EIS Summary

Introduction

Interstate 90 (I-90) is a critical link connecting Puget Sound's large population and business centers with the farmlands, diverse industries, and extensive recreational areas of Eastern Washington. The uninterrupted movement of people, freight, and business over Snoqualmie Pass is essential to our quality of life and the economic vitality of Washington State.

I-90 at Gold Creek valley looking north.

The I-90 Snoqualmie Pass East Project is located on the east side of Snoqualmie Pass between Hyak, at milepost (MP) 55.1, and Easton (MP 70.3). This 15-mile stretch of I-90 is in Kittitas County, Washington, and passes through the Okanogan-Wenatchee National Forest. The beginning point at Hyak is located where the existing highway narrows from six lanes to four lanes. The end point at Easton is just outside the Okanogan-Wenatchee National Forest boundary, where the terrain becomes flatter and the highway is straighter.

This project would build a safer, more efficient, and more reliable highway from Hyak to Easton, adding capacity and ensuring the continued availability of I-90 as a primary statewide transportation corridor. The Washington State Legislature has funded the first phase (Phase 1) of the project: the five miles between Hyak and Keechelus Dam.

Why is this project unique?

The project presents many unique environmental and design challenges due to its location along a high mountain pass in the Central Cascades. The project area receives high levels of rain and snow, requiring specialized designs to manage stormwater runoff and snow storage. In some parts of the project area, the highway exists in a narrow corridor between the eastern shore of Keechelus Lake and steep cliffs, making the area susceptible to rockfall and avalanches. Large areas of protected state, federal, and conservation lands north and south of I-90 support a broad range of habitats and a diverse array of plants and wildlife that have been separated by the highway.

Gold Creek bridges. (Design visualization)

What is the project purpose and need?

The purpose of the project is to meet projected traffic demands, improve public safety, and meet the identified project needs for a 15-mile stretch of I-90 between the communities of Hyak and Easton, in Kittitas County, Washington.

Avalanches in the project area regularly close I-90.

Avalanches

I-90 is frequently closed due to avalanches and associated control work. These closures strand motorists and freight on Snoqualmie Pass, resulting in substantial safety hazards to the traveling public, travel delays, and impacts to the state's economy. The traveling public and movement of goods remain at risk as long as the avalanche problem is not resolved. The risk will increase with growth in traffic volumes.

Unstable slopes in the project area regularly lead to rock fall.

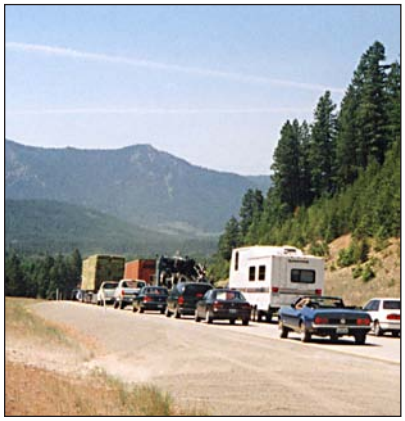
Slope Instability

I-90 has several unstable slopes, which results in rock and debris falling onto the roadway, causing damage to property and loss of life. These slopes will continue to pose a threat to property and safety if they are not stabilized or if the highway is not realigned to avoid areas of slope instability.

Cracked and deteriorated pavement on I-90.

Structural Deficiencies

The pavement on I-90 is beyond its design life and the roadway is rapidly deteriorating. If it is not repaired or replaced, continued deterioration of the roadway will result in unsafe driving conditions, increased vehicle damage, travel delay, and eventual failure of the roadway.



Recreational vehicles and freight travel I-90 during a holiday weekend.

Traffic Volumes

Traffic volumes on I-90 are increasing at an estimated rate of 2.1 percent per year and are expected to increase at a similar rate well into the future. Traffic volumes already exceed the highway's design capacity during peak travel periods. The worsening traffic situation may lead to higher numbers of accidents, adverse economic impacts, and increased travel times.

Ecological Connectivity

Federal land management plans have documented that I-90 forms a barrier to wildlife movement, and have identified the need to increase ecological connectivity across the highway. Improving ecological connectivity will advance federal land management goals by reducing fish and wildlife population isolation. It also will reduce the risks to wildlife and the public from collisions between vehicles and wildlife.

Elk killed in collision with vehicle near proposed wildlife overcrossing structure.

What would the project accomplish?

The I-90 project would improve safety and add capacity within a critical 15-mile section of I-90. Under all of the build alternatives, the project would include the following:

- The highway would be expanded from two to three lanes in each direction. This would accommodate projected traffic volumes for the next 25 years.
- The aging, deteriorated highway surface would be replaced with new concrete pavement. This would provide a smoother ride and reduce maintenance costs.
- Where possible, highway curves would be straightened to increase sight distance, driveability, and safety.
- New chain-up areas would be built, providing additional area for trucks and motorists to move out of the travel lanes.
- Low, narrow bridges at two interchanges would be replaced, making truck travel through the interchanges safer and more efficient.
- Avalanche risks and associated closures would be reduced substantially by replacing the existing Lake Keechelus Snowshed Bridge (snowshed) with an expanded six-lane snowshed covering all highway lanes. This would increase safety and reduce road closures for avalanche control work.

Chain-up areas in the project area frequently fill up, forcing trucks into the main travel lanes.

Proposed snowshed. (Design Visualization)

- Slopes would be stabilized to reduce rock fall hazards. This would increase safety and reduce road closures due to rock fall.

- Structures for wildlife passage would be built at the 14 major wildlife crossing areas within the project. This would increase safety by reducing collisions between wildlife and vehicles, and would connect habitat that is currently separated by the highway. Wildlife passage would be improved by:

    - Replacing narrow bridges and culverts with longer, wider bridges and culverts

    - Adding wildlife exclusion fences and other features to keep wildlife off the highway

    - Adding wildlife overcrossings at strategic locations

What would happen if the project were not built?

If this project were not built, the section of I-90 between Hyak and Easton would not be improved and critical needs would not be met:

- The risk of avalanches and rock and debris slides from unstable slopes would remain the same. The economic and social cost of closures and accidents would increase as traffic volumes increase.

- Maintenance costs would remain extremely high to keep the highway in a driveable condition. The existing four-lane highway would require frequent resurfacing projects to keep the highway functioning. These resurfacing projects have a short lifespan due to harsh weather conditions.

- Highway safety would continue to deteriorate and congestion would worsen as traffic volumes increase.

- Habitat connections would continue to be inadequate. As traffic volumes continue to increase, habitat fragmentation and wildlife/vehicle collisions also would increase.

Freight trucks crossing I-90 on Snoqualmie Pass after a closure.

How much would the project cost and how much has been funded?

Because of the large size of the project, construction would take place in phases. The Legislature has appropriated $545 million for Phase 1, the first five miles between Hyak and Keechelus Dam. The Washington State Department of Transportation (WSDOT) estimates that Phase 1 would cost between $474 and $587 million, assuming that the Preferred Alternative is selected. All of the other alternatives for Phase 1 would be substantially more expensive, with estimated costs ranging from $706 million to $1.6 billion. WSDOT estimates that the remaining phases of the project, which are not yet funded, would cost between $516 and $752 million.

When would the project be built?

Phase 1 of the project is scheduled to begin in 2010, and construction would last approximately six years. Construction for the remaining project area would require between seven and 15 years, depending mostly on whether funding is available.

What planning has taken place for the project and who has been involved?

Who is leading the project?

WSDOT is the project proponent and the Federal Highway Administration (FHWA) and WSDOT are the joint lead agencies. FHWA is providing highway design guidance and environmental oversight, and is the lead agency for the National Environmental Policy Act (NEPA). WSDOT is leading the highway design efforts and writing the environmental impact statement (EIS), and is the lead agency for the State Environmental Policy Act (SEPA). The US Forest Service (USFS) and the US Bureau of Reclamation (USBR) are cooperating agencies in the preparation of the EIS.

Who are FHWA and WSDOT's partners for this project?

Throughout the project, FHWA and WSDOT have engaged in a continuous process of consultation, collaboration, and partnership with the public, interest groups, the project's cooperating agencies,

What is a "cooperating agency?"

Under NEPA, a cooperating agency is an agency that has a vested interest in a proposed project for which environmental documents would be prepared. The USFS and the USBR are cooperating agencies with FHWA and WSDOT in the preparation of the EIS, and have a role in writing and reviewing the information contained in the documents.

U.S. Department of Transportation
Federal Highway Administration

Washington State Department of Transportation

and other stakeholders. These consultation and collaboration efforts have included:

- During scoping, FHWA and WSDOT's public involvement activities went beyond those required by NEPA and SEPA, including open houses, public meetings, and a project web site.

- FHWA and WSDOT created a multi-agency project Interdisciplinary Team (IDT) as an advisory body to incorporate relevant science and the concerns of agency stakeholders, as well as to recommend a Preferred Alternative. The lead agencies went beyond their normal practice and invited technical experts from other agencies to participate on the IDT. After the Preferred Alternative had been identified, FHWA and WSDOT extended the charter of the IDT, and expanded its membership to include additional member agencies.

- WSDOT created the Mitigation Development Team (MDT) as a multi-agency advisory group on ecological connectivity. The MDT developed a comprehensive list of connectivity objectives, evaluated design options, and developed a series of performance standards.

- WSDOT formed three additional advisory committees to provide technical expertise in the area of wetlands, stormwater management, and wildlife monitoring.

- WSDOT created innovative partnerships with university researchers and conservation groups to design and implement a wildlife monitoring program for the project.

Who is on the Interdisciplinary Team and what are their roles?

The project's original IDT included the Federal Highway Administration, Washington State Department of Transportation, US Forest Service, US Fish and Wildlife Service, and Washington Department of Fish and Wildlife.

Advisory members included Washington State Department of Ecology, Washington State Parks and Recreation Commission, US Environmental Protection Agency, and US Army Corps of Engineers.

The IDT was used as an advisory body to incorporate both relevant science and the concerns of agency stakeholders, and to recommend a Preferred Alternative.

After the Preferred Alternative was identified, the advisory agencies, US Bureau of Reclamation, National Marine Fisheries Service, and Kittitas County joined the IDT.

Technical Committees

WSDOT created three additional technical committees to assist in permitting challenges and to provide advice through final design: the Wetlands Technical Committee, the Wildlife Technical Committee, and the Stormwater Technical Committee.

- FHWA and WSDOT participated in the Signatory Agency Committee (SAC) Agreement, which established an interagency process to consider potential impacts to aquatic resources. The SAC Agreement includes a mechanism for formal concurrence on the project's purpose and need, the range of alternatives, and the Preferred Alternative.

- WSDOT formed relationships with transportation-based organizations, associations, and businesses in order to gain insight into the requirements of highway users. This includes relationships with Port of Seattle, Port of Tacoma, Washington State Good Roads & Transportation Association, Washington Trucking Association, Freight Mobility Strategic Investment Board, and local importing and exporting freight business such as Anderson Hay & Grain.

- FHWA and WSDOT consulted continuously with the USFS and USBR as cooperating agencies. This included early review of project documents and ongoing exchange of information.

- FHWA and WSDOT developed partnerships with a variety of agencies, landowners, and citizen groups to reduce conflicts that could affect the project, particularly land use and recreation conflicts that could affect the use of wildlife connectivity structures.

What was the role of the Mitigation Development Team?

- Identifying ways to connect and improve fish and wildlife corridors within the project area
- Developing criteria for improving ecological connectivity
- Making recommendations to the IDT for the types of structures that would best meet these criteria

This collaborative approach substantially influenced the direction of the project. FHWA and WSDOT, along with all of the interagency partners, recognized the importance of correcting problems with avalanches, slope instability, deteriorating pavement, increasing traffic volumes, and ecological connectivity, and included all of these as part of the project's purpose and need. FHWA recognized the project's collaborative approach in 2006 with an Exemplary Ecosystem Initiative award for exceptional environmental stewardship.

How have FHWA and WSDOT consulted with Native American Tribes?

FHWA and WSDOT have engaged in an extensive and ongoing program of government-to-government consultation with affected Native American Tribes. Tribes have indicated strong support for the project's ecological connectivity goals.

Tribal consultation began in 1998 at the beginning of the project prior to the initiation of scoping, and will continue throughout the completion of the project. Tribes included in this consultation are the Yakama Nation, Snoqualmie Tribe, Tulalip Tribe, Muckleshoot Tribe, Confederated Tribes of the Colville Reservation, and Wanapum Tribe. WSDOT is planning additional tribal consultation activities for late summer or early fall of 2008:

- Developing an unanticipated discovery plan for the project with input from the affected tribes, federal agencies, and the Washington State Department of Archaeology and Historic Preservation (DAHP).

- As part of the National Historic Preservation Act Section 106 mitigation for removing the snowshed, a resource listed on the National Register of Historic Places (NRHP), WSDOT will analyze the Traveler's Rest site at Snoqualmie Pass for its potential listing on the NRHP and will develop interpretative signage related to transportation history at Snoqualmie Pass and the I-90 corridor at this location. Affected tribes and the DAHP may provide input on and help develop the interpretive language for the displays.

