APPENDIX O: WATER RESOURCES DISCIPLINE REPORT

I-405, NE 8th Street to SR 520 Improvement Project

INTERSTATE 405 Corridor Program

Congestion Relief & Bus Rapid Transit Projects

WATER RESOURCES DISCIPLINE REPORT

March 2008

Washington State Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

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SUMMARY

The Washington State Department of Transportation (WSDOT) is proposing to construct the Interstate 405 (I-405), NE 8th Street to State Route 520 (SR 520) Improvement Project to improve safety and reduce congestion in the vicinity of the I-405 and SR 520 interchange within the city of Bellevue. This Water Resources Discipline Report assesses the project's construction and operational effects on water resources, including surface water bodies, water quality, floodplains, and groundwater. This report evaluates two alternatives, the Build Alternative and the No Build Alternative.

Study Approach

To evaluate effects on water resources, the project 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. The project team 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*[1] to evaluate potential project effects on surface water (flows and quality), floodplains, and groundwater. Finally, we identified mitigation measures to avoid and minimize any potential adverse effects of the project on water resources.

Existing Conditions

The I-405, NE 8th Street to SR 520 Improvement Project is located in one of the most heavily developed watersheds in the Puget Sound area. This development has disturbed the landscape and affected the water resources and water quality. Within the study area, I-405 and SR 520 cross over and/or discharge stormwater to 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. Much of the stormwater runoff that enters these streams is not treated because treatment was not required when I-405 and SR 520 were built. A delineated

[1] *WSDOT, 2007b.*

floodplain exists along Valley Creek upstream and downstream of the SR 520 crossing.

Most of the groundwater resources in the study area occur in surficial glacial outwash deposits along Kelsey Creek and Yarrow Creek. Although King County does not currently designate these deposits as critical aquifer recharge areas (CARAs), the deposits are susceptible to contamination because of the shallow depth to groundwater and their permeable surface layers. Based on Ecology well log database information, all known groundwater wells located within 0.5 mile of the project are monitoring wells; no water supply wells were identified.

Project Effects

Project construction may have minor, temporary effects on the flow rates and water quality of streams within the study area. There could be slight increases in peak flows or turbidities in the receiving water bodies as work crews clear, grade, prepare construction areas for new pavement, and reconstruct the storm drain system. However, these effects will be temporary.

In-stream work is expected to be minimal. Widening the on-ramp from NE 8th Street to northbound I-405 will encroach into the ordinary high water mark of the unnamed tributary to Sturtevant Creek and its buffer. Approximately 200 linear feet of stream channel and 6,640 square feet of stream buffer will be permanently affected. The affected portion of the stream will be placed in a pipe to convey the water. There will be no other stream-crossing culvert replacements or extensions with this project.

The project will add approximately 11.4 acres of new impervious surface to the study area – an increase of approximately 13.2 percent over existing conditions. WSDOT will provide stormwater flow control for the new impervious area to prevent potential increases in peak steam flows and durations of flows.

WSDOT will provide more stormwater quality treatment and detention than required by the WSDOT *Highway Runoff Manual*[2] (HRM), which will provide a benefit for the environment. Ecology has conditionally approved WSDOT's

[2] *WSDOT, 2006a.*

revised HRM for use as an equivalent approach to Ecology's *Stormwater Management Manual for Western Washington.* Annual loadings of targeted pollutants to most of the surface waters from the project limits are expected to slightly decrease. This is because the proposed water quality treatment facilities will treat stormwater from both the new impervious surfaces and a portion of the existing impervious surfaces. Stormwater runoff from most of the existing impervious surfaces currently discharges to streams without water quality treatment.

The project will not encroach on any existing floodplains. With the proposed stormwater flow system, the project will not affect downstream floodplains or floodplain characteristics.

Construction effects related to groundwater include localized lowering of groundwater levels due to construction dewatering near NE 12th Street. Underdrains will be installed in this area to provide permanent dewatering. No water supply wells were identified in the vicinity that could be affected by groundwater dewatering during project construction and operation.

Measures to Avoid or Minimize Effects

The project will be designed and operated to meet all current federal, state, and local standards for stormwater management. WSDOT will use standard best management practices (BMPs) to avoid and reduce potential effects from this project during construction. These BMPs are designed in accordance with the HRM. With proper design, implementation, and maintenance of BMPs, stream crossings, and highway runoff control facilities, there will be no need for additional measures to minimize effects on surface water quantity and quality.

Stream mitigation for the effects on the unnamed tributary to Sturtevant Creek and its buffer will occur at Sturtevant Creek. The stream mitigation site is located along Sturtevant Creek near the southeast quadrant of the intersection of NE 4th Street and I-405. The mitigation design will include placing large woody debris in the stream and other channel enhancements; revegetating a portion of the stream buffer; and removal and control of invasive plant species. This stream mitigation will help to decrease flooding, improve

water quality via sediment removal, and provide improved habitat for fish and other aquatic life.

The project will have no adverse effects on floodplains; therefore, no floodplain mitigation is required.

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.

Unavoidable Adverse Effects

The project will add impervious surfaces to the study area, and this is an unavoidable negative effect on surface water and water quality. However, by providing a new stormwater management system and including runoff treatment and flow control, the adverse effects will be minimized. Stormwater facilities will both maintain the rate of stormwater runoff at existing conditions or less and remove pollutants from runoff generated by the project.

The project will not have unavoidable adverse effects on floodplains or groundwater.

