
Chapter 5:

Environmental Resources Overview

This chapter provides an overview of the natural and built environmental resources in the SR 520 Multi-modal Corridor Planning Study area.

Why did we study environmental resources for the SR 520 Multi-modal Corridor Planning Study?

The SR 520 Project Team reviewed the natural and the built environment in the study corridor as part of the process of developing the study recommendations. Conceptual planning studies like this SR 520 Multi-modal Corridor Planning Study are not required to meet the detailed analyses needed to comply with the National or State Environmental Policy Acts (NEPA/SEPA). However, early identification of environmental resources can help guide recommendations for project designs that avoid or minimize environmental impacts. Also, environmental information gathered in the planning phase can contribute to NEPA and SEPA documentation during later phases of project design and construction. Source material produced in support of the transportation planning process may be incorporated into subsequent SEPA/NEPA documents in accordance with RCW, WAC, FHWA and CEQ regulations.

Environmental Analysis and the Federal Nexus

What is a federal nexus? When transportation projects require a federal environmental permit or receive federal funds, then Federal Environmental laws like NEPA and ESA are triggered. This trigger (federal funds or federal permits) is called the federal nexus.

For projects that trigger a federal nexus, additional time and budget may be needed to complete environmental documentation and permitting prior to project construction.

Environmental elements described in this corridor plan consist of general information collected to identify and document potential issues as part of the transportation study process. Specific impacts to environmental elements would be determined, and associated permits

obtained, when a project has been funded for design and construction. As funding becomes available to move forward with the projects recommended in this corridor planning study, additional environmental analyses will be necessary. If the project has a federal nexus (federal funds or federal permits), an environmental assessment or EIS may be required.

Future Environmental Analysis: Environmental resources and elements

Based on the preliminary review of environmental resources in the SR 520 study area described below, more detailed future environmental analysis may be required to include the following environmental elements of the natural and built environments. Review of some or all of these elements may be combined to reduce paperwork and duplication, improve readability, and focus on the significant issues.

1. Natural Environment

- a. Earth (geology, soils, topography, unique physical features, erosion/enlargement of land area- accretion)
- b. Air (air quality, odor, climate)
- c. Water (surface water movement/quantity/quality, runoff/absorption, floods, groundwater movement/quantity/quality, public water supplies)
- d. Plants and animals (habitat for and numbers or diversity of species of plants, fish, or other wildlife)
- e. Energy and natural resources (amount required/rate of use/efficiency, source/availability, nonrenewable resources, conservation and renewable resources, scenic resources)

2. Built Environment

- a. Environmental health (noise, risk of explosion, releases or potential releases to the environment affecting public health, such as toxic or hazardous materials)
- b. Land and shoreline use (relationship to existing land use plans and to estimated population, housing, light and glare, aesthetics, recreation, historic and cultural preservation, agricultural crops)
- c. Transportation (transportation systems, vehicular traffic, waterborne, rail and air traffic, parking, movement/circulation of people or goods, traffic hazards)
- d. Public services and utilities (fire, police, schools, parks or other recreational facilities, maintenance, communications, water/storm water, sewer/solid waste, other governmental services or utilities). What are the natural environmental resources in the corridor?

For the purpose of the SR 520 Multi-modal Corridor Planning Study, WSDOT conducted a preliminary environmental review of the environmental resources in the study area. The environmental elements described below will most likely require detailed future study.

1. Natural Environment

a. Earth

The project area is located in area of moderate to high seismic risk. See Exhibit 5.1 Seismic.

The liquefaction hazard potential is low to moderate, with areas of landslide hazard in some portions of the project area. See Exhibit 5.2 Earth and Soils.

Also, substantial environmental documentation was recently completed for the SR 520 Bridge Replacement Project and is indicative of the types of conditions likely to be encountered:

- a number of potential geologic hazards exist along the corridor, including areas susceptible to erosion, steep-slope and landslide hazard areas, artesian groundwater conditions, soft soil conditions, and seismic risk.
- An abundance of compressible and low-strength soils in a region with high seismicity.
- slide-prone soils, which would require relatively more expensive excavation support to maintain safety.

Source: <http://www.wsdot.wa.gov/Projects/SR520Bridge/EIS.htm#FEIS>

GIS analysis for the SR 520 Multi-modal Corridor Planning Study area confirms these findings.

