LéSmith

Issaquah-Fall City Road

Final Environmental Impact Statement

King County
Department of Transportation
Road Services Division

March 1996

King County
~~Roads and Engineering Division~~
~~Department of~~
~~Public Works~~
Yesler Building
400 Yesler Way Room 400
Seattle, WA 98104-2637

Road Services Division
Department of
Transportation

March 6, 1996

RE: Issaquah-Fall City Road - Final Environmental Impact Statement

Dear Reviewer:

The Final Environmental Impact Statement (FEIS) for proposed improvements to Issaquah–Fall City Road, prepared according to the requirements of Washington Administrative Code 197-11, is attached. King County will not act on the proposal until at least seven days after publication of this FEIS. Copies of the FEIS and Draft EIS (DEIS) are available for review at the King County Road Services Division office in downtown Seattle and at the Issaquah Public Library.

The FEIS for the improvements to Issaquah-Fall City Road (between the intersection with Issaquah-Pine Lake Road and Klahanie Drive Southeast) includes:

- A brief description of the project and alternatives considered.
- A summary of impacts for the alternative that Road Services Division has chosen as the Preferred Alternative.
- Changes to the EIS text made as a result of comments on the DEIS.
- Copies of all comment letters received and responses to those comments.
- Appendix D that includes revised and updated transportation analysis since publication of the DEIS.
- Appendix H which is an addendum to the Surface Water Technical Information Report based on new analysis since publication of the DEIS.
- A distribution list for the EIS document.

Persons interested in viewing the original analysis contained in the DEIS should contact the Road Services Division for information on locations and availability of copies of the document.

The DEIS included analysis of three alternatives: A five-lane option, a three-lane option, and a no-action option. The five-lane alternative has been chosen as the Preferred Alternative, as it provides the best roadway capacity for projected high volumes of traffic and safer facilities for bicyclists and pedestrians. The project's environmental impacts, after mitigation, are no greater than the other build alternative (the three-lane option).

RECYCLED PAPER

The Preferred Alternative includes:

- Use of retaining walls and a bottomless culvert over North Fork Issaquah Creek to lessen impacts to sensitive areas.
- Construction of storm water detention ponds and water quality treatment facilities to control storm water runoff and remove pollutants.
- Mitigation for stream and wetland impacts due to the road construction.

The major difference between the three-lane and five-lane alternatives is that the five-lane alternative will require acquisition of more right-of-way for road construction and drainage detention/infiltration facilities than would the three-lane option.

Please address any questions you may have regarding the proposed Issaquah-Fall City Road improvement or the FEIS to Supervising Engineer Pete Ringen at:

King County Department of Transportation
Road Services Division
400 Yesler Way, Room 400
Seattle, WA 98104-2637
Phone: (206) 296-8771.

Thank you for your interest and participation in the environmental review process for the Issaquah-Fall City Road improvements project.

Sincerely,

Jesse Krail, P.E.
County Road Engineer
Department of Transportation, SEPA Responsible Official

Attachment

JK:KF:jcg

ISSAQUAH-FALL CITY ROAD IMPROVEMENT PROJECT

Final Environmental Impact Statement

Prepared in Compliance with the
State Environmental Policy Act of 1971
Chapter 43.21C, Revised Code of Washington, as Amended

and

SEPA Rules, Effective April 4, 1984
Chapter 197-11, Washington Administrative Code, as Amended

March 6, 1996

Printed on recycled paper

Persons with disabilities may request that this information be prepared and supplied in alternate forms by calling collect (206) 664-9009; deaf and hearing-impaired persons call 1-800-833-6388 (TTY relay service).

PREFACE

The Draft Environmental Impact Statement (DEIS) for the Issaquah-Fall City Road Improvement Project was issued on February 10, 1995. During the comment period for the DEIS, 23 comment letters were received from the public and government agencies. A public open house was held on February 28, 1995, during which seven people presented their comments.

The purpose of a Final Environmental Impact Statement (FEIS) is to respond to the comments and identify a preferred alternative. Responses may take several forms, including supplemental analysis, factual corrections, and explanations as to why some comments do not require further response. This FEIS includes responses to comments and factual changes.

The FEIS format depends on the types of responses and the length of the document. This FEIS is presented as an addendum, described in the State Environmental Policy Act Rules (WAC 197-11-560[5]). Using this format, the FEIS consists of the addendum and the original DEIS, and according to WAC 197-11-460, shall be issued together, except that only the addendum needs to be sent to recipients of the DEIS.

Two important sections of the addendum are the text changes and the comment letters with the responses to comments. Most of the changes take the form of text additions and other alterations to clarify, elaborate, or correct information presented in the DEIS. All changes are not necessarily made in response to comments; some are the result of additional review for accuracy and clarification. Pages of the FEIS in the "text changes" section are limited to those pages on which changes were made, except for the Air Quality, Noise, and Transportation sections which are included in their entirety because of the numerous changes. The original year 2010 traffic volume projections for Issaquah-Fall City Road were based on adopted land use data available at the time, which included pre-GMA land use, a mid-range land use estimate for Grand Ridge, and all committed roadway projects (see Transportation section). The traffic volumes used for the FEIS have been adjusted to assume adopted GMA year 2012 background land use data, current Grand Ridge land use information, all committed roadway projects plus the East Sammamish South Access Roadway (Grand Ridge Extension). Each page is numbered as in the DEIS. Where additional pages are needed due to the addition of text, the same page number is used with a letter to denote its order in the sequence, such as 1.12 followed by 1.12a. Text additions are denoted by bold text. Text exclusions are denoted by a line through the words to be omitted. A vertical line is placed in the margin noting the location of the change.

A description of the project, the purpose and need, and the alternatives from the DEIS, as well as a description of the Preferred Alternative and the selection process, have been included to aid continuity between the Draft and Final EISs and to aid readers of the FEIS. Also a summary of the Preferred Alternative's impacts and mitigations has been included.

In the chapter on comment letters and responses, comment letters and applicable responses occur in tandem. Each comment is identified with a number in the outside margin. Responses are coded with the same number as the comment to which they refer. Several comments are responded to simply with a statement of acknowledgment. This type of response is common for rhetorical comments, opinions, and other types of comments which do not require explanations. For parts of letters or other documents that were not coded, it should be assumed that these comments are acknowledged.

FACT SHEET

Project Title	Issaquah-Fall City Road Improvement Project
Description of Alternatives	The King County Department of Transportation has proposed a road improvement project to increase traffic capacity, improve traffic operations and safety, and provide sidewalks and bicycle lanes along Issaquah-Fall City Road from Issaquah-Pine Lake Road to Klahanie Drive SE. To accomplish these objectives, the road would be widened and the roadway would be regraded to improve sight distance. There are two action alternatives and the no action alternative. The Five-Lane Alternative would be constructed to accommodate two 11-foot travel lanes in each direction and a 12-foot center two-way left-turn lane. The south side of the roadway would be constructed to rural standards, which would include a six-foot shoulder and a four-foot neighborhood path. The north side of the road would be constructed to urban standards, which would include curb, gutter, sidewalk, and bicycle lane. In order to minimize impacts, the Five-Lane Alternative would not have a center two-way left-turn lane across North Fork Issaquah Creek. The crossing of North Fork Issaquah Creek would be accomplished using a culvert. A bridge option and a retaining wall option were analyzed as mitigation for the North Fork Issaquah Creek crossing. The Three-Lane Alternative would be the same as the Five-Lane Alternative except that it would be constructed to accommodate one 11-foot travel lane in each direction with a 12-foot center two-way left-turn lane.
Location of Site	The project is located in unincorporated King County within the East Sammamish Community Planning Area on the East Sammamish Plateau east of Lake Sammamish. The project area is located along Issaquah-Fall City Road between Issaquah-Pine Lake Road and Klahanie Drive SE.
Project Proponent and Lead Agency	King County Department of Transportation Road Services Division

Implementation Date

Depending on funding, construction is anticipated to occur in spring 1998.

Responsible Official

Paul Tanaka
Director, King County Department of Transportation

Contact Person
SEPA Responsible Official

Jesse Krail, P.E.
County Road Engineer
King County Department of Transportation
Yesler Building
400 Yesler Way, Room 400
Seattle, Washington 98104
(206) 296-8771

Permits, Licenses, and Approvals Required

Washington State Department of Fish and Wildlife: Hydraulic Project Approval

U.S. Army Corps of Engineers: Section 404 permit

Washington State Department of Ecology: Water Quality Modification, National Pollution Discharge Elimination System permit, Water Quality Certification (if over one acre of wetland is impacted) or Temporary Water Quality Modification (if under one acre of wetland is impacted).

King County:
Clearing and Grading Permit (Public Agency and Utility Exception).

Authors and Principal Contributors to EIS

Entranco, Bellevue, Washington: Project management, environmental impact statement preparation, preliminary engineering and design, Technical Information Report for stormwater, Sensitive Areas Special Study of Wetlands, and environmental impact statement sections on wetlands, plants and animals, land use/housing and population, transportation, and public services and utilities.

Terra Associates, Inc., Redmond, Washington: Geotechnical and groundwater and Sensitive Areas Special Study of Earth.

McCulley, Frick, and Gilman, Inc., Lynnwood, Washington: Noise and air quality.

Aquatic Resource Consultants, Seattle Washington: Fisheries and Sensitive Areas Special Study of Streams.

Don Shimono Associates, Bellevue, Washington: Aesthetics/light and glare and recreation.

Eastern Washington University: Archaeological and historical resources.

Date of Issue of Final EIS March 6, 1996

Cost of Copy of Final EIS $15.50 plus $3.00 for shipping

Location of Background Information

King County
Department of Transportation
Road Services Division
Contact: Mark Brzoska
(206) 296-3737

CONTENTS

PROJECT DESCRIPTION AND ALTERNATIVES CONSIDERED

PROJECT DESCRIPTION

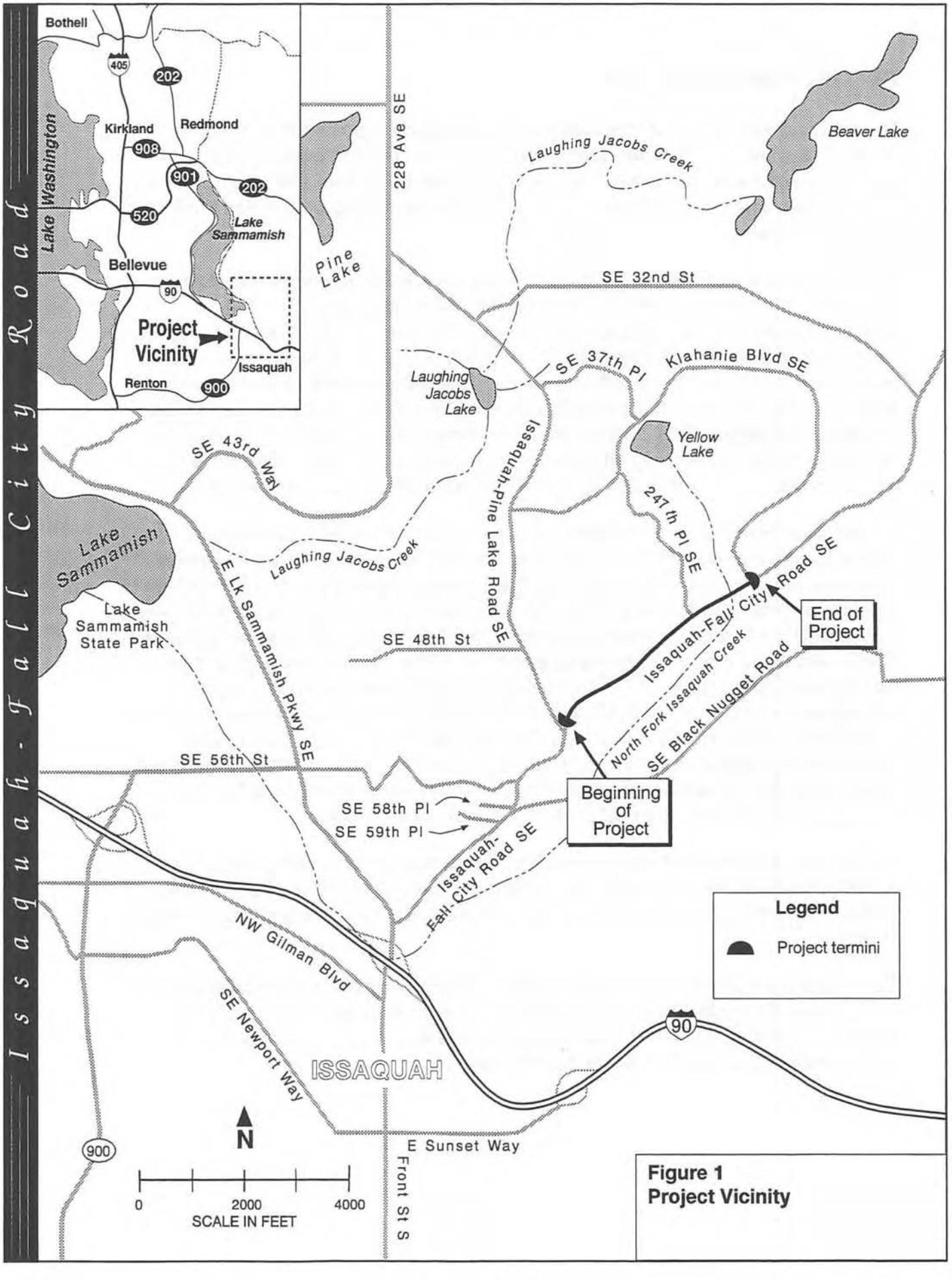
The Issaquah-Fall City Road Improvement Project has been proposed by the King County Department of Transportation to increase traffic capacity, improve traffic operations and safety, and provide bicycle and pedestrian facilities (**figure 1**). To meet these primary objectives, Issaquah-Fall City Road is proposed to be widened to either five or three lanes.

The project limits are from the Issaquah-Fall City Road/Issaquah-Pine Lake Road intersection to Klahanie Drive SE. The project length is about one mile. The southwestern terminus at Issaquah-Pine Lake Road was logical because it is a major intersection with a major change in traffic. This intersection is proposed to be reconstructed as part of the Issaquah-Pine Lake Road Improvement Project and was studied for the Environmental Impact Statement (EIS) that was issued for that project (**King County Roads 1994**). The northeastern project terminus at Klahanie Drive SE was selected due to the heavy left turns into the Klahanie development, which results in lighter through volumes on Issaquah-Fall City Road northeast of that intersection.

The Issaquah-Fall City Road Improvement Project is one of several road projects planned to be implemented on the East Sammamish Plateau over the next 15 years. These projects have been included in the Capital Improvement Program (CIP) to help meet the projected traffic demand from future development permitted by the King County Comprehensive Plan (**King County Planning and Community Development Division 1994**). According to the Growth Management Act (GMA) concurrency requirements, development cannot take place unless adequate capital improvements to support development are in place within six years. The GMA defers to local transportation plans for adequacy limits on roads. The King County Road Adequacy Standards (**King County DPW 1992a**) require a level of service (LOS) E or better on affected roads and intersections before development may occur. Please refer to the Level of Service Concept section at the end of the DEIS for an explanation of LOS.

Without the proposed road improvements along the project route, left-turning traffic would continue to use the through lanes, and thus continue to cause delay for other traffic. This continued delay would probably increase along with the projected increase in traffic.

There also is a need for safety improvements, primarily to flatten the hills southwest of 247th Place SE and the dip in the road across North Fork Issaquah Creek. These vertical curves have presented a safety issue due to inadequate sight distances for vehicles seeking access to and from 247th Place SE.


Issaquah - Fall City Road
Bothell
405
202
Kirkland
Redmond
908
901
202
520
Lake Washington
Lake Sammamish
Bellevue
90
Project Vicinity
Issaquah
Renton
900
228 Ave SE
Pine Lake
Laughing Jacobs Creek
Beaver Lake
SE 32nd St
SE 37th Pl
Klahanie Blvd SE
Laughing Jacobs Lake
Yellow Lake
SE 43rd Way
Issaquah-Pine Lake Road SE
247th Pl SE
Lake Sammamish
Laughing Jacobs Creek
E Lk Sammamish Pkwy SE
Lake Sammamish State Park
SE 48th St
Issaquah-Fall City Road SE
End of Project
North Fork Issaquah Creek
SE Black Nugget Road
SE 56th St
Beginning of Project
SE 58th Pl
SE 59th Pl
Issaquah-Fall City Road SE
Legend
Project termini
NW Gilman Blvd
SE Newport Way
90
ISSAQUAH
N
900
E Sunset Way
Front St S
0
2000
4000
SCALE IN FEET
Figure 1
Project Vicinity
A725 93020-20-8665 FEIS 10/20/95 AGT

The County's objectives for the proposed action are to:

- Provide roadway improvements that will prevent excessive congestion anticipated for the future design year of 2012. Road improvements are typically designed to be adequate from the year of opening to a specified design year.
- Reduce safety hazards and congestion by providing a two-way left-turn lane.
- Improve safety by improving the sight distances along the hills and at intersections along the roadway.
- Provide better pedestrian and bicycle facilities that will also improve safety for pedestrians and bicyclists.
- Increase roadway capacity to meet the growing demand resulting from anticipated development allowed by the King County Comprehensive Plan (**King County Planning and Community Development Division 1994**).
- Improve safety for school-related pedestrian activity, as called for in the King County School Pathways Program.
- Minimize environmental impacts created by the road improvement project.

PURPOSE, NEEDS, AND OBJECTIVES

The King County Department of Transportation has proposed a road improvement project to increase traffic capacity to accommodate the projected traffic volumes in the area, improve traffic operations and existing sight distance problems, and provide bicycle and pedestrian facilities along an approximately one-mile-long segment of Issaquah-Fall City Road from Issaquah-Pine Lake Road to Klahanie Drive SE (**figure 1**). To meet these objectives, the roadway would be widened to add one or more traffic lanes, with a sidewalk and a bicycle lane on the north side, and a shoulder with a neighborhood path on the south side. In addition, the grade of the roadway would be changed to flatten the reverse vertical curves (hills) southwest of 247th Place SE, as well as lengthen the vertical curve (dip in the road) across North Fork Issaquah Creek. The proposed action was determined to have the potential for significant environmental impact, and consequently, an EIS is required.

The 1994 average daily traffic volume (ADT) for Issaquah-Fall City Road within the project limits is about 9,900 vehicles per day. This volume is projected to increase to an ADT of 33,800 vehicles per day in 2012 (the design year). The estimated capacity of a typical two-lane road is 18,000 vehicles per day; consequently, road use would be higher than the planning level capacity. In 2012, it is expected that both the Issaquah-Fall City Road/Klahanie Boulevard SE and Issaquah-Fall City Road/247th Place SE intersections would operate at LOS D or better with all three alternatives with the exception of

Issaquah-Fall City Road/247th Place SE intersection, which is expected to operate at LOS F under the No Action Alternative. The project action alternatives would increase capacity and provide for continuation of an acceptable LOS (LOS D or better at the study intersections).

The average vehicle accident rate is currently much lower than the overall rate in King County, but this low rate is jeopardized by poor road features that provide the potential for a significantly higher accident rate as the volume of traffic increases to an overcapacity condition. The most important of these poor road features is the limited sight distance caused by hills and valleys within the corridor. The vertical alignment near driveways does not provide drivers with sufficient time to observe vehicles turning to and from driveways. Hills on both sides of the intersection with 247th Place SE prevent adequate sight distance to and from this heavily-used intersection. The proposed project would correct these deficiencies by realigning the roadway.

The 1993 King County Nonmotorized Transportation Plan has proposed bicycle facilities along Issaquah-Fall City Road. These facilities have been proposed both to meet the growing demand for bicycle facilities and to meet King County's goals to encourage nonmotorized alternative travel modes. The East Sammamish Community Plan Update recommends a sidewalk and neighborhood pathway along Issaquah-Fall City Road. Currently, there are no sidewalks or bicycle facilities along the road. Bicyclists and pedestrians have no safe traveling facilities and are obliged to use narrow shoulders along the road. By adding a sidewalk, a neighborhood pathway, a paved shoulder, and a bicycle lane, the project action would fulfill King County plans and provide safer accommodations for nonmotorized forms of travel.

A public scoping meeting was held April 7, 1994, to provide additional information to the public as part of an expanded scoping process, and to receive comments about what alternatives, environmental issues, and potential mitigation should be addressed in the EIS. The following is a summary of issues and concerns that were expressed in the scoping comments:

- Concerns were expressed over safety problems due to poor sight distances.
- Concerns were expressed over safety issues related to the proximity of traffic to persons using the yards of existing single-family homes.
- Concerns were expressed over property acquisition for right-of-way.
- The need to widen Issaquah-Fall City Road was questioned.

Following this meeting, two action alternatives and a no action alternative were selected for detailed analysis in the EIS. The Five-Lane Alternative would widen Issaquah-Fall City Road to four-lanes with a center two-way left-turn lane. The Three-Lane Alternative would widen Issaquah-Fall City Road to two lanes with a center two-way left-turn lane. Both alternatives would include a 5.5-foot sidewalk and a five-foot bicycle lane on the north side of the roadway (Klahanie development side) and a six-foot shoulder and four-foot neighborhood path on the south side of the roadway (**figure 2**). The No Action Alternative would leave Issaquah-Fall City Road essentially unchanged.

To select a preferred alternative, King County considered which alternative would best satisfy the original objectives of enhancing traffic capacity, improving traffic safety and operations, and providing bicycle and pedestrian facilities while at the same time minimizing impacts to the environment. Several specific evaluation criteria in categories such as transportation operations, engineering factors, cost, and environmental factors were used to assess the relative merits of each alternative during the decision-making process. The Draft EIS and related background materials supplied much of the information used to arrive at the selection. Public comments on the Draft EIS were also used to help weigh the merits of each alternative.

As a result of this effort, the Five-Lane Alternative was selected. Among the reasons for selecting this alternative was the fact that future traffic volumes are projected to increase substantially on Issaquah-Fall City Road.

There may be minor refinements made to the preferred alternative design to further reduce impacts or to accommodate final design issues; however, while additional environmental analysis may be required, these changes are not expected to require preparation of a Supplemental EIS.

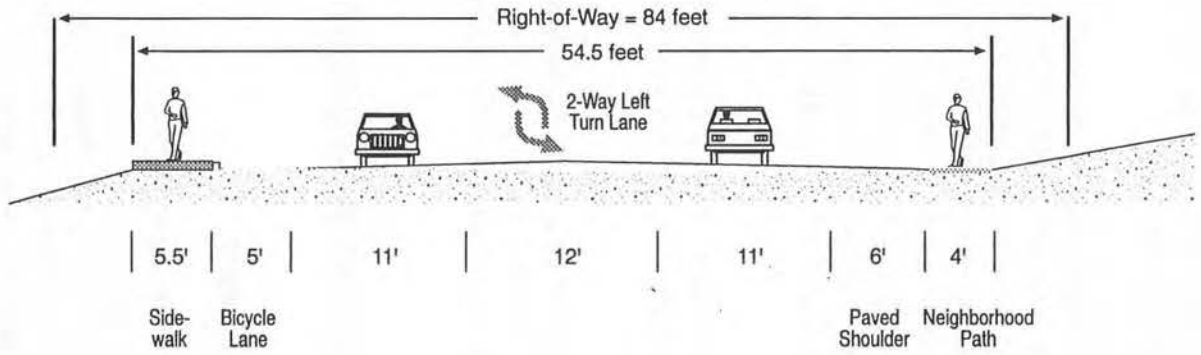
ALTERNATIVES CONSIDERED INCLUDING THE PREFERRED ALTERNATIVE

Five-Lane Alternative - The Preferred Alternative

The Five-Lane Alternative would be constructed to accommodate two 11-foot travel lanes in each direction and a 12-foot center two-way left-turn lane. Because the road is located along the urban growth boundary, construction standards are different for the north and south sides of the road. The north side of the roadway would be constructed to urban standards, which would include curb, gutter, sidewalk, and bicycle lane. The south side of the roadway would be constructed to rural standards, which would include a paved six-foot shoulder and a four-foot neighborhood path. See **figure 2**, which shows the proposed roadway section with dimensions. To minimize impacts, the Five-Lane Alternative would taper to four lanes, two in each direction across North Fork Issaquah Creek. With both action alternatives, the crossing of North Fork Issaquah Creek would be accomplished using an open-bottom culvert. A bridge option and a retaining wall option were analyzed as wetland mitigation for the North Fork Issaquah Creek crossing.

Klahanie Side

Three-Lane Roadway Section



Five-Lane Roadway Section

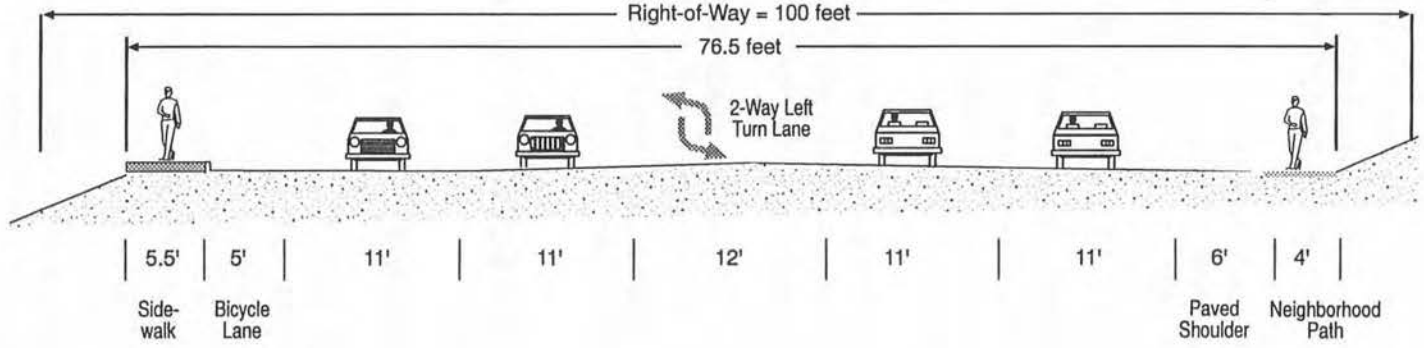


Figure 2
Alternative Road Sections

Retaining walls would be used in a few locations along the project corridor to stabilize cuts along slopes, and to minimize the need for acquiring additional right-of-way. Based on current King County road standards, approximately 4.35 acres of right-of-way would be required to construct this alternative. It is possible that less right-of-way would be needed to widen the road. Consequently, deviations from the standards could be allowed to reduce the amount of right-of-way acquisition. In addition, 36,600 square feet of right-of-way would be needed to construct two detention facilities and one infiltration facility.

The road would be posted to allow a speed of 45 mph, which is not expected to change as a result of this project. To improve sight distances, the hills southwest of 247th Place SE would be flattened, the dip in the road across North Fork Issaquah Creek would be reduced, and the entire length of the project corridor would be illuminated. See **figure 3**, which shows the existing and proposed road profile.

Three-Lane Alternative

The Three-Lane Alternative would be the same as the Five-Lane Alternative with the following exceptions:

- The Three-Lane Alternative would be constructed to accommodate one 11-foot travel lane in each direction with a 12-foot center two-way left-turn lane. See **figure 2**, which shows the proposed roadway section with dimensions. The Three-Lane Alternative would not have a center left-turn lane across North Fork Issaquah Creek.
- Based on current King County road standards, approximately 2.62 acres of right-of-way would be required to construct the Three-Lane Alternative. As with the Five-Lane Alternative, it is possible that less right-of-way would be needed to widen the road. Consequently, deviations from the standards could be allowed to reduce the amount of right-of-way acquisition. In addition, 24,400 square feet of right-of-way would be needed to construct two detention facilities and one infiltration facility.

No Action Alternative

The width of the road would be essentially unchanged, except for routine maintenance and minor improvements. There would be no major structural modifications or changes.

Issaquah-Fall City Road currently has two lanes from Issaquah-Pine Lake Road to Klahanie Drive SE, with left-turn pockets at 247th Place SE and Klahanie Drive SE. There currently are no bicycle lanes, sidewalks, curbs, or gutters.

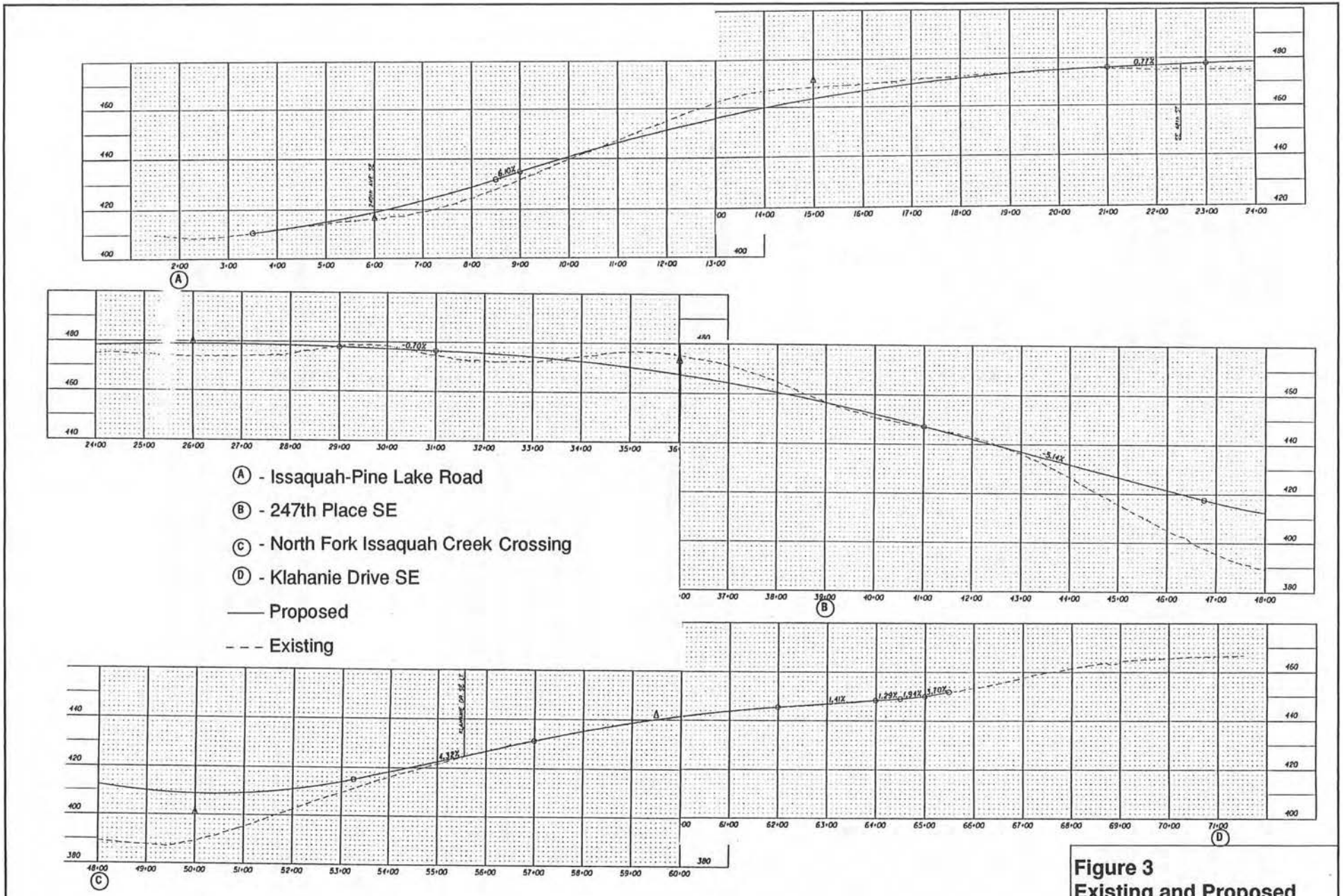


Figure 3
Existing and Proposed Road Profile
Three-Lane and Five-Lane Alternatives

SUMMARY OF IMPACTS AND MITIGATION FOR THE PREFERRED ALTERNATIVE

SUMMARY OF IMPACTS AND MITIGATION FOR THE PREFERRED ALTERNATIVE

Significant Impacts	Mitigation Measures		Unavoidable Significant Adverse Impacts
	Designed Into the Proposal	Recommended Over and Above the Proposal	
Earth			
Maximum cuts and fills required to construct the roadway would be about 10 and 20 feet. An estimated 67,100 cubic yards of soil would be excavated for the roadway, with the required fill quantity approaching 73,200 cubic yards of soil. During construction, runoff and the potential for erosion would increase where vegetation protecting the ground surface is removed.	Best Management Practices, as outlined in the King County Surface Water Design Manual (**King County DPW 1992**), would be implemented to mitigate the erosion potential.	None.	The required cuts and fills would change the surface topography if either action alternative is built. If it rains during construction, there would be an increase in runoff and erosion in cut and fill sections.
Air			
Airborne dust during construction would increase temporarily.	None.	None.	None.
Water			
There would be a significant increase in the peak runoff flows and volumes leaving the roadway surface after construction.	Flows would be collected and carried into a ditch on the south side of the road. The flows would be conveyed to one of two detention ponds or an infiltration pond.	None.	There would be unavoidable changes in the natural hydrologic regime, due to paving areas which currently infiltrate rainfall and increasing the volume of stormwater generated on site.

Significant Impacts	Mitigation Measures: Designed Into the Proposal	Mitigation Measures: Recommended Over and Above the Proposal	Unavoidable Significant Adverse Impacts
Water (Continued)			
The water quality of the untreated runoff from Issaquah-Fall City Road could become poorer as the surrounding land becomes developed and traffic increases in the future. Erosion and sedimentation during construction could diminish water quality and reduce the survival of young fish. Shallow groundwater patterns would be altered. Without avoidance measures, approximately 0.42 acre of wetland and 0.92 acre of wetland buffer would be lost.	This project would use biofiltration swales to provide water quality treatment before infiltration or after detention. The soil in the infiltration facility would serve to further improve water quality. Erosion/sedimentation would be controlled by a Temporary Erosion and Sedimentation Control Plan, which would be developed and implemented prior to construction. By using retaining walls, wetland loss would be reduced to 0.03 acre of wetland and 0.44 acre of wetland buffer.	None.	Efforts to minimize sedimentation are unlikely to be 100 percent effective, particularly if a significant storm event were to overwhelm silt fences, hay bales, and other erosion control measures.
Plants and Animals			
There would be loss of habitat due to right-of-way acquisition from wooded lots, wetlands, and ornamental landscaping. Existing animal species may perish, relocate, or be replaced with more development-tolerant species.	The free movement of wildlife along North Fork Issaquah Creek would be restored with a large, open-bottom culvert.	Using retaining walls would minimize loss of wildlife habitat.	Although impacts on wetland habitats would be mitigated, upland habitats would be eliminated. Loss of natural vegetation and wildlife would add to a cumulative elimination of habitat that has occurred on a large scale in the Puget Sound area and likely will continue to occur in conjunction with planned urbanization and growth.

Significant Impacts	Mitigation Measures		Unavoidable Significant Adverse Impacts
	Designed Into the Proposal	Recommended Over and Above the Proposal	
Noise			
All receptor locations would experience peak-hour sound level increases of less than approximately two dBA compared with the No Action Alternative, except receptor 17, where sound levels would be expected to increase five dBA.	None.	None.	Peak-hour traffic noise levels would continue to approach or exceed the FHWA residential noise abatement criterion level at most residential locations.
Land Use/Population and Housing			
About 4.35 acres of land would be converted from existing uses to right-of-way. One single-family residence would be displaced.	Property owners would receive compensation at fair market value.	None.	None.
Aesthetics Light and Glare			
The roadway would more than double in width, changing the overall visual character of the road. Roadway illumination would introduce a night time light source to the area.	None.	Significant vegetation and landforms, which screen single-family residences and subdivisions and offer significant visual amenities, should be preserved. This would minimize visual impacts created by widening and preserve the community's visual character. Residences exposed to Issaquah-Fall City Road by vegetation removal could have additional landscaping treatment compatible with the surrounding vegetation provided along the roadway.	None.

Significant Impacts	Mitigation Measures		Unavoidable Significant Adverse Impacts
	Designed Into the Proposal	Recommended Over and Above the Proposal	
Transportation			
The project would increase traffic capacity and improve safety and traffic operations. Levels of service would improve at all intersections.	None.	None.	None.
Public Services and Utilities			
Construction could require minor relocation of overhead and underground utilities.	Utility customers would be notified in advance of potential construction-related interruptions.	None.	None.
Cultural Resources			
No impacts are anticipated.	None.	None.	None.

CHANGES IN THE TEXT OF THE DRAFT EIS

METHOD FOR TEXT CHANGES

Most text changes take the form of additional information or other alterations to clarify, elaborate, or correct information presented in the DEIS. All changes are not necessarily made in response to comments; some are the result of additional review for accuracy and clarification. Pages of the FEIS in this "text changes" section, including figures, are limited to those pages on which changes were made, except for the Air Quality, Noise, and Transportation sections which are included in their entirety because of the numerous changes. Each page is numbered as in the DEIS. Where additional pages are needed due to the addition of text, the same page number is used with a letter to denote its order in the sequence, such as 1.12 followed by 1.12a. **Text additions are denoted by bold text.** Text exclusions are denoted by a line through the words to be omitted. A vertical line is placed in the margin noting the location of the change.

1.3 AIR QUALITY

~~*In many cases where it is necessary to analyze the potential air quality impacts from a proposed project, air quality models are used to quantify pollutant emissions and concentrations that could result. This approach is dictated by EPA guidelines and by federal and state air quality rules. In some cases, however, it is possible to forgo such quantitative analyses because it is clear that a project will have a minor effect on air quality. The proposed Issaquah-Fall City Road improvement project is one such project.*~~

~~This determination was based on EPA guidance, which suggests that it is not necessary to model projects for air quality impacts if projected traffic conditions indicate the project would not cause major changes in carbon monoxide (CO) emissions or concentrations.~~

~~Consistent with EPA guidance, the LOS analyses for the intersections that would be most affected by the Issaquah-Fall City Road improvement project were reviewed. The intersections of Issaquah-Fall City Road with Klahanie Drive SE, and 247th Place SE would be directly affected by the proposed project; both were analyzed in the traffic study for this project and both were considered for further air quality analysis.~~

~~Based on the review of the LOS analysis of project affected intersections, it was decided that detailed examination with air quality modeling was unnecessary. The intersections that were analyzed indicate the project would have a minimal impact on air quality.~~

Existing air quality data for the Issaquah area were reviewed and existing and future air quality effects attributable to traffic in the project area were calculated. A "microscale" air quality impact analysis was performed using the CAL3QHC dispersion model. Carbon monoxide (CO) concentrations determined with modeling were used to evaluate the potential air quality impacts due to existing and future vehicle-related air pollution in the project opening year (2000) and the project design year (2012). These two years were analyzed to conform with the State Implementation Plan to reduce air pollution.

The findings of this analysis are as follows:

- **1994 Existing Conditions CO concentrations fall within the one-hour 35-ppm standard near the intersection of Issaquah-Fall City with Klahanie Drive SE. Converting the one-hour concentrations to eight-hour levels (with a 0.7 persistence factor), resulted in levels below the eight-hour 9-ppm limit as well.**

By year 2000, the No Action Alternative would result in higher peak-hour CO concentrations than those calculated for 1994. Maximum one-hour and eight-hour concentrations would continue to comply with the national ambient air quality standards at the two signalized intersections of Issaquah-Fall City Road with Klahanie Drive SE, and 247th Place SE.

- **In the opening year 2000, the Three-Lane Alternative would result in CO levels similar to the No Action Alternative and higher than those in 1994. Near both signalized intersections examined, levels would comply with both short-term standards.**

- **In the opening year 2000, the Five-Lane Alternative, worst-case CO levels at the intersection of Issaquah-Fall City Road with Klahanie Drive SE would be 4 ppm higher than the No Action Alternative. Levels near the other intersection would be the same as the No Action Alternative. Nevertheless, the maximum peak-hour CO concentrations would remain within both CO standards.**

- **With the No Action Alternative in 2012, CO concentrations would be above existing levels, but would continue to be in compliance with the one-hour and eight-hour standards near the two signalized intersections examined.**

- **The 2012 Three-Lane Alternative would result in improved air quality near the intersection of Issaquah-Fall City Road with 247th Place SE compared with the No Action Alternative. Near both modeled intersections, levels would meet both air quality standards.**

- **The Five-Lane Alternative in 2012 would result in a higher maximum peak-hour concentration near the intersection of Issaquah-Fall City Road with Klahanie Drive SE compared with both existing conditions and the 2012 No Action Alternative. Near the other intersection, however, CO levels would be similar to the No Action Alternative. Nonetheless, CO levels with the Five-Lane Alternative would be in compliance with the 35-ppm National Ambient Air Quality Standards and would be low enough to remain within the eight-hour standard as well.**

1.4 WATER

Runoff from the project area enters two regional drainage basins, the North Fork Issaquah Creek Basin and the East Lake Sammamish Basin. King County Surface Water Management (SWM) has proposed basin plans for both drainage basins (**King County SWM 1992a and 1992b**). Both plans have more stringent standards than are required by the King County *Surface Water Design Manual* (**King County DPW 1992**).

For the most part, stormwater on the existing site drains to ditches along the sides of the roadway, where much, if not all, of it infiltrates into the soil. Flows from eight off-site subbasins either cross Issaquah-Fall City Road or enter the ditches at one of eight locations. Due to the natural infiltration occurring through most of the areas upstream of the roadway, the only drainage crossing that shows evidence of frequent flows is North Fork Issaquah Creek. Most of the other off-site basins do not appear to have contributed

flow to the roadway in the past several years. There have been no reports of flooding within one-quarter mile upstream or downstream of the project.

There are four delineated wetlands (Wetlands A–D) in the vicinity of the proposed project. Two of these wetlands, including Wetland A on North Fork Issaquah Creek, would be impacted by the new roadway.

construction. All stormwater discharged to the stream during all phases should be treated before discharge. Effects of changes in the volume of stormwater on channel morphology should be estimated and evaluated as part of the design process.

Construction of either of the action alternatives would alter the shallow groundwater patterns. Any impacts to the lower aquifer resources would be insignificant. Fill and a longer culvert at North Fork Issaquah Creek could impact the creek by encroachment and by creating a potential fish passage barrier, respectively.

Limitations on the time of construction and areas cleared and graded would reduce erosion and maintain water quality. Expected impacts to the shallow groundwater regime would be reduced by adherence to standard design and construction practices. Wetlands filling would require the creation of 1.4 to 1.6 acres of new replacement wetlands, depending on the alternative.

Options to cross the North Fork Issaquah Creek using a bridge or retaining walls to minimize fill would mitigate some of the impacts to the creek, wetlands, and shallow groundwater.

1.5 PLANTS AND ANIMALS

No threatened or endangered species are expected to be directly affected by the proposed alternatives. However, a candidate species, the **northern** red-legged frog, has been found in the project corridor near the North Fork Issaquah Creek. The vegetation and wildlife habitat that would be directly affected by right-of-way acquisition for the proposed roadway widening is primarily second-growth lowland forest interspersed with agricultural and suburban habitats. The highest quality wildlife habitat in the project corridor is the forested wetland along North Fork Issaquah Creek. Between 2.6 and 4.4 acres of new right-of-way would be acquired under the Three-Lane Alternative or Five-Lane Alternatives, respectively. About 90 percent of this land provides some type of wildlife habitat. The remaining 10 percent consists of driveways and parking areas. Small mammals and songbirds would be eliminated as a result of habitat loss from the new right-of-way. If adequate ground-level passages are not provided for animals at the roadway crossing of North Fork Issaquah Creek, the action alternatives may hinder wildlife movements and increase roadkills. If effective wetland mitigation is implemented, such as is proposed by the Bridge Option (see Water section), wildlife habitat could be improved along North Fork Issaquah Creek.

1.6 NOISE

Existing sound levels were measured at five locations representing residential uses along Issaquah-Fall City Road. Peak hour sound levels at one of the five measurement locations approached the 67-dBA level the U.S. Department of Transportation, Federal

Highway Administration (FHWA) uses as an indication of noise impacts to residential locations.

The Five-Lane Alternative would increase sound levels up to ~~3.4 dBA compared to the No Action Alternative at the residential locations modeled. Such a change would be considered a slight impact according to EPA criteria, but sound levels at all but two of the locations examined would approach or exceed the FHWA 67~~ **5 dBA at one location, but at most locations examined would increase sound levels 0–2 dBA, compared with the No Action Alternative. Compared with existing conditions, however, peak-hour traffic noise would increase 5–7 dBA (except for about 10 dBA at one location) and would approach or exceed the FHWA residential noise abatement criterion level at most locations along the entire project corridor. All receptor locations examined would be considered noise impacted under FHWA noise policy.**

The Three-Lane Alternative would increase ~~sound levels up to 2.5 dBA compared to the No Action Alternative at the residential locations modeled. Such a change would be considered a slight impact according to EPA criteria. Sound levels at several residential~~ **traffic noise levels up to 4 dBA at one location, but at most locations the increase would be less than 1 dBA compared with the No Action Alternative; sound levels at a few** locations would decrease slightly compared with **the** No Action **Alternative. Compared with existing conditions, however, peak-hour traffic noise would increase 4–7 dBA (except for about 10 dBA at one location along the project corridor) and would approach or exceed the FHWA/WSDOT residential noise abatement criterion level at most locations. All receptor locations examined would be considered noise impacted under FHWA noise policy.**~~, due to the realignment of the road. Sound levels at all but three of the residential locations examined would approach or exceed the FHWA 67 dBA residential criterion.~~

With the No Action Alternative, peak hour traffic noise would increase by ~~4 to~~ 5 dBA over existing levels at all receptors, due to growth in traffic volumes. Projected sound level increases ~~at all locations~~ would be considered **noise impacts under FHWA policy, and traffic**~~slight noise impacts according to EPA guidelines. Traffic~~ noise levels at most residential locations along the project route would approach or exceed the FHWA 67-dBA residential noise abatement criterion level.

No mitigation is being proposed with any of the action alternatives.

1.7 LAND USE/HOUSING AND POPULATION

The existing land use in the immediate project vicinity is characterized by high density (urban) and low density (rural) development. Urban land uses in the form of mostly residential development have occurred on the northwest side of the roadway. A new commercial center, which includes retail and office uses and a park-and-pool lot, is located northeast of the intersection of Klahanie Drive SE and Issaquah-Fall City Road.

Rural land uses in the form of large-lot residential development and undeveloped, heavily forested land dominate the area southwest of Issaquah-Fall City Road.

North of Klahanie Drive SE, the project vicinity is projected to experience rapid suburban residential growth. Between 1980 and 1990, the population within the East Sammamish Community Planning Area increased 155 percent, to 31,300 people. Population is expected to exceed 40,000 by 2000, and 73,000 by 2020.

Since Issaquah-Fall City Road serves many urban-designated properties which have been approved or are waiting to be approved for development, this project is considered to be a high priority capital improvement within the East Sammamish Community Planning Area (**King County Planning and Community Development Division 1992**).

New right-of-way for the roadway widening would be acquired from both undeveloped land and land on which single-family residences are located. One single-family

and single-family developments, and the east half is predominantly native vegetation on both sides of the roadway.

The Five-Lane Alternative would require larger amounts of vegetation to be removed on both sides than the Three-Lane Alternative. Mitigation measures for both the Five-Lane and Three-Lane Alternatives are similar, but are greater for the Five-Lane Alternative because of the greater vegetation removal and cut and fill operations. The No Action Alternative would cause no changes to the existing conditions, and therefore no significant impacts would result under this alternative.

1.9 RECREATION FACILITIES

Issaquah-Fall City Road currently lacks any nonmotorized facilities within the project vicinity; however, it is still considered a popular route for recreational bicycling.

Both action alternatives would provide a bicycle lane, sidewalk, and neighborhood path. These facilities would provide a link between the Sammamish Plateau Regional Trail to the northeast, and the future facilities along Issaquah-Pine Lake Road to the southwest.

Once implemented, these facilities are expected to increase the volume of pedestrian and bicycle traffic within the area.

1.10 TRANSPORTATION

Both action alternatives would add a sidewalk and bicycle lane on the north side and a shoulder and neighborhood path on the south side of Issaquah-Fall City Road along the entire length of the project. These facilities would provide for safer pedestrian and bicycle access than use of the existing gravel or paved shoulders.

Both action alternatives would add a center **two-way** left-turn lane. The addition of this lane would provide a refuge for left-turning traffic to move out of the through lanes, thus allowing other traffic to proceed along their routes without delay. This would reduce the probability of rear-end collisions.

In addition, a center **two-way** left-turn lane would improve access to and from all adjacent properties. This would, therefore, improve fire and emergency vehicle, transit, and school bus operations. The widening would also provide more room for vehicles to pull over, thus allowing greater passing capabilities in an emergency situation. A center **two-way** left-turn lane also would provide a passing lane for emergency vehicles.

Both action alternatives would flatten the hills southwest of 247th Place SE, as well as reduce the dip across North Fork Issaquah Creek. Flattening of these vertical curves would improve sight distance, and therefore enhance safety for vehicles seeking access to 247th Place SE. In addition, the bicycle lane on the north side of the roadway, the

shoulder on the south side of the roadway, and a center left-turn lane would widen the roadway and improve sight distance.

If no improvements are made, left-turning traffic would continue to use the through lanes between intersections, and thus continue to cause delay for through traffic. This continued delay would probably increase along with the projected increase in traffic. Fire and emergency vehicle, and transit and school bus operations would continue to experience this delay along their routes.

If no improvements are made for either pedestrians or bicyclists, they would be forced to continue using the narrow shoulders in most locations.

