Skagit County, Washington • Tesoro Anacortes Clean Products Upgrade Project

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Draft EIS Summary

March 2017

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ES1. Draft **EIS** Summary

Skagit County is the lead agency overseeing the preparation of this Environmental Impact Statement (EIS) under the Washington State Environmental Policy Act (SEPA) for a proposed project at the Tesoro Anacortes Refinery (refinery). The applicant, Tesoro Refining & Marketing Company LLC, is proposing upgrades and new equipment at the refinery that would allow the facility to produce cleaner burning gasoline, as required by federal laws, and produce a new product, mixed xylenes.

ES2. Proposed Project Location

The refinery is located approximately 70 miles north of Seattle on the northern half of the March Point peninsula in western Skagit County, east of the city of Anacortes, Washington. March Point is located on the Puget Sound portion of the Salish Sea and is bordered by Fidalgo Bay to the west and Padilla Bay to the east. Figure ES-1 shows the general location of the refinery and Figure ES-2 shows the refinery property.

The site has been a refinery since 1955, and Tesoro acquired it in 1998. The refinery currently has a total crude oil processing capacity of approximately 120,000 barrels per day (bpd).

The proposed project would consist of infrastructure additions and upgrades to the existing refinery facility with the objective of improving the refinery's capability to deliver cleaner gasoline and to produce a new product, mixed xylenes—a global feedstock used for many industrial purposes.

Xylenes

Mixed xylenes are a mixture of three compounds: ortho-xylene, meta-xylene, and para-xylene. Xylenes are one of many petroleum compounds found in gasoline and similar petroleum products. Pure xylenes are made from a petroleum feedstock called reformate. In a process known as catalytic reforming, refiners distill partly refined crude oil and convert the distillate into reformate, a high-octane liquid (de Place and Stroming 2014; USEPA 1994).

Mixed xylenes are a key component for manufacturing many consumer products and are in high demand by global manufacturers. The U.S. is a primary supplier of xylenes to overseas markets, which are used in the following applications:

- Medical films and x-rays
- Spray paints
- Solvents and cleaners
- Synthetic fiber production
- Rubber and plastics manufacturing
- Industrial printing
- Paint thinners
- Papermaking



Legend

Source: ESRI Topographic Web Mapping Service NAD 1983 UTM Zone 10N

Tesoro Refinery Boundary







Legend

Source: ESRI Imagery Web Mapping Service NAD 1983 UTM Zone 10N

Tesoro Refinery Boundary

0	1,500	3,000	6,000
			East

Figure ES-2: Proposed Project Area and Vicinity Map

ES3. Environmental Review Process

Under SEPA (Revised Code of Washington [RCW] 43.21C), the proposed project is required to undergo an environmental review process to help Skagit County identify and consider possible environmental impacts that could result from the proposed project. The preparation of an EIS is required based on Skagit County's determination that the proposed project may have a probable significant adverse environmental impact. This EIS was prepared as required under RCW 43.21C.031 and in accordance with RCW 43.21.C.030 (2)(c),(d), and (e), and Washington Administrative Code (WAC) 197-11.

This Draft EIS is intended to meet the environmental review needs of Skagit County as well as other state and local agencies with jurisdiction over the proposed project. Detailed information on the SEPA EIS process is available on the Washington State Department of Ecology (Ecology) website at: http://www.ecy.wa.gov/programs/sea/sepa. The SEPA environmental review process is shown on Figure ES-3 and is described in the following sections.





ES3.1. Scoping

The scoping process is the first public involvement step in EIS development. During the scoping process (which occurred from March 17, 2016, to April 15, 2016), agencies, tribes, and the public are invited to comment on the range of alternatives, areas of impact, and possible mitigation measures that should be considered and potentially analyzed within the EIS. Specifically, this scoping process was intended to collect input on a range of alternatives: to identify potentially impacted resources and the scope of analysis for evaluating potential impacts on those resources; to identify potential measures to avoid, minimize, and mitigate impacts of the proposed project; and to identify potential cumulative impacts.

The scoping process, including a summary of public meetings and comments received is documented in the Tesoro Anacortes Clean Products Upgrade Project Environmental Impact Statement Scoping Report (Skagit County 2016).

ES3.2. Draft EIS Preparation, Publication, and Review

This SEPA Draft EIS was prepared in accordance with applicable guidelines, regulations, and input received during the public scoping process. The purpose of the Draft EIS is to provide an impartial discussion of probable significant adverse environmental impacts, consider reasonable alternatives, and develop mitigation measures that avoid or minimize the potential for adverse environmental impacts. The information in this Draft EIS is provided for review and comment by interested parties and will be used by Skagit County to evaluate the potential impacts associated with the proposed project and alternatives, and to support the County's decision on whether to issue a Shoreline Substantial Development Permit.

ES3.3. Public, Agency, and Tribal Involvement

Skagit County will seek further input from the public, agencies, and tribes during the 45-day public comment period on the Draft EIS from March 23 to May 8, 2017. During the comment period, a public hearing will be held at the Anacortes High School on April 17, 2017. Comments will also be accepted by means of a post office box, in person at Skagit County, in an online open house, by e-mail, and by voicemail.

ES3.4. Final EIS Publication

Following the public comment period, Skagit County, as the lead agency, will issue the Final EIS. The Final EIS will be prepared to address the comments received on the Draft EIS during the public comment period. The Final EIS may differ from the Draft EIS because it will be revised based on public comments, comments from other agencies, and new information learned, including additional information from Tesoro.

ES3.5. Federal, State, and Local Permits and Approvals

The proposed project would also require permits, authorizations, approvals, or other government actions from Northwest Clean Air Agency (NWCAA), Ecology, U.S. Army Corps of Engineers (USACE), Washington Department of Fish and Wildlife (WDFW), Washington Department of Natural Resources (WDNR), Washington State Department of Transportation (WSDOT), and Skagit County. See Chapter 1, Introduction, of the Draft EIS for a list of the required permits.

ES4. Proposed Project Objectives

Tesoro's objectives for the proposed project are to improve the refinery's capability to deliver cleaner gasoline per U.S. Environmental Protection Agency (USEPA) requirements and to enable the refinery to produce mixed xylene feedstocks. The USEPA has adopted new, more stringent fuel standards that require lowering the sulfur content in gasoline, which went into effect January 1, 2017. The proposed project would install upgrades at the refinery to comply with the upcoming federal fuel standards for reduced-sulfur gasoline in a manner that is economically viable for the operation of the refinery. These new fuel standards are referred to by the USEPA as "Tier 3" standards. The upgrades would lower the sulfur content in gasoline (resulting in cleaner fuel) and consequently reduce the amount of sulfur emissions from automobiles combusting this gasoline.

The proposed project would also enable the refinery to produce mixed xylenes feedstock which would diversify the refinery's product mix, achieving two objectives. First, it would increase the value of products produced by the refinery, increasing both employment and economic value. Second, a more diverse product mix increases the long-term economic viability and financial security of the refinery.

ES5. Alternatives Considered

SEPA requires the lead agency or agencies to evaluate reasonable alternatives to the proposed project. Alternatives considered were on-site alternatives as no off-site alternative would meet the objectives of the proposed project. When a proposal is for a private project on a specific site, SEPA requires the lead agency to evaluate the no action alternative plus other reasonable alternatives for achieving the proposal's objectives on the same site (WAC 197-11-440(5)(d)).

ES5.1. No Action Alternative

Under the no action alternative, Tesoro would not proceed with the proposed project. The refinery would be unable to meet the upcoming federal Tier 3 standards for reduced-sulfur gasoline in sufficient quantity to remain economically competitive and would not produce a new product, mixed xylenes. In the short term, the refinery would continue to operate as it does today, likely in a reduced capacity. Additionally, the contribution of the proposed project in reducing sulfur emissions would not occur. The Tier 3 standards implementation is expected to result in major health improvements in the U.S. on a nationwide basis. By 2030, the Tier 3 standards implementation is predicted to prevent up to 2,000 premature deaths, avoid up to 2,200 hospital admissions, and eliminate 19,000 asthma attacks each year (Union of Concerned Scientists 2016).

ES5.2. On-Site Alternatives

Reasonable technology and siting alternatives were considered. In many cases, no alternatives were identified. In other cases, the alternatives were eliminated from further analysis because they did not meet the objectives of the proposed project. The alternatives are summarized in Table ES-1 and described in detail in Chapter 2, Proposed Action and Alternatives, of the Draft EIS.

