CHAPTER 2 PROPOSED PROJECT AND ALTERNATIVES

Skagit County (County) and the Washington State Department of Ecology (Ecology) are co-lead agencies for the preparation of an environmental impact statement (EIS) under the State Environmental Policy Act (SEPA) for a project proposed by the Shell Puget Sound Refinery (PSR). This chapter describes:

- *The no action alternative, including the existing Shell PSR location, facilities and operations, and potential changes if the proposed project is not implemented.*
- *The evaluation of reasonable alternatives to the proposed project.*
- *The proposed project, including proposed facilities, operations, and construction methods and sequencing.*

NO ACTION ALTERNATIVE

The State Environmental Policy Act (SEPA) requires evaluation of a no action alternative as a benchmark from which other alternatives can be compared (WAC 197-11-440(5); Ecology 2004). Under the no action alternative, none of the proposed facilities would be constructed and the proposed wetland mitigation would not occur. The existing Shell Puget Sound Refinery (PSR) would continue to operate as it does today; however, Shell would need to find another source of crude oil to maintain the refinery's existing production output. The location of the Shell PSR, existing facilities and operations, and potential changes to operations if the proposed project were not implemented, are described below.

Location

The Shell PSR is near Anacortes, Washington, in unincorporated Skagit County. Figure 2-1 shows the facility's location and vicinity. The refinery is located on a peninsula called March Point, which is bordered by Fidalgo Bay to the west and Padilla Bay to the east. The Shell PSR is within the Anacortes Urban Growth Area and is designated as a Heavy Manufacturing District by the Anacortes Comprehensive Plan (City of Anacortes 2012). Additional information about existing land use in the vicinity of the Shell PSR is presented in Chapter 3.12 – Land Use and Social Elements.

BNSF Railway Company divides its national rail network into regions, divisions, and subdivisions for operational and management purposes. A region is the largest area and contains multiple divisions. Each division contains hundreds of subdivisions. The proposed project is located on the Anacortes Subdivision, which connects to the Bellingham Subdivision in Burlington, WA.

BNSF Railway Company (BNSF Railway) operates and maintains the existing rail line that runs adjacent to the Shell PSR. The rail line, known as the Anacortes Subdivision, is approximately 14 miles long, extending from the Bellingham Subdivision in Burlington, Washington, to the western side of the March Point peninsula (Figure 2-1). The Anacortes Subdivision is currently used by Shell, Tesoro, and other neighboring industries.

DATA SOURCE: (ESRI 2016, Skagit County 2015, USGS 2015, WSDOT 2015)

N

0 1 2 Mile

Proposed Project Site

Proposed Wetland Mitigation Site

Anacortes Subdivision

Bellingham Subdivision

BNSF Railway

Interstate Highway

State Highway

City Limits

Swinomish Indian Reservation

Figure 2-1
PROJECT VICINITY

Existing Facilities and Operations

Existing Facilities

Existing facilities at the Shell PSR include storage tanks, a pier for marine vessels, refining equipment and facilities, pipelines, a parking and laydown area, a rail line and spur to receive *manifest trains*, paved and graveled roads, and fences. Wastewater from the Shell PSR is treated at the facility's wastewater treatment plant before being discharged into Fidalgo Bay.

A manifest train is a mixture of car types and cargoes. A unit train carries the same type of product in all cars from origin to destination.

Two buried pipelines cross the Shell PSR site (Figure 2-6). The Kinder Morgan Puget Sound pipeline provides crude oil supplies from Canada. The BP Olympic pipeline is used to distribute refined products to customers in the Pacific Northwest. Puget Sound Energy (PSE) electrical transmission lines on wooden poles are present on the southern and eastern portions of the Shell PSR property (Figure 2-5).

Existing Operations

The Shell PSR is one of five petroleum refineries in Washington State and has been in operation since 1958. The Shell PSR currently employs approximately 750 people (AECOM 2015). The facility has the capacity to refine 5.7 million gallons (145,000 barrels) of crude oil per day. Approximately 75 percent of the Shell PSR's supply of crude oil comes from the Alaska North Slope, which it receives in weekly deliveries via marine vessels. Approximately 25 percent of its crude oil is delivered from Canada via the Kinder Morgan Puget Sound pipeline. No crude oil is currently received by rail because the Shell PSR does not have facilities designed to receive or unload crude oil from unit trains.

The Shell PSR's principal products are automotive gasoline, ultra-low sulfur diesel fuel, and jet fuel. The Shell PSR also produces several byproducts of the refining process, including sulfur, propane gas, and petroleum coke. The Shell PSR distributes these products from the refinery via pipeline, truck, and rail throughout the Pacific Northwest.

The Swinomish Channel Swing Bridge is a prominent feature along the Anacortes Subdivision.

While the Shell PSR does not currently have the capability to receive crude by rail via unit trains, the refinery uses the Anacortes Subdivision to receive materials and distribute products. Approximately two BNSF Railway trains travel daily on the Anacortes Subdivision to serve the Shell PSR, the adjacent Tesoro Anacortes Refinery, and other neighboring industries.

Potential Changes to Existing Operations

If the proposed project were not built, Shell would need to find another source of crude oil to maintain the PSR's existing refining production output. The Shell PSR would continue to receive crude oil shipments from the Alaska North Slope by marine vessels. However, supplies of crude oil from the North Slope are diminishing and no new sources that can be transported by marine vessels to the Shell PSR are known at this time. While it may be possible in the future for Bakken crude oil to be transported to other west coast ports by rail and then shipped to the Shell PSR by marine vessel, this option is not currently available and it is not known when or whether this option would become available.

Would the Shell PSR refine oil from tar sands?

The Shell PSR does not have the capability to refine diluted bitumen (low-grade oil, sometimes referred to as *dil-bit*), which is mined from tar sands. No such facilities are included as part of the proposed project.