ACRONYMS AND ABBREVIATIONS

Term	Meaning
BMP	best management practice
CARA	critical aquifer recharge area
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
EPM	Environmental Procedures Manual
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GIS	geographic information system
HPA	Hydraulic Project Approval
HRM	*Highway Runoff Manual*
I-405	Interstate 405
JARPA	Joint Aquatic Resource Permit Application
mg/L	milligrams per liter
ml	milliliters
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
NURP	Nationwide Urban Runoff Program
OHWM	ordinary high water mark
SEPA	Washington State Environmental Policy Act
SPCC	Spill Prevention, Control, and Countermeasures
SR 520	State Route 520
TESC	temporary erosion and sediment control
TMDL	total maximum daily load
USFWS	U.S. Fish and Wildlife Service

WAC	Washington Administrative Code
WRIA	water resource inventory area
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

GLOSSARY

Term	Meaning
100-year flood	A flood having a 1 percent chance of occurring in any given year.
100-year floodplain	The area of land that would be inundated by a flood having a one-percent chance of occurring in any given year.
acre-feet	The volume of water, 43,560 cubic feet, that will cover an area of one acre to a depth of one foot.
aquifer	A geological stratum of saturated materials with the capability to yield useable quantities of groundwater on a long-term, sustainable basis.
aquitard	Soil or rock that is less permeable than adjacent aquifers and restricts groundwater flow.
bank	The slope of land adjoining a body of water, such as a river, lake, wetland, or drainage channel. With respect to flowing waters, banks are either right or left as viewed facing in the direction of the flow (downstream).
base flow	The volume of flow in a stream or river during dry conditions, as opposed to conditions influenced by storm runoff. Base flows discharge groundwater and water from upstream channels, wetlands, lakes, and ponds.
basin	An area of land that drains to a specific water body.
basin planning programs	These are programs containing land use recommendations, regulations, capital projects, and other initiatives to reduce and prevent flooding and erosion, and preserve salmonid habitat in a particular basin.
bedrock	Native consolidated rock underlying gravel and/or soil, sometimes visible on the surface as outcrops.
best management practice (BMP)	Innovative and improved environmental protection tools, practices, and methods that have been determined to be the most effective, practical means of avoiding or reducing environmental effects.
biofiltration swale	Long, broad, shallow grassy channel that is designed so that stormwater flows slowly through the facility. This allows the vegetation and soil matrix to filter and absorb pollutants from the stormwater runoff.
box culvert	A box-shaped concrete structure that drains open channels, swales, or ditches under a roadway or embankment.
buffer (aquatic resource)	A designated area along and adjacent to a stream or wetland that may be regulated to control the negative effects of adjacent development on the aquatic resource.

Term	Meaning
buffer (land use)	A transitional area that separates land uses that are not naturally compatible. Often the buffer is green space, and is termed a landscape buffer. Other times, a buffer can be a structure or a type of development.
capacity	The maximum sustained traffic flow of a transportation facility under prevailing traffic and roadway conditions in a specified direction.
confluence	The convergence of two streams of comparable size into a single channel, or the junction where two rivers or streams flow together.
critical aquifer recharge area (CARA)	Specially designated areas where aquifers are considered more susceptible to groundwater contamination because the depth to groundwater is shallow, a protective low permeability surface layer is not present, and the aquifers are critical for use as potable water.
critical areas	These include aquifer recharge areas, fish and wildlife habitat conservation areas, flood hazard areas, geologic hazard areas, and wetlands. Critical area functions and values are protected by ordinances that require development to avoid or compensate for adverse effects on critical areas.
culvert	A pipe or box structure that drains open channels, swales, or ditches under a roadway or embankment.
design storm	A rainfall event of specific size and frequency that is used to calculate the runoff volume and peak discharge rate for a stormwater facility.
detention pond	A surface catchment designed to reduce effects on stormwater runoff quality and/or quantity effects by storing the increased runoff volume that results from development, then slowly releasing it at controlled runoff rates. Detention tanks and vaults are underground structures used to reduce peak stormwater flows.
discharge	Runoff leaving an area via overland flow, built conveyance systems, or infiltration facilities; a rate of fluid flow; or a volume of fluid passing a point per unit of time.
downstream	Referring to the direction of the flow of a stream or river.
drainage ditch	An open channel designed and constructed to convey water. This may include modifications of natural drainages or manmade historic channels incorporated in a system design.

Term	Meaning
ecology embankment	A stormwater treatment facility constructed in the pervious shoulder area of a highway to provide water quality treatment for highway runoff. It is constructed by digging a trench alongside the highway shoulder, placing perforated pipe, and backfilling with filtration media. Water from the road flows off the roadway, is filtered by the media, and is carried offsite by the pipe.
erosion	The wearing away of soil or rock by the action of running water, wind, ice, or geologic agents. For this analysis, erosion relates primarily to stormwater runoff.
Federal Highway Administration (FHWA)	One of several agencies in the U.S. Department of Transportation, the FHWA provides federal financial assistance to the states through the Federal Aid Highway Program, the purpose of which is to construct and improve the national highway system, urban and rural roads, and bridges.
Federal Emergency Management Agency (FEMA) floodway	The federally designated channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be conveyed without substantial increases in flood heights. The floodways in the FEMA flood insurance maps are presented to local agencies as a minimum basis for additional floodway studies.
fill	Any material placed in an area to increase surface elevation.
flood	An overflow or inundation that comes from a river, stream, tide, wave action, storm drain, or excess rainfall; any relatively high stream flow overtopping the natural or artificial banks in any reach of a stream.
flood fringe	That portion of the floodplain outside the floodway that is covered by floodwaters during the base flood; it is generally associated with slower moving or standing water rather than rapidly flowing water.
flood insurance rate maps	The insurance and floodplain management map produced by FEMA. These maps identify the areas subject to flooding during a base (100-year) flood event in a community. Flood insurance risk zones, which are used to compute actuarial flood insurance rates, also are shown.
floodplain	The total area subject to inundation by a flood, including the flood fringe and floodway.
floodway	The channel of the river or stream, and those portions of the adjoining floodplains that have been designated as reasonably required to carry and discharge the base flood flow without resulting in a backwater that exceeds flood hazard regulations.