Alternative Description	Alternative Evaluation
Technology Alternatives	
Reduce Sulfur Content of Fuels	The current technology at the refinery to remove sulfur from gasoline is hydrotreating. The current hydrotreater at the refinery does not have the capacity to treat the necessary amount of feedstock; therefore, increasing the capacity of the existing hydrotreater is the most viable option. No other feasible technologies were identified, given the current configuration of the refinery. As part of producing reduced sulfur gasoline, a low sulfur blend feedstock will be produced using a proposed new Isom Unit. No reasonable alternatives to the isomerization unit are available.
Recover Mixed Xylenes	Traditional distillation processes to recover mixed xylenes were considered; however, this process alone would not achieve the required specifications for the mixed xylenes product, and therefore it was not a reasonable alternative. A combination of traditional distillation and extractive distillation was then considered and selected as the most reasonable alternative. An Aromatics Recovery Unit (ARU) was identified as the leading technology in the industry and was selected as the preferred technology that would work within the existing refinery configuration and reliably meet the mixed xylenes product specifications.
Marine Vapor Recovery System	The use of a Vapor Recovery Unit was considered to control hydrocarbon emissions associated with marine loading and unloading at the refinery wharf. The Vapor Recovery Unit would meet the objective of capturing emissions at the wharf; however the Vapor Recovery Unit costs more (over \$3 million more) and has a lower volatile organic compound (VOC) removal efficiency of 98 percent as compared to the Vapor Combustion Unit (VCU) at 99 percent, and thereby did not meet the financial or environmental performance objective. Therefore, the Vapor Recovery Unit was not considered a reasonable alternative.
Production of Heat	The refinery has insufficient capacity to provide both the steam and heat required to operate and provide process heat for the new equipment. The option of using both a new natural-gas fired boiler for steam and additional natural-gas fired process heater(s) for process heat was investigated. Multiple pieces of equipment to provide steam and heat were found to require more space, costs, and maintenance, than a single larger boiler. Therefore, a single large boiler, optimized to reduce energy requirements, was selected as the most efficient way to provide the steam and heat needed for the proposed project.
Siting Alternatives	
ARU placement west of existing Naphtha Hydrotreater (NHT)	This site was considered but dismissed because it is not flat and would require additional engineering analysis, along with extensive grading and filling, resulting in additional truck trips during construction.

Table ES-1: Reasonable Alternatives Descriptions

Alternative Description	Alternative Evaluation
Boiler placement adjacent to existing refinery boilers	This site was considered but dismissed due to its distance from the ARU. Colocation of the ARU and boiler is both effective and energy-efficient as the boiler would be used to provide process heat to the ARU for reformate processing and mixed xylenes production and steam to the expanded NHT to increase processing capacity to further reduce the sulfur content in gasoline.
Alternative Tank 1 site on the east side of the existing tank farm	The Alternative Tank 1 site is located on the east side of the existing tank farm and adjacent to the west side of the East March Point wetland. This site was considered but dismissed due to direct impacts on three wetlands and potential indirect impacts on the buffer for the East March Point Wetland.
Alternative Tank 2 site on the south and west side of the existing tank farm	The Alternative Tank 2 site is located south and west of the existing tank farm. This site was considered but dismissed due to direct impacts on two wetlands and the potential to indirectly impact several other adjacent and interconnected wetlands and drainage ditches.

ES5.3. Proposed Project

The majority of the proposed project would occur within the already-developed areas of the refinery. There are five specific infrastructure additions and upgrades for the proposed project. These five components are described below and shown on Figure ES-4. Chapter 2, Proposed Action and Alternatives, of the Draft EIS, contains the details of the proposed project.

- Expand the Naphtha Hydrotreater (NHT) Unit to increase its processing capacity to further reduce the sulfur content in gasoline.
- Build a new Isomerization (Isom) Unit to increase the amount of octane available to the refinery. Coupled with the NHT expansion, this provides more flexibility for gasoline production.
- Build a new Aromatics Recovery Unit (ARU) capable of producing 15,000 barrels per day of mixed xylenes. Install a new steam boiler adjacent to the ARU to provide the additional process heat needed to operate the new ARU and steam to operate the expanded NHT.
- Build three new storage tanks on currently undeveloped land west of the refinery's existing tank storage area to hold reformate and mixed xylenes. These additional tanks would expand the existing tank storage area and are referred to in this Draft EIS as the "New Tanks Area" at the refinery.
- Build a new Marine Vapor Emissions Control (MVEC) System to capture vapors during product loading and unloading from marine vessels docked at the refinery wharf. The MVEC System consists of two physical components: the Dock Safety Unit (DSU) located on the wharf and the Vapor Combustion Unit (VCU) located onshore. While the MVEC System is being installed as part of this proposed project, it would also be used for other marine vessels, unrelated to xylenes transport, currently using the wharf.

Two off-property areas would be changed due to the proposed project. The first consists of refinements to North Texas Road near the refinery's southern Gate 10 entrance that would widen the gate area and one area of the road. The second off-property change is the addition of five marine vessels per month calling at the refinery wharf for shipping the new product, mixed xylenes, and receiving additional reformate for use in xylenes production.

This Draft EIS addresses the short-term construction phase and the long-term operations phase of the proposed project because these two phases could have different types of impacts.



Figure ES-4: Proposed Project Infrastructure

ES5.3.1. Construction Activities

The new proposed project infrastructure and upgrades are expected to be completed between 2017 and 2018. Construction involves the following activities:

- Infrastructure placement and construction activities within the refinery footprint. This would include expanding the NHT, a new Isom Unit, a new ARU, a new steam boiler, new storage tanks, and new tie-ins to existing utilities and stormwater treatment systems.
- Installation of a DSU on the refinery wharf and a VCU within the existing refinery processing areas as part of the MVEC System.
- Installation of a 3-inch natural gas line from an existing natural gas line within the refinery to the end of Tesoro's causeway and wharf.
- Widening of the Gate 10 Access entrance to the refinery on North Texas Road and widening approximately 200 feet of the road to accommodate the heavy lift transport vehicles that would deliver the new process units.
- Increased vehicle traffic due to the presence of additional workers, delivery of site materials (10 to 50 truck trips per day), delivery of process units from the Port of Anacortes (52 deliveries), and import of fill material required for the New Tanks Area (70 trucks per day for 4 months).
- The addition of an average of 190 temporary construction workers for up to 19 months, with a peak number of approximately 270 temporary construction workers for up to 4 months.

ES5.3.2. Operations and Maintenance Phase Activities

Proposed project operations and maintenance activities that represent a change in existing refinery operations include the following activities:

- The addition of 20 permanent staff members to support the new activities. Use and/or storage of additional materials in new tanks on-site, including mixed xylenes, sulfolane (a solvent used to extract xylenes from petroleum feedstock), ammonia (required for the pollution control system on the new boiler), and reformate. Reformate is currently used at the refinery; however, the proposed project would require additional reformate storage capacity due to the increased volume of reformate use.
- Increased use of natural gas to operate new equipment.
- Increased vehicle traffic due to the additional workers, as well as an increase in 50 truck trips per year to deliver chemicals (sulfolane, ammonia, and perchloroethylene) and other necessary supplies to the refinery. Perchloroethylene is currently in use at the refinery; however, the proposed project would require additional amounts.
- Increased marine vessel traffic to deliver additional reformate to the refinery and export xylenes from the refinery (60 additional vessels per year; approximately 5 per month). Twenty of the vessels would be used for exporting mixed xylenes; 40 vessels would be used to deliver additional reformate to the refinery. Reformate would be obtained from a variety of existing west coast sources, and individual locations would vary depending on market conditions. The marine vessel transportation route from the refinery to the Pacific Ocean is shown on Figure ES-5. Examples of the vessels expected to be used for transport are shown on Figure ES-6.

Operation of the proposed project would not change the crude oil processing capacity of the refinery, the capability of the refinery to receive crude oil, or the method and number of crude oil deliveries via marine vessel, pipeline, or rail.



Source: CH2M HILL et al. 2016

Figure ES-5: Marine Vessel Transportation Route from the Refinery to the Pacific Ocean



reformate to the refinery

Figure ES-6: Example Project Vessels

ES6. Significant Areas of Concern

Skagit County received more than 2,500 comments during the scoping period from the public, governmental agencies, and other interested stakeholders pertaining to the proposed project about a wide range of issues. The following is a list of many of the concerns brought to the attention of Skagit County (Skagit County 2016):

- Determine the potential impacts of increased emissions to the air.
- Consider the potential impacts of a spill of xylenes or reformate to the marine environment, including sensitive habitats, recreation, and commercial fishing.
- Assess the impacts of the increased marine vessel traffic on tribal, commercial, and recreational fishing, and on marine life.
- Address climate change and the impacts of contributing greenhouse gas sources.
- Consider the positive and negative impacts on jobs, property values, economic growth, and local and state tax revenue.
- Assess the impacts on public health from xylenes and other materials emitted, and from fires or explosions.

Based on the comments received during scoping, and through additional coordination during the development of the Draft EIS, Skagit County determined the environmental issues that would be studied in this analysis. See Chapter 1, Introduction, for a description of each environmental resource area and the specific chapter number where each topic is addressed.

ES7. Summary of Potential Impacts of the Proposed Project

The major conclusions of this Draft EIS are summarized in the discussions of potential environmental impacts of the proposed project in the following sections. These impacts are described in Chapter 3 through Chapter 13 of the Draft EIS. The potential impacts were categorized as to whether they were part of the planned activities (e.g., air emissions from the new process units) or whether an impact could occur due to an unplanned event, such as an accidental spill, a fire, or an earthquake. The impact topics assessed for each resource are summarized in the following sections. If an impact was found to be significant, according to the SEPA definition, then additional mitigations measures were considered. A summary table of mitigations by resource area is presented in Section ES7.12, which also indicates whether the proposed mitigation measures are anticipated to be effective in mitigating potential adverse impacts, or whether significant unavoidable adverse environmental impacts would remain.