Exhibit 5.1: Seismic

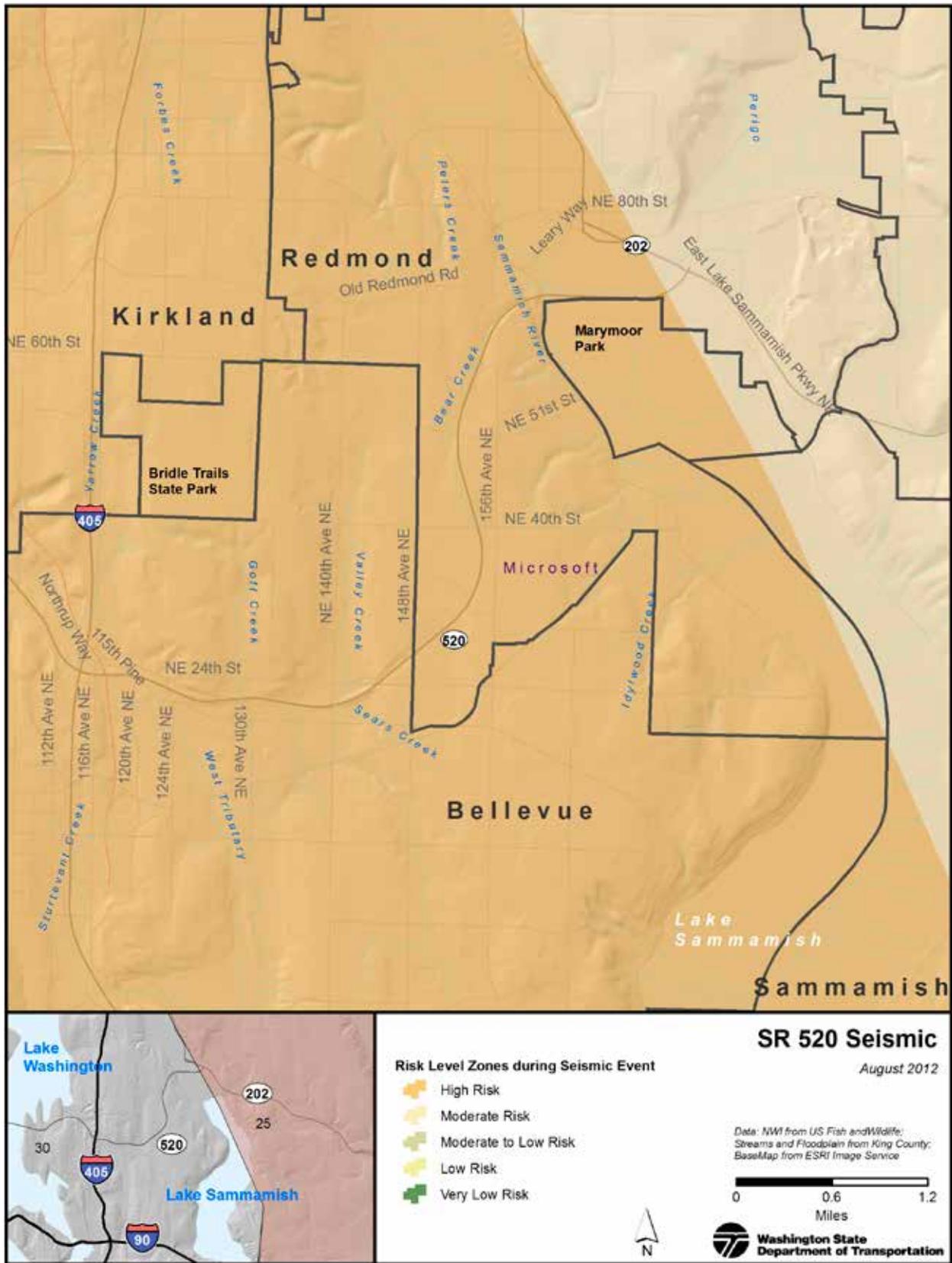
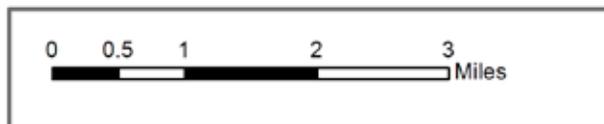
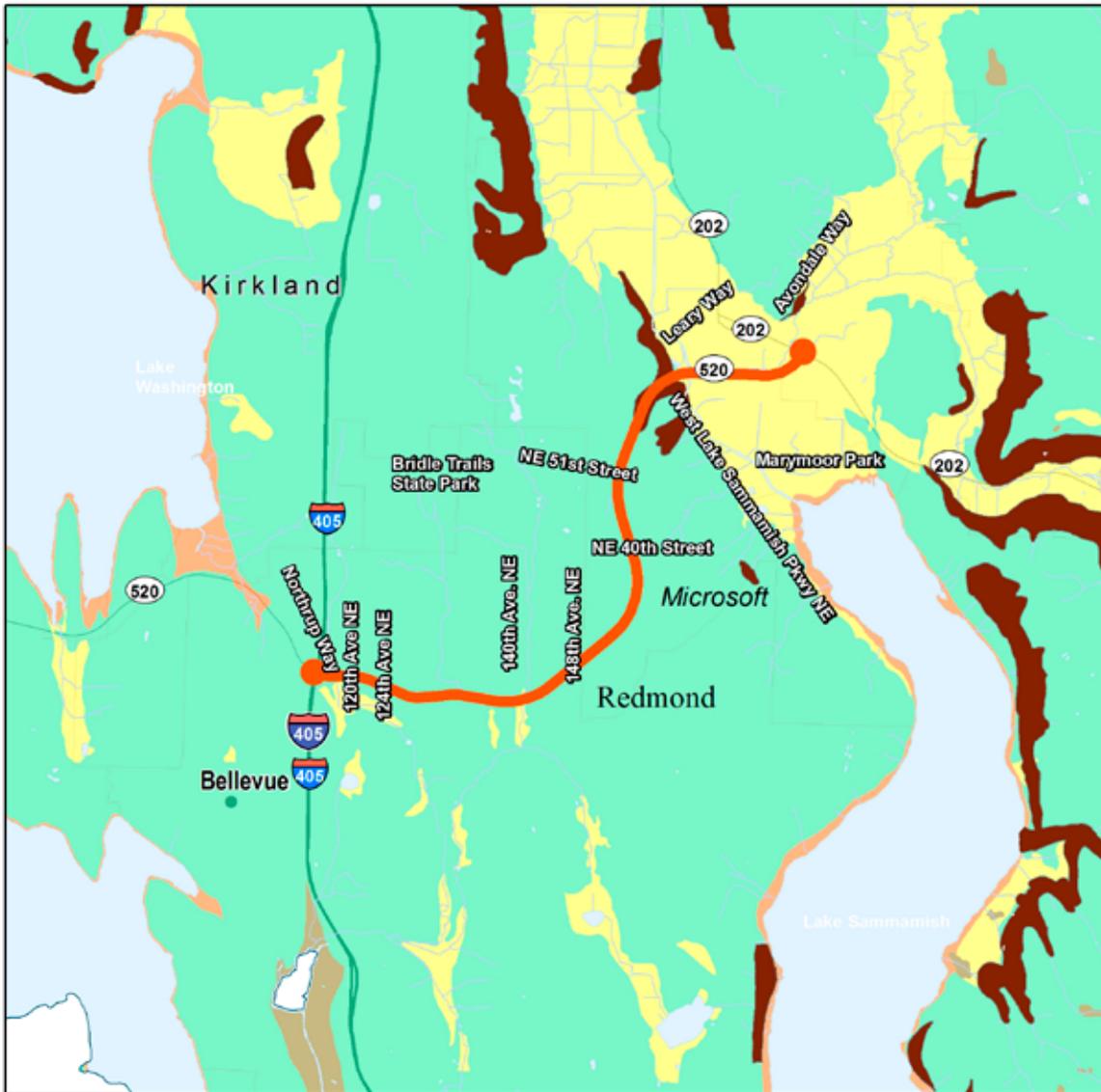


