5.4 Visual Quality

The project is not expected to result in substantial, unavoidable, adverse effects on visual quality. The project will change views by clearing vegetation, constructing raised structures, ramps, and retaining walls, and relocating a noise barrier. These changes will occur primarily within the I-405 right-of-way. Views will change for both freeway neighbors and freeway users and are expected to be negligible.

I-405 retaining wall treatment facing the community

When individuals view the environment during an everyday commute or on a first-time trip to the area, the visual characteristics strongly influence responses—positive and negative. Research has shown that most people will generally agree on which views have high or low visual quality. This section describes how WSDOT studied the visual quality of the I-405, NE 8th Street to SR 520 Improvement study area and examined how construction and operations will affect the views found within these local communities.

Please refer to the NE 8th Street to SR 520 Improvement Project Visual Quality Technical Memorandum in Appendix N for a complete discussion of the visual quality analysis.

How did WSDOT evaluate visual resources for this project?

The I-405 Team used FHWA's *Visual Impact Assessment for Highway Projects* (FHWA-HI-88-054) method to evaluate visual quality for the project. This method assesses both negative and positive visual effects of the project on the study area's visual resources. These resources were identified based on a field reconnaissance of the I-405 and SR 520 corridors, review of existing aerial photographs, and review of proposed design plans. Our evaluation used a subjective assessment of three criteria—vividness, intactness, and unity—which are elements that are prominent in landscapes perceived as having high visual quality. During our evaluation, we incorporated the proposed project improvements into the views looking toward and from I-405 and SR 520 to determine visual quality after project construction. Our analysis evaluated changes in visual resources as a result of the project and the likely viewer response to those changes.

What is *visual quality*?

A subjective measure of the character of the visual resource. The many factors that contribute to a landscape's visual quality are grouped under intactness, unity, and vividness.

What views can people currently see in the study area?

In general, topography, vegetation, and structures limit existing views of and from I-405 and SR 520 in the study area. Except for some downtown Bellevue high-rise buildings, many neighboring areas do not have direct views of the project. Portions of the project can be seen from cross streets or interchanges perpendicular to I-405 and SR 520 where screening by vegetation or buildings is limited. The I-405 travel lanes are also visible from overpasses that link the commercial areas on both sides of the freeway. These overpasses are NE 4th Street, NE 8th Street, and NE 12th Street, as well as a bus ramp at NE 6th Street.

Between NE 4th Street and NE 12th Street, I-405 passes through downtown Bellevue. Views of this area are predominantly of urban commercial buildings on both sides of the corridor and the freeway is slightly lower than the surrounding area. This section of I-405 includes expansive views of the downtown Bellevue skyline west of the I-405 corridor. The tall office and mixed-use commercial and residential buildings are a dominant visual feature; the taller buildings have views of and are visible from I-405. Pockets of mature evergreen and deciduous trees, both natural and ornamental, soften views of the built environment.

East of the I-405 corridor there are views of local ridgelines and vegetation. In this area, there is a mix of low- to mid-rise commercial, mostly multi-family residential, and public facility uses.

Moving north of the NE 12th Street overpass along I-405, the area becomes noticeably less urban in character, and is dominated by mature evergreen trees that frame both sides of the I-405 corridor and screen surrounding commercial and residential development.

East of I-405, views from SR 520 extend south over the Bel-Red commercial district to the horizon. Development is diverse and continuous, including moderate- to large-footprint, low-rise industrial and commercial buildings; dense mixed single- and multi-family neighborhoods; and small- to moderate-sized retail centers along arterial streets. SR 520 is not generally visible from the commercial district south of the

How is visual quality determined?

The project team determined the visual quality of existing views using three criteria:

Vividness is the memorability of landscape components as they combine in striking and distinctive visual patterns.

Intactness is the visual integrity of the natural and human landscape and its freedom from encroaching elements.

Unity is the visual coherence and compositional harmony of the landscape considered as a whole.

(FHWA, 1981)

Visual Character - I-405

Visual Character – Eastbound SR 520

corridor because the district is below the grade of the roadway, and buildings and street trees block views.

On the north side of SR 520, where there are residential areas such as the Bridle Trails neighborhood, trees screen some views to and from SR 520. Trees also screen views of SR 520 from Viewpoint Park, which is also located on the north side of SR 520. Several newer residential developments north and south of NE 24th Street have more direct views of the freeway. These areas include single-family development on 127th Avenue NE south of NE 24th Street and the Boulders at Pikes Peak townhouse development north of NE 24th Street.

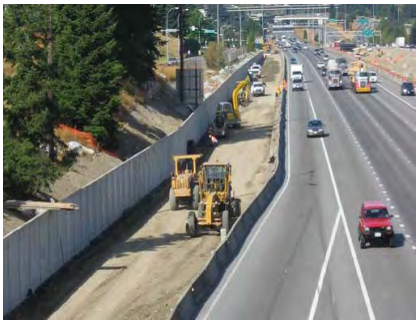
What project features will have noticeable effects on visual quality?

Project features that are out of scale with or encroach upon the existing visual character will have noticeable effects on visual quality. The potential effects on visual quality will result primarily from constructing the following project elements:

- Replacing the NE 12th Street overpass over I-405;
- Constructing grade-separated ramps along northbound I-405 and eastbound SR 520 within the study area;
- Constructing various walls to address numerous issues including noise, slope retention, and safety; and
- Removing vegetation.

The proposed project will also create new sources of overhead lighting, shade, and shadowing in various portions of the study area. Continuous illumination will be installed along all new freeway on- and off-ramps. The new lighting will use fixtures that shield sideways glare.

Please refer to Chapter 6 for a discussion of visual quality mitigation measures during project construction and operation.



Clearing and grading along I-405

How will the completed project affect what people see?

The project will permanently change visual quality for both freeway users (views from the road) and freeway neighbors (views toward the road). Overall, however, these changes are minor when compared to the existing visual quality in the study area.

Freeway Users

The I-405 and SR 520 users who will experience changes in visual quality consist of commuters (people traveling to and

Exhibit 5-13: View of I-405 at the NE 8th Street On-ramp (Looking North)

Existing

Proposed

Exhibit 5-14: View of SR 520 at 124th Avenue NE (Looking East)

Existing

Proposed

from places of employment), local drivers (non-commuters who have an origin or destination within the study area), tourists, and freight traffic. Local and tourist traffic are more sensitive to view changes than commuters because they either experience the view less frequently or for the first time.

The view rendering of I-405 at the NE 8th Street on-ramp (Exhibit 5-13) conceptually shows the visual change for northbound I-405 freeway viewers. Viewers will see the new braided ramps to the north and east, and the newly reconstructed NE 12th Street overpass in the foreground. The new structures will increase the visual scale of the highway with a greater visual mass and larger footprint. Combined with the loss of mature vegetation, this will produce a more urban appearance and decrease intactness for this viewpoint.

The view rendering of SR 520 at 124th Avenue NE (Exhibit 5-14) conceptually shows the visual change for eastbound SR 520 freeway viewers. To the south, existing views of mature vegetation will be replaced by a retaining wall. To the north, freeway viewers will see elevated westbound lanes of SR 520 and another new retaining wall. Although the new constructed elements will be designed to unify human-made elements of the freeway corridor, these new structures, along with loss of existing mature vegetation, will reduce intactness for this view.

The use of landscaping and aesthetically pleasing designs for I-405, SR 520, and related facilities will enhance the attractiveness of the constructed environment and will alleviate minor effects on visual resources. In addition, removal of some mature vegetation will open up views of the Cascade Mountain range for viewers located immediately north of SR 520, such as along the SR 520 Trail.

Freeway Neighbors

I-405 and SR 520 neighbors include local residents and users of the local transportation network and commercial, industrial, institutional (e.g., medical, educational), and recreational areas. Local residents and users of local recreation areas are most sensitive to changes because they have longer and more frequent exposures to views of the project. The view rendering of the NE 12th Street overcrossing conceptually shows the visual change for viewers traveling across the bridge overpass (Exhibit 5-15). Pedestrians, bicyclists, and local traffic will see

a newly reconstructed and widened overpass structure with visually pleasing railings to provide interest to the drivers and pedestrians. Additionally, the sidewalk will be patterned to provide more visual interest for the pedestrians. The visual scale and dominance of the reconstructed bridge will be partially offset by these elements.

The view rendering of the SR 520 Trail near the NE 24th Street trailhead (Exhibit 5-16) conceptually shows the visual change for trail users. Trail users will see the tops of some remaining vegetation within the SR 520 median, but most of the existing mature vegetation will be removed.

