-Tac airport.

Although median home values in Seattle are among the very highest in the region, median incomes are lower than both King County and the four-county region. Nearly 25 percent of total employment in the region is concentrated in Seattle, where the average wage is 11 percent higher than the four-county region.

Demographics of Seattle, WA

<table>
<thead>
<tr>
<th></th>
<th>Seattle, WA</th>
<th>King County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>613,000</td>
<td>1,941,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$63,500</td>
<td>$71,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$441,000</td>
<td>$389,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>373,000</td>
<td>925,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$58,600</td>
<td>$58,700</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

As the region’s largest employment center, over 60 percent of its employed residents work within city limits, with an additional 12 percent working in nearby Bellevue or Redmond. 244 Fifty percent of employed residents travel to work via single-occupancy vehicle journeys, and nearly 20 percent make use of public transportation, a far higher number than any other community examined in this study. 245

Impacts to Seattle (King County)

Impact location(s): Nine at-grade crossings on the north-south main line in Seattle could be impacted by increased rail traffic to and from Gateway Pacific Terminal. Four crossings are located on the Seattle waterfront. Five crossings are located in an industrial area. Crossings are located on Broad, Clay, Vine, and Wall Streets in the waterfront area and on S Holgate, S Lander, S Horton, and one separate crossing in each direction on S Spokane Street in the industrial area.

Surrounding property type(s): Development in the waterfront area primarily consists of commercial and residential development. The waterfront crossings are located in high pedestrian activity areas, which could impact pedestrian access and safety when train traffic

244 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
245 Analysis of 2012 data from the American Community Survey.
passes through the region to or from the proposed terminal. Crossings in the industrial district are primarily surrounded by industrial development.

**Freight classification:** The S Holgate and S Lander Street crossings are located on T3 freight routes, the Broad Street crossing is located on a T2 freight route, and the Spokane Street crossing is located on a T1 route. A T3 route accommodates 300,000 to 4 million tons of freight per year, a T2 route accommodates 4 million to 10 million tons of freight per year and a T1 route serves more than 10 million tons of freight per year.246

**Vehicle traffic:** In 2035, average daily vehicle volumes at the waterfront crossings are projected to be 11,500 at Broad Street and between 1,000 and 5,000 vehicles at Vine, Wall and Clay Streets. The 2035 average daily vehicle volumes in the industrial district are projected to range from 4,500 vehicles at S Horton Street to 18,500 vehicles at S Lander Street.

**Train volume and gate-down time:** In 2035, there could be 18 terminal-related trains as a result of the operation of the proposed Gateway Pacific Terminal at all nine crossings, for a total of 95 total daily trains. The marginal increase in daily gate-down time as a result of the operation of the proposed Gateway Pacific Terminal could be between approximately 55 minutes to 1 hour 25 minutes (for a total of between approximately 2 hours 35 minutes to 3 hours 50 minutes of daily gate-down time).

**Emergency responders and hospitals:** Terminal-related rail traffic could have a high impact on emergency response services at the Horton Street crossing because there is a fire station located within close proximity to the crossing.

**Environmental justice populations:** Disproportionate impacts to environmental justice populations could occur near the industrial district crossings because there is a high proportion of minority residents and residents living below the poverty level near the crossings.

The S Lander Street crossing is included in a grade separation project by the City of Seattle that does not currently have funding.247

**Affected Grade Crossings for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the BNSF main line, which runs from north to south through Seattle, will carry trains traveling to and from the proposed terminal. In the north, the BNSF main line runs along the city’s western waterfront edge, passing by residential development and much of the commercial development in the central business district. In the south, the BNSF main line passes next to Sea-Tac airport and through an area of light industrial development.

Nine grade crossings in Seattle would be affected by increased freight rail traffic as a result of the Gateway Pacific Terminal, and six of these crossings were evaluated for economic impacts.248 Four of these crossings are located just west of Seattle’s Central Business District, along the waterfront. The location of all crossings is shown in Figure 59, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

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246 [http://www.wsdot.wa.gov/freight/FGTS/default.htm](http://www.wsdot.wa.gov/freight/FGTS/default.htm)
247 [http://www.seattle.gov/transportation/southlanderdraft.htm](http://www.seattle.gov/transportation/southlanderdraft.htm)
248 Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
**Grade Crossings Evaluated for Economic Impacts in Seattle, WA**

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seattle</td>
<td>Broad St &amp; Alaskan Way</td>
<td>11,528</td>
<td>7 percent</td>
<td>8 6 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Seattle</td>
<td>Clay St &amp; Alaskan Way</td>
<td>1,697</td>
<td>1 percent</td>
<td>86 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Seattle</td>
<td>Vine St &amp; Alaskan Way</td>
<td>1,099</td>
<td>27 percent</td>
<td>55 minutes</td>
</tr>
<tr>
<td>4</td>
<td>Seattle</td>
<td>Wall St &amp; Alaskan Way</td>
<td>4,767</td>
<td>3 percent</td>
<td>55 minutes</td>
</tr>
<tr>
<td>5</td>
<td>Seattle</td>
<td>S Holgate near Third Ave</td>
<td>8,961</td>
<td>9 percent</td>
<td>55 minutes</td>
</tr>
<tr>
<td>6</td>
<td>Seattle</td>
<td>S Lander/3rd near Occidental Ave</td>
<td>18,420</td>
<td>15 percent</td>
<td>55 minutes</td>
</tr>
</tbody>
</table>

**Figure 59: Location of Train Route, Grade Crossings, and 750-ft Buffer in Seattle, WA**

Source: ESRI
**Impact of Gateway Pacific Terminal Project**

The project information document indicates that, upon full build out, the operation of Gateway Pacific Terminal could add up to 18 trains per day to the BNSF main line in Seattle. In 2035, this would represent up to 19 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Seattle.

**Economic Impact of Increased Gate-down Time**

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above six grade crossings that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $500,000.\(^{249}\)
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $128,000.\(^{250}\)
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $628,000 and an annual per-capita cost of less than $1.00.

**Effect of Increased Freight Train Traffic on Property Values\(^{251}\)**

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Seattle, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $283.2 million to $396.5 million.
- In 2035, for nearby non-residential property in Seattle, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $284.8 million.

**Mitigation in Seattle (King County)**

The selected crossings included in the mitigation analysis in Seattle on the north-south line have the following characteristics:

---

\(^{249}\) Journeys of this type include commuting, personal errands, and leisure travel.

\(^{250}\) Journeys of this type include deliveries, service calls, and other business-related trips.

\(^{251}\) It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
Crossing Characteristics in Seattle

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad St &amp; Alaskan Way</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>S Holgate near Third Ave</td>
<td>No</td>
<td>No</td>
<td>3</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>S Lander/3rd near Occidental Ave</td>
<td>No</td>
<td>No</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Spokane St WB &amp; 2nd Ave S</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>No</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>S Spokane St EB &amp; 2nd Ave S</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>No</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

All of the crossings in Seattle are considered low performing (see table beginning on page 135). The S Lander Street crossing is also a planned grade separation project for the City of Seattle. The S Lander Street Grade Separation project is currently on hold due to lack of funding. In the interim, the impacts at Seattle crossings potentially could be mitigated using measures including, but not limited to: crossing improvements (such as signalization, advanced warning, pavement markings, and/or additional lighting), ITS and/or signal timing optimization. These improvements could help to relieve delay for some drivers at these intersections, reduce impacts to emergency service and freight delivery, and improve safety for vehicles, bicyclists, and pedestrians.

Some crossings in Seattle, such as the Broad Street crossing, would be difficult to grade separate because of the adjacent road network and nearby development. A combination of alternative mitigation measures other than grade separation will be important to reduce impacts at crossings where grade separation would be difficult.
Main Line and Stampede Pass

City of Kent
King County

Demographic and Economic Overview

Kent is a city in King County. The median household income in Kent is 13 percent lower than that of the four-county region, and median home prices are 29 percent lower than the average for King County and 18 percent lower than the average for the four-county region.

Demographics of Kent, WA

<table>
<thead>
<tr>
<th>Population (2012)</th>
<th>Kent, WA</th>
<th>King County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>108,700</td>
<td>1,941,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$58,000</td>
<td>$71,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$278,000</td>
<td>$389,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>55,000</td>
<td>925,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$48,000</td>
<td>$58,700</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Employed Kent residents largely work in King County, with nearly 50 percent working in Seattle, Bellevue, Kent, or Auburn. Nearly three-quarters of employed residents travel to work via single-occupancy vehicle journeys, and six percent make use of public transportation, primarily traveling via bus.

Main Line Impacts to Kent (King County)

Impact location(s): Eight crossings in Kent could be impacted by increased rail traffic going to and from Gateway Pacific Terminal.

Crossings on the north-south main line are located on:

- W James Street adjacent to Railroad Avenue
- W Smith Street adjacent to Railroad Avenue
- E Meeker Street adjacent to Railroad Avenue
- E Gowe Street adjacent to Railroad Avenue
- E Titus Street adjacent to Railroad Avenue
- E Willis Street adjacent to Railroad Avenue
- S 212th Street and 77th Avenue S
- S 259th Street and 1st Avenue South

Surrounding property type(s): Development near the S 212th Street and S 259th Street crossings is primarily industrial and the crossings in the downtown area are primarily surrounded by commercial development. The Interurban Trail is also located adjacent to the crossings from S 212th Street to S 259th Street. The six crossings located in downtown Kent are located in high pedestrian activity areas:

253 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
254 Analysis of 2012 data from the American Community Survey.
255 The Interurban Trail links Tukwila, Kent, Auburn, Algona, and Pacific along a near-straight 14 mile-long alignment following the historic Interurban Rail Line.
• W James Street adjacent to Railroad Avenue
• W Smith Street adjacent to Railroad Avenue
• E Meeker Street adjacent to Railroad Avenue
• E Gowe Street adjacent to Railroad Avenue
• E Titus Street adjacent to Railroad Avenue
• E Willis Street adjacent to Railroad Avenue

*Freight classification:* Three crossings are located on freight routes:

• Two T2 Routes: S 212\(^{th}\) Street and Willis Street crossings
• One T3 Route: S 259\(^{th}\) Street

*Vehicle traffic:* Three crossings are on roads that are predicted to have daily volumes of more than 20,000 in 2035:

• S 212th Street and 77th Avenue S: 32,446 daily vehicles
• W James Street 1st Avenue N: 22,956 daily vehicles
• SR 516/Willis Street and Railroad Avenue S: 25,905 daily vehicles

*Train volume and gate-down time:* By 2035, the crossings on the north-south main line could increase by 18 daily trains to a total of 95 daily train crossings as a result of the proposed Gateway Pacific Terminal operation. Due to the proposed terminal, gate-down time at these crossings could have a marginal increase of approximately 38 minutes from Gateway Pacific Terminal trains (for a total of approximately 2 hours of daily gate-down time).

*Emergency responders and hospitals:* Emergency service response could be highly impacted by terminal-related trains at the SR 516/Willis Street and Railroad Avenue crossing and the S 259th Street and 1st Avenue S crossing. Fire stations are located within close proximity to both crossings.

*Environmental justice populations:* Environmental justice populations near the S 212th Street and 77th Avenue S crossing could be disproportionately impacted by trains related to terminal operations. This is because there is a high proportion of minority residents and residents living below the poverty level near the crossings.

**Affected Grade Crossings for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line, which parallels Central Avenue and passes through the downtown, will carry trains traveling to and from the proposed terminal. Much of the development to the north of downtown is characterized by light industrial land uses, with many large-scale warehouses and parking lots. In the city’s southern half, a limited amount of residential development can be found within one-half mile of the BNSF main line amidst additional light industrial and commercial development. A Sounder commuter rail station located in the center of Kent’s downtown travels on the BNSF main line tracks.

Eight grade crossings in Kent would be affected by increased freight rail traffic as a result of the
Gateway Pacific Terminal, and four of these crossings were evaluated for economic impacts. All four selected crossings are on the BNSF main line, and of these, three are located in the center of Kent’s downtown. The two crossings with the highest traffic (W James St & 1st Ave N, SR516-Willis St & Railroad Ave S) surround Kent Station, a transit-oriented retail and entertainment development. The location of the crossings is shown in Figure 60, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

Grade Crossings Evaluated for Economic Impacts on BNSF Main Line in Kent, WA

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kent</td>
<td>S 212th St &amp; 77th Ave S</td>
<td>32,446</td>
<td>14 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Kent</td>
<td>W James St &amp; 1st Ave N</td>
<td>22,956</td>
<td>14 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Kent</td>
<td>Meeker St &amp; Railroad Ave N</td>
<td>6,284</td>
<td>1 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>4</td>
<td>Kent</td>
<td>SR516-Willis St &amp; Railroad Ave S</td>
<td>25,905</td>
<td>6 percent</td>
<td>38 minutes</td>
</tr>
</tbody>
</table>

Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal on the BNSF main line will add up to 18 trains per day to local train traffic in Kent. In 2035, this would represent up to 19 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Kent.

In the event that empty coal trains are routed eastward along the Stampede Pass line, the total number of additional trains passing through Kent on the BNSF main line could be reduced from 18 to 9. However, since the Stampede Pass line also passes through Kent, this change in service would result in additional economic impacts in a different location within Kent. As the scheduling for Gateway Pacific Terminal traffic is not presently known, this analysis separately considers the potential economic impacts of increased train service on both train routes.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above five grade crossings that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.
In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $316,000.257

In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $97,000.258

In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $413,000, and an annual per-capita cost of up to $4.00.

Effect of Increased Freight Train Traffic on Property Values – BNSF Main Line259

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

In 2035, for nearby residential property in Kent, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $8.9 million to $12.4 million.

In 2035, for nearby non-residential property in Kent, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $61 million.