Exhibit 5.2: Earth and Soils



b. Air Quality

The SR 520 Multi-modal Corridor Planning study area is located in King County, Washington. King County is an attainment/maintenance area for air quality ozone and carbon monoxide. For particulates, the study area is designated a non-attainment area. See also attached map, Exhibit 5.3.

Areas that have experienced persistent air quality problems are designated by the U.S. Environmental Protection Agency (EPA) as nonattainment areas. The federal Clean Air Act requires additional air pollution controls in these areas. Each nonattainment area is declared for a specific pollutant; however, nonattainment areas for different pollutants may overlap each other or share common boundaries.

EPA has designated 13 areas in Washington State as nonattainment. After air monitoring shows that a nonattainment area is meeting health-based air quality standards, EPA redesignated the areas as attainment. To be redesignated, an area must both meet air quality standards, and have a 10-year plan for continuing to meet and maintain air quality standards and other requirements of the Clean Air Act. Areas that are redesignated to attainment are called maintenance areas.

Here are the areas in Washington State designated as maintenance areas:

Ozone: Puget Sound (King, Pierce and Snohomish Counties) and Vancouver (Clark County) are maintenance areas.

Particulate Matter (PM10) Thurston County, Tacoma Tideflats, Kent Valley, and Seattle Duwamish, Spokane, Yakima, and Wallula (Sept 26, 2005) are maintenance areas.

Carbon Monoxide: Puget Sound (King, Pierce and Snohomish Counties) Yakima, Vancouver (Clark County) and Spokane are maintenance areas.

Who monitors air quality?

Air quality in most areas of Washington State is protected by local clean air agencies. Tribes protect and have authority over their tribal lands. The Washington State Department of Ecology has authority in all other areas. Puget Sound Clean Air Authority (PSCAA) is responsible for Snohomish County air quality monitoring.

Click here to visit the PSCAA website:
<http://www.pscleanair.org/>

What air pollutants are monitored?

The federal Environmental Protection Agency (EPA) sets air quality standards to protect health. EPA has set standards for seven air pollutants: carbon monoxide (CO), nitrogen oxides (NO₂), sulfur dioxide (SO₂), lead (Pb), fine particulate matter (PM 2.5), larger particulate matter (PM 10), and ozone (O₃). The standards define how much air pollution is safe in the outdoor air.

Why monitor air quality?

States monitor air quality in different areas to find out how much pollution is in the air and make sure pollutant levels are meeting health-based federal air quality standards. Knowing how much pollution is in the air in a certain area helps air quality agencies know when and how to take action to protect public health. For more information about air quality, visit the Department of Ecology website:
http://www.ecy.wa.gov/programs/air/air_monitoring_data/WAQA_Intro_Page.html

Common sources of CO₂, Ozone and Particulate Matter

Pollutant	Description	Sources	Health Effects
Carbon Monoxide (CO)	An odorless, tasteless, colorless gas which is emitted primarily from any form of combustion.	Mobile sources (autos, trucks, buses), Wood stoves, Open burning, Industrial combustion sources.	Deprives the body of oxygen by reducing the blood's capacity to carry oxygen; causes headaches, dizziness, nausea, listlessness and in high doses, may cause death.
Ozone (O₃)	Formed when nitrogen oxides and volatile organic compounds react with one another in the presence of sunlight and warm temperatures. A component of smog.	Mobile sources, Industry, Power plants, Gasoline storage and transfer, Paint.	Irritates eyes, nose, throat and respiratory system; especially bad for those with chronic heart and lung disease, as well as the very young and old, and pregnant women.
Particulate Matter PM₁₀	Particles of soot, dust, and unburned fuel suspended in the air.	Wood stoves, Industry, Dust, Construction, Street sand application, Open burning.	Aggravates ailments such as bronchitis and emphysema; especially bad for those with chronic heart and lung disease, as well as the very young and old, and pregnant women.

Washington Climate Change

Executive Order 07-02, Governor Christine Gregoire's Washington Climate Change Challenge, established the state's commitment to address climate change by reducing greenhouse gas emissions through strategies that reduce the amount of driving and vehicle miles traveled. The recommendations in this corridor planning study address climate change by reinforcing CTR Programs, analysis of bicyclist and pedestrian needs to encourage nonmotorized travel, and inter-agency coordination with transit to encourage access to and use of transit.

In 2009, Governor Gregoire issued Executive Order 09-05, Washington's Leadership on Climate Change, which directs WSDOT to consult and collaborate with the Departments of Ecology and Commerce, local governments and other stakeholders in estimating current and future statewide levels of vehicle miles traveled (VMT); in evaluating potential changes to the VMT benchmarks established in RCW 47.01.440; and in developing additional strategies to reduce greenhouse gas (GHG) emissions from the transportation sector.