Exhibit ES-1
Process of Development

Design %	0%	10%	30%
Steps	**Scoping**	**Preliminary Design and Environmental Documentation**	**Design and Environmental Permitting**
Processes	• Public Hearings • Form IDT • Develop Study Plan • Develop Communications Plan • Begin Engineering Investigations • Begin Environmental • Investigations • Identify Alternatives • Begin Cost Estimation	• Begin Right–of–Way Investigations • Preliminary Impact Analysis • Publish Draft EIS • Identify Mitigation Needs and Opportunities • Begin Contract Plans, Specifications and Estimates • Refine Cost Estimates	• Identify Preferred Alternative • Refine Cost Estimates • Publish Final EIS • Publish Record of Decision • Begin Right–of–Way Acquisition • Submit Permit Applications & Mitigation Plans • Document Commitments • Begin Federal Land Transfer(s) • Contract Plans, Specifications and Estimates 30% Complete

How are transportation projects planned and built?

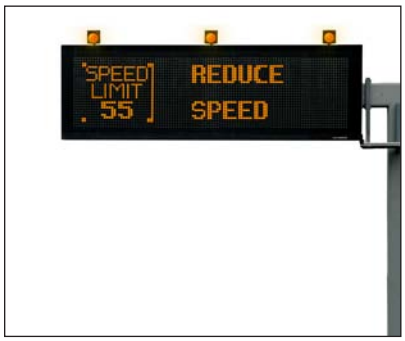
Planning for the project started in May 1996. Exhibit ES-1 shows the sequence of steps that the I-90 project is following in planning and building the project.

How did FHWA and WSDOT identify and evaluate the alternatives?

Which alternatives were analyzed in the Draft EIS and which were eliminated?

Since 1996, FHWA and WSDOT have worked with agencies and the public to develop and consider a range of potential solutions to the project needs (Exhibit ES-2). Alternatives considered prior to the Draft EIS included:

- Continuing to operate two lanes in each direction, but managing traffic demand using signage, highway advisory radio messages, electronic variable message signs, and intelligent traffic solutions (the Limited Construction Alternative)



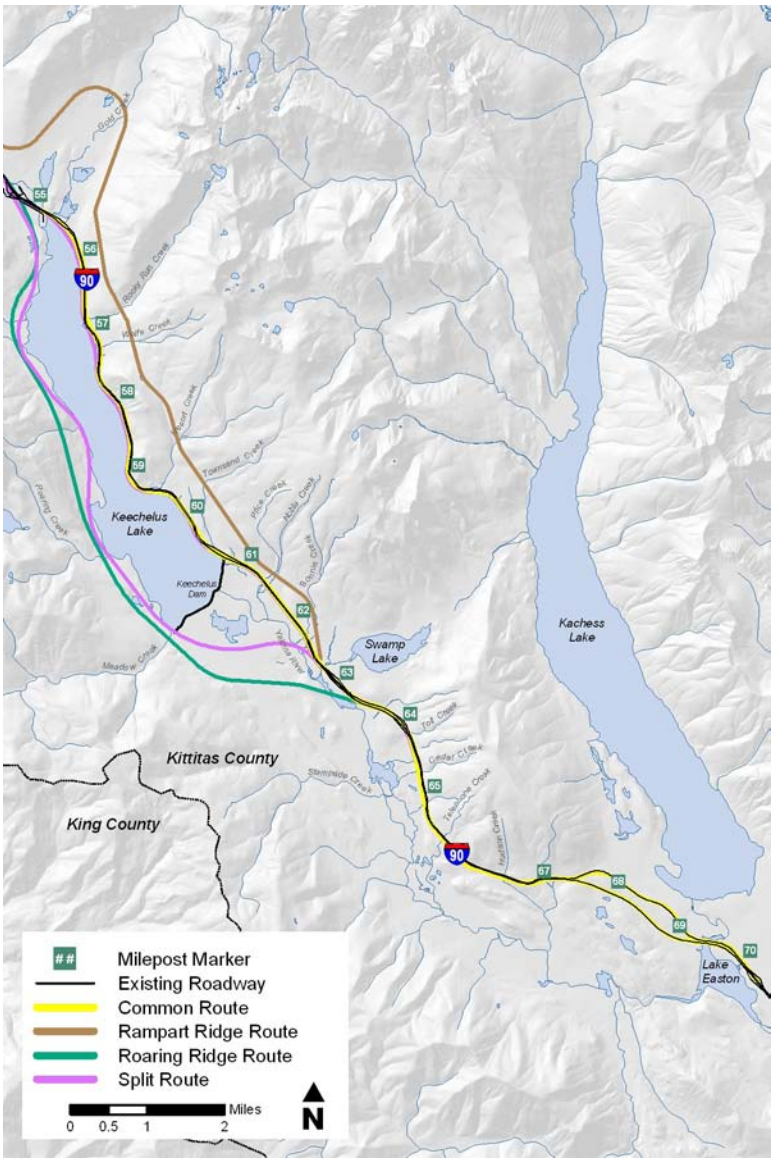
Speed limits will be reduced in construction zones. WSDOT will use variable message signs to keep the public informed.

60 %	90%	100%	M/O
Contract Development and Mitigation Plans	**Final Contract**	**Construction**	**Maintenance & Operations**
• Develop Final Mitigation Plan(s) • Negotiate Permit Conditions and Stipulations • Begin Tracking Project Commitments • Begin Pre-Construction Monitoring • Contract Plans, Specifications and Estimates 60% Complete	• Finalize Right–of–Way Acquisition • Receive Permits • Advertise Contract • Award Contract • Continue Tracking Project Commitments • Finalize Mitigation Plans • Contract Plans, Specifications and Estimates 90% Complete	• Begin Construction • Monitor Construction • Monitor Mitigation & Permit • Compliance • Finish Construction • Continue Tracking Project Commitments	• Begin Maintenance & Operations • Monitor Mitigation Sites • Maintain Highway • Adaptive Management • and Wildlife Monitoring

- Relocating the highway away from its current location to one of three possible new locations

- Expanding the highway to three lanes in each direction, largely in its existing location

Exhibit ES-2
Initial Route Alternatives



No-Build Alternative

(not shown on map)

This alternative, which is required under NEPA, assumed that the existing highway would be maintained and repaired as needed, but that no new construction would take place.

Limited Construction Alternative

(not shown on map)

This alternative considered technology-based or policy-based actions, along with mass transit and rail.

Rampart Ridge Route Alternative

This alternative would construct a new six-lane highway northeast of Keechelus Lake and would leave the existing I-90 alignment east of Hyak and rejoin it just west of the Stampede Pass Interchange.

Roaring Ridge Route Alternative

This alternative would construct a new six-lane highway southwest of Keechelus Lake, from the Hyak Interchange to the Cabin Creek Interchange.

Split Route Alternative

This alternative would construct three new eastbound lanes along the southwest shore of Keechelus Lake and convert the section of the existing highway to westbound lanes.

Common Route Alternative

This alternative would reconstruct the existing highway to six lanes, generally following the existing highway alignment.

The lead agencies and the IDT analyzed the initial alternatives and determined that the No-Build and Limited Construction Alternatives did not meet the project's purpose and need. The Rampart Ridge, Roaring Ridge, and Split Route Alternatives each presented unacceptable levels of environmental impact, construction challenges, risk, and cost, and did not meet the project's purpose and need as well as the Common Route Alternative. The Common Route Alternative met the project's purpose and need, and had acceptable levels of environmental impact. This alternative was advanced for further study in the Draft EIS, including the development of a range of build alternatives along the Common Route. The No-Build Alternative also was included in the Draft EIS, as required under NEPA.

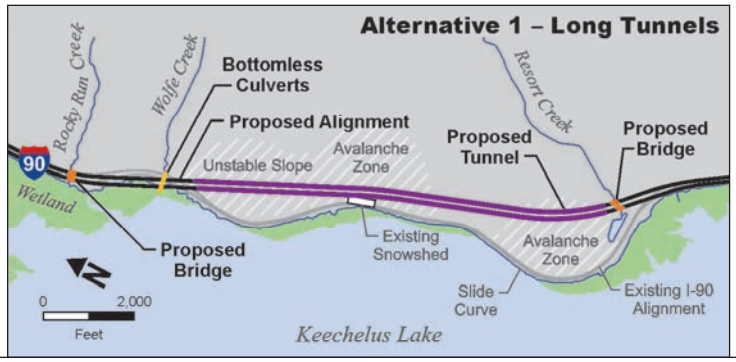
How did FHWA and WSDOT design the alternatives in the Draft EIS?

The project team developed a range of build alternatives for the Common Route, all of which would meet the project's purpose and need. All would add new lanes and chain-up areas, stabilize slopes, and replace the old pavement and substandard bridges. There were two areas where the build alternatives differed, and these required FHWA and WSDOT to make two distinct decisions.

The first decision was how to rebuild the highway along the 3.3 miles on the east shore of Keechelus Lake. WSDOT created four separate alternatives for this area, which was referred to in the Draft EIS as the Keechelus Lake Alignment (Exhibit ES-3). In this area, the primary problems were avalanches, rock fall, and sharp curves. This portion of the highway contains few opportunities to improve ecological connectivity, because of the steep gradient and deeply incised nature of the three streams in this area and the steep slopes bordering the highway.

The second decision was how to improve habitat connections along the remainder of the project corridor. This portion of the highway contains the greatest opportunities to improve ecological and hydrologic connectivity, and few problems related to avalanches or rock fall. WSDOT developed three to four build alternatives for most of the wildlife crossing locations.

Exhibit ES-3
Initial Keechelus Lake Alignment Alternatives

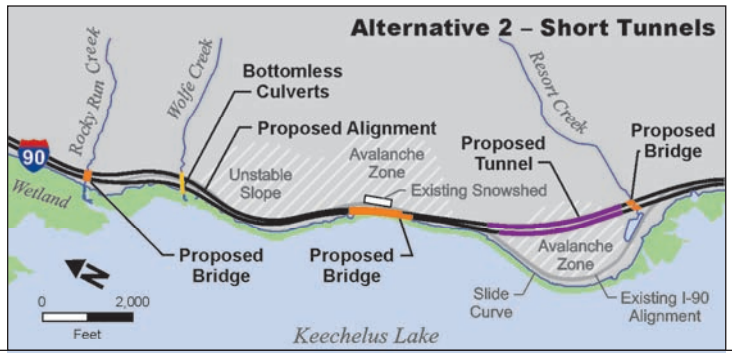


Alternative 1 – Two 1.9-mile tunnels with three lanes in each direction would be built along Keechelus Lake.

Rocky Run Creek – Replace two existing 6-foot culverts and a single-span bridge with two 120-foot single-span bridges.

Wolfe Creek – Replace two existing 6-foot culverts with bottomless culverts.

Resort Creek – Replace two existing culverts with two 120-foot single-span bridges.

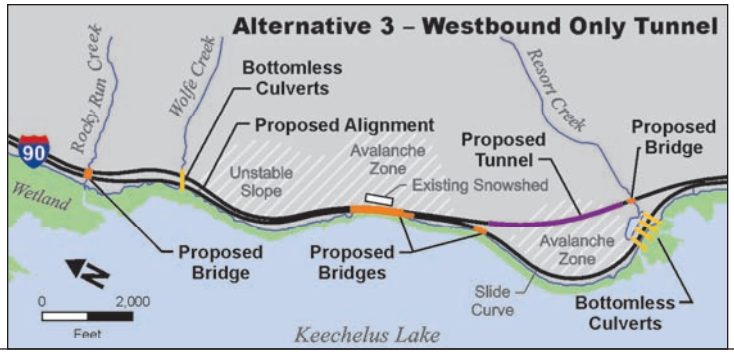


Alternative 2 – Two 0.6-mile tunnels with three lanes in each direction would be built along Keechelus Lake.

Rocky Run Creek – Same as Alternative 1.

Wolfe Creek – Same as Alternative 1.

Resort Creek – Same as Alternative 1.

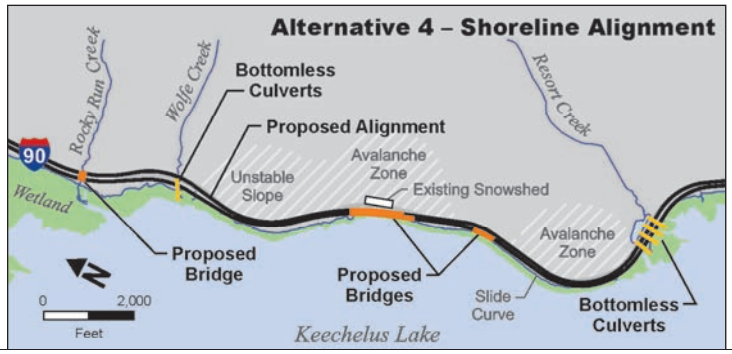


Alternative 3 – One 0.6-mile tunnel with three lanes would be built in the westbound direction along Keechelus Lake. Three eastbound lanes would be constructed along Keechelus Lake.