ES7.1. Geologic Resources

Construction of the proposed project would require grading and filling activities, which would expose soils and have potential to degrade soil quality, create unstable stopes, and increase the soil's susceptibility to erosion. Ninety percent

Significant Impacts Under SEPA

The SEPA Rules define "significant" as something that has a reasonable likelihood of more than a moderate adverse impact on environmental quality (WAC 197-11-794). The WAC definition for significance requires examining context and intensity (WAC 197-11-330) and does not lend itself to a formula or quantifiable test as the context may vary with the physical setting. Intensity depends on the magnitude and duration of the impact.

SEPA states: "The severity of an impact should be weighed along with the likelihood of its occurrence. An impact may be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred."

of soil disturbance activities would occur in the New Tanks Area, which is currently a pasture. Total soil disturbance would impact up to approximately 28 acres, all but 0.37 acre on refinery property, and active soil disturbance would last approximately 6 months. The complete construction program is expected to occur over a 19-month period; however, soil exposure would last no more than 6 months at any given location. The off-property soil disturbance is for the North Texas Road work that would widen the road and refinery Gate 10 access.

Operations and maintenance of the proposed project would not require additional excavation or disturbance of ground surfaces and no direct or indirect impacts are anticipated. Geologic hazards would be present during construction and operations activities and include earthquakes, tsunamis, volcanic activity, and landslides. There is a 10 to 17 percent probability of an earthquake from the Cascadia Subduction Zone within 50 years (Goldfinger et al. 2016), and a 12 percent probability of a great moment earthquake on the Cascadia Subduction Zone causing a tsunami to inundate Padilla Bay in the next 50 years (NOAA 2016). Skagit County critical areas maps indicate that erosion hazard soils, unstable slopes, and landslide areas are not present on March Point (Skagit County 2015).

If a spill were to occur on refinery property during construction or operation activities, soil quality could be degraded as a result of contamination.

Within the study area, there has been significant past agricultural, industrial, commercial, and residential growth that has resulted in impacts on earth resources. There are no present or reasonably foreseeable future actions that would impact earth resources in the area of the proposed project. Cumulative impacts as a result of the proposed project in addition to the past impacts on geologic resources associated with refinery development on March Point are considered to be negligible.

No unavoidable significant adverse impacts were identified. The details of the geologic resource analysis are presented in Chapter 3, Geologic Resources.

ES7.2. Air Quality and Climate Change

Air emissions of volatile organic compounds (VOCs) and the criteria pollutants could occur during construction activities, primarily due to the use of heavy, non-road machinery. Emissions would consist of exhausts from the non-road construction equipment, fugitive dust emissions during earth moving, and increases in vehicle traffic. The duration of construction emissions would be short term (about 19 months), and the frequency would be intermittent. No emissions are anticipated to result in air quality exceedances above applicable air quality standards, i.e., the National Ambient Air Quality Standards/Washington Ambient Air Quality Standards (NAAQS/WAAQS) or the acceptable source impact levels (ASILs).

Emissions of VOCs and the criteria pollutants from operations and maintenance would come from new and modified sources as part of the proposed project. New air emission sources include a boiler, MVEC System, three new storage tanks for mixed xylenes and medium reformate, and new component equipment that could release VOCs (connectors, pumps, and valves) within the new ARU, Isom Unit, modified NHT, and storage and product load-out areas. The duration of operation and maintenance emissions would be long term, the frequency would be intermittent to constant. No emissions are anticipated to result in air quality exceedances above the NAAQS/WAAQS or ASILs within the state of Washington

or tribal lands.

Greenhouse gas (GHG) emissions from the refinery would increase during the operations and maintenance phase, primarily due to operation of the new gas-fired boiler; however, the proposed project would reduce net GHG emissions by replacing some of the refinery's current fuel production with xylenes production. The xylenes will not be combusted, as are fuels, but will be used as feedstock to make a variety of products. Consequently, net GHG

Criteria Pollutants

The USEPA has identified six air pollutants as indicators of air quality and public health and closely regulates the emissions and ambient concentrations of these pollutants:

- Particulate matter (both particulate matter less than 10 microns in diameter [PM₁₀] and particulate matter less than 2.5 microns in diameter [PM_{2.5}])
- Carbon monoxide
- Nitrogen dioxide
- Sulfur dioxide
- Ozone
- Lead (the proposed project will not emit lead)

emissions in the state of Washington could be reduced. The use of Best Available Control Technology (BACT) will be implemented on the new GHG sources at the refinery as a control for local emissions. BACT is included as a requirement in the air permit for the proposed project. The GHG emissions are a less than potentially significant impact because of the net GHG reduction.

GHG emissions due to the additional marine vessel traffic, new employee transportation, and construction emissions are below the 25,000 metric tons CO₂e annual emissions disclosure threshold.

If a spill was to occur on the refinery property air quality could be temporarily impacted. The impacts on air quality from a spill in the marine environment are discussed in Section ES7.11, Marine Transportation.

Within the study area, there has been significant past agricultural, industrial, commercial, and residential growth that has resulted in GHG emissions that contribute to climate change, and other emissions that impact local air quality.

Historically, air quality surrounding the refinery has typically met both the federal and state standards. A review of pending permits and permit applications did not identify any major new stationary emissions

sources. The project would contribute to a cumulative increase in emissions of local air pollutants; however, such emissions would meet air quality standards when added to existing concentrations.

Emissions from marine vessel transport have the potential to combine with impacts from increased marine vessel traffic from other sources that would contribute to cumulative impacts on air quality. However, the additional five vessels traveling to and from the refinery wharf each month are not considered to substantially increase existing vessel traffic air emissions.

Emissions of GHG, when combined with existing and future global emissions, contribute to climate change; however, because the proposed project would result in a net reduction in GHG emissions, the proposed project would not contribute to cumulative

climate impacts.

Potential impacts on project infrastructure due to sea level rise resulting from climate change were considered. It is not anticipated that sea level rise would impact proposed infrastructure, because proposed infrastructure would be located above the sea level predicted for Puget Sound in the year 2100, and the useful life of the proposed infrastructure is less than 100 years.

No unavoidable significant adverse impacts were identified. The details of the air quality and GHG analysis are presented in Chapter 4, Air Quality and Climate Change.

ES7.3. Freshwater Resources

Freshwater resources include surface water, groundwater, and wetlands. The impacts on freshwater resources are not anticipated to be significant as construction activities would occur within the

Greenhouse Gases and Climate Change

Climate change is driven by changes in the composition of the Earth's atmosphere, which influence the greenhouse effect. The greenhouse effect is a natural process whereby the Earth's atmosphere retains thermal energy from the sun, rather than being reflected back into space.

Small changes in the atmospheric concentration of certain gases (primarily carbon dioxide, methane, nitrogen dioxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) can have large impacts in how much energy the Earth's atmosphere retains. These changes drive an average warming of the atmosphere, which causes climate change.

developed areas of the refinery with the exception of the New Tanks Area. Construction of the New Tanks Area would require grading, filling and rerouting of drainage ditches, and the removal of two small, isolated, manmade wetlands of low value. Indirect impacts on wetlands remaining on refinery property, including impacts on wetland buffers, are not anticipated. Sheet flow of sediment or contaminants carried to surface water could potentially impact water quality. Impacted water is unlikely to reach Fidalgo Bay as drainage ditches and wetlands impacted by the proposed project are not directly hydrologically connected to other wetlands or waterbodies.

Operations and maintenance of the proposed project would require increasing the refinery's paved area. An increase in impervious surfaces can impact infiltration to surface water, groundwater, and wetlands, and can increase sheet flow from rain events. The proposed project would create an additional 15.18 acres of impermeable surface, equivalent to approximately 1.5 percent increase in the area of impervious surfaces in the refinery. Water from the majority of the new impervious surfaces, predominantly from the 15 acres of new impervious surfaces within the New Tanks Area, would be routed to the refinery's on-site Wastewater Treatment Plant (WWTP), rather than allowed to infiltrate to groundwater. Groundwater is not a significant source of water for adjacent wetlands west of the New Tanks Area and only minimal direct or indirect impacts on groundwater, surface water, and wetlands are anticipated.

If a spill was to occur during construction or operation activities, spilled material could impact on-site drainage areas, surface waters, wetlands, and groundwater.

Within the study area, there has been significant past agricultural, industrial, commercial, and residential growth that has resulted in impacts on fresh water resources. No development projects involving changes to wetlands, surface water drainage patterns, or surface or groundwater quality were identified in the March Point area. Cumulative impacts as a result of the proposed project in addition to the past impacts on freshwater resources are considered to be negligible.

No unavoidable significant adverse impacts were identified. The details of the freshwater resource analysis are presented in Chapter 5, Freshwater Resources, of the Draft EIS.

ES7.4. Terrestrial Vegetation and Wildlife

Vegetation removal would be required primarily in the New Tanks Area. The overall permanent impacts of construction on terrestrial vegetation and wildlife are not anticipated to be significant because the permanent removal of the pasture in the New Tanks Area is approximately15 acres of land that has previously been disturbed and does not provide quality wildlife habitat. The surrounding area is a designated urban growth area that includes a number of industrial facilities.

During operations, the increased marine vessel traffic of 60 marine vessels per year could impact birds in the marine vessel transportation route from vessel strike, stress, and disruption of behavior due to vessels; damage to prey resources due to strikes or disruption; or damage to habitat due to marine vessel wakes (birds are the only wildlife considered in the marine vessel transportation study area). The potential impacts from the additional vessels are not considered significant as the vessel traffic due to the proposed project is 2.2 percent or less above current large marine vessel traffic levels in the study area.

