scaling (forcing the looser rocks to fall in a controlled setting), rock bolting, and installing wire mesh.

Alternative 3 would stabilize all of the unstable slopes along Keechelus Lake, be aligned onto a bridge in front of the existing snowshed, and include a tunnel through Slide Curve for westbound traffic. Alternative 3 would use the same slope scaling approach described for Alternative 2.

Alternative 4 would stabilize all of the unstable slopes along Keechelus Lake and be aligned onto a bridge in front of the existing snowshed. Alternative 4 would use the same slope scaling approach described for Alternative 2.

All of these improvements would be expected to improve traffic safety and reduce crash rates.

The sharpness of the road curvature and the placement of barriers directly affect the accident risk of the roadway. The four Keechelus Lake Alignment Alternatives have similar amounts of barriers. Alternative 1 is the straightest and has the least amount of accident risk. Alternatives 2, 3, and 4 have progressively sharper curves, increasing the accident risk from Alternative 2 to Alternative 4, respectively.

The Improvement Packages essentially follow the same route, so their accident risks do not differ substantially. The three Improvement Packages, considered as a whole, would not present substantial differences relative to existing traffic safety or crash rates. All of the new features would comply with applicable safety standards.

### 3.8 Noise

This section was prepared based on the *Noise Discipline Report* (Washington State Department of Transportation [WSDOT] 2003e) (Appendix P). The study area for noise includes the residential dwellings and campgrounds within the 15-mile project corridor that are classified as sensitive land uses or sensitive receptors. Calculated peak-hour noise levels were modeled for receptors north of westbound lanes and receptors south of eastbound lanes. The distances range from 50 feet from the edge of the highway to over 1,200 feet. These distances make up the study area for noise.

This analysis was prepared in accordance with Federal Highway Administration (FHWA) National Environmental Policy Act (NEPA) regulations, with additional guidance as provided in the WSDOT document entitled *Traffic Noise Analysis and Abatement Policy and Procedures*. The following methods were used to evaluate potential noise impacts associated with the project:
• Existing activities, developed lands and undeveloped lands for which development is planned, designed or programmed, and that may be affected by noise from the proposed highway, were identified from field surveys and aerial photographs of the project area.

• Short-term sound level measurements and traffic counts typical of existing peak-hour conditions were collected at selected representative locations throughout the project area, and used to characterize the existing noise environment throughout the project corridor.

• Traffic noise levels for Year 2001 and Design Year 2025 were estimated using the FHWA Traffic Noise Model. Traffic noise impacts were identified using the relative and absolute criteria specified in the WSDOT Environmental Procedures Manual (WSDOT 2001).

• Noise abatement measures for reducing or eliminating noise impacts were identified. The approximate costs to install noise barriers were estimated based on WSDOT guidance.

3.8.1 Affected Environment

3.8.1.1 Land Uses and Noise Sensitive Receptors

This section describes land uses and residential noise-sensitive receptors that were evaluated for the discipline report. Based on visual surveillance, most of the Interstate 90 (I-90) corridor between the towns of Hyak and Easton is rural and lightly developed, consisting mainly of commercial forest and rangeland.

Residential dwellings and campgrounds where people are frequently outdoors and normally sleep at night are considered FHWA Activity Category B land uses, and are subject to FHWA’s 66 A-weighted decibels (dBA) Noise Abatement Criterion (NAC) (Table 3.8-1). These criteria are for predicted or actual measured noise levels at the receptor, and are not necessarily for a specified distance between the source and receptor. Representative dwellings and campgrounds in the project area are quantitatively evaluated in the following assessment.
Table 3.8-1. Federal Highway Administration Noise Abatement Criterion

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>$L_{eq}$ Noise Levels (dBA)</th>
<th>Description of Activity Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>57 (exterior)</td>
<td>Lands where 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</td>
</tr>
<tr>
<td>B</td>
<td>67 (exterior)</td>
<td>Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals</td>
</tr>
<tr>
<td>C</td>
<td>72 (exterior)</td>
<td>Developed lands, properties, or activities not included in Categories A or B above</td>
</tr>
<tr>
<td>D</td>
<td>--</td>
<td>Undeveloped lands</td>
</tr>
<tr>
<td>E</td>
<td>52 (interior)</td>
<td>Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums</td>
</tr>
</tbody>
</table>

Note: 1. $L_{eq}$ = Equivalent Sound Level
Source: 23 Code of Federal Regulations (CFR) 772 Appendix A Table 1

Commercial use areas and other developed areas are FHWA Activity Category C land uses. None of the commercial establishments in the project area have exterior areas of frequent human use that would benefit from a lowered noise level (Table 3.8-1). Accordingly, none of the commercial land uses in the project area were quantitatively assessed for this analysis.

Modeling receptors were used to represent groups of dwelling units. The number of dwelling units per representative receptor was estimated using WSDOT Directive D 22-22, Noise Evaluation Procedures for Existing State Highways, with the following model parameters:

- Each home, cabin, or condominium used for overnight stays was assigned a usage factor of 1 dwelling unit.
- Each room in a lodge or hotel was assigned a usage factor of 1 dwelling unit.
- Each campsite at the Crystal Springs Campground and Lake Easton State Park was assigned a usage factor of 0.5 dwelling unit, based on seasonal usage for overnight camping for 6 months per year. Only the campsites in the western portion of Lake Easton State Park (within the project area) were considered. Campsites east of the project area were not modeled.
- Each picnic site at the Crystal Springs Campground and Lake Easton State Park was assigned a usage factor of 0.17 dwelling unit.

**Hyak Area**

The Hyak residential area is just outside the western end of the project area. Scattered homes, cabins, and condominiums are situated south of the highway.
Representative dwellings were selected for quantitative evaluation as noise sensitive receptors as indicated in Figure 3.8-1.

The old Chicago-Milwaukee-St. Paul Railway route runs along the south side of Keechelus Lake. This rail line is no longer in operation, and the John Wayne Pioneer Trail now runs along the route along the southern end of the lake. This trail is used for hiking, biking, and other recreational purposes. This southern area is almost completely rural with virtually no residences in the area. The John Wayne Pioneer Trail is not considered to be a land use that depends on quiet conditions because it was only recently established as a trail next to the highway, so it is not evaluated in this discipline report as a noise sensitive receptor.

**Wolfe Creek and Resort Creek Area**

Two small cabin communities are located within this area. During field reconnaissance, eight cabins were observed to be in the immediate vicinity of Wolfe Creek. Using aerial photographs, a total of four to five cabins were estimated within the vicinity of Resort Creek. Cabins at Wolfe Creek are located approximately 200 to 400 feet from the edge of I-90. Three of these cabins have full views of the highway, and, in most cases, the cabins are at elevations similar to (or slightly higher than) that of the highway. Since noise travels in line of sight, dwellings with a view of the highway would be more susceptible to noise impacts than dwellings that have a blocked view. It does not appear that cabins in the vicinity of Resort Creek have views of the highway. All of the cabins in this area sit 100 to 300 feet above I-90 at distances of 600 feet or more. Representative dwellings were selected for quantitative evaluation as noise sensitive receptors as indicated in Figure 3.8-1.

**Crystal Springs Campground Area**

The Crystal Springs Campground is a developed campground located on the south side of I-90 (Figure 3.8-1). Because campers sleep there, the campground has been evaluated as a noise-sensitive receptor subject to FHWA Activity Category B, with a 66 dBA peak-hour noise abatement criterion.

**Easton Area**

The Town of Easton is well outside the project area. However, there are a few scattered cabins within the project area on the north side of I-90 (Figure 3.8-1). In addition, Lake Easton State Park includes a campground on the south side of I-90. The cabins shown on Figure 3.8-1 and the campground at Lake Easton State Park have been designated as noise-sensitive receptors.
Figure 3.8-1. Modeled Noise Receivers
3.8.1.2 BASELINE NOISE MONITORING

Noise monitoring was conducted throughout the project area to generally characterize existing noise conditions at locations along the proposed alignment rated as Activity Category B. Baseline monitoring was not used to directly quantify the Year 2001 peak-hour traffic noise levels to satisfy the NAC. Instead, Year 2001 peak-hour noise levels were modeled.

Baseline monitoring positions are shown on Figure 3.8-1, and the results are listed in Table 3.8-2.

3.8.2 Environmental Consequences

A noise impact occurs when a predicted traffic noise level under design-year conditions approaches or exceeds the noise abatement criteria listed in Table 3.8-1, or when the predicted traffic noise level substantially exceeds the existing noise level. As defined by WSDOT, a noise level within 1 dBA of the NAC is considered to approach the NAC, while a noise level greater than or equal to the NAC is considered to exceed the NAC. A 10 dBA increase over existing noise levels is considered to be a substantial increase. Thus, for this project, a noise impact would consist of either of the following:

- An outdoor peak-hour Equivalent Sound Level (Leq) of 66 dBA or greater at a residential dwelling or campground.
- An increase in outdoor peak hour (Design Year 2025 minus Year 2001) of 10 dBA or greater.

