

3.16 Vehicle Traffic and Safety

Vehicles provide transportation for individuals to travel to work, school, and for recreational purposes. Vehicles also are used for emergency response and for the delivery of commercial goods that support economic activity. Vehicle delays increase travel time for motorists and can affect quality of life and economic growth.

This section describes vehicle traffic and safety in the study area, including existing traffic congestion and safety conditions. It then describes impacts on vehicle traffic and safety that could result under the no-action alternative or as a result of the construction and routine operation¹ of the proposed action. Finally, this section presents any measures identified to mitigate impacts of the proposed action on vehicle traffic and safety and any remaining unavoidable and significant adverse impacts.

3.16.1 What is the study area for vehicle traffic and safety?

The study area for vehicle traffic and safety consists of the roadways near the project site that could be affected by increased vehicle traffic from construction and routine operation of the proposed action. The study area also includes the public roadways that cross the Puget Sound & Pacific Railroad (PS&P)² rail line.

3.16.2 What laws and regulations apply to vehicle traffic and safety?

The laws and regulations for determining potential impacts on vehicle traffic and safety are summarized in Table 3.16-1. More information about these laws and regulations and applicable land use policies is provided in Appendix B, *Laws and Regulations*. For additional details related to rail operations, see Section 3.15, *Rail Traffic*.

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 or other proposed bulk liquids).

² The PS&P rail line refers to the rail line between the BNSF main line in Centralia and the project site.

Table 3.16-1. Laws and Regulations for Vehicle Traffic and Safety

Laws and Regulations	Description
Federal	
Railroad Safety Act of 1970 (49 U.S.C. 20101–20144; 21301–21304)	Authorizes FRA with rulemaking authority over all areas of rail line safety.
Highway Safety Act (23 U.S.C. 4), Railroad Safety Act (49 CFR 200–299)	Gives FHWA and FRA regulatory jurisdiction over safety at federal highway/rail grade crossings.
Railroad Safety Enforcement Procedures (49 CFR 200-209)	Grants FRA authority to regulate safety, track, signaling, and rolling stock for common carrier rail lines that are part of the general rail line system of transportation.
Manual on Uniform Traffic Control Devices (23 U.S.C. 109(d))	Provides standards and guidelines for traffic control devices.
State	
Transportation System Policy Goals (RCW 47.04.280)	Establishes the following goals for the transportation system in Washington State: economic vitality, preservation, safety, mobility, environment, and stewardship.
Railroads—Operating Requirements and Regulations (RCW 81.48)	Establishes railroad operating requirements and regulations with regard to obstruction of trains, train speed, and safety.
Railroads—Crossings (RCW 81.53)	Provides standards, preference, and guidelines for highway rail crossings.
Motor Vehicles—Rules of the Road (RCW 46.61)	Establishes rules of the road for vehicle and rail crossings.
Grade-Crossing Petitions (WAC 480-62-150)	Requires that a petition is filed for creation or changes to a grade crossing.
City Streets as Part of State Highways (RCW 47.24)	Regulates the maintenance and jurisdictional control for city streets that are part of state highways.
Local	
Traffic Regulations (AMC 10.64 and HMC 1.45)	Establishes regulations for vehicle traffic and emergency services in the respective cities.
FRA = Federal Railroad Administration U.S.C. = United States Code; FR = Federal Regulation RCW = Revised Code of Washington; OPA 90 = Oil Pollution Act of 1990	

3.16.3 How were impacts on vehicle traffic and safety evaluated?

This section describes the sources of information methods used to evaluate impacts. Additional details are presented in Appendix L, *Vehicle Traffic Analysis*.

3.16.3.1 Information Sources

Several data sources were used to characterize vehicle traffic, including grade-crossing³ delay and safety conditions.

³ Grade crossings are intersections of a rail line and a highway at the same grade—no overpasses or underpasses separate the crossing.

- | Annual average daily traffic volumes adjusted to the analysis year (2017 or 2037). The adjusted annual average daily traffic volumes were used to determine peak hour traffic volumes.
- | Existing train traffic (average number of trains per day) and operating speed on the PS&P rail line (Federal Railroad Administration 2014a).
- | Future vehicle and train traffic to and from the project site as estimated by the applicant (Chapter 2, *Proposed Action and Alternatives*).
- | Train characteristics, including number of cars (train length) and speed.

Vehicle Traffic

Estimates of annual average daily traffic for vehicles at each public road crossing along the PS&P rail line were calculated for existing year, 2017, and 2037 based on data obtained from local agencies, Washington State Department of Transportation (WSDOT), and Federal Railroad Administration (FRA). Annual average daily and peak hour traffic volumes were factored to reflect the analysis years (2017 and 2037). Field observation and data collection supplemented available traffic volumes. These data were used to characterize estimated future vehicle traffic along area roadways adjacent to grade crossings of the PS&P rail line.

The following planning studies address vehicle delay and safety in the study area:

- | The *U.S. 101 Regional Circulation Project Report* (Washington State Department of Transportation 2007) examined congestion along the US Route 101 (US 101) corridor, US Route 12 (US 12), and State Route 109 (SR 109) in Aberdeen, Hoquiam, and Cosmopolis. Intersections were found to be experiencing congestion issues and moderate levels of vehicle delay.
- | A planning study by the Grays Harbor Council of Governments is underway. The East Aberdeen Mobility Project will identify ways to relieve congestion and improve safety along US 12 and potential improvements to access into the Olympic Gateway Plaza.

Vehicle Safety

Ten years of collision records (2003 to 2013) for the study area were obtained from WSDOT and FRA (Washington State Department of Transportation 2014; Federal Railroad Administration 2014a).

3.16.3.2 Impact Analysis

The following sections describe the methods for the impact analysis. More information on the methods is located in Appendix L, *Vehicle Traffic Analysis*.

Onsite

The onsite impact analysis considered the number of trips that would be generated by employees traveling to and from the project site during construction and operations. As noted in Chapter 2, *Proposed Action and Alternatives*, transport of crude oil or bulk liquids associated with the proposed action would rely on rail and vessel transport. It is anticipated that tanker truck traffic would remain the same as for existing conditions and would not change average daily traffic on surrounding roadways.

Rail

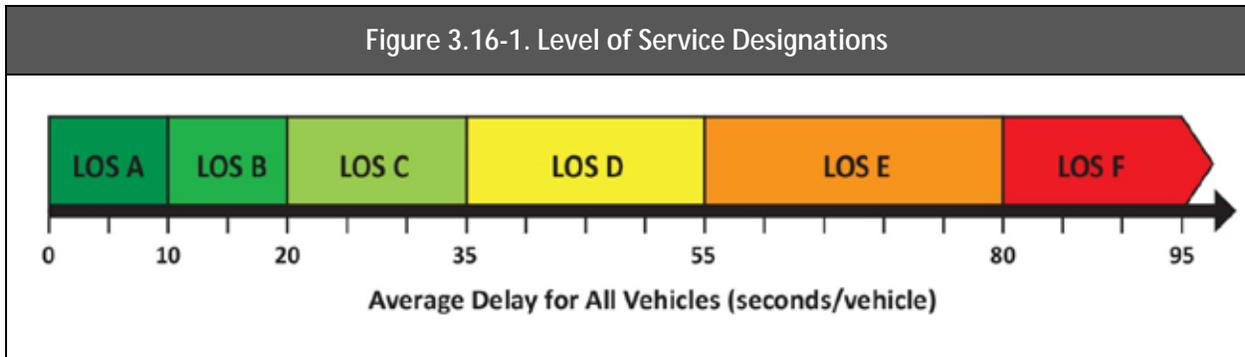
The analysis of vehicle impacts along the PS&P rail line considered the potential impact on vehicle traffic and safety associated with rail traffic related to operation of the proposed action at maximum throughput. In other words, this analysis assumes that the proposed action would begin operating rail traffic at 100% throughput. However, a more gradual ramp-up may occur, during which additional infrastructure improvements, could offset some of the impacts identified in this section. The potential vehicle impacts addressed in this analysis include increases in average vehicle delay in a 24-hour period (average vehicle delay), peak hour vehicle delay, vehicle queuing, vehicle safety, and emergency access. The analysis evaluates existing conditions (2015), opening year (2017) conditions when proposed action trains would begin to operate on the PS&P rail line, and 2037 conditions. This 20-year horizon provides a general assessment of vehicle traffic and safety conditions in the future.

Section 3.15, *Rail Traffic*, describes the switching operations when a train arrives at the project site. As described in that section, an alternative method could deliver rail cars to the project site that would reduce train occupancy times at the grade crossings between Poynor Yard and the project site in the Port of Grays Harbor area. However, this alternative method would not be the most cost-efficient and time-efficient approach for PS&P and is not anticipated to be the preferred method to deliver rail cars to the project site. For this reason, the vehicle analysis assumes the switching operations method that would have a greater impact on vehicle traffic in the Port of Grays Harbor area.

Average Vehicle Delay

Unlike passenger trains, freight trains do not run on a schedule. Railroad companies 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 impact of rail operations requires analyzing the rail traffic and developing typical operations. These operations measurements and support analysis and projections, as addressed in Section 3.15, *Rail Traffic*. Because trains along the PS&P rail line do not run on a schedule, this analysis uses average vehicle delay as the primary method to characterize vehicle delay at PS&P rail line grade crossings.

A level of service (LOS) scale rates the quality of traffic operations on a given transportation facility by using letter grades A through F (Transportation Research Board 2010). LOS designations were used to provide a qualitative measure of average vehicle delay at grade crossings (Figure 3.16-1). The letter grades are based on the average vehicle delay that drivers would experience at a PS&P grade crossing, with LOS A representing the least delayed conditions with an average delay for all vehicles between 0 and 10 seconds. A LOS F indicates the most delayed conditions (average vehicle delay of more than 80 seconds).