By removing the existing vegetation the view's intactness will decrease. However, the project will open views to the south and southeast and to the horizon line, which will make the Cascade Mountains more visible, softening the effect of human elements with natural elements.

The proposed project will not be visible from the scenic viewpoint in Viewpoint Park, so there will be no change in visual quality for park users.

What would happen to visual resources if WSDOT did not build this project?

The No Build Alternative would not affect visual quality as no structures would be replaced or noticeably modified.

Exhibit 5-15: View of Reconstructed NE 12th Street Overcrossing

Existing

Proposed

Exhibit 5-16: View of SR 520 from the SR 520 Trail

Existing

Proposed

5.5 Water Resources

The project is not expected to result in substantial, unavoidable, adverse effects on water resources. The project will cover a portion of an unnamed tributary to Sturtevant Creek and its associated buffer. To mitigate these effects, WSDOT will provide stream channel and buffer improvements to the main stem of Sturtevant Creek. The project will add 11.4 acres of impervious area. New stormwater management facilities will treat about 28 acres of impervious surface, thereby treating some areas that currently have no treatment.

Valley Creek

The project will not encroach on any floodplains and will not affect floodplains downstream from the project.

Localized lowering of groundwater levels in one location will result from the project, but no water supply wells will be affected.

Please refer to the NE 8th Street to SR 520 Improvement Project Water Resources Discipline Report in Appendix O for a complete discussion of the water resources analysis.

Water resources—surface water, water quality, floodplains and groundwater—are essential to maintaining human health, stream habitat, and vegetation. These resources can be affected by roadway projects because an increase in impervious surfaces can lead to changes in the quality and quantity of rainwater that flows from these surfaces and drain to streams. These changes can also influence flooding and groundwater recharge. In this chapter, we evaluate the water resources located in the study area and how the proposed project may affect them.

What is impervious surface?

Pavement, roofs, and other compacted or hardened areas that do not allow the passage of rainfall or runoff into the ground are called impervious surfaces. The percentage of impervious surface is a key indicator of how urbanized and developed a basin is.

How did WSDOT evaluate water resources for this project?

To evaluate effects on water resources, the I-405 team collected information from a variety of sources, including field surveys, aerial photos, geographic information system (GIS) maps, water quality studies, and Washington State Department of Ecology (Ecology) databases. We used these data to assess and characterize the existing condition of water resources in the study area. We used methods described in WSDOT's

Environmental Procedures Manual[10] (EPM) to evaluate potential project effects on surface water (flows and quality), floodplains, and groundwater.

Surface Water Flows

New pavement created by the project will add impervious surface to the study area, which can increase the amount of stormwater runoff draining to study area streams. The I-405 Team compared existing pavement areas to the proposed project design pavement areas and calculated changes in runoff flows to affected streams. The project team used these values to design the size and type of stormwater management facilities needed to protect receiving waters.

Surface Water Quality

What is pollutant loading?

Pollutant loading is a term used to refer to the amount of a pollutant that enters a water body in a specified amount of time. Estimates of pollutant loads are usually given in pounds per year.

Traffic on roadways can deposit dust, hydrocarbons, and other pollutants from vehicle brakes, tires, and exhaust on the pavement that can be transported to surface waters when it rains or snows. The I-405 Team used Method 1, known as the WSDOT Data-FHWA method, in WSDOT's EPM to calculate pollutant load estimates that the completed project will generate. This method estimates pollutant loads based on highway runoff data collected in western Washington since 2001.

Floodplains

Floodplains are important because they convey and store floodwater and minimize flood risks during large storm events. The project team determined potential floodplain effects based on whether the project would encroach upon or place earth fill in the Federal Emergency Management Agency (FEMA) 100-year floodplain.

Groundwater

Groundwater is the water contained in the soil and bedrock below the ground's surface. We assessed the project's potential changes to the quality and quantity of groundwater supplies to wells and surface water bodies in the study area.

Groundwater effects were evaluated based on sound engineering principles, standard WSDOT practices, and professional judgment. Information from a groundwater

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[10] *WSDOT, 2007c.*

monitoring study conducted by WSDOT was used to evaluate areas where project excavation has the potential to encounter groundwater. WSDOT's 2005 *Geotechnical Design Manual* describes many standard design and construction practices that minimize effects on groundwater.

What water resources are found in the study area?

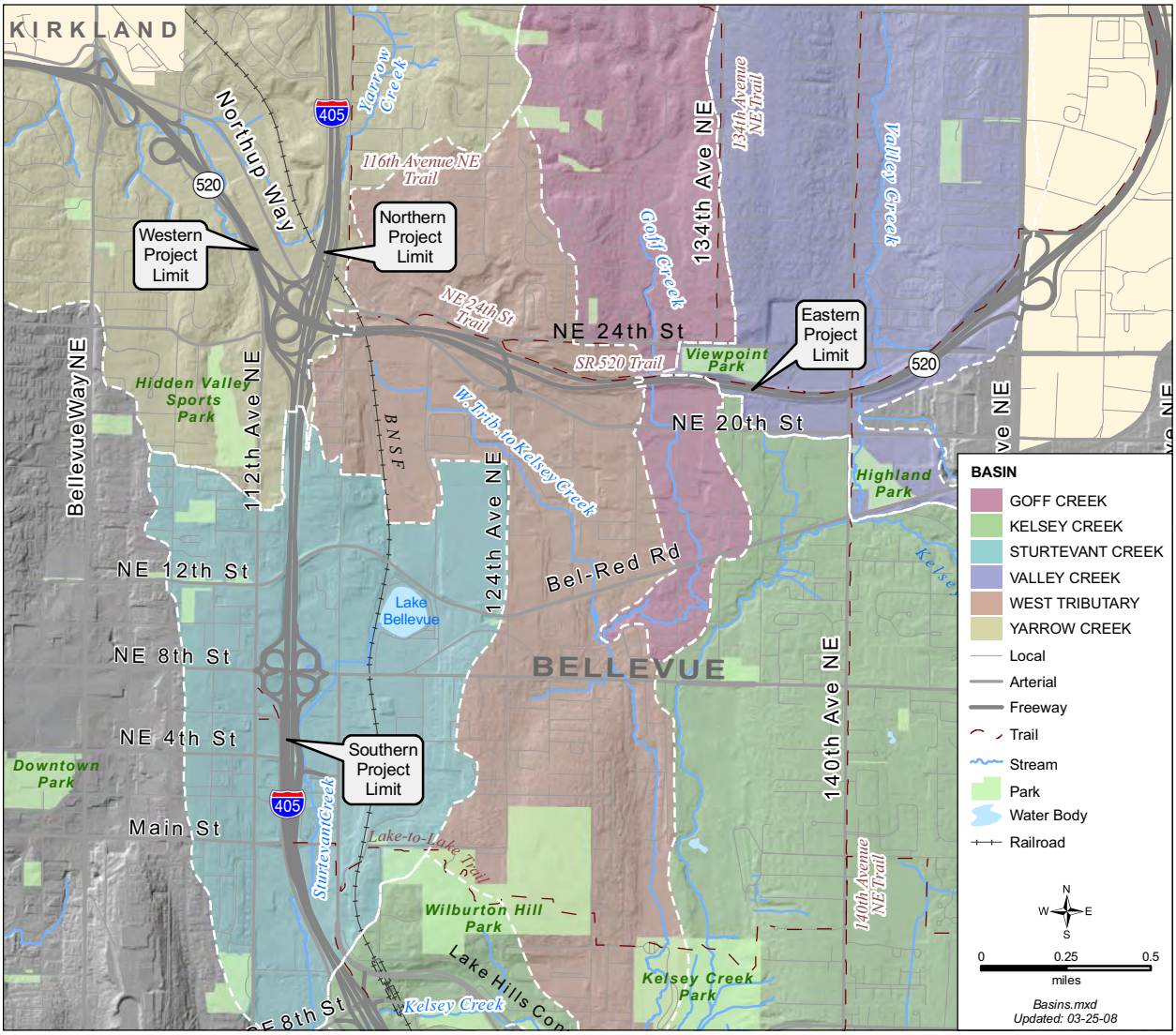
Surface Waters

The I-405, NE 8th Street to SR 520 Improvement Project is located entirely in Water Resource Inventory Area (WRIA) 08, the Lake Washington/Cedar-Sammamish watershed. This is one of the most heavily developed watersheds in the Puget Sound region. I-405 and SR 520 intersect and/or discharge stormwater runoff to the following streams within the study area:

- Sturtevant Creek
- Unnamed tributary to Sturtevant Creek
- Yarrow Creek
- Unnamed tributary to Yarrow Creek
- West Tributary to Kelsey Creek
- Goff Creek
- Valley Creek

Exhibit 5-17 shows the drainage basins in the general vicinity of the project. Exhibit 4-2 in Chapter 4 provides a more detailed look at streams relative to the project. The physical characteristics of the stream basins are listed in Exhibit 5-18.

