

SECTION 3 STUDY APPROACH

What are water resources?

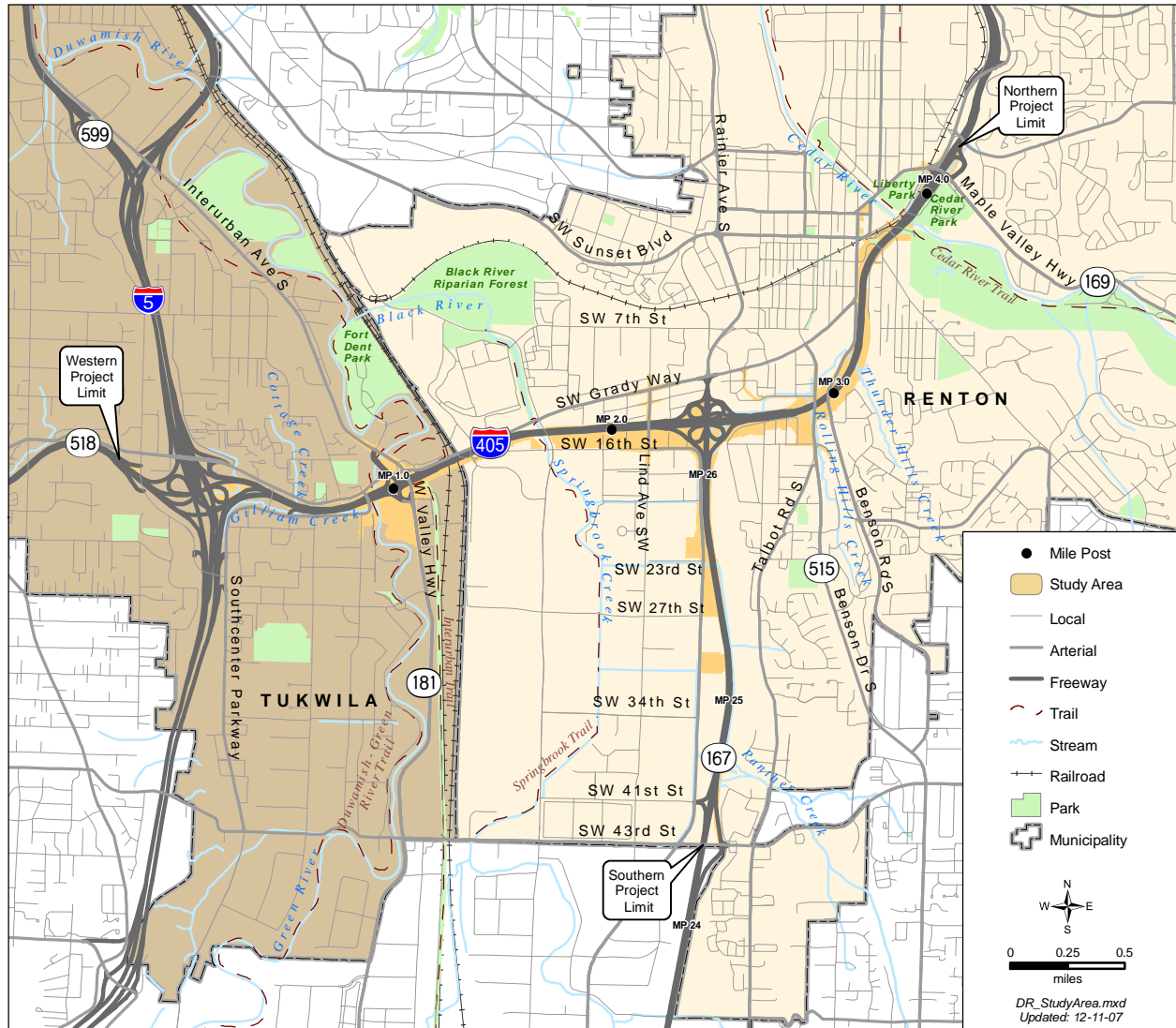
In this report, water resources include surface water flow, surface water quality, floodplains, and groundwater. For the purposes of this report, surface water flow is defined as the water flow or current in a river or stream. Surface water quality is the condition or amount of pollutants in a river or stream. A floodplain is the area bordering river channels that becomes inundated during flood flows. Groundwater is water below the ground surface and is further defined in this report's glossary.