According to WSDOT LOS standards, LOS D or better is acceptable for urban highways and LOS C or better is acceptable for rural highways in Grays Harbor County and Thurston County (Washington State Department of Transportation 2009). The local jurisdictions along the PS&P rail line do not have LOS standards for PS&P grade crossings. Therefore, the WSDOT LOS standard of D was generally used as guidance to determine potential vehicle delay impact at PS&P grade crossings. However, because there are no applicable LOS standards for non-WSDOT facilities, this standard is not a required threshold to determine significance of the impact.

Average vehicle delay was calculated at each public PS&P grade crossing in the study area to determine how the crossings would operate in 2017 and 2037⁴ for the no-action alternative and the proposed action. The average delay per vehicle in a 24-hour period is based on the estimated time each train would block the crossing, the average number of trains per day, and grade-crossing characteristics (such as annual average daily traffic and number of roadway lanes). This average vehicle delay in seconds per vehicle was then converted to the applicable LOS designation (Figure 3.16-1) to provide a qualitative measure of vehicle delay at PS&P grade crossings for comparison with the no-action alternative.

Peak Hour Vehicle Delay

As previously noted, it is not possible to predict when a train might travel on the PS&P rail line under existing conditions or related to the proposed action. To describe the highest potential vehicle delay impacts that could occur related to the proposed action, an analysis of vehicle delay during the peak traffic hour was completed. The peak traffic hour is the hour of the day when the highest number of vehicles travel study area roads. It was assumed that the longest unit train would travel during the peak hour of traffic. Vehicle traffic during the peak hour was assumed to be 11.5% of the annual average daily traffic data based on available traffic count data, except where location-specific hour traffic data were available. The LOS scale in Figure 3.16-1 was used to assess peak hour vehicle delay.

The peak hour vehicle delay assumes the longest train under consideration (a grain train for existing conditions and no-action alternative, and a unit train for the proposed action) would operate during the peak hour. This is a very conservative assumption, because based on the average number of trains operating per day under existing conditions, the no-action alternative, and the proposed

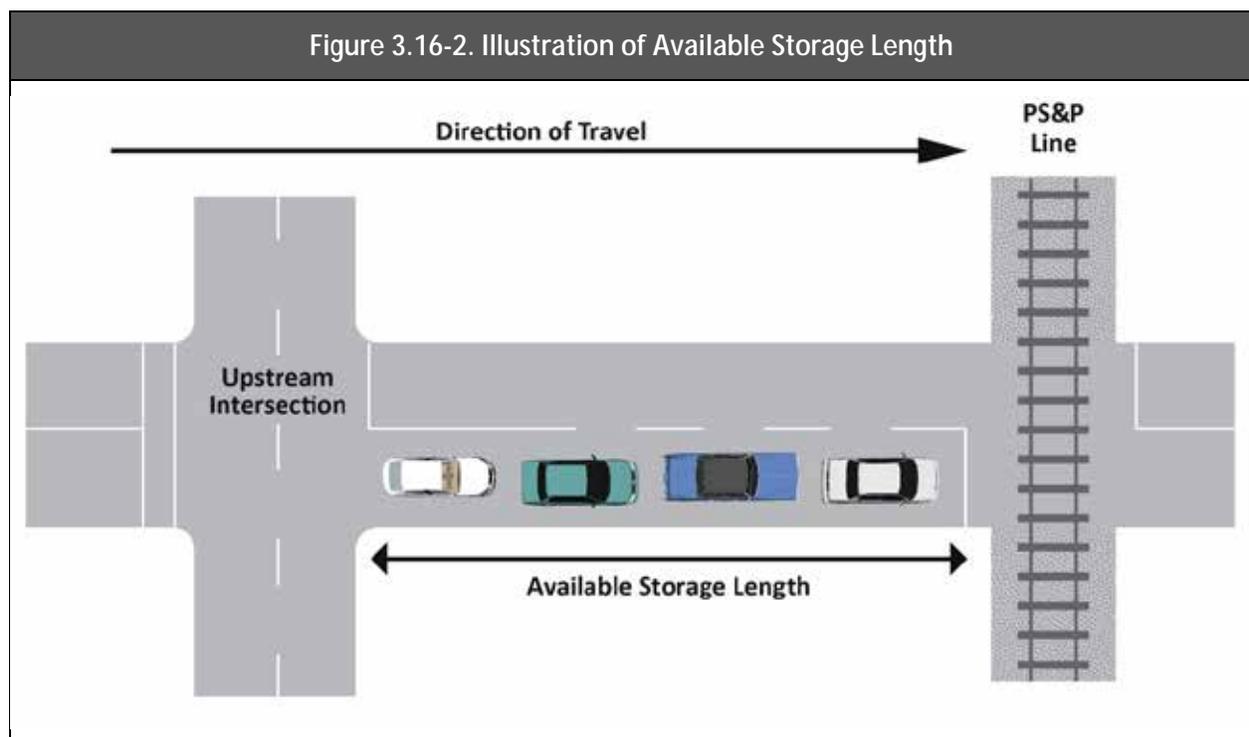
⁴ The annual traffic growth rate at PS&P rail line grade crossings between 2017 and 2037 was assumed to be 1.5% based on available traffic count data and input from the Washington State Department of Transportation.

action, there would be a low probability that a train related to the proposed action would travel during the peak traffic hour.

Vehicle Queuing

Vehicle delay from trains blocking grade crossings can affect upstream intersections. Each PS&P grade crossing has a storage length to store vehicles when the crossing is blocked. The available storage length is the distance between the crossing and upstream intersection (Figure 3.16-2). As vehicles queue, the distance that vehicles extend back from the crossing while waiting at a blocked crossing increases.

Years 2017 and 2037 vehicle volumes were used to calculate average queue length to determine if the queue length exceeded the available storage capacity. Queue length, which is the total average length of vehicles per lane, was calculated based on the number of vehicles delayed due to gate down times throughout a 24-hour period and an average vehicle length of 20 feet. Queue lengths were calculated at 25 key crossings in the study area.



Vehicle Safety

Vehicle safety at PS&P grade crossings was analyzed by estimating future accident frequency and the corresponding predicted interval between accidents with and without the addition of proposed action rail traffic. The FRA GradeDec.Net model was used to analyze public PS&P grade crossings (Federal Railroad Administration 2014b). This model accounts for accident history and frequency of trains at existing at-grade crossings, volume of vehicle traffic, existing safety devices at the at-grade crossings, and other factors to determine the potential impacts of an increase in rail traffic. For

grade crossings not included in the GradeDec.Net model, the FRA accident prediction formula was used to calculate a total predicted annual accident rate.

Emergency Access

An increase in vehicle delay at PS&P grade crossings could affect emergency access and response time. A qualitative analysis was conducted to identify potential impacts on emergency vehicle response and access under the proposed action at PS&P grade crossings. The analysis identified areas along the PS&P rail line where the emergency vehicle response and access would substantially change.

3.16.4 What are the existing vehicle traffic and safety conditions in the study area?

This section describes vehicle traffic and safety conditions in the study area that could be affected by construction and routine operation of the proposed action. The specific roadways and grade crossings considered in the analysis are presented in Appendix L, *Vehicle Traffic Analysis*.

3.16.4.1 Vehicle Traffic

This section provides a summary of existing vehicle traffic conditions related to onsite operations at the project site and from existing rail traffic along the PS&P rail line.

Onsite

Under existing conditions, vehicle trips generated by employees regularly on site are estimated to be 50 per day.

Rail

This section provides general information about vehicle traffic in the context of the PS&P grade crossings in the study area, key areas of vehicle delay in the study area, and planning studies to address vehicle delay. Appendix L, *Vehicle Traffic Analysis*, identifies the emergency service providers in the study area.

The road network from Centralia consists of arterial, collector, and local roads that cross and parallel the PS&P rail line. Figure 3.15-2 and 3.15-3 in Section 3.15, *Rail Traffic*, illustrate the PS&P rail line. There are 81 public at-grade crossings of the PS&P rail line between Centralia and the project site. Information on the PS&P grade crossings in the study area is summarized as follows.

- | Roadways with grade crossings on the PS&P rail line are classified as follows: four arterials, 13 collectors, and 64 local roads.
- | The annual average daily traffic in both directions at the 81 grade crossings ranges from approximately 20 vehicles (at four crossings) to approximately 17,310 vehicles (at Port Industrial Road in Aberdeen).
- | The annual average daily traffic at the 81 crossings is approximately 1,425 vehicles. However, 60 of the 81 crossings have an average daily traffic of less than 900 vehicles.

Table 3.16-2 illustrates the 10 grade crossings with the highest average daily traffic from Centralia to the project site, and the existing LOS for average and peak hour vehicle delay. Three crossings are located in Centralia, one is located in unincorporated Thurston County and Satsop, and five crossings are located in Aberdeen.

Table 3.16-2. Top 10 Grade Crossings by Annual Average Daily Traffic

Grade Crossing	Milepost	Location	Approximate 2015 Annual Average Daily Traffic	Level of Service (Average Vehicle Delay)	Level of Service (Peak Hour)
Tower Street (State Route 507)	0.82	Centralia	7,785	A	F
Pearl Street (State Route 507)	0.89	Centralia	13,340	A	F
West Reynolds Street	2.14	Centralia	6,190	A	C
Old Highway 99 SW	6.07	Unincorporated Thurston County	9,850	A	C
Monte Elma Road	51.98	Satsop	4,625	A	A
Tyler Street	68.23	Aberdeen	3,925	B	F
South Chehalis Street	68.36	Aberdeen	4,760	C	F
Port Industrial Road	70.06	Aberdeen	17,310	A	F
West 1st Street	70.41	Aberdeen	4,485	A	E
Industrial Road	71.04	Aberdeen	5,620	B	F

Vehicle delay occurs in several areas along the PS&P rail line. The two most substantial areas of vehicle traffic along the PS&P rail line are in Centralia and Aberdeen, as shown in Table 3.16-2.

