3.3 SURFACE WATER

Surface water moves over land as sheet flow and as channelized flow within streams and ditches. Surface water serves as habitat for wildlife, a source of hydrology for wetlands, a place for recreation, and a source of drinking water, industrial process water, and irrigation. Changes in surface water quality can occur from an increase in toxic chemicals, temperature, or turbidity. Surface water quantity can be affected when water is rerouted from one receiving water body to another or from increased impervious surfaces that do not allow for infiltration into groundwater. These changes are regulated through the National Pollution Discharge Elimination System (NPDES) stormwater permits, state water quality standards for surface water, and county regulations.

STUDY AREA AND METHODOLOGY

The surface water study area includes ditches, streams, sloughs, wetlands, and marine shorelines associated with Padilla and Fidalgo bays. These features are crossed by or could receive runoff and stormwater discharge from the proposed project site at the Shell Puget Sound Refinery (PSR), the proposed wetland mitigation site, and the Anacortes Subdivision. Figures 3.3-1 and 3.3-3 identify the surface water features on the proposed project and wetland mitigation sites, respectively. The analysis considers the impacts of the proposed project on surface water flows and surface water quality in these receiving waters.

Impacts on surface water flow and water quality were identified by reviewing the information provided by Shell as outlined in Chapter 3 – Affected Environment and Environmental Impacts. A field visit to evaluate and verify descriptions of the project site was conducted on December 8, 2015.

In addition, applicable regulations and policies were evaluated to assist in placing potential project impacts into context of the state and local regulatory environment. Select laws, regulations, and guidance applicable to surface water associated with the proposed project are summarized in Table 3.3-1.

Because the potential impacts associated with surface water are localized, the cumulative impacts study area for surface water would be the same as that described above for the direct and indirect impacts. It includes the ditches, streams, sloughs, wetlands, and marine shorelines associated with Padilla and Fidalgo bays.
### Table 3.3-1  Laws, Regulations, and Guidance for Project-Related Surface Water

<table>
<thead>
<tr>
<th>Description</th>
<th>Laws, Regulations, and Guidance</th>
</tr>
</thead>
</table>
| Establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulates quality standards for surface water. | **Clean Water Act (CWA)** (33 USC 1251 et seq.)  

Section 303(d) requires states, territories, and tribes to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes.  

Section 401 (33 USC 1251) Water Quality Certifications are required for any activity that requires a federal permit or license to discharge any pollutant into waters of the United States. This certification attests that the responsible agency has reasonable assurance the proposed activity will meet its water quality standards.  

Section 402 (33 USC 1342) prohibits the discharge of any pollutant to waters of the United States without a permit. Section 402 also establishes the National Pollutant Discharge and Elimination System (NPDES) permitting program, under which such discharges are regulated both during construction and facility operation.  

Section 404 (33 USC 1344) establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. |
| Through the Federal Coastal Zone Management Act, coastal states with approved Coastal Zone Management Programs (CZMP) require projects operating under a federal permit or license to demonstrate consistency with the CZMPs. Federal consistency allows states to review those projects that are likely to affect state coastal resources or uses. | **The Federal Coastal Zone Management Act** |
| Addresses water pollution by regulating point sources that discharge pollutants to waters of the United States. Created in 1972 by the Clean Water Act, the NPDES permit program is authorized to state governments by U.S. Environmental Protection Agency (USEPA) to perform many permitting, administrative, and enforcement functions. | **National Pollutant Discharge Elimination System (NPDES) Permit Program** |
### Laws, Regulations, and Guidance

<table>
<thead>
<tr>
<th><strong>Description</strong></th>
<th><strong>State</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State Environmental Policy Act (SEPA) (RCW 43.21c; WAC 197-11)</strong></td>
<td>Helps state and local agencies in Washington identify possible environmental impacts that could result from a proposed action, alternatives to the proposed action, and potential impact minimization and mitigation measures. Information learned through the review process can be used to change a proposal to reduce likely impacts and inform permitting decisions at the state and local levels.</td>
</tr>
<tr>
<td><strong>Water Resources Act of 1971 (RCW 90.54)</strong></td>
<td>Sets forth fundamentals of water resource policies for the state to ensure that waters of the state are protected and fully used for the greatest benefit to the people.</td>
</tr>
<tr>
<td><strong>Water Pollution Control Act (RCW 90.48)</strong></td>
<td>Maintains the highest possible standards to ensure the purity of all waters of Washington State are consistent with public health and public enjoyment, the propagation and protection of wildlife, birds, game, fish and other aquatic life, and industrial development of the state. To that end, requires the use of all known available and reasonable methods by industries and others to prevent and control the pollution of state waters.</td>
</tr>
<tr>
<td><strong>Model Toxics Control Act (MTCA) and Cleanup Regulation (RCW 70.105D; WAC 173-340)</strong></td>
<td>Sets cleanup standards to ensure that the quality of cleanup and protection of human health and the environment are not compromised and requires potentially liable persons to assume responsibility for cleaning up contaminated sites.</td>
</tr>
<tr>
<td><strong>Oil and Hazardous Substance Spill Prevention and Response (RCW 90.56)</strong></td>
<td>Establishes a comprehensive prevention and response program to protect Washington's waters and natural resources from oil spills.</td>
</tr>
<tr>
<td>Laws, Regulations, and Guidance</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Washington State Shoreline Management Act (RCW 90.58)</td>
<td>Provides a statewide framework for managing, accessing, and protecting shorelines of the state and reflects the strong interest of the public in shorelines and waterways for recreation, protection of natural areas, aesthetics, and commerce.</td>
</tr>
<tr>
<td>Washington State Coastal Zone Management Program (WCZMP)</td>
<td>Under Washington's Coastal Zone Management Program (WCZMP), the above projects and activities that are likely to affect state coastal resources or uses must be consistent with the WCZMP's enforceable policies found in the Shoreline Management Act, the Ocean Resource Management Act, the Water Pollution Control Act, and the Clean Air Act, and all state regulations that implement those Acts.</td>
</tr>
<tr>
<td>Washington State Hydraulic Code (WAC 220-660)</td>
<td>A hydraulic project is the construction or performance of work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state. Unless otherwise provided, any person who wishes to conduct a hydraulic project must get a construction permit called the hydraulic project approval (HPA) from the Washington Department of Fish and Wildlife (WDFW). The purpose of the HPA is to ensure that construction or performance of work is done in a manner that protects fish life.</td>
</tr>
<tr>
<td>Stormwater Management Manual for Western Washington (SWMMWW)</td>
<td>Provides guidance on the measures necessary to control the quantity and quality of stormwater.</td>
</tr>
<tr>
<td>Local</td>
<td></td>
</tr>
<tr>
<td>Skagit County Stormwater Management (SCC 14.32)</td>
<td>Mandates and sets requirements that stormwater discharge be controlled and treated to provide available and reasonable methods of erosion control, flood control, and water quality treatment for both temporary and long-term stormwater management.</td>
</tr>
<tr>
<td>Skagit County Critical Areas Ordinance (SCC 14.24)</td>
<td>This ordinance was developed under the directives of the Growth Management Act to designate and protect critical areas and to assist in conserving the value of property, safeguarding the public welfare, and providing protection for these areas. Critical areas are defined as wetlands, aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas.</td>
</tr>
</tbody>
</table>
### Laws, Regulations, and Guidance