A level of service analysis (LOS) was conducted for the following signalized study intersections, which have the highest volumes along the project length:

- Issaquah-Fall City Road/Klahanie Drive SE
- Issaquah-Fall City Road/247th Place SE

Both study intersections currently operate at LOS B. In **2012**~~2010~~, it is expected that both intersections would operate at LOS **D**~~C~~ or better with all three alternatives **with the exception of Issaquah-Fall City Road/247th Place SE intersection, which is expected to operate at LOS F under the No Action Alternative**.

The intersection of Issaquah-Fall City Road/Klahanie Drive SE, however, operates more efficiently than expected because of imbalanced turning movement volumes (relatively low through volumes approaching from the north vs. relatively high left-turn volumes approaching from the south—see **figure 3-14** on page 100). Because of this imbalance, signal phasing can optimize the green-time necessary for the left-turn volumes approaching from the south. This results in an intersection with minor delays.

~~Planning level estimates of the~~ **The** LOS **estimates** at the open-flow segment of Issaquah-Fall City Road were analyzed using **methodology outlined in the "Highway Capacity Manual" (Transportation Research Board 1994).**~~calculated roadway capacities from the King County Transportation Planning Section, Department of Public Works.~~ Based on this **methodology**~~criteria~~, the LOS at the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Drive SE) would operate at LOS F with the Three-Lane and No Action Alternatives, and LOS **D**~~C~~ with the Five-Lane Alternative.~~ This segment currently operates at LOS A.~~

In general, construction activity would increase both travel time and the potential for accidents. Construction activity would also temporarily reduce the width of ~~available~~ **road** shoulder **available** for bicyclists and pedestrians within the construction zone.

1.11 PUBLIC SERVICES AND UTILITIES

Public services that could be affected by the action alternatives include the Issaquah Montessori Preschool, the Plateau Bible Church, public school buses, and local police and fire vehicles. Utilities in the project corridor include underground water, sewer,

The County's objectives for the proposed action are to:

- Provide roadway improvements that will prevent excessive congestion anticipated for the future design year of 201~~0~~**2**. Road improvements are typically designed to be adequate from the year of opening to a specified design year.
- Reduce safety hazards and congestion by providing a two-way left-turn lane.
- Improve safety by improving the sight distances along the hills and at intersections along the roadway.
- Provide better pedestrian and bicycle facilities that will also improve safety for pedestrians and bicyclists.
- Increase roadway capacity to meet the growing demand resulting from anticipated development allowed by the **King County Comprehensive Plan** ~~East Sammamish Community Plan Update and Area Zoning~~ (**King County Planning and Community Development Division 1994~~2~~**).
- Improve safety for school-related pedestrian activity, as called for in the King County School Pathways Program.
- Minimize environmental impacts created by the road improvement project.

2.1 FIVE-LANE ALTERNATIVE

The Five-Lane Alternative would be constructed to accommodate two 11-foot travel lanes in each direction and a 12-foot center two-way left-turn lane. Because the road is located along the urban growth boundary, construction standards are different for the north and south sides of the road. The north side of the roadway would be constructed to urban standards, which would include curb, gutter, sidewalk, and bicycle lane. The south side of the roadway would be constructed to rural standards, which would include a paved six-foot shoulder and a four-foot neighborhood path. See **figure 1-2**, which shows the proposed roadway section with dimensions. In order to minimize impacts, the Five-Lane Alternative would not have a center left-turn lane across North Fork Issaquah Creek. Under both action alternatives, the crossing of North Fork Issaquah Creek would be accomplished using an open-bottom culvert. A bridge option and a retaining wall option were analyzed as wetland mitigation for the North Fork Issaquah Creek crossing (see **tables 3-4, 3-5,** and **3-6** in Chapter 3). These options are discussed in Chapter 3 under mitigation sections for Earth and Water.

Retaining walls would be used in a few locations along the project corridor to stabilize cuts along slopes, and to minimize the need for additional right-of-way. Based on current King County road standards, approximately 4.35 acres of right-of-way would be required to construct this alternative. It is possible that less right-of-way will be needed to widen the road. Consequently, deviations from the standards could be allowed, in order to reduce the

amount of right-of-way acquisition. In addition, **36,600**~~18,900~~ square feet of right-of-way would be needed to construct two detention facilities and one infiltration facility.

The road would be posted to allow a speed of 45 mph, which is typical for roads designated as principal or minor arterials. To improve sight distances, the hills southwest of 247th Place SE would be flattened, the dip in the road across North Fork Issaquah Creek would be reduced, and the entire length of the project corridor would be illuminated.

2.2 THREE-LANE ALTERNATIVE

The Three-Lane Alternative would be the same as the Five-Lane Alternative with the following exceptions:

- The Three-Lane Alternative would be constructed to accommodate one 11-foot travel lane in each direction with a 12-foot center left-turn lane. See **figure 1-2**, which shows the proposed roadway section with dimensions. The Three-Lane Alternative would not have a center left-turn lane across North Fork Issaquah Creek.
- Based on current King County road standards, approximately 2.62 acres of right-of-way would be required to construct the Three-Lane Alternative. As with the Five-Lane Alternative, it is possible that less right-of-way will be needed to widen the road. Consequently, deviations from the standards could be allowed, in order to reduce the amount of right-of-way acquisition. In addition, **24,400**~~12,300~~ square feet of right-of-way easements would be needed to construct two detention facilities and one infiltration facility.

2.3 NO ACTION ALTERNATIVE

The width of the road would be essentially unchanged, except for routine maintenance and minor improvements. There would be no major structural modifications or changes.

Issaquah-Fall City Road currently has two lanes from Issaquah-Pine Lake Road to Klahanie Drive SE, with left-turn pockets at 247th Place SE and Klahanie Drive SE. There currently are no bicycle lanes, sidewalks, curbs, or gutters.

2.4 IMPACTS COMPARISON

The No Action Alternative would result in the fewest impacts to most elements of the natural environment because there would be no right-of-way acquisition, no grading activities, and no increase in the amount of impervious surface area.

Both action alternatives would require ROW acquisition that would impact existing land uses, public utilities, plants and animals, and wetlands. The Five-Lane Alternative would require the greatest amount of ROW for widening.

Both action alternatives would require grading activities that could increase the potential for erosion. The Five-Lane Alternative would require the most removal and replacement of soil.

Both action alternatives would increase the amount of impervious surface area, and result in a significant increase in the peak runoff flows leaving the roadway surface after construction. The Five-Lane Alternative would result in the greatest increase in impervious surface area.

There are several impacts that the Five-Lane Alternative would have on North Fork Issaquah Creek. First, the channel would be encroached on by the placement of fill material for the roadway crossing. Placing fill in the channel would result in the loss of stream and wetland habitat. Second, erosion and sedimentation during construction could affect water quality. Third, the increase in the volume of stormwater entering the stream from the increased impervious surface of the new roadway area could lead to possible changes in channel morphology through increased channel erosion. Finally, lengthening the existing culvert possibly could create a barrier to upstream fish migration.

The greatest potential for water quality degradation would occur during construction. At that time, rain falling on exposed soils could transport large quantities of sediment off-site. Downstream, the sediment could contribute to sedimentation and flooding problems, and introduce nutrients to the streams and lakes.

The addition of sediment to the channel could contaminate spawning gravel and reduce the survival of young fish. Excess sediment also could reduce the available food to stream fishes.

Impacts to the stream and wetlands would be similar in nature, but likely smaller in magnitude, than those described for the Five-Lane Alternative. Less encroachment would be required, less sediment mobilized, smaller volumes of stormwater and a shorter culvert would be required than the equivalent quantities for the Five-Lane Alternative.

The No Action Alternative would have no additional impacts to the stream.

All of the alternatives would have minor impacts on air quality and noise.

The action alternatives would provide improvements to safety and operations due to the addition of a center two-way left-turn lane, sidewalks, and bicycle lanes. Both action alternatives would also improve sight distances along the roadway by flattening the hills

somewhat southwest of 247th Place SE, and reducing the dip across North Fork Issaquah Creek.

Although the No Action Alternative would result in the fewest impacts to the natural environment, it would not provide any benefit to traffic operations and safety along the route. The No Action Alternative also would exceed Road Adequacy Standards sooner than if improvements were made. This could result in prohibitions on development anticipated by the East Sammamish Community Plan Update and Area Zoning until standards are met.

2.5 CONSTRUCTION SCHEDULE

Widening of the road depends on funding availability, but is anticipated to occur in the spring of 1998. Construction is expected to be complete in one year.

2.6 DELAY IN ACTION

The SEPA requires consideration of the effects of delaying the proposed action until a later date. Delaying implementation of the proposed road improvements until some future time would have no immediate effect because there is still sufficient capacity along the road.

Although the road meets the design standards that were in effect when it was built, it does not meet the current standards. The continuation of conditions that are below current standards would result in a delay in implementing the proposed action.

Unavoidable environmental impacts to various elements of the environment would be postponed by a delay in action.

3.2 AIR QUALITY

3.2.1 Existing Conditions

Air quality is generally assessed in terms of whether concentrations of air pollutants are higher or lower than ambient air quality standards set to protect human health and welfare. In the case of transportation projects, the air pollutant of major concern is carbon monoxide (CO), because it is the pollutant emitted in the largest quantity by transportation sources for which an ambient air standard exists.

Other pollutants generated by traffic include the ozone precursors: hydrocarbons and nitrogen oxides. Fine particulate matter (PM_{10}) also is emitted in vehicle exhaust and generated by tire action on pavement (or unpaved areas), but the amounts of PM_{10} generated by individual vehicles are small compared with other sources (e.g., a wood-burning stove). Sulfur oxides and nitrogen dioxide also are both emitted by motor vehicles, but concentrations of these pollutants are generally not high except near large industrial facilities.

Three agencies have jurisdiction over the ambient air quality in the proposed project area: the U.S. Environmental Protection Agency (EPA), the Washington Department of Ecology (Ecology), and the Puget Sound Air Pollution Control Agency (PSAPCA). These agencies establish regulations that govern both the concentrations of pollutants in the outdoor air and contaminant emissions from air pollution sources. Although their regulations are similar in stringency, each agency has established its own standards.

Ecology and PSAPCA maintain a network of air quality monitoring stations throughout the Puget Sound area. In general, these stations are located where there may be air quality problems, and so are usually in or near urban areas or close to specific large air pollution sources. Other stations are located in remote areas to provide an indication of regional air pollution levels. Based on monitoring information collected over a period of years, the state (Ecology) and federal (EPA) agencies designate regions as being "attainment" or "nonattainment" areas for particular air pollutants. Attainment status is therefore a measure of whether air quality in an area complies with the federal health-based ambient air quality standards.

Ozone

Ozone is a highly reactive form of oxygen created by sunlight-activated chemical transformations of nitrogen oxides and volatile organic compounds (hydrocarbons) in the atmosphere. Unlike carbon monoxide concentrations which tend to occur very close to the emission source(s), ozone problems tend to be regional in nature, because the atmospheric chemical reactions which produce ozone occur over a period of time. During the lag time between emission and ozone formation, ozone precursors can be transported far from their sources. Transportation sources are one of a number of sources which produce the precursors to ozone.

During the summer of 1990, ozone concentrations exceeded the 0.12 parts per million (ppm) ambient standard several times at monitoring stations in both Enumclaw and Lake Sammamish State Park. As a result of these violations, EPA designated all of Snohomish, King, and Pierce Counties as nonattainment for ozone. In late 1992, the ozone nonattainment area was reduced to include all of Pierce County, all except a small portion in the northeast corner of King County, and the western portion of Snohomish County (**Federal Register 1992**, page 56777). The project area is included in the ozone nonattainment area. This designation requires the State to develop a plan to reduce emissions and bring ozone concentrations back into attainment. Such a plan probably will require further efforts to reduce ozone-precursor emissions (hydrocarbons and oxides of nitrogen) from all sources including transportation, as well as requiring emissions reductions from some large industrial sources.

The PSAPCA and Ecology currently are studying recent ambient air quality monitoring and meteorological data in an effort to begin the process of petitioning EPA for redesignation to attainment for ozone. There were no recorded ~~exceedances of the ozone standard~~ **ozone concentrations above the 0.12 ppm one-hour limit** at Ecology monitoring stations in the Puget Sound region in 1991, 1992, or 1993 (**D. Schneider, personal communication**). During July 1994, however, ~~*unofficial*~~ ozone concentrations exceeded the allowable limit twice at the Enumclaw monitor, and ~~reached the level of the 0.12 ppm standard~~ at the Pack Forest station. Because the ozone standard allows concentrations at each monitoring site to exceed the limit up to three times in three years, the ozone standard has not been violated since 1990. ~~If the July 1994 Enumclaw measurements are confirmed,~~ **To date, no exceedances have been recorded in 1995. If** a total of two or more maximum hourly ozone concentrations above 0.12 ppm at the Enumclaw monitor in the next two years**, the station would be out of compliance.** ~~would cause the standard to be violated.~~ This would very likely extend the nonattainment status of the area.

Fine Particulate Matter (PM_{10})

Federal, state, and local regulations set limits for particles less than or equal to about 10 micrometers in diameter. This fraction of particulate matter is called PM_{10}, and is the important size fraction in terms of potential human health impacts, because particles this size can be inhaled deeply into the human lung. ~~Fine particulate matter~~ **The PM_{10}** is generated by industrial activities and operations, fuel combustion sources like residential wood burning, motor vehicle engines and tires, and other sources. Such sources occasionally cause high PM_{10} levels in the Puget Sound region, and several areas in Seattle and Tacoma have been declared nonattainment areas because PM_{10} concentrations sometimes exceed health standards.

The project area is not included in an existing PM_{10} nonattainment area, and given the lack of major sources, it is likely that PM_{10} concentrations are below the limits set by the health standards most of the year. During prolonged periods of stagnant meteorological conditions, however, it is possible that PM_{10} emissions from vehicles, residential

solid-fuel space heating, and other sources in the study area could elevate PM_{10} concentrations beyond the established health standards.

Carbon Monoxide (CO)

Carbon monoxide is the product of incomplete combustion, and it is generated by transportation sources and other fuel-burning activities like residential space heating, especially heating with solid fuels like coal or wood. Carbon monoxide **(CO)** is usually the pollutant of greatest concern related to transportation sources because it is the pollutant emitted in the greatest quantity for which short-term health standards exist. Short-term standards (as opposed to annual average standards) are often the controlling, or most restrictive air pollution standards. There are two air quality standards for carbon monoxide: a one-hour average standard of 35 **parts per million** (ppm) and an eight-hour average standard of **9.5**~~nine~~ ppm. These levels may be exceeded once per year without violating the standard.

Unlike ozone, CO is a pollutant whose impact is usually very localized. The highest ambient concentrations of CO usually occur near congested roadways and intersections during periods of low temperatures, light winds, and stable atmospheric conditions. Because the impact occurs so close to the source, it is not possible to extrapolate CO concentrations from regional data or distant monitors.

There are no direct CO monitoring data for the project area, so there are no definitive indications of existing CO concentrations. The project area is, however, located on the eastern border of the CO nonattainment area which encompasses a large portion of the Everett-Seattle-Tacoma urban area (**Federal Register 1991**, page 56846). This designation requires PSAPCA and Ecology to develop strategies and plans to work toward complying with the ambient standards, and will affect transportation planning and emission control policies throughout the nonattainment area.

The most recent two years of published ambient air quality monitoring data **(1992 and 1993)** indicate there have been no recorded ~~exceedances~~ **concentrations that were not in compliance with** ~~of~~ the CO standards in the Puget Sound region ~~in~~**during that period (Ecology 1994). Ecology recorded no CO levels that did not fall within the standards in 1994. On Wednesday, January 4, 1995 an ambient air monitor on NE 8th Street/108th Avenue NE in Bellevue recorded on eight-hour concentration of 9.7 ppm (J. Rasmussen, personal communication). This station will be out of compliance if it measures one more eight-hour concentration above the 9.5 ppm limit.** ~~the past two years (D. Schneider, personal communication)~~. **Because no other monitoring stations have recorded violations of the standards in recent years** ~~As with ozone~~, PSAPCA and Ecology are analyzing recent data to determine whether the area should be redesignated as attainment for CO.

3.2.2 Impacts

Dispersion modeling was completed for 1994 Existing Conditions near one signalized intersection on Issaquah-Fall City Road (refer to the "Method of Analysis" Section for modeling methodology). The results of the modeling (shown in table 1) indicate that the existing, maximum peak-hour CO concentration near the intersection examined is within the one-hour standard (35 ppm) and low enough to ensure compliance with the eight-hour standard as well.

Construction Impacts

Impacts Common to Both Action Alternatives. During construction, dust from excavation and grading would contribute to ambient concentrations of suspended particulate matter. The construction contractor(s) would have to comply with the Puget Sound Air Pollution Control Agency's Regulation I, Section 9.15, requiring reasonable

precautions to avoid dust emissions. This environmental protection may include applying water or dust suppressants during dry weather.

Construction would require the use of heavy trucks and smaller equipment such as generators and compressors. These engines would emit air pollutants that would slightly degrade local air quality, but their emissions and resulting concentrations would be far outweighed by emissions from traffic normally in and around the project area.

Some phases of construction would cause odors detectable to some people away from the project site. This would be particularly true during paving operations using tar and asphalt. Such odors would be short-term.

Construction equipment, material hauling, and detours for excavation and grading could affect traffic flow in the project area. If construction delays traffic enough to significantly reduce travel speeds in the area, general traffic-related emissions would increase.

No Action Alternative. Because the No Action Alternative would involve no construction other than routine maintenance, there would be no construction-related air quality impacts.

~~*Operational Impacts*~~

~~***Method of Analysis.*** In many cases where it is necessary to analyze the potential air quality impacts from a proposed project, air quality models are used to quantify pollutant emissions and concentrations that could result. This approach is dictated by EPA guidelines and by federal and state air quality rules. In some cases, however, it is possible to forgo such quantitative analyses because it is clear that a project will have a minor effect on air quality. The proposed Issaquah-Fall City Road improvement project is one such project.~~

~~This determination was based on EPA guidance, which suggests that it is not necessary to model projects for air quality impacts if projected traffic conditions indicate the project would not cause major changes in CO emissions or concentrations. This assessment can be made by reviewing traffic analyses that calculate intersection levels of service (LOS) based on the average delay experienced by vehicles traveling through a signalized intersection (see **Appendix D** for a detailed description of LOS and LOS calculations). Level of service is generally described by a letter scale from A to F with A representing free-flow conditions (motorists experience little or no delay at intersections), and F representing forced flow or congestion (motorists experience very long delays at an intersection). Environmental Protection Agency guidance suggests that signalized intersections with an LOS of C or better probably do not have the potential to exceed the CO standard (**EPA 1992**).~~

~~Consistent with EPA guidance, the LOS analyses for the intersections that would be most affected by the Issaquah-Fall City Road improvement project were reviewed. The~~

~~intersections of Issaquah-Fall City Road with Klahanie Drive SE (signalized), and 247th Place SE (signalized) would be directly affected by the proposed project; both were analyzed in the traffic study for this project and both were considered for further air quality analysis.~~

~~The intersection of Issaquah-Fall City Road with Issaquah-Pine Lake Road is not included in this proposed project, but may be modified as part of the Issaquah-Pine Lake Road project. This intersection was analyzed in a separate EIS that included consideration of traffic from the proposed Issaquah-Fall City Road project, so this intersection was not reexamined as part of the current study. The intersection of Issaquah-Fall City Road with Issaquah-Pine Lake Road is mentioned in the following discussion for completeness because it is near the western terminus of the proposed project.~~

~~Based on EPA guidance for intersections that would not cause a major change in CO emissions or concentrations, it was decided that detailed examination with air quality modeling was unnecessary for the project alternatives. As discussed below, either action alternative would result in sufficiently high LOS at all three intersections to indicate the project would have a minimal impact on air quality.~~

Method of Analysis for Operational Impacts

A "microscale" air quality impact analysis was performed, with carbon monoxide (CO) concentrations used to evaluate air quality impacts associated with the proposed Issaquah-Fall City Improvement Project. To calculate CO concentrations, peak-hour CO emission rates due to traffic near several intersections in the project area were computed using the Mobile5a emissions model. Based on these calculated vehicle emission factors and assumed worst-case meteorological factors, the CAL3QHC dispersion model was used to calculate ambient CO concentrations near signalized intersections that would be most affected by traffic in the project area. The CAL3QHC model estimates CO concentrations at model receptors near roadway intersections based on emissions from free-flowing and queued traffic under different wind and stability conditions. Calculated concentrations were then compared with pertinent air quality standards.

Mobile5a Emission Factor Modeling Parameters. The EPA recommended Mobile5a was used to calculate carbon monoxide emission factors for current and future years (EPA 1993a). Mobile5a is the fifth in a series of models for predicting vehicle emission factors (in grams per vehicle mile-of-travel) based on a specific traffic description for an area of interest. The Mobile5a model can consider programs in effect in an area and adjust the emission factors accordingly. Other than region-specific programs, parameters such as temperature, hot and cold starts, speed, year, etc. are incorporated into the model to produce composite emission factors for dispersion modeling.

The Washington State Departments of Ecology and Transportation (Ecology, WSDOT) recommend using Mobile5a input parameters consistent with those used in the development of the CO Washington State Implementation Plan (SIP). Accordingly, the following assumptions and parameters were used in Mobile5a to determine emission factors in the Issaquah area. These same parameters were employed in Ecology's modeling for the CO SIP.

- Consistent with EPA guidance, idle emission rates were calculated by multiplying the emission rate for 2.5 mph by 2.5 (EPA 1993b); Mobile5a produces average emission factors for all speeds between 2.5 and 65 mph, but cannot yet calculate idle emission rates.

- The Issaquah-Fall City Road area is included in the original 1982 vehicle Inspection & Maintenance program (I&M). Accordingly, 87 percent of vehicles traveling through this area in the peak-hour were assumed to be subject to this program.

- The percentages assumed in the federal testing procedure were used to represent the percentages of vehicles in cold-start and hot-start modes.

- To simulate conditions when carbon monoxide violations have been found most likely to occur in southwestern Washington, outdoor minimum and maximum daily temperatures of 34° and 50° Fahrenheit were used. From these temperatures, Mobile5a calculated a PM peak-hour temperature of about 46°F.

- Data representing the 1990 Washington State vehicle-registration pattern were used to represent the distribution of vehicles by type and age in the three years evaluated (1994, 2000, and 2012).

CAL3QHC-Evaluated Intersections. Traffic-related air quality impacts were evaluated at locations near two intersections in the project area using a network of road links near each intersection. Consistent with EPA guidance, project-affected, signalized intersections were selected for dispersion modeling by reviewing LOS analyses, total traffic volume, and project trips in the future year (Entranco 1995). Based on this screening evaluation, three intersections would be affected by this project; Issaquah-Fall City Road with Issaquah-Pine Lake Road, Klahanie Drive SE, and 247th Place SE. Because the intersection of Issaquah-Fall City with Issaquah-Pine Lake was analyzed previously in the Grand Ridge UDP DEIS (King County 1995) and the Issaquah-Pine Lake Road EIS (King County 1994) using similar traffic volumes, it was not analyzed in this EIS. The intersection of Issaquah-Fall City Road with 247th Place SE has recently been signalized (refer to the Transportation section for more details).

CAL3QHC Dispersion Modeling Parameters and Application. The CAL3QHC, Version 2, dispersion model was used to calculate peak-hour CO concentrations near each intersection (EPA 1992a). The CAL3QHC Version 2 is the latest in the Caline series of dispersion models designed to calculate pollutant concentrations caused by transportation sources. It considers "free-flow" and "queue" emissions (based on Mobile5a emission factors) together with intersection geometry, wind direction, and other meteorological factors.

The following assumptions and parameters were used in the CAL3QHC modeling and are consistent with the Washington State CO SIP and EPA guidance for dispersion modeling:

- Critical meteorological parameters were a 3,280.8 feet mixing height, low wind speed (3.28 feet/second), and a stable atmosphere (Class E) (EPA 1992b, P. Downey, personal communications).
- The modeling evaluated 36 wind directions (in 10° increments) to ensure worst-case conditions were considered for each receptor location (EPA 1992b).
- A "background" one-hour carbon monoxide concentration of three ppm was assumed to represent other sources in the project area (EPA 1992b).
- The modeling configuration considered road links extending 1,000 feet from each intersection. Using the procedures required for the CAL3QHC dispersion model, both free-flow and queue links were configured approaching and departing the intersections evaluated. Near-road receptors were located 33 feet and 98 feet from cross streets, 10 feet from the nearest traffic lane, and 5.7 feet above the ground to correspond to a typical sidewalk location at typical breathing height. Modeling used at least six near-road receptors near each intersection, depending on the intersection's configuration (EPA 1992b).
- The p.m. peak-hour traffic conditions provided by King County would lead to the highest possible one-hour and eight-hour CO concentrations.
- One-hour concentrations were converted to represent eight-hour concentrations using a "persistence factor" (i.e., the ratio of eight-hour to one-hour CO concentrations) to represent variability in both traffic volumes and meteorological conditions. The analysis employed a persistence factor of 0.7, that is the default value recommended in EPA guidance, to be used if specific CO monitoring data are not available. Using this factor, a calculated one-hour concentration must be greater than or equal to 13.6 ppm (13.6 ppm x 0.7 = 9.5 ppm) for there to be a potential for an eight-hour concentration exceeding the standard. Thus, to ensure compliance with the eight-hour standard, the one-hour concentration must be less than 13.6 (or "14" in table 1) (EPA 1992b).

Table 1 displays the results of the CAL3QHC dispersion modeling for 1994 existing conditions and the action and no action alternatives in 2000 and 2012. While the modeling used at least six nearby receptors depending on each intersection's configuration, table 1 displays only the highest calculated one-hour and eight-hour CO concentrations near each intersection. The reported one-hour concentrations include a three-ppm background concentration to account for emissions from other sources in the area. The calculated one-hour concentrations were converted to represent eight-hour concentrations using a factor of 0.7 to reflect both meteorological and traffic variability over an eight-hour period. This conversion is based on EPA and local agency recommendations, and generally over estimates eight-hour CO concentrations above actual levels.

Table 1
Existing and Future Calculated Peak-Hour (and Eight-Hour) Carbon Monoxide Concentrations
(ppm)

	1994	Opening Year 2000			Design Year 2012		
Intersection	Existing	5-Lane	3-Lane	No Action	5-Lane	3-Lane	No Action
I-FC Rd & Klahanie Road	6 (4)	11 (8)	7 (5)	7 (5)	10 (7)	7 (5)	7 (5)
I-FC Rd & 247th Place SE[1]	NS	7 (5)	7 (5)	7 (5)	9 (6)	7 (5)	9 (6)

Note: I-FC Rd = Issaquah-Fall City Road, NS = not signalized; an unsignalized intersection cannot be modeled using the CAL3QHC model.

1. This intersection was signalized for the year 2000 and 2012 analyses.

Operational Impacts

~~***Five-Lane Alternative.*** The LOS analysis indicates that in 2010, the Five-Lane Alternative would result in high LOS at all three intersections affected by the project. Because the LOS at all three intersections is currently better than LOS D and would remain better than D in the project design year, current EPA guidance suggests that effects on air quality near these intersections would be minimal, and that no further analysis is required.~~

Five-Lane Alternative. **With this alternative, Issaquah-Fall City Road would be widened to five lanes (two through lanes plus one center-turn lane) from Issaquah-Pine Lake Road to Klahanie Drive SE. By widening the Issaquah-Fall City Road and producing more traffic volume, this alternative would result in higher CO concentrations than with existing conditions or those that would result with no action in the opening year 2000. Near the intersection of Issaquah-Fall City Road**

with Klahanie Drive SE, the maximum calculated one-hour CO concentration would be five ppm higher than the calculated maximum level for 1994. These higher levels, however, would meet the 35-ppm standard and would be low enough to remain within the eight-hour limit of nine ppm as well (table 1).

Near the intersection of Issaquah-Fall City with 247th Place SE, the Five-Lane Alternative would result in CO concentrations the same as the No Action Alternative. As with the other modeled intersection, maximum CO levels would comply with both applicable standards.

Due to increasingly stringent emission reduction requirements and a continuing vehicle Inspection and Maintenance Program, Mobile5a calculated peak-hour vehicle emission rates would continue to decrease by 2012. These lower emission rates would not, however, offset the expected increases in traffic congestion by 2012. Consequently, in 2012, the Five-Lane Alternative would increase worst-case CO concentrations at both intersections compared with existing conditions, and result in the same peak-period concentration as no action at the intersection with 247th Place SE. At the intersection with Klahanie Drive SE, this alternative would result in higher concentrations than the No Action Alternative. Nonetheless, calculated one-hour CO concentrations near both modeled intersections would be well below the 35-ppm standard. Converting the maximum one-hour concentration to eight-hour levels results in levels below the 9.5-ppm limit (table 1).

~~***Three-Lane Alternative.*** Based on the LOS analysis, the air quality effects of this alternative would be approximately the same as with the Five-Lane Alternative. The intersections of Issaquah-Fall City Road with Klahanie Drive SE and 247th Place SE would both have LOS C; the intersection with SE Issaquah-Pine Lake Road would have LOS B. Because the LOS at all three intersections is currently better than D and would remain better than LOS D in the project design year, EPA guidance suggests that effects on air quality near these intersections would be minimal, and that no further analysis is required.~~

Three-Lane Alternative. With the Three-Lane Alternative, maximum one-hour and eight-hour CO levels near both modeled intersections would be the same as would be expected with no action in the opening year 2000 (table 1). The road configurations near the intersection of Issaquah-Fall City Road with Klahanie Drive SE would be virtually the same as with the No Action Alternative. On 247th Place SE near the intersection with Issaquah-Fall City Road, channelization improvements would occur with this alternative (i.e., an extra right-turn lane) because of extreme congestion (refer to the Transportation section).

Calculated one-hour CO concentrations near both intersections would meet the 35-ppm one-hour standard. Converting these values to eight-hour average concentrations suggests these levels would comply with the National Ambient Air Quality Standard (NAAQS) as well.

In 2012, the Three-Lane Alternative would have the same one-hour and eight-hour CO levels as would be expected with the No Action Alternative at the intersection of Issaquah-Fall City Road with Klahanie Drive SE. Near the intersection with 247th Place SE, the Three-Lane Alternative would result in improved air quality compared with the No Action Alternative because of channelization improvements along 247th Place SE (table 1). As a result, the Three-Lane Alternative would meet both applicable standards for CO concentration.

~~***No Action Alternative.*** With the No Action Alternative, the LOS at the three currently signalized intersections would be the same as with the Three-Lane Alternative. Thus, no air quality impacts would be expected.~~

No Action Alternative. **This alternative would have the same road network as currently exists, except that the intersection of Issaquah-Fall City Road with 247th Place SE would be signalized because of scheduled King County improvements.**

As a result of the expected improvements in engine efficiency, emission rates calculated by Mobile5a would be lower by the opening year 2000. These lower emission rates would not, however, offset the increases in emissions due to expected traffic congestion. Nevertheless, calculated one-hour CO concentrations near all modeled intersections are well below the 35-ppm standard and low enough to remain within the eight-hour limit as well (table 1).

By 2012, no action would result in higher peak-hour CO concentrations than with existing conditions. Compared with the opening year, the No Action Alternative would result in higher or similar maximum CO levels in the design year 2012. The modeled, peak-hour CO concentrations near both intersections would be in compliance with the one-hour standard. Maximum eight-hour concentrations would continue to comply with the 9.5-ppm NAAQS as well (table 1).

3.2.3 Conformity With State Implementation Plan

The federal Clean Air Act requires the State to take actions to reduce air pollution in nonattainment areas to the extent that federal health-based standards are not exceeded, and to provide enough control measures to assure attainment for at least ten years. The

framework that provides for meeting these goals is the ~~State Implementation Plan (~~SIP~~)~~. As required by the Federal Clean Air Act, Ecology and PSAPCA have submitted both the ozone and the CO SIPs to EPA for review, but the plans have not yet been approved.

Under section 176(c) of the Clean Air Act, as amended in 1990 and adopted by chapter 70.94 Revised Code of Washington (RCW) of the Washington Clean Air Act of 1991, the Puget Sound Regional Council (PSRC), as the responsible metropolitan planning organization, and the ~~Washington State Department of Transportation (~~WSDOT~~)~~ cannot adopt, approve, or accept any transportation improvement plans, programs, or projects unless they conform to the Washington SIPs.

Conformity to an implementation plan is defined as conforming with a plan's purpose of eliminating or reducing the severity and number of violations of an ambient air quality standard, and achieving expeditious attainment of such standards. The federal and state rules and regulations governing conformity are described in the EPA 40 CFR parts 51 and 93 and in chapter 174-420 of the Washington Administrative Code (WAC). Under these rules, transportation projects in nonattainment areas which affect major arterials and/or regionally significant roads are subject to conformity review. Because Issaquah-Fall City Road is considered a minor arterial and because the project will not affect traffic on a regionally significant route, the proposed project is not subject to a formal conformity determination. ~~Nonetheless, given the minor effects the proposed project is expected to have on local air quality, the project would conform with the existing air quality plans.~~

3.2.4 Mitigation

The air quality impact evaluation described here provides the same level of detail as a *project-level* conformity assessment. Based on the results of this air quality analysis, the Issaquah-Fall City Road project conforms to the SIP's purpose of achieving attainment with the carbon monoxide one-hour and eight-hour standards.

Mitigation During Construction Common to Both Action Alternatives

Emissions from construction equipment and trucks can be reduced by using well-maintained equipment. Avoiding prolonged periods of vehicle idling and engine-powered equipment would also reduce emissions.

Trucking materials to and from the project area could be scheduled to minimize congestion during peak travel times. This would minimize secondary air quality impacts caused by traffic having to travel at reduced speeds.

Dust produced by construction would be reduced by several techniques. Areas of exposed soils such as storage yards and construction roadways could be sprayed with water or other dust suppressants. Roads and other areas that might be exposed for

prolonged periods could be paved, planted with a vegetative ground cover, or covered with gravel. The amount of soils carried out of the construction area by trucks would be reduced by wheel washing and covering dusty truck loads. Finally, that soil that does escape the construction area on exiting vehicles would be reduced with an effective street-cleaning effort.

Mitigation During Operation

No air quality impacts have been identified, so no actions to mitigate operation of the proposed project have been considered, nor are they warranted.

3.2.5 Unavoidable Significant Adverse Impacts

None have been identified.

3.3 WATER

3.3.1 Existing Conditions

Runoff/Flooding

Rainfall in the Puget Sound region usually occurs in the form of long-duration storms of relatively low intensity. After the rain strikes most soil surfaces, a certain amount soaks into the ground, or infiltrates. When the amount of rainfall exceeds the infiltration capacity of the ground, the additional water flows across the surface of the ground and becomes stormwater runoff. Runoff tends to increase when an area becomes developed, because developed areas tend to have a lower capacity to infiltrate rainfall, and because runoff tends to move more quickly off of the area, due to the smoother surfaces of roadways and landscaping, and the ditches or pipes which are installed to carry the runoff.

Runoff from the project area enters two regional drainage basins: the Issaquah Creek Basin and the East Lake Sammamish Basin. The Issaquah Creek Basin drains to North Fork Issaquah Creek, and the East Lake Sammamish Basin drains to Laughing Jacobs Creek (**figure 3-4**). Both creeks eventually flow into Lake Sammamish. King County Surface Water Management (SWM) has proposed basin plans for both regional drainage basins (**King County SWM 1992a, 1992b**), and both proposed plans have more stringent standards for detaining runoff than required by the King County *Surface Water Design Manual* (**King County DPW 1992b**). In addition, both plans make recommendations to preserve water quality which exceed the requirements of the King County *Surface Water Design Manual*.

For the most part, stormwater on the existing site drains to ditches along the sides of the roadway, where much, if not all, of it infiltrates into the soil. The exceptions are at the entrances of various properties and subdivisions where the ditches enter culverts under the driveways. Except for a 550-foot stretch in the middle of the study area, the soils along the roadway have high infiltration rates, and there are no signs that runoff concentrates into flows along or near the roadway.

Flows from eight off-site subbasins either cross Issaquah-Fall City Road or enter the roadway ditches. Due to the natural infiltration occurring through most of the areas upstream of the roadway, the only drainage crossing that shows evidence of frequent flows is North Fork Issaquah Creek. The Hunters **Ridge~~Glen~~** and Klahanie subdivisions both discharge some flows into the roadway ditches, but most of the other off-site subbasins do not appear to have contributed flow to the roadway in the past several years. **Refer to Appendix D of the Surface Water Technical Information Report, which is Appendix A of the DEIS.**

There have been no reports of flooding within one-quarter mile upstream or downstream of the project.

Water Quality

The two main streams downstream of the project area, Laughing Jacobs Creek and North Fork Issaquah Creek, are classified by King County as Class 2 with salmonids (**King County SWM 1992a, 1992b**). Although the water quality of both streams is generally good, water quality problems have been noted in both during storm events (**King County SWM 1992a, Metro 1990, 1991**), primarily due to nonpoint source pollution in their watersheds. Nonpoint pollution is contamination which does not enter a water body at a specific spot, but rather comes from a relatively dispersed area. Two examples of nonpoint sources of pollution in the area are pasture land, which introduces nutrients and bacterial contamination to the stream, and runoff from developed areas, which add metals, bacteria, and petroleum compounds.

The entire project is within the Lake Sammamish watershed. In 1989, a management plan was developed to reduce the effects of urban development on water quality in the lake (**Entranco 1989**). Studies had shown that the amount of biologically available phosphorus (BAP) coming into the lake, that is, the amount of phosphorus which is directly available for uptake and use by algae, would eventually cause a serious decline in lake water quality. It was estimated that if development were to occur without measures to reduce BAP loading (the mass of BAP entering the lake), the BAP load to the lake would increase by nearly 70 percent, which would cause the clarity of the water to decrease by 35 percent.

It was estimated that the North Fork Issaquah Creek was contributing 401 kilograms of BAP to Lake Sammamish per year, and that Laughing Jacobs Creek was contributing 287 kilograms per year, out of a total of 6,175 kilograms per year from all sources entering the lake. Therefore, North Fork Issaquah Creek and Laughing Jacobs Creek contribute approximately 6.5 and 4.6 percent of the external BAP load to Lake Sammamish, respectively.

The Lake Sammamish study recommended several measures to control BAP entering the lake, and King County is enacting the recommendations through the basin plans mentioned above. **Stormwater treatment requirements in the basin plans and in the forthcoming revisions to the King County Surface Water Design Manual include specific measures designed to reduce the BAP in stormwater before it is discharged to lakes or streams.**

Increased flow and flooding from developed areas can result in erosion problems in streams and ditches, if they are not adequately vegetated. Erosion increases the suspended solids, nutrients, and turbidity in the water, and can cause habitat and

flooding problems after deposition of the eroded material. **There is significant erosion occurring along the north side of the road. The discharge from both the Klahanie and Hunters Ridge developments is causing downcutting in the ditch lines along Issaquah-Fall City Road, near the crossing of North Fork Issaquah Creek. The roadside ditch, located north of the North Fork Issaquah Creek channel, has been armored with four- to six-inch quarry rock in an effort to mitigate erosion and the transport of sediment to the creek channel. Other than this,** ~~T~~there were no serious erosion problems observed in, or for one-quarter mile downstream of, the project area. Erosion is discussed further in the Earth section of this EIS.

Groundwater

Three groundwater regimes are known to reside within the vicinity of the project alignment. The first of these regimes is a shallow perched water table commonly referred to as "interflow." Interflow develops as rainwater infiltrates through the upper weathered glacial till and recessional outwash deposits and becomes perched above the less pervious glacial till or hard pan (refer to the section on Earth for a discussion of site geology). Upon encountering the hardpan contact, the infiltrated rainwater begins to flow laterally and is often seen as seeps or springs emanating on side hills or slopes adjacent to alluvial channels such as North Fork Issaquah Creek and local depressions such as Yellow Lake. This interflow typically dries up during the summer months.

The second groundwater condition is a deeper aquifer residing in the advanced outwash sands and gravels underlying the upper glacial till cap which covers the area. This aquifer is regionally recharged by the shallow groundwater regime which will slowly infiltrate through the till cap in topographically low areas such as wetlands, stream channels, and lakes.

The third distinct groundwater regime resides in the sandstone bedrock. This groundwater aquifer receives its recharge regionally from the overlying glacial and interglacial sediments.

Review of Ecology's well log files identified 14 wells in the project vicinity. The approximate locations of these wells are shown on **figure 3-5**. Of these 14 wells, five wells (W1, W2, W7, W13, and W14) derive their water from cut outwash sand and gravel deposits at depths of 60 to 90 feet below the ground surface. The remaining nine wells were cut into the underlying sandstone bedrock and derive water from depths as great as 340 feet below the ground surface.

Wetlands

The King County Sensitive Areas Ordinance defines wetlands as those areas of King County that are inundated or saturated by ground or surface water at a frequency and duration sufficient to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Water in

wetlands can come from rainfall, surface flows, seeps, or high groundwater tables. Wetlands have functions and values that can include water quality treatment, stormwater storage, wildlife habitat, and the provision of recreational and educational opportunities.

contrasts sharply with the muck substrate found upstream. The substrate appeared suitable for salmonid spawning; the presence of many juvenile fish is an indication that successful spawning has occurred. A 15-foot-high waterfall and series of bedrock cascades occur about two miles downstream of Issaquah-Fall City Road. In 1989, coho carcasses were found at the base of this cascade (**King County SWM 1991**).

The riparian vegetation consisted of many of the same species observed in the upstream area. Douglas fir (*Pseudotsuga menziesii*) is common in areas along the stream with the drier soils. The stream is well shaded with nearly complete closure of the canopy.

Over much of the inventoried length, the stream flows within 500 feet of Issaquah-Fall City Road. At 1,000 feet downstream of the roadway, the stream alignment begins to pull away from the road. The stream enters a large wetland area approximately 1,300 feet downstream of the Issaquah-Fall City Road.

For more information, see the Streams Special Study located in **Appendix C**.

3.3.2 IMPACTS

Five-Lane Alternative

Runoff/Flooding. There would be a significant increase (44 to 129 percent) in the peak runoff flows and volumes leaving the roadway surface after construction of this alternative (**table 3-2**). This is a consequence of the increased amount of pavement, which would both prevent rainfall from soaking into the soil, increasing runoff peak flows and volumes, and shorten the time the runoff takes to collect, which also affects the peak flow rates.

Table 3-2
Stormwater Flow Summary

	Flow from Roadway (cfs)								
	2-Year			10-Year			100-Year		
Roadway Subbasin[a]	Five-Lane	Three-Lane	No Action	Five-Lane	Three-Lane	No Action	Five-Lane	Three-Lane	No Action
1	2.02	1.44	0.92	2.96	2.11	1.43	3.89	2.77	1.95
2	1.12	0.80	0.49	1.64	1.17	0.75	2.16	1.53	1.03
3	0.55	0.40	0.34	0.81	0.58	0.52	1.07	0.77	0.70
4	2.69	2.06	1.67	3.95	3.02	2.61	5.19	3.97	3.60

a. Shown on **figure 3-4**

Runoff from the roadway would flow both to the north and to the south from the crown in the middle of the two-way left-turn lane. Along the northern edge of the road, a curb and gutter would divert the runoff to a series of catch basins. The flows leaving each catch basin would travel under the road and discharge into a ditch running along the south shoulder of the roadway. Flows from the south half of the roadway would flow directly into the ditch. **Some of the flow is likely to infiltrate into the ground beneath the ditch, as currently occurs, but the ditch also may carry additional flow that cannot infiltrate quickly into the ditch.**

Peak flows from the roadway would be detained in two wetpond detention facilities (X and Z on **figure 3-4**) and one infiltration facility (Y on **figure 3-4**). All of the facilities would be designed to meet the flow release requirements of the North Fork Issaquah Creek and East Lake Sammamish Basin Plans: the post-developed 2-year flow rate would be released at one-half the pre-developed 2-year flow rate, and the post-developed 10-year flow rate and the post-developed 100-year flow rates would be released at the pre-developed **2-year and** 10-year flow rate**s, respectively**. To meet these requirements, Facility X would be approximately **13,800**~~5,100~~ square feet in area, Facility Y would be approximately 7,000 square feet, and Facility Z would be approximately **15,800** ~~5,000~~ square feet (**table 3-3**). Detailed information regarding the engineering design of the surface water facilities can be found in the Surface Water Technical Information Report **in the DEIS and Addendum** (**Appendix H~~-A~~ of the FEIS**).

Table 3-3
Stormwater Facility Sizing Summary

		Five-Lane Alternative			Three-Lane Alternative		
Facility[a]	**Type**	**Area** (square feet)	**Storage Volume** (cubic feet)	**Water Quality Volume** (cubic feet)	**Area** (square feet)	**Storage Volume** (cubic feet)	**Water Quality Volume** (cubic feet)
X	Proposed Wetpond Site	**13,800**	**39,100**	**8,000**	**8,900**	**23,050**	**5,700**
Y	Proposed Infiltration Site	**7,000**	**24,100**	na	**5,200**	**16,900**	na
Z	Proposed Wetpond Site	**15,800**	**45,850**	**10,900**	**10,300**	**27,600**	**8,300**

a. Shown on **figure 3-4**.

The flows would discharge into their natural drainage course: Facility Z would discharge to North Fork Issaquah Creek, Facility X would discharge to wetland ELS 40 and

Facility Y would overflow back into the roadway ditch to be conveyed to Facility X **(only during emergency situations)** and eventually to wetland ELS 40.

Although the post-project peak flows would be lower than existing levels, the project would result in increased stormwater volumes discharged from Facilities X and Z.

Water Quality. The water quality of the untreated runoff from Issaquah-Fall City Road is likely to become poorer as the surrounding land becomes developed and traffic increases in the future. **The quality of roadway runoff is affected both by traffic volumes and by surrounding land uses. As land use in an area becomes more intensive, the stormwater quality tends to deteriorate. Since the surrounding land is being developed from rural to residential uses, the increases are likely to be significant. Therefore, the water quality of the untreated runoff will degrade whether or not the roadway is widened.** ~~For example, t~~**T**he BAP in the untreated runoff will increase by around 26 percent (**Entranco 1989**) as the surrounding land becomes more densely developed. Higher traffic will result in more oil and grease and metals in the stormwater, as well.

Research has found that stormwater run through grassy areas has better water quality than untreated stormwater (**Wang et al. 1982**). This is due to what is called biofiltration, which treats stormwater runoff by using grassy swales (channels) or filter strips. This project would use biofiltration swales in the roadside ditches and filter strips along the side of the roadway to provide water quality treatment before infiltration. The biofiltration systems can be expected to remove approximately 75 percent of the solid pollutants and 38 percent of the total BAP. The wetponds would be similarly effective at removing pollutants. **The ponds and swales would also remove BAP from the water; the Lake Sammamish study estimated approximately 40–50 percent BAP removal from such systems (Entranco 1989). Given this, the load of BAP leaving the site would be lower (around 25–35 percent less) than the existing untreated flow. This assumes that there would be a 26 percent increase before treatment (Entranco 1989) and that no biofiltration currently occurs in the roadside ditches.** For the infiltrated portion of the runoff, nearly all of the BAP would be removed in the upper layers of soil and so would be trapped before it could adversely impact Lake Sammamish water quality.

The greatest potential for water quality degradation would occur during construction. At that time, rain falling on exposed soils could transport large quantities of sediment off of the site. Downstream, the sediment can contribute to sedimentation and flooding problems, destroy or degrade habitat, and introduce nutrients (such as BAP) to the streams and lakes. Due to the very small size of most of the sediment particles, it is not possible to remove the sediment after it enters the runoff. **Large quantities of phosphorus are generally associated with particles of very small size. During construction, if fine sediment is not controlled sufficiently, Lake Sammamish could be adversely affected by phosphorus loading from the construction project.** Because of this, the only effective means to reduce the water quality problems due to

construction is to prevent the sediment from being washed off the construction site (see Mitigation Common to Both Action Alternatives at the end of this section for a description of erosion control measures).

Groundwater. Construction of either of the action alternatives would alter the shallow groundwater regime. In cut areas, the interflow pattern would be disrupted and seeps likely would develop on some cut slope faces, locally lowering the shallow groundwater table. Beneath embankment fills, a rise in the shallow groundwater regime may occur. This would be due to soil compression beneath the embankment reducing the soil's permeability and thereby locally restricting the naturally-occurring flow beneath the embankment.

The lower aquifer resources would be impacted to the same extent that the shallow groundwater regime would be impacted. However, these impacts would be insignificant because impacts to the shallow groundwater regime would be mitigated. Also, the lower

downstream fisheries and other wetlands. Sediment from construction activity can clog fish gills, cover fish spawning gravels, fill instream pools, raise water temperature, and cover aquatic plant and insect habitat.

Streams. There are several impacts that this project would have on North Fork Issaquah Creek. First, the channel would be encroached on by the placement of fill material for the roadway crossing. Placing fill in the channel would result in the loss of stream and wetland habitat. Second, there would be potential changes to water quality from the addition of sediment and other material during construction and the stormwater and associated pollutants afterward. Third, the increase in the volume of stormwater entering the stream from the increased impervious surface of the additional roadway area could lead to possible changes in channel morphology through increased channel erosion. Finally, lengthening the existing culvert could possibly create a barrier to upstream fish migration. ~~The existing culvert allows fish to migrate upstream.~~

Changes in water quality and channel morphology would not likely occur upstream of the construction activity. The project design should include an evaluation of the hydraulic characteristics of the culvert and its suitability for fish passage to upstream areas.