If a spill were to occur on the refinery property, terrestrial vegetation and associated habitat could be impacted. The potential impacts on marine birds from a spill in the marine environment are discussed in Section ES7.11, Marine Transportation. The potential impacts on marine wildlife, other than birds, are discussed in Section ES7.5, Marine and Nearshore Resources.

Within the study area, there has been significant past agricultural, industrial, commercial, and residential growth that has resulted in impacts on terrestrial vegetation and wildlife. There are no present or reasonably foreseeable future actions that would impact terrestrial vegetation and wildlife in the area of the proposed project that might represent an impact related to loss or change of habitat. Cumulative impacts as a result of the proposed project in addition to the past impacts associated with refinery development on March Point are considered negligible.

Impacts from operations within the marine vessel transportation route have the potential to combine with impacts from increased marine vessel traffic from other sources that would contribute to cumulative impacts on marine birds. This increase in vessel traffic would increase the likelihood of injury or mortality to marine birds through vessel strike, stress, disruption of behavior, and damage to habitat. Because the proposed project's increase in current vessel traffic is 2.2 percent or less along the marine vessel transportation route, cumulative impacts on marine birds are not anticipated to be significant.

No unavoidable significant adverse impacts were identified. The details of the vegetation and wildlife analysis are presented in Chapter 6, Terrestrial Vegetation and Wildlife, of the Draft EIS.

ES7.5. Marine and Nearshore Resources

Marine and nearshore resources could be impacted by the proposed project during construction due to the work on the refinery wharf, and during operations due to the increased marine vessel traffic. During construction, installation of the proposed DSU and 3-inch natural gas line on the wharf would require operating a spud barge that would remain moored for 2 weeks, an articulated tugboat, and one small safety motor boat. The short duration (2 weeks) of construction activities would minimize the potential direct and indirect impacts on marine species and associated habitat in the vicinity of the wharf and

causeway vicinity. There is no marine vegetation in the area of the wharf work. Work would only occur during the approved in-water work window established to reduce potential impacts on juvenile and adult fishes by avoiding in-water work during out-migrations and spawning times. Therefore, potential direct and indirect impacts on marine and nearshore resources due to construction of the proposed project would not be significant.

During operations, the increase in marine vessel traffic could impact marine life through marine vessel strikes, increased marine vessel noise, and increased marine vessel wakes. As noted above, the increase in large marine vessel traffic due to the proposed project is 2 percent or less. The impacts on marine life (vegetation, shellfish, fish, marine mammals, and sea turtles) in the marine vessel transportation route due to the proposed project is minimal based on the traffic increase of 2.2 percent or less and the transient nature of each vessel movement.

The potential impacts on marine life from a vessel spill are described in Section ES7.11, Marine Transportation.

Future marine vessel traffic in the Salish Sea is expected to increase. The traffic increase could increase the level of disturbances and the potential for injury or damage to marine life. Of particular concern for cumulative impacts is the impact of additional marine vessel traffic noise on the Southern Resident killer whale population. When the Canadian National Energy Board (NEB) approved the Trans Mountain pipeline project expansion in 2016 (NEB 2016), it concluded that although the Trans Mountain Project's vessels (348 vessels per year, 34 vessels per month) "will be a small fraction of the total cumulative impacts, the Board acknowledges that this increase in marine vessels associated with the proposed project would further contribute to cumulative impacts that are already jeopardizing the recovery of the Southern Resident killer whale." In light of the NEB conclusion that any additional adverse environmental impacts would be considered significant, the cumulative impacts of marine vessel traffic in the Salish Sea, including the proposed project as well as past, existing, and future marine vessel traffic from all sources, could further impact the Southern Resident killer whale population. Although vessel traffic associated with the proposed project would only represent 2.2 percent or less of projected marine vessel traffic, and the increase would occur in the Rosario Strait, where the Southern Resident killer whales spend less time compared to surrounding areas (NMFS 2008), the proposed project would contribute to potential cumulative impacts on the Southern Resident killer whale population.

The proposed project, when considered with past, present, and reasonably foreseeable future actions, would contribute to cumulative impacts on the marine and nearshore environment.

No unavoidable significant adverse impacts were identified. The details of the marine and nearshore resources analysis are presented in Chapter 7, Marine and Nearshore Resources, of the Draft EIS.

ES7.6. Energy and Natural Resources

Construction activities for the proposed project would require use of energy, water, natural gas, and local fuels. Approximately 133,000 cubic yards of fill would be sourced from the local area. Fuels for vehicles and any gas-driven generators would be locally sourced, and are not anticipated to put a stress on local fuel supplies as the forecasted construction activities are similar in scope to the routine major maintenance turnarounds that periodically occur at the refinery. Similarly, Skagit County has sufficient sources of fill material readily available. The public would not experience changes in their ability to access energy and natural resources as a result of construction of the proposed project.

Operation of the proposed project would require increased uses of electricity (17 percent increase), water (2 percent increase), and natural gas (68 percent increase), as well as fuel for employee vehicle, truck, and marine vessel transport. Local supplies of energy and natural resources are sufficient to support operation and maintenance of the proposed project and would not impact other customers.

If a spill were to occur on the refinery property, spill response activities would require additional fuel consumption, and fill material may be required to replace contaminated soils. The potential impacts on energy and natural resources from a spill in the marine environment are discussed in Section ES7.11, Marine Transportation.

Within the study area, there has been significant past agricultural, industrial, commercial, and residential growth that has resulted in impacts on energy and natural resources. There are no present or reasonably foreseeable future actions that would impact energy and natural resources in the area of the proposed project. Cumulative impacts as a result of the proposed project in addition to the past impacts on energy and natural resources associated with refinery development on March Point are considered to be negligible.

No unavoidable significant adverse impacts were identified. The details of the energy and natural resources analysis are presented in Chapter 8, Energy and Natural Resources, of the Draft EIS.

ES7.7. Environmental Health

Construction-related impacts on environmental health could occur due to air emissions, primarily PM_{2.5}, increased traffic resulting in decreases in public safety, and increases in noise. Air emissions during construction would meet NAAQS/WAAQS and ASILs. These standards are health-based, therefore as long there are no exceedances for PM_{2.5} standards or standards for the other emitted pollutants, impacts on public health are not anticipated. The traffic increases would be primarily on State Route (SR) 20 and West March Point Road, and the increases in traffic due to construction would be short term. Construction activities could generate fluctuations in noise. Noise levels would be short term and increases would not be noticeable at sensitive areas near the refinery.

Air emissions during operations would also meet NAAQS/WAAQS and ASILs; consequently, impacts on public health are not anticipated. Road traffic increases during construction and operations would represent only a small increase over existing traffic levels on SR 20 and West March Point Road and are not anticipated to impact traffic safety. Noise from operation of the proposed project would be consistent with noise produced from existing industrial activities and are not expected to result in significant increases in noise levels.

The proposed project would require the shipment via truck, of two new chemicals to the refinery, sulfolane and ammonia, and an increase in the shipment of perchloroethylene, already in use. Ammonia, perchloroethylene, and sulfolane are regulated by the U.S. Department of Transportation as hazardous materials; therefore, the packaging, labeling, and transportation of these materials follow federal safety requirements. If a traffic accident were to occur, spills of these materials could result in inhalation of chemicals and possible acute health impacts if someone was near the scene of the accident. None of these chemicals is very flammable. Washington State Patrol would assist in establishing an exclusion zone around the spill, rerouting traffic as needed, and notifying Ecology for hazardous material response.

If a spill were to occur on the refinery property, on-site workers could be at risk of health impacts. Potential public health impacts from marine spills are discussed in Section ES7.11, Marine Transportation.

Within the study area, there has been significant past agricultural, industrial, commercial, and residential growth that has resulted in impacts on air quality, vehicle traffic, and ambient noise levels. There are no present or reasonably foreseeable future actions that would impact environmental health resources in the March Point area, therefore cumulative impacts as a result of the proposed project in addition to the past impacts on environmental health resources associated with refinery development on March Point are considered to be negligible.

No unavoidable significant adverse health impacts were identified. The details of the environmental health analysis are presented in Chapter 9, Environmental Health, of the Draft EIS.

ES7.8. Land Use and Shoreline Use

The land and shoreline use analysis addressed changes in land or shoreline use, changes in the access to or enjoyment of recreational areas, and changes in the visual/aesthetics of the area due to the proposed project.

ES7.8.1. Land Use and Shoreline Use

Construction and operation of the proposed project would take place at the existing refinery, within an area that is already zoned as a Heavy Manufacturing Use District and within the urban growth area as established by the city of Anacortes. Shoreline activities would occur within designated urban shoreline use areas and an existing marine transit corridor. Wharf and causeway construction actions do not increase the refinery wharf footprint, and, therefore, would not expand the developed footprint of the wharf within the 100-foot shoreline setback and buffer established under the Skagit County Shoreline Management Master Program or the 140-foot fish and wildlife habitat conservation area buffer. The proposed land/shoreline use is compatible with existing land use designations and impacts on land and shoreline use would not be significant.