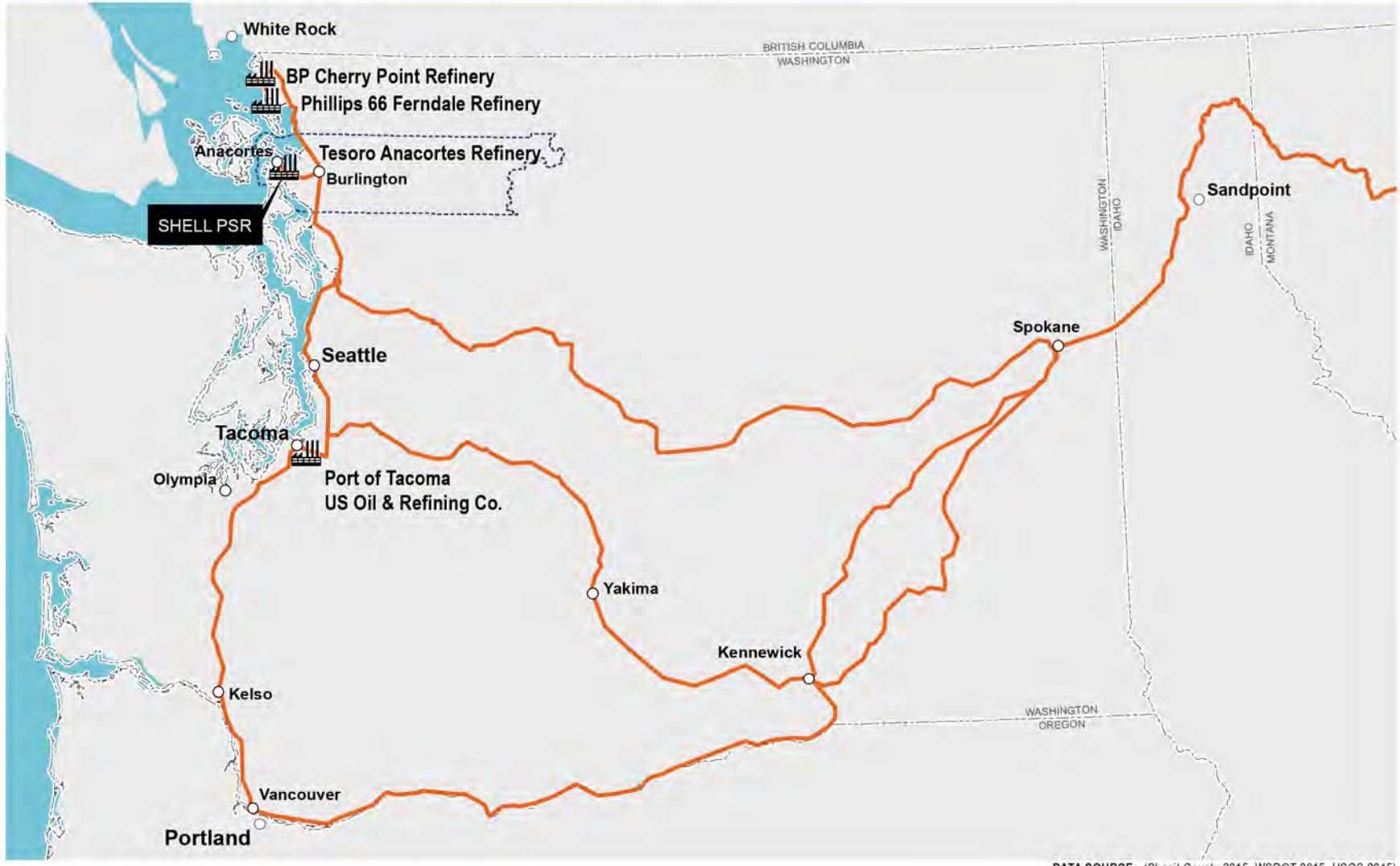
U.S. and Regional Rail Operations

More than 3,000 miles of railroad lines operated by multiple companies currently provide mobility for freight and passengers within Washington State. U.S. crude oil production has greatly increased in recent years with much of the output shipped by rail. Across the U.S., crude oil rail shipments increased from 9,500 carloads in 2008, to 493,146 carloads in 2014 (AAR 2015). As described in Chapter 1 – Introduction, there are four refineries in Washington State that currently receive crude by rail from the mid-continent area (Figure 2-2). According to the Washington State 2014 Marine & Rail Oil Transportation Study, the state receives approximately 19 unit trains per week of Bakken crude (Etkin et al. 2015).

Effective April 1, 2015, Bakken crude oil must be conditioned before being transported by rail to reduce volatility and to meet federal crude oil safety standards (State of North Dakota Industrial Commission 2014).

The U.S. freight railroads are private organizations that are responsible for their own maintenance and improvement projects. The railroads are subject to safety and operations regulation from the Federal Railroad Administration (FRA), a division of the U.S. Department of Transportation (USDOT). The Interstate Commerce Commission Termination Act of 1995 (49 USC 101) identifies the Surface Transportation Board (STB) as the sole regulatory jurisdiction of transportation by rail carriers. Main line construction, operation, and facilities development is regulated at the federal level and preempts state and local authority. Chapter 3.15 – Rail Traffic and Transportation, provides additional information about rail safety, operation, and maintenance requirements.

BNSF Railway is one of the two largest railroad companies operating in Washington State. BNSF Railway transports the majority of bulk crude oil out of the Bakken region. Approximately 17 one-way trains carrying a variety of cargoes (manifest trains) currently travel north or south along the Bellingham Subdivision through Burlington each day. Four additional one-way Amtrak passenger trains (two northbound and two southbound) also travel daily along the Bellingham Subdivision.



DATA SOURCE: (Skagit County 2015, WSDOT 2015, USGS 2015)

Refineries
Railways
State/Provincial/International Boundary
Skagit County

N
0 25 50 Mile

Figure 2-2
BNSF RAILWAY ROUTES WITHIN WASHINGTON STATE AND EXISTING OIL REFINERIES CURRENTLY ACCEPTING CRUDE OIL BY RAIL

In May 2015, the Pipeline and Hazardous Materials Safety Administration (PHMSA), in coordination with the FRA, issued a final rule to reduce the consequences and, in some instances, reduce the probability of accidents involving trains transporting large quantities of flammable liquids (49 CFR § 171-174 and 179). One of the requirements adopted in that rule is for rail carriers to perform a routing analysis that considers, at a minimum, 27 safety and security factors and then select a route based on the findings. These 27 factors include examination of environmentally sensitive or significant areas, population density, venues (e.g., stations, events, places of congregation), presence of passenger traffic, and emergency response capability along the route. BNSF Railway and other railroads use these criteria to evaluate rail routes for potential crude oil transport. The rail carriers must perform a route analysis every calendar year. Chapter 3.17 – Public Services and Incident Response, provides additional information about current and pending regulations pertaining to transport of crude oil by rail.

ALTERNATIVES CONSIDERED

SEPA requires lead agencies to evaluate reasonable alternatives to the proposed project (WAC 197-11-786,197-11-440(5)). As defined in the SEPA handbook, "a reasonable alternative is a feasible alternate course of action that meets the proposal's objective at a lower environmental cost (Ecology 2004)."

The co-lead agencies evaluated potential alternatives using the following criteria:

- Do they feasibly attain or approximate the proposal's objectives?
- Do they provide a lower environmental cost or decreased level of environmental degradation than the proposal?

A reasonable alternative is a feasible alternate course of action **that meets the proposal's** objective at a lower environmental cost.

Alternatives considered included on-site alternatives, off-site alternatives, alternatives suggested by commenters during the scoping process, and alternative methods of transporting crude oil to the Shell PSR (e.g., marine vessel, pipeline, or truck). Each potential project alternative was analyzed to determine if it would meet the proposal's objective at a lower environmental cost or decreased level of environmental degradation. Alternatives that failed to meet these criteria were eliminated from further study.

On-Site Alternatives

The Shell PSR is located on a peninsula that is already substantially developed. Therefore, the ability to find alternative locations for the proposed rail unloading facility within the Shell PSR property was limited. Shell identified five on-site alternatives, including two configurations for the proposed project site, and three additional locations within the Shell PSR property. Figure 2-3 shows their respective locations.

On-site alternatives were initially developed to satisfy federal guidelines under Section 404(b)(1) of the Clean Water Act (CWA), which requires evaluation of practicable alternatives to a proposal that would have less impact on the aquatic environment (AECOM 2015). The on-site alternatives were evaluated to determine whether they met the proposal's *objective*, taking into account the following factors:

The objective of the Shell Anacortes Rail Unloading Facility is to provide the capability to receive crude oil from the mid-continent area to maintain operations at the Shell PSR at the current level.

- Size and Configuration – The size and configuration of the alternative site must accommodate one incoming and one outgoing unit train of 102 tank cars at the same time. It must also provide sufficient space to meet BNSF Railway design criteria for safe and effective rail operations.
- Topography – The alternative site must be relatively flat to accommodate BNSF Railway design criteria. The facility design must incorporate a limiting grade of 0.3 percent in the rail unloading area to facilitate safe operating conditions and to minimize the risk of accidental rail car movement during unloading activities (AECOM 2015; Appendix A).
- Security– The alternative must be located in an area that can accommodate federal security requirements. The Shell PSR is subject to enhanced federal security requirements and standards established by the U.S. Department of Homeland Security. Each alternative was evaluated for such factors as vehicular access, ability to physically secure the site, and the potential for road blockages by trains during operation.
- Safety and Emergency Management– The alternative must be located in an area that can accommodate prevention and response measures to emergencies in the design and layout of the facility. Factors considered were spill prevention, stormwater management, equipment malfunction prevention, and rapid and safe response to emergencies.

See Appendix A for the complete Clean Water Act 404(B)(1) Alternatives Analysis completed by Shell for the proposed project (AECOM 2015).

Each alternative that met the proposal's objective was then evaluated to determine whether the alternative would have a lower environmental cost than the proposed project.