While salmonids were observed 300 feet downstream of the road crossing, there is limited fish habitat in the area immediately adjacent to the road. The available habitat increases as the flow increases downstream. The addition of sediment to the channel could contaminate spawning gravel and reduce the survival of young fish. Excess sediment could also reduce the available food to stream fishes.

Three-Lane Alternative

Runoff/Flooding. Additional runoff flows and volumes would be generated from the roadway under this alternative (10 to 63 percent more than existing), although the increases would not be as great as those for the Five-Lane Alternative (**table 3-2**). The net results of this alternative would be similar to the Five-Lane Alternative, although the smaller flows would mean that smaller facilities would be required for the stormflows. For this alternative, Facility X would be approximately **8,900**~~2,800~~ square feet in area, Facility Y would be approximately 5,200 square feet, and Facility Z would be approximately **10,300**~~2,900~~ square feet (**table 3-3**).

Water Quality. The water quality impacts of this alternative are likely to be similar to those of the Five-Lane Alternative. The water quality treatment of roadway runoff for this alternative would be similar to that described for the Five-Lane Alternative.

Groundwater. The groundwater impacts of this alternative are likely to be similar to those of the Five-Lane Alternative.

Wetlands. The Three-Lane Alternative would fill less of Wetlands A and B than would the Five-Lane Alternative (see **table 3-4**). A retaining wall along Wetland C would

prevent direct impacts on both Wetland C and its buffer entirely. None of the proposed alternatives would result in direct impacts on Wetland D.

Under the Three-Lane Alternative, about the same amount of fill (75 feet) would be placed in Wetland A north of the roadway as under the Five-Lane Alternative. South of the roadway, fill would extend 20 feet less into Wetland A than under the Five-Lane Alternative (see **Appendix B**). Both of the proposed action alternatives would increase the height of the upland intrusion to about 36 feet.

Construction of the Three-Lane Alternative would pose slightly less risk of construction-related water quality impacts than the Five-Lane Alternative, due to less construction activity.

Streams. Impacts to the stream would be similar in nature, but likely smaller in magnitude, than those described for the Five-lane Alternative. Less encroachment would be required, less sediment mobilized, smaller volumes of stormwater and a shorter culvert would be required than the equivalent quantities for the Five-Lane Alternative.

No Action Alternative

Runoff/Flooding. There would be no additional runoff occurring with this alternative.

Water Quality. The water quality of the runoff from Issaquah-Fall City Road is likely to become somewhat poorer even for the No Action Alternative, due to the development and traffic increases which will occur in the future. Untreated runoff will continue to infiltrate or run off at the same locations, any surface flows would remain untreated, and downstream water quality would be adversely impacted.

Groundwater. There would be no additional groundwater impacts with this alternative.

Wetlands. No filling of wetlands or buffers would occur under the No Action Alternative. The existing roadway fill crossing Wetland A would continue to hinder the free movement of wildlife along North Fork Issaquah Creek.

Streams. There would be no additional impacts to the stream with this alternative.

3.3.3 Mitigation Common to Both Action Alternatives

Runoff/Flooding

The East Lake Sammamish Basin Plan (**King County SWM 1992a**) **and Issaquah Creek Basin Plan (King County Surface Water Management 1992b)** specifically recommends that infiltration be used whenever appropriate soils are present. Because most of the soil along the roadway is adequate for infiltration, all of the runoff generated

by the roadway could be infiltrated. This would further reduce the runoff flows from the project and greatly reduce the runoff volumes.

The following measures would be taken to lessen and prevent damage to the environment:

Two wetpond detention facilities and one infiltration facility would be provided to maintain or reduce flow rates from the site. All of the facilities would be designed to meet the flow release requirements of the Issaquah Creek and East Lake Sammamish Basin Plans.

Water quality treatment would be provided by wetponds, biofiltration swales, and a water quality swale (water quality swales have smaller design depths and therefore larger widths than do biofiltration swales). Treatment of the roadway runoff is required to offset water quality degradation. The proposed measures can be expected to provide a high degree of water quality treatment. Wet ponds differ from standard detention ponds in that wet ponds are designed to have some volume of standing water between storm events, which increases the amount of pollutants which settle out of the water. Standard detention ponds are designed to be dry between storm events.

This project would use biofiltration swales in the roadside ditches and filter strips along the side of the roadway to provide water quality treatment before infiltration. For the infiltrated portion of the runoff, nearly all of the BAP would be removed in the upper layers of soil and so would be trapped before it could adversely impact Lake Sammamish water quality.

The land use and traffic around and on Issaquah-Fall City Road will intensify in the future, and the stormwater quality will be degraded. However, due to the treatment facilities, the quality of the stormwater discharged from the project area will probably improve relative to currently untreated stormwater. Wetponds have been shown to be effective in removing solids and metal particles from urban stormwater.

Water Quality

The King County *Surface Water Design Manual* contains water quality treatment requirements which would help to mitigate some of the potential problems owing to construction impacts. Two of the requirements are:

- The implementation of and strict adherence to a well-designed TESCP during construction to mitigate increased off-site sediment transport. The TESCP should include elements for site stabilization, slope protection, drainageway protection, and sediment retention. The TESCP should continue operating until vegetation has been established in all biofilters and other constructed water quality enhancement devices. Vegetation helps to reduce erosion by protecting the soil from the impact of raindrops, reducing the velocity of surface runoff, binding the

soil with roots, enabling easier infiltration, and protecting soil from wind. (The manual includes a chapter describing erosion control methods, and methods to enhance re-establishment of vegetation.)

- Limitation of clearing and grading activities to the driest season in King County (the period from June to October). The site should be stabilized prior to the beginning of the wet season (November to May).

The basin plans have even more stringent limitations on the time that sites can be cleared, with no clearing allowed between October 1 and March 31.

In addition to these preventative measures, sedimentation ponds, filter fences, check dams, and similar measures must be used to prevent fine sediment from entering downstream water bodies.

Groundwater

Expected impacts to the shallow groundwater regime would be mitigated by adherence to standard design and construction practices. This would include design and construction of drains from areas of seepage to biofiltration swales, infiltration trenches, or other stormwater facilities for reintroduction into North Fork Issaquah Creek. Beneath embankments, pervious gravel fill would be used to maintain the local interflow drainage pattern. These standard design measures would help to maintain seasonal stream base flows, wetland conditions, and water quality.

The two wetland mitigation options would minimize impacts on groundwater as well as wetlands, by reducing the effects of cut and fill, as described below.

Bridge Option. This option would mitigate impacts to the groundwater regime at the alignment's crossing with North Fork Issaquah Creek because no embankment fills will be placed across the existing channel. Impacts to interflow will be further reduced because of further reduction in the amount of excavation along the south portion of the roadway alignment.

Retaining Wall Option. There will be a reduced impact to the groundwater regime at the North Fork Issaquah Creek crossing because of the reduced embankment size.

work associated with buffers. All impacts to wetlands and buffers associated with this project would require compensation "on-site and in-kind".

In addition to complying with King County's mitigation requirements, this project would comply with all mitigation requirements of other regulatory agencies, which may have more stringent replacement ratios.

Several opportunities are available to mitigate wetland and buffer impacts within the project site. This mitigation could be in the form of buffer and wetland enhancement and wetland creation along existing wetlands. The prime opportunities for mitigation within the project site consist of restoration and enhancement. There are very few opportunities for substantial amounts of wetland creation.

Most of the sensitive areas within the project limits have been severely impacted and are in need of restoration and enhancement. However, most of the potential restoration sites lie outside of the right-of way and would require land acquisition by the County. Therefore, the expected benefits of the mitigation must be weighed against the cost of the land on which the mitigation would take place.

Since Wetland A is a Class 1 wetland requiring a 2:1 replacement ratio, and Wetland B is a Class 3 wetland requiring a 1:1 replacement ratio, the total amount of required wetland mitigation could be 1.4 acres under the Three-Lane Alternative and 1.6 acres under the Five-Lane Alternative (see **table 3-7**). Since Wetland A is part of a forested environment that contains large snags and is contiguous with a wildlife corridor and over 200 acres of wetlands, attention should be paid to replacing Wetland A's wildlife habitat value. **Section 79 of the King County Sensitive Areas Ordinance states that mitigation sites should be located to alleviate wildlife habitat fragmentation.**

Table 3-7
Direct Compensation for Wetland Impacts
Without Avoidance Measures
(acres)

Wetland	King County SAO Class	Mitigation Ratio[a]	Five-Lane Alternative		Three-Lane Alternative	
			Wetland Area Lost	Replacement Area Required	Wetland Area Lost	Replacement Area Required
A	1	2:1	0.41	0.82	0.36	0.72
B	3	1:1	0.80	0.80	0.70	0.70
C	3	1:1	0	0	0	0
D	3	1:1	0	0	0	0
TOTAL			1.21	1.62	1.06	1.42

a. Based on King County Zoning Code Title 21A.24.340; replacement ratios of other regulatory agencies would be met if they are more stringent.

3.3.4 Unavoidable Significant Adverse Impacts

Under either action alternative, there would be unavoidable changes in the natural hydrologic regime, removing areas which currently infiltrate rainfall and increasing the volume of stormwater generated on the site. The established interflow patterns along the alignment will be disrupted by excavations and subsurface drainage features. The water quality of untreated roadway runoff will decrease in the future as the surrounding area becomes more developed and traffic increases.

For either action alternative, there may be increases in stormflows from the site which exceed the design capacities of the proposed drainage system.

Under both action alternatives and mitigation options, construction activity would take place within and in the vicinity of Wetlands A and B. Soil would be temporarily exposed to wind and rain during construction. Efforts to minimize sedimentation are unlikely to be 100 percent effective, particularly if a significant storm event were to overwhelm silt fences, hay bales, and other erosion control measures. Sediment carried into Wetland A and North Fork Issaquah Creek could be deposited on top of streambed gravels and could fill pools used by fish. Sedimentation could result in shallower water, less fish and amphibian habitat, higher water temperature, fewer wetland plants, and alterations in the stream channel.

3.4 PLANTS AND ANIMALS

3.4.1 Existing Conditions

Vegetation and Wildlife Habitat

The project site lies on a rolling plateau north of the city of Issaquah in eastern King County. From a regional perspective of the environment, Issaquah-Fall City Road forms an important boundary. King County has designated most of the land from the south side of Issaquah-Fall City Road to the crest of the Cascade Mountains as rural and forest resource lands. If current land use plans are followed, considerable vegetation on the south and east side of Issaquah-Fall City Road should remain in a relatively natural state into the future. The other side of Issaquah-Fall City Road is a designated urban area that is generally contiguous with the large urban centers of Bellevue and Seattle. Conversion of natural vegetation and wildlife habitat to urban environments will likely continue on areas north and west of Issaquah-Fall City Road.

An exception to the urban pattern on the north side of the project site is a corridor of riparian forest along North Fork Issaquah Creek (see **figure 3-6**). The riparian area connects the rural area on the south side of Issaquah-Fall City Road to a large wetland at Yellow Lake. The riparian forest along North Fork Issaquah Creek includes wetlands, large snags, western red-cedars, cottonwoods, and **Sitka~~Engleman~~** spruce. Expanding residential developments are located on both sides of the riparian forest.

3.4.3 Mitigation Common to Both Action Alternatives

Vegetation and Wildlife Habitat

The vegetation and wildlife habitat that would be directly affected by ROW acquisition for the proposed roadway widening is primarily second-growth lowland forest groupings that are interspersed with agricultural and urban and suburban habitats.

Where possible this vegetation should be preserved by using retaining walls to minimize the extent of cut and fill operations.

After construction is completed, disturbed areas would be revegetated to limit impacts to the environment. Specific plant species would be selected during project design. These species would be consistent with other species within the area to mitigate losses in terms of function.

Mitigation sites should be located to alleviate wildlife habitat fragmentation.~~Clearing of natural vegetation would be minimized. Clearing limits would be clearly flagged prior to construction.~~

The free movement of wildlife along North Fork Issaquah Creek would be restored with a large, open-bottom culvert. Recommendations from the Washington Department of Fish and Wildlife should be requested and followed regarding culvert design that could accommodate fish, amphibians, raccoons, black-tailed deer, and black bear.

A bridge option could be used as mitigation in place of the open-bottom culvert. A bridge would allow for more natural movement of small mammals, amphibians, fish, insects, and plant seeds along North Fork Issaquah Creek.

Please refer to the Water section, **pages 51–53,** for details on **the bridge and retaining wall options which could be used as** mitigation~~of impacts to wetlands~~.

Threatened and Endangered Species

Although the **northern** red-legged frog is still common in western Washington, and no decision has yet been made on whether this candidate species should be added to the federal list of endangered and threatened species, actions taken now to protect habitat for **northern** red-legged frogs may preclude the need to list this species in the future. Mitigation for this project will maintain or replace **northern** red-legged frog habitat by maintaining or replacing wetlands. Refer to the wetland mitigation in the section on Water.

Northern red-legged frog habitat could be maintained during construction through the retention of closed forests and the placement of culverts for safe crossings. Measures to mitigate operational impacts on the northern red-legged frog include maintenance of culverts, water quality treatment, and cultivating the planted vegetation to provide a visual and auditory buffer along the roadway.

3.4.4 Unavoidable Significant Adverse Impacts

Although impacts on wetland habitats would be mitigated, upland habitats and the wildlife supported by upland habitats would be eliminated. The elimination of natural vegetation and wildlife would add to a cumulative elimination of habitat that has occurred on a large scale in the Puget Sound area and will likely continue to occur in conjunction with planned urbanization and growth.

Sediment carried into Wetland A and North Fork Issaquah Creek due to construction activities could result in shallower water, less fish and amphibian habitat, higher water temperature, fewer wetland plants, and alterations in the stream channel.

3.5 NOISE

The human ear responds to a very wide range of sound intensities. The decibel scale used to describe sound is a logarithmic rating system that accounts for the large differences in audible sound intensities. This scale accounts for the human perception of a *doubling* of *loudness* as an increase of 10 decibels, so a 70 decibel sound level is twice as loud as a 60 decibel sound level. People generally cannot detect differences of one decibel, while under ideal conditions, differences of two or three decibels can be

detected. In the outside environment such as near roads, a change of two or three decibels would not be noticeable to most people, while a five decibel change would be expected to be perceived under normal listening conditions.

When addressing the effects of noise on people, it is necessary to consider the frequency response of the human ear. Instruments that measure sounds are therefore designed to respond to, or ignore, certain frequencies. The frequency-weighting most often used to evaluate environmental noise is A-weighting, and measurements from instruments using this system are reported in "A-weighted decibels" or dBA. All sound levels in this evaluation are reported in A-weighted decibels.

Because of the logarithmic scale used to describe noise, a *doubling* of the *noise source* (e.g., twice as much traffic on a road) produces a three dBA increase in average roadway noise. Average sound levels due to sources such as traffic decrease with distance from the road at a rate of three to 4.5 dBA per doubling of the distance from the road. Peak sound levels from discrete events or point sources, such as from a single vehicle's brake screech or tire squeal, decrease at six dBA per doubling of the distance from the road. Conversely, moving half the distance closer to a road increases sound levels by three dBA and six dBA for roadway and point sources, respectively.

For a given noise source, factors affecting the sound transmission from the source and therefore the potential noise impact include distance from a source, frequency of the sound, absorbency of the ground surface, the presence or absence of obstructions and their absorbency or reflectivity, and the duration of the sound. The degree of impact on humans also depends on who is listening and on existing sound levels. Typical sound levels of some familiar noise sources and activities are presented in **table 3-10**.

3.5.1 Regulatory Overview

Federal regulatory agencies use the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}) to evaluate noise impacts. The L_{eq} is a constant sound level that has the same sound energy as the actual, fluctuating sound being measured by an instrument. As such, it can be considered an energy-average sound level. The L_{eq} is the noise descriptor most often used in estimating noise impacts. The L_{eq} is a convenient unit for planning purposes, because the tremendous variations in hourly sound levels are represented in an hourly *average* sound level. For this reason, L_{eq} is used to estimate noise impacts in this evaluation.

In discussing sound level measurements and predictions, it is important to identify the time period being considered, because most sound-energy criteria address sound-energy over some time period. In this way, noise criteria address both the intensity and the duration of sounds. $L_{eq(24)}$, for example, is the equivalent sound level for a 24-hour period. The day-night sound level, L_{dn}, is similar to the $L_{eq(24)}$ except that it includes an added 10 decibel penalty for hourly sound levels between 10 p.m. and 7 a.m., to account

for sleep interference. Equivalent sound levels reported in this analysis are for a one-hour period during the peak evening commute traffic.

Table 3-10
Common Sound Levels with Human Perceptions and Responses

Thresholds/Noise Sources	Sound Level (dBA)	Subjective Evaluations	Possible Effects on Humans
Human threshold of pain Carrier jet takeoff (50 ft)	140	Deafening	Continuous exposure can cause hearing loss
Siren (100 ft) Loud rock band	130		
Jet takeoff (200 ft) Auto horn (3 ft)	120		
Chain saw Noisy snowmobile	110		
Lawn mower (3 ft) Noisy motorcycle (50 ft)	100	Very Loud	
Heavy truck (50 ft)	90		
Pneumatic drill (50 ft) Busy urban street, daytime	80	Loud	
Normal automobile at 50 mph Vacuum cleaner (3 ft)	70		Speech Interference
Large air conditioning unit (20 ft) Conversation (3 ft)	60	Moderate	
Quiet residential area Light auto traffic (100 ft)	50		Sleep Interference
Library Quiet home	40	Faint	
Soft whisper (15 ft)	30		
Broadcasting Studio	10	Very Faint	
Threshold of Human Hearing	0		

Noise criteria established by federal agencies and WSDOT are relevant for this evaluation. The King County noise ordinance is not considered, because it currently

exempts traffic noise from the regulatory limits applied to most other sources. While noise from traffic on public roads is exempt from the limits in King County's Noise ordinance, noise from *individual* motor vehicles is regulated by performance standards (King County Ordinance 12.90.010), which set limits on the noise generated by various classes of motor vehicles. These standards are based on noise levels at specific distances (e.g., 50 feet) from vehicles moving at particular speeds (e.g., less than or greater than 35 mph). These county limits range from about 76 dBA to about 90 dBA, depending on the class and speed of the vehicle.

The U.S. Department of Transportation, Federal Highway Administration (FHWA) identified noise criteria and established procedures for evaluating road improvement projects in its Federal Aid Highway Manual (**U.S. Department of Transportation, 1982b~~a~~**). Noise abatement (mitigation) must be considered for federally or state funded projects when the noise level approaches or exceeds the noise abatement criteria (**table 3-11**), or when the predicted traffic noise levels substantially exceed the existing noise levels. The WSDOT customarily interprets FHWA policy to mean sound levels within two dBA of a criterion are "approaching" the limit, and considers noise increases of 7–10 dBA or more to be "substantial."

Table 3-11
Federal Highway Administration
Roadway Noise Abatement Criteria
(dBA)

	Land Use Category	Hourly L_{eq} (dBA)
(A)	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.	57 (exterior)
(B)	Picnic areas, recreation areas, play-grounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.	67 (exterior)
(C)	Developed lands, properties, or activities not included in the above categories.	72 (exterior)
(D)	Undeveloped lands	—
(E)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.	52 (interior)

Source: US DOT (**1982a**)

Although the EPA has no regulations governing environmental noise, it has conducted extensive studies to identify the effects of certain sound levels on public health and welfare. The EPA ~~has~~ identified sound levels requisite to protect the public health and welfare with an adequate margin of safety (**EPA 1974**). In part because neither the cost nor the feasibility of achieving these sound levels were taken into consideration, these levels are guidelines, not regulations or standards. The EPA specifie~~d~~s an L_{dn} of 55 dBA for outdoor places such as residential areas where people spend widely varying amounts of time, or in which quiet is a basis for use.

The EPA also classifie~~d~~s sound level impacts based on the relative change in sound due to an action: an increase of zero to five dBA is a *slight* impact, an increase of five to 10 dBA is a *significant* impact, and an increase of more than 10 dBA is a *very serious* impact. Using these classifications, it is possible for the addition of a noise source in a very quiet place to cause a very serious noise increase, even though the absolute sound levels remain relatively low.

3.5.2 Existing Conditions

Existing sound levels were measured at five locations representing residential or other sensitive uses along Issaquah-Fall City Road between 4 and 6 p.m. on July 25, 1994. (See **Appendix G** for data forms.) Conditions were warm and dry. These 15-minute, baseline measurements used a Larson-Davis 820 Type I integrating sound level meter, that samples many times each second and then computes summary statistics for the measurement period. The sound level measurement (SLM) locations are described in **table 3-12** and shown in **figure 3-7**. In all locations, the sound level meter was mounted on a tripod 1.5 meters above ground level. These measurements document existing **peak-hour** sound levels from all sources audible during the measurement periods, and in each case, noise from traffic along Issaquah-Fall City Road dominated the sound environment.

Traffic conditions were observed during the sound level measurements, and six-minute traffic counts were taken at each location. The counted traffic volumes then were multiplied by ten to estimate the hourly directional volumes. The traffic conditions observed on July 25, 1994 were used later to calculate peak-hour sound levels to assess the performance of the traffic noise model discussed below. The results of these calculations are shown in **table 3-12**.

Comparing the sound level measurements (**table 3-12**) with the FHWA criteria (**table 3-11**) indicates that peak-hour sound levels at SLM 1 approach the 67-dBA noise abatement criterion level FHWA uses as an indication of noise impacts to residential locations. This residential location is in the middle of the project area on the south side of Issaquah-Fall City Road, 60 feet from the centerline. The proximity to the road contributes to the relatively high traffic noise level. Measurements at the other four locations found peak-hour sound levels below the levels considered to be a noise impact under FHWA guidelines. Measured background sound levels as indicated by the L_{90} noise descriptor (i.e., the sound level exceeded ninety percent of the time during the measurement) ranged from the low to the high 40s dBA.

Table 3-12
Measured and Calculated P.M. Peak-Hour Sound Levels

SLM Location	Leq (dBA) Measured	Leq (dBA) Calculated[a]	Comments
1) The Morgan Residence, Issaquah-Fall City Road	66	67	Front yard of the Morgan residence, 60 feet from the centerline of Issaquah-Fall City Road. Noise from traffic was dominant.
2) 24721 Issaquah-Fall City Road	61	59	The yard of a house 75 feet from the centerline of Issaquah-Fall City Road. The location represents an area in which residents would spend leisure time.
3) 24445 SE 47th Court	49	50	The backyard of a house in the Hunters Ridge housing development. The distance to the centerline of Issaquah-Fall City Road was approximately 270 feet. Intervening terrain and residences help to reduce traffic noise, which is the dominant noise source.
4) 24326 SE Issaquah-Fall City Road	59	61	In front of the Issaquah Montessori School. The measurement was taken 92 feet from the centerline of the road.
5) 4923 242nd Avenue SE	54	60	Backyard of a house near the western end of the project. The location was partially shielded from traffic noise on Issaquah-Fall City Road by terrain and vegetation. The measurement location was 85 feet from the road.

a. Calculated for conditions observed during the sound level measurements on July 25, 1994.

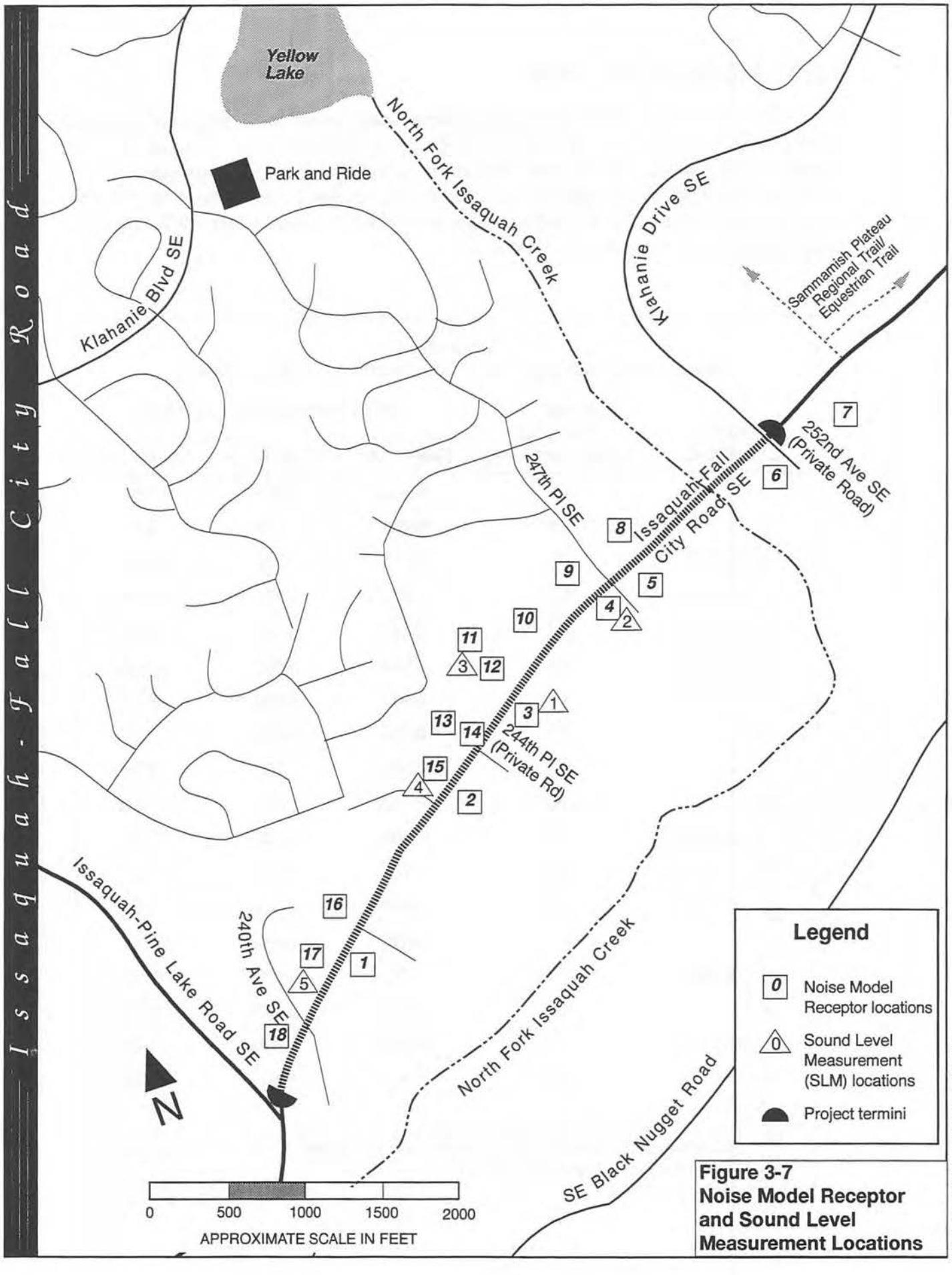


Figure 3-7
Noise Model Receptor and Sound Level Measurement Locations

3.5.3 Analytical Approach

The Stamina model was used to model peak hour sound levels at 18 "receptor" locations on residential properties typical of places people would spend leisure time or at other sensitive locations (**US DOT 1982b**). The same 18 receptor locations were used throughout the modeling scenarios to represent the changes in sound levels that would occur with the alternatives. Receptor locations are shown above in **figure 3-7**. Results of the modeling are summarized in **table 3-13**.

Table 3-13
Summary of Modeled P.M. Peak-Hour Traffic Noise Levels

Receptor Locations	Modeled 1993 Existing Conditions(dBA)	2012~~2010~~ Alternatives (dBA)		
		Five-Lane	Three-Lane	No Action
1	64	~~68~~69	~~67~~68	68
2	64	~~68~~69	~~67~~68	68
3 (SLM1)	68	~~72~~73	~~71~~72	~~71~~72
4 (SLM2)	67	~~71~~72	~~70~~71	~~71~~72
5	62	~~66~~67	~~65~~66	~~66~~67
6	61	~~65~~66	~~64~~65	~~65~~66
7	57	~~61~~62	~~60~~62	~~61~~63
8	61	~~67~~67	~~66~~67	66
9	69	~~75~~76	76	~~73~~74
10	60	~~65~~66	65	~~64~~65
11 (SLM3)	57	~~62~~63	~~61~~62	~~61~~62
12	69	75	~~74~~75	~~73~~74
13	61	~~65~~66	~~65~~66	65
14	69	~~74~~75	~~73~~74	~~73~~74
15 (SLM4)	67	72	~~71~~72	~~71~~72
16	65	~~70~~71	~~69~~70	~~69~~70
17 (SLM5)	60	~~67~~70	~~66~~69	~~64~~65
18	63	~~68~~69	~~67~~68	~~67~~68

Notes: SLM = Measurement locations that coincide with receptor locations
Calculations of dBA based on traffic volumes and speeds derived from the traffic analysis discussed in the Transportation section.

Stamina implements the procedures developed by FHWA for calculating traffic-generated noise levels, and this model is the approved model for performing these types of analyses. Based on traffic information such as volume, speed, vehicle mix, and the relative locations and elevations of the roads and the receptors, the hourly equivalent sound level (L_{eq}) generated by traffic is modeled. The Stamina model accounts for ground and/or barrier attenuation of sound at specific model receptor locations.

After the initial modeling setup, the Stamina model and the similar FHWA noise model were used to evaluate the traffic conditions observed during the peak-hour noise measurements on July 25, 1994. The observed traffic conditions included vehicle counts and classifications, and estimated travel speeds. Other observed conditions considered in the modeling include angles of exposure, terrain, ground type, and the presence or absence of obstructions. Comparing the measured levels with the calculated results provides a means to assess the adequacy of the modeling setup (**table 3-12**). Because the traffic model cannot account for secondary non-traffic contributions and cannot adequately address great distances or very complex terrain, a two- to three-decibel difference in calculated results compared to actual measured sound levels is usually considered an adequate representation. As shown in **table 3-12**, in this case the sound levels calculated for conditions observed during the sound level measurements were within 1.7 dBA of the measured sound levels at all but one of the measurement locations. This comparison indicates the modeling is adequately representing traffic noise from Issaquah-Fall City Road at most of the locations examined. Please note that the calculated sound levels based on observed traffic conditions on July 25, 1994 are displayed in **table 3-12**; these levels should not be compared with the modeled levels from the traffic analysis data used in the Transportation section, shown in **table 3-13**.

At SLM location 5, the calculated sound level based on observed traffic conditions was 60 dBA compared with a measured level of 54 dBA. The cause for this discrepancy was examined with additional measurements but not determined; it could be due to the topography of the measurement location and/or to an unusual traffic flow during the sound level measurement (e.g., short-term traffic counts not being representative of hourly volumes and/or slower than normal traffic during the measurement). This discrepancy was not correctable using information available within the scope of this project, so the projected impacts for this location may be somewhat overstated. In spite of this flaw, the traffic noise modeling results presented in **table 3-13** adequately represent the traffic noise levels at most locations, and so are sufficient for estimating noise impacts with and without the proposed project.

The impact analysis considered p.m. peak hour traffic noise from existing conditions, both of the action alternatives and the No Action Alternative in **2012**~~2010~~. Traffic noise modeling was based on p.m. peak hour traffic volumes (**see figure 3-14** in the Transportation section) and free-flow speeds away from congested areas. The vehicle mixes assumed in all the modeling were based on observations during the sound level measurements. The observed eastbound vehicle mix was 0.6 percent heavy, 2.3 percent medium, and 97.1 percent light vehicles (usually cars). The westbound mix was five percent heavy, 3.6 percent medium, and 91.4 percent cars. Based on the traffic

analysis, both the No Action and Three-Lane Alternative were assumed to have the same traffic volumes; the Five-Lane Alternative had higher traffic volumes.

3.5.4 Impacts

Construction Impacts Common to Both Action Alternatives

During construction there would be temporary increases in sound levels along the alignments due to the use of heavy equipment and the hauling of construction materials. The increase in noise levels would depend on the type of equipment being used and the amount of time it would be in use. Excavation, grading, and construction would generate sounds audible on surrounding properties.

Typical noise levels from construction are displayed in **table 3-14**. Sounds from construction equipment (a point source) decrease about six dBA for each doubling in distance from the source. Construction noise levels at nearby residents and businesses could exceed the sound levels commonly recommended for residential land uses and for other places where people spend time.

Table 3-14
Typical Construction Equipment Noise Levels
(dBA)

Construction Activity	Estimated L_{eq} at 50 feet	Types of Equipment	Range Of Noise Levels at 50 feet
Clearing	83	Bulldozer	77–96
		Dump Truck	82–94
Grading	75-88	Scraper	80–93
		Bulldozer	77–96
Paving	72-88	Paver	86–88
		Dump Truck	82–94

Source: US EPA (**1971**)

Operational Impacts

The comparisons of future action alternatives with existing conditions are based on *modeled* existing sound levels derived from traffic volumes and speeds provided by the traffic analysis (**see table 3-13**). The disparity in the traffic volumes observed during the sound level measurements on July 25, 1994 and the volumes derived from the traffic analysis account for some of the differences in the measured, calculated, and modeled sound levels (**tables 3-12 and 3-13**). Other factors that influence this comparison

include travel speed and the presence or absence of heavy-duty vehicles. In this instance, the observed percentages of westbound, heavy-duty vehicles (usually trucks but sometimes including buses) is higher than usually is assumed for county roads. This percentage is, however, based on direct observations during the sound level measurements and is the best data available. This large percentage of heavy-duty vehicles is a major reason for the relatively high calculated sound levels.

Five-Lane Alternative. With this alternative, the road would be widened and shifted slightly to the north at some locations. The realignment and widening would increase sound levels ~~up to about three dBA over No Action,~~ due to both an increase in the amount of traffic and ~~a~~ change**s** in distance from the receptor**s** to the road. Receptor locations 1 to 7 (**figure 3-7**), south of Issaquah-Fall City Road, would be less affected by the increased traffic because the road would be shifted farther away from the residences. These locations would undergo imperceptible **(1–2 dBA)** peak hour traffic noise increases over those expected to occur with **the** No Action **Alternative**. Receptor locations 8 to 18, north of the road, would experience larger sound level increases because the road would be shifted closer to them. All receptor locations would experience peak hour sound level increases of less than approximately ~~three~~ **two** dBA ~~over~~ **compared with the** No Action **Alternative, ~~levels and~~ except receptor 17, where** sound level**s would be expected to increase five dBA** ~~increases of four to six dBA over existing conditions~~.

The maximum projected sound level increase~~s~~ occur**s** at receptor location 17, which is currently partially shielded from road noise because it is below the grade of the road. To reflect this difference in terrain, shielding factors (i.e., reductions) were included in the modeling of the Existing Conditions and the No Action Alternative to adjust calculated noise levels from both the eastbound and westbound traffic at this location. Most of the increases in sound levels expected to occur at this receptor with both action alternatives are due to the assumption that the ~~location would no longer be shielded~~ **shielding** from westbound traffic noise ~~because~~ **due to terrain differences would no longer exist with** the **widened**~~expanded~~ road ~~would eliminate the difference in terrain~~.

All the projected sound level increases of five dBA or less over both existing conditions and **the** No Action **Alternative** would be considered slight noise impacts according to EPA guidelines. The ~~two~~ projected **sound level** increases of six dBA or more over existing conditions **north of Issaquah-Fall City Road (receptors 8–18)** ~~(receptors 9 and 17)~~ would be considered significant impacts according to EPA guidelines. The relatively high traffic noise levels at receptor 9 are due to the westbound hill and the large percentage of trucks; the increase at receptor 17 is due to the removal of the shielding as discussed above.

With ~~even~~ the ~~small~~ increases, ~~however,~~ peak-hour traffic noise levels would approach or exceed the 67-dBA FHWA residential noise abatement criterion at most receptor locations. Only receptor location 7 on the eastern end of the project and receptor 11,

representing the homes northwest of and about 275 feet from the road, do not approach or exceed the criterion. ~~Most~~ **Under WSDOT policy, the projected sound level increases at all receptors except receptor 7 would be considered noise impacts because the increases are at least five dBA and the resulting sound levels are greater than 62 dBA. Therefore, all but one** of the approximately 20 residential locations and the school

and church along the project route would be considered to be impacted by noise under FHWA and WSDOT policy.

These peak-hour noise levels would interfere with normal conversations, could increase annoyance and stress, and with long-term exposure, could lead to stress-related health impacts like high blood pressure. Hearing-sensitive individuals and people with communication difficulties would be most prone to such impacts.

Inside homes and other buildings sound levels would be 10 to 25 dBA lower than outside, depending on the construction materials used, ~~and~~ the orientation of the building **and the interior location to the road**. Even so, it is possible that interior sound levels in some homes would exceed EPA-recommended interior sound levels, especially near open windows. This could, in some instances, lead to sleep interference and related health impacts.

Three-Lane Alternative. With the Three-Lane Alternative, the Issaquah-Fall City Road alignment would be widened and shifted slightly north. Since the traffic volume is expected to remain the same as with the No Action Alternative, those receptor locations farther from the realigned road (receptors 1–7) would experience slight decreases in sound levels **compared with the No Action Alternative**; those closer (receptors 8–18) would have slight increases in the ~~sound~~ **traffic noise** level. The maximum increases over the sound levels expected with **the** No Action **Alternative** would be ~~2.5~~ **five** dBA at receptor **7**~~locations 9 and 17~~; all other increases would be less than ~~one~~ **three** dBA. (Once again, the partial shielding from westbound traffic noise was not included in the modeling for receptor location 17.) **Although** these projected noise increases would be considered slight impacts according to EPA guidelines**, under WSDOT policy, the calculated sound levels at all receptors except 7 and 11 would be considered noise impacts either because the levels approach or exceed the criterion level or because of the magnitude of the increase over existing sound levels.** ~~However, all of the residences in the project area except residences at receptor locations 7, 10, 11, and 17 would experience sound levels approaching or exceeding the FHWA criterion level of 67 dBA for residential or otherwise sensitive locations.~~

The impacts of these noise levels would be the same as those discussed under the Five-Lane Alternative. ~~Somewhat fewer~~ **The same number of** residential locations would be affected.

No Action Alternative. Expected growth in traffic volumes in the project area would increase peak hour traffic noise ~~four to~~ **about** five dBA over existing levels. Such changes would be considered slight according to EPA guidelines. However, all ~~but two of the 18~~ receptor locations**, except receptor 11,** would experience sound levels approaching or exceeding the FHWA 67 dBA noise abatement criterion **or would be considered noise impacts due to the expected increase over existing sound levels.** ~~Most of the~~ **The** same locations that would be affected by the action

alternatives also would be impacted by traffic noise due to growth in traffic that would occur with **the** No Action **Alternative**.

3.5.5 Mitigation

Mitigation During Construction

Construction noise can be mitigated by using properly sized and maintained mufflers, engine intake silencers, engine enclosures, turning off equipment when not in use, and

confining activities to daylight hours. Stationary construction equipment should be located away from sensitive receiving properties where possible. Particularly noisy equipment can be shielded by temporary attenuation barriers.

Substituting hydraulic or electric motors for impact tools such as jack hammers, rock drills, and pavement breakers would also reduce construction noise. Scheduling the noisiest construction operations to occur during the times of highest ambient noise would minimize the impact to adjacent property, even if actual equipment noise is unchanged.

Mitigation During Operation

Mitigation for traffic noise is not proposed.

3.5.6 Unavoidable Significant Adverse Impacts

Construction would temporarily increase noise levels along the route of the proposed project. Sound levels near construction activities could exceed levels set by King County's noise ordinance and guidelines established by the EPA for residential properties.

Each future action alternative would result in slight noise increases in those locations where the road would be realigned to a position closer to receptors. Peak-hour traffic noise levels would continue to approach or exceed the FHWA residential noise abatement criterion level at most residential locations.

3.6 LAND USE/HOUSING AND POPULATION

3.6.1 Existing Conditions

Land Use

The existing land use in the immediate project vicinity is characterized by high density (urban) and low density (rural) development (see **figure 3-8**). Urban land uses, in the form of mostly residential development, have occurred on the northeast side of the roadway. A new commercial center, which will include retail and office uses and a park-and-pool lot, is located northeast of the intersection of Klahanie Drive SE and Issaquah-Fall City Road. Rural land uses, in the form of large-lot residential development and undeveloped, heavily forested land, dominate the area southeast of Issaquah-Fall City Road.

Housing and Population

North of Klahanie Drive SE, the project vicinity is projected to experience rapid suburban residential growth. Several subdivisions, including Klahanie, Trossachs, and Aldarra, are in the process of being approved for development in proximity to Issaquah-Fall City Road. Development of these projects would contribute to the overall trend of residential development in the area.

3.8.3 Mitigation

Bicycle lanes and routes should be clearly marked with universal symbols to discourage misuse of these facilities and to control the increased pedestrian, bicycle, and equestrian traffic on these facilities. Traffic signs warning motorists of pedestrian, bicycle, and equestrian traffic at appropriate locations along the Issaquah-Fall City Road should be provided.

3.8.4 Unavoidable Significant Adverse Impacts

Construction equipment, debris, and dust normally associated with construction activities may temporarily block or interfere with the movement of pedestrians, bicyclists, and equestrians along recreational routes during the construction period. The temporary construction activities and requirements may decrease both sight distance along the corridor and views of traffic at intersections and driveways, which in turn may temporarily affect the safety of motorists, bicyclists, equestrians, and pedestrians.

3.9 TRANSPORTATION

This section is based in part on the analysis conducted in the Transportation Technical Appendix prepared by the King County Roads Division, Transportation Planning Section (**Appendix D**).

3.9.1 Existing Conditions

Road Network

The project corridor is part of an interdependent network of roadways which serve the East Sammamish Community Planning Area. These roadways are designed and maintained to fulfill a particular function. A hierarchy of these functions is developed in King County's functional classification system and includes the following:

- Freeways are intended for major through traffic, and regional travel and traffic volumes are generally high. Access is restricted to grade-separated interchanges. Interstate 90 is classified as a freeway. Full interchanges are provided at East Lake Sammamish Parkway/Front Street and SR 900 in Issaquah, and a partial interchange is provided on I-90 at Sunset Way.

- Principal arterials provide connections to the freeway system, serve regional traffic needs, connect centers, and provide limited access to abutting properties. East Lake Sammamish Parkway SE, 228th Avenue SE, SR 900, SE 56th Street, and SE 43rd Way are considered principal arterials. Southeast 56th Street is a four/five-lane road with a 35 mph speed limit. Portions of East Lake Sammamish Parkway SE have four to five lanes and portions have two lanes. The road is

posted for 40 mph throughout the project vicinity. The other three principal arterials have two lanes each and 45 mph speed limits.

- Minor arterials distribute traffic from principal arterials to collector arterials and to local access streets. Issaquah-Pine Lake Road and Issaquah-Fall City Road are considered minor arterials. Issaquah-Pine Lake Road provides two travel lanes and has a speed limit of 35 mph. Issaquah-Fall City Road provides two travel lanes and has a speed limit of 45 mph.

- Collector arterials serve the traffic within neighborhoods and provide direct property access. Collector arterials in the project vicinity are SE 32nd Street, which has a 35 mph speed limit, and SE Klahanie Boulevard, which has a 25 mph speed limit. They each provide two travel lanes.

Figure 3-11 shows the road network and the classification of roads in the project vicinity.

General Travel Patterns

About 92 percent of all work-related trips that originate in the study area are *external* trips (trips between the study area and an area outside of the study area). Of these external trips, 43 percent are destined to eastside cities, 15 percent are destined to Seattle, 14 percent are destined southwest to the Newcastle area, and the remaining 28 percent are destined to other locations.

~~This general travel pattern is projected to change slightly by 2010. The *internal* work trips (trips between work and home when both are within the study area) are projected to increase from 8 percent to 12 percent. This increase in internal work trips is projected to occur generally as a result of new retail developments which would provide employment for people that live in the study area. In 2010, most work trips will be attracted to the Eastside cities (35 percent), Seattle (16 percent), and Newcastle (11 percent).~~

Traffic Volumes

Between 1983 and 1993, traffic volumes on Issaquah-Fall City Road increased at an average annual rate of 18.6 percent (**King County DPW 1994**).

Average weekday traffic volumes shown on **figure 3-12** were based on traffic counts performed by King County in 1993. The p.m. peak hour traffic volumes for 1994 are turning movement counts performed by King County in May 1994. The p.m. peak hour traffic volumes were used in this analysis because they represent the worst case scenario.

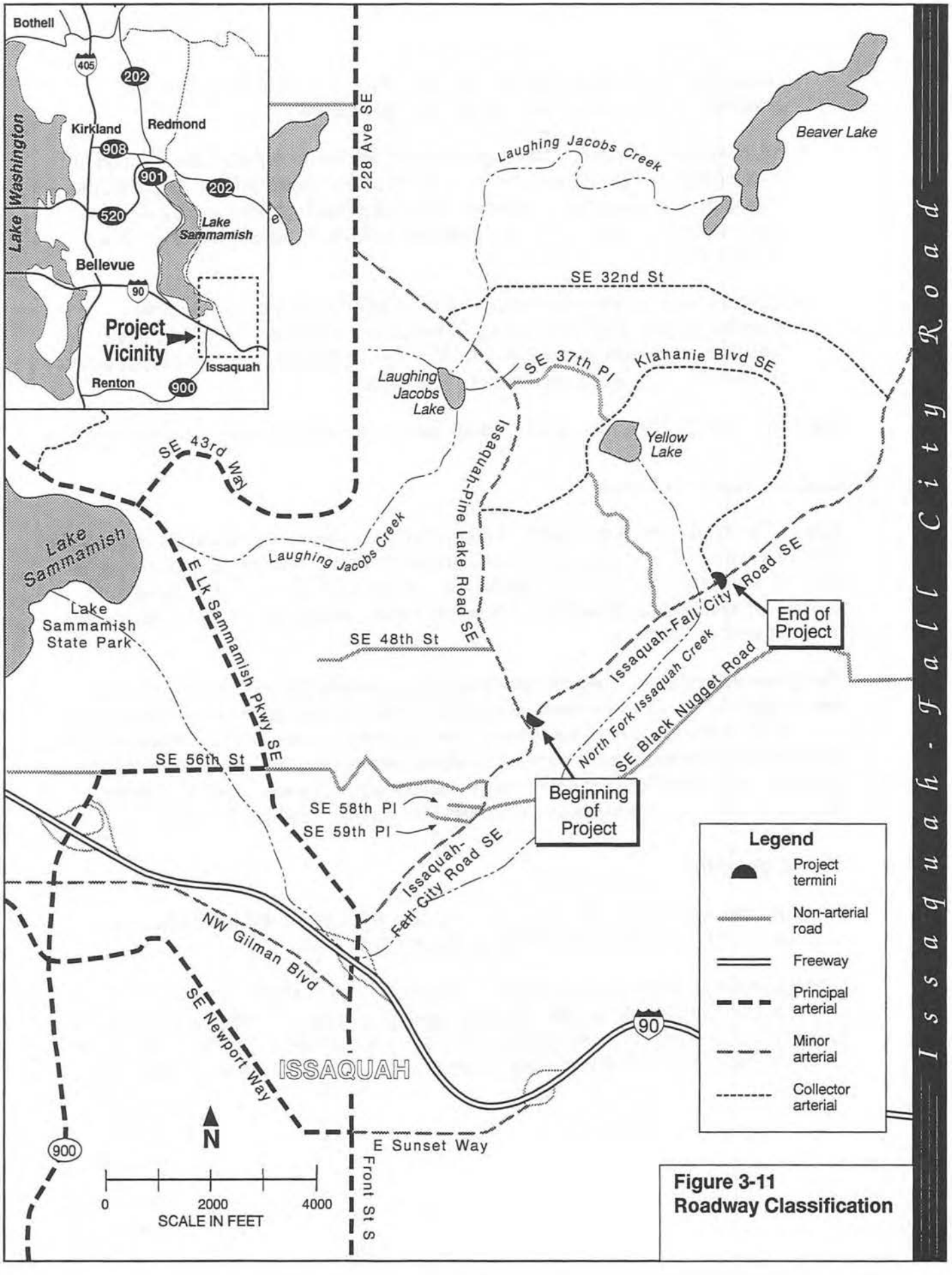


Figure 3-11
Roadway Classification

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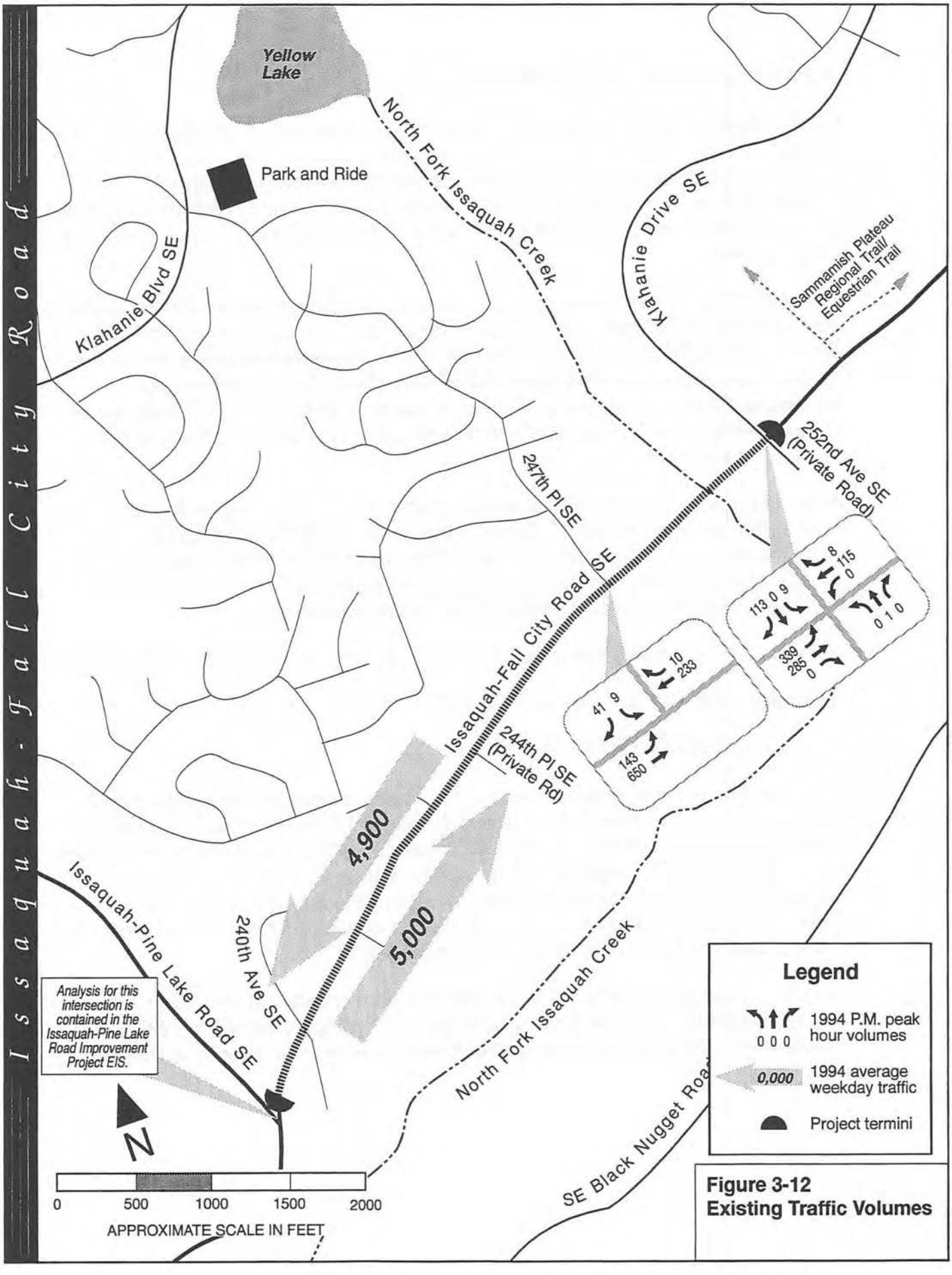

Figure 3-12
Existing Traffic Volumes

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Traffic Operations - Level of Service

Level of service refers to the degree of congestion on a roadway or intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. Level of service is qualitatively described by a letter scale from A to F with "A" representing free-flow conditions (motorists experience little or no delay at intersections), and "F" representing forced flow or congestion (motorists experience very long delays at an intersection).