257 Journeys of this type include commuting, personal errands, and leisure travel.
258 Journeys of this type include deliveries, service calls, and other business-related trips.
259 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
Main Line Mitigation in Kent (King County)

The crossings included in the mitigation analysis in Kent on the north-south line have the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>S 212th St &amp; 77th Ave S</td>
<td>Yes</td>
<td>No</td>
<td>4</td>
<td>Yes</td>
<td>No</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>W James St &amp; 1st Ave N</td>
<td>No</td>
<td>No</td>
<td>0</td>
<td>Yes</td>
<td>Yes, stop lines</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>W Smith St &amp; 1st Ave N</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>SR516-Willis St &amp; Railroad Ave S</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>S 259th St &amp; 1st Ave S</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Three crossings in Kent are low performing (S 212<sup>th</sup> Street, W James Street, and SR 516/Willis Street). The 212<sup>th</sup> Street and SR 526/Willis Street crossings are also identified grade separation projects that are currently on the FIMSIB list.<sup>261</sup>

The S 259<sup>th</sup> Street and W Smith Street crossings have a lower impact, or are high performing (see table beginning on page 135). Some impacts at these crossings could be mitigated using crossing improvements, such as signalization and/or lighting, as well as with ITS and/or signal timing optimization. This could help to relieve safety impacts, emergency response impacts, and the total number of vehicles impacted.
City of Auburn  
King County

Demographic and Economic Overview

Auburn is a city in King County. Located directly south of Kent and east of Federal Way, its downtown contains a limited amount of mid-rise office development along with light industrial and residential development. The median household income in Auburn is 19 percent lower than that of the four-county region, and median home prices are 34 percent lower than King County and 24 percent lower than the four-county region.

Demographics of Auburn, WA

<table>
<thead>
<tr>
<th></th>
<th>Auburn, WA</th>
<th>King County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>70,300</td>
<td>1,941,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$54,000</td>
<td>$71,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$256,000</td>
<td>$389,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>32,000</td>
<td>925,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$46,000</td>
<td>$58,700</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Nearly two-thirds of employed Auburn residents work in King County, with 20 percent commuting to Seattle or Bellevue. Three-quarters of employed residents travel to work via single-occupancy vehicle journeys, and six percent make use of public transportation.

Impacts to Auburn (King County)

Impact locations: Five crossings on the north-south main line, and one crossing on the Stampede Pass line in Auburn could be impacted by increased rail traffic going to and from the Gateway Pacific Terminal. Crossings are located on:

- 29th Street NW and B Street NW
- 37th Street NW near B Street NW
- 3rd Street NW and C Street NW
- Main Street W and 1st Street NW
- C Street SW
- R SE/Black Diamond Road and T Street SE

Surrounding property type(s): Development near the crossings is primarily commercial and industrial, with some open space. There is also residential development near the Main Street W crossing. The 3rd Street NW and Main Street W crossings are located in a high pedestrian activity area.

Freight classification: No crossing is located on a freight classified route.

Vehicle Traffic: Vehicle volumes near the Main Street W crossing are predicted to be near approximately 10,000 daily vehicles in 2035. The 3rd Street NW and the 37th Street NW crossings are predicted to have daily vehicle volumes of approximately 7,500 daily vehicles in 2035. Daily vehicle volumes at the 29th Street NW crossing would be approximately 550 daily vehicles.

262 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
263 Analysis of 2012 data from the American Community Survey.
vehicles in 2035.

*Train volume and gate-down time:* By 2035, the crossings in Auburn could increase by 18 daily trains to a total of 95 daily train crossings as a result of operation of the proposed Gateway Pacific Terminal. Due to the proposed terminal, gate-down time at these crossings could have a marginal increase of approximately 38 minutes from Gateway Pacific Terminal trains (for a total of approximately 2 hours of daily gate-down time).

*Emergency responders and hospitals:* Emergency service response could be highly impacted by terminal-related trains at the 3rd Street NW and Main Street W crossings. This is because there is a fire station and the Auburn Regional Medical Center is located within close proximity to both crossings.

*Environmental justice populations:* Environmental justice populations near the crossings in Auburn on the north-south main line could experience a moderate disproportionate impact from trains related to terminal operations. Approximately 25 to 35 percent of residents living near the crossings are minority residents and 35 to 50 percent of residents live below the poverty level.

**Affected Grade Crossings for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line, which passes to the west of the Auburn central business district, will carry trains traveling to and from the proposed terminal. In the north of the city, the BNSF main line passes by the Emerald Downs horse track, as well as the Auburn Municipal Airport. To the south of the city, the BNSF main line passes through a region characterized by light industrial development and a limited amount of residential and commercial development.

Six grade crossings in Auburn would be affected by increased freight rail traffic as a result of the Gateway Pacific Terminal, and two of these crossings were evaluated for economic impacts.264 Both of these selected crossings are located in the center of Auburn’s downtown, just north of the Auburn commuter rail station. One of these crossings (Main St West & 1st St NW) bisects the main commercial artery of the town, and both are located within one-quarter mile of West Auburn Senior High School. The location of the selected crossings is shown in Figure 61, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Auburn</td>
<td>3rd St NW &amp; C St NW</td>
<td>7,585</td>
<td>4 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Auburn</td>
<td>Main St West &amp; 1st St NW</td>
<td>10,258</td>
<td>4 percent</td>
<td>38 minutes</td>
</tr>
</tbody>
</table>

264 Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to 18 trains per day to the BNSF main line in Auburn. In 2035, this would represent up to 19 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Auburn.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above two grade crossings that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.
• In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $69,000.265
• In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $7,000.266
• In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $76,000 and an annual per-capita cost of approximately $1.00.

Effect of Increased Freight Train Traffic on Property Values267
Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

• In 2035, for nearby residential property in Auburn, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $7.2 million to $10.1 million.
• In 2035, for nearby non-residential property in Auburn, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $34.8 million.

Mitigation in Auburn (King County)

The selected crossing included in the mitigation analysis in Auburn on the north-south line has the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main St West &amp; 1st St NW</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

The selected Auburn crossing is has a moderate performance, or moderate impact, as shown the table beginning on page 135. Mitigation measures at this crossing could include ITS, traffic signal optimization, and crossing improvements, such as additional lighting and/or signalization. Impacts to safety and emergency response could be alleviated using these measures.

265 Journeys of this type include commuting, personal errands, and leisure travel.
266 Journeys of this type include deliveries, service calls, and other business-related trips.
267 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
268 US Department of Transportation Crossing Inventory Information.
City of Sumner
Pierce County

Demographic and Economic Overview

Sumner is a city located at the northern border of Pierce County adjacent to Auburn. The City’s downtown contains a limited amount of mid-rise office development along with light industrial development and nearby residential development. The median household income in Sumner is 22 percent lower than that of the four-county region, although median home prices are four percent higher than the average for Pierce County.

<table>
<thead>
<tr>
<th>Demographics of Sumner, WA</th>
<th>Sumner, WA</th>
<th>Pierce County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>9,500</td>
<td>799,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$52,000</td>
<td>$59,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$261,000</td>
<td>$251,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>7,000</td>
<td>241,500</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$45,000</td>
<td>$39,300</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

One out of ten employed Sumner residents works in either Seattle or Tacoma, with the remainder spread across nearby Kent, Auburn, and Puyallup.269 Three-quarters of employed residents travel to work via single-occupancy vehicle journeys, and six percent make use of public transportation.270

Impacts to Sumner (Pierce County)

Impact location(s): Five crossings on the north-south main line in Sumner could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. Crossings are located on:

- 24th Street E near E Valley Highway
- Puyallup Street near Williams Avenue
- Zehnder Street and Pease Avenue
- Main Street near Fryar Avenue
- Maple Street near Narrow Street.

Surrounding property type(s): Development near the 24th Street crossing is primarily industrial; near the Puyallup Street and Zehnder Street crossings, development is primarily industrial with some residential development. The crossings on Main Street and Maple Street are located in areas of commercial development.

Freight classification: The Puyallup Street crossing is located on a T3 freight route.

Vehicle traffic: In 2035, most crossings are predicted to have average daily vehicle volumes of between 3,300 and 6,600. The crossing on 24th Street is projected to have very low traffic volumes in 2035 – about 15 daily vehicles.

269 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
270 Analysis of 2012 data from the American Community Survey.
**Train volume and gate-down time:** The proposed terminal could increase daily train traffic at crossings in Sumner to approximately 95 total trains – 18 trains would be due to the operation of the proposed terminal. In 2035, the marginal increase in daily gate-down time directly related to the operation of the proposed terminal could be 38 minutes (for approximately 2 hours of total gate-down time in 2035).

**Emergency responders and hospitals:** The Maple Street and Main Street crossings could have a high potential to impact emergency response services; two fire stations are located within a half-mile of the crossings.

**Environmental justice populations:** Impacts to environmental justice populations would be low.

**Affected Grade Crossing for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line, which bisects the core of Sumner, will carry trains traveling to and from the proposed terminal. In the city’s core, the BNSF main line divides industrial uses to the northwest from commercial and residential development to the southeast. A Sounder commuter rail station is located on the BNSF main line near to the town’s commercial corridor.

Five grade crossings in Sumner would be affected by increased freight rail traffic as a result of the Gateway Pacific Terminal, and one of these crossings was evaluated for economic impacts. This selected crossing (Main St near Fryar Ave) is located just north of the Sumner commuter rail station, and is located between the main commercial thoroughfare (Main Street) and points west. The location of the selected crossing is shown in Figure 62, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sumner</td>
<td>Main St near Fryar Ave</td>
<td>6,636</td>
<td>5 percent</td>
<td>38 minutes</td>
</tr>
</tbody>
</table>

271 Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
**Impact of Gateway Pacific Terminal Project**

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to 18 trains per day to the BNSF main line in Sumner. In 2035, this would represent up to 19 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Sumner.
Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above selected grade crossing that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $25,000.\(^{272}\)
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $3,000.\(^{273}\)
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $28,000 and annual per-capita cost of up to $3.00.

Effect of Increased Freight Train Traffic on Property Values\(^{274}\)

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Sumner, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $14.1 million to $19.7 million.
- In 2035, for nearby non-residential property in Sumner, a high-level analysis of aggregate real estate data suggests that the marginal increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $3.3 million.

Mitigation in Sumner (Pierce County)

The selected crossing included in the mitigation analysis in Sumner on the north-south line has the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puyallup St near E Valley Hwy E</td>
<td>No</td>
<td>No</td>
<td>0</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The Sumner crossing is high performing, or low impact, as shown the table beginning on page 135. Some impacts, such as those to safety, accidents, and emergency services could be mitigated using alternative mitigation measures at this crossing. This could include crossing improvements, such as signalization and crossbuck signs, as well as ITS and/or signal timing optimization.

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272 Journeys of this type include commuting, personal errands, and leisure travel.
273 Journeys of this type include deliveries, service calls, and other business-related trips.
274 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
275 US Department of Transportation Crossing Inventory Information.
Puyallup
City of Puyallup  
Pierce County  

Demographic and Economic Overview

Puyallup is a city in the north of Pierce County. Puyallup’s median household income outperforms the County and trails the region by nine percent. The City is primarily characterized by residential development which surrounds a series of moderately-developed commercial corridors. Median home prices are eight percent higher than the average for Pierce County, although they are 20 percent lower than the average for the four-county region.

<table>
<thead>
<tr>
<th>Demographics of Puyallup, WA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Puyallup, WA</strong></td>
</tr>
<tr>
<td>Population (2012)</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
</tr>
<tr>
<td>Employment (2013)</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Thirty percent of employed Puyallup residents work in Puyallup or nearby Tacoma, with only 10 percent commuting to Seattle. Nearly 80 percent of employed residents travel to work via single-occupancy vehicle journeys, and less than four percent make use of public transportation.

Impacts to Puyallup (Pierce County)

Impact location(s): Seven crossings on the north-south main line in Puyallup could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. Crossings are located at:

- 15th Street SE and E Pioneer Avenue
- 5th Street SE and Spring Street
- 3rd Street SE and E Main Avenue
- Meridian Street and W Stewart Avenue
- 5th Street NW and W Stewart Avenue
- 7th Street NW and W Stewart Avenue
- 12th Street NW and W Stewart Avenue

Surrounding property type(s): Development near the crossings is commercial and residential. Four crossings are located in the designated urban growth center boundary between 5th Street SE and 5th Street SW on W Stewart Street, which could impact pedestrian safety and mobility.

Freight classification: No crossings are located on a freight route.

Vehicle traffic: In 2035, average daily vehicle volumes could be between approximately 13,250 to 17,400 vehicles at five crossings. The 12th Street NW crossing could have approximately 7,000 vehicles and the 7th Street NW crossing could have approximately 1,500 daily vehicles.

276 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
277 Analysis of 2012 data from the American Community Survey.
**Train volume and gate-down time:** At all crossings, daily train volumes could increase by 18 trains due to the operation of the proposed terminal – for a total of 80 trains per day. The marginal increase in gate-down time directly related to the operation of the proposed terminal could be approximately 38 minutes (to approximately 1 hour 30 minutes of daily gate-down time).

**Emergency responders and hospitals:** Emergency services could be highly impacted at five of the crossings in Puyallup because there is a fire station located within close proximity.

**Environmental justice populations:** Impacts to environmental justice populations would be low.

**Affected Grade Crossings for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line, which parallels Stewart Avenue and bisects the commercial corridor of N Meridian Street, will carry trains traveling to and from the proposed terminal. In the town’s center, a Sounder commuter rail station is also located on the BNSF main line.

Seven grade crossings in Puyallup would be affected by increased freight rail traffic as a result of the Gateway Pacific Terminal, and five of these were evaluated for economic impacts. Three of these crossings are near to the commuter rail station, and are located on connecting roads that link the residential development near to the Puyallup River to the schools and parks located to the south of the rail line. The location of the selected crossings is shown in Figure 63, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Puyallup</td>
<td>15th St SE &amp; E Pioneer Ave</td>
<td>15,101</td>
<td>6 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Puyallup</td>
<td>5th St SE &amp; Spring St</td>
<td>13,251</td>
<td>7 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Puyallup</td>
<td>3rd St SE &amp; E Main Ave</td>
<td>17,370</td>
<td>7 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>4</td>
<td>Puyallup</td>
<td>Meridian St &amp; W Stewart Ave</td>
<td>14,763</td>
<td>6 percent</td>
<td>38 minutes</td>
</tr>
<tr>
<td>5</td>
<td>Puyallup</td>
<td>5th St NW &amp; W Stewart Ave</td>
<td>14,631</td>
<td>6 percent</td>
<td>38 minutes</td>
</tr>
</tbody>
</table>

Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to 18 trains per day to the BNSF main line in Puyallup. In 2035, this would represent up to 23 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Puyallup.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above five selected grade crossings that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $279,000.\(^{279}\)

\(^{279}\) Journeys of this type include commuting, personal errands, and leisure travel.
In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $48,000.280

In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $327,000 and an annual per-capita cost of up to $9.00.

