CHAPTER 5.9 Water Resources

Construction activities such as replacing culverts or installing retaining walls could temporarily alter the quality or flow of surface water bodies or groundwater in the study area. The completed project will add 24.2 acres of new pollution-generating impervious surface (PGIS) to the study area and treat a total of 62.3 acres of PGIS. Stormwater associated with impervious surfaces will be treated for pollutants and controlled for flow rate increases. The project will have minimal or no effect on groundwater.

Please refer to the Water Resources Discipline Report in Appendix S for additional information about the water resources analysis.

This chapter addresses water resources, including surface water bodies (e.g., lakes, rivers, and streams), stormwater, and groundwater. It addresses water quantity and water quality under the Build Alternative and No Build Alternative.

Why are water resources considered in this EA?

The Clean Water Act, passed in 1972, protects water resources in the U.S. The act was created in response to widespread public concern about controlling water pollution and protecting America's water bodies. The U.S. Environmental Protection Agency (USEPA) is the federal agency responsible for implementing and enforcing the Clean Water Act. In many cases, USEPA has delegated its authority and implementation duties to state agencies. USEPA has delegated the Washington State Department of Ecology (Ecology) to manage and protect Washington's water resources. In doing so, Ecology has adopted laws that regulate the allowable concentration of toxic substances allowed in stormwater and surface water bodies. Ecology has also developed design guidelines for constructing Ecology-approved stormwater treatment and detention facilities.

Other state and federal agencies – the Washington State Department of Fish and Wildlife (WDFW); the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries); the U.S. Army Corps of Engineers (USACE); and the U.S. Fish and Wildlife Service

What are water resources?

The term *water resources* refers collectively to surface water bodies (for example, lakes and streams), stormwater, and groundwater.

Surface water bodies include lakes, streams, ponds, and wetlands.

Stormwater includes stormwater runoff, snowmelt runoff, and surface runoff and drainage. Drainage can flow across the ground in open ditches, in pipes, or below the surface.

Groundwater is water found underground in the saturated zone. The saturated zone is the layer of soil that is soaked, or loaded to capacity with water.

(USFWS) – have developed water quality rules and guidelines that protect wetlands and fish and wildlife resources.

In addition to state and federal agency regulations, the cities and towns in the study area have adopted codes and policies that apply to water resources, wetlands, and critical areas in the project vicinity.

How did WSDOT evaluate water resources for this project?

What is the Ecology 303(d) list?

The 303(d) list identifies surface water body segments (lakes, streams, and ponds) with degraded water quality. Ecology assembles available water quality data and publishes this list, as required under Section 303(d) of the federal Clean Water Act.

What is the Ecology 305(b) Report?

Ecology prepares the Section 305(b) Report to inform the U.S. Congress and the public about the current condition of the state's waters. This report describes the status of *all* waters in the state, while the 303(d) list reports only the *impaired* waters in the state.

The project team identified surface water resources in the study area by collecting and reviewing maps and government reports. The team combined several maps using geographic information system (GIS) software to create a single project base map that incorporated data on streams, lakes, wetlands, wetland buffers, soil types, floodplains, floodways, culverts, and subbasin and watershed boundaries.

The team also consulted with state and local agencies to obtain important information about study area surface water resources and stormwater. Local agencies identified existing flooding problems in the study area. The team obtained water quality information from Ecology's 303(d) list and Washington's Water Quality Assessment Report (also called the 305[b] Report).

WSDOT reviewed information about the existing stormwater system on SR 520 and obtained information from other agencies about hazardous materials, edges of existing pavement lines, and the quantity and quality of treated stormwater in the study area.

An **aquifer** is a geologic stratum of saturated materials with the capability of yielding useable quantities of groundwater on a long-term, sustainable basis.

Recharge areas are those in which water (precipitation, surface water, or groundwater) enters and adds to an aquifer.

For groundwater, the team evaluated information on aquifers, recharge areas, public water supply wells, and domestic/residential water wells.

How does water flow through the study area?

Water flows through the study area via several pathways (see Exhibit 5-36):

- In surface water bodies such as streams, ponds, wetlands, and lakes.

- Across the surface as stormwater runoff, where it flows directly to surface water bodies, or is conveyed to surface water bodies in open ditches or drainage pipes.
- Below ground in soil and/or in the groundwater.