If a spill were to occur at the refinery, the spilled material would be managed within the refinery grounds and would not result in a restriction of access to or a change in land or shoreline use. Impacts on land use and shoreline use from a spill in the marine environment are discussed in Section ES7.11, Marine Transportation.

ES7.8.2. Recreation

There are no public recreation areas on March Point; however, the road along March Point's shoreline is used by bikers, walkers, and runners. Construction of the proposed project at March Point could impact recreationists along this road and in surrounding recreation areas such as Padilla Bay and Fidalgo Bay if increased traffic limited access or the increased noise or air emissions reduced the enjoyment of the recreation activities. Operations would not impact recreation activities or the enjoyment of recreation activities, as the proposed project would be operated within the confines of the refinery property.

If a spill were to occur at the refinery, the spilled material would be managed within the refinery grounds, so would be unlikely to limit recreation. Impacts on recreation rom a spill in the marine environment are discussed in Section ES7.11, Marine Transportation.

ES7.8.3. Visual/Aesthetics

Construction and operation of the proposed project would take place within the existing refinery, in an area with industrial development and activities; therefore, visual impacts from construction and operation would be minimal. The new components would be similar in size, shape, color, and texture to the existing components at the refinery. The addition of 60 marine vessels per year represents an increase of 2.2 percent or less in vessel traffic along the marine vessel transportation route. This increase is anticipated to have a minimal impact on visual and aesthetic resources in the area.

Spills within the refinery property would be contained within the refinery, and would not be visible outside of the refinery. Impacts to visual/aesthetics from a spill in the marine environment are discussed in Section ES7.11, Marine Transportation.

ES7.8.4. Cumulative Impacts

Within the study area, there has been significant past agricultural, industrial, commercial, and residential growth that has resulted in impacts on land and shoreline use, recreation, and visual resources. There are no present or reasonably foreseeable future actions that would impact and land and shoreline use, and visual resources in the area of the proposed project. Cumulative impacts on land use and shoreline use and visual resources as a result of the proposed project in addition to the past impacts associated with refinery development on March Point are considered negligible.

Future marine vessel traffic in the Salish Sea is expected to increase. The future increase could potentially result in cumulative impacts on recreation and visual resources. Increased marine tanker traffic could make shipping lane crossings by non-commercial vessels more difficult or dangerous. However, even with added tanker traffic, it is expected that sufficient space would remain for shipping lane crossings. Cumulative impacts on land and shoreline use and on visual resources as a result of the proposed project, in addition to the past impacts associated with refinery development on March Point, are considered negligible.

ES7.8.5. Unavoidable Significant Adverse Impacts

No unavoidable significant adverse impacts were identified. The details of the land and shoreline analysis are presented in Chapter 10, Land Use and Shoreline Use, of the Draft EIS.

ES7.9. Social and Economic Environment

Social and economic resources include local communities, residential housing, public services available in communities, and economic activity, as well as jobs or other livelihoods that may have socioeconomic and/or cultural importance. This section also assessed tribal treaty and traditionally used resources, as well as the potential for "environmental justice" concerns. Environmental justice reviews include an evaluation of whether there could be "disproportionately high and adverse" impacts on minority and low-income communities when a potential environmental, social, or health impact exists.

If a spill was to occur on the refinery property, social and economic resources could be impacted. Impacts from a spill in the marine environment are discussed in Section ES7.11, Marine Transportation.

ES7.9.1. Housing

Based on the number of expected workers and the availability of local housing stock, it is anticipated that current housing levels would be adequate to support any workers coming from outside the area during construction and operations, and that no changes in property values would occur.

ES7.9.2. Public Services and Utilities

There would be no reduction in the level of public services and utilities, including first responders (police, fire, and emergency medical services), hospitals, and water and sewage services in the city of Anacortes and Skagit County due to the proposed project. The refinery has their own emergency response team and the new products that would be used do not require changes in the existing fire or spill response plans and equipment currently at the refinery.

ES7.9.3. Employment Income and Tax Receipts

Construction would result in the permanent conversion of 15.37 acres of 370 acres of grazing land to industrial land, although no perceptible change in employment income would result. Construction of the proposed project would temporarily support employment in the construction, scientific, and technical services and transportation industries within the study area, positively impacting employment income.

Tesoro's direct annual expenditures on labor income and goods and services for the production and sale of up to 15,000 barrels per day of mixed xylenes would result in a positive impact on economic resources in the local areas, for those in Tesoro's supply chain, and for those impacted by household spending.

Marine vessel traffic associated with operation of the proposed project would be indistinguishable from existing traffic volume levels and would occur within established lanes dedicated to industrial shipping activity, and would not interfere with commercial fishers. Adverse impacts on economic income and tax receipts due to construction or operations of the proposed project would not be significant.

ES7.9.4. Treaty and Traditionally Used Resources

Specific gathering and hunting areas and plants and animals important to tribes have not been identified in the study area to date; therefore, no impacts from the proposed project were identified. If gathering and hunting areas and plants and animals were identified through coordination with the tribes, it would be possible to assess those impacts.

Marine vessel traffic associated with operation of the proposed project would be indistinguishable from existing traffic volume levels and would occur within established lanes dedicated to industrial shipping activity. Impacts could include loss or changes to habitat, loss of fishing gear or changes in water quality that could impact fish. Depending on the degree of these impacts, treaty resources, traditional lifeways, health, and the culture of the Swinomish and other tribes could be affected due to degradation of their fisheries.

ES7.9.5. Environmental Justice

Environmental justice reviews focus on low-income and minority populations. The nearest census block group in the proposed project area that had a "meaningfully greater"¹ population of minority or low-income resident was a low-income portion of the city of Anacortes, approximately 2 miles from the proposed project area. Some coastal areas along the marine vessel transportation route in the Strait of Juan de Fuca also have meaningfully greater minority or low-income populations, including the Makah Indian Reservation at Cape Flattery.

Skagit County has a higher percentage of Native Americans than the state as a whole. The Swinomish Reservation is located in closest proximity to the refinery.

No disproportionately high and adverse impacts were identified for low-income or minority populations within the study area for the proposed project's planned construction and operations. Air emissions meet health-based standards, and none of the social and economic impacts assessed would disproportionately impact these groups. Potential impacts from marine spills are discussed in Section ES7.11, Marine Transportation.

ES7.9.6. Cumulative Impacts

Within the study area, there has been significant past industrial, commercial, and residential growth that has resulted in impacts on social and economic resources. Other than the proposed project, no present or reasonably foreseeable future actions were identified within Skagit County, which is the study area for housing and public services. Therefore, the potential for cumulative increase in demand for housing or its affordability, public services, or emergency services in the city of Anacortes and Skagit County is considered negligible. As a result, a cumulative adverse impact on minority populations in Anacortes and Skagit County with respect to these resources is also considered negligible. The economic development

¹ There is no official or generally accepted definition of a "meaningfully greater" minority or low-income population. This Draft EIS considers block groups with minority or low-income populations with 80th or higher percentile as having "meaningfully greater" minority or low-income populations. This means that 80 percent of the state's census block groups have lower minority or low-income populations when compared to all block groups in the state of Washington.

aspects of construction and operation of the proposed project would have beneficial impacts on employment income and tax receipts in the state of Washington. Therefore, the proposed project, combined with the present and reasonably foreseeable future projects and activities, would contribute to a cumulative beneficial impact on employment income and tax receipts.

Future marine vessel traffic in the Salish Sea is expected to increase. The future increase could potentially result in cumulative impacts on commercial and tribal fisheries, primarily through reductions in access to fishing areas. Because the proposed project's increase in current vessel traffic is 2.2 percent or less along the marine vessel transportation route, vessel traffic associated with proposed project operations would not reduce waterway access to commercial fishers or to tribal fishers for commercial, subsistence, or ceremonial purposes. Similarly, marine vessel traffic would not reduce access to marine plants currently gathered as part of tribal aquaculture activities.

ES7.9.7. Unavoidable Significant Adverse Impacts

No unavoidable significant adverse impacts were identified. The details of the social and economic analysis are presented in Chapter 11, Social and Economic Environment, of the Draft EIS.

ES7.10. Cultural Resources

A historical assessment and archaeological resources survey was conducted for the proposed project within the refinery. In addition, database searches within a 1-mile radius of the site were conducted for archaeological sites and sites eligible for listing in the National Register of Historic Places, National Historic Landmark, or protected by state law. No such sites were identified and impacts on cultural resources are therefore not expected.

Within the marine vessel transportation route, impacts on submerged cultural resources are not anticipated from vessels traveling at the surface. The wakes of the five additional marine vessels per month, representing a 2.2 percent or less increase, are not expected to create significant soil erosion or slope instability impacts where cultural resources may be located along the shoreline, particularly given the distance from the shoreline that the vessels are expected to travel. Vessel traffic would be unlikely to impact cultural resources.

Potential impacts from marine spills on cultural resources are discussed in Section ES7.11, Marine Transportation.

No cultural resources were identified that are listed in, or eligible for listing, in the NRHP or the WHR within the APE. The proposed project would not impact identified cultural resources listed in the NRHP or the WHR, and therefore would not contribute to cumulative impacts on these resources.