DATA SOURCE: (AECOM 2015, HDR 2015, NAIP 2016, Skagit County 2015, USGS 2015, WSDOT 2015)

Alternative 1
Alternative 2
Alternative 3
Alternative 4
Alternative 5
Highway
Local Road
Anacortes Subdivision

Figure 2-3
ON-SITE ALTERNATIVES

Alternatives 1 and 2

Shell identified two alternatives within the proposed project site: a two-track configuration (Alternative 1), and a four-track configuration (Alternative 2). The two-track configuration would be shorter and wider (approximately 6,745 feet by 385 feet); the four-track configuration would be longer and narrower (approximately 8,455 feet by 300 feet). Both alternatives would be located east of the refinery, west of East March's Point Road, south of North Texas Road, and north of South March's Point Road. Alternative 2 would require an extension of the Anacortes Subdivision east of East March's Point Road. The two-track configuration (Alternative 1) was carried forward as the proposed project (Figure 2-3).

The four-track configuration (Alternative 2) met the proposal's objective; however, it was eliminated from further study because of a higher environmental cost than Alternative 1. Construction of Alternative 2 would disturb a sensitive cultural resources area and would have a greater total impact on wetlands than Alternative 1. Alternative 2 would affect 27.5 acres of wetlands; Alternative 1, the proposed project, would affect 25.83 acres of wetlands. In addition, Alternative 2 would impact high-quality estuarine wetlands along Padilla Bay; Alternative 1 would not affect these wetlands. The other on-site alternatives identified by Shell were eliminated from further study because they did not meet the proposal's objective. As described below, Alternatives 3, 4, and 5 could not feasibly be constructed or successfully operated within the constraints of the Shell PSR site.

Alternative 3

Alternative 3 would be located south of the Shell PSR, between South Texas Road and South March's Point Road, adjacent to the existing Anacortes Subdivision. Alternative 3 met criteria for Size and Configuration, and Topography, but did not meet Security, or Safety and Emergency Management requirements. The rail unloading facility would extend outside the Shell PSR property, under Bartholomew Road and across South Texas Road, to provide adequate length for a unit train. This means that the unit train could not be fully contained within the Shell PSR property or isolated from public access while unloading, and would block South Texas Road, a primary access route for emergency response at the Shell PSR. Alternative 3 would also require relocation of utilities and roads, which would have substantial impacts on adjacent property owners and businesses.

Alternative 4

Alternative 4 would be located north and east of the existing Anacortes Subdivision and mostly west of Bartholomew Road. Alternative 4 met the criterion for Topography, but did not meet criteria for Size and Configuration, Security, or Safety and Emergency Management. The location is not long enough to accommodate a unit train. As such, Alternative 4 would require the train to be staged entirely outside of the Shell PSR property during unloading, meaning that the train could not be isolated from public access and would block South Texas Road and an emergency exit (Refinery West Emergency Road). This alternative's need to stage trains outside of the Shell PSR property would also have substantial impacts on adjacent property owners and businesses by disrupting local traffic patterns during the construction period.

Alternative 5

Alternative 5 would be located south of the refinery and would employ an existing rail alignment that is sometimes used to export petroleum coke from the refinery. Alternative 5 met the criterion for Security and potentially lower environmental cost, but did not meet the criteria for Size and Configuration, Topography, or Safety and Emergency Management. The site is not large enough to stage a unit train and the slope of the existing rail spur is too steep for the train's safe operation.

Based on the evaluation described above, the co-lead agencies determined that alternatives 2, 3, 4, and 5 should not be carried forward for analysis in this EIS. Therefore, this EIS analyzes the no action alternative and the proposed project (Alternative 1). Table 2-1 presents the summary results of the evaluation of on-site alternatives and the environmental cost analysis, where applicable.

Table 2-1 Summary Results of On-Site Alternatives Considered or Evaluated

	On-Site Alternatives Considered				
	Alternative 1 (proposed project)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Size and Configuration	Meets criteria	Meets criteria	Meets criteria	Site cannot accommodate unit train	Site cannot accommodate unit train
Topography	Meets criterion	Meets criterion	Meets criterion	Meets criterion	Site is too steep to meet design criterion for safe train operations
Security	Meets criterion	Meets criterion	Train cannot be isolated from public access	Train cannot be isolated from public access	Meets criterion
Safety and Emergency Management	Meets criteria	Meets criteria	Train would block emergency access	Train would block emergency access	Site is too steep to meet design criteria for safe train operations
Alternative Meets the **Proposal's** Objective	Yes	Yes	No	No	No
Alternative Results in Lower Environmental Cost	Yes	No	N/A	N/A	N/A

Off-Site Alternatives

When a proposal is presented for a project on a specific, privately-owned site, SEPA requires the lead agency to evaluate the no action alternative and other reasonable alternatives on the same site, but does not require evaluation of off-site alternatives (WAC 197-11-440(5)(d)).

Although not required under SEPA, to satisfy federal guidelines under Section 404(b)(1) of the CWA, Shell was required to evaluate off-site alternatives. The CWA guidelines, established by the U.S. Environmental Protection Agency (USEPA) and implemented by the U.S. Army Corps of Engineers (USACE), require screening of off-site alternatives to identify the least environmentally damaging practicable alternative to a proposed action (40 CFR Part 230). Therefore, Shell identified and evaluated two off-site alternatives (AECOM 2015; Appendix A).

The first off-site alternative, located approximately 6.0 miles east of the refinery, was an undeveloped area zoned for agricultural use. This alternative was eliminated from further consideration when it was deemed not feasible to rezone the site from agricultural to industrial use. Historically, most rezone requests seeking to de-designate agricultural land in Skagit County have been unsuccessful (AECOM 2015; Appendix A).

The second off-site alternative, located approximately 6.3 miles east of the refinery, was at an existing lumber mill zoned for industrial use. This alternative was eliminated from further study when it was deemed to present a safety risk because the rail unloading facility would be located too far away to meet the 15-minute required response time by emergency response personnel at the Shell PSR. This alternative was also deemed not feasible because it was limited by a single means of ingress/egress.

Alternatives Suggested During the EIS Scoping Process

As described in Chapter 1 – Introduction, one of the goals of the EIS scoping process is to identify potential alternatives to the proposed project. Comments related to alternatives are summarized in the *Shell Anacortes Rail Unloading Facility Environmental Impact Statement Scoping Report* (Skagit County and Ecology 2015).

Many commenters suggested that the co-lead agencies consider a no action alternative. As described above, a no action alternative is being considered in this EIS.

Commenters also suggested alternative locations for the project to the east of the Shell PSR site. However, as described above, off-site alternatives were evaluated and were not considered further because they either did not meet the proposal's objective or were not technically feasible.

Commenters suggested a variety of alternatives to the project itself; for example, renewable energy projects, or a smaller project that would require fewer trains or a lesser quantity of oil to be transported. As described in Chapter 1 – Introduction, and above, these suggestions would not meet the proposal's objective of providing the capability to receive crude oil from the mid-continent area to maintain supplies needed for refinement at the existing Shell PSR and, therefore, were eliminated from further study.

Commenters suggested alternative methods of transporting crude oil to the Shell PSR. Several alternative methods were considered and are described below.

Alternative Methods of Crude Oil Transport

Alternative methods of delivering mid-continent crude oil to the Shell PSR were considered, including transport via marine vessel, pipeline, or truck along existing highways. The evaluation of these options is summarized below.

- Transport via marine vessel –This alternative would not meet the proposal's objective because the mid-continent area is a landlocked region of the U.S. without access to water-based transportation routes. Mid-continent crude oil could be delivered to the U.S. Gulf Coast and shipped via marine-based vessel to the Shell PSR; however, high shipping costs and transit distance would preclude this option from being economically viable (AECOM 2015). As described for the no action alternative, it is possible that other sources of Bakken crude oil could be accessed by marine vessel from other West Coast ports in the future. This option is not currently available and it is not known when or whether this option would become available.
- Transport via pipeline –No existing crude oil pipelines are planned or currently serve the U.S. West Coast from mid-continent production locations. The construction of a new 1,000-mile-long crude oil pipeline is not considered an economically viable option because of the sheer scale of the endeavor.
- Transport via truck along existing highways –Transport of crude oil by tanker truck from the Bakken region to the Shell PSR could meet the proposal's objective of providing mid-continent crude. However, transport via truck would not be an economically viable option, would result in greater environmental cost, and would be less safe than transport via rail. Approximately 490 tanker trucks would be required to deliver the same amount of crude oil as that transported by one unit train. Moreover, transporting crude oil by rail would require approximately 80-percent less fuel than moving it by truck. In addition, transport by truck would increase the likelihood of a potential accident or spill. Historically, the largest spills in most inland areas are from overturned tanker trucks (Etkin et al. 2015). Between 2002 and 2007, tanker trucks spilled about 225 barrels of oil per billion-ton-miles, while rail transport resulted in about 25 barrels of oil spilled per billion-ton-miles (CRS 2014).

