3.15 Rail Traffic

Railroads provide transportation services for passengers and commercial goods and support regional economic activity. Rail traffic in the study area consists of commercial goods, industrial products, agricultural commodities, and garbage. Similar to other forms of transportation, rail traffic is subject to various regulatory requirements governing maintenance of infrastructure standards, allowable speed limits, and methods and types of goods and services that can be transported.

This section describes rail traffic in the study area, including rail lines and subdivisions, rail yards, connections with the main lines, freight traffic, capacity, and rail operations at the project site. It then describes impacts on rail traffic that could result under the no-action alternative or as a result of the construction and routine operation[1] of the proposed action. Finally, this section presents any measures identified to mitigate impacts of the proposed action on rail traffic and any remaining unavoidable and significant impacts.

3.15.1 What is the study area for rail traffic?

The study area for rail traffic consists of the Puget Sound & Pacific Railroad (PS&P)[2] rail line, including the PS&P rail line junction with the BNSF Railway (BNSF)[3] main line in Centralia that could be affected during routine rail transport. Figure 3.15-1 illustrates the location of the PS&P rail line in relation to other rail lines in northwest Washington. Figures 3.15-2 and 3.15-3 present the general route of the PS&P rail line. Impacts related to increased rail and vessel traffic beyond the study area are described in Chapter 5, *Extended Rail and Vessel Transport*.

[1] Chapter 4, *Environmental Health and Safety*, addresses the potential impacts from increased risk of incidents (e.g., storage tank failure, train derailments, vessel collisions) and related consequences (e.g., release of crude oil).

[2] The PS&P rail line refers to the rail line between Centralia and the project site (which is called the Elma Subdivision by PS&P). For more information on PS&P subdivisions, see Section 3.15.4.1, *Rail Service between Centralia and Hoquiam*.

[3] Throughout this section, reference to the BNSF main line includes trains operated by the BNSF Railway Company (BNSF) and the Union Pacific Railroad (UP). BNSF owns the tracks that serve PS&P at Centralia. An operating agreement between BNSF and UP, however, allows BNSF's tracks to serve UP and PS&P. When a freight train transfers to the PS&P rail line from the BNSF main line, depending on the operator of that train, either BNSF or UP crews oversee the operation.

Figure 3.15-1. PS&P Rail Line in Regional Rail Context

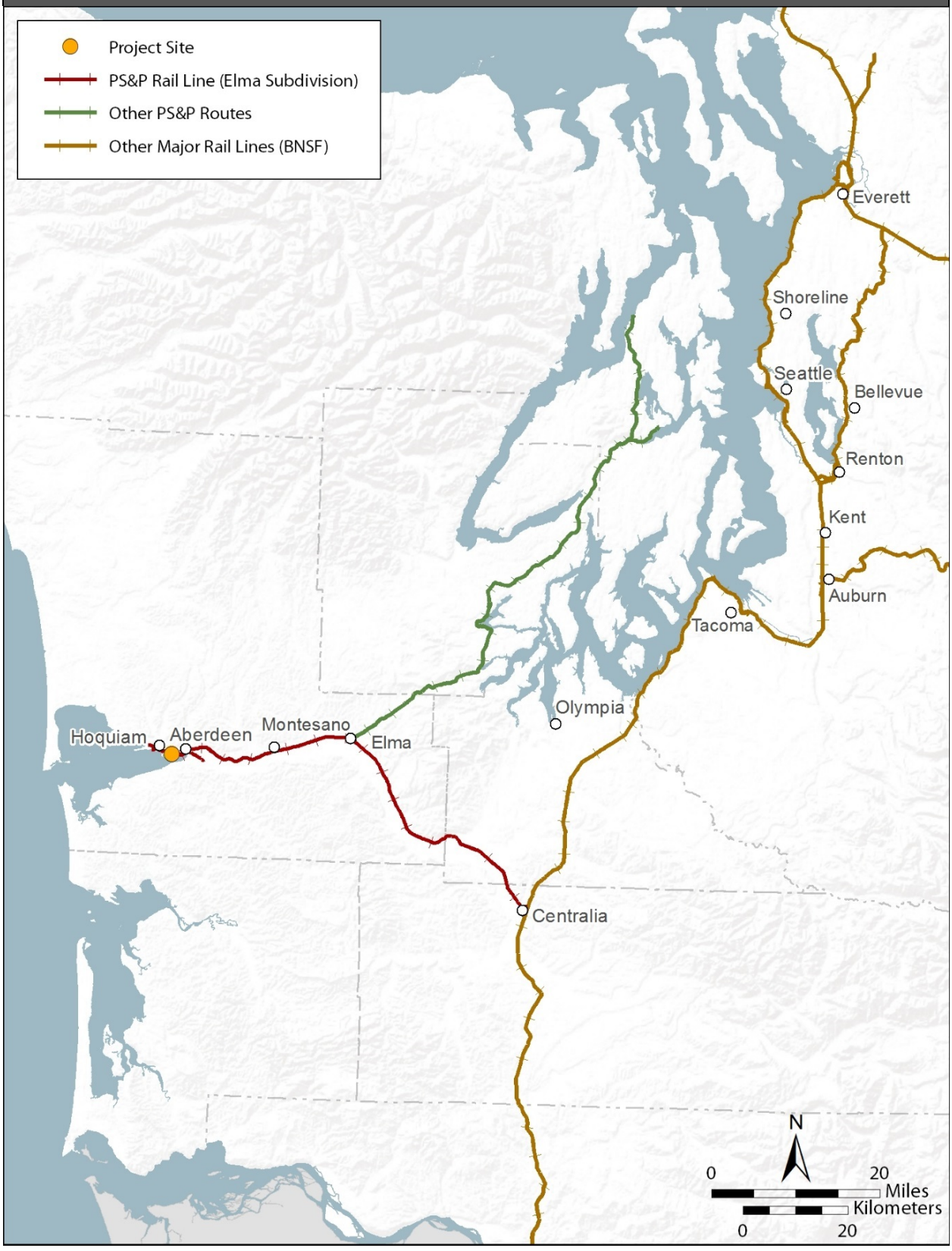


Figure 3.15-2. PS&P Rail Line General Route (East)