Term	Meaning
flow rate	The volume of water that moves by a particular point in one second, typically measured in cubic feet per second.
glacial till	Unsorted sediment deposited directly by a glacier when the glacial ice melts. This creates unstratified material of varying composition that may include clay, sand, gravel, and boulders.
gradient	A measure of how steep a slope is. A slope with a gradient of 10 percent rises (or declines) 1 foot for every 10 feet of horizontal length.
groundwater	That portion of water contained in porous geologic units below the ground surface. Groundwater may move toward and eventually enter into streams, lakes, and oceans.
groundwater recharge	The process whereby rain, snowmelt, or surface water enters the subsurface soil and replenishes the groundwater supply.
Group A wells	Groundwater wells that serve 15 or more households.
Group B wells	Groundwater wells that serve 2 to 14 households.
hydrologically connected	Linked to or associated with the water source of another drainage system through surface water, a stream, groundwater, etc.
impervious surface	Pavement, roofs, and other compacted or hardened areas that do not allow the passage of rainfall or runoff into the ground.
infiltration	The passage of water through the soil surface into the subsoil.
monitoring well	A well used to test or sample on an ongoing basis the quality and quantity of groundwater.
National Pollutant Discharge Elimination System (NPDES)	The federal program under Section 402 of the Clean Water Act for issuing, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements for discharges of pollutants from point sources to tidal waters, lakes, wetlands, rivers, streams, or other water courses.
ordinary high water mark (OHWM)	The elevation marking the highest water level which is so common and maintained for a sufficient time in all ordinary years that it leaves evidence upon the landscape, such as a clear and natural line impressed on the bank, changes in soil character, destruction of or change in vegetation, or the presence of litter and debris. Generally, it is the point where the natural vegetation changes from predominantly aquatic to upland species. Where the ordinary high water mark cannot be found, it is the line of mean annual flood—the highest the water gets in an average year, but not the highest it gets during extreme flooding.

Term	Meaning
outfall	The point of discharge for stormwater runoff; also the outlet or mouth of a drain pipe or culvert that discharges stormwater runoff.
outwash	Sediment deposited by flowing water originating from glacial meltwaters. Outwash that is deposited and then subsequently overrun by an advancing ice sheet is known as advance outwash. Outwash that is not overrun is commonly called recessional outwash. Outwash typically consists of sand and gravel sized particles.
peak flow	The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.
permeability	A measure of how quickly a fluid (in this case, water) can move through sediment or other subsurface material.
pollutant	Any substance introduced into the environment that contaminates or otherwise adversely affects the usefulness of a resource.
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.
recharge	The entry of water, whether by precipitation, surface water, or groundwater, that adds to an aquifer.
recharge area	Land area where water can infiltrate an aquifer relatively easily.
retention/detention pond	A drainage facility designed to reduce stormwater runoff quantity and quality effects either by holding the increased runoff volume that results from development for a considerable amount of time, allowing the suspended particles to settle out, and then slowly releasing it through natural means on site; or by holding the runoff for a short period of time and then releasing it to a stormwater management system for treatment and discharge.
riparian	Pertaining to anything connected with or immediately adjacent to the banks of a stream, river, or other water body.
riparian area	The land and habitat adjacent to streams, lakes, estuaries, or other waterways, comprising the transition area between the aquatic ecosystem and the nearby upland terrestrial ecosystem. Riparian corridors, or zones, identified by soil characteristics or plant communities, include the wet areas in and near streams, ponds, lakes, springs, and other surface waters.

Term	Meaning
riprap	A manmade armoring, facing layer, or protective mound of rocks placed to prevent erosion or sloughing of a stream bank or structure due to flow of surface and stormwater runoff.
runoff	Rainwater or snowmelt that leaves an area as a surface drainage.
sediment	Mineral grains often carried by wind, ice, or water and deposited to form beds of geologic units. It is also transported by stormwater runoff and may be suspended within the water.
seep	A spot where water trickles out of the ground to form a pool or wet area.
shallow groundwater	Groundwater that is encountered at depths of less than 10 feet.
slope	The change in elevation over a distance, or an inclined land form.
soil matrix	The portion of a given soil having the dominant color. In most cases, the matrix would be the portion of the soil representing more than 50 percent of the color.
staging area	Locations used during construction to provide room for employee parking, large equipment storage, and material stockpiles.
storm drain	A sewer that carries stormwater and surface water, street wash, and other wash waters or drainage, but excludes sewage and industrial wastes; also called a storm sewer.
stormwater	The portion of precipitation that does not naturally percolate into the ground or evaporate, but flows overland, in channels, or in pipes into a defined surface water channel or a constructed stormwater facility.
stormwater detention	The process of storing stormwater in manmade facilities such as ponds or vaults and releasing the stormwater at a controlled rate. This helps control the volume and rate at which stormwater enters streams and rivers. Controlling the flow of stormwater helps maintain or improve conditions in the streams and minimizes erosion of stream banks.
till	An unsorted and non-stratified deposit of clay- to boulder-sized sediment deposited by a glacier. Till deposited at the base of a glacier is usually hard or very dense. Till is often referred to as hardpan.
total suspended solids	Soil and other particles that are carried in water. High levels of soil particles can make a water body appear muddy or cloudy and affect fish by clogging gills and reducing their ability to see and forage for food.