Based on the review of scoping comments and the analysis summarized above, the alternatives suggested during the scoping process and the alternative methods of transport were eliminated from further study because they did not meet the proposal's objective.

Benefits and Disadvantages of Delaying Implementation

SEPA requires that an EIS discuss the benefits and disadvantages of delaying implementation of a proposed project (WAC 197-11-440(5)(c)(vii)). The urgency of implementing the proposal can be compared with any benefits of delay. The foreclosure of other options should also be considered; that is, if implementation of the proposal would preclude implementation of another project at a later time.

If the proposed project were postponed, the direct, indirect, and cumulative impacts associated with the project would be delayed. This delay could forestall the potential impacts of the project, as well as the economic benefits that could be sustained or increased by employment and tax revenues generated from its construction and operation. If the proposal were implemented, the site would not be available for future development; however, there are no proposals to use the site for an alternative project at this time.

In 2016, Ecology adopted rules (WAC 173-185) to create reporting standards for facilities that receive crude oil by rail, and pipelines that transport crude oil through the state (Ecology 2016a). Additionally, the rule identifies reporting standards for Ecology to share information with emergency responders, local governments, tribes, and the public. Ecology also adopted rules (WAC 173-186) to establish oil spill contingency plan, drill and equipment verification requirements, and provisions for inspection of records for railroads required to submit oil spill contingency plans, and for the response contractors that support the implementation of the railroad plans (Ecology 2016b). These rules go into effect on October 1, 2016. Regardless of when the proposed project is constructed, it would be subject to WAC 173-185 and WAC 173-186 after it is implemented; therefore, there is no apparent benefit of delaying implementation of the project to await the final rules.

PROPOSED PROJECT

Shell proposes to construct and operate a rail unloading facility at the Shell PSR. The proposed project includes building a rail spur from the existing adjacent Anacortes Subdivision onto the Shell PSR property to accommodate trains transporting crude oil from the mid-continent area.

Each unit train arriving at the rail unloading facility would be carrying approximately 60,000 to 70,000 barrels of crude oil. The facility would receive six unit trains per week, on average, with each train comprised of about 102 tank cars. Each tank car would meet weight limits of a maximum gross rail load of 286,000 pounds, prescribed by the PHMSA (49 CFR 179.13).

The proposed project has been designed to receive 360,000 to 420,000 barrels of crude oil by rail per week. This volume is equivalent to *six trains per week*, which is the maximum volume of crude that can be unloaded at the facility, as it takes approximately 12 hours to complete the unloading process.

The proposed project has been designed to receive a volume of crude oil equivalent to six trains per week. BNSF Railway does not use a specific schedule for freight trains. Therefore, in any given week, the number of trains arriving at the facility could vary slightly. For example, seven trains could be received at the Shell PSR during one week, and five trains the next.

The proposed project would not result in a change in the refining capacity of the Shell PSR. The facility currently receives delivery of crude by marine vessel from the Alaska North Slope and the Kinder Morgan Puget Sound pipeline. Overall production from the North Slope is on the decline and that downward trend is projected to continue. Therefore, the crude oil received by rail would be used to replace diminishing North Slope supplies.

The project would also include installing equipment and facilities to pump oil from tank cars to existing tanks within the refinery, constructing stormwater detention ponds, and installing safety and spill response measures.

The proposed project site includes approximately 47.1 acres, of which 45.8 acres are on the Shell PSR property and 1.3 acres are on adjacent BNSF Railway right of way. There would be an additional 25.7 acres of temporary impacts on the Shell PSR property. Figure 2-4 shows the location of the proposed project. The proposed project site is situated east of the refinery, west of East March's Point Road, south of North Texas Road, and north of South March's Point Road.

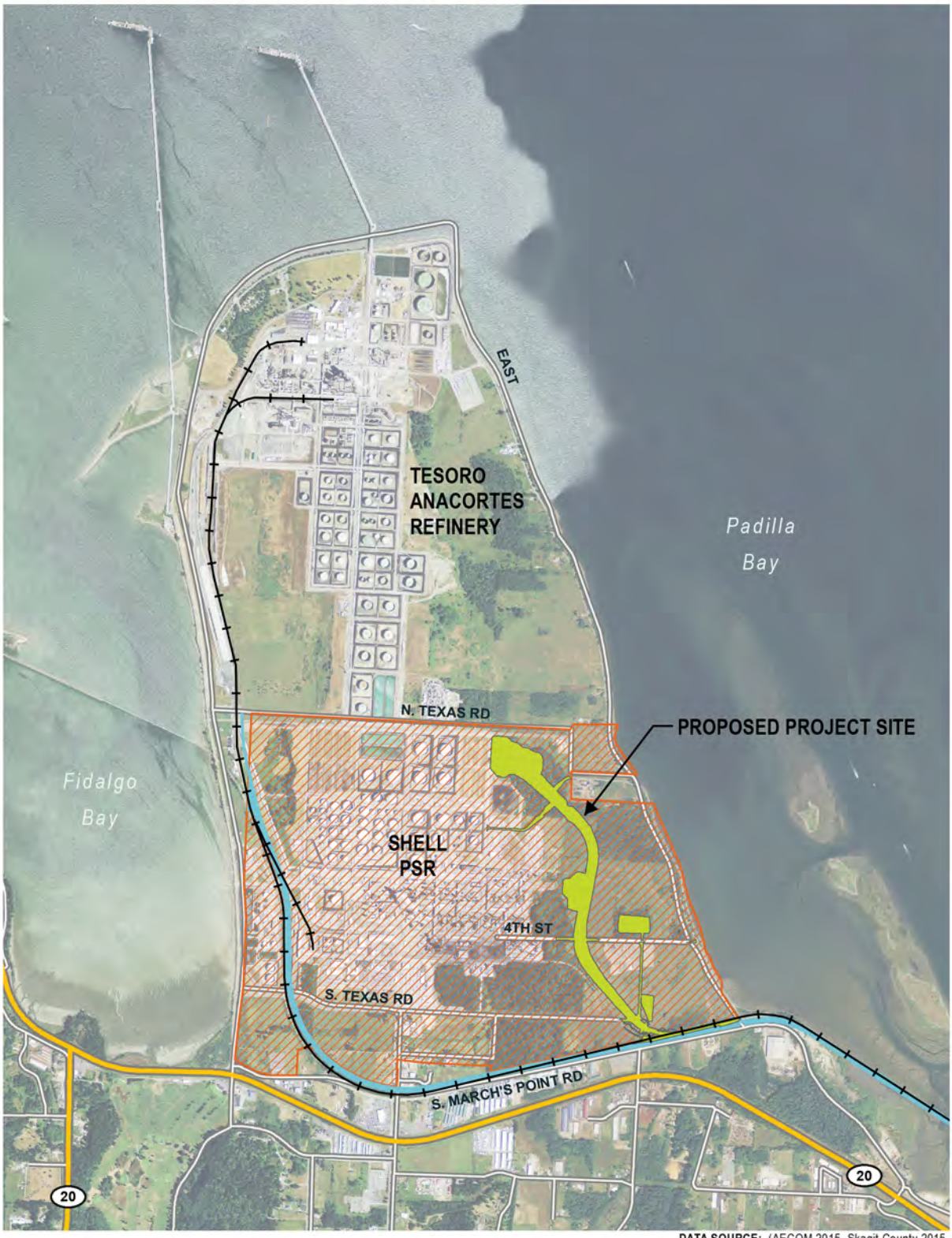
The proposed project site includes approximately 47.1 acres, of which 45.8 acres are on the Shell PSR property and 1.3 acres are on adjacent BNSF Railway right of way.

The proposed project site is a mix of undeveloped and developed industrial land. Undeveloped areas on the project site are pastures that have been used for cattle grazing. The developed areas include:

- An unvegetated soil stockpile covering approximately 5.9 acres.
- Impervious surfaces covering approximately 14.8 acres consisting of:
  - Roadways.
  - Two railroad tracks on the Anacortes Subdivision and one *wye track* leading to the existing Shell PSR facility.
  - Parking and turnaround areas (to be used as a parking and laydown area during construction).

A wye track is a triangle of railroad track used for turning locomotives or trains.

Construction of the proposed project would result in wetland impacts that, as described in Chapter 3.5 – Wetlands, would require compensatory mitigation to replace the loss of wetland functions. Shell has identified a potential wetland mitigation site approximately 2 miles east of the project location at the south end of Padilla Bay. The mitigation site is 100 acres, of which approximately 73 acres would be restored to tidal estuary. Some of the remaining 27 acres would be used for a setback dike, pump station, and stormwater drainage features. The number of acres to be restored is pending approval by the USACE and Ecology (AECOM 2015). Additional detail about the proposed wetland mitigation is provided later in this chapter and in Chapter 3.5 – Wetlands.



DATA SOURCE: (AECOM 2015, Skagit County 2015, WSDOT 2015, NAIP 2013)

Proposed Project Site | BNSF Rail ROW | Highway
Anacortes Subdivision | Shell Parcels | Local Road

N 0 0.25 0.5 Mile

Figure 2-4
PROPOSED PROJECT LOCATION

Proposed Facilities and Operations

Proposed Facilities

The proposed project would include the following facilities:

- Arrival and departure rail tracks.
- Rail unloading area with two tracks and a concrete containment pad.
- Designated rail section referred to as a *bad order track*, with facilities for rail cars that require repair before being dispatched.

A bad order track is designated for rail cars with mechanical defects or that are in need of maintenance.

- Personnel operations building and ancillary facilities. The personnel operations building would contain controls to allow for the efficient operation of pumps and equipment directly associated with the rail unloading facility.
- Perimeter inspection/security road.
- Pumps and an above-ground pipeline to connect the proposed project to existing storage tanks.
- New road connections. Roads would be added and/or modified for safe and efficient ingress/egress of operating personnel, refinery emergency response personnel and equipment, and external emergency equipment and personnel such as the local fire department.
- Relocation of segments of the Kinder Morgan Puget Sound pipeline, the BP Olympic pipeline, and PSE power lines. The existing locations of these pipelines and power lines conflict with the proposed location of the new rail unloading facility. Because of the limited space on the Shell PSR property to align a new rail system and unloading facility, conflicts with the pipeline and power system are unavoidable (Figures 2-5 and 2-6).
- Stormwater facilities.
- Oil/water containment facilities, including pump and piping facilities to route water to the refinery's wastewater treatment plant.
- New electrical power substation.
- Fire response facilities, including monitors, hydrants, fire-fighting foam equipment, and supplies.
- Other ancillary facilities (e.g., lighting, fencing, etc.) typically associated with rail unloading facilities.

DATA SOURCE: (AECOM 2015, NAIP 2013, Skagit County 2015, WSDOT 2015)

Existing PSE Power Line to be Retained
Relocated PSE Power Line
PSE Power Line to be Removed
Proposed Rail Track
BNSF/Shell Rail Improvement
Local Road

Figure 2-5
PROPOSED POWER LINE RELOCATION

DATA SOURCE: (AECOM 2015, NAIP 2013, Skagit County 2015, WSDOT 2015)

N 0 250 500 Feet

Existing Pipeline
Relocated Pipeline
Decommissioned Pipeline
Proposed Rail Track
BNSF/Shell Rail Improvement
Local Road

Figure 2-6
PROPOSED PIPELINE RELOCATION

Rail Line Extension

The proposed project includes construction of over 3 miles of new railroad track on the Shell PSR property, including:

- 8,000 feet of unloading track with a concrete unloading pad.
- 1,300 feet of bad order track for temporary storage of rail cars that are taken out of service for repair or maintenance.
- 7,200 feet of departure track.

A rail spur would be constructed to connect the Shell PSR to the existing Anacortes Subdivision near South March's Point Road. The rail spur would extend in a northwesterly direction approximately 5,500 feet to North Texas Road. Most of this distance would require excavation below existing topography to meet grade requirements.

Rail access would be provided by a new connection to the existing Anacortes Subdivision located to the southeast, which would require modifications to the Anacortes Subdivision configuration. Short segments of the existing Anacortes Subdivision and a *siding track* would be realigned slightly to the south. The existing Shell rail spur would be realigned slightly to the west and new switches would be installed in addition to the new connection. An approximately 1,100-foot-long, 10-foot-high retaining wall would be constructed between the Anacortes Subdivision and South March's Point Road within the BNSF Railway right of way for support of the siding track realignment (Figure 2-7).

> A siding track is a low-speed auxiliary track that is separate from a main line or spur. It may connect to a through track or to other sidings.

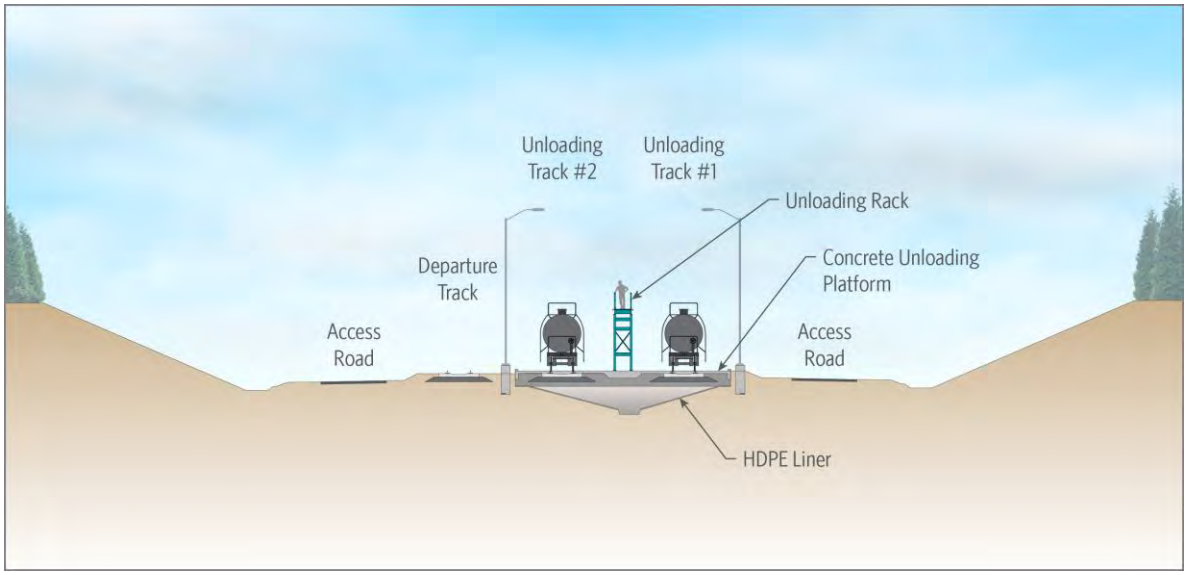
The rail line crosses 4th Street, an existing private road running east-west through the middle of the project site. This portion of 4th Street would be reconstructed underneath the proposed rail line.

Rail Unloading Facility

Figures 2-7 and 2-8 present the key features of the rail unloading facility. The facility would include an unloading rack, concrete unloading platform, vent pipes, a containment area, drain connections, collection pipes, and tank car grounding. The unloading rack is an overhead platform that would run the length of the unloading area and would be the largest structure in the facility, approximately 20 feet high. The unloading facility, including the unloading rack, would be located below grade in a cut in the hillside; as such, most of the facility would not be visible from public rights of way. The unloading facility would include three sets of railroad tracks: Unloading Track 1, Unloading Track 2, and a Departure Track. Both of the unloading tracks would be used simultaneously for unloading a single unit train.

