

3.3 WATER RESOURCES

This section describes existing water resources on and in the vicinity of the New Whatcom site. Potential impacts to water resources from future redevelopment under the EIS Alternatives are analyzed. This section is based on the December 2007 *Earth Elements Technical Report* prepared by Landau Associates, the December 2007 *Stormwater Technical Report* prepared by David Evans and Associates, Inc., and the December 2007 *Water Quality Technical Report* prepared by A.C. Kindig and Company; the full texts of these reports are contained in **Appendices D, F and G**, respectively.

3.3.1 Affected Environment

Surface Water

Hydrologic Setting

The New Whatcom site is located in the Puget Sound Central Watershed and is part of the greater Nooksack drainage basin. The site is situated adjacent to Bellingham Bay and the Whatcom Waterway (see **Figure 2-2** in **Chapter 2** of this Draft EIS). Bellingham Bay is approximately 28 square miles in size and about 6 miles across from the Whatcom Waterway on the east to Lummi Shore Drive on the west. Whatcom Creek originates in Whatcom Lake and drains to the Whatcom Waterway. Tidal influence from Bellingham Bay into Whatcom Creek extends to the Maritime Heritage Center Park, but not upstream of the park, because of a steep rise in slope at a falls. Depths of both the inner and outer Whatcom Waterways are a result of historic dredging.

A majority of the site lies on relatively flat areas of fill and upland area at the western side of Bellingham Bay divided by the Whatcom Waterway. The site is cleared and mainly paved or graveled with a combination of industrial and maritime uses. Impervious surface areas (including gravel, structures, and paving) presently comprise approximately 94 percent of the site (CollinsWoerman, 2007).

Flooding

The site is relatively flat with the existing perimeter ground surface along Bellingham Bay and the Whatcom Waterway ranging between elevations 12 feet to 15 feet. (City of Bellingham Datum) with internal areas ranging between elevations 10 feet and 27 feet. Flood information obtained from the Federal Emergency Management Agency (FEMA) indicate the site is not identified as being in a floodway or floodplain. Base flood elevation at the mouth of Whatcom Creek of 8 feet. [National Geodetic Vertical Datum 1929 (NGVD 29)] correlates to a conservatively high 100-year flood elevation of 13.7 feet. (City of Bellingham Datum). Accordingly, small portions of the site not protected by a perimeter wharf/bulkhead or berm (such as in portions of Areas 1, 8, 9, and 10) may currently be subject to flood hazards (see Figures 2A and 2B in the *Stormwater Technical Report* for more information on topographic conditions).

Stormwater Control Facilities

Stormwater control facilities that are present on and in the vicinity of the site are described below.

Onsite Stormwater Control Facilities

The more developed areas of the site generally contain stormwater collection and more conveyance systems with outfall structures that discharge directly into Bellingham Bay or the Whatcom Waterway, or into Bellingham Bay via a pipe that extends out to the Bay from the Aerated Stabilization Basin (ASB). More undeveloped areas, or areas with minimal infrastructure systems, such as portions of Areas 1, 8 and 10, have minimal stormwater collection and conveyance systems. In these areas, stormwater runoff either infiltrates, evaporates, or sheet flows into the Bay and Waterway.

Since the site is bounded by City streets that contain stormwater collection systems and berms associated with the BNSF railroad corridor with stormwater interceptor ditches, very little offsite runoff sheet flows onto or across the site. Existing stormwater pipes convey runoff from offsite basins through the site, however, as described below under *Offsite Flows*.

Following are descriptions of the existing stormwater control facilities in each of the site's redevelopment areas.

Redevelopment Area 1. This area includes the GP Tissue Warehouse and other industrial uses and is largely covered in impervious surfaces. In the vicinity of Area 1, curb and gutter systems on Hilton Street, C Street and a portion of F Street extend approximately 50 feet west of their intersections with Roeder Avenue. Runoff from these street intersections is conveyed south along Roeder Avenue and discharges into a box culvert in C Street. The culvert discharges at the west end of C Street at Outfall 1. Three C Street stormwater conveyance pipes have been identified that tie into this culvert and discharge to the outfall.

The GP Tissue Warehouse and surrounding paved area (approximately 13 acres of impervious surface) in Area 1 have a stormwater collection system that gravity drains directly to the ASB, (see discussion under the ASB below). Stormwater runoff from other portions of Area 1 generally sheet flows into the Bay, infiltrates, or evaporates.

When the ASB closes, the Tissue Warehouse's existing stormwater collection system will need to be reconfigured to allow stormwater discharge to a new location. Prior to connecting to this new discharge location, runoff from pollution generating surfaces (i.e. streets and parking areas) will likely be routed to a water quality treatment facility. Roof runoff could be directed to bypass the treatment facility to minimize the treatment facility's size. A new conveyance pipe from the GP Tissue Warehouse to the new discharge location will be required.

Redevelopment Areas 2, 3, 4, 5, and 8. The area that constitutes Areas 2, 3, 4, 5 and 8 includes existing GP operations. Stormwater runoff from this area is collected through a series of ditches, culverts, and underground pipes, and combines with GP's industrial wastewater. Due to the number of cross connections between the stormwater and the industrial wastewater systems, the limits of each of these systems are unclear. The combined effluent from these two systems is currently pumped to a large pump station located at the north end of the West Laurel

Street right-of-way. This pump station discharges runoff into the ASB for treatment prior to discharge to Bellingham Bay.

The closure of the ASB could require the installation of one or more of the new outfalls ultimately planned to accommodate New Whatcom redevelopment. Temporary measures that may be implemented during this interim phase (prior to the construction of new outfalls) could include the following:

- The existing ditches, culverts, underground pipes, and small pump stations could remain in operation directing runoff to the main pump station at the north end of the vacated West Laurel Street right-of-way. Runoff could then be pumped to a new treatment facility where, after treatment, it could either gravity drain or be pumped to an existing outfall.
- Runoff from areas that are, or will remain, pollution generating surfaces (i.e. streets and parking areas) could be treated through small localized facilities. After treatment, runoff could be pumped to existing conveyance systems (i.e., the West Laurel Street, Cornwall Avenue, or Bellingham Shipping Terminal (BST) systems) and discharge through existing outfalls.

Redevelopment Area 6. Area 6 consists of the existing PSE Encogen facility and is primarily in impervious surfaces. This area's stormwater control system includes manholes, conveyance pipe, and concrete swales along the north and south perimeter of the area. The system discharges in the southwest corner of the site into the Cornwall Avenue stormwater system.

Presently, the industrial wastewater from the Encogen facility is pumped to the ASB for treatment and discharge. The termination of the ASB will require the re-routing of Encogen's wastewater to the City's sanitary sewer system or other facilities, subject to applicable permits.

Redevelopment Area 7. This area is entirely in impervious surfaces. The City of Bellingham's Oak Street sanitary sewer pump station is located in this area. The stormwater infrastructure in Area 7 is limited, with a few conveyance pipes connecting to the Cornwall Avenue stormwater system.

The offsite BNSF railroad spur south of Area 7 contains a series of catch basins and conveyance pipes that collect runoff and convey it through the area. The east half of the spur drains to the West Laurel Street offsite stormwater control system. The west half drains to the Cornwall Street system. Although Area 7 is located at the base of a bluff, the raised railroad spur prevents offsite stormwater runoff from the bluff from traveling north onto the site. The bluff runoff appears to pond at the base of the spur where it infiltrates and evaporates.

Redevelopment Area 9. Area 9 contains the Bellingham Shipping Terminal (BST). The area is essentially 100 percent impervious, with small landscaped areas at the offices along Cornwall Avenue and along the Bay embankment on the west side of the site. This area contains four stormwater outfalls:

- A 12-inch diameter culvert at the north end of the BST that discharges north into the Waterway (Outfall 5);
- A 12-inch diameter culvert in the northeast corner of the BST that discharges east into the Waterway (Outfall 6). A second pipe of unknown size also discharges 50 feet north of the nearby 12-inch culvert;

- A 12-inch diameter culvert approximately 125 feet north of the Cornwall Avenue culvert that discharges west into the Bay (Outfall 7); and,
- A 24-inch diameter culvert at the west end of Cornwall Avenue that discharges west into the Bay (Outfall 8).

Redevelopment Area 10. This area contains no known stormwater infrastructure.

Aerated Stabilization Basin

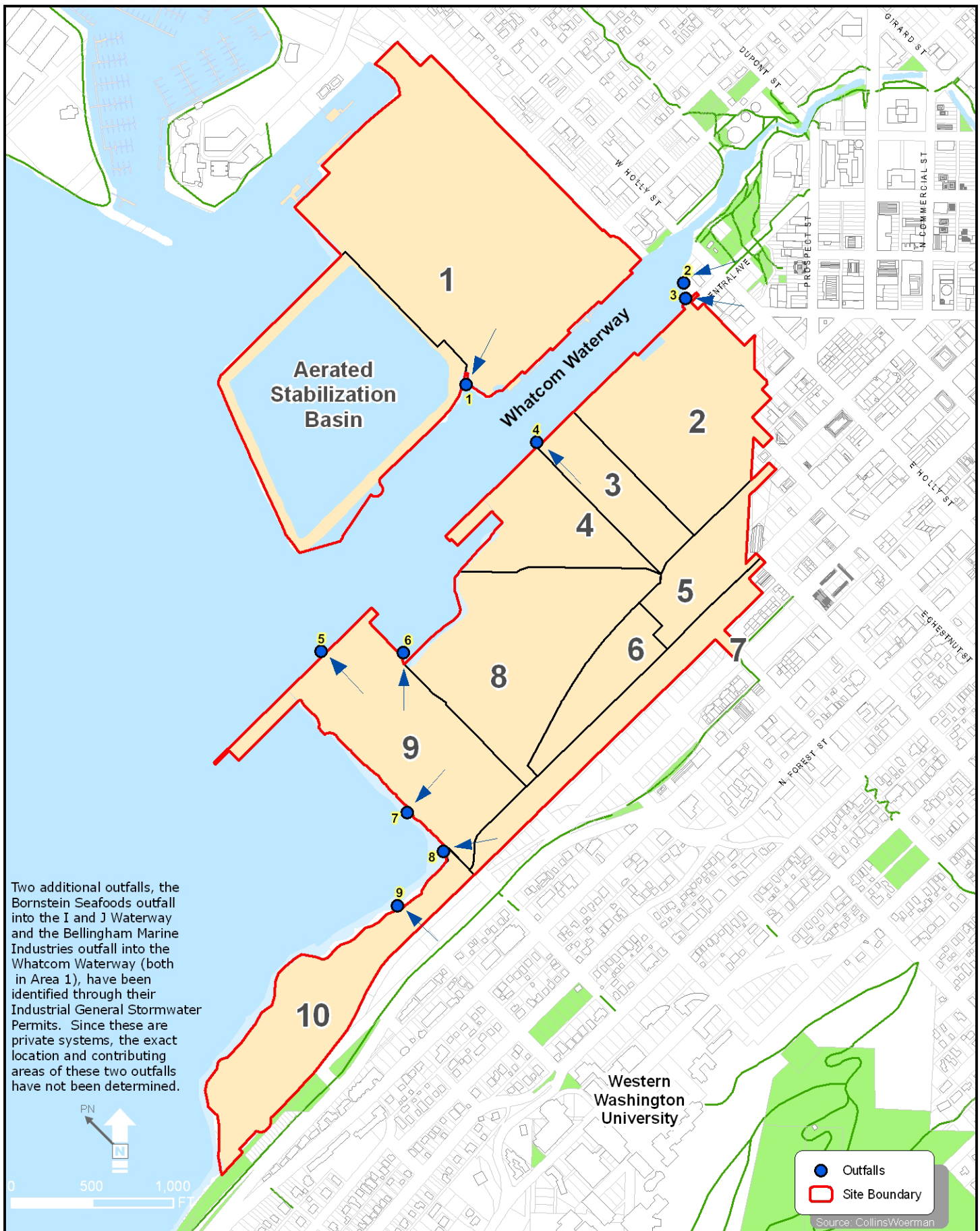
The Aerated Stabilization Basin (ASB) is a 35.9-acre wastewater treatment/discharge facility located adjacent to Area 1 in the northern portion of the New Whatcom site (see **Figure 3.3-1**). This facility currently treats and discharges stormwater from certain Georgia Pacific (GP) operations onsite in Areas 1, 2, 3, 4, 5 and 8. Processed wastewater from Puget Sound Energy's (PSE) Encogen facility (in Area 6) is also discharged to the ASB. Stormwater runoff is collected through a series of ditches, culverts, and underground pipes, and combined with GP's and Encogen's wastewater. The combined effluent discharges to a pump station located at the north end of the vacated West Laurel Street right-of-way. The pump station discharges the effluent through an approximately 700-foot long force main that extends under the Whatcom Waterway, and then discharges into the ASB. The effluent is treated in the ASB and then pumped through a 60-inch diameter pipe which extends 8,000 feet into Bellingham Bay.