Term	Meaning
tributary	A stream or other body of water that contributes its water to another stream or body of water.
turbidity	A condition caused by suspended sediments or floating material that clouds the water and makes it appear dark and muddy.
underdrain	A drain installed at the base of a fill embankment or cut wall to control seepage and eliminate water pressure against the wall.
vaults	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.
Water Resource Inventory Area (WRIA)	The Washington State Department of Ecology has designated 62 WRIAs for water and aquatic resource management issues. The terms WRIA and watershed are frequently used interchangeably, although a WRIA may include more than one watershed.
watershed	The region of land that drains into a specific body of water, such as a river, lake, sea, or ocean. Rain that falls anywhere within a given body of water's watershed will eventually drain into that body of water.
wellhead protection area	A surface and subsurface land area regulated to avoid contamination of groundwater in a well or well field supplying a public water system. This program, established under the Federal Safe Drinking Water Act, is implemented through the Washington State Department of Health.
wetlands	Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

SECTION 1 INTRODUCTION

What are the primary features of the I-405, NE 8th Street to SR 520 Improvement Project?

The proposed I-405, NE 8th Street to SR 520 Improvement Project is part of the overall I-405 corridor program designed to improve safety, reduce congestion, and add capacity along the I-405 corridor. The I-405, NE 8th Street to SR 520 Improvement Project extends approximately 1.5 miles north along I-405, from south of NE 8th Street to the SR 520 interchange, and approximately 1.6 miles east along SR 520, from the I-405 interchange to east of 124th Avenue NE.

The primary features of the I-405, NE 8th Street to SR 520 Improvement Project are presented below:

- Construct grade-separated ramps (referred to as braids) on northbound I-405 to separate the I-405 traffic exiting to SR 520 from traffic entering I-405 at NE 8th Street in downtown Bellevue;
- Construct a new three-lane eastbound collector-distributor lane on SR 520 to separate the on- and off-ramp traffic between I-405 and 124th Avenue NE;
- Reconstruct the NE 12th Street bridge over I-405;
- Construct an on-ramp from the NE 10th Street bridge (built prior to this project) to SR 520; and
- Reconfigure the ramps from SR 520 to southbound I-405.

What is the purpose of this report?

This report discusses effects on water resources from the I-405, NE 8th Street to SR 520 Improvement Project. It also details how WSDOT will avoid, minimize, and mitigate effects of the project on water resources.

What topics are included in water resources?

In this report, water resources include surface water flows, surface water quality, floodplains, and groundwater. For the purposes of this report, surface water flow is defined as the water flow or current in a stream. Surface water quality is the condition or amount of pollutants in a stream. A floodplain is the area bordering stream channels that becomes inundated

during flood-level flows. Groundwater is water located beneath the ground surface in soil pore spaces and in the fractures of geologic formations.

Why are water resources important to consider?

Surface Waters

Within the study area, past conversions of pervious surface areas to impervious areas have affected the water quality and the quantity of runoff in the watersheds. Because the project will also add impervious surface area, this discipline report investigates the effects this new impervious area will have on the area's streams and determines if any additional measures are required to reduce potential effects.

Surface Water Quality

Surface water is an important resource for people and all other animals and plants. For this reason, the federal government passed the Clean Water Act (CWA) to protect surface waters. This act requires each state to set water quality standards and limits on pollution in its lakes, rivers, and marine waters to protect water quality for beneficial uses such as drinking water supply, aquatic life habitat, agricultural needs, and recreational purposes.

Floodplains

Floodplains are important because they convey and store floodwater and minimize flood risks during large storm events. These functions reduce flood losses, maintain clean and plentiful water supplies, and generally enhance quality of life.

Floodplain management is influenced by federal, state, and local regulations or guidance. However, counties and cities bear the primary responsibility for regulating the activities allowed in floodplains. Many cities have floodplain restrictions in their zoning and building codes as well as in their sensitive area ordinances. These codes prohibit projects that cause any rise in the base flood elevation for the 100-year flood event within the 100-year floodplains as identified on the flood insurance rate maps.

Groundwater

We consider groundwater because it is a factor in determining the types of foundations, pavement sections, subsurface drainage, retaining walls, and bridges required for the project. Groundwater pertains to the water contained in the soil and bedrock below the ground's surface. We consider groundwater quality and quantity because changes to quality and quantity can affect supplies for drinking water, and water available for surface water bodies such as lakes, streams, and wetlands. When reviewing potential effects on groundwater quality and quantity in the study area, we considered federal, state, and local regulations.

What studies were completed?

The I-405 Team conducted a field investigation to examine surface water resources within the study area to verify and update drainage mapping. Aerial photographs, topographic survey data, and drainage maps were used to help the I-405 Team identify flow pathways, outfalls, and existing stormwater facilities.

The project team determined existing surface water body conditions using data provided by Ecology, including Water Resource Inventory Area (WRIA) maps. WRIAs are the major watershed drainage areas that Ecology uses to track water quality data and to plan and manage water resources.

Other relevant data that the project team reviewed included Ecology's 2004 303(d) list of impaired water bodies. Every 2 years states are required to prepare a list of water body segments that do not meet state water quality standards.

The Total Maximum Daily Load (TMDL) list, which is prepared by Ecology, was also reviewed. A TMDL establishes the mechanisms to implement water quality standards for an impaired water body. The TMDL establishes the allowable loadings of pollutants to a water body so that it achieves state water quality standards.

City of Bellevue and King County personnel provided additional surface water and water quality data and information.

Federal Emergency Management Agency (FEMA) floodplain information came from flood insurance rate maps and other related reports and documents.

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.

What is a total maximum daily load (TMDL)?

A TMDL is part of the water cleanup plan for each water body on the 303(d) list. It is a calculation of the maximum amount of a pollutant that a water body can receive and still meet State water quality standards. Percentages of the total maximum daily load are allocated to the various pollutant sources.

Groundwater information came from several sources, including:

- Critical aquifer recharge area (CARA) maps
- Previous studies and investigations
- Agency databases including Ecology's well log and water right databases

City of Bellevue and King County personnel provided additional groundwater quality information.

What are the key messages from this report?

The key points of this report are:

- Runoff from the new pollution-generating impervious surfaces or an equivalent area will be treated for water quality. Although there will be an increase in impervious surfaces, the annual loadings of targeted pollutants are expected to remain the same.
- Runoff increases from the new impervious area will be mitigated using detention facilities for storm events from 50 percent of the 2-year-recurrence-interval storm through the 50-year-recurrence-interval storm.
- This project will not raise the existing 100-year floodplain level because there will be no filling within the floodplain.
- Construction dewatering will be required along the northbound I-405 shoulder between NE 10th Street and just north of NE 12th Street due to groundwater elevations that are higher than the excavation elevations.

What are the guidelines for stormwater management facilities?

Water quality treatment will be provided for an area equal to the new impervious surfaces created on the project. Impervious surfaces, such as pavement, are those that do not allow water to penetrate into the ground. Stormwater from new impervious surfaces or an equal area will be controlled in detention facilities. This process allows water to be held (detained) and thus released at rates that are equal to existing conditions.

What measures are proposed to avoid or reduce effects?

The WSDOT *Highway Runoff Manual*[3] (HRM) provides guidance on project design to avoid and minimize negative effects on surface water flow, surface water quality, floodplains, and groundwater. WSDOT will meet the manual's requirements by implementing an array of treatment BMPs. These treatment systems will be sufficient to reduce potential surface water effects to non-measurable levels. Surface water quality treatment will be achieved by

[3] *WSDOT, 2006a.*

incorporating treatment systems that follow the WSDOT HRM design guidelines.

WSDOT will also prepare a Temporary Erosion and Sediment Control Plan that will be in place prior to starting construction. This plan will set forth the specific measures that will be used to manage stormwater during construction. WSDOT will also prepare a Spill Prevention, Control, and Countermeasures Plan prior to construction that will be followed by the contractor to reduce the risk of accidental spills during construction.

What would happen if we adopted the No Build Alternative?

Effects of construction on water resources in the study area would not occur under the No Build Alternative.

Stormwater treatment facilities would not be constructed and operated under the No Build Alternative. One of the beneficial effects of the project will be the operation of enhanced stormwater treatment facilities to capture and treat portions of the existing impervious surfaces that currently are not treated; this will help to reduce the overall pollutant loadings to the streams. That benefit would not occur with the No Build Alternative.

SECTION 2 PROJECT DESCRIPTION

What is the intent of the I-405, NE 8th Street to SR 520 Improvement Project?

WSDOT is proposing to construct the I-405, NE 8th Street to SR 520 Improvement Project to improve safety and reduce congestion in the vicinity of the I-405 and SR 520 interchange within the city of Bellevue. The improvements will benefit the public by:

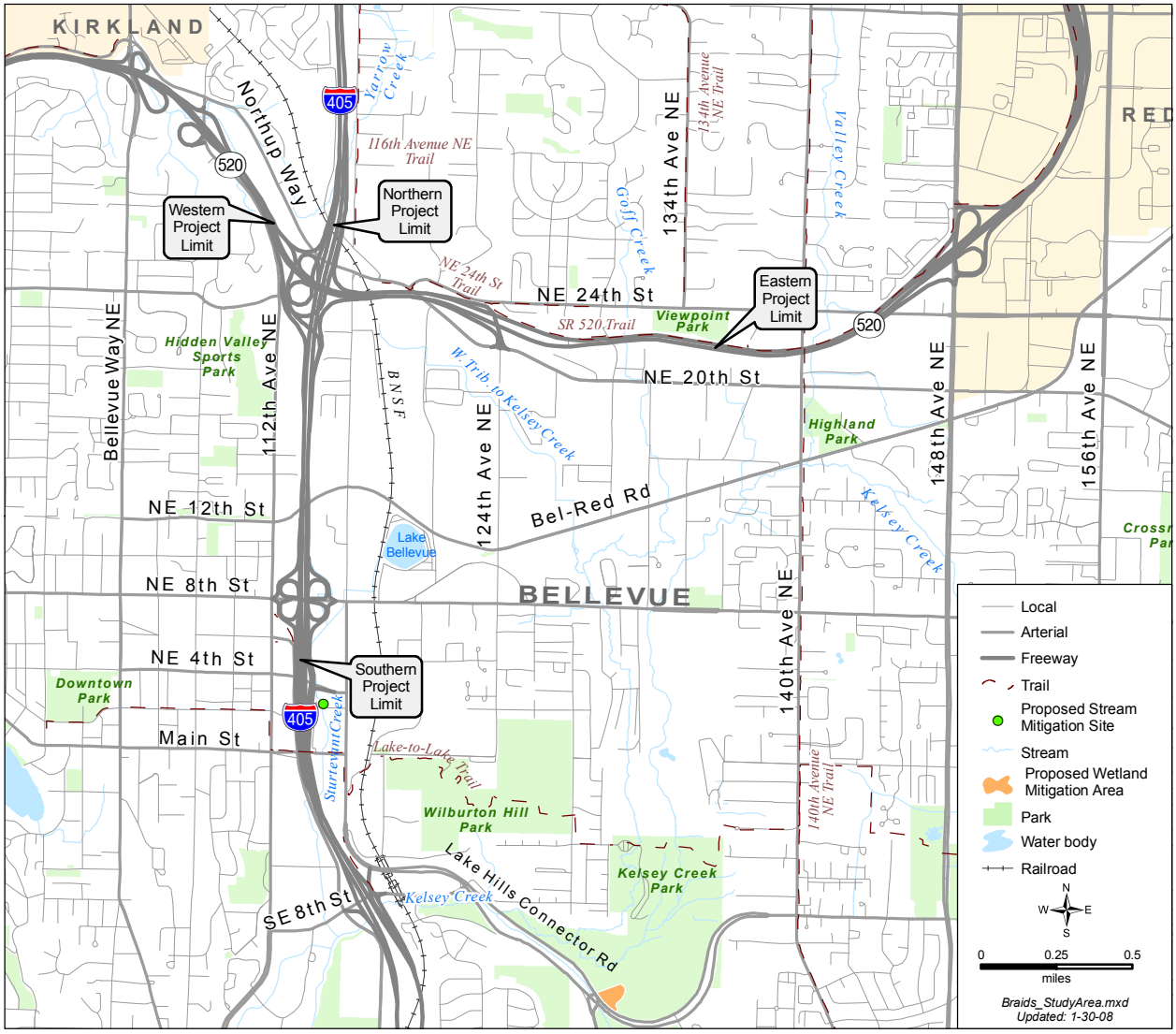
- Reducing congestion for the public and freight vehicles;
- Improving safety;
- Improving access and circulation to and from local streets; and
- Providing opportunities for environmental improvements.

The I-405, NE 8th Street to SR 520 Improvement Project extends approximately 1.5 miles north along I-405, from south of NE 8th Street to the SR 520 interchange, and approximately 1.6 miles east along SR 520, from the I-405 interchange to east of 134th Avenue NE (Exhibit 2-1).

What are the details of the I-405, NE 8th Street to SR 520 Improvement Project?

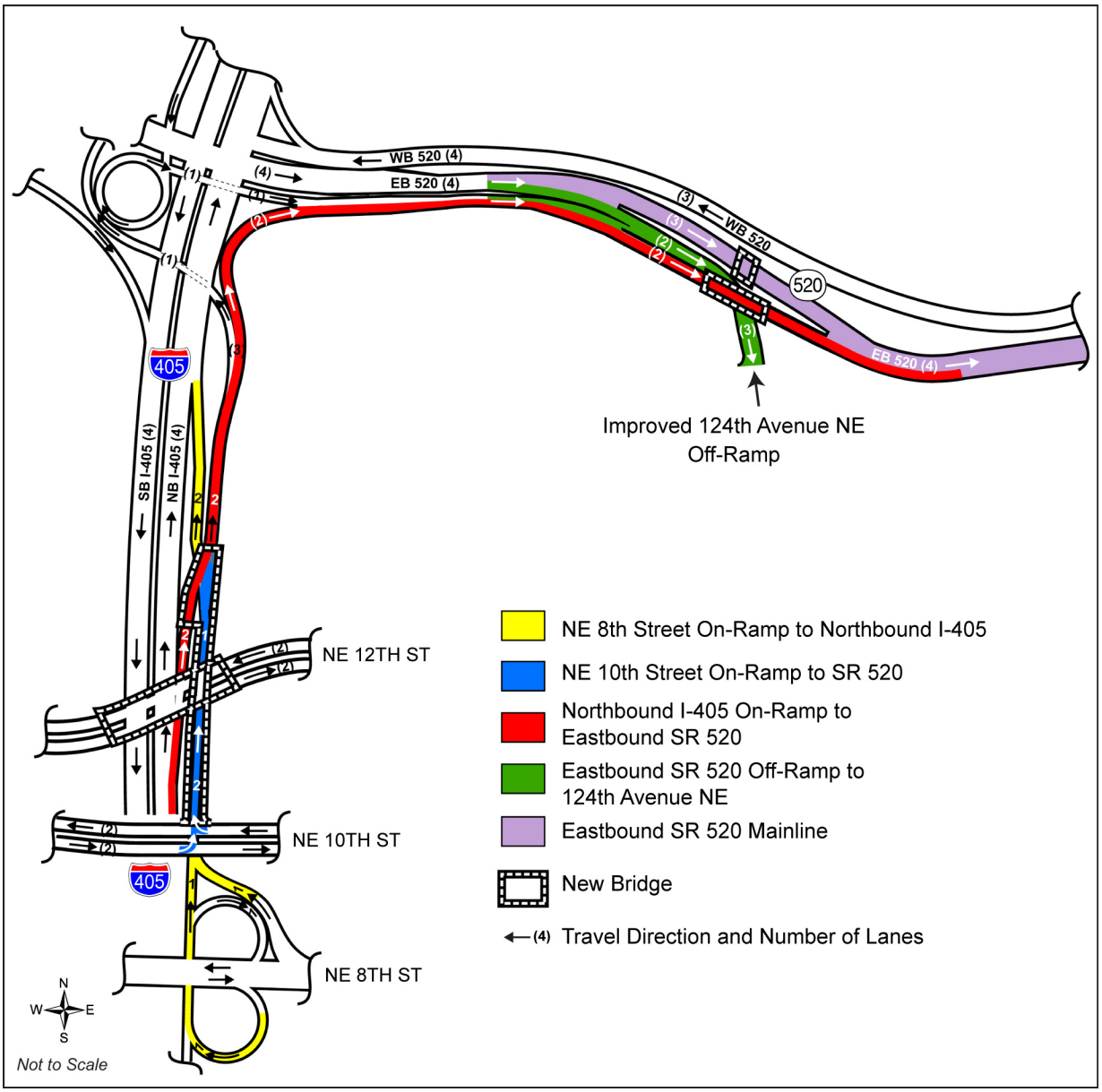
The proposed I-405, NE 8th Street to SR 520 Improvement Project is part of the overall I-405 Corridor Program Master Plan designed to improve safety and reduce congestion along the I-405 corridor. The I-405, NE 8th Street to SR 520 Improvement Project will improve safety and mobility by constructing grade-separated ramps on northbound I-405 to separate the I-405 traffic exiting to SR 520 from traffic entering I-405 at NE 8th Street in downtown Bellevue. On SR 520, a new eastbound collector-distributor lane will also be constructed to separate the on- and off-ramp traffic between I-405 and 124th Avenue NE (Exhibit 2-2). In addition, the ramps from SR 520 to southbound I-405 will be reconfigured to improve traffic flow.

Exhibit 2-1: Project Location and Vicinity



This discipline report analyzes two alternatives, the Build Alternative and the No Build Alternative. The proposed project improvements for the Build Alternative, from south to north on I-405, and west to east on SR 520, are described below. The No Build Alternative is described at the end of this section.

Exhibit 2-2: Proposed Lane Configuration on Northbound I-405 to Eastbound SR 520



Northbound I-405 to Eastbound SR 520 Improvements

- Reconfigure the existing northbound NE 4th Street on-ramp to become an auxiliary lane that exits to SR 520 and northbound I-405 as part of a two-lane exit ramp. See Exhibit 2-3.
- Reconstruct portions of the NE 8th Street on- and off-ramps to and from northbound I-405. The on-ramp will be reconstructed at a lower grade than the I-405 mainline.

What is an auxiliary lane?

An auxiliary lane is a lane added between interchanges—from one on-ramp to the next off-ramp. It is dedicated to traffic entering and leaving a freeway and provides motorists with more time and extra room to accelerate or decelerate and merge when getting on and off the freeway.

- Rebuild the NE 12th Street bridge crossing over I-405 to accommodate the new ramps.
- Construct a northbound on-ramp to SR 520 from a new NE 10th Street bridge crossing; the bridge crossing will be constructed as part of a separate project prior to constructing the on-ramp.
- Construct grade-separated ramps to divide traffic entering northbound I-405 from NE 8th Street and traffic exiting I-405 to SR 520.
- Construct grade-separated ramps to divide traffic entering eastbound SR 520 from northbound I-405 and traffic exiting eastbound SR 520 to 124th Avenue NE.
- Shift eastbound SR 520 mainline travel lanes toward the median.
- Extend the ramp from northbound I-405 to eastbound SR 520 on a collector-distributor system through the 124th Avenue NE interchange to merge with the existing eastbound SR 520 mainline just east of 134th Avenue NE.
- Reconstruct the 124th Avenue NE interchange off-ramp.
- Relocate an existing noise barrier. The new barrier will be approximately 1,585 feet long and 20 feet high.
- Construct several retaining walls needed to allow for the proposed widening of I-405.

What is a collector-distributor system?

Collector-distributor lanes are freeway lanes serving single or multiple interchanges that are physically separated from general freeway lanes. The purpose of collector-distributor lanes is to separate the traffic entering and exiting the freeway from the through traffic.

In the simplest form, all ramps that would normally touch the freeway are instead shifted outwards to the collector distributor lanes. There is still weaving, but it is no longer on the main lanes.

SR 520 to Southbound I-405 Improvements

- Reconfigure the ramps from SR 520 to southbound I-405 to improve traffic flow. The westbound SR 520 to southbound I-405 ramp will become a dedicated auxiliary lane, and on-ramp traffic will no longer be required to immediately merge with southbound I-405 mainline traffic. The eastbound SR 520 to southbound I-405 ramp will merge with the dedicated auxiliary lane.

Southbound I-405 to SR 520 Improvements

- Realign the southbound I-405 to eastbound SR 520 loop ramp.
- Realign eastbound SR 520 to match the proposed improvements.

Exhibit 2-3: Project Features - Sheet 1 of 6

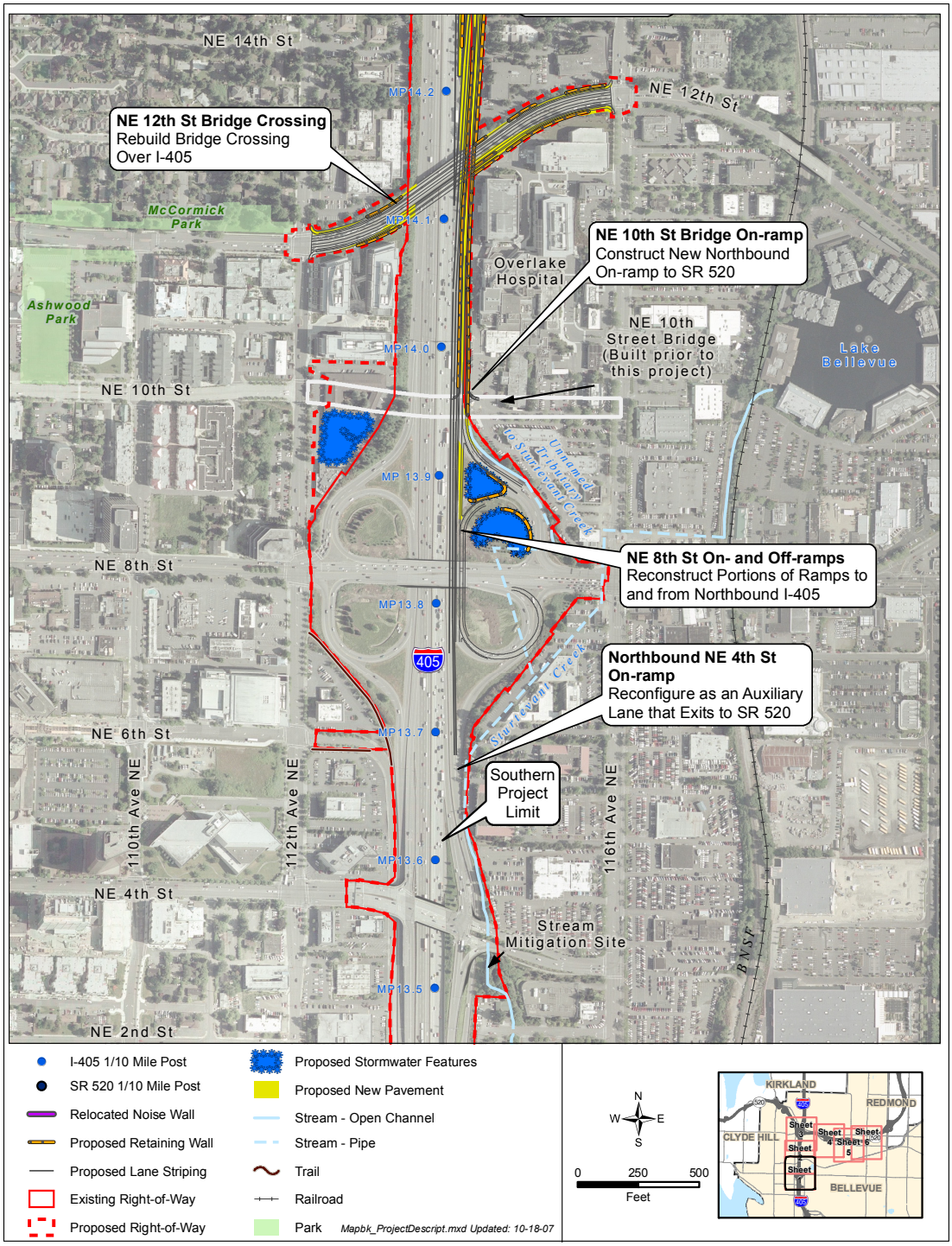
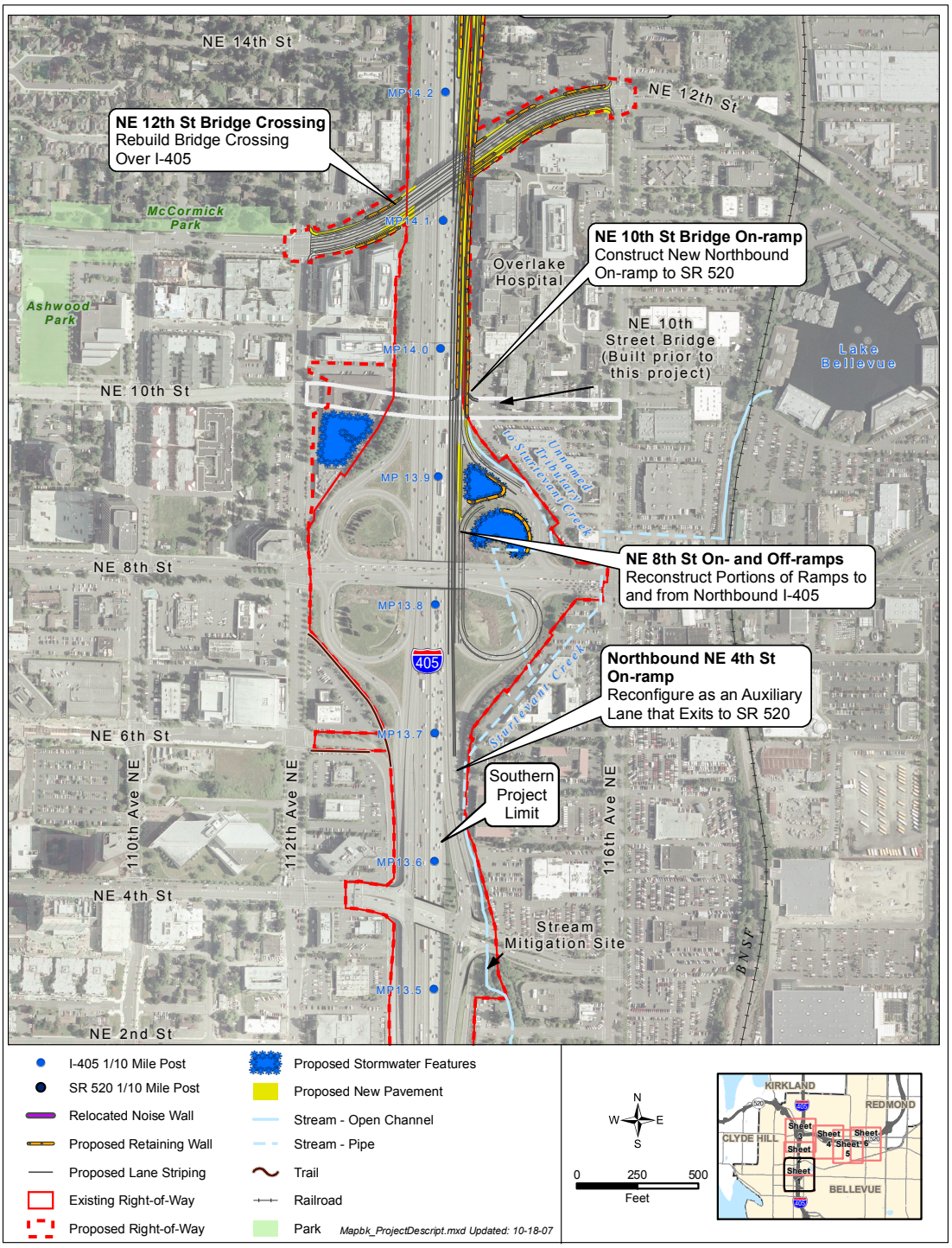



Exhibit 2-3: Project Features - Sheet 2 of 6