Appendix I: Water Resources Discipline Report

Point Defiance Bypass Project

Water Resources Discipline Report

Washington State Department of Transportation

September 2012

Table of Contents

List of Exhibits

Summary

What are the water resources in the study area?

Surface Water

The Point Defiance Bypass Project (the Project) would occur within three major watersheds known as the Puyallup/White, Chambers/ Clover, and Nisqually Water Resource Inventory Areas (WRIAs). Within the study area WRIAs, the Project would cross seven watercourses of interest:

- **First Creek:** An urbanized stream network managed by the City of Tacoma as a stormwater conveyance system and utility corridor. First Creek flows through the study area in a 6-foot-diameter pipe before discharging to the Puyallup River.
- **Tacoma Eastern Gulch/B-Street Gulch:** A large open channel that is typically dry, but may convey flows to the Thea Foss Waterway during large storms. The gulch flows are conveyed through the study area in a 6-foot-diameter culvert.
- **Stream 1:** A small tributary stream to Flett Creek that crosses the project corridor through a 3-foot-diameter culvert.
- **Clover Creek:** The largest stream in the study area, with documented water quality problems related to fecal coliform bacteria.[1] The existing rail line crosses over the stream on a 70-foot-long wood trestle bridge.
- **Stream 2:** A small tributary stream to American Lake that only flows during certain times of the year. Though it is a small, intermittent stream, it has an associated 500-year floodplain and crosses the study area in a 5-foot-diameter culvert.
- **Murray Creek:** A continuously-flowing tributary stream to American Lake that crosses the study area in a 9-foot-diameter culvert.
- **Stream 3:** A small tributary to the Nisqually River that only flows during certain times of the year. It passes through the study area in a 3-foot-diameter culvert.

[1] *Ecology 2009a.*

Shorelines

Within the study area, the Puyallup River, Nisqually River, and American Lake have shorelines of statewide significance.[2] Clover Creek, Sequalitchew Creek (which flows between American Lake and Sequalitchew Lake), and Gravelly Lake also have regulated shorelines.[3]

Floodplains

There are regulated 100- and 500-year floodplains associated with surface waters in the study area. The floodplains for Clover Creek and Murray Creek are regulated by the Federal Emergency Management Agency (FEMA), while the floodplains for Streams 1 and 2 are flood hazard areas designated by Pierce County.

Groundwater

Because of the generally porous soils in the study area, groundwater may be susceptible to contamination from uncontrolled spills and other sources of pollution. The Project lies within a USEPA-designated sole source aquifer area. In addition, Pierce County has designated critical aquifer recharge and wellhead protection areas that occur within the study area.

How would the Project affect water resources?

The effect on water resources from the No Build Alternative would be the same as existing conditions.

The Project would pose some risk to surface and groundwater from sediment transport and/or pollutant spills during construction. However, the Project would minimize or eliminate these risks through the implementation of required BMPs. Therefore, no construction effects are expected.

No direct effects to water resources are expected from operation of the Project. The Project would remove vegetation as part of track construction and reconstruction, and add new impervious surfaces for roadway and sidewalk upgrades. However, the changes in land cover would be below the thresholds for flow control and water quality treatment requirements outlined in WSDOT's *Highway Runoff Manual*.[4] Therefore, in accordance with the presumptive approach, the Project is not expected to result in effects to surface waters through changes in volume or water quality. In

[2] *WAC 173-18-310, WAC 173-20-570.*
[3] *WAC 173-18-310, WAC 173-20-560.*
[4] *WSDOT 2010b.*

addition, no changes would be made within the boundaries of regulated shorelines or floodplains.

Would the Project need minimization measures related to water resources?

Minimization for potential construction-related water quality impacts would be addressed by complying with the National Pollution Discharge Elimination System Construction Stormwater General Permit process,[5] and *Highway Runoff Manual* standards and best management practices,[6] as appropriate.

[5] *Ecology 2010a.*
[6] *WSDOT 2010b.*

Chapter 1 – Project Description

Introduction

Under the High-Speed Intercity Passenger Rail (HSIPR) Program and pursuant to a programmatic Tier I Environmental Assessment (EA) the Federal Railroad Administration (FRA) has approved an application from the Washington State Department of Transportation (WSDOT) to improve the Pacific Northwest Rail Corridor (PNWRC), a federally designated high-speed rail corridor. One project included in the PNWRC application is the Point Defiance Bypass Project (the Project), which would respond to deficiencies in the existing rail operations around Point Defiance. This Discipline Report has been prepared in support of the project-specific EA for the Point Defiance Bypass project.

The Project is located in Pierce County along an existing approximately 20-mile rail corridor between Tacoma and Nisqually.[7] The Project would provide for the re-routing of Amtrak passenger trains from the BNSF rail line that runs along the southern Puget Sound shoreline (Puget Sound route) to the Point Defiance Bypass route, an existing rail corridor that runs along the west side of I-5. The Project would consist of railroad track and support facility improvements, and relocation of the Tacoma Amtrak Station to Freighthouse Square in Tacoma.

Purpose and Need

As described above, the Point Defiance Bypass route is part of the larger PNWRC. Within Washington State, the vision for the PNWRC is to "…improve intercity passenger rail service by reducing travel times and achieving greater schedule reliability in order to accommodate growing intercity travel demand…"[8].

The purpose of the Project is to provide more frequent and reliable high-speed intercity passenger rail service along the PNWRC between Tacoma and Nisqually. In conformity with the decisions under the Tier 1 Programmatic EA, the PNWRC Improvement Program has reduced the overall environmental effects of providing improved passenger rail service with the use of an existing transportation corridor and associated infrastructure, rather than creating a new corridor.

[7] *The three owners of the project corridor are Sound Transit, Tacoma Rail, and BNSF.*
[8] *WSDOT 2009*

The Project is needed to address the deficiencies in the existing rail alignment around Point Defiance. The existing alignment (Puget Sound route), shared by freight and passenger rail traffic, is near capacity and is therefore unable to accommodate additional high-speed intercity passenger rail service without substantial improvements. In addition, the existing alignment has physical and operational constraints that adversely affect both passenger train scheduling and reliability.

Improving intercity passenger rail service in the project area and meeting the Project needs would be accomplished by:

- Enhanced Frequency: Increasing Amtrak Cascades round-trips from four to six by 2017 to meet projected service demands.
- Improved Reliability: Reducing scheduling conflicts with freight trains that often result in delays, and by minimizing or avoiding operational delays (e.g., drawbridge openings) and weather-related delays (e.g., mudslides), and improving on-time performance from 68 percent to 88 percent.
- Enhanced Efficiency: Enhancing the efficient movement of people by decreasing trip times by 10 minutes, and reducing the amount of time passenger trains spend yielding to freight movements.
- Improved Safety: Constructing at-grade crossings with upgraded safety features, including wayside horns, median barriers, advance warning signals, and traffic signal improvements.

What alternatives are being considered for the Point Defiance Bypass Project?

FRA and WSDOT conducted an evaluation of three build alternatives: the Point Defiance Bypass Alternative, the Shoreline Alternative, and the Greenfield Alternative. Two of the alternatives (the Shoreline Alternative, and the Greenfield Alternative) were eliminated from further study. Although both alternatives could meet the Project's purpose and need, they were determined to be impracticable and unfeasible due to technical constraints, high construction costs, and significant environmental effects. Grade separations were also evaluated for further consideration. FRA and WSDOT's preliminary analysis revealed that current and projected future traffic volumes do not warrant the construction of new grade-separated crossings.

What's happening in the bypass corridor today?