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skagit County Shoreline Master Program (SMP) (SCC 14.26)</strong></td>
</tr>
<tr>
<td>The Shoreline Master Program (SMP) is comprised of local land use policies and regulations designed to manage shoreline use. The SMP protects natural resources for future generations, provides for public access to public waters and shores, and plans for water dependent uses. It was created in partnership with the local community and Ecology and must comply with the Shoreline Management Act and Shoreline Master Program Guidelines.</td>
</tr>
<tr>
<td><strong>Skagit County Grading Permit</strong></td>
</tr>
<tr>
<td>A Fill and Grade Permit may be required for any grading work involving substantial ground disturbing activity (either fill or excavation) or any additional activity that affects drainage in the area.</td>
</tr>
</tbody>
</table>

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Historical and more current sources of information regarding existing conditions of surface water bodies in the study area were reviewed to characterize surface water resources and how they came to be in their current configuration. This information also provided the context for evaluating potential project impacts on the existing surface water resources. Based on a review of floodplain mapping in the area of the proposed project site, no floodplains would be encroached upon by the proposal.

The proposed project would affect surface water resources through direct changes to existing topography and increased impervious surfaces. These changes would alter existing surface water pathways through redistribution of surface water flows and collection and management of stormwater on the project site. Permanent changes in the distribution of study area surface waters could lead to direct and indirect impacts to environmental resources. Changes in the hydroperiod of wetland soils—the time during which soils are waterlogged and the depth and duration of flooding—could affect these resources. Stormwater is also the primary potential distribution mechanism for spills and other pollutant constituents from the project vicinity to adjacent receiving waters. Therefore, stormwater management and spill containment is a major focus of the surface water discussion.

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**Callout box:** A floodplain is an area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding.

**Callout box:** Impervious surfaces are those areas in the landscape that do not effectively absorb or infiltrate rainwater.
Figure 3.3-1
SURFACE WATER FEATURES – PROPOSED PROJECT SITE

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

Proposed Project Site

The proposed project site is located on the March Point peninsula in the Lower Skagit-Samish watershed, in Water Resource Inventory Area 3 (WRIA 3). Washington State is divided into 62 WRIAs that delineate the state’s major watersheds that drain into rivers, lakes, or other waterbodies. Topography of the proposed project site slopes down to the east into Padilla Bay. The site is a mix of undeveloped and developed industrial lands. Undeveloped areas on the project site have been used as pasture for cattle grazing. Developed areas include a large unvegetated soil stockpile, roadways, railroad tracks, parking, and laydown areas.

Site soils are described in detail in Chapter 3.1 – Earth Resources. In general, soils consist of gravelly loam with low to moderate infiltration rates and are poorly drained. Twenty-one wetlands were identified on the proposed project site by Shell in 2013 (URS 2013). Wetland delineations are preliminary and are subject to review and verification by the Washington State Department of Ecology (Ecology) and the U.S. Army Corps of Engineers (USACE) as part of the Section 401 and 404 permitting process. Chapter 3.5 – Wetlands, describes the existing wetlands identified on the proposed project site. In 2013, Shell also identified streams and ditches on the site; one stream and 13 ditch segments were delineated (URS 2013) (Figure 3.3-1).

The ditches identified on the proposed project site combine into three primary drainage systems that discharge into Padilla Bay along the shoreline east of East March’s Point Road through perched metal culverts. Ditches discharging into Padilla Bay follow 4th Street, North Texas Road, and a point midway between these roads. The ditches are presumed to have flow during much, if not all, of the year.

What are Ecology’s water quality assessment categories?