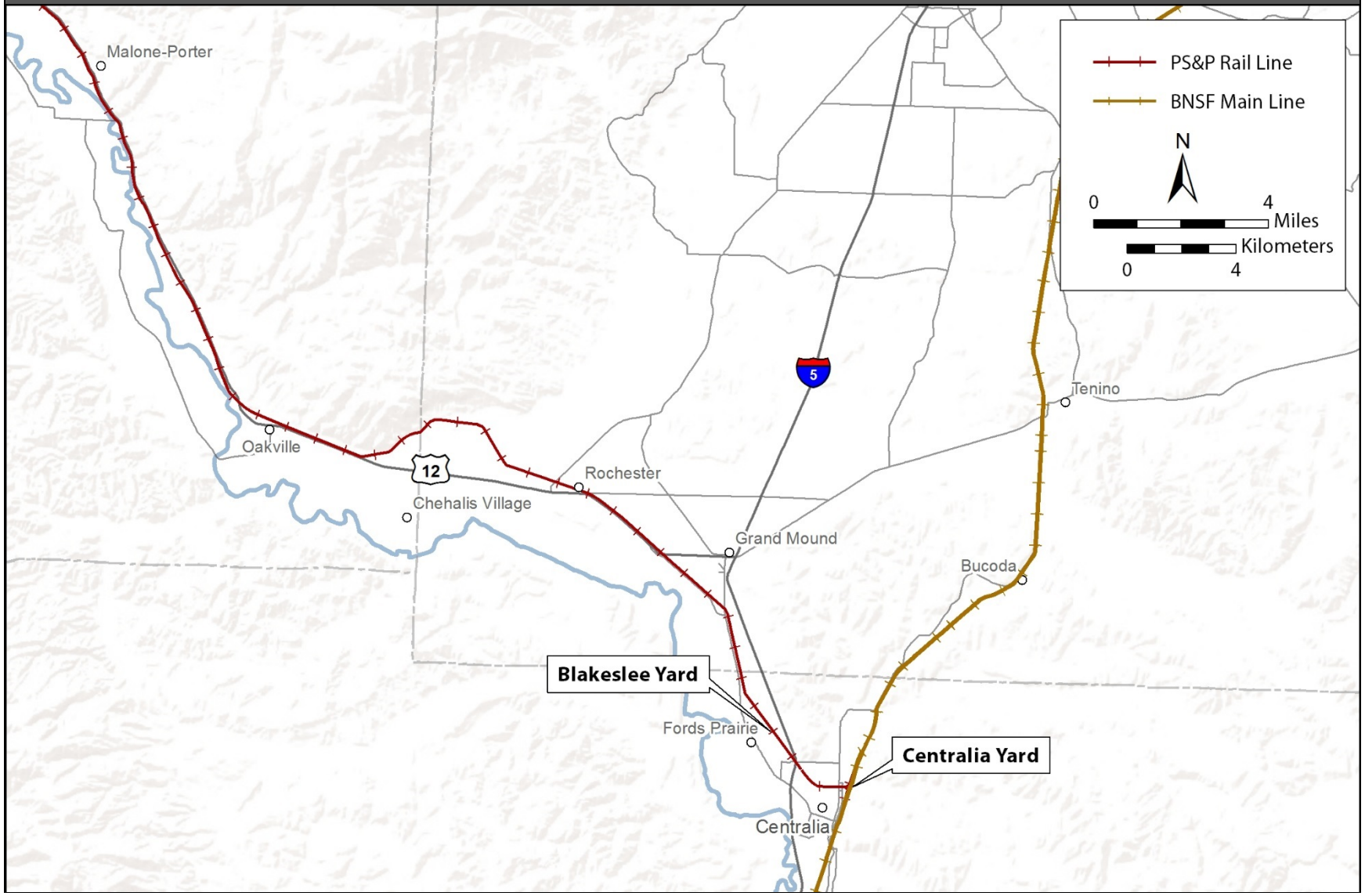
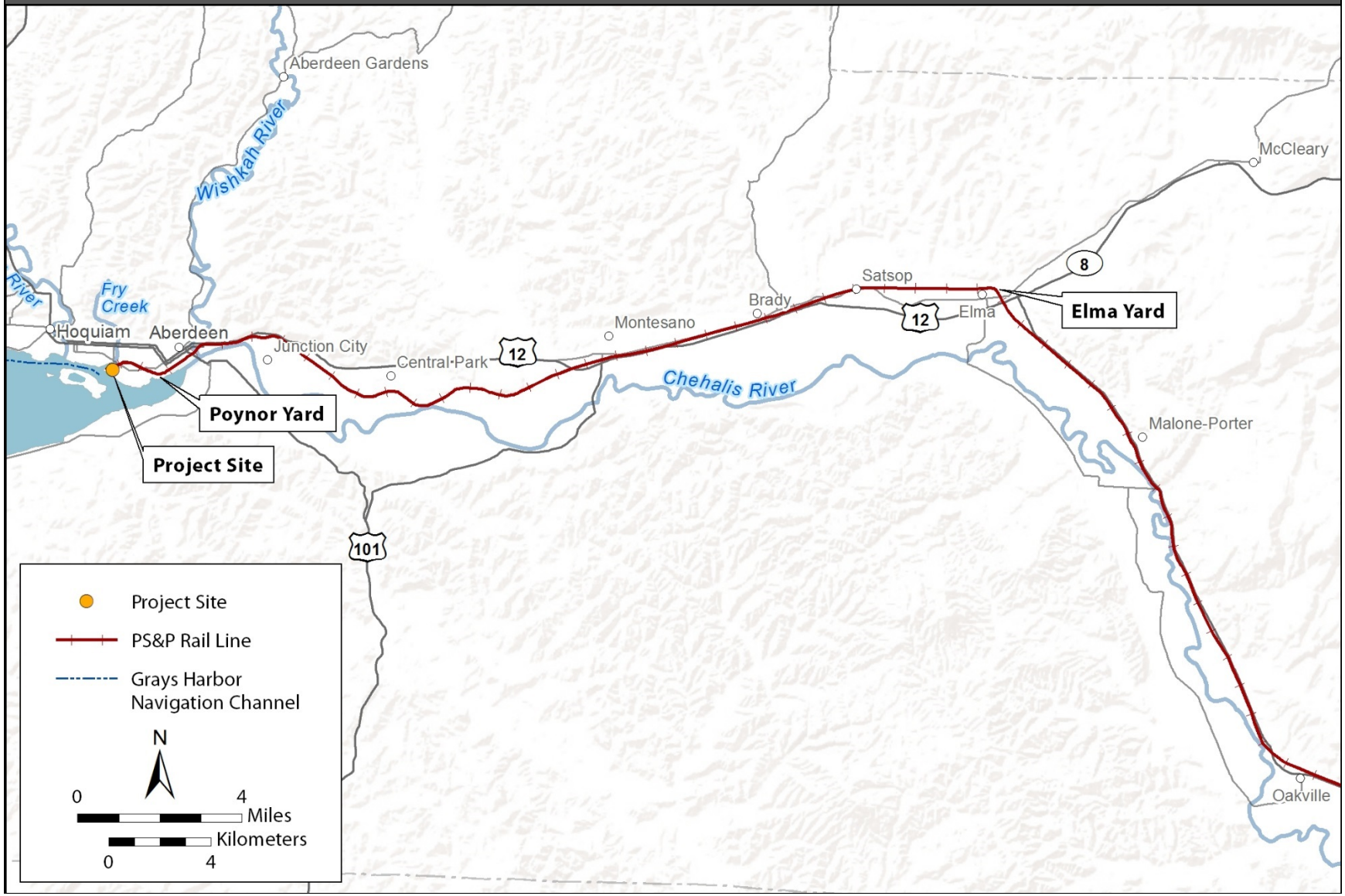


Figure 3.15-3. PS&P Rail Line General Route (West)



3.15.2 What laws and regulations apply to rail traffic?

Laws and regulations for determining potential impacts on rail traffic are summarized in Table 3.15-1. More information about these laws and regulations is provided in Appendix B, *Laws and Regulations.* Policies related to the transport of crude oil by rail are addressed in Chapter 4, *Environmental Health and Safety.*

Table 3.15-1. Laws and Regulations for Rail Traffic

Laws and Regulations	Description
Federal	
Interstate Commerce Commission Termination Act (49 U.S.C. 101)	Re-establishes the Surface Transportation Board and upholds the common carrier obligations of railroads; requires railroads to provide service upon reasonable request.
Federal Railroad Administration Regulations (49 CFR 200–299)	Establishes railroad regulations, including safety requirements related to track, operations, and cars. For example, Part 237 establishes requirements for bridge management programs, including personnel qualifications and responsibilities, determining bridge load capacities, protecting bridges from overweight loads, inspection, repair, modification, recordkeeping, and audits.
Pipeline and Hazardous Materials Safety Administration (49 CFR 105-110, 130, and 171-180)	Regulates the movement of hazardous materials.
Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains (80 FR 26643)	The Final Rule, passed May 8, 2015, defines and regulates the operations of "high-hazard flammable trains."
State	
Title 81, Transportation – Railroads, Crossings (RCW 81.53)	Establishes requirements and process for railroad construction and extensions that would cross any existing railroad or highway at grade. Includes approval from the commission.
WSDOT Local Agency Guidelines M 36-63.28, June 2015, Chapter 32, Railroad/Highway Crossing Program	Focuses on adding protection that improves safety and efficiency of railroad/highway crossings. Provides a process for investigating alternatives for improving grade-crossing safety. Alternatives include closure, consolidation, and installation of warning devices.
WSDOT Design Manual M 22.01.10, July 2013, Chapter 1350, Railroad Grade Crossings	Provides specific guidance for the design of at-grade railroad crossings.
Rail Companies—Operation (WAC 480-62)	Establishes operating procedures for railroad companies operating in Washington State. Includes general and procedural rules, safety rules, safety standards at private crossings through which crude oil is transported, reporting requirement rules, and the establishment and distribution of a grade-crossing protective fund.
Local	
No local laws or regulations apply to rail traffic.	

Laws and Regulations	Description

Notes:

[a] Although states have limited regulatory authority over railroads, per agreements with FRA, WUTC inspects and issues violations for hazardous materials, track, signal and train control, and rail operations. WUTC also regulates the construction, closure, or modification of public railroad crossings. In addition, WUTC inspects and issues defect notices if a crossing does not meet minimum standards. However, WUTC has no jurisdiction over public crossings in first class cities, including the City of Aberdeen. State rail safety inspectors are trained by FRA via an agreement that allows the state to enforce FRA regulations. WUTC and WSDOT also play other roles in the planning and oversight of railroads in Washington State.

U.S.C. = United States Code; CFR = Code of Federal Regulations; FRA = Federal Railroad Administration; WUTC = Washington Utilities and Transportation Commission; WSDOT = Washington State Department of Transportation; RCW = Revised Code of Washington; WAC = Washington Administrative Code

3.15.3 How were impacts on rail traffic evaluated?

This section describes the sources of information and methods used to evaluate impacts.

3.15.3.1 Information Sources

Research and analysis for rail traffic entailed visiting sites along the PS&P rail line, interviewing PS&P staff, collecting and reviewing data, and conducting rail simulation modeling. Existing rail information was collected from state and federal agencies, the applicant, the Port of Grays Harbor (Port), and PS&P. Compiled data included the following items.

- Typical scheduled traffic
- Typical actual traffic
- Track geometry[4]
- Track construction
- Track right-of-way
- PS&P rail line crossing data (referred to as grade crossings)

Recently prepared agency studies provided a foundation for the rail traffic analysis. The following studies were used for this analysis.

- *Washington State 2014 Marine & Rail Oil Transportation Study* (Washington State Department of Ecology 2014, 2015)
- *Washington State Rail Plan, Integrated Freight and Passenger Rail Plan, 2013–2015* (Washington State Department of Transportation 2014a)
- *Washington State Freight Mobility Plan* (Washington State Department of Transportation 2014b)

During fall 2014, project sites and tours of the PS&P rail line were conducted via hi-rail.[5] Where feasible, rail tracks and current rail operations were observed.

[4] Track geometry refers to layout, design, and curvature of the rail line.

[5] Hi-rail is a road-rail vehicle that can operate both on rail tracks and a roadway.

3.15.3.2 Impact Analysis

Rail traffic data were compiled and analyzed per the following five steps.

1. Reviewed and compiled relevant rail characteristics. Elements included current physical track arrangement, traffic, speed and time, signals, traffic control, and grade crossings.
2. Held discussions with PS&P staff to determine planned future maintenance and operating improvements along the rail line.
3. Used a simulation model with basic manual stringlines[6] to analyze current scheduled traffic and typical traffic patterns. The stringlines are provided in Section K.2 of Appendix K, *Rail Traffic Technical Information*.
4. Modeled future traffic patterns with and without the proposed action for 2017 and 2037 and used the simulation to determine PS&P's ability to support new and/or additional freight service. Planned PS&P rail line improvements for 2037 were incorporated into the model to identify differences in rail operations and delays with and without the improvements. The methods for completing the modeling are described under *Rail Simulation Modeling.*
5. Identified physical and operational improvements that may be necessary for new service, as appropriate.

