AECOM Environment

Submitted to:
City of Woodinville,
Washington

Submitted by:
AECOM
Seattle, WA
60177826
November 2011

EXHIBIT 9
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Sammamish River Bridge and Road (SR 202) Project
Air Quality Conformity Analysis

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Acronyms and Abbreviations

AADT	Average Annual Daily Traffic
ADT	Average Daily Traffic
BACT	Best Available Control Technology
BMP	Best Management Practice
CAA	Clean Air Act
CFR	Code of Federal Regulations
City	City of Woodinville
CO	Carbon Monoxide
DOT	Department of Transportation
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
EPM	Environmental Program Manager
FHWA	Federal Highway Administration
I/M	Inspection and Maintenance
LOS	Level of Service
mph	miles per hour
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
MTIP	Metropolitan Transportation Improvement Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	Nitrogen Oxide
O_3	Ozone
Pb	Lead
PM	Particulate Matter
ppm	parts per million
PSCAA	Puget Sound Clean Air Agency
PSRC	Puget Sound Regional Council
RTIP	Regional Transportation Improvement Program
RTPO	regional transportation planning organization
SO_2	Sulfur Dioxide
SR	State Route
TSP	Total Suspended Particulates
U.S.C.	United States Code
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compound
vph	Vehicles per Hour
WAC	Washington Administrative Code
WASIST	Washington State Intersection Screening Tool
WSDOT	Washington State Department of Transportation

Executive Summary

The City of Woodinville (City) proposes the Sammamish Bridge and Road (SR 202) Project to widen State Route 202 (SR 202) from the intersection of 131st Avenue NE to Woodinville-Redmond Road NE. The purpose of the project is to improve traffic circulation in the City by increasing capacity on SR 202 between Woodinville-Redmond Road NE and 131st Avenue NE and relieving congestion at the intersections at each end of the project.

An air quality analysis was conducted under the federal and state requirements of Title 40, Part 93 of the Code of Federal Regulations (40 CFR 93) "Determining Conformity of Federal Actions to State or Federal Implementation Plans" and Chapter 173-420 of the Washington Administrative Code (WAC 170-420) "Conformity of Transportation Activities to Air Quality Implementation Plans" to demonstrate conformity with the purpose and intent of state implementation plans for air quality.

The project study area is located in a carbon monoxide (CO) and ozone (O_3) maintenance area. A project-level quantitative CO hot-spot analysis was performed for the existing year of 2011, and No Build Alternative and Build Alternative for the opening year of 2014 and horizon year of 2040. A qualitative mobile source air toxics (MSAT) analysis was also performed. A regional air quality analysis is not required because the project is part of the conforming Puget Sound Regional Council (PSRC) Transportation Improvement Program (TIP), Transportation 2040. No project-level analysis for O_3 is required as the one-hour O_3 standard has been revoked.

The results of the analyses demonstrate air quality conformity of the project.

1.0 Introduction

1.1 Purpose of Air Quality Analysis

The City of Woodinville (City) proposes the Sammamish Bridge and Road (SR 202) Project to widen State Route 202 (SR 202) from the intersection of 131st Avenue NE to Woodinville-Redmond Road NE. This analysis was conducted under the federal and state requirements of Title 40, Part 93 of the Code of Federal Regulations (40 CFR 93) "Determining Conformity of Federal Actions to State or Federal Implementation Plans" and Chapter 173-420 of the Washington Administrative Code (WAC 170-420) "Conformity of Transportation Activities to Air Quality Implementation Plans."

1.2 Project Purpose

The purpose of the project is to improve traffic circulation in the City by increasing capacity on SR 202 between Woodinville-Redmond Road NE and 131st Avenue NE and relieving congestion at the intersections at each end of the project, and to improve the level of safety for pedestrians and bicyclists

Within the project limits, the existing SR 202 roadway section and bridge vary between two lanes and four lanes. Currently, there is one eastbound through/right-turn lane, two eastbound left-turn lanes, and one westbound lane at the signalized intersection of 131st Avenue NE. At the signalized intersection of Woodinville-Redmond Road NE, there is currently one westbound through/right-turn lane, one westbound left-turn lane, and one eastbound lane. The center of the project consists of an existing two-lane bridge (one lane in each direction) that crosses over the Sammamish River. The roadway section varies in width with lanes that are 11 to 12 feet and shoulders between 2 and 6 feet. The existing bridge supports two 12-foot lanes, and 1-foot shoulders and 3-foot sidewalks on each side. The SR 202 roadway section is classified as an Urban Minor Arterial with a posted speed limit of 35 miles per hour (mph). The current average daily traffic (ADT) levels on the project roadway are 17,000 vehicles. ADT levels are expected to grow at an annual rate of 3.2%.

SR 202 serves as one of five entrances to the downtown core of the City. Traffic and development in the area have increased considerably since the SR 202 roadway section and bridge were built in 1963. During peak traffic hours, vehicles back up in both directions beyond the bridge to the intersections at Woodinville-Redmond Road NE and 131st Avenue NE.

1.3 Project Location

The proposed project is located on SR 202 (also known as 175th Street) within the City of Woodinville, in King County, Washington. The project corridor extends from Woodinville-Redmond Road NE to 131st Avenue NE (SR 202 Mile Post 0.31 to Mile Post 0.55). This east-west segment of SR 202 spans the Sammamish River and covers a distance of approximately 0.25 mile. At the intersection of 131st Avenue NE, there is one eastbound through/right-turn lane and two left-turn lanes, and one westbound lane. At the intersection of Woodinville-Redmond Road NE, there is one westbound through/right-turn lane and one left-turn lane, and one eastbound lane. The center of the project consists of a two-lane bridge (one lane in each direction) that crosses over the Sammamish River. The project includes two railroad crossings – one just east of Woodinville-Redmond Road NE, and the other just east of the bridge. Figure 1 illustrates the project corridor and study area.

1.4 Project Description

The proposed project involves widening SR 202 from the intersection of 131st Avenue NE to Woodinville Redmond Road NE (the project corridor) from two to four lanes by constructing a new two-lane bridge adjacent to and south of the existing two-lane bridge. An additional westbound through lane would be added to the existing configuration at the intersection of 131st Avenue NE, and a westbound right-turn pocket would be added at the Woodinville-Redmond Road NE intersection. An additional eastbound through lane would be added at the Woodinville-Redmond Road NE intersection. The proposed project includes bike lanes, curbs and gutters, and sidewalks along both sides of the road.

The existing roadway profile would be maintained. The existing roadway and bridge would become the westbound lanes, and the new roadway and bridge would become the eastbound lanes. Figure 2 illustrates the proposed project. The roadway lanes would vary in width from 11 to 13 feet. Bike lanes would extend the length of the project corridor on both sides of the road and vary in width from 4 to 5 feet. Sidewalks would also extend the length of the project corridor and vary in width from 5 to 8 feet. The intersections of SR 202 with Woodinville-Redmond Road NE and 131st Avenue NE are both signalized. The signal at the intersection of Woodinville-Redmond Road NE would be upgraded. Project construction is expected to begin in March 2013 and last for 9 months. The majority of construction would occur during daylight hours. A few periods of night work may be necessary to set the bridge girders.

Figure 1. Project Study Area Vicinity Map.

Figure 2. Proposed Project

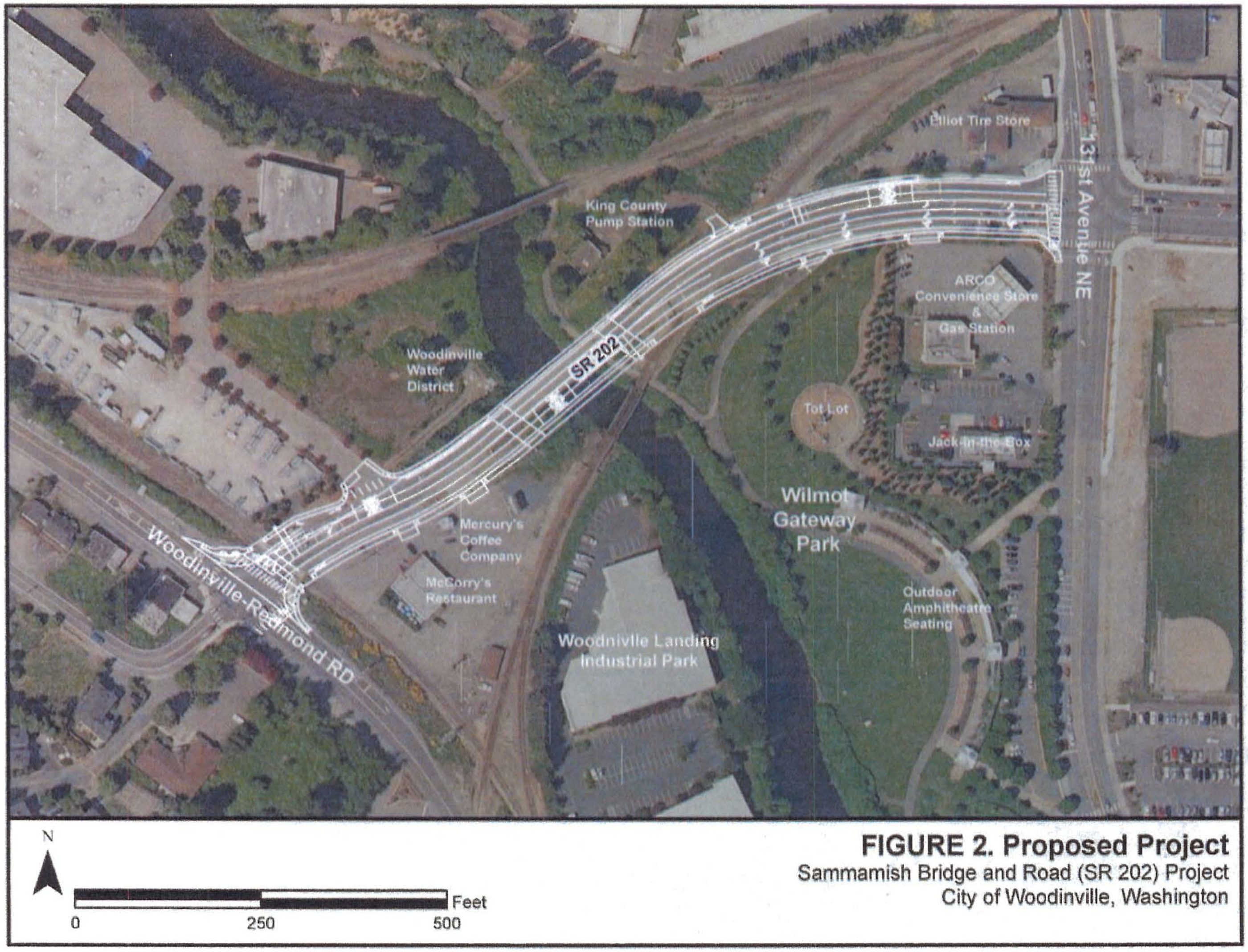


FIGURE 2. Proposed Project
Sammamish Bridge and Road (SR 202) Project
City of Woodinville, Washington