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>Meets tested standards for clean waters. The water body met standards for all the pollutants for which it was tested.</td>
</tr>
<tr>
<td>Category 2</td>
<td>Waters of concern. Waters where there is some evidence of a water quality problem, but not enough to require development of a water quality improvement (WQI) project (including total maximum daily load [TMDL]) at this time.</td>
</tr>
<tr>
<td>Category 3</td>
<td>Insufficient data. Water where there is insufficient data to meet minimum requirements.</td>
</tr>
<tr>
<td>Category 4</td>
<td>Polluted waters that do not require a TMDL. Waters that have pollution problems that are being solved in one of three ways:</td>
</tr>
<tr>
<td>Category 4a</td>
<td>Has a TMDL Water bodies that have an approved TMDL in place and are actively being implemented.</td>
</tr>
<tr>
<td>Category 4b</td>
<td>Has a pollution control program. Water bodies that have a program in place that is expected to solve the pollution problems.</td>
</tr>
<tr>
<td>Category 4c</td>
<td>Is impaired by a non-pollutant. Water bodies impaired by causes that cannot be addressed through a TMDL.</td>
</tr>
<tr>
<td>Category 5</td>
<td>Polluted waters that require a TMDL or other WQI project. The list of impaired water bodies is known as the 303(d) list. Placement in this category means that Ecology has data showing that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan. TMDLs or other approved WQI projects are required for the water bodies in this category.</td>
</tr>
</tbody>
</table>
The stream on the proposed project site is identified as Stream S, which is a natural drainage channel that appears on historic maps (USCGS 1886). Historically, this stream may have extended south of the Anacortes Subdivision and South March’s Point Road; however, this area does not appear to be part of the current watershed because of local development patterns. Stream S receives surface flow from several ditches, including those draining areas adjacent to the Anacortes Subdivision (Ditches Q and I), the existing rail spur to the Shell Puget Sound Refinery (PSR) (Ditch E1), and South Texas Road (Ditches E2 and E3). Stream S flows to an estuarine wetland complex (Wetland I1) that is connected to Padilla Bay through two 62-inch-tall, 102-inch-wide concrete box culverts under East March’s Point Road (Figure 3.3-1).

A 2015 hydrology/hydraulics report provided the results of modeled existing surface water flows for the proposed project site. The pre-developed condition was modeled as a flat forested system. The existing two-year peak stormwater flow rate for the project site is 10.47 cubic feet per second (cfs), and the 10-year peak flow rate is 13.79 cfs (Wilson and Company 2015a).

Section 303(d) of the CWA requires states, territories, and tribes to develop lists of impaired water bodies. Ecology categorizes this list of impaired water bodies based on the level of impairment within the water body (see sidebar on page 3.3-7). Portions of Padilla Bay and some of its freshwater tributaries have high levels of fecal coliform bacteria that currently do not meet state water quality standards and are listed as a Category 5 303(d) water body (Ecology 2015) (Figure 3.3-2). Category 5 waters are impaired and require a total maximum daily load (TMDL). Cattle grazing, along with other activities, has contributed fecal coliform bacteria to Padilla Bay. Ecology is developing a water cleanup plan to reduce these bacteria within the bay (Ecology 2015).

On the northern tip of the March Point peninsula in Padilla Bay there is a 303(d) listing for chrysene (a polycyclic aromatic hydrocarbon [PAH]) and 2,3,7,8-TCDD (Tetrachlorodibenzo-p-dioxin), a known carcinogen. The chrysene listing is based on tissue samples collected in 1999 and the 2,3,7,8-TCDD is listed based on tissue samples collected in 2007 (Ecology 2016). Both of these listings are considered Category 5 by Ecology.

West of the Shell PSR facility in Fidalgo Bay there is a 303(d) Category 5 listing for chrysene based on tissue samples collected in 1999. Benz[a]anthracene, also a PAH, is listed as Category 5 for this area based on tissue samples collected in 1999 (Ecology 2016).
Figure 3.3-2  303(d) Ecology Listings

[Map showing proposed project site and wetland mitigation site.]
**Wetland Mitigation Site**

The proposed wetland mitigation site located at the south end of Padilla Bay (Figure 3.3-3) was historically estuarine wetlands and tidal sloughs. This land was diked and drained more than 100 years ago to convert the area to uplands to support agriculture including, most recently, hybrid poplar cultivation. The site is mapped within the 100-year floodplain. Hydrology at the wetland mitigation site has been altered by the perimeter dike and construction of State Route (SR) 20 and the Anacortes Subdivision to the south. Flow paths, water quality, and water regimes within the diked area have been significantly altered by the installation of drainage ditches, cultivation, and the creation of elevated tree planting berms on the proposed mitigation site (AECOM 2016).

A remnant tidal channel, commonly known as East Slough, crosses the center of the mitigation site along a dike access road. Because of the dike, this tidal channel is no longer connected to Padilla Bay and largely serves as a drainage ditch. East Slough flows north along the access road into a small ponded area at the base of the dike where an existing pump station and a tidegate are located (Figure 3.3-3). The pump house is no longer operational. The ponded area is approximately 3 feet deep and 30 feet wide (AECOM 2016).

Another small ditch (approximately 2 feet deep and 7 feet wide) is located on the northern end of the wetland mitigation site and runs parallel to the dike and the access road. East Slough and the small drainage ditch do not appear to effectively drain the mitigation site, as evidenced by high groundwater levels. No evidence was observed that this ditch receives surface flow from under SR 20 or the Anacortes Subdivision tracks (AECOM 2016). Water ponding occurs in low depressions and in many of the swales between the elevated tree planting berms.

None of the waterways immediately adjacent to or within the wetland mitigation site is currently listed on Ecology’s 303(d) list for water quality issues (Figure 3.3-2).
Anacortes Subdivision

The Anacortes Subdivision runs between the proposed project site and Burlington, Washington, where it connects to the Bellingham Subdivision. Traveling from west to east, the existing railroad crosses several waterbodies: Whitmarsh/Padilla Bay, Swinomish Channel/Padilla Bay, Blind Slough, tributaries to Padilla Bay, Telegraph Slough, Big Indian Slough, tributaries to Big Indian Slough and Higgins Slough. Land use along the Anacortes Subdivision is discussed in Chapter 3.12 – Land Use and Social Elements. In general, the land along the rail line is characterized as agricultural (51 percent) or industrial (24 percent).