Discharge to the ASB will be terminated for planned remediation and redevelopment as a marina, in coordination with planned upland redevelopment of the New Whatcom site (refer to **Chapter 2** of this Draft EIS for more information on the cleanup and redevelopment of the ASB). The removal of the ASB would require two steps. First, industrial wastewater and industrial stormwater runoff from those portions of the site that discharge to the ASB would need to be terminated, and Ecology would need to concur that the industrial discharge and the need for industrial discharge coverage under the NPDES program were both terminated. Second, an alternative routing of stormwater runoff from the site to an existing or new onsite stormwater treatment system would need to be provided.

Onsite Outfalls

Nine existing outfalls have been identified on the New Whatcom site (see **Figures 3.3-1** for the locations of these outfalls). Outfalls 2, 3 and 9 convey runoff from offsite areas that passes through the site without combining with onsite runoff. The remaining outfalls receive a portion of their runoff from the site. Outfalls 5, 6 and 7 receive their entire runoff from Area 9. Two additional outfalls, the Bornstein Seafoods outfall into the I and J Waterway and the Bellingham Marine Industries outfall into the Whatcom Waterway (both in Area 1), have been identified through their Industrial General Stormwater Permits. Since these are private systems, the exact location and contributing areas of these two outfalls have not been determined. Following are further descriptions of these outfalls and their contributing drainage areas.

Outfall 1. This outfall consists of a box culvert that discharges at the west end of C Street. The extent of the stormwater basin that contributes to this structure is unknown. Portions of the Roeder Avenue stormwater conveyance system are known to connect to this culvert, as do areas east of Roeder Avenue.



This outfall also acts as the discharge point for the City's C Street Combined Sewer Overflow (CSO). In the event of a severe rainfall, the CSO can release wastewater directly to Bellingham Bay (Whatcom Waterway) through this outfall. If the influent rate at the City's Oak Street Station exceeds the station's hydraulic lift capacity of 58-60 million gallons per day (MGD), a sanitary sewer overflow can occur. In accordance with the City's NPDES permit with the Washington Department of Ecology (Ecology), the City is allowed one overflow event per year.

Outfall 2. This outfall is a 22-inch diameter pipe that discharges into the Whatcom Waterway at the southwest corner of the Central Avenue and Roeder Avenue intersection in Area 2. From the outfall, a culvert extends east offsite under the railroad tracks and south along the east side of the tracks. The extent of the drainage basin that contributes to this outfall is unknown.

Outfall 3. This outfall is an 8-inch diameter pipe that discharges into the Whatcom Waterway at the southwest corner of the Central Avenue/Roeder Avenue intersection in Area 2, adjacent to Outfall 2. Runoff to this outfall originates from the Roeder Avenue bridge between Central Avenue and Bay Street, with an approximately 0.7-acre contributory drainage basin.

Outfall 4. This outfall is known as the Laurel Street Outfall and is located at the north end of the vacated Laurel Street right-of-way along the boundary between Areas 3 and 4. The culvert discharges approximately 5 feet below the ordinary high water mark. This outfall discharges runoff from a 96-acre offsite basin located above the bluff south of Area 7. Runoff from the Cornwall Avenue/Laurel Street intersection and the east half of the railroad berm in Area 7 also discharges into this system.

Outfall 5. This outfall is a 12-inch diameter pipe located at the north end of the BST in Area 9. This outfall collects the roof runoff from Shipping Terminal Warehouse #1 and the surrounding paved area.

Outfall 6. This outfall is a 12-inch diameter pipe located at the northeast corner of the BST in Area 9. This outfall collects the runoff from the eastern half of the BST. A second pipe of unknown size located along the south side of Shipping Terminal Warehouse #2 also discharges 50 feet north of the nearby 12-inch culvert.

Outfall 7. This outfall provides the discharge for stormwater collected from the Port of Bellingham maintenance building and surrounding area in the southwest corner of Area 9. The 12-inch diameter pipe discharges below the ordinary highwater mark to the west of the building.

Outfall 8. This outfall is a 24-inch diameter pipe that discharges into Bellingham Bay at the west end of Cornwall Avenue approximately six feet below the ordinary highwater mark in Area 10. Stormwater runoff from Cornwall Avenue west of Laurel Street, the Encogen facility in Area 6, Area 7 west of Laurel, and the western half of the railroad spur south of Area 7, discharge to this outfall.

Outfall 9. This outfall is known as the Cedar Street Outfall and is located at the north end of the vacated Cedar Street right-of-way approximately 500 feet west of the end of Cornwall Avenue. This 30-inch diameter pipe discharges north into the Bay. The extent of the outfall's contributing basin is unknown; however, the basin is believed to extend to the Western Washington University campus with a contributing basin exceeding 40 acres.

Offsite Flow

Offsite runoff is conveyed via pipe through the site primarily in Areas 2, 4 and 10. Outfalls 2, 3, and 9 convey runoff from offsite areas that passes through the site without combining with onsite runoff. Outfall 4 discharges runoff from a 96-acre offsite basin, as well as a small portion of the site.

Surface Water Quality

Stormwater Treatment

As mentioned previously, the City of Bellingham maintains a stormwater collection and conveyance system in the site area that includes stormwater outfalls discharging to Bellingham Bay and the Whatcom Waterway, including some which discharge from and through the site. These outfalls are regulated under the Federal National Pollutant Discharge Elimination Program (see **Appendix G** for details on this program)

Stormwater runoff from the more developed areas of the site (Areas 2, 3, 4 and 5 and a portion of Area 8) is combined with industrial wastewater and pumped to the ASB for treatment prior to discharging to Bellingham Bay. A portion of Area 1 also discharges to the ASB for treatment. Other more undeveloped portions of the site (portions of Area 1, 8 and 10) currently drain to Bellingham Bay without water quality treatment, although some oil water separators or catch basin settling facilities exist. The Port of Bellingham typically manages stormwater quality on its properties and facilities through the use of source control measures that are both structural and operational. Source control measures typically include: 1) restriction of uses to cargo marshalling and equipment storage; 2) site house-keeping, including sweeping; and, 3) catch basin cleaning and using catch basins as traps for petroleum hydrocarbons and particulates/sediments.

Water Quality Standards

Surface waters in the State of Washington are regulated for quality by Chapter 173-201A WAC administered through Ecology. State water quality standards are intended to protect all beneficial uses of surface waters, including the protection of aquatic biota. The State Water Quality Standards were last amended on November 20, 2006.

According to Ecology, Bellingham Bay has Designated Uses for Excellent Aquatic Life; Shellfish Harvest; Primary Contact Recreation; and, other uses including Wildlife Habitat, Harvesting, Commerce/Navigation; Boating; and Aesthetics. These use designations provide for excellent quality salmonid and other fish migration, rearing and spawning; clam, oyster, and mussel rearing and spawning; crustacean and other shellfish rearing and spawning; and, other uses through water quality standards (see Table 2-1 in **Appendix G** for the specific standards).

Tidal influences from Bellingham Bay extend less than 0.2 River Mile (RM) into Whatcom Creek, and minor water quality influence from the site at the mouth of Whatcom Creek is possible. For the purposes of this analysis, it is assumed that if marine water quality standards are maintained, there would be no impairment to the very small zone of tidal influence in Whatcom Creek. Typically, freshwater inflow from Whatcom Creek would “lens” over the top of the more saline and, therefore, denser tidal inflow from the Whatcom Waterway. For that reason, and

because of the slight area of tidal influence up into Whatcom Creek, freshwater quality standards for Whatcom Creek are not evaluated herein as a criterion applicable to the site.

Section 303(d) Threatened and Impaired Water Bodies. Section 303(d) of the 1972 Federal Clean Water Act (CWA) requires states to identify and list threatened and impaired water bodies. The CWA requires the list to be updated and submitted for review and approval by the U.S. Environmental Protection Agency (EPA) every 2 years. The purpose of the listing is to identify water body segments where, with technology-based pollution control measures, applicable standard(s) are not expected to be met for the listed water quality parameter(s). Total Maximum Daily Loads (TMDLs) are prepared to restore state waters to all beneficial uses, or to prevent anticipated degradation of beneficial uses (see below). The 2004 Integrated Water Quality Assessment is the current 303(d) listing. Inner Bellingham Bay and the Whatcom Waterway, where the site is located are not listed as impaired for any parameters under the current 303(d) listing. Four parameters were specifically assessed in 2004: dissolved oxygen, fecal coliform, pH and temperature. Dissolved oxygen was categorized as having data insufficient to list the waterbody as impaired, but there still may be concern, because of circulation patterns that may increase the Bay's susceptibility to human-induced causes of lowered oxygen. Ecology determined that fecal coliforms and pH met water quality standards, and that there are insufficient human influences to produce significant temperature increases above naturally caused patterns.

Total Maximum Daily Load (TMDL). A total maximum daily load (TMDL) was prepared for Inner Bellingham Bay by Ecology in 2001, because of the presence of contaminated sediments in the Bay. Ecology regulates sediment cleanup levels as water quality standards; however, this TMDL has no direct consequence for the stormwater quality assessment in this analysis. Remediation of contaminated sediments at the site is assumed to be completed as an independent action separate from New Whatcom redevelopment, but in coordination with redevelopment (refer to **Section 3.5**, Environmental Health for more information on remediation plans for the Whatcom Waterway).

Inner Bellingham Bay/Whatcom Waterway Surface Water Quality

Recent baseline water quality data for Inner Bellingham Bay / Whatcom Waterway in the vicinity of the site, and for runoff from the existing site, are relatively sparse. Ecology collected data at a long-term "core" water quality station from 1990 through the present, but this station is too distant from the site to reasonably characterize water quality near the Whatcom Waterway. Ecology also collected data at a rotational marine monitoring station from the central/west side of Bellingham Bay intermittently from 1973 through 2003. This station is nearer to the site, but still is approximately 5 miles distant and is influenced by the Nooksack River and Puget Sound to a greater extent than waters near the site. The marine monitoring data by Ecology indicate good water quality consistent with marine water quality standards for the parameters that were analyzed (see **Appendix G** for details on the most recent 2003 data, collected monthly in February and April through September, for the station nearest the site).