Exhibit 5-17: Study Area Drainage Basins



In general, streams within the study area have been highly altered from their natural states to accommodate residential, commercial, and industrial development. Sturtevant Creek, its unnamed tributary, and the West Tributary to Kelsey Creek are located in the most heavily urbanized basins within the study area. Sturtevant Creek originates in Lake Bellevue and flows generally west/southwest until it crosses under I-405 south of the project limit. The West Tributary to Kelsey Creek originates in a large wetland complex southeast of the I-405 and SR 520 interchange and flows to the east.

Exhibit 5-18: Stream Basin Characteristics

	Sturtevant Creek	Yarrow Creek	W. Tributary to: Kelsey Creek	Goff Creek	Valley Creek
Basin size (acres)	773	1,667	1,001	679	1,391
Stream Length (ft)	4,049	18,738	14,585	7,028	13,295
Tributary to	Mercer Slough	Lake Washington	Kelsey Creek	W. Tributary to Kelsey Creek	Kelsey Creek
Percent impervious	68	29	44	30	32

Source: City of Bellevue, 2002.

The Yarrow Creek, Goff Creek, and Valley Creek basins are less densely developed with a higher percentage of residential, undeveloped, and open space. Yarrow Creek crosses underneath I-405 north of the northern project limit. The southwestern quadrant of the I-405/SR 520 interchange drains to an unnamed tributary to Yarrow Creek. Goff Creek crosses under SR 520 within the project limits, and Valley Creek crosses under SR 520 just east of the project limit.

Floodplains

The only floodplains within the project limits are located along Valley Creek. Valley Creek has a delineated 100-year floodplain both upstream and downstream of the SR 520 crossing.

Groundwater

Most of the groundwater resources in the study area are present in surficial glacial outwash deposits along Kelsey Creek and Yarrow Creek. Groundwater ranges in depth from 10 to 40 feet below ground surface. Shallow groundwater flow direction is primarily toward the south in the Kelsey Creek deposits, and toward the northwest in the Yarrow Creek deposits. Recharge occurs primarily as a result of direct infiltration from precipitation. King County does not designate these deposits as critical aquifer recharge areas. Regional groundwater flow direction is generally westward toward Puget Sound.

There are no domestic water supply wells within one half mile of the project limits that are listed in Ecology's database of wells that have been drilled and installed. For this reason, and because the City of Bellevue supplies potable water to its

residents, it is unlikely that any domestic groundwater wells are currently being used within the study area.

How is surface water quality in the study area now?

The Washington State Department of Ecology prepares a 303(d) list that identifies water bodies that do not meet the state water quality standards and why. None of the five streams in the study area are identified on the most recently approved 303(d) list (Ecology, 2006). However, one nearby stream is on the list: Kelsey Creek does not meet the water quality standards for temperature, dissolved oxygen, and fecal coliform downstream of the study area.

What is the Ecology 303(d) List?

The federal Clean Water Act (CWA), adopted in 1972, requires states to restore their waters to be "fishable and swimmable." The Clean Water Act established a process to identify and clean up polluted waters. Every 2 years, all states are required to prepare a list of water bodies that do not meet water quality standards. This list is called the 303(d) list because the process is described in Section 303(d) of the Clean Water Act.

Ecology has prepared a preliminary assessment of water quality in Washington. The assessed waters are listed in categories that describe the status of water quality. For those waters that are in the polluted category, beneficial uses—such as drinking, recreation, aquatic habitat, and industrial use—are impaired by pollution.

How is stormwater from I-405 and SR 520 currently managed?

Precipitation that falls on the roadway and ramps in the study area flows to roadside ditches or storm drains and catch basins located along the edges of the highway. Because the area is highly urbanized, most of the stormwater is eventually conveyed away from the roadway in pipes or culverts. Most stormwater runoff from the roadways enters the streams without receiving any water quality treatment or flow control because these facilities were not required when I-405 and SR 520 were originally built. However, some stormwater facilities were constructed as part of recent improvements. These include:

- In the Sturtevant Creek basin, an existing pond in the northeast quadrant of the NE 8th Street interchange treats approximately 1.6 acres of roadway.
- In the West Tributary to Kelsey Creek basin, an existing buried vault on the south side of SR 520 near the 124th Avenue NE off-ramp provides stormwater treatment for flow control.

What are stormwater vaults?

Stormwater vaults are underground facilities that store and treat stormwater. Dry vaults provide stormwater quantity control by detaining runoff and then releasing reduced flows at established rates. Wet vaults are designed to treat stormwater for both quantity and quality by maintaining a permanent pool of water in a settling basin.

How will construction activities affect water resources?

Surface Water Flows

In-stream work for the project is expected to be minimal. There will be no stream-crossing culvert replacements or extensions with this project. The only place where in-stream construction will occur is within the unnamed tributary to Sturtevant Creek to allow for widening the on-ramp from NE

8th Street to northbound I-405. This widening will encroach into the ordinary high water mark (OHWM) of the unnamed tributary and its buffer. Approximately 200 linear feet of stream channel and 0.15 acres of stream buffer will be permanently affected. The affected portion of the stream will be placed in a pipe to maintain conveyance of the water.

Please refer to Chapter 6 for a discussion of mitigation measures for water resources during project construction and operation.

WSDOT will use standard construction BMPs to control runoff and minimize the potential for sediment and other pollutants to be discharged to surface waters. Because the City of Bellevue has indicated that there have been recurring flooding along Valley Creek, Goff Creek, and Sturtevant Creek,[11] WSDOT will implement measures to prevent temporary increases in flow rates during construction. These measures could include early construction of stormwater ponds for flow control/sediment removal, completing certain construction activities during dry weather, and limiting the exposure of new impervious surfaces.

Water Quality

WSDOT will use appropriate measures to avoid or minimize adverse water quality effects. Those measures consider events that could occur inadvertently as a result of:

- Clearing and grading activities – erosion and spilling of soil into the receiving waters, which temporarily increase suspended sediment and turbidity concentrations in these water bodies;
- Staging and storing equipment – fuel and hydraulic lubricants that could be washed from construction equipment and vehicles, or engine coolant that could be spilled inadvertently along with other construction materials; and
- In-water work – materials such as earthen fill or gravel could be spilled during culvert construction. These spills could temporarily increase turbidity in surface waters and groundwater.

BMPs are required on all WSDOT projects including the I-405, NE 8th Street to SR 520 Improvement Project. These will be described in detail in a Temporary Erosion and Sediment

[11] *LaCombe, 2007.*

Control Plan and a Spill Prevention, Control, and Countermeasure Plan. These plans will be prepared before construction begins.

Floodplains

Project construction will not affect the Valley Creek floodplain. The existing SR 520 crossing of Valley Creek is approximately 1,500 feet east of the project limits.

Groundwater

Construction excavation near NE 12th Street may occur below groundwater levels and may require dewatering. Thus, lowering of the water table to a depth of about 18 feet might be required. No domestic wells were identified in the study area that could be affected by groundwater dewatering. Groundwater from construction dewatering will likely be discharged to the unnamed tributary to Sturtevant Creek.

How will the completed project affect surface waters and runoff?

Surface Water Flows

The Build Alternative will result in approximately 11.4 acres of new impervious surface. This increase represents approximately 13 percent more impervious surface than the existing conditions in the project limits; the existing impervious area is approximately 86 acres. If left unmitigated, this expected increase in impervious area could result in degradation of the downstream surface waters or an increase in flooding risks.

WSDOT will provide stormwater flow control for the new impervious area using seven stormwater detention facilities to prevent the potential increases in peak flows and durations of flows. These facilities will be designed in accordance with the WSDOT *Highway Runoff Manual* (HRM).[12] They will provide a combined detention volume of approximately 6.6 acre-feet. The proposed locations of these facilities are shown in Exhibit 4-2. These facilities include the following:

- Five combined stormwater detention and treatment wetlands will be constructed (four new facilities and one

[12] *WSDOT, 2006a.*

reconstructed facility) within the Sturtevant Creek, Yarrow Creek, and West Tributary to Kelsey Creek basins.

- One detention tank will be constructed within the Goff Creek basin.
- One detention ditch will be constructed within the Valley Creek basin.

The existing I-405 and SR 520 stormwater collection and conveyance system will be modified to route drainage to the new stormwater management facilities. Discharges from the stormwater facilities and the modified drainage system will continue to flow to the existing outfalls to the streams and eventually to Lake Washington.