Big Indian Slough crosses the Anacortes Subdivision in multiple locations and runs parallel to the rail corridor (Figure 3.3-4). Big Indian Slough is tidally influenced and is characterized as a “Managed Watercourse” by the Washington Department of Fish and Wildlife (WDFW), meaning that there are tidegates or other control structures present in the system that affect the movement of water. Portions of Big Indian Slough adjacent to the rail line are being restored by Drainage and Irrigation Improvement District 19 as compensatory mitigation for continued maintenance of their flow control structures (WDFW 2008 and USACE 2015).

Big Indian Slough is the only 303(d) waterbody listed by Ecology on the Anacortes Subdivision (Figure 3.3-2). Along the rail line, Big Indian Slough is listed for bacteria (Category 5, see sidebar, page 3.3-7), dissolved oxygen (Category 5), and pH (Category 2). Downstream of the rail line, as the slough empties into Padilla Bay, it is listed for dissolved oxygen (Category 5) and temperature (Category 2). Ecology is currently implementing a TMDL study for fecal coliform within the Padilla Bay system that would include Big Indian Slough (Ecology 2015).
ENVIRONMENTAL IMPACTS

No Action Alternative
Because no construction or operation would take place under the no action alternative, there would be no impacts to surface water flow or water quality. Surface water conditions at the proposed project and wetland mitigation sites would remain the same unless affected by other projects in the future.

Proposed Project Site

Direct Impacts
Direct impacts to surface water at the project site would occur from both construction and operation of the proposed project. These impacts are discussed below. Habitats affected by surface water impacts are discussed in Chapter 3.4 – Fish and Aquatic Species and Habitat.

Construction
As part of construction of the facility, the upper channel of Stream S would be moved away from the existing BNSF Railway embankment and approximately 700 linear feet of channel would be constructed (AECOM 2016). (See Figure 3.4-3, Chapter 3.4 – Fish and Aquatic Species and Habitat.) Several ditches currently contribute flow to Stream S near its point of origin (Figure 3.3-1). Flow from these ditches would be redirected into the newly constructed channel segment of Stream S originating slightly west of its current headwaters.

During construction, direct impacts to stormwater patterns and water quality could occur from water flows that cause turbidity through erosion and sedimentation downstream of soil disturbance activities, runoff that has been in contact with uncured concrete that may have high pH values, or release of pollutants from equipment. However, adherence to best management practices (BMPs) and minimization measures as required by permits would reduce the potential for adverse impacts.

Also, as discussed in Chapter 3.2 – Groundwater, soil compaction from construction activities may temporarily reduce the capacity of surface soils to infiltrate precipitation. The effects of any decreased infiltration of stormwater would be minimized by limiting the area of temporary soil compaction and managing construction stormwater according to the NPDES construction permit.

A construction stormwater pollution prevention plan (SWPPP) would be submitted to Ecology prior to start of construction as a requirement of the construction NPDES permit. The construction NPDES permit would require that water quality levels for turbidity not exceed 25 nephelometric turbidity units (NTU) for the downstream receiving water body.

The construction NPDES permit would require that the SWPPP also identify sampling of pH at the discharge points of the stormwater ponds. Concrete pouring and curing processes during construction could cause alkaline water to be released to wetlands and eventually to Padilla Bay. Monitoring of pH would be conducted during these activities. The construction NPDES permit
would require that water quality levels not exceed a pH of 8.5. Any results above the benchmarks for turbidity or pH would activate additional monitoring and BMP activities.

To mitigate the possible release of turbid or alkaline waters, the construction NPDES permit would require sampling for both turbidity and pH at the discharge points for the stormwater ponds and the exit points of the culverts under East March’s Point Road, or other applicable discharge locations. Mitigation measures designed to avoid and minimize impacts that would be implemented during project construction are further discussed in Chapter 5 – Summary of Impacts and Mitigation.

As described in Chapter 2 – Proposed Project and Alternatives, railroad ties installed for new rail lines would be constructed primarily of concrete. It is possible that treated wood railroad ties would be used in switch areas. Wooden railroad ties are typically treated with creosote and contain more than 300 chemicals including polycyclic aromatic hydrocarbons (PAHs), such as chrysene, which could leach out and contaminate soil and surface water. Presently, the number of ties that could be used is unknown; however, few switching areas are proposed within the project site, therefore, the potential amount of chrysene that could enter the stormwater system would be minimal. Furthermore, any treated wood ties that would be used in switch areas would be well seasoned and handled properly during construction to minimize their contact with soil, stormwater, or surface water.

**Operation**

Permanent impacts to surface water flows could result at the proposed project site from the rerouting of surface water, or an increase or decrease to the peak flow rates associated with pre-development patterns.

If treated wood railroad ties are used, it is possible that chrysene would be released over time into the stormwater that is routed to the proposed stormwater ponds. The stormwater ponds would discharge to land surfaces, not directly to the stream or ditches on site, so any chrysene entering the stormwater system would not be discharged directly into streams or ditches leading to Padilla Bay. When wood ties are replaced during rail maintenance activities, proper handling procedures and disposal of hazardous waste would be followed to minimize exposure of soil and surface waters to creosote leachate.
Direct impacts to water quality during operation of the facility could occur during rail unloading activities. In particular, leaks or spills could occur from tank cars carrying crude oil, or other petroleum products, lubricants, and chemicals from locomotive engines. Brake pads could also contribute heavy metals in the form of dust as they break down from normal wear. Within the rail unloading platform area, leaks and spills would be captured in an oil/water separation pond system that would be constructed as part of the proposed project. Outside the unloading platform area, spills and heavy metals would enter into the new stormwater pond system. The primary, secondary, and tertiary spill containment, as well as stormwater systems, is described in further detail below.