The rail line between TR Junction and East "D" Street in Tacoma hosts both freight and commuter trains, including freight operators Tacoma Rail and BNSF, and Sound Transit's *Sounder* commuter rail service. Freight

train traffic between TR Junction and East "D" Street averages under two trains per day, while Sound Transit currently operates 18 trains per day between Freighthouse Square and Seattle each weekday, and also offers occasional special event trains, usually on weekends, to serve sporting and other events in Seattle. *Sounder* service to Lakewood begins in late 2012.

What would happen if the Project were not built?

If the Project were not built (the No Build Alternative), Amtrak's Cascades and Coast Starlight passenger train service would continue to use the existing Puget Sound route. The No Build Alternative includes only the minor maintenance and repair activities necessary to keep the existing Puget Sound route operational. With the No Build Alternative, it would be expected that as freight traffic increases, congestion would adversely affect Amtrak service reliability, and the travel time for Amtrak trains between Seattle and Portland would increase.

Along the Point Defiance Bypass route, the Tacoma Rail and BNSF freight services would continue. The at-grade crossings at Clover Creek Drive Southwest, North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive, and Barksdale Avenue Southwest would not be upgraded.

Sound Transit's *Sounder* commuter passenger trains will become operational in late 2012 between the Tacoma Dome Station at Freighthouse Square in Tacoma and Sound Transit's Lakewood Station (on the Point Defiance Bypass route) with as many as 18 *Sounder* trains per day.

What are the proposed improvements and related activities of the Point Defiance Bypass Project?

The Project consists of railroad track and support facility improvements, and the relocation of Amtrak's Tacoma Station. Exhibit 1 shows the components of the Build Alternative. The following details specific components of the Build Alternative.

- **Construct New Track Adjacent to the Existing Main Line** – A new 3.5-mile track adjacent to the existing main line would be constructed from South 66th Street (Rail MP 6.9) in Tacoma to between Bridgeport Way SW (Rail MP 10.4) and Clover Creek Drive SW (Rail MP 10.9) in Lakewood.
- **Reconstruct and Rehabilitate the Existing Main Line** – Starting just southwest of Bridgeport Way Southwest (Rail MP 10.4) in Lakewood, the existing track would be reconstructed to a location southeast of the I-

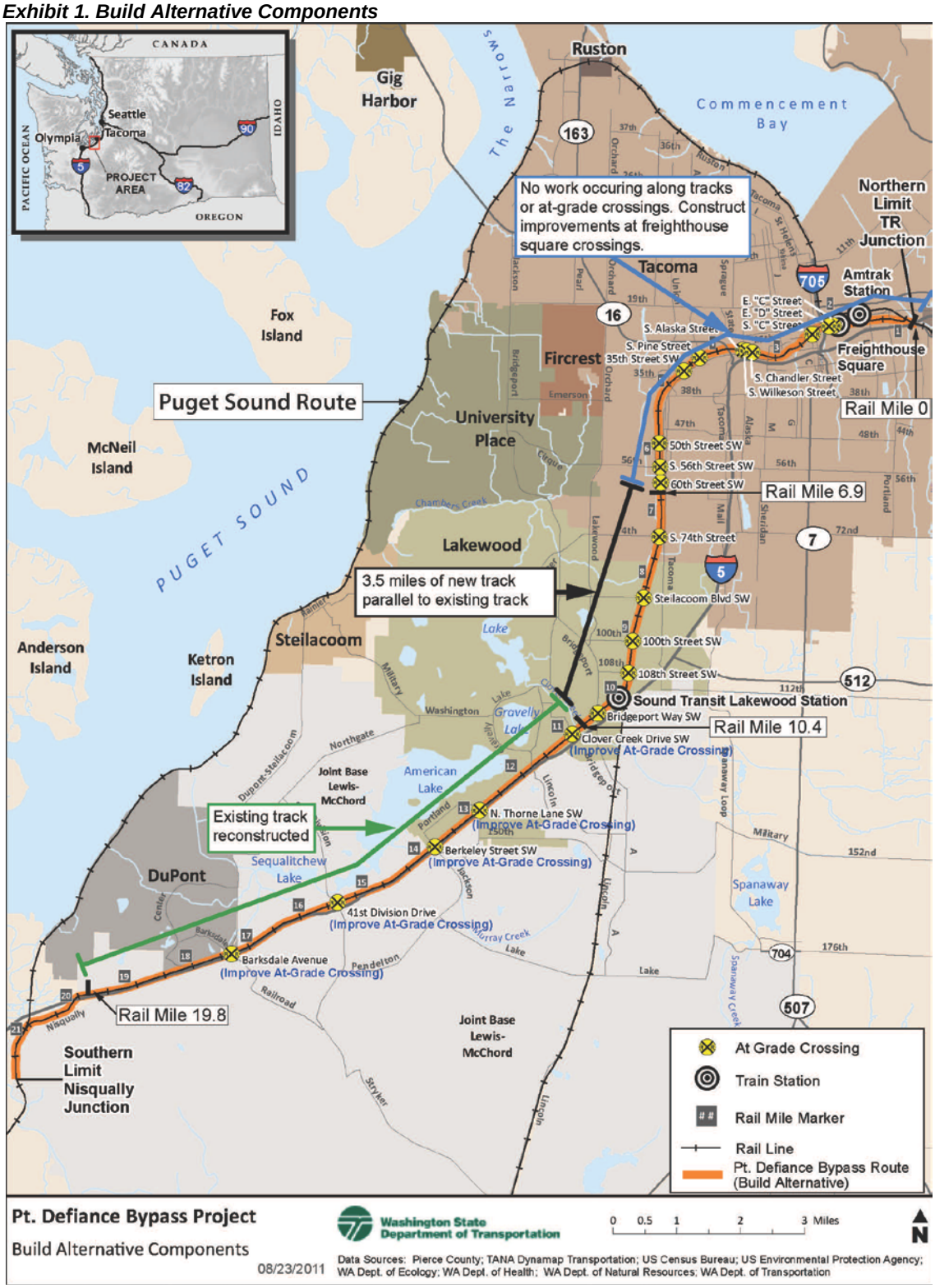
5/Mounts Road Southwest interchange (Rail MP 19.8) at Nisqually Junction.

- **Improvements at at-Grade Crossings** – Several grade crossings would be improved with wayside horns, gates, traffic signals and signage, sidewalks, median separators, and warning devices. These crossings include Clover Creek Drive Southwest, North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive and Barksdale Avenue.
- **Tacoma Amtrak Station Relocation** – The existing Tacoma Amtrak Station would be relocated from its Puyallup Avenue location to the Tacoma Dome Station at Freighthouse Square, at 430 E. 25th Street in Tacoma.

What are the proposed operational changes that would result from the Point Defiance Bypass Project?

Amtrak's existing Cascades and Coast Starlight passenger train service would be rerouted from the Puget Sound route along the Puget Sound shoreline to the Point Defiance Bypass route. The Project would also provide for additional Amtrak Cascades service by increasing the number of round trips provided from 4 to 6, or a total of 12 Cascades service train trips. Amtrak Coast Starlight would also travel on the Point Defiance Bypass route for a total of two Coast Starlight service train trips. The speed of these passenger trains would be up to 79 mph.

Exhibit 1. Build Alternative Components



Chapter 2 – Methodology

What is included in the water resources analysis?

This report discusses the existing water resources in the vicinity of the Project, how they would be affected by the Project, and what measures could be taken to minimize potential effects.

Water resources included in this analysis are:

- Surface waters, which include streams, rivers, and lakes
- Shorelines
- Floodplains
- Groundwater, which includes critical aquifer recharger areas, sole source aquifers, and wellhead protection areas

How was the study area defined?

The study area for the water resources analysis includes water resources that exist within the boundary of the Project footprint, their associated drainage basins, and downstream receiving waters. The study area was determined by reviewing existing aerial photography and geographic information system (GIS) data from federal, state, county, and local sources.