Water Quality

Highway runoff contains several pollutants of concern:

- Nutrients, such as nitrogen and phosphorus, which generally bond to dirt particles; and
- Heavy metals such as copper and zinc.

Although the project will increase the total impervious surface in the study area, overall we expect water quality to improve compared to existing conditions. This is because water quality treatment facilities proposed for the project will treat stormwater from both the new impervious surfaces and some of the existing impervious surfaces that currently discharge to streams without treatment. These proposed stormwater facilities will provide water quality treatment for approximately 28 acres of new and existing pavement, or about 240 percent of the new impervious surfaces. WSDOT will provide this projected level of treatment using over 700 linear feet of ecology embankments and five stormwater treatment wetlands. These facilities will be designed in accordance with the WSDOT HRM.

Floodplains

The project will not encroach on the floodplain along Valley Creek. However, a minimal amount of stormwater runoff from the project will be discharged to Valley Creek. With the proposed stormwater flow system, the project will not affect downstream floodplains or floodplain characteristics.

Groundwater

To control seepage at retaining walls and fill embankments, WSDOT will install underdrains. The underdrains will be installed as part of the permanent storm drain system. The drains will be installed above groundwater levels and seepage will be routed back into the environment.

To minimize the effects from groundwater drawdown due to the installation of underdrains and permanent dewatering facilities, WSDOT will include special provisions in the design, such as discharging drain flow back into approved surface water and wetlands. WSDOT has well-established design and construction practices for managing the types of groundwater conditions anticipated for the project. With the implementation of these practices and by following standard BMPs, potential negative effects on groundwater resources will be minimized.

No domestic wells were identified in the study area that could be affected by dewatering.

What would happen to surface waters and runoff if WSDOT did not build this project?

Effects of construction on water resources in the study area would not occur under the No Build Alternative. The proposed project would provide water quality treatment to impervious surfaces in the study area that currently receive no treatment. Under the No Build Alternative, these benefits would not be realized and water quality would continue to degrade. No effects on floodplains and groundwater in the study area would occur under the No Build Alternative.

5.6 Ecosystems

The project is not expected to result in substantial, unavoidable, adverse effects on ecosystems. The I-405, NE 8th Street to SR 520 Improvement Project will have relatively minor effects on ecosystem elements, which include wetlands, aquatic resources, and wildlife habitat. The project will permanently fill 0.3 acres of wetland, and temporarily disturb an additional 0.05 acres. WSDOT will provide mitigation at a wetland mitigation site located in Kelsey Creek Park, which is about one mile southeast of the southern project limit.

Sturtevant Creek west of I-405 and south of the project limits

The project will permanently affect 200 linear feet of an unnamed tributary to Sturtevant Creek, and 0.15 acres of its buffer. Stream mitigation will occur at the main stem of Sturtevant Creek.

Approximately 4.4 acres of vegetation will be removed by the project. Most of the affected vegetation is located in existing roadway right-of-way that is regularly mowed and provides relatively poor wildlife habitat.

Please refer to the NE 8th Street to SR 520 Improvement Project Ecosystems Discipline Report in Appendix E for a complete discussion of the ecosystems analysis.

Wetlands, aquatic resources, and wildlife habitat are integral to the long-term viability and sustainability of the area's ecosystems. These resources provide plants and animals with areas to live, grow, and reproduce. Streams, wetlands, and upland areas contribute to clean air, clean water, rainwater retention, and the reduction of flooding. Because the project is located in a highly urbanized area, the existing conditions of wetlands, aquatic resources, and wildlife habitat in the study area are generally degraded.

How did WSDOT identify and evaluate ecosystems in the study area?

The I-405 Team identified ecosystems in the study area through a combination of research and field work. Research included reviewing available literature, performing geographical information system (GIS) and internet searches, and interviewing various state, county, and local agencies.

Field work included wetland delineations, stream surveys, and vegetation and wildlife habitat assessments, including a large woody debris (LWD) recruitment study. The information gathered was used to determine the type, number, and quality of existing ecosystems within the study area.

We identified all streams and wetlands within 500 feet of the project footprint or any stream that has a hydrologic connection to a wetland in the study area, and wildlife habitat with one-half mile of the project footprint.

Wetlands

Wetlands are a valuable environmental resource. In addition to providing vital habitat for many plants and animals, wetlands help to moderate stormwater flows by slowing and retaining floodwater during periods of rain, thereby minimizing downstream flooding. Wetlands can also improve water quality, including that of drinking water, by intercepting surface runoff and removing or retaining many types of suspended contaminants before reaching open water.

The I-405 Team evaluated potential effects on wetlands using wetland information gathered in the field, coupled with an overlay of the project footprint. We reviewed the wetland mapping, compared it to the project footprint, and calculated temporary and permanent wetland effects. Temporary and permanent construction effects within regulated wetland buffers were also calculated. In addition, the project team evaluated each affected wetland to determine the extent to which the overall function and viability of the wetland would be altered.

Ecology's Wetland Ratings

The project team determined the wetland ratings based on Ecology's rating system.

Category I wetlands represent a unique or rare wetland type; are more sensitive to disturbance; or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime.

Category II wetlands are difficult, although not impossible, to replace, and provide high levels of some functions.

Category III wetlands have a moderate level of function. They have been disturbed in some way and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.

Category IV wetlands have the lowest levels of functions and are often heavily disturbed.

Aquatic Resources

Aquatic resources include streams, lakes, and the organisms that inhabit them. The significance of these resources for food, livelihood, employment, income, and cultural value is widely recognized.

We evaluated effects on aquatic resources based on the extent of construction in or adjacent to streams. Similar to wetlands, we calculated temporary and permanent effects on aquatic resources by overlaying the project footprint on a map of streams within the study area. We also evaluated whether the new impervious area resulting from the project would

increase peak stream flows or add pollutants that would result in a negative effect on fish.

Wildlife Habitat

Wildlife habitat is important for the feeding, migrating, resting, and breeding of animals. The value of a given habitat primarily depends on its size and type of vegetation, or land use cover type, and its connection to other wildlife habitats.

The I-405 Team conducted a GIS-based land cover analysis to determine the existing upland vegetation and impervious surface in the study area. The land cover map included information from the Washington State Department of Natural Resources National Heritage Program and Washington State Department of Fish and Wildlife Priority Habitat and Species databases; from resource agency biologists; and from reconnaissance-level field surveys. The project team then overlaid the project footprint with land cover information to quantify the amount of upland vegetation the project will affect, as well as the effect on documented sensitive wildlife species. In addition to direct effects, the team also evaluated the effects of project noise and stormwater management on wildlife species and their habitat.

What ecosystems are located in the study area?

Wetlands

The I-405 Team identified 12 wetlands totaling approximately 7.3 acres within the study area. All 12 wetlands have been affected by development to some extent. The wetlands are typically associated with streams, hillside seeps, or drainage ditches that receive runoff and convey stormwater. Due to the disturbed conditions that favor invasive plant species, most of the wetlands contain a low percentage of native plant species.

Exhibit 5-19 provides a summary of the wetlands, their local and state ratings, and their buffers.

Locations of the wetlands studied in this EA are shown in Exhibit 5-20. The wetlands numbers show the milepost where the wetland is relative to the highway, and the letters indicate if the wetland is on the left side of the freeway(L), the right side of the freeway (R), or in the freeway median (M).

Exhibit 5-19: Summary of Wetlands in the Study Area

Wetland	Size (acres)	Habitat Classification	State (Ecology) & City of Bellevue Rating[a]	Local Jurisdiction Buffer Width (feet)
6.8L	0.50	Emergent	IV	40
6.9L	0.18	Emergent	IV	40
6.9R	0.23	Emergent	IV	40
6.95R	0.39	Emergent	IV	40
7.18L	0.59	Forested, scrub-shrub, and emergent	III	60
7.2L	0.12	Forested	III	60
7.3R	4.14	Forested, scrub-shrub, and emergent	II	75
8.1L	0.04	Forested, scrub-shrub, and emergent	III	60
8.5L	0.74	Forested and scrub-shrub	IV	40
8.5R	0.34	Forested and scrub-shrub	IV	40
15.24L	<0.01	Forested	IV	NA[b]
15.25L	<0.01	Forested	IV	NA[b]
Total	**7.29**			

[a] The City of Bellevue's Critical Areas Ordinance in the Bellevue Land Use Code uses ratings similar to Ecology's rating system.

[b] NA – Not Applicable – The City of Bellevue does not regulate buffers for wetlands smaller than 0.06 acres.