Construction Noise Impacts

Construction equipment would be the primary source of noise in the project area. The types of construction equipment expected to be used for typical highway construction include trucks, pavers, backhoes, bulldozers, scrapers, loaders, and pneumatic tools. The noise levels at various distances from a typical construction site were estimated assuming hemispherical sound wave spreading, and conservatively assuming no atmospheric absorption or ground attenuation. Based on the assumed types and number of equipment, and the reference noise levels, the combined sound levels caused by simultaneous use of these pieces of equipment are 88 dBA (Leq) and 91 dBA (L10) measured at 50 feet (WSDOT 2003e).
### Table 3.8-2. Baseline Noise Monitoring Results

<table>
<thead>
<tr>
<th>Land Use in Vicinity of Monitoring Location</th>
<th>Approximate Distance to Edge of Pavement on Closest Side</th>
<th>Line of Sight to I-90?</th>
<th>Date</th>
<th>Start Time</th>
<th>Baseline Interval $L_{eq}^1$</th>
<th>Acceptable Noise Level, $L_{eq}^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyak: Exit 54. Near new cabins/Snoqualmie Road</td>
<td>550 feet</td>
<td>No</td>
<td>9/7/00</td>
<td>11:08 a.m.</td>
<td>61.3</td>
<td>67</td>
</tr>
<tr>
<td>Hyak: Condominium community</td>
<td>600 feet</td>
<td>No</td>
<td>9/7/00</td>
<td>11:16 a.m.</td>
<td>54.1</td>
<td>67</td>
</tr>
<tr>
<td>Hyak: Cul-de-sac, some condos up from highway, next to ski run, off Keechelus Dr. W.</td>
<td>1,200 feet</td>
<td>Partial</td>
<td>9/7/00</td>
<td>11:23 a.m.</td>
<td>54.0</td>
<td>67</td>
</tr>
<tr>
<td>Hyak: White castle cabin on access road next to highway</td>
<td>150 feet</td>
<td>Yes</td>
<td>9/7/00</td>
<td>11:36 a.m.</td>
<td>68.1</td>
<td>67</td>
</tr>
<tr>
<td>Hyak: Lodge/storage facility adjacent to start of Keechelus Lake</td>
<td>750 feet</td>
<td>No</td>
<td>9/7/00</td>
<td>11:41 a.m.</td>
<td>56.9</td>
<td>72</td>
</tr>
<tr>
<td>Wolfe Creek: Milepost (MP) 57. Recreation activities nearby</td>
<td>190 feet</td>
<td>Yes</td>
<td>1/9/03</td>
<td>1:05 p.m.</td>
<td>65.3</td>
<td>67</td>
</tr>
<tr>
<td>Resort Creek: Sparse cabins along Forest Roads – Snowmobiling in winter</td>
<td>1,400 feet</td>
<td>No</td>
<td>1/9/03</td>
<td>2:20 p.m.</td>
<td>51.3</td>
<td>67</td>
</tr>
<tr>
<td>Exit 62: Stampede Pass/ Keechelus Lake, Crystal Springs Campground</td>
<td>300 feet</td>
<td>No</td>
<td>9/7/00</td>
<td>12:12 p.m.</td>
<td>57.7</td>
<td>72</td>
</tr>
<tr>
<td>Lake Easton State Park: South side of highway between Easton Lake Recreational Vehicle Park and Campground</td>
<td>500 feet</td>
<td>No</td>
<td>9/7/00</td>
<td>12:40 p.m.</td>
<td>57.1</td>
<td>67</td>
</tr>
<tr>
<td>MP 70: House on north side of I-90 on access road off of Easton exit, near cabins “Kamp”</td>
<td>500 feet</td>
<td>Yes</td>
<td>9/7/00</td>
<td>12:50 p.m.</td>
<td>57.8</td>
<td>67</td>
</tr>
<tr>
<td>House at end of access road: West of MP 70 exit, north side of highway, a few scattered cabins</td>
<td>600 feet</td>
<td>Partial</td>
<td>9/7/00</td>
<td>1:00 p.m.</td>
<td>59.1</td>
<td>67</td>
</tr>
</tbody>
</table>

Note: 1. $L_{eq}$ = equivalent sound level.
Source: WSDOT 2003e
Daytime construction activities are excluded from Kittitas County and State of Washington noise regulations, so there are no regulatory requirements applicable to daytime construction. However, for this evaluation, it was assumed that daytime noise levels exceeding the state noise limits would constitute a temporary adverse environmental impact to dwellings exposed to long-term construction noise. In addition, WSDOT has indicated some nighttime construction might be required. Nighttime construction activities would be subject to the Washington regulations. In that case, nighttime construction noise levels exceeding the state nighttime limits at any dwelling near the construction site would be prohibited by law. Night work permits would have to be secured through Kittitas County before advertisement of the project. WSDOT would specify specific noise mitigation measures for nighttime construction as part of their construction contracts.

The construction noise mentioned above (e.g., trucks, backhoes, bulldozers, etc.) could cause temporary impacts to campers near the highway at the Crystal Springs Campground and Lake Easton State Park. The noise would most likely be during the daylight hours for the time that construction is ongoing near the Campground. Some critical construction may also occur at night, with proper permits. It is unlikely that construction noise would affect hikers and bicyclists along the John Wayne Pioneer Trail, which is at least 500 feet from the highway at its nearest point.

Operational Noise Impacts

Traffic noise under existing conditions and for the Design Year 2025 was modeled using the FHWA Traffic Noise Model. The model calculates 1-hour $L_{eq}$ noise levels based on hourly traffic volumes. The roadways entered into Traffic Noise Model consist of a network of user-specified, interconnected, straight-line road segments. Modeling assumptions used in this approach are fully described in the Noise Discipline Report (WSDOT 2003e).

Potential Noise Mitigation

Section 4.2.5 evaluates the feasibility of constructing noise barrier walls as a potential noise mitigation measure. While constructing the noise barrier walls was feasible, the cost to construct such relative to the benefit provided made barriers unreasonable.

WSDOT guidance stipulates that noise mitigation shall be implemented only if it is both feasible and reasonable. This guidance is based on federal noise abatement standards. For a noise barrier to be considered feasible, it must be constructed without adversely affecting either the structural integrity of the roadway or sight distances along curves. Furthermore, the barrier must provide a minimum of 5 dBA reduction for the first row of receivers. Once the construction of a noise barrier has been determined feasible, WSDOT then
determines whether construction of the barrier is reasonable by considering cost
effectiveness and residents’ desire for construction.

WSDOT analyzed noise barrier walls in the Hyak area and Crystal Springs
Campground. In each of these areas, the proposed noise barrier wall met the
feasibility criteria, but not the reasonability criteria. Construction of the noise
walls exceeded WSDOT’s reasonableness of criteria of cost. Section 4.2.5
provides more information on WSDOT’s mitigation procedure analysis.

3.8.2.1 NO-BUILD ALTERNATIVE

As stated in Chapter 2, the No-Build Alternative includes periodic resurfacing
with Asphalt Concrete Pavement (ACP) at an interval of 4 to 6 years and minor
safety improvements that would occur as part of ongoing facility operations.
Minor construction-related noise would accompany these maintenance activities,
although the noise would be less than for the build alternatives.

Without the benefit of the traffic improvements realized by the build alternatives,
the Level of Service (LOS) is predicted to worsen to LOS D by 2007 and LOS E
by 2019. Because vehicles would be passing sensitive receptors at a much
slower rate of speed, the receptors would be impacted for a greater length of
time, e.g., high traffic volumes on a busy weekend would last much longer under
the No-Build Alternative. This would result in an adverse impact, although not a
significant impact.

3.8.2.2 KEECHELUS LAKE ALIGNMENT ALTERNATIVES

Alternative 1: Long Tunnels

Tunnel Construction

Construction of tunnels would be required along Keechelus Lake for Alternatives
1, 2, and 3. Construction of the tunnel portals could require more equipment than
normally used for routine highway construction and may require blasting.
According to WSDOT, tunnel construction would occur 24 hours a day for
approximately 2 years. Cabins located in the vicinity of Wolfe Creek are likely
to experience temporary construction impacts. The distance between the western
tunnel portal and the closest cabin near Wolfe Creek is approximately 1,000 feet.
Cabins at Resort Creek could also experience temporary construction impacts.
Cabins within the vicinity of Resort Creek are located approximately 1,800 feet
from the eastern tunnel portal. The closest cabins in this area are also
approximately 600 feet from the proposed Resort Creek bridge construction. A
quantitative noise analysis would be performed during design phases of this
project. If nighttime construction noise levels are predicted to exceed
Washington State Noise Limits, variances would have to be applied for from
Kittitas County.
Traffic Noise Model Modeling Results – Operational Noise Impacts

The modeled peak hour noise levels at Hyak, Wolfe Creek, Resort Creek, Crystal Springs Campground, Lake Easton State Park, and the Easton Airport cabins are listed in Table 3.8-3. Representative noise sensitive receptors at each area are shown on Figure 3.8-1. The table lists the modeled noise levels for the Existing Year 2001 and the Design Year 2025. The baseline monitoring results are lower than those modeled for 2001 traffic, suggesting that the modeled results for 2025 may also be higher that actual. If the modeled noise level at any given receptor exceeds FHWA’s NAC, then the table lists the number of noise-impacted dwelling units.