What design guidance was used in reference to the Project?

WSDOT has set forth minimum requirements in the *Highway Runoff Manual (HRM)*, which have been approved by the Washington State Department of Ecology (Ecology), to achieve compliance with federal and state water quality regulations through the presumptive approach.[9]

Under the presumptive approach, projects meeting the thresholds in the *HRM* are expected to comply with local, state, and federal water quality-based standards if they use the Best Management Practices (BMPs) outlined in the *HRM*. Those projects falling below the thresholds are expected to meet applicable regulations without the use of additional

[9] *WSDOT 2010b.*

BMPs. In turn, projects that comply with local, state, and federal water quality-based standards are not expected to affect water resources.

The *HRM* requires general stormwater planning and management for most large projects. In addition, the HRM requires specific evaluation of a project for water quality treatment and flow control based on land use changes within each threshold discharge area (TDA). A TDA is an on-site area that drains to a single natural discharge location or multiple natural discharge locations that combine within a quarter mile downstream of the study area.

The *HRM* requires basic water quality treatment BMPs in any given project TDA that meets either of the following thresholds:

- The effective PGIS is greater than 5,000 square feet in a TDA.
- For western Washington, the project converts three-quarters of an acre or more of native vegetation to pollution-generating pervious surface within a TDA and there is a surface discharge in a natural or manmade conveyance system from the site.

The HRM also requires flow control BMPs for the effective impervious surfaces and, in western Washington, the converted pervious surfaces in any project TDA that meets one or more of the following thresholds:

- The effective impervious surface is greater than 10,000 square feet in the TDA.
- In western Washington, the TDA converts three-quarters of an acre or more of native vegetation to lawn or landscaped area and there is a surface discharge in a natural or manmade conveyance system from the site.
- In western Washington, the combination of effective impervious surfaces and converted pervious surfaces in the TDA causes the 100-year frequency flow to increase by 0.1 cubic foot per second or more.

FRA and WSDOT projects sometimes fall within the jurisdiction of other local governments that have more stringent standards than those outlined in the *HRM*. The project would be designed to meet the local requirements only if Ecology has required the local government to use more stringent standards, rather than the local jurisdiction simply doing so of its own accord. Within the study area, there are no known Ecology-required local requirements more stringent that those outlined in the *HRM*. Therefore, for the purposes of this study, it is assumed that the Project would mainly follow the surface water design guidelines in the *HRM*.

How were the Project's effects on water resources evaluated?

The existing conditions in the study area were used as a baseline to compare the potential changes from the Project. Existing conditions were identified using field observations, literature review, and aerial photographic analysis. The Project's potential effects on water resources compared to the baseline were qualitatively evaluated based on regulatory guidance (see list in Chapter 3) and similar past projects.

Chapter 3 – Studies and Coordination

How does this report relate to previous environmental studies completed for the Project?

This report builds upon environmental work previously conducted by FRA and WSDOT for the Project including:

- Point Defiance Bypass Project *Hydrology and Water Quality Technical Memorandum*[10]
- Point Defiance Rail Bypass Project *Draft Floodplain Discipline Report*[11]
- Point Defiance Bypass Project *Fish, Wildlife, and Vegetation Discipline Report*[12]
- Point Defiance Bypass Project *Soils and Geology Discipline Report*[13]

Information for the water resources analysis was taken partially from the previous FRA and WSDOT studies and was supplemented through literature review and with data from regulatory agency websites.

What coordination took place as part of the water resources analysis?

FRA and WSDOT coordinated with other authors on the Point Defiance Bypass team, including those responsible for the fish, wildlife, and vegetation; wetlands; and geology and soils analyses.

[10] *WSDOT 2007.*
[11] *WSDOT 2011a.*
[12] *WSDOT 2011b.*
[13] *WSDOT 2011c.*

Information was also collected from the following sources:

- Federal Emergency Management Agency (FEMA)[14]
- US Environmental Protection Agency (USEPA)[15]
- Ecology[16]
- Pierce County[17]
- City of Tacoma[18]

What regulations apply to water resources in the study area?

Regulations related to water resources that apply to the Project are listed below.

Federal

- National Environmental Policy Act, 42 USC Section 4321
- Clean Water Act, 33 USC 1251 et seq.
- Coastal Zone Management Act, 16 USC 1451 et seq.
- Floodplain Management Presidential Executive Order 11988
- Safe Drinking Water Act, 42 USC 300 et seq, Chapter 6A

State

- State Environmental Policy Act, WAC 197-11 and WAC 468-12
- Water Pollution Control Act, RCW 90.48
- Water Quality Standards for Surface Waters, WAC 173-201A
- Water Quality Standards for Ground, WAC 173-200
- Shoreline Management Act, RCW 90.58, WAC 173-26
- Flood Control Management Act, RCW 89
- National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit [19]
- WSDOT's NPDES Municipal Stormwater Permit[20]

[14] *FEMA 2011.*
[15] *EPA 2011a,b,c.*
[16] *Ecology 2009a.*
[17] *Pierce County 2011a, 2011b.*
[18] *Tacoma 2011a, 2011b.*
[19] *Ecology 2010a.*
[20] *Ecology 2009b.*

Additional regulations related to water resources that apply to local jurisdictions within the study area are listed below.

- Pierce County Storm Drainage and Surface Water Management Code, PCC Title 11
- Pierce County Shoreline Management Use Regulations, PCC Title 20
- Pierce County Construction and Infrastructure Regulations for Site Development and Stormwater Drainage, PCC Title 17A
- Pierce County Development Regulations for Storm Drainage and Site Development, PCC Title 18C
- Pierce County Development Regulations for Critical Areas, PCC Title 18E
- NPDES Phase 1 Municipal Stormwater Permit, applicable to Pierce County and City of Tacoma[21]
- South Tacoma Groundwater Protection District, TMC Chapter 13.09

As discussed in Chapter 2, the Project would comply with state and federal requirements by following the guidance contained in the *HRM*. The local requirements listed above not expected to meet any additional federal or state requirements beyond those met through use of the *HRM*.

[21] *Ecology 2010b.*

Chapter 4 – Affected Environment

What surface waters are present in the study area?

The surface water analysis was grouped according to the three Water Resource Inventory Areas (WRIAs) in which the study area occurs. The WRIAs are, from north to south:

- WRIA 10 Puyallup/White
- WRIA 12 Chambers/Clover
- WRIA 11 Nisqually

These WRIAs represent the major watersheds for surface water in the study area. Within these WRIAs, the Project would cross seven watercourses of interest, which are described in the following sections. The study area basins, associated WRIAs, and watercourses of interest are shown on Exhibit 2.