What is the study area and how was it determined?

The I-405 Team used the construction footprint of the Tukwila to Renton Project as the focus of the study area for water resources. Baseline conditions for these water resources are presented in Section 4 of this report. Within the study area, the baseline condition also includes the Phase 1 Built Alternative detailed in the *I-405 Renton Nickel Improvement Project, I-5 to SR 169, Environmental Assessment*.

The study area is the area affected by proposed improvements to I-405 and SR 167 in addition to those areas affected by other necessary project elements, such as stormwater treatment facilities, noise walls, surface street improvements, and staging areas for construction equipment. The study area includes existing and proposed new WSDOT right-of-way. Along streams and rivers, the study area extends 300 feet upstream and 1,320 feet (1/4 mile) downstream so that effects to these waterbodies can be assessed. Streams and rivers in the study area are located in Water Resource Inventory Areas (WRIA) 8 and 9. In total, the study area encompasses approximately 200 acres as shown in Exhibit 3-1.

Exhibit 3-1: Study Area (stream and river 300 feet upstream and 1,320 feet downstream boundary not shown)



What policies or regulations are related to effects on water resources?

Several policies and regulations are related to the Tukwila to Renton Project and its effects on water resources. Authority for implementing these policies and regulations is delegated to different agencies. The following list includes potential policies and regulations related to the Tukwila to Renton Project followed by the agency with authority:

- National Environmental Policy Act (NEPA) – United States Environmental Protection Agency.

- Federal Clean Water Act (CWA) – Washington State Department of Ecology (Ecology) and U.S. Army Corps of Engineers (Corps)
- State Environmental Policy Act – Ecology
- Washington State Shoreline Management Act – Ecology
- King County Critical Areas Ordinance for shorelines and wetlands
- King County Floodplain Ordinance and City of Tukwila and Renton Critical Areas Ordinances. The King County, Tukwila, and Renton floodplain ordinances include a provision that requires compensatory mitigation for flood storage that is lost due to fill in jurisdictional floodplains.

Related to these policies and procedures are several permits. The following list includes potential water resource permits that may be required to construct the Tukwila to Renton Project followed by the agency with authority:

- Joint Aquatic Resources Permit (JARPA)
 - Section 404 of the CWA and Section 10 of the Rivers and Harbors Act – Corps
 - The Bridge Act Permit and Private Aids to Navigation – U.S. Coast Guard
 - 401 Water Quality Certifications – Ecology
 - Hydraulic Project Approval (HPA) – Washington Department of Fish and Wildlife
 - Aquatic Resources Use Authorization Notification – Washington State Department of Natural Resources
- Shoreline Conditional Use permit – Ecology
- Shoreline substantial development and variance permits – Cities of Tukwila and Renton
- National Pollutant Discharge Elimination System (NPDES) – Ecology

How did we collect information on water resources for this report?

The I-405 Team reviewed the I-405 Renton Nickel Improvement Project, I-5 to SR 169 discipline reports related to

surface water,² water quality,² floodplains,³ and groundwater.⁴ We used information from these discipline reports as sources for information about surface water, water quality, floodplains, and groundwater.

Additional water resources information was collected in Autumn 2004 during a series of site visits where experts in the fields of fisheries, wetlands, wildlife, road design, drainage design, and permitting reviewed the natural and manmade features located in the study area.