**Effect of Increased Freight Train Traffic on Property Values**281

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Puyallup, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $22.3 million to $31.3 million.
- In 2035, for nearby non-residential property in Puyallup, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $6 million.

**Mitigation in Puyallup (Pierce County)**

The selected crossings included in the mitigation analysis in Puyallup on the north-south line have the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>15th St SE &amp; E Pioneer Ave</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5th St SE &amp; Spring St</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3rd St SE &amp; E Main Ave</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Meridian St &amp; W Stewart Ave</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>No</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5th St NW &amp; W Stewart Ave</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

All of these Puyallup crossings may warrant consideration for mitigation or potential grade separation. This is because they would have a moderate impact (see table beginning on page 135). All of the Puyallup crossings have also been identified by the Washington State Freight Advisory Committee as emerging crossings that will need to be addressed in the future. Interim mitigation measures could include crossing improvements, such as signalization and/or advanced warning devices, as well as signal timing optimization and/or ITS. This could help to alleviate impacts to safety, emergency response, and accidents, and could help to reduce the total number of impacted vehicles.

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280 Journeys of this type include deliveries, service calls, and other business-related trips.
281 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
282 US Department of Transportation Crossing Inventory Information.
Tacoma
**City of Tacoma**  
**Pierce County**

**Demographic and Economic Overview**

Tacoma is the largest city in Pierce County. Its median household income trails the County by 14 percent and the four-county region by 25 percent. Median home prices are eight percent lower than the average for Pierce County, and they are 32 percent lower than the average for the four-county region.

<table>
<thead>
<tr>
<th>Demographics of Tacoma, WA</th>
<th>Tacoma, WA</th>
<th>Pierce County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>200,000</td>
<td>799,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$50,500</td>
<td>$59,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$230,000</td>
<td>$251,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>80,400</td>
<td>241,500</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$44,300</td>
<td>$39,300</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

*Source: 2012 American Community Survey, ESRI Business Analyst, PSRC*

One-third of employed Tacoma residents work within the city, with 10 percent commuting to Seattle. Three-quarters of employed residents travel to work via single-occupancy vehicle journeys, and five percent of residents make use of public transportation.

**Impacts to Tacoma (Pierce County)**

**Impact location(s):** Three at-grade crossings on the north-south main line in Tacoma could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. Crossings are located on:

- Sixth Avenue and S Seashore Drive
- McCarver Street and Ruston Way
- S 19th Street and Wilton Road

**Surrounding property type(s):** Development near the S 19th Street crossing is primarily industrial. Development near the remaining crossings is commercial. All of the crossings in Tacoma are located along the shoreline.

**Freight classification:** No crossings would be located on a classified freight route.

**Vehicle traffic:** By 2035, the crossing on Sixth Avenue is projected to have an average daily vehicle volume of approximately 3,000 vehicles. The remaining two crossings could have between approximately 6,400 and 10,800 daily vehicles.

**Train volume and gate-down time:** In 2035, with the 18 additional trains due to the operation of the proposed terminal, daily train volumes could be approximately 80 total trains. In 2035, daily gate-down time could increase by between approximately 45 to 55 minutes due to trains traveling to and from the proposed terminal (for a total of 1 hour 50 minutes to 2 hours of daily
gate-down time).

*Emergency responders and hospitals:* Impacts to emergency services would be low at all crossings in Tacoma.

*Environmental justice populations:* There would be a low disproportionate impact to environmental justice populations.

**Affected Grade Crossings for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line will carry trains traveling to and from the proposed terminal.

Three grade crossings in Tacoma would be affected by increased freight rail traffic as a result of the Gateway Pacific Terminal, and one of these crossings was selected for evaluation of economic impacts. The location of the crossing is shown in Figure 64 and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tacoma</td>
<td>S 19th St West &amp; Wilton Rd</td>
<td>10,774</td>
<td>6 percent</td>
<td>44 minutes</td>
</tr>
</tbody>
</table>

Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Figure 64. Location of Train Route, Grade Crossings, and 750-ft Buffer in Tacoma, WA

Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to 18 trains per day to the BNSF mainline in Tacoma. In 2035, this would represent up to 23 percent of all passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Tacoma.
Economic Impact of Increased Gate-down Time
Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above selected grade crossing that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $52,000.287
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $8,000.288
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $60,000 and an annual per-capita cost of less than $1.00.

Effect of Increased Freight Train Traffic on Property Values
Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF Mainline. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Tacoma, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $89.3 million to $125 million.
- In 2035, for nearby non-residential property in Tacoma, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $34.8 million.

287 Journeys of this type include commuting, personal errands, and leisure travel.
288 Journeys of this type include deliveries, service calls, and other business-related trips.
Steilacoom
**Town of Steilacoom**  
**Pierce County**

**Demographic and Economic Overview**

Steilacoom is a town along the eastern shore of Pierce County. With a median household income that outperforms both the County and the region, it is primarily characterized by residential development. Median home prices are 19 percent higher than the average for Pierce County and 12 percent lower than the average for the four-county region.

<table>
<thead>
<tr>
<th>Demographics of Steilacoom, WA</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population (2012)</strong></td>
<td>6,100</td>
<td>799,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td><strong>Median HH Income (2012)</strong></td>
<td>$69,000</td>
<td>$59,000</td>
<td>$67,000</td>
</tr>
<tr>
<td><strong>Median Home Value (2012)</strong></td>
<td>$299,000</td>
<td>$251,000</td>
<td>$339,000</td>
</tr>
<tr>
<td><strong>Employment (2013)</strong></td>
<td>1,400</td>
<td>241,500</td>
<td>1,490,000</td>
</tr>
<tr>
<td><strong>Average Wage (2008)</strong></td>
<td>$29,000</td>
<td>$39,300</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Only eight percent of employed Steilacoom residents commute to Seattle, with nearly 45 percent of residents employed in Tacoma, Lakewood, or Steilacoom. Over 80 percent of employed residents travel to work via single-occupancy vehicle journeys, and less than five percent make use of public transportation.

**Impacts to Steilacoom (Pierce County)**

**Impact location(s):** One at-grade crossing on the north-south main line in Steilacoom could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. The crossing is located at Union Avenue near Commercial Street.

**Surrounding property type(s):** Development near the Steilacoom crossing is primarily commercial. A ferry terminal is also located near this crossing.

**Freight classification:** This crossing is not located on a freight classified route.

**Vehicle traffic:** By 2035, this crossing is projected to have an average daily vehicle volume of approximately 800 vehicles.

**Train volume and gate-down time:** In 2035, with the 18 additional trains due to the operation of the proposed terminal, daily train volumes could be approximately 103 total trains. In 2035, daily gate-down time could increase by between approximately 55 minutes due to trains traveling to and from the proposed terminal (for a total of 3 hours 10 minutes of daily gate-down time).

**Emergency responders and hospitals:** Impacts to emergency services would be low at this crossing.

**Environmental justice populations:** There would be a low disproportionate impact to environmental justice populations.

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289 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.  
290 Analysis of 2012 data from the American Community Survey.
Affected Grade Crossing for Economic Analysis

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line, which aligns with the town’s eastern edge on the Puget Sound coastline, will carry trains traveling to and from the proposed terminal. A limited amount of commercial development in Steilacoom can be found near the Ferry Terminal, and residential development is predominant land use elsewhere in the town.

One grade crossing in Steilacoom would be affected by increased freight rail traffic as a result of the Gateway Pacific Terminal.\textsuperscript{291} This crossing is located directly across from the ferry terminal that provides service to Anderson, Ketron, and McNeil Islands. The location of this crossing is shown in Figure 65 and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steilacoom</td>
<td>Union Ave near Commercial St</td>
<td>777</td>
<td>25 percent</td>
<td>55 minutes</td>
</tr>
</tbody>
</table>

\textsuperscript{291} Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to 18 trains per day to the BNSF main line in Steilacoom. In 2035, this would represent up to 17 percent of passenger and freight train traffic on the BNSF main line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Steilacoom.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above-grade crossing that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $5,000.292

292 Journeys of this type include commuting, personal errands, and leisure travel.
• In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $4,000.\textsuperscript{293}

• In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $9,000 and an annual per-capita cost of less than $1.00.

\textit{Effect of Increased Freight Train Traffic on Property Values}\textsuperscript{294}

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF Mainline. All estimates are in 2013 dollars.

• In 2035, for nearby residential property in Steilacoom, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $7.4 million to $10.4 million.

• In 2035, for nearby non-residential property in Steilacoom, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $400,000.

\textit{Mitigation in Steilacoom (Pierce County)}

The crossing included in the mitigation analysis in Steilacoom on the north-south main line has the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union Ave near Commercial St</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

The Steilacoom crossing would have a moderate impact (see table beginning on page 135) and is also identified by the Washington State Freight Advisory Committee as an emerging crossing that will need to be addressed following 2020.\textsuperscript{296} Interim mitigation measures could include crossing improvements, such as signalization, pavement markings, and/or advanced warning devices, as well as signal timing optimization and/or ITS. This could help to alleviate impacts to safety, emergency response, and accidents, and could help to reduce the total number of impacted vehicles. These mitigation measures could also help to reduce the impact to freight vehicles.

\textsuperscript{293} Journeys of this type include deliveries, service calls, and other business-related trips.
\textsuperscript{294} It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
\textsuperscript{295} US Department of Transportation Crossing Inventory Information.
\textsuperscript{296} Washington State Freight Advisory Committee First Priority Railroad crossings. 
http://www.fmsib.wa.gov/fac/FACApril2014/Inventory%202014_0411.pdf
Stevens Pass (up to 9 trains per day)

City of Everett
Snohomish County

Demographic and Economic Overview

Everett is the largest city in Snohomish County and one of the major employment hubs of the central Puget Sound region. The median household income in Everett is nearly 30 percent lower than that of the four-county region, and median home prices are 19 percent lower than Snohomish County and 26 percent lower than the four-county region.

<table>
<thead>
<tr>
<th>Demographics of Everett, WA</th>
<th>Everett, WA</th>
<th>Snohomish County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>103,100</td>
<td>714,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$47,500</td>
<td>$68,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$251,200</td>
<td>$312,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>53,500</td>
<td>221,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$60,500</td>
<td>$47,000</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Thirty percent of employed Everett residents work within the city, with an additional 20 percent of residents commuting to Seattle, Bellevue, or Redmond.297 Seventy percent of employed residents travel to work via single-occupancy vehicle journeys, with 7 percent of residents using public transportation.298

Impacts to Everett (Snohomish County)

Impact location(s): The BNSF north-south main line and the Stevens Pass rail line both travel through Everett. There are seven at-grade crossings – three of which examined here on the Stevens Pass line – that could be impacted by increased rail traffic going to and from Gateway Pacific Terminal:

- Railway Avenue near Harrison Avenue
- Eclipse Mill Road and Chestnut Street
- Lenora Street and S 1st Avenue

Surrounding property type(s): Development near the at-grade crossings is primarily industrial with some commercial uses.

Freight classification: No crossings would be located on a classified freight route.

Vehicle traffic: In 2035, projections suggest the average daily vehicles at the Eclipse Mill Road crossing will reach 12,500. In 2035, the other two crossings are projected to experience average daily crossings of less than 4,000.

Train volume and gate-down time: There could be approximately 53 daily trains at the Lenora

297 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
298 Analysis of 2012 data from the American Community Survey.
Street crossing and approximately 73 daily trains at the remaining crossings. Nine of the daily trains at all of the crossings would be due to the operation of the proposed Gateway Pacific Terminal. The marginal increase in daily gate-down time from trains traveling to or from the terminal could be between approximately 33 minutes to 1 hour 40 minutes in 2035 (total daily gate-down time could be between approximately 1 hour and 3 hours 35 minutes).

**Emergency responders and hospitals:** There would be low impacts to emergency services.

**Environmental justice populations:** At the Eclipse Mill Road crossing there could be moderate disproportionate impacts to Environmental Justice populations. Near the crossing, 25 to 35 percent of residents would be below the poverty line and 10 to 20 percent of residents would be considered a minority.

The Lenora Street crossing is included in a grade separation project with construction to start in May of 2016. This project is funded in the City of Everett's 2013-2018 Transportation Improvement Program (TIP).

**Affected Grade Crossings for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the BNSF main line, which passes through eastern Everett, will carry trains traveling to and from the proposed terminal. As a result of prior investments in grade crossing eliminations at several locations in Everett, the aggregate impact of freight traffic on gate-down time on the BNSF main line has been minimized. This analysis instead considers the impact of the potential re-routing of eastbound empty coal train traffic associated with the Gateway Pacific Terminal across the Stevens Pass line, which intersects with the BNSF main line at a junction in Everett.

Three selected grade crossings on the Stevens Pass route in Everett would be affected by increased freight rail traffic if additional train traffic, such as empty rail cars returning from the terminal or other volume displaced by terminal-related traffic, is added to the line as a result of the Gateway Pacific Terminal. Two of these crossings were evaluated for economic impacts.299 The first crossing (Lowell-River Rd/Lenora Street & S 1st Ave) is located near an area of moderate residential development. The second (Pacific/Chestnut & Eclipse Mill Rd) is located in an industrial area near to the eastern bank of the Snohomish River. The locations of the crossings are shown in Figure 66 and a summary table of total vehicular traffic forecasted for 2035 can be found below.