Centralia

Traffic congestion issues exist in Centralia at the Tower Street and Pearl Street PS&P grade crossings when trains are delayed in entering the BNSF Railway Company (BNSF) main line and wait on the PS&P rail tracks, blocking the Tower Street and Pearl Street crossings. Delays are also experienced if a train were to pass during the Tower Street and Pearl Street crossings during the peak traffic periods.

Aberdeen

Traffic along the US 101 and US 12 corridors between Aberdeen and Hoquiam is becoming more congested due to growth at the Port of Grays Harbor and overall vehicle traffic growth from population growth (Grays Harbor Council of Governments 2009).

In the Olympic Gateway Plaza and Port of Grays Harbor areas in Aberdeen, existing vehicle delay is further worsened by current rail operations at Poyner Yard. As described in Section 3.15, *Rail Traffic*, trains leaving Aberdeen traveling east typically have more cars than one yard track can hold,

and it is necessary to couple cars located on multiple tracks in Poynor Yard to create one eastbound train. These operations block the seven PS&P grade crossings east of the Wishkah River.

Figure 3.15-4 in Section 3.15, *Rail Traffic*, illustrates the location of these crossings. East Heron Street, the crossing furthest to the west and closest to Poynor Yard, has the longest blockage time. Fleet Street, the crossing furthest to the east has the shortest blockage time of the crossings in the Olympic Gateway Plaza area. Section 3.15, *Rail Traffic*, describes the duration and frequency that trains block these crossings.

At times, all entrances to the Olympic Gateway Plaza can be blocked. This occurs periodically when a grain or auto train is moving east from the Port of Grays Harbor area. As a result, the Grays Harbor Council of Governments is leading a study, called the East Aberdeen Mobility Project, to examine ways to relieve congestion, improve safety along US 12, and improve access into the Olympic Gateway Plaza. Options being considered include possible grade-separated entrances to the plaza.

Trains also block the crossings west of Poynor Yard. As described in Section 3.15, *Rail Traffic*, switching operations⁵ related existing operations at the project site and adjacent industrial site block the crossings west of Poynor Yard, including Port Industrial Road, West 1st Street, and Industrial Road. Figure 3.15-5 in Section 3.15, *Rail Traffic*, illustrates the location of these crossings. Section 3.15 also describes the duration and frequency that trains block these crossings.

3.16.4.2 Vehicle Safety

Collision records in the study area from 2003 to 2013 identified one collision involving a train that resulted in a possible injury at the Olympic Gateway Plaza access between Chehalis Street and Tyler Street in Aberdeen (Washington State Department of Transportation 2014; Federal Railroad Administration 2014a). The collision involved a right-turning vehicle not yielding the right-of-way to a slow-moving train.

3.16.5 What are the potential impacts on vehicle traffic and safety?

This section describes vehicle traffic and safety impacts 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.

3.16.5.1 No-Action Alternative

Under the no-action alternative, the applicant would continue to operate its existing facility as described in Chapter 2, *Proposed Action and Alternatives*. As noted in Section 3.16.4.1, *Vehicle Traffic*, existing rail operations that serve the project site and the immediately surrounding industrial area currently contribute to existing vehicle delays. Under the no-action alternative, these operations would continue to result in vehicle delays and grade-crossing safety concerns that are expected to increase slightly over the analysis period (2017 to 2037), primarily as the result of predicted

⁵ Switching operations are generally related to disassembling unit trains by setting rail cars on multiple tracks, rearranging rail cars on tracks to facilitate loading or unloading, sorting rail cars by destination, delivering rail cars to an industry, picking up rail cars from an industry, or assembling unit trains from rail cars on multiple tracks.

increases in vehicle traffic. Rail traffic anticipated under the no-action alternative is discussed in Section 3.15, *Rail Traffic*.

The complete results of the vehicle analysis are presented in Appendix L, *Vehicle Traffic Analysis*. The following summarizes key vehicle traffic and safety findings under the no-action alternative in 2017 and 2037. The analysis addresses three topics: vehicle delay (year 2017), vehicle delay (year 2037), and vehicle safety.

Vehicle Delay (Year 2017)

The following sections describe vehicle delay from ongoing operations at the project site and from rail operations along the PS&P rail line that would be expected in 2017 under the no-action alternative.

Onsite

Because the proposed action would not be constructed, the number of trips generated at the project site is anticipated to be the same as described for existing conditions.

Rail

Average Vehicle Delay

All PS&P grade crossings under the no-action alternative would operate at LOS C or better in 2017; no grade crossings would operate at or below LOS D in 2017.

Peak Hour Vehicle Delay

All crossings that would operate at LOS E or F are located in Centralia and Aberdeen (Olympic Gateway Plaza area and Port of Grays Harbor area). Under the no-action alternative, substantial vehicle delay would occur in these areas if a grain train, the longest train currently operating on the PS&P rail line, passes through the corridor during the peak traffic hour. Table 3.16-3 illustrates the grade crossings that would operate at LOS E or F during the peak traffic hour. All seven crossings in east Aberdeen in the Olympic Gateway Plaza area would operate at LOS F during the peak traffic hour. All crossings between Port Industrial Road and the project site would operate at LOS E or F.

Table 3.16-3. Grade Crossings Operating Below Level of Service D during the Peak Traffic Hour – No-Action Alternative (2017)

Grade Crossing	Level of Service (Peak Hour Delay)
Centralia	
Tower Street (SR 507)	F
Pearl Street (SR 507)	F
East Aberdeen (Olympic Gateway Plaza Area)	
Fleet Street	F
Tyler Street	F
McDonalds Entrance	F
Dairy Queen Entrance	F
South Chehalis Street	F
Newell Street	F
East Heron Street	F
Port of Grays Harbor	
Port Industrial Road	F
West 1st Street	E
North Maple Street	F
Industrial Road	F

Average Vehicle Queuing

Table 3.16-4 illustrates the grade crossings that would exceed the available storage length under the no-action alternative in 2017. The queue lengths at these crossings would back into upstream intersections.

Table 3.16-4. Average Queue Lengths Exceeding Available Storage Length—No-Action Alternative (2017)

Grade Crossing	Queue Direction	Crossing Location	Upstream Intersection Affected by Queue
Centralia			
Tower Street (SR 507)	Northbound	SR 507 northbound in central Centralia.	4th Street
Pearl Street (SR 507)	Southbound	SR 507 southbound in central Centralia.	6th Street
East Aberdeen (Olympic Gateway Plaza Area)			
Fleet Street	Northbound	Exit from Olympic Gateway Plaza at US 12.	Olympic Gateway Plaza parking lot
Tyler Street	Northbound	Exit from Olympic Gateway Plaza at US 12	Olympic Gateway Plaza parking lot
Chehalis Street	Northbound	Exit from Olympic Gateway Plaza at US 12	Olympic Gateway Plaza parking lot
East Heron Street	Eastbound Right-Turn	Right-turn from US 12 eastbound to Olympic Gateway Plaza.	South F Street

Two crossings are located in Centralia (State Route 507 [SR 507] in central Centralia) and four crossings are in east Aberdeen in the Olympic Gateway Plaza area. Crossings in the Olympic Gateway Plaza area would experience substantial queuing under existing conditions and queuing would continue or increase under the no-action alternative as traffic volumes increase.

Vehicle Delay (Year 2037)

The following sections describe vehicle delay from ongoing operations at the project site and from rail operations along the PS&P rail line that would be expected in 2037 under the no-action alternative. This scenario accounts for increased growth in vehicle traffic during the analysis period and the fact that some improvements to and along the PS&P rail line are likely to be made that could partially offset the potential for increased vehicle delay during this period.

Onsite

If the proposed action is not constructed, it is possible that another industrial use could occur at the project site; however because it is not possible to predict, it is assumed that the number of trips generated at the project site would not change over the 20-year analysis period (2017 to 2037).

Rail

Average Vehicle Delay

All PS&P grade crossings under the no-action alternative would operate at LOS C or better in 2037; no crossings would operate at or below LOS D.

In general, the average vehicle delay would decrease over the 20-year analysis period in east Aberdeen (Olympic Gateway Plaza area) because of infrastructure improvements to the Wishkah River bridge that would allow speeds to increase from 10 miles per hour to 20 miles per hour. Trains would move through grade crossings faster, thereby reducing vehicle delay at east Aberdeen crossings.

Future roadway improvements could further improve congestion and improve LOS. For example, as mentioned previously, possible options to alleviate congestion along US 12 in Aberdeen related to the East Aberdeen Mobility Project are under consideration, including the creation of grade-separated crossings; however, because the preferred alternative has not yet been determined and funding has not been identified, this project was not considered in transportation modeling.

Peak Hour Vehicle Delay

The same crossings that would operate at LOS E or F in 2017, as identified in Table 3.16-3, would also operate below LOS E or F in 2037. In addition, two crossings with a low annual daily traffic west of Poyner Yard (Washington Street and Heron Street) would operate at LOS F.

Average Queuing

The Industrial Road crossing would exceed the available storage length in 2037. In addition, the same PS&P grade crossings that would exceed available storage length in 2017 would also exceed available storage length in 2037.

- | Centralia: Tower Street and Pearl Street
- | East Aberdeen (Olympic Gateway Plaza area): Fleet Street, Tyler Street, Chehalis Street, East Heron Street

The queue lengths at Pearl Street and Tower Street crossings in Centralia and the Industrial Road crossing adjacent to the project site would grow by approximately 30% due to the anticipated growth in vehicle traffic between 2017 and 2037. This growth in vehicle traffic would extend queue lengths at crossings. However, the east Aberdeen crossings that would exceed available storage length in 2017 would only grow by approximately 10% by 2037 due to assumed rail improvements that would improve train speeds in east Aberdeen (Olympic Gateway Plaza area) and reduce the amount of time trains occupy PS&P grade crossings in east Aberdeen.