The Governor's Executive Order (EO) also directs the department to work cooperatively with the four largest metropolitan planning organizations to develop and adopt regional transportation plans that will provide people with additional transportation alternatives, reduce GHGs, and achieve the annual per capita VMT statutory benchmarks. The Washington Legislature passed laws in 2009 to encourage electric vehicles, create a sustainable energy trust, set goals for greenhouse gas emissions, improve energy efficiency, establish a climate change/land use work group, and support commute trip reduction for state agencies. Climate change is addressed at the following WSDOT website:

www.wsdot.wa.gov/SustainableTransportation/

Climate Change and Greenhouse Gas Emissions (GHG)

Global climate change refers to changes in average temperatures, wind patterns, precipitation, and storms. Gases that trap heat in the atmosphere are often called Greenhouse Gases (GHGs). GHGs are emitted by both natural processes and human activities.

The accumulation of GHGs in the atmosphere regulates the Earth's temperature. Emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of GHGs in the atmosphere, leading to higher ambient temperatures and global climate change. Carbon dioxide makes up the larger share of greenhouse gases. In Washington State, the largest single source of carbon emissions is motorized transportation, accounting for an estimated 47 percent of carbon dioxide equivalent emissions statewide. The average passenger vehicle emits about 423 grams of CO₂ per mile, or 423 grams per Vehicle Miles Travelled (VMT).

GHG and VMT

WSDOT calculates the statewide VMT based on roadway miles and traffic count data from WSDOT, counties, and cities. VMT is reported on a calendar year basis. Differences from one year to the next are not clear indicators of changes in driving behavior. Five-year periods are the minimum time period over which trends can be identified. At the state level, VMT is a good indicator of the actual miles traveled. This accuracy holds down to the county level. Below the county level, it is very difficult to accurately assess VMT. Because VMT reflects activity across the roadway network, it is not a useful measure at the project level. Reductions in greenhouse gases might be expected when project designs include significant investment in promoting and supporting the three basic ways to reduce VMT: Shift modes from the private car to transit, walking, or biking; Increase vehicle occupancy in private cars and vanpools; and, Travel less through telecommuting, combining trips, reducing the number of discretionary vehicle trips, and employing tools such as a compressed work week, pricing, and more compact land development that enhances transit, biking, and walking.

Climate Change

Pacific NW climate projections available from the Climate Impacts Group at the University of Washington show that over the next 50 years Washington State is likely to experience:

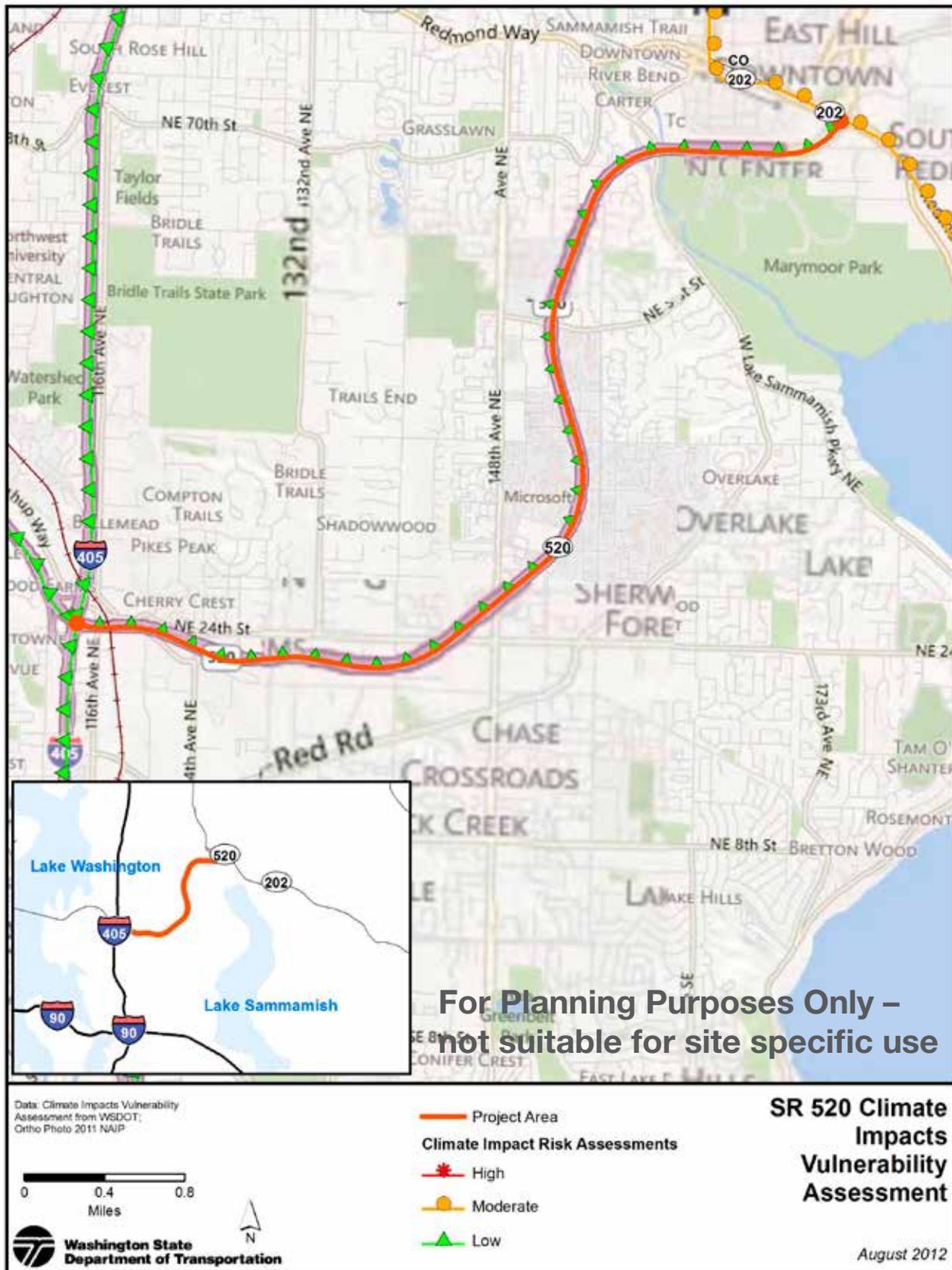
- increased temperature (extreme heat events, changes in air quality, glacial melting)
- changes in volume and timing of precipitation (reduced snow pack, increased erosion, flooding)
- ecological effects of a changing climate (spread of disease, altered plant and animal habitats, negative impacts on human health and well-being)
- sea-level rise, coastal erosion, salt water intrusion