Water quality data for Bellingham Bay and runoff from various portions of the site were also reported in the *Remedial Investigation Report for the Whatcom Waterway Cleanup Site* (2000). These included salinity, total suspended solids, and heavy metals measured in 1996. This data (shown in Table 2-2 in **Appendix G**) are for a station in inner Bellingham Bay (about 3,000 feet southwest of the ASB) collected during the wet and dry seasons for selected metals. Most values for dissolved copper, lead, and zinc were reported below the detection limits (also shown

in Table 2-2 in **Appendix G**). Based on these data copper, lead and zinc were within state standards during the dry season. The detection limit for dissolved lead in the dry season was higher than the state standard; therefore, compliance with state standards cannot be definitively demonstrated when this sample was taken. However, because dissolved lead was confirmed to be less than 3 µg/L during the wet season when most stormwater discharge occurs, it is unlikely the dry season value, when little stormwater discharge occurs, would have been measured above the standard had the detection limit been lower.

The quality of existing stormwater runoff from two portions of the site can be estimated (as of 1996) using discharge data from the Whatcom Waterway Remedial Investigation (2000) for the Bornstein Seafoods' outfall into the I and J Waterway and the Bellingham Marine Industries outfall into the Whatcom Waterway (both are part of Area 1 in the northern portion of the site (see Table 2-3 in **Appendix G**). Added best management practices and source control measures at these locations and other properties that are part of the New Whatcom site likely have improved stormwater runoff quality since these data were collected, but they are indicative of historic conditions for some portions of the site.

As mentioned previously, the City's Combined Sewer Overflow (CSO) at C Street discharges to Bellingham Bay from Outfall 1 in Area 1. This CSO is regulated under the Bellingham Post Point NPDES Permit. Post Point is the location of the City's Wastewater Treatment Plant facility. There have been three CSO overflow events since 1995, but the City has made substantial system improvements to minimize overflow since that time. It is assumed that CSO overflow would not occur by buildout of the site at 2026, due to likely future improvements.

Groundwater

The primary groundwater system at the New Whatcom site consists of a shallow, non-potable, unconfined aquifer that is tidally influenced near the shoreline areas. There are no known active uses of groundwater (from industrial or domestic wells) at the site.

Information regarding groundwater levels within the site was obtained from previous subsurface investigations. Generally, groundwater has been encountered at about 3 to 12 feet below the ground surface (BGS), with a groundwater flow direction typically toward Bellingham Bay. It is anticipated that groundwater conditions vary depending on local subsurface conditions, the season, recent weather patterns, the tide level in Bellingham Bay, and other factors.

The site is not considered a critical aquifer recharge area, because a significant portion of the site is currently developed and covered by buildings or pavement.

Soil and groundwater contamination is known to exist in portions of the site. With the exception of Area 7, the eastern portion of Area 2, and small isolated areas in Areas 1 and 5, contaminated groundwater would likely preclude the use of infiltration for stormwater runoff (see **Section 3.5**, Environmental Health, for additional information on existing contamination onsite).

3.3.2 Impacts

Introduction

The evaluation of probable impacts of the New Whatcom Redevelopment Alternatives on water resources is based on a number of factors or assumptions. These include: the ASB will no longer serve as a wastewater treatment/discharge facility; the PSE Encogen facility will no longer operate at this site by 2026; and, remediation activities under a Final Cleanup Action Plan for the Whatcom Waterway Cleanup Site, as well as other Cleanup Action Plans for other portions of the site, will be completed and effective prior to or as part of redevelopment (see **Chapter 2** for details).

In addition, the BNSF operates a railroad corridor through or adjacent to the New Whatcom site. Stormwater runoff from the BNSF corridor would be unaffected by redevelopment under Alternatives 1 through 3, although the corridor would be relocated under some of them. As such, BNSF corridor stormwater runoff is not analyzed in detail in this evaluation (i.e. it is assumed that runoff from the railroad corridor would be handled the same as runoff from certain offsite areas that passes through the site, and would be unaffected by redevelopment on the site). Railroad corridor relocation would be subject to specific permitting and environmental review separate from New Whatcom redevelopment, if relocation is undertaken by Washington State Department of Transportation/BNSF in the future.

There are a number of separate actions planned or proposed onsite or in the site vicinity that would occur independently of New Whatcom redevelopment. Water resource impacts from these separate actions are evaluated as cumulative impacts, in combination with the Redevelopment Alternatives (see the **Cumulative Impacts** sub-section for this evaluation). These would include, for example, major improvements to the Bellingham Shipping Terminal to accommodate future shipping and cargo management requirements.

This section evaluates the water resource aspects of the Redevelopment Alternatives at 2026, which is assumed to represent full buildout. At 2016, the area of impervious pollution-generating surfaces for stormwater (i.e. parking lots and roadways, as opposed to rooftops) would be less than at 2026 under all Alternatives. Because maximum stormwater impacts would occur at the time of highest pollution-generating surfaces at the site, the following analysis focuses on the 2026 time period.

Construction Impacts

Stormwater Control

Stormwater runoff during construction would be collected and routed to stormwater quality treatment facilities prior to discharge. Best management practices would be used to prevent impacts associated with erosion and sedimentation. Construction activities would be subject to coverage under Ecology's Construction National Pollutant Discharge and Elimination System (NPDES) permit (see discussion below for more detail).

Water Quality

Construction under any of the EIS Alternatives has the potential to impact water resources adjacent to the site, primarily from erosion and sedimentation, but also from pollutants generated by construction equipment and concrete work that could enter nearby waters. Under Alternatives 1 through 2A, the assumed amount of site work, the potential for construction impacts related to water quality, and the best management practices to manage stormwater to avoid and minimize construction related impacts, would be similar. The potential for construction-related impacts from Alternatives 3 and 4 (the No Action Alternative) would be somewhat less than under Alternatives 1 through 2A. Although Alternatives 3 and 4 would have less area redeveloped in structures, construction of road, pavement and other impervious area would be the same or potentially more (under the No Action Alternative). However, the specific scale of construction activities in any given year through 2026 under Alternatives 1 through 4 cannot be predicted and could be similar. Consequently, this section discusses the nature and likely intensity of construction impacts in any given year under the assumption that the potential impacts from all EIS Alternatives would be similar on a year-by-year basis, and mitigation measures to avoid or minimize such impacts would be similar as well.

Erosion and Sedimentation

The nature of construction that could potentially lead to erosion would include the following: removal of some structures and foundations, placing and compacting structural fill, and any preloading stockpiles. The potential for erosion-related impacts would rise during construction during the wet season, because of the increased difficulty in preventing erosion when soils are saturated and exposed during wet weather. However, construction during relatively rare summer storms could also have the same result. Minor turbidity and minor sediment-related impacts would not have long-lasting adverse impacts. However, short-term water quality impacts and related habitat degradation could occur if discharges were sustained or if significant turbidity reached Bellingham Bay or the Whatcom Waterway. Short-term water quality impacts could include increases in turbidity and suspended and settleable solids. With implementation of TESC BMPs, sediment and turbidity-related impacts would not be significant (see **Appendix G** for details on the TESC BMPs that could be implemented).

Temporary Stormwater, Erosion and Sedimentation Control

Stormwater runoff during construction would be collected and conveyed to applicable stormwater facilities (i.e. temporary sediment trap(s), ponds or vaults) to ensure that significant impacts to adjacent waters do not occur. Prior to or during the first stages of redevelopment, Temporary Erosion and Sediment Control (TESC) best management practices (BMPs) would be implemented and maintained in accordance with a Stormwater Pollution Prevention Plan (SWPPP) that would be prepared as required by the NPDES permit for all of the EIS Alternatives to prevent erosion/sedimentation impacts. The City of Bellingham requires use of the Ecology 2005 Manual to determine appropriate construction BMPs. A construction monitoring plan(s) would be also prepared, as required by the NPDES permit(s). The elements of the construction monitoring plan would follow any NPDES permit requirements issued specifically for the New Whatcom redevelopment. With implementation of TESC BMPs, sediment and turbidity-related impacts would not be significant (see **Appendix G** for details or TESC BMPs that could be implemented). Construction would also conform to the soil management plan related to site remediation (see Section 3.5, **Environmental Health**, for details).

In-Water Work

In-water construction work at the New Whatcom site would consist of the following:

- Under Marina Concept A (to take place under Redevelopment Alternatives 1 through 3), up to 300 steel or concrete piles could be placed to support up to 120,000 square feet of float area and approximately 1,200 square feet of ramp area. Under Marina Concept B (under the No Action Alternative) up to 360 piles, up to 138,000 square feet of float area, and approximately 1,200 square feet of ramp area would be constructed.
- Under Alternatives 1 through 3, approximately 98,700 square feet of over-water wharf and about 560 creosote piles, approximately 1,490 linear feet of bulkhead and associated rip rap covering approximately 1,890 square feet at the south side of the Whatcom Waterway would be removed for restoration of a natural shoreline.
- Under Redevelopment Alternatives 1 through 3 approximately 1,500 linear feet of shoreline would be restored on the south side of the Whatcom Waterway to create 2.4 acres of new natural shoreline and beach, some of which could occur below the mean higher high water line.
- Transient moorage within the Whatcom Waterway would be constructed under Redevelopment Alternatives 1 through 3 with ramps to the shoreline. On the north side of the Waterway, two floats each 1,500 feet long by 20-feet wide with 120-foot by 10-foot ramps are proposed for construction, supported by 64 steel piles. On the south side of the Waterway, a 900-foot by 20-foot float and a 600-foot by 20-foot float would be constructed, each with a 120-foot by 10-foot ramp supported by 64 steel piles.

Minor introduction of fine sediment to the Whatcom Waterway could result from shoreline restoration work, as well as from pile removal and new pile installation. All of this work would proceed in compliance with conditions to be established in federal, state, and local permits. Implementation of mitigation measures described in Section 3.4, **Plants and Animals**, would prevent adverse impacts to habitat.

Petroleum-Based Products and Spill Response and Prevention

The use of heavy equipment during construction could require onsite fueling and limited storage of products, such as lubricating oil and hydraulic fluid, which create a risk for accidental spills. Unintended release of fuels, oil, or hydraulic fluid could contaminate soils and, if untended or uncontrolled, migrate to groundwater or Bellingham Bay or the Whatcom Waterway. The SWPPP for the New Whatcom redevelopment would include control measures and spill response methods to prevent or control construction equipment leakage of fuel, oil or hydraulic fluid. Water quality impacts from construction spills can typically be prevented or limited to very local areas by BMPs and accidental spill provisions, as required by the NPDES permit, and no significant impacts would be expected.

Concrete Work

The construction of foundations, structures, curbs, driveways, sidewalks, and other infrastructure could raise the pH in stormwater runoff if fresh concrete comes into contact with rain during pouring or until cured (pH is a measure of the acidity or alkalinity of a solution; pH of

less than seven are considered acidic, while those with a pH greater than seven are considered basic or alkaline). Curing times vary with weather conditions and concrete types. Marine waters are much less susceptible to pH impacts than fresh waters, because they are very highly buffered, which neutralizes higher pH water when it is introduced. The higher pH runoff would be addressed in the SWPPP for New Whatcom construction, with provisions for management and disposal which could occur separate from other construction runoff (see **Appendix G** for possible measures for addressing stormwater runoff impacted by concrete work, and for cleaning concrete-related equipment). With proper employment of construction BMPs, no long-term or significant turbidity impacts to water resources from concrete work would occur during construction. Monitoring, site cleanup, and onsite inspections, as required by the NPDES permit, would be expected to limit or rectify any problems shortly after their occurrence, or prevent them altogether.