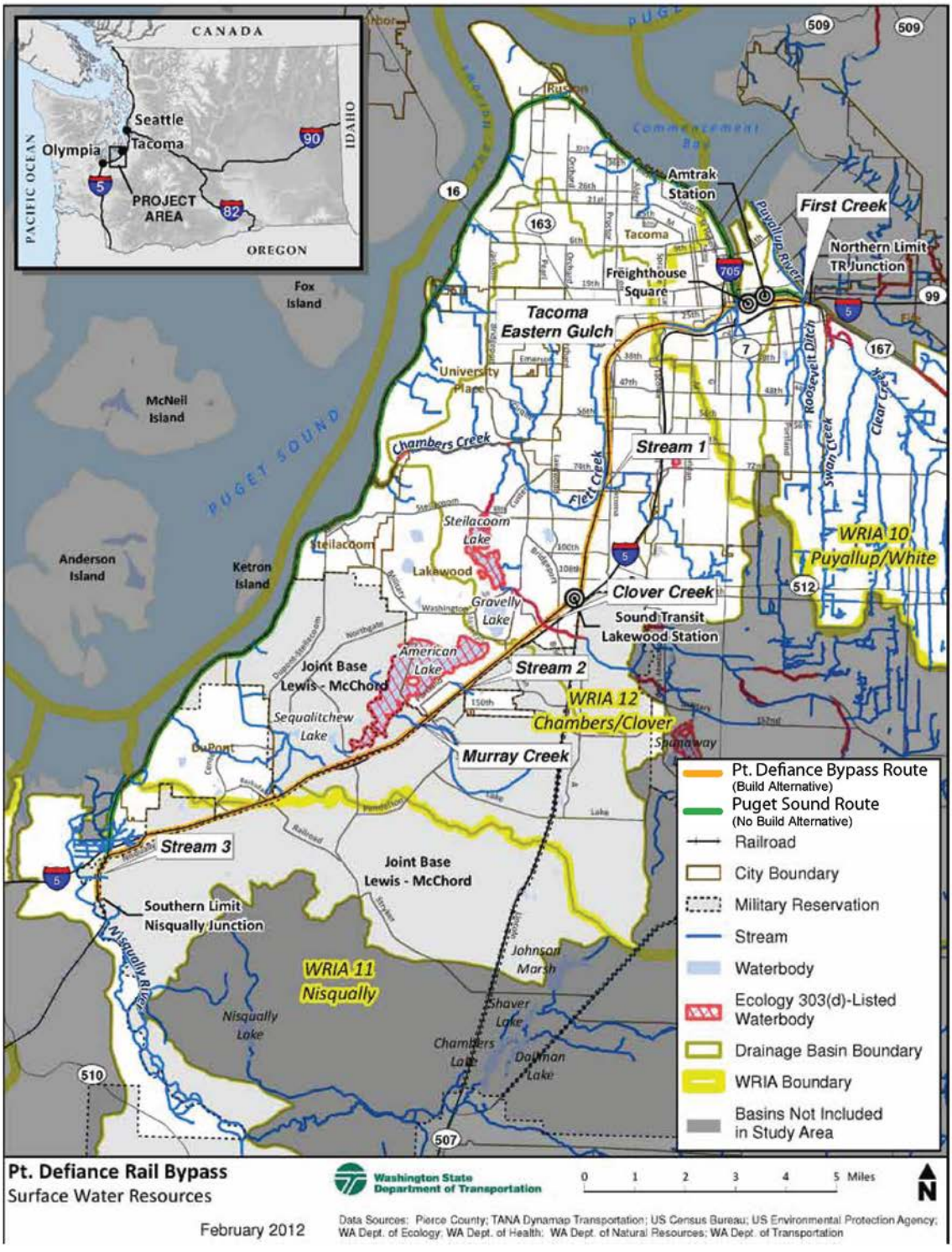
WRIA 10 Puyallup/White

The Puyallup River Watershed is the largest watershed in Pierce County, covering over 622,000 acres and including all lands tributary to the Puyallup, Carbon, and White Rivers.[22] The lower part of the watershed where the study area is located is affected by urban stressors, such as road and stormwater runoff, other sources of pollution, conversion of open space to development, and permanent removal of vegetation.[23] In the lower Puyallup tideflats area, industrial activity is dominant.

The river, along with its tributaries, serve as major migration routes for a variety of salmonids, including spring Chinook salmon (*Oncorhynchus tshawytscha*) and bull trout (*Salvelinus confluentus*), which have both been listed as endangered species under the Endangered Species Act (ESA). There are four fish hatcheries located in the Puyallup River Watershed upstream of the study area.[24]

[22] *Ecology 1995a.*
[23] *Pierce County 2011a.*
[24] *Tacoma 2008.*

Exhibit 2. Surface Water Resources



Within the study area, the Puyallup River is not identified on Ecology's 303(d) list for exceedance of any water quality standards.[25]

First Creek

The Project would cross First Creek near Rail MP 0.85. The First Creek Watershed collects runoff from approximately 2,680 acres and conveys it through two tributary channels and a main stream channel, which are each located in 20- to 30-foot deep ravines. This stream network is managed by the City of Tacoma as a stormwater conveyance system and utility corridor. It has undergone historical maintenance for erosion, including the placement of rip rap into the channels. South of the Project boundary at East 34th Street, First Creek enters a 6-foot-diameter pipe that conveys the stream under I-5 and the existing rail corridor, and then discharges to the Puyallup River approximately 630 feet downstream of I-5.[26]

Tacoma Eastern Gulch / "A" Street Gully

The Project would cross a constructed watercourse called the Tacoma Eastern Gulch, also referred to as the "A" Street gully, at Rail MP 2.15. This watercourse flows under the Project alignment through a 6-foot-diameter culvert before discharging into the Thea Foss Waterway.[27] No natural or critical area habitat is associated with the Tacoma Eastern Gulch.

The Foss Waterway sub-basin covers approximately 5,780 acres in south-central Tacoma. This sub-basin is mostly residential, with some commercial and industrial land use.[28]

The Thea Foss Waterway is a current Superfund sediment cleanup site and is identified on Ecology's 303(d) list for exceedance of polychlorinated biphenyls (PCBs) in tissue samples.[29]

WRIA 12 Chambers/Clover

The Chambers/Clover Creek Watershed covers approximately 92,160 acres and receives runoff from the most urbanized portion of Pierce County. [30] It receives drainage flows from seven municipalities (Tacoma, Ruston, Fircrest, University Place, Lakewood, Steilacoom, and DuPont), Camp Murray, and the northern segment of JBLM. Urbanization in this watershed has resulted in stream degradation from effects such as heavy recreational use, increase in impervious surfaces, clearing of streamside

[25] *Ecology 2009a.*
[26] *Tacoma 2011c.*
[27] *Federal Transit Administration 2002.*
[28] *Tacoma 2011b.*
[29] *Ecology 2009a.*
[30] *Ecology 1995b.*

vegetation, pet waste, vehicle emissions and leaks, pesticide and fertilizer use, leaking from underground storage tanks, and untreated urban and stormwater runoff.[31]

Stream 1, Flett Creek Tributary

Stream 1, an unnamed tributary to Flett Creek, crosses the project corridor through a 3-foot-diameter corrugated steel culvert located between SE 74th Street and SE 80th Street in the City of Tacoma, near Rail MP 7.65.[32] This stream drains the urban area to the east of South Tacoma Way and east to the east side of I-5. The Flett Creek sub-basin comprises 7,153 acres, with runoff coming from mostly residential areas and some commercial and industrial areas.[33] Flett Creek flows into Chambers Creek, a salmonid-bearing stream, that discharges into Chambers Bay and then into the Narrows.[34]

Within the study area, Stream 1 is not identified on Ecology's 303(d) list for exceedance of any water quality standards.[35]

Infiltration of stormwater runoff from PGIS is generally prohibited in this area by the South Tacoma Groundwater Protection District.