Although surface water bodies, stormwater, and groundwater are typically managed and regulated independently, they are interconnected and interdependent. Exhibit 5-36 shows how stormwater can move into and out of surface water bodies, runoff can percolate into soil and become groundwater, and how groundwater can move into and out of surface water bodies.

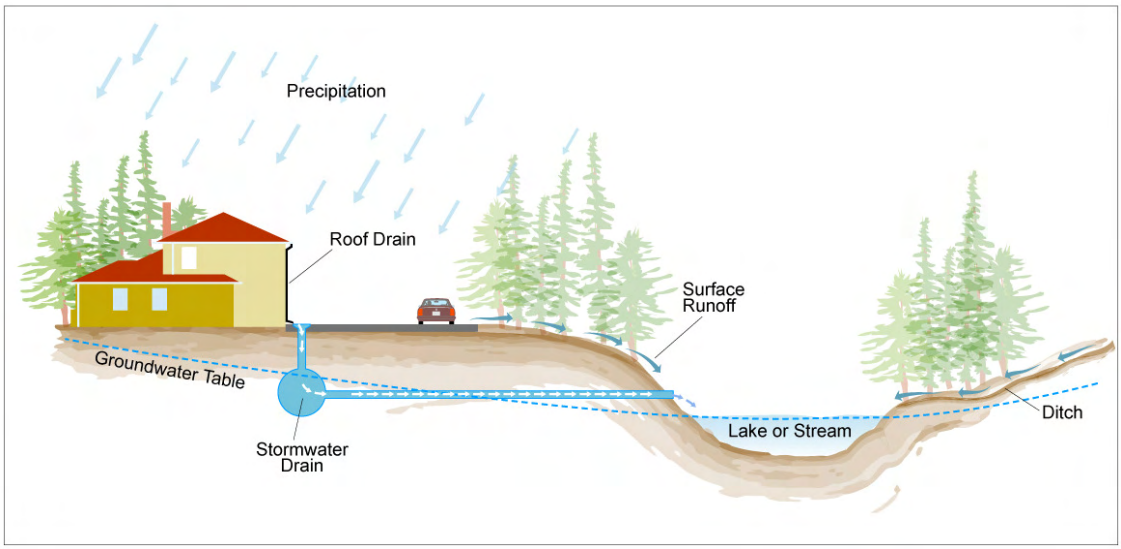


Exhibit 5-36. Pathways for Water Moving through the Study Area

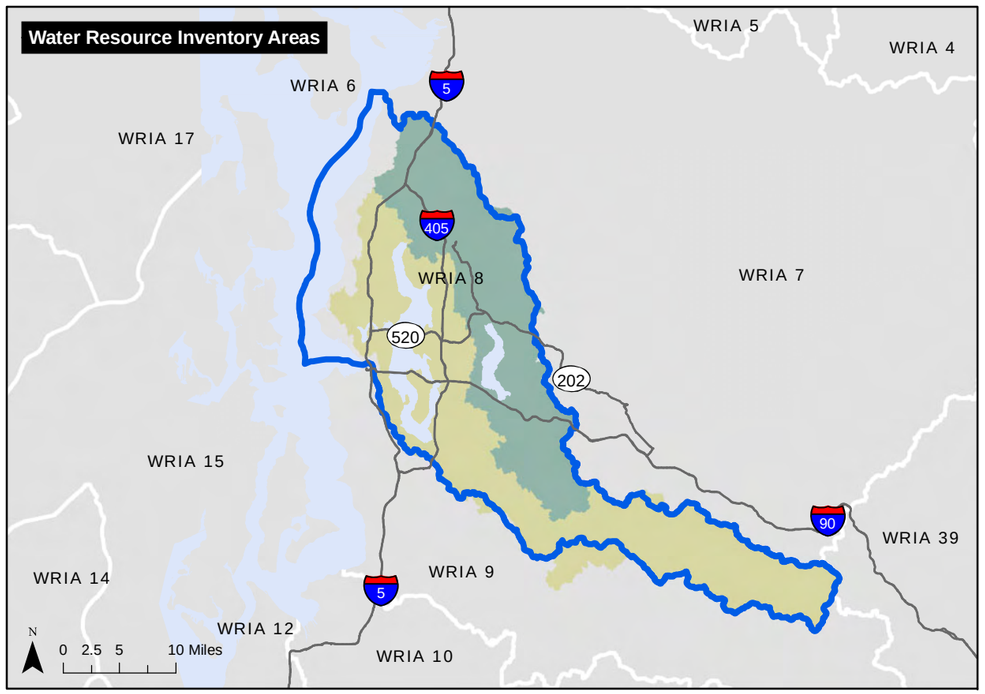
What water resources are present in the study area?