Summary of Potential Construction Impacts Under the EIS Alternatives

With proper control of stormwater runoff during construction, use of BMPs and effective accidental spill response planning, adverse impacts from fine sediment, alkaline (high) pH, and construction-related accidental hazardous material spills would be expected to be avoided or limited to small short-term occurrences with no lasting adverse effects. Some minor introductions of fine sediments to Bellingham Bay or Whatcom Waterway from runoff during both heavy rainstorms and due to shoreline restoration work, piling removal, and new piling installation would be likely; however, stringent implementation of SWPPP measures and countermeasures required by federal, state, and City of Bellingham permits would identify and rapidly correct such occurrences in order to preclude adverse impacts to habitat in the Bay or Waterway.

Alternatives 1 through 3 include the removal and upland disposal of about 560 creosote treated piles. Creosote is a complex mixture of many chemicals and has been found to be potentially toxic to fish, other marine organisms and humans. Therefore, removal of existing creosote treated timber piles would remove a significant source of chronic creosote contamination from the marine environment in the site area. In the long term, such removal would more than compensate for short-term water quality impacts from pile removal and other in-water construction work proposed under the Redevelopment Alternatives.

Operational Impacts

Permanent Stormwater Control System

A permanent stormwater control system would be installed to serve long-term redevelopment. The stormwater control system would be designed and constructed in accordance with standards set forth in the City of Bellingham Stormwater Management Ordinance, which is based on the Ecology 2005 *Stormwater Management Manual for Western Washington* (Ecology Manual). While a specific stormwater system design for the New Whatcom site has not yet been established, a stormwater control plan and certain assumptions have been formulated regarding the likely features and configuration of the stormwater system for purposes of analysis in this Draft EIS. The site-specific stormwater system design and layout would be established as part of the future construction and redevelopment permit process.

The permanent stormwater conveyance system for the site is assumed to be based on a gravity flow system. Pump stations could be used to support temporary systems, but on a long-term basis pump stations would not likely be used, except potentially to collect runoff from small isolated areas. Fill would be placed on the site to create a gradient that would enable a gravity flow system to Bellingham Bay or Whatcom Waterway. System design assumptions and options could be reevaluated at the time of site development based on specific designs, engineering and economic factors. However, it is assumed that any future modifications to system design assumptions would not result in significant environmental impacts.

Redevelopment Areas 1-9 would be served by conveyance systems that outfall to the Bay or waterway. The assumed number and location of new outfall structures is based on the location of the existing outfalls, the assumed road network to serve redevelopment, and the goal of minimizing potential impacts to fish and their habitat. Based on these criteria, eight new outfalls would be constructed/reconstructed to discharge runoff from the redeveloped site (Outfalls A, B, C, E, F, G and H would be newly constructed, and Outfall D would be reconstructed; see Figure 3.3-2 for the locations of these outfalls). Discharge from Area 10 would occur via dispersion trenches.

Since stormwater runoff would be discharged to the Bay, a salt water body, no detention for runoff is required by the Ecology Manual. A stormwater main would extend from each basin contributing to an outfall. This main would typically be constructed within or alongside a primary road. Lateral storm lines would collect runoff in each basin from both sides of the main. The number and location of the outfalls is assumed to be the same for Alternatives 1-3 and the No Action Alternative. The only differences between the alternatives would be the size of the onsite drainage basin and the estimated discharge rates at each outfall. Runoff from Area 10 would not be routed to an outfall structure, but is assumed to either sheet flow into the Bay or be collected and released through dispersion trenches located above the ordinary high water elevation. Existing outfalls to Bellingham Bay, serving offsite stormwater collection systems that pass through the site, would continue to discharge runoff and would not be altered by redevelopment of the site.

Stormwater originating on all pollution-generating surfaces (i.e. roads and parking areas) would be treated for water quality before discharge to the Bay or Waterway. Water quality treatment would be provided to meet Basic Treatment standards designed in accordance with the Ecology Manual (2005), as adopted by the City of Bellingham. Basic treatment could be provided by any type of facility meeting Basic criteria under the Manual, but the most probable facility types would be wet vaults, bioretention facilities (which also qualify as an Enhanced Treatment), biofiltration swales, and filter strips. Stormwater originating on roofs constructed with inert materials (i.e. materials that would not leach zinc or copper) would be conveyed directly to outfalls, because roofs of this type are not considered pollution-generating surfaces.

In addition, the Port anticipates participating in the LEED for Neighborhood Development (LEED-ND) Pilot Program. LEED-ND is a rating system that integrates the principles of smart growth, new urbanism, and green building into the first national standard for neighborhood design. The Port would work with agencies, businesses and organizations regarding potential incorporation of feasible stormwater design and low-impact development strategies into future redevelopment projects, including Innovation and Design Process Points for a Clean Ocean Marina and stormwater design to minimize impervious surfaces and provide innovative water quality treatment techniques.

It is assumed that the permanent stormwater control system would be in place in all of the redevelopment areas by 2016.

Hydrology and Outfall Flow Rates

Based on the assumed amounts and distributions of pervious (i.e. landscaping), impervious pollution-generating (i.e. parking areas and roads), and impervious non-polluting generating (i.e. building roofs) surface areas, stormwater flow rates for each redevelopment area were estimated using the 2005 Ecology Manual's continuous hydrological model WWHM. Tables 1, 2 and 3 in **Appendix F** provide the calculated flow rates and stormwater treatment volumes for each redevelopment area under Alternatives 1 and 3 and the No Action Alternative (the flow rates and treatment volumes for Alternative 2 would fall within the range identified for Alternatives 1 and 3; therefore, stormwater flows were not modeled for Alternative 2). Outfalls would be designed to accommodate the design storm flow rates to prevent any conveyance problems, localized flooding, or scouring of the Waterway and bay.

Permanent Stormwater Control System by Redevelopment Area

Alternatives 1 and 2

The assumed features of the stormwater control system for each redevelopment area under Alternatives 1 and 2 are described below (see **Figure 3.3-2** for a conceptual depiction of the stormwater flow direction/outfalls and Tables 1 and 4 in **Appendix F** for the flow rates at each outfall at full buildout in 2026). The specific features of the stormwater control system would be subject to actual design and/or phasing considerations as part of future redevelopment projects.

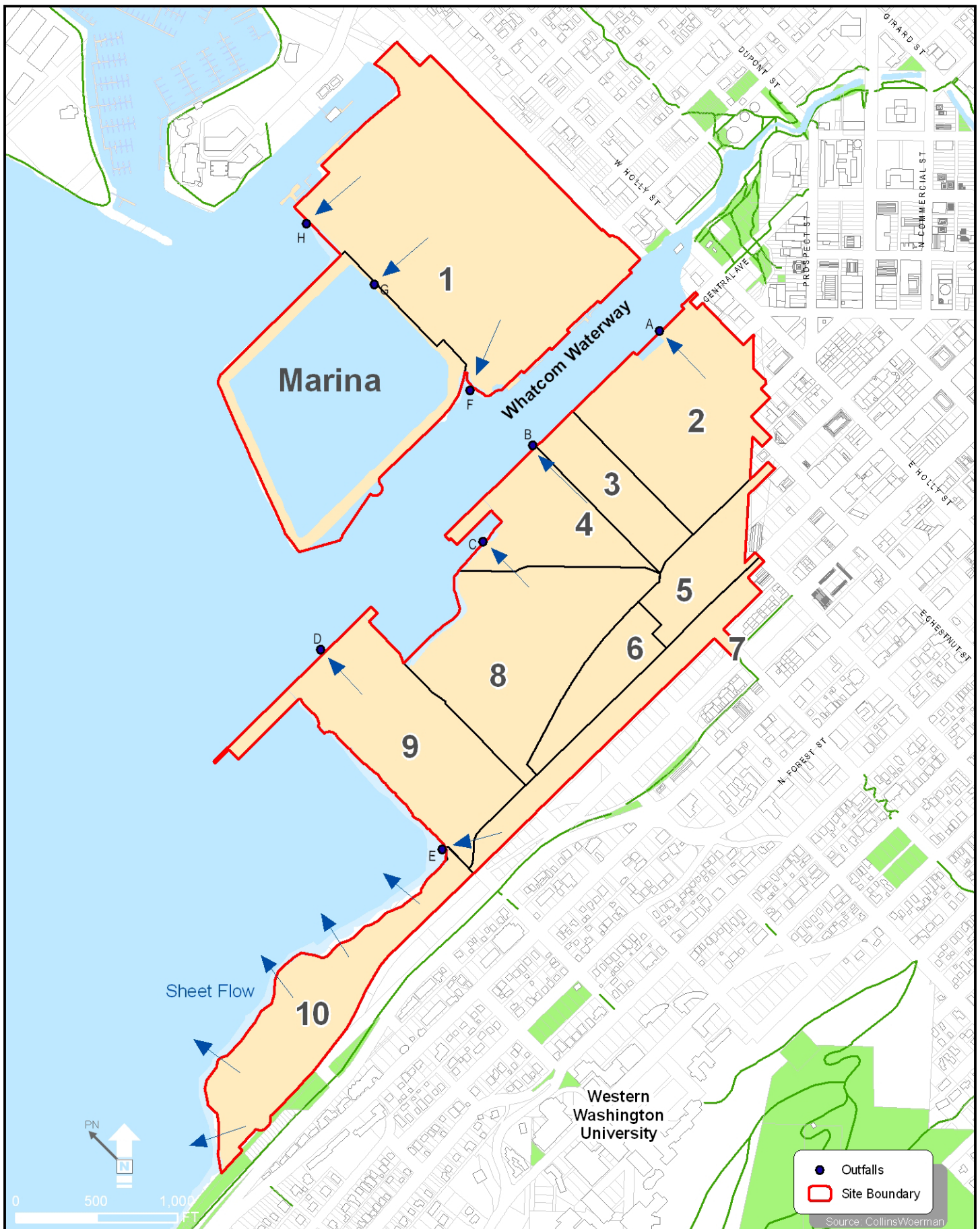
Redevelopment Area 1. The permanent stormwater control system for Area 1 would be based on the three existing roads (C Street, F Street, and Hilton Street) that divide the area. A new outfall is proposed at the west end of each road; Outfall F from C Street, Outfall G from F Street, and Outfall H from Hilton Street. Runoff from the east side of the area would gravity flow west to the outfalls.

Redevelopment Area 2. This area would fall within onsite drainage basins A and B. Runoff from the majority of the area would gravity flow east and north to Outfall A, with the smaller western portion flowing west to Outfall B (the Laurel Street Outfall).

Redevelopment Area 3. Area 3 would be located in drainage basin B. Runoff would gravity flow west to Laurel Street and Outfall B (the Laurel Street Outfall).

Redevelopment Area 4. Area 4 would be in drainage basins B and C. The majority of the area would gravity flow east to Laurel Street and north to Outfall B, with the smaller western portion draining west to Outfall C.