Climate Change Vulnerability Assessment

In 2011, WSDOT examined climate risks to state transportation assets using data from the University of Washington Climate Impacts Group. WSDOT convened 14 workshops across the state to inventory and assess the possible impact of extreme weather on WSDOT owned and operated facilities. The result was the Climate Impacts Vulnerability Assessment Report, published November, 2011. The report includes GIS level data and maps with linked notes about the possible effects of extreme weather on specific facilities. The planning team incorporated information from the 2011 Climate Change Vulnerability Assessment Report into this corridor planning study. See also Appendix D.

The SR 520 Multimodal Planning Study area is rated as low risk. However, the Climate Impacts Vulnerability Assessment Report does include the note that there are potential slope problems at the Microsoft access road/NE 49th where it hooks into West Lake Sammamish Parkway. The area is in a flood plain with a low spot at Marymoor flats. Vulnerability assessment notes comment that it is still fairly high above sea level, and that it is at low risk to climate change impacts but notes that it is a critical facility. However, it is projected that extreme precipitation events will increase with climate change and this raises the possibility that flooding may become more frequent at this location. This flooding is likely to result in temporary operational failure (characterized by minor damage or disruption). See also the following map, Exhibit 5.4, SR 520 Climate Impacts Vulnerability Assessment.

Exhibit 5.4: SR 520 Climate Impacts Vulnerability Assessment



c. Water Resources: rivers and streams, wetlands, flood plain, culverts. See also map 5. 4, Water Resources

Rivers and Streams: The SR 520 Multi-modal Corridor Planning Study project area includes several rivers and streams, and is partially located in the floodplain. SR 520 between MP 7.0 and MP 13.0 from I-405 to Avondale Road intersects with the Sammamish River, Valley Creek and Goff Creek.

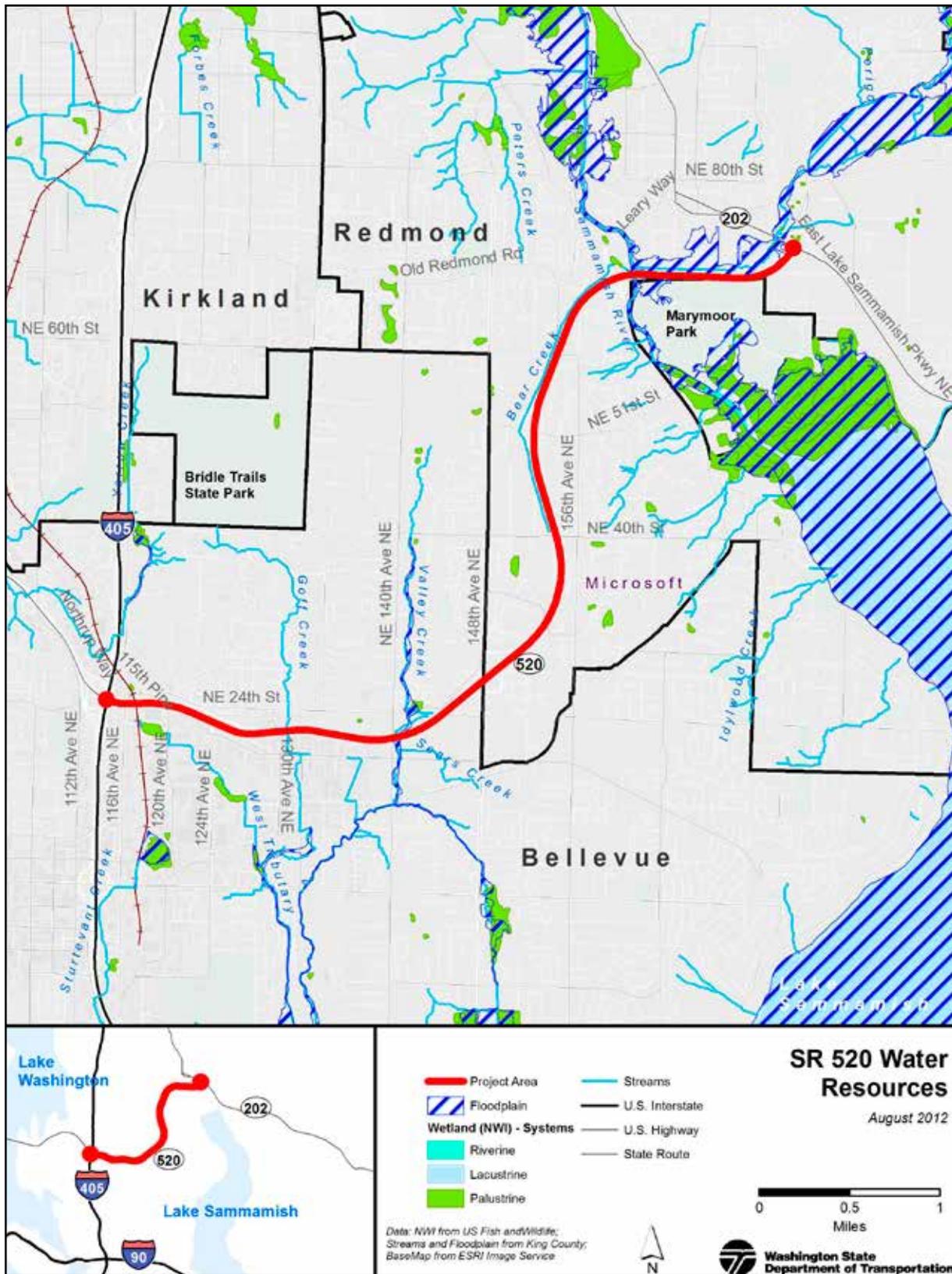
Wetlands: Located in Water Resource Inventory Area (WRIA) 8 Cedar- Sammamish, there are high quality (likely Category I and II) wetlands in the study area. GIS analysis also shows the presence of hydric soils, a primary indicator of the likelihood of the presence of wetlands.