Rail Simulation Modeling

A typical approach to determining the ability of a rail line to support future rail traffic is to perform a simulation model. The simulation was completed to verify PS&P's ability to support additional trains (in each direction) and to determine any potential impacts on overall rail traffic and environmental and community resources. In addition, this simulation and analysis consider whether physical and operational improvements may be necessary to accommodate additional trains anticipated in relation to the proposed action.

The initial step of the simulation entailed a train performance calculator, which calculates the propulsive (e.g., gravity, locomotive power) and resistive (e.g., brakes, gravity, air resistance, friction) forces acting on the train at 1-second intervals. The calculation includes the effect of infrastructure on rail traffic (e.g., speed limits) by simulating the actions of the engineer controlling the train.

The train performance calculator input data include the following elements.

- Locomotive characteristics (e.g., horsepower, tractive effort, fuel consumption per hour per throttle position).
- Train characteristics (number of loaded and empty cars, weight of the cars when empty, weight of the train including lading, length, cross section in square feet, an air resistance factor based upon car type).
- Track characteristics (to the nearest 0.01 mile: turnouts, grade crossings, grade and change in grade, speed limits).

The simulation follows the location of current and future trains minute-by-minute along a specific segment of the PS&P rail line. The simulation included the following steps.

[6] A stringline analysis is a graphic representation of the movement of trains on a rail line.

- Representing the existing track configuration. Planned Port and PS&P track improvements were also included in the simulation for the 2037 analysis (Gomez pers. comm.).
- Locating (minute-by-minute) every train entering and leaving the area (current trains and anticipated future trains).
- Determining the conflicts between trains as they use the tracks and associated facilities.
- Determining the conflicts that could be solved by changing the time certain trains operate, as well as by determining if the time could be changed for trains related to the proposed action (trains have various schedule and maintenance requirements that need to be met).
- Determining the additional track and facilities needed to accommodate future train traffic.

Three scenarios were run.

- 2017 no action included existing infrastructure.
- 2037 no action included PS&P-identified rail infrastructure improvement projects designed to improve operating efficiency along the PS&P rail line if rail traffic increased up to 10 trains per day[7] (Gomez pers. comm.). These projects are currently not funded or programmed for implementation.
    - Extension of one track at Blakeslee Junction to 8,100 feet.
    - Addition of a siding immediately east of Montesano.
    - Addition of a siding at a place yet to be determined, but probably immediately east (south) of Elma.
    - Improvements to Wishkah River bridge to allow increase in speeds from 5 miles per hour (mph) up to 25 mph.
- 2037 proposed action included the 2037 no action baseline with the addition of the proposed rail traffic.

In addition to providing information regarding the operations of current and future rail traffic along the PS&P, the simulation model and analysis provided the foundation for the impacts analysis related to fuel consumption, grade-crossing occupancy and vehicle traffic delay, noise and vibration, and diesel emissions. Discussion of these topics is provided in Section 3.2, *Air Quality*, Section 3.6, *Energy and Natural Resources*, Section 3.7, *Noise and Vibration*, and Section 3.16, *Vehicle Traffic and Safety*. The potential impacts related to rail safety are discussed in Chapter 4, *Environmental Health and Safety*.

3.15.4 What rail traffic is in the study area?

This section describes rail traffic in the study area that could be affected by construction and routine operation of the proposed action.

[7] Although these projects are currently not funded or programmed for implementation, they were included in the simulation modeling for 2037 to determine if they would contribute to rail operational efficiency and decrease delay at grade crossings in the future.

The PS&P rail line is the sole rail connection to the project site and Hoquiam and Aberdeen. The rail line extends from Hoquiam to Centralia, where it connects with the BNSF main line. As a common carrier, PS&P is exclusively regulated by the federal government.

3.15.4.1 Rail Service between Centralia and Hoquiam

The PS&P rail line between Centralia and Hoquiam was constructed from 1889 through 1896. The original segment was constructed by the Puget Sound & Grays Harbor Railroad, then purchased and completed between Centralia and Hoquiam by Northern Pacific Railway.[8] Headquartered in Connecticut, Genesee & Wyoming, Inc., is the current owner of PS&P.

AS defined by the Surface Transportation Board, PS&P is considered a Class III railroad based on its annual revenue of less than $34.7 million. PS&P is also categorized as a short-line railroad, as defined by the Association of American Railroads because it is less than 350 miles long with an annual revenue under $40 million.

PS&P Subdivisions

The PS&P rail line serves 30 industries, including current activities at the project site. It provides a connection to the Naval Base Kitsap, brings unit trains of automobiles and grain to Grays Harbor for export on ships, and removes municipal solid waste from Kitsap County twice per week. PS&P owns and operates the line between Centralia and Hoquiam (Elma Subdivision) and the line between Elma and Shelton (Shelton Subdivision). PS&P also operates the U.S. Navy-owned line between Shelton and the Bangor Base (Bangor Subdivision) with a short segment between Bremerton Junction and Bremerton (Bremerton Subdivision). This portion of the line is designated as part of the Strategic Rail Corridor Network and, as such, must be maintained at levels dictated by the U.S. military to support current and potential defense mobilization demands (WorleyParsons 2014).

Table 3.15-2 provides an overview of PS&P subdivisions, areas it serves, and commodities and products it transports.

[8] In 1970, Northern Pacific merged with the Burlington Northern Railroad (now the BNSF Railway Company). In 1997, the line was sold to Puget Sound & Pacific Railroad (PS&P), a subsidiary of ParkSierra Railgroup. In 2002, ParkSierra Railgroup was purchased by RailAmerica, which was purchased by Genesee & Wyoming, Inc. in 2012.

Table 3.15-2. PS&P Subdivisions

Subdivision[a]	PS&P Rail Mileposts	Length (miles)	Location	Description
Elma	0.0–75.2[b]	59	Centralia (Blakeslee Junction) to Hoquiam	Main line owned and operated by PS&P, serves the industries of the Port and the project site. Commodities include grain, soybean, soda ash, automobiles, garbage, military trains, and bulk liquids.
Shelton	48.7–25.2	26	Elma to Shelton	Owned and operated by PS&P, commodities include lumber, garbage, and propane gas.
Bangor	25.2–42.8	48	Shelton to Bangor Base	Owned by the U.S. Navy, operated by PS&P. Same commodities as Shelton Subdivision plus military and other U.S. Government traffic from Naval Base Kitsap in Bremerton and Bangor Base.
Bremerton	0.0Z[c]–4.6Z	5	Bremerton Junction to Bremerton	Owned by the U.S. Navy, operated by PS&P. U.S. Government traffic from Naval Base Kitsap in Bremerton, and Bangor Base.

Source: WorleyParsons 2014

[a] The PS&P rail line is composed of four subdivisions. A subdivision is part of a larger section of a rail line (division), which is overseen by a superintendent.

[b] The milepost numbering skips a section from MP 13.3 to 29.8, resulting in the physical track miles being less than the notated signage. The current end of track is at MP 74.2.

[c] MP 32.1 on Bangor Subdivision.

MP = milepost

3.15.4.2 PS&P Rail Line Track Conditions and Physical Characteristics

A railroad is a fixed guideway transportation system. Unlike motor vehicles, trains must follow a track and can only change "lanes," turn, enter, or leave the route when a track has been specifically constructed for that purpose. Managing rail operations and identifying infrastructure needs involves determining exactly where trains need to enter and leave the route, change tracks, and turn onto another route. Physical rail characteristics must be considered when evaluating current and future rail traffic and a rail line's capacity. Section K.1 of Appendix K, *Rail Traffic Technical Information*, provides an explanation of these terms, as well as other railroad terminology used throughout this section. The following discussion describes characteristics of the PS&P rail line.

Main Line Track and Sidings

The PS&P rail main line extends between rail milepost (MP) 0.00 at Centralia and 70.0 at the Port of Grays Harbor. The track extends beyond Hoquiam at MP 74.2 (Figures 3.15-2 and 3.15-3).[9]

The entire line between Centralia and Hoquiam is single track. On a single-track line, segments of second track (sidings) must be located periodically along the line to allow trains to pass each other (passing or meeting). To be functional, a siding must be able to accommodate a complete train,

[9] Due to different surveys during construction, the rail milepost at Gate is both MP 13.3 and MP 29.8. Mileposts from Gate continue based on the MP 29.8 designation.

allowing the main track to be used by the passing or meeting train. There is only one siding between Centralia and Aberdeen, at Cedar Creek, about 4 miles west of Oakville. The yard at Blakeslee Junction, located in Centralia, can also serve as a siding.

The running time between sidings defines the capacity of the line. For example, if the longest running time between meeting points is 1 hour, the line can typically accommodate one train per hour when traffic is arranged with operation in alternating directions.

Curves and Grades

The PS&P rail line is relatively flat and straight. The route contains four 6-degree[10] curves and thirteen 4-degree curves. All other curves are approximately 3 degrees or less. All of the grades are quite short in length at around 0.1 or 0.2 mile. The steepest grade along the line is approximately 1% in eight locations. The speed limits are less than the limit on operating speed that would be imposed by track geometry or grades.

Rail Bridges

The PS&P line between the BNSF main line in Centralia (MP 0.0) and its terminus in Hoquiam (MP 74.2) has 55 rail bridges (including box culverts). There are 52 rail bridges (including box culverts) between Centralia and the project site. All bridges cross waterways (sloughs, rivers, creeks, or intermittent streams). The larger waterway crossings on the PS&P rail line are described in Table 3.15-3. The speed limit across rail bridges is generally 25 mph for all trains except as noted in the next subsection.