Emergency Vehicle Access

As described above, all PS&P grade crossings under the no-action alternative would operate at LOS C or better in 2017 for average vehicle delay. Average vehicle delay in 2017 between west of Centralia and east of Aberdeen is estimated to be between approximately 7 and 17 minutes daily. However, some crossings in Centralia and Aberdeen would operate at LOS E or F during the peak hour. Under the no-action alternative, substantial vehicle delay would occur in these areas if a grain train, the longest train currently operating on the PS&P rail line, passes through the corridor during the peak traffic hour. Emergency service providers would also experience this delay if an emergency vehicle encountered a train at a PS&P grade crossing. Additionally, as noted above, there are times (an average of four times per week) when all access into the Olympic Gateway Plaza is blocked for approximately 35 minutes. Although there are other locations along the PS&P rail line that would continue to have limited vehicle access under the no-action alternative, these areas would not be

affected for more than the typical amount of time for a train to pass (approximately 3 minutes) or there are alternative routes for emergency vehicles to take in the event of train.

Vehicle Safety

Under the no-action alternative, the predicted accident frequency of a train and motor vehicle collision would increase slightly over the 20-year analysis period because of the anticipated increase in annual average daily traffic at PS&P grade crossings.

In 2017, PS&P grade crossings that would have the shortest predicted interval between accidents would be in Aberdeen. This is due to rail operations east of the Poynor Yard (Olympic Gateway Plaza area) and west of the Poynor Yard (Port of Grays Harbor area), and the associated increased frequency of trains at these crossings from switching operations compared to the PS&P rail line east of Aberdeen. The grade crossings with the predicted highest interval between accidents include Industrial Road in the Port of Grays Harbor area, and the Dairy Queen and McDonald's driveways in the Olympic Gateway Plaza area. As with vehicle delay, accident frequencies would generally improve by 2037 for some crossings. This is due to planned improvement projects that were assumed to be implemented by 2037.⁶ Additionally, infrastructure improvements considered for the East Aberdeen Mobility Project were not included in the safety analysis, but would likely improve both delay and safety at crossings in the Olympic Gateway Plaza area. The results of predicted accident intervals at PS&P grade crossings in 2017 and 2037 are provided in Appendix L, *Vehicle Traffic Analysis*.

The *Railroad-Highway Grade Crossing Handbook-Revised Second Edition* (Federal Highway Administration 2007) indicates that active devices with automatic gates should be considered as an option when certain criteria are met. One criterion is if the expected accident frequency, as calculated by the U.S. Department of Transportation Accident Prediction formula, exceeds 0.075. As shown in Appendix L, *Vehicle Traffic Analysis*, no crossings would exceed this frequency. Therefore, using this threshold, no crossings under the no-action alternative would warrant automatic gates.

3.16.5.2 Proposed Action

This section describes the vehicle traffic and safety impacts that could occur in the study area as a result of construction and routine operation of the proposed action. First, this section describes impacts from construction of the proposed action. It then describes impacts of routine operation at the project site and of routine rail and vessel transport to and from the project site.

Construction

As described in Chapter 2, *Proposed Action and Alternatives*, construction of the proposed action could occur in two phases, with approximately 76 workers for Phase 1 (lasting up to 18 months) and 110 workers for Phase 2 (lasting 3 to 4 months). It is assumed that for every one worker there would be one trip to and from the project site. Therefore, Phase 1 construction would generate approximately 152 trips and Phase 2 would generate approximately 220 vehicle trips.

⁶ Appendix L, *Vehicle Traffic Analysis*, illustrates the planned infrastructure projects listed in WSDOT's 2014-2019 Transportation Improvement Plan that were included in the safety analysis. These projects include adding an early warning system and crossing gates, installing crossing gates and signs, and removing an existing crossing.

Average annual daily traffic on Industrial Road adjacent to the project site is estimated to be 5,800 vehicles in 2017. Therefore, construction-related vehicle traffic would result in an approximately 3.8% increase in traffic on Industrial Road adjacent to the site during Phase 2. Construction-related traffic would likely take varying routes to the project site and workers would have fluctuating schedules that would further spread out the potential for impacts over space and time. Additional vehicle trips to and from the site associated with this temporary increase in construction workers and the delivery of construction equipment and materials could increase vehicle delays and queue lengths at intersections surrounding the project site. However, the potential for additional construction-related vehicle trips to affect vehicle delay times, including emergency vehicle delay times would be low.

In addition to construction vehicle traffic, increased rail traffic from delivery of construction materials could increase vehicle delays. However, the anticipated delay would typically be very similar to existing conditions because construction equipment and materials, if delivered by train, would likely occur in the form of additional cars on existing freight trains and would not increase the average number of trains per day to any appreciable extent. For these reasons, proposed action vehicle traffic would not be expected to cause a change in the LOS for the average vehicle for any of the PS&P grade crossings.

Operations

Onsite

Operation of the proposed action would result in an additional 30 employee vehicle trips per day to and from the project site. Assuming two trips per employee, this would result in a less than 1.0% increase in the average daily traffic on Industrial Road, and adjacent roadways would experience a negligible increase to average daily traffic. For these reasons, onsite operation of the proposed action would not contribute to a noticeable increase in vehicle delay.

Rail

As described in Section 3.15, *Rail Traffic*, operation of the proposed action at maximum throughput would add approximately two unit train trips⁷ per day on average (730 per year maximum) along the PS&P rail line to approximately three train trips per day (1,235 per year) under the no-action alternative. This increase in train traffic would result in increased occupancy of PS&P grade crossings (Section 3.15, *Rail Traffic*). In general, these blockages would increase vehicle delay and reduce access.

The following sections outline the results of the vehicle traffic analysis under the proposed action. The results focus on selected PS&P grade crossings with the most potential for a vehicle to experience delay (i.e., highest average annual daily traffic) and the crossings that would have the most substantial vehicle delay impacts (i.e., LOS designation declines to E or F and queue lengths increase beyond existing storage capacity). Appendix L, *Vehicle Traffic Analysis* provides the results for all PS&P grade crossings. Similar to the no-action alternative, the analysis addresses four topics: vehicle delay (year 2017), vehicle delay (year 2037), emergency vehicle access, and vehicle safety.

⁷ A trip represents one-way travel; in other words, an inbound trip and an outbound trip are counted as two trips.

Vehicle Delay (Year 2017)

The following sections describe vehicle delay at the project site and along the PS&P rail line in 2017 under the proposed action. As noted previously, this analysis assumes maximum throughput is achieved within the first year of operation. The following describes the average vehicle delay, peak hour vehicle delay, and average queuing in 2017 for PS&P grade crossings.

Average Vehicle Delay

Increased rail trips along the PS&P rail line related to the proposed action would increase average vehicle delay compared to the no-action alternative, because the average number of train trips would increase from approximately three trips per day to five trips per day. However, for the majority of the PS&P grade crossings, the increase in crossing blockage time would not result in a substantial decline in vehicle delay compared to the no-action alternative because the potential to encounter a train at any crossing for the average vehicle would be low. In addition, as previously described, the annual average daily traffic for a majority of crossings is low. Sixty of the 81 public PS&P grade crossings have an annual average daily traffic of fewer than 900 vehicles. The approximate total vehicle delay in a 24-hour period between west of Centralia and east of Aberdeen would be between approximately 13 and 36 minutes daily compared to between 7 and 17 minutes under the no-action alternative. Therefore, the total blockage time would increase up to approximately 19 minutes in a 24-hour period. Because traffic volumes are low at a majority of the crossings, an increase in train trips on the PS&P rail line would not substantially increase the average vehicle delay at most PS&P grade crossings compared to the no-action alternative.

Table 3.16-5 provides a summary of average vehicle delay at the grade crossings with the highest annual average daily traffic. Because these crossings have the highest annual average daily traffic, vehicles at these crossings have highest probability to experience vehicle delay at grade crossings.

Table 3.16-5. Level of Service at Selected Grade Crossings—Proposed Action (2017)

Grade Crossing	Milepost	Location	Approximate 2017 Annual Average Daily Traffic	No-Action Alternative	Proposed Action
Tower Street (SR 507)	0.82	Centralia	8,025	A	B
Pearl Street (SR 507)	0.89	Centralia	13,755	A	B
West Reynolds Street	2.14	Centralia	6,380	A	A
Old Highway 99 SW	6.07	Unincorporated Thurston County	10,160	A	A
Monte Elma Road	51.98	Satsop	4,770	A	A
Tyler Street	68.23	Aberdeen	4,050	B	D
South Chehalis Street	68.36	Aberdeen	4,905	C	E
Port Industrial Road	70.06	Aberdeen	17,845	A	D
West 1st Street	70.41	Aberdeen	4,625	A	D
Industrial Road	71.04	Aberdeen	5,795	B	F

As shown in Table 3.16-5, PS&P grade crossings in Aberdeen (Olympic Gateway Plaza area and Port of Grays Harbor area) would experience the most substantial increase in average vehicle delay with the addition of proposed action trains. All grade crossings that would operate at or below LOS D in 2017 are located in Aberdeen. These grade crossings are located in two general areas:

- I Olympic Gateway Plaza area: As illustrated in Figure 3.16-3, average vehicle delay would worsen at the Olympic Gateway Plaza area with the proposed action. As described in Section 3.15, *Rail Traffic*, existing train-building activities at Poynor Yard require rail cars to extend across the Wishkah River bridge and block crossings at the west end of the Olympic Gateway Plaza area. The addition of on average, two unit train trips per day (an average of one train trip per day eastbound) under the proposed action would lengthen the average vehicle delay at these crossings. The level of service at the East Heron Street, Newell Street, and South Chehalis Street crossings at the Olympic Gateway Plaza would degrade from LOS C or LOS D under the no-action alternative to LOS E or F under the proposed action. The crossings further east in the Olympic Gateway Plaza area would degrade from LOS B to LOS D.
- I Port of Grays Harbor area: As illustrated in Figure 3.16-4, the Industrial Road crossing at the project site would operate at LOS F (LOS B with the no-action alternative). The increase in the average vehicle delay at the Industrial Road crossing is due to the delivery of rail cars from the PS&P rail line across Industrial Road to the project site, as described in Section 3.15, *Rail Traffic*. The Port Industrial Road and West 1st Street crossings would operate at LOS D due to switching operations west of Port Industrial Road.