The rail unloading facility system, valves, and connections to the tank cars would be designed to prevent spills from occurring. However, to assess the functionality of the proposed project features that would contain a potential spill event and how impacts to surface waters in the project vicinity could be prevented, engineering drawings of the proposed facility were reviewed (Wilson and Company 2015b).

The main elements of the proposed rail unloading facility (tracks, oil/water separation pond system, and operations buildings) would be located in an excavated area and can be envisioned as a “bowl.” The unloading track area has uphill grades in both directions extending outward from the middle of the facility. This configuration would prevent tank cars from rolling backward onto the Anacortes Subdivision in the event of brake failure. A secondary benefit of the bowl design would be its capacity to contain an oil spill before it could escape to the surrounding area.

**Impervious surfaces**

The proposed project would add about 10 acres of impervious surfaces for a total of approximately 25 acres within the project site (Wilson and Company 2015a). Direct impacts from stormwater runoff from these additional impervious surfaces could cause a reduction in water quality. The reduction in water quality would come from contribution of contaminants and erosion from increased runoff if not adequately contained. New impervious areas include:

- Concrete platform underneath the length of the rail unloading area.
- Crude unloading operational areas.
  - Oil/water separation pond system.
  - Pump pad.
  - Operations building.
  - Electrical building.
  - PSE substation.
- Asphalt access roads.
- Concrete stormwater conveyance channels.

**Spill containment system**
Several components, designed to work together, would provide various levels of containment for up to the entire volume of crude oil within a 102-tank car unit train on the project site. Details for spill prevention and response at the Shell PSR would be included as part of the Spill Prevention, Control, and Countermeasure (SPCC) plan that would be finalized and approved during the individual NPDES permitting process. The Shell PSR facility has an existing individual NPDES permit and any changes to the facility, like adding new operations, could require that the NPDES permit be modified and reviewed by Ecology.

This plan would outline the various design and operational measures put in place to prevent spills on site and identify procedures that would be implemented in the event of a spill. Regular inspection and maintenance inspections of all shut-off valves would be incorporated into the SPCC plan to ensure they remain fully operational. Following the SPCC plan would lower the likelihood of spills that could be released from the facility to either the uplands east of the North Stormwater Pond or Wetland I1 east of the South Stormwater Pond. See Chapter 4 – Environmental Health and Risk, for discussion of accidental spills during transport of crude oil to the Shell PSR. In addition, Chapter 3.17 – Public Services and Incident Response, provides information about Shell’s contingency planning efforts, and the capabilities of Shell, BNSF Railway, and other organizations in the region to respond if an oil spill were to occur.

Three levels proposed for spill containment are described above, listed below, and illustrated in Figure 3.3-5. Spill capacities for each level of containment are listed in Table 3.3-2.

1. Primary containment: Paved and curbed unloading platform.
2. Secondary containment: Oil/water separation pond system.
3. Tertiary containment: Stormwater system.
Figure 3.3-5  Surface Water and Spill Containment System Plan View

LEGEND
- Project Limits
- Primary Containment (paved and curbed unloading platform)
- Secondary Containment (oil/water separation pond system routed to existing Shell PSR wastewater treatment plant)
- Tertiary Containment (stormwater system)

Unloading Platform
Up to 9 Car Capacity + 100-yr 24-hr Storm

Oil/Water Separation Pond Drainage System
Up to 3 Car Capacity

Stormwater Drainage System

North Stormwater Pond

Up to 88 Car Capacity

Oil/Water Separator Vault

4th Street

Pump Pad

Up to 147 Car Capacity

Operations Building
Electrical Building
PSE Substation

Departure Track
Bad Order Tracks

Unloading Track #1
Unloading Track #2
### Table 3.3-2 On-Site Spill Containment Capacity

<table>
<thead>
<tr>
<th>Site Feature</th>
<th>Capacity (barrels)</th>
<th>Tank cars (based on 650 barrels per car)</th>
<th>Level of Containment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unloading platform(^1)</td>
<td>8,998</td>
<td>9</td>
<td>Primary</td>
</tr>
<tr>
<td>Underground piping to oil/water separation pond system</td>
<td>1,913</td>
<td>3</td>
<td>Secondary</td>
</tr>
<tr>
<td>Oil/water separation pond(^3)</td>
<td>14,617</td>
<td>22</td>
<td>Secondary</td>
</tr>
<tr>
<td>Area surrounding oil/water separation pond</td>
<td>95,900</td>
<td>147</td>
<td>Secondary</td>
</tr>
<tr>
<td>North stormwater pond(^2)</td>
<td>57,490</td>
<td>88</td>
<td>Tertiary</td>
</tr>
</tbody>
</table>

**Notes:**
1. This includes capacity to hold a 100-year storm event (3,050 barrels) in addition to the spilled oil.

**Paved and curbed unloading platform**

The paved and curbed unloading platform would serve as the first level of containment in the event of a spill during the unloading process. The paved unloading platform was designed to accommodate an entire 102-tank car unit train split into two sections on parallel tracks, with one track holding 49 tank cars and the other track holding 53 tank cars. Unloading operations would take place on as many as 10 tank cars at any one time. Unloading equipment and procedures are designed to minimize spillage during unloading. The unloading platform would be underlain with a high-density polyethylene (HDPE) liner and a leak detection system to prevent soil and groundwater contamination.

The platform would be sloped toward the center (within the bowl) and have a variable height curb running its entire length (3,200 feet). The minimum curb height would be 6 inches and increase to 18 inches at the center, or lowest, point in the platform. The curbed platform would have the capacity to contain a volume of crude oil of approximately nine tank cars in addition to stormwater from a 100-year, 24-hour duration event.