Refer to Section 3.15.4.5, *Ongoing Maintenance and Inspections,* for information on the Federal Railroad Administration's (FRA) bridge maintenance program and recent inspection results for the above bridges.

[10] In railroad engineering, a degree change takes place over a 100-foot distance.

Table 3.15-3. Rail Bridges in the Study Area Crossing Larger Waterways

Crossing	Mile Post	Length (feet)	Location (city/town)	Bridge Type	Structure Type
Skookumchuck River	1.68	155	Centralia	Single span of through-pin truss	Concrete abutments
Black River	12.64	130	Black River	Single span of through-pin truss	Concrete abutments
Satsop River	52.43	992	Satsop	24 spans of timber beams approaching single span of through-pin truss followed by 31 spans of timber beams	Timber pile bents under the timber beam spans and H pile towers under the through truss
Wynoochee River	59.00	591	Montesano	Two spans of reinforced concrete slab approaching single span of deck plate girder approaching two spans of through-pin truss followed by 16 spans of timber beams	Concrete stems under the slab, concrete abutment and pier under the deck plate girder, concrete piers under the through truss, and timber piles under the timber beams
Wishkah River	68.64	1,156	Aberdeen	28 spans of timber beams approaching two spans of through-pin truss approaching one span of steel beams followed by 31 spans of timber beams	Timber piles under the timber beams, concrete piers under the through truss, and concrete pier and timber piles under the steel beams

Source: American Short Line and Regional Railroad Association 2016.

Federal Railroad Administration Class of Track and Speeds

The PS&P tracks are registered with FRA as Class 2 tracks[11] with an overall maximum speed of 25 mph for freight trains.

The speed limit between Centralia and Poynor Yard in Aberdeen is generally 25 mph for all trains except as follows.

- Between Centralia and about 1.5 miles east of Grand Mound, the speed limit is 10 mph, and trains must be prepared to stop for other trains or obstructions within half the range of vision (yard limits operation). Depending on visibility, actual train speed may be substantially less than 10 mph. For example, structures on the inside of the curve between the connection with BNSF near Maple and B Streets in Centralia limit visibility. As a result, trains may move at 5 mph or less until extended visibility allows greater speed.
- Through a 4-mile segment in Elma, the speed limit is 25 mph, except for a 2,000-foot-long segment where the speed limit is 10 mph. Depending on visibility, trains may operate at substantially less than 10 mph.

[11] Class of track is defined in terms of rail tolerances, by 49 CFR 213. FRA has published the Track and Rail and *Infrastructure Integrity Compliance Manual, Volume II, Section 1 Track Safety Standards Classes 1 through 5* to provide explanation and commentary for these regulations.

- Over Devonshire Bridge (Wynoochee River), the speed limit is 10 mph. Current maintenance plans include repairing this bridge and increasing the speed limit to 25 mph.
- For about 1,000 feet at a point about 4 miles west of Montesano, the speed limit is 10 mph. The track is on the bank of the Chehalis River. The soil condition is such that maintenance to the tolerance required for 25 mph speed limit is difficult.
- Between approximately Junction City Road, east of Aberdeen, and the end of the line in Hoquiam, the speed limit is 10 mph. This area is within yard limits, so trains may move at a speed substantially less than the speed limit, depending upon visibility. This segment includes seven grade crossings along US Route 12 (US 12), east of the Wishkah River.
- Over the moveable bridges spanning the Wishkah and Hoquiam Rivers, the speed limit is 5 mph, in part because of the maintenance condition, but also because these are moveable bridges (swing bridges). The rails must separate to open the bridge and align again when the bridge is closed, which contributes to the speed limit of 5 mph.

In addition to the above exceptions to the speed limit, PS&P has committed to restricting the speed of crude oil trains to a maximum of 10 miles per hour in urban and residential areas and areas of significant potential environmental impact (Irvin pers. comm.).

3.15.4.3 Rail Yards

The Poynor Yard, Elma Yard, and Centralia/Blakeslee Yard serve the PS&P rail line between Centralia and Hoquiam (Figures 3.15-2 and 3.15-3).

Poynor Yard

Poynor Yard is in Aberdeen along the Chehalis River between South H Street and South Washington Street. Cars from the industries in Hoquiam and Aberdeen are moved to Poynor Yard for mechanical inspection and air brake testing before being coupled with other cars (to form a train). The yard has five tracks, which, depending on the track, can hold 17 to 27 cars each. The main track between the ends of the yard can hold 40 cars.

Trains leaving Aberdeen traveling east typically have more cars than a single yard track can hold. It is necessary to couple cars located on multiple tracks to create one train. The process, called *doubling*, involves pulling the cars on a yard track out of the yard and onto the main line. The coupled cars on the main line are then backed against cars on another yard track. Depending on the desired length of the train, this process may be repeated up to five times. Doubling a train out of the yard in Aberdeen can take up to 50 minutes. During that time, the main line between Aberdeen and the siding at Cedar Creek is occupied and no trains can be run to Aberdeen from Cedar Creek or Elma.

Elma Yard

A small yard at Elma is used to store cars for industries on the Shelton Subdivision and to sort cars destined to or received from industries on the Shelton Subdivision.

Centralia Yard and Blakeslee Yard

The Blakeslee Yard (operated by PS&P) receives cars destined to industries along the PS&P rail line from the BNSF main line and BNSF Centralia Yard and delivers cars from the industries to the BNSF

main line. When cars are delivered to these locations, PS&P sorts the cars by destination, using the yard tracks for sorting. The destination may be a specific industry or another location that has several industrial customers. Cars for those locations, such as Aberdeen, are locally sorted by industrial customer and then delivered. When PS&P takes away the cars that the customer has released, they are brought to either the Blakeslee Yard or the Centralia Yard, where they are sorted into cars for the BNSF main line.

3.15.4.4 PS&P Rail Line Connection with the BNSF Main Line in Centralia

At Centralia, trains moving to and from the PS&P rail line at 10 mph or less must separate from or merge with the flow of the BNSF through-traffic, which includes Union Pacific (UP) and Amtrak trains. Traffic on the BNSF main line through Centralia operates at a wide variety of speeds (Table 3.15-4).

Table 3.15-4. Typical Train Speeds along the BNSF Main Line through Centralia

Type of Train	Typical Speed through Centralia
PS&P train entering or merging the BNSF main line	Less than 10 mph
Amtrak	Up to 79 mph
Bulk commodity (e.g. grain trains)	30 to 45 mph
Other type of freight trains	30 to 60 mph

BNSF = BNSF Railway Company; PS&P = Puget Sound & Pacific Railroad; mph = miles per hour

The typical speeds cited above represent train movement along the BNSF main line; however, Amtrak trains slow down considerably and stop at the Amtrak station in Centralia; they are not traveling at 79 mph once they near the train station, which is approximately 0.5 mile south of the PS&P rail line and BNSF main line junction. In addition, some freight trains stop at Centralia to deliver cars to or pick up cars from the PS&P rail line, which also results in slower train speeds. These freight trains may be stopped at Centralia for as long as 1 hour, while the Amtrak trains are typically stopped at the Centralia station for 3 minutes.

3.15.4.5 Ongoing Maintenance and Inspections

Railroads are required by FRA to inspect and maintain railroads. Typical actions may include replacement of ballast, ties, and rail. Other continued railroad maintenance activities, such as bridge upgrades and grade-crossing improvements, help to maintain safety. Activities specific to the PS&P rail line in the study area are described below.

Track Maintenance and Inspections

PS&P maintains the line between Centralia and Aberdeen (Poynor Yard) to FRA Class 2 standards. The rail line is inspected electronically annually to find hidden defects. . As required by FRA, PS&P conducts weekly track inspections and continues to maintain and upgrade track.

PS&P has committed to the following operating guidelines related to track maintenance and inspection in handling any crude oil trains in the study area (Irvin pers. comm.)

- Conduct an additional weekly track inspection on parts of the railroad that handle crude oil (beyond what is required by FRA).

- Precede every crude oil train by a track inspector in a hi-rail truck to ensure that the route is intact and free of obstructions.
- Conduct tests of track geometry and employ two different test methods to detect flaws inside the rail.

In 2014, PS&P performed the following track upgrades.

- Installed 12,200 ties between MPs 0.60 and 5.0, 28.5 and 38.0, and 62.0 and 64.0.
- Relayed 7,840 feet of curve rail at MPs 1.8, 4.1, 41.5, 47.9, and 66.6.

Bridge Maintenance and Inspection

FRA regulates bridge safety standards under 49 Code of Federal Regulations (CFR) 237. The CFR requires each track owner to have a bridge management program in place (Subpart B - 237.31) with specific criteria, including an accurate inventory of bridges, information about safe load capacity, and specific program for bridge inspections (237.33). The inventory must include a unique identifier for each bridge, its location, configuration, type of construction, number of spans, and span lengths. Each bridge management program must schedule inspections by a qualified inspector once per calendar year for each bridge in railroad service (237.101). In addition, each track owner is required to keep bridge inspection records (237.109). FRA employs one full-time bridge inspector for Region 8, which consists of eight states. The bridge inspector generally investigates complaints and performs inspections as required. No routine bridge inspections are conducted by this FRA inspector.

FRA's Fixing America's Surface Transportation Act (FAST Act) provides a means for a state or political subdivision to obtain a public version of a bridge inspection report generated by a railroad for a bridge inspection within their respective jurisdiction. This is an avenue for states and local jurisdictions to monitor inspection information about railroad bridges in their areas.