In summary, five intersections that would operate at or above LOS D under the no-action alternative would operate below LOS D for the proposed action: Industrial Road (Port of Grays Harbor area), North Maple Street (Port of Grays Harbor area), East Heron Street (Olympic Gateway Plaza area), Newell Street (Olympic Gateway Plaza area), and South Chehalis Street (Olympic Gateway Plaza area).

Figure 3.16-3. 2017 Vehicle Delay at Selected Grade Crossings West of Poynor Yard (Imperium)

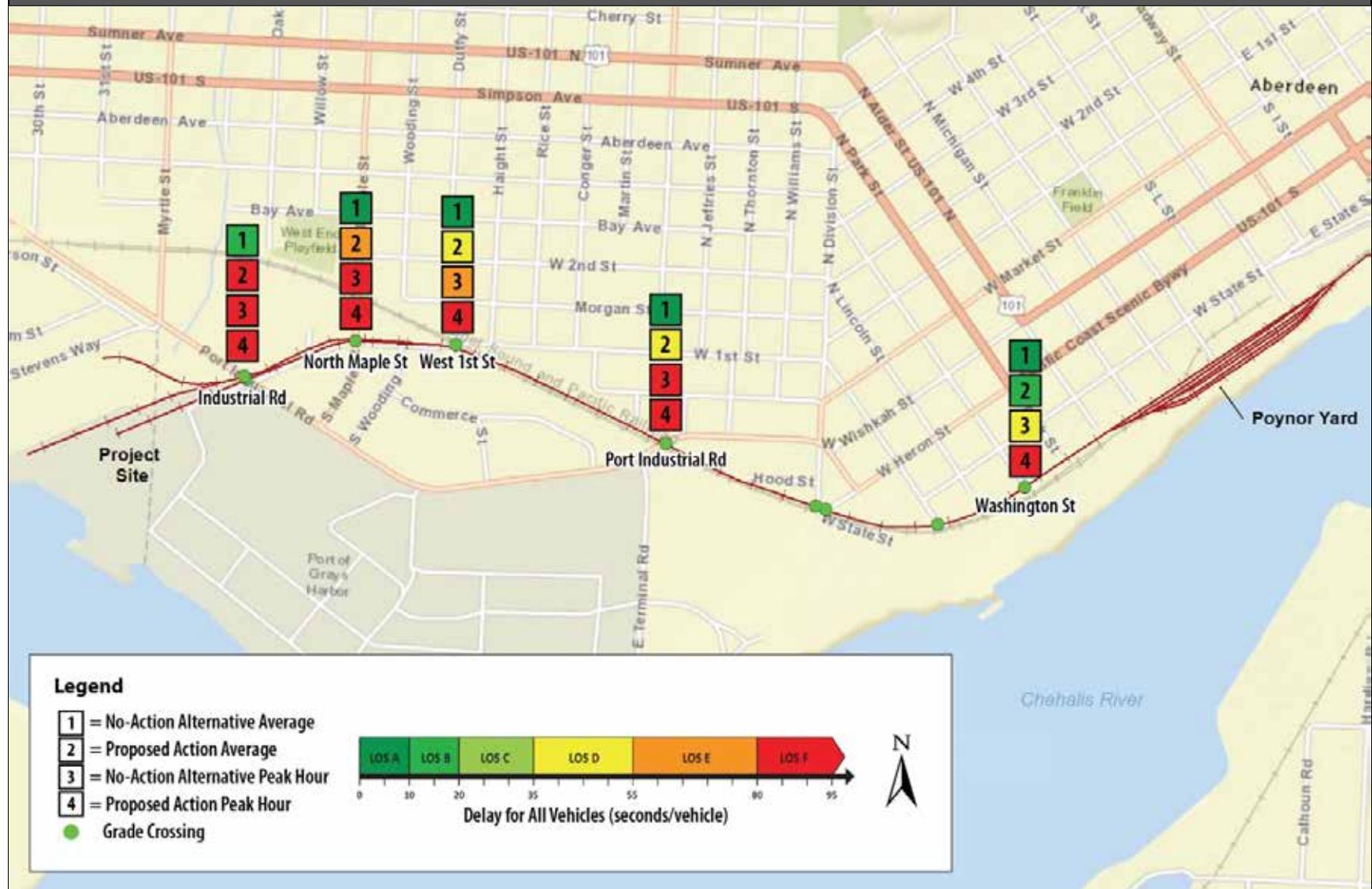
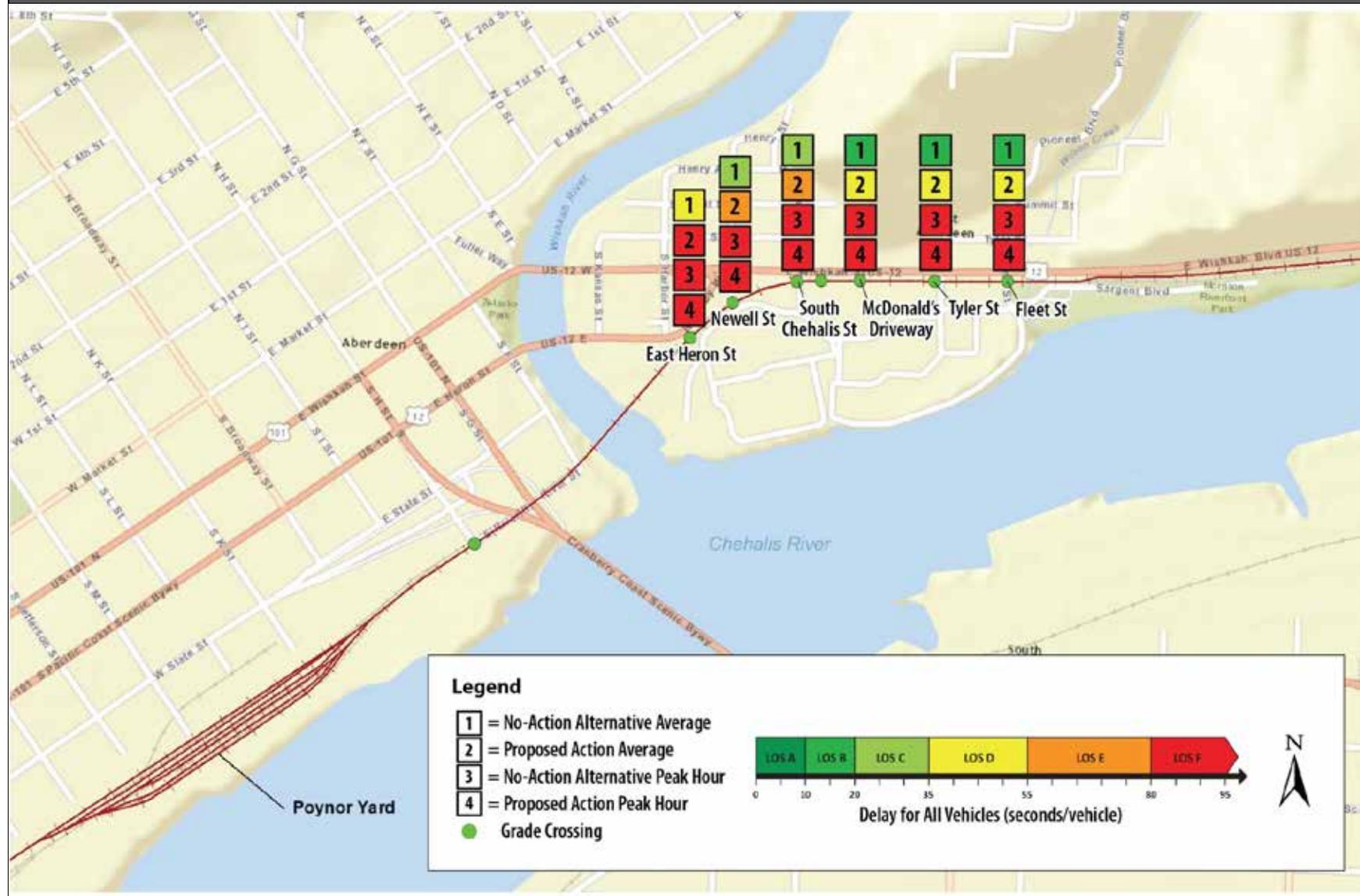


Figure 3.16-4. 2017 Vehicle Delay at Selected PS&P Line Crossings East of Poynor Yard (Imperium)



Section 3.16.6.3, *Applicant Mitigation*, identifies applicant mitigation to reduce vehicle delay impacts.

As noted in Section 3.16.3.2, *Impact Analysis*, the average vehicle delay analysis represents a conservative analysis for the average vehicle, because it is based on the following assumptions.