Clover Creek

Clover Creek is the largest perennial stream in the study area with a drainage area of approximately 47,400 acres. The Clover Creek channel crosses under the existing rail line just south of Bridgeport Way Southwest at Rail MP 10.8 beneath a 70-foot-long wood trestle bridge. Clover Creek is a fish-bearing stream originating from springs and groundwater discharge in the northeast corner of the watershed and that flows into Steilacoom Lake. Steilacoom Lake is the source of Chambers Creek, while Leach Creek and Flett Creek are two important tributaries to Chambers Creek. Chambers Creek flows north and west down a ravine into Chambers Bay, then into Puget Sound. Clover Creek is the only gauged stream in the study area.[36]

Within the study area, Clover Creek is identified on Ecology's 303(d) list as exceeding water quality standards for fecal coliform bacteria.[37]

[31] *Pierce County 2011a.*
[32] *WSDOT 2011a.*
[33] *Tacoma 2011b.*
[34] *Tacoma 2011b.*
[35] *Ecology 2009a.*
[36] *WSDOT 2007, WSDOT 2011a.*
[37] *Ecology 2009a.*

Stream 2, American Lake Tributary

Stream 2, a small intermittent tributary to American Lake, crosses the Project right-of-way just south of N. Thorne Lane Southwest at Rail MP 12.85 in a 5-foot-diameter circular concrete culvert.[38]

American Lake, the largest natural lake in Pierce County, is approximately 1,100 acres in size with a drainage area of approximately 4,200 acres.[39] It is supplied by groundwater and Murray Creek, and has a controlled outflow to Sequalitchew Creek. The lake receives heavy recreational use.[40]

American Lake is identified on Ecology's 303(d) list as exceeding water quality standards for total phosphorus and various toxins in tissue samples.[41]

Murray Creek

Murray Creek is a perennial tributary to American Lake that has a drainage area of approximately 10,240 acres.[42] The stream channel crosses the BNSF right-of-way just south of Berkeley Street Southwest at Rail MP 14.0 in a 9-foot-diameter circular concrete culvert.[43]

Within the study area, Murray Creek is not identified on Ecology's 303(d) list for exceedance of any water quality standards.[44]

WRIA 11 Nisqually

Stream 3, Nisqually River Tributary

Stream 3, the only surface water in the study area located in the 486,400-acre Nisqually Watershed (WRIA 11), is an intermittent, spring-fed stream. [45] Stream 3 crosses the Project right-of-way just south of the intersection of the rail line and Nisqually Road Southwest at Rail MP 21.25 in a 3-foot-diameter circular corrugated steel culvert.[46]

Within the study area, neither the Nisqually River nor Stream 3 is identified on Ecology's 303(d) list for exceedance of any water quality standards.[47]

---

[38] *WSDOT 2011a.*
[39] *Ecology 1995b.*
[40] *Pierce County 2011.*
[41] *Ecology 2009a.*
[42] *Pierce County 2011b.*
[43] *WSDOT 2011a.*
[44] *Ecology 2009a.*
[45] *Pierce County 2006.*
[46] *WSDOT 2011a.*
[47] *Ecology 2009a.*

Are there regulated shorelines in the study area?

Pierce County is the regulating authority for designated shorelines in the study area, including shorelines of statewide significance. Ecology designates shorelines of statewide significance to include areas within 200 feet of river or stream segments in Western Washington where the mean annual flow is 1,000 cubic feet per second or more, and lakes that are 1,000 acres or more in size.[48] Pierce County also regulates shorelines of river or stream segments where the mean annual flow is greater than 20 cubic feet per second and shorelines on lakes greater than or equal to 20 acres in size.[49] Along regulated shorelines, Pierce County limits and/or prohibits certain developments and activities.

Within the study area, the Puyallup River, Nisqually River, and American Lake have shorelines of statewide significance.[50] Clover Creek, Sequalitchew Creek, and Gravelly Lake also have regulated shorelines.[51]

Where are the areas at risk for flooding in the study area?

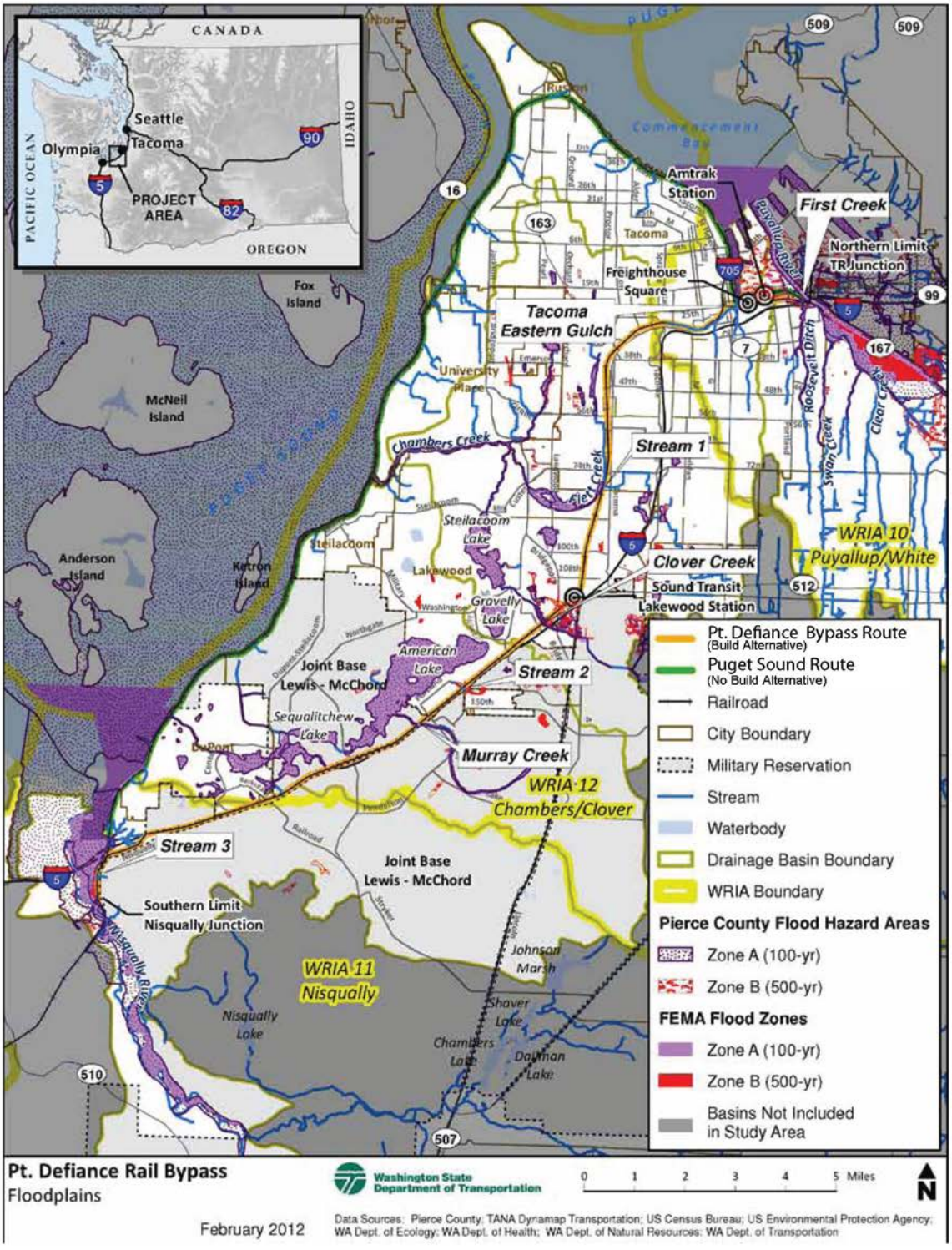
Designated 100-year and 500-year floodplains in the study area are shown in Exhibit 3. Within the study area, Clover Creek and Murray Creek have flood zones regulated by FEMA. These flood zones are geographic areas defined by FEMA as having an annual risk of flooding of 1 percent (100-year floodplain) or 0.2 percent (500-year floodplain).[52]

First Creek, Stream 1, and Stream 2 do not have FEMA flood zones, but they do have flood hazard areas designated by Pierce County. Pierce County designates flood hazard areas as those identified by FEMA, but also areas within 65 feet from the ordinary high water mark of an identified natural river, stream, or other water channel; areas within 10 vertical feet from the bottom of a regulated closed depression; areas within two vertical feet of a potential surface water spillway or other type of outlet; and identified channel migration zones.[53]

The Tacoma Eastern Gulch and Stream 3 do not have either a designated FEMA flood zone or a Pierce County flood hazard area in the study area.