In response to a request for information by the Washington State Department of Ecology via the FAST Act, FRA provided public bridge inspection reports generated by PS&P for the rail bridges that cross the larger waterways in the study area: Skookumchuck River (MP 1.68), Black River (MP 12.64), Satsop River (MP 52.43), Wynoochee River (MP 59.00), Chehalis River (MP 66.65 for a spur track), and Wishkah River (MP 68.24). The inspections were conducted within the past year and state that all six bridges are confirmed to have the capacity to safely carry the traffic being operated over them (American Short Line and Regional Railroad Association 2016). PS&P has stated that rail bridges will be inspected on a routine basis by trained railroad employees, expert contractors, and FRA. PS&P will then plan bridge maintenance work based on these inspections (Irvin pers. comm.).

In 2014, PS&P performed various bridge repairs at MPs 2.34, 12.64, 38.8, 46.9, 52.43, 63.93, and 68.64.

Train and Rail Car Inspections

Railroad operating rules require all employees to conduct a visual inspection for defects (e.g., overheated bearings, sticking brakes, sliding wheels, wheels not properly positioned on the rail, dragging equipment, insecure contents, signs of smoke or fire, headlight or marker improperly displayed, any other dangerous condition) of every passing train they encounter. If any defect in the train is found, the employee sends a radio message to the train, which is then stopped for inspection

by a crewmember. Cars that have a defect that a crewmember cannot repair are removed from the train and left for repairs. Trains operating on the PS&P rail line are also inspected at Poynor Yard.

FRA regulations require a complete mechanical inspection of each train before it leaves its initial station. Regulations also require mechanical inspections at intervals of 1,000 miles (1,500 miles under certain conditions). For trains traveling to Washington State along BNSF's Northwest and Montana Operating Divisions, an inspection would take place at Havre, Montana.

Electronic train defect detectors inspect passing trains for defects such as overheated bearings, broken wheels, dragging equipment, and other faults. When a defect is detected, the device transmits a message on the two-way radio communication channel. The train is then stopped for inspection by a crewmember. There is one electronic defect detector located on the PS&P rail line, near Oakville.

Future Maintenance Projects

PS&P has a capital improvement program, which includes a number of ongoing and periodic maintenance projects designed to maintain current capacity, safety, and operations. These projects address the normal wear and tear of a rail line, and will be needed as more trains (or more cars) transport commodities along the PS&P rail line. It is assumed that these maintenance projects, listed below, would occur between 2017 and 2037. The actual scope of these projects may vary depending on future rail traffic volume and the needs of PS&P's rail customers and would be determined based on applicable regulatory requirements.

- Install 9,500 new hardwood ties at various locations on the west end of the Elma Subdivision.
- Resurface approximately 15 miles of track.
- Upgrade three steel bridges.
- Upgrade five grade crossings in Aberdeen.
- Relay 90-pound rail at MP 72 and replace two turnouts in Hoquiam.
- Relay 11.2 miles of jointed 112-pound rail with continuous welded rail between Elma and Montesano.

3.15.4.6 Current Freight Rail Traffic

As stated previously, the PS&P rail line serves several industries and the U.S. military, which results in various rail traffic patterns between Centralia and Poynor Yard. Directional traffic along the PS&P rail line varies depending on customer and commodity. Current rail traffic on the PS&P rail line is described below by commodity.

- Automobiles (westbound) and empty automobile cars (eastbound).
- Grain (westbound) and empty grain cars (eastbound).
- Wood products (eastbound) and empty wood-product cars (westbound).
- Garbage (eastbound) and empty garbage cars (westbound).
- Chemicals and other liquids (both directions, typically to and from the project site, the site adjacent to the project site (REG, formerly Imperium Terminal Services), and Dow Chemical.

- Miscellaneous carload industrial material and products to and from a steel fabricator in Aberdeen, Port of Grays Harbor Warehouses.

Table 3.15-5 provides typical daily rail traffic information, based on one month of activity data provided by PS&P. Virtually all of this traffic is loaded in specialized cars. The cars return empty for another load rather than being loaded with another commodity for the return trip. Under existing conditions, approximately three trains transit the PS&P rail line daily.

Table 3.15-5. Typical Daily Rail Traffic by Commodity along the PS&P Rail Line under Existing Conditions

	Status by Direction		Typical Daily Trips[a]	Typical Number of Cars per Train
Commodity	**West**	**East**	**Daily**	
Auto	Full	Empty	0.5	65
Grain	Full	Empty	0.6	101
Mixed carload freight[b]				
Between Centralia and Aberdeen	*Varies*	*Varies*	*1.6*	*50*
Between Centralia and Elma	*Varies*	*Varies*	*0.2*	*50*
Between Elma and Aberdeen	*Varies*	*Varies*	*0.3*	*50*
Garbage (*Between Centralia and Elma only*)	Empty	Full	0.1	98
Total (between Centralia and Elma)			**3.0[c]**	
Total (between Elma and Aberdeen)			**3.1[c]**	

[a] A trip represents one-way travel. In other words, eastbound and westbound travel of a train is counted as two trips.
[b] Includes various products and commodities including lumber and wood products, plastics, cement, frozen foods, bulk liquids, and chemicals. Depending upon the customer and product, full train and empty train travel directions vary.
[c] Column totals do not sum due to rounding.

3.15.4.7 Current PS&P Rail Line Capacity and Operations

This section describes current PS&P rail line capacity and operations between Centralia and east Aberdeen and between east Aberdeen and the project site.

Between Centralia and East Aberdeen

Unlike passenger trains, freight trains do not run on a schedule. U.S. railroads evaluate each situation and dispatch trains based on a number of criteria, including available crew, number of cars, cost of fuel, and overall revenue. Analysis and projection of the effect of rail operations on a line's capacity requires analyzing the rail traffic and developing typical operations. Measurements, analysis, and projections are based on this hypothetical traffic plan.

Current PS&P rail traffic between Centralia and east Aberdeen is very light. In October 2014, PS&P provided a table of typical traffic for November 2013. The table was transformed into a stringline diagram, the graphical format universal to railroad operation. The stringline is a time-distance graph of train movements. From it, the relationship of trains to infrastructure and to each other becomes visible, and current and future rail capacity can be determined.

As presented in Section 3.15.3.2, *Impact Analysis, Rail Simulation Modeling*, the train performance calculator was used to simulate individual train movement along the rail line to provide a basis to

measure changes over time. To do so required considering each type of train (e.g., grain, auto, carload freight, and local freight) for the sample period and determining the number of cars composing a typical train. Train size and makeup of loaded and empty cars varies substantially; therefore, existing data were used to determine typical train type and features. Additional analysis of the traffic by train type, capacity of the tracks, and the total of number of cars as trains left and arrived, resulted in a year of typical eastbound and westbound traffic. The number of trains is not the same in both directions because of varying train length.

Once the modeling and analysis were completed, daily individual trips[12] were combined to create stringlines for the entire line. Stringline diagrams are provided in Section K.2 of Appendix K, *Rail Traffic Technical Information*. The stringline diagrams show that traffic is substantially less than capacity. The analysis indicates that the PS&P rail line has the theoretical capacity to handle up to 12 train trips per day.

As shown in Table 3.15-5, current rail traffic along the PS&P rail line consists of an average of three trips per day. However, trains take longer to make the trip than would be expected from a nonstop trip. The diagrams show conflicts where two trains would occupy a segment of track at the same time had the dispatcher not intervened. In these cases, one train would wait for the other unless their paths happened to cross at a location where they could pass each other (Blakeslee Junction, Cedar Creek siding, or if one train was originating or terminating on the line between Elma and Shelton).

The following operations information was determined based on an analysis of individual trains and typical traffic.

- Westbound trains sometimes wait between Centralia and Aberdeen for accommodation at Aberdeen.
- Eastbound trains going through Centralia on the BNSF main line sometimes wait west of Centralia until the BNSF crew arrives or for an opening in the flow of the BNSF and Amtrak traffic at Centralia, so that roadways are not blocked in Centralia while the train is waiting.
- Eastbound trains that terminate at the yards in Centralia sometimes wait west of Centralia for accommodation.
- Some trains leave *en route* cars that cannot be accommodated at the destination to be picked up by a subsequent train.

In summary, although trains may need to wait at either end of the PS&P rail line in Centralia or Aberdeen, there is mainline capacity to handle up to 12 trips per day. Therefore, capacity limitations on the PS&P rail line are not related to mainline deficiencies between Centralia and Aberdeen but to the lack of sufficient space for cars (e.g., sidings, yards) to break down and deliver cars to customers at both ends of the PS&P rail line in Centralia and Aberdeen. Capacity and operations between east Aberdeen and the project site are discussed in the next section.

Grade-crossing occupancy depends on the number of rail cars and train speed at the crossing. On average, each train transit occupies grade crossings between Centralia and east Aberdeen for between approximately 3 and 8 minutes (Table 3.15-5 illustrates the frequency of train transits). Appendix L, *Vehicle Modeling* provides the average daily occupancy time at all grade crossings.

[12] A trip represents one-way travel; in other words, an inbound trip and an outbound trip are counted as two trips.