The unloading platform would also be equipped with a trench drain system of 8-inch drain pipes that connect to a 24-inch drain line. Any spills or stormwater collected on the rail unloading platform would enter these drains and be routed to the oil/water separation pond system and its associated oil/water separator vaults.
If these drains were blocked for any reason, there is a possibility that oil would overflow the curb system and enter into the concrete-lined ditches that serve the stormwater pond system. A spill of this volume would likely overwhelm the oil/water separator vaults and the shut-off valves located on the discharge lines from the stormwater ponds would then need to be closed to prevent discharge of oil.

**Oil/water separation pond system**

The secondary containment would be comprised of the stormwater drainage system from the rail unloading platform combined with the oil/water separation pond, a lined pond (14,617-barrel capacity) located at the lowest point and west of the unloading facility (Figures 3.3-1 and 3.3-6). The drain system connecting the unloading platform to the oil/water separation pond was designed to contain an additional three tank cars of crude oil. The oil/water separation pond provides 22 tank cars of containment prior to overflowing into the surrounding area. The combination of the oil/water separation pond, the area immediately around the pond, the oil/water separation pond drainage system, and the unloading platform were designed to contain the volume of crude oil from an entire 102-tank car unit train (Anvil 2015). All components of primary and secondary levels of containment would be needed to contain a spill equivalent to 102 tank cars.

Similar to the rail unloading platform, the oil/water separation pond facility would be underlain with a HDPE liner and a leak detection system to prevent soil and groundwater contamination. Stormwater collected from the unloading platform, oil/water separation pond drainage system, and operations buildings would be routed to the oil/water separation pond and then to the existing wastewater treatment plant inside the Shell PSR. After being treated, the water would be released to Fidalgo Bay according to the Shell PSR’s existing NPDES permit.

During a spill event, the pumps and valves that allow discharge to the wastewater treatment plant would be shut off. Materials from the spill would then be pumped into recovery trucks and transferred to refinery tanks for later processing at the Shell PSR (Anvil 2015).
Stormwater system as spill containment

In the event that the first two elements of the containment system do not function as proposed, it is possible that a major spill during unloading operations could escape the curbed system of the rail unloading platform and enter into the drainage channels of the stormwater system that run parallel to the unloading platform. In this scenario, the crude oil would be routed from the vicinity of the unloading platform to the North Stormwater Pond (description provided below).

Also, if a spill occurred outside the area of the unloading platform, that spill would be collected in the drainage channels of the stormwater system. Depending on the location of the spill, either the North or South stormwater pond would be affected (Anvil 2015). The stormwater ponds are designed with oil/water separation vaults for pre-treatment of stormwater. These vaults are intended to capture any spills that could occur outside of the unloading platform during normal, daily operations. These vaults would be sized to treat stormwater entering the ponds at a rate equivalent to the flow rate during a 100-year storm.

If a spill were to occur that overwhelmed the oil/water separation vaults in either stormwater pond (North or South), the discharge lines would be shut off so that a release to Padilla Bay would not occur. In the event that the shut-off valves were not activated in time to prevent a release to Padilla Bay, Shell would be required to report the release and conduct cleanup and mitigation for any areas impacted by the spill.

If a spill were to occur within the project site and crude oil were to be released to the unlined stormwater ponds, thereby overwhelming the oil/water separator vault systems, accumulated oil would need to be removed along with any contaminated soils in the area. Crude oil entering the
stormwater ponds would likely be removed with recovery trucks and taken either to the wastewater treatment facility in the Shell PSR or to storage tanks for refining. Any soils or groundwater contaminated by spilled product would be excavated and removed from the site for remediation. The stormwater facilities would need to be reconstructed following cleanup activities to restore their intended design functions. This cleanup would be required prior to resuming direct releases from the stormwater pond system.

**Stormwater ponds**

Two unlined stormwater ponds (North and South) would be located east of the rail unloading facility (Figure 3.3-1). The purpose of these stormwater ponds is to detain flows and release them slowly over time to prevent erosion. The stormwater ponds have been designed to detain a 100-year, 24-hour duration storm event. The Western Washington Hydrologic Model (WWHM) Version 4.0 was used to size both ponds (Wilson and Company 2015a). Neither of the ponds discharges directly to Stream S, ditches, or Padilla Bay. The North Stormwater Pond discharges to the upland buffer of Wetland W and the South Stormwater Pond discharges to the freshwater slope area of Wetland I1. It is not anticipated that the discharge of freshwater in these areas would have measurable impacts to the salinity levels within Padilla Bay because it is not a direct discharge to Padilla Bay.

The Skagit County Code (SCC) was recently updated and the new code (effective January 1, 2016) requires compliance with Ecology’s 2014 Stormwater Management Manual for Western Washington (SWMMWW). One specific discharge requirement that would need to be addressed is the discharge to wetlands. The SCC 14.32.080(3) requires that stormwater discharges to wetlands be allowed only when consistent with SWMMWW Minimum Requirement #8 and Appendix I-D. Minimum Requirement #8 specifies that total discharge to a wetland must not deviate by more than 20 percent of pre-project volumes on a daily basis, and must not deviate by more than 15 percent of pre-project volumes on a monthly basis. The design of the stormwater ponds for detention capacity and discharge would be updated to meet this code requirement as part of the permitting process for the project.