Authors obtained additional surface water information for the Tukwila to Renton Project from:

- Field surveys
- Aerial photos
- Topographic maps
- Drainage maps
- Data from the City of Tukwila, City of Renton, and King County personnel

We obtained water quality information from:

- Data provided by Ecology including WRIA Maps
- Ecology's 2004 303(d) list of impaired water bodies (according to Ecology, the updated 2006 list will not be approved until 2008, and therefore was not available for this report)
- Ecology's Total Maximum Daily Load (TMDL) list
- Data from the City of Renton, Tukwila, and King County personnel
- Pollutant load estimates, WSDOT Environmental Procedures Manual⁵ (EPM) – Method 1

Floodplain information came from FIRMs.

Groundwater information came from several sources including:

² WSDOT 2005a

³ WSDOT 2005b

⁴ WSDOT 2005c

⁵ WSDOT 2004a

- LiDAR (*Light Detection and Ranging*) data for land elevations and topographic information for this report. LiDAR is an optical remote sensing technology that measures properties of scattered light to find range and/or other information of a distant target.
- Sole Source Aquifers and Group A and B Wellhead Protection Areas from King County and City of Renton databases.
- Databases on wells and water rights from Ecology web sites

How did we evaluate effects on water resources?

The I-405 Team used the methods described in WSDOT's EPM to evaluate the project's effects on surface water, water quality, floodplains, and groundwater during construction and operation. The manual provides guidance that WSDOT follows to ensure that its projects comply with local, state, and federal laws and regulations. We elaborate on the evaluation methods in the following sections.

Surface Water Flow

To determine operational effects, the I-405 Team compared baseline conditions with the proposed project drainage designs to determine the new impervious pavement distribution and the affected streams and rivers. We determined affected streams and rivers by consulting with the authors of the *Ecosystems Discipline Report*, who mapped the streams and rivers for the project.

The WSDOT HRM requires the use of MGSFlood to calculate runoff from impervious pavement. These runoff values are used by the I-405 Team to verify the number and size of ponds needed to protect the receiving waters.

Surface Water Quality

The I-405 Team used Method 1 in WSDOT's EPM to calculate pollutant load estimates that the project will generate during operation. Method 1 is known as the WSDOT Data-FHWA method and is considered to provide conservative results. Method 1 estimates pollutant loads based on highway runoff data collected in western Washington since 2001. These data

What is MGSFlood?

MGSFlood is a model used in hydrologic analyses. The public domain version was developed for WSDOT by MGS Engineering Consultants. The program is a general, continuous, rainfall-runoff computer model developed specifically for stormwater facility design in the lowlands of Western Washington. The program meets the requirements in the 2001 Washington State Department of Ecology Stormwater Management Manual for Western Washington.

What are best management practices?

Best management practices, referred to commonly as BMPs, are methods used to minimize or avoid construction effects to water quality such as sediment getting into streams. Examples of BMPs include installing filter fabric fence downstream of all exposed slopes, around existing drainage inlets, and along river, stream, and drainage channels near work areas to prevent sediment-laden stormwater from entering streams.

provide a reasonable estimate of pollutant concentrations flowing from both treated and untreated highway surfaces because they are recent and specific to WSDOT highways.

The I-405 Team reviewed the effectiveness of BMPs to determine potential water quality effects from construction. Specific BMPs for this project will be described in more detail in the Temporary Erosion and Sediment Control Plan that WSDOT will write prior to construction

Floodplains

The I-405 Team compared baseline conditions with the proposed project to determine where construction will require fill or bridge piers to be placed in the floodplain. To determine how much fill will be placed in the floodplain, the I-405 Team used the floodplain elevation maps prepared by the Federal Emergency Management Agency (FEMA).

To evaluate whether the floodplain will be affected by the project, the I-405 Team compared how much material is being placed in the floodplain and how much material is being removed. If, for the same floodplain at the same elevation, more material is being removed than being placed as fill, then the project will not negatively affect floodplain storage capacity.

Groundwater

The I-405 Team reviewed the proposed project design and likely construction methods to evaluate the project's potential effects. Evaluations were based primarily on sound engineering principles, WSDOT practices, and professional judgment. Part of WSDOT's practice is to use the Geotechnical Design Manual, which contains many WSDOT design and construction practices that minimize effects to groundwater.