Figure 2-7 Rail Unloading Facility Features

Figure 2-8 Profile View of Rail Unloading Facility



The rail unloading facility would be constructed in a bowl with uphill grades in both directions extending outward from the middle of the facility. This design would contain the oil in the event that the contents of an entire unit train were released at one time. The unloading platform would be paved and curbed to allow containment of both rainwater and potential spills. The bowl design would also prevent tank cars from rolling backward onto the Anacortes Subdivision in the event of brake failure. The facility would also contain a compressor to supply air to the tank cars in the unloading area to ensure the train's brake system is energized in the brake position.

A high-density polyethylene (HDPE) liner would be installed underneath the entire rail unloading platform. In addition, an oil/water separation pond system would be included in the rail unloading facility area to capture any potential leaks or spills. The system would be connected to the Shell PSR's existing wastewater treatment facility located on the west side of the refinery. Additional details about proposed stormwater and spill containment features are provided below and in Chapter 3.3 – Surface Water.

The oil/water separation pond system would be constructed west of the proposed rail unloading platform. It would be comprised of the stormwater drainage system from the unloading platform combined with a lined oil/water separation pond. The system would gather minor leaks, wash-down water, and stormwater from the rail unloading facility and pump it to the existing Shell PSR wastewater treatment plant. This would prevent any drips or potential leaks from entering Fidalgo or Padilla bays. The lined oil/water separation pond would have a capacity of about 82,000 cubic feet (or about 22 full tank cars). However, because the unloading facility is designed as a bowl, with uphill grades extending outward from the middle, the facility itself would be able to contain a spill of 102 full tank cars. In the event of this type of major spill, the oil would be routed to the oil/water separation pond, but would not be sent to the Shell PSR wastewater treatment plant. Rather, the pumps to the treatment plant would be turned off and

the oil would be pumped from the oil/water separation pond into recovery trucks for later processing at the refinery.

Stormwater Management

Two unlined stormwater ponds (North and South) are proposed east of the rail unloading facility. Both ponds have been designed to detain 100-year, 24-hour storm events. A third oil/water separation pond system would provide stormwater drainage for the rail unloading facility (Figure 2-7).

The North Stormwater Pond would receive stormwater collected from the project site, as well as from a portion of the existing Shell PSR facility north of 4th Street. The stormwater would be delivered to the pond via ditches and an underground system. The North Stormwater Pond would discharge into a forested upland.

A similar system, the South Stormwater Pond, would be designed to receive stormwater from the project site south of 4th Street. This system would discharge into an emergent wetland to the east of the pond. Both stormwater ponds would eventually infiltrate into Padilla Bay. See Figure 2-7 for locations of these proposed facilities.

Additional Facilities

The proposed project would include the following supporting facilities:

- Rail car repair facility and operations building.
- Perimeter road with connections to existing roads at 8th Street and North Texas Road at the northern end, and at South Texas Road on the southern end.
- Improvement to 4th Street at the intersection with East March's Point Road.
- Improvements and/or partial extensions of existing private roads on the Shell PSR site to provide access for operating personnel and emergency response personnel and equipment.
- Pumps and below- and above-ground pipelines to connect the proposed project to existing storage tanks.
- Electrical power substation to provide power to the proposed facilities.
- Facility and safety lighting.

Improvements to the BNSF Railway right of way would also be made, including installing power that would eliminate the need for trains to stop and manually be switched into the facility.

Proposed Operations

The Shell PSR proposes to transport crude oil from the mid-continent area—the Bakken region of North Dakota and Montana. Trains would travel to Washington State via BNSF Railway (Figure 2-9). Although BNSF Railway has discretion in the operation of trains on their rail lines, in this EIS it is assumed for analytical purposes that the unit trains traveling to the Shell PSR would take the existing BNSF Railway main line from the mid-continent area, enter Washington State near Spokane, and travel southwest along the Columbia River Valley to the Vancouver area. Then, turning north, the trains would generally parallel the I-5 corridor toward Burlington, exit the Bellingham Subdivision onto the Anacortes Subdivision rail line and head north and west toward the Shell PSR. On the return trip, trains would take a different route by moving south along the I-5 corridor, turning southeast near Auburn, traveling through Stampede Pass and the Yakima Valley. Trains would join up with the original route in Kennewick and then travel north through Spokane.

The proposed project is designed to receive, on average, six unit trains per week, which would result in approximately 624 new train trips per year, or 312 incoming and 312 outgoing unit trains. Each train would include up to 102 tank cars and have a total length of approximately 6,600 feet.

Although the U.S. recently lifted the ban on exportation of oil to foreign countries, Shell is not considering such exports as part of the proposed project.

Would Shell export oil as part of the proposed project?

Although the U.S. recently lifted the ban on exportation of oil to foreign countries, the foreign export of crude oil from the Shell PSR is not being considered as part of the proposed project.

When added to Shell's current five to six manifest trains per week for incoming materials used in the refining process, the proposed project would result in an increase in the overall train traffic to and from the Shell PSR. Overall, that translates to 24 (incoming and outgoing) train trips per week and approximately 1,248 train trips per year.

Currently, approximately 77 marine vessels per year (or about 1.5 per week) deliver crude oil to the Shell PSR. With the proposed project, inbound marine vessels delivering crude oil would be reduced to about 28 per year (or 0.5 per week), when the facility is operating at full capacity. Crude oil deliveries via pipeline are not expected to change.

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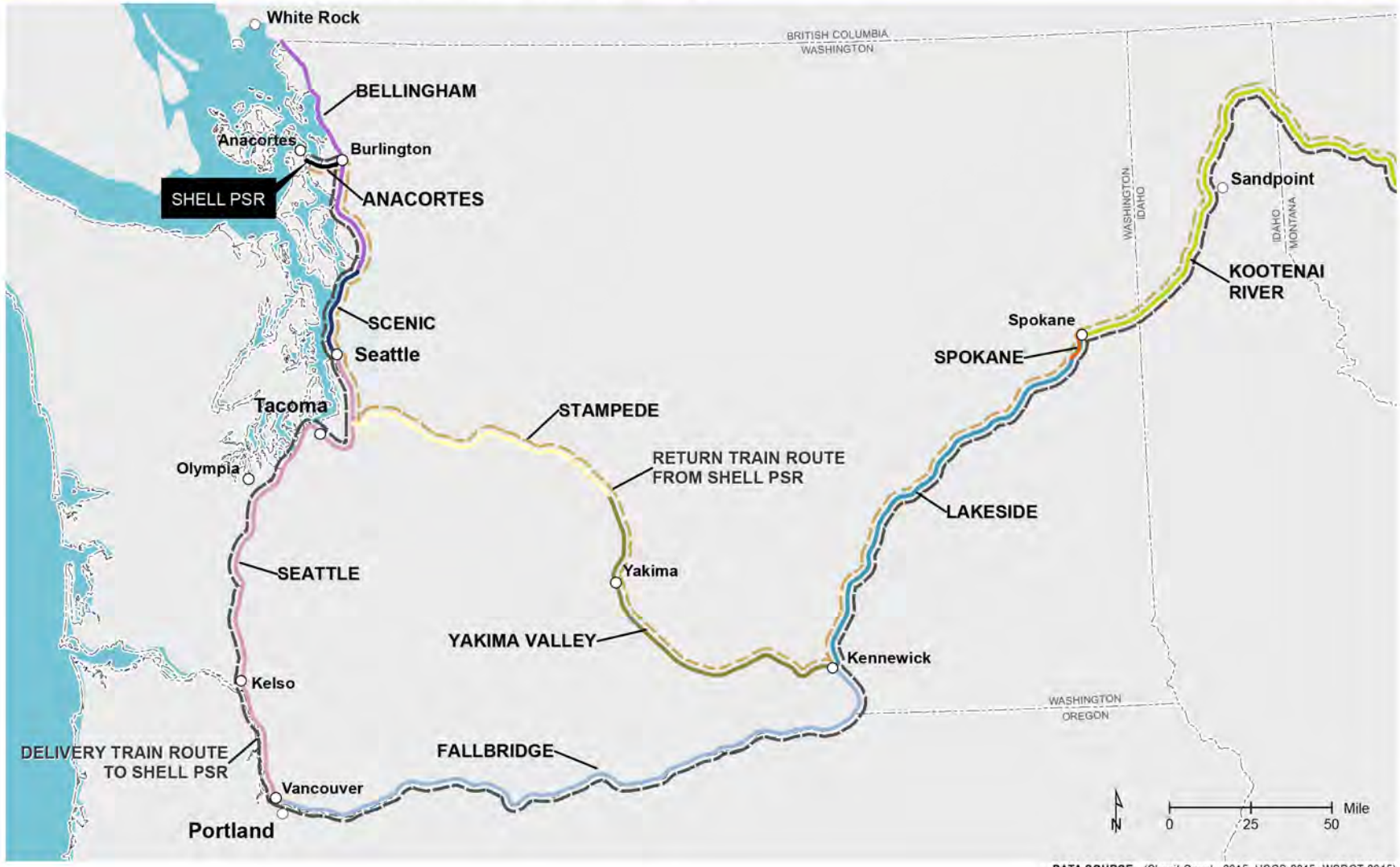