Rocky Run Creek – Same as Alternative 1.

Wolfe Creek – Same as Alternative 1.

Resort Creek – Replace the existing 6-foot culvert under the westbound lanes with a 120-foot single-span bridge. Replace the existing 6-foot culvert under the eastbound lanes with bottomless culverts.



Alternative 4 – Three lanes would be constructed in each direction around Slide Curve.

Rocky Run Creek – Same as Alternative 1.

Wolfe Creek – Same as Alternative 1.

Resort Creek – Replace existing 6-foot culvert with bottomless culverts.

How were the alternatives for the Keechelus Lake Alignment analyzed?

The project team developed four alternatives for the Keechelus Lake Alignment area. Three of these alternatives included tunnels. These alternatives are shown in Exhibit ES-3.

Evaluation of Keechelus Lake Alignment Alternatives 1, 2, and 3

FHWA and WSDOT found that building tunnels would add cost, risk and environmental impact to the project. The most important factors associated with tunnels are discussed in this section.

Engineering Feasibility and Risk. Building tunnels would be a high-risk activity for both the schedule and budget. Engineering experience world-wide shows that tunnel construction generally requires making real-time adjustments to design and engineering specifications, since variations in the rock material cannot be known with certainty until tunnel boring is underway. In WSDOT's experience, such changes in conditions and design frequently result in schedule delays and substantially increased costs.

Maintenance Costs. Any of the tunnel alternatives would substantially increase the cost of maintenance. Maintenance costs for tunnels are far higher than for normal highways, because of required systems for ventilation, lighting, fire detection, and 24-hour monitoring. WSDOT estimated the annual maintenance cost of the existing project area at approximately $184,000 and Alternative 4 (the Preferred Alternative) at approximately $290,000. All of the tunnel alternatives had annual maintenance costs of over $1 million with Alternative 1 the most expensive at over $2.8 million.

WSDOT tandem snowplowing crews clearing Snoqualmie Pass.

Operational Difficulties. Tunnels present operational problems. Tunnels would require specialized emergency response equipment and would place limits on the types of cargo that could pass through the tunnel. Stalled vehicles in the tunnel would represent an added hazard. Trucks hauling hazardous and flammable materials could present additional problems, and would need to be accommodated in the design and operational plan for the tunnels.

Environmental Consequences. In all three tunnel alternatives, the proposed eastern end point is at Resort Creek, which contains the largest concentration of high-value wetlands in the project area. Constructing a tunnel entrance at this location, with associated maintenance and chain-up/chain-off areas, would require extensive fill and cause severe impacts to these wetlands.

Keechelus Lake Alignment Alternative 4. (Design Visualization)

Cost and Environmental Trade-Offs. The costs of tunnel construction would be very high, and in some cases higher than the total amount of funding available for the project. Building tunnels would likely force the project to either forego most or all of the improvements to ecological connectivity (which would not meet the project's purpose and need) or to request substantial additional funding from the Legislature.

Evaluation of Keechelus Lake Alignment Alternative 4

Alternative 4, the only non-tunnel alternative, would present much lower construction risk and would eliminate important operation and maintenance problems. The cost would be much lower than any of the tunnel alternatives. Alternative 4 would result in fewer impacts to wetlands than the tunnel alternatives, particularly at Resort Creek. Using the existing alignment to the greatest extent possible would minimize the loss of terrestrial habitat from new highway fill. Preliminary studies developed for the Draft EIS indicated that compensatory mitigation could be accomplished for the unavoidable impacts.

Keechelus Lake Alternatives Preferred Alternative Recommendation

The project IDT recommended Alternative 4 as the Preferred Alternative for the Keechelus Lake Alignment, based on lower construction risk, cost, and environmental impacts. FHWA and WSDOT decision makers accepted the IDT's recommendation in June 2006.

Members of the IDT sign their final recommendations on the Preferred Alternative.

How were the alternatives for the remainder of the project area analyzed?

For the remaining project area, all of the build alternatives would expand the highway to three lanes in each direction, stabilize unstable slopes, and add new chain-on areas. The primary decision for this part of the project was how the lead agencies would meet the project's ecological connectivity needs, primarily at stream crossings.

The MDT, a technical advisory group of hydrologists and biologists, identified 14 locations in the project area that could benefit from connectivity improvements (Exhibit ES-4). Most of these areas are at stream crossings, but some are located within larger wildlife corridors away from streams. These areas are referred to as connectivity emphasis areas (CEAs) and are shown in Exhibit ES-5. WSDOT worked with the MDT to develop design options for improvements at each CEA. WSDOT identified three potential designs for the connectivity improvements wherever site conditions allowed (Options A, B and C). At some CEAs, however, physical conditions only allowed a single alternative.

Members of the MDT in the field.

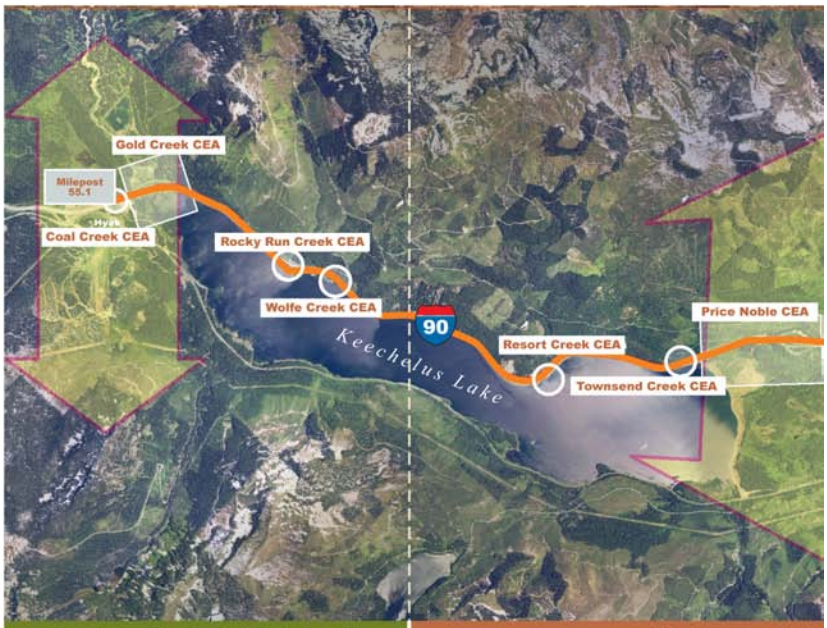
Following publication of the Draft EIS in June 2005, the MDT reviewed these design options and recommended modifications to the design at four CEAs where the original designs did not fully meet their connectivity objectives. WSDOT designated these modifications as Option D. Exhibit ES-4 shows the entire range of options considered by the MDT at each CEA.

CEA Option Preferred Alternative Recommendation

Based on the work of the MDT, the IDT re-examined the options at each CEA and recommended the most appropriate option for the Preferred Alternative. In general, the IDT recommended Option A, and in the cases where Option A did not represent the best connectivity design, an alternate or modified option was identified (Exhibit ES-6). The IDT's recommendations were adopted by FHWA and WSDOT in June 2006.

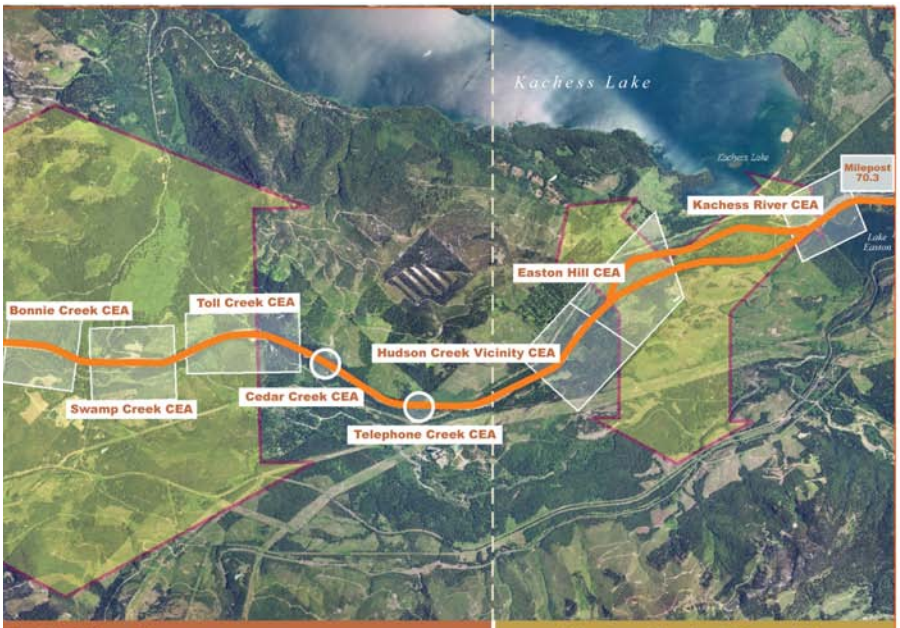
CEA improvements will connect streams, wetlands and forest habitats. (Shown: Swamp Creek)

Exhibit ES-4
The MDT's Evaluation of the CEA Options



OBJECTIVE	Mountain Hemlock/Subalpine Fir				Western Hemlock		
	Coal Creek	Gold Creek	Rocky Run Cr	Wolfe Creek	Resort Creek*	Townsend Creek	Price/Noble Creeks
High-Mobility Species	●	●●●	●	●	●	●	●●●
Low-Mobility Species	●●	●●	●●	●	●	●●	●●●
Stream Channel and Floodplain Processes	●●	●●●	●●	●●	●●	●●	●●●
Wetland and Subsurface Flow		●●			●●		●●●
EXISTING STRUCTURES	Box culverts	140' bridge	40' bridge 2-6' culverts	6' culvert	6' culvert	6' culvert	10' culvert 4' culvert
Option A		☆☆☆ 120' bridge 1,100' EB/ 900' WB bridge	☆☆☆ 120' bridge	☆☆☆ 25' x 8' culvert WB 20' x 10' culvert EB	☆☆☆ Alternative 1 Twin bore tunnels 120' bridge 1 HCZ	☆☆☆ 25' x 12' culvert	☆☆ 120' bridge 2-800' bridges 1 HCZ
Option B		☆☆ 1,200' EB/ 1,000' WB bridge 100' wildlife bench			Alternative 2 Same as Alternative 1		☆ 120' bridge 800' bridge 2 HCZs
Option C		120' bridge 300' bridge			Alternative 3 Single bore tunnel WB 120' bridge WB Multiple culverts EB** 1 HCZ		3-120' bridges 2 HCZs
Option D		☆ 120' bridge 700' bridge			Alternative Alt. 4 Multiple culverts**		☆☆☆ Wildlife Overcrossing 3-120' bridges 2 HCZs

Design recommendations at Townsend, Cedar, and Telephone Creeks were modified by the IDT to better meet MDT objectives. Design recommendations at Rocky Run and Resort Creeks were modified by the WSDOT design team due to engineering constraints, and bridges were added and/or increased in size to better meet MDT objectives.



Pacific Silver Fir					Western Hemlock/Grand Fir		
Bonnie Creek	Swamp Creek	Toll Creek	Cedar Creek	Telephone Creek	Hudson Creek	Easton Hill	Kachess River
●●●	●●●	●●●	●●	●●	●●●	●●●	●●●
●●●	●●●	●●●	●●	●●	●●●	●●	●●
●●●	●●●	●●	●●	●●	●●		●●
●●●	●●●	●●●			●●●	●●	●
6' culvert	2-8' culverts	4' culvert 3' culvert	4' culvert	5' x 4' culvert	2' culvert	No Structure	99' bridge EB 150' bridge WB
★★★ 600' bridge 1 HCZ	★★ 240' bridge 120' bridge 4 HCZs	★★★ 120' bridge 6'x5' culvert	★ ≥4' culvert 1 HCZ	★ ≥4' culvert	★★★ 240' bridges 2 HCZs	★★★ 120' bridge (EB and WB)	120' bridge Replace existing county bridges
240' bridge 2 HCZs	★★★ 3-120' bridges 5 HCZs	Same as Option A			120' bridge 3 HCZs	★★ Wildlife Overcrossing EB and WB 1 HCZ	Widen existing county bridges
16' x 10" culvert 2 HCZs	120' bridge 6 HCZs	6'x5' culvert			≥4' culvert 3 HCZs	★ Wildlife Overcrossing WB 120' bridge 1 HCZ	Widen existing county bridges
							★★★ Wildlife Overcrossing (EB and WB) Widen existing county bridges

LEGEND

★ MDT Recommendation Ranking; three stars = highest

Option meets connectivity objectives

Option does not meet connectivity objectives

Level of Emphasis

●●● Strong emphasis

●● Moderate emphasis

● Low emphasis

Little or no emphasis

North-South Linkage Zones

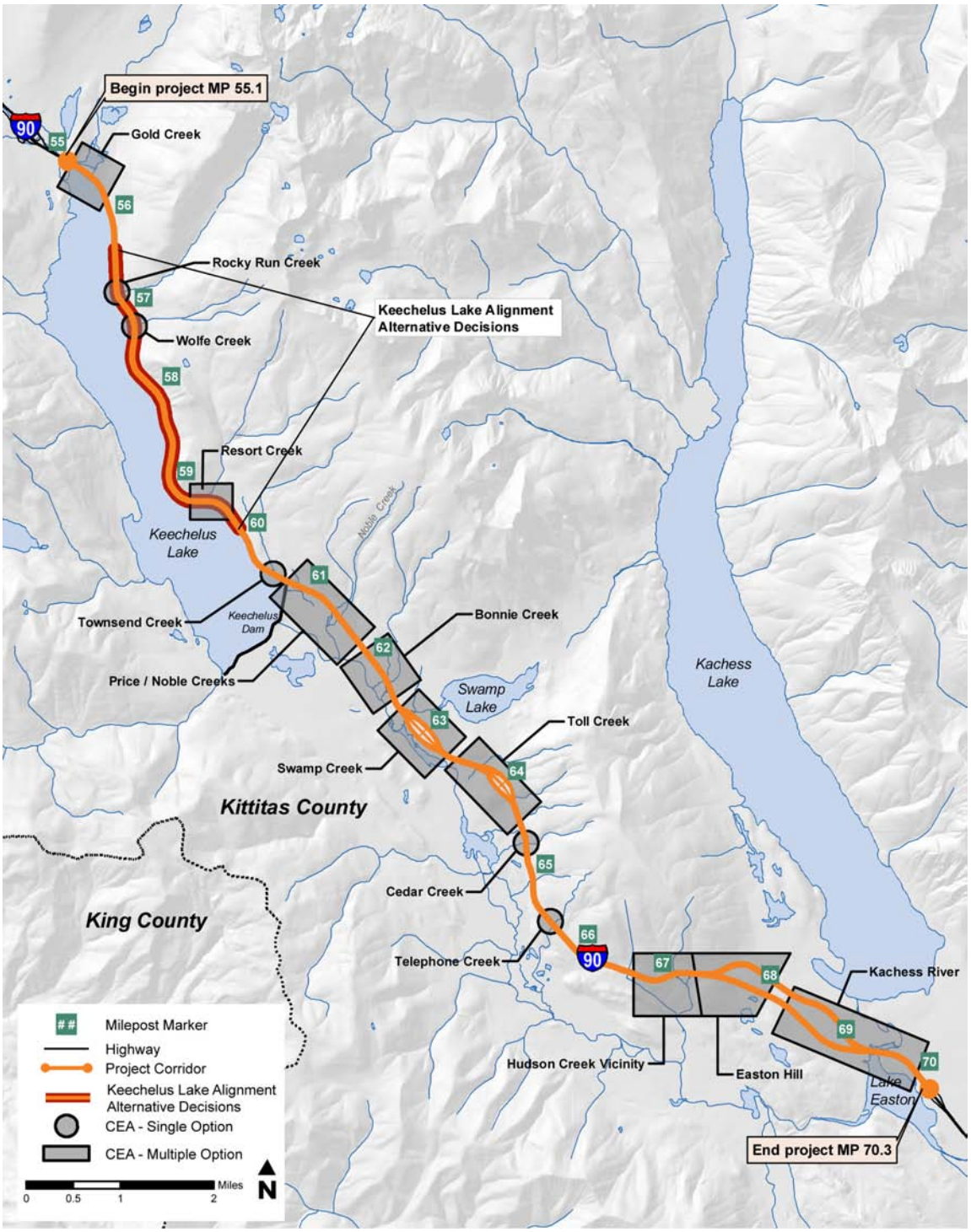
HCZ = hydrologic connectivity zone

ASSUMPTIONS BEHIND HYDROLOGY RATINGS:
Stream channel process, ▬ is for CEAs with unconfined floodplains and dynamic migrating streams. ▬ for CEAs where focus is on fish and debris passage. ▭ where only minor streams occur. Blank means no streams.
Wetland flow paths, ▬ indicates high value wetland resources and/or subsurface flow paths at the CEA.
▬ or ▭ indicates some wetlands, relatively low value or less extensive. Blank indicates wetland and subsurface flow are relatively minor.

* At the Resort Creek CEA, different highway alternatives are linked to different design options (three separate options).

** Resort Creek Alignments 3 and 4: multiple culverts with combined width of 100 feet. At least one culvert to provide 12-foot clearance.

Exhibit ES-5
Project Connectivity Emphasis Areas



CEA borders illustrate the general locations where the project will invest more resources to meet ecological connectivity objectives. Public and private lands near these CEAs are not part of the I-90 project. The project may acquire private land near CEAs via purchase, easement, and/or federal land transfer.

Exhibit ES-6
The IDT's Recommendations at Individual CEAs

CEA	Recommended Preferred Alternative
Gold Creek	Option A
Rocky Run Creek	Option A
Wolfe Creek	Option A
Resort Creek	Option D
Townsend Creek	Option A Modified
Price/Noble Creeks	Option D
Bonnie Creek	Option A
Swamp Creek	Option B Modified
Toll Creek	Options A/B Modified
Cedar Creek	Option A Modified
Telephone Creek	Option A Modified
Hudson Creek	Option A
Easton Hill	Option A
Kachess River	Option D

The MDT's recommendations and each option's details are shown on Exhibit ES-4.

How did FHWA and WSDOT modify the project after the Preferred Alternative **was identified?**

After the lead agencies identified the Preferred Alternative, WSDOT conducted additional technical studies to support more detailed design work. These included studies of geotechnical (soil and rock) conditions, avalanches, and construction methods. The information from these studies were analyzed by a multi-agency value engineering (VE) team. The VE team recommended two modifications to the range of alternatives.

Value Engineering is a systematic application of recognized techniques by a multidisciplinary team to identify the function of a product or service and the lowest life cycle cost without sacrificing safety, necessary quality, or environmental attributes.

The first modification would reduce the design speed of the new highway. The original design speed for all of the build alternatives varied between 65 and 75 miles per hour (mph) for the entire 15-mile corridor. The VE team recommended that the design speed be reduced to 65 mph for the western six miles of the corridor along Keechelus Lake, and 70 mph for the remainder of the corridor. This recommendation was based on physical constraints of the site, including the sharp curves along Keechelus Lake, the narrow highway alignment between the rock slopes and the lake, and consistancy with design speeds east and west of the project area.

What is design speed and how does it vary from the posted highway speed limits?

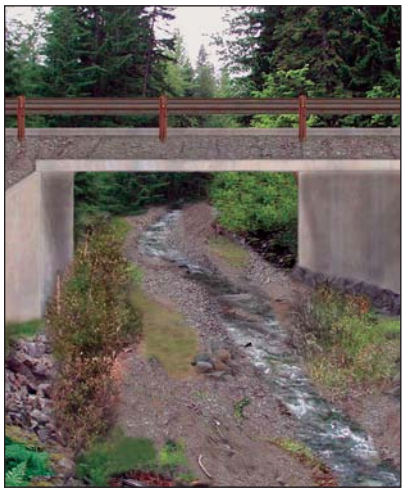
The design speed of a road is the maximum speed at which a motor vehicle can be operated safely on that road in perfect conditions. The posted speed limit is the maximum speed allowed by law for vehicles.

The second modification was to eliminate the large viaduct bridges planned in Keechelus Lake (Exhibit ES-7). As originally planned under Alternatives 2, 3 and 4, the new highway would be shifted away from its existing location in order to avoid the avalanche slopes near MP 58.1 and allow for a 75 mph design speed. Two long bridges (over 1,100 feet) would be built over Keechelus Lake. Also, a 600-foot bridge would be constructed on the eastbound lanes near MP 58.6. The existing roadway at the avalanche chutes would be removed to create a large chute, allowing avalanches to pass beneath the bridges. The existing snowshed would be left in place. The VE team recommended that these viaduct bridges be eliminated, based on the findings from new technical studies conducted in 2006:

What are "logical termini"?

The FHWA defines logical termini as (1) rational beginning and end points for a transportation project, and (2) rational beginning and end points for review of environmental impacts.

- Rock in the vicinity of the snowshed is stronger than was previously assumed, which would allow taller rock cuts.
- Avalanche modeling indicated that avalanche powder blast may cause white-out conditions on the proposed viaduct, which would create safety problems.
- Constructing the viaduct bridges presented engineering problems that approach the level of fatal flaws, which could make the alternative impossible to build. The lake in this location is very deep with a steeply sloping bottom. Support structures for the bridge would be more than 170 feet tall in some locations. Bedrock on the lake bottom is of poor quality and is overlain by up to 80 feet of saturated soil.
- Access to the work area during construction would be limited by the narrow eastbound road shoulders and steep embankment slopes.
- The construction period is limited by the long winters and by rapidly fluctuating water levels in Keechelus Lake.

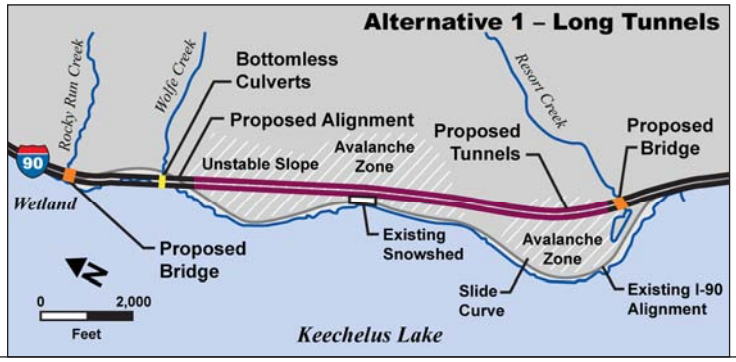


Larger bridge to provide passage by wildlife habitat. (Design Visualization)

Perched culvert at Resort Creek outlet.

Removing the viaduct bridges would require WSDOT to replace the existing snowshed at MP 58.1, which covers the two westbound lanes. The snowshed is listed on the NRHP, and removing it requires evaluation under Section 4(f) of the Transportation Act. This evaluation can be found in Chapter 5 of the Final EIS, *Programmatic Section 4(f) Evaluation.*

Exhibit ES-7
Keechelus Lake Alignment Alternatives as Modified by the IDT and WSDOT

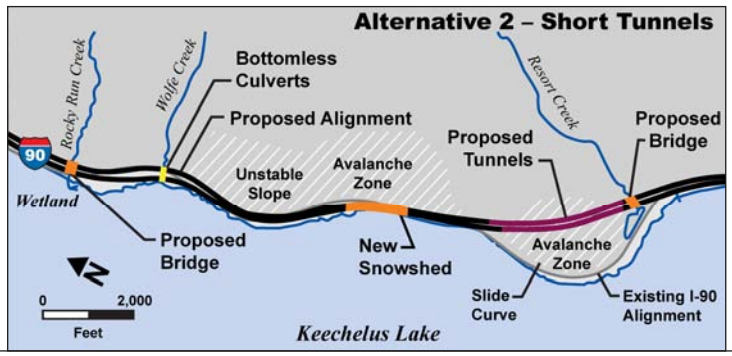


Alternative 1 – Two 1.9-mile tunnels with three lanes in each direction would be built along Keechelus Lake.

Rocky Run Creek – Replace two existing 6-foot culverts and a single-span bridge with one 120-foot and one 160-foot single-span bridge.

Wolfe Creek – Replace two existing 6-foot culverts with bottomless culverts.

Resort Creek – Replace existing 6-foot culvert with two 120-foot single-span bridges.

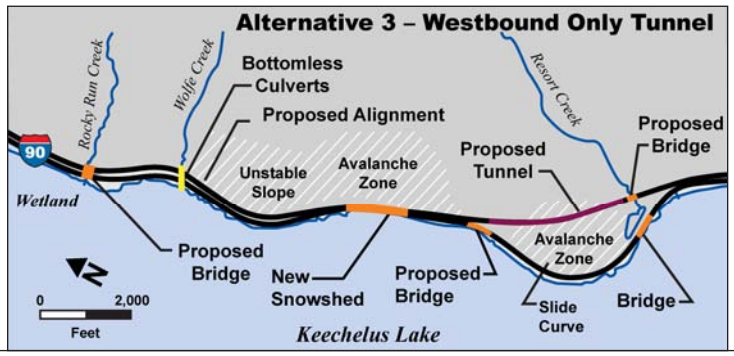


Alternative 2 – Two 0.6-mile tunnels with three lanes in each direction would be built along Keechelus Lake. Replace existing snowshed with new six-lane expanded snowshed.

Rocky Run Creek – Same as Alternative 1.

Wolfe Creek – Same as Alternative 1.

Resort Creek – Same as Alternative 1.

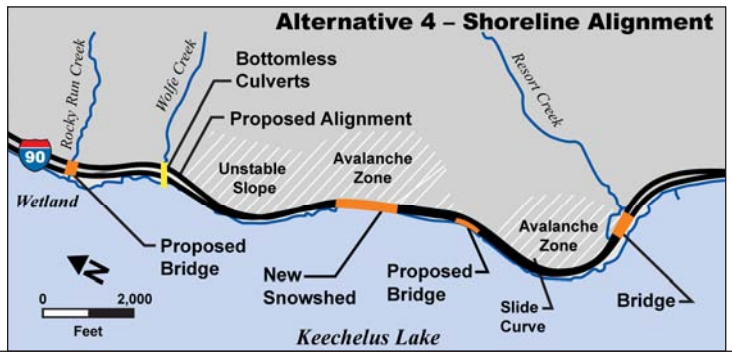


Alternative 3 – One 0.6-mile tunnel with three lanes would be built in the westbound direction along Keechelus Lake. The eastbound lanes would be constructed along Keechelus Lake. Replace existing snowshed with new six-lane expanded snowshed.

Rocky Run Creek – Same as Alternative 1.

Wolfe Creek – Same as Alternative 1.

Resort Creek – Replace the existing 6-foot culvert under the westbound lanes with a 120-foot single-span bridge. Replace the existing 6-foot culvert under the eastbound lanes with a 180-foot single-span bridge.



Alternative 4 – Three lanes would be constructed in each direction around Slide Curve. Replace existing snowshed with new six-lane expanded snowshed.

Rocky Run Creek – Same as Alternative 1.

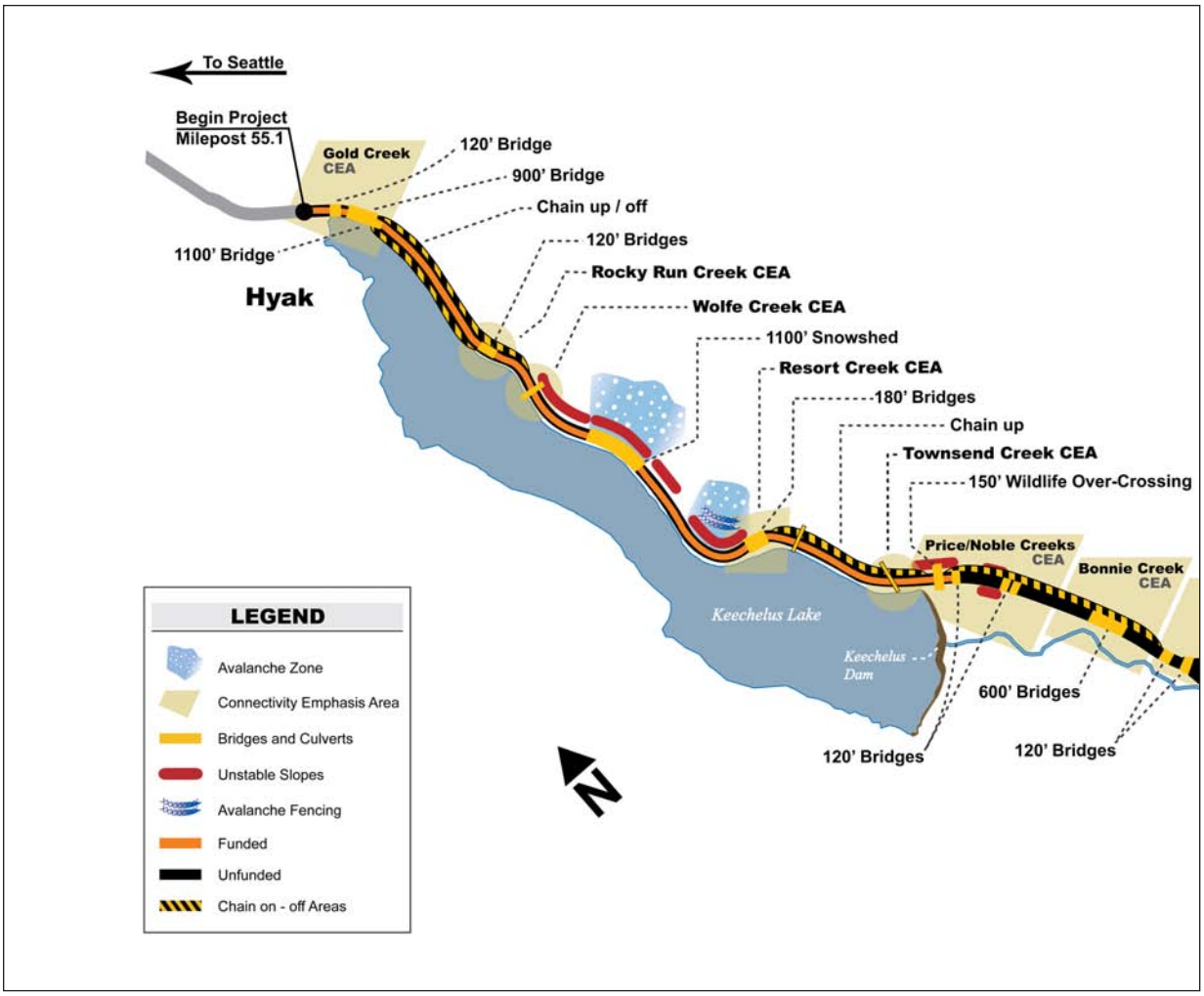
Wolfe Creek – Same as Alternative 1.

Resort Creek – Replace existing 6-foot culvert with two 180-foot single-span bridges.

Reducing the design speed and removing the viaduct bridges would reduce environmental impacts and would allow the highway to remain closer to its existing alignment, eliminating the need for new fill in Keechelus Lake. Removing the viaduct bridges would eliminate the need for substantial amounts of in-water construction (Exhibit ES-7).

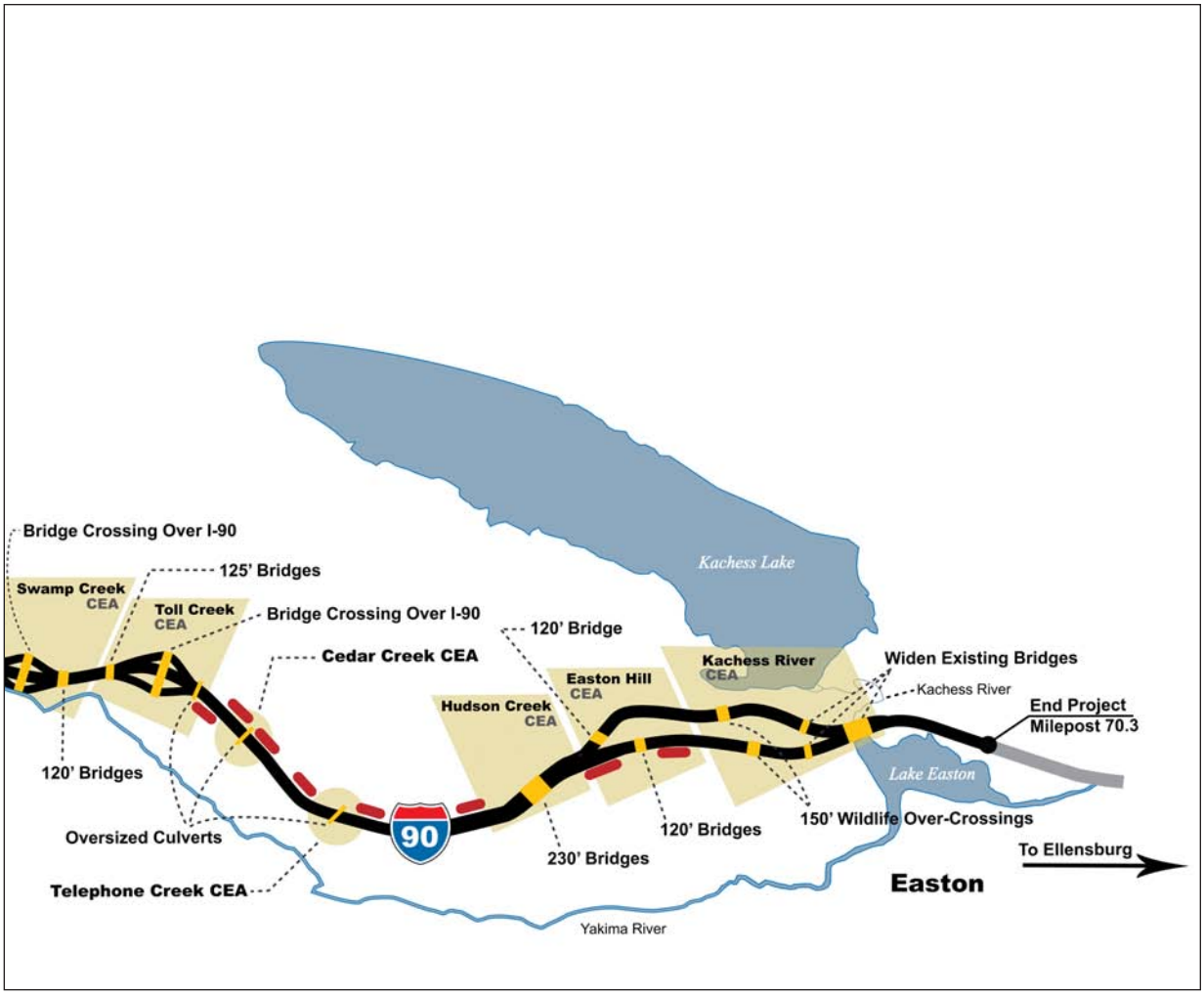
In May 2008, WSDOT proposed a further minor change to the project design at Resort Creek. WSDOT replaced the original Preferred Alternative design, a series of culverts, with a pair of 180-foot single-span bridges. This change would avoid design and construction problems with culverts, and allow for creation of

Exhibit ES-8
Preferred Alternative Major Improvements



additional habitat connections under the bridges. WSDOT discussed this modification with the IDT and with biologists and hydrologists from the USFS, the US Fish and Wildlife Service (USFWS), and the Washington Department of Fish and Wildlife (WDFW).

FHWA and WSDOT adopted these recommended changes in March 2007. These design modifications were within the range of alternatives analyzed within the Draft EIS (Exhibit ES-8).



What are the effects of the project?

The I-90 project would have both beneficial and adverse environmental impacts. FHWA, WSDOT, and all of the project partner agencies expect that the project's beneficial effects would be much more extensive than the adverse impacts. The overall beneficial and adverse effects of the project are summarized in Exhibit ES-9. The permanent adverse impacts are shown in more detail in Exhibit ES-10 and Exhibit ES-11.

Exhibit ES-9
Summary of Effects of the Project

Element of the Environment	Summary of Beneficial and Adverse Effects of the Build Alternatives	
	Beneficial Effects	**Adverse Effects**
Traffic Safety and Capacity	All of the build alternatives would provide increased capacity for traffic by widening the highway to three lanes in each direction. Slope stabilization and the new snowshed would reduce the danger of avalanches and rock fall hazards. Straightening the highway where possible and building wider shoulders would lower the danger of accidents. Building wildlife crossing structures would reduce the potential for collisions between wildlife and vehicles. These beneficial effects would be similar for all of the build alternatives, except in the area of collisions between wildlife and vehicles, where the Preferred Alternative would provide the greatest benefit, since the wildlife crossing structures in this alternative most closely meet the project's ecological connectivity objectives.	The project would have temporary adverse effects on transportation during construction. Once construction is complete, there would be no adverse effects.
Social Values	All of the build alternatives would produce benefits to the social environment by implementing the Cascadian Architectural design theme. Additional social benefits would include reducing driver frustration due to traffic backups and increasing access to recreation areas. Increasing wildlife habitat connections in the project area also has been identified as an important social value. These benefits would be similar for all of the build alternatives.	Construction of any of the build alternatives would result in some temporary social impacts, including traffic delays due to construction and noise impacts to residents and recreation users. The only permanent adverse social impact would be replacment of the existing snowshed, which is an historic structure. FHWA and WSDOT do not expect the project to result in relocation of residences or businesses. All of the build alternatives would have similar adverse social impacts.
Economic Values	All of the build alternatives would result in greater predictability and fewer delays to freight transport, as the avalanche, rock fall, and sharp curve problems are corrected. All of the build alternatives would reduce the economic costs of traffic delays. All would result in reduced costs of pavement repair, since the project would replace the existing deteriorated pavement.	Construction of any of the build alternatives would cause some temporary economic impacts, primarily due to traffic delays. There would be no permanent adverse economic impacts. For the Keechelus Lake Alignment Alternatives, the Preferred Alternative would most likely have the lowest impact since the period of construction would be the shortest.

Exhibit ES-9
Summary of Effects of the Project

Element of the Environment	Summary of Beneficial and Adverse Effects of the Build Alternatives	
	Beneficial Effects	**Adverse Effects**
	Jobs in Kittitas and King Counties, as well as the added economic benefit of the expenditure of project funds on regional economies.	All of the build alternatives for the CEA Improvement Packages would have similar adverse impacts.
Natural Environment	All of the build alternatives would result in benefits to wildlife and wildlife habits. Crossing structures would result in a greater ability for wildlife to safely cross the highway, which would include both larger, more mobile species such as deer and bear, and smaller, less mobile species such as amphibians. All would result in more natural stream channel movement and improved fish passage by replacing narrow bridges and culverts with longer bridges and larger culverts. All would result in increased habitat connections at the CEAs, which may lead to improved species health. These beneficial effects would be greatest for the Preferred Alternative, which has been designed to most fully meet the project's ecological connectivity objectives. Benefits would be smaller for the other build alternatives. In some cases, Option C would not perform well enough to meet the project's purpose and need. All of the build alternatives would improve groundwater flow under the highway by placing small culverts at identified hydrologic connectivity zones. This benefit would be similar for all of the build alternatives. Under all of the build alternatives, water quality would improve, since WSDOT would treat stormwater runoff for the equivalent of all existing and new impervious surfaces. This would include compensatory treatment for areas where terrain makes stormwater treatment difficult or impossible.	Construction of any of the build alternatives would cause some temporary impacts to the natural environment, primarily from disturbed vegetation. Temporary impacts would be limited to the period of construction and would be successfully mitigated through construction BMPs. Any of the build alternatives would cause some permanent impact, primarily from the placement of new highway fill. Adverse impacts would include loss of terrestrial, riparian, and aquatic habitat, including some project area forest, wetlands, streams, and deep water areas of Keechelus Lake. The overall area of impact would be similar for any of the build alternatives; however, the Preferred Alternative would shift impacts from higher to lower-quality wetlands.

BMP – best management practice
CEA – connectivity emphasis area
FHWA – Federal Highway Administration
WSDOT – Washington State Department of Transportation

Permament adverse impacts would occur under any of the build alternatives. These include impacts to terrestrial, riparian, and aquatic habitats. However, the Preferred Alternative would shift impacts from higher to lower quality resources (Exhibit ES-11 and Exhibit ES-12).

Exhibit ES-10
Permanent Adverse Impacts, Keechelus Lake Alignment Alternatives

Element of the Environment	No Build	Alternative 1	Alternative 2	Alternative 3	Alternative 4/ Preferred Alternative
Geology and Soils					
Avalanche hazards	Increase	Decrease	Decrease	Decrease	Decrease
Total disturbed area (acres)	None	36.9	52.7	55.8	58.7
Air Quality					
	None	None	None	None	None
Water Resources[1]					
Water quality	No change	Meets Highway Runoff Manual			
Wetlands and Other Jurisdictional Waters[1]					
Category I wetlands (acres)	None	2.00	1.93	1.41	0.00
Category II wetlands (acres)	None	0.87	0.87	0.87	0.87
Category III wetlands (acres)	None	0.36	0.36	1.02	0.80
Wetlands without hydric soil indicators (acres)	None	3.89	4.02	4.48	4.48
Category IV wetlands (acres)	None	0.26	0.46	0.46	0.46
Total Wetlands (acres)	None	*7.39*	*7.64*	*8.24*	*6.61*
Wetland Buffers (acres)	None	8.15	10.17	9.11	7.64
Reservoirs (acres)	None	0.94	1.22	4.06	3.80
Streams (acres)	None	0.19	0.19	0.08	0.07
Potentially jurisdictional ditches (linear feet)	None	454	1,522	1,560	2,538
Terrestrial Species					
Total Terrestrial Habitat Filled (acres)	None	31.3	46.7	45.8	49.2
Mature Forest Filled (acres)	None	1.7	3.4	2.8	5.1
Transportation					
LOS D	2013	2041	2041	2041	2041
LOS E	2025	2058	2058	2058	2058
Noise					
	Noise will increase with traffic volume, but will not meet federal abatement criteria.				
Historic, Cultural, and Archaeological Resources					
	None	None	Removal of the snowshed	Removal of the snowshed	Removal of the snowshed
Recreation Resources					
	None	None	None	None	None

Exhibit ES-10
Permanent Adverse Impacts, Keechelus Lake Alignment Alternatives

Element of the Environment	No Build	Alternative 1	Alternative 2	Alternative 3	Alternative 4/ Preferred Alternative
Land Use Approximate number of acres acquired					
Private Land (approximate acres acquired)	0	6.8	7.4	4.5	0.7
Public Land (approximate acres acquired)	0	89.3	48.6	43.5	39.3
Total	*0*	*96.1*	*56.0*	*48.0*	*40.0*
Visual Quality					
	None	Minimal	Minimal	Minimal	None
Social and Economic Resources					
	Continued road closures	None	None	None	None
Hazardous Materials and Waste					
	None	None	None	None	None
Energy					
	Lowest Consumption	Highest Consumption	2nd Highest Consumption	3rd Lowest Consumption	2nd Lowest Consumption

The area of permanent impact is between MP 56.6 and MP 59.9.

[1] Impacts to wetlands and water resources have been delineated and surveyed and are shown to the nearest hundredth of an acre; other areas are based on field measurements, surveyed footprint, and GIS analysis, and are shown to the nearest tenth of an acre.

Exhibit ES-11
Permanent Adverse Impacts, CEA Improvement Packages

Element of the Environment	No Build	Option Package A	Option Package B	Option Package C	Preferred Alternative
Geology and Soils					
Total disturbed area (acres)	None	203.2	208.2	211.5	205.5
Air Quality					
	None	None	None	None	None
Water Resources					
Water quality	No change	Meets Highway Runoff Manual			
Wetlands and Other Jurisdictional Waters[1]					
Category I wetlands (acres)	None	0.23	0.32	0.42	0.3
Category II wetlands (acres)	None	3.28	3.54	3.51	4.39
Category III wetlands (acres)	None	2.61	3.24	3.31	2.59
Wetlands without hydric soil indicators (acres)	None	1.23	1.23	1.23	1.30
Category IV wetlands (acres)	None	1.00	1.05	1.05	1.01
Total Wetlands (acres)	None	*8.35*	*9.38*	*9.52*	*9.59*

Exhibit ES-11
Permanent Adverse Impacts, CEA Improvement Packages

Element of the Environment	No Build	Option Package A	Option Package B	Option Package C	Preferred Alternative
Wetland Buffers (acres)	None	13.30	14.52	14.90	13.45
Reservoirs (acres)	None	2.30	2.34	2.34	2.33
Streams (acres)	None	0.83	0.85	0.91	0.83
Potentially jurisdictional ditches (linear feet)	None	1,229	1,285	1,205	1,272
Terrestrial Species					
Wildlife mortality	Increase	Decrease	Decrease	Decrease	Decrease
Total Terrestrial Habitat Filled (acres)	None	197.2	202.2	205.5	199.5
Mature Forest Filled (acres)	None	70.2	71.3	79.1	70.3
Transportation					
LOS D	2013	2041	2041	2041	2041
LOS E	2025	2058	2058	2058	2058
Noise					
	Noise will increase with traffic volume, and may meet abatement criteria at Lake Easton State Park.				
Historic, Cultural, and Archaeological Resources					
	None	None	None	None	None
Recreation Resources					
	None	Closure of Price Creek Sno-Park (Westbound) and Price Creek Interim Rest Area (Eastbound)			
Land Use Approximate number of acres acquired					
Private Land (approximate acres acquired)	0	6.6	6.6	6.6	6.6
Public Land (approximate acres acquired)	0	87.9	87.9	87.9	87.9
Total	*0*	*94.5*	*94.5*	*94.5*	*94.5*
Visual Quality					
	None	None	None	None	None
Social and Economic Resources					
	Continued road closures	None	None	None	None
Hazardous Materials and Waste					
	None	None	None	None	None
Energy					
	Lowest Consumption	2nd Highest Consumption	3rd Lowest Consumption	2nd Lowest Consumption	Highest Consumption

The area of permanent impact includes the entire project area except the area between MP 56.6 and MP 59.9.

[1] Impacts to wetlands and water resources have been delineated and surveyed and are shown to the nearest hundredth of an acre; other areas are based on field measurements, surveyed footprint, and GIS analysis, and are shown to the nearest tenth of an acre.

How would FHWA and WSDOT mitigate for the adverse impacts of the project?

How did FHWA and WSDOT avoid and minimize impacts?

The lead agencies have committed to using appropriate BMPs to mitigate for the impacts of construction. Construction BMPs are measures designed to assure compliance with all applicable regulations, permit conditions, and the conditions of the transfer of federal land to FHWA and WSDOT for the expanded highway.

The project's approach to mitigation began with designing the project to avoid and minimize impacts. These efforts included:

- Designing the range of build alternatives along the Common Route
- Identifying alternatives that would have the lowest level of impact
- Making small adjustments to the location of the new highway to avoid areas of sensitive habitat wherever possible
- Designing the new highway to treat stormwater for the equivalent of all new and impervious surfaces in the project area
- Designing bridges and culverts to state design standards and the performance standards recommended by the IDT and MDT for ecological connectivity objectives

What commitments have FHWA and WSDOT made related to construction impacts?

Commitments for construction include specific best management practices (BMPs) to be used by contractors before, during, and after construction to minimize environmental impacts. BMPs are tools or actions designed to achieve a desired result by establishing factors such as the timing of construction, construction methods, or methods to protect specific resources. BMPs are designed to meet the performance standards set by applicable regulations and project-specific commitments. Applicable performance standards for the I-90 project are shown in Exhibit ES-12.

Crystal Springs Sno-Park will be used in the spring and summer as a materials stockpiling site. It will continue to be used as a sno-park in the winter.

Exhibit ES-12
Summary of Performance Standards Governing Construction BMPs

Element of the Environment	Applicable Performance Standards
Geology and Soils	NPDES General Permit for Construction Activities
	NPDES General Permit for Sand and Gravel Operations
	Temporary Erosion and Sediment Control Plans
	Erosion and sediment control requirements of the WSDOT *Design Manual* and *Standard Specifications for Road, Bridge, and Municipal Construction*
	Spill Prevention, Control and Countermeasure Plans
	Applicable permit requirements
	Conditions imposed by the USFS related to use of federal land for additional easement
	Applicable conservation measures included in the NOAA Fisheries' ESA Consultation Concurrence Letter
	Applicable parts of the *Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation*
	Objectives of the USFS Aquatic Conservation Strategy
	Construction safety requirements and maintaining operation of the highway during construction, including Occupational Safety and Health Administration requirements and highway safety standards
Air Quality	Permit conditions from Ecology's Central Regional Office for temporary exhaust emissions sources and suspended particulates
	The National Ambient Air Quality Standards
	Air quality BMPs included as permit requirements or as conditions imposed by the USFS related to use of federal land for additional highway easement
Water Resources	Clean Water Act Section 404 Permit(s)
	Clean Water Act Section 401 Water Quality Certification
	NPDES General Permit for Construction Activities
	NPDES General Permit for Sand and Gravel Operations
	Temporary Erosion and Sediment Control Plans
	Spill Prevention, Control and Countermeasures Plans
	Erosion and sediment control requirements of the WSDOT *Design Manual and Standard Specifications for Road, Bridge, and Municipal Construction*
	WSDOT *Highway Runoff Manual*
	Applicable measures specified in the USFWS Biological Opinion
	Applicable conservation measures included in the NOAA Fisheries' ESA Consultation Concurrence Letter
	Applicable parts of the *Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation*
	Objectives of the USFS Aquatic Conservation Strategy

Exhibit ES-12
Summary of Performance Standards Governing Construction BMPs

Element of the Environment	Applicable Performance Standards
	MDT design objectives and performance standards
	Applicable permit conditions
	Applicable conditions and stipulations related to the transfer of federal land for highway easement
Wetlands and Other Jurisdictional Waters	Standards listed under Water Resources
	The Final Wetland & Aquatic Resources Mitigation Plan
	The project-specific roadside master plan
Fish, Aquatic Species and Habitats	Standards listed under Water Resources
	The WDFW *Design of Road Culverts for Fish Passage* manual
	WSDOT's *Fish Exclusion Protocols and Standards*
	The Washington State Hydraulic Code (Washington Administrative Code 220-110)
	Applicable measures specified in the USFWS Biological Opinion
	WDFW guidelines for stream crossing structures
Terrestrial Species	NPDES General Permit for Construction Activities
	NPDES General Permit for Sand and Gravel Operations
	Temporary Erosion and Sediment Control Plans
	Spill Prevention, Control and Countermeasure Plans
	Erosion and sediment control requirements of the WSDOT *Design Manual* and *Standard Specifications for Road, Bridge, and Municipal Construction*
	Applicable measures specified in the USFWS Biological Opinion
	Applicable parts of the *Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation*
	Applicable permit conditions
	Applicable conditions related to the transfer of federal land for highway easement
Transportation	*Standard Specifications for Road, Bridge, and Municipal Construction*
	All other applicable WSDOT design manuals and standards
Noise	Washington State and Kittitas County noise requirements
Historic, Cultural, and Archaeological Resources	WSDOT will develop and implement a project-specific unanticipated discovery plan, which will establish procedures to deal with the discovery of cultural resources before and during construction, and cultural resource monitoring for each phase of the project
Recreation Resources	The agreement between WSDOT and State Parks for use of the Crystal Springs Sno-Park for materials staging and stockpiling
	Permit conditions, which may include Special Use Permits from the USFS for the temporary use of and improvements to the Cabin Creek Sno-Park, and FSR 4832 and FSR 54 if they are used as haul roads
	Applicable conditions related to the transfer of or use authorization for federal land from the USFS and USBR for highway easement

Exhibit ES-12
Summary of Performance Standards Governing Construction BMPs

Element of the Environment	Applicable Performance Standards
Land Use	No BMP-related commitments have been made. Construction BMPs will avoid and minimize impacts to adjacent private property.
Visual Quality	WSDOT's Integrated Vegetation Management Program WSDOT's *Roadside Classification Plan*, which specifies the restoration of native forest communities using small plant material, as well as soil restoration, hydroseeding, fertilizing, and mulching
Social and Economic Resources	No BMP-related commitments have been made
Hazardous Materials and Waste	Spill Prevention, Control and Countermeasure Plan Applicable parts of the *Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation* The project health and safety plan and Occupational Health and Safety Administration regulations
Energy	No BMP-related commitments have been made

BMP - best management practice
Ecology - Washington State Department of Ecology
ESA - Endangered Species Act
FSR - Forest Service Road
MDT - Mitigation Development Team
NOAA - National Oceanic and Atmospheric Administration
NPDES - National Pollutant Discharge Elimination System
State Parks - Washington State Parks and Recreation Commission
USBR - US Bureau of Reclamation
USFS - US Forest Service
USFWS - US Fish and Wildlife Service
WDFW - Washington Department of Fish and Wildlife
WSDOT - Washington State Department of Transportation

What commitments have FHWA and WSDOT made related to compensatory mitigation?

Where environmental impacts remain, the lead agencies have committed to performing compensatory mitigation. The projects' compensatory mitigation approach and commitments are shown in Exhibit ES-13.

Commitments for compensatory mitigation include the actions the lead agencies will take to replace or substitute for unavoidable environmental impacts. Commitments listed in Exhibit ES-13 do not include the many actions that the project has taken to avoid and minimize environmental impacts. Because avoidance and minimization are important elements of environmental mitigation, they have been incorporated into the design and do not require subsequent commitments other than to build the project as designed.

Cross-country skiers take advantage of winter recreation opportunities near I-90.

Exhibit ES-13
Summary of Compensatory Mitigation Approaches

Element of the Environment	Proposed Mitigation Approach
Geology and Soils	Since there will be no permanent adverse impacts to geology and soils, no compensatory mitigation will be required.
Air Quality	Since there will be no permanent adverse impacts to air quality, no compensatory mitigation will be required.
Water Resources	WSDOT will provide stormwater treatment for the equivalent of all impervious surfaces. To compensate for areas where the terrain makes treatment impracticable, WSDOT will provide additional treatment in other off-site locations in or near the project corridor. WSDOT will use the *Highway Runoff Manual* Appendix 2A procedure or the "equivalent area" approach to mitigate for constrained areas in which stormwater treatment is physically impossible. This approach allows WSDOT to retrofit stormwater treatment onto existing off-site impervious surface with pollution loading characteristics similar to the constrained areas.
Wetlands and Other Jurisdictional Waters	**Restoration** WSDOT will restore wetland areas, stream channels, and riparian areas at each CEA where new bridges and culverts are installed. Wetlands and riparian areas probably existed prior to the original highway construction at these locations, and the project has been designed to reestablish connections between wetlands and other high quality habitats, as well as restore channel migration and floodplain functions. Mitigation measures proposed at locations within and adjacent to CEAs include: • Restoring and creating wetland, stream, and riparian zone area and function • Restoring connections between wetlands and other important wildlife habitats • Restoring channel migration and surface and subsurface flow paths • Restoring connections between streams, floodplains, and riparian zones • Restoring passage for fish and aquatic organisms at stream crossings Impacts from these restoration activities would be limited to soil disturbance during construction. Mitigation sites temporarily affected by construction will be restored once construction is complete. Restoration activities may include: • Restoring pre-construction contours • Replacing or amending surface soils • Planting or seeding with native herbaceous and/or woody vegetation WSDOT will maintain and monitor all planted areas, based on the commitments made in the final *Wetlands & Aquatic Resources Mitigation Plan*, which will be completed by WSDOT as part of project permitting. **Habitat Preservation** WSDOT is acquiring a 265-acre property for habitat preservation in the Gold Creek Valley. This property contains wetlands, riparian areas, and mature forest, including potential habitat for northern spotted owls, marbled murrelets, and bull trout. This property has potential for high-density development, which would be avoided through this acquisition. WSDOT has committed to preserve this property in perpetuity.

Exhibit ES-13
Summary of Compensatory Mitigation Approaches

Element of the Environment	Proposed Mitigation Approach
	Proposed Wetland Mitigation Ratio WSDOT will compensate for unavoidable impacts to wetland area and function at a minimum 1:1 mitigation ratio, in accordance with Federal Executive Order 11990, Governor's Executive Order 89-10 (Protection of Wetlands: "No Net Loss") and WSDOT Directive 31-12 (Protection of Wetlands Action Plan). A Clean Water Act Section 404 permit will be obtained. **Highway Reclamation** As phases of the project are completed, WSDOT will perform extensive restoration activities that include areas of additional forested habitat, highway reclamation, buffer improvements, and highway slope vegetation with native species.
Fish, Aquatic Species, and Habitats	FHWA and WSDOT believe that by combining avoidance, mitigation, and BMPs, the impacts of the project to fish and other aquatic species and their habitats will be minimized. Potential impacts to Columbia River bull trout will be mitigated through compliance with the applicable measures specified in the USFWS Biological Opinion. The project also will implement the conservation measures in the *Biological Assessment* and the *Biological Evaluation.* The remaining impacts will be mitigated through beneficial effects including fish passage restoration, increase in overall habitat, improved in-stream physical processes, and improved water quality. Consequently, no additional compensatory mitigation will be required.
Terrestrial Species	FHWA and WSDOT believe that by combining avoidance, mitigation, and BMPs, the impacts of the project to terrestrial species will be minimized. Potential impacts to the marbeled murrelet and northern spotted owl will be mitigated through compliance with the applicable measures specified in the USFWS Biological Opinion. The project also will implement the conservation measures in the *Biological Assessment* and the *Biological Evaluation.* The project will mitigate for remaining impacts through the beneficial effects of the build alternatives, which includes improved ecological connectivity, an increase in riparian habitat, and a decrease in wildlife mortality. Consequently, no additional compensatory mitigation will be required. However, WSDOT has acquired areas of mature forest now in private ownership as part of the preservation component for wetlands.
Transportation	Since there will be no permanent adverse impacts to transportation, no compensatory mitigation will be required.
Noise	WSDOT found that a noise wall at Lake Easton State Park Campground would be both feasible and reasonable. Lake Easton State Park is not within the currently funded portion of the project. When funding becomes available for this portion of the I-90 project, WSDOT will conduct a supplemental noise analysis that addresses potential noise impacts and the feasibility of a noise barrier wall. WSDOT will continue to consult with State Parks to determine whether a noise wall or other suitable noise mitigation measure is required at Lake Easton State Park.
Historic, Cultural, and Archaeological Resources	FHWA, WSDOT, and the SHPO agreed on mitigation measures for removing the snowshed. WSDOT has agreed to perform the following measures, all located at Travelers' Rest, a potentially historic WSDOT-owned building located at the Snoqualmie Pass summit: ▪ Historic structures report for the Travelers' Rest building ▪ Site assessment of current and potential uses of Travelers' Rest, including mitigation options and needs

Exhibit ES-13
Summary of Compensatory Mitigation Approaches

Element of the Environment	Proposed Mitigation Approach
	▪ Phase 1 environmental site assessment for hazardous materials • Interpretive signs at Travelers' Rest depicting historic travel, including Native Americans, over Snoqualmie Pass, history of the Travelers' Rest building and site, and history and engineering facts of the snowshed
Recreation Resources	FHWA and WSDOT will work with the USFS and State Parks to mitigate for the temporary occupancy of the Crystal Springs and Cabin Creek Sno-Parks, and for the loss of the Price Creek Sno-Park (Westbound). WSDOT will develop an agreement with State Parks for the Crystal Springs Sno-Park to identify temporary and long-term commitments for the site. WSDOT will work with the USFS to develop a Special Use Permit that will specify details for WSDOT's temporary occupancy of the Cabin Creek Sno-Park and long-term reclamation for the site. WSDOT will replace the parking afforded by the Price Creek Sno-Park (Westbound) at a location to be determined in consultation with the USFS and State Parks, and the current parking lot will be restored to forested conditions. The new sno-park location will not conflict with resources managed by State Parks or the USFS. WSDOT will not close the Price Creek Sno-Park (Westbound) until funding has been received for the remainder of the project and a replacement site has been identified, designed, and constructed.
Land Use	In the event that residents or businesses are relocated, WSDOT will comply with the terms of the federal Uniform Relocation Act of 1970, as amended.
Visual Quality	WSDOT will meet the terms of the Project *Architectural Design Guidelines* and project roadside master plan.
Social and Economic Resources	Since there will be no permanent adverse impacts to social and economic resources, no compensatory mitigation will be required.
Hazardous Materials and Waste	Since there will be no permanent adverse impacts to hazardous materials and waste, no compensatory mitigation will be required.
Energy	Since there will be no permanent adverse impacts to energy, no compensatory mitigation will be required.

BMPs - best management practices
CEA - connectivity emphasis area
FHWA - Federal Highway Administration
SHPO - State Historic Preservation Officer
State Parks - Washington State Parks and Recreation Commission
USFS - US Forest Service
USFWS - US Fish and Wildlife Service
WSDOT - Washington State Department of Transportation

The project area contains several threatened or endangered species, and FHWA has consulted with USFWS and National Oceanic and Atmospheric Administration (NOAA) Fisheries as required by the Endangered Species Act. FHWA has received a letter of concurrence from NOAA Fisheries for Middle Columbia River steelhead, and is formally consulting with USFWS for northern spotted owl, marbled murrelet and Columbia River bull trout. Based on this consultation, FHWA and WSDOT believe that the project would not have a substantial impact on these species.

What commitments have FHWA and WSDOT made related to the design of wildlife structures?

WSDOT performed a detailed analysis of the MDT's recommended performance objectives and standards for CEAs. Based on this analysis, WSDOT made a series of commitments related to the design at each CEA. These commitments are designed to be adaptable, preserving WSDOT's commitment to the MDT goals and objectives, but allowing modification of the specific designs as new field information is developed. FHWA and WSDOT will continue to work with the IDT and technical committees throughout final design.

What commitments have FHWA and WSDOT made to keep traffic flowing during construction?

How would construction affect vehicle traffic?

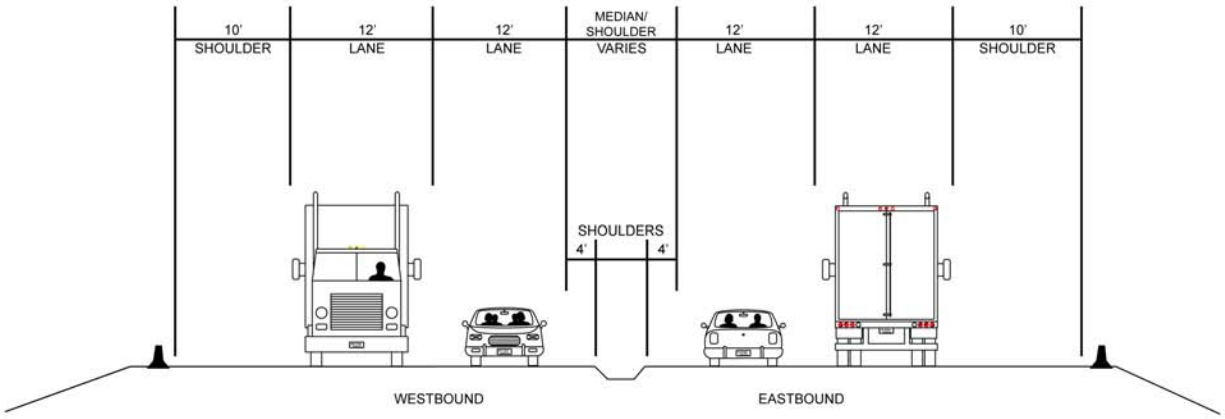
Lane restriction on I-90.

Construction of any of the build alternatives would affect travel in the project area. These impacts would include detours, construction work zones, lane restrictions, and reduced speed limits.

WSDOT has made several commitments to minimize impacts to traffic while the project is under construction. Except for rare exceptions, WSDOT will keep two lanes open in each direction during peak driving times throughout construction. Construction would sometimes require WSDOT to reduce traffic to a single lane; however, WSDOT will keep lane closures as short as possible and would typically limit them to Monday through Thursday during low-traffic periods. During blasting operations, traffic traveling both directions would be required to stop as a safety measure.