Floodplain: The study area is partially located in the flood plain of the Sammamish River, a designated 100-year floodplain. See also Exhibit 5.5, Water Resources.

Why are wetlands important?

Wetlands are transitional zones between aquatic environments and dry land. Their physical, biological, and chemical functions provide a wide variety of ecological benefits. For example wetlands have the capacity to store water and reduce downstream flooding and trap sediments and other pollutants, improving overall water quality. Wetland vegetation also slows the movement of water, reducing streambank and shoreline erosion. In addition, wetland can support diverse plant communities, which provide food and habitat for wildlife. Wetlands also provide education and recreational opportunities.

Exhibit 5.5: Water Resources

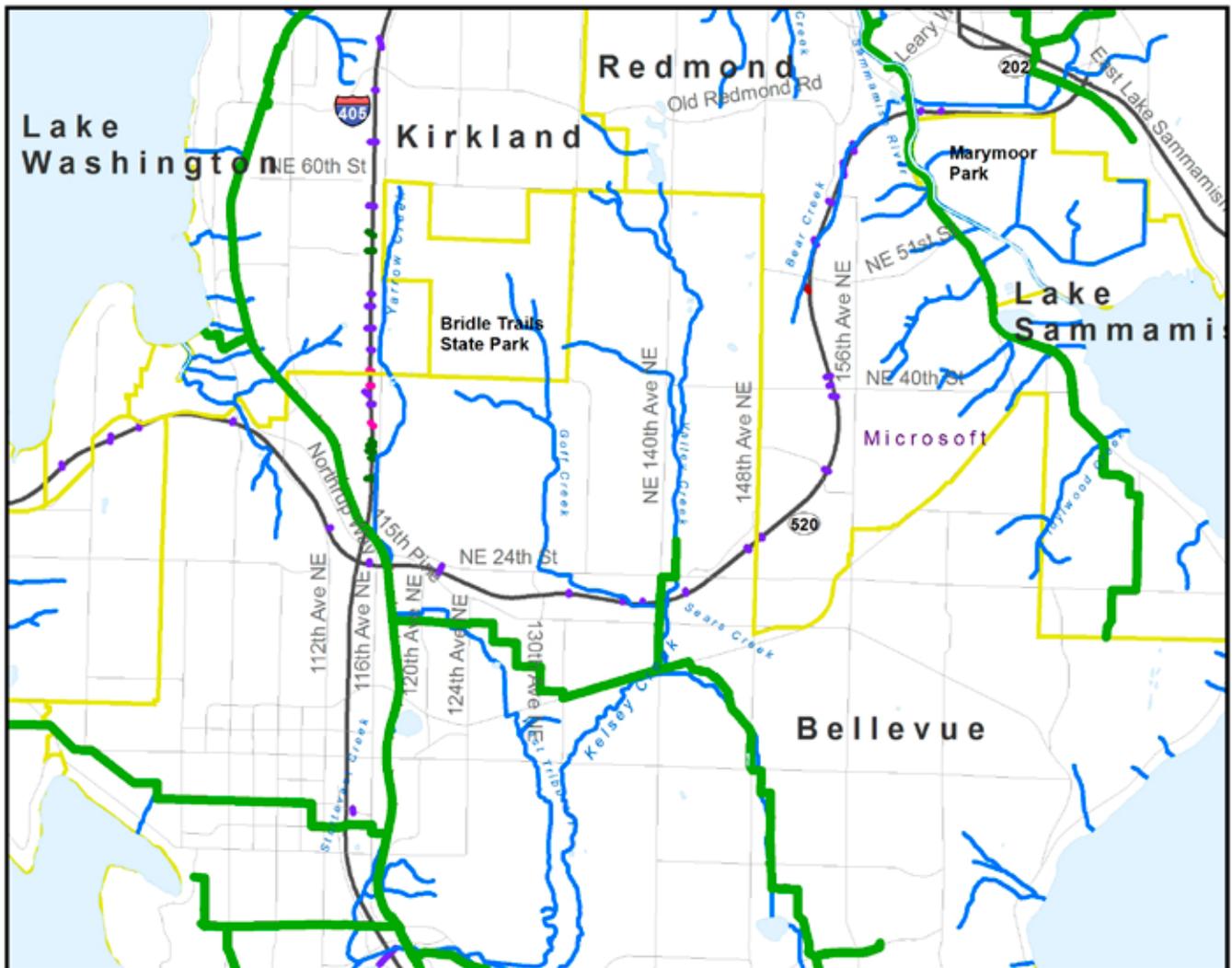


Culverts: The WSDOT inventory shows a fish passage barrier culvert at MP 7.9, which coincides with Valley Creek. In addition, WDFW staff who field checked the project area also noted that “(t)he city of Bellevue piped most of the headwaters of the small streams and wetlands under the city and tied them to the city drain system. Nothing upstream of WSDOT crossings can be classified as fish bearing anymore. There are several places where water collects during rainy periods.” (personal email dated 8/01/12). There are several other named streams and named or unnamed tributaries within 2000 feet of the project area: Yarrow Creek, Bear Creek, Sears Creek, and Kelsey Creek. Where any of these streams and their named and unnamed tributaries cross the project area there are likely to be culverts that would need to be investigated further during project scoping and design phases.