DATA SOURCE: (Skagit County 2015, USGS 2015, WSDOT 2015)

BNSF Subdivisions
Anacortes
Bellingham
Scenic
Seattle
Fallbridge
Stampede
Yakima Valley
Lakeside
Spokane
Kootenai River
Representative Delivery Train Route to Shell PSR
Representative Return Train Route from Shell PSR
State/Provincial/International Boundary

Figure 2-9
PROPOSED PROJECT RAIL ROUTES THROUGH WASHINGTON STATE

Tank Cars

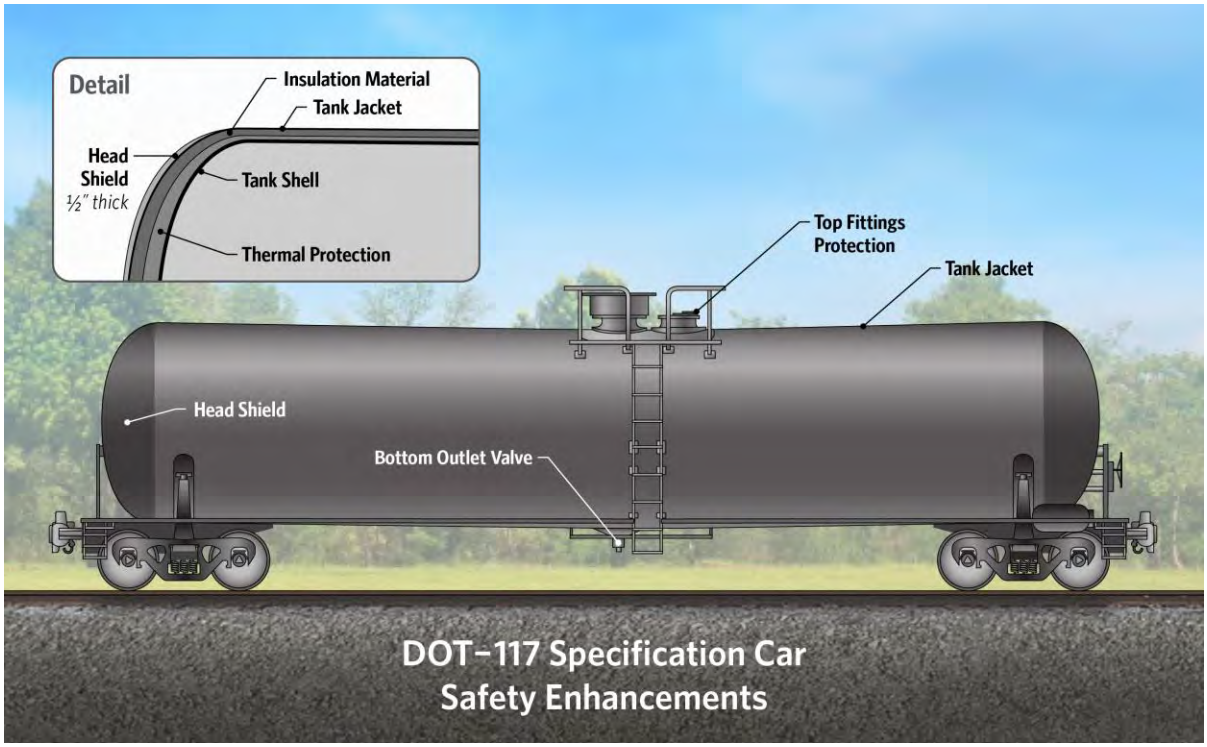
For this project, Shell would use DOT-117 Specification tank cars that meet enhanced safety standards issued by the PHMSA and the FRA (Figure 2-10). A single DOT-117 Specification tank car is expected to hold approximately 600 to 700 barrels of crude oil and has a maximum gross rail load of 286,000 pounds.

All railroad cars, regardless of what commodity they hold, must not exceed a loaded maximum gross weight of 286,000 pounds (49 CFR 179.13).

The DOT-117 Specification tank car includes the following features (AAR 2015):

- Tank shell is an inner steel jacket or a cylinder of 9/16-inch steel. Most existing nonpressurized tank cars are made of 7/16-inch steel. A 9/16-inch steel jacket is less likely to breach in the event of an accident.
- Thermal protection is a layer to help prevent a tank car from overheating if there is an accident with a resultant fire.
- Tank jacket is an outer layer of 11-gauge steel that wraps around the shell of the tank car shielding the thermal protection layer and offering additional puncture resistance.
- Head shield is a 1/2-inch-thick layer of steel at both ends of the tank car that protects against punctures caused by collisions with adjacent tank cars.
- Bottom outlet valves include an enhanced handle design to prevent the valves from opening and releasing oil in the event of an accident. These valves are used to load and unload the oil.
- Top fittings are pressure-relief valves located at the top of the tank car. If the internal pressure in a tank car gets too high from liquid inside becoming too hot, the pressure could cause a tank car to rupture. Pressure relief valves are designed to open when pressure reaches a certain level, thereby emitting product in a controlled fashion and lowering the internal pressure.

Figure 2-10 DOT-117 Specification Tank Car



Source: Adapted from USDOT 2016.

Unloading Operations

The proposed project unloading operations would likely be performed during both day and night. An incoming unit train would arrive from the Anacortes Subdivision onto Unloading Track 2. Manual brakes would be set on the northern half of the unit train, and then the southern half of the train would be separated. The southern half would be moved backwards to clear the railroad switch and then moved up to Unloading Track 1. Brakes would be set on the southern half of the unit train to ensure both halves are ready for unloading. To ensure brakes have adequate air pressure, the cars would be connected to a pressurized air system specifically designed for this purpose. BNSF Railway would transfer custody to Shell after all safety checks were performed.

As described above, unit trains entering the facility would be split into two segments using Tracks 1 and 2 on the unloading platform. One track would have 49 cars and the other with 53, respectively. Tank cars would be attached to unloading lines in groups of about 10 cars. Unloading lines would be attached to the bottom drain valve on each tank car; other lines would be attached to vent valves on the top of the tank cars to capture volatile gases released during the unloading process and to control the atmosphere of the tank car. At that point, the crude oil would be pumped to existing storage tanks on the Shell PSR property prior to refining. As the tank cars were emptied, the unloading lines would be transferred to other cars to continue the sequential process until all tank cars in the train were unloaded.

After unloading, the empty unit train would be transferred to the Departure Track, and reassembled starting with Unloading Track 2 and then Unloading Track 1. The train would be inspected for safety before custody would be transferred back to BNSF Railway. At that point, the empty train would be ready to depart for its return to the mid-continent. The entire unloading process described above would take about 12 hours to complete. This limits the volume of oil that can be unloaded to 60,000 to 70,000 barrels per day or up to six trains per week.

Shell anticipates that the proposed rail unloading facility would be initially staffed 24 hours a day, seven days per week. This could change in the future after unit train schedules and logistics are better defined. Approximately 25 new workers are anticipated to operate the proposed project, eight to ten of whom would be expected to work on site at any one time. The number of personnel could change after operational routines are established.