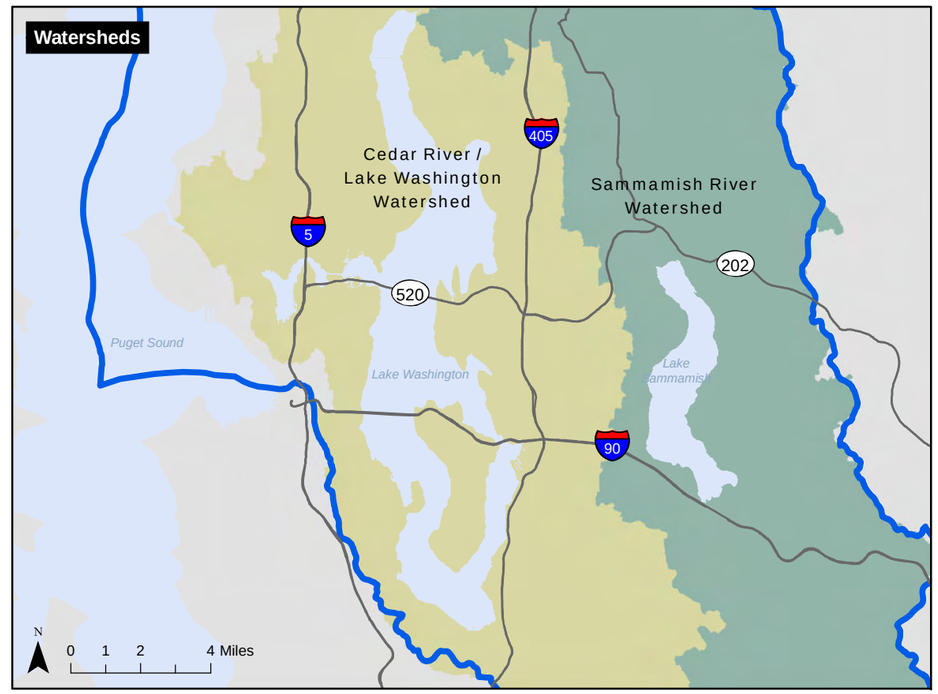
Surface Water

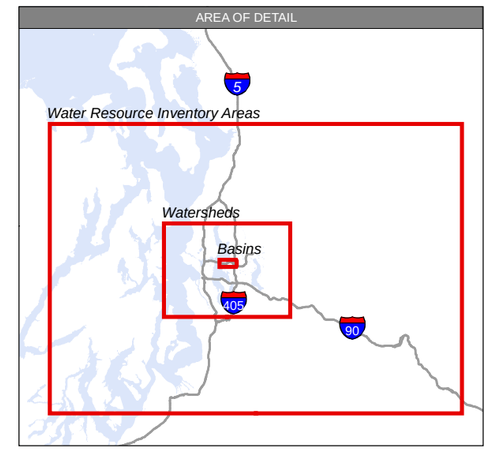
Exhibit 5-37 shows the surface water bodies in the study area: Lake Washington, Fairweather Creek, Cozy Cove Creek, and Yarrow Creek (including the east and west tributaries). These water bodies are located in developed suburban areas where impervious surfaces cover 30 to 33 percent of the stream basins.

How does impervious surface affect surface water resources?

Impervious surfaces such as rooftops, sidewalks, roads, parking lots, and compacted urban soils prevent rain from infiltrating soils as it would naturally. These barriers shift more water into creeks and lakes, and can increase the transport of pollutants from land to adjoining surface waters.