2.0 Air Quality Compliance

2.1 Regulatory Agencies and Regulations

The Environmental Protection Agency's (EPA) Office of Transportation and Air Quality regulates emissions from vehicles, engines, and fuels. The Department of Transportation (DOT) Federal Highway Administration's (FHWA) Air Quality Program provides information and guidance to meet the air quality requirements for transportation projects. In Washington State, the Washington State Department of Ecology (Ecology), and local clean air authorities establish similar regulations at the state and local level governing the concentrations of pollutants in the ambient air, visible emissions, and contaminant emissions from air pollution sources. The Puget Sound Clean Air Agency (PSCA) is a special-purpose, regional agency chartered by state law in 1967 (RCW 70.94) that works in partnership with the EPA and Ecology to regulate air quality in King, Kitsap, Pierce, and Snohomish counties. The Washington State Department of Transportation (WSDOT) Air Quality Program works to improve the air quality in the state by ensuring that transportation projects comply with applicable environmental laws.

EPA and Ecology have established federal and state regulations to evaluate transportation plans, programs, and projects for conformity with federal and state implementation plans for air quality. Federal requirements are provided under Title 40, Part 93 of the Code of Federal Regulations (40 CFR 93) "Determining Conformity of Federal Actions to State or Federal Implementation Plans" and Title 40, Part 51 Subpart T of the Code of Federal Regulations "Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. or the Federal Transit Laws." State requirements are provided under Chapter 173-420 of the Washington Administrative Code (WAC 170-420) "Conformity of Transportation Activities to Air Quality Implementation Plans." The state requirements are at least as stringent as the federal requirements. They clarify state policy and procedures to achieve National Ambient Air Quality Standards (NAAQS), provide a basis for evaluating conformity determinations, and guide state, regional, and local agencies in making conformity determinations.

2.2 Standards and Designations

Air quality is generally assessed against the NAAQS, established under Title 40, Part 50 of the Code of Federal Regulations (40 CFR 50) by EPA as required by the Clean Air Act (CAA). There are two types of NAAQS: primary and secondary. The primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. NAAQS were set for six specific air pollutants called criteria pollutants. The criteria pollutants include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particular matter (PM), and sulfur dioxide (SO_2). In Washington state, Ecology established additional ambient standards for total suspended particulates (TSP) and more stringent standards for SO_2 (Table 1).

Table 1. National and State Ambient Air Quality Standards.

Pollutant	Averaging Period	National Standards [18]		Washington State Standards [19]
		Primary	Secondary	
Carbon Monoxide (CO)	8-hour	9 ppm (10 mg/m³) [1]	None	9 ppm (10 mg/m³) [1]
	1-hour	35 ppm (40 mg/m³) [1]	None	35 ppm (40 mg/m³) [1]
Lead (Pb)	Rolling 3-Month Average	0.15 µg/m³	0.15 µg/m³	None
	Quarterly Average	1.5 µg/m³ [2]	1.5 µg/m³ [2]	None
Nitrogen Dioxide (NO_2)	Annual (Arithmetic Mean)	0.053 ppm (100 µg/m³) [3]	0.053 ppm (100 µg/m³) [3]	0.05 ppm (100 µg/m³) [1]
	1-hour	0.100 ppm [4]	None	None
Particulate Matter (PM10)	Annual (Arithmetic Mean)	None	None	50 µg/m3 [13]
	24-hour	150 µg/m³ [5]	150 µg/m³ [5]	150 µg/m³ [5]
Particulate Matter (PM2.5)	Annual (Arithmetic Mean)	15.0 µg/m³ [6]	15.0 µg/m³ [6]	None
	24-hour	35 µg/m³ [7]	35 µg/m³ [7]	None
Total Suspended Particulate (TSP)	Annual (Geometric Mean)	None	None	60 µg/m³
	24-hour	None	None	150 µg/m³ [1]
Ozone (O_3)	8-hour	0.075 ppm [8,9]	0.075 ppm [8,9]	None
	1-hour (Daily Maximum)	0.12 ppm [10]	0.12 ppm [10]	0.12 ppm (235 mg/m³) [14]
Sulfur Dioxide (SO_2)	Annual (Arithmetic Mean)	0.03 ppm [11]	None	0.02 ppm
	24-hour	0.14 ppm [1,11]	None	0.10 ppm [1]
	3-hour	None	0.5 ppm (1300 µg/m³) [1]	
	1-hour	0.075 ppm [12]	None	0.40 ppm [1] 0.25 ppm [15]
	5-minute	None	None	0.80 ppm [16]

Source(s):

- U.S. Environmental Protection Agency (USEPA). National Ambient Air Quality Standards (NAAQS). August 2011
- Washington State Department of Ecology. Ambient Air Quality Standards in Washington State. April 2010

Note(s):

1 Not to be exceeded more than once per year.

2 Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

3 The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

4 To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

5 Not to be exceeded more than once per year on average over 3 years.

6 To attain this standard, the 3-year average of the weighted annual mean $PM_{2}.5$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

7 To attain this standard, the 3-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).

8 To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

9 (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard and the implementation rules for that standard will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) EPA is in the process of reconsidering these standards (set in March 2008).

10 (a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1.

11 The 1971 sulfur dioxide standards remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

12 Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

13 The 3-year average of annual arithmetic mean concentrations at each monitor within an area is not to be above this level.

14 Not to be above this level on more than 1 day in a calendar year.

15 Not to be above this level more than twice in a consecutive 7-day period.

16 This is the Northwest Clean Air Agency's standard, which applies in Island, Skagit, and Whatcom counties.

17 ppm = parts per million; µg/m3 = micrograms per cubic meter

18 National standard obtained from www.epa.gov/air/criteria.html, updated as of August 4, 2011.

19 Washington state standard obtained from www.ecy.wa.gov/programs/air/sips/pollutants/naaqs.htm "National and State Ambient Air Quality Standards Table", updated as of April 2010

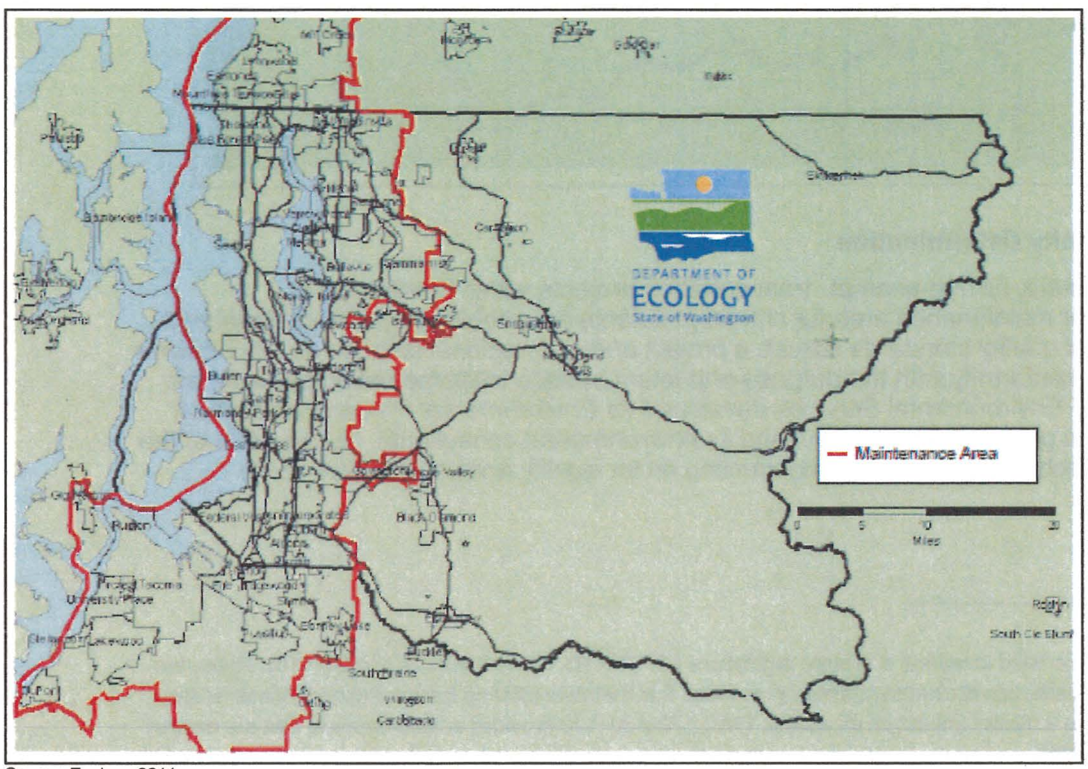
2.3 Area Designation

The CAA requires EPA to designate areas in Washington as "attainment," "nonattainment," or "unclassifiable" based on monitoring information collected over a period of years. Attainment status is a measure of air quality against the ambient air quality standard. A region is designated as an "attainment" area when the standard is met. "Nonattainment" signifies that the air quality in the region exceeds the standard. A region is "unclassifiable" when there is not enough information to designate. Each designation is for a specific standard. An area can be in attainment for one standard and nonattainment or unclassifiable for another.

EPA may redesignate areas from nonattainment to attainment if air monitoring shows that a nonattainment area is meeting the health-based air quality standards. To be redesignated, an area must both meet air quality standards and have a 10-year plan for continuing to meet and maintain air quality standards and other requirements of the CAA. Areas that are redesignated to attainment are called "maintenance areas."