There is, however, potential for cultural resources to be present within shorelines of the marine vessel transportation route that were not identified through field-based or desktop review. These resources could be impacted by vessel wakes generated by marine vessels associated with the proposed project. Within the study area, there has been significant past marine vessel activity, and future marine vessel traffic in the Salish Sea is expected to increase. The relative contribution of vessel transportation wave effects is anticipated to be a small component of the existing wave climate. Therefore, cumulative impacts as a result of the proposed project in addition to the past impacts on cultural resources as a result of wakes are considered to be negligible.

No unavoidable significant adverse impacts were identified. The details of the cultural resources analysis are presented in Chapter 12, Cultural Resources, of the Draft EIS.

ES7.11. Marine Transportation

ES7.11.1. Marine Vessel Traffic

Construction of the proposed project would require four marine vessel deliveries of proposed project components to the Port of Anacortes. These deliveries would result in no perceptible change in existing vessel traffic patterns and schedules. The proposed project would result in an additional five marine vessels traveling to and from the refinery wharf per month (60 vessels per year). These additional vessel trips represent a 2.2 percent or less increase compared to current large vessel activity in the study area, as measured at three locations: the Guemes Channel, the south end of Rosario Strait, and the Strait of Juan de Fuca. The proposed project-related marine vessel traffic would represent traffic increases of less than 0.1 percent, 2.2 percent, and 1.3 percent, respectively, at these locations.

ES7.11.2. Marine Vessel Safety

Increased marine vessel traffic during operations could increase the risk of marine vessel incidents, such as collisions (two or more vessels in motion striking each other) or allisions (a vessel in motion striking a stationary object). Between 1995 and 2010 in the Salish Sea, a total of 7 collisions, 18 allisions, and 15 groundings involving large vessels, such as cruise ships, cargo vessels, and tankships, were recorded (Glosten Associates 2014). Like other large vessels, the tankers and ATBs associated with the proposed

project would require tug escorts and licensed pilots within the study area. In addition, substantial vessel traffic management systems are in place including, but not limited to: traffic separation schemes that manage inbound and outbound vessels in different lanes; safety zones where access is limited for the purpose of safety or protection of the environment; and specific tank ship security zones, specifically a 500-yard zone established around a tank ship (whether stationary or moving). These safety measures are managed under the direction of the U.S. Coast Guard. Additional safety measures also include design components incorporated into all modern tankers, such as: the use of multiple independent cargo/oil tanks within a marine vessel, rather than one single large tank; double hulls; and improved navigation systems. The proposed project would use marine vessels with these design features to transport material.

The 2.2 percent or less increase in marine vessel traffic, combined with existing safety measures, indicates a minimal impact on overall marine safety due to increased vessel traffic as a result of the proposed project. Spills, a specific type of marine casualty event, are discussed in detail below.

Volumes for Spill Scenarios

Three marine spill scenarios were selected for modeling based on U.S. Coast Guard regulation volumes used for spill response planning purposes. These regulations use the term "discharge" when defining volumes for the following scenarios:

The "**worst-case scenario discharge**" spill is a spill of 5,045 barrels (bbl) at the refinery wharf or 330,000 bbl (the entire contents of a tank ship of mixed xylenes) along the marine vessel transportation route.

The "maximum most probable

discharge" is a spill of 1,200 bbl at the refinery wharf or 2,500 bbl along the marine vessel transportation route.

The "**average most probable discharge**" is 50 bbl, spilled in any location.

ES7.11.3. Spills

Spill Modeling

Spills of xylenes and reformate in the marine environment were identified during scoping as an area of public concern, because these materials are flammable and can be toxic if inhaled or swallowed. If a spill were to occur, marine birds, aquatic life, and people could be adversely impacted.

An analysis of three marine spill scenarios (see Volumes for Spill Scenarios above) was performed using computer models to simulate conditions of a potential spill of mixed xylenes or reformate during an uncontrolled releases (i.e., no spill response) into the marine environment. Spill scenarios included spills at the refinery wharf, as well as spills at three different representative locations along the marine vessel transportation route: the south end of Rosario Strait, near Port Angeles, and near Neah Bay. Because a spill is not a planned activity, information on the likelihood of a spill occurring, and on the available spill response measures (planning, personnel, and equipment) were included to provide context when evaluating potential spill-related impacts.

Xylenes and reformates are classified as insoluble, since only small amounts are able to dissolve in water. In addition, both products are less dense than water. As a result, these materials, if released into the marine environment, would mostly float on the surface as a very thin layer (as a "slick" or "sheen"), much less than the thickness of a human hair. If churned into the water by wind and wave action, the products would occur as tiny undissolved droplets. Unlike crude oil, xylenes and reformates would not cause a viscous coating on the shoreline, vegetation, or wildlife. The surface slick from a crude oil spill may linger by floating on the water surface and may be submerged with winds and tides. In contrast, xylenes and reformates quickly evaporate from the water surface and break down into harmless components (carbon dioxide and water).

The spread and thickness of the spilled material for each modeled spill scenario was analyzed at 12-hour increments, until no floating spilled material above a 0.1 µm thickness was detected. For the modeled worst-case spill scenario, the thickness of spilled material was estimated to be decreased below the levels of concern for wildlife and people in less than 48 hours (sooner at most locations), and 99.5 percent of the material was estimated to have evaporated or broken down within 60 hours. For the modeled maximum most probable spill scenario, the thickness of spilled material was estimated to decrease below the levels of concern within 36 hours. For the average most probable spill scenario, 99.5 percent of the spilled material was estimated to evaporate or dissipate within 12 hours.

Potential Spill Exposure

Impacts from a marine spill depend on the exposure pathways of the spill materials to the resources. An exposure pathway describes the way that resources (i.e., organisms) come into contact with spilled material. Exposure pathways are summarized on Figure ES-7. Impacts on specific resources are described below. At the point of exposure, a spilled material can enter the body of an organism by inhalation, ingestion, or direct contact. Spilled materials can be inhaled if an organism takes a breath and the chemical is present in the air; materials can be ingested through incidentally swallowing the material while the organism is eating its prey or grooming itself. Ingestion can also occur indirectly, whereby an organism ingests food in which the spilled material has bioaccumulated (i.e., the chemical has concentrated in the prey organism's tissues). Spilled material can also come into contact with the exterior of the organism, which results in direct contact exposure with the skin, also known as dermal exposure.

Exposure via the food chain is an incomplete pathway, because bioaccumulation of xylenes and reformates in tissues of marine organisms is generally not considered a concern. These materials are rapidly metabolized and excreted from tissues, precluding uptake in marine organisms (ATSDR 2007, Neff 2002). Exposure of deep water benthic populations to xylenes and reformates is also an incomplete pathway, because the maximum depth at which xylenes or reformates would dissolve into the water column was estimated to be 6 meters (19.7 feet) or less under the water surface (see Chapter 13, Marine Transportation).

Potential Spill Impacts

The following sections discuss the potential impacts on resources in the event of a spill assuming no response actions occur. As discussed in Section ES7.11.4, Spill Likelihood, a spill would be unlikely to occur. Because of the modeled assumption of no response actions taken, the following sections may overestimate the impacts in the event of a spill.

Air Quality and Greenhouse Gas

For the worst-case and maximum most probable spill volumes, the releases to the atmosphere could lead to increased ozone formation given the presence of nitrogen oxides under the correct atmospheric conditions (i.e., strong sunlight, light winds, and low-level temperature inversions). The area of influence is currently in attainment with ozone ambient air quality standards (AAQS) and is expected to remain in attainment for the future. Therefore, the short-term duration of large quantities of VOCs emitted into the atmosphere from a product spill is not expected to directly cause a long-term exceedance of the ozone AAQS but a short-term "exceptional event" exceedance could occur. An exceptional event is defined by USEPA as unusual or naturally occurring events that can impact air quality, but are not reasonably controllable using techniques that air agencies may implement in order to attain and maintain the AAQS. Exceptional events include wildfires, stratospheric ozone intrusions, and volcanic and seismic activities.

The worst-case spill from either reformate, reformate backhaul (a byproduct material) from the ARU after xylenes have been removed, or mixed xylenes would release large quantities of VOC hazardous air pollutants (HAPs), specifically mixed xylene isomers, toluene, ethylbenzene, and isopropylbenzene. The ASIL concentrations for these VOCs would be exceeded for up to 24 hours, based on the results of the modeling, and would be a potentially significant impact.

The VOC emissions could eventually convert to GHG emissions. The emissions generated from the maximum spill volume could produce 87,400 metric tons of GHG. This exceptional event could produce impacts similar to a forest fire.

Marine Birds

Injury (sub-lethal) to marine birds could occur if a worst-case spill or most probable maximum spill of xylenes or reformates occurred in an area with important foraging, resting, or staging habitat for marine birds, in particular flightless molting birds, during seasonally high concentrations, and if response actions were not implemented. Spills of reformate or xylenes would not result in significant oiling of feathers as is seen in crude oil spills. However, the less viscous layer of xylenes and reformate products on the water surface still do have the potential for some direct toxicity related to feather coating, as well as indirect mortality due to compromised flight and foraging ability. Surface dwelling organisms such as seabirds may also inhale toxic doses of petroleum product vapor (narcotic effects) when at the surface in the vicinity of a spill. Consequently, spills of this volume would have a potentially significant impact on marine birds. Injury due to an average most probable spill is unlikely.