[48] *RCW 90.58.030.*
[49] *Pierce County Code§20.04.560.*
[50] *WAC 173-18-310, WAC 173-20-570.*
[51] *WAC 173-18-310, WAC 173-20-560.*
[52] *FEMA 2011.*
[53] *Pierce County Code§18E.70.020.*

Exhibit 3. Floodplains



What is the condition of groundwater in the study area?

Groundwater Movement

The topography across most of the study area is generally flat and has underlying coarse-grained, permeable soils; therefore, most of the precipitation falling on the surface infiltrates directly into the ground. Water that infiltrates in the study area moves laterally through the shallow groundwater system, where the groundwater table is approximately 10-40 feet below the ground surface. The water table commonly intersects larger depressions in the land surface, resulting in standing bodies like American Lake. Because of rapid infiltration and the shallow groundwater system, the groundwater in the study area is susceptible to contamination. This is especially true in the northern portion of the project corridor, from TR Junction (Rail MP 1.0) to Freighthouse Square, where groundwater is very shallow and highly susceptible to contamination.[54]

Sole Source Aquifers

As shown on Exhibit 4, the Project would lie within a USEPA-designated sole source aquifer area. A sole source aquifer is an aquifer that is either the main (it supplies over 50 percent of the total demand) or only source of drinking water consumed in the area above the aquifer. These areas have no alternative source(s) that can physically, legally, or economically supply drinking water to recipients who depend upon the aquifer.[55] The USEPA reviews all federally-funded projects that may have the potential to contaminate a designated sole source aquifer.[56]

The USEPA designated the sole source aquifer shown in Exhibit 4 as the Central Pierce County Aquifer System in 1989. The groundwater in this area moves regionally through unconsolidated glacial deposits toward Puget Sound and adjacent river valleys. Groundwater from the aquifer system supplies between 60 and 90 percent of the drinking water used within the area. The quality of drinking water supplied by the aquifer is generally good, but contamination is becoming more frequent and gradually decreasing the water quality.[57]

Critical Aquifer Recharge and Wellhead Protection Areas

The study area contains critical aquifer recharge and wellhead protection areas, which are shown in Exhibit 4.

[54] *WSDOT 2011c.*
[55] *EPA 2011a.*
[56] *EPA 2011b.*
[57] *EPA 2011c.*

Exhibit 4. Groundwater Resources

Pierce County defines aquifer recharge areas as areas that have a critical effect on recharging groundwaters used for potable water supplies. These groundwater areas may also be at risk of contamination from land use activities. Wellhead protection area boundaries are defined by Pierce County as the maximum distance from which a contaminant could potentially reach a public water system well within 10 years of travel through the ground.[58]

Within critical aquifer recharge and wellhead protection areas, Pierce County regulates the amount of impervious surface that may be added by new development. In addition, Pierce County prohibits and/or regulates certain activities and land uses, such as landfills, underground injection wells, metals mining, wood treatment facilities, pesticide manufacturing, petroleum refining and/or storage facilities, hazardous product storage, and certain agricultural activities.[59]

Potential Pollutant Sources

The sandy and gravelly soils found in the eastern half of the Chambers/Clover Creek area are porous; therefore, pollutants may leach into the unconfined aquifer and enter the groundwater. Potential sources of pollutants in the watershed include uncontrolled roadway runoff, existing septic tanks, drain fields, solid waste disposal landfills, and underground storage tanks.[60]

[58] *Pierce County Code §18.25.030.*
[59] *Pierce County Code §18E.50.040.*
[60] *Pierce County 2011.*

Chapter 5 – Potential Project Effects

What is considered a "project effect?"

Effects from a project can be direct, indirect, or cumulative. Direct effects are effects caused by a project that occur at the same time and place, including construction of the project, changes in the landscape, and long-term operation of new facilities. Indirect effects caused by a project happen later in time or farther away. Cumulative effects result from the effects of one project that are then added to other past, present, and likely future projects, regardless of who implements each project. Cumulative effects can result from individual small actions that become significant when added together in one place or over time.[61]

How would the No Build Alternative affect water resources?

No direct, indirect, or cumulative effects to water resources would result. Amtrak service would continue to operate on the Puget Sound route within a landscape disturbed by development and urban activity. No additional construction or maintenance activities would result from the No Build Alternative.

How would the Project directly affect water resources during construction?

Construction Effects

Construction elements of the Project that were evaluated in the water resources study included the following:

- Between South 66th Street (Rail MP 6.9) to about 700 feet beyond the Lakewood Station (Rail MP 10.1), track ballast material would be added and new rail would be installed. Stream 1 crosses the Project alignment in this construction area.
- Between about 700 feet beyond the Lakewood Station (Rail MP 10.1) to the southern end of the Project, the track section

[61] *WSDOT 2010a.*

would be reconstructed. The reconstruction would involve clearing and grubbing the existing ground of vegetation, cutting into existing slopes, placing new fill for wider track embankments, excavating new drainage ditches, placing track sub-ballast and ballast material, and hauling away and disposing of excavated material. Clover Creek, Stream 2, Murray Creek, and Stream 3 cross the project alignment in this reconstruction area.

- Roadway upgrades would be implemented at Clover Creek Drive Southwest, North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive, and Barksdale Avenue. New impervious surfaces would be constructed at these crossings. The Clover Creek Drive Southwest construction would take place approximately 600 feet southwest of Clover Creek; the North Thorne Lane Southwest construction would take place approximately 200 feet northeast of Stream 2; and the Berkeley Street Southwest construction would take place approximately 1,500 feet northeast of Murray Creek. The construction at 41st Division Drive and Barksdale Avenue would not be immediately adjacent to any streams in the study area.
- At the two bridges crossing I-5 near Rail MP 20.0, additional construction along the rail line could potentially include extending the bridge abutment wing walls with retaining structures, which could require high cuts into existing slopes. Additional construction activities could include protecting the track from upslope debris and removal of existing loose fill. No streams are in the immediate vicinity of this construction area.
- In the vicinity of the Mounts Road overpass (Rail MP 19.8), the track embankment slopes could potentially be regraded and new retaining structures may be installed to support the track widening. No streams are in the immediate vicinity of this construction area.
- At Freighthouse Square, modifications to the station would involve reconstructing a portion of the existing Freighthouse Square building, extending or rebuilding the existing commuter rail platform, modifying existing on-street parking and parking lots, and creating additional parking. Freighthouse Square is approximately 900 feet east of the Tacoma Eastern Gulch.

Effect Evaluation

Effects to water resources from construction-related activities were evaluated in the context that the Project would comply with applicable requirements of the NPDES Construction Stormwater General Permit process,[62] and *HRM* standards and BMPs,[63] as appropriate.

[62] *Ecology 2010a.*
[63] *WSDOT 2010b.*

Construction effects on surface water can result from the types of earthwork, concrete work, paving, stockpiling, material transport, and storm drainage utility work planned as part of the Project. Soil exposed in sloped excavations or fills would be especially susceptible to local erosion until vegetation was established. In addition, if the exposed soil dries out, it can also be at risk from wind erosion. Eroded soil can be carried by water or wind into adjacent stormwater drains and streams. Also, the pH in surface water can be increased if runoff comes in contact with curing concrete. The tires of construction vehicles could also carry soil onto roadways, which could then runoff into ditches or streams. In addition, equipment leaks or spills from construction machinery can also affect water quality in nearby water resources. Construction-related pollutants can increase turbidity and affect other water quality parameters, such as pH levels and/or the amount of available oxygen in the water. However, as discussed in Chapter 6, construction pollution-prevention BMPs would be implemented to avoid and minimize the risk of effects; therefore, the Project is not expected to affect surface waters during construction.