Life of the Proposed Project

The proposed rail unloading facility would be part of the larger operations of the Shell PSR. The proposed project is designed for a 20-year life. However, the facility could operate for a much longer period if components are replaced when needed. Operation of the facility would depend on how long it remains commercially viable to receive crude oil by rail. Maintenance activities during operation may include daily checks of pumps, piping, and instruments. Piping wall thickness would be monitored to identify the timing for replacement well in advance of potential significant thinning. The new rail system would undergo routine inspections by experienced contractors that specialize in rail maintenance. Permit requirements that apply to project operation would remain in place for the life of the proposed project.

Construction Methods and Sequencing

Construction of the proposed project is anticipated to begin as early as 2017, and take about two years to complete. Approximately 200 temporary employees may be needed at the peak of construction. The total construction cost of the unloading facility is estimated at $95 million.

The construction equipment required would include approximately five large excavators, five pay loaders, 75 tractor-trailers, five bulldozers, 10 scrapers, five water trucks, and two service trucks.

Construction activities on the Shell PSR property would mostly occur during daylight hours for 10 hours per day, four days a week (Monday through Thursday); however, there may be a need to work outside these hours because of schedule or time constraints. No night work scenarios are anticipated at this time.

Construction of the proposed project is anticipated to begin as early as 2017, and take about two years to complete.

The proposed project would involve various site preparation activities including, but not limited to, clearing and grading; installation and construction of associated infrastructure improvements such as additional stormwater facilities; and extension of existing services and utilities, including electricity, sanitary sewer, and potable water.

Utility Relocation

Before construction could begin, some existing pipelines and power lines would need to be relocated to create the additional space and clearances necessary for the rail unloading area. Approximately 4,250 feet of the existing Kinder Morgan Puget Sound pipeline and 1,350 feet of the BP Olympic pipeline would be relocated from within the footprint of the rail facility to a common corridor along the unloading facility's eastern side (Figure 2-6).

Approximately 6,830 feet of PSE power lines on the east side of the existing refinery facility would also require relocation. This effort would involve the relocation of three power poles, the removal of 14 existing power poles, and the installation of 18 new power poles.

Clearing and Grading

Standard and heavy earth-moving and grading equipment would be used to construct the necessary base for the proposed rail lines. Approximately 1.1 million cubic yards (cy) of excavated material is anticipated for construction of the rail spur extension and unloading tracks. Approximately 236,000 cy would be excavated from wetlands on the Shell PSR property.

Excavated materials not needed for fill at other proposed project locations would be hauled away to approved disposal sites. All excavated materials would be tested for contaminants and, if any were found, the contaminated materials would be handled and disposed of separately in accordance with state and local regulations. Approximately 400,000 cy of clean excavated material from the proposed project site would be hauled to the proposed wetland mitigation site and approximately 8,500 cy would be placed in wetlands on the Shell PSR property.

The soil characteristics on site do not meet the requirements of the facility; therefore, fill material would need to be imported to the Shell PSR site. Imported backfill would be brought in and stockpiled for use in constructing the facility at approximately the same time excavated material would be removed from the site. Structural fill material would be obtained on site to the extent feasible. It is likely that fill materials such as ballast needed to provide foundation for the rail tracks and select pipeline bedding would be imported to the site. Approximately 175,000 cy of fill materials would be imported.

Clearing limits would be established by surveyors before any earth was moved. Temporary erosion and sediment control measures would be put in place to limit and control construction stormwater runoff and erosion. The site would be cleared of topsoil and minor vegetation and portions of forest would be removed. Surplus excavated materials, including topsoil and vegetation, would be hauled to an approved location within Skagit County (Figure 2-11).

Over the course of about seven months, a total of approximately 55,000 truck trips (up to 384 per day) are anticipated to remove excavated material from the site. Approximately 20,000 truck trips (or up to 140 per day) would be needed to haul materials from the proposed project site to the wetland mitigation site. Approximately 35,000 truck trips (or up to 244 per day) would be needed to haul materials to potential spoils disposal sites (identified on Figure 2-11), but cannot be secured until a contractor is chosen. Potential haul routes from the Shell PSR and the wetland

mitigation sites to the stockpile areas are also shown in Figure 2-11. An additional 8,750 truck trips, or 61 trucks per day, would be anticipated to import fill material to the Shell PSR site. For a period of about two years, construction truck traffic is anticipated on the local roads adjacent to the refinery.

Infrastructure Construction

The HDPE liner would be installed underneath the entire unloading area and under the oil/water separation pond system to capture and control any spills or leaks and preclude such materials from reaching ground or surface waters.

Multiple specialty contractors would be working on the project at the same time. Crews would be excavating foundations while others would be fabricating elements of the various structures. These elements would be delivered by truck to on-site laydown areas and assembled by other subcontractors. Railroad ties would be brought in and placed to support new railroad tracks. The railroad ties would be primarily made of concrete; however, some wooden railroad ties may be used in the switch areas. Railroad tracks would then be brought to the site, either by truck or rail, and welded into continuous strings for assembling this portion of the project.

The below-ground portion of the pipeline connecting the unloading facility to the existing storage tanks would be installed and backfilled before the railroad tracks and elevated structures were finished. Permanent structures would be brought to the site and assembled or placed according to design requirements. The pump pad and pumps for transferring the crude oil to the refinery would be constructed and installed. Emergency fire water system components would be brought in and assembled per state and local requirements.

Work performed inside the Shell PSR would include installing tie-ins for utility services, various piping connections, access road connections, and other essential communications elements.

DATA SOURCE: (HDR 2015, ESRI 2015, Skagit County 2015, USGS 2015, WSDOT 2015)

Proposed Project Site
Proposed Mitigation Site
Proposed Haul Routes
Potential Spoils Disposal Site
Anacortes Subdivision
Bellingham Subdivision
BNSF Railway
Interstate Highway
State Highway
Waterbody

Figure 2-11
PROPOSED HAUL ROUTES AND SPOILS DISPOSAL SITES

Drainage Modifications

Several drainages (ditches and one seasonal stream) would be rerouted or placed into culverts during construction to accommodate the new facilities and modified topography. Approximately 175 linear feet of Stream S would be rerouted and approximately 50 linear feet would be placed in a culvert. Many of the ditches would be rerouted to new stormwater basins. None of the rerouted ditches are proposed to be lined. Additional information about drainage features is provided in Chapter 3.3 – Surface Water.

Wetland Mitigation

Construction of the proposed project would result in 25.83 acres of permanent wetland impacts; 0.23 acre of long-term temporary impacts; 12.58 acres of permanent impacts to wetland buffers; and 0.02 acre of impacts to Stream S. As described in Chapter 3.5 – Wetlands, these impacts would require compensatory mitigation to replace the loss of wetland functions. Shell has identified a potential wetland mitigation site approximately 2 miles east of the project at the south end of Padilla Bay (AECOM 2016). The mitigation site is 100 acres, of which 73 acres would be restored to tidal estuary. Some of the remaining 27 acres would be used for a setback dike, pump station, and stormwater drainage features.

The draft wetland mitigation plan calls for the removal of an existing dike in strategic areas to restore estuarine processes such as tidal flow, channel formation, and connections to existing channels (AECOM 2016). Before the existing dike is removed, a setback dike would be built to protect surrounding properties and facilities from tidal inundation.

Construction at the wetland mitigation site would begin concurrently with that of the rail unloading facility and is expected to take three to four years to complete (AECOM 2016). Filling the site with excavated material from the unloading facility would occur during the first two years of construction. The new setback dike would require at least two years for settlement and supplemental fill before the existing dike is breached.

Construction of the wetland mitigation site would require the use of scrapers, excavators, bulldozers, dump trucks, graders, rollers for soil compaction, and water trucks for dust control. It would require up to 20 workers to construct.

The wetland mitigation site contains properties owned and managed by Skagit County Dike Drainage and Irrigation Improvement District #12 and Triton America (AECOM 2016). Shell and Triton America have entered into a license agreement to allow for the development of the wetland mitigation site and to conduct subsequent monitoring and maintenance (AECOM 2016). The license would also allow the wetland mitigation site to be placed into a conservation easement in perpetuity.