Table 3.8-3. Modeled Traffic Noise Levels

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Modeled Traffic Noise Level</th>
<th>Increase in Modeled Traffic Noise Level 2001 to 2025</th>
<th>Exceeds or Approaches FHWA Criteria?</th>
<th>Number of Impacted Dwelling Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>R17</td>
<td>73</td>
<td>76</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R17a</td>
<td>74</td>
<td>77</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R18</td>
<td>64</td>
<td>67</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R18a</td>
<td>73</td>
<td>76</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R19</td>
<td>69</td>
<td>72</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R19a</td>
<td>72</td>
<td>74</td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Total Dwelling Units Exposed to Noise Exceeding FHWA NAC in Wolfe Creek Area</strong></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Location</th>
<th>Modeled Traffic Noise Level</th>
<th>Increase in Modeled Traffic Noise Level 2001 to 2025</th>
<th>Exceeds or Approaches FHWA Criteria?</th>
<th>Number of Impacted Dwelling Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>R20</td>
<td>600 feet from roadway</td>
<td>57</td>
<td>60</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>R21</td>
<td>1,700 feet from roadway</td>
<td>60</td>
<td>63</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>R22</td>
<td>1,600 feet from roadway</td>
<td>36</td>
<td>39</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td><strong>Total Dwelling Units Exposed to Noise Exceeding FHWA NAC in Resort Creek Area</strong></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Note: 1. All modeled noise levels are 1-hour L_{eq} in dBA and are based on peak hourly traffic volumes at 70 mph traffic speed.
2. There are no sensitive receptors in Cedar Creek/Easton Hill Area.
3. Criteria for dwelling units is 66 dBA.

At each of the six areas modeled, there would be no significant difference in the lateral alignments used for the project alternatives, and there would be no difference in traffic volumes. Therefore, the modeled noise levels would be similar for each project alternative including the No-Build.

Wolfe Creek

As listed in Table 3.8-3, five dwelling units were modeled to experience noise exceeding the NAC for the existing year 2001. A total of eight dwelling units within 300 feet of the highway would experience noise levels exceeding the NAC in the Design Year 2025. The highest modeled noise level was 77 dBA at one
cabin within 190 feet of the highway. A traffic noise increase of 2 to 3 dBA was modeled throughout the area between the Year 2001 to Year 2025.

Resort Creek

As listed in Table 3.8-3, no dwelling units were modeled to exceed the NAC for the Existing Year 2001 or the Design Year 2025. A traffic noise increase of 3 dBA was modeled throughout the area between the Year 2001 and Year 2025, but the predicted levels are well below the 66 dBA NAC criteria.

Alternative 2: Short Tunnels

The alignment alternatives are similar enough that future traffic noise levels would be virtually identical for all alternatives. Therefore, impacts from this alternative would be the same as Alternative 1. Refer to Section 3.8.2.2 for a discussion of noise impacts.

Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound

The alignment alternatives are similar enough that future traffic noise levels would be virtually identical for all alternatives. Therefore, impacts from this alternative would be the same as Alternative 1. Refer to Section 3.8.2.2 for a discussion of noise impacts.

Alternative 4: Both Directions of Traffic Along Kechelus Lake Around Slide Curve

Under this alternative, tunnel construction would not occur; therefore, noise levels would not be as loud as Alternatives 1 and 2. In addition, lower speeds would also decrease noise levels. Noise level changes would be 1 to 2 dB less than the Alternatives 1, 2, and 3.

3.8.2.3 IMPROVEMENT PACKAGES

Construction Impacts

Under all three Improvement Packages, changes in noise levels would result from construction along the project corridor. The types of construction equipment expected to be used for typical highway construction on this project include trucks, pavers, backhoes, bulldozers, scrapers, loaders, and pneumatic tools. Based on the assumed types and number of equipment, and the associated noise levels, the combined sound levels caused by simultaneous use of these pieces of equipment are 88 dBA (L_{eq}) and 91 dBA (L_{10}) measured at 50 feet. The noise levels at various distances from a typical construction site were estimated assuming hemispherical sound wave spreading, and conservatively assuming no atmospheric absorption or ground attenuation.
**Operational Noise Impacts**

The modeled peak hour noise levels at Crystal Springs Campground, Lake Easton State Park, and the Easton Airport cabins are listed in Table 3.8-4. The table lists the modeled noise levels for the Existing Year 2001 and the Design Year 2025. If the modeled noise level at any given receptor exceeds FHWA criteria, the table lists the number of noise-impacted dwelling units.

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Location(^1)</th>
<th>MODELED TRAFFIC NOISE LEVEL</th>
<th>Increase in Modeled Traffic Noise Level 2001 to 2025</th>
<th>Exceeds or Approaches FHWA Criteria?</th>
<th>Number of Impacted Dwelling Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Year 2001</td>
<td>Year 2025</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyak Area West</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>White castle cabin</td>
<td>74</td>
<td>77</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R2</td>
<td>Houses on west end of street</td>
<td>74</td>
<td>77</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R3</td>
<td>Houses on east end of street</td>
<td>66</td>
<td>69</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R4</td>
<td>Houses on hillside</td>
<td>66</td>
<td>69</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R5</td>
<td>Houses on hillside</td>
<td>64</td>
<td>67</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R6</td>
<td>Hyak Lodge</td>
<td>63</td>
<td>65</td>
<td>2</td>
<td>No</td>
</tr>
<tr>
<td>Total Dwelling Units Exposed to Noise Exceeding FHWA NAC in Hyak Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Crystal Springs Campground Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R7</td>
<td>Campsites and picnic areas</td>
<td>64</td>
<td>66</td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>R8</td>
<td>Campsites and picnic areas</td>
<td>62</td>
<td>63</td>
<td>1</td>
<td>No</td>
</tr>
<tr>
<td>R9</td>
<td>Campsites and picnic areas</td>
<td>59</td>
<td>60</td>
<td>1</td>
<td>No</td>
</tr>
<tr>
<td>Total Dwelling Units Exposed to Noise Exceeding FHWA NAC in Crystal Springs Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Lake Easton Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R10</td>
<td>Campsites and picnic areas</td>
<td>66</td>
<td>69</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>R11</td>
<td>Campsites and picnic areas</td>
<td>65</td>
<td>69</td>
<td>4</td>
<td>Yes</td>
</tr>
<tr>
<td>R12</td>
<td>Campsites and picnic areas</td>
<td>56</td>
<td>59</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>R13</td>
<td>Cabins</td>
<td>67</td>
<td>69</td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>R14</td>
<td>Cabins</td>
<td>64</td>
<td>66</td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>R15</td>
<td>Cabins</td>
<td>59</td>
<td>62</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>R16</td>
<td>Cabins</td>
<td>54</td>
<td>57</td>
<td>3</td>
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</tr>
<tr>
<td>Total Dwelling Units Exposed to Noise Exceeding FHWA NAC in Lake Easton Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

Note: 1. All modeled noise levels are 1-hour $L_{eq}$ in dBA and are based on peak hourly traffic volumes at 70 mph traffic speed.
2. There are no sensitive receptors in Cedar Creek/Easton Hill Area.
3. Criteria for dwelling units is 66 dBA.

At each of the areas modeled, there would be no significant difference in the lateral alignments used for the project alternatives, and there would be no difference in traffic volumes. Therefore, the modeled noise levels would be similar for each Improvement Package.

**Hyak Area**

As listed in Table 3.8-4, six dwelling units near the highway were modeled to experience noise exceeding the NAC for the Existing Year 2001. A total of eight dwelling units within 500 feet of the highway would experience noise levels...
exceeding the NAC in the Design Year 2025. The highest modeled noise level was 77 dBA at two houses within 150 feet of the highway. A traffic noise increase of 1 to 3 dBA was modeled throughout the area between the Year 2001 to Year 2025.

**Crystal Springs Campground**

As listed in Table 3.8-4, no campsites or picnic sites were modeled to exceed the FHWA noise criteria for the Existing Year 2001. A total of three dwelling units within 300 feet of the highway (six campsites) would experience noise levels just equal to the FHWA criteria in the Design Year 2025. A traffic noise increase of 2 to 3 dBA was modeled throughout the area between the Year 2001 to Year 2025. Although the lateral alignment for the highway would be similar for both the No-Build and the build alternatives, WSDOT’s construction drawings indicate that Improvement Packages A and B would raise the highway by 15 to 30 feet compared to its existing elevation. The modeled noise levels listed in Table 3.8-4 were based on the raised elevation.

Campers staying at Crystal Springs Campground currently experience a noisy environment due to the proximity of the highway and the associated traffic noise. Because of this noise, campers do not experience a pristine outdoor camping experience. Construction of the Improvement Packages would increase the noise levels, although this is not considered substantially adverse, given that the condition already exists.

**Lake Easton State Park**

As listed in Table 3.8-4, seven dwelling units (consisting of 14 campsites within 250 feet of the highway) were modeled to exceed the NAC for the Existing Year 2001. A total of 15 dwelling units (consisting of 30 campsites) within 600 feet of the highway would experience noise levels exceeding the NAC in the Design Year 2025. A traffic noise increase of 2 to 3 dBA was modeled throughout the area between the Year 2001 to Year 2025.