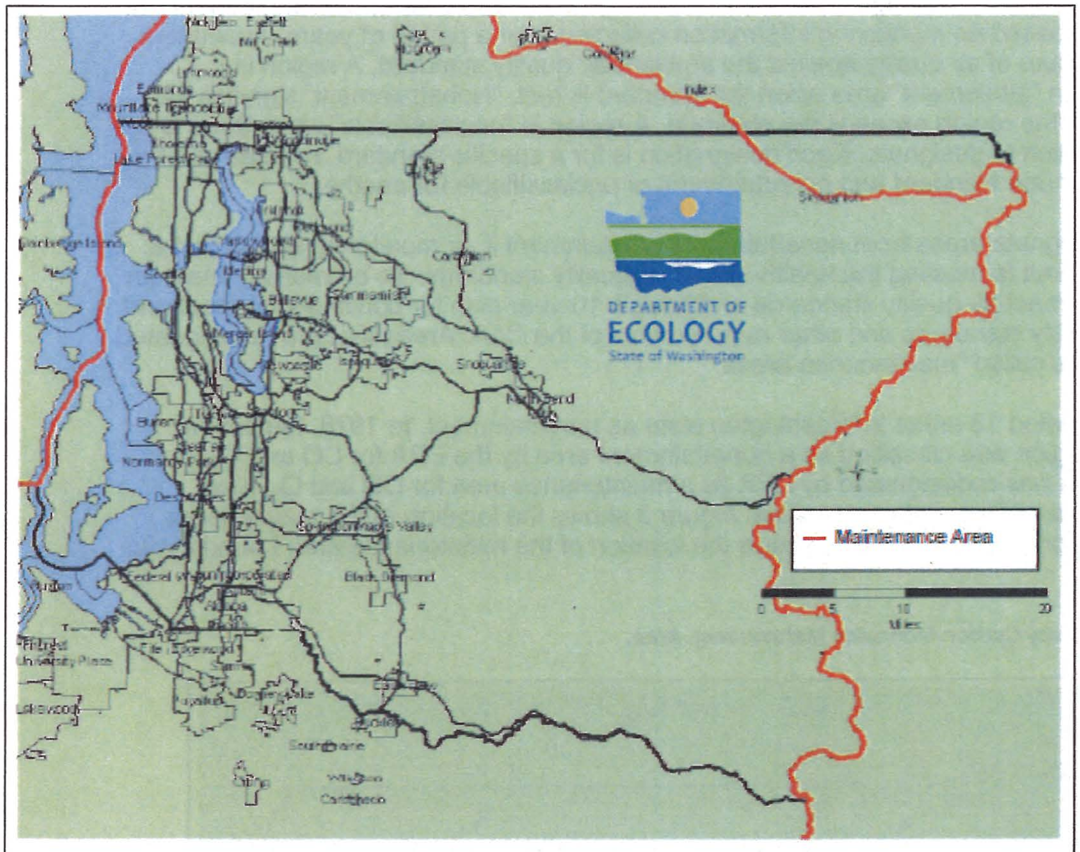
EPA had designated 13 areas in Washington state as nonattainment. In 1978, the central Puget Sound region was classified as a nonattainment area by the EPA for CO and O_3. In 1996, the region was redesignated by EPA as a maintenance area for CO and O_3. King County is a CO and O_3 maintenance area. Figure 3 shows the location of the maintenance area boundary for CO, and Figure 4 shows the location of the maintenance area boundary for O_3.

Figure 3. King County Carbon Monoxide Maintenance Area.



Source: Ecology 2011.

Figure 4. King County Ozone Maintenance Area.



Source: Ecology 2011.

2.4 Conformity Determination

In Washington state, all non-exempt[1] transportation projects within or affecting a nonattainment or maintenance area for criteria pollutants as established in the national and state ambient air quality standards require a project and/or a regional level air quality analysis to demonstrate conformity with the purpose and intent of state implementation plans for air quality. WSDOT Environmental Services developed its *Environmental Procedures Manual* (EPM) to provide guidance for WSDOT and its environmental consultants. Section 425 of the EPM provides technical guidance on conducting an air quality analysis for conformity demonstration.

[1] Exempt projects are listed in federal and state regulations (40 CFR 93.126 and WAC 173-420-110). These are mostly projects outside nonattainment/maintenance areas that maintain existing transportation facilities or are considered to have a neutral impact on air quality. WAC 173-420-120 provides a list of projects that are exempt from regional analysis.

In accordance with the EPM, projects that change traffic flow, increase capacity and/or traffic lanes, or add traffic signals within CO nonattainment or maintenance areas require a quantitative analysis of CO emissions at the project level. A project-level analysis is conducted via a "hot-spot analysis." A hot-spot analysis is an estimate of likely future localized pollutant concentrations and a comparison of those concentrations to the ambient air quality standards. It assesses impacts in and around the project on a scale smaller than the entire nonattainment or maintenance area, such as congested roadway intersections and highways or transit terminals, and uses an air quality dispersion model to determine the effects of emissions on air quality. As specified in the EPM, all intersections affected by the project that are at (or will be at) Level of Service[2] (LOS) D, E, or F must be evaluated.

Regionally significant[3] projects within CO, O_3, or PM_{10} nonattainment or maintenance areas must be analyzed for regional air emissions of the applicable pollutant for which the area is designated nonattainment or maintenance. The regional analysis is usually conducted by the local metropolitan planning organization (MPO) or a regional transportation planning organization (RTPO) when they develop their metropolitan transportation improvement program (MTIP) or regional transportation improvement program (RTIP). However, if a project is part of a conforming TIP and the scope of the project has not changed since the TIP was found to conform, a separate regional analysis is not required.

The EPM also identifies projects that are located in an O_3 nonattainment or maintenance area. No project-level analysis for O_3 is required as the one-hour O_3 standard has been revoked.

In addition, a mobile source air toxics (MSATs) analysis is required regardless of whether the project is in a maintenance or nonattainment area or is exempt from a project-level hot-spot analysis. MSATs are a group of chemicals that EPA has prioritized to reduce in transportation projects. These chemicals are known to adversely affect human health. The FHWA provides guidance to determine if a quantitative or qualitative analysis is required. In general, a quantitative analysis is required for projects or facilities with average annual daily traffic (AADT) greater than 140,000 vehicles or where there is potential for a substantial increase in the number of diesel vehicles using a roadway as a result of the project. Otherwise, qualitative analysis is sufficient.

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[2] The LOS is a qualitative measure of the traffic operations at an intersection or along a roadway segment. The LOS is ranked from LOS A, which signifies little or no congestion (i.e., very good traffic operations), to LOS F, which signifies substantial congestion (i.e., very poor traffic operations). As a general principle, in Washington state an affected intersection is one on which the change in total traffic volumes is at or above 10 percent.

[3] Regionally significant projects are those that serve regional transportation needs, major activity centers in the region, major planned developments, or transportation terminals and most terminals themselves. Such projects are normally included in the modeling of a metropolitan area's transportation network, including, at a minimum, all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel (40 CFR 93.101).

3.0 Air Quality Analysis

3.1 Approach

The project study area is within a CO and O_3 maintenance area. Therefore, a project-level quantitative CO hot-spot analysis is required for this project. No project-level analysis for O_3 is required as the one-hour O_3 standard has been revoked. At the regional level, the project is part of the PSRC TIP, Transportation 2040 (PSRC 2010). A regional air quality analysis was conducted for the TIP to demonstrate air quality conformity and was adopted on May 20, 2010 (PSRC 2010). Since the design concept[4] and scope[5] of the project have not changed since the TIP was found to conform, a separate regional air quality analysis for the project is not needed. Also, the project would result in a traffic volume of less than 140,000 AADT. Therefore, a qualitative MSAT analysis is sufficient.

3.2 CO Hot-Spot Analysis

3.2.1 Analysis Model

A project-level quantitative CO hot-spot analysis was performed. The analysis was performed using the WSDOT Washington State Intersection Screening Tool (WASIST) Version 2.0. WASIST is a screening model used to determine worst-case CO concentrations at signalized intersections throughout Washington state. The results from WASIST are based on the EPA-approved models MOBILE6 version 2.03 and CAL3QHC. If the results from WASIST are within the NAAQS for CO, no further CO modeling is required for the intersection. If the results from WASIST indicate that the project may cause a NAAQS violation, a detailed analysis is required to more accurately evaluate potential CO levels (WSDOT 2009a,b).

3.2.2 Inputs and Assumptions

The use of WASIST requires input of project-specific information such as project location, traffic data, and intersection design. The best available information was used in the analysis. Where data were not available or limitations of the model were encountered, assumptions were made to best depict the scenario of interest. The following subsections provide more details on the inputs and assumptions made.

Intersections, Alternatives, and Years of Analysis

As described above in Section 2.4, all intersections affected by a project that are at (or will be at) LOS D, E, of F, must be evaluated. A traffic analysis which included LOS determinations for

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[4] Design concept means the type of facility identified by the project (e.g., freeway, expressway, arterial highway, reserved right-of-way rail transit, mixed traffic rail transit, or exclusive busway).

[5] Design scope means design aspects that will affect the proposed facility's impact on regional emissions, usually as they relate to vehicle or person carrying capacity and control (e.g., number of lanes or tracks to be constructed or added, length of project, signalization, access control [including approximate number and location of interchanges], or preferential treatment of high-occupancy vehicles.

the project intersections was conducted for this project in 2008 (AECOM 2008); however, existing LOS for the project intersections is not available. The project study area includes two intersections. They are SR 202 (NE 175th Street)/Woodinville-Redmond Road NE/127th Place NE (referred to as SR 202 & Woodinville-Redmond Road NE), and SR 202 (aka NE 175th Street) & 131st Avenue NE (see Figure 2). Because existing LOS determinations for these intersections are not available, both intersections were evaluated in this analysis. Modeling was performed for each intersection for 3 years and two alternatives, resulting in a total of ten scenarios for analysis (Table 2). The 3 years include the existing year of 2011, opening year of 2014, and horizon year of 2040. The two alternatives include the No Build Alternative and Build Alternative. Under the No Build Alternative, the project study area will remain exactly as it is today. Under the Build Alternative, the project study area will be modified as described in Sections 1.2, 1.3, and 1.4.

Table 2. CO Hot-Spot Analysis Scenarios.

Scenario	Intersection	Year	Alternative
1	SR 202 & Woodinville-Redmond Road NE	Existing (2011)	No Build
2		Opening Year (2014)	Build
3			No Build
4		Horizon Year (2040)	Build
5			No Build
6	SR 202 & 131st Avenue NE	Existing (2011)	No Build
7		Opening Year (2014)	Build
8			No Build
9		Horizon Year (2040)	Build
10			No Build

Background CO Concentration

The best available air quality data for King County were obtained from the *2009 Air Quality Data Summary* (PSCAA 2011). The report indicates that the maximum 8-hour concentration for CO in 2009 was 2.7 parts per million (ppm). Using a conservative approach, a CO concentration of 3.0 ppm was used for all scenarios in our analysis, as suggested in the *WASIST Version 2.0 User's Manual* (WSDOT 2009b).