### Grade Crossings Evaluated for Economic Impacts in Everett, WA

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Everett</td>
<td>Pacific/Chestnut &amp; Eclipse Mill Rd</td>
<td>12,446</td>
<td>12 percent</td>
<td>86 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Everett</td>
<td>Lowell-River Rd/Lenora Street &amp; S 1st Ave</td>
<td>3,323</td>
<td>9 percent</td>
<td>33 minutes</td>
</tr>
</tbody>
</table>

299 Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to nine trains per day to the Stevens Pass line in Everett. In 2035, this would represent up to 12 percent of total train traffic on the Stevens Pass line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Everett.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above two selected grade crossings that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $233,000.\(^3\)
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $80,000.\(^4\)
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal

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\(^3\) Journeys of this type include commuting, personal errands, and leisure travel.

\(^4\) Journeys of this type include deliveries, service calls, and other business-related trips.
project would result in an annual economic cost of up to $313,000 and an annual per-capita cost of approximately $3.00.

Effect of Increased Freight Train Traffic on Property Values

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the Stevens Pass Line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Everett, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $12.9 million to $18.1 million.
- In 2035, for nearby non-residential property in Everett, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $1.7 million.

Mitigation in Everett (Snohomish County)

The crossing included in the mitigation analysis in Everett on the Stevens Pass line has the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Characteristics in Everett</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossing Location</td>
</tr>
<tr>
<td>Pacific/Chestnut &amp; Eclipse Mill Rd</td>
</tr>
</tbody>
</table>

The Everett crossing is high performing, or would have low impact, as shown the table beginning on page 135. Other mitigation measures to reduce impacts from Gateway Pacific Terminal-related trains could include crossing improvements, such as signalization, pavement markings, and/or additional lighting. This could help to mitigate impacts to safety, accidents, and emergency response. The total number of impacted vehicles could also be reduced using these mitigation measures.

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302 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
303 US Department of Transportation Crossing Inventory Information.
Stevens Pass (up to 9 trains per day)

City of Snohomish
Snohomish County

Demographic and Economic Overview

Snohomish is a city in Snohomish County. The median household income in Snohomish is 20 percent lower than that of the four-county region, and median home prices are eight percent lower than Snohomish County and 15 percent lower than the four-county region.

Demographics of Snohomish, WA

<table>
<thead>
<tr>
<th></th>
<th>Snohomish, WA</th>
<th>Snohomish County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>9,200</td>
<td>714,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$54,000</td>
<td>$68,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$287,600</td>
<td>$312,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>4,800</td>
<td>221,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$30,300</td>
<td>$47,000</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Thirty percent of employed Snohomish residents commute to Seattle, Bellevue, or Redmond. Nearly eight in ten employed residents travel to work via single-occupancy vehicle journeys, with negligible use of public transportation.

Impacts to Snohomish (Snohomish County)

Impact location(s): One crossing on the Stevens Pass Line could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. This crossing is located on Airport Way and Lowell-Snohomish River Road.

Surrounding property type(s): Development near this crossing is primarily industrial and commercial.

Freight classification: The Snohomish crossing is located on a T3 freight route.

Vehicle traffic: By 2035, the average daily vehicle volume at the crossing is projected to be approximately 2,000 vehicles.

Train volume and gate-down time: In 2035, daily train volumes could be approximately 53 daily trains with 9 trains as a result of the operation of the proposed Gateway Pacific Terminal. Daily gate-down time could increase by approximately 30 minutes due to trains traveling to or from the terminal (a total daily gate-down time of approximately 1 hour 45 minutes).

Emergency responders and hospitals: Emergency services could be moderately impacted by terminal-related trains. There is a fire station located within one mile of the crossing.

Environmental justice populations: There would be a low disproportionate impact to environmental justice populations.

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304 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
305 Analysis of 2012 data from the American Community Survey.
**Affected Grade Crossing for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line will carry trains traveling to and from the proposed terminal. Under one alternative scenario, it is possible that a number of empty coal trains would be routed eastbound along the existing Stevens Pass Line, which runs parallel to the south bank of the Snohomish River and passes near to the city, rather than southbound along the BNSF main line.

One grade crossing in Snohomish would be affected by increased freight rail traffic if additional train traffic, such as empty rail cars returning from the terminal or other volume displaced by terminal-related traffic, is added to the line as a result of the Gateway Pacific Terminal. This crossing is an access road that links Snohomish with nearby Harvey Airfield.

The location of the crossing is shown in Figure 67, and total vehicular traffic forecasted for 2035 can be found in the table below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Snohomish</td>
<td>Airport Way &amp; Lowell Snohomish River Rd</td>
<td>1,960</td>
<td>9 percent</td>
<td>28 minutes</td>
</tr>
</tbody>
</table>

Figure 67: Location of Train Route, Grade Crossings, and 750-ft Buffer in Snohomish, WA

Source: ESRI

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306 Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to nine trains per day to the Stevens Pass line in Snohomish. In 2035, this would represent up to 17 percent of train traffic on the Stevens Pass line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Snohomish.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above grade crossing that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $4,000.\(^{307}\)
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $1,000.\(^{308}\)
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $5,000 and an annual per-capita cost of less than $1.00.

Effect of Increased Freight Train Traffic on Property Values\(^{309}\)

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the Stevens Pass Line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Snohomish, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $1 million to $1.3 million.
- In 2035, for nearby non-residential property in Snohomish, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal would have a negligible impact on non-residential property values.

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307 Journeys of this type include commuting, personal errands, and leisure travel.
308 Journeys of this type include deliveries, service calls, and other business-related trips.
309 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
**Mitigation in Snohomish (Snohomish County)**

The crossing included in the mitigation analysis in Snohomish on the Stevens Pass Line has the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Way &amp; Lowell</td>
<td>No</td>
<td>No</td>
<td>1</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Snohomish River Rd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The crossing in Snohomish would have a low impact (see table beginning on page 135) but was identified by the Washington State Freight Advisory Committee as an emerging crossing that will need to be addressed.\(^{311}\) Interim mitigation measures could include crossing improvements, such as signalization, and/or additional street lighting, as well as signal timing optimization and/or ITS. This could help to alleviate impacts to safety, emergency response, and accidents, and could help to reduce the total number of impacted vehicles.

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310 US Department of Transportation Crossing Inventory Information.
311 Washington State Freight Advisory Committee First Priority Railroad Crossings
http://www.fmsib.wa.gov/fac/FACApril2014/Inventory%202014_0411.pdf
Stevens Pass (up to 9 trains per day)

City of Monroe
Snohomish County

Demographic and Economic Overview

Monroe is a city in Snohomish County. The median household income in Monroe is 5 percent higher than that of the four-county region, although median home prices are 13 percent lower than Snohomish County and 20 percent lower than the four-county region.

<table>
<thead>
<tr>
<th>Demographics of Monroe, WA</th>
<th>Monroe, WA</th>
<th>Snohomish County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>17,200</td>
<td>714,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$70,300</td>
<td>$68,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$270,500</td>
<td>$312,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>8,000</td>
<td>221,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$32,200</td>
<td>$47,000</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Twenty three percent of employed Monroe residents commute to work in Seattle or Bellevue. Nearly eight in ten employed residents travel to work via single-occupancy vehicle journeys, with negligible use of public transportation.

Impacts to Monroe (Snohomish County)

Impact location(s): Five crossings in Monroe could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. Monroe at-grade crossings are located on the Stevens Pass line at:

- SE Fryelands Boulevard and Stevens Pass Highway
- 179th Avenue SE and Stevens Pass Highway
- N Kelsey Street and Blueberry Lane
- SR 203 and E Stretch Street
- E Main Street and Butler Street

Surrounding property type(s): Development near four of the crossings is primarily commercial and industrial. One remaining crossing is located in an open space area.

Freight classification: The E Main Street crossing is located on a T3 freight route, which could impact freight mobility if freight trucks were delayed while trains crossed.

Vehicle traffic: By 2035, the crossings at SR 203 and E Main Street are predicted to have an average daily vehicle volume of approximately 12,500 to 18,000 vehicles. The crossings on SE Fryelands Boulevard, 179th Avenue SE, and N Kelsey Street could have average daily vehicle volumes between approximately 3,000 and 6,500 vehicles. The average daily traffic volumes at

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312 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
313 Analysis of 2012 data from the American Community Survey.
314 179th Avenue SE and Stevens Pass Highway; N Kelsey Street and Blueberry Lane; SR 203/Lewis Street and E Stretch Street; E Main Street and Butler Street.
the remaining four crossings could be below 250 vehicles.

*Train volume and gate-down time:* In 2035, daily train volumes in Monroe could increase by 9 trains to approximately 53 daily trains as a result of the proposed Gateway Pacific Terminal operation. This could result in a marginal increase of approximately 30 minutes in daily gate-down time (approximately 1 hour 45 minutes to 2 hours of total daily gate-down time).

*Emergency responders and hospitals:* Emergency services could also be highly impacted at the 179th Avenue SE crossing because there is a hospital located within near proximity to the crossing.

*Environmental justice populations:* There would be a very low disproportionate impact to environmental justice populations in Monroe.

Other communities along the Stevens Pass route could have similar impacts due to increased freight rail traffic related to the operation of the proposed Gateway Pacific Terminal.

**Affected Grade Crossing for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the BNSF main line will carry trains traveling to and from the proposed terminal. Under one alternative scenario, it is possible that a number of empty coal trains would be routed eastbound along the existing Stevens Pass Line, which runs parallel to Highway 2 and intersects with State Road 203, rather than southbound along the BNSF main line.

Five grade crossings in Monroe would be affected by increased freight rail traffic if additional train traffic, such as empty rail cars returning from the terminal or other volume displaced by terminal-related traffic, is added to the line as a result of the Gateway Pacific Terminal. Of these, one selected crossing was evaluated for economic impacts. This crossing is in close proximity to Main Street, the city’s main commercial thoroughfare. The location of the crossing is shown in Figure 68 and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monroe</td>
<td>SR203-Lewis St &amp; E Stretch St</td>
<td>17,886</td>
<td>9 percent</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

315 Further information on the criteria used to select grade crossings for evaluation of economic impacts can be found in the methodology at the beginning of this chapter.
Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to nine trains per day to the Stevens Pass line in Monroe. In 2035, this would represent up to 17 percent of train traffic on the Stevens Pass line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Monroe.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above selected grade crossing that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $41,000.\(^{316}\)
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $10,000.\(^{317}\)

\(^{316}\) Journeys of this type include commuting, personal errands, and leisure travel.

\(^{317}\) Journeys of this type include deliveries, service calls, and other business-related trips.
In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $51,000 and an annual per-capita cost of approximately $3.00.

**Effect of Increased Freight Train Traffic on Property Values**

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the Stevens Pass Line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Monroe, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $12.1 million to $17 million.
- In 2035, for nearby non-residential property in Monroe, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of non-residential property by approximately $6.2 million.

**Mitigation in Monroe (Snohomish County)**

The selected crossings included in the mitigation analysis in Monroe on the Stampede Pass Line have the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR203-Lewis St &amp; E Stretch St</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>E Main St &amp; Butler St</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines and railroad crossing symbols</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

The SR 203/Lewis Street crossing would be a low impact crossing (see table beginning on page 135) but has been identified by the Washington State Freight Advisory Committee as an emerging crossing that will need to be addressed. The Main Street crossing would have a moderate impact, as shown in the table beginning on page 135. Other mitigation measures at these crossings could include crossing improvements, such as signalization and/or additional street lighting. ITS and signal timing optimization could also be used to mitigate impacts to safety, emergency response, and freight movements. These measures could also reduce the total number of impacted vehicles.

Mitigation measures in other communities along the Stevens Pass line would be similar to those identified in Monroe.

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318 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
319 US Department of Transportation Crossing Inventory Information.
Covington
Stampede Pass (up to 9 trains per day)

City of Covington
King County

The Stampede Pass line, a proposed alternate route for eastbound empty trains, passes near the City of Covington.

Stampede Pass Impacts to Covington (King County)

Impact location(s): One crossing on the Stampede Pass line through Covington could be impacted by Gateway Pacific Terminal trains. This crossing is located at Covington Way SE near 164th Place SE.

Surrounding property type(s): This crossing is primarily surrounded by open space.

Freight classification: The Covington Way S crossing is located on a T3 route.

Vehicle traffic: In 2035, it is predicted that there could be approximately 2,580 daily vehicles traveling over the crossing.

Train volume and gate-down time: In 2035, this crossing could increase by 9 Gateway Pacific Terminal trains to a total of 22 daily trains. Gate-down time could increase by approximately 33 minutes due to the proposed terminal (resulting in approximately 1 hour of total daily gate-down time).

Emergency responders and hospitals: There could be a medium impact from terminal-related trains to emergency response at this crossing, due to its location near two fire stations.

Environmental justice populations: Impacts to environmental justice populations would be low.

Grade Crossing Evaluated for Economic Impacts on Stampede Pass Line in Covington, WA

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kent</td>
<td>Covington Way S</td>
<td>2,580</td>
<td>5 percent</td>
<td>33 minutes</td>
</tr>
</tbody>
</table>

Stampede Pass Mitigation in Covington (King County)

The crossing included in the mitigation analysis in Covington on the Stampede Pass Line has the following characteristics:
Crossing Characteristics in Covington (Stampede Pass)

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covington Way S near 164th Place SE</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
<td>Yes, stop lines</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The Covington Way S crossing has been identified by the Washington State Freight Advisory Committee as an emerging crossing that will need to be addressed. Interim mitigation measures could include crossing improvements, such as signalization and/or additional street lighting. ITS and signal timing optimization could also be used to mitigate impacts to safety and emergency response.

Economic Impact of Increased Gate-down Time - Stampede Pass Line

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above five grade crossings that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $8,000.
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $1,000.
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $9,000 and an annual per-capita cost of less than $1.00.

Effect of Increased Freight Train Traffic on Property Values - Stampede Pass Line

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the BNSF main line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Covington, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the increase in train

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320 US Department of Transportation Crossing Inventory Information
322 Journeys of this type include commuting, personal errands, and leisure travel.
323 Journeys of this type include deliveries, service calls, and other business-related trips.
traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $6 million to $8 million.

- In 2035, for nearby non-residential property in Covington, a high-level analysis of aggregate real estate data suggests that the increase in train traffic attributable to the Gateway Pacific Terminal would have a negligible effect on non-residential property values.
Maple Valley
City of Maple Valley
King County

Demographic and Economic Overview

Maple Valley is a city in King County. The City’s median household income is 48 percent higher than that of the four-county region, and median home prices are 18 percent lower than the average for King County and 6 percent lower than the average for the four-county region.