- | **Maximum throughput.** The applicant would begin maximum throughput operations in 2017.
- | **No trip diversion.** The vehicle delay analysis did not consider trip diversion (alternative routes for automobile traffic). Including trip diversion in the analysis would likely indicate shorter average vehicle delay at the Port of Grays Harbor area PS&P rail line crossings (grade crossings) because at some locations other routes would avoid crossing the PS&P rail line. For example, some vehicles at the Port Industrial Road crossing could divert to US 101 to travel to central Hoquiam. In the Olympic Gateway Plaza area, vehicles attempting to use the grade crossings on the west end of the plaza could divert to the crossings on the east end of the plaza (such as Fleet Street and Tyler Street). Those crossings would not be blocked for as long as the crossings on the west end of the Olympic Gateway Plaza (such as East Heron Street and Newell Street).
- | **No planned rail infrastructure.** New infrastructure implemented in 2017 that could provide for increased train speeds (Section 3.15, *Rail Traffic*) could reduce vehicle delay at grade crossings. Infrastructure improvements were not included in the analysis.
- | **Assumed throughput that affects switching operations.** As described in the impact analysis methods, the analysis assumes that PS&P would deliver rail cars to the site in a manner that is the most cost and time efficient. This method would increase the time that proposed action trains would block the grade crossing between Poynor Yard and the project site. A sensitivity analysis was conducted to determine the LOS for 50% throughput (i.e., requiring half the number of unit trips) in 2017. This analysis concluded that of the six grade crossings that would operate below LOS D for 100% throughput, five would operate at LOS D or better at 50% throughput. The East Heron Street grade crossing would continue to operate at LOS E at 50% throughput. All other grade crossings would operate at LOS D or better. Therefore, the analysis showed that while there would be an improvement in vehicle delay for 50% throughput, East Heron Street would continue to operate below LOS D.

Peak Hour Vehicle Delay

An analysis evaluated the potential vehicle delay of a proposed action train operating during the peak traffic hour. Because a proposed action train would be longer (120 rail cars) than an existing grain train (101 rail cars) analyzed under the 2017 no-action alternative for the peak hour scenario, the same grade crossings that would operate below LOS D (Table 3.16-3) would also operate below LOS D with the proposed action.

Table 3.16-6 provides a summary of summary of peak hour vehicle delay at the grade crossings with the highest annual average daily traffic.

Table 3.16-6. Level of Service (Peak Hour Vehicle Delay) at Selected Grade Crossings—Proposed Action (2017)

Grade Crossing	Milepost	Location	No-Action Alternative	Proposed Action
Tower Street (SR 507)	0.82	Centralia	F	F
Pearl Street (SR 507)	0.89	Centralia	F	F
West Reynolds Street	2.14	Centralia	C	D
Old Highway 99 SW	6.07	Unincorporated Thurston County	C	D
Monte Elma Road	51.98	Satsop	A	B
Tyler Street	68.23	Aberdeen	F	F
South Chehalis Street	68.36	Aberdeen	F	F
Port Industrial Road	70.06	Aberdeen	F	F
West 1st Street	70.41	Aberdeen	E	F
Industrial Road	71.04	Aberdeen	F	F

The peak hour vehicle delay would be most substantial in Centralia and Aberdeen. In Aberdeen, rail operations on the PS&P rail line are heavily influenced by activities related to Poynor Yard, as described in Section 3.15, *Rail Traffic*. Peak hour vehicle delay can be summarized as follows.

- | Centralia: Similar to the no-action alternative (Table 3.16-3), the Tower Street and Pearl Street crossings would operate at LOS F. The H Street crossing would operate at LOS E.
- | Olympic Gateway Plaza area: Similar to the no-action alternative, all grade crossings would operate at LOS F (Figure 3.16-3)
- | Port of Grays Harbor area: All grade crossings would operate at LOS F (Figure 3.16-4)

Therefore, in Aberdeen, the peak hour analysis concluded substantial vehicle delay, with all grade crossings operating at LOS F, from the eastern end of the Olympic Gateway Plaza (Fleet Street) to the project site. Section 3.16.6.3, *Applicant Mitigation*, identifies measures to reduce vehicle delay impacts.

Average Queuing

As noted previously, increased vehicle delay from trains blocking grade crossings can have secondary impacts on nearby intersections. As vehicles begin to queue while waiting for the crossing to open, increased roadway congestion can affect upstream intersections. Table 3.16-7 illustrates the grade crossings that would have a queue that would exceed available storage length under the proposed action in 2017. This table also illustrates the increase in the queue length in number of cars compared to the no-action alternative. Of the grade crossings shown in the table, storage capacity is already exceeded under the no-action alternative, except for at Newell Street, Port Industrial Road, West 1st Street, and Industrial Road. While the proposed action would cause storage capacity problems at all the listed crossings, the problems already exist except at these crossings.

**Table 3.16-7. Average Queue Lengths that Exceed Available Storage Length at Grade Crossings—
Proposed Action (2017)**

Grade Crossing	Queue Direction	Queue Location Description	Increase in Queue Length (Number of Cars)^a
Centralia			
Tower Street (SR 507)	Northbound	SR 507 northbound couplet in central Centralia. Upstream affected intersection is 4 th Street.	2
Pearl Street (SR 507)	Southbound	SR 507 southbound in central Centralia. Upstream affected intersection is 6 th Street.	3
East Aberdeen/Olympic Gateway Plaza Area^b			
Fleet Street	Northbound	Exit from Olympic Gateway Plaza at US 12.	4
Tyler Street	Northbound	Exit from Olympic Gateway Plaza at US 12	4
Chehalis Street	Northbound	Exit from Olympic Gateway Plaza at US 12	4
Newell Street ^c	Northbound	Exit from Olympic Gateway Plaza at US 12	1
East Heron Street	Eastbound Right-Turn Lane	Right-turn from SR 12 eastbound to Olympic Gateway Plaza. Upstream affected intersection is South F Street.	11
Port of Grays Harbor Area^b			
West 1st Street ^c	Eastbound and Westbound	East of the project site and Port Industrial Road. Upstream affected intersection is Maple Street (eastbound) and Haight Street (westbound).	21
Port Industrial Road ^c	Eastbound and Westbound	Southeast of the project site. Upstream affected intersection is Terminal Road (eastbound) and Jefferson Street (westbound).	65
Industrial Road ^c	Eastbound and Westbound	Adjacent to applicant's project site. Upstream affected intersection is South and Myrtle Street (Eastbound) and Maple Street (westbound).	28

Notes:

- ^a Increase in average queue length compared to the no-action alternative. Assumes 20 feet per car. For example, the proposed action average queue length at Fleet Street would be 80 feet longer than the no-action alternative.
- ^b Grade-crossing location shown on Figures 3.16-3 and 3.16-4.
- ^c Would not exceed available storage length under the no-action alternative. All other grade crossings also exceed available storage length under the no-action alternative.

The table illustrates that average queue lengths at the Tower Street and Pearl Street crossings in central Centralia, five of the seven Olympic Gateway Plaza area crossings, and three of the Port of Grays Harbor area crossings would be longer than the no-action alternative. At the Olympic Gateway Plaza area, the East Heron Street right-turn queue would extend approximately 11 cars longer than under the no-action alternative. The grade crossing at East Heron Street conflicts with Olympic Gateway Plaza traffic traveling eastbound on US 12, and serves as a bottleneck. During an eastbound

train event, the queue length could extend past F Street (upstream intersection) on the west side of the Wishkah River.

In the Port of Grays Harbor area, the West 1st Street and Industrial Road (at the project site) queue lengths would be approximately 21 and 28 cars longer, respectively, than the no-action alternative. The Port Industrial Road crossing queue would substantially increase (65 cars) compared to the no-action alternative due to lengthy project-related switching movements on Industrial Road. While the eastbound queue would stay contained within the Port area, a westbound queue stretching east past Division Street would begin to substantially affect local traffic flow in Aberdeen.

Similar to the vehicle delay analysis, the queuing analysis did not consider trip diversion. Including trip diversion in the analysis would likely indicate shorter average queue lengths at the Port of Grays Harbor area because there are other routes to avoid the grade crossings. For example, some vehicles could divert to US 101 to travel to central Hoquiam. In the Olympic Gateway Plaza area, vehicles attempting to use the crossings on the west end of the plaza (East Heron Street and Newell Street) could divert to the crossings on the east end of the plaza (Fleet Street and Tyler Street) because those crossings would not be blocked for as long.

Vehicle Delay (Year 2037)

As noted in Chapter 2, *Proposed Action and Alternatives*, transport of bulk liquids associated with the proposed facilities would rely on rail and vessel transport. It is anticipated that tanker truck traffic would remain the same as for existing conditions and would not affect average daily traffic on surrounding roadways. The potential grade-crossing safety and delay impacts of increased rail traffic related to the proposed action are discussed below.

For the majority of the grade crossings, the blockage time would not result in a substantial vehicle delay in 2037 because the potential to encounter a train at any crossing for any vehicle would be low. In addition, as previously described, the annual average daily traffic for a majority of crossings is low. Because traffic volumes are low at a majority of the crossings, an increase in train trips on the PS&P rail line would not substantially increase the average vehicle delay at most grade crossings.

Table 3.16-8 provides a summary of average vehicle delay at the grade crossings with the highest annual average daily traffic.