Location and I/M Program

The Puget Sound region of King County was selected as the location of analysis. Also, Washington has a statewide vehicle inspection and maintenance (I/M) program. Therefore, a vehicle and inspection and maintenance program was indicated as being present at the location of analysis.

Intersection Surroundings

The intersection surroundings may change over the years. Therefore, using a conservative approach, a smooth surface was selected for all scenarios in the analysis.

Intersection Type

A two-lane by two-lane four-way intersection with four left turns was used in all scenarios. Under the No Build Alternative, vehicles are prohibited from turning left from 127th Place NE onto Woodinville-Redmond Road at the SR 202 & Woodinville-Redmond Road NE intersection (see Figure 2). Since WASIST does not provide an option to indicate a prohibited left turn, a value of 3 vehicles per hours (vph) was used as the traffic volume for the turn to best represent this traffic pattern. 3 vph is the minimum value allowed for entry into WASIST. This conservative approach overestimates emissions at the intersection.

Intersection Volume

Intersection traffic volumes were calculated for each lane, each leg, each intersection, and each year of interest. The best available traffic data were obtained from the *SR 202 Traffic Analysis Report, Sammamish Bridge and Road (SR 202) Project* (AECOM 2008). The report includes traffic data from years 2007, 2012, 2017, and 2022. Since the years of traffic data provided in the report do not align with the years of interest in the analysis, the following assumptions and projections were made. In the analysis, traffic data for the existing year of 2011 was assumed to be the same as year 2012. Traffic data for the opening year of 2014 were interpolated from traffic data from year 2012 and year 2017. Also, traffic data for the horizon year of 2040 were extrapolated from traffic data from year 2007 and year 2022. Traffic volumes were assumed to be the same under the No Build Alternative and Build Alternative.

Intersection Approach Speeds

Intersection approach speeds for each intersection were obtained from the *SR 202 Traffic Analysis Report, Sammamish Bridge and Road (SR 202) Project* (AECOM 2008). They are assumed to be the same for all scenarios.

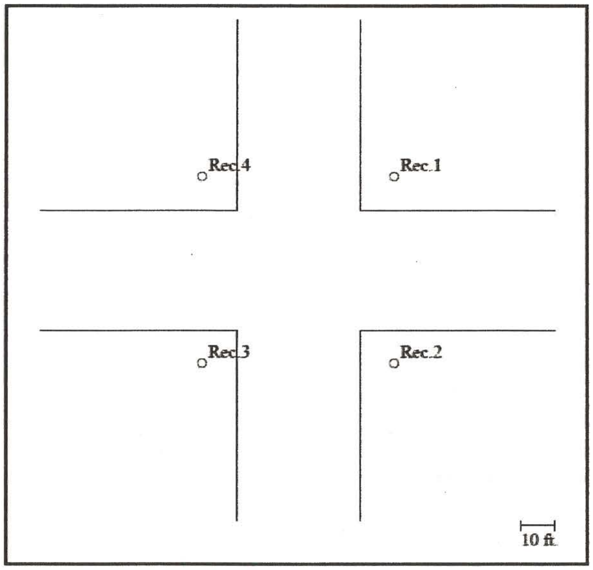
Intersection Signal Timing

Intersection signal times for each intersection under the No Build Alternative and Build Alternative were obtained from the *SR 202 Traffic Analysis Report, Sammamish Bridge and Road (SR 202) Project* (AECOM 2008). They are assumed to be the same for all years of interest under each alternative.

Receptor Inputs

One receptor was assigned to each quadrant at each intersection to represent all receptors surrounding the intersection. Using a conservative approach, the closest distance of 10 feet was used for all receptors in all scenarios (Figure 5. Receptor Locations).

Figure 5. Receptor Locations.



3.2.3 MSAT Analysis

A project-level qualitative MSAT analysis was also conducted. The analysis was conducted in accordance with the *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* developed by the FHWA (USDOT and FHWA 2009). The guidance is considered the best practice for determining the appropriate level of MSAT analysis for transportation projects (USDOT and FHWA 2010). The qualitative analysis compared, in a narrative form, the MSAT impacts from the alternatives considered. Example language from Appendix B of the guidance document was used for this analysis.

4.0 Air Quality Impacts

4.1 Long-Term Impacts

Long-term impacts include changes in CO and MSAT concentrations after construction of the project. CO and MSAT impacts are described in more detail in the following subsections.

4.1.1 CO Hot-Spot Impacts

Table 3 shows the 1-hour and 8-hour CO concentrations calculated from the CO hot-spot analysis for the scenarios as described in Table 2. None of the scenarios resulted in a 1-hour or 8-hour CO concentration that exceeds the national or state ambient air quality standard. Also, the 1-hour and 8-hour CO concentrations for the Build Alternative are not higher than the No Build Alternative. Therefore, the modeling results confirm that the Build Alternative would not cause any air quality impacts in areas adjacent to the two intersections. Detailed analysis results are provided in Appendix A.

Table 3. CO Hot-Spot Analysis Results

Year	No Build Alternative		Build Alternative		Ambient Air Standard			
					National Standard[1]		Washington State[2]	
	1-hour (ppm)	8-hour (ppm)	1-hour (ppm)	8-hour (ppm)	1-hour (ppm)	8-hour (ppm)	1-hour (ppm)	8-hour (ppm)
SR 202 & Woodinville-Redmond Road NE								
Existing (2011)	5.7	4.9	NA	NA	35	9	35	9
Opening Year (2014)	5.4	4.7	5.1	4.5				
Horizon Year (2040)	6.1	5.2	6.1	5.2				
SR 202 & 131st Avenue NE								
Existing (2011)	7.4	6.1	NA	NA	35	9	35	9
Opening Year (2014)	6.6	5.5	6.6	5.5				
Horizon Year (2040)	7.5	6.2	7.5	6.2				

[1] USEPA 2011.
[2] Ecology 2010.

4.1.2 MSAT Impacts

The amount of MSAT emitted would be proportional to the vehicle miles traveled (VMT), assuming that the other variables such as vehicle mix are the same for the No Build Alternative and Build Alternative. The VMT for the Build Alternative was assumed to be higher than that for the No Build Alternative 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. However, the emissions increase may be offset by lower MSAT emission rates due to increased speeds. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models. Also, 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 vehicle 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 may have the effect of moving some traffic closer to nearby businesses and recreational facilities. Therefore, there may be localized areas where ambient concentrations of MSAT could be higher under the Build Alternative than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced at the two intersections SR 202 & Woodinville-Redmond Road NE and SR 202 & 131st Avenue NE. However, the magnitude and the duration of these potential increases compared with the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway 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 due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, 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 substantially lower than today.

4.2 Temporary Impacts

During construction of the project, temporary air quality impacts would include emissions from the operation of construction equipment and vehicles, and fugitive dust, particulates, and odors from construction activities. These emissions would be temporary and localized. It is highly unlikely that the temporary emissions would cause ambient concentrations to approach the national or state ambient air quality standards in the vicinity of the project study area.

4.2.1 Emissions from Construction Equipment and Vehicles

Mobile construction equipment and portable stationary engines would include an asphalt batch plant or a concrete batch plant. Also, diesel- and gasoline-powered vehicles and equipment would be used to transport workers, soils, and materials to the site for construction activities. These activities would generate emissions such as volatile organic compounds (VOCs), CO, SO_X, NO_X, and PM.

4.2.2 Fugitive Dust and Particulates

Construction activities such as demolition, earth-moving, and paving tasks would generate fugitive dust and particulate matter. Fugitive dust emissions during construction would be temporary and localized. The PSCAA regulations (PSCAA Rule 1, Section 9.15) require all construction operations to employ Best Available Control Technology (BACT) to minimize fugitive dust emissions (as summarized in Section 6.2).

4.2.3 Odors

Asphalt installation and paint striping operations would emit small amounts of odor-causing compounds. Odor impacts will be temporary and limited to the immediate vicinity of the construction site.

5.0 Air Quality Conformity

In conclusion, the proposed project demonstrates conformity with the purpose and intent of state implementation plans for air quality for two reasons. First, modeling of CO concentrations at both intersections in the project study area shows that the project would not cause CO concentrations to exceed the national or state ambient air quality standards, or increase when compared to the No Build Alternative. Second, the project is part of the PSRC TIP, Transportation 2040 (PSRC 2007). A regional air quality analysis was conducted for the TIP to demonstrate air quality conformity, and adopted on May 20, 2010. Since the design concept and scope of the project have not changed since the TIP was found to conform, a separate regional air quality analysis for the project is not needed.

6.0 Measures Taken to Avoid or Minimize Project Effects

6.1 Project Operation

The project demonstrates air quality conformity. Also, the Build Alternative does not result in an increase in CO concentrations. Therefore, no CO mitigation measures are recommended.

6.2 Construction

During construction, impacts on air quality would be reduced and controlled through the implementation of best management practices (BMPs). The following is a list of potential BMPs that would be implemented.

- Turn off vehicles and equipment when not in use to reduce idling time.
- Install BACT emission controls on temporary portable stationary construction equipment.
- Spray exposed soil with water or other suppressant to reduce emissions of and the deposition of particulate matter.
- Minimize dust emissions during the transport of fill material or soil by wetting down or covering the load.
- Promptly clean up spills of transported material on public roads.
- Schedule hauling and other work tasks to minimize congestion of existing vehicle traffic.
- Locate construction equipment and truck staging areas away from residences as practical, and in consideration of potential effects on other resources.
- Provide wheel washers to remove particulate matter that would otherwise be carried off site by construction vehicles.
- Cover dirt, gravel, and debris piles, as needed, to reduce dust and wind-blown debris.
- Minimize on-site odors by covering loads of hot asphalt.
- Maintain construction equipment in good mechanical condition to minimize exhaust emissions.
- Work with the contractor to establish equipment staging areas and material transfer sites so as to reduce the amount of time the engines of heavy equipment are running while waiting, thus reducing fuel usage and emissions.
- Develop and implement a project-specific spill prevention, control, and countermeasure (SPCC) plan and a temporary erosion and sediment control (TESC) plan).

7.0 References

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Appendix A

CO Hot-Spot Analysis WASIST Results

Washington State Intersection Screening Tool 2.0

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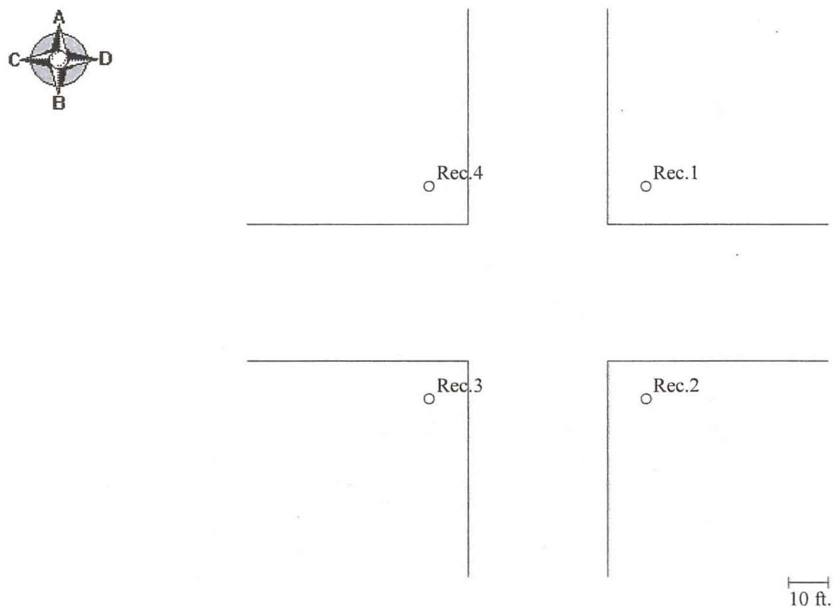
Sammamish River Bridge and Road (SR 202) Project

Description:	**SR 202 & Woodinville-Redmond Road NE - 2011 No Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: Woodinville Redmond Road NE C-D: SR 202**



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	5.7	4.9	Pass
2	2	10	10	5.3	4.6	Pass
3	3	10	10	4.9	4.3	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 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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

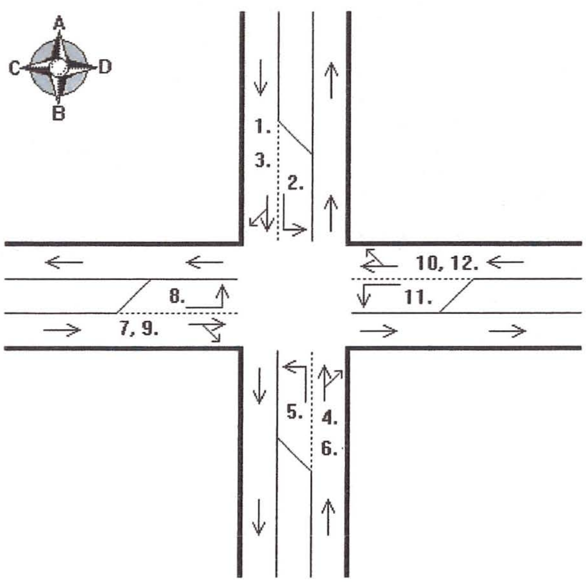
Sammamish River Bridge and Road (SR 202) Project

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	38
2	A-D Left Turn	355
3	A-C Right Turn	5
4	B-A Thru	82
5	B-C Left Turn	20
6	B-D Right Turn	350
7	C-D Thru	450
8	C-A Left Turn	3
9	C-B Right Turn	10
10	D-C Thru	215
11	D-B Left Turn	135
12	D-A Right Turn	287



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
Model Year: **2011**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **74.97**

Approach	Speed (mph)	EF (g/mile)
Leg A	**25**	**7.00**
Leg B	**35**	**6.73**
Leg C	**35**	**6.73**
Leg D	**35**	**6.73**

***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): **110**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**57**
Leg A Left Turn	**80**
Leg B Thru & Rt	**91**
Leg B Left Turn	**91**
Leg C Thru & Rt	**72**
Leg C Left Turn	**1**
Leg D Thru & Rt	**61**
Leg D Left Turn	**61**

Washington State Intersection Screening Tool 2.0

USER COMMENTS

Sammamish River Bridge and Road (SR 202) Project

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User Comments:

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Sammamish River Bridge and Road (SR 202) Project

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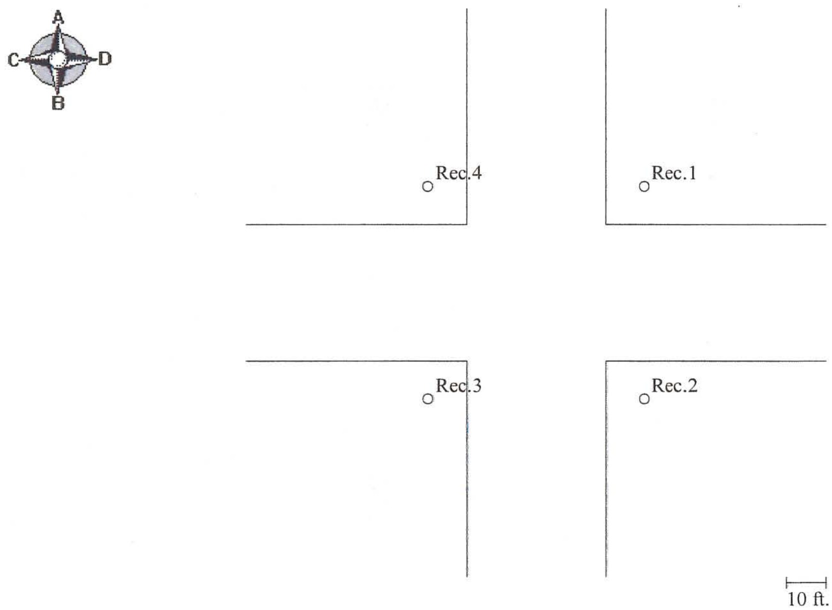
Description:	**SR 202 & Woodinville-Redmond Road NE - 2014 No Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: Woodinville Redmond Road NE C-D: SR 202**



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	4.9	4.3	Pass
3	3	10	10	4.6	4.1	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 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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

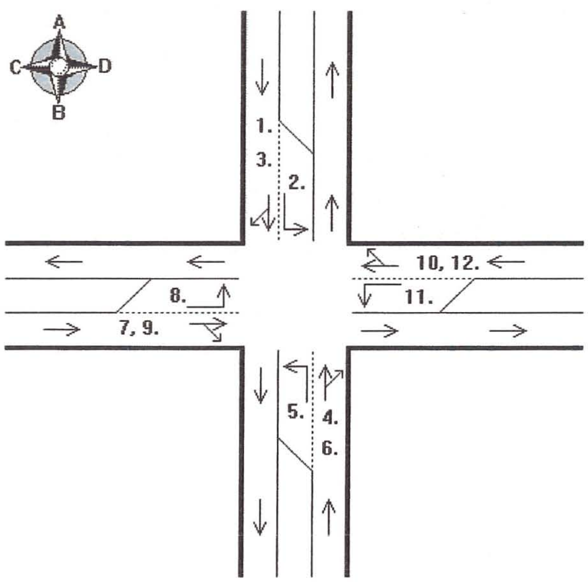
Sammamish River Bridge and Road (SR 202) Project

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	38
2	A-D Left Turn	385
3	A-C Right Turn	5
4	B-A Thru	80
5	B-C Left Turn	20
6	B-D Right Turn	367
7	C-D Thru	490
8	C-A Left Turn	3
9	C-B Right Turn	10
10	D-C Thru	237
11	D-B Left Turn	142
12	D-A Right Turn	315



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
Model Year: **2014**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **61.53**

Approach	Speed (mph)	EF (g/mile)
Leg A	**25**	**5.83**
Leg B	**35**	**5.62**
Leg C	**35**	**5.62**
Leg D	**35**	**5.62**

***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): **110**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**57**
Leg A Left Turn	**80**
Leg B Thru & Rt	**91**
Leg B Left Turn	**91**
Leg C Thru & Rt	**72**
Leg C Left Turn	**1**
Leg D Thru & Rt	**61**
Leg D Left Turn	**61**

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Washington State Intersection Screening Tool 2.0

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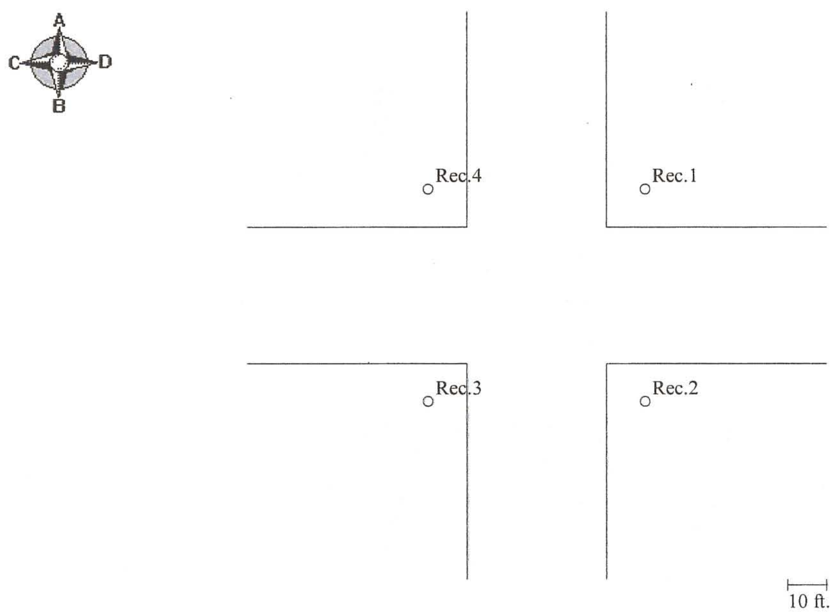
Sammamish River Bridge and Road (SR 202) Project

Description:	**SR 202 & Woodinville-Redmond Road NE - 2014 Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: Woodinville Redmond Road NE C-D: SR 202**



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	4.8	4.3	Pass
3	3	10	10	4.6	4.1	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 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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

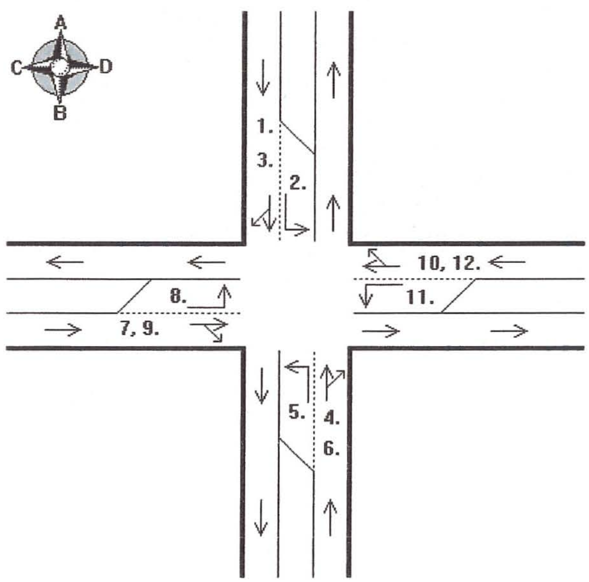
Sammamish River Bridge and Road (SR 202) Project

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	**A-B Thru**	**38**
2	**A-D Left Turn**	**385**
3	**A-C Right Turn**	**5**
4	**B-A Thru**	**80**
5	**B-C Left Turn**	**20**
6	**B-D Right Turn**	**367**
7	**C-D Thru**	**490**
8	**C-A Left Turn**	**3**
9	**C-B Right Turn**	**10**
10	**D-C Thru**	**237**
11	**D-B Left Turn**	**142**
12	**D-A Right Turn**	**315**



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
Model Year: **2014**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **61.53**

Approach	Speed (mph)	EF (g/mile)
Leg A	25	5.83
Leg B	35	5.62
Leg C	35	5.62
Leg D	35	5.62

***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	**66**
Leg A Left Turn	**66**
Leg B Thru & Rt	**94**
Leg B Left Turn	**94**
Leg C Thru & Rt	**70**
Leg C Left Turn	**70**
Leg D Thru & Rt	**62**
Leg D Left Turn	**62**

Washington State Intersection Screening Tool 2.0

USER COMMENTS

Sammamish River Bridge and Road (SR 202) Project

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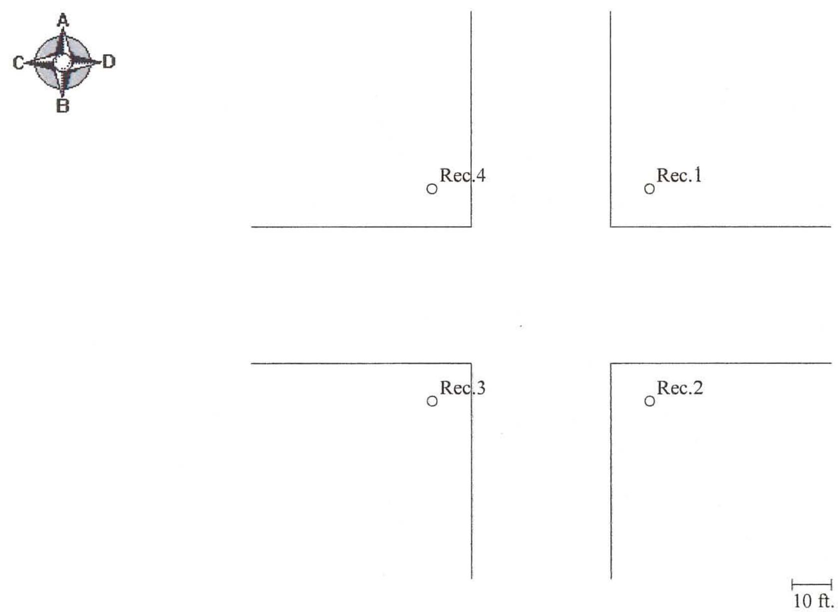
Sammamish River Bridge and Road (SR 202) Project

Description:	**SR 202 & Woodinville-Redmond Road NE - 2040 No Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: Woodinville Redmond Road NE C-D: SR 202**



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**	**5.9**	**5.0**	**Pass**
3	**3**	**10**	**10**	**6.1**	**5.2**	**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 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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

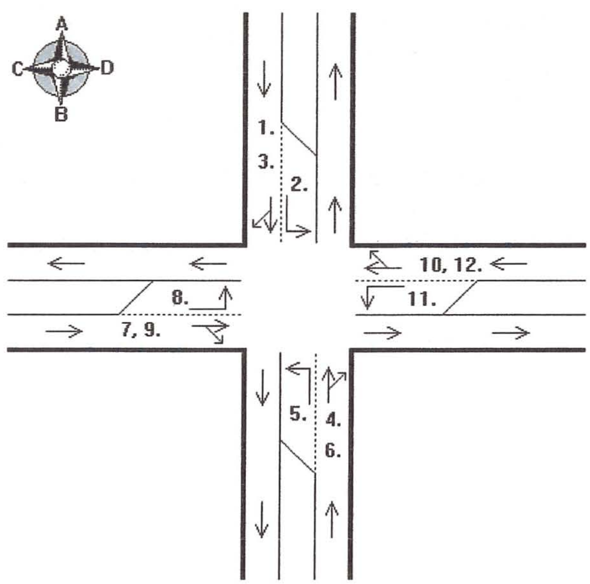
Sammamish River Bridge and Road (SR 202) Project

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	29
2	A-D Left Turn	691
3	A-C Right Turn	5
4	B-A Thru	63
5	B-C Left Turn	20
6	B-D Right Turn	546
7	C-D Thru	921
8	C-A Left Turn	5
9	C-B Right Turn	10
10	D-C Thru	467
11	D-B Left Turn	219
12	D-A Right Turn	604



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
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	**25**	**6.17**
Leg B	**35**	**5.90**
Leg C	**35**	**5.90**
Leg D	**35**	**5.90**

***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): **110**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**57**
Leg A Left Turn	**80**
Leg B Thru & Rt	**91**
Leg B Left Turn	**91**
Leg C Thru & Rt	**72**
Leg C Left Turn	**1**
Leg D Thru & Rt	**61**
Leg D Left Turn	**61**

User Comments:

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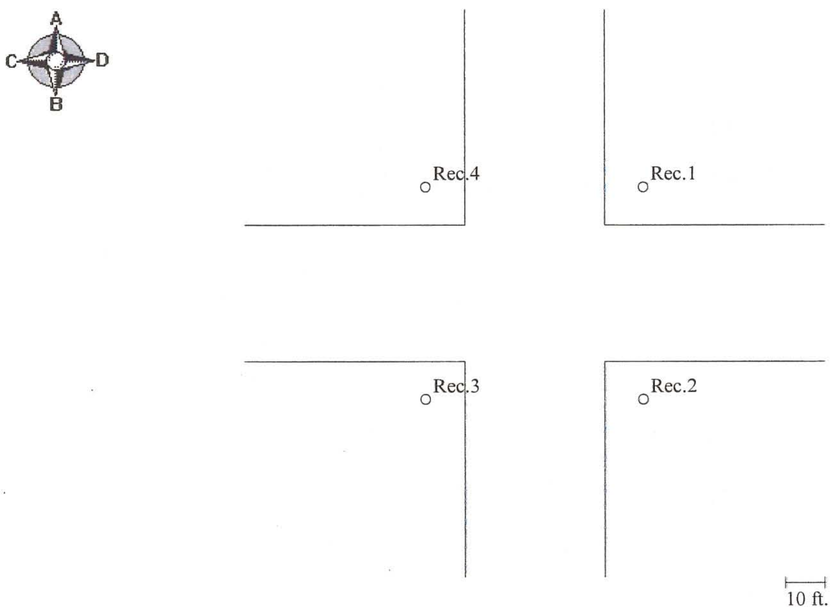
Sammamish River Bridge and Road (SR 202) Project

Description:	**SR 202 & Woodinville-Redmond Road NE - 2040 Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: Woodinville Redmond Road NE C-D: SR 202**



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	5.7	4.9	**Pass**
3	3	10	10	6.1	5.2	**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 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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

Sammamish River Bridge and Road (SR 202) Project

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Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
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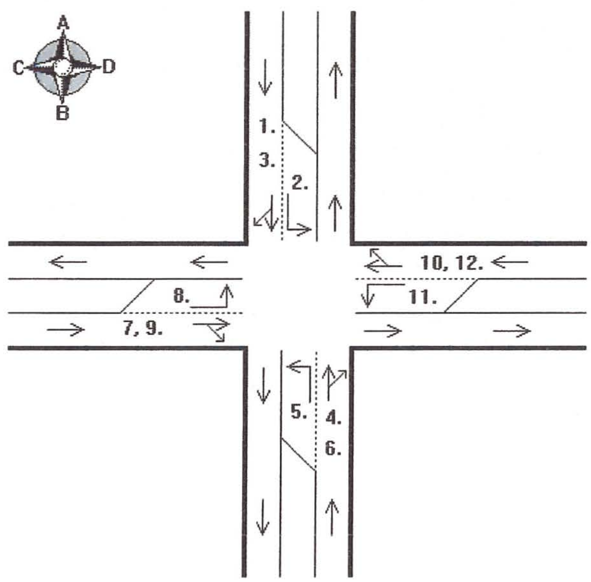

CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
Model Year: **2040**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

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Approach	Speed (mph)	EF (g/mile)
Leg A	**25**	**6.17**
Leg B	**35**	**5.90**
Leg C	**35**	**5.90**
Leg D	**35**	**5.90**

***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	**66**
Leg A Left Turn	**66**
Leg B Thru & Rt	**94**
Leg B Left Turn	**94**
Leg C Thru & Rt	**70**
Leg C Left Turn	**70**
Leg D Thru & Rt	**62**
Leg D Left Turn	**62**

User Comments:

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Washington State Intersection Screening Tool 2.0

09-22-11

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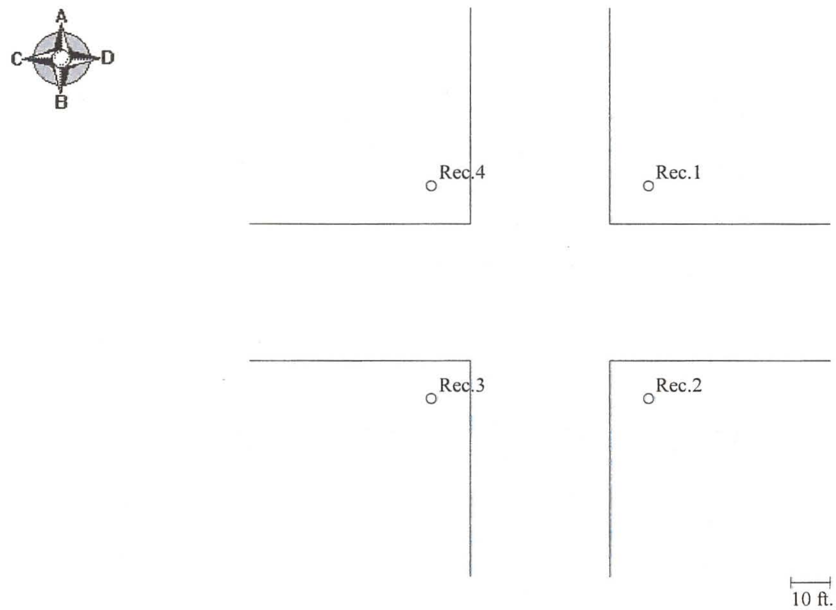
Sammamish River Bridge and Road (SR 202) Project

Description:	**SR 202 & 131st Avenue NE - 2011 No Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: SR 202 C-D: 131st Avenue 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**	**6.6**	**5.5**	**Pass**
2	**2**	**10**	**10**	**7.0**	**5.8**	**Pass**
3	**3**	**10**	**10**	**7.4**	**6.1**	**Pass**
4	**4**	**10**	**10**	**6.8**	**5.7**	**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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

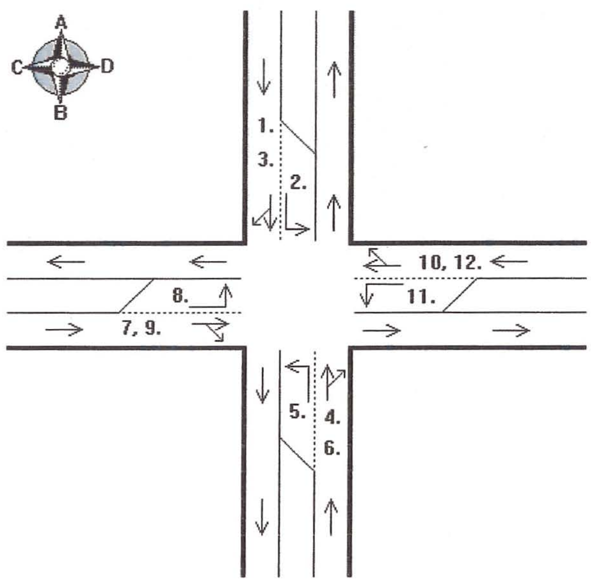
Sammamish River Bridge and Road (SR 202) Project

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	**A-B Thru**	**448**
2	**A-D Left Turn**	**317**
3	**A-C Right Turn**	**210**
4	**B-A Thru**	**458**
5	**B-C Left Turn**	**93**
6	**B-D Right Turn**	**17**
7	**C-D Thru**	**400**
8	**C-A Left Turn**	**668**
9	**C-B Right Turn**	**43**
10	**D-C Thru**	**360**
11	**D-B Left Turn**	**25**
12	**D-A Right Turn**	**457**



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
Model Year: **2011**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **74.97**

Approach	Speed (mph)	EF (g/mile)
Leg A	**25**	**7.00**
Leg B	**35**	**6.73**
Leg C	**35**	**6.73**
Leg D	**35**	**6.73**

***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): **110**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**83**
Leg A Left Turn	**96**
Leg B Thru & Rt	**90**
Leg B Left Turn	**84**
Leg C Thru & Rt	**54**
Leg C Left Turn	**82**
Leg D Thru & Rt	**78**
Leg D Left Turn	**74**

User Comments:

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Washington State Intersection Screening Tool 2.0

09-22-11
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Sammamish River Bridge and Road (SR 202) Project

EXHIBIT 9
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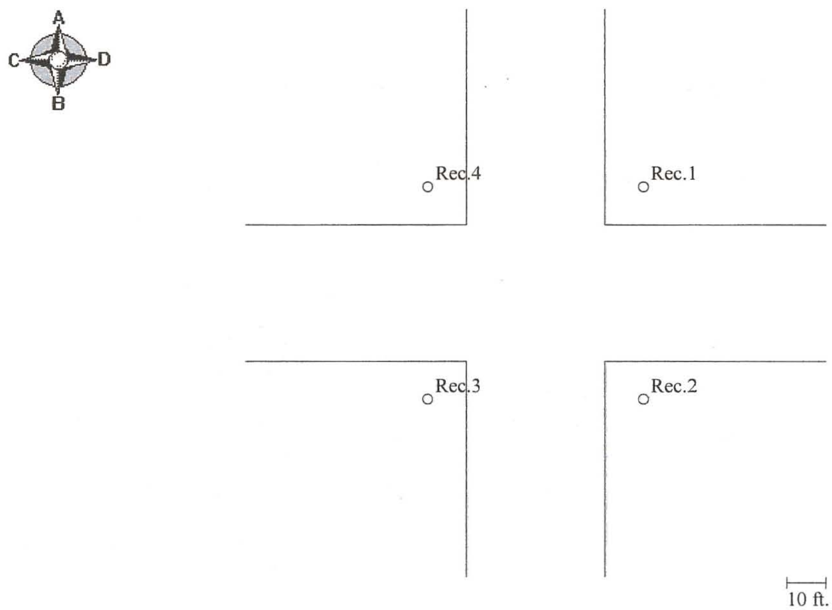
Description:	**SR 202 & 131st Avenue NE - 2014 No Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: SR 202 C-D: 131st Avenue NE**



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**	**6.4**	**5.4**	**Pass**
3	**3**	**10**	**10**	**6.6**	**5.5**	**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 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.

USER INPUTS

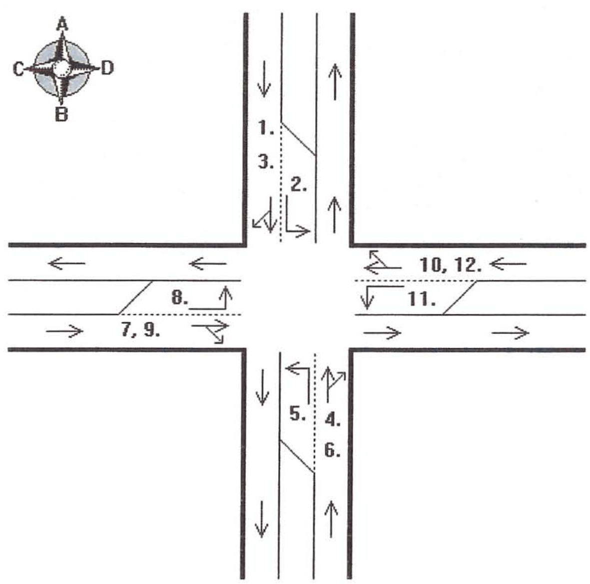
Sammamish River Bridge and Road (SR 202) Project

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	**A-B Thru**	**427**
2	**A-D Left Turn**	**320**
3	**A-C Right Turn**	**248**
4	**B-A Thru**	**427**
5	**B-C Left Turn**	**95**
6	**B-D Right Turn**	**15**
7	**C-D Thru**	**420**
8	**C-A Left Turn**	**760**
9	**C-B Right Turn**	**42**
10	**D-C Thru**	**388**
11	**D-B Left Turn**	**22**
12	**D-A Right Turn**	**450**



Washington State Intersection Screening Tool 2.0

USER INPUTS continued...

Sammamish River Bridge and Road (SR 202) Project

EXHIBIT 9
PAGE 53 OF 66

CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
Model Year: **2014**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **61.53**

Approach	Speed (mph)	EF (g/mile)
Leg A	**35**	**5.62**
Leg B	**30**	**5.60**
Leg C	**35**	**5.62**
Leg D	**30**	**5.60**

***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): **110**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**83**
Leg A Left Turn	**96**
Leg B Thru & Rt	**90**
Leg B Left Turn	**84**
Leg C Thru & Rt	**54**
Leg C Left Turn	**82**
Leg D Thru & Rt	**78**
Leg D Left Turn	**74**

USER COMMENTS

Sammamish River Bridge and Road (SR 202) Project

User Comments:

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Washington State Intersection Screening Tool 2.0

09-22-11
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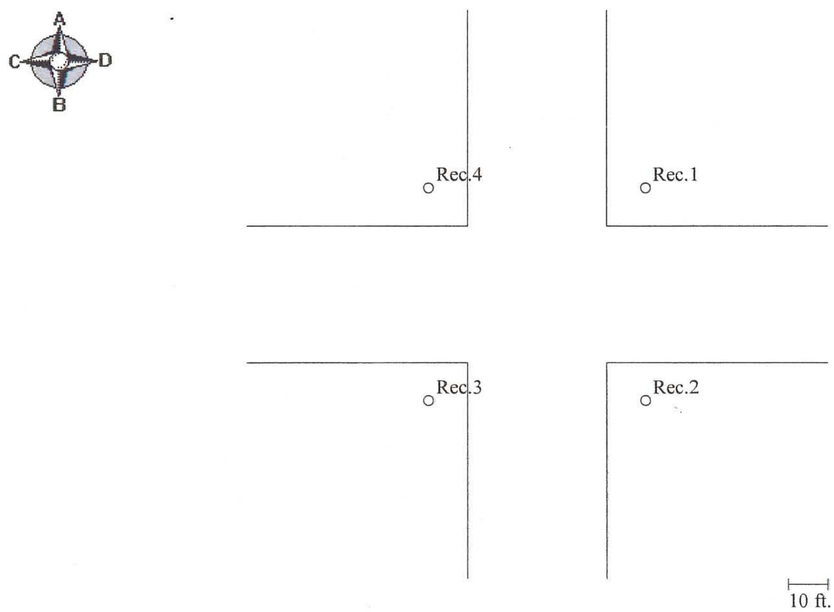
Sammamish River Bridge and Road (SR 202) Project

Description:	**SR 202 & 131st Avenue NE - 2014 Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: SR 202 C-D: 131st Avenue 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	6.5	5.4	Pass
3	3	10	10	6.6	5.5	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 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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

Sammamish River Bridge and Road (SR 202) Project

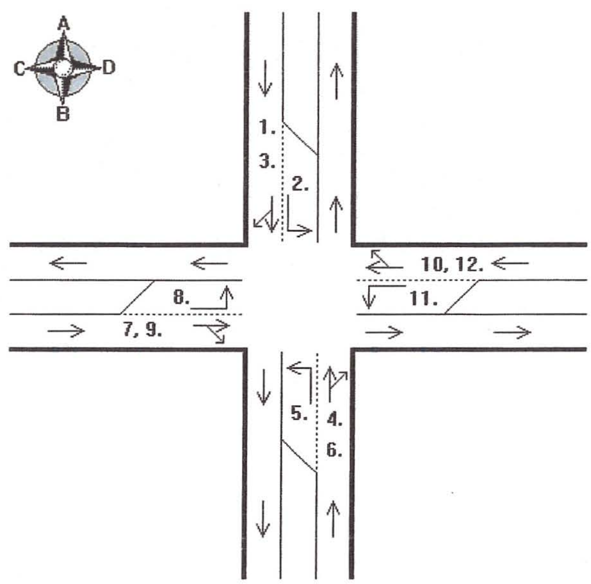
EXHIBIT 9
PAGE 50 OF 66

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	427
2	A-D Left Turn	320
3	A-C Right Turn	248
4	B-A Thru	427
5	B-C Left Turn	95
6	B-D Right Turn	15
7	C-D Thru	420
8	C-A Left Turn	760
9	C-B Right Turn	42
10	D-C Thru	388
11	D-B Left Turn	22
12	D-A Right Turn	450



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
Model Year: **2014**
Gasoline sulfur content of 30 ppm for all model years.

MOBILE6.2 CO Emission Factors:

Idle Emission Factor (g/hr): **61.53**

Approach	Speed (mph)	EF (g/mile)
Leg A	**35**	**5.62**
Leg B	**30**	**5.60**
Leg C	**35**	**5.62**
Leg D	**30**	**5.60**

***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	**95**
Leg A Left Turn	**106**
Leg B Thru & Rt	**104**
Leg B Left Turn	**98**
Leg C Thru & Rt	**50**
Leg C Left Turn	**82**
Leg D Thru & Rt	**85**
Leg D Left Turn	**82**

User Comments:

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Washington State Intersection Screening Tool 2.0

09-22-11
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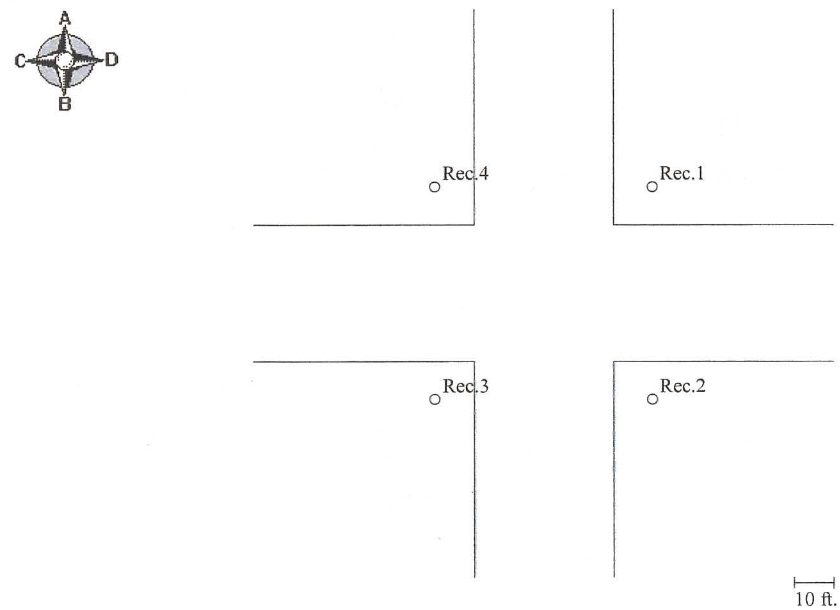
Sammamish River Bridge and Road (SR 202) Project

Description:	**SR 202 & 131st Avenue NE - 2040 No Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: SR 202 C-D: 131st Avenue 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**	**6.9**	**5.7**	**Pass**
2	2	**10**	**10**	**7.0**	**5.8**	**Pass**
3	3	**10**	**10**	**7.5**	**6.2**	**Pass**
4	4	**10**	**10**	**6.8**	**5.7**	**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.

Washington State Intersection Screening Tool 2.0

USER INPUTS

Sammamish River Bridge and Road (SR 202) Project

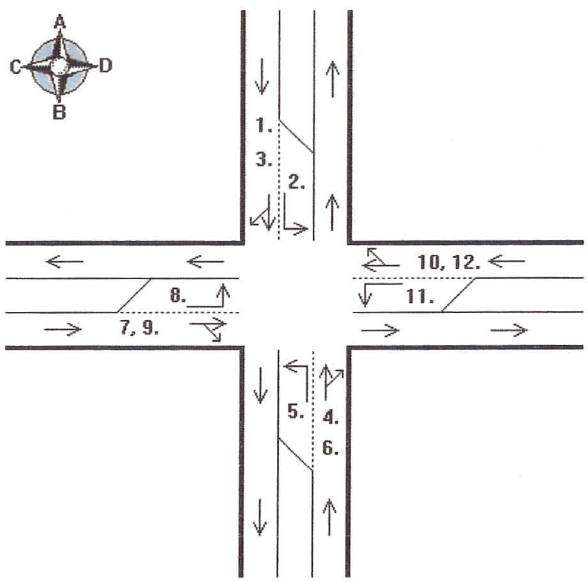
EXHIBIT 9
PAGE 60 OF 66

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	**A-B Thru**	**215**
2	**A-D Left Turn**	**354**
3	**A-C Right Turn**	**630**
4	**B-A Thru**	**113**
5	**B-C Left Turn**	**122**
6	**B-D Right Turn**	**5**
7	**C-D Thru**	**624**
8	**C-A Left Turn**	**1583**
9	**C-B Right Turn**	**34**
10	**D-C Thru**	**668**
11	**D-B Left Turn**	**15**
12	**D-A Right Turn**	**342**



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
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	**35**	**5.90**
Leg B	**30**	**5.92**
Leg C	**35**	**5.90**
Leg D	**30**	**5.92**

***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): **110**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**83**
Leg A Left Turn	**96**
Leg B Thru & Rt	**90**
Leg B Left Turn	**84**
Leg C Thru & Rt	**54**
Leg C Left Turn	**82**
Leg D Thru & Rt	**78**
Leg D Left Turn	**74**

User Comments:

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Washington State Intersection Screening Tool 2.0

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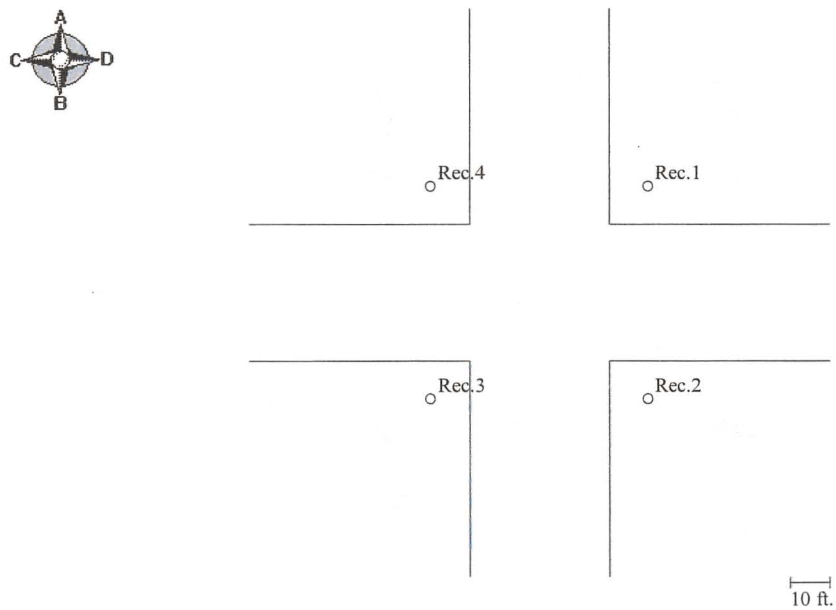
Sammamish River Bridge and Road (SR 202) Project

EXHIBIT 9
PAGE 63 OF 66

Description:	**SR 202 & 131st Avenue NE - 2040 Build Alternative**
Performed by:	**Environment - AECOM**
	(206) 624-9349 - www.aecom.com
Intersection Type:	**Four-Way Intersection, 2 x 2 w/4 Lt Turns**
Street Names:	**A-B: SR 202 C-D: 131st Avenue 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	6.8	5.7	Pass
2	2	10	10	7.2	5.9	Pass
3	3	10	10	7.5	6.2	Pass
4	4	10	10	6.8	5.7	Pass

*Project **PASSES** 1-hr and 8-hr NAAQS of 35 ppm and 9 ppm, respectively.
Largest modeled CO concentrations are at **receptor 3**.

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Washington State Intersection Screening Tool 2.0

USER INPUTS

Sammamish River Bridge and Road (SR 202) Project

EXHIBIT 9
PAGE 64 OF 66

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	A-B Thru	215
2	A-D Left Turn	354
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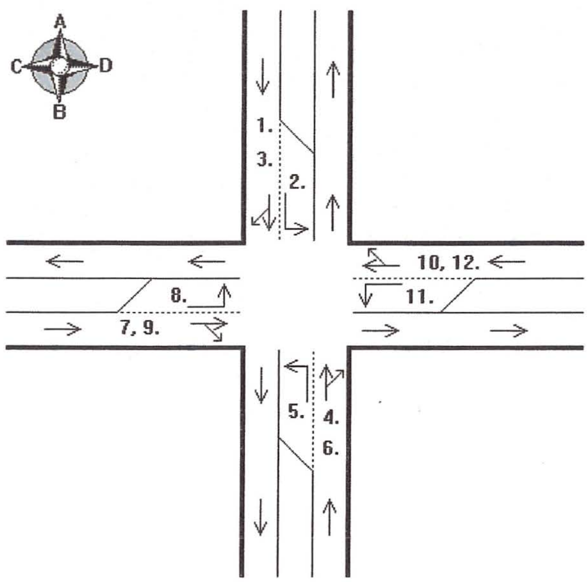
5	B-C Left Turn	122
6	B-D Right Turn	5
7	C-D Thru	624
8	C-A Left Turn	1583
9	C-B Right Turn	34
10	D-C Thru	668
11	D-B Left Turn	15
12	D-A Right Turn	342



CO Emission Factors Based On:

Location: **Western Washington - KING County**
CO Maint. Area: **Puget Sound**
I/M Program: **Yes**
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	**35**	**5.90**
Leg B	**30**	**5.92**
Leg C	**35**	**5.90**
Leg D	**30**	**5.92**

***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	**95**
Leg A Left Turn	**106**
Leg B Thru & Rt	**104**
Leg B Left Turn	**98**
Leg C Thru & Rt	**50**
Leg C Left Turn	**82**
Leg D Thru & Rt	**85**
Leg D Left Turn	**82**

Washington State Intersection Screening Tool 2.0

USER COMMENTS

Sammamish River Bridge and Road (SR 202) Project

User Comments:

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