What are non-native invasive plant species?

Non-native invasive plant species are plant species that do not naturally grow in a particular area, but thrive once introduced. These plants are characteristically adaptable, aggressive, and have a high reproductive capacity. Their vigor, combined with a lack of natural enemies, often leads to a sudden increase in non-native plant populations.

Aquatic Resources

Seven streams are located in the study area and are shown in Exhibit 5-20: Sturtevant Creek, an unnamed tributary to Sturtevant Creek, Yarrow Creek, an unnamed tributary to Yarrow Creek, West Tributary to Kelsey Creek, Goff Creek, and Valley Creek. In general, the streams in the study area have been highly altered from their natural states to accommodate residential, commercial, and industrial land uses. 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. Substantial changes have occurred in the vegetation surrounding these water bodies. What was once predominantly mature native vegetation has been replaced by a mix of immature native vegetation and non-native invasive plant species.

Exhibit 5-20: I-405, NE 8th Street to SR 520 Improvement Project Wetlands and Streams - Sheet 1 of 6

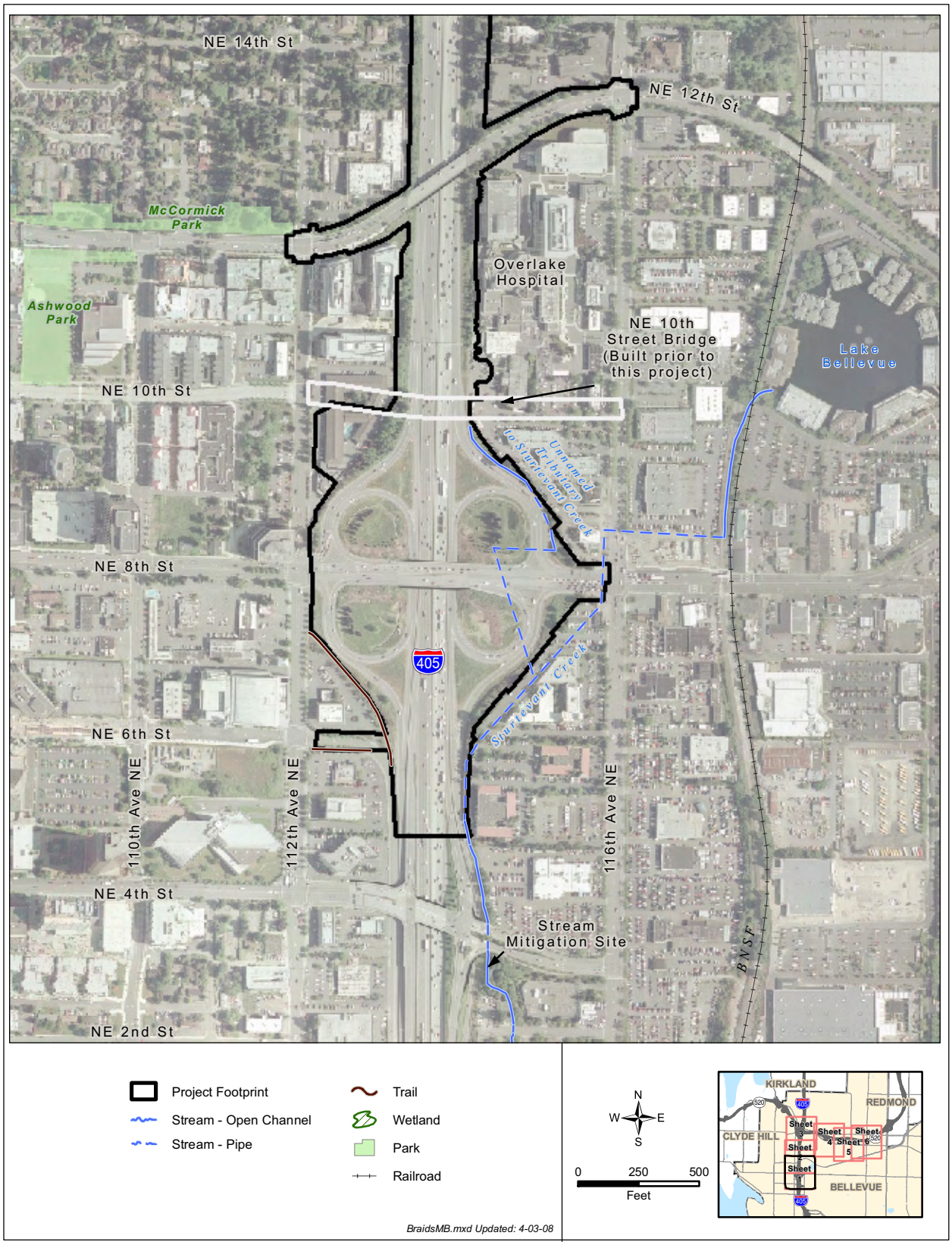


Exhibit 5-20: I-405, NE 8th Street to SR 520 Improvement Project Wetlands and Streams - Sheet 2 of 6

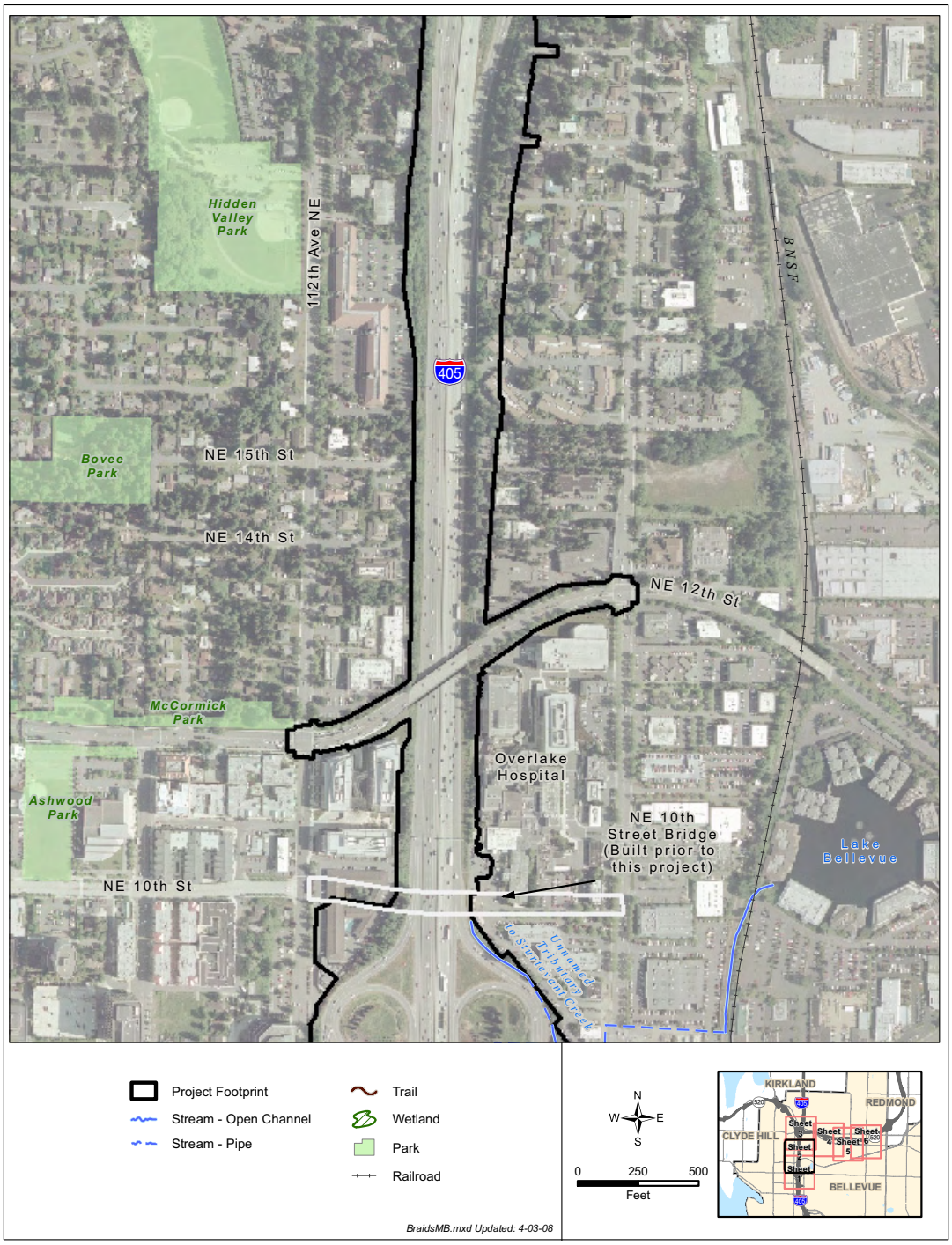


Exhibit 5-20: I-405, NE 8th Street to SR 520 Improvement Project Wetlands and Streams - Sheet 3 of 6