<table>
<thead>
<tr>
<th>Demographics of Maple Valley, WA</th>
<th>Maple Valley, WA</th>
<th>King County</th>
<th>PSRC Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2012)</td>
<td>22,700</td>
<td>1,941,000</td>
<td>3,705,000</td>
</tr>
<tr>
<td>Median HH Income (2012)</td>
<td>$99,000</td>
<td>$71,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>Median Home Value (2012)</td>
<td>$320,000</td>
<td>$389,000</td>
<td>$339,000</td>
</tr>
<tr>
<td>Employment (2013)</td>
<td>3,000</td>
<td>925,000</td>
<td>1,490,000</td>
</tr>
<tr>
<td>Average Wage (2008)</td>
<td>$37,000</td>
<td>$58,700</td>
<td>$53,000</td>
</tr>
</tbody>
</table>

Source: 2012 American Community Survey, ESRI Business Analyst, PSRC

Nearly one-third of employed Maple Valley residents work in Seattle or Bellevue. Eighty percent of employed residents travel to work via single-occupancy vehicle journeys, and few residents use public transportation.

Impacts to Maple Valley (King County)

Impact location(s): One at-grade crossing in Maple Valley could be impacted by increased rail traffic going to and from Gateway Pacific Terminal. This crossing is located on the Stampede Pass line at 216th Avenue SE and SE 283rd Street.

Surrounding property type(s): The crossing is located near residential and open space development.

Freight classification: This crossing is located on a T3 freight route.

Vehicle traffic: By 2035, the average daily traffic volume at the crossing is predicted to be approximately 1,200 vehicles.

Train volume and gate-down time: In 2035, the proposed terminal could add 9 train movements per day for a total of 22 daily trains at crossings on the Stampede Pass route. The daily gate-down time could increase by approximately 30 minutes due to the proposed terminal (for a total of approximately 1 hour of daily gate-down time).

Emergency responders and hospitals: There could be a moderate impact to emergency services because there are two fire stations located within one mile of the crossing.

Environmental justice populations: Impacts to environmental justice populations would be low.

Other communities along the Stampede Pass route could have similar impacts from increased train movements resulting from the operation of the proposed terminal.

324 Analysis of 2011 data from the Longitudinal Employer-Household Dynamics (LEHD) survey conducted by the U.S. Census Bureau.
325 Analysis of 2012 data from the American Community Survey.
**Affected Grade Crossing for Economic Analysis**

The precise route for Gateway Pacific Terminal-bound rail traffic is unknown, but it is likely that the existing BNSF main line will carry trains traveling to and from the proposed terminal. Under one alternative scenario, it is possible that a number of empty coal trains would be routed eastbound along the existing Stampede Pass Line, which passes through a residential area located in the south of Maple Valley, rather than southbound along the BNSF main line.

One grade crossing in Maple Valley would be affected by increased freight rail traffic if additional train traffic, such as empty rail cars returning from the terminal or other volume displaced by terminal-related traffic, is added to the line as a result of the Gateway Pacific Terminal. This crossing is on a secondary route which passes through an area of residential development.

The location of the crossing is shown in Figure 69, and a summary table of total vehicular traffic forecasted for 2035 can be found below.

<table>
<thead>
<tr>
<th>Crossing</th>
<th>City</th>
<th>Cross Streets</th>
<th>Est. Daily Traffic Volume (2035)</th>
<th>Trucks as percent of Daily Traffic Volume</th>
<th>Daily Increase in Gate Down Time from Gateway Pacific Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maple Valley</td>
<td>216th Ave SE &amp; SE 283rd St</td>
<td>1,209</td>
<td>5 percent</td>
<td>33 minutes</td>
</tr>
</tbody>
</table>


Impact of Gateway Pacific Terminal Project

The project information document indicates that upon full build out, the operation of Gateway Pacific Terminal could add up to nine trains per day to the Stampede Pass line in Maple Valley. In 2035, this would represent up to 41 percent of all train traffic on the Stampede Pass line for this community. Increased gate-down time and lowered property values are among the likely costs that may result from the increase in freight train traffic due to the project in the central Puget Sound region and in Maple Valley.

Economic Impact of Increased Gate-down Time

Using the methodology described at the beginning of this chapter, the project team estimated the high-level economic impacts of increased gate-down time at the above grade crossing that would result from additional Gateway Pacific Terminal-related train traffic by calculating the aggregate value of lost time resulting from increased vehicle delay for personal and commercial
journeys. All estimates are in 2013 dollars.

- In 2035, increased vehicular delay to personal journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $4,000.  
- In 2035, increased vehicular delay to commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in a negligible annual economic cost.
- In 2035, the combined economic costs of increased vehicular delay to personal and commercial journeys from train traffic attributable to the Gateway Pacific Terminal project would result in an annual economic cost of up to $4,000 and an annual per-capita cost of less than $1.00.

**Effect of Increased Freight Train Traffic on Property Values**

Using the methodology described at the beginning of this chapter, the project team estimated the aggregate marginal impact of increased Gateway Pacific Terminal-related freight train traffic on residential and non-residential property in the vicinity of the Stampede Pass Line. All estimates are in 2013 dollars.

- In 2035, for nearby residential property in Maple Valley, an analysis of aggregate American Community Survey and U.S. Census Bureau data suggests that the marginal increase in train traffic attributable to the Gateway Pacific Terminal could reduce the value of residential property by approximately $18 million to $25 million.
- In 2035, for nearby non-residential property in Maple Valley, a high-level analysis of aggregate real estate data suggests that the marginal increase in train traffic attributable to the Gateway Pacific Terminal would have a negligible effect on non-residential property values.

**Mitigation in Maple Valley (King County)**

The crossing included in the mitigation analysis in Maple Valley on the Stampede Pass Line has the following characteristics:

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Signalized Street</th>
<th>Stop Signs</th>
<th>Crossbucks</th>
<th>Advanced Warning</th>
<th>Pavement Markings</th>
<th>Gates</th>
<th>Mast Mounted Flashing Lights</th>
<th>Cantilevered Flashing Lights</th>
<th>Bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>216th Ave SE &amp; SE 283rd St</td>
<td>No</td>
<td>No</td>
<td>0</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The Maple Valley crossing would have a low impact, as shown the table beginning on page 135. Other mitigation measures could include crossing improvements, such as pavement markings and/or crossbuck signs to mitigate safety impacts. Currently there are few alternate routes over the rail line in the immediate area so ITS and signal timing optimization would not be likely mitigation measures to reduce impacts to emergency services or freight truck movements.

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326 Journeys of this type include commuting, personal errands, and leisure travel.
327 Journeys of this type include deliveries, service calls, and other business-related trips.
328 It is critical to note that this analysis does not include potential offsetting property value gains discussed in the Land Use section of this report.
329 US Department of Transportation Crossing Inventory Information.
Appendices
Appendix A – Stakeholder Outreach

The PFM Team conducted a series of interviews and meetings with various stakeholders:

- City of Edmonds
- City of Marysville
- City of Seattle
- King County
- Pierce County
- Port of Seattle
- Port of Tacoma
- Washington State Department of Transportation
- Boeing
- Washington State University Freight Policy Transportation Institute
- Washington AFL-CIO
- BNSF
## Appendix B – Methodology

### Gate Down Time and Traffic Methodology

<table>
<thead>
<tr>
<th>Measure</th>
<th>Data Source</th>
<th>Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Crossing Speed</td>
<td>US DOT Crossing Inventory Information</td>
<td>A compound growth rate of 1% was applied to the ADT to adjust to years 2014 and 2035</td>
</tr>
<tr>
<td>Average Daily Traffic</td>
<td>US DOT Crossing Inventory Information</td>
<td>ál</td>
</tr>
<tr>
<td>Average Daily Traffic Year</td>
<td>US DOT Crossing Inventory Information</td>
<td>ál</td>
</tr>
<tr>
<td>Truck Trips</td>
<td>US DOT Crossing Inventory Information</td>
<td>ál</td>
</tr>
<tr>
<td>Collisions</td>
<td>FRA Accident/Incident Report</td>
<td>ál</td>
</tr>
<tr>
<td>Freight Volumes 2010, 2035</td>
<td>WSDOT State Rail Plan 2013-2035</td>
<td>ál</td>
</tr>
<tr>
<td>Passenger Train Volumes 2010, 2035</td>
<td>WSDOT State Rail Plan 2013-2035</td>
<td>ál</td>
</tr>
<tr>
<td>Train Volumes 2015,2035</td>
<td>Gateway Pacific Terminal Project Information Document</td>
<td>ál</td>
</tr>
<tr>
<td>Assumed Passenger Train Length</td>
<td>Sounder Locomotive Information</td>
<td>ál</td>
</tr>
<tr>
<td>Assumed Freight Train Length</td>
<td>BNSF Railway Customer Equipment Information</td>
<td>Average of all equipment lengths multiplied by the average length of trains recorded in the SDOT Train Traffic Impact Study</td>
</tr>
<tr>
<td>Assumed Train Length</td>
<td>Gateway Pacific Terminal Project Information Document</td>
<td>ál</td>
</tr>
</tbody>
</table>

2014 Gate Down Time w/o New Train Volumes: 2010 Passenger and Freight Train volumes multiplied by time in crossing (assumed 50 foot crossing width + assumed train width/75% of max train speed + 30 seconds of lead and lag time)

2035 Gate Down Time w/o New Train Volumes: 2035 Passenger and Freight Train volumes multiplied by time in crossing (assumed 50 foot crossing width + assumed train width/75% of max train speed + 30 seconds of lead and lag time)

2035 Gate Down Time w/ New Train Volumes: 2035 Passenger and Freight Train volumes multiplied by time in crossing (assumed 50 foot crossing width + assumed train width/75% of max train speed + 30 seconds of lead and lag time) + Train volumes multiplied by time in crossing (assumed 50 foot crossing width + assumed train width/75% of max train speed + 30 seconds of lead and lag time)
Daily gate-down time is dependent on the length of train, how fast it is travelling, and how many daily trains are scheduled. Several assumptions were made to calculate daily gate-down time at regional at-grade crossings:

- Future (2035) freight and passenger rail volumes were collected from the Washington State Rail Plan 2013-2035. Train volumes related to the proposed terminal for 2035 were assumed to be consistent with the Gateway Pacific Terminal Project Information Document.
- Freight trains were assumed to be approximately 4,200 feet long. Average equipment length was collected from BNSF and number of cars was assumed to be consistent with crossing data collected in the SDOT Coal Train Traffic Impacts Study 2012.
- Passenger train length was assumed to be 400 feet. This was consistent with Sounder and Amtrak train equipment information.
- Gateway Pacific Terminal Trains were assumed to be 8,448 feet long in 2035, consistent with the Gateway Pacific Terminal Project Information Document.
- It was assumed that trains would operate at 75 percent of the maximum speed allowable at the at-grade crossing.
- Crossing widths were assumed to be 50 feet.
- It was assumed that there would be a lead and lag time for gate-down time before trains enter and after trains exit the crossing. Lead time was assumed to be 20 seconds and lag time was assumed to be 10 seconds.
- Time in crossing was calculated by dividing the sum of the train and crossing length by the train speed (75% max speed of crossing) and adding 30 seconds of lead/lag time. To calculate daily gate-down time, the passenger, freight and Gateway Pacific Terminal train volumes at each crossing were multiplied by the time in crossing (unique to train type) and summed.
## Puget Sound Regional At-Grade Crossings

<table>
<thead>
<tr>
<th>USDOT Crossing Number</th>
<th>City</th>
<th>Cross Streets</th>
<th>2035 Maximum Daily Train Volumes (Gateway Pacific Terminal Trains/Total Trains)</th>
<th>2035 Daily Delay/Gate Down Time with Gateway Pacific Terminal trains(min)</th>
<th>2035 Marginal Increase in Daily Delay/Gate Down Time from Gateway Pacific Terminal trains (min)</th>
<th>2035 Marginal Percent Increase in Gate Down Time from Gateway Pacific Terminal</th>
<th>Freight Class</th>
<th>Impact to Emergency Services</th>
<th>Accidents / Yr</th>
<th>Impacts to Environmental Justice</th>
<th>High Pedestrian Activity Area</th>
<th>Crossing Identified for Future Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>084678C</td>
<td>Stanwood</td>
<td>271st St NW &amp; Marine Drive</td>
<td>10,483</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>X</td>
<td>High</td>
<td>0.13</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>084669E</td>
<td>Marysville</td>
<td>172 St NE/SR531 &amp; 19th Drive NE</td>
<td>21,161</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>T3</td>
<td>Low Direct</td>
<td>0.05</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084658S</td>
<td>Marysville</td>
<td>124th St NE &amp; Old Hwy 99</td>
<td>N/A</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>084657K</td>
<td>Marysville</td>
<td>122nd St NE &amp; Old Hwy 99</td>
<td>732</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.14</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084654P</td>
<td>Marysville</td>
<td>116th St NE &amp; Smokey Pt Blvd</td>
<td>25,966</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>X</td>
<td>Medium</td>
<td>0.00</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084653H</td>
<td>Marysville</td>
<td>104th St NE &amp; 42nd Ave NE</td>
<td>1,643</td>
<td>68</td>
<td>38</td>
<td>128%</td>
<td>X</td>
<td>Medium</td>
<td>0.08</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084650M</td>
<td>Marysville</td>
<td>88th St NE &amp; Old Hwy 99</td>
<td>38,742</td>
<td>95</td>
<td>55</td>
<td>138%</td>
<td>T3</td>
<td>Low Direct</td>
<td>0.14</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084646X</td>
<td>Marysville</td>
<td>Great St b/w Cedar Ave &amp; State Ave</td>
<td>11,019</td>
<td>95</td>
<td>55</td>
<td>138%</td>
<td>T4</td>
<td>High</td>
<td>0.03</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084644J</td>
<td>Marysville</td>
<td>Eighth St b/w Cedar Ave &amp; Delta Ave</td>
<td>3,674</td>
<td>95</td>
<td>55</td>
<td>138%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084640G</td>
<td>Marysville</td>
<td>SR528-4th Ave &amp; Cedar Ave</td>
<td>36,526</td>
<td>145</td>
<td>86</td>
<td>147%</td>
<td>T3</td>
<td>High</td>
<td>0.09</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>084630B</td>
<td>Marysville</td>
<td>1st St &amp; Cedar Ave</td>
<td>5,246</td>
<td>145</td>
<td>86</td>
<td>147%</td>
<td>T4</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085452V</td>
<td>Mukilteo</td>
<td>Mukilteo Lane</td>
<td>489</td>
<td>143</td>
<td>51</td>
<td>55%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.10</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085445K</td>
<td>Edmonds</td>
<td>SR104/Main St &amp; Railroad Ave, Edmonds</td>
<td>7,742</td>
<td>135</td>
<td>48</td>
<td>55%</td>
<td>T3</td>
<td>Low Indirect</td>
<td>0.46</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085439G</td>
<td>Edmonds</td>
<td>Dayton St &amp; Railroad Ave, Edmonds</td>
<td>12,940</td>
<td>135</td>
<td>48</td>
<td>55%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.26</td>
<td>Low</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085414L</td>
<td>Seattle</td>
<td>Broad St &amp; Alaskan Way</td>
<td>11,528</td>
<td>229</td>
<td>86</td>
<td>61%</td>
<td>T2</td>
<td>Low Indirect</td>
<td>0.28</td>
<td>Medium</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>085413E</td>
<td>Seattle</td>
<td>Clay St &amp; Alaskan Way</td>
<td>1,697</td>
<td>229</td>
<td>86</td>
<td>61%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.09</td>
<td>Medium</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>085411R</td>
<td>Seattle</td>
<td>Vine St &amp; Alaskan Way</td>
<td>1,099</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.05</td>
<td>Medium</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>085410J</td>
<td>Seattle</td>
<td>Wall St &amp; Alaskan Way</td>
<td>4,767</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.36</td>
<td>Medium</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>085583Y</td>
<td>Seattle</td>
<td>S Holgate near Third Ave</td>
<td>8,961</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>T3</td>
<td>Medium</td>
<td>0.20</td>
<td>High</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085584F</td>
<td>Seattle</td>
<td>S Lander/3rd near Occidental Ave</td>
<td>18,420</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>T3</td>
<td>Medium</td>
<td>0.60</td>
<td>High</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085585M</td>
<td>Seattle</td>
<td>Horton St So &amp; 2nd Ave S</td>
<td>4,456</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>X</td>
<td>High</td>
<td>0.00</td>
<td>High</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085586U</td>
<td>Seattle</td>
<td>Spokane St WB &amp; 2nd Ave S</td>
<td>7,014</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>T1</td>
<td>Medium</td>
<td>0.31</td>
<td>High</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085587B</td>
<td>Seattle</td>
<td>S Spokane St EB &amp; 2nd Ave S</td>
<td>10,122</td>
<td>156</td>
<td>55</td>
<td>55%</td>
<td>X</td>
<td>Medium</td>
<td>0.31</td>
<td>High</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085625H</td>
<td>Kent</td>
<td>S 212th St &amp; 77th Ave S</td>
<td>32,446</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>T2</td>
<td>Medium</td>
<td>0.13</td>
<td>High</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>085629K</td>
<td>Kent</td>
<td>W James St &amp; 1st Ave N</td>
<td>22,956</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.19</td>
<td>High</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>085633A</td>
<td>Kent</td>
<td>West Smith St &amp; 1st Ave N</td>
<td>18,980</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.39</td>
<td>Medium</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>085634E</td>
<td>Kent</td>
<td>Meeker St &amp; Railroad Ave N</td>
<td>6,284</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Direct</td>
<td>0.04</td>
<td>Medium</td>
<td>X</td>
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</tr>
<tr>
<td>085637C</td>
<td>Kent</td>
<td>Gow St &amp; Railroad Ave N</td>
<td>5,027</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Direct</td>
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<td>Medium</td>
<td>X</td>
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</tr>
<tr>
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<td>Kent</td>
<td>Titus St &amp; Railroad Ave S</td>
<td>2,206</td>
<td>116</td>
<td>38</td>
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<td>X</td>
<td>Medium</td>
<td>0.07</td>
<td>Medium</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>USDOT Crossing Number</td>
<td>City</td>
<td>Cross Streets</td>
<td>2035 Average Daily Traffic Volume</td>
<td>2035 Maximum Daily Train Volumes (Gateway Pacific Terminal Trains/Total Trains)</td>
<td>2035 Daily Delay/Gate Down Time with Gateway Pacific Terminal Trains(min)</td>
<td>2035 Marginal Increase in Daily Delay/Gate Down Time from Gateway Pacific Terminal Trains (min)</td>
<td>2035 Marginal Percent Increase in Gate Down Time from Gateway Pacific Terminal</td>
<td>Freight Class</td>
<td>Impact to Emergency Services</td>
<td>Accidents / Yr</td>
<td>Impacts to Environmental Justice</td>
<td>High Pedestrian Activity Area</td>
</tr>
<tr>
<td>----------------------</td>
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<td>-------------------------------------------------</td>
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<tr>
<td>085640K</td>
<td>Kent</td>
<td>SR516-Willis St &amp; Railroad Ave S</td>
<td>25,905</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>T2</td>
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<td>Medium</td>
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</tr>
<tr>
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<td>Kent</td>
<td>So 259th St &amp; 1st Ave S</td>
<td>2,776</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>T3</td>
<td>High</td>
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<tr>
<td>085647H</td>
<td>Auburn</td>
<td>37th St NW near B St NW</td>
<td>7,602</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.10</td>
<td>Medium</td>
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</tr>
<tr>
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<td>29th St NW &amp; B St NW</td>
<td>660</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
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<td>X</td>
<td>Low Indirect</td>
<td>0.15</td>
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</tr>
<tr>
<td>085652E</td>
<td>Auburn</td>
<td>3rd St NW &amp; C St NW</td>
<td>7,555</td>
<td>18/95</td>
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<td>38</td>
<td>49%</td>
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<td>Medium</td>
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<tr>
<td>085655A</td>
<td>Auburn</td>
<td>Main St West &amp; 1st St NW</td>
<td>10,258</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>High</td>
<td>0.16</td>
<td>Medium</td>
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<tr>
<td>085675L</td>
<td>Sumner</td>
<td>24th St SE near E Valley Hwy E</td>
<td>15</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>101387L</td>
<td>Sumner</td>
<td>Puyallup St near E Valley Hwy E</td>
<td>3,369</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>T3</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085680H</td>
<td>Sumner</td>
<td>Zehnder Rd &amp; Pease Ave</td>
<td>4,242</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>Low Direct</td>
<td>0.24</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085683D</td>
<td>Sumner</td>
<td>Main St near Fryar Ave</td>
<td>6,636</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>High</td>
<td>0.19</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>085685S</td>
<td>Sumner</td>
<td>Maple St &amp; Traffic St</td>
<td>3,956</td>
<td>18/95</td>
<td>116</td>
<td>38</td>
<td>49%</td>
<td>X</td>
<td>High</td>
<td>0.12</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085691V</td>
<td>Puyallup</td>
<td>15th St SE &amp; E Pioneer Ave</td>
<td>15,101</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.19</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>085694R</td>
<td>Puyallup</td>
<td>5th St SE &amp; Spring St</td>
<td>13,251</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.10</td>
<td>Low</td>
<td>X</td>
</tr>
<tr>
<td>085695X</td>
<td>Puyallup</td>
<td>3rd St SE &amp; E Main Ave</td>
<td>17,370</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.00</td>
<td>Low</td>
<td>X</td>
</tr>
<tr>
<td>085696E</td>
<td>Puyallup</td>
<td>Meridian St &amp; W Stewart Ave</td>
<td>14,763</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.31</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>085699A</td>
<td>Puyallup</td>
<td>5th St NW &amp; W Stewart Ave</td>
<td>14,631</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.11</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>085700S</td>
<td>Puyallup</td>
<td>7th St NW &amp; W Stewart Ave</td>
<td>1,422</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>High</td>
<td>0.08</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085701Y</td>
<td>Puyallup</td>
<td>12th St NW &amp; W Stewart Ave</td>
<td>7,100</td>
<td>18/80</td>
<td>97</td>
<td>38</td>
<td>66%</td>
<td>X</td>
<td>Medium</td>
<td>0.21</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085742D</td>
<td>Tacoma</td>
<td>Sixth Ave &amp; S Seashore Drive</td>
<td>2,918</td>
<td>18/80</td>
<td>126</td>
<td>54</td>
<td>74%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.24</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085730J</td>
<td>Tacoma</td>
<td>McCarver St &amp; Ruston Way</td>
<td>6,440</td>
<td>18/80</td>
<td>118</td>
<td>50</td>
<td>72%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.17</td>
<td>Low</td>
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</tr>
<tr>
<td>085743K</td>
<td>Tacoma</td>
<td>S 19th St West &amp; Wilton Rd</td>
<td>10,774</td>
<td>18/80</td>
<td>107</td>
<td>44</td>
<td>69%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.11</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085755E</td>
<td>Steliacco m</td>
<td>Union Ave near Commercial St</td>
<td>777</td>
<td>18/103</td>
<td>191</td>
<td>55</td>
<td>41%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.14</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>084992M</td>
<td>Everett</td>
<td>Railway Avenue near Harrison Ave</td>
<td>1,528</td>
<td>9/73</td>
<td>215</td>
<td>102</td>
<td>31%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.18</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084605T</td>
<td>Everett</td>
<td>Pacific/Chestnut &amp; Eclipse Mill Rd</td>
<td>12,446</td>
<td>9/73</td>
<td>186</td>
<td>86</td>
<td>30%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.03</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>084594H</td>
<td>Everett</td>
<td>Lowell-River Rd/Lenora Street &amp; S 1st Ave</td>
<td>3,323</td>
<td>9/53</td>
<td>123</td>
<td>33</td>
<td>37%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.11</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084577S</td>
<td>Snohomis h</td>
<td>Airport Way &amp; Lowell Snohomish River Rd</td>
<td>1,960</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>T3</td>
<td>Medium</td>
<td>0.09</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>084571B</td>
<td>Monroe</td>
<td>SE Fryelands Blvd &amp; Stevens Pass Hwy</td>
<td>6,476</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
<td>37%</td>
<td>X</td>
<td>Low Direct</td>
<td>0.09</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>084570U</td>
<td>Monroe</td>
<td>179th Ave SE &amp; Stevens Pass Hwy</td>
<td>3,547</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
<td>37%</td>
<td>X</td>
<td>High</td>
<td>0.04</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084565X</td>
<td>Monroe</td>
<td>N Kelsey St &amp; Blueberry Ln</td>
<td>2,902</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
<td>37%</td>
<td>X</td>
<td>Medium</td>
<td>0.17</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>USDOT Crossing Number</td>
<td>City</td>
<td>Cross Streets</td>
<td>2035 Average Daily Traffic Volume</td>
<td>2035 Maximum Daily Train Volumes (Gateway Pacific Terminal Trains/Total Trains)</td>
<td>2035 Daily Delay/Gate Down Time with Gateway Pacific Terminal trains (min)</td>
<td>2035 Marginal Increase in Daily Delay/Gate Down Time from Gateway Pacific Terminal trains (min)</td>
<td>2035 Marginal Percent Increase in Gate Down Time from Gateway Pacific Terminal</td>
<td>Freight Class</td>
<td>Impact to Emergency Services</td>
<td>Accidents / Yr</td>
<td>Impacts to Environmental Justice</td>
<td>Impacts to High Pedestrian Activity Area</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>---------------------------------------------------------------------------------</td>
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<td>----------------------</td>
</tr>
<tr>
<td>084564R</td>
<td>Monroe</td>
<td>SR203-Lewis St &amp; E Stretch St</td>
<td>17,866</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
<td>37%</td>
<td>X</td>
<td>Medium</td>
<td>0.06</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>084560N</td>
<td>Monroe</td>
<td>E Main St &amp; Butler St</td>
<td>12,575</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
<td>37%</td>
<td>T3</td>
<td>Low Direct</td>
<td>0.17</td>
<td>Low</td>
<td>Y</td>
</tr>
<tr>
<td>084557F</td>
<td>Unincorporated</td>
<td>Sofie Rd West &amp; 227th Ave SE</td>
<td>244</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.09</td>
<td>None</td>
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</tr>
<tr>
<td>084556Y</td>
<td>Unincorporated</td>
<td>Sofie Rd East &amp; Stevens Pass Hwy</td>
<td>244</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.03</td>
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</tr>
<tr>
<td>084553D</td>
<td>Unincorporated</td>
<td>Fern Bluff Rd W &amp; 161st St SE</td>
<td>111</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.04</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084552W</td>
<td>Sultan</td>
<td>Fern Bluff Rd E &amp; Old Owen Rd</td>
<td>228</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>X</td>
<td>Medium</td>
<td>0.07</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084549N</td>
<td>Sultan</td>
<td>5th Street &amp; Stevens Pass Hwy</td>
<td>239</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>X</td>
<td>High</td>
<td>0.05</td>
<td>Low</td>
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</tr>
<tr>
<td>084547A</td>
<td>Sultan</td>
<td>10th St near Dyer Rd</td>
<td>192</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>X</td>
<td>Medium</td>
<td>0.07</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084546T</td>
<td>Sultan</td>
<td>Foundry Drive/Skywall Drive &amp; S Sultan Basin Rd</td>
<td>160</td>
<td>9/53</td>
<td>86</td>
<td>22</td>
<td>35%</td>
<td>X</td>
<td>Low Direct</td>
<td>0.00</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084544E</td>
<td>Unincorporated</td>
<td>Reese Rd &amp; 147th St SE</td>
<td>391</td>
<td>9/53</td>
<td>86</td>
<td>22</td>
<td>35%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084543X</td>
<td>Unincorporated</td>
<td>363rd SE at Reese Rd</td>
<td>128</td>
<td>9/53</td>
<td>86</td>
<td>22</td>
<td>35%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.03</td>
<td>Low</td>
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</tr>
<tr>
<td>084540C</td>
<td>Unincorporated</td>
<td>Reese Rd &amp; 147th St SE</td>
<td>24</td>
<td>9/53</td>
<td>84</td>
<td>22</td>
<td>35%</td>
<td>X</td>
<td>Medium</td>
<td>0.04</td>
<td>Low</td>
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</tr>
<tr>
<td>084534Y</td>
<td>Unincorporated</td>
<td>Deer Crk-Reiter Rd near River Park Dr</td>
<td>N/A</td>
<td>9/53</td>
<td>123</td>
<td>33</td>
<td>37%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.24</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084533S</td>
<td>Index</td>
<td>363rd SE at Reese Rd</td>
<td>399</td>
<td>9/53</td>
<td>123</td>
<td>33</td>
<td>37%</td>
<td>X</td>
<td>High</td>
<td>0.06</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>084524T</td>
<td>Unincorporated</td>
<td>635th Ave NE &amp; NE 197th Pl</td>
<td>130</td>
<td>9/53</td>
<td>104</td>
<td>28</td>
<td>36%</td>
<td>X</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>084520R</td>
<td>Unincorporated</td>
<td>Old Cascade Hwy W &amp; NE Lowe Creek Road</td>
<td>326</td>
<td>9/53</td>
<td>113</td>
<td>30</td>
<td>37%</td>
<td>T3</td>
<td>High</td>
<td>0.08</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>084517H</td>
<td>Skykomish</td>
<td>Index Ave &amp; Crescent St</td>
<td>1,352</td>
<td>9/53</td>
<td>156</td>
<td>43</td>
<td>38%</td>
<td>X</td>
<td>High</td>
<td>0.03</td>
<td>None</td>
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</tr>
<tr>
<td>084515U</td>
<td>Unincorporated</td>
<td>Old Cascade Hwy East &amp; 747th Ave NE</td>
<td>814</td>
<td>9/53</td>
<td>156</td>
<td>43</td>
<td>38%</td>
<td>T3</td>
<td>Low Indirect</td>
<td>0.00</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>085158X</td>
<td>Auburn</td>
<td>R SE/Black Diamond Rd &amp; T St SE</td>
<td>2,983</td>
<td>9/22</td>
<td>91</td>
<td>51</td>
<td>127%</td>
<td>X</td>
<td>Low Direct</td>
<td>0.00</td>
<td>Medium</td>
<td></td>
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<tr>
<td>085234N</td>
<td>Covington</td>
<td>Covington Way S</td>
<td>2,580</td>
<td>9/22</td>
<td>61</td>
<td>33</td>
<td>122%</td>
<td>T3</td>
<td>Medium</td>
<td>0.00</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085233G</td>
<td>Maple Valley</td>
<td>216th Ave SE &amp; SE 283rd St</td>
<td>1,209</td>
<td>9/22</td>
<td>61</td>
<td>33</td>
<td>122%</td>
<td>T3</td>
<td>Medium</td>
<td>0.08</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085172T</td>
<td>Unincorporated</td>
<td>SE Ravensdale near 267th Ave SE</td>
<td>806</td>
<td>9/22</td>
<td>61</td>
<td>33</td>
<td>122%</td>
<td>T3</td>
<td>Medium</td>
<td>0.00</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>085175N</td>
<td>Unincorporated</td>
<td>SE Hudson RD near 340th PI SE</td>
<td>242</td>
<td>9/22</td>
<td>68</td>
<td>38</td>
<td>124%</td>
<td>T4</td>
<td>High</td>
<td>0.00</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix D – Economic Analysis Supporting Data