Table 3.16-8. Level of Service at Selected Grade Crossings—Proposed Action (2037)

Grade Crossing	Milepost	Location	Approximate 2037 Annual Average Daily Traffic	No-Action Alternative	Proposed Action
Tower Street (SR 507)	0.82	Centralia	10,375	A	B
Pearl Street (SR 507)	0.89	Centralia	17,790	A	B
West Reynolds Street	2.14	Centralia	8,250	A	A
Old Highway 99 SW	6.07	Unincorporated Thurston County	13,135	A	A
Monte Elma Road	51.98	Satsop	6,170	A	A
Tyler Street	68.23	Aberdeen	5,235	A	D
South Chehalis Street	68.36	Aberdeen	6,345	B	D
Port Industrial Road	70.06	Aberdeen	23,075	A	D
West 1st Street	70.41	Aberdeen	5,980	A	D
Industrial Road	71.04	Aberdeen	7,495	B	F

As noted under the 2037 no-action alternative, with the incorporation of PS&P infrastructure improvements that could allow for increased speeds in East Aberdeen (up to 20 miles per hour), the predicted declines in LOS would be slightly less than they would be under 2017 conditions. Four grade crossings would operate below LOS D:

- | Newell Street (Olympic Gateway Plaza area)
- | East Heron Street (Olympic Gateway Plaza area)
- | North Maple Street (Port of Grays Harbor area)
- | Industrial Road (Port of Grays Harbor area)

Average queue lengths would increase compared to 2017 proposed action conditions due to the increase in traffic over the 20-year period. Average queue lengths would also increase compared to no-action alternative conditions because of the blockage time associated with the addition of proposed action trains along the PS&P rail line. The grade crossings that would exceed the available storage length in 2037 would be the same as 2017 (Table 3.16-7). The queue lengths at Pearl Street and Tower Street crossings in Centralia and the Port of Grays Harbor would grow by approximately 30% due to the anticipated growth in vehicle traffic between 2017 and 2037. The increase in queue lengths at grade crossings in east Aberdeen would grow less than 30% due to assumed rail infrastructure improvements that would improve train speeds in this area and reduce the amount of time trains occupy grade crossings in east Aberdeen by 2037.

Solutions being evaluated by ongoing regional planning efforts (such as the East Aberdeen Mobility Project) would alleviate some of the vehicle delay impacts related to the proposed action if such improvements are implemented by 2037. Further regional efforts to evaluate the potential for additional storage capacity would also help to mitigate increased delay at those locations.

Emergency Vehicle Access

As described in the vehicle delay analysis, average vehicle and peak hour delay would increase with the addition of proposed action trains because more trains would operate on the PS&P rail line. Because vehicle delay would increase, emergency vehicle delay would also increase at grade crossings. The following sections describe the impacts on emergency vehicle access, focused on the PS&P rail line between Centralia and Aberdeen, in Centralia, and in Aberdeen (Olympic Gateway Plaza and Port of Grays Harbor areas).

Between Centralia and Aberdeen

For the grade crossings between west of Centralia and east of Aberdeen, the average vehicle delay would slightly increase compared to the no-action alternative. As described previously, the projected 2017 daily crossing time between west of Centralia and east of Aberdeen would be between 13 and 36 minutes compared to between 7 and 17 minutes under the no-action alternative (Appendix L, *Vehicle Traffic Analysis*, provides daily crossing blockage times for all grade crossings.) Therefore, the average delay at grade crossings would increase 6 to 19 minutes in a 24-hour period from the addition of proposed action trains.

The addition of proposed action trains would affect emergency response times if an emergency vehicle was blocked at a grade crossing occupied by a proposed action train. The potential for the proposed action to affect emergency response would also depend on whether the dispatched emergency vehicle would need to cross the PS&P rail line and the availability of alternative routes if a train occupies the crossing at the time of the call.

There are land uses along the grade crossing where no alternate access is provided; crossing the PS&P rail line is required. Because the frequency of train traffic on the PS&P rail line would increase, the probability of an increase in emergency response time at these crossings would also increase. This impact would only occur if an emergency vehicle experienced a delay related a proposed action train that would operate two times per day. Section 3.16.6.3, *Applicant Mitigation*, identifies mitigation to reduce emergency response delay at grade crossings under the proposed action.

As described previously in the vehicle delay discussion, vehicle delay would be most substantial in Centralia and Aberdeen. Therefore, emergency response in Centralia and Aberdeen would experience the most delay from blocked grade crossings under the proposed action.

Centralia

The grade crossings in Centralia (BNSF main line to Reynolds Street crossing) are located in an urban area with a well-connected roadway network. The projected 2017 daily crossing time at grade crossings in Centralia would be 35 to 47 minutes compared to between approximately 17 and 26 minutes under the no-action alternative. Because emergency response providers are located on both sides of the PS&P rail line, similar to existing conditions, emergency response calls could be dispatched to stations that would not be blocked at a grade crossing. Section 3.16.6.3, *Applicant Mitigation*, identifies mitigation to reduce the impact of increased emergency response delay at grade crossings under the proposed action.

Olympic Gateway Plaza Area (Aberdeen)

Figures 3.15-6 and 3.15-7 in Section 3.15, *Rail Traffic*, illustrate the duration that existing and proposed action eastbound and westbound trains would occupy grade crossings in east Aberdeen

for each train type. In summary, in the Olympic Gateway Plaza area, an eastbound train—the maximum train event under the proposed action—would block the Fleet Street crossing (the grade crossing furthest to the east and least affected by Poynor Yard activities) for approximately 45 minutes under the proposed action compared to 37 minutes under the no-action alternative (eastbound grain train).

Unit train trips under the proposed action would also increase the frequency of trains occupying grade crossings in Aberdeen by approximately 14 times per week on average. All crossings in the Olympic Gateway Plaza area (from East Heron Street to Fleet Street) would be occupied for more than 35 minutes on average 3.8 times per week from eastbound grain and auto trains under the no-action alternative. Adding proposed action eastbound trains, these crossings would be occupied for more than 35 minutes on average 10.8 times per week. Section 3.15, *Rail Traffic*, provides additional information on blocked crossings in east Aberdeen.

Vehicle delays in the Olympic Gateway Plaza area are substantial because the seven grade crossings at the plaza provide the only vehicular emergency access to and from the plaza area and Morrison Riverfront Park, immediately east of the plaza. Emergency response vehicles would experience more frequent and longer delays to access the Olympic Gateway Plaza area under the proposed action because there is no alternate roadway access to the plaza area. However, there are two existing alternate options to access the Olympic Gateway Plaza area when train blocks grade crossings.

- 1 A paved recreational path approximately 1 mile long and 8 feet wide extends from Morrison Riverfront Park immediately east of the Olympic Gateway Plaza to Junction City Road to the east, the grade crossing east of the Fleet Street entrance to the Olympic Gateway Plaza area. The path parallels the Chehalis River and the PS&P rail line.
- 1 A paved trail approximately 750 feet long extends from the Aberdeen Hotel parking lot (located between East Heron Street [US 12 eastbound] and the PS&P rail line) to the west side of Walmart. The trail passes underneath the PS&P rail line Wishkah River bridge. This underpass is approximately 11 feet wide and 8.5 feet high.

These paths could provide alternate emergency vehicle access to the Olympic Gateway Plaza area and Morrison Riverfront Park when a train blocks all emergency vehicular access to the plaza area. Section 3.16.6.3, *Applicant Mitigation*, identifies applicant mitigation for emergency vehicle access to the Olympic Gateway Plaza area.

Port of Grays Harbor Area (Aberdeen)

Vehicular access west of Poynor Yard and south of the PS&P rail line is completely blocked on the existing roadways during train events. Section 3.15, *Rail Traffic*, illustrates the average and maximum duration that trains would occupy grade crossings in Aberdeen. Emergency vehicle access blockage under the proposed action would be affected in two areas, described as follows.

Between Poynor Yard and East of Port Industrial Road. West of Poynor Yard and east of Port Industrial Road are the Washington Street, Monroe Street, Heron Street, and Division Street crossings. Figures 3.15-4 and 3.15-5 illustrate the location of these grade crossings. Proposed action trains would block these crossings for a maximum of 51 minutes compared to between 4 and 8 minutes, depending on train type, under the no-action alternative. In addition, the frequency of crossing blockages would increase under the proposed action. Therefore, the grade crossings that provide emergency vehicular access to the industrial land uses west of Poynor Yard and south of the PS&P rail line would be completely blocked more frequently and for longer periods.

An unpaved road that parallels the south side of the PS&P rail line from the H Street crossing (east of Poynor Yard) could provide access to the industrial land uses south of the PS&P rail line in this area. Alternate access is also available through the State Route 520 (SR 520) construction site from East Terminal Road. Therefore, alternative routes can provide emergency vehicular access to the land uses immediately west of Poynor Yard and south of the PS&P rail line. Section 3.16.6.3, *Applicant Mitigation*, identifies applicant mitigation for emergency vehicle access to reduce the impact on emergency response to this area when a train blocks these grade crossings.

Between Port Industrial Road and the Project Site. All land uses south of the PS&P rail line between the Port Industrial Road crossing and the project site, including Home Depot and the Port of Grays Harbor, would be blocked from the land uses north of the PS&P rail line for approximately 58 minutes when a proposed action train arrives. The Port Industrial Road crossing would be the first grade crossing that would open to provide vehicular access to this area and would clear after approximately 58 minutes. This blockage of all grade crossings and the isolation of these land uses for approximately 58 minutes when a proposed action train arrives would substantially affect emergency response in this area. During this time, PS&P would be able to “cut” the train at Industrial Road to provide emergency response through Industrial Road; however, coordination would be required between PS&P and the emergency dispatch center. Section 3.16.6.3, *Applicant Mitigation*, identifies applicant mitigation to reduce the impact on emergency response to this area when a train blocks these crossings.

Vehicle Safety

Increased rail traffic related to the proposed action could increase the frequency of accidents along the PS&P rail line compared to the no-action alternative. The impacts on grade-crossing safety specific to each grade crossing for accidents involving trains and vehicles are summarized in Appendix L, *Vehicle Traffic Analysis*, which provides the total predicted accident rate, predicted intervals between accidents, and the decrease in years between the predicted intervals in the analysis year versus the no-action alternative for all the grade crossings along the PS&P rail line.

In 2017, the grade crossings that would have the shortest predicted intervals between accidents would be in Aberdeen, due to rail operations east of the Poynor Yard (Olympic Gateway Plaza area) and west of the Poynor Yard (Port of Grays Harbor area) that would increase frequency of train passbys at these crossings. These crossings include Industrial Road in the Port of Grays Harbor area, and the Dairy Queen and McDonalds driveways at the Olympic Gateway Plaza area. As with vehicle delay, accident frequencies would generally improve by 2037 for some crossings. This is due to improvements such as grade-crossing protections that are assumed to be implemented by 2037. Additionally, although infrastructure improvements considered for the East Aberdeen Mobility Project were not included in the safety analysis, any improvements would likely improve both delay and safety at crossings in the Olympic Gateway Plaza area.

The *Railroad-Highway Grade Crossing Handbook–Revised Second Edition* (Federal Highway Administration 2007) indicates that active devices with automatic gates should be considered when certain criteria are met. One criterion is if the expected accident frequency, as calculated by the U.S. Department of Transportation Accident Prediction formula, exceeds 0.075. As shown in Appendix L, *Vehicle Traffic Analysis*, no grade crossings would exceed this frequency using this formula. Therefore, using this threshold, no crossings under the no-action alternative would require consideration of automatic gates.

3.16.6 What required permits apply to vehicle traffic and safety?

No required permits or plans apply to vehicle traffic and safety.

3.16.7 What mitigation measures would reduce impacts on vehicle traffic and safety?

This section describes the applicant mitigation as well as other measures that would reduce vehicle traffic and safety impacts from construction and routine operation of the proposed action.

3.16.7.1 Applicant Mitigation

The applicant will implement the following mitigation measures.

- I To mitigate vehicle traffic impacts associated with rail operations of the proposed action, the applicant will work with the City of Hoquiam, City of Aberdeen, Port of Grays Harbor, Grays Harbor Council of Governments, and PS&P to address vehicle delay and/or inform motorists of potential blockages at PS&P crossings between the project site and Poynor Yard. WSDOT, the City of Hoquiam, City of Aberdeen, and Port of Grays Harbor will approve proposed measures for the areas where they are responsible for vehicle delay. The applicant will ensure measures are in place prior to beginning the proposed operations. The proposed changes should include an evaluation of impacts on potentially affected low-income and minority populations.
- I To mitigate vehicle traffic impacts associated with rail operations related to the proposed action, the applicant will work with the City of Hoquiam, City of Aberdeen, Port of Grays Harbor, Grays Harbor Council of Governments, and PS&P to address vehicle delays and/or inform motorists of potential blockages at PS&P grade crossings into and out of the Olympic Gateway Plaza. WSDOT, the City of Hoquiam, City of Aberdeen, and Port of Grays Harbor will approve proposed measures for the areas where they are responsible for vehicle safety. The applicant will ensure acceptable measures are in place prior to beginning the proposed project operations. The proposed changes should include an evaluation of impacts on potentially affected low-income and minority populations.
- I To reduce the potential for increased delay of emergency vehicles at PS&P grade crossings during project operations, the applicant will work with local emergency service providers to provide advance notification of incoming trains.
- I To ensure that local emergency service providers have access to areas south of the PS&P rail line in Aberdeen, the applicant will ensure that an emergency response vehicle with an 8-foot clearance is available and staged at the City of Aberdeen Fire Department. The applicant will also ensure a new combination pumper truck is available and staged at the City of Hoquiam's Eastside Fire Station to respond to incidents at the nearby project sites. These measures will be in place prior to beginning crude oil operations.
- I To address the potential for emergency access conflicts to areas along the PS&P rail line during unplanned unit train stoppages, the applicant will work with PS&P and local emergency service providers along the PS&P rail line to develop and implement a notification protocol to inform local emergency service providers and other interested parties of the duration and magnitude of

the unplanned stoppages. The notification protocol will be in place prior to the beginning of operations involving transport of crude oil.

- | To address potential vehicle safety impacts, each of the public at-grade crossings on the rail line, the applicant will work with PS&P to provide permanent signs that prominently display both a toll-free telephone number and a unique grade-crossing identification number in compliance with Federal Highway Administration regulations (23 Code of Federal Regulations 655). The toll-free number would enable drivers to promptly report any accidents, malfunctioning warning devices, stalled vehicles, or other dangerous conditions. The signs will be in place prior to the beginning of operations involving transport of crude oil.
- | To address potential vehicle safety impacts, the applicant will coordinate with PS&P to make Operation Lifesaver educational programs available to communities, schools, and other organizations located along the rail line. Operation Lifesaver is a nationwide, nonprofit organization that provides public education programs to help prevent collisions, injuries, and fatalities at highway/rail grade crossings.

3.16.7.2 Other Measures to Be Considered

Overall, impacts of vehicle safety resulting from the proposed action are considered low; however, the following measures could further improve vehicle safety along the PS&P rail line.

- | To improve vehicle delay and safety in East Aberdeen, the Grays Harbor Council of Governments should continue working with the appropriate jurisdictions and PS&P to evaluate options for improving existing congestion and delay, access, and safety issues along US 12 and the Olympic Gateway Plaza.
- | To reduce the risk of an accident on the PS&P rail line, PS&P should work with local jurisdiction including WSDOT and the Washington Utilities Transportation Commission to ensure all of the public grade crossings meet Manual on Uniform Traffic Control Devices (23 U.S.C. 109(d)) guidance to include a yield or stop sign on every cross-buck post.
- | To reduce the risk of an accident at grade crossings, PS&P should install flashers, gates, and/or cantilevers at crossings where warranted to improve vehicle and rail safety conditions. Begin to install these upgrades before initiating oil train traffic.
- | To reduce the risk of an accident at grade crossings, PS&P should coordinate with applicable jurisdictions to ensure that trees, brush, and weeds are cleared from all grade crossings as far as possible to ensure clear lines of sight for all motorists approaching rail crossings.

3.16.8 Would the proposed action have unavoidable and significant adverse impacts on vehicle traffic and safety?

Implementation of the mitigation measures described above would reduce impacts on vehicle traffic but would not completely eliminate all vehicle delay impacts in Aberdeen. Therefore, the proposed action would have unavoidable and significant adverse impacts on vehicle delay in Aberdeen. As described in Section 3.16.5.2, *Proposed Action*, the vehicle delay would be most severe if a proposed action train were to pass by during the peak vehicle traffic hour. However, significant adverse impacts would also result from single events at grade crossings in the Olympic Gateway Plaza area and between Poynor Yard and the project site.

Three primary mechanisms would reduce vehicle delay at grade crossings: grade separation, grade crossing closures, and railroad infrastructure improvements, as explained below. None of these is a reasonable option to reduce grade-crossing delay.

- I **Grade separation.** A grade separation is created when a bridge or underpass allows the roadway to pass over or under the rail line, completely separating vehicles from trains and therefore eliminating vehicle delay at the grade crossing. Grade separation is typically recommended for existing grade crossings when design thresholds are exceeded. Design thresholds look at the number of cars and trains traveling through the crossing, vehicle speeds, train speeds, the number and type of tracks, and the number of roadway lanes. Grade separation requires a substantial investment and can be disruptive to communities if businesses or homes adjacent to the intersection must be condemned or relocated. WSDOT estimates that creating grade separation in Washington State at a single crossing costs approximately \$15 to \$20 million. Because of the high cost of grade separation, the number of grade crossings in Aberdeen with substantial vehicle delay (at the Olympic Gateway Plaza and Port of Grays Harbor areas) and the private property and community impacts that would result from grade separation at the crossings with substantial vehicle delay, grade separation in Aberdeen is not a reasonable option to reduce vehicle delay.
- I **Crossing closures.** While closing certain grade crossings could improve vehicle safety, closing crossings would worsen vehicle delay by diverting motorists to other grade crossings. This trip diversion would extend queue lengths at other grade crossings. Extended queue lengths would negatively affect vehicle delay. In addition, state and local governments do not have the authority to close rail crossings. For these reasons, closing grade crossings is not a reasonable option to reduce vehicle delay.
- I **Railroad infrastructure improvements.** Vehicle delay could be reduced by adding new railroad infrastructure on the PS&P rail line. As discussed in Section 3.15, *Rail Traffic*, additional improvements to the PS&P infrastructure in Aberdeen have limited potential to reduce blocked crossing time substantially. However, PS&P infrastructure improvements between the Olympic Gateway Plaza and the project site could be explored further with regional stakeholders.

Addressing vehicle delay at the grade crossings at the Olympic Gateway Plaza area and between Poynor Yard and the project site would require the participation of a broad group of stakeholders in coordination with ongoing regional transportation planning efforts. For this reason, as listed in Section 3.16.7.2, *Applicant Mitigation*, the applicant will work with the City of Hoquiam, City of Aberdeen, Port of Grays Harbor, Grays Harbor Council of Governments, and PS&P to address vehicle delays and/or inform motorists of potential blockages at grade crossings into and out of the Olympic Gateway Plaza and between Poynor Yard and the project site. Measures to reduce vehicle delay could include modification of PS&P operations to limit switching activities during peak traffic hours, adding new PS&P infrastructure to reduce grade-crossing occupancy time, adding new queue storage capacity at grade crossings that exceed available storage length, or implementing an early warning system to provide advance information on train crossings to travelers and emergency service providers.

Ongoing regional solutions such as the East Aberdeen Mobility Project could reduce vehicle delay impacts and improve safety conditions at the Olympic Gateway Plaza area. In addition, further regional efforts to evaluate the potential improvements to reduce vehicle delay (such as grade separation, early-warning system, grade-crossing protections), would also help to reduce vehicle delay.

Implementation of the mitigation measures outlined above and in Chapter 4, *Environmental Health and Safety*, would reduce impacts on vehicle safety from increased rail operations on the PS&P rail line. There would be no unavoidable and significant impacts on vehicle safety.