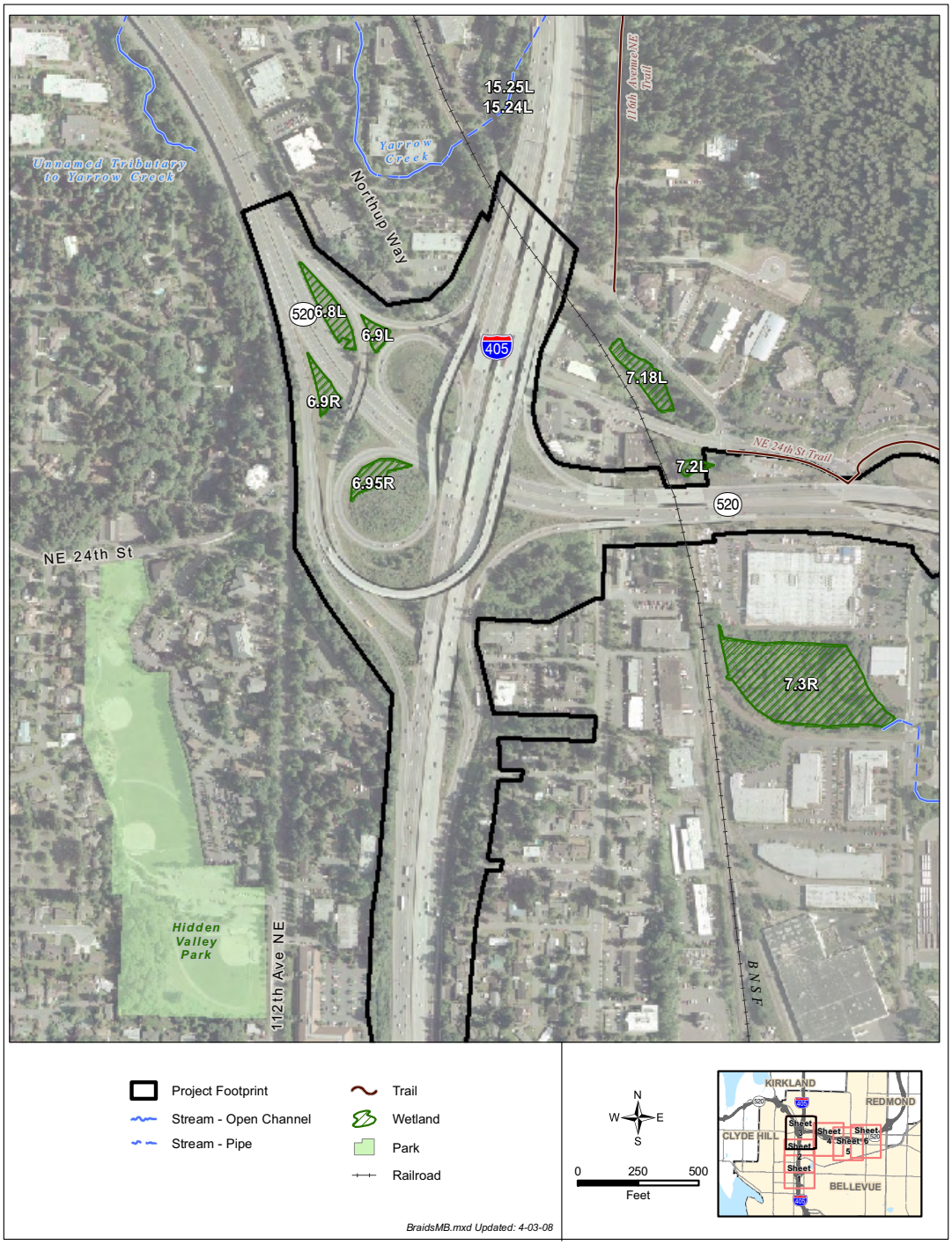


Exhibit 5-20: I-405, NE 8th Street to SR 520 Improvement Project Wetlands and Streams – Sheet 4 of 6

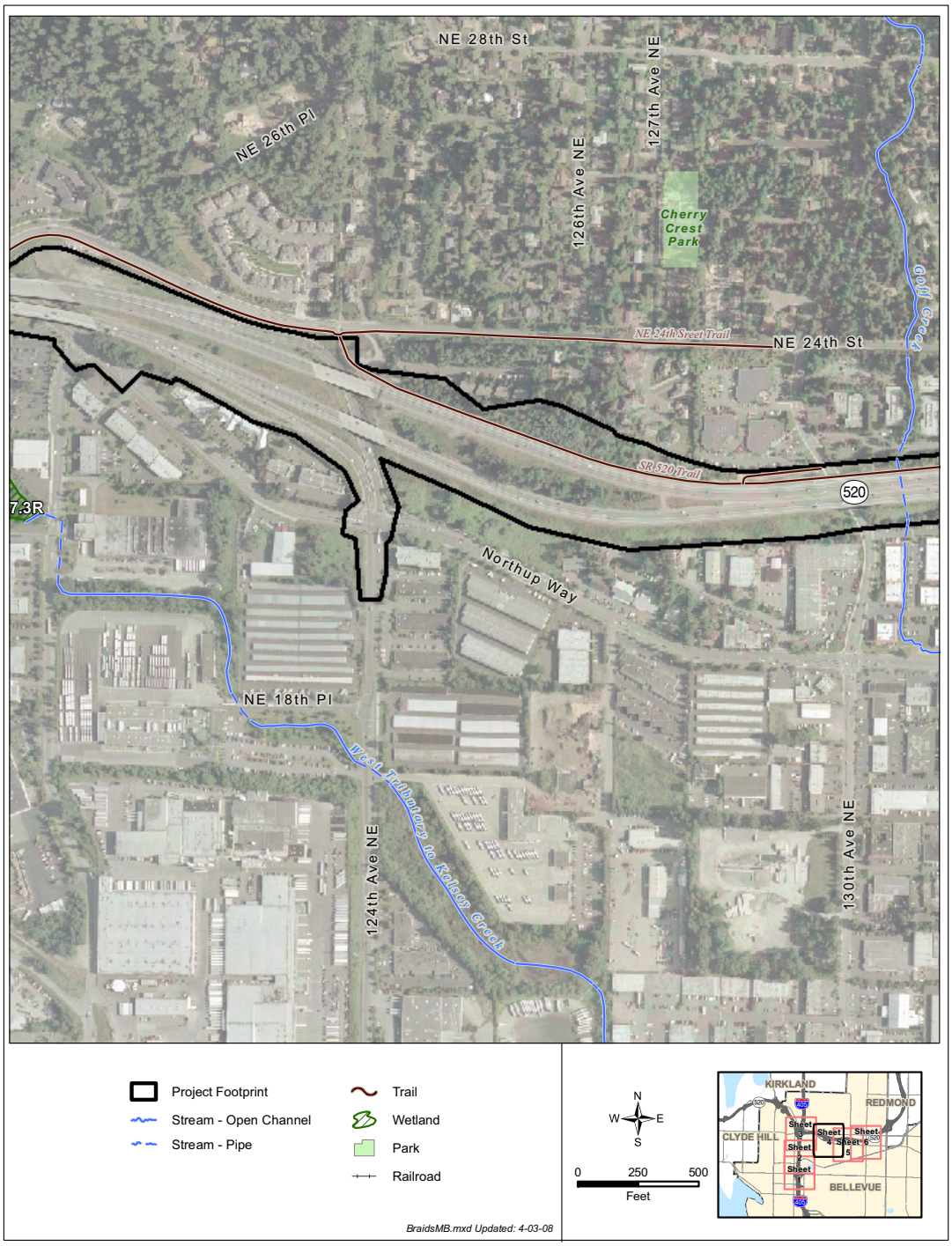
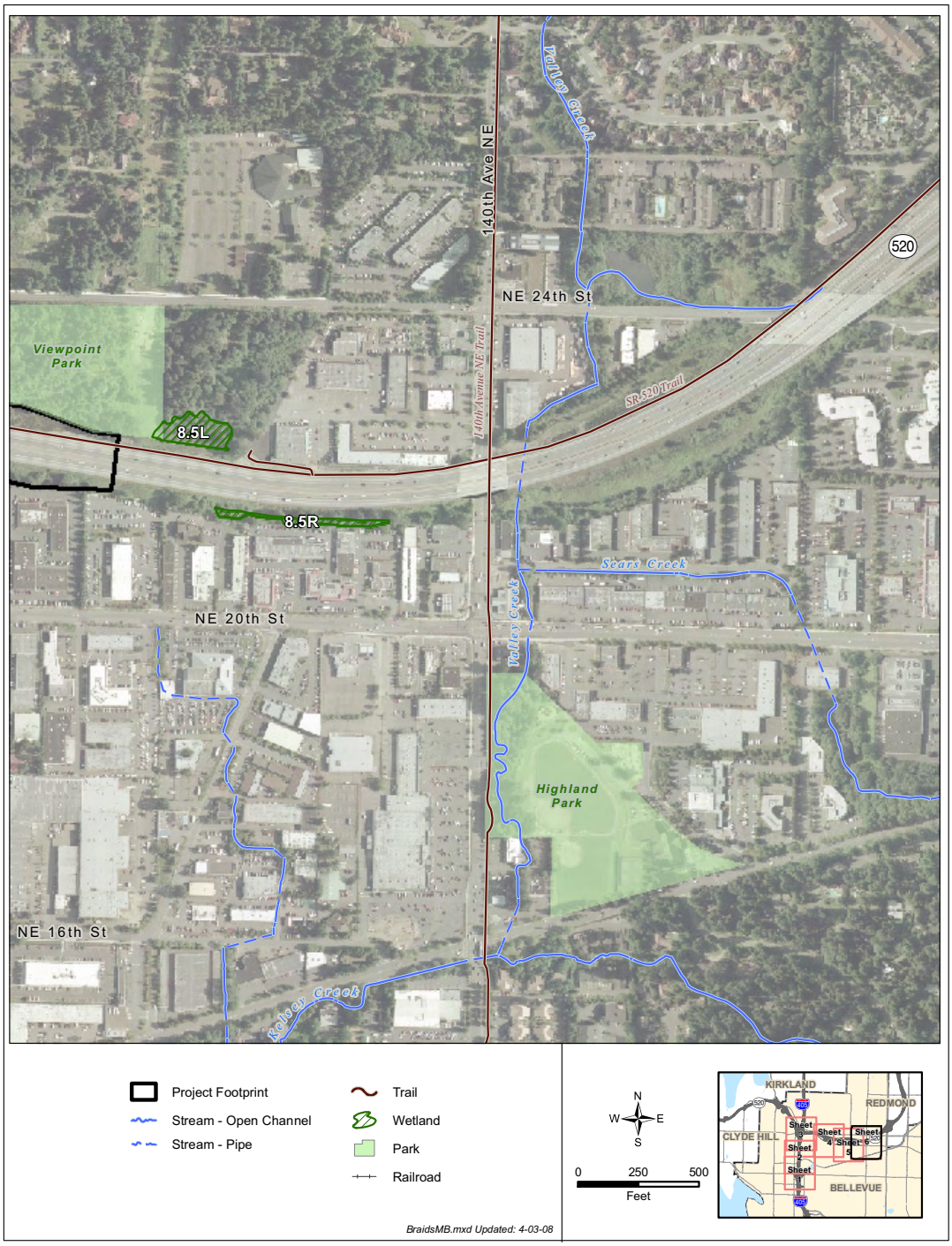