### Table 1. Estimated Vehicle Occupancy per County

<table>
<thead>
<tr>
<th>County</th>
<th>Commute via Single-Occupancy Vehicle</th>
<th>Commute Via Carpool</th>
<th>Estimated size of carpool</th>
<th>Weighted Average Occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snohomish</td>
<td>259,024</td>
<td>42,407</td>
<td>2</td>
<td>1.14</td>
</tr>
<tr>
<td>Pierce</td>
<td>280,993</td>
<td>38,686</td>
<td>2</td>
<td>1.12</td>
</tr>
<tr>
<td>King</td>
<td>657,302</td>
<td>107,260</td>
<td>2</td>
<td>1.14</td>
</tr>
<tr>
<td>Kitsap</td>
<td>77,959</td>
<td>12,688</td>
<td>2</td>
<td>1.14</td>
</tr>
</tbody>
</table>

Source: American Community Survey 2012 5-year estimates. The project team has conservatively assumed two occupants per carpool.

### Table 2. Selected Grade Crossings for Evaluation

<table>
<thead>
<tr>
<th>USDOT Crossing Number</th>
<th>City</th>
<th>County</th>
<th>Cross Streets</th>
<th>2035 Forecasted Daily Traffic</th>
<th>Minutes of Gate-down Time</th>
<th>% of Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>084687C</td>
<td>Stanwood</td>
<td>Snohomish</td>
<td>271st St NW &amp; Marine Drive</td>
<td>10,483</td>
<td>38</td>
<td>5%</td>
</tr>
<tr>
<td>084669E</td>
<td>Marysville</td>
<td>Snohomish</td>
<td>172 St NE/SR531 &amp; 19th Drive NE</td>
<td>21,161</td>
<td>38</td>
<td>5%</td>
</tr>
<tr>
<td>084654P</td>
<td>Marysville</td>
<td>Snohomish</td>
<td>116th St NE &amp; Smokey Pt Blvd</td>
<td>25,966</td>
<td>38</td>
<td>3%</td>
</tr>
<tr>
<td>084653H</td>
<td>Marysville</td>
<td>Snohomish</td>
<td>104th St NE &amp; 104th St NE</td>
<td>1,643</td>
<td>38</td>
<td>14%</td>
</tr>
<tr>
<td>084650M</td>
<td>Marysville</td>
<td>Snohomish</td>
<td>88th St NE &amp; Old Hwy 99</td>
<td>38,742</td>
<td>55</td>
<td>6%</td>
</tr>
<tr>
<td>084646X</td>
<td>Marysville</td>
<td>Snohomish</td>
<td>Grove St b/w Cedar Ave &amp; State Ave</td>
<td>11,019</td>
<td>55</td>
<td>6%</td>
</tr>
<tr>
<td>084644J</td>
<td>Marysville</td>
<td>Snohomish</td>
<td>Eighth St b/w Cedar Ave &amp; Delta Ave</td>
<td>3,674</td>
<td>55</td>
<td>5%</td>
</tr>
<tr>
<td>084640G</td>
<td>Marysville</td>
<td>Snohomish</td>
<td>SR528-4th Ave &amp; Cedar Ave</td>
<td>36,526</td>
<td>86</td>
<td>8%</td>
</tr>
<tr>
<td>085445K</td>
<td>Edmonds</td>
<td>Snohomish</td>
<td>SR104-Main St &amp; Railroad Ave</td>
<td>7,742</td>
<td>48</td>
<td>6%</td>
</tr>
<tr>
<td>085439G</td>
<td>Edmonds</td>
<td>Snohomish</td>
<td>Dayton St &amp; Railroad Ave</td>
<td>12,940</td>
<td>48</td>
<td>4%</td>
</tr>
<tr>
<td>085414L</td>
<td>Seattle</td>
<td>King</td>
<td>Broad St &amp; Alaskan Way</td>
<td>11,528</td>
<td>86</td>
<td>7%</td>
</tr>
<tr>
<td>085413E</td>
<td>Seattle</td>
<td>King</td>
<td>Clay St &amp; Alaskan Way</td>
<td>1,697</td>
<td>86</td>
<td>1%</td>
</tr>
<tr>
<td>085411R</td>
<td>Seattle</td>
<td>King</td>
<td>Vine St &amp; Alaskan Way</td>
<td>1,099</td>
<td>55</td>
<td>27%</td>
</tr>
<tr>
<td>085410J</td>
<td>Seattle</td>
<td>King</td>
<td>Wall St &amp; Alaskan Way</td>
<td>4,767</td>
<td>55</td>
<td>3%</td>
</tr>
<tr>
<td>085583Y</td>
<td>Seattle</td>
<td>King</td>
<td>S Holgate near Third Ave</td>
<td>8,961</td>
<td>55</td>
<td>9%</td>
</tr>
<tr>
<td>085584F</td>
<td>Seattle</td>
<td>King</td>
<td>S Lander/3rd near Occidental Ave</td>
<td>18,420</td>
<td>55</td>
<td>15%</td>
</tr>
<tr>
<td>085625H</td>
<td>Kent</td>
<td>King</td>
<td>S 212th St &amp; 77th Ave S</td>
<td>32,446</td>
<td>38</td>
<td>14%</td>
</tr>
<tr>
<td>085629K</td>
<td>Kent</td>
<td>King</td>
<td>W James St &amp; 1st Ave N</td>
<td>22,956</td>
<td>38</td>
<td>14%</td>
</tr>
<tr>
<td>Code</td>
<td>City</td>
<td>County</td>
<td>Location</td>
<td>Vehicles</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>--------</td>
<td>-----------------------------------------------</td>
<td>----------</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>085636V</td>
<td>Kent</td>
<td>King</td>
<td>Meeker St &amp; Railroad Ave N</td>
<td>6,284</td>
<td>38</td>
<td>1%</td>
</tr>
<tr>
<td>085640K</td>
<td>Kent</td>
<td>King</td>
<td>SR516-Willis St &amp; Railroad Ave S</td>
<td>25,905</td>
<td>38</td>
<td>6%</td>
</tr>
<tr>
<td>085652E</td>
<td>Auburn</td>
<td>King</td>
<td>3rd St NW &amp; C St NW</td>
<td>7,585</td>
<td>38</td>
<td>4%</td>
</tr>
<tr>
<td>085655A</td>
<td>Auburn</td>
<td>King</td>
<td>Main St West &amp; 1st St NW</td>
<td>10,258</td>
<td>38</td>
<td>4%</td>
</tr>
<tr>
<td>085683D</td>
<td>Sumner</td>
<td>Pierce</td>
<td>Main St near Fryar Ave</td>
<td>6,636</td>
<td>38</td>
<td>5%</td>
</tr>
<tr>
<td>085691V</td>
<td>Puyallup</td>
<td>Pierce</td>
<td>15th St SE &amp; E Pioneer Ave</td>
<td>15,101</td>
<td>38</td>
<td>6%</td>
</tr>
<tr>
<td>085694R</td>
<td>Puyallup</td>
<td>Pierce</td>
<td>5th St SE &amp; Spring St</td>
<td>13,251</td>
<td>38</td>
<td>7%</td>
</tr>
<tr>
<td>085695X</td>
<td>Puyallup</td>
<td>Pierce</td>
<td>3rd St SE &amp; E Main Ave</td>
<td>17,370</td>
<td>38</td>
<td>7%</td>
</tr>
<tr>
<td>085696E</td>
<td>Puyallup</td>
<td>Pierce</td>
<td>Meridian St &amp; W Stewart Ave</td>
<td>14,763</td>
<td>38</td>
<td>6%</td>
</tr>
<tr>
<td>085699A</td>
<td>Puyallup</td>
<td>Pierce</td>
<td>5th St NW &amp; W Stewart Ave</td>
<td>14,631</td>
<td>38</td>
<td>6%</td>
</tr>
<tr>
<td>085743K</td>
<td>Tacoma</td>
<td>Pierce</td>
<td>S 19th St West &amp; Wilton Rd</td>
<td>10,774</td>
<td>44</td>
<td>6%</td>
</tr>
<tr>
<td>085755E</td>
<td>Steilacoom</td>
<td>Pierce</td>
<td>Union Ave</td>
<td>777</td>
<td>55</td>
<td>25%</td>
</tr>
<tr>
<td>084605T</td>
<td>Everett</td>
<td>Snohomish</td>
<td>Pacific/Chestnut &amp; Eclipse Mill Rd</td>
<td>12,446</td>
<td>86</td>
<td>12%</td>
</tr>
<tr>
<td>084594H</td>
<td>Everett</td>
<td>Snohomish</td>
<td>Lowell-River Rd/Lenora Street &amp; S 1st Ave</td>
<td>3,323</td>
<td>33</td>
<td>9%</td>
</tr>
<tr>
<td>084577S</td>
<td>Snohomish</td>
<td>Snohomish</td>
<td>Airport Way &amp; Lowell Snohomish River Rd</td>
<td>1,960</td>
<td>28</td>
<td>9%</td>
</tr>
<tr>
<td>084564R</td>
<td>Monroe</td>
<td>Snohomish</td>
<td>SR203-Lewis St &amp; E Stretch St</td>
<td>17,866</td>
<td>30</td>
<td>9%</td>
</tr>
<tr>
<td>085234N</td>
<td>Covington</td>
<td>King</td>
<td>Covington Way S</td>
<td>2,580</td>
<td>33</td>
<td>5%</td>
</tr>
<tr>
<td>085233G</td>
<td>Maple Valley</td>
<td>King</td>
<td>216th Ave SE &amp; SE 283rd St</td>
<td>1,209</td>
<td>33</td>
<td>5%</td>
</tr>
</tbody>
</table>
Table 3. Summary of Potential Annual Economic Impacts of Increased Gate-down Time at Selected Crossings

<table>
<thead>
<tr>
<th>BNSF Mainline</th>
<th>Personal Travel</th>
<th>Commercial Travel</th>
<th>All Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanwood</td>
<td>$40,000</td>
<td>$5,000</td>
<td>$45,000</td>
</tr>
<tr>
<td>Marysville</td>
<td>$1,300,000</td>
<td>$241,000</td>
<td>$1,541,000</td>
</tr>
<tr>
<td>Edmonds</td>
<td>$123,000</td>
<td>$15,000</td>
<td>$138,000</td>
</tr>
<tr>
<td>Seattle</td>
<td>$500,000</td>
<td>$128,000</td>
<td>$628,000</td>
</tr>
<tr>
<td>Kent</td>
<td>$316,000</td>
<td>$97,000</td>
<td>$413,000</td>
</tr>
<tr>
<td>Auburn</td>
<td>$69,000</td>
<td>$7,000</td>
<td>$76,000</td>
</tr>
<tr>
<td>Sumner</td>
<td>$25,000</td>
<td>$3,000</td>
<td>$28,000</td>
</tr>
<tr>
<td>Puyallup</td>
<td>$279,000</td>
<td>$48,000</td>
<td>$327,000</td>
</tr>
<tr>
<td>Tacoma</td>
<td>$52,000</td>
<td>$8,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Steilacoom</td>
<td>$5,000</td>
<td>$4,000</td>
<td>$9,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stevens Pass</th>
<th>Personal Travel</th>
<th>Commercial Travel</th>
<th>All Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everett</td>
<td>$233,000</td>
<td>$80,000</td>
<td>$313,000</td>
</tr>
<tr>
<td>Monroe</td>
<td>$41,000</td>
<td>$10,000</td>
<td>$51,000</td>
</tr>
<tr>
<td>Snohomish</td>
<td>$4,000</td>
<td>$1,000</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stampede Pass</th>
<th>Personal Travel</th>
<th>Commercial Travel</th>
<th>All Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kent</td>
<td>$8,000</td>
<td>$1,000</td>
<td>$9,000</td>
</tr>
<tr>
<td>Maple Valley</td>
<td>$4,000</td>
<td>-</td>
<td>$4,000</td>
</tr>
</tbody>
</table>

Source: American Community Survey, PSRC. All numbers rounded to $1,000. All estimates are in 2013 dollars.

Table 4. Scenario Comparison of Annual Economic Impacts from Increased Gate-down Time

<table>
<thead>
<tr>
<th>BNSF Mainline</th>
<th>Scenario 1: BNSF Mainline Travel Only</th>
<th>Scenario 2: BNSF Mainline + Stevens Pass for empty trains</th>
<th>Scenario 3: BNSF Mainline + Stampede Pass for empty trains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanwood</td>
<td>$45,000</td>
<td>$45,000</td>
<td>$45,000</td>
</tr>
<tr>
<td>Marysville</td>
<td>$1,541,000</td>
<td>$1,541,000</td>
<td>$1,541,000</td>
</tr>
<tr>
<td>Edmonds</td>
<td>$138,000</td>
<td>$69,000</td>
<td>$138,000</td>
</tr>
<tr>
<td>Seattle</td>
<td>$628,000</td>
<td>$314,000</td>
<td>$628,000</td>
</tr>
<tr>
<td>Kent</td>
<td>$413,000</td>
<td>$207,000</td>
<td>$413,000</td>
</tr>
<tr>
<td>Auburn</td>
<td>$76,000</td>
<td>$38,000</td>
<td>$38,000</td>
</tr>
<tr>
<td>Sumner</td>
<td>$28,000</td>
<td>$14,000</td>
<td>$14,000</td>
</tr>
<tr>
<td>Puyallup</td>
<td>$327,000</td>
<td>$164,000</td>
<td>$164,000</td>
</tr>
<tr>
<td>Tacoma</td>
<td>$60,000</td>
<td>$30,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Steilacoom</td>
<td>$9,000</td>
<td>$5,000</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stevens Pass</th>
<th>Personal Travel</th>
<th>Commercial Travel</th>
<th>All Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everett</td>
<td>$313,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monroe</td>
<td>$51,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snohomish</td>
<td>$5,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stampede Pass</th>
<th>Personal Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kent</td>
<td>$9,000</td>
</tr>
<tr>
<td>Maple Valley</td>
<td>$4,000</td>
</tr>
</tbody>
</table>

Source: American Community Survey, PSRC. All numbers rounded to $1,000. All estimates are in 2013 dollars.

Note: in Scenarios 2 and 3, total daily train traffic at selected BNSF Mainline stations will be cut by 50% (from 18 to 9) as empty trains are routed back along the Stevens Pass or Stampede Pass branch lines. This is reflected by a corresponding 50% deduction in economic impacts for the affected communities.
### Table 5. Summary of Potential Project Impacts on Residential Property

<table>
<thead>
<tr>
<th>BNSF Mainline</th>
<th>Aggregate Property Value in Buffer ($ millions)</th>
<th>% increase in train traffic from GPT</th>
<th>Property Value Impacts 5% ($ millions)</th>
<th>Property Value Impacts 7% ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanwood</td>
<td>$46.9</td>
<td>42%</td>
<td>$1.0</td>
<td>$1.4</td>
</tr>
<tr>
<td>Marysville</td>
<td>$432.7</td>
<td>42%</td>
<td>$9.1</td>
<td>$12.7</td>
</tr>
<tr>
<td>Edmonds</td>
<td>$572.8</td>
<td>22%</td>
<td>$6.3</td>
<td>$8.8</td>
</tr>
<tr>
<td>Seattle</td>
<td>$5,664.1</td>
<td>19%</td>
<td>$53.8</td>
<td>$75.3</td>
</tr>
<tr>
<td>Kent</td>
<td>$177.7</td>
<td>19%</td>
<td>$1.7</td>
<td>$2.4</td>
</tr>
<tr>
<td>Auburn</td>
<td>$144.2</td>
<td>19%</td>
<td>$1.4</td>
<td>$1.9</td>
</tr>
<tr>
<td>Sumner</td>
<td>$281.2</td>
<td>19%</td>
<td>$2.7</td>
<td>$3.7</td>
</tr>
<tr>
<td>Puyallup</td>
<td>$446.6</td>
<td>23%</td>
<td>$5.1</td>
<td>$7.2</td>
</tr>
<tr>
<td>Tacoma</td>
<td>$1,786.3</td>
<td>23%</td>
<td>$20.5</td>
<td>$28.8</td>
</tr>
<tr>
<td>Steilacoom</td>
<td>$148.3</td>
<td>17%</td>
<td>$1.3</td>
<td>$1.8</td>
</tr>
<tr>
<td>Stevens Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Everett</td>
<td>$257.9</td>
<td>12%</td>
<td>$1.5</td>
<td>$2.2</td>
</tr>
<tr>
<td>Monroe</td>
<td>$242.9</td>
<td>17%</td>
<td>$2.1</td>
<td>$2.9</td>
</tr>
<tr>
<td>Snohomish</td>
<td>$19.1</td>
<td>17%</td>
<td>$0.2</td>
<td>$0.2</td>
</tr>
<tr>
<td>Stampede Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kent</td>
<td>$110.4</td>
<td>41%</td>
<td>$2.5</td>
<td>$3.3</td>
</tr>
<tr>
<td>Maple Valley</td>
<td>$363.1</td>
<td>41%</td>
<td>$7.4</td>
<td>$10.3</td>
</tr>
</tbody>
</table>

Source: American Community Survey, U.S. Census Bureau. All values are rounded to $100,000. All estimates are in 2013 dollars.

### Table 6. Summary of Potential Project Impacts on Non-Residential Property

<table>
<thead>
<tr>
<th>BNSF Mainline</th>
<th>Aggregate Property Value in Buffer ($ millions)</th>
<th>% increase in train traffic from GPT</th>
<th>Property Value Impacts (5%) ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanwood</td>
<td>$15.3</td>
<td>42%</td>
<td>$0.3</td>
</tr>
<tr>
<td>Marysville</td>
<td>$254.1</td>
<td>42%</td>
<td>$5.3</td>
</tr>
<tr>
<td>Edmonds</td>
<td>$71.7</td>
<td>22%</td>
<td>$0.8</td>
</tr>
<tr>
<td>Seattle</td>
<td>$5,696.6</td>
<td>19%</td>
<td>$54.1</td>
</tr>
<tr>
<td>Kent</td>
<td>$1,220.3</td>
<td>19%</td>
<td>$11.6</td>
</tr>
<tr>
<td>Auburn</td>
<td>$697.2</td>
<td>19%</td>
<td>$6.6</td>
</tr>
<tr>
<td>Sumner</td>
<td>$65.1</td>
<td>19%</td>
<td>$0.6</td>
</tr>
<tr>
<td>Puyallup</td>
<td>$120.9</td>
<td>23%</td>
<td>$1.4</td>
</tr>
<tr>
<td>Tacoma</td>
<td>$696.2</td>
<td>23%</td>
<td>$8.0</td>
</tr>
<tr>
<td>Steilacoom</td>
<td>$8.5</td>
<td>17%</td>
<td>$0.1</td>
</tr>
<tr>
<td>Stevens Pass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Everett</td>
<td>$33.6</td>
<td>12%</td>
<td>$0.2</td>
</tr>
<tr>
<td>Monroe</td>
<td>$124.6</td>
<td>17%</td>
<td>$1.1</td>
</tr>
<tr>
<td>Snohomish</td>
<td>-</td>
<td>17%</td>
<td>-</td>
</tr>
<tr>
<td>Stampede Pass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kent</td>
<td>-</td>
<td>41%</td>
<td>-</td>
</tr>
<tr>
<td>Maple Valley</td>
<td>-</td>
<td>41%</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: CoStar. All values are rounded to $100,000. All estimates are in 2013 dollars.
Table 7. Scenario Comparison of Potential Project Impacts on Residential Property

<table>
<thead>
<tr>
<th>BNSF Mainline</th>
<th>Scenario 1: BNSF Mainline Travel Only</th>
<th>Scenario 2: BNSF Mainline + Stevens Pass for empty trains</th>
<th>Scenario 3: BNSF Mainline + Stampede Pass for empty trains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanwood</td>
<td>$1.0 - $1.4</td>
<td>$1.0 - $1.4</td>
<td>$1.0 - $1.4</td>
</tr>
<tr>
<td>Marysville</td>
<td>$9.1 - $12.7</td>
<td>$9.1 - $12.7</td>
<td>$9.1 - $12.7</td>
</tr>
<tr>
<td>Edmonds</td>
<td>$6.3 - $8.8</td>
<td>$3.2 - $4.4</td>
<td>$6.3 - $8.8</td>
</tr>
<tr>
<td>Seattle</td>
<td>$53.8 - $75.3</td>
<td>$26.9 - $37.7</td>
<td>$53.8 - $75.3</td>
</tr>
<tr>
<td>Kent</td>
<td>$1.7 - $2.4</td>
<td>$0.9 - $1.2</td>
<td>$1.7 - $2.4</td>
</tr>
<tr>
<td>Auburn</td>
<td>$1.4 - $1.9</td>
<td>$0.7 - $1.0</td>
<td>$0.7 - $1.0</td>
</tr>
<tr>
<td>Sumner</td>
<td>$2.7 - $3.7</td>
<td>$1.4 - $1.9</td>
<td>$1.4 - $1.9</td>
</tr>
<tr>
<td>Puyallup</td>
<td>$5.1 - $7.2</td>
<td>$2.6 - $3.6</td>
<td>$2.6 - $3.6</td>
</tr>
<tr>
<td>Tacoma</td>
<td>$20.5 - $28.8</td>
<td>$10.3 - $14.4</td>
<td>$10.3 - $14.4</td>
</tr>
<tr>
<td>Steilacoom</td>
<td>$1.3 - $1.8</td>
<td>$0.7 - $0.9</td>
<td>$0.7 - $0.9</td>
</tr>
</tbody>
</table>

Stevens Pass

| Everett     | $1.5 - $2.2                            |
| Monroe      | $2.1 - $2.9                           |
| Snohomish   | $0.2                                  |

Stampede Pass

| Kent     | $2.5 - $3.3                          |
| Maple Valley | $7.4 - $10.3                  |

Source: American Community Survey, U.S. Census Bureau. All values are rounded to $100,000. All estimates are in 2013 dollars.

Note: in Scenarios 2 and 3, total daily train traffic at selected BNSF Mainline stations will be cut by 50% (from 18 to 9) as empty trains are routed back along the Stevens Pass or Stampede Pass branch lines. This is reflected by a corresponding 50% deduction in economic impacts for the affected communities.

Table 8. Scenario Comparison of Potential Project Impacts on Non-Residential Property

<table>
<thead>
<tr>
<th>BNSF Mainline</th>
<th>Scenario 1: BNSF Mainline Travel Only</th>
<th>Scenario 2: BNSF Mainline + Stevens Pass for empty trains</th>
<th>Scenario 3: BNSF Mainline + Stampede Pass for empty trains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanwood</td>
<td>$0.3</td>
<td>$0.3</td>
<td>$0.3</td>
</tr>
<tr>
<td>Marysville</td>
<td>$5.3</td>
<td>$5.3</td>
<td>$5.3</td>
</tr>
<tr>
<td>Edmonds</td>
<td>$0.8</td>
<td>$0.4</td>
<td>$0.8</td>
</tr>
<tr>
<td>Seattle</td>
<td>$54.1</td>
<td>$27.1</td>
<td>$54.1</td>
</tr>
<tr>
<td>Kent</td>
<td>$11.6</td>
<td>$5.8</td>
<td>$11.6</td>
</tr>
<tr>
<td>Auburn</td>
<td>$6.6</td>
<td>$3.3</td>
<td>$3.3</td>
</tr>
<tr>
<td>Sumner</td>
<td>$0.6</td>
<td>$0.3</td>
<td>$0.3</td>
</tr>
<tr>
<td>Puyallup</td>
<td>$1.4</td>
<td>$0.7</td>
<td>$0.7</td>
</tr>
<tr>
<td>Tacoma</td>
<td>$8.0</td>
<td>$4.0</td>
<td>$4.0</td>
</tr>
<tr>
<td>Steilacoom</td>
<td>$0.1</td>
<td>$0.1</td>
<td>$0.1</td>
</tr>
</tbody>
</table>

Stevens Pass

| Everett     | $0.2                                  |
| Monroe      | $1.1                                  |
| Snohomish   | -                                     |

Stampede Pass

| Kent     | -                                     |
| Maple Valley | -                         |

Source: CoStar. All values shown in millions. All values are rounded to $100,000. All estimates are in 2013 dollars.

Note: in Scenarios 2 and 3, total daily train traffic at selected BNSF Mainline stations will be cut by 50% (from 18 to 9) as empty trains are routed back along the Stevens Pass or Stampede Pass branch lines. This is reflected by a corresponding 50% deduction in economic impacts for the affected communities.