Drainage basin data provided by Shell (Wilson and Company 2015a) formed the basis for the design of the stormwater ponds (Figure 3.3-5). As part of this drainage basin analysis, areas were identified as impervious (see Impervious Surfaces above) and the following new areas were considered to be pervious:

- 7,200 feet of departure tracks.
- 750 feet of unloading tracks.
- 1,300 feet of bad order tracks.
In general, the North Stormwater Pond would receive stormwater from the project site and from a portion of the existing Shell PSR facility north of 4th Street (Figure 3.3-7). This pond would have a detention volume of 7.41 acre feet with 1 foot of freeboard. Prior to entering the North Stormwater Pond, stormwater would be routed through an oil/water separator vault system to remove oil (sidebar). This vault system would have a maximum water quality treatment flow rate of 34.7 cfs and a peak flow rate of 46.7 cfs. The 100-year storm event would cause a flow of 62.0 cfs into the North Stormwater Pond, which would overwhelm this vault system (Wilson and Company 2015a). Revisions to the design of the pond and vault system would occur as part of the permitting process and appropriate sizing of the vault would be addressed at that time.

The South Stormwater Pond would receive stormwater from the project site south of 4th Street (Figure 3.3-7), and have a detention volume of 2.08 acre feet with 1 foot of freeboard. Prior to entering the South Stormwater Pond, stormwater would be routed through an oil/water separation vault system to remove oil. This vault system would have a water quality flow rate of 14.8 cfs and a peak flow rate of 20.0 cfs. The 100-year storm event would cause a flow of 12.7 cfs into the South Stormwater Pond, which would fall within the design parameters for this vault system (Wilson and Company 2015a).

To address increased flows as a result of the proposed project, the stormwater ponds would discharge to flow spreaders as recommended in the Ecology SWMMWW (Ecology 2014). Flow spreaders are used to reduce the erosive energy of concentrated flows by distributing the runoff as sheet flow. Both the North and South stormwater ponds have emergency shut-off valves on their discharge lines.

The North Stormwater Pond discharge flow spreader would be located approximately 500 feet to the east of the pond upslope and within the forested upland buffer of Wetland W (Figure 3.3-1). The South Stormwater Pond discharge flow spreader would be located approximately 200 feet to the east of the pond within Wetland I1 (Figure 3.3-1). The flow spreader would allow for
controlled sheet flow of water through the emergent freshwater portion of Wetland I1 before entering Stream S or the salt marsh portion of Wetland I1 and discharging to Padilla Bay.

It is possible that additional dissolved or suspended metals could enter into the stormwater system for the proposed project. If required NPDES permit monitoring were to show these levels increasing above NPDES thresholds, Shell would need to implement mitigation measures to remove metals prior to discharge. Treatment systems exist that can be installed within the current footprint of the facility and should not require an increased stormwater pond footprint. Additional wetland impacts could be avoided if this additional treatment step is needed.

**Other facilities**
The departure track, bad order tracks, and access roads are outside of the concrete containment system proposed for the rail unloading platform. The tracks and access roads south of 4th Street are also outside of this area and do not have additional spill protection. Therefore, any spills in these areas would enter the proposed stormwater system serving these facilities (stormwater channels leading to the North or South stormwater ponds).

**Surface water flows**
Existing surface water flows at the proposed project site would be changed by routing stormwater through the stormwater ponds or through the existing Shell PSR wastewater treatment system. The acreage of the contributing basin for Ditch D4 would be less than prior to construction. The upper portion of the drainage basin for this ditch would be rerouted to the North Stormwater Pond. The western portion of the ditches that drain along 4th Street would also be rerouted to either the North Stormwater Pond or the South Stormwater Pond, depending on the side of the street the surface water flowed. A portion of the stormwater that contributes to flows for Ditch D4 would also be routed to the wastewater treatment system in the Shell PSR through the oil/water separation pond and then discharged to Fidalgo Bay. This rerouting of stormwater would decrease the volume of water being discharged to Padilla Bay and route it to Fidalgo Bay. This is not expected to have a measureable effect on either Padilla Bay or Fidalgo Bay due to requirements set by the NPDES permit.

Based on modeling results reported (Wilson and Company 2015a), the existing and proposed peak flows at the proposed project site are listed in Table 3.3-3.

**Table 3.3-3**  **Existing and Proposed Peak Flows for Entire Facility**

<table>
<thead>
<tr>
<th>Storm Event</th>
<th>Existing Peak Flows (cfs)</th>
<th>Proposed Peak Flows (cfs)</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-year</td>
<td>10.47</td>
<td>18.85</td>
<td>80%</td>
</tr>
<tr>
<td>10-year</td>
<td>13.79</td>
<td>30.84</td>
<td>124%</td>
</tr>
</tbody>
</table>
The stormwater pond system is designed for detention and controlled release rates. The stormwater ponds would capture runoff volume and peak flows that would prevent erosion and sediment transport to the wetlands, streams, and ditches downslope of the pond discharges, and eventually into Padilla Bay, over the life of the project.

While the oil/water separation vaults associated with both the North and South stormwater ponds would capture daily operational oil releases, the system is not currently designed to address dissolved metals. The design is based on the assumption that the existing system would meet all water quality parameters on discharge and that the current discharge conditions would not change during operation of the proposed facility. It is possible, however, that the new facility and additional train traffic to the area could increase some constituents in the stormwater (e.g., dissolved metals from equipment wear). Future monitoring, as required by the facility's NPDES permit, would indicate whether additional treatment is warranted.

**Indirect Impacts**

The proposed project could produce changes to shallow groundwater and/or redirection of surface water flows. This rerouting would result from excavations within the project site to construct the unloading platform and associated facilities that currently support wetland hydrology and/or surface water flows in existing drainage ditches. These activities could also affect the hydroperiod of the wetlands adjacent to the proposed project facilities. Changes in the timing and/or volume of water discharging from the proposed stormwater ponds to wetlands downstream of these facilities could also lead to changes in vegetation communities that are adapted to the current hydroperiod of these areas. If changes in flow are great enough, the existing wetland boundaries could also be altered over time. Because the stormwater ponds would be designed to function as detention ponds, there would be changes to flow patterns adjacent to wetland areas compared with the existing conditions.