Exhibit 5-20: I-405, NE 8th Street to SR 520 Improvement Project Wetlands and Streams - Sheet 5 of 6

Exhibit 5-20: I-405, NE 8th Street to SR 520 Improvement Project Wetlands and Streams - Sheet 6 of 6



Salmonid species found in the study area include Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and sea-run cutthroat trout (*O. clarki clarki*). Chinook, coho, and sea-run cutthroat are found in Valley Creek, which is located outside of the project footprint. Coho are also found in Yarrow Creek. These anadromous fish species primarily use the streams in the study area for upstream and downstream migration and rearing. The study area also contains limited spawning habitat for Chinook and coho. Resident cutthroat trout use the study area for all life stages. Chum salmon (*Oncorhynchus keta*), sockeye salmon (*O. nerka*), pink salmon (*O. gorbuscha*), steelhead (*O. mykiss*), and bull trout (*Salvelinus confluentus*) are not known to occur in the study area.

Other fish species likely to be found in the study area include threespine stickleback (*Gasterosteus aculeatus*), longnose dace (*Rhinichthys cataractae*), speckled dace (*R. osculus*), prickly sculpin (*Cottus asper*), riffle sculpin (*C. gulosus*), reticulated sculpin (*C. perplexus*), shorthead sculpin (*C. confuses*), torrent sculpin (*C. rhotheus*), largescale sucker (*Catostomus macrocheilus*), Pacific lamprey (*Lampetra tridentate*), river lamprey (*L. ayresi*), and western brook lamprey (*L. richardsoni*). Exhibits 5-21 and 5-22 detail the anadromous and resident fish species known to occur in the individual streams in the study area.

What is a salmonid?

A salmonid is a fish of the fish family Salmonidae, for example, salmon, trout, and chars.

What are anadromous fish?

An anadromous fish is a fish species that spends a part of its life cycle in the sea and returns to freshwater streams to reproduce (for example, salmon, steelhead, and trout).

Exhibit 5-21: Anadromous Fish Species Known or Presumed to Be in Water Bodies in or near the Study Area

	Fish Species			
	Chinook Salmon	Coho Salmon	Sea-Run Cutthroat	Pacific Lamprey
Sturtevant Creek				
Unnamed Tributary to Sturtevant Creek				
Unnamed Tributary to Yarrow Creek				
Yarrow Creek		✓		
West Tributary to Kelsey Creek				
Goff Creek				
Valley Creek	✓	✓	✓	✓

Exhibit 5-22: Resident Fish Species Known or Presumed to Be in Water Bodies in or near the Study Area

	Fish Species							
	Cutthroat Trout	River Lamprey	Western Brook Lamprey	Sculpin	Longnose Dace	Speckled Dace	Largescale Sucker	Threespine Stickleback
Sturtevant Creek	✓			✓	✓	✓	✓	✓
Unnamed Tributary to Sturtevant Creek								
Unnamed Tributary to Yarrow Creek	✓		✓	✓		✓	✓	✓
Yarrow Creek	✓	✓	✓	✓		✓	✓	✓
West Tributary to Kelsey Creek	✓		✓	✓				✓
Goff Creek	✓		✓	✓			✓	
Valley Creek	✓		✓	✓	✓	✓	✓	✓

Other native species found in the study area include several species of crayfish, frogs, salamanders, freshwater clams, and freshwater mussels.

The habitat characteristics for the water bodies located within the study area and the stream surveys performed for this project are detailed in Appendix E.

Wildlife Habitat

Four land use cover types are present in the study area: forested, shrub/grasses, maintained vegetation, and impervious surfaces. A large portion of the study area (approximately 95 percent) is dominated by the maintained vegetation and impervious surface cover types, leaving native wildlife species with little native habitat to use. The small amount of native upland habitat present within the study area is primarily forested (3 percent) and shrub/grasses (2 percent).

The forested land cover type in the study area has a relatively high degree of use by wildlife for cover, foraging, nesting, and denning areas, as well as migration corridors. However, the areas of forested cover type are typically small and surrounded by more urbanized areas, limiting use by larger mammals. Some of the typical habitat features found in forested areas, such as fallen trees and snags, are lacking in these areas as compared to natural conditions. In general,

these forested areas provide habitat for birds, mammals, reptiles, amphibians, and a variety of insect species.

The shrub/grasses land cover type provides habitat for a variety of smaller birds and mammals, reptiles, amphibians, and insects. Shrubs and grasses provide food sources for insects, songbirds, upland game birds, and many mammals. Shrubs can also provide shelter from predators or extreme weather, or to nest and raise young. Predator species, such as raptors and coyotes, use shrub and grassy areas to hunt.

The maintained vegetation land cover type, including mowed and landscaped areas, does not typically provide habitat for a large diversity of species due to the regular disturbance associated with these areas. These areas are often frequented by small birds and mammals adapted to human presence.

The impervious surface land use cover type provides little or no wildlife habitat value.

No federally-listed wildlife species are known to inhabit the study area. Based on information in the Washington Department of Natural Resources Natural Heritage Program, the Washington Department of Fish and Wildlife Priority Habitats and Species Program, and U.S. Fish and Wildlife Service databases, the project team identified two special status species within one mile of I-405. The two species are great blue heron (*Ardea heodias*) and osprey (*Pandion haliaeetus*). However, no osprey nests or blue heron colonies occur within the project study area.

How will project construction affect ecosystems in the study area?

Wetlands

Permanent Effects

Only one wetland (Wetland 6.95R) will be permanently affected by construction activities. Wetland 6.95R is a 0.39-acre wetland dominated by reed canarygrass and surrounded by urban land uses including roads and buildings. Approximately 0.30 acres of the wetland and 0.47 acre of its associated buffer will be affected. The affected buffer is a mix of reed canarygrass, planted shrubs, and trees. The remaining portion of the wetland is expected to continue functioning after the project is constructed because it is downslope of the source of water in-flow.

Please refer to Chapter 6 for a discussion of ecosystems mitigation measures during project construction and operation.

Wetland mitigation will be provided at a site in Kelsey Creek Park. It is upland area adjacent to a large wetland complex that will be transformed to an emergent wetland. Its wildlife habitat will be enhanced by constructing habitat structures and replanting adjacent upland areas with forest-type vegetation. See Chapter 6 for more detail.

Temporary Effects

WSDOT may need to temporarily place fill in wetlands and buffers to allow adequate room for construction activities. Two wetlands (Wetlands 6.95R and 7.2L) will be temporarily affected. About 0.05 acres of wetland and 0.07 acres of wetland buffer will be temporarily affected.

Aquatic Resources

Permanent Effects

Project elements that will permanently affect fish and aquatic resources include:

- Encroachment below the OHWM of the unnamed tributary to Sturtevant Creek and its associated buffer to allow for widening the on-ramp from NE 8th Street to northbound I-405.
- Constructing new stormwater facilities for the treatment of water quality and quantity associated with the new impervious surfacing created by the project. Please see Section 5.5 Water Resources for additional information on stormwater treatment and quality.

Approximately 200 linear feet of stream channel and 0.15 acres of stream buffer will be permanently affected. In-water work will occur in 0.04 acres of stream channel. The affected portion of the stream will be placed in a pipe to convey the water. This habitat is mostly represented by poor habitat conditions, including reduced over-water cover, no LWD contribution, substrate composed mostly of fine silt and sand, and frequent stormwater inputs. There will be no other stream-crossing culvert replacements or extensions with this project.

Stream mitigation will occur along the main stem of Sturtevant Creek and will be designed to increase hydrologic connectivity with two small riparian wetlands, improve fish rearing habitat, and improve riparian buffer conditions. See Exhibit 4-2 and Chapter 6 for more detail.

The I-405, NE 8th Street to SR 520 Improvement Project would add approximately 11.4 acres of new impervious surface within the study area. Increases in peak stream flows resulting from increased impervious area can negatively affect fish and aquatic habitat. The stormwater facilities that will be constructed as part of the project will mitigate effects on peak flows. Likewise, no negative effects on stream base flows are likely to occur as the overall amount of impervious surface resulting from the project will only slightly increase. New stormwater features will treat stormwater runoff from all new impervious surfaces, as well as some existing impervious surfaces that currently do not receive treatment. Therefore, the water quality of stormwater discharge associated with the project is not expected to adversely affect aquatic life in the streams of the study area.

Temporary Effects

Temporary construction effects include in-water disturbances and stream diversions, sedimentation from areas cleared of vegetation, and removal of stream buffer vegetation.

Construction activities occurring in or near the unnamed tributary to Sturtevant Creek can disturb fish, other aquatic species, and aquatic habitat. Except where absolutely necessary, construction equipment will not enter streams below the OHWM. In addition, the stream will be dewatered prior to work within the stream channel. Although no fish have been observed or documented in the unnamed tributary to Sturtevant Creek, they could be present. Prior to the commencement of in-water work, any fish will be excluded and removed from the work area with appropriate methods. Dewatering will occur during the summer months, typically the driest time of the year when fish presence is least likely, and will be completed in the shortest time possible. Approximately 0.05 acres of stream buffer will be temporarily affected. After construction, the affected stream buffer will be replanted with native vegetation.

The potential for erosion and sedimentation will be highest in areas where construction activities will occur directly adjacent to streams. Within the study area, these areas include streams that cross under or flow adjacent to I-405 and SR 520. Streams fitting this definition include: Sturtevant Creek, the unnamed tributary to Sturtevant Creek, the unnamed tributary to

Yarrow Creek, and Goff Creek. BMPs will be implemented as required in the WSDOT HRM to minimize erosion and sedimentation during construction.

Wildlife Habitat

Permanent Effects

Project construction activities will occur adjacent to and within all of the existing wildlife habitat cover types found in the study area. The permanent effects on wildlife habitat are shown in Exhibit 5-23.

Exhibit 5-23: Potential Land Cover Loss in the Study Area

Land Cover	Existing Land Cover (acres)[a]	Permanent Habitat Loss (acres)	Land Cover Change (%)
Forested	64.5	0.05	0.08
Shrubs and Grasses	37.3	0.01	0.03
Maintained Vegetation	699.5	4.34	0.62
Total	**801.3**	**4.40**	**0.55**

[a]Within 0.5 miles of project footprint

The permanent loss of approximately 4.40 acres of potential habitat will affect wildlife species in the study area. However, the 4.40 acres contains approximately 4.34 acres of maintained vegetation that provides low habitat value. The already sparse forested and shrub/grasses habitat in the study area will decrease by approximately 0.06 acres. Wildlife species within these areas are likely to migrate to other portions of the study area or outside the study area to find usable and available habitat. Currently, this habitat area is used by very few small mammals and bird species due to its frequent disturbance and lack of diversity.

Temporary Effects

Temporary effects on wildlife species include noise associated with general and localized construction activities. Although resident wildlife are adapted to urban environments and associated noise levels, some wildlife species will be affected during localized construction activities when noise levels

noticeably increase. Noise can disturb wildlife by disrupting communication, interfering with mating, and reducing the ability to obtain sufficient food, water, and cover.

In addition to direct effects on wildlife, construction activities such as clearing vegetation for staging areas and access roads will temporarily affect approximately 0.1 acres of forested, 0.3 acres of shrub/grasses, and 29.8 acres of maintained vegetation. WSDOT will develop a project-specific planting plan prior to commencing construction to identify how and where vegetation will be restored.

How will the completed project affect ecosystems in the study area?

No adverse effects on wetlands, aquatic resources, or wildlife habitat are expected during operation of the I-405, NE 8th Street to SR 520 Improvement Project. Some wetlands and streams within the study area are currently affected by routine vegetation maintenance to meet safety and operation standards as set forth by WSDOT. Wetland and riparian areas located within the right-of-way that are presently subject to routine maintenance activities would likely continue to be affected by these practices and conditions.

WSDOT has completed consultation with USFWS and NMFS regarding potential effects of the project on federally-listed threatened and endangered species. WSDOT determined the project "may affect, but is not likely to adversely affect" bull trout, Puget Sound Chinook salmon, and steelhead. WSDOT also determined the project would have "no effect" on other federally-listed species. See concurrence letters from USFWS and NMFS in Appendix A.

What would happen to ecosystems if WSDOT did not build this project?

Wetlands

The No Build Alternative would have no new permanent, temporary, or indirect effects on wetlands in the study area. No wetlands or wetland buffers would be filled or cleared under this alternative, and there would be no change to the existing moderation of stormwater flows or the existing wildlife habitat functions.

Many of the wetlands present in the right-of-way are currently adversely affected by the lack of forested upland buffer, by

mowing associated with WSDOT maintenance activities, and by the lack of modern stormwater management facilities. Wetlands in the study area that currently receive untreated runoff from I-405 and SR 520 would continue to do so. Wetlands in the study area that currently receive untreated runoff would likely continue to be affected by these conditions. Water quality in these wetlands would continue to be affected by sediment transport and erosion.

Aquatic Resources

With the No Build Alternative, water quality in the streams in the study area would continue to degrade and stormwater flows into the streams would increase as urbanization of the area continues. No physical changes would occur to the streams from construction activities, though some disturbance to stream buffers may occur through routine maintenance activities such as mowing.

The amount of untreated stormwater entering these water bodies from I-405 and SR 520 would remain unchanged. It is possible that emission-reducing improvements in automobiles or increases in traffic volumes could change the concentrations of pollutants and contaminants entering these streams.

Wildlife Habitat

The No Build Alternative would have no permanent, temporary, or indirect effects on wildlife and land use cover types in the I-405, NE 8th Street to SR 520 Improvement Project study area. No cover types would be fragmented, cleared, or converted under this alternative, and there would be no change to current existing wildlife habitat functions.

Wildlife habitat in the right-of-way and existing cover types would continue to be low quality with the presence of invasive species. Normal roadway maintenance including mowing and clearing would continue to preserve roadway safety.