As previously discussed, soils are generally permeable in the study area. These soils would potentially allow for surface water and/or uncontrolled pollutant spills to infiltrate during construction, posing a risk to the sole source aquifer, critical aquifer recharge area, and wellhead protection area in this vicinity. However, implementation of required construction BMPs would avoid and minimize this risk; therefore, the Project is not expected to affect groundwater during construction.

How would the Project directly affect water resources after it is built?

Surface Waters

Effects to surface waters were evaluated in the context that the Project would comply with applicable requirements of WSDOT's NPDES Municipal Stormwater Permit[64] and *HRM* standards,[65] as appropriate.

Flow Quantities

As previously discussed, the Project would construct new rail between South 66th Street at Rail MP 6.9 and 700 feet beyond the Lakewood Station at Rail MP 10.1. The Project would also remove and reconstruct the existing track between Rail MP 10.1 to the southern end of the Project. The new rail construction and existing rail reconstruction would permanently remove approximately 24 acres of landscaped vegetation, 2.5 acres of disturbed mixed forest, and one acre of scattered trees along the

[64] *Ecology 2009b.*
[65] *WSDOT 2010b.*

rail line right-of-way.[66] Track ballast material would also be added as part of the new construction and reconstruction. The ballast material would be permeable and would allow precipitation to continue to infiltrate. Stream 1 crosses the project alignment in the area of new track construction, while Clover Creek, Stream 2, Murray Creek, and Stream 3 cross the project alignment in the area of track reconstruction.

The Project would also implement roadway upgrades at Clover Creek Drive Southwest, N. Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive, and Barksdale Avenue. The surfaces added as part of the roadway improvements and associated sidewalk upgrades would be new impervious areas. The roadway upgrades would take place in the Clover Creek, Stream 2, and Murray Creek sub-basins.

Renovation of the Freighthouse Square station would utilize the existing structure and involve minor site development activities that would not result in significant changes to impervious surface quantities.

Removing vegetation in a watershed and/or adding impervious surface can change the hydrologic cycle by reducing infiltration, increasing the volume of surface runoff, and increasing the peak flow rate generated by a storm event.[67] Increased flows in streams can lead to scouring of the stream banks and changes in sediment transport patterns that can damage fish habitat. However, the land use changes expected under the Project associated with the added track ballast, vegetation removal, and the new impervious surfaces would be below the *HRM* thresholds for flow control for each Project TDA.

As discussed, because the proposed changes in land cover would fall below the *HRM* thresholds for flow control, the Project is expected to comply with local, state, and federal water quality-based flow control standards without the use of additional flow control BMPs. In turn, the Project is not expected to affect water resources through changes in flow.

Water Quality

Removing vegetation in a watershed can result in surface erosion and sediment transport that increases turbidity, affects available oxygen supply, and affects habitat in receiving waters. Also, vehicle traffic associated with roadways and parking areas can produce metals, oil, and grease that are collected by surface water runoff and delivered to natural receiving waters. However, the amount of vegetation removal and pollution-generating area increases that would occur as part of the Project for track construction and reconstruction, roadway upgrades, and the Freighthouse Square station renovations are expected to be below *HRM*

[66] *WSDOT 2011b.*
[67] *WSDOT 2010b.*

thresholds for water quality treatment requirements. Also, the Project operation would not generate any pollutants identified on the Ecology 303(d) list as concerns for surface waters within the study area.

Under the presumptive approach outlined in the *HRM*, the Project is expected to comply with local, state, and federal water quality-based standards without the use of additional water quality BMPs and in turn is not expected to affect surface water quality.

Shorelines

The Project design would not significantly alter any areas within regulated shorelines; therefore, no effects are expected.

Floodplains

The Project design would not alter any of the water crossing structures in the Project right-of-way. In addition, the renovations at Freighthouse Square would be outside of any regulated floodplains. Therefore, the Project design would not affect jurisdictional flood zones, flood hazard areas, or base flood elevations.

Groundwater

Groundwater Supply

In addition to affecting surface waters as previously discussed, removing vegetation in a watershed and/or adding impervious surface can also reduce infiltration and associated groundwater recharge.[68] However, the land use changes expected under the Project associated with the added track ballast, vegetation removal, and the new impervious surfaces would be below the *HRM* thresholds for flow control for each Project TDA. Therefore, the Project would allow precipitation to continue to infiltrate at levels similar to existing conditions and would not result in significant effects on groundwater recharge.

Water Quality

Metals, oil, and grease that are associated with roadways and parking areas can be collected by surface runoff and infiltrate into the ground. However, the amount of pollution-generating area increases that would occur as part of the Project for track construction and reconstruction, roadway upgrades, and the Freighthouse Square station renovations are expected to be below *HRM* thresholds for water quality treatment requirements. Finally, the Project operation would not generate any pollutants identified on the Ecology 303(d) list as concerns for surface

[68] *WSDOT 2010b.*

waters within the study area. Therefore, no effects to groundwater quality are expected from the Project.

What potential indirect effects could occur from the Project?

The Project is located within an existing rail corridor and urbanized area. The only potential indirect effect tied to the Project is that it may indirectly influence redevelopment near the relocated Amtrak Station at Freighthouse Square (see Land Use Discipline Report[69]). Such redevelopment would be consistent with local zoning and approved by state and local agencies and would take place in previously disturbed areas where surface waters are not present. Effects to surface and groundwater from redevelopment would be avoided through the use of required construction and design BMPs. Thus, no indirect effects to water resources are anticipated.

What cumulative effects would there be from the Project and other planned projects in the study area?

The Project would have no direct or indirect effect on water resources. Thus, the Project would not contribute to a cumulative effect on these resources.

Does the Project cause any significant unavoidable adverse effects?

As discussed above, risks to surface water and groundwater posed by the Project will be avoided through Project design and controlled through the use of construction BMPs; therefore, no direct or indirect adverse effects are expected. The risks of cumulative effects will similarly be controlled by each project in the area through compliance with applicable regulations. Therefore, no significant unavoidable adverse effects to water resources are expected from the Project.

[69] *WSDOT 2012.*

Chapter 6 – Recommended Minimization Measures

What is considered "minimization?"

Minimization includes avoiding, minimizing, rectifying, reducing or eliminating, compensating, and/or monitoring project effects.[70]

What measures will be taken to minimize the effects during construction of the Project?

As discussed in Chapter 5, mitigation for potential construction-related water quality impacts would be addressed by complying with the NPDES Construction Stormwater General Permit process,[71] and *HRM* standards and BMPs,[72] as appropriate.

Through compliance with the above requirements, an approved *Construction Stormwater Pollution Prevention Plan* (*CSWPPP*) would be developed and implemented for the proposed Project. The *CSWPPP* will serve as the overall construction stormwater mitigation plan and will include each of the following plans:

- *Temporary Erosion and Sediment Control Plan*
- *Spill Prevention, Control, and Countermeasures Plan*
- *Concrete Containment and Disposal Plan*
- *Fugitive Dust Plan*

Minimization contained in the CSWPPP aimed at preventing erosion from exposed soil will include the following:[73]

- The contractor will not leave disturbed areas exposed and unworked for more than seven days during the dry season (May 1-Sept. 30), or more than two days during the wet season (October 1 - April 30).
- Mulch, sodding, plastic covering, or other stabilization BMPs will be used to prevent erosion in these areas.

[70] *WSDOT 2010a.*
[71] *Ecology 2010a.*
[72] *WSDOT 2010b.*
[73] *WSDOT 2007, Ecology 2010a.*

- Clearing will be limited to the footprint of the proposed cut.
- Water trucks will provide water as needed for dust control.
- The earthwork staging areas and equipment turnaround sites would be located in previously disturbed areas that support routine railroad access and maintenance activities as much as possible.
- The staging areas will not be located within 150 feet of a fish-bearing or potentially fish-bearing water, or a water body that drains into fish-bearing waters.
- Silt fences and temporary sediment traps will be installed along critical areas.
- Site stabilization techniques will be implemented during construction, prior to the wet season, and for final site preparation.
- Disturbed areas will be permanently stabilized once construction is complete.
- All temporary and permanent erosion and sediment control BMPs will be maintained and repaired as needed to ensure continued performance.

BMPs contained in the *CSWPPP* aimed at preventing non-sedimentation pollutants, such as hazardous materials, from entering water bodies will include the following:[74]

- All pollutants other than sediment that occur on site during construction will be handled and disposed of in a manner that does not contaminate stormwater.
- Staging areas for equipment repair and maintenance will be established away from all drainage courses.
- Washout from concrete trucks will be contained and covered when not in use to prevent it from entering storm drains or spilling onto soil or pavement that carries stormwater runoff.
- Thinners and solvents will not be used to wash oil, grease, or similar substances from heavy machinery or machine parts.
- A fuel truck will fuel equipment daily at the work sites, but this activity would be conducted a minimum of 150 feet away from surface water bodies and drainage conveyances.
- Fueling of construction vehicles and the storing of hazardous materials will not be conducted within 100 feet of any sensitive surface areas.
- Any on-site fuel storage will have secondary containment equal to 150 percent of storage capacity.
- Given the porous nature of the soils in the proposed Project area and the sensitive groundwater features, refueling and hazardous material storage would generally be conducted within contained areas.

[74] *WSDOT 2007.*

The construction area will be designed to treat polluted runoff and contain spills.

How will operational effects be minimized?

As discussed in Chapter 5, control of potential risks to water resources will be addressed by complying with WSDOT's NPDES Municipal Stormwater Permit[75] and *HRM* guidance.[76] As a result, no effects to water resources are expected and no minimization is required.

[75] *Ecology 2009b.*
[76] *WSDOT 2010b.*

References

Ecology (Washington State Department of Ecology). 1995a. Initial Watershed Assessment, Water Resources Inventory Area 10, Puyallup-White Watershed. Publication Number 95-008. Washington State Department of Ecology Southwest Regional Office, Water Resources Program. March 1995.

Ecology. 1995b. Initial Watershed Assessment, Water Resources Inventory Area 12, Chambers-Clover Creek Watershed. Publication Number 95-009. Washington Department of Ecology Southwest Regional Office, Water Resources Program. March 1995.

Ecology. 2009a. 2008 Washington State's Water Quality Assessment [303(d)] Query Tool. Available at: http://www.ecy.wa.gov/programs/wq/303d/2008/index.html. Last updated February 2009. Approved by U.S. Environmental Protection Agency January 29, 2009.

Ecology. 2009b. Washington State Department of Transportation Municipal Stormwater Permit – NPDES and State Waste Discharge General Permit for Large and Medium Separate Storm Sewer Systems. Olympia, Washington. Issued on February 4, 2009. Effective March 4, 2009.

Ecology. 2010a. Construction Stormwater General Permit – NPDES and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity. Washington State Department of Ecology. Olympia, Washington. Issued on December 1, 2010. Effective January 1, 2011.

Ecology. 2010b. Phase I Municipal Stormwater Permit – NPDES and State Waste Discharge General Permit for discharges from Large and Medium Municipal Separate Stormwater Sewer Systems. Washington State Department of Ecology. Olympia, Washington. Issued on January 17, 2007. Effective February 16, 2007. Modified September 1, 2010.

Federal Transit Administration. 2002. Sound Transit Lakewood-to-Tacoma Commuter Rail and SR-512 Park-and-Ride Expansion NEPA/SEPA Final Environmental Impact Statement. U.S. Department of Transportation Federal Transit Administration and Sound Transit. May 2002. FEMA (Federal Emergency Management Agency). 2011. Map Services Center, Definitions of FEMA Flood Zone Designations. Accessed at: http://www.msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1&userType=G.

Pierce County 2006. Nisqually River Basin Plan Characterization Report. Pierce County Public Works & Utilities Water Programs Division. September 2006

Pierce County. 2011a. Surface Water Health 2010 Report Card, a report on the health of surface water in Pierce County. Pierce County Public Works and Utilities, Surface Water Management Division, Water Quality and Watershed Section.

Pierce County. 2011b. Pierce County Surface Water Management Water Quality Index, MS023, Murray Creek. http://www.co.pierce.wa.us/xml/services/home/environ/water/wqws/Monitoring/WQI/2010/Murray%20Creek%20WQI%202010.pdf. Accessed on October 24, 2011.

Tacoma, City of. 2008. Surface Water Management Manual. City of Tacoma Public Works/Environmental Services, Maintenance Division. September 2008.

Tacoma, City of. 2011a. Tacoma govME mapping application and database. Accessed at: http://wspwit01.ci.tacoma.wa.us/govMe/Maps/Inter/MapGuideCS/MGMain.aspx.

Tacoma, City of. 2011b. Tacoma Watersheds. Accessed at: http://www.cityoftacoma.org/Page.aspx?hid=925. Tacoma Public Works Division, Surface Water Services.

Tacoma, City of. 2011c. Forest Habitat Assessment and Restoration Report. Prepared by AHBL for the City of Tacoma. September 2011.

USEPA (US Environmental Protection Agency). 2011a. Sole Source Aquifer Program. Accessed at: http://yosemite.epa.gov/r10/water.nsf/Sole+Source+Aquifers/SSA. USEPA Region 10. Last updated October 27, 2011.

USEPA. 2011b. Sole Source Aquifer Protection Program Project Review - Areas of Concern. Accessed at: http://yosemite.epa.gov/r10/water.nsf/Sole+Source+Aquifers/Concern. USEPA Region 10. Last updated October 27, 2011.

USEPA. 2011c. Central Pierce County, WA, Sole Source Aquifer. Accessed at: http://yosemite.epa.gov/r10/water.nsf/Sole+Source+Aquifers/Central+Pierce. USEPA Region 10. Last updated October 27, 2011.

WSDOT (Washington State Department of Transportation). 2007. Point Defiance Bypass Project Hydrology and Water Quality Technical Memorandum. Prepared for WSDOT by HDR Engineering, Inc. and the Resource Group Consultants, Inc. August 2007.

WSDOT. 2009. *Pacific Northwest Rail Corridor Tier 1 Environmental Assessment*. Available at: http://wadot.wa.gov/Freight/publications/PNWRCReports.htm

WSDOT. 2010a. Environmental Procedures Manual M 31-11.09. Washington State Department of Transportation, Environmental and Engineering Programs, Environmental Services Office. Olympia, Washington. October 2010.

WSDOT. 2010b. Highway Runoff Manual M 31-16.02. Washington State Department of Transportation, Environmental and Engineering Programs, Design Office. Olympia, Washington. May 2010.

WSDOT. 2011a. Point Defiance Rail Bypass Project Draft Floodplain Discipline Report. Olympia, Washington. May 2011.

WSDOT. 2011b. Point Defiance Bypass Project Fish, Wildlife, and Vegetation Discipline Report. Washington State Department of Transportation. October 2011.

WSDOT. 2011c. Point Defiance Bypass Project Soils and Geology Discipline Report. Washington State Department of Transportation. November 2011.

WSDOT. 2012. Point Defiance Bypass Project Land Use Discipline Report. Washington State Department of Transportation. September 2012.