The existing typical highway cross section (Exhibit ES-14) consists of four 12-foot lanes (two in each direction of travel), 10-foot outside shoulders, and four-foot to 10-foot inside shoulders. During construction detours, WSDOT would use a similar alignment. Detour alignments would physically separate traffic from the work zone and would include four 12-foot lanes, two in each direction of travel. Both the inside and outside shoulders would be four feet wide. Each direction of travel would be separated by a temporary concrete barrier. The traffic capacity of the construction detour alignment would be reduced from 2,000 to 1,300 vehicles per hour per lane, as a result of the unfamiliar alignment and reducing the speed limit to 55 mph in the work zone.

Exhibit ES-14
Existing Highway Cross Section



Construction typically would take place during the snow-free months, generally between April and October. During the winter months, construction likely would shut down and traffic would be separated from construction zones using a four-lane configuration similar to existing conditions wherever possible. Each of the build alternatives would result in different construction phases, and WSDOT will determine the exact sequence of construction steps during final design and permitting.

How would construction affect bicycle traffic?

Bicycle traffic would be affected during construction, since the existing shoulder may become hazardous or temporarily unusable. This would be especially true along the narrow area of the highway along Keechelus Lake.

Bicyclists should expect temporary closures as a result of construction. These closures could last as long as a full construction season.

After construction, WSDOT would continue allowing bicyclists to use the outside paved shoulders of I-90. None of the build alternatives include specific improvements for pedestrians or bicycles.

What options has WSDOT considered to manage bicycle traffic during construction?

- Informing local bike clubs of planned closures so that they can alert their members
- Temporary bicycle detours through the construction zone
- Temporary closures with event shuttles and posted detour routes
- Equipping incident response team vehicles with bicycle racks that could accommodate three to four bicycles so that the incident response team vehicles could give bicyclists rides through the construction zone

How will WSDOT communicate with the public?

WSDOT will use a variety of communication programs to keep the public informed and traffic moving. These programs or resources include Intelligent Transportation Systems, Highway Advisory Radio, the WSDOT website, and a newsletter with pertinent construction information for travellers. The media will be used to inform drivers about road conditions.

Bicyclists using the John Wayne Pioneer trail near the project.

What other commitments have FHWA and WSDOT made?

The lead agencies have made a variety of additional commitments:

- During consultation, WSDOT agreed to coordinate revegetation and mitigation plant lists with interested tribes to consider the inclusion of plants traditionally used by Native Americans.

- WSDOT will continue to collaborate with state and federal land managers, land conservancies, and private landowners in order to ensure that public investments continue to have value for both travelers and the natural environment.

- WSDOT will extend Phase 1C past MP 59.9 if funding allows.

- As design for subsequent phases is completed, WSDOT will conduct further environmental investigations, which will determine the precise extent and location of environmental impacts and whether supplemental review is needed. WSDOT commits to performing any supplemental review that is required by NEPA and SEPA if:

    - Changes to the proposed project would result in significant environmental impacts

    - There are any significant design changes to the project

    - Environmental impacts not discussed in the Final EIS are discovered

Image of a bear from a mounted wildlife monitoring camera near Snoqualmie Pass.

- WSDOT will implement a monitoring plan for wildlife crossing structures during Phase 1 of construction and will use the results of this monitoring program in an adaptive management approach when designing fish and wildlife crossing structures for the remaining project area.
- WSDOT will comply with the USFS Riparian Reserves requirements.
- WSDOT will design wildlife structures that would not be conducive to human use.
- WSDOT will monitor the performance of the connectivity structures, and will use the results in the design of later phases of the project.
- WSDOT will conduct further wetland impact analysis as part of permitting for sites within the currently unfunded phase(s) of the project east of Keechelus Dam.
- WSDOT will add culverts at increased frequency and density in areas where habitat, topography, and engineering constraints allow.

How is WSDOT proposing to monitor wildlife?

Monitoring would consist of two tiers:

Baseline monitoring in and near the highway right-of-way, which would consist of collecting data on current wildlife movement (including accidents involving wildlife), and data on the use and effectiveness of the crossing structure designs after they are built. Pre-construction monitoring began in 2008.

Additional monitoring farther away from WSDOT's right-of-way, which would complement the baseline monitoring and may help to advance the state of knowledge of wildlife crossing design and performance, along with landscape level topics such as population viability. WSDOT would have to partner with other agencies and groups to accomplish this additional monitoring.

Would there be unavoidable impacts following mitigation?

FHWA and WSDOT believe that following mitigation there would be no substantial adverse impacts to any element of the environment.

What issues are controversial?

The following issues remain controversial:

Closure of the Price Creek Sno-Park (Westbound). Some recreation users may object to the loss of this recreation site. WSDOT has committed to replace the parking capacity to be lost, and is engaged in ongoing consultation with Washington State Parks and Recreation Commission and user groups regarding replacement sites.

Preservation land containing wetland and mature forest in upper Gold Creek.

Whether stormwater treatment is adequate to handle heavy snow loads. Heavy snow loads can create more stormwater runoff in the spring than can be handled by many known runoff treatment systems. WSDOT is engaged in ongoing discussion with the Washington State Department of Ecology on alternative designs.

Will increased traffic noise impact Lake Easton State Park? WSDOT has committed to re-study this issue when funding is secured for this phase of the project, and to build a noise wall if it is found to be reasonable and feasible.

What issues remain to be resolved?

FHWA and WSDOT believe that the following issues remain to be resolved:

- Property acquisition and easements
- Identification of a parking area for the replacement of Price Creek Sno-Park (Westbound)
- Final decisions on construction phasing
- Final design of stream crossing structures and adaptive management application to CEA designs
- Funding for the remainder of the project following Phase 1
- Final permit conditions and final requirements for acquisition of right-of-way from the USFS and USBR
- Final stormwater design
- Final USFWS Biological Opinion
- An updated noise analysis at Lake Easton State Park when funding is secured for that phase of the project

- Additional funding for staff and resources to maintain the expanded highway

What are the next steps?

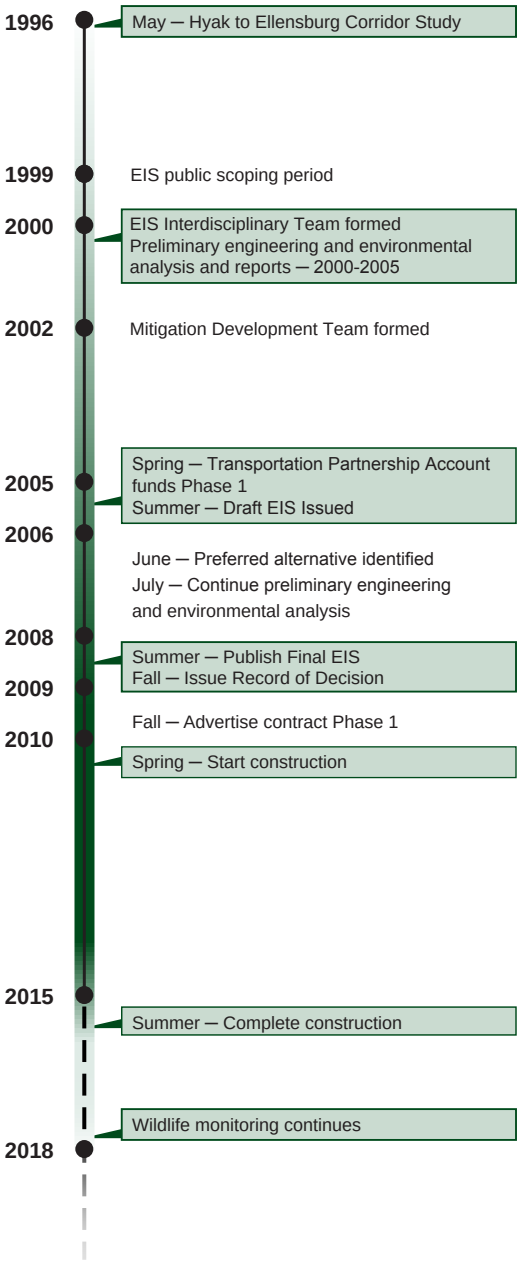
Upcoming milestones include:

Fall 2008 – FHWA will issue the Record of Decision for the project. FHWA and WSDOT will prepare the contract plan and obtain right-of-way easements, and WSDOT will work with regulatory agencies to obtain permits.

Fall/Winter 2009 – First construction contract will be advertised.

Spring 2010 – Construction will begin.

Summer 2015 – Phase 1 is scheduled to be completed.



What permits would be needed?

FHWA and WSDOT would be required to obtain numerous federal, state, and local permits, approvals, and notifications prior to construction of the project (Exhibit ES-15).

Most of the land surrounding the project area is within the Okanogan-Wenatchee National Forest. When I-90 was built in the late 1960s, the USFS granted FHWA an easement to use National Forest land for highway purposes where I-90 passes through National Forest land. Construction of the project would require the use of additional federal land in addition to the current right-of-way, and would therefore require an additional easement from the USFS. In order to grant the request for an additional easement, the USFS must first determine that the selected alternative is consistent with its statutory requirements and approved land use plans, as well as with procedures established between the USFS and FHWA. The USFS has indicated that this consistency determination will be made after publication of the Final EIS and Record of Decision.

Exhibit ES-15
Permits, Approvals, and Agreements

Agency	Regulation	Permit and Approval
Federal		
US Fish and Wildlife Service/ National Oceanic and Atmospheric Administration Fisheries	Endangered Species Act Section 7 Consultation and concurrence (impact to listed species) Magnuson-Stevens Fishery Conservation and Management Act Migratory Bird Act	Consultation and Biological Opinion
US Army Corps of Engineers	Clean Water Act (including demonstration that WSDOT has identified the least environmentally damaging practicable alternative) Section 404(b)(1) Alternatives Analysis	Section 404 Individual permit Jurisdictional Determination for Waters of the US
US Forest Service	Memoranda of Understanding between USFS, FHWA and WSDOT	Consistency determination with the USFS Forest Plan(s)
US Forest Service	Organic Act of 1897, National Forest Management Act of 1976	Access Permit(s) and Special Use Permit(s)
US Bureau of Reclamation	Work in Keechelus Lake	Crossing Permit(s) and/or use authorization
State		
Washington Department of Archaeology and Historic Preservation	National Historic Preservation Act Section 106 (impact on historic or cultural properties)	Consultation, Memorandum of Agreement for adverse effects between DAHP, FHWA, and WSDOT
Washington State Parks and Recreation Commission	Land and Water Conservation Act Section 6(f) (impact on outdoor recreation properties)	Agreement for use of Crystal Springs Sno-Park
Washington State Department of Ecology	Clean Water Act Section 401	Water Quality Certification
Washington State Department of Ecology	Clean Water Act Section 402 (RCW 90.48)	National Pollutant Discharge Elimination System Permits for Construction, Sand and Gravel, and possible aquatic spraying
Washington State Department of Ecology	Shoreline Management Act (RCW 90.58)	Consider administrative appeals
Washington State Department of Ecology	Oil Pollution Prevention Program (40 CFR 112)	Spill Prevention, Control and Countermeasure Plan
Washington Department of Fish and Wildlife	Construction Projects in State Waters (RCW 77.55)	Hydraulic Project Approval
Washington Department of Natural Resources	Forest Practices Act (RCW 76.09)	Forest Practices Permit (if project would remove trees on state or private land)
Local		
Kittitas County	County Code Shoreline Management Act (RCW 90.58)	Substantial Development Permit(s) and/or exemption(s)
Kittitas County	County Code	Detour and Haul Road Agreements on county roads

Exhibit ES-15
Permits, Approvals, and Agreements

Agency	Regulation	Permit and Approval
Kittitas County	County Code Title 18.08	Floodplain permit
Kittitas County	County Code Title 18.20 Growth Management Act: RCW 36.70A, Critical Areas: WAC 365-190-080(5)	Growth Management Act Critical Areas Ordinance permit
Kittitas County	County Code Title 17.44.150	Noise regulations
Kittitas County	County Code Title 17	Limited Zoning review

CFR – Code of Federal Regulations
DAHP – Department of Archaeology and Historic Preservation
FHWA – Federal Highway Administration
RCW – Revised Code of Washington
USFS – US Forest Service
WAC – Washington Administrative Code
WSDOT – Washington State Department of Transportation

Where can I find a copy of the Final EIS and other project documents?

Electronic versions of the Final EIS, Draft EIS, and appendices to both documents are included on the CD and DVD on the inside back cover of this document. This includes responses to comments on the Draft EIS. Additional copies can be found at: www.wsdot.wa.gov/Projects/I90/SnoqualmiePassEast

A limited number of hard copies or DVDs of the Final EIS may be obtained by contacting:

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(509) 577-1921
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Copies of the Final EIS (including responses to comments received on the Draft EIS) in paper copy and DVDs for reference only are located at selected King County Libraries (Bellevue Regional, Issaquah, Lake Hills, Newport Way, North Bend), Ellensburg Library, Cle Elum Library, Central Washington University Library, Seattle Public Library (Downtown Branch only), and the Washington State Library.