Redevelopment Area 5. With the relocation of the railroad corridor, stormwater runoff from Area 5 is assumed to be conveyed north and split into drainage basins A and B. Runoff from the majority of the area would gravity flow toward Laurel Street and north to Outfall B. Stormwater runoff from the northeastern corner of the area would flow north to Commercial Street where it would be routed to Outfall A.



Redevelopment Area 6. Similar to Area 5, the relocation of the railroad corridor would enable a portion of this area to drain north. Stormwater runoff from this area would be split between drainage basins C and E. Runoff from the eastern portion of the area would gravity flow north to Outfall C. The western portion of the area would drain south to a new Cornwall Avenue storm main. This main would discharge at Outfall E.

Redevelopment Area 7. Stormwater runoff from this area would be split into drainage basins B and E. With relocation of the railroad corridor, stormwater runoff from the eastern portion of this area would drain to the Laurel Street stormwater system and north to Outfall B. The western two-thirds would drain to the north and stormwater runoff would be captured by the new Cornwall Avenue conveyance pipe and routed west to Outfall E.

Redevelopment Area 8. Stormwater runoff from this area would be split into drainage basins B, C, and E. With relocation of the railroad corridor, the southern portion of this area would drain to Outfall C, with a small portion of the area draining to the Laurel Street stormwater system and north to Outfall B. Stormwater from the southwest corner of the area would flow south, into the new Cornwall Avenue conveyance pipe, and then routed west to Outfall E.

Redevelopment Area 9. As this area is redeveloped and stormwater treatment is provided for runoff, it is assumed that a new stormwater conveyance system would be installed. This new system would consolidate the existing Outfalls 5 and 6 (see **Figure 3.3-1**) into a new structure at Outfall 5 (Outfall D). Outfall 7 would be eliminated and runoff from the southern portion of the area would be redirected south to the new Cornwall Avenue system and routed to Outfall E.

Redevelopment Area 10. Runoff from Area 10 would not be routed to an outfall structure. Runoff is assumed to either sheet flow into the Bay or would be collected and released through dispersion trenches located above the ordinary high water elevation.

Alternative 3

The assumed features of the stormwater control system for each redevelopment area under Alternative 3 are described below (see **Figure 3.2** for a conceptual depiction of the stormwater flow directions/outfalls and Tables 2 and 5 in **Appendix F** for the flow rates at each outfall at full buildout in 2026).

Redevelopment Areas 1, 2, 3, 4, 9 and 10. The assumed conveyance system, drainage basin configuration, and outfall locations for these redevelopment areas would be similar to those under Alternatives 1 and 2. The primary difference would relate to the assumed groundcover condition. Alternative 3 would have a different distribution of pervious, impervious pollution-generating surfaces, and impervious non-pollution generating surfaces based on its lower density redevelopment. Therefore, the stormwater runoff rates and volumes would differ from the rates and volumes under Alternatives 1 and 2.

Redevelopment Area 5. Without relocation of the railroad corridor, stormwater runoff from Area 5 is assumed to be conveyed south into drainage basin E. This area would gravity drain toward Cornwall Avenue and its new conveyance system to Outfall E.

Redevelopment Area 6. As under existing conditions, the railroad corridor defines the boundary between basins in this area. The runoff on the north side of the corridor would continue to flow north and runoff on the south side would continue to flow south. Stormwater runoff from this

area would be located in drainage basin E. The site would gravity drain south and west to Outfall E.

Redevelopment Area 7. Stormwater runoff from this area would be located in drainage basin E. The area would slope to the north and runoff would be captured by the new Cornwall Avenue conveyance pipe and routed west to Outfall E.

Redevelopment Area 8. Stormwater runoff from this area would be divided between drainage basins C and E. The majority of the runoff from this area would drain north to Outfall C. The southwest corner of the area would drain south, with flows captured by the new Cornwall Avenue conveyance pipe and routed west to Outfall E.

Water Quality

As mentioned previously, at 2016, the area of pollution-generating surfaces related to stormwater control (i.e. parking lots and roadways, as opposed to rooftops composed of inert materials) would be less than at 2026 under all EIS Alternatives. Therefore, the water quality analysis evaluates the 2026 buildout condition.

To encompass the range of potential water quality impacts under all EIS Alternatives, Alternative 1 (highest density), Alternative 3 (lowest density) and Alternative 4 (No Action) are assessed quantitatively. Alternatives 2 and 2a (medium density) are evaluated qualitatively, relative to the results for Alternatives 1 and 3.

Stormwater Contaminants

Vehicular traffic is the greatest local cause of stormwater pollution. Data for urban stormwater runoff have shown a dramatic decline in lead and all other automotive pollutants from roadways and parking lots since the 1980s due to improvements in automobile design, fuels, automotive emission controls and catalytic converters.

Vehicles typically deposit an array of organic and inorganic pollutants to roadways and parking areas, which accumulate and then wash off with stormwater runoff. These include: heavy metals, petroleum products and solids. Oils and greases contain lead and zinc, tire wear contributes zinc, moving parts of automobiles wear and deposit lead and copper, and brake linings and protective coatings to undercarriages contain copper. Streets themselves degrade to some extent, also contributing suspended sediments to stormwater runoff. Roadways also collect runoff from driveways and landscaping when rainfall is heavy enough to saturate soils. Concentrations of pollutants in stormwater are highly variable by site and are affected by numerous factors, such as traffic and parking characteristics, storm intensity, rainfall pattern within a given storm, amount of time since the last storm, road maintenance (such as street sweeping) and airborne contributions from adjacent land uses.

The following section is a brief overview of stormwater contaminants typical of urban development, such as New Whatcom.

Metals

Three heavy metals are typically used to assess stormwater quality and its impacts: lead, zinc and copper. Lead (Pb) in stormwater runoff on streets is mainly associated with particulates

and mainly originates from wear of moving vehicle parts. The primary source of roadway copper (Cu) is wear from vehicle parts, such as brakes, alternators, and radiators. A substantial source of zinc on roadways is tire wear. Lesser amounts of zinc originate from brake linings and exhaust emissions. Galvanized metal in structures are also a source of zinc in stormwater. Zinc is not considered a carcinogenic metal and federal agencies have no specified health limits for zinc. However, Washington State water quality standards for zinc do exist, and are used in this analysis. The dissolved form of heavy metals is generally the toxic form; dissolved metals are the basis for state water quality standards.

Oil, Grease, and Total Petroleum Hydrocarbons (TPH)

Oil and grease have natural vegetative and manmade components. Total petroleum hydrocarbons (TPH) are a subset of oil and grease derived solely from petroleum products that are more volatile than oil and grease. Natural oils from vegetation generally comprise the remainder. TPH results from automotive spills, leaks, antifreeze, hydraulic fluids, and asphalt leachate.

Total Suspended Solids (TSS)

Suspended solids are comprised of inorganic and organic material and can be transported by, suspended in, or deposited by stormwater. Suspended solids are generally considered one of the most substantial nonpoint source (no single discrete source) contaminants, because other contaminants bind to fine particulates.

Nutrients

Nutrients tend to build up on impervious surfaces. Nitrogen (N) and phosphorus (P) occur in stormwater runoff from: roadways and parking lots, fertilizers used in landscaping and sediment erosion. Nitrogen occurs in numerous forms, including dissolved molecular nitrogen, ammonia-nitrogen (NH₃-N), and nitrate- and nitrite-nitrogen (NO₂-N and NO₃-N, respectively). Phosphorus, unlike nitrogen, readily binds to aluminum and iron in sediments where it is immobilized, although still available, to plant root uptake.

Pesticides: Insecticides and Herbicides

Some landscaping insecticides and herbicides can be transported in stormwater runoff. The mobility and persistence of pesticides varies greatly. Where measured, the appearance of landscape chemicals in urban settings tends to be sporadic and has not been associated with toxic effect to surface waters. Diazinon is a pesticide that has been found at levels considered toxic to aquatic life in a study of single-family homes in King County. However, manufacturing of Diazinon for lawn and garden use ceased, and all sales and distribution stopped in 2003. Other pesticides have come under scrutiny and are now restricted as well.

Fecal Coliforms

Fecal coliforms in stormwater are an inevitable result of development, because natural filtering pathways for stormwater runoff that used to remove them, such as interflow through shallow soils and sheet flow through forest duff and vegetation, are replaced by impervious surfaces and stormwater treatment facilities. Even for commercial developments lacking pet waste sources, wildlife, including birds, generates fecal coliforms that collect on roadways and impervious

surfaces until storms wash them to and through stormwater facilities. Fecal bacteria densities have been shown to be related to percent impervious surface. Fecal coliforms tend to be extremely variable and peak values are immediately responsive to storms, making average stormwater discharge concentrations difficult to predict.

Temperature

The temperature in urban runoff during summer storms is often thought to be warm, because of the influence of impervious surfaces and wet ponds. However, stormwater runoff in western Washington rarely coincides with warmer weather. Most stormwater runoff events, and the vast majority of runoff volume, occur during the cooler weather seasons. The New Whatcom redevelopment is unlikely to employ open wet ponds. The types of facilities that are most likely to be employed all would generate cooler stormwater runoff than wet ponds, because they have no open water component exposed to sunlight (i.e., wet vaults, biofiltration swales, bioretention, and filter strips). Therefore, stormwater discharge temperature is expected to be well within water quality standards and natural background conditions in Bellingham Bay, and is not analyzed further.

Biochemical Oxygen Demand

BOD is a measure of the amount of oxygen required for aerobic micro-organisms to oxidize the organic content of water or sediments under the water over a fixed period of time, usually five days. This type of metabolism consumes oxygen, and thereby lowers the oxygen content in water. Generally, stormwater runoff from mixed use development carries a very low biochemical oxygen demand, unlike for example, runoff from agricultural areas with significant livestock use, or discharge from wastewater treatment plants. Because the EIS Alternatives would all comprise urban mixed use or industrial use, BOD and dissolved oxygen is not included in the quantitative water quality model.

Stormwater Quality Analysis

Within each of the nine new outfall catchments (A through H and Area 10) stormwater quality was determined for each of the five major land use categories that are assumed for the Redevelopment Alternatives: industrial, office/institutional, goods and services, housing, and park/landscaping. All assessments were for buildout conditions assumed by 2026. The stormwater contributions from each category were proportionately mixed, based on assumed square footage of land cover for each land use category (contaminant source area exposed to runoff). Rooftop runoff was assumed to bypass the stormwater treatment facilities and discharge directly to Bellingham Bay, because roof runoff does not require stormwater treatment under the current City of Bellingham code; therefore, the water quality assessment included runoff from parking, sidewalks, landscaping, and access roadways associated with each land use category (see **Appendix G** for details).

Stormwater quality was forecast by the following method:

1. Untreated stormwater runoff quality for each land use category was estimated using data from previous studies at sites with similar land uses. None of the existing industrial use discharges at the site were considered representative of redeveloped industrial use by 2026, because changes in source control and other pollution prevention measures that have taken place since those measurements were taken.

2. Stormwater runoff from different land use categories was proportionately mixed on the basis of contributing area, except for landscaping in each category, the park/open space category, which were proportionately reduced due to lower levels of runoff from these areas.
3. The quality of the combined inflow to the stormwater facility was modified by the expected performance of three possible water quality treatment systems: (1) wet vaults, (2) bioretention/biofiltration/filter strip treatment, and (3) the average of (1) and (2) to represent a 50:50 combined use of the two categories of facilities. Since specific plans for facility types and locations do not exist at this stage, this method was used to estimate a reasonably expected range and probable average storm discharge quality.
4. The forecast quality of the treated discharge (without dilution by rooftop runoff) was directly compared (prior to dilution or mixing in Bellingham Bay) to marine water quality standards and to background water quality in Bellingham Bay (see **Appendix G** for details on the stormwater quality forecast methods and assumptions and the contaminant removal efficiencies of each treatment system).