Water Resource Inventory Area 8 Boundary

Water Resource Inventory Area

Watershed

Cedar River / Lake Washington Watershed

Sammamish River Watershed

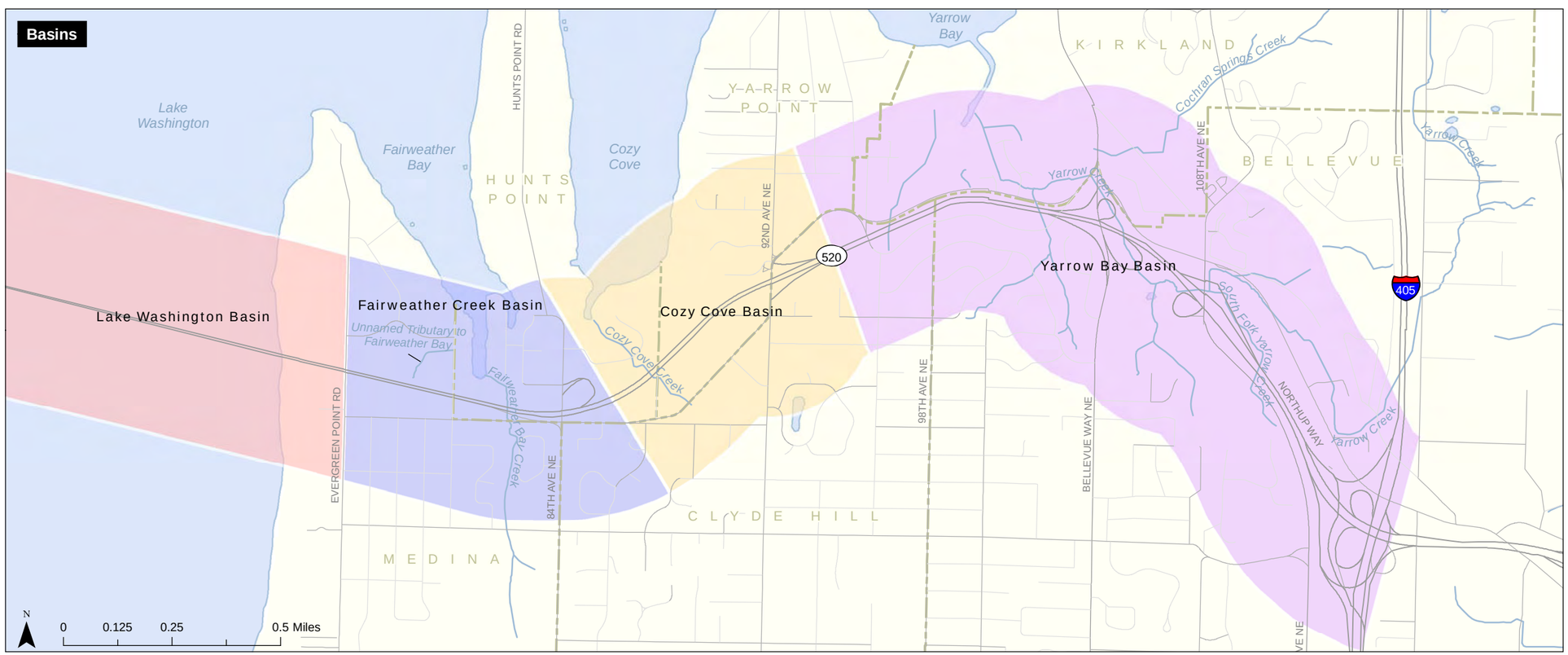
Creek Basin

Lake Washington

Fairweather Creek

Cozy Cove

Yarrow Bay



Source: King County (2008) GIS Data (Highways, Water Bodies), Washington Department of Ecology (2000) GIS Data (WRIA). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-37. **Location of Affected Watersheds, Basins and Creeks**

Medina to SR 202: Eastside Transit and HOV Project

The Federal Emergency Management Agency (FEMA) flood rate insurance map for the study area does not show any 100-year floodplains associated with Fairweather Creek or Cozy Cove Creek. Fairweather Creek and its historical floodplain are currently disconnected because the stream is confined by high, steep banks along much of its length (Anderson et al. 2001). The FEMA flood insurance rate map for Yarrow Creek shows no floodplains for the section of stream located in the study area.

The **100-year floodplain** is the area that would be inundated by a flood having a 1-percent chance of occurring in any given year.

Overall, stormwater management in the study area takes place as follows:

- Currently, stormwater runoff discharged from SR 520 is not treated prior to discharge.
- Stormwater runoff in the study area discharges to either Lake Washington or to a series of small streams that ultimately drain to Lake Washington, the major receiving water body.

How do state agencies regulate stormwater management and increases in impervious surface?

Current state regulations require new and redeveloping construction projects to treat stormwater and sometimes control the flow of stormwater from existing and new impervious surfaces.

Groundwater

In Washington, all groundwater is considered a potential drinking water source, and the State regulates the quality of this resource to protect it from degradation. However, the use of groundwater as a drinking water supply is limited within the study area. Seattle Public Utilities supplies most of the drinking water in the study area from three primary sources—Chester Morse Reservoir, South Fork Tolt Reservoir, and the Highline Well Field (located in the Renton area). Although there are water wells of record in the area, they are generally located in areas supplied by municipal water and are most likely not used for drinking water supply.