Marine and Nearshore Resources

Direct impacts on marine life in the event of a spill of xylenes or reformate include both injury and mortality, depending on the spill volume and location. If sufficient concentrations are present, an organism exposed to the narcotic effects of xylenes and reformate can experience a system-wide depression of biological activity that can lead to death. If the exposure is sufficiently small and/or of short duration, impacts are reversible. In the case of a worst-case or maximum most probable spill scenario, there could be potential mortality of microorganisms present within the upper marine water column, invertebrates, and fish; disruption to behavior of marine mammals; and temporary damage to marine habitat. Based on the potential thickness of the materials on the water surface, the concentrations in the water column, and the length of time the materials would be present (up to 3 days), impacts on marine

life, except for threatened and endangered fish, would be less than significant for all spill scenarios. Concentrations of xylene at the immediate location of the spill could be acutely toxic to fish, and special status fish are known to occur in the study area. Therefore, a marine spill could have a potentially significant impact on special status fish, depending on the location and season of the spill.



Figure ES-7: Exposure Pathways for a Marine Spill

Natural Resources and Energy Use

In the event of a worst-case or maximum most probable spill scenario, nominal increases in consumption of gasoline and diesel could result from product spill response activities. These activities would be expected to last 3 days or less and would not require large numbers of response vehicles or vessels, or other types of energy or natural resources.

Environmental Health

In the event of a worst-case or maximum most probable spill scenario, concentrations of VOCs (xylenes and similar chemicals present in reformate) would exceed health-based ASILs for up to 24 hours. Acute health impacts could include headaches, nausea, dizziness, and eye, nose, and throat irritation, and could include more severe effects if concentrations were sufficiently high. Spill response to protect people could involve evacuation and the establishment of an exclusion zone to prevent acute health impacts. ASILs would not be exceeded in an average most probable spill scenario.

Land and Shoreline Use

Marine spills could impact land and shoreline use, recreation, and visual resources for a few days in the event of a worst-case or maximum most probable spill scenario. Spill response could include closure of a shoreline recreational area and the presence of spill response vehicles, personnel, and marine vessels in the area. Based on the modeling results, spilled materials would mostly evaporate or dissipate within 3 days, and these materials would not leave any residue on the shoreline. Any closures would be temporary and would not result in any permanent changes in the nature of the shoreline or marine areas.

Economics

Minimal, short-term business interruptions due to spill response, marine waterway closure, and work absences could result in reduced total employment income in one or more industries. Commercial fishing and aquaculture could be impacted due to temporary restrictions and reduced availability of fish species. Potential impacts include lower than expected wages for a 2-day to 3-day catch period. Given the short duration of the potential impact on catch, there would be no measurable impact on processing industries. Minimally perceptible reductions in spending on tourism and recreation due to temporary use restrictions, or other factors causing reduced visitation (loss of enjoyment), would be possible in the event of a marine spill.

Cultural Resources

Marine spills could impact submerged marine or shoreline cultural resources; however, a marine spill has a negligible to low likelihood of occurring within the study area. In the worst-case spill scenario, spilled materials were estimated to dissipate or evaporate within 3 days of the spill. Additionally, spill prevention and response measures are in place that would prevent or minimize exposure of cultural resources to a spill. The impact on submerged marine or shoreline cultural resources in marine environments from xylenes and reformate spills would be temporary.

ES7.11.4. Spill Likelihood

In assessing spill likelihood, the Draft EIS considered both the historical record of spills in the area and Ecology's Draft Vessel Traffic Risk Analysis (VTRA), published in 2016, which looked at current and future spill probabilities (Merrick and van Dorp 2016). Based on the historical record, the likelihood of a spill of any petroleum-based material decreases in proportion to the size of the spill: the larger the spill, the less likely it is to occur. Of more than 10,000 spills related to tankers, carriers, and barges worldwide since 1967, 81 percent were less than 50 barrels (bbl) (ITOPF 2016). Since 1985, the state of Washington

and U.S. Coast Guard records document only four spill events larger than the average most probable volume (50 bbl) in the Salish Sea (Merrick and van Dorp 2016):

- A 5,690 bbl spill from a single-hulled tanker that grounded while anchoring in Port Angeles in 1985
- A 1,670 bbl spill from a capsized tank barge in the Guemes Channel in 1988
- A 8,600 bbl spill resulting from a collision between a fishing vessel and a cargo vessel near Cape Flattery in 1991
- A 640 bbl spill from a grounded tank barge near Anacortes in 1994

A 330,000 bbl spill (the volume of the worst-case scenario) would be two orders of magnitude larger than the largest recorded spill in the Salish Sea, and would rank among the top 35 spills in history (regardless of material spilled). By comparison, the Exxon Valdez released approximately 250,000 bbl of crude oil in 1989.

Based on the VTRA analysis of future spill risks, the proposed project's vessel traffic increases, and the marine vessel traffic route that would be used by the proposed project, the changes in spill risks due to the proposed project do not represent a significant increase in spill risks above the risks currently present.

With regards to the historical record at the refinery wharf, Tesoro tracks spills of any size that have occurred at the wharf since 1999. From 1999 to 2016, Tesoro recorded 11 spills. Ten of those spills were less than one gallon and one spill was two gallons. Because one barrel of xylenes and reformates is equal to 42 gallons, all recorded spills at the wharf were significantly lower than one barrel. Tesoro has reported that no vessels carrying their products have had any spills in the Strait of Juan de Fuca or the Salish Sea.

ES7.11.5. Spill Response

Significant federal and state regulations are in place to ensure that plans are in place to respond to a spill at the refinery and along the marine vessel transportation route, that these plans are approved by federal and state agencies, and that personnel and equipment are adequate to respond to even a worst-case spill event. Response to spills of xylenes and/or reformates would involve booming to protect sensitive areas (see Figure ES-8), establishment of an exclusion zone, evacuation of people if needed, and control of ignition sources to prevent fires. These measures would last for up to 3 days until the materials had evaporated to levels no longer considered hazardous.



Source: BTNEP (undated) Figure ES-8: Example of a Boom Used in Spill Response

If booming is needed to protect a sensitive area, such as the city of Anacortes or the Padilla Bay National Estuarine Research Reserve, deployment would begin immediately—regulations require that boom deployment occurs within 1 hour of a spill event.

Tesoro would respond to a spill at the refinery wharf. In addition to the refinery's on-site trained personnel and equipment, the refinery also maintains spill response contracts with Marine Spill Response Corporation and Global Diving and Salvage. Both of these companies maintain personnel and equipment in Anacortes available 24 hours a day, 7 days a week, and would be called out in the event of a spill.

By law, each tank vessel must have a U.S. Coast Guard-certified oil spill response organization (OSRO) under contract. Response to a spill along the marine vessel transportation route would be addressed by the OSRO and the ship's crew. The OSRO would be responsible for deploying booms, supplying tug support (for example, to safely evacuate a crew or to provide support in the event of a steering failure), and for supporting vessel firefighting assets. This deployment would begin immediately if needed, according to the Oil Spill Contingency Plan, and would be requested through the Coast Guard's Captain of the Port. Spill response equipment, including boat launch locations, staging areas, and an identification of whether the location has a specific spill notification strategy, are available throughout the study area as documented in the Department of Ecology Western Response Resource List (WRRL) database that stores data on various types of oil spill response equipment in the Pacific Northwest.

ES7.11.6. Cumulative Impacts

Future marine vessel traffic in the Salish Sea is expected to increase. Although it would only represent a small portion of projected marine vessel traffic, the proposed project, when considered with past, present, and reasonably foreseeable future actions, would contribute to cumulative impacts on vessel traffic, vessel safety, and the risk of a marine spill.

Marine vessel traffic through the study area (the Strait of Juan de Fuca, Rosario Strait, and Guemes Channel) could increase by 20 to 40 percent by 2030 (Glosten 2014). That same study estimated that adding the marine vessel traffic from the BP project, the Trans Mountain Expansion, and the Gateway Pacific Terminal to this baseline growth would increase marine vessel traffic by 60 to 120 percent by 2030.

To assess the potential for an increased risk of a spill associated with additional marine vessel traffic, particularly tanker traffic, the VTRA modeled several scenarios of increases in tanker and cargo vessel traffic in Puget Sound. The assessment examined the impact of additional vessel traffic on the probabilities of spills occurring. The study did not make specific forecasts of future marine vessel traffic, but examined several "what-if" scenarios of possible increases, based on possible new projects going forward. Among the scenarios considered is one with an increase in tanker traffic of 610 vessel calls per year combined with an increase of 1,000 non-tanker cargo vessel calls in the Puget Sound area. This what-if scenario of 1,600 additional marine vessel calls in the area did indicate the potential for additional vessel traffic to increase spill likelihood. However, the increases were minor in the entire study area, with an increased risk of a spill occurring in any single year of less than 1 percent. When considering the potential cumulative impacts, the proposed project's additional traffic is unlikely to result in a discernable change in the overall risk of a spill.

