5.3 Water and Aquatic Resources

The Renton Nickel Improvement Project will add 15 acres of new impervious surface to the area. Runoff from an equal area of the highway will be treated for flow quantity and water quality.

Some stream habitat and some buffers will be either permanently or temporarily affected by the project. To help improve stream habitat, the box culvert at Springbrook Creek will be removed and the streambed restored.

WSDOT will need to add fill to some floodplains to build this project. To compensate for this fill, an equal amount of fill will be removed from the Springbrook Creek Wetland and Habitat Mitigation Bank.

Water resources are important to protect because they support many different species including people

Water and aquatic resources are essential for maintaining human health, fish and wildlife habitat, and vegetation. These resources are important elements of the ecosystem in which we live and the significance of these resources for food, livelihood, employment, income, and cultural value is widely recognized. These resources can be affected by roadway projects because paved surfaces can change the pattern of water flow, which in turn degrades streams and affects natural habitats and fish. These changes can also affect flooding.

Please refer to the Renton Nickel Improvement Project Surface Water and Water Quality Discipline Report in Appendix V, Fisheries and Aquatic Resources Discipline Report in Appendix L, and Floodplains Discipline Report in Appendix M for a complete discussion of these analyses.

What water resources are found in the project area?

Surface water

The Renton Nickel Improvement Project crosses two major rivers: the Green River to the west and the Cedar River to the east. Tributaries to the Green River that are also crossed by the highway include Cottage Creek, Gilliam Creek, an un-named tributary to Gilliam Creek, Springbrook Creek, Panther Creek, Rolling Hills Creek, an un-named tributary to Rolling Hills Creek, and Thunder Hills Creek. No Cedar River tributaries cross the highway in the study area. The crossing locations for the streams listed above are shown on Exhibit 5-11.

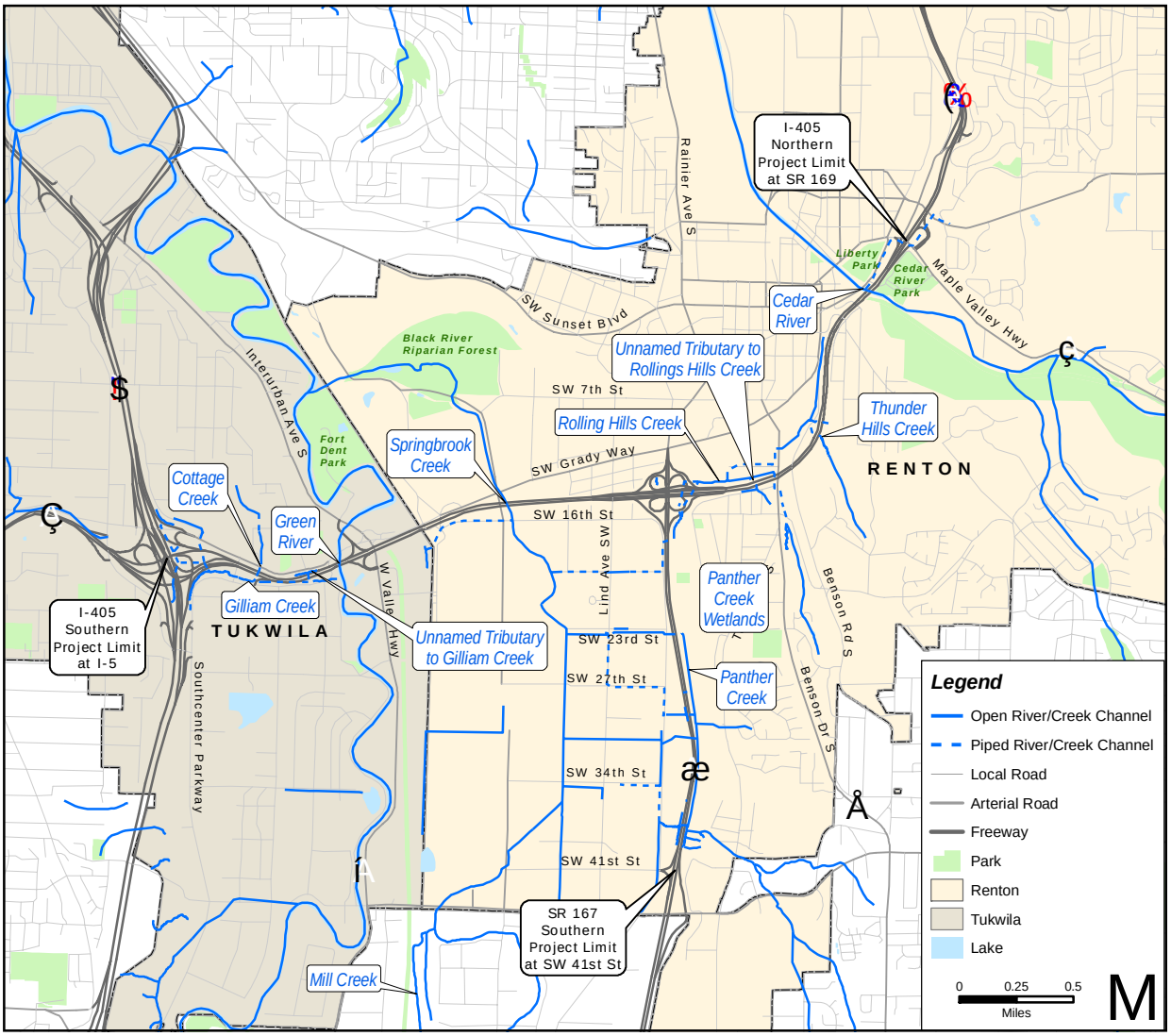

Exhibit 5-11. Surface Waterbodies in the Study Area. None of these waterbodies will be affected by this project.

Rolling Hills Creek and overflow culvert at the I-405/SR 167 interchange

Fish habitat

Residential, commercial, and industrial development has greatly altered the rivers and streams in the study area. This alteration has included bank hardening, such as installing riprap and placing streams in concrete channels; reducing or removing streamside vegetation; straightening stream channels; and removing in-stream habitat. These alterations have also resulted in loss of the historic floodplains associated with most of these waterbodies. Substantial changes have also occurred in the vegetation surrounding these waterbodies. What was once predominantly mature native vegetation has been replaced by a mix of immature

native vegetation and non-native invasive plant species, such as blackberry, reed canarygrass, and Japanese knotweed.

Water quality

Within the study area, the state includes the Green River, Springbrook Creek, and the Cedar River on the list of impaired water bodies. Ecology publishes this list every two years. The problems affecting each waterbody are:

- Green River – low dissolved oxygen, high fecal coliform bacteria, high temperature
- Springbrook Creek – low dissolved oxygen, high fecal coliform bacteria
- Cedar River – high fecal coliform bacteria (downstream from study area)

Floodplains

Floodplains identified from flood insurance rate maps are associated with the Green River, Springbrook Creek, Panther Creek, and Rolling Hills Creek. At the project's north end, I-405 also crosses the Cedar River floodplain. Exhibit 5-12 shows that the primary floodplain within the study area is associated with the Green River and Springbrook Creek.

What fish species live in the project area?

Many fish and other aquatic species inhabit the rivers, streams, and wetlands in the study area. The species found in these different waterbodies vary greatly depending on the type, size, and quality of the waterbody, and how it is connected to other waterbodies. Fish species in the area include both anadromous and resident salmonids and a variety of other resident fish. Some of these species are listed on the federal and state endangered species lists. Other aquatic species found in the area include macro and microinvertebrates, lamprey, crayfish, amphibians, and freshwater mussels and clams.

Many species of salmonids can be found in the study area, including chinook, coho, chum, pink, and sockeye salmon; steelhead trout; and sea-run cutthroat. In addition, bull trout, Dolly Varden, and resident cutthroat trout are known to use the waterbodies in the study area. Three of these species, chinook, bull trout, and Dolly Varden, are listed as endangered species under the Endangered Species Act. The Green River, Cedar River, and Springbrook Creek are all critical habitat for chinook

What is a floodplain?

A floodplain is the level area bordering river channels that is inundated during flood level flows. These areas of river valleys are frequently defined in terms of the likelihood of flooding in a given year. Hence, the "100-year" flood event is the flood having a 1% chance of occurring during any given year. Flood insurance rate maps identify 100-year floodplains that are used to determine the risk of flooding for a given area.

What are macroinvertebrates and microinvertebrates?

Macroinvertebrates are small animals without backbones, which are visible to the naked eye (insects, worms, larvae, etc.). Microinvertebrates are similar to macroinvertebrates, but are not visible to the naked eye. Waterbodies have communities of aquatic macro and microinvertebrates. The species composition, diversity, and abundance of the macro and microinvertebrates in a given waterbody can provide valuable information on the relative health and water quality of a waterway.

What are anadromous vs. resident fish?

Anadromous fish are born in freshwater streams, rivers, or lakes, spend their adult phase in the ocean, and return to spawn in the waters where they were born.

Resident fish spend their entire lives in freshwater systems and do not migrate into saltwater environments.

What is the Endangered Species Act?

An Act of Congress passed in 1973 that governs how animal and plant species whose populations are dangerously in decline or close to extinction will be protected and recovered.

salmon within the study area. The Green River and the Cedar River are bull trout critical habitat within the study area. Coho salmon and Pacific and river lamprey, which are federal species of concern under the Endangered Species Act, can be found in the waterbodies in the vicinity of the study area as well.

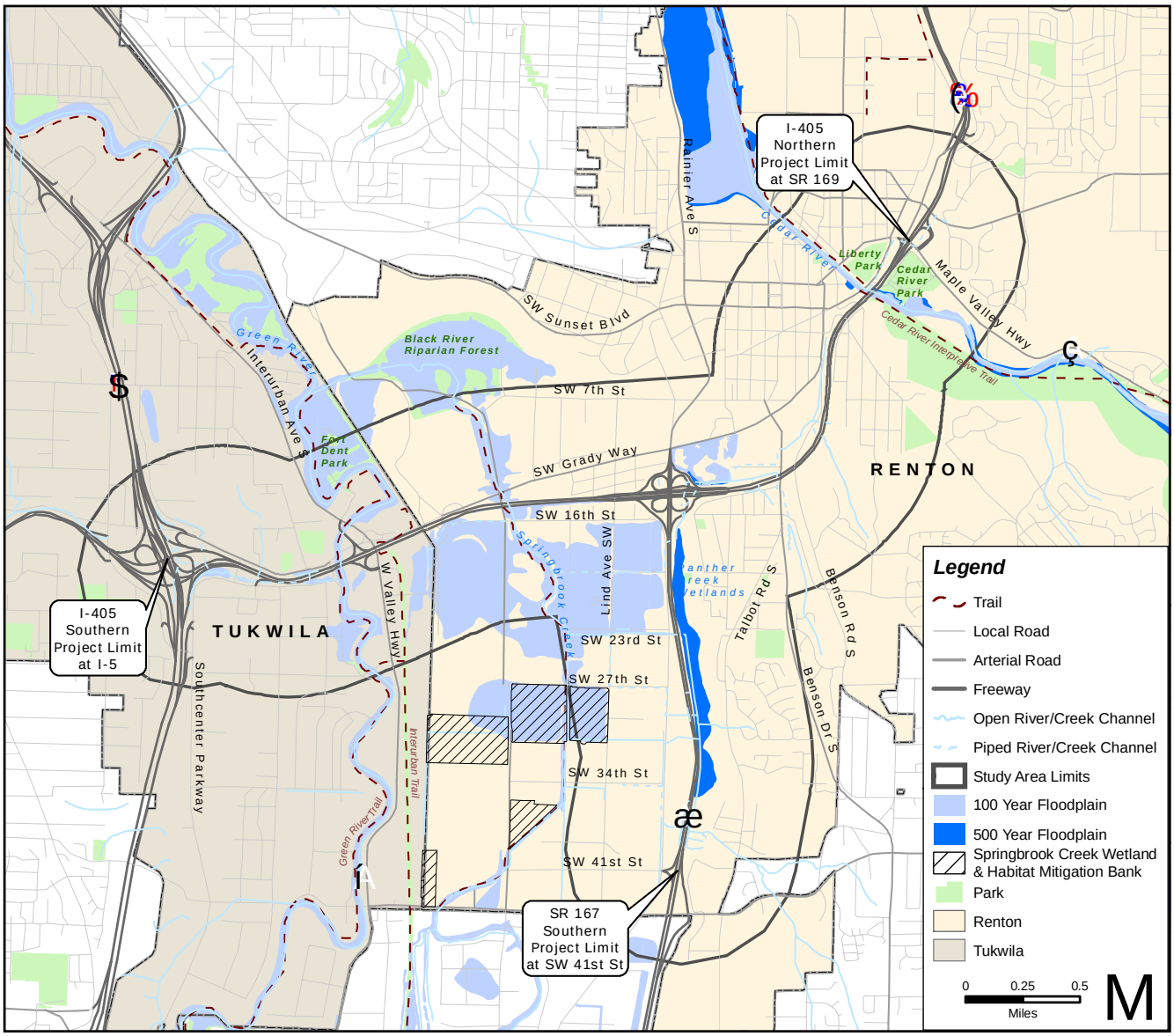

Exhibit 5-12. Floodplains within Renton Nickel Improvement Project Study Area
Source: FEMA maps published March 15, 1996

Anadromous salmonid species primarily use the rivers and streams in the study area for upstream and downstream migration and rearing. However, these streams provide some limited spawning habitat for chinook, coho, pink, sockeye, and chum salmon and

steelhead within the study area. Resident cutthroat trout use the study area for all life stages.

How are water resources currently managed in the project area?

Stormwater

A variety of facilities such as wetponds, biofiltration swales, ecology embankments, filter strips, and constructed wetlands currently treat stormwater along the project corridor. However, large portions of the highway do not have detention or water quality treatment for runoff because these facilities were not required when I-405 was originally built. Greater detail on the function of these stormwater facilities can be found in the Surface Water and Water Quality Discipline Report in Appendix V.

Stormwater pond near I-405

Floodplains

Floodplain management within the Renton Nickel Improvement Project area is influenced by federal, state, and local regulations or guidance. However, counties and cities bear the primary responsibility for regulating activities allowed in floodplains.

City codes in both Tukwila and Renton prohibit projects within the 100-year floodplain that cause any rise in the base floodplain elevation. This is known as the zero-rise requirement. As several 100-year floodplains occur within the study area, these regulations apply to the project.

These codes also dictate that projects must not reduce the amount of flood storage volume on a floodplain. For any fill placed in the floodplain, the project must compensate by removing equal volumes of fill at equivalent elevations.

How will project construction affect water resources and fish?

Stormwater

During construction, work crews clear, grade, and prepare the site for new pavement. Preparing the area to be paved exposes bare soil. The exposed soil is easily eroded by rainfall and water runoff, which can create short-term effects to water quality. These effects to water quality are minimized by using required sediment and erosion control measures that are commonly referred to as best management practices (BMPs). Because

How do best management practices (BMPs) protect water quality?

Erosion control BMPs are used to minimize the amount of soil that washes from construction sites into streams, lakes, or wetlands. Examples of erosion control BMPs include installing filter fabric fence downstream of all areas where water collects and discharges, covering all areas of exposed soil with plastic or straw, and minimizing the amount of area cleared.

WSDOT will follow these standard practices, effects on water quality are expected to be minor. For more detailed information on these BMPs, see the Surface Water and Water Quality Discipline Report in Appendix V

Construction can also create the potential for unexpected spills of hazardous materials such as fuel, oil, paint, and other potentially toxic liquids, which may be temporarily stored on site. These materials present the greatest risk near open waterbodies such as where streams and rivers pass under the highway. To prevent unexpected spills of hazardous materials to waterbodies, a Spill Prevention, Control, and Countermeasures Plan will be prepared before construction starts. Along with the Temporary Erosion Sediment Control Plan, these two plans identify the measures that will be used to help maintain good water quality during construction.

Fish

Project construction will have several temporary effects on fish and aquatic resources. These temporary construction effects are primarily related to in-water disturbances and stream diversions, in-stream sedimentation, and removal of stream buffer and riparian vegetation. Potential effects to streams include:

- The introduction of fine sediment to streams during the construction of culvert extensions or replacements, and from stormwater facility discharges from construction areas. However, the amount of sediment entering the streams is expected to be small.
- Construction noise that could disturb or displace fish could occur for relatively long periods (weeks to months) at any given stream crossing. This is most likely to occur at the Springbrook Creek box culvert crossing during construction of the new southbound and northbound bridges. For all in-stream work, the work window specified in various permits and approvals will limit the potential noise effects to fish because these windows are designed to allow work when salmonids are not expected to be present. Pile driving may be necessary for installing one bridge support that will be within the ordinary high water mark (OHWM). The support will be isolated from the water when it is installed.
- Artificial lighting will be required for some work areas and night time work. Lighting will be directed to illuminate work areas and avoid direct illumination of the affected waterbodies to limit effects to fish behavior.

Floodplains

The I-405 bridges over Springbrook Creek and Oakesdale Avenue will be replaced to accommodate the new lanes. The existing bridges will be replaced with new southbound and northbound bridges that will span not only the side channel of Springbrook Creek but also the main channel and Oakesdale Avenue. These bridges will cross a 100-year floodplain and construction will require placing new piers and fill in the floodplain.

In addition to fill used to construct the new I-405 bridges over Springbrook Creek and Oakesdale Avenue, fill will also be placed on the south side of I-405 between Oakesdale Avenue and Lind Avenue, and some minor fill could also occur on the west side of SR 167 at SW 23rd Street where Panther Creek, a tributary to Springbrook Creek, crosses the highway. The other floodplain crossings at the Green River, Rolling Hills Creek, and the Cedar River will not be affected by this project.

How will project operation affect water resources and fish?

Stormwater

This project will add approximately 15 acres of new impervious surface area to the highway drainage area. The drainage area currently has 115 acres of impervious surface collectively. This results in almost 13 percent more impervious surface within the project limits. The roadside areas that will not be paved, will generally be landscaped with grass and some shrubs.

Runoff collected from areas of the highway that are equivalent in size to the new impervious area will be treated for both quality and flow control (detention). The location of new stormwater flow control facilities can be seen in Exhibit 5-13.

Portions of the I-405 study area fall within the Federal Aviation Administration (FAA) mandated wildlife hazard management area around the Renton Municipal Airfield. This area encompasses all land within 10,000 feet of the airport. Direct coordination with the FAA and the Renton Municipal Airfield staff confirmed that the proposed I-405 facilities, east of Springbrook Creek and along SR 167 to the north of the SW 23rd Street channel, are where wildlife hazard management and plantings are required.

How does runoff from a forest area compare with runoff from a highway?

For a forested area in King County, approximately 55 percent of the rain that falls each year eventually appears as water in a stream. The remainder of the rainwater either percolates into the soil or is evaporated back into the atmosphere.

However, for a highly impervious area, approximately 85 to 90 percent of annual rainfall eventually appears as water in a stream and the remaining water replenishes either the groundwater or the atmosphere.

Source: King County Surface Water Design Manual 2005.

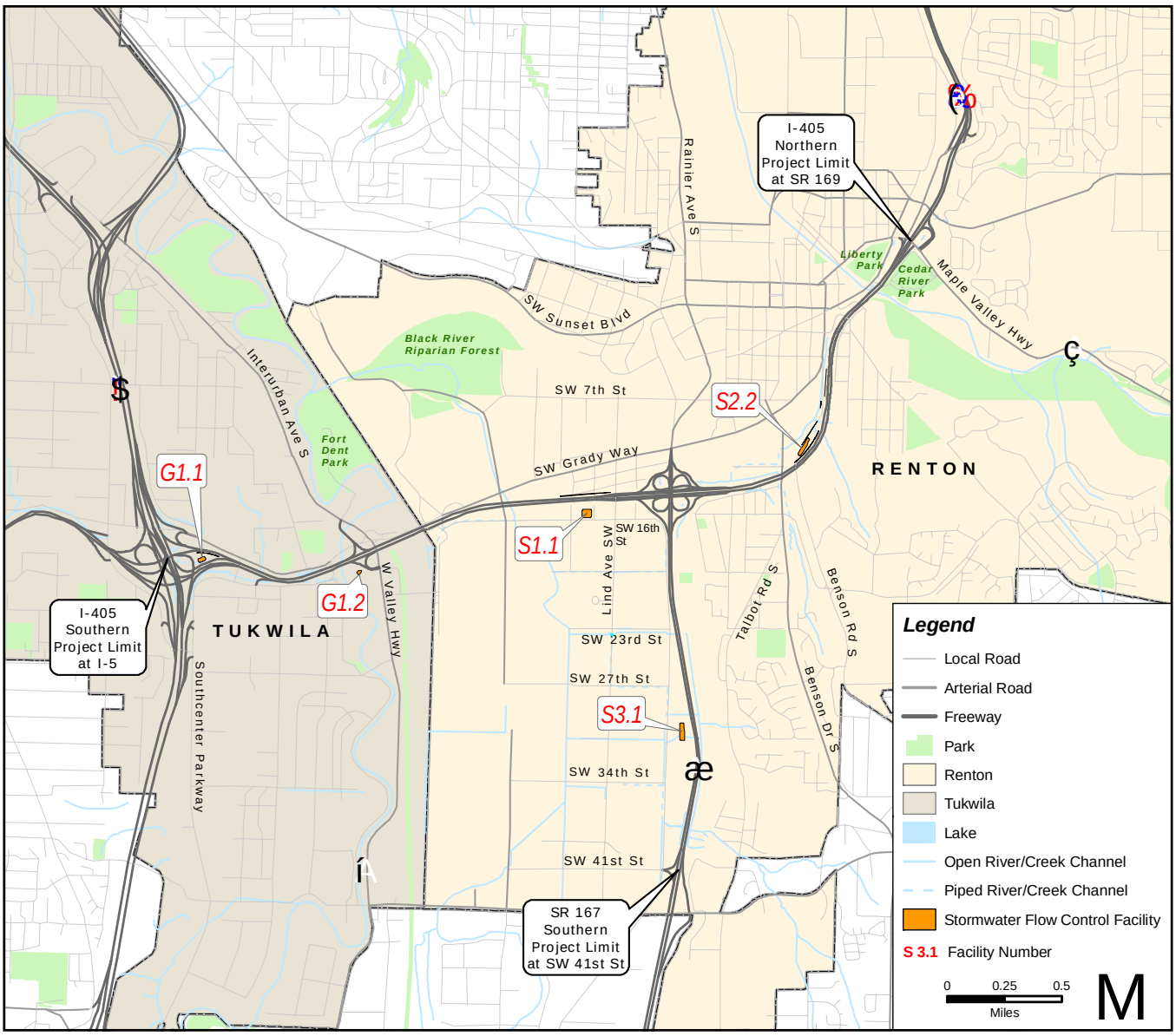

Exhibit 5-13. Stormwater Flow Control Facility Locations

Fish

Overwater and in-stream structures

This project will permanently affect about 1.04 acres of stream habitat because of construction either in streams or over water. These effects will occur primarily in three locations: where the Springbrook Creek box culvert will be removed, where the I-405 bridge over the creek's side channel will be replaced, and where Panther Creek crosses SR 167. The habitat quality of the streams affected by the project is already low, due to historic

modifications to the streambeds including channel straightening, removal of in-stream structure, encroachment of non-native plant species, and lack of riparian cover. Details on these effects can be found in the Fisheries and Aquatic Resources Disciple Report for this project in Appendix L of this environmental assessment.

Riparian buffer encroachment

Most of the streams affected by the Build Alternative will experience limited riparian buffer effects. The effects to fish, if any, from this project's encroachments on riparian buffers will be small in magnitude and difficult to measure, particularly considering the already degraded condition of the existing riparian buffers. In total, approximately 2.39 acres of riparian vegetation will be affected by this project either temporarily (0.88 acre) or permanently (1.51 acres).

Stream flow

Increases in stream peak flows resulting from added impervious area can cause harm to, or kill, fish. Harm typically occurs when fish or other aquatic species are unable to get out of high flow areas and are swept downstream or battered against rocks or stream banks.

Negative effects on stream flow are expected to be minimized because WSDOT will provide flow control for runoff from new impervious area to address changes in stormwater discharge to fish-bearing streams. Stormwater flow control facilities will be designed in accordance with the WSDOT Highway Runoff Manual.

How does the Highway Runoff Manual (HRM) protect water and aquatic resources?

The HRM criteria were developed to protect receiving waters from adverse hydrologic changes and water quality degradation. This manual also provides guidance to support WSDOT in complying with the Endangered Species Act requirements. WSDOT maintains this manual to include all known, available, and reasonable methods of prevention and treatment for stormwater runoff discharges consistent with state and federal law. The HRM, developed by WSDOT, will be used as the design standard for this project and reflects the best available science in stormwater management to ensure that WSDOT projects adequately protect the functions and values of critical environmental areas including wetlands, streams, lakes, and marine waters.

Fish passage

All culverts affected by the project were assessed to determine if they are barriers to up or downstream fish passage. Fish passage barriers were evaluated to determine if replacing culverts was warranted and would benefit fish. As a result of this analysis, no fish passage culvert replacements are planned as part of the Renton Nickel Improvement Project.

Water quality

Highway runoff contains several pollutants of concern: nutrients such as phosphorous, which is generally bonded to dirt particles; heavy metals such as lead, copper, and zinc; and petroleum hydrocarbons from oil and grease. These contaminants accumulate on the road surface and rain eventually washes them away.

The Renton Nickel Improvement Project will provide enhanced water quality treatment of areas equal to the new impervious area for all new freeway pavement added as part of this project. The project will use ecology embankments and stormwater treatment wetlands in accordance with the WSDOT HRM.

This project will not affect any of the 303(d) listed waterbodies in this area:

- The Green River is 303(d) listed for dissolved oxygen, fecal coliform bacteria, and temperature. None of these parameters will be affected by runoff from this project.
- Springbrook Creek is 303(d) listed for dissolved oxygen and fecal coliform bacteria. None of these parameters will be affected by runoff from this project.
- The Cedar River is also listed on the state's 303(d) list but only for fecal coliform. This parameter will not be affected by runoff from this project

Springbrook Creek side channel currently has piers in the floodway

Floodplains

Replacing the I-405 bridge over Springbrook Creek will add approximately 11,200 cubic yards of fill to the floodplain. In addition, some piers will need to be placed in the floodplain to support the bridge.

What measures are proposed to avoid or minimize effects on water resources during construction?

The Temporary Erosion and Sediment Control plan and the Spill Prevention, Control and Countermeasures plan will be written before construction begins. These documents will specify the stormwater and erosion control BMPs that will be used during construction. For a list of recommended measures see Appendix B.

What measures are proposed to avoid or minimize effects on water resources during operation?

Stormwater

WSDOT has designed stormwater facilities for this project that will both maintain the rate of stormwater runoff at existing conditions and remove pollutants from runoff generated by the project. With these facilities, the runoff is not expected to contribute to any exceedances of

Washington State water quality standards listed in WAC 173-201(A).

Floodplains

Adding fill to the floodplain of Springbrook Creek is an unavoidable negative effect. WSDOT will compensate for this fill with excavation within the Springbrook Creek Wetland and Habitat Mitigation Bank. To construct this bank, large volumes of material will be removed. The excavation, which is required to construct the wetlands, will provide sufficient floodplain storage to compensate for the fill placed within the floodplain to construct the new I-405 northbound and southbound bridges over Springbrook Creek and Oakesdale Avenue.

In addition, the box culvert that currently exists in the Springbrook Creek main channel will no longer be necessary once the new bridge is in place. Removal of this culvert from the channel will be counted as part of the compensatory storage for the fill and new piers.

WSDOT will also analyze the effectiveness of the fill mitigation to confirm that the 100-year floodplain elevation will not change, meeting the zero-rise requirement for floodplains. If the mitigation bank is demonstrated to be inadequate for floodplain mitigation, then another site will be found to provide compensatory storage. In addition, WSDOT will evaluate revised stream crossings prior to construction to ensure that the structures will not cause the flood elevations to change.

Bridge piers placed within the floodplain will be designed to minimize hydraulic disturbance to flow. This can be achieved by designing piers that are all the same size and placed in lines parallel to the flow path.

How will the project compensate for unavoidable negative effects to fish or aquatic resources?

In cooperation with resource agencies, WSDOT will help to develop plans for habitat improvement, restoration, or construction to mitigate the effects of the roadway widening and the increased width of stream crossings. Specific mitigation plans will be included in the permit applications for construction of the Renton Nickel Improvement Project. Mitigation will take the form of on-site, in-kind mitigation (such as underplanting native trees in an area near where trees had to be removed to construct the project) or off-site mitigation to improve

What is underplanting?

Underplanting involves planting trees beneath an existing canopy of larger trees or shrubs. This planting technique is often used to establish a stand of coniferous trees, which will eventually mature and become the dominant vegetation type, under an existing deciduous tree canopy.

habitat conditions in areas away from the project where mitigation might be more beneficial.

Two of the streams in the study area will experience work within or above the OHWM. In each case, the areas affected by the project contain limited in-stream habitat. Because the affected streams are already in a degraded condition, the on-site mitigation for these streams will only restore the functions or values already existing in those areas.

WSDOT will address overwater, in-stream, and riparian buffer effects to enhance in-stream fish habitat to the maximum extent practicable. This will also satisfy the requirements of the local critical areas regulations, the Hydraulic Code, and the Endangered Species Act. To achieve this end, WSDOT will select mitigation options during the design-build process. These are possible mitigation options:

- Plant native riparian vegetation to improve habitat and provide stream shading along each stream where vegetation will be cleared. The extent of riparian planting will be dictated by the extent of the clearing effects.
- Plant native riparian vegetation outside of the study area in places where restoring native riparian buffers may have a greater benefit to fish and aquatic species. Mitigation could be concentrated along streams with high fish use where important stream processes and functions related to riparian buffers (e.g., large woody debris (LWD) recruitment levels, litter fall, and bank stabilization) are impaired.
- Install in-stream habitat features (e.g., boulders or LWD) in the streambed up or downstream of the project to increase the habitat complexity of the affected waterbody.
- Participate in an off-site mitigation opportunity, such as a mitigation bank, that will offset the effects of the project. This type of mitigation can provide watershed scale benefits that may not be realized by providing on-site mitigation.

All mitigation for this project will be provided in areas where mitigation is viable in the long term. Mitigation related to the project will occur on one or more waterbodies in the immediate vicinity of the project footprint (on-site mitigation).