It is important to note that a conservative approach to parking exposed to rainfall was taken in the water quality analysis. The data used to derive runoff quality were generated from sites with exposed parking, which together with roadways is the greatest source of stormwater contaminants. Under Alternatives 1, 3 and 4 exposed parking would vary, with more inside structured parking structures for Alternative 1, a lesser amount under Alternative 3, and none or very little under Alternative 4. Therefore, the analysis for Alternative 1 and (to a lesser extent) Alternative 3 overstates contaminant concentrations and is conservative (i.e. tends to overstate impacts).

Stormwater Quality Analysis Results

Under Alternatives 1 and 3 at buildout in 2026, the overall quality of stormwater discharged to Bellingham Bay and Whatcom Waterway would be improved over existing conditions (see Table 2-3 in **Appendix G**). This is true whether considered for any of the eight individual outfalls and Area 10 discharge (see **Table 3.3-1** and **3.3-2**) or for the site-wide combined outfalls (see **Table 3.3-3**). It is important to consider that the contaminant concentrations shown in **Tables 3.3-1** and **3.3-2** are conservative, because they were calculated solely based on the treated stormwater discharge from pollution-generating areas. Stormwater contributions to the outfalls from inert rooftops would lower storm contaminant concentrations in discharge to values below these levels due to dilution.

At buildout in 2026, all stormwater parameters would be well within marine water quality standards and well within background conditions in Bellingham Bay, with the exception of fecal coliforms, which are discussed in more detail below. Dissolved zinc would likely be above background at the outfalls (prior to mixing), but would be well within state standards under both Alternatives 1 and 3 before discharge (or mixing) to Bellingham Bay or Whatcom Waterway.

In terms of degree of impact, stormwater constituents would have only slightly higher concentrations under Alternative 1 than under Alternative 3, with the exception of fecal coliforms. Fecal coliform concentrations would be somewhat higher under Alternative 3 than under Alternative 1, because there is more park area assumed at buildout in 2026 under Alternative 1 and parks generally result in fewer fecal coliforms in stormwater runoff. For all other parameters, the difference in water quality between the two alternatives would be slight.

Fecal coliforms could be above state marine water quality standards at all outfalls under Alternatives 1 and 3. Fecal coliform concentrations would be lowest assuming bioretention treatment as discussed in more detail below. Fecal coliforms originate from wildlife, including bird droppings, and thus occur wherever stormwater runoff is generated from impervious surfaces. Pet waste exacerbates fecal coliform concentrations when it is left to run off with stormwater. From a water quality perspective, fecal coliforms are difficult to remove with any water quality facilities, because they readily pass through all saturated flow systems and are small enough for some to pass through filtration-based systems, including bioretention. On a site-wide basis, fecal coliforms after treatment are projected to range from about 38 up to 92 CFU (colony forming units)/100mL under Alternatives 1 and 3 (see **Table 3.3-3**). On an outfall by outfall basis, the model predicts a range of 18 to 111 CFU/100 mL (see **Tables 3.3-1 and 3.3-2**). Discrete sampling by Ecology in 2003 indicated that outer Bellingham Bay had fecal coliform concentrations between 1 to 2 CFU/100 mL, and the standard is for a geometric mean under 14 CFU/100mL. Fecal coliforms were not reported for site runoff under existing conditions, but given that there is no stormwater quality treatment for runoff at present that would remove fecal coliforms, both Alternatives 1 and 3 would be likely to represent a near-comparable source of fecal coliforms to the existing industrial conditions (i.e. residential uses and associated pets may add fecal coliforms, but runoff from all pollution-generating surfaces would be treated, and would thus remove more fecal coliforms than at present).

As noted in **Affected Environment**, the existing concentration of fecal coliforms in Bellingham Bay is low and Ecology considers that fecal coliform standards in Bellingham Bay are being met. Given (1) steps taken by the City of Bellingham to remove CSO influence to Bellingham Bay at the C Street outfall in Area 1 of the site, (2) the Whatcom Creek TMDL to reduce fecal coliform sources in the Whatcom Creek watershed that drains to Bellingham Bay at the Whatcom Waterway, and (3) fecal coliforms in stormwater runoff are discharged without treatment under existing conditions, it is reasonably probable that fecal coliform concentrations in Bellingham Bay near the site would be improved or at worst unchanged by buildout in 2026 with the New Whatcom redevelopment. Since fecal coliforms are within standards in Bellingham Bay at present, it is reasonably probable they would remain so under Alternatives 1 and 3. To the extent bioretention is employed more than vaults or other stormwater treatment facilities with redevelopment, fecal coliform concentrations would occur at the lower ends of the ranges shown in **Tables 3.3-1 and 3.3-2**.

Some non-conservative water quality parameters, including pH, dissolved oxygen, and temperature, are too responsive to buffering, air temperature, and/or receiving water characteristics to be meaningfully modeled on an average annual basis. These are qualitatively appraised below:

- The marine standard for pH is within the range of 7.0 to 8.5, with a human caused variation in the receiving water within a range of less than 0.5 units. Marine waters are very well buffered, (which means seawater chemistry tends to remain pH neutral). In addition, rainfall in contact with cured concrete tends to buffer pH towards the neutral range; therefore, any of the Redevelopment Alternatives would likely maintain relatively neutral in pH at discharge. For both of those reasons, pH in Bellingham Bay and Whatcom Waterway is unlikely to be affected by any of the EIS Alternatives.

Table 3.3-1
ALTERNATIVE 1 TREATED DISCHARGE WATER QUALITY ESTIMATE *Vault (V), Bioretention (B), and 50% of Each (V & B)*

Water Quality Parameter	Units	Existing Condition	Treat-ment	Outfall A	Outfall B	Outfall C	Outfall D	Outfall E	Outfall F	Outfall G	Outfall H	Area 10	State Marine Water Quality Standards
Dissolved Copper	µg/L	<1 – 1.8	V	0.8	0.9	0.6	1.1	0.9	1.6	1.6	1.6	0.5	3.1 ^(A)
			B	0.5	0.5	0.4	0.7	0.6	1.0	1.0	1.0	0.3	
			V&B	0.7	0.7	0.5	0.9	0.8	1.3	1.3	1.3	0.4	
Dissolved Zinc	µg/L	<10	V	17.8	16.3	17.0	27.4	21.2	51.3	51.3	51.3	16.9	81.0 ^(A)
			B	11.7	10.7	11.1	17.9	13.9	33.6	33.6	33.6	11.0	
			V&B	14.7	13.5	14.1	22.6	17.6	42.4	42.4	42.4	14.0	
Dissolved Lead	µg/L	<3	V	0.5	0.6	0.3	0.5	0.5	0.4	0.4	0.4	0.2	8.1 ^(A)
			B	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.1	
			V&B	0.4	0.5	0.2	0.4	0.4	0.3	0.3	0.3	0.2	
Total Ammonia-N	mg/L	0 – 5.18	V	0.12	0.15	0.10	0.12	0.12	0.13	0.13	0.13	0.19	1.6
			B	0.08	0.10	0.07	0.08	0.08	0.09	0.09	0.09	0.13	
			V&B	0.10	0.13	0.08	0.10	0.10	0.11	0.11	0.11	0.16	
Nitrate+Nitrite-N	mg/L	0 – 28.95	V	0.33	0.32	0.22	0.29	0.29	0.13	0.13	0.13	0.15	none
			B	0.26	0.26	0.18	0.23	0.24	0.10	0.10	0.10	0.12	
			V&B	0.29	0.29	0.20	0.26	0.26	0.11	0.11	0.11	0.13	
Total Phosphorus	mg/L	0.06 – 2.39 (ortho-p)	V	0.08	0.09	0.06	0.08	0.08	0.05	0.05	0.05	0.07	none
			B	0.10	0.11	0.07	0.09	0.09	0.07	0.07	0.07	0.08	
			V&B	0.09	0.10	0.07	0.09	0.08	0.06	0.06	0.06	0.07	
Turbidity	NTU		V	3.5	3.6	2.8	3.1	3.5	1.2	1.2	1.2	1.6	5 NTU over back-ground
			B	3.5	3.6	2.8	3.1	3.5	1.2	1.2	1.2	1.6	
			V&B	3.5	3.6	2.8	3.1	3.5	1.2	1.2	1.2	1.6	
Total Suspended Solids	mg/L	19-27	V	2.8	3.2	1.8	4.3	3.8	7.0	7.0	7.0	1.0	none
			B	2.8	3.2	1.8	4.3	3.8	7.0	7.0	7.0	1.0	
			V&B	2.8	3.2	1.8	4.3	3.8	7.0	7.0	7.0	1.0	
Fecal Coliforms	CFU/100mL	1 - 2	V	107	105	106	90	101	40	40	40	88	Geometric mean less than 14
			B	48	47	47	40	45	18	18	18	39	
			V&B	78	76	77	65	73	29	29	29	63	
Total Petroleum Hydrocarbons	mg/L		V	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	No visible sheen (~5.0 mg/L)
			B	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
			V&B	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Oil & Grease	mg/L		V	0.9	1.0	0.7	0.8	0.9	0.5	0.5	0.5	0.8	No visible sheen (~5.0 mg/L)
			B	0.8	0.9	0.6	0.7	0.7	0.4	0.4	0.4	0.7	
			V&B	0.9	0.9	0.6	0.8	0.8	0.5	0.5	0.5	0.7	

Source: A.C. Kindig and Company, 2007

^A A four-day average not to be exceeded more than once every three years on the average (WAC 173-201A).