See Exhibit 5.6, Streams and Culverts for the locations of these resources..

Cultural Resources: there are several rivers and streams in the project area. Where rivers and streams have historically intersected, there is an increased chance of discovering cultural resource and artifacts. A full cultural resources review would be required during project scoping and design phases.

Exhibit 5.6 Streams and culverts



- Concrete Culvert
- Corrugated Steel
- Other pipe material
- PVC
- Plastic Culvert
- Smooth Metal
- Sewer Line
- Rivers & Streams

d. Plants and animals

The SR 520 Multi-modal Planning Study area includes wetlands, rivers, and streams. Prime habitat is commonly found adjacent to wetlands and streams. Riparian and wetland areas can also support rare and endangered plant species communities. During project design more extensive environmental review will be needed to identify, avoid and minimize impacts to wetlands and to endangered and listed plant and animal species. Consultation may be required with state and federal agencies. For unavoidable impacts, mitigation may be necessary.

During the project design and environmental documentation phase, WSDOT engineering staff will work closely with the Northwest Region Environmental Office to determine if impacts to resources can be avoided. If not, then the appropriate measures will be taken to minimize or mitigate the impacts.



2. Built Environment

a. Land Use: Parks and Trails See also Chapter 3.

There is a large bicycling and walking community in Puget Sound and regional trails get heavy use in the planning study area. Nearby parks and recreation opportunities include Marymoor Park and Bridle Trails State Park. With bike racks on every bus, commuters can and walk or ride their bikes to transit centers for portions of a multi-modal daily commute.

King County lists the following regional trails in the study area:

- SR 520 Regional Trail
- Lake to Lake Trail
- Sammamish River Trail
- PSE Trail
- Evans Creek Trail
- Bear Creek Trail

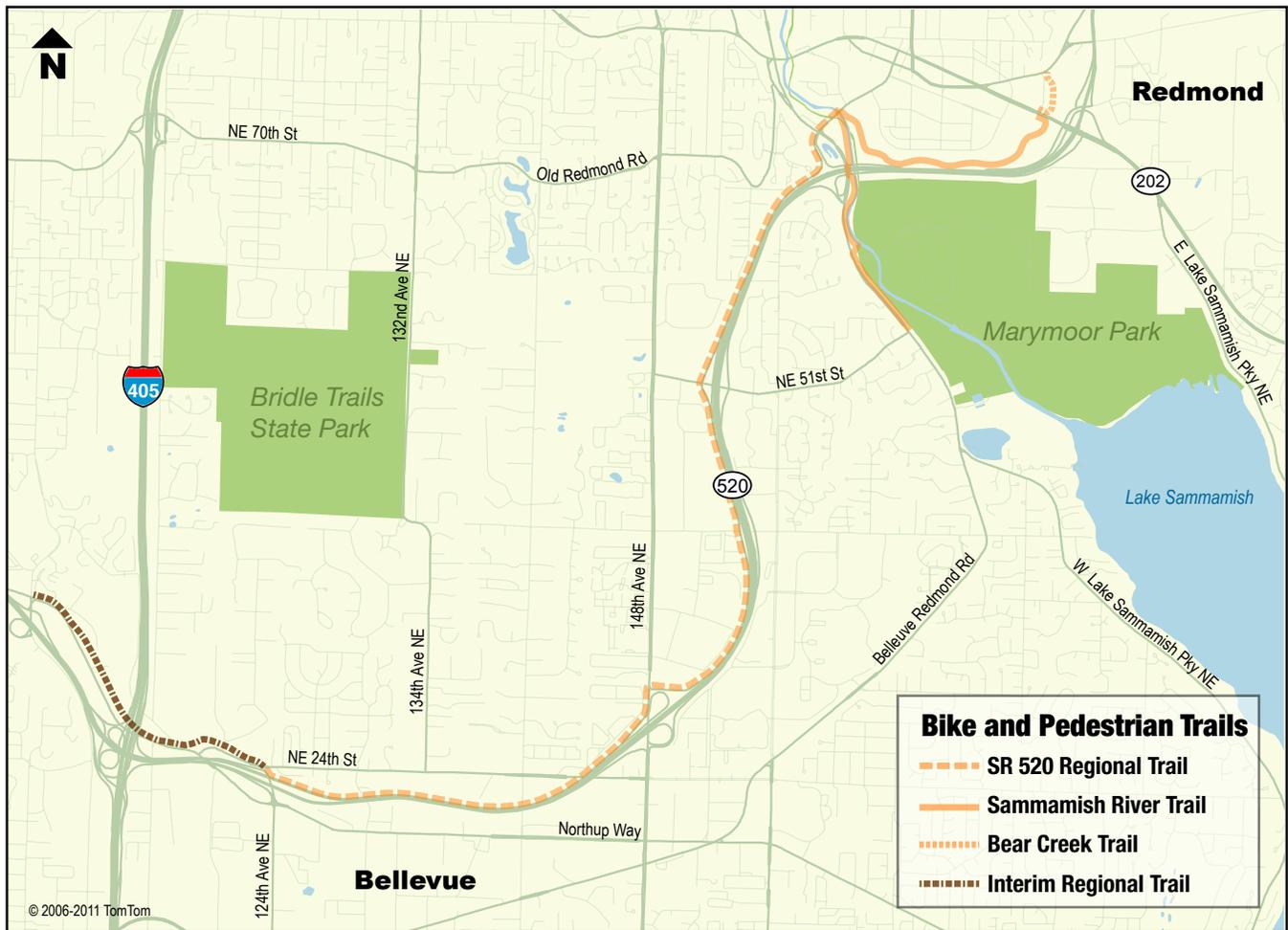
See also attached map, Exhibit 5.7: Regional Bicycle Trails.