The LOS calculations for the study intersections **and roadway segments between the intersections** followed the methodology outlined in the "Highway Capacity Manual" (**Transportation Research Board 19941985**). ~~Planning level estimates of the LOS on the open flow segment of Issaquah Fall City Road was analyzed using calculated roadway capacities from the King County Transportation Planning Section, Department of Public Works.~~ The LOS concept is further defined in the Level of Service Concept section at the end of this report.

At signalized intersections, the LOS was calculated in terms of average delay per vehicle passing through the intersection. Characteristics such as the number of lanes, channelization at an intersection, and conflicting traffic movements were taken into consideration when determining LOS values. (See **Appendix D** for the LOS calculation worksheets, ~~and~~ methodology**, and assumptions/default values**.)

A level of service analysis was conducted for the following signalized study intersections:

Issaquah-Fall City Road/Klahanie Drive SE

Issaquah-Fall City Road/247th Place SE

The 1994 weekday p.m. peak hour turning movement volumes shown on **figure 3-12** and used for this LOS analysis were based on actual turn movement counts performed by King County in May 1994. **Figure 3-13** shows the existing intersection channelization and control used to calculate the LOS for existing conditions. The p.m. peak hour volumes were used for the LOS analysis, since they were the highest volumes. The results of the LOS analysis for the 1994 weekday p.m. peak hour existing traffic volumes and existing channelization are summarized in **table 3-15**.

King County Road Adequacy Standards require LOS E or better on affected roads and intersections before land use development may occur (**King County DPW 1992b**). The results of the LOS analysis indicate that both study intersections currently operate at LOS B.

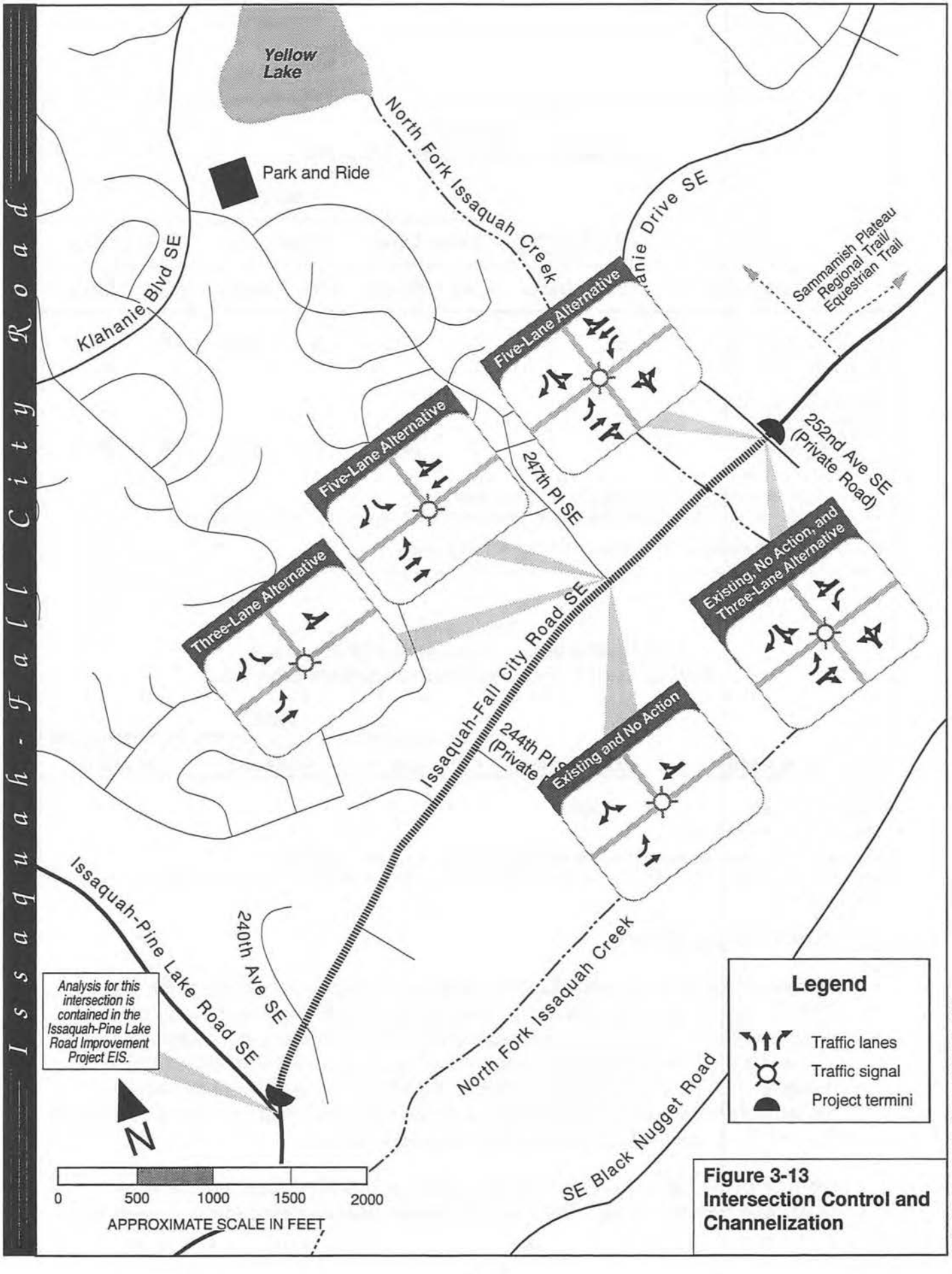

Figure 3-13
Intersection Control and Channelization

Table 3-15
Intersection Level of Service Summary

Signalized Intersections	1994 Existing		2012~~0~~ Three-Lane		2012~~0~~ Five-Lane		2012~~0~~ No Action	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Issaquah-Fall City/ Klahanie Drive SE	B	8.7	D	37.6	D	36.1	D	37.6
Issaquah-Fall City/ 247th Place SE ~~Signalized~~	B	8.1	D	30.8	B	12.6	F	67.7[a]

Notes: 1994 volumes counted by King County in May 1994.
2012~~0~~ volumes modeled by King County - modified by Entranco with King County approval.

a. Expect more delays due to extreme volume/capacity ratios.

~~**Table 3-16**~~
~~**Daily Traffic Volume - Issaquah-Fall City Road from Issaquah-Pine Lake Road to Klahanie Drive SE**~~

~~Parameter~~	~~1994 Existing~~	~~2010 Three-Lane~~	~~2010 Five-Lane~~	~~2010 No Action~~
~~Demand - ADT~~	~~9,900~~			

~~Source: King County Transportation Planning Section, Department of Public Works~~

Public Transportation

Transit service to and from the East Sammamish Plateau is provided by Metro Transit. Only one Metro bus route, 269, currently serves the East Sammamish Plateau. This route operates between downtown Issaquah and the Redmond park-and-**pool**~~ride~~ lot, also serving the Issaquah park-and-**pool**~~ride~~ lot at the intersection of SR 900/SE Newport Way, the I-90 Corporate Center off SE 56th Street, and the large Klahanie residential development via 228th Avenue SE and Issaquah-Pine Lake Road. This route currently does not provide service along the project corridor.

Metro Route 927 provides dial-a-ride service to portions of Issaquah and the East Sammamish Plateau areas. This route can be accessed by calling Metro, in which case

the driver will provide the rider with transportation service to and from locations within the service area.

Metro also maintains a park-and-pool lot which is located at the Sammamish Highlands Shopping Center at the intersection of NE 8th Street/228th Avenue NE, and a park-and-**pool**~~ride~~ lot which is located in the Klahanie subdivision at the intersection of 244th Place SE/SE Klahanie Boulevard. A park-and-pool lot is also proposed as part of the Klahanie Commercial Center, located at the intersection of Klahanie Drive SE and Issaquah-Fall City Road.

School Bus Operations

One school is currently located in the immediate project vicinity. Challenger Elementary School is located in the Klahanie Development at 25200 Klahanie Boulevard. There are approximately 72 school bus trips that currently travel along Issaquah-Pine Lake Road and/or Issaquah-Fall City Road. These trips are produced by the morning, mid-day, and afternoon school bus routes for five schools in the project vicinity. The bus routes operate during three peak periods of the day: the a.m. peak (6:00 to 9:45 a.m.), noon peak (11:00 a.m. to 12:30 p.m.), and p.m. peak (2:00 to 4:30 p.m.). Five school bus stops are located along Issaquah-Fall City Road within the project limits. See **figure 3-15** on page 105 for existing school bus stops.

Fire and Emergency Vehicle Access

The King County Fire District No. 10 provides fire protection to the project vicinity, serving a 165-square-mile area from the east side of Renton to near the South Snohomish County line and east to Snoqualmie Summit. Station No. 223, which is located along Issaquah-Pine Lake Road, provides service within the project vicinity. (See the Public Services section for a detailed discussion regarding fire protection.)

Nonmotorized Facilities

The goals and objectives of trail development are currently being updated in the Draft Regional Trails Plan (**King County Parks 1992b**). This document will revise and further develop the goals of the 1971 Urban Trails Plan and the 1988 King County Open Space Plan, which addressed the need for adequate trails for pedestrian, bicycle, and equestrian use throughout King County. In addition, King County has developed a Nonmotorized Transportation Plan, which addresses issues pertaining to these modes of travel as they relate to the transportation system of the County (**King County DPW 1993a**).

Under the School Pathways Program, pathways and walkways are being constructed for safer access to schools and parks (**King County DPW 1993a**). The recently developed

Pedestrian Priority Process accomplishes the same task for areas not adjacent to schools. Both the 1971 Urban Trails Plan and the existing East Sammamish Community Plan Update call for the development of several off-road multi-user trails in the area, including facilities on the plateau as well as on the Lake Sammamish shoreline.

Pedestrian Access. Few facilities are provided for pedestrian access and safety within the project vicinity, except for those that have been required as a condition of new development. In much of the project vicinity, pedestrians (including school children) must travel on narrow roadway shoulders, less than four feet wide in some locations, which are unprotected from adjacent automobile traffic. The Sammamish Plateau Regional Trail, however, is located at the northern end of the project corridor (see **figure 3-10**)

Particular needs for pedestrian access in the East Sammamish Planning Area include linking residential areas to commercial developments and constructing pathways and walkways for safer access to schools and parks from residential areas.

The East Sammamish Community Plan Update recommends a sidewalk and neighborhood pathway along Issaquah-Fall City Road.

Equestrian Access. The East Sammamish Plateau is an active equestrian community. Equestrians use the unpaved road shoulders or parallel unpaved pathways which lead to separated trail networks and ultimately to equestrian stables and arenas. Because of rapid urbanization of the Plateau, however, equestrian access along King County roads has become increasingly difficult. An equestrian trail is located at the northern end of the project corridor (see **figure 3-10** in the Recreation section).

The 1993 King County Nonmotorized Transportation Plan identifies a pedestrian/equestrian trail around Laughing Jacobs Creek which crosses Issaquah-Pine Lake Road to the north/south trails proposed near Klahanie. Due to community opposition of equestrian trails on private property, the implementation of the equestrian part of this project would have to be by private interest groups instead of King County.

Bicycle Access. A combination of topography and the lack of adequate bicycle facilities has established a barrier to bicycling between the Plateau and surrounding areas. The roads which border the Plateau, however, remain very popular among both recreational and utilitarian bicyclists. The wide shoulders on East Lake Sammamish Parkway and on Issaquah-Fall City Road are being used by a growing number of bicyclists seeking access to a variety of eastside destinations.

Bicycle facilities within the project vicinity are typified by the provision of either a paved shoulder or a widened (14-foot) outside or curb lane. These facilities tend to be used only by experienced bicyclists. A bicycle trail is located at the northern end of the project corridor.

Particular needs for commuter cyclists in the East Sammamish Planning Area include bicycle lanes on arterials on the plateau itself, and the provision of some type of facility on the hill-climb approaches which link the Plateau to other communities in King County.

The 1993 King County Nonmotorized Transportation Plan proposes bicycle lanes along Issaquah-Fall City Road. These facilities would be Class 2 bicycle lanes, which would consist of right-of-way restricted to bicycle use along the roadway.

Safety Issues/Accidents

Sight Distance. Due to its rolling nature, Issaquah-Fall City Road has several slight **vertical**~~horizontal~~ curves which limit sight distance. As a result, vehicles turning to and from driveways and roadways adjacent to Issaquah-Fall City Road may cause through drivers to have to reduce speed quickly.

The intersection at 247th Place SE lies between two sharp vertical curves (hills). This intersection is of particular concern because there is a relatively high volume of vehicles turning into and out of the adjacent Hunters Ridge residential development.

Accidents. According to King County, rear-end collisions and broadside collisions normally account for over 75 percent of all accidents reported in urbanizing areas **(see table 3-16)**. This is true for the project area as well. These accidents almost always are access-related, occurring at an intersection or driveway. The most common of the two are rear-end collisions, which are typical in stop-and-go traffic where there are frequent traffic signals and numerous access movements. Angle collisions normally result when a turn is attempted without an adequate gap in oncoming traffic.

Table 3-16
Issaquah-Fall City Road
1991–1993 Accident Summary
From Issaquah-Pine Lake Road to Klahanie Drive

Severity		
Property Damage Only		**11**
Injury		**4**
Fatalities		**0**
	Total	**15**
Type		
Rearend		**5**
Left-Turn		**3**
Right-Turn		**2**
Vehicle Struck Animal		**2**
Right Angle		**1**
Vehicle Struck Object		**1**
Other		**1**
	Total	**15**

The average **1993**~~1990~~ roadway accident rate for all of King County ~~is~~ **was 3.60**~~4.39~~ per million vehicle miles (mvm) ~~for principal arterials, 5.38 per mvm~~ for minor arterials~~, and 5.21 per mvm for collector arterials~~. To determine whether the project area exceeded this average under current conditions, the accident rates were calculated for roadway segments and intersections. Data was provided by King County for three years (1991, 1992, and 1993) for the Issaquah-Fall City Road roadway segment between Issaquah-Pine Lake Road and Klahanie Drive SE. Roadway segment accident rates are based on daily traffic volumes, number of accidents, and segment lengths. This segment of roadway had an average accident rate of **1.36**~~1.44~~ accidents per mvm, which is a significantly lower average accident rate than King County's overall average rate **for minor arterials (see Appendix D for a summary of the accident data). The severity index, which is based on the number of fatalities divided by the total number of accidents, is zero for this segment of road.**

3.9.2 Impacts

Traffic Modeling Assumptions

King County identifies a wide range of county-wide potential roadway improvements in their Transportation Needs Report (TNR), which is updated each spring. See table 6 in **Appendix D** for a list of current and proposed roadway improvements. A principal tool in implementing the improvements recommended in the Transportation Needs Report is the

Capital Improvement Program (CIP) (see **Appendix D**). The CIP describes programming of funds for capital transportation improvements for the current year and planned spending for the following five years. East Sammamish Planning Area transportation projects are placed on the King County TNR, with the highest scoring projects making it ~~o~~into the CIP. These projects are in competition with projects throughout King County for funds, and this prioritization process takes place annually.

All committed projects **in the CIP,** listed in **Appendix D,** are assumed to be in place by **2012**~~2010~~, and therefore were included in the **2012**~~2010~~ traffic forecast scenario used for the impact analysis. Overall, these improvements will add capacity to the regional roadway system and could affect the distribution of traffic within the project vicinity and the Issaquah-Pine Lake Road traffic operations. Major projects that could affect Issaquah-Pine Lake Road and Issaquah-Fall City Road are the proposed Grand Ridge South Access Roadway from the intersection of Issaquah-Pine Lake Road and Issaquah-Fall City Road to the Sunset Interchange at I-90, and the 228th Avenue SE from Inglewood Hill Road to East Lake Sammamish Parkway project, which proposes to widen 228th Avenue NE to four lanes with curb, gutter, and sidewalk. It would also include constructing a bicycle lane and adding equestrian trail access between Issaquah-Pine Lake Road and East Lake Sammamish Parkway.

The general travel pattern in 2012 is projected to change slightly from existing conditions. The *internal* work trips (trips between work and home when both are within the study area) are projected to increase from 8 percent to 12 percent. This increase in internal work trips is projected to occur generally as a result of new retail developments which would provide employment for people that live in the study area. In 2012, most work trips will be attracted to the Eastside cities (35 percent), Seattle (16 percent), and Newcastle (11 percent).

~~*2010 Projected Traffic Volumes*~~

Projected **2012**~~2010~~ traffic volume data were provided by the King County ~~Public Works~~ Department **of Transportation** (see **figure 3-14**). Projected volumes were based on the County's traffic model and land use assumptions for the draft East Sammamish Community Plan Update (Alternative 5, Staff Recommended). This model assumes that all committed projects listed in **Appendix D** would be complete by the year **2012**~~2010~~. These volumes were adjusted based on existing traffic counts, projected future land uses, volumes used in the Klahanie Commercial Center EIS, **volumes projected for the East Sammamish South Access Roadway (Grand Ridge Extension)**, and intersection volumes used in the Issaquah-Pine Lake Road Improvement Project EIS.

~~The 2010 average daily traffic volumes shown on **figure 3-14** were projected by applying the existing "K" factor (ratio of peak hour to daily volume) of 0.10 to the 2010 projected p.m. peak hour volumes. All forecast adjustments were confirmed by King County's Transportation Planning Section.~~

The projected **2012**~~2010~~ traffic volume data was used to assess operations of each of the action alternatives and the No Action Alternative.

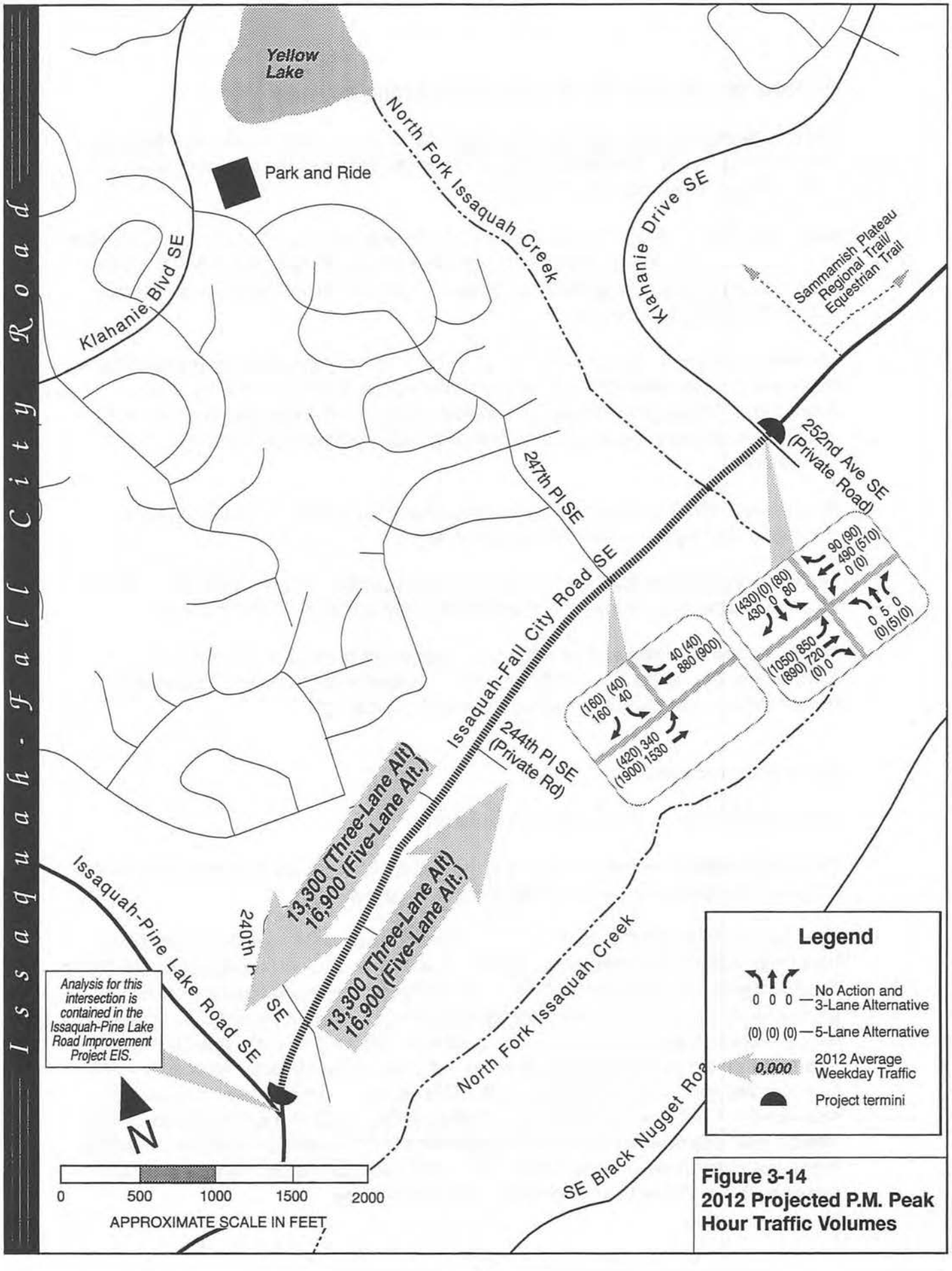

Figure 3-14
2012 Projected P.M. Peak Hour Traffic Volumes

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Construction Impacts Common to Both Action Alternatives

Traffic Operations. Vehicles traveling along the project corridor could experience an increase in delay with the construction of additional lanes and the potential closure of roadway segments for construction zones.

Rerouting traffic through the side streets and residential neighborhoods may also create additional delay. Vehicles on side streets may encounter longer delays due to slower traffic moving through the construction areas. In general, travel times would increase during the construction period.

The response time for fire and emergency vehicles may increase during the construction phase of the action alternatives because of the expected congestion created by construction. Although the fire and emergency vehicles would be given right-of-way during an emergency response, slow-downs through construction zones are unavoidable.

School buses could experience longer delays along Issaquah-Fall City Road from potential re-routing during the construction phase.

Nonmotorized Facilities. Construction activity would temporarily reduce the width of shoulder available for bicyclists and pedestrians within the construction zones.

Safety Issues/Accidents. The potential for accidents could increase during construction, due to the increased congestion created by partial road closures and modifications to channelization during construction phasing.

Operational Impacts

Impacts Common to Both Action Alternatives

Traffic Operations - Levels of Service. A 2012~~0~~ LOS analysis was performed for the same study intersections analyzed for the existing conditions.

As shown on **table 3-17~~15~~**, both the study intersections would operate at LOS **D~~C~~** or better with either of the action alternatives. The **overall** intersection of Issaquah-Fall City Road/Klahanie Drive SE operates more efficiently than expected because of imbalanced turning movement volumes (relatively low volumes approaching from the north and high left-turn volumes approaching from the south—see **figure 3-14**). Because of the low volumes from the north, the signal phasing can be optimized to accommodate the left turn volumes approaching from the south. This results in **the overall~~an~~** intersection **operating at LOS D.~~with minor delays.~~ It should be noted that although the overall intersection operates at LOS D, the eastbound left-turn and the westbound traffic lanes will operate over capacity with the channelization shown in figure 3-13, under both the Three-Lane and Five-Lane alternatives.**

As shown on **figure 3-14**, projected traffic volumes for the Five-Lane Alternative are greater than for the Three-Lane Alternative. This is because the Five-Lane Alternative

Table 3-17
Intersection Level of Service Summary

Signalized Intersections	2012					
	Three-Lane		Five-Lane		No Action	
	LOS	Delay	LOS	Delay	LOS	Delay
Issaquah-Fall City/ Klahanie Drive SE	D	37.6	D	36.1	D	37.6
Issaquah-Fall City/ 247th Place SE	D	30.8	B	12.6	F	67.7[a]

Note: 2012 volumes modeled by King County - modified by Entranco with King County approval.

a. Expect more delays due to extreme volume/capacity ratios.

would be able to accommodate higher traffic volumes by providing two additional travel lanes.

Since a center **two-way** left-turn lane would be added, both action alternatives would improve the flow of traffic between intersections. This additional lane would provide a refuge for left-turning traffic to move out of the through lanes, thus allowing other traffic to proceed along their routes without delay. A center **two-way** left-turn lane also would improve access to and from all adjacent properties. This would therefore improve fire and emergency vehicle and school bus operations. The widening would also provide more room for vehicles to pull over, allowing greater passing capabilities in an emergency situation.

Based on a planning level capacity analysis, the Three-Lane Alternative would provide a roadway capacity of 17,000 vehicles per day, and the Five-Lane Alternative would provide a roadway capacity of 33,900 vehicles per day (nearly twice as many vehicles as the Three-Lane Alternative). Based on the average daily traffic demand (see table 3-18), the capacity provided by the Three-Lane Alternative would be exceeded by 46 percent. Based on the average daily traffic demand, the capacity of the Five-Lane Alternative would not be exceeded.

A more definitive operational analysis for peak hour volumes was conducted based on the methodology as outlined in the updated 1994 Highway Capacity Manual for two-lane and multilane highways. The results show the Three-Lane Alternative would operate at LOS F and the Five-Lane Alternative would operate at an acceptable LOS D. (See Appendix D for the capacity analysis worksheets, methodology, and assumptions/default values).

Table 3-18
Daily Traffic Volume - Issaquah-Fall City Road
from Issaquah-Pine Lake Road to Klahanie Drive SE

		2012		
Parameter	1994 Existing	Three-Lane	Five-Lane	No Action
Demand - ADT[1]	9,900	26,600	33,800	26,600
Capacity - ADT[2]	13,780	17,000	33,900	13,780

1. King County Transportation Planning Section, Department of Transportation
2. Planning Level Analysis Method, based on data in the Florida Department of Transportation *Level of Service Standards and Guidelines Manual*, April 1992.

Nonmotorized Facilities. The sidewalk, neighborhood path, and bicycle lanes along the entire length of the project would provide for safer pedestrian and bicycle access than the existing gravel or paved shoulder. The planned sidewalks also would provide safer pickup/drop off points for school bus passengers.

Both action alternatives would provide a bicycle lane, sidewalk, and neighborhood path. These facilities would provide a link between the Sammamish Plateau Regional Trail to the northeast and the future facilities along Issaquah-Pine Lake Road to the southwest.

Safety Issues/Accidents. The addition of a center **two-way** left-turn lane would provide a refuge for left-turning traffic to move out of the through lanes. This would lower the probability of occurrences where drivers in the through lanes would need to stop quickly, and thus reduce rear-end collisions.

Both action alternatives would **flatten**~~eliminate~~ the hills southwest of 247th Place SE, as well as reduce the dip across North Fork Issaquah Creek. Flattening of these curves will improve sight distance, and therefore enhance safety for vehicles in the vicinity of 247th Place SE. In addition, the bicycle lanes and a center **two-way** left-turn lane would widen the roadway and improve sight distance for vehicles entering the roadway.

No Action Alternative

The No Action Alternative assumes that Issaquah-Fall City Road would remain as it is without any roadway or intersection improvements.

Traffic Operation - Levels of Service. An LOS analysis, assuming no improvements, was performed for the same study intersections analyzed for the existing conditions. **Figure 3-13** shows the intersection channelization for the No Action Alternative. This channelization, which is exactly the same as existing conditions, was used in this LOS analysis.

The results of the LOS analysis **are shown in table 3-17.** ~~for the study intersections are exactly the same as for the Three Lane Alternative (table 3-15).~~ **The Issaquah-Fall City Road/247th Place SE intersection is expected to operate at LOS F and the Issaquah-Fall City Road/Klahanie Drive SE intersection is expected to operate at LOS D. It should be noted that although the intersection of Issaquah-Fall City Road/Klahanie Drive would operate at LOS D, the eastbound left-turn and westbound traffic would operate over capacity under the No Action Alternative.**

Based on a planning level capacity analysis, the No Action Alternative would provide a roadway capacity of 13,780 vehicles per day. Based on the average daily traffic demand (see table 3-18), the capacity provided by the No Action Alternative would be exceeded by 93 percent.~~This is because channelization would not differ between the No Action Alternative and the Three Lane Alternative at these intersections (see figure 3-13).~~

If no improvements are made, however, left-turning traffic would continue to use the through lanes between intersections, and thus continue to cause delay for through traffic. This continued delay would probably increase along with the projected increase in traffic. Fire and emergency vehicle and transit and school bus operations would continue to experience this delay along their routes.

Nonmotorized Facilities. If no improvements are made for either pedestrians or bicyclists, they would be forced to continue using the narrow shoulders in most locations.

Safety Issues/Accidents. If no improvements are made, left-turning traffic would continue to need to stop quickly, and the potential for rear-end collisions would increase along with the projected increase in traffic.

3.9.3 Mitigation

Mitigation During Construction

Measures to mitigate the temporary impacts of construction include:

- Signage for traffic control
- Public notification of lane diversions
- Following King County procedures for traffic diversions

Mitigation During Operation

~~No mitigation is proposed beyond those that make up the various elements of the proposed action—expand capacity, make intersection improvements, realign to increase sight distances, and provide bicycle and pedestrian facilities.~~

Additional mitigation such as transportation demand management may be implemented to help meet the demand for road capacity. Please refer to the discussion of mitigating measures in Appendix D.

Mitigation is proposed at the intersection of Issaquah-Fall City Road and Klahanie Drive SE. Under the Three-Lane Alternative, eastbound dual left-turn lanes are proposed to accommodate the demand on this movement. The results show the overall intersection would operate at LOS C with 16.5 seconds of delay per vehicle. The eastbound left-turn and westbound traffic lanes would improve to LOS C.

For the Five-Lane Alternative, as mitigation for the intersection, eastbound approach lanes would be channelized as an exclusive left-turn lane, a shared left-through lane, and a shared right-through lane. This improvement would result in the overall intersection operating at LOS C with 19.0 seconds of delay per vehicle.

The eastbound left-turn lane would operate at LOS C and the westbound traffic lanes would operate at LOS D (see Appendix D for the mitigated LOS calculations).

3.9.4 Unavoidable Significant Adverse Impacts

No unavoidable significant adverse impacts are expected.

3.10 PUBLIC SERVICES AND UTILITIES

3.10.1 Existing Conditions

Public Services

Educational Facilities. The project area is served by Issaquah School District No. 411. The closest public school to the project corridor is Challenger Elementary School, which is located about 1.5 miles from the project on SE Klahanie Boulevard. Issaquah Montessori is a private preschool located on Issaquah-Fall City Road in the project

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DISTRIBUTION LIST

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Issaquah School District No. 411
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Issaquah, Washington 98027

Issaquah Library
120 E Sunset Way
Issaquah, Washington 98027

COMMENT LETTERS AND RESPONSES

State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Mailing Address: 600 Capitol Way N, Olympia, WA 98501-1091 - (206) 902-2200; TDD (206) 902-2207 .
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia, WA

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MAR 30 1995
PUBLIC WORKS
SPECIAL PROJECTS

March 27, 1995

Matt Dolan, Acting Supervising Engineer
King County Department of Public Works
Roads and Engineering Division
400 Yesler Way, Room 400
Seattle, Washington 98104-2637

SUBJECT: Draft Environmental Impact Statement - Issaquah-Fall City Road - North Fork Issaquah Creek, Tributary to Issaquah Creek, WRIA 08.0181

Dear Mr. Dolan:

The Washington Department of Fish and Wildlife (WDFW) has reviewed the above-referenced document and submits the following comments.

The document correctly identifies that impacts to the North Fork of Issaquah Creek and its associated wetlands can be avoided by construction of a bridge to replace the existing culvert. WDFW is very likely to require a bridge for this project if a build alternative is selected. A bridge will be necessary to avoid impacts and mitigate for impacts to the creek and wetlands. 1

A Hydraulic Project Approval is required from WDFW for this project for any work within the ordinary high water mark of the streams and associated wetlands. The applicant must provide proper protection of fish life prior to issuance of the approval. WDFW policies require no-net-loss of habitat productivity. Impacts must first be avoided to comply with this policy. A thorough mitigation plan will be necessary to replace the habitat value of any unavoidable impacts. 2

Thank you for the opportunity to comment. If you have any questions or need additional information, please contact me at (206) 392-9159.

We appreciate your cooperation in our efforts to preserve, perpetuate, and manage the fish resources of the state of Washington.

Sincerely,

Larry Fisher

Larry Fisher
Area Habitat Biologist
Habitat Management Program

lf
cc: WDFW, Muller
WDFW, Olympia

RESPONSES TO COMMENTS FROM WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

1. Thank you for your comments. King County will continue to coordinate with the Washington State Department of Fish and Wildlife during project development.

2. King County will prepare an application for Hydraulic Project Approval. This will include submittal of mitigation plans.

King County
Environmental Division
Department of
Development and Environmental Services
3600 - 136th Place Southeast
Bellevue, Washington 98006-1400
(206) 296-6602

April 10, 1995

TO: Matt Nolan, Acting Supervising Engineer, Roads and Engineering Division

FM: Ikuno Masterson, Manager

RE: Issaquah-Fall City Road - Draft Environmental Impact Statement

Thank you for the opportunity to review and comment on this Draft Environmental Impact Statement (DEIS) which proposes road improvements to Issaquah-Fall City Road between Issaquah-Pine Lake Road and the southern entrance to the development of Klahanie (Klahanie Drive Southeast). Our review focused on the plant and animals section.

This DEIS offers a good range of alternatives and options which quantitatively show changes in impacts to plant and animal values. Further, this DEIS addresses cumulative impacts to wildlife habitat better than most road improvement EIS's. The importance of habitat connections with Yellow Lake are discussed and options to minimize impacts are evaluated. This project is also put into perspective with the key components of the 1994 King County Comprehensive Plan, including the proximity to the urban - rural line and Countywide Wildlife Habitat network.

The Bridge and Retaining Wall Options (pages 51-53) discussed under Wetland Mitigation are also very applicable to the wildlife mitigation section. This language should be repeated or more specifically referenced in the wildlife mitigation section to emphasize how wildlife habitat impacts, especially related to small mammals, amphibians, fish, insects and plant seeds, can be mitigated and minimized through the bridge or retaining wall option. 1

Thank you again for the opportunity to review and comment on this DEIS. My staff have mentioned substantial improvement on environmental analysis and evaluation concerning road improvement projects over the past several years. We believe the relationship we cultivated has contributed to more accurate disclosure of impacts and better land use decisions. I look forward to continuing this relationship. Please address any questions concerning this DEIS to Tom Beavers, Resource Planner, at 296-7277.

TB:mm
:TB\ISSFALL.doc

cc: Kathy Creahan, Lead Planner, Resource Planning Section
ATTN: Tom Beavers, Resource Planner

"Preserving the Balance"

RESPONSES TO COMMENTS FROM KING COUNTY ENVIRONMENTAL DIVISION

1. The following information has been added to 3.4.3 Mitigation Common to Both Action Alternatives in the Plants and Animals section.

   The free movement of wildlife along North Fork Issaquah Creek would be restored with a large, open-bottom culvert. Recommendations from the Washington Department of Fish and Wildlife should be requested and followed regarding culvert design that could accommodate fish, amphibians, raccoons, black-tailed deer, and black bear.

   A bridge option could be used as mitigation in place of the open-bottom culvert. A bridge would allow for more natural movement of small mammals, amphibians, fish, insects, and plant seeds along North Fork Issaquah Creek.

...ED

MAR 22 1995

PUBLIC WORKS
SPECIAL PROJECTS

March 20, 1995

Mark Brzoska
Senior Engineer
Roads and Engineering Division
Department of Public Works
Yesler Building - Room 400
400 Yesler Way
Seattle, Washington 98104

The purpose of this letter is to establish our concerns regarding the draft environmental impact statement completed for the proposed road improvements to the Issaquah-Falls City Road. Generally, we support the no action alternative because it would have the least environmental impact on our home located at 24721 Issaquah-Fall City Road or between sections 37 and 38 on your maps. However, increased traffic and safety concerns probably have established a need for some road improvements, and in that case, we may support the three-lane alternative if certain concerns which are outlined below are addressed. We are opposed to the five-lane alternative because of safety, noise, and access concerns, as well as overall degradation of our home site. 1

We are mainly concerned about losing our home under the five lane alternative. These concerns are specifically addressed below with reference to section 1.7.

Under 1.7 the county suggests that the only home that would be lost is located at 244th Place SE. We believe our home, located between sections 37 and 38, would be lost under the five lane alternative, and we need to have this concern addressed . This section talks about a public taking of up to 4.35 acres, but it does not detail where the land would be acquired. It appears from the figures in the technical appendices Figures 9 and 11 that our property would be especially impacted under the five lane alternative. 2

Under the five-lane (Figure 11) it appears from the scale that about 23 feet of right of way would be acquired all along our home site for about 300+ feet.. Our property is pie-shaped and encompasses about six-tenths of an acre. At the rate the county is proposing of condemnation one-third of our overall site would be lost. This proposal would mean the loss of our home. Anything short of that would mean the edges of the sidewalk would skirt our living room.

Under the five-lane our children's safety would be in doubt, access to our home appears to be eliminated, noise impacts would be even greater, drainage would be impacted, as well as our back-up drainfield for the septic tank. 3

Would need our concerns about this public taking addressed with greater specificity, and with precise measurements which are hard to glean from the appendices. Additionally, it appears that all of our natural buffers that help mitigate sound, glare and noise would be eliminated, particularly under the five lane alternative. How would the 130 foot fir trees be replaced? 4

Further we are concerned about access to our home under any alternative, especially at our main driveway entrance located on the southwest corner of our property, adjacent to what the DEIS refers to as Wetland C. Those additional concerns are outlined in order below. 5

Under section 1.1 (Purposes, needs and Objectives) the width and need to eliminate vertical curves southwest of 247th Place SE is discussed, but there is no figure or description detailing how the road could be excavated, and the height difference that would result from cutting down the road to eliminate the vertical curves.

Further on page 3, the DEIS suggests the vertical alignment near the driveways does not provide for sufficient time to observe vehicles exiting and entering the roadway. The DEIS suggests the proposed project would address this through realignment .The alignments (technical appendices) show right of way that would be acquired, but there are no drawings that show pitch or steepness of the redesigned driveways or how the overall character of the neighborhood could be changed by what conceptually may be called a "tunnel effect". It is difficult to comment on the alternatives without the kind of information that would detail these impacts. A road profile is necessary. 6

Under 1.2 there appears to be no discussion of how erosion would impact Wetland C referred to later in the document -- the only discussion is of the retaining wall option on North Creek. Would a retaining wall be an option or would the only option be the rockery indicated in the technical appendices? Without a a drawing of the proposed rockery is it difficult to assess the impacts on the "Wetland C" located in the southwest corner of our property. It is a very deep and steep hole, particularly because of the area has been recently filled by the neighbors adjacent. 7

Under 1.3 we agree that further air quality modeling should be conducted because we are located at the corner of 247th Place SE and Iss-Fall City Road and air quality likely will be further impaired by vehicles idling at the new traffic signal.that will be built under the interim action. 8

Under 1.4 the county suggests that two of the wetlands, including Wetland A on North Fork Issaquah Creek would be impacted by the new roadways. Further there would be substantial increased in peak runoff flows and volumes leaving the roadway surface under either alternative. There is no mention however, of how this runoff will impact the southwest corner of our property ("Wetland C"). This is of particular concern to us because during rainy years the water has reached the roadway surface, the neighbors tell us the water has on occasion been up and over the roadway surface. Under the three-lane alternative it appears that little or no right of way will be taken there, so perhaps this area would not be affected. It is unclear how much would be taken if a five-lane road was built, in any case run-off mitigation should be addressed on the southwest corner of our land. 9

On page 8 the DEIS references wetlands filling and the creation of up to 1.6 acres of new replacement. It is unclear from this section where the wetlands would be filled, my primary concern is whether my land would be filled under either alternative. And, how we would be compensated for its loss and the natural buffer the wetland provides. 10

Under 1.5 there is reference to impacts on wildlife. We have photographs of Piliated woodpeckers which pilfer the stumps on our property. I'm not sure if the roadway would impact their habitat, but I raise this issue here as a point that should be addressed. 11

Under 1.6 no mitigation is suggested. We think this is inadequate because the sound studies have been based on residential traffic patterns. When Lowe Enterprises builds the new commercial complex at the intersection of Klahanie Drive SE and Issaquah Fall City Road there will be large commercial sixteen and eighteen wheeler delivering groceries to the QFC. These vehicles will contribute to the noise and traffic patterns, particularly at intersections where they idle and where they gear down on the hills. Mitigation that addresses the noise produced from commercial vehicle usage that will occur should be considered. 12

Under 1.8 it says mitigation measures would be greater, but it does not detail the measures. How can we react to which alternative would be appropriate or if the mitigation under consideration is extensive enough when there appears to be no detail? 13

Under 1.9 The county appears to place great importance on bike access. Currently, we have difficulty with bicyclist en route to the Herb Farm stopping in our front yard and blocking our driveway ingress and egress, as well as leaving garbage. If the bike paths are installed it would be worthwhile designing natural stopping places with garbage receptacles, so these individuals do not use private residences as rest stops. 14

Under 1.10 the intersections and LOS is discussed and the diagram on page 100 is referenced. However, there is no discussion of how are driveway ingress or egress will be affected by the installation of the actualized signal in our direction too. This may not be necessary, however it needs to be clear in the FEIS that traffic signal at the Iss-Fall City Road and 247th will allow for our access at that point on the south side of the road, as well as other flows. 15

Under 2.1 the five lane alternative, again there is little specificity about which of the 4.35 acres would be required to achieve this alternative. So, it is difficult to analyze, the figures in the appendices seem to suggest that our home would be taken by the county, but I can't find any specific discussion in the document. Additionally, a 45 mile per hour speed may be legal under the county standard, but by your own figures that growth in the region will be substantial, there are many school children in the area, and for safety reasons it makes more sense to lower the speeds to protect pedestrians. 16

Under 2.2 the three lane alternative we have similar right of way concerns, but the DEIS is not detailed enough to show the number of feet along our property that would be lost. It appears from the technical appendices that it could be accomplished under existing right of way on the south side of the road. If this analysis is correct, we would prefer the three-lane improvement. 17

Under 3.1.2 Impacts five lane and three-lane alternatives. This is the first specific reference I have found with respect to maximum cuts and fills of 10 to 20 feet. It is unclear how steep driveway accesses would have to be from a cut that deep, or how it would look along the roadway corridor. The FEIS should explain this in greater detail, so the public can understand the character this road would take. 18

Under Wetland B page 42 the DEIS suggests that water is received from the road and surrounding land. A closer look would reveal that there are remnants of an old well that may not have been visible when the County evaluated it. The DEIS suggests that this southwest corner of our land is unaffected by development, however it should be noted that half of it has been filled with I-90 dirt over the past five years. It is unclear from this comment whether a 25-foot buffer is required, and whether this area is viewed as a wetland since it has not been classified as such. This question should be addressed in the final EIS. It is unclear how the buffer would be achieved under the three or five lane alternatives. 19

Further discussion, on page 47 indicates that some fill would be needed. But, in order for us to comment on how this impacts our property we would need to understand the design. So, for now, we suggest that this would be lost area and more detail is needed to better define necessary mitigation.

Safety Issues/Accidents are discussed on page 98. We would like to raise a problem for consideration by the County should a three-lane alternative be approved. As motorists approach Hunters Ridge from the west and travel east they slow to make a right hand turn. Under the three lane alternative a turn lane with better sight distance would help the collisions which currently occur. However, a buffer on the south side of the road would alleviate some of our safety concerns, as currently motorist pass on the right, at high speeds 45 mph and up, and often spin-off into the lower part of our yard. 20

In summary, with proper mitigation and better attention to safety concerns we would consider supporting a three lane alternative. However, more design detail would be necessary to develop proper mitigation for safety, wetlands buffers, traffic access, noise, and drainage. This comments are made with the caveat that we correctly interpreted the DEIS to say that the three lane alternative would have no right of way acquisition along our property line and could be accomplished with mitigation under existing right of way in our area. 21

We are totally opposed to the five lane alternative which would, in our opinion, cause irreparable damage to our home and safety issues which could not be mitigated. 22

We look forward to your response.
Sincerely,

James Fosnaugh
James Fosnaugh
24721 Iss-Fall City Road
Issaquah, WA 98027
(206)391-8728

Rose Berg-Fosnaugh
Rose Berg-Fosnaugh

RESPONSES TO COMMENTS FROM JAMES FOSNAUGH AND ROSE BERG-FOSNAUGH

1. We appreciate your preference for the No Action Alternative. Based on the County's obligation to study and enhance transportation service for the Sammamish plateau area, the Five-Lane Alternative has been chosen as the preferred alternative. This alternative provides the best level of service for the entire length of the roadway under review. The Three-Lane Alternative meets the County's standards for level of service at the intersections but not for the road segments between intersections.

2. All aspects of a property and the effect that right-of-way acquisition would have on that property would be carefully studied on a case by case basis during the right-of-way acquisition process. If your property is directly impacted by the need to purchase property and/or property rights, then the site would be appraised to determine the just compensation due. Right-of-way impacts involving displacement of residents are taken seriously by King County, and if displacements are needed, the acquisition process would be guided by the Uniform Relocation and Real Property Acquisition Act of 1970.

   The preliminary plans showing the right-of-way were on display at the Draft Environmental Impact Statement (DEIS) Open House and are available for examination at the King County Roads Division. Based on these plans, it appears that the Five-Lane Alternative would not require the acquisition of your home. As shown on figure 11 in Appendix B of the DEIS, a rockery would be placed just outside of the existing right-of-way to minimize cut and fill impacts on your property. The actual width of right-of-way that would be purchased for roadway construction, however, would be determined during final design and it could vary depending on the location of cuts, fills, retaining walls, and drainage facilities. See the Project Description in this Final Environmental Impact Statement (FEIS).

   Potential impacts on residences are estimated and discussed in the DEIS beginning on page 77. Final alignments would be adjusted to reduce property acquisition and displacements wherever possible.

3. Your concerns regarding the Five-Lane Alternative are appreciated.

   The sidewalk, neighborhood path, and bicycle lanes along the entire length of the project would provide for safer pedestrian and bicycle access than the existing gravel or paved shoulder. The sidewalks also would provide safer pickup/drop off points for school bus passengers (see the Transportation section in this FEIS).

   Access to your home would be retained as part of the project. Driveways would be reconstructed according to King County Road Standards.

   Table 3-13 in this FEIS shows the modeled p.m. peak-hour traffic noise levels. The table indicates that in the year 2012, noise levels at SLM 2, which is near your home, would be 72 dBA for both the Five-Lane and the No Action Alternative.

There would be a substantial increase in the peak runoff flows and volumes leaving the roadway surface after construction of either action alternative. Flows would be collected and carried into a ditch on the south side of the road. The flows in the ditches would be conveyed to one of two detention ponds or an infiltration pond, which would be designed to provide the standard of runoff/ flooding control required by either the North Fork Issaquah Creek or the East Lake Sammamish basin plans (see the Water section in the DEIS for more details).

If your property is directly impacted by the need to purchase property and/or property rights, then the site would be appraised to determine the just compensation due. All aspects of a property would be carefully studied on a case by case basis during the right-of-way acquisition process.