ES7.11.7. Marine Transportation Summary

No unavoidable significant adverse impacts were identified for vessel traffic or vessel safety. A worstcase spill or maximum most probable spill could result in significant adverse impacts for some resources if such a spill were to occur and response actions were not taken. The risk of a spill occurring in the marine vessel transportation route or at the refinery wharf is low and the risk would not significantly change from existing conditions as a result of the proposed project. There are safety systems in place throughout the study area that would minimize proposed project-related vessel safety risks along the marine vessel transportation route and at the refinery wharf. Spill response measures are in place to prevent a spill from occurring and, in the event of a spill, established plans and procedures are in place to conduct a spill response with sufficient resources (both equipment and trained personnel) available for spill response throughout the study area. The details of the marine transportation analysis are presented in Chapter 13, Marine Transportation, of the Draft EIS.

ES7.12. Summary of Potential Impacts and Proposed Mitigation Measures

The potential impacts of the proposed project on resources discussed in the Draft EIS are summarized in Table ES-2 with the planned and proposed mitigations.

Resource	Potential Impacts Requiring Mitigation	Key Planned Prevention and Minimization Measures ^a	Additional Proposed Mitigation Measures	Unavoidable Significant Adverse Impacts Following Mitigation
Chapter 3, Geo	logic Resources			
Geologic Resources	None	Implementation of appropriate erosion control BMPs in accordance with permitting requirements would keep soil within construction boundaries such as covering stockpiled soils, setting clearing limits, and installing temporary silt barriers around construction areas. Measures to promote slope stability, particularly in the New Tanks Area, would be implemented including stabilizing steep slopes with asphalt binder or temporary seeding and following applicable grading and building requirements. Exposed soil surfaces and unprotected steep slopes would be stabilized by paving or seeding surfaces following construction activities.	None	None
Chapter 4, Air (Quality and Climate Ch	ange		
Air Quality and Climate Change	None	Best Available Control Technology (BACT) selections for the new boiler were ultra-low NOx burners with Selective Catalytic Reduction to minimize nitrogen oxides emissions, Catalytic Oxidizer to minimize carbon monoxide and volatile organic compounds emissions, and the use of natural gas or treated fuel gas as a fuel and good combustion technology to minimize GHG and sulfur dioxide emissions. The Marine Vapor Emission Control System is being installed as BACT to minimize volatile organic compounds emissions from loading and unloading vessels at the refinery wharf. The technology selected minimizes the formation of nitrogen oxides emissions, and the use of natural gas as a fuel and good combustion technology to minimize GHG, carbon monoxide, and sulfur dioxide emissions. The new storage tanks have BACT selected as dual seal	None	None

Table ES-2: Summary of Impacts and Proposed Mitigations

Resource	Potential Impacts Requiring Mitigation	Key Planned Prevention and Minimization Measures ^a	Additional Proposed Mitigation Measures	Unavoidable Significant Adverse Impacts Following Mitigation
		floating roofs to minimize volatile organic compounds emissions.		
		For new piping and pump components, the BACT selected is low emission rate leak detection and repair.		
Chapter 5, Fres	hwater Resources			
Freshwater Resources (surface water, groundwater, and wetlands)	None	Stormwater during construction would be managed in accordance with the construction SWPPP and TESC Plan. Drainage ditches would be designed to guard against erosion. Stormwater and wastewater within developed areas would be routed to the on-site WWTP, preventing sediment or spilled materials from reaching freshwater resources, in accordance with NPDES permit. Tanks will have containment berms around them able to contain the entire contents of the tank in the event of a leak or breach. Regular inspections of piping, tanks, and tank containment infrastructure would occur. Proposed project components were designed to be outside of floodplain areas.	None	None
Chapter 6, Terr	estrial Vegetation and	Wildlife		
Terrestrial Vegetation and Wildlife	None	Implementation of a Weed Management Plan with direction from the Skagit County Noxious Weed Control Board; dust reduction measures such as wetting and covering exposed soil; and approved work windows for in-water work to reduce impacts on important prey species of marine birds; implementation of fire control measures.	None	None
Chapter 7, Mar	ine and Nearshore Res	ources		
Marine and Nearshore Resources	None	Construction: Work at the refinery wharf and causeway would take place in approved fish window to minimize disruption to spawning fish.	None	None
		Operations: Stormwater and wastewater discharged at		

Resource	Potential Impacts Requiring Mitigation	Key Planned Prevention and Minimization Measures ^a	Additional Proposed Mitigation Measures	Unavoidable Significant Adverse Impacts Following Mitigation
		approved outfalls in accordance with NPDES permit requirement, a survey for the presence of surf smelt eggs adjacent to the wharf and causeway prior to beginning construction and adherence to work windows if discovered, directing ballast water from marine vessels to the WWTP for treatment prior to discharge.		
Chapter 8, Ener	gy and Natural Resour	rces		
Energy and Natural Resources	None	The high-efficiency boiler would utilize energy conservation features to maximize energy recovery and minimize natural gas consumption, such as combustion air pre-heat and feedwater pre-heat.	None	None
Chapter 9, Envi	ronmental Health			
Air Emissions	None	Prevention/mitigation measures to reduce air emissions are listed under air quality.	None	None
Traffic Safety	None	Truck traffic would use roads designated for truck use by the city of Anacortes. Actions to ensure safety during SPMT hauls include: Transport permits would be required from the city of Anacortes and Skagit County and a Superload Transport Permit would be required from the WSDOT for the SPMT heavy haul moves from the Port of Anacortes to the refinery. Moves of prefabricated proposed project components would travel at slow speeds and moves are planned to occur at night to minimize disruptions along the marine vessel transportation route.	None	None
Noise	None	Mufflers will be installed on construction equipment.	None	None

Resource	Potential Impacts Requiring Mitigation	Key Planned Prevention and Minimization Measures ^a	Additional Proposed Mitigation Measures	Unavoidable Significant Adverse Impacts Following Mitigation
Chapter 10, Lan	d and Shoreline Use			
Land Use	None	Tesoro maintains 100-yard public safety and security exclusion zone around the refinery wharf and causeway, implementation of vessel traffic and safety measures described below.	None	None
Recreation	None	Use of materials and paint for the proposed project infrastructure with characteristics (i.e., color and texture) similar to that of existing refinery infrastructure, to reduce contrast between new and existing structures.	None	None
Visual/ Aesthetics	None	New lighting for the proposed project would match the existing type of the lighting at the refinery, which would reduce contrast between existing and new lighting during nighttime hours. Directional lighting techniques and shrouds would be used to minimize light overcasting and glare.	None	None
Chapter 11, Soc	ial and Economic Envi	ronment		
Housing	None	None	None	None
Public Services	None	Tesoro's own, on site, firefighting resources and mutual aid agreements with industrial neighbors.	None	None
Economics	None	Federal Regulation OPA 90 requires a party deemed responsible for releasing oil into navigable waters of the U.S. to incur the costs of its removal and provide compensation for associated damages (33 USC § 2702).	None	None
Chapter 12, Cul	tural Resources			
Cultural Resources	None	Implementation of the Unanticipated Discoveries Plan during construction.	None	None

Resource	Potential Impacts Requiring Mitigation	Key Planned Prevention and Minimization Measures ^a	Additional Proposed Mitigation Measures	Unavoidable Significant Adverse Impacts Following Mitigation
Chapter 13, Ma	arine Transportation			
Vessel Traffic and Safety	None	Use of tug escorts and licensed pilots within the study area; use of traffic separation schemes; use of safety zones that restrict or prohibit vessel traffic in sensitive areas; specific tank ship security zones where a 500 yard zone in all directions is established around a tank ship (whether stationary or moving). Use of vessel designed with multiple independent cargo oil tanks rather than one single large tank, double hulls, and modern navigation systems.	None	None
Marine Spills	None	Spill prevention measures include a robust wharf management program to address transfer operations at the refinery wharf to help prevent spills. Implementation of the Dock Manual, SPCC plan, and OSCP. Annual updates (at a minimum) to the OSCP. The OSCP plan is written in conjunction with other plans including the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300), the Northwest Area Contingency Plan (NWAC 2017/Region 10 RRT), and the Washington Statewide Master Oil and Hazardous Substance Spill Contingency Plan (RCW 90.56).	None	A worst-case or maximum most probable spill could have unavoidable significant impacts for humans, marine birds and aquatic life

OPA = Oil Pollution Act of 1990; OSCP = Oil Spill Contingency Plan; SPCC = Spill prevention, control, and countermeasures; SWPPP = Stormwater Pollution Prevention Plan; TESC = temporary erosion and sediment control; WSDOT = Washington State Department of Transportation; WWTP = Waste Water Treatment Plant

^a The controls listed that apply to marine vessel transportation are not specific to the proposed project, but are regulatory requirements that apply to all vessel traffic in the marine vessel transportation study area.

ES8. Next Steps

Skagit County will seek comments on the Draft EIS and proposed mitigation from agencies, tribes, local communities, organizations, and the public during a 45-day comment period from March 23, 2017, through May 8, 2017. Comments received during the comment period will be compiled, reviewed, and considered. A Final EIS will be prepared. The County may refine or augment the mitigation in the Final EIS based on the comments received. The County anticipates the Final EIS being issued in the summer of 2017.

A public hearing will be held during the comment period. Please see the Fact Sheet or visit the website (www.tesoroanacorteseis.com) for additional details about the public hearing and information on how to provide comments.

An EIS does not deny or approve a project; it is intended to provide technical, objective information to decision makers about a project's objectives, reasonable alternatives, significant areas of concern, and mitigation measures (if available) for significant adverse impacts.

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