**Cabins Near Easton Airport**

As listed in Table 3.8-4, two cabins adjacent to the highway were modeled to experience noise exceeding the NAC for the Existing Year 2001. A total of five cabins within 350 feet of the highway would experience noise levels exceeding the NAC in the Design Year 2025. A traffic noise increase of 2 to 3 dBA was modeled throughout the area between the Year 2001 to Year 2025.

**3.8.3 Construction Best Management Practices**

To reduce the potential for temporary, adverse noise impacts associated with construction, the contractor would be required to comply with all federal, state, and local regulations relating to construction noise. The following Best
Management Practices (BMPs) are examples of measures that can reduce the effects of construction noise:

- Locating stationary equipment away from receiving properties would decrease noise from that equipment in relation to the increased distance.
- Erecting noise berms and barriers as early as possible would provide noise shielding.
- Limiting construction activities to between 7:00 a.m. and 10:00 p.m. would reduce construction noise levels during sensitive nighttime hours.
- Equipping construction equipment engines with adequate mufflers, intake silencers, and engine enclosures would reduce their noise by 5 to 10 dBA.
- Specifying the quietest equipment available would reduce noise by 5 to 10 dBA.
- Turning off construction equipment during prolonged periods of nonuse would eliminate noise from construction equipment during those periods.
- Requiring contractors to maintain all equipment and to train their equipment operators would reduce noise levels, and increase efficiency of operation.

3.9 Historic, Cultural, and Archaeological Resources

This section was prepared based on the Cultural Resources Discipline Report (Washington State Department of Transportation [WSDOT] 2003d). The cultural resources investigations took place in two parts. The initial literature review and survey of the non-federal lands within the project area were conducted in 2001 (WSDOT 2002m). In 2002, additional surveys were completed on federal and non-federal lands in the project area, including limited shovel testing (WSDOT 2003d). The 2003 investigations incorporated the results of the 2002 study to provide a complete Cultural Resources Discipline Report for the project area. Testing and evaluation was conducted in 2004 to determine National Register of Historic Places (NRHP) eligibility for 10 sites and 7 cabins (WSDOT 2004c, Appendix K).

The cultural resource investigations consisted of a site file and literature search of various state, federal, and university repositories, and a review of previous professional reports to determine the number of previously recorded/reported
cultural resources within the project corridor as well as the potential for occurrence of unrecorded cultural resources.

A total of 58 cultural resources have been identified in the project area: 43 are historic resources; 12 are prehistoric resources; and 3 have components of both. One site is listed on the NRHP, and 6 are recommended as eligible for listing on the NRHP eligibility (WSDOT 2004c).

The discipline report presents information regarding the affected environment, synopses of local history, a description of previously recorded cultural resources within the project area, and impact analysis of project alternatives.

The area of potential effect for cultural resources is the 15-mile section along Interstate 90 (I-90) from the Hyak Interchange (Milepost [MP] 55) to the West Easton Interchange (MP 70) consisting of a 400-foot wide corridor on each side of the existing roadway for a corridor width of 800 feet (not including the roadway). Where the eastbound and westbound lanes diverge, the area of potential effect includes a 400-foot wide corridor on each side of both existing eastbound and westbound roadways.

3.9.1 Affected Environment

3.9.1.1 Historical Setting

Human occupation of the region is known from at least 11,000 years ago in the vicinity of Lake Cle Elum (WSDOT 2002m). Archaeological chronologies for the mid-Columbia region incorporate archaeological data mainly from riverine sites, with less information on upland areas away from major rivers (WSDOT 2002m). The Early Prehistoric period (10,000 to 6,000 years ago), the Middle Prehistoric period (6,000 to 2,500 years ago), and the Late Prehistoric period (2,500 years ago to the contact era) each reflect similarities in technology, settlement patterns, trade, and climate. Projectile points from the shores of Kachess and Keechelus lakes indicate use of the area during the Early and Middle Prehistoric periods. A housepit site just south of the project area has been dated to between 5,200 and 2,500 years before present (WSDOT 2002m).

At the time of European contact, several tribal groups used the project area. Kittitas or Upper Yakama territory included the Kittitas Valley and Upper Yakima River Valley. The camps and villages in this territory included large summer fishing villages at the south ends of Lake Cle Elum and Kachess Lake (Economics and Engineering Services, Inc. 2001), and around Keechelus Lake.

The project area was also used by the Snoqualmie people who hunted in the Cascades. Aboriginal mountain trails were reported to be heavily used, providing strong links between groups east and west of the mountains (WSDOT 2002m, Norton 2001). The Kittitas and Snoqualmie people followed a seasonal round of resource use, fishing in the spring through fall, digging roots on the
prairies in spring and summer, and gathering berries and hunting game in the mountains into late fall (WSDOT 2002m).

With the coming of Euroamerican settlement, the Native American people of the region were dislocated and began to disperse. In 1855, a reservation was set aside for the Yakama in a treaty signed by the governor of Washington Territory and representatives of the Cayuse, Umatilla, Walla Walla, Nez Perce, and Yakama tribes. Shortly thereafter, tensions between the groups arose, and a coalition of tribes came into conflict with the United States in what was known as the Yakima War. The Yakama Nation was formed after treaty ratification in 1859 by the 14 confederated tribes (Bard 1997).

The first cattle were introduced into the Kittitas Valley in 1840 (Economics and Engineering Services, Inc. 2001). Ranchers from the Yakima Valley grazed their cattle in the Kittitas Valley before moving them to the mining districts to the north. Later, cattle were raised locally to fill the demand in the Puget Sound area. They were herded to the Sound through Snoqualmie or Naches passes (Access Washington 2002). Ranches were established in the area by the 1870s. Eventually, railroads provided more effective transportation of cattle to eastern markets.

Wheat, hay, and fruit crops were important to the county agricultural industry (Access Washington 2002). Fruit growing was especially important in the areas of Ellensburg and Kittitas (Eberhart 2002). The harvest was transported to western markets by truck over Snoqualmie Pass, known as “Rum Runner” Pass during Prohibition (Eberhart 2002).

The trail over Snoqualmie Pass was used by EuroAmericans beginning in the 1850s (WSDOT 2003d). The first wagon train crossed the pass from east to west in 1865, and settlers began arriving in the region shortly thereafter. Gold was discovered in the region in 1867, leading to gold rushes to the county in the 1870s.

The logging and lumber industries were established in the early 1870s, primarily in the western part of the county. Logging camps arose along the shores of Lake Cle Elum, and Kachess and Keechelus lakes. Harvested timber was hauled from the forest to the river on greased skids or by wagons with horse teams. In spring, logs were floated downriver to sawmills in Ellensburg and Yakima (Access Washington 2002). By the 1900s, large logging companies had taken over many smaller operations. The steam-donkey took the place of horse teams and skids, and the river log drives were phased out in favor of logging railroads. After World War II, logging trucks came into widespread use (Access Washington 2002). The Town of Easton developed as a logging camp at the intersection of four rail lines. It served as the last station where trains could be serviced before going over the Cascade Mountains (Access Washington 2002).
In the early 1880s, coal and other mining activities began in the Cle Elum River Valley and nearby mountains. The Northern Pacific Company began to actively develop the region’s coal deposits in 1886. A railway was laid to Cle Elum and Roslyn, and the first shipment of coal was sent west to markets. By the early 1900s, large coal operations were mining more than one million tons of coal annually. Production peaked in the 1920s with the introduction of modern mining equipment and electric locomotives. Mining had subsided by the 1930s because of competition from the oil industry (Access Washington 2002).

Motorized traffic began crossing Snoqualmie Pass in 1905 on an old wagon road that became known as State Road No. 7 (WSDOT 2003d). By 1912, State Road 7 from Seattle to Spokane incorporated the Sunset Highway from west of Spokane to the Lincoln County line, among other road segments. State Road 7 was renamed the Sunset Highway in 1914 and dedicated in 1915, when 75 automobiles met at the Keechelus Inn and Snoqualmie Pass for the event (WSDOT 2003d). The Chicago-Milwaukee-St. Paul Pacific Railroad completed its line over the Cascades by way of Snoqualmie Pass in 1909. In the first decade of the 20th century, a road suitable for automobiles was built across Snoqualmie Pass. The road was open year-round beginning in the winter of 1931/1932. The Washington State Highway Department dedicated a year-round highway in 1934. A snowshed was built in 1950, and construction was begun on a four-lane route (Economics and Engineering Services, Inc. 2001). Since that time, numerous improvements have been made, including realignment of several segments, and the construction of additional lanes and snowsheds.

Federal agencies began managing properties in the project area in the early 1900s. The United States Bureau of Reclamation (USBR) built a temporary crib dam on Keechelus Lake in 1907 to allow for 15,000 acre-feet of water storage. This dam was replaced by an earth-filled structure in 1917 (USBR 1993).