Between East Aberdeen and the Project Site

PS&P rail line capacity is more constrained between east Aberdeen and the project site than between Centralia and east Aberdeen. Poynor Yard and adjacent track to the yard in Aberdeen have limited capacity for moving a locomotive (train engine) from one end of a train to the other (running around). Switching movements, including breaking down unit trains to deliver to industries in the Port area, require pushing multiple cars extracted from arriving trains a long distance over one or more grade crossings west of Poynor Yard. Switching movements from the buildup of trains at Poynor Yard also occupy grade crossings east of Poynor Yard, all the way to South Fleet Street in east Aberdeen for some trains. Yard operations also require movement at restricted speed, and it is often necessary to stop and have a crewmember get off the train and stand in the roadway to flag traffic before the train can proceed. Thus, extended occupancy times at the grade crossings between east Aberdeen and the project site are common.

Like mainline operations, yard operations are developed based on operational needs. Each day, the conductor of the train assigned to yard switching determines, from a list of work to be done (e.g., cars to move from the yard to an industry, cars to remove from an industry, cars to move from one place to another within an industry) how to perform the work. Appendix K, *Rail Traffic Technical Information*, provides information on the basics of rail operations and characteristics.

Using train performance calculator data and a detailed itinerary of a typical switching operation, a model of track and grade crossing occupancy was developed to characterize the existing condition. The following description represents typical rail operations east and west of Poynor Yard.

East of Poynor Yard

Due to the limited track lengths in the Poynor Yard, long trains leaving Aberdeen traveling east on the PS&P rail line are assembled in the Poynor Yard from short segments. The yard has five tracks that can hold 17 to 27 cars each. Trains leaving Aberdeen traveling east typically have more cars than a single yard track can hold, and cars must be doubled, as described in Section 3.15.4.3, *Rail Yards, Poynor Yard*. Section K.5 of Appendix K, *Rail Traffic Technical Information*, provides illustrations of the doubling process.

Doubling a train out of the yard can take up to 50 minutes and no westbound train can run into Aberdeen during this time. For each track of cars added to an eastbound train, cars attached to the engine are pulled to the east beyond the switch to allow the next track of cars to be added to the train. This train-building process can result in the grade crossings east of the Poynor Yard, including the grade crossings in east Aberdeen (Olympic Gateway Plaza area), being occupied. Table 3.15-6 illustrates existing grade crossing occupancy times for a single train transit by train type at the crossings closest to Poynor Yard (East Heron Street) and the crossing furthest from the yard (Fleet Street) in the Olympic Gateway Plaza area. Figure 3.15-4 illustrates the PS&P rail line east of Poynor Yard.

The grade-crossing occupancy times for eastbound grain and auto trains (each average 0.25 train per day) are between 36 and 44 minutes; the times are between 17 and 34 minutes for mixed carload freight trains. The grade-crossing occupancy times for all westbound trains are between 6 and 12 minutes. East Heron Street has the highest crossing occupancy times because it is the closest crossing in east Aberdeen to Poynor Yard.

The grade-crossing occupancy times in Table 3.15-6 are for each train transit. As shown in Table 3.15-5, the typical number of existing daily trips in this area is 3.1 for all trains. Using the typical number of trips per day for each train type (0.6 grain train trip, 0.5 auto train trip, and 2.1 mixed carload freight train trips), the total daily average crossing occupancy time for all trains is 1 hour 10 minutes at East Heron Street and 49 minutes at Fleet Street. The frequency of these trains by is shown in Table 3.15-5.

Table 3.15-6. Grade Crossing Occupancy Times[a] in East Aberdeen at Selected Crossings by Train Type and Direction for Each Train Transit

	Eastbound Trains		Westbound Trains	
Train Type[b]	**East Heron Street**	**Fleet Street**	**East Heron Street**	**Fleet Street**
Grain	44 minutes	37 minutes	11 minutes	9 minutes
Auto	43 minutes	36 minutes	12 minutes	10 minutes
Mixed carload freight (68 cars)	34 minutes	17 minutes	9 minutes	6 minutes
Mixed carload freight (37 cars)	16 minutes	14 minutes	9 minutes	6 minutes

[a] Occupancy times rounded to the nearest minute.
[b] See Table 3.15-5 for the frequency of these train types.

Figure 3.15-4. PS&P Rail Line Grade Crossings East of Poynor Yard

West of Poynor Yard

Rail operations west of Poynor Yard include trains moving directly between industrial facilities and Poynor Yard, and switching operations, which move rail cars among tracks in an industrial facility during the process of sorting cars or placing them in the required location for loading or unloading. Figure 3.15-5 illustrates the grade crossings west of Poynor Yard.

Figure 3.15-5. PS&P Rail Line Grade Crossings West of Poynor Yard

Any time an eastbound or westbound grain, auto, or mixed carload freight train is moved directly between Poynor Yard and industrial facilities west of Poynor Yard, the train occupies grade crossings between 3 and 9 minutes, depending on the train type and location (Table 3.15-7).

Table 3.15-7. Grade-Crossing Occupancy Times in East Aberdeen at Selected Crossings by Train Type and Direction for Each Train Transit[a]

	Eastbound Trains		Westbound Trains	
Train Type[b]	West 1st Street	Port Industrial Road	West 1st Street	Port Industrial Road
Grain	9 minutes	9 minutes	N/A[c]	8 minutes
Auto	8 minutes	8 minutes	N/A[c]	7 minutes

[a] Occupancy times rounded to the nearest minute.
[b] See Table 3.15-5 for the frequency of these train types. Mixed carload freight trains do not occupy these crossings.
[c] Not applicable. Train does not occupy crossing.

Switching operations, described below, between industrial facilities west of Poynor Yard (project site and REG, formerly Imperium Terminal Services site) occupy the grade crossings west of Poynor Yard. The maximum grade-crossing occupancy times are between 3 and 13 minutes from switching operations (Table 3.15-8).

Table 3.15-8. Maximum Grade Crossing Occupancy Times West of Poynor Yard from Switching Operations at Selected Crossings[a]

Grade Crossing	Applicant	REG, formerly Imperium Terminal Services
Port Industrial Road	5 minutes	3 minutes
West 1st Street	7 minutes	4 minutes
Industrial Road	9 minutes	13 minutes

[a] Occupancy times rounded to the nearest minute.

On a typical day, the applicant receives 10 cars and releases 10 cars. These cars are separated from other cars of an incoming mixed carload freight train in the Poynor Yard then moved by a switching locomotive to the project site for unloading. This process typically results in one to two trips onto and off the project site each day, to deliver and remove an average of 10 cars. These movements occupy the West 1st Street, South Maple Street, and Industrial Road crossings as shown in Table 3.15-8. In addition, the adjacent industrial site (REG, formerly Imperium Terminal Services) releases cars and receives cars that occupy grade crossings. Including all trains (grain, auto, and mixed carload freight trains) and switching operations (delivery of rail cars to and from the project site and adjacent site), the average daily grade-crossing occupancy time is 14 minutes at Port Industrial Road, 17 minutes at West 1st Street, and 43 minutes at Industrial Road.

3.15.4.8 Running Time between Centralia and Poynor Yard in Aberdeen

PS&P trains between the BNSF main line in Centralia and the Poynor Yard in Aberdeen during a 30-day sample period had the following average running times.

- The aggregate average nonstop running time for all trains was 2 hours 43 minutes.
- The average running time for all trains was 6 hours 3 minutes (includes stopping time).
- The longest running time was 22 hours 53 minutes.

The variances in running times are a direct result of the operational constraints identified in Section 3.15.4.7, *Current PS&P Capacity and Operations.* The capacity limitation on the PS&P line is not related to mainline deficiencies between Centralia and Aberdeen, but rather the lack of sufficient space for cars (e.g., sidings, yards) to break down and deliver cars to customers at these locations. Detailed information related to these running times can be found in the stringlines and accompanying data tables in Appendix K, Section K.2, *Rail Traffic Technical Information*.

PS&P has committed to the following operating guidelines related to safe transport of crude oil in the study area (Irvin pers. comm.).

- Operating crude oil trains with no planned stops between the proposed facility and the destination.
- Never leaving loaded crude oil or other hazardous materials trains unattended.
- Providing a crew of at least two people whenever crude oil is being transported.

3.15.5 What are the potential impacts on rail traffic?

This section describes impacts on rail traffic that could occur in the study area. Potential impacts of the no-action alternative are described first as a baseline for comparing the potential impacts of the proposed action.

3.15.5.1 No-Action Alternative

Under the no-action alternative, the applicant would continue to operate its existing facility as described in Chapter 2, Section 2.1.3.2, *Existing Operations*. Although the proposed action and related rail traffic would not occur, it is assumed that growth in the region would continue under the no-action alternative, which could lead to development of another industrial use at the project site. However, the Washington State Department of Transportation Freight Mobility Plan (2014b:75–76) projects zero growth in the number of trains along the PS&P rail line over the next 20 years.[13] Increased rail traffic, if any, would likely be in the form of additional cars in a typical train and not in the form of additional entire trains. Potential impacts on rail capacity (unrelated to the proposed action) are discussed below.

With no projected growth in freight rail traffic, rail traffic would remain the same as existing conditions, which are far below current capacity between Centralia and east Aberdeen. Rail traffic delays described in Section 3.15.4.7, *Current PS&P Capacity and Operations*, would continue under the no-action alternative. Implementation of the projects identified by PS&P (Section 3.15.3.2, *Impact Analysis, Rail Simulation Modeling*) would theoretically increase mainline capacity between Centralia and Poynor Yard from 12 trains per day to 19 trains per day. However, because rail traffic is currently substantially less than the capacity of the line (between but not including Centralia and Poynor Yard), the sidings would increase efficiency by reducing rail traffic delay and making rail operations more flexible.

Existing capacity constraints associated with rail operations at and near Poynor Yard would continue under the no-action alternative. Although improvements would provide for additional

[13] The rail traffic projections in the Freight Mobility Plan do not include the proposed action and the reasonably foreseeable future actions identified in Table 6.4-1 in Chapter 6, *Cumulative Impacts*, which would add new rail traffic to the PS&P rail line.

flexibility and alleviate, to some degree, the duration of occupied grade crossings, existing rail traffic would continue to result in occupying grade crossings in the Port of Grays Harbor and east Aberdeen areas, as described in Section 3.15.4.7, *Current PS&P Capacity and Operations*. Vehicle delays at grade crossings would continue under the no-action alternative, as discussed in Section 3.16, *Vehicle Traffic and Safety*.

3.15.5.2 Proposed Action

This section describes the impacts that could occur in the study area as a result of construction and routine operation of the proposed action. Impacts on vehicle traffic delay at grade crossings are discussed in Section 3.16, *Vehicle Traffic and Safety.* Impacts related to rail safety are discussed in Chapter 4, *Environmental Health and Safety*.

Construction

Construction of the proposed action would not modify existing PS&P rail line facilities and would have no impact on rail traffic.

Operations

Operation of the proposed action at maximum throughput would result in approximately 458 unit train trips per year, or approximately one trip per day on average. Table 3.15-9 summarizes trips under the proposed action. The trips identified in Table 3.15-9 are used to assess potential impacts of the proposed action; therefore, the discussion of potential impacts assumes the maximum annual throughput.

Table 3.15-9. Unit Train[a] Trips[b] at Maximum Throughput—Proposed Action

Average Daily	Average Weekly	Maximum Annual
1.25	8.8	458

[a] Assumes 120-car unit trains (1.25 miles in length).
[b] Trips represent one-way travel; an eastbound trip and a westbound trip would be counted as two trips.

The following sections describe impacts of the proposed action on PS&P rail line capacity and operations between Centralia and east Aberdeen, and between east Aberdeen and the project site.

Rail Capacity and Operation between Centralia and East Aberdeen

As discussed previously, stringline and train performance calculator analyses indicate that the PS&P rail line has the theoretical capacity to handle up to 12 trips per day. Adding the approximately 1.25 unit train trips per day on average under the proposed action to the projected 3.1 trips under the no-action alternative (same as existing conditions, Table 3.15-5), the rail line would have capacity for an additional 7.7 trips per day.

Train Occupancy Times at Grade Crossings

Increased rail trips along the PS&P rail line related to the proposed action would increase train occupancy times at grade crossings between Centralia and east Aberdeen. The far-right column of Table 3.15-10 lists the average daily grade-crossing occupancy time at selected crossings for all trains (grain, auto, mixed carload freight, and proposed action train trips) compared to the no-action

alternative. These crossings are already in the top 10 in the rail corridor for average daily traffic and blocked crossings (the other crossings are located in Aberdeen). Because rail traffic is not projected to increase between 2017 and 2037, other than that related to the proposed action, grade-crossing occupancy time would remain the same in both years. Impacts of these blockages on vehicles and pedestrians are discussed in Section 3.16, *Vehicle Traffic and Safety*.

Table 3.15-10. Average Daily Grade-Crossing Occupancy Time[a] at Selected Crossings between Centralia and East Aberdeen—No-Action Alternative and Proposed Action

Grade Crossing	Milepost	Location	No-Action Alternative	Proposed Action[b]
Tower Street (SR 507)	0.82	Centralia	26 minutes	39 minutes
Pearl Street (SR 507)	0.89	Centralia	26 minutes	39 minutes
West Reynolds Street	2.14	Centralia	17 minutes	28 minutes
Old Highway 99 SW	6.07	Unincorporated Thurston County	8 minutes	15 minutes
Monte Elma Road	51.98	Satsop	7 minutes	12 minutes

[a] Occupancy times rounded to the nearest minute.
[b] Times include no-action and proposed action trains.

Rail Capacity and Operation between East Aberdeen and the Project Site

Current operations at the project site would continue under the proposed action. However, the addition of unit train delivery and release would increase the length of time needed to perform these operations, as described below.

Switching Operations Into and Out of the Project Site

Switching operations of trains into and out of the project site would be similar to existing operations. Appendix K, *Rail Traffic Technical Information*, Section K. 3, *Proposed Switching Operations,* illustrates how these operations would occur. However, actual operations could vary and would depend on specific circumstances such as the availability of the crewmembers and space and facilities in Poynor Yard. The estimated process of delivering and releasing a 120-car unit train is summarized as follows.

Upon arrival, the unit train would stop at Poynor Yard. The crew would use the locomotive on the front (west) end of the train to back the head-end 80 cars into the yard tracks, about 20 cars to a track. This process would occupy the grade crossings between Port Industrial Road and Poynor Yard. After all cars are in the yard, the leading locomotive and buffer car would remain and the crew would board the distributed power unit, disconnect radio control, and push the remaining cars in the train to the project site.

A crewmember would ride the leading car into the project site to the end of the track. This crewmember would control the movement by giving directions to the engineer by radio. When the leading end of the train reaches the desired position near the end of the track, the movement would be stopped. The crewmember would walk back to the east end of the track, apply hand brakes to the cars, uncouple the remaining train, and instruct the engineer to back up until the train has cleared

the next delivery track. The crewmember would align the switches for the next track, board the leading end of the train, and repeat the procedure.

The project site would only accommodate 20 cars of a unit train (120 cars) for each rail spur, so the train would need to be delivered in six separate switching operations. The leading 20 cars would be pushed into a track and the remaining 20 would be pushed into the adjacent track.

Once the first 40 cars are released (emptied) by the applicant, a crew would run a locomotive from Poynor Yard to the project site, couple to 20 cars in one track, add another 20 cars in the adjacent track, pull them to east of Poynor Yard, then double them into the yard. This process would be repeated three times for a full delivery of one unit train to the project site. The empty cars would be given a mechanical and air brake inspection in Poynor Yard then doubled together in the same manner as the empty train from the project site, blocking crossings for the same period. The delivery and releasing of cars would occupy the grade crossings between Poynor Yard and the project site.

When the cars are released to return empty, they would be moved to Poynor Yard for mechanical and air brake inspection before being assembled into a train and returned to BNSF. A crewmember would run a locomotive from Poynor Yard to the project site, couple to 20 cars in a track, add another 20 cars in an adjacent track, pull them to Poynor Yard, and double them into the yard. This entire process would be repeated two more times. The empty cars would be given a mechanical and air brake inspection in Poynor Yard, then the distributed power unit and buffer car would be coupled to the west end of a track of about 20 cars. The leading locomotive and buffer car would be coupled to the east end of about 20 cars in another track. The train would then be doubled several times until the entire 120 cars are coupled and the air brakes are connected. The process is time-consuming. The grade crossings east of Poynor Yard would be blocked for an extended period as described below. Section K.4 of Appendix K, *Rail Traffic Technical Information,* illustrates the operation in use to inspect empty trains at Poynor Yard prior to their movement onto the rail line and eventually onto the BNSF main line.

Train Occupancy Times at Grade Crossings

Proposed action unit trains would contain 120 cars; these trains are longer than existing trains serving the project site and would therefore increase train occupancy times at grade crossings between east Aberdeen (Olympic Gateway Plaza area) and the project site. Figures 3.15-6 and 3.15-7 illustrate westbound and eastbound occupancy times by train type in east Aberdeen. Table 3.15-11 illustrates the maximum occupancy times for the proposed action and no-action alternative trains at selected grade crossings.

Figure 3.15-6. Westbound Train Occupancy Times (per trip) by Train Type at Selected Grade Crossings East of Poynor Yard