Transportation Agencies and Environmental Justice

Transportation agencies are expanding their mission statements to include environmental justice. When transportation agencies receive federal dollars, they need to follow the federal requirements of Executive Order 12898, which defines environmental justice. Executive Order 12898 is the 1994 policy that directs all federal agencies to examine and to avoid disproportionately high and adverse human health or environmental effects of its programs on minority and low-income populations. This is the operative definition of environmental justice. In the past decade this executive order has prompted a renewed interest in Title VI of the Civil Rights Act of 1964, which prohibits discrimination in any federal program or federally-funded program, and applies to any agency that is the recipient of federal funds, including state and local agencies. For full text of Executive Order 12898, visit this website:

<http://www.ejnet.org/ej/execorder.html>

Exhibit 5.7: Bike and Pedestrian Trails

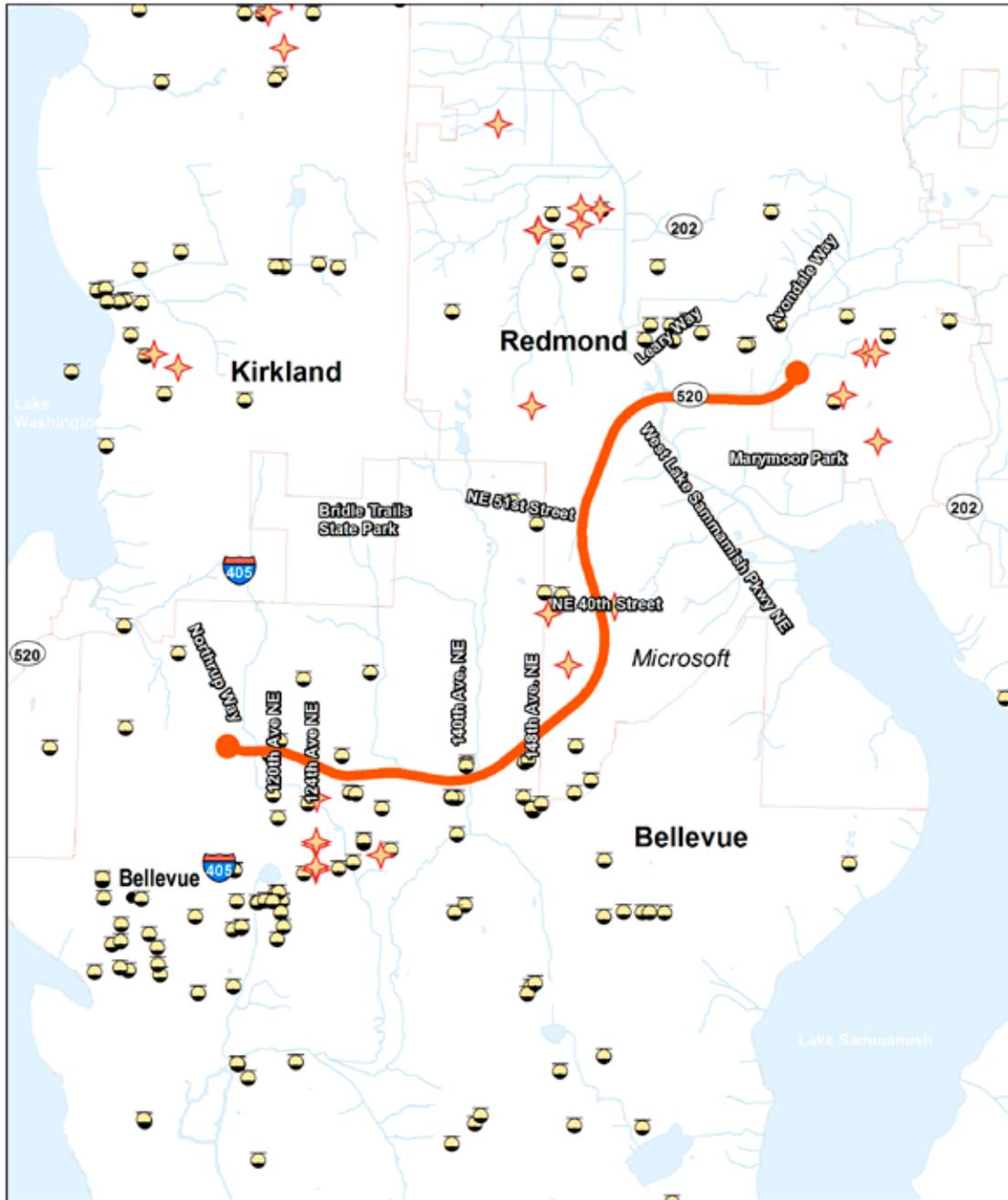


b. Environmental Health: Hazardous Materials

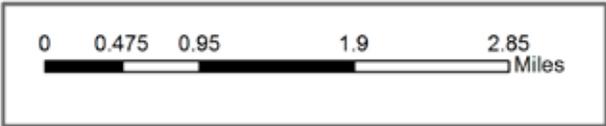
WSDOT reviewed GIS information sources from the Department of Ecology showing likely point sources of hazardous materials contamination in the SR 520 Multi-modal Planning Study area. This information includes Leaking Underground Storage Tanks and Superfund sites. There are several possible sources of contamination in the immediate vicinity of the SR 520 Multi-modal Planning Study area. These sites are often associated with gas stations and light industrial land uses and have reasonably predictable hazardous waste conditions.

See Exhibit 5.8: Environmental Hazards for the locations of these hazards.

Exhibit 5.8: Environmental Hazards



-  Toxic Releases (EPA)
-  Super Fund Sites (EPA)
-  LUST Site (Ecology)



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