4. The DEIS presents the total additional right-of-way needed for each alternative. This level of detail is considered adequate at this stage of planning and design. Further refinements in the area of impacts to individual properties will come during the project's detailed design phase.

   Vegetation that currently provides screening for residences should be preserved, where possible, with the use of retaining walls to minimize the extent of cut and fill operations. Although trees can provide visual screening, it has been found to be of minimal value as a noise barrier unless they form a dense barrier at least 100 feet in width.

   Significant trees would be preserved where possible. After construction is completed, disturbed areas would be revegetated with native plant species. A roadside revegetation plan would be developed during final design.

5. Access to your home would be retained as part of the project.

6. A profile showing the grade changes of the Three-Lane and Five-Lane alternatives has been added to the FEIS (see figure 3 in the Project Description). Impacts associated with grading activities are discussed in the Earth section of the DEIS. The height differences between the existing grade and proposed grade are shown on the profile. The greatest height differences, about 20 feet, would occur near the North Fork Issaquah Creek crossing. In other locations along the road, height differences would range from zero to seven feet.

   Cut slopes on either side of the roadway would be at an incline of 2:1 or flatter. Where there is insufficient room for cut slopes, retaining walls would be designed and constructed to support the excavated cut.

   Driveways would be reconstructed according to King County Road Standards. The grade transition of the driveways would be constructed as smooth vertical curves at a maximum slope of 12 percent or flatter. If severe conditions exist, the slope may be greater. Driveways would be studied on a case by case basis during detailed design.

The roadway's overall character would change with the addition of curbs and sidewalks on the north side of the roadway and a neighborhood path on the south side of the roadway. The removal of vegetation would reduce the amount of shadows cast onto the roadway by trees along the south side, and improve visibility along the corridor, especially during fall and winter when there are fewer daylight hours. Where roadside vegetation is relatively thin, the removal of roadside vegetation may increase views of the roadway to affected residences. For the most part, however, there would still be a significant amount of vegetation along both sides of the roadway, and therefore the overall aesthetics of the roadway would not significantly change. Impacts to the overall character of the neighborhood are discussed on page 83 of the DEIS.

A profile showing the grade changes of the Three-Lane and Five-Lane alternatives have been added to this FEIS as figure 3 in the Project Description.

7. During construction, the potential for erosion would increase where vegetation protecting the ground surface is removed. Both alternatives would build a retaining wall (shown as a rockery) to avoid direct impacts to Wetland C. The Five-Lane Alternative, however, would fill a portion of the buffer surrounding Wetland C. See table 3-4 on page 47 of the DEIS.

   Best Management Practices such as silt fences and other erosion control measures would be installed prior to construction and addressed during detailed design.

8. Based on the air quality analyses contained in the Air Quality section of this FEIS, and EPA guidance, it has been determined that effects on air quality would be minimal at this intersection.

9. Drainage from the developed roadway would be collected in a roadside ditch on the south side of the roadway. Runoff from the southbound lanes would sheetflow over the pavement edge before entering the ditch. No ditch would be installed adjacent to Wetland C. The flows in this area would be diverted to the ditch downstream of the wetland to prevent introduction of any new flows from the roadway into the wetland.

   Refinements in the area of drainage would occur during the project's detailed design phase.

10. Both alternatives would build a retaining wall (shown as a rockery) to avoid direct impacts to Wetland C. The Five-Lane Alternative, however, would fill a portion of the buffer surrounding Wetland C. See table 3-4 on page 47 of the DEIS.

    If your property is directly impacted by the need to purchase property and/or property rights, then the site would be appraised to determine the just compensation due. All aspects of a property would be carefully studied on a case by case basis during the right-of-way acquisition process.

11. Impacts to wildlife are discussed in the Plants and Animals section of the DEIS. Table 3-8 in the DEIS shows the type and amount of wildlife habitat that would be acquired for new right-of-way. The highest quality wildlife habitat in the project corridor is the forested wetland along North Fork Issaquah Creek. Large trees and snags along North Fork Issaquah Creek are important to pileated woodpeckers for nesting and feeding. Although the impacts on wetland habitats would be mitigated, there would be no mitigation for impacts on upland habitats.

12. Noise mitigation is not suggested because the King County Noise Ordinance currently exempts traffic noise from the regulatory limits applied to most other sources. However, King County has recently proposed a draft Road Noise Policy regarding environmental review and mitigation of roadway traffic noise. This policy, when adopted, will provide the County with guidelines for analysis of noise mitigation. Analysis of noise mitigation will consider the benefits and costs of abatement and the overall social, economic, and environmental effects of the mitigation. This project does not propose mitigation measures at this time. However, the County will analyze potential noise mitigation measures along Issaquah-Fall City Road, and if feasible and reasonable, these measures may be included as part of the project.

    The noise analysis was based on p.m. peak-hour traffic noise, since the p.m. peak hour represents the worst-case condition. The analysis also considered noise from heavy-duty vehicles, (trucks and buses) based on direct observations during the p.m. peak hour. The noise impact analysis for both action alternatives and the No Action Alternative was based on projected year 2012 p.m. peak-hour traffic volumes, which considered traffic volumes from the Klahanie Commercial Center as well as other planned developments.

    The noise impacts that would result from the Klahanie Commercial Center were analyzed in a separate August 1992 Draft Supplemental EIS, called the Klahanie Commercial Center Supplemental EIS. According to this study, commercial traffic would not create a noticeable increase in traffic noise in the project area; however, delivery and refuse trucks may be audible, particularly if they arrive at night when ambient noise levels are lower (**King County 1993**).

13. The Summary does not include details on mitigation. The mitigation measures are described on page 86 of the DEIS. Additional details would be determined during final design.

14. Your suggestion is appreciated. Natural stopping places with garbage receptacles could prevent bicyclists from using private residences as resting stops. These stopping places, however, would also require purchasing additional right-of-way from private landowners, and would require regular maintenance. The bicycle lane proposed along the north side of the roadway also could prevent bicyclists from using private residences as resting stops. They would provide enough room for bicyclists to rest without having to pull over into your front yard or driveway.

15. Access to the existing driveway along Issaquah-Fall City Road would be preserved with the installation of the signal at 247th Place SE. At the driveway, located 175 feet west of the intersection, there would be more potential for cars to block the driveway because its location is close to the signal. The driveway is located far enough back from the intersection that the driveway wouldn't be blocked throughout most of the day. During the p.m. peak hour, however, queues on average would extend 225 feet and therefore block the driveway. The signal at 247th Place NE would create gaps in the traffic to allow vehicles to enter and exit the driveway.

16. Please refer to the response to Comment 2.

    Changing the speed limit is not proposed as part of this project. Pedestrian safety would not necessarily be increased by lowering the posted speed limit from 45 mph to 35 mph. Motorists usually adjust their speeds according to road conditions.

    Speed limits are set based on certain criteria which includes roadway geometrics, the number of driveways along a portion of roadway, the number of accidents, sight distance, and pedestrian traffic. Motorists usually adjust their speeds according to these conditions. When unreasonably low speed limits are posted, the speed limit is violated by a larger number of drivers. Research and experience have shown that effective speed limits are those that the majority of motorists naturally drive, and that raising and lowering speed limits does not substantially influence that speed. Speed limits that reflect the behavior of the majority are determined by what engineers call the "85th percentile speed", or the speed that 85 out of 100 cars travel at or below.

    The speed limit along a road can only be changed based on the recommendation of a Speed Limit Engineer. Any change greater than 10 mph also requires County Council action. If you would like more information about the process used to set speed limits, please contact: King County Department of Transportation, Traffic Operations Unit at (206) 296-6596.

    Sidewalks and bicycle lanes are proposed as part of this project. These facilities would provide for safer pedestrian and bicycle access in comparison to existing conditions. Also, the sidewalks would provide safer pickup/drop off points for school bus passengers.

17. Your preference for the Three-Lane Alternative is appreciated. See the response to Comment 2.

18. See the response to Comment 6.

    The Aesthetics/Light and Glare section of the DEIS describes the changes in character along the road with the different alternatives.

19. The well could be a source of water to the wetland, if it is an artesian well.

    The reference to development was specifically related to Wetland B which is located at the project's north end.

    The area viewed as a wetland is Wetland C, which apparently is located on your property. Wetland C is a Class 3 wetland, requiring a 25-foot buffer. Table 3-4 in the DEIS indicates how much wetland and wetland buffer would be impacted by fill with the different alternatives. About 0.02 acre of the 25-foot buffer area surrounding Wetland C would be impacted by the Five-Lane Alternative. The Three-Lane Alternative would not impact the buffer area.

    Class 3 wetlands and buffers must be mitigated at a 1:1 replacement ratio. Several opportunities are available to mitigate wetland and buffer impacts within the project site. The mitigation could be in the form of buffer and wetland enhancement and wetland creation along existing wetlands. A detailed wetland mitigation plan would be developed concurrently with the construction document preparation. The King County Sensitive Areas Ordinance does not allow wetlands or wetland buffers to be altered until the plan is approved by King County.

20. Thank you for raising these issues about safety. Your concerns about safety would be considered during detailed design.

    However, with a center left-turn lane, there should be no need for vehicles to pass on the right. Locations where traffic violations are a pattern should be reported to appropriate law enforcement officials.

21. Your concerns are appreciated. During final design, more detailed mitigation would be determined for safety, wetland buffers, traffic access, and drainage. The King County Noise Ordinance currently exempts traffic noise from the regulatory limits applied to most other sources. Therefore noise mitigation is not proposed as part of this project.

    Several opportunities are available to mitigate wetland and buffer impacts within the project site. However, there are few opportunities for substantial amounts of wetland creation; and therefore, mitigation would likely occur outside of existing right-of-way.

22. Your concerns are appreciated.

King County
Roads and Engineering Division
Department of
Public Works
Yesler Building
400 Yesler Way Room 400
Seattle, WA 98104-2637

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MAR 22 1995
PUBLIC WORKS
SPECIAL PROJECTS

COMMENT SHEET

February 28, 1995

RE: Issaq:ah-Fall City Road

The King County Roads and Engineering Division Capital Improvement Program proposes to reconstruct the Issaquah-Fall City Road from the Issaquah-Pine Lake Road to 252nd Avenue Southeast. Project improvements would provide for four through travel lanes with left turn channelization, widening for bicycles, equestrians, curb, gutter and sidewalk. Other items in the project include stormwater detention, retaining walls, landscaping, illumination and signalization.

Thank you for attending the public meeting and commenting on this important community improvement. Your comments are important. You may give them to a Roads Division representative at the meeting or you may mail them to:

Mark Brzoska, Senior Engineer
Roads and Engineering Division
400 Yesler Building Room 400
Seattle, WA 98104

Comments should be returned by March 15, 1995 to receive fullest consideration. If you have any questions, please call Rose LeSmith, Engineer at 296-3737.

Name Deanne Nichols + Ron Nichols

Address 3980 - 262nd Ave S.E.

City, State, Zip Issaquah, WA 98027

Comments on the Improvements to the Issaquah-Fall City Road:

attached statement from:
Citizens Against 5-Lane widening of
Issaquah Fall City Road
Committee

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PUBLIC WORKS
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Our first comment is to refer you to the letter of 2/14/95 (a copy has been attached) which was sent to we "Citizens" by Vicki J. Shapley, Supervising Environmental Engineer, Environmental Unit. The second paragraph indicates ***three (3)*** alternatives: (a) no-action (b) five-lane alternative (3) three-lane alternative. However, I see by your latest Comment Sheet dated 2/28/95 (also enclosed) that you then propose only one (1) five-lane alternative to the Issaquah-Fall City Road. This leads me to believe that you're now suggesting only ***one (1)*** alternative. Thus, it appears that there is a misleading discrepancy where, in fact, you are not really offering any alternatives. 1

We are not in favor of the proposed five-lane alternative, and therefore request a three-lane alternative for the following reasons:

The figure of ***ten (10) trips per day per driver*** that was quoted by an engineer on this project as a base figure, then multiplied by your vehicle count, is a totally unrealistic figure. We'd like to know where this ten (10) trips per driver figure comes from and how does that compare to the semi-rural area along Issaquah-Fall City Road to 252nd Avenue S.E. being discussed? It sounds like you are forcing figures! And have you considered the fact that in the most populated area along that stretch lies the Klahanie subdivision where more than 2/3rd of the drivers are wage earners outside of the home, so it is inconceivable for the majority of them to be making ten (10) trips a day on that road as was suggested - as well as to consider that more than half of them are closer to the Issaquah-Pine Lake Road and use that entrance/exit? Even with the completion of Klahanie apartments, we can not realistically accept your figures of over use at this time. Plus the Klahanie residents should be using the QFC, et al for shopping, reducing vehicle use of Issaquah-Fall City Road which could off-set increased incoming traffic. 2

And why is it that your staff say that Issaquah-Fall City Road is more heavily traveled than Issaquah-Pine Lake Road which has many more subdivisions and families living along that road, plus the distance along Issaquah-Pine Lake Road is double that of the Issaquah-Fall City Road that currently is being reviewed? 3

At what particular locations were the vehicle counts taken and over how long a period of time? Was consideration made for the many vehicles that were on those roads for building/sub contracting purposes within Klahanie itself and which construction should be completed and eliminated within the next year, or was any of the frequent construction along the roadside to bury lines on Issaquah-Fall City Road in progress at that time? 4

Would you agree that the bulk of new housing construction is completed on Issaquah-Fall City Road to S.E 32nd Street. since the South side is designated rural and there is no room left for construction on the North side? It's obvious that the growth factor is extremely low for the area surrounding this section of roadway. 5

In your 2nd widening phase beyond Klahanie, the residents of Klahanie, whose homes back up to the greenbelt, will suffer a decline in property values when you take ***12'*** for *each additional lane plus curb, gutter & bike lanes, etc.* from their the existing greenbelt on the North side. Real estate along a five (5) lane road has been recently estimated by a John L. Scott Realtor to drop by at least $20,000 per home in today's market!! How high will this figure actually be when the road is completed in your twenty (20) year plan? This affects homeowners in at least three (3) large subdivisions with high end property values. And besides that this greenbelt contains a walking path that circles the subdivision that was promised to the Klahanie homebuyers by Lowe as a 75' greenbelt trail and buffer that would ***always*** remain there! There goes our money it seems and - our trust!!! 6

My husband drives this section of roadway Monday-Friday at 7 A.M. Traffic is steady but NOT OVERCROWDED and I travel it at 8 A.M. daily which is *not busy at all*. If there is any buildup it's at the bottom of the hill at the stop light well after the Issaquah-Fall City & Issaquah-Pine Lake Roads have merged. The same pattern of holds true at 5:30 and 6:00 P.M. for the return commute. 7

We all know that there is money from Lowe towards widening Issaquah-Fall City Road around the Klahanie subdivision or this would not be a priority project. It is unfair to the homeowners to inflict property value loss and loss of the promised 75' greenbelt when the figures are not really there for widening to five (5) lanes. Why can't you ***compromise like we have*** *with the three (3) lane project?* We don't really want to loose our rural setting nor money on our investment, but realize that improvements for the sake of safety, like the big dip in the road and access from Hunter's Ridge should be made. ***Please*** **spend our tax money more wisely where it is needed not where is isn't needed**. After all, we live here and you don't. 8

Citizens Against 5-lane widening of
Issaquah-Fall City Road
Committee

King County
Roads and Engineering Division
Department of
Public Works
Yesler Building
400 Yesler Way Room 400
Seattle, WA 98104-2637

February 14, 1995

RE: Issaquah–Fall City Road – Draft Environmental Impact Statement

Dear Citizen:

The Department of Public Works Draft Environmental Impact Statement (DEIS) for the widening of Issaquah–Fall City Road from Issaquah–Pine Lake Road to Klahanie Drive Southeast is now available for review and comment.

Copies of the DEIS may be reviewed at the Issaquah Public Library at 120 East Sunset Way in Issaquah (telephone (206) 392-5430). Copies may be purchased for $8.50 plus tax at the Department's Map Counter, which is located on the ninth floor of the King County Administration Building at 500 Fourth Avenue in Seattle. A copy of the DEIS can be mailed to you for $11.20, including first class postage. Please call the Map Counter at 296-6548 for more information. A technical appendix is also available for $20.50 plus tax.

The DEIS analyzes three alternatives, including a no-action alternative. The action alternatives include a five-lane alternative that would add two through-lanes and a continuous left-turn lane between Issaquah–Pine Lake Road and Klahanie Drive Southeast, and a three-lane alternative that would provide a continuous left-turn lane only between Issaquah–Pine Lake Road and Klahanie Drive Southeast. Both action alternatives include curbs, gutters, sidewalks, and bicycle lanes on the north side; a paved six-foot-wide shoulder and a four-foot-wide pathway on the south side, and left-turn channelization at the intersection of the Issaquah–Pine Lake Road and the Issaquah–Fall City Road.

On Tuesday, February 28, 1995, King County will hold a public meeting from 4:00 P.M. to 7:00 P.M. to explain the proposal and to gather comments on the DEIS. The meeting will be held in the multipurpose room at the Pine Lake Middle School (3200–228th Avenue Southeast).

The Department of Public Works must decide which of the alternatives described in the DEIS to recommend for implementation. Your comments regarding the DEIS and the proposal would be appreciated. Comments concerning any impacts that may have been omitted or inadequately discussed would be particularly useful. Please address your comments to:

Matt Nolan, Acting Supervising Engineer
King County Department of Public Works
Roads and Engineering Division
400 Yesler Way, Room 400
Seattle, WA 98104-2637

To receive maximum consideration, your comments should be submitted no later than March 29, 1995.

If you have any questions about the Issaquah–Fall City Road proposal, or about the environmental review of the project, please call Matt Nolan at (206) 296-8771.

Thank you.

Sincerely,

Vicki J. Shapley

Vicki J. Shapley
Supervising Environmental Engineer
Environmental Unit

VJS:MF:dsn

cc: William S. Vlcek, Manager, Engineering Services Section

RESPONSES TO COMMENTS FROM CITIZENS AGAINST 5-LANE WIDENING OF ISSAQUAH-FALL CITY ROAD COMMITTEE

1. We apologize for the misleading information contained in the Comment Sheet dated February 28, 1995. Due to an oversight, it discusses only the Five-Lane Alternative, when in fact there are three alternatives as discussed in the letter from Vicki J. Shapley, Supervising Environmental Engineer, Environmental Unit.

2. According to the Institute of Transportation Engineers Trip Generation Manual 5th edition, the trip generation rate is 10 trips per day per household, not per person. We apologize for any inadequate information that may have been conveyed to you.

   For this project, the 1994 weekday p.m. peak-hour turning movement volumes were based on actual traffic counts. These volumes were then used to determine the level of service (LOS) at two intersections along Issaquah-Fall City Road. As shown in table 3-15 of this FEIS, both intersections currently operate at LOS B, which represents under capacity conditions.

   Projected 2012 volumes, which are higher than existing volumes, were based on King County's traffic model and on land use assumptions for the draft East Sammamish Community Plan Update. These volumes were adjusted based on existing traffic counts, projected future land uses, volumes used in the Klahanie Commercial Center Supplemental EIS, volumes projected for the East Sammamish South Access Roadway (Grand Ridge Extension), and intersection volumes used in the Issaquah-Pine Lake Road Improvement Project EIS. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the intersections of 247th Place SE/Issaquah-Fall City Road and Klahanie Drive SE/Issaquah-Fall City Road would operate over capacity (see table 3-15 in this FEIS). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

3. As shown on figure 4 in Appendix D of the DEIS, there is currently more traffic traveling on Issaquah-Pine Lake Road than Issaquah-Fall City Road. This pattern is expected to change by 2012, resulting in more traffic on Issaquah-Fall City Road than on Issaquah-Pine Lake Road. This is primarily due to the projected future developments that, at least in part, would use Issaquah-Fall City Road including the Klahanie Commercial Center, Beaver Lake Estates, and Trossachs.

4. As stated in the DEIS, actual turning movement counts were performed by King County on May 24, 1994. Counts were taken between 6:30 and 8:30 a.m., and between 4:45 and 6:15 p.m. at the intersections of 247th Place SE/Issaquah-Fall City Road, and Klahanie Drive SE/Issaquah-Fall City Road. Vehicles related to construction activities including those related to Klahanie were counted if they were traveling along the Issaquah-Fall City Road during the hours that counts were taken.

5. The area immediately adjacent to the study portion of Issaquah-Fall City Road is nearing build-out. However, there are several proposed developments to the east of SE 32nd Street, that would likely use the study portion of Issaquah-Fall City Road to gain access onto and off of the plateau.

The Five-Lane Alternative would require about 12 feet of right-of-way on the north side. Impacts to the walking trail are not anticipated. During detailed design it may be determined that less right-of-way would be needed to widen the road.

6. Any widening east of Klahanie Boulevard SE would be analyzed during a separate environmental process. The effects of roadway widening projects on property values are not definitive. Property values would be considered if there would be a need to purchase property or property rights. In the event that property is purchased, all aspects of the property and the effect that right-of-way acquisition would have on that property would be carefully studied on a case by case basis during the right-of-way acquisition process.

7. For this project, the 1994 weekday p.m. peak-hour turning movement volumes were based on actual traffic counts. These volumes were then used to determine the LOS at two intersections along Issaquah-Fall City Road. As shown in table 3-15 of this FEIS, both intersections currently operate at LOS B, which represents the steady flow conditions that you describe.

   In the year 2012, however, the conditions change due to an increase in traffic volumes. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the intersections of 247th Place SE/Issaquah-Fall City Road and Klahanie Drive SE/Issaquah-Fall City Road would operate over capacity. This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

8. Your concerns are appreciated. Lowe Enterprise has paid a fair share of the improvements planned for Issaquah-Fall City Road and other transportation projects in the surrounding area, based on traffic generated by their development.

   The Five-Lane Alternative would require about 12 feet of right-of-way from the 75-foot greenbelt. During detailed design, however, it may be determined that less right-of-way would be needed to widen the road.

   The priority of the Issaquah-Fall City Road Improvement project is based on a variety of sources including public comment, studies, existing plans, safety concerns, and analysis of existing and future congestion.

   During preparation of this EIS, it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the intersections of 247th Place SE/ Issaquah-Fall City Road and Klahanie Drive SE/Issaquah-Fall City Road would operate over capacity. This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

The Hamblens

Mark Bazoska
King County Roads

Re: Proposed expansion of the Issaquah Fall City Road

Dear Mark,

I would first like to point out how disappointed I am the DEIS review period was limited to two weeks and did not allow a through review by the average citizen. My biggest concern is not weather or not the road needs to be 3 or 5 lanes, but instead the **total disregard for appropriate noise mitigation.** 1

King County has very strict noise ordinances in regards to both the allowable noise level at the property line and the allowable increase over existing background noise levels. It is difficult to understand how or why this DEIS **does not properly address noise mitigation** measures. 2

I strongly advocate you put up **concrete barriers** to insure that the LEQ does not exceed your own policies.

Allen and Arlene Hamblen
4830 240 Place SE
Issaquah Washington

RESPONSES TO COMMENTS FROM ALLEN AND ARLENE HAMBLEN

1. The SEPA Rules, Chapter 197-11-502 of the Washington Administrative Code, as amended, requires a thirty-day comment period unless extended by the lead agency. The comment period began on February 14, 1995, the day of issuance, and ended on March 30, 1995, which exceeds the 30-day minimum.

2. The King County Noise Ordinance currently exempts traffic noise from the regulatory limits applied to most other sources. However, King County has recently proposed a draft Road Noise Policy regarding environmental review and mitigation of roadway traffic noise. This policy, when adopted, will provide the County with guidelines for analysis of noise mitigation. Analysis of noise mitigation will consider the benefits and costs of abatement and the overall social, economic, and environmental effects of the mitigation. This project does not propose mitigation measures at this time. However, the County will analyze potential noise mitigation measures along Issaquah-Fall City Road, and if feasible and reasonable, these measures may be included as part of the project.

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PUBLIC WORKS
SPECIAL PROJECTS

King County
Roads and Engineering Division
Department of
Public Works
Yesler Building
400 Yesler Way Room 400
Seattle, WA 98104-2637

COMMENT SHEET

February 28, 1995

RE: Issaquah-Fall City Road

The King County Roads and Engineering Division Capital Improvement Program proposes to reconstruct the Issaquah-Fall City Road from the Issaquah-Pine Lake Road to 252nd Avenue Southeast. Project improvements would provide for four through travel lanes with left turn channelization, widening for bicycles, equestrians, curb, gutter and sidewalk. Other items in the project include stormwater detention, retaining walls, landscaping, illumination and signalization.

Thank you for attending the public meeting and commenting on this important community improvement. Your comments are important. You may give them to a Roads Division representative at the meeting or you may mail them to:

Mark Brzoska, Senior Engineer
Roads and Engineering Division
400 Yesler Building Room 400
Seattle, WA 98104

Comments should be returned by March 15, 1995 to receive fullest consideration. If you have any questions, please call Rose LeSmith, Engineer at 296-3737.

Name GURDIAL S. DHATT

Address 24230 S.E 48TH ST

City, State, Zip ISSAQUAH WA 98027

Comments on the Improvements to the Issaquah-Fall City Road:

MY FIRST CHOICE REGARDING ROAD IMPROVEMENT WOULD BE TO MAKE LOCAL IMPROVEMENT SUCH AS STOP LIGHT AT APPROPRIATE INTERSECTIONS & BICYCLE & PEDESTRIAN PATHS, HORSE RIDING TRAILS. SECOND WILL BE ADD LEFT HAND TURN LANE FOR LOCAL ACCESS. 1

WHAT WE NEED IS A COMPREHENSIVE STUDY & GROWTH MANAGEMENT TO ALLEVIATE TRAFFIC CONGESTIONS. 2

ALTERNATIVE WAY TO GET PEOPLE OFF THE PLATEAU TO I-90 RATHER THAN USING 228TH & DUTHIE HILLS ROADS ONLY. COORDINATE WITH STATE REGARDING SUNSET WAY INTERCHANGE AT I-90 3

-OVER-

DEVELOPE PINE LAKE ROAD AS THE MAIN NORTH-SOUTH ARTERIAL AS WELL AS 228TH. ALSO ADD A THIRD ROAD TO GET THE TRAFFIC OFF THE HILL — TIED TO SUNSET WAY INTERCHANGE. 3

RESPONSES TO COMMENTS FROM GURDIAL S. DHATT

1. Your preferences regarding road improvements are appreciated.

   A traffic signal has recently been installed along the project corridor at the intersection of 247th Place SE/Issaquah-Fall City Road. The other improvements that you describe are elements of the proposed project (see the Project Description section of this FEIS).

2. The King County land use planning process and the Growth Management Act both provide mechanisms for communities to plan for the amount and types of development that will be allowed in your area. Roadway improvement projects are designed to accommodate the growth that is provided for by the land use planning process.

3. King County plans to improve both Issaquah-Pine Lake Road, and 228th Avenue SE. The County also recognizes the need to improve the Sunset Interchange. All of these projects are recommended in the East Sammamish Community Plan Update.

   Currently, King County is studying alternatives for the East Sammamish South Access Roadway (Grand Ridge Extension). This project also is recommended in the East Sammamish Community Plan Update.

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PUBLIC WORKS
SPECIAL PROJECTS

COMMENT SHEET

February 28, 1995

RE: Issaquah-Fall City Road

The King County Roads and Engineering Division Capital Improvement Program proposes to reconstruct the Issaquah-Fall City Road from the Issaquah-Pine Lake Road to 252nd Avenue Southeast. Project improvements would provide for four through travel lanes with left turn channelization, widening for bicycles, equestrians, curb, gutter and sidewalk. Other items in the project include stormwater detention, retaining walls, landscaping, illumination and signalization.

Thank you for attending the public meeting and commenting on this important community improvement. Your comments are important. You may give them to a Roads Division representative at the meeting or you may mail them to:

Mark Brzoska, Senior Engineer
Roads and Engineering Division
400 Yesler Building Room 400
Seattle, WA 98104

Comments should be returned by March 15, 1995 to receive fullest consideration. If you have any questions, please call Rose LeSmith, Engineer at 296-3737.

Name PATTI DHATT

Address 24230 SE 48th ST.

City, State, Zip ISSAQUAH, WA. 98027

Comments on the Improvements to the Issaquah-Fall City Road: A LEFT TURN LANE AND SOME MEANS OF SLOWING TRAFFIC SO THAT THOSE OF US TRYING TO TURN INTO DRIVEWAYS OFF FROM THE ISS-FALL CITY ROAD (OR EVEN WORSE ONTO) CAN DO SO WITHOUT TAKING OUR LIVES IN OUR HANDS - IT IS BAD NOW - AND WITH 3 LANES WILL STILL BE BAD, BUT WITH 5 LANES - (2 TO CROSS) WILL BE NEXT TO IMPOSSIBLE. DEVELOPERS COME IN - DO THEIR THING - REAP THEIR PROFITS, AND LEAVE THE REST OF US WITH HELL TO PAY. PLEASE CONSIDER US AS WELL. THANK →

1

YOU FOR AT LEAST LETTING ME AIR MY GRIPES.

RESPONSES TO COMMENTS FROM PATTI DHATT

1. Your concerns are appreciated. The improvement of safety on Issaquah-Fall City Road is a stated objective of this project. The lack of existing accommodations for left turns is a safety concern that would be addressed with the addition of a center left-turn lane. During preparation of this EIS, it was determined that five lanes are necessary to provide an acceptable level of service for 2012.

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Seattle, WA 98104

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Name JOHN A. PERKINS

Address 2535 261st Ave SE.

City, State, Zip ISSAQUAH WA. 98027

Comments on the Improvements to the Issaquah-Fall City Road: I use this road every day and see no reason to do any improvements. It is my desire to see nothing done period. If you would like to improve a road please get started on the front Street entrance and exit to I 90. The back up every morning & Evening is getting worse everyday. When you take 3 lanes and merge them into one and add ramp lights you're not doing anyone a favor

Thanks John Perkins

1

2

RESPONSES TO COMMENTS FROM JOHN A. PERKINS

1. Your preference for the No Action Alternative is appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

2. The City of Issaquah's Transportation Improvement Plan has identified the I-90/ Front Street North Interchange Reconstruction as a Major Roadway Improvement. The City of Issaquah has yet to determine the details about this project.

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Seattle, WA 98104

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Name Jo Lynn Collins

Address 26645 SE 31st St. (we live on

City, State, Zip Issaquah, Wa. 98027 the plateau)

Comments on the Improvements to the Issaquah-Fall City Road I believe the "considering" of the proposed project is a mute point; if the widening is needed, please let it be the least amount to impact the surrounding rural homes and the wetland right before Klahanie. It's hypocritical to mouth concerns about watershed and purity of streams, drinking water, air quality, etc. and still allow growth and depletion of trees and wild areas that perform the very functions that keep the water and air pure) - to continue. I also ask that King County Council get their asses out of chambers and into the great outdoors now → 1 2 3

for an on-sight and more insightful review for each decision they make concerning sensitive areas. No - make that on-sight for all areas that they would normally see in 2-D on paper - squiggles and lines and words that don't show the actual lay of the land. They (i.e. you) change the land and our quality of life - those of us who live in areas of consideration - in an irreversible manner. Once things are paved over - built and dammed up - once the native soil with its cleansing layers of clay & rocks is replaced by concrete - after the shrub cover, alder & ferns are out - all needed to filter impurities through leaf and roots - you've taken away the gift for all of us forever. Our task, I thought, was to leave this earth better than we found it.

3

RESPONSES TO COMMENTS FROM JO LYNN CELLINI

1. Your concerns are appreciated.

2. Balancing urban uses and environmental protection is one of King County's primary goals. The Countywide Planning Policies established an Urban Growth Area, most of which is within the western one-third of the County. Most future growth and development would occur within the Urban Growth Area to limit urban sprawl, enhance open space, protect rural areas, and more efficiently use human services, transportation, and utilities. While critical areas within the Urban Growth Area will continue to receive measures of protection, the emphasis is to protect critical areas in the rural areas. Therefore, the rural areas are given stricter guidelines regarding the type and amount of development.

3. The King County Sensitive Areas Ordinance provides extensive guidance for reducing the impacts of human actions on natural systems. The King County Council in enacting this ordinance has relied on extensive scientific documentation and testimony concerning these sensitive areas and the appropriate methods and mechanisms for their protection.

   King County performs a sensitive areas review for any King County permit or approval requested for a development proposal on a site which includes or is adjacent to one or more sensitive areas. King County does not allow the condition of air, land, water, or vegetation to be altered until the requirements of the Sensitive Areas Ordinance are fulfilled. The Technical Appendices of the DEIS included a Sensitive Areas Special Study of wetlands, streams, and geologic hazards.

   If you would like more information about the Sensitive Areas Ordinance, please contact the Land Use Services Division at (206) 296-6640.

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Mark Brzoska, Senior Engineer
Roads and Engineering Division
400 Yesler Building Room 400
Seattle, WA 98104

Comments should be returned by March 15, 1995 to receive fullest consideration. If you have any questions, please call Rose LeSmith, Engineer at 296-3737.

Name Terry Cothrel (Cottrell)

Address 26116 SE 29th Pl.

City, State, Zip Issaquah, Wa. 98027

Comments on the Improvements to the Issaquah-Fall City Road: 3 lane would be the best 1

RESPONSES TO COMMENTS FROM TERRY COTTRELL

1. Your preference for the Three-Lane Alternative is appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

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Seattle, WA 98104

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Name Susan Cottrell

Address 26116 SE. 29th St.

City, State, Zip Issaquah, Wa. 98027

Comments on the Improvements to the Issaquah-Fall City Road: I suggest a 3 lane Road on Iss-Fall City Rd / Duthie Hill The area is partially rural so adding a 5 lane road would take away from the beauty. On the other hand, a 3 lane would provide a turning lane for those turning left and probably help to avoid potential accidents. 1

RESPONSES TO COMMENTS FROM SUSAN COTTRELL

1. Your preference for the Three-Lane Alternative is appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

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Seattle, WA 98104

Comments should be returned by March 15, 1995 to receive fullest consideration. If you have any questions, please call Rose LeSmith, Engineer at 296-3737.

Name Larry J. Lockwood

Address 2728 261st Ave S.E. (High Country)

City, State, Zip Issaquah, WA 98027

Comments on the Improvements to the Issaquah-Fall City Road: There currently are no traffic problems on Issaquah-Fall City Road. There most definitely is a traffic congestion problem on Vaughn Hill. What's the point of improving access to an already overburdened thoroughfare without first fixing it? Please spend our tax dollars where they will do the most good, i.e., solved the Vaughn Hill / I-90 Interchange 17 problems before worrying about Issaquah-Fall City Rd.

1

RESPONSES TO COMMENTS FROM LARRY J. LOCKWOOD

1. King County recognizes the need to improve the Sunset Interchange. This project is recommended in the East Sammamish Plan Update.

   King County is currently studying alternatives for the East Sammamish South Access Roadway (Grand Ridge Extension). This project is recommended in the East Sammamish Plan Update. This project would provide an alternative access to I-90 from the plateau.

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PUBLIC WORKS
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COMMENT SHEET

February 28, 1995

JIM AND LINDA WALLER
24615 S.E. 44TH COURT
ISSAQUAH, WA 98027

RE: Issaquah-Fall City Road

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400 Yesler Building Room 400
Seattle, WA 98104

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Name James O. Walter James O Walter

Address 24615 SE 44th Court

City, State, Zip Issaquah WA 98027

Comments on the Improvements to the Issaquah-Fall City Road:

1. EIS incomplete
   a. missing road profile showing changes in elevation | 1
   b. in Sect 3.7 Aesthetics, no discussion on loss of tree-lined corridor ~~Eas~~ as shown in photo 7. | 2

~~[illegible]~~

2. My position on improvements
   a. OPPOSED to 5-lane roadway - overkill.
   b. 3-lane roadway OK, but please minimize loss of tree-lined corridor | 3

RESPONSES TO COMMENTS FROM JAMES O. WALLER

1. A profile has been added to the FEIS as figure 3 in the Project Description.

2. Impacts from the removal of roadside vegetation is discussed on pages 83 and 84 of the DEIS under Impacts Common to Both Action Alternatives.

   After construction is completed, disturbed areas would be revegetated to limit impacts to the environment caused by erosion of exposed soils. Specific plant species would be selected during project design; however, these species would be consistent with other species within the area to mitigate losses in terms of function.

3. Your position on the improvements is appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

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Seattle, WA 98104

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Name Terry Brown

Address 3339 251st Ave SE.

City, State, Zip Issaquah 98027

Comments on the Improvements to the Issaquah-Fall City Road:

I strongly support 5 Lane development of Issaquah-Fall City Road to 252nd Ave. As a general comment, given projected population growth road development is crucial for the Issaquah plateau 1

RESPONSES TO COMMENTS FROM TERRY BROWN

1. Traffic volumes on the project corridor are expected to more than double by the year 2012, due to projected growth. Your support for the Five-Lane Alternative is appreciated.

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Name Willis B DORIAN

Address 3521 - 255th Ln. S.E #19

City, State, Zip Issaquah, WA 98027

Comments on the Improvements to the Issaquah-Fall City Road:

I feel that a 3 lane roadway with bike path and sidewalk would best fill our needs at this time. 1

Willis B Dorian

RESPONSES TO COMMENTS FROM WILLISA B. DORIAN

1. Your support for the Three-Lane Alternative is appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

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Seattle, WA 98104

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Name EDWARD GROSS

Address 24703 SE 45TH CT

City, State, Zip ISSAQUAH WA 98027-6542

Comments on the Improvements to the Issaquah-Fall City Road:

THE 3 LANE OPTION SEEMS REASONABLE. PLANS TO IMPROVE LINE OF SIGHT DISTANCES SHOULD NOT BE DOWNGRADED. A TRAFFIC LIGHT AT THE INTERSECTION OF 247TH SE AND ISS-FALL CITY RD IS A "NO OPTION" REQUIREMENT. 1

RESPONSES TO COMMENTS FROM EDWARD GROSS

1. Your support for the Three-Lane Alternative is appreciated.

   The improvement of existing sight distance problems is a stated objective of the project. The grade of Issaquah-Fall City Road would be changed to flatten the reverse vertical curves southwest of 247th Place SE, as well as flatten the vertical curve across North Fork Issaquah Creek.

   The traffic signal at the intersection of 247th Place SE/Issaquah-Fall City Road has recently been installed and is not linked to this project.

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Name Glen Mauer

Address 4290 258th Ave SE

City, State, Zip Issaquah WA 98027

Comments on the Improvements to the Issaquah-Fall City Road:

- I would prefer a 3 lane improvement with a reduced speed. I recommend the traffic speed be reduced from 45 mph to 35 mph. 1

- I would rather see a 3 lane vs no improvement or 5-lane improvement. 2

Glen Mauer

RESPONSES TO COMMENTS FROM GLEN MAURER

1. Speed limits are set based on certain criteria which includes roadway geometrics, the number of driveways along a portion of roadway, the number of accidents, sight distance, and pedestrian traffic. Motorists usually adjust their speeds according to these conditions. When unreasonably low speed limits are posted, the speed limit is violated by a larger number of drivers. Research and experience have shown that effective speed limits are those that the majority of motorists naturally drive, and that raising and lowering speed limits does not substantially influence that speed. Speed limits that reflect the behavior of the majority are determined by what engineers call the "85th percentile speed", or the speed that 85 out of 100 cars travel at or below.

   The speed limit along a road can only be changed based on the recommendation of a Speed Limit Engineer. Any change greater than 10 mph also requires County Council action. If you would like more information about the process used to set speed limits, please contact: King County Department of Transportation, Traffic Operations Unit at (206) 296-6596.

2. Your preference for the Three-Lane Alternative is appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

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Seattle, WA 98104

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Name Mike McArthur

Address 26425 S.E. 39th

City, State, Zip Issaquah, WA 98027

Comments on the Improvements to the Issaquah-Fall City Road:

Please put me on your mailing list for information on any projects that affect the Sammamish Plateau area including I-90 accesses, etc. 1

RESPONSES TO COMMENTS FROM MIKE MCARTHUR

1. Your name has been added to King County's mailing list.

   Projects related to I-90 access fall under the jurisdiction of the Washington State Department of Transportation. They should be contacted directly for information about I-90. You should also contact the City of Issaquah, which is preparing to write an environmental impact statement on the Sunset Interchange, Southeast Bypass, and south plateau access roads.

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Name Mike McArthur

Address 26425 S.E. 39th

City, State, Zip Issaquah, WA 98027

Comments on the Improvements to the Issaquah-Fall City Road: Please widen the road to five lanes at least to Klahanie Blvd and preferably even farther east/north. I've lived on the Plateau for 26 years and am disappointed at the extent to which infrastructure improvements happen minimally and only after a large development such as Klahanie is in, the profiteers have gone and the conditions for residents become so frustrating that the County finally seriously considers corrective action. Please widen the road to at least 4 lanes. 1 2

RESPONSES TO COMMENTS FROM MIKE MCARTHUR

1. Your preference for the Five-Lane Alternative is appreciated.

2. Your concerns are appreciated. Lowe Enterprise has paid a fair share of the improvements to Issaquah-Fall City Road and other transportation projects in the surrounding area, based on traffic generated by their development.

   During preparation of this EIS, it was determined that five lanes are needed to provide an acceptable level of service for 2012.

King County
Roads and Engineering Division
Department of
Public Works
Yesler Building
400 Yesler Way Room 400
Seattle, WA 98104-2637

COMMENT SHEET

February 28, 1995

RE: Issaquah-Fall City Road

The King County Roads and Engineering Division Capital Improvement Program proposes to reconstruct the Issaquah-Fall City Road from the Issaquah-Pine Lake Road to 252nd Avenue Southeast. Project improvements would provide for four through travel lanes with left turn channelization, widening for bicycles, equestrians, curb, gutter and sidewalk. Other items in the project include stormwater detention, retaining walls, landscaping, illumination and signalization.

Thank you for attending the public meeting and commenting on this important community improvement. Your comments are important. You may give them to a Roads Division representative at the meeting or you may mail them to:

Mark Brzoska, Senior Engineer
Roads and Engineering Division
400 Yesler Building Room 400
Seattle, WA 98104

Comments should be returned by March 15, 1995 to receive fullest consideration. If you have any questions, please call Rose LeSmith, Engineer at 296-3737.

Name Jim Stanton

Address 22533 SE 47th Place

City, State, Zip Issaquah WA 98027

Comments on the Improvements to the Issaquah-Fall City Road: The five lane section appears excessive unless there are considerable accident/safety warrants to justify such a large ROW(100') and paved section (76.5'). 1

If safety and volume justifies this alternative please separate the sidewalk and bicycle lane to provide a landscape planter separation. This could be partially accomplished through sidewalk easements adjoining the ROW if it cannot be accomplished within the roadway section. 2

In addition, I question not completing full improvements on 3

over →

on the south side of the street under either configuration. By the time this project is constructed, and given that this area is within the County's urban growth boundary, it will mai more sense to complete full improvements to be done to both sides of the street vs. coming back at some later to to complete frontage improvements only to the south side of the street. Again, under either the 3 or 5-lane scenario I would encourage separating the bicycle/pedestrian amenities from the street as much as possible within the existing ROW. No one is going to feel safe walking on a paved shoulder/neighborhood path (on south side) with traffic volumes approaching 23,000 AWDT and speeds of 45 miles per hour. Please refer to my attached Exhibit A. 3 4

Jim Stanton
556-2448 (#) W
557-6532 (#) H

Exhibit A

A446 93020-20 DEIS 12/20/94 AGT

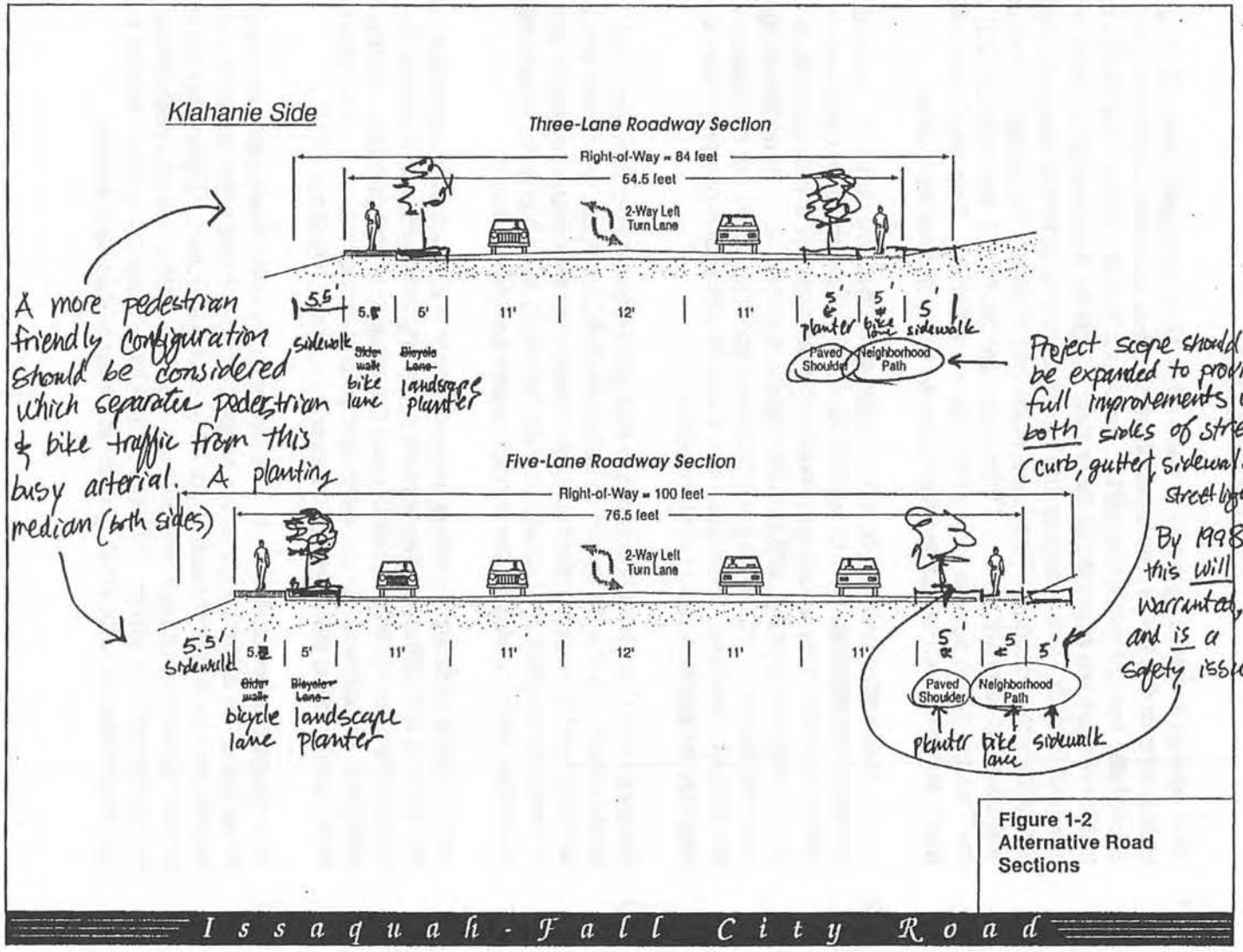

Figure 1-2
Alternative Road Sections

Issaquah - Fall City Road

59

93020 / Reports / FEIS / Com&resp / Com&res3 (10/19/95) / mwpm5

RESPONSES TO COMMENTS FROM JIM STANTON

1. Your concerns regarding the Five-Lane Alternative are appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

2. During preparation of this EIS, it was determined that five lanes are needed to provide an acceptable level of service for 2012. Planting strips could improve safety, however, they would also require the purchase of additional right-of-way from private landowners, and require regular maintenance. To minimize right-of-way needs and maintenance considerations, planting strips are not planned for this project. However, this project does include landscape planting along the roadside for aesthetic and functional issues.

3. Issaquah-Fall City Road is one of the boundaries between urban and rural development. To the northwest of Issaquah-Fall City Road, where the Klahanie Development is located, land has been designated for urban residential land uses. Immediately southeast of Issaquah-Fall City Road, land has been designated for rural uses, which includes low-density residential development.

   It is desirable to design roadway improvements in a way that is compatible with the existing and planned development served by the roadway. Because Issaquah-Fall City Road is located along the urban growth boundary, construction standards are different for the north and south sides of the road. The differences in the construction standards are explained on page 16 of the DEIS.

4. Your suggestion is appreciated. The sidewalk, neighborhood path, and bicycle lanes along the entire length of the project would provide safer pedestrian and bicycle access than the existing gravel or paved shoulder. Separating the bicycle/pedestrian amenities from the roadway could give bicyclists and pedestrians an increased sense of safety. However, separating these amenities from the roadway would require additional right-of-way from private land owners.

RECEIVED

MAR 30 1995

PUBLIC WORKS
SPECIAL PROJECTS

March 28, 1995

Matthew Nolan, Supervisor
K.C. Dept. of Public Works
400 Yesler Way
Seattle, WA 98104

Re: Issaquah-Fall City Road Improvement Project

Dear Mr. Nolan:

My comments on the referenced project are the following:

1. The three lane alternative is adequate if interesections are properly impoved. Road capacity is less critical than properly functioning intersections. 1

2. Neither road capacity or intersection improvements are cost or function effective if the end of the funnel is plugged. Access to I-90 and SR-520 must be improved first. 2

3. Is the road improvement pushed by special development interests? Are policy and design standards requiring arterials to support apartment and commercial development motivating this project? 3

4. Safety concerns in the East Sammamish Planning area should have higher priority than new road capacity. The lack of shoulders on 228th Ave. N.E., crosswalks near schools, sub-standard intersections, exceedance of Federal carbon monoxide standards at key intersections and a host of other safety issues should have higher priority. King County is running a substantial liablilty risk. 4

5. The King County road standards degrade our natural setting by not including planted medians, sidewalks separated by planted areas, meandering trails in-lieu of sidewalks and the like. One of your staff cited safety/liability concerns and the football player accident in Kirkland. Cities take on the liability much to the liking of their residents. Why not urban designated areas of King County? The Kirkland incident involved alcohol, a curb and a utility pole. Do like Mercer Island - planted mounds without the expense of curbs and underground the utilities. 5

6. With regard to item 5, have you thought of organizing community groups to maintain the planted medians? This could follow the current adopt-a-road format. The groups could work to county specified safety standards. The same hold harmless and specific action limits could parallel organization use of King County parks.