Table 3.3-2
ALTERNATIVE 3 TREATED DISCHARGE WATER QUALITY ESTIMATE *Vault (V), Bioretention (B), and 50% of Each (V & B)*

Water Quality Parameter	Units	Existing Condition	Treat-ment	Outfall A	Outfall B	Outfall C	Outfall D	Outfall E	Outfall F	Outfall G	Outfall H	Area 10	State Marine Water Quality Standards
Dissolved Copper	µg/L	<1 – 1.8	V	0.7	0.8	0.7	1.0	0.9	1.3	1.3	1.3	0.4	3.1 ^(A)
			B	0.4	0.5	0.4	0.6	0.5	0.8	0.8	0.8	0.2	
			V&B	0.6	0.7	0.6	0.8	0.7	1.1	1.1	1.1	0.3	
Dissolved Zinc	µg/L	<10	V	16.2	17.5	14.9	29.7	18.5	45.1	45.1	45.1	17.3	81.0 ^(A)
			B	10.6	11.4	9.8	19.4	12.1	29.5	29.5	29.5	11.3	
			V&B	13.4	14.4	12.3	24.6	15.3	37.3	37.3	37.3	14.3	
Dissolved Lead	µg/L	<3	V	0.4	0.5	0.5	0.4	0.5	0.3	0.3	0.3	0.1	8.1 ^(A)
			B	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.0	
			V&B	0.3	0.4	0.4	0.3	0.4	0.2	0.2	0.2	0.0	
Total Ammonia-N	mg/L	0 – 5.18	V	0.09	0.13	0.10	0.10	0.10	0.11	0.11	0.11	0.02	1.6
			B	0.06	0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.02	
			V&B	0.08	0.11	0.08	0.09	0.09	0.09	0.09	0.09	0.02	
Nitrate+Nitrite-N	mg/L	0 – 28.95	V	0.25	0.33	0.23	0.23	0.27	0.10	0.10	0.10	0.11	none
			B	0.20	0.27	0.19	0.18	0.21	0.08	0.08	0.08	0.09	
			V&B	0.23	0.30	0.21	0.21	0.24	0.09	0.09	0.09	0.10	
Total Phosphorus	mg/L	0.06 – 2.39 (ortho-p)	V	0.06	0.08	0.06	0.06	0.07	0.04	0.04	0.04	0.03	none
			B	0.08	0.10	0.08	0.08	0.08	0.05	0.05	0.05	0.03	
			V&B	0.07	0.09	0.07	0.07	0.08	0.05	0.05	0.05	0.03	
Turbidity	NTU		V	3.4	3.6	3.4	2.6	3.5	1.3	1.3	1.3	2.0	5 NTU over back-ground
			B	3.4	3.6	3.4	2.6	3.5	1.3	1.3	1.3	2.0	
			V&B	3.4	3.6	3.4	2.6	3.5	1.3	1.3	1.3	2.0	
Total Suspended Solids	mg/L	19-27	V	2.5	3.0	2.8	4.0	3.5	5.9	5.9	5.9	0.4	none
			B	2.5	3.0	2.8	4.0	3.5	5.9	5.9	5.9	0.4	
			V&B	2.5	3.0	2.8	4.0	3.5	5.9	5.9	5.9	0.4	
Fecal Coliforms	CFU/100mL	1 - 2	V	110	108	111	86	106	53	53	53	110	Geometric mean less than 14
			B	49	48	49	38	47	24	24	24	49	
			V&B	80	78	80	62	77	38	38	38	79	
Total Petroleum Hydrocarbons	mg/L		V	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	No visible sheen (~5.0 mg/L)
			B	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	
			V&B	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Oil & Grease	mg/L		V	0.7	0.9	0.7	0.7	0.8	0.4	0.4	0.4	0.3	No visible sheen (~5.0 mg/L)
			B	0.6	0.8	0.6	0.6	0.7	0.4	0.4	0.4	0.3	
			V&B	0.7	0.9	0.7	0.6	0.7	0.4	0.4	0.4	0.3	

Source: A.C. Kindig and Company, 2007

^A A four-day average not to be exceeded more than once every three years on the average (WAC 173-201A).

**Table 3.3-3
COMBINED OUTFALL TREATED DISCHARGE WATER QUALITY ESTIMATE FOR ALL ALTERNATIVES**

Water Quality Parameter	Units	Existing Condition	Alt 1			Alt 3			Alt 4 (No Action)			State Marine Water Quality Standards
			Vault	Bio-retention	Both	Vault	Bio-retention	Both	Vault	Bio-retention	Both	
Dissolved Copper	µg/L	<1 – 1.8	1.0	0.6	0.8	0.9	0.6	0.7	2.0	1.2	1.6	3.1 ^(A)
Dissolved Zinc	µg/L	<10	27.9	18.3	23.1	25.8	16.9	21.3	67.7	44.3	56.0	81.0 ^(A)
Dissolved Lead	µg/L	<3	0.4	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.3	8.1 ^(A)
Total Ammonia-N	mg/L	0 – 5.18	0.13	0.09	0.11	0.10	0.07	0.08	0.13	0.09	0.11	1.6
Nitrate+Nitrite-N	mg/L	0 - 28.95	0.23	0.19	0.21	0.20	0.16	0.18	0.06	0.05	0.05	none
Total Phosphorus	mg/L	0.06 – 2.39 (ortho-p)	0.07	0.08	0.08	0.06	0.07	0.06	0.05	0.05	0.05	none
Turbidity	NTU		2.6	2.6	2.6	2.7	2.7	2.7	0.3	0.3	0.3	5 NTU over back-ground
Total Suspended Solids	mg/L	19 - 27	4.0	4.0	4.0	3.6	3.6	3.6	9.2	9.2	9.2	none
Fecal Coliforms	CFU/100mL	1 - 2	84	38	61	92	41	66	10	5	8	Geometric mean less than 14
Total Petroleum Hydrocarbons	mg/L		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	No visible sheen (~5.0 mg/L)
Oil & Grease	mg/L		0.8	0.7	0.7	0.6	0.5	0.6	0.3	0.3	0.3	No visible sheen (~5.0 mg/L)

Source: A.C. Kindig and Company, 2007

^A A four-day average not to be exceeded more than once every three years on the average (WAC 173-201A).

- Dissolved oxygen is difficult to forecast, because it constantly seeks atmospheric equilibrium, which is a function of temperature. Biochemical oxygen demand (BOD) is a measure of the oxygen-consuming potential in a water sample, and tends to be very low in urbanized stormwater. Facilities such as bioretention, bioswales, and filter strips facilitate atmospheric equilibrium, and BOD in urban stormwater runoff tends to be very low. It is expected that the redevelopment would cause no change in dissolved oxygen in Bellingham Bay or Whatcom Waterway.
- The marine standard for temperature is a 1-day maximum below 16 degrees C. As described in the previous section, stormwater runoff in summer in the Puget Sound lowlands rarely coincides with warmer weather and when it does, data show that stormwater discharges would be within background levels in Bellingham Bay and Whatcom Waterway. To the extent that underground vault treatment systems are utilized on the site under Alternatives 1 and 3, discharge temperatures would be somewhat lower, since solar warming of standing water would not occur.

Some land uses could include shipping, storing, and processing of hazardous materials. To the extent that these are industrial processes, they would be regulated under an industrial NPDES permit, which requires preparation of a SWPPP to indicate how all hazardous materials and process waters would be handled and kept out of the stormwater system. To the extent that they are related to non-industrial processes, use and handling of hazardous materials are regulated by the City of Bellingham and the State of Washington. No specific lists of hazardous materials can be identified at this point; however, all uses would be required to follow applicable local, state, and federal laws to protect public safety and the environment.

Alternatives 2 and 2A represent a range of redevelopment between Alternatives 1 and 3. The water quality modeling results for Alternatives 1 and 3 were similar. Since no significant adverse water quality impacts were forecast under Alternatives 1 and 3, Alternatives 2 and 2A would also be unlikely to result in significant adverse impacts.

Stormwater Facility Differences

Under all EIS Alternatives any stormwater quality treatment facilities meeting Basic Treatment criteria from the Ecology 2005 Manual could be used. The water quality analysis evaluated all stormwater runoff treated by (1) wet vaults, (2) bioretention or biofiltration swales or filter strips, and (3) a 50:50 mix of the two to reflect a combination of facilities that could be constructed. For dissolved metals, ammonia, nitrate-nitrogen, and fecal coliforms, bioretention provides better treatment than vaults, with the 50:50 mix of facilities giving an intermediate result. However as described above, all water quality analysis results with all treatment combinations, would meet state standards for water quality in the discharge assuming no mixing zone, except for fecal coliforms. For fecal coliforms, bioretention provides the best treatment, but data indicate fecal coliforms would not be substantially higher if biofiltration swales or filter strips were employed to any degree.

Potential Low-Impact Development Measures

In recent years, alternative means to maintain natural system hydrology, protect streams from increases in stormwater runoff, and protect wetlands have been developed under the collective term of “low-impact development” or LID. Many of these methods seek to infiltrate stormwater in localized areas where it is generated, for example through bioretention and pervious/porous

hard surface treatments, in order to reduce hydraulic impacts. Other methods seek to reduce stormwater runoff volumes, for example use of vegetation to hold and evapotranspire rainfall between storms, reducing runoff volumes.

The existing New Whatcom site is largely covered in impervious surfaces. Cleanup of contaminated onsite areas would be coordinated with redevelopment and could feature capping of contaminated soils and sediment (see Section 3.5, **Environmental Health**, for more information on planned cleanup methods). Meaningful infiltration of stormwater runoff is not feasible under any of the EIS Alternatives, because of the combined high impervious surface coverage and remediation capping. Since stormwater from the site enters Bellingham Bay or Whatcom Waterway directly after treatment, there are no streams or wetlands downstream needing hydrologic or flow control protection (because there is no potential to affect seawater elevations or currents by the site's stormwater discharge). While LID measures could be employed to some degree, depending on cost and engineering feasibility, there would be no expected benefit from a hydrologic flow control or water quality perspective to downstream aquatic habitat (relative to the stormwater treatment systems analyzed above) beyond those already identified for bioretention, which is an LID form of stormwater treatment. Other LID treatments, such as porous pavement treatments or other semi-permeable treatments, would not be required to mitigate water quality impacts. Nonetheless, to the extent that porous pavements or other semi-permeable treatments are feasible and employed in the future, they would reduce stormwater runoff generation from smaller storms or from the earlier stages of storms. This would allow more runoff to be held on the site and more runoff to be treated in the stormwater facilities. This would be beneficial even though unlikely to have substantial effects on this site for the reasons described above.

Groundwater

There are presently no known active uses of groundwater (from industrial or domestic wells) at the site, and no installation/use of any new water supply wells is assumed as part of site redevelopment; therefore, groundwater use at the site would not change.

The site is not considered a critical aquifer recharge area, because a significant portion of the site is currently developed and covered by buildings or pavements. The assumed redevelopment would typically replace existing impervious surfaces with new buildings and pavements; however, site redevelopment would result in some decrease in impervious surfaces at the site relative to existing conditions. No significant impacts to the shallow aquifer would be anticipated.

Some temporary excavation dewatering could potentially be required for certain structures; however, the effect on groundwater would be temporary and localized. The need for dewatering is expected to be minimal given the limited amount of excavation that would be performed onsite (see **Section 3.1**, Earth for additional information on assumed grading operations). Any deep foundations and ground improvement measures that could be associated with future structures at the site could potentially have some minor and localized effect on groundwater movement; however, groundwater would be diverted around relatively impervious foundations and ground improvement zones, and these structures would not likely impact the overall groundwater flow system at the site.

Groundwater that may be encountered within excavations at relatively shallow depths, particularly during the winter and spring months could be addressed through construction

dewatering to control groundwater flow into certain temporary excavations. However, raising site grades for other site redevelopment purposes would tend to limit the amount of excavation that extend below the groundwater level (refer to Section 3.1, **Earth**, for more information on the assumed grading concept). The process of excavation dewatering could potentially cause some ground settlement and damage to adjacent utilities and structures. The radius of influence of a dewatering system is related to the amount of drawdown of the water table. Because future below-grade construction would likely be limited (currently estimated at about 5 to 10 feet BGS or less for elevation pits), the associated excavations and degree of drawdown required would likely be relatively shallow. Site-specific analyses, performed during the permit stage would determine which structures (existing or future, onsite or offsite) may be influenced by any required excavation dewatering; however, the potential for offsite impacts applies only to excavation dewatering for future redevelopment at the perimeter of the New Whatcom site. Measures to control the potential impact of excavation dewatering include site-specific design at the permit stage and careful control of dewatering systems, minimizing the extent and duration of dewatering, and reinfiltration of extracted groundwater.

Extracted groundwater could potentially contain certain chemical contaminants and/or a high percentage of sediment, which could necessitate special handling, treatment, and/or disposal methods. Monitoring could be employed to assess the quality of dewatering discharges and treatment, if needed, to comply with applicable discharge permits (also see Section 3.5, **Environmental Health**, for information on groundwater contamination and cleanup activities onsite).

Marina Operation

Under all of the EIS Alternatives a marina would be constructed on the site of the ASB. The marina would have up to 460 slips and would include more park and habitat features under Redevelopment Alternatives 1 through 3. Under the No Action Alternative, the marina would have 600 slips. About 2 percent of the slips are anticipated to have live-aboards under all EIS Alternatives.

The Port of Bellingham is considering a marina concept that includes such features as:

- Designing depths and geometry to enable natural flushing circulation;
- Monitoring water quality;
- Limiting live-aboards;
- Providing restrooms, showers, and waste pump-out facilities;
- Providing education materials on clean boating practices and proper waste disposal;
- Providing recycling facilities and disposal sites for waste oil;
- Providing indoor facilities, paint booths, and hull maintenance areas for boat repair and maintenance with systems to capture paint dust and runoff;
- Locating and designing fueling facilities to minimize and contain spills;

- Maintain a fuel spill recovery plan; and,
- Establish no-wake areas to prevent erosion.

The Port would operate the marina under a general Boatyard NPDES permit, if such permit is deemed necessary by Ecology, which would require measures to maintain water quality standards in Bellingham Bay. The Port would use BMPs outlined in Ecology's *Resource Manual for Pollution Prevention in Marinas* (this manual is referenced in **Appendix G** and is available for review at the Port and City of Bellingham). These BMPs could include bilge water discharge management, fuel dock operation and maintenance, hazardous and solid wastes, waste oils and spills, sewage management, and exotic species introduction preventive measures. These BMPs are predominantly focused on preventing contaminant entry into Bellingham Bay, and secondarily on effective cleanup of accidental spills. With implementation of BMPs no significant impacts on water quality would be anticipated.

No Action Alternative

Under the No Action Alternative it is assumed that a centralized stormwater system would be installed, with drainage basins and outfall locations similar to those assumed under Alternative 3. The No Action Alternative would have a different distribution of pervious surfaces, pollution-generating impervious surfaces, and non-pollution generating impervious surfaces than Alternative 3, based on its lower density and industrial uses. Therefore, the stormwater runoff rates and volumes would differ from those under Alternative 3 (see **Tables 3.3-3** and **3.3-4** for the runoff rates at each outfall under the No Action Alternative).

Alternative 4 would have poorer water quality for dissolved metals (i.e. higher concentrations of dissolved metals) than under the other Redevelopment Alternatives, although water quality would still be within state standards and, except for zinc, within or near background levels (see **Tables 3.3-3** and **3.3-4**). Fecal coliforms would be lowest under this alternative, because industrial use has fewer human-induced sources of fecal coliforms than all other land use categories except parks. Unlike under the Redevelopment Alternatives, fecal coliforms would likely be within state water quality standards no matter what type of Basic stormwater treatment facility was employed for this alternative. Further, fecal coliform concentrations would be reduced under this alternative relative to existing conditions, because future treatment of stormwater by Basic water quality treatment facilities is assumed, as compared to the little or no treatment that currently exists.

Cumulative Impacts

Separate actions and background projects that could occur independent of New Whatcom redevelopment include changes to the Bellingham Shipping Terminal (BST), such as two new piers to accommodate large vessels, improvements to replace bulkheads and piers in-kind on the north side of the Whatcom Waterway and along the I and J Waterway, and an over-water trail south to link to Boulevard Park. These actions would involve in-water work to remove/replace/repair in-water and over-water structures, and the addition of two new piers for large vessels at the BST. These actions could influence water quality in the short-term (for replacement and construction) and long-term (operational changes at the BST). These projects are considered for cumulative water-related impacts with the New Whatcom redevelopment below.

Table 3.3-4
NO ACTION ALTERNATIVE TREATED DISCHARGE WATER QUALITY ESTIMATE (*Vault (V), Bioretention (B), and 50% of Each*)

Water Quality Parameter	Units	Existing Condition	Treat-ment	Outfall A	Outfall B	Outfall C	Outfall D	Outfall E	Outfall F	Outfall G	Outfall H	Area 10	State Marine Water Quality Standards
Dissolved Copper	µg/L	<1 – 1.8	V	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.1 ^(A)
			B	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
			V&B	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	
Dissolved Zinc	µg/L	<10	V	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	81.0 ^(A)
			B	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	
			V&B	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	
Dissolved Lead	µg/L	<3	V	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	8.1 ^(A)
			B	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
			V&B	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Total Ammonia-N	mg/L	0 – 5.18	V	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1.6
			B	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	
			V&B	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	
Nitrate+Nitrite-N	mg/L	0 – 28.95	V	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	none
			B	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
			V&B	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Total Phosphorus	mg/L	0.06 – 2.39 (ortho-p)	V	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	none
			B	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
			V&B	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Turbidity	NTU		V	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	5 NTU over back-ground
			B	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
			V&B	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Total Suspended Solids	mg/L	19-27	V	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	none
			B	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	
			V&B	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	
Fecal Coliforms	CFU/100mL	1 - 2	V	10	10	10	10	10	10	10	10	10	Geometric mean less than 14
			B	5	5	5	5	5	5	5	5	5	
			V&B	7	7	7	7	7	7	7	7	7	
Total Petroleum Hydrocarbons	mg/L		V	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	No visible sheen (~5.0 mg/L)
			B	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
			V&B	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Oil & Grease	mg/L		V	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	No visible sheen (~5.0 mg/L)
			B	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
			V&B	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	

Source: A.C. Kindig and Company, 2007

^A A four-day average not to be exceeded more than once every three years on the average (WAC 173-201A).

In-water construction that would remove and replace bulkheads and piers could have short-term impacts similar to those discussed above for proposed in-water and marina construction activities. Similar mitigation measures and permit requirements and conditions would apply to these separate actions as would apply to New Whatcom redevelopment; such measures and requirements would be expected to have similar effectiveness. To the extent that separate actions involving in-water construction occur at the same time as New Whatcom redevelopment in-water construction, separated but more numerous areas of Bellingham Bay or Whatcom Waterway could have concurrent short-term sediment influences on water quality. Mitigation measures would be expected to limit all short-term construction influences within the immediate area of each construction activity; therefore, no overlap of construction impacts between the separate actions and New Whatcom redevelopment would be expected. If in-water construction under the separate actions would occur at different times from the New Whatcom in-water construction, there would be no cumulative impacts on water quality.

In the longer term, the addition of new piers to the BST may change operations at that Terminal. Ecology would determine if any changes are warranted by improvements to the Terminal as part of the NPDES permitting for the facility, which could include an individual Shipyard NPDES permit and associated requirements to prevent adverse impacts to water quality and maintain water quality standards. Changes to operations at BST would not be expected to have adverse cumulative impacts with New Whatcom redevelopment. Water quality in stormwater runoff from the New Whatcom site would improve from existing conditions under all EIS Alternatives, and NPDES permit requirements for the BST would require maintenance of state water quality standards in stormwater runoff from that facility.

Beyond the BST, other planned development in the site area includes the Bellwhether on the Bay Phase II, 1010 Morse Square and Bayview Towers; see **Chapter 2** for more information on these offsite planned projects. Similar to New Whatcom redevelopment, these projects would be required to include stormwater control systems designed in accordance with the Ecology Manual (2005) and City of Bellingham requirements. Therefore, no significant cumulative impacts on water resources would be expected.

3.3.3 Mitigation Measures

The following features would be incorporated into New Whatcom redevelopment to reduce or offset the potential impacts of redevelopment on water resources:

Construction

- Temporary erosion and sedimentation control measures would be employed during site construction, per a National Pollution Discharge Elimination System (NPDES) permit from Ecology, the *Ecology 2005 Stormwater Management Manual*, and City of Bellingham requirements (see Tables 3.1 and 3.2 in **Appendix G** and Section 3.1, **Earth** for a list of specific measures that could be implemented).
- A Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented, as required by the NPDES permit. The SWPPP would contain specific best management practices (BMPs) for each construction season.
- Construction entrances would include truck wheel washes in addition to quarry spalls to

dislodge sediment, if warranted by truck traffic and soil export volumes. Streets would also be routinely cleaned during construction.

- Specialized products, such as Chitosan or Electrocoagulation, and other water treatment systems could be used if warranted and approved by Ecology under the NPDES permit.
- BMPs for concrete work would include the following:
 - Cement trucks wash water would not be disposed onsite, but would be returned to the offsite batch plant for recycling as process water;
 - New concrete work would be covered and protected from rainfall until cured; and,
 - Monitoring of pH would occur in areas with active concrete work.
- In-water construction would employ measures established in federal, state, and local permits to prevent adverse impacts to water quality (see Section 3.4, **Plants and Animals**, for more information).
- The generation of dissolved zinc and copper would be minimized through prohibitions on the use of unsealed external copper and galvanized metal, except where required by code and/or necessary for public safety and/or where no feasible alternative exists. Zinc and copper source controls would extend to rooftops, which would be constructed of inert materials so that roof runoff would bypass water quality treatment facilities.
- Measures to control any impacts of excavation dewatering on groundwater could include: site-specific design and careful control of dewatering systems, minimizing the extent and duration of dewatering, and reinfiltration of extracted groundwater.
- Monitoring could be employed to assess the quality of any dewatering discharges and treatment, if needed, to comply with applicable discharge permits.

Operation

- Stormwater would be managed per the requirements of the Ecology Manual (2005), as adopted by the City of Bellingham. All stormwater runoff from pollution-generating surfaces would be collected and treated to Basic water quality treatment standards, per the Ecology Manual (2005), as adopted by the City of Bellingham.
- The design and construction of all stormwater collection, treatment and discharge systems and facilities (including conveyance and outfall sizing) would comply with applicable City of Bellingham and Ecology requirements.
- The Port anticipates participating in the LEED for Neighborhood Development (LEED-ND) Pilot Program, to the extent possible. The LEED-ND includes guidelines for stormwater design and low-impact development which could potentially be implemented as part of future redevelopment projects.
- Fecal coliforms in stormwater runoff could be minimized by:
 - Emphasizing pet waste removal by visitors and residents to the parks; and,
 - Discouraging feeding and roosting of gulls and waterfowl on the site.

- Fecal coliform removal could be maximized by encouraging the use of bioretention and discouraging use of biofiltration swales and filter strips in the stormwater control system, where possible.
- Marina source control and operational BMPs would be employed to reduce potential water quality impacts to Bellingham Bay per Ecology's *Resource Manual for Pollution Prevention in Marinas*.

3.3.4 Significant Unavoidable Adverse Impacts

During construction of in-water structures (under Alternatives 1 through 3 and the No Action Alternative) and removal of creosote piles and wharf structures on the south side of Whatcom Waterway, some sediment release to Bellingham Bay or Whatcom Waterway waters in the immediate vicinity of the construction activity would be expected. The turbidity from these short-term releases would be controlled and minimized by implementation of BMPs, but would not be eliminated.

It is probable that during some storm events, fecal coliforms from stormwater runoff in the immediate vicinity of the onsite outfalls would exceed state water quality standards, although there may be little or no change from the existing stormwater discharges for fecal coliforms. Mitigation measures to remove and control wildlife and pet sources of fecal coliforms would be expected to offset this potential to a large degree, but may not remove it altogether. Discharges of fecal coliforms in stormwater discharge under all EIS Alternatives would not be expected to cause exceedances of state water quality standards for fecal coliforms in Bellingham Bay under any circumstance, and no significant unavoidable adverse impacts would result.