Groundwater in the study area is contained within aquifers overlain by other geologic deposits. The aquifers are exposed (and thus susceptible to contamination) at 80th Avenue NE and 86th Avenue NE, at 96th Avenue NE, and between 95th Avenue NE and Bellevue Way NE/104th Avenue NE.

What is the existing condition of water resources in the study area?

Surface Water

Cozy Cove Creek

In general, the overall quality of surface water bodies in the study area is listed by Ecology as impaired because of high temperatures and bacterial contamination.

- **Lake Washington.** As indicated on the 2009 303(d) list, Lake Washington exceeded the water quality criteria for fecal coliform in a section adjacent to and just north of Hunts Point.
- **Fairweather Creek.** Ecology placed Fairweather Creek on the 303(d) list because the stream exceeded the water quality criteria for fecal coliform, dissolved oxygen, and temperature (Ecology 2009).
- **Cozy Cove Creek.** Little is known about the water quality of Cozy Cove Creek because this stream was not rated in the 303(d) water quality classification system. The stream receives runoff from landscaped lawns, residential streets, and SR 520.
- **Yarrow Creek.** Yarrow Creek is on the Ecology 303(d) list because it exceeds the water quality criteria for dissolved oxygen and fecal coliform (Ecology 2009).

Main Stem of Yarrow Creek

Groundwater

In general, groundwater quality in the study area is good and suitable for most purposes (Vaccaro et al. 1998).

How will project construction affect water resources?

Surface Water

The team evaluated temporary construction effects on surface water bodies by determining construction actions that might disturb soil and in-water sediments, and by evaluating the potential for accidental spills of hazardous materials.

Under the Build Alternative, water quality in Eastside streams could be temporarily affected by construction activities such as replacing or extending culverts and installing retaining

walls. Construction activities occurring within or directly adjacent to streams could temporarily increase turbidity levels.

Turbidity is a condition caused by suspended sediments or floating material that clouds the water and makes it appear dark and muddy.

Groundwater

Potential effects on groundwater during construction of the Build Alternative will be related to the disturbed area footprint during construction or dewatering activities (see below).

Construction of roadways and bridges could temporarily alter the flow of groundwater. For example, groundwater could be affected by the use of dewatering wells to lower groundwater levels to allow subsurface construction in a dry environment. This could cause a temporary reversal of groundwater flow toward the construction area; however, these effects will be localized and temporary.

How will project operation affect water resources?

Surface Water

Construction and operation of the Build Alternative will result in an increase of 24.2 acres pollution-generating impervious surfaces (PGIS). The project will treat 24.2 acres of new PGIS and 38.1 acres of existing PGIS, for a total of 62.3 acres of PGIS. The 62.3 acres of PGIS will be treated for stormwater pollutants and controlled to prevent flow increases, as required by the *Highway Runoff Manual* (WSDOT 2008a). Treatment of 62.3 acres of PGIS will improve water quality of the receiving water bodies in the study area.

Pollution-generating impervious surfaces (PGIS) are impervious surfaces that are a source of pollutants in stormwater runoff. Study area PGIS includes roadways that receive direct rainfall or the run-on or blow-in of rainfall.

Groundwater

The Build Alternative will have minimal or no effect on the quantity or quality of study area groundwater.

The increased impervious surface associated with the Build Alternative will also have minimal or no effect on groundwater recharge because the roadway will be only a fraction of the size of the total recharge area of the groundwater system. The size of the associated groundwater basins is unknown, but typically groundwater basins are much larger than surface water basins.

What will happen to water resources if WSDOT does not build this project?

Surface Water

Because no construction will occur under the No Build Alternative, no effects to water resources would result. Under the No Build Alternative, stormwater runoff from SR 520 within the study area would continue to be discharged to streams with no treatment or flow control. Compared with existing levels, the higher traffic volumes that would occur between 108th Avenue NE and I-405 between 2002 and 2030 could increase pollutant loading (for example, copper and zinc from automobile tires and brakes) from project corridor pavement.

Groundwater

Because no construction would occur under the No Build Alternative, no effects to groundwater would result. There would be no change in the quantity or quality of study area groundwater under the No Build Alternative. The No Build Alternative would not change the amount or quality of stormwater percolating to the groundwater.