**Wetland Mitigation Site**

**Direct Impacts**

The wetland mitigation site is approximately 100 acres, and Shell is proposing to restore approximately 73 acres of the site to tidal estuary. The proposed development would restore a surface water connection between the 73-acre site and Padilla Bay by breaching the existing dike in selected areas and lowering the dike elevations down to mean higher high water (MHHW) in other areas. The dike breach and constructed tidal channels would allow for full exchange of tidal water while maintaining separation between the site and an expansive estuarine wetland to the east. Full exchange means that water levels within the site would match those in Padilla Bay and the dike breach openings would be wide enough to allow the site to drain during low tide.

A setback dike would be constructed to prevent flooding of the remaining 27 acres of the site, thereby protecting the existing structures such as buildings, natural gas pipeline, roads, and the Anacortes Subdivision. An objective of the wetland mitigation site design is to prevent flooding of surrounding property, either directly from tidal waters or indirectly from alterations to flows and water levels. In addition to the setback dike, flood protection would require the redirection of
surface flows and drainage channels from adjacent parcels and water bodies into the site. The wetland mitigation plan states that “[e]ither the pump station will need to be relocated to outside the proposed setback dike or a detention and gravity drain system will need to be used if possible. A pump station may be included as a back up to a gravity drainage system to allow pumping of stormwater over the dike during an intense storm to protect adjacent property from flooding” (AECOM 2016). If a pump system is used, the system would need to be maintained in perpetuity to ensure flooding is addressed.

**Indirect Impacts**

Over time, the establishment of tidal processes is expected to increase hydrologic and habitat functions within the wetland mitigation site. This would be accomplished by restoring tidal inundation and reestablishing an estuarine environment for vegetation and animals. The tidal channel configuration (i.e., shape, length, and location) would adjust to estuarine processes and is anticipated to sustain the appropriate tidal regime for the site. Historic hydrologic functions of the wetland mitigation site would be greatly improved by reconnecting the site with Padilla Bay, and restoring natural hydrology and tidal exchange. As a result, the wetland mitigation site would have beneficial impacts on surface water.

**Anacortes Subdivision**

**Direct Impacts**

Increased train traffic on the Anacortes Subdivision has the potential to increase accidents and require continued maintenance of the rail corridor. Maintenance and operation activities contribute petroleum-based products and heavy metals to stormwater discharge, which are currently not treated along the Anacortes Subdivision. The potential impacts of spills associated with transport of crude by rail to the Shell PSR are discussed in Chapter 4 – Environmental Health and Risk.

Train operations also likely contribute to deposition of airborne pollution. Deposition of particulate matter from diesel train exhaust is described in Chapter 3.10 – Air Quality and Greenhouse Gases. These materials currently are not at concentrations or levels known to affect human or aquatic life. However, concentrations of particulate matter are expected to increase with the additional trains and the number of trains idling in the area.

The Anacortes Subdivision contains a trestle and a moveable swing bridge across the Swinomish Channel. Passage over this bridge by unit trains proposed for the project is expected to take approximately 5 minutes each direction. Moving the bridge into position and then reopening the bridge (the swing bridge is open by default) would take an additional 2 to 5 minutes. Boats queuing for the bridge to reopen may contribute to an increase in water pollution associated with idling vessels.
**Cumulative Impacts**

As described above, construction and operation of the proposed project could result in impacts to surface water. Within the study area, there has been significant agricultural, industrial, commercial, and residential development. It is assumed that with this growth and construction, surface water resources have been affected. Construction and operation of the proposed Tesoro Clean Products Upgrade Project (Tesoro 2015) (see Table 3.0-2 in Chapter 3.0 – Introduction, for additional project details) has the potential to impact these resources. The Tesoro project and the proposed project could have cumulative impacts on surface water resources. These impacts would be minimized by construction BMPs and localized to the Tesoro Anacortes Refinery site and the proposed project and mitigation sites.

**MITIGATION MEASURES**

**Avoidance and Minimization**

Shell has incorporated engineering and operational measures into the design of the proposed project to avoid or minimize the potential for impacts on surface water, including:

- The proposed project would restore an estimated total of 700 linear feet of stream S and eight acres of riparian area.

- Several ditches currently contribute flow to Stream S near its point of origin. Flow from these ditches would be redirected into the newly constructed channel segment of Stream S originating slightly upslope (west) of its current headwaters.

- A new fence would be installed to maintain the new riparian buffer on Stream S that would be planted with native trees and shrubs. This buffer is expected to improve stream temperature, reduce erosion, improve channel structure, and benefit resident and migrating fish, including nonnatal Chinook salmon and Puget Sound steelhead.

- As described above, the rail unloading facility has been designed to contain and capture leaks or spills associated with operations to prevent the release of material into nearby waterbodies.

In addition, impacts to surface water would be minimized by implementing the BMPs required as part of the NPDES Construction and Industrial Stormwater Permit, CWA Section 401 and 404 permits, Hydraulic Project Approval, Skagit County Grading Permit, and Shoreline Substantial Development Permit. For example, to minimize a possible release of turbid or alkaline waters, water would be sampled for both turbidity and pH. This activity should occur at both the discharge points for the stormwater ponds and the exit points of the culverts under East March’s Point Road, or other applicable discharge locations. This monitoring and reporting of water quality would be conducted during construction.

**Mitigation**

No additional mitigation measures are proposed beyond the avoidance and minimization measures that would be developed and enforced as part of the permitting process.