The Wenatchee National Forest (WNF) was established in 1908. The Cle Elum Ranger District was established in 1934 (United States Forest Service [USFS] 1997). The Civilian Conservation Corps conducted a number of projects in the WNF during the 1930s. Many Civilian Conservation Corps roads and facilities are still in use today. Crystal Springs Civilian Conservation Corps Campground lies within the project area (WSDOT 2002m). Recreational camping and outdoor activities on the forest were associated with a number of lodges, hotels, campgrounds, and other buildings along the highway. The Keechelus Inn was located at Slate Creek just
south of Wolfe Creek. The Sunset Lodge was at Resort Creek. The Rustic Inn (Kachess Lodge), later known as Kamp Kachess, still stands at the Stampede Pass Interchange (WSDOT 2002m).

Skiing began at Snoqualmie Pass in the 1920s. In 1933, the Seattle Parks Department applied for a permit from the USFS to establish a ski hill at Snoqualmie Pass, and a rope tow was constructed. The Snoqualmie Pass Ski Area opened in 1937 (Nelson 1999). Following World War II, the ski area became the first in the United States to offer night skiing. Another ski area just east of Snoqualmie Pass was opened for skiing in 1948, and, in 1949, the first chairlift in Washington was added there (Nelson 1999).

3.9.1.2 PREVIOUS INVESTIGATIONS

A 1910 archaeological study that focused on the Yakima Valley included information about the area around Cle Elum (WSDOT 2002m). However, much of the research for many decades after that focused on the major river valleys in the region rather than on the mountains. Studies in the vicinity of the project corridor began in 1981. Archaeological inventories prior to the present project have recorded 16 cultural resources within the corridor and 22 resources within 0.5 mile – but outside the present project corridor (WSDOT 2002m).

Archaeological inventory of non-federal lands within a corridor 400 feet wide on either side of the existing route of I-90 was conducted in 2001 (WSDOT 2002m). The field survey recorded one previously undocumented historic site and one prehistoric isolate (WSDOT 2002m). Phase II pedestrian survey on federal and non-federal lands in the I-90 corridor from the Hyak Interchange to the West Easton Interchange took place in 2002 in an area ranging from 300 feet to 900 feet from the existing highway centerline (WSDOT 2003d). Limited shovel testing was conducted at seven locations with the potential for subsurface deposits.

3.9.1.3 IDENTIFIED CULTURAL RESOURCES

A total of 58 cultural resources have been identified in the project area. In 2001 and 2002, 10 of 16 previously documented cultural resources were relocated, and 38 new resources were documented (WSDOT 2002m). An additional four cultural resources were identified in 2004 (WSDOT 2004c). The Lake Keechelus Snowshed Bridge is the only resource listed in the NRHP (WSDOT 2003d). Six more are eligible for the NRHP eligibility, and the remainder are ineligible or could not be relocated.

Archaeological Resources

Thirty-seven archaeological resources were identified in the project area. Twelve are prehistoric sites or isolates, 22 are associated with historic settlement and use, and three of the 37 have both prehistoric and historic components. The majority of the archaeological resources have been evaluated as ineligible for the NRHP,
with two historic dumps and one prehistoric camp considered eligible for the NRHP (WSDOT 2004c).

Architectural/Engineering Resources

Twenty-one architectural or engineering resources were identified in the project area. The 11 architectural resources consist of the Crystal Springs Campground and Kitchen, 8 cabins in the Rocky Run Summer Home Tract, the Rustic Inn (Kachess Lodge), and a cement block telephone company building. The 10 engineering resources consist of the NRHP-listed Lake Keechelus Snowshed Bridge, a segment of the Sunset Highway, two box culverts associated with the Sunset Highway, two bridges (a steel pony truss bridge [removed] and a concrete bridge), a rock retaining wall, an earth and rock berm, a watering station, and a pair of bridge abutments. The Lake Keechelus Snowshed Bridge, built in 1950, is significant as the sole remaining snowshed in the state highway system. The majority of the other resources have been identified as ineligible for the NRHP. Three cabins in the Rocky Run Summer Home Tract are eligible for the NRHP (WSDOT 2004c).

Traditional Cultural Properties

The Federal Highway Administration (FHWA) and WSDOT are continuing ongoing coordination with interested Native American groups to identify potential traditional resource concerns in the area. In previous studies, sites of cultural, traditional, and historical value have been identified in the Keechelus Lake and Dam area (USBR 2001b). The Yakama Nation has indicated that the current project lies within their ancestral ceded lands called Ayutaash, which contain important geographic locations, sites, and resources such as wildlife, fish, and traditional plants (Meninick 2002). Appendix D contains copies of Native American coordination correspondence for the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA).

3.9.2 Environmental Consequences

This section summarizes the proposed construction plans and potential impacts to cultural resources by alternative. A number of federal regulations and guidelines have been established for the management of cultural resources. Section 106 of the NHPA, as amended, requires federal agencies to take into account the effects of their undertakings on historic properties.

Historic properties are cultural resources that are listed in, or eligible for listing in, the NRHP. Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have significance for certain traditional cultural groups.
Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource’s significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts are assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts result primarily from the effects of project-induced population increases.

A cultural resources inventory has been completed for an area that includes all build alternatives (WSDOT 2002m; WSDOT 2003d; WSDOT 2004c). Compliance with Section 106 of the NHPA would be completed prior to issuance of the Record of Decision (ROD). Archaeological monitoring of areas with high archaeological sensitivity, such as drainages and creek crossings, would be conducted during construction. If cultural resources are inadvertently discovered during project construction, work would stop at that location, and the WSDOT archaeologist, the USFS archaeologist (if applicable), and appropriate tribal groups would be notified.

From 1998 to the present, WSDOT has coordinated with potentially interested Native American tribes to identify potential traditional resources concerns in the I-90 project area. Appendix D contains copies of correspondence with the Yakama Nation, the Snoqualmie Tribe, the Tulalip Tribe, the Muckleshoot Tribe, the Wanapum Tribe, and the Confederated Tribes of the Colville Reservation regarding the I-90 Snoqualmie Pass project. In a letter to WSDOT, the Yakama Nation reported that the current project lies within their ancestral ceded lands called Ayutaash (Meninick 2002). Geographic locations, sites, and resources such as wildlife, fish, and traditional plants that are important to the Yakama Nation can be found throughout this area (Meninick 2002). Tribal coordination efforts by WSDOT continue into the present.

3.9.2.1 NO-BUILD ALTERNATIVE

The No-Build Alternative includes no new lanes, related capacity improvements, or connectivity improvements. No impacts to cultural resources are expected under this alternative. Resources on federal lands would continue to be managed in compliance with Section 106 of the NHPA and agency regulations.

3.9.2.2 KEECHELUS LAKE ALIGNMENT ALTERNATIVES

Alternative 1: Long Tunnels

After comparing cultural resources inventory maps (WSDOT 2003d) with the footprint of Alternative 1, this alternative is not expected to adversely impact the NRHP-listed Lake Keechelus Snowshed Bridge. Tunnels through the hillside would be used to bypass the Lake Keechelus Snowshed Bridge, which would be abandoned in place. The roadway leading to the Lake Keechelus Snowshed
Bridge will likely be reclaimed and revegetated as mitigation for project impacts. The Lake Keechelus Snowshed Bridge can no longer be used as part of the transportation system since it is located in an avalanche zone that is unsafe for bicycles and pedestrians.

The Lake Keechelus Snowshed Bridge has not required any structural maintenance within the last 25 years, nor is any currently planned in the future. FHWA and WSDOT will consult with the Washington State Historic Preservation Office (SHPO) to determine if abandoning the Lake Keechelus Snowshed Bridge results in an adverse effect and if any mitigation measures would be necessary.

The other cultural resources identified in the area are considered ineligible for the NRHP and would not be impacted. Consultation with interested Native American groups is underway to identify potential traditional resource concerns for this alternative.

**Alternative 2: Short Tunnels**

Alternative 2 is not expected to adversely impact the NRHP-listed Lake Keechelus Snowshed Bridge. Bridges over Keechelus Lake would be used to avoid the Lake Keechelus Snowshed Bridge, which would be abandoned in place. The roadway leading to the Lake Keechelus Snowshed Bridge will likely be reclaimed and revegetated as mitigation for project impacts. The Lake Keechelus Snowshed Bridge can no longer be used as part of the transportation system since it is located in an avalanche zone that is unsafe for bicycles and pedestrians.

The Lake Keechelus Snowshed Bridge has not required any structural maintenance within the last 25 years, nor is any currently planned in the future. FHWA and WSDOT will consult with the SHPO to determine if abandoning the Lake Keechelus Snowshed Bridge results in an adverse effect and if any mitigation measures would be necessary.

The other cultural resources identified in the area are considered ineligible for the NRHP and would not be impacted. Consultation with interested Native American groups is underway to identify potential traditional resource concerns for this alternative.

**Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound**

Alternative 3 is not expected to adversely impact the NRHP-listed Lake Keechelus Snowshed Bridge. Bridges over Keechelus Lake would be used to avoid the Lake Keechelus Snowshed Bridge, which would be abandoned in place. The roadway leading to the Lake Keechelus Snowshed Bridge will likely be reclaimed and revegetated as mitigation for project impacts. The Lake Keechelus Snowshed Bridge can no longer be used as part of the transportation system since it is located in an avalanche zone that is unsafe for bicycles and pedestrians.
system since it is located in an avalanche zone that is unsafe for bicycles and pedestrians.

The Lake Keechelus Snowshed Bridge has not required any structural maintenance within the last 25 years, nor is any currently planned in the future. FHWA and WSDOT will consult with the SHPO to determine if abandoning the Lake Keechelus Snowshed Bridge results in an adverse effect and if any mitigation measures would be necessary.

The other cultural resources identified in the area are all considered ineligible for the NRHP and would not be impacted. Consultation with interested Native American groups is underway to identify potential traditional resource concerns for this alternative.

Alternative 4: Both Directions of Traffic Along Keechelus Lake Around Slide Curve

Alternative 4 is not expected to adversely impact the NRHP-listed Lake Keechelus Snowshed Bridge. Bridges over Keechelus Lake would be used to avoid the Lake Keechelus Snowshed Bridge, which would be abandoned in place. The roadway leading to the Lake Keechelus Snowshed Bridge will likely be reclaimed and revegetated as mitigation for project impacts. The Lake Keechelus Snowshed Bridge can no longer be used as part of the transportation system since it is located in an avalanche zone that is unsafe for bicycles and pedestrians.

The Lake Keechelus Snowshed Bridge has not required any structural maintenance within the last 25 years, nor is any currently planned in the future. FHWA and WSDOT will consult with the SHPO to determine if abandoning the Lake Keechelus Snowshed Bridge results in an adverse effect and if any mitigation measures would be necessary.

The other cultural resources identified in the area are all considered ineligible for the NRHP and would not be impacted. Consultation with interested Native American groups is underway to identify potential traditional resource concerns for this alternative.

3.9.2.3 IMPROVEMENT PACKAGES

Improvement Package A

Depending upon the extent of improvements, Improvement Package A has the potential to impact three prehistoric sites (45KT2195, 45KT2196, 45KT2197) at Lake Easton State Park (WSDOT 2003d). All three sites have been evaluated for NRHP eligibility (WSDOT 2004c), but only site 45KT2196 is considered eligible. Site 45KT2196 is crossed by old State Route 10 and extends north towards eastbound I-90. Although the site may extend into the existing right-of-way (ROW), no construction activities are planned for the immediate vicinity, so that adverse impacts to site 45KT2196 are unlikely. Should impacts become unavoidable, then in compliance with Section 106 of the NHPA, mitigation
measures for this site would be developed in consultation with Washington State Parks, the Washington SHPO, and interested Native American groups. Potential mitigation measures are identified in Section 4.2.4. Archaeological monitoring of areas with high archaeological sensitivity, such as the known NRHP-eligible site, 45KT2196, and drainages and creek crossings, would be conducted during construction. If cultural resources are inadvertently discovered during project construction, work would stop at that location, and the WSDOT archaeologist, the USFS archaeologist (if applicable), and appropriate tribal groups would be notified.

**Improvement Package B**

Potential adverse impacts of Improvement Package B would be similar to those described for Improvement Package A, except that the construction of fewer crossings under Improvement Package B would reduce the potential for inadvertent discoveries of buried cultural resources.

**Improvement Package C**

Potential adverse impacts of Improvement Package C would be similar to those described for Improvement Package A, except that the construction of fewer crossings under Improvement Package C would reduce the potential for inadvertent discoveries of buried cultural resources.

### 3.10 Recreation Resources

This section was prepared based on the *Recreation Baseline Study* (Washington State Department of Transportation [WSDOT] 2002h) and the *Recreation and Section 4(f) Evaluation Discipline Report* (WSDOT 2002i) (Appendix R).

The *Recreation Baseline Study* examined the existing recreational resources adjacent to and accessible from the segment of Interstate 90 (I-90) between Hyak and Easton. The methodology for studying recreation consisted of:

- review of documents on the project area;
- review of applicable laws and regulations, and land use objectives within the project area;
- interviews with the primary land managers, the United States Forest Service (USFS) and Washington State Parks and Recreation Commission (WSPRC), Federal Highway Administration (FHWA), as well as local recreation group representatives; and
- a site visit to identify recreational resources.
The Recreation and Section 4(f) Evaluation Report examined the recreational opportunities and federally protected Department of Transportation Act Section 4(f) and Section 6(f) resources in the project area, which include public parks, recreation areas, and historic sites. To prepare the report, site visits were made, interviews with federal and state agencies and individuals were conducted, and background information and studies were reviewed. Potential impacts associated with construction and operation of the proposed action, and mitigation measures were identified and evaluated.

The study area for recreation is the 15-mile section of the I-90 corridor and an area approximately 1 mile on either side of the highway from the Hyak Interchange (Milepost [MP] 55) to the West Easton Interchange (MP 70) in Kittitas County. Other recreational areas are included that are outside the study area if I-90 provides the primary access route. The study area is also within the Mountains-to-Sound Greenway National Scenic Byway, and includes numerous locations for camping, hiking, horseback riding, cross-country skiing, snowmobile riding, and mountain biking. Popular destinations within or adjacent to the project corridor include the Pacific Crest Trail, Kachess and Crystal Springs campgrounds, Lake Easton State Park, the Iron Horse State Park/John Wayne Pioneer Trail, the Hyak, Gold Creek, and Price Creek Sno-parks, and Alpine Lakes Wilderness Area.

A Section 4(f) Evaluation Report (WSDOT 2005) was prepared that examined the federally protected Department of Transportation Act Section 4(f) and Section 6(f) resources in the project area. This act declares that “It is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.” Because one or more of the alternatives under consideration in this Environmental Impact Statement (EIS) impacts a Section 4(f) resource, a Section 4(f) Evaluation was completed. Chapter 5 of this document provides the complete evaluation of Section 4(f) resources.

3.10.1 Affected Environment

The project area is located within one of the most heavily used recreational areas in the state. Population growth in surrounding regions is increasing the demand for more recreational opportunities. Trails and roads within the project area provide a variety of recreational opportunities, and are used by runners, hikers, bicyclists, horseback riders, cross-country skiers, and snowmobile enthusiasts. The project corridors also provide access to areas used for sledding, rock climbing, hunting and fishing, back-country skiing, berry picking, hang-gliding, boating, and camping.

Recreational destinations within or accessible from the project area are listed below and are shown in Figure 3.10-1.
Figure 3.10-1. Recreation Areas Within or Accessible from the I-90 Snoqualmie Pass East Corridor
The Hyak and Gold Creek Sno-parks (i.e., areas that are managed during the winter as parking lots with access to winter recreation trails) are accessible from Hyak Interchange (Exit 54) in this section of the project corridor. A USFS Sno-park permit is required. The Hyak Sno-park has an annual average visitor use of 50,000 (WSDOT 2005).

Gold Creek Pond Picnic Area. Accessible from Exit 54, it contains a 15-acre spring-fed pond that flows into Gold Creek. The pond was formed by removing gravel during the construction of I-90. The view of Chickamin Peak, within the Alpine Lake Wilderness Area, provides a backdrop to Gold Creek Pond. Annual average use is 7,000 visitors (WSDOT 2005).

Keechelus Lake boat launch and trailhead (accessible from Exit 54). Keechelus Lake has 2,560 water-surface acres and provides recreational water sports, with an annual average visitor use of 5,000 (WSDOT 2005).

Iron Horse State Park/John Wayne Pioneer Trail between Hyak and Easton is a linear park that was a part of the Chicago-Milwaukee-St. Paul Pacific Railroad. The northern trailhead to the John Wayne Pioneer Trail is accessible from Exit 54 and the southern trailhead is accessible from Exit 62. This trail is used for walking, biking, cross-country skiing, horseback riding, wagon riding, and dog sledding, and receives approximately 90,000 visitors per year (WSDOT 2002h).

Rachel Lake Trailhead (accessible from Exits 62 and 63). Located in the Wenatchee National Forest (WNF), this trail is moderately difficult and not handicap accessible.

Kachess Lake Campground, trailhead, and boat launch are accessible from Exit 62 of I-90. The 92-acre campground provides water-based recreation activities such as swimming, fishing, boating, etc., with an annual average of 23,000 visitors (WSDOT 2005). The boat launch has an average annual visitor use of 11,000 (WSDOT 2005).

Kachess Lake Sno-park (accessible from Exits 62 and 63) is a parking area that provides access to snowmobiling trails. A Washington State Sno-park permit is required to park in this area.

Price Creek Sno-park east and west (accessible from Exit 62). This area is used for parking access to snowmobiling trails. A Washington State Sno-park permit is required to park in this area.

Crystal Springs Campground is accessible from the Stampede Pass Interchange at Exit 62 on the southwest side of the I-90 corridor. This 8-
acre campground provides recreational opportunities including picnicking, fishing, berry picking, and mountain biking, etc., with an annual average of 2,000 users (WSDOT 2005). The USFS administers the campground, and a Northwest Forest Pass is required to park.

- Crystal Springs Sno-park (accessible from Exit 62) is a parking area that provides access to snowmobiling trails. A Washington State Sno-park permit is required to park in this area.

- Cabin Creek Cross Country ski area and Nordic racetrack located between Exits 62 and 63 on both sides of I-90, with an annual average of 14,000 users (personal communication, Rogalski 2005). The Kongsberger and Trolhaugen ski areas are located in this area, providing Nordic skiing trails that are maintained and groomed by WSPRC. Portions of these trails are used in the summer for biking and hiking (WSDOT 2002h).

- Cabin Creek Sno-park (accessible from Exit 63). The 3.8-acre Sno-park provides access to cross country ski trails with an annual average use of 14,000 (WSDOT 2005). A Washington State Sno-park permit is required to park in this area.

- Pacific Crest Trail was designated a National Scenic Trail under the National Scenic Trails Act. The trail starts out as a desert trail at the California/Mexican border and ends 2,655 miles later in the Okanogan National Forest at the Canadian Border. It passes through 24 national forests, seven national parks, and 33 wilderness areas.

- Lake Easton State Park is accessible from Exit 70. This 516-acre park provides access to the Lake Easton Sno-park, campgrounds, a boat launch, and the John Wayne Pioneer Trail. It is managed in the winter as the Lake Easton Sno-park. Average annual visitor use is 212,400 (WSDOT 2005).

- Alpine Lakes Wilderness Area. This 394,000-acre wilderness area is located in the rugged Central Cascades region of Washington State and is jointly administered by the Mt. Baker-Snoqualmie National Forest and the WNF. The area is accessed from 47 trailheads and offers 615 miles of trail.

Most of the federal lands adjacent to the project corridors are managed by the USFS and are open to the public for dispersed recreational use. Dispersed uses may include hiking, mountain biking, backcountry skiing, snowmobile riding, boating, hunting, and berry picking. According to the Final Environmental Impact Statement, Snoqualmie Pass Adaptive Management Area Plan (USFS 1997), winter dispersed recreational use within the project area is among the highest in the state, and the most significant increases in year-around recreational
use has been in the dispersed areas because the developed areas are often filled to capacity.

The USFS manages land using the Recreation Opportunity Spectrum classification system. The Recreation Opportunity Spectrum provides a management framework for the USFS for defining classes of outdoor recreation environments, activities, and experience opportunities. Along the I-90 corridor, the USFS manages the land as primarily Recreation Opportunity Spectrum Rural (USFS 1997). Under this classification, the natural environment is culturally modified yet attractive. The Sno-parks located along the corridor are classified by the USFS as Developed Recreation (RE-1) sites in which the objective is to provide developed recreation in a Recreation Opportunity Spectrum Roaded Natural classification (personal communication, Jackson 2004).

3.10.2 Environmental Consequences

This section describes the expected impacts on recreational opportunities and facilities resulting from the I-90 Snoqualmie Pass East project.

3.10.2.1 NO-BUILD ALTERNATIVE

Under the No-Build Alternative, regular maintenance would preserve and repair the existing roadway as needed; however, no widening or other similar projects are proposed.

These activities may result in temporary land closures and traffic stoppages during maintenance periods, which may increase driving times through the corridor. However, these activities are not expected to affect access to recreational opportunities in the corridor or user enjoyment of those facilities.

Over the long-term, continued deterioration of the roadway, increased traffic volumes, and delays may contribute to increased driver frustration, resulting in decreased user enjoyment. Because no effect on access to recreational facilities is expected under this alternative, no mitigation is proposed.

3.10.2.2 KEECHELUS LAKE ALIGNMENT ALTERNATIVES

Construction-related impacts on recreational opportunities include traffic delays, increased noise levels in the corridor, air quality and visual impacts, and temporary exit closures or detours. These impacts would result in increased driving times and driver frustration, and may result in decreased user enjoyment. However, after project completion, drive times and easier access would be a beneficial effect.

For all build alternatives and Improvement Packages, WSDOT must comply with the requirements of Section 4(f) and Section 6(f) (refer to Chapter 5), and all access roads to trails and winter recreation sites would be maintained, or signed detour routes would be provided.
Some lands categorized as dispersed recreation areas by the USFS may be acquired to provide additional right-of-way (ROW) to accommodate roadway widening. The highway provides access to areas beyond the roadway corridor. However, because all road connections would be maintained or replaced, the proposed land acquisition is not expected to adversely affect access for users of dispersed recreation areas.

**Alternative 1: Long Tunnels**

Roadway widening along Keechelus Lake in the vicinity of Wolfe Creek may require the construction of retaining walls along the lake. The retaining wall would encroach on the lake shoreline, thereby requiring a ROW easement from the USFS and United States Bureau of Reclamation (USBR). Construction activities could affect the recreation experience for boaters on the lake and other recreational users. Increased noise levels, dust, and detours could cause disruptions to their recreational experience and cause some annoyance. However, these impacts are not expected to be so adverse as to deter its use as a recreation area.

Regarding disruptions due to noise, existing noise levels are high in this area due to traffic, so visitors to campgrounds and parks adjacent to the roads would expect higher noise levels than a recreation area with greater solitude values. Blasting activities associated with tunneling along Keechelus Lake would be limited to April through October, and no materials or equipment would be stored over winter. Blasting noise may be heard by some visitors to the campgrounds. However, since noise levels are elevated in these locations due to the proximity of the highway, noise is not expected to be a deterrent for use.

Access to all Sno-parks and winter trails would be maintained; therefore, construction would have a minimal impact on winter recreation facilities or opportunities in the corridor. After completion, operation of the 1.9-mile segment of the roadway within the tunnels would reduce existing noise impacts on the lake and other recreation users in this corridor.

In general, impacts would not be substantially adverse to recreation visitors. Although construction activities would be temporary (various changes in the noise and visual environment and access over a 5-year project schedule), adverse impacts to recreation visitors would not be expected. Visitor use is expected to continue. Post-construction will provide less traffic congestion which may entice visitors to the area and easier access. Visual impacts from the proposed alternative on Keechelus Lake are discussed in Section 3.12.2.3. Impacts from dust and air quality are discussed in Section 3.2.

The USFS manages the land along the I-90 corridor as Recreation Opportunity Spectrum classification of Rural and Roaded Natural, which includes campgrounds, trailheads, day use areas, and Sno-parks. Since the area is already...
a major interstate, the proposed construction projects would be consistent with allowable modifications within these categories.

**Alternative 2: Short Tunnels**

Impacts on recreational opportunities and use in the project corridor under Alternative 2 would be similar to those described for Alternative 1. The following additional impacts would result from this alternative.

Under this alternative, bridges and retaining walls would be constructed along Keechelus Lake between approximately MP 58 and Slide Curve. This activity would encroach on the lake shoreline, which would require a ROW easement from the USFS and USBR. These structures along the lake shoreline at this location may displace recreational users of this area, and would increase potential noise impacts on boaters and other recreational users. This effect would be minimized by operation of the tunnels.

**Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound**

Impacts on recreational opportunities and use in the project corridor would be similar to those described for Alternative 2. The following additional impacts would result from this alternative.

Under this alternative, bridges and retaining walls would be constructed along Keechelus Lake between approximately MP 58 and Slide Curve. This activity would encroach on the lake shoreline, which would require a ROW easement from the USFS and USBR. These structures along the lake shoreline at this location may displace recreational users of this area, and would increase potential noise impacts on boaters and other recreational users. This effect would be minimized by operation of the tunnel.

**Alternative 4: Both Directions of Traffic Along Keechelus Lake Around Slide Curve**

Under this alternative, bridges and retaining walls would be constructed along Keechelus Lake between approximately MP 58 and Slide Curve. This activity would encroach on the lake shoreline, which would require a ROW easement from the USFS and USBR. These structures along the lake shoreline at this location may displace recreational users of this area, and would increase potential noise impacts on boaters and other recreational users.

### IMPROVEMENT PACKAGES

This section considers the effects on recreation resources from the Improvement Packages and corridor-wide roadway improvements (outside the area of Keechelus Lake Alignment Alternatives). Recreation use would continue under the Improvement Packages. However, possible increases in traffic and noise due to temporary lane closures, exit closures, or detours, and increased driving times may decrease user enjoyment.
Reconfiguring the Stampede Pass Interchange at Exit 62 would require temporary ramp closures at this exit, affecting access to the Pacific Crest Trail, Crystal Springs Campground, Kachess Lake Campground and boat launch, Kachess Lake Sno-park, and Rachel Lake Trailhead. This closure would last less than eight months. Alternate access to the Kachess Lake Campground and Sno-park, and the Rachel Lake Trailhead would be from Exit 63 during temporary closure. Other access points exist for the Pacific Crest Trail. Construction could be staggered to close only one access point at a time to allow access to continue.

Under Improvement Packages A and B, pavement would be removed from the Price Creek Sno-park, and natural vegetation would be re-established. The loss of this area as a recreation area would increase demand in other Sno-parks along the corridor. Overcrowding at these Sno-parks may decrease user enjoyment. For Improvement Package C, the Sno-park may continue to operate. Section 4.2.6 presents a discussion of potential mitigation measures if Price Creek Sno-park is closed.

Increased noise and construction activity in the vicinity of the Crystal Springs Campground may discourage users from this facility. However, the overall capacity of campgrounds in the area will not be diminished. The increased noise and activity in the vicinity of the campground during roadway construction may decrease user enjoyment and cause annoyance. However, due to the location of this campground, which is already adjacent to an interstate highway, visitors would not expect a quiet wilderness experience while camping in this area.

After project completion, the widened roadway would be located directly on top of or away from the existing alignment. All widening is planned to occur to the north. The highway widening would not substantially increase noise levels at this location since the campground would be in the same location. The natural existing sound levels generated by the nearby Yakima River would further temper noise impacts on campsites near the river.

### 3.10.3 Construction Best Management Practices

Measures to minimize potential impacts on recreation opportunities during construction include the following:

- Implementing a traffic control plan to move traffic through the project corridor as efficiently as possible.

- Providing adequate public notice of road closures or delays through highway signage, public notices, and postings to the WSDOT traffic report website and WSDOT traffic radio.

- Coordinating with or providing links to recreation management agencies, or private organization websites and newsletters.
Coordinating with the USFS and WSPRC to provide alternative access routes to forest roads, state parks, campgrounds, and trailheads.

Limiting traffic stoppages and blasting to weekdays.

Restricting the construction period to weekdays when fewer recreation users would be affected.

## 3.11 Land Use

This section is based on the *Land Use Discipline Report* (Washington State Department of Transportation [WSDOT] 2003f) (Appendix O). It was prepared in compliance with the evaluation guidelines outlined in the WSDOT *July 2001 Environmental Procedures Manual, Chapter 451, Land Use, Land Use Plans, and Growth Management*. The *Land Use Discipline Report* evaluated all applicable land use related regulations and plans.

The attributes of land use to be addressed include land ownership, and general land use patterns, plans, and special use areas. Land ownership, also referred to as land status, is a categorization of land according to type of owner. The major land ownership categories discussed include federal, state, and private land. General land use classifications are identified in the vicinity of the project area. Natural land use classifications include wildlife areas, parks, and other open or undeveloped areas. Human land uses include residential, commercial, industrial, utilities, agricultural, recreational, mining, and other developed uses. Plans prepared by federal, state, and local agencies have been reviewed and analyzed.

The study area for land use includes lands within one-half mile of either side of the 15-mile long highway corridor.

### 3.11.1 Affected Environment

#### 3.11.1.1 Land Use Activities

The entire 15-mile project area transects the high mountain terrain of western Kittitas County, of which 4.5 miles borders Keechelus Lake. For the most part, land use consists of undeveloped Wenatchee National Forest (WNF) land managed by the United States Forest Service (USFS), but portions of the project area are federal lands managed by the United States Bureau of Reclamation (USBR). Land use within the WNF consist of a range of recreational and scenic opportunities, several watersheds and rivers, open forested property, the WSDOT Price Creek Rest Area, and an electrical utility corridor. A small number of private land use activities are also contained within the WNF and are discussed in more detail in the *Land Use Discipline Report* (WSDOT 2003f).
The community of Hyak is located at the proposed project’s starting point near Snoqualmie Pass (Milepost [MP] 55). The community of Easton is located at the proposed project’s end point (MP 70). Both of these communities consist largely of high-density rural residential and recreational-related land use activities. Commercial land use activities in these two unincorporated communities support local residential and recreational needs, and service Interstate 90 (I-90) travelers.

Other commercial and retail businesses that currently operate along the project segment of I-90 are generally related to outdoor recreation, including skiing, mountain biking, camping, hiking, horseback riding, and snowmobile riding. The area is used for recreation year-round. Both seasonal and permanent single-family residences and condominiums have been built in the project area. There are no industrial land use activities in this area.

Outdoor recreational land use activities, like the John Wayne Pioneer Trail, and the Yakima River run to the south between the project termini. Additional recreational opportunities within the project area are discussed further in Section 3.10 Recreation Resources.

The project limits also includes multiple Bonneville Power Administration high-voltage transmission lines. These power lines, between eastern and western Washington State, can be seen while traveling on I-90 near MP 68.

Access to federal and privately owned lands is gained through four I-90 interchanges within the project area. Access to the Hyak sub-area is from Exit 54, and the Easton sub-area is from Exit 71. The remaining access points are Exits 62 and 63 near the middle of the project limits.

3.11.1.2 LAND OWNERSHIP

Property owners in the project area include the federal government (lands managed by USBR, Federal Highway Administration (FHWA), and the USFS) and the state government (lands managed by Washington State Parks and Recreation Commission [WSPRC] and, by fee and under easement from the USFS, WSDOT), as well as various private landowners primarily within the Hyak and Easton areas. Private forestland owners include Boise Corporation and Plum Creek Timber Company. Figure 3.11-1 represents current land ownership within the project area. However, large blocks of land in the project area recently changed ownership.

In 1999, the USFS undertook the I-90 Land Exchange in order to consolidate “checkerboard” land ownerships (USFS and Plum Creek) primarily within the I-90/Snoqualmie Pass corridor. The exchange involved acquisition of 31,000 acres of Plum Creek land, the majority of which lies to the north of I-90 between MP 58 and MP 75, for 11,500 acres of federal lands in the central and south Cascades.
Figure 3.11-1. Land Ownership
The Cascades Conservation Partnership, comprising the USFS and many private conservation and recreation groups, undertook an unprecedented campaign to address the checkerboard land ownership issue. Over 75,000 acres of privately-owned forests that link the Alpine Lakes to Mount Rainier have been purchased. The Plum Creek land exchange resulted in a net increase of 23,000 acres of National Forest land in the area between Alpine Lakes and Mount Rainier, about half of that within 4 miles of I-90.

3.11.1.3 LAND MANAGEMENT AND USE

Historic land use activities primarily consisted of forest logging practices. The USFS manages the land under its jurisdiction according to the following hierarchy of planning documents: the Snoqualmie Pass Adaptive Management Area (SPAMA) Plan, followed by the Wenatchee National Forest Land and Resource Management Plan (the Wenatchee Forest Plan) as amended by the Northwest Forest Plan. These public lands predominate in the central project area, and are managed for multiple objectives including, but not limited to, forest practices, habitat, ecosystem functions, and recreation.

As part of the Environmental Impact Statement (EIS) process for the I-90 improvement project, the FHWA is required to comply with National Environmental Policy Act (NEPA) regulations as a federal agency. A supplemental Memorandum of Understanding between the FHWA and the USFS was signed in 1998, outlining the process for the transferring of lands from USFS to FHWA. During and following the NEPA process for this project, the USFS will evaluate the build alternatives and the Improvement Packages for consistency with the standards and guidelines contained in the Wenatchee Forest Plan as amended.

Following completion of the EIS process and final right-of-way (ROW) design, the USFS will have four months to evaluate whether National Forest interests are adequately protected by specific design features in the highway project plans or if the proposal is inconsistent with National Forest management. If approval is granted, the USFS will provide FHWA with a letter of consent containing stipulations for project construction, operation, and maintenance of the highway.

The WNF is federally managed and administered by the USFS. Congress possesses the power under the Property Clause of the Constitution to manage public lands. The Wenatchee Forest Plan is the guiding document by which these lands are managed. The WSDOT’s Roadside Classification Plan classifies the entire project area as “Forest” (WSDOT 1996).

All private property in the project limits are regulated by Kittitas County zoning and land use policies. Land use-related permits for this project will be limited to a letter of consent for ROW, and easements from the USFS, and Kittitas County Shoreline/Critical Area permits, as follows:
• ROW consent for new lands on federal forest property occurs through a process defined in the August 20, 1998, Memorandum of Understanding between the FHWA and the USFS.

• Contained within this Memorandum of Understanding is a requirement for highway projects to satisfy NEPA prior to providing FHWA a letter of consent for ROW needs. After review and approval of the project’s EIS, the FHWA is to submit a letter to the USFS requesting any needed ROW, including lands needed for temporary construction activities.

• Within the project’s ROW, Kittitas County permits are limited to Shoreline and Critical Area permits, and includes both federal and private areas of the project limits. This permit process occurs after a decision on the EIS has been made. Within the 15-mile project limits, a total of 13 creek or river crossings and the potential of five Keechelus Lake crossings have been identified as possible areas for Shoreline/Critical Area permits. Construction over these water bodies, in addition to any other identified critical area, requires application and permits from Kittitas County.

### 3.11.2 Environmental Consequences

Environmental consequences to land use may result when land use patterns and land ownership are affected. In addition, if land management plans or regulations require modification as a result of implementation of the proposed action or alternative, then an environmental consequence may be assumed to occur.

**Wenatchee Forest Plan Consistency.** Most of the changes to the existing I-90 alignment are proposed within the WNF portion of the project area, but substantial portions also occur on USBR-managed lands along Keechelus Lake (see Figure 3.11-1). As presented in Section 1.11, the USFS will analyze consistency of the project alternatives with adopted goals, objectives, standards, and guidelines of the Wenatchee Forest Plan (as amended) that rely heavily on ecosystem and resource protection and management. Other environmental disciplines such as wetlands, soils, aquatic/terