DEVELOPMENT SERVICES DEPARTMENT
ENVIRONMENTAL COORDINATOR
450 110th Ave NE., P.O. BOX 90012
BELLEVUE, WA 98009-9012

OPTIONAL DETERMINATION OF NON-SIGNIFICANCE (DNS) NOTICE MATERIALS

The attached materials are being sent to you pursuant to the requirements for the Optional DNS Process (WAC 197-11-355). A DNS on the attached proposal is likely. This may be the only opportunity to comment on environmental impacts of the proposal. Mitigation measures from standard codes will apply. Project review may require mitigation regardless of whether an EIS is prepared. A copy of the subsequent threshold determination for this proposal may be obtained upon request.

File No.	11-114971-LM
Project Name/Address:	NE 4th Street/120th Ave NE Corridor Project - SEPA Review/ 120th Ave NE from Northup Way to NE 4th Street
Planner:	David Pyle / dpyle@bellevuewa.gov
Phone Number:	425-452-2973
Minimum Comment Period:	**July 21, 2011**

Materials included in this Notice:

- ☒ Blue Bulletin
- ☒ Checklist
- ☒ Vicinity Map
- ☒ Plans
- ☐ Other:

City of Bellevue File Number 11-114971-LM
07/07/2011
City of Bellevue Transportation Department NE 4th Street/120th Ave NE Corridor Project SEPA Checklist
120th Ave NE from Northup Way to NE 4th Street

SEPA Checklist Reviewed By:
David Pyle, Land Use Planner
425-452-2973 - dpyle@bellevuewa.gov

City of Bellevue Submittal Requirements

ENVIRONMENTA

If you need assistance in completing the checklist or have any questions regarding the environmental review process, please visit or call the Permit Center (425-452-6864) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Our TTY number is 425-452-4636.

BACKGROUND INFORMATION

Property Owner:

City of Bellevue

Proponent:

City of Bellevue

Contract Person:
(If different from the owner. All questions and correspondence will be directed to the individual listed.)

Paul Krawczyk, Project Manager

Address:

City of Bellevue
Transportation Department
450 110th Avenue NE
P.O. Box 90012
Bellevue, WA 98009

Phone:

Telephone: (206) 452-7905

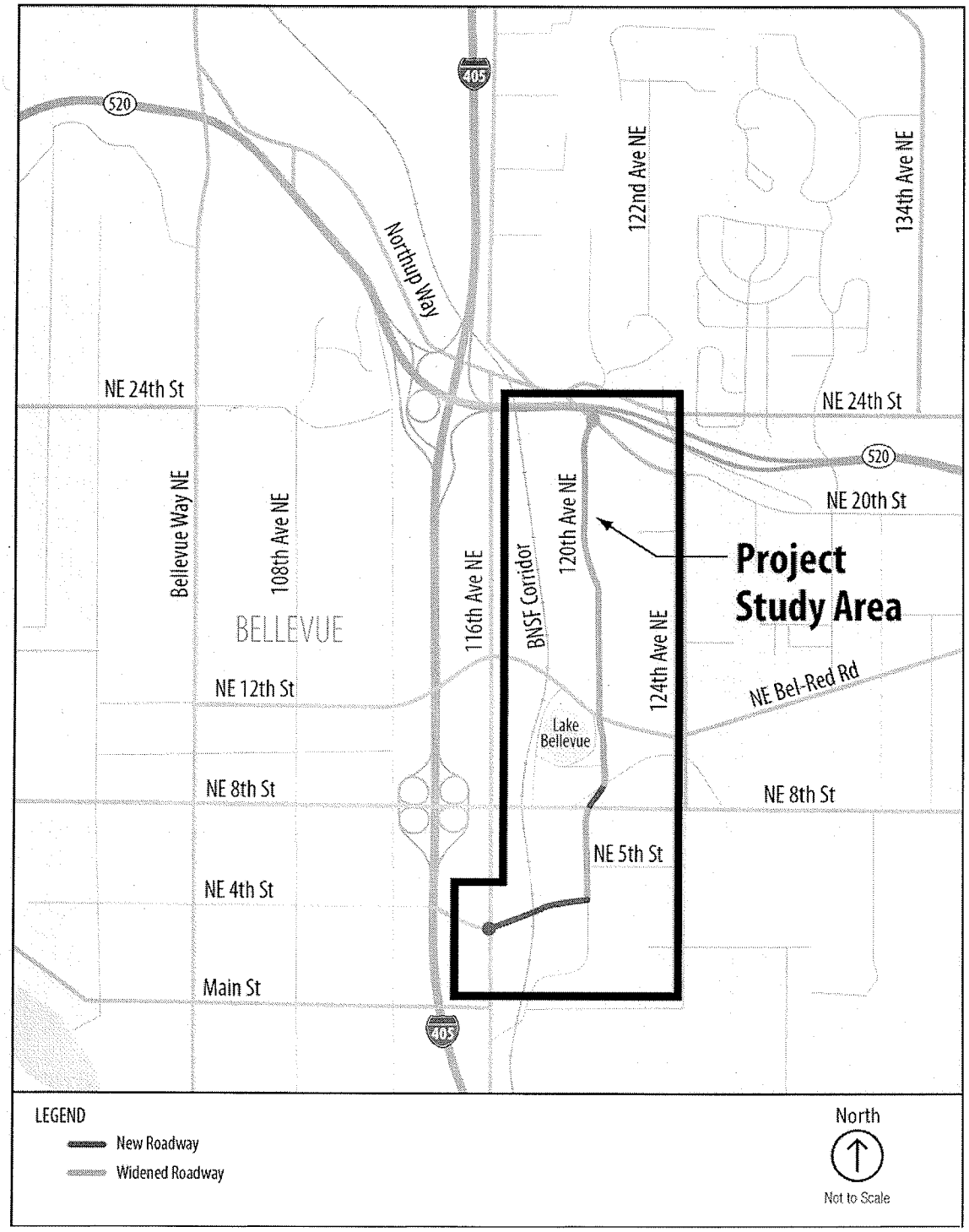
Proposal Title:

NE 4th Street/120th Avenue NE Corridor Project

Proposal Location:
(Street address and nearest cross street or intersection. Provide a legal description, if available.)

The proposed project would be located in King County, Township 25 north, Range 5 east, Sections 28 and 33. The project corridor is located approximately 1 mile east of downtown Bellevue. It would extend the existing NE 4th Street roughly a quarter-mile east from its current dead-end intersection with 116th Avenue NE. The project would also widen and realign 120th Avenue NE for roughly 1.3 miles from the NE 300 block to just south of Northup Way. Figure 1 shows an overview of the project corridor study area, including the sections of the corridor that would require new roadway or widened roadway construction.

Figure 1. Proposed Project Corridor



Give an accurate, brief description of the proposal's scope and nature:

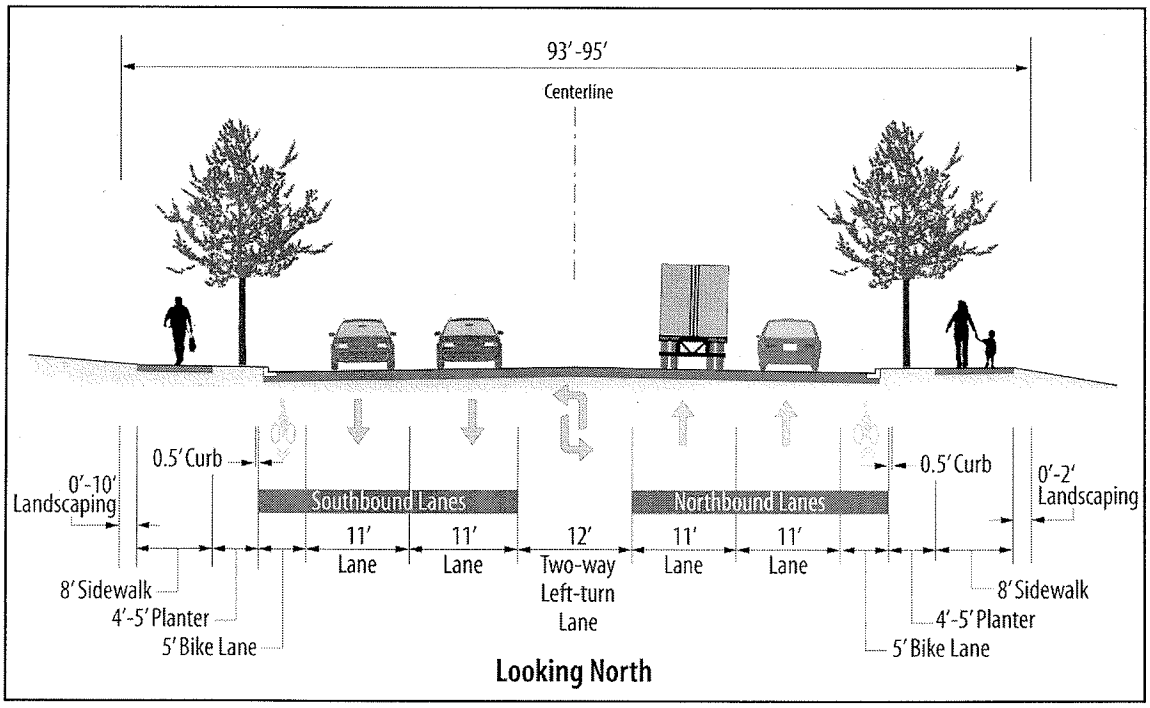
1. General description:

PROPOSED PROJECT

The proposed NE 4th Street/120th Avenue NE Corridor Project would extend NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE, and widen and realign 120th Avenue NE from the NE 300 block northward to Northup Way. These corridor roadway improvements extend approximately 1.6 miles and would be constructed in phases.

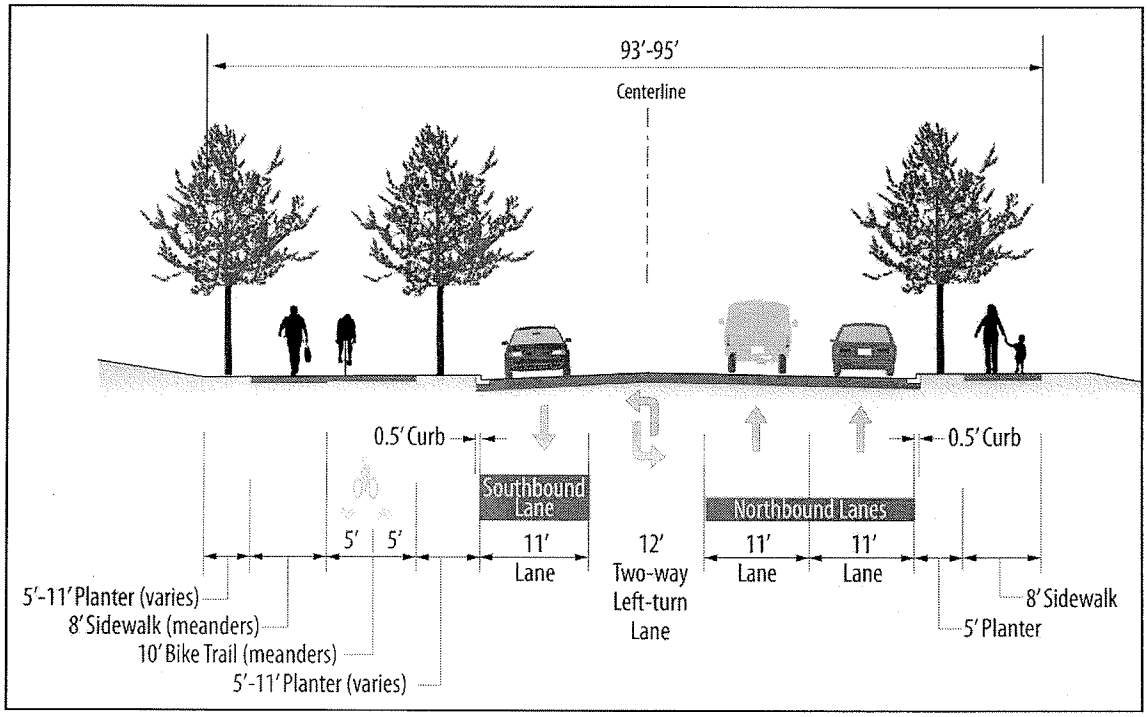
A five-lane roadway design proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE from the 300 block north to NE 18th Street would generally reflect the roadway cross-section shown in Figure 2. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. A 5-foot-wide bike lane generally would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. The size and location of the sidewalks, bicycle facilities, and planter strips may vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

Figure 2. Typical Section – Five-lane Roadway Design



A four-lane roadway section is proposed for 120th Avenue NE from about NE 18th Street to just south of Northup Way as shown in Figure 3. The roadway would be designed to have three travel lanes—two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed on both sides of a combined two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

Figure 3. Typical Section – Four-lane Roadway Design



Along some portions of the corridor, the required right-of-way would need to exceed 95 feet. Both of the proposed roadway cross-sections include the use of retaining walls. Cut and fill retaining walls are proposed at numerous locations due to changes in elevation on both sides of the roadway. Where retaining walls are required, these structures would generally be located immediately adjacent to and behind the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet wide. To the outside of the retaining walls, the soil would be graded to a maximum 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 119 feet or more where retaining walls are needed on both sides of the roadway.

PHASE 1

The entire length of Phase 1 of the proposed project, the widening of 120th Avenue NE from the NE 300 block to NE 700 block, would be constructed using the five-lane roadway design.

This document discusses potential environmental impacts of all phases of project construction, but specifically notes impacts anticipated to occur for Phase 1 of the proposed project.

2. Acreage of site:

Not applicable.

3. Number of dwelling units/buildings to be demolished:

PROPOSED PROJECT

The project would fully acquire four parcels, two of which have buildings on them that would be demolished. There would be no other building demolitions, though portions of other buildings may be affected. In particular, based on conceptual engineering plans, the extension of NE 4th Street would impact a portion of the Best Buy building (maximum reduction of up to 12,000 square feet).

PHASE 1

No buildings would be demolished as part of Phase 1 of the proposed project.

4. Number of dwelling units/buildings to be constructed:

Not applicable.

5. Square footage of buildings to be demolished:

PROPOSED PROJECT

The square footage of the two buildings that would be demolished are as follows:

Building 1 – Bakkers, Inc. (1099100419) = 6,770 square feet

Building 2 – Barrier (1099100167) = 14,115 square feet

Areas proposed to be demolished are estimates only. As project plans are refined for construction total areas to be demolished may increase or decrease.

PHASE 1

No buildings will be demolished during Phase 1 of project construction.

6. Square footage of buildings to be constructed:

Not applicable.

7. Quantity of earth movement (in cubic yards):

PROPOSED PROJECT

The proposed project would require roughly 118,545 cubic yards of earth movement, comprised of approximately 60,190 cubic yards of cut and about 58,355 cubic yards of fill.

PHASE 1

Phase 1 of the project would require approximately 5,500 cubic yards of earth movement, comprised of 5,300 cubic yards of cut and 200 cubic yards of fill.

8. Proposed land use:

The proposed project is to make improvements to an arterial roadway corridor.

The proposed project passes through multiple land use areas including commercial and residential land use districts.

9. Design features, including building height, number of stories and proposed exterior materials:

Not applicable.

An elevated structure designed to connect NE 4th Street to 120th Ave NE is proposed and will cross the Port of Seattle owned rail corridor.

10. Other:

None.

Estimated date of completion of the proposal or timing of phasing:

PROPOSED PROJECT

The Phases are not listed in order of implementation which is dependent on funding.

Project construction would be phased and is expected to be ongoing from early 2012 to at least 2016. Currently, the planned phases are:

- Phase 1: 120th Avenue NE widening between approximately the NE 300 block north to NE 700 block.
- Phase 2: 120th Avenue NE new construction between NE 8th Street and NE Bel-Red Road, and realignment and widening between approximately NE Bel-Red Road north to NE 12th Street.
- Phase 3: NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4: 120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5: 120th Avenue NE widening between NE 16th Street north to Northup Way.

PHASE 1

Phase 1 construction between approximately the NE 300 block north to NE 700 block is expected to begin in early 2012 and extend through late 2012.

As noted earlier, details about potential impacts of Phase 1 are discussed in this SEPA Checklist. Additional details of potential environmental impacts of future phases of the proposed project will be provided in one or more subsequent addenda to this environmental document.

Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

This proposed project is part of the Mobility and Infrastructure Initiative - a group of transportation investments in the downtown, west Wilburton and Bel-Red areas intended to respond to increased traffic spurred by downtown development and growth anticipated in the Bel-Red area.

List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

SEPA Non-Project Documents

Attached as links to the electronic permit bulletin and available in the project file.

Bellevue, City of. 2007. Bel-Red Corridor Project, Final Environmental Impact Statement. Issued July 19, 2007.

Bellevue, City of. 2007. Downtown Mobility Plan, Optional Determination of Non-Significance. Issued November 1, 2007.

Bellevue, City of. 2010. Transportation Related Comprehensive Plan Amendments to the Transportation Element, Optional Determination of Non-Significance. Issued August 17, 2010.

Proposed Project Technical Reports

Northwest Archaeological Associates, Inc. NE 4th Street/120th Avenue NE Corridor Project, Cultural Resources Technical Report, Redacted Version. Anticipated July 2011.

Parsons Brinckerhoff. NE 4th Street/120th Avenue NE Corridor Project, Air Quality Technical Report (Draft). April 15, 2011.

Parsons Brinckerhoff. NE 4th Street/120th Avenue NE Corridor Project, Community Effects Technical Report (Draft). April 15, 2011.

Parsons Brinckerhoff. NE 4th Street/120th Avenue NE Corridor Project, Fisheries, Wildlife, and Vegetation Technical Report (Draft). April 15, 2011.

Parsons Brinckerhoff. NE 4th Street/120th Avenue NE Corridor Project, Noise and Vibration Technical Report (Draft). April 15, 2011.

Parsons Brinckerhoff. NE 4th Street/120th Avenue NE Corridor Project, Transportation Technical Report (Draft). April 15, 2011.

Parsons Brinckerhoff. NE 4th Street/120th Avenue NE Corridor Project, Water Quality Technical Report (Draft). April 15, 2011.

Shannon and Wilson, Inc. NE 4th Street/120th Avenue NE Corridor Project, Biological Resources Technical Report. June 3, 2011.

Shannon and Wilson, Inc. NE 4th Street/120th Avenue NE Corridor Project, Hazardous Materials Technical Report
(Draft). April 15, 2011.

Shannon and Wilson, Inc. NE 4th Street/120th Avenue NE Corridor Project, Wetland and Stream Delineation Technical Report (Draft). April 15, 2011.

Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. List dates applied for and file numbers, if known.

Unknown.

Yes. Critical Areas Land Use Permit for impacts to steep slope critical areas for the NE 4th Street extension to 120th Ave NE.

Please provide one or more of the following exhibits, if applicable to your proposal.
(Please check appropriate box(es) for exhibits submitted with your proposal.)

/__/ Land Use Reclassification (rezone) Map of existing and proposed zoning

/__/ Preliminary Plat or Planned Unit Development
Preliminary plat map

/_X_/ Clearing & Grading Permit
Plan of existing and proposed grading
Development plans

The following permit applications have been submitted for Phase I of the proposed project:

- Clear & Grade Permit #11-103060 GD, applied for 1/14/11
- Building Permit #10-121986 BW, applied for 9/16/10
- ROW Use Permit #10-121696 TK, applied for 9/10/10
- Utility Extension Permit #10-111810 UE, applied for 4/29/10

/__/ Building Permit (or Design Review)
Site plan
Development plans

/__/ Shoreline Management Permit
Site plan

A. ENVIRONMENTAL ELEMENTS

1. EARTH

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other:

PROPOSED PROJECT

The topography of the project corridor varies. The portion of the NE 4th Street extension west of the BNSF corridor is steeply sloped; rising 55 feet in a narrow band immediately west of the railroad embankment, and the portion eastward of the railroad embankment to 120th Avenue NE is generally flat. Along 120th Avenue NE, the land generally slopes downward from east to west and the roadway itself has a slight rolling character.

PHASE 1

Phase 1 of the project involves little topographical variation, from roughly 140 to 150 feet, and due to the high level of development along this portion of 120th Avenue NE the project area is generally flat. The adjacent terrain slopes downhill to the west, and the roadway slopes from north to south.

b. What is the steepest slope on the site (approximate percent slope)?

PROPOSED PROJECT

The steepest slope along the project corridor is located along the proposed alignment for the extension of NE 4th Street. Here, the topography rises roughly 50 feet in elevation between 116th Avenue NE on the west and the BNSF corridor. This change in elevation is concentrated in a narrow band immediately west of the BNSF corridor, and based on the City's critical areas map, the area exceeds a 40 percent slope.

PHASE 1

Phase 1 of the project contains no steep slopes and the project area is generally flat. Along this portion of the corridor, there is little topographical variation.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

PROPOSED PROJECT

Seven soil types are located along the project corridor. For the proposed extension of NE 4th Street, the project would encounter three soil types: Norma sandy loam, Alderwood gravelly sandy loam, and urban land. Along 120th Avenue NE, the alignment from the NE 300 block to roughly NE 6th Street would encounter Alderwood gravelly sandy loam, then Bellingham silt loam to roughly NE 8th Street. From that location, the project would encounter urban land again, with an area of Tukwila muck that is east and north of Lake Bellevue. In the vicinity of the West

Tributary of Kelsey Creek, the project would cross urban land soils again and then Seattle muck. The northernmost portion of the project corridor would encounter Everett gravelly sandy loam.

PHASE 1

Phase 1 of the project would mainly occur in two soil types, Alderwood gravelly sandy loam from the NE 300 block to roughly NE 6th Street, and then Bellingham silt loam for the remaining portion of this phase of project construction at about the NE 700 block of 120th Avenue NE.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

PROPOSED PROJECT

There is no known history or surface indication of unstable soils in the immediate vicinity of the project corridor. The area on the western side of 120th Avenue NE in and around Lake Bellevue consists of Tukwila Muck (peat), a very poorly drained soil found in floodplains and made up of herbaceous organic material. The area is shown as exhibiting a low to moderate risk of liquefaction.

PHASE 1

There is no history of unstable soils or risks associated with Phase 1.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

PROPOSED PROJECT

Fill would generally be comprised of material imported from an approved off-site source. Recycled excavated material may also be used, but because the project would be constructed in phases, excavated material may not always be sufficient or acceptable to satisfy the necessary fill volume. The proposed project would require roughly 118,545 cubic yards of earth movement, comprised of approximately 60,190 cubic yards of cut and about 58,355 cubic yards of fill along the corridor in total. Fill would be used to allow the proposed extension of NE 4th Street to accommodate the steep slope near the BNSF corridor, as the horizontal alignment of the proposed project would curve up the hillside. The hillside slope would not be altered, requiring the construction of substantial retaining walls on both sides of the proposed roadway. There would also be fill used along 120th Avenue NE, though to a much lesser extent than for NE 4th Street. Excavated material not used on site would be disposed of at an appropriate facility.

PHASE 1

Phase 1 of the project would require approximately 5,500 cubic yards of earth movement, comprised of 5,300 cubic yards of cut and 200 cubic yards of fill. It is expected the fill quantities would be provided by the cut volumes.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

PROPOSED PROJECT

As with any construction project requiring clearing of an area, the proposed project has the potential to result in erosion during clearing and construction activities. However, the proposed construction activities would include the preparation of a Construction Stormwater Pollution Prevention Plan (CWSPPP) and a Temporary Erosion and Sediment Control (TESC) Plan to address and mitigate any potential erosion. In the geologic critical areas (steep slopes), the potential for erosion is lessened due to the fact that the proposed design would not require excavation of the existing hillside west of the BNSF corridor. Instead, retaining walls would be constructed and fill would be used to minimize effects to the surrounding steep slope.

PHASE 1

Phase 1 of the project would have a minimal risk of erosion, due to the generally flat nature of this portion of 120th Avenue NE and the existing level of development that surrounds it. A CWSPPP and TESC Plan would be prepared for this phase of construction to address and mitigate any potential erosion.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

PROPOSED PROJECT

Currently, there are 14.1 acres within the existing roadway corridor covered with impervious surfaces (52% of the approximate 27.2-acre construction area). The proposed project would result in an additional 2.84 acres that would be covered with impervious surfaces, for a total of 16.94 acres upon completion of the proposed project (62% of the approximate 27.2-acre construction area).

PHASE 1

By contrast the City of Bellevue Land Use Code allows up to 85% impervious surface in areas of adjacent zoning.

Phase 1 of the project currently contains 1.94 acres of impervious surfaces (55% of the approximate 3.5-acre construction area). The proposed project would result in an additional 0.44 acre of impervious surfaces. This is a total of 2.38 acres that would be covered with impervious surfaces upon completion of the proposed project (68% of the approximate 3.5-acre construction area).

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

PROPOSED PROJECT

A Clearing and Grading Permit is required. Site management practices and erosion control plans are reviewed as part of the Clearing and Grading Permit to ensure project plans comply the the City's Clearing and Grading Code, BCC 23.76.

Preparation and City approval of a CWSPPP and a TESC Plan would occur prior to construction of the proposed project. These plans would detail the proposed measures to reduce and/or control erosion. In general, construction of the proposed project would make use of best management practices (BMPs) to reduce and minimize impacts due to construction activities. BMPs that could be used include minimizing the size of disturbed area at any time, practicing good housekeeping, and structural control measures such as silt fences.

PHASE 1

A City-approved CWSPPP and a TESC Plan would be required for Phase 1 construction, and BMPs would be implemented, as appropriate, to reduce and minimize impacts due to construction activities.

2. AIR

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

PROPOSED PROJECT

Construction of the proposed project would have the potential to result in fugitive dust emissions, but this could be mitigated through the application of water to the area to control dust as needed. Once completed, the roadway would be used by automobiles that release various pollutants to the air. However, the proposed project is not predicated to measurably affect regional miles of travel in the study area, nor is it anticipated to cause or exacerbate a violation of the applicable ambient air quality standards. Long term, the proposed project would reduce emissions through the addition of roadway capacity that could yield significant reductions in arterial roadway congestion and intersection delay, improved travel times for transit, the addition of bicycle and pedestrian facilities, and support for future transit-oriented mixed-used development. The project is not predicted to impact regional levels of carbon monoxide (CO), particulate matter smaller than or equal to 10 microns in size (PM10), particulate matter smaller than or equal to 2.5 microns in size (PM2.5), and ozone (O3) levels. Based on the

microscale CO screening analysis, the project is not predicted to cause or exacerbate a violation of the applicable ambient air quality standards. As such, it complies with the U.S. Environmental Protection Agency's (EPA) local (microscale) requirements under its Conformity Rule for a project located in a CO maintenance area.

PHASE 1

Construction of the proposed project would have the potential to result in fugitive dust emissions, but this could be mitigated through the application of water to the area to control dust as needed. Once completed, the roadway would be used by automobiles that release various pollutants to the air. However, the proposed project is not predicated to measurably affect regional miles of travel in the study area, nor is it anticipated to cause or exacerbate a violation of the applicable ambient air quality standards. Also, the proposed project would reduce emissions long term through the addition of roadway capacity that could yield significant reductions in arterial congestion and intersection delay, improved travel times for transit, the addition of bicycle and pedestrian facilities, and support for future transit-oriented mixed-used development.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None known; but the proposed project area is within a maintenance area for both carbon monoxide and ozone.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Aside from BMPs to be used during construction activities, the proposed project is not anticipated to require any further mitigation measures regarding air quality.

3. WATER

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

PROPOSED PROJECT

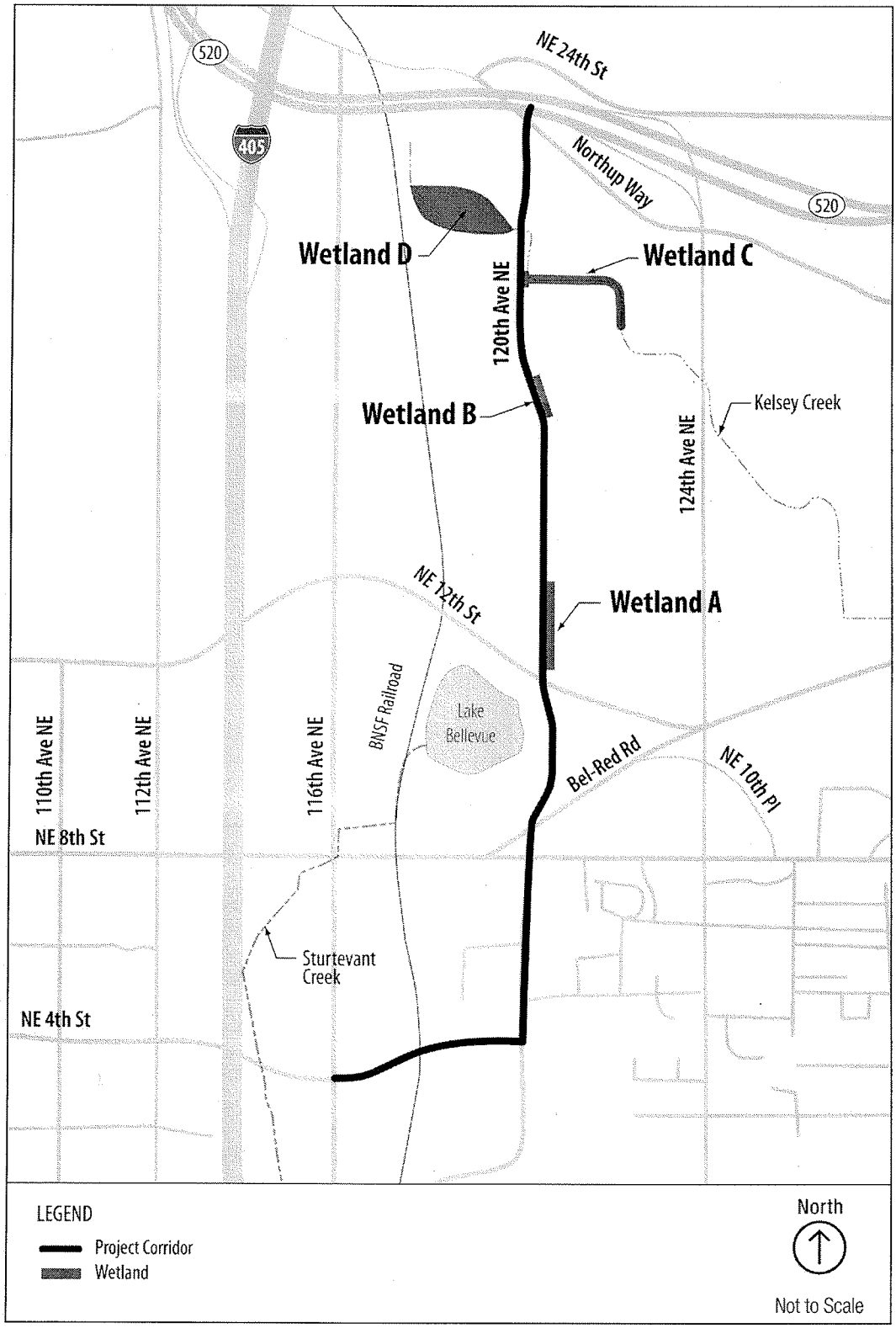
In the immediate vicinity of the proposed project, there is one small lake, two creeks, and four wetlands (see Figure 4). The nearest wetland is associated with Sturtevant Creek and located south of NE 4th Street and immediately east of I-405, approximately 400 feet west of the western terminus of the proposed project. Sturtevant Creek is approximately 500 feet west of this portion of the proposed project area. Along 120th Avenue NE, there are four wetlands in the project corridor. The southernmost, Wetland A, is near NE 12th Street, then Wetlands B, C, and D are in the northern portion of the corridor towards Northup Way. The proposed alignment crosses the West Tributary of Kelsey Creek, which originates in Wetland D. Lake Bellevue, the headwaters of Sturtevant Creek, is in the vicinity of the proposed project, but over 150 feet west of the roadway. Impacts as discussed are based on conceptual design, and efforts will be made during preliminary and final engineering to reduce the impacts to the extent possible.

Wetland A is approximately 8,260 square feet in size and is located entirely within the project corridor. Based on the Cowardin classification system (Cowardin 1979), Wetland A is palustrine emergent, scrub-shrub (PEM/SS) wetland, and its hydrogeomorphic classification (Brinson 1993) is "depressional outflow."

Wetland B is located along an open roadside ditch east of 120th Avenue NE and is entirely within the project corridor. Wetland B is approximately 4,420 square feet in size. Wetland B's Cowardin classification is PEM/SS, and its hydrogeomorphic classification is "depressional outflow."

Wetland C is part of a larger wetland system associated with the West Tributary of Kelsey Creek that extends off site to the east. This wetland is approximately 2 acres in size. Wetland C's Cowardin classification is PEM/SS, and its hydrogeomorphic classification is "riverine."

Figure 4. Wetlands and Streams in the Project Corridor



Wetland D is 4.9 acres in size. Based on the Cowardin classification system, Wetland D is a palustrine aquatic bed, emergent, scrub-shrub, and forested wetland. Wetland D's hydrogeomorphic classification is "depressional outflow."

PHASE 1

There are no surface water resources (lakes, streams, creeks, or wetlands) in the immediate vicinity of Phase 1 of project construction.

2) **Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.**

PROPOSED PROJECT

Please see Figure 4 for an overview map of the location of the lake, creeks, and four wetlands in the project vicinity. Figure 5 through Figure 7 show details on the anticipated effects to the four wetlands. Construction activities would require installation of a new culvert where 120th Avenue NE crosses the West Tributary of Kelsey Creek. A very small portion of Lake Bellevue is located within 200 feet of planned construction activities along 120th Avenue NE. Sturtevant Creek is located more than 200 feet from construction activities.

PHASE 1

There are no surface water resources (streams, creeks, or wetlands) within 200 feet of planned construction activities associated with Phase 1.

3) **Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.**

PROPOSED PROJECT

Please see Figure 5 through Figure 7 below for the wetland areas that would be affected by construction fill activities. Table 1 below presents the preliminary estimates of unavoidable impacts. Fill would be comprised of recycled excavated material or would come from an appropriate off-site facility.

Table 1. Preliminary Wetland and Stream Impacts

Name	Area of Wetland and Stream Impact		Area of Buffer Impacts	
	Square Feet	Acre	Square Feet	Acre
Wetland A	8,260	0.19	20,693	0.48
Wetland B	4,420	0.10	10,375	0.24
Wetland C and West Tributary of Kelsey	206	0.005	3,702	0.08
Wetland D	0	0	940	0.02
Total	**12,886**	**0.295**	**35,710**	**0.82**

PHASE 1

Construction for Phase 1 would not result in any filling or dredging activities that would affect surface water or wetlands.

Figure 5. Wetland A Detail Map

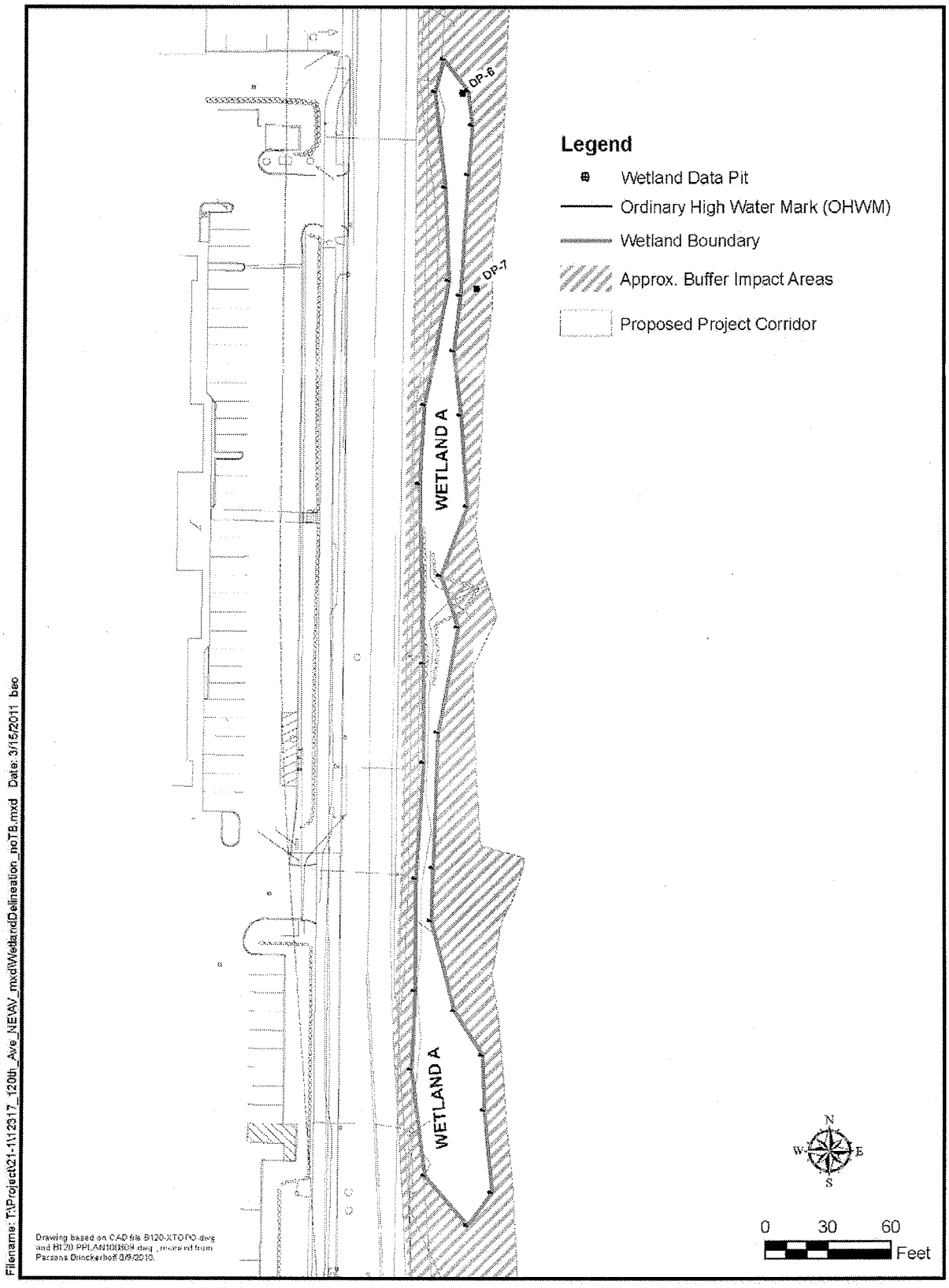


Figure 6. Wetland B Detail Map

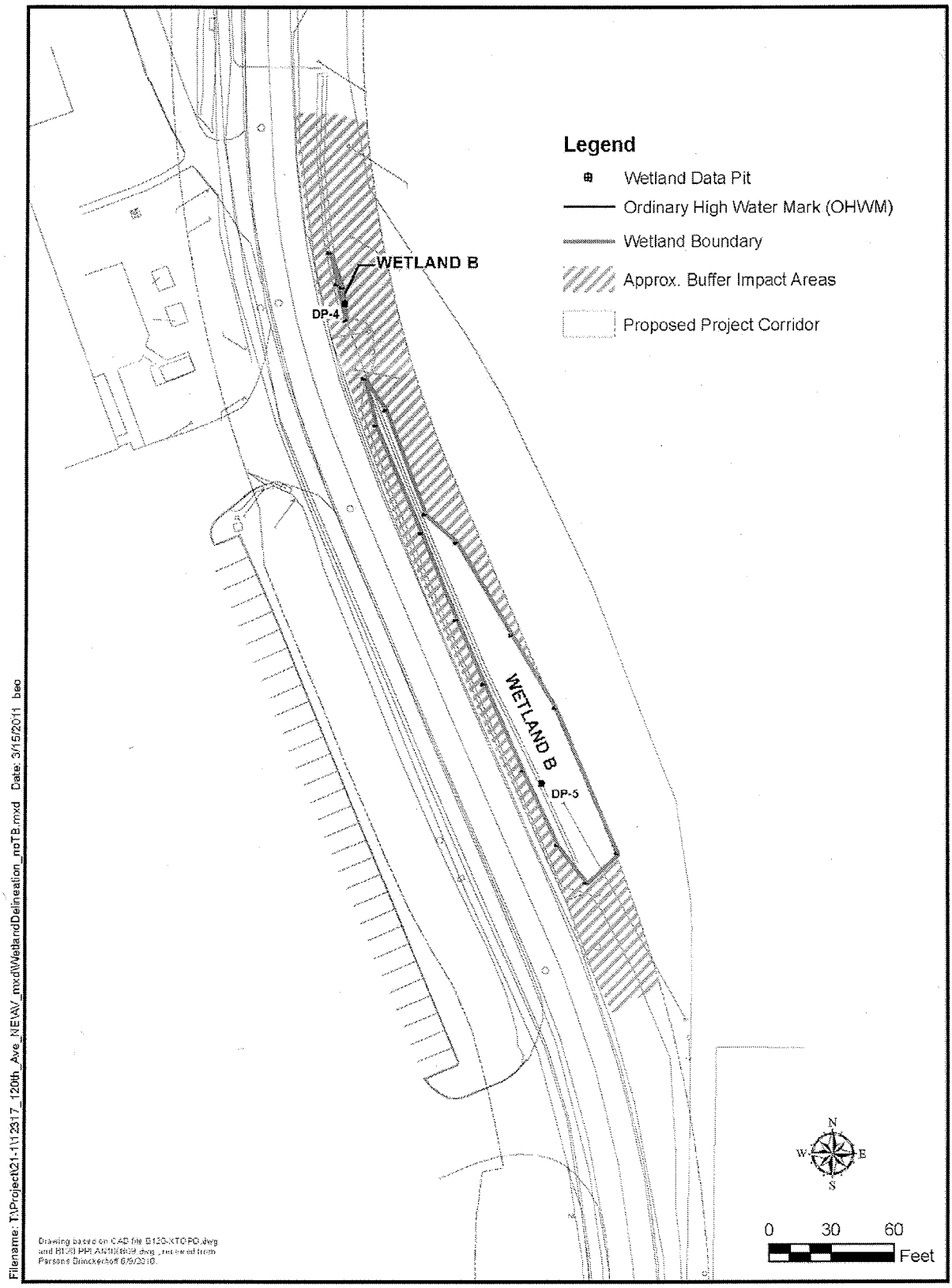
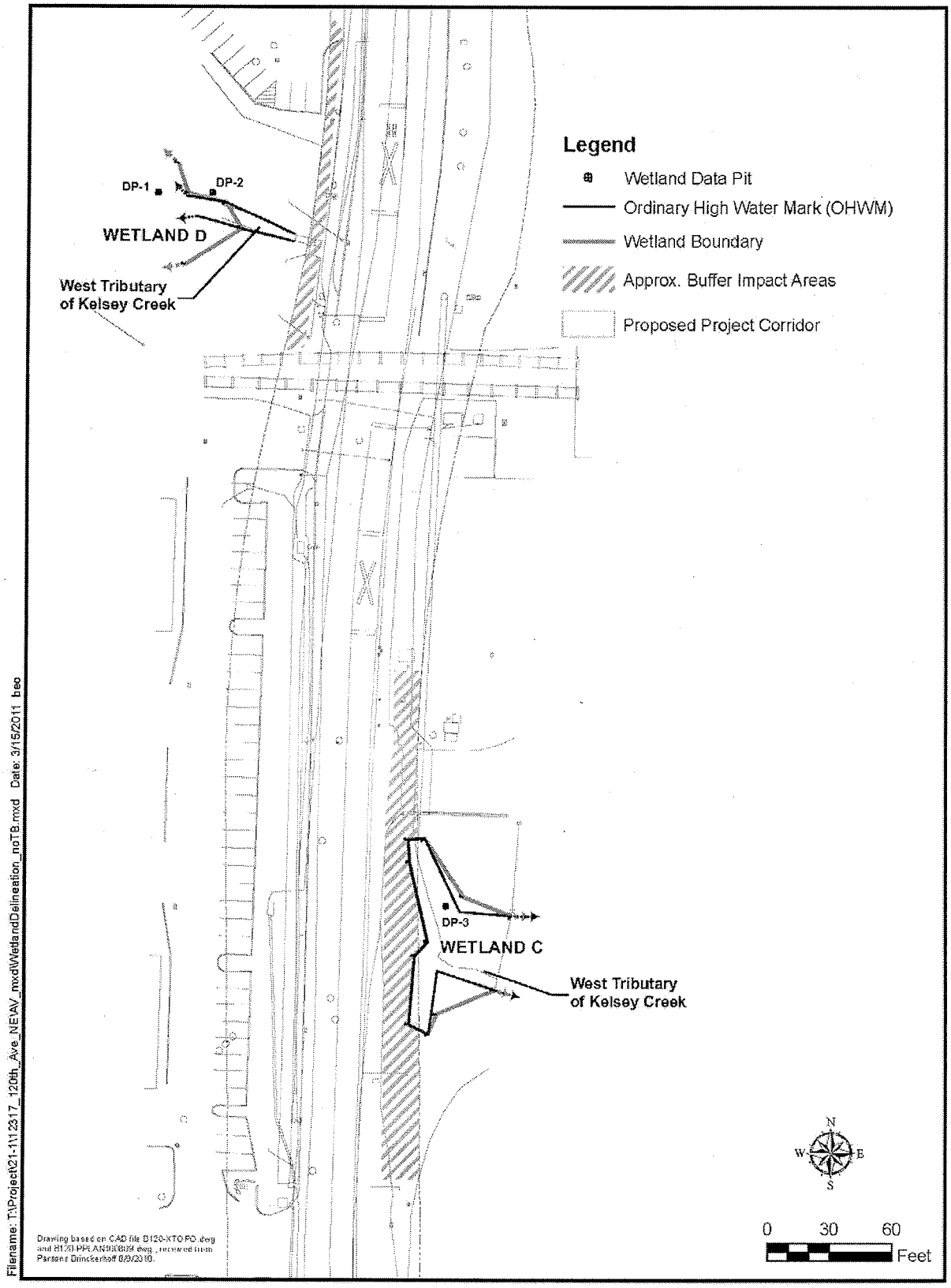


Figure 7. Wetlands C and D Detail Map (includes West Tributary to Kelsey Creek)



4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No, the proposed project would not require any surface water withdrawals or diversions.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

PROPOSED PROJECT

The FEMA FIRM panel 53033C0656F shows the mapped 100-year floodplain of Lake Bellevue, located southwest of the intersection of 120th Avenue NE and NE 12th Street. The 100-year flood elevation shown on the FEMA FIRM map is 138 feet NGVD (142 NAVD) for Lake Bellevue. The mapped 100-year floodplain area is zoned AE, which indicates that the map boundaries were developed from the results of FEMA's detailed hydrologic and hydraulic computer modeling. The proposed project improvements do not extend into the designated floodplain area.

PHASE 1

The project corridor encompassed in Phase 1 of project construction is not located in a 100-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

Erosion control measures will be used during construction to limit any sediment that may reach surface waters. Storm water runoff from the operational roadway would be the only discharge from the proposed project. The proposed project design calls for the construction and installation of natural drainage practices (i.e., low impact development) to manage storm water treatment and flow control.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

During construction, groundwater would be withdrawn. Foundation, vault, and trench dewatering water would be discharged into a controlled system prior to discharge to a sediment trap or temporary basin. Approximate quantities are unknown. Turbid or otherwise contaminated dewatering water would be handled separately from storm water. Disposal options could include infiltration, off-site transport using a vacuum truck, Ecology-approved on-site treatment (chemical or other), sanitary sewer discharge with City of Bellevue approval, and use of a sedimentation bag with an outfall to a ditch or swale for small volumes of localized dewatering. There would be no long-term effects on groundwater.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Not applicable.

c. Water runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

PROPOSED PROJECT

Storm water runoff from the roadway would be the only discharge from the proposed project, and the proposed project calls for the construction and installation of flow control and treatment facilities to manage storm water runoff. Natural drainage practices would include the use of bioretention planters (infiltration) and other techniques, along with the installation of bioretention filtrations systems at curb inlets along the proposed roadway to meet the project's flow control and treatment requirements. The proposed project would result in a small increase of 2.84 acres of currently pervious surfaces becoming impervious, for a total of 16.94 acres that would be covered with impervious surfaces upon completion of the proposed project. Currently, no storm water treatment is provided for impervious surfaces within the project corridor. The proposed project would provide storm water treatment for 2.84 acres of new impervious surfaces and 1.81 acres of existing impervious surfaces, for a total of 4.65 acres to be treated. Where runoff treatment is provided, enhanced treatment measures would be used. The remaining 12.29 acres of impervious surfaces that would not be treated results in an average volume of runoff on the order of 32.5 ac-ft as analyzed using the Western Washington Hydrology Model for the 50-year time series. During construction, BMPs would be used to minimize the potential for construction storm water to enter surface waters.

PHASE 1

Phase 1 contains 1.94 acres of impervious surfaces, which would increase by 0.44 acre due to construction of this phase of the proposed project. The total amount of impervious surfaces to be treated by bioretention BMPs would be 0.54 acre. The remaining 1.84 acres of impervious surfaces that would not be treated results in an average volume of runoff on the order of 4.5 ac-ft as analyzed using the Western Washington Hydrology Model for the 50-year time series. Again, it is important to note that the 1.84 acres of impervious surfaces that would not be treated is less that the existing 1.94 acres of impervious surfaces that is currently untreated, and currently results in higher storm water runoff volumes. During construction, BMPs would be used to minimize the potential for construction storm water to enter surface waters.

2) Could waste materials enter ground or surface waters? If so, generally describe.

During construction of all phases of the proposed project, the use of BMPs would minimize the potential for any construction storm water discharge containing waste materials to water resources, including discharges that could contain pollutants. The construction activities would include the preparation of a TESC Plan as well as a CWSPPP that would include a pollutant control element to address the potential for any accidental release of waste material from fuel leaks or spills of petroleum fuel products that would be used and possibly stored at the construction site.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

The use of bioretention planters (infiltration) and other techniques, along with the installation of bioretention filtrations systems at curb inlets along the proposed roadway would minimize surface, ground, and runoff water impacts. During construction, the use of BMPs would minimize the potential for any construction storm water discharge to water resources. The project would also be required to prepare a TESC Plan as well as a CWSPPP that would include a pollutant control element to address the potential for any accidental release of waste material from fuel leaks or spills of petroleum fuel products that would be used and possibly stored at the construction site.

4. PLANTS

a. Check or circle types of vegetation found on the site:
(those found in Phase 1 have an asterisk at the end)

/ X / deciduous tree: alder, maple, aspen, other *

/ X / evergreen tree: fir, cedar, pine, other *

/ X / shrubs

/ X / grass *

/___/ pasture

/___/ crop or grain

/ X / wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other

/___/ water plants: water lily, eelgrass, milfoil, other

/ X / other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

PROPOSED PROJECT

In the southern portion of the project corridor where NE 4th Street would be extended, the corridor for the proposed alignment is paved except for the BNSF corridor. The vegetation found in the area is associated with an ornamental landscaped area and an area currently dominated by Himalayan Blackberry and some Red Alder saplings. The removal of this vegetation would comprise approximately 0.3 acre.

Along 120th Avenue NE, the proposed project would result in the permanent removal of the following vegetation types:

- 1.2 acre of wetland and wetland buffer areas
- <0.1 acre of upland forest areas

The removal of vegetation in the wetland and wetland buffer areas would be of similar types of vegetation species. These species include a scrub-shrub layer of Pacific willow (Salix lasiandra), Sitka willow (Salix sitchensis), and/or Douglas spirea (Spirea douglasii) with an emergent strata of bentgrass (Agrostis sp.), reed canarygrass (Phalaris arundinacea), small-fruited bulrush (Scirpus microcarpus), swordleaf rush (Juncus ensifolius), common cattail (Typha latifolia), hardstem bulrush (Schoenoplectus acutus), and/or soft rush (Juncus effuses). Vegetation in and around Wetland D includes a forested canopy of Pacific willow (Salix lasiandra) and black cottonwood (Populus trichocarpa).

The forested uplands in the project corridor are limited. There is an isolated patch of black cottonwoods on the west side of 120th Avenue NE between Wetlands A and B. An isolated strip of Douglas fir and western red cedar runs perpendicular to the roadway and north of Wetland B. There are also mixed black cottonwood and conifers around Wetlands C and D. Six sequoias were observed along the east side of 120th Avenue NE north of NE 12th Street, and ornamental pines including maples, sweetgum, and other landscaping trees were observed in planting strips along the corridor.

The widening of 120th Avenue NE could require the removal of up to 88 City trees located along the project corridor.

PHASE 1

Along 120th Avenue NE, Phase 1 construction activities would affect approximately 44 City street trees on the western side of the roadway and about 9 City street trees on the eastern side of the roadway.

c. List threatened or endangered species known to be on or near the site.

A total of 15 species were identified as threatened or endangered within King County by the National Oceanic and Atmospheric Administrations's National Marine Fisheries Service and the U.S. Fish and Wildlife Service as of April 2011. Only one species was a plant species – Golden paintbrush (Castilleja levisecta). This species is not documented or expected within the projects's Action Area due to the urban environment.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The project would include the design and installation of planting strips and associated landscaping. Landscaping would conform to all City standards and requirements. City street trees would be replaced or replanted as required by City standards and requirements.

5. ANIMALS

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

/_X_/ birds: hawk, heron, eagle, songbirds, other: pileated woodpecker, Western grebe, other grebes, cormorants, dabbling ducks, diving ducks, geese, and wading birds

/___/ mammals: deer, bear, elk, beaver, other:

/___/ fish: bass, salmon, trout, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site.

PROPOSED PROJECT

A total of 14 animal species were identified as threatened or endangered within King County by the National Oceanic and Atmospheric Administrations's National Marine Fisheries Service and the U.S. Fish and Wildlife Service as of April 2011. Of these species listed as potentially present in King County, no terrestrial, avian, or marine mammal species are documented or expected within the projects's action area due to a lack of suitable habitat, though avian species are not precluded from flying over the site. Marine species and anadromous species potentially present in King County are precluded from the basin by downstream culverts that are documented as full barriers to upstream passage, one on each of the draining tributaries for the project. Critical habitat is designated in King County for marbled murrelet, northern spotted owl, Chinook salmon, bull trout, and killer whale; however, northern spotted owl and killer whale are considered precluded from the action area due to lack of potential habitat.

Evidence of pileated woodpecker foraging was observed in one snag in Wetland A, and this species is a state candidate species and a City species of local importance. Based on the presence of snags in Wetlands C and D, these areas are also likely used by pileated woodpeckers. Site observations and discussions with Michael Paine at the City of Bellevue, these wetlands are likely regulated under the Bellevue City Code as habitat associated with species of local importance.

Given the presence of aquatic habitat in Wetland D, the Western toad, a state candidate species, and the Pacific pond turtle, listed by the state as endangered, could be present. However, the project area does not contain sufficient upland/terrestrial habitat to sustain a Western toad population, and any Pacific pond turtles found would be an isolated population.

PHASE 1

The construction area for Phase 1 does not contain any of areas where threatened or endangered species are likely to be found due to its highly developed urban character of this portion of the project corridor.

c. Is the site part of a migration route? If so, explain.

No.

d. Proposed measures to preserve or enhance wildlife, if any:

Impacts to habitat associated with species of local importance must be mitigated in accordance with the requirements of LUC 20.25H.150 through LUC 20.25H.170.

PROPOSED PROJECT

The existing non-fish-passable culvert at the 120th Avenue NE crossing of the West Tributary of Kelsey Creek would be replaced with a fish-passable culvert. Based on conceptual design, this open-bottom box culvert would be approximately 8 to 10 feet wide and 4 to 6 feet tall to also allow for some wildlife crossing.

PHASE 1

Phase 1 is a developed urban area, and no measures to preserve or enhance wildlife are proposed.

6. ENERGY AND NATURAL RESOURCES

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity would be used for traffic signals and the street lighting that would be installed along the corridor.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No, the proposed project would not affect the potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Due to the small amount of electricity required for traffic signals and street lighting, no conservation measures are proposed other than those generally implemented by the City.

7. ENVIRONMENTAL HEALTH

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

PROPOSED PROJECT

Information was obtained on potential or existing conditions as well as relevant historical conditions within the project area to assess potential risks associated with hazardous materials. Based on former and/or current land uses, 52 sites were identified that pose some potential risk to the project. Each of the sites investigated were ranked as a low, moderate, or high risk to the project based on its proximity to the proposed alignment, the solubility/mobility of contamination that may be present, and whether the City anticipates acquiring the property or a portion of the property.

A total of 40 sites of concern are considered a low risk to the project. Acquisition of these properties is limited to strips of land along the road alignment to expand the roadway and/or partial acquisition of properties for the NE 4th Street roadway extension. A total of 10 sites of concern are considered a moderate risk to the project. One of these sites would not be acquired, but is considered a moderate risk because known contamination on these sites may have migrated to areas where excavation is expected to occur. Two moderate-risk sites would be fully acquired for the project; acquisition of the seven remaining moderate risk sites would be limited to partial acquisitions. A total of two sites of concern are considered a high risk to the project—a former dry cleaning plant and a former gas/service station.

PHASE 1

Phase 1 of the proposed project would affect two moderate-risk sites, potentially contaminated by petroleum. Mitigation measures would be the same as generally proposed for the project.

1) Describe special emergency services that might be required.

No emergency services are anticipated for the proposed project during construction or long-term operation.

2) Proposed measures to reduce or control environmental health hazards, if any:

Mitigation measures include reducing the amount of soil excavation required for the project, conducting further investigations in proposed excavation areas to determine whether contamination is present, and conducting further investigations on properties that would be acquired to determine the concentrations and extents of contamination on these sites and to determine whether contamination has migrated to adjacent properties. A limited Phase II environmental site assessment is planned for soil and groundwater sampling on the moderate and high-risk sites of concern that would be partially or fully acquired for the project. Construction monitoring would occur on all sites of concern where clearing or grading is proposed. In accordance with the Washington State Department of Transportation Standard Specifications, the general contractor would complete a spill prevention control and counter measures plan for dealing with hazardous materials.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

The project corridor experiences noise mainly due to traffic because it consists of roadways and is adjacent to additional travel facilities, but would not be affected by noise. The proposed project is not anticipated to cause an increase in traffic, so noise levels would not be expected to be substantially greater than existing levels.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

During construction of the proposed project, there would be noise associated with construction equipment. Construction would occur during daytime hours, 7 a.m. to 10 p.m., and within the City's construction noise limits. This noise would be temporary and would halt immediately upon completion of the proposed project. It is not anticipated that any unusual construction equipment or techniques would be required to complete the proposed project. Noise from project construction and traffic noise levels resulting from project operation are not anticipated to contribute to an increase in noise levels at all residences within the study area. For construction outside of daytime hours, a noise variance may be required by the City if project construction noise is predicted to exceed the City's noise limits or if nighttime construction is required to maintain daytime traffic flow or schedule requirements.

During operation, the project would result in traffic noise, as the existing roadways currently do. As stated above, noise levels after construction is completed are not expected to be substantially greater than existing levels.

3) Proposed measures to reduce or control noise impacts, if any:

Construction and operation noise is regulated by BCC 9.18. The proposed construction must meet the requirements of this section.

PROPOSED PROJECT

Existing noise levels and future noise levels without the project do not approach or exceed the Federal Highway Administration (FHWA) noise abatement criteria (NAC) at all modeled locations. Noise levels would exceed the FHWA NAC in 2040 with the project, with South Option 1 and South Option 2 at All Saints Episcopal Church at 1307 120th Avenue NE. Mitigation measures to reduce traffic noise at this site were evaluated but they would not effectively reduce exterior traffic noise levels; however, depending on interior traffic noise levels at the church, soundproofing may be feasible to reduce interior noise at this location. Insulation of buildings could be feasible at the church as this remedy, in accordance with FHWA and WSDOT policy, only applies to public or non-profit institutional buildings such as schools, churches, or libraries. All Saints Episcopal Church may be able to receive government-sponsored funding for installation of noise insulation. Interior noise levels would need to be measured to determine if traffic noise levels in the facility meet the FHWA Noise Abatement Criteria.

It should also be considered that generally, a structure with closed windows and doors would reduce the exterior noise levels by 25 decibels inside the structure. At All Saints Episcopal Church, this would lead to interior noise levels being roughly 43 dBA and well below the NAC.

PHASE 1

There are no mitigation measures proposed for Phase 1 of the proposed project.

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties?

PROPOSED PROJECT

Land use in the project study area is primarily characterized by moderate-density commercial developments with a mix of institutional, residential, retail, and office uses. Land uses directly adjacent to the project corridor consist of automobile dealerships, vacant lots, retail and big-box retail stores, a post office, small strip malls, office buildings, medical offices, parking lots, and large warehouses.

Limited residential land uses are located throughout the corridor. The Westside Apartments at 500 121st Place NE and the Oasis Condominiums at 680 122nd Avenue NE are multi-family residential complexes located northeast of the eastern terminus of the proposed extension of NE 4th Street and are more than a block east of the existing intersection of NE 5th Street with 120th Avenue NE in the project corridor. Both residential complexes currently experience noise levels common in a typical urban area. This includes traffic noise from side streets, arterials in the immediate area, and I-405, which is less than a half-mile to the west. In addition, both complexes are located at least 250 feet from the proposed eastern-most edge of the project corridor. Another cluster of residences is located farther north on the eastern side of the project corridor. Two apartment complexes are within the triangular intersection of NE 8th Street and NE Bel-Red Road, roughly at and east of 122nd Avenue NE. Brierwood, located at 12022 NE 8th Street, is a two-story apartment building; Midlakes Apartments, located at 12028 NE 8th Street, is also a two-story apartment building. Four additional two-story condominium buildings are also located at 12107 NE Bel-Red Road. Finally, there is the Lake Bellevue Village located to the west of 120th Avenue NE, just south of NE 12th Street, which consists of three two- and three-story condominiums. This condominium community includes a shopping complex that offers various services and amenities to nearby residents.

The only church in the project study area is All Saints Episcopal Church at 1307 120th Avenue NE. The church is located within a commercial development adjacent to the project corridor.

Open space near the project corridor includes Wilburton Hill Community Park at 12053 Main Street, located to the south and east of the southern portion of the project corridor. Bel-Red Mini Park is located east of the project corridor at 124th Avenue NE and NE Bel-Red Road.

PHASE 1

Phase 1 is comprised of the existing roadway and right-of-way, and adjacent commercial and office uses.

b. Has the site been used for agriculture? If so, describe.

The project corridor is developed and urban in nature, and has not been used for agriculture in recent history.

c. Describe any structures on the site.

Not applicable.

See item "d" below.

d. Will any structures be demolished? If so, what?

PROPOSED PROJECT

The project would fully acquire four parcels, two of which have buildings on them that would be demolished. There would be no other building demolitions, though portions of one other building would experience impacts. In particular, based on conceptual engineering plans, the extension of NE 4th Street would impact a portion of the Best Buy building (maximum reduction of approximately 12,000 square feet).

PHASE 1

No buildings would be demolished as part of required construction activities associated with Phase 1 of the proposed project.

e. What is the current zoning classification of the site?

The project corridor is directly adjacent to seven different zoning districts, as shown in Table 2 below. Those adjacent to Phase 1 are marked with an asterisk.

Table 2. Current Zoning Classifications Along the Corridor

Abbreviation	Zoning District	Purpose
GC*	General Commercial	To provide for the location of a wide variety of business activities providing goods and services to other businesses and the general public.
O*	Office	To provide for the location of business, financial, administrative, and professional services.
BR-OR-1	Bel-Red Subarea: Office/Residential Node 1	To provide an area for a mix of office, housing, and retail uses within the core of a nodal area, with office as the predominant use. The district is limited in extent to provide the level of intensity appropriate for areas close to the highest levels of transit service within the Bel-Red area.
BR-OR-2	Bel-Red Subarea: Office/Residential Node 2	To provide an area for a mix of office, housing, and retail uses, with office as the predominant use. The district is located within a node, but outside the node's core. Building heights provide for a transition between the node's core and areas outside the node.
BR-R	Bel-Red Subarea: Residential	To provide an area for residential uses. Limited retail and service uses are permitted secondary to residential use to provide the amenity of shopping and services within easy walking distance of residential structures.
BR-CR	Bel-Red Subarea: Commercial Residential	To provide an area for a mix of housing, retail, office, and services. Multiple uses are encouraged on individual sites, in individual buildings, and in the district as a whole.
BR-GC	Bel-Red Subarea: General Commercial	To provide an area for a wide variety of business activities that provides goods and services to other businesses and the general public.

f. What is the current comprehensive plan designation of the site?

PROPOSED PROJECT

The comprehensive plan land use designations along the proposed project corridor include the following:

GB/CB – General Business/Community Business

GC – General Business
O – Office
LI – Light Industrial

PHASE 1

Phase 1 of the proposed project traverses three different land use designations. Between NE 300 block and NE 700 block on the east side of 120th Avenue NE, properties adjacent to the roadway are designated O – Office. On the west side of 120th Avenue NE, adjacent properties are designated both GC – General Business (Home Depot and Best Buy properties) and GB/CB – General Business/Community Business (all properties north of Best Buy).

g. If applicable, what is the current shoreline master program designation of the site?

The proposed project corridor crosses only one surface water regulated by the City of Bellevue Shoreline Master Program (SMP). This is the West Tributary of Kelsey Creek and associated wetlands. Lake Bellevue and associated wetlands are also regulated by the SMP, and are located more than 150 feet west of the roadway corridor.

The project is not within Shoreline jurisdiction and does not affect shorelines of the state.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

PROPOSED PROJECT

See attached wetland and stream delineation reports for stream and wetland typing.

The City regulates six types of critical areas in its land use code: streams and riparian areas, wetlands, habitats for species of local importance, geological hazard areas, flood hazard areas, and shorelines. The proposed project is not located in a designated flood hazard area, nor is it in the vicinity of a designated critical area shoreline. The discussion below addresses the project with regard to the remaining four types of critical areas.

The topography in the area of the proposed NE 4th Street extension rises roughly 50 feet in elevation between 116th Avenue NE on the west and the elevation in the existing BNSF corridor. This change in elevation is concentrated in a narrow band immediately west of the BNSF corridor and based on the City's critical areas map, this area exceeds a 40 percent slope. To accommodate the steep slope, the horizontal alignment of the proposed project would curve up the hillside. This portion of the proposed alignment would have a 13 percent slope. The roadway design would require the construction of substantial retaining walls on both sides of the roadway. It is not anticipated that this sloped area is considered geologically hazardous, or that it would present any unusual or dangerous conditions for or during construction activities.

The proposed project would also affect four wetlands along 120th Avenue NE and the West Tributary of Kelsey Creek in the northern portion of the project corridor. The preliminary plans provided for the project show unavoidable wetland impacts to all of Wetlands A and B, and portions of Wetland C and the West Tributary of Kelsey Creek. These impacts were discussed in a previous section.

PHASE 1

Phase 1 does not affect any environmentally sensitive areas.

i. Approximately how many people would reside or work in the completed project?

Not applicable.

j. Approximately how many people would the completed project displace?

PROPOSED PROJECT

The proposed project would not displace any residences. The project would fully acquire four parcels, two of which have buildings on them that would be demolished. There would be no other building demolitions, though portions of other buildings may experience impacts. In particular, based on conceptual engineering plans, the extension of NE 4th Street would impact a portion of the Best Buy building. The removal of the two buildings could displace up

to an estimated 59 employees. It is unknown how many employees could be displaced by the impacts to the Best Buy building.

PHASE 1

Phase 1 would not displace any residences or businesses.

k. Proposed measures to avoid or reduce displacement impacts, if any:

The project is currently in the conceptual design phase and as it progresses through preliminary and final design stages, efforts would be made to minimize impacts to the extent possible. Where acquisition causes the displacement of a business, displacement of parking, adverse effects on loading dock facilities, and/or changes in property access, the extent of these impacts would be considered in the relocation services and payments made under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq) (Chapter 468-100 WAC).

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The proposed project corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. The project is also one of a number of high priority transportation investments that make up the City's Mobility and Infrastructure Initiative, which was formed to connect downtown Bellevue and planned growth in the Bel-Red and Wilburton/NE 8th Street Subareas. The project's consistency with specific goals and objectives of the regional and City plans is presented below:

Statewide Transportation Improvement Program

The STIP is comprised of federally funded state and local roadway projects that have been identified through the planning process as high priority. The project corridor is listed on the 2009-2010 STIP and is noted as having regional significance. While the proposed four-lane design of 120th Avenue NE from NE 18th Street to Northup Way is not consistent with this plan, however, a revised description was submitted to PSRC April 8, 2011 for the June 2011 Amendment to the STIP.

The City of Bellevue 2011-2016 Transportation Improvement Plan

The proposed project corridor is listed on the City of Bellevue 2011-2016 Transportation Improvement Program and is included in the Adopted 2009-2015 Capital Investment Program.

The City of Bellevue Comprehensive Plan

Although the design of 120th Avenue NE from NE 18th Street to Northup Way is not consistent with the City's Comprehensive Plan, the proposed roadway is consistent with the following policies:

> Policy TR-24—Incorporate pedestrian and bicycle facility improvements into roadway projects, and incorporate transit/high-occupancy vehicle improvements where feasible.
>
> Policy TR-25—Provide for adequate roadway, pedestrian, and bicycling connections in newly developing and redeveloping areas of the City, promoting both internal access and linkages with the rest of the City.
>
> Policy TR-43—Provide sufficient arterial right-of-way width to permit landscaping, and to accommodate pedestrian and bicycle facilities, while considering neighborhood character and context.

The City of Bellevue Wilburton/NE 8th Street Subarea Plan

> Policy S-WI-25—Improve local access, street system connectivity, and traffic flow by providing additional east-west transportation connections, including an arterial street connection at NE 4th Street between 116th and 120th Avenues NE...

Policy S-WI-31—Recognize the transportation and recreation uses under consideration for the BNSF rail corridor when considering public and private improvements adjacent to the corridor and preserve the opportunity for future multi-modal transportation use and access.

The City of Bellevue Bel-Red Subarea Plan

Policy S-BR-59—Design Bel-Red Subarea arterials and local streets in a manner that contributes to community character, open space, and environmental enhancements.

Policy S-BR-63—Improve pedestrian connectivity and the quality of the pedestrian environment with a comprehensive sidewalk and trail system, including through-block pedestrian connections and mid-block crossings.

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Not applicable.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable.

c. Proposed measures to reduce or control housing impacts, if any:

Not applicable.

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

PROPOSED PROJECT

The proposed project would require the construction of retaining walls throughout the corridor, particularly along NE 4th Street. The highest such structure would be the retaining walls required to accommodate the steep slope along the proposed alignment for the extension of NE 4th Street. On the north side, the retaining wall would rise to roughly 23 feet, while on the southern side, the retaining wall would be up to 21 feet tall. The retaining walls would be built using earth materials, and would be finished with a cement concrete fascia wall treatment.

PHASE 1

The tallest structures in Phase 1 would be retaining walls would be approximately 4 to 6 feet in height and would be finished with a cement concrete fascia wall treatment.

b. What views in the immediate vicinity would be altered or obstructed?

Once completed, the project would alter the visual and aesthetic character of the area, but it is anticipated that none would result in an adverse effect in the area. The extension of NE 4th Street would result in a new roadway that must accommodate a substantial rise in elevation. However, the area is already highly developed and it is not anticipated that this would result in an adverse visual impact. The realignment of 120th Avenue NE between NE 8th and NE 12th Streets would be a widened roadway. As 120th Avenue NE is already present in the area, the realignment is not anticipated to result in any adverse visual impacts. The remainder of the project corridor consists of widening 120th Avenue NE. These changes are not expected to result in adverse visual impacts because both the four-lane and five-lane roadway designs would comply with code set forth in the design guidelines for both subareas. The design for retaining walls would also comply with these guidelines.

c. Proposed measures to reduce or control aesthetic impacts, if any:

The design of retaining walls along the corridor would have exterior treatments that would be context sensitive and would blend with the surrounding streetscape and urban character. As such, the exterior treatments could be different along the corridor.

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The project would result in the installation of nighttime-operational streetlights along the entire length of the project corridor. This could be considered a positive effect on human use and activity in the area, particularly for safety along what is now a largely unlit roadway corridor. Street lighting would follow the design guidelines of the Wilburton/NE 8th Street and Bel-Red Subarea Plans, including the use of lower poles and more efficient lighting that provides more focused energy with less stray light. The installation of street lights along the proposed roadway would introduce a new source of light in the area. Street lights are currently present along NE 4th Street west of 116th Avenue NE, along portions of cross-streets, as well as portions of 120th Avenues NE. As such, there are existing sources of light surrounding the project corridor.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Street lighting would follow the design guidelines of the Wilburton/NE 8th Street and Bel-Red Subarea Plans, and therefore is not anticipated to be a safety hazard or cause interference with views.

c. What existing off-site sources of light or glare may affect your proposal?

None anticipated.

d. Proposed measures to reduce or control light and glare impacts, if any:

Street lighting would follow the design guidelines of the Wilburton/NE 8th Street and Bel-Red Subarea Plans, including the use of lower poles and more efficient lighting that provide more focused energy with less stray light. There are no visual impacts that are anticipated to be so severe as to create an adverse effect requiring additional mitigation.

12. RECREATION

a. What designated and informal recreational opportunities are in the immediate vicinity?

PROPOSED PROJECT

Generally, designated and informal recreation opportunities are not located in close proximity to the proposed project. No existing parks are adjacent to either the proposed alignment extension of NE 4th Street or along 120th Avenue NE. The Wilburton Hill Community Park, the Bel-Red Mini Park; Ashwood Playfield, McCormick Park, Bovee Park, and Hidden Valley Sports Park are all located some distance from the project corridor.

No trails or designated bike paths traverse the project corridor; however, the Wilburton/NE 8th Street and Bel-Red Subareas include plans for additional trails to be built. The proposed project would link to some of these proposed trails and would include improvements to extend planned trails along the west side of the corridor between NE 15th/NE 16th Street and the West Tributary of Kelsey Creek.

Informal recreational activities may occur in nearby surface waters. Sturtevant Creek lies on the western side of Lake Bellevue and extends to the south; though no recreational uses were observed during site visits. Lake Bellevue is approximately 150 feet to the west of 120th Avenue NE southwest of the NE 120th Avenue NE and NE 12th Street intersection. Due to limited access caused by adjacent buildings, use of Lake Bellevue is largely limited to people walking around the lake to view the birds and ducks. The Western Tributary to Kelsey Creek is currently routed in a culvert underneath 120th Avenue NE in the northern portion of the project corridor. It is not wide

enough for kayaking or canoeing, and access along the creek is restricted due to the lack of trails across adjacent private property.

PHASE 1

Designated and informal recreation opportunities are not located in close proximity to Phase I of the proposed project corridor. The Wilburton Hill Community Park and designated trails would not be affected by project construction or operation. Moreover, Phase 1 does not include construction on streets used by bicyclists. There are no streams or lakes in close proximity to Phase 1.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Construction of the project would not affect any parks, trails, or water resources that could be used for recreation. Use of streets by bicyclists within the project corridor may be temporarily affected during construction activities. However, at a minimum, partial use would be maintained throughout construction.

13. HISTORIC AND CULTURAL PRESERVATION

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

PROPOSED PROJECT

A pedestrian survey of the area of potential effects (APE) identified six historical resources within or near the APE:

- A segment of the Northern Pacific (NP) Railway Lake Washington Beltline,
- A railroad spur,
- An automobile dealership,
- A former dry cleaning plant,
- A truck repair shop in the former Safeway Distribution Center, and
- A warehouse in the former Safeway Distribution Center.

The NP Lake Washington Beltline, a feature passing through the APE, was recorded in 2007 and determined eligible for the National Register of Historic Places (NRHP) by the Washington State Historic Preservation Officer (SHPO). The former Safeway facilities are recommended eligible for the NRHP, but are outside the APE. The rail spur, dry cleaning plant, and automobile dealership are recommended not eligible for the NRHP due to limited historical significance and loss of integrity. Of the six historic resources, only the NP Lake Washington Beltline would be adversely affected by the project as a result of constructing the extension of NE 4th Street. The project would have no effect, either directly or indirectly, on the other five resources.

No archaeological sites listed on or proposed for national state, or local preservation are located in the project corridor. However, construction in the peat soils east of Lake Bellevue could disturb buried archaeological resources.

PHASE 1

There are no identified cultural or historic resources in the construction area of Phase 1.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

None other than discussed in 13.a. above.

c. Proposed measures to reduce or control impacts, if any:

PROPOSED PROJECT

The proposed project design disturbes the current rail embankment, but analysis has been conducted to accommodate potential future uses. Mitigation would be undertaken for any alterations to NRHP-eligible resources under a Memorandum of Agreement (MOA) between SHPO and FHWA. Typical mitigation measures include Level II documentation of affected resources, but final decisions on mitigation would be made among the agencies involved in the MOA. Significant archaeological sites discovered during construction would be mitigated through scientific data recovery or other suitable measures determined in consultation with SHPO, affected Indian Tribes, and other concerned parties. In order to minimize potential damage, construction would be conducted under the auspices of a monitoring and discovery plan that would include provisions for inadvertent discovery of cultural materials and human remains. The City has standard contract specifications that detail a monitoring procedure that should be specifically tailored to the project and risks associated with proposed construction east of Lake Bellevue.

PHASE 1

No measures to reduce or control impacts to historical or cultural resources are proposed.

14. TRANSPORTATION

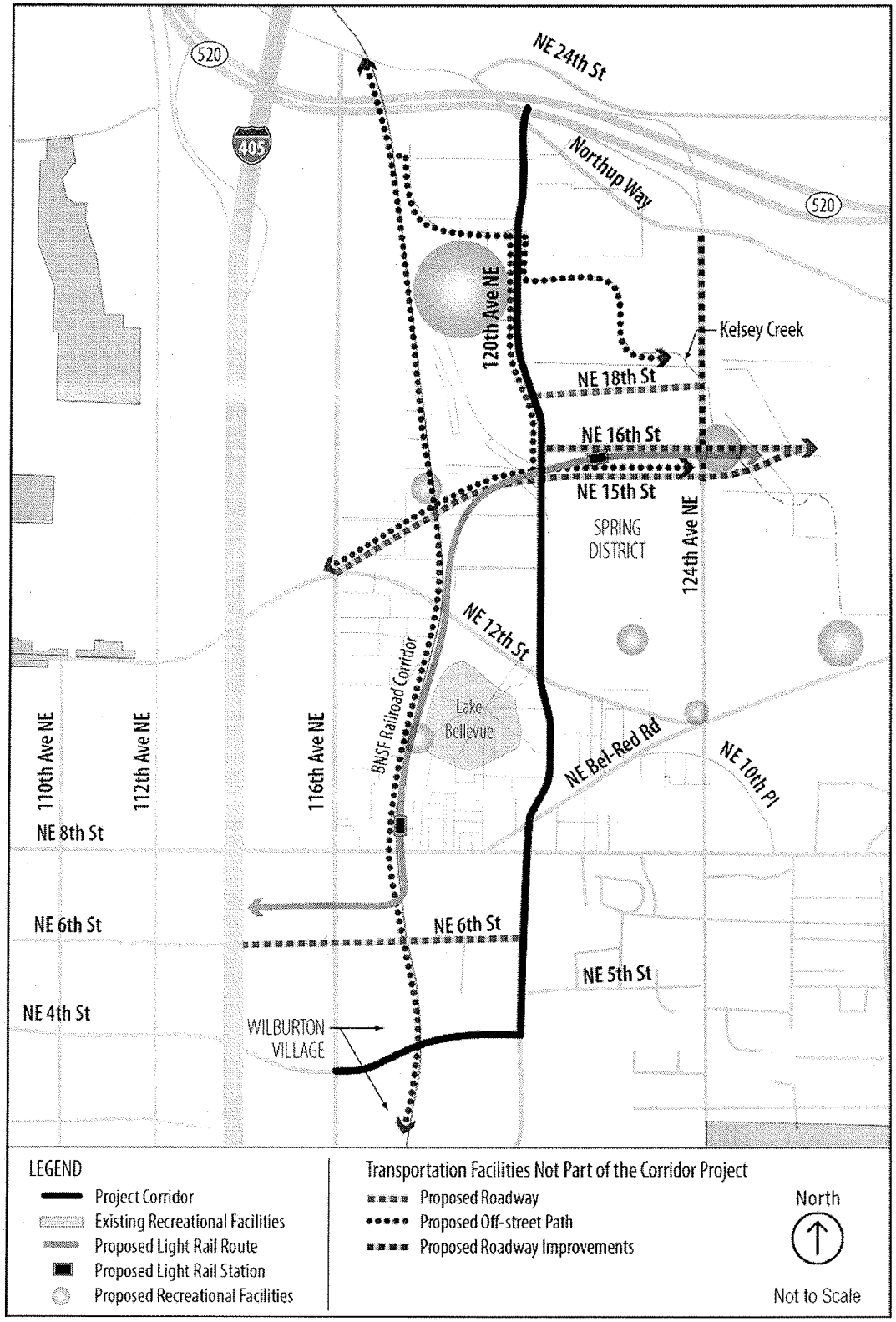
a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

The proposed project is a transportation project. The project corridor is located approximately 1 mile east of downtown Bellevue. Major transportation connections in the project vicinity include Interstate 405 and State Route 520. Currently, NE 4th Street dead-ends at its intersection with 116th Avenue NE. The proposed project would extend NE 4th Street just over a quarter-mile to the east and create a new intersection with 120th Avenue NE. Figure 8 illustrates the project corridor and planned and existing transportation facilities and connections in the project corridor study area.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

There are currently bus stops located along NE 4th Street and 116th Avenue NE. Along 120th Avenue NE, there are bus stops at NE 8th Street, NE 12th Street, and Northup Way. Metro Transit provides bus service in the project

Figure 8. Planned and Existing Transportation Connections in the Project Area



area. Currently there are no transit routes that operate on 120th Avenue NE within the study area. However, several routes operate on streets that cross 120th Avenue NE, particularly during peak commute hours. Bus routes 230, 253, 261, 272, and 885 provide service along NE 8th Street; Route 233 travels on NE 12th Street; and Routes 249, 256, and 889 all travel on Northup Way. Service frequencies for these routes are not particularly high with headways ranging from approximately 30 to 60 minutes during the PM peak commute period. Bus route 271 operates on NE 4th Street between 116th Avenue NE and 112th Avenue NE. However, several routes operate on streets that cross NE 4th Street, particularly during peak commute hours and they include Metro routes 243 and 342 and Sound Transit routes 550 and 556, which travel on 112th Avenue NE crossing NE 4th Street. Headways for these routes range from approximately 7 minutes to one hour during the PM peak commute period, depending on the specific route.

c. How many parking spaces would the completed project have? How many would the project eliminate?

PROPOSED PROJECT

The proposed project would not provide any parking spaces. An estimated 376 to 595 parking spaces may be removed by the project and not all would be replaced. In particular, a maximum of up to 208 parking spaces could be displaced on the Best Buy property and up to 159 parking spaces could be displaced on the Home Depot site. Up to 40 spaces each could be displaced on the Briarwood Center and Bellevue Trade Center sites. Use of the loading docks at Best Buy and the American Games sites may also be adversely affected.

PHASE 1

Phase 1 would result in the removal of roughly 109 parking spaces. This loss would not result in any adverse impacts on those businesses experiencing the removals because the impacts range from 3 to 36 parking spaces per property and would not compromise the operability of the individual business based on City standards and the ability to reconfigure the parking on these sites.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Not applicable.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No. The proposed extension of NE 4th Street would cross the BNSF corridor, which is no longer in use as a railroad corridor. The proposed project would not hinder any potential future uses of the BNSF corridor. There are no water transportation facilities or airports in the project vicinity.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

The proposed project would accommodate planned growth and development, and the resulting traffic demand.

g. Proposed measures to reduce or control transportation impacts, if any:

Construction of the proposed project would in itself be a measure to improve traffic conditions in the area, alleviating congestion and improving connectivity. A Traffic Management Plan would be prepared by the general contractor to minimize traffic impacts during construction.

For specific properties that would be adversely affected by loss of parking spaces, the City would work with property owners to reconfigure parking lots based on City standards to recoup the loss of parking spaces. In the case of the combined loss of parking on the Best Buy and Home Depot sites, mitigation could include reconfiguration of the parking lots as well as potential construction of a three-story parking garage north of the Home Depot building to replace up to about 160 parking spaces. The City may also facilitate mitigation measures to reroute access to the Best Buy loading dock via a new route north of the existing building.

15. Public services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Not applicable.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

This is a transportation project, and therefore would not result in the need for utility service other than electricity for the traffic signals and street lights. There are utilities present in the corridor, and the project would coordinate with the appropriate departments and companies during construction.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

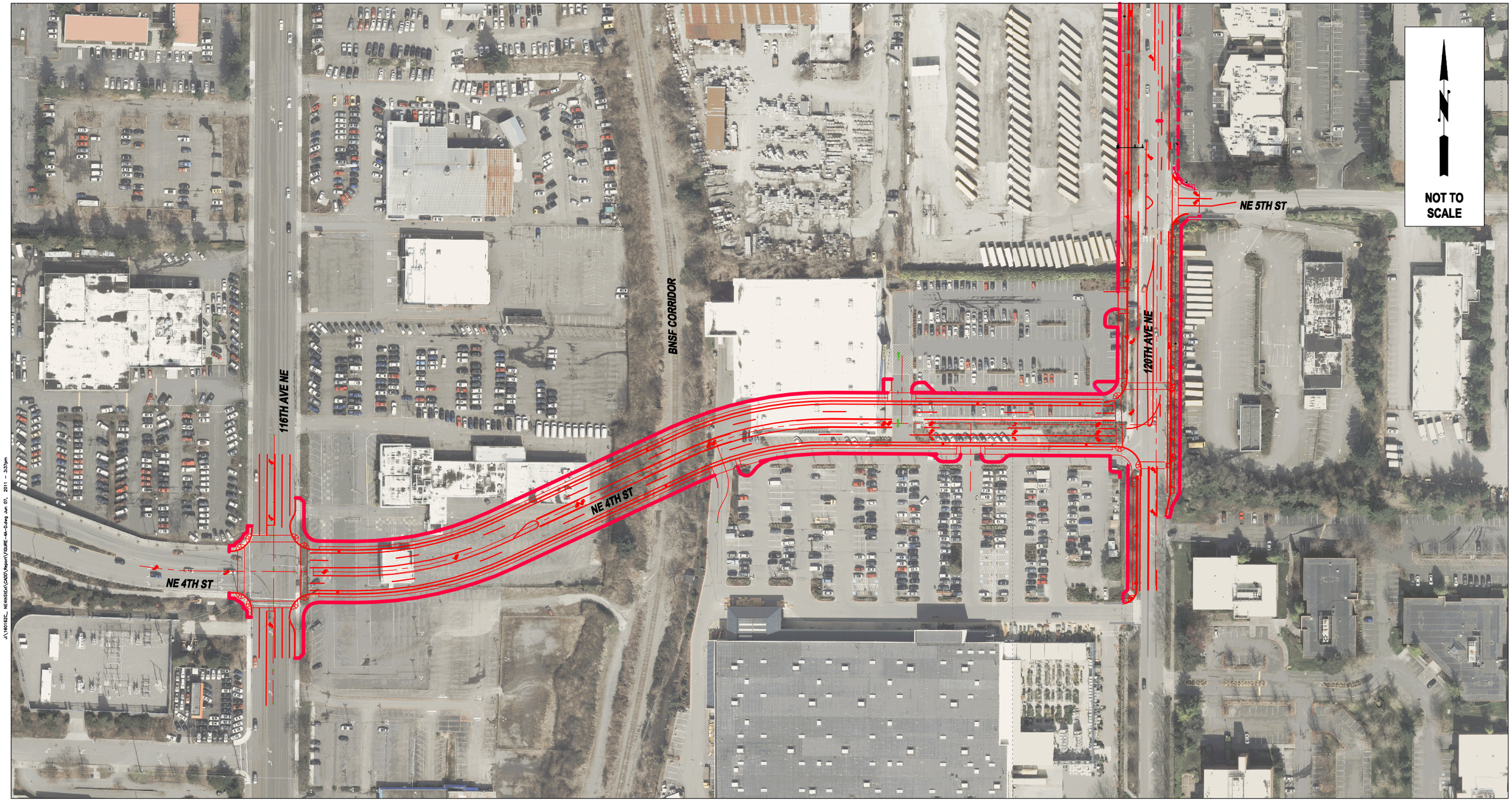
Utilities would be relocated and/or installed during construction of the proposed project; no effort beyond general coordination before and during construction with each utility's operator is anticipated.

B. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: .....

Date Submitted: 6/6/11



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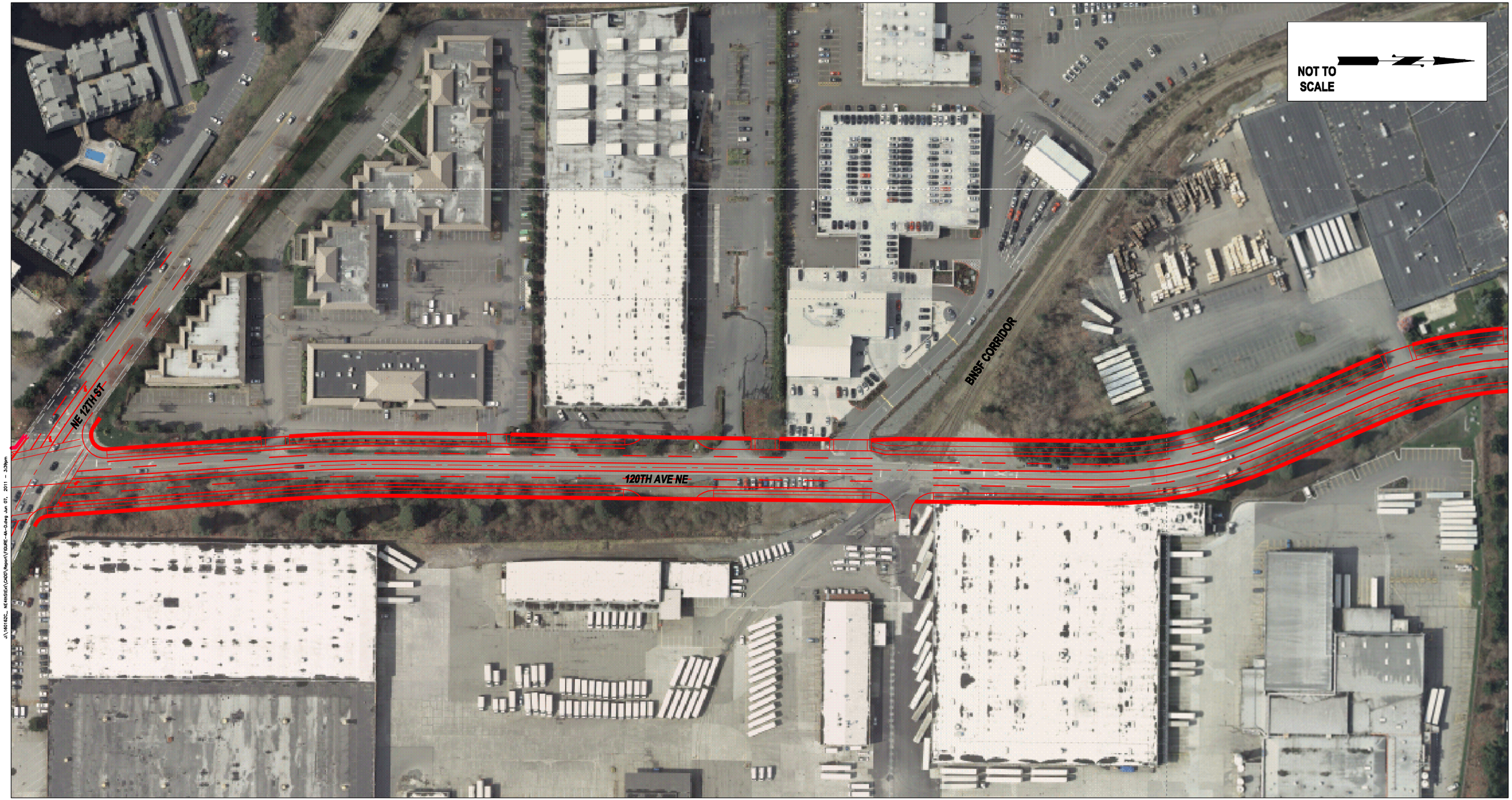

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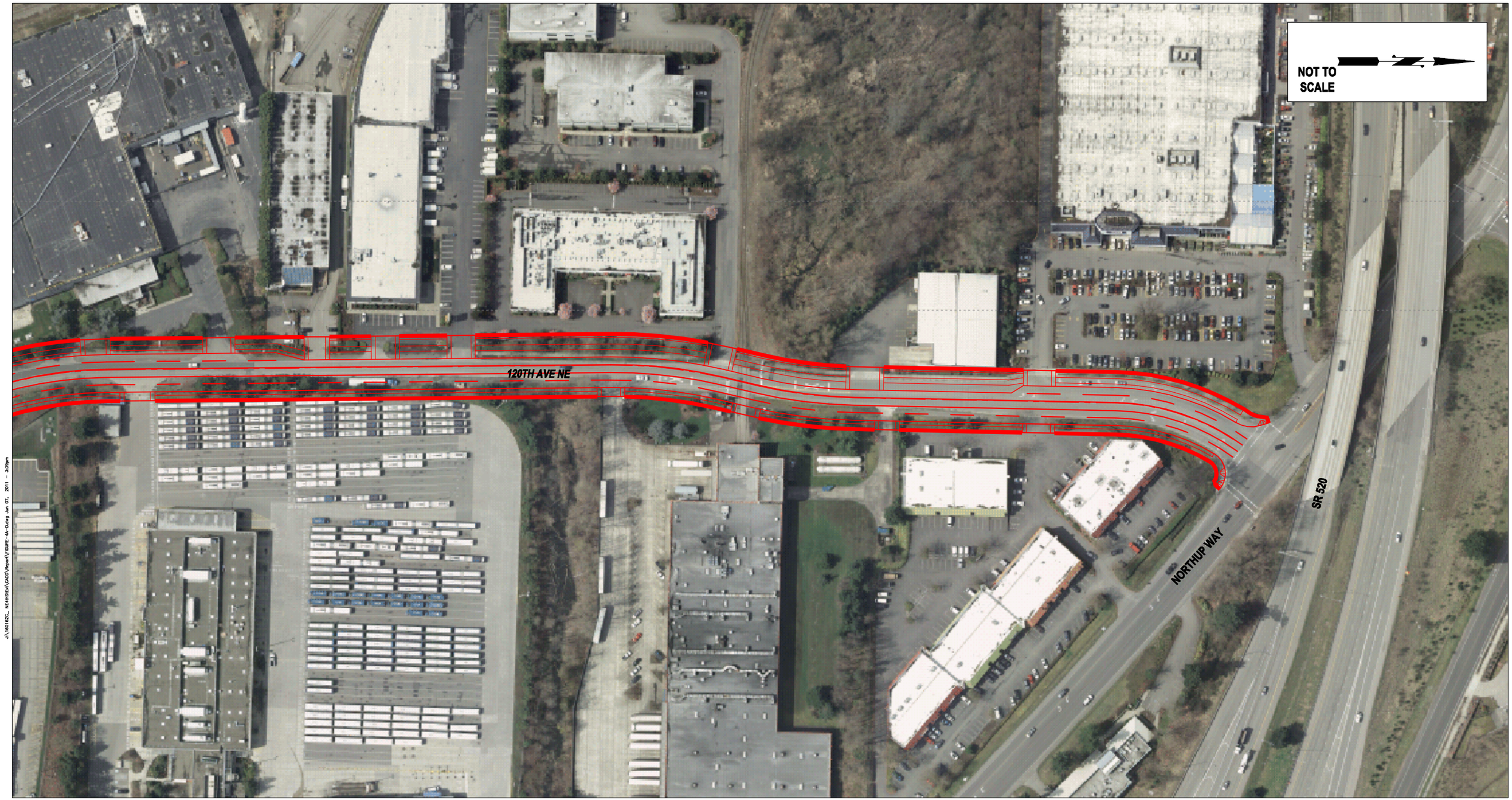

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NE 4th Street/ 120th Avenue NE Corridor Project

Air Quality Technical Report

prepared for
City of Bellevue

prepared by
Parsons Brinckerhoff

April 15, 2011

COB File # 11-114971-LM

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Acronyms and Abbreviations

AADT	Average annual daily traffic
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CFR	Code of Federal Regulations
CO	Carbon monoxide
DPM	Diesel particulate matter
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
HC	Hydrocarbons
IRIS	Integrated Risk Information System
LOS	Level-of-Service
MSAT	Mobile source air toxics
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act
NH_3	Ammonia
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
O_3	Ozone
Pb	Lead
PM	Particulate matter
PM_{10}	Particulate matter smaller than or equal to 10 microns in size
$PM_{2.5}$	Particulate matter smaller than or equal to 2.5 microns in size
ppm	Parts per million
SIP	State Implementation Plan
SO_2	Sulfur dioxide
SO_x	Sulfur oxides
TIP	Transportation Improvement Program
TSP	Total suspended particulates
VHT	Vehicle hours traveled
VMT	Vehicle miles traveled

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VOC	Volatile organic compounds
WAAQS	Washington Ambient Air Quality Standards
WAC	Washington Administrative Code
WASIST	Washington State Intersection Screening Tool
$\mu g/m^3$	Micrograms per cubic meter

Executive Summary

The NE 4th Street/120th Avenue NE Corridor Project proposes to extend NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE and widen and realign 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way. Analyses were conducted to estimate potential air quality impacts of the project. The following are the results of these analyses:

- The project corridor is included in the Puget Sound Regional Council's 2010-2013 Transportation Improvement Program (TIP) as BELL-56 120th Avenue NE Corridor from NE 4th Street to Northup Way (including federal award reference number 09-10-KGCO-02 for Stage 1 from NE 4th to NE 8th Street) and BELL-61 NE 4th Street Extension from 116th to 120th Avenues NE (including federal award reference number 10-11-KGCO-01). As such, the project is not predicted to impact regional levels of carbon monoxide (CO), particulate matter smaller than or equal to 10 microns in size (PM_{10}), particulate matter smaller than or equal to 2.5 microns in size ($PM_{2.5}$), and ozone (O_3) levels. Based on the microscale CO screening analysis, the project is not predicted to cause or exacerbate a violation of the applicable ambient air quality standards. As such, it complies with the U.S. Environmental Protection Agency's (EPA) local (microscale) requirements under its Conformity Rule for a project located in a CO maintenance area.
- As the study area is designated as being in attainment for all other air quality standards, no additional project-level conformity demonstration is required.
- The project is included in the Central Puget Sound Regional 2010-2013 Transportation Improvement Program (TIP) as Award Reference Number 09-10-KGCO-02, 120th Avenue NE Corridor—NE 4th to Northup Way. As such, it meets all regional (mesoscale) requirements of 40 Code of Federal Regulations (CFR) 93 and Washington Administrative Code (WAC) 173-420.
- Mobile source air toxic levels are predicted to decrease significantly in the future as a result of federally mandated programs. The project is not expected to affect this reduction.
- Construction-related effects of the project would be limited to short-term increased fugitive dust and mobile-source emissions during construction. State and local regulations regarding dust control and other air quality emission reduction controls should be followed.

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1.0 Introduction

1.1 Purpose of this Report

This *Air Quality Technical Report* is being prepared as part of the NE 4th Street/ 120th Avenue NE Corridor Project for the City of Bellevue, which proposes to provide a new transportation link between Downtown and the Wilburton and Bel-Red Subareas through the extension of NE 4th Street between 116th Avenue NE and 120th Avenue NE. and the widening/realignment of 120th Avenue NE from NE 4th Street to Northup Way.

The purpose of this report is to evaluate the effects of the project on air quality in the project area, including the following:

- A microscale CO analysis
- A mobile source air toxics (MSAT) analysis
- A construction analysis

There would be no permits required with respect to air quality.

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2.0 Proposed Project

2.1 Project Overview

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined roadway corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of the Downtown Bellevue center. Major regional transportation connections and facilities in the project vicinity include Interstate 405 (I-405) to the west and State Route 520 (SR 520) to the north.

The project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include—the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road. Figure 2-1 shows the project study area.

The NE 4th Street/120th Avenue NE Corridor Project is one of a number of high priority transportation investments that make up the City of Bellevue's Mobility and Infrastructure Initiative. This initiative was formed to address unprecedented growth in Downtown Bellevue and to support planned growth in the Bel-Red, Spring District, and Wilburton areas.

Other key projects included in the initiative that would complement the proposed project include the following:

- NE 5th Street neighborhood project improvements
- NE 6th Street Extension from 112th Avenue NE to 120th Avenue NE
- NE 15th Street multi-modal corridor improvements north of NE 12th Street (also supporting Sound Transit's East Link Project)
- 124th Avenue NE improvements from NE 8th Street to Northup Way.

For each of these projects, new travel lanes, non-motorized facilities, signal enhancements, illumination, and various structure and utility relocations would be included.

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Figure 2-1. Project Study Area

2.2 Project Purpose and Need

The purpose of the proposed project is to achieve the following:

- Support and accommodate the City's adopted future land use changes and resulting travel demands.
- Improve local traffic circulation.
- Bring corridor features into compliance with current and proposed design standards and guidelines.
- Prepare the project corridor to support connections to planned transit facilities, specifically Sound Transit's East Link Project light rail alignment.

Collectively, the proposed project elements (see Figure 2-2) would enhance area-wide mobility by adding capacity to support the expected growth in travel demand, constructing critical missing links in the City's traffic distribution network, and easing congestion in other travel corridors. Moreover, the project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to transit facilities identified in City plans.

It would improve access for other modes to local recreational facilities, businesses, and the planned Link light rail stations at NE 8th Street and 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE.

In summary, the proposed project would meet the following objectives:

- To provide acceptable level of service at existing and planned study area intersections to meet anticipated long-term travel demands.
- To improve access and connectivity with the regional and local. transportation networks.
- To enhance long-term traffic operations over time by incorporating design standards that serve a variety of transportation modes, including the needs of large trucks and freight vehicles, as well as buses.
- To improve quality of life by improving mobility and transportation choice, particularly for transit, bicycle, and pedestrian traffic.

As shown in preliminary traffic analysis work for the NE 4th Street extension and the widening and realignment of 120th Avenue NE, the project elements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas as well as the region in terms of travel mobility and access to neighborhoods and businesses. This is primarily the result of new and enhanced connections across the Burlington Northern Santa Fe (BNSF) corridor and NE 8th Street, respectively. The proposed project also provides expanded arterial street capacity and driveway consolidation along 120th Avenue NE. The project termini are logical because they bracket the extent of the expected future development in the Wilburton/

NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail transit facilities.

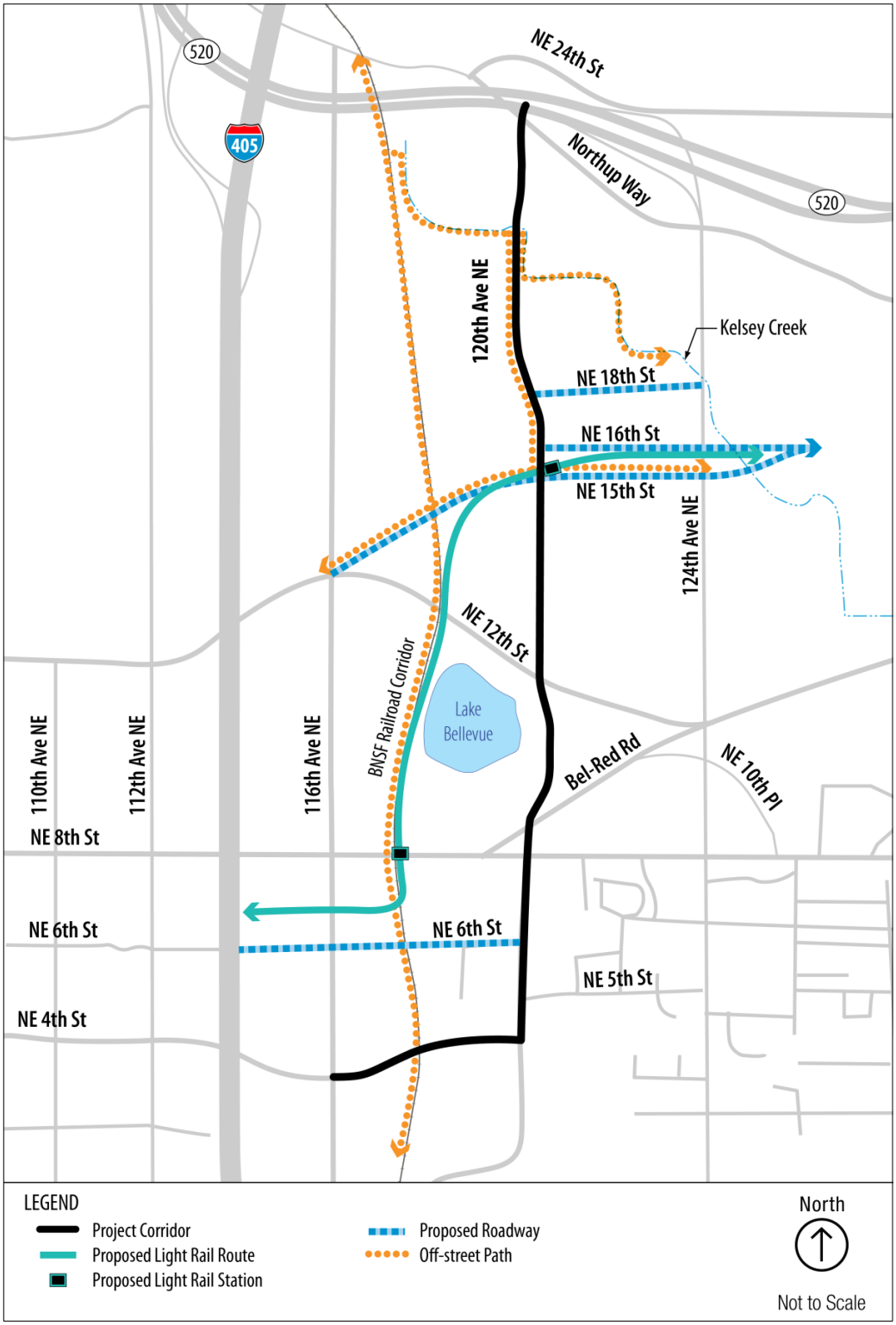

Figure 2-2. Planned Transportation Connections in the Study Area

2.3 Corridor Improvements

2.3.1 Programmed Corridor Improvements

This corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. These projects are described below.

- **NE 4th Street Extension (116th to 120th Avenue NE)**—Construct a new four to five lane roadway with arterial standard curb, gutter, sidewalk (including planting strips) and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension will be designed to accommodate future development and uses of the BNSF corridor.
- **120th Avenue NE Corridor—NE 4th Street to Northup Way**
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected segments; install continuous sidewalks to arterial standards; realign the roadway between Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project will be constructed in phases. Federal funding awarded to improvements, including bike lanes, planned between NE 4th and NE 8th Streets.

This revised description was submitted to Puget Sound Regional Council [PSRC] April 8, 2011 for the June 2011 Amendment to the Statewide Transportation Improvement Program (STIP).

2.3.2 Proposed Corridor Improvements

Specific design elements include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.

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- Construct improvements that support the planned new intersections at NE 15th/16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.
- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

The five-lane roadway design is proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE north to NE 15th Street. This proposed roadway cross-section is shown in Figure 2-3. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. Generally, a 5-foot-wide bike lane would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. However, the size and location of the sidewalks, bicycle facilities, and planter strips vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

As mentioned earlier, this analysis addresses the potential impacts of two minor alignment options for the extension of NE 4th Street east of the BNSF corridor. The alignment for Option 1 is farther north than that of Option 2. The Option 1 alignment would require acquisition of a portion of the southern side of the Best Buy building and displace access to the loading dock located on the west side of the building. Negotiations with the property owner are ongoing and may include construction of a building addition on the north side of the existing structure and/or realignment of the loading dock access to the north of the building. Option 2, roughly 55 feet south of the Option 1 alignment, would not require acquisition of any portion of nearby buildings, but would displace a substantial amount of parking on the Home Depot property as well as displace the Best Buy building's access to the loading dock area. Again, negotiations are ongoing with the property owners and mitigation may include construction of a new loading

dock access for the Best Buy property on the north side of the existing structure and/or a new parking garage on the Home Depot property. Note, the design for improvements along 120th Avenue NE south of NE 8th Street do not assume either option has been selected, but rather improvements are based on existing curb cuts for the driveway access to parking for the Best Buy and Home Depot properties.

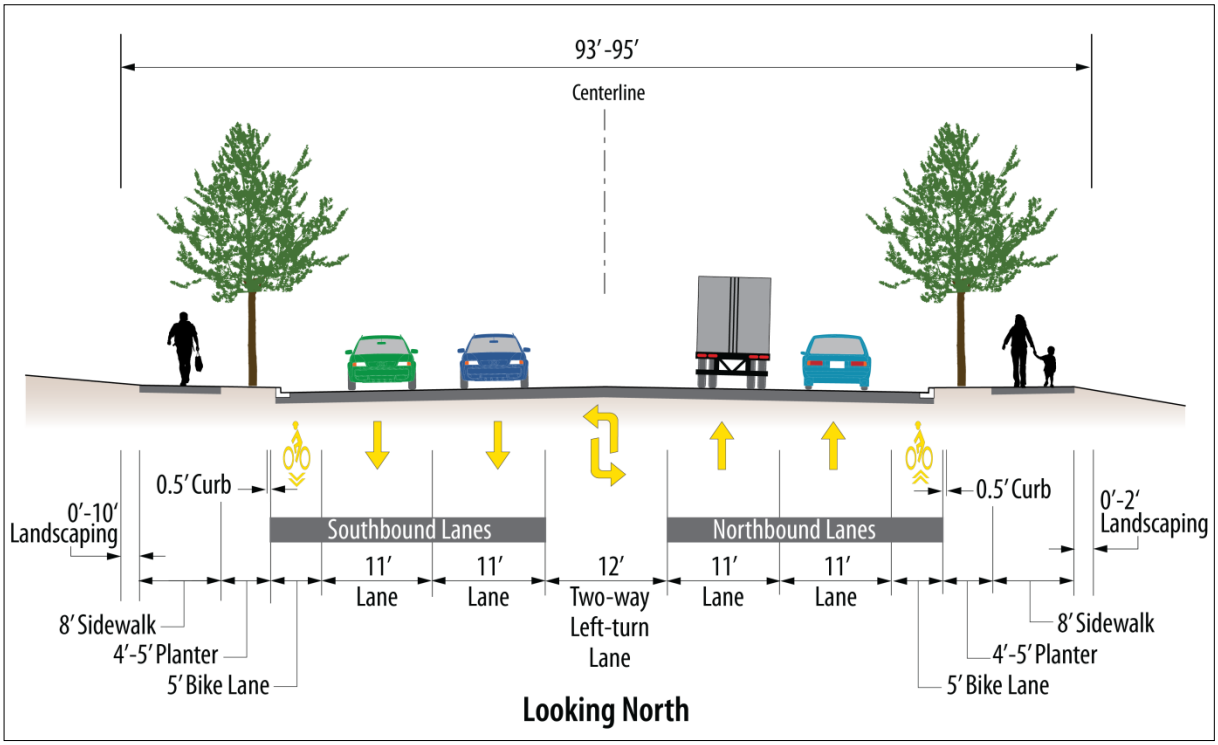

Figure 2-3. Typical Section—Five-lane Roadway Design

A four-lane roadway section is proposed for 120th Avenue NE from NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets. At the intersection at Northup Way, the cross-section would again be five lanes to allow for adequate turning movement capacity. This proposed four-lane cross-section is show in Figure 2-4. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes —two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed for each side of a two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

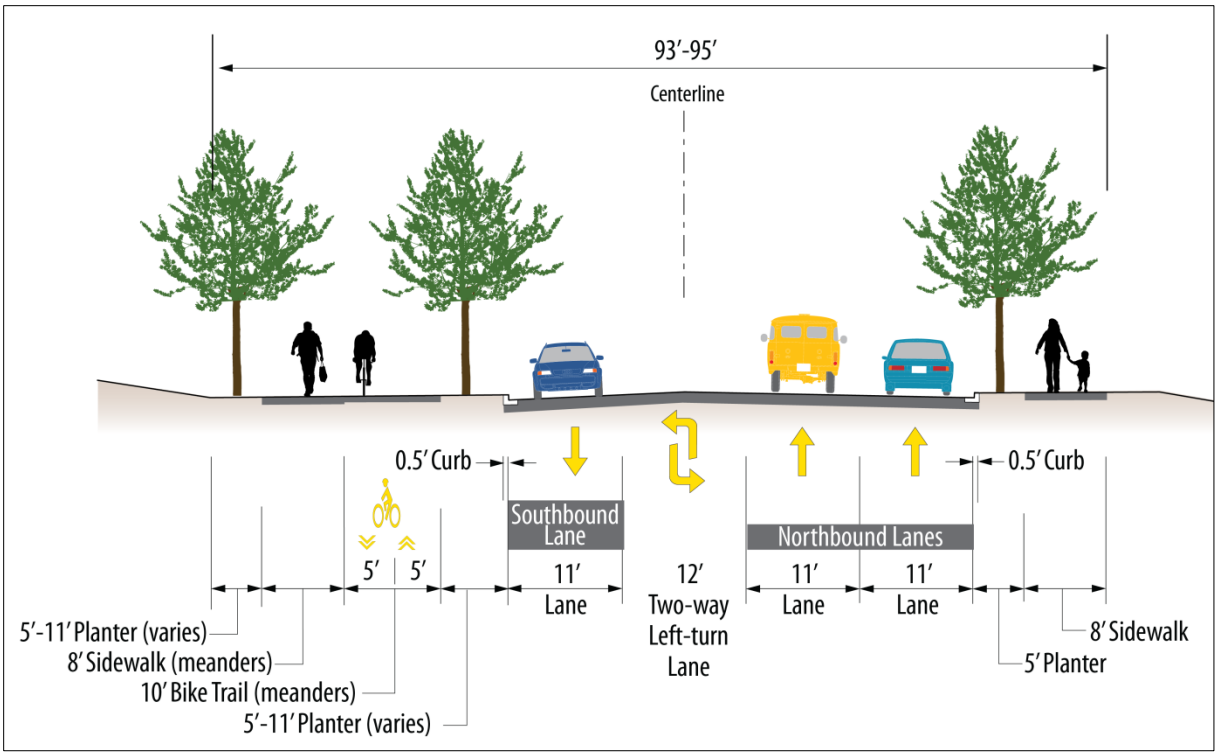

Figure 2-4. Typical Section—Four-lane Roadway Design

Both of the proposed roadway cross-sections also include the use of retaining walls, which would further increase the width of the required right-of-way beyond 95 feet. Retaining walls are proposed at numerous locations along the corridor and they would be located on both sides of the roadway. They would be used for both cut walls and fill walls. When retaining walls are required, these structures would generally be located immediately adjacent to the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet in width. To the outside of the retaining walls, the soil would be graded to a 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 121 feet or more where retaining walls are needed on both sides of the roadway.

Note, the term “right-of-way,” as used in this report, includes both right-of-way owned by the City and permanent easements (i.e., the complete footprint of the project).

2.4 Project Construction

2.4.1 Construction Duration and Phasing

Project construction would be phased and is expected to be completed from late 2011 to at least 2016 to match the programming of local, state, and federal funding sources. Each phase would last approximately 12 to 15 months. The planned phases, which may be further sub-divided into construction stages, are:

- Phase 1—120th Avenue NE widening between approximately the NE 300 block north to NE 7th Street.
- Phase 2—120th Avenue NE new construction between NE 8th Street and Bel-Red Road, and realignment and widening between approximately Bel-Red Road north to NE 12th Street.
- Phase 3—NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4—120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5—120th Avenue NE widening between NE 16th Street north to Northup Way.

Based on the Wilburton/NE 8th Street and Bel-Red Subarea Plans, it is essential that all phases of the NE 4th Street/120th Avenue NE Corridor Project be implemented in order to meet the purpose and need of the project. The City has committed to constructing all phases of the project, with cross sections appropriate to meet the multi-modal demand anticipated in the next 20 years. In addition, construction of the project phases could occur sequentially or some phases could overlap.

2.4.2 Construction Approach

The approach to project construction along the corridor differs. The following paragraphs describe the varying approaches to construction.

The improvements for NE 4th Street consist of constructing a new roadway, and would not involve working within an existing operable roadway. Construction for this phase would include clearing the full roadway right-of-way; grading; installing utilities and the roadway gravel base; constructing the curb, gutter and sidewalks; paving the roadway; and installing illumination/signals and landscaping. The construction activities would not disrupt existing traffic patterns along NE 4th Street, 116th Avenue NE, or 120th Avenue NE. However, the construction zone for NE 4th Street may extend somewhat into the existing roadways (116th and 120th Avenues NE) in order to connect new and existing pavements and existing and planned utilities at these locations.

Generally, the construction along 120th Avenue NE from the NE 300 block to NE 7th Street would widen the existing roadway on both sides of the existing centerline. Construction in this area would occur along an operational roadway.

The improvements in this area would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

Construction of the realignment and widening of 120th Avenue NE between the intersection at NE 8th Street and about NE 12th Street would occur along an operational roadway. Thus, the construction in this area is anticipated to occur in the following manner:

- Contractor mobilization
- Install traffic control and temporary erosion control measures
- Relocate and/or install utilities
- Roadway Side 1—retaining walls, grading, paving, signals, and illumination
- Roadway Side 2—retaining walls, grading, paving, signals, and illumination
- Construction zone landscaping, restoration, and clean up.

The corridor could not be closed during construction though both directions of travel may be constrained to perhaps only a single lane. Use of Bel-Red Road between NE 8th Street and 120th Avenue NE, however, would be closed at the start of roadway construction between Bel-Red Road and NE 8th Street. With this road closure, construction could occur unhampered for the new roadway. Parcels along this portion of the alignment would be fully acquired and construction activities would not affect adjacent businesses. Traffic on Bel-Red Road east of 120th Avenue NE would continue to be able to travel north on 120th Avenue NE during construction. To the north of Bel-Red Road, the roadway alignment is generally shifted eastward. Construction work would likely start on the eastern half of the expanded right-of-way. When completed, traffic would be shifted to the new roadway, while the western portion of the roadway is constructed. All construction sequencing would be planned to minimize impacts to traffic and adjacent businesses.

Lastly, construction along the remaining northern portion of 120th Avenue NE from NE 12th to just south of Northup Way would also widen the existing roadway on both sides of the existing centerline. The improvements along 120th Avenue NE would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

2.5 Project Funding

The total cost of the proposed project improvements based on the final City Council Direction for the 2011-2017 General Capital Improvement Plan would be between an estimated $67.3 and $67.6 million, depending on the selected option for extending NE 4th Street. Construction would cost approximately $32 million and right-of-way acquisition would cost roughly $35 million.

Funding for the overall project would likely include monies from the following sources:

- Federal grants
- State Transportation Improvement Board funding
- State Local Revitalization Financing funding
- Local contributions from transportation-dedicated sources, long-term general obligation bonds, impact fees, and other private participation programs including possible local improvement districts.

The specific mix of federal, state, and local funding contributions for each construction phase could differ.

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3.0 Methods

The following methods were applied to the effects analysis contained in this report. Reasons were provided for methods that varied from Washington State Department of Transportation standards.

3.1 Air Pollutants and Standards

Air pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, or harming human or animal health.

3.1.1 Clean Air Act Amendments of 1990

The Clean Air Act Amendments (CAAA) of 1990 and the Final Transportation Conformity Rule [40 CFR Parts 51 and 93] direct the EPA to implement environmental policies and regulations that will ensure acceptable levels of air quality. The CAAA and the Final Transportation Conformity Rule affect proposed transportation projects. According to Title I, Section 176 (c) 2:

> "No federal agency may approve, accept, or fund any transportation plan, program, or project unless such plan, program, or project has been found to conform to any applicable State Implementation Plan (SIP) in effect under this act."

The Final Conformity Rule defines conformity as follows:

> "Conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards; and that such activities will not:
>
> - Cause or contribute to any new violation of any NAAQS in any area;
> - Increase the frequency or severity of any existing violation of any NAAQS in any area; or
> - Delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area."

3.1.2 National and State Ambient Air Quality Standards

As required by the Clean Air Act (CAA), NAAQS have been established for six major air pollutants. These pollutants, known as criteria pollutants, are CO, nitrogen dioxide (NO_2), O_3, particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). The State of Washington has also established Washington Ambient Air Quality Standards (WAAQS) that apply throughout Washington State. These standards are either the same or more stringent than the corresponding federal standards.

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Table 3-1 summarizes the state and federal standards. "Primary" standards have been established to protect public health. "Secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. Washington State has primary standards only.

Table 3-1. State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	Washington Standards (Primary)	Federal Standards	
			(Primary)	(Secondary)
Ozone (O_3)	1 hour	0.12 ppm (235 µg/m^3)	0.12 ppm (235 µg/m^3) (applies in only limited areas)	Same as primary standard
	8 hour[1]	--	0.075 ppm (147 µg/m^3)	Same as primary standard
Carbon Monoxide (CO)	8 hour[2]	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	1 hour[2]	35 ppm (40 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual arithmetic mean	0.05 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary standard
	1 hour	--	0.1 ppm	None
Sulfur Dioxide (SO_2)	Annual arithmetic mean	0.02 ppm	0.030 ppm (80 µg/m^3)	-
	24 hour[2]	0.10 ppm	0.14 ppm (365 µg/m^3)	-
	3 hour		-	0.5 ppm (1,300 µg/m^3)
	1 hour[6]	0.40 ppm		
	1 hour[7]	0.25 ppm		
Particulate Matter (PM_{10})	Annual arithmetic mean	50 µg/m^3	--	--
	24 hour[3]	150 µg/m^3	150 µg/m^3	Same as primary standard
Particulate Matter ($PM_{2.5}$)	Annual arithmetic mean[4]	--	15 µg/m^3	Same as primary standard
	24 hour[5]	--	35 µg/m^3	
Total Suspended Particulates (TSP)[6]	Annual geometric mean	60 µg/m^3		
	24 hour	150 µg/m^3	--	--
Lead (Pb)	Quarterly arithmetic mean	1.5 µg/m^3	1.5 µg/m^3	-

Source: http://www.ecy.wa.gov/programs/air/Nonattainment/WA_Stds_April2010.pdf and http://www.epa.gov/air/criteria.html
µg/m^3 = micrograms per cubic meter
Footnotes on next page

(1) To attain this standard, the three-year average of the fourth-highest daily maximum eight-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
(2) Not to be exceeded more than once per year.
(3) Not to be exceeded more than once per year on average over three years.
(4) To attain this standard, the three-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
(5) To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).
(6) Not to be above this level more than once in a calendar year.
(7) Not to be above this level more than twice in a consecutive seven-day period.

3.2 Criteria Pollutants and Effects

Pollutants that have established national standards are referred to as "criteria pollutants." The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably. A brief description of each pollutant is provided below.

3.2.1 Ozone

O_3 is a colorless, toxic gas. As shown in Figure 3-1, O_3 is found in both the Earth's upper and lower atmosphere. In the upper atmosphere, O_3 is a naturally occurring gas that helps prevent the sun's harmful ultraviolet rays from reaching Earth. In the lower layer of the atmosphere, O_3 is man-made. Although O_3 is not directly emitted, it forms in the lower atmosphere through a chemical reaction between reactive organic gases and nitrogen oxides (NOx), which are emitted from industrial sources and from automobiles. Substantial O_3 formations generally require a stable atmosphere with strong sunlight; thus high levels of O_3 are generally a concern during summer. O_3 is the main ingredient of smog. It enters the blood stream through the respiratory system and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O_3 also damages vegetation by inhibiting their growth.

Source: http://www.ozoneny.org/about_ozone/good_vs_bad_ozone.asp

Figure 3-1. Ozone in the Atmosphere

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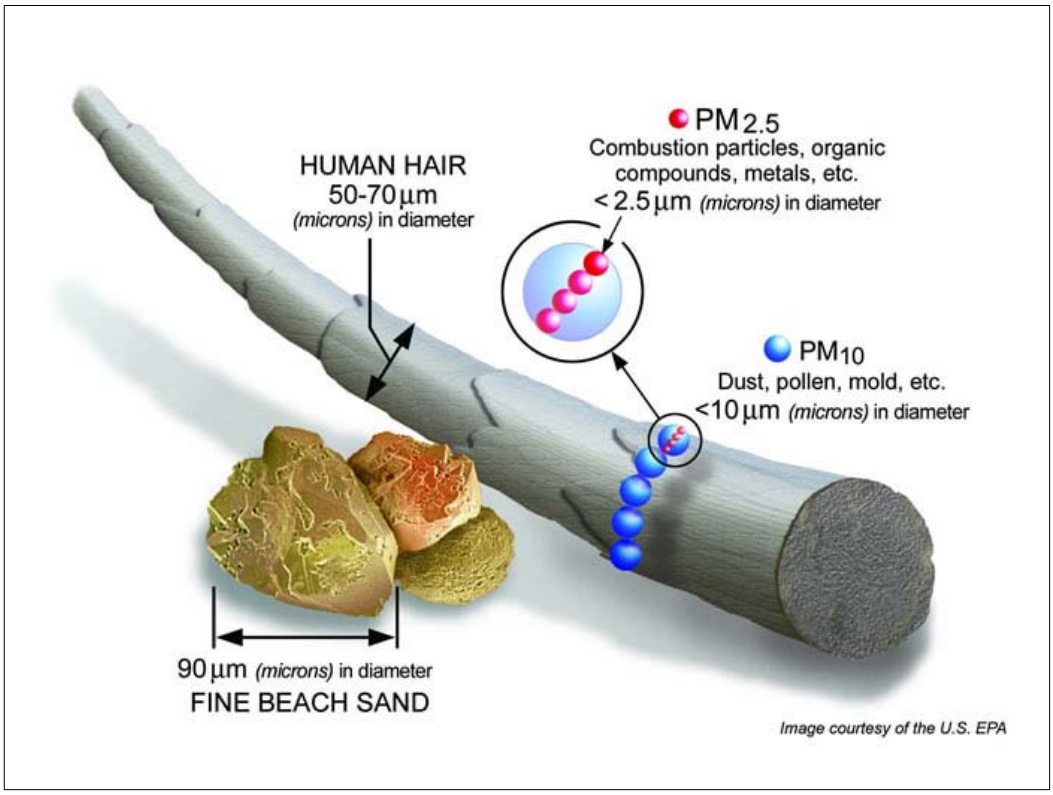
3.2.2 Particulate Matter

Particulate pollution is composed of solid particles or liquid droplets that are small enough to remain suspended in the air. In general, particulate pollution can include dust, soot, and smoke; these can be irritating but usually are not poisonous.

Particulate pollution also can include bits of solid or liquid substances that can be highly toxic. Of particular concern are those particles that are smaller than, or equal to, 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$) in size.

PM_{10} refers to particulate matter less than 10 microns in diameter, about 1/7th the thickness of a human hair (Figure 3-2). Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industries undergo chemical reactions in the atmosphere. Major sources of PM_{10} include motor vehicles; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Suspended particulates produce haze and reduce visibility.



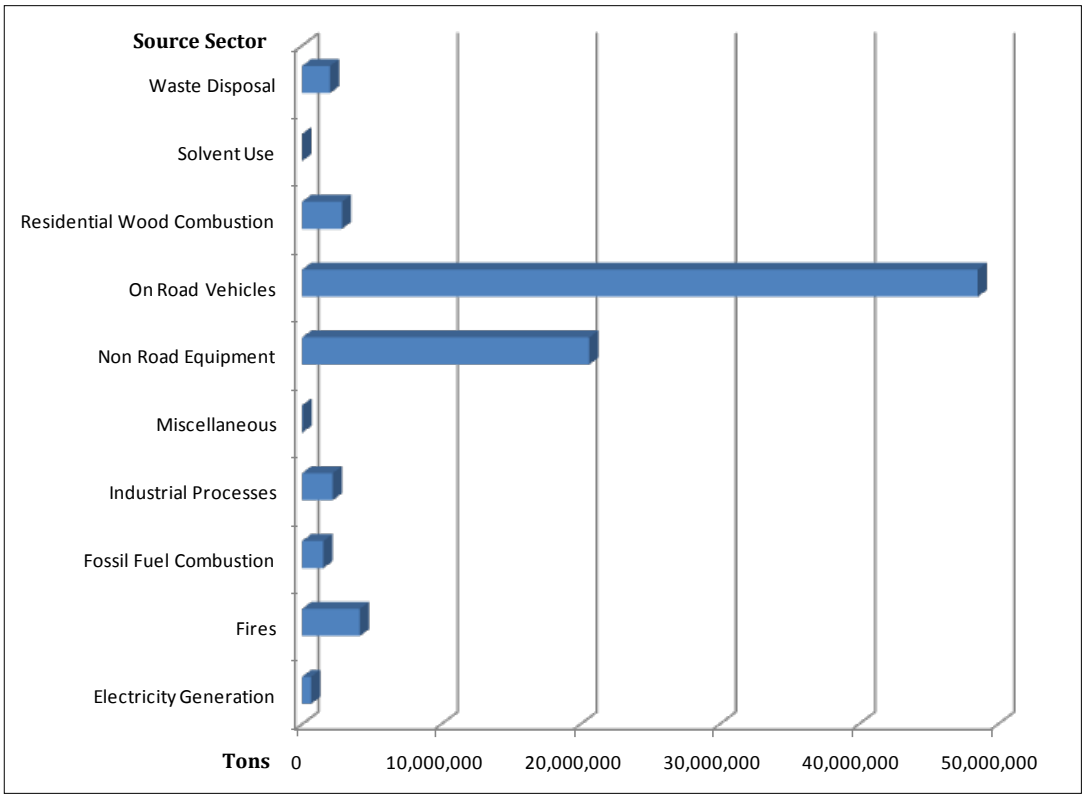
Source: http://www.epa.gov/airscience/images/pm2.5_graphic.jpg

Figure 3-2. Relative Particulate Matter Size

Data collected through numerous nationwide studies indicate most PM_{10} comes from fugitive dust, wind erosion, and/or agricultural and forestry sources. A small portion of particulate matter is the product of fuel combustion processes. In the case of $PM_{2.5}$, the combustion of fossil fuels accounts for a significant portion of this pollutant. The main health effect of airborne particulate matter is on the respiratory system. $PM_{2.5}$ refers to particulates that are 2.5 microns or less in diameter, roughly 1/28th the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as SO_2, NOx, and volatile organic compounds (VOCs). Like PM_{10}, $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Whereas particles 2.5 to 10 microns in diameter tend to collect in the upper portion of the respiratory system, particles 2.5 microns or less are so tiny they can penetrate deeper into the lungs and damage lung tissues.

3.2.3 Carbon Monoxide

CO, a colorless gas, interferes with the transfer of oxygen to the brain. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. As shown in Figure 3-3, on-road motor vehicle exhaust is the primary source of CO. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Prolonged exposure to high levels of CO can cause headaches, drowsiness, loss of equilibrium, or heart disease. CO levels are generally highest in colder months when inversion conditions (warmer air traps colder air near the ground) are more frequent. CO concentrations can vary greatly over relatively short distances. Relatively high concentrations of CO are typically found near congested intersections, along heavily used roadways carrying slow-moving traffic, and in areas where atmospheric dispersion is inhibited by urban "street canyon" conditions. Consequently, CO concentrations must be predicted on a localized, or microscale, basis.



Source: http://www.epa.gov/air/emissions/co.htm

Figure 3-3. National Carbon Monoxide Emissions by Source Sector in 2005 (Tons)

3.2.4 Nitrogen Dioxide

NO_2, a brownish gas, irritates the lungs. It can cause breathing difficulties at high concentrations. As with O_3, NO_2 is not directly emitted but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NOx and are major contributors to ozone formation. NO_2 also contributes to the formation of PM_{10}. At atmospheric concentrations, NO_2 is only potentially irritating. In high concentrations, the result is a brownish-red cast to the atmosphere and reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 parts per million (ppm).

3.2.5 Lead

Pb is a stable element that persists and accumulates both in the environment and in animals. Its principal effects in humans are on the blood-forming, nervous, and renal systems. Lead levels in the urban environment from mobile sources have significantly decreased due to the federally mandated switch to lead-free gasoline.

3.2.6 Sulfur Dioxide

SO_2 is a product of high-sulfur fuel combustion. The main sources of SO_2 are coal and oil used in power stations, industry, and for domestic heating. Industrial chemical manufacturing is another source of SO_2, which is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

3.3 Mobile Source Air Toxics (MSATs)

In addition to the criteria pollutants for which there are NAAQS, EPA also regulates air toxics. Toxic air pollutants are those pollutants known or suspected to cause cancer or other serious health effects. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Controlling air toxic emissions became a national priority with the passage of the CAAA of 1990, whereby Congress mandated that EPA regulate 188 air toxics, also known as hazardous air pollutants. EPA has assessed this expansive list in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (*Federal Register*, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html).

In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from its 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter (DPM) plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While the Federal Highway Administration (FHWA) considers these compounds the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle miles traveled, or VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050.

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4.0 Existing Conditions

4.1 Attainment Status/Regional Air Quality Conformity

Section 107 of the 1977 Clean Air Act (CAA) requires that EPA publish a list of all geographic areas in compliance with the NAAQS, as well as those areas not in attainment with the NAAQS. Areas not in compliance with the NAAQS are termed nonattainment areas. Areas that have insufficient data to make a determination are unclassified and are treated as being in attainment areas until proven otherwise. The designation of an area is made on a pollutant-by-pollutant basis. Table 4-1 shows the EPA's area designations.

Table 4-1. Attainment Classifications and Definitions

Attainment	Unclassified	Maintenance	Nonattainment
Area is in compliance with the NAAQS.	Area has insufficient data to make a determination and is treated as being in attainment.	Area once classified as nonattainment but has since demonstrated attainment of the NAAQS.	Area is not in compliance with the NAAQS.

The project study area is classified as a maintenance area for CO and an attainment area for all other criteria pollutants (Figure 4-1).

4.2 Monitored Air Quality

Table 4-2 presents ambient air quality monitoring data for CO, $PM_{2.5}$, PM_{10}, NO_x, and SO_2 for the years 2006-2008 (the most recent years with available data). Monitoring data were not available for Pb in King County.

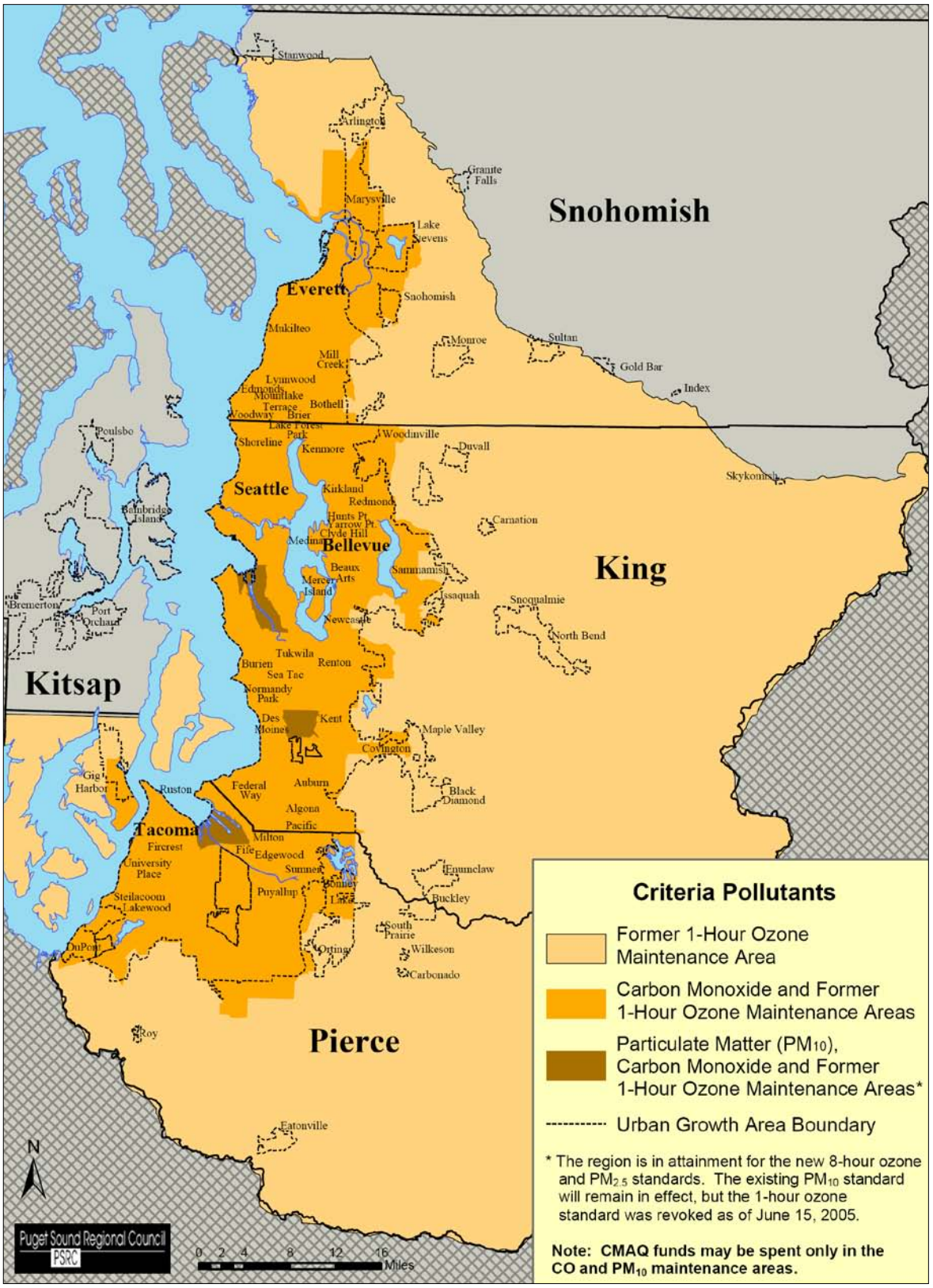

Figure 4-1. Puget Sound Maintenance Areas

Table 4-2. Ambient Air Quality Monitored Data 2006—2008

Pollutant		2421 148th NE Bellevue			4103 Beacon Hill S Seattle			17171 Bothell Way Lake Forest Park		
		2006	2007	2008	2006	2007	2008	2006	2007	2008
Carbon Monoxide (CO) [ppm]										
1-Hour	Maximum	5.1	3.9	3.4	2.3	1.4	1.4			
	2nd Maximum	4.4	3.5	3.1	2	1.4	1.2			
	Number of Exceedances	0	0	0	0	0	0			
8-Hour	Maximum	3.7	2.7	2.3	1.5	1	0.9			
	2nd Maximum	3.4	2.6	1.9	1.2	1	0.9			
	Number of Exceedances	0	0	0	0	0	0			
Particulate Matter(PM) [ug/m^3]										
PM_{10}	Maximum 24-Hour				42					
	Mean Annual				26					
	Number of Exceedances				0					
$PM_{2.5}$	Maximum 24-Hour	19*	17*	15*	26	29	21	68	35	33
	Mean Annual	7.0*	6.3*	5.8*	7.9	7.2	7.3	9.4	8.5	10.1
	Number of Exceedances	0	0	0	0	0	0	0	0	0
Ozone (O_3) [ppm]										
8-Hour	First Highest					0.098	0.065			
	Second Highest					0.072	0.058			
	Third Highest					0.06	0.055			
	Fourth Highest					0.058	0.053			
	Number of Days Standard Exceeded					0	0			
Nitrogen Dioxide (NO_2) [ppm]										
1-Hour Maximum					0.053					
1-Hour Second Maximum					0.051					
Annual Mean					0.018					
Number of Days Standard Exceeded					0					
Sulfur Dioxide (SO_2) [ppm]										
1-Hour Maximum						0.039	0.073			
3-Hour Maximum						0.028	0.03			
24-Hour Maximum						0.007	0.11			
Annual Mean						0.002	0.001			

Sources: EPA Air Data: http://www.epa.gov/air/data/geosel.html and Puget Sound Clean Air Agency's 2008 Air Quality Data Summary.
Note: * Three-year average values.

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5.0 Environmental Effects

5.1 Direct Effects on Air Quality

Direct effects are caused by the action and occur at the same time and place as the project.

5.1.1 Effects during Construction

In general, construction-related effects of the project would be limited to short-term increased fugitive dust and mobile-source emissions during construction. State and local regulations regarding dust control and other air quality emission-reduction controls should be followed.

Temporary fugitive PM_{10} emissions from the project are associated with construction activities, such as demolition, land clearing, ground excavation, grading, cut-and-fill operations, and structure erection. PM_{10} emissions would vary daily depending on the level of activity, specific operations, and weather conditions. Emission rates would depend on soil moisture, silt content of soil, wind speed, and the amount and type of operating equipment associated with project construction. Larger dust particles would settle near the source, and fine particles would be dispersed over greater distances from the construction site.

Temporary fugitive PM_{10} emissions from construction activities could be noticeable if uncontrolled. Mud and particulates from trucks would be noticeable if construction trucks are routed through residential neighborhoods. Measures to reduce the deposition of mud and emissions of particulates are listed in Section 5.4, Mitigation Measures.

In addition to PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate $PM_{2.5}$, CO, and NO_x in exhaust emissions. If construction traffic and lane closures were to increase congestion and reduce the speed of other vehicles in the area, emissions from traffic would increase temporarily while those vehicles are delayed. These emissions would be temporary and limited to the immediate area where the congestion is occurring. Some construction phases (particularly during paving operations using asphalt) would result in short-term odors. These odors might be detectable to some people near the site and would be diluted as distance from the site increases.

5.1.2 Effects during Operation

Criteria Pollutants

Pollutants that can be traced principally to motor vehicles are relevant to the evaluation of the project's effects; these pollutants include CO, hydrocarbons (HC), NO_x, O_3, PM_{10}, $PM_{2.5}$, and MSATs. Transportation sources account for a small percentage of regional emissions of sulfur oxides (SO_x) and Pb; thus, a detailed analysis is not required.

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HC (VOC) and NO_x emissions from automotive sources are a concern primarily because they are precursors in the formation of ozone and particulate matter. Ozone is formed through a series of reactions that occur in the atmosphere in the presence of sunlight. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated ozone levels often are found many miles from the sources of the precursor pollutants. Therefore, the effects of HC and NO_x emissions generally are examined on a regional or "mesoscale" basis.

PM_{10} and $PM_{2.5}$ effects are both regional and local. A significant portion of particulate matter, especially PM_{10}, comes from disturbed vacant land, construction activity, and paved road dust. $PM_{2.5}$ also comes from these sources. Motor vehicle exhaust, particularly from diesel vehicles, is also a source of PM_{10} and $PM_{2.5}$. PM_{10}, and especially $PM_{2.5}$, can also be created by secondary formation from precursor elements such as SO_2, NO_X, VOCs, and ammonia (NH_3). Secondary formation occurs due to chemical reaction in the atmosphere generally downwind some distance from the original emission source. Thus, it is appropriate to predict concentrations of PM_{10} and $PM_{2.5}$ in nonattainment or maintenance areas on both a regional and localized basis in accordance with EPA's *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (dated March 29, 2006).

CO effects are generally localized. Even under the worst meteorological conditions and most congested traffic conditions, high concentrations are limited to a relatively short distance (300 to 600 feet) of heavily traveled roadways. Vehicle emissions are the major sources of CO.

Regional Analysis

A regional or mesoscale analysis of a project determines its overall impact on regional air quality levels. In general, this analysis would use regional VMT and vehicle hours traveled (VHT) within the region with and without the project to determine daily "pollutant burden" levels. However, as the project is not predicted to affect regional VMT and VHT, it is predicted to have no measurable impact on regional pollutant levels. In addition, the project corridor is included in the Puget Sound Regional Council's 2010-2013 Transportation Improvement Program (TIP) as BELL-56 120th Avenue NE Corridor from NE 4th Street to Northup Way (including federal award reference number 09-10-KGCO-02 for Stage 1 from NE 4th to NE 8th Street) and BELL-61 NE 4th Street Extension from 116th to 120th Avenues NE (including federal award reference number 10-11-KGCO-01). As such, it meets all regional (mesoscale) requirements of 40 CFR 93 and WAC 173-420.

PM_{10}/$PM_{2.5}$ Analysis

The project is located in a PM_{10} and $PM_{2.5}$ attainment area. As such, a detailed analysis of PM_{10} and $PM_{2.5}$ is not required. Since the project is not predicted to affect regional VMT or generate additional truck traffic, it is not expected to affect regional levels of PM_{10} and $PM_{2.5}$.

CO Analysis

A microscale analysis was conducted to estimate CO levels near intersections that are expected to be affected by the project. the Washington State Intersection Screening Tool (WASIST), which was used in this analysis, is a Microsoft Windows-based screening model used for determining worst-case 1-hour and 8-hour CO concentrations at signalized intersections throughout the state. Results are based on EPA's emission factor algorithm (MOBILE6.2.03) and EPA's CAL3QHC mobile source dispersion model. The CAL3QHC algorithm was used to calculate CO concentrations in WASIST based on intersection geometry, user inputs, and worst-case assumptions. CO emission factors were determined for each approaching leg of traffic and for idling vehicles.

WASIST uses readily available data in a user-friendly application to make a conservative estimate of CO levels near congested intersections. This is done by using a combination of worst-case conditions that, when occurring simultaneously, produce the highest levels of CO. The purpose of the model is to allow the user to conservatively estimate the highest CO concentrations that would occur at an intersection without having to perform a more time-consuming detailed analysis.

The potential of the project to create localized CO concentrations that would exceed the NAAQS at the locations most affected by the project were estimated. Locations with the three highest predicted volumes and three longest predicted delays were selected for analysis. Table 5-1 provides the volume, delay, and level-of-service (LOS) at all intersections in the project area for the PM peak period for the design year of the project (2030). As shown, the following intersections have the highest delay in the 2030 build scenario:

- #6—120th Avenue NE at NE 12th Street
- #10—120th Avenue NE at NE 8th Street
- #14—116th Avenue NE at NE 4th Street

The following intersections have the highest volume in the 2030 build scenario:

- #10—120th Avenue NE at NE 8th Street
- #14—116th Avenue NE at NE 4th Street
- #17—112th Avenue NE at NE 4th Street

Therefore, a total of four intersections were analyzed:

- #6—120th Avenue NE at NE 12th Street
- #10—120th Avenue NE at NE 8th Street
- #14—116th Avenue NE at NE 4th Street
- #17—112th Avenue NE at NE 4th Street

Table 5-1. 2030 PM Peak hour Volume, Delay, and Level-of-Service

Intersection		2030 No Action				2030 Build			
		Control	Volume	LOS	Delay	Control	Volume	LOS	Delay
1	120th Avenue NE at Northup Way	Signal	2740	C	32	Signal	2985	C	23
2	120th Avenue NE at NE 18th Street	Signal	1295	A	9	Signal	1480	A	8
3	120th Avenue NE at NE 16th Street	Signal	1605	C	34	Signal	2095	E	67
4	120th Avenue NE at NE 15th Street	Signal	3640	F	117	Signal	4025	D	45
5	120th Avenue NE at Spring District Driveway	Signal	1945	C	34	Signal	2590	D	42
6	120th Avenue NE at NE 12th Street	Signal	3655	F	92	Signal	4695	F	115
7	120th Avenue NE at Lake Bellevue Driveway	---	---	---	---	Signal	3035	A	7
8	120th Avenue NE at Bel-Red Road	Stop	---	---	---	---	---	---	---
9	NE 8th Street at Bel-Red Road	Signal	4710	F	159	---	---	---	---
10	120th Avenue NE at NE 8th Street	Signal	4035	F	243	Signal	5865	E	77
11	120th Avenue NE at NE 6th Street	Signal	2585	F	297	Signal	3180	D	39
12	120th Avenue NE at NE 5th Street	Signal	1180	A	8	Signal	2695	B	17
13	120th Avenue at NE 4th Street	---	---	---	---	Signal	3030	C	34
14	116th Avenue NE at NE 4th Street	Signal	3450	E	57	Signal	5330	F	135
15	I-405 NB Ramps at NE 4th Street	Signal	3505	C	30	Signal	3895	C	31
16	I-405 SB Ramps at NE 4th Street	Signal	4185	C	32	Signal	4205	C	25
17	112th Avenue NE at NE 4th Street	Signal	5765	E	61	Signal	5685	E	57

Note: shaded rows indicate those intersections selected for modeling.

The level-of-service of these four intersections for existing (2010), opening (2015), and design (2030) years are presented in Table 5-2. LOS A represents free-flowing traffic, while LOS F represents the most congested conditions.

Table 5-2. Level-of-Service of the Intersections Evaluated

Intersection	Existing	No Build		Build	
	2010	2015	2030	2015	2030
120th Avenue NE at NE 12th Street	C	C	F	F	F
120th Avenue NE at NE 8th Street	D	D	F	D	E
116th Avenue NE at NE 4th Street	C	C	E	E	F
112th Avenue NE at NE 4th Street	C	C	E	D	E

If the results from WASIST do not violate the NAAQS for CO, the effect from any other combination of conditions would also be below the standards and no further modeling would be required.

This traffic analysis considers induced traffic growth associated with the project. Afternoon peak-period traffic data were used to estimate maximum 1-hour CO concentrations. This peak period is from the highest traffic-volume period. A persistence factor of 0.7 was applied to the 1-hour CO concentrations to obtain 8-hour CO concentrations. A persistence factor accounts for the fact that over 8 hours, vehicle volumes will fluctuate downward from the peak period and meteorological conditions will vary compared to the conservative assumptions used for the 1-hour concentration. Table 5-3 and Table 5-4 show the results of the screening-level mobile source analysis for predicted 1-hour and 8-hour PM-peak concentrations for existing, future No Build, and future Build conditions. The values provided are the highest 1-hour and 8-hour CO concentrations predicted at any of the receptor sites near the selected intersections for year of opening (2015), design year (2030) conditions, and conformity year (2040). The estimated CO concentrations are all below the 1-hour and 8-hour NAAQS of 35 and 9 ppm, respectively. WASIST model runs can be found in Appendix A. Because the predicted results were all below the NAAQS, the results of this analysis indicate that a more in-depth mobile source air quality analysis is not required and that the CO impacts of the project are not significant.

Table 5-3. Maximum Predicted 1-Hour PM-Peak CO Concentrations (ppm)

Intersection	Existing	No Build			Build		
	2010	2015	2030	2040	2015	2030	2040
120th Avenue NE at NE 12th Street	5.9	5.2	5.1	5.1	6.0	5.3	5.5
120th Avenue NE at NE 8th Street	5.8	5.4	5.2	5.6	6.3	6.1	6.2
116th Avenue NE at NE 4th Street	5.7	5.2	5.2	5.2	5.5	5.4	5.5
112th Avenue NE at NE 4th Street	6.2	5.4	5.8	5.8	5.9	5.8	5.7

A background concentration of 3 ppm was used.

Table 5-4. Maximum Predicted 8-Hour PM-Peak CO Concentrations (ppm)

Intersection	Existing	No Build			Build		
	2010	2015	2030	2040	2015	2030	2040
120th Avenue NE at NE 12th Street	5.0	4.5	4.5	4.5	5.1	4.6	4.8
120th Avenue NE at NE 8th Street	5.0	4.7	4.5	4.8	5.3	5.2	5.2
116th Avenue NE at NE 4th Street	4.9	4.5	4.5	4.5	4.8	4.7	4.8
112th Avenue NE at NE 4th Street	5.2	4.7	5.0	5.0	5.0	5.0	4.9

A background concentration of 3 ppm and a persistence factor of 0.7 were used.

MSATs

On February 3, 2006, FHWA released its *Interim Guidance on Air Toxic Analysis in NEPA [National Environmental Policy Act] Documents.* This guidance was superseded on September 30, 2009, by FHWA's *Interim Guidance Update on Air Toxic Analysis in NEPA Documents*. The purpose of FHWA's guidance is to advise on when and how to analyze MSATs in the NEPA process for highways. Since MSAT science is evolving, this guidance is interim. As the science progresses, FHWA will update the guidance.

Technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions of the project. However, even though reliable methods do not exist to accurately estimate the health effects of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions. The qualitative assessment presented below has been prepared in accordance with FHWA's Interim Guidance derived in part from a study conducted by the FHWA, *A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternatives*.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects
- Projects with Low Potential MSAT Effects
- Projects with Higher Potential MSAT Effects

FHWA's Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersegment on a surface street or where design year traffic projections are less than 140,000 to 150,000 average annual daily traffic (AADT).

The Build Alternative would extend NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE, and widen and realign 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way. The highest projected design year AADT is 24,800. This is within FHWA's criteria for a project with "Low Potential MSAT Effects."

Therefore, the project meets the criteria for a “Project with Low Potential MSAT Effects” and has been evaluated as such.

Based on the recommended tiering approach detailed in the FHWA methodology, the project falls within the Tier 2 category. For the Build Alternative, the amount of MSAT emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. There is not expected to be any regional change in VMT with the Build Alternative when compared to the No Build Alternative. Local VMT along 120th Avenue NE would increase, however, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the Build Alternative along the project corridor, along with a corresponding decrease in MSAT emissions along parallel routes. This emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds. According to EPA's MOBILE6.2 model, emissions of all of the priority MSAT except for DPM decrease as speed increases.

The extent to which these speed-related emission decreases will offset VMT-related emission increases cannot be reliably projected because of the inherent deficiencies of technical models. Emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the Build Alternative would have the effect of moving some traffic closer to nearby land uses on 120th Avenue NE. Therefore, under the Build Alternative there may be localized areas where ambient concentrations of MSAT could be higher than under the No Build Alternative.

The magnitude and the duration of these potential increases compared to the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health effects. In sum, when a roadway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset as a result of increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). In addition, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

This technical report includes a basic analysis of the likely MSAT emission effects of the project. However, available technical tools do not enable prediction of project-specific health effects of the emission changes associated with the project alternatives. As a result of these limitations, the following discussion is included in accordance with the Council on Environmental Quality's regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

Information that is Unavailable or Incomplete

Evaluating the environmental and health effects from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling to estimate ambient concentrations resulting from the estimated emissions, exposure modeling to estimate human exposure to the estimated concentrations, and then a final determination of health effects based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health effects of this project.

Emissions

The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects.

Dispersion

The tools to predict how MSATs disperse are also limited. EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of CO to determine compliance with the NAAQS**.** The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk.

Exposure Levels and Health Effects

Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude drawing meaningful conclusions about project-specific health effects. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Effects of MSATs

Research into the health effects of MSATs is ongoing. For different emission types, a variety of studies show that either some are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the NATA in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of, or benchmark for, local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or state level.

EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA IRIS is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris.

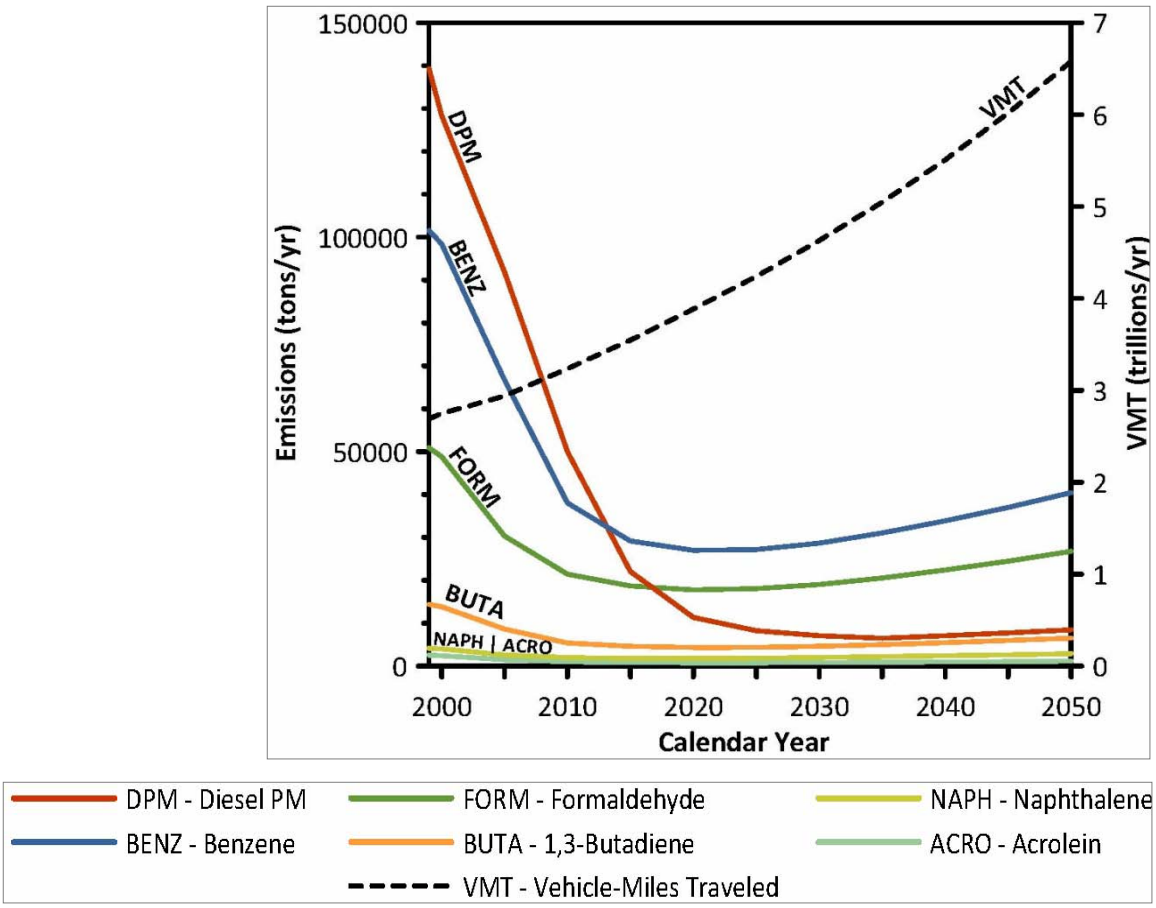
There have been other studies that address MSAT health effects in proximity to roadways. The Health Effects Institute, a non-profit organization funded by the EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes—particularly respiratory problems. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, the studies do not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health effects specific to this project.

Relevance of Unavailable or Incomplete Information

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions on human health cannot be made at the project level. While available tools do allow a reasonable estimate of relative emission changes among alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health effects. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have “significant adverse effects on the human environment.”

Emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Figure 5-1.



(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle miles traveled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.
Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Figure 5-1. National MSAT Emission Trends 1999–2050 for Vehicles Operating on Roadways Using EPA's Mobile6.2 Model

This document has provided a qualitative analysis of MSAT emissions relative to the various alternatives and has acknowledged that the Build Alternative may increase exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain. Because of this uncertainty, the health effects from these emissions cannot be estimated.

5.2 Indirect Effects on Air Quality

Indirect effects are associated with a project and occur later in time or farther removed in distance; but they are still reasonably foreseeable (e.g., induced land development from highway projects).

The air quality analysis described in this technical report was performed using projected traffic volumes for future years. Therefore, the air quality analysis includes the indirect effects of the project and other traffic growth that would be associated with the project.

The air quality analysis evaluated projected traffic volumes and delays that incorporate anticipated traffic generation from planned development in the project area. Therefore, the air quality analysis includes the indirect effects of the project and other traffic growth that would be associated with the project.

5.3 Cumulative Effects on Air Quality

Cumulative effects result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions, regardless of the agency or person initiating the other actions.

Planned development in the area has already been included in the traffic and air quality modeling for 2040. Therefore, no cumulative effects are anticipated.

5.4 Mitigation Measures

5.4.1 Mitigation of Construction Effects

Construction areas, staging areas, and material transfer sites would be set up in a way that reduces standing wait times for equipment, engine idling, and the need to block the movement of other activities on the site. These strategies would reduce fuel consumption by reducing wait times and ensuring that construction equipment operates efficiently.

In addition to the strategies detailed above, other possible air pollutant emission control measures include the following, in compliance with the Associated General Contractors of Washington 1997:

- Spraying exposed soil with water or other dust palliatives to reduce emissions of PM_{10} and deposition of particulate matter
- Covering all trucks transporting materials, wetting materials in trucks, or providing adequate freeboard (space from the top of the material to the top of the truck) to reduce particulate emissions during transportation
- Providing wheel washers to remove particulate matter that vehicles would otherwise carry offsite to decrease deposition of particulate matter on area roadways
- Removing particulate matter deposited on paved public roads to reduce mud and resultant windblown dust on area roadways

- Maintaining as many traffic lanes as possible during peak travel times to reduce air quality effects caused by increased congestion
- Placing quarry spall aprons where trucks enter public roads to reduce the amount of mud tracked out.
- Requiring appropriate emission-control devices (e.g., diesel oxygen catalyst, diesel particulate filters, and particulate traps) on large pieces of diesel-fueled equipment to reduce CO, NO_x, and particulate emissions in vehicular exhaust
- Using relatively new, well-maintained equipment to reduce CO and NO_x emissions
- Planting vegetative cover on graded areas that would be left vacant for more than one season to reduce windblown particulates in the area
- Routing construction trucks away from residential and business areas to minimize annoyance from dust
- Requiring the use of low or ultra-low sulfur fuels in construction equipment to allow for the use of effective particulate-emission control devices on diesel vehicles
- Coordinating construction activities with other projects in the area to reduce the cumulative effects of concurrent construction projects

5.4.2 Mitigation Measures for Long-Term Effects

MSAT emissions are not expected to increase, and no exceedances of the NAAQS are anticipated. In addition, no significant adverse air quality effects are expected from the project. As a result, no mitigation measures would be required.

5.5 Conclusions

The project is predicted to comply with all applicable air quality standards and regulations. This result is based on the following:

- The project corridor is included in the Puget Sound Regional Council's 2010-2013 Transportation Improvement Program (TIP) as BELL-56 120th Avenue NE Corridor from NE 4th Street to Northup Way (including federal award reference number 09-10-KGCO-02 for Stage 1 from NE 4th to NE 8th Street) and BELL-61 NE 4th Street Extension from 116th to 120th Avenues NE (including federal award reference number 10-11-KGCO-01). As such, the project is not predicted to impact regional CO, PM_{10}, $PM_{2.5}$, and O_3 levels.
- Based on the microscale CO screening analysis conducted, the project is not predicted to cause or exacerbate a violation of the applicable ambient air quality standards. As such, the project complies with EPA's local (microscale) requirements under EPA's Conformity Rule for a project located in a CO maintenance area.

- As the study area is designated as being in attainment for all other air quality standards, no additional project-level conformity demonstration is required.
- The project is included in the Central Puget Sound Regional 2010-2013 TIP as Award Reference Number 09-10-KGCO-02, 120th Avenue NE Corridor—NE 4th to Northup Way. As such, it meets all regional (mesoscale) requirements of 40 CFR 93 and WAC 173-420.
- MSAT levels are predicted to decrease significantly in the future due to federally mandated programs. The project is not expected to affect this reduction.
- Construction-related effects of the project would be limited to short-term increased fugitive dust and mobile-source emissions during construction, and state and local regulations regarding dust control and other air quality emission reduction controls should be followed.

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6.0 References

EPA 2006 U.S. Environmental Protection Agency (EPA). March 2006. *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*. EPA420-B-06-902.

EPA 2007 U.S. Environmental Protection Agency (EPA). February 26, 2007. *Control of Hazardous Air Pollutants from Mobile Sources.*

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FHWA 2006 U.S. Federal Highway Administration (FHWA). February 3, 2006. *Interim Guidance on Air Toxic Analysis in NEPA Documents*.

FHWA 2009 U.S. Federal Highway Administration (FHWA). September 30, 2009. *Interim Guidance Update on Air Toxic Analysis in NEPA Documents.*

WSDOT 2009 Washington State Department of Transportation (WSDOT). September 2009. *WSDOT Environmental Procedures Manual M 31-11.06*.

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Appendix A
WASIST Model Runs

[Appendix A is provided on the attached CD.]

Appendix A
WASIST Model Runs

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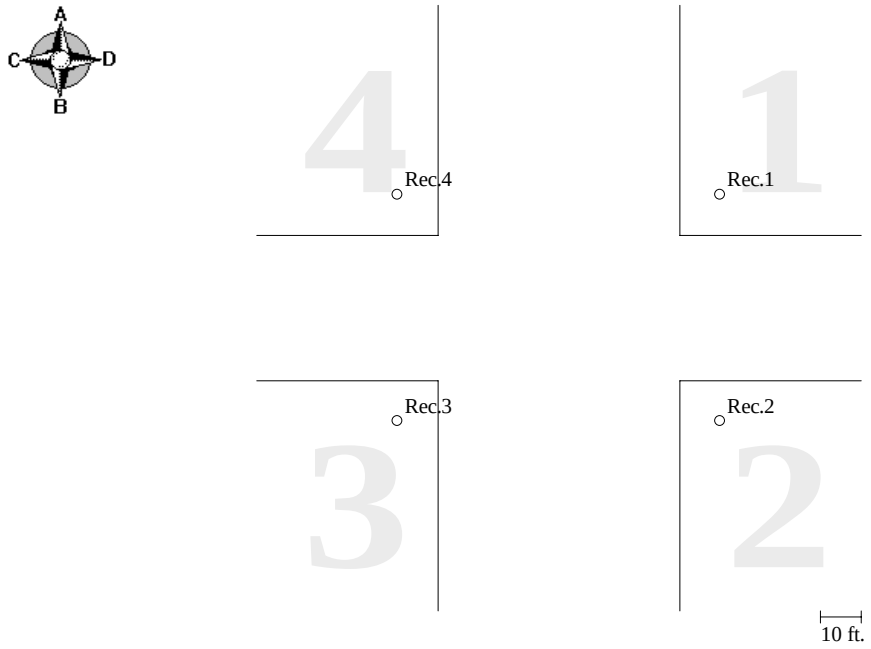
Washington State Intersection Screening Tool 2.0

03-21-11
02:02 PM
NE 4th Street/120th Avenue

Description: **NE 12th Street & 120th Avenue NE**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 2 w/4 Lt Turns**
Street Names: **A-B: NE 12th Street C-D: 120th Ave NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.3	4.6	Pass
2	2	10	10	5.4	4.7	Pass
3	3	10	10	6.0	5.1	Pass
4	4	10	10	5.6	4.8	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 3**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

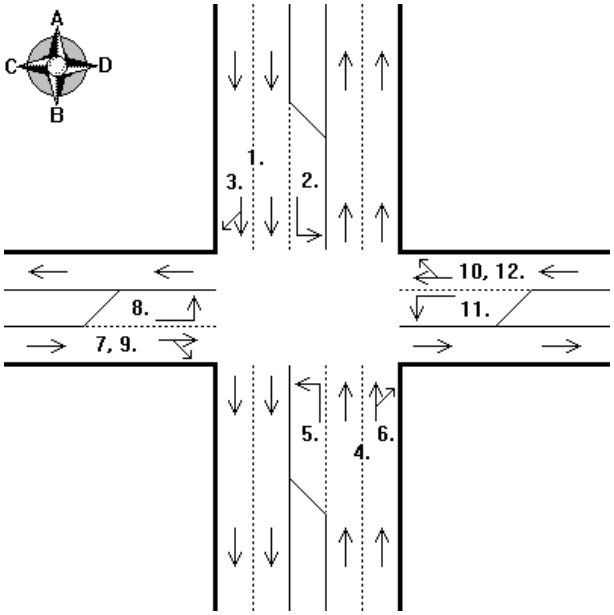
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	940
2	A-D Left Turn	115
3	A-C Right Turn	40
4	B-A Thru	870
5	B-C Left Turn	50
6	B-D Right Turn	80
7	C-D Thru	90
8	C-A Left Turn	40
9	C-B Right Turn	50
10	D-C Thru	195
11	D-B Left Turn	75
12	D-A Right Turn	80



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2010**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **110.67**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	12.42
Leg B	15	12.42
Leg C	15	12.42
Leg D	15	12.42

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	73
Leg A Left Turn	129
Leg B Thru & Rt	56
Leg B Left Turn	117
Leg C Thru & Rt	114
Leg C Left Turn	130
Leg D Thru & Rt	110
Leg D Left Turn	126

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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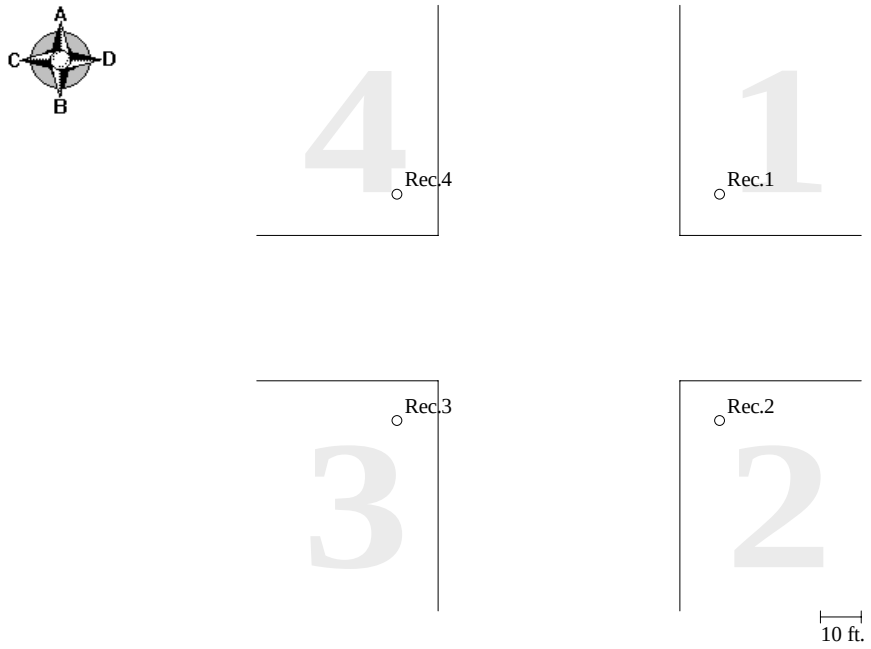
Washington State Intersection Screening Tool 2.0

03-24-11
09:11 AM
NE 4th Street/120th Avenue

Description: **NE 12th Street & 120th Avenue NE**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 2 w/4 Lt Turns**
Street Names: **A-B: NE 12th Street C-D: 120th Ave NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	4.8	4.3	Pass
2	2	10	10	4.7	4.2	Pass
3	3	10	10	5.2	4.5	Pass
4	4	10	10	4.9	4.3	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 3**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

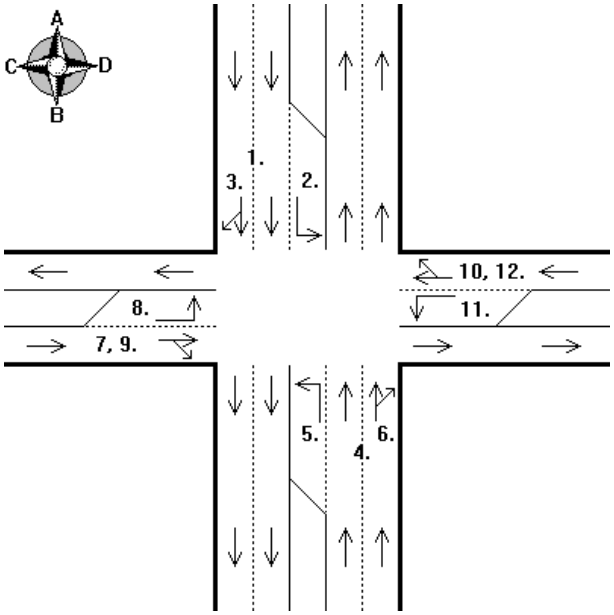
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	900
2	A-D Left Turn	115
3	A-C Right Turn	40
4	B-A Thru	790
5	B-C Left Turn	50
6	B-D Right Turn	80
7	C-D Thru	90
8	C-A Left Turn	40
9	C-B Right Turn	50
10	D-C Thru	115
11	D-B Left Turn	75
12	D-A Right Turn	80



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	9.86
Leg B	15	9.86
Leg C	15	9.86
Leg D	15	9.86

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	73
Leg A Left Turn	129
Leg B Thru & Rt	56
Leg B Left Turn	117
Leg C Thru & Rt	114
Leg C Left Turn	130
Leg D Thru & Rt	110
Leg D Left Turn	126

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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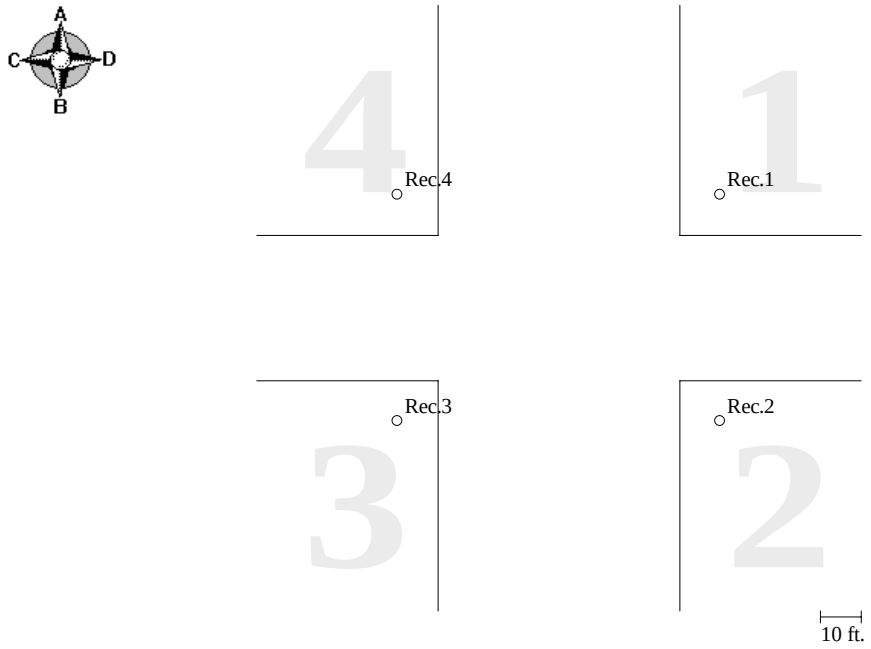
Washington State Intersection Screening Tool 2.0

03-21-11
02:17 PM
NE 4th Street/120th Avenue

Description: **NE 12th Street & 120th Avenue NE NO BUILD 2030**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 2 w/4 Lt Turns**
Street Names: **A-B: NE 12th Street C-D: 120th Ave NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.1	4.5	Pass
2	2	10	10	4.9	4.3	Pass
3	3	10	10	5.0	4.4	Pass
4	4	10	10	4.9	4.3	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 1**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

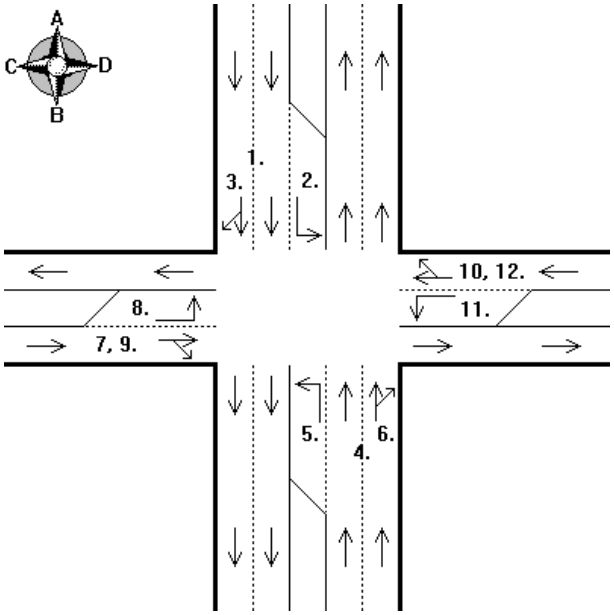
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	715
2	A-D Left Turn	375
3	A-C Right Turn	175
4	B-A Thru	595
5	B-C Left Turn	155
6	B-D Right Turn	115
7	C-D Thru	475
8	C-A Left Turn	135
9	C-B Right Turn	15
10	D-C Thru	435
11	D-B Left Turn	155
12	D-A Right Turn	310



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.76
Leg B	15	7.76
Leg C	15	7.76
Leg D	15	7.76

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	94
Leg A Left Turn	101
Leg B Thru & Rt	106
Leg B Left Turn	124
Leg C Thru & Rt	89
Leg C Left Turn	127
Leg D Thru & Rt	83
Leg D Left Turn	121

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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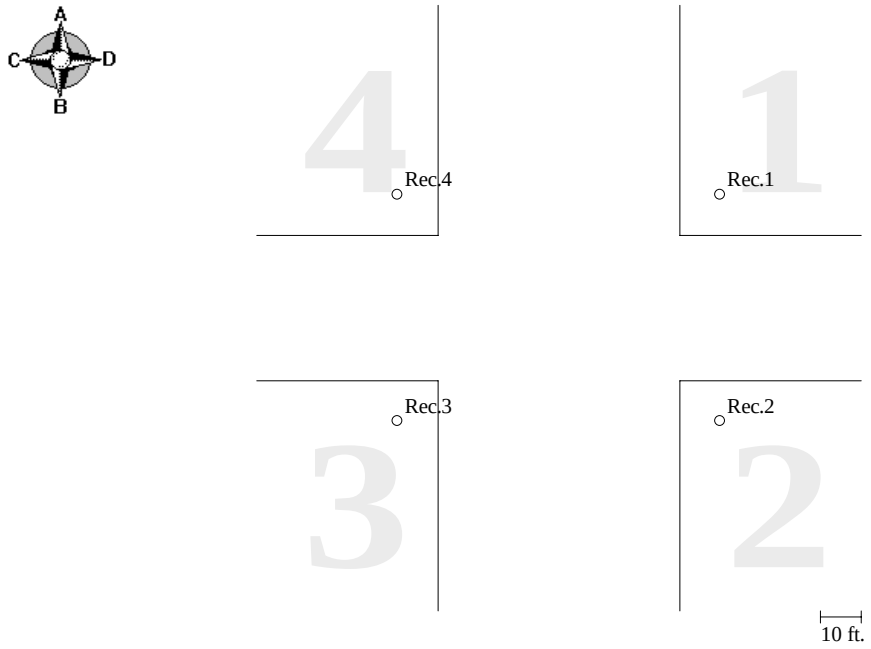
Washington State Intersection Screening Tool 2.0

03-21-11
02:31 PM
NE 4th Street/120th Avenue

Description: **NE 12th Street & 120th Avenue NE NO BUILD 2040**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 2 w/4 Lt Turns**
Street Names: **A-B: NE 12th Street C-D: 120th Ave NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.0	4.4	Pass
2	2	10	10	5.1	4.5	Pass
3	3	10	10	5.1	4.5	Pass
4	4	10	10	5.1	4.5	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

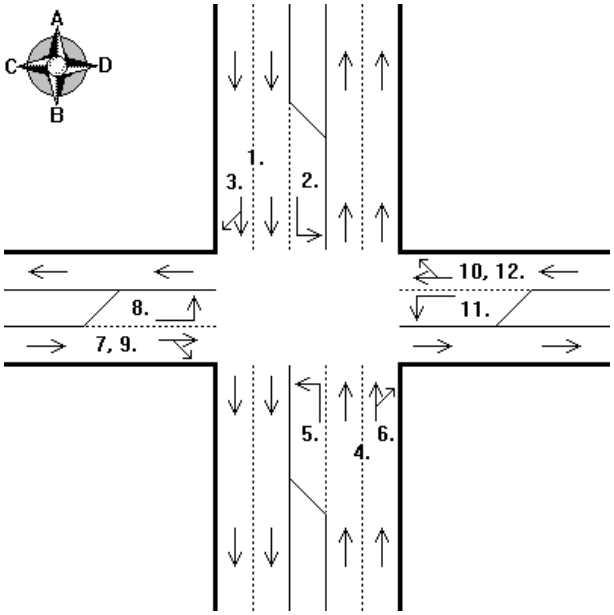
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	760
2	A-D Left Turn	400
3	A-C Right Turn	160
4	B-A Thru	630
5	B-C Left Turn	40
6	B-D Right Turn	125
7	C-D Thru	505
8	C-A Left Turn	145
9	C-B Right Turn	15
10	D-C Thru	460
11	D-B Left Turn	165
12	D-A Right Turn	330



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.72
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	88
Leg A Left Turn	130
Leg B Thru & Rt	107
Leg B Left Turn	111
Leg C Thru & Rt	87
Leg C Left Turn	127
Leg D Thru & Rt	83
Leg D Left Turn	123

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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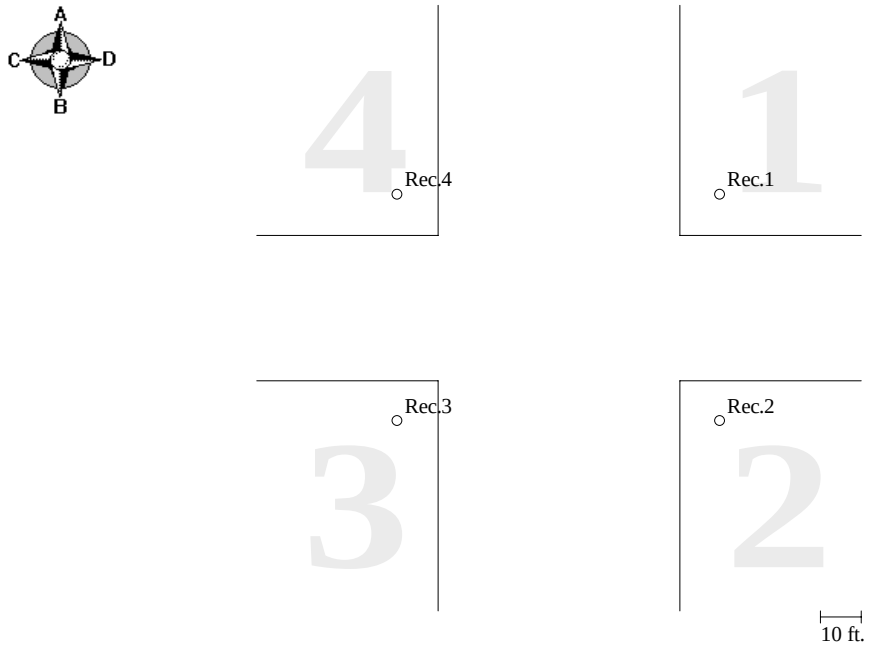
Washington State Intersection Screening Tool 2.0

03-24-11
09:13 AM
NE 4th Street/120th Avenue

Description: **NE 12th Street & 120th Avenue NE BUILD 2015**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 2 w/4 Lt Turns**
Street Names: **A-B: NE 12th Street C-D: 120th Ave NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	6.0	5.1	Pass
2	2	10	10	5.6	4.8	Pass
3	3	10	10	5.9	5.0	Pass
4	4	10	10	5.9	5.0	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 1**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

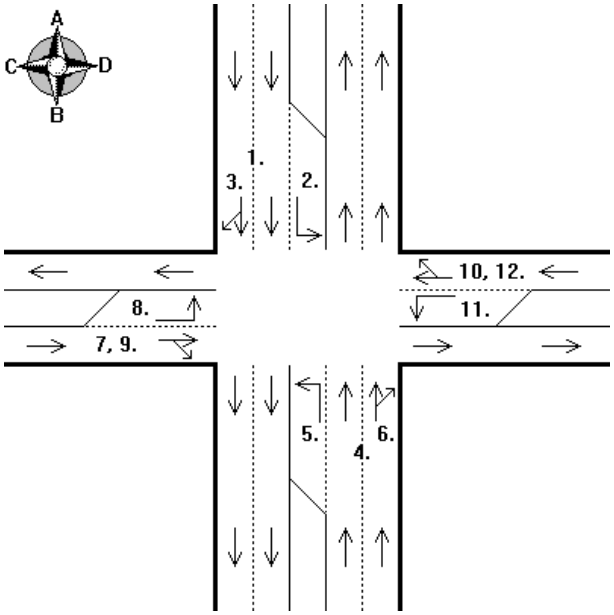
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	735
2	A-D Left Turn	460
3	A-C Right Turn	115
4	B-A Thru	800
5	B-C Left Turn	225
6	B-D Right Turn	65
7	C-D Thru	350
8	C-A Left Turn	75
9	C-B Right Turn	395
10	D-C Thru	665
11	D-B Left Turn	185
12	D-A Right Turn	375



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	9.86
Leg B	15	9.86
Leg C	15	9.86
Leg D	15	9.86

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	86
Leg A Left Turn	105
Leg B Thru & Rt	98
Leg B Left Turn	116
Leg C Thru & Rt	105
Leg C Left Turn	129
Leg D Thru & Rt	97
Leg D Left Turn	121

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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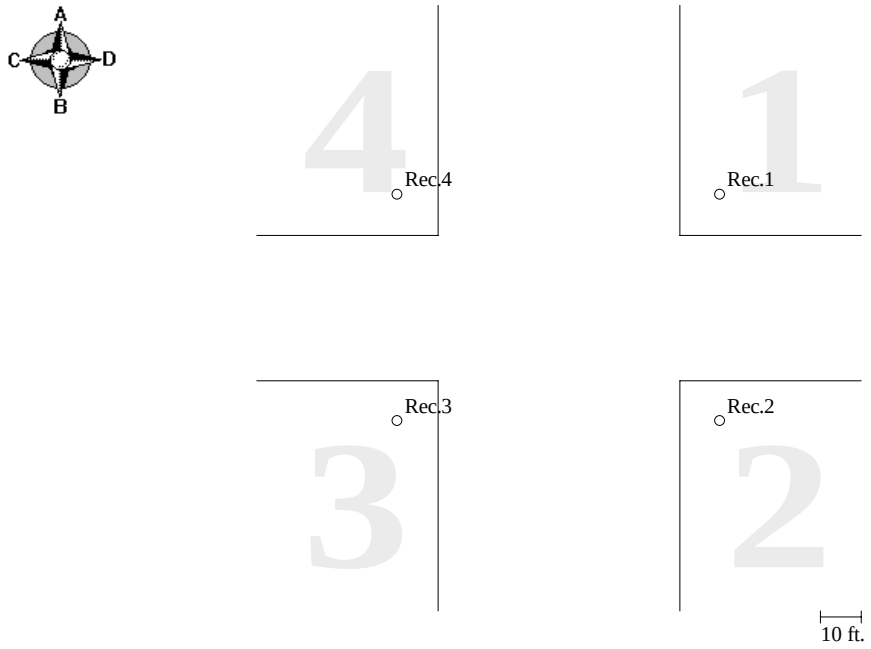
Washington State Intersection Screening Tool 2.0

03-21-11
02:23 PM
NE 4th Street/120th Avenue

Description: **NE 12th Street & 120th Avenue NE BUILD 2030**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 2 w/4 Lt Turns**
Street Names: **A-B: NE 12th Street C-D: 120th Ave NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.1	4.5	Pass
2	2	10	10	5.3	4.6	Pass
3	3	10	10	5.2	4.5	Pass
4	4	10	10	5.1	4.5	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

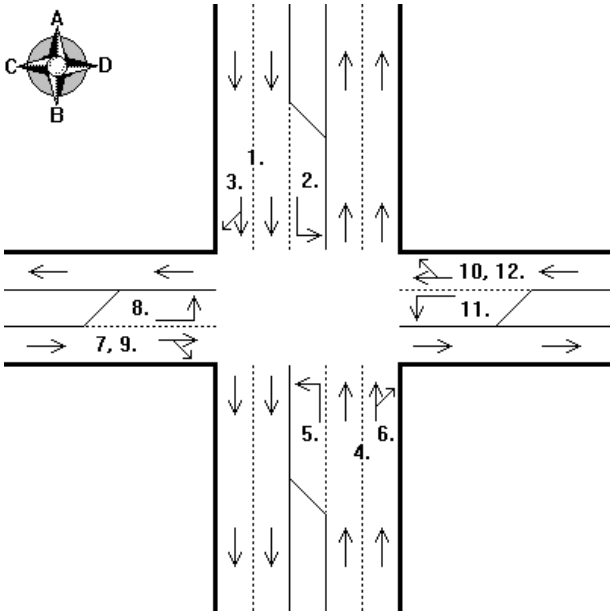
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	730
2	A-D Left Turn	530
3	A-C Right Turn	115
4	B-A Thru	615
5	B-C Left Turn	20
6	B-D Right Turn	155
7	C-D Thru	845
8	C-A Left Turn	175
9	C-B Right Turn	250
10	D-C Thru	970
11	D-B Left Turn	115
12	D-A Right Turn	175



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.76
Leg B	15	7.76
Leg C	15	7.76
Leg D	15	7.76

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **120**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	63
Leg A Left Turn	92
Leg B Thru & Rt	85
Leg B Left Turn	114
Leg C Thru & Rt	84
Leg C Left Turn	107
Leg D Thru & Rt	84
Leg D Left Turn	107

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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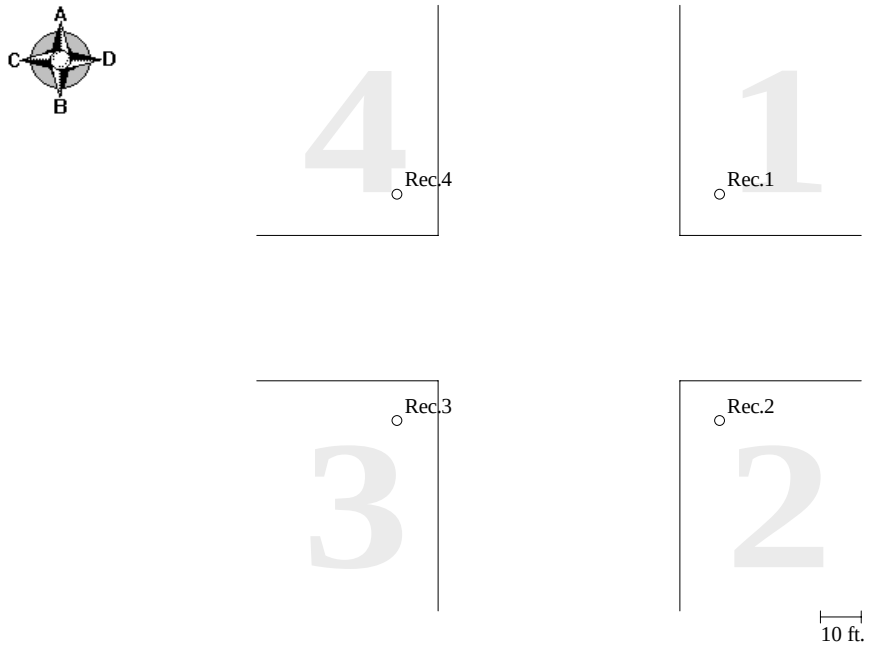
Washington State Intersection Screening Tool 2.0

03-21-11
02:30 PM
NE 4th Street/120th Avenue

Description: **NE 12th Street & 120th Avenue NE BUILD 2040**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 2 w/4 Lt Turns**
Street Names: **A-B: NE 12th Street C-D: 120th Ave NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.2	4.5	Pass
2	2	10	10	5.5	4.8	Pass
3	3	10	10	5.3	4.6	Pass
4	4	10	10	5.3	4.6	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

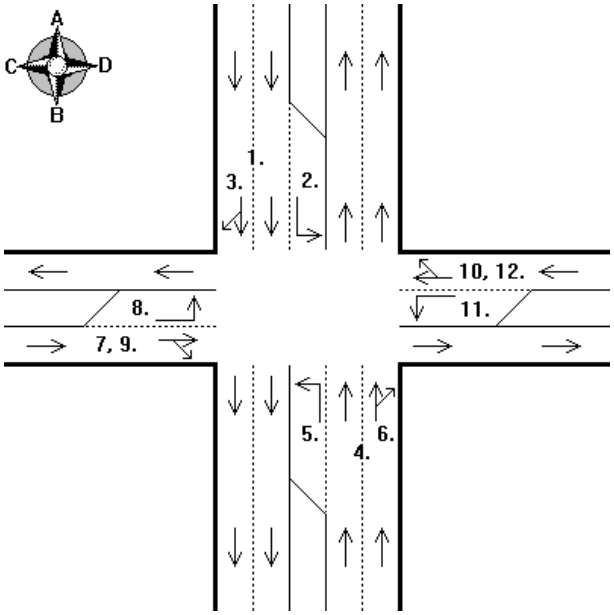
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	775
2	A-D Left Turn	560
3	A-C Right Turn	150
4	B-A Thru	650
5	B-C Left Turn	20
6	B-D Right Turn	165
7	C-D Thru	900
8	C-A Left Turn	180
9	C-B Right Turn	260
10	D-C Thru	1035
11	D-B Left Turn	160
12	D-A Right Turn	200



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.72
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **120**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	63
Leg A Left Turn	92
Leg B Thru & Rt	85
Leg B Left Turn	114
Leg C Thru & Rt	84
Leg C Left Turn	107
Leg D Thru & Rt	84
Leg D Left Turn	107

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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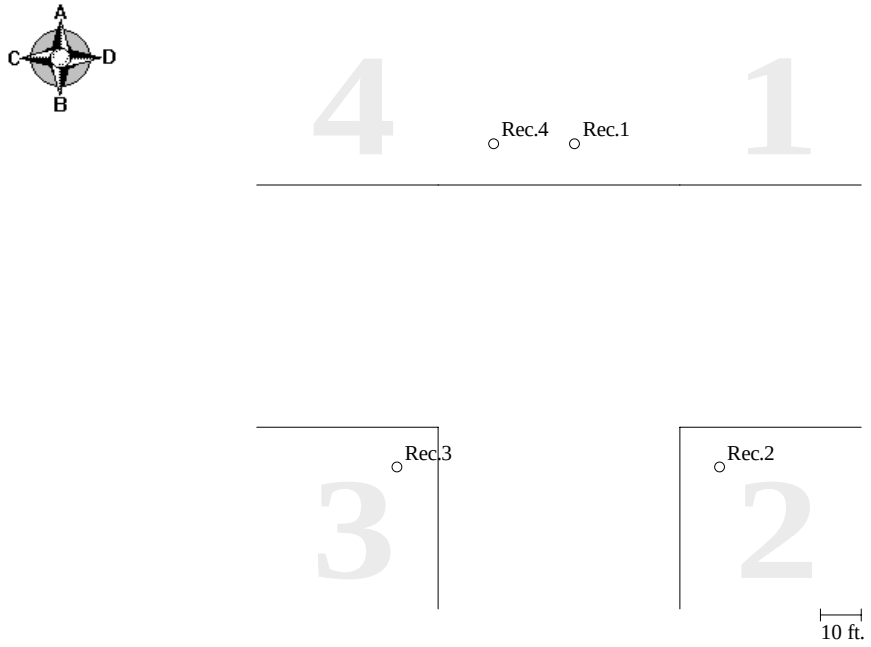
Washington State Intersection Screening Tool 2.0

03-24-11
08:01 AM
NE 4th Street/120th Avenue

Description: **NE 8th Street & 120th Avenue NE EXISTING**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **T-type Intersection, 5 x 4**
Street Names: **A-B: 120th Ave NE C-D: NE 8th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.0	4.4	Pass
2	2	10	10	5.8	5.0	Pass
3	3	10	10	5.4	4.7	Pass
4	4	10	10	4.9	4.3	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

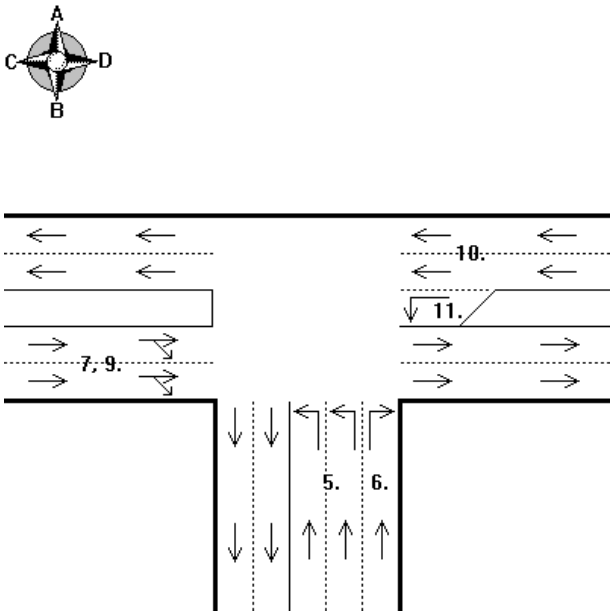
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	415
6	B-D Right Turn	190
7	C-D Thru	1060
8	C-A Left Turn	-----
9	C-B Right Turn	260
10	D-C Thru	820
11	D-B Left Turn	210
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2010**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **110.67**

Approach	Speed (mph)	EF (g/mile)
Leg A	---	-----
Leg B	15	12.42
Leg C	15	12.42
Leg D	15	12.42

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **90**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	---
Leg A Left Turn	---
Leg B Thru & Rt	63
Leg B Left Turn	63
Leg C Thru & Rt	46
Leg C Left Turn	---
Leg D Thru & Rt	49
Leg D Left Turn	73

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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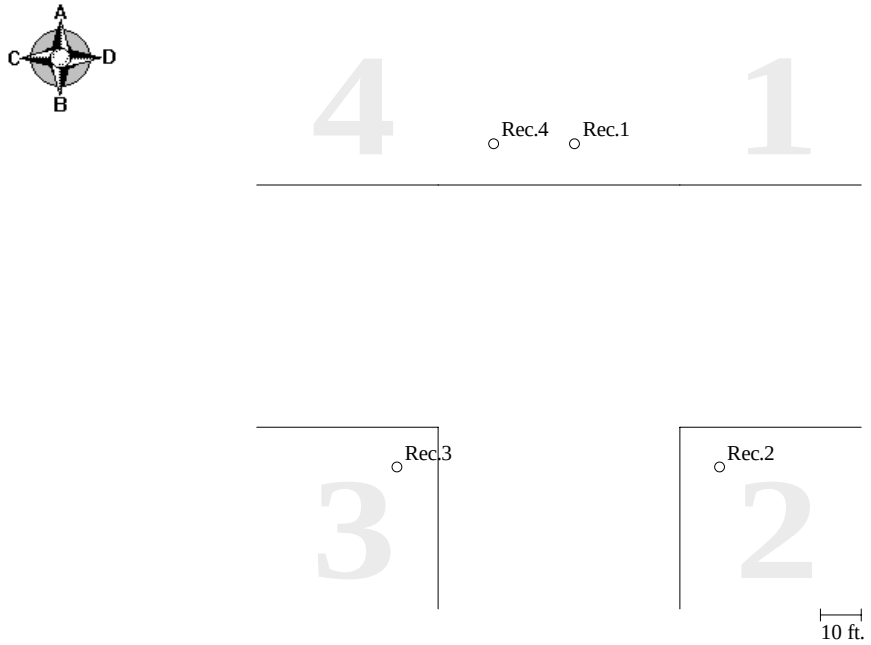
Washington State Intersection Screening Tool 2.0

03-24-11
08:21 AM
NE 4th Street/120th Avenue

Description: **NE 8th Street & 120th Avenue NE NO BUILD 2015**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **T-type Intersection, 5 x 4**
Street Names: **A-B: 120th Ave NE C-D: NE 8th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.3	4.6	Pass
2	2	10	10	5.3	4.6	Pass
3	3	10	10	5.4	4.7	Pass
4	4	10	10	5.2	4.5	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 3**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

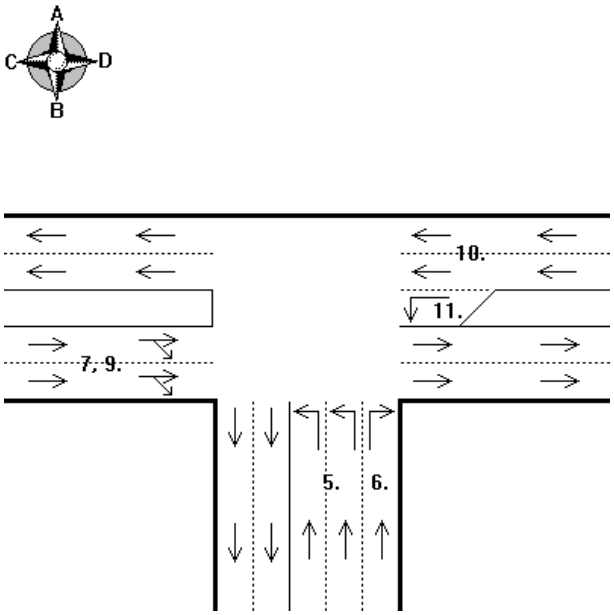
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	415
6	B-D Right Turn	190
7	C-D Thru	1060
8	C-A Left Turn	-----
9	C-B Right Turn	260
10	D-C Thru	820
11	D-B Left Turn	210
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	**---**	**-----**
Leg B	**15**	**9.86**
Leg C	**15**	**9.86**
Leg D	**15**	**9.86**

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **90**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**---**
Leg A Left Turn	**---**
Leg B Thru & Rt	**63**
Leg B Left Turn	**63**
Leg C Thru & Rt	**48**
Leg C Left Turn	**---**
Leg D Thru & Rt	**66**
Leg D Left Turn	**73**

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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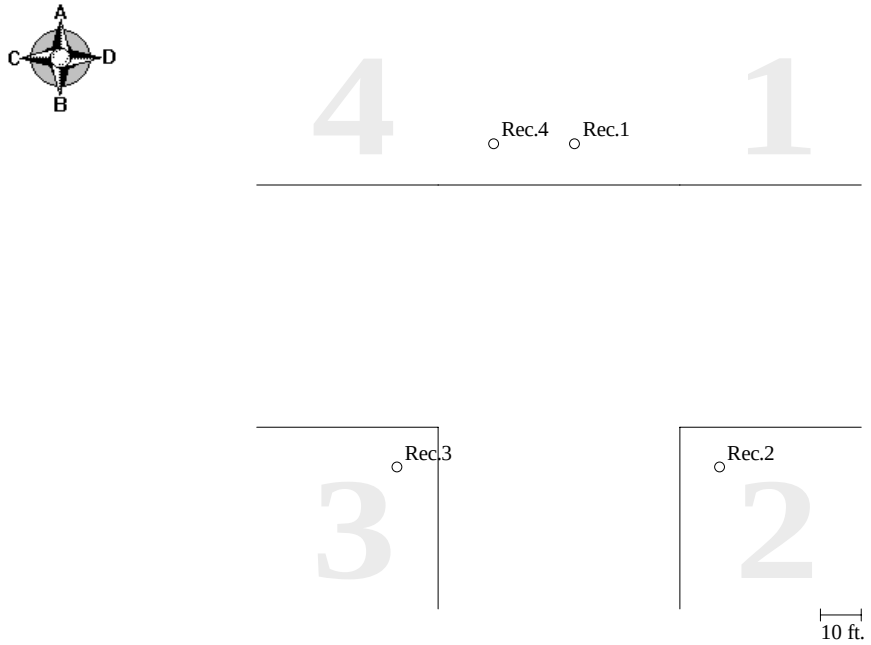
Washington State Intersection Screening Tool 2.0

03-24-11
08:17 AM
NE 4th Street/120th Avenue

Description: **NE 8th Street & 120th Avenue NE NO BUILD 2030**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **T-type Intersection, 5 x 4**
Street Names: **A-B: 120th Ave NE C-D: NE 8th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	4.6	4.1	Pass
2	2	10	10	5.2	4.5	Pass
3	3	10	10	5.2	4.5	Pass
4	4	10	10	4.6	4.1	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

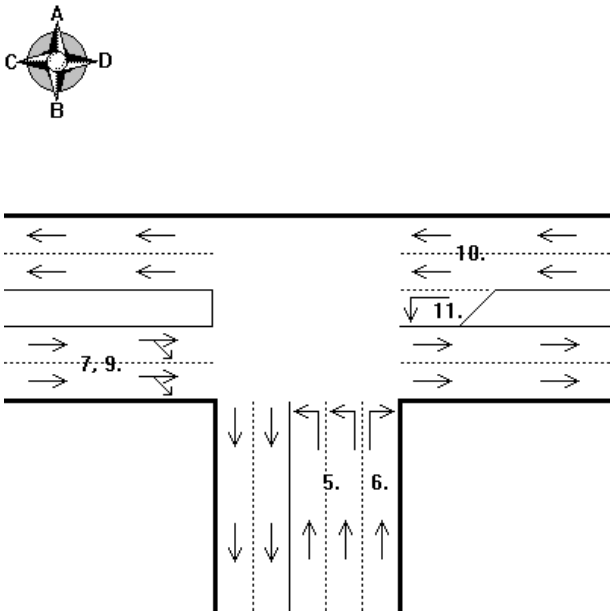
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	410
6	B-D Right Turn	630
7	C-D Thru	1225
8	C-A Left Turn	-----
9	C-B Right Turn	255
10	D-C Thru	735
11	D-B Left Turn	780
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	---	-----
Leg B	15	7.76
Leg C	15	7.76
Leg D	15	7.76

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **90**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	---
Leg A Left Turn	---
Leg B Thru & Rt	63
Leg B Left Turn	63
Leg C Thru & Rt	55
Leg C Left Turn	---
Leg D Thru & Rt	57
Leg D Left Turn	62

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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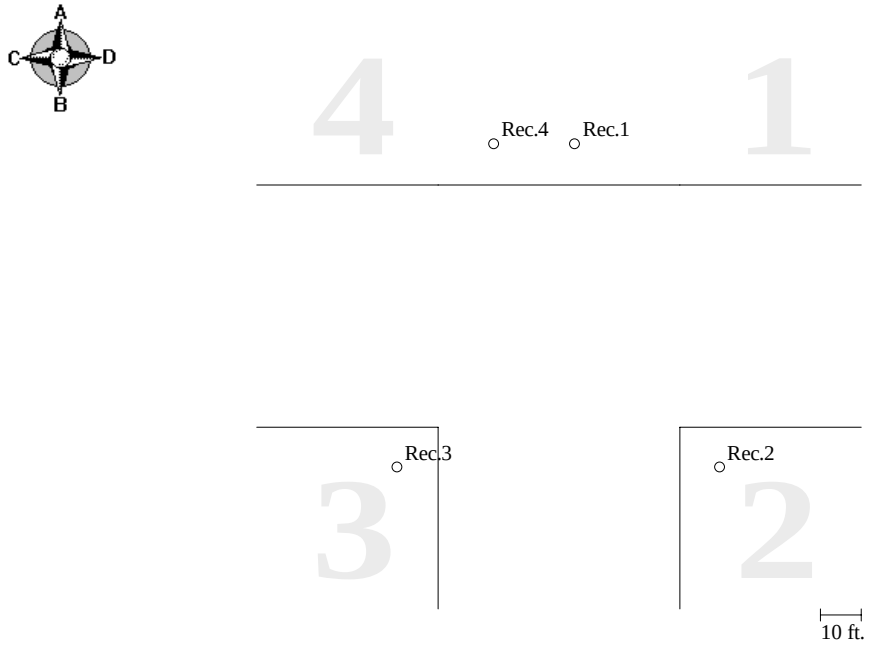
Washington State Intersection Screening Tool 2.0

03-24-11
08:25 AM
NE 4th Street/120th Avenue

Description: **NE 8th Street & 120th Avenue NE NO BUILD 2040**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **T-type Intersection, 5 x 4**
Street Names: **A-B: 120th Ave NE C-D: NE 8th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	4.8	4.3	Pass
2	2	10	10	5.4	4.7	Pass
3	3	10	10	5.6	4.8	Pass
4	4	10	10	4.6	4.1	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 3**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

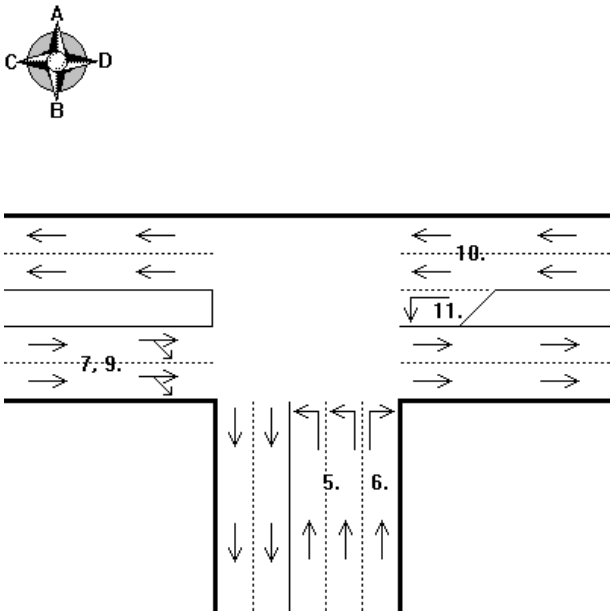
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	435
6	B-D Right Turn	670
7	C-D Thru	1300
8	C-A Left Turn	-----
9	C-B Right Turn	270
10	D-C Thru	815
11	D-B Left Turn	825
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	---	-----
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **90**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	---
Leg A Left Turn	---
Leg B Thru & Rt	63
Leg B Left Turn	63
Leg C Thru & Rt	55
Leg C Left Turn	---
Leg D Thru & Rt	58
Leg D Left Turn	62

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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Washington State Intersection Screening Tool 2.0

03-24-11

08:13 AM

NE 4th Street/120th Avenue

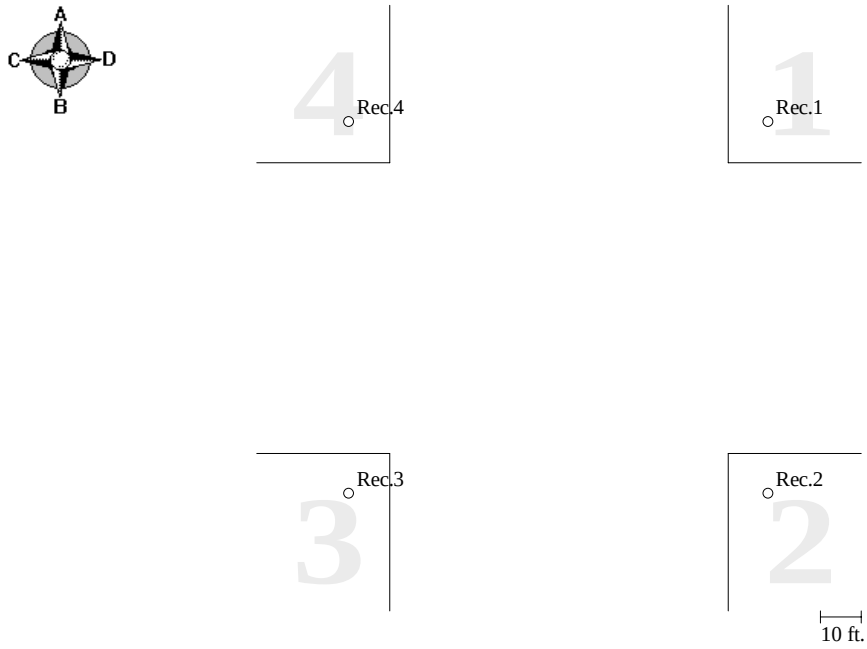
Description: **NE 8th Street & 120th Avenue NE BUILD 2015**

Performed by: **Melissa Livingston - consultant**

212.465.5166 - livingstonm@pbworld.com

Intersection Type: **Four-Way Intersection, 6 x 4 w/4 Lt Turns (2 Double Lt)**

Street Names: **A-B: 120th Ave NE C-D: NE 8th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.9	5.0	Pass
2	2	10	10	6.3	5.3	Pass
3	3	10	10	6.3	5.3	Pass
4	4	10	10	6.5	5.4	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.

Largest modeled CO concentrations are at **receptor 4**.

- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

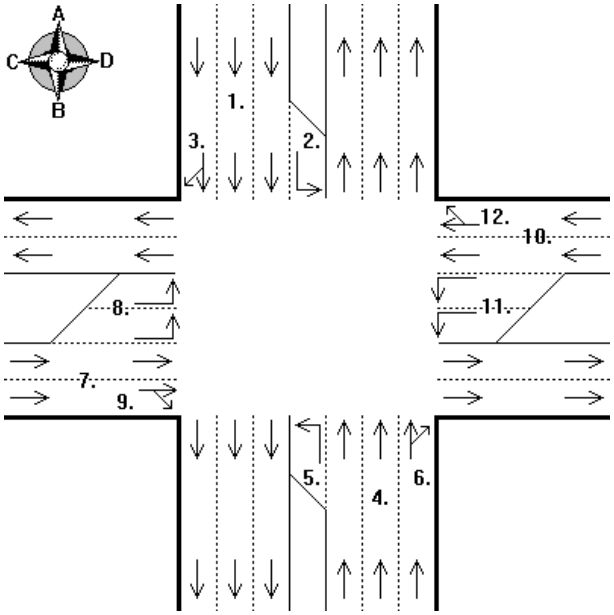
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	680
2	A-D Left Turn	40
3	A-C Right Turn	620
4	B-A Thru	490
5	B-C Left Turn	140
6	B-D Right Turn	340
7	C-D Thru	730
8	C-A Left Turn	510
9	C-B Right Turn	65
10	D-C Thru	1050
11	D-B Left Turn	325
12	D-A Right Turn	30



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	9.86
Leg B	15	9.86
Leg C	15	9.86
Leg D	15	9.86

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **120**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	85
Leg A Left Turn	111
Leg B Thru & Rt	76
Leg B Left Turn	102
Leg C Thru & Rt	79
Leg C Left Turn	99
Leg D Thru & Rt	82
Leg D Left Turn	102

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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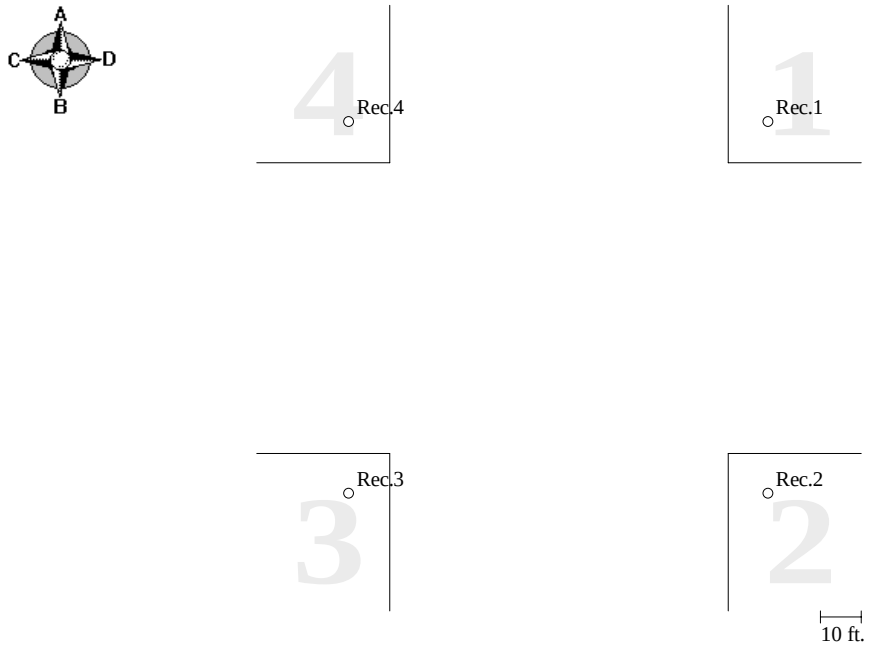
Washington State Intersection Screening Tool 2.0

03-24-11
08:33 AM
NE 4th Street/120th Avenue

Description: **NE 8th Street & 120th Avenue NE BUILD 2030**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 6 x 4 w/4 Lt Turns (2 Double Lt)**
Street Names: **A-B: 120th Ave NE C-D: NE 8th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.4	4.7	Pass
2	2	10	10	5.9	5.0	Pass
3	3	10	10	5.9	5.0	Pass
4	4	10	10	6.1	5.2	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 4**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

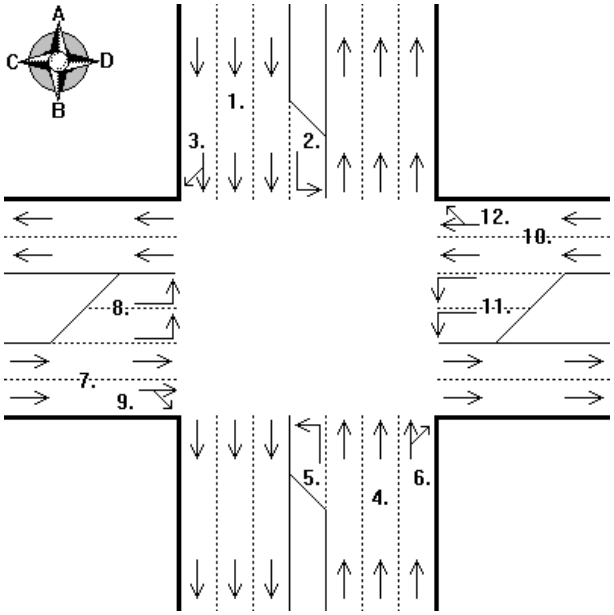
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	985
2	A-D Left Turn	25
3	A-C Right Turn	620
4	B-A Thru	580
5	B-C Left Turn	205
6	B-D Right Turn	515
7	C-D Thru	900
8	C-A Left Turn	515
9	C-B Right Turn	20
10	D-C Thru	1050
11	D-B Left Turn	350
12	D-A Right Turn	100



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.76
Leg B	15	7.76
Leg C	15	7.76
Leg D	15	7.76

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **150**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	101
Leg A Left Turn	143
Leg B Thru & Rt	85
Leg B Left Turn	126
Leg C Thru & Rt	100
Leg C Left Turn	127
Leg D Thru & Rt	103
Leg D Left Turn	130

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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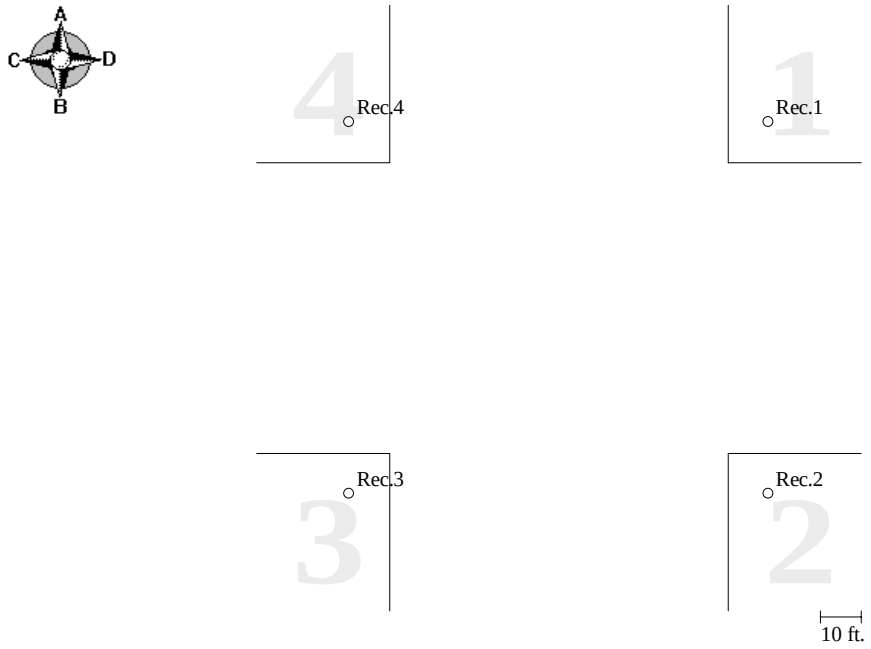
Washington State Intersection Screening Tool 2.0

03-24-11
08:37 AM
NE 4th Street/120th Avenue

Description: **NE 8th Street & 120th Avenue NE BUILD 2040**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 6 x 4 w/4 Lt Turns (2 Double Lt)**
Street Names: **A-B: 120th Ave NE C-D: NE 8th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.6	4.8	Pass
2	2	10	10	6.0	5.1	Pass
3	3	10	10	6.1	5.2	Pass
4	4	10	10	6.2	5.2	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 4**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

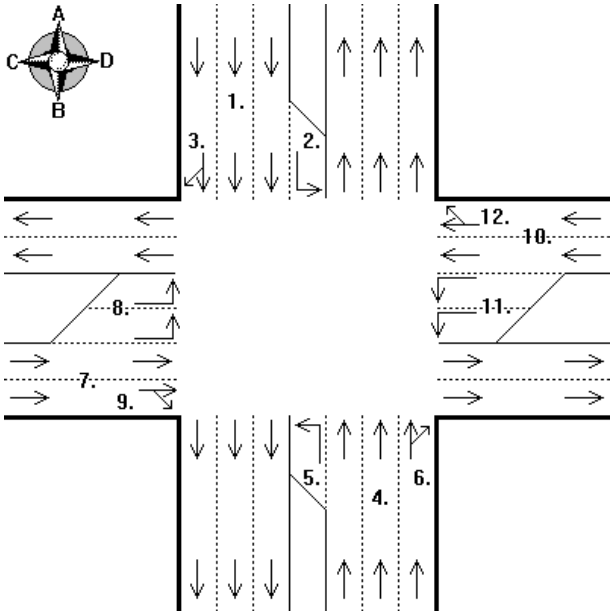
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	1045
2	A-D Left Turn	25
3	A-C Right Turn	650
4	B-A Thru	620
5	B-C Left Turn	205
6	B-D Right Turn	515
7	C-D Thru	955
8	C-A Left Turn	545
9	C-B Right Turn	20
10	D-C Thru	1110
11	D-B Left Turn	370
12	D-A Right Turn	105



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.72
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **150**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	102
Leg A Left Turn	143
Leg B Thru & Rt	86
Leg B Left Turn	126
Leg C Thru & Rt	100
Leg C Left Turn	126
Leg D Thru & Rt	103
Leg D Left Turn	129

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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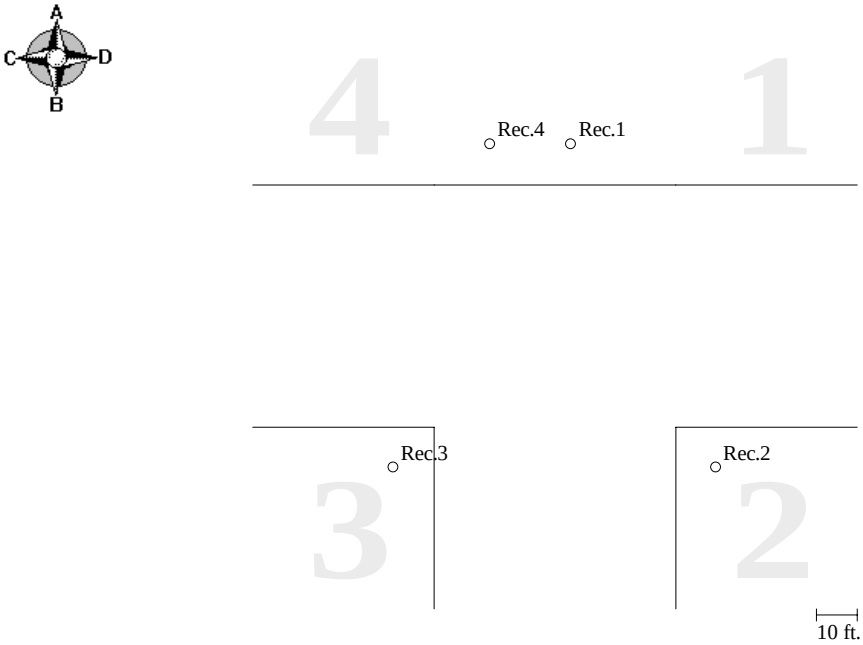
Washington State Intersection Screening Tool 2.0

03-24-11
08:44 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street & 116th Avenue NE EXISTING**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **T-type Intersection, 5 x 4**
Street Names: **A-B: NE 4th Street C-D: 116th Avenue NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.0	4.4	Pass
2	2	10	10	5.7	4.9	Pass
3	3	10	10	5.2	4.5	Pass
4	4	10	10	5.2	4.5	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

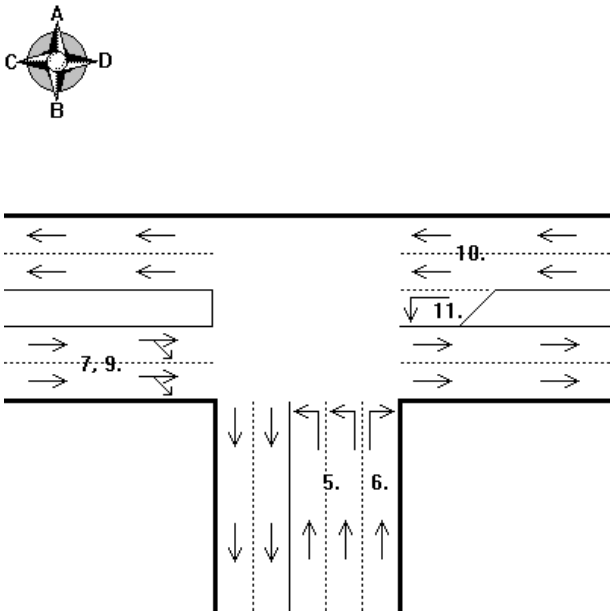
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	380
6	B-D Right Turn	330
7	C-D Thru	920
8	C-A Left Turn	-----
9	C-B Right Turn	175
10	D-C Thru	580
11	D-B Left Turn	280
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2010**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **110.67**

Approach	Speed (mph)	EF (g/mile)
Leg A	---	-----
Leg B	15	12.42
Leg C	15	12.42
Leg D	15	12.42

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	---
Leg A Left Turn	---
Leg B Thru & Rt	112
Leg B Left Turn	112
Leg C Thru & Rt	66
Leg C Left Turn	---
Leg D Thru & Rt	32
Leg D Left Turn	108

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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Washington State Intersection Screening Tool 2.0

03-24-11

08:46 AM

NE 4th Street/120th Avenue

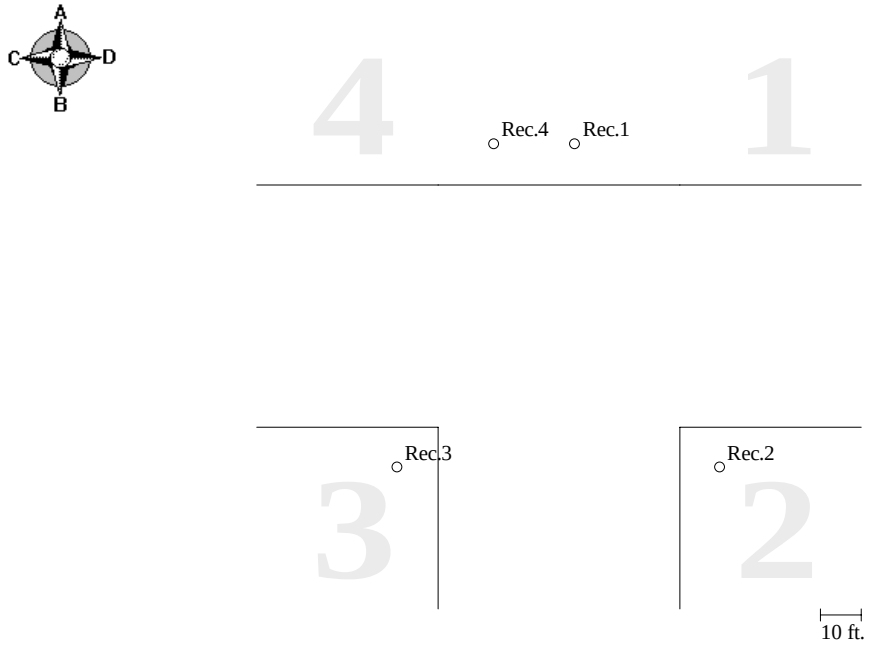
Description: **NE 4th Street & 116th Avenue NE NO BUILD 2015**

Performed by: **Melissa Livingston - consultant**

212.465.5166 - livingstonm@pbworld.com

Intersection Type: **T-type Intersection, 5 x 4**

Street Names: **A-B: NE 4th Street C-D: 116th Avenue NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	4.7	4.2	Pass
2	2	10	10	5.2	4.5	Pass
3	3	10	10	4.7	4.2	Pass
4	4	10	10	4.8	4.3	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.

Largest modeled CO concentrations are at **receptor 2**.

- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

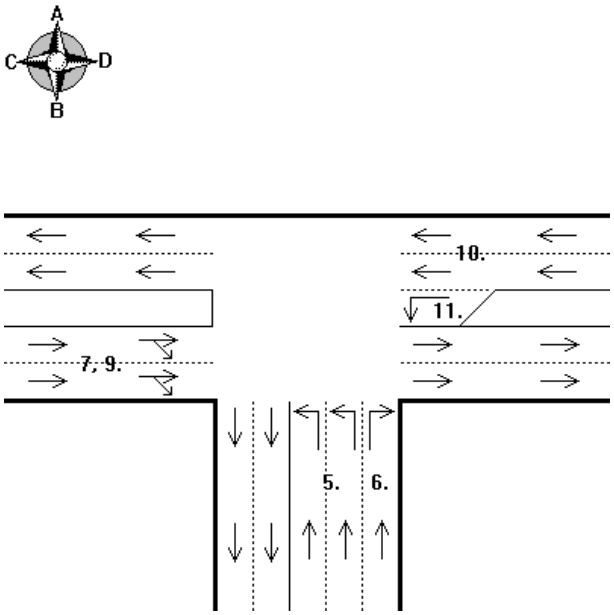
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	380
6	B-D Right Turn	330
7	C-D Thru	920
8	C-A Left Turn	-----
9	C-B Right Turn	175
10	D-C Thru	580
11	D-B Left Turn	280
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	**---**	**-----**
Leg B	**15**	**9.86**
Leg C	**15**	**9.86**
Leg D	**15**	**9.86**

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**---**
Leg A Left Turn	**---**
Leg B Thru & Rt	**112**
Leg B Left Turn	**112**
Leg C Thru & Rt	**66**
Leg C Left Turn	**---**
Leg D Thru & Rt	**32**
Leg D Left Turn	**108**

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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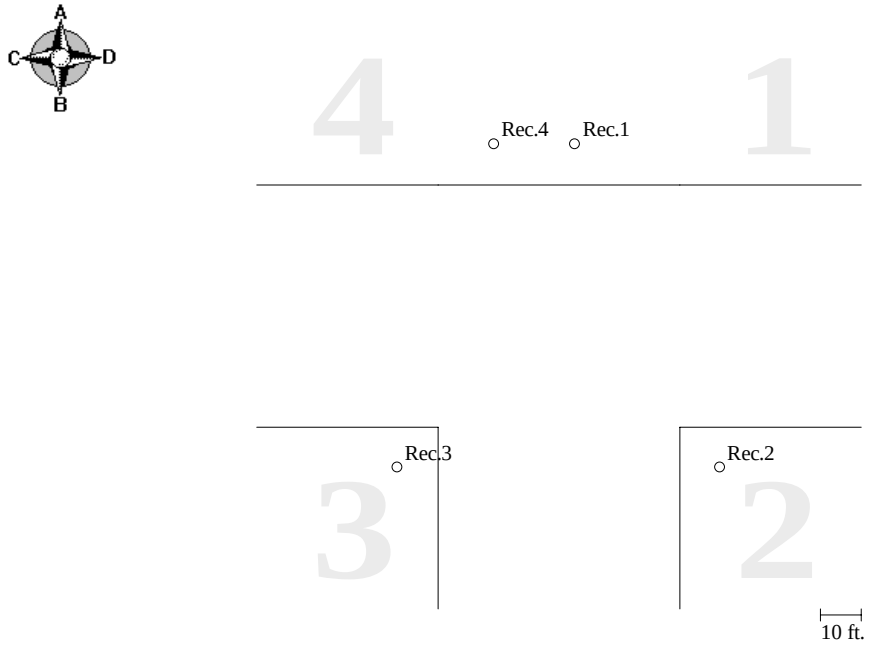
Washington State Intersection Screening Tool 2.0

03-24-11
08:49 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street & 116th Avenue NE NO BUILD 2030**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **T-type Intersection, 5 x 4**
Street Names: **A-B: NE 4th Street C-D: 116th Avenue NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	4.7	4.2	Pass
2	2	10	10	5.2	4.5	Pass
3	3	10	10	4.7	4.2	Pass
4	4	10	10	4.5	4.0	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

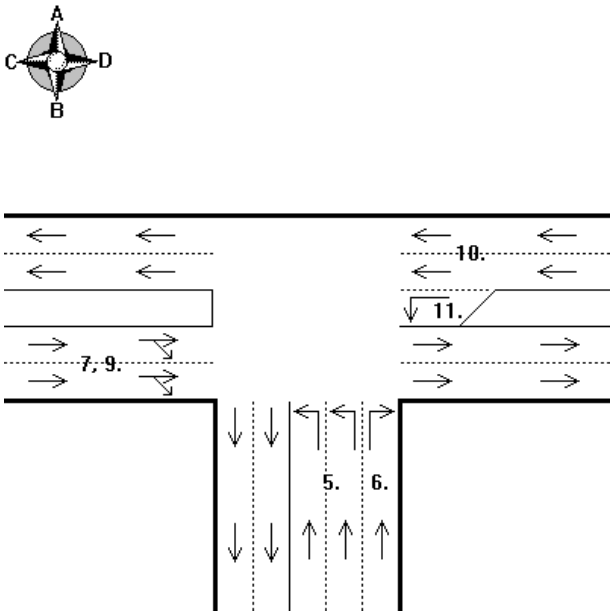
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	620
6	B-D Right Turn	285
7	C-D Thru	1175
8	C-A Left Turn	-----
9	C-B Right Turn	370
10	D-C Thru	650
11	D-B Left Turn	350
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	**---**	**-----**
Leg B	**15**	**7.76**
Leg C	**15**	**7.76**
Leg D	**15**	**7.76**

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**---**
Leg A Left Turn	**---**
Leg B Thru & Rt	**106**
Leg B Left Turn	**106**
Leg C Thru & Rt	**72**
Leg C Left Turn	**---**
Leg D Thru & Rt	**36**
Leg D Left Turn	**108**

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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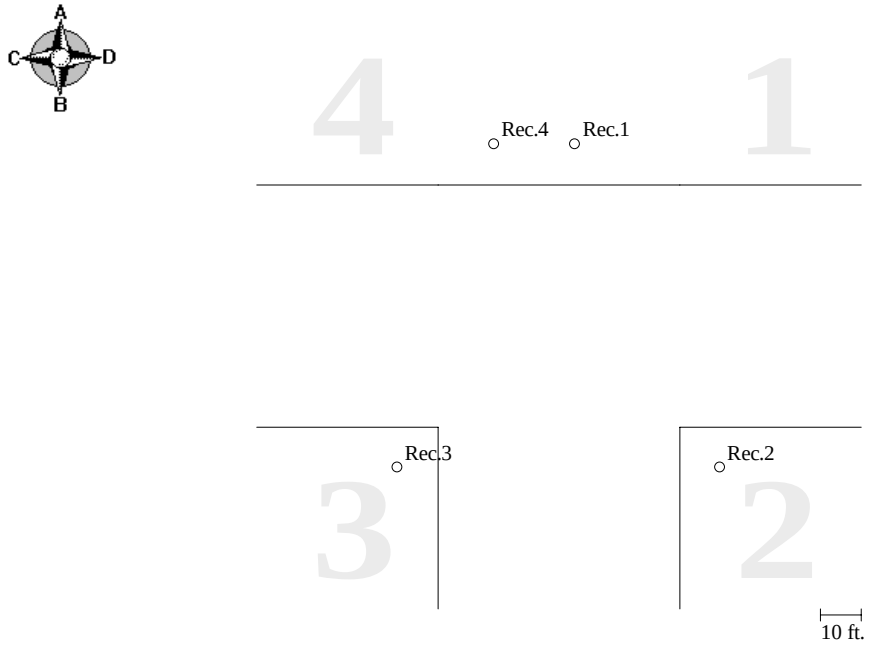
Washington State Intersection Screening Tool 2.0

03-24-11
08:51 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street & 116th Avenue NE NO BUILD 2040**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **T-type Intersection, 5 x 4**
Street Names: **A-B: NE 4th Street C-D: 116th Avenue NE**



RESULTS:

Receptor#	Quadrant	Distance from A-B boundary (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	4.8	4.3	Pass
2	2	10	10	5.2	4.5	Pass
3	3	10	10	4.7	4.2	Pass
4	4	10	10	4.7	4.2	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

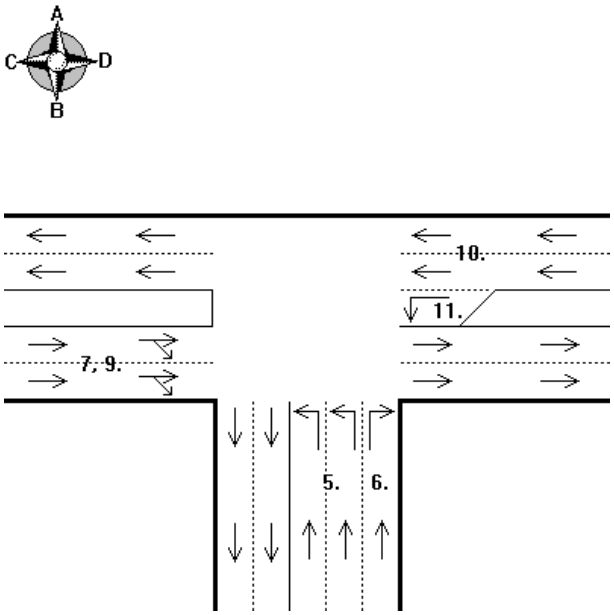
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	-----
2	A-D Left Turn	-----
3	A-C Right Turn	-----
4	B-A Thru	-----
5	B-C Left Turn	660
6	B-D Right Turn	300
7	C-D Thru	1245
8	C-A Left Turn	-----
9	C-B Right Turn	390
10	D-C Thru	690
11	D-B Left Turn	370
12	D-A Right Turn	-----



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	---	-----
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	---
Leg A Left Turn	---
Leg B Thru & Rt	107
Leg B Left Turn	107
Leg C Thru & Rt	70
Leg C Left Turn	---
Leg D Thru & Rt	37
Leg D Left Turn	109

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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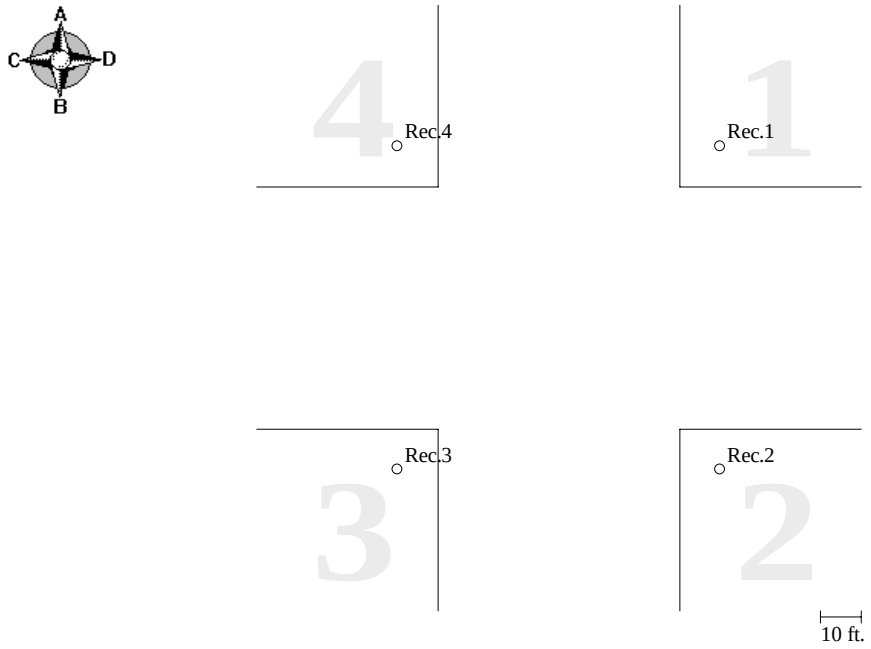
Washington State Intersection Screening Tool 2.0

03-24-11
08:58 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street & 116th Avenue NE BUILD 2015**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns**
Street Names: **A-B: 116th Avenue NE C-D: NE 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.3	4.6	Pass
2	2	10	10	5.5	4.8	Pass
3	3	10	10	5.3	4.6	Pass
4	4	10	10	5.2	4.5	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

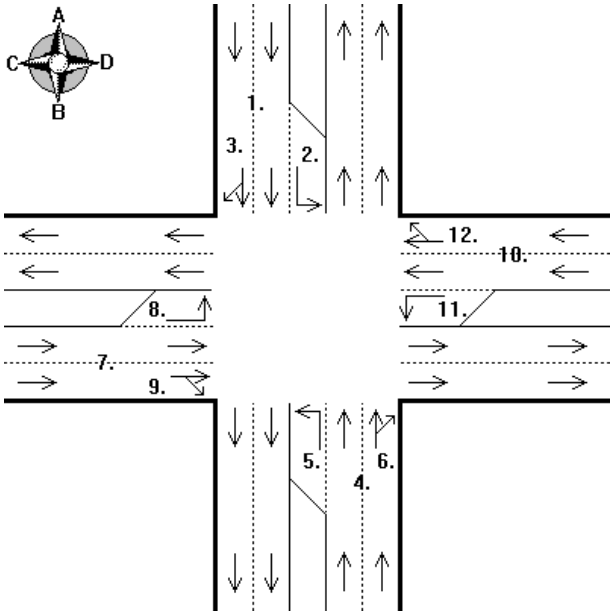
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	595
2	A-D Left Turn	20
3	A-C Right Turn	200
4	B-A Thru	75
5	B-C Left Turn	170
6	B-D Right Turn	400
7	C-D Thru	630
8	C-A Left Turn	140
9	C-B Right Turn	90
10	D-C Thru	295
11	D-B Left Turn	445
12	D-A Right Turn	335



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	9.86
Leg B	15	9.86
Leg C	15	9.86
Leg D	15	9.86

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	95
Leg A Left Turn	133
Leg B Thru & Rt	85
Leg B Left Turn	123
Leg C Thru & Rt	105
Leg C Left Turn	123
Leg D Thru & Rt	87
Leg D Left Turn	68

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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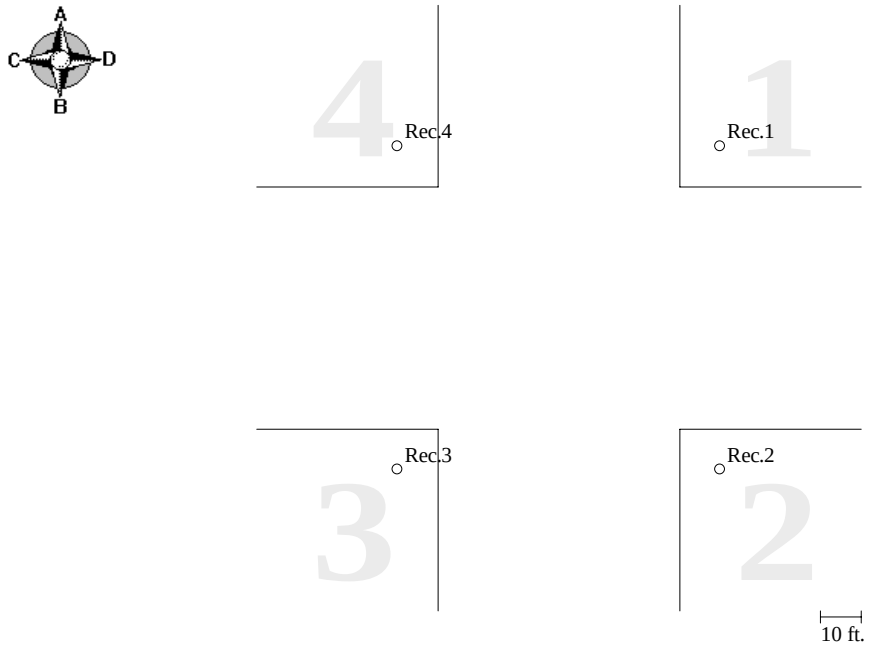
Washington State Intersection Screening Tool 2.0

03-24-11
09:03 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street & 116th Avenue NE BUILD 2030**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns**
Street Names: **A-B: 116th Avenue NE C-D: NE 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.2	4.5	Pass
2	2	10	10	5.4	4.7	Pass
3	3	10	10	5.3	4.6	Pass
4	4	10	10	5.0	4.4	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

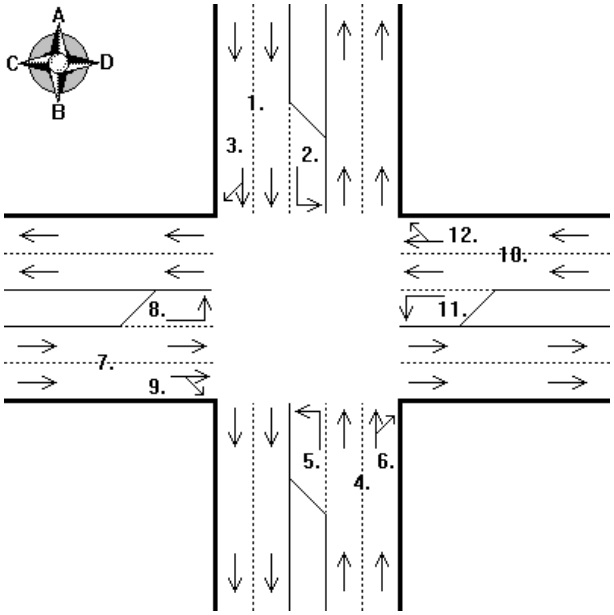
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	920
2	A-D Left Turn	100
3	A-C Right Turn	145
4	B-A Thru	260
5	B-C Left Turn	275
6	B-D Right Turn	365
7	C-D Thru	720
8	C-A Left Turn	195
9	C-B Right Turn	145
10	D-C Thru	435
11	D-B Left Turn	145
12	D-A Right Turn	340



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.76
Leg B	15	7.76
Leg C	15	7.76
Leg D	15	7.76

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **160**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	111
Leg A Left Turn	145
Leg B Thru & Rt	103
Leg B Left Turn	137
Leg C Thru & Rt	115
Leg C Left Turn	139
Leg D Thru & Rt	101
Leg D Left Turn	125

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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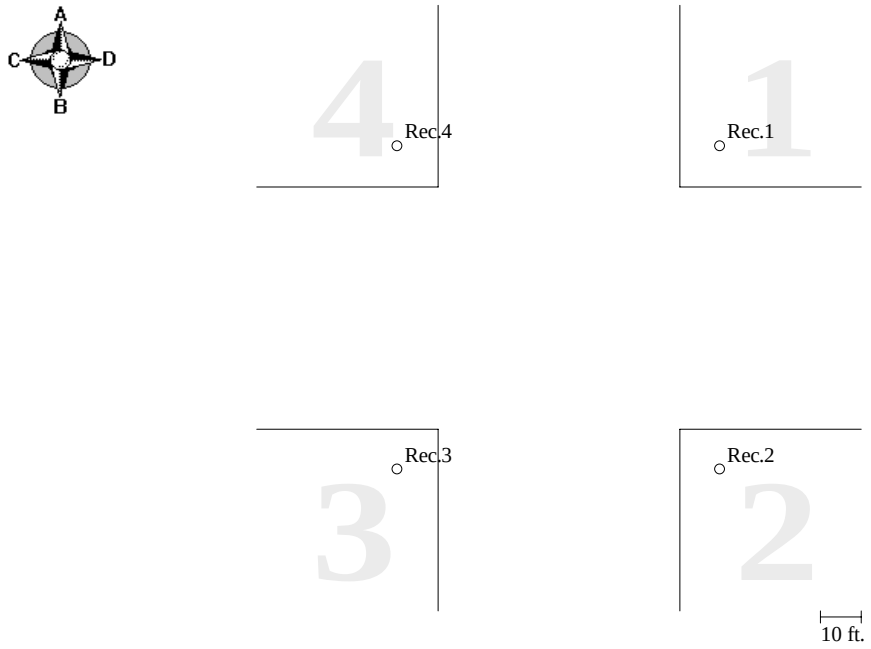
Washington State Intersection Screening Tool 2.0

03-24-11
09:07 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street & 116th Avenue NE BUILD 2040**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns**
Street Names: **A-B: 116th Avenue NE C-D: NE 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.4	4.7	Pass
2	2	10	10	5.5	4.8	Pass
3	3	10	10	5.3	4.6	Pass
4	4	10	10	5.2	4.5	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

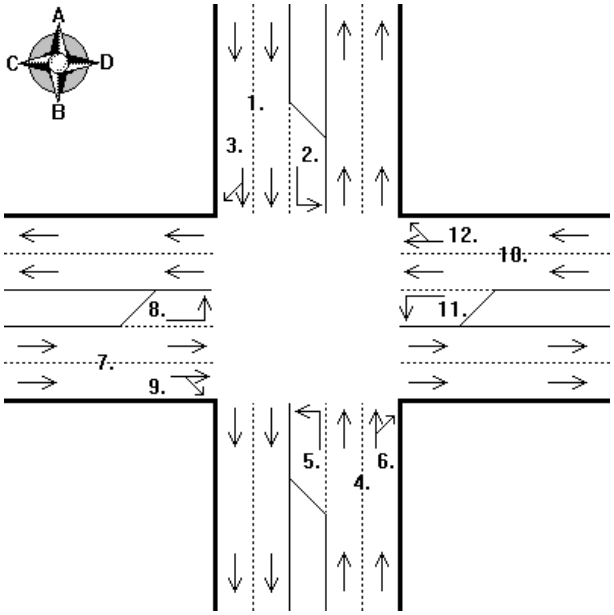
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	975
2	A-D Left Turn	105
3	A-C Right Turn	155
4	B-A Thru	280
5	B-C Left Turn	290
6	B-D Right Turn	385
7	C-D Thru	760
8	C-A Left Turn	205
9	C-B Right Turn	155
10	D-C Thru	460
11	D-B Left Turn	460
12	D-A Right Turn	360



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.72
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **160**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	111
Leg A Left Turn	146
Leg B Thru & Rt	103
Leg B Left Turn	138
Leg C Thru & Rt	114
Leg C Left Turn	139
Leg D Thru & Rt	100
Leg D Left Turn	125

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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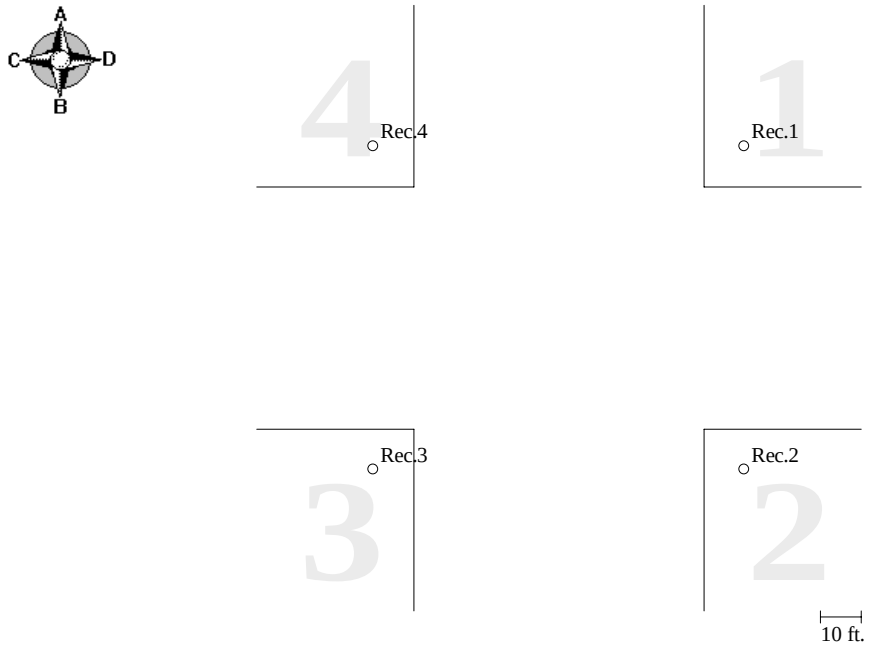
Washington State Intersection Screening Tool 2.0

03-24-11
09:23 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street and 112th Avenue EXISTING**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns (2 Double Lt)**
Street Names: **A-B: 112th Avenue C-D: 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.4	4.7	Pass
2	2	10	10	6.2	5.2	Pass
3	3	10	10	5.8	5.0	Pass
4	4	10	10	6.0	5.1	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

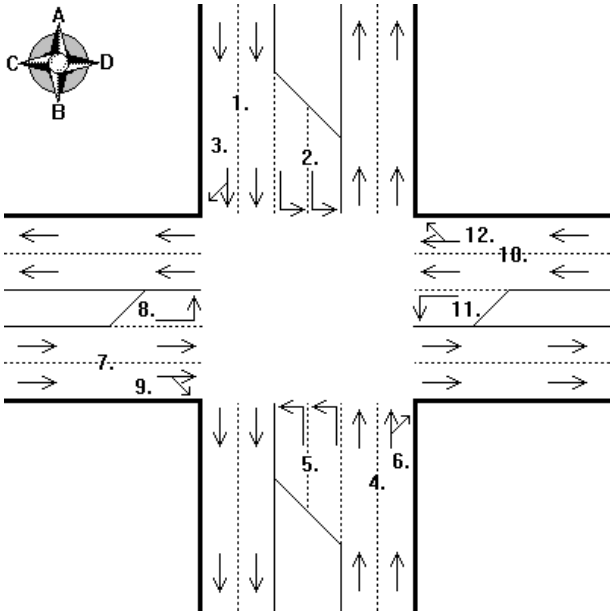
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	635
2	A-D Left Turn	100
3	A-C Right Turn	70
4	B-A Thru	305
5	B-C Left Turn	60
6	B-D Right Turn	255
7	C-D Thru	1110
8	C-A Left Turn	60
9	C-B Right Turn	85
10	D-C Thru	655
11	D-B Left Turn	3
12	D-A Right Turn	100



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2010**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **110.67**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	12.42
Leg B	15	12.42
Leg C	15	12.42
Leg D	15	12.42

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	97
Leg A Left Turn	128
Leg B Thru & Rt	98
Leg B Left Turn	129
Leg C Thru & Rt	60
Leg C Left Turn	129
Leg D Thru & Rt	74
Leg D Left Turn	74

USER COMMENTS

NE 4th Street/120th Avenue

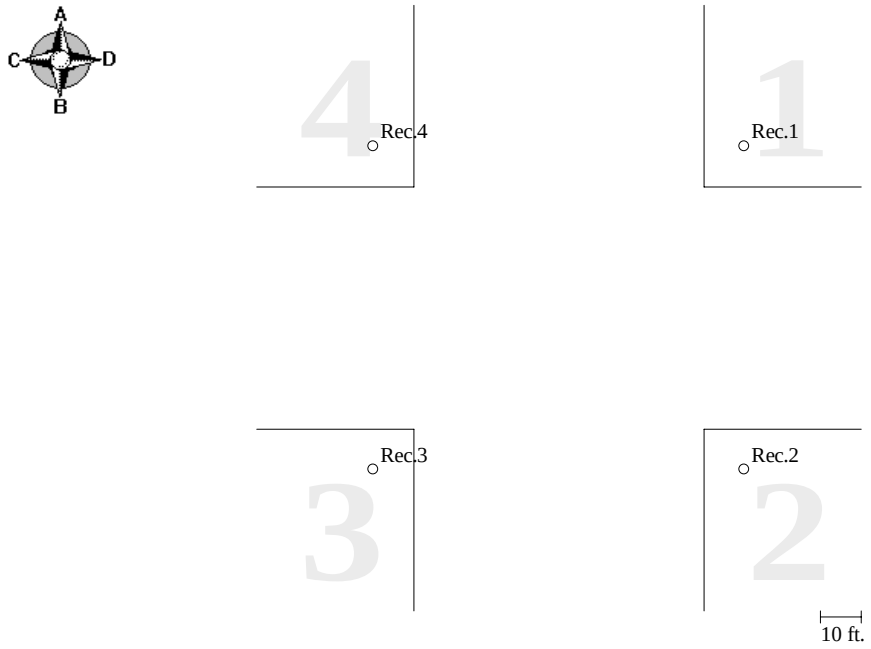
User Comments:

1. < blank >

Washington State Intersection Screening Tool 2.0

03-24-11
09:25 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street and 112th Avenue NO BUILD 2015**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns (2 Double Lt)**
Street Names: **A-B: 112th Avenue C-D: 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	4.9	4.3	Pass
2	2	10	10	5.4	4.7	Pass
3	3	10	10	5.1	4.5	Pass
4	4	10	10	5.2	4.5	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

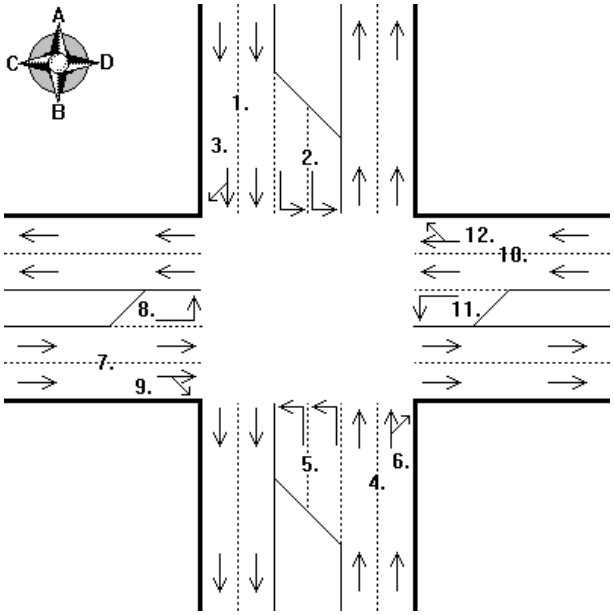
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	635
2	A-D Left Turn	100
3	A-C Right Turn	70
4	B-A Thru	305
5	B-C Left Turn	60
6	B-D Right Turn	255
7	C-D Thru	1110
8	C-A Left Turn	60
9	C-B Right Turn	85
10	D-C Thru	655
11	D-B Left Turn	3
12	D-A Right Turn	100



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	**9.86**
Leg B	15	**9.86**
Leg C	15	**9.86**
Leg D	15	**9.86**

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**97**
Leg A Left Turn	**128**
Leg B Thru & Rt	**98**
Leg B Left Turn	**129**
Leg C Thru & Rt	**60**
Leg C Left Turn	**129**
Leg D Thru & Rt	**74**
Leg D Left Turn	**74**

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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Washington State Intersection Screening Tool 2.0

03-24-11

10:05 AM

NE 4th Street/120th Avenue

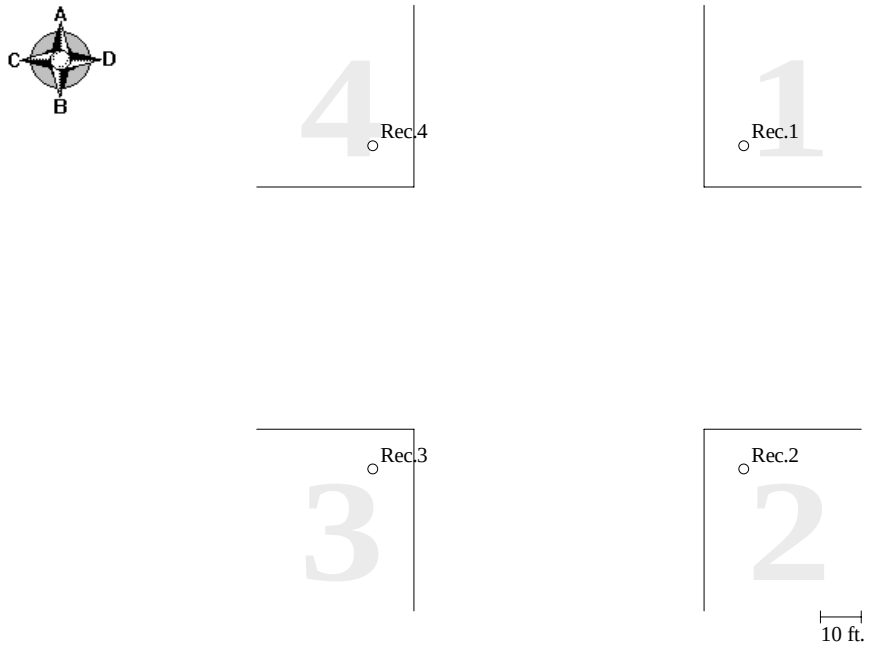
Description: **NE 4th Street and 112th Avenue NO BUILD 2030**

Performed by: **Melissa Livingston - consultant**

212.465.5166 - livingstonm@pbworld.com

Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns (2 Double Lt)**

Street Names: **A-B: 112th Avenue C-D: 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.1	4.5	Pass
2	2	10	10	5.8	5.0	Pass
3	3	10	10	5.7	4.9	Pass
4	4	10	10	5.5	4.8	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.

Largest modeled CO concentrations are at **receptor 2**.

- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

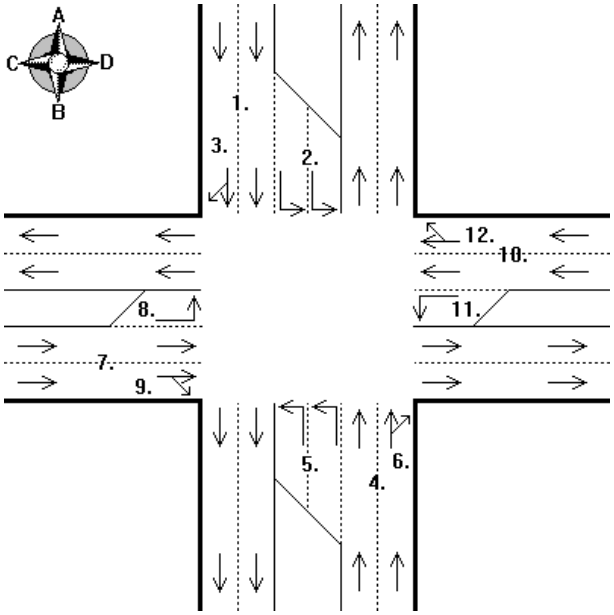
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	1215
2	A-D Left Turn	265
3	A-C Right Turn	35
4	B-A Thru	495
5	B-C Left Turn	40
6	B-D Right Turn	590
7	C-D Thru	1650
8	C-A Left Turn	50
9	C-B Right Turn	165
10	D-C Thru	1035
11	D-B Left Turn	3
12	D-A Right Turn	225



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.76
Leg B	15	7.76
Leg C	15	7.76
Leg D	15	7.76

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	76
Leg A Left Turn	126
Leg B Thru & Rt	81
Leg B Left Turn	131
Leg C Thru & Rt	79
Leg C Left Turn	131
Leg D Thru & Rt	89
Leg D Left Turn	20

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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Washington State Intersection Screening Tool 2.0

03-24-11

10:11 AM

NE 4th Street/120th Avenue

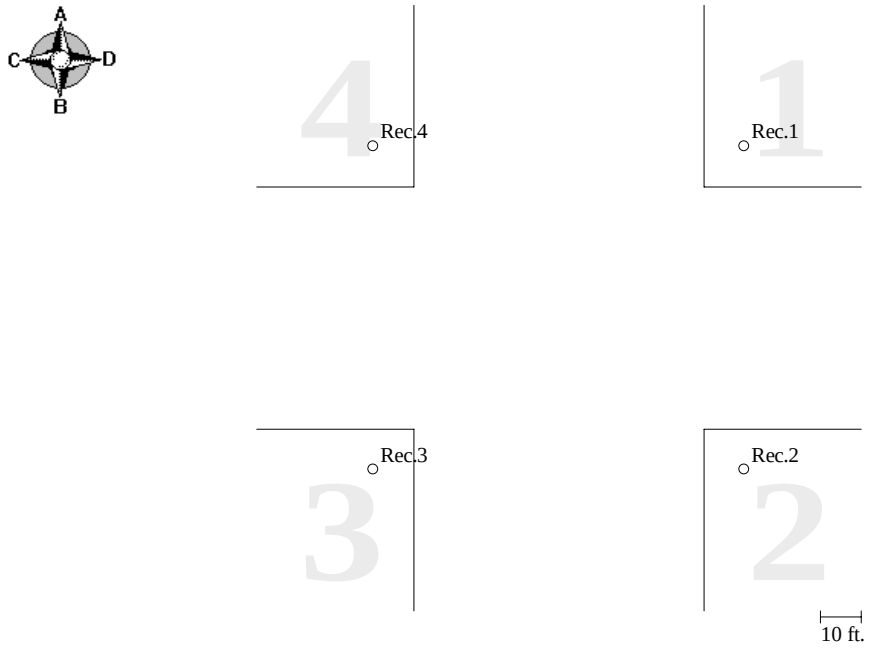
Description: **NE 4th Street and 112th Avenue NO BUILD 2040**

Performed by: **Melissa Livingston - consultant**

212.465.5166 - livingstonm@pbworld.com

Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns (2 Double Lt)**

Street Names: **A-B: 112th Avenue C-D: 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.2	4.5	Pass
2	2	10	10	5.8	5.0	Pass
3	3	10	10	5.8	5.0	Pass
4	4	10	10	5.6	4.8	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.

Largest modeled CO concentrations are at **receptor 2**.

- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

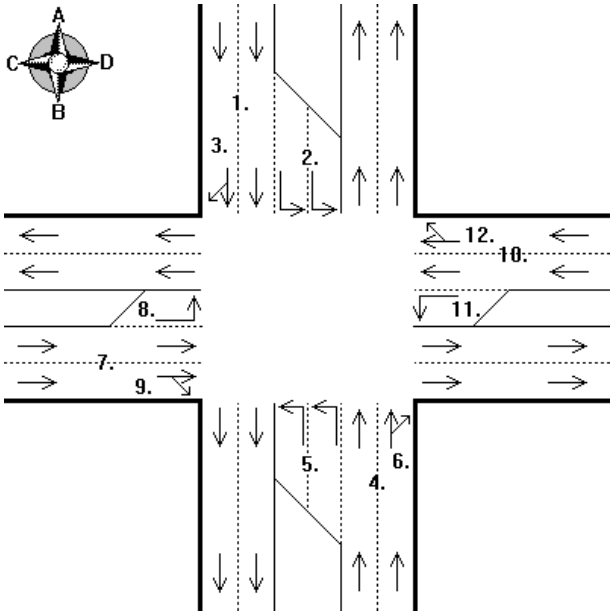
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	1290
2	A-D Left Turn	280
3	A-C Right Turn	40
4	B-A Thru	525
5	B-C Left Turn	40
6	B-D Right Turn	625
7	C-D Thru	1750
8	C-A Left Turn	55
9	C-B Right Turn	175
10	D-C Thru	1100
11	D-B Left Turn	3
12	D-A Right Turn	240



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.72
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	76
Leg A Left Turn	126
Leg B Thru & Rt	81
Leg B Left Turn	131
Leg C Thru & Rt	77
Leg C Left Turn	129
Leg D Thru & Rt	97
Leg D Left Turn	20

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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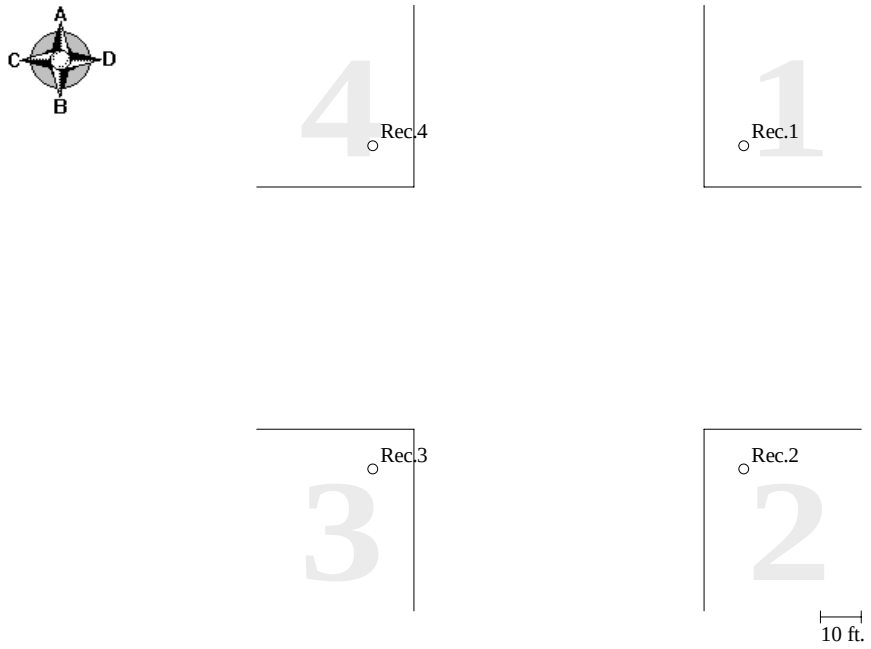
Washington State Intersection Screening Tool 2.0

03-24-11
09:29 AM
NE 4th Street/120th Avenue

Description: **NE 4th Street and 112th Avenue BUILD 2015**
Performed by: **Melissa Livingston - consultant**
212.465.5166 - livingstonm@pbworld.com
Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns (2 Double Lt)**
Street Names: **A-B: 112th Avenue C-D: 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.3	4.6	Pass
2	2	10	10	5.9	5.0	Pass
3	3	10	10	5.5	4.8	Pass
4	4	10	10	5.7	4.9	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 2**.
- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

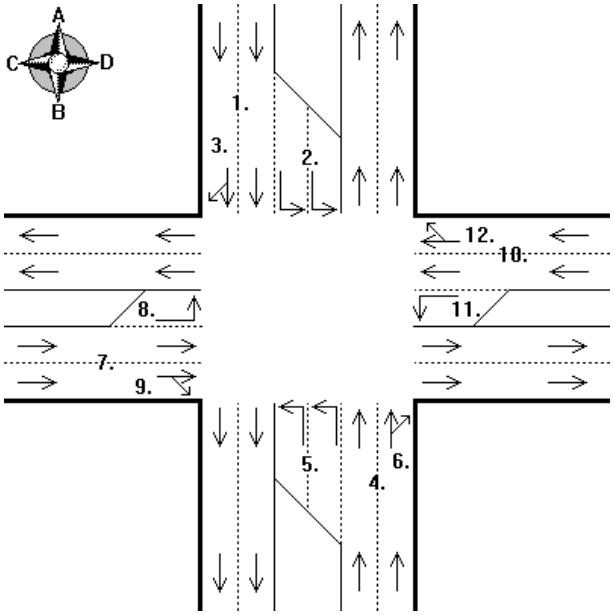
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	885
2	A-D Left Turn	160
3	A-C Right Turn	50
4	B-A Thru	445
5	B-C Left Turn	45
6	B-D Right Turn	365
7	C-D Thru	1280
8	C-A Left Turn	85
9	C-B Right Turn	225
10	D-C Thru	855
11	D-B Left Turn	3
12	D-A Right Turn	120



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2015**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **84.02**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	9.86
Leg B	15	9.86
Leg C	15	9.86
Leg D	15	9.86

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	88
Leg A Left Turn	126
Leg B Thru & Rt	93
Leg B Left Turn	131
Leg C Thru & Rt	65
Leg C Left Turn	126
Leg D Thru & Rt	83
Leg D Left Turn	83

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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Washington State Intersection Screening Tool 2.0

03-24-11

10:08 AM

NE 4th Street/120th Avenue

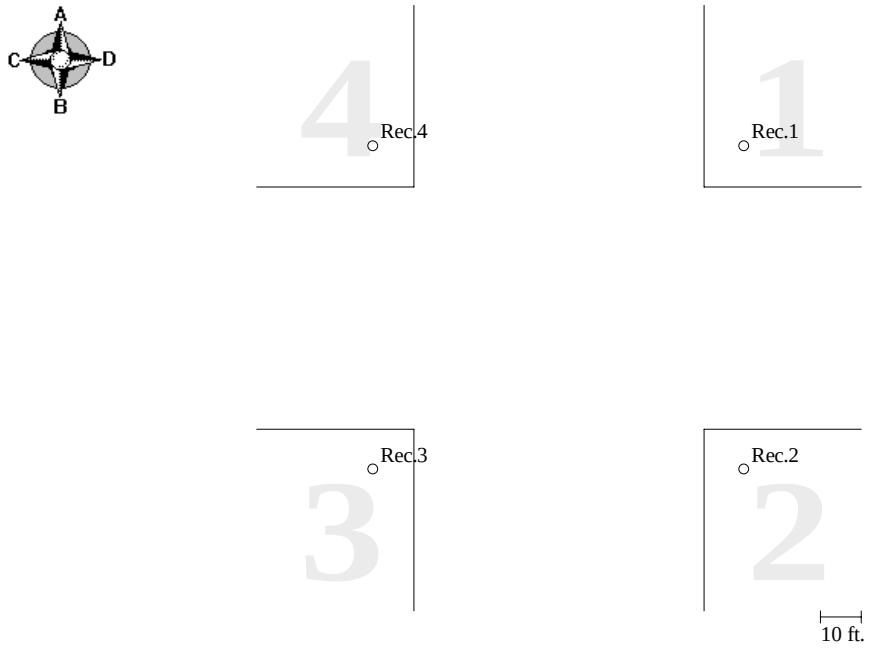
Description: **NE 4th Street and 112th Avenue BUILD 2030**

Performed by: **Melissa Livingston - consultant**

212.465.5166 - livingstonm@pbworld.com

Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns (2 Double Lt)**

Street Names: **A-B: 112th Avenue C-D: 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.1	4.5	Pass
2	2	10	10	5.6	4.8	Pass
3	3	10	10	5.8	5.0	Pass
4	4	10	10	5.6	4.8	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.

Largest modeled CO concentrations are at **receptor 3**.

- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

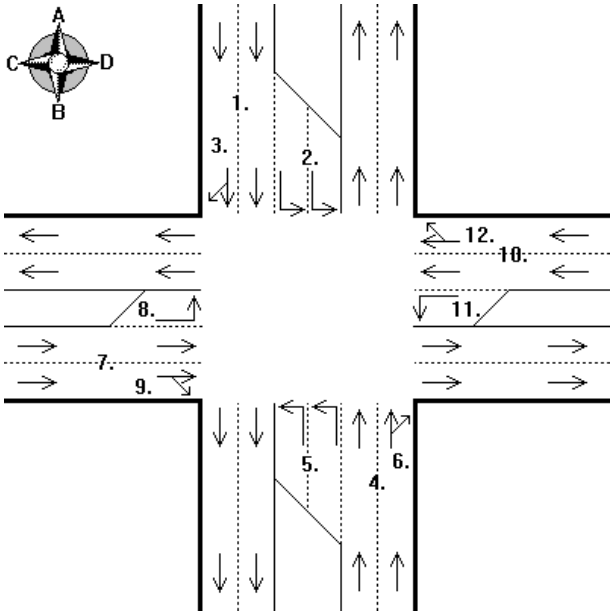
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	1185
2	A-D Left Turn	280
3	A-C Right Turn	30
4	B-A Thru	470
5	B-C Left Turn	40
6	B-D Right Turn	485
7	C-D Thru	1645
8	C-A Left Turn	30
9	C-B Right Turn	220
10	D-C Thru	1050
11	D-B Left Turn	3
12	D-A Right Turn	250



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2030**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **66.06**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.76
Leg B	15	7.76
Leg C	15	7.76
Leg D	15	7.76

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	80
Leg A Left Turn	125
Leg B Thru & Rt	86
Leg B Left Turn	131
Leg C Thru & Rt	75
Leg C Left Turn	131
Leg D Thru & Rt	84
Leg D Left Turn	20

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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Washington State Intersection Screening Tool 2.0

03-24-11

10:15 AM

NE 4th Street/120th Avenue

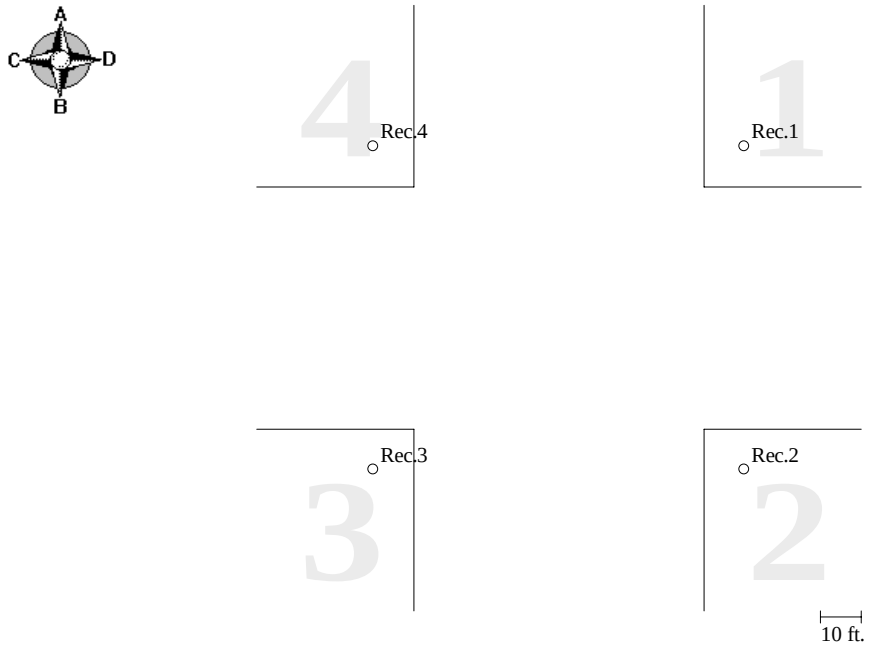
Description: **NE 4th Street and 112th Avenue BUILD 2040**

Performed by: **Melissa Livingston - consultant**

212.465.5166 - livingstonm@pbworld.com

Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns (2 Double Lt)**

Street Names: **A-B: 112th Avenue C-D: 4th Street**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	CO 1-hour avg. Conc. (ppm)	CO 8-hour avg. Conc. (ppm)	Pass/Fail*
1	1	10	10	5.2	4.5	Pass
2	2	10	10	5.6	4.8	Pass
3	3	10	10	5.7	4.9	Pass
4	4	10	10	5.6	4.8	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.

Largest modeled CO concentrations are at **receptor 3**.

- All CO concentrations include a background concentration of **3.0** ppm.
- 8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

COB File # 11-114971-LM

Washington State Intersection Screening Tool 2.0

USER INPUTS

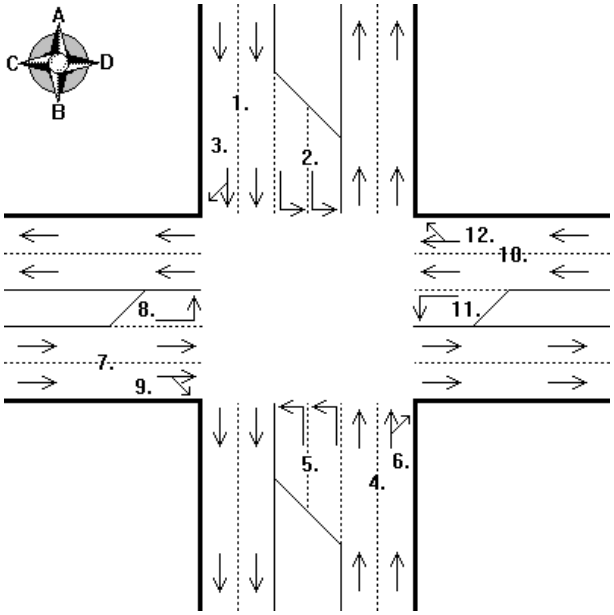
NE 4th Street/120th Avenue

Intersection Data:

Predominant Surroundings: **Central Business District**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	1255
2	A-D Left Turn	295
3	A-C Right Turn	30
4	B-A Thru	500
5	B-C Left Turn	40
6	B-D Right Turn	515
7	C-D Thru	1745
8	C-A Left Turn	30
9	C-B Right Turn	235
10	D-C Thru	1115
11	D-B Left Turn	3
12	D-A Right Turn	265



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Other**
I/M Program: **No**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **65.73**

Approach	Speed (mph)	EF (g/mile)
Leg A	15	7.72
Leg B	15	7.72
Leg C	15	7.72
Leg D	15	7.72

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	78
Leg A Left Turn	124
Leg B Thru & Rt	86
Leg B Left Turn	131
Leg C Thru & Rt	76
Leg C Left Turn	131
Leg D Thru & Rt	85
Leg D Left Turn	20

USER COMMENTS

NE 4th Street/120th Avenue

User Comments:

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NE 4th Street/120th Avenue NE Corridor Project

Alternatives Evaluation and Screening Technical Report

prepared for
City of Bellevue

prepared by
Parsons Brinckerhoff

June 29, 2011

COB File # 11-114971-LM

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Acronyms and Abbreviations

BNSF	Burlington Northern Santa Fe Railroad
City	City of Bellevue
I-405	Interstate 405
GMA	Washington State Growth Management Act
LOS	level of service
MMA	mobility management area
NEPA	National Environmental Policy Act
NE Bel-Red Road	NE Bellevue-Redmond Road
PSRC	Puget Sound Regional Council
Regional TIP	2010–2030 Regional Transportation Improvement Program
SEPA	Washington State Environmental Policy Act
SR	State Route
STIP	Statewide Transportation Improvement Program
WSDOT	Washington State Department of Transportation

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Executive Summary

The City of Bellevue proposes to make arterial street improvements to NE 4th Street and 120th Avenue NE, which together are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The corridor is located in an area about 1/4 mile east of downtown Bellevue. Planned and proposed growth and development in this part of the City over the coming decades is anticipated to be substantial and will require increased transportation facilities in the area to handle forecasted traffic demand and connect the area to the downtown core.

The purpose of this *Alternatives Evaluation and Screening Technical Report* is to document the decision-making process relating to the development of the proposed project. This report describes the project purpose and need, alternatives considered for the 1.65-mile corridor, as well as the screening methodology. Engineering concepts were prepared for the project alternatives, including several different configuration concepts for major intersections along the corridor. A wide variety of screening criteria were used to evaluate the alternatives. In the end, a preferred alternative was identified and selected for the project corridor.

Purpose and Need

The objective of the proposed project is to achieve the following:

- Support and accommodate the City's adopted land use plans and resulting forecasted travel demands.
- Improve access, mobility, and circulation for local traffic.
- Improve roadway safety by implementation of current engineering standards and design guidelines.
- Support non-motorized connections to planned transit facilities, specifically Sound Transit's East Link light rail project.

Land Use and Transportation Planning

The preferred alternative for the corridor improvements represents and reflects regional, state, and local plans and policies, including those adopted by the Puget Sound Regional Council, Washington State, and the City of Bellevue. These land use and transportation plans, as well as associated capital improvement programs and transportation improvement programs, are more fully described in Sections 2.3 and 2.4 of this report.

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Evaluation Methodology

The alternative analysis evaluated a range of potential design alternatives in order to arrive at a preferred alternative for recommendation to the City Council. This systematic approach began with the consideration of community and agency concerns, and included a review of the goals defined by the *Bellevue Comprehensive Plan*.

Corridor designs were developed that took into account several sensitive issues such as the potential for traffic spillover into the Wilburton neighborhood and water quality impacts to Lake Bellevue. Incremental input from staff, consultants and the community and decisions were made that narrowed the list of alternatives. Quantitative and qualitative evaluation criteria were then identified and used to analyze each alternative.

Selection of Preferred Alternative

At the conclusion of this extensive evaluation and screening of alternatives for the NE 4th Street/120th Avenue NE Corridor Project, a preferred alternative alignment was identified for the entire corridor. Section 6 describes the preferred alternative and Figure 6-1 through Figure 6-4 show the proposed alignment.

The alignment selected for the extension of NE 4th Street was a central alignment. The alignment results in a partial displacement and mitigation for a commercial building on the east end. The western alignment was selected for 120th Avenue NE between the NE 300 block and NE 700 block. The preferred alternative for 120th Avenue NE between NE 8th and NE 12th Streets was an eastern alignment. And a symmetrical alignment was identified as the preferred alternative along 120th Avenue NE between NE 12th Street and Northup Way. The new widened roadway cross-section would be five lanes for the extension of NE 4th Street and along 120th Avenue NE between the NE 300 block and about NE 18th Street. To the north, a four-lane cross-section was selected to accommodate reduced forecasted traffic volumes. However, right-of-way to accommodate a five-lane facility in the future was included in the alternative to allow for future expansion beyond year 2030. In general, the proposed corridor alignment provides needed transportation facilities, while minimizing adverse effects.

1.0 Proposed Project

The City of Bellevue proposes to make arterial street improvements to NE 4th Street and 120th Avenue NE in an area approximately 1/4 mile east of downtown Bellevue. The improvements along this corridor total approximately 1.65 miles and are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project study area is shown in Figure 1-1.

At the southern end of the project corridor, the arterial street project would extend NE 4th Street easterly about 0.27 mile from its current terminus at 116th Avenue NE to a new signalized intersection with 120th Avenue NE. On 120th Avenue NE, the roadway would be widened between the NE 300 block and the NE 700 block, a distance of about 0.24 mile. From about NE 8th Street to NE 12th Street, the 0.38-mile roadway would be realigned. In addition, between about NE 12th Street and Northup Way, 120th Avenue NE would be widened for a length of approximately 0.76 mile. Figure 1-1 shows these new and widened roadway sections. The new roadway would generally include four or five travel lanes, bicycle lanes, sidewalks, landscaping, retaining walls, underground conveyance systems, natural drainage practices, and illumination.

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Figure 1-1. Project Study Area

2.0 Project Objective

The proposed project is needed to improve long-term access, mobility, and capacity in the Wilburton/NE 8th Street and Bel-Red Subareas. These improvements are especially needed considering the anticipated substantial redevelopment of the area and the need to connect the area to the city's downtown core.

2.1 Purpose of this Report

The purpose of this *Alternatives Evaluation and Screening Technical Report* is to document the decision-making process relating to the development of the proposed project. This report describes the alternatives considered for the project as well as the screening methodology. The alternatives were evaluated based on a variety of factors, including the existing topography and land use, transportation operations, and engineering and environmental criteria. Based on the analysis, the City identified a preferred alternative for the NE 4th Street/ 120th Avenue NE Corridor Project. It is this preferred alternative that is analyzed for potential short-term construction effects, long-term operational effects, and indirect and cumulative effects in the separate technical reports prepared to support the NEPA and SEPA environmental review for the NE 4th Street/120th Avenue NE Corridor Project.

2.2 Project Purpose and Need

The objective of the proposed project is to achieve the following:

- Support and accommodate the City's adopted land use plans and resulting forecasted travel demands.
- Improve access, mobility, and circulation for local traffic.
- Improve roadway safety by implementation of current engineering standards and design guidelines.
- Support non-motorized connections to planned transit facilities, specifically Sound Transit's East Link light rail project.

The proposed project would enhance area-wide access and mobility and would add capacity to support the expected growth in travel demand in the corridor. It would provide critical missing links in the City's traffic distribution network, and it would ease congestion in other travel corridors. The project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to local and regional transit facilities identified in City plans (see Figure 2-1).

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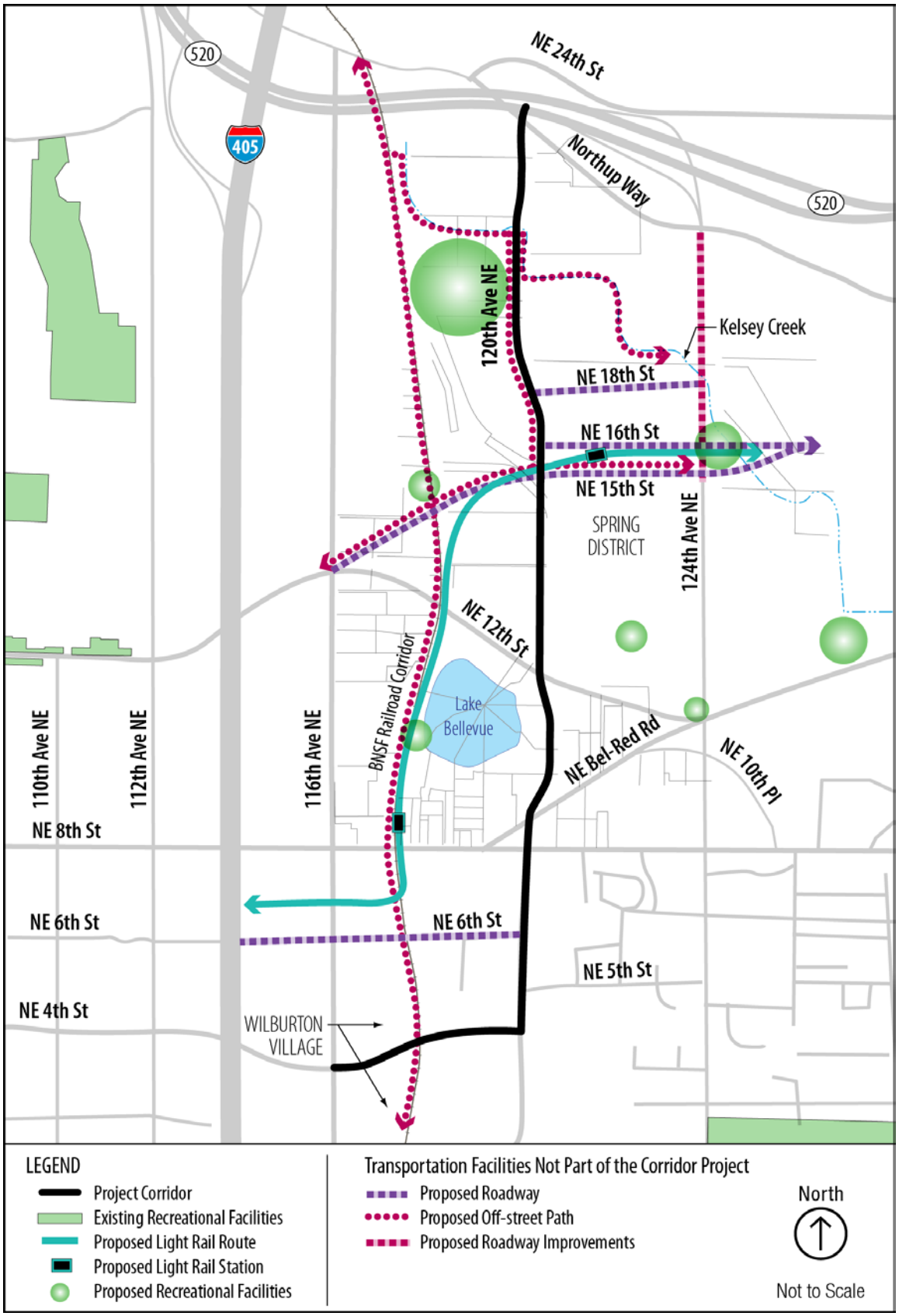

Figure 2-1. Planned Transportation Linkages in the Study Area

Specifically, the project would support multiple transportation linkages to the planned Sound Transit East Link light rail transit stations at NE 8th Street and about 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE. The project also would improve access to existing and planned local recreational facilities, residential, and commercial development.

As shown in the multiple traffic analyses (PB 2011g and Transpo 2010) conducted for NE 4th Street/120th Avenue NE, the corridor improvements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas—as well as the region in terms of travel mobility and access to neighborhoods and businesses. This would occur primarily as the result of new and enhanced connections across the BNSF corridor and reconfiguration of the 120th Avenue NE and NE 8th Street intersection. The proposed project also would provide expanded arterial street capacity and driveway consolidation along 120th Avenue NE, which would improve safety and traffic operations.

In addition, the termini for the project are logical because they bracket the extent of expected future development in the Wilburton/NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail and bus transit facilities.

2.3 Land Use Planning Context

The project encompasses and is adjacent to several subareas as defined in the *Bellevue Comprehensive Plan* (Bellevue 2010c) (see Figure 2-2). Existing and planned land uses adjacent to the project vary and are outlined below.

2.3.1 City of Bellevue Comprehensive Plan

The *Bellevue Comprehensive Plan* (Bellevue 2010c) is a broad statement of community goals and policies that directs the orderly and coordinated physical development of the City. It anticipates change and provides guidance for future legislative and administrative actions.

The *Bellevue Comprehensive Plan* serves as a guideline for designating land uses and infrastructure development, as well as development of community services. The objectives of the plan's policies are to achieve the following:

- Well-maintained, livable neighborhoods
- A healthy environment
- A vibrant urban center
- A strong, diverse local economy

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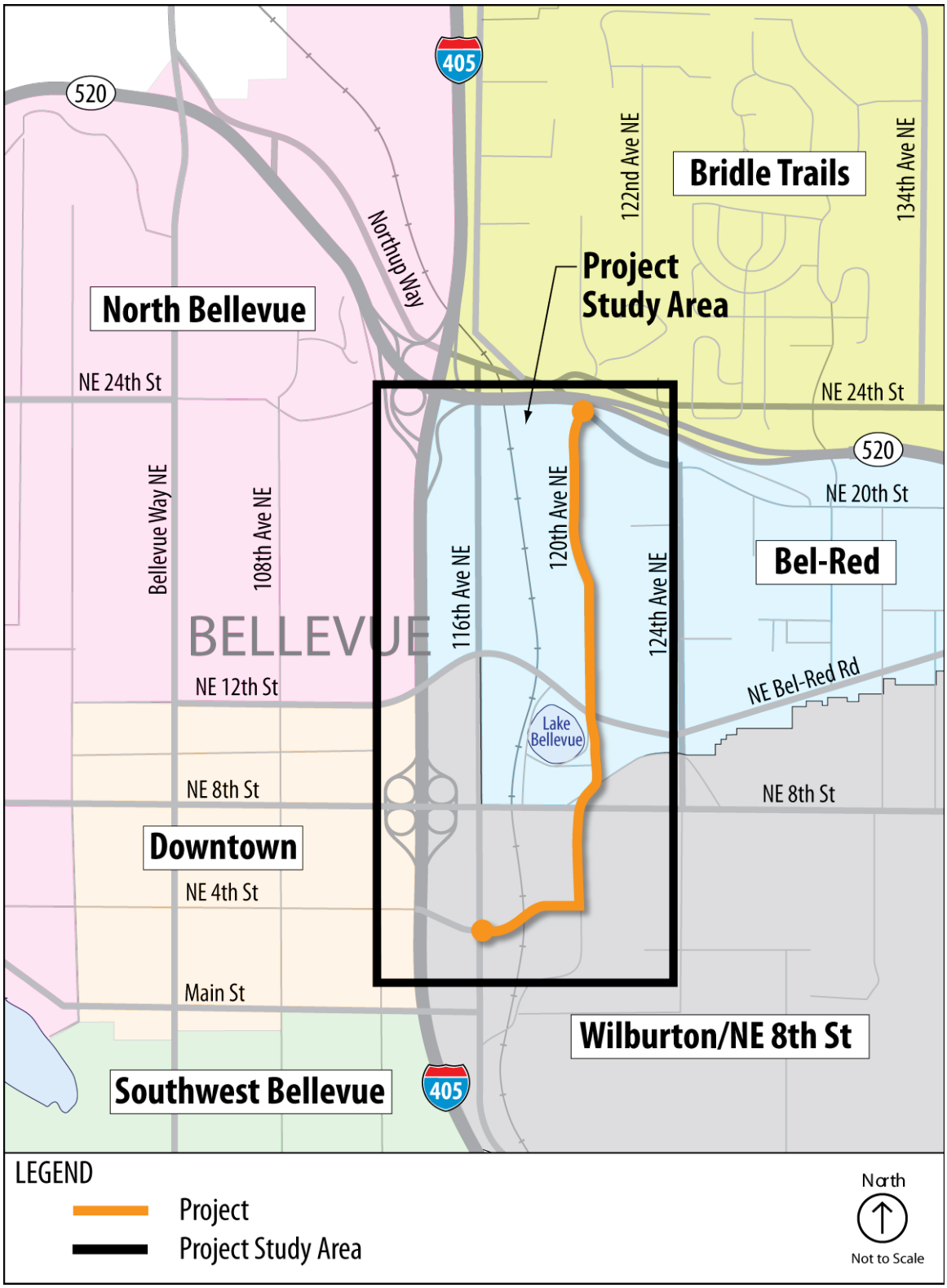

Figure 2-2. Project Corridor Subarea Planning Areas

The NE 4th Street/120th Street Corridor Project is consistent with the following policies:

- Policy TR-1—Integrate land use and transportation decisions to ensure that the transportation system supports the Comprehensive Plan Land Use vision.
- Policy TR-24—Incorporate pedestrian and bicycle facility improvements into roadway projects and incorporate transit/high-occupancy vehicle improvements where feasible.
- Policy TR-25—Provide for adequate roadway, pedestrian, and bicycle connections in newly developing and redeveloping areas of the city, promoting both internal access and linkages with the rest of the city.
- Policy TR-43—Provide sufficient arterial right-of-way width to permit landscaping and to accommodate pedestrian and bicycle facilities while considering neighborhood character and context.
- Policy LU-2—Support the State Growth Management Act (GMA) by developing and implementing a land use vision that is consistent with the GMA goals, the regional Vision 2020, and the King County Countywide Planning Policies.
- Policy LU-3—Accommodate growth targets of 10,117 additional households and 40,000 additional jobs for the 2001- 2022 period. These targets represent the City's commitment to develop the zoning and infrastructure to accommodate this level of growth. The City, however, is not making a commitment that the market will deliver these numbers.
- Policy LU-4—Encourage new residential development to achieve a substantial portion of the maximum density allowed on the net buildable acreage.

2.3.2 City's Transportation Element

The goal of the Transportation Element of the *Bellevue Comprehensive Plan* (Bellevue 2010c) is to maintain and enhance mobility of residents and businesses. The objective of this long-range plan is to create a balanced system of transportation alternatives that achieves the following:

- Provides a wide range of travel choices
- Supports the land use vision of the City
- Protects neighborhoods from adverse transportation effects
- Reflects the regional role of the city in transportation issues
- Reduces the overall dependency on automobiles throughout the City

The Transportation Element provides the policy vision for Bellevue's transportation system.

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2.3.3 Downtown Bellevue Subarea Plan

The City of Bellevue's *Downtown Bellevue Subarea Plan* (Bellevue 2010d) is important to this project because the Downtown Subarea is located immediately west of the project corridor and connected through the extension of NE 4th Street. The goal of the *Downtown Bellevue Subarea Plan* is as follows:

> *To remain competitive in the next generation, Downtown Bellevue must remain viable, livable, memorable, and accessible. It must become the symbolic as well as the functional heart of the Eastside Region through the continued location of cultural, entertainment, residential, and regional uses located in distinct mixed-use neighborhoods connected by a variety of unique public places and great public infrastructure.*

This subarea plan calls for the widening of the existing NE 4th Street overpass across I-405 with an additional eastbound lane. This is part of a vision to generally improve east-west transportation network connections between the Downtown Bellevue Subarea and the Wilburton/NE 8th Street Subarea in the vicinity of NE 4th Street, NE 6th Street, and NE 8th Street. As such, the planned extension of NE 4th Street that is part of the proposed NE 4th Street/120th Avenue NE Corridor Project would help to implement this vision.

2.3.4 Wilburton/NE 8th Street Subarea Plan

The southern portion of the project corridor is located within the Wilburton/ NE 8th Street Subarea. The subarea plan for this neighborhood includes the following goals:

- To separate residential, recreational, and open space areas from commercial areas and to protect open space.
- To improve pedestrian accessibility and attractiveness of commercial areas for residents of Bellevue.
- To support the provision of commercial services in Wilburton that complement Downtown, such as large retail and auto sales, that provide mixed-use opportunities and that provide convenient shopping for adjacent neighborhoods.

Policy S-WI-25 of the *Wilburton/NE 8th Street Subarea Plan* (Bellevue 2010d) addresses transportation needs for the subarea. Specifically this subarea plan states the following:

> *Improve local access, street system connectivity, and traffic flow by providing additional east-west transportation connections, including an arterial street connection at NE 4th Street between 116th and 120th Avenues NE.*

This proposal to extend NE 4th Street is incorporated into the NE 4th Street/120th Avenue NE Corridor Project.

2.3.5 Bel-Red Subarea Plan

The *Bel-Red Subarea Plan* (Bellevue 2010d) covers the northern portion of the project corridor between NE 8th Street and Northup Way. The goal of this subarea is as follows:

> *To develop a sustainable urban development pattern that dramatically reshapes the future of the Bel-Red Subarea, while allowing the area to transition from its past.*

Future development in the subarea is planned to be compact, mixed-use, smart-growth development that would be economically and environmentally sustainable. The substantial redevelopment of the existing industrial and commercial uses would be at higher densities that would not compete with Downtown Bellevue, and yet would be sensitive to adjacent single-family residential land uses. In total, up to 5,000 dwelling units and 4.5 million square feet of commercial space is planned for the subarea in the next two decades.

Regarding transportation improvements, this subarea plan specifically calls for the widening of 120th Avenue NE to a five-lane arterial between NE 8th Street and Northup Way. These improvements are incorporated into the NE 4th Street/ 120th Avenue NE Corridor Project.

2.3.6 Planned Private and Public Land Use Development

Figure 2-1 shows private and public land development projects in the study area. The reasonably foreseeable private development projects in the area include the following:

- As part of the adopted Wilburton/NE 8th Street Subarea Plan (Bellevue 2010d), several policies address private development including Policy S-WI-3 which supports the long term development of a "retail village" in the commercial area on the west side of 120th Avenue to provide a transition from more intense commercial areas to the west and the residential area to the east.
- Spring District—Wright Runstad & Company, in joint venture with Shorenstein Properties, LLC, plans development of the Spring District, a 36-acre mixed-use urban neighborhood within the Bel-Red Corridor. The Spring District will include up to 1,000 multi-family residences, over 3 million square feet of office space, and several multi-story buildings that will provide retail services. The proposed development will be located at the northeast corner of 120th Avenue NE and NE 12th Street.

Planned transportation projects in the project corridor include the following:

- Sound Transit's East Link Project—This project consists of an electric light rail train system that will connect areas between Seattle and the Overlake Transit Center in Redmond. It is anticipated that the system will have a station in the BNSF corridor just north of NE 8th Street (Hospital Station) and between NE 15th Street and NE 16th Street just east of 120th

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Avenue NE (Spring District Station). The light rail line is expected to be completed between 2016 and 2021.

- NE 6th Street Extension Project – This project will extend the existing transit and carpool ramp, which is accessible to and from Interstate 405 in both directions, eastward from the middle of the freeway. The new road would extend above the northbound lanes of Interstate 405 and 116th Avenue NE to a new signalized intersection at 120th Avenue NE. This project, however, is not included in any legislative funding package and funding is not secured yet for this project for which WSDOT will be the lead agency.
- NE 15th/NE 16th Streets Corridor—The planned NE 15th Street and NE 16th Street will be constructed eastward from NE 12th Street. Sound Transit's East Link Project will be located between these two streets between 120th Avenue NE and 124th Avenue NE and in the median of NE 16th Street east of 124th Avenue NE.
- NE 18th Street Corridor—NE 18th Street is a new street proposed to extend between 120th Avenue NE and 124th Avenue NE.
- 124th Avenue NE Improvements—124th Avenue NE will be improved to support proposed developments in the Bel-Red Subarea. The anticipated traffic flow pattern from Downtown to eastbound State Route (SR) 520 is expected to be along NE 4th Street to 120th Avenue NE, north on 120th Avenue NE to the NE 15th/NE 16th Street corridor, east on NE 15th Street to 124th Avenue NE, and then north on 124th Avenue NE to the interchange with SR 520.

Figure 2-1 also shows reasonably foreseeable community amenities planned for the study area, including the following planned open space and park projects:

- Community Park (17 acres)—A community park is planned along the West Tributary of Kelsey Creek adjacent to 120th Avenue NE. It would incorporate the trailhead and trail system along the West Tributary of Kelsey Creek and the BNSF corridor with community park facilities. Ten acres would be purchased for community park facilities, and 7 acres of open space would be dedicated by an adjacent land owner.
- Neighborhood Park (7 acres)—A neighborhood park is planned along the West Tributary of Kelsey Creek, adjacent to NE 16th Street. This park would integrate major trail systems and regional stormwater detention with neighborhood park facilities. It would include 1 acre of property that would be a remnant from property acquisition associated with a transportation project.
- Neighborhood Park (4 acres)—A neighborhood park is planned along the West Tributary of Kelsey Creek, adjacent to NE Bel-Red Road (also known as Old Bel-Red Road). This park would integrate major trail and

neighborhood park facilities. It would include 3 acres of neighborhood park and a 1-acre riparian corridor.

- Gateway Park (1 acre)—A gateway park is planned near the intersection of 120th Avenue NE and NE Bel-Red Road. This park would integrate mini park facilities and a potential art component near a major road intersection and serve as a gateway to the Bel-Red Corridor.
- Mini Park (1 acre)—A mini park is planned to be located between 120th Avenue NE and 124th Avenue NE, south of the NE 15th/NE 16th Streets corridor. This mini park would provide park facilities to serve residential and commercial mixed-use development.
- Trailhead (1 acre)—A trailhead is planned adjacent to the BNSF corridor at Lake Bellevue. This facility would integrate a trailhead with mini park facilities at the BNSF corridor regional trail and Lake Bellevue.
- Trailhead (1 acre)—A trailhead is planned to be located at the BNSF corridor regional trail and NE 15th/NE 16th Streets corridor. This facility would integrate a trailhead with mini park facilities at the crossing of the two major multi-purpose trails.

2.4 Transportation Planning Context

The following sections describe the planned and programmed transportation improvements in the study area.

2.4.1 Puget Sound Regional Council Regional Transportation Plan

The Puget Sound Regional Council regional transportation plan, known as *Transportation 2040* (PSRC 2010), includes the NE 4th Street extension and full 120th Avenue NE corridor. These projects are contained within the financially constrained portion of the implementation plan. The corridor is identified in the plan by numbers 4264 and 4523, highlighted as part of the East Side SMART Corridors within Appendix B, and detailed project descriptions in Appendix M of the regional transportation plan. The NE 4th Street/120th Avenue NE Corridor Project was included as a regionally significant project because it aligns with the following multi-county policies:

- MPP-DO-43—Design communities to provide an improved environment for walking and bicycling.
- MPP-T-1—Maintain and operate transportation systems to provide safe, efficient, and reliable movement of people, goods, and services.
- MPP-T-12—Give regional funding priority to transportation improvements that serve regional growth centers and regional manufacturing and industrial centers.
- MPP-T-15—Improve local street patterns—including their design and how they are used—for walking, bicycling, and transit use to enhance communities, connectivity, and physical activity.

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- MPP-T-16—Promote and incorporate bicycle and pedestrian travel as important modes of transportation by providing facilities and reliable connections.

2.4.2 City's Transportation Facilities Plan

The City's *Transportation Facilities Plan* (Bellevue 2009a) is an intermediate plan that covers the foreseeable 12-year period, from 2009 to 2020. It identifies high-priority long-range projects and outlines projected funding and financing for these projects. The need for transportation projects is outlined for 14 separate mobility management areas (MMA).

The NE 4th Street/120th Avenue NE Corridor Project is covered by two MMAs. The proposed extension of NE 4th Street and the widening of 120th Avenue NE between the NE 300 block and the NE 700 block are located in MMA #4. These capacity improvements are identified as TFP-207, which is described as follows:

> *The NE 4th Street Extension will consist of 5 vehicle lanes, bike lanes, and sidewalks and will require construction of a sunken roadway and bridge(s) for BNSF RR tracks and pedestrian over-crossings. Neighborhood traffic mitigation will be evaluated to discourage cut-through traffic on NE 5th Street east of 120th. 120th Avenue NE will be widened to 5 lanes with bike lanes between the NE 4th Street Extension and NE 8th Street. This project does not include improvement to the intersection with NE 8th Street. This project will be coordinated with potential private development in the immediate vicinity.*

The realignment of 120th Avenue NE between NE 8th Street and NE 12th Street and the widening of 120th Avenue NE north from NE 12th Street to Northup Way are found in MMA #12. These capacity improvements are identified as TFP-208, which is described as follows:

> *Widen to five lanes with sidewalks and bike lanes. Extend/realign roadway between NE 8th Street and Old Bel-Red Road. Key intersection improvements at NE 8th Street, NE 12th Street, the proposed NE 15th/16th Street, and Northup Way.*

Based on City roadway standards, the five-lane cross-section for the proposed improvements is shown in Figure 2-3.

2.4.3 The City of Bellevue 2011–2016 Transportation Improvement Program

The NE 4th Street/120th Avenue NE Corridor Project is listed in the City of Bellevue *2011-2016 Transportation Improvement Program* (Bellevue 2010a). The extension of NE 4th Street is listed as TIP #12, and the improvements for 120th Avenue NE are listed as TIP #13 and TIP #16.

2.4.4 Mobility and Infrastructure Initiative and Finance Plan

The Mobility and Infrastructure Initiative identifies a group of capital projects in the downtown, west Wilburton, and Bel-Red areas that respond to increased

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travel spurred by downtown development. Some of the projects also provide early investments in the Bel-Red area where substantial new growth is planned in conjunction with the future East Link light rail line.

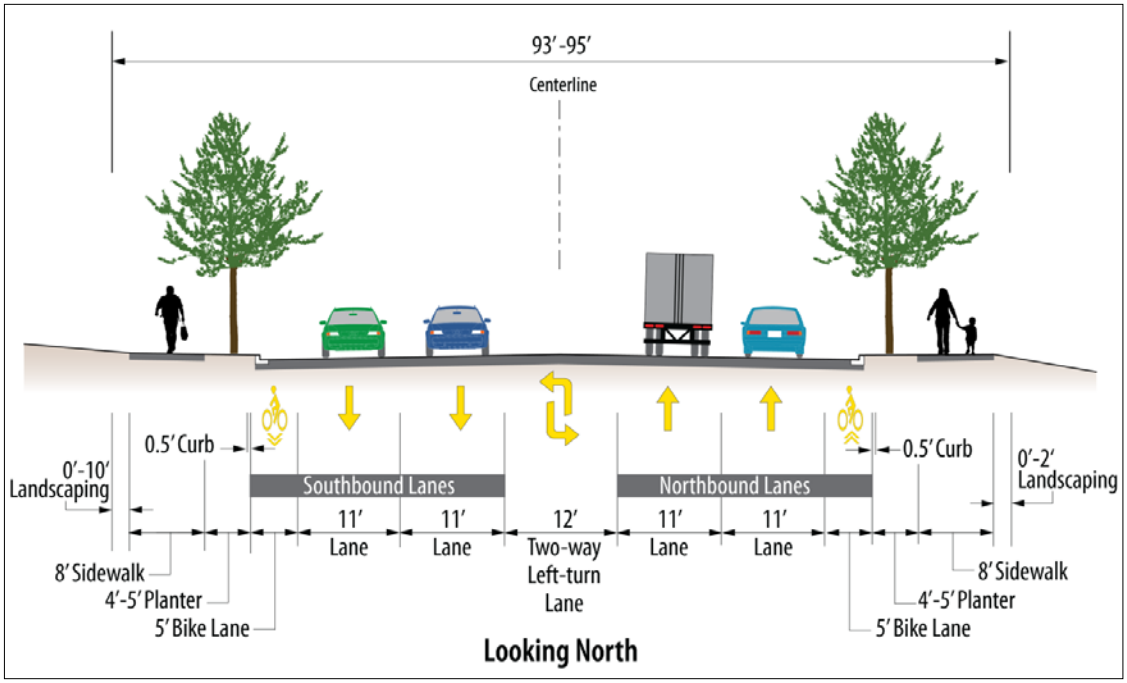

Figure 2-3. Proposed Five-lane Roadway Design

The specific transportation improvements include the following:

- NE 4th Street extension from 116th Avenue NE to 120th Avenue NE and improvements to 120th Avenue NE (including realignment of the 120th Avenue NE/NE 8th Street intersection)
- NE 6th Street extension from I-405 to 120th Avenue NE
- 120th Avenue NE widening from NE 10th Street to Northup Way
- NE 15th Street extension from 116th Avenue NE to 124th Avenue NE
- 124th Avenue NE widening from NE 15th Street to the SR 520 interchange

On January 20, 2009, the Bellevue City Council signed Resolution #7874 supporting the Mobility and Infrastructure Initiative Finance Plan (Bellevue 2009a). This plan specifically outlined financing for transportation improvements in the Wilburton/NE 8th Street and Bel-Red Subareas.

This financial plan coordinates and schedules the planned transportation improvements in the two subarea plans and the Transportation Facilities Plan (Bellevue 2009a). In addition, it presents a specific financing plan to effectively implement the transportation improvements, including those in the NE 4th Street/120th Avenue NE Corridor Project.

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2.5 City's Programmed Corridor Improvements

The subsections below summarize the state, regional, and local transportation improvement programs that address the NE 4th Street/120th Avenue NE Corridor Project.

2.5.1 Washington Statewide Transportation Improvement Program

The *Washington Statewide Transportation Improvement Program* (STIP) (WSDOT 2009) is comprised of federally funded state and local roadway projects that have been identified through planning and designated as high priority. The project corridor is listed on the 2009-2010 STIP and is noted as having regional significance.

2.5.2 Puget Sound Regional Transportation Improvement Program

The Puget Sound Regional Council's *2010-2013 Regional Transportation Improvement Program* (Regional TIP) (PSRC 2011) specifically lists the proposed project. Appendix A in the Regional TIP describes the proposed project as being comprised of two separately listed projects as described below.

- NE 4th Street Extension (116th to 120th Avenues NE) (BELL-61)—Construct a new four-to-five-lane roadway with arterial standard curb, gutter, sidewalk (including planting strips), and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension would be designed to accommodate future development and uses of the BNSF corridor.
- 120th Avenue NE Corridor (NE 4th Street to Northup Way) (BELL-56)
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected sections; install continuous sidewalks to arterial standards; realign the roadway between NE Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, NE 15th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project would be constructed in phases.

2.5.3 The City of Bellevue 2011-2017 Capital Investment Program Plan

The proposed project is included in the City's adopted *2011-2017 Capital Investment Program Plan* (Bellevue 2010b). This capital expenditure program is a seven-year plan of capital improvements approved by the City Council on a biennial basis. The extension of NE 4th Street is listed as PW-R-160, and the improvements for 120th Avenue NE are listed as PW-R-161 and PW-R-164.

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3.0 Existing Corridor

This section describes the existing conditions and constraints that have the potential to influence the development of alternatives and contains information on current alignments, intersections, traffic control and existing known environmental, topographic, geological and design constraints. Figures 3-1 through Figure 3-4 at the end of this section illustrate the conditions along the proposed corridor.

As previously described, the project corridor begins at the eastern terminus of the existing, signalized, three legged intersection of NE 4th Street and 116th Avenue NE, heads east 1300 feet towards 120th Avenue NE, then north along 120th Avenue 7100 feet to a terminus at the intersection of 120th Avenue NE and Northup Way. Because the existing conditions and constraints vary depending on the location within the corridor, each unique environment is presented below using common landmarks to define its limits.

3.1 NE 4th Street Extension - 116th Avenue NE to the BNSF Corridor

- The proposed extension would require new right-of-way to be acquired on private property.
- Existing older buildings at about the same elevation as and fronting 116th Avenue NE used to operate as automobile dealerships, and most of the property is paved for display of automobiles. The property was purchased by private developers for future commercial development and is currently vacant. The property sits about 10 feet higher than 116th Avenue NE and then is relatively flat toward its easterly edge.

3.2 BNSF Corridor

- The new roadway extension must cross an inactive railway right-of-way (BNSF corridor) that is currently owned by the Port of Seattle (along with easement rights by other public entities). The right-of-way has been proposed to be potentially used for train, bicycle and pedestrian uses in the future.
- The existing BNSF corridor is approximately 40 feet higher than the properties to the west, making it challenging to not only cross, but also provide potential future access to adjacent redevelopment.
- Centered in an easement occupying the west 20 feet of the BNSF corridor is an existing, shallowly buried 72-inch sanitary sewer line (King County Wastewater Eastside Interceptor).

3.3 NE 4th Street Extension - BNSF Corridor to 120th Avenue NE

- East of the BNSF corridor to 120th Avenue NE is relatively flat.

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- East of the BNSF corridor existing land uses include a builder's supply business, Mutual Materials, which includes several older out-buildings and display/storage space; Bellevue School District property used for school bus parking; a 47,000 square foot retail store (Best Buy) with surface parking; and a 106,000 square foot building supply store (Home Depot) with surface parking. All the properties are owner-occupied, with the exception of Best Buy, which leases the property.
- Best Buy and Home Depot have a reciprocal parking agreement that would be affected by any alignment between the two properties.
- A large buried stormwater detention vault (approximately 40 feet wide by 90 feet long by 15 feet deep) serving Home Depot and Best Buy is located in the parking area between the existing buildings. This vault is privately owned and maintained.

3.4 120th Avenue NE and NE 4th Street Intersection

- The future intersection of NE 4th Street at 120th Avenue NE, created by the extension of NE 4th Street, would be signalized. The new alignment of 120th Avenue NE will need to match this new intersection.
- Frequent freight deliveries to commercial businesses along 120th Avenue NE need to be taken into consideration in design of turning radii.

3.5 120th Avenue NE – 400 block to 700 block

- The existing roadway provides one lane in each direction with a two-way left turn lane from approximately the 300 block to the 500 block. There are two northbound and one southbound lane between the 500 block and the 700 block.
- The intersection of 120th Avenue NE at NE 5th Street is currently a three-legged, unsignalized intersection (no west leg) with stop control on the east leg. NE 5th serves several commercial properties, a multi-family property, and the Wilburton residential neighborhood.
- During very early community outreach through several planning efforts, the need to reduce traffic cutting through the residential neighborhood was identified.
- The existing roadway grade of 120th Avenue NE along this portion of the corridor is essentially level, with only a slight down grade from south to north.
- Land use adjacent to 120th Avenue NE is primarily commercial, with multiple driveways providing access to developed commercial and retail businesses.
- The topography of properties on the west side of 120th Avenue NE is largely level with the existing roadway. In contrast, the existing properties

to the east of the roadway sit up to 10 feet above 120th Avenue NE. Driveways to these properties range from approximately 8% to 13%. Access to all existing businesses and properties would need to be maintained with the corridor widening.

- Widening 120th Avenue NE between the NE 300 block and NE 700 block would require modest acquisition of right-of-way. Additionally, some frontage impacts to public properties and commercial properties fronting the roadway would occur.

3.6 120th Avenue NE and NE 8th Street Intersection

- The existing intersection of 120th Avenue NE at NE 8th Street is currently a three-legged signalized intersection (no north leg) that operates in tandem with the adjacent offset intersection to the west.
- 120th Avenue NE would need to be extended to cross over NE 8th Street and continue north to NE 12th Street
- The new roadway alignment would cross several private properties, with potential hazardous material contamination in this area (S&W 2009a and 2011a).

3.7 120th Avenue NE and NE Bel-Red Road Intersection

- There is approximately a 10-12 foot grade difference between the intersection of NE 8th Street and the intersection of NE Bel-Red Road, with grade changes east and west of any new proposed roadway alignment.
- The existing intersection of 120th Avenue NE at NE Bel-Red Road is a three-legged, unsignalized intersection (no south leg) with stop control on the north leg.
- In order to match the proposed extension of 120th Avenue NE (north of NE 8th Street), the intersection of 120th Avenue NE and NE Bel-Red Road (to the east) would need to be relocated, and realigned
- Due to the extension of 120th Avenue NE and the realignment of NE Bel-Red Road, NE Bel-Red Road to the west would be vacated.

3.8 120th Avenue NE – 900 block to 1200 block

- North of NE Bel-Red Road, 120th Avenue NE is a two-lane roadway, with one lane in each direction.
- It is anticipated at least one full parcel acquisition north of NE Bel-Red Road will be required due to the extent of the proposed widening.
- Existing commercial offices and retail businesses are located on either side of the 120th Avenue NE alignment between the intersections of NE Bel-Red Road and NE 12th Street. Access would need to be maintained to

adjacent properties; however, potential access management may be necessary due to the closely spaced signals and driveways.

- Moderate slopes exist on both sides of the roadway.
- Soil conditions and the effects on water quality are a concern, especially in the vicinity of Lake Bellevue. Substantial poor soils (peat) are present east of 120th Avenue NE, near Lake Bellevue, and could contain archeological resources (NWAA 2011).

3.9 120th Avenue NE and NE 12th Street Intersection

- The existing intersection of 120th Avenue NE at NE 12th Street is a four-legged, signalized intersection.
- This intersection has a pronounced skew that adversely affects existing traffic operations.

3.10 120th Avenue NE – 1200 block to 1800 block

- Between the 1200 block and the 1800 block 120th Avenue NE is a two-lane roadway.
- There are numerous driveways to commercial and industrial business along 120th Avenue, but there are no intersections.
- Design of the 120th Avenue NE corridor would require coordination with the new NE 15th/NE 16th Streets corridor, the regional pedestrian and bicycle trail system (north of NE 15th Street), access to the Spring District Development (NE 18th Street), and Sound Transit's East Link light rail transit project.
- The proposed project must be designed to accommodate significant profile elevation changes over a short distance (approximately a 6 percent grade) in order to meet the needs of other planned public and private projects.
- There are grade differences ranging from 20 feet below to 30 feet above between the existing roadway and adjacent properties along both sides of 120th Avenue NE.
- Wetlands are located along the eastern edge of the existing roadway and a major stream crossing exists at the north end (S&W 2011b).
- Existing commercial buildings are located on either side of the existing right-of-way.

3.11 120th Avenue NE and 15th/16th Street Intersection

- A proposed intersection will need to be coordinated with the new 15th/16th Street Corridor, Sound Transit's proposed East Link light rail, and a proposed regional pedestrian and bicycle trail system.

- There are many design constraints in coordinating grades between each of the proposed future elements noted above.

3.12 120th Avenue NE – 1800 block to Northup Way

- Between the 1800 block and Northup Way, 120th Avenue NE is a two-lane roadway.
- Traffic modeling indicates that travel demand could be accommodated by a four lane cross section instead of the five lane vision in the subarea plans. There are several driveways to commercial and industrial business.
- The existing roadway the grade is relatively level.
- There are grade differences ranging from 10 feet below to 10 feet above between the existing roadway and adjacent properties along both sides of 120th Avenue NE.
- Wetlands are located along the both sides of the existing roadway and a major stream crossing exists at the north end (S&W 2011b).
- Existing commercial buildings are located on either side of the existing right-of-way at the northern end of the corridor.

3.13 120th Avenue NE and Northup Way Intersection

- This intersection is a three-legged, signalized intersection (no north leg).
- The existing pavement at this intersection is five lanes wide but is channelized for four lanes, two lanes southbound, one left turn lane and one right turn lane. One lane between the left turn lane and the southbound lanes is available for a second left turn lane, but is currently striped for non-use.

As described in the next section, the evaluation methodology used to refine and ultimately select a preferred alternative for the corridor considered and balanced the impacts of these conditions and constraints across multiple proposed alignments.

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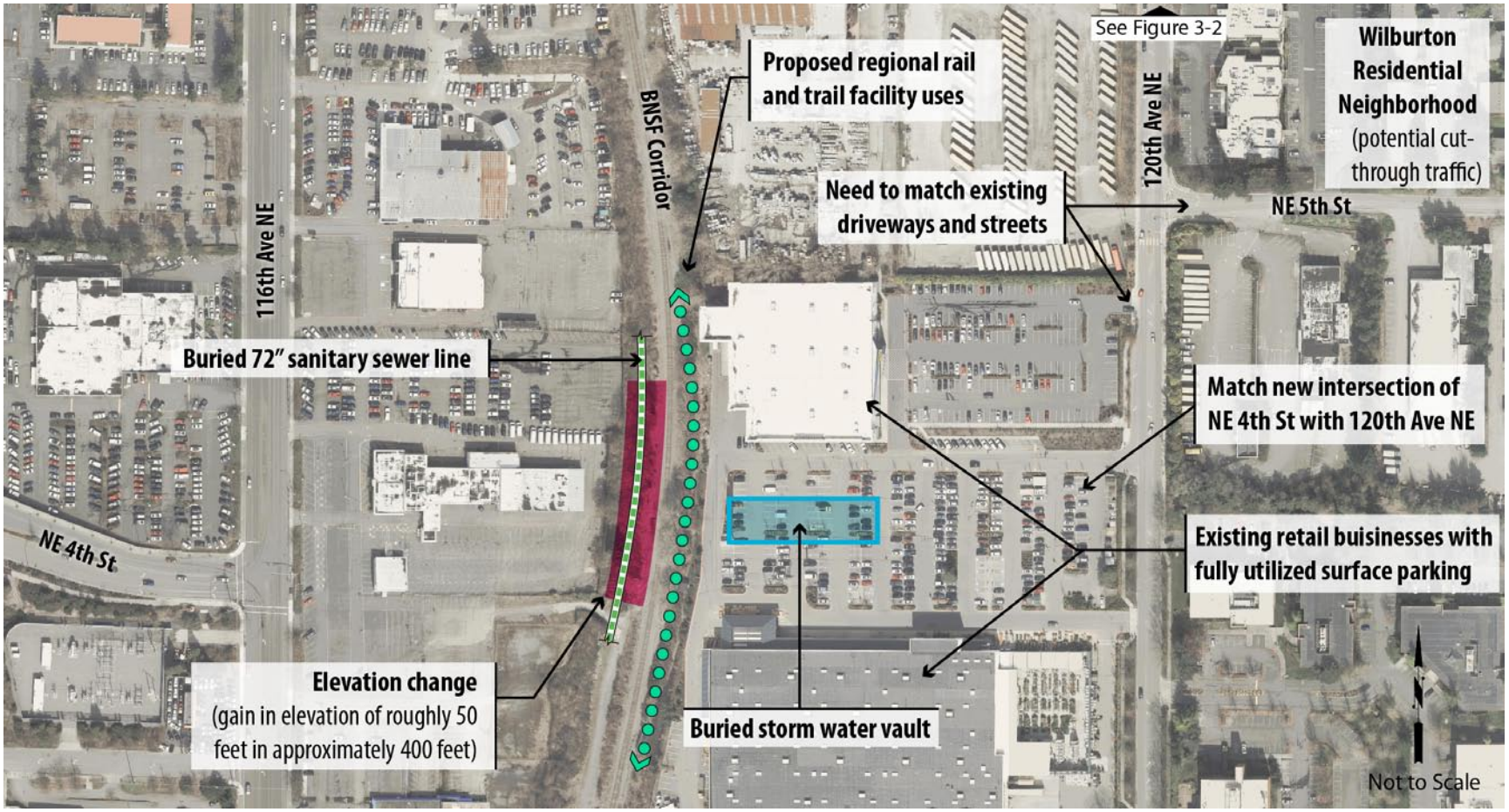

Figure 3-1. NE 4th Street/120th Avenue NE Corridor Project: Existing Constraints (Stage 1 and Stage 2)

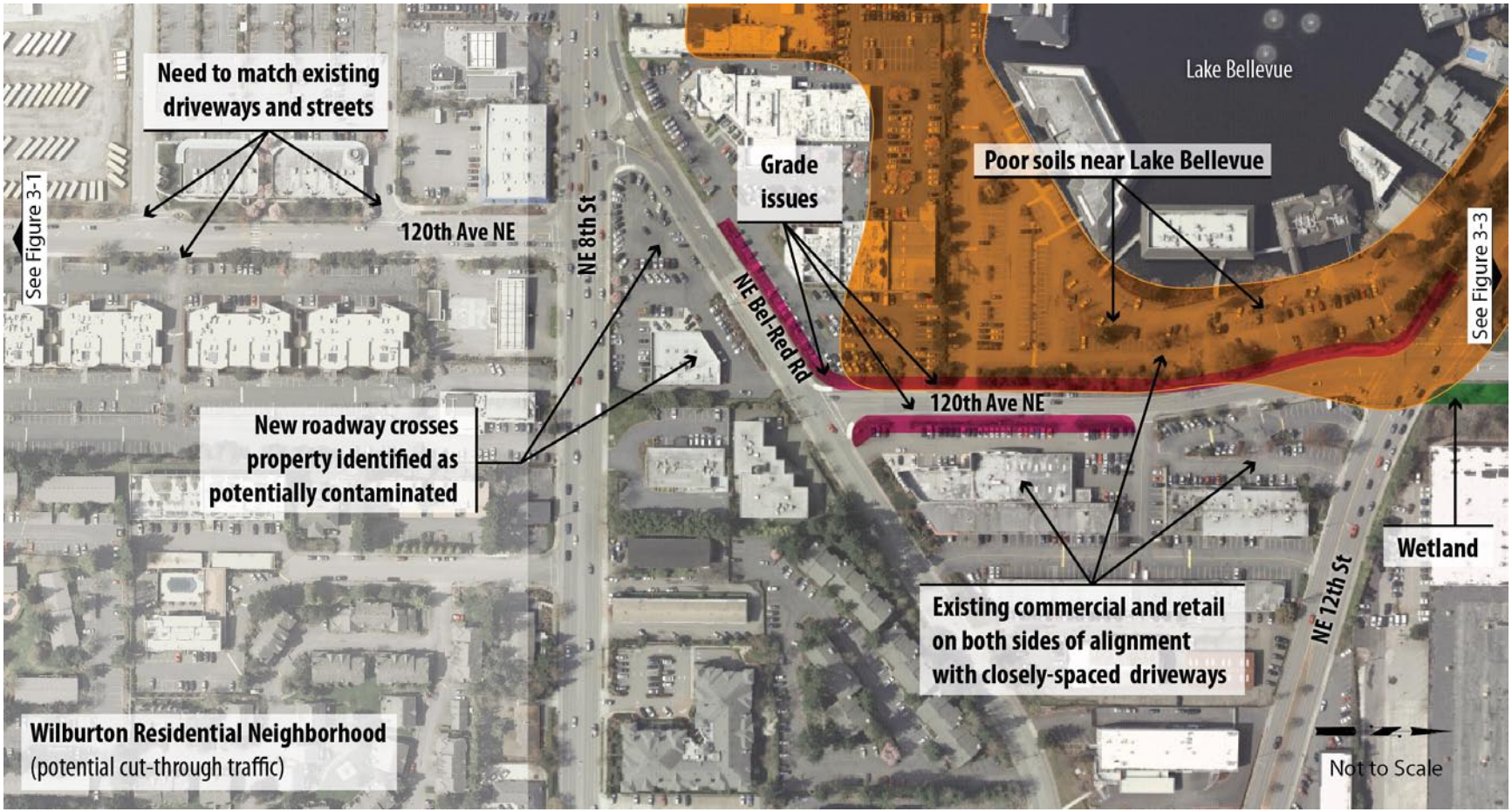

Figure 3-2. NE 4th Street/120th Avenue NE Corridor Project: Existing Constraints (Stage 2 and Stage 3)

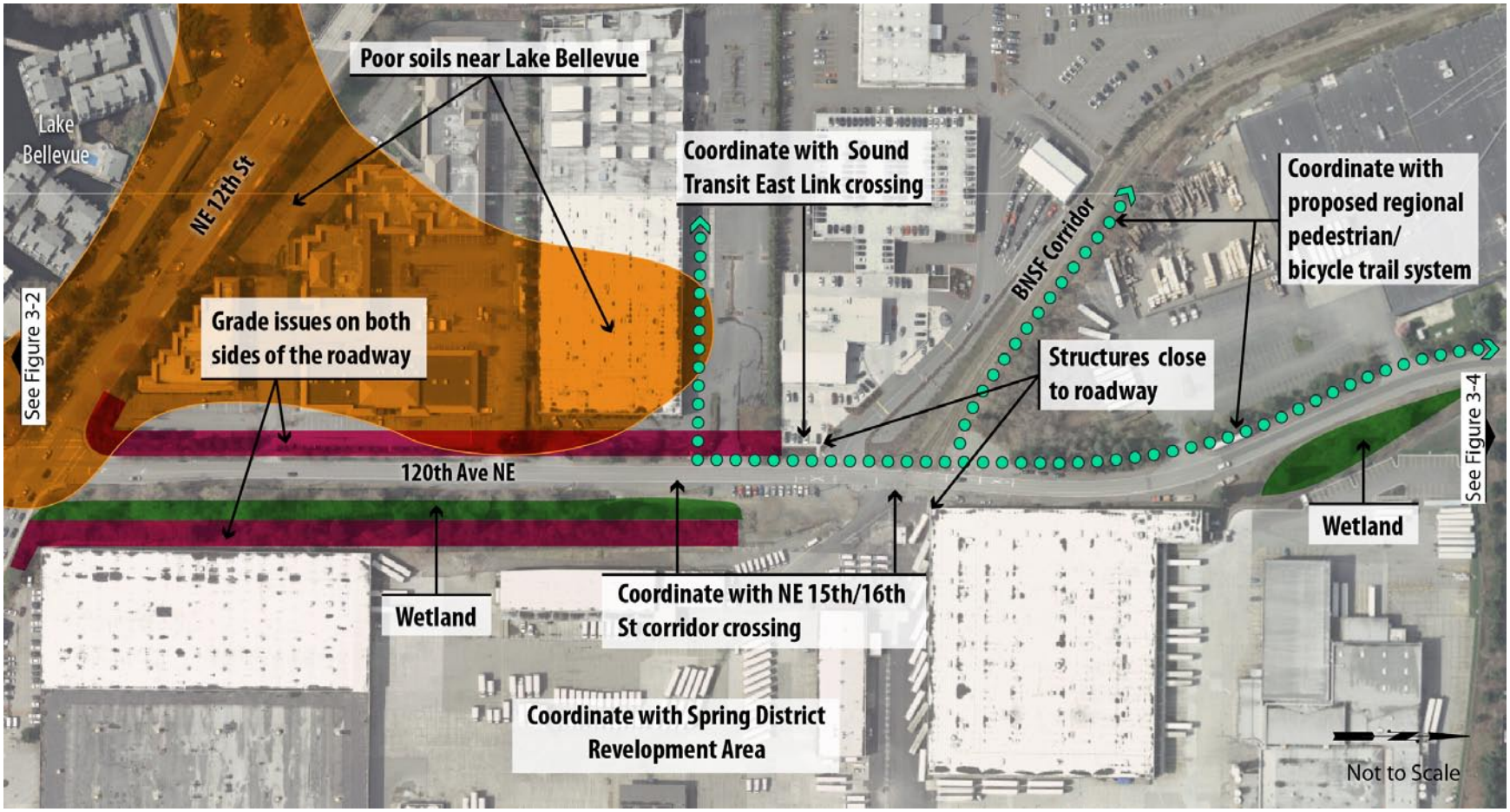

Figure 3-3. NE 4th Street/120th Avenue NE Corridor Project: Existing Constraints (Stage 4 South)

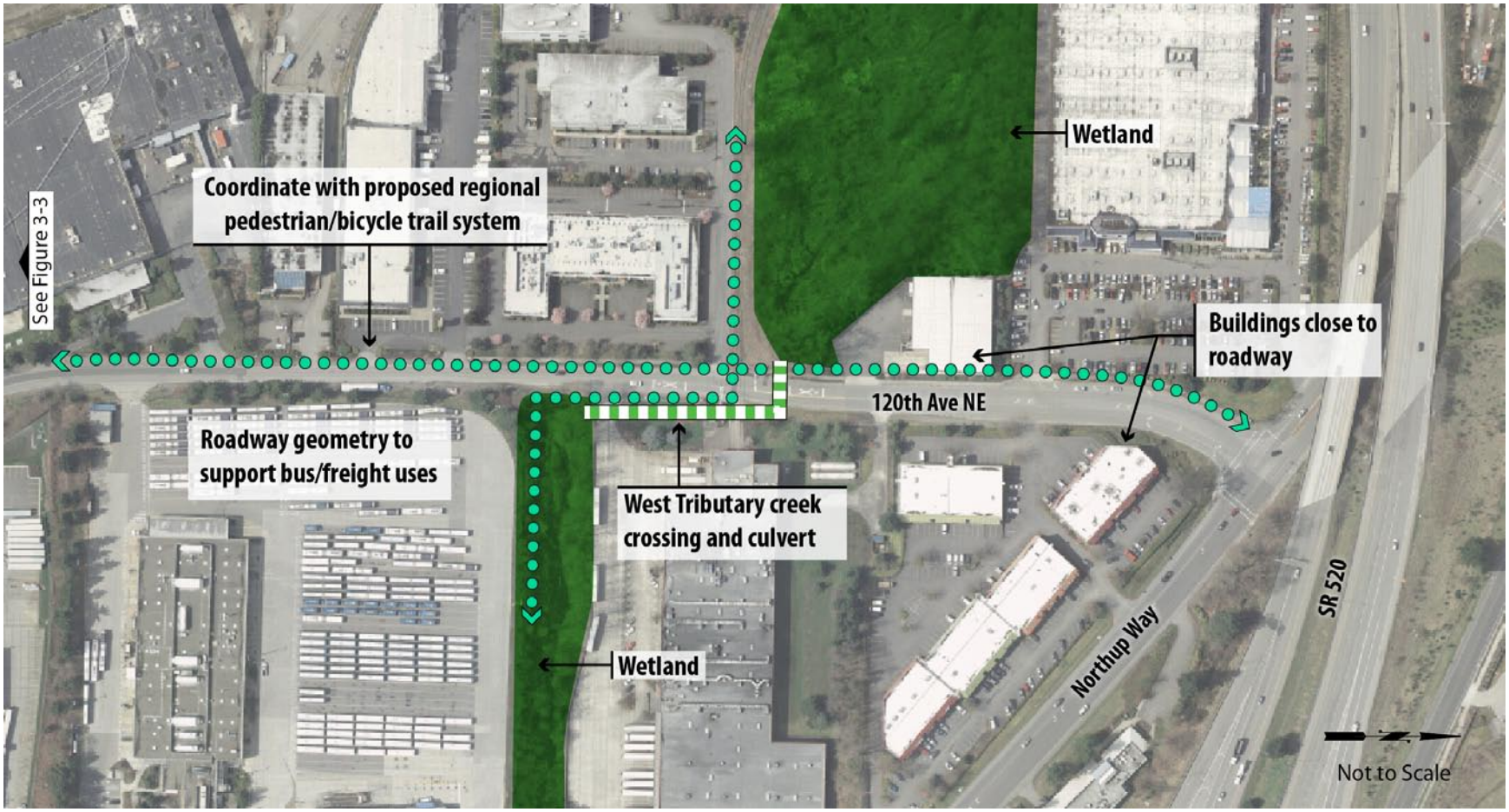

Figure 3-4. NE 4th Street/120th Avenue NE Corridor Project: Existing Constraints (Stage 4 North)

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4.0 Evaluation Methodology

4.1 Alternative Analysis

4.1.1 General Overview

The alternative analysis represents the next step in implementing the City's Comprehensive Plan and the Wilburton and Bel-Red Subarea Plans. The Wilburton/NE 8th and Bel-Red Subarea Plans were adopted into the *Bellevue Comprehensive Plan* in 2008 and 2009, respectively; and identify future land uses along the corridor, project concepts to support anticipated growth, and general urban design guidelines. The evaluation of alternatives required a collaborative and "context-sensitive" approach involving both community and agency input due to the multitude of design options and issues. Figure 4-1 schematically illustrates the overall process. City staff and consultants wore multiple hats during this process, acting as educators, facilitators and designers. As a result, engineers were challenged to think not only of technical design considerations, but also community values such as protection of neighborhoods from traffic impacts.

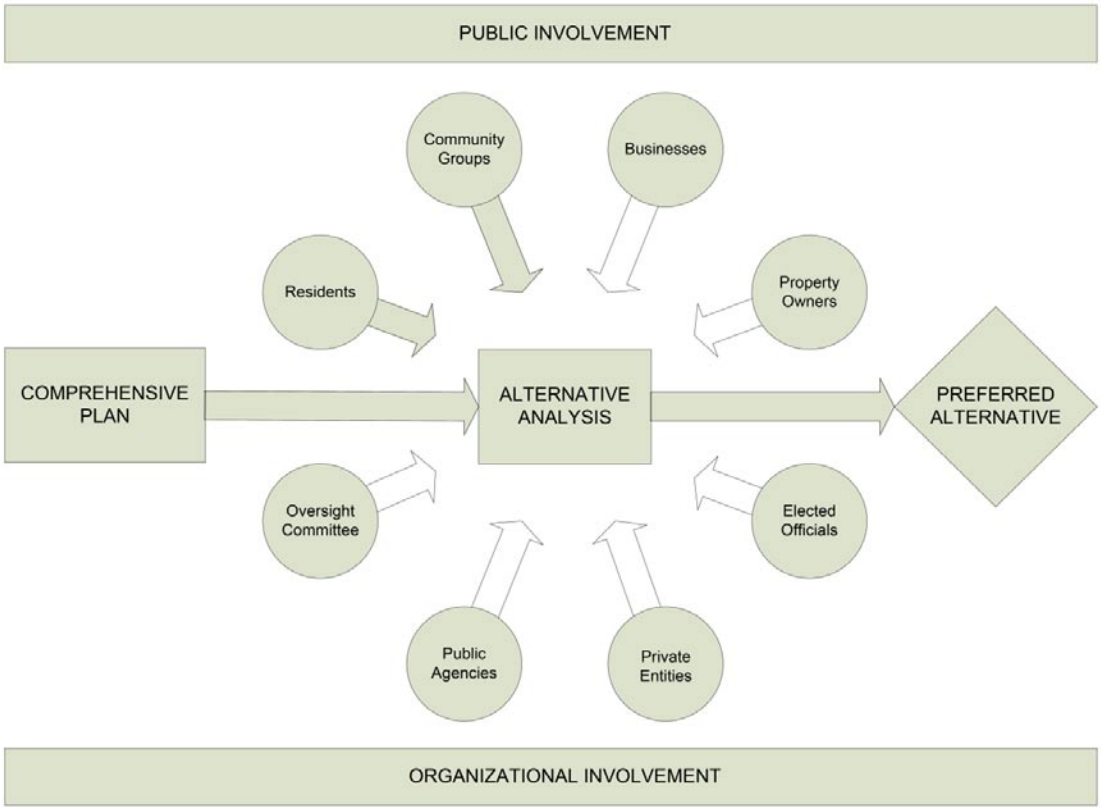

Figure 4-1. Alternative Analysis Process

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The Alternative Analysis evaluated a range of potential design alternatives in order to arrive at a preferred alternative for recommendation to the City Council. This systematic approach began with the consideration of community and agency concerns, and included a review of the goals defined by the *Bellevue Comprehensive Plan*.

Several corridor design concept alternatives were developed that took into account several sensitive issues, such as the potential for traffic spillover into the Wilburton neighborhood and water quality impacts to Lake Bellevue. Incremental input and decisions were made that narrowed the list of alternatives. Evaluation criteria were then identified and used to analyze each alternative. The criteria were developed across four overall categories (discussed in more detail below) with associated quantitative and qualitative measures as summarized in Table 4-1. Additionally, each criteria category was assessed with respect to its expected level of risk (low, moderate or high) to project implementation and impacts to stakeholders; and general duration of the risk (i.e., short- and/or long-term). The criteria were rated on a scale of 1 to 3 by analysts with the appropriate subject-matter knowledge. For example, a real property specialist evaluated right-of-way related business impacts, a water resources engineer evaluated water quality related technical requirements, etc.

Table 4-1. Summary of Screening Criteria

Category	Evaluation Criteria Examples	Risk	Duration
Traffic Operations	Roadway Geometry Access Management Traffic Operations	Low	Short and Long Term
Technical Requirements	Impacts to the BNSF corridor Impacts to Above- and Below-Ground Structures Topographic and Geological Conditions Impacts to Lake Bellevue	Moderate	Long Term
Business & Land Use Impacts	Impacts to Business Operations Impacts to Parking Impacts to Physical Features Fee acquisition and easement areas Impacts to residential neighborhoods Consistency with plans and policies	Moderate	Long Term
Constructability	Construction Duration Staging Areas Traffic Detours Impacts to Franchise Utilities	High	Short Term

4.1.2 Traffic Operations

All engineering design concepts followed federal, state, and city guidelines. The alternative development was constrained by minimum sight distance, curve radius, level of service, and other engineering standards. Concepts that compromised safety and operations were not pursued. Based upon the

comprehensive traffic forecasting and analysis undertaken, the required capacity needed for acceptable traffic operations is known; hence the amount of risk associated with traffic operations is low provided the identified capacity needs are met. Issues can be readily addressed in the short-term; however, planned growth in the region will continue to increase traffic demands and could require additional changes in the long-term.

4.1.3 Technical Requirements

Engineering guidelines apply to both man-made and natural features. The alternative development was influenced by fixed features such as buildings, and topographic features that influenced the placement of walls. Soil conditions and the effects on water quality in the area were also a concern especially in the vicinity of Lake Bellevue. Some technical requirements can be mitigated for, others cannot. Unknowns may still be encountered during construction and therefore the amount of risk is moderate. Any unforeseen challenges could pose a long-term risk to the operations and maintenance of the improvements.

4.1.4 Business and Land Use Impacts

Business impacts could be direct as with the acquisition of property, or indirect as related to access, parking, or building modifications. Since the improvements were discussed with the affected property owners well ahead of implementation, and mitigation options were explored in each case, the amount of risk associated with business impacts might be considered moderate. Property acquisitions represent a significant cost to the project and can have long-term effects on property owners and tenants. Land use impacts would be direct, as with increases in cut-through traffic to adjacent residential neighborhood.

4.1.5 Constructability

Although construction impacts are generally short-term, they can have a lasting impact on the City, contractor, franchise utility companies, and other stakeholders both next to the corridor improvements and in the surrounding area. Any unforeseen challenges during construction will have to be dealt with immediately and will have direct cost consequences. Therefore the risk associated with construction is generally higher than the other categories.

4.2 Public Involvement

The public involvement process for this project worked at multiple levels so that all interested and affected parties could participate in the identification and development of a preferred design. The stakeholders included:

- **Residents**—This group covers the general public and includes residents from the Wilburton neighborhood, Lake Bellevue community, apartment dwellers and condominium owners.
- **Community Groups**—This group includes the Wilburton Homeowners Association and the Lake Bellevue Water Quality Association. The NE 5th

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Street Traffic Committee was also formed to provide input related to the protection of the Wilburton neighborhood from traffic impacts.

- **Businesses**—This group includes property owners and tenants who operate businesses in the general vicinity of the improvements.
- **Property Owners**—This group primarily owns property along the corridor and is directly affected by the improvements.

A public involvement strategy was executed to inform and involve these audiences. Elements of the public involvement campaign included open house events, meetings with property owners, websites, newsletters and press releases.

4.2.1 Open House Events

Since the outcome of this project affects the quality of life of the surrounding community, the community was invited to learn about the project and provide input through a series of open houses. A total of three open houses were held in 2010. These events were advertised in local media and on the City's web site. Announcements were also sent to over 4,000 addresses in the surrounding area. Residents of the Wilburton neighborhood and Lake Bellevue were specifically engaged, as well as commercial property owners and tenants along the corridor.

The open houses presented project information and encouraged questions and comments through comment sheets. City staff and consultant teams were also on hand to answer questions. Key concerns that were heard at the open house events included sequencing of construction and impacts to residential neighborhoods.

4.2.2 Meetings with Property Owners

Conversations were held with property owners affected by property acquisitions, construction activities, and/or changes in traffic operations. Meetings were held with the following property owners or corporate representatives: Michael R. Mastro; Bellevue Properties; Jimmy R. Barrier; Ernest H. Bakker; Bakkers, Inc.; Holly Finkbeiner; Monty Realty Capital; Brierwood Center LLC #4; Hal & Joan Griffith; WR-SRI, 120th LLC; Pine Forest Transitory Company; Barrier Properties LLC; Safeway , Inc. #6350; IP Eat One, Inc.; JTN Properties; King County; Legacy Kelsey Creek, LLC; Bellevue Trade Center; Granger WW, Inc.; Safeway, Inc. Store #8114; This LDEW Properties, LLC; and Lowe's HIW, Inc. Conversations were also held with a number of organizations and developers, including the Bellevue Downtown Association (BDA), Lake Bellevue Homeowners Association, Lake Bellevue Water Quality Association, Wright Runstad, and Wilburton Homeowners Associations. At these meetings, City staff explained the proposed roadway improvements and construction activities. They also explored potential mitigation measures with stakeholders. As the design concepts evolved, City staff informed property owners of the changes and shared revised engineering plans in an effort to obtain further input.

4.2.3 Websites, Newsletters and Press Releases

Those who were not able to attend any of the open house events were kept informed of project development through newsletters, press releases, and the "Wilburton Connections" website. Email alerts were also provided for those wanting electronic notification of website updates.

4.3 Agency Involvement

Agency representation included participation by stakeholders both internal and external to the City. The audience for this effort included:

- **Oversight Committee**—An Oversight Committee made up of the City's individual department directors was formed to provide guidance on policy issues and help resolve technical conflicts relating to the development of the corridor plan. They provided input on the evaluation of alternatives.
- **Public Agencies**—Examples of public agencies that provided input include WSDOT, Sound Transit, Port of Seattle, King County Metro, and a variety of environmental regulatory agencies. City and consultant staff worked directly with these agencies in addressing technical issues. Permits will be required from some of these agencies prior to construction of the project.
- **Private Entities**—There are many private agencies that have a stake in this process, including BNSF, Puget Sound Energy, Qwest, Comcast, and others. Franchise utility facilities may be impacted during construction and therefore require early coordination to minimize service interruptions.
- **Elected Officials**—This group includes the Bellevue City Council. A total of three project briefings were given to the City Council at study sessions. The briefings covered various aspects of project development and solicited comments on design options.

4.4 Bellevue City Council Actions

Over the past several years, the Bellevue City Council has taken action to implement transportation improvements in the project study area. Table 4-2 lists Bellevue City Council actions related to the high priority capital projects including: NE 4th Street, NE 6th Street, 120th Avenue NE, and NE 15th/16th Street Corridor. Together these projects support growth in Downtown Bellevue, the Wilburton/NE 8th Street Subarea, and the emerging Bel-Red Corridor.

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Table 4-2. Bellevue City Council Actions Related to High Priority Capital Projects

Date	Resolution/ Ordinance No.	Bellevue City Council Action
2/25/08	Ord. 5803	Adopted the 2007 amendments to the Comprehensive Plan incorporating the Wilburton/NE 8th Study and amending the Wilburton/NE 8th Street Subarea Plan and the East Bellevue Transportation Plan
12/1/08	Ord. 5851	Adopted the 2009-2010 Budget & 2009-2015 Capital Investment Program Plan (including the Mobility and Infrastructure Initiative).
1/20/09	Res. 7874	Endorsed the Mobility Infrastructure Initiative Finance Plan.
2/2/09	Res. 7876	Authorized a contract to conduct a feasibility analysis for the proposed formation of a Local Improvement District (LID) to support construction of the NE 4th Street Extension and improvements to 120th Avenue NE from the NE 300 block to NE 8th Street.
8/3/09	Res. 5898	Established a revitalization area for purposes of using State of Washington Local Revitalization Financing for the Wilburton Connections Projects.
2/1/10	Res. 5936	Amended the 2009-2015 Capital Investment Program Plan to add three new projects (NE 4th Street, NE 6th Street, 120th Avenue NE)
3/1/10	Res. 5942	Amended the 2009-2015 Capital Investment Program Plan to create one new project (NE 15th Street Multi-modal Corridor) and authorized a contract for preliminary design for this roadway.
4/19/10	Res. 8080	Authorized use of Public Works Trust Fund Construction Program Loan for a professional services contract for final design of the NE 4th Street Extension Project.
6/7/10	Council Motion	Approved a motion to move forward with additional analysis on the LID formation and the special benefits analysis.
7/6/10	Ord. 5953	Authorized (1) amendment of the 2009–2015 Capital Investment Program (CIP) Plan by modifying the project title, description, and budget for improvements from NE 8th to NE 12th Streets (PW-R-164), to reflect the new project title and description of 120th Ave NE Improvements from NE 8th Street to Northup Way (PW-R-164); and 2) transfer Mobility and Infrastructure Initiative funding (G-80) for CIP Plan No. PW-R-164.
7/26/10	Res. 8125	Authorized a professional services agreement to prepare preliminary engineering design and grant support for an application for TIGER II funding for 120th Avenue NE from NE 8th Street to Northup Way.
8/2/10	Res. 8130	Authorized a contract supplement to prepare 30% engineering design for 120th Avenue NE (NE 8th to NE 12th Streets) Project, which is funded through CIP Plan No. PW-R-164.
9/20/10	Res. 8141	Declared the intent to consider formation of a local improvement district, to be known as the Wilburton Connections Local Improvement District, for the purpose of constructing an extension to NE 4th Street between 116th and 120th Avenues NE and constructing improvements to 120th Avenue NE between the NE 4th Street extension and NE 8th Street.
3/7/11	Res. 8205	Authorized the execution of a grant agreement with the Transportation Improvement Board for the acceptance of a Washington State fuel tax funded Urban Arterial Program grant for the construction of 120th Avenue NE from NE 8th to NE 12th Streets (CIP Plan No. PW-R-164).

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5.0 Alternatives Development

The development, evaluation, and screening of alternatives for the NE 4th Street/ 120th Avenue NE Corridor Project are discussed in this section. Figures are also provided to allow readers to compare and contrast the alternative alignments.

5.1 Framework for Analysis of Alternatives

In recognition of the existing roadway characteristics, adjacent land use and topographic conditions, as well as environmental and engineering design constraints discussed in Section 3, the project corridor was divided into sections, or stages, for purposes of evaluating and selecting a preferred alternative. The boundaries of each stage of the corridor encompass similar key issues including:

- construction of a new roadway;
- widening an existing roadway section that is encumbered with few environmental or design constraints, and
- widening an existing roadway section that requires substantial revisions to the horizontal alignment and/or addressing a number of environmental and engineering design issues.

These stages are numbered from south to north along the corridor, but do not infer any particular order in which roadway improvements would be constructed. The four project stages are as follows:

- **Stage 1: NE 4th Street (116th Avenue NE to 120th Avenue NE)**—The engineering design for this stage differs from most of the corridor as it involves construction of a new roadway. New right-of-way for a five-lane roadway would need to be acquired. The corridor includes a substantial grade within the west half of the four-block alignment. Alternatives would need to accommodate future uses of the BNSF corridor. Design would require coordination with property owners on the western end to accommodate planned redevelopment of adjacent properties. Alternatives also would need to minimize potential loading dock access, parking, and building impacts on two large retail businesses on the eastern end of the corridor.
- **Stage 2: 120th Avenue NE (NE 300 Block to NE 700 Block)**—The development of alternatives for this portion of the project corridor is a more routine engineering design effort as only moderate right-of-way would be required to widen the existing roadway. Adjacent properties are at similar elevations, and few buildings or parking facilities are immediately adjacent to the outside edge of the existing roadway right-of-way, especially on the west side.

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- **Stage 3: 120th Avenue NE (NE 8th Street to NE 12th Street)**—The engineering design effort for this portion of the corridor is more challenging. The City's Transportation Facilities Plan (Bellevue 2009a) calls for the realignment and widening of 120th Avenue NE as it crosses NE 8th Street, which is a six-lane major arterial. Additional intersection realignments would be required at NE Bel-Red Road and NE 12th Street. Known environmental issues affecting design along this portion of the corridor include considerable hazardous materials contamination near the 120th Avenue NE/NE 8th Street intersection, poor soil conditions near Lake Bellevue and water quality issues for Lake Bellevue. Moreover, the existing right-of-way is comparatively narrow so alternatives need to address potential impacts to adjacent commercial properties due to the substantial right-of-way acquisition needed.
- **Stage 4: 120th Avenue NE (NE 12th Street to Northup Way)**—The development of alternatives for this portion of the project corridor requires substantial coordination with a variety of stakeholders to address proposed development projects along the alignment. Planned transportation projects along the corridor include roadway intersections with planned new roads at NE 15th, NE 16th, and NE 18th Streets, new bike lanes and paths, and the Sound Transit East Link light rail transit project. The planned high-density development in the Spring District would considerably increase traffic volumes and would require driveway accesses along the roadway. The development of alternatives also needs to consider stream and wetland impacts that could include potential off-site mitigation as well as and steep slopes east and west of the existing roadway.

In the following sections, alternatives for each stage of the project corridor are discussed. The text then summarizes the criteria used to evaluate the alternatives, identifies the key decisions that were made based on the criteria, and identifies the preferred alternative selected for each stage.

5.2 Stage 1: NE 4th Street (116th Avenue NE to 120th Avenue NE)

5.2.1 Early Concepts Considered

An alignment concept for a NE 4th Street extension was prepared as part of the Mobility and Infrastructure Initiative. This alignment concept extended east from the existing NE 4th Street and 116th Avenue NE intersection, traversed over an existing 72-inch sanitary sewer line, and through the existing BNSF corridor railroad track embankment.

Field investigations were conducted to identify any potential environmental issues in the roadway corridor. This work determined that no biological issues (S&W 2009b, 2011b, 2011c; PB 2011e) or archaeological issues (NWAA 2009 and 2011) existed that would distinguish any conceptual alternatives developed for the proposed roadway. The railroad tracks are likely eligible for listing on the

National Register of Historic Places, but all alternatives would cross the BNSF corridor and displace the existing tracks.

A technical workshop to discuss possible alignments was conducted on November 5, 2009. The workshop discussed issues related to roadway geometry, constraints and impacts of the proposed alignment, and potential conceptual alternative alignments. As a result of this workshop, seven conceptual alternative alignments were carried forward to assess the viability of various design options.

The conceptual alternative alignments are described below.

- **Alternative #1**—This alignment trenches under the sewer and railway embankment to achieve a moderate grade (5 percent). The alignment has minimal curvature, and a comparatively short length (i.e., the most direct connection). It also minimizes the number of affected parcels to four and confines parking impacts to one existing business (Home Depot). It does not provide easily viable access for adjacent properties
- **Alternative #2**—This alignment assumes full displacement of the Best Buy building on the east end and would require full acquisition and relocation of that retail store. The alignment follows the northern property line of that parcel to maximize the remaining property for redevelopment. The alignment crosses over the sewer and trenches through the railway embankment resulting in a 12-percent grade west of the sewer crossing.
- **Alternative #3**—This alignment assumes partial displacement of the Best Buy building on the east end, but assumes the building could be remodeled to allow the business to continue to operate at the site. This alternative would reduce the building's size from about 45,000 square feet to 25,000 square feet. The alignment would also displace parking associated with that property. This alignment crosses over the sewer and trenches through the railway embankment resulting in a 13-percent grade west of the sewer crossing.
- **Alternative #4**—This alternative is similar to Alternative #3 as it assumes partial displacement of the Best Buy building on the east end, but assumes the building could be repaired to allow the business to continue to operate at the site. This alignment is somewhat south of the Alternative #3 alignment and would reduce the size of the building from about 45,000 square feet to 35,000 square feet. This alternative would displace fewer parking spaces on that property than Alternative #3, but would also cause parking loss on the Home Depot property south of the alignment. This alignment crosses over the sewer and trenches through the railway embankment resulting in a 12.5-percent grade west of the sewer crossing.
- **Alternative #5**—This alignment clears the northwest corner of the Best Buy building on the east end and follows a path north of the parcel with

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the Best Buy building. It is the longest alignment and requires the most right-of-way overall, including land from Mutual Materials and the Bellevue School District. The alignment intersects 120th Avenue NE at NE 5th Street, resulting in a four-legged intersection. This alignment crosses over the sewer and trenches through the railway embankment resulting in a 12-percent grade west of the sewer crossing.

- **Alternative #6**—As with Alternative #1, this alignment trenches under the sewer and railway embankment to achieve a moderate grade of 6 percent. This is an increase over Alternative #1 (5 percent) and is intended to allow access to adjacent parcels nearly at-grade on the far eastern end of the corridor. It was located north of Alternative #1 in a trench between the Best Buy building on the north and the large stormwater detention vault on the Home Depot property. This alternative would result in a substantial reduction in parking for the Best Buy and Home Depot properties.
- **Alternative #7**—This alignment divides impacts as equitably as possible between both properties at the east end. It is a surface version of Alternative #6 and passes at-grade between the Best Buy building and the large buried stormwater detention vault. Parking spaces would be displaced on both properties, although somewhat more on the Home Depot property. This alignment crosses over the sewer and trenches through the railway embankment resulting in a 12-percent grade west of the sewer crossing.

These seven alternatives are illustrated in Figure 5-1 through Figure 5-7in the following pages.

5.2.2 Evaluation of Seven Conceptual Alternatives

Table 5-1 summarizes the potential performance of the initial seven alignment alternatives versus eight project goals, which primarily addressed transportation and land use impact issues. While all of the alternatives perform well for goals A, D, E, and F Alternatives #4, #5, and #7 generally perform better against goals B, C, G, and H. Alternatives #1, #2, #3, and #6 all rated high impacts (i.e., low score) for one or more of the project goals. Based on information in Table 5-1, the following three alternatives were dropped from further consideration:

- Alternative #1 did not satisfy the purpose of the project because it failed to provide access to adjacent properties along the corridor.
- Alternatives #2 and #3 did not satisfy the purpose of the project because these alternatives have substantial adverse impacts on existing businesses and especially Best Buy.

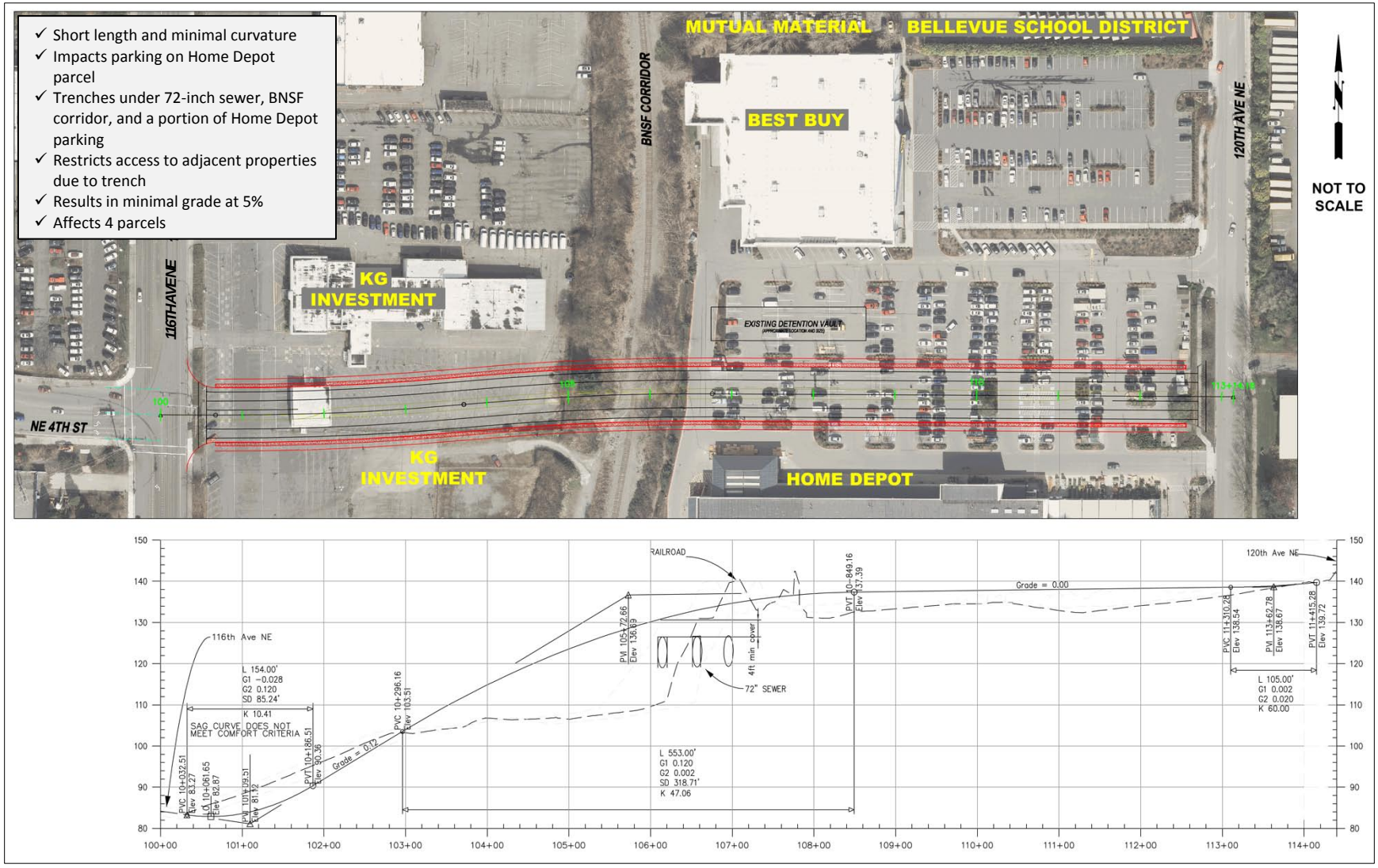

Figure 5-1. NE 4th Street Extension: Alternative #1

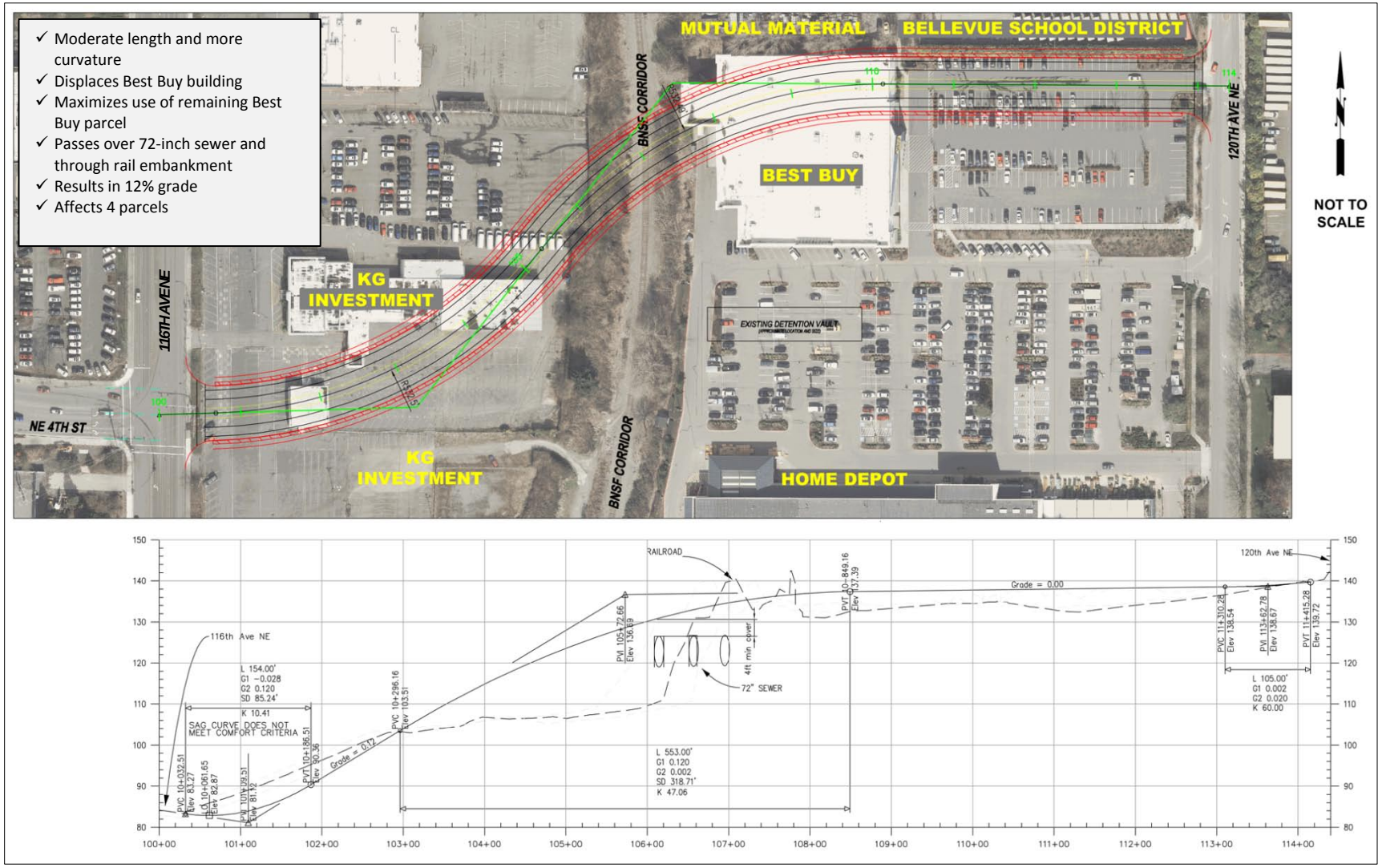

Figure 5-2. NE 4th Street Extension: Alternative #2

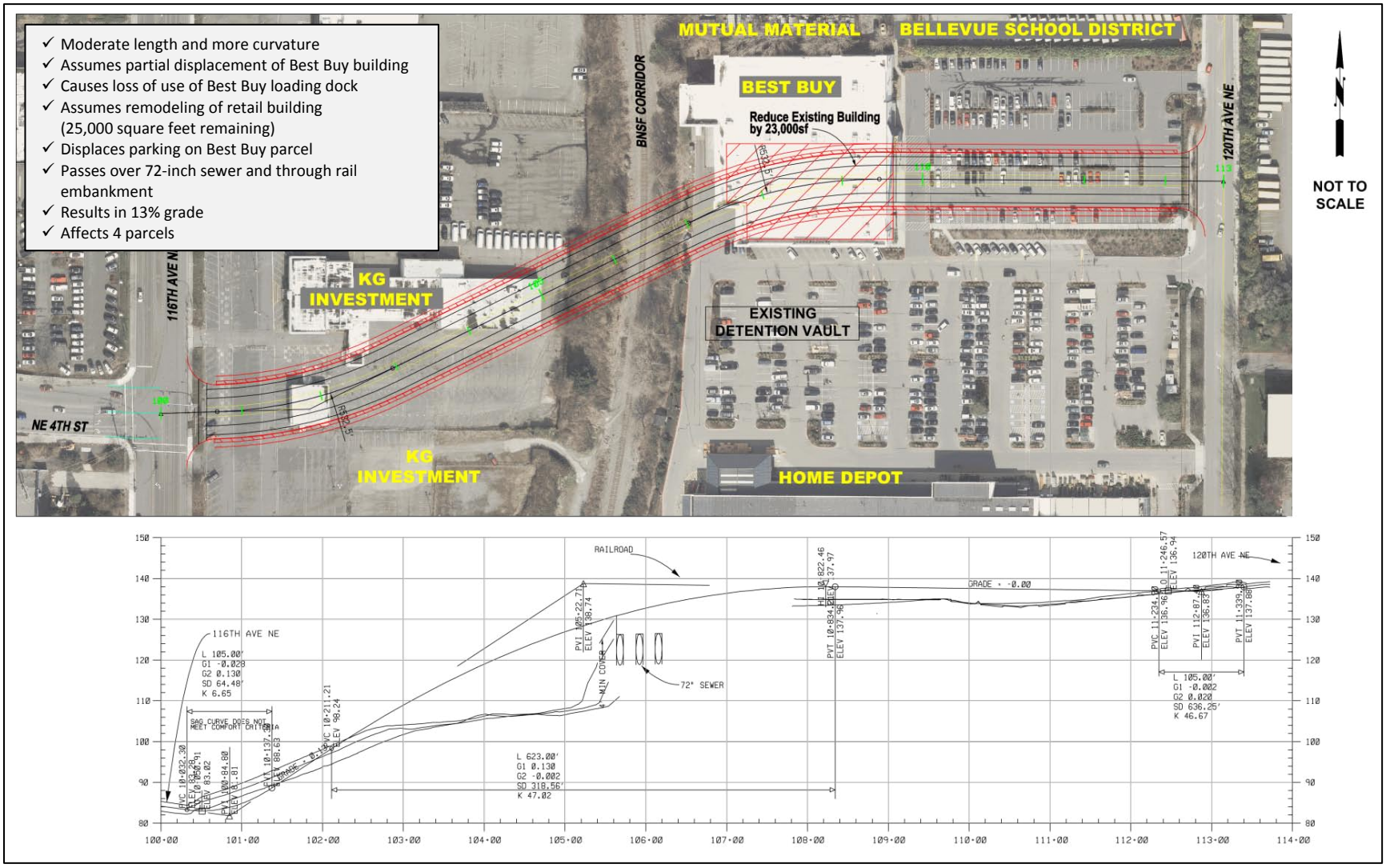

Figure 5-3. NE 4th Street Extension: Alternative #3

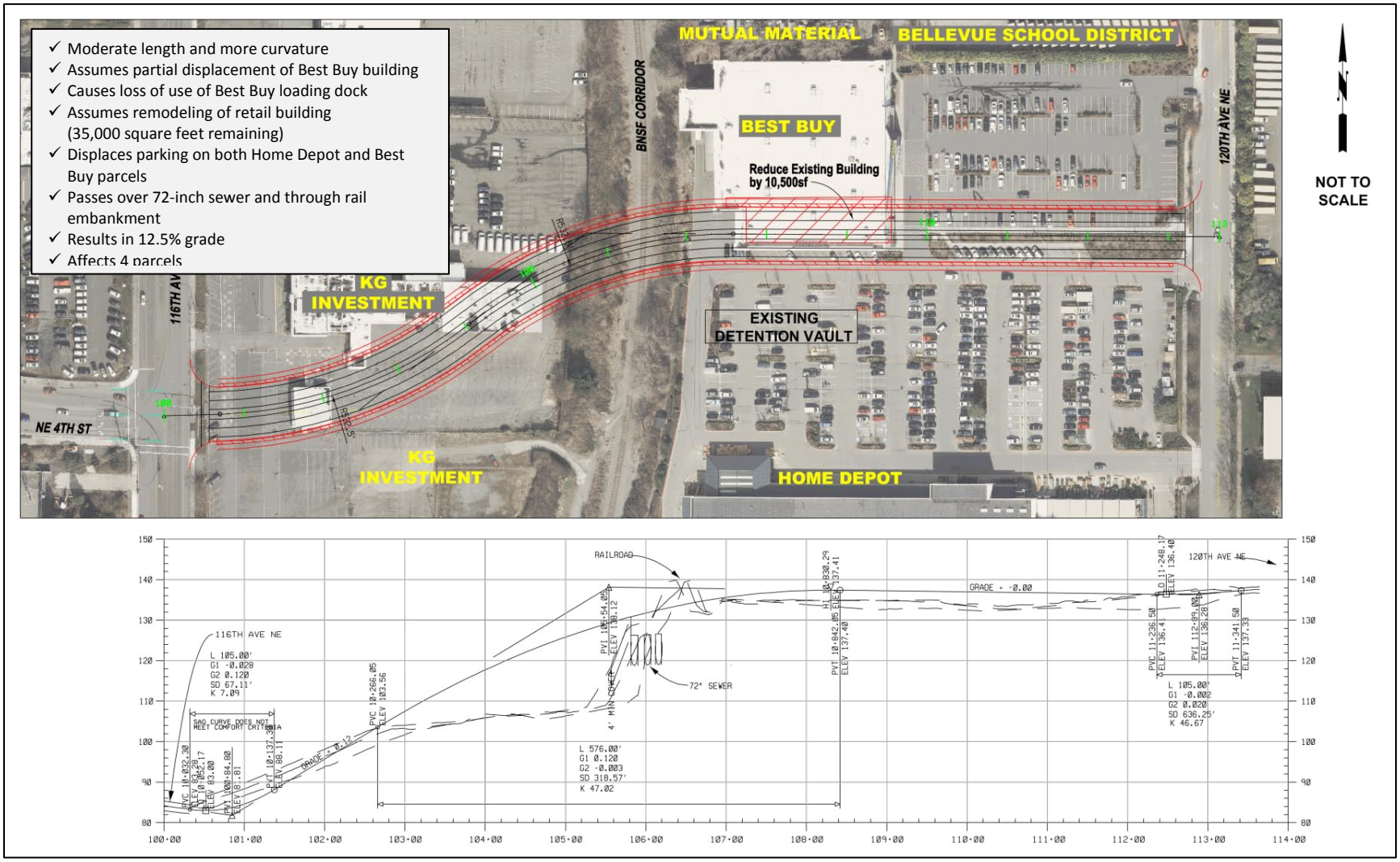

Figure 5-4. NE 4th Street Extension: Alternative #4

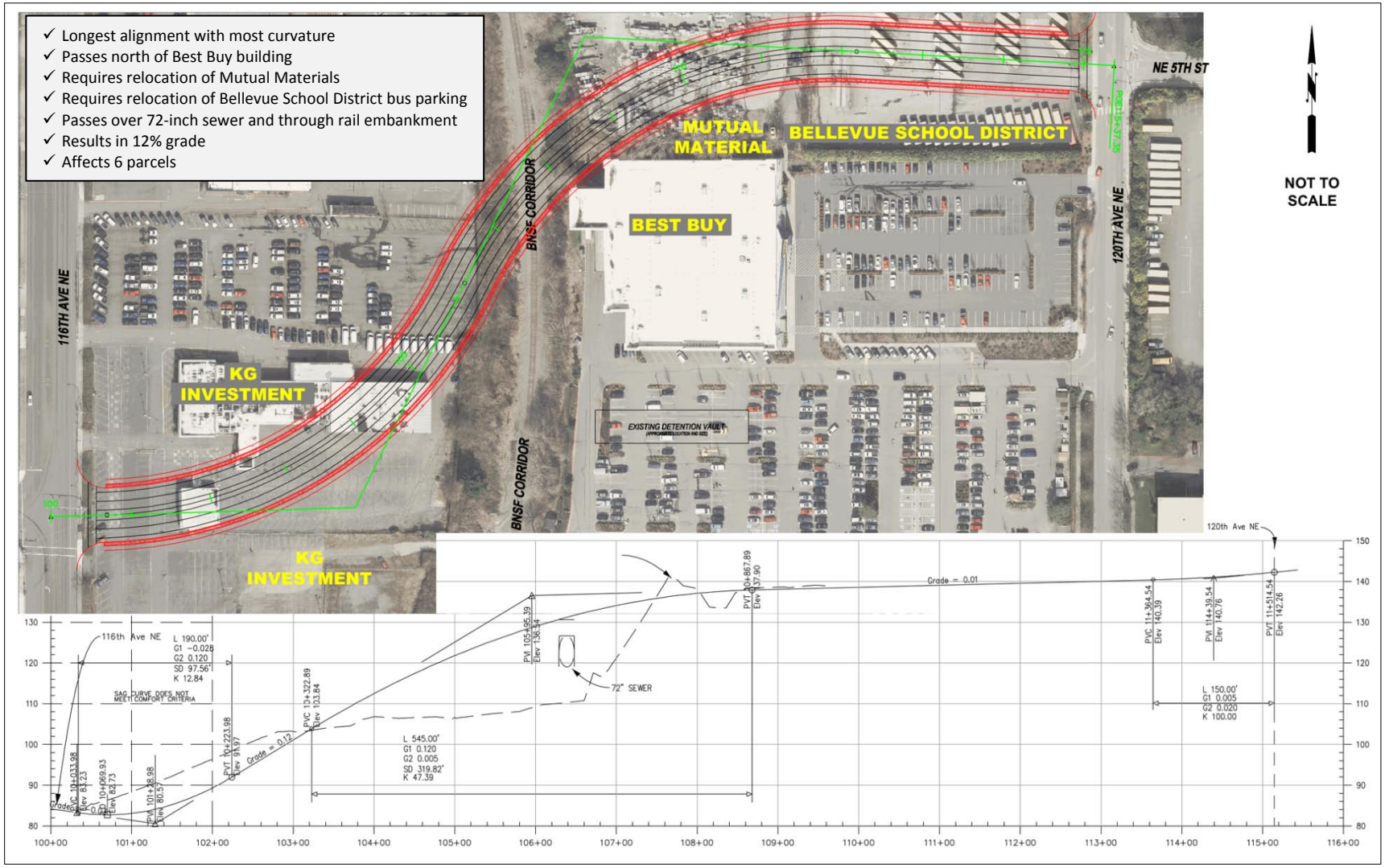

Figure 5-5. NE 4th Street Extension: Alternative #5

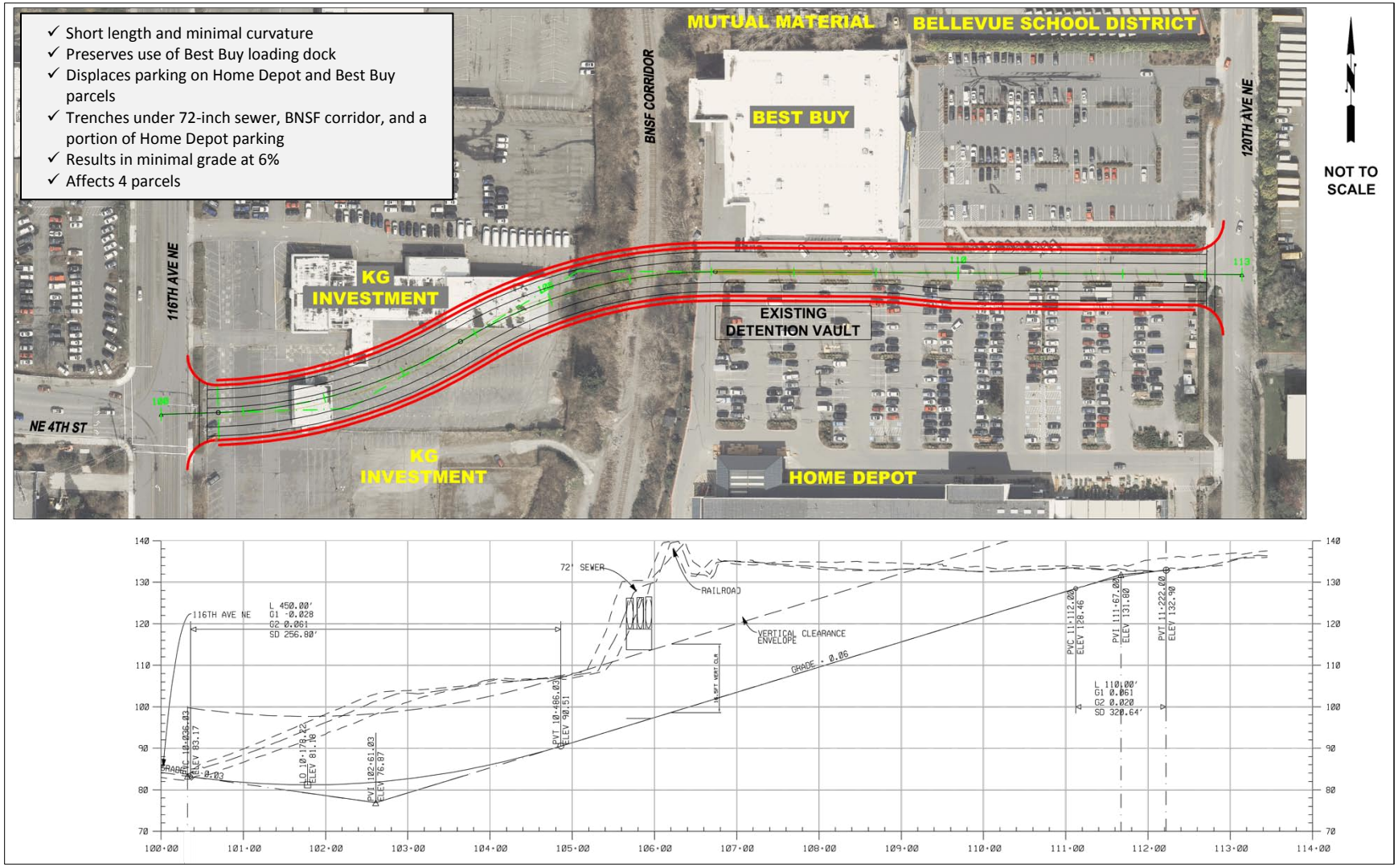

Figure 5-6. NE 4th Street Extension: Alternative #6

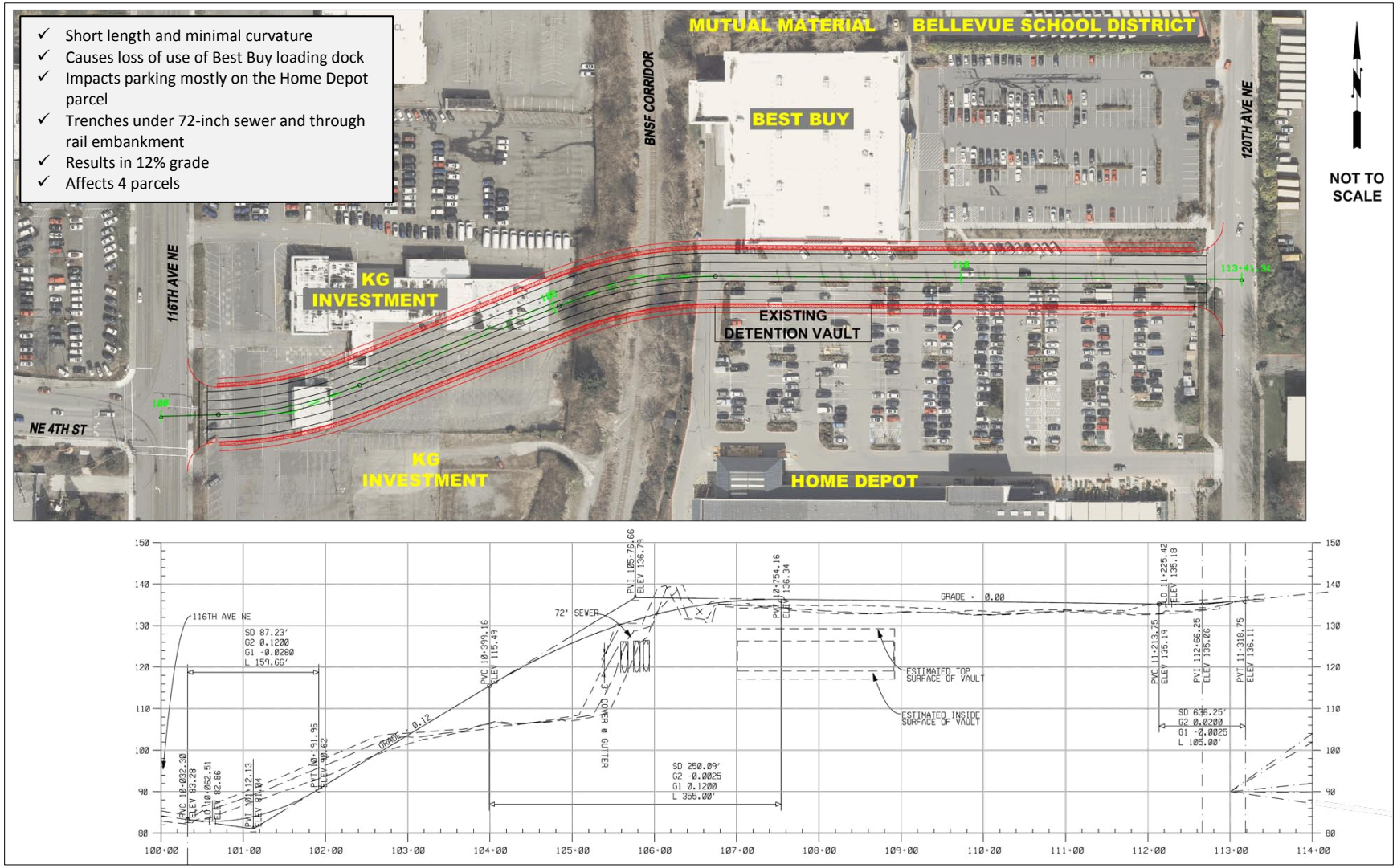

Figure 5-7. NE 4th Street Extension: Alternative #7

Table 5-1. Evaluation of the Conceptual Alternatives for NE 4th Street Extension

ID	Project Goals	Conceptual Alternatives						
		1	2	3	4	5	6	7
TRAFFIC OPERATIONS								
A	Design the roadway to meet City design standards.	●	●	●	●	●	●	●
B	Provide access to support the desired redevelopment of adjacent parcels.	○	●	●	●	●	◐	●
BUSINESS & LAND USE IMPACTS								
C	Minimize impacts on existing businesses. Parking or storage only Building and parking/storage.	◐	○	○	◐	◐	●	●
D	Minimize the redistribution of traffic into nearby residential neighborhoods.	●	●	●	●	●	●	●
E	Provide facilities for non-motorized transportation.	●	●	●	●	●	●	●
F	Provide the transportation system needed for the Wilburton Village Plan.	●	●	●	●	●	●	●
TECHNICAL REQUIREMENTS								
G	Do not preclude future uses of the railway right-of-way.	●	◐	◐	◐	◐	●	◐
CONSTRUCTABILITY								
H	Minimize construction and right-of-way costs for the project.	○	◐	◐	◐	◐	○	◐

● Lower impacts

◐ Medium impacts

○ High impacts

- A second technical workshop was held on January 13, 2010. Topics discussed included roadway geometry, constraints and impacts of each alternative alignment, and the criteria used to evaluate the alternatives. Development of evaluation criteria was started at the workshop. As a result of the discussions at the workshop, all of the four remaining alternatives were recommended for further evaluation.

The four alternatives carried forward (Alternatives #4 through #7) were discussed with adjacent property owners. Individual meetings were arranged with the property owners and held in February 2010. The objective of these meetings was to share current conceptual alignments and obtain the property owner's input. In addition, all four alternatives were presented for general public comment at an open house for all Wilburton Connections Project held on March 2, 2010.

5.2.3 Refinement of Alignment Alternatives

As a result of the technical workshops and input received from stakeholders and the public, 14 screening criteria were developed to compare and contrast the four selected alternatives. The alternatives were rated based on these criteria.

In addition, conceptual cost estimates were developed separate from the scoring of the engineering and environmental factors and were used for information purposes. These screening criteria, definitions, and scoring by City and consultant staff of the four alternatives are presented in Table 5-2 and Table 5-3.

As shown in Table 5-2, Alternative #4 was clearly rated the highest against the 14 screening criteria. Based on this data, Alternative #4 was selected as the alternative and was approved by the Bellevue City Council as the alternative to move forward for final design.

Additional refinements were considered for Alternative #4 to address public comments. Two options were briefly considered to reduce the number of travel lanes from five to three. One option would be an interim solution and the second option would be a permanent long-term design solution. These options were qualitatively evaluated without the development of conceptual plans. The options were not advanced for further consideration due to the following concerns:

- The options result in similar environmental impacts as a five-lane concept without providing needed project transportation benefits, even as an interim condition.
- The options do not mitigate for long term traffic impacts.
- The options fail to address long-rang traffic volumes.
- The options are inconsistent with adopted Land Use Plan.
- The options as three-lane concepts are inconsistent with transportation plans, which would adversely affect the City's ability to secure grant funding.

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Table 5-2. Screening Criteria and Evaluation of the Four Alternatives for NE 4th Street Extension

Screening Criteria		Scoring by Alternative				Score	Description
		#4	#5	#6	#7		
TRAFFIC OPERATIONS							
A	Roadway Geometry	3	3	1	2	1	Significant geometric deviations. Very little opportunity for further geometric refinement.
						2	Average geometric deviations. Some opportunities for further geometric refinements.
						3	Relatively minor geometric deviations. Good opportunities for further geometric refinements.
B	Business Access – Grade Difference and Locations	3	3	1	2	1	Access to adjacent properties poses significant technical challenges, or compromises of the design, to achieve.
						2	Access to adjacent properties poses some technical challenges.
						3	Access to adjacent properties is relatively easy to accommodate.
C	Traffic Operations	2	2	2	2	1	More than 2/3 of the study intersections have poor Level of Service (LOS) in 2030.
						2	1/3 to 2/3 of the study intersections have poor LOS in 2030.
						3	Less than 1/3 of the study intersections have poor LOS in 2030.
TECHNICAL REQUIREMENTS							
D	Railroad Track Impacts	2	2	3	1	1	Design has significant impacts on railroad corridor.
						2	May require re-grading of railroad bed and changes to future rail profile.
						3	Minor or no constraints to future railroad uses.
E	Wall Conflicts with Existing Structures	2	3	1	2	1	Very high risk of potentially impacting adjacent building foundations, detention vaults, or other major structures.
						2	Some risk of impacting adjacent building foundations, detention vaults, or other major structures.
						3	No risk of impacting adjacent underground structures.
F	Impacts to Existing Vault	3	3	1	2	1	Substantial reconstruction or additional support structure of vault will be required.
						2	Proximity of new work to existing vault may have some impacts on vault.
						3	Minimal impacts to existing vault.
BUSINESS & LAND USE IMPACTS							
G	Impacts to Home Depot Property	2	3	1	1	1	Major impacts to property, either physically or functionally, or property is a "total acquisition."
						2	Some reconstruction of existing building or impacts to existing property functionality.
						3	No appreciable impacts to property, or property not affected by alternative.
H	Impacts to Best Buy Property	1	3	2	2	1	Major impacts to property, either physically or functionally, or property is a "total acquisition."
						2	Some reconstruction of existing building or impacts to existing property functionality.

Table 5-2. Screening Criteria and Evaluation of the Four Alternatives for NE 4th Street Extension (continued)

Screening Criteria		Scoring by Alternative				Score	Description
		#4	#5	#6	**#7**		
						3	No appreciable impacts to property, or property not affected by alternative.
I	Impacts to KG Investments Properties	2	1	1	2	1	Major impacts to property, either physically or functionally, or property is a "total acquisition."
						2	Some reconstruction of existing building or impacts to existing property functionality.
						3	No appreciable impacts to property, or property not affected by alternative.
J	Impacts to Mutual Materials Properties	3	1	3	3	1	Major impacts to property, either physically or functionally, or property is a "total acquisition."
						2	Some reconstruction of existing building or impacts to existing property functionality.
						3	No appreciable impacts to property, or property not affected by alternative.
K	Impacts to Bellevue School District Properties	3	1	3	3	1	Major impacts to property, either physically or functionally, or property is a "total acquisition."
						2	Some reconstruction of existing building or impacts to existing property functionality.
						3	No appreciable impacts to property, or property not affected by alternative.
M	Public Comment	2	1	1	2	1	Comments received are substantially unfavourable.
						2	Comments received are generally balanced.
						3	Comments received are substantially favourable.
N	Compatibility with Wilburton Village Vision	3	1	2	2	1	Substantial adverse impact on planned street and circulation patterns.
						2	Supports planned street and circulation patterns.
						3	Promotes planned street and circulation patterns.
CONSTRUCTABILITY							
L	Construction Duration/ Disruptions	2	3	1	2	1	About 24 months to complete.
						2	About 18 months to complete.
						3	About 12 months to complete.
TOTAL SCORE		**33**	**30**	**23**	**28**		

All screening criteria are scored from 1 to 3, with 1 being the least favorable and 3 being the most favorable.
All screening criteria are equally weighted.

Table 5-3. Ranking of Estimated Project Costs of the Four Alternatives for NE 4th Street Extension

	Scoring by Alternative				Score	**Description**
	Alternative #4	Alternative #5	Alternative #6	**Alternative #7**		
Project Costs	2	2	1	2	1	Highest
					2	Middle
					3	Lowest

Note: Costs were not an evaluation criterion and did not factor into the total score.

- A second Wilburton Connections Project open house was held on May 25, 2010, and the Alternative #4 alignment for NE 4th Street was presented for general public comment, along with other projects in the Wilburton Connections Project program.
- On November 9, 2010, an open house for the Bel-Red and Wilburton Connections elements of the Mobility and Infrastructure Initiative was held at City Hall. The public was invited to attend and comment on the projects presented.

5.2.4 Selection of Final Preferred Alignment

Based on all the information received during public involvement, further refinements of Alternative #4 were considered based on stakeholder input. These refined alignments are described below and shown in Figure 5-8 through Figure 5-10:

- **Alternative #8**—This alignment is the result of revisions to Alternative #4 as requested by adjacent property owners and tenants. The west end of the Alternative #4 alignment was shifted to the south to provide a larger usable parcel of developable land north of the project corridor in part to accommodate the preliminary short plat submitted by the property owner and developer. The east end of the alignment is unchanged from the Alternative #4 alignment.
- **Alternative #9**—This alignment was developed to address adjacent property owners and tenants concerns about impacts at the east end of the corridor. Alternative #9 embodies some specific mitigation to address the impacts of the Alternative #8 alignment on the Best Buy property. In this alternative, the City would facilitate enlargement of the site to the north for purposes of restoring the Best Buy store to about 45,000 square feet and mitigate displaced parking. The west end of the Alternative #9 alignment is identical to the Alternative #8 alignment.
- **Alternative #10**—This alignment was developed to address adjacent property owners and tenants concerns raised about potential impacts to properties on the east end of the corridor. Alternative #10 would shift the east end of the Alternative #8 alignment to the south to avoid damage to the Best Buy building and closely follows the Alternative #7 alignment at the east end. The City would facilitate modification of the site to mitigate displaced parking and relocate the loading dock for the Best Buy building. A parking structure would be built to replace parking displaced on the Home Depot property.

It should be noted that Alternatives #8, #9 and #10 all avoid the large buried storm water detention vault that located between the existing Best Buy and Home Depot buildings. Alternatives #8, #9 and #10 were investigated further and were presented by staff to the Bellevue City Council on April 4, 2011. The staff presentation compared and contrasted the alternatives and provided very

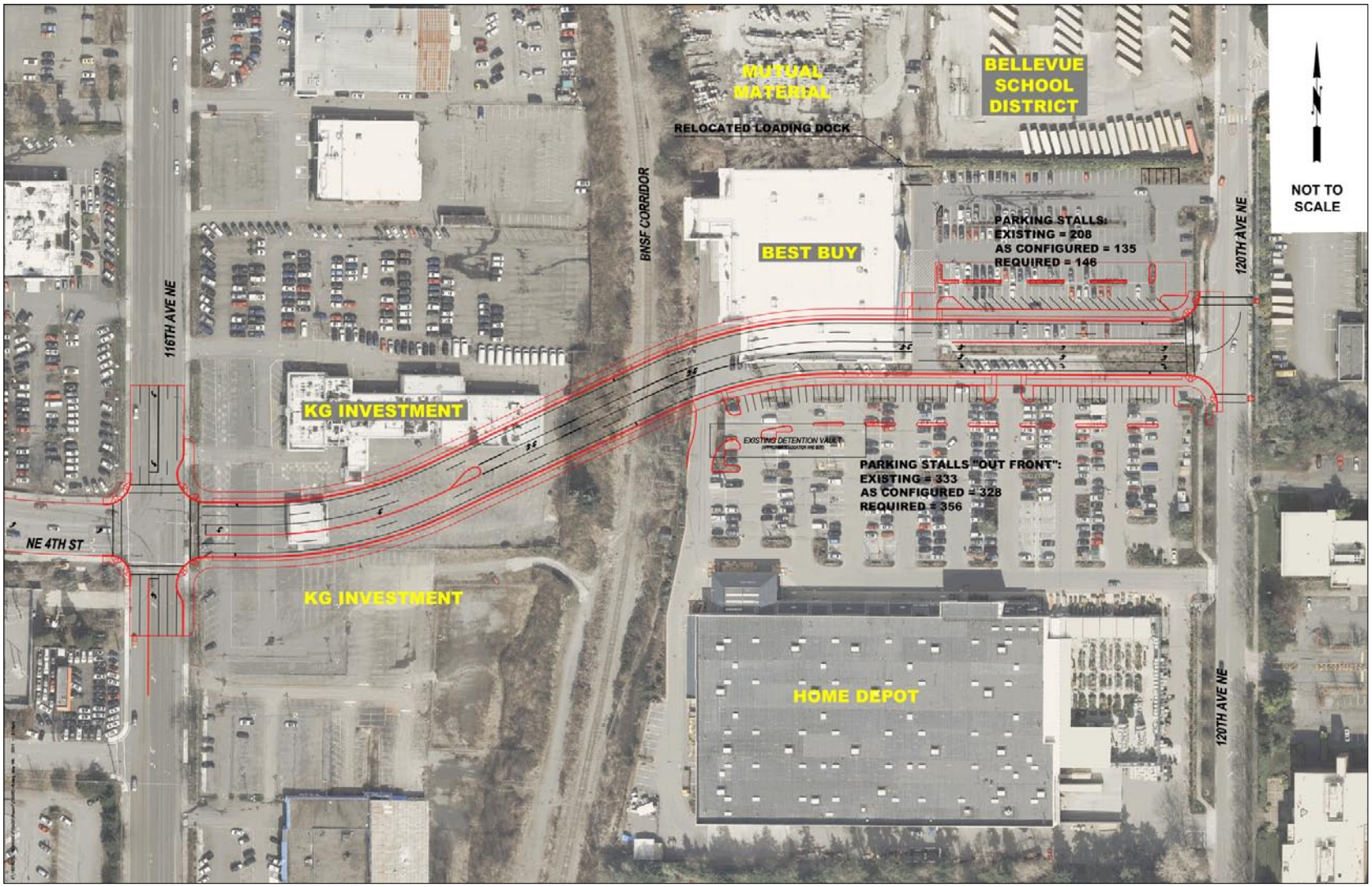

Figure 5-8. NE 4th Street Extension: Alternative #8

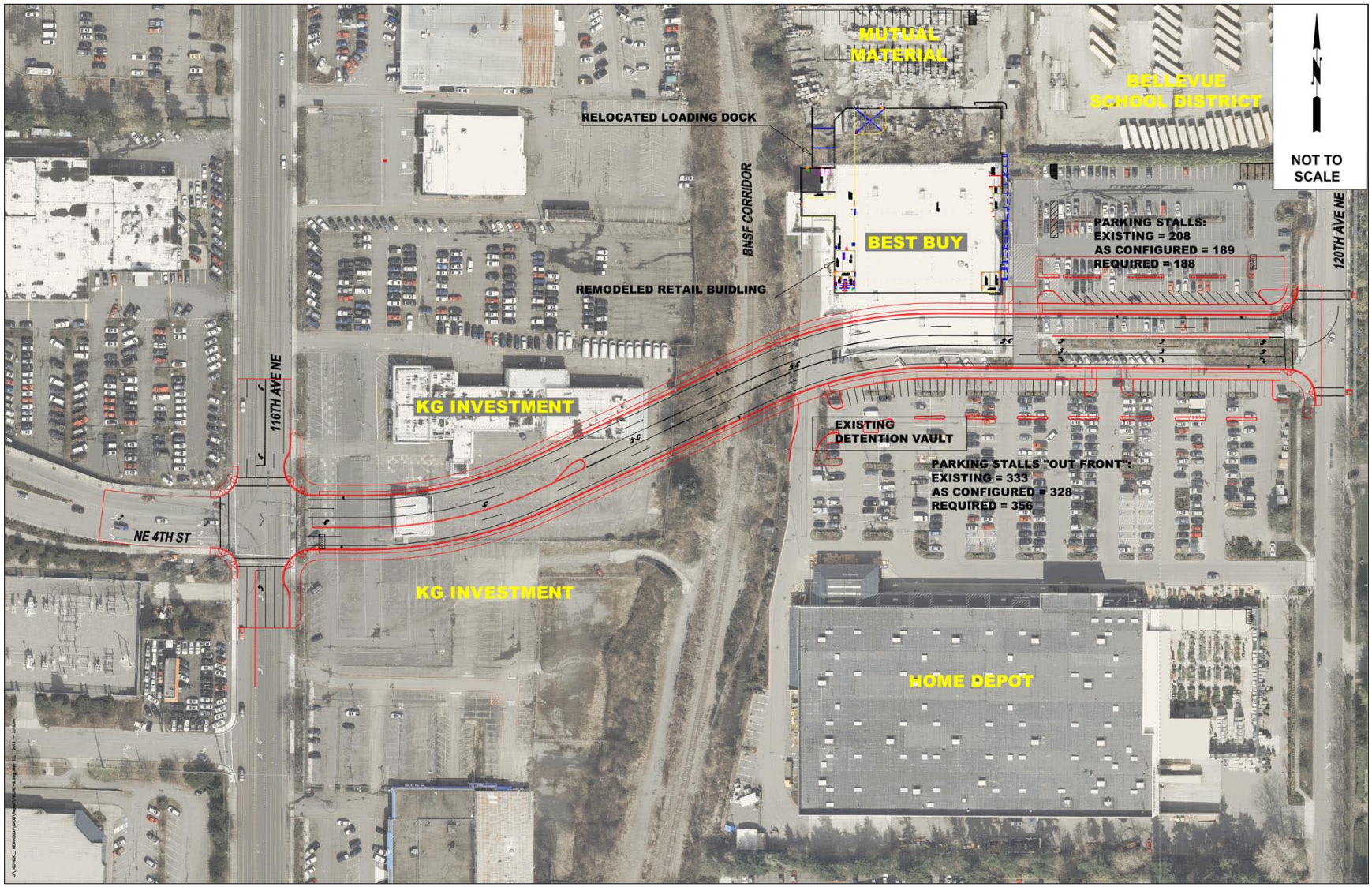

Figure 5-9. NE 4th Street Extension: Alternative #9

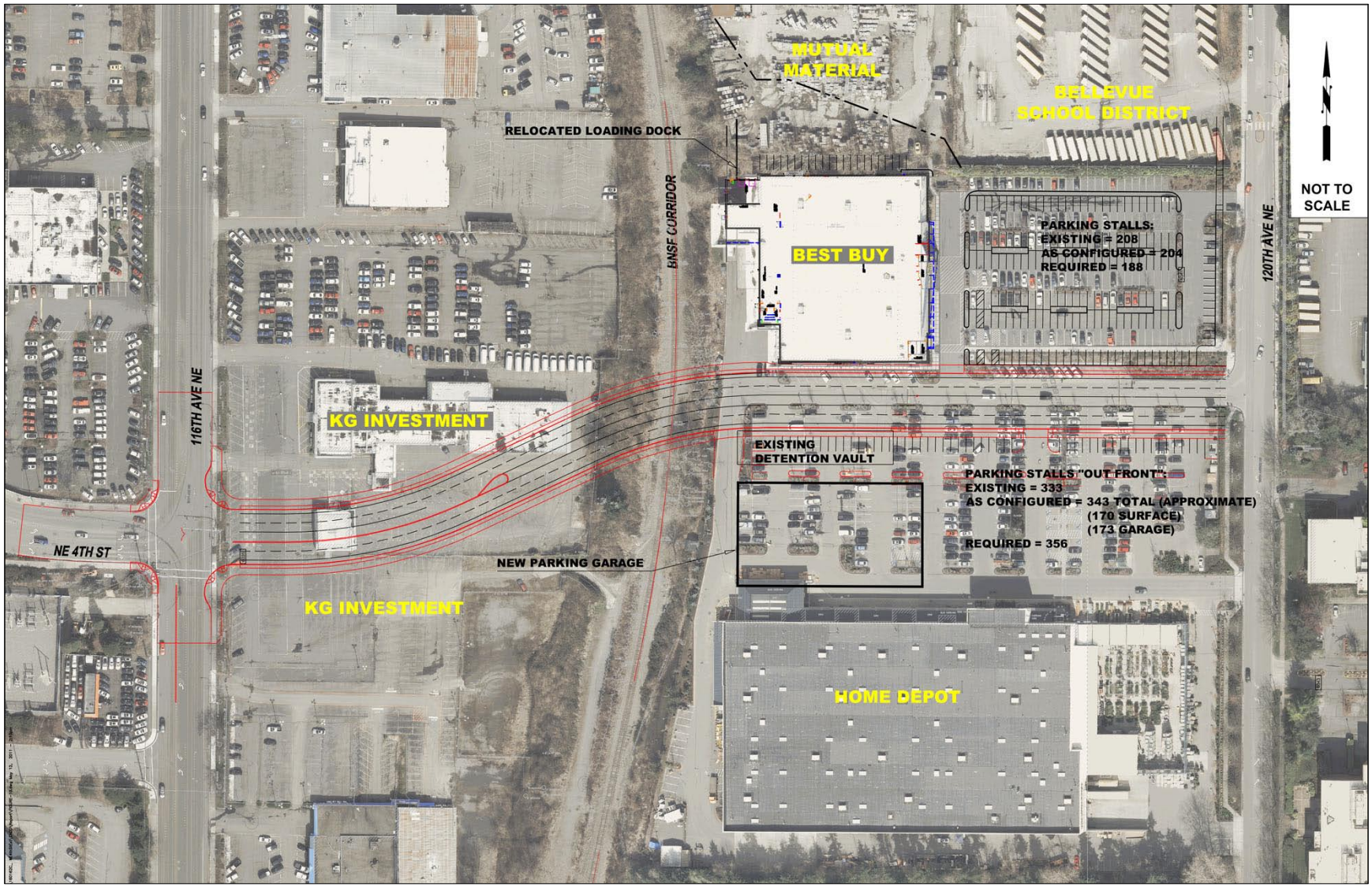

Figure 5-10. NE 4th Street Extension: Alternative #10

preliminary cost estimates. Staff also recommended Alternative #10 be dropped from further consideration because of the high impacts of the alignment compared to Alternatives #8 and #9, both of which use the same alignment (derived from minor adjustments to the Alternative #4 alignment). Eliminating Alternative #10 would:

- Allow design of the project to continue
- Provide clarity for roadway right-of-way acquisition
- Allow for continued coordination with stakeholders to minimize impacts and optimize potential mitigation measures regarding potential land acquisitions, modifications to the existing structure, and parking mitigation
- Reduce the number of impacted parcels
- Minimize visual impacts
- Reduce construction disruptions
- Potentially reduce overall project costs
- Help meet timelines for federal grant obligations

Based on this reasoning, the City Council decided to eliminate Alternative #10, proceed with design using the alignment included in both Alternatives #8 and #9, and seek to facilitate implementation of mitigation measures in Alternative #9.

5.3 Stage 2: 120th Avenue NE (NE 300 Block to NE 700 Block)

5.3.1 Alternative Alignments Considered

As described in Sections 3.3 and 3.4, the existing terrain and adjacent development limited the number of alternatives that could be considered for 120th Avenue NE between the NE 300 block and NE 700 block. Three alternatives were considered:

- **Alternative #11**—This alignment considers symmetrical widening about the existing roadway and right-of-way centerline to take advantage of the existing roadway right-of-way. This approach is also generally considered the most equitable for widening a roadway that already has developments on both sides.
- **Alternative #12**—This alignment considers widening the existing roadway mostly to the east. The topography along the corridor, however, makes widening to the east somewhat problematic due to impacts to existing retaining walls and parking lots above the roadway
- **Alternative #13**—This alignment widens the existing roadway mostly to the west. This approach takes advantage of the level ground to the west of the existing right-of-way.

A qualitative evaluation process was used to support the final decisions regarding the selected preferred alignment. Multiple factors were qualitatively rated during this evaluation and translated to a numeric scoring system. These screening criteria and ratings are presented in Table 5-4 and Table 5-5 on the following two pages.

5.3.2 Preferred Alignment

As shown in Table 5-4, Alternative #13 was rated the highest against the 10 screening elements. A review of Table 5-4 shows that Alternative #13 scored well based primarily on the following:

- Minimal or mitigatable parking impacts
- Simpler construction due to flat terrain
- Allows contractor to phase construction and work faster and use more common construction methods (reducing cost)
- Minimal impacts to business access
- As part of the Wilburton Connections Project, these alternatives were presented to the public through the series of open houses and public hearings, described previously in Section 4.2. Additionally, discussions with adjacent property owners and stakeholders have been on-going throughout the alternatives evaluation process. Based on the information above, Alternative #13 was selected as the preferred alternative for this stage of the project.

5.4 Stage 3: 120th Avenue NE (NE 8th Street to NE 12th Street)

5.4.1 Intersection Alternatives Considered

The first step in the alternatives evaluation process for 120th Avenue NE, between NE 8th Street and NE 12th Street, was to conduct a traffic operations analysis for intersections for this stage of 120th Avenue NE. Unlike the stage to the south between NE 300 block and NE 700 block that just widened the existing 120th Avenue NE roadway, this stage between NE 8th Street and NE 12th Street would build a new roadway across private property to realign the intersection at 120th Avenue NE and NE 8th Street, providing a new north leg and creating a four-legged intersection. Therefore, it was necessary to determine the final configuration of intersections along this portion of 120th Avenue NE before the new roadway alignments could be considered. Intersections considered are discussed in the following subsections.

NE 7th Street Intersection

The concept for this intersection was to restrict all left turns based on its proximity to NE 8th Street. This concept was brought to affected business owners for comment. Based on input from business and property owners, the intersection design was modified to maintain northbound left turns at the intersection of 120th Avenue NE/NE 7th Street.

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Table 5-4. Screening Criteria and Evaluation of Alternatives for 120th Avenue NE (NE 300 block to NE 700 Block)

	Screening Criteria	Scoring by Alternative			Score	Description
		#11 Symmetrical Widening	#12 East Widening	#13 West Widening		
TRAFFIC OPERATIONS						
A	Roadway Geometry	3	3	3	1	Insufficient alignment, smaller curve radii and more curves, short tangents. Achieving minimum sight distance standards.
					2	Sufficient alignment with balance in curves versus tangents, balance between minimum and maximum sight distance standards.
					3	Sufficient alignment with longer tangents, larger radius curves and meets optimum sight distance standards.
B	Business Access – Grade Difference and Locations	2	1	3	1	Steep access driveways to properties. Restricting future expansion opportunities with businesses and the roadway.
					2	Moderate encroachment requiring access adjustments, but not limiting future business or roadway expansion opportunities.
					3	Minor grade differences, no impact to growth opportunities.
TECHNICAL REQUIREMENTS						
C	Topographic and Geological Condtiions	2	2	2.5	1	Extensive walls or other structures.
					2	Moderate wall or other structures.
					3	Minor walls or other structures.
BUSINESS & LAND USE IMPACTS						
D	Business Impacts—Parking	1	1	2	1	Significant loss of parking stalls with little or no recovery on site.
					2	Loss of parking, but with opportunity to recover some on site.
					3	Low or no loss of parking, all recoverable on site.
E	Business Impacts—Operations	2	1	2	1	Significant impact to business operations, such as loss of property for expansion or maintenance of current business levels.
					2	Moderate impacts such as frontage exposure or access revisions.
					3	Low no impact to current business operations.
F	Compatibility with Wilburton Village Vision	2	2	2	1	Substantial adverse impact on planned street and circulation patterns.
					2	Supports planned street and circulation patterns.
					3	Promotes planned street and circulation patterns.

Table 5-4. Screening Criteria and Evaluation of Alternatives for 120th Avenue NE (NE 300 block to NE 700 Block) (continued)

Screening Criteria		Scoring by Alternative			Score	Description
		#11 Symmetrical Widening	#12 East Widening	#13 West Widening		
CONSTRUCTABILITY						
G	Construction—MOT and Staging	2	2	2.5	1	Significant impacts to traffic mobility during construction.
					2	Moderate risk to traffic, short-term detours or minimal access impacts.
					3	Low risk to traffic, only minimal daily or weekend detours necessary. Maximum use of existing roadway.
H	Construction—Project Duration	2	2	3	1	Significant risk to schedule or cost due to project complexity of construction.
					2	Moderate risk to schedule or cost due to project complexity of construction.
					3	Low risk to schedule or cost due to the lack of complexity of construction.
I	Construction—Utility Impacts	1.5	2	1	1	Significant adjustments to public utilities and private utility connections.
					2	Moderate impacts to private utility connections or relatively uncomplicated public utility adjustments.
					3	Minor impacts to private utility connections and public utility adjustments.
J	Construction—Constructability	2.5	2	3	1	Complicated construction method. Large materials need requiring on site stockpiling; non-standard structures such as special wall or bridge design.
					2	Moderately complicated construction method. Use of some standard structure design and some specialized design.
					3	Straight forward common non-complicated construction method using standard wall designs and moderate materials needs.
TOTAL SCORE		**20**	**18**	**24**		

All screening criteria are scored from 1 to 3, with 1 being the least favorable and 3 being the most favorable.
All screening criteria are equally weighted.

Table 5-5. Ranking of Estimated Project Costs of Alternatives for 120th Avenue NE (NE 300 block to NE 700 Block)

	Scoring by Alternative			Score	**Description**
	#11 Symmetrical Widening	#12 East Widening	#13 West Widening		
Project Costs	2	2	2	1	Highest
				2	Middle
				3	Lowest

Note: Costs were not an evaluation criterion and did not factor into the total score.

NE 8th Street Intersection

Some of the design constraints at the intersection concerned both the horizontal and vertical placements and non-motorized (pedestrian facilities and bicycle lanes) connectivity. The existing intersection does not have a northern leg, and expansion of this intersection would move 120th Avenue NE into the existing hillside. Adjusting the intersection's vertical placement impacts the other existing legs of the intersection, adjacent property owners, access points, and utilities.

Several intersection design options were briefly explored and rejected early in the conceptual design phase. The concepts and reasons why they were not advanced are as follows:

- Multi-lane Roundabout: This concept was rejected because it could not provide adequate capacity for future traffic demand. It was also expected to have extensive business impacts and large right-of-way requirements.
- Grade-separated Bridge: This concept was rejected due to a perceived low benefit/cost ratio since the benefits were substantially reduced by greater impacts to access and visibility to local businesses.
- Realign Corridor North of NE 8th Street Only: This concept would not improve operations at the intersection. It would require substantial acquisition of existing commercial property on the northwestern quadrant of the intersection and greatly impact business operations.

The preferred preliminary design was an at-grade signalized intersection with dual left-turn lanes for eastbound, westbound, and northbound traffic, as well as a segregated free right-turn lane for southbound traffic. The preferred preliminary design satisfies the City of Bellevue Design Standards. The preliminary intersection configuration is shown in Figure 5-11.

There was concern with the overall size of the intersection that resulted in the removal of the southbound free right turn to improve the design for pedestrians and bicycles. The eastbound right-turn lane was removed due to lack of forecasted traffic volumes and forecasted changes in travel patterns due to improvements along NE 4th Street and NE 12th Street, and the explicit accommodations for U-turns (eastbound to westbound) were eliminated. Figure 5-12 illustrates the final intersection configuration for the 120th Avenue NE/NE 8th Street intersection.

NE Bel-Red Road Intersection

One mobility goal is to discourage the use of alternate "cut-through" routes. Design options for the NE Bel-Red Road intersection were explored to this end.

The following alternative designs were explored:

- **Signalizing both ends of NE Bel-Red Road (120th Avenue NE and 124th Avenue NE)**—Option rejected as it would attract considerable traffic volumes to this link of NE Bel-Red Road.

- **Restricting turning movements at 124th Avenue NE**—Option abandoned in favor of changes at the intersection of 120th Avenue NE/ NE Bel-Red Road.
- **New 120th Avenue NE/NE Bel-Red Road intersection (two options)**
  - The first option, shown in Figure 5-13, would combine business access on the west side of 120th Avenue NE to create a four-legged signalized intersection with 120th Avenue NE/NE Bel-Red Road. The option was dropped as it did not resolve issues for reducing traffic on NE Bel-Red Road.
  - The second option was to separate the intersections of NE Bel-Red Road and business access on the west side of 120th Avenue NE into two T- intersections, with the business access intersection signalized. This option would discourage cut-through traffic. The intersection of 120th Avenue NE/NE Bel-Red Road would remain unsignalized and operate as right-in/right-out. This design satisfies the City of Bellevue Design Standards. The preferred design concept for the intersection of 120th Avenue NE/NE Bel-Red Road is shown in Figure 5-14.

NE 12th Street Intersection

The existing design of the 120th Avenue NE/NE 12th Street intersection has a pronounced skew that adversely affects traffic operations. The preliminary intersection design improved the skew and accommodated the design vehicle in all turning movements. Additionally, as shown in Figure 5-15, the following improvements were considered in the preliminary configuration to accommodate future forecasted traffic volumes:

- Dual westbound left-turn lane
- Separate southbound right-turn lane

The proposed configuration for the 120th Avenue NE/NE 12th Street intersection was presented to the City. Similar to the 120th Avenue NE/NE 8th Street intersection, there were impacts identified that were associated with the overall size of the footprints of this intersection. The recommendations received were based on traffic analysis results, community input, business impacts and effects on overall non-motorized connectivity.

The recommendations were

- Eliminating the separate southbound right-turn lane
- Eliminating one of the westbound left-turn lanes

The final configuration for the 120th Avenue NE/NE 12th Street intersection is shown in Figure 5-16.

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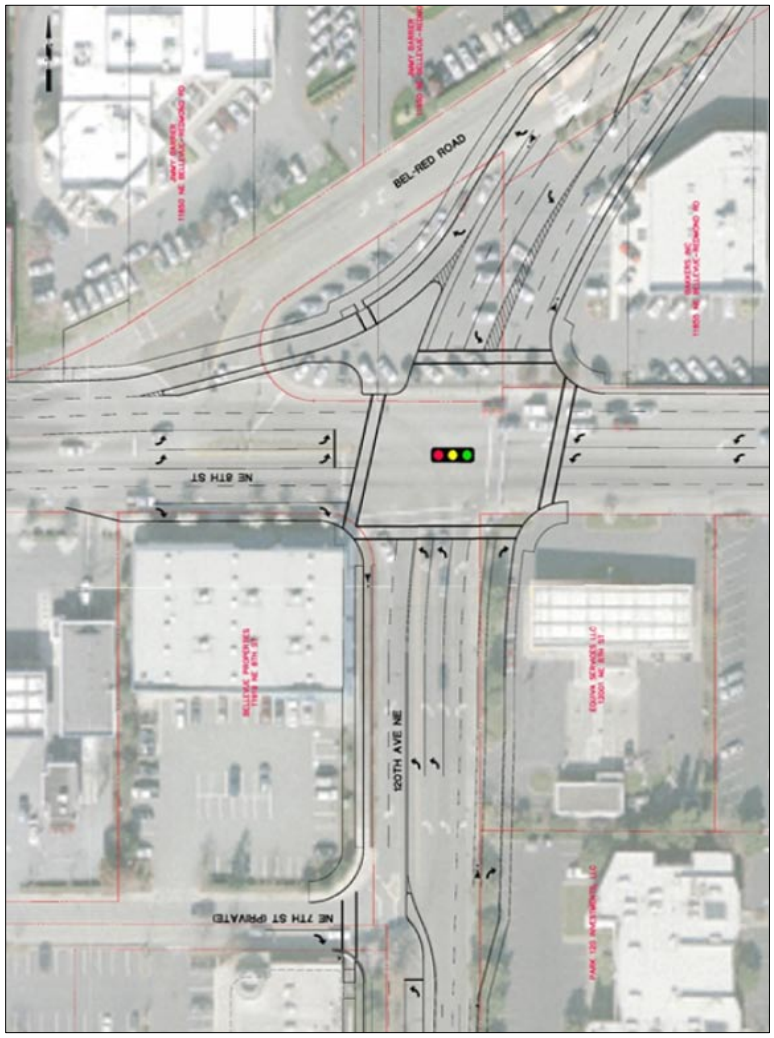

Figure 5-11. Preliminary Configuration for 120th Avenue NE/ NE 8th Street Intersection

Figure 5-12. Final Configuration for 120th Avenue NE/ NE 8th Street Intersection

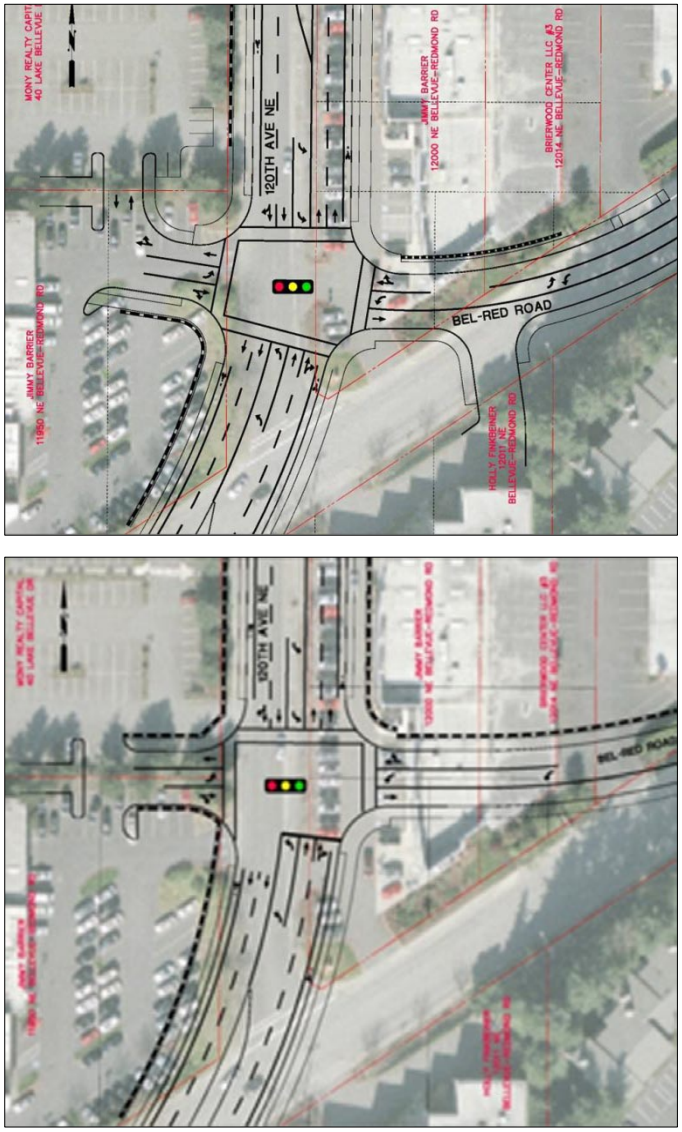

Figure 5-13. Preliminary Configurations for 120th Avenue NE/NE Bel-Red Road Intersection

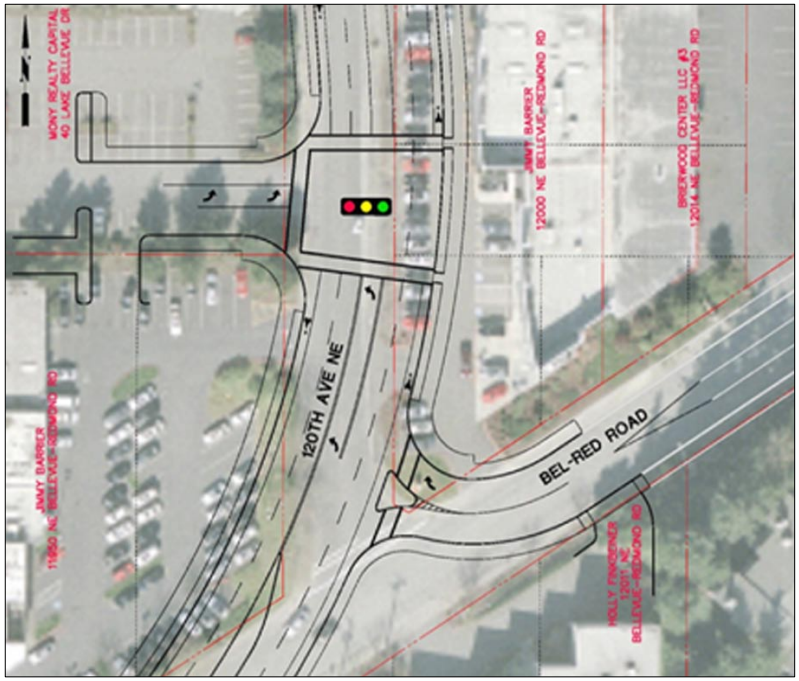

Figure 5-14. Final Configuration for 120th Avenue NE/ NE Bel-Red Road Intersection

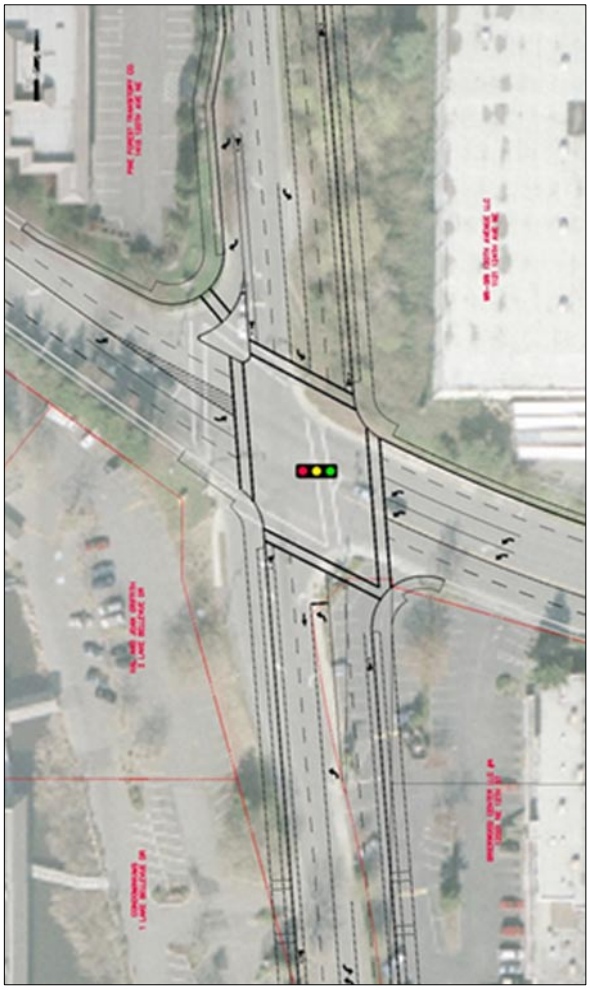

Figure 5-15. Preliminary Configuration for the 120th Avenue NE/NE 12th Street Intersection

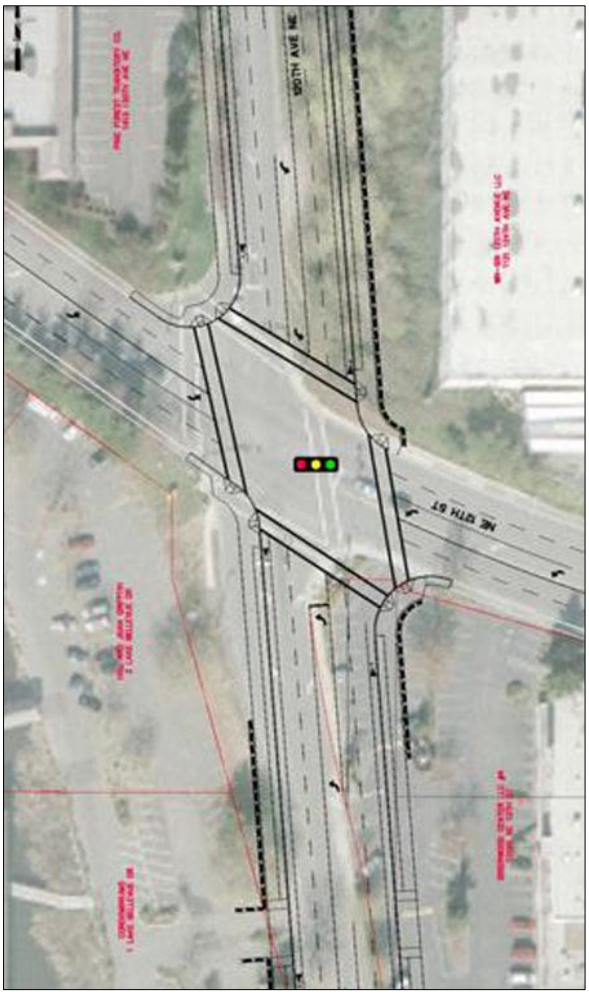

Figure 5-16. Final Configuration for the 120th Avenue NE/NE 12th Street Intersection

5.4.2 Alternative Alignments Considered

The development of alignment alternatives for 120th Avenue NE between NE 8th Street and NE 12th Street started with the resolution of the NE 8th Street intersection geometry. The configuration of this intersection was key to advancing the engineering design north to NE 12th Street. The resolution of the design issues for the NE 8th Street intersection effectively resolved the corridor alignment for the portion of 120th Avenue NE between NE 8th Street and NE Bel-Red Road.

For the portion of 120th Avenue NE, from the proposed new intersection of NE Bel-Red Road northward past the NE 12th Street intersection, three alignment alternatives were considered. They are shown in Figure 5-17 through Figure 5-19 and are described as follows:

- **Alternative #14**—This alignment considers symmetrical widening about the roadway (and right-of-way) centerline in this stage. This is generally considered to be an equitable approach for widening a roadway that already has developments on both sides.
- **Alternative #15**—This alignment considers widening the existing roadway more to the east to see if the project can be constructed without substantial intrusion into the areas of peat known to exist on the west (Lake Bellevue) side of the road.
- **Alternative #16**—This alignment considers widening the existing roadway more to the west to consider how project impacts are increased or reduced versus symmetrical widening. Both sides of the roadway have changes in grade, existing retaining walls, and parking lots.

These alternatives were presented to the public through a series of open houses and public hearings, as described in Section 4.2. Additionally, discussions with adjacent property owners and stakeholders have been on-going throughout the alternatives evaluation process.

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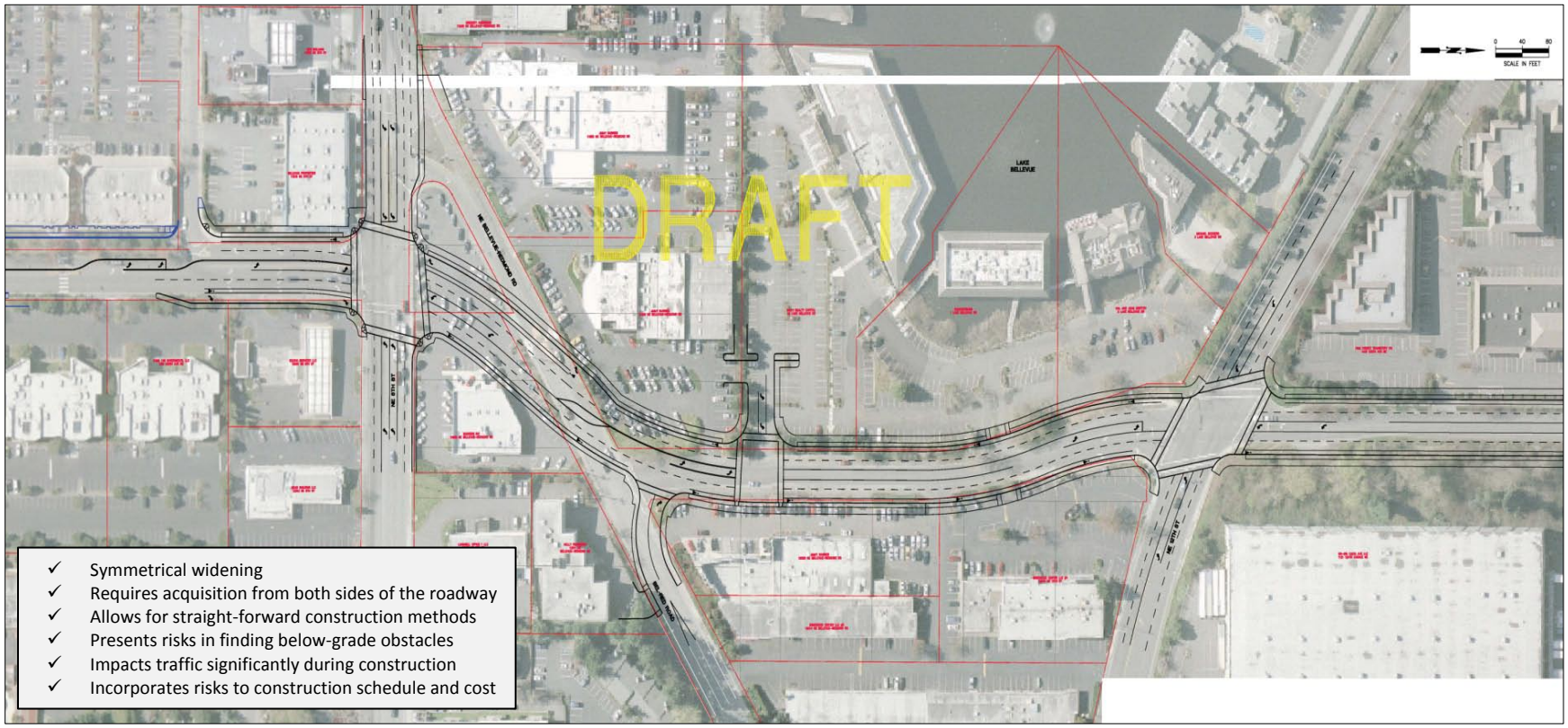

Figure 5-17. 120th Avenue NE (NE 8th to NE 12th Streets): Alternative #14—Symmetrical Alignment

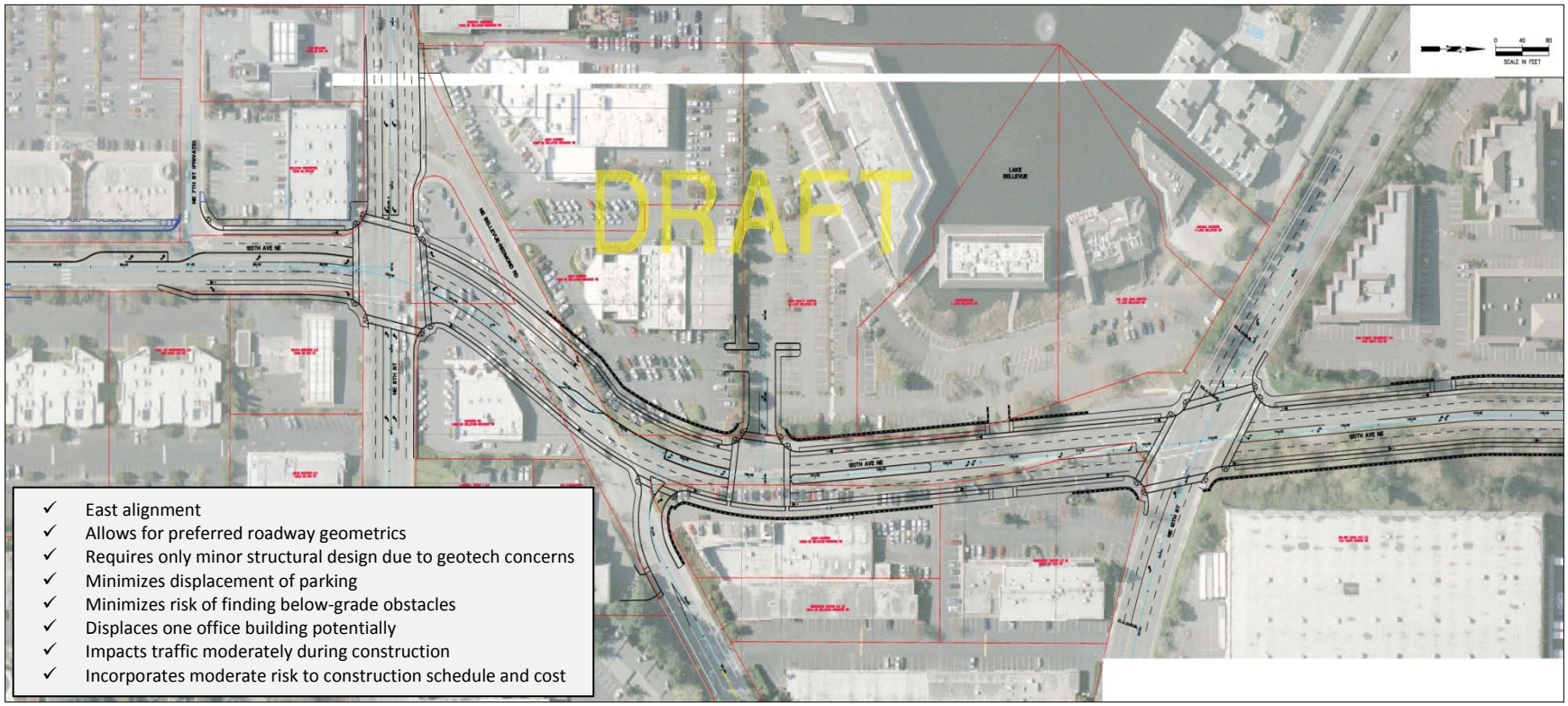

Figure 5-18. 120th Avenue NE (NE 8th to NE 12th Streets): Alternative #15—East Alignment

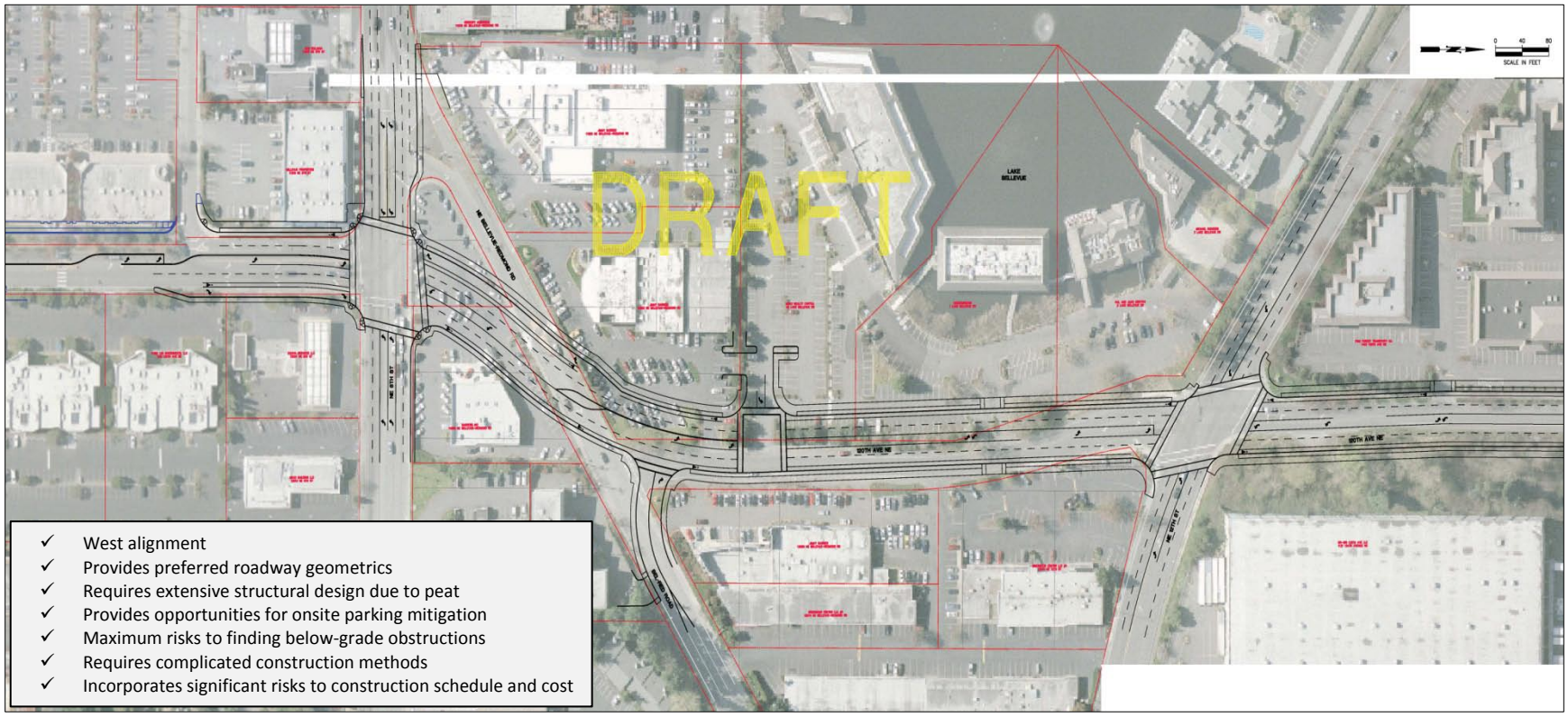

Figure 5-19. 120th Avenue NE (NE 8th to NE 12th Streets): Alternative #16—West Alignment

5.4.3 Preferred Alignment

A qualitative evaluation process was used to support the final decisions regarding the selected preferred alignment option. Multiple factors were qualitatively rated during this evaluation and translated to numeric scoring system. These screening criteria and definitions are presented in Table 5-6 and Table 5-7.

The decision evaluation resulted in the selection of Alternative #15 (east alignment) as the preferred alignment. As shown in Table 5-6, Alternative #15 was rated the highest against 12 screening criteria. A review of the table shows that Alternative #15 scored well based primarily on the following:

- Provides preferred roadway geometrics that directly relate to route continuity and safety
- Results in parking impacts that can be recovered or compensated
- Offers simpler construction over fill material rather than the weaker underlying peak soils near Lake Bellevue
- Allows existing 120th Avenue NE roadway to remain o9pen during construction
- Allows contractor the phase construction, work faster, and use more efficient construction methods
- Avoids multiple utility conflicts
- Allows for construction of typical, less complicated retaining walls
- Reduces drainage impacts to Lake Bellevue
- Offers least costly alignment alternative

Based on this information, Alternative #15 was selected as the preferred alternative for this stage of the project.

Table 5-6. Screening Criteria and Evaluation of Alternatives for 120th Avenue NE (NE 8th Street to NE 12th Street)

Screening Criteria		Scoring by Alternative			Score	Description
		#14 Symmetrical Widening	#15 East Widening	#16 West Widening		
TRAFFIC OPERATIONS						
A	Roadway Geometry	1.5	3	3	1	Insufficient alignment, smaller curve radii and more curves, short tangents. Achieving minimum sight distance standards.
					2	Sufficient alignment with balance in curves versus tangents, balance between minimum and maximum sight distance standards.
					3	Sufficient alignment with longer tangents, larger radius curves and meets optimum sight distance standards.
B	Business Access—Grade Difference and Locations	2	2.5	1	1	Steep access driveways to properties. Restricting future expansion opportunities with businesses and the roadway.
					2	Moderate encroachment requiring access adjustments, but not limiting future business or roadway expansion opportunities.
					3	Minor grade differences, no impact to growth opportunities.
TECHNICAL REQUIREMENTS						
C	Topographic and Geological Conditions	2.5	3	1	1	Extensive walls or other structures or high soil compression risk (peat zone encroachment).
					2	Moderate wall or other structures, minimal encroachment into peat areas.
					3	Minor walls or other structures with small amount of geotechnical issues.
D	Impacts to Lake Bellevue—Water Quality	2	2.5	1	1	High likelihood to significant effect current drainage to Lake Bellevue. Significant retaining wall structures closest to Lake Bellevue.
					2	Moderate likelihood to significant effect current drainage to Lake Bellevue. Significant retaining wall structures closest to Lake Bellevue.
					3	Low likelihood to significant effect current drainage to Lake Bellevue. Significant retaining wall structures closest to Lake Bellevue.
BUSINESS & LAND USE IMPACTS						
E	Business Impacts—Parking	1	2.5	1.5	1	Significant loss of parking stalls with little or no recovery on site.
					2	Loss of parking, but with opportunity to recover some on site.
					3	Low or no loss of parking, all recoverable on site.
F	Business Impacts—Operations	1.5	1.5	2	1	Significant impact to business operations, such as loss of property for expansion or maintenance of current business levels.
					2	Moderate impacts such as frontage exposure or access revisions.
					3	Low no impact to current business operations.
G	Compatibility with City plans & polices	2	2	2	1	Substantial adverse impact on planned street and circulation patterns.
					2	Supports planned street and circulation patterns.
					3	Promotes planned street and circulation patterns.

Table 5-6. Screening Criteria and Evaluation of Alternatives for 120th Avenue NE (NE 8th Street to NE 12th Street)(continued)

Screening Criteria		Scoring by Alternative: #14 Symmetrical Widening	#15 East Widening	#16 West Widening	Score	Description
CONSTRUCTABILITY						
H	Construction—Potential Changed Conditions	1.5	2.5	1	1	Significant risk in finding below grade features and other obstructions (natural and/or manmade).
					2	Moderate risk in finding below grade features and other obstructions (natural and/or manmade).
					3	Low risk of finding underground obstructions.
I	Construction—MOT and Staging	1	2	2	1	Significant impacts to traffic mobility during construction.
					2	Moderate risk to traffic, short-term detours or minimal access impacts.
					3	Low risk to traffic, only minimal daily or weekend detours necessary. Maximum use of existing roadway.
J	Construction—Project Duration	2	2	1	1	Significant risk to schedule or cost due to project complexity of construction.
					2	Moderate risk to schedule or cost due to project complexity of construction.
					3	Low risk to schedule or cost due to the lack of complexity of construction.
K	Construction—Utility Impacts	3	2	1	1	Significant adjustments to public utilities and private utility connections.
					2	Moderate impacts to private utility connections or relatively uncomplicated public utility adjustments.
					3	Minor impacts to private utility connections and public utility adjustments.
L	Construction—Constructability	3	2	1	1	Complicated construction method. Large materials need requiring on site stockpiling; non-standard structures such as special wall or bridge design.
					2	Moderately complicated construction method. Use of some standard structure design and some specialized design.
					3	Straight forward common non-complicated construction method using standard wall designs and moderate materials needs.
TOTAL SCORE		**22**	**27.5**	**17.5**		

All screening criteria are scored from 1 to 3, with 1 being the least favorable and 3 being the most favorable. All screening criteria are equally weighted.

Table 5-7. Ranking of Estimated Project Costs of Alternatives for 120th Avenue NE (NE 8th Street to NE 12th Street)

	Scoring by Alternative: #14 Symmetrical Widening	#15 East Widening	#16 West Widening	Score	**Description**
Project Costs	2	2.5	1	1	Highest
				2	Middle
				3	Lowest

Note: Costs were not an evaluation criterion and did not factor into the total score

5.5 Stage 4: 120th Avenue NE (NE 12th Street to Northup Way)

5.5.1 Alternative Alignments Considered

Three alternative alignments were considered for this stage:

- **Alternative #17**—This alignment considers symmetrical widening about the roadway (and right-of-way) centerline along a substantial length in this stage to balance and minimize impacts. It is also generally considered the most equitable approach for widening a roadway that already has developments on both sides.
- **Alternative #18**—This alignment considers widening the existing roadway more to the east. It takes advantage of unique opportunities on the east side to widen using slopes on vacant land rather than having to construct retaining walls. This alignment also takes advantage of opportunities to minimize specific project impacts, such as wetlands and parking.
- **Alternative #19**—This alignment considers widening the existing roadway more to the west to take advantage of opportunities to minimize specific project impacts, such as wetlands and parking.

Figure 5-20 through Figure 5-22 illustrate the alternative alignments for this portion of 120th Avenue NE.

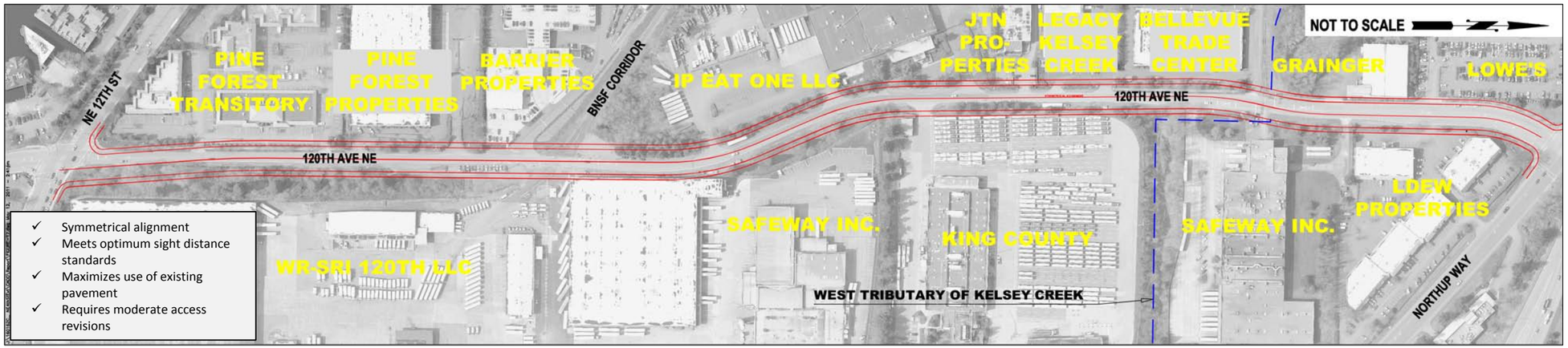

Figure 5-20. 120th Avenue NE (NE 12th Street to Northup Way): Alternative Alignment #17—Symmetrical Alignment

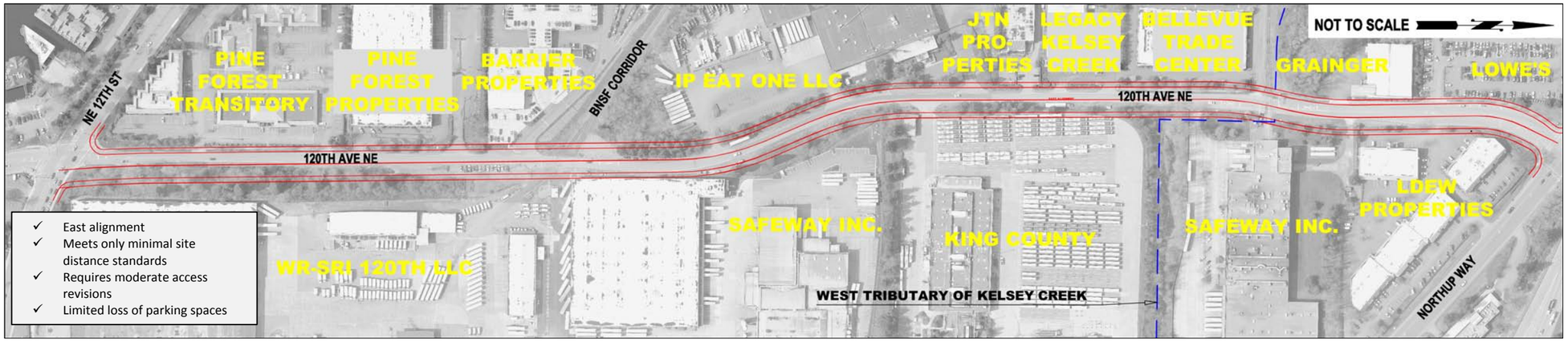

Figure 5-21. 120th Avenue NE (NE 12th Street to Northup Way): Alternative Alignment #18—East Alignment

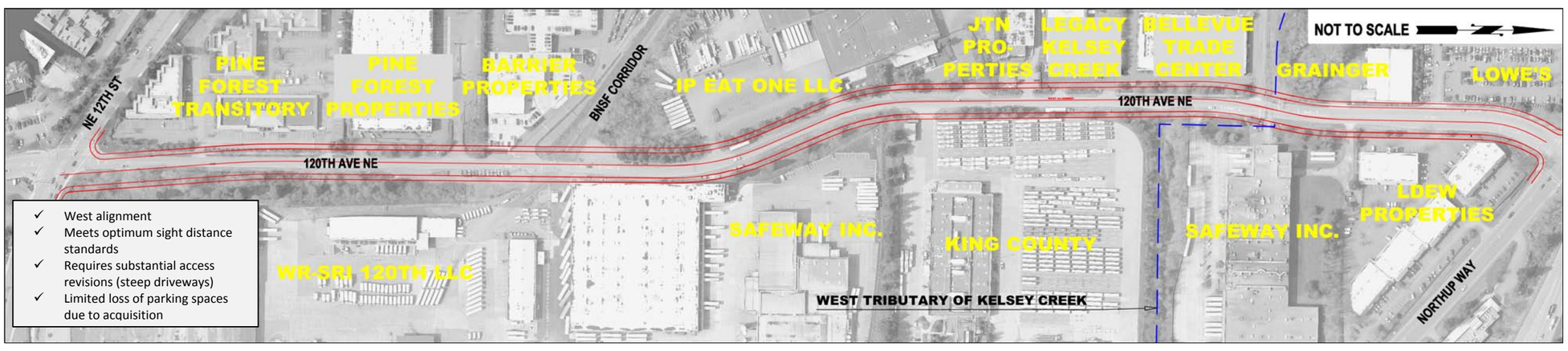

Figure 5-22. 120th Avenue NE (NE 12th Street to Northup Way): Alternative Alignment #19—West Alignment

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A qualitative evaluation process was used to support the final decisions regarding the selected preferred alignment option. Multiple factors were qualitatively rated during this evaluation and translated to a numeric scoring system. These screening criteria and ratings are presented in Table 5-8. Alternative #17 was ranked the highest with a score of 24. A review of Table 5-8 shows that Alternative #17 scored well based primarily on the following:

- Low impact on existing parking
- Supports current business operations
- Low risk for subsurface changed conditions
- Consistent construction envelope.

Based on the above information, Alternative #17 was selected as the preferred alternative. However, Alternatives #17 and #19 were essentially rated a tie with only half a point difference in score. This means there could be benefits to shifting the alignment slightly to the west in some places to minimize edge impacts on the east side of the project. This is a possibility that can be explored during final design.

5.5.2 Channelization Options: NE 18th Street to Northup Way

As engineering and environmental studies progressed for 120th Avenue NE, additional travel demand modeling and traffic analysis were conducted to investigate the possibility of reducing the five-lane roadway section proposed in the City's *Transportation Facilities Plan* (Bellevue 2009a) to a four-lane roadway section north of about NE 18th Street. This is because traffic modeling documented in the *Transportation Technical Report* (PB 2011h) indicated lower-than-expected traffic volumes along this portion of the project corridor though the midterm future. As such, the traffic volumes did not appear to justify the proposal to construct a five-lane roadway at this time.

In March 2011, a technical memorandum was completed that evaluated channelization options for 120th Avenue NE north of NE 18th Street (PB 2011b). In this analysis, the five-lane cross-section is considered Option 1. Two additional lane configurations were evaluated in the supplemental traffic modeling. These additional channelization options were both four-lane configurations and both had only one southbound lane. The options differed primarily in the amount of proposed right-of-way with Option 1 and 3 requiring about 93 feet and Option 2 requiring about 82 feet. The back of sidewalk on the eastside would be in the same location for all options. See Figure 5-23 for illustrations of the roadway cross-section options considered.

The traffic analysis looked at the operation of intersections and driveways along 120th Avenue NE between NE 18th Street and Northup Way. Based on results of the analysis, it was determined that any of the five-lane or four-lane options would be able to accommodate future traffic demands along 120th Avenue NE through the 2030 horizon year.

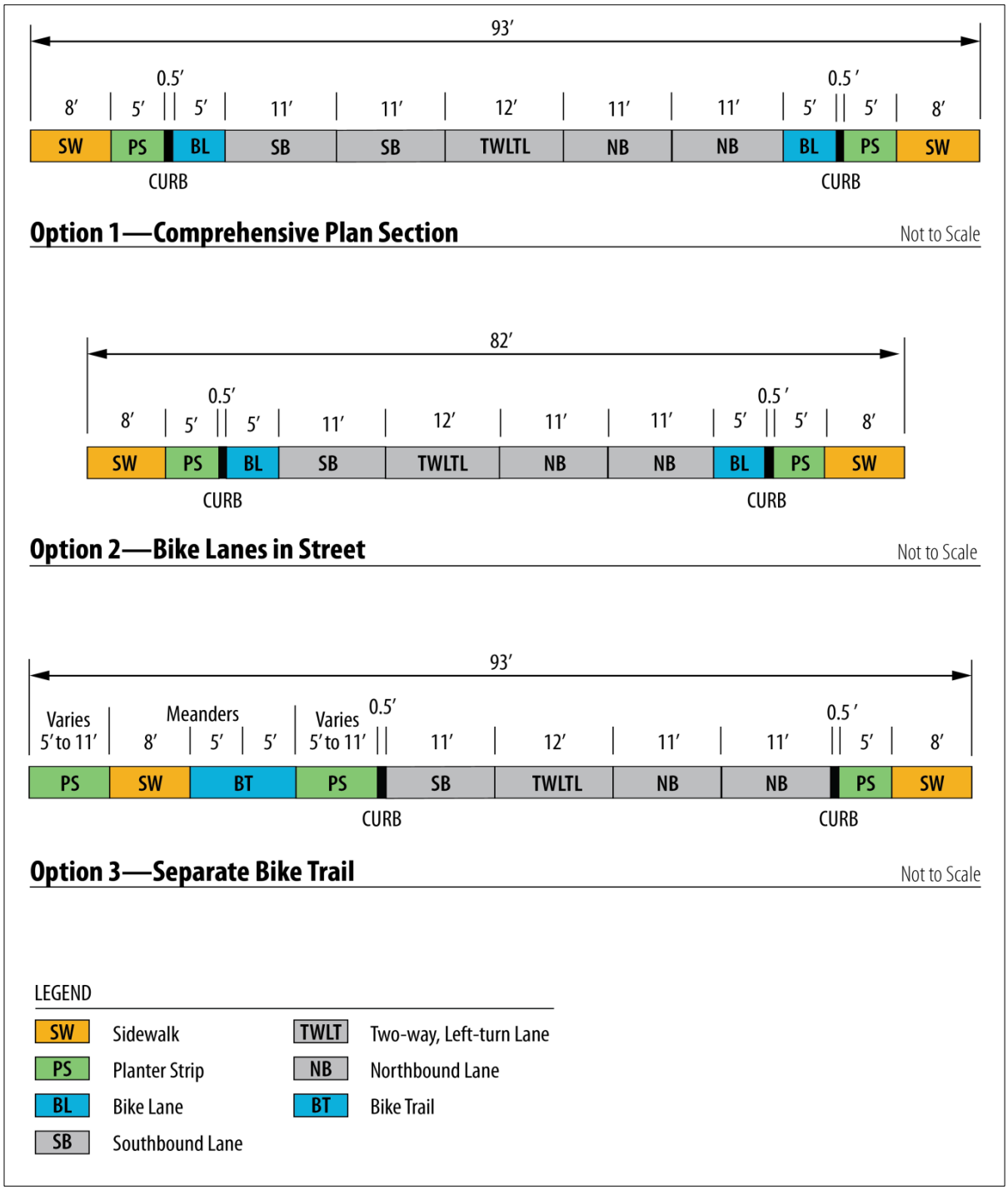
Table 5-8. Screening Criteria and Evaluation of Alternatives for 120th Avenue NE (NE 12th Street to Northup Way)

Screening Criteria		Scoring by Alternative			Score	Description
		#17 Symmetrical Widening	#18 East Widening	#19 West Widening		
TRAFFIC OPERATIONS						
A	Roadway Geometry	2	1.5	3	1	Insufficient alignment, smaller curve radii and more curves, short tangents. Achieving minimum sight distance standards.
					2	Sufficient alignment with balance in curves versus tangents, balance between minimum and maximum sight distance standards.
					3	Sufficient alignment with longer tangents, larger radius curves and meets optimum sight distance standards.
B	Business Access—Grade Difference and Locations	2	2.5	2	1	Steep access driveways to properties. Restricting future expansion opportunities with businesses and the roadway.
					2	Moderate encroachment requiring access adjustments, but not limiting future business or roadway expansion opportunities.
					3	Minor grade differences, no impact to growth opportunities.
TECHNICAL REQUIREMENTS						
C	Topographic and Geological Risks	2	2	1.5	1	Complicated construction method. Large materials need requiring on site stockpiling; non-standard structures such as special wall or bridge design.
					2	Moderately complicated construction method. Use of some standard structure design and some specialized design.
					3	Straight forward common non-complicated construction method using standard wall designs and moderate materials needs.
D	Impacts to Lake Bellevue—Water Quality	1.5	3	1	1	Extensive walls or other structures or high soil compression risk (peat zone encroachment).
					2	Moderate wall or other structures, minimal encroachment into peat areas.
					3	Minor walls or other structures with small amount of geotechnical issues.
BUSINESS & LAND USE IMPACTS						
E	Business Impacts—Parking	2.5	1	3	1	Significant loss of parking stalls with little or no recovery on site.
					2	Loss of parking, but with opportunity to recover some on site.
					3	Low or no loss of parking, all recoverable on site.
F	Business Impacts—Operations	3	1.5	2.5	1	Significant impact to business operations, such as loss of property for expansion or maintenance of current business levels.
					2	Moderate impacts such as frontage exposure or access revisions.
					3	Low to no impact to current business operations.

Table 5-8. Screening Criteria and Evaluation of Alternatives for 120th Avenue NE (NE 12th Street to Northup Way) (continued)

Screening Criteria		Scoring by Alternative			Score	Description
		#17 Symmetrical Widening	#18 East Widening	#19 West Widening		
G	Compatibility with City plans & polices	2	2	2	1	Substantial adverse impact on planned street and circulation patterns.
					2	Supports planned street and circulation patterns.
					3	Promotes planned street and circulation patterns.
CONSTRUCTABILITY						
G	Construction—Potential Changed Conditions	2.5	1.5	2	1	Significant risk in finding below grade features and other obstructions (natural and/or manmade).
					2	Moderate risk in finding below grade features and other obstructions (natural and/or manmade).
					3	Low risk of finding underground obstructions.
H	Construction—MOT and Staging	2.5	2	2.5	1	Significant impacts to traffic mobility during construction.
					2	Moderate risk to traffic, short-term detours or minimal access impacts.
					3	Low risk to traffic, only minimal daily or weekend detours necessary. Maximum use of existing roadway.
I	Construction—Project Duration	2	2	2	1	Significant risk to schedule or cost due to project complexity of construction.
					2	Moderate risk to schedule or cost due to project complexity of construction.
					3	Low risk to schedule or cost due to the lack of complexity of construction.
J	Construction—Utility Impacts	2	2	2	1	Significant adjustments to public utilities and private utility connections.
					2	Moderate impacts to private utility connections or relatively uncomplicated public utility adjustments.
					3	Minor impacts to private utility connections and public utility adjustments.
K	Construction—Constructability	2	2	2	1	Complicated construction method. Large materials need requiring on site stockpiling; non-standard structures such as special wall or bridge design.
					2	Moderately complicated construction method. Use of some standard structure design and some specialized design.
					3	Straight forward common non-complicated construction method using standard wall designs and moderate materials needs.
TOTAL SCORE		**26**	**23.5**	**25.5**		

All screening criteria are scored from 1 to 3, with 1 being the least favorable and 3 being the most favorable.
All screening criteria are equally weighted.



Note: The proposed implementation of the three channelization options would have all aligned along the eastern edge of the right-of-way for Option 1, the five-lane cross-section.

Figure 5-23. Channelization Options for 120th Avenue NE North of NE 18th Street

In the end, a four-lane configuration was selected for the section of 120th Avenue NE from the NE 1800 block to Northup Way. On April 8, 2011, a revised description was submitted to the Puget Sound Regional Council to modify the STIP project description north of NE 18th Street to reflect two northbound lanes, one southbound lane, and a center two-way left-turn lane. This change will be included in the June 2011 amendment to the STIP.

Additional consideration was given to evaluating the four-lane cross-section designs for Option 2 and Option 3. A key distinguishing attribute between the two options is that the right-of-way for Option 2 would be 82 feet and 93 feet for Option 3. The decision to select Option 3 was made because the planned large-scale redevelopment of the Bel-Red Corridor—such as the high-density Spring District adjacent to 120th Avenue NE—would make future right-of-way acquisition extremely costly should a second southbound lane be needed after 2030. Option 3 does not reduce the amount of right-of-way to be acquired, but the construction cost would be substantially less. Option 3 also provides the most flexibility for the 10-foot, two-way regional bike trail concept proposed by the City for the west side of the roadway. Option 3 is the design for the widening of 120th Avenue NE north of NE 18th Street that is evaluated in the environmental review documentation.

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6.0 Alternative Selection

The detailed evaluation performed for the NE 4th Street/120th Avenue NE Corridor Project resulted in the selection of an alignment for the corridor that addressed the unique needs of each stage, and the overall objectives of the project. The proposed corridor design represents improvements that address travel demand from anticipated growth in the Downtown, Wilburton and Bel-Red subareas, while minimizing impacts, improving access, and reducing congestion.

6.1 Overview of Proposed Improvements

The proposed NE 4th Street/120th Avenue NE Corridor Project consists of a five-lane roadway section over 85 percent of the corridor, with a four lane roadway section covering the remaining 15 percent. The proposed project is generally described as follows:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE.
- Widen and realign the existing 120th Avenue NE to five travel lanes from the NE 300 block to about the planned NE 18th Street intersection. Reconfigure intersections on 120th Avenue NE at NE 8th Street, NE Bel-Red Road, and NE 12th Street. The existing section of NE Bel-Red Road between NE 8th Street and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of about NE 18th Street to just south of Northup Way with a transition section occurring between NE 16th and NE 18th Streets.
- Design roadway improvements to accommodate new intersections at NE 15th, NE 16th, and NE 18th Streets, and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street between 116th and 120th Avenues NE, and 120th Avenue between NE 4th and NE 15th Streets.
- Install a multi-purpose trail on the west side of 120th Avenue NE between NE 15th and NE 16th Streets. Also include a northbound in-street bike lane and east side sidewalk. Install a bike trail on the west side and sidewalks on both sides of 120th Avenue NE north of NE 16th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, and water quality treatment facilities, and use natural drainage practices to the extent practicable.

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- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities

6.2 Proposed Alignment

The selected alignments for the proposed roadway improvements for the NE 4th Street/120th Avenue NE Corridor Project vary along the corridor (see Figure 6-1 through Figure 6-4).

For the extension of NE 4th Street between 116th Avenue NE and 120th Avenue NE, the preferred alternative is centrally located in the corridor compared to the other alternatives considered. The alignment accommodates planned redevelopment of properties north and south of the alignment west of the BNSF corridor. The preferred alternative substantially reduces impacts to retail businesses east of the BNSF corridor compared to the other alternatives. In addition, additional mitigation for the property owners would be facilitated by the City.

The preferred alignment for widening 120th Avenue NE between the NE 300 block and the NE 700 block is the alternative that generally widens the roadway on the west side. Between NE 8th Street and NE 12th Street, the alternative selected accommodates realignment of the roadway and reconfiguration of the three intersections with most of the widening occurring on the east side of the existing roadway. For the most northern portion of the corridor, the alternative selection results in essentially symmetrical widening of the existing roadway, which results in a “best fit” proposal.

In general, the proposed alignments for the four stages comprising the NE 4th Street/120th Avenue NE Corridor Project meets the City’s transportation needs while minimizing adverse effects along the corridor.

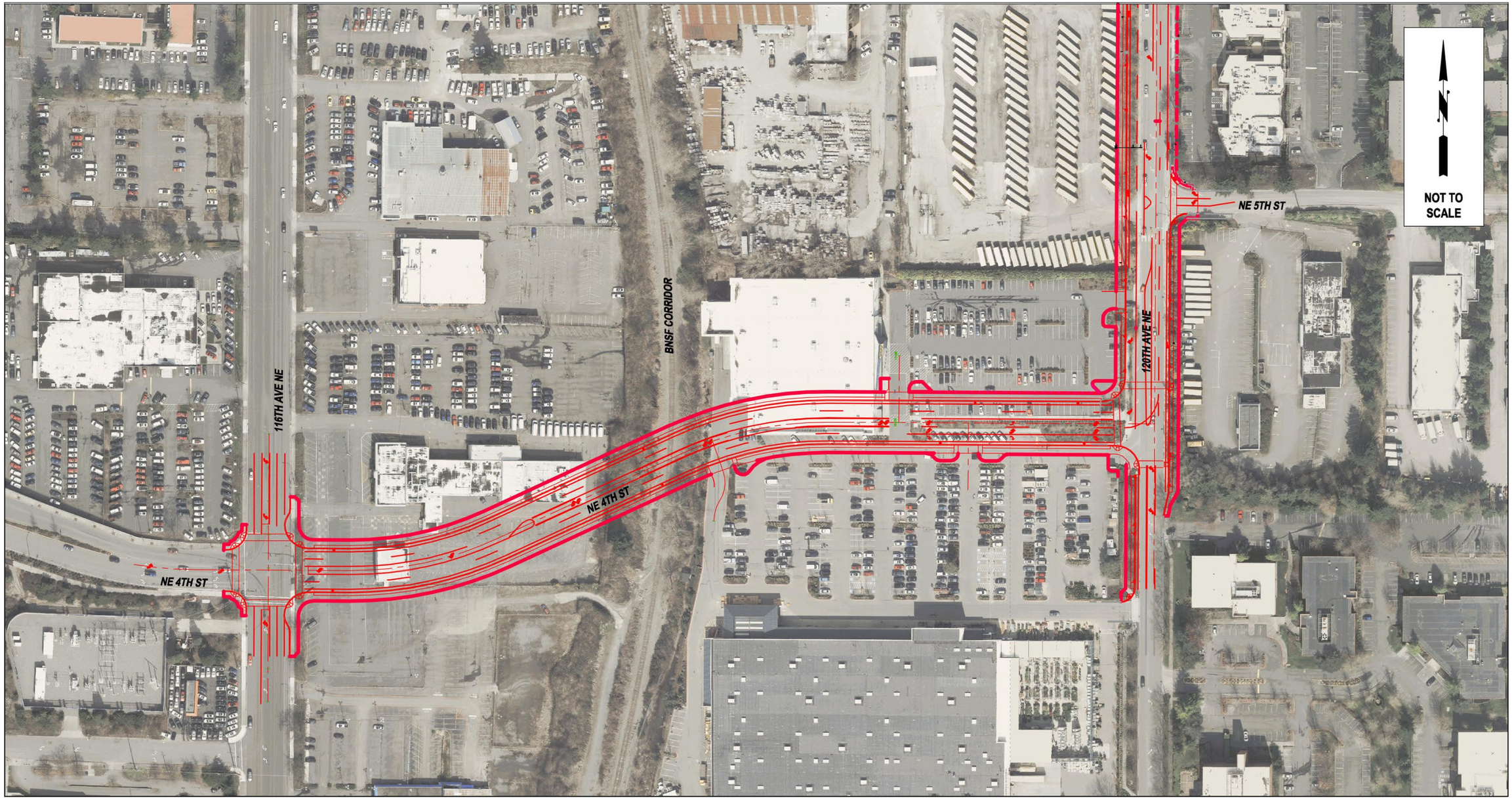

Figure 6-1. NE 4th Street/120th Avenue NE Corridor Project: Preferred Alignment (Stage 1 and Stage 2)

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Figure 6-2. NE 4th Street/120th Avenue NE Corridor Project: Preferred Alignment (Stage 2 and Stage 3)

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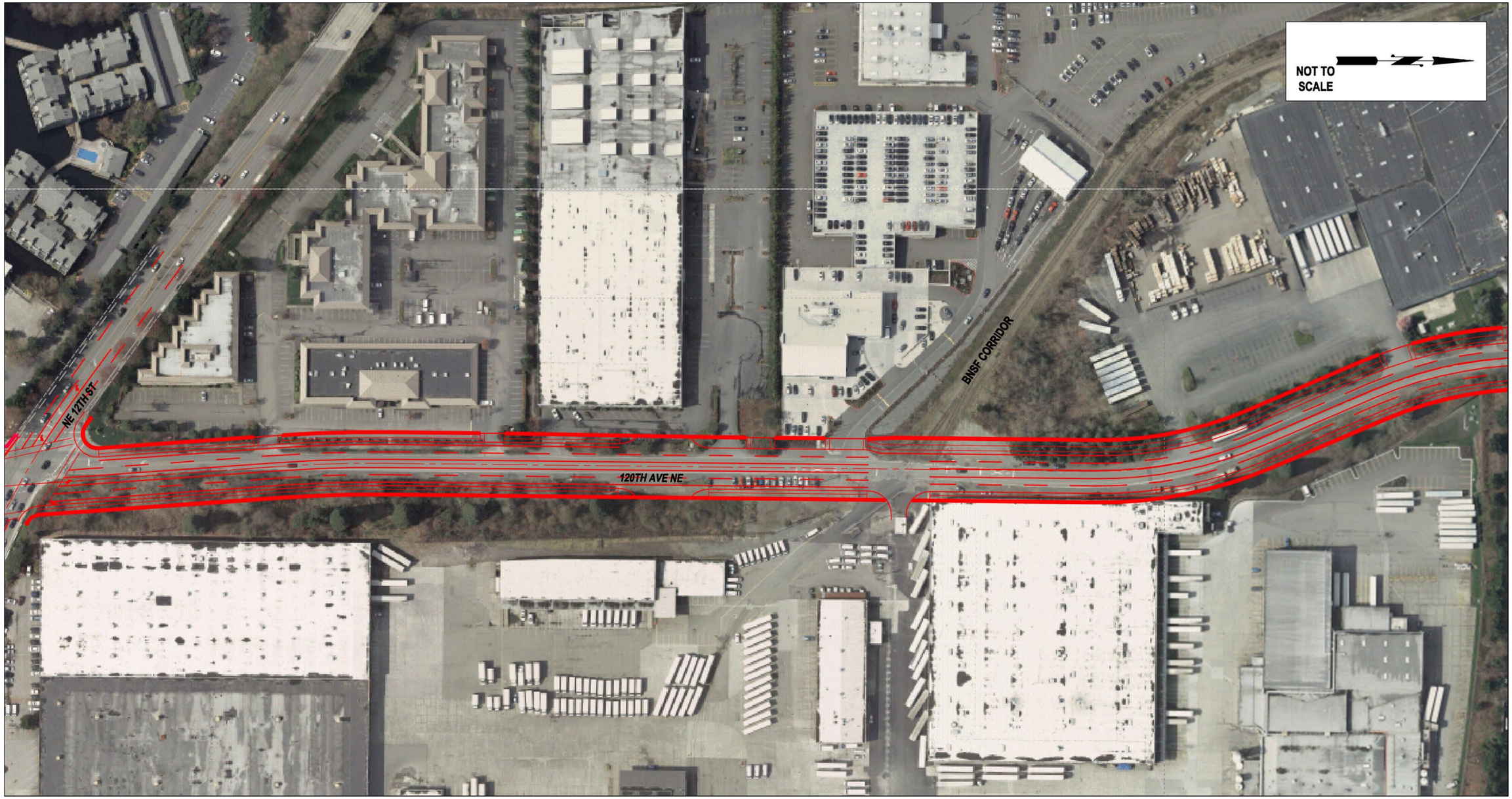

Figure 6-3. NE 4th Street/120th Avenue NE Corridor Project: Preferred Alignment (Stage 4 South)

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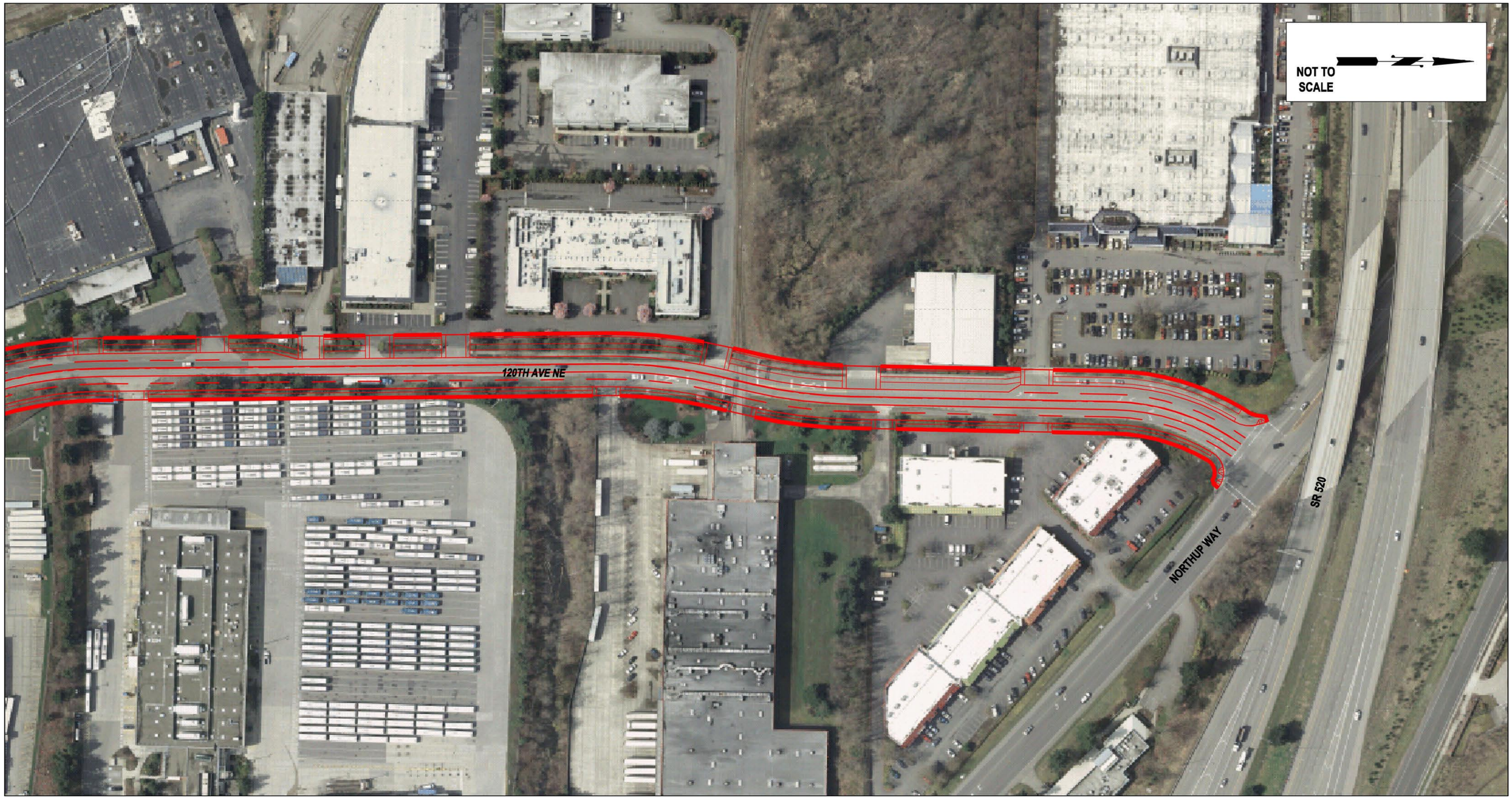

Figure 6-4. NE 4th Street/120th Avenue NE Corridor Project: Preferred Alignment (Stage 4 North)

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6.3 Proposed Cross-Section

The five-lane roadway design proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE from the NE 300 block north to about NE 18th Street would generally reflect the roadway cross-section shown in Figure 6-5. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. A 5-foot-wide bike lane generally would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. The size and location of the sidewalks, bicycle facilities, and planter strips may vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

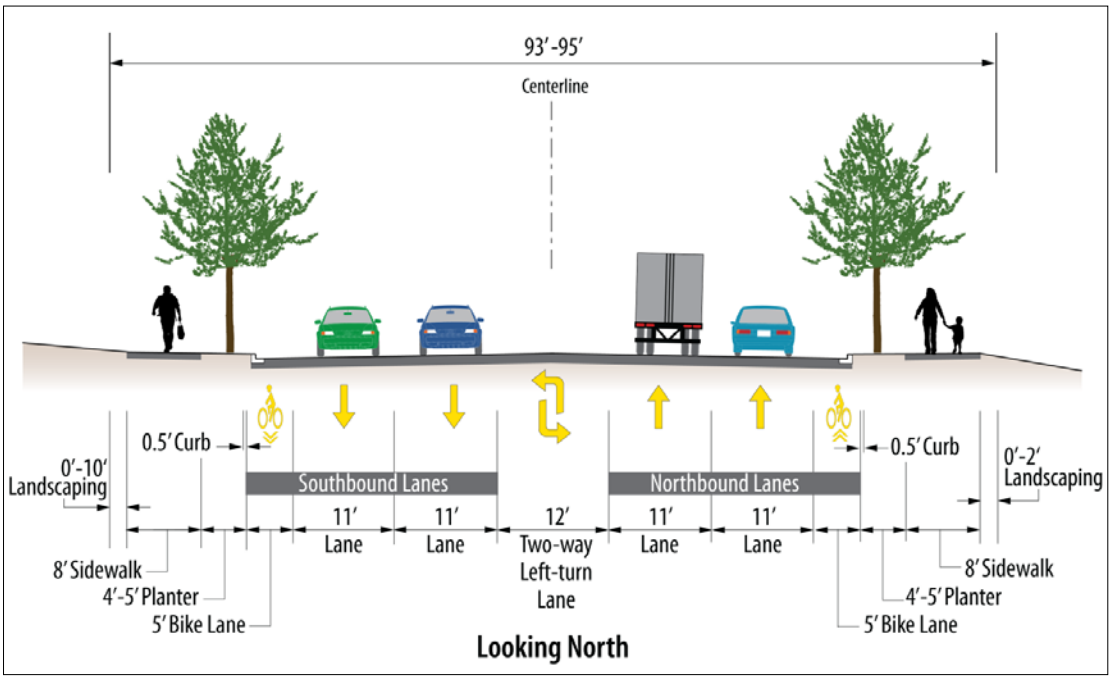

Figure 6-5. Typical Section—Five-lane Roadway Design

The four-lane roadway section proposed for 120th Avenue NE from about NE 18th Street to just south of Northup Way would generally reflect the four-lane cross-section shown in Figure 6-6. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes—two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties.

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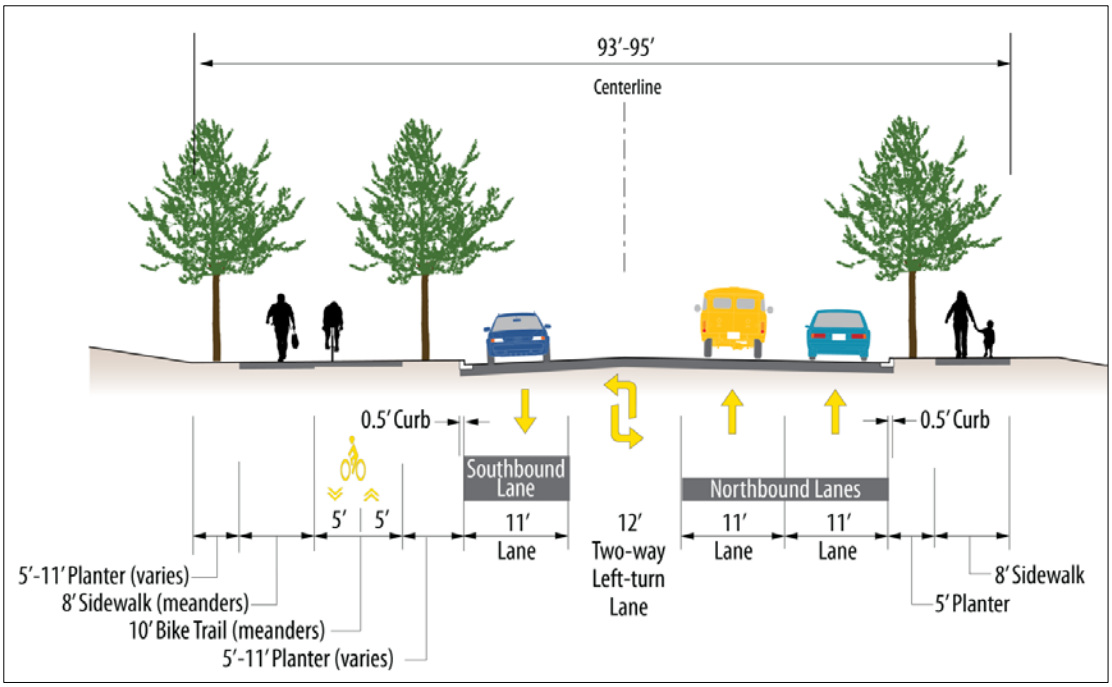

Figure 6-6. Typical Section—Four-lane Roadway Design

A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed on both sides of a combined two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

Special cross-sections would need to be designed to provide a transition between the five-lane and four-lane roadway sections between about NE 16th Street and NE 18th Street. Few improvements would be required at the 120th Avenue NE intersection with Northup Way as that intersection is currently a five-lane cross-section.

Along some portions of the corridor, the required right-of-way would need to exceed 95 feet. Both of the proposed roadway cross-sections include the use of retaining walls. Cut and fill retaining walls are proposed at numerous locations due to changes in elevation on both sides of the roadway. Where retaining walls are required, these structures would generally be located immediately adjacent to and behind the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet wide.

To the outside of the retaining walls, the soil would be graded to a maximum 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 119 feet or more where retaining walls are needed on both sides of the roadway.

7.0 References

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NE 4th Street/ 120th Avenue NE Corridor Project

Biological Resources Technical Report

prepared for
City of Bellevue

prepared by
Shannon & Wilson, Inc.

June 3, 2011

COB File # 11-114971-LM

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Appendix A—Noise Analysis
Appendix B—Bel-Red Living Streams Document
Appendix C— Highway Runoff Dilution Analysis

Acronyms and Abbreviations

the City	the City of Bellevue
Ecology	Washington Department of Ecology
ESA	Endangered Species Act
HI-RUN	Washington State Department of Transportation Highway Runoff Dilution subroutine
I-405	Interstate 405
MSA	Magnuson-Stevens Act
NE	Northeast
PB	Parsons Brinkerhoff
NMFS	National Marine Fisheries Services
WNHP	Washington Natural Heritage Program
WRIA 8	Watershed Water Resource Inventory Area No. 8

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Executive Summary

This *Biological Resources Technical Report* is being prepared for the City of Bellevue in support of the No Effect Letter for the Northeast (NE) 4th Street/120th Avenue NE Corridor Project. For this project, the City of Bellevue proposes to extend NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE and comprehensive widening and realignment of 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way.

The purpose of this assessment is to document expected effects on Endangered Species Act (ESA)-protected species and habitat and Magnuson-Stevens Act (MSA)-protected habitat from the project and any associated actions, such as mitigation.

The project corridor is located in two subbasins: the Sturtevant Creek subbasin to the south and the West Tributary of Kelsey Creek subbasin to the north. Light-industrial development, likely built in the last 40 years, currently dominates the environment. Much of this area was developed without stormwater control. The West Tributary of Kelsey Creek is the only stream located within the project boundary or its immediate vicinity and drains the northern third of the project corridor. The creek crosses under 120th Avenue NE at the northern end of the corridor and flows east and south approximately 3,5000 feet where passes through an approximately 2,000 foot pipe that is a fish barrier based on WDFW SalmonScape maps (WDFW, 2010) and the City's basin map (Bellevue, 2010b). Sturtevant Creek originates at Lake Bellevue west of 120th Avenue NE and drains the southern two-thirds of the project corridor.

A total of 15 species were identified as threatened or endangered within King County by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service and the U.S. Fish and Wildlife Service as of April 2011. Of the species listed as potentially present in King County, no terrestrial, plant, avian, or marine mammal species are documented or expected within the project's Action Area due to a lack of suitable habitat, though avian species are not precluded from flying over the site. Marine species and anadromous species potentially present in King County are precluded from the basin by downstream culverts that are documented as full barriers to upstream passage, one on each of the draining tributaries for the project. Critical Habitat is designated in King County for marbled murrelet, northern spotted owl, Chinook salmon, bull trout, and killer whale; however, northern spotted owl and killer whale are considered precluded from the Action Area due to lack of potential habitat.

In conclusion, the potential effects on ESA-listed species or designated critical habitat are as follows:

- No effect on terrestrial and plant species due to urban environment and lack of suitable wildlife corridors or habitat.

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- No effect on avian species due to lack of appropriate nesting, foraging, or critical habitat in or near the Action Area.
- No effect on marine species due to lack of marine habitat.
- No effect on steelhead trout, Chinook salmon, or bull trout due to culverts located 3,000 to 5,500 feet downstream of the proposed project that are documented as full barriers to upstream passage and because potential project water quality impacts are not expected to reach salmonid fish populations.
- Would not adversely affect essential fish habitat due to the lack of such habitat in the Action Area.

1.0 Proposed Project

The Northeast (NE) 4th Street/120th Avenue NE Corridor Project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include: the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road (Figure 1-1).

The elements of the project include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.
- Construct improvements that support the planned new intersections at NE 15th/16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.

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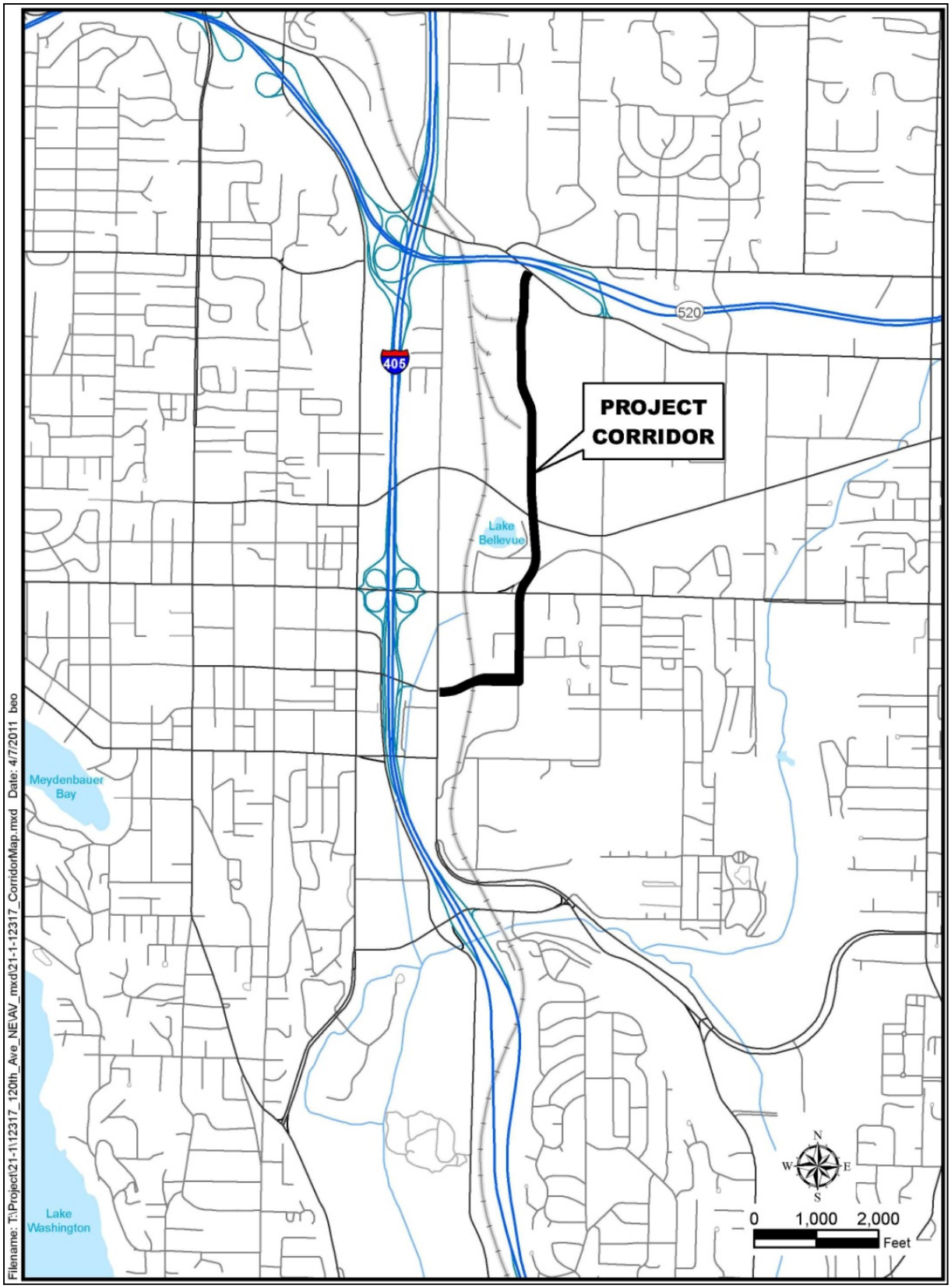

Figure 1-1. Project Vicinity Map

- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

Four wetlands, labeled Wetlands A, B, C, and D, are adjacent to the project corridor (Figure 1-2). The proposed project would impact Wetlands A, B, and C. For project wetland and stream impacts, mitigation likely would occur offsite but upstream of known anadromous fish blockages. Wetland mitigation in the West Tributary of Kelsey Creek basin likely would occur upstream of an outlet-control structure on the waterway, located approximately 0.6 mile downstream of the project corridor (Figure 1-2). Wetland mitigation in the Lake Bellevue/ Sturtevant Creek basin likely would occur upstream of Interstate 405 (I-405); however, a mitigation site has not been identified.

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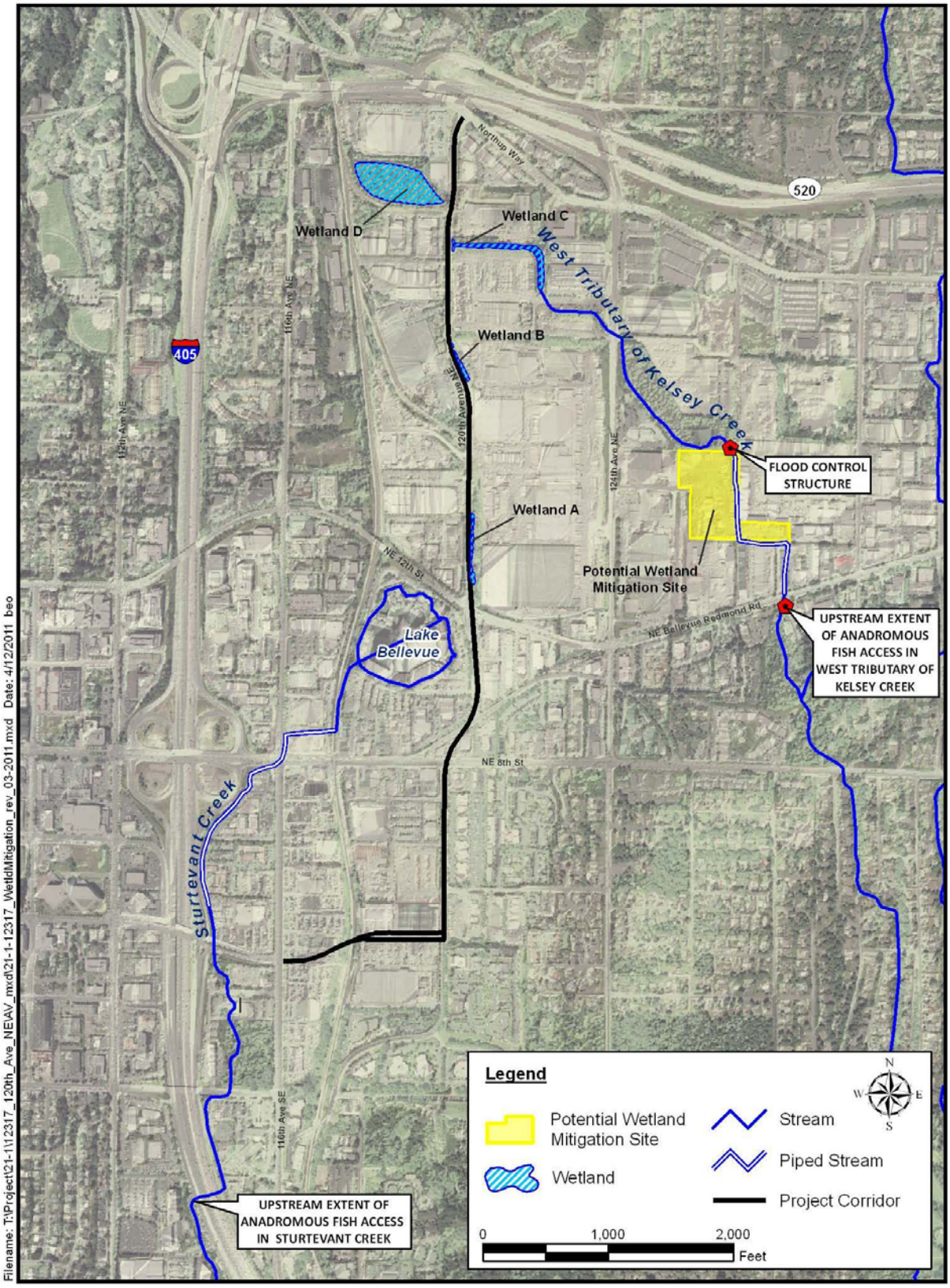

Figure 1-2. Potential Wetland Mitigation Site

2.0 Existing Conditions

The project corridor is located in two subbasins: the Sturtevant Creek subbasin to the south and the West Tributary of Kelsey Creek subbasin to the north. Light-industrial development, likely built in the last 40 years, currently dominates the environment. Much of this area was developed without stormwater control.

2.1 Stream Crossings in the Project Corridor

The West Tributary of Kelsey Creek is the only stream located within the project boundary or its immediate vicinity. The on-site reach includes the stream's headwaters within Wetland D, where it gradually flows within a 5-foot-wide active channel with a bed comprised of 6 inches of silt before entering a 36-inch culvert under 120th Avenue NE. The stream daylights again within the project corridor approximately 260 feet downstream into a channel within Wetland C. The active channel in Wetland C is approximately 4 feet wide with a bed comprised of sand and well-rounded gravels. As the stream exits the 36-inch corrugated metal pipe under 120th Avenue NE, the ordinary high water mark for the stream quickly fans out above the banks of the active channel and encompasses much of Wetland C.

2.2 Receiving Waterbodies

2.2.1 Sturtevant Creek

Sturtevant Creek drains the southern two-thirds of the project corridor. This creek originates at Lake Bellevue and flows south in a ditch adjacent to railroad tracks for approximately 600 feet before going into an underground pipe at approximately NE 8th Street (Figure 2-1). Sturtevant Creek daylights again at NE 4th Street (Figure 2-2) and flows south to where it crosses under I-405.

After it crosses I-405, Sturtevant Creek flows south to its confluence with Kelsey Creek/Mercer Slough. I-405 is a fish passage barrier based on WDFW SalmonScape maps (WDFW, 2010) and the City's basin map for Sturtevant Creek (Bellevue, 2010a). Even if this fish barrier was removed, the piped portion of Sturtevant Creek would be considered another fish barrier (Figure 2-3).

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Figure 2-1. Upstream Extent of Sturtevant Creek (Between NE 8th Street and Lake Bellevue)

Figure 2-2. Sturtevant Creek South of NE 4th Street.

2.2.2 West Tributary of Kelsey Creek

The West Tributary of Kelsey Creek drains the northern third of the project corridor (Figure 2-4).

Approximately 3,500 feet downstream of the project corridor, the West Tributary of Kelsey Creek passes through an outlet-control structure (Figure 2-5) and enters a culvert where it is conveyed below ground for approximately 2,000 feet to the south of Bel-Red Road (Figures 2-6 and 2-7). This 2,000-foot underground pipe has several bends and is a fish barrier based on WDFW SalmonScape maps (WDFW, 2010) and the City's basin map for the West Tributary of Kelsey Creek (Bellevue, 2010b).

Downstream of Bel-Red Road, the West Tributary of Kelsey Creek joins Goff Creek, which is tributary to Kelsey Creek. Goff Creek then connects to Kelsey Creek, which drains through Mercer Slough into Lake Washington.

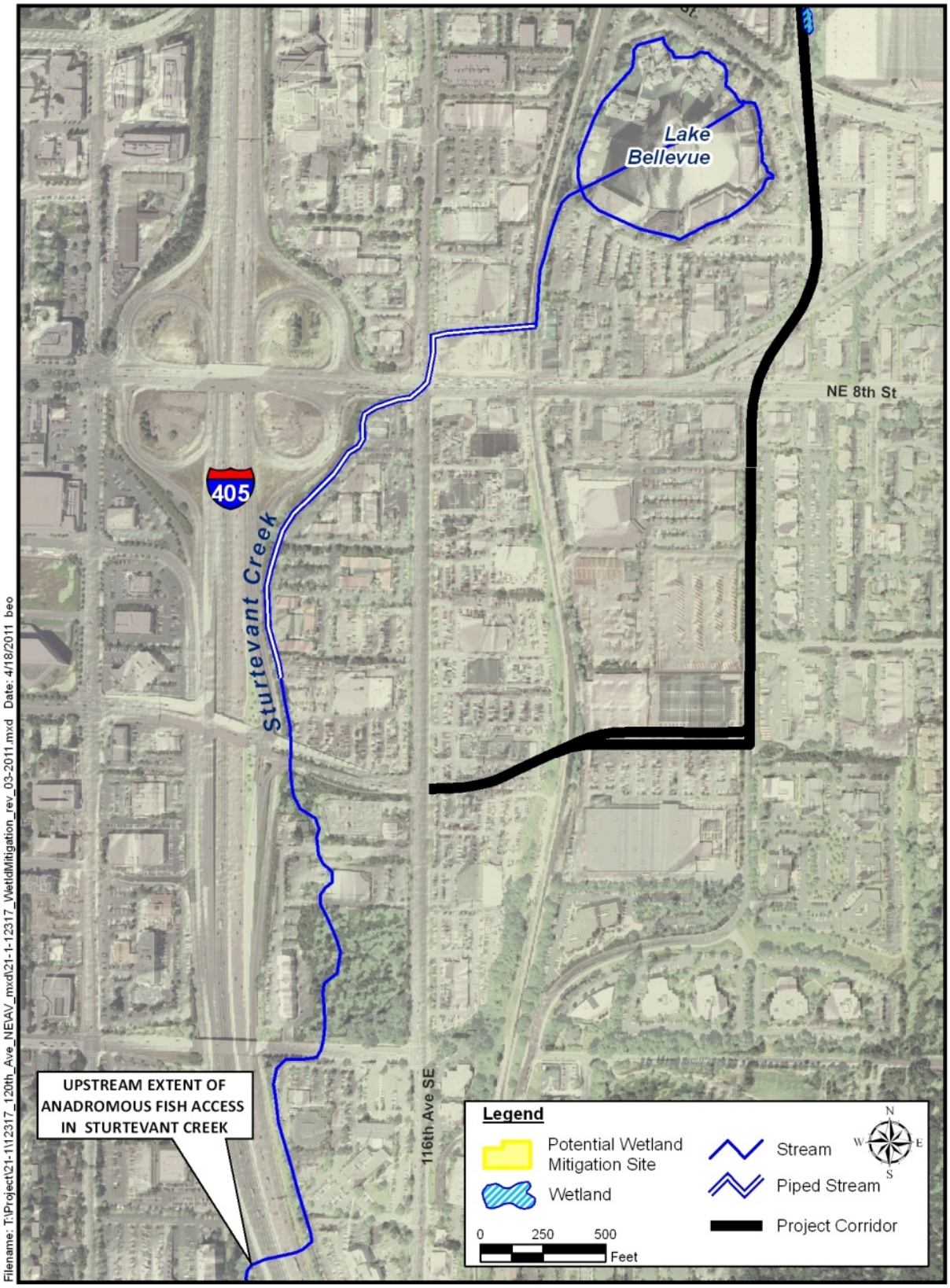

Figure 2-3. Sturtevant Creek Map.

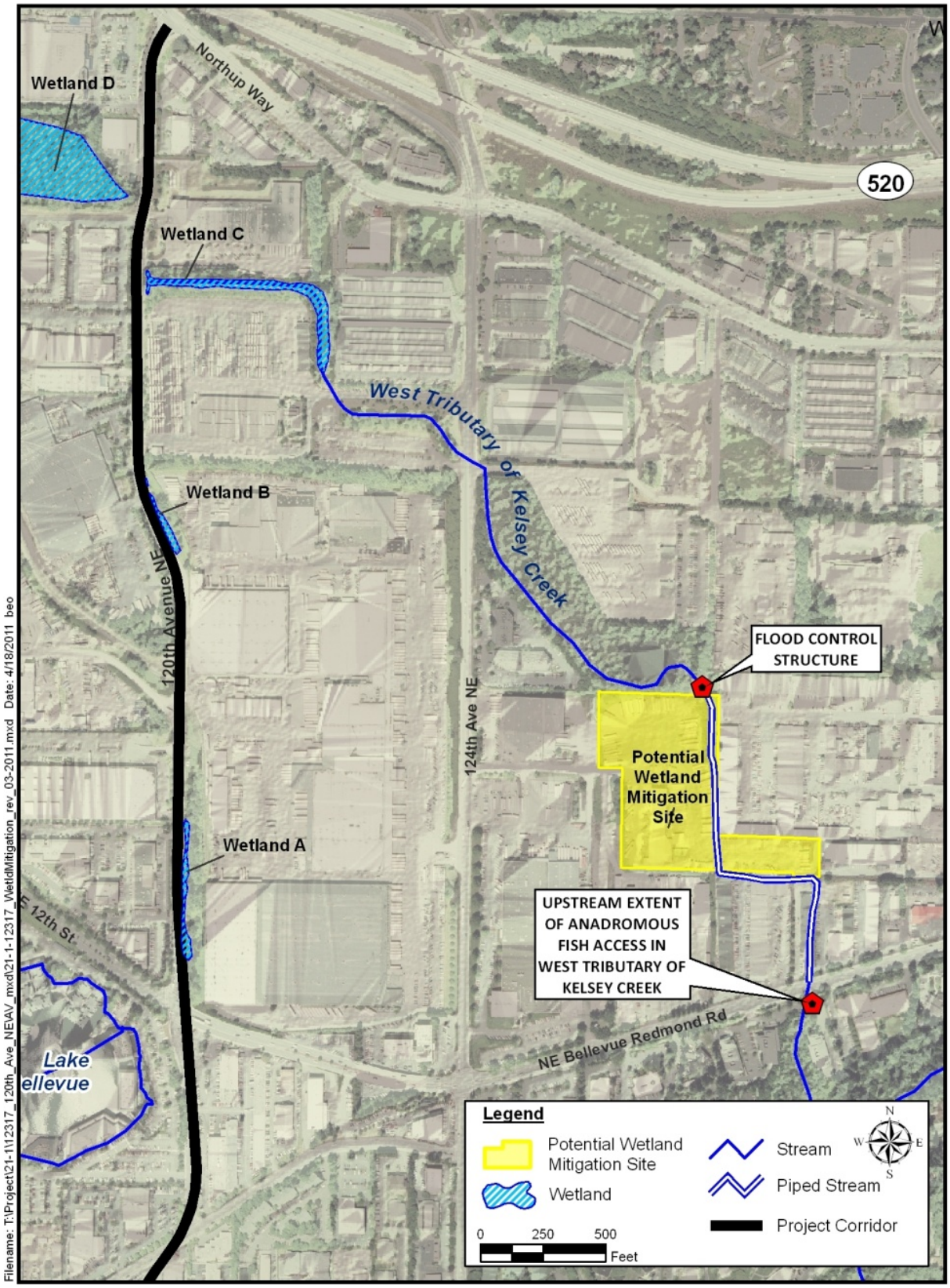

Figure 2-4. West Tributary of Kelsey Creek Map.

Figure 2-5. West Tributary of Kelsey Creek Outlet-Control Structure.

Figure 2-6. West Tributary of Kelsey Creek at the Upstream Extent of Anadromous Access (South of Bel-Red Road).

Figure 2-7. Off-site Stream Habitat at the Upstream Extent of Anadromous Access in the West Tributary of Kelsey Creek (South of Bel-Red Road).

3.0 Action Area

The Action Area for the NE 4th Street/120th Avenue NE project is depicted in Figure 3-1 and includes:

- The project corridor.
- A 2,500-foot radius around the corridor for construction noise associated with heavy equipment (see Appendix A for noise analysis).
- Sturtevant Creek as far downstream as its crossing under I-405 (approximately 3,000 feet downstream) in consideration of stormwater effects from the project. Wetland mitigation in the Lake Bellevue/Sturtevant Creek basin, if constructed, will be constructed in such a way that Endangered Species Act (ESA)-listed species below I-405 (approximately 0.5 mile downstream) are not affected by changes in turbidity.
- The West Tributary of Kelsey Creek as far downstream as the outlet-control structure (Figures 1-2 and 2-3) (approximately 3,200 feet downstream) in consideration of stormwater effects from the project and from the project's potential wetland mitigation work in the West Tributary of Kelsey Creek basin. Wetland mitigation in the West Tributary of Kelsey Creek , if constructed, will be constructed using the outlet-control structure in such a way that ESA-listed species below Bel-Red Road (approximately 5,500 feet downstream of the project corridor) are not affected by changes in turbidity.

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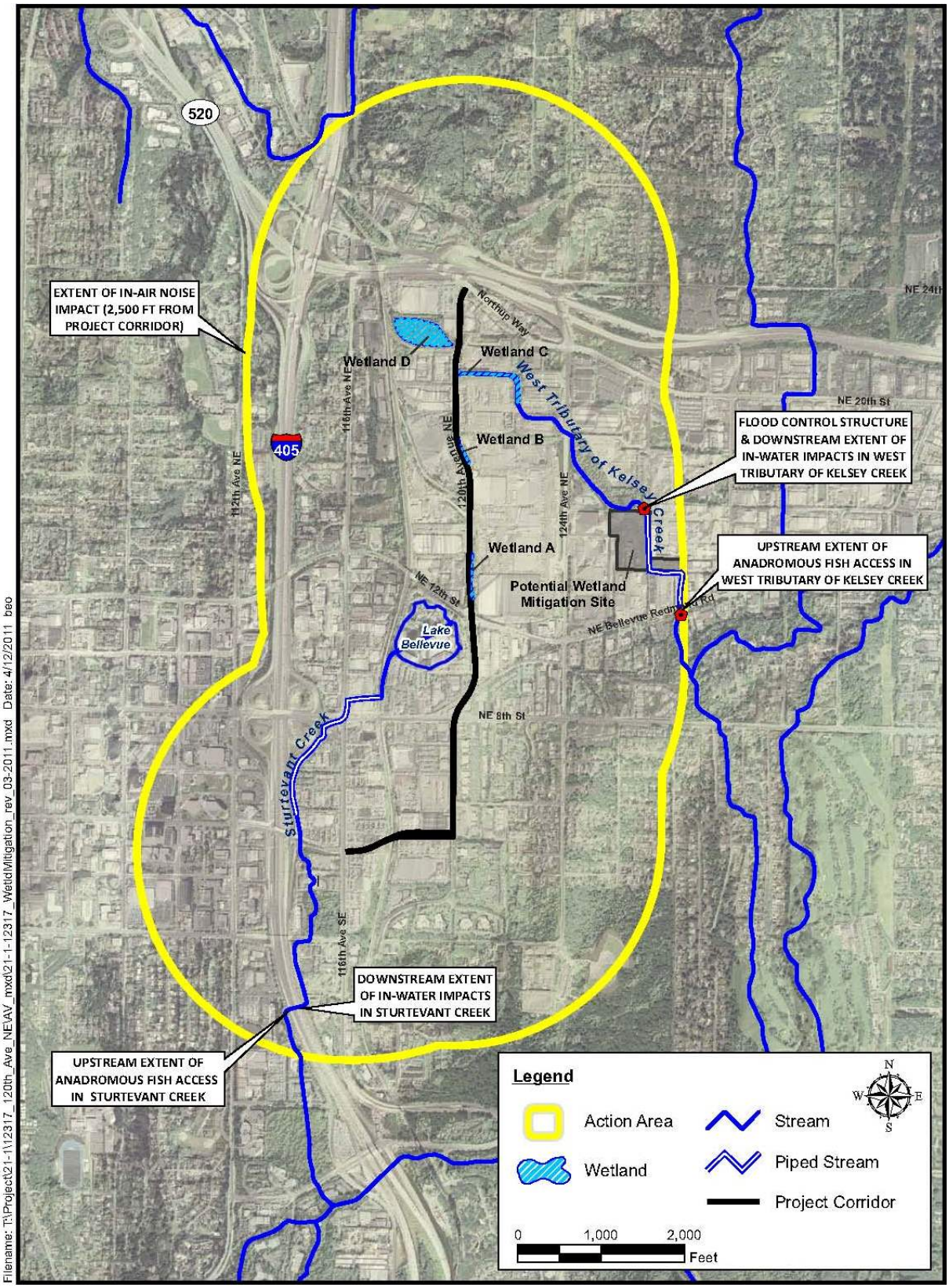

Figure 3-1. Action Area Map

4.0 Species and Habitat

4.1 Species

The following is a list of all species identified as threatened or endangered within King County by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service and the U.S. Fish and Wildlife Service as of April 2011.

1. Grizzly bear *(Ursus arctos = U. a. horribilis)*
2. Gray wolf *(Canis lupus)*
3. Canada lynx *(Lynx canadensis)*
4. Marbled murrelet (*Brachyramphus marmoratus*)
5. Northern spotted owl *(Strix occidentalis caurina)*
6. Golden paintbrush (*Castilleja levisecta)*
7. Puget Sound Chinook (*Oncorhynchus tshawytscha*)
8. Coastal-Puget Sound bull trout (*Salvelinus confluentus*)
9. Puget Sound steelhead (*Oncorhynchus mykiss*)
10. Humpback whale (*Megaptera novaeangliae*)
11. Southern resident killer whale (*Orcinus orca*)
12. Steller sea lion (*Eumetopias jubatus*)
13. Bocaccio (*Sebastes paucispinis*)
14. Canary rockfish (*Sebastes pinniger*)
15. Yelloweye rockfish (*Sebastes ruberrimus*)

Of the species listed as potentially present in King County, no terrestrial, plant, avian, or marine mammal species are documented or expected within the project's Action Area due to a lack of suitable habitat, though avian species are not precluded from flying over the site. Grizzly bear, gray wolf, Canada lynx, marbled murrelet, and northern spotted owl generally require less disturbed or more forested habitat than that present within the Action Area for the project. Golden paintbrush typically occupies open grasslands (Washington Natural Heritage Program [WNHP] 2010), which are not present in the Action Area.

Marine species and anadromous species potentially present in King County are precluded from the basin by downstream culverts that are documented as full barriers to upstream passage, one on each of the draining tributaries for the project. On the West Tributary of Kelsey Creek anadromous fish are documented approximately 0.8 mile downstream below the fully impassable Bel-Red Road culvert (Kit Paulsen, 2010; Bellevue, 2010a; Washington Department of Fish and Wildlife [WDFW], 2010) (Figure 2-3). Fish presence/absence surveys are conducted by the City of Bellevue (the City) every two years in the City's streams and no anadromous fish have been identified above the Bel-Red Road culvert in the West Tributary of Kelsey Creek system (Kit Paulsen, 2010). In Sturtevant Creek, anadromous access to Lake Bellevue is blocked by a fully impassable culvert under I-405 (Bellevue, 2010b).

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Other sources of fish presence data confirm Bel-Red Road as the upstream extent of fish presence in the West Tributary of Kelsey Creek system and I-405 the upstream extent of fish presence in the Sturtevant Creek system. The Known Freshwater Fish Distribution of Salmon and Trout for Watershed Water Resource Inventory Area No. 8 (WRIA 8) maps are a series of maps and supporting tabular data of recent sightings for Chinook, coho, steelhead, sockeye, cutthroat trout, and kokanee species for the whole of WRIA 8. For the West Tributary of Kelsey Creek, these maps show that Chinook and cutthroat trout were observed up to Bel-Red Road. Coho and sockeye were observed up to NE 8th Street, approximately 1.1 river miles downstream of the site. Steelhead are not known to use the West Tributary of Kelsey Creek. According to the Known Freshwater Fish Distribution of Salmon and Trout for WRIA 8 maps, only coho occur in Sturtevant Creek from its mouth to I-405, approximately 0.5 river mile downstream of the site.

4.2 Critical Habitat

Critical Habitat is designated in King County for marbled murrelet, northern spotted owl, Chinook salmon, bull trout, and killer whale; however, northern spotted owl and killer whale are considered precluded from the Action Area due to lack of potential habitat.

4.2.1 Marbled Murrelet

No designated critical habitat for marbled murrelet is located in the project Township/Range.

4.2.2 Chinook Salmon & Steelhead Trout

According to the Federal Register, Volume 65, Number 32, pages 7764-7787, Puget Sound Chinook critical habitat has been designated to include all marine, estuarine, and river reaches accessible to Puget Sound Chinook. Because the Action Area is not accessible to Chinook, no designated critical habitat exists within the Action Area for this species.

Critical habitat has not been designated for steelhead; however, because of the similarities in Chinook and steelhead essential habitat needs, it is likely that the critical habitat designated for steelhead will be very similar to the critical habitat for Chinook. Because the Action Area is not accessible to salmonids, it is precluded from being critical habitat for steelhead.

4.2.3 Bull Trout

The Action Area streams are not listed as designated bull trout critical habitat.

5.0 Determination of Effect

5.1 Effects of Foreseeable Projects

One future City project was considered during the effects determination because it is reasonably foreseeable and was considered to have a potential influence on the effect analyses. The Bel-Red Living Streams project includes daylighting approximately 1,000 feet of the West Tributary of Kelsey Creek at the potential wetland mitigation site (Figure 3-1 and Appendix B). However, it is our understanding that approximately 1,000 feet would remain in an underground pipe with a 90-degree bend. Future daylighting of this remaining stretch of pipe is uncertain as it would be located on privately-owned property. Therefore, the West Tributary of Kelsey Creek was still considered a non-fish bearing stream above Bel-Red Road during the effects analyses.

5.2 Effects to Terrestrial and Plant Species

Grizzly bear, Canada lynx, and gray wolf habitat may occur in parts of eastern King County; however, no suitable habitat is located within the urban areas of King County. The Action Area does not contain any prairie habitat that would be suitable for golden paintbrush. Therefore, the proposed project would have no effect on grizzly bear, Canada lynx, gray wolf, or golden paintbrush.

5.3 Effects to Avian Species

No forested areas within the Action Area contain appropriate nesting, foraging, or critical habitat for either northern spotted owl or marbled murrelet, though avian species are not precluded from occasionally flying over the Action Area. Therefore, the proposed project would have no effect on northern spotted owl, marbled murrelet, or designated critical habitat for these species.

5.4 Effects to Aquatic Species

Marine species are precluded from the Action Area due to lack of marine habitat and the Ballard Locks in Seattle. Therefore, the proposed project would have no effect on humpback whale, southern resident killer whale, Steller sea lion, bocaccio, canary rockfish, or yelloweye rockfish.

Several factors suggest that the proposed project and associated mitigation work would not affect ESA-listed anadromous steelhead trout, Chinook salmon, and bull trout:

- **Preclusion**—There is no access to the Action Area for anadromous fish.
- **Lack of Prey**—The Action Area lacks resident fish use, with the possible exception of goldfish that are reportedly present in Lake Bellevue.

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- **Stormwater Effects during Construction**—Best management practices would be used during construction to prevent soils from being conveyed to the action area wetlands and streams. In addition, Lake Bellevue and the large, ponded area above the flood control structure in the West Tributary of Kelsey Creek would likely insulate lower sections from construction stormwater effects.
- **Stormwater Effects during Operation**—Treatment is proposed for the new pollution-generating impervious surfaces of the project. Based on the *Water Quality Technical Report*, the project would result in increased levels of dissolved zinc and copper in stormwater (Parsons Brinkerhoff [PB], 2011).

Parsons Brinckerhoff (PB) used the Washington State Department of Transportation Highway Runoff Dilution subroutine (HI-RUN) to determine when these increased dissolved zinc and copper concentrations would dilute to below the biological threshold (where salmonids have a behavioral change) in the Action Area water bodies. Background dissolved zinc and copper concentrations were obtained for Kelsey Creek (downstream of its confluence with the West Tributary of Kelsey Creek) via Washington State Department of Ecology (Ecology) Environmental Information Management website (Ecology, 2011). No closer sources of baseline information for Sturtevant Creek or the West Tributary of Kelsey Creek were found. The HI-RUN calculations were completed for the months that salmon are expected to be in site streams (September through November). Based on these parameters, it appears likely (with 95 percent certainty) that Sturtevant Creek and West Tributary of Kelsey Creek would dilute to below the biological threshold for copper within 1 foot of stormwater discharge locations and within 1 to 6 feet of stormwater discharge locations for zinc (see Appendix C). Based on the HI-RUN calculations, the dissolved copper and zinc concentrations would decrease from existing conditions.

Due to fish barriers at Bel-Red Road (for the West Tributary of Kelsey Creek) and I-405 (Sturtevant Creek), salmonids are not likely present until approximately 3,000 feet downstream of the project corridor in Sturtevant Creek and 5,500 feet downstream of the project corridor in the West Tributary of Kelsey Creek. Based on these distances, it is expected that dissolved zinc and copper associated with this project would be diluted to baseline conditions before reaching salmonids populations.

Therefore, the proposed project would have no effect on Chinook salmon, steelhead trout, or bull trout. Moreover, due to a lack of critical habitat for these species in the Action Area, the proposed project would have no effect on Chinook salmon designated critical habitat or bull trout designated critical habitat.

6.0 Essential Fish Habitat Assessment

The habitat in the Action Area is freshwater habitat. No effects are expected on habitat for pelagic or groundfish species managed by the National Marine Fisheries Service (NMFS) due to the lack of marine habitat.

The proposed project is not expected to adversely affect habitat for NMFS-managed anadromous species (e.g., habitat for coho salmon) that is protected under the MSA due to the following factors, which are detailed in Section 5.3:

- Lack of fish access to the Action Area due to barriers downstream
- Lack of prey population in Action Area stream reaches
- Construction stormwater impacts would be avoided/minimized with BMPs
- Dissolved copper and zinc concentrations are expected to dilute to background levels before reaching salmonids populations.

Therefore, the proposed project would not have an adverse effect essential fish habitat.

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7.0 References

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Bellevue 2010b City of Bellevue (Bellevue). 2010. http://www.bellevuewa.gov/drainage_basin_maps.htm. *Drainage Basin Maps, West Tributary Basin.*

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WNHP 2010 Washington Natural Heritage Program Database http://www1.dnr.wa.gov/nhp/refdesk/fguide/htm/fgmain.htm.

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Appendix A
Noise Analysis

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Construction In-Air Noise[1]

Equipment	**Lmax at 50 ft (dBA)**
Chainsaw	84
Soil compactor	83
Bulldozer	82
Vacuum street sweeper	82
Excavator	81
Crane	81
Front end loader	79
Air compressor for impact wrench	78
Dump truck	76
Combined Lmax:	**88**

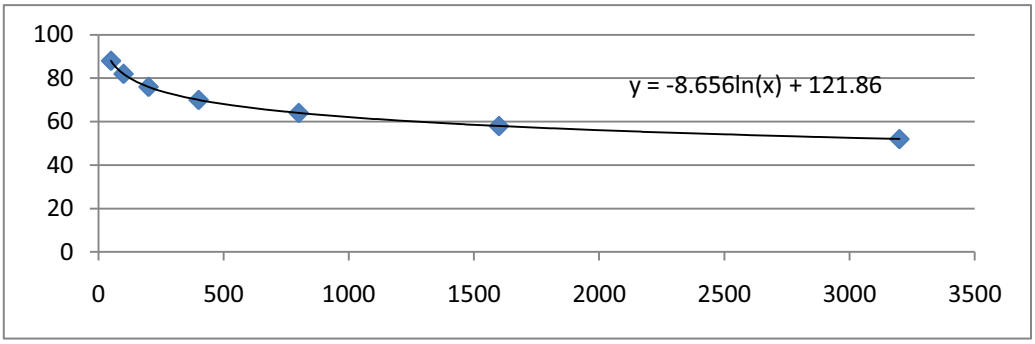
Background Noise[2]

Background Noise Measurements	54-63 dBA
Lowest Background Leq	**54 dBA**

Attentuation rate for soft site 6 dB

Distance from Construction (ft)	Construction Noise (dBA)	Lowest Background Noise (dBA)
50	88	54
100	82	54
200	76	54
400	70	54
800	64	54
1600	58	54
3200	52	54

Trendline equation: y=-8.656ln(x) + 121.86



Distance at which construction noise equals 54 dBA: 2,539 feet

Marbled Murrelet -- Noise thresholds

Detect	44
Alert	57
Disturb	70
Injure	92

Distance from site where noise attentuates to 70 dB: 426 ft

[1] Lmax from WSDOT biological assessment preparation advanced training manual Table 7-4.
[2] Background noise measurements taken by Parsons Brinkerhoff in August 2010.

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Appendix B
Bel-Red Living Streams Document

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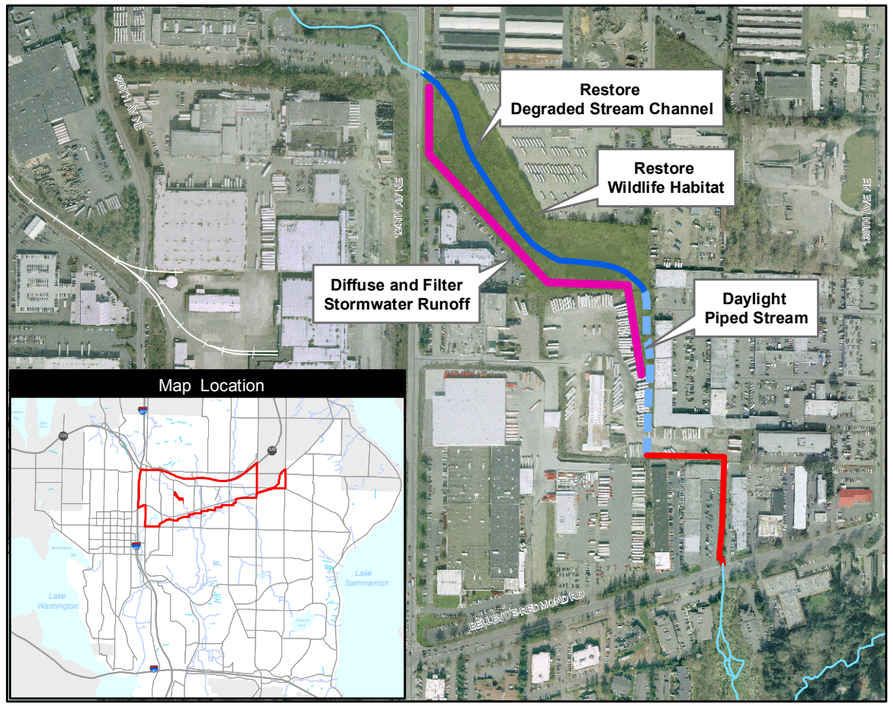
Bel-Red Living Streams
West Tributary of Kelsey Creek



Bel-Red Living Streams

Location:	West Tributary (Kelsey Basin) between Bel-Red Rd and 124th Ave NE
Estimated Cost:	$1.1 million
Request:	$500,000
Account:	Interior-Environment, EPA STAG

The newly zoned Bel-Red area is slated to transition from an older industrial area to transit-oriented, multiple use development. However, the area has few existing amenities to attract the 5,000 dwelling units. Also, uncontrolled historical development caused substantial damage to the streams, wetlands and forests. Storm-water runoff flows untreated directly into the West Tributary of Kelsey Creek from multiple sources. Green infrastructure, such as bioswales and diffusion channels will immediately reduce pollution from these sources. The vision for the area will require public-private partnerships to realize the full environmental recovery. This grant resource will help the City show how streams can become an amenity, allowing businesses to see the value of restored fish and wildlife habitat, regional trail linkages, and verdant open space.

The goals of this project are to

- create bioswales, diffusion channels and other green infrastructure,
- design and restore approximately 1,800 feet of stream,
- remove invasive weeds,
- design and construct 7 acres of diverse, attractive native landscaping,
- promote private development incentive programs using restored areas, and
- model new, environmentally sensitive urban redevelopment.

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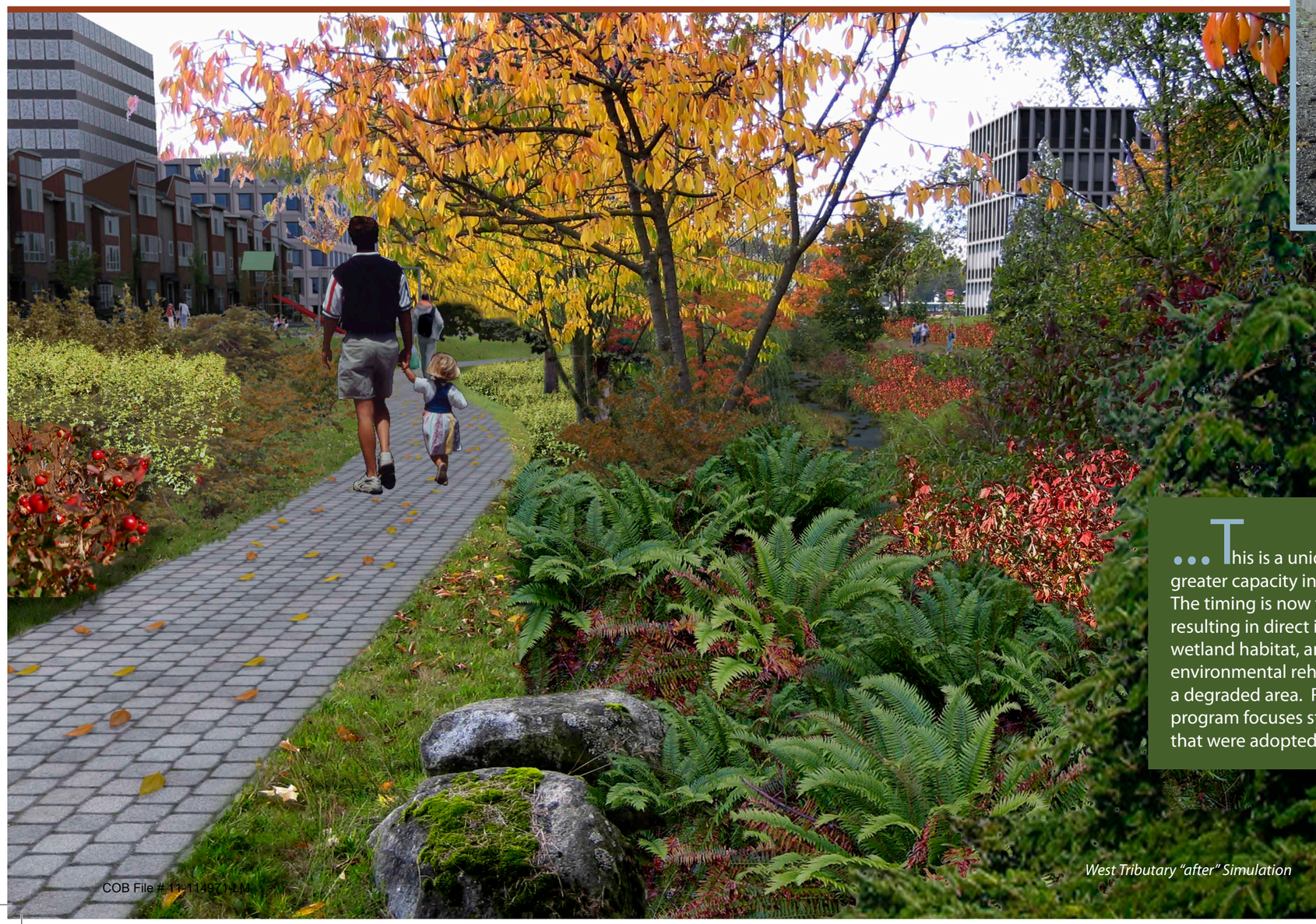
PROJECT BENEFITS

The Bel-Red plan creates the potential for thousands of new housing units and entirely new residential and mixed use neighborhoods in close proximity to jobs, services, and transit. New residential development in Bel-Red will include a percentage of units affordable to low or moderate income households. The immediate project area is also anticipated to provide 15,000 jobs in new office towers surrounding a Sound Transit East Link light rail station. This will allow residents throughout the region easy transit access to jobs and amenities.

New urban residential neighborhoods planned for Bel-Red will require investments such as stream restoration and open spaces that support high quality, livable places. Public investment in these improvements paves the way for pioneer housing development in a transitioning area. Focusing growth in urban areas in transit-oriented developments such as the Bel-Red area helps protect intact rural and suburban habitats, reduces traffic, and lowers carbon footprints.



West Tributary "after" Simulation

...This is a unique opportunity to try something new and build greater capacity in local governments for environmental restoration. The timing is now for new approaches for environmental programs, resulting in direct improvements to water quality, stream and wetland habitat, and new jobs. This project is a new approach to environmental rehabilitation and compliance for redevelopment in a degraded area. Rather than relying on regulatory restrictions, this program focuses strongly on incentives for planned developments that were adopted by the Bellevue City Council.

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Appendix C
Highway Runoff Dilution Analysis

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Highway Runoff Dilution Summary Results

Project: TDA1, Subbasin 1 (East)
Precipitation Series: Puget East 40
Description:

Background Concentrations (mg/L)
Dissolved Copper: 0.0019
Dissolved Zinc: 0.00612

Baseline Conditions: 2.12 acres
No Treatment Infiltration 0% - 2.12 acres

Proposed Conditions: 2.645 acres
Enhanced Treatment Infiltration 0% - 0.525 acres with detention
No Treatment Infiltration 0% - 0 acres with detention
No Treatment Infiltration 0% - 2.12 acres

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Depth (ft)										0.5	0.5	0.5	
Velocity (fps)										1	1	1	
Width (ft)										3	3	3	
Slope										0.02	0.02	0.02	
Discharge Distance (ft)										0	0	0	
Distance Downstream in feet to Meet Biological Threshold													
Dissolved C	Baseline									< 1	< 1	< 1	
	Proposed									< 1	< 1	< 1	
Dissolved Z	Baseline									< 1	2	2	
	Proposed									< 1	< 1	2	

Highway Runoff Dilution Detailed Results

Dissolved Copper - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.006	0.001	0.002	0.002	0.001	0.000	0.000	0.000	0	> 0.0039	0.007	0.000	0.001	0.002	0.002	0.002	0.001	0.000	0.000
0019 - 0.00	0.780	0.063	0.232	0.294	0.153	0.034	0.003	0.000	0	0019 - 0.00	0.844	0.013	0.077	0.203	0.268	0.190	0.074	0.016	0.002
0 - 0.0019	0.214	0.017	0.064	0.081	0.042	0.009	0.001	0.000	0	0 - 0.0019	0.149	0.002	0.014	0.036	0.047	0.034	0.013	0.003	0.000
		0.081	0.298	0.377	0.196	0.044	0.004	0.000	0			0.016	0.092	0.241	0.318	0.225	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - September probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.008	0.001	0.002	0.003	0.002	0.000	0.000	0.000	0.000	> 0.0039	0.005	0.000	0.001	0.001	0.002	0.001	0.000	0.000	0.000
0019 - 0.00	0.775	0.063	0.229	0.293	0.153	0.033	0.003	0.000	0.000	0019 - 0.00	0.845	0.013	0.079	0.202	0.270	0.190	0.073	0.016	0.002
0 - 0.0019	0.217	0.018	0.064	0.082	0.043	0.009	0.001	0.000	0.000	0 - 0.0019	0.150	0.002	0.014	0.036	0.048	0.034	0.013	0.003	0.000
		0.081	0.296	0.378	0.198	0.043	0.004	0.000	0.000			0.016	0.093	0.239	0.319	0.225	0.086	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.036	0.003	0.011	0.014	0.007	0.002	0.000	0.000	0	> 0.012	0.026	0.000	0.003	0.006	0.008	0.006	0.002	0.001	0.000
.006 - 0.01	0.906	0.073	0.269	0.344	0.177	0.040	0.004	0.000	0	.006 - 0.01	0.951	0.015	0.089	0.227	0.303	0.214	0.083	0.019	0.002
0 - 0.00612	0.058	0.005	0.017	0.022	0.011	0.003	0.000	0.000	0	0 - 0.00612	0.023	0.000	0.002	0.005	0.007	0.005	0.002	0.000	0.000
		0.080	0.297	0.380	0.195	0.044	0.004	0.000	0			0.016	0.093	0.238	0.318	0.225	0.087	0.020	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.029	0.002	0.009	0.011	0.006	0.001	0.000	0.000	0	> 0.012	0.032	0.001	0.003	0.008	0.010	0.007	0.003	0.001	0.000
.006 - 0.01	0.914	0.072	0.273	0.345	0.180	0.040	0.004	0.000	0	.006 - 0.01	0.945	0.014	0.087	0.229	0.301	0.212	0.083	0.018	0.002
0 - 0.00612	0.057	0.005	0.017	0.022	0.011	0.003	0.000	0.000	0	0 - 0.00612	0.023	0.000	0.002	0.006	0.007	0.005	0.002	0.000	0.000
		0.079	0.299	0.378	0.197	0.043	0.004	0.000	0			0.015	0.092	0.242	0.318	0.224	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions									
> 0.0039	0.009	0.001	0.002	0.003	0.002	0.001	0.000	0.000	0	> 0.0039	0.007	0.000	0.000	0.001	0.002	0.002	0.001	0.001	0.000
0019 - 0.00	0.775	0.054	0.209	0.291	0.172	0.044	0.005	0.000	0	0019 - 0.00	0.843	0.006	0.037	0.119	0.218	0.233	0.152	0.061	0.017
0 - 0.0019	0.216	0.015	0.058	0.081	0.048	0.012	0.001	0.000	0	0 - 0.0019	0.150	0.001	0.007	0.021	0.039	0.041	0.027	0.011	0.003
		0.069	0.270	0.376	0.222	0.056	0.007	0.000	0			0.007	0.044	0.141	0.258	0.277	0.180	0.073	0.021
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.009	0.001	0.002	0.003	0.002	0.001	0.000	0.000	0	> 0.0039	0.007	0.000	0.000	0.001	0.002	0.002	0.001	0.001	0.000
0019 - 0.00	0.777	0.053	0.208	0.294	0.172	0.045	0.005	0.000	0	0019 - 0.00	0.843	0.006	0.037	0.118	0.218	0.234	0.153	0.061	0.017
0 - 0.0019	0.215	0.015	0.057	0.081	0.047	0.012	0.001	0.000	0	0 - 0.0019	0.149	0.001	0.007	0.021	0.039	0.041	0.027	0.011	0.003
		0.069	0.268	0.379	0.221	0.057	0.007	0.000	0			0.007	0.044	0.140	0.258	0.277	0.182	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for baseline conditions downstream distance = 2 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.012	0.035	0.002	0.009	0.013	0.008	0.002	0.000	0.000	0	> 0.012	0.017	0.000	0.001	0.002	0.004	0.005	0.003	0.001	0.000
.006 - 0.01	0.909	0.062	0.246	0.343	0.200	0.051	0.006	0.000	0	.006 - 0.01	0.960	0.007	0.042	0.135	0.244	0.268	0.175	0.070	0.019
0 - 0.00612	0.057	0.004	0.015	0.022	0.013	0.003	0.000	0.000	0	0 - 0.00612	0.023	0.000	0.001	0.003	0.006	0.006	0.004	0.002	0.001
		0.068	0.270	0.378	0.220	0.057	0.007	0.000	0			0.007	0.044	0.140	0.254	0.279	0.182	0.073	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.030	0.002	0.008	0.011	0.007	0.002	0.000	0.000	0.000	> 0.012	0.046	0.000	0.002	0.007	0.012	0.013	0.008	0.003	0.001
.006 - 0.01	0.913	0.064	0.244	0.344	0.202	0.053	0.006	0.000	0.000	.006 - 0.01	0.932	0.007	0.041	0.132	0.239	0.257	0.170	0.067	0.019
0 - 0.00612	0.058	0.004	0.015	0.022	0.013	0.003	0.000	0.000	0.000	0 - 0.00612	0.022	0.000	0.001	0.003	0.006	0.006	0.004	0.002	0.001
		0.070	0.268	0.377	0.221	0.058	0.007	0.000	0.000			0.007	0.044	0.141	0.257	0.276	0.182	0.072	0.021
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.0039	0.011	0.001	0.003	0.004	0.003	0.001	0.000	0.000	0.000	> 0.0039	0.007	0.000	0.000	0.001	0.001	0.002	0.002	0.001	0.000
0019 - 0.00	0.773	0.055	0.203	0.283	0.175	0.050	0.007	0.001	0.000	0019 - 0.00	0.840	0.002	0.014	0.063	0.158	0.232	0.209	0.114	0.049
0 - 0.0019	0.216	0.015	0.057	0.079	0.049	0.014	0.002	0.000	0.000	0 - 0.0019	0.152	0.000	0.003	0.011	0.029	0.042	0.038	0.021	0.009
		0.071	0.262	0.367	0.226	0.065	0.009	0.001	0.000			0.002	0.017	0.075	0.188	0.276	0.248	0.136	0.058
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.009	0.001	0.002	0.003	0.002	0.001	0.000	0.000	0	> 0.0039	0.009	0.000	0.000	0.001	0.002	0.003	0.002	0.001	0.001
0019 - 0.00	0.777	0.056	0.204	0.283	0.176	0.051	0.007	0.001	0	0019 - 0.00	0.839	0.002	0.014	0.063	0.155	0.231	0.208	0.116	0.049
0 - 0.0019	0.215	0.016	0.056	0.078	0.049	0.014	0.002	0.000	0	0 - 0.0019	0.151	0.000	0.003	0.011	0.028	0.042	0.038	0.021	0.009
		0.072	0.262	0.364	0.227	0.065	0.009	0.001	0			0.002	0.017	0.075	0.185	0.275	0.248	0.138	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for baseline conditions downstream distance = 2 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.041	0.003	0.011	0.015	0.009	0.003	0.000	0.000	0.000	> 0.012	0.016	0.000	0.000	0.001	0.003	0.005	0.004	0.002	0.001
.006 - 0.01	0.903	0.066	0.237	0.330	0.203	0.059	0.008	0.001	0.000	.006 - 0.01	0.961	0.002	0.016	0.071	0.178	0.267	0.240	0.131	0.056
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.023	0.000	0.000	0.002	0.004	0.006	0.006	0.003	0.001
		0.073	0.262	0.366	0.225	0.066	0.009	0.001	0.000			0.002	0.017	0.074	0.185	0.278	0.250	0.136	0.058
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for proposed conditions downstream distance = 2 feet

Baseline Conditions										Proposed Conditions								
> 0.012	0.019	0.001	0.005	0.007	0.004	0.001	0.000	0.000	0.000	> 0.012	0.038	0.000	0.001	0.003	0.007	0.010	0.009	0.005	0.002
.006 - 0.01	0.924	0.065	0.241	0.336	0.211	0.061	0.008	0.001	0.000	.006 - 0.01	0.940	0.002	0.017	0.070	0.175	0.257	0.236	0.128	0.055
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.022	0.000	0.000	0.002	0.004	0.006	0.006	0.003	0.001
		0.071	0.261	0.364	0.229	0.066	0.009	0.001	0.000			0.002	0.018	0.075	0.186	0.273	0.251	0.136	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Highway Runoff Dilution Summary Results

Project: TDA1, Subbasin 2 (West)
Precipitation Series: Puget East 40
Description:

Background Concentrations (mg/L)
Dissolved Copper: 0.0019
Dissolved Zinc: 0.00612

Baseline Conditions: 2.12 acres
No Treatment Infiltration 0% - 2.12 acres

Proposed Conditions: 2.645 acres
Enhanced Treatment Infiltration 0% - 0.525 acres with detention
No Treatment Infiltration 0% - 0 acres with detention
No Treatment Infiltration 0% - 2.12 acres

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Depth (ft)										1	1	1	
Velocity (fps)										0.2	0.2	0.2	
Width (ft)										7.5	7.5	7.5	
Slope										0.01	0.01	0.01	
Discharge Distance (ft)										0	0	0	
Distance Downstream in feet to Meet Biological Threshold													
Dissolved C	Baseline									< 1	< 1	< 1	
	Proposed									< 1	< 1	< 1	
Dissolved Z	Baseline									< 1	< 1	< 1	
	Proposed									< 1	< 1	< 1	

Highway Runoff Dilution Detailed Results

Dissolved Copper - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.005	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0.000	> 0.0039	0.005	0.000	0.000	0.001	0.002	0.001	0.000	0.000	0.000
0019 - 0.00	0.781	0.063	0.233	0.296	0.152	0.034	0.003	0.000	0.000	0019 - 0.00	0.846	0.013	0.078	0.204	0.267	0.192	0.074	0.016	0.002
0 - 0.0019	0.215	0.017	0.064	0.082	0.042	0.009	0.001	0.000	0.000	0 - 0.0019	0.150	0.002	0.014	0.036	0.047	0.034	0.013	0.003	0.000
		0.080	0.298	0.380	0.194	0.044	0.004	0.000	0.000			0.015	0.093	0.241	0.315	0.226	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - September probability of occurrence for proposed conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.006	0.001	0.002	0.002	0.001	0.000	0.000	0.000	0	> 0.0039	0.004	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000
0019 - 0.00	0.779	0.062	0.232	0.295	0.153	0.033	0.004	0.000	0	0019 - 0.00	0.847	0.013	0.078	0.203	0.269	0.191	0.074	0.016	0.002
0 - 0.0019	0.215	0.017	0.064	0.082	0.042	0.009	0.001	0.000	0	0 - 0.0019	0.150	0.002	0.014	0.036	0.048	0.034	0.013	0.003	0.000
		0.080	0.298	0.379	0.196	0.042	0.005	0.000	0			0.016	0.092	0.240	0.318	0.226	0.087	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.027	0.002	0.008	0.010	0.005	0.001	0.000	0.000	0	> 0.012	0.020	0.000	0.002	0.005	0.006	0.005	0.002	0.000	0.000
.006 - 0.01	0.915	0.075	0.271	0.347	0.180	0.039	0.004	0.000	0	.006 - 0.01	0.957	0.015	0.088	0.231	0.302	0.217	0.084	0.018	0.002
0 - 0.00612	0.058	0.005	0.017	0.022	0.011	0.002	0.000	0.000	0	0 - 0.00612	0.023	0.000	0.002	0.006	0.007	0.005	0.002	0.000	0.000
		0.081	0.296	0.379	0.196	0.042	0.004	0.000	0			0.015	0.092	0.241	0.316	0.227	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions								
> 0.012	0.022	0.002	0.006	0.008	0.004	0.001	0.000	0.000	0.000	> 0.012	0.023	0.000	0.002	0.006	0.007	0.005	0.002	0.000	0.000
.006 - 0.01	0.921	0.074	0.275	0.348	0.180	0.040	0.004	0.000	0.000	.006 - 0.01	0.954	0.015	0.088	0.228	0.304	0.216	0.083	0.018	0.002
0 - 0.00612	0.058	0.005	0.017	0.022	0.011	0.003	0.000	0.000	0.000	0 - 0.00612	0.023	0.000	0.002	0.005	0.007	0.005	0.002	0.000	0.000
		0.080	0.299	0.378	0.196	0.043	0.004	0.000	0.000			0.016	0.093	0.239	0.318	0.226	0.087	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.007	0.000	0.002	0.003	0.001	0.000	0.000	0.000	0	> 0.0039	0.005	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000
0019 - 0.00	0.775	0.053	0.209	0.292	0.170	0.045	0.005	0.000	0	0019 - 0.00	0.846	0.006	0.037	0.119	0.218	0.235	0.152	0.061	0.018
0 - 0.0019	0.219	0.015	0.059	0.083	0.048	0.013	0.002	0.000	0	0 - 0.0019	0.149	0.001	0.007	0.021	0.038	0.041	0.027	0.011	0.003
		0.068	0.270	0.377	0.220	0.058	0.007	0.000	0			0.007	0.044	0.141	0.258	0.277	0.180	0.072	0.021
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.005	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0	> 0.0039	0.005	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000
0019 - 0.00	0.780	0.053	0.210	0.295	0.173	0.044	0.005	0.000	0	0019 - 0.00	0.844	0.006	0.037	0.119	0.218	0.234	0.153	0.061	0.017
0 - 0.0019	0.214	0.015	0.058	0.081	0.047	0.012	0.002	0.000	0	0 - 0.0019	0.151	0.001	0.007	0.021	0.039	0.042	0.027	0.011	0.003
		0.068	0.269	0.378	0.221	0.056	0.007	0.000	0			0.007	0.044	0.141	0.258	0.277	0.181	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.012	0.039	0.003	0.010	0.015	0.009	0.002	0.000	0.000	0	> 0.012	0.020	0.000	0.001	0.003	0.005	0.006	0.004	0.001	0.000
.006 - 0.01	0.905	0.062	0.244	0.340	0.201	0.053	0.006	0.000	0	.006 - 0.01	0.958	0.006	0.042	0.134	0.248	0.265	0.173	0.070	0.019
0 - 0.00612	0.056	0.004	0.015	0.021	0.012	0.003	0.000	0.000	0	0 - 0.00612	0.022	0.000	0.001	0.003	0.006	0.006	0.004	0.002	0.000
		0.068	0.269	0.376	0.222	0.058	0.007	0.000	0			0.007	0.044	0.140	0.259	0.277	0.181	0.073	0.019
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.022	0.002	0.006	0.008	0.005	0.001	0.000	0.000	0.000	> 0.012	0.036	0.000	0.002	0.005	0.009	0.010	0.007	0.003	0.001
.006 - 0.01	0.922	0.063	0.248	0.347	0.205	0.053	0.006	0.000	0.000	.006 - 0.01	0.941	0.007	0.042	0.132	0.239	0.263	0.171	0.068	0.019
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.003	0.000	0.000	0.000	0 - 0.00612	0.023	0.000	0.001	0.003	0.006	0.006	0.004	0.002	0.001
		0.069	0.269	0.376	0.222	0.057	0.007	0.000	0.000			0.007	0.045	0.140	0.254	0.279	0.182	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.0039	0.008	0.001	0.002	0.003	0.002	0.001	0.000	0.000	0.000	> 0.0039	0.005	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000
0019 - 0.00	0.778	0.056	0.206	0.282	0.176	0.051	0.007	0.000	0.000	0019 - 0.00	0.844	0.002	0.014	0.064	0.156	0.230	0.211	0.118	0.050
0 - 0.0019	0.214	0.016	0.057	0.078	0.048	0.014	0.002	0.000	0.000	0 - 0.0019	0.150	0.000	0.002	0.011	0.028	0.041	0.038	0.021	0.009
		0.072	0.265	0.363	0.226	0.066	0.008	0.001	0.000			0.002	0.016	0.076	0.184	0.273	0.250	0.140	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.006	0.001	0.002	0.002	0.001	0.000	0.000	0.000	0.000	> 0.0039	0.007	0.000	0.000	0.001	0.001	0.002	0.002	0.001	0.000
0019 - 0.00	0.778	0.056	0.205	0.283	0.175	0.051	0.007	0.001	0.000	0019 - 0.00	0.841	0.002	0.015	0.063	0.157	0.232	0.209	0.116	0.048
0 - 0.0019	0.216	0.016	0.057	0.079	0.049	0.014	0.002	0.000	0.000	0 - 0.0019	0.152	0.000	0.003	0.011	0.028	0.042	0.038	0.021	0.009
		0.072	0.264	0.364	0.225	0.065	0.010	0.001	0.000			0.002	0.017	0.075	0.187	0.276	0.248	0.138	0.057
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.046	0.003	0.012	0.017	0.011	0.003	0.000	0.000	0.000	> 0.012	0.020	0.000	0.000	0.002	0.004	0.006	0.005	0.003	0.001
.006 - 0.01	0.896	0.066	0.236	0.327	0.202	0.058	0.008	0.001	0.000	.006 - 0.01	0.957	0.002	0.017	0.072	0.178	0.265	0.236	0.132	0.056
0 - 0.00612	0.058	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.022	0.000	0.000	0.002	0.004	0.006	0.006	0.003	0.001
		0.073	0.263	0.365	0.226	0.065	0.009	0.001	0.000			0.002	0.018	0.075	0.185	0.277	0.246	0.138	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.022	0.002	0.006	0.008	0.005	0.001	0.000	0.000	0.000	> 0.012	0.044	0.000	0.001	0.003	0.008	0.012	0.011	0.006	0.003
.006 - 0.01	0.922	0.067	0.241	0.337	0.208	0.060	0.009	0.001	0.000	.006 - 0.01	0.933	0.002	0.016	0.070	0.172	0.259	0.232	0.128	0.053
0 - 0.00612	0.056	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.023	0.000	0.000	0.002	0.004	0.006	0.006	0.003	0.001
		0.073	0.262	0.365	0.226	0.065	0.009	0.001	0.000			0.002	0.017	0.075	0.185	0.278	0.248	0.137	0.057
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Highway Runoff Dilution Summary Results

Project: TDA 2
Precipitation Series: Puget East 40
Description:

Background Concentrations (mg/L)
Dissolved Copper: 0.0019
Dissolved Zinc: 0.00612

Baseline Conditions: 3.38 acres
No Treatment Infiltration 0% - 3.38 acres

Proposed Conditions: 4.33 acres
Enhanced Treatment Infiltration 0% - 0.95 acres with detention
Enhanced Treatment Infiltration 0% - 1.83 acres
No Treatment Infiltration 0% - 1.55 acres

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Depth (ft)										0.3	0.3	0.3	
Velocity (fps)										0.5	0.5	0.5	
Width (ft)										3.3	3.3	3.3	
Slope										0.01	0.01	0.01	
Discharge Distance (ft)										150	150	150	
Distance Downstream in feet to Meet Biological Threshold													
Dissolved C	Baseline									< 1	< 1	< 1	
	Proposed									< 1	< 1	< 1	
Dissolved Z	Baseline									6	11	16	
	Proposed									3	5	6	

Highway Runoff Dilution Detailed Results

Dissolved Copper - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.030	0.002	0.009	0.011	0.006	0.001	0.000	0.000	0.000	> 0.0039	0.023	0.000	0.002	0.006	0.007	0.005	0.002	0.000	0.000
0019 - 0.00	0.756	0.061	0.225	0.287	0.147	0.033	0.003	0.000	0.000	0019 - 0.00	0.873	0.013	0.081	0.211	0.275	0.198	0.077	0.017	0.002
0 - 0.0019	0.215	0.017	0.064	0.082	0.042	0.009	0.001	0.000	0.000	0 - 0.0019	0.104	0.002	0.010	0.025	0.033	0.024	0.009	0.002	0.000
		0.080	0.298	0.380	0.194	0.044	0.004	0.000	0.000			0.015	0.093	0.241	0.315	0.226	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - September probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.040	0.003	0.012	0.015	0.008	0.002	0.000	0.000	0	> 0.0039	0.015	0.000	0.001	0.004	0.005	0.003	0.001	0.000	0.000
0019 - 0.00	0.745	0.060	0.222	0.282	0.146	0.032	0.003	0.000	0	0019 - 0.00	0.880	0.014	0.081	0.211	0.280	0.199	0.077	0.017	0.002
0 - 0.0019	0.215	0.017	0.064	0.082	0.042	0.009	0.001	0.000	0	0 - 0.0019	0.105	0.002	0.010	0.025	0.033	0.024	0.009	0.002	0.000
		0.080	0.298	0.379	0.196	0.042	0.005	0.000	0			0.016	0.092	0.240	0.318	0.226	0.087	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for baseline conditions downstream distance = 6 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions									
> 0.012	0.049	0.004	0.014	0.019	0.010	0.002	0.000	0.000	0	> 0.012	0.019	0.000	0.002	0.005	0.006	0.004	0.002	0.000	0.000
.006 - 0.01	0.894	0.073	0.265	0.339	0.175	0.038	0.004	0.000	0	.006 - 0.01	0.970	0.015	0.090	0.234	0.307	0.220	0.085	0.018	0.002
0 - 0.00612	0.058	0.005	0.017	0.022	0.011	0.002	0.000	0.000	0	0 - 0.00612	0.011	0.000	0.001	0.003	0.003	0.002	0.001	0.000	0.000
		0.082	0.296	0.379	0.196	0.042	0.004	0.000	0			0.015	0.092	0.241	0.316	0.227	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for proposed conditions downstream distance = 3 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.059	0.005	0.018	0.023	0.012	0.003	0.000	0.000	0.000	> 0.012	0.040	0.001	0.004	0.010	0.013	0.009	0.004	0.001	0.000
.006 - 0.01	0.883	0.071	0.264	0.334	0.173	0.038	0.004	0.000	0.000	.006 - 0.01	0.949	0.015	0.088	0.227	0.302	0.215	0.083	0.018	0.002
0 - 0.00612	0.058	0.005	0.017	0.022	0.011	0.003	0.000	0.000	0.000	0 - 0.00612	0.011	0.000	0.001	0.003	0.003	0.002	0.001	0.000	0.000
		0.080	0.299	0.378	0.196	0.043	0.004	0.000	0.000			0.016	0.093	0.239	0.318	0.226	0.087	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions									
> 0.0039	0.041	0.003	0.011	0.016	0.009	0.002	0.000	0.000	0	> 0.0039	0.023	0.000	0.001	0.003	0.006	0.006	0.004	0.002	0.001
0019 - 0.00	0.740	0.050	0.200	0.279	0.163	0.043	0.005	0.000	0	0019 - 0.00	0.875	0.006	0.038	0.123	0.226	0.242	0.158	0.063	0.018
0 - 0.0019	0.219	0.015	0.059	0.083	0.048	0.013	0.002	0.000	0	0 - 0.0019	0.103	0.001	0.005	0.015	0.027	0.029	0.019	0.007	0.002
		0.068	0.270	0.377	0.220	0.058	0.007	0.000	0			0.007	0.044	0.141	0.258	0.277	0.180	0.072	0.021
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.040	0.003	0.011	0.015	0.009	0.002	0.000	0.000	0	> 0.0039	0.023	0.000	0.001	0.003	0.006	0.006	0.004	0.002	0.001
0019 - 0.00	0.746	0.051	0.201	0.282	0.165	0.042	0.005	0.000	0	0019 - 0.00	0.872	0.006	0.038	0.123	0.225	0.242	0.158	0.063	0.018
0 - 0.0019	0.214	0.015	0.058	0.081	0.047	0.012	0.002	0.000	0	0 - 0.0019	0.104	0.001	0.005	0.015	0.027	0.029	0.019	0.008	0.002
		0.068	0.269	0.378	0.221	0.056	0.007	0.000	0			0.007	0.044	0.141	0.258	0.277	0.181	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for baseline conditions downstream distance = 11 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.012	0.049	0.003	0.013	0.019	0.011	0.003	0.000	0.000	0	> 0.012	0.012	0.000	0.001	0.002	0.003	0.003	0.002	0.001	0.000
.006 - 0.01	0.895	0.061	0.241	0.336	0.198	0.052	0.006	0.000	0	.006 - 0.01	0.977	0.007	0.043	0.137	0.253	0.271	0.177	0.071	0.019
0 - 0.00612	0.056	0.004	0.015	0.021	0.012	0.003	0.000	0.000	0	0 - 0.00612	0.011	0.000	0.001	0.002	0.003	0.003	0.002	0.001	0.000
		0.068	0.269	0.376	0.222	0.058	0.007	0.000	0			0.007	0.044	0.140	0.259	0.277	0.181	0.073	0.019
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for proposed conditions downstream distance = 5 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.045	0.003	0.012	0.017	0.010	0.003	0.000	0.000	0.000	> 0.012	0.043	0.000	0.002	0.006	0.011	0.012	0.008	0.003	0.001
.006 - 0.01	0.899	0.062	0.242	0.338	0.200	0.051	0.006	0.000	0.000	.006 - 0.01	0.947	0.007	0.042	0.133	0.240	0.265	0.172	0.069	0.019
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.003	0.000	0.000	0.000	0 - 0.00612	0.011	0.000	0.001	0.002	0.003	0.003	0.002	0.001	0.000
		0.069	0.269	0.376	0.222	0.057	0.007	0.000	0.000			0.007	0.045	0.140	0.254	0.279	0.182	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.0039	0.050	0.004	0.013	0.018	0.011	0.003	0.000	0.000	0.000	> 0.0039	0.022	0.000	0.000	0.002	0.004	0.006	0.006	0.003	0.001
0019 - 0.00	0.736	0.053	0.195	0.267	0.166	0.048	0.006	0.000	0.000	0019 - 0.00	0.874	0.002	0.014	0.067	0.161	0.239	0.219	0.122	0.052
0 - 0.0019	0.214	0.016	0.057	0.078	0.048	0.014	0.002	0.000	0.000	0 - 0.0019	0.103	0.000	0.002	0.008	0.019	0.028	0.026	0.014	0.006
		0.072	0.265	0.363	0.226	0.066	0.008	0.001	0.000			0.002	0.016	0.076	0.184	0.273	0.250	0.140	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.041	0.003	0.011	0.015	0.009	0.003	0.000	0.000	0.000	> 0.0039	0.030	0.000	0.001	0.002	0.006	0.008	0.007	0.004	0.002
0019 - 0.00	0.743	0.054	0.196	0.270	0.167	0.048	0.007	0.001	0.000	0019 - 0.00	0.866	0.002	0.015	0.065	0.162	0.239	0.215	0.120	0.050
0 - 0.0019	0.216	0.016	0.057	0.079	0.049	0.014	0.002	0.000	0.000	0 - 0.0019	0.104	0.000	0.002	0.008	0.019	0.029	0.026	0.014	0.006
		0.072	0.264	0.364	0.225	0.065	0.010	0.001	0.000			0.002	0.017	0.075	0.187	0.276	0.248	0.138	0.057
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for baseline conditions downstream distance = 16 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.049	0.004	0.013	0.018	0.011	0.003	0.000	0.000	0.000	> 0.012	0.008	0.000	0.000	0.001	0.002	0.002	0.002	0.001	0.001
.006 - 0.01	0.894	0.065	0.235	0.326	0.202	0.058	0.008	0.001	0.000	.006 - 0.01	0.980	0.002	0.017	0.074	0.182	0.272	0.241	0.135	0.058
0 - 0.00612	0.058	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.011	0.000	0.000	0.001	0.002	0.003	0.003	0.002	0.001
		0.073	0.263	0.365	0.226	0.065	0.009	0.001	0.000			0.002	0.018	0.075	0.185	0.277	0.246	0.138	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for proposed conditions downstream distance = 6 feet

Baseline Conditions										Proposed Conditions								
> 0.012	0.040	0.003	0.011	0.015	0.009	0.003	0.000	0.000	0.000	> 0.012	0.049	0.000	0.001	0.004	0.009	0.014	0.012	0.007	0.003
.006 - 0.01	0.904	0.066	0.236	0.330	0.204	0.059	0.008	0.001	0.000	.006 - 0.01	0.941	0.002	0.016	0.071	0.174	0.262	0.234	0.129	0.054
0 - 0.00612	0.056	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.010	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001
		0.073	0.262	0.365	0.226	0.065	0.009	0.001	0.000			0.002	0.017	0.075	0.185	0.278	0.248	0.137	0.057
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Highway Runoff Dilution Summary Results

Project: TDA 3
Precipitation Series: Puget East 40
Description:

Background Concentrations (mg/L)
Dissolved Copper: 0.0019
Dissolved Zinc: 0.00612

Baseline Conditions: 1.79 acres
No Treatment Infiltration 0% - 1.79 acres

Proposed Conditions: 1.8 acres
No Treatment Infiltration 0% - 0.01 acres with detention
No Treatment Infiltration 0% - 1.79 acres

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Depth (ft)										0.3	0.3	0.3	
Velocity (fps)										0.5	0.5	0.5	
Width (ft)										3.3	3.3	3.3	
Slope										0.01	0.01	0.01	
Discharge Distance (ft)										1000	1000	1000	
Distance Downstream in feet to Meet Biological Threshold													
Dissolved C	Baseline									< 1	< 1	< 1	
	Proposed									< 1	< 1	< 1	
Dissolved Z	Baseline									2	4	5	
	Proposed									2	4	5	

Highway Runoff Dilution Detailed Results

Dissolved Copper - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.014	0.001	0.004	0.005	0.003	0.001	0.000	0.000	0	> 0.0039	0.018	0.000	0.002	0.004	0.006	0.004	0.002	0.000	0.000
0019 - 0.00	0.773	0.062	0.230	0.292	0.152	0.034	0.003	0.000	0	0019 - 0.00	0.766	0.012	0.070	0.185	0.244	0.172	0.067	0.014	0.002
0 - 0.0019	0.214	0.017	0.064	0.081	0.042	0.009	0.001	0.000	0	0 - 0.0019	0.216	0.003	0.020	0.052	0.069	0.049	0.019	0.004	0.001
		0.081	0.298	0.377	0.196	0.044	0.004	0.000	0			0.016	0.092	0.241	0.318	0.225	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - September probability of occurrence for proposed conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.019	0.002	0.006	0.007	0.004	0.001	0.000	0.000	0	> 0.0039	0.013	0.000	0.001	0.003	0.004	0.003	0.001	0.000	0.000
0019 - 0.00	0.765	0.062	0.227	0.290	0.150	0.032	0.003	0.000	0	0019 - 0.00	0.772	0.012	0.072	0.183	0.245	0.175	0.069	0.015	0.002
0 - 0.0019	0.216	0.018	0.064	0.082	0.042	0.009	0.001	0.000	0	0 - 0.0019	0.215	0.003	0.020	0.051	0.068	0.049	0.019	0.004	0.001
		0.081	0.297	0.379	0.196	0.042	0.004	0.000	0			0.016	0.093	0.238	0.318	0.226	0.089	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for baseline conditions downstream distance = 2 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.045	0.004	0.013	0.017	0.009	0.002	0.000	0.000	0	> 0.012	0.037	0.001	0.004	0.009	0.012	0.008	0.003	0.001	0.000
.006 - 0.01	0.898	0.073	0.267	0.339	0.175	0.040	0.004	0.000	0	.006 - 0.01	0.906	0.014	0.085	0.217	0.288	0.204	0.078	0.017	0.002
0 - 0.00612	0.057	0.005	0.017	0.022	0.011	0.003	0.000	0.000	0	0 - 0.00612	0.057	0.001	0.005	0.014	0.018	0.013	0.005	0.001	0.000
		0.082	0.297	0.378	0.195	0.044	0.004	0.000	0			0.016	0.094	0.239	0.318	0.226	0.086	0.019	0.003
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for proposed conditions downstream distance = 2 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.037	0.003	0.011	0.014	0.007	0.002	0.000	0.000	0.000	> 0.012	0.044	0.001	0.004	0.011	0.014	0.010	0.004	0.001	0.000
.006 - 0.01	0.907	0.075	0.268	0.343	0.176	0.041	0.004	0.000	0.000	.006 - 0.01	0.900	0.014	0.083	0.217	0.285	0.202	0.079	0.017	0.002
0 - 0.00612	0.056	0.005	0.017	0.021	0.011	0.003	0.000	0.000	0.000	0 - 0.00612	0.057	0.001	0.005	0.014	0.018	0.013	0.005	0.001	0.000
		0.082	0.296	0.378	0.195	0.045	0.005	0.000	0.000			0.016	0.093	0.241	0.317	0.225	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.020	0.001	0.005	0.008	0.004	0.001	0.000	0.000	0	> 0.0039	0.019	0.000	0.001	0.003	0.005	0.005	0.004	0.001	0.000
0019 - 0.00	0.766	0.053	0.207	0.290	0.168	0.044	0.005	0.000	0	0019 - 0.00	0.766	0.005	0.034	0.108	0.196	0.214	0.139	0.055	0.015
0 - 0.0019	0.214	0.015	0.058	0.081	0.047	0.012	0.001	0.000	0	0 - 0.0019	0.215	0.002	0.009	0.030	0.055	0.060	0.039	0.016	0.004
		0.069	0.270	0.379	0.219	0.057	0.007	0.000	0			0.007	0.044	0.141	0.256	0.279	0.182	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.019	0.001	0.005	0.007	0.004	0.001	0.000	0.000	0.000	> 0.0039	0.020	0.000	0.001	0.003	0.005	0.006	0.004	0.002	0.000
0019 - 0.00	0.768	0.052	0.208	0.290	0.169	0.043	0.005	0.000	0.000	0019 - 0.00	0.762	0.005	0.034	0.108	0.195	0.212	0.139	0.056	0.014
0 - 0.0019	0.214	0.015	0.058	0.081	0.047	0.012	0.001	0.000	0.000	0 - 0.0019	0.217	0.002	0.010	0.031	0.056	0.060	0.040	0.016	0.004
		0.068	0.271	0.378	0.220	0.056	0.007	0.000	0.000			0.007	0.044	0.141	0.256	0.278	0.183	0.073	0.019
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for baseline conditions downstream distance = 4 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.012	0.043	0.003	0.012	0.016	0.009	0.002	0.000	0.000	0.000	> 0.012	0.025	0.000	0.001	0.004	0.006	0.007	0.005	0.002	0.001
.006 - 0.01	0.901	0.062	0.242	0.340	0.199	0.052	0.006	0.000	0.000	.006 - 0.01	0.918	0.006	0.040	0.128	0.237	0.255	0.167	0.066	0.019
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.003	0.000	0.000	0.000	0 - 0.00612	0.057	0.000	0.003	0.008	0.015	0.016	0.010	0.004	0.001
		0.069	0.269	0.377	0.221	0.057	0.007	0.000	0.000			0.007	0.044	0.140	0.258	0.278	0.182	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for proposed conditions downstream distance = 4 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.025	0.002	0.007	0.009	0.006	0.001	0.000	0.000	0	> 0.012	0.043	0.000	0.002	0.006	0.011	0.012	0.008	0.003	0.001
.006 - 0.01	0.918	0.063	0.247	0.347	0.204	0.051	0.006	0.000	0	.006 - 0.01	0.899	0.006	0.040	0.126	0.228	0.251	0.163	0.066	0.018
0 - 0.00612	0.058	0.004	0.016	0.022	0.013	0.003	0.000	0.000	0	0 - 0.00612	0.057	0.000	0.003	0.008	0.015	0.016	0.010	0.004	0.001
		0.068	0.269	0.378	0.222	0.055	0.007	0.000	0			0.007	0.044	0.140	0.254	0.279	0.182	0.073	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.0039	0.024	0.002	0.006	0.009	0.005	0.002	0.000	0.000	0.000	> 0.0039	0.019	0.000	0.000	0.001	0.004	0.005	0.005	0.003	0.001
0019 - 0.00	0.761	0.055	0.200	0.276	0.172	0.050	0.007	0.000	0.000	0019 - 0.00	0.765	0.002	0.013	0.058	0.141	0.211	0.191	0.106	0.044
0 - 0.0019	0.215	0.016	0.057	0.078	0.049	0.014	0.002	0.000	0.000	0 - 0.0019	0.215	0.000	0.004	0.016	0.040	0.059	0.054	0.030	0.012
		0.073	0.263	0.363	0.226	0.066	0.009	0.001	0.000			0.002	0.017	0.075	0.185	0.276	0.250	0.139	0.057
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.018	0.001	0.005	0.007	0.004	0.001	0.000	0.000	0.000	> 0.0039	0.023	0.000	0.000	0.002	0.004	0.006	0.006	0.003	0.001
0019 - 0.00	0.765	0.056	0.201	0.278	0.172	0.051	0.007	0.001	0.000	0019 - 0.00	0.762	0.002	0.013	0.057	0.142	0.209	0.189	0.106	0.045
0 - 0.0019	0.217	0.016	0.057	0.079	0.049	0.014	0.002	0.000	0.000	0 - 0.0019	0.214	0.000	0.004	0.016	0.040	0.059	0.053	0.030	0.013
		0.073	0.263	0.364	0.224	0.066	0.010	0.001	0.000			0.002	0.018	0.075	0.186	0.274	0.248	0.139	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for baseline conditions downstream distance = 5 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.046	0.003	0.012	0.017	0.010	0.003	0.000	0.000	0	> 0.012	0.022	0.000	0.000	0.002	0.004	0.006	0.006	0.003	0.001
.006 - 0.01	0.898	0.065	0.237	0.329	0.200	0.059	0.008	0.001	0	.006 - 0.01	0.920	0.002	0.016	0.068	0.171	0.253	0.230	0.128	0.053
0 - 0.00612	0.056	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0	0 - 0.00612	0.057	0.000	0.001	0.004	0.011	0.016	0.014	0.008	0.003
		0.072	0.264	0.366	0.223	0.065	0.009	0.001	0			0.002	0.018	0.074	0.186	0.274	0.250	0.139	0.058
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for proposed conditions downstream distance = 5 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.022	0.002	0.006	0.008	0.005	0.001	0.000	0.000	0.000	> 0.012	0.046	0.000	0.001	0.004	0.009	0.013	0.011	0.006	0.003
.006 - 0.01	0.922	0.067	0.244	0.335	0.207	0.060	0.008	0.001	0.000	.006 - 0.01	0.896	0.002	0.015	0.068	0.167	0.245	0.223	0.125	0.051
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.058	0.000	0.001	0.004	0.011	0.016	0.014	0.008	0.003
		0.073	0.264	0.364	0.225	0.065	0.009	0.001	0.000			0.002	0.017	0.076	0.187	0.274	0.249	0.139	0.057
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Highway Runoff Dilution Summary Results

Project: TDA 4
Precipitation Series: Puget East 40
Description:

Background Concentrations (mg/L)
Dissolved Copper: 0.0019
Dissolved Zinc: 0.00612

Baseline Conditions: 4.7 acres
No Treatment Infiltration 0% - 4.7 acres

Proposed Conditions: 5.54 acres
Enhanced Treatment Infiltration 0% - 0.83 acres with detention
No Treatment Infiltration 0% - 0.01 acres with detention
No Treatment Infiltration 0% - 4.7 acres

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Depth (ft)										1.5	1.5	1.5	
Velocity (fps)										0.62	0.62	0.62	
Width (ft)										6.5	6.5	6.5	
Slope										0.05	0.05	0.05	
Discharge Distance (ft)										900	900	900	
Distance Downstream in feet to Meet Biological Threshold													
Dissolved C	Baseline									< 1	< 1	< 1	
	Proposed									< 1	< 1	< 1	
Dissolved Z	Baseline									< 1	< 1	< 1	
	Proposed									< 1	< 1	< 1	

Highway Runoff Dilution Detailed Results

Dissolved Copper - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0019 - 0.00	0.786	0.064	0.234	0.297	0.154	0.035	0.003	0.000	0	0019 - 0.00	0.836	0.013	0.077	0.202	0.266	0.188	0.073	0.016	0.002
0 - 0.0019	0.214	0.017	0.064	0.081	0.042	0.009	0.001	0.000	0	0 - 0.0019	0.164	0.003	0.015	0.040	0.052	0.037	0.014	0.003	0.000
		0.081	0.298	0.377	0.196	0.044	0.004	0.000	0			0.016	0.092	0.241	0.318	0.225	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - September probability of occurrence for proposed conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0019 - 0.00	0.783	0.064	0.232	0.296	0.155	0.034	0.003	0.000	0.000	0019 - 0.00	0.836	0.013	0.078	0.200	0.267	0.188	0.072	0.016	0.002
0 - 0.0019	0.217	0.018	0.064	0.082	0.043	0.009	0.001	0.000	0.000	0 - 0.0019	0.164	0.003	0.015	0.039	0.052	0.037	0.014	0.003	0.000
		0.081	0.296	0.378	0.198	0.043	0.004	0.000	0.000			0.016	0.093	0.239	0.319	0.225	0.086	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.003	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0	> 0.012	0.002	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
.006 - 0.01	0.939	0.075	0.279	0.357	0.183	0.041	0.004	0.000	0	.006 - 0.01	0.970	0.015	0.091	0.231	0.309	0.219	0.085	0.019	0.002
0 - 0.00612	0.058	0.005	0.017	0.022	0.011	0.003	0.000	0.000	0	0 - 0.00612	0.028	0.000	0.003	0.007	0.009	0.006	0.002	0.001	0.000
		0.080	0.297	0.380	0.195	0.044	0.004	0.000	0			0.016	0.093	0.238	0.318	0.225	0.087	0.020	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - September probability of occurrence for proposed conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.002	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0	> 0.012	0.002	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000
.006 - 0.01	0.940	0.075	0.281	0.355	0.185	0.041	0.004	0.000	0	.006 - 0.01	0.970	0.015	0.089	0.235	0.309	0.217	0.085	0.018	0.002
0 - 0.00612	0.057	0.005	0.017	0.022	0.011	0.003	0.000	0.000	0	0 - 0.00612	0.028	0.000	0.003	0.007	0.009	0.006	0.002	0.001	0.000
		0.079	0.299	0.378	0.197	0.043	0.004	0.000	0			0.015	0.092	0.242	0.318	0.224	0.088	0.019	0.002
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0019 - 0.00	0.784	0.054	0.212	0.294	0.174	0.044	0.005	0.000	0	0019 - 0.00	0.835	0.006	0.037	0.118	0.216	0.231	0.150	0.061	0.017
0 - 0.0019	0.216	0.015	0.058	0.081	0.048	0.012	0.001	0.000	0	0 - 0.0019	0.164	0.001	0.007	0.023	0.042	0.045	0.030	0.012	0.003
		0.069	0.270	0.376	0.222	0.056	0.007	0.000	0			0.007	0.044	0.141	0.258	0.277	0.180	0.073	0.021
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0019 - 0.00	0.785	0.054	0.210	0.297	0.174	0.045	0.005	0.000	0	0019 - 0.00	0.836	0.006	0.037	0.117	0.216	0.232	0.152	0.060	0.017
0 - 0.0019	0.215	0.015	0.057	0.081	0.047	0.012	0.001	0.000	0	0 - 0.0019	0.164	0.001	0.007	0.023	0.042	0.045	0.030	0.012	0.003
		0.069	0.268	0.379	0.221	0.057	0.007	0.000	0			0.007	0.044	0.140	0.258	0.277	0.182	0.072	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.012	0.004	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0	> 0.012	0.002	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
.006 - 0.01	0.939	0.064	0.254	0.355	0.207	0.053	0.007	0.000	0	.006 - 0.01	0.970	0.007	0.043	0.136	0.246	0.271	0.176	0.071	0.020
0 - 0.00612	0.057	0.004	0.015	0.022	0.013	0.003	0.000	0.000	0	0 - 0.00612	0.028	0.000	0.001	0.004	0.007	0.008	0.005	0.002	0.001
		0.068	0.270	0.378	0.220	0.057	0.007	0.000	0			0.007	0.044	0.140	0.254	0.279	0.182	0.073	0.020
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - October probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.002	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	> 0.012	0.004	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000
.006 - 0.01	0.940	0.066	0.252	0.355	0.208	0.055	0.006	0.000	0.000	.006 - 0.01	0.969	0.007	0.042	0.137	0.249	0.268	0.177	0.070	0.020
0 - 0.00612	0.058	0.004	0.015	0.022	0.013	0.003	0.000	0.000	0.000	0 - 0.00612	0.028	0.000	0.001	0.004	0.007	0.008	0.005	0.002	0.001
		0.070	0.268	0.377	0.221	0.058	0.007	0.000	0.000			0.007	0.044	0.141	0.257	0.276	0.182	0.072	0.021
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)

Baseline Conditions										Proposed Conditions									
> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0019 - 0.00	0.784	0.056	0.205	0.287	0.177	0.051	0.007	0.001	0.000	0019 - 0.00	0.832	0.002	0.014	0.062	0.156	0.230	0.206	0.113	0.048
0 - 0.0019	0.216	0.015	0.057	0.079	0.049	0.014	0.002	0.000	0.000	0 - 0.0019	0.167	0.000	0.003	0.013	0.031	0.046	0.042	0.023	0.010
		0.071	0.262	0.367	0.226	0.065	0.009	0.001	0.000			0.002	0.017	0.075	0.188	0.276	0.248	0.136	0.058
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Copper - November probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	> 0.0039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0019 - 0.00	0.785	0.057	0.206	0.286	0.178	0.051	0.007	0.001	0	0019 - 0.00	0.833	0.002	0.014	0.063	0.154	0.229	0.206	0.115	0.049
0 - 0.0019	0.215	0.016	0.056	0.078	0.049	0.014	0.002	0.000	0	0 - 0.0019	0.166	0.000	0.003	0.013	0.031	0.046	0.041	0.023	0.010
		0.072	0.262	0.364	0.227	0.065	0.009	0.001	0			0.002	0.017	0.075	0.185	0.275	0.248	0.138	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for baseline conditions downstream distance = 1 feet

Conc. (mg/L)	Baseline Conditions									Proposed Conditions								
> 0.012	0.005	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0.000	> 0.012	0.002	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000
.006 - 0.01	0.938	0.069	0.246	0.343	0.211	0.062	0.008	0.001	0.000	.006 - 0.01	0.970	0.002	0.016	0.072	0.179	0.270	0.242	0.132	0.056
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.028	0.000	0.001	0.002	0.005	0.008	0.007	0.004	0.002
		0.073	0.262	0.366	0.225	0.066	0.009	0.001	0.000			0.002	0.017	0.074	0.185	0.278	0.250	0.136	0.058
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

Dissolved Zinc - November probability of occurrence for proposed conditions downstream distance = 1 feet

Baseline Conditions										Proposed Conditions									
> 0.012	0.002	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	> 0.012	0.004	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000
.006 - 0.01	0.941	0.067	0.246	0.342	0.215	0.062	0.009	0.001	0.000	.006 - 0.01	0.968	0.002	0.017	0.072	0.180	0.264	0.243	0.132	0.057
0 - 0.00612	0.057	0.004	0.015	0.021	0.013	0.004	0.001	0.000	0.000	0 - 0.00612	0.028	0.000	0.001	0.002	0.005	0.008	0.007	0.004	0.002
		0.071	0.261	0.364	0.229	0.066	0.009	0.001	0.000			0.002	0.018	0.075	0.186	0.273	0.251	0.136	0.059
		0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192			0 - 3	3 - 6	6 - 12	12 - 24	24 - 48	48 - 96	96 - 192	>192

Discharge Duration (hrs)

NE 4th Street/ 120th Avenue NE Corridor Project

Community Effects Technical Report

prepared for
City of Bellevue

prepared by
Parsons Brinckerhoff

April 15, 2011

COB File # 11-114971-LM

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Acronyms and Abbreviations

ACS	American Community Survey
BEA	Bureau of Economic Analysis
BNSF	Burlington Northern Santa Fe Railroad
City	City of Bellevue
GIS	Geographic Information System
RIMS	Regional Input-Output Modeling System
SR	State Route
STIP	Statewide Transportation Improvement Plan

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Executive Summary

The purpose of this technical report is to assess potential community effects that may result from construction or operation of the NE 4th/120th Avenue Corridor Project proposed by the City of Bellevue. This project involves the extension of NE 4th Street between 116th Avenue NE and 120th Avenue NE, the widening of 120th Avenue NE from about the NE 300 block north to Northup Way, and includes the realignment of 120th Avenue NE at the intersection at NE 8th Street. The investigation examines land use, community character and cohesion, economic, public services, community facilities, utilities, and visual effects.

Land use surrounding the project corridor is primarily characterized by moderate-density commercial developments with a mix of institutional, residential, retail, and office uses. Land uses directly adjacent to the project corridor consist of automobile dealerships, small strip malls, office buildings, medical offices, and parking lots. Residential communities are located in the southwest portion of the study area as well as on both the east and west sides of the project corridor in the central portion of the study area. Open space near the project corridor includes Wilburton Hill Community Park to the southeast and Bel-Red Mini Park to the east in the central portion of the project corridor. No environmental justice populations are located in the study area.

Overall, the proposed NE 4th Street/120th Avenue NE Corridor Project would benefit the community by providing better traffic, transit, pedestrian, and bicycle access to the area. The project would enhance community cohesion as part of the City of Bellevue's future plans for both the Wilburton/NE 8th Street and Bel-Red Subareas. It is envisioned that these subareas would become areas of mixed-use transit-oriented development that would provide additional economic and social opportunities complementary to Downtown Bellevue.

No significant adverse effects to community resources are anticipated as part of this project. However, there would be minor effects on economics, street trees, and visual resources that would be mitigated in the following manner:

- Economic Effects—Where acquisition results in the relocation of a business, the extent of this effect is considered in the relocation services and payments made under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq.) (Chapter 468-100 WAC).
- Community Effects—Street trees would be protected and replaced according to the City of Bellevue Land Use Code 20.50.046.
- Visual Effects—Lighting in the area would follow the respective design guidelines of each subarea.

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1.0 Introduction

1.1 Purpose of This Report

This *Community Effects Technical Report* was prepared for environmental documentation for the City of Bellevue's (City) NE 4th Street/120th Avenue NE Corridor Project. The project proposes to extend NE 4th Street east from its current terminus at 116th Avenue NE to a new intersection with 120th Avenue NE, and widen and realign 120th Avenue NE north from the new intersection with NE 4th Street to Northup Way.

The purpose of this report is to describe the existing land use, zoning, economics, and demographics of the community in the study area; discuss the potential adverse and beneficial effects of the project on the community during both construction and operation; and identify mitigation measures to minimize potential effects, as needed.

There would be no permits required with respect to the community resources discussed in this technical report.

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2.0 Proposed Project

2.1 Project Overview

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined roadway corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of the Downtown Bellevue center. Major regional transportation connections and facilities in the project vicinity include Interstate 405 (I-405) to the west and State Route 520 (SR 520) to the north.

The project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include—the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road. Figure 2-1 shows the project study area.

The NE 4th Street/120th Avenue NE Corridor Project is one of a number of high priority transportation investments that make up the City of Bellevue's Mobility and Infrastructure Initiative. This initiative was formed to address unprecedented growth in Downtown Bellevue and to support planned growth in the Bel-Red, Spring District, and Wilburton areas.

Other key projects included in the initiative that would complement the proposed project include the following:

- NE 5th Street neighborhood project improvements
- NE 6th Street Extension from 112th Avenue NE to 120th Avenue NE
- NE 15th Street multi-modal corridor improvements north of NE 12th Street (also supporting Sound Transit's East Link Project)
- 124th Avenue NE improvements from NE 8th Street to Northup Way.

For each of these projects, new travel lanes, non-motorized facilities, signal enhancements, illumination, and various structure and utility relocations would be included.

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Figure 2-1. Project Study Area

2.2 Project Purpose and Need

The purpose of the proposed project is to achieve the following:

- Support and accommodate the City's adopted future land use changes and resulting travel demands.
- Improve local traffic circulation.
- Bring corridor features into compliance with current and proposed design standards and guidelines.
- Prepare the project corridor to support connections to planned transit facilities, specifically Sound Transit's East Link Project light rail alignment.

Collectively, the proposed project elements (see Figure 2-2) would enhance area-wide mobility by adding capacity to support the expected growth in travel demand, constructing critical missing links in the City's traffic distribution network, and easing congestion in other travel corridors. Moreover, the project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to transit facilities identified in City plans.

It would improve access for other modes to local recreational facilities, businesses, and the planned Link light rail stations at NE 8th Street and 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE.

In summary, the proposed project would meet the following objectives:

- To provide acceptable level of service at existing and planned study area intersections to meet anticipated long-term travel demands.
- To improve access and connectivity with the regional and local. transportation networks.
- To enhance long-term traffic operations over time by incorporating design standards that serve a variety of transportation modes, including the needs of large trucks and freight vehicles, as well as buses.
- To improve quality of life by improving mobility and transportation choice, particularly for transit, bicycle, and pedestrian traffic.

As shown in preliminary traffic analysis work for the NE 4th Street extension and the widening and realignment of 120th Avenue NE, the project elements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas as well as the region in terms of travel mobility and access to neighborhoods and businesses. This is primarily the result of new and enhanced connections across the Burlington Northern Santa Fe (BNSF) corridor and NE 8th Street, respectively. The proposed project also provides expanded arterial street capacity and driveway consolidation along 120th Avenue NE. The project termini are logical because they bracket the extent of the expected future development in the Wilburton/

NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail transit facilities.

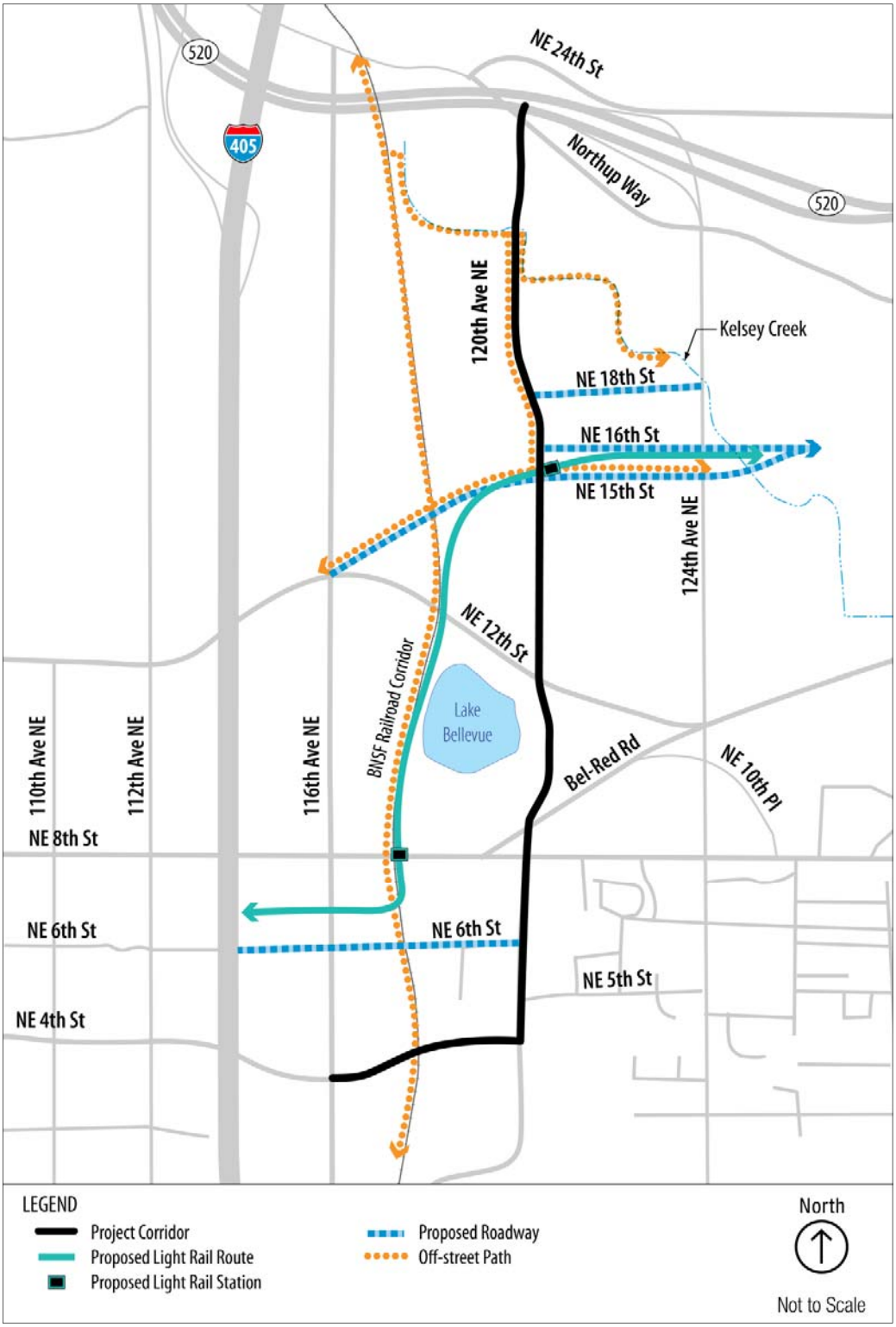

Figure 2-2. Planned Transportation Connections in the Study Area

2.3 Corridor Improvements

2.3.1 Programmed Corridor Improvements

This corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. These projects are described below.

- **NE 4th Street Extension (116th to 120th Avenue NE)**—Construct a new four to five lane roadway with arterial standard curb, gutter, sidewalk (including planting strips) and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension will be designed to accommodate future development and uses of the BNSF corridor.
- **120th Avenue NE Corridor—NE 4th Street to Northup Way**
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected segments; install continuous sidewalks to arterial standards; realign the roadway between Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project will be constructed in phases. Federal funding awarded to improvements, including bike lanes, planned between NE 4th and NE 8th Streets.

This revised description was submitted to Puget Sound Regional Council [PSRC] April 8, 2011 for the June 2011 Amendment to the Statewide Transportation Improvement Program (STIP).

2.3.2 Proposed Corridor Improvements

Specific design elements include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.

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- Construct improvements that support the planned new intersections at NE 15th/16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.
- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

The five-lane roadway design is proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE north to NE 15th Street. This proposed roadway cross-section is shown in Figure 2-3. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. Generally, a 5-foot-wide bike lane would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. However, the size and location of the sidewalks, bicycle facilities, and planter strips vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

As mentioned earlier, this analysis addresses the potential impacts of two minor alignment options for the extension of NE 4th Street east of the BNSF corridor. The alignment for Option 1 is farther north than that of Option 2. The Option 1 alignment would require acquisition of a portion of the southern side of the Best Buy building and displace access to the loading dock located on the west side of the building. Negotiations with the property owner are ongoing and may include construction of a building addition on the north side of the existing structure and/or realignment of the loading dock access to the north of the building. Option 2, roughly 55 feet south of the Option 1 alignment, would not require acquisition of any portion of nearby buildings, but would displace a substantial amount of parking on the Home Depot property as well as displace the Best Buy building's access to the loading dock area. Again, negotiations are ongoing with the property owners and mitigation may include construction of a new loading

dock access for the Best Buy property on the north side of the existing structure and/or a new parking garage on the Home Depot property. Note, the design for improvements along 120th Avenue NE south of NE 8th Street do not assume either option has been selected, but rather improvements are based on existing curb cuts for the driveway access to parking for the Best Buy and Home Depot properties.

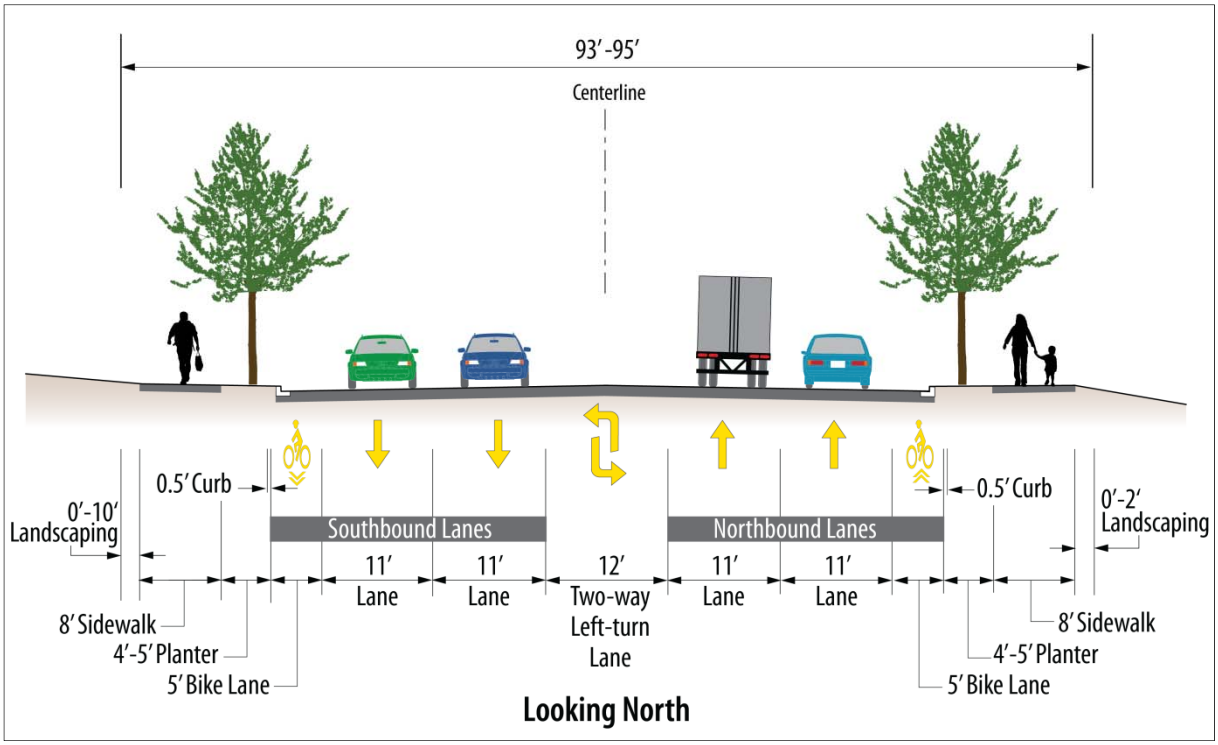

Figure 2-3. Typical Section—Five-lane Roadway Design

A four-lane roadway section is proposed for 120th Avenue NE from NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets. At the intersection at Northup Way, the cross-section would again be five lanes to allow for adequate turning movement capacity. This proposed four-lane cross-section is show in Figure 2-4. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes—two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed for each side of a two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

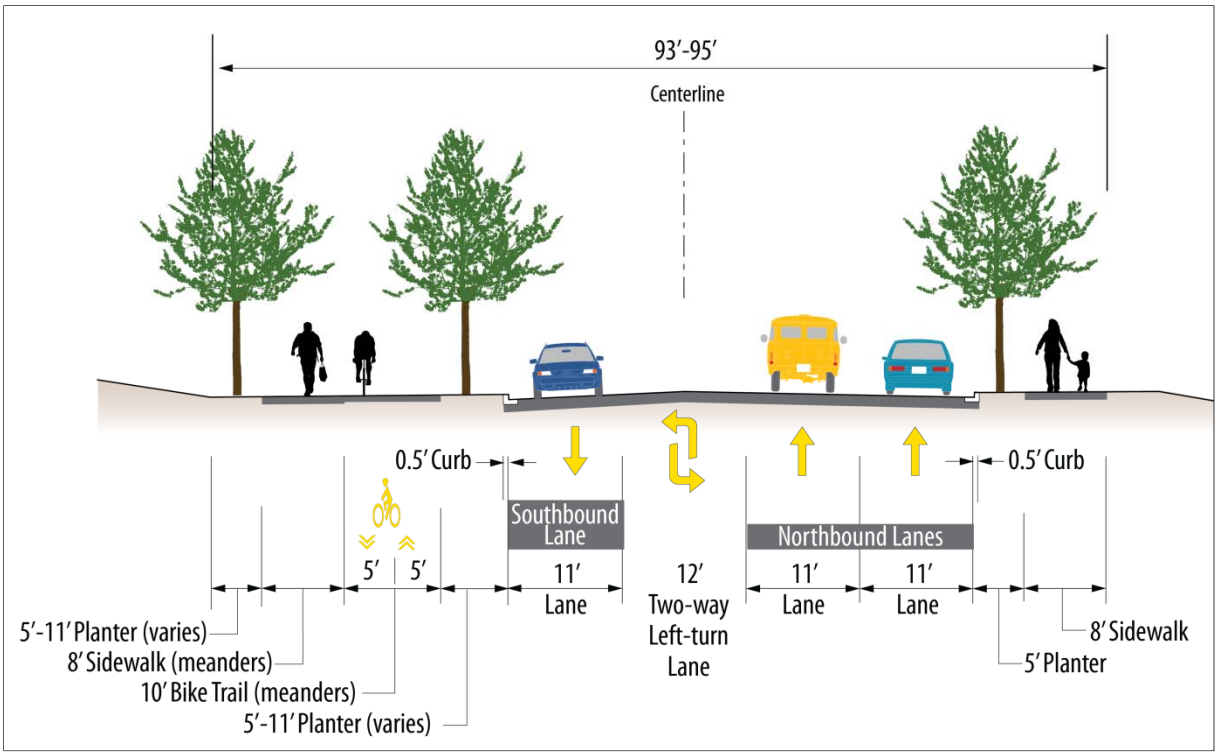

Figure 2-4. Typical Section—Four-lane Roadway Design

Both of the proposed roadway cross-sections also include the use of retaining walls, which would further increase the width of the required right-of-way beyond 95 feet. Retaining walls are proposed at numerous locations along the corridor and they would be located on both sides of the roadway. They would be used for both cut walls and fill walls. When retaining walls are required, these structures would generally be located immediately adjacent to the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet in width. To the outside of the retaining walls, the soil would be graded to a 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 121 feet or more where retaining walls are needed on both sides of the roadway.

Note, the term “right-of-way,” as used in this report, includes both right-of-way owned by the City and permanent easements (i.e., the complete footprint of the project).

2.4 Project Construction

2.4.1 Construction Duration and Phasing

Project construction would be phased and is expected to be completed from late 2011 to at least 2016 to match the programming of local, state, and federal funding sources. Each phase would last approximately 12 to 15 months. The planned phases, which may be further sub-divided into construction stages, are:

- Phase 1—120th Avenue NE widening between approximately the NE 300 block north to NE 7th Street.
- Phase 2—120th Avenue NE new construction between NE 8th Street and Bel-Red Road, and realignment and widening between approximately Bel-Red Road north to NE 12th Street.
- Phase 3—NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4—120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5—120th Avenue NE widening between NE 16th Street north to Northup Way.

Based on the Wilburton/NE 8th Street and Bel-Red Subarea Plans, it is essential that all phases of the NE 4th Street/120th Avenue NE Corridor Project be implemented in order to meet the purpose and need of the project. The City has committed to constructing all phases of the project, with cross sections appropriate to meet the multi-modal demand anticipated in the next 20 years. In addition, construction of the project phases could occur sequentially or some phases could overlap.

2.4.2 Construction Approach

The approach to project construction along the corridor differs. The following paragraphs describe the varying approaches to construction.

The improvements for NE 4th Street consist of constructing a new roadway, and would not involve working within an existing operable roadway. Construction for this phase would include clearing the full roadway right-of-way; grading; installing utilities and the roadway gravel base; constructing the curb, gutter and sidewalks; paving the roadway; and installing illumination/signals and landscaping. The construction activities would not disrupt existing traffic patterns along NE 4th Street, 116th Avenue NE, or 120th Avenue NE. However, the construction zone for NE 4th Street may extend somewhat into the existing roadways (116th and 120th Avenues NE) in order to connect new and existing pavements and existing and planned utilities at these locations.

Generally, the construction along 120th Avenue NE from the NE 300 block to NE 7th Street would widen the existing roadway on both sides of the existing centerline. Construction in this area would occur along an operational roadway.

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The improvements in this area would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

Construction of the realignment and widening of 120th Avenue NE between the intersection at NE 8th Street and about NE 12th Street would occur along an operational roadway. Thus, the construction in this area is anticipated to occur in the following manner:

- Contractor mobilization
- Install traffic control and temporary erosion control measures
- Relocate and/or install utilities
- Roadway Side 1—retaining walls, grading, paving, signals, and illumination
- Roadway Side 2—retaining walls, grading, paving, signals, and illumination
- Construction zone landscaping, restoration, and clean up.

The corridor could not be closed during construction though both directions of travel may be constrained to perhaps only a single lane. Use of Bel-Red Road between NE 8th Street and 120th Avenue NE, however, would be closed at the start of roadway construction between Bel-Red Road and NE 8th Street. With this road closure, construction could occur unhampered for the new roadway. Parcels along this portion of the alignment would be fully acquired and construction activities would not affect adjacent businesses. Traffic on Bel-Red Road east of 120th Avenue NE would continue to be able to travel north on 120th Avenue NE during construction. To the north of Bel-Red Road, the roadway alignment is generally shifted eastward. Construction work would likely start on the eastern half of the expanded right-of-way. When completed, traffic would be shifted to the new roadway, while the western portion of the roadway is constructed. All construction sequencing would be planned to minimize impacts to traffic and adjacent businesses.

Lastly, construction along the remaining northern portion of 120th Avenue NE from NE 12th to just south of Northup Way would also widen the existing roadway on both sides of the existing centerline. The improvements along 120th Avenue NE would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

2.5 Project Funding

The total cost of the proposed project improvements based on the final City Council Direction for the 2011-2017 General Capital Improvement Plan would be between an estimated $67.3 and $67.6 million, depending on the selected option for extending NE 4th Street. Construction would cost approximately $32 million and right-of-way acquisition would cost roughly $35 million.

Funding for the overall project would likely include monies from the following sources:

- Federal grants
- State Transportation Improvement Board funding
- State Local Revitalization Financing funding
- Local contributions from transportation-dedicated sources, long-term general obligation bonds, impact fees, and other private participation programs including possible local improvement districts.

The specific mix of federal, state, and local funding contributions for each construction phase could differ.

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3.0 Methods

The following methods were applied to the effects analysis contained in this report. Reasons are provided for methods that varied from Washington State Department of Transportation guidance.

3.1 Land Use and Zoning

The land use analysis is based on the existing land use patterns and anticipated future development trends in the Wilburton/NE 8th Street and Bel-Red Subareas. Land use and transportation information was obtained through the following regional and City plans and policies:

- Statewide Transportation Improvement Plan (STIP)
- Washington Transportation Plan 2007-2026
- Puget Sound Regional Council Transportation 2040, Appendix B—Projects and Programs by SMART Corridor
- Puget Sound Regional Council Transportation 2040, Appendix C—Multicounty Planning Policies
- City of Bellevue Comprehensive Plan (amended February 2009)
- The City of Bellevue 2011-2016 Transportation Improvement Program
- Wilburton/NE 8th Street Subarea Plan
- Bel-Red Subarea Plan
- Bel-Red Overlake Transportation Facilities Plan
- Bel-Red Corridor Project Existing Conditions

3.2 Neighborhood Character

The neighborhood character analysis is based on site visits conducted during July and August 2010 and information acquired from the City, including the subarea plans noted above.

3.3 Social Composition

The primary approach to analyzing population and demographic data follows the outline provided in the Washington State Department of Transportation *Environmental Procedures Manual*. Resource issues involving community cohesion, population and demographics, and environmental justice (including minority and low-income populations) were reviewed. Census data were collected from the 2000 U.S. Census and the 2005-2009 American Community Survey (ACS) 5-Year Estimates and included data on the following:

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- Population
- Racial composition
- Household characteristics
- Household income

Specific census information was used to describe the study area characteristics. Year 2000 Census blocks were used to best approximate the population within the study area. In some cases, the geographic boundaries for the census blocks extended beyond the immediate study area; however, block information provided the best source of data on population characteristics. Some year 2000 census data, such as median household income, were not available at the census block level. Therefore, to collect this information for the study area, census block groups were used. The four census block groups that cover the study area extend much farther beyond the project limits and incorporate a large number of residences well outside of where the project would be constructed. To be as inclusive as possible, for both census block and census block groups, data were included even if only a portion of the block or block group was located within the defined project study area.

Furthermore, to attain a more current understanding of the study area characteristics, 2005-2009 ACS data were gathered at the census tract level. To extrapolate the change between year 2000 and 2010, ratios were applied to the 2000 census blocks based on the percent of change between the 2000 census and the 2005-2009 ACS figures. Both the 2000 census data and estimated 2010 data are detailed throughout this report. (2010 U.S. Census data was not available at the time this analysis was conducted.)

3.4 Economic Environment

The discussion of the economic environment covers various topics. The project was analyzed for its potential effects on property taxes due to property acquisitions, effects on City taxes due to effects on businesses and employees, and effects on County and regional economic activity due to construction, including the project capital cost and the construction jobs created by the project.

The number of properties to be acquired was identified to calculate the corresponding reduction in property tax revenue. Benefits and effects of property acquisitions were discussed as they relate to changes in government revenues. The number of affected employees was used to assess the effect of the displacement of workers when buildings were acquired.

Benefits and effects on regional economic activity were estimated using U.S. Department of Commerce Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS) II multipliers (BEA 1997). Temporary economic effects to businesses were evaluated within or adjacent to the area of immediate effect (construction zone). The construction footprint was evaluated for its disruptive effects on the businesses immediately adjacent to where construction

activities would occur. Disruption factors evaluated include loss of on-street parking, loss of sidewalk access and visibility, and loss of freight delivery parking. Temporary jobs created during construction were estimated using BEA RIMS II multipliers (BEA 1997).

Off-street parking effects on study area businesses were estimated by overlaying the engineering plans on an aerial map. Two effects determined the loss of a parking space—1) street infrastructure would be constructed over a parking space, or 2) there would be no room for vehicle maneuvering into or out of a parking space. The next step included in this analysis was a determination of whether the loss of parking for a particular business would be so substantial as to question its long-term viability.

3.5 Public Services

The public services analysis is based on information acquired from the City, including Geographic Information System (GIS) data and the Bellevue School District website:

- Bellevue School District, All Schools Directory Website http://www.bsd405.org/Default.aspx?tabid=178
- GIS data shapefiles
  - "Fir
  - ehouse"
  - "Pstation" (police stations)
  - "Schools"
  - "Strnet" (street network)

3.6 Community Facilities

The community facilities analysis is based on information acquired from the City, including GIS data and individual department websites, as well as the King County Library System website:

- Parks and Community Services Department Website http://www.ci.bellevue.wa.us/parks_intro.htm
- Transportation Department Website http://www.bellevuewa.gov/walking_biking.htm
- GIS data shapefiles:
  - "Bikenetwork"
  - "Citytrees" (street trees)
  - "Lakes"
  - "Parksite"

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    - "Parksproperty"
    - "Trails"
- King County Library System, Bellevue Library Information Website http://www.kcls.org/bellevue/about.cfm

3.7 Utilities

The utilities analysis is based on information acquired during surveys performed for the project and from the City, including GIS data and the Utilities Department website.

- Utilities Department Website http://www.ci.bellevue.wa.us/utilities.htm
- GIS data shapefiles:
    - "Oilpipes"
    - "Powerline"
    - "Sd_basin" (storm drainage basin)
    - "Utilgrid" (utility grid)

3.8 Visual and Aesthetic

The visual and aesthetic analysis is based on site visits conducted during July and August 2010 and general neighborhood characteristic information obtained from the City. Potential effects on visual resources are discussed in qualitative terms rather than conducting a quantitative assessment pursuant to Federal Highway Administration guidance. This determination was made due to the absence of sensitive resources and receptors along the route, as well as the nature of the project, primarily involving changes in elevation rather than construction of overhead structures.

4.0 Existing Conditions

This chapter discusses the existing community in terms of land use, neighborhood character, social composition, economic environment, public services, and community facilities, among other things. This discussion establishes the baseline from which to assess the potential effects of the proposed project on the community. Unless otherwise noted, the existing conditions for both proposed alignments for the extension of NE 4th Street are essentially the same.

4.1 Land Use and Zoning

The project corridor is located in the western portions of the Wilburton/ NE 8th Street and Bel-Red Subareas within the City of Bellevue, King County, Washington.

The Washington State Legislature enacted the Growth Management Act in 1990 "to create a method for comprehensive land use planning involving citizens, counties, cities, and the private sector that would prevent uncoordinated and unplanned growth". The project is subject to the following Regional and City plan policies:

- The Puget Sound Regional Council Transportation 2040 Multicounty Policies
- The King County Countywide Planning Policies
- The City of Bellevue Comprehensive Plan
- The City of Bellevue Wilburton/NE 8th Street Subarea Plan
- The City of Bellevue Bel-Red Subarea Plan

4.1.1 Land Use

Land use in the project study area is primarily characterized by moderate-density commercial developments with a mix of institutional, residential, retail, and office uses. Land uses directly adjacent to the project corridor consist of automobile dealerships, vacant lots, retail and big-box retail stores, a post office, small strip malls, office buildings, medical offices, parking lots, and large warehouses.

Limited residential land uses are located throughout the corridor. The Westside Apartments at 500 121st Place NE and the Oasis Condominiums at 680 122nd Avenue NE are multi-family residential complexes located northeast of the eastern terminus of the proposed extension of NE 4th Street and are more than a block east of the existing intersection of NE 5th Street with 120th Avenue NE in the project corridor. Both residential complexes currently experience noise levels common in a typical urban area, including traffic noise from side streets, arterials in the immediate area, and I-405, which is less than a half- mile

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to the west. In addition, both complexes are located at least 250 feet from the proposed eastern-most edge of the project corridor. Another cluster of residences is located farther north on the eastern side of the project corridor. Two apartment complexes are within the triangular intersection of NE 8th Street and Bel-Red Road, roughly at and east of 122nd Avenue NE. Brierwood, located at 12022 NE 8th Street, is a two-story apartment building; Midlakes Apartments, located at 12028 NE 8th Street, is also a two-story apartment building. Four additional two-story condominium buildings are also located at 12107 NE Bel-Red Road. Finally, there is the Lake Bellevue Village located to the west of 120th Avenue NE, just south of NE 12th Street, which consists of three two- and three-story condominiums. This condominium community includes a shopping complex that offers various services and amenities to nearby residents.

The only church in the project study area is All Saints Episcopal Church at 1307 120th Avenue NE. The church is located within a commercial development adjacent to the project corridor.

Open space near the project corridor includes Wilburton Hill Community Park at 12053 Main Street, located to the south and east of the southern portion of the project corridor. The Bellevue Botanical Garden comprises 53 acres of display gardens, woodlands, meadows, and wetlands, and is part of the Wilburton Hill Community Park. Bel-Red Mini Park is located east of the project corridor at 124th Avenue NE and Bel-Red Road.

4.1.2 Zoning

The project corridor is directly adjacent to seven different zoning districts, as shown in Figure 4-1. Table 4-1 identifies the various land uses permitted in those zoning districts.

In May 2009, the City adopted a zoning ordinance for the Bel-Red Subarea in support of City and regional initiatives to attract new mixed-use development. One of the purposes of this effort was to plan for future smart growth in the Bel-Red Subarea, including pedestrian and bike-friendly access and transit-oriented development associated with future light rail stations located in corridor.

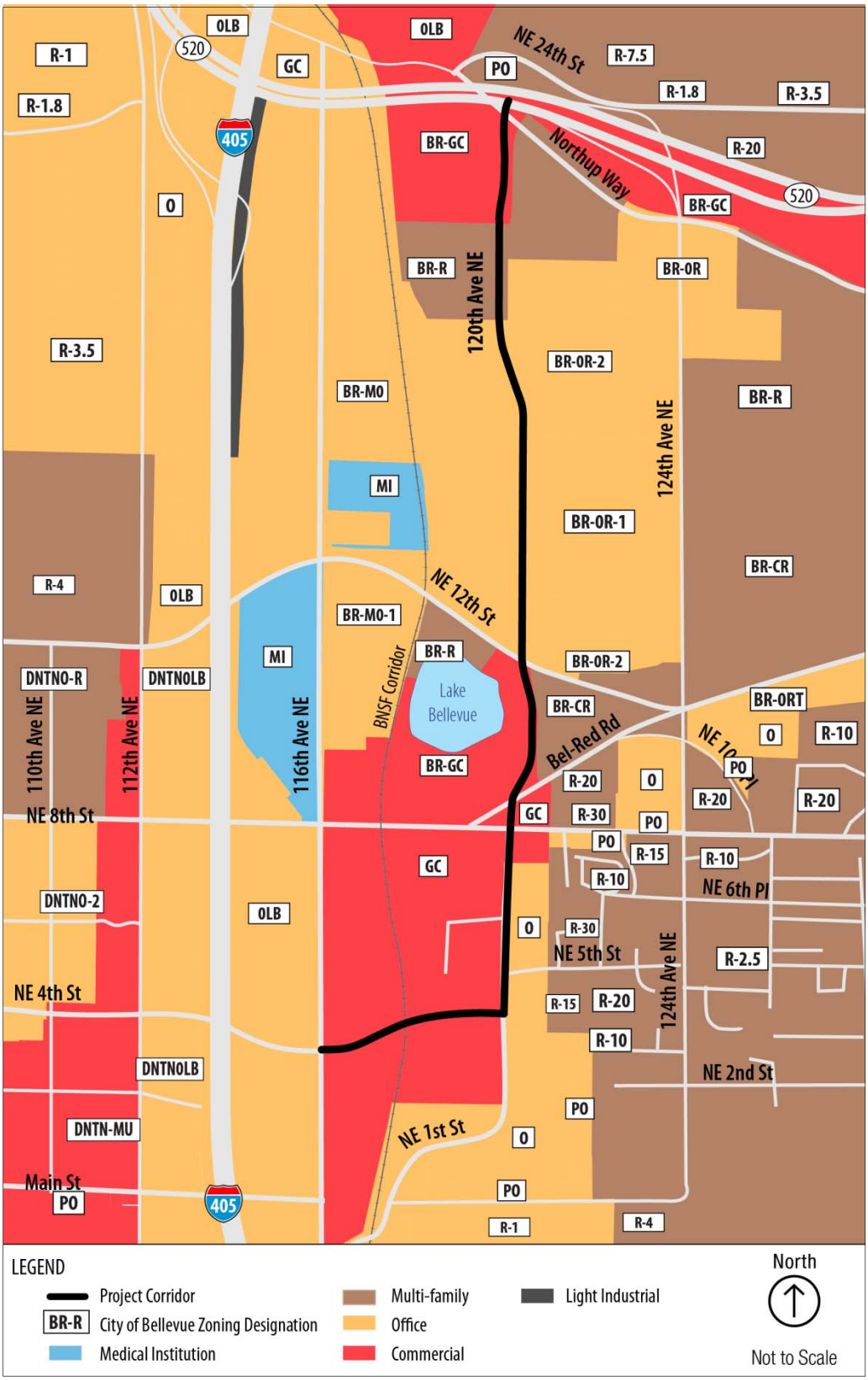

Figure 4-1. Study Area and Surrounding Zoning/Land Use

Table 4-1. Land Use and Zoning Districts

Abbreviation	Zoning District	Purpose
GC	General Commercial	To provide for the location of a wide variety of business activities that provide goods and services to other businesses and the general public.
O	Office	To provide for the location of business, financial, administrative, and professional services.
BR-OR-1	Bel-Red Subarea: Office/Residential Node 1	To provide an area for a mix of office, housing, and retail uses within the core of a nodal area, with office as the predominant use. The district is limited in extent to provide the level of intensity appropriate for areas close to the highest levels of transit service within the Bel-Red area.
BR-OR-2	Bel-Red Subarea: Office/Residential Node 2	To provide an area for a mix of office, housing, and retail uses, with office as the predominant use. The district is located within a node but outside the node's core, and building heights provide for a transition between the node's core and areas outside the node.
BR-R	Bel-Red Subarea: Residential	To provide an area for residential uses. Limited retail and service uses are permitted secondary to residential use to provide the amenity of shopping and services within easy walking distance of residential structures.
BR-CR	Bel-Red Subarea: Commercial Residential	To provide an area for a mix of housing, retail, office, and services. Multiple uses are encouraged on individual sites, in individual buildings, and in the district as a whole.
BR-GC	Bel-Red Subarea: General Commercial	To provide an area for a wide variety of business activities that provides goods and services to other businesses and the general public.

Source: Excerpted from the City of Bellevue, Ordinance 5874.

4.2 Neighborhood Character

The project corridor is primarily defined by an existing mix of light industrial and commercial uses, with some interspersed residential uses.

The residential area of the Westside Apartments and the Oasis Condominiums is located between NE 5th and NE 8th Streets, generally buffered from nearby roads by tall trees and other buildings. The apartment complexes within the triangular intersection of NE 8th Street and Bel-Red Road are bounded by Bel-Red Road to the north, office buildings to the west, and NE 8th Street to the south. The residential area to the west is nestled around the northern shore of Lake Bellevue and is slightly detached from nearby high volume areas. Roadways are mostly tree-lined, while sidewalks and curbs appear inconsistently throughout the corridor.

Street parking is currently allowed along portions of 120th Avenue NE and is largely used by employees of the various businesses within the project corridor.

4.3 Social Composition

4.3.1 Community Cohesion

The proposed project corridor lies within Bellevue's Wilburton/NE 8th Street and Bel-Red Subareas, as shown in Figure 4-2. The project's northern terminus borders the Bridle Trails Subarea.

The Wilburton/NE 8th Street Subarea is comprised of commercial areas along I-405, 116th Avenue NE, and NE 8th Street with the remainder of the subarea generally comprised of single- and multi-family residences. A number of the existing retail areas may be ready for redevelopment as they evolve from older suburban commercial to a more urban form. The subarea plan aims to protect residential neighborhoods from increased commercial development and traffic while enhancing the retail areas and establishing good transitions between differing land uses.

The Bel-Red Subarea is characterized by a mix of light industrial and commercial uses. Particularly on the western end, existing land uses include sprawling, large lot warehouses and distribution buildings with areas of surface parking. Within the overall subarea, residential uses are extremely limited. A goal of the Bel-Red Subarea Plan is to encourage redevelopment that will result in new job growth as well as a diversity of housing types and prices, including a significant share of "workforce housing." As future redevelopment in the area occurs, a stronger presence of residential uses is anticipated.

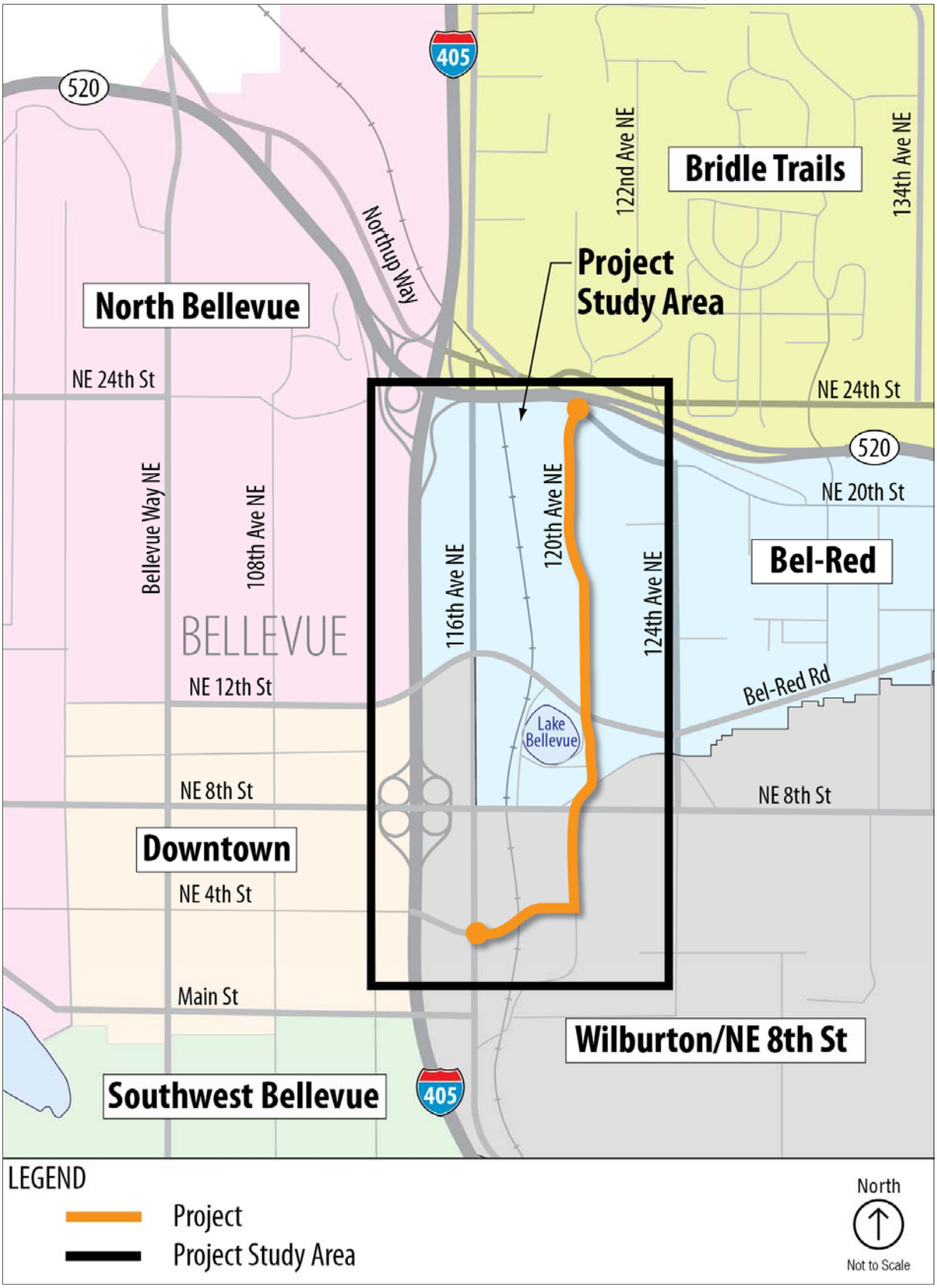

Figure 4-2. Study Area and Surrounding Subareas

The NE 4th Street corridor provides east/west mobility and access to I-405. The 120th Avenue NE corridor is one of the few north/south arterials that provide mobility in the Bel-Red Subarea and has an important role in linking the Bridle Trails Subarea in the north with the Wilburton/NE 8th Street Subarea. In the project study area, pedestrian facilities are present along the existing NE 4th Street west of 116th Avenue NE, but they do not provide a high level of connectivity as the roadway currently ends at 116th Avenue NE. Along 120th Avenue NE, pedestrian and bicyclist facilities are intermittent and lacking for much of the study area.

Along the proposed extension of NE 4th Street, there is not a great deal of community cohesion. The now-vacant paved automobile lots do not offer an inviting type of open space where residents would be expected to come together, such as a park would. The BNSF railroad corridor is likewise an open space, but not one that provides much opportunity for community togetherness. In the eastern portion of the proposed extension are two large retail businesses. Wilburton Hill Community Park is south of the proposed extension, which is one place residents could gather and create a sense of community.

Along 120th Avenue NE, Bel-Red Mini Park is an open space for residents to come together. In addition, All Saints Episcopal Church is expected to be a location where residents may feel a real sense of community and togetherness. Lake Bellevue Village is a multi-use condominium community that may also offer residents a place to gather and mingle. The remainder of the project corridor is largely comprised of warehouses, businesses, and office space.

4.3.2 Population and Demographics

There are 25 2000 census blocks that encompass the study area. The statistics for these blocks were aggregated to represent the demographics for the study area. Because not all census data are available at the census block level, some demographics for the study area are represented by four 2000 census block groups that encompass the study area, as shown in Figure 4-3. As described in Chapter 3, 2010 population and demographic estimates are provided based on the percent of change between the 2000 census data and the 2005-2009 ACS 5-year estimated data. (2010 U.S. Census data was not available at the time this analysis was conducted.)

The population of the study area blocks is quite small compared to the City's total population (see Table 4-2). Only seven census tract blocks of the 25 that make up the study area contribute to the total population, one of which adds just five people. Census tract 237 block 3020 represents the Lake Bellevue Village condominiums near the project corridor, while census tract 236.01 blocks 2004, 4001, 4002, 4003, and 4024 represent residences farther east of the southern project limit. Changes in population between 2000 and 2010 were minimal. In total, it is estimated that the study area population remained relatively constant (losing an estimated four individuals), whereas the City and County both increased in population by an estimated 10 and 7 percent, respectively.

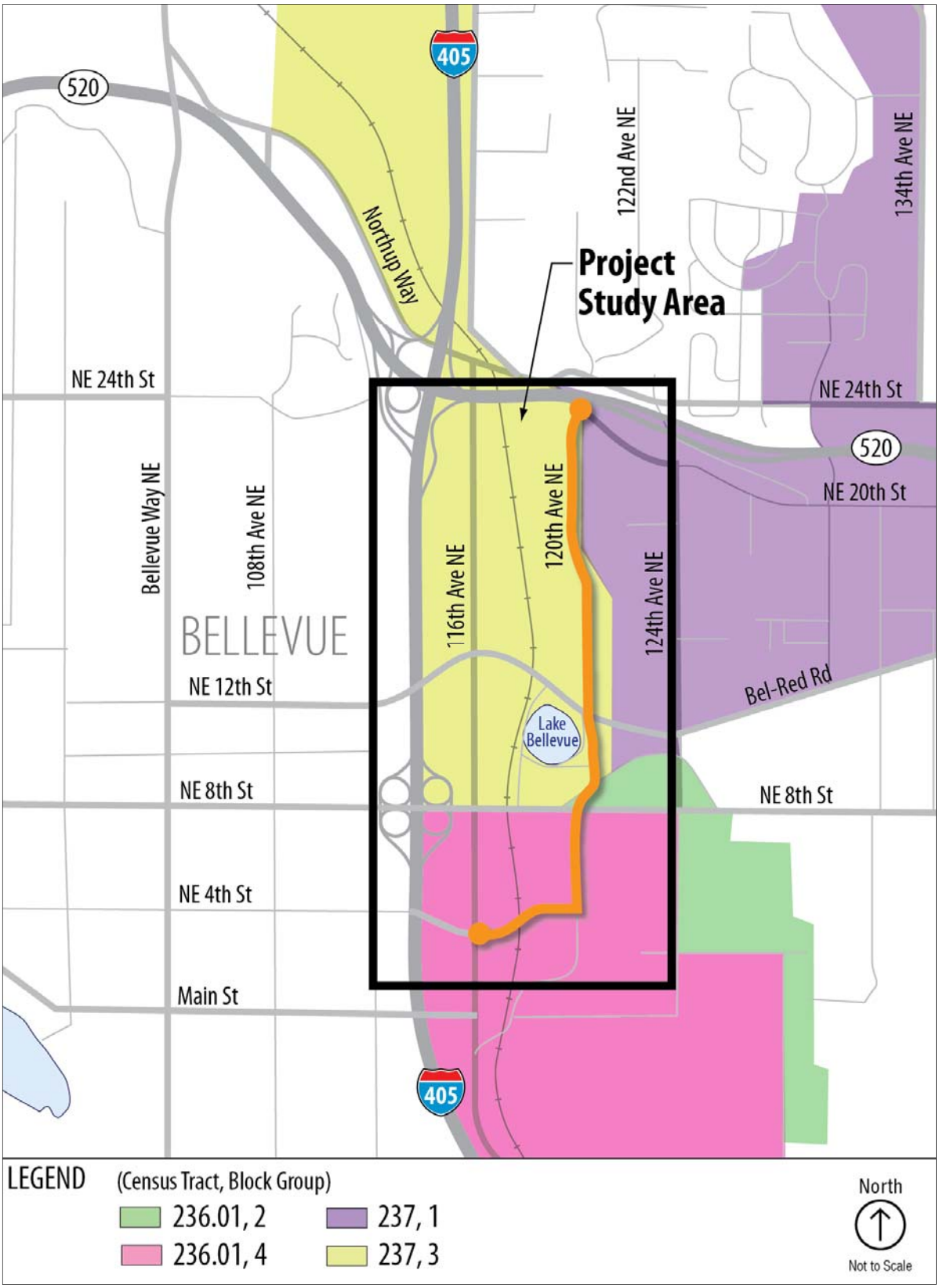

Figure 4-3. Study Area 2000 Census Block Groups

Table 4-2. Study Area Census Information

Census Tract	Block	2000 Total Population[1]	2010 Estimated Population[2]
236.01	2004	126	125
236.01	4001	202	201
236.01	4002	284	282
236.01	4003	50	50
236.01	4004	0	0
236.01	4005	0	0
236.01	4006	0	0
236.01	4007	0	0
236.01	4010	0	0
236.01	4011	0	0
236.01	4012	0	0
236.01	4013	0	0
236.01	4014	0	0
236.01	4015	5	5
236.01	4024	51	51
237	1007	0	0
237	1016	0	0
237	1031	0	0
237	1032	0	0
237	3015	0	0
237	3016	0	0
237	3017	0	0
237	3018	0	0
237	3020	116	117
237	3021	0	0
Study Area		**834**	**830**
City of Bellevue		**109,569**	**121,337**
King County		**1,737,034**	**1,858,788**

[1] *Source: U.S. Census Bureau, 2000.*
[2] *Source: U.S. Census Bureau, 2010.*

As stated in Chapter 3, to extrapolate the change between year 2000 and 2010, ratios were applied to the 2000 census blocks based on the percent of change between the 2000 census and the 2005-2009 ACS data. This methodology presents a margin of error into the analysis that is not quantified here, but should be generally acknowledged. The 2010 estimated census data indicate that 42.9 percent of the study area residents are in renter-occupied units. This is a substantial change from the 2000 census, which indicated that 58 percent of the study area residents were in renter-occupied units. The median income in the

study area was roughly 95 percent of that of the overall City in 2000, and although incomes rose from 2000 to 2010, the median income in the study area dropped slightly to roughly 92 percent of that of the City in 2010. From 2000 to 2010, the percentage of persons 65 years of age and older remained steady for all geographic areas. Information for persons with disabilities and transit-dependent populations was not available from the 2005-2009 ACS 5-year estimated data (see Table 4-3).

Table 4-3. Population Characteristics

Geographic Area	65 Years and Older	Persons with Disabilities*	Transit-Dependent*	Median Household Income*	Average Household Size	Percent Owner-Occupied Housing	Percent Renter-Occupied Housing
2000[1]							
Study Area	9.0%	25%	5.6%	$59,529	2.1	42%	58%
City of Bellevue	13.4%	25%	5.6%	$62,338	2.4	58.2%	36.5%
King County	10.5%	28%	9.3%	$53, 157	2.4	57.3%	38.5%
2010 Estimate Based on 2005-2009 ACS[2]							
Study Area	9.0 %	*not available*[3]	*not available*[3]	$73,598	1.9	55.9%	42.9%
City of Bellevue	13.4%	*not available*[3]	*not available*[3]	$80,350	2.4	63.2%	36.8%
King County	10.5%	*not available*[3]	*not available*[3]	$67,246	2.4	65.7%	34.3%

[1] *Source: U. S. Census Bureau, 2000.*
[2] *Source: U. S. Census Bureau, 2010.*
[3]Data for this characteristic were not readily available in the 2005-2009 ACS 5-Year Estimates dataset.
Note: *Census data were unavailable at the census tract block level; therefore, census block groups (BGs) were used. The BGs that encompass the study area are tract 236.01 BGs 2 and 4 and tract 237 BGs 1 and 3. The resulting population is much larger because these BGs cover the Bridle Trials and Wilburton/NE 8th Street Subareas, which contain a greater amount of residential land uses.

4.3.3 Regional and Community Growth

The study area is located within a highly industrial and commercial portion of the City's Wilburton/NE 8th Street Subarea and the highly industrial and commercial Bel-Red Subarea. The study area is largely comprised of large lot warehouses, distribution buildings, offices, and surface parking; a very few residential uses are scattered throughout. However, transit and transit-oriented development projects have been planned for the area and future growth is expected, especially considering the planned extension of the light rail system to the Bel-Red Corridor.

King County and the City of Bellevue have experienced considerable growth between 1990 and 2000; however, this growth slowed considerably during the past decade (see Table 4-4). For Bellevue, this slowing was in part due to a much

smaller amount of new residents added through annexations during the years between 2000 and 2010 as compared to those between 1990 and 2000.

Table 4-4. Community Population Growth

Geographic Area	1990 Population	2000 Population[1]	2010 Estimated Population[2]	Increase from 1990—2000	Increase from 2000—2010
City of Bellevue	86,874	109,569	121,337	26%	10%
King County	1,507,319	1,737,034	1,858,788	15.2%	7%

[1] *Source: U.S. Census Bureau, 2000.*
[2] *Source: U.S. Census Bureau, 2010.*

4.3.4 Environmental Justice

Under Executive Order 12898, all federal actions must consider effects on minority and low-income populations and provide mitigation where disproportionate adverse effects would occur to these groups. Census information was reviewed for the study area to determine the presence of minority and low-income groups (see Table 4-5). The study area includes residents from a variety of racial and ethnic groups; however, the study area is generally equal to or has a lower total percentage of total minority populations than either the City or King County. The Asian population group is the exception; while it is lower in the study area than it is for the City, it is higher than that of King County. These minority characteristics remain true based on the 2010 estimates from the 2005-2009 ACS 5-year estimated data.

Approximately 6 percent of the study area population was below the poverty line in 1999 (see Table 4-6); data from 1999 was the most recent available in the 2000 Census. This is a slightly higher percentage than that of the City as a whole, but lower than for King County. In 2010, it is estimated that poverty characteristics in the study area slightly increased compared to 1999, at 6.3 percent. But in 2010, the percentage of the study area population below the poverty level was estimated to be lower than for both the City and King County.

Based on this analysis, there are no environmental justice communities—either minority or low-income—located in the study area that would be affected by the proposed project.

Additional minority and/or low-income populations that may exist in the study area include persons who may be employed by study area businesses. Based on field investigations, it does not appear that the mix of businesses along the project corridor pay minimum or low wages, although the several big-box retail businesses, such as Lowe's, Bartell Drugs, Home Depot, and Best Buy, may. Other corridor businesses also may employ low-income persons and/or persons of minority populations. It is unknown if any of the employees of businesses in the project corridor reside in study area neighborhoods. An Asian food market, Uwajimaya, is located at 699 120th Avenue NE and is the only business in the

area that could be considered as providing services to local area minority population.

Table 4-5. Study Area Racial Characteristics

Area	Total Pop.	One Race						Two or More Races	Hispanic
		White	Black or African American	American Indian & Alaska Native	Asian	Native Hawaiian & Pacific Islander	Some Other Race		
2000[1]									
Study Area	834	670	15	4	108	1	14	22	30
		80%	2%	0%	13%	0%	2%	3%	4%
City of Bellevue	109,569	81,441	2,183	356	19,056	257	2,785	3,491	5,827
		74%	2%	0%	17%	0%	3%	3%	5%
King County	1,737,034	1,315,507	93,875	15,922	187,745	9,013	44,473	70,499	95,242
		76%	5%	1%	11%	1%	3%	4%	5%
2010 Estimate Based on 2005-2009 ACS[2]									
Study Area	821	641	7	2	161	0	6	4	27
		78%	1%	0%	20%	0%	1%	1%	3%
City of Bellevue	121,377	82,882	2,310	289	28,968	322	2,593	3,973	7,358
		68%	2%	0%	24%	0%	2%	3%	6%
King County	1,858,788	1,350,824	108,881	14,382	243,910	11,273	54,991	74,527	140,188
		73%	6%	1%	13%	1%	3%	4%	8%

[1] *Source: U. S. Census Bureau, 2000.*
[2] *Source: U. S. Census Bureau, 2010.*
Notes: To extrapolate the change between year 2000 and 2010, ratios were applied to the 2000 census blocks based on the percent of change between the 2000 census and the 2005-2009 ACS figures. This methodology presents a margin of error into the analysis that is not quantified here, but should be generally acknowledged. In addition, percentages may not total due to rounding.

Table 4-6. Poverty Status

Geographic Area	Population Below the Poverty Level in 1999[1]	Population Estimated Below the Poverty Level in 2010[2]
Study Area	275 (6.1%)	286 (6.3%)
City of Bellevue	6,162 (5.7%)	7,979 (6.6%)
King County	142,546 (8.3%)	176,808 (9.7%)

[1] *Source: U. S. Census Bureau, 2000.*
[2] *Source: U. S. Census Bureau, 2010.*
Note: Census data were unavailable at the census tract block level; therefore, census block groups (BGs) were used. The BGs that encompass the study area are tract 236.01 BGs 2 and 4 and tract 237 BGs 1 and 3. The resulting population is much larger because these BGs cover the Bridle Trials and Wilburton/NE 8th Street Subareas, which contain a greater amount of residential land uses.

4.4 Economic Environment

4.4.1 Property Taxes

The study area lies within the City of Bellevue's tax code area 0330; the corresponding levy rate for Year 2010 is 7.89339 percent. Businesses receive a single property tax bill from King County, which collects the property tax for all governmental entities in the county. Property in Bellevue is taxed by a combination of some, but not all, of the following jurisdictions—City of Bellevue, Bellevue and Issaquah School Districts, King County, Port of Seattle, Regional Emergency Medical Services, and the State School Fund.

The project may affect up to 52 properties. Applying the Year 2010 levy rate to the total assessed value of these properties would generate roughly $34.2 million in property taxes. King County collected $638 million in property taxes in 2010. The 52 potentially affected properties generate about 5.3 percent of King County's total property tax revenue.

4.4.2 City Taxes

The City of Bellevue collects general taxes from businesses, mostly in the form of the business and occupation tax, but also including utility, gambling, and admission taxes.

4.5 Public Services

Locations of public services in and around the study area are discussed below; Figure 4-4 shows their general locations.

4.5.1 Police Protection

The Bellevue Police Department maintains a headquarters and four substations in the Crossroads, Factoria, and Spiritwood Neighborhoods, as well as the Bellevue Transit Center. The Police Department headquarters and the Transit Center Substation are located more than one-half mile west of the project corridor; the remaining three substations are well outside the study area.

4.5.2 Fire Protection

The Bellevue Fire Department maintains a headquarters and nine stations in the City. The Fire Department headquarters is co-located with the Bellevue Police Department headquarters, more than one-half mile west of the project corridor. Station 7 is just more than one-half mile south of the project corridor, and Station 6 is roughly three-quarters of a mile east of the project corridor. The remaining seven stations are well outside the study area.

4.5.3 Schools

The Bellevue School District is comprised of 16 elementary schools, five middle schools, five high schools, and two alternative schools of varying grade levels. No educational institutions are located in the study area. The School District has

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administrative and school bus maintenance facilities and a bus parking lot on both sides of 120th Avenue NE at approximately NE 5th Street.

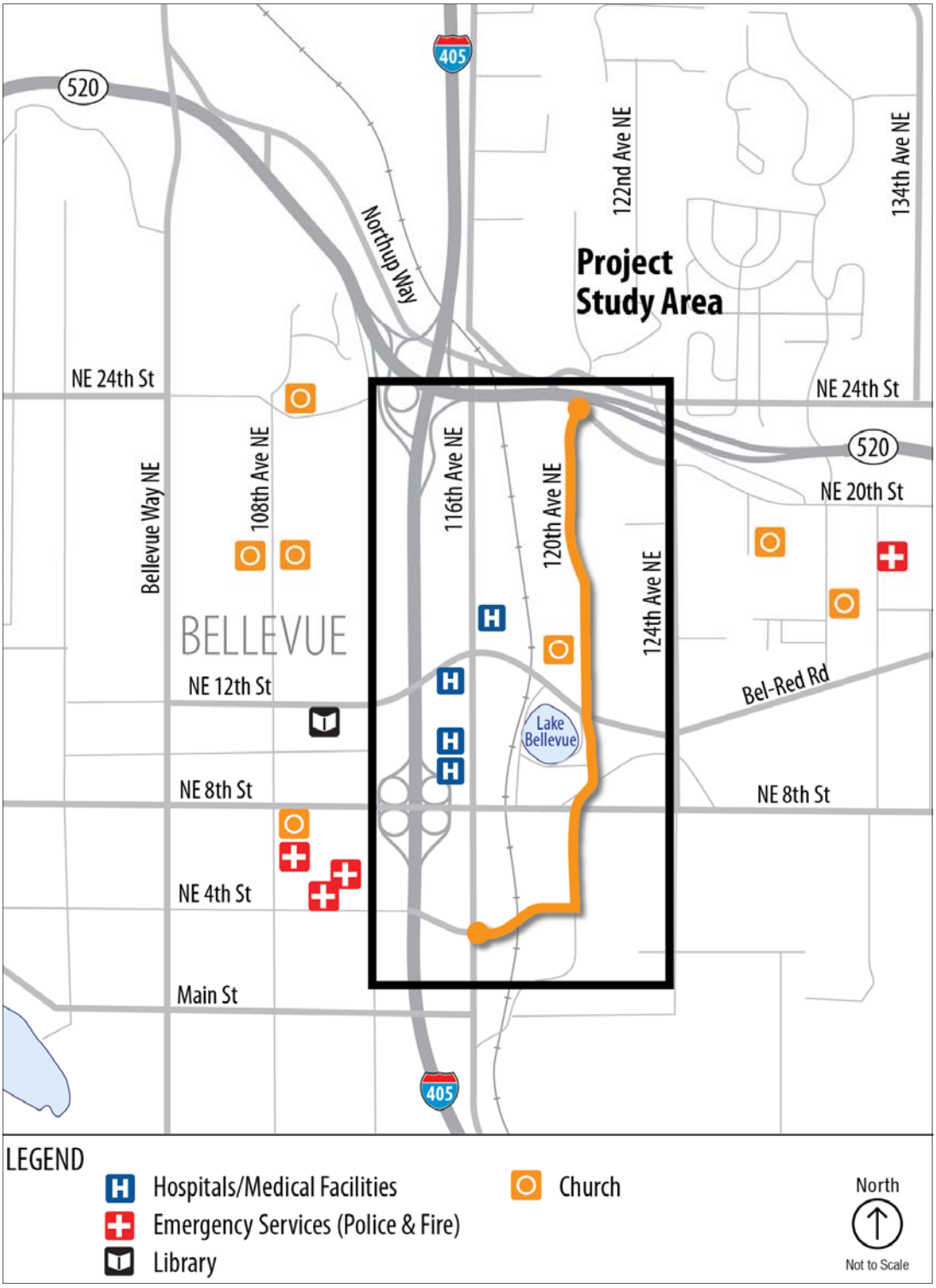

Figure 4-4. Study Area and Surrounding Public and Community Resources

4.6 Community Facilities

4.6.1 Community Resources

Locations of community resources in and around the study area are discussed below; Figure 4-4 shows their general locations.

Churches

All Saints Episcopal Church is the only religious institution located within the project corridor (1307 120th Avenue NE). The church conducts services for approximately 50 to 100 parishioners. Seven other churches are located near, but outside of, the project corridor. To the west are the International Free Methodist Church and First Congregational Church (both located at 752 108th Avenue NE), Church of Jesus Christ of Latter Day Saints (10675 NE 20th Street), First United Methodist Church (1934 108th Avenue NE), and Bellewood Presbyterian Church (10936 NE 24th Street). To the east are the Living Hope Bible Church (12727 Northup Way) and Blue Sky Church (1720 130th Avenue NE).

Hospitals

There is one medical facility located along the eastern side of 116th Avenue NE, approximately 0.25 mile the west of the project corridor—Seattle Children's Bellevue Clinic and Surgery Center (1500 116th Avenue NE). Three other medical facilities are located along the western side of 116th Avenue NE—Overlake Hospital Medical Center (1035 116th Avenue NE), Children's Hospital and Medical Center (1135 116th Avenue NE), and Group Health Bellevue Medical Center (11511 NE 10th Street).

Libraries

The Bellevue Regional Library is located at the intersection of NE 12th Street and 110th Avenue NE, approximately 0.5 mile west of the project corridor. The Bellevue Regional Library is the largest library in the King County Library System. This regional reference center houses the most comprehensive and sophisticated reference collection in the system. The library is open from 9 a.m. to 9 p.m. Monday through Thursday, from 10 a.m. to 6 p.m. Friday and Saturday, and from 12 to 8 p.m. on Sunday.

4.6.2 Recreational Resources

The City of Bellevue has nearly 100 parks and other recreational facilities. Recreational resources near the project corridor include bike paths, trails, and parks. Locations of recreational resources in and around the study area are discussed below. Figure 4-5 shows their general locations.

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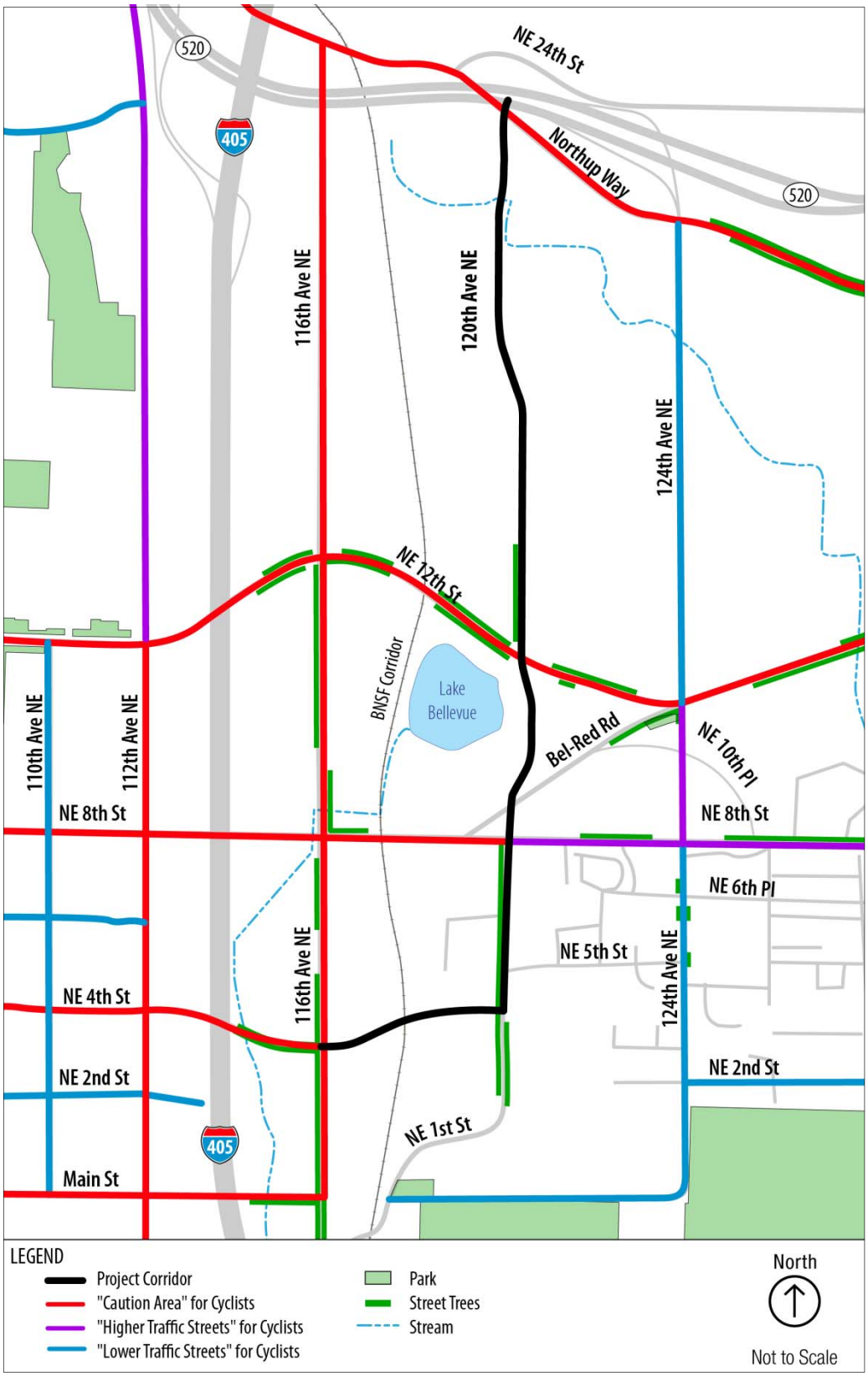

Figure 4-5. Project Corridor Recreational Resources and Street Trees

Parks

No existing parks in the study area are adjacent to either the proposed alignment extension of NE 4th Street or along 120th Avenue NE.

Wilburton Hill Community Park is located along Main Street approximately 0.2 mile south of the proposed intersection of NE 4th Street with 120th Avenue NE; it is approximately 106 acres in size. This community park is the largest upland park in Bellevue and offers picnic areas, baseball and soccer fields, and restrooms, as well as the 53-acre Bellevue Botanical Garden that consists of display gardens, woodlands, meadows, and wetlands. There is also a small portion of Wilburton Hill Community Park that extends just north of Main Street and east of NE 1st Street where the historic McDowell House is located. The McDowell House is currently occupied by the administrative offices of the Eastside Heritage Center.

Bel-Red Mini Park is approximately 0.15 mile east of the project alignment along 120th Avenue NE on the southwestern corner of NE 12th Street and 124th Avenue NE. This one-third acre park offers a picnic area and open space.

On the western side of the project corridor, Ashwood Playfield is a little less than 3 acres in size and is located west of 110th Avenue NE between NE 10th and NE 12th Streets. The playfield has one multi-use field. McCormick Park stretches along the northern side of NE 12th Street from roughly 102nd to 112th Avenues NE; it totals just over 3 acres in size. McCormick Park provides sitting areas, flower gardens, and trails. Bovee Park is located west of 110th Avenue NE between roughly 14th and 16th Avenues NE; it is about 4 acres in size. The park offers trails, tennis courts, picnic and play areas, and restrooms. Hidden Valley Sports Park is just over 17 acres in size and stretches between 110th and 112th Avenues NE from NE 18th to NE 24th Streets. This park offers multiple amenities, including picnic tables, softball fields, basketball and tennis courts, and restrooms. These parks are all at least 0.5 mile west of the project alignment along 120th Avenue NE.

All the parks discussed above are open for users daily from dawn until dusk, except the lighted sports fields at Wilburton Hill Community Park and Hill Valley Sports Park that are open until 11 p.m.

Trails

The Parks and Community Services Department maintains more than 50 miles of trails throughout Bellevue. No trails traverse the project corridor; however, there are multiple paths in the parks surrounding the project study area as discussed above. Both the Wilburton/NE 8th Street and Bel-Red Subareas include plans for additional trails to be built. Some trails are part of larger trail systems and would connect destinations or already completed portions of trails, while others are individual projects.

Bike Paths

The *2009 Bike Map* on the City Transportation Department's website illustrates streets used by bicyclists within the study area; these are not designated facilities, such as bike paths or bike lanes. The bike map has three different designations—"caution areas," "higher traffic streets," and "lower traffic streets." Streets with higher traffic volumes that generally travel at higher speeds and may lack shoulders or wide curb lanes are designated "caution areas" for cyclists. Streets with higher traffic volumes that have wide shoulders, wide curb lanes, or bike lanes are designated "higher traffic streets" for cyclists. The designation of "lower traffic streets" for cyclists generally represents two-lane streets with lower traffic speeds.

Streams and Lakes

Sturtevant Creek lies on the western side of Lake Bellevue and extends to the south; it crosses NE 4th Street roughly 0.1 mile west of 116th Avenue NE. No recreational uses were observed during the site visits. Lake Bellevue is approximately 150 feet to the west of 120th Avenue NE just south of the intersection with NE 12th Street. The area surrounding the lake is highly developed and includes restaurants and high-density residences. Due to limited access and the high level of surrounding development it is anticipated that the portion of Sturtevant Creek near the project corridor and Lake Bellevue do not serve as recreational resources.

The Western Tributary to Kelsey Creek is currently routed underneath 120th Avenue NE in the northern portion of the project corridor; the creek exits on the eastern side of the road through a culvert. No evidence of recreational use was observed during the site visits and none is anticipated since there are no fish present and the stream is generally not wide enough for other recreational uses such as kayaking or canoeing.

4.6.3 Street Trees

Although street trees are not used particularly for recreation, their presence can dramatically change the feeling and character of an area. Street trees located along the project alignment are shown in Figure 4-5.

City trees are located along the existing NE 4th Street and 116th Avenue NE. At the existing intersection of NE 4th Street with 116th Avenue NE, five City trees are within approximately 100 feet of the proposed project.

In the southern portion of the project corridor, 48 City tress are located on the western side of 120th Avenue NE stretching from roughly NE 2nd to NE 8th Streets. An additional 20 City trees are on the eastern side of 120th Avenue NE, from roughly NE 2nd Street to the proposed intersection with NE 4th Street.

Along the central portion of the project corridor, 20 City trees are located in planter strips on the western side of the 120th Avenue NE and NE 12th Street intersection. The trees extend northward for approximately 700 feet. Additional City trees located along NE 12th Street are not directly adjacent to 120th Avenue NE, although three of them are within 100 feet of the roadway.

4.7 Utilities

This section discusses both privately owned and City-owned utilities in the region and the project corridor.

4.7.1 Above-Ground Utilities

Overhead power lines run northward along 120th Avenue NE from NE 12th Street to roughly the driveway of the Metro Transit base yard (1227 124th Avenue NE); a portion of this line is underground (see Section 4.7.3). Streetlights are also present along portions of 120th Avenue NE in the project corridor.

4.7.2 Surface Utilities

A few Fire Department connections currently serve the Best Buy building in the southeast portion of the project corridor.

The project corridor lies within the Sturtevant Creek and West Tributary Basins. The existing storm sewer system in the area currently consists of catch basins that direct stormwater to underground pipes. This system extends along 120th Avenue NE from roughly the Pella Windows & Doors building at 1919 120th Avenue NE to Northup Way.

Three power vaults are located just north of the Teledesic building's parking lot and driveway at 1445 120th Avenue NE, and five more located at ground level on the eastern corner of the intersection of 120th Avenue NE at Northup Way.

4.7.3 Underground Utilities

Some underground power lines are located in the proposed future right-of-way for the NE 4th Street extension. The same overhead power lines discussed in Section 4.7.1 are underground along the BNSF corridor on the western side of 120th Avenue NE just north of Barrier Audi (1533 120th Avenue NE), as well as from the Metro Transit base yard's driveway north to Northup Way. Two underground power lines also cross 120th Avenue NE perpendicularly. One line is south of the driveway to the Metro Transit base yard, and the other is at the driveway to the Bellevue Trade Center (2023 120th Avenue NE).

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Communications lines are present within the project corridor in the proposed future right-of-way for the NE 4th Street extension. Teledesic owns and maintains a broadband fiber optic line that extends northward from the parking lot of its building to the northern terminus of the project corridor. Verizon, Qwest, Comcast, and the City of Bellevue all own and maintain telecommunications infrastructure that extends the entire length of 120th Avenue NE within the project corridor.

A privately owned gas line is located within the proposed future right-of-way for the NE 4th Street extension. A gas-oil line extends north from the southern terminus of the project corridor along 120th Avenue NE to roughly the location of the Barclay Dean Interiors building. Puget Sound Energy owns and maintains this line.

An underground storm sewer system is located in the vicinity of the proposed alignment for the NE 4th Street extension. A 72-inch King County Metro sewer main runs north-south along the westerly edge of the railroad right-of-way crossing the proposed alignment for the roadway extension. The City of Bellevue Utilities Department owns and maintains a potable water line and a wastewater system within the project corridor. Bellevue's drinking water is acquired through the Cascade Water Alliance. The potable water line extends along the entire length of 120th Avenue NE within the project corridor, and the wastewater system extends from roughly the driveway to the building at 1899 120th Avenue NE to the northern terminus of the project corridor.

4.8 Visual and Aesthetics

The existing NE 4th Street west of 116th Avenue NE is a gently sloping roadway a little more than one mile in length. It travels through a highly developed corridor as a minimum five-lane roadway with two lanes in each direction. The proposed extension of NE 4th Street west to 120th Avenue NE would continue as a five-lane roadway with two lanes in each direction and a center turn lane. However, the topography for this portion of the road is quite different than that of the existing portion. The topography in the project area here rises roughly 55 feet in elevation between 116th Avenue NE on the west and the elevation of the existing railway corridor. This change in elevation is concentrated in a narrow band immediately west of the railroad corridor. Based on the City's critical areas map, this area exceeds a 40 percent slope. The east end of the project corridor between the railway corridor and 120th Avenue NE is approximately level. To accommodate the steep slope, the horizontal alignment of the project would curve up the hillside. This portion of the proposed alignment for NE 4th Street would have a 13 percent slope but would not alter the existing hillside slope. The roadway design would require the construction of substantial retaining walls on both sides of the roadway along this portion of the project corridor. Many of the parcels that the proposed NE 4th Street extension would travel through are currently unused, except for the Home Depot and Best Buy store sites on the east.

The existing 120th Avenue NE is a slightly curving roadway with gentle slopes and minor-to-moderate changes in grade throughout. Portions of the roadway were constructed in areas that slope downward to the west, as evidenced by the sharp upward slope on one side of the road and an immediate drop on the other. Drivers generally travel to places of employment or use the road as a throughway to other destinations, such as Brierwood Center, Lowe's, and other businesses. Other than the restaurants surrounding Lake Bellevue and Bel-Red Mini Park, there are no destinations near the project corridor that would attract the attention of drivers or cause them to stop along the roadway. Because of the generally destination-focused travel along 120th Avenue NE, drivers and other users are not considered visually sensitive receptors. Development along 120th Avenue NE currently consists mostly of light industrial and business uses. A few large warehouses are located within the northern portion of the study area, and multiple car dealerships occur along the southern portion.

Much of the existing roadway corridor is lined with indigenous trees growing in unimproved areas. In addition, City-owned trees are located in planters along the sidewalk in some areas of the project corridor. Many of these trees are fairly tall; however, they do not provide the corridor with shading or a visual canopy.

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5.0 Environmental Effects

5.1 Direct Effects on Community Resources

Direct effects are caused by the action and occur at the same time and place as the project. If the potential effects would differ between the alignments of Option 1 and Option 2 for the extension of NE 4th Street, they are noted.

5.1.1 Effects during Construction

Land Use and Zoning

There would be no effects on land use and zoning during project construction. The Contractor would be responsible for implementing the conditions of any permits and approvals from the City.

Neighborhood Character

Because of the predominantly industrial and business character immediately surrounding the project corridor, it lacks a strong neighborhood character or cohesiveness that would be adversely affected by project construction.

During construction activities, the availability of street parking would likely decrease due to partial road closures and the presence of construction equipment. Employees of surrounding businesses, the largest users of street parking, would temporarily need to park elsewhere while construction occurs. It is anticipated that the project would not have an adverse effect on street parking in the area due to the small number of drivers using street parking.

Social Composition

Community Cohesion

The proposed project would result in temporary effects on mobility around the project corridor during construction activities. Short-term lane closures and detours would occasionally occur along the proposed route, and noise and dust from construction activities could be noticeable in some locations. Bel-Red Road, however, would be closed west of 120th Avenue NE at the start of construction and would not re-open upon completion. Although temporary detours may be needed, the project would be sequenced to always allow for both north and south travel along 120th Avenue NE (i.e., one side of the street's centerline) to remain open and fully operational for users. Thus, it is anticipated that neighborhood cohesion would not be seriously affected; it is expected that mobility in the area would not be greatly impaired.

Population and Housing

Construction effects to populations and housing in the study area would include noise from construction equipment, air pollution from construction equipment and machinery emissions and dust, and additional light and glare from construction equipment. There would be no increase or decrease to population or housing due to the project during construction.

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Regional and Community Growth

Project construction activities would not likely affect regional and community growth. Although some residents may refrain from driving in the area during construction periods, construction of the project would not likely affect growth during the expected construction period.

Environmental Justice

Environmental justice populations near the project corridor would be affected by lane closures, detours, and dust and noise from construction activities in the same manner as other residents. These groups are not expected to be inconvenienced by these activities to a greater extent than the population as a whole. Low-income populations may be somewhat more transit-dependent than the overall population, and local bus routes may be slowed or delayed moving through the project corridor during construction. However, such occurrences would affect all transit users equally and would be temporary and limited. Therefore, local mobility may be slightly affected, but it is not expected to disproportionately affect environmental justice populations. Please see the *Transportation Technical Report* for additional information.

Economic Environment

County and Regional Economic Activity

Beneficial economic effects would be experienced at the county and regional level from construction of the project. This section assesses the likely overall economic effects that would be attributed to construction of the project, as measured by increases in county and regional activity, employment, and associated job earnings. Appendix A, the RIMS II Detailed Model Analysis, presents the detailed analysis, including implementation of the RIMS II input-output model. Analysis was conducted on the Option 2 alignment for the extension of NE 4th Street as it is somewhat more expensive than Option 1.

Project Total Costs

For purposes of assessing the economic effects on output, earnings, and employment, the focus is placed on the project capital costs (construction and right-of-way acquisition) of the Build Alternative as an accurate measure of the capital investment that would likely occur for the project. It is assumed that no project capital costs would be incurred with the No Build Alternative. Table 5-1 and Table 5-2 show the funding sources of the estimated capital expenditures, as well as details of the capital cost estimate by portion of the total capital cost attributed to right-of-way acquisitions and the portion attributed to the cost of construction.

Table 5-1. Capital Costs and Funding Sources of the Build Alternative

Capital Cost Estimate ($ millions)	Funding Source ($ millions and share)	
	Federal	Local
67.6	8.2 (12%)	59.4 (88%)

Table 5-2. Total Project Costs of the Build Alternative

Total Project Cost Estimate ($ millions)	Project Cost Component ($ millions and share)	
	Construction Cost[1]	Right-of-Way Acquisition
67.6	31.8 (47.0%)	35.8 (53.0%)

[1] Construction cost includes the cost of preliminary engineering.

For purposes of examining the regional economic effects, all of the federal grants and federal general funding are assumed to be new funds that would otherwise not be spent regionally or within the state in the absence of the project. All state and local funding sources are assumed to be expended with or without this project, because these funds are raised by taxing local and/or state residents and are specifically earmarked for transportation projects within the region or state.

Summary of Gross Economic Effects

For every $1 spent on construction capital cost for the project, $1.80 of additional economic activity would be generated in King County; slightly more than $2 would be generated in the region. This additional economic activity would occur across all economic and labor sectors. In addition, every dollar spent on capital costs translates directly into about $0.43 in new wages and salary earnings for the jobs generated outside of the construction field.

New demand for construction would generate gross direct effects equal to the capital cost of $31.8 million of the total $67.6 million project cost. The King County gross multiplied effect on output would total approximately $57.5 million for all industries not directly involved with construction of the project. Of this amount, $13.8 million would be paid to workers as wage and salary earnings for the jobs generated beyond those directly involved with project construction. The estimated average number of jobs related to construction of the project would be 35 jobs per year, representing about $4.2 million per year in wages and benefits.

These figures do not include the secondary benefits, presented in Section 5.1.2.

Summary of Net Economic Effects

For the portion of the project funding that comes from the federal government (outside of the region or state), the net effect on the regional economy from this new money would be less than the gross effect associated with the expenditure of all of the construction capital cost. The same new demand for construction expenditures would generate net direct effects equal to $7.0 million

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($31.8 million[1] × 12% × 1.8.081) of construction dollars after accounting for local funds that would otherwise be spent in the regional economy with similar multiplied effects. Of this amount, $1.7 million would be paid to workers as wage and salary earnings for the net new jobs created beyond those directly involved with project construction. This does not include the secondary benefits presented in Section 5.1.2.

Summary of Benefits for Regional Economic Activity

The cost associated with construction of the project would result in additional (gross) activity throughout all economic sectors within King County and the region. This gross economic activity is derived from the multiplier effects on the capital expenditures for the project. Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new rights-of-way.

The amount of new economic activity directly associated with the project (for construction and right-of-way acquisition) that is the result of new money entering the King County economy would be $13.7 million; the amount of new earnings (wages) entering the King County economy would be $2.6 million. The portion of new money attributable to overall construction costs is 12 percent. The amount of new money assumes that both committed and anticipated federal funds are received for this project. If anticipated federal funding were not provided for the project, the net economic benefit associated with new money would decrease. All other funding sources are coming from the region or King County (local sources) and would likely be spent in the local economy even in the absence of this project.

Temporary Jobs Created during Construction

Temporary jobs would be created to construct the project. The duration of these temporary jobs varies with the construction plan, but is expected to be about 48 months. The estimates of the direct labor force needed to construct the project were calculated based on the average construction labor rate of $60 per hour. Again, analysis was conducted for Option 2, as it is the more expensive of the two alignments under consideration for the proposed extension of NE 4th Street.

There would be an average of 35 jobs per year directly related to construction. The direct jobs needed to construct the project would generate approximately $4.2 million in direct wages per year. Assuming that the construction duration is approximately 48 months, the total construction labor for the project would be 140 person-year jobs.

New demand for construction would generate gross direct effects equal to the capital cost of $31.8 million in construction dollars. The gross multiplied effect on output would total approximately $57.5 million for all industries in King County

[1] As detailed in Table 5-2, construction costs are only part of the total capital cost estimate. Right-of-way acquisition is estimated to cost $35.8 million, and construction (including preliminary engineering) is estimated to cost $31.8 million for a total of $67.6 million estimated project capital costs.

not directly involved with the project. Of this amount, $13.8 million would be paid to workers as wage and salary earnings for the jobs generated beyond those directly involved with construction of the project. The amount of new indirect and induced earnings (wages) as a result of money entering the county's economy would be $1.7 million.

Summary of Benefits for Employment

Compared with the existing conditions, the employment associated with construction of the project would result in additional (gross) employment throughout all economic sectors within King County and the Puget Sound region. This gross employment is derived from the multiplication effects of the capital expenditures for the project. Examples of capital expenditures include direct hire of temporary construction workers, purchase of construction materials and equipment, and expenditure of capital funds to acquire new rights-of-way. Further, sales taxes would be generated through the purchase of goods and materials related to construction.

The number of new jobs directly associated with the project that would be the result of new money entering the King County economy is 83 jobs, and new money would constitute 12 percent of overall construction costs. All other funding would come from the state or the Puget Sound region and would likely be spent in the local/state economy even without this project.

Property Taxes

Construction activities would not affect property taxes in the study area, as tax rates would not be raised or lowered due to the construction work, and there would be no effects on property values during construction of the project.

Business Effects

Project construction would disturb and inconvenience businesses and business customers adjacent to the construction area. Customers and business employees could experience the following temporary effects:

- The presence of construction workers, heavy construction equipment, and materials within the construction area.
- An increase in traffic congestion around the work zone.
- Temporary road closures, traffic diversions, and alterations to property access (see the *Transportation Technical Report*).
- Loss of on-street parking along 120th Avenue NE.
- Disruption of existing parking on the Best Buy and Home Depot properties along the alignment of the selected design option.
- Airborne dust (see the Air Quality Technical Report).
- Noise and vibrations from construction equipment and vehicles (see the *Noise/Vibration Technical Report*).

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- Decreased visibility and alterations of access to businesses for customers.
- Rerouted pedestrian walk-up access to primary business entrances.

Public Services

No public services facilities are within 0.5 mile of the project corridor; therefore, it is reasonably anticipated that project construction would have no effects on public services facilities.

It is also anticipated that public services response times would not be affected by project construction activities. While construction would require partial closures and other temporary traffic modifications along 120th Avenue NE, the contractor would be responsible for creating a suitable Maintenance of Traffic Plan to ensure that access is maintained for the duration of construction activities. In addition, the project is anticipated to be phased to always allow for one side of the road to remain open and fully operational. Therefore, it is anticipated that public services response times would not be adversely affected by construction of the project.

Construction activities would likely require adjustments to traffic operations at intersections along the project corridor. However, public services response times would not be adversely affected, as there are alternative access points to and along such roadways that could be used in case of an emergency.

Community Facilities

Community Resources

All Saints Episcopal Church is directly adjacent to the project corridor. During construction, the church would be temporarily affected by noise and dust pollution. If a variance is obtained to allow for construction to occur on weekends, measures should be included to minimize noise effects in this area during services. In addition, street parking would not be available during construction as overflow to the church parking area. However, the project corridor contains additional unrestricted parking that could be used without significant inconvenience to the church's community.

It is anticipated that the medical facilities and library that are near the project corridor would not experience any adverse effects due to construction activities. There is enough distance and existing development between these facilities and the project corridor that any construction-related effects would not disturb them.

Recreational Resources

Construction of the project would not affect any parks, trails, or water resources that could be used for recreation.

Bike paths within the project corridor may be temporarily modified during construction activities. However, at a minimum, partial access would be maintained so they would remain accessible to the public throughout construction and would not be adversely affected.

Street Trees

The widening of 120th Avenue NE could require the removal of up to 88 City trees located along the project corridor. A survey for significant trees, as defined by the City of Bellevue Land Use Code 20.50.046, would be performed prior to construction to establish which ones would require protection.

Utilities

Temporary effects during construction include potential interruptions in services when relocated utilities are brought online. However, these interruptions would be limited both in their occurrence and in duration, and it is anticipated that they would not be so severe as to cause an adverse effect on any surrounding users. In addition, in planning for service interruptions resulting from utility relocations, reasonable efforts would be made to schedule such work during times of minimal use to minimize any effects (e.g., in the middle of the night).

Overhead utilities in the northern portion of the project corridor could be relocated underground; if not, the poles would be relocated behind the sidewalk. The gas-oil line owned by Puget Sound Energy may be upgraded and/or relocated during construction. This could require greater disruptions in service than experienced by other utilities. However, reasonable efforts would be made to sequence and schedule the utility disruptions to minimize any effects.

Visual and Aesthetics

There would be temporary effects during construction, including the presence of heavy machinery and large construction equipment. The Contractor would coordinate with the City to secure appropriate locations for use as staging and lay down areas for the duration of construction activities. In addition, the presence of best management practices, including the use of straw bales and silt fences, would modify the landscape alongside the road. Because of the existing uses along the project corridor and temporary nature of the construction work, it is anticipated that the presence of construction equipment, materials, and personnel would not have such a significant effect on the visual experience of users traveling along the project corridor as to be considered an adverse effect.

Construction activities would necessitate the removal of some trees, which may affect the visual environment. Trees would be replaced pursuant to the City of Bellevue code for the Wilburton/NE 8th Street and Bel-Red Subareas.

5.1.2 Effects during Operation

Land Use and Zoning

Construction of the project would comply with local land use and zoning districts. The project would not affect established patterns of land use nor would it require changes to local zoning regulations.

The project's consistency with specific goals and objectives of the regional and City plans discussed previously in Chapter 4 is presented below:

Statewide Transportation Improvement Program

The STIP is comprised of federally funded state and local roadway projects that have been identified through the planning process as high priority. The project corridor is listed on the 2009-2010 STIP and is noted as having regional significance. While the proposed four-lane design of 120th Avenue NE from NE 18th Street to Northup Way is not consistent with this plan,as stated in Chapter 2, a revised description was submitted to PSRC April 8, 2011 for the June 2011 Amendment to the STIP.

The City of Bellevue 2011-2016 Transportation Improvement Plan

The proposed project corridor is listed on the City of Bellevue 2011-2016 Transportation Improvement Program and is included in the Adopted 2009-2015 Capital Investment Program.

Washington Transportation Plan 2007-2026

The Washington Transportation Plan 2007-2026 provides a 20-year outlook on the expanding transportation needs of Washington State. The proposed project conforms to the following policies and recommendations of the Washington Transportation Commission:

- Preservation
  - Protect our investments by keeping transportation infrastructure in sound operating condition.
  - Emphasize infrastructure preservation and maintenance as the priority in funding transportation programs.
- Economic Vitality
  - Support the economy through reduced barriers to the movement of people, products, and information.
  - Support transportation investment that contributes to economic development.
- Mobility
  - Identify and preserve vital transportation corridors and sites for future transportation uses.
- Growth Management Act
  - Encourage efficient multi-modal transportation systems that are based on regional priorities and coordinated with county and city comprehensive plans.
  - Retain open space, enhance recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreation facilities.

The Puget Sound Regional Council Transportation 2040 Multicounty Policies

Within the Puget Sound Regional Council Transportation 2040 Plan, the project has been identified as an East Side SMART Corridor. The project is consistent with the following policies:

- MPP-DO-43—Design communities to provide an improved environment for walking and bicycling.
- MPP-T-1—Maintain and operate transportation systems to provide safe, efficient, and reliable movement of people, goods, and services.
- MPP-T-12—Give regional funding priority to transportation improvements that serve regional growth centers and regional manufacturing and industrial centers.
- MPP-T-15—Improve local street patterns—including their design and how they are used—for walking, bicycling, and transit use to enhance communities, connectivity, and physical activity.
- MPP-T-16—Promote and incorporate bicycle and pedestrian travel as important modes of transportation by providing facilities and reliable connections.

The King County Countywide Planning Policies

The project is supportive of the following transportation policies presented as part of the King County Countywide Planning Policies:

- Policy FW-18—The land use pattern shall be supported by a balanced transportation system, which provides for a variety of mobility options, including, 1) a high-capacity transit system that links the Urban Centers; 2) a system of bus and other transit modes that links Centers, provides circulation within the Centers, and links to the non-center Urban Areas; 3) a high-occupancy vehicle system that links Urban Centers; and 4) non-motorized travel options.
- Policy T-7—The transportation element of Comprehensive Plans shall include pedestrian and bicycle travel as part of the transportation system and be developed on a coordinated, regional basis. The bicycle and pedestrian element shall be a part of the funding component of the capital improvement program.

The City of Bellevue Comprehensive Plan

Although the design of 120th Avenue NE from NE 18th Street to Northup Way is not consistent with the City's Comprehensive Plan, the proposed roadway is consistent with the following policies:

- Policy TR-24—Incorporate pedestrian and bicycle facility improvements into roadway projects, and incorporate transit/high-occupancy vehicle improvements where feasible.

- Policy TR-25—Provide for adequate roadway, pedestrian, and bicycling connections in newly developing and redeveloping areas of the City, promoting both internal access and linkages with the rest of the City.
- Policy TR-43—Provide sufficient arterial right-of-way width to permit landscaping, and to accommodate pedestrian and bicycle facilities, while considering neighborhood character and context.

The City of Bellevue Wilburton/NE 8th Street Subarea Plan

- Policy S-WI-25—Improve local access, street system connectivity, and traffic flow by providing additional east-west transportation connections, including an arterial street connection at NE 4th Street between 116th and 120th Avenues NE (…).
- Policy S-WI-31—Recognize the transportation and recreation uses under consideration for the BNSF rail corridor when considering public and private improvements adjacent to the corridor and preserve the opportunity for future multi-modal transportation use and access.

The City of Bellevue Bel-Red Subarea Plan

- Policy S-BR-59—Design Bel-Red Subarea arterials and local streets in a manner that contributes to community character, open space, and environmental enhancements.
- Policy S-BR-63—Improve pedestrian connectivity and the quality of the pedestrian environment with a comprehensive sidewalk and trail system, including through-block pedestrian connections and mid-block crossings.

Neighborhood Character

Construction of the project would extend the function of NE 4th Street and substantially improve the function of 120th Avenue NE. Physical improvements of the project, including the addition of gutters, curbs, sidewalks, and bike trails, would increase the aesthetic character of the corridor and create an opportunity for additional transportation alternatives for pedestrians and cyclists.

The introduction of the new portion of NE 4th Street is not anticipated to disrupt the neighborhood character of the area in any substantial way. The adjacent properties are largely commercial, and many are currently vacant. The residential properties in the area are already near busy roadways, including the existing five-lane NE 4th Street and I-405, and it is not anticipated that they would experience adverse effects due to the roadway extension.

Along 120th Avenue NE, the proposed widening and realignment would represent a fairly dramatic change in the existing two-lane roadway configuration. The residential uses surrounding the project area may experience a shift in their perception of the neighborhood. However, because the proposed project would include pedestrian and bicycle facilities for the length of the corridor improvements, it is also anticipated that the project would have a

positive effect on the neighborhood feel for area residents and has the potential to encourage stronger neighborhood connectivity.

Street parking would no longer be allowed along the length of 120th Avenue NE within the project corridor. It is anticipated that this would affect some of the employees of local businesses, and, to a lesser extent, may affect some of their customers. However, the overall improved traffic connectivity and the addition of bike lanes may encourage more customers to visit the area using alternative transportation methods, which would decrease the demand for street parking.

Social Composition

Community Cohesion

The proposed project would improve connectivity along the project corridor and within the surrounding communities. The extension of bike lanes along NE 4th Street and the addition of them to 120th Avenue NE would allow for safer, increased bicycle and pedestrian access to and along the project corridor. In addition, the redesign of 120th Avenue NE would result in a much safer roadway. The project would not displace any community facilities and overall could have a positive effect on community cohesion in the area.

Population and Housing

The proposed project would not affect population or housing in the area. No residential properties would be affected by required right-of-way acquisition. The project would increase connectivity to the area, but the widening of the road would not result in additional residences being built or the removal of any existing residences.

Regional and Community Growth

Completion of the project would not directly affect regional or community growth. The project would not induce any additional growth by itself, but it is part of the early phase of planned development for the area as set forth in the *Wilburton/NE 8th Street and Bel-Red Subarea Plans*. The southern portion of the project corridor contains multiple vacant lots that are envisioned for redevelopment. Along 120th Avenue NE, the area surrounding the project alignment is almost completely developed, with little to no space for additional uses. Future land uses in the area are anticipated to be of a higher density than those that currently exist, but they require additional development beyond this one project to be realized.

Environmental Justice

The study area does not have any identified minority and/or low-income communities; therefore, there would be no disproportional impacts to these population groups. The enhanced mobility anticipated with the project would have a positive effect on residents in surrounding areas, including environmental justice populations.

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Economic Environment

Property Acquisitions and Property Taxes

Project improvements would require full acquisition of four parcels and partial acquisition of 46 to 48 parcels, depending on implementation of final design and selection of one of the proposed alignments for the extension of NE 4th Street.

Partial acquisitions would primarily consist of strips of land along the project corridor to accommodate the widened road and associated support facilities. The parcels subject to partial acquisition would retain any existing buildings, maintain their current function, and continue to pay property taxes. The amount of property taxes paid may change for the properties subject to partial acquisition if they are reassessed by the King County Department of Assessments. Because these reassessments would be on a case-by-case basis and would occur sometime after completion of the right-of-way acquisition, an estimate cannot be made at this time regarding what changes in property taxes would occur.

Full Acquisitions

The economic effect of potentially fully acquiring up to four parcels would be to convert them permanently from private to public ownership. Parcels in public ownership are exempt from paying property taxes on the assessed value of the parcel. Total property taxes that would be lost as a result of these full acquisitions are roughly $74,800 annually (see Table 5-3). This estimate was based on actual amounts collected in 2010 by the King County Finance and Business Operations Division for all of the parcels to be acquired. This estimate is for one year and represents roughly 0.01 percent of all property tax revenue collected by King County in 2010. Construction of the project would slightly but permanently decrease the number of available parcels across which the property tax load is distributed.

Table 5-3. Anticipated Full Acquisitions and Property Tax Loss Information

Parcel Number	Parcel Use	2010 Tax Rate (%)	2010 Property Total Assessed Value[1]	2010 Property Tax*
1099100425	Barrier—Mercedes Benz Dealership	7.89339	$1,273,000	$10,048
1099100420	Barrier—Mercedes Benz Dealership	7.89339	$1,014,400	$8,019
1099100419	Barrier—Mercedes Benz Dealership	7.89339	$0	$18,294
1099100167	Barrier—Porsche Dealership	7.89339	$2,630,700	$38,417
Total				**$74,800**
King County Total Real Property Taxes Collected in 2010 by Affected Properties				**$34,200,000**
Percent of Property Tax Permanently Removed from Affected Properties				**0.22%**
King County Total Real Property Taxes Collected in 2010[2]				**$638,000,000**
Percent of King County Property Tax Removed Due to the Project				**0.01%**

[1] *Source: County 2010a.*
[2] *Source: County 2010b.*
Note: *Figures rounded up to nearest whole dollar amount.

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Of the four parcels that would be acquired, only two have buildings on them. The removal of these buildings would displace roughly 59 employees. These employees earn an estimated aggregate annual income of approximately $3.36 million; aggregate annual income could be as low as $2.42 million or as high as $4.22 million.

The project also could result in additional full property acquisitions based on the results of final design and effects on business operations; please see the discussion below for additional details.

Partial and Parking Acquisitions

Employee, customer, and bus parking spaces in front of numerous businesses would be removed at various locations due to the roadway widening. An estimated 376 to 595 parking spaces may be removed by the project and not all would be replaced. Spaces that would be removed would be in strips along the infrastructure improvements. In some locations, the new right-of-way would be located where the spaces currently exist. In other locations, the lack of room to maneuver into and out of spaces would render the parking spaces unusable.

Up to six properties face potential partial and parking acquisitions that could result in long-term effects. For those that result in different effects under Option 1 and Option 2, the differences are discussed.

- Parcel 3325059007—Home Depot (300 120th Avenue NE) could lose 57 parking spaces under Option 1 or 159 under Option 2. The parking impacts of Option 2 are a substantial portion of the existing parking and could present a substantial adverse effect on long-term operations of the business without mitigation, and may require the provision of replacement parking. Therefore, Option 2 requires the construction of a parking garage in the existing Home Depot parking lot.
- Parcel 3325059213—Best Buy (457 120th Avenue NE) could lose 91 parking spaces under Option 1 or 208 under Option 2. In addition, under both options the project would affect use of the existing loading dock access. These parking impacts would affect a substantial portion of the existing parking, and combined with the effects to the loading dock could present a substantial adverse effect on long-term operation of the business. These effects may result in acquisition of adjacent parcels to the north to mitigate the potential business operations effects. Option 1 would entail constructing an addition to the north end of the existing Best Buy building on two parcels (3325059133, Mutual Materials and 3325059121, Bellevue School District).
- Parcel 3325059134—Parcel 3325059133 (Mutual Materials Co. at 605 119th Avenue NE) would experience a partial acquisition due to the project displacement of the existing loading dock access on the south side of the existing building and possibly the additional displacement of a portion of the south side of the building. The realignment of the loading dock access under both options, and the possible construction of an

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addition to the north side of the existing Best Buy building under Option 1, could result in full acquisition of this parcel north of the parcel to be acquired due to adverse effects on business operations for Mutual Materials.

- Parcel 1099100165—Brierwood Center, LLC (12001 NE 12th Street) could lose roughly 36 stalls out of 106, or 34 percent of its parking. This is a substantial portion of the existing parking and would adversely affect long-term operation of the business. However, the remainder of the property could also be redeveloped and/or reconfigured to once again provide sufficient parking.
- Parcel 2825059307—Bellevue Trade Center (2023 120th Avenue NE) could lose approximately 37 parking spaces, which would not result in an adverse effect on the property. However, in order to preserve driveway access to this building, 20 feet would need to be removed from the two wings of the C-shaped building that are closer to 120th Avenue NE. The building is currently divided into four office suites, so this could result in two business relocations. The suites are currently unoccupied, and if they remain that way, there would be no effect on businesses in this building.
- Parcel 2825059310—This building (12021 Northup Way) houses multiple businesses and offices, including Tap Plastics, Inc., American Games Billiards and Bar Stools, and the GroomingSPA. This building would lose a small amount of parking (three stalls), as well as access to its west loading dock. This could result in up to one business relocation.

Any required driveway relocations would maintain comparable access to the businesses they currently serve.

Anticipated Effects

After construction of the project, the City could sell those parcels that were either fully or partially acquired and are not part of the permanent roadway right-of-way as surplus property, returning them to private ownership. Parcels returned to private ownership would pay property taxes and could provide opportunities as replacement properties for displaced businesses, allowing owners to remain in the community. Some remnant parcels, however, may not be sold and redeveloped following construction because of potential access constraints caused by the proposed roadway changes.

The project would improve traffic flow and access to and from the businesses and establishments from the western end of NE 4th Street to its proposed eastern intersection with 120th Avenue NE and along 120th Avenue NE. Traffic to and from businesses and establishments that would rely on either NE 4th Street or 120th Avenue NE to move goods and people but are not originating in or destined for the area would also improve. Some businesses may be adversely affected by the changes in traffic flow along NE 4th Street and 120th Avenue NE.

Public Services

It is anticipated that the project would not affect public services facilities or response times. The project would not directly result in any additional residences or businesses being constructed in the area; therefore, there would be no additional demand on public services. In addition, the project would increase the capacity of the existing roadway, so there would be no adverse effects on public services response times. As traffic levels increase in the future, the extended and widened roadways would relieve congestion and allow for better emergency access to the planned development of the Wilburton/NE 8th Street and Bel-Red Subareas.

Community Facilities

Community Resources

Upon completion of construction, the project is anticipated to have beneficial effects on community resources by providing better access to local facilities, such as the church, and through access to facilities in the general vicinity, such as the hospitals. The project would also continue and improve pedestrian and bicycle facilities along the roads, providing additional resources where none exist at this time and additional access to community resources.

Recreational Resources

The project would include construction of designated bike lanes and wider sidewalks on the extension of NE 4th Street and each side of 120th Avenue NE, which would result in a positive effect on transportation connectivity along the project corridor as it pertains to bicycle and pedestrian movements. This potential increase in connectivity would create alternative ways to access recreational resources in the area, but it would not directly affect those resources.

Street Trees

Tree replacement would occur pursuant to the pertinent sections of the applicable Land Use Code Amendments. Additional trees may be planted in the landscaped buffer included in the construction design.

Utilities

Once completed, it is anticipated that the project would not affect any utilities. The project would not directly result in any additional residences or businesses being constructed in the area; therefore, there would be no additional demand on existing utilities due to the project.

The relocation of utilities would allow for the potential placement of the overhead electrical lines underground in the northern portion of 120th Avenue NE and would result in utilities being installed in common trenches for ease of access and repair, likely one for electrical and one set of conduits for telecommunications. Stormwater systems would also be upgraded at this time, and water lines would be adjusted to allow for better maintenance access in the

future. The potentially upgraded and relocated gas-oil line could result in improved service and allow for better maintenance access in the future as well.

Visual and Aesthetic

Once completed, the project would affect the visual and aesthetic character of the area, but it is anticipated that none would result in an adverse effect in the area. The following areas have been highlighted for discussion due to the introduction of a roadway element that does not currently exist or a substantial change in the elevation of the existing roadway.

NE 4th Street

There is a substantial change in topography that occurs between 116th Avenue NE on the west and the elevation of the existing railway corridor, as it rises roughly 55 feet in elevation. This change in elevation is concentrated in a narrow band immediately west of the railroad corridor. To accommodate the steep slope, the horizontal alignment of the extension of NE 4th Street would curve up the hillside. This portion of the proposed alignment would have a 13 percent slope but would not alter the existing hillside slope. The roadway design would require the construction of substantial retaining walls on both sides of the roadway for this portion of the project corridor. As stated earlier, many parcels that the proposed NE 4th Street extension would travel through are currently unused, except for Home Depot and Best Buy to the east. While construction of the retaining walls necessary for the project would introduce a new visual element in the area and disrupt the existing visual environment, it is not anticipated that they would be so substantial as to result in an adverse effect in the area.

120th Avenue NE from Bel-Red Road through to NE 8th Street

120th Avenue NE currently intersects with NE 8th Street in the south and Bel-Red Road in the north, with an interruption in the road. The project would modify the northern intersection with Bel-Red Road to allow 120th Avenue NE to continue in a north–northeasterly direction from NE 8th Street to generally match the proposed intersection with Bel-Red Road. This realignment and newly constructed portion of 120th Avenue NE would result in a new visual presence and experience in this location.

The residential complexes east of the project corridor within the triangular intersection of NE 8th Street and Bel-Red Road could experience a change in their visual experience when looking to the west. The Brierwood and Midlakes apartment buildings are already bounded on the western side by fairly tall trees and two office buildings that would remain, but the land slopes downward to the east in this location. The presence of the newly constructed portion of 120th Avenue NE here is not anticipated to adversely affect the visual experience of residents of these complexes as the area changes from parking to traffic. The two office buildings to the west would remain, and residents in these two-story buildings already have a view of Bel-Red Road and its intersection with NE 8th Street to the west.

Three of the four two-story buildings that comprise the Midlakes condominium complex are adjacent to Bel-Red Road, with fairly tall trees acting as a buffer so they are not directly adjacent to the road; the fourth building is southeast of the other three. Residents of these buildings currently have a view of the existing intersection of 120th Avenue NE with Bel-Red Road. The project would result in 120th Avenue NE being three lanes wider and modifications would be made to the existing intersection, but these changes are not anticipated to be so significant as to adversely affect the visual experience of any of the residents here.

NE 15th/16th Street Corridor

In the location of the proposed NE 15th/16th Street Corridor, 120th Avenue NE would be higher than its existing elevation. The grade changes would be largest south of the Multimodal Corridor, where the roadway elevation may be as much as 10 feet higher than it is currently. This change in elevation is largely to accommodate the planned East Link light rail alignment.

In general, this rise in elevation would result in the road's elevations generally matching that of the surrounding land on the east side. This additional height would likely change the view from businesses and residences on the west side of the road. In that area, the existing slopes are already fairly steep, and businesses immediately south of the future corridor are planned to be acquired as part of the light rail project. The Audi dealership at 1533 120th Avenue NE would remain and may experience the greatest visual effect of this overcrossing. However, as this business does not rely upon views as a component of its business, it would not be considered a sensitive receptor and no adverse effects would be expected. For other businesses along the project corridor, the grade would be gradual and the changes not so great; therefore, it is not anticipated that any existing views would be so severely affected as to experience an adverse effect.

It is not anticipated that the Lake Bellevue residents' visual experience would be adversely affected as a result of the project. These residences are also west of 120th Avenue NE, and therefore already face the existing steep slopes on the eastern side of the road. In addition, it is likely that these residents value and take advantage of their views of the lake and wider panoramic views in the southwest direction. The widened road would not create a substantial difference from their existing view of the roadway.

Other Roadway Components

Both the four-lane and five-lane roadway designs contain a 5-foot-wide planter strip on each side of the highway, and landscaping would comply with code set forth in the design guidelines for both subareas. The design for retaining walls would also comply with these guidelines.

The project would result in the installation of nighttime-operational streetlights along the entire length of the project corridor. This could be considered a positive effect on human use and activity in the area, particularly as a safety issue along what is now a largely unlit roadway corridor. However, as the area develops in

the future and additional residential units are added, excessive street lighting could disturb people's enjoyment of the area and change the visual nature of the roadway. Street lighting would follow the design guidelines of the Wilburton/ NE 8th Street and Bel-Red Subarea Plans, including the use of lower poles and more efficient lighting that provides more focused energy with less stray light.

5.2 Indirect Effects on Community Resources

Indirect effects are associated with a project and occur later in time or farther removed in distance, but they are still reasonably foreseeable (e.g., induced land development from highway projects).

While the NE 4th Street/120th Avenue NE Corridor Project would not contribute significantly to indirect effects, it is part of the larger *Wilburton/NE 8th Street and Bel-Red Subarea Plans* discussed previously. This project is focused on improving transportation and traffic flow in the area. By itself, its indirect effects would be minor and beneficial to community resources. Mainly, they would result from additional capacity on the roadway and better access to properties along the roadway and in the project vicinity. For example:

- Better access to All Saints Episcopal Church could result in additional participation and community cohesion in the future, allowing this and other facilities to become meeting points for area residents.
- The residents to the north and east of the corridor would be better able to access hospital facilities west of the corridor, and in turn be better accessed by public services, which could allow these areas to grow.
- Business and restaurants in the Lake Bellevue area could be more easily accessed by residents to the north and east of the project corridor, resulting in increased economic stimulation of this area.

Any growth that the project could stimulate in the area is currently being planned for as part of the City of Bellevue's new *Comprehensive Plan* and the *Wilburton/ NE 8th Street and Bel-Red Subarea Plans*. Since the study area is predominantly commercial and industrial, additional traffic flow and use of the corridor is generally considered a beneficial effect. As a result, no adverse indirect effects are anticipated due to the project.

5.3 Cumulative Effects on Community Resources

Cumulative effects result from the incremental effects of the action when added to other past, present, and reasonably foreseeable actions, regardless of the agency or person initiating the other actions. At this time, reasonably foreseeable projects in the area include the following:

- Spring District—Wright Runstad & Company, in joint venture with Shorenstein Properties, LLC, has planned the development of the Spring District, a 36-acre mixed-use urban neighborhood within the Bel-Red Corridor. The Spring District will consist of up to 1,000 multi-family

residences, over 3 million square feet of office space, and several high-density buildings that will provide retail services. The proposed development will be located at the northeast corner of 120th Avenue NE and NE 12th Street.

- Sound Transit's East Link Project—This project will consist of an electric light rail train system that will connect areas between Seattle and Overlake Transit Center in Redmond. It is anticipated that the system will have a station just east of 120th Avenue NE and between NE 15th Street and NE 16th Street. This project is expected to be completed between 2016 and 2021.
- Construction of light rail will result in the acquisition of property at 1445 120th Avenue NE. Since not all of the property will be used for the light rail track, some portion of it will be redeveloped. As this is already a commercial property, the nature of the land use is unlikely to change significantly.
- NE 15th/NE 16th Streets Corridor—The NE 15th Street/NE 16th Street will be constructed from NE 12th Street through to Northup Way. The East Link light rail project will be located in this corridor east of 124th Avenue NE.
- 124th Avenue NE Improvements—124th Avenue NE will be improved to support proposed developments in the Bel-Red subarea. The anticipated traffic flow pattern from Downtown to eastbound State Route (SR) 520 is NE 4th Street to 120th Avenue NE to NE 15th/NE 16th Street to 124th Avenue NE to SR 520.

Reasonably foreseeable projects in the area relating specifically to community resources include the following, as found in Table 2 of the Bel-Red Subarea Plan and shown in Figure 5-1:

- N-1: Neighborhood Park—Along the West Tributary, adjacent to NE 16th Street Parkway. Integrates major trail systems and regional detention, with neighborhood park facilities. Includes f1 acre remnant transportation acquisition. (7 acres)
- N-2: Neighborhood Park—Along the West Tributary of Kelsey Creek, adjacent to Bel-Red Road. Integrates major trail and neighborhood park facilities. Includes 3 acres Neighborhood Park/1 acre riparian corridor. (4 acres)
- G: Gateway Park—Near the intersection of 124th Avenue NE and Bel-Red Road. Integrates mini park facilities and potential art component near major road intersections to serve as a gateway to the Bel-Red Corridor. (1 acre)

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- T-1: Trail Head—Located adjacent to the BNSF Corridor at Lake Bellevue. Integrates a trailhead with mini park facilities at BNSF regional trail and Lake Bellevue. (1 acre)
- T-2: Trail Head—Located at the BNSF regional trail corridor and the NE 15th/16th Parkway. Integrates a trailhead with mini park facilities at the crossing of the two major multi-purpose trails. (1 acre)
- M-3: Mini Park—Located between 120th Avenue NE and 124th Avenue NE and south of NE 15th/16th Street. Provides park facilities to serve residential and commercial mixed-use development. (1 acre)
- C-1: Community Park—Along the West Tributary of Kelsey Creek adjacent to 120th Avenue NE. Incorporates trailhead and trail system along the West Tributary of Kelsey Creek and the BNSF corridor with community park facilities. Includes 10-acre acquisition through purchase for community park facilities and 7-acre open space dedication by adjacent owner. (17 acres)

TheWilburton/NE 8th Street Subarea Plan does not list any planned park facilities within the project area. However, the plan does include the following policies that pertain to recreational resources in the area:

- Policy S-WI-32. Retain the parks in the Subarea and ensure that they remain park facilities (including Wilburton Hill and Kelsey Creek Parks).
- Policy S-WI-36. Support continuation of the Lake-to-Lake Trail through Wilburton. The trail should connect from the NE 4th Street interchange at I-405 to the Wilburton Hill Park to Kelsey Creek Park to the Lake Hills Greenbelt and Richards Valley.
- Policy S-WI-39. Support implementation of the Wilburton Hill Park Master Plan, including neighborhood park elements.

The NE 4th Street/120th Avenue NE Corridor Project is part of the larger Wilburton/NE 8th Street and Bel-Read Subarea planning efforts and is included in the plans. The redevelopment of this area is intended to change its nature from a commercial/industrial area to one that consists of mixed-use smart growth, including residential transit-oriented development. From a community standpoint, this would be considered a beneficial effect, as community centers are developed around the future light rail stations at 120th Avenue NE and at 130th Avenue NE. Each of these transit-oriented development areas will contain its own mixture of commercial and residential facilities and provide pedestrian and bicycle facilities to connect these communities, both internally and with each other.

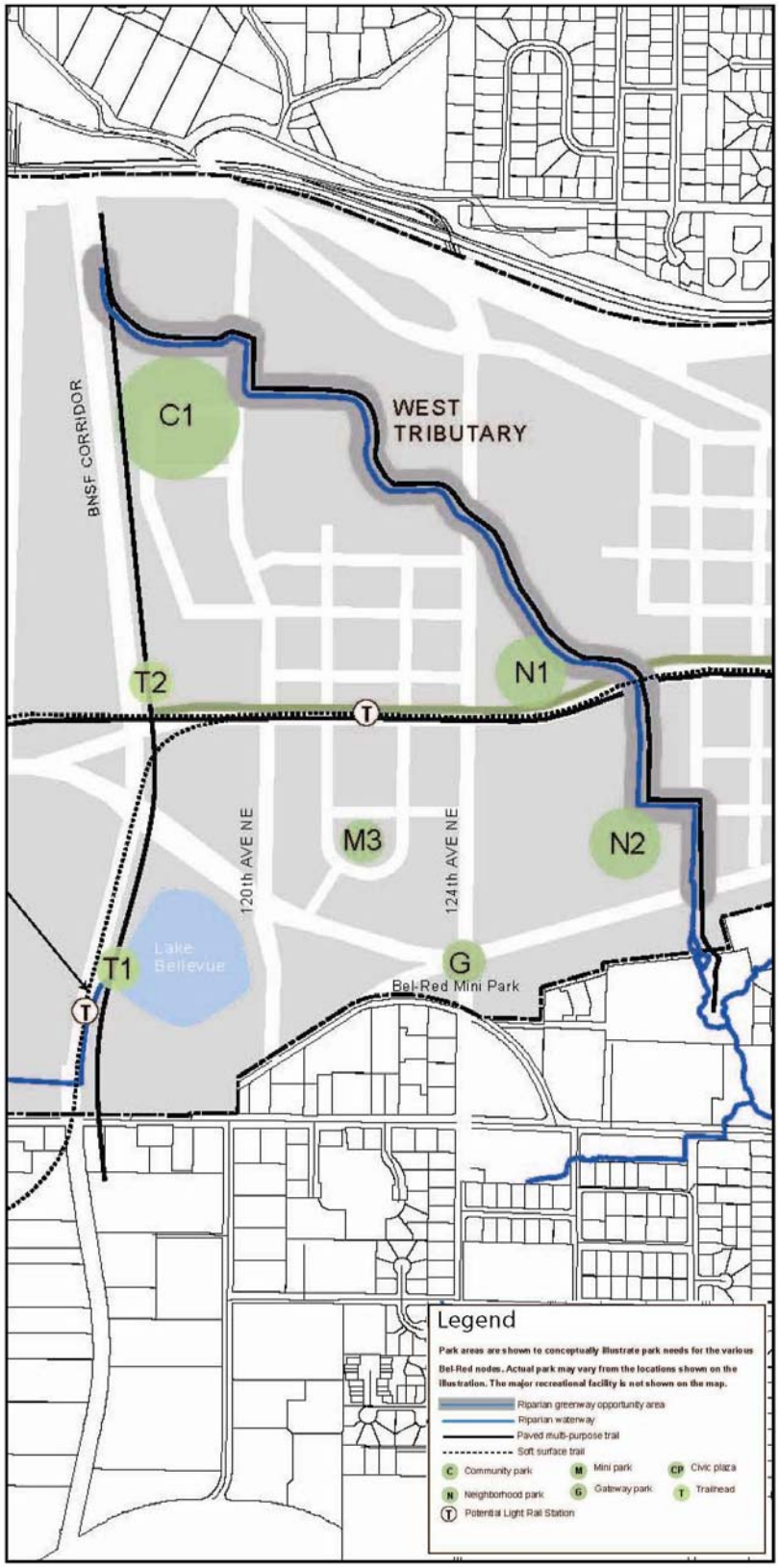

Figure 5-1. Bel-Red Parks and Open Space Plan—Relevant Portion of Figure S-BR.3 in Bel-Red Subarea Plan (Page 47)

While this new community will increase the demand for community services and public facilities, many of these would be included within the developments themselves, providing better access to future residents. Encouraging mixed-use development, the *Wilburton/NE 8th Street and Bel-Red Subarea Plans* will also result in job and commercial opportunities, providing additional economic benefits to residents of both this area and the surrounding communities.

5.4 Mitigation Measures

The following mitigation measures would be put in place to protect community resources in the study area:

- Economic Effects—Where acquisition causes the displacement of a business, displacement of parking, adverse effects on loading dock facilities, and/or changes in property access, the extent of these impacts will be considered in the relocation services and payments made under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq) (Chapter 468-100 WAC).
- Community Effects—The project could require the removal of up to 88 City trees located along the project corridor. A survey for significant trees, as defined by the City of Bellevue Land Use Code 20.50.046, would be performed prior to construction to establish which ones would require protection. Tree replacement would occur pursuant to applicable General Land Use Code Amendments for the subareas.
- Visual Effects—Street lighting would follow the design guidelines of the Wilburton/NE 8th Street and Bel-Red Subarea Plans, including the use of lower poles and more efficient lighting that provide more focused energy with less stray light.

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Appendix A
RIMS II Detailed Model Analysis

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1.1 Introduction

1.1.1 Regional Economic Activity

The proposed Bellevue NE 4th Street/120th Avenue NE Corridor Project (Build Alternative) would result in economic effects at the county and regional level relative to not building the project (No Build Alternative). The intent of the analysis that follows is to assess the likely overall economic effects that would be attributed to project construction, as measured by increases in regional activity, employment, and associated job earnings. This analysis does not account for the economic impacts of reduced congestion and shorter travel times through the corridor facilitated by the corridor project.

As part of the corridor project, two construction options are currently under consideration for the extension of NE 4th Street. As such, a capital cost estimate was prepared for both options. The analysis contained in this attachment estimates the economic effect of the more costly of the two options—Option 2. However, the cost estimates only differ by about $280,000. This relatively minor difference would not noticeably affect regional economic activity.

1.1.2 Terminology and Methods

To analyze the economic effects of the project capital investment, it is necessary to examine the economic reactions that an increase in the demand for construction goods and services creates. Economists use input-output models to analyze how changes in the production of a specific firm or industry alter the flow of funds into and out of all other industries, as well as households. By tracing how production in one economic sector consumes the output of other sectors as production inputs and how each of these other sectors in turn influences the demand for the output of yet other sectors, input-output analysis facilitates the calculation of multipliers. These multipliers provide a quantitative estimate of changes in economic activity, employment, and job earnings within the local economy (county or region) that compound from initial new expenditures.

Defining the terms below will aid in understanding how project construction would lead to multiplied economic effects on the economies of the central Puget Sound region.

- **Direct Effects**—The increases in demand for roadway construction and related materials and services within a defined regional economy arising from undertaking the project. Direct effects are usually measured as construction expenditures, but also can be expressed in the number of new construction jobs or job earnings.
- **Indirect Effects**—The sum of all inter-firm and inter-industry transactions that filter through the regional economy resulting from the purchase of material and labor inputs by the firms directly affected in the course of producing their construction-related output.

- **Induced Effects**—The increases in household consumption of goods and services of all firms within the regional economy by the workers who receive additional earnings resulting from either the direct or indirect effects of construction.
- **Total Effects**—The sum of the direct, indirect, and induced economic effects as measured by the overall increase in economic activity, employment, and/or earnings within the regional economy. Total effects are also referred to as the total multiplied effects, where the multiplier is the factor ratio of total to direct effects.
- **Gross Effects**—The economic effects of total project expenditures—in terms of direct, indirect, and induced effects—prior to assessing what proportion of those expenditures and subsequent effects would likely have still occurred in some other manner in the absence of the project being evaluated.
- **Net or "New Money" Effects**—Only those economic effects—in terms of direct, indirect, and induced effects—attributable to funds that are uniquely available for expenditure on the subject project. These funds would otherwise not enter the regional economy. Economists tend to emphasize the net or new money effects as more accurate measures of the true increases in output, employment, and earnings.

Construction expenditures are assumed to occur over a period of four years as a worst-case scenario. This directly would create new demand for construction materials and labor inputs. These direct effects would then lead to indirect or secondary effects, as the production of output by firms in other industries increases to supply the demand for inputs to the construction industry. Both the direct and indirect effects of construction expenditures cause firms in all industries to employ more workers to meet increases in demand; this leads to induced effects as the additional wages and salaries paid to workers lead to higher consumer spending.

The economic effects at the county and regional level due to the influx of capital construction funds are quantified as direct and indirect effects. The direct and indirect effects are calculated using multipliers provided by the U.S. Department of Commerce Bureau of Economic Analysis' (BEA) Regional Input-Output Modeling System (RIMS II) for King County and the central Puget Sound region. The central Puget Sound region is defined as King, Pierce, and Snohomish Counties. The detailed application of these RIMS II multipliers is presented below.

1.1.3 Economic Effects

For purposes of assessing the economic effects on output, earnings, and employment, the focus is placed on the project capital costs (construction and right-of-way acquisition) of the Build Alternative as an accurate measure of the capital investment that would likely occur for the project. It is assumed that no project capital costs would be incurred with the No Build Alternative.

Table 1. Capital Costs and Funding Sources of the Build Alternative

Capital Cost Estimate ($ millions)	Funding Source ($ millions and Share)	
	Federal	Local
67.6	8.2 (12%)	59.4 (88%)

Table 1 lists the project capital cost estimate, distribution of funding sources, and regional and state new money estimates for the project. The distribution of funding sources has been developed by the design team and is the list of potential funding mechanisms available and committed to the project as of March 2011. The City is currently pursuing several other federal grants for the Build Alternative, which are not included in this analysis. The economic net effects of the project would be greater should the City be able to secure additional federal funding in the future for the project.

Percentage shares of the capital cost estimates are also provided. For purposes of examining the regional economic effects, all of the federal grants and federal general funding sources are assumed to be new money that would otherwise not be spent either regionally or within the state in the absence of the project. All state, regional, and city funding sources are assumed to be expended with or without this project and are not considered to be new money. All state, regional, and city funding sources, including local improvement district taxes, are tax-based funding of local and/or state residents or property owners specifically earmarked for transportation projects within the region or state. The difference between the capital cost and new money net direct effect for the Build Alternative is assumed to be expended with or without the project, thereby qualifying the difference only as a gross effect.

1.2 Application of RIMS II Multipliers

Three classes of RIMS II final demand multipliers and one class of direct effect multipliers were used to estimate the gross and net effects:

- Final Demand Output Multipliers translated the initial project capital expenditures (demand) for construction outputs to the total multiplied effect on the demand for output of all firms/industries (in dollars) within the regional economy.

- Final Demand Earnings Multipliers translated the same direct project expenditures into the total multiplied effect on wage and salary earnings within the regional economy.
- Final Demand Employment Multipliers converted project expenditures into the total multiplied effect on employment within the regional economy, expressed in person-year jobs. This is generally used when there is no estimate of direct employment available.
- Direct Effect Employment Multipliers translated direct employment into the total multiplied effect on employment within the regional economy, expressed in person-year jobs.

For application of the RIMS II final demand multipliers, capital costs were divided into two categories. Table 2 presents the capital cost distribution for the project by two industry expenditure/multiplier categories. Table 3 presents final demand multipliers, as well as direct effect multipliers, for King County and the central Puget Sound region. All construction labor, construction materials, and right-of-way acquisition were assumed to be obtained locally.

Table 2. Total Project Costs of the Build Alternative

Total Project Cost Estimate ($ millions)	Project Cost Component ($ millions and Share)	
	Construction Cost[1]	Right-of-Way Acquisition
67.6	31.8 (47%)	35.8 (53%)

[1]Includes preliminary engineering costs.

Table 3. Capital Costs Multipliers

Expenditure Category	BEA RIMS II Multiplier Industry Classification & Number	Final Demand Multipliers			Direct Effect Multipliers	
		Output (dollars)	Earnings (dollars)	Employment (jobs)	Earnings (dollars)	Employment (jobs)
King County Multipliers						
Construction	11.0400 Highways and Streets	1.8081	0.4328	11.5	1.9334	2.4057
Right-of-Way	71.0201 Real Estate Agents, Managers, Operators, and Lessors	1.5392	0.2076	8.5	2.569	2.1197
Central Puget Sound Regional Multipliers						
Construction	11.0400 Highways and Streets	2.0627	0.6093	16.4	2.0837	2.6392
Right-of-Way	71.0201 Real Estate Agents, Managers, Operators, and Lessors	1.5920	0.2517	10.1	2.8933	2.3467

The gross total (direct, indirect, and induced) effects on output and earnings can be calculated by multiplying the expenditure in millions of dollars by category in Table 2 by the appropriate final demand multiplier in Table 3. Under the Build Alternative, expenditures of $31.8 million in the construction category would yield a gross output effect on all County economy industries of ($31.8M × 1.8081) = $57.5 million; the capital expenditures would yield a gross output effect on all regional economy industries of ($31.8M × 2.0627) = $65.6 million.

Some of the county and regional economic output would have occurred anyway without construction of this project. The more realistic measure of net effects on economic output can be assessed by multiplying the gross output effect by the average of percentages of general construction expenditures in representing new money (committed and/or anticipated) to the region listed in Table 1. This gives ($31.8M × 12% × 1.8081) = $7.0 million, which represents the net increase in economic output attributable to new money entering King County specifically; ($31.8M x 12% x 2.0627) = $8.0 million to the central Puget Sound region. The gross and net effects form the upper and lower boundaries within which the true effects would likely fall, with net effects being the lower bound. Although the true magnitude of the effects would be closer to the net effects in the absence of this project, some of the non-new money tax and/or consumer dollars spent elsewhere may result in smaller multipliers than with this project. King County industries would experience a net increase in economic output of ($31.8M × 12% × 1.8081) = $7.0 million. Similar calculations can be performed for the other expenditure categories.

1.3 Summary of Economic Effects

The following tables exhibit the gross and net total effects on output and earnings for King County and the central Puget Sound region. Table 4 presents the gross total economic effects for King County and the central Puget Sound region. Under the Build Alternative, new demand for construction would generate gross direct effects equal to the capital cost of $57.5 million of construction dollars. Adding in the indirect and induced effects on the output of other regional firms, the gross multiplied effect on output would total approximately $65.6 million over the construction period. In addition, $13.8 million would be paid to workers in King County as wage and salary earnings for the jobs generated.

Table 4. Gross Total Regional Economic Impacts[1]

Alternative & Expenditure Category	Direct Gross Expenditures ($ millions)	King County Gross Total Effects		Central Puget Sound Region Gross Total Effects	
		Output ($ millions)	Earnings ($ millions)	Output ($ millions)	Earnings ($ millions)
Build Alternative	**67.6**	**112.6**	**21.6**	**122.6**	**28.4**
Construction	31.8	57.5	13.8	65.6	19.4
Right-of-Way	35.8	55.1	7.4	57.0	9.0

[1] Includes only effects directly associated with the expenditure of construction and right-of-way funds and does not include secondary economic benefits.

Table 5 presents the net total economic effects attributable to new money for King County and the central Puget Sound region. Under the Build Alternative, the same new demand for construction expenditures would generate net direct effects equal to $7.0 million ($31.8 million × 12 percent × 1.8081) in midyear construction dollars after accounting for local funds that would otherwise still be spent in the regional economy with similar multiplied effects. Adding in the indirect and induced effects on the output of other county firms, the net multiplied effect on output would total $13.7 million over the construction period. Of this amount, $2.6 million would be paid to workers as wage and salary earnings for the net new jobs created.

Table 5. Net New Money Total Economic Impacts[1]

Alternative & Expenditure Category	Direct Gross Expenditures ($ millions)	Percent Contribution Due to New Money Funds[2]	King County Net Total Effects		Central Puget Sound Region Gross Total Effects	
			Output ($ millions)	Earnings ($ millions)	Output ($ millions)	Earnings ($ millions)
Build Alternative	**67.6**	**12%**	**13.7**	**2.6**	**14.9**	**3.4**
Construction	31.8		7.0	1.7	8.0	2.4
Right-of-Way	35.8		6.7	0.9	6.9	1.1

[1] Includes only effects directly associated with the expenditure of construction and right-of-way funds and does not include secondary economic benefits.
[2] Includes Committed New Money Funds. See Table 1.

While the gross total economic effects are useful for examining the overall magnitude of the project, the net total economic effect measures represent more generally accepted and appropriate estimates of the true economic effects that would arise solely from project construction. The gross and net effects form the upper and lower boundaries within which the true effects would likely fall, with net effects being the lower bound. Although the true magnitude of the effects would be closer to the net effects, in the absence of this project, some of the non-new money tax and/or consumer dollars spent elsewhere may result in smaller multipliers than with this project.

1.4 Summary of Benefits for the County Economic Activity

This discussion of benefits includes only benefits directly associated with the expenditure of construction and right-of-way funds during the construction period and does not include indirect economic benefits after construction is completed. The cost associated with construction of the Build Alternative would result in additional (gross) activity throughout all economic sectors within King County. This gross economic activity is derived from the multiplication effects on the capital expenditures for the project. Examples of capital expenditures include the direct hire of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new rights-of-way.

The amount of new economic activity directly associated with the Build Alternative that is the result of new money entering King County's economy is $5.6 million. The amount of new earnings (wages) entering King County's economy is $1.8 million. These estimates assume that all of the committed and anticipated new money funds are received for the project.

1.4.1 Temporary Economic Effects to Businesses, including Construction Expenditures on Sales Tax Revenue

Sales Tax Revenue

Sales taxes would be generated through the purchase of goods and materials related to construction. Table 6 lists the estimated amount of sales tax generated for the Build Alternative based on construction costs only. Sales tax would not accrue for non-construction costs such as right-of-way acquisition and engineering.

Table 6. Total Capital Costs and Sales Tax Generated ($ millions)

Alternative	Total Capital Cost	Total Sales Tax Generated
Build Alternative	$38.9	$0.2

The project sales tax estimates are based on the construction cost estimates. These estimates will be refined once additional information regarding project design and funding becomes available. The sales tax generated would be received by cities and counties throughout the central Puget Sound region. The proportion of tax generation received by each jurisdiction is unknown because it is dependent where construction materials are purchased in the region.

Temporary Jobs Created during Construction

With implementation of the Build Alternative, temporary jobs would be created to construct the project. The duration of these temporary jobs is expected to be about 48 months.

A hybrid approach was used to estimate the gross and net increases in employment attributable to new money entering King County. Both direct effect and final demand multipliers (see Table 3) were used to estimate employment effects for the Build Alternative. Direct effect multipliers were used on the estimates of the direct labor force to be employed in constructing the Build Alternative, as presented in Table 7. Final demand multipliers were used to estimate capital costs for right-of-way acquisition, as no direct labor estimates have been generated by the project design team for this expenditure category.

The estimates of the direct jobs generated by the project were calculated based on the approximate cost for construction contracts and the assumption that the average labor rate in 2011 would be about $60 per hour.[1] The direct effect of

[1] The Annual Average Construction Employment (Jobs) was calculated based the following assumptions: 25% of the Capital Cost = $16.9M total for labor, including subs and staff; 4 year construction duration = $4.2M per

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these temporary construction jobs on the economy would cause the indirect effect of creating additional jobs throughout King County and the central Puget Sound region. Using the direct effect multipliers for highway and street construction presented in Table 3, we can calculate the secondary effect of regional job creation in the same manner used to calculate the gross output and earnings using only the direct gross expenditures.

No estimate of the direct labor force needed to perform right-of-way acquisition was prepared by the project design team. Consequently, the capital costs associated with this task are used to quantify employment effects in the same manner that gross output and earnings were estimated for all capital costs using final demand multipliers presented in Table 3.

The Build Alternative would have direct gross expenditures of $35.8 million in the right-of-way category, which is 53 percent of the total project cost. This is due to the project's location in a developed corridor within downtown Bellevue. The acquisition of right-of-way would create a demand for jobs. Existing city staff would likely provide the majority of the labor to process the right-of-way acquisitions with some help from local consulting firms. However, the number of jobs created would not be commensurate with the right-of-way cost and would not have a substantial effect on total job creation in King County.

For the construction expenditure category, a direct generation of 35 person-year jobs would yield a gross employment effect on all county economies of (35 person-year jobs × 4 years = 140 total construction labor × 2.4057) = 337 person-year jobs. Summing these gross employment effects together yields the total gross employment effect to the county economy of 695 person-year jobs.

Some of these jobs would have occurred without construction of the project. The more realistic measure of net effects on employment can be assessed by multiplying the gross total employment effect by the percentage of capital expenditures representing new money (committed and anticipated) for the county listed in Table 1. This gives ($35.8M × 10) + ((35 person-year jobs × 2.4057) × 12%) = 83 person-year jobs, which represents the net increase in employment attributable to new money entering King County.

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year; $60/hour @ 2,000 man hours/year = $120,000; $120,000/$4.2M = 35 construction jobs per year. The labor rate was estimated by averaging the past 12 months (June 2009—June 2010) of hourly construction wage ($28.50) provided by the Current Employment Statistics available at: LMEA http://www.workforceexplorer.com/cgi/dataanalysis/?PAGEID=94&SUBID=149. This wage was multiplied by a total compensation multiplier of 1.5, which was determined based the ratio of wages and salaries to total compensation of the construction industry during the first quarter of 2010 available at: BLS http://www.bls.gov/iag/tgs/iag23.htm#earnings.

Table 7. Gross County and Regional Total Employment Effects and Net New Money Total Employment Effects

Alternative & Expenditure Category	Build Alternative	Construction	Right-of-Way
Direct Gross Expenditures ($ millions)	--	--	35.8
King County Final Demand Employment (prs-yr jobs)	--	--	n/a
Central Puget Sound Region Final Demand Employment (prs-yr jobs)	--	--	n/a
Annual Average Construction Employment (jobs)	--	35	--
Construction Duration (years)	--	4	--
Total Construction Labor (prs-yr jobs)	--	140	--
King County Direct Effect Employment (prs-yr jobs)	--	337	--
Central Puget Sound Region Direct Effect Employment (prs-yr jobs)	--	369	--
King County Gross Employment (prs-yr jobs)	695	--	--
Central Puget Sound Region Gross Employment (prs-yr jobs)	731	--	--
Average Percent Contribution Due to New Money Funds	12%	--	--
King County Net Employment (prs-yr jobs)	83	--	--
Central Puget Sound Region Net Employment (prs-yr jobs)	88	--	--

prs-yr jobs = person-year jobs.
Construction duration assumes four years for the Build Alternative.
Central Puget Sound Region is defined as King, Pierce, and Snohomish Counties.
Final Demand Employment shows the translation from right-of-way gross expenditures into direct, indirect, and induced employment. Direct Effect Employment shows the translation from temporary construction employment into direct, indirect, and induced employment.
Gross Employment is the sum of Final Demand Employment and Direct Effect Employment. Gross Employment is all direct, indirect, and induced employment.
Net Employment is that fraction of Gross Employment that represents all direct, indirect, and induced employment associated with new money (committed and anticipated).

1.4.2 Summary of Benefits for Employment

Compared with existing conditions, the employment associated with the construction the Build Alternative would result in additional (gross) employment throughout all economic sectors within King County and the central Puget Sound region. This gross employment is derived from the multiplication effects on capital expenditures for the project. Examples of capital expenditures include the direct hire of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new rights-of-way. Therefore, the higher the capital cost, the more direct, indirect, and induced jobs are generated within King County and the central Puget Sound region.

The number of new jobs directly associated with the Build Alternative is the result of new money (committed and anticipated) entering the county economy and is estimated at 83 jobs; 88 jobs are estimated for the regional economy. The portion of new money to overall construction costs is 12 percent. All other fund sources come from within either the state or the central Puget Sound region; these funds would likely be spent in the local economy even without this project.

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NE 4th Street/ 120th Avenue NE Corridor Project

Fisheries, Wildlife, and Vegetation Technical Report

prepared for
City of Bellevue

prepared by
Parsons Brinckerhoff

April 15, 2011

COB File # 11-114971-LM

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Acronyms and Abbreviations

BNSF	Burlington Northern Santa Fe
CMP	corrugated metal pipe
Corps	U.S. Army Corps of Engineers
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
GIS	geographic information system
NPDES	National Pollutant Discharge Elimination System
NMFS	National Marine Fisheries Service
PEM/SS	palustrine emergent, scrub-shrub wetland
S&W	Shannon & Wilson
SR	State Route
TWLTL	Two-way, left turn lane
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington State Department of Fish and Wildlife
WNHP	Washington Natural Heritage Program

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Executive Summary

The proposed NE 4th Street/120th Avenue NE Corridor Project would affect limited natural resources, including fish, wildlife, and vegetation, because of its location in an urban environment where most surfaces are covered by impervious buildings, asphalt, and concrete. Four wetlands, identified as Wetlands A, B, C, and D, were delineated in the central and northern portions of the project corridor. Native vegetation in the study area is limited to these four palustrine wetlands and a small area of nearby forested uplands. In addition, native trees have been planted along the entire corridor as part of the landscaping.

Sturtevant Creek crosses NE 4th Street at roughly its intersection with Interstate 405 (I-405), more than 500 feet west of the project corridor. The creek is in a highly developed area and has been urbanized. Lake Bellevue, the headwaters to Sturtevant Creek, is approximately 100 feet west of 120th Avenue NE and is surrounded by urban development. As such, vegetation is limited to small areas of cattails and willows along the lake fringe. The West Tributary of Kelsey Creek begins at Wetland D in the northern portion of the project corridor and flows east beneath 120th Avenue NE in a 36-inch culvert into Wetland C. No fish use has been documented in the tributary between its headwaters at Wetland D and the downstream culvert at Bel-Red Road.

Washington Department of Fish and Wildlife (WDFW) priority habitats in the project corridor include freshwater wetlands (Wetlands A, B, C, and D), fresh deepwater habitat (Lake Bellevue), riparian (West Tributary of Kelsey Creek), and instream (West Tributary of Kelsey Creek).

Pileated woodpeckers (a state candidate species) likely use Wetland A for foraging and may also use snags observed in Wetlands C and D. Given the presence of aquatic habitat in Wetland D, the Western toad, a state candidate species, and the Pacific pond turtle, listed by the state as endangered, could be present. However, the project area does not contain sufficient upland/terrestrial habitat to sustain a Western toad population, and any Pacific pond turtles found would be an isolated population.

Waterfowl that may use Lake Bellevue include Western grebe (a state candidate species), other grebes, cormorants, dabbling ducks, diving ducks, geese, and wading birds. The Great blue heron also may be found foraging in Sturtevant Creek, Lake Bellevue, and the West Tributary of Kelsey Creek.

The project would fill approximately 10 linear feet of the stream channel of the West Tributary of Kelsey Creek and daylight approximately 150 linear feet of new stream channel. The existing non-fish-passable culvert at the 120th Avenue NE crossing would be replaced with a fish-passable culvert that would be large enough to allow for some wildlife passage. In areas not adjacent to the culvert, the widening of 120th Avenue NE would make it more difficult for

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wildlife to cross safely. Approximately 8,260 square feet of pileated woodpecker habitat in Wetland A would be cleared. The project would result in permanent removal of vegetation in the project corridor, including wetland fill, wetland buffer clearing/filling, and upland forest clearing.

Potential indirect effects include more contaminants and sediment entering roadway stormwater runoff as a result of increases in vehicle usage. No cumulative effects have been identified as a result of project construction and operation.

Mitigation measures include avoiding and minimizing clearing, grading, and filling of project corridor wetlands, streams, and forested areas during preliminary engineering design; protecting these habitats during construction; and mitigating unavoidable impacts to the areas after construction is complete.

1.0 Introduction

1.1 Purpose of This Report

This *Fisheries, Wildlife, and Vegetation Technical Report* is being prepared as part of the NE 4th Street/120th Avenue NE Corridor Project for the City of Bellevue (City). The project proposes to extend NE 4th Street east from its current terminus at 116th Avenue NE to a new intersection with 120th Avenue NE, and widen and realign 120th Avenue NE north from the new intersection with NE 4th Street northward to Northup Way. The project is located in Section 28, Township 28 North, Range 5 East, Willamette Meridian.

The purpose of this report is to describe the potential effects of the project on fish, wildlife, and vegetation. This report discusses existing conditions, the proposed project, potential effects of the project, and measures taken to minimize those effects.

1.2 Permits Needed

Several federal, state, and local permits and approvals are required for projects involving work in or near aquatic resources, protected wildlife habitat areas, and protected vegetation communities. Table 1-1 summarizes common permits that likely would be required for this project, but this is not an exhaustive list.

Table 1-1. Permits Needed

Permit/Approval	Lead Agency	Trigger
National Environmental Policy Act	Lead Federal Agency	Federal nexus (federal land, federal funding, federal permit)
Clean Water Act Section 404	U.S. Army Corps of Engineers (Corps)	Dredge or fill of waters of the U.S., including jurisdictional wetlands, streams, and lakes
Hydraulic Project Approval	Washington State Department of Fish and Wildlife	Work in or over streams
Clean Water Act Section 401	Washington State Department of Ecology (Ecology)	Impacts to waters of the U.S., including jurisdictional wetlands, streams, and lakes
National Pollutant Discharge Elimination System (NPDES) Permit	Washington State Department of Ecology	Ground disturbance of 1 acre or more
State Environmental Policy Act	Local City	Proposed government action defined in the State Environmental Policy Act rules that is not categorically exempt (Washington Administrative Code 197-11-704 and 197-11-800 through 890)
Critical Areas Review	Local City or County	Work in or near critical areas, including streams, lakes, wetlands, protected wildlife and wildlife habitat, and steep slopes (some jurisdictions include additional critical areas)
Clearing and Grading Permit	Local City	Clearing and grading activities over a certain size threshold and/or in a critical area (varies by jurisdiction)

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2.0 Proposed Project

2.1 Project Overview

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined roadway corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of the Downtown Bellevue center. Major regional transportation connections and facilities in the project vicinity include Interstate 405 (I-405) to the west and State Route 520 (SR 520) to the north.

The project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include—the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road. Figure 2-1 shows the project study area.

The NE 4th Street/120th Avenue NE Corridor Project is one of a number of high priority transportation investments that make up the City of Bellevue's Mobility and Infrastructure Initiative. This initiative was formed to address unprecedented growth in Downtown Bellevue and to support planned growth in the Bel-Red, Spring District, and Wilburton areas.

Other key projects included in the initiative that would complement the proposed project include the following:

- NE 5th Street neighborhood project improvements
- NE 6th Street Extension from 112th Avenue NE to 120th Avenue NE
- NE 15th Street multi-modal corridor improvements north of NE 12th Street (also supporting Sound Transit's East Link Project)
- 124th Avenue NE improvements from NE 8th Street to Northup Way.

For each of these projects, new travel lanes, non-motorized facilities, signal enhancements, illumination, and various structure and utility relocations would be included.

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Figure 2-1. Project Study Area

2.2 Project Purpose and Need

The purpose of the proposed project is to achieve the following:

- Support and accommodate the City's adopted future land use changes and resulting travel demands.
- Improve local traffic circulation.
- Bring corridor features into compliance with current and proposed design standards and guidelines.
- Prepare the project corridor to support connections to planned transit facilities, specifically Sound Transit's East Link Project light rail alignment.

Collectively, the proposed project elements (see Figure 2-2) would enhance area-wide mobility by adding capacity to support the expected growth in travel demand, constructing critical missing links in the City's traffic distribution network, and easing congestion in other travel corridors. Moreover, the project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to transit facilities identified in City plans.

It would improve access for other modes to local recreational facilities, businesses, and the planned Link light rail stations at NE 8th Street and 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE.

In summary, the proposed project would meet the following objectives:

- To provide acceptable level of service at existing and planned study area intersections to meet anticipated long-term travel demands.
- To improve access and connectivity with the regional and local. transportation networks.
- To enhance long-term traffic operations over time by incorporating design standards that serve a variety of transportation modes, including the needs of large trucks and freight vehicles, as well as buses.
- To improve quality of life by improving mobility and transportation choice, particularly for transit, bicycle, and pedestrian traffic.

As shown in preliminary traffic analysis work for the NE 4th Street extension and the widening and realignment of 120th Avenue NE, the project elements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas as well as the region in terms of travel mobility and access to neighborhoods and businesses. This is primarily the result of new and enhanced connections across the Burlington Northern Santa Fe (BNSF) corridor and NE 8th Street, respectively. The proposed project also provides expanded arterial street capacity and driveway consolidation along 120th Avenue NE. The project termini are logical because they bracket the extent of the expected future development in the Wilburton/

NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail transit facilities.

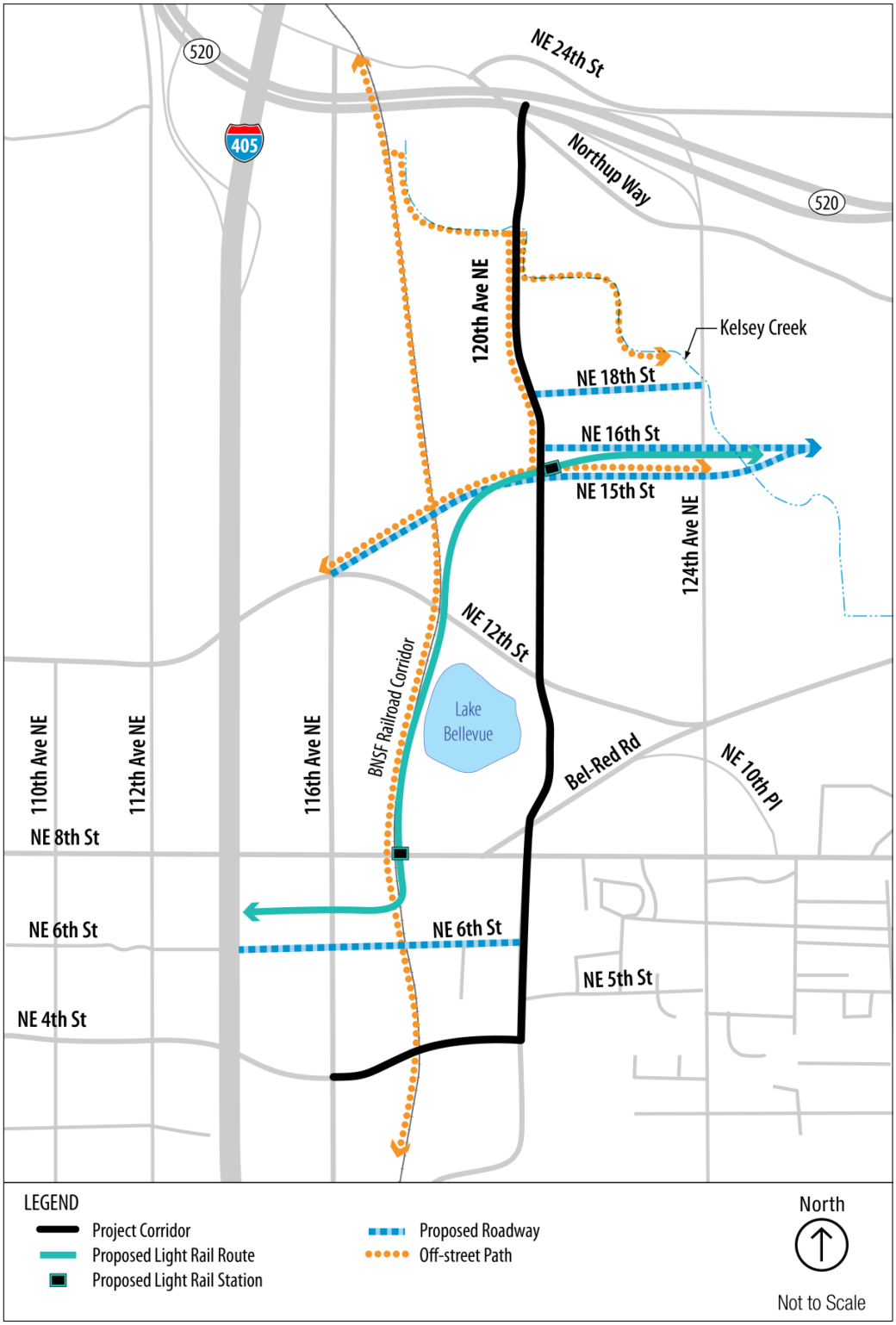

Figure 2-2. Planned Transportation Connections in the Study Area

2.3 Corridor Improvements

2.3.1 Programmed Corridor Improvements

This corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. These projects are described below.

- **NE 4th Street Extension (116th to 120th Avenue NE)**—Construct a new four to five lane roadway with arterial standard curb, gutter, sidewalk (including planting strips) and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension will be designed to accommodate future development and uses of the BNSF corridor.
- **120th Avenue NE Corridor—NE 4th Street to Northup Way**
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected segments; install continuous sidewalks to arterial standards; realign the roadway between Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project will be constructed in phases. Federal funding awarded to improvements, including bike lanes, planned between NE 4th and NE 8th Streets.

This revised description was submitted to Puget Sound Regional Council [PSRC] April 8, 2011 for the June 2011 Amendment to the Statewide Transportation Improvement Program (STIP).

2.3.2 Proposed Corridor Improvements

Specific design elements include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.

- Construct improvements that support the planned new intersections at NE 15th/16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.
- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

The five-lane roadway design is proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE north to NE 15th Street. This proposed roadway cross-section is shown in Figure 2-3. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. Generally, a 5-foot-wide bike lane would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. However, the size and location of the sidewalks, bicycle facilities, and planter strips vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

As mentioned earlier, this analysis addresses the potential impacts of two minor alignment options for the extension of NE 4th Street east of the BNSF corridor. The alignment for Option 1 is farther north than that of Option 2. The Option 1 alignment would require acquisition of a portion of the southern side of the Best Buy building and displace access to the loading dock located on the west side of the building. Negotiations with the property owner are ongoing and may include construction of a building addition on the north side of the existing structure and/or realignment of the loading dock access to the north of the building. Option 2, roughly 55 feet south of the Option 1 alignment, would not require acquisition of any portion of nearby buildings, but would displace a substantial amount of parking on the Home Depot property as well as displace the Best Buy building's access to the loading dock area. Again, negotiations are ongoing with the property owners and mitigation may include construction of a new loading

dock access for the Best Buy property on the north side of the existing structure and/or a new parking garage on the Home Depot property. Note, the design for improvements along 120th Avenue NE south of NE 8th Street do not assume either option has been selected, but rather improvements are based on existing curb cuts for the driveway access to parking for the Best Buy and Home Depot properties.

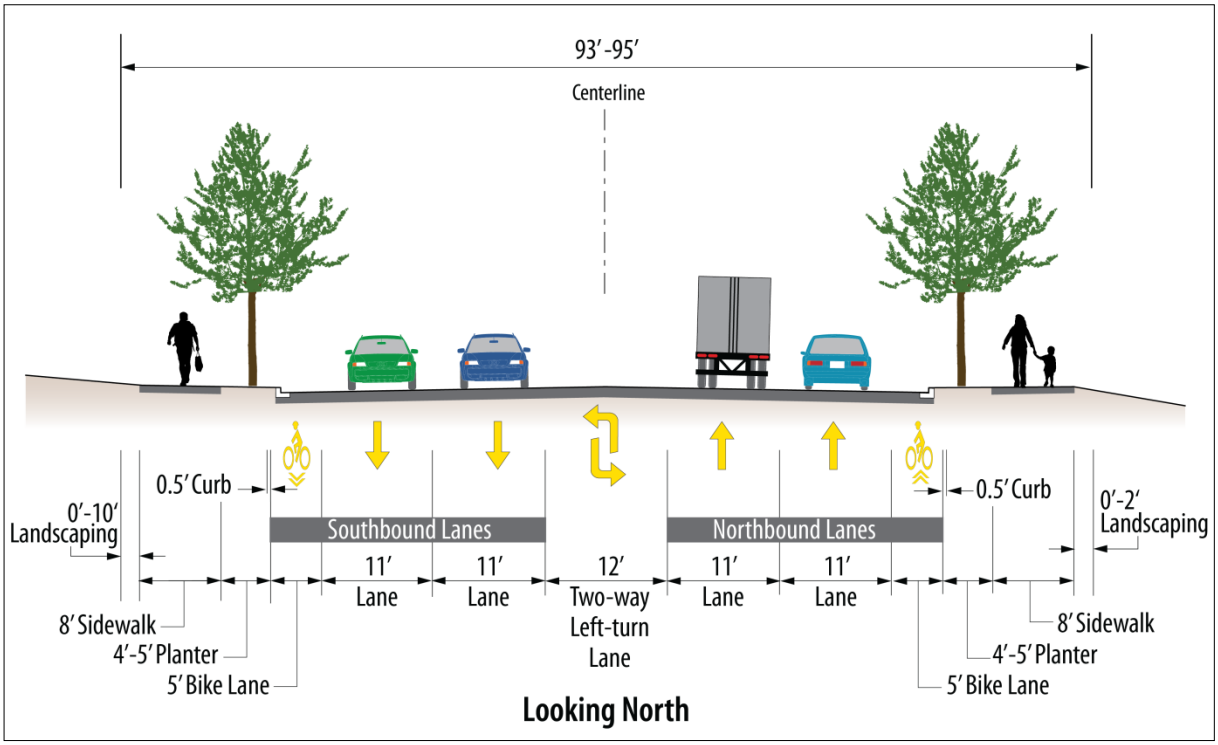

Figure 2-3. Typical Section—Five-lane Roadway Design

A four-lane roadway section is proposed for 120th Avenue NE from NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets. At the intersection at Northup Way, the cross-section would again be five lanes to allow for adequate turning movement capacity. This proposed four-lane cross-section is show in Figure 2-4. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes—two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed for each side of a two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

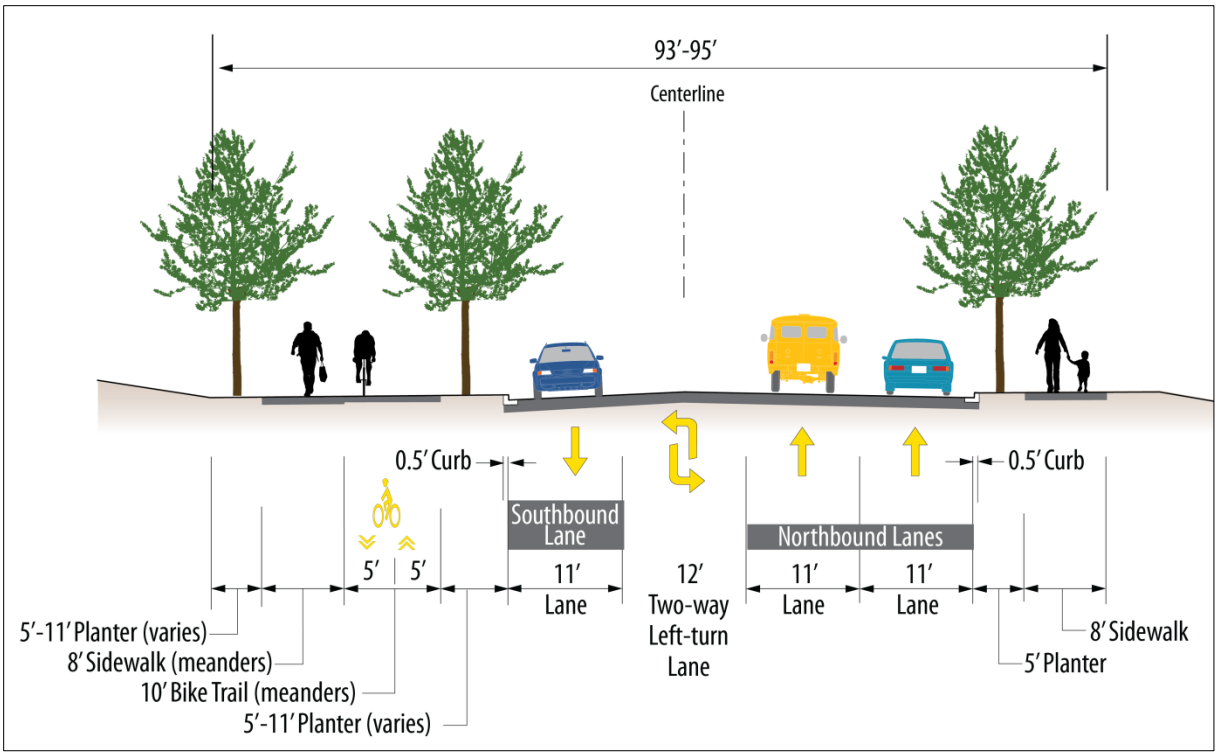

Figure 2-4. Typical Section—Four-lane Roadway Design

Both of the proposed roadway cross-sections also include the use of retaining walls, which would further increase the width of the required right-of-way beyond 95 feet. Retaining walls are proposed at numerous locations along the corridor and they would be located on both sides of the roadway. They would be used for both cut walls and fill walls. When retaining walls are required, these structures would generally be located immediately adjacent to the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet in width. To the outside of the retaining walls, the soil would be graded to a 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 121 feet or more where retaining walls are needed on both sides of the roadway.

Note, the term “right-of-way,” as used in this report, includes both right-of-way owned by the City and permanent easements (i.e., the complete footprint of the project).

2.4 Project Construction

2.4.1 Construction Duration and Phasing

Project construction would be phased and is expected to be completed from late 2011 to at least 2016 to match the programming of local, state, and federal funding sources. Each phase would last approximately 12 to 15 months. The planned phases, which may be further sub-divided into construction stages, are:

- Phase 1—120th Avenue NE widening between approximately the NE 300 block north to NE 7th Street.
- Phase 2—120th Avenue NE new construction between NE 8th Street and Bel-Red Road, and realignment and widening between approximately Bel-Red Road north to NE 12th Street.
- Phase 3—NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4—120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5—120th Avenue NE widening between NE 16th Street north to Northup Way.

Based on the Wilburton/NE 8th Street and Bel-Red Subarea Plans, it is essential that all phases of the NE 4th Street/120th Avenue NE Corridor Project be implemented in order to meet the purpose and need of the project. The City has committed to constructing all phases of the project, with cross sections appropriate to meet the multi-modal demand anticipated in the next 20 years. In addition, construction of the project phases could occur sequentially or some phases could overlap.

2.4.2 Construction Approach

The approach to project construction along the corridor differs. The following paragraphs describe the varying approaches to construction.

The improvements for NE 4th Street consist of constructing a new roadway, and would not involve working within an existing operable roadway. Construction for this phase would include clearing the full roadway right-of-way; grading; installing utilities and the roadway gravel base; constructing the curb, gutter and sidewalks; paving the roadway; and installing illumination/signals and landscaping. The construction activities would not disrupt existing traffic patterns along NE 4th Street, 116th Avenue NE, or 120th Avenue NE. However, the construction zone for NE 4th Street may extend somewhat into the existing roadways (116th and 120th Avenues NE) in order to connect new and existing pavements and existing and planned utilities at these locations.

Generally, the construction along 120th Avenue NE from the NE 300 block to NE 7th Street would widen the existing roadway on both sides of the existing centerline. Construction in this area would occur along an operational roadway.

The improvements in this area would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

Construction of the realignment and widening of 120th Avenue NE between the intersection at NE 8th Street and about NE 12th Street would occur along an operational roadway. Thus, the construction in this area is anticipated to occur in the following manner:

- Contractor mobilization
- Install traffic control and temporary erosion control measures
- Relocate and/or install utilities
- Roadway Side 1—retaining walls, grading, paving, signals, and illumination
- Roadway Side 2—retaining walls, grading, paving, signals, and illumination
- Construction zone landscaping, restoration, and clean up.

The corridor could not be closed during construction though both directions of travel may be constrained to perhaps only a single lane. Use of Bel-Red Road between NE 8th Street and 120th Avenue NE, however, would be closed at the start of roadway construction between Bel-Red Road and NE 8th Street. With this road closure, construction could occur unhampered for the new roadway. Parcels along this portion of the alignment would be fully acquired and construction activities would not affect adjacent businesses. Traffic on Bel-Red Road east of 120th Avenue NE would continue to be able to travel north on 120th Avenue NE during construction. To the north of Bel-Red Road, the roadway alignment is generally shifted eastward. Construction work would likely start on the eastern half of the expanded right-of-way. When completed, traffic would be shifted to the new roadway, while the western portion of the roadway is constructed. All construction sequencing would be planned to minimize impacts to traffic and adjacent businesses.

Lastly, construction along the remaining northern portion of 120th Avenue NE from NE 12th to just south of Northup Way would also widen the existing roadway on both sides of the existing centerline. The improvements along 120th Avenue NE would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

2.5 Project Funding

The total cost of the proposed project improvements based on the final City Council Direction for the 2011-2017 General Capital Improvement Plan would be between an estimated $67.3 and $67.6 million, depending on the selected option for extending NE 4th Street. Construction would cost approximately $32 million and right-of-way acquisition would cost roughly $35 million.

Funding for the overall project would likely include monies from the following sources:

- Federal grants
- State Transportation Improvement Board funding
- State Local Revitalization Financing funding
- Local contributions from transportation-dedicated sources, long-term general obligation bonds, impact fees, and other private participation programs including possible local improvement districts.

The specific mix of federal, state, and local funding contributions for each construction phase could differ.

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3.0 Methods

The following methods were used in the effects analysis presented in this report. Where methods varied from Washington State Department of Transportation standards and/or guidance, the reasons for such variation are provided.

3.1 Project Effect Area

The project effect area encompasses all areas potentially affected directly or indirectly by the project. This includes the existing roadway and all areas surrounding the existing and proposed roadways where construction activities could affect the environment, either directly, indirectly, or through interrelated or interdependent actions. Project elements that were considered included the following:

- Removal of existing pavement
- Extension, realignment, and expansion of roadways
- Construction of sidewalks and planters
- Removal and replanting of vegetation
- Construction of new stormwater conveyances
- Connecting to, extending, or replacing existing culverts within the study area
- Potential wetland mitigation site

The project is located in Sections 28 and 33, Township 25 North, Range 5 East, Willamette Meridian, and within the Cedar-Sammamish Watershed (Water Resource Inventory Area 8). Figure 3-1 shows the project effect area.

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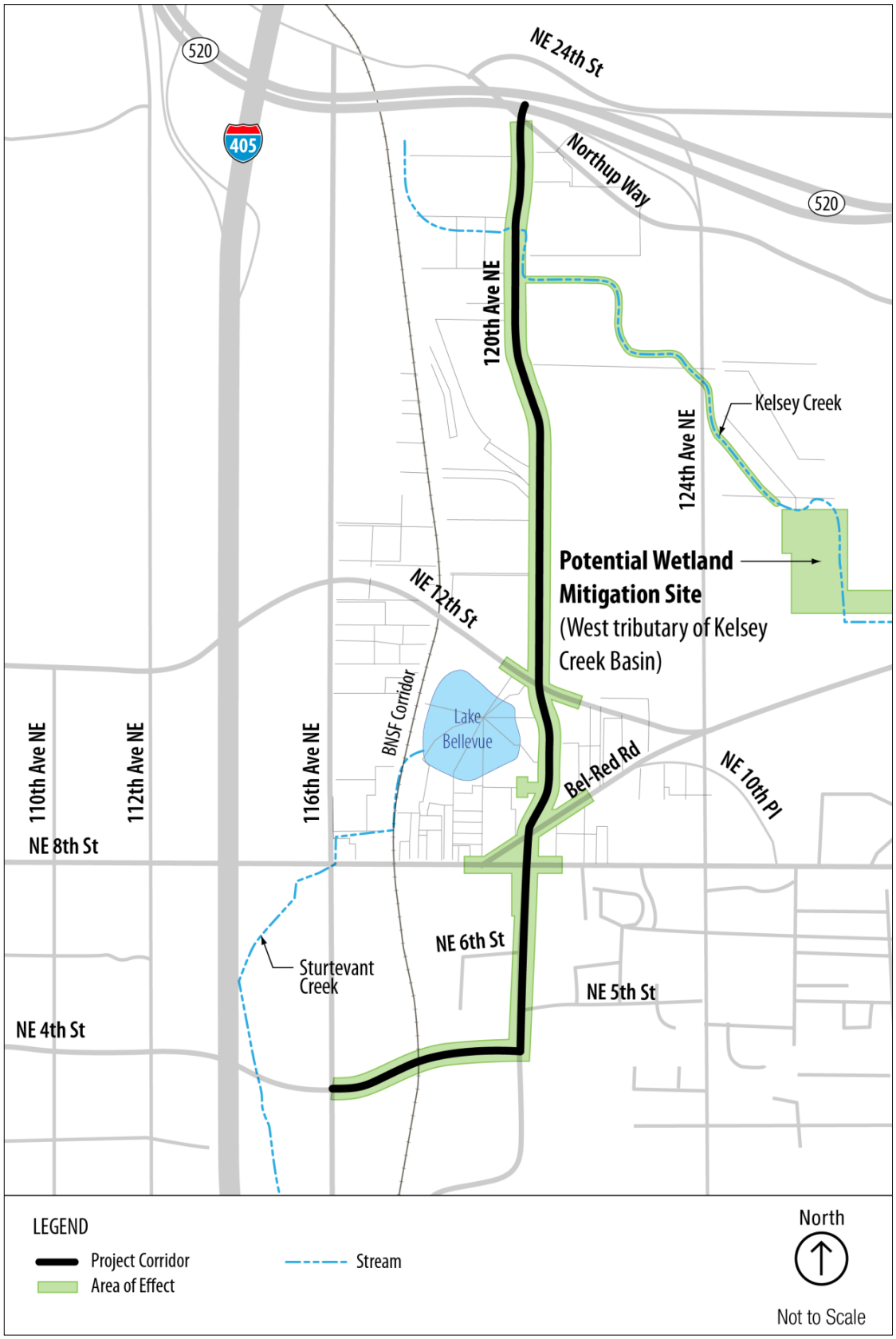

Figure 3-1. Project Effect Area

3.2 Review of Existing Information

Existing information regarding corridor fisheries, wildlife, and vegetation was collected by reviewing the following available resources:

- Priority Habitat and Species database (WDFW 2010a)
- King County iMAP on-line interactive geographic information system (GIS) data (King County, 2010)
- SalmonScape interactive, computer mapping system (WDFW 2010b)
- Salmon and Steelhead Habitat Limiting Factors Report for the Cedar-Sammamish Basin (Water Resource Inventory Area 8)(Kerwin 2001)
- City of Bellevue Drainage Basin Maps, West Tributary Basin and Sturtevant Creek Basin (City of Bellevue 2002a and 2002b)
- Washington Department of Natural Resources Natural Heritage Program (WNHP) GIS data (WNHP 2010)
- National Wetland Inventory maps (U.S. Fish and Wildlife Service [USFWS], 2010)
- Shannon & Wilson (S&W) Biological Assessment (S&W 2010a)
- S&W Wetland and Stream Delineation Report (S&W 2010b)

3.3 Site Survey

On December 7, 2009, July 28, 2010, and March 8, 2011, S&W biologists surveyed and characterized the fisheries, wildlife, and vegetation habitat in the study area. Stream substrate and fish habitat, vegetation communities, wildlife habitat types, and direct wildlife observations were documented throughout the project corridor.

Wetlands were delineated using the routine methodology described in Ecology's *Washington State Wetland Identification and Delineation Manual* (Ecology 1997), the Corps 1987 *Wetland Delineation Manual* (Corps 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Corps 2010).

The ordinary high water mark of the West Tributary of Kelsey Creek was delineated following the guidance provided within *Determining the Ordinary High Water Mark on Streams in Washington State* (Olson 2010) and *Ordinary High Water Mark (OHWM) Identification* (Corps 2005).

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4.0 Existing Conditions

Because the project is located in an urban environment, most study area surfaces are covered by impervious buildings, asphalt, and concrete.

Sturtevant Creek generally runs north-south, exiting from the southwest portion of Lake Bellevue and crossing NE 4th Street at roughly its intersection with I-405 more than 500 feet west of the project corridor. A small wetland on the southeast corner of NE 4th Street and I-405 is associated with Sturtevant Creek, approximately 400 feet west of the project corridor.

Lake Bellevue's eastern shoreline is approximately 100 feet west of 120th Avenue NE. Because the lake is surrounded by urban development, vegetation is limited to small sections of cattails and willows along the lake's fringe.

Four wetlands, identified as Wetlands A, B, C, and D, were delineated along 120th Avenue NE in the project corridor (Figure 4-1).

The West Tributary of Kelsey Creek begins at Wetland D in the northern portion of the project corridor and flows east beneath 120th Avenue NE in a 36-inch culvert into Wetland C.

The topography in the area of the proposed NE 4th Street extension rises approximately 55 feet in elevation between 116th Avenue NE on the west and the elevation of the existing BNSF railway corridor. This change in elevation is concentrated in a narrow band immediately west of the railroad corridor. Based on the City's critical areas map, this area exceeds a 40 percent slope. To accommodate the steep slope, the horizontal alignment of the proposed extension would curve up the hillside with a 10 to 15 percent slope. The roadway design would require the construction of substantial retaining walls on both sides of the roadway. For the remainder of the proposed extension of NE 4th Street, the topography is relatively flat. Within the project corridor along 120th Avenue NE, the area is relatively flat but exhibits a regional topography that slopes to the southwest. Multiple retaining walls would be required along the eastern side of 120th Avenue NE.

Seven soil types are located along the project corridor. For the proposed extension of NE 4th Street, the project would encounter three soil types—Norma sandy loam, Alderwood gravelly sandy loam, and urban land. Along 120th Avenue NE, the alignment from roughly the NE 300 block to roughly NE 6th Street would encounter Alderwood gravelly sandy loam, entering Bellingham silt loam to roughly NE 8th Street. From that location, the project would encounter urban land again, with a small area of Tukwila muck that occurs at NE 12th Street associated with Lake Bellevue. In the vicinity of the West Tributary of Kelsey Creek, the project would cross urban land soils again and then Seattle muck. The northernmost portion of the project corridor would encounter Everett gravelly sandy loam (U.S. Department of Agriculture [USDA] 2010).

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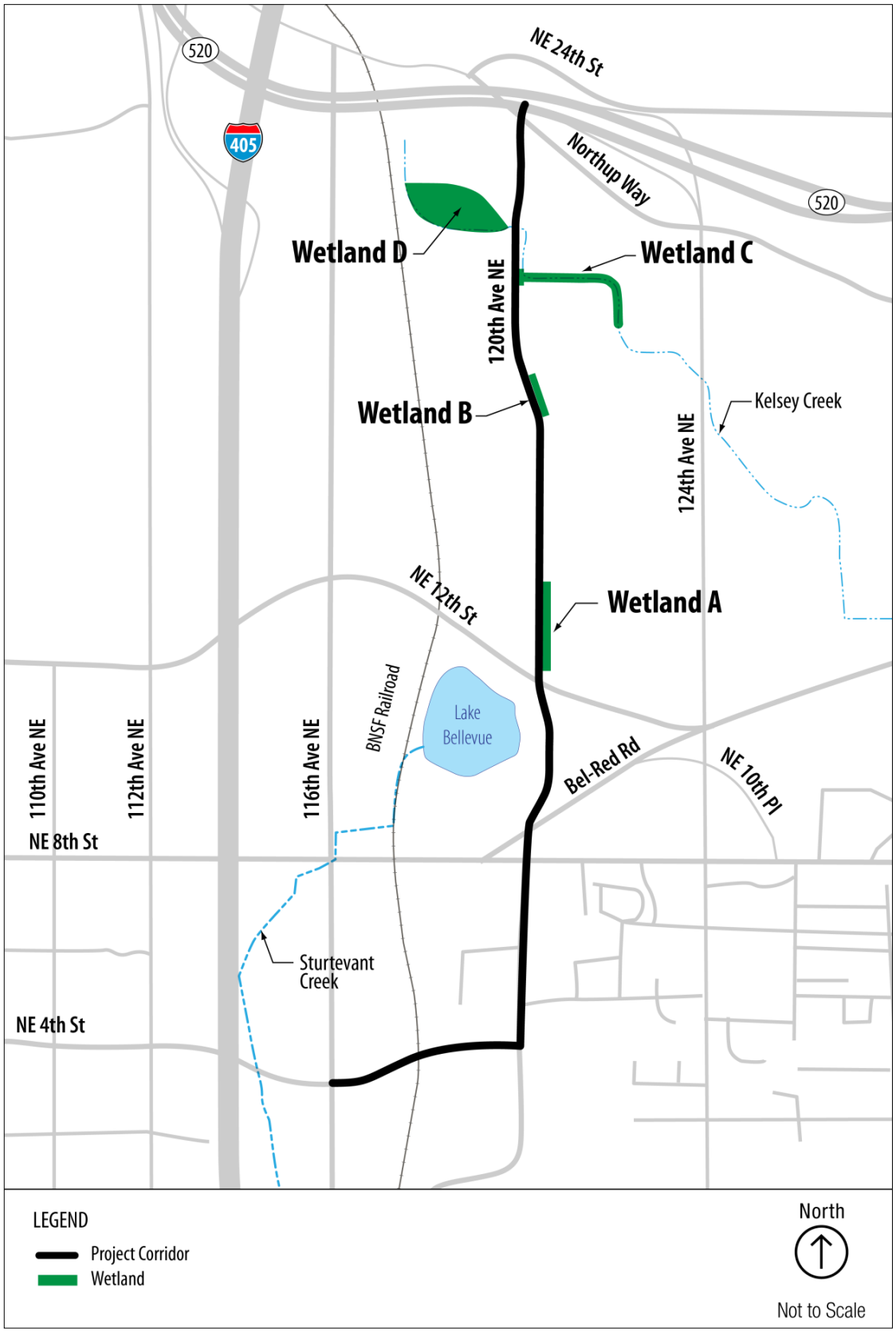

Figure 4-1. Habitat Map

4.1 Fisheries Resources in the Project Corridor

4.1.1 Sturtevant Creek

Sturtevant Creek begins at Lake Bellevue and extends generally south. It crosses NE 4th Street roughly 500 feet west of the project corridor. At its discharge location from Lake Bellevue, the channel of Sturtevant Creek reportedly contains little water and is muddy with a thick organic soil layer. Although coho salmon were historically known to be present in the Sturtevant Creek system in the 1970s, the City's current records indicate that it is unlikely that they still use any areas upstream of I-405 (City of Bellevue 2002b).

4.1.2 Lake Bellevue

Lake Bellevue is a small urban lake that, as stated above, is the headwaters to Sturtevant Creek. Because the lake is surrounded by urban development, vegetation is limited to small sections of cattails and willows along the lake's fringe. Coho were historically known to be present in the Sturtevant Creek system and presumably would have been in Lake Bellevue as well, but the City's current records conclude that it is unlikely that coho salmon are still present. Documented fish use in the lake is limited to a non-native goldfish population.

4.1.3 West Tributary of Kelsey Creek

The West Tributary of Kelsey Creek originates in Wetland D. The tributary crosses beneath 120th Avenue NE through a 36-inch corrugated metal pipe (CMP)/concrete culvert. The culvert crosses perpendicular to 120th Avenue NE and connects with another culvert from the north. The creek within the combined culverts then flows through a CMP to the south for approximately 250 feet and discharges into Wetland C.

West of 120th Avenue NE, the stream gradually flows in a 5-foot-wide active channel. In this location, the creek bed is comprised of 6 inches of silt. The stream then enters a 36-inch CMP culvert under 120th Avenue NE. The stream daylights east of 120th Avenue NE and runs into a channel within Wetland C. The active channel in Wetland C is approximately 4 feet wide with a bed comprised of sand and well-rounded gravels. As the stream exits the 36-inch CMP under 120th Avenue NE, the ordinary high water mark for the stream fans out above the banks of the active channel and encompasses much of Wetland C.

As the stream exits the project corridor to the east it flows through a riparian corridor highly confined and fragmented by developed warehouse and commercial properties on each side for approximately 0.6 river mile. Despite the confined riparian corridor, aerial photographs suggest this reach is densely vegetated by emergent and scrub-shrub species with trees scattered throughout. Habitat features, such as downed large woody debris, are present.

Downstream of this upper reach, the stream enters a culvert where it is conveyed below ground for approximately 1,100 feet south of Bel-Red Road. Downstream of its crossing under Bel-Red Road, the West Tributary of Kelsey Creek joins Goff

Creek, which is tributary to Kelsey Creek. Goff Creek eventually connects to Kelsey Creek, which drains through Mercer Slough and into Lake Washington.

No fish use has been documented in the Kelsey Creek tributary between its headwaters at Wetland D and the Bel-Red Road culvert. Electro-fishing conducted by the City in the West Tributary of Kelsey Creek in 2001 yielded no fish on either side of 120th Avenue NE (City 2002a). A limiting factors report, prepared by the Washington Conservation Commission in 2001, also indicates that the Bel-Red Road culvert is impassible.

The West Tributary of Kelsey Creek is not listed on the Washington State Department of Transportation fish passage barrier list or located within a recognized tribal fishing area.

4.1.4 Priority Fish Species

No federally or state-listed aquatic species, or other species of concern, are documented for the West Tributary of Kelsey Creek within the project effect area. Sockeye, chinook, and coho salmon and cutthroat trout are documented approximately 0.6 mile downstream in the portion of the West Tributary of Kelsey Creek south of Bel-Red Road. Puget Sound chinook are listed as threatened under the Endangered Species Act.

Appendix A summarizes the federally and state-listed species, proposed species, candidate species, and species of concern that are known to be present in King County. These data are based on county-specific lists prepared by WDFW, USFWS, and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS). A discussion of the likelihood of species occurrence in the project corridor is included for each fish species.

4.2 Wildlife in the Project Corridor

Wildlife habitat types in the study area are limited to the deciduous forest associated with Wetlands A and B and a small upland area, in-stream habitat associated with the West Tributary of Kelsey Creek, and ornamental landscaped areas (including lawns and ornamental trees and shrubs). Lake Bellevue offers an open water habitat in the vicinity of the project corridor, and Sturtevant Creek is outside of the study area. Wildlife observed during fieldwork included direct observation of passerine birds and evidence of woodpecker use (holes in snag) along 120th Avenue NE.

Wetland D and Lake Bellevue are mapped by WDFW as priority habitats. Specifically, they are designated as wetlands associated with smaller tributary streams in urbanized areas that discharge to Lake Washington. Although not mapped by WDFW, Wetland C also meets these criteria. Other WDFW priority habitats in the project corridor are as follows:

- Freshwater wetlands (Wetlands A, B, C, and D)
- Fresh deepwater habitat (Lake Bellevue)

- Riparian (West Tributary of Kelsey Creek)
- Instream (West Tributary of Kelsey Creek)

Appendix A summarizes the WDFW designated and proposed critical habitat known to be present in King County.

Evidence of pileated woodpecker foraging was observed in one snag in Wetland A. Pileated woodpeckers are a state candidate species and a City species of local importance. Based on the presence of snags in Wetlands C and D, these areas are also likely used by pileated woodpeckers. Based on site observations and discussions with Michael Paine at the City of Bellevue, these wetlands are likely regulated under the Bellevue City Code as habitat associated with species of local importance.

Given the presence of aquatic habitat in Wetland D, the Western toad, a state candidate species, and the Pacific pond turtle, listed by the state as endangered, could be present. However, the project area does not contain sufficient upland/ terrestrial habitat to sustain a Western toad population, and any Pacific pond turtles found would be an isolated population.

Waterfowl that may use Lake Bellevue include Western grebe (a state candidate species), other grebes, cormorants, dabbling ducks, diving ducks, geese, and wading birds. The Great blue heron also may be found foraging in Sturtevant Creek, Lake Bellevue, and the West Tributary of Kelsey Creek.

Based on the urban nature of this area, it is unlikely that any other listed species occur in the project corridor. Appendix A summarizes the federally and state-listed wildlife species, proposed species, candidate species, and species of concern that are known to be present in King County. These data are based on county-specific lists prepared by WDFW, USFWS, and NMFS. A discussion of the likelihood of species occurrence in the study area is included for each species.

4.3 Vegetation in the Project Corridor

4.3.1 Vegetation Communities

The study area's native vegetation is limited to four palustrine wetlands, forested uplands, and native trees planted as part of landscaping amenities.

Along NE 4th Street, there is little natural vegetation in the project corridor except along the inactive railroad corridor. Between 116th Avenue NE and the railroad corridor the land has been developed as automobile dealerships and is covered with impervious surfaces. From the railroad corridor west to 120th Avenue NE, the area is dominated by two large retail stores and parking lots. Areas that are vegetated include ornamental landscaped areas, the slope on the west side of the railroad corridor, and a ditch to the east of it. The slope is dominated by Himalayan blackberry (*Rubus armeniacus*, FACU) with some red alder saplings (*Alnus rubra*, FAC).

Along 120th Avenue NE, vegetation consists of lawns and non-native ornamental trees and shrubs. Non-native ornamental trees consist predominantly of oaks (*Quercus* sp.) and pines (*Pinus* sp.) with a few maples (*Acer* spp.) and cherry trees (*Prunus* sp.). Non-native ornamental shrubs include English laurel (*Prunus laurocerasus*), photinia (*Photinia* sp.), *sarcococca* (Sarcococca sp.), cotoneaster (*Cotoneaster horizontalis*), yew (*Taxus* sp.), privet (*Ligustrum* sp.), arborvitae (*Thuja* sp.), dogwood (*Cornus* sp.), heavenly bamboo (*Nandina domestica*), boxwood (*Buxus* sp.), and rhododendron (*Rhododendron* sp.). Groundcover vegetation consisted of kinnikinnick (*Arctostaphylos uva-ursi*), currant (*Ribes* sp.), and lawn grasses. Invasive weeds were also present and consisted of Himalayan blackberry (*Rubus armeniacus*) and English ivy (*Hedera helix*).

Wetlands

One data plot was recorded in the ditch on the eastern side of the railroad corridor along the proposed extension of NE 4th Street to determine whether it met the three parameters for wetlands. In general, the ditch was dominated by black cottonwood (*Populus balsamifera*, FAC), red elderberry (*Sambucus racemosa*, FACU), and Himalayan blackberry (*Rubus armeniacus*, FACU). The soil was moist during the site visit and consisted of 12 inches of very dark grayish brown (10 YR 3/2) sandy loam underlain by olive (5Y 4/3) silt loam with one percent redoximorphic concentrations. Based on the local topography, water likely ponds in this area for short durations; however, it does meet the vegetation or soil parameters for wetlands.

The four wetlands identified along 120th Avenue NE are discussed below.

Wetland A

Wetland A is approximately 8,260 square feet in size and is located entirely within the project corridor. Based on the Cowardin classification system (Cowardin 1979), Wetland A is palustrine emergent, scrub-shrub (PEM/SS) wetland, and its hydrogeomorphic classification (Brinson 1993) is "depressional outflow."

Dominant vegetation within Wetland A includes Pacific willow (*Salix lasiandra,* FACW) and Douglas spirea (*Spirea douglasii*), with an emergent strata of bentgrass (*Agrostis* sp).

Wetland B

Wetland B is located along an open roadside ditch east of 120th Avenue NE and is entirely within the project corridor. Wetland B is approximately 4,420 square feet in size. Wetland B's Cowardin classification is PEM/SS, and its hydrogeomorphic classification is "depressional outflow."

Dominant vegetation within Wetland B includes a scrub-shrub layer of sitka willow (*Salix sitchensis*) and Douglas spirea (*Spiraea douglasii*) with an emergent strata dominated by reed canarygrass (*Phalaris arundinacea*), small-fruited bulrush (*Scirpus microcarpus*), and soft rush (*Juncus effusus*).

Wetland C

Wetland C is part of a larger wetland system associated with the West Tributary of Kelsey Creek that extends off site to the east. This wetland is approximately 2 acres in size. Wetland C's Cowardin classification is PEM/SS, and its hydrogeomorphic classification is "riverine."

Dominant vegetation within the portion of Wetland C that is located in the project corridor includes a scrub-shrub layer of Pacific willow (*Salix lasiandra*) and Douglas spirea (*Spiraea douglasii*) above an emergent strata dominated by reed canarygrass (*Phalaris arundinacea*).

Wetland D

Wetland D is the headwaters of the West Tributary of Kelsey Creek. The wetland is 4.9 acres in size. Based on the Cowardin classification system, Wetland D is a palustrine aquatic bed, emergent, scrub-shrub, forested wetland. Wetland D's hydrogeomorphic classification is "depressional outflow."

Dominant vegetation within that portion of Wetland D located in the project corridor includes a forested canopy of Pacific willow (*Salix lasiandra*) and black cottonwood (*Populus trichocarpa*) with a scrub-shrub layer of Pacific willow (*Salix lasiandra,* FACW), black cottonwood (*Populus trichocarpa*), sitka willow (*Salix sitchensis*), and Douglas spirea (*Spiraea douglasii*) above an emergent strata dominated by small-fruited bulrush (*Scirpus microcarpus*), swordleaf rush (*Juncus ensifolius*), common cattail (*Typha latifolia*), hardstem bulrush (*Schoenoplectus acutus*), and soft rush (*Juncus effusus*).

Forested Uplands

Forested uplands in the project corridor are limited to the following areas:

- An isolated patch of black cottonwoods on the west side of 120th Avenue NE between Wetlands A and B
- An isolated strip of Douglas fir and western red cedar running perpendicular to the roadway and north of Wetland B
- Mixed black cottonwood and conifers around Wetlands C and D

Six sequoias were observed along the east side of 120th Avenue NE, and ornamental pines, maples, sweetgum, and other landscaping trees were observed in planting strips along the corridor.

4.3.2 Plant Species of Concern

No federally or state-listed plant species, proposed species, candidate species, or species of concern are known to occur in the project corridor. Based on the urban nature of the area, it is unlikely that any of these species occur in the project corridor.

Appendix B summarizes the federally and state-listed plant species, proposed species, candidate species, and species of concern that are known to occur in King County. These data are based on the Washington State Department of Natural Resources Natural Heritage Program Rare Plant Database.

5.0 Environmental Effects

5.1 Fisheries, Wildlife, and Vegetation Policies and Regulations

Aquatic resources for fisheries, wildlife, and vegetation communities are protected under federal, state, and local policies and regulations.

5.1.1 Federal Policies and Regulations

- National Environmental Policy Act
- Clean Water Act—NPDES permit program (administered by the U.S. Environmental Protection Agency [EPA] for federal projects and projects on federal land)
- Clean Water Act—Section 404
- Clean Water Act—Section 401 (administered by EPA for projects on tribal lands)
- Endangered Species Act

5.1.2 State Policies and Regulations

- State Environmental Policy Act (administered by local agency)
- Clean Water Act—NPDES permit program (administered by Ecology for non-federal projects and projects not located on federal land)
- Clean Water Act—Section 401 (administered by Ecology for projects not occurring on tribal land)
- Hydraulic Code (Chapter 77.55 of the Revised Code of Washington)
- Shoreline Management Act (administered by local agency)

5.1.3 Local Policies and Regulations

- Critical Areas Ordinances
- Clearing and Grading Requirements
- Shoreline Master Programs

5.2 Direct Effects on Fisheries, Wildlife, and Vegetation

Wetland A, which contains pileated woodpecker foraging habitat, would be cleared and filled. Other wetland vegetation, upland forest, and landscaped areas also would be cleared and graded as part of this project. These habitats are adjacent to 120th Avenue NE, a busy arterial road. With the exception of the pileated woodpecker habitat in Wetland A, these habitats have limited value for wildlife. Habitat removal would occur as a narrow strip along the road edge.

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The project would fill approximately 10 linear feet of the existing stream channel of the West Tributary of Kelsey Creek and daylight approximately 150 linear feet of new stream channel. The existing non-fish-passable culvert at the 120th Avenue NE crossing would be replaced with a fish-passable culvert. This culvert would be approximately 8 to 10 feet wide and 4 to 6 feet tall to also allow for some wildlife crossing.

Potential staging areas have not been identified for the project. However, due to the presence of vacant paved lots in the southern portion of the project corridor and the multiple parking lots along 120th Avenue NE in the project corridor that could be used for staging, it is unlikely that fisheries, wildlife, or vegetation impacts would occur associated with staging areas.

5.2.1 Effects during Construction

Fisheries

Erosion and sediment control measures would be used during construction to control erosion and prevent transport of sediment to Sturtevant Creek, Lake Bellevue, the West Tributary of Kelsey Creek, and any other nearby water bodies.

During construction, stream flow would be diverted around the culvert at the West Tributary of Kelsey Creek to prevent water quality violations or erosion of the stream channel during culvert installation. Sediment-laden water would enter the West Tributary of Kelsey Creek when the stream flow is redirected into the new stream channel. This would be a temporary, short-term condition.

Wildlife

The project would affect wildlife by reducing the amount of habitat available within the project corridor and by creating noise above ambient levels during construction, which could disturb wildlife in the project corridor.

Approximately 8,260 square feet of pileated woodpecker habitat in Wetland A would be cleared. The City would likely require mitigation for woodpecker habitat impacts. No impacts to Wetland D, where the Western toad and Pacific pond turtle could be present, are expected.

If construction occurs when pileated woodpeckers and other birds are nesting, construction activities may lead to the loss of nests and potentially of eggs or nestlings. Similarly, eggs or young of wetland-breeding amphibians may be present in the project wetlands during the spring. The proposed wetland fill in Wetland C could have direct effects to these eggs and/or young amphibians if construction occurs in the spring.

Vegetation

No effects to federally or state-listed plant species, proposed species, candidate species, or species of concern are expected.

The project would result in the permanent removal of the following vegetation in the project corridor:

- 0.30 acre of wetland fill
- 0.84 acre of wetland buffer clearing/filling
- 0.06 acre (2,650 square feet) of upland forest clearing/filling

In 2006, the Corps, Ecology, and EPA developed a joint guidance document for compensatory mitigation in Washington State (Ecology 2006). These guidelines provide recommended replacement ratios and guidance for on-site and in-kind mitigation that Ecology and the Corps have adopted. The replacement ratios for the Corps/Ecology and City of Bellevue are summarized in Table 5-1.

Table 5-1. Required Replacement Ratios

		Wetland Replacement Ratios[1]					
		Bellevue	Corps/Ecology				
Wetland	Category	R/C	R/C	RH	R/C and RH	R/C and E	E
A	III	3:1	3:1	4:1	1:1 R/C + 2:1 RH	1:1 R/C + 4:1 E	8:1
B	III	3:1	3:1	4:1	1:1 R/C + 2:1 RH	1:1 R/C + 4:1 E	8:1
C	II	2:1	2:1	6:1	1:1 R/C + 4:1 RH	1:1 R/C + 8:1 E	12:1
D	II	2:1	2:1	6:1	1:1 R/C + 4:1 RH	1:1 R/C + 8:1 E	12:1

[1] Replacement ratios are for on-site and in-kind mitigation only. Replacement ratios reflect area of required mitigation to the area of wetland impact.
E = Wetland Enhancement
R/C = Wetland Re-establishment or Creation
RH = Wetland Rehabilitation

Mitigation for this project is currently in the conceptual phase. Based on conversations with City staff, the City would require mitigation to be performed in the subbasin where impacts occur. Therefore, mitigation for impacts to Wetland A would occur in the Lake Bellevue/Sturtevant Creek subbasin and impacts to Wetlands B and C would occur in the West Tributary of Kelsey Creek subbasin.

A potential wetland mitigation site within the Lake Bellevue/Sturtevant Creek subbasin has not yet been identified. One potential site in the West Tributary of Kelsey Creek subbasin has been identified—the City has purchased three parcels comprising approximately 7 acres near the intersection of NE 14th Street and 124th Avenue NE (see Figure 3-1). These parcels are considered an ideal location for wetland and stream mitigation in the West Tributary of Kelsey Creek subbasin because they include a piped portion of the West Tributary of Kelsey Creek that could be daylighted, with wetlands created along the stream channel.

Impacts to wetlands and buffers, and conceptual mitigation strategies, are described in detail in the *Wetland and Stream Delineation Technical Report* prepared for this project.

Although no mitigation is planned for the clearing of upland forest and landscaped areas, vegetated planters would be constructed on both sides of the extended NE 4th Street and widened 120th Avenue NE.

5.2.2 Effects during Operation

Fisheries

Stormwater runoff currently is not detained or treated. As part of this project, stormwater and water quality treatment facilities would be constructed to collect and retain sediments and pollutants from traffic operations. With the stormwater treatment measures being designed for this project corridor, there would be an approximate 10 percent decrease in total suspended solids and an increase in dissolved metals. Dissolved zinc and copper would increase by approximately 3.5 percent and 7.5 percent, respectively. Based on dilution modeling conducted for the project, background levels of dissolved metals would be reached within one to six feet of entering the project water bodies (Sturtevant Creek, Lake Bellevue, and the West Tributary of Kelsey Creek) and these discharge locations are several thousand feet upstream of any native fish habitat. Please see the *Biological Assessment and Essential Fish Habitat Assessment Report* and the *Water Quality Technical Report* prepared for the project for details.

Wildlife

The roadway design throughout the project corridor will typically be 93 to 95 feet wide. The extension of NE 4th Street is proposed for an area that is already highly developed and mostly paved, and it is not anticipated that this additional length of roadway in the area would adversely impact any wildlife.

Along 120th Avenue NE, the project proposes to widen the roadway. This would make it more difficult for wildlife to cross the roadway safely. However, the project design would include a wildlife-passable culvert at the crossing of the West Tributary to Kelsey Creek.

Vegetation

Vegetation maintenance along the corridor is not likely to change in any substantial way as a result of the project.

5.3 Indirect Effects on Fisheries, Wildlife, and Vegetation

Indirect effects are associated with a project and occur later in time or farther removed in distance; but they are still reasonably foreseeable.

The extension of NE 4th Street and the widening and realignment of 120th Avenue NE would likely generate more vehicle use of both roadways. Potential indirect effects include more contaminants and sediment entering stormwater from an increase in vehicle usage. However, the proposed enhanced runoff treatment includes capturing and treating stormwater from additional impervious surfaces. This likely would be accomplished via bioretention in roadway planters. Because the project corridor is highly urbanized and developed, the proposed project is not expected to substantially alter surface

water quality. The built-out level of development also suggests that long-term changes to non-point source water quality problems are unlikely.

5.4 Cumulative Effects on Fisheries, Wildlife, and Vegetation

Cumulative effects result from the incremental effects of the action when added to other past, present, and reasonably foreseeable actions, regardless of the agency or person initiating the other actions. At this time, reasonably foreseeable projects in the area include the following:

- Spring District—Wright Runstad & Company, in joint venture with Shorenstein Properties, LLC, has planned the development of the Spring District, a 36-acre mixed-use urban neighborhood within the Bel-Red Corridor. The Spring District will consist of up to 1,000 multi-family residences, more than 3 million square feet of office space, and several high-density buildings that will provide retail services. The proposed development will be located at the northeast corner of 120th Avenue NE and NE 12th Street.
- Sound Transit's East Link Project—This project will consist of an electric light rail train system that will connect areas between Seattle and the Overlake Transit Center in Redmond. It is anticipated that the system will have a station just east of the intersection of 120th Avenue NE and NE 15th/16th Street in the Spring District development. This project is expected to be completed between 2016 and 2021.
- Construction of the light rail will result in the acquisition of property at 1445 120th Avenue NE. Since not all of the property will be used for the light rail track, some portion of it will be redeveloped. As this is already a commercial property, the nature of the land use is unlikely to change significantly.
- NE 15th Street/NE 16th Street/124th Avenue NE—In concert with the East Link Project, NE 15th Street/NE 16th Street will be constructed through to 124th Avenue NE, which will be widened to five lanes. The anticipated traffic flow pattern from Downtown to eastbound SR 520 is NE 4th Street to 120th Avenue NE to NE 15th/NE 16th Street to 124th Avenue NE to SR 520.

In addition, the City purchased the potential wetland Mitigation Site (Figure 3-1) to convert it into a public park. The City's conceptual urban redevelopment for the area includes daylighting the West Tributary of Kelsey Creek from Bel-Red Road to the existing wetland east of 124th Avenue NE and creating an urban trail along the stream corridor.

Cumulative effects of the Bellevue NE 4th Street/120th Avenue NE Corridor Project and the projects listed above could include the following:

- A potential increase of impervious surfaces and non-vegetated areas in the Sturtevant Creek and West Tributary of Kelsey Creek basins due to urban redevelopment.
- A potential extension of fish use of the West Tributary of Kelsey Creek into the project corridor due to removal of downstream fish barriers.

5.5 Mitigation Measures

Mitigation measures include the following:

- Avoiding and minimizing clearing, grading, and filling of project corridor wetlands, streams, and forested areas during conceptual design
- Protecting these habitats during construction
- Mitigating unavoidable wetland, stream, and buffer impacts after construction is complete

5.5.1 Avoidance and Minimization of Impacts

During preliminary design, the project biologists and design engineers discussed ways to avoid and minimize impacts to the wetlands, stream, and forested areas in the project corridor. The design team concluded that filling Wetlands A and B would be required for the project to be constructed. During the upcoming design phases, the design team will look at ways to minimize impacts to the project corridor stream and Wetlands C and D. One example may be to remove the proposed middle turn lane in the vicinity of Wetlands C and D to narrow the overall road footprint.

5.5.2 Habitat Protection during Construction

Erosion and sediment control measures would be used during construction to control erosion and prevent transport of sediment to Sturtevant Creek, Lake Bellevue, the West Tributary of Kelsey Creek, and other nearby water bodies. Stream flow would be diverted around the culvert at the West Tributary of Kelsey Creek to prevent water quality violations or erosion of the stream channel during culvert installation.

5.5.3 Mitigation for Unavoidable Impacts

The proposed project is a stream enhancement, as stream mitigation includes replacing the existing non-fish passable culvert at the 120th Avenue NE crossing with a fish-passable culvert and constructing approximately 150 linear feet of new stream channel to facilitate potential future fish use. As stated earlier, there are no fish species currently in this portion of the West Tributary of Kelsey Creek because of existing downstream fish passage barriers. The project's replacement of the non-fish passable culvert at the 120th Avenue NE crossing with a fish-passable culvert would allow for fish passage once the downstream barriers are replaced with fish-passable systems, which is in the City's long range plans.

Because the project would not directly impact Sturtevant Creek, no mitigation is anticipated.

Wildlife mitigation includes designing the new culvert to be large enough to allow for some wildlife crossing beneath the new roadway. Other potential wildlife mitigation could include the following:

- Prohibit tree clearing in Wetland A from late March to early July to avoid the pileated woodpecker nesting season. If work must be performed in the area during the nesting season, a survey could be performed by a qualified biologist for nests prior to any disturbance, and nests could be protected and monitored until the young have fledged. These activities would be coordinated with WDFW if pileated woodpeckers are nesting in Wetland A.
- Include the installation of pileated woodpecker habitat features (e.g., snags and/or large woody debris) into the design of the conceptual wetland and stream mitigation design.

Vegetation mitigation includes constructing vegetated planters along the roadway and wetland mitigation. Wetland mitigation for this project is currently in the conceptual phase. Conceptually, wetland mitigation could include creating a new wetland on City-owned parcels. Conceptual wetland mitigation strategies are described in Section 5.1.1 of this report and in more detail in the *Wetland and Stream Delineation Technical Report* prepared for this project.

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6.0 References

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Appendix A
Priority Species and Habitat in King County

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Priority Species and Habitat in King County

Common Name	Scientific Name	State Status	Federal Status	Rationale
Priority Habitats				
Biodiversity Areas and Corridors				**Not present.** The existing project corridor roads, impervious surface development, and fish-impassible culverts preclude the presence of undisturbed and unbroken tracts of vegetation that connect fish and wildlife habitat conservation areas, etc.
Herbaceous Balds				**Not present.** No grass or forb vegetation located on shallow soils above bedrock was observed in the project corridor.
Old-Growth/Mature Forest				**Not present.** Forests observed in the project corridor are less than 200 years old (based on diameter of trees and the 1936 aerial photograph on King County iMAP).
Oregon White Oak Woodlands				**Not present.** Oaks observed in the project corridor are planted, ornamental species.
West Side Prairie				**Not present.** Areas in the project corridor that were dominated by grasses and other herbaceous species were limited to commercial landscaped areas (lawns).
Riparian				**Present.** A riparian corridor is associated with the West Tributary of Kelsey Creek.
Freshwater Wetlands and Fresh Deepwater				**Present.** Four freshwater wetlands were identified in the project corridor. Lake Bellevue, a fresh deepwater habitat, is located nearby.
Instream				**Present.** Although no fish are documented in the project corridor, the West Tributary to Kelsey Creek is considered instream habitat.
Puget Sound Nearshore				**Not present.** No shore, intertidal, or subtidal habitat is present in the project corridor.
Caves				**Not present.** No caves were observed in the project corridor.
Cliffs				**Not present.** No cliffs were observed in the project corridor.

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Common Name	Scientific Name	State Status	Federal Status	Rationale
Snags and Logs				**Present.** Snags and logs were observed in Wetlands A and B.
Talus				**Not present.** No native rock rubble was observed in the project corridor.
Fish				
Bull trout	*Salvelinus confluentus*	Candidate	Threatened	**Unlikely**. Due to fish barriers present at the Bel-Red Road NE culvert and the I-405 culvert, as well as electro-shocking data from the City, these anadromous fish species are likely precluded from the project corridor.
Dolly varden	*Salvelinus malma*	Candidate	Similarity of Appearance (Threatened)	
Chinook salmon	*Oncorhynchus tsawytcha*	Candidate	Threatened	
Chum salmon	*O. keta*			
Searun cutthroat	*O. clarki clarki*		Concern	
Coho salmon	*O. kisutch*		Concern	
Kokanee	*O. nerka*			
Pink salmon	*O. gorbushka*			
Sockeye salmon	*O. nerka*			
Steelhead	*O. mykiss*		Threatened	
Rainbow/inland redband trout	*O. mykiss*			**Unlikely**. Based on the lack of observed fish presence upstream of the Bel-Red Road NE culvert and upstream of I-405 during City stream electro-shocking efforts, and the lack of habitat connectivity in the sub-basin due to culverts, it is unlikely that these resident fish species exist in the area.
Resident cutthroat	*O. clarki clarki*		Concern	
Pygmy whitefish	*Prosopium coulteri*	Sensitive		
Pacific lamprey	*Lampetra tridentata*	Monitor		
River lamprey	*Lampetra ayresi*	Candidate	Concern	
Olympic mudminnow	*Novumbra hubbsi*	Sensitive		
Amphibians and Reptiles				
Larch mountain salamander	*Plethodon larselli*	Sensitive	Species of Concern	**Unlikely.** The larch mountain salamander inhabits steep, forested or nonforested slopes associated with talus, scree, gravelly soils, or other rocky substrates. Therefore, this species is not likely to be present.
Oregon spotted frog	*Rana pretiosa*	Endangered	Candidate	**Not likely.** The Oregon spotted frog is typically found near permanent quiet water and usually occurs at the grassy margins of streams, lakes, ponds, springs, and marshes. However, it is unlikely that the Oregon spotted frog is present in the project area because no known populations have been inventoried in or around Bellevue.

Common Name	Scientific Name	State Status	Federal Status	Rationale
Western toad	*Bufo boreas*	Concern	Candidate	**Potentially.** The western toad needs both aquatic breeding habitat and upland/terrestrial nonbreeding habitat. This species potentially could be found in the Bellevue Regional Pond downstream. Western toads could potentially migrate to the project area from the regional pond but the project area does not contain sufficient upland/ terrestrial habitat to sustain a Western toad population.
Pacific pond turtle (formerly western pond turtle)	*Actinemys marmorata*	Endangered	Concern	**Potentially.** Pacific pond turtles typically occupy permanent and intermittent waters of rivers, creeks, small lakes and ponds, marshes, irrigation ditches, and reservoirs. Because there is some aquatic habitat associated with the slow-moving stream flow through Wetland A, this species could be present, albeit in an isolated population.
Birds				
Common loon	*Gavia immer*	Sensitive		**Unlikely**. Common loons are typically found in marine habitats and clear lakes containing both shallow and deep water areas. Loon studies have indicated that loons avoid turbid water bodies. Although Lake Bellevue provides a lacustrine environment, common loons are likely not present due to the poor water quality of the lake.
Common murre	*Uria aalge*	Candidate		**Unlikely.** Common murre are found along rocky sea coasts and cliffs. Due to lack of suitable habitat, this species is not likely to be present.
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	Threatened	**Unlikely**. Marbled murrelet forage along the Puget Sound shoreline during the day and move farther off-shore to late successional reserves in the evening. Due to the project corridor's urbanized nature and lack of old-growth forest, any marbled murrelet sightings would be limited to incidental flyovers. Therefore, this species is not likely to be present.

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Common Name	Scientific Name	State Status	Federal Status	Rationale
Western grebe	*Aechmophorus occidentalis*	Candidate		**Potentially.** Western grebes generally prefer lakes with marshy vegetation. Although Lake Bellevue is small and contains minimal vegetation along the fringe of the lake, the species could potentially utilize this water body.
Western Washington nonbreeding concentrations of grebes, cormorants,	*Aechmophorus occidentalis*	Candidate		**Potentially.** These species generally prefer lakes with marshy vegetation. Although Lake Bellevue is small and contains minimal vegetation along the fringe of the lake, the species could potentially utilize this water body.
Western Washington nonbreeding concentrations of loons, fulmar, shearwaters, storm-petrels, alcids	n/a			**Unlikely.** These species generally prefer lakes with marshy vegetation or coastal waters. Due to the small size of Lake Bellevue and minimal vegetation along the fringe of the lake, it is unlikely that these species are present.
Western Washington breeding concentrations of cormorants, storm-petrels, terns, alcids	n/a			
Great blue heron	*Ardea herodias*			**Likely.** Great blue herons generally prefer lakes with marshy vegetation. Because this species is relatively common, it likely utilizes Sturtevant Creek, Lake Bellevue, and the West Tributary of Kelsey Creek for foraging.
Brant	*Branta bernicla*			**Unlikely.** Brants prefer saltwater bays and estuaries. Due to lack of suitable habitat, this species is not likely to be present.
wood duck, hooded merganser	n/a			**Potentially.** These species may be present in Lake Bellevue, but are not likely because they are cavity nesters; they would only be foraging if present.

Common Name	Scientific Name	State Status	Federal Status	Rationale
Barrow's goldeneye, common goldeneye, bufflehead	n/a			**Unlikely.** These species generally prefer rivers, bays, and/or lakes with marshy vegetation or trees around them. Due to the small size of Lake Bellevue and minimal vegetation along the fringe of the lake, it is unlikely that this species is present.
Harlequin duck	*Histrionicus histrionicus*			**Unlikely.** Harlequin ducks winter along rocky coastlines and nest along fast-moving rivers and mountain streams on rocky islands or banks. Due to lack of suitable habitat, this species is not likely to be present.
Trumpeter swan, Tundra swan	*Cygnus buccinators, Cygnus columbianus*			**Unlikely.** These swans overwinter on open ponds, lakes, and sheltered bays and estuaries in Puget Sound. Due to the small size of Lake Bellevue and minimal aquatic/ emergent vegetation along the fringe of the lake, it is unlikely that these species are present.
Waterfowl concentrations	n/a			**Likely.** Waterfowl generally prefer lakes with marshy vegetation. Due to the small size of Lake Bellevue and minimal vegetation along the fringe of the lake, waterfowl that use the lake are generally limited to urbanized species (e.g., Canada geese, mallards, etc.).
Bald eagle	*Haliaeetus leucocephalus*	Concern	Sensitive	**Unlikely.** Bald eagles are usually found near lakes, rivers, and coasts where prey is abundant. Due to Lake Bellevue's small size and minimal prey source, it is unlikely that this species is present for more than an occasional flyover.
Golden eagle	*Aquila chrysaetos*	Candidate		**Unlikely.** Golden eagles prefer open country relatively far from people. Based on the project corridor's urban setting, it is unlikely that this species is present.
Northern goshawk	*Accipiter gentilis*	Candidate	Concern	**Unlikely.** Northern goshawk's prefer mature or old-growth forest, and prefer larger tracts of forest. Due to lack of suitable habitat, this species is not likely to be present.

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Common Name	Scientific Name	State Status	Federal Status	Rationale
Peregrine falcon	*Falco peregrinus*	Sensitive	Concern	**Unlikely**. Peregrine falcons typically nest on ledges or in holes in rocky cliffs, and sometimes nest on skyscrapers in urban environments. Because no cliffs or skyscrapers are present in the project corridor, it is unlikely that this species is present.
Arctic peregrine falcon	*Falco peregrinus tundrius*	Sensitive	Concern	
Greater sage-grouse	*Centrocercus urophasianus*	Threatened	Candidate	**Unlikely.** The greater sage-grouse is found in sagebrush-dominating shrub-steppe habitat. Because no shrub-steppe habitat is present in the project corridor, it is unlikely that this species is present.
Western Washington nonbreeding concentrations of charadriidae, scolopacidae, phalaropodidae	n/a			**Unlikely.** These species are shorebirds. Due to the small size of Lake Bellevue and its lack of shoreline along the fringe of the lake, it is unlikely that these species are present.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Candidate	**Unlikely.** Although yellow-billed cuckoo prefer tall cottonwoods and willow riparian woodland, this species is considered extirpated from Washington. Due to the urban setting of the project corridor, it is unlikely that this rare bird is present.
Northern spotted owl	*Strix occidentalis caurina*		Threatened	**Unlikely.** Northern spotted owls prefer old-growth forests. Because no old-growth forests are present in the project corridor, it is unlikely that this species is present.
Vaux's swift	*Chaetura vauxi*	Candidate		**Unlikely.** Vaux's swift is typically found in mature or old-growth forests that have large-diameter hollow trees. Although forested areas are present in the project corridor, they are not considered mature or old-growth and do not contain large, hollow trees. Therefore, this species is unlikely to be present.
Black-backed woodpecker	*Picoides arcticus*	Candidate		**Unlikely.** The black-backed woodpecker prefers boreal and montane coniferous forests. Due to lack of suitable habitat, this species is not likely to be present.

Common Name	Scientific Name	State Status	Federal Status	Rationale
Pileated woodpecker	*Dryocopus pileatus*	Candidate		**Documented presence.** Although pileated woodpeckers prefer dense coniferous forests, the species has been found in second growth and wooded residential areas of towns. The City of Bellevue has documented the presence of the pileated woodpecker in the vicinity of Wetland D.
Purple martin	*Progne subis*	Candidate		**Unlikely.** Although suitable habitat (woodpecker holes or natural cavities for nests) is present in the project corridor, purple martins are likely outcompeted for this habitat by invasive birds such as European starlings and house sparrows that thrive in urban environments. Therefore, it is unlikely that this species is present.
Aleutian Canada goose	*Branta canadensis leucopareia*		Recovery	**Unlikely**. Aleutian Canada goose is typically found on maritime islands. Because the project corridor is at least 10 miles from the nearest Puget Sound island, it is unlikely that this species is present.
Mammals				
Townsend's big-eared bat	*Corynorhinus townsendii*	Candidate	Concern	**Unlikely.** Pacific Townsend's big-eared bat prefers caves, lava tubes, and/or abandoned buildings. In addition, this bat is extremely sensitive to disturbance. Due to lack of suitable habitat and the urban setting of the project corridor, this species is not likely to be present.
Louie's western pocket gopher	*Thomomys mazama louiei*		Candidate	**Unlikely**. The Louie's western pocket gopher prefers glacial outwash prairies. Because no prairies are located in the project corridor, it is unlikely that this species is present.
Tacoma western pocket gopher	*Thomomys mazama tacomensis*		Candidate	**Unlikely**. The Tacoma western pocket gopher prefers glacial outwash prairies. Because no prairies are located in the project corridor, it is unlikely that this species is present.

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Common Name	Scientific Name	State Status	Federal Status	Rationale
Fisher	*Martes pennanti*	Endangered	Candidate	**Unlikely.** Fishers prefer old-growth habitat. Due to the lack of old-growth in the project corridor and/or a wildlife corridor to this habitat, it is unlikely that fishers are present.
Gray wolf	*Canis lupis*	Endangered	Endangered	**Unlikely.** Gray wolves prefer undisturbed areas and prey primarily on ungulates. Based on the lack of suitable habitat and prey, it is unlikely that this species is present in the project corridor.
Grizzly bear	*Ursus arctos horribilis*	Endangered	Threatened	**Unlikely**. The closest known grizzly bear population is in the North Cascades area of north-central Washington. Due to the highly urbanized nature of the project corridor and lack of wildlife corridors to undeveloped habitat, it is unlikely that this species is present.
Canada lynx	*Lynx canadensis*	Threatened	Threatened	**Unlikely**. The Canada lynx prefers undisturbed, forested areas and are most likely to persist in areas that receive deep snow and have high-density populations of snowshoe hares, its principal prey. Due to the lack of undisturbed forested habitat and the highly urbanized nature of the site, it is unlikely that this species is present.
Wolverine	*Gulo gulo*	Candidate	Concern	**Unlikely.** Wolverines are found in alpine and arctic tundra, and boreal and mountain forests. Due to lack of suitable habitat, it is unlikely that this species is present.
Invertebrates				
Beller's ground beetle	*Agonum belleri*	Candidate	Concern	**Unlikely.** These beetles are found in sphagnum bogs. Due to the lack of bog habitat in the project corridor, this species is unlikely to be present.
Hatch's click beetle	*Eanus hatchi*	Candidate	Concern	
Bog idol leaf beetle	*Donacia idola*	Candidate		
Johnson's hairstreak	*Callophrys johnsoni*	Candidate		**Unlikely.** Johnson's hairstreak is typically found in old-growth forests. Because no old-growth is present in the project corridor, this species is not likely to be present.

Common Name	Scientific Name	State Status	Federal Status	Rationale
Valley silverspot	*Speyeria zerene bremnerii*	Candidate		**Unlikely.** Valley silverspot prefers open prairies and alpine and sub-alpine glades. Due to lack of suitable habitat, this species is not likely to be present.

Source: WDFW County-Specific Lists of Priority Habitats and Species, 2008

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Appendix B
Rare Plants in King County

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Rare Plants in King County

Common Name	Scientific Name	State Status	Federal Status	Rationale
Swamp sandwort	*Arenaria paludicola*	Possibly extinct or extirpated from Washington	Endangered	**Unlikely**. Swamp sandwort prefers saturated acidic bogs and sandy soils with a high organic component. No extant populations of swamp sandwort are known in Washington State. Although soils in the project corridor have a high organic component, no peat soils and/or bog vegetation was observed. Due to the highly urbanized location of the project corridor, it is unlikely that this plant is present.
Stalked moonwort	*Botrychium pedunculosum*	Sensitive	Species of Concern	**Unlikely**. Stalked moonwort is found in moist or dry meadows, along perennial streams, and in coniferous forests. Elevations range from 1,800 to 6,300 feet. One known population of this species is in eastern King County. Most populations are found in the mountainous areas of northeast Washington. Based on the elevation of the project corridor (around 150 feet above sea level) and its highly urbanized setting, it is unlikely that this plant is present.
Alaska harebell	*Campanula lasiocarpa*	Sensitive		**Unlikely.** Alaska harebell prefers rock crevices in alpine zones, usually in unglaciated areas. Based on the elevation of the project corridor (around 150 feet above sea level) and its highly urbanized setting, it is unlikely that this plant is present.
Bristly sedge	*Carex comosa*	Sensitive		**Potentially**. Bristly sedge is found in marshes, lake shores, and wet meadows. Associated species may include *Carex utriculata, Potentilla palustris, Typha latifolia, Spiraea douglasii, Lulichium arundinaceum*, and *Phalaris arundinacea*. This species was not documented during the project wetland delineation; however, the site wetlands meet the habitat requirements above.

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Common Name	Scientific Name	State Status	Federal Status	Rationale
Large-awn sedge	*Carex macrochaeta*	Threatened		**Unlikely**. This species grows in seepage areas, around waterfalls, in wet meadows, and along streams and lakes, and is frequently found near the coast. Observed plant associations include *Sullivantia origana, Dodecatheon dentatum, and Stenanthium occidentale.* Because this plant association was not observed in the project corridor, and due to the highly urbanized nature of the project corridor, it is unlikely that large-awn sedge is present.
Few-flowered sedge	*Carex pauciflora*	Sensitive		**Unlikely**. Few-flowered sedge grows in sphagnum bogs and acidic peat, usually on open mats, but also in partial conifer shade. Because the project corridor wetlands are not sphagnum bogs or dominated by acidic-loving vegetation, it is unlikely that this plant is present.
Long-styled sedge	*Carex stylosa*	Sensitive		**Unlikely.** Long-styled sedge is mainly found in coastal regions of Washington and in shallow marshes, gravelly loam, stream banks, and moist meadows. Some occurrences in Washington are known to be growing over hardened lava flow. Because there are no known documented populations in King County, and due to the highly urbanized nature of the project corridor, it is unlikely that this species is present.
Clubmoss cassiope	*Cassiope lycopodioides*	Threatened		**Unlikely**. Clubmoss cassiope is found more commonly in circumboreal regions and at higher elevations. The Washington occurrence is found at around 6,562 feet. Based on the elevation of the project corridor (around 150 feet above sea level) and its highly urbanized setting, it is unlikely that this plant is present.
Golden paintbrush	*Castilleja levisecta*	Endangered	Threatened	**Unlikely**. Golden paintbrush occurs in prairies and open grasslands in the Puget Trough. Because no prairies or open grasslands were identified in the project corridor, it is unlikely that this plant is present.

Common Name	Scientific Name	State Status	Federal Status	Rationale
Golden chinquapin	*Chrysolepis chrysophylla var. chrysophylla*	Sensitive		**Unlikely**. Golden chinquapin prefers dry open sites to fairly thick woodlands. Plant associations include *Pseudotsuga menziesii, Tsuga heterophylla,* and *Rhododendron macrophyllum.* Known populations in Washington are limited to Mason County near Hood Canal and Skamania County near the Columbia Gorge. Based on its limited range and lack of coniferous forests in the project corridor, it is unlikely that this plant is present.
Tall bugbane	*Cimicifuga elata var. elata*	Sensitive	Species of Concern	**Unlikely**. Tall bugbane is found in undisturbed, old-growth forests. Because the project corridor does not include old-growth forests, it is unlikely that this plant is present.
Spleenwort-leaved goldthread	*Coptis aspleniifolia*	Sensitive		**Unlikely**. Spleenwort-leaved goldthread occurs in undisturbed, old-growth forests. Because the project corridor does not include old-growth forests, it is unlikely that this plant is present.
Toothed wood fern	*Dryopteris carthusiana*	Of potential concern but needs more field work to assign another rank		**Unlikely**. Toothed wood fern is found in sphagnum swamps. Because this habitat was not found in the project corridor, it is unlikely that toothed wood fern is present.
Black lily	*Fritillaria camschatcensis*	Sensitive		**Unlikely**. Black lily prefers open woodland and sub-alpine meadows. Because these habitats were not observed in the project corridor, it is unlikely that this species is present.
Canadian St. John's-wort	*Hypericum majus*	Sensitive		**Unlikely**. Canadian St. John's-wort is found in ponds and lakesides. Although a population of Canadian St. John's-wort was historically found in King County, this plant is now only found in Benton, Franklin, Skagit, and Spokane Counties. Based on the highly disturbed vegetation around Lake Bellevue, it is unlikely that this species is present. No other suitable habitat is available in the project corridor.

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Common Name	Scientific Name	State Status	Federal Status	Rationale
Water lobelia	*Lobelia dortmanna*	Threatened		**Unlikely**. Water lobelia is found in shallow water at the margins of lakes and ponds. Based on the highly disturbed vegetation around Lake Bellevue, it is unlikely that this species is present. No other suitable habitat is available in the project corridor.
Bog clubmoss	*Lycopodiella inundata*	Sensitive		**Unlikely**. Bog clubmoss is primarily found in sphagnum bogs. Because this habitat was not found in the project corridor, it is unlikely that bog clubmoss is present.
Treelike clubmoss	*Lycopodium dendroideum*	Sensitive		**Unlikely**. Treelike clubmoss prefers rock outcrops, talus, or boulder fields. Because this habitat was not found in the project corridor, it is unlikely that treelike clubmoss is present.
White meconella	*Meconella oregana*	Threatened	Species of Concern	**Unlikely**. White meconella is found in open grassland and sometimes within a mosaic of forest/grassland. Because no grasslands were observed in the project corridor, it is unlikely that this species is present.
Branching montia	*Montia diffusa*	Sensitive		**Unlikely**. Branching montia is typically found in open fir woodlands and is often found in recently burned or logged areas. Because no open fir woodlands were observed in the project corridor, it is unlikely that this species is present.
Texas toadflax	*Nuttallanthus texanus*	Sensitive		**Unlikely**. Texas toadflax is found in glacial outwash prairies. Because no prairies were observed in the project corridor, it is unlikely that this species is present.
Choris' bog-orchid	*Platanthera chorisiana*	Threatened		**Unlikely**. Choris' bog-orchid prefers tundra-like hillsides and grassy mossy turf. Because these habitats were not observed in the project corridor, it is unlikely that this species is present.
White-top aster	*Sericocarpus rigidus*	Sensitive	Species of Concern	**Unlikely**. White-top aster is typically found in open grassland habitat. Because no grasslands were observed in the project corridor, it is unlikely that this species is present.

Common Name	Scientific Name	State Status	Federal Status	Rationale
Humped bladderwort	*Utricularia gibba*	Of potential concern but needs more field work to assign another rank		**Unlikely**. Humped bladderwort occurs in lake and lake edges and muddy disturbed sites. This species has been observed in Kitsap, Thurston, and Cowlitz Counties. It was historically found in King County, but it is believed to be extirpated here. Based on its limited range and the highly disturbed condition of Lake Bellevue, it is unlikely that this species is present. No other suitable habitat is available in the project corridor.
Flat-leaved bladderwort	*Utricularia intermedia*	Sensitive		**Unlikely**. Flat-leaved bladderwort prefers open wet meadows. Because no meadows were observed in the project corridor, it is unlikely that this species is present.
Lesser bladderwort	*Utricularia minor*	Of potential concern but needs more field work to assign another rank		**Unlikely**. Lesser bladderwort is found in low nutrient lakes and peat bogs. Based on the land use in the project corridor, it is unlikely that Lake Bellevue is a low-nutrient lake. No other suitable habitat is available in the project corridor; therefore, it is unlikely that this species is present.

Source: Washington Natural Heritage Information System, List of Known Occurrences of Rare Plants in Washington, King County, updated February 2009

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NE 4th Street/ 120th Avenue NE Corridor Project

Hazardous Materials Technical Report

prepared for
City of Bellevue

prepared by
Shannon & Wilson, Inc.

April 15, 2011

COB File # 11-114971-LM

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Acronyms and Abbreviations

AST	aboveground storage tank
bgs	below ground surface
BNSF	BNSF Railway Company
BTEX	benzene, toluene, ethylbenzene, and xylenes
City	City of Bellevue
CSCSL	Confirmed and Suspected Contaminated Sites List
cy	cubic yards
DVE	Dual Vacuum Extraction
Ecology	Washington Department of Ecology
EDR	Environmental Data Resources, Inc.
HSL	Hazardous Sites List
ICR	Independent Cleanup Report
ID	identification
K&L	K&L Distributors
LUST	leaking underground storage tank
MTCA	Model Toxics Control Act Cleanup Regulation
NFA	No Further Action
PAHs	polycyclic aromatic hydrocarbons
ppb	parts per billion
PADS	PCB activity database system
PCBs	polychlorinated biphenyls
PCS	Petroleum contaminated soil
PNEC	Pacific Northern Environmental Corporation
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way
S&W	Shannon & Wilson, Inc.
SR	State Route
SVOCs	semi-volatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
TSD	treatment, storage, and disposal
UST	underground storage tank
VCP	Voluntary Cleanup Program

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VOCs	volatile organic compounds
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

Executive Summary

This report identifies properties in and around the project area where current or past property uses may have resulted in hazardous materials contamination, and assesses the likelihood that hazardous materials may be disturbed or encountered during construction of the proposed project.

Based on windshield surveys and a review of historical and regulatory records, 52 sites of concern were identified. These sites include former and current dry cleaners, automobile dealerships, auto repair shops, gasoline stations, print shops, sites with heating oil use, and railroad tracks.

A total of 40 sites of concern are considered a low risk to the project. Acquisition of these properties is limited to strips of land along the road alignment to expand the roadway and/or partial acquisition of properties for the NE 4th Street roadway extension. These sites were ranked as posing a low risk typically because they had historic or current land uses of concern, but encountering contamination during project construction is not considered likely based on the limited excavation proposed in the vicinity of these sites.

A total of 10 sites of concern are considered a moderate risk to the project. One of these sites will not be acquired but are considered a moderate risk because known contamination on these sites may have migrated to areas where excavation is expected to occur. Two moderate-risk sites would be fully acquired for the project; acquisition of the seven remaining moderate risk sites will be limited to partial acquisitions. These sites were ranked as posing a moderate risk typically because they had historic or current land uses of concern and excavation is proposed on these properties for retaining walls, cut slopes, or other ground improvements.

A total of 2 sites of concern are considered a high risk to the project—a former dry cleaning plant and a former gas/service station. The former dry cleaning plant is considered a high risk because of the relatively high expense of remediating solvent contamination and because the City of Bellevue (City) would acquire this site. The former gas/service station site is considered a high risk to the project because (1) known gasoline- and diesel- range petroleum, benzene, mineral spirits, and chlorinated solvent contamination is present on the property and may be migrating offsite; (2) the former gasoline underground storage tanks may still be present on site; and (3) the City would acquire this property.

Mitigation measures include reducing the amount of soil excavation required for the project, conducting further investigations in proposed excavation areas to determine whether contamination is present, and conducting further investigations on properties that would be acquired to determine the concentrations and extents of contamination on these sites and to determine whether contamination has migrated to adjacent properties. Information obtained from additional explorations could be used by the City in negotiating

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cleanup responsibilities and costs with the existing owners prior to property purchase.

Construction monitoring is recommended on all sites of concern in the project corridor where clearing or grading is proposed. In accordance with the Washington State Department of Transportation Standard Specifications, the City or the general contractor will complete a spill prevention control and counter measures plan for dealing with hazardous materials.

1.0 Introduction

1.1 Purpose of This Report

This Hazardous Materials Technical Report was prepared to support the environmental documentation for the City of Bellevue's (City) NE 4th Street/120th Avenue NE Corridor Project. The project proposes to extend NE 4th Street east from its current terminus at 116th Avenue NE to a new intersection with 120th Avenue NE, and widen and realign 120th Avenue NE from the new intersection with NE 4th Street north to Northup Way. The project is located in Section 28, Township 28 North, Range 5 East, Willamette Meridian.

The purposes of this report are to (1) identify properties in and around the project area where current or past property uses may have resulted in hazardous materials contamination, and (2) assess the likelihood that hazardous materials may be disturbed or encountered during construction of the proposed project.

1.2 Hazardous Materials Policies and Regulations

The federal, state and local policies and regulations that apply to hazardous materials are discussed in Chapter 2 and include:

Federal Regulations

- Comprehensive Environmental Response, Compensation, and Liability Act
- Superfund Amendments and Reauthorization Act
- Resource Conservation and Recovery Act (RCRA)
- Toxic Substances Control Act
- Occupational Safety and Health Act
- Clean Air Act
- Clean Water Act
- National Environmental Policy Act

Washington State Regulations

- Model Toxics Control Act Cleanup Regulation (MTCA)
- Dangerous Waste Regulations
- Solid Waste Regulations
- Washington State Environmental Policy Act
- Water Pollution Control Act
- Washington Industrial Safety and Health Act

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- Washington State Department of Transportation (WSDOT) Environmental Procedures Manual M31-11 (April 2007)

More information on each regulation is provided in Appendix A.

2.0 Proposed Project

2.1 Project Overview

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined roadway corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of the Downtown Bellevue center. Major regional transportation connections and facilities in the project vicinity include Interstate 405 (I-405) to the west and State Route 520 (SR 520) to the north.

The project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include—the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road. Figure 2-1 shows the project study area.

The NE 4th Street/120th Avenue NE Corridor Project is one of a number of high priority transportation investments that make up the City of Bellevue's Mobility and Infrastructure Initiative. This initiative was formed to address unprecedented growth in Downtown Bellevue and to support planned growth in the Bel-Red, Spring District, and Wilburton areas.

Other key projects included in the initiative that would complement the proposed project include the following:

- NE 5th Street neighborhood project improvements
- NE 6th Street Extension from 112th Avenue NE to 120th Avenue NE
- NE 15th Street multi-modal corridor improvements north of NE 12th Street (also supporting Sound Transit's East Link Project)
- 124th Avenue NE improvements from NE 8th Street to Northup Way.

For each of these projects, new travel lanes, non-motorized facilities, signal enhancements, illumination, and various structure and utility relocations would be included.

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Figure 2-1. Project Study Area

2.2 Project Purpose and Need

The purpose of the proposed project is to achieve the following:

- Support and accommodate the City's adopted future land use changes and resulting travel demands.
- Improve local traffic circulation.
- Bring corridor features into compliance with current and proposed design standards and guidelines.
- Prepare the project corridor to support connections to planned transit facilities, specifically Sound Transit's East Link Project light rail alignment.

Collectively, the proposed project elements (see Figure 2-2) would enhance area-wide mobility by adding capacity to support the expected growth in travel demand, constructing critical missing links in the City's traffic distribution network, and easing congestion in other travel corridors. Moreover, the project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to transit facilities identified in City plans.

It would improve access for other modes to local recreational facilities, businesses, and the planned Link light rail stations at NE 8th Street and 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE.

In summary, the proposed project would meet the following objectives:

- To provide acceptable level of service at existing and planned study area intersections to meet anticipated long-term travel demands.
- To improve access and connectivity with the regional and local. transportation networks.
- To enhance long-term traffic operations over time by incorporating design standards that serve a variety of transportation modes, including the needs of large trucks and freight vehicles, as well as buses.
- To improve quality of life by improving mobility and transportation choice, particularly for transit, bicycle, and pedestrian traffic.

As shown in preliminary traffic analysis work for the NE 4th Street extension and the widening and realignment of 120th Avenue NE, the project elements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas as well as the region in terms of travel mobility and access to neighborhoods and businesses. This is primarily the result of new and enhanced connections across the Burlington Northern Santa Fe (BNSF) corridor and NE 8th Street, respectively. The proposed project also provides expanded arterial street capacity and driveway consolidation along 120th Avenue NE. The project termini are logical because they bracket the extent of the expected future development in the Wilburton/

NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail transit facilities.

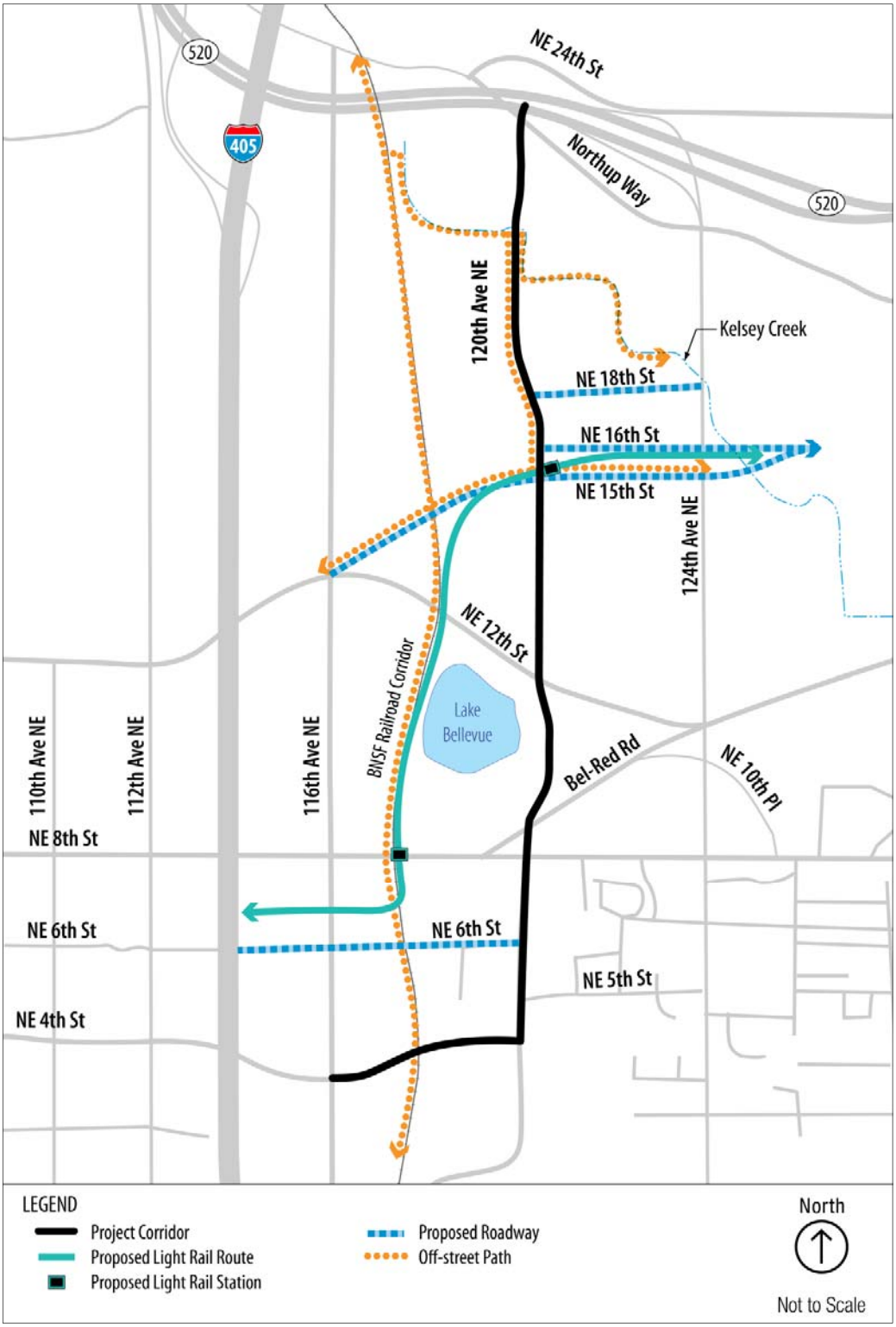

Figure 2-2. Planned Transportation Connections in the Study Area

2.3 Corridor Improvements

2.3.1 Programmed Corridor Improvements

This corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. These projects are described below.

- **NE 4th Street Extension (116th to 120th Avenue NE)**—Construct a new four to five lane roadway with arterial standard curb, gutter, sidewalk (including planting strips) and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension will be designed to accommodate future development and uses of the BNSF corridor.
- **120th Avenue NE Corridor—NE 4th Street to Northup Way**
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected segments; install continuous sidewalks to arterial standards; realign the roadway between Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project will be constructed in phases. Federal funding awarded to improvements, including bike lanes, planned between NE 4th and NE 8th Streets.

This revised description was submitted to Puget Sound Regional Council [PSRC] April 8, 2011 for the June 2011 Amendment to the Statewide Transportation Improvement Program (STIP).

2.3.2 Proposed Corridor Improvements

Specific design elements include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.

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- Construct improvements that support the planned new intersections at NE 15th/16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.
- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

The five-lane roadway design is proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE north to NE 15th Street. This proposed roadway cross-section is shown in Figure 2-3. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. Generally, a 5-foot-wide bike lane would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. However, the size and location of the sidewalks, bicycle facilities, and planter strips vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

As mentioned earlier, this analysis addresses the potential impacts of two minor alignment options for the extension of NE 4th Street east of the BNSF corridor. The alignment for Option 1 is farther north than that of Option 2. The Option 1 alignment would require acquisition of a portion of the southern side of the Best Buy building and displace access to the loading dock located on the west side of the building. Negotiations with the property owner are ongoing and may include construction of a building addition on the north side of the existing structure and/or realignment of the loading dock access to the north of the building. Option 2, roughly 55 feet south of the Option 1 alignment, would not require acquisition of any portion of nearby buildings, but would displace a substantial amount of parking on the Home Depot property as well as displace the Best Buy building's access to the loading dock area. Again, negotiations are ongoing with the property owners and mitigation may include construction of a new loading

dock access for the Best Buy property on the north side of the existing structure and/or a new parking garage on the Home Depot property. Note, the design for improvements along 120th Avenue NE south of NE 8th Street do not assume either option has been selected, but rather improvements are based on existing curb cuts for the driveway access to parking for the Best Buy and Home Depot properties.

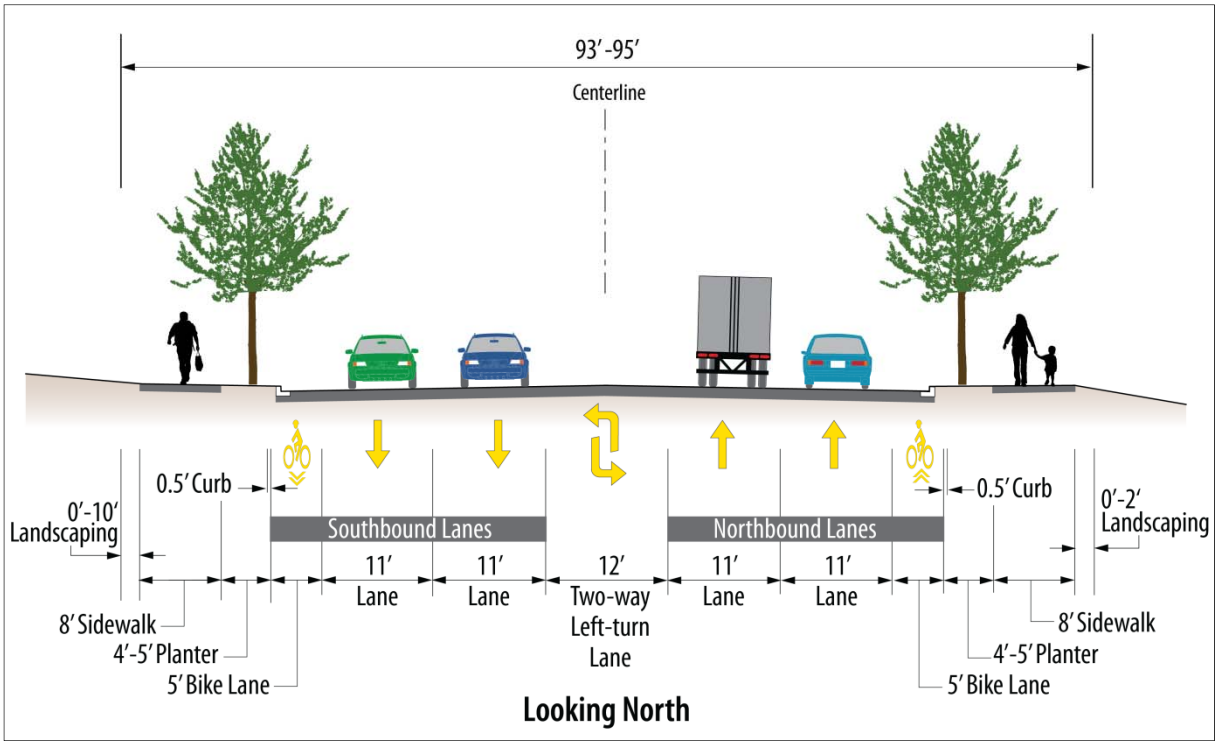

Figure 2-3. Typical Section—Five-lane Roadway Design

A four-lane roadway section is proposed for 120th Avenue NE from NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets. At the intersection at Northup Way, the cross-section would again be five lanes to allow for adequate turning movement capacity. This proposed four-lane cross-section is show in Figure 2-4. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes—two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed for each side of a two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

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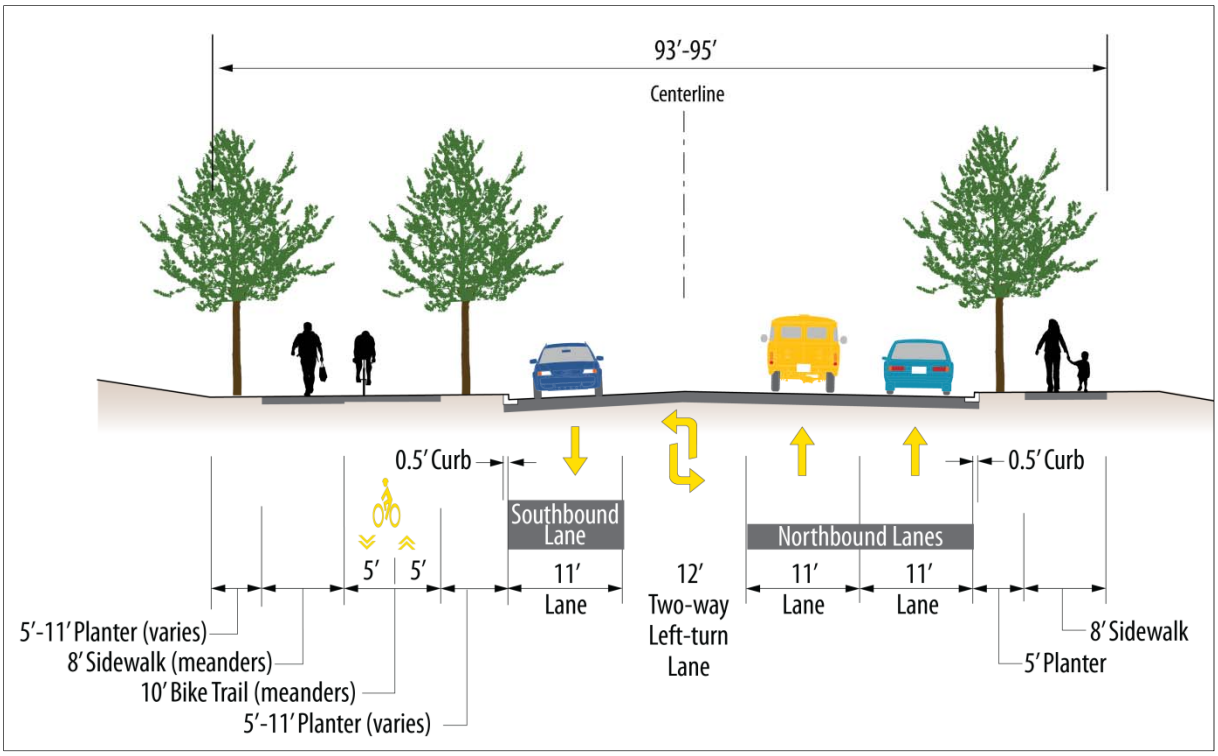

Figure 2-4. Typical Section—Four-lane Roadway Design

Both of the proposed roadway cross-sections also include the use of retaining walls, which would further increase the width of the required right-of-way beyond 95 feet. Retaining walls are proposed at numerous locations along the corridor and they would be located on both sides of the roadway. They would be used for both cut walls and fill walls. When retaining walls are required, these structures would generally be located immediately adjacent to the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet in width. To the outside of the retaining walls, the soil would be graded to a 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 121 feet or more where retaining walls are needed on both sides of the roadway.

Note, the term “right-of-way,” as used in this report, includes both right-of-way owned by the City and permanent easements (i.e., the complete footprint of the project).

2.4 Project Construction

2.4.1 Construction Duration and Phasing

Project construction would be phased and is expected to be completed from late 2011 to at least 2016 to match the programming of local, state, and federal funding sources. Each phase would last approximately 12 to 15 months. The planned phases, which may be further sub-divided into construction stages, are:

- Phase 1—120th Avenue NE widening between approximately the NE 300 block north to NE 7th Street.
- Phase 2—120th Avenue NE new construction between NE 8th Street and Bel-Red Road, and realignment and widening between approximately Bel-Red Road north to NE 12th Street.
- Phase 3—NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4—120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5—120th Avenue NE widening between NE 16th Street north to Northup Way.

Based on the Wilburton/NE 8th Street and Bel-Red Subarea Plans, it is essential that all phases of the NE 4th Street/120th Avenue NE Corridor Project be implemented in order to meet the purpose and need of the project. The City has committed to constructing all phases of the project, with cross sections appropriate to meet the multi-modal demand anticipated in the next 20 years. In addition, construction of the project phases could occur sequentially or some phases could overlap.

2.4.2 Construction Approach

The approach to project construction along the corridor differs. The following paragraphs describe the varying approaches to construction.

The improvements for NE 4th Street consist of constructing a new roadway, and would not involve working within an existing operable roadway. Construction for this phase would include clearing the full roadway right-of-way; grading; installing utilities and the roadway gravel base; constructing the curb, gutter and sidewalks; paving the roadway; and installing illumination/signals and landscaping. The construction activities would not disrupt existing traffic patterns along NE 4th Street, 116th Avenue NE, or 120th Avenue NE. However, the construction zone for NE 4th Street may extend somewhat into the existing roadways (116th and 120th Avenues NE) in order to connect new and existing pavements and existing and planned utilities at these locations.

Generally, the construction along 120th Avenue NE from the NE 300 block to NE 7th Street would widen the existing roadway on both sides of the existing centerline. Construction in this area would occur along an operational roadway.

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The improvements in this area would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

Construction of the realignment and widening of 120th Avenue NE between the intersection at NE 8th Street and about NE 12th Street would occur along an operational roadway. Thus, the construction in this area is anticipated to occur in the following manner:

- Contractor mobilization
- Install traffic control and temporary erosion control measures
- Relocate and/or install utilities
- Roadway Side 1—retaining walls, grading, paving, signals, and illumination
- Roadway Side 2—retaining walls, grading, paving, signals, and illumination
- Construction zone landscaping, restoration, and clean up.

The corridor could not be closed during construction though both directions of travel may be constrained to perhaps only a single lane. Use of Bel-Red Road between NE 8th Street and 120th Avenue NE, however, would be closed at the start of roadway construction between Bel-Red Road and NE 8th Street. With this road closure, construction could occur unhampered for the new roadway. Parcels along this portion of the alignment would be fully acquired and construction activities would not affect adjacent businesses. Traffic on Bel-Red Road east of 120th Avenue NE would continue to be able to travel north on 120th Avenue NE during construction. To the north of Bel-Red Road, the roadway alignment is generally shifted eastward. Construction work would likely start on the eastern half of the expanded right-of-way. When completed, traffic would be shifted to the new roadway, while the western portion of the roadway is constructed. All construction sequencing would be planned to minimize impacts to traffic and adjacent businesses.

Lastly, construction along the remaining northern portion of 120th Avenue NE from NE 12th to just south of Northup Way would also widen the existing roadway on both sides of the existing centerline. The improvements along 120th Avenue NE would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

2.5 Project Funding

The total cost of the proposed project improvements based on the final City Council Direction for the 2011-2017 General Capital Improvement Plan would be between an estimated $67.3 and $67.6 million, depending on the selected option for extending NE 4th Street. Construction would cost approximately $32 million and right-of-way acquisition would cost roughly $35 million.

Funding for the overall project would likely include monies from the following sources:

- Federal grants
- State Transportation Improvement Board funding
- State Local Revitalization Financing funding
- Local contributions from transportation-dedicated sources, long-term general obligation bonds, impact fees, and other private participation programs including possible local improvement districts.

The specific mix of federal, state, and local funding contributions for each construction phase could differ.

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3.0 Methods

3.1 Record Review and Site Survey

The project area studied for the hazardous materials analysis includes the proposed project footprint (i.e., where construction will occur), as well areas up to 1 mile from the project boundaries.

The following methods were applied to the effects analysis contained in this report. A rationale is provided for use of methods that varied from WSDOT standards.

3.1.1 Review of Previous Technical Reports

The NE 4th Street/120th Avenue NE Corridor Project was formerly split into three separate projects—(1) NE 4th Street Extension, (2) 120th Avenue NE Corridor Project—Segment 1, and (3) 120th Avenue NE Corridor Project—Segments 2 and 3. The hazardous materials technical reports for these projects that were reviewed for this report include:

- Revised Hazardous Materials Technical Memoranda for the NE 4th Street Extension Project, Bellevue, Washington (Shannon & Wilson [S&W], 2009)
- Focused Phase I Environmental Site Assessment/Corridor Study, 120th Avenue NE (From the NE 300 Block to the NE 700 Block), Bellevue, Washington (Landau Associates, Inc. [Landau], 2010a)
- Bellevue 120th Avenue NE Corridor Project, Preliminary Hazardous Materials Technical Report (S&W, 2010)

3.1.2 Historical Records Review

A land use profile was developed for the NE 4th Street/120th Avenue NE Corridor Project based on a review of historic records. Historical records reviewed include the following sources:

- Historical land use maps (Kroll Map Company, 1965 and 1998);
- Polk and Cole city directories (2005, 2000, 1996, 1990-91, 1985, 1980, 1975, 1970, 1964-65, 1959);
- Washington State Archive historical tax records (Puget Sound Archives 1900-1972);
- Sanborn Fire Insurance Maps (no coverage);
- Historical aerial photographs (full coverage: 1965, 1981, 1990, 1998, 2007; partial coverage: 1977, 1985); and
- Current topographic and geologic maps.

See Appendix B for a summary of findings.

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3.1.3 Windshield Survey

Windshield surveys were performed on November 20, 2009 (NE 4th Street extension area), and July 29, 2010 (120th Avenue NE), to identify current uses in the project corridor that are likely to involve the use, treatment, storage, or disposal of hazardous materials and to verify the location of listed and orphan sites associated with the regulatory review, where possible. Site-specific investigations were beyond the scope of this evaluation.

All observations were made from public areas. Each property adjacent to the NE 4th Street/120th Avenue NE corridor within the study area was viewed to compare the current tax assessor description of the site with observed site conditions. Current land uses that are likely to involve use or storage of hazardous materials were also noted.

3.1.4 Regulatory Review

Database Review

Federal and state databases were researched to identify properties with records of environmental enforcement; past or present underground storage tanks; and the generation, transportation, and storage of hazardous materials.

An environmental database research service, Environmental Data Resources, Inc. (EDR), collected information for listed sites located within 1 mile of the project corridor, in accordance with the ASTM International search radius guidance. EDR collected the environmental database information on October 16, 2009 for the NE 4th Street area (EDR, 2009), and July 28, 2010 for 120th Avenue NE area (EDR, 2010b). EDR's reports are included in Appendix C. The EDR results were not independently verified.

Based on the results of the EDR search, the following state databases were of particular concern because they record sites that store large quantities of petroleum products or because they record sites with known contamination:

- **Confirmed and Suspected Contaminated Sites List (CSCSL)**—This list includes state hazardous waste site records and is Washington's equivalent to the federal Comprehensive Environmental Response, Compensation, and Liability Information System.
- **Hazardous Sites List (HSL)**—The HSL is a subset of the CSCSL. It includes sites that have been assessed and ranked using the Washington Ranking Method.
- **Underground Storage Tank (UST) List**—This list identifies properties that have registered USTs with Washington Department of Ecology (Ecology). Information includes operational status, removal status, and substances stored.
- **Leaking Underground Storage Tank (LUST) Database**—LUST records contain an inventory of reported leaking UST incidents along with cleanup status and the medium (soil or groundwater) affected.

- **Independent Cleanup Reports (ICR)**—These are remedial action reports that Ecology has received from either the owner or operator of the sites. These actions have been conducted without Ecology oversight or approval and are not under an order or decree. Since 2002, this database is no longer updated by Ecology.
- **Voluntary Cleanup Program (VCP) Database**—These are sites that have entered Ecology's VCP or its predecessor Independent Remedial Action Program.

Washington Department of Ecology (Ecology) File Review

In general, sites identified by the EDR search to be within 1/8 mile of the center of the project area were reviewed for additional information at Ecology's Northwest Regional Office in Bellevue, Washington, on November 19, 2009, and March 9, 2010. This additional information was collected because environmental conditions at sites within 1/8 mile are more likely to result in possible effects to the project area than those located at a greater distance. Files were not available for all sites. Files were reviewed for the following information including but not limited to:

- Enforcement action in the last five years
- Confirmed or suspected contaminated media
- Confirmed or suspected contaminants
- Depth to groundwater and flow direction
- Cleanup status

See Appendix D for copies from the Ecology records reviews.

3.2 Site Screening

Based on the historical records and regulatory database review findings, a list of potential sites of concern was compiled. Several potential sites of concern were deemed unlikely to have an effect on the project based on the following screening criteria:

- Sites listed only on the RCRA, FINDS, ALL SITES, and National Pollutant Discharge Elimination System databases were eliminated. Inclusion on these databases indicates that a site uses or generates regulated materials as part of their business practice, but gives no indication of a hazardous materials release.
- Most sites located greater than 1/8 mile from the project corridor were eliminated due to the relatively high concentration of gas stations, automobile repair shops, drycleaners, and other potentially hazardous sites within 1/8 mile of the project corridor. Some properties within 1/8 mile of the project corridor were also eliminated if they were separated from the project corridor by two or more sites with similar

potential contaminants. These sites were eliminated because it is unlikely that contamination associated with these sites could be differentiated from contaminants from closer sources.

After the screening was conducted, the remaining sites of concern were ranked as having a low, moderate, or high potential risk to the project, in general accordance with the WSDOT Guidance and Standard Methodology for WSDOT Hazardous Material Discipline Reports (October 2010). As allowed under this methodology, the risk rankings were modified to include the liability associated with acquiring a site of concern.

Low-risk Sites are sites where a potential concern exists because of historical activities, but either the likelihood for the site to impact the project is low or the contamination was previously remediated.

Moderate-risk Sites include sites where (1) current or former land uses have likely used or stored hazardous materials; (2) insufficient information was available to determine whether contamination would be present in the project corridor; and (3) excavation for retaining walls, slope cuts, or ground improvements is anticipated on the property. Moderate risk sites also include sites that are contaminated and would be acquired by the City, but the contamination is from hazardous materials migrating from an adjacent site or where remediation is considered relatively straightforward.

High-risk Sites are sites with a known concern because of historical activities, contamination is known and extensive, and/or site contamination will likely impact the project. In general, high-risk sites are properties that possess a potential for substantial soil, groundwater, or sediment contamination, or the information necessary to predict remedial costs is lacking. The site may be contaminated over a large area by a single contaminant or over a smaller area by multiple contaminants. High-risk sites typically are large, have large volumes of contaminated materials, or have a long history of industrial or commercial use. Sites were also identified as high risk when (1) contamination is known to exist and, (2) the City plans to acquire the portion of the site where the source of contamination is or was located.

4.0 Existing Conditions

4.1 Physical Environment

The physical environment of the project area can strongly influence the fate (possible degradation of contaminants) and transport of contaminants released to the environment. Fate and transport of contaminants, in general, are controlled by:

- The mobility of the chemicals;
- The rate of breakdown or degradation of the chemicals in the environment;
- Pathways the chemicals can take to travel from their point of release, such as volatilization to the air or dissolution to water (surface water or groundwater); and
- Whether the transport along those pathways is enhanced or limited by the physical environment.

For example, areas with high-permeability soils and shallow groundwater can facilitate contaminant migration (via groundwater) beyond the point of release. In contrast, fine-grained soils tend to impede subsurface contaminant transport.

4.1.1 Topography

The southern third of the corridor is relatively flat, with the exception of approximately 50 feet of topographic relief west of the railroad tracks (see Figure 4-1). In the central third of the project corridor, the topography slopes downward toward the west and flattens out in the vicinity of Lake Bellevue. The northern third of the project corridor is also relatively flat except where filling and/or grading of large, light industrial properties has resulted in relief of up to about 20 feet in localized areas.

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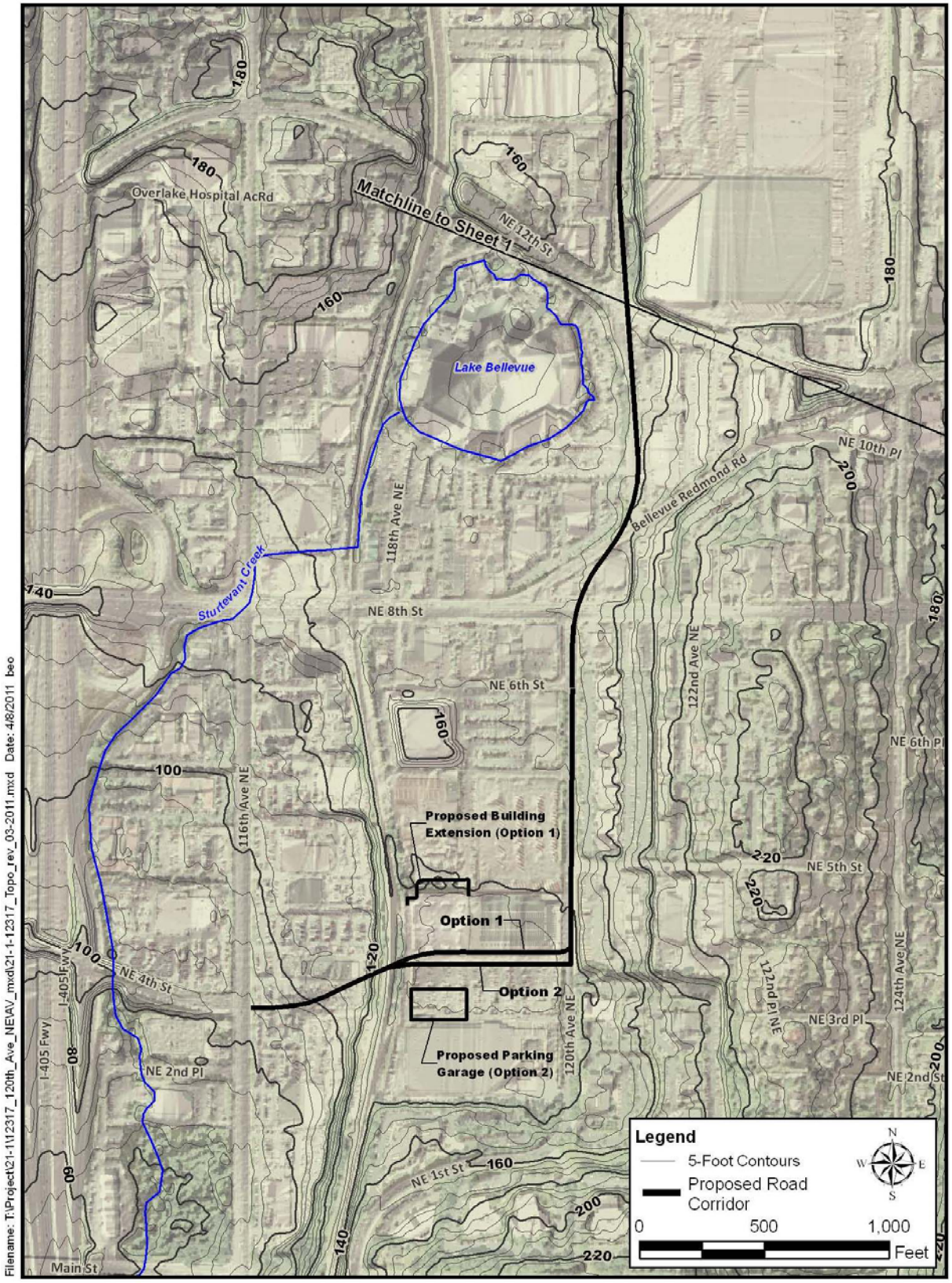

Figure 4-1. Project Area Topography—Sheet 1 of 2

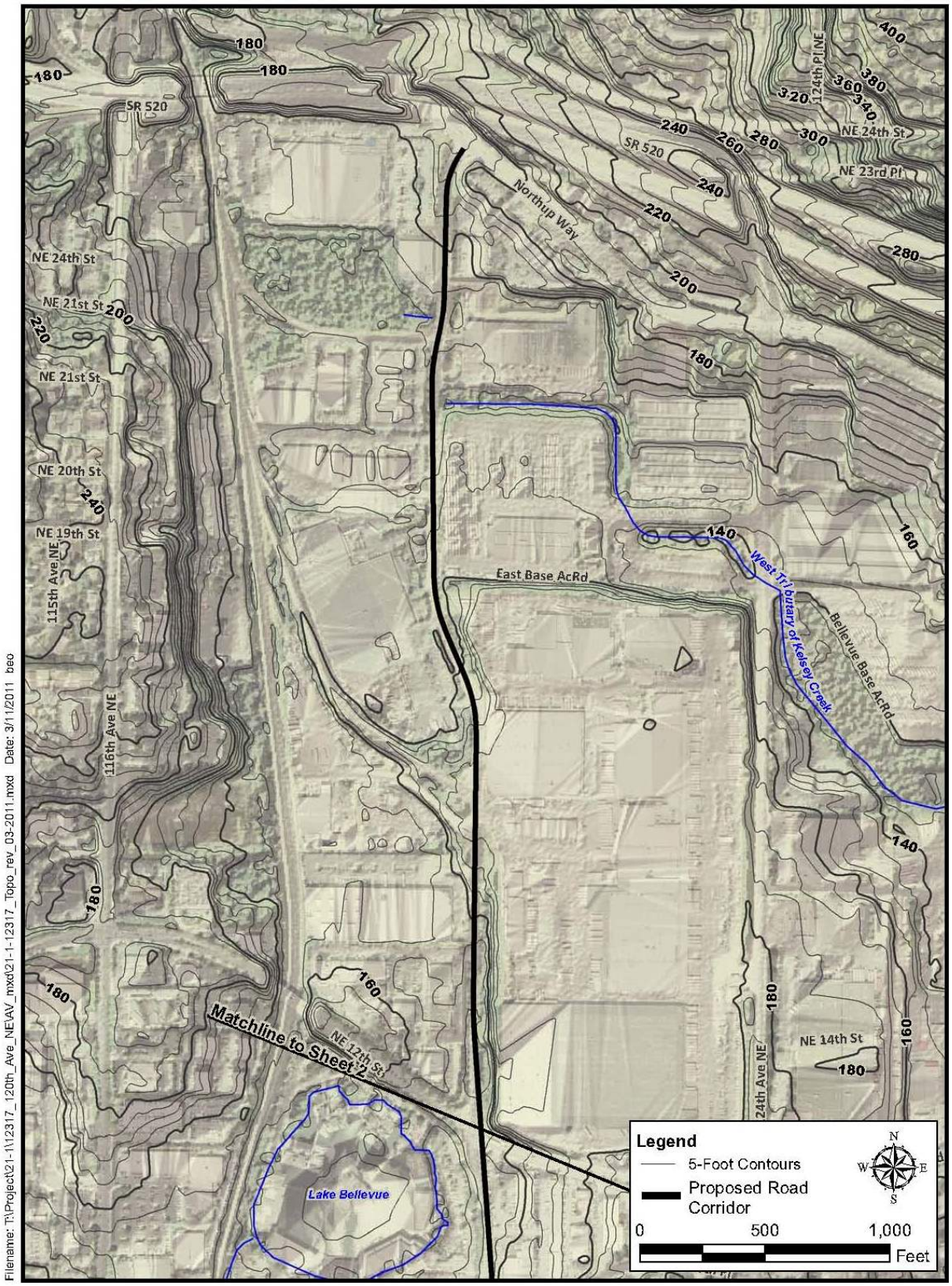

Figure 4-1. Project Area Topography—Sheet 2 of 2

4.1.2 Geology

The project is located in the central portion of the Puget Lowland, which is an elongated, north-south depression between the Olympic Mountains and the Cascade Range. The Puget Lowland was subjected to six or more major glacial events in the Quaternary time. Each glaciation deposited new sediment and partially eroded existing deposits. During the most recent glaciation (termed Vashon), glacial ice is estimated to have been about 3,000 feet thick in the project area (Thorson, 1989). The weight of the glacial ice resulted in compaction of the underlying soils. The glacially overridden deposits are overlain by recessional glacial deposits that accumulated during retreat of the Vashon ice sheet. The glacial deposits are in turn overlain by younger (Holocene Epoch) sediments that were deposited principally by streams, lakes, and mass wasting processes.

Subsurface conditions in the project area predominantly consist of very dense Vashon till overlain by loose to dense and soft to stiff, Vashon recessional and Holocene deposits of variable thickness. Vashon till is present at or near the ground surface between NE 6th Street and NE 4th Street, and along much of the central and east portion of the 120th Avenue NE roadway. The till typically consists of very dense, gravelly, silt and sand. Near NE 4th Street, very dense Vashon till is overlain by medium dense to dense ablation till that accumulated during wasting of the Vashon ice sheet.

Vashon recessional outwash deposits overlie Vashon till along most of 120th Avenue NE north of approximately NE 8th Street and west of the railroad tracks in the vicinity of NE 4th Street. These deposits range in thickness from a few feet to more than 20 feet thick and typically consist of medium dense to dense sand and gravel. The outwash deposits are locally interlayered with lacustrine deposits silt.

Holocene peat, lacustrine silt and clay, and fill locally overlie the Vashon till and recessional deposits. Soft Holocene peat and/or lacustrine deposits are generally concentrated in two areas: (1) the vicinity of Lake Bellevue, and (2) the crossing of 120th Avenue NE with the West Tributary of Kelsey Creek. Artificial fill is widely distributed over the length of the project area and typically consists of loose to dense sand and gravel. Generally, the fill is less than 5 feet thick, but locally is more than 20 feet thick where it was used to replace peat deposits.

4.1.3 Hydrogeology

The regional groundwater flow direction is toward the west-southwest, whereas the shallow perched groundwater tends to mimic surface topography with localized groundwater discharge points at Sturtevant Creek, Lake Bellevue (formerly Lake Sturtevant), and the West Tributary to Kelsey Creek (see Figure 4-2). Sturtevant Creek flows southward from Lake Bellevue and eventually discharges to Lake Washington. The West Tributary to Kelsey Creek flows to the southeast, joining Kelsey Creek and draining into Lake Washington to the west-southwest.

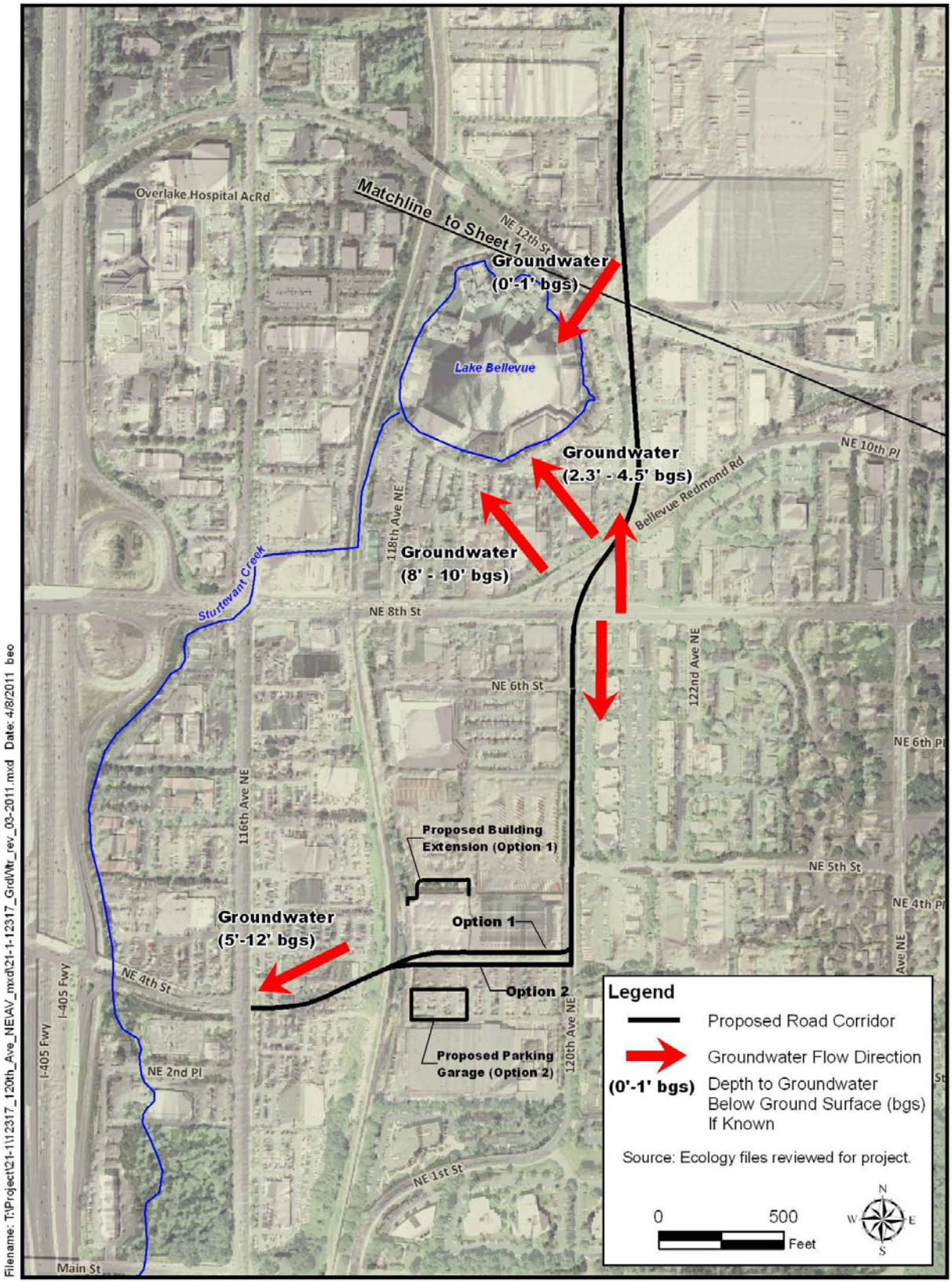

Figure 4-2. Project Area Groundwater Flow—Sheet 1 of 2

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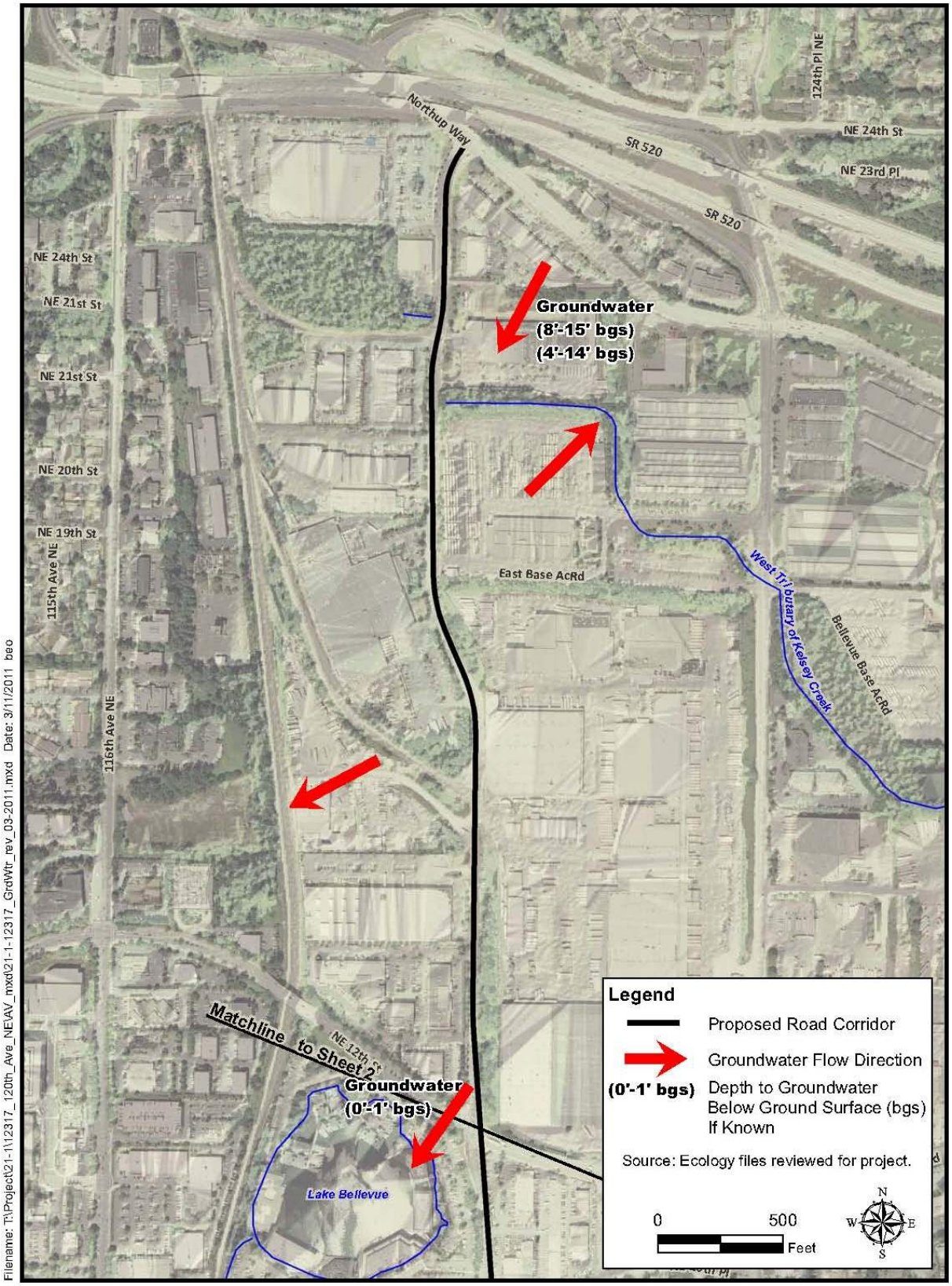

Figure 4-2. Project Area Groundwater Flow—Sheet 2 of 2

Based on our review of boring logs in the area (S&W, 1965; S&W 1975; GeoEngineers, 1994; PNCGMS, 2010; Ecology, 2010; and Landau, 2010b;), shallow groundwater is typically encountered in the northern end of the project corridor at 1 to 5 feet below ground surface (bgs). Shallow groundwater occurs in the Holocene peat deposits found in the vicinity of Lake Bellevue (see Figure 4-2) and the West Tributary to Kelsey Creek. Perched groundwater is also scattered discontinuously across the corridor in shallow soils and fill (typically 1 to 17 feet bgs).

Perched groundwater is located in the recessional outwash sands that overlie the glacial till and in sand seams within the till, generally found at depths between 5 and 20 feet bgs. Locally, groundwater flow in the perched zones follows topography, generally directing groundwater toward topographic lows along 120th Avenue NE, particularly the intersections of 120th Avenue NE and NE 12th Street and the intersection of 120th Avenue NE near the West Tributary to Kelsey Creek.

4.2 Land Use

4.2.1 Overview

The first documented land uses of the project area included residential housing and farming as early as 1888. Railroad tracks ran north and south between 116th Avenue NE and 120th Avenue NE through the project area as early as 1936. During the late 1950s to early 1960s, auto dealerships, gas stations, and other commercial structures started to appear in the project area, primarily in the vicinity of NE 8th Street and along 116th Avenue NE. By 1965, the railroad spurs that cross 120th Avenue NE (north of NE 12th Street) were present. Warehouses began to appear along the northern third of 120th Avenue NE in the project corridor in the late 1960s to early 1970s. The project corridor has been dominated by commercial and light industrial land uses since the late 1980s.

In the mid 1990s, NE 4th Street was extended across the Interstate 405 and connected to 116th Avenue NE. Presently, parcels to the north and south of the planned NE 4th Street extension to 120th Avenue NE are unoccupied and have been purchased by a single developer who plans to redevelop them.

4.2.2 Businesses that Commonly Use Hazardous Materials

Certain business activities, whether presently or formerly occurring on a site, can provide a reasonable basis for assuming that contaminants were used or generated on the site and may have been released. Historic land uses in the project area that may have resulted in soil and/or groundwater contamination include automobile repair shops, automobile dealerships, dry cleaners, print shops, metal shops, and railroad spurs. Hazardous materials typically associated with these types of businesses include:

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Petroleum contamination is typically associated with gasoline stations, vehicle maintenance facilities, and heating oil. This contaminant type includes the following sub-categories:

- **Gasoline-range petroleum** contamination generally results from leaks and spills associated with former gasoline stations and vehicle maintenance facilities. Gasoline is relatively mobile in the environment and is more toxic at lower concentrations than heavier grades of hydrocarbons (diesel and oil).
- **Benzene, toluene, ethylbenzene, and xylenes (BTEX)** are constituents in gasoline. Depending on the age of a gasoline release, it can also include BTEX, methyl tertiary butyl ether, and/or lead. These fuel constituents can pose a substantial risk to humans and the environment, are highly soluble and mobile in groundwater, and will float on the water table or perched groundwater.
- **Diesel- and oil-range petroleum** is used to fuel vehicles and heat businesses and homes. Oil-range petroleum is also often associated with automobile repair shops. For the most part, these contaminants are relatively low in toxicity and are not particularly mobile. Diesel- and oil-range petroleum tends to bind to soil and float on the water table rather than dissolve or disperse throughout the water column. As a result, any given leak or release of diesel or oil is not likely to have resulted in widespread contamination.

Creosote is a yellowish to greenish-brown, oily liquid containing polycyclic aromatic hydrocarbons (PAHs), such as phenols, creosols, and naphthalene. Creosote is derived from coal tar and is commonly used to treat railroad ties, piles, and telephone poles. It can cause severe neurological disturbances if inhaled in high concentrations. Creosote-contaminated soil associated with railroad ties is typically relatively shallow. However, if creosote migrates to groundwater, it is considered relatively mobile because some constituents of creosote are water-soluble.

PAHs, some of which are carcinogenic, are present in heavy-range petroleum hydrocarbons and are also created during burning as a result of incomplete combustion. They are also present in creosote. PAHs may be associated with petroleum releases such as leaking heating oil USTs and lubricating oils used by railroads. In general, PAHs are relatively insoluble in water and bind to soil particles. Consequently, they tend not to migrate in the subsurface environment.

Heavy metals, including arsenic, cadmium, chromium, lead, zinc, and copper, are associated with metal manufacturers, welders, paint manufacturers, printers, wrecking yards, and junkyards. In addition, arsenic has historically been used in herbicides. Metals can become soluble and migrate to groundwater, depending on the chemistry of infiltrating water and/or the media into which the metals were initially released. However, metal contamination is more commonly found in shallow, subsurface soils. Arsenic is commonly associated with peat deposits in the Puget Sound region.

Solvents such as trichloroethylene and tetrachloroethylene were used historically as solvents in dry cleaning and for degreasing at a variety of businesses such as automobile body shops and paint shops/manufacturers. Dry cleaners used large volumes of these solvents. Solvents are highly toxic at low concentrations and are highly mobile in soil and groundwater. Most solvents are denser than water and therefore tend to move downward through the subsurface and water column. Unlike most contaminants, solvents can migrate readily through fine-grained soils.

Polychlorinated Biphenyls (PCBs) contamination is commonly the result of spills or leaks of dielectric fluids from PCB-containing equipment such as transformers or capacitors, which are often found at power stations, electrical substations, and switchyards. PCBs are persistent in the environment; however, they tend to adhere to organic matter and soil and do not readily migrate from soil to groundwater.

4.3 Sites of Concern

Fifty-two sites of concern were identified adjacent to or near the project corridor. These sites are mapped in Figure 4-3 and are summarized from west to east, and then south to north in Table 4-1. The sites of concern are discussed in more detail after the table.

Puget Sound Energy (1)—The Puget Sound Energy site has been occupied by a substation since 1987. It is not known whether PCB-containing transformers are located on the property. Two residences were located on the property until the mid-1970s and may have been heated with oil. This site is considered a low risk to the project because PCBs and heating oil have low mobility and because the property is located downgradient of the project corridor.

NE 4th Street ROW (2)—The existing NE 4th Street ROW was occupied by a residence that was heated with oil until the mid-1960s. This site is considered a low risk because it is located down gradient of the project corridor and because heating oil, if present, is relatively low in toxicity and is not particularly mobile in the subsurface environment. Therefore, contamination, if encountered, is not likely to be widespread.

Ford of Bellevue (3)—The Ford of Bellevue property is currently occupied as auto dealership. The property is listed on the state LUST, UST, CSCSL-No Further Action (NFA), and VCP databases. Between 1991 and 2003, a 1,000-gallon waste oil UST, a 500-gallon oil-water separator, and 240 tons of petroleum-contaminated soil (PCS) were excavated and disposed of off site. Four monitoring wells were installed in 2002. Contaminants of concern during the four quarters of groundwater sampling at the site in 2002 were either not detected or were detected at concentrations below the state MTCA Method A Cleanup levels for groundwater. Ecology issued the site a NFA determination in 2007.

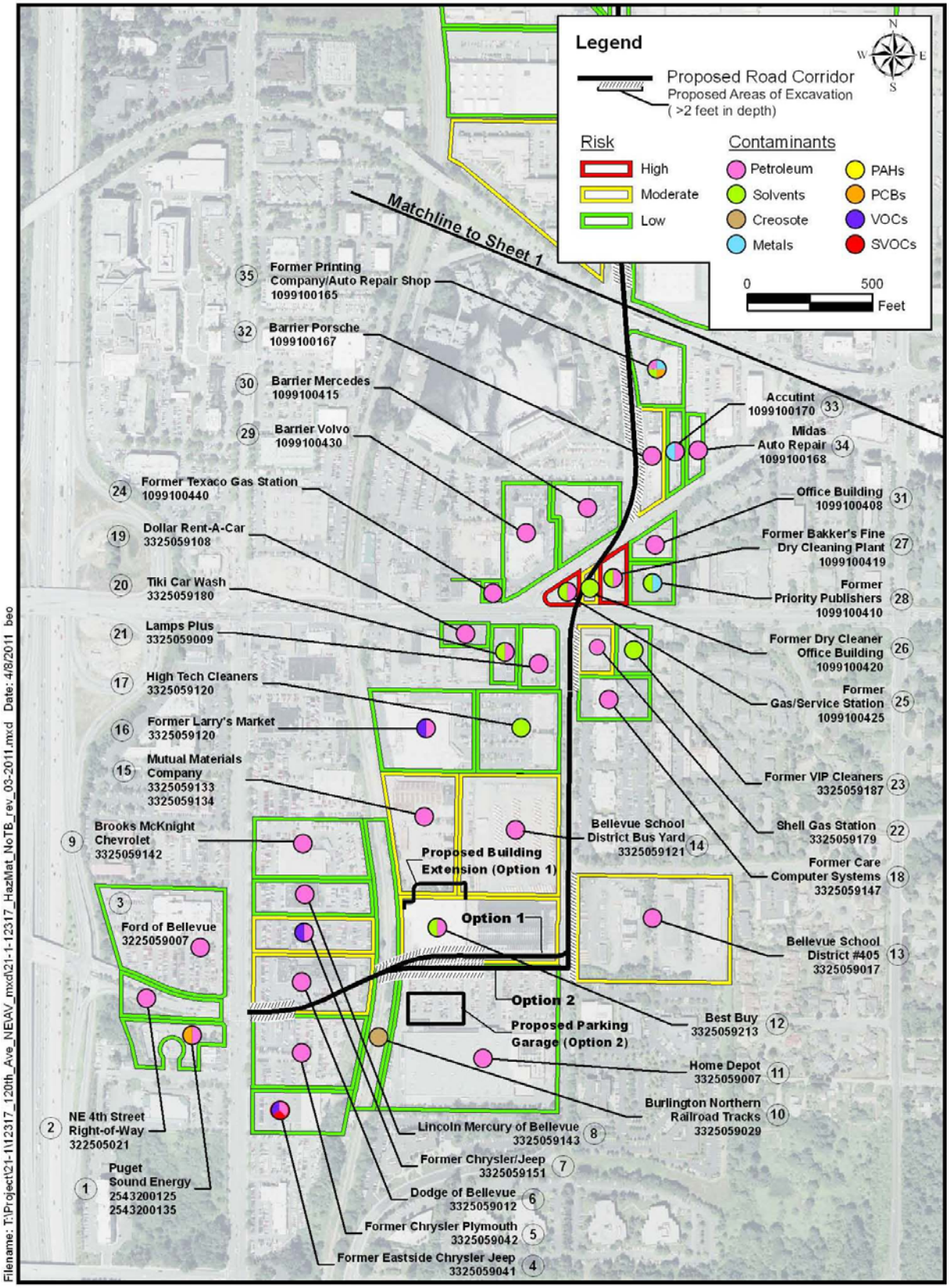

Figure 4-3. Sites of Concern—Sheet 1 of 2

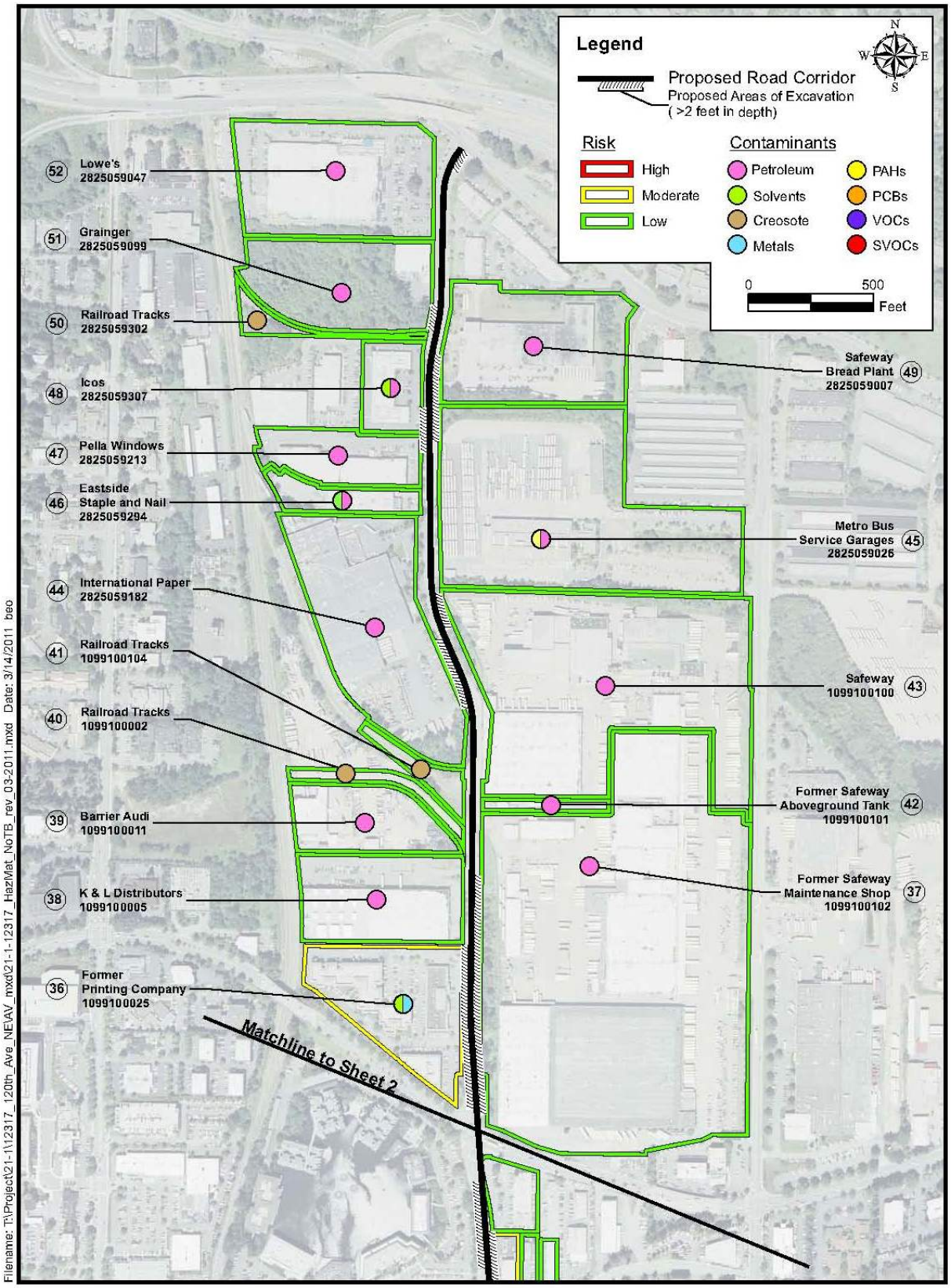

Figure 4-3. Sites of Concern—Sheet 2 of 2

Table 4-1. Sites of Concern Summary

Number	Site Name	Parcel Number	Address	Hazardous Material	Risk
1	Puget Sound Energy	2543200125 and 2543200135	206 115th Avenue NE	PCBs, petroleum	Low
2	NE 4th Street Right-of-Way	322505021	305 116th Avenue NE	Petroleum	Low
3	Ford of Bellevue	3225059007	411 116th Avenue NE	Petroleum	Low
4	Former Eastside Chrysler Jeep	3325059041	200 116th Avenue NE	Petroleum, VOCs, SVOCs	Low
5	Former Chrysler Plymouth	3325059042	128 116th Avenue NE	Petroleum	Low
6	Dodge of Bellevue	3325059012	316 116th Avenue NE	Petroleum	Moderate
7	Former Chrysler/Jeep	3325059151	400 116th Avenue NE	Petroleum, VOCs	Moderate
8	Lincoln Mercury of Bellevue	3325059143	420 116th Avenue NE	Petroleum	Low
9	Brooks McKnight Chevrolet	3325059142	430 116th Avenue NE	Petroleum	Low
10	BNSF Railroad Tracks	3325059029	515 120th Avenue NE	Creosote	Low
11	Home Depot	3325059007	300 120th Avenue NE	Petroleum	Low
12	Best Buy	3325059213	457 120th Avenue NE	Solvents	Moderate
13	Bellevue School District #405	3325059017	12037 NE 5th Street	Petroleum	Moderate
14	Bellevue School District Bus Yard	3325059121	500 120th Avenue NE	Petroleum	Moderate
15	Mutual Materials Company	3325059133 and 3325059134	605 119th Avenue NE	Petroleum	Moderate
16	Former Larry's Market	3325059120	655 120th Avenue NE	Petroleum, VOCs	Low
17	High Tech Cleaners	3325059120	699 120th Avenue NE	Solvents	Low
18	Former Care Computer Systems	3325059147	636 120th Avenue NE	Petroleum	Low
19	Dollar Rent-A-Car	3325059108	11839 NE 8th Street	Petroleum	Low
20	Tiki Car Wash	3325059180	11909 NE 8th Street	Solvents, Petroleum	Low
21	Lamps Plus	3325059009	11919 NE 8th Street	Petroleum	Low
22	Shell Gas Station	3325059179	12001 NE 8th Street	Petroleum	Moderate
23	Former VIP Cleaners	3325059187	12015 NE 8th Street	Solvents	Low
24	Former Texaco Gas Station	1099100440	11830 NE Bellevue-Redmond Road	Petroleum	Low
25	Former Gas/Service Station	1099100425	11866 NE 8th Street	Petroleum, solvents	High

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Number	Site Name	Parcel Number	Address	Hazardous Material	Risk
26	Former Dry Cleaner Office Building	1099100420	11876 NE 8th Street	Solvents	Moderate
27	Former Bakker's Fine Dry Cleaning Plant	1099100419	11855 NE Bellevue-Redmond Road	Solvents, petroleum (including Stoddard solvent)	High
28	Former Priority Publishers	1099100410	12000 NE 8th Street	Solvents, metals	Low
29	Barrier Volvo	1099100430	11850 NE Bellevue-Redmond Road	Petroleum	Low
30	Barrier Mercedes	1099100415	11950 NE Bellevue-Redmond Road	Petroleum	Low
31	Office Building	1099100408	12011 NE Bellevue-Redmond Road	Petroleum	Low
32	Barrier Porsche	1099100167	12000 NE Bellevue-Redmond Road	Petroleum	Moderate
33	Accutint	1099100170	12014 NE Bellevue-Redmond Road	Petroleum, metals	Low
34	Midas Auto Repair	1099100168	12020 NE Bellevue-Redmond Road	Petroleum	Low
35	Former Printing Company/Auto Repair Shop	1099100165	12001 NE 12th Street	Petroleum, metals, PCBs, solvents	Low
36	Former Printing Company	1099100025	1220 120th Avenue NE	Metals, solvents	Moderate
37	Former Safeway Maintenance Shop	1099100102	1121 124th Avenue NE	Petroleum	Low
38	K & L Distributors	1099100005	1445 120th Avenue NE	Petroleum	Low
39	Barrier Audi	1099100011	1533 120th Avenue NE	Petroleum	Low
40	Railroad Tracks	1099100002	1601 120th Avenue NE	Creosote	Low
41	Railroad Tracks	1099100104	None	Creosote	Low
42	Former Safeway Aboveground Tank	1099100101	None	Petroleum	Low
43	Safeway	1099100100	1469 to 1747 124th Avenue NE	Petroleum	Low
44	International Paper	2825059182	1899 120th Avenue NE	Petroleum	Low
45	Metro Bus Service Garages	2825059026	1975 124th Avenue NE	Petroleum, PAHs	Low
46	Eastside Staple and Nail	2825059294	1970 120th Avenue NE	Petroleum, solvents	Low
47	Pella Windows	2825059213	2019 120th Avenue NE	Petroleum	Low

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Number	Site Name	Parcel Number	Address	Hazardous Material	Risk
48	Icos	2825059307	2023 120th Avenue NE	Petroleum, solvents	Low
49	Safeway Bread Plant	2825059007	1121 124th Avenue NE	Petroleum	Low
50	Railroad Tracks	2825059302	1820 120th Avenue NE	Creosote	Low
51	Grainger	2825059099	2221 120th Avenue NE	Petroleum	Low
52	Lowe's	2825059047	11959 Northup Way	Petroleum	Low

PCB = polychlorinated biphenyls
SVOCs = Semi-volatile organic compounds
VOCs = Volatile organic compounds

The property is considered a low risk to the project because it is located downgradient of the project corridor and because petroleum contamination is considered relatively east to treat and remediation approaches would most likely be straightforward.

Former Eastside Chrysler Jeep (4)—The Former Eastside Chrysler Jeep site is currently vacant; however, the parking lot is being used to store vehicles. This site is listed on the state UST, CSCSL-NFA, and ICR databases. A 275-gallon waste oil tank was removed from the property in 1987. In 1994, contaminated soil and groundwater were identified beneath a floor slab of the back service bay located on the property. The soil and groundwater contamination was apparently associated with a service bay vault that was subsequently sealed. MCTA Method B cleanup standards were established for the soil and groundwater at the property. Concentrations of volatile organic compounds (VOCs) and semi-volatile compounds (SVOCs) in soils samples collected at the site were below the established MTCA Method B cleanup levels. However, concentrations of diesel-range hydrocarbons in some of the samples collected were above the established MTCA Method B cleanup levels. In 2000, this site received a NFA determination and the site monitoring wells were abandoned in 2001.

Site soils and groundwater may have hazardous materials concentrations exceeding MTCA Method A regulatory cleanup levels. However, the site is located approximately 600 feet south of, and downgradient to, the project corridor. Therefore, this site is considered a low risk to the project.

Former Chrysler Plymouth (5)—The Former Chrysler Plymouth site is currently a parking lot. Assessor records indicate that the property was part of Chrysler Plymouth properties located directly to the north and south. Based on historical records, a former residence and barn were located on the property until the mid-1960s. There is a potential that the former residence was heated with oil.

Potential site acquisition is limited to a small strip of land on the northwest corner of the property; the remainder of the site is located downgradient of the project corridor. Heating oil, if present, is relatively low in toxicity and is not

particularly mobile in the subsurface environment. Therefore, contamination, if encountered, is not likely to be widespread. This site is considered a low risk to the project.

Dodge of Bellevue (6)—The former Dodge of Bellevue property was formerly occupied by an automobile dealership. The site was listed on the state UST, CSCSL-NFA, and VCP databases. A waste oil tank was reportedly removed from the site in 1988. One water sample was taken from groundwater encountered in the excavation below the tank at 11 feet bgs. The water in the excavation exhibited a 1/4-inch thickness of floating product, but the water sample contained non-detectable concentrations of petroleum and concentrations of BTEX that were below U.S. Environmental Protection Agency maximum contaminant levels for potable water supplies.

Subsequent soil sampling conducted in the area of the removed UST established that residual total petroleum hydrocarbon (TPH) concentrations exceeding MTCA Method A cleanup levels were still present. To mitigate the impacted soil, approximately 82 tons of soil were removed from around the UST excavation and disposed.

The excavation was terminated when an oil/water separator pipe was encountered along the eastern portion of the building foundation. The oil/water separator line was not properly capped and appeared to be leaking fluid into the area of the existing pipe. An additional 63 tons of contaminated soil were excavated and removed. Soils were excavated to a depth of 8 feet bgs; no groundwater was encountered during excavation. Analytical results from confirmation samples were below MCTA Method A cleanup levels for BTEX and diesel- and gasoline-range hydrocarbons. Ecology issued an NFA determination in 2004.

Based on Ecology files reviewed for the adjoining Former Chrysler/Jeep property to the north, contaminated groundwater has been detected above regulatory cleanup levels in a monitoring well on the southern boundary of the Former Chrysler/Jeep property. Groundwater appears to flow to the southwest, toward where excavation is proposed on the Dodge of Bellevue property. Because groundwater was encountered at 11 feet bgs on the Dodge of Bellevue property, it is unlikely that groundwater will be encountered during the 6 feet of excavation proposed for the project. However, groundwater depth can vary due to seasonality and differing subsurface conditions.

The Dodge of Bellevue property is considered a moderate risk to the project because (1) the City anticipates acquiring part of the property, and (2) PCS and/or petroleum- and VOCs-contaminated groundwater may be encountered during excavation. The property is not considered a high risk because the source of the petroleum contamination on this property appears to have been removed and because petroleum and VOCs contamination associated with auto repair shops and fueling facilities are not considered extremely toxic or difficult to treat.

Former Chrysler/Jeep (7)—The Former Chrysler/Jeep site is currently being used as a parking lot. This site is listed on the state CSCSL-NFA, UST, and ICR databases. In 1991, two former waste oil USTs were removed from the property. Between 1993 and 1996, investigations conducted at the property indicated that petroleum- and VOC-contaminated soil and groundwater were detected near several former hydraulic lifts and trench drains. As part of an Independent Remedial Action conducted in 1996, the former dealership building was demolished and removed along with existing concrete pavement, seven hydraulic lifts, and associated surface and subsurface drains.

Approximately 2,600 cubic yards (cy) of PCS was excavated and removed from the site. Based on groundwater monitoring wells installed on the property, groundwater is reportedly located at 5 to 12 feet bgs and flows to the southwest. Results of the groundwater sampling indicated that detected concentrations of petroleum and VOCs were below their respective MTCA Method A cleanup levels in all of the wells, with the exception of MW-13, which had elevated levels of petroleum hydrocarbons. Monitoring well MW-13 is located approximately at the center of the southern property boundary (adjacent to the Dodge of Bellevue property). In 1999, Ecology issued an NFA determination and placed a restrictive covenant on the property in the vicinity of MW-13.

Petroleum- and VOCs-contaminated groundwater is present on the southern property boundary and appears to flow to the southwest toward where excavation is proposed on the adjoining Dodge of Bellevue property. Groundwater was encountered at 11 feet bgs on the Dodge of Bellevue property; therefore, it is unlikely that groundwater will be encountered during the 6-foot-deep excavation proposed for the project. However, this property is considered a moderate risk to the project because groundwater depth can vary due to seasonality, differing subsurface conditions, and grade changes. In addition, the City plans to acquire an easement on the southeast boundary of this property to place fill for the elevation of the proposed NE 4th Street roadway.

Lincoln Mercury of Bellevue (8)—The Lincoln Mercury of Bellevue site is listed on state UST and ICR databases. Ecology files indicate that one 875-gallon gasoline UST was closed in place below the existing dealership building in 1992. Approximately 100 cy of impacted soil was removed at that time. The excavated soil was remediated on site and placed back in the excavation.

In 1994, a site investigation determined that both soil and groundwater plumes extended over portions of the Lincoln Mercury property and onto the Former Chrysler/Jeep property to the south. As part of that investigation, six monitoring wells and a free product recovery system were installed. In 1996, a Dual Vacuum Extraction (DVE) system was installed to remediate the soil and groundwater under the existing building and confine the plume to the Lincoln Mercury property. Additionally, a waste oil UST, trench hoist, and alignment pit were removed and up to 80 cy of contaminated soil was removed.

Annual groundwater monitoring was conducted until 1999; however, the DVE system was not continuously operated. Based on the 1999 groundwater report, the operating DVE system had removed all measurable free product in the wells. The gasoline plume reportedly was localized on the Lincoln Mercury property. Gasoline-range hydrocarbon concentrations were above MTCA Method A cleanup levels in 12 of 19 wells. Xylenes were above their respective cleanup level in three wells. No other monitoring reports were available in the Ecology files reviewed for this property.

This site is located approximately 300 feet upgradient of the project area. Based on monitoring well information from the Former Chrysler/Jeep property, it does not appear that contamination from the Lincoln Mercury of Bellevue property has extended to the project corridor. Therefore, this property is considered a low risk to the project.

Brooks McKnight Chevrolet (9)—The Brooks McKnight Chevrolet property has been an active automobile dealership since the early 1970s and is listed on the state CSCSL, VCP, UST, and ICR databases. Ecology files reviewed for this site indicated that a 1,000-gallon gasoline UST, two hoists, and 1,125 cy of PCS were removed from the property in 1994. Between 1999 and 2007, 12 monitoring wells and a biosparge trench were installed along the southwest property boundary. In 2007, a 1,000-gallon UST was decommissioned. As of 2009, soil and groundwater contamination remain on site with free product being frequently observed in MW-2 and MW-3.

Two other properties, Former Chrysler/Jeep and Lincoln Mercury of Bellevue, are located between the Brooks McKnight Chevrolet and the project corridor.

Although this site is upgradient of the project corridor, it is considered a low risk to the project because it is located approximately 700 feet from the project corridor and because two other properties with PCS and/or groundwater are located between this site and the project corridor.

BNSF Railway Company (BNSF) Railroad Tracks (10)—The BNSF railroad tracks are bisected by the project corridor where NE 4th will be extended from 116th Avenue NE to 120th Avenue NE**.** Approximately 15 feet of excavation will be required through this property to match up the grades between 116th Avenue NE and 120th Avenue NE. Railroad ties are commonly treated with creosote as a wood preservative. Because creosote contamination, if present, is likely limited to shallow surface soils, this site is considered a low risk to the project.

Home Depot (11)—The Home Depot property and the adjoining property to the north (see Best Buy discussion below) were formerly occupied by the Benaroya Business Park. Seven buildings, and railroad spur tracks associated with the adjacent BNSF railroad, were located on the combined properties. The buildings for the Benaroya Business Park were constructed in 1969. Between 1995 and 1997, the business park buildings were demolished and the existing Home Depot building was constructed. In 2002, the properties were divided into the existing two parcels.

K&L Distributors (K&L), a distributor of liquor and wine, was located in Building 5 of the former Benaroya Business Park from at least 1972 to 1985. Based on Ecology files and aerial photograph review, it appears that Building 5 was located on the southwest corner of the Home Depot site, approximately 400 feet from the project corridor.

K&L was listed on the state UST, LUST, and ICR databases. Ecology files indicated that in 1991, three USTs (gasoline, diesel and waste oil tanks), were removed from the site. PCS was excavated from each UST area and stockpiled on site. The stockpiled soils were either successfully treated and used as backfill or hauled to an approved landfill. After PCS was excavated and removed, soil samples taken at the walls and bottoms of the tank excavations were below MCTA Method A cleanup levels.

One monitoring well was installed downgradient of the gasoline and diesel excavation. Analytical results of the groundwater sample collected from this monitoring well indicated no detectable concentrations of diesel-range hydrocarbons, BTEX, or total lead; however, gasoline-range hydrocarbons were detected below MTCA Method A cleanup levels.

No contamination associated with the existing railroad or former rail spurs on the west side of the property was identified in the Ecology files reviewed for the site. Railroad ties are commonly treated with creosote as a wood preservative; however, creosote contamination, if present, is likely limited to shallow surface soils.

The Home Depot property is currently listed on the federal RCRA-NonGen and RCRA-SQG databases. A review of Ecology files indicated that numerous violations were issued by Ecology, including issues of non-compliance for management of dangerous waste, and notices of non-submittal of pollution prevention planning documentation. As of July 2005, Home Depot had corrected the issues and provided Ecology with written documentation.

This property is located in the project area and the City would acquire a portion of the existing parking lot for the project. Approximately 5 feet of excavation will be required along the northwest boundary of the Home Depot property to match up the grades between 116th Avenue NE and 120th Avenue NE. Although there is the potential that additional contamination maybe encountered from either the former site USTs or the former site rail spurs, this property is considered a low risk to the project because (1) the portion of the property that was the source of contamination (former UST location) will not be acquired for the project, (2) the former site USTs were located approximately 400 feet south of the project corridor, and (3) any remaining petroleum or creosote contamination, if encountered, would be relatively easy to treat and remediation approaches would most likely be straightforward.

Best Buy (12)—The Best Buy property was formerly part of the Home Depot property and was occupied by a portion of the Benaroya Business Park. Between 1995 and 1997, the business park buildings were demolished and the existing

Home Depot building was constructed. In 2002, the properties were divided into the existing two parcels and the existing Best Buy building was constructed.

The Best Buy property is listed on the state VCP and CSCSL databases. One former site use of concern, Unicraft Printing, is listed on the state CSCSL database. Based on Ecology files and aerial photograph review, it appears that Unicraft Printing was located in Building 7 of the former Benaroya Business Park, which was situated on the eastern half of the Best Buy property.

Ecology files reviewed for the former Unicraft Printing business indicated that in 1995, approximately 500 cy of soil was excavated from the solvent storage area and the northern and southern press areas. Soil samples collected from the excavation walls and floor indicated that soils exceeding MCTA Method A cleanup levels had been removed. Three additional groundwater monitoring wells were installed at the site and subsequent groundwater sampling events were conducted with the existing four wells until 1999. Results of these sampling events indicated the presence of vinyl chloride, benzene, and gasoline-range hydrocarbons in concentration exceeding MCTA Method A cleanup levels in MW-2. In 1996, diesel-range hydrocarbons were also detected exceeding groundwater cleanup levels in monitoring wells MW-1, MW-3, MW-4, and MW-5.

Prior to site redevelopment in 2001, groundwater was sampled from three monitoring wells MW-1, MW-2, and MW-7. Elevated concentrations of benzene were detected in MW-1, which is downgradient of MW-2, and vinyl chloride was detected exceeding its MCTA Method A cleanup level in MW-7. As part of redevelopment, the wells were decommissioned. In 2006, MW-2a was installed in the vicinity of the former well MW-2 and sampled. Analytical results of the groundwater collected from the well did not indicate the presence of petroleum- or solvent-related compounds exceeding their respective MTCA Method A cleanup levels. In 2007, four additional wells were installed at the site and quarterly groundwater sampling of all five wells was conducted until August of 2008. All concentrations of petroleum-related hydrocarbons and solvents in groundwater were well below MTCA Method A cleanup levels with no reportable levels of benzene in any of the samples. In 2009, the site was enrolled in the VCP with a request to discontinue groundwater sampling and for the site to be issued an NFA determination by Ecology. There was no indication in the Ecology files reviewed that contamination had been found with the existing railroad and/or former rail spurs located on the west side of the property. Similarly, there was no indication of contamination associated with a transformer that is currently located on the west side of the property.

Although the source of contamination has been removed, this property is considered a moderate risk because (1) the portion of the property that was the source of contamination would be acquired for the project under Option 1, and (2) potential contamination may still be present. Creosote contamination associated with the former railroad spurs may also be present on the property but likely would be limited to shallow surface soils. This property is not

considered a high risk to the project because the source of contamination has reportedly been removed.

Bellevue School District #405 (13)—The Bellevue School District #405 property is listed on the state UST, ICR, and federal PCB activity database system (PADS) databases. Nine USTs have been installed on the property since 1964. Four have been removed and two are exempt. Three USTs are operational onsite—one 20,000-gallon gasoline tank and two 20,000-gallon diesel tanks. A cleanup report was received by Ecology in 1993; however, this report was not found during our Ecology file review.

This property is considered a moderate risk to the project because (1) the status of the former and existing site USTs is unknown, (2) the property is located upgradient of the project corridor, and (3) approximately 10 to 12 feet of excavation is proposed on the western boundary of this property to expand the 120th Avenue NE roadway.

Bellevue School District Bus Yard (14)—The Bellevue School District Bus Yard has been a City school bus yard since 1971. This site is listed on the state LUST database. Site files reviewed at Ecology indicated that four 12,000-gallon USTs (diesel and gasoline) were decommissioned and removed from the site in March 1993. Soil contamination was detected in the top 5 feet of the excavation and along the south wall where the dispenser island and associated piping were located. A total of 350 cy of contaminated soil was removed and remediated onsite. Confirmation soil samples collected in the excavation perimeter were all non-detect.

A sample was obtained from the water that had collected in the excavation at approximately 9 feet bgs. The water sample contained concentrations of gasoline- and diesel-range hydrocarbons and BTEX above MCTA Method A cleanup levels. The water was believed to be from drainage runoff that had entered the excavation while it was open and not from the groundwater. The water was assumed to be contaminated as a result of mixing with surrounding contaminated soil.

A groundwater sample collected in a new tank excavation 17 feet south of the removed tank excavation was collected below 15 feet bgs. The excavations were backfilled with clean material. The excavated soil was remediated onsite to below MTCA Method A cleanup levels was used as backfill material. Currently, a pump island is located in the northwest corner of the property and a bus wash rack is located in the southwest corner of the property. Based on Ecology files, no sampling has been conducted in the bus wash rack location.

This property is considered a moderate risk to the project because (1) it is adjacent to the existing corridor, and (2) the City would acquire part of the property, including the bus wash rack location, under Option 1.

Mutual Materials Company (15)—The Mutual Materials Company is adjacent to, and likely upgradient of, the project corridor. The property is listed on the state UST database. Mutual Materials sells construction and masonry supplies

and has been in operation since the mid-1960s. A review of site files at Ecology indicated that in 1993, three USTs (two diesel and one gasoline) were decommissioned and removed from the site. Field observations collected during the closure suggested that the UST system may have released a minor amount of petroleum product to the subsurface. Analytical results of the confirmation samples collected indicated that the UST project area was in full compliance with environmental regulations at the time of the UST closure.

Although the USTs have been removed, this property is considered a moderate risk to the project because (1) it is adjacent to the existing corridor and (2) the City would acquire part of the property under Option 1. This property is not considered a high risk because residual petroleum contamination, if present, is considered relatively easy to treat and remediation approaches would most likely be straightforward.

Former Larry's Market (16)—The Former Larry's Market property is listed on the state UST, ICR, and LUST databases. The property was previously owned by the City and used as a municipal service center for their vehicles. A review of Ecology site files indicated that five USTs, four hydraulic pit reservoirs, and 550 cy of PCS were removed in 1989. Analytical results of groundwater sampling in 1990 indicated that concentrations of VOCs, including benzene, detected in the samples were decreasing. A final cleanup report was issued in 1990 with the site reported to be cleaned up.

The property is considered a low risk to the project because contamination, if present, is limited in extent and because the site is located 700 feet away from the project corridor.

High Tech Cleaners (17)—The High Tech Cleaners site has been occupied by a dry cleaners since at least 2000. This property is listed on the state LUST, UST, and ICR databases. In 2002, soil and groundwater were confirmed to be contaminated with halogenated solvents. Based on Ecology files reviewed for this site, approximately 19 cy of solvent-contaminated soil was excavated from beneath the dry cleaning building and disposed of offsite as a dangerous waste. Confirmation samples indicated that the removal of tetrachloroethylene-impacted soils was accomplished. It does not appear that potential groundwater contamination has been addressed. This site is considered a low risk to the project because contaminated soil reportedly has been remediated and limited earthwork (1 to 2 feet in depth) is proposed adjacent to this property.

Former Care Computer Systems (18)—The Former Care Computer Systems site was formerly occupied by a residence that was heated with oil. No other land uses of concern were noted. Approximately 3 feet of excavation is proposed along the western property boundary for a cut slope or retaining wall. Heating oil is relatively low in toxicity and is not particularly mobile in the subsurface environment. Contamination, if encountered, is not likely to be widespread. This site is considered a low risk to the project.

Dollar Rent-A-Car (19)—The Dollar Rent-A-Car site was historically occupied by a gas station and used car sales lot. Based on a Hazardous materials discipline report for the NE 4th Street Extension project (S&W, 2010), the site was also historically occupied by a bulk heating oil distributor. PCS and petroleum-contaminated groundwater were encountered in 1989 when four USTs were reportedly removed. The property was reported as cleaned up 1995. In 1996, four additional USTs were reportedly removed. No other information was given as to whether soil and/or groundwater contamination was encountered during the 1996 tank removal/closure.

This site is located approximately 280 feet east of the project corridor; however, the City anticipates acquiring an easement along the northern boundary of this property for a sidewalk and planting strip. It is unlikely that contamination, if present, would be encountered because earthwork will be limited to removing existing pavement to construct the sidewalk and planting strip; no excavation is anticipated. This site is considered a low risk to the project.

Tiki Car Wash (20)—The Tiki Car Wash site has been occupied by a gas station since 1971. This site is listed on the state CSCSL, LUST, UST, and HSL databases. The three USTs that were installed on the site in the 1970s are still operational. PCS and petroleum-contaminated groundwater were documented on this site in 1989 and 1995. In 1991, soil and groundwater were also documented as being contaminated with non-halogenated solvents.

This site is located approximately 160 feet west of the project corridor; however, the City anticipates acquiring an easement along the northern boundary of this property for a sidewalk and planting strip. It is unlikely that contamination, if present, would be encountered because earthwork will be limited to removing existing pavement to construct the sidewalk and planting strip; no excavation is anticipated. This site is considered a low risk to the project.

Lamps Plus (21)—The Lamps Plus site was formerly occupied by a transmission repair shop and tire shop (1969) and an auto sales business (1985 and 1990-91). Based on GeoEngineers' summary of Ecology files reviewed for the 120th Avenue Improvement Project (GeoEngineers, 1994), PCS was encountered on the site in 1992. No cleanup activities have been recorded for this site. However, soil contamination may have been addressed when the existing building was constructed on the property in 1994. This property is considered a low risk to the project because only limited clearing and grading (1 to 2 feet in depth) is proposed on this site and PCS, if encountered, is relatively easy to treat.

Shell Gas Station (22)—The Shell Gas Station site has been occupied by a gas station since 1972. The site is listed on the state CSCSL, LUST, UST, and VCP databases. Three USTs were installed in 1990 and are still in use. PCS and petroleum-contaminated groundwater were encountered during the tank installation, likely due to leaks associated with older USTs. Based on GeoEngineers' summary of Ecology files reviewed for the 120th Avenue Improvement Project (GeoEngineers, 1994), contaminated soil was left in place

where it extended beyond the western property line of the site. A vapor extraction system reportedly was installed along the western property boundary in 1991. Five USTs were removed in 1996. Based on the CSCSL database information, soil and groundwater were confirmed as contaminated with petroleum products in 2009. Based on Ecology files reviewed for this site, PCS may be present along the western boundary of this site.

This site is upslope from and adjacent to the project. Contamination is known to be present on the site and may be present in the 120th Avenue NE roadway. Because 3 feet of excavation is proposed for a cut slope or retaining wall on the west side of this site, the site is considered a moderate risk to the project.

Former VIP Cleaners (23)—The Former VIP Cleaners site was occupied by a dry cleaner in 1985. Based on its short occupancy of the site, the dry cleaner was likely a drop-off location rather than a dry cleaning plant. Accordingly, it is considered unlikely that widespread solvent contamination has occurred. This property is not located adjacent to the NE 4th Street/120th Avenue NE corridor. This property is considered a low risk to the project.

Former Texaco Gas Station (24)—The Former Texaco Gas Station site was occupied by a gas station from at least 1959 to 1970. This site is listed on the state CSCSL, LUST, UST, and ICR databases. Three USTs, reportedly installed in 1989/1990, are still in use. Soil and groundwater contamination were identified on this site in 1990. Interim cleanup reports were received by Ecology for this site during 1991 to 1994. Five USTs reportedly were removed in 1996. This site is the western limit of the project corridor. It is unlikely that contamination, if present, would be encountered because earthwork will be limited to removing existing pavement to construct the new alignment; no excavation is anticipated. Therefore, the site is considered a low risk to the project.

Former Gas/Service Station (25)—The Former Gas/Service Station site was occupied by a gasoline station from 1956 to at least 1975. Based on the site photo from archived assessor records, it appears that the gasoline USTs and tanks were located west of the former site building.

This site is identified on the state LUST, UST, and ICR databases as Avis Rent-A-Car. PCS and petroleum-contaminated groundwater were encountered in 1989 during the removal of a waste oil UST and a gasoline UST south of the site building. Approximately 19 tons of contaminated soil were excavated and disposed of offsite. Petroleum- and benzene-contaminated soil was left in place beneath the building and PCS was left in place beneath utilities east of the waste oil UST excavation.

Based on the *Report on Groundwater Monitoring and Investigation and Cleanup of Petroleum Contaminated Soils at the Avis Rent-A-Car Sales Lot* that was prepared by Petroleum Services Unlimited (Pacific Northern Environmental Corporation [PNEC], 1991), a Phase II environmental site investigation was conducted on the property in 1991. The Phase II report was not available for review at Ecology. The PNEC report included the following information:

- Diesel-contaminated soil identified north of the site building was inferred to be the result of a former UST in this location. Contaminated soil was removed from this area except along the north wall of the building, due to the potential for structural damage. PCS was also left along the northern extent of the excavation, where contamination was reportedly below regulatory cleanup levels.
- Groundwater on the north portion of the site contained gasoline and BTEX VOCs. Monitoring well samples collected five months after initial discovery reportedly contained gasoline and mineral spirits contamination above regulatory cleanup levels in one well (MW3, located directly north of the site building). The mineral spirits contamination was concluded to have migrated onto the site from the adjoining dry cleaning site to the east.
- Benzene contamination was identified above cleanup levels in monitoring well MW6, located north of MW1 and adjacent to NE Bellevue-Redmond Road.
- A 16-inch concrete sewer pipe was discovered along the eastern boundary of the site. Excavation of this pipe led to the discovery of a 4-inch concrete pipe originating on the Bakker's Fine Dry Cleaning site that was connected to the 16-inch pipe. Water was reportedly discharging from the 4-inch pipe onto the Former Gas/Service Station site. Water collected from this pipe had concentrations of trichloroethylene at 11 parts per billion (ppb) and tetrachloroethylene at 1,600 ppb, which are both above regulatory cleanup levels.
- Based on the discovery of the leaking pipe from the dry cleaner property, groundwater samples from three monitoring wells were analyzed for chlorinated organic compounds. MW3 contained levels of trichloroethylene and tetrachloroethylene above regulatory cleanup levels.
- Monitoring well sampling appeared to be limited to three monitoring wells north of the site building. One monitoring well was installed west of the site building. Based on the site map in the report, it appears that this monitoring well was located between the site building and the former gas station pumps and USTs; however, no investigation of this area was documented.
- Based on Figure 6 in the report, a new UST and gas pump had been installed south of the site building prior to 1991.

Based on the UST database information, one UST was removed in 1996 and a second UST was "temporarily closed in place" in 2003. Based on current assessor records, the site building was demolished in 1999.

This site is considered a high risk to the project because (1) known gasoline- and diesel- range petroleum, benzene, mineral spirits, and chlorinated solvent

contamination is present and may be migrating off-site; (2) the former gasoline USTs may still be present on site; and (3) the City would acquire this property.

Former Dry Cleaner Office Building (26)—The Former Dry Cleaner Office Building site is located between a former dry cleaning plant and a former gas station. The site building was constructed as a bank in 1961 and later used as an office building for the dry cleaning plant located on the adjacent property to the east. No dry cleaning operations were documented for this site. However, the dry cleaning plant had documented practices of dumping solvents down floor drains, and an underground drain pipe discharging solvent-contaminated water was identified on this property during investigations on the adjacent gas/service station to the west. This property is considered a moderate risk to the project because it was associated with a contamination source property, it has known contamination exiting the western property boundary, and because the City would acquire this site. If the City acquires the adjoining dry cleaning plant property and this site, it may be required to clean up both sites.

Former Bakker's Fine Dry Cleaning Plant (27)—The Former Bakker's Fine Dry Cleaning Plant building was originally occupied by a dry cleaning facility from 1959 until at least 2005, and is currently used as a Barrier Mercedes Benz showroom. Based on GeoEngineers' summary of Ecology files reviewed for the 120th Avenue Improvement Project (GeoEngineers, 1994) and our Ecology file review for this site, four USTs were removed from the site in 1989. The USTs reportedly were used to store Stoddard solvent, diesel fuel, distillates, and solvents. The USTs were excavated from two adjoining locations immediately northeast of the existing building. An Ecology representative was on site during the tank removal.

"Minor" water seepage was reported at a depth of approximately 8 feet bgs. This water was reportedly from a leaking drain tile and was not considered groundwater. Discoloration or iridescent sheens were noticed in soil and water near the distillate tank and solvent tank excavation and a petroleum odor was also detected. It was reported that a 4-inch tile drain, which was connected to two floor drains inside the building and drained to the Stoddard solvent tank, was leaking into the soil in the area of the tanks. According to an interview with the operator of the facility, occasional "accidental" spills occurred during cleanup that discharged Stoddard solvent directly into the building floor drains. The tile drain was reportedly replaced with plastic drain line.

Soil samples obtained from the four sides and bottoms of each of the two excavations were analyzed for TPH. One sample, taken from the bottom of one of the excavations, was also analyzed for chlorinated organic compounds. Soil samples were below the regulatory cleanup levels for diesel-range petroleum hydrocarbons and non-detect for the one soil sample analyzed for chlorinated organic compounds. Because the water in the excavation was reportedly from the leaking drain tile and was reportedly removed with the excavated soil, no groundwater samples were analyzed.

An additional UST was reportedly installed in 1989 to store Stoddard solvent. Based on maps in the Ecology file, it appears that the UST was installed in the location of the former USTs. The 1989 UST was removed in 1999. At this time, three soil samples reportedly were taken on the east, west, and south walls of the excavation and analyzed for petroleum hydrocarbons. Laboratory test results reportedly indicated that the soil samples were below regulatory cleanup levels for petroleum.

Solvent spills associated with poor housekeeping practices were reported for this property, and only limited soil sampling and no groundwater sampling was conducted on this site. This site is considered a high risk due to the relatively high expense of remediating solvent contamination and because the City would acquire this site.

Former Priority Publishers (28)—The Former Priority Publishers site was occupied by a printing company in 1985. Although solvents and metals are typically used in printing operations, it is unlikely that widespread contamination occurred due to the short occupancy of the site by a printing company. No excavation is proposed for this site. The site is considered a low risk to the project.

Barrier Volvo (29)—The Barrier Volvo site is occupied by a car showroom and service garage. The site is not listed on a state or federal database that would indicate that contamination is present. The site is considered a low risk to the project because, although petroleum products are used and stored on the site, no excavation is proposed on this property.

Barrier Mercedes (30)—The Barrier Mercedes site includes a service garage. This site is listed on the state LUST, UST, and ICR databases. Soil contamination associated with a LUST was documented in 1994. Cleanup was started in 1994 and reportedly completed in 1995. In 1996, two USTs were removed and an interim cleanup report was submitted to Ecology. Groundwater reportedly flows to the northwest at 2 to 4 feet bgs. This property is considered a low risk to the project because, although contamination is present on the property, groundwater, if contaminated, reportedly flows away from the project corridor and only 1 to 2 feet of excavation is proposed along the eastern portion of the property.

Office Building (31)—The Office Building site was formerly occupied by a residence that was heated with oil. No other land uses of concern were noted and no excavation is proposed on this property. This site is considered a low risk to the project.

Barrier Porsche (32)—The Barrier Porsche site building, constructed in 1969, was historically heated with oil. The building was occupied by a bakery until 1996 and was remodeled as a car showroom in 2003. The building includes a service garage. It is unknown whether the heating oil UST has been removed and/or if a heating oil spill has occurred on the site. This property is considered a moderate risk to the project because of the historical and current use of

petroleum products on the site, 10 to 15 feet of excavation is anticipated along the western boundary of this property for a cut wall, and the City anticipates acquiring this property.

Accutint (33)—The Accutint site has been occupied by up to three automobile repair shops since 1969. The site was occupied by a machine shop in 1980 and by an ornamental iron shop in 1969. Petroleum products and metals were likely used and stored on this site. The site is considered a low risk to the project because it is not adjacent to the NE 4th Street/120th Avenue NE corridor, no excavation is proposed on the site, and it is not listed on a state or federal database that would indicate that contamination is present.

Midas Auto Repair (34)—The Midas Auto Repair site has been occupied by up to three auto repair shops since 1969. Petroleum products were likely used and stored on this site. The site is considered a low risk to the project because it is not adjacent to the NE 4th Street/120th Avenue NE corridor, no excavation is proposed on the site, and it is not listed on a state or federal database that would indicate that contamination is present.

Former Printing Company/Auto Repair Shop (35)—The Former Printing Company/Auto Repair Shop site was historically occupied by several printing, photography, and gold and silver plating businesses between 1985 and 2000. Each business was only listed for one year in the city directories reviewed. An engraving business occupied the site from 1990 to 2000, and up to seven auto repair shops and two auto parts companies occupied the site between 1980 and 2000. Based on these site uses, metals, solvents, and petroleum products were likely used and stored on the site. The site is listed on the PADS database. The site is considered a low risk to the project because limited excavation is proposed on the site (1 to 2 feet) and it is not listed on a state or federal database that would indicate that contamination is present.

Former Printing Company (36)—The Former Printing Company site was historically occupied by Graphic Advertising Services (1985), Newsletters, Inc. (1990-91) and Crown Printing (1990-91). These businesses typically use metals and solvents during their printing operations; however, printing/graphics companies occupied the site for a relatively short time. Groundwater is likely relatively shallow in this area and dewatering may be required associated with the approximately 5 to 10 feet of excavation proposed along the eastern edge of the property. This property is considered a moderate risk to the project based on the types of hazardous materials associated with the historical site uses and the proposed excavation.

Former Safeway Maintenance Shop (37)—The Former Safeway Maintenance Shop site includes four large warehouses, an office building, a recycling center, and a maintenance shop. Safeway owned this property until 2007, when the property was sold to WR-SRI 120th LLC. The site is listed on the state ICR and SPILLS database. Ecology files for this site and the adjoining Safeway site to the north indicate that seven areas of concern (four UST nests, two oil/water

separators, and a 10-gallon spill of petroleum into the stormwater system) were identified in 2005. All sites have been reportedly cleaned up and no groundwater contamination was identified.

Groundwater may be encountered during the 2 to 4 feet of excavation for proposed ground improvements along the western boundary of this site. However, this property is considered a low risk to the project because the sources of contamination and associated PCS have been removed and because groundwater reportedly was not impacted.

K&L Distributors (38)—The K&L Distributors site is listed on the state CSCSL-NFA, UST, ICR, and VCP databases. PCS and petroleum-contaminated groundwater were identified in 1998. A final cleanup report was submitted in 1998 and an NFA status was obtained from Ecology. Two USTs that were installed on the property in 1981 were removed in 2008. No other information was given as to whether soil and/or groundwater contamination was encountered during the 2008 tank removal/closure. This property is considered a low risk because limited excavation (2 feet in depth) is anticipated on this property for a retaining wall.

Barrier Audi (39)—The Barrier Audi site is listed on the state CSCSL, LUST, UST, VCP, and ICR databases. PCS was documented in 1996 when three USTs were removed from the site. The site was listed as cleaned up in 1996. However, groundwater was found to be contaminated with petroleum products in 2008 and a remedial assessment is in progress. This property is considered a low risk to the project because the location of the service garage is at the west end of the site building (at least 300 feet away) and because limited clearing and grading (1 to 2 feet) is anticipated along this property.

Railroad Tracks (40 and 41)—Railroad Tracks cross 120th Avenue NE from these parcels to the Safeway site. Railroad ties are commonly treated with creosote as a wood preservative. Because creosote contamination, if present, is likely limited to shallow surface soils, this site is considered a low risk to the project.

Former Safeway Aboveground Tank (42)—Based on aerial photographs, an aboveground storage tank (AST) was located on the Former Safeway Aboveground Tank site from at least 1990 to 2007. The tank was located approximately 75 feet from the 120th Avenue NE roadway. The type of material that was stored in the AST is not known. This property is considered a low risk to the project because, although an AST that may have been used to store bulk petroleum was located on this property, only limited clearing and grading (1 to 2 feet) is proposed at this site.

Safeway (43)—The Safeway site includes a truck repair building and a fuel station. This site is listed on the state CSCSL-NFA and UST databases. Nineteen USTs were removed from this site; nine in 1996, six in 2007, and four in 2009. One additional exempt UST is present. Ecology files for this site and the adjoining Former Safeway Maintenance Shop site to the south indicate that seven areas of

concern (four UST nests, two oil/water separators, and a 10-gallon spill of petroleum into the stormwater system) were identified in 2005. All sites have been reportedly cleaned up and no groundwater contamination was identified. This site received an NFA determination from Ecology in 2009.

Groundwater may be encountered during the 15 feet or more of excavation that is anticipated along the western property boundary for a cut wall. However, this property is considered a low risk to the project because the sources of contamination and associated PCS have been removed and because groundwater reportedly was not impacted.

International Paper (44)—The International Paper site building historically was heated with oil. Two USTs associated with a former tenant, Willamette Valley Lumber, were documented in archived tax assessor records. This site is listed on the state LUST, UST, and ICR databases. Based on Ecology records, one diesel UST and one gasoline UST were removed southeast of the building (excavation #1), and one diesel UST and one heating oil UST were removed northeast of the building (excavation #2). The tank removal took place in 1995. PCS was excavated, treated on site, and used to backfill the tank excavations. However, a groundwater sample taken from excavation #2 at 10 feet bgs had diesel-range petroleum concentration of 18,000 micrograms/liter (µg/l), which is significantly above the MCTA Method A cleanup level of 500 µg/l.

This site is considered a low risk to the project because contaminated soil has been remediated to below MTCA cleanup levels and groundwater, if contaminated, is not likely to be encountered during the proposed 2 to 5 feet of excavation on the southeast portion of the property.

Metro Bus Service Garages (45)—The King County Metro Bus Service Garages site includes two service garages constructed in 1977. This site is listed on the CSCSL, LUST, UST, ICR, and SPILLS databases. Twenty-three USTs were installed on this property between 1964 to 1989. The eight USTs installed in 1989 are still in use. The rest were removed, closed in place, or had a “change of service” in 1996. Based on Ecology files reviewed for the property, the site USTs are located in the northeast quarter of the property, approximately 500 feet east of the project corridor. Reports reviewed at Ecology documented that groundwater in this area flows to the northeast toward the West Tributary of Kelsey Creek. Although 5 feet or more of excavation is anticipated along the northwest portion of this property for a retaining wall and culvert replacement, this property is considered a low risk to the project because the source of contamination is located 500 feet from the project corridor and because groundwater reportedly flows to the northeast, away from the project corridor.

Eastside Staple and Nail (46)—The Eastside Staple and Nail site was occupied in 1996 by Absolute Coatings, a wood finish manufacturer. Although solvents and petroleum products are typically used in wood finishing products, it is unlikely that contamination is present in the road ROW to be acquired due to the short and relatively recent Absolute Coatings occupancy, and because the building is

located more than 50 feet from the right-of-way (ROW) to be acquired. Limited clearing and grading (1 to 2 feet in depth) is proposed in this location. This property is considered a low risk to the project.

Pella Windows (47)—The Pella Windows site building historically was heated with oil. In 1969, the property was occupied by Sunset Equipment Company. This site is considered a low risk to the project because, based on the projected groundwater flow to the southwest and limited excavation planned in this location (approximately 2 feet in depth), it is unlikely that petroleum contamination would be encountered during project construction.

Icos (48)—The Icos site is listed on the state UST and hazardous waste manifest databases. One UST was removed from this site in 1996. No other information was given on whether soil and/or groundwater contamination was encountered during the tank removal. Based on the hazardous waste manifest data, halogenated and non-halogenated solvents have been used/stored on this site since 1997.

The groundwater flow in this portion of the project corridor is likely to the southwest and limited excavation (approximately 2 feet in depth) is planned on the property. This site is considered a low risk to the project because it is unlikely that petroleum or solvent contamination would be encountered during project construction.

Safeway Bakery (49)—The Safeway Bakery site was formerly heated with oil. The 15,000-gallon UST was located north of the existing building and was removed from the site around 1996. Petroleum hydrocarbons were not detected in soil samples taken at the walls and bottoms of the tank excavations. This site is considered a low risk because heating oil is relatively low in toxicity and is not particularly mobile in the subsurface environment. Therefore, contamination, if encountered, is not likely to be widespread.

Railroad Tracks (50)—Railroad Tracks cross 120th Avenue NE from this site to a bakery facility owned by Safeway. Railroad ties are commonly treated with creosote as a wood preservative. Because creosote contamination, if present, is likely limited to shallow surface soils, this site is considered a low risk to the project.

Grainger (51)—The Grainger site was formerly occupied by a residence that was heated with oil. It is not known whether a heating oil spill has occurred on the site or whether the heating oil tank was removed or decommissioned when the existing building and parking lot were constructed.

Although 5 feet or more of excavation is anticipated associated with replacing the existing culvert on the southeast corner of this site, the potential for encountering contaminants is considered to pose a low risk to the project because heating oil is relatively low in toxicity and is not particularly mobile in the subsurface environment. Therefore, contamination, if encountered, is not likely to be widespread.

Lowe's (52)—The Lowe's site was formerly occupied by a residence that was heated with oil. The existing Lowe's building was constructed in 1993. This site is listed on the state UST, LUST, and ICR databases. PCS associated with a LUST was documented on the site in 1992. In 1995, a final cleanup report was submitted to Ecology and the property was reported as cleaned up. In 1996, one UST was closed in place and two USTs were removed. No other information was given as to whether soil and/or groundwater contamination was encountered during the 1996 tank removal/closure.

The groundwater flow in this portion of the project corridor is likely to the southwest, and only clearing and minor grading (1 to 2 feet in depth) is proposed. This site is considered a low risk to the project because it is unlikely that petroleum or solvent contamination would be encountered during project construction.

4.4 Complexity of Hazardous Materials Cleanup

The WSDOT Guidance and Standard Methodology for WSDOT Hazardous Material Discipline Reports (October 2010) recommends discussing whether the complexity of mitigation on a site would be straightforward or complicated. These terms are defined by WSDOT as:

- **Straightforward**—Sites determined to be straightforward are typically small to medium in size and the potential contaminants are not extremely toxic or difficult to treat. Examples of straightforward sites are gas stations, automobile repair shops, most USTs, ASTs, and buildings with asbestos or materials that contain lead-based paint.
- **Complicated**—Sites determined to be complicated consist of sites with widespread contamination or potential contaminants which are difficult to treat. Complicated sites will typically involve additional research, investigation, and possibly regulatory involvement. Examples of complicated sites are dry cleaners, wood treating operations, metal plating facilities, or other operations that use or used large amounts of hazardous materials.

To expand the roadway, the City will acquire strips of land from most adjacent properties, including several of the sites of concern. These strips of land typically have been used as sidewalks, landscaped areas, and parking lots. Contamination present on these strips of land would presumably have migrated toward the roadway from the main portion of the property. The complexity of cleanup will be relatively straightforward for these strips of land because cleanup will be limited to disposal of excavated materials.

A significant portion of the Dodge of Bellevue property would be acquired by the City to extend NE 4th Street from 116th Avenue NE to 120th Avenue NE. The southern Mutual Materials parcel would be acquired by the City for an addition onto the Best Buy building to mitigate for a partial building loss under Option 1. The Barrier Porsche site, the Former Bakker's Fine Dry Cleaning Plant site, the

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Former Dry Cleaner Office Building site, and the Former Gas/Service Station site would be fully acquired by the City to extend 120th Avenue NE from NE Bellevue-Redmond Road to NE 8th Street. For these sites, the City may be liable under MTCA for cleanup of contamination generated on these sites, including remediation of nearby properties where contamination has migrated from the acquired sites.

PCS associated with a leaking waste oil UST and an oil/water separator pipe trench was identified and removed from the Dodge of Bellevue site. Petroleum-contaminated groundwater is known to exist on the adjoining property to the north of Dodge of Bellevue and may extend to this site. Because contamination is limited to petroleum hydrocarbons, remediation of this site would likely be relatively straightforward.

Contamination at the Mutual Materials Company site, if present, is likely limited to residual hydrocarbons from the former fuel USTs; therefore, remediation of this site would likely be relatively straightforward.

For the Barrier Porsche site, contamination is likely limited to petroleum hydrocarbons released by the site auto repair shop and/or from the former heating oil UST. Remediation of this site would likely be relatively straightforward.

Soil and groundwater is known to be contaminated with petroleum, benzene, and solvents on the Former Bakker's Fine Dry Cleaning Plant site, the Former Dry Cleaner Office Building site, and the Former Gas/Service Station site. Previous site investigations suggest that contamination may extend offsite. Therefore, remediation for these properties is considered complicated.

5.0 Environmental Effects

Hazardous materials could affect the project during construction and operation of the proposed roadway. The following sections describe possible direct, indirect, and cumulative effects of the proposed project. No discussion of the environmental effects of a no-build alternative is included. Recommended further investigations and mitigation measures are summarized after the effects sections.

5.1 Direct Effects on Hazardous Materials

Direct effects are caused by the action and occur at the same time and place as the project. For example, hazardous materials may be encountered or generated directly due to the construction or operation of the NE 4th Street/120th Avenue NE Corridor Project.

5.1.1 Effects During Construction

Potential Soil and Groundwater Contamination

Proposed construction activities include cut slopes, retaining walls, over-excavating unsuitable soils, and a culvert replacement. Contaminated soil may be encountered during excavation associated with these project components.

Shallow groundwater (0 to 5 feet bgs) is anticipated in the vicinities of Lake Bellevue and the West Tributary to Kelsey Creek. Perched groundwater (5 to 20 feet bgs) may be encountered along the remainder of the corridor. Therefore, contaminated groundwater may be encountered during excavation activities.

Spills of hazardous materials used in construction, such as fuels, lubricants, and hydraulic fluids, can occur during construction and introduce contaminants to the environment. Chemicals that can be released from uncured asphalt used for road surfacing also can be toxic. Use of these and other construction materials presents some risk to the environment.

Health and Safety Concerns

Workers would be at risk from exposure to hazardous materials and waste encountered or generated during construction because of the duration of their potential exposure and proximity to areas where such materials may be encountered or used. The primary means of exposure would be inhalation of dusts or vapors containing hazardous substances generated during excavation in areas with contaminated soils.

Encountering unanticipated contamination could expose workers to potentially toxic concentrations and could create other hazardous situations, such as explosive environments. Air quality could be affected, with associated health concerns as a result of disturbing volatile substances during construction.

Minor spills of materials used in construction, such as fuels, lubricants, and hydraulic fluids, can occur during construction operations. Exposure to such

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accidental releases could damage skin, eyes, lungs, and other organs. Unless a spill is a major event, it is not likely to present significant risk to human health. Chemicals potentially released from uncured asphalts in road surfacing also present some exposure risk. All workers have a legal right to know about potential hazardous conditions in the workplace and should be trained in hazard recognition, as well as how to respond to and report such conditions.

Public health risk could also arise as a result of accidental release or diversion of contaminants to environmentally sensitive areas such as surface waters, groundwater, public drinking water systems, or public air spaces. Releases to such areas could provide direct or indirect pathways of contaminant exposure to the general public.

Issues related to health and safety issues discussed here are specific to potential exposure to hazardous materials encountered or generated during construction activities. Physical hazards of construction activities are not addressed.

5.1.2 Effects During Operation

Effects of hazardous materials from normal operations of the roadway are primarily associated with runoff of contaminants entrained in stormwater. Contaminants likely to be in stormwater runoff include petroleum-based fuel and lubricants, compounds from tires, and automobile engine coolants such as ethylene glycol. Stormwater runoff currently is not contained or treated. Stormwater and water quality treatment facilities would be designed to collect and retain pollutants from traffic operations.

Other operation effects include potential pesticide use as part of a vegetation management program and potential catastrophic spills of hazardous materials resulting from vehicle accidents.

5.2 Indirect Effects on Hazardous Materials

Indirect effects are associated with a project and occur later in time or farther removed in distance, but they are still reasonably foreseeable (e.g., induced land development from highway projects). Potential indirect effects associated with the project include:

- Contamination may be discovered and addressed by the project or subsequent development along the corridor that otherwise would have remained in place or potentially migrated.
- Contamination may be cleaned up faster to accommodate project construction.
- Contamination may be prevented by removing potential hazardous material release sources, such as USTs, before a release occurs.
- Contaminated materials may be uncovered, allowing more direct exposure to the public.

- Contamination may be spread as a result of construction (for example, a new utility corridor could provide a new conduit for contamination to spread through).

5.3 Cumulative Effects on Hazardous Materials

Cumulative effects result from the incremental effects of the action when added to other past, present, and reasonably foreseeable actions, regardless of the agency or person initiating the other actions. At this time, reasonably foreseeable projects in the area include:

- Spring District—Wright Runstad & Company, in joint venture with Shorenstein Properties, LLC has planned the development of the Spring District, a 36-acre mixed-use urban neighborhood within the Bel-Red Corridor. The Spring District will consist of up to 1,000 multi-family residences, over 3,000,000 square feet of office space and several high-density buildings that will provide retail services. The proposed development will be located at the northeast corner of 120th Avenue NE and NE 12th Street.
- Sound Transit's East Link Project—This project will consist of an electric light rail train system that will connect areas between Seattle and Overlake Transit Center in Redmond. It is anticipated that the system will have a station just east of the intersection of 120th Avenue NE and NE15th/16th Street, located in the Spring District development. This project is expected to be completed between 2016 to 2021.
- Construction of the light rail will result in the acquisition of property at 1445 120th Avenue NE. Since not all of the property will be used for the light rail track, some portion of it will be redeveloped. As this is already a commercial property, the nature of the land use is unlikely to change significantly.
- NE 15th/NE16th Streets/124th Avenue NE—In concert with East Link light rail project, NE 15th Street/NE 16th Street will be constructed through to 124th Avenue NE, which will be widened to five lanes. The anticipated traffic flow pattern from Downtown to eastbound State Route (SR) 520 is NE 4th Street to 120th Avenue NE to NE 15th/NE 16th Street to 124th Avenue NE to SR 520.

No adverse cumulative effects on hazardous materials are anticipated. A positive cumulative effect would be that less contamination would exist in the study area if cleanup activities are conducted associated with the NE 4th Street/ 120th Avenue NE Corridor project or one of the projects above.

5.4 Recommendations for Further Investigations

Further investigation is recommended during conceptual design and prior to property acquisition for this project. A limited Phase II environmental site

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assessment is recommended for soil and groundwater sampling on the moderate and high-risk sites of concern that would be partially or fully acquired for the project.

On the moderate risk sites where only a strip of land will be acquired and no known contamination is present, sampling should be conducted at regular intervals where excavation is proposed (i.e., retaining walls, foundations, and cut slopes). Sampling should be conducted to the maximum depth of excavation/proposed structure. Specifically, these sites of concern are Bellevue School District #405, and the Former Printing Company.

On the other moderate risk sites that the City would partially acquire that have, or have had, a documented hazardous materials release on the property, soil and groundwater sampling should be conducted to determine the concentrations and extents of contamination on the portions of these sites that would be acquired. Based on these findings, further soil and groundwater investigations may be warranted to determine whether contamination has migrated off of these areas to adjacent properties. These sites of concern are Former Chrysler/Jeep, Dodge of Bellevue, Best Buy, Bellevue School District Bus Yard, Mutual Materials, Shell Gas Station, and Barrier Porsche. Based on this knowledge, the City may be able to negotiate cleanup responsibilities and costs with the existing owners prior to property purchase.

On the high- and moderate-risk sites that the City would fully acquire, soil and groundwater sampling should be conducted on and off site to determine the concentrations and extents of contamination on these sites and to determine whether contamination has migrated to adjacent properties. Specifically, these sites of concern are Former Gas/Service Station, Former Dry Cleaner Office Building, and Former Bakker's Fine Dry Cleaning Plant. Based on this knowledge, the City may be able to negotiate cleanup responsibilities and costs with the existing owners prior to property purchase.

Construction monitoring is recommended in the project corridor where clearing and grading is proposed on all sites of concern that are adjacent to the ROW. In accordance with the WSDOT Standard Specifications, the City or the general contractor will complete a spill prevention control and counter measures plan for dealing with hazardous materials.

5.5 Mitigation Measures

5.5.1 Avoidance of Contamination

During conceptual engineering, the design team discussed whether the project could be constructed without purchasing the Former Bakker's Fine Dry Cleaning Plant, Former Gas Pump/Tanks, and Former Gas/Service Station properties, since the remediation of these properties is considered complicated. The design team concluded that acquisition of these properties likely will be required for the project.

Where avoidance of contaminated soils and/or groundwater is not feasible, several construction methods could be used to reduce the amount of potentially contaminated soil and/or groundwater is encountered. For example, it may be possible to surcharge peat soils in some locations rather than excavating the peat. If surcharging is not practical, stone columns or piles may be used to structurally support fill material placed over the peat.

5.5.2 Construction Planning

Several mitigation measures will be required as part of construction planning. These include:

- The construction plans will include procedures, including best management practices, that will be employed for construction of the project. The plans will include direction for spill prevention, control, and countermeasure plans; temporary erosion and sedimentation control plans; and plans for handling and disposal of known and unanticipated contamination.
- To ensure the use of appropriate procedures on health and safety monitoring, a site-specific Health and Safety Plan describing monitoring requirements and the use of personal protective equipment will be necessary.
- Because contaminated soil is likely to be encountered, a stockpile area should be designated for temporary storage of soils awaiting characterization results.
- If further soil investigations indicate that soils encountered during project construction are anticipated to be a dangerous waste, assignment of an identification (ID) number, along with planning for soil handling and disposal should be completed prior to construction. This would reduce soil handling time, as soils can be loaded onto trucks during initial excavation and hauled to treatment or disposal facilities.

Although many of the known and potentially contaminated sites that could affect the project have been identified, the possibility of encountering unknown contamination cannot be discounted. The WSDOT Construction Manual and WSDOT Environmental Procedures Manual provide guidelines for addressing discoveries of unanticipated contamination.

It is necessary during earthwork activities that individuals be present on site who are trained in recognizing potential contamination and reporting procedures. Failure to recognize such hazards can lead to spills or injury, with the associated response and health implications.

5.5.3 Disposal Options for Contamination

Contamination may not be avoidable in some areas of the NE 4th Street/ 120th Avenue NE corridor where earthwork is anticipated. If contamination is

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encountered during project construction, mitigation measures will be taken to handle the contaminated materials.

Possible mitigation measures include:

- Adjusting construction methods to minimize the volume of contaminated soil and/or groundwater encountered.
- Properly managing and disposing of contaminated soil and/or groundwater encountered.

If soil contamination is encountered during construction, excavated soil will be stockpiled and tested to determine its regulatory classification and the most cost-effective management strategies. Concentrations of hazardous materials should be evaluated relative to MTCA Method A cleanup standards to assess whether the soils would be of concern. MTCA Method A or B cleanup levels could be used to determine disposal strategies where small amounts of contaminated soils are present, where soils need to be removed and disposed of quickly, and where soils can be easily used as subgrade road material.

Soils failing the Toxicity Characteristic Leaching Procedure (TCLP) or exceeding other dangerous waste criteria would need to be handled as Washington State dangerous waste.

Some specific options to mitigate for encountered contamination are discussed below.

Petroleum

PCS and petroleum-contaminated groundwater associated with gasoline stations, auto repair shops, and heating oil tanks will likely be encountered during project construction. Mitigation options for petroleum contamination differ depending on the media contaminated. Mitigation options for petroleum contaminated soil and groundwater are discussed below.

Soil

PCS will be evaluated relative to current MTCA Method A cleanup levels or to Ecology's risk-based TPH criteria. Method A cleanup levels are conservative and are not risk based. Soil cleanup actions using Method A cleanup levels would likely result in more soil having to be remediated than would be required under a risk-based cleanup. Method A would be easier to implement and would allow for more rapid determination of remediation requirements than would be realized using the risk-based evaluation. Use of the risk-based approach, however, would result in more flexible cleanup levels and would allow more PCS to remain on site or to be used as road fill material in the project area.

Soil contamination encountered during construction will require stockpiling and testing to assess the regulatory classification of the soil and the most cost-effective remediation strategy. Options for reusing and disposing of PCS, not in prioritized order, include the following:

- Soils containing petroleum contamination at concentrations below MCTA Method A cleanup levels are not restricted in use and could be used similarly to non-contaminated soils.
- Soils containing petroleum contamination at concentrations above MCTA Method A cleanup levels but below site-specific risk-based contaminant concentrations could be placed under roadways if adequate fill capacity exists and the soils meet geotechnical fill requirements.
- Petroleum hydrocarbons-contaminated soils that exceed risk-based contaminant concentrations, or soil in excess of the quantity required for fill, could be transported to a thermal treatment facility. Alternatively, the soil could be disposed at a landfill permitted to accept such contaminated soils.

Groundwater

If contaminated groundwater is generated during construction, containerization and characterization will be required to determine the approach to treatment. Groundwater that does not exceed MTCA Method A cleanup levels and conforms to criteria defined in Washington Administrative Code (WAC) 173-201A, Water Quality Standards for Surface Waters in Washington State, may be discharged directly or indirectly to the ground surface or surface water.

Groundwater containing contaminants at concentrations above MTCA Method A cleanup levels will be treated to meet requirements for discharge, depending on the contaminants and their concentrations. After treatment, discharge could include:

- Discharge to the ground surface
- Discharge to surface water
- Discharge to a publicly owned treatment works
- Off-site disposal at a private treatment, storage, and disposal (TSD) facility

Discharge of treated water to the ground surface will require conformance with MTCA Method A cleanup criteria. Direct or indirect discharge to surface water will require conformance with criteria defined in WAC 173-201A, Water Quality Standards for Surface Waters in Washington State, and will require permitting through Ecology. Discharge to a local sanitary sewer or to a TSD facility will require a temporary waste water treatment permit and conformance with publicly owned treatment works or facility-specific criteria.

Metals, Solvents, Polycyclic Aromatic Hydrocarbons (PAHs), Creosote, and Polychlorinated Biphenyls (PCBs) Contamination

Metals, solvents, PAHs, creosote, and PCBs associated with printers, dry cleaners, railroad tracks, automobile repair shops, and engraving operations may be encountered during site construction. Mitigation options for these contaminants differ depending on the media contaminated. Mitigation options for soil and groundwater containing these contaminants are discussed below.

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Soil

Soil contamination encountered during construction will require stockpiling and testing to determine its regulatory classification and the most cost-effective management strategies. Concentrations of contaminants will be evaluated relative to MTCA Method A cleanup standards to assess whether the soils would be of concern. MTCA Method A cleanup levels may be used to determine disposal strategies where small amounts of contaminated soils are present, where soils need to be removed and disposed of quickly, and where soils can be easily used as subgrade road material.

Soils failing the TCLP or exceeding other dangerous waste criteria must be handled as Washington State dangerous waste.

Generators of dangerous waste are required to obtain an ID number for each site. This can be done after the soils have been determined to be dangerous waste. If pre-construction explorations are used to determine where dangerous wastes will be encountered, an ID number can be obtained and soil handling and disposal procedures can be set up prior to construction. Options for reusing and disposing of the contaminated soils include:

- Soils that do not exceed Method A cleanup levels could be placed under roadways if adequate fill capacity exists and the soils meet geotechnical fill requirements.
- Soils that do exceed the Method A cleanup levels or do not meet geotechnical fill requirements could be transported to and disposed at either a treatment facility or a land reclamation facility based on their characteristics.
- Soils designated as dangerous waste could be transported to a hazardous waste landfill or incinerator.

Groundwater

Where contaminated groundwater is generated during construction dewatering, containerization and characterization will be required to determine the approach to treatment. Groundwater that does not exceed MTCA Method A cleanup levels may be discharged directly or indirectly to the ground surface or surface water, provided that discharge conforms to criteria defined in WAC 173-201A, Water Quality Standards for Surface Waters in Washington State.

Groundwater that contains contaminants at concentrations below dangerous waste criteria could be treated and discharged (1) to the ground surface, (2) to surface water, (3) to a publicly owned treatment works, or (4) to a private TSD facility. Discharge of contaminated water to the ground surface would require conformance with MTCA Method A cleanup criteria. Discharge directly or indirectly to surface water would require conformance with criteria defined in WAC 173-201A, Water Quality Standards for Surface Waters in Washington State, and permitting through Ecology. Discharge to a local sanitary sewer or to a TSD

facility would require conformance with the publicly owned treatment works or facility-specific criteria.

Groundwater that is designated as Dangerous Waste will require disposal at a hazardous waste TSD facility.

5.5.4 Hazardous Materials Disposal Costs

Soil

The following costs are for contaminated soil disposal only and do not include the cost of excavation or transportation to the selected disposal/treatment facility.

Petroleum-contaminated Soils

- Thermal Treatment—$30 to $35 per ton
- Landfill Disposal—$25 to $30 per ton

Metals-, Volatile Organic Compounds (VOCs), Creosote-, and Formaldehyde-contaminated Soil

- Landfill Disposal/Non-Dangerous Waste—$30 per ton
- Landfill Disposal/Dangerous Waste—$200-320 per ton
- Incineration/Dangerous Waste—$600 per ton

Groundwater

Groundwater treatment and/or disposal options include permitting for local discharge and/or off-site treatment and disposal.

- Permitting for Local Discharge—$2,500 to $10,000, depending on the type and level of contaminants present.
- On-site Treatment and Discharge—$2,500 to $5,000 per month, depending on the type and level of contaminants present and the volume of water discharged; discharge rate to municipal water treatment facility is $0.006 per gallon.
- Off-site Treatment and Disposal—$0.25 to $2 per gallon, depending on the type and level of contaminants present and volume of discharge.

5.5.5 Operational Mitigation Measures

Contaminants associated with normal operation of the NE 4th Street/ 120th Avenue NE corridor could potentially enter stormwater runoff. These contaminants include fuel and lubricants, compounds from tires, and automobile engine coolants such as ethylene glycol.

The proposed enhanced runoff treatment includes treating stormwater from additional impervious surfaces. This likely would be accomplished via bioretention in roadway planters. Because the amount of new impervious surface would be treated, no change in effect is anticipated.

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Appendix A
Hazardous Materials Policies and Regulations

Appendix B
Summary of Historical Findings

Appendix C
EDR Reports

Appendix D
Ecology Records Copies

[Appendices A through D are provided on the attached CD.]

City of Bellevue
Post Office Box 90012 • Bellevue, Washington • 98009 9012

June 1, 2011

Trevin Taylor
Washington State Department of Transportation
Highways and Local Programs Division
PO Box 47390
310 Maple Park Avenue
Olympia WA 98504-7390

Subject: No Effect Letter; NE 4th Street/120th Avenue NE Corridor Project, Bellevue, Washington

Dear Trevin:

We have prepared this No Effect Letter to assist the City of Bellevue (City) in meeting the requirements for Endangered Species Act (ESA) Section 7 coordination with the Washington State Department of Transportation (WSDOT) Highways and Local Programs Division (HWLP) and the Federal Highway Administration (FHWA), as described in Chapter 24.7 of the Local Agency Guidelines Manual. The federal nexus for this project is potential FHWA funding through WSDOT's HWLP. Supporting technical information for this No Effect Letter is documented in the project *Biological Resources Technical Report* (Shannon & Wilson, Inc. [S&W], 2011).

Project Description

The proposed project is located in Bellevue, Washington, which is located in King County (Section 28, Township 25 North, Range 5 East, Willamette Meridian). The City is proposing to extend NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE and complete comprehensive widening and realignment of 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way (see enclosed Action Area Map). Project elements include clearing and grading within the existing and acquired right-of-way, paving of the new roadway, constructing sidewalks and planting strips, and replacing a culvert beneath 120th Avenue NE at the West Tributary of Kelsey Creek.

The proposed project would result in an increase of 2.84 acres of currently pervious surfaces becoming impervious. Currently, no stormwater treatment is provided for impervious surfaces within the project corridor. The proposed project would provide stormwater treatment for 2.84 acres of new impervious surfaces and 1.81 acres of existing impervious surfaces, for a total of 4.65 acres to be treated. Where runoff treatment is provided, enhanced treatment measures would be used. The remaining 12.29 acres of impervious surfaces in the project corridor would not be treated. The project Environmental Classification Summary and supporting technical reports include more detailed project components.

Construction is planned for early 2012 and will take approximately four years to complete. The project is located in a commercial/light-industrial area, which is already subject to noise from surface streets, construction, and adjacent businesses. The proposed action is not anticipated to significantly increase noise levels beyond that of background noise levels.

Species Information

Based on ESA listings on the U.S. Fish and Wildlife Service (WSFWS) and National Marine Fisheries Service (NMFS) websites, accessed in April 2011, federally-listed species potentially present in King County include:

1. Grizzly bear *(Ursus arctos = U. a. horribilis)*
2. Gray wolf *(Canis lupus)*
3. Canada lynx *(Lynx canadensis)*
4. Marbled murrelet (*Brachyramphus marmoratus*)
5. Northern spotted owl *(Strix occidentalis caurina)*
6. Golden paintbrush (*Castilleja levisecta)*
7. Puget Sound Chinook (*Oncorhynchus tshawytscha*)
8. Coastal-Puget Sound bull trout (*Salvelinus confluentus*)
9. Puget Sound steelhead (*Oncorhynchus mykiss*)
10. Humpback whale (*Megaptera novaeangliae*)
11. Southern resident killer whale (*Orcinus orca*)
12. Steller sea lion (*Eumetopias jubatus*)
13. Bocaccio (*Sebastes paucispinis*)
14. Canary rockfish (*Sebastes pinniger*)
15. Yelloweye rockfish (*Sebastes ruberrimus*)

A review of the Washington State Department of Fish and Wildlife (WDFW) Priority Habitat and Species Database (WDFW, 2010a), WDFW SalmonScape mapping tool (WDFW, 2010b), the Washington State Department of Natural Resources Washington Natural Heritage Program (WNHP) rare plant species database (WNHP, 2010), and the City Drainage Basin Maps (Bellevue, 2010a and Bellevue, 2010b) indicated that no federally-listed plant or animal species have been mapped in the project vicinity.

Action Area

The Action area was determined based on anticipated limits of construction noise and stormwater effects (see enclosed Action Area Map). A field review of the action area was conducted by a Shannon & Wilson biologist on December 7, 2009; July 29, 2010; and March 8, 2011. Land use in the Action Area consists primarily of commercial/light-industrial activity and transportation corridors. Most of the action area is covered by impervious surfaces; much of the area was developed without stormwater treatment. Background noise levels are high due to traffic on 120th Avenue NE, Bel-Red Road, Interstate 405, adjacent side streets, and commercial activity.

The project corridor is located in two subbasins: the Sturtevant Creek subbasin to the south and the West Tributary of Kelsey Creek subbasin to the north. The West Tributary of Kelsey

Creek drains the northern third of the project corridor and Sturtevant Creek drains the southern two-thirds of the project corridor.

Available wildlife habitat in the Action Area is fragmented and is limited to the Sturtevant Creek and West Tributary of Kelsey Creek stream corridors, four wetlands (identified as Wetlands A, B, C, and D), and a small forested upland area. The West Tributary of Kelsey Creek is the only stream located within the project boundary or its immediate vicinity. The on-site reach includes the stream's headwaters within Wetland D, where it gradually flows within a 5-foot-wide active channel with a bed comprised of 6 inches of silt before entering a 36-inch culvert under 120th Avenue NE. The stream daylights approximately 260 feet downstream into a channel within Wetland C. The active channel in Wetland C is approximately 4 feet wide with a bed comprised of sand and well-rounded gravels. As the stream exits the 36-inch corrugated metal pipe under 120th Avenue NE, the ordinary high water mark for the stream fans out above the banks of the active channel and encompasses much of Wetland C.

Approximately 3,500 feet downstream of the project corridor, the West Tributary of Kelsey Creek passes through an outlet-control structure (see enclosed Photo A) and enters a culvert where it is conveyed below ground for approximately 2,000 feet to the south of Bel-Red Road (Photo B). This 2,000-foot underground pipe has several bends and is a fish barrier based on WDFW SalmonScape maps (WDFW, 2010b) and the City's basin map for the West Tributary of Kelsey Creek (Bellevue, 2010a). Downstream of Bel-Red Road, the West Tributary of Kelsey Creek joins Goff Creek, which is tributary to Kelsey Creek. Goff Creek then connects to Kelsey Creek, which drains through Mercer Slough into Lake Washington.

Sturtevant Creek originates at Lake Bellevue and flows south in a ditch adjacent to railroad tracks for approximately 600 feet before going into an underground pipe at approximately NE 8th Street (Photo C). Sturtevant Creek daylights again at NE 4th Street (Photo D) and flows south to where it crosses under I-405 (approximately 3,000 feet downstream of the project corridor). After it crosses I-405, Sturtevant Creek flows south to its confluence with Kelsey Creek/Mercer Slough. I-405 is a fish passage barrier based on WDFW SalmonScape maps (WDFW, 2010b) and the City's basin map for Sturtevant Creek (Bellevue, 2010b). Even if this fish barrier was removed, the piped portion of Sturtevant Creek would be considered another fish barrier (Photo E).

Impacts

Best management practices will be used during construction to prevent soils from being conveyed to the action area wetlands and streams. In addition, Lake Bellevue and a large, ponded area above a flood control structure in the West Tributary of Kelsey Creek would likely insulate lower sections from construction stormwater effects.

Stormwater treatment is proposed for the new pollution-generating impervious surfaces of the project. Based on the project *Water Quality Technical Report*, the project would result in increased levels of dissolved zinc and copper in stormwater (Parsons Brinkerhoff [PB], 2011). As described in the *Biological Resources Technical Report* (S&W, 2011), PB used the WSDOT Highway Runoff Dilution subroutine (HI-RUN) to determine when these increased dissolved zinc and copper concentrations would dilute to below the biological threshold (where salmonids have a behavioral change) in the Action Area water bodies.

Background dissolved zinc and copper concentrations were obtained for Kelsey Creek (downstream of its confluence with the West Tributary of Kelsey Creek) via Washington State Department of Ecology (Ecology) Environmental Information Management website (Ecology, 2011). No closer sources of baseline information for Sturtevant Creek or the West Tributary of Kelsey Creek were found. The HI-RUN calculations were completed for the months that salmon are expected to be in site streams (September through November). Based on these parameters, it appears likely (with 95 percent certainty) that Sturtevant Creek and West Tributary of Kelsey Creek would dilute to below the biological threshold for copper within 1 foot of stormwater discharge locations and for zinc within 1 to 6 feet of stormwater discharge locations.

Due to fish barriers at Bel-Red Road (for the West Tributary of Kelsey Creek) and I-405 (Sturtevant Creek), salmonids are not likely present until approximately 3,000 feet downstream of the project corridor in Sturtevant Creek and 5,500 feet downstream of the project corridor in the West Tributary of Kelsey Creek. Based on these distances, it is expected that dissolved zinc and copper associated with this project would be diluted to baseline conditions before reaching anadromous fish populations.

Effects Determination

No forested areas within the action area contain habitat elements suitable for either northern spotted owl or marbled murrelet, though avian species are not precluded from occasionally flying over the Action Area. The action area does not contain any prairie habitat that would be suitable for golden paintbrush. Grizzly bear, Canada lynx, and gray wolf habitat may occur in parts of eastern King County; however, no suitable habitat is located within the urban areas of King County. Therefore, the proposed project will have *no effect* on northern spotted owl, marbled murrelet, golden paintbrush, grizzly bear, Canada lynx, or gray wolf.

Marine species are precluded from the Action Area due to lack of marine habitat and the Ballard Locks in Seattle. Therefore, the proposed project will have *no effect* on humpback whale, southern resident killer whale, Steller sea lion, bocaccio, canary rockfish, or yelloweye rockfish.

Anadromous fish species potentially present in King County are precluded from the Action Area by culverts located 3,000 to 5,500 feet downstream of the proposed project that are documented as full barriers to upstream passage. Potential project construction and operation water quality impacts are not expected to reach salmonid populations (see impacts section above). Therefore, the proposed project will have *no effect* on Puget Sound Chinook, Coastal-Puget Sound bull trout, or Puget Sound steelhead.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) includes a mandate that NOAA Fisheries must identify essential fish habitat (EFH) for federally managed marine fish, and federal agencies must consult with NOAA Fisheries on all activities, or proposed activities, authorized, funded, or undertaken by the agency that

may adversely affect EFH. The Pacific Fishery Management Council (PFMC) has designated EFH for the Pacific salmon fishery, federally managed ground fishes, and coastal pelagic fisheries.

The habitat in the Action Area is freshwater habitat. Therefore, the project will have no adverse effect on pelagic or groundfish species managed by NMFS due to the lack of marine habitat.

The proposed project will not adversely affect habitat for Pacific salmon fishery species protected under the Magnuson-Stevens Act due to the following factors: lack of fish access to the Action Area due to barriers downstream, lack of prey population in Action Area stream reaches, construction stormwater impacts would be avoided/minimized with BMPs, and dissolved copper and zinc concentrations are expected to dilute to background levels before reaching anadromous fish populations.

In compliance with the Magnuson-Stevens Act, essential fish habitat was assessed for the project. It was determined that the project will not have an adverse effect on EFH.

Closure

This assessment satisfies WSDOT's and FHWA's responsibilities under Section 7(c) of the Endangered Species Act at this time. We are sending you this copy of our assessment for your files. We will continue to remain aware of any change in status of these species and will be prepared to reevaluate potential project impacts if necessary.

If you have any questions, or need additional information, please contact me by phone at (425) 452-7905 or by e-mail at PKrawczyk@bellevuewa.gov, or you may contact the City's biological consultant Becki Kniveton of Shannon & Wilson by phone at (206) 695-6673 or by e-mail at bsk@shanwil.com.

Sincerely,

Paul, Krawczyk, PE, PTOE
City of Bellevue
Transportation Department

Enclosures: References
Action Area Map
Photos

cc: Phil Segami, WSDOT Highway and Local Programs
Ken Oswall, PB
Becki Kniveton, Shannon & Wilson
City of Bellevue Project File

References

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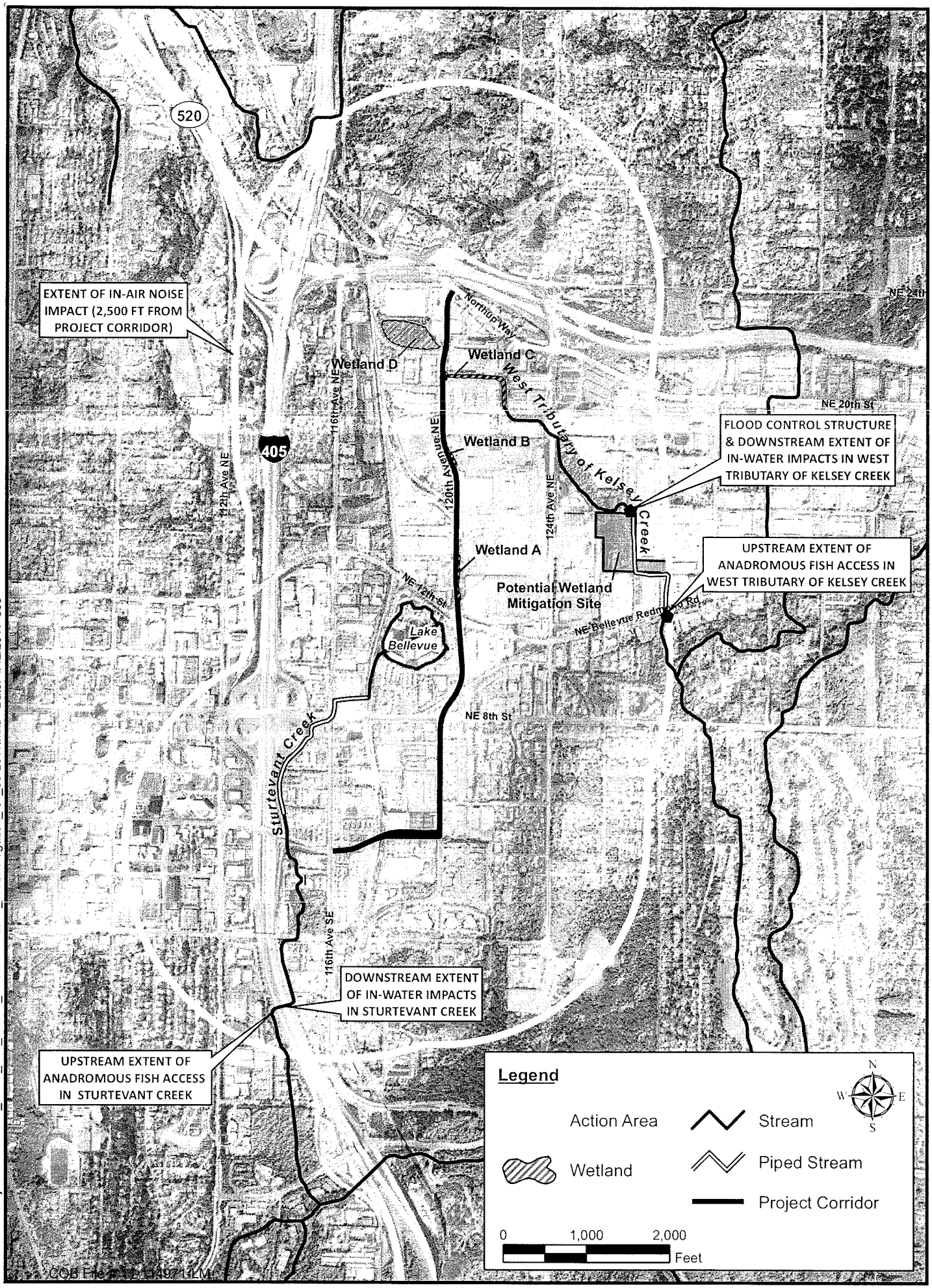

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Photos

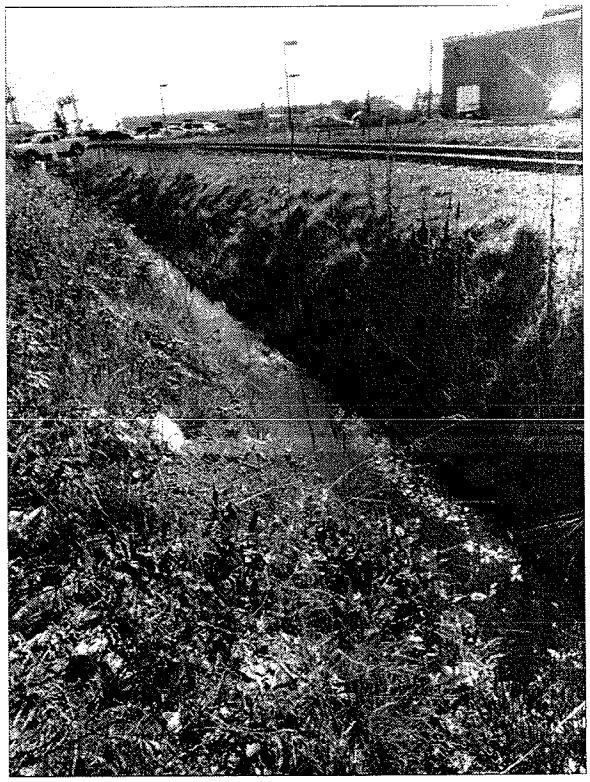

Photo A. Upstream Extent of Sturtevant Creek (Between NE 8th Street and Lake Bellevue)

Photo B. Sturtevant Creek South of NE 4th Street

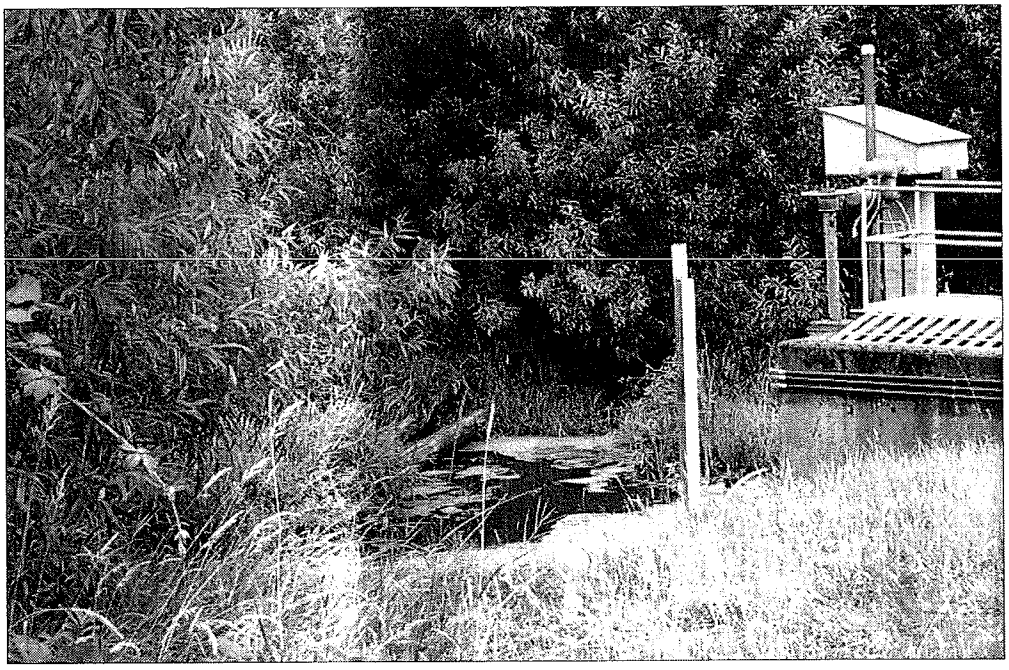

Photo C. West Tributary of Kelsey Creek Outlet-Control Structure

NE 4th Street/ 120th Avenue NE Corridor Project

Noise and Vibration Technical Report

prepared for
City of Bellevue

prepared by
Parsons Brinckerhoff

April 15, 2011

COB File # 11-114971-LM

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Appendix A—Traffic and Noise Modeling Output Files
Appendix B—Noise Modeling Files (provided on CD)

Acronyms and Abbreviations

City	City of Bellevue
dB	Decibels
dBA	A-weighted decibels for sound energy averages
EPA	U.S. Environmental Protection Agency
FHWA	U.S. Federal Highway Administration
FTA	U.S. Federal Transit Administration
Leq	Equivalent sound level
Leq(h)	Hourly equivalent sound level
L_v	Velocity level in decibels
mph	Miles per hour
NAC	Noise Abatement Criteria
PPV	Peak particle velocity
Project	Bellevue 120th Avenue NE Widening Corridor Project
rms	Root mean square
TNM	Traffic Noise Model
V	Velocity amplitude in inches/second
VdB	Vibration decibels
V^{ref}	10^{-6} inches/second
WSDOT	Washington State Department of Transportation

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Executive Summary

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of Downtown Bellevue. Major transportation connections in the project vicinity include Interstate 405 (I-405) and State Route 520 (SR 520). A noise and vibration technical report was prepared for the proposed project to document the potential effects.

Land use surrounding the NE 4th Street/120th Avenue NE Project corridor is primarily characterized by moderate-density commercial developments with a mix of institutional, residential, retail, and office uses. Land uses directly adjacent to the project corridor consist of automobile dealerships, small strip malls, office buildings, medical offices, and parking lots. Residential communities are located on both the east and west sides of the project corridor in the southern portion of the study area. Open space near the project corridor includes Wilburton Hill Community Park to the southeast and Bel-Red Mini Park to the east in the central portion of the project corridor. No building permits have been filed to develop noise-sensitive uses to date in the study area.

No significant effects to noise and vibration are anticipated as part of this project. A summary of the effects of noise and vibration are detailed below.

Noise

Fifteen sites representing 257 residential units, one recreation area, and one church were modeled to represent noise-sensitive receptors within the study area. Four additional sites represent first row commercial businesses along NE 4th Street and 120th Avenue NE. Existing noise levels and future noise levels without the project do not approach or exceed the Federal Highway Administration (FHWA) noise abatement criteria (NAC) at all modeled locations. Noise levels would exceed the FHWA NAC in 2040 with the project, with South Option 1 and South Option 2 at All Saints Episcopal Church at 1307 120th Avenue NE. Mitigation measures to reduce traffic noise at this site were evaluated but they would not effectively reduce exterior traffic noise levels; however, depending on interior traffic noise levels at the church, soundproofing may be feasible to reduce interior noise.

Residences located west of 120th Avenue NE would not experience increased traffic noise levels with or without the project in the year 2040. Residences east of 120th Avenue NE between NE 5th Street and Bel-Red Road would experience increase traffic noise levels of 1 dBA without the project in the year 2040 and 1 to 3 dBA with the project in the year 2040.

Maximum (peak) noise levels from construction equipment would range from 69 to 93 dBA at 50 feet. Construction noise at locations farther away would decrease

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at a rate of 6 dBA per doubling of distance from the source. Because various equipment would be turned off, idling, or operating at less than full power at any time and because construction machinery is typically used to complete short-term tasks at any given location, average L_{eq} noise levels during the day would be less than the maximum noise levels and within City of Bellevue construction noise limits. Nearby noise-sensitive receptors would experience temporary noise effects during project construction. Mitigation measures may be considered to reduce temporary noise effects during construction.

Prior to final project design, it is recommended that the final project elevations be reviewed for roadways and all associated design elements, including retaining walls and any localized ground disturbance. It is recommended to compare final project elevations to surveyed elevations at apartment and condominium complexes east of 120th Avenue NE between NE 8th Street and Bel-Red Road as noise levels at these locations are within 1 dBA of approaching the FHWA NAC.

Vibration

Ground-borne vibration could be a concern for occupants of nearby buildings during construction activities associated with the project. However, it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Most common sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, pile driving, and operating heavy earth-moving equipment.

Vibration impacts would only occur if vibration-sensitive land uses are present in the immediate vicinity of the project. The survey of nearby land uses did not identify any vibration-sensitive uses within the immediate project area. Therefore, no substantial vibration impacts are predicted to occur as a result of operation of the project.

Five structures are within 25 feet of project construction along 120th Avenue NE. None of the five structures is considered sensitive to vibration; therefore, no substantial vibration effects are predicted to occur from construction. Mitigation measures would be considered, however, to reduce temporary vibration effects during construction.

1.0 Introduction

1.1 Purpose of this Report

This *Noise and Vibration Technical Report* is being prepared as part of the NE 4th Street/120th Avenue NE Corridor Project for the City of Bellevue (City). The project proposes to extend NE 4th Street east from its current terminus at 116th Avenue NE to a new intersection with 120th Avenue NE, and widen and realign 120th Avenue NE north from the new intersection with NE 4th Street to Northup Way.

The purpose of this report is to describe the existing noise environment and evaluate existing and future predicted traffic noise levels at noise-sensitive sites in the study area. Mitigation measures are evaluated, as are the effects of temporary construction noise and vibration.

1.1.1 Noise Variance

Because construction is expected to be completed during daytime hours (7 a.m. to 10 p.m.) and within City of Bellevue construction noise limits, mitigation would not be required**.** For construction outside of daytime hours, a noise variance may be required by the City if project construction noise is predicted to exceed the City's noise limits or if nighttime construction is required to maintain daytime traffic flow or schedule requirements.

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2.0 Proposed Project

2.1 Project Overview

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined roadway corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of the Downtown Bellevue center. Major regional transportation connections and facilities in the project vicinity include Interstate 405 (I-405) to the west and State Route 520 (SR 520) to the north.

The project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include—the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road. Figure 2-1 shows the project study area.

The NE 4th Street/120th Avenue NE Corridor Project is one of a number of high priority transportation investments that make up the City of Bellevue's Mobility and Infrastructure Initiative. This initiative was formed to address unprecedented growth in Downtown Bellevue and to support planned growth in the Bel-Red, Spring District, and Wilburton areas.

Other key projects included in the initiative that would complement the proposed project include the following:

- NE 5th Street neighborhood project improvements
- NE 6th Street Extension from 112th Avenue NE to 120th Avenue NE
- NE 15th Street multi-modal corridor improvements north of NE 12th Street (also supporting Sound Transit's East Link Project)
- 124th Avenue NE improvements from NE 8th Street to Northup Way.

For each of these projects, new travel lanes, non-motorized facilities, signal enhancements, illumination, and various structure and utility relocations would be included.

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Figure 2-1. Project Study Area

2.2 Project Purpose and Need

The purpose of the proposed project is to achieve the following:

- Support and accommodate the City's adopted future land use changes and resulting travel demands.
- Improve local traffic circulation.
- Bring corridor features into compliance with current and proposed design standards and guidelines.
- Prepare the project corridor to support connections to planned transit facilities, specifically Sound Transit's East Link Project light rail alignment.

Collectively, the proposed project elements (see Figure 2-2) would enhance area-wide mobility by adding capacity to support the expected growth in travel demand, constructing critical missing links in the City's traffic distribution network, and easing congestion in other travel corridors. Moreover, the project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to transit facilities identified in City plans.

It would improve access for other modes to local recreational facilities, businesses, and the planned Link light rail stations at NE 8th Street and 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE.

In summary, the proposed project would meet the following objectives:

- To provide acceptable level of service at existing and planned study area intersections to meet anticipated long-term travel demands.
- To improve access and connectivity with the regional and local. transportation networks.
- To enhance long-term traffic operations over time by incorporating design standards that serve a variety of transportation modes, including the needs of large trucks and freight vehicles, as well as buses.
- To improve quality of life by improving mobility and transportation choice, particularly for transit, bicycle, and pedestrian traffic.

As shown in preliminary traffic analysis work for the NE 4th Street extension and the widening and realignment of 120th Avenue NE, the project elements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas as well as the region in terms of travel mobility and access to neighborhoods and businesses. This is primarily the result of new and enhanced connections across the Burlington Northern Santa Fe (BNSF) corridor and NE 8th Street, respectively. The proposed project also provides expanded arterial street capacity and driveway consolidation along 120th Avenue NE. The project termini are logical because they bracket the extent of the expected future development in the Wilburton/

NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail transit facilities.

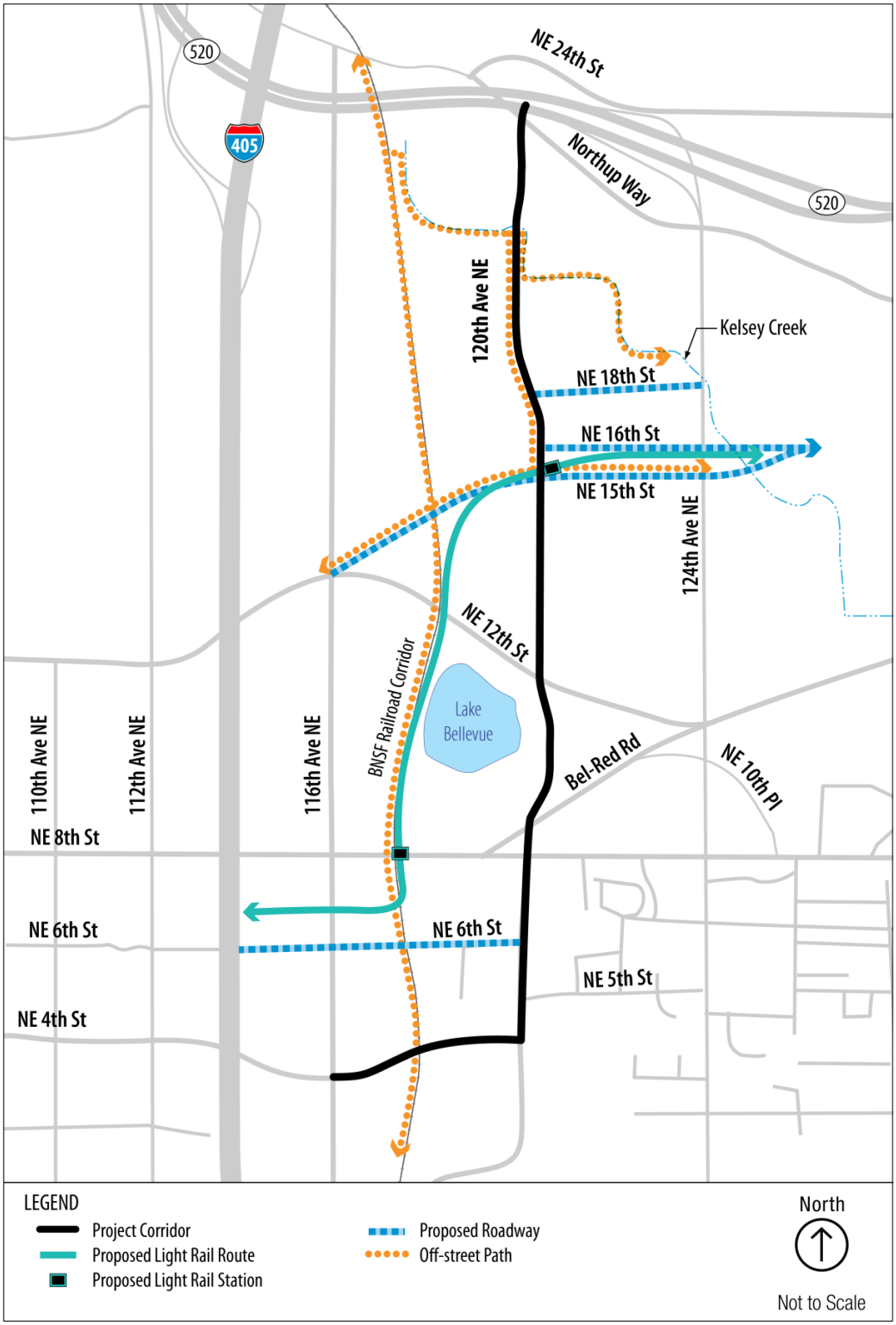

Figure 2-2. Planned Transportation Connections in the Study Area

2.3 Corridor Improvements

2.3.1 Programmed Corridor Improvements

This corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. These projects are described below.

- **NE 4th Street Extension (116th to 120th Avenue NE)**—Construct a new four to five lane roadway with arterial standard curb, gutter, sidewalk (including planting strips) and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension will be designed to accommodate future development and uses of the BNSF corridor.
- **120th Avenue NE Corridor—NE 4th Street to Northup Way**
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected segments; install continuous sidewalks to arterial standards; realign the roadway between Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project will be constructed in phases. Federal funding awarded to improvements, including bike lanes, planned between NE 4th and NE 8th Streets.

This revised description was submitted to Puget Sound Regional Council [PSRC] April 8, 2011 for the June 2011 Amendment to the Statewide Transportation Improvement Program (STIP).

2.3.2 Proposed Corridor Improvements

Specific design elements include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.

- Construct improvements that support the planned new intersections at NE 15th/16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.
- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

The five-lane roadway design is proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE north to NE 15th Street. This proposed roadway cross-section is shown in Figure 2-3. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. Generally, a 5-foot-wide bike lane would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. However, the size and location of the sidewalks, bicycle facilities, and planter strips vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

As mentioned earlier, this analysis addresses the potential impacts of two minor alignment options for the extension of NE 4th Street east of the BNSF corridor. The alignment for Option 1 is farther north than that of Option 2. The Option 1 alignment would require acquisition of a portion of the southern side of the Best Buy building and displace access to the loading dock located on the west side of the building. Negotiations with the property owner are ongoing and may include construction of a building addition on the north side of the existing structure and/or realignment of the loading dock access to the north of the building. Option 2, roughly 55 feet south of the Option 1 alignment, would not require acquisition of any portion of nearby buildings, but would displace a substantial amount of parking on the Home Depot property as well as displace the Best Buy building's access to the loading dock area. Again, negotiations are ongoing with the property owners and mitigation may include construction of a new loading

dock access for the Best Buy property on the north side of the existing structure and/or a new parking garage on the Home Depot property. Note, the design for improvements along 120th Avenue NE south of NE 8th Street do not assume either option has been selected, but rather improvements are based on existing curb cuts for the driveway access to parking for the Best Buy and Home Depot properties.

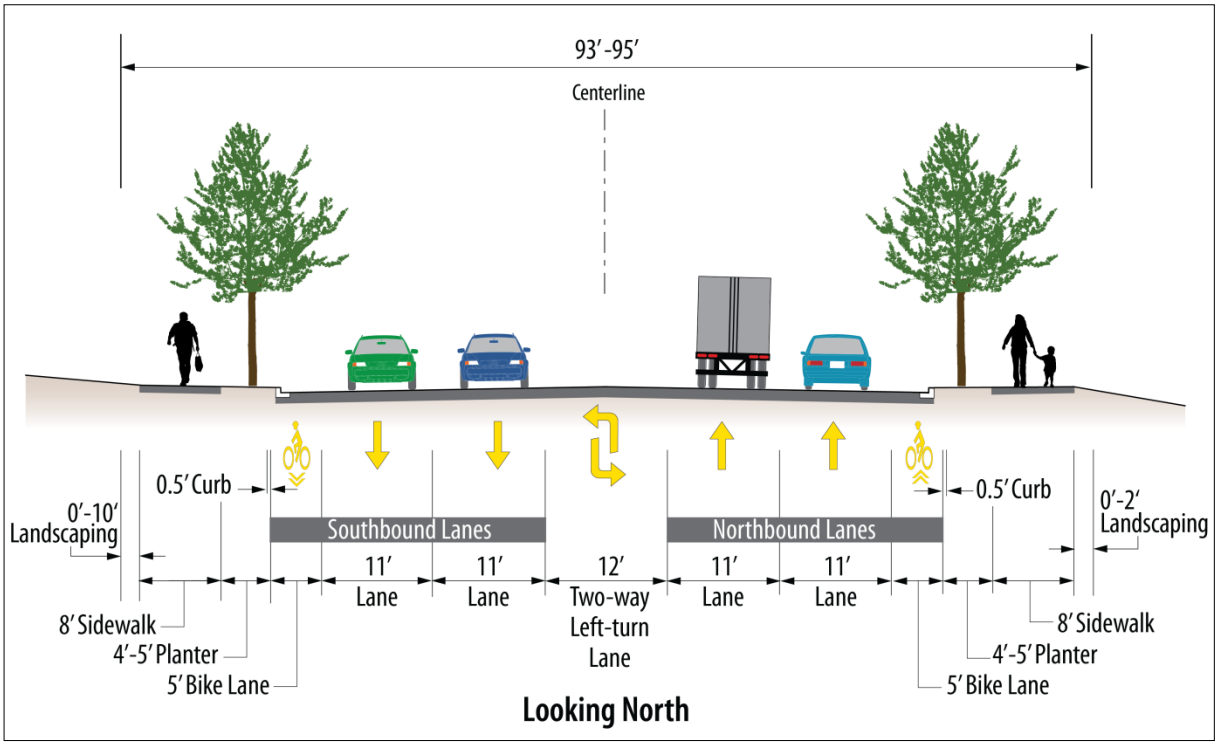

Figure 2-3. Typical Section—Five-lane Roadway Design

A four-lane roadway section is proposed for 120th Avenue NE from NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets. At the intersection at Northup Way, the cross-section would again be five lanes to allow for adequate turning movement capacity. This proposed four-lane cross-section is show in Figure 2-4. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes—two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed for each side of a two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

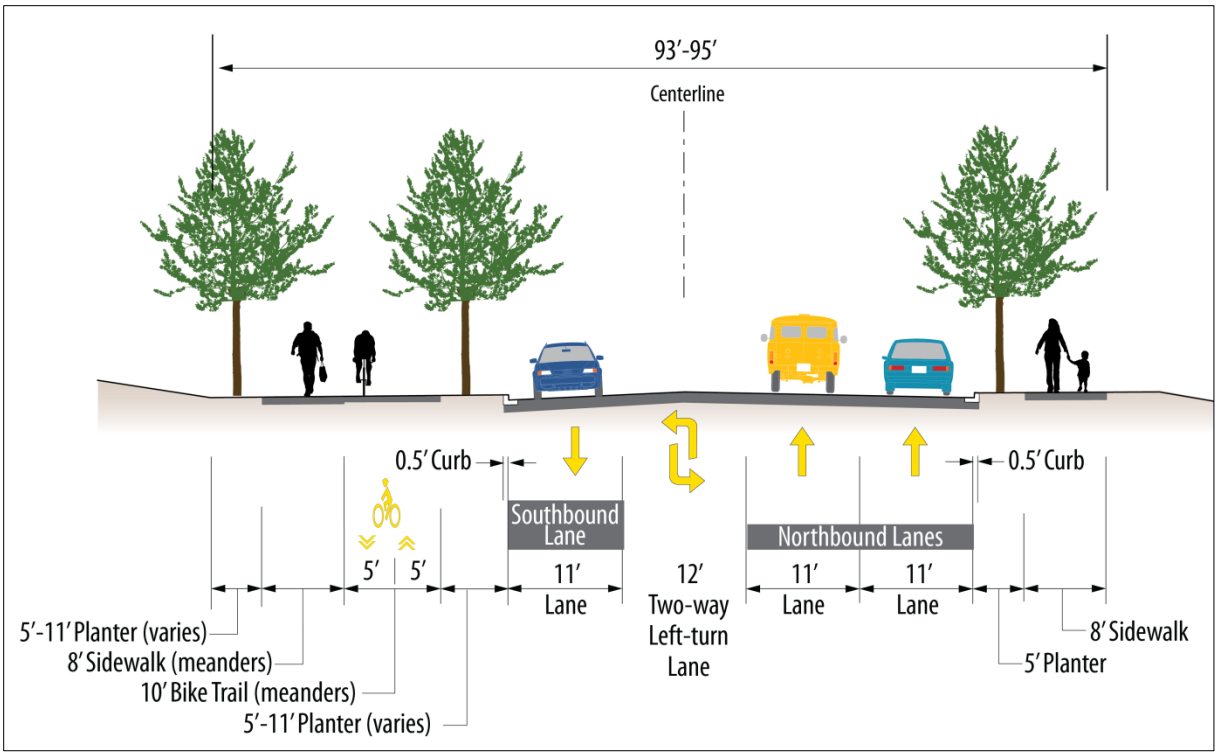

Figure 2-4. Typical Section—Four-lane Roadway Design

Both of the proposed roadway cross-sections also include the use of retaining walls, which would further increase the width of the required right-of-way beyond 95 feet. Retaining walls are proposed at numerous locations along the corridor and they would be located on both sides of the roadway. They would be used for both cut walls and fill walls. When retaining walls are required, these structures would generally be located immediately adjacent to the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet in width. To the outside of the retaining walls, the soil would be graded to a 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 121 feet or more where retaining walls are needed on both sides of the roadway.

Note, the term "right-of-way," as used in this report, includes both right-of-way owned by the City and permanent easements (i.e., the complete footprint of the project).

2.4 Project Construction

2.4.1 Construction Duration and Phasing

Project construction would be phased and is expected to be completed from late 2011 to at least 2016 to match the programming of local, state, and federal funding sources. Each phase would last approximately 12 to 15 months. The planned phases, which may be further sub-divided into construction stages, are:

- Phase 1—120th Avenue NE widening between approximately the NE 300 block north to NE 7th Street.
- Phase 2—120th Avenue NE new construction between NE 8th Street and Bel-Red Road, and realignment and widening between approximately Bel-Red Road north to NE 12th Street.
- Phase 3—NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4—120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5—120th Avenue NE widening between NE 16th Street north to Northup Way.

Based on the Wilburton/NE 8th Street and Bel-Red Subarea Plans, it is essential that all phases of the NE 4th Street/120th Avenue NE Corridor Project be implemented in order to meet the purpose and need of the project. The City has committed to constructing all phases of the project, with cross sections appropriate to meet the multi-modal demand anticipated in the next 20 years. In addition, construction of the project phases could occur sequentially or some phases could overlap.

2.4.2 Construction Approach

The approach to project construction along the corridor differs. The following paragraphs describe the varying approaches to construction.

The improvements for NE 4th Street consist of constructing a new roadway, and would not involve working within an existing operable roadway. Construction for this phase would include clearing the full roadway right-of-way; grading; installing utilities and the roadway gravel base; constructing the curb, gutter and sidewalks; paving the roadway; and installing illumination/signals and landscaping. The construction activities would not disrupt existing traffic patterns along NE 4th Street, 116th Avenue NE, or 120th Avenue NE. However, the construction zone for NE 4th Street may extend somewhat into the existing roadways (116th and 120th Avenues NE) in order to connect new and existing pavements and existing and planned utilities at these locations.

Generally, the construction along 120th Avenue NE from the NE 300 block to NE 7th Street would widen the existing roadway on both sides of the existing centerline. Construction in this area would occur along an operational roadway.

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The improvements in this area would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

Construction of the realignment and widening of 120th Avenue NE between the intersection at NE 8th Street and about NE 12th Street would occur along an operational roadway. Thus, the construction in this area is anticipated to occur in the following manner:

- Contractor mobilization
- Install traffic control and temporary erosion control measures
- Relocate and/or install utilities
- Roadway Side 1—retaining walls, grading, paving, signals, and illumination
- Roadway Side 2—retaining walls, grading, paving, signals, and illumination
- Construction zone landscaping, restoration, and clean up.

The corridor could not be closed during construction though both directions of travel may be constrained to perhaps only a single lane. Use of Bel-Red Road between NE 8th Street and 120th Avenue NE, however, would be closed at the start of roadway construction between Bel-Red Road and NE 8th Street. With this road closure, construction could occur unhampered for the new roadway. Parcels along this portion of the alignment would be fully acquired and construction activities would not affect adjacent businesses. Traffic on Bel-Red Road east of 120th Avenue NE would continue to be able to travel north on 120th Avenue NE during construction. To the north of Bel-Red Road, the roadway alignment is generally shifted eastward. Construction work would likely start on the eastern half of the expanded right-of-way. When completed, traffic would be shifted to the new roadway, while the western portion of the roadway is constructed. All construction sequencing would be planned to minimize impacts to traffic and adjacent businesses.

Lastly, construction along the remaining northern portion of 120th Avenue NE from NE 12th to just south of Northup Way would also widen the existing roadway on both sides of the existing centerline. The improvements along 120th Avenue NE would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

2.5 Project Funding

The total cost of the proposed project improvements based on the final City Council Direction for the 2011-2017 General Capital Improvement Plan would be between an estimated $67.3 and $67.6 million, depending on the selected option for extending NE 4th Street. Construction would cost approximately $32 million and right-of-way acquisition would cost roughly $35 million.

Funding for the overall project would likely include monies from the following sources:

- Federal grants
- State Transportation Improvement Board funding
- State Local Revitalization Financing funding
- Local contributions from transportation-dedicated sources, long-term general obligation bonds, impact fees, and other private participation programs including possible local improvement districts.

The specific mix of federal, state, and local funding contributions for each construction phase could differ.

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3.0 Methods

3.1 Methods Used in this Analysis

The following methods were applied to the effects analysis contained in this report.

The analysis of noise impacts in the project area is based on the noise caused by the project compared with existing noise levels to determine if sensitive noise receptors would experience traffic noise levels that exceed the NAC and if any substantial noise increases would occur. Construction noise effects are described based on maximum noise levels of construction equipment published by the U.S. Environmental Protection Agency (EPA). Mitigation measures are discussed, where appropriate, to avoid or reduce potential noise effects.

Ambient noise levels were measured to describe the existing noise environment, determine the noise levels above which impacts would occur, and to identify major noise sources in the project area. Noise levels in the project area are typical of an urban location. Noise that would result from the project was modeled at noise-sensitive uses nearest the project alignment.

Vibration impacts were evaluated qualitatively based on the type of construction equipment likely to be used and nearby land uses.

3.1.1 Background of Noise

Characteristics of Sound

Sound is created when objects vibrate, resulting in a minute variation in surrounding atmospheric pressure, called *sound pressure*. The human response to sound depends on the magnitude of a sound as a function of its frequency and time pattern (EPA 1974). Magnitude measures the physical sound energy in the air. The range of magnitude, from the faintest to the loudest sound the ear can hear, is so large that sound pressure is expressed on a logarithmic scale in units called decibels (dB). Loudness, compared to physical sound measurement, refers to how people subjectively judge a sound. This varies from person to person. Magnitudes of typical sound levels are presented in Figure 3-1.

Because of the logarithmic decibel scale, a doubling of the number of noise sources (e.g., the number of cars operating on a roadway) increases noise levels by 3 dBA. A 10-fold increase in the number of noise sources will add 10 dBA. As a result, a noise source emitting a noise level of 60 dBA combined with another noise source of 60 dBA yields a combined noise level of 63 dBA (not 120 dBA). The human ear can barely perceive a 3-dBA increase, but a 5- or 6-dBA increase is readily noticeable and sounds as if the noise is about one and one-half times as loud. A 10-dBA increase appears to be a doubling of the noise level to most listeners.

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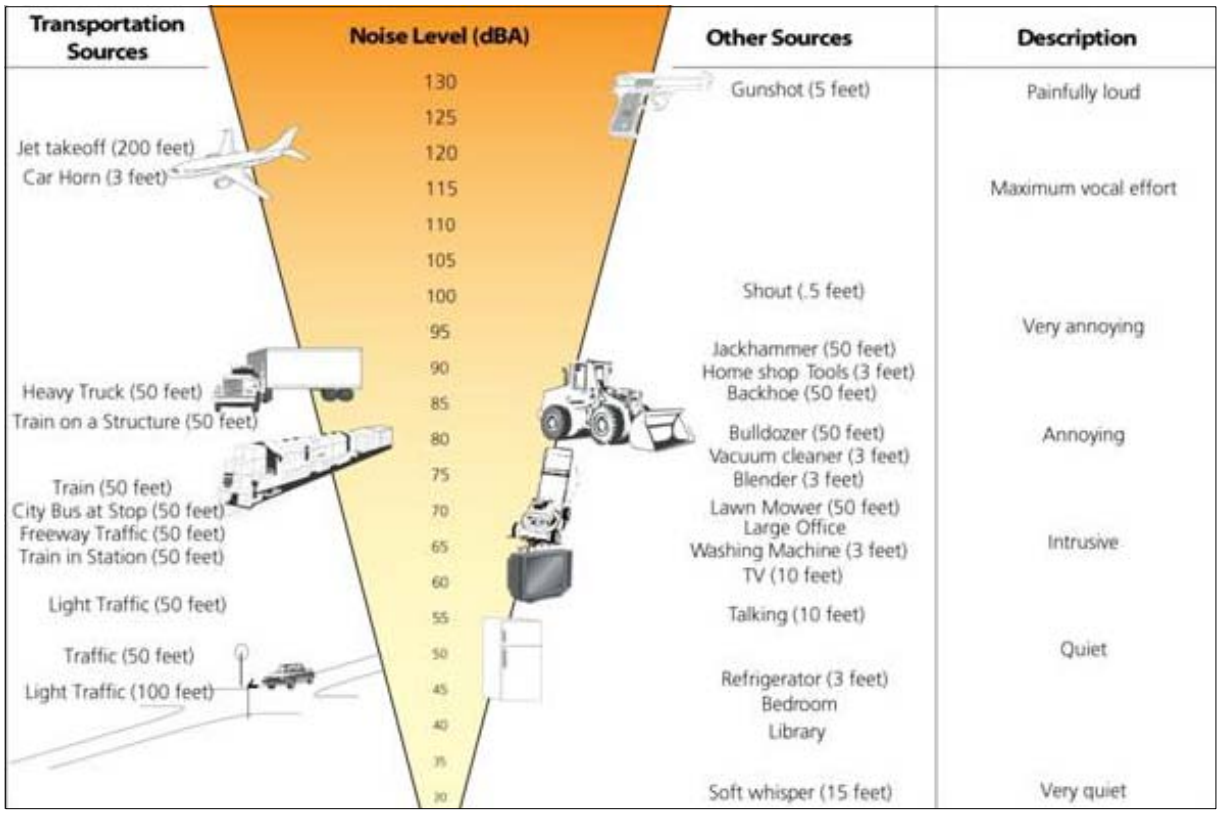
The propagation of noise can be greatly affected by terrain and the elevation of the receiver relative to the noise source. Noise travels in a straight line-of-sight path between the source and the receiver. The addition of a berm or other area of high terrain will reduce the noise energy arriving at the receiver. Breaking the line of sight between the receiver and the highest noise source results in a noise reduction of approximately 5 dBA.



Source: Federal Transit Administration (FTA), 1995; EPA, 1971; EPA 1974

Figure 3-1. Typical Sound Levels

Noise levels decrease with distance from the noise source. For a line source, such as a roadway, noise levels decrease 3 dBA over hard ground (e.g., concrete or pavement) or 4.5 dBA over soft ground (e.g., grass) for every doubling of distance between the source and the receptor. For a point source, such as construction sources, noise levels will decrease between 6 and 7.5 dBA for every doubling of distance from the source.

Sound Level Descriptors

A widely used descriptor for environmental noise is the equivalent sound level (L_{eq}). The L_{eq} can be considered a measure of the average noise level during a specified period of time. It is a measure of total noise, or a summation of all sounds during a time period. It places more emphasis on occasional high noise levels that accompany general background noise levels. L_{eq} is defined as the

constant level that, over a given period of time, transmits to the receiver the same amount of acoustical energy as the actual time-varying sound. L_{eq} measured over a one-hour period is the hourly L_{eq} (L_{eq}[h]), which is used for highway noise impact and abatement analyses.

Noise Regulations and Impact Criteria

Applicable noise regulations and guidelines provide a basis for evaluating potential noise effects. For federally funded highway projects, traffic noise effects occur when predicted $L_{eq(h)}$ noise levels approach or exceed the NAC established by the FHWA (23 CFR 772), or substantially exceed existing noise levels (U.S. Department of Transportation, 1982 and 1995, FHWA, HEP-41). The FHWA expects that "substantially exceed" be defined by the state. WSDOT defines substantial noise effects as traffic noise levels that are at least 10 dBA over existing sound levels, and severe noise effects at 30 dBA over existing sound levels. Severe noise effects also occur if predicted future noise levels exceed 80 dBA or more at outdoor activity areas as the result of a project.

The FHWA NAC exterior $L_{eq(h)}$ noise levels for various land activity categories are summarized in Table 3-1. For sites where serenity and quiet are of extraordinary significance and necessary for its public need, the noise criterion is 57 dBA; there are very few of these sites identified in the U.S. For residences, parks, schools, churches, and similar areas, the noise criterion is 67 dBA. For developed lands, the noise criterion is 72 dBA. WSDOT considers a noise effect to occur if predicted $L_{eq(h)}$ noise levels approach within 1 dBA of the noise mitigation criteria in Table 3-1; thus, if an outdoor noise level was 66 dBA or higher, it would approach or exceed the FHWA noise mitigation criterion of 67 dBA for residences (activity category B).

Table 3-1. FHWA Noise Abatement Criteria

Activity Category	Leq (h) (dBA)	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Category A or B above.
D	-	Undeveloped lands.
E	72 (exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: U.S. Department of Transportation 1982.

The City has adopted a qualitative noise standard with Municipal Code Chapter 9.18, Noise Control. The standard limits any noise, sound, or signal that

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unreasonably disturbs the comfort, peace, or repose of another person or persons. Construction noise is exempt from this qualitative standard between 7 a.m. and 10 p.m.

Noise Regulations and Impact Criteria

If noise levels that approach or exceed the noise abatement criteria are predicted, noise abatement must be evaluated as part of a project. A variety of mitigation methods can effectively reduce traffic noise impacts. If impacts are predicted, noise levels could be reduced by implementing traffic management measures, acquiring land as buffer zones or for construction of noise barriers or berms, realigning the roadway, or installing noise insulation for public or nonprofit institutional structures.

3.1.2 Vibration

Vibration is an oscillatory motion, which can be described in terms of displacement, velocity, or acceleration. There is no net movement of the vibration element, and the average of any of the motion descriptors is zero because the motion is oscillatory. Displacement is the easiest descriptor to understand. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement, and acceleration is the rate of change of the speed. Although displacement is easier to understand than velocity or acceleration, it is rarely used for describing ground-borne vibration. This is because most transducers used for measuring ground-borne vibration use either velocity or acceleration and, more importantly, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

Vibration Descriptors

One of the several different methods that are used to quantify vibration amplitude is peak particle velocity (PPV), which is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used to monitor blasting vibration because it is related to the stresses that are experienced by buildings. Although PPV is appropriate for evaluating the potential of building damage, it is not suitable for evaluating human response. It takes time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. Because the net average of a vibration signal is zero, the root mean square (rms) amplitude is used to describe the “smoothed” vibration amplitude. The rms of a signal is the average of the squared amplitude of the signal. The average is typically calculated over a 1-second period. The rms amplitude is always less than the PPV and is always positive. The PPV and rms velocity are normally described in inches per second in the U.S. and in meters per second in the rest of the world. Although it is not universally accepted, decibel notation is in common use for vibration. Decibel notation compresses the range of numbers required to describe vibration. The vibration velocity level in decibels is defined as the following:

$$L_v = 20\log (V/V_{ref})$$

where "L_v" is the velocity level in decibels,

"V" is the rms velocity amplitude, and

"V_{ref}" is the reference velocity amplitude.

A reference must always be specified whenever a quantity is expressed in terms of decibels. All vibration levels in this report are referenced to 1 x 10^{-6} inches per second. Although not a universally accepted notation, the abbreviation VdB is used in this document to indicate vibration decibels to reduce the potential for confusion with sound decibels.

Typical Vibration Levels

In contrast to airborne noise, ground-borne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 VdB or lower, well below the threshold of perception for humans, which is around 65 VdB (Figure 3-2). Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. Pile driving is a common source of vibration. The vibration from traffic is rarely perceptible if the roadway is smooth. The range of interest is from approximately 50 to 100 VdB.

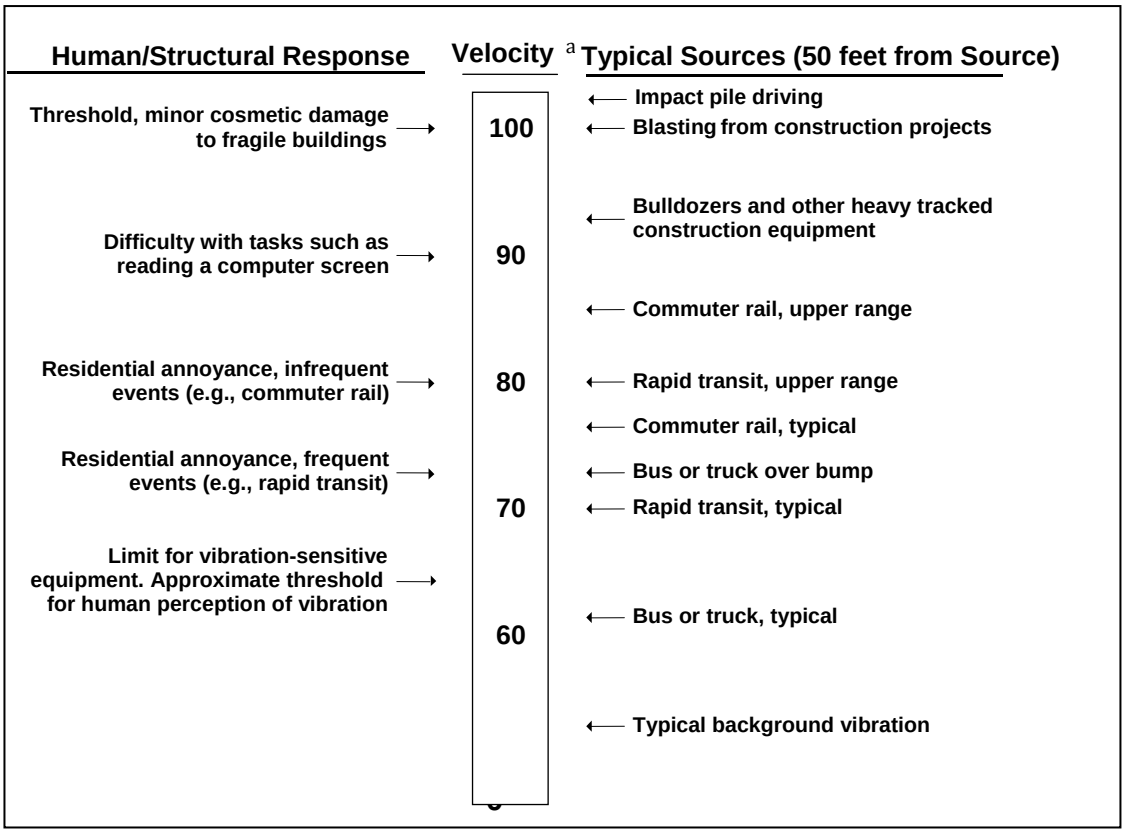
Background vibration is usually well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment. Electron microscopes and high-resolution lithography equipment are examples of equipment that is highly sensitive to vibration and may be disturbed by vibration levels greater than approximately 65 VdB. Although the perceptibility threshold is about 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. This is a typical level 50 feet from a rapid transit or light rail system. Buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps in the road.

Effects of Vibration

Ground-borne vibration can be a concern for occupants of nearby buildings during project construction. However, it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. The most common sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, pile driving, and operating heavy earth-moving equipment.

The effects of ground-borne vibration include perceptible movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, vibration can damage buildings. Building damage is not a factor for normal transportation projects, with the occasional exception of blasting, pile driving, and demolition of structures, which may occur during construction.

The rumbling sound caused by the vibration of room surfaces is called ground-borne noise. The annoyance potential of ground-borne noise is usually characterized using the A-weighted sound level. Although the A-weighted level is almost the only metric used to characterize community noise, there are potential problems with characterizing low-frequency noise using A-weighting. This is because of the non-linearity of human hearing, which causes sounds dominated by low-frequency components to seem louder than broadband sounds that have the same A-weighted level. The result is that ground-borne noise with a level of 40 dBA sounds louder than 40-dBA broadband noise. This is accounted for by setting the limits for ground-borne noise lower than for broadband noise.



Source: U.S. Department of Transportation 1995.
Note: *RMS vibration velocity level in VdB relative to 10^{-6} inches per second.

Figure 3-2. Common Vibration Sources and Levels

Vibration Effect Criteria

Criteria for construction ground vibration must address both:

- The potential for disturbance and annoyance to building occupants, and
- The potential for damage to nearby buildings and other nearby structures.

Temporary vibration effects may occur in the local area during construction as a consequence of blasting or the use of pile drivers, jackhammers, hoe rams, soil compactors, and other heavy construction equipment. Buildings near the construction site respond to these vibrations with varying results, ranging from perceptible effects at the lowest levels, low rumbling sounds and noticeable vibrations at moderate levels, and slight damage at the highest levels. Ground vibrations from construction activities rarely reach the levels that can damage structures but can achieve moderate levels in buildings very close to a site. Impact pile drivers generally cause the highest vibration levels compared to other types of equipment. During the project's construction, mitigation measures should be applied to minimize the potential for harm to nearby structures.

Detailed information on the proposed construction methods, the specific construction activity, the types of construction equipment, the characteristics of underlying soils, and the existing conditions and the use of buildings is required for a precise assessment of potential effects. Field review of building types and construction and measurement of existing vibration levels at sensitive sites are also required to determine the potential sensitivity of the buildings near the construction site.

Vibration Criteria

FHWA, WSDOT, and the City do not have specific vibration impact criteria. If construction dictates transient or impact vibration equipment, project-specific vibration criteria would be developed in coordination with the City to prevent vibration damage to nearby structures.

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4.0 Existing Conditions

4.1 Land Use and Zoning

The project corridor is located in the western portions of the Wilburton/NE 8th Street and Bel-Red Subareas within the City of Bellevue, King County, Washington.

The Washington State Legislature enacted the Growth Management Act in 1990 "to create a method for comprehensive land use planning involving citizens, counties, cities, and the private sector that would prevent uncoordinated and unplanned growth." The project is subject to the following regional and City plan policies:

- The Puget Sound Regional Council Transportation 2040 Multicounty Policies
- The City of Bellevue Comprehensive Plan
- The City of Bellevue Wilburton/NE 8th Street Subarea Plan
- The City of Bellevue Bel-Red Subarea Plan

4.1.1 Land Use

Land use in the project study area is primarily characterized by moderate-density commercial developments with a mix of institutional, residential, retail, and office uses. Land uses directly adjacent to the project corridor consist of automobile dealerships, vacant lots, retail and big-box retail stores, a post office, small strip malls, office buildings, medical offices, parking lots, and large warehouses.

Limited residential land uses are located throughout the corridor. The Westside Apartments at 500 121st Place NE and the Oasis Condominiums at 680 122nd Avenue NE are multi-family residential complexes located northeast of the eastern terminus of the proposed extension of NE 4th Street and are more than a block east of the existing intersection of NE 5th Street with 120th Avenue NE in the project corridor. Both residential complexes currently experience noise levels common in a typical urban area, including traffic noise from side streets, arterials in the immediate area, and I-405, which is less than a half-mile to the west. In addition, both complexes are located at least 250 feet from the proposed eastern-most edge of the project corridor. Another cluster of residences is located farther north on the eastern side of the project corridor. Two apartment complexes are within the triangular intersection of NE 8th Street and Bel-Red Road, roughly at and east of 122nd Avenue NE. Both Brierwood, located at 12022 NE 8th Street, and the Midlakes Apartments, located at 12028 NE 8th Street, are two-story apartment buildings. Four additional two-story condominium buildings are also located at 12107 NE Bel-Red Road. Finally, there is the Lake Bellevue Village located to the west of 120th Avenue NE, just south of NE 12th Street, which consists of three two- and three-story

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condominiums. This condominium community includes a shopping complex that offers various services and amenities to nearby residents.

The only church in the project study area is All Saints Episcopal Church at 1307 120th Avenue NE. The church is located within a commercial development adjacent to the project corridor.

Open space near the project corridor includes Wilburton Hill Community Park at 12053 Main Street, located to the south and east of the southern portion of the project corridor. Bel-Red Mini Park is located east of the project corridor at 124th Avenue NE and Bel-Red Road.

4.1.2 Zoning

The project corridor is directly adjacent to seven different zoning districts, as shown in Figure 4-1. Table 4-1 identifies the various land uses permitted in those zoning districts.

In May 2009, the City adopted a zoning ordinance for the Bel-Red Subarea in support of City and regional initiatives to attract new mixed-use development. One of the purposes of this effort was to plan for future smart growth in the Bel-Road Subarea, including pedestrian and bike-friendly access and transit-oriented development associated with the future light rail corridor.

4.1.3 Noise

Project-area traffic is a mix of small vehicles through the area to businesses and homes and heavy truck and bus trips to and from transportation and distributions facilities located throughout the area.

4.1.4 Vibration

Five structures are within 25 feet of project construction. All five buildings house commercial businesses that do not involve vibration-sensitive uses. The five structures are summarized below:

- Mixed commercial masonry building constructed in 1994 is located at the southwest corner of 120th Avenue NE and NE 8th Street (11919 NE 8th Street).
- Shell Service Station (fuel pump canopy located within 25 feet of construction) constructed in 1990 is located at the southeast corner of 120th Avenue NE and NE 8th Street (12001 NE 8th Street).
- Safeway warehouse is a masonry structure built in 1968 and is located east of 120th Avenue NE and north of NE 12th Street with no street address available on site at the time of this report.

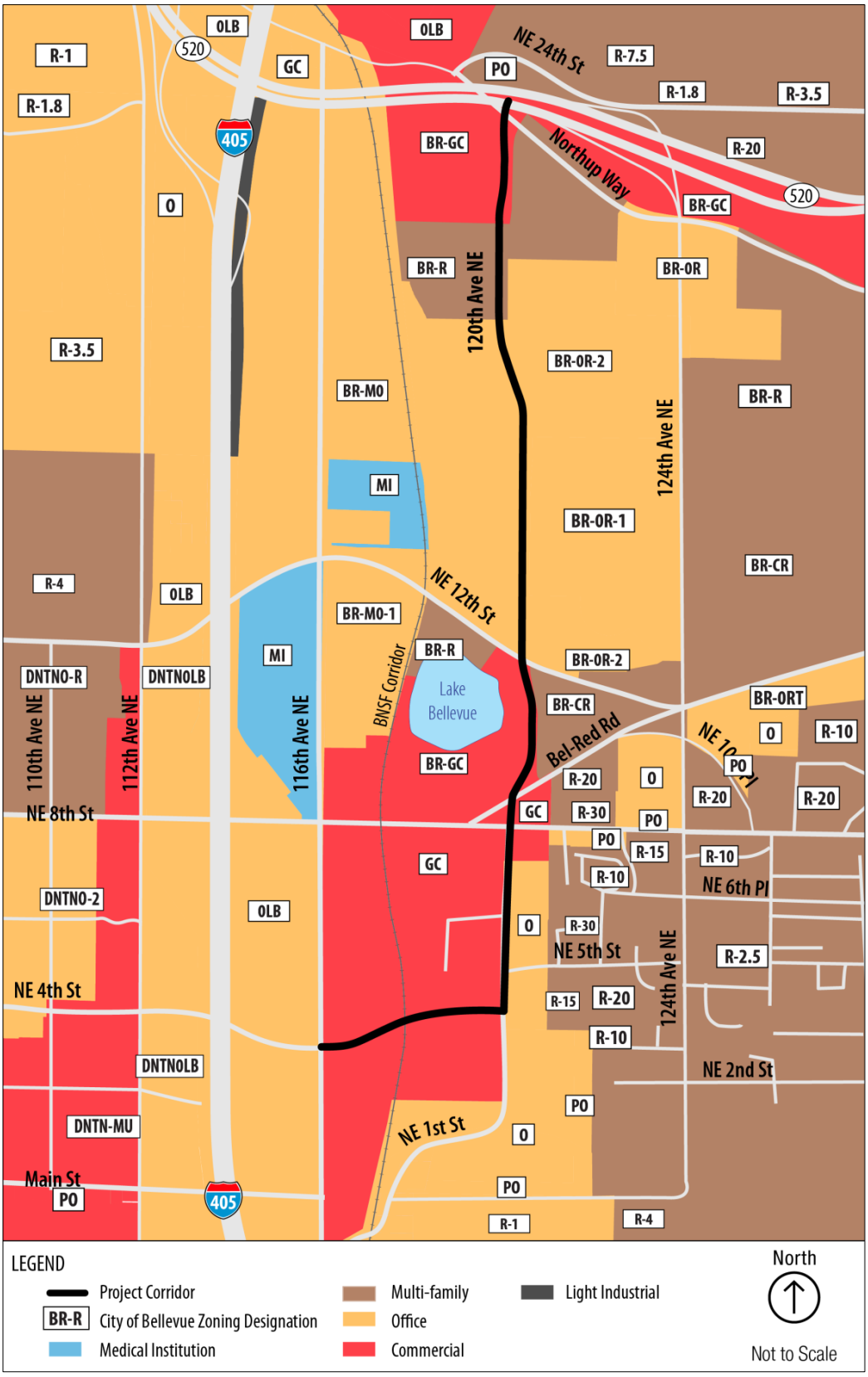

Figure 4-1. Study Area and Surrounding Zoning/Land Use

Table 4-1. Land Use and Zoning Districts

Abbreviation	Zoning District	Purpose
GC	General Commercial	To provide for the location of a wide variety of business activities that provide goods and services to other businesses and the general public.
O	Office	To provide for the location of business, financial, administrative, and professional services.
BR-OR-1	Bel-Red Subarea—Office/ Residential Node 1	To provide an area for a mix of office, housing, and retail uses within the core of a nodal area, with office as the predominant use. The district is limited in extent to provide the level of intensity appropriate for areas close to the highest levels of transit service within the Bel-Red area.
BR-OR-2	Bel-Red Subarea—Office/ Residential Node 2	To provide an area for a mix of office, housing, and retail uses, with office as the predominant use. The district is located within a node but outside the node's core, and building heights provide for a transition between the node's core and areas outside the node.
BR-R	Bel-Red Subarea—Residential	To provide an area for residential uses. Limited retail and service uses are permitted secondary to residential use to provide the amenity of shopping and services within easy walking distance of residential structures.
BR-CR	Bel-Red Subarea—Commercial Residential	To provide an area for a mix of housing, retail, office, and services. Multiple uses are encouraged on individual sites, in individual buildings, and in the district as a whole.
BR-GC	Bel-Red Subarea—General Commercial	To provide an area for a wide variety of business activities that provides goods and services to other businesses and the general public.

Source: Excerpted from the City of Bellevue, Ordinance 5874
Note: *A minimum density of 10 units per acre shall be achieved for new single-family dwelling units. This requirement does not apply to work-live units.

- Grainger warehouse is a mixed-material structure built in 1999 at 2221 120th Avenue NE. Grainger is located west of 120th Avenue NE approximately 500 feet south of Northup Way.
- Mixed commercial masonry building constructed in 1983 is located at the southeast corner of the intersection of 120th Avenue NE and Northup Way (12021 Northup Way).

4.2 Existing Noise Environment

4.2.1 Noise Measurements

Ambient noise levels were measured for 15-minute periods at seven locations near the project area (Figure 4-2) to describe the existing noise environment, identify major noise sources in the project area, validate the noise prediction model, and characterize the background environmental noise levels (Table 4-2).

Figure 4-2. Locations of Measured and Modeled Noise Receptors

Table 4-2. Noise Measurement Data

Measurement Location Number	Description	Measured Noise Level (dBA Leq)	Modeled Noise Level (dBA leq)	Difference between Measured and Modeled Noise Level (dBA Leq)
1[1]	Church	61	61	0
2[1]	Condominiums at Lake Bellevue	59	59	0
3[1]	Condominiums at Bel-Red Road	60	60	0
4[1]	Apartments at NE 8th Street	56	57	+1
5[2]	Commercial	63	63	0
6[2]	Commercial	54	53	-1
7[2]	Commercial	61	60	-1

[1] *Parsons Brinckerhoff, August 5 and 10, 2010.*
[2] *Landau Associates, December 3, 2009.*

Measurements were taken on December 3, 2009 by Landau Associates and on August 5 and 10, 2010, by Parsons Brinckerhoff. All measurements were taken with calibrated Larson Davis Model 820 or Norsonic 118 noise meters that comply with ANSI S1.4 Standard for a Type I accuracy instrument. The metrological conditions were ideal for taking noise measurements. Measurement locations represent larger clusters of noise-sensitive receptors near the proposed project. Existing noise levels were subsequently modeled at 12 locations that represent noise-sensitive uses in the study area and first row commercial businesses in the area, and shown in Figure 4-2.

Noise measurement locations were only used to calibrate the noise model and were not used for predicting noise levels at noise-sensitive locations because traffic volumes and speeds are generally not consistent with loudest hour conditions.

4.2.2 Noise Modeling

FHWA's Traffic Noise Model (TNM®) Version 2.5 computer model (FHWA 2004) was used to predict $L_{eq(h)}$ traffic noise levels. TNM® was used to predict noise levels at discrete, but representative, points by considering interactions between different noise sources on the propagation of noise. The model predicts the traffic noise level at a receiver location resulting from a series of straight-line roadway segments. Noise emissions from free-flowing traffic depend on the number of automobiles, medium trucks, heavy trucks, motorcycles, and buses per hour; vehicular speed; and reference noise emission levels of specified vehicles. TNM® considers the effects of intervening barriers, topography, trees, and atmospheric absorption of sound.

By intent and design, noise from sources other than traffic is not included. Therefore, when non-traffic noise such as aircraft noise is considerable in an area, the TNM® modeled results can be slightly less than the measured noise levels. For this reason, the results from the noise measurements were used to calibrate the TNM® model by comparing the predicted and measured noise levels

at the seven measurement locations using the traffic count data obtained during the measurement periods. These traffic counts reflect the conditions present during the period of the measurement and therefore help to ensure the model is producing accurate sound-level predictions. The calibration process proved to be successful because the differences between measured and modeled noise levels at the receptors were within +/- 1 dBA, as shown in Table 4-2. A match between measurement and modeled sound levels this close indicates that no calibration adjustment of the model is necessary in accordance with FHWA policy.

Base maps were exported as DXF files and imported into the TNM®. Major roadways, retaining walls, terrain lines, building rows, and sensitive receptors were digitized into the model. The proposed roadway alignments were added to the model from electronic design files and design drawings. The proposed design speed on 120th Avenue NE is 35 miles per hour (mph).

4.2.3 Existing Traffic Noise Levels

Much of the land use in the noise study area is light industrial and commercial. Residences in the noise study area are located along Lake Bellevue and east of 120th Avenue NE between NE 8th Street and Bel-Red Road. A church is located along 120th Avenue NE, north of NE 12th Street, and a private swimming pool is located within the Lake Bellevue condominium complex. Roadway traffic along 120th Avenue NE is the dominant source of noise north of NE 12th Street. Roadway traffic from NE 8th Street and NE 12th Street is the dominate source of noise south of NE 12th Street.

The modeled traffic noise levels for the existing conditions along the noise study area range from 49 to 64 dBA $L_{eq,}$ as shown in Table 4-3. The locations of the receptors can be seen on Figure 4-2. No modeled sites currently approach or exceed the FHWA NAC.

4.2.4 Future Traffic Noise Levels

Traffic noise levels at noise-sensitive receptors under future No Build conditions are predicted to increase by approximately 1 to 5 dBA L_{eq} over existing conditions. 2040 future noise levels without the project would not approach or exceed the FHWA NAC at all modeled locations.

For the future Build condition, traffic noise levels along the proposed roadway improvements are predicted to increase by approximately 1 to 9 dBA L_{eq} over existing conditions. 2040 Future Build conditions would exceed the FHWA NAC at one church (Table 4-4). This exceedance is largely due to the proximity of this noise-sensitive site in relation to future traffic volumes on 120th Avenue NE and 120th Avenue widening bringing traffic closer to the site.

Table 4-3. Existing Noise Modeling Data

Modeled Site Number	Number of Residential Units Represented by the Receptor	WSDOT NAC Criteria Leq(h) dBA	Existing Traffic Noise Level Leq(h)dBA	Leq dBA Equal to or Exceeding NAC
1	Church	66	59	No
2	24 Residences	66	60	No
3	18 Residences	66	61	No
4	10 Residences	66	57	No
5	Commercial	71	63	No
6	Commercial	71	53	No
7	Commercial	71	60	No
A	Recreation	66	59	No
B	14 Residences	66	64	No
C	14 Residences	66	64	No
D	18 Residences	66	63	No
E	14 Residences	66	49	No
F	14 Residences	66	53	No
G	42 Residences	66	52	No
H	17 Residences	66	59	No
I	52 Residences	66	55	No
J	20 Residences	66	53	No
K	Commercial	71	52	No
L	Commercial	71	57	No

Source: Parsons Brinckerhoff, August 11, 2010.

Table 4-4. Existing and Future Noise Modeling Data

Site Number	Number of Residential Units Represented by the Receptor	NAC Criteria Leq(h) dBA	Existing Traffic Noise Level Leq(h)dBA	2040 No Build Traffic Noise Level Leq(h)dBA	Difference from Existing Noise Level Leq(h)dBA	2040 Build (Options 1 & 2) Traffic Noise Level Leq(h)dBA	Difference from Existing Noise Level(h) dBA
1	Church	67	59	64	5	**68**	9
2	24 Residences	67	60	60	0	62	2
3	18 Residences	67	61	62	1	64	3
4	10 Residences	67	57	59	2	59	2
5	Commercial	71	63	66	3	68	5
6	Commercial	71	53	57	4	61	8
7	Commercial	71	60	62	2	65	5
A	Recreation	67	59	59	0	60	1
B	14 Residences	67	64	64	0	65	1
C	14 Residences	67	64	64	0	65	1
D	18 Residences	67	63	64	1	65	2
E	14 Residences	67	49	51	2	52	3
F	14 Residences	67	53	55	2	56	3
G	42 Residences	67	52	53	1	54	2
H	17 Residences	66	59	61	2	61	2
I	52 Residences	66	55	56	1	57	2
J	20 Residences	66	53	56	3	59	6
K	Commercial	71	52	53	1	57	5
L	Commercial	71	57	58	1	62	5

Source: Parsons Brinckerhoff, April 8, 2011.
Note: **Bold** indicates an affected receptor according to NAC

4.3 Existing Vibration Environment

Existing vibration levels in the project area are typical of an urban environment, with trucks and buses operating on existing roadways. Current vibration levels are not known to disturb residents or businesses in the project area.Five structures are within 25 feet of project construction along 120th Avenue NE. None of the five structures is considered sensitive to vibration.

A detailed discussion of the geologic setting of the project area is presented in the *Geotechnical Report* (Shannon & Wilson, 2010).

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5.0 Environmental Effects

5.1 Direct Effects on Noise

Direct effects are caused by the action and occur at the same time and place as the project.

5.1.1 Noise Effects during Operation

No Build

Modeling for the No Build Alternative indicates that predicted traffic noise levels at all sensitive noise receptors in the noise study area would not approach or exceed the FHWA NAC in the year 2040.

Build

Modeling for the Build Alternative indicates that noise levels would exceed the NAC at the All Saints Episcopal Church in the year 2040 with South Option 1 and South Option 2. Noise levels at all noise-sensitive sites do not approach or exceed the FHWA NAC criteria under both South Options of the Build Alternative. Increased traffic noise levels exceed the NAC criteria at the church, which is a result of its proximity to the widened roadway and increased traffic volumes on 120th Avenue NE.

5.1.2 Noise Effects during Construction

As noted in Chapter 2.0, the project will be constructed in phases beginning no earlier than fall 2011 and extending to at least 2016.

No Build

The project would not be constructed under the No Build Alternative and thus would not result in construction noise.

Build

Project construction would generate noise during construction. Construction would usually be carried out in several reasonably discrete steps, each with its own mix of equipment and its own noise characteristics. Roadway construction would involve clearing, cut-and-fill (grading) activities, removing old roadways, importing and compacting fill, and paving.

The most prevalent noise source at construction sites would be the internal combustion engine. Engine-powered equipment includes earth-moving and compaction, material-handling, and stationary equipment. Mobile equipment operates intermittently, with periods of high and low noise. Stationary equipment such as generators and compressors operates at sound levels fairly constant over time. Because trucks would be present during most construction sequences and would not be confined to the active construction area, truck noise

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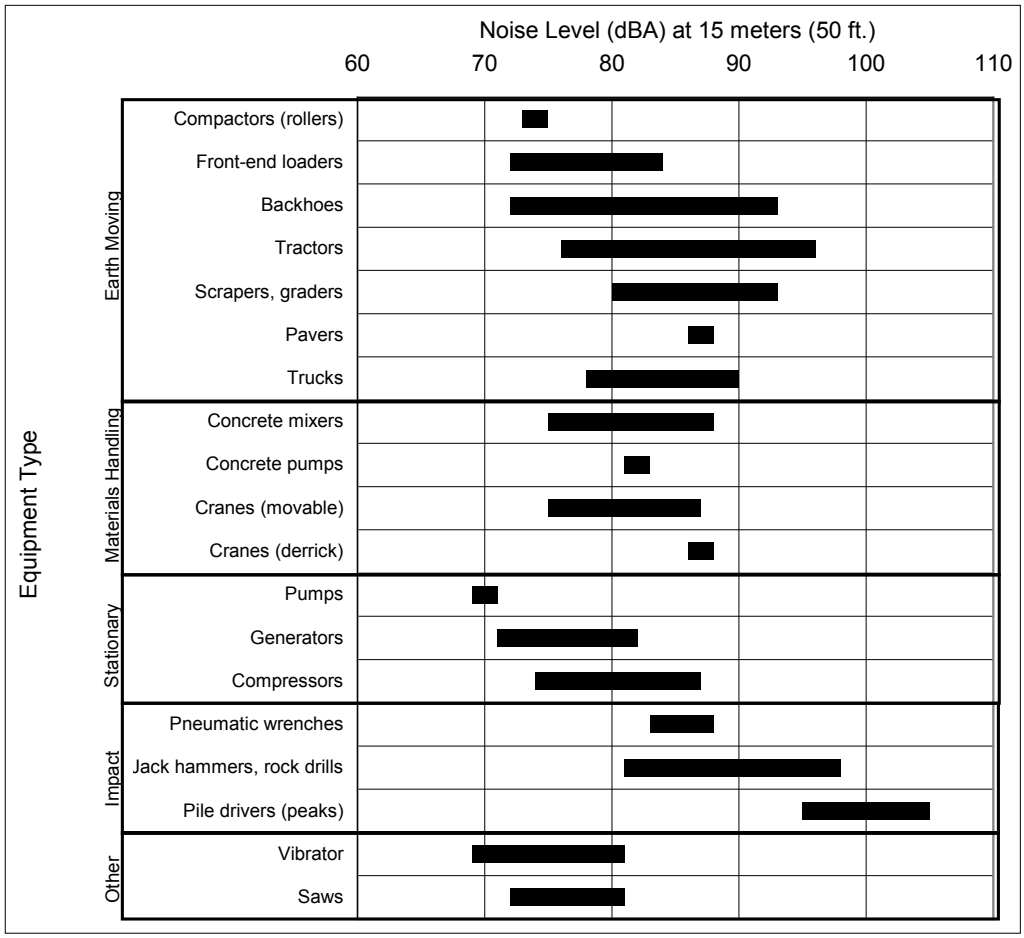
could affect more area residents. Other construction noise sources would include impact equipment and tools such as pile drivers near the culvert/bridge replacement. Impact tools could be pneumatically powered, hydraulic, or electric.

Construction noise would be intermittent. Noise levels would depend on the type, amount, and location of construction activities. The type of construction methods followed would establish maximum noise levels for the equipment used. The amount of construction activity would define how often noise would occur. The proximity of construction equipment to adjacent properties would affect the noise levels of the receptors. Maximum noise levels for construction equipment for the Build Alternative would range from 69 to 93 dBA at 50 feet (Figure 5-1). Pile drivers shown in Figure 5-1 would not be used during project construction.



Source: EPA 1971.

Figure 5-1. Construction Equipment Noise Ranges

5.1.3 Vibration Effects during Construction

Vibration is usually measured as a rms velocity level L_v, which is reported in VdB referenced to a vibration level of 1 micro inch/second. Humans can perceive vibration levels above approximately 65 VdB. The threshold for minor damage to

fragile buildings is approximately 100 VdB. Buses and trucks frequently generate approximately 65 VdB at 25 feet. Heavy construction equipment, such as large bulldozers and loaded trucks, frequently generate between 85 and 87 VdB at 25 feet. No potentially fragile buildings are within 25 feet of proposed construction activities; therefore, no vibration damage is expected to buildings during construction. Any cast-iron water mains within 100 feet or other fragile utility lines within 25 feet could be affected by vibrations caused by impact equipment, such as pavement breakers (jackhammers). No fragile utility lines were identified within 25 feet of project construction. Limits on construction activities are discussed in Section 5.4, Mitigation Measures. Mitigation would minimize the risk of vibration damage during construction.

5.1.4 Vibration Effects during Operation

Vibration levels that would cause disturbance of land use or structural damage are not anticipated as part of the project.

5.2 Indirect Effects on Noise and Vibration

Indirect effects are associated with a project and occur later in time or farther removed in distance; but they are still reasonably foreseeable (e.g., induced land development from highway projects). No additional indirect effects on noise would occur because all foreseeable projects in the area are included in the 2040 traffic modeling used to generate the analysis. No indirect effects on vibration would occur in the foreseeable future.

5.3 Cumulative Effects on Noise and Vibration

Cumulative effects result from the incremental effects of the action when added to other past, present, and reasonably foreseeable actions, regardless of the agency or person initiating the other actions. At this time, reasonably foreseeable projects in the area include the following:

- Spring District—Wright Runstad & Company, in joint venture with Shorenstein Properties, LLC, has planned the development of the Spring District, a 36-acre mixed-use urban neighborhood within the Bel-Red Corridor. The Spring District will consist of up to 1,000 multi-family residences, more than 3 million square feet of office space, and several high-density buildings that will provide retail services. The proposed development will be located at the northeast corner of 120th Avenue NE and NE 12th Street.
- Sound Transit's East Link Project—This project will consist of an electric light rail train system that will connect areas between Seattle and Overlake Transit Center in Redmond. It is anticipated that the system will have a station just east of 120th Avenue NE and between NE 15th Street and NE 16th Street. This project is expected to be completed between 2016 and 2021.

- Construction of light rail will result in the acquisition of property at 1445 120th Avenue NE. Since not all of the property will be used for the light rail track, some portion of it will be redeveloped. As this is already a commercial property, the nature of the land use is unlikely to change significantly.
- NE 15th/NE 16th Streets Corridor—The NE 15th Street/NE 16th Street Corridor will be constructed from NE 12th Street through to Northup Way near NE 15th/NE 16th Streets. The East Link light rail project will be located in this corridor east of 124th Avenue NE.
- 124th Avenue NE Improvements—124th Avenue NE will be improved to support proposed developments in the Bel-Red subarea. The anticipated traffic flow pattern from Downtown to eastbound State Route 520 is NE 4th Street to 120th Avenue NE to NE 15th/NE 16th Street to 124th Avenue NE to State Route 520.

The NE 4th Street/120th Avenue NE Corridor Project is part of the larger Wilburton/NE 8th Street and Bel-Read Subarea planning efforts and is included in the plans. Redevelopment of this area is intended to change its nature from a commercial/industrial area to one that consists of mixed-use smart growth, including residential transit-oriented development. From a community standpoint, this would be considered a beneficial effect, as community centers are developed around the future light rail stations at 120th Avenue NE and at 130th Avenue NE. Each of these transit-oriented development areas will contain its own mixture of commercial and residential facilities and provide pedestrian and bicycle facilities to connect these communities, both internally and with each other.

No additional cumulative effects on noise would occur because all foreseeable projects in the area are included in the 2040 traffic modeling used to generate the analysis. No indirect effects on vibration would occur in the foreseeable future.

5.4 Mitigation Measures

5.4.1 Operational Noise Mitigation

Because predicted traffic noise levels are expected to exceed WSDOT noise criteria limits for some receivers, mitigation measures are warranted for consideration. Noise abatement is to be considered only where frequent human use occurs and where a lower noise level would provide benefits (U.S. DOT, 1982).

One church (Figure 4-2) is predicted to experience operational effects by traffic noise under the Build Alternative in 2040.

Evaluation of Mitigation Measures

Several different traffic noise abatement measures are evaluated whenever traffic noise impacts are expected. For example, noise generated from long-term operation of the project can be reduced by implementing traffic management

measures, acquiring land as buffer zones, realigning the roadway, soundproofing public or nonprofit institutional structures, and constructing noise barriers or berms. These measures were evaluated for their potential to reduce noise impacts from the project.

Any specific mitigation measure recommended as part of the project must be feasible and reasonable. In this context, feasible means the physical ability to implement the noise mitigation measure in such a manner as to provide an acceptable noise reduction benefit, while reasonable means being able to implement the mitigation measure at an acceptable cost.

Traffic management measures include modification of speed limits, traffic control devices, and restricting or prohibiting truck traffic. Restricting truck use on the new roadways could reduce noise levels at nearby receivers because trucks are louder than cars. The speed limit of the new facility is expected to be 35 mph. Reducing the speed could reduce noise in the project area but would conflict with mobility through the study area and would be counter to the purpose of the new facility. Therefore providing a substantial noise reduction through traffic management measures would not be feasible.

Acquiring land for noise buffer purposes at the affected sites would require relocating residences and would require the City to purchase additional right-of-way. Typically, residences within 500 feet of roadways are exposed to varying amounts of roadway noise. Relocating the affected receptors and purchasing right-of-way would be unreasonably expensive for the purpose of noise mitigation.

Creation of noise buffers could reduce the potential for future development along the roadways that are incompatible with traffic noise. Areas within the project area that are currently undeveloped or abandoned could remain as such to avoid noise from the new facility.

The project's horizontal alignment is already designed to avoid displacing any residences in the noise study area. Changes in the horizontal alignment could cause residential displacements and could shift traffic noise to other sensitive receptors. The vertical alignment is constrained by the need to match surrounding roadway grades. Locating the Build Alternative alignment on a completely new alignment is likely not possible and could be prohibitively expensive. Even if found to be possible, doing so would provide only marginal improvement (i.e., less than 5 dBA L_{eq}). Therefore, realigning the roadway is not reasonable for noise mitigation.

Due to access limitations caused by driveways at All Saints Episcopal Church, evaluation of noise barriers is not an option to effectively reduce traffic noise. Noise barrier placement along this area of 120th Avenue NE would not be able to block the line of sight from the church to the roadway, thus not effectively reducing traffic noise by at least 5 dBA.

Insulation of buildings could be feasible at All Saints Episcopal Church as this remedy, in accordance with FHWA and WSDOT policy, only applies to public or

non-profit institutional buildings such as schools, churches, or libraries. All Saints Episcopal Church may be able to receive government-sponsored funding for installation of noise insulation. Interior noise levels would need to be measured to determine if traffic noise levels inside the facility meet the FHWA NAC.

Traffic noise mitigation measures may be effective for this church because soundproofing may be a feasible way to reduce traffic noise at this location.

5.4.2 Operational Vibration Mitigation

No mitigation is proposed because no effects are anticipated.

5.4.3 Construction Noise Mitigation

Because construction is expected to be completed during daytime hours (7 a.m. to 10 p.m.) and within City of Bellevue construction noise limits, mitigation would not be required. For construction outside of daytime hours, a noise variance may be required by the City if project construction noise is predicted to exceed the City's noise limits or if nighttime construction is required to maintain daytime traffic flow or schedule requirements.

5.4.4 Construction Vibration Mitigation

Impact equipment should not be used for pavement removal or placement of piles within 100 feet of known fragile cast-iron water mains or within 25 feet of other fragile underground utilities or historic buildings.

6.0 References

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Shannon & Wilson 2010	Shannon & Wilson 2010. *Bellevue 120th Avenue NE Widening Project, Geotechnical Report.* Seattle, WA.
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USEPA 1974	U.S. Environmental Protection Agency, 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Report Number 550/9-74-004.
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Appendix A
Traffic and Noise Modeling Output Files

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Traffic Data

Table A-1. Noise Measurement Data

Roadway	Direction of Travel	Speeds	Existing Condition 2010				No Build 2040				Build 2040 (South Options 1 and 2)			
			Total	**Autos**	**Medium Trucks**	**Heavy Trucks**	**Total**	**Autos**	**Medium Trucks**	**Heavy Trucks**	**Total**	**Autos**	**Medium Trucks**	**Heavy Trucks**
NE 4th Street	EB	35	0	0	0	0	0	0	0	0	1240	1178	25	37
NE 4th Street	WB	35	0	0	0	0	0	0	0	0	1530	1454	31	46
NE 5th Street	WB	30	50	48	1	2	210	200	4	6	380	361	8	11
NE 8th Street (west)	EB	35	1525	1449	31	46	2470	2347	49	74	1520	1444	30	46
NE 8th Street (east)	EB	35	1320	1254	26	40	1970	1872	39	59	1495	1420	30	45
NE 8th Street (east)	WB	35	1235	1173	25	37	1640	1558	33	49	1585	1506	32	48
NE 8th Street (west)	WB	35	1770	1682	35	53	1250	1188	25	38	1965	1867	39	59
Bel-Red Rd (west)	EB	30	250	238	5	8	955	907	19	29	0	0	0	0
Bel-Red Rd (east)	EB	30	214	203	4	6	145	138	3	4	140	133	3	4
Bel-Red Rd (east)	WB	30	145	138	3	4	345	328	7	10	265	252	5	8
Bel-Red Rd (west)	WB	30	580	551	12	17	1275	1211	26	38	0	0	0	0
NE 12th Street (west)	EB	35	1000	950	20	30	670	637	13	20	835	793	17	25
NE 12th Street (east)	EB	35	995	945	20	30	810	770	16	24	970	922	19	29
NE 12th Street (east)	WB	35	1095	1040	22	33	1160	1102	23	35	1485	1411	30	45
NE 12th Street (west)	WB	35	1060	1007	21	32	1235	1173	25	37	1155	1097	23	35
120th Ave NE (S of 4th)	NB	35	0	0	0	0	645	613	13	19	615	584	12	18
120th Ave NE (S of 4th)	SB	35	0	0	0	0	560	532	11	17	390	371	8	12
120th Ave NE (N of 4th)	NB	35	605	575	12	18	1105	1050	22	33	1340	1273	27	40
120th Ave NE (N of 4th)	SB	35	470	447	9	14	1095	1040	22	33	1435	1363	29	43
120th Ave NE (N of 8th)	NB	35	0	0	0	0	0	0	0	0	1270	1207	25	38
120th Ave NE (N of 8th)	SB	35	0	0	0	0	0	0	0	0	1720	1634	34	52
120th Ave NE (N of Bel-Red)	NB	35	180	171	4	5	665	632	13	20	1540	1463	31	46
120th Ave NE (N of Bel-Red)	SB	35	390	371	8	12	985	936	20	30	1760	1672	35	53
120th Ave NE (N of 12th)	NB	35	180	171	4	5	705	670	14	21	1070	1017	21	32
120th Ave NE (N of 12th)	SB	35	250	238	5	8	625	594	13	19	1395	1325	28	42

Source: Parsons Brinckerhoff, 2011.

Noise Modeling Output Files
Validation Output File

PB 14-Apr-11
P. Romero TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 160195C
RUN: Bellevue 120th - Validation
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
3	1	18	0	60.4	66	60.4	10	----	60.4	0	8	-8
2	5	24	0	59.4	66	59.4	10	----	59.4	0	8	-8
1	8	0	0	60.5	66	60.5	10	----	60.5	0	8	-8
4	16	10	0	56.7	66	56.7	10	----	56.7	0	8	-8
5	19	0	0	62.8	66	62.8	10	----	62.8	0	8	-8
6	27	0	0	52.8	66	52.8	10	----	52.8	0	8	-8
7	29	0	0	60.1	66	60.1	10	----	60.1	0	8	-8

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	52	0	0	0
All Impacted	0	0	0	0
All that meet NR Goal	0	0	0	0

Existing Conditions 2010 Output File

PB 14-Apr-11
P. Romero TNM 2.5
RESULTS: SOUND LEVELS Calculated with TNM 2.5
PROJECT/CONTRACT: 160195C Average pavement type shall be used unless
RUN: Bellevue 120th - Existing Conditions a State highway agency substantiates the use
BARRIER DESIGN: INPUT HEIGHTS of a different type with approval of FHWA.
ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h dBA	No Barrier LAeq1h Calculated dBA	Crit'n dBA	Increase over existing Calculated dB	Crit'n Sub'l Inc dB	Type Impact	With Barrier Calculated LAeq1h dBA	Noise Reduction Calculated dB	Goal dB	Calc'd - Goal dB
3	1	18	0	60.9	66	60.9	10	----	60.9	0	8	-8
D	3	18	0	62.9	66	62.9	10	----	62.9	0	8	-8
2	5	24	0	60.2	66	60.2	10	----	60.2	0	8	-8
A	6	0	0	58.9	66	58.9	10	----	58.9	0	8	-8
1	8	0	0	59	66	59	10	----	59	0	8	-8
C	10	14	0	63.9	66	63.9	10	----	63.9	0	8	-8
B	13	14	0	64.2	66	64.2	10	----	64.2	0	8	-8
E	14	14	0	49.4	66	49.4	10	----	49.4	0	8	-8
F	15	14	0	53.4	66	53.4	10	----	53.4	0	8	-8
4	16	10	0	57	66	57	10	----	57	0	8	-8
G	17	42	0	51.6	66	51.6	10	----	51.6	0	8	-8
5	19	0	0	62.9	66	62.9	10	----	62.9	0	8	-8
6	20	0	0	53.3	66	53.3	10	----	53.3	0	8	-8
7	21	0	0	60.1	66	60.1	10	----	60.1	0	8	-8
H	23	17	0	59.4	66	59.4	10	----	59.4	0	8	-8
I	24	52	0	54.5	66	54.5	10	----	54.5	0	8	-8
J	25	20	0	53.1	66	53.1	10	----	53.1	0	8	-8
K	26	0	0	52.2	66	52.2	10	----	52.2	0	8	-8
L	27	0	0	56.7	66	56.7	10	----	56.7	0	8	-8

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	257	0	0	0
All Impacted	0	0	0	0
All that meet NR Goal	0	0	0	0

No Build 2040 Output File

PB 14-Apr-11
P. Romero TNM 2.5
RESULTS: SOUND LEVELS Calculated with TNM 2.5
PROJECT/CONTRACT: 160195C
RUN: Bellevue 120th - No Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h dBA	No Barrier LAeq1h Calculated dBA	Crit'n dBA	Increase over existing Calculated dB	Crit'n Sub'l Inc dB	Type Impact	With Barrier Calculated LAeq1h dBA	Noise Reduction Calculated dB	Goal dB	Calc'd - Goal dB
3	1	18	0	62.2	66	62.2	10	----	62.2	0	8	-8
D	3	18	0	63.7	66	63.7	10	----	63.7	0	8	-8
2	5	24	0	60.2	66	60.2	10	----	60.2	0	8	-8
A	6	0	0	58.8	66	58.8	10	----	58.8	0	8	-8
1	8	0	0	63.6	66	63.6	10	----	63.6	0	8	-8
C	10	14	0	64.1	66	64.1	10	----	64.1	0	8	-8
B	13	14	0	64.3	66	64.3	10	----	64.3	0	8	-8
E	14	14	0	50.9	66	50.9	10	----	50.9	0	8	-8
F	15	14	0	55	66	55	10	----	55	0	8	-8
4	16	10	0	58.8	66	58.8	10	----	58.8	0	8	-8
G	17	42	0	53	66	53	10	----	53	0	8	-8
5	19	0	0	65.6	66	65.6	10	----	65.6	0	8	-8
6	20	0	0	57.4	66	57.4	10	----	57.4	0	8	-8
7	21	0	0	61.6	66	61.6	10	----	61.6	0	8	-8
H	23	17	0	61	66	61	10	----	61	0	8	-8
I	24	52	0	56.3	66	56.3	10	----	56.3	0	8	-8
J	25	20	0	55.8	66	55.8	10	----	55.8	0	8	-8
K	26	0	0	53.4	66	53.4	10	----	53.4	0	8	-8
L	27	0	0	57.7	66	57.7	10	----	57.7	0	8	-8

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	257	0	0	0
All Impacted	0	0	0	0
All that meet NR Goal	0	0	0	0

Build 2040 Option 1 Output File

PB 15-Apr-11
P. Romero TNM 2.5
RESULTS: SOUND LEVELS Calculated with TNM 2.5
PROJECT/CONTRACT: 160195C
RUN: Bellevue 120th - Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h dBA	No Barrier LAeq1h Calculated dBA	Crit'n dBA	Increase over existing Calculated dB	Crit'n Sub'l Inc dB	Type Impact	With Barrier Calculated LAeq1h dBA	Noise Reduction Calculated dB	Goal dB	Calc'd - Goal dB
3	1	18	0	64.3	66	64.3	10	----	64.3	0	8	-8
D	3	18	0	65	66	65	10	----	65	0	8	-8
2	5	24	0	62.3	66	62.3	10	----	62.3	0	8	-8
A	6	0	0	59.5	66	59.5	10	----	59.5	0	8	-8
1	8	0	0	67.5	66	67.5	10	Snd Lvl	67.5	0	8	-8
C	10	14	0	64.8	66	64.8	10	----	64.8	0	8	-8
B	13	14	0	64.5	66	64.5	10	----	64.5	0	8	-8
E	14	14	0	52	66	52	10	----	52	0	8	-8
F	15	14	0	56.3	66	56.3	10	----	56.3	0	8	-8
4	16	10	0	58.5	66	58.5	10	----	58.5	0	8	-8
G	17	42	0	53.6	66	53.6	10	----	53.6	0	8	-8
5	19	0	0	68.1	66	68.1	10	Snd Lvl	68.1	0	8	-8
6	20	0	0	61.1	66	61.1	10	----	61.1	0	8	-8
7	21	0	0	65.4	66	65.4	10	----	65.4	0	8	-8
H	22	17	0	61	66	61	10	----	61	0	8	-8
I	23	52	0	57.4	66	57.4	10	----	57.4	0	8	-8
J	24	20	0	58.9	66	58.9	10	----	58.9	0	8	-8
K	25	0	0	56.8	66	56.8	10	----	56.8	0	8	-8
L	26	0	0	61.8	66	61.8	10	----	61.8	0	8	-8

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	257	0	0	0
All Impacted	0	0	0	0
All that meet NR Goal	0	0	0	0

Build 2040 Option 2 Output File

PB 15-Apr-11
P. Romero TNM 2.5
RESULTS: SOUND LEVELS Calculated with TNM 2.5
PROJECT/CONTRACT: 160195C
RUN: Bellevue 120th - Build Opt 2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h dBA	No Barrier LAeq1h Calculated dBA	Crit'n dBA	Increase over existing Calculated dB	Crit'n Sub'l Inc dB	Type Impact	With Barrier Calculated LAeq1h dBA	Noise Reduction Calculated dB	Goal dB	Calc'd - Goal dB
3	1	18	0	64.3	66	64.3	10	----	64.3	0	8	-8
D	3	18	0	65	66	65	10	----	65	0	8	-8
2	5	24	0	62.3	66	62.3	10	----	62.3	0	8	-8
A	6	0	0	59.5	66	59.5	10	----	59.5	0	8	-8
1	8	0	0	67.5	66	67.5	10	Snd Lvl	67.5	0	8	-8
C	10	14	0	64.8	66	64.8	10	----	64.8	0	8	-8
B	13	14	0	64.5	66	64.5	10	----	64.5	0	8	-8
E	14	14	0	52	66	52	10	----	52	0	8	-8
F	15	14	0	56.3	66	56.3	10	----	56.3	0	8	-8
4	16	10	0	58.5	66	58.5	10	----	58.5	0	8	-8
G	17	42	0	53.6	66	53.6	10	----	53.6	0	8	-8
5	19	0	0	68.1	66	68.1	10	Snd Lvl	68.1	0	8	-8
6	20	0	0	61.1	66	61.1	10	----	61.1	0	8	-8
7	21	0	0	65.5	66	65.5	10	----	65.5	0	8	-8
H	22	17	0	61	66	61	10	----	61	0	8	-8
I	23	52	0	57.4	66	57.4	10	----	57.4	0	8	-8
J	24	20	0	58.9	66	58.9	10	----	58.9	0	8	-8
K	25	0	0	57.1	66	57.1	10	----	57.1	0	8	-8
L	26	0	0	62.3	66	62.3	10	----	62.3	0	8	-8

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	257	0	0	0
All Impacted	0	0	0	0
All that meet NR Goal	0	0	0	0

Appendix B
Noise Modeling Files

[Appendix B is provided on the attached CD.]

NE 4th Street/ 120th Avenue NE Corridor Project

Transportation Technical Report

prepared for
City of Bellevue

prepared by
Parsons Brinckerhoff

April 15, 2011

COB File # 11-114971-LM

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Acronyms and Abbreviations

City	City of Bellevue
I-405	Interstate 405
LOS	Level-of-Service
NB	Northbound
SB	Southbound

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Executive Summary

As one of several key elements of the NE 4th Street/120th Avenue NE Corridor Project environmental review, a comprehensive transportation analysis was performed to document existing and future conditions related to the effects of proposed land use changes and roadway improvements along the project corridor. The analysis involved a wide range of areas related to PM peak hour traffic operations, non-motorized mobility, transit services, and safety. For the purposes of the environmental documentation, a total of five analysis scenarios were targeted for this work:

- 2010 Existing Conditions
- 2015 No Build
- 2015 Build
- 2030 No Build
- 2030 Build

The analysis findings, in terms of traffic operations, show that current levels of congestion and peak-hour delay are both moderate and manageable based on standard-practice thresholds. Analysis of existing peak-hour (2010) conditions yielded results that show average vehicle delays for all signalized and unsignalized intersections operate at level-of-service (LOS) D or better.

Future traffic levels in the area are expected to increase considerably, especially by the long-range 2030 horizon. Such increases would occur because of zoning changes and proposed land use intensification adjacent to the NE 4th Street and 120th Avenue NE corridors, particularly in the Spring District and Bel-Red Subarea. For the near-term 2015 horizon, the "ramp up" time needed to invoke such changes in land use would result in few development projects completed. Commensurately, congestion levels for the 2015 analysis scenarios would reflect LOS D or better conditions with two exceptions under 2015 Build conditions—the intersections of 120th Avenue NE at NE 12th Street and 116th Avenue NE at NE 4th Street are forecasted to operate at LOS F and LOS E, respectively.

With the implementation of the 2030 land use vision for the subarea, the full build-out of the Bel-Red roadway improvements, Interstate 405 (I-405) and State Route 520 (SR 520) enhancements, and completion of the planned East Link light rail alignment along NE 15th/16th Street, large increases in traffic demand on 120th Avenue NE would occur along with elevated congestion levels. Under No Build conditions (i.e., none of the improvements along NE 4th Street or 120th Avenue NE, but all other roadway projects completed), seven of the seventeen study intersections would potentially operate at LOS E or LOS F by 2030.

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Due to known capacity constraints within the local transportation system such as NE 8th Street and other arterials connecting to or parallel to NE 4th Street and 120th Avenue NE, it is expected that implementation of project improvements representing Build conditions will result in a redistribution of traffic demand that ultimately increases volumes along the project corridor beyond those estimated under No Build conditions. This will provide some relief for these other congested corridors as drivers choose to utilize the improved NE 4th Street / 120th Avenue NE corridor, benefits that are not captured by the project corridor analysis conducted for this report. As a result of increased volumes, some congestion areas along the project corridor are expected despite the proposed improvements. While congestion levels at most of the seven "hot spot" locations identified herein for the 2030 No Build analysis would be largely addressed by the project improvements, congestion levels at three specific locations along the corridor would likely remain at LOS E or LOS F conditions even when the project is complete and no further measures are taken.

In terms of mitigation, the following are potential strategies that could complement the design elements for the project and reduce congestion levels at the three locations where high levels of delays could occur:

- **120th Avenue NE at NE 12th Street**—Southbound right-turn lane and second westbound left-turn lane. To enhance signal timing efficiency at the intersection of 120th Avenue NE at NE 12th Street, a southbound right-turn lane and an additional westbound left-turn lane should be considered to maximize capacity at this intersection and reduce average vehicle delays. With these added turn lanes in place, PM peak hour level-of-service for the 2015 and 2030 Build scenarios could improve.
- **120th Avenue NE at NE 16th Street**—Westbound right-turn lane. To enhance signal timing efficiency at the intersection of 120th Avenue NE at NE 16th Street, a westbound right-turn lane could be considered for future build-out of the NE 16th Street project to reduce backups into the Spring District. This added westbound right-turn lane could improve overall intersection level-of-service for the 2030 Build scenario.
- **116th Avenue NE at NE 4th Street**—Multiple turn lanes. The extension of NE 4th Street is expected to draw a significant amount of traffic during peak-hour periods. To enhance signal timing efficiency and reduce overall congestion levels from LOS F to LOS E, the following turn lanes could be considered as added design elements to the NE 4th Street/120th Avenue NE Corridor Project at the 116th Avenue NE intersection:
    - Second westbound left-turn lane
    - Westbound right-turn pocket
    - Southbound right-turn pocket
    - Eastbound right-turn pocket
    - Northbound right-turn pocket

Added collectively, the turn lanes listed above could reduce average vehicle delays at the intersection of 116th Avenue NE and NE 4th Street to manageable levels. However, at a minimum, in order to reduce delays to levels below the LOS F threshold during the 2030 PM peak hour, the following would be needed at this intersection:

- Second westbound left-turn lane
- Westbound right-turn pocket
- Southbound right-turn pocket

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1.0 Introduction

1.1 Purpose of Report

This *Transportation Technical Report* is being prepared as part of the NE 4th Street/120th Avenue NE Corridor Project for the City of Bellevue (City). The project proposes to extend NE 4th Street east from its current terminus at 116th Avenue NE to a new intersection with 120th Avenue NE, and widen and realign 120th Avenue NE north from the new intersection with NE 4th Street to Northup Way.

The contents of this report summarize the potential future impacts and benefits of this project as they relate to general purpose traffic flow and circulation during the critical weekday PM peak periods.

To evaluate short-term and long-range traffic impacts, two horizon years were targeted for the technical analysis—2015 (year-of-opening) and 2030. For each of these timeline horizons, a No Build scenario (no project) and a Build scenario (project constructed) were investigated in terms of arterial operations, intersection vehicular delays, and level-of-service. Combined with the existing conditions analysis, this work covers a total of five PM peak-hour analysis scenarios.

The structure of this *Transportation Technical Report* is intended to support the environmental review process for both the National Environmental Policy Act and the Washington State Environmental Policy Act. The analysis work summarized in this report strives to convey a range of potential project specific impacts and benefits and is not meant to demonstrate the full benefits of the project in the context of the larger transportation system. The land use assumptions reflected in this work, particularly for areas adjacent to 120th Avenue NE north of NE 12th Street, are considered updates to previous land use forecasts and are specific to the horizon years and development timelines determined at the time of this study. They are not intended to reflect the land use changes represented in previous planning and traffic modeling efforts for the Bel-Red Corridor Study.

An abbreviated project description and a brief overview of the study methodology are provided in Chapters 2 and 3, respectively. The data collected for this traffic analysis effort and an evaluation of the affected environment are included in Chapter 4. Future traffic-related impacts, benefits, and peak-hour operational conditions are described in Chapter 5. Finally, potential short-term and long-term mitigation measures are discussed in Chapter 6.

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2.0 Proposed Project

2.1 Project Overview

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined roadway corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of the Downtown Bellevue center. Major regional transportation connections and facilities in the project vicinity include Interstate 405 (I-405) to the west and State Route 520 (SR 520) to the north.

The project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include—the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road. Figure 2-1 shows the project study area.

The NE 4th Street/120th Avenue NE Corridor Project is one of a number of high priority transportation investments that make up the City of Bellevue's Mobility and Infrastructure Initiative. This initiative was formed to address unprecedented growth in Downtown Bellevue and to support planned growth in the Bel-Red, Spring District, and Wilburton areas.

Other key projects included in the initiative that would complement the proposed project include the following:

- NE 5th Street neighborhood project improvements
- NE 6th Street Extension from 112th Avenue NE to 120th Avenue NE
- NE 15th Street multi-modal corridor improvements north of NE 12th Street (also supporting Sound Transit's East Link Project)
- 124th Avenue NE improvements from NE 8th Street to Northup Way.

For each of these projects, new travel lanes, non-motorized facilities, signal enhancements, illumination, and various structure and utility relocations would be included.

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Figure 2-1. Project Study Area

2.2 Project Purpose and Need

The purpose of the proposed project is to achieve the following:

- Support and accommodate the City's adopted future land use changes and resulting travel demands.
- Improve local traffic circulation.
- Bring corridor features into compliance with current and proposed design standards and guidelines.
- Prepare the project corridor to support connections to planned transit facilities, specifically Sound Transit's East Link Project light rail alignment.

Collectively, the proposed project elements (see Figure 2-2) would enhance area-wide mobility by adding capacity to support the expected growth in travel demand, constructing critical missing links in the City's traffic distribution network, and easing congestion in other travel corridors. Moreover, the project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to transit facilities identified in City plans.

It would improve access for other modes to local recreational facilities, businesses, and the planned Link light rail stations at NE 8th Street and 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE.

In summary, the proposed project would meet the following objectives:

- To provide acceptable level of service at existing and planned study area intersections to meet anticipated long-term travel demands.
- To improve access and connectivity with the regional and local transportation networks.
- To enhance long-term traffic operations over time by incorporating design standards that serve a variety of transportation modes, including the needs of large trucks and freight vehicles, as well as buses.
- To improve quality of life by improving mobility and transportation choice, particularly for transit, bicycle, and pedestrian traffic.

As shown in preliminary traffic analysis work for the NE 4th Street extension and the widening and realignment of 120th Avenue NE, the project elements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas as well as the region in terms of travel mobility and access to neighborhoods and businesses. This is primarily the result of new and enhanced connections across the Burlington Northern Santa Fe (BNSF) corridor and NE 8th Street, respectively. The proposed project also provides expanded arterial street capacity and driveway consolidation along 120th Avenue NE. The project termini are logical because they bracket the extent of the expected future development in the Wilburton/

NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail transit facilities.

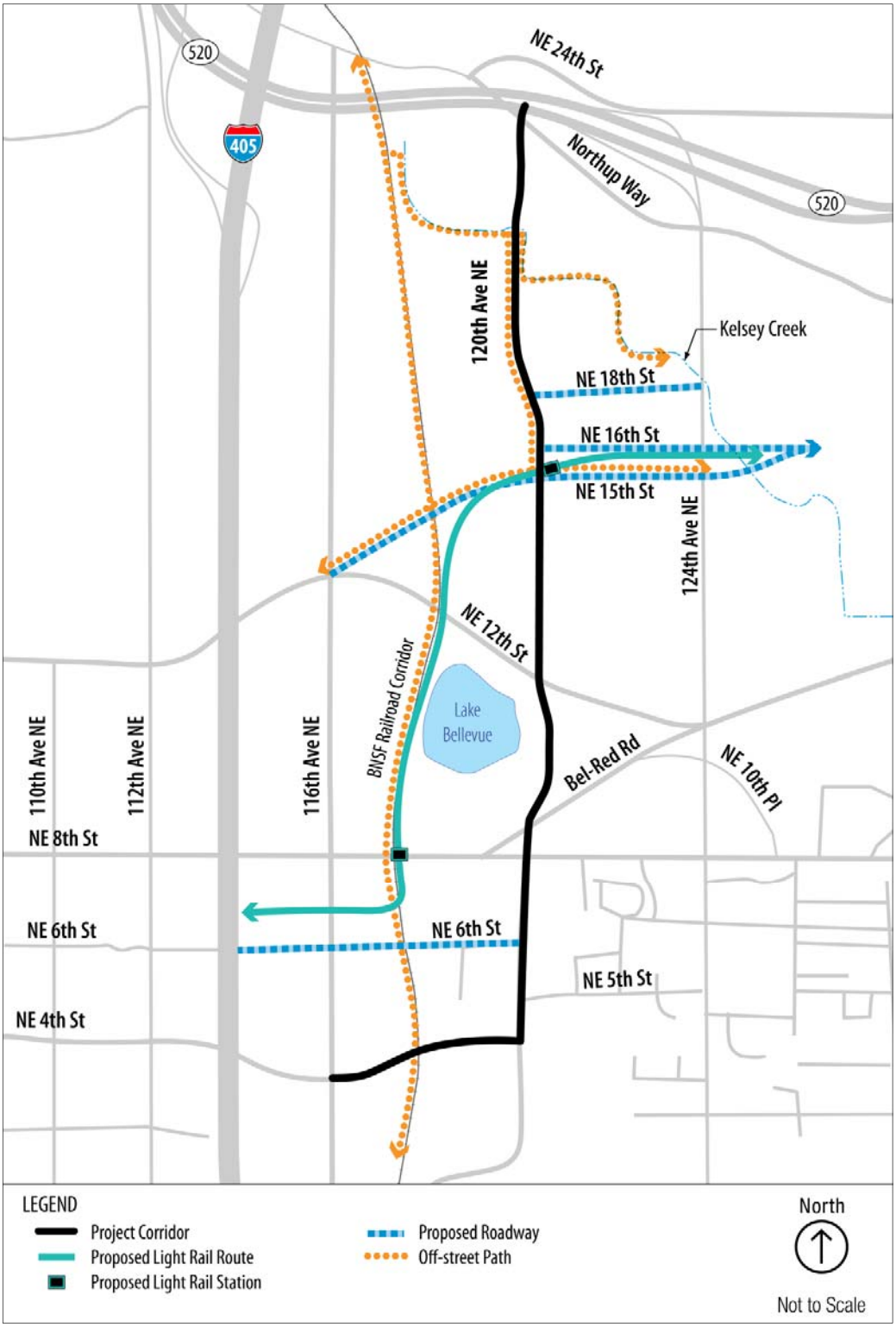

Figure 2-2. Planned Transportation Connections in the Study Area

2.3 Corridor Improvements

2.3.1 Programmed Corridor Improvements

This corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. These projects are described below.

- **NE 4th Street Extension (116th to 120th Avenue NE)**—Construct a new four to five lane roadway with arterial standard curb, gutter, sidewalk (including planting strips) and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension will be designed to accommodate future development and uses of the BNSF corridor.
- **120th Avenue NE Corridor—NE 4th Street to Northup Way**
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected segments; install continuous sidewalks to arterial standards; realign the roadway between Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project will be constructed in phases. Federal funding awarded to improvements, including bike lanes, planned between NE 4th and NE 8th Streets.

This revised description was submitted to Puget Sound Regional Council [PSRC] April 8, 2011 for the June 2011 Amendment to the Statewide Transportation Improvement Program (STIP).

2.3.2 Proposed Corridor Improvements

Specific design elements include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.

- Construct improvements that support the planned new intersections at NE 15th/NE 16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.
- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

The five-lane roadway design is proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE north to NE 15th Street. This proposed roadway cross-section is shown in Figure 2-3. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. Generally, a 5-foot-wide bike lane would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. However, the size and location of the sidewalks, bicycle facilities, and planter strips vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

As mentioned earlier, this analysis addresses the potential impacts of two minor alignment options for the extension of NE 4th Street east of the BNSF corridor. The alignment for Option 1 is farther north than that of Option 2. The Option 1 alignment would require acquisition of a portion of the southern side of the Best Buy building and displace access to the loading dock located on the west side of the building. Negotiations with the property owner are ongoing and may include construction of a building addition on the north side of the existing structure and/or realignment of the loading dock access to the north of the building. Option 2, roughly 55 feet south of the Option 1 alignment, would not require acquisition of any portion of nearby buildings, but would displace a substantial amount of parking on the Home Depot property as well as displace the Best Buy building's access to the loading dock area. Again, negotiations are ongoing with the property owners and mitigation may include construction of a new loading

dock access for the Best Buy property on the north side of the existing structure and/or a new parking garage on the Home Depot property. Note, the design for improvements along 120th Avenue NE south of NE 8th Street do not assume either option has been selected, but rather improvements are based on existing curb cuts for the driveway access to parking for the Best Buy and Home Depot properties.

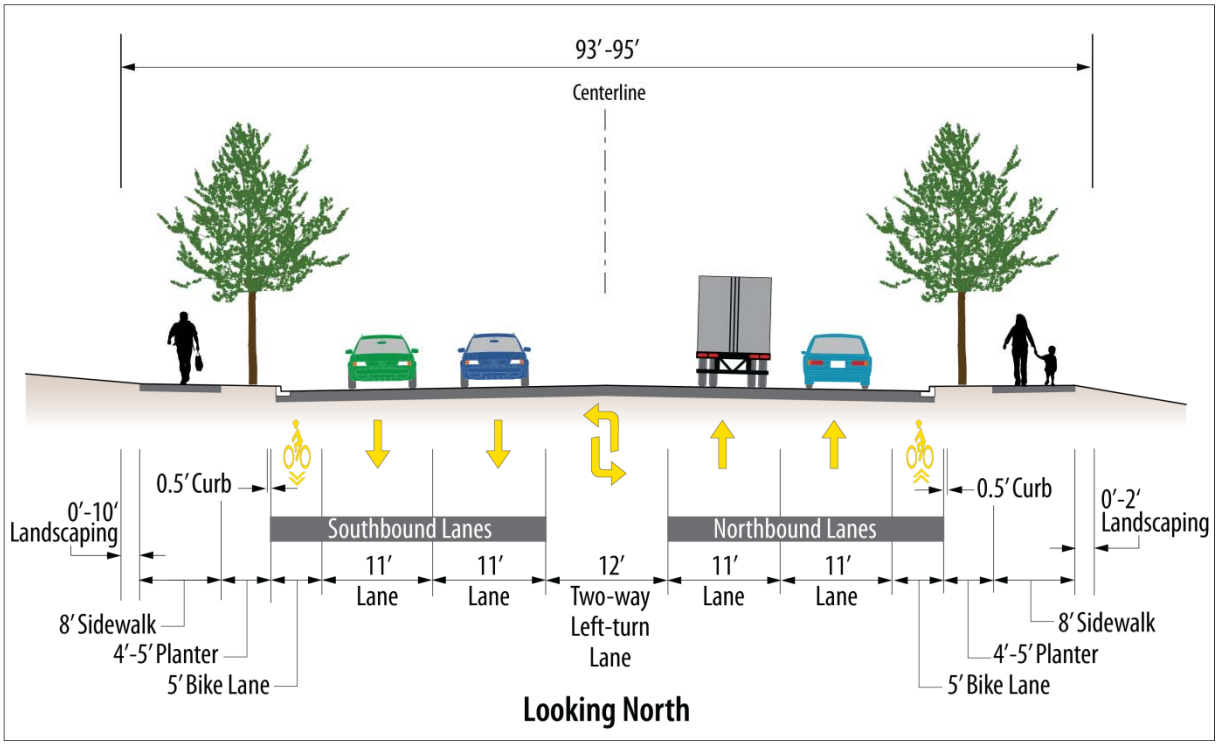

Figure 2-3. Typical Section—Five-lane Roadway Design

A four-lane roadway section is proposed for 120th Avenue NE from NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets. At the intersection at Northup Way, the cross-section would again be five lanes to allow for adequate turning movement capacity. This proposed four-lane cross-section is show in Figure 2-4. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes —two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed for each side of a two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

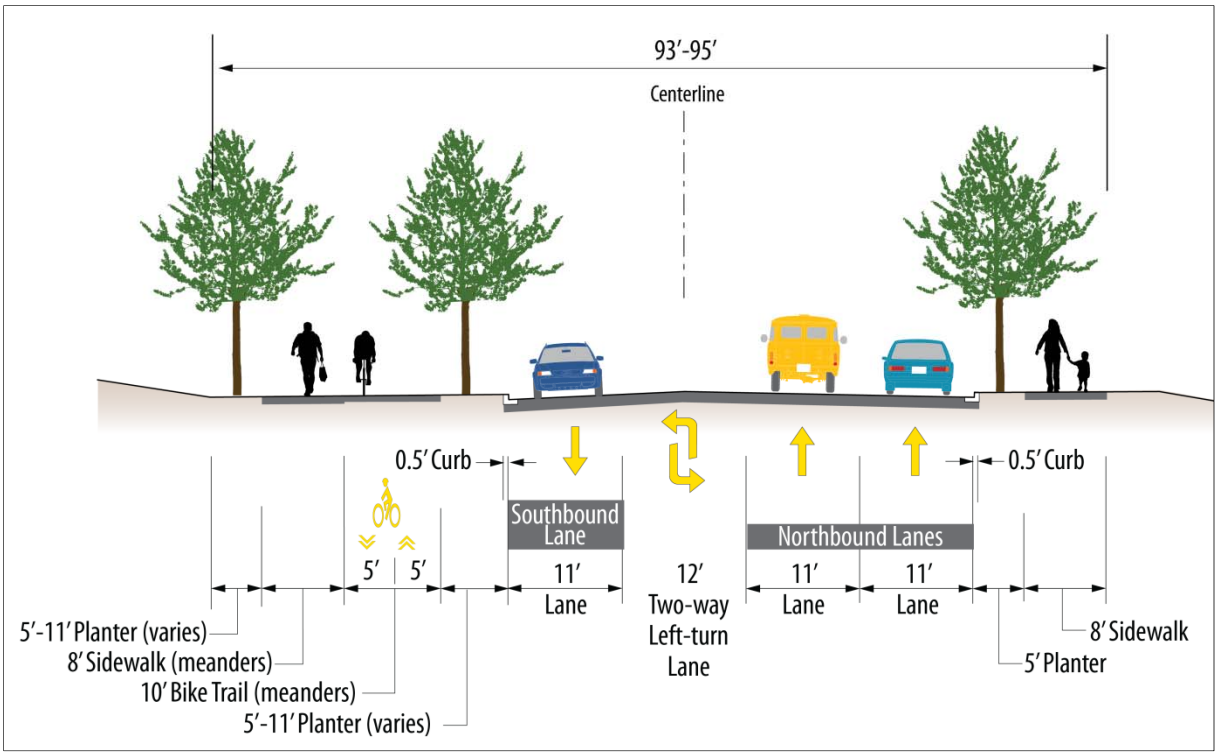

Figure 2-4. Typical Section—Four-lane Roadway Design

Both of the proposed roadway cross-sections also include the use of retaining walls, which would further increase the width of the required right-of-way beyond 95 feet. Retaining walls are proposed at numerous locations along the corridor and they would be located on both sides of the roadway. They would be used for both cut walls and fill walls. When retaining walls are required, these structures would generally be located immediately adjacent to the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet in width. To the outside of the retaining walls, the soil would be graded to a 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 121 feet or more where retaining walls are needed on both sides of the roadway.

Note, the term "right-of-way," as used in this report, includes both right-of-way owned by the City and permanent easements (i.e., the complete footprint of the project).

2.4 Project Construction

2.4.1 Construction Duration and Phasing

Project construction would be phased and is expected to be completed from late 2011 to at least 2016 to match the programming of local, state, and federal funding sources. Each phase would last approximately 12 to 15 months. The planned phases, which may be further sub-divided into construction stages, are:

- Phase 1—120th Avenue NE widening between approximately the NE 300 block north to NE 7th Street.
- Phase 2—120th Avenue NE new construction between NE 8th Street and Bel-Red Road, and realignment and widening between approximately Bel-Red Road north to NE 12th Street.
- Phase 3—NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4—120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5—120th Avenue NE widening between NE 16th Street north to Northup Way.

Based on the Wilburton/NE 8th Street and Bel-Red Subarea Plans, it is essential that all phases of the NE 4th Street/120th Avenue NE Corridor Project be implemented in order to meet the purpose and need of the project. The City has committed to constructing all phases of the project, with cross sections appropriate to meet the multi-modal demand anticipated in the next 20 years. In addition, construction of the project phases could occur sequentially or some phases could overlap.

2.4.2 Construction Approach

The approach to project construction along the corridor differs. The following paragraphs describe the varying approaches to construction.

The improvements for NE 4th Street consist of constructing a new roadway, and would not involve working within an existing operable roadway. Construction for this phase would include clearing the full roadway right-of-way; grading; installing utilities and the roadway gravel base; constructing the curb, gutter and sidewalks; paving the roadway; and installing illumination/signals and landscaping. The construction activities would not disrupt existing traffic patterns along NE 4th Street, 116th Avenue NE, or 120th Avenue NE. However, the construction zone for NE 4th Street may extend somewhat into the existing roadways (116th and 120th Avenues NE) in order to connect new and existing pavements and existing and planned utilities at these locations.

Generally, the construction along 120th Avenue NE from the NE 300 block to NE 7th Street would widen the existing roadway on both sides of the existing centerline. Construction in this area would occur along an operational roadway.

The improvements in this area would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

Construction of the realignment and widening of 120th Avenue NE between the intersection at NE 8th Street and about NE 12th Street would occur along an operational roadway. Thus, the construction in this area is anticipated to occur in the following manner:

- Contractor mobilization
- Install traffic control and temporary erosion control measures
- Relocate and/or install utilities
- Roadway Side 1—retaining walls, grading, paving, signals, and illumination
- Roadway Side 2—retaining walls, grading, paving, signals, and illumination
- Construction zone landscaping, restoration, and clean up.

The corridor could not be closed during construction though both directions of travel may be constrained to perhaps only a single lane. Use of Bel-Red Road between NE 8th Street and 120th Avenue NE, however, would be closed at the start of roadway construction between Bel-Red Road and NE 8th Street. With this road closure, construction could occur unhampered for the new roadway. Parcels along this portion of the alignment would be fully acquired and construction activities would not affect adjacent businesses. Traffic on Bel-Red Road east of 120th Avenue NE would continue to be able to travel north on 120th Avenue NE during construction. To the north of Bel-Red Road, the roadway alignment is generally shifted eastward. Construction work would likely start on the eastern half of the expanded right-of-way. When completed, traffic would be shifted to the new roadway, while the western portion of the roadway is constructed. All construction sequencing would be planned to minimize impacts to traffic and adjacent businesses.

Lastly, construction along the remaining northern portion of 120th Avenue NE from NE 12th to just south of Northup Way would also widen the existing roadway on both sides of the existing centerline. The improvements along 120th Avenue NE would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

2.5 Project Funding

The total cost of the proposed project improvements based on the final City Council Direction for the 2011-2017 General Capital Improvement Plan would be between an estimated $67.3 and $67.6 million, depending on the selected option for extending NE 4th Street. Construction would cost approximately $32 million and right-of-way acquisition would cost roughly $35 million.

Funding for the overall project would likely include monies from the following sources:

- Federal grants
- State Transportation Improvement Board funding
- State Local Revitalization Financing funding
- Local contributions from transportation-dedicated sources, long-term general obligation bonds, impact fees, and other private participation programs including possible local improvement districts.

The specific mix of federal, state, and local funding contributions for each construction phase could differ.

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3.0 Methodology

This chapter summarizes the study approach and primary tools used to develop traffic volume forecasts and perform operational analysis of the various study intersections. The various types of data compiled and processes are summarized. The overall study approach is first discussed and is followed by a description of the traffic forecasting process and operational analysis.

3.1 Study Approach

This transportation assessment followed a conventional planning analysis approach that included the development of goals and objectives, basic data compilation, investigation of existing transportation conditions that reflects all modes, forecasts of future trip generation and circulation patterns, and analysis of future operational impacts and benefits. A general flow chart illustrating the key tasks targeted for this traffic analysis effort is provided in Figure 3-1.

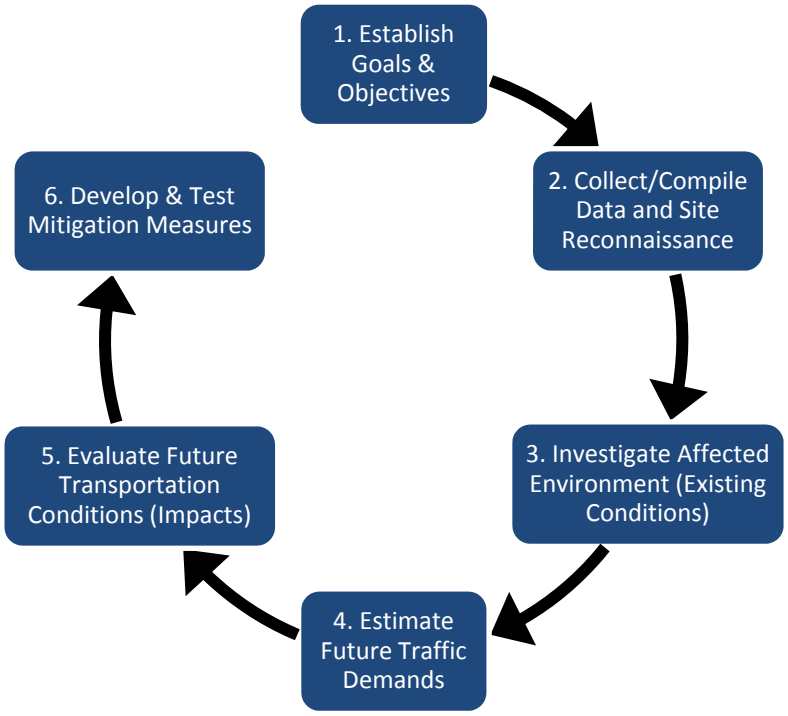

Figure 3-1. Key Study Tasks

Existing traffic data were obtained and compiled from on-going studies for the Wilburton Connections subarea program or directly from City of Bellevue staff. Analysis input items such as lane geometry elements, signal timing data, and roadside physical features were confirmed through field visits/visual documentation. After reviewing and refining (if needed) the available background data, existing traffic conditions in terms of average vehicle delays

and level-of-service were examined by using Synchro software (v7). The following seventeen existing and proposed intersections were targeted for this evaluation (from north to south):

- 120th Avenue NE at Northup Way
- 120th Avenue NE at NE 18th Street (new intersection)
- 120th Avenue NE at NE 16th Street (new intersection)
- 120th Avenue NE at NE 15th (new intersection)
- 120th Avenue NE at Spring District development (new intersection)
- 120th Avenue NE at NE 12th Street
- 120th Avenue NE at Lake Bellevue Driveway (new intersection)
- 120th Avenue NE at Bel-Red Road
- 120th Avenue NE at NE 8th Street
- NE 8th Street at Bel-Red Road
- NE 6th Street a 120th Avenue NE
- NE 5th Street at 120th Avenue NE
- NE 4th Street at 120th Avenue NE (new intersection)
- NE 4th Street at 116th Avenue NE
- NE 4th Street at I-405 Northbound ramps
- NE 4th Street at I-405 Southbound ramps
- NE 4th Street at 112th Avenue NE

Future opening-year (2015) PM peak-hour traffic forecasts for these key intersections were then developed using the City's travel demand model-based growth rates and intersection volume refinements. Long-range (2030) PM peak-hour forecasts were similarly developed using model-based data provided by the City of Bellevue. Using the refined forecast volumes and distribution patterns for the 2015 and 2030 future year scenarios, future traffic conditions were investigated through further operational analysis.

3.2 Data Compilation and Site Reconnaissance

The majority of input data for the technical analysis was taken from previous work related to the NE 4th Street/120th Avenue NE Corridor Project, the Wilburton Connections traffic forecasting effort, and the NE 15th Street/ NE 16th Street Corridor Project. These data included intersection traffic counts, I-405 ramp volumes, truck volumes, and lane geometry data. As part of the field investigation process, digital photos were taken for data verification. Signal timing data for the study intersections were taken from traffic analysis files created during preliminary work for the NE 4th Street/120th Avenue NE

Corridor Project and the City's signal operations staff. Transit routes and service levels were extracted from the King County Metro and Sound Transit websites.

3.3 Traffic Forecasts

The City of Bellevue provided travel demand model data that reflected 2015 No Build and 2030 No Build scenarios. The City also provided 2030 No Build turning movement forecasts for the PM peak hour. PM peak-hour turning movements for the 2015 No Build were developed from the travel demand model data.

Travel demand model data and post-processed PM peak-hour intersection volumes that reflected 2015 Build conditions were available from previous modeling work for the Wilburton Connections Subarea program and preliminary analysis conducted for the 120th Avenue NE corridor.

2030 Build conditions were derived and established using forecasted peak-hour turning movement volume estimates developed for the Wilburton Connections Subarea program. These volume estimates applied to intersections on 120th Avenue NE south of NE 12th Street. For the intersection of NE 12th Street/ 120th Avenue NE and all intersections to the north, peak-hour turning movement volumes developed as part of the NE 15th/NE 16th Street Corridor Project were used. Additionally, the City provided traffic volume projections for existing and proposed driveways along the 120th Avenue NE corridor north of NE 12th Street. Minor refinements in terms of volume adjustments and link balancing were required to balance volumes estimated between the three data sources.

3.4 Operational Analysis

Analysis of roadway and intersection operational performance for the existing, No Build, and Build evaluation scenarios was performed using the Synchro analysis package**.** Key inputs into Synchro included traffic volume data, signal timing data, pedestrian and bicycle volumes, bus and heavy vehicle traffic levels, and a variety of other geometry-related data items. Where no explicit input data were available (e.g., saturation flow rate information), default values within the analysis package were assumed. Performance measures extracted from the analysis results included average vehicle delays and level-of-service.

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4.0 Existing Conditions

4.1 Existing Street Network

The roadway network associated with the NE 4th Street/120th Avenue NE Corridor Project consists of a variety of facilities ranging from two-lane collector arterials to major multi-lane arterials. Key streets reflected in the study area and traffic analysis process include NE 4th Street (and proposed extension), 112th Avenue NE, the I-405 northbound (NB) and southbound (SB) ramps, 116th Avenue NE, 120th Avenue NE, NE 8th Street, NE 12th Street, and Northup Way.

The project extends from the intersection of NE 4th Street at 116th Avenue NE to 120th Avenue NE at Northup Way. NE 4th Street, while serving as a critical link through the Downtown Bellevue area, currently terminates at 116th Avenue NE with no direct east-west connection between 116th Avenue NE and 120th Avenue NE. 120th Avenue NE currently provides one lane in each direction and is classified as a collector arterial by the City of Bellevue.

Key cross streets and intersections along the corridor are described below and shown in Figure 4-1.

4.1.1 120th Avenue NE at Northup Way

The intersection of 120th Avenue NE at Northup Way is a three-leg signalized configuration. Northup Way is classified as a minor arterial by the City. For the eastbound leg, one through lane is provided along with an exclusive right-turn lane. Two through lanes and one left-turn lane are provided for westbound traffic. Separate left-turn and right-turn lanes are provided for northbound traffic onto Northup Way.

4.1.2 120th Avenue NE at NE 12th Street

The intersection of 120th Avenue NE at NE 12th Street is signalized. NE 12th Street is classified as a major arterial by the City and provides two travel lanes in each direction (eastbound and westbound). Exclusive left-turn lanes are provided for all approach legs, and a northbound right-turn lane currently exists.

4.1.3 120th Avenue NE at Bel-Red Road

The intersection of 120th Avenue NE at Bel-Red Road is currently a three-legged unsignalized intersection, with the north leg being stop-controlled and the east and west legs operating freely. A through lane and left-turn lane are provided in the eastbound direction. A single lane is provided for all westbound and southbound movements.

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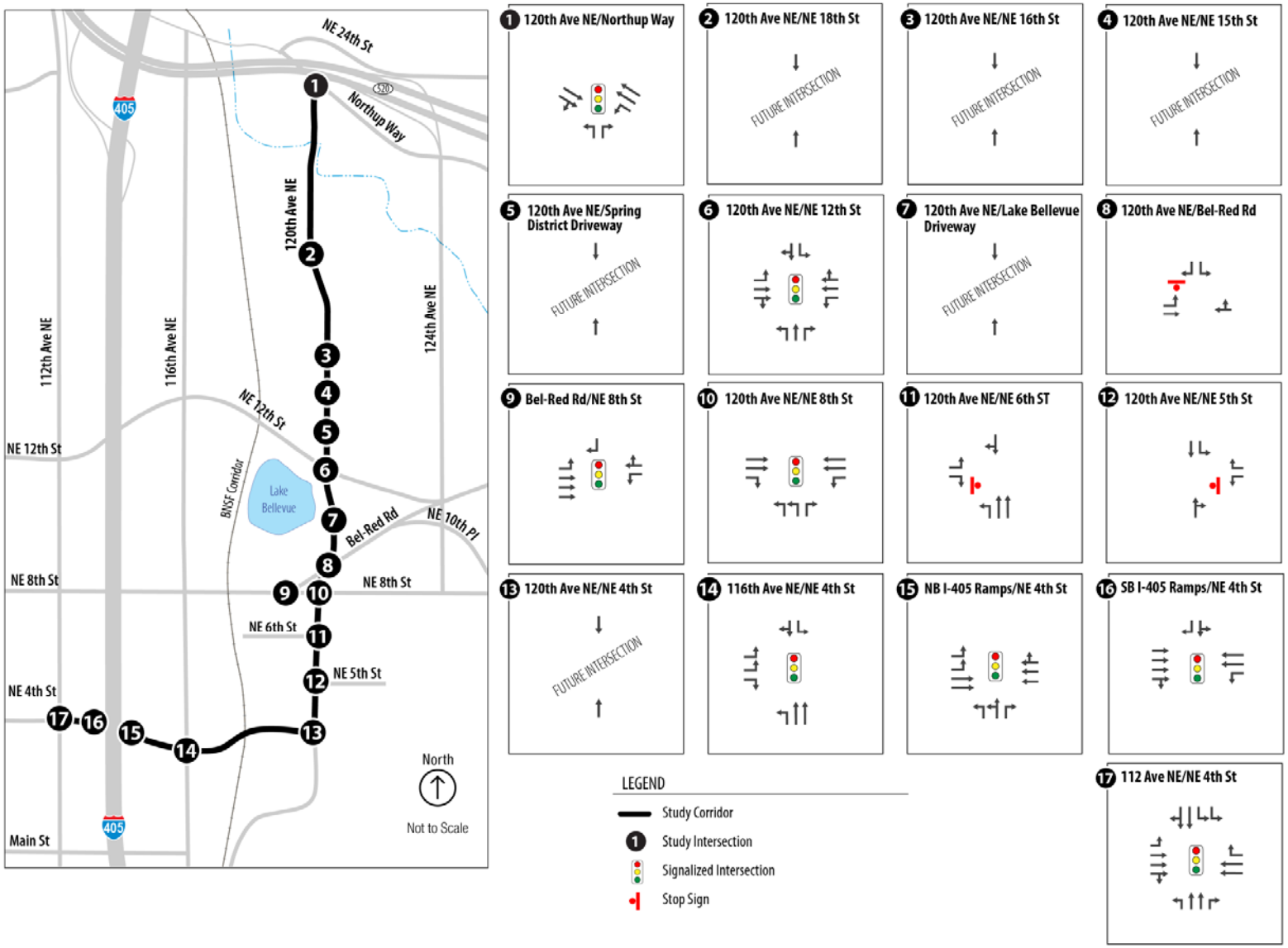

Figure 4-1. Existing (2010) Intersection Lane Configuration

4.1.4 Bel-Red Road at NE 8th Street

The intersection of Bel-Red Road at NE 8th Street is a three-legged signalized intersection. NE 8th Street is designated as a major arterial by the City and serves as a critical spine linking neighborhoods on the east and west sides of I-405. The intersection geometry is slightly skewed, with the southbound leg connecting to the intersection at an angle. Three through lanes are provided in the eastbound direction, with one of the through lanes transitioning into a right-turn-only lane at the downstream intersection of 120th Avenue NE at NE 8th Street. Eastbound traffic operates freely at the intersection of Bel-Red Road and NE 8th Street. There is also an eastbound left-turn/U-turn lane. In the westbound direction, two westbound lanes, including a shared through/right-turn lane, are currently provided. Southbound traffic must turn right and head westbound on NE 8th Street; this movement is configured and operated as a free right-turn.

The intersection of Bel-Red Road and NE 8th Street is approximately 200 feet west of the 120th Avenue NE at NE 8th Street intersection. Signal timings for these two intersections are closely coordinated due to the skewed geometry of this intersection combined with their close proximity.

4.1.5 120th Avenue NE at NE 8th Street

The intersection of 120th Avenue NE at NE 8th Street is currently a three-legged signalized intersection that operates in tandem with the adjacent offset intersection to the west. 120th Avenue NE is the northbound leg of the intersection, and two left-turn lanes are provided with an exclusive right-turn lane. The eastbound leg has two through lanes and a right-turn lane while the opposing westbound leg has two through lanes and a left-turn lane. Signal timing and phasing at this location is coordinated on a single controller with the adjacent signal to the west.

4.1.6 120th Avenue NE at NE 6th Street

The intersection of 120th Avenue NE at NE 6th Street is currently a three-legged unsignalized intersection with stop control on the west leg. NE 6th Street provides access to retail and commercial businesses to the west of 120th Avenue NE before terminating at its western end into a commercial parking lot.

4.1.7 120th Avenue NE at NE 5th Street

The intersection of 120th Avenue NE at NE 5th Street is currently a three-legged unsignalized intersection with stop control on the east leg. Westbound left-turning traffic on NE 5th Street is required to stop by an existing stop sign. Westbound right-turning traffic on NE 5th Street is segregated from the left-turn movement by a “pork chop” traffic island and required to yield to vehicles or pedestrians on 120th Avenue NE.

4.1.8 NE 4th Street at 120th Avenue NE

There is no existing intersection at this location. NE 4th Street currently terminates at the intersection with 116th Avenue NE (west termini of the

NE 4th Street extension). Driveways for local businesses are provided on 116th Avenue NE and 120th Avenue NE near where the proposed extension would connect at the western and eastern termini.

4.1.9 NE 4th Street at 116th Avenue NE

The intersection of NE 4th Street and 116th Avenue NE is currently a three-legged signalized intersection (no east leg). NE 4th Street is classified as a major arterial. The eastbound approach consists of one left-turn pocket, one left-turn lane, and one right-turn lane. The northbound approach consists of one left-turn pocket and two through lanes. The southbound approach reflects a through lane and one shared through/right-turn lane.

4.1.10 NE 4th Street at I-405 NB Ramps

The intersection of NE 4th Street and I-405 NB on/off ramps is currently a four-leg signalized intersection. The south and north legs of this intersection comprise the one-way off-ramp and on-ramp from NB I-405, respectively. The off-ramp leg consists of a left-turn lane and a shared left-through lane along with a right-turn lane (yield). The on-ramp (receiving) leg consists of two lanes. Two left-turn lanes and two through lanes are provided for the east leg. The west leg includes two lanes but approaching the intersection extends to three, comprised of a through pocket, through lane, and a shared through/right-turn lane.

4.1.11 NE 4th Street at I-405 SB Ramps

The intersection of the NE 4th Street and SB I-405 ramps is approximately 220 feet west of the NE 4th Street and NB I-405 ramps intersection. The intersection of NE 4th Street and the I-405 SB ramps is currently a four-leg signalized intersection. The south leg is the on-ramp to SB I-405, whereas the north leg operates as the off-ramp from SB I-405. The northbound leg (on-ramp) consists of two travel lanes. The southbound leg (off-ramp) consists of two lanes, a shared left-through lane, and a right-only lane. The eastbound leg consists of four travel lanes with three through lanes and a shared through/right-turn lane. The westbound leg consists of three lanes, one left-turn only lane and two through lanes.

4.1.12 NE 4th Street at 112th Avenue NE

The intersection of NE 4th Street and 112th Avenue NE is currently a four-legged signalized intersection. The northbound leg has two travel lanes but as it approaches the intersection, it widens to include a left-turn pocket, two through lanes, and a right-turn only pocket. The southbound leg is also comprised of two lanes but widens to include two left-turn pockets, one through lane, and a shared through/right-turn lane. The eastbound leg consists of three through travel lanes and a left-turn pocket. The westbound leg consists of three lanes that include two through lanes and an exclusive right-turn-only lane.

4.2 Traffic Volumes

Existing 2010 PM peak-hour turning-movement traffic volumes for the study area were provided by the City. The volumes were developed as part of the Wilburton Connections traffic modeling effort. A summary of intersection volumes is shown in Figure 4-2.

4.3 Intersection Level-of-Service

Operational analysis of the PM existing peak-hour conditions along the NE 4th Street/120th Avenue NE corridor was performed using the Synchro analysis package. Synchro was used to determine level-of-service, which is a general measure of congestion for transportation facilities such as arterials. Table 4-1 provides standard level-of-service criteria and thresholds for signalized and two-way stop-controlled intersections, as provided in the Transportation Research Board's *2000 Highway Capacity Manual*. A summary of the intersection analysis results is provided in Table 4-2.

As shown in Table 4-2, levels of congestion at key study intersections are generally low to moderate in terms of average vehicle delay and level-of-service. Overall, all intersections captured in the analysis currently operate at LOS D or better during the PM peak hour. However, some vehicle movements at critical intersections currently experience longer-than-average delays. Field observations of traffic conditions during commute periods confirmed these high congestion levels for specific movements, such as the eastbound through, westbound left turn, and northbound left-turn movements from the intersection of 120th Avenue NE at NE 8th Street and for specific movements at the intersection of NE 4th Street at 116th Avenue NE and at the two I-405 ramp intersection locations.

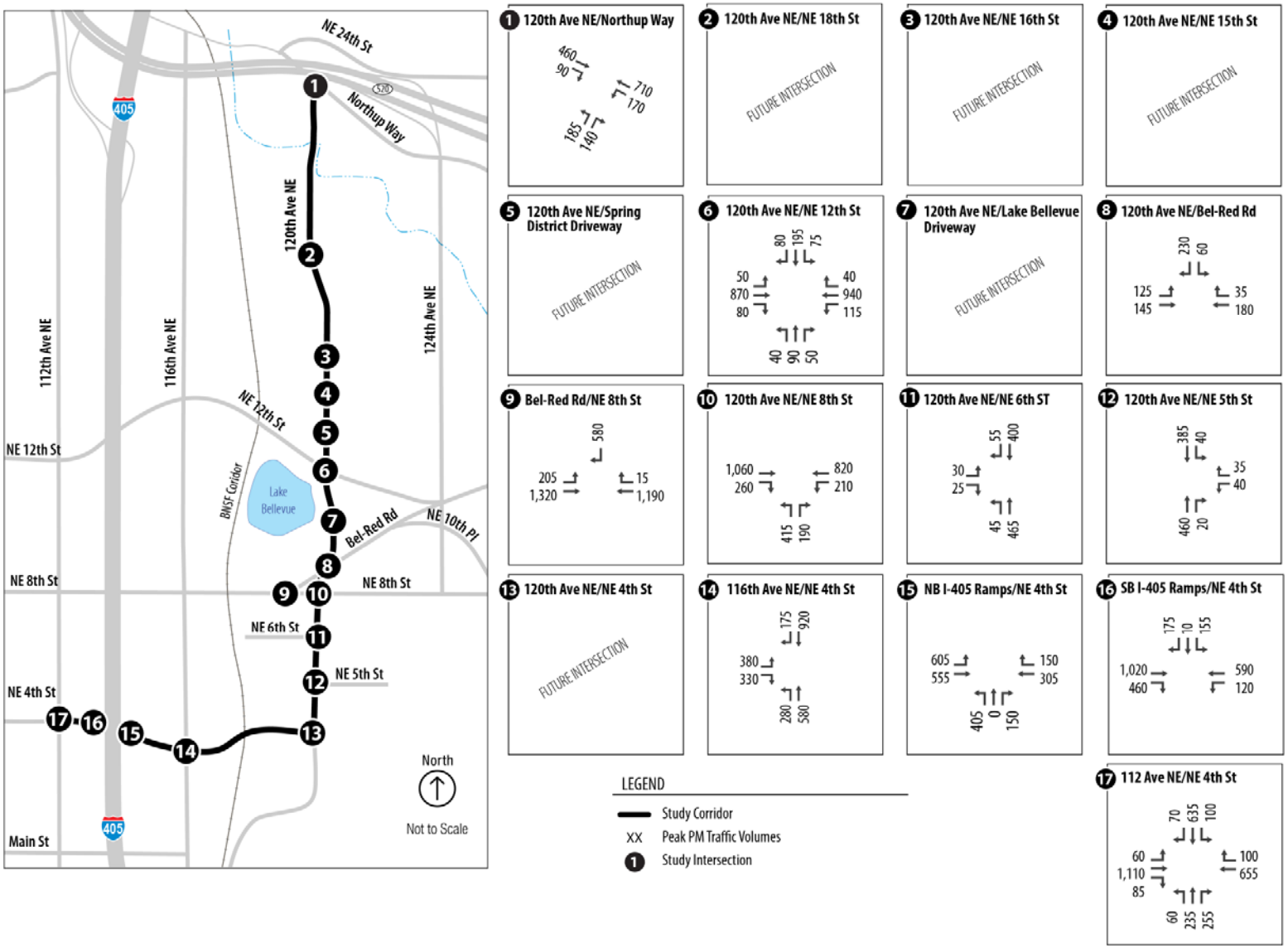

Figure 4-2. Existing (2010) PM Peak-Hour Volumes

Table 4-1 Intersection Level-of-Service Thresholds

Level of Service	Signalized Average Vehicle Delay	Unsignalized Average Vehicle Delay
A	0-10 sec/veh	0-10 sec/veh
B	> 10-20 sec/veh	> 10-15 sec/veh
C	> 20-35 sec/veh	> 15-25 sec/veh
D	> 35-55 sec/veh	> 25-35 sec/veh
E	> 55-80 sec/veh	> 35-50 sec/veh
F	> 80 sec/veh	> 50 sec/veh

Source: 2000 Highway Capacity Manual, Transportation Research Board

Table 4-2. Existing (2010) PM Peak-Hour Level-of-Service

	Signalized Intersections	Control	LOS	Delay[1]
1	120th Avenue NE at Northup Way	Signal	B	14
2	120th Avenue NE at NE 18th Street	—	—	—
3	120th Avenue NE at NE 16th Street	—	—	—
4	120th Avenue NE at NE 15th Street	—	—	—
5	120th Avenue NE at Spring District Driveway	—	—	—
6	120th Avenue NE at NE 12th Street	Signal	C	33
7	120th Avenue NE at Lake Bellevue Driveway	—	—	—
8	120th Avenue NE at Bel-Red Road	Stop	—	—
9	NE 8th Street at Bel-Red Road	Signal	A	4
10	120th Avenue NE at NE 8th Street	Signal	D	44
11	120th Avenue NE at NE 6th Street	Stop	—	—
12	120th Avenue NE at NE 5th Street	Stop	—	—
13	120th Avenue/NE 4th Street	—	—	—
14	116th Avenue/NE 4th Street	Signal	C	32
15	I-405 NB Ramps/NE 4th Street	Signal	C	22
16	I-405 SB Ramps/NE 4th Street	Signal	B	18
17	112th Avenue NE/NE 4th Street	Signal	C	33

[1]For signalized intersections, delays are represented by average intersection estimates given in seconds per vehicle. For unsignalized intersections, delays are for the stop-controlled approach.

4.4 Transit Routes and Service

Metro Transit provides bus service in the project area. Currently there are no transit routes that operate on 120th Avenue NE within the study area segments. However, several routes operate on streets that cross 120th Avenue NE, particularly during peak commute hours. Bus routes 230, 253, 261, 272, and 885 provide service along NE 8th Street; Route 233 travels on NE 12th Street; and Routes 249, 256, and 889 all travel on Northup Way. Service frequencies for these routes are not particularly high with headways ranging from approximately 30 to 60 minutes during the PM peak commute period.

Bus route 271 operates on NE 4th Street between 116th Avenue NE and 112th Avenue NE. However, several routes operate on streets that cross NE 4th Street, particularly during peak commute hours and they include Metro routes 243 and 342 and Sound Transit routes 550 and 556, which travel on

112th Avenue NE crossing NE 4th Street. Headways for these routes range from approximately 7 minutes to one hour during the PM peak commute period, depending on the specific route. More detailed information regarding routes and service levels can be found on the King County Metro and Sound Transit websites.

4.5 Freight Movements

Land use in the 120th Avenue NE corridor between Northup Way and Bel-Red Road is comprised of light industrial and warehouse uses, which generate a fair amount of heavy vehicle traffic throughout a typical weekday. Traffic data collected for this corridor show that heavy vehicles (e.g., single-unit trucks, delivery vehicles, and semi-trailers) comprise approximately 3 to 7 percent of the overall traffic volumes during the PM peak hour. This range of heavy vehicle activity is considered common for an industrial area. Several marked at-grade rail crossings are located along 120th Avenue NE between Northup Way and NE 12th Street; these crossings are currently inactive.

Presently the land use in the vicinity of the proposed extension of NE 4th Street is comprised of commercial and retail uses. Heavy vehicles (i.e. single-unit trucks, delivery vehicles, and semi-trailers) comprise approximately 3 to 5 percent of the overall traffic volumes during the PM peak hour with access to/from 120th Avenue NE. In the future, when the new arterial extension is in place, some of this freight traffic is assumed to shift to the new facility to access current and future retail and commercial land uses along this corridor such as Home Depot, Best Buy, etc.

4.6 Non-Motorized Traffic

Sidewalks are provided intermittently on 120th Avenue NE between Bel-Red Road and Northup Way, with the majority of the roadway between NE 12th Street and the 2000 block lacking sidewalks. Pedestrian volumes are low, with less than 30 movements during the PM peak period. Bicycle volumes in the area are low as well. Based on the City's *2009 Pedestrian-Bicycle Plan*, sidewalks and bike lanes are planned along 120th Avenue NE.

Sidewalks are provided on NE 4th Street between 116th Avenue NE and 112th Avenue NE. Pedestrian volumes are low, with observed volumes generally less than 20 movements during the PM peak period. Similarly, bicycle volumes in the area are modest. No exclusive bicycle lanes are provided on either side of the arterial. However, curb, gutter, and sidewalks sections are provided on both sides of the arterial and are designed to city standards.

4.7 Parking

Please see the NE 4th Street/120th Avenue NE Corridor Project's *Community Effects Technical Report* for a discussion regarding existing parking.

4.8 Crash Analysis

The City of Bellevue provided collision data for the study area. Collision data at intersections along 120th Avenue NE were summarized for the past three years (February 2008 through February 2011). Table 4-3 summarizes accidents rates.

Table 4-3. Collision Rates (2008-2011)

Intersection	Number of Accidents1	Accident Rate2
120th Avenue NE/Northup Way	9	0.63
120th Avenue NE/NE 12th Street	9	0.42
120th Avenue NE/Bel-Red Road	3	0.47
120th Avenue NE/NE 8th Street	14	0.58
120th Avenue NE/NE 5th Street	2	0.25

[1] Accident data from February 2008 to February 2011
[2] Intersection accident rate = (average number of crashes * 1,000,000) / (daily int. vol. * 365)

The City tracks accident rates at intersections and ranks the top 30 locations on an annual basis using these rates. Only two intersections listed in Table 4-3 have been included on the list over the past 20 years. The intersection of 120th Avenue NE/NE 12th Street was last included in the list of high accident locations in 1997, with an accident rate of 0.88 (rank: 25 out of 30). The intersection of 120th Avenue NE/NE 5th Street made the list in 2004 with an accident rate of 0.72 (rank: 24 out of 30). As shown in Table 4-3, accident rates at these intersections have decreased in recent years so they are currently not considered locations of concern.

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5.0 Future Conditions

5.1 Roadway Network Changes

Planned or proposed changes for the study area arterials by the long-range 2030 horizon year would include a wide range of improvements, including arterial extensions, new street construction, general roadway widening, and Sound Transit's East Link light rail alignment. These projects are documented in various Wilburton Connections technical reports. Under the 2015 horizon, only a subset of the improvements to local arterials is assumed. Build conditions for both future horizon years would reflect the entire NE 4th Street/120th Avenue NE Corridor Project. A summary of the assumed network changes for the 2015 and 2030 horizon years (for No Build and Build conditions) is provided in Table 5-1.

Table 5-1. Planned or Programmed Improvements

Planned Project or Improvement	2015 No Build	2015 Build	2030 No Build	2030 Build
NE 4th St/120th Ave NE Project		X		X
NE 5th Street Traffic Calming	X	X	X	X
NE 6th Street Ext (to 120th Ave NE)			X	X
NE 15th/16th St Corridor			X	X
Sound Transit East Link Light Rail			X	X
I-405 NB Braided Ramps	X	X	X	X
124th Ave NE Widening (N. of NE 8th)			X	X
124th Ave NE/SR 520 Interchange			X	X
SR 520 HOV Lanes (System Ext)	X	X	X	X
Spring District Build-Out			X	X

Outside of these projects and planned arterial improvements, the same basic network used for existing conditions was retained for the future No Build and Build scenarios. A new mid-segment, three-leg signalized intersection is created between NE 8th Street and NE 12th Street with reconfiguration of Bel-Red Road. The NE 4th Street/120th Avenue NE lane configuration and intersection control are graphically represented in Figure 5-1 and Figure 5-2.

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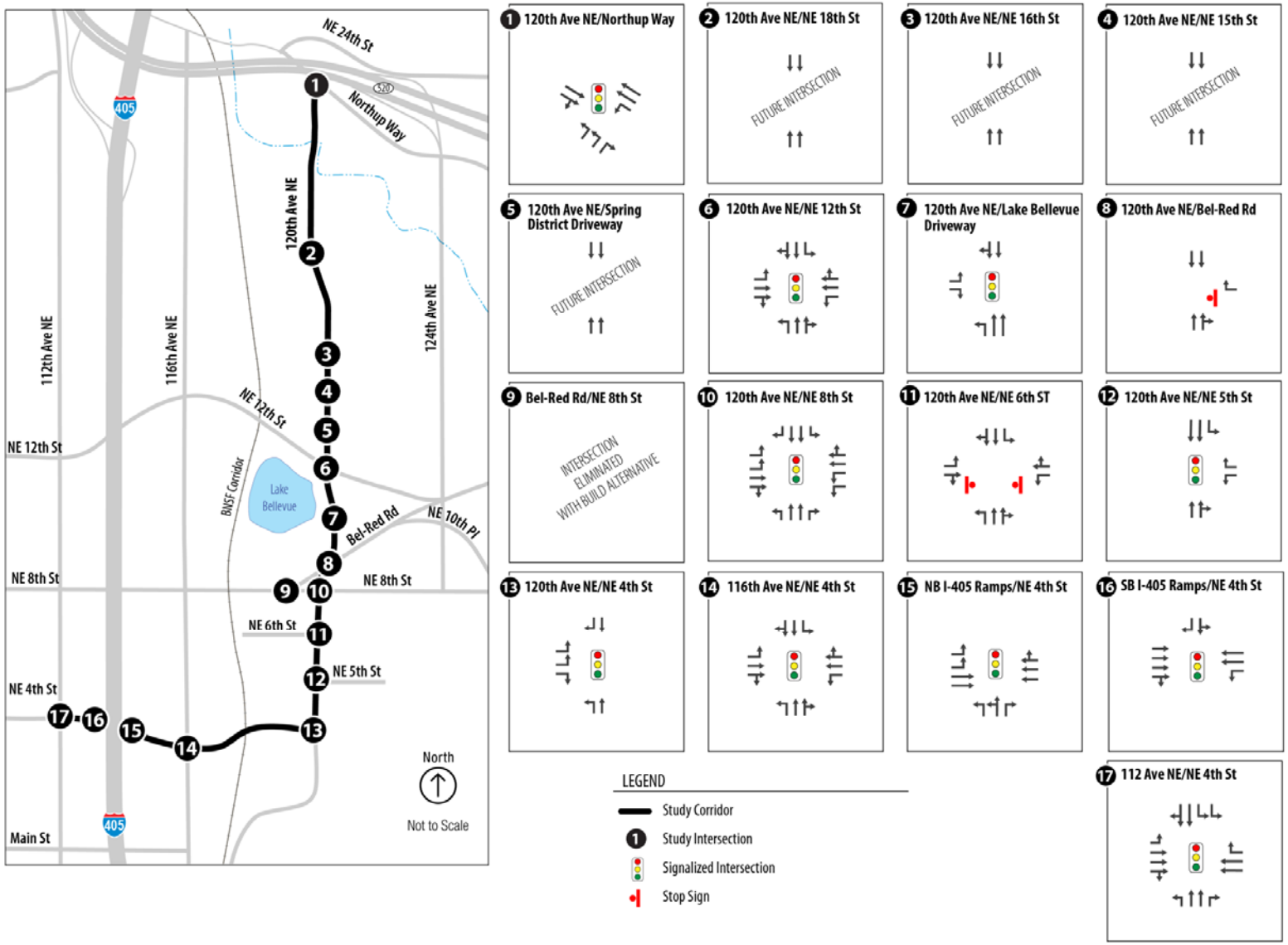

Figure 5-1. Proposed Intersection Lane Configurations (2015)

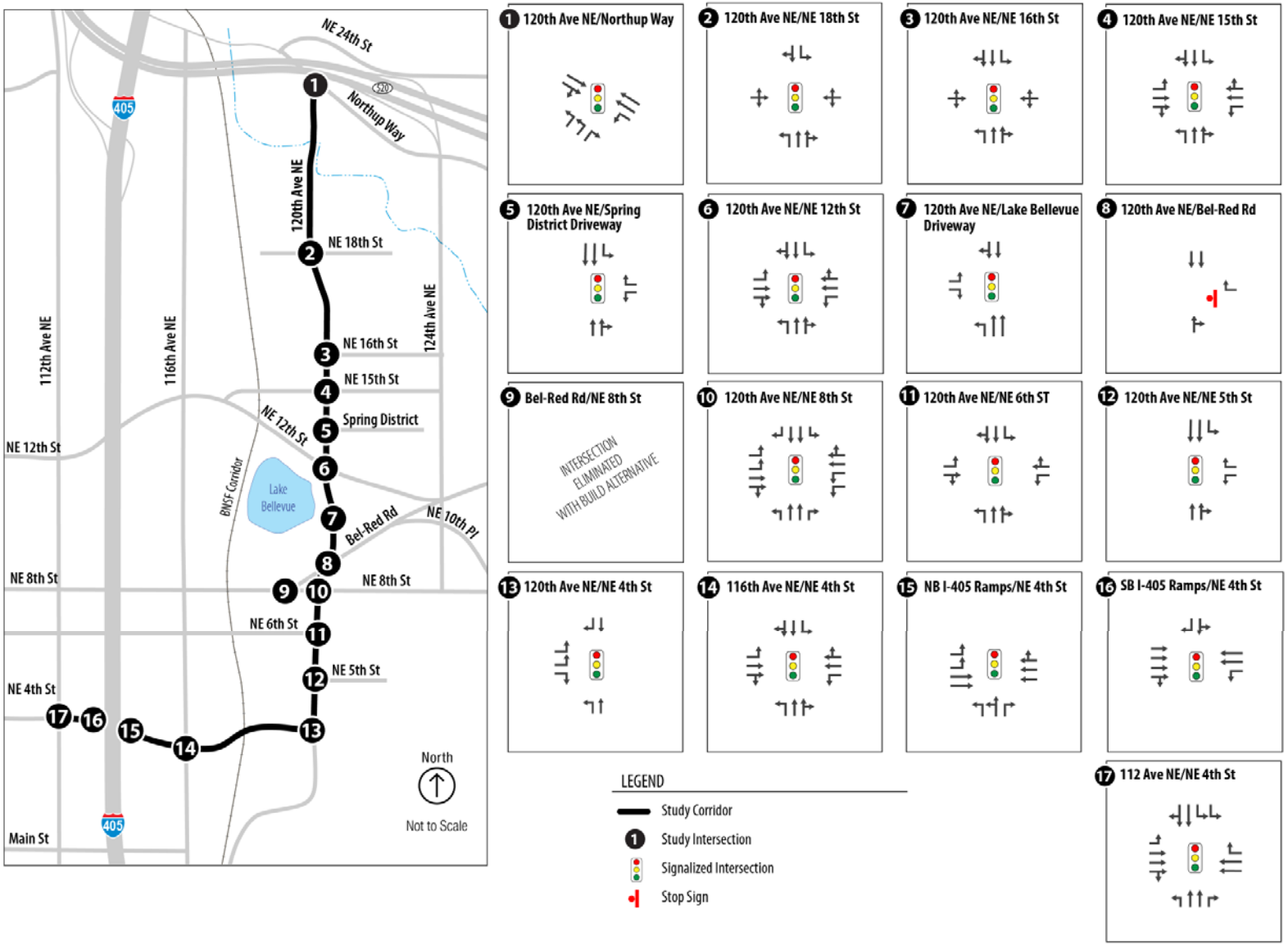

Figure 5-2. Proposed Intersection Lane Configurations (2030)

5.2 Traffic Volume Forecasts

As discussed in Chapter 3, traffic volume forecasts for the 2015 No Build and 2030 No Build scenarios are based on travel demand forecasts provided by the City of Bellevue. PM peak-hour turning movement volume estimates were developed from the travel demand model data.

Travel demand model data and post-processed PM peak-hour intersection volumes that reflected 2015 Build conditions were available from previous modeling work for the Wilburton Connections Subarea program and preliminary analysis conducted along the 120th Avenue NE corridor.

Volume estimates representing 2030 Build conditions were derived using forecasted peak-hour turning movement counts developed for the Wilburton Connections Subarea program for the intersections south of NE 12th Street/ 120th Avenue NE. For the intersection of NE 12th Street/120th Avenue and all intersections in the study area to the north, the peak-hour turning movements developed for the NE 15th/NE 16th Street Corridor Project were used. Additionally, the City provided traffic volumes forecasted at existing and proposed driveways along the 120th Avenue NE corridor, north of NE 12th Street. Additional refinements in terms of volume adjustments and link averaging were required to balance volumes estimated between the three data sources.

Summaries of the 2015 and 2030 intersection turning movement volumes (for both No Build and Build conditions) for the study area intersections are provided in Figure 5-3 and Figure 5-4.

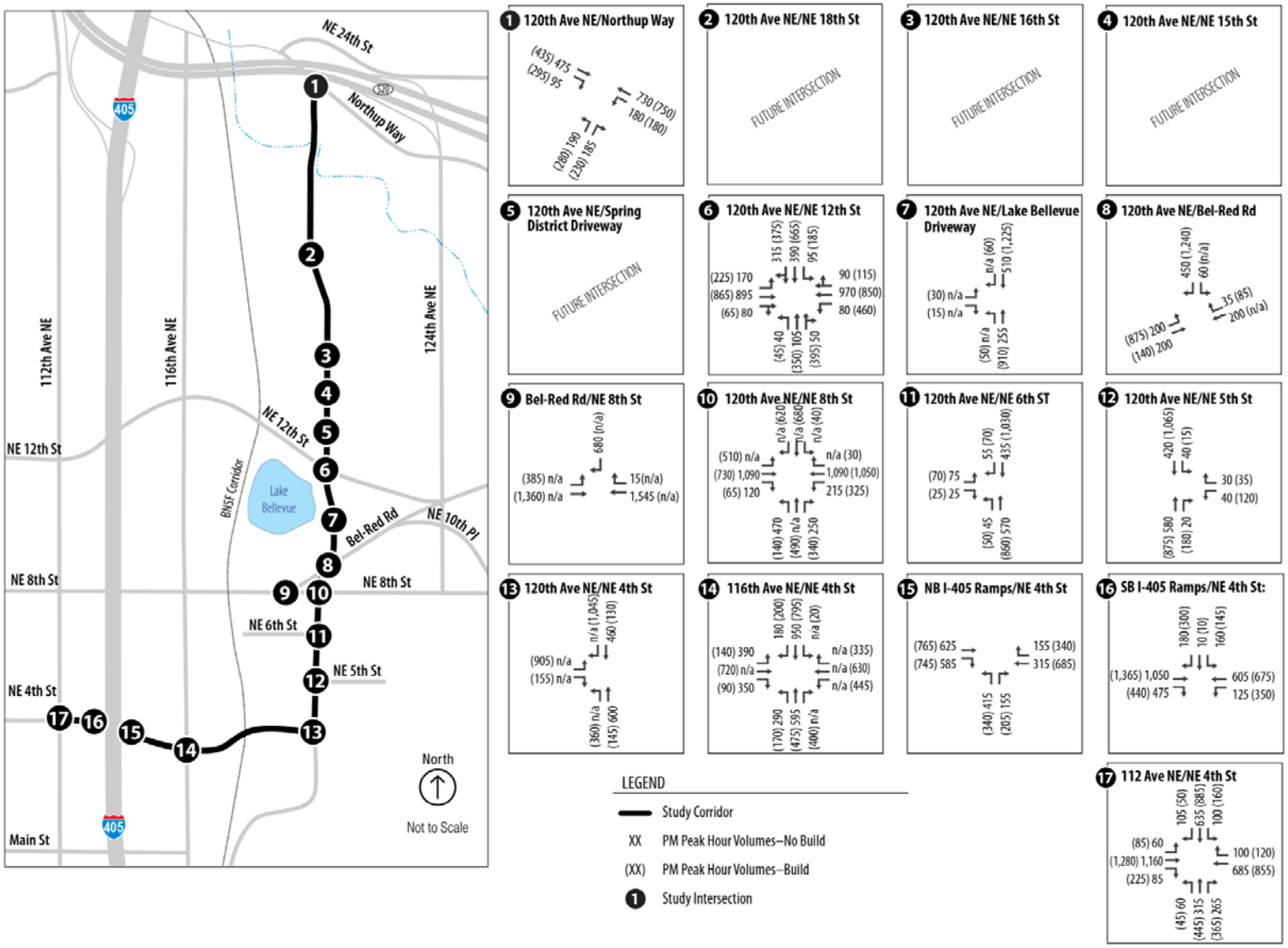

Figure 5-3. 2015 PM Peak-Hour Volumes

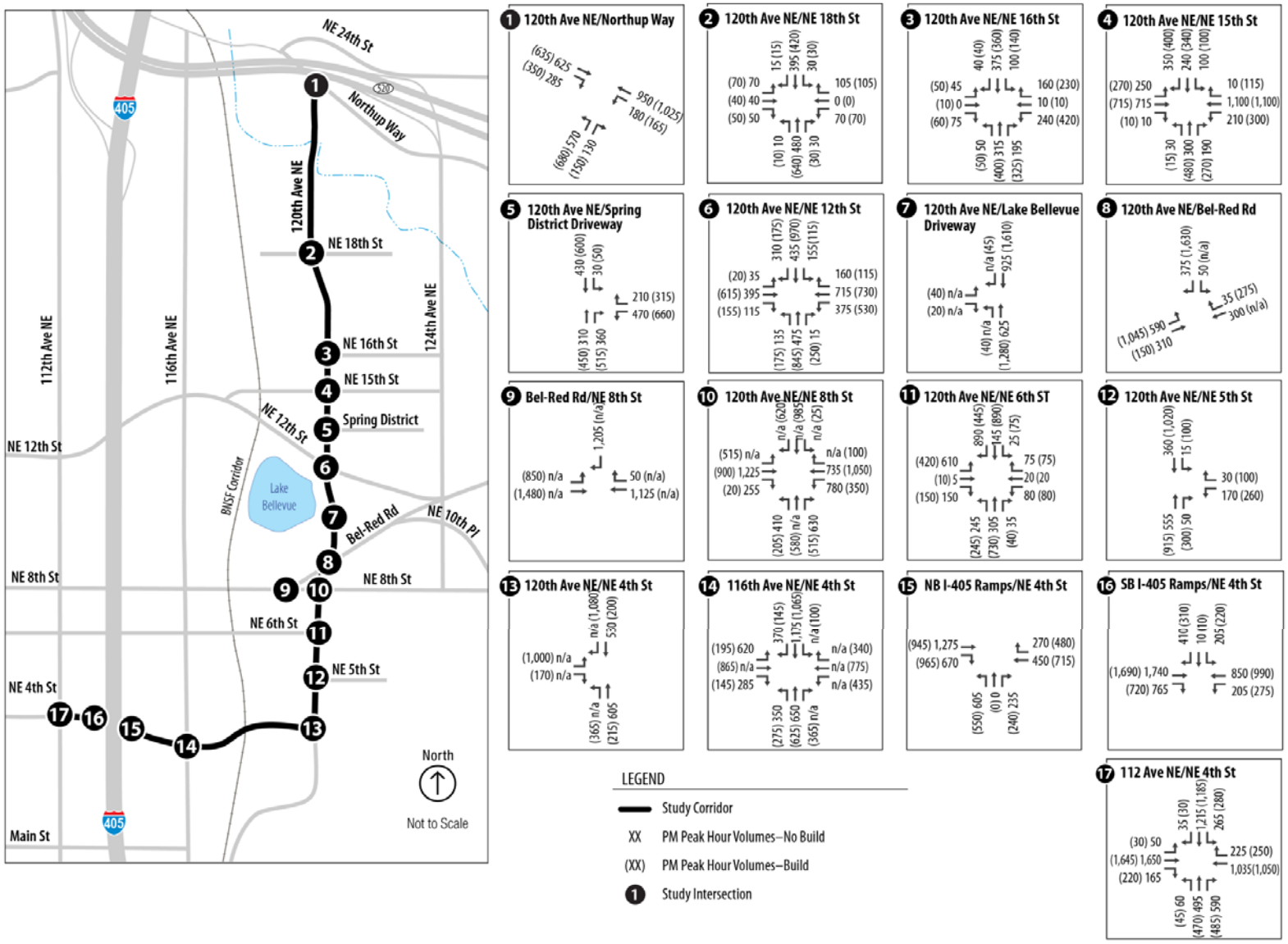

Figure 5-4. 2030 PM Peak-Hour Volumes

5.3 Intersection Level-of-Service

Operational analysis of future 2015 and 2030 PM peak-hour conditions was performed using Synchro analysis software. As with the existing conditions assessment, the two primary performance measures used to compare No Build and Build conditions were average vehicle delays (in seconds per vehicle) and level-of-service. The major roadway network differences between the No Build and Build scenarios included the project elements represented by the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and widening of 120th Avenue NE between NE 4th Street and Northup Way and cross-street channelization improvements at NE 8th Street and NE 12th Street.

For the purposes of the analysis, it was assumed that future conditions at the intersection of NE 5th Street/120th Avenue NE will warrant a signal in 2015 due to volume increases from the NE 4th Street extension. This is consistent with on-going neighborhood planning work related to NE 5th Street project. The NE 6th Street extension is anticipated to be completed sometime between the years 2015 and 2030. A traffic signal will likely be warranted at the intersection of NE 6th Street/120th Avenue NE when this arterial extension is constructed and traffic demands and congestion levels at this intersection increase.

A new signalized intersection was also assumed under the Build conditions at the Lake Bellevue Driveway between NE 8th Street and NE 12th Street to accommodate trips into and out of properties on the west side of 120th Avenue NE. Finally, it was also assumed signals would be installed by the 2030 (even without the project) at the Spring District Driveway on 120th Avenue NE (between NE 12th Street and NE 15th Street) and at NE 15th Street/120th Avenue NE, NE 16th Street/120th Avenue NE, and NE 18th Street/120th Avenue NE.

As shown in Table 5-2, the intersections evaluated under future 2015 No Build conditions are expected to operate with moderate peak-hour delays at LOS D or better, with two exceptions. The intersections of NE 12th Street/120th Avenue NE and NE 8th Street/120th Avenue NE are forecasted to operate at LOS F during the 2015 No Build PM peak hour. This is largely due to increases in demand along NE 8th Street and NE 12th Street as a result of background traffic growth.

By comparison, analysis results of the 2015 Build scenario show peak-hour delays increasing at most of the evaluated intersections. These slight increases in delays are due to higher levels of demand and/or reconfiguration of some intersections. One notable exception is the intersection of NE 8th Street at 120th Avenue NE where overall intersection LOS during the 2015 Build condition is forecasted to improve from LOS F (under 2015 No Build conditions) to LOS D with the project elements in place.

Table 5-2. 2015 PM Peak-Hour Level-of-Service

Intersection		2015 No Build			2015 Build		
		Control	LOS	Delay	Control	LOS	Delay
1	120th Avenue NE at Northup Way	Signal	B	14	Signal	B	14
2	120th Avenue NE at NE 18th Street	—	—	—	—	—	—
3	120th Avenue NE at NE 16th Street	—	—	—	—	—	—
4	120th Avenue NE at NE 15th Street	—	—	—	—	—	—
5	120th Avenue NE at Spring District Driveway	—	—	—	—	—	—
6	120th Avenue NE at NE 12th Street	Signal	F	82	Signal	F	115
7	120th Avenue NE at Lake Bellevue Driveway	—	—	—	Signal	A	6
8	120th Avenue NE at Bel-Red Road	Stop	D	32	—	—	—
9	NE 8th Street at Bel-Red Road	Signal	C	26	—	—	—
10	120th Avenue NE at NE 8th Street	Signal	F	85	Signal	D	54
11	120th Avenue NE at NE 6th Street	Stop	B	14	Stop	C	22
12	120th Avenue NE at NE 5th Street	Stop	B	14	Signal	A	6
13	120th Avenue/NE 4th Street	—	—	—	Signal	C	33
14	116th Avenue/NE 4th Street	Signal	C	28	Signal	E	69
15	I-405 NB Ramps/NE 4th Street	Signal	C	21	Signal	C	20
16	I-405 SB Ramps/NE 4th Street	Signal	B	17	Signal	C	25
17	112th Avenue NE/NE 4th Street	Signal	C	32	Signal	D	39

However, even with increases in delay, overall intersection level-of-service during the 2015 Build condition is expected to remain at LOS D or better, with two exceptions. The intersection of 120th Avenue NE at NE 12th Street is forecasted to operate at LOS F during the 2015 Build PM peak hour. This is largely due to the large forecasted increase in demand of the westbound left-turn movement under the Build condition. This movement is forecasted to increase from 80 vehicles in the 2015 No Build PM peak-hour condition to more than 450 vehicles in the 2015 Build PM peak-hour condition. Current design calls for one westbound turn lane.

The intersection of 116th Avenue NE at NE 4th Street is anticipated to operate at LOS E during the 2015 Build PM peak hour. A new east leg and all corresponding movements are added to this intersection to connect NE 4th Street between 116th Avenue NE and 120th Avenue NE. Extension of NE 4th Street and the higher levels of demand for the 2015 Build conditions caused the level-of-service to degrade.

Table 5-3 shows the analysis results for the 2030 No Build and 2030 Build conditions. Congestion levels and delays at two intersections under the 2030 No Build conditions reach LOS E, and five intersections reach well beyond LOS F minimum thresholds.

A comparison of 2030 No Build and 2030 Build conditions reduces delay at some intersections and increases delay at others. The intersections of 120th Avenue NE/NE 15th Street, 120th Avenue NE/NE 8th Street, and 120th Avenue NE/NE 6th Street are all forecasted to improve from LOS F during the 2030 No Build PM peak hour to LOS D/E conditions during the 2030 Build PM peak hour. The

unsignalized intersection of 120th Avenue NE/Bel-Red Road is forecasted to improve from LOS F to LOS C due to reconfiguration of this intersection.

During the 2030 Build PM peak hour, the intersection of 120th Avenue/ NE 16th Street is forecasted to degrade from LOS C to LOS E. Delays are expected to increase at this intersection due to increased volumes on NE 16th Street. Added capacity on 120th Avenue NE is expected to increase demand under the 2030 Build condition.

Table 5-3. 2030 PM Peak-Hour Level-of-Service

Intersection		2030 No Build			2030 Build		
		Control	LOS	Delay	Control	LOS	Delay
1	120th Avenue NE at Northup Way	Signal	C	32	Signal	C	23
2	120th Avenue NE at NE 18th Street	Signal	A	9	Signal	A	8
3	120th Avenue NE at NE 16th Street	Signal	C	34	Signal	E	67
4	120th Avenue NE at NE 15th Street	Signal	F	117	Signal	D	45
5	120th Avenue NE at Spring District Driveway	Signal	C	34	Signal	D	42
6	120th Avenue NE at NE 12th Street	Signal	F	92	Signal	F	115
7	120th Avenue NE at Lake Bellevue Driveway	—	—	—	Signal	A	7
8	120th Avenue NE at Bel-Red Road	Stop	F	>180	Stop	C	16
9	NE 8th Street at Bel-Red Road	Signal	F	159	—	—	—
10	120th Avenue NE at NE 8th Street	Signal	F	>180	Signal	E	77
11	120th Avenue NE at NE 6th Street	Signal	F	>180	Signal	D	39
12	120th Avenue NE at NE 5th Street	Signal	A	8	Signal	B	17
13	120th Avenue/NE 4th Street	—	—	—	Signal	C	34
14	116th Avenue/NE 4th Street	Signal	E	57	Signal	F	135
15	I-405 NB Ramps/NE 4th Street	Signal	C	30	Signal	C	31
16	I-405 SB Ramps/NE 4th Street	Signal	C	32	Signal	C	25
17	112th Avenue NE/NE 4th Street	Signal	E	61	Signal	E	57

The intersection of 116th Avenue NE/NE 4th Street is forecasted to degrade from LOS E to LOS F. Similar to the 2015 Build condition, this is largely due the large westbound left-turn volumes forecasted under the 2030 Build PM peak-hour condition. Finally the intersection of 120th Avenue NE/NE 12th Street is forecasted to continue to operate at LOS F but with more delays. This is largely due to the substantial increase in forecasted demand for the westbound left-turn movement under the Build condition. Volume for this movement is estimated to increase from 375 vehicles in the 2030 No Build PM peak-hour condition to approximately 530 vehicles in the 2030 Build PM peak-hour condition. Current design calls for one westbound turn lane.

In terms of a vertical comparison and trend assessment between scenarios, the 2030 No Build analysis generally predicts higher delays than the 2015 conditions. A similar review of the analysis results for the Build scenarios are consistent with general traffic growth trends in that delays for 2030 Build conditions are higher than for 2015 Build conditions.

5.4 Transit and Freight Impacts

Based on feedback from City staff, future bus service will likely be provided along 120th Avenue NE to support the proposed Sound Transit East Link light rail alignment along the NE 15th/16th Street corridor. Projected service levels for future bus routes along 120th Avenue NE may be as frequent as one bus arriving/departing every 10 minutes during peak commute periods based on the City's travel demand model inputs and coordination with Sound Transit and King County Metro. The East Link light rail line comprises a major change to the regional transit system, particularly in terms of connections and potential ridership demand. The widening of 120th Avenue NE as envisioned would not affect East Link operations since the light rail line near the NE 4th Street/120th Avenue NE Corridor Project would most likely be constructed in a trench section that crosses under 120th Avenue NE and aligned so as to be adjacent to the new NE 15th/16th Street arterial.

Freight movements along 120th Avenue NE would generally be reduced as the redevelopment efforts unfold in the Bel-Red Subarea. However, heavy vehicle access and circulation in the area would generally improve due to the additional roadway capacity along 120th Avenue NE and potential efforts to enhance accessibility to and from adjacent properties.

Freight movements along the extension of NE 4th Street may be affected by the Option 1 alignment of the NE 4th extension. The grade proposed on NE 4th Street between 116th Avenue NE and the railroad track overpass is approximately 13 percent. Steep grades could reduce the overall speeds and performance of freight vehicles.

5.5 Non-Motorized Impacts

Pedestrian and bicyclist mobility and non-motorized safety would generally improve with the proposed project improvements in place. As discussed in Chapter 2, continuous sidewalks and bicycle facilities would be provided on NE 4th Street and 120th Avenue NE. Such delineation for pedestrians and bicyclists would reduce direct conflicts with vehicular traffic and allow for better connections to regional non-motorized facilities, transit hubs, and bus service on streets crossing NE 4th Street and 120th Avenue NE. The proposed non-motorized trail on the west side of 120th Avenue NE north of NE 15th Street will help to define a permanent bike and pedestrian spine along the study corridor that expands and facilitates efficient access to/from the Spring District light rail station along NE 15th Street (between 120th Avenue NE and 124th Avenue NE).

5.6 Parking Impacts

Potential project-related parking impacts are discussed in the NE 4th Street/120th Avenue NE Corridor Project's *Community Effects Technical Report.*

5.7 Safety Impacts

The improved pedestrian and bicycle routes along the NE 4th Street/120th Avenue NE corridor is expected to improve safety conditions along the corridor. Additionally the elimination of the intersection of NE 8th Street/120th Avenue NE is expected to improve safety conditions for drivers along NE 8th Street by eliminating potential conflicts caused by the closely spaced intersections of NE 8th Street/120th Avenue and NE 8th Street/Bel-Red Road.

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6.0 Mitigation

Based on the operational analysis results and the assessment of transit services and non-motorized mobility, a few transportation-related improvements beyond those covered in the proposed NE 4th Street/120th Avenue NE Corridor Project would be needed to ensure that the corridor functions as envisioned for the larger Wilburton and Bel-Red Subareas.

Minor channelization widening and restriping could be considered to provide some flexibility in the design process. A minimum of one lane would be open for traffic in each direction along 120th Avenue NE as the project is constructed. Only Bel-Red Road would be closed for any length of time during the realignment of 120th Avenue NE near NE 8th Street. Temporary traffic management plans would be prepared to ensure the implementation of detour signage and markings as appropriate during the various phases of construction.

The analysis findings showing the potential traffic flow and circulation benefits of the various treatments are provided in Table 6-1. Each mitigation strategy is then described in greater detail in the following sections.

Table 6-1. 2030 PM Peak-Hour LOS (without and with Mitigation)

Intersection		2030 Build (No Mitigation)			2030 Build (With Mitigation)		
		Control	LOS	Delay	Control	LOS	Delay
3	120th Avenue NE at NE 16th Street	Signal	E	67	Signal	C	28
6	120th Avenue NE at NE 12th Street	Signal	F	115	Signal	D	49
14	116th Avenue/NE 4th Street	Signal	F	135	Signal	E	62

6.1 120th Avenue NE at NE 12th Street

The additional vehicular capacity proposed along 120th Avenue NE as part of the project would likely not be sufficient to adequately address future increases in peak-hour demand along 120th Avenue NE. As a result, LOS F (highly congested) conditions at this intersection would be expected under the 2015 Build scenario. Long-range traffic projections coupled with expected traffic generated by the nearby Spring District Development cause further vehicular delays by the 2030 No Build and 2030 Build conditions.

In order to provide sufficient vehicular capacity at this intersection and reduce forecasted delays, a second westbound left-turn lane from NE 12th Street to 120th Avenue NE and a southbound right-turn lane from 120th Avenue NE to NE 12th Street should be considered at this intersection.

The additional throughput afforded by the southbound right-turn lane and the additional westbound left-turn lane could translate into greater signal green time for competing movements at this intersection. Associated overhead signage could

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be incorporated to provide advanced indication of downstream channelization and access to nearby arterials.

6.1.1 Potential Problem

Heavy volumes (2015 Build and 2030 Build) using the westbound left-turn from NE 12th Street as well as heavy volumes using the southbound right-turn movement result in moderate-to-high average vehicle delays.

6.1.2 Possible Solution

Add a second westbound left-turn lane and a southbound right-turn pocket (100 feet minimum). Preliminary analysis findings show that these channelization measures could improve peak-hour level-of-service for the 2015 Build scenario and 2030 No Build and Build scenarios from LOS F to LOS D.

6.2 120th Avenue NE at NE 16th Street

NE 15th/16th Street is a proposed new roadway connecting NE 12th Street to 120th Avenue NE and 124th Avenue NE that would draw a significant amount of traffic during typically commute-based peak hour periods. Under the 2030 Build scenario, volumes projected for the westbound movement from NE 16th Street onto 120th Avenue NE (to head southbound) are forecasted to be fairly high with commensurately high vehicle delays for the westbound approach. Volumes for the westbound approach of NE 16th Street, NE 15th Street, and the Spring District Driveway were assumed to be higher under the 2030 Build scenario compared to the 2030 No Build scenario. These differences in volumes are due in large part to the additional capacity along 120th Avenue NE under the Build scenario.

To enhance signal timing efficiency at the intersection of 120th Avenue NE at NE 16th Street, a westbound right-turn pocket should be considered as an added design element to the NE 16th Street project to reduce westbound queuing activity and delay.

6.2.1 Potential Problem

Heavy westbound volumes from NE 16th Street to 120th Avenue NE due to additional capacity on 120th Avenue NE.

6.2.2 Possible Solution

Add 150-foot-long (minimum) westbound right-turn pocket. This would improve 2030 Build level-of-service from LOS F to LOS C.

6.3 116th Avenue NE at NE 4th Street

The west leg of NE 4th Street is part of the proposed roadway extension that will connect 116th Avenue to 120th Avenue NE across the Burlington Northern-Santa Fe railroad tracks. This extension of NE 4th Street is expected to draw a significant amount of vehicular traffic during weekday peak-hour periods. Under 2015 and 2030 Build conditions, volumes for all legs of the intersection are

anticipated to increase substantially compared to No Build conditions, thereby resulting in significant delays.

The analysis results show that the intersection would likely operate at LOS E for the 2015 Build scenario and at LOS F for the 2030 Build scenario. To enhance signal timing efficiency, the following turn lanes could be added to help reduce delays and improve overall intersection level-of-service:

- Second westbound left-turn lane
- Westbound right-turn pocket
- Southbound right-turn pocket
- Eastbound right-turn pocket
- Northbound right-turn pocket

The implementation of these additional turn lanes would likely help reduce average vehicular delays at the intersection of 116th Avenue NE at NE 4th Street and improve overall congestion levels from LOS E to LOS D for the 2015 Build scenario. For the 2030 Build scenario, the addition of these turn lanes would help reduce average delays from approximately 135 seconds per vehicle to 62 seconds per vehicle. For 2030 No Build conditions, average intersection vehicular delays are expected to be 57 seconds per vehicle (LOS E).

Adding the full suite of turn lanes listed above would help improve level-of –service at 116th Avenue NE/NE 4th Street to the greatest degree. However, in the event that right-of-way constraints and costs may prove prohibitive, it may not be possible to implement the full range of channelization treatments.

At a minimum, to reduce delays to achieve a congestion target of LOS E by the 2030 horizon, the following would be needed at the intersection of 116th Avenue NE/NE 4th Street:

- Second westbound left-turn lane
- Westbound right-turn pocket
- Southbound right-turn pocket

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7.0 References

City	City of Bellevue Arterial Classification System. http://www.bellevuewa.gov/arterial_class_map.htm
City	City of Bellevue Wilburton Connections Projects. http://www.bellevuewa.gov/wilburton-connections.htm
City	*2009 City of Bellevue Pedestrian & Bicycle Transportation Plan Report,* City of Bellevue Planning Division, 2009.
Inca Engineers, Inc.	*Draft Traffic Operations Analysis Report, 120th Avenue NE, Phase 1 (NE 3rd Street to NE 7th Street) Report,* INCA Engineers, Inc. November 2009.
TRB	*Highway Capacity Manual,* Transportation Research Road, National Research Council, HCM 2000. http://www.trb.org/Main/Public/Blurbs/152169.aspx

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NE 4th Street/ 120th Avenue NE Corridor Project

Water Quality Technical Report

prepared for
City of Bellevue

prepared by
Parsons Brinckerhoff

April 15, 2011

COB File # 11-114971-LM

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Acronyms and Abbreviations

BCC	Bellevue City Code
BMP	best management practice
City	City of Bellevue
CSWPPP	Construction Stormwater Pollution Prevention Plan
Ecology	Washington State Department of Ecology
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GMA	Growth Management Act
I-405	Interstate 405
NAVD	North American Vertical Datum of 1988
NGVD	National Geodetic Vertical Datum of 1929
OHWM	ordinary high water mark
PGIS	pollutant-generating impervious surface
SCS	Soil Conservation Service
SPCC	spill prevention contingency and countermeasures
TDA	threshold discharge area
TESC	temporary erosion and sediment control
TSS	total suspended solids
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

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Glossary

100-year floodplain	An area with a 1 percent chance of being flooded in any given year.
Alluvial sediments	Sediment is a general term for any unconsolidated particulate material that has been deposited by an agent of transport, such as water, ice, or wind. Alluvial sediment is unconsolidated particulate material that has been deposited by a river or stream.
Best Management Practices (BMPs)	Physical, structural, and/or managerial practices that, when used singly or in combination, prevent or reduce pollutant discharge.
Clean Water Act 303(d) List	Section 303(d) of the federal Clean Water Act requires Washington State to prepare a list of all surface waters in the state for which beneficial uses of the water—such as for drinking, recreation, aquatic habitat, and industrial use—are impaired by pollutants.
Construction Stormwater Pollution Prevention Plan (CSWPPP)	A stand-alone document for a construction project that describes the potential for pollution problems and defines approaches to control the identified problems. A narrative and drawings are required and must be modified as necessary as the work progresses.
Detention pond	A facility for temporarily holding stormwater runoff so that it can be released at a controlled rate.
Emergent wetlands	Wetlands dominated by herbaceous plants.
Endangered species	An endangered species is any species that is in danger of extinction throughout all or a significant portion of its range.
Floodway	The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base (100-year) flood without cumulatively increasing the water surface elevation more than a designated height. For the City of Bellevue, the designated height is zero feet (FEMA, NFIP Policy Index).
Hydrology	The science that relates to the occurrence, properties, and movement of water on the earth. It includes water found in the oceans, lakes, rivers, streams, and wetlands, as well as in upland areas, above and below ground, and in the atmosphere.
Impervious surface	A hard surface, such as a rooftop, walkway, road, parking lot, and compacted urban soils, that prevents or retards rain from passing through or penetrating and moving into soils as it would naturally.

Mitigation	The measures that could be taken to lessen the negative effects predicted for each resource. These measures may include reducing or minimizing a specific negative effect, avoiding it completely, or rectifying or compensating for the negative effect.
Ordinary High Water Mark (OHWM)	A physical mark along most waterways that indicates the height normally reached during average high flow.
Pollutant	Any substance that upon reaching the environment (soil, water, or air), is degrading in effect so as to impair the environment.
Right-of-way	Right-of-way is the land set aside for use as a highway. Rights-of-way are purchased (acquired) prior to the construction of a new road. Usually enough extra land is purchased for the purpose of providing safety clearances, building retaining walls, and implementing other mitigation features.
Riparian area	A riparian area is an area of land covered by vegetation and adjacent to and influenced by streams, lakes, and open water wetlands.
Salmonid	Belonging to the family Salmonidea, including salmon, trout, and whitefish.
Sediment	A general term for any unconsolidated particulate material that has been deposited by an agent of transport, such as water, ice, or wind.
Spill Prevention, Control, and Countermeasures (SPCC)	A SPCC plan includes site information regarding hazardous materials, spill prevention and containment methods, response procedures, and equipment and material to carry out preventive and response measures. SPCC plans ensure that all harmful and/or deleterious materials are properly stored and contained.
Stormwater runoff	Stormwater runoff is the portion of precipitation (rainwater or snowmelt) that does not naturally seep into the ground or evaporate, but flows overland via ditches, surface flow, pipes, or other features into a defined surface water or treatment facility.
Temporary Erosion and Sediment Control (TESC) plan	The TESC plans are the drawings that demonstrate how a construction project will prevent and minimize erosion and other impacts to water quality, supporting the CSWPPP narrative.
Threatened species	A threatened species is any species that is likely to become endangered within the foreseeable future.

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Although the NE 4th Street/120th Avenue NE Corridor Project would increase the amount of impervious surface in the study area, stormwater management practices for the project would adhere to Bellevue City Code (BCC) 24.06.05, as required by the City's National Pollutant Discharge Elimination System Stormwater Permit. Stormwater management practices that would be used on the project, which include flow control and runoff treatment, "are presumed to meet the technology-based treatment requirement of State law to provide all known available and reasonable methods of treatment, prevention, and control (AKART; RCW 90.52.040 and RCW 90.48.010)."

Implementation of the requirements set forth in BCC 24.06.05 is considered necessary to protect the beneficial uses of receiving waters (both surface and ground waters) in the project corridor. The project would provide flow control and treatment as required by the City of Bellevue (City) to protect Sturtevant Creek, the West Tributary of Kelsey Creek, and groundwater in the study area.

The existing culvert for the West Tributary of Kelsey Creek would be replaced as part of the project. The cross-sectional area for the culvert would be increased, which would increase the culvert's flood-carrying capacity.

The Build Alternative, in conjunction with other past, present, and reasonably foreseeable actions, would degrade surface-water resources by the incremental conversion of pervious surface and the incremental conversion of non-pollution-generating impervious surface to pollution-generating impervious surface. The majority of the landscape in the two subbasins has already been altered by the past loss of pervious surfaces, altered flow conditions, and conversion to a built environment.

The additive effects of the Build Alternative, in combination with other actions, could further degrade surface-water resources. However, dilution modeling performed for the Biological Assessment shows that metal concentrations would reach background levels within a few feet of entering water bodies.

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1.0 Introduction

1.1 Purpose of this Report

This *Water Quality Technical Report* is being prepared as part of the NE 4th Street/120th Avenue NE Corridor Project for the City of Bellevue. The project proposes to extend NE 4th Street east from its current terminus at 116th Avenue NE to a new intersection with 120th Avenue NE, and widen and realign 120th Avenue NE north from the new intersection with NE 4th Street in the south to Northup Way.

The purpose of this report is to describe the existing water quality, groundwater, surface water, and floodplains in the study area; discuss the effects and benefits the project would have on those resources; and identify mitigation measures to address adverse effects, as needed.

1.2 Permits Needed

The permits required with respect to the water resources discussed in this technical report are listed in Table 1-1.

Table 1-1. Permits Required

Permit	Agency	Trigger
Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers and Washington State Department of Ecology (Ecology)	All work below the ordinary high water mark (OHWM) for the culvert modification and within wetlands
Hydraulic Project Approval	Washington Department of Fish and Wildlife	Culvert modification
Clean Water Act Section 401 Water Quality Certification	Ecology	Section 404 permit
National Pollutant Discharge Elimination System Construction Stormwater Permit	Ecology	Construction stormwater discharge
Clearing and Grading Permit	City of Bellevue	Construction activities of clearing and grading
Building Permit	City of Bellevue	Clearing and Grading Permit
Approved Conditional Use Permit	City of Bellevue	Clearing and Grading Permit
Preliminary Plat Approval	City of Bellevue	Clearing and Grading Permit
Shoreline Approval or Exemption	City of Bellevue	Clearing and Grading Permit
Right-of-Way Use Permit	City of Bellevue	Clearing and Grading Permit
Demolition Permit	City of Bellevue	Clearing and Grading Permit
Utility Developer System Extension Agreement	City of Bellevue	Clearing and Grading Permit
Critical Area Special Condition for a Clearing and Grading Permit	City of Bellevue	Clearing and Grading Permit for culvert construction

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2.0 Proposed Project

2.1 Project Overview

The City of Bellevue (City) proposes to implement arterial street transportation improvements to NE 4th Street and 120th Avenue NE in Bellevue, Washington. The improvements along the combined roadway corridors are referred to as the NE 4th Street/120th Avenue NE Corridor Project. The project corridor is located approximately 1 mile east of the Downtown Bellevue center. Major regional transportation connections and facilities in the project vicinity include Interstate 405 (I-405) to the west and State Route 520 (SR 520) to the north.

The project extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. Key project elements include—the extension of NE 4th Street from its existing terminus with 116th Avenue NE eastward to 120th Avenue NE; widening of existing 120th Avenue NE from the proposed intersection with NE 4th Street northward to Northup Way; and the realignment of a new segment of 120th Avenue NE between NE 8th Street and Bel-Red Road. Figure 2-1 shows the project study area.

The NE 4th Street/120th Avenue NE Corridor Project is one of a number of high priority transportation investments that make up the City of Bellevue's Mobility and Infrastructure Initiative. This initiative was formed to address unprecedented growth in Downtown Bellevue and to support planned growth in the Bel-Red, Spring District, and Wilburton areas.

Other key projects included in the initiative that would complement the proposed project include the following:

- NE 5th Street neighborhood project improvements
- NE 6th Street Extension from 112th Avenue NE to 120th Avenue NE
- NE 15th Street multi-modal corridor improvements north of NE 12th Street (also supporting Sound Transit's East Link Project)
- 124th Avenue NE improvements from NE 8th Street to Northup Way.

For each of these projects, new travel lanes, non-motorized facilities, signal enhancements, illumination, and various structure and utility relocations would be included.

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Figure 2-1. Project Study Area

2.2 Project Purpose and Need

The purpose of the proposed project is to achieve the following:

- Support and accommodate the City's adopted future land use changes and resulting travel demands.
- Improve local traffic circulation.
- Bring corridor features into compliance with current and proposed design standards and guidelines.
- Prepare the project corridor to support connections to planned transit facilities, specifically Sound Transit's East Link Project light rail alignment.

Collectively, the proposed project elements (see Figure 2-2) would enhance area-wide mobility by adding capacity to support the expected growth in travel demand, constructing critical missing links in the City's traffic distribution network, and easing congestion in other travel corridors. Moreover, the project would provide planned pedestrian and bicycle facilities, as well as enhanced connections to transit facilities identified in City plans.

It would improve access for other modes to local recreational facilities, businesses, and the planned Link light rail stations at NE 8th Street and 118th Avenue NE and between NE 15th and NE 16th Streets just east of 120th Avenue NE.

In summary, the proposed project would meet the following objectives:

- To provide acceptable level of service at existing and planned study area intersections to meet anticipated long-term travel demands.
- To improve access and connectivity with the regional and local. transportation networks.
- To enhance long-term traffic operations over time by incorporating design standards that serve a variety of transportation modes, including the needs of large trucks and freight vehicles, as well as buses.
- To improve quality of life by improving mobility and transportation choice, particularly for transit, bicycle, and pedestrian traffic.

As shown in preliminary traffic analysis work for the NE 4th Street extension and the widening and realignment of 120th Avenue NE, the project elements would enhance the Wilburton/NE 8th Street and Bel-Red Subareas as well as the region in terms of travel mobility and access to neighborhoods and businesses. This is primarily the result of new and enhanced connections across the Burlington Northern Santa Fe (BNSF) corridor and NE 8th Street, respectively. The proposed project also provides expanded arterial street capacity and driveway consolidation along 120th Avenue NE. The project termini are logical because they bracket the extent of the expected future development in the Wilburton/

NE 8th Street and Bel-Red Subareas and would complement adjacent roadway improvements and planned light rail transit facilities.

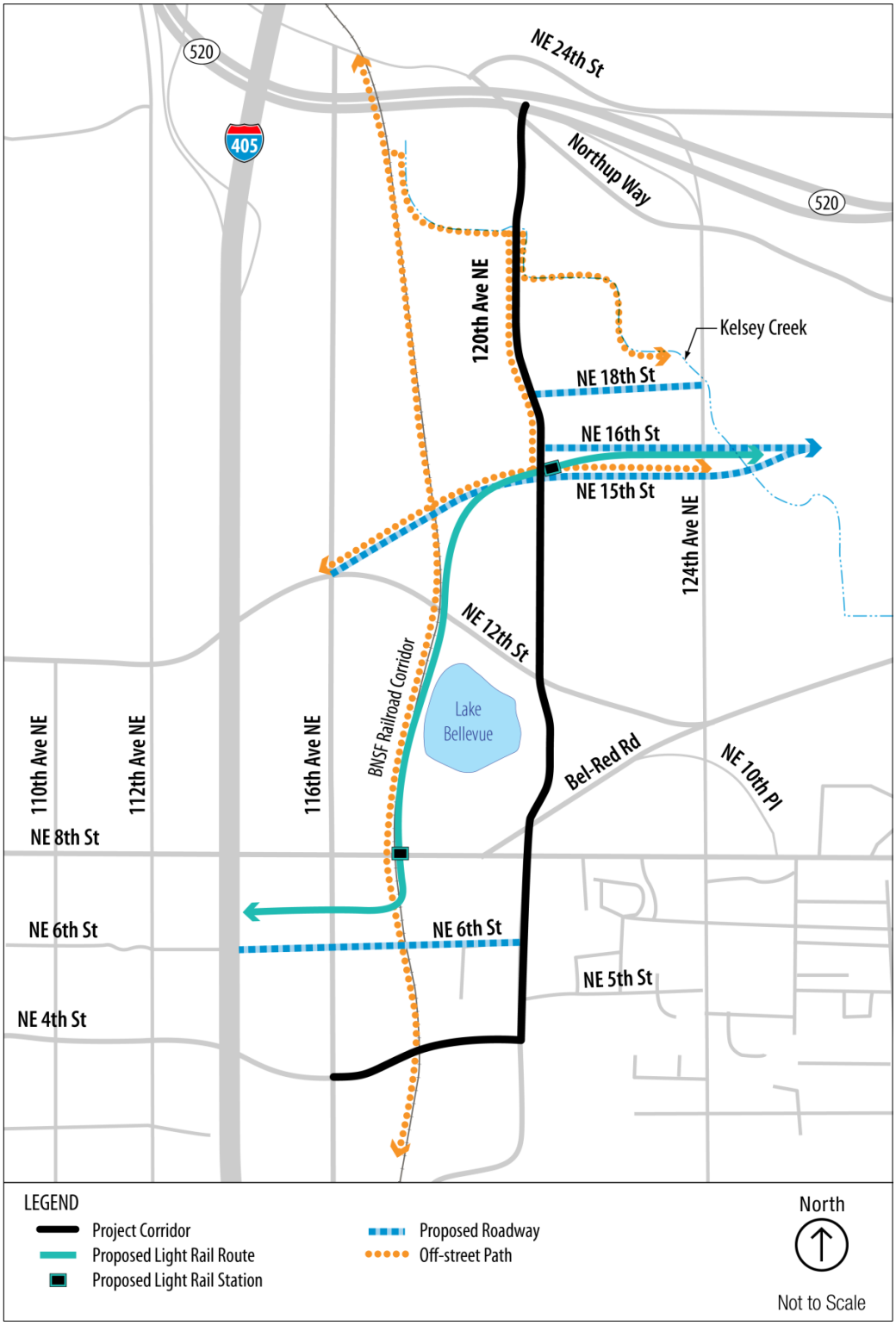

Figure 2-2. Planned Transportation Connections in the Study Area

2.3 Corridor Improvements

2.3.1 Programmed Corridor Improvements

This corridor is comprised of two projects currently listed in the regional and state transportation improvement programs. These projects are described below.

- **NE 4th Street Extension (116th to 120th Avenue NE)**—Construct a new four to five lane roadway with arterial standard curb, gutter, sidewalk (including planting strips) and five-foot bike lanes on both sides. The project includes a new signalized intersection at 120th Avenue NE and illumination, landscaping, and stormwater drainage/detention. The extension will be designed to accommodate future development and uses of the BNSF corridor.
- **120th Avenue NE Corridor—NE 4th Street to Northup Way**
  - From NE 4th to NE 18th Streets—Widen to five lanes with a two-way center turn lane; provide bike lanes along selected segments; install continuous sidewalks to arterial standards; realign the roadway between Bel-Red Road and NE 8th Street; and improve intersections (including additional turn lanes) at NE 8th, NE 12th, and NE 16th Streets.
  - From NE 18th Street to Northup Way—Widen to four lanes with arterial standard sidewalk and a separated multi-use path on the west side. The project will be constructed in phases. Federal funding awarded to improvements, including bike lanes, planned between NE 4th and NE 8th Streets.

This revised description was submitted to Puget Sound Regional Council [PSRC] April 8, 2011 for the June 2011 Amendment to the Statewide Transportation Improvement Program (STIP).

2.3.2 Proposed Corridor Improvements

Specific design elements include the following:

- Extend NE 4th Street as a five-lane roadway from 116th Avenue NE to 120th Avenue NE. There are two minor alignment options under consideration for this proposed roadway extension east of the BNSF corridor. Impacts of both options are considered in this analysis.
- Widen 120th Avenue NE to five travel lanes from the NE 300 block to the planned NE 15th Street intersection.
- Extend 120th Avenue NE south of Bel-Red Road to NE 8th Street. The existing section of Bel-Red Road between NE 8th Street east and 120th Avenue NE, roughly 300 feet long, would be abandoned.
- Widen 120th Avenue NE to four lanes north of NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets.

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- Construct improvements that support the planned new intersections at NE 15th/16th and NE 18th Streets and Sound Transit's East Link light rail line that would pass under 120th Avenue NE.
- Install continuous sidewalks and bicycle facilities designed to arterial street standards on NE 4th Street and 120th Avenue NE north to NE 15th Street. North of NE 15th Street, a two-way bicycle trail would be located on the west side of the roadway to allow connection with planned regional trails west, north, and east of 120th Avenue NE. Sidewalks will still be present on both sides of 120th Avenue NE north of NE 15th Street.
- Install planting strip(s) on both sides of the roadways and create other green spaces where possible.
- Install stormwater conveyance, detention, water quality treatment facilities, and use natural drainage practices to the extent practicable.
- Connect with and minimize effects to wetlands and open space areas, including a planned community park near Northup Way.
- Provide other project elements, including illumination, landscaping, structural retaining walls, traffic signals, and new and relocated utilities.

The five-lane roadway design is proposed for both the extension of NE 4th Street from 116th Avenue NE to 120th Avenue NE and the widening/realignment of 120th Avenue NE north to NE 15th Street. This proposed roadway cross-section is shown in Figure 2-3. The roadway would be designed to meet City standards for an urbanized arterial that has four through travel lanes—two 11-foot-wide lanes in each direction. A center 12-foot-wide, two-way, left-turn lane would allow turning movements to adjacent properties. Generally, a 5-foot-wide bike lane would be provided on each side of the roadway adjacent to the curb. A 4- to 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk. However, the size and location of the sidewalks, bicycle facilities, and planter strips vary somewhat along the corridor to accommodate natural drainage practices, retaining walls, and existing buildings.

As mentioned earlier, this analysis addresses the potential impacts of two minor alignment options for the extension of NE 4th Street east of the BNSF corridor. The alignment for Option 1 is farther north than that of Option 2. The Option 1 alignment would require acquisition of a portion of the southern side of the Best Buy building and displace access to the loading dock located on the west side of the building. Negotiations with the property owner are ongoing and may include construction of a building addition on the north side of the existing structure and/or realignment of the loading dock access to the north of the building. Option 2, roughly 55 feet south of the Option 1 alignment, would not require acquisition of any portion of nearby buildings, but would displace a substantial amount of parking on the Home Depot property as well as displace the Best Buy building's access to the loading dock area. Again, negotiations are ongoing with the property owners and mitigation may include construction of a new loading

dock access for the Best Buy property on the north side of the existing structure and/or a new parking garage on the Home Depot property. Note, the design for improvements along 120th Avenue NE south of NE 8th Street do not assume either option has been selected, but rather improvements are based on existing curb cuts for the driveway access to parking for the Best Buy and Home Depot properties.

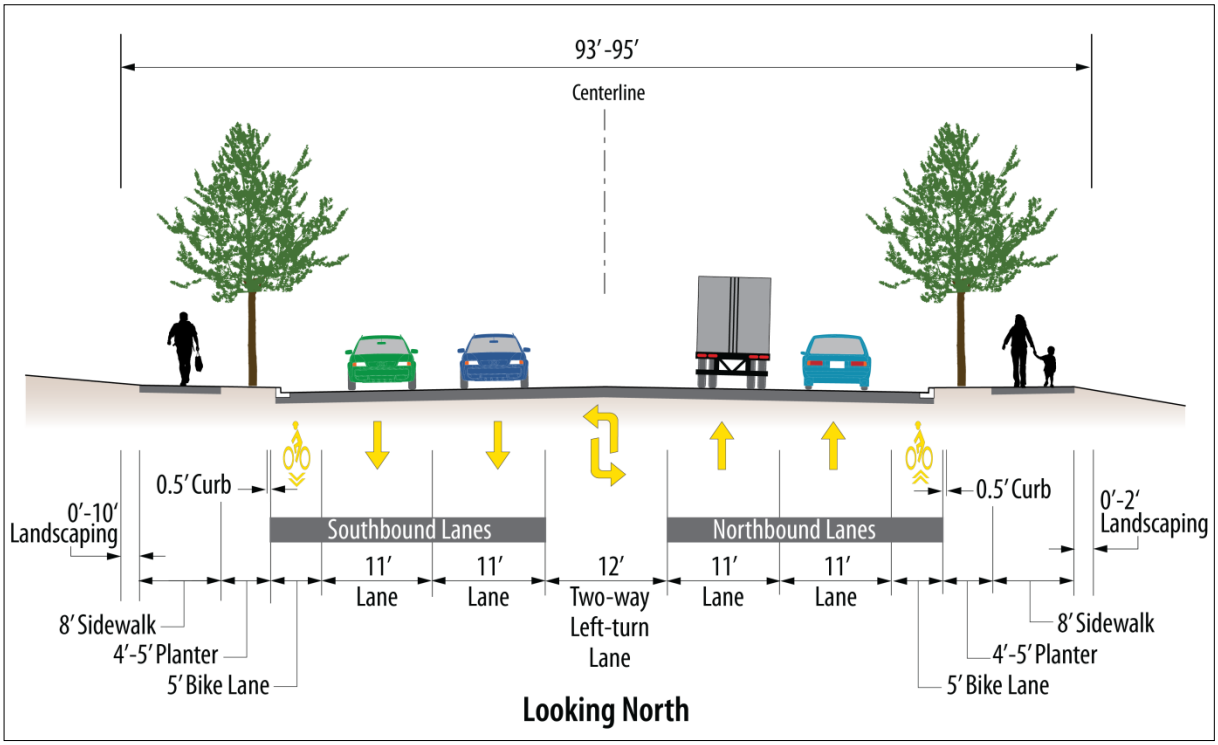

Figure 2-3. Typical Section—Five-lane Roadway Design

A four-lane roadway section is proposed for 120th Avenue NE from NE 18th Street to just south of Northup Way with a transition section occurring between NE 15th and NE 18th Streets. At the intersection at Northup Way, the cross-section would again be five lanes to allow for adequate turning movement capacity. This proposed four-lane cross-section is show in Figure 2-4. The roadway would be designed to meet City standards for an urbanized arterial that has three travel lanes—two 11-foot-wide lanes northbound and one southbound. The two directions of travel would be separated by a 12-foot-wide two-way, left-turn lane that would permit turning movements to adjacent properties. A 5-foot-wide planter strip is proposed between the curb and the 8-foot-wide sidewalk on the east side of the street. A variable-width planter strip is proposed for each side of a two-way, 10-foot-wide bike trail and 8-foot-wide sidewalk that would be constructed on the west side of the street. There would be no bike lanes in the roadway north of NE 18th Street.

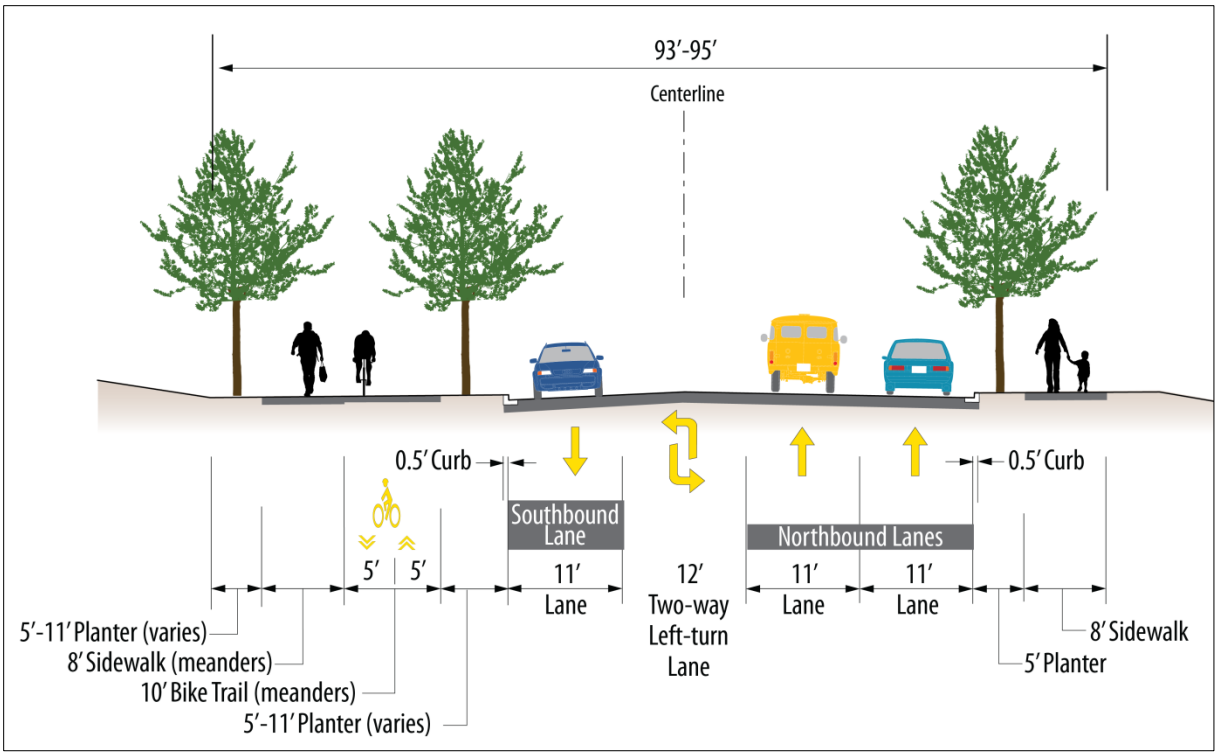

Figure 2-4. Typical Section—Four-lane Roadway Design

Both of the proposed roadway cross-sections also include the use of retaining walls, which would further increase the width of the required right-of-way beyond 95 feet. Retaining walls are proposed at numerous locations along the corridor and they would be located on both sides of the roadway. They would be used for both cut walls and fill walls. When retaining walls are required, these structures would generally be located immediately adjacent to the sidewalk. The width of the retaining walls would vary depending on the design, but would be a maximum of about 3 feet in width. To the outside of the retaining walls, the soil would be graded to a 2:1 slope. To ensure the City has access to the retaining walls for maintenance and repair, the acquired right-of-way would include the re-graded area to the outside of the retaining walls. This re-graded area would likely be a minimum of 10 feet. As such, the acquired right-of-way width could be 121 feet or more where retaining walls are needed on both sides of the roadway.

Note, the term "right-of-way," as used in this report, includes both right-of-way owned by the City and permanent easements (i.e., the complete footprint of the project).

2.4 Project Construction

2.4.1 Construction Duration and Phasing

Project construction would be phased and is expected to be completed from late 2011 to at least 2016 to match the programming of local, state, and federal funding sources. Each phase would last approximately 12 to 15 months. The planned phases, which may be further sub-divided into construction stages, are:

- Phase 1—120th Avenue NE widening between approximately the NE 300 block north to NE 7th Street.
- Phase 2—120th Avenue NE new construction between NE 8th Street and Bel-Red Road, and realignment and widening between approximately Bel-Red Road north to NE 12th Street.
- Phase 3—NE 4th Street extension between 116th Avenue NE east to 120th Avenue NE.
- Phase 4—120th Avenue NE widening between approximately NE 12th Street north to NE 16th Street.
- Phase 5—120th Avenue NE widening between NE 16th Street north to Northup Way.

Based on the Wilburton/NE 8th Street and Bel-Red Subarea Plans, it is essential that all phases of the NE 4th Street/120th Avenue NE Corridor Project be implemented in order to meet the purpose and need of the project. The City has committed to constructing all phases of the project, with cross sections appropriate to meet the multi-modal demand anticipated in the next 20 years. In addition, construction of the project phases could occur sequentially or some phases could overlap.

2.4.2 Construction Approach

The approach to project construction along the corridor differs. The following paragraphs describe the varying approaches to construction.

The improvements for NE 4th Street consist of constructing a new roadway, and would not involve working within an existing operable roadway. Construction for this phase would include clearing the full roadway right-of-way; grading; installing utilities and the roadway gravel base; constructing the curb, gutter and sidewalks; paving the roadway; and installing illumination/signals and landscaping. The construction activities would not disrupt existing traffic patterns along NE 4th Street, 116th Avenue NE, or 120th Avenue NE. However, the construction zone for NE 4th Street may extend somewhat into the existing roadways (116th and 120th Avenues NE) in order to connect new and existing pavements and existing and planned utilities at these locations.

Generally, the construction along 120th Avenue NE from the NE 300 block to NE 7th Street would widen the existing roadway on both sides of the existing centerline. Construction in this area would occur along an operational roadway.

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The improvements in this area would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

Construction of the realignment and widening of 120th Avenue NE between the intersection at NE 8th Street and about NE 12th Street would occur along an operational roadway. Thus, the construction in this area is anticipated to occur in the following manner:

- Contractor mobilization
- Install traffic control and temporary erosion control measures
- Relocate and/or install utilities
- Roadway Side 1—retaining walls, grading, paving, signals, and illumination
- Roadway Side 2—retaining walls, grading, paving, signals, and illumination
- Construction zone landscaping, restoration, and clean up.

The corridor could not be closed during construction though both directions of travel may be constrained to perhaps only a single lane. Use of Bel-Red Road between NE 8th Street and 120th Avenue NE, however, would be closed at the start of roadway construction between Bel-Red Road and NE 8th Street. With this road closure, construction could occur unhampered for the new roadway. Parcels along this portion of the alignment would be fully acquired and construction activities would not affect adjacent businesses. Traffic on Bel-Red Road east of 120th Avenue NE would continue to be able to travel north on 120th Avenue NE during construction. To the north of Bel-Red Road, the roadway alignment is generally shifted eastward. Construction work would likely start on the eastern half of the expanded right-of-way. When completed, traffic would be shifted to the new roadway, while the western portion of the roadway is constructed. All construction sequencing would be planned to minimize impacts to traffic and adjacent businesses.

Lastly, construction along the remaining northern portion of 120th Avenue NE from NE 12th to just south of Northup Way would also widen the existing roadway on both sides of the existing centerline. The improvements along 120th Avenue NE would be sequenced to manage potential traffic impacts. Every effort would be made to keep one lane open for traffic in each direction along 120th Avenue NE during all construction stages. All City requirements limiting roadway construction activities (e.g., seasonal, time of day, access) would be enforced. Construction activities would be closely coordinated with adjacent property owners and businesses to minimize disruptions to the greatest extent possible.

2.5 Project Funding

The total cost of the proposed project improvements based on the final City Council Direction for the 2011-2017 General Capital Improvement Plan would be between an estimated $67.3 and $67.6 million, depending on the selected option for extending NE 4th Street. Construction would cost approximately $32 million and right-of-way acquisition would cost roughly $35 million.

Funding for the overall project would likely include monies from the following sources:

- Federal grants
- State Transportation Improvement Board funding
- State Local Revitalization Financing funding
- Local contributions from transportation-dedicated sources, long-term general obligation bonds, impact fees, and other private participation programs including possible local improvement districts.

The specific mix of federal, state, and local funding contributions for each construction phase could differ.

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3.0 Methods

3.1 Methods Used in this Analysis

The following methods were applied to the effects analysis contained in this report. Reasons were provided for methods that varied from Washington State Department of Transportation (WSDOT) standards.

3.1.1 Surface Water

Summary of Baseline Documentation

The study area falls within the Kelsey Creek Subarea, which is part of the larger Cedar River-Lake Washington Inventory Area (Water Resource Inventory Area (WRIA) #8).

The southern half of the project corridor lies within the Sturtevant Creek Basin. The northern portion of the project corridor lies within the West Tributary of Kelsey Creek. The southern boundary of this basin crosses the project corridor between NE 14th Street and NE 15th Street.

The surface-water body in the central portion of the project corridor is Lake Bellevue, which is the headwater of Sturtevant Creek. Sturtevant Creek also discharges into Mercer Slough and ultimately into Lake Washington. The surface-water body within the northern portion of the project corridor is the West Tributary of Kelsey Creek. This tributary drains directly to Kelsey Creek, which discharges into Mercer Slough, which then joins Lake Washington.

Within the study area, no fish are documented as using Sturtevant Creek or the West Tributary of Kelsey Creek. Sturtevant Creek north of Interstate 405 (I-405) is almost entirely within a piped system. Two small dams create partial barriers to fish passage on the West Tributary of Kelsey Creek downstream of the project boundary.

Relevant Rules and Regulations

The analysis of potential effects and benefits related to stormwater runoff is necessary to complete Endangered Species Act and Essential Fish Habitat consultation. The preliminary stormwater design evaluates the stormwater quality and quantity management for the project. The preliminary stormwater analysis does not intend to address each of the nine minimum requirements in the City's Storm and Surface Water Utility Code Chapter 24.06.065G, which will be completed as part of the Final Design process.

In 1990, the Washington State Legislature passed the Growth Management Act (GMA) to provide a framework for efficient local planning to manage statewide growth at the local level and to maintain the State's quality of life. The act was passed in response to the Washington State Legislature's recognition that uncoordinated and unplanned growth posed a threat to the environment,

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economic development, and the health and safety of state residents. In most years since 1990, the Legislature has readopted the GMA.

The City has adopted a comprehensive plan that meets the mandates of the GMA, which is titled *The City of Bellevue, Washington Comprehensive Plan.*

According to this Comprehensive Plan, the City prohibits most development proposed within floodplains, wetlands, and riparian corridors with conditions in place to guide development within these sensitive areas. The City has defined a "Protection Zone" that includes a designated critical area in addition to an adjacent undeveloped buffer area. To better protect watershed hydrology, the City uses the Protection Zone in conjunction with stormwater controls and low impact development requirements. In addition, the City does not allow development within the 100-year floodplain, thus implementing more stringent guidelines than the federal government requires.

Runoff in the project corridor drains to adjacent uplands, wetlands, and streams that eventually discharge to one of two subbasins—Lake Bellevue or the West Tributary of Kelsey Creek.

Part 20.25H of the City of Bellevue Land Use Code addresses the Critical Areas Overlay Districts. Critical Areas potentially applicable to this discipline report include Streams (Part 20.25H.075), Wetlands (Part 20.25H.095), and Areas of Special Flood Hazard (Part 20.25H.175).

To protect the waterways and associated habitat value, the Streams Chapter establishes buffer widths and structure setbacks from waterways in addition to performance standards for development. Similarly, the Wetlands Chapter establishes buffer widths and structure setbacks from wetlands in addition to development performance standards.

The Areas of Special Flood Hazard Chapter is intended to protect the public health and regulate the construction and development within flood hazard areas. Lake Bellevue has a mapped floodplain within the project vicinity but does not cross the existing 120th Avenue NE alignment.

The City's Clearing and Grading Codes (Chapter 23.76) and Storm and Surface Water Utility Code (Chapter 24.06) provide regulations to protect environmental resources in accordance with the City's Comprehensive Plan. The regulations require construction activities to focus on proactively preventing adverse impacts through the permitting process.

Kelsey Creek is identified as a water-quality-impaired water body (Section 303(d) of the Clean Water Act) by Ecology. Kelsey Creek has two locations downstream of the study area that are 303(d)-listed for fecal coliform and one location is listed for dissolved oxygen and temperature. Sturtevant Creek, Lake Bellevue, and the West Tributary of Kelsey Creek are not identified as 303(d)-listed water bodies. A Total Maximum Daily Load water cleanup plan was not found for Kelsey Creek, its tributaries, or Lake Bellevue in WRIA #8 (Ecology 2007a).

3.1.2 Groundwater

Logs for groundwater wells and geotechnical boreholes in the study area were obtained from Ecology and reviewed to assess the affected environment for groundwater resources. Washington State Department of Health and King County records were reviewed to identify any groundwater protection areas in the study area.

3.1.3 Floodplains

Federal Emergency Management Agency Studies

Lake Bellevue is mapped within a 100-year floodplain designated by the Federal Emergency Management Agency (FEMA), within the project vicinity but not within the existing 120th Avenue NE alignment. FEMA has not designated 100- and 500-year floodplains or a floodway for the West Tributary of Kelsey Creek near the project corridor. Specifically, the West Tributary of Kelsey Creek is not delineated on the FEMA Flood Insurance Rate Map (FIRM) at 120th Avenue NE.

The currently effective FEMA Flood Insurance Study (FIS) for King County, Washington (and Incorporated Areas) is dated April 19, 2005. The study area is shown on the King County FIRM, panel 53033C0656F, dated May 16, 1995. The 100-year flood elevation for Lake Bellevue shown on the FEMA FIRM map is 138 feet National Geodetic Vertical Datum of 1929 (NGVD). The City has adopted the North American Vertical Datum of 1988 (NAVD), and the City's website contains the FEMA flood maps with the vertical datum modified to NAVD. The 100-year flood elevation for Lake Bellevue is shown as 142 feet NAVD (Bellevue, 2010d). Although the FIS is dated April 19, 2005, the hydrologic and hydraulic analyses of the West Tributary of Kelsey Creek in the FIS do not appear to have been revised since the City's FEMA contract was completed in May 1977.

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4.0 Existing Conditions

4.1 Surface Water

4.1.1 Natural Framework to Surface Water

Geologic Setting

Located within the Puget Sound Lowland, the geology of the NE 4th Street/ 120th Avenue NE Corridor Project reflects the impacts of repeated glacial scouring combined with deposition, tectonic activity, landslides, stream erosion, and human activity (Troost 2008). The Bellevue area rests on Eocene volcanic and sedimentary rocks, which are overlain by glacial tills and interglacial unconsolidated sediment (Tetra Tech 2006). Following the glacial activity, the area was periodically underwater with sands and gravels deposited in varying layer thicknesses and peat beds formed in wetlands.

The topography of the project corridor includes gently sloping hills that drain to the piped collection system leading to Sturtevant Creek in the southern half of the project corridor and toward the West Tributary of Kelsey Creek in the northern half of the project corridor.

Soils

The project corridor lies between the Cascade and Coast Mountain Ranges in King County. The *Soil Survey of King County Area, Washington* prepared by the U.S. Department of Agriculture Soil Conservation Service (SCS) cites the study area's soils and associated properties (SCS 1973).

Moving generally from west to east, and then south to north through the project corridor (and ignoring recurrences of a soil type already listed), the SCS maps indicate the following seven soil types:

- **Norma sandy loam, 0 to 2 percent slopes (No)**—This soil is typified as sandy loam to 60 inches in depth. It is poorly drained, and ponding occurs frequently, generally due to its association with depressional landforms and floodplains as it has a high capacity to transmit water and moderate water capacity. The erosion hazard is considered slight.
- **Alderwood gravelly sandy loam, 6 to 15 percent slopes (AgC)**—Soil permeability is moderately rapid in the surface layer and subsoil and very slow in the substratum. Runoff is slow to medium. Development limitations are similar to the AgB series. The erosion hazard is considered moderate.
- **Urban land (Ur)**—Extending along more than half of the project corridor, urban land describes soils modified by development through the placement of several feet of fill material. The erosion hazard is characterized as slight to moderate.

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- **Bellingham Silt Loam (Bh)**—Permeability is slow and there is a seasonally high water table during the rainy season. Runoff is slow. This unit has a moderate shrink-swell potential and moderate-to-high corrosivity for uncoated steel and concrete. The seasonal high water table presents limitations for building foundations for low buildings and septic tank filter fields. Slopes for Bh soils are less than 2 percent. The erosion hazard is considered slight.
- **Tukwila muck (Tu)**—Surrounding Lake Bellevue, Tukwila muck is similar to Seattle muck with slopes of less than 1 percent and moderate permeability. Subsurface layers consist of strong brown to very dark brown muck, peaty muck, and potential layers of diatomite. The seasonal high water table is typically near or at the surface of the ground with a high available water capacity. The erosion hazard is considered slight as runoff generally ponds.
- **Seattle muck (Sk)**—Including the West Tributary to Kelsey Creek, Seattle muck generally has slopes of less than 1 percent with moderate permeability. The subsurface layers consist of stratified mucky peat, muck, and peat. The seasonal high water table is typically near or at the surface of the ground with a high available water capacity. The erosion hazard is considered slight to none as runoff generally ponds.
- **Everett gravelly sandy loam, 5 to 15 percent slopes (EvC)**—In the Everett association, the soil is typified as gravelly sandy loam 18 to 36 inches in depth, which is underlain by sand and gravel. As a result, soils are somewhat excessively drained, and runoff is slow to medium. The associated erosion hazard is characterized as slight to moderate. Soils are gently undulating with slopes predominantly between 0 and 15 percent.

The soils identified within the study area are not prone to severe soil erosion or severe slope instability.

Climate

The moderate climate in the study area is characterized by mild, wet winters and warm summers. Maritime air masses from Puget Sound generally dominate the vicinity during the year. Mean monthly high temperatures range from 45 degrees Fahrenheit to 76 degrees Fahrenheit, while mean monthly low temperatures range from 34 degrees Fahrenheit to 55 degrees Fahrenheit. The annual precipitation is slightly higher than 34 inches, with 74 percent of this total occurring between October and March. On average, less than 6 inches of snowfall occur annually (NOAA 2010).

4.1.2 Surface-Water Resources

Basins, Subbasins, and Project Boundaries

The study area falls within the Sturtevant Creek and West Tributary Basins of the Lake Washington Watershed (WRIA #8) (City 2009). Lake Bellevue and the West Tributary of Kelsey Creek are the surface-water bodies within the study area.

Lake Bellevue is located southwest of the intersection of NE 12th Street and 120th Avenue NE in the central portion of the project corridor. Part of the headwaters for the Sturtevant Creek watershed, Lake Bellevue is a subbasin of the Lake Washington Watershed. The lake provides aquatic life habitat for fisheries and waterfowl. The lake has historically provided the hydrologic benefits of water storage and water treatment through the retention of pollutants.

The West Tributary of Kelsey Creek is in the northern portion of the project corridor, crossing 120th Avenue NE once. Downstream of the project boundaries, the West Tributary of Kelsey Creek joins Kelsey Creek, which continues to flow south before entering Mercer Slough. Discharge from Mercer Slough enters Lake Washington. The West Tributary of Kelsey Creek is classified as stream type "N" according to the City's Land Use Code. The waterway does not reportedly provide any habitat for salmonids or other fish species, but the receiving streams do contain fish or fish habitat. Two small dams downstream of the project corridor partially block fish passage on the West Tributary of Kelsey Creek.

The beneficial uses for the two surface waterbodies near the project corridor include waterfowl and other wildlife habitat, preservation of environmental and aesthetic values, and other uses.

The total watershed sizes for Lake Bellevue and the West Tributary of Kelsey Creek are 0.14 square mile and 1.75 square miles (92.3 acres), respectively.

For Lake Bellevue, FEMA has designated a 100-year floodplain with a flood elevation of 138 feet NGVD (142 feet NAVD). FEMA has not designated 100-year and 500-year floodplains or a floodway for the West Tributary of Kelsey Creek near the project corridor.

King County has monitored the ecological health of Kelsey Creek (King County 2010) by collecting and analyzing water, sediment, and benthic invertebrate samples; however, stream flow gage data were not located for any of the Kelsey Creek tributaries. Given the similarity of small waterways in the region, the stream flow patterns of the West Tributary of Kelsey Creek can be assumed to closely follow precipitation patterns. Consequently, stream flows would tend to be heaviest during winter and smallest during summer and early fall.

Water quality data are collected and analyzed monthly on Kelsey Creek from two sites—one near the creek's mouth (Station 0444) and the other in Kelsey Creek Park (Station D444) (King County 2010).

Kelsey Creek was also rated very poor based on benthic invertebrate samples collected and analyzed in 2002 and 2003.

Water Quality

Based on the *Lake Bellevue Water Quality Study,* the lake is considered "over-enriched" with phosphorus, which promotes cyanobacteria growth, such as the frequently observed blue-green algae blooms (*Aphantzomenon flos-aquae, Anabaena* spp. and *Microcystis aeruginosa*). Blue-green algae blooms reduce the

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lake's ability to provide suitable habitat for fisheries and waterfowl (Tetra Tech 2006). The State has established a recommended phosphorus concentration of 20 micrograms per liter. A phosphorus concentration in excess of 40 micrograms per liter is associated with phytoplankton blooms. The phosphorus concentrations measured in Lake Bellevue exceed both limits, varying from 62 to 226 micrograms per liter (Tetra Tech 2006).

In addition, water quality conditions are deemed impaired when the chlorophyll α levels are above 10 to 12 micrograms per liter as chlorophyll α measures the phytoplankton production. The highest measured Lake Bellevue chlorophyll α levels are 70 micrograms per liter according to the *Lake Bellevue Water Quality Study.* The study determined that 76 percent of the phosphorus in the lake occurs naturally due to lake-bottom sediments, aquatic vegetation, and plankton. The remaining 24 percent of the lake's phosphorus results from stormwater runoff generated by the surrounding watershed (Tetra Tech 2006).

The *Lake Bellevue Water Quality Study* also noted periodic oil sheens on the lake; however, some of these sheens may be attributed to decomposing algal blooms. Other possible sources include oil releases from stormwater runoff and near shore parking lot areas, oil spills in the watershed, and in-lake creosote piling. However, the study did not find a direct correlation between storm runoff events and oil sheens (Tetra Tech 2006).

The private and public property owners surrounding Lake Bellevue currently employ Best Management Practices (BMPs) for water quality. The City offers an educational program to address spill prevention, pollutant spill response, and pollution prevention. Local and state agencies also respond to spill reports within the watershed. As properties redevelop, the City encourages drainage BMPs and low impact development, which focus on nutrient retention and oil/water separation during the structural retrofit of existing drainage systems.

Kelsey Creek is identified as a water-quality-impaired water body (Section 303(d) of the Clean Water Act) by Ecology. Kelsey Creek has two locations downstream of the study area that are 303(d)-listed for fecal coliform, and one location is listed for dissolved oxygen and temperature. The West Tributary of Kelsey Creek and Lake Bellevue are not identified as 303(d)-listed water bodies.

A Total Maximum Daily Load water cleanup plan was not found for Kelsey Creek, its tributaries, or Lake Bellevue in WRIA #8 (Ecology 2007a).

Three of the four project threshold discharge areas (TDAs) lie within the Sturtevant Creek Basin, one of which discharges directly into Lake Bellevue. Runoff from the northernmost TDA drains to the West Tributary Basin. The West Tributary of Kelsey Creek crosses 120th Avenue NE once within the project corridor. Because slopes near stream crossings are quite low, erosion is not expected to be a problem. Potential water quality effects would be associated with stormwater runoff and temporary short-term effects associated with construction.

Existing Drainage Pathways

Stormwater runoff from the project corridor is conveyed to Sturtevant Creek, Lake Bellevue, and the West Tributary of Kelsey Creek.

Sturtevant Creek within the project corridor is composed of a buried storm system. The lower half of the project corridor is collected and conveyed via a piped storm drain system to Sturtevant Creek.

Lake Bellevue receives stormwater runoff from a 42-inch-diameter pipe and multiple small catch basins for the adjacent parking lots, buildings, walkways, and roof drains. The *Lake Bellevue Water Quality Study* noted that Ecology reached an agreement with Safeway to install inserts into several of the catch basins to filter pollutants from the runoff. In addition as part of the agreement, Safeway added oil-absorbent pads into the 42-inch-diameter pipe. Lake Bellevue discharges into Sturtevant Creek.

The West Tributary of Kelsey Creek receives stormwater runoff via overland flow with no active treatment of stormwater runoff from 120th Avenue NE. Some passive treatment may occur as stormwater passes through vegetated ditches, shoulders, and wetlands in the northern portion of the project corridor. However, there is no engineered diversion of stormwater for infiltration and treatment that would prevent pollutants entrained in the runoff from reaching waterways or wetlands.

The project corridor's drainage area is divided into TDAs to serve as the basis of comparison between the existing and proposed conditions. A TDA is defined as an on-site area draining to a single natural or manmade discharge location or multiple or manmade discharge locations that combine within 0.25 mile downstream (as determined by the shortest flow path).

The TDAs for this project were delineated based upon existing contours, culverts, as-built information, and survey data. The existing drainage area was divided into four TDAs as described in Table 4-1. For the purposes of analyzing effects associated with this project, all impervious surfaces in the study area, as defined in Bellevue City Code Chapter 23.76 and 24.06, are considered to be pollutant-generating impervious surface (PGIS). The total amount of existing PGIS in the study area is 14.1 acres.

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Table 4-1. Threshold Discharge Areas in the Study Area

TDA No.	Amount of Existing PGIS (acres)	Comments
1	4.70	TDA No. 1 drains to the underground storm system located along 116th Avenue NE before discharging to Sturtevant Creek, where flow combines with TDA No. 2 and TDA No. 3, and ultimately flowing into Lake Washington.
2	1.79	TDA No. 2 discharges to the underground storm system located along NE 8th Street before combining with TDA No. 2, draining to Sturtevant Creek, and ultimately flowing into Lake Washington.
3	3.38	TDA No. 3 discharges directly to Lake Bellevue, which is the headwaters to Sturtevant Creek, and ultimately flows into Lake Washington.
4	4.23	TDA No. 4 drains to the West Tributary of the Kelsey Creek subbasin, which flows into Kelsey Creek and ultimately flows into Lake Washington.

Wetlands and Streams

A *Wetlands and Stream Delineation Technical Report* was prepared for this project. Two Category III and two Category II wetlands were identified in the project corridor. Wetland A is a Category III wetland located northeast of the intersection of 120th Avenue NE and NE 12th Street and lies entirely within the project corridor. Wetland B is also a Category III wetland located in an open roadside ditch west of 120th Avenue NE, directly south of the property at 1975 120th Avenue NE, and lies entirely within the project corridor. Wetlands C and D are associated with the West Tributary of Kelsey Creek. Wetland C is a Category II wetland located east of 120th Avenue NE, just south of the 1121 120th Avenue NE property. The wetland is part of a larger wetland system that extends east of the project corridor. Wetland D is also a Category II Wetland and is located west of 120th Avenue NE, just north of the property at 1121 120th Avenue NE. Wetlands A and B have a 60-foot buffer; Wetland C has a 75-foot buffer; and Wetland D has a 110-foot buffer. Wetlands A, B, and C have approximate wetland impacts of 0.19, 0.10, and 0.005 acre, respectively. Approximately 10 linear feet of stream will be filled, and approximately 0.82 acre of wetland and stream buffer impacts are anticipated. Due to the highly developed nature of the project corridor, on-site mitigation is not feasible.

Fisheries

A separate *Fisheries, Wildlife, and Vegetation Technical Report* has been prepared for this project. Sturtevant Creek is not likely to have fish habitat upstream of its crossing with I-405, which is well south of the project corridor. The reach of the West Tributary of Kelsey Creek is reportedly above the known fish habitat portion of the creek. Two small dams are located downstream of Bel-Red Road, which are reportedly a partial barrier to fish passage. Coordination will occur with the Washington Department of Fish and Wildlife to determine if fish passage

is required for the culvert conveying the West Tributary of Kelsey Creek under 120th Avenue NE.

Hazardous Materials

A separate *Hazardous Materials Technical Report* has been prepared for this project. Previous releases of solvents, metals, petroleum products, and creosote have been recorded from more than 30 separate events and responsible parties within the project corridor. The impacts of the past releases on groundwater are discussed in that technical report.

4.2 Groundwater

The project corridor lies within the Puget-Willamette Trough aquifer system between the Cascade and Coast Mountain Ranges in Washington and which extends to Central Oregon. Within the Puget-Willamette Trough system, the Bellevue area is located within the Puget Sound Lowland subarea. The principal aquifers in the Puget Sound Lowland are unconsolidated deposit aquifers, which consist primarily of glacial deposits. Around Seattle, the glacial deposits extend up to 3,000 feet thick.

The most productive aquifers in the region tend to exist in the upper 200 to 300 feet of unconsolidated sand and gravel deposits left during the last period of glaciation. The sand and gravel lenses produce strong well yields with reports of wells yielding between 8,000 to 10,000 gallons per minute along the Green River in King County. However, most of the discharge from the aquifer is not withdrawn from wells but rather captured from springs and seeps to streams. Large springs in glacial-outwash gravel have been reported to yield up to 20,000 gallons per minute. In addition, a large spring serves as the principal water supply for Olympia, yielding up to 11,000 gallons per minute.

A review of the well drilling logs along the project corridor did not indicate any private wells in the vicinity.

According to the Phase I Environmental Site Assessment, the depth to groundwater in the project corridor is estimated to range from approximately 5 to 23 feet below ground surface (Landau 2010). In addition, the groundwater flow direction reportedly varies within the project boundary. Groundwater contours prepared for the existing Shell Station and Hi Tech Cleaners sites indicate flow directions to the south and west, respectively.

No sole-source aquifers were identified within the project boundary. The closest sole-source aquifer is the Cedar Valley Aquifer, located southeast of Bellevue.

King County and the Washington State Department of Health Geographic Information System database did not identify any critical aquifer recharge areas near the project corridor. In addition, the Washington State Department of Health does not identify any wellhead protection areas near the project corridor. No information was available on sanitary control areas in the project corridor.

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4.3 Floodplains

4.3.1 Flood Hazard

The FEMA FIRM panel 53033C0656F shows the mapped 100-year floodplain of Lake Bellevue at the southwest corner of 120th Avenue NE and NE 12th Street. The 100-year flood elevation shown on the FEMA FIRM map is 138 feet NGVD (142 NAVD) for Lake Bellevue. The mapped 100-year floodplain area is zoned AE, which indicates that the map's boundaries were developed from the results of FEMA's detailed hydrologic and hydraulic computer modeling. The FIRM map labels Lake Bellevue as Sturtevant Lake, reflecting the lake's drainage to Sturtevant Creek.

The primary potential source of flooding along the project reach is the West Tributary of Kelsey Creek. FEMA performed a detailed study of the West Tributary of Kelsey Creek from its confluence with Kelsey Creek 1.57 miles upstream to Bel-Red Road, which is downstream from the project site. The FEMA detailed study provides base flood elevations and mapping of the 100-year floodplain associated with the West Tributary of Kelsey Creek; however, no base flood elevations or mapped floodplains have been prepared for the reach of the West Tributary of Kelsey Creek within the project boundary.

No mapped floodplains in the study area are associated with the West Tributary of Kelsey Creek or lie within the Sturtevant Creek Basin. As such, land within the study area is identified on the FEMA FIRM maps as Zone X, which represents areas outside of the 500-year floodplain, areas within the 100-year floodplain with minimal flooding, where the average flood depths are less than 1 foot, and areas of 100-year flooding with drainage areas less than 1 square mile. As the drainage basin of the West Tributary of Kelsey Creek is 0.34 square mile at the confluence of the East Branch of the West Tributary of Kelsey Creek, the creek falls below the 1-square-mile drainage basin criteria for FEMA.

4.3.2 Channel Stability

The channel of the West Tributary of Kelsey Creek is not constrained near the project by levees or substantial bank stabilization projects. As such, the channel has the capacity to migrate within the study area. Whether the West Tributary of Kelsey Creek may avulse in the future near the project depends upon several factors including, but not limited to, bank stability and cohesion, channel sinuosity, deposition or erosion, water velocities, and bedload. Site photographs from August 2010 show well-vegetated banks covered with grasses, brush, and trees. Aerial photographs show that the channel of the West Tributary of Kelsey Creek has some sinuosity but lacks sharp curves in excess of 90 degrees.

From the FEMA FIS, the 100-year flood discharge of the West Tributary of Kelsey Creek is 29 cubic feet per second at the confluence with the East Branch. No estimations of the average 100-year flood velocity are available within the project boundary. Based on site photographs, the observed substrate of the West Tributary of Kelsey Creek contains gravels with fine-grained materials.

Channel avulsion is not typically an instantaneous phenomenon, with some channels taking years, decades, or longer to avulse. Prior to avulsion, the channel would likely provide some indications of future movement, such as eroding or slumping banklines, an increase in the channel's sinuosity, and changes in deposition and erosion patterns.

4.3.3 Debris

The channel of the West Tributary of Kelsey Creek contains a few pieces of large woody debris near the project corridor; however, site photographs did not indicate other debris sources.

4.3.4 Skew of Crossing

The West Tributary of Kelsey Creek crosses under 120th Avenue NE via a culvert that has negligible skew to the channel. The proposed culvert has an alignment that is skewed approximately 25 degrees to the channel.

4.3.5 Floodplain Limits

None of the sections of the project corridor that are proposed to receive fill are located within the mapped 100-year floodplain of Lake Bellevue or the mapped 100-year floodplain of the West Tributary of Kelsey Creek. In the City, fill is not allowed within the 100-year floodplain unless compensatory storage is created. However, as no fill is being placed within adopted 100-year floodplains, compensatory storage is not a project requirement.

Watershed characteristics of the Kelsey Creek Basin were obtained from the King County Streams Monitoring Program. The Kelsey Creek Basin encompasses approximately 10,870 acres; it is characterized as having reached built-out conditions. Future projects are limited primarily to redevelopment of existing facilities. A vegetation analysis performed in 2000 delineated 7 percent of the basin with forest canopy and an additional 38 percent with green vegetation. The balance of the watershed, 55 percent, reflects the total impervious area, such as roads, buildings, and other surfaces that create runoff, including bare soils.

The creek's channels appear typical of other small waterways in the region with a pool-riffle morphology and gently sloping gradients of a few percent.

The existing culvert for the West Tributary of Kelsey Creek would be replaced, and the cross-sectional area would increase, as would the flood-carrying capacity.

Within the study area, the West Tributary of Kelsey Creek does not have an adopted regulatory 100-year flood elevation. Near the confluence with the East Branch and downstream of the project corridor, the West Tributary of Kelsey Creek has a FEMA-adopted 100-year flood elevation of 108 feet NGVD (112 feet NAVD).

The City's regulations address no reduction of existing conveyance capacity and no net loss of existing storage capacity during the 100-year flood (Part 20.25H.175). The project would comply with the City's Land Use Code through the permit process for clearing and grading in a critical area.

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4.3.6 Consistency with Existing Watershed and Floodplain

Sturtevant Creek within the project corridor is a piped system and would remain so after the project is complete. The existing 120th Avenue NE spans the West Tributary of Kelsey Creek at one location in the project corridor, containing the channel within a culvert. The proposed widening and realignment of 120th Avenue NE would extend or replace the existing creek crossing such that no reduction in conveyance would occur. The runoff and flows would remain in their basin of origin for the project, thereby maintaining the integrity of the existing floodplain and watershed. No new crossings of the West Tributary of Kelsey Creek or alterations to the creek's natural channel are proposed.

4.3.7 Current/Proposed Water Resource Projects

No reservoirs or other flow regulation structures are located on Sturtevant Creek or the West Tributary of Kelsey Creek within the project corridor, and no proposed water resource projects were identified on the creek. As a result, the proposed widening is not anticipated to impact current water resource projects.

4.3.8 Flood History

FEMA's FIS indicates that flooding along the West Tributary of Kelsey Creek is similar to other waterways in the area. Flooding along Kelsey Creek and its tributaries was characterized as typically limited to November through February. The winter months coincide with the highest rainfall-producing storms. Major flood problems were attributed to floodwaters leaving the creek's banks and inundating and potentially damaging private property. The highest potential for out-of-bank flooding was primarily noted along the low-gradient reaches of the waterways. The creeks may reach flood stage within 6 to 12 hours, depending upon the intensity of the storm.

4.3.9 Existing Structures

One culvert crossing of the West Tributary of Kelsey Creek would be affected during the proposed widening and realignment. Across from Safeway, the West Tributary of Kelsey Creek is conveyed under 120th Avenue NE by a 36-inch-diameter corrugated metal pipe. The culvert does not appear to be perched (invert elevated above the natural creek bed). Based upon site visit photos, scour does not appear to pose a problem at the existing culvert.

4.3.10 Drainage Area

The total drainage area of Sturtevant Creek is 1.21 square miles and discharges into Kelsey Creek near the I-90 and I-405 interchange.

The drainage area of the West Tributary of Kelsey Creek is 0.34 square mile at the confluence with the East Branch of the West Tributary of Kelsey Creek, approximately 700 feet downstream of Bel-Red Road. At its mouth, the total drainage area of the West Tributary of Kelsey Creek is 1.75 square miles.

4.3.11 Potential for Watershed Changes

Sturtevant Creek is largely developed with more than 70 percent impervious surface; as a result, the likelihood of future watershed changes is low. Given the relatively small drainage basin size for the West Tributary of Kelsey Creek, the likelihood is low of potential future watershed changes significantly increasing the magnitude of flood peaks near the project corridor. The City's regulations for stormwater treatment and preservation of flood storage capacity should minimize and potentially offset any potential future discharge increases related to development. One caveat is that the potential for an increased peak discharge depends upon the effectiveness of the stormwater facilities constructed and the maintenance performed.

Since no appreciable increase in discharge is expected and future developments are assumed to provide erosion and stormwater controls, the future sediment load would be expected to remain relatively consistent.

4.3.12 Flow Patterns during Flood Events

FEMA's FIS indicates that Kelsey Creek and its tributaries flood similarly to other waterways in the area. Climatic conditions produce high flows during winter when precipitation is more frequent. Low flows occur in summer as a response to the dry warmer weather that is typical of this season in the Pacific Northwest.

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5.0 Environmental Effects

5.1 Direct Effects on Water Quality

Direct effects are caused by the action and occur at the same time and place as the project.

5.1.1 Effects during Construction

No Build Alternative

Under the No Build Alternative, the existing NE 4th Street/120th Avenue NE corridor would not be retrofitted with stormwater treatment and flow control, and runoff would continue to discharge as it does under existing conditions. No changes to the quality of groundwater resources due to roadway construction would occur. No changes to wetlands, the West Tributary of Kelsey Creek, or Lake Bellevue would occur. The existing culvert under 120th Avenue NE would not be replaced, and no work would occur below the OHWM of the West Tributary of Kelsey Creek.

Build Alternative

Surface Water

Effects of the project on water quality could occur where proposed work occurs near Lake Bellevue, the West Tributary of Kelsey Creek, and near or in wetlands. The project would result in approximately 0.3 acre of wetlands being filled. Additional direct wetland effects may occur as the project design evolves and stormwater features are developed.

The proposed culvert replacement would impact areas below the OHWM of the West Tributary of Kelsey Creek. The proposed three-sided box culvert would include a native material/streambed gravel bottom. The culvert dimensions are being refined through the design process; however, the existing cover and utilities limit the culvert's height to approximately 4 feet. The current culvert width is designed to be between 8 and 10 feet.

Erosion from exposed soils (either disturbed soil areas or soil stockpiles) during construction could increase the amount of sediment, suspended solids, and turbidity entering the West Tributary of Kelsey Creek and adjacent wetlands. Effects due to erosion could be prevented by implementation of appropriate conservation measures in a Construction Stormwater Pollution Prevention Plan (CWSPPP) and Temporary Erosion and Sediment Control (TESC) Plan. No work is expected in erosion hazard zones, as much of the study area is underlain by gravelly sandy loams and muck with slight-to-moderate erosion hazard.

Clearing and grading would occur in the study area as the roadways are widened and new roadways are created along NE 4th Street. The newly widened areas would be the sources for any potential water quality problems, in addition to those from construction staging areas. The locations of construction staging areas

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are unknown at this time; however, staging areas can be sites of increased disturbance and erosion.

Increased stormwater runoff resulting from an increase in impervious area could combine with erosion from construction grading, machine operation, and vegetation removal to decrease water quality. Stormwater runoff may also carry other contaminants, such as fuel or oil from construction operations, particularly at staging areas. As stormwater facilities would be an integral part of the project, they would be constructed concurrently with the project and provide some mitigation for construction effects. Through the clearing and grading permit process, the City requires a CWSPPP for the project, which will address measures to prevent sediment and other project-related pollutants from impacting water quality outside of the project site.

The construction season is not defined, but construction would likely occur during summer. Because of low precipitation rates in summer, the West Tributary of Kelsey Creek would likely contain low flows. As a result, erosion or contaminants that reach the stream during summer may be more concentrated relative to other times of the year.

Spills from construction equipment at project staging areas or within the project construction limits could occur. Pouring concrete near open water would create the potential for spills. Concrete spilled into open waters can impact local pH. The CSWPPP would contain spill control measures to be implemented in the event of an incident.

Groundwater

Construction activities that require vegetation clearing, soil compaction, and other practices that decrease the permeability of the ground surface and impede infiltration of rainfall could affect groundwater resources. Spills from construction equipment, if not properly contained and cleaned up, can enter and impact shallow groundwater.

Floodplains

During construction, the minor grading associated with the Build Alternative could redirect and/or obstruct the flow of runoff or floodwaters. Once grading is completed and stormwater facilities are operational, the potential temporary floodplain effects would be eliminated.

5.1.2 Effects during Operation

No Build Alternative

Under the No Build Alternative, the existing 120th Avenue NE corridor would not be retrofitted with stormwater treatment, and stormwater runoff would continue to discharge as it does under existing conditions. No changes to the quality of groundwater resources due to roadway construction would occur. No changes in the flood storage capacity of the West Tributary of Kelsey Creek would occur.

Build Alternative

Surface Water

Per the City Utilities Department's Storm and Surface Water Engineering Standards and BCC 24.06, the project is required to comply with nine minimum requirements (MR), as applicable. These requirements include runoff treatment (MR6) and flow control (MR7). Flow control is both a flood protection and water quality protection requirement.

Currently, no stormwater treatment is provided for impervious surfaces within the study area. The project would provide stormwater treatment for 2.84 acres of new PGIS and 1.81 acres of existing PGIS for a total of 4.65 acres of PGIS (Table 5-1). These quantities may change as design progresses. Where runoff treatment is provided, enhanced treatment measures would be used.

Table 5-1. Threshold Discharge Areas Build Alternative Modifications

TDA	Amount Existing Impervious (acres)	Increase in Impervious due to Build Alternative (Net New) (acres)	Total Impervious Proposed to be Untreated (acres)	Amount Total Impervious Treated by Bioretention BMPs (acres)
TDA 1	4.70	0.83	4.71	0.82
TDA 2	1.79	0.01	1.80	0.00-
TDA 3	3.38	0.95	1.55	2.78
TDA 4	4.23	1.05	4.23	1.05
TOTALS	**14.10**	**2.84**	**12.29**	**4.65**

Note: These quantities are approximate and may change as design progresses.

With the stormwater treatment measures being designed for this project corridor, there would be an approximate 10 percent decrease in total suspended solids (TSS) and an increase in dissolved metals. Dissolved zinc and copper would increase by approximately 3.5 percent and 7.5 percent, respectively (Table 5-2). The detailed pollutant loading calculations per TDA are included in Appendix B. Based on dilution modeling conducted for the project, background levels of dissolved metals would be reached within a few feet of entering the project corridor's water bodies (Sturtevant Creek, Lake Bellevue, and the West Tributary of Kelsey Creek) and these discharge locations are several thousand feet upstream of any native fish habitat.

Proprietary bioretention systems (Filterra) would be used to provide runoff treatment within planting areas. Flow control would be provided using natural drainage practices (porous concrete sidewalks, bioretention systems) and conventional buried storage systems. The design of the proposed stormwater treatment and flow control systems may change slightly as final design progresses.

Table 5-2. Pollutant Loading Summary

Project Total	TSS	Zinc		Copper	
		Total	Dissolved	Total	Dissolved
Annual effluent load from existing impervious surfaces prior to project (lbs)	7,967	15.51	5.64	2.82	0.75
Annual effluent load from new and existing impervious surfaces after project (lbs) with treatment	7,153	14.82	5.85	3.76	0.81
Net change in pollutant loads between pre- and post-project conditions (lbs) with treatment	-813	-0.69	0.21	0.94	0.07

The preliminary stormwater design for the project corridor contains details regarding the proposed locations of the water treatment and flow control BMPs and the specific stormwater management requirements.

Groundwater

The net increase in impervious surface would reduce groundwater infiltration and increase flow to surface waters for portions of the project corridor. However, implementation of bioretention/infiltration facilities should help offset this potential reduction in aquifer recharge.

Floodplains

No fill is proposed within the mapped 100-year floodplain of Lake Bellevue, thereby preserving the floodplain functions of the lake.

Similarly, no fill is proposed within the West Tributary of Kelsey Creek. A three-sided box culvert is proposed to replace the existing 36-inch corrugated metal pipe culvert under 120th Avenue NE. The proposed box culvert would be 4 feet high and approximately 8 to 10 feet wide. Its dimensions will be refined as the final design progresses. However, the final culvert would create a larger opening than the existing culvert and consequently increase the tributary's flood-carrying capacity. The proposed culvert is not expected to modify the floodplain functions of the West Tributary of Kelsey Creek.

5.2 Indirect Effects on Water Quality

Indirect effects are associated with a project and occur later in time or farther removed in distance, but they are still reasonably foreseeable (e.g., induced land development from highway projects). The indirect effects to surface waters in the project corridor are limited.

Because the project corridor is highly urbanized and developed, the proposed widening is not expected to substantially improve surface water quality. The built-out level of development also suggests that long-term changes to non-point source water quality problems are unlikely.

For the proposed culvert replacement under 120th Avenue NE for the West Tributary of Kelsey Creek, the increased culvert cross-sectional area would increase the culvert's flood-carrying capacity, potentially increasing water velocities downstream of the culvert. An increase in stream velocities may destabilize existing vegetation and erode the creek's banks or bed.

5.3 Cumulative Effects on Water Quality

Cumulative effects result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions, regardless of the agency or person initiating the other actions. Construction of the Build Alternative would result in direct effects to surface-water resources. The Build Alternative, in conjunction with other past, present, and reasonably foreseeable actions, would degrade surface-water resources by the incremental conversion of pervious surface to impervious. The majority of the landscape in the two subbasins is already altered by past loss of pervious surfaces, altered flow conditions, and conversion to the built environment. The additive effects of the Build Alternative in combination with other actions could further degrade surface-water resources, if not properly mitigated. Assuming other types of projects are constructed and placed in operation, the cumulative effects on surface-water resources would be as described above.

5.4 Mitigation Measures

Conservation measures are required activities or standard practices that are routinely employed on projects to avoid or minimize effects on water quality and quantity. Mitigation measures are those activities that need to be taken to reduce the effect that remains despite implementing the required conservation measures. Mitigation measures would reduce effects and restore or replace environmental resources.

5.4.1 Conservation Methods for Temporary Effects

The following conservation measures will be employed individually or together, where appropriate and feasible, to minimize temporary disturbances:

- A CSWPPP with TESC drawings will be prepared prior to the start of construction and adhered to throughout the construction process in compliance with the City's clearing and grading permit requirements. All reasonable measures will be used to ensure that construction activities comply with the City's standards.
- During project construction, all erosion and stormwater control measures will either meet or exceed the City's requirements as defined in its Clearing and Grading Code (Chapter 23.76) and Storm and Surface Water Utility Code (Chapter 24.06).
- The CSWPPP will include measures to address spill control as well as erosion and water quality. This plan will guide actions that control

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pollutants throughout construction work areas. The CSWPPP components could include, but are not limited to, staging, storage, maintenance, refueling areas, and waste sites. It will be the responsibility of the project sponsor and its contractors to structure their operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterways or wetlands. In addition, the project sponsor and its contractors will structure their operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials. Construction monitoring will follow the City's requirements. The CSWPPP will mitigate for potential contaminant spills that could affect groundwater.

- The project will follow spill prevention and response procedures that meet the requirements of state and federal agencies. It will be the responsibility of the project sponsor and its contractors to structure their operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterways, wetlands, or groundwater. In addition, the project sponsor and its contractors will structure their operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials.
- Proper storage, containment facilities, and spill control BMPs, including those defined in the CSWPPP, will be used during construction to minimize the effects of a spill. Specific spill control BMPs can be found in the City's Chapter 24.06 Storm and Surface Water Utility Code.

5.4.2 Mitigation Measures for Temporary Effects

No mitigation measures are proposed for the project's temporary effects to water resources.

5.4.3 Conservation Methods for Long-Term Effects

The following conservation measures will be employed individually or together, where appropriate and feasible, to minimize operational and maintenance disturbances:

- Stormwater treatment and flow control will be part of the corridor improvements. The proposed water quality, water quantity BMPs for roadway runoff, and stormwater management requirements are described in the preliminary stormwater design for the project.
- All stormwater facilities will undergo routine inspection and maintenance and will be designed to facilitate these activities. Maintenance will be conducted based on regular inspections and will follow the City's standards for protecting roads and the environment.
- To comply with the City's floodplain criteria, the replacement culvert under 120th Avenue NE will not reduce the flood-carrying capacity of the West Tributary to Kelsey Creek relative to existing conditions.

5.4.4 Mitigation Methods for Long-Term Effects

The following mitigation measures will be employed individually or together, where appropriate and feasible, to restore or replace riparian and wetland vegetation and function that are lost due to the project:

- Wetland mitigation will likely involve a combination of wetland re-establishment, creation, rehabilitation, and/or enhancement. *The Wetland and Stream Delineation Technical Report* discusses the City's baseline replacement ratios for wetland mitigation and the acreage of mitigation that would likely be required under each scenario. Additionally, buffer impacts will be mitigated at a one-to-one ratio. The exiting culvert under 120th Avenue NE will be replaced with a fish-passable culvert, and approximately 150 feet of the West Tributary of Kelsey Creek will be daylighted by the project. Disturbed riparian areas will be seeded and planted, with a preference for woody vegetation, to provide in-stream shading and prevent sediment loading to waterbodies within the study area.

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Washington State Department of Ecology (Ecology). 2007a. *WRIA 8 Total Maximum Daily Load Study Status.* http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/tmdl-wria08.html (last accessed August 10, 2010).

Washington State Department of Ecology (Ecology). 2007b. *Environmental Information Management Database.* http://www.ecy.wa.gov/eim/ (last accessed August 10, 2010).

Washington State Department of Transportation (WSDOT). 2007. *Highways and Local Programs. State Transportation Improvement Program*. http://www.wsdot.wa.gov/TA/ProgMgt/STIP/STIPHP.htm (last accessed September 19, 2007).

Appendix A
List of Baseline Documentation

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List of Baseline Documentation

Several studies, analyses, and technical memoranda were prepared for the City of Bellevue for the NE 4th Street/120th Avenue NE Corridor Project. These documents support the environmental evaluation presented in this technical memorandum and include the following:

- *120th Avenue NE Preliminary Stormwater Design*
- *120th Avenue NE Draft Wetland Discipline Report*
- *120th Avenue NE Draft Biology Discipline Report*
- *120th Avenue NE Draft Hazardous Materials Discipline Report*

Other technical reports and resources used include the following:

- *Soil Survey of King County, Washington,* prepared by the United States Department of Agriculture's Natural Resources Conservation Service
- Federal Emergency Management Agency Flood Insurance Rate Maps
- Focused Phase I Environmental Site Assessment of 120th Avenue NE, Bellevue, Washington

In addition to these technical reports, the following web-based resources from governing agencies were also used:

- *WSDOT Quantitative Procedures for Water Quality Impact Assessment,* http://www.wsdot.wa.gov/NR/rdonlyres/4A1328B5-0B23-4E78-9E5A-790E12A80843/0/QuantitativeProcedures.pdf
- Washington Department of Ecology, http://www.ecy.wa.gov/programs/eap/env-info.html
- United States Geological Survey, http://waterdata.usgs.gov/nwis/sw

Field reconnaissance and site visits confirmed data obtained from the above sources. Site photographs, aerial photographs, and maps were also reviewed.

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Appendix B
Pollutant Loading Spreadsheets

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Pollutant Loading Spreadsheets

Data Entry Table—Breakdown by Project

Project	TDA No.	Amount Existing Impervious (acres)	Increase in Impervious due to Build Alternative (net new) (acres)	Total Impervious Proposed to be Untreated (acres)	Amount Total Impervious Treated by Bioretention BMPs(acres)
NE 4th St.	1	2.15	0.28	2.15	0.28
120th Ave. NE Segment 1	1	1.94	0.44	1.84	0.54
120th Ave. NE Segment 2	1	0.61	0.11	0.72	-0-
120th Ave. NE Segment 2	2	1.79	0.01	1.80	-0-
120th Ave. NE Segment 2	3	1.83	0.18	-0-	2.01
120th Ave. NE Segment 3	3	1.55	0.77	1.55	0.77
120th Ave. NE Segment 3 Segment 4	4	4.23	1.05	4.23	1.05

- NE 4th Street—Values were taken from the *30% Storm Drainage Report* prepared by Parsons Brinckerhoff.
- 120th Avenue NE—Segment 1 values were taken from the *Surface Water Management Report 60% Preliminary Design* prepared by INCA Engineers, Inc. in April 2010.
- 120th Avenue NE—Segment 2 values were taken from the *60% Storm Drainage Report* currently being prepared for submittal by Parsons Brinckerhoff
- 120th Avenue NE—Segment 3 and Segment 4 values were taken from the *60% Storm Drainage Report* prepared for Segment 3 by Parsons Brinckerhoff in December 2010.

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Load Calculations

	TSS	Zinc		Copper	
		Total	Dissolved	Total	Dissolved
Load Rates					
Mean annual load from untreated surfaces (lbs/acre)	565	1.1	0.4	0.2	0.053
Mean annual load from treated surfaces (lbs/acre)	45	0.28	0.2	0.065	0.035
Project Total					
Annual effluent load from existing impervious surfaces prior to project (lbs)	7,967	15.51	5.64	2.82	0.75
Annual effluent load from new and existing impervious surfaces after project (lbs) with treatment	7,153	14.82	5.85	3.76	0.81
Net change in pollutant loads between pre- and post-project conditions (lbs) with treatment	-813	-0.69	0.21	0.94	0.07
TDA Breakdown					
TDA 1					
Annual effluent load from existing impervious surfaces prior to project (lbs)	2,656	5.17	1.88	0.94	0.25
Annual effluent load from new and existing impervious surfaces after project (lbs) with treatment	2,698	5.41	2.05	1.00	0.28
Net change in pollutant loads between pre- and post-project conditions (lbs) with treatment	43	0.24	0.17	0.06	0.03
TDA 2					
Annual effluent load from existing impervious surfaces prior to project (lbs)	1,011	1.97	0.72	0.36	0.09
Annual effluent load from new and existing impervious surfaces after project (lbs) with treatment	1,017	1.98	0.72	1.36	0.10
Net change in pollutant loads between pre- and post-project conditions (lbs) with treatment	6	0.01	0.00	1.00	0.00
TDA 3					
Annual effluent load from existing impervious surfaces prior to project (lbs)	1,910	3.72	1.35	0.68	0.18
Annual effluent load from new and existing impervious surfaces after project (lbs) with treatment	1,001	2.48	1.18	0.49	0.18
Net change in pollutant loads between pre- and post-project conditions (lbs) with treatment	-909	-1.23	-0.18	-0.19	0.00
TDA 4					
Annual effluent load from existing impervious surfaces prior to project (lbs)	2,390	4.65	1.69	0.85	0.22
Annual effluent load from new and existing impervious surfaces after project (lbs) with treatment	2,437	4.95	1.90	0.91	0.26
Net change in pollutant loads between pre- and post-project conditions (lbs) with treatment	47	0.29	0.21	0.07	0.04

NE 4th Street/ 120th Avenue NE Corridor Project

Wetland and Stream Delineation Technical Report

prepared for
City of Bellevue

prepared by
Shannon & Wilson, Inc.

April 15, 2011

COB File # 11-114971-LM

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Appendix C—Wetland Rating Form (provided on CD)
Appendix D—Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report (provided on CD)

Acronyms and Abbreviations

BCC	Bellevue City Code
City	City of Bellevue
CMP	corrugated metal pipe
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
Ecology	Washington State Department of Ecology
I-405	Interstate 405
IRT	Interagency Review Team
NE	Northeast
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OHWM	ordinary high water mark
PB	Parsons Brinckerhoff
PEM/PSS	palustrine scrub-shrub wetland
PFOC	palustrine forested seasonally flooded
ROW	right-of-way
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington State Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
WRIA 8	Watershed Water Resource Inventory Area No. 8

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Executive Summary

A wetland and stream delineation was completed for the project corridor to identify aquatic areas protected under local, state, and federal regulations. Four wetlands (Wetlands A, B, C, and D) and one stream (West Tributary of Kelsey Creek) were identified and delineated within the project corridor. These wetlands and the stream are located in the northern third of the project corridor. No wetlands or streams were identified in the remainder of the corridor.

Based on Bellevue City Code, Wetlands A and B are both classified as Category III wetlands and require 60-foot standard buffers. Wetlands C and D are classified as Category II wetlands and require 110- and 75-foot standard buffers, respectively, due to differences in habitat scores. The West Tributary of Kelsey Creek provides suitable fish habitat and therefore would be classified as a Type F water. The creek requires a 50-foot standard buffer.

Based on the project's preliminary plans, unavoidable impacts would occur to Wetlands A, B, and C, and the West Tributary of Kelsey Creek. In total, 0.295 acre of unavoidable wetland impacts would occur and include completely filling Wetlands A and B. Additionally, approximately 15 linear feet of open-channel stream habitat in the West Tributary of Kelsey Creek would be impacted as a result of the project.

On-site and in-kind compensatory mitigation is not feasible in the project corridor due to the project limits and highly developed setting. Conceptual mitigation opportunities include off-site mitigation through off-site and in-kind mitigation, mitigation banking, or in-lieu fee program. Of these conceptual mitigation strategies, off-site and in-kind mitigation would be required by the City of Bellevue.

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1.0 Introduction

Shannon & Wilson, Inc. was contracted by Parsons Brinckerhoff (PB) to conduct a wetland and stream delineation along the NE 4th Street/120th Avenue NE project corridor in Bellevue, Washington (Figure 1-1). The NE 4th Street/120th Avenue NE project corridor is located in the Bel-Red Subarea of Bellevue, Washington.

The project corridor extends from the intersection of NE 4th Street with 116th Avenue NE eastward to 120th Avenue NE and then northward along 120th Avenue NE to Northup Way. The corridor is located along a topographic ridge, sloping to the north and south. The north subbasin is the headwaters of the West Tributary to Kelsey Creek, while the south subbasin is located in the Lake Bellevue and Sturtevant Creek basin. Both Kelsey Creek and Sturtevant Creek eventually drain to Lake Washington.

The project corridor is located within the Lake Washington/Cedar/Sammamish Watershed Water Resource Inventory Area No. 8 (WRIA 8) and Hydrologic Unit Code 17110012. The project corridor is located in the NW ¼ and SW ¼ of Section 28, Township 25 North, Range 5 East, Willamette Meridian.

The purpose of this wetland and stream delineation is to provide a determination of the extent, limits, and categories of wetlands associated with the NE 4th Street/120th Avenue NE project corridor for the preliminary design of proposed road improvements throughout the corridor.

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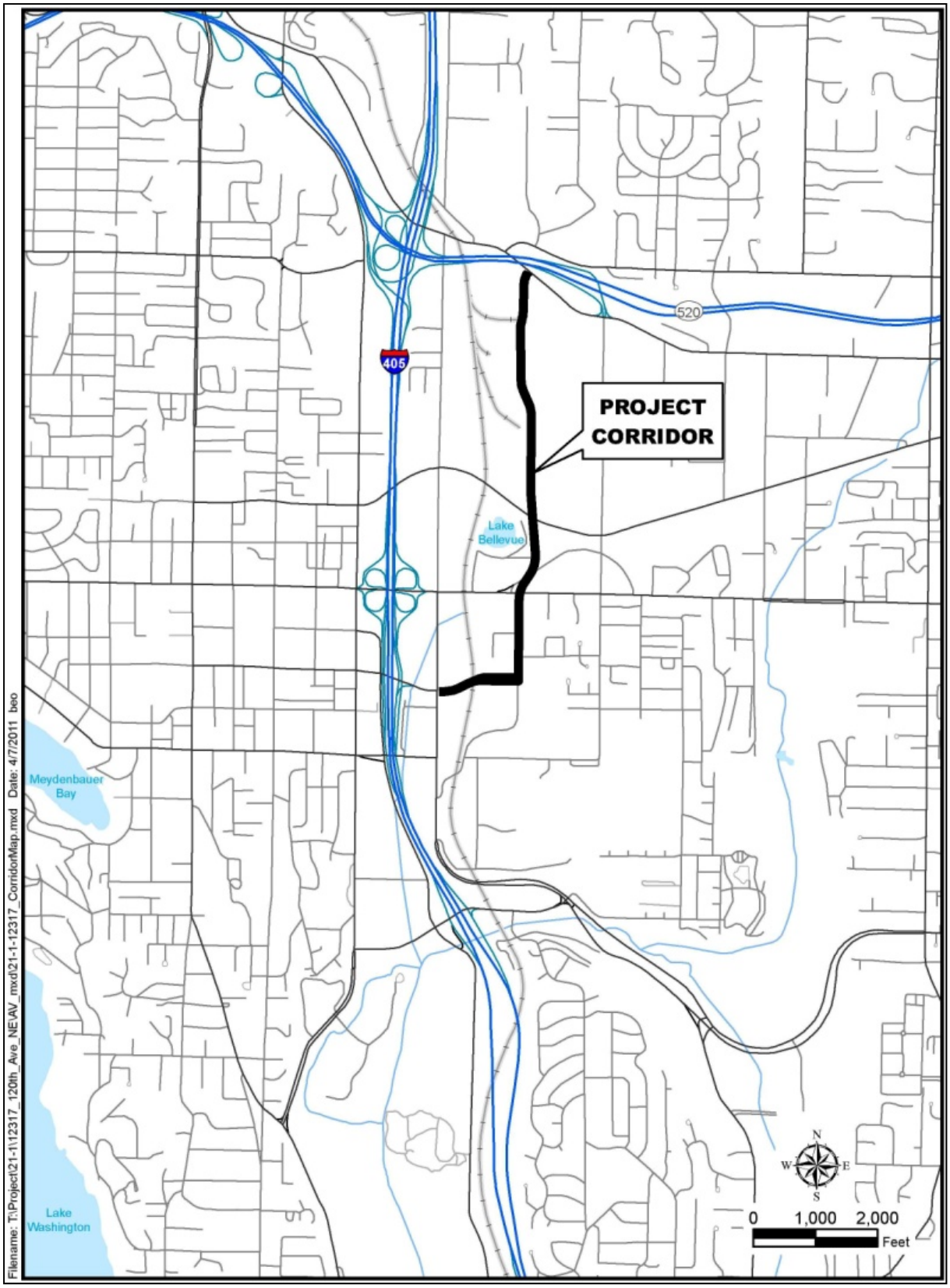

Figure 1-1. Project Corridor Map

2.0 Methods

Shannon & Wilson, Inc. conducted the wetland and stream delineation following a background review of information relating to the project corridor. This includes a review of the U.S. Department of Agriculture (USDA) Soil Survey for King County, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps, City of Bellevue (City) critical areas maps, Washington State Department of Fish and Wildlife (WDFW) SalmonScape mapping system, and other relevant background information provided by PB.

The wetland and stream fieldwork was conducted on December 7, 2009, July 29, 2010, and March 8, 2011. Wetlands were delineated using the routine methodology described in the Washington State Department of Ecology's (Ecology's) 1997 *Washington State Wetland Identification and Delineation Manual*, the U.S. Army Corps of Engineers' (Corps') 1987 *Wetland Delineation Manual*, and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (May 2010). Appendix A includes a summarized description of methodology used.

Seven data plots (two upland, five wetland) were characterized within identified wetland and upland plant community types to help describe general conditions at the site. Information on vegetation, soils, and hydrology was collected at each data plot. These data plots were located near the upland/wetland interface to more accurately determine the boundaries of on-site wetlands or were located in areas that exhibited conditions similar to wetlands (i.e., drainage patterns and hydrophytic vegetation). Information gathered at these locations is provided in Appendix B.

Wetland areas were determined using the triple-parameter approach, which considers vegetation types, soil conditions, and hydrologic conditions. For an area to be considered wetland, it must display each of the following: (1) dominant plant species that are considered hydrophytic by the accepted classification indicators, (2) soils that are considered hydric under federal definition, and (3) indications of wetland hydrology, in accordance with federal definition. Please see Appendix A for more information and categorization of hydrophytic vegetation, hydric soils, and wetland hydrology.

Following their identification and delineation, wetlands within the project corridor were rated using Ecology's *Washington State Wetland Rating System for Western Washington*. This rating system has been adopted within the Bellevue City Code (BCC) and is used to determine the standard wetland buffer widths.

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The ordinary high water mark of the West Tributary of Kelsey Creek was delineated for federal and state purposes following the guidance provided within *Determining the Ordinary High Water Mark on Streams in Washington State* and *Ordinary High Water Mark (OHWM) Identification* (Corps, 2005). All streams identified and delineated were classified using the water typing system defined within BCC.

Identified wetlands were delineated by flagging the wetland boundaries with pink "wetland boundary" flagging. Wetlands were flagged in the field from north to south as Wetland A to Wetland D, but were later renamed so Wetland A was the southernmost wetland and Wetland D was the northernmost wetland. Ordinary high water mark (OHWM) and data point locations were flagged with orange flagging.

3.0 Document Review

Background information pertaining to the wetland site was collected and reviewed for its usefulness. These information sources included:

- USDA Natural Resources Conservation Service (NRCS) Web Soil Survey interactive mapping system (USDA, 2010);
- USFWS NWI Wetlands Mapper interactive mapping system;
- Known Freshwater Distribution of Salmon and Trout for WRIA 8;
- WDFW SalmonScape interactive mapping system;
- The City's West Tributary Basin and Sturtevant Creek Basin Maps; and
- BCC, Chapter 20.25H, Critical Areas Overlay District.

The USDA NRCS maps the project corridor as containing Norma sandy loam (No), Alderwood gravelly sandy loam (AgC), Urban Land (Ur), Bellingham silt loam (Bh), Tukwila muck (Tu), Seattle muck (Sk), and Everett gravelly sandy loam (EvC) (Figure 3-1). Of these soil series, Seattle muck and Tukwila muck are identified as hydric soils.

According to the USFWS NWI, a palustrine scrub-shrub seasonally flooded wetland is west of the southern end of the project corridor, a palustrine unconsolidated bottom permanently flooded wetland is west of the central portion of the project corridor, and a palustrine forested seasonally flooded (PFOC) wetland is located along the northwest edge of the project corridor (Figure 3-2).

The Known Freshwater Fish Distribution of Salmon and Trout for WRIA 8 maps are a series of maps and supporting tabular data of recent sightings for Chinook, coho, steelhead, sockeye, cutthroat trout, and kokanee species for the whole of WRIA 8. For Sturtevant Creek, these maps show that only coho occur in Sturtevant Creek from its mouth at Mercer Slough to Interstate 405 (I-405) (approximately 0.5 river mile downstream of the site). For the West Tributary of Kelsey Creek, these maps show that Chinook and cutthroat trout were observed up to Bel-Red Road (approximately 0.8 river mile downstream of the site) while coho and sockeye were observed up to NE 8th Street (approximately 1.1 river mile downstream of the site). Steelhead are not known to use the West Tributary of Kelsey Creek.

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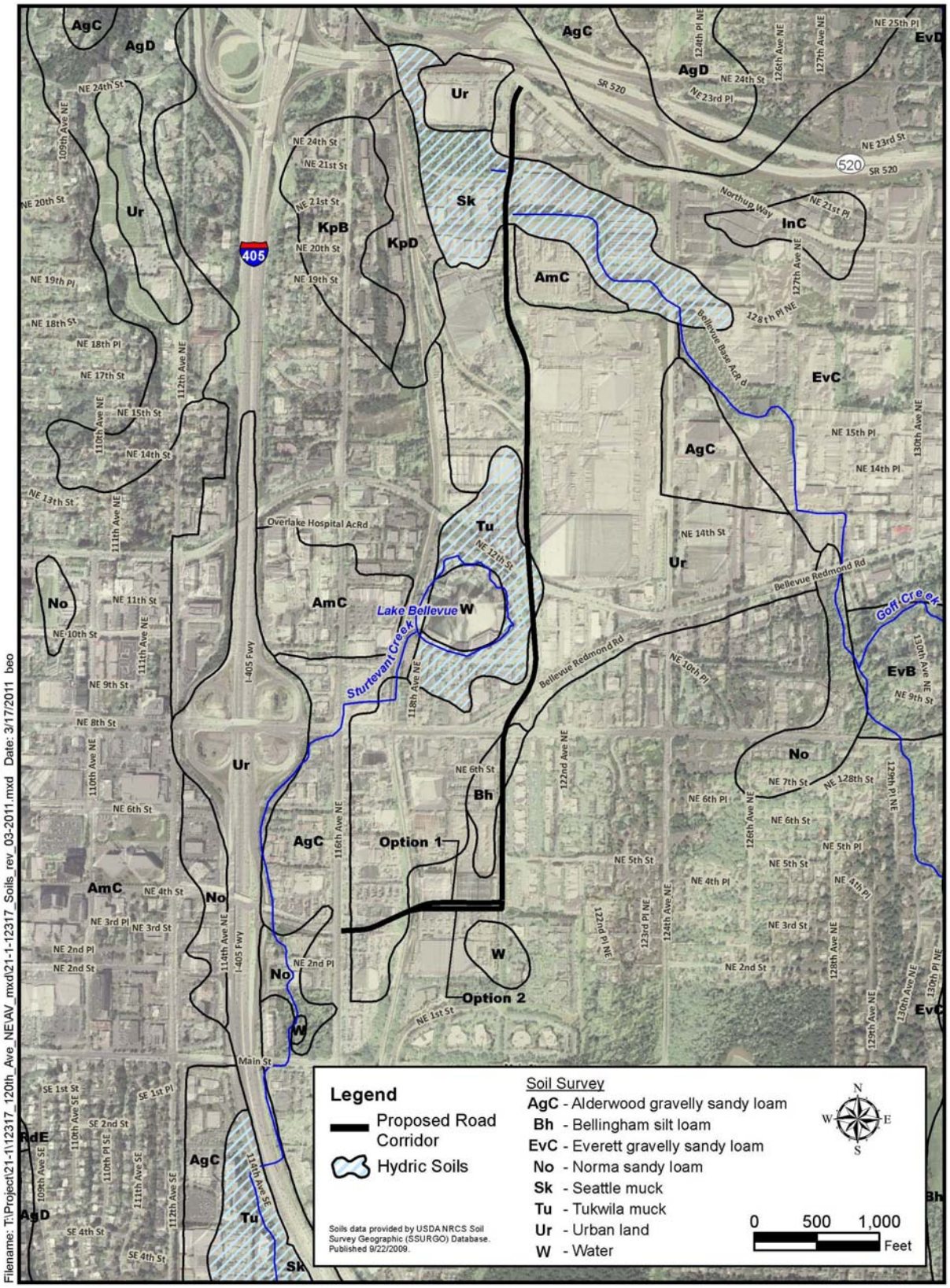

Figure 3-1. USDA Soils Map

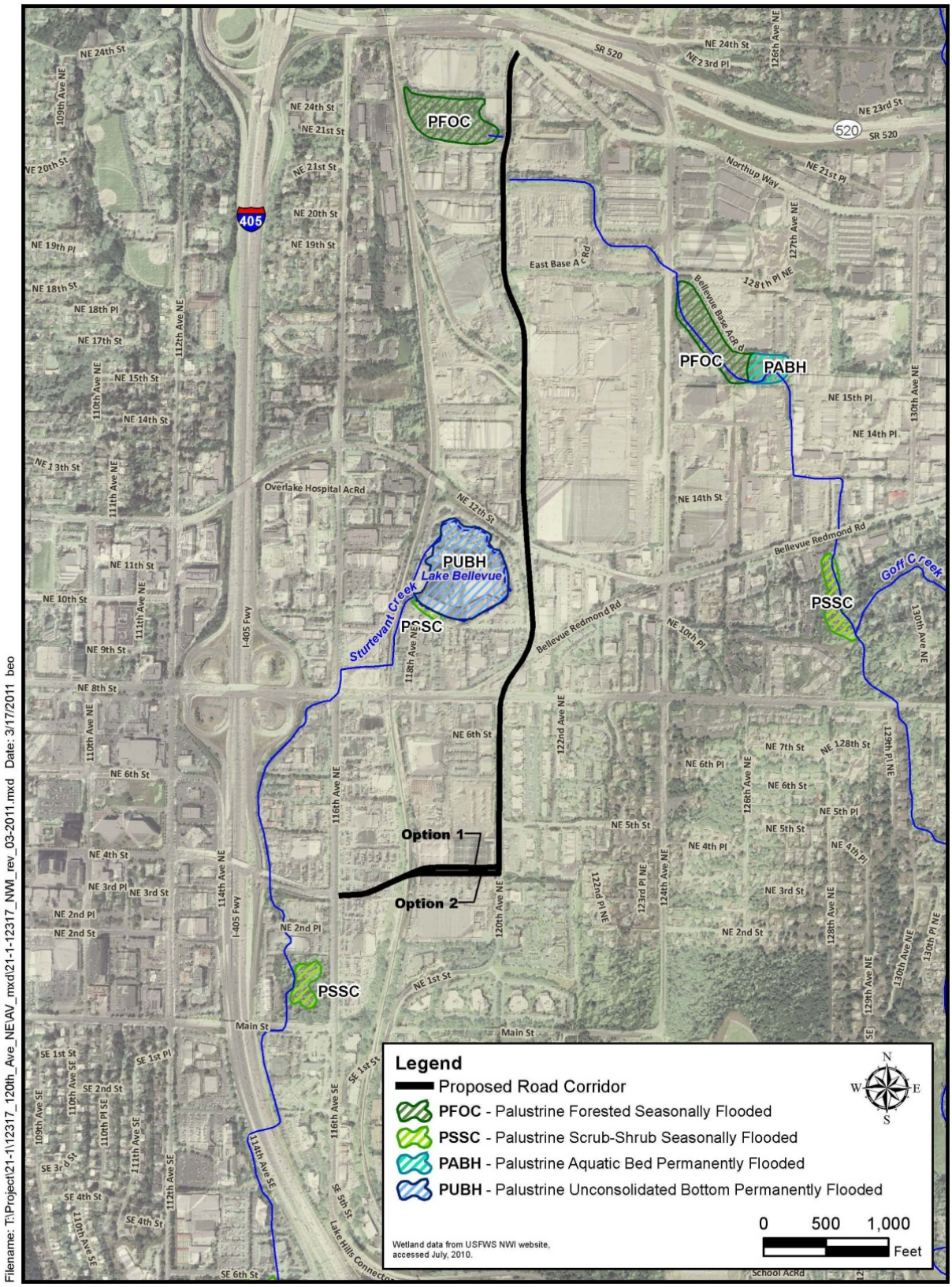

Figure 3-2. USFWS NWI Map

WDFW's SalmonScape interactive mapping system identifies coho presence south of where it crosses under I-405 (Figure 3-3). For the West Tributary of Kelsey Creek, SalmonScape identifies three partial fish passage barriers surveyed by WDFW on November 17, 2009. The partial barriers are located between NE 8th Street and Bel-Red Road: one culvert below NE 8th Street and two dams between NE 8th Street and Bel-Red Road. It is not specified whether these dams are natural (e.g., beaver or debris dams) or man-made dams.

Based on the City's basin map for the Sturtevant Creek, the upper limits of Sturtevant Creek (Lake Bellevue to NE 2nd Place) barely exhibits any flow within its muddy and organic channel. However, the middle reach (I-405 to NE 2nd Place) exhibits substantial flow that is believed to be stormwater runoff and does not support fish or provide fish habitat. The downstream reach (mouth to I-405) historically contained coho and peamouth chub, according to City records. Coho were known to use the entire lower reach in 1975; however, field investigations in 2001 determined it was unlikely that coho continue to use the full lower reach. Lake Bellevue is known to support a non-native population of goldfish. Based on correspondence with the City, the muddy and organic channel within the upper limits of Sturtevant Creek has recently been cleaned out and provides improved flow.

According to the City's basin maps for the West Tributary Basin, the West Tributary of Kelsey Creek is used by sockeye, Chinook, and coho salmon as well as migratory and resident cutthroat trout. The upper limits of fish use appear to be at Bel-Red Road. Electrofishing occurred in 2001 and yielded no fish on either side of 124th Avenue NE and 120th Avenue NE. South of NE 8th Street, the West Tributary Basin map describes the stream as "a sequence of tiny pockets of water, each less than 2 inches deep."

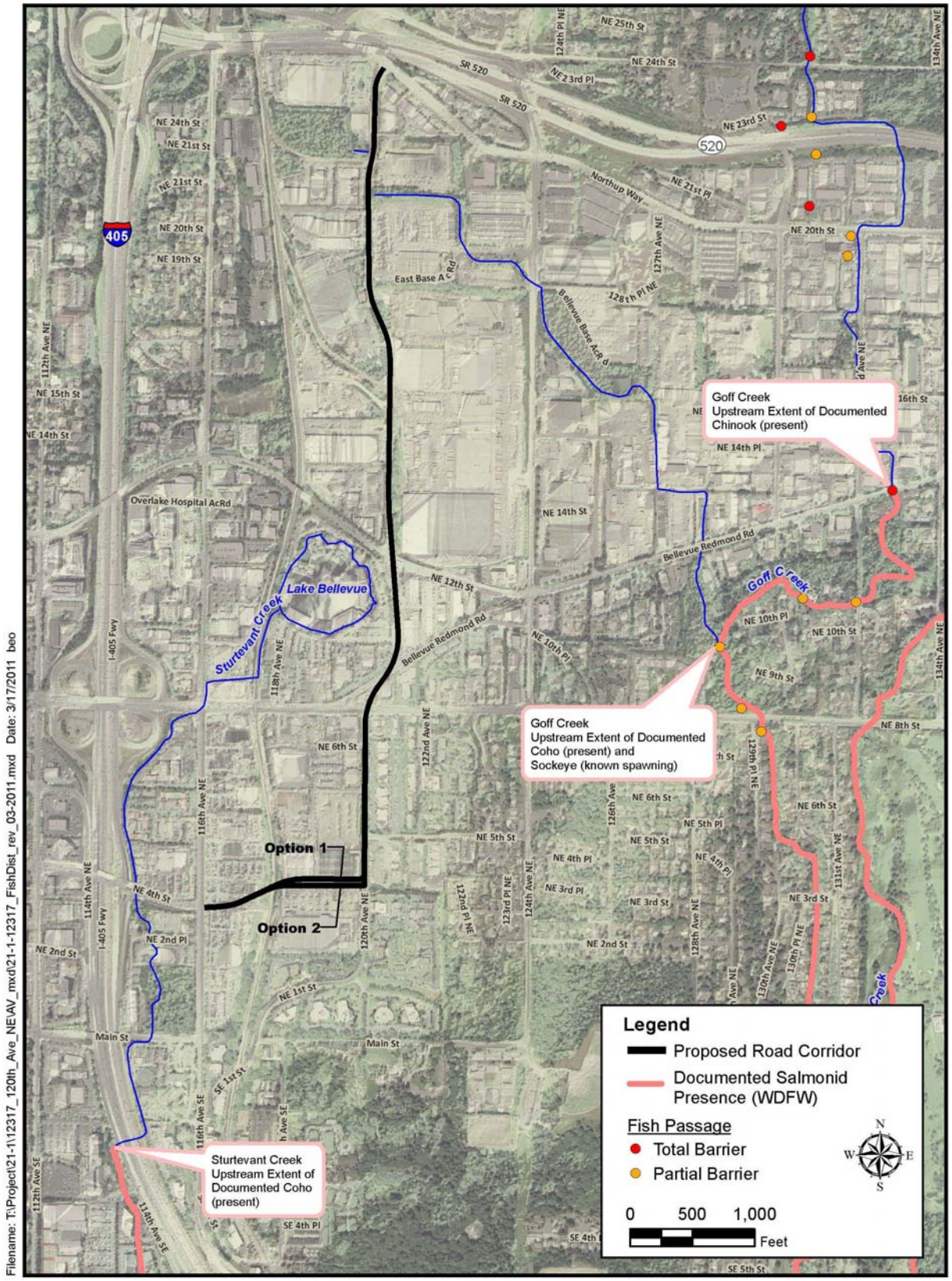

Figure 3-3. Fish Distribution Map

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4.0 Wetlands and Streams

Four wetlands (Wetlands A to D) and one stream (West Tributary of Kelsey Creek) were located within the project corridor. Sturtevant Creek is located approximately 500 feet west of the project corridor and therefore is not discussed further in this report.

A summary of the wetlands and stream within the project corridor follows. Vegetation is described below by common name, with the scientific name and facultative indicator status in parentheses. Soils are described with the associated Munsell Color Charts color in parentheses. Appendix A includes vegetation indicator status definitions and Munsell Color Charts information.

4.1 Wetland A

Wetland A (8,260 square feet [sf]) is located northeast of the intersection of 120th Avenue NE and NE 12th Street and is entirely within the project corridor (Figure 4-1). The Cowardin classification (Cowardin, 1979) for Wetland A is PEM/SS and its hydrogeomorphic classification (Brinson, 1993) is "depressional outflow."

Dominant vegetation within Wetland A includes Pacific willow (*Salix lasiandra,* FACW), Douglas spirea (*Spirea douglasii,* FACW) with an emergent strata of bentgrass (*Agrostis sp*., FAC).

Soils observed included a surface layer of black (10YR 2/1) muck above a layer of dark gray (2.5Y 4/1) clay loam exhibiting dark grayish-brown (10YR 4/2) redoximorphic concentrations. While the site is mapped as urban land (Ur), Tukwila muck (Tu) is mapped immediately west of Wetland A.

There appear to be three primary hydrologic sources for Wetland A: (1) a high groundwater table, (2) stormwater sheetflow off of 120th Avenue NE, and (3) discharge of surface flow out of a large, black plastic outfall structure in the middle of the wetland. We presume the black plastic outfall releases stormwater from the development upslope to the east of Wetland A. A roadside ditch is located within Wetland A, which originates from the black outfall structure, runs parallel to 120th Avenue NE, and terminates at a concrete culvert. Surface flow within Wetland A exits through this concrete culvert and is presumably conveyed through a series of underground pipes to Lake Bellevue.

Wetland A was classified as a Category III wetland using Ecology's Wetland Rating System (Ecology, 2004), see Appendix C. The rationale for this rating was the wetland's:

- High water quality functions score (24 points) due to its organic soils, persistent vegetation, unconstructed surface outlet, and opportunity to remove pollutants;

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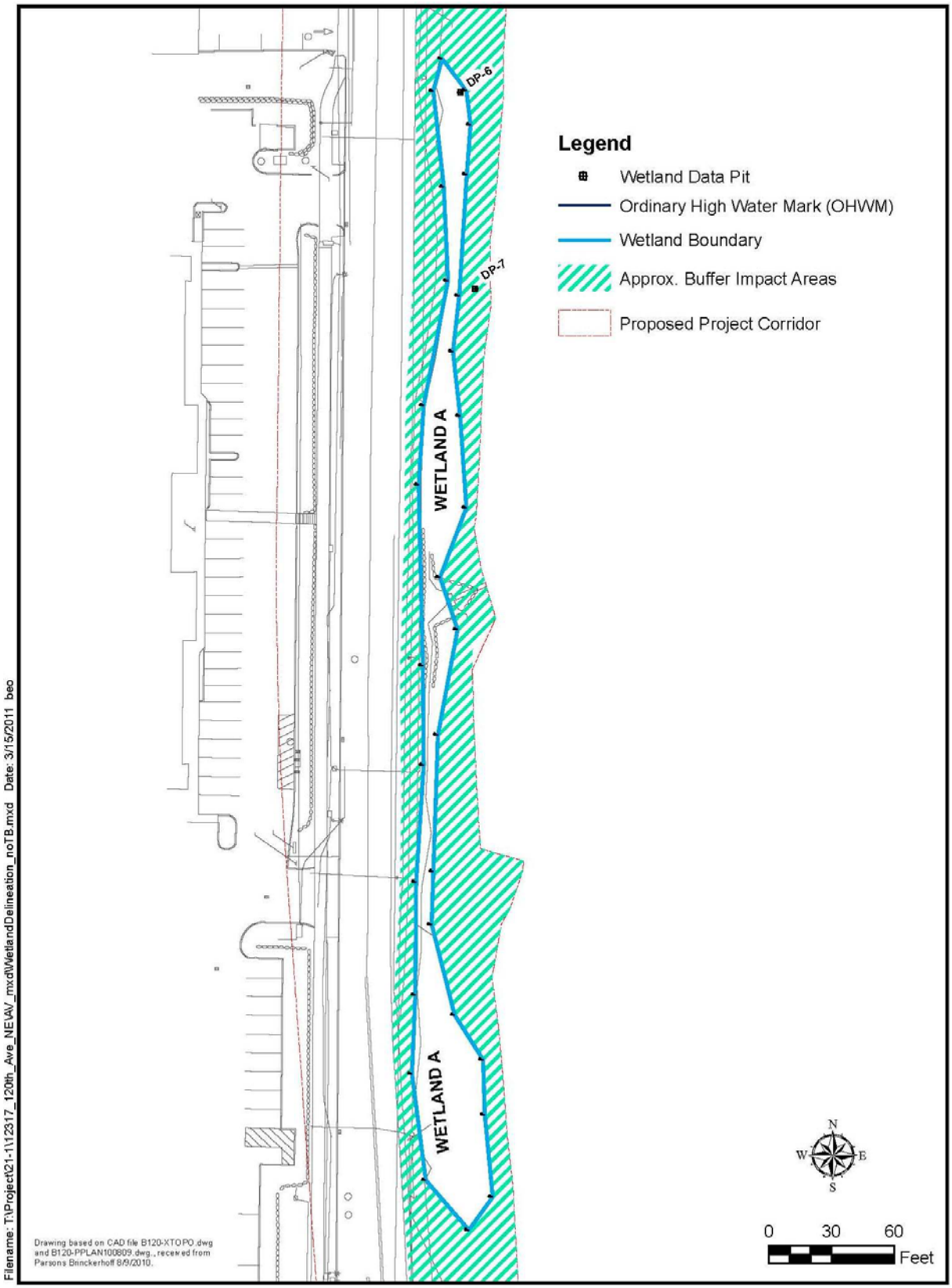

Figure 4-1. Wetland and Stream Delineation – Wetland

- Low hydrologic functions score (8 points) due to the high dead storage during wet periods, the moderate ratio of the wetland's area to its basin, but lack of opportunity to reduce flooding downstream as the wetland drains to Lake Bellevue; and
- Moderate habitat functions score (14 points) due to its low diversity of vegetation, moderate interspersion of hydroperiods, and the presence of other nearby wetlands in the developed landscape. Additionally, a standing snag was observed in the southern end of Wetland A with evidence that it has been used by pileated woodpeckers for foraging.

The City has adopted Ecology's Wetland Rating System into the BCC, which requires Category III wetlands with habitat scores less than 20 points to maintain a 60-foot standard buffer.

4.2 Wetland B

Wetland B (4,420 sf) is located along an open roadside ditch east of 1899 120th Avenue NE and is entirely within the project corridor (Figure 4-2). The Cowardin classification (Cowardin, 1979) for Wetland B is PEM/SS and its hydrogeomorphic classification (Brinson, 1993) is "depressional outflow."

Dominant vegetation within Wetland B includes a scrub-shrub layer of Sitka willow (*Salix sitchensis,* FACW) and Douglas spirea (*Spirea douglasii,* FACW) with an emergent strata dominated by reed canarygrass (*Phalaris arundinacea*, FACW), small-fruited bulrush (*Scirpus microcarpus,* OBL), and soft rush (*Juncus effusus,* FACW).

Soil conditions within Wetland B exhibit evidence of being disturbed as a result of fill material placed for road construction and presumably from ongoing maintenance to the roadside ditch. Soils within the wetland were observed at two data plot locations. The first soil observation included a surface layer of very dark gray (10YR 3/1) sandy loam with road ballast and inclusions of greenish- gray (10Y 5/1) clay loam exhibiting light olive brown (2.5Y 5/1) redoximorphic concentrations. The second soil observation included a surface layer of black (5Y 2.5/1) loam with inclusions of very dark grayish-brown (10YR 3/2) loam exhibiting dark yellowish-brown (10YR 4/6) redoximorphic concentrations.

Hydrologic support for Wetland B is believed to be from stormwater sheetflow off of 120th Avenue NE resulting in saturation to the surface and occasional flooding for a minimum of 14 days during the growing season. Flow within Wetland B exits through a series of underground conveyances that direct stormwater to the West Tributary of Kelsey Creek.

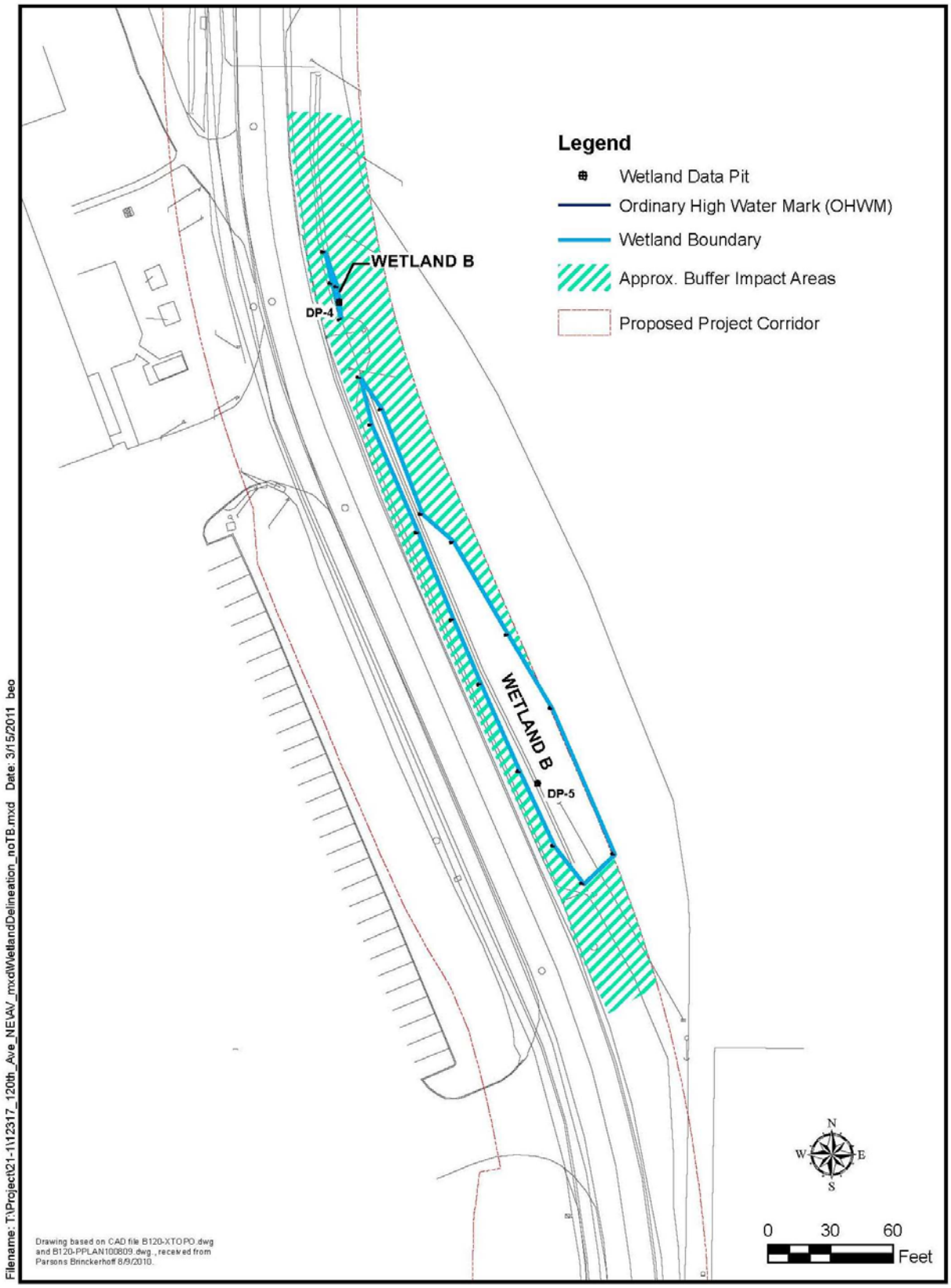

Figure 4-2. Wetland and Stream Delineation – Wetland B

Wetland B was classified as a Category III wetland using Ecology's Wetland Rating System (Appendix C). The rationale for this rating was the wetlands:

- Moderate water quality functions score (12 points) due to the persistent vegetation, unobstructed surface outlet, and opportunity to remove pollutants;
- Moderate hydrologic functions score (12 points) due to the moderate storage during wet periods, the moderate ratio of the wetland's area to its basin, and opportunity to reduce flooding downstream; and
- Low habitat functions score (8 points) due to its low diversity and interspersion of vegetation strata and hydroperiods as well as the presence of other nearby wetlands in the developed landscape.

The City requires Category III wetlands with habitat scores less than 20 points to maintain a 60-foot standard buffer.

4.3 Wetland C

Wetland C is a palustrine emergent, palustrine scrub-shrub wetland (PEM/PSS) located east of 2023 120th Avenue NE (Figure 4-3). This wetland is part of a larger wetland system that extends off site to the east and is approximately 2 acres in size. The Cowardin classification (Cowardin, 1979) for Wetland C is PEM/SS and its hydrogeomorphic classification (Brinson, 1993) is "riverine."

Dominant vegetation within that portion of the Wetland C located in the project corridor includes a scrub-shrub layer of Pacific willow (*Salix lasiandra,* FACW) and Douglas spirea (*Spirea douglasii,* FACW) above an emergent strata dominated by reed canarygrass (*Phalaris arundinacea*, FACW).

Soil conditions observed can be characterized by a surface layer of black (2.5Y 2.5/1) muck with inclusions of very dark greenish-gray (10Y 3/1) sand exhibiting dark yellowish-brown (10YR 4/6) streaking and coated sand grains. The muck soil corresponds to the Seattle muck soil series mapped by the NRCS Web Soil Survey.

Hydrologic support for Wetland C is dominated by the West Tributary of Kelsey Creek, which enters the wetland through a culvert at the northwest corner of Wetland C. While the creek flows through a defined channel as it enters Wetland C, its OHWM quickly fans out to encompass much of Wetland C, resulting in surficial sand deposits and drainage patterns through the wetland.

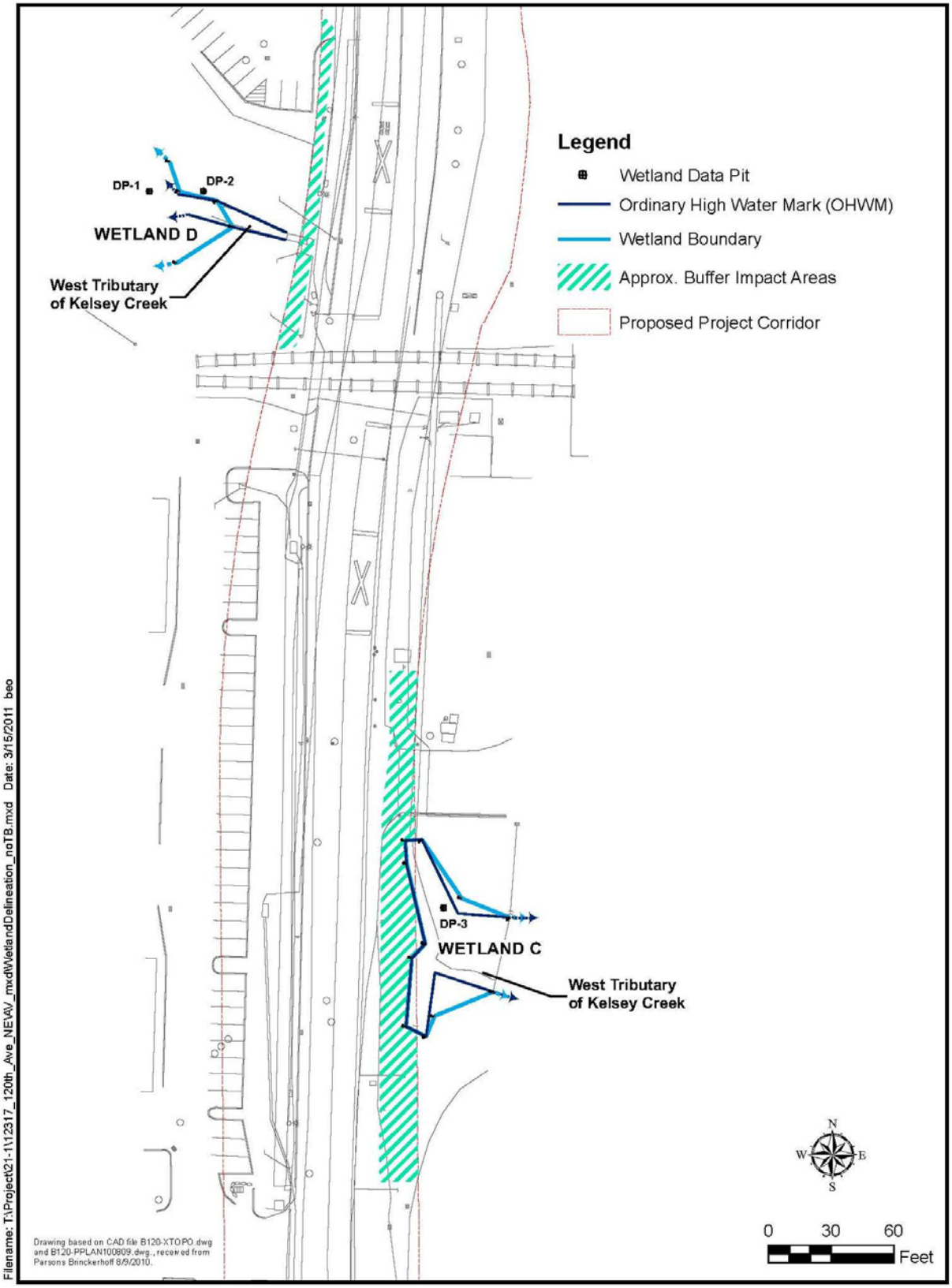

Figure 4-3. Wetland and Stream Delineation – Wetlands C and D

Wetland C was classified as a Category II wetland using Ecology's Wetland Rating System (Appendix C). The rationale for this rating was the wetland's:

- High water quality functions score (20 points) due the frequency of small depressions throughout the wetland unit, scrub-shrub cover, and opportunity to remove pollutants;
- High hydrologic functions score (26 points) due to the high ratio of flood plain to channel width, scrub-shrub and herbaceous cover, and opportunity to reduce flooding downstream,
- Moderate habitat functions score (16 points) due to its moderate diversity and interspersion of vegetation strata and hydroperiods as well as the presence of special habitat features and WDFW-defined priority habitats.

The City requires Category II wetlands with a habitat score of less than 20 points to maintain a 75-foot standard buffer.

4.4 Wetland D

Wetland D is a located along the northwestern portion of the site, south of 2221 120th Avenue NE (Figure 4-3). This wetland is part of a larger wetland system that corresponds to the 4.9-acre PFOC wetland identified by the USFWS NWI (Figure 3-2). The Cowardin classification (Cowardin, 1979) for Wetland D is palustrine aquatic bed, emergent, scrub-shrub, forested wetland and its hydrogeomorphic classification (Brinson, 1993) is "depressional outflow."

Dominant vegetation within that portion of Wetland D located in the project corridor includes a forested canopy of Pacific willow (*Salix lasiandra,* FACW+) and black cottonwood (*Populus trichocarpa,* FAC) with a scrub-shrub layer of Pacific willow, black cottonwood, Sitka willow (*Salix sitchensis,* FACW), and Douglas spirea (*Spirea douglasii,* FACW) above an emergent strata dominated by small-fruited bulrush (*Scirpus microcarpus,* OBL), swordleaf rush (*Juncus ensifolius,* FACW), common cattail (*Typha latifolia,* OBL), hardstem bulrush (*Schoenoplectus acutus,* OBL), and soft rush (*Juncus effusus,* FACW).

Soil conditions observed can be characterized by a surface layer of black (10YR 2/1) muck, which corresponds to the Seattle muck soil series mapped by the NRCS Web Soil Survey.

Sources of hydrology supporting Wetland D are presumed to primarily be a high groundwater table sufficient to support the development of the organic soils and permanent flow within the West Tributary of Kelsey Creek, the headwaters of which are Wetland D. Stormwater may also contribute to wetland hydrology during precipitation events, as the site is surrounded by paved developments, however, no stormwater inlets into Wetland D were observed.

Wetland D was classified as a Category II wetland using Ecology's Wetland Rating System (Appendix C). The rationale for this rating was the wetland's:

- High score (20 points) for water quality functions due to its organic soils, persistent vegetation cover, and its opportunity to remove pollutants;
- Moderate score (16 points) for hydrologic functions due to its minimal depth of storage, the wetland's area relative to its basin, and its hydrologic position as the headwaters of the West Tributary of Kelsey Creek; and
- High score (24 points) for habitat functions due to its high diversity and interspersion of vegetation strata and hydroperiods, as well as the presence of special habitat features and WDFW-defined priority habitats.

The City requires Category II wetlands with a habitat score of between 20 and 28 points to maintain a 110-foot standard buffer.

4.5 West Tributary of Kelsey Creek

The West Tributary of Kelsey Creek is the only stream located within the project corridor or its immediate vicinity. The on-site reach includes the stream's headwaters within Wetland D, where it gradually flows within a 5-foot-wide active channel with a bed comprised of 6 inches of silt before entering a 36-inch corrugated metal pipe (CMP) culvert under 120th Avenue NE (Figure 4-3). The stream daylights again within the project corridor approximately 260 feet downstream into a channel within Wetland C. The active channel in Wetland C is approximately 4 feet wide with a bed comprised of sand and well-rounded gravels. As the stream exits the 36-inch CMP under 120th Avenue NE, the OHWM for the stream quickly fans out above the banks of the active channel and encompasses much of Wetland C.

As the stream exits the project corridor, it flows through a riparian corridor highly confined and fragmented by developed warehouse and commercial properties on either side for approximately 0.6 river mile. Despite the confined riparian corridor, aerial photographs suggest this reach is densely vegetated by emergent and scrub-shrub species with trees scattered throughout. Habitat features such as downed large, woody debris are present.

Downstream of this upper reach, the stream enters a culvert where it is conveyed below ground for approximately 1,100 feet to the south of Bel-Red Road. As described in Section 3.0, fish species documented within the West Tributary of Kelsey Creek includes Chinook, coho, sockeye, and cutthroat trout. The upper limit of presence is the downstream end of this long culvert daylighting at Bel-Red Road.

Downstream of its crossing under Bel-Red Road, the West Tributary of Kelsey Creek joins Goff Creek, which is tributary to Kelsey Creek. Goff Creek eventually connects to Kelsey Creek, which drains through Mercer Slough and into Lake Washington.

According to the BCC, streams that support fish or fish habitat are identified as Type F waters. Those that do not support fish or fish habitat are identified as Type N waters. While the on-site reach of the West Tributary of Kelsey Creek

does not support fish, it may provide fish habitat if they could access it. The BCC specifically calls out all daylighted sections of the West Tributary of Kelsey Creek as requiring 50-foot standard buffers, which is the same as required for all Type N waters. However, as the stream provides suitable fish habitat to species that may become present when downstream barriers are removed, we believe this tributary should be classified as a Type F water.

4.6 Uplands

The uplands throughout the project corridor are zoned as commercial, office, and multi-family and are largely built out as commercial warehouses, office buildings, and associated parking.

A small, triangular stormwater pond was identified offsite, but within 200 feet of the project corridor and on the northeast corner of 1899 120th Avenue NE. While this stormwater pond appeared to satisfy all three wetland criteria, the City does not consider, "… *those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities…*" (BCC 20.25H.095) to be jurisdictional wetlands.

Where patches of upland vegetation occur, vegetation includes landscaped uplands associated with development and disturbed vegetative communities along the roadside. These areas are dominated by black cottonwood (Populus trichocarpa, FAC), Pacific madrona (*Arbutus menziesii*, NI), red alder (*Alnus rubra*, FAC), Indian plum (*Oemelaria cerasiformis*, FACU) Douglas spirea (*Spirea douglasii*, FACW), black hawthorn (*Crataegus douglasii*, FAC), Himalayan blackberry (*Rubus armeniacus*, FACU), and creeping blackberry (*Rubus ursinus*, FACU).

Soils observed throughout the uplands include very dark brown (10YR 2/2) and dark grayish-brown (10YR 4/2) loam lacking redoximorphic features.

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5.0 Wetland Regulations

Several federal, state, and local regulations apply to development proposals in and/or near wetlands. A summary of applicable regulatory implications is given below.

5.1 City of Bellevue

The City regulates impacts to wetlands and streams under Section 20.25H (Critical Areas Overlay District) of the BCC.

5.1.1 Wetlands

Wetlands within the project corridor were rated using Ecology's Wetland Rating System, which the City has adopted. These wetlands ratings and their required standard buffers are summarized in Table 5-1 below.

Table 5-1. Wetland Classifications

Wetland	Wetland Classification		Wetland Size (acre)	Buffer Width (feet)
	Ecology/Bellevue Rating System	Habitat Score		
A	III	14	0.19	60
B	III	8	0.10	60
C	II	16	~1.5	75
D	II	24	~5	110

Where the standard buffer for Wetlands A to D meets the edge of the existing 120th Avenue NE improved right-of-way (ROW) or other legally established linear transportation ROWs, the standard buffer width for each wetland terminates. Therefore, buffer impacts associated with the project would only include those areas of existing or new unimproved ROW impacted from the proposed road widening project.

Buffer modification may occur through buffer averaging, which allows a wetland buffer to be reduced down to 75 percent of its standard width provided the total buffer area does not decrease and does not have an adverse effect on the ecological function or structure of the buffer. Unavoidable impacts to wetland buffers require compensatory mitigation.

Modification to wetlands is allowed where avoidance and minimization measures cannot avoid impacts for "*new or expanded public right-of-way, private roads, access easements and driveways*" as well as "*new or expanded bridges and culverts*" under BCC 20.25H.055B. However, compensatory wetland mitigation for impacts

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must occur. In the event that mitigation can occur on-site and in-kind, the compensatory mitigation would be required to comply with the City's replacement ratios, as summarized in Table 6.1.

While mitigation on-site and in-kind is the City's preference, followed by in-kind and the same drainage basin, the City would allow off-site mitigation when there is: (1) no reasonable alternative, (2) it has a greater likelihood of providing those functions impacted, and (3) it occurs within the same drainage basin.

5.1.2 Streams

Open channel reaches of the West Tributary of Kelsey Creek are specifically called out under BCC 20.25H.075.C.1.c as requiring a standard buffer width of 50 feet. This is the same buffer width as Type N waters.

Stream buffers are regulated under the BCC similarly to wetlands, where the edge of the improved ROW defines the limits of the buffer. Buffer modification may occur through buffer averaging. Unavoidable impacts to stream buffers require compensatory mitigation.

Modification to streams may also occur where avoidance and minimization measures cannot avoid impacts for "*new or expanded public right-of-way, private roads, access easements and driveways*." While compensatory mitigation is required for impacts to streams, there are no prescriptive replacement ratios.

5.1.3 Habitat for Species of Local Importance

Under BCC 20.25H.150A, the City has designated the pileated woodpecker (*Dryocopus pileatus*), among others, as a species of local importance. Therefore, habitat associated with pileated woodpeckers is identified as a critical area. Projects that have unavoidable impacts to habitats associated with local species of importance are required to implement the management recommendations developed by WDFW for that species.

Snags and large woody debris were observed in Wetlands A, C, and D during the wetland and stream delineation. This includes a snag used for foraging in Wetland A. As the project would permanently impact all of Wetland A and that snag providing pileated woodpecker forage habitat, the management recommendations for pileated woodpeckers would need to occur.

Habitat recommendations were last updated by WDFW for pileated woodpecker in 2004 (WDFW, 2004). While there are no prescriptive mitigation requirements as part of these management recommendations, mitigation associated with impacting the pileated woodpecker forage snag would likely include the installation of habitat features (e.g., snags and/or large woody debris) into the design of any compensatory wetland and stream mitigation. However, specific requirements necessary for mitigating pileated woodpecker habitat would be subject to the City's review and approval.

5.2 State Regulations

Ecology has been authorized to implement Section 401 of the Clean Water Act (CWA) for Water Quality Certification in Washington for most projects that require the Corps permits under CWA Section 404 (see Section 5.3). The purpose of the certification process is to ensure that federally permitted activities comply with the federal CWA, state water quality laws, and any other applicable state laws. Some general requirements for Section 401, if it is required, include pollution spill prevention and response measures, disposal of excavated or dredged material in upland areas, use of fill material that does not compromise water quality, clear identification of construction boundaries, and provision for site access to the permitting agency for inspection.

5.3 Federal Regulations

The Corps' CWA Section 404 review process is required for projects involving discharges of dredges or fill materials into the waters of the United States, including non-isolated wetlands and streams. Given that the aquatic areas that may be impacted by the project drain to Lake Washington, the Corps would likely regulate impact to these wetlands and stream under Section 404.

Any proposed impact located within a jurisdictional wetland would require a Nationwide permit (NWP) or an Individual permit from the Corps. Given the project description, impacts to the wetlands and stream may qualify for a NWP 14 for Linear Transportation Projects, provided the project does not exceed one-half acre of fill in waters of the United States.

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6.0 Conceptual Mitigation Opportunities

6.1 Project Impacts

The preliminary plans provided for the project show unavoidable wetland impacts to all of Wetlands A and B, and portions of Wetland C and the West Tributary of Kelsey Creek. These impacts are summarized in Table 6-1.

Table 6-1. Preliminary Area of Unavoidable Impacts

Name	Area of Wetland and Stream Impact		Area of Buffer Impacts	
	Square Feet	Acre	Square Feet	Acre
Wetland A	8,260	0.19	20,693	0.48
Wetland B	4,420	0.10	10,375	0.24
Wetland C and West Tributary of Kelsey Creek	206	0.005	3,702	0.08
Wetland D	0	0	940	0.02
Total	**12,886**	**0.295**	**35,710**	**0.82**

6.2 Mitigation Requirements

The City requires that compensatory mitigation occur for wetland impacts following prescriptive replacement ratios for on-site and in-kind mitigation. Additionally, as part of the Section 401 and 404 review process, Ecology and the Corps would require that compensatory mitigation occur. In 2006, the Corps, Ecology, and the U.S. Environmental Protection Agency developed a joint guidance document for compensatory mitigation in Washington State (Ecology, 2006). These guidelines provide recommended replacement ratios for on-site and in-kind mitigation. The replacement ratios are summarized in Table 6-2 below.

Table 6-2. Required Replacement Ratios

Wetland	Category	Wetland Replacement Ratios[1]					
		Bellevue	Corps/Ecology				
		R/C	R/C	RH	R/C and RH	R/C and E	E
A	III	2:1	2:1	4:1	1:1 R/C + 2:1 RH	1:1 R/C + 4:1 E	8:1
B	III	2:1	2:1	4:1	1:1 R/C + 2:1 RH	1:1 R/C + 4:1 E	8:1
C	II	3:1	3:1	6:1	1:1 R/C + 4:1 RH	1:1 R/C + 8:1 E	12:1
D	II	3:1	3:1	6:1	1:1 R/C + 4:1 RH	1:1 R/C + 8:1 E	12:1

Wetland Replacement Ratios Source: Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1) (Ecology, 2006)

Notes:

[1] Replacement ratios are for on-site and in-kind mitigation only. Replacement ratios reflect area of required mitigation to the area of wetland impact.

Corps = U.S. Army Corps of Engineers; E = Wetland Enhancement; Ecology = Washington State Department of Ecology; R/C = Wetland Re-establishment or Creation; RH = Wetland Rehabilitation

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While unavoidable stream impacts also require compensatory mitigation, neither the City nor the joint guidance document provide prescriptive stream replacement ratios. However, in addition to the compensatory mitigation for both wetland and stream impacts, the City also requires mitigation for buffers at a minimum of 1:1. Table 6-3 summarizes the wetland and buffer mitigation that would be required by the City.

Table 6-3. City of Bellevue Mitigation Requirements

Name	Area of Impact (square feet)	City of Bellevue Mitigation Ratios	Area of Mitigation (square feet)
Lake Bellevue/Sturtevant Creek Subbasin			
Wetland A	8,260	2:1	16,520
Wetland A Buffer	20,693	1:1	20,693
West Tributary of Kelsey Creek Subbasin			
Wetland B	4,420	2:1	8,840
Wetland B Buffer	10,375	1:1	10,375
Wetland C	206	3:1	618
Wetland C Buffer	3,702	1:1	3,702
Wetland D Buffer	940	1:1	940

City of Bellevue Mitigation Ratios Source: Bellevue City Code Chapter 20.25H. Critical Area Overlay District (City of Bellevue, 2010a)

The highly developed nature and narrowness of the project corridor would likely preclude on-site mitigation. Therefore, off-site and in-kind mitigation or off-site and out-of-kind mitigation options would likely need to be pursued.

From our preliminary review of alternative off-site mitigation strategies, there are three potential options: (1) off-site an in-kind mitigation at a nearby site, (2) mitigation bank, or (3) in-lieu fee program. These alternative mitigation strategies are described more fully in Section 6.3.

6.3 Alternative Mitigation Strategies

6.3.1 Off-site and In-kind Mitigation

The City's policy is to mitigate within the drainage basin or subbasin whenever possible. Therefore, mitigation for impacts to Wetland A should occur in the Lake Bellevue/Sturtevant Creek subbasin and impacts to Wetlands B and C must occur in the West Tributary of Kelsey Creek subbasin.

A potential off-site location within the Lake Bellevue/Sturtevant Creek subbasin has not been identified. Mitigation requirements would be the same as those shown in Table 6-3.

Based on discussions between PB staff and the City's Urban Design and Land Use staff on August 3, 2010, the City has purchased three parcels comprising approximately 7 acres near the intersection of 14th Street NE and

124th Avenue NE. This site is approximately 0.3 mile from the site and is located in the West Tributary of Kelsey Creek basin. The City-owned parcels include a piped portion of the West Tributary of Kelsey Creek where mitigation for stream impacts may be able to be accomplished as well. Mitigation requirements would be the same as those shown in Table 6-3.

Off-site and in-kind mitigation at a nearby site within the project area subbasins is the most likely option to be accepted by the City, Ecology, and Corps. Other alternative mitigation strategies exist if this strategy is not approved or proves cost prohibitive.

6.3.2 Mitigation Bank

There is currently no approved mitigation bank whose service area includes the project site. However, it may be possible to justify to the City and Interagency Review Team (IRT) the use of credits from a nearby mitigation bank for the project's impacts. If this occurs, the bank most likely to be accepted by the IRT, as it serves a portion of WRIA 8, is the Springbrook Creek Mitigation Bank operated by the Washington State Department of Transportation (WSDOT) in Renton, Washington. If WSDOT does not allow credits to be sold for Local Highways and Programs-sponsored projects, other mitigation banks in the area may be sought.

Justifying the use of mitigation banks outside of their service area may be difficult if other options are available.

6.3.3 In-Lieu Fee Program

Three in-lieu fee programs are currently seeking approval from the IRT. One of these programs is sponsored by King County and is currently awaiting final certification. When this program is approved, it would allow projects, where on-site and in-kind mitigation is not feasible and an approved mitigation bank is not currently available, to mitigate for impacts through a fee. The fee for such mitigation would be used by King County to construct large mitigation projects at predetermined locations.

In the event that off-site and in-kind mitigation is not possible, in-lieu fee may be the next best alternative if it has been approved.

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7.0 Limitations

The findings and conclusions documented in this report have been prepared for specific application to this project, and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. The conclusions and recommendations presented in this report are professional opinions based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made. We have prepared the document, "Important Information About Your Wetland Delineation/Mitigation Report and/or Stream Assessment" (Appendix D) to assist you and others in understanding the use and limitations of our reports.

Wetland boundaries identified by Shannon & Wilson are considered to be preliminary until the Corps and/or the local jurisdictional agency validates the flagged wetland boundaries. Validation of the wetland boundary by the regulating agency(s) provides a certification, usually written, that the wetland boundaries verified are the boundaries that would be regulated by the agency(s) until specified data or until the regulations are modified. Only the regulating agency(s) can provide this certification.

Since wetlands are dynamic communities affected by both natural and human activities, changes in wetland boundaries may be expected; therefore, wetland delineations cannot remain valid for an indefinite period. The Corps typically recognizes the validity of wetland delineations for a period of five years after completion. Development activities on a site five years after the completion of this wetland delineation report may require revision of the wetland delineation. In addition, changes in government code, regulations, or laws may occur. Because of such changes beyond our control, our observations and conclusions regarding this site may need to be revised wholly or in part.

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Appendix A
Wetland Delineation Methodology

Appendix B
Wetland Field Data Sheets

Appendix C
Wetland Rating Form

Appendix D
Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report

[Appendices A through D are provided on the attached CD.]