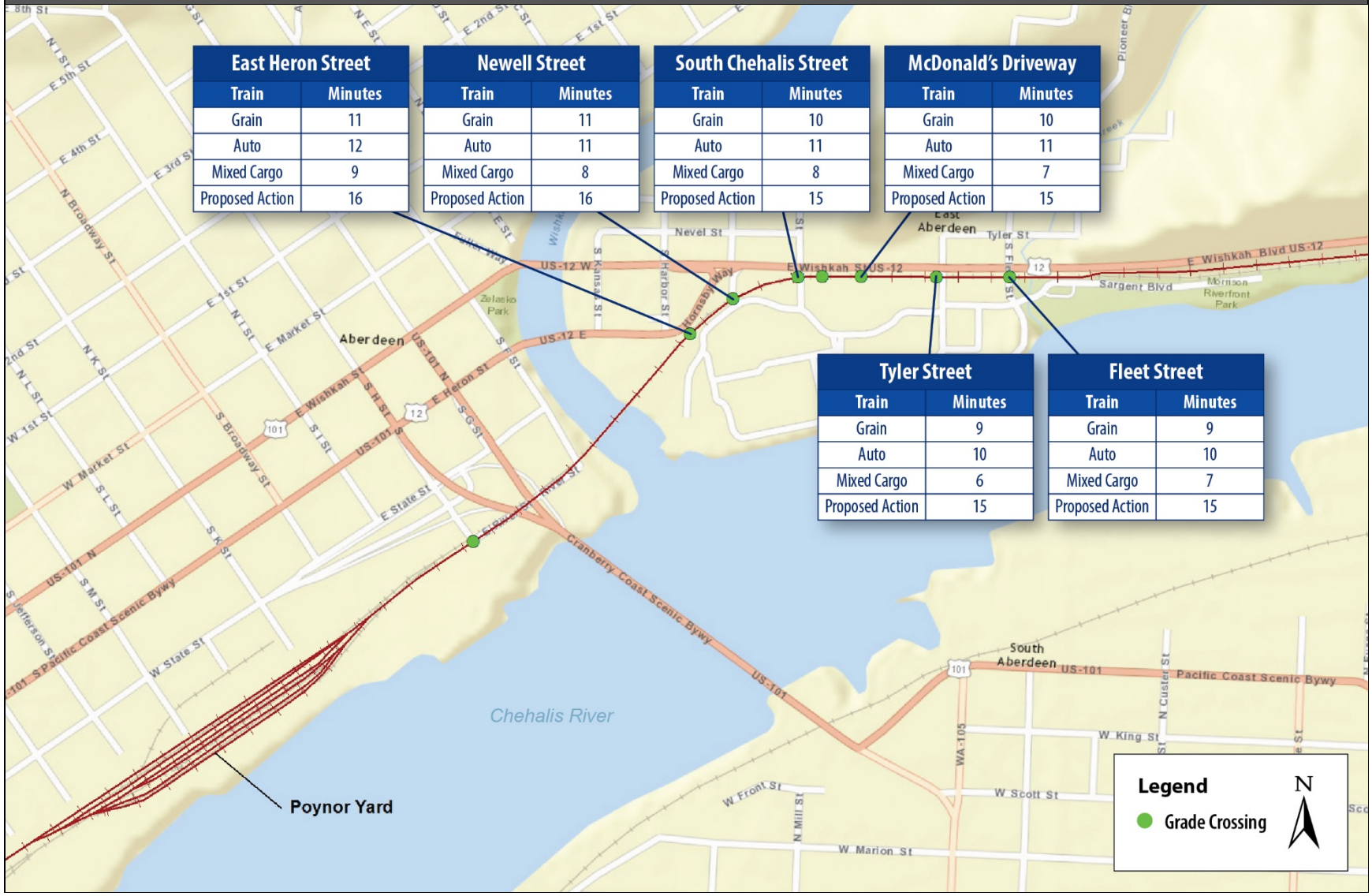


Figure 3.15-7. Eastbound Train Occupancy Times (per trip) by Train Type at Selected Grade Crossings East of Poynor Yard

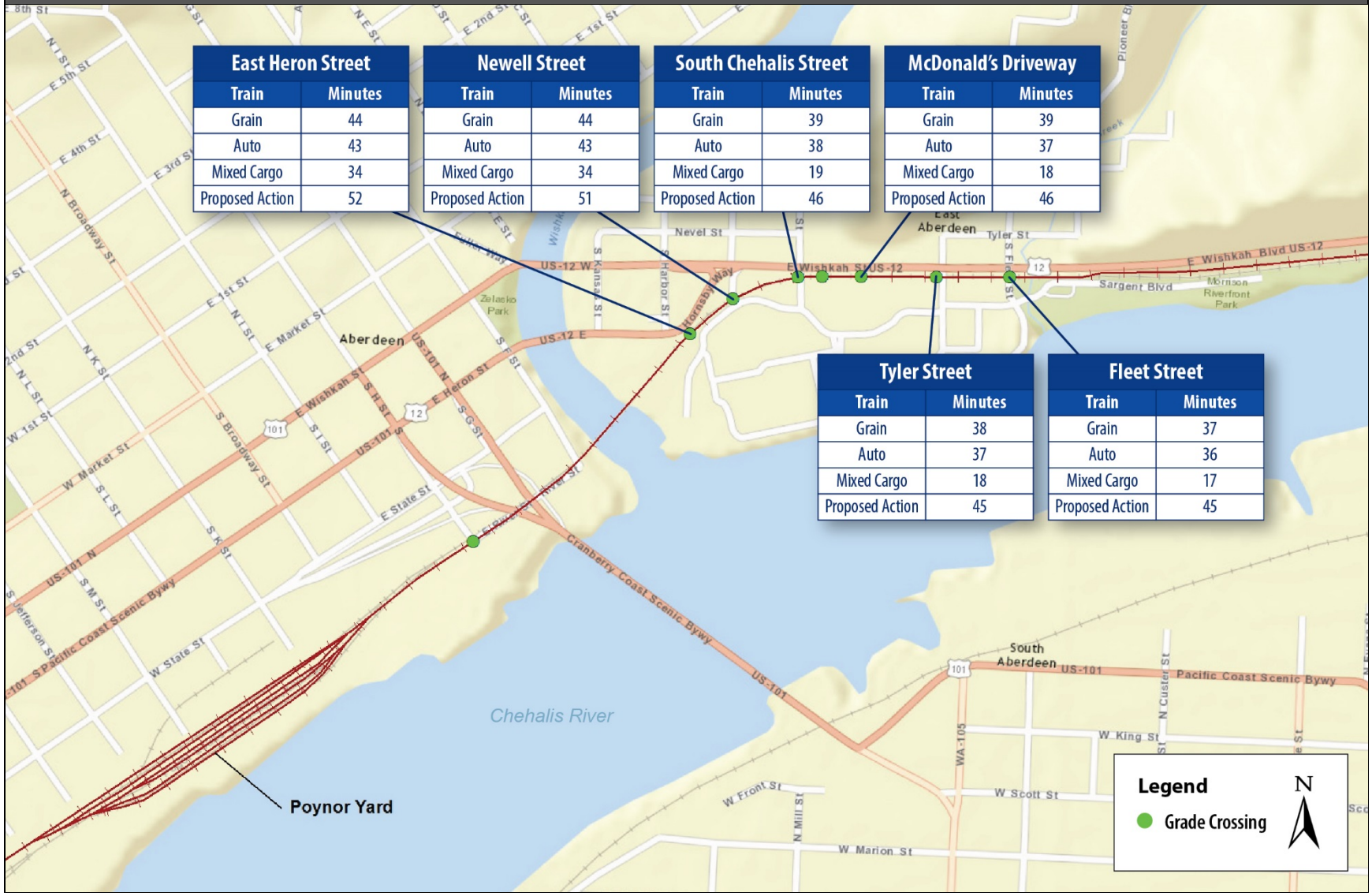


Table 3.15-11. Maximum Occupancy Time (per trip) at Selected Grade Crossings—No-Action Alternative and Proposed Action [a]

Grade Crossing	No-Action Alternative	Proposed Action
Fleet Street	37 minutes	45 minutes
East Heron Street	44 minutes	52 minutes
Port Industrial Road	9 minutes	10 minutes
West 1st Street	7 minutes	14 minutes
Industrial Road	13 minutes	22 minutes

[a] Occupancy times rounded to the nearest minute.

Unit train trips under the proposed action would increase the maximum train occupancy times at all grade crossings in Aberdeen. For example, the maximum train occupancy time at East Heron Street would increase from 44 minutes to 52 minutes under the proposed action. The increase in occupancy times at the grade crossings east of Poynor Yard would be from switching operations to build up departing trains at and east of the Poynor Yard. The increase in train occupancy times at the grade crossings west of Poynor Yard would be from arriving trains and switching operations to break down trains at and west of Poynor Yard.

Unit train trips under the proposed action would also increase the frequency of trains occupying grade crossings in Aberdeen by approximately 8.8 times per week on average. All grade crossings in the Olympic Gateway Plaza area (from East Heron Street to Fleet Street) would be occupied for more than 35 minutes on average 3.9 times per week from eastbound grain and auto trains under the no-action alternative. The addition of the proposed action train traffic to existing/no-action train traffic would increase occupancy times at grade crossings from 3.9 times per week to 8.3 times per week.

The far-right column of Table 3.15-12 illustrates the average daily train occupancy time at selected grade crossing for all trains (no-action and proposed action trains). Appendix L, *Vehicle Traffic Analysis*, provides the daily occupancy time at all crossings.

Table 3.15-12. Average Daily Train Occupancy Time[a] at Selected Grade Crossings—No-Action Alternative and Proposed Action

Grade Crossing	No-Action Alternative	Proposed Action[b]
Fleet Street	49 minutes	1 hour 26 minutes
East Heron Street	1 hour 10 minutes	1 hour 52 minutes
Port Industrial Road	14 minutes	39 minutes
West 1st Street	17 minutes	50 minutes
Industrial Road	43 minutes	1 hour 30 minutes

[a] Occupancy times rounded to the nearest minute.
[b] Times include no-action and proposed action trains.

The addition of proposed action trains would substantially increase the average daily occupancy at grade crossings in Aberdeen. For example, the East Heron Street crossing is currently occupied an average of 1 hour and 10 minutes daily from grain, auto, and mixed carload freight trains. With proposed action train trips, the East Heron Street crossing would be occupied an average of 1 hour and 52 minutes daily. Impacts of these blockages on vehicles and pedestrians are discussed in Section 3.16, *Vehicle Traffic and Safety*.

3.15.6 What required permits and plans apply to rail traffic?

No required permits or plans apply to rail traffic.

3.15.7 What mitigation measures would reduce impacts on rail traffic?

Impacts on rail traffic resulting from the proposed action are not considered significant and would not necessitate mitigation beyond the minimum requirements specified by applicable laws and regulations.

Mitigation measures to reduce impacts on vehicle traffic delay at grade crossings are presented in Section 3.16, *Vehicle Traffic and Safety.* Mitigation measures to reduce impacts on environmental health and safety from increased risk of incidents and related consequences are presented in Chapter 4, *Environmental Health and Safety*.

3.15.8 Would the proposed action have unavoidable and significant adverse impacts on rail traffic?

There would be no unavoidable and significant impacts. Potential impacts on vehicle traffic and safety from increased rail traffic are addressed in Section 3.16, *Vehicle Traffic and Safety*. Potential impacts related to increased risk of incidents and related consequences are addressed in Chapter 4, *Environmental Health and Safety*.