7. The rural standard shoulders are useless if they are not periodicly raked, tilled or treated with herbicides. 6

8. There is inadequate provision for the treatment of metals, suspended solids and most organics in the road runoff water. 7

Please call with any questions.

Sincerely,

Greg Allan

Gregory R. Allan
530 - 254th Ave. N.E.
Redmond, WA 98053
868-7804

Greg Allan
P.O. Box 21
Redmond, WA 98073-0021

RESPONSES TO COMMENTS FROM GREGORY R. ALLAN

1. Your preference for the Three-Lane Alternative is appreciated. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. With this increase in traffic, it is expected that the open-flow segment of Issaquah-Fall City Road (between Issaquah-Pine Lake Road and Klahanie Boulevard SE) would operate over capacity with the Three-Lane and No Action Alternative in 2012 (see the Transportation section in this FEIS for more details). This was a consideration when selecting the Five-Lane Alternative as the preferred alternative.

2. King County recognizes the need to improve the Sunset Interchange. This project is recommended within the East Sammamish Plan Update.

   King County is currently studying alternatives for the East Sammamish South Access Roadway (Grand Ridge Extension). This project is recommended within the East Sammamish Plan Update. Construction is currently underway for the SR 520/SR 202 Interchange.

3. The roadway improvement projects planned for the East Sammamish Plateau are designed to accommodate growth as projected by the land use planning process.

   The East Sammamish Community Plan Update, which is the land use plan for this area, provides standards and criteria for new development. To the north of Issaquah-Fall City Road, the plan designates land use as urban development which includes some commercial and some multifamily residential development.

4. The East Sammamish Community Plan Update recommends a list of facility improvements as part of the plan's capital program. The list is developed from a variety of sources including public comment, studies, existing plans, safety concerns, and analysis of existing and future congestion. The adopted community plan list has been added to the Transportation Needs Report (TNR). The contents of the TNR are updated countywide each spring. In this process, transportation needs are evaluated throughout King County and rated according to several criteria. The ratings are based on a numerical score and placed in a range of high, medium, and low priority.

   There are a number of King County programs which are designed to address the needs of nonmotorized transportation. The School Pathways Program, the Roadshare Program, the Spot Improvement Program, and the Pedestrian Priority Program are all funded programs which help provide planning and improvements for nonmotorized facilities.

5. Issaquah-Fall City Road is one of the boundaries between urban and rural development. To the northwest of Issaquah-Fall City Road, where the Klahanie Development is located, land has been designated for urban residential land uses. Immediately southeast of Issaquah-Fall City Road, land has been designated for rural uses, which includes low-density residential development.

It is desirable to design roadway improvements in a way that is compatible with the existing and planned development served by the roadway. Because Issaquah-Fall City Road is located along the urban growth boundary, construction standards are different for the north and south sides of the road. The differences in the construction standards are explained on page 16 of the DEIS.

A median with a planting strip could improve visual quality. It would also require the purchase of additional right-of-way from private landowners, require regular maintenance, and restrict the number of locations where left turns would be possible, and therefore planting strips are not likely to be considered for this project.

Your suggestion is appreciated. King County would encourage citizens to develop programs similar to Adopt-A-Road programs.

6. Shoulders would be maintained by King County.

7. Due to the planned installment of treatment facilities, the quality of stormwater discharged from the project area would probably improve relative to currently untreated stormwater.

King County
Roads and Engineering Division
Department of
Public Works
Yesler Building
400 Yesler Way Room 400
Seattle, WA 98104-2637

RECEIVED
MAR 27 1995
PUBLIC WORKS
SPECIAL PROJECTS

COMMENT SHEET

February 28, 1995

RE: Issaquah-Fall City Road

The King County Roads and Engineering Division Capital Improvement Program proposes to reconstruct the Issaquah-Fall City Road from the Issaquah-Pine Lake Road to 252nd Avenue Southeast. Project improvements would provide for four through travel lanes with left turn channelization, widening for bicycles, equestrians, curb, gutter and sidewalk. Other items in the project include stormwater detention, retaining walls, landscaping, illumination and signalization.

Thank you for attending the public meeting and commenting on this important community improvement. Your comments are important. You may give them to a Roads Division representative at the meeting or you may mail them to:

Mark Brzoska, Senior Engineer
Roads and Engineering Division
400 Yesler Building Room 400
Seattle, WA 98104

Comments should be returned by March 15, 1995 to receive fullest consideration. If you have any questions, please call Rose LeSmith, Engineer at 296-3737.

Name Vicky GIANNELLI

Address 25408 SE 28th ST

City, State, Zip ISSAQUAH WA. 98027

Comments on the Improvements to the Issaquah-Fall City Road: LEAVE THE ROAD AS IS. WE CERTAINLY DO NOT NEED IT LIT LIKE A CHRISTMAS TREE. WHEN THAT SHOPPING CENTER GETS IN IT WILL HAVE PLENTY OF LIGHT POLLUTION. THE WIDENG WILL HAVE NO EFFECT AS MOST OF THE NEW DIVISIONS ARE NORTH OF THERE I.E. BEAVER LAKE ESTATES & TROSSACHS. WHO KNOWS WHICH WAY THE PEOPLE FROM ALL THE NEW APTS. /TOWN (N KLAHANIE HOUSES WILL GO

1

2

WHY IS IT NECESSARY TO PUT A HUGE SIDEWALK ON THE URBAN SIDE. CAN'T WE STILL KEEP THE RURAL FEEL WITH A NEIGHBORHOOD PATH? 3 lanes WILL NOT DO ANYTHING THERE ARE NOT THAT MANY TURNS YOU CAN MAKE WHY NOT JUST ADD TURN OUTS SO IF SOMEONE IS TURNING YOU CAN GO AROUND THEM. 3 4

RESPONSES TO COMMENTS FROM VICKY GIANNELLI

1. Your preference for the No Action Alternative is appreciated.

   To improve safety on Issaquah-Fall City Road, a stated objective of this project, the entire length of the project corridor would be illuminated. Light and glare impacts that would result from the project are discussed on page 85 of the DEIS.

2. Projected 2012 volumes, which are higher than existing volumes, were based on King County's traffic model and land use assumptions for the draft East Sammamish Community Plan Update. These volumes were adjusted based on existing traffic counts, projected future land uses, volumes used in the Klahanie Commercial Center Supplemental EIS, projected volumes for the East Sammamish South Access Roadway (Grand Ridge Extension), and intersection volumes used in the Issaquah-Pine Lake Road Improvement Project EIS.

   Although much of the new development on the plateau is north of the project corridor it is expected that some of the traffic generated by these developments would use Issaquah-Fall City Road.

   Future traffic volumes were assigned to the road network based on King County's traffic model. The model adjusts travel routes based on the road system including travel times and the location of congested areas (see Appendix D of the DEIS for details regarding trip distribution and assignments).

3. Issaquah-Fall City Road is one of the boundaries between urban and rural development. To the northwest of Issaquah-Fall City Road, where the Klahanie Development is located, land has been designated for urban residential land uses. Immediately southeast of Issaquah-Fall City Road, land has been designated for rural uses, which includes low-density residential development.

   It is desirable to design roadway improvements in a way that is compatible with the existing and planned development served by the roadway. Because Issaquah-Fall City Road is located along the urban growth boundary, construction standards are different for the north and south sides of the road. The differences between the construction standards are explained on page 16 of the DEIS. The south side of the road would have a neighborhood path as it is a rural area. Because the northeast side of the road has been designated as an urban area, a concrete sidewalk that would require less maintenance is necessary to handle the expected heavier pedestrian use.

4. There are several driveways on both sides of the road, and perhaps more to be built in the future. Widening and tapering for turnouts would result in a road width similar to that required for an extra lane and would not accommodate new driveways in the future. A center left-turn lane, which is part of the Five-Lane Alternative, would accommodate new driveways and would serve all the existing driveways along the project corridor. The addition of a center left-turn lane also would provide a refuge for left-turning traffic to move out of the through lanes. To serve

all the driveways along project corridor, this center left-turn lane would be constructed from Issaquah-Pine Lake Road to Klahanie Boulevard SE.

Speed limits are set based on certain criteria which includes roadway geometrics, the number of driveways along a portion of roadway, the number of accidents, sight distance, and pedestrian traffic. Motorists usually adjust their speeds according to these conditions. When unreasonably low speed limits are posted, the speed limit is violated by a larger number of drivers. Research and experience have shown that effective speed limits are those that the majority of motorists naturally drive, and that raising and lowering speed limits does not substantially influence that speed. Speed limits that reflect the behavior of the majority are determined by what engineers call the "85th percentile speed", or the speed that 85 out of 100 cars travel at or below.

The speed limit along a road can only be changed based on the recommendation of a Speed Limit Engineer. Any change greater than 10 mph also requires County Council action. If you would like more information about the process used to set speed limits, please contact: King County Department of Transportation, Traffic Operations Unit at (206) 296-6596.

KING COUNTY DEPARTMENT OF PUBLIC WORKS

PUBLIC HEARING

ROAD IMPROVEMENT PROJECT
Issaquah - Fall City Road

4:00 - 7:00 p.m.
Tuesday, February 28, 1995

Pine Lake Middle School
3200 228th Avenue S.E.
Issaquah, Washington

VALERIE GREGG
NORTHWEST COURT REPORTERS
1415 Second Avenue, Suite 1107
Seattle, Washington 98101
(206) 623-6136

COPY

* * * * *

Pubic Hearing, February 28, 1995

The following are oral comments received during the Public Hearing held on February 28, 1995, at Pine Lake Middle School, regarding the Road Improvement Project Proposal on Issaquah - Fall City Road, Issaquah, Washington. Comments were received by Mr. Jan Klippert, Coordinator.

* * * * *

GREG ALLEN
530 - 254th Avenue Northeast
Redmond, Washington, 98053.

One main point is that I think it's more cost effective to address the intersection choke points rather than increasing road capacity. It's more cost effective and also at the same time it alleviates more health and safety issues.

The East Sammamish Community Plan EIS Appendices indicate that there's intersections that exceed carbon monoxide standards, Federal carbon monoxide standards, and that just the current improvements now in the pipeline will not

alleviate those concerns, that more work needs to be done. So I would strongly urge better study of intersection improvements over and above what's currently planned in order to alleviate both the congestion choke points and the carbon monoxide exceedence of the federal health standards, and both public safety and health issue. 1

Second point has to do with aesthetics. I note in incorporated urban areas they have planted medians and they separate sidewalks from the curb and have those planted. And there's a significant difference between the County road standard, which is just straight curb gutter sidewalks, no plantings whatsoever. So the difference you have is basically a runway instead of something more consistent with the adjacent property and the general atmosphere that's out here. So it's an aesthetic issue that I don't think has been addressed in the EIS, and it's quite contrary to the urban incorporated areas that do such a thing. 2

The response I get from County traffic people is that they don't do the planning because of safety issues. But then on the other hand,

they're not addressing the safety issues of the intersection as I addressed in my first point. So there's going to be inconsistency here, and I suspect it has more to do with dollars and expediency than it does giving the community what it wants. So I think that should be pretty closely looked and a very specific response. And I'd certainly like it to be more consistent with the adjacent cities that have nice -- reasonably nice looking arterial- or boulevard-type of look.

That's pretty much all I have, and I'll put more written comments in too.

Thank you.

2

* * * * *

VELMA SATTERTHWAITE
4901 - 242nd Ave. S.E.
Issaquah, Washington 98027

I have a question right off the bat and nobody can seem to answer it for me. I have been advised that -- I'm told that the property down between 242nd and the Pine Lake Road is commercial or is going to be zoned commercial; is that correct?

1

MR. KLIPPERT: I don't know.

MRS. SATTERTHWAITE: Anyway, we have a little private road that is not shown on most of the maps on 242nd. There's only five houses there. They are going to take away all of our trees that buffer us from the road. If they're going to do that, then I want some type of sound barrier, some type of wall or something to take us away from that. 2

And five lanes is ridiculous. Three would be more than sufficient, I think. If you try to take five lanes of traffic into that four lanes, you're going to back us up the hill even further, and it's going to take hours to get off that hill. Because you can wait in line now to turn left on the East Lake Sammamish Parkway down the hill, you can -- it can take anywhere from six to nine minutes even to go down the hill, and that's only about a mile long. So you're making a worse mess rather than a better one with a five-lane road. And leave my trees alone. 3

MR. KLIPPERT: Where is that, Velma?

MRS. SATTERTHWAITE: I'm on a little tiny road right -- I can't read a map very well. So here's the Issaquah - Pine Lake Road. Here's the

Fall City Road, and 240th -- We're not on this map. That didn't help at all. Right there (indicating).

MR. KLIPPERT: Are you on a private road?

MRS. SATTERTHWAITE: Yes.

MR. KLIPPERT: Does it show up there on those drawings at all in the photographs?

MRS. SATTERTHWAITE: In the photographs over there I guess they just changed it. On the last ones it showed that our road went through from Klahanie to the Fall City Road, but it does not. It's blocked by a structure, so that it can't. And I guess the easement ran out and it was never renewed. But there are five properties back here that are effected. We're being hemmed because we can hardly get out of our road now, but we can make a right-hand turn.

MR. KLIPPERT: You saw the comment sheets?

MRS. SATTERTHWAITE: We have one of those, too.

MR. KLIPPERT: So the guys can get a better fix on the address and where it shows.

MRS. SATTERTHWAITE: On none of the ones are we drawn in. But on one of the overheads, you can see our house. But anyway, that's what's

happening. I think something has to be done, but I think five lanes is a bit of overkill unless you're going to widen the hill going up to Pine Lake - Fall City Road. Unless you're going to widen East Lake Sammamish Parkway to five lanes, you're going to be feeding five lanes right into that mess. Got an extra lane. Don't want bicycles. Don't want kids. I've outgrown all that. Thanks.

MR. KLIPPERT: Thanks for coming.

* * * * *

ALAN HAMBLEN
240th Place Southeast
Issaquah, Washington 98027

What I'm here basically to talk about is that -- I haven't read the EIS, because I haven't gotten a copy of it. We just moved into a house which is located on the road. I was not aware that the expansion was going on to be honest with you. I lived in Brookshire prior to moving, and I still didn't see much indication or anything in the news on it.

My concern is noise, like everybody else's 1

is going to be. I guess what I'm here to say is that there needs to be something in the mitigation in the EIS to compensate for the impacts in the increased noise, barriers, like along 405 and I-5, something along that nature to try to defray the noise which is going to be increased which is obviously going to be there. I'm not sure why there isn't anything in the current EIS to -- there is nothing that I can tell -- do you -- aware of any type of mitigation measures? 1

MR. KLIPPERT: No, I'm not aware. I haven't read the EIS.

MR. HAMBLEN: My understanding is that the comments the EIS have to be in by April 14; is that correct?

MR. KLIPPERT: Yes.

MR. HAMBLEN: I guess that's basically everything I have to say.

MR. KLIPPERT: Thanks for coming.

* * * * *

DON SATTERTHWAITE
4901 - 242nd Ave. S.E.
Issaquah, Washington 98027

If I had my druthers, I'd rather have no change at all. If we have to have change, I want to see a three-lane only with a center change lane. We're concerned about taking all the trees down, no noise abatement whatsoever, easement. Really concerned about that. And I don't see anything in your plans -- I don't see anything up on the drawings or anything, so it's a major concern. 1

It is a real problem getting out of the road right now, when they opened up Klahanie. We're real concerned about the traffic going through. And if we turn this from a five-lane road and you're going into a four-lane road, eventually on the Issaquah -- or on the lower road, Issaquah - Fall City Road, you're dumping four lanes of traffic into that other road. It's bad enough now trying to back up on the freeway without putting the transportation signal on the freeway. It backs almost all the way up the light every day now. I don't know what we're going to do with all this additional traffic. I know that they're planning on taking and putting that -- trying to put a bypass on it, but we're talking 2

probably ten years at a minimum. That's a very big concern.

MR. KLIPPERT: Is that it?

MR. SATTERTHWAITE: That's it.

MR. KLIPPERT: Did they put in a metered ramp? Did you say the the D.O.T. --

MR. SATTERTHWAITE: Yes, it is. It's metered.

MR. KLIPPERT: The on-ramp onto the freeway is metered?

MR. SATTERTHWAITE: The on-ramp onto the free way is metered right there on -- both on Front Street and on Sunset.

MR. KLIPPERT: So it does back up considerably?

MR. SATTERTHWAITE: Oh, Yeah. If you come out of there at 7:30, quarter to eight in the morning, in fact even a little bit earlier than that, it can back almost all the way up to the light, which is just about a mile up the hill.

MR. KLIPPERT: Up the hill?

MR. SATTERTHWAITE: Yes, correct. And it takes a while even with two lanes. And then you've got everybody trying to get on the freeway. So even if you're two lanes coming off

of there, you're trying to channel in down to one lane getting on the freeway. It has turned out to be a major problem. And, yeah, they're improving traffic later on, supposedly toward Mercer Island, but they're sure not helping us at all. It slows us down.

MR. KLIPPERT: Do you recall how long that's been there? Is that fairly new?

MR. SATTERTHWAITE: Six to eight months, if I remember correctly, someplace in that time frame. And, you know, again, that's -- we're increasing the traffic. They're putting more developments in down below us. We live almost at the "Y" of the Pine Lake Issaquah Fall City Road, so it's -- the traffic is going to increase. There's no question about that. I'm concerned about all the -- trying to dump that into that one roadway. We live right up in here (indicating). Anyway, that's it.

MR. KLIPPERT: Thank you for stopping by.

* * * * *

JACKIE CADMUS
26629 S.E 31st Street
Issaquah, Washington

JO and JOHN CELLINI
26645 S.E. 31st Street
Issaquah, Washington

I'm Jackie Cadmus, C-a-d-m-u-s. Address is 26629 - Southeast 31st Street. We're in high country up on the plateau. And we -- the traffic is just getting ridiculous. We cannot -- we can't get off the -- I only work 14 miles from home, and it takes me 35 minutes.

MRS. CELLINI: Well, we don't want a five-laner to get off.

MRS. CADMUS: No, a five-laner will just make more traffic going in and out. Half the people coming up the road we're talking about turn into Klahanie. I think they should go the other way. That's their development and everything.

MRS. CELLINI: They have two entrances.

MRS. CADMUS: They have entrances all over. They don't need to come up on --

MRS. CELLINI: They can go straight once they go up the hill and go in that way (indicating), or they can turn right like we do and go in the entrance on our road. So they have

options, whereas we just can go on our own way. If you go straight up the Duthie Hill Road and you get up to the top, there's a light. They can opt to go straight, which is down the Pine Lake - Issaquah Road, and there's an entrance over there by the Lake, two entrances, or they can go our way, turn right, and they go into the side, to the left. And it impacts our road, which is alright, because we all moved up there to get away from it anyway. And we don't care if we have to go 35 and it takes ten minutes.

MRS. CADMUS: We don't want a freeway.

MRS. CELLINI: No, we don't want a freeway up there. But what's worrying us is we still have animals up there, and there's -- you know, rural homes. It's rural. And there's wetlands. There's watersheds. There's all kinds of things that will -- you know, five lanes will impact it immensely. And I guess that's our problem with it. We didn't move there to be in an urban setting. Nobody did. The speed limit on the road is 45, at the most. And it's a two-laner. It's a windy road. It was meant to be traveled leisurely, not five lanes, you know, going 50. There's no point to living in a place and ruining

1

it like that. We have -- The only thing you see along the road are dead animals now.

MRS. CADMUS: That is true.

MRS. CELLINI: You don't see the animals that are there because people are going too fast. And this will encourage them to go faster.

MR. KLIPPERT: Did we get your name and number?

MRS. CADMUS: She's my neighbor.

MRS. CELLINI: Jo, my last name is C-e-l-l-i-n-i. My husband's name is John. We're at 26645 - Southeast 31st Street.

MRS. CADMUS: Have you had a good turn out?

MR. KLIPPERT: It's been a very good turn out.

MRS. CELLINI: Are most of the people not in favor? A three-laner by -- now that they've -- as long as they've built their lousy shopping center already, it's there. If it'll help the traffic flow -- Five lanes, if you open it up that far, it'll open up all the way. There won't be any hope of saving what's up there now.

MR. KLIPPERT: Okay. Thank you for coming.

MRS. CADMUS: You're welcome.

* * * * *

GINGER ANDERSON
252nd Ave. S.E.
Issaquah, Washington

I'm Ginger Anderson. I live at 252nd Avenue Southeast, across from Klahanie. And my real -- I have a couple of concerns. One of the them is you've got a rural road that's going in an area that's going to stay rural for a period of time. And with the traffic that is on it today, and the potential for traffic that's there, I really question the concept of going to a five-lane configuration because of where it empties down below, that you don't have a huge demand -- or a huge capacity down below for what it is that you're talking about putting up above. In other words, you're putting almost more road above than what the capacity is below. So that would be one concern that I have about the size of the road. 1

Another thing that I have in the way of concern about the road at this point is that the road is inherently dangerous. It's 1998 before really major changes are going to be made by the

timelines that you have set down. In the next several months Klahanie has to make some changes on that road in order to be able to get their final permits for the shopping center. And during that period of time the road is going to be somewhat torn up, and clearly I understand that you can't be putting everything together. I mean, it just isn't in your plans, and it isn't in their plans for what they've got to do. But at the time the road is going to be somewhat torn up, I really think that the County needs to seriously look at the speed limit on that road. The hills and valleys in that road today make it so dangerous that it should not be left at a 45-mile-an-hour speed limit. And as you add a bike lane to that, where you're going to be putting junior high age kids out on it and more joggers and that kind of thing and people trying to make turns out of their private home driveways and so on -- you're putting another light on that road, which means people then try to speed from light to light, if they have a 45-mile-an-hour speed limit.

It seems that since you're already having to somewhat alter traffic, just slowing it down in

2

the process of all the construction that's going on and everything else, it would be a perfect time to really sort of change the whole thought of some people's driving habits and start looking at why don't we reduce that speed limit down now. Why don't we get it down to 35 miles an hour at this point instead of letting it continue on with all of the excuses that there are for why that section of road stays at what is not a safe speed limit for the conditions on that road. Okay.

2

MR. KLIPPERT: Okay. Is that it?

MS. ANDERSON: Thank you.

MR. KLIPPERT: Thank you for coming.

(Whereupon, the hearing was concluded at 7:00 p.m.)

C E R T I F I C A T E

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

I, the undersigned notary public in and for the State of Washington, do hereby certify:

That the annexed and foregoing deposition of the deponent named herein was taken stenographically before me and reduced to transcription under my direction;

I further certify that all objections made at the time of said examination to my qualifications or the manner of taking the deposition, or to the conduct of any party, have been noted by me upon said deposition;

I further certify that I am not a relative or employee or attorney or counsel of any of the parties to said action, or a relative or employee of any such attorney or counsel, and that I am not financially interested in the said action or the outcome thereof;

I further certify that the deponent before examination was by me duly sworn to testify the truth, the whole truth and nothing but the truth;

I further certify that the deposition,

as transcribed, is a full, true, and correct transcript of the testimony, including questions and answers, and all objections, motions, and exceptions of counsel made and taken at the time of the foregoing examination;

I further certify that I am sealing the deposition in an envelope with the title of the above cause thereon and marked "Deposition" with the name of the deponent and promptly delivering the same to the ordering attorney, with notice sent to interested parties.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal this 17th day of March, 1995.

Notary Public in and for the State of Washington, residing at Bellevue

RESPONSES TO THE HEARING TRANSCRIPT

Greg Allen

1. The project area is located on the eastern border of the carbon monoxide nonattainment area which encompasses a large portion of the Everett-Seattle-Tacoma urban area. The federal Clean Air Act requires the State to take actions to reduce air pollution in nonattainment areas to the extent that federal health-based standards are not exceeded, and to provide enough control measures to assure attainment for at least ten years. The framework that provides for these goals is the State Implementation Plan (SIP). As required by the Federal Clean Air Act, the Washington State Department of Ecology and the Puget Sound Air Pollution Control Agency have submitted the carbon monoxide SIP to the U.S. Environmental Protection Agency for review, but the plan has not yet been approved. This plan includes strategies to work toward compliance with the ambient air quality standards, and will affect transportation planning and emission control policies throughout the nonattainment area. Based on the results of the air quality analysis, the Issaquah-Fall City Road project conforms to the SIP's purpose of achieving attainment with the carbon monoxide one-hour and eight-hour standards.

2. A planting strip between the curb and sidewalk or within a median could improve visual quality. It would also require the purchase of additional right-of-way from private landowners, require regular maintenance, and restrict the number of locations where left turns would be possible, and therefore planting strips are not likely to be considered for this project. Landscaping would be placed at the back of the sidewalk.

Velma Satterthwaite

1. No, that is not correct. Please contact the King County Land Use Services Division at (206) 296-6655 for more information regarding zoning.

2. The trees that currently buffer your home from the road should be preserved, where possible, with the use of retaining walls to minimize the extent of cut and fill operations. Although trees can provide visual screening, they have been found to be of minimal value as a noise barrier unless they form a dense barrier at least 100 feet in width.

   Noise mitigation is not suggested because the King County Noise Ordinance currently exempts traffic noise from the regulatory limits applied to most other sources. However, King County has recently proposed a draft Road Noise Policy regarding environmental review and mitigation of roadway traffic noise. This policy, when adopted, will provide the County with guidelines for analysis of noise mitigation. Analysis of noise mitigation will consider the benefits and costs of abatement and the overall social, economic, and environmental effects of the mitigation. This project does not propose mitigation measures at this time. However, the County will analyze potential noise mitigation measures along Issaquah-Fall City Road, and if feasible and reasonable, these measures may be included as part of the project.

3. During preparation of this EIS it was determined that five lanes are needed to provide an acceptable level of service for 2012. King County recognizes the need to improve the Sunset Interchange. King County is also studying alternatives for the East Sammamish South Access Road. Both of these projects will help to resolve the problems on East Lake Sammamish Parkway SE.

Allen Hamblen

1. The King County Noise Ordinance currently exempts traffic noise from the regulatory limits applied to most other sources. However, King County has recently proposed a draft Road Noise Policy regarding environmental review and mitigation of roadway traffic noise. This policy, when adopted, will provide the County with guidelines for analysis of noise mitigation. Analysis of noise mitigation will consider the benefits and costs of abatement and the overall social, economic, and environmental effects of the mitigation. This project does not propose mitigation measures at this time. However, the County will analyze potential noise mitigation measures along Issaquah-Fall City Road, and if feasible and reasonable, these measures may be included as part of the project.

Don Satterthwaite

1. Your concerns are appreciated. During final design, mitigation would be developed for safety, wetland buffers, traffic access, and drainage. The King County Noise Ordinance currently exempts traffic noise from the regulatory limits applied to most other sources. Therefore noise mitigation is not proposed as part of this project.

2. Your concerns regarding increases in traffic volumes are appreciated. One of the stated objectives of this project is to increase roadway capacity to meet the growing demand that will result from anticipated development. King County recognizes the need to improve the Sunset Interchange. The future I-90 interchange associated with the East Sammamish South Access Road will also help to alleviate the problem in the future. At this time, however, there is no funding, and therefore no scheduled improvements by the Washington State Department of Transportation.

Jackie Cadmus and Jo Cellini

1. Your concerns regarding the impacts of the Five-Lane Alternative are appreciated. Although the area to the southwest of the road remains designated as rural, the area on the northeast side has been designated as urban in the East Sammamish Community Plan Update. Traffic modeling based on land use assumptions from the East Sammamish Community Plan indicate that traffic will more than double by 2012.

Ginger Anderson

1. Projected 2012 volumes, which are higher than existing volumes, were based on King County's traffic model and land use assumptions for the draft East

Sammamish Community Plan Update. These volumes were adjusted based on existing traffic counts, projected future land uses, volumes used in the Klahanie Commercial Center Supplemental EIS, volumes for the East Sammamish South Access Roadway (Grand Ridge Extension), and intersection volumes used in the Issaquah-Pine Lake Road Improvement Project EIS. As shown in table 3-16 of this FEIS, daily traffic volumes are expected to more than double by the year 2012. This was a consideration when selecting the Five-Lane Alternative as the preferred alternative. King County recognizes the need to improve the Sunset Interchange. The future I-90 interchange associated with the East Sammamish South Access Road will also help to alleviate the problem in the future. At this time, however, there is no funding, and therefore no scheduled improvements by the Washington State Department of Transportation.

2. Changing the speed limit is not proposed as part of this project. Pedestrian safety would not necessarily be increased by lowering the posted speed limit from 45 mph to 35 mph. Motorists usually adjust their speeds according to road conditions.

   Speed limits are set based on certain criteria which includes roadway geometrics, the number of driveways along a portion of roadway, the number of accidents, sight distance, and pedestrian traffic. Motorists usually adjust their speeds according to these conditions. When unreasonably low speed limits are posted, the speed limit is violated by a larger number of drivers. Research and experience have shown that effective speed limits are those that the majority of motorists naturally drive, and that raising and lowering speed limits does not substantially influence that speed. Speed limits that reflect the behavior of the majority are determined by what engineers call the "85th percentile speed", or the speed that 85 out of 100 cars travel at or below.

   The speed limit along a road can only be changed based on the recommendation of a Speed Limit Engineer. Any change greater than 10 mph also requires County Council action. If you would like more information about the process used to set speed limits, please contact: King County Department of Transportation, Traffic Operations Unit at (206) 296-6596.

   The project would flatten the hills southwest of 247th Place SE, as well as reduce the dip across North Fork Issaquah Creek. Flattening these curves would improve sight distance, and therefore enhance safety for vehicles.

   Sidewalks and bicycle lanes are proposed as part of this project. These facilities would provide for safer pedestrian and bicycle access in comparison to existing conditions. In addition, the sidewalks would provide safer pickup/drop off points for school bus passengers.

APPENDIX A

Surface Water Technical Information Report

This appendix only provides replacements of selected original pages of Appendix A - Surface Water Technical Information Report. These pages have been updated with new information. This appendix also includes new calculation data sheets. The original report has not been reproduced in its entirety.

ISSAQUAH - FALL CITY ROAD
TECHNICAL INFORMATION REPORT

ADDENDUM

INTRODUCTION

King County Surface Water Management determined that the standard methodology for determining allowable release rates from detention facilities is inadequate to account for the concentration of flow that would result due to this project. Therefore, a method that represents interflow, instead of surface flow, as the dominant runoff component was used to redesign the two wet ponds. This method resulted in ponds with smaller allowable release rates and larger required storage volumes.

DESIGN METHODOLOGY

The revised methodology holds the allowable release rates to the same standard (i.e. developed peak flows for the 2-, 10- and 100-year events not to exceed 1/2 the 2-, the 2- and 10-year existing peak flows, respectively), however the method for determining times-of-concentration has been changed. Instead of using the standard time-of-concentration calculations from the King County Surface Water Design Manual, which are based on surface flow conditions, the revised methodology utilizes times-of-concentration developed for interflow conditions. The design of the infiltration facility was not revised, because the assumption of surface flow results in a more conservative design for infiltration.

Detention facility release rates were calculated assuming that existing flows travel to the discharge points via interflow. After development, a portion of the flows would infiltrate and travel via interflow, and a portion would form concentrated flows in the ditches and travel to the detention facilities. For this design, it was assumed that the amount of flow infiltrating under proposed conditions would be the same as the existing amount, and that the added flows would result in surface flows. The developed interflows were added to the developed surface flows and the resulting hydrographs were used to design the detention facilities. The design assumptions are listed in **table A1**.

Table A1 Revised Issaquah-Fall City Road hydrologic parameters		
	Outfall 6 + 50	**Outfall 50 + 30**
Existing:		
Area (ac)	1.38	2.53
Tc (min)	530	530
Previous Tc (min)	12.0	7.1
Proposed:		
Area (ac)	3.16	4.31
Tc1(min)	530	530
Tc2(min)	8.0	9.9
Previous Tc (min)	8.0	9.9

RESULTS

The flows calculated using this methodology are listed in **table A2**. Using the King County RDFAC program, detention ponds were designed using these flows (see attached printouts). Adequate facilities would require approximately 39,100 and 45,850 cubic feet of storage, up from 14,321 and 13,952 cubic feet using the standard methodology. These ponds would have surface areas of 13,800 and 15,800 square feet, respectively.

Table A2 Revised Issaquah-Fall City Road design flows		
	Outfall 6 + 50	**Outfall 50 + 30**
Existing:		
1/2 of 2-year	0.075	0.14
2-year	0.15	0.28
10-year	0.23	0.42
Proposed:		
2-year	1.26	1.34
10-year	1.86	1.97
100-year	2.44	2.60

Several facility sites were originally proposed in King County SWM's Plan for the Disposal of Residuals from Cleaning of Stormwater Detention and Conveyance Systems (Resource Planning Associates 1990). These sites should be further evaluated. Additionally, all efforts should be coordinated with the existing *Interjurisdictional Decant/Sediment Disposal Plan* (Ecology Centennial Clean Water Fund grant) project currently managed by the SWM Division. In the interim, wastes from drainage facility maintenance should be treated at current County decant stations.

The drainage facility maintenance recommendations will improve the water quality performance of on-site R/D facilities, but they will also increase the annual maintenance costs of the SWM Division. Therefore, additional funds should be allocated to facility maintenance.

Estimated Cost: One-time (survey) = $30,000; Annual (improved maintenance at 0.5 FTE) = $30,000. No capital costs estimated for improvements.

BW 19: Water Quality Treatment Design Standards

~~**Recommendations:** Based on the outcome of preliminary resulted from the Lake Sammamish Water Quality Management test projects, SWM BMP monitoring and SWM's evaluation of sediment and decant disposal, SWM should develop additional water quality facility/treatment requirements for the Issaquah Basin. In the interim, the King County Surface Water Design Manual Special Requirement 5 should be amended to allow the use of the most effective combination of the following water quality treatment methods: soil infiltration basins, wet retention/detention (R/D) ponds, constructed wetland treatment, biofilters, alum treatment of stormwater ponds, and dry ponds with biofilters.~~

Following the King County Surface Water Design Manual Update, 50 percent phosphorus removal will be required. Prior to the Design Manual revision, treatment should be via a water quality swale or filter strip; sand filter; wet pond designed using 2/3 of the 2-year, 24-hour storm; combined R/D and wet pond; constructed wetland; or infiltration followed by an infiltration facility or sand filter.

Discussion: Phosphorous reduction has been identified as one of the key water quality goals for protecting the basins surface water features from beneficial use impairment. BMPs for phosphorus control in this region are currently being evaluated through several initiatives. The application of alum as a treatment technology for stormwater will be explored through the Lake Sammamish test projects beginning fall 1992. The information generated from these project should be used to develop and refine all water quality treatment design standards for the Issaquah basin.

Estimated Cost: No change.

NF 3: Wetland 7 Management Area

Recommendation: In order to prevent further degradation of North Fork Wetland 7, the largest riparian wetland in the Issaquah Creek Basin, the following performance standards should apply to all new subdivisions, short subdivisions, and Master Planned Developments in the area draining to the wetland:

1. **Impervious surfaces within the subdivision or short subdivision, including surfaces associated with all structures, driveways, and roads within the development, should be limited to a maximum of eight percent.**

2. **For all lands draining to Wetland 7, on-site R/D facilities should be designed to the standard specified in BW 2. In addition, the stormwater conveyance, detention, and discharge facilities should maximize infiltration potential to recharge the groundwater on which Wetland 7 depends. Whenever possible, the drainage system should use perforated pipes in gravel trenches for stormwater conveyance and dispersal systems in undisturbed vegetation for stormwater discharge, and the detention ponds should be designed to encourage infiltration.**

Discussion: This Class I wetland exhibits a variety of high-quality habitat types and plant communities, including a section of forested peat bog. It is heavily used by birds, large mammals, and beavers. The wetland is very sensitive to the inevitable increases in flow volumes that result from development. Because these volumes are not adequately controlled by standard detention or other engineering mitigations, the amount of impervious area draining to the wetland must be tightly limited to protect this wetland's function.

Estimated Cost: One-time (permit review at .25 FTE) = $15,000. No capital costs for mitigation to standards are included.

ISSAQUAH-FALL CITY ROAD
REVISED DETENTION DESIGN
JULY 7, 1995
hyd

KING COUNTY DEPARTMENT OF PUBLIC WORKS
Surface Water Management Division

HYDROGRAPH PROGRAMS
Version 4.21B

1 - INFO ON THIS PROGRAM
2 - SBUHYD
3 - MODIFIED SBUHYD
4 - ROUTE
5 - ROUTE2
6 - ADDHYD
7 - BASEFLOW
8 - PLOTHYD
9 - DATA
10 - RDFAC
11 - RETURN TO DOS

ENTER OPTION:
2

SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION:
1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
2,24,2.7

********** S.C.S. TYPE-1A DISTRIBUTION **********
********* 2-YEAR 24-HOUR STORM **** 2.70" TOTAL PRECIP. *********

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
0,90,1.38,98,530

DATA PRINT-OUT:

AREA(ACRES)	PERVIOUS A	PERVIOUS CN	IMPERVIOUS A	IMPERVIOUS CN	TC(MINUTES)
1.4	.0	90.0	1.4	98.0	530.0

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
.15	12.50	11889

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcintle.2

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 2
0,90,2.53,98,530

DATA PRINT-OUT:

```
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       2.5         .0  90.0     2.5  98.0       530.0

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
       .28         12.50           21796

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint4e.2

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  3
0,90,1.78,98,8

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.8         .0  90.0     1.8  98.0         8.0

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
      1.14           7.83           15954

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin1pa.2

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  4
0,90,1.78,98,9.9

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.8         .0  90.0     1.8  98.0         9.9

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
      1.11           7.83           15949

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4pa.2

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
n

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION:
1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
10,24,3.9
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.90" TOTAL PRECIP. *********

------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0,90,1.38,98,530

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.4         .0  90.0     1.4  98.0       530.0
```

```
  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .23          12.50           17642

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcintle.10

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  2
0,90,2.53,98,530

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       2.5         .0  90.0     2.5  98.0       530.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .42          12.50           32344

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint4e.10

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  3
0,90,1.78,98,8

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.8         .0  90.0     1.8  98.0         8.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
      1.67           7.83           23679

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin1pa.10

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  4
0,90,1.78,98,9.9

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.8         .0  90.0     1.8  98.0         9.9

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
      1.63           7.83           23672

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4pa.10

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
n

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION:
1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
100,24,5.1
```

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  5.10" TOTAL PRECIP. *********

------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0,90,1.38,98,530

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.4         .0  90.0     1.4  98.0       530.0

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
       .30         12.50           23415

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint1e.100

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  2
0,90,2.53,98,530

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       2.5         .0  90.0     2.5  98.0       530.0

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
       .55         12.50           42928

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint4e.100

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  3
0,90,1.78,98,8

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.8         .0  90.0     1.8  98.0         8.0

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
      2.19          7.83           31416

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin1pa.100

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  4
0,90,1.78,98,9.9

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       1.8         .0  90.0     1.8  98.0         9.9

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
      2.14          7.83           31407

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4pa.100

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
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s

                    KING COUNTY DEPARTMENT OF PUBLIC WORKS
                      Surface Water Management Division

                            HYDROGRAPH PROGRAMS
                               Version 4.21B

                          1 - INFO ON THIS PROGRAM
                          2 - SBUHYD
                          3 - MODIFIED SBUHYD
                          4 - ROUTE
                          5 - ROUTE2
                          6 - ADDHYD
                          7 - BASEFLOW
                          8 - PLOTHYD
                          9 - DATA
                         10 - RDFAC
                         11 - RETURN TO DOS

ENTER OPTION:
6

ROUTINE FOR ADDING HYDROGRAPHS

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcin4pa.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcint4e.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=   1.11 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .28 CFS   T-PEAK= 10.17 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   1.34 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    37806CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint4p.2

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcin1pa.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcint1e.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:
```

```
  HYDROGRAPH 1: PEAK-Q=   1.14 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .15 CFS   T-PEAK=  9.33 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   1.26 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    27870CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint1p.2

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcin1pa.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcint1e.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=   1.67 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .23 CFS   T-PEAK= 10.33 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   1.86 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    41412CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint1p.10

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcin4pa.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcint4e.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=   1.63 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .42 CFS   T-PEAK= 10.50 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   1.97 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    56130CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint4p.10

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
```

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n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcin1pa.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcint1e.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=   2.19 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .30 CFS   T-PEAK=  9.83 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   2.44 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    54774CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint1p.100

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcin4pa.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcint4e.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=   2.14 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .55 CFS   T-PEAK= 10.17 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   2.60 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    74274CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcint4p.100

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
s
```

KING COUNTY DEPARTMENT OF PUBLIC WORKS
Surface Water Management Division

HYDROGRAPH PROGRAMS
Version 4.21B

```
                    1 - INFO ON THIS PROGRAM
                    2 - SBUHYD
                    3 - MODIFIED SBUHYD
                    4 - ROUTE
                    5 - ROUTE2
                    6 - ADDHYD
                    7 - BASEFLOW
                    8 - PLOTHYD
                    9 - DATA
                   10 - RDFAC
                   11 - RETURN TO DOS

ENTER OPTION:
10
R/D FACILITY DESIGN ROUTINE

SPECIFY TYPE OF R/D FACILITY:

1 - POND            4 - INFILTRATION POND
2 - TANK            5 - INFILTRATION TANK
3 - VAULT           6 - GRAVEL TRENCH/BED
1
ENTER: POND SIDE SLOPE (HORIZ. COMPONENT)
3

ENTER: EFFECTIVE STORAGE DEPTH(ft) BEFORE OVERFLOW
4

ENTER [d:][path]filename[.ext] OF PRIMARY DESIGN INFLOW HYDROGRAPH:
ifcintlp.100
PRIMARY DESIGN INFLOW PEAK =   2.44 CFS

ENTER PRIMARY DESIGN RELEASE RATE(cfs):
.23

ENTER NUMBER OF INFLOW HYDROGRAPHS TO BE TESTED FOR PERFORMANCE (5 MAXIMUM):
2

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 1:
ifcintlp.2
ENTER TARGET RELEASE RATE(cfs):
.075

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 2:
ifcintlp.10
ENTER TARGET RELEASE RATE(cfs):
.15

ENTER:  NUMBER OF ORIFICES,  RISER-HEAD(ft),  RISER-DIAMETER(in)
3,4,12

RISER OVERFLOW DEPTH FOR PRIMARY PEAK INFLOW =   .42 FT

SPECIFY ITERATION DISPLAY:  Y - YES,  N - NO
n

SPECIFY:  R - REVIEW/REVISE INPUT,  C - CONTINUE
c

INITIAL STORAGE VALUE FOR ITERATION PURPOSES:    40941 CU-FT

BOTTOM ORIFICE:  ENTER Q-MAX(cfs)
.1
DIA.= 1.36 INCHES
MIDDLE ORIFICE:  ENTER Q-MAX(cfs), HEIGHT(ft)
.08,2.4
DIA.= 1.53 INCHES
TOP ORIFICE:  ENTER HEIGHT(ft)
3.3
DIA.= 1.48 INCHES

PERFORMANCE:   INFLOW   TARGET-OUTFLOW   ACTUAL-OUTFLOW   PK-STAGE     STORAGE
 DESIGN HYD:     2.44           .23             .23         4.00       39074
 TEST HYD 1:     1.26           .08             .08         2.37       20760
 TEST HYD 2:     1.86           .15             .15         3.26       30340
```

```
SPECIFY:  D - DOCUMENT,  R - REVISE,  A - ADJUST ORIF,  E - ENLARGE,  S - STOP
d

PERFORMANCE:    INFLOW   TARGET-OUTFLOW   ACTUAL-OUTFLOW   PK-STAGE     STORAGE
 DESIGN HYD:      2.44           .23             .23         4.00       39074
 TEST HYD 1:      1.26           .08             .08         2.37       20760
 TEST HYD 2:      1.86           .15             .15         3.26       30340


STRUCTURE DATA:  R/D-POND (3.0:1 SIDE SLOPES)

RISER-HEAD   POND-BOTTOM-AREA   TOP-AREA(@1'F.B.)   STOR-DEPTH   STORAGE-VOLUME
  4.00 FT       7394.3 SQ-FT       13766.7 SQ-FT      4.00 FT      39074 CU-FT

TRIPLE ORIFICE RESTRICTOR:   DIA(INCHES)   HT(FEET)   Q-MAX(CFS)
          BOTTOM ORIFICE:         1.36         .00         .100
          MIDDLE ORIFICE:         1.53        2.40         .080
             TOP ORIFICE:         1.48        3.30         .050

ROUTING DATA:

STAGE(FT)   DISCHARGE(CFS)   STORAGE(CU-FT)   PERM-AREA(SQ-FT)
    .00           .00              .0               .0
    .40           .03             3046.0            .0
    .80           .04             6271.8            .0
   1.20           .05             9681.9            .0
   1.60           .06            13281.0            .0
   2.00           .07            17073.6            .0
   2.40           .08            21064.3            .0
   2.80           .12            25257.8            .0
   3.20           .15            29658.7            .0
   3.30           .15            30791.9            .0
   3.60           .20            34271.6            .0
   4.00           .23            39101.0            .0
   4.10           .55            40342.8            .0
   4.20          1.12            41598.4            .0
   4.30          1.85            42868.0            .0
   4.40          2.65            44151.7            .0
   4.50          2.94            45449.4            .0

AVERAGE VERTICAL PERMEABILITY:     .0 MINUTES/INCH

SPECIFY:  F - FILE,  N - NEWJOB,  P - PRINT IF/OF,  R - REVISE,  S - STOP
n
R/D FACILITY DESIGN ROUTINE

SPECIFY TYPE OF R/D FACILITY:

1 - POND              4 - INFILTRATION POND
2 - TANK              5 - INFILTRATION TANK
3 - VAULT             6 - GRAVEL TRENCH/BED
1
ENTER:  POND SIDE SLOPE (HORIZ. COMPONENT)
3

ENTER:  EFFECTIVE STORAGE DEPTH(ft) BEFORE OVERFLOW
4

ENTER [d:][path]filename[.ext] OF PRIMARY DESIGN INFLOW HYDROGRAPH:
ifcint4p.100
PRIMARY DESIGN INFLOW PEAK =   2.60 CFS

ENTER PRIMARY DESIGN RELEASE RATE(cfs):
.42

ENTER NUMBER OF INFLOW HYDROGRAPHS TO BE TESTED FOR PERFORMANCE (5 MAXIMUM):
2

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 1:
ifcint4p.2
ENTER TARGET RELEASE RATE(cfs):
.14

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 2:
```

```
ifcint4p.10
ENTER TARGET RELEASE RATE(cfs):
.28

ENTER:  NUMBER OF ORIFICES,  RISER-HEAD(ft),  RISER-DIAMETER(in)
3,4,12

RISER OVERFLOW DEPTH FOR PRIMARY PEAK INFLOW =    .47 FT

SPECIFY ITERATION DISPLAY:  Y - YES,  N - NO
n

SPECIFY:  R - REVIEW/REVISE INPUT,  C - CONTINUE
c

INITIAL STORAGE VALUE FOR ITERATION PURPOSES:     50115 CU-FT

BOTTOM ORIFICE:  ENTER Q-MAX(cfs)
.18
DIA.= 1.82 INCHES
MIDDLE ORIFICE:  ENTER Q-MAX(cfs), HEIGHT(ft)
.15,2.5
DIA.= 2.13 INCHES
TOP ORIFICE:  ENTER HEIGHT(ft)
3.3
DIA.= 1.99 INCHES

PERFORMANCE:    INFLOW   TARGET-OUTFLOW   ACTUAL-OUTFLOW   PK-STAGE    STORAGE
 DESIGN HYD:      2.60           .42              .42         4.00      45836
 TEST HYD 1:      1.34           .14              .14         2.41      25080
 TEST HYD 2:      1.97           .28              .27         3.30      36210

SPECIFY:  D - DOCUMENT,  R - REVISE,  A - ADJUST ORIF,  E - ENLARGE,  S - STOP
d

PERFORMANCE:    INFLOW   TARGET-OUTFLOW   ACTUAL-OUTFLOW   PK-STAGE    STORAGE
 DESIGN HYD:      2.60           .42              .42         4.00      45836
 TEST HYD 1:      1.34           .14              .14         2.41      25080
 TEST HYD 2:      1.97           .28              .27         3.30      36210


STRUCTURE DATA:  R/D-POND (3.0:1 SIDE SLOPES)

RISER-HEAD    POND-BOTTOM-AREA   TOP-AREA(@1'F.B.)   STOR-DEPTH   STORAGE-VOLUME
  4.00 FT        8878.4 SQ-FT       15774.9 SQ-FT      4.00 FT      45836 CU-FT

TRIPLE ORIFICE RESTRICTOR:   DIA(INCHES)   HT(FEET)   Q-MAX(CFS)
           BOTTOM ORIFICE:         1.82        .00         .180
           MIDDLE ORIFICE:         2.13       2.50         .150
              TOP ORIFICE:         1.99       3.30         .090

ROUTING DATA:

STAGE(FT)   DISCHARGE(CFS)   STORAGE(CU-FT)   PERM-AREA(SQ-FT)
    .00            .00              .0               .0
    .40            .06           3648.1              .0
    .80            .08           7492.6              .0
   1.20            .10          11538.3              .0
   1.60            .11          15789.7              .0
   2.00            .13          20251.4              .0
   2.40            .14          24928.0              .0
   2.50            .14          26131.3              .0
   2.80            .22          29824.2              .0
   3.20            .26          34944.5              .0
   3.30            .27          36260.1              .0
   3.60            .36          40293.5              .0
   4.00            .42          45875.9              .0
   4.10            .74          47308.5              .0
   4.20           1.32          48756.1              .0
   4.30           2.06          50218.6              .0
   4.40           2.86          51696.3              .0
   4.50           3.16          53189.1              .0

AVERAGE VERTICAL PERMEABILITY:      .0 MINUTES/INCH
```

SPECIFY: F - FILE, N - NEWJOB, P - PRINT IF/OF, R - REVISE, S - STOP
s

ENTRANCO

SHEET NO. 1 OF 1
JOB NO. 1-93020-20

PROJECT Issaquah- Fall City Road
CALCULATIONS FOR Revised Detention ponds → Interflow method
MADE BY MTS DATE 7/7/95 CHECKED BY _____ DATE _____

Existing Areas

Roadway Subbasin

Existing Impervious:

SB #1 – 1.38 acres

SB #4 – 2.53 acres

Times of concentration:

#1 – T_c = 530 min

#4 – T_c = 530 min

Proposed Conditions: (5-lane)

SB #1 : 1.38 ac w/ T_c = 530 min

: 3.16 - 1.38 = 1.78 ac

w/ T_c = 8.0 min

SB #4 : 2.53 acres w/ T_c = 530 min

: 4.31 - 2.53 = 1.78 ac

w/ T_c = 9.9 min

		2-yr	10-yr	100-yr
P(in)		2.7	3.9	5.1
Q(cfs)/V(cf)				
SB #1	Exist	0.15/11889	0.23/17642	0.30/23415
	Proposed	1.26/27870	1.86/41412	2.44/54774
SB #4	Exist	0.28/21996	0.42/32344	0.55/42928
	Proposed	1.34/37806	1.97/56130	2.60/74274

```
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       .8          .0  90.0      .8  98.0         9.7

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
       .48          7.83            6810

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4pb.2

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
n

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION:
1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
10,24,3.9
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.90" TOTAL PRECIP. *********

------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0,90,.87,98,7.8

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       .9          .0  90.0      .9  98.0         7.8

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
       .82          7.83           11573

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcinlpb.10

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  2
0,90,.76,98,9.7

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       .8          .0  90.0      .8  98.0         9.7

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
       .70          7.83           10107

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4pb.10

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
n

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION:
1
```

```
S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
100,24,5.1
------------------------------------------------------------------------
****************** S.C.S. TYPE-1A DISTRIBUTION ******************
********* 100-YEAR  24-HOUR STORM  ****  5.10" TOTAL PRECIP. *********

------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0,90,.87,98,7.8

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
        .9         .0  90.0      .9  98.0         7.8

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
      1.07          7.83           15355

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin1pb.100

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
c
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  2
0,90,.76,98,9.7

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
        .8         .0  90.0      .8  98.0         9.7

  PEAK-Q(CFS)   T-PEAK(HRS)     VOL(CU-FT)
       .92          7.83           13410

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4pb.100

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
s



                    KING COUNTY DEPARTMENT OF PUBLIC WORKS
                      Surface Water Management Division

                            HYDROGRAPH PROGRAMS
                                Version 4.21B

                           1 - INFO ON THIS PROGRAM
                           2 - SBUHYD
                           3 - MODIFIED SBUHYD
                           4 - ROUTE
                           5 - ROUTE2
                           6 - ADDHYD
                           7 - BASEFLOW
                           8 - PLOTHYD
                           9 - DATA
                          10 - RDFAC
                          11 - RETURN TO DOS

ENTER OPTION:
6

ROUTINE FOR ADDING HYDROGRAPHS

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
```

```
ifcintle.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcinlpb.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=    .15 CFS   T-PEAK=  9.33 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .56 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=    .68 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    19710CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcinlp3.2

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcint4e.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcin4pb.2

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=    .28 CFS   T-PEAK= 10.17 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .48 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=    .71 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    28638CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4p3.2

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcintle.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcinlpb.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=    .23 CFS   T-PEAK= 10.33 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .82 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES
```

```
HYDROGRAPH SUM: PEAK-Q=   1.01 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    29208CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin1p3.10

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcint4e.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcin4pb.10

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=    .42 CFS   T-PEAK= 10.50 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .70 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   1.04 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    42444CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4p3.10

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
ifcint1e.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcin1pb.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=    .30 CFS   T-PEAK=  9.83 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=   1.07 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   1.32 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    38778CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin1p3.100

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
n

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 1
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```
ifcint4e.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 1
0

ENTER: [d:][path]filename[.ext] OF HYDROGRAPH 2
ifcin4pb.100

ENTER: TRAVEL TIME (MINUTES) OF HYDROGRAPH 2
0

DATA PRINT-OUT:

  HYDROGRAPH 1: PEAK-Q=    .55 CFS   T-PEAK= 10.17 HRS   TT=  0 MINUTES
  HYDROGRAPH 2: PEAK-Q=    .92 CFS   T-PEAK=  7.83 HRS   TT=  0 MINUTES

HYDROGRAPH SUM: PEAK-Q=   1.38 CFS   T-PEAK=  7.83 HRS

  TOTAL VOLUME:    56262CU-FT

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
f

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
ifcin4p3.100

SPECIFY: C - CONTINUE, N - NEWJOB, F - FILE, P - PRINT, S - STOP
s




                    KING COUNTY DEPARTMENT OF PUBLIC WORKS
                      Surface Water Management Division

                            HYDROGRAPH PROGRAMS
                                Version 4.21B

                          1 - INFO ON THIS PROGRAM
                          2 - SBUHYD
                          3 - MODIFIED SBUHYD
                          4 - ROUTE
                          5 - ROUTE2
                          6 - ADDHYD
                          7 - BASEFLOW
                          8 - PLOTHYD
                          9 - DATA
                         10 - RDFAC
                         11 - RETURN TO DOS

ENTER OPTION:
10
R/D FACILITY DESIGN ROUTINE

SPECIFY TYPE OF R/D FACILITY:

1 - POND              4 - INFILTRATION POND
2 - TANK              5 - INFILTRATION TANK
3 - VAULT             6 - GRAVEL TRENCH/BED
1
ENTER: POND SIDE SLOPE (HORIZ. COMPONENT)
3

ENTER: EFFECTIVE STORAGE DEPTH(ft) BEFORE OVERFLOW
4

ENTER [d:][path]filename[.ext] OF PRIMARY DESIGN INFLOW HYDROGRAPH:
ifcin1p3.100
PRIMARY DESIGN INFLOW PEAK =   1.32 CFS

ENTER PRIMARY DESIGN RELEASE RATE(cfs):
```

```
.23

ENTER NUMBER OF INFLOW HYDROGRAPHS TO BE TESTED FOR PERFORMANCE (5 MAXIMUM):
2

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 1:
ifcinlp3.2
ENTER TARGET RELEASE RATE(cfs):
0.075

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 2:
ifcinlp3.10
ENTER TARGET RELEASE RATE(cfs):
.15

ENTER:  NUMBER OF ORIFICES,  RISER-HEAD(ft),  RISER-DIAMETER(in)
3,4,12

RISER OVERFLOW DEPTH FOR PRIMARY PEAK INFLOW =    .26 FT

SPECIFY ITERATION DISPLAY:  Y - YES,  N - NO
n

SPECIFY:  R - REVIEW/REVISE INPUT,  C - CONTINUE
c

INITIAL STORAGE VALUE FOR ITERATION PURPOSES:    25215 CU-FT

BOTTOM ORIFICE:  ENTER Q-MAX(cfs)
.1
DIA.= 1.36 INCHES
MIDDLE ORIFICE:  ENTER Q-MAX(cfs), HEIGHT(ft)
.08,2.5
DIA.= 1.55 INCHES
TOP ORIFICE:  ENTER HEIGHT(ft)
3.35
DIA.= 1.51 INCHES

PERFORMANCE:   INFLOW   TARGET-OUTFLOW   ACTUAL-OUTFLOW   PK-STAGE    STORAGE
 DESIGN HYD:     1.32          .23             .23         4.00      23049
 TEST HYD 1:      .68          .08             .08         2.49      12530
 TEST HYD 2:     1.01          .15             .15         3.32      18050

SPECIFY:  D - DOCUMENT,  R - REVISE,  A - ADJUST ORIF,  E - ENLARGE,  S - STOP
d

PERFORMANCE:   INFLOW   TARGET-OUTFLOW   ACTUAL-OUTFLOW   PK-STAGE    STORAGE
 DESIGN HYD:     1.32          .23             .23         4.00      23049
 TEST HYD 1:      .68          .08             .08         2.49      12530
 TEST HYD 2:     1.01          .15             .15         3.32      18050


STRUCTURE DATA:  R/D-POND (3.0:1 SIDE SLOPES)

RISER-HEAD   POND-BOTTOM-AREA   TOP-AREA(@1'F.B.)   STOR-DEPTH   STORAGE-VOLUME
  4.00 FT        3971.7 SQ-FT        8882.4 SQ-FT      4.00 FT      23049 CU-FT

TRIPLE ORIFICE RESTRICTOR:   DIA(INCHES)   HT(FEET)   Q-MAX(CFS)
           BOTTOM ORIFICE:         1.36        .00         .100
           MIDDLE ORIFICE:         1.55       2.50         .080
              TOP ORIFICE:         1.51       3.35         .050

ROUTING DATA:

STAGE(FT)   DISCHARGE(CFS)   STORAGE(CU-FT)   PERM-AREA(SQ-FT)
    .00           .00              .0               .0
    .40           .03           1653.6              .0
    .80           .04           3440.2              .0
   1.20           .05           5364.3              .0
   1.60           .06           7430.6              .0
   2.00           .07           9643.7              .0
   2.40           .08          12008.2              .0
   2.50           .08          12623.5              .0
   2.80           .12          14528.6              .0
   3.20           .14          17209.7              .0
```

```
   3.35          .15          18257.4              .0
   3.60          .19          20055.9              .0
   4.00          .23          23072.0              .0
   4.10          .55          23853.0              .0
   4.20         1.12          24645.1              .0
   4.30         1.85          25448.2              .0
   4.40         2.65          26262.4              .0
   4.50         2.94          27087.9              .0

AVERAGE VERTICAL PERMEABILITY:     .0 MINUTES/INCH

SPECIFY:  F - FILE,  N - NEWJOB,  P - PRINT IF/OF,  R - REVISE,  S - STOP
n
R/D FACILITY DESIGN ROUTINE

SPECIFY TYPE OF R/D FACILITY:

1 - POND              4 - INFILTRATION POND
2 - TANK              5 - INFILTRATION TANK
3 - VAULT             6 - GRAVEL TRENCH/BED
1
ENTER: POND SIDE SLOPE (HORIZ. COMPONENT)
3

ENTER: EFFECTIVE STORAGE DEPTH(ft) BEFORE OVERFLOW
4

ENTER [d:][path]filename[.ext] OF PRIMARY DESIGN INFLOW HYDROGRAPH:
ifcin4p3.100
PRIMARY DESIGN INFLOW PEAK =   1.38 CFS

ENTER PRIMARY DESIGN RELEASE RATE(cfs):
.42

ENTER NUMBER OF INFLOW HYDROGRAPHS TO BE TESTED FOR PERFORMANCE (5 MAXIMUM):
2

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 1:
ifcin4p3.2
ENTER TARGET RELEASE RATE(cfs):
.14

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 2:
ifcin4p3.10
ENTER TARGET RELEASE RATE(cfs):
.28

ENTER:  NUMBER OF ORIFICES,  RISER-HEAD(ft),  RISER-DIAMETER(in)
3,4,12

RISER OVERFLOW DEPTH FOR PRIMARY PEAK INFLOW =   .27 FT

SPECIFY ITERATION DISPLAY:  Y - YES,  N - NO
n

SPECIFY:  R - REVIEW/REVISE INPUT,  C - CONTINUE
c

INITIAL STORAGE VALUE FOR ITERATION PURPOSES:    32934 CU-FT


BOTTOM ORIFICE:  ENTER Q-MAX(cfs)
.18
DIA.= 1.82 INCHES
MIDDLE ORIFICE:  ENTER Q-MAX(cfs), HEIGHT(ft)
.15,2.6
DIA.= 2.16 INCHES
TOP ORIFICE:  ENTER HEIGHT(ft)
3.4
DIA.= 2.07 INCHES

PERFORMANCE:   INFLOW   TARGET-OUTFLOW   ACTUAL-OUTFLOW   PK-STAGE    STORAGE
 DESIGN HYD:     1.38          .42             .42          4.00      27611
 TEST HYD 1:      .71          .14             .14          2.56      15780
 TEST HYD 2:     1.04          .28             .28          3.38      22260
```

SPECIFY: D - DOCUMENT, R - REVISE, A - ADJUST ORIF, E - ENLARGE, S - STOP
d

PERFORMANCE:	INFLOW	TARGET-OUTFLOW	ACTUAL-OUTFLOW	PK-STAGE	STORAGE
DESIGN HYD:	1.38	.42	.42	4.00	27611
TEST HYD 1:	.71	.14	.14	2.56	15780
TEST HYD 2:	1.04	.28	.28	3.38	22260

STRUCTURE DATA: R/D-POND (3.0:1 SIDE SLOPES)

RISER-HEAD	POND-BOTTOM-AREA	TOP-AREA(@1'F.B.)	STOR-DEPTH	STORAGE-VOLUME
4.00 FT	4929.9 SQ-FT	10298.3 SQ-FT	4.00 FT	27611 CU-FT

TRIPLE ORIFICE RESTRICTOR:	DIA(INCHES)	HT(FEET)	Q-MAX(CFS)
BOTTOM ORIFICE:	1.82	.00	.180
MIDDLE ORIFICE:	2.16	2.60	.150
TOP ORIFICE:	2.07	3.40	.090

ROUTING DATA:

STAGE(FT)	DISCHARGE(CFS)	STORAGE(CU-FT)	PERM-AREA(SQ-FT)
.00	.00	.0	.0
.40	.06	2044.2	.0
.80	.08	4236.1	.0
1.20	.10	6580.1	.0
1.60	.11	9080.9	.0
2.00	.13	11743.2	.0
2.40	.14	14571.5	.0
2.60	.15	16049.3	.0
2.80	.21	17570.4	.0
3.20	.26	20744.6	.0
3.40	.28	22398.8	.0
3.60	.35	24098.6	.0
4.00	.42	27637.1	.0
4.10	.74	28551.0	.0
4.20	1.32	29476.9	.0
4.30	2.06	30414.7	.0
4.40	2.87	31364.6	.0
4.50	3.16	32326.6	.0

AVERAGE VERTICAL PERMEABILITY: .0 MINUTES/INCH

SPECIFY: F - FILE, N - NEWJOB, P - PRINT IF/OF, R - REVISE, S - STOP
s

APPENDIX D

Transportation Improvements and Technical Data

This appendix only provides replacements of selected original pages of Appendix D - Transportation Improvements and Technical Data. These pages have been updated with new information. This appendix also includes new calculation data sheets. The original report has not been reproduced in its entirety.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Project Alternatives

The eight alternatives analyzed were as follows:

1. No action (two lane) on Issaquah-Fall City Road; "Committed" road network (Fig. 11)

2. Build, three lanes on Issaquah-Fall City Road; "Committed" road network (Fig. 11)

3. Build, four lanes on Issaquah-Fall City Road; "Committed" road network (Fig. 12)

4. Build, five lanes on Issaquah-Fall City Road; "Committed" road network (Fig. 12)

5. No action (two lane) on Issaquah-Fall City Road; "Recommended" road network (Fig. 13)

6. Build, three lanes on Issaquah-Fall City Road; "Recommended" road network (Fig. 13)

7. Build, four lanes on Issaquah-Fall City Road; "Recommended" road network (Fig. 14)

8. Build, five lanes on Issaquah-Fall City Road; "Recommended" road network (Fig. 14)

Roadway Traffic Operations

Alternatives 1 & 2: No build and three lanes on Issaquah-Fall Lake Road, "Committed" road network (figures 11)

The volumes on Issaquah-Fall City Road are projected to increase substantially over 1994 traffic volumes, as the Klahanie MPD reaches completion (estimated year: 1998) immediately adjacent to this project, and further expected development occurs to the east of the project roadway. The projected year 2012 level of service on the project roadway is F, with traffic volumes 66% over capacity in the two lane alternative, and 46% over capacity in the three lane alternative. Near East Lake Sammamish Parkway, traffic volumes are expected to increase by approximately 42% under both two lane and three lane alternatives over 1994 traffic volumes.

Issaquah-Pine Lake Road is expected to show substantial growth in traffic by the year 2012, partly due to the direct connection to the South Access roadway. Traffic is expected to increase significantly south of the Klahanie development entrance, with increases of 78% under both two lane and three lane alternatives over 1994 traffic volumes. The LOS is expected to be F in both alternatives. Traffic volumes near 228th Avenue Southeast are expected to increase by 54% under both two lane and three lane alternatives over 1994 traffic volumes, also with a LOS of F.

Conditions are expected to be good on Southeast 43rd Way, which will have a LOS of A in spite of a 40% traffic volume increase over 1994 traffic counts under both two lane and three lane alternatives near East Lake Sammamish Parkway.

228th Avenue Southeast will continue to operate acceptably, with a LOS of B/C, even with traffic volumes north of Issaquah Pine-Lake Road expected to increase by approximately 48% under both two and three lane alternatives over 1994 traffic volumes.

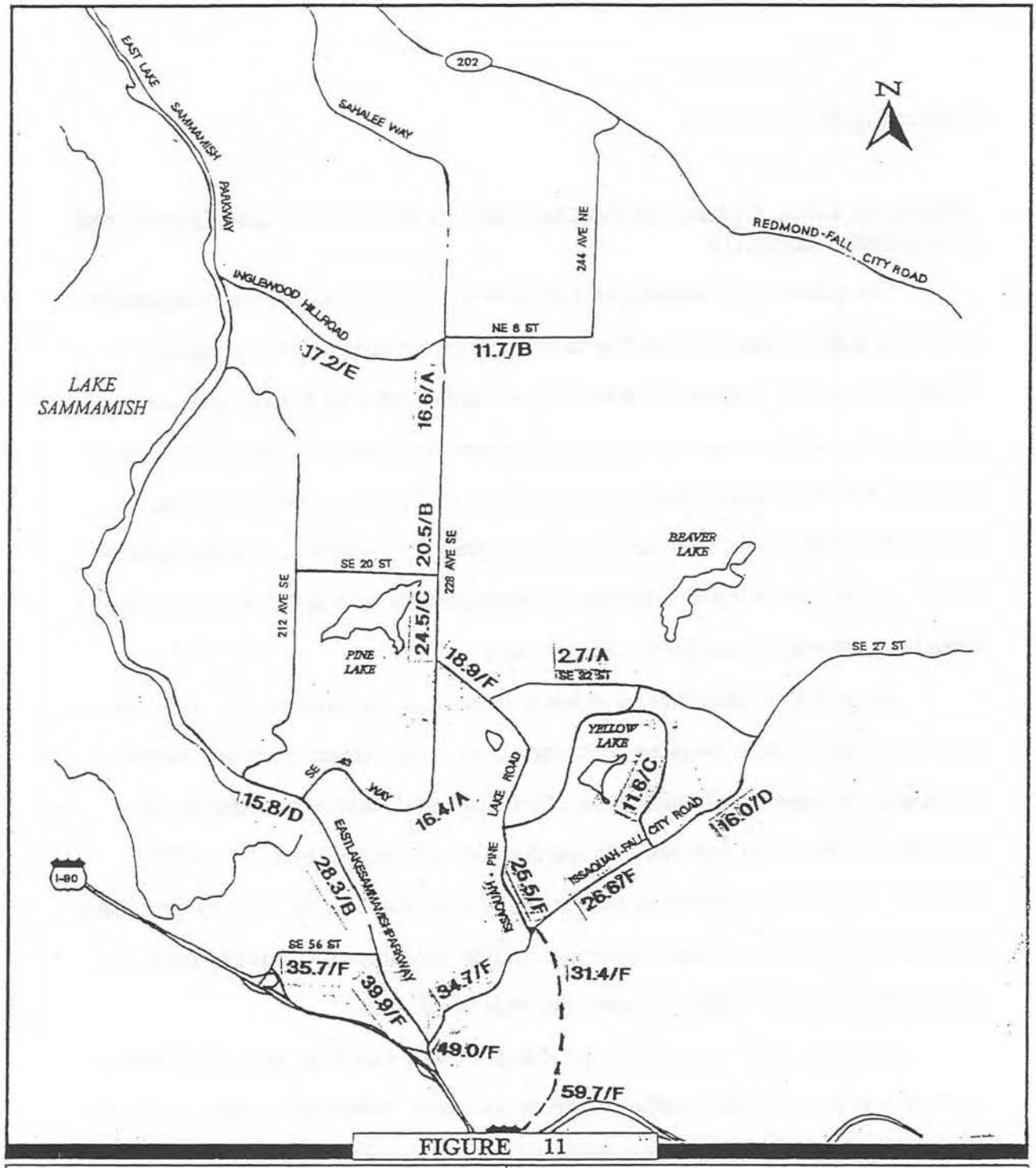


FIGURE 11

Issaquah Fall City Road Widening Project	LEGEND
Eastern Klahanie entrance to Issaquah Pine Lake Road	xx.x Daily Traffic Volumes in 1000's
June 1995	/x Roadway Level-of-Service

Year 2012 Traffic Volumes and Levels-of-Service: No-Build, (two-lane), Build, (three-lane), with Committed Roadway System

KING COUNTY ROADS DIVISION TRANSPORTATION PLANNING SECTION

The South Access roadway is expected to operate at LOS F in both alternatives, operating approximately 8% over capacity in the northern portion of the roadway. The southern portion of the roadway is also at LOS F. Additional analysis of this roadway may be required to determine adequate mitigation of future traffic conditions.

Alternatives 3 & 4: Build, four and five lanes on Issaquah-Fall City Road, "Committed" road network (figures 12)

Under these alternatives, Issaquah-Fall City Road traffic volumes are approximately 27% higher than the two lane and three lane alternatives. The LOS remains at F with traffic volumes 17% over capacity in the four lane alternative, and 4% over capacity in the five lane alternative. Traffic volumes on the project roadway are expected to increase substantially from 1994 to 2012 (approximately 200%) while the capacity increase is moderate (61% and 81% under four and five lane alternatives, respectively). The resulting capacity increase does not meet the expected future traffic demand, under either alternative.

The high level of congestion under all of the "Committed" alternatives is due to the lack of optional routes which are as convenient in terms of distance and travel time as the project roadway. The five lane alternative is only slightly over capacity (4%), and has the best chance of mitigation to improve to an acceptable condition. In addition, the northern portion of the South Access roadway may have a chance to be mitigated to an acceptable LOS, depending on the level of site roadway access, turn movements and intersection operational improvements. Final improvements needed for the South Access roadway, however, will be determined by additional traffic analysis. Operational improvements and more detailed capacity analysis will determine ultimate mitigation for this roadway.

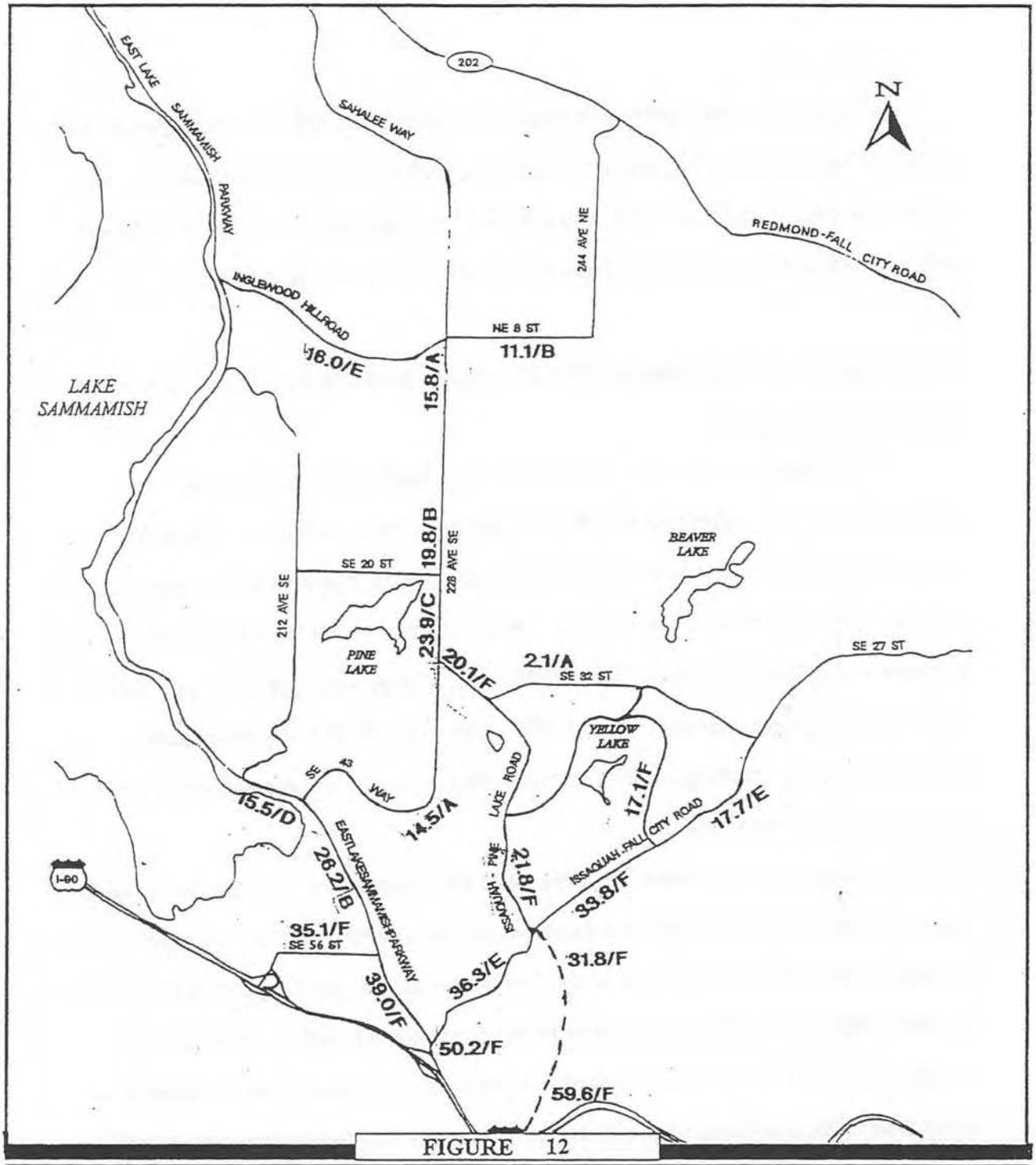


FIGURE 12

Issaquah Fall City Road Widening Project

Eastern Klahanie entrance to
Issaquah Pine Lake Road

June 1995

LEGEND

xx.x Daily Traffic Volumes in 1000's

/x Roadway Level-of-Service

Year 2012 Traffic Volumes and Levels-of-Service: Build, (four/five lane), with Committed Roadway System

KING COUNTY ROADS DIVISION TRANSPORTATION PLANNING SECTION

Alternatives 5 and 6: No-build and Build three lanes on Issaquah-Fall City Road, "Recommended" road network(figure 13)

In order for both Issaquah-Pine Lake Road and Issaquah-Fall City road to operate at an acceptable LOS, both roadways need to be either four lanes plus turn channels or five lanes (four through lanes plus a two-way center turn lane). The following represents our analysis of the various Issaquah-Fall City Road alternatives with Issaquah-Pine Lake Road at five lanes.

Alternatives five through eight have the same road network as alternatives one through four, respectively, plus Issaquah-Pine Lake Road at five lanes.

For the two and three lane alternatives, volumes on Issaquah-Fall City Road are projected to be approximately 27% lower than in the Committed alternatives. This reduction in traffic volumes is due to a shift to Issaquah-Pine Lake Road, as traffic diverts from Issaquah-Fall City Road. In addition, the improved Issaquah-Pine Lake Road facilitates a greater flow from the central and south parts of the plateau towards the new South Access road. The project roadway's projected level of service, however, remains at F, with traffic volumes 31% over capacity in the two lane alternative, and 15% over capacity in the three lane alternative.

Issaquah-Pine Lake Road is expected to show a substantial increase in traffic volumes over 1994 traffic volumes, as well as higher traffic volumes than under the Committed alternatives. This increase in traffic volume is due to it's added capacity. Under both two lane and three lane Recommended alternatives, traffic volumes are expected to increase by 39% near 228 Avenue Southeast and by 44% near Issaquah-Fall City Road over the Committed alternatives. The level of service near 228th Avenue Southeast is expected to improve over the Committed alternatives from F to D under both Recommended two and three lane alternatives. The level of service near Issaquah-Fall City Road remains at F under both the Recommended two and three lane alternatives.

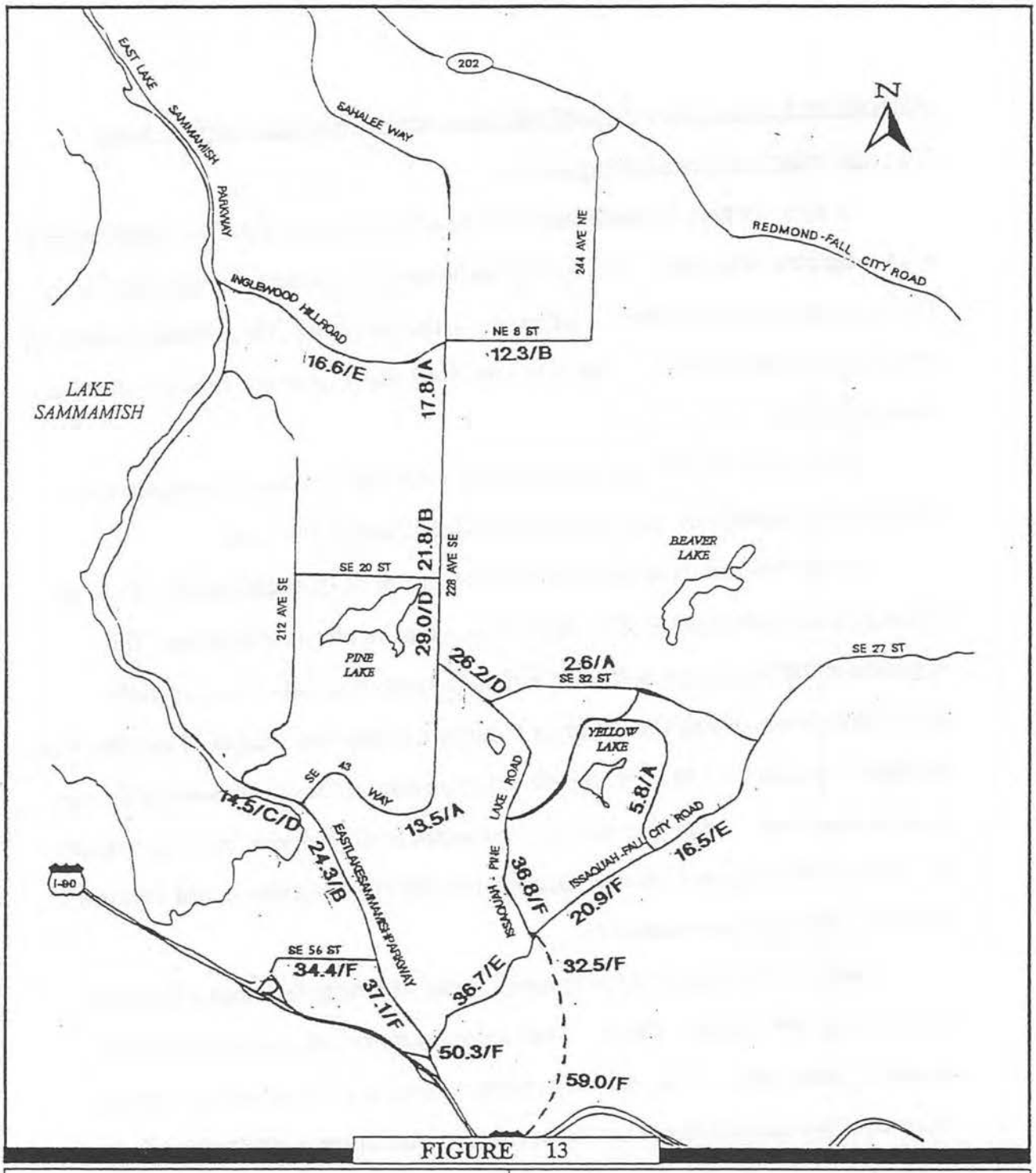


FIGURE 13

Issaquah Fall City Road Widening Project

Eastern Klahanie entrance to
Issaquah Pine Lake Road

June 1995

LEGEND

xx.x Daily Traffic Volumes in 1000's

/x Roadway Level-of-Service

Year 2012 Traffic Volumes and Levels-of-Service: No-Build, (two-lane), Build, (three-lane), with Recommended Roadway System

KING COUNTY ROADS DIVISION TRANSPORTATION PLANNING SECTION

Southeast 43rd Way is expected to have a decrease in traffic volumes over both Committed two and three lane alternatives. This is due to diversion of traffic from Southeast 43rd Way to use the improved Issaquah-Pine Lake Road to get to I-90 via the new South Access roadway.

228th Avenue Southeast traffic volumes are expected to increase by 18% over both Committed two and three lane alternatives.

Alternatives 7 and 8: Four and five lanes on Issaquah-Fall City Road, "Recommended" road network(figure 14)

Under alternatives seven and eight conditions on the project roadway are good, with traffic volumes on Issaquah-Fall City Road expected to be approximately 18% lower than the Committed four and five lane alternatives. Both of these alternatives function at an adequate LOS, and are the only alternatives analyzed in this report which do so. The LOS is D under both alternatives, compared to a LOS of F in all other alternatives analyzed in this report. Under these alternatives, Issaquah-Pine Lake Road operates at LOS C near 228th Avenue Southeast and at LOS E near Issaquah-Fall City Road. It should be noted that, like Issaquah-Fall City Road, the southern portion of Issaquah-Pine Lake Road has an acceptable LOS under these alternatives compared to a LOS of F on all other alternatives analyzed on this report. Additional improvements such as longer intersection turn channel pockets, adjustments to signal timing at intersections and other improvements may improve conditions further. The lower congestion level for the four and five lane alternatives would be expected to result in improved safety conditions, since accident numbers tend to rise with increased congestion.

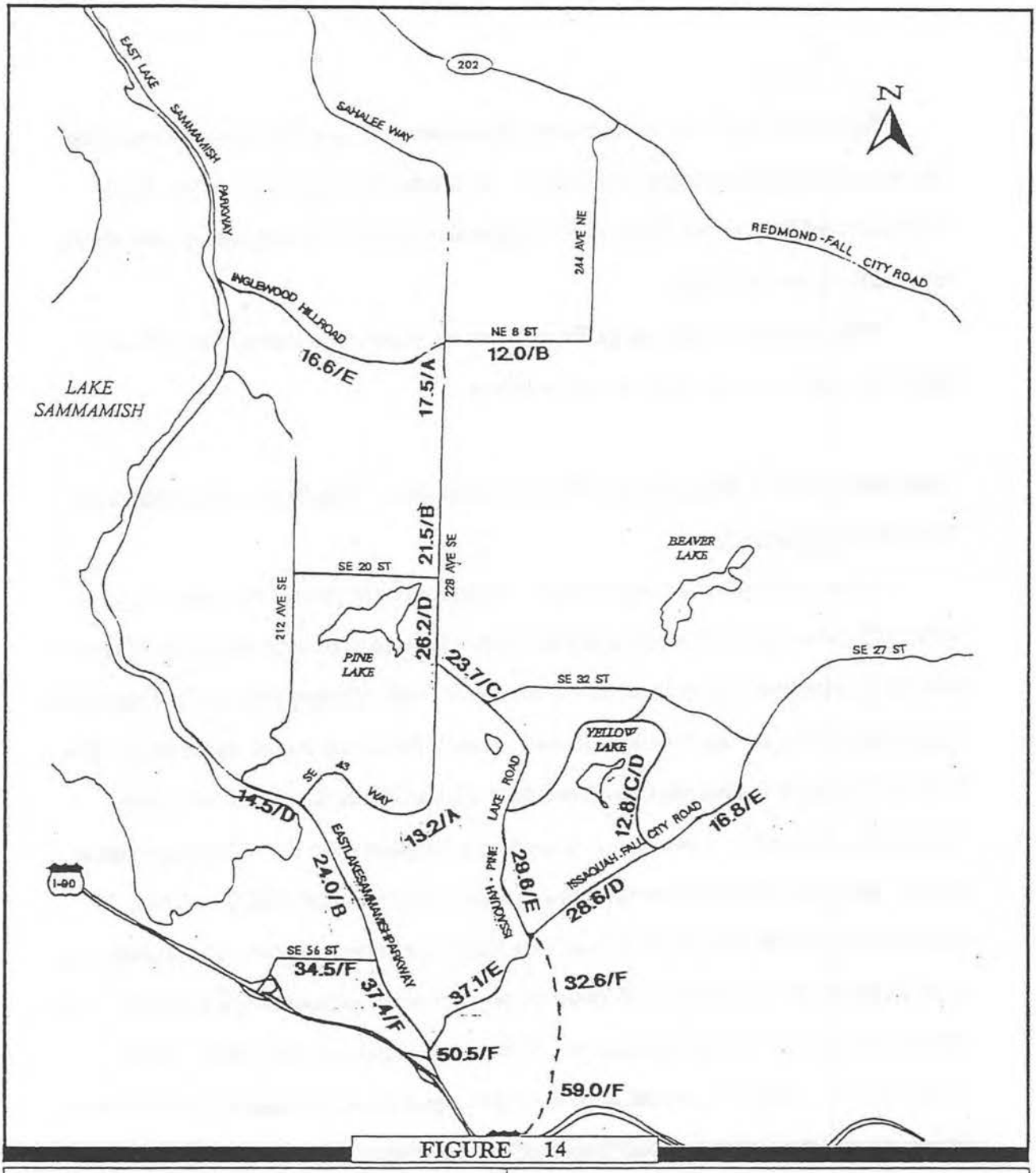


FIGURE 14

Issaquah Fall City Road Widening Project	LEGEND
Eastern Klahanie entrance to Issaquah Pine Lake Road	xx.x Daily Traffic Volumes in 1000's
June 1995	/x Roadway Level-of-Service

Year 2012 Traffic Volumes and Levels-of-Service: Build, (four /five lane), with Recommended Roadway System

KING COUNTY ROADS DIVISION TRANSPORTATION PLANNING SECTION

Intersection Traffic Operations

The intersection analysis discussion that follows is based on a "planning" level analysis. It is intended to show general results and point out major intersection concerns that need to be examined further. The next step is to perform an "operational" analysis. This is a more complete and detailed level of analysis, and is discussed in the main body of the EIS text, under the "Transportation" chapter.

A summary of planning level results for intersection levels of service at key intersections is shown in Table 7. Both of these intersections shown are on the project roadway.

At a planning level, Issaquah-Fall City Road at Southeast Klahanie Blvd. operates over capacity in all Committed alternatives, near capacity in the two and three lane Recommended alternatives, but over capacity in the four and five lane Recommended alternatives. It should be noted that the addition of a second left turn lane eastbound improves the four and five lane Recommended alternatives to near capacity, but the same improvement to the four and five lane Committed alternatives does not improve them.

Issaquah Fall-City Road at 247th Pl. SE operates over capacity under all Committed alternatives but operates near capacity under all Recommended alternatives.

The planning level analysis just discussed is a broad analysis intended to show patterns of congestion. It should be noted however, that intersection operations along Issaquah-Fall City Road are unique.

Analysis results show that for this project, it is the link that is the determining factor for the number of lanes needed, not the intersections.

Roadway capacity analysis using the 1985 Highway Capacity Manual was performed. This analysis confirmed that the roadway volumes for the three lane alternative exceeded the maximum theoretical traffic flow for this roadway. Therefore, intersection analysis of this alternative was not necessary. Forecasted traffic volumes for the four and five lane alternatives, however, did not exceed the maximum theoretical

Issaquah-Fall City Road
Intersection Level-of-Service Summary
(PM peak Hour)

	Intersection Location	Capacity Level	YEAR 2012 "Committed" Road Network		YEAR 2012 "Recommended" Road Network *	
		1994	2/3 LANES	4/5 LANES	2/3 LANES	4/5 LANES
1	Iss. F.C.R. @ Klahanie Boulevard	UNDER	OVER	OVER	NEAR	OVER**
2	Iss. F.C.R. @ 247 Pl. SE.	UNDER	OVER	OVER	NEAR	NEAR

Source: King County Roads Division, Transportation Planning Section, June 1995.

Includes the South Access Roadway From I-90/Sunset Interchange to the Intersection of Issaquah-Fall City Road and Issaquah-Pine Lake Road.

* = Issaquah-Pine Lake Road improvement includes widening the roadway to five lanes.

** = Addition of a second left turn lane eastbound improves this alternative to "NEAR".

capacity for this roadway; therefore meaningful intersection analysis was possible.

The conclusion reached was that four/five lane roadway from Issaquah-Pine lake Road to Klahanie Boulevard would accommodate year 2012 traffic volumes.

Traffic Safety

Since increasing congestion directly relates to increased accident rates, increased 2012 volumes in the study area indicate that traffic safety would be expected to decline. In general, the Build alternatives would be expected to promote better safety conditions than the other alternatives, due to lower overall congestion levels(levels-of-service). In addition, sidewalks, illumination, adequate lane widths and proper signalization along the project length combined with other roadway improvements in the area could also help to improve safety and keep accident rates from deteriorating, in spite of increased growth in the area.

Public Transportation

METRO bases it's transit-related decisions on demand in an area. With the growth expected in the study area, METRO is planning to implement changes in routing to meet expected needs. Route 269 replaces route 268, which was a peak directional-only route connecting the Plateau area with both the Bear Creek and Issaquah Park and Rides. It changed the old route 268 by serving the south portion of the Plateau via Issaquah-Pine Lake Road and Vaughn Hill Road, instead of using Southeast 43rd Way, and by providing two-direction peak shuttle service. In addition, route 927 is proposed to be an all day, dial-a-ride service for the southern portion of the plateau. This is to be a test route for low-density areas with limited bus service.

Non-motorized Facilities

The Issaquah-Fall City Road widening project will provide a class-II bicycle facility, plus curbs, gutters, sidewalks, and a class II bicycle facility on the north side, and a paved six foot wide shoulder and a four foot wide pathway on the south side. This will help to improve safety and access on the current network of non-motorized facilities in the area, particularly since these roadways are increasingly busy arterials with pedestrian traffic traveling on unimproved shoulders.

MITIGATING MEASURES

Traffic Operations

Improvements in addition to those discussed in this report may be required to alleviate year 2012 capacity deficiencies occurring with the no-build or build alternatives. The East Sammamish Community Plan was adopted in May, 1993. It guides decisions on issues such as land use and transportation. Transportation recommendations in the plan, as well as area zoning, efforts towards increased transit service, transportation demand management(TDM) and other transportation-related improvements will be implemented within the life of the plan (typically 6-10 years), and will continue to have significant effects afterwards. These efforts may also involve additional improvements such as added signalization or channelization of intersections, longer turn channel pockets, or construction of roadways besides those in the "Committed", or "Recommended" road networks. Other improvements may be required with the build alternatives, while others would be needed as a result of a change in the traffic distribution resulting from a specific alternative. King County will continue the present program of annual monitoring of East Sammamish area traffic volumes and accident records. This data will enable King County to develop the necessary projects to maintain acceptable traffic operation in the area.

Proposed alignments for the Issaquah-Fall City Road widening project may cause temporary disruption of local access. During project construction, access to all properties abutting the project right-of-way would be maintained where feasible by construction staging. Property owners would be given adequate advance notice of the timing and duration of disruption to local access.

Some study area roads and intersections would be near or over capacity in the year 2012 even with the improvements described in this report. King County monitors traffic growth in study area roads on a systematic basis. The continued surveillance of traffic growth along with the continued identification of future transportation system improvements will help to ensure that the existing level of traffic operations will continue and be the basis for the planning and implementation of traffic improvements in the East Sammamish area.

During project construction, traffic disruption and accident potential would be minimized through strict adherence to construction contract provisions for traffic control through the work area. Construction would be prohibited during nighttime hours and may be limited during peak traffic periods. Provisions would be made for safe pedestrian and bicycle travel through the construction area.

UNAVOIDABLE ADVERSE IMPACTS

No unavoidable adverse transportation system impacts have been identified.

OPERATION ANALYSIS

Issaquah Fall City Road
Assumptions

Signalized Intersections		
Peak Hour Factor	0.90	
Yellow + Red Time	5.0 Sec	
Ideal Saturation Flow Rate	1900 vph	
Percent Trucks	2%	
Arrival Type	3	(random arrivals)
Actuated Signal	Yes	
Cycle Length	60 Sec	(existing)
	120 Sec	(future)
Link Analysis		
Percent Trucks	2%	
Free Flow Speed	50 mph	
Peak Hour Factor	0.90	
Directional Split	60/40	(east of 247th Place)
	70/30	(west of 247th Place)
Lane Width	11 Feet	
Shoulder Width	6 Feet	
Percent No Passing Zones	100%	
Access Points Per Mile	16	(eastbound west of 247th Place SE)
	16	(westbound west of 247th Place SE)
	7	(eastbound east of 247th Place SE)
	0	(westbound east of 247th Place SE)
Median Type	Divided	

1994 Highway Capacity Software used for analysis:

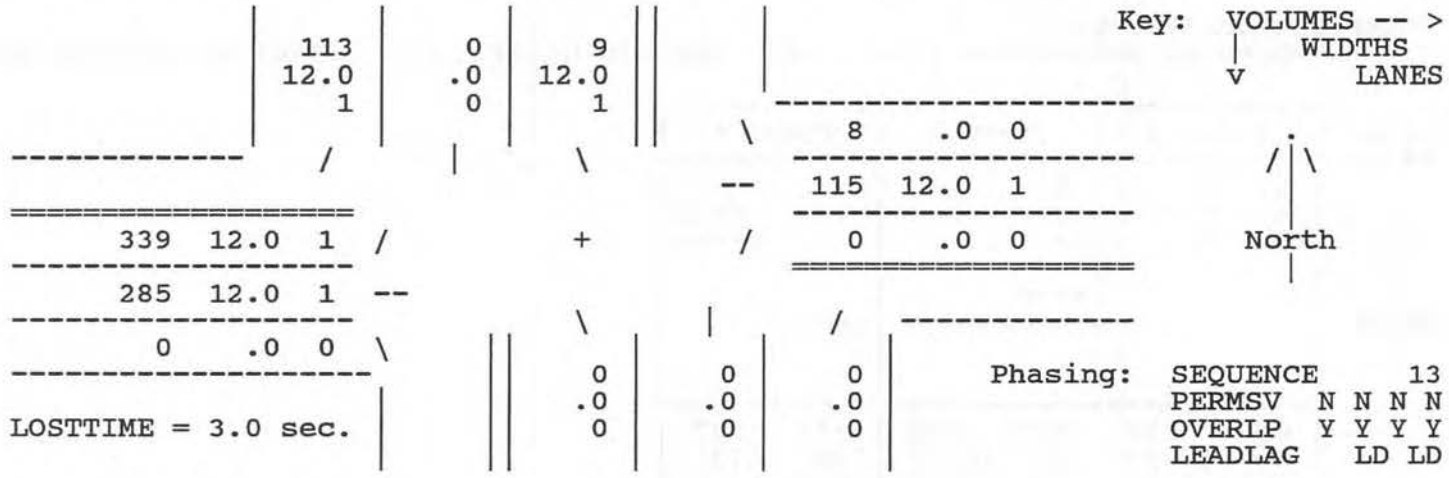
Four-lane multilane highway with divided medians was used for five-lane analysis.

Two-lane rural highway was used for three-lane analysis.

LOS Calculations

ISSAQUAH FALL CITY/KLAHANIE DRIVE 01/15/96
JJH IFC252 (1) 08:35:02
1994 EXISTING PM PEAK

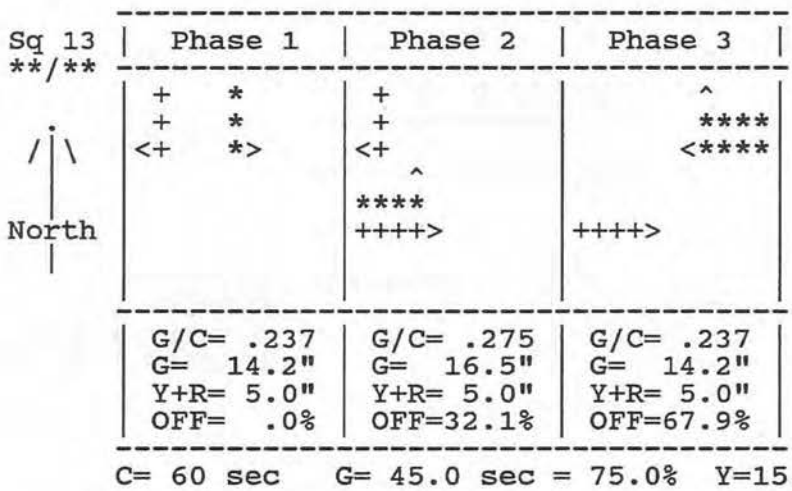
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY/KLAHANIE DRIVE 01/15/96
JJH IFC252 (1) 08:35:06
1994 EXISTING PM PEAK

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .42 Vehicle Delay 8.7 Level of Service B+

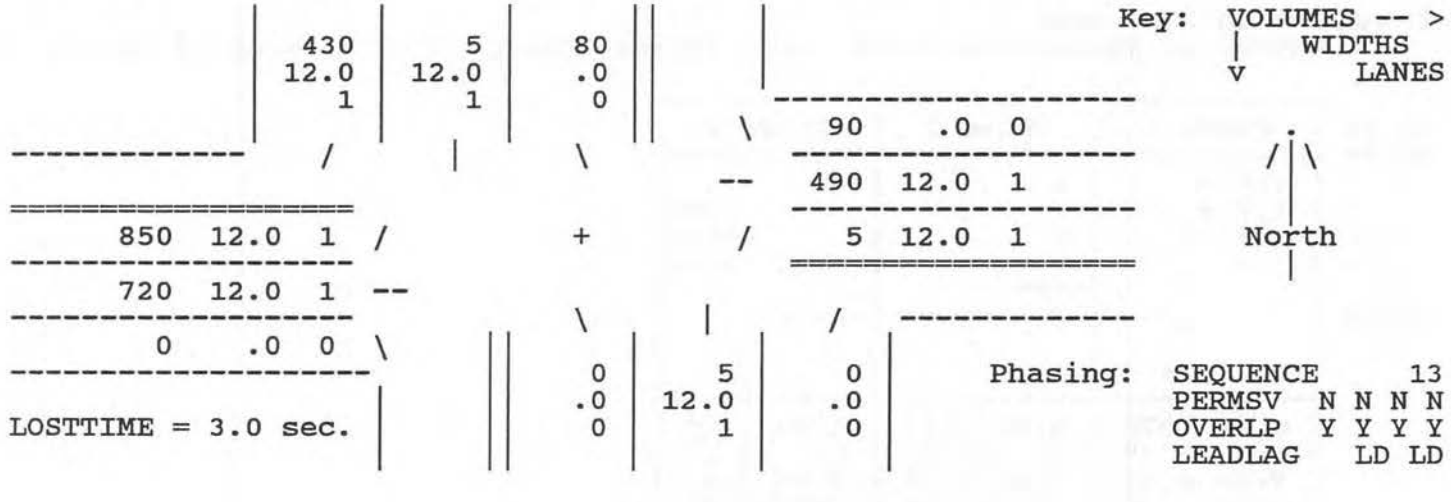


C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								3.5	A	
RT	12/1	.115	.629	950	969	126	.130	2.9	A	39 ft
LT	12/1	.015	.271	359	416	10	.024	10.4	*B	25 ft
WB Approach								11.4	B	
TH+RT	12/1	.114	.271	390	448	137	.306	11.4	*B	84 ft
EB Approach								9.3	B+	
TH	12/1	.204	.629	1160	1172	317	.270	3.2	A	99 ft
LT	12/1	.247	.309	489	546	377	.690	14.3	*B	220 ft

ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (225) 08:51:29
2012 3-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

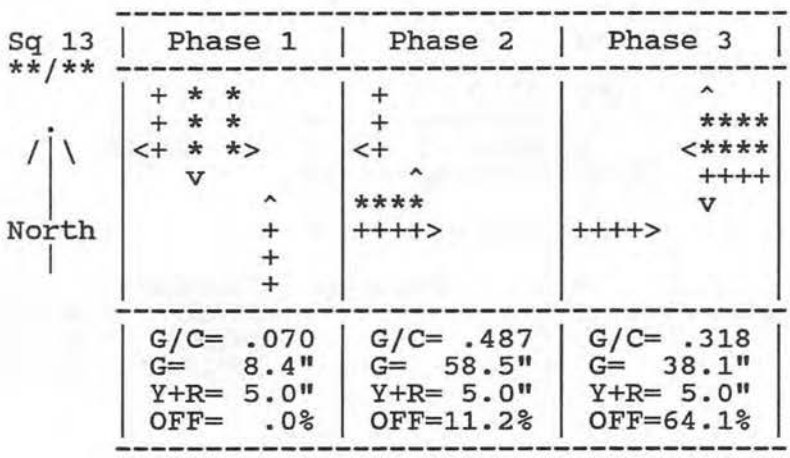
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (225) 08:51:35
2012 3-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .80 Vehicle Delay 37.6 Level of Service D

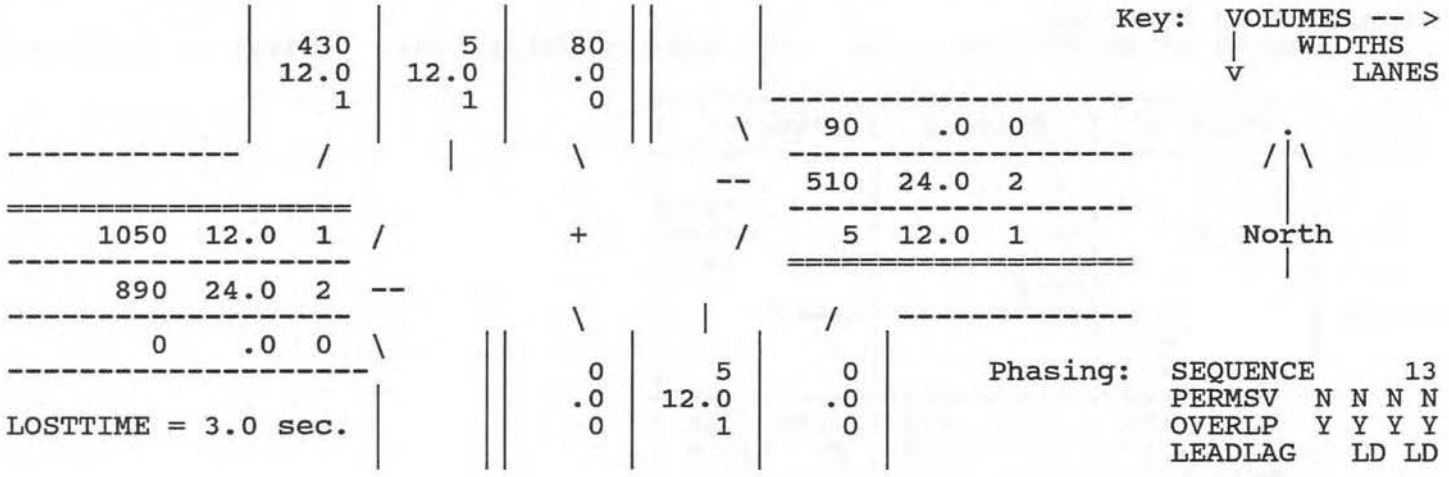


C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								13.8	B	
RT	12/1	.389	.616	913	975	478	.490	8.5	B+	310 ft
LT+TH	12/1	.220	.087	1	129	95	.638	40.2	*E+	146 ft
NB Approach								32.4	D+	
TH	12/1	.198	.087	1	141	6	.037	32.4	D+	25 ft
WB Approach								71.2	F	
TH+RT	12/1	.427	.334	428	608	644	1.059	71.7	*F	723 ft
LT	12/1	.206	.334	39	65	6	.079	17.6	C+	25 ft
EB Approach								32.9	D	
TH	12/1	.488	.863	1608	1608	800	.498	1.5	A	184 ft
LT	12/1	.576	.504	793	892	944	1.058	59.5	*E	790 ft

ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (281) 08:52:32
2012 5-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters

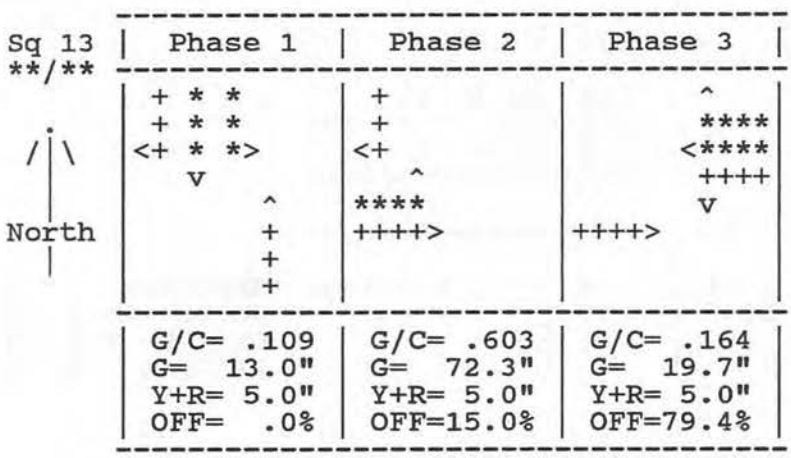


ISSAQUAH FALL CITY ROAD
CFC 20COMMIT (281)
2012 5-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

01/15/96
08:52:39

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .74 Vehicle Delay 36.1 Level of Service D



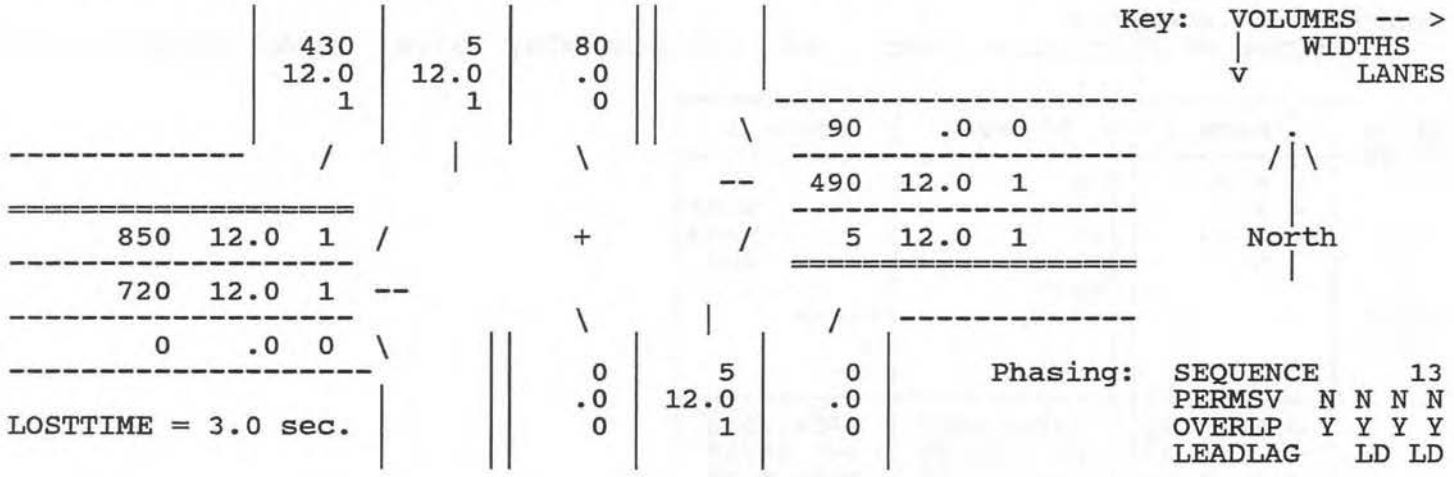
C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								7.9	B+	
RT	12/1	.389	.769	1199	1218	478	.392	3.1	A	186 ft
LT+TH	12/1	.220	.125	1	197	95	.440	32.3	*D+	140 ft
NB Approach								29.8	D+	
TH	12/1	.198	.125	1	214	6	.026	29.8	D+	25 ft
WB Approach								78.3	F	
TH+RT	24/2	.293	.181	1	657	700	1.065	78.8	*F	484 ft
LT	12/1	.204	.181	1	49	6	.097	26.5	D+	25 ft
EB Approach								29.9	D+	
TH	24/2	.352	.825	3073	3073	1038	.338	1.7	A	153 ft
LT	12/1	.683	.619	1036	1096	1167	1.065	55.0	*E	749 ft

ISSAQUAH FALL CITY ROAD
CFC 20COMMIT (169)
2012 NO ACTION PM - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

01/15/96
08:49:55

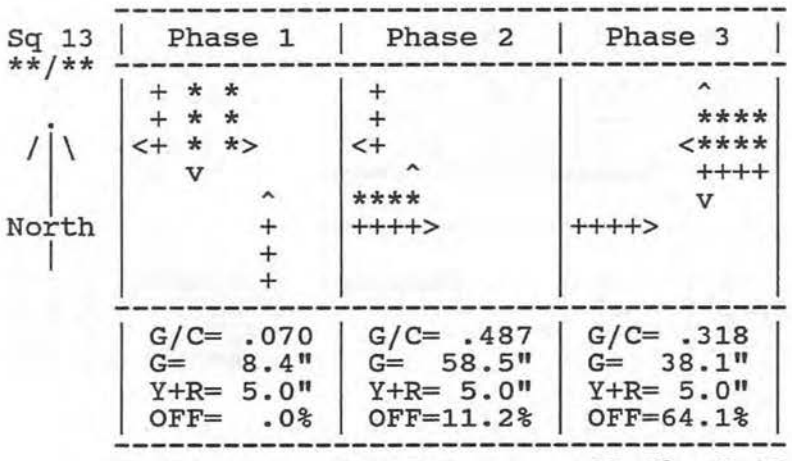
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (169) 08:50:01
2012 NO ACTION PM - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .80 Vehicle Delay 37.6 Level of Service D

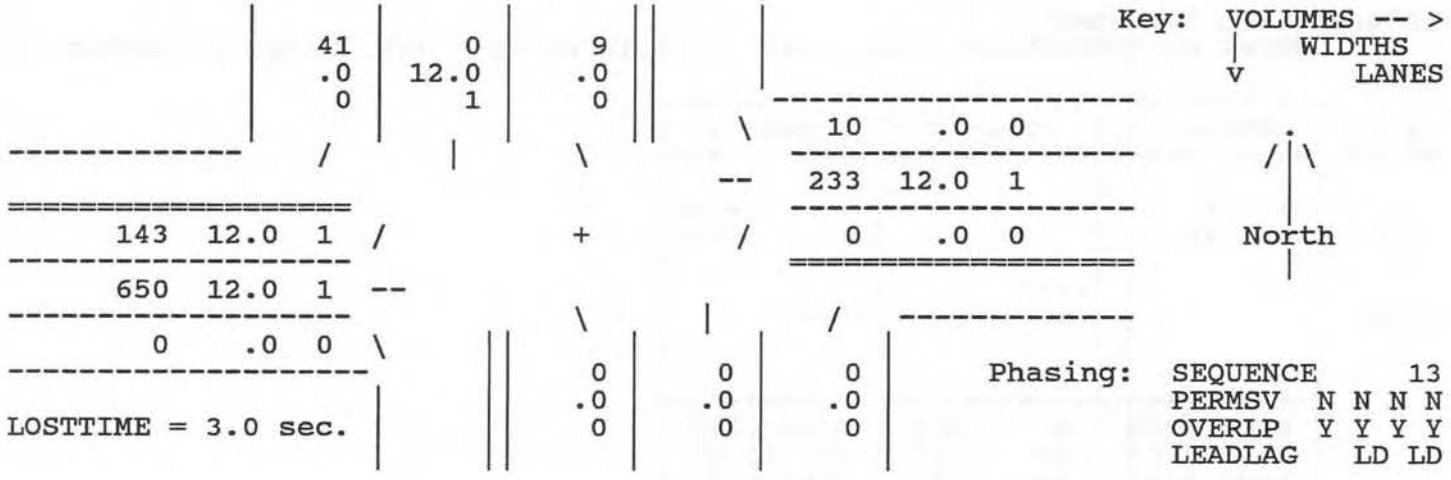


C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								13.8	B	
RT	12/1	.389	.616	913	975	478	.490	8.5	B+	310 ft
LT+TH	12/1	.220	.087	1	129	95	.638	40.2	*E+	146 ft
NB Approach								32.4	D+	
TH	12/1	.198	.087	1	141	6	.037	32.4	D+	25 ft
WB Approach								71.2	F	
TH+RT	12/1	.427	.334	428	608	644	1.059	71.7	*F	723 ft
LT	12/1	.206	.334	39	65	6	.079	17.6	C+	25 ft
EB Approach								32.9	D	
TH	12/1	.488	.863	1608	1608	800	.498	1.5	A	184 ft
LT	12/1	.576	.504	793	892	944	1.058	59.5	*E	790 ft

ISSAQUAH FALL CITY/247TH DRIVE SE 01/15/96
JJH IFC247 (281) 08:53:46
1994 EXISTING PM PEAK

SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters

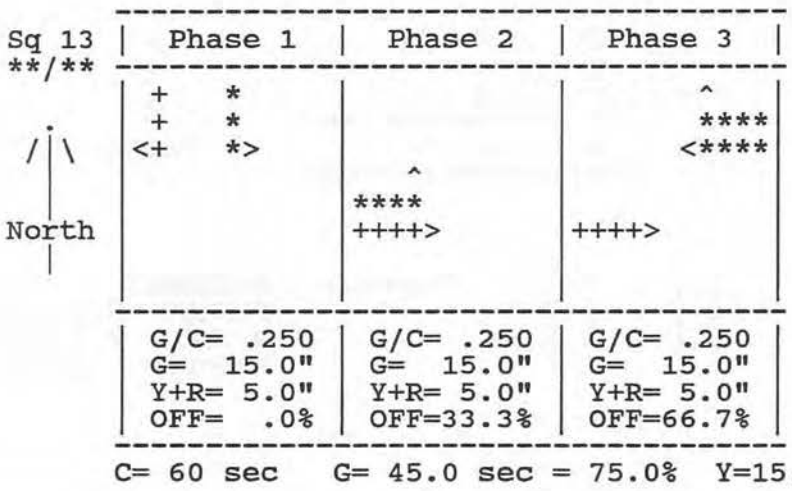


ISSAQUAH FALL CITY/247TH DRIVE SE
JJH IFC247 (281)
1994 EXISTING PM PEAK

01/15/96
08:53:51

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .55 Vehicle Delay 8.1 Level of Service B+

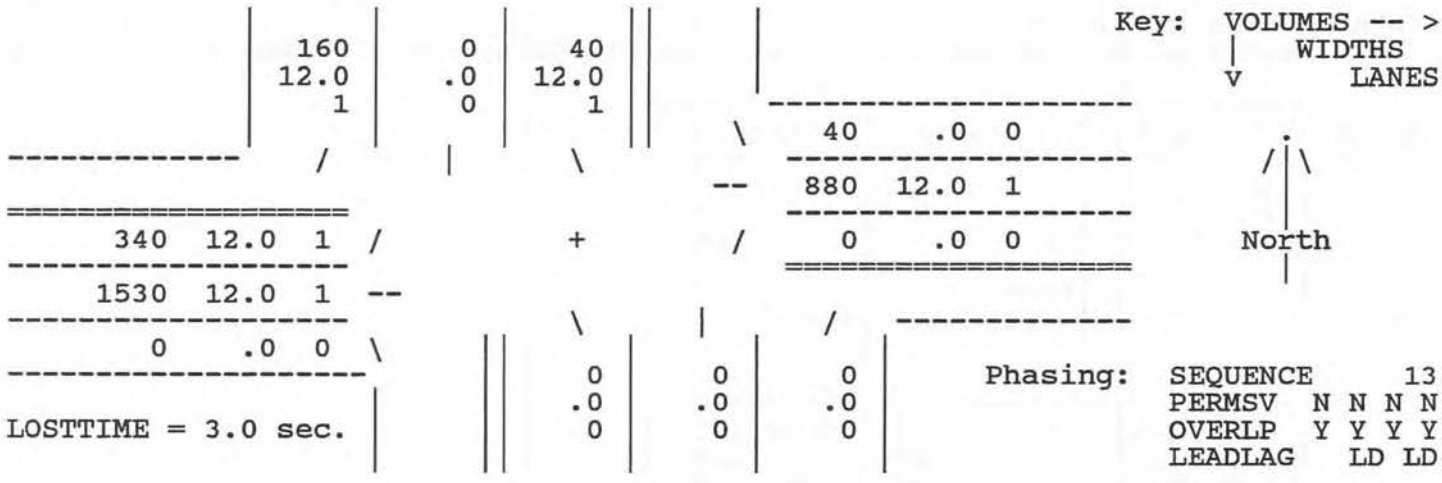


C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								10.4	B	
LT+TH+RT	12/1	.073	.283	301	354	56	.158	10.4	B	34 ft
WB Approach								13.1	B	
TH+RT	12/1	.199	.283	414	472	270	.572	13.1	*B	163 ft
EB Approach								6.5	B+	
TH	12/1	.413	.617	1135	1149	722	.628	5.4	B+	233 ft
LT	12/1	.121	.283	442	501	159	.317	11.1	*B	96 ft

ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (393) 08:57:00
2012 3-LANE PM PEAK - ISS. FALL CITY/247TH PLACE SE COMMITTED

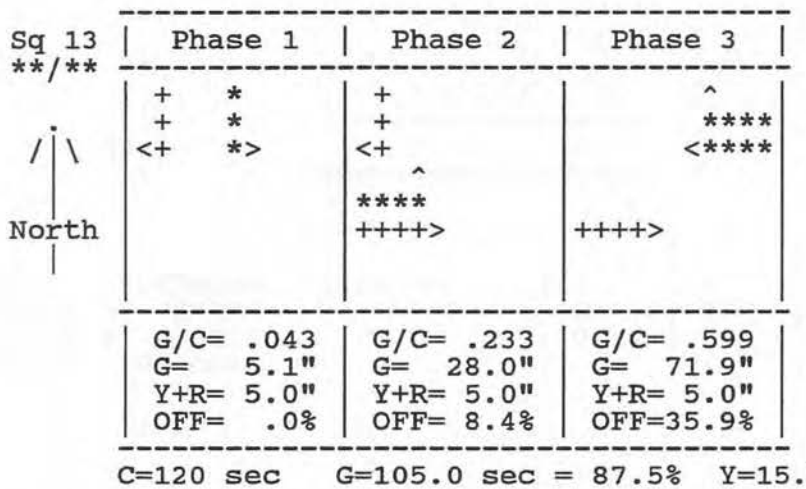
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (393) 08:57:05
2012 3-LANE PM PEAK - ISS. FALL CITY/247TH PLACE SE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .95 Vehicle Delay 30.8 Level of Service D+



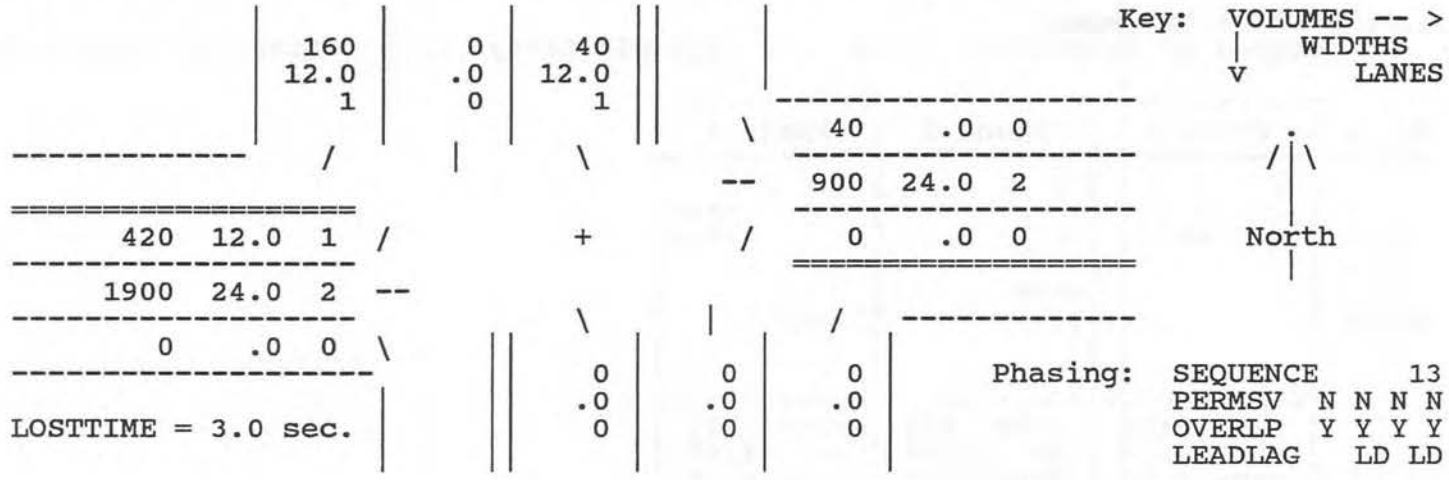
C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								22.9	C	
RT	12/1	.252	.334	366	529	178	.336	19.5	C+	200 ft
LT	12/1	.207	.059	1	86	44	.419	36.8	*D	70 ft
WB Approach								35.5	D	
TH+RT	12/1	.646	.616	965	1026	1022	.996	35.5	*D	662 ft
EB Approach								29.3	D+	
TH	12/1	.897	.891	1659	1659	1700	1.025	27.3	D+	313 ft
LT	12/1	.319	.250	195	439	378	.855	38.3	*D	478 ft

ISSAQUAH FALL CITY ROAD
CFC 20COMMIT (449)
2012 5-LANE PM PEAK - ISS. FALL CITY/247TH PLACE SE COMMITTED

01/15/96
08:58:17

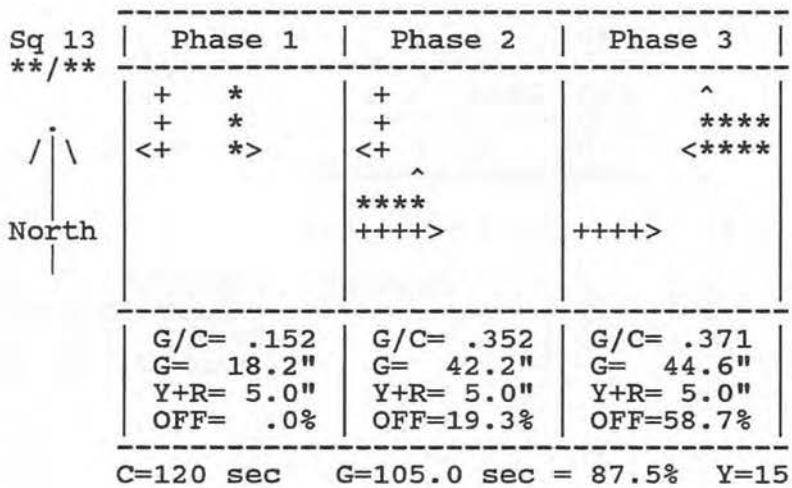
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (449) 08:58:23
2012 5-LANE PM PEAK - ISS. FALL CITY/247TH PLACE SE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .72 Vehicle Delay 12.6 Level of Service B

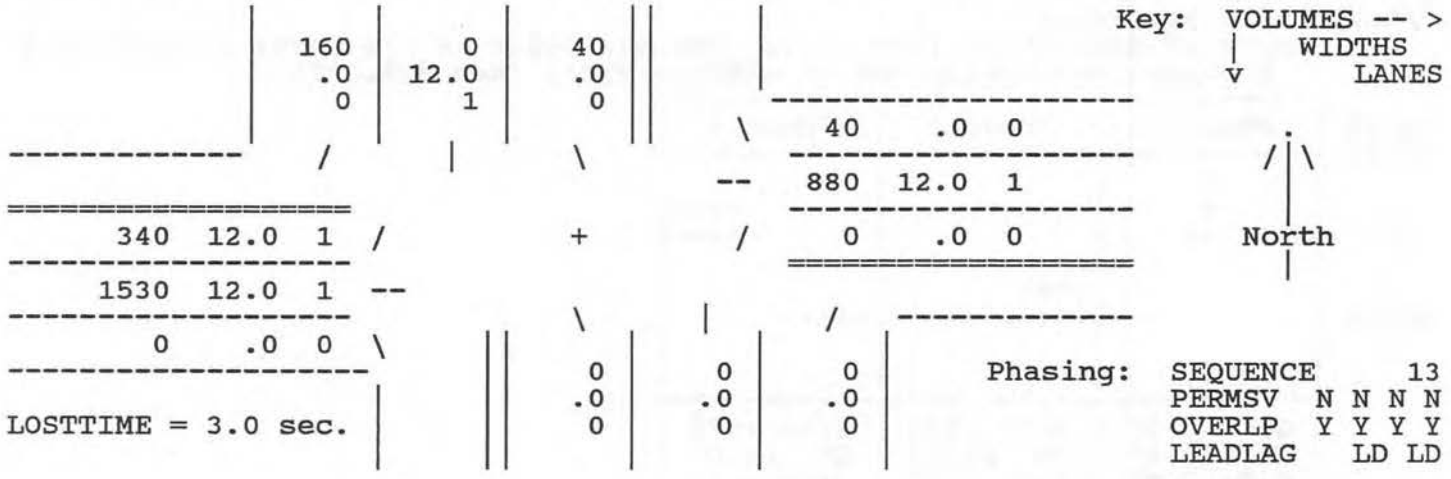


C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								12.2	B	
RT	12/1	.252	.562	813	890	178	.200	8.4	B+	132 ft
LT	12/1	.207	.168	1	283	44	.148	27.5	*D+	62 ft
WB Approach								22.4	C	
TH+RT	24/2	.364	.388	1214	1437	1096	.763	22.4	*C	566 ft
EB Approach								8.6	B+	
TH	24/2	.609	.782	2912	2912	2217	.761	5.4	B+	408 ft
LT	12/1	.357	.369	495	652	467	.716	23.6	*C	497 ft

ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (337) 08:55:56
2012 NO ACTION PM - ISS. FALL CITY/247TH PLACE SE COMMITTED

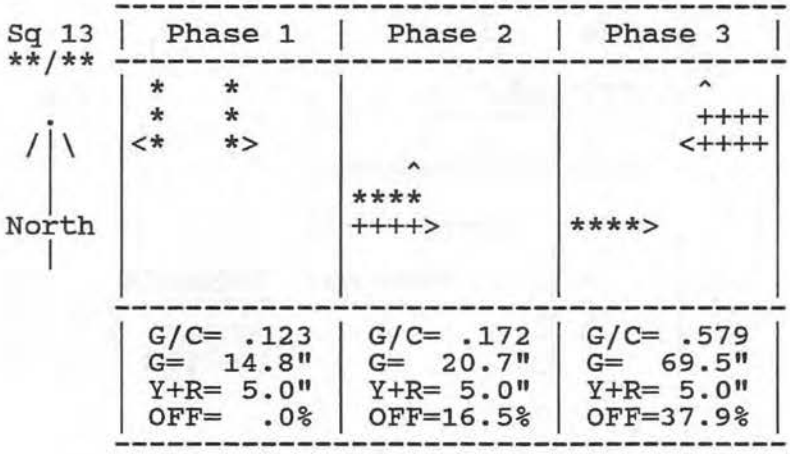
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (337) 08:56:04
2012 NO ACTION PM - ISS. FALL CITY/247TH PLACE SE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) 1.10 Vehicle Delay 67.7@ Level of Service F
@ expect more delay due to extreme v/c's (see EVALUATE)



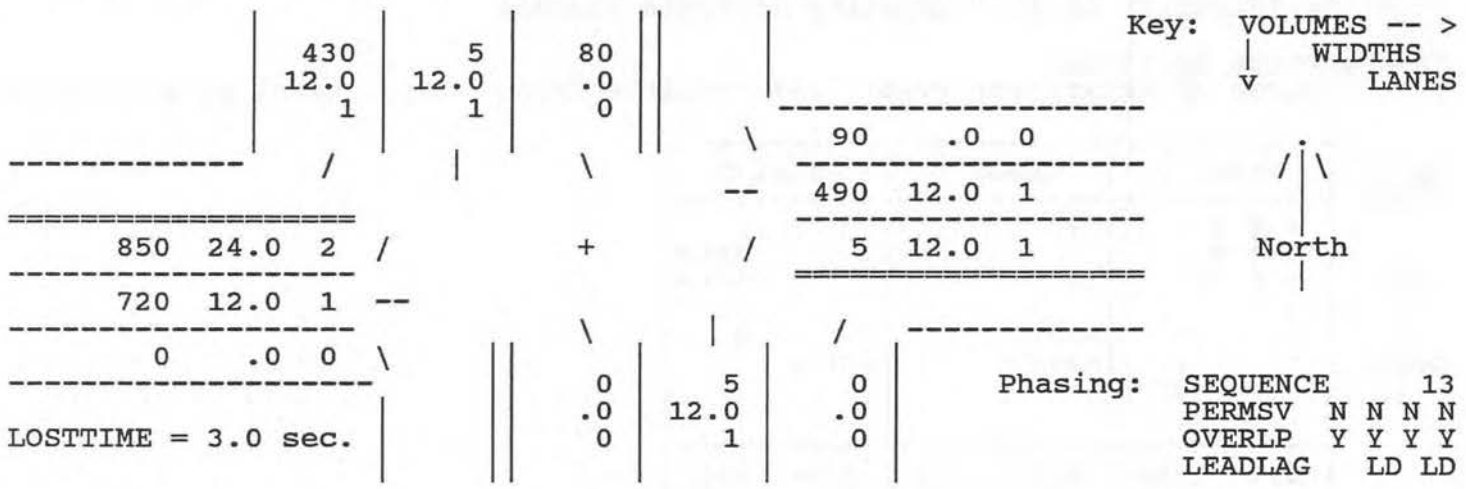
C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								125.6@	F	
LT+TH+RT	12/1	.283	.140	1	178	222	1.133	125.6@	*F	322 ft
WB Approach								45.2	E+	
TH+RT	12/1	.646	.596	925	993	1022	1.029	45.2	E+	696 ft
EB Approach								72.6@	F	
TH	12/1	.897	.810	1508	1509	1700	1.127	64.3@	*F	545 ft
LT	12/1	.319	.189	1	322	378	1.132	109.9@	*F	517 ft

Mitigated LOS Calculations

ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (617) (DUAL EB LEFTS) 15:09:05
2012 3-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

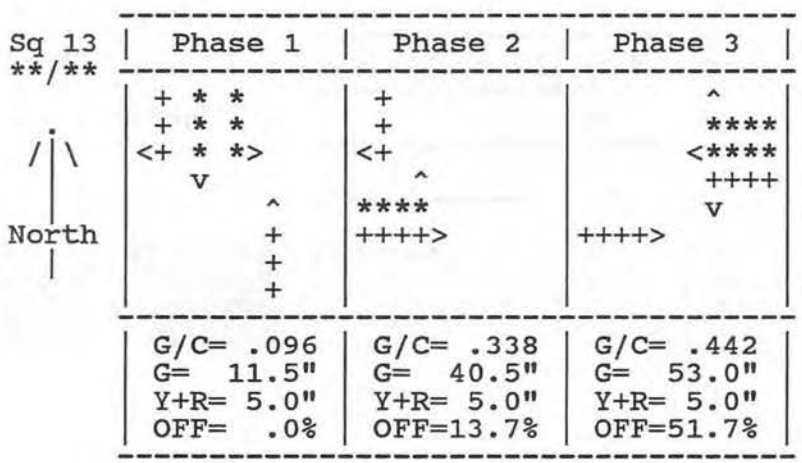
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (617) (DUAL EB LEFTS) 15:09:10
2012 3-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .67 Vehicle Delay 16.5 Level of Service C+

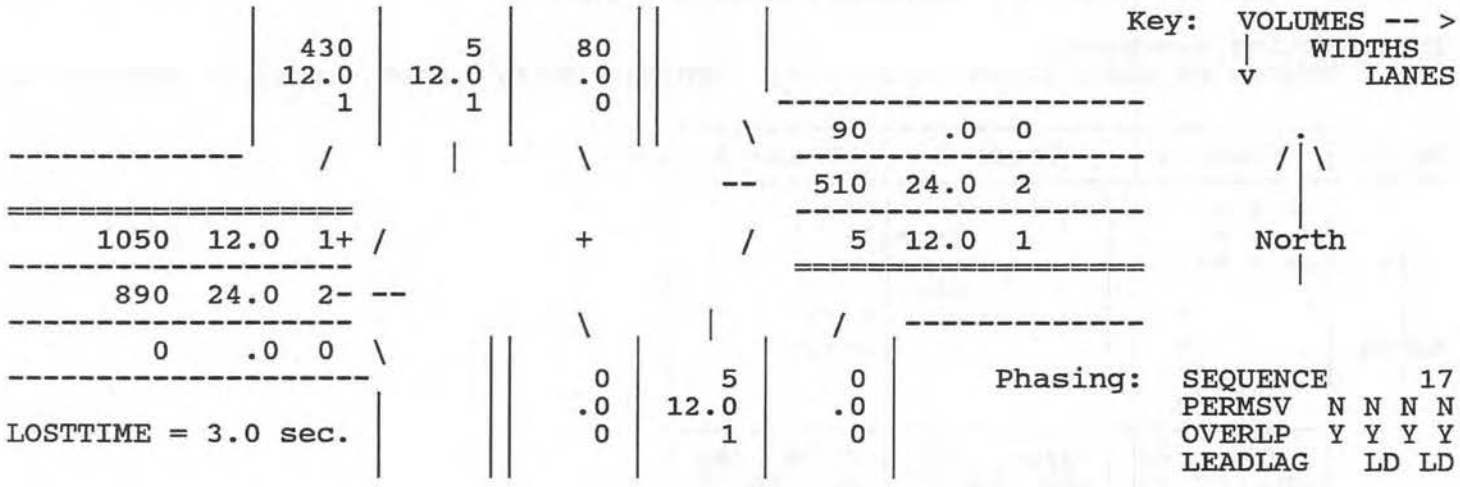


C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								18.5	C+	
RT	12/1	.389	.492	678	778	478	.614	15.4	C+	410 ft
LT+TH	12/1	.220	.112	1	174	95	.490	33.9	*D	142 ft
NB Approach								30.6	D+	
TH	12/1	.198	.112	1	190	6	.029	30.6	D+	25 ft
WB Approach								20.7	C	
TH+RT	12/1	.427	.458	716	834	644	.772	20.7	*C	588 ft
LT	12/1	.206	.458	68	94	6	.058	11.7	B	25 ft
EB Approach								14.3	B	
TH	12/1	.488	.838	1560	1560	800	.513	2.0	A	219 ft
LT	24/2	.350	.354	995	1254	972	.775	24.5	*C	529 ft

ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (561) EB LEFT AND THRU LEFT 13:51:13
2012 5-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

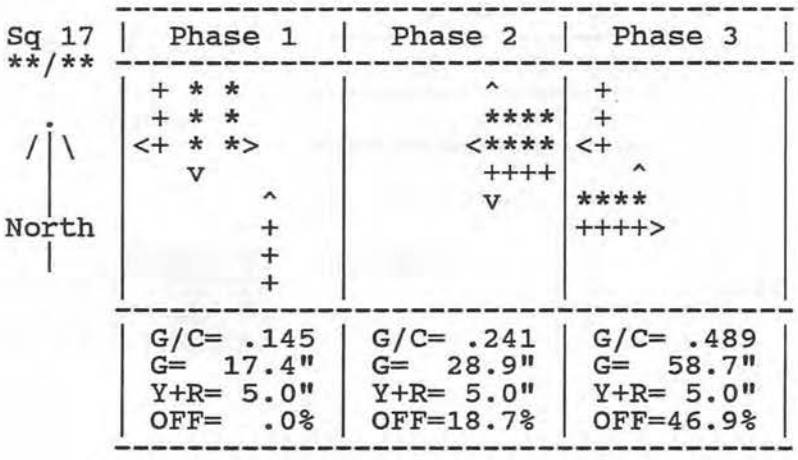
SIGNAL94/TEAPAC[V1 L1.4] - Display of Intersection Parameters



ISSAQUAH FALL CITY ROAD 01/15/96
CFC 20COMMIT (561) EB LEFT AND THRU LEFT 13:51:21
2012 5-LANE PM PEAK - ISS. FALL CITY/KLANANIE DRIVE COMMITTED

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages:
Degree of Saturation (v/c) .73 Vehicle Delay 19.0 Level of Service C+



C=120 sec G=105.0 sec = 87.5% Y=15.0 sec = 12.5% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								9.4	B+	
RT	12/1	.389	.693	1057	1097	478	.436	5.4	B+	248 ft
LT+TH	12/1	.220	.162	1	263	95	.341	29.1	*D+	134 ft
NB Approach								27.3	D+	
TH	12/1	.198	.162	1	286	6	.020	27.3	D+	25 ft
WB Approach								28.7	D+	
TH+RT	24/2	.293	.257	478	937	700	.747	28.8	*D+	438 ft
LT	12/1	.198	.257	219	454	6	.013	21.4	C	25 ft
EB Approach								18.3	C+	
TH	24/2-	.451	.506	1738	1856	1495	.805	17.9	C+	623 ft
LT	12/1+	.466	.506	796	895	710	.793	19.3	*C+	592 ft

Roadway Link Analysis

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... ISSAQUAH FALL CITY ROAD
ANALYST..... CFC IFCWO247
TIME OF ANALYSIS..... 2012 PM PEAK HOUR
DATE OF ANALYSIS..... 01-15-1996
OTHER INFORMATION.... E/O ISSAQUAH PINE LAKE W/O 247TH PLACE SE

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS	2
PERCENTAGE OF BUSES	0
PERCENTAGE OF RECREATIONAL VEHICLES	0
DESIGN SPEED (MPH)	50
PEAK HOUR FACTOR	.9
DIRECTIONAL DISTRIBUTION (UP/DOWN)	70 / 30
LANE WIDTH (FT)	11
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)	6
PERCENT NO PASSING ZONES	100

B) CORRECTION FACTORS

ROLLING TERRAIN

LOS	E T	E B	E R	f w	f d	f HV
A	4	3	3.2	.93	.94	.94
B	5	3.4	3.9	.93	.94	.93
C	5	3.4	3.9	.93	.94	.93
D	5	2.9	3.3	.93	.94	.93
E	5	2.9	3.3	.94	.94	.93

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 2910
ACTUAL FLOW RATE: 3233

LOS	SERVICE FLOW RATE	V/C
A	69	.03
B	295	.13
C	635	.28
D	975	.43
E	2062	.9

LOS FOR GIVEN CONDITIONS: F

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... ISSAQUAH FALL CITY ROAD
ANALYST..... CFC IFCWOKLH
TIME OF ANALYSIS..... 2012 PM PEAK HOUR
DATE OF ANALYSIS..... 01-15-1996
OTHER INFORMATION.... E/O 247TH PLACE SE W/O KLAHANIE DR SE

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS	2
PERCENTAGE OF BUSES	0
PERCENTAGE OF RECREATIONAL VEHICLES	0
DESIGN SPEED (MPH)	50
PEAK HOUR FACTOR	.9
DIRECTIONAL DISTRIBUTION (UP/DOWN)	60 / 40
LANE WIDTH (FT)	11
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)	6
PERCENT NO PASSING ZONES	100

B) CORRECTION FACTORS

ROLLING TERRAIN

LOS	E T	E B	E R	f w	f d	f HV
A	4	3	3.2	.93	.94	.94
B	5	3.4	3.9	.93	.94	.93
C	5	3.4	3.9	.93	.94	.93
D	5	2.9	3.3	.93	.94	.93
E	5	2.9	3.3	.94	.94	.93

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 2490
ACTUAL FLOW RATE: 2767

LOS	SERVICE FLOW RATE	V/C
A	69	.03
B	295	.13
C	635	.28
D	975	.43
E	2062	.9

LOS FOR GIVEN CONDITIONS: F

HCS: Multilane Highways Release 2.1
****

File Name .....
5LIFCW24.HC7
Facility Section.....
ISSAQUAH FALL CITY
From/To.....
FROM IPL TO 247TH PL
Analyst.....
CFC
Time of Analysis.....
2012 PM PEAK
Date of Analysis.....
01/15/96
Other Information.... 5 LANES ON ISSAQUAH FALL CITY ROAD

A. Adjustment Data	Direction 1	Direction 2
Volume	2320	1060
Percentage of Trucks and Buses	2.0	2.0
Percentage of Recreational Vehicles	0.0	0.0
Ideal Free-Flow Speed	50.0	50.0
Peak-Hour Factor or Peak 15 Minutes	0.90	0.90
Lane Width	11.0	11.0
Access Points per Mile	16.0	16.0
Distance from Roadway Edge	6.0	6.0
Type of Median	D	D

B. Adjustment Factors

Terrain Type	E T	E R	F HV	F M	F LW	F LC	F A
ROLLING	3.00	2.00	0.96	0.00	1.90	1.30	4.00
	3.00	2.00	0.96	0.00	1.90	1.30	4.00

C. Level of Service Results	Direction 1	Direction 2
Service Flow Rate (Vp)	1340	612
Average Passenger Car Speed (mph)	43	43
Free Flow Speed (mph)	43	43
Density (pcpmpl)	31	14
Level of Service (LOS)	D	B

HCS: Multilane Highways Release 2.1
****

File Name .....
5LIFCE24.HC7
Facility Section.....
ISSAQUAH FALL CITY
From/To.....
FROM 247 TO KLAHANIE
Analyst.....
CFC
Time of Analysis.....
2012 PM PEAK
Date of Analysis.....
01/15/96
Other Information.... 5 LANES ON ISSAQUAH FALL CITY ROAD

A. Adjustment Data	Direction 1	Direction 2
Volume	1940	940
Percentage of Trucks and Buses	2.0	2.0
Percentage of Recreational Vehicles	0.0	0.0
Ideal Free-Flow Speed	50.0	45.0
Peak-Hour Factor or Peak 15 Minutes	0.90	0.90
Lane Width	11.0	11.0
Access Points per Mile	7.0	0.0
Distance from Roadway Edge	6.0	6.0
Type of Median	D	D

B. Adjustment Factors

Terrain Type	E T	E R	F HV	F M	F LW	F LC	F A
ROLLING	3.00	2.00	0.96	0.00	1.90	1.30	1.80
	3.00	2.00	0.96	0.00	1.90	1.30	0.00

C. Level of Service Results	Direction 1	Direction 2
Service Flow Rate (Vp)	1121	543
Average Passenger Car Speed (mph)	45	42
Free Flow Speed (mph)	45	42
Density (pcpmpl)	25	13
Level of Service (LOS)	C	B

Accident Summary

Issaquah Fall City Road
1991-1993 Accident Summary
From Issaquah Pine Lake Road to Klahanie Drive

Severity

Property Damage Only	11
Injury	4
Fatalities	0
Total	15

Type

Rearend	5
Left Turn	3
Right Turn	2
Vehicle Struck Animal	2
Right Angle	1
Vehicle Struck Object	1
Other	1
Total	15

$$\text{Severity Index} = \frac{\text{Number of Fatalities}}{\text{Number of Accidents}} = 0$$

$$\text{Accident Rate} = \frac{(\text{Number of Accidents}) \times (1 \text{ Million})}{(\text{Secton Length}) \times (\text{AADT}) \times 365 \text{ Days}} = \frac{(15/3) \times (1 \text{ Million})}{(1.02) \times (9{,}900) \times 365 \text{ Days}} = 1.36$$

RNGSUM.XLS

King County Traffic and Planning Section

Accident Summary

Road Name: ISSAQUAH FALL CITY FRM ISSAQ PINE LK TO KLAHANIE DR

Location			Date		Data		
Cross Street	Distance	Direction	Time	Date	Severity	# of veh	Type
ISSAQUAH PINE LK RD	0	AT	1125	8/31/91	INJURY	2	REAR END
	150 FT	EASTOF	1420	2/11/91	PDO	2	OTHER
247TH PL SE	0	AT	1700	10/26/91	PDO	1	OBJECTS

Period Covered: 19 ~~--~~ to 19 91

Prepared by: CARLA KRITSONIS **Date:**

RNGSUM.XLS

King County Traffic and Planning Section

Accident Summary

Road Name: ISSAQUAH FALL CITY FRM ISSAQ PINE LK TO KLAHANIE DR

Location			Date		Data		
Cross Street	Distance	Direction	Time	Date	Severity	# of veh	Type
ISSAQUAH PINE LK RD	0	AT	1020	2/21/92	PDO	2	RT ANGLE
	0	AT	1645	6/5/92	PDO	2	RT TURN
	0	AT	1615	10/12/92	PDO	3	REAR END
242ND AVE. S.E.	700 FT	EASTOF	2030	9/7/92	PDO	1	ANIMAL
KLAHANIE DR SE	0	AT	1015	11/12/92	PDO	2	RT TURN

Period Covered: 19 ——— to 19 92

Prepared by: CARLA KRITSONIS **Date:**

RNGSUM.XLS

King County Traffic and Planning Section

Accident Summary

Road Name: ISSAQUAH FALL CITY FRM ISSAQ PINE LK TO KLAHANIE DR

Location			Date		Data		
Cross Street	Distance	Direction	Time	Date	Severity	# of veh	Type
ISSAQUAH PINE LK RD	0	AT	1810	5/17/93	PDO	2	LEFT TURN
	0	AT	1215	9/8/93	PDO	2	LEFT TURN
240TH AVE S.E.	220 FT	EASTOF	710	11/16/93	INJURY	3	REAR END
	225 FT	EASTOF	711	11/16/93	INJURY	2	REAR END
242ND AVE SE	380FT	EASTOF	1812	11/28/93	PDO	2	LEFT TURN
244TH PL SE	1200 FT	EASTOF	1240	1/22/93	INJURY	2	REAR END
247TH PL SE	800 FT	EASTOF	1715	12/5/93	PDO	1	ANIMAL

Period Covered: ~~19~~ to 19 93

Prepared by: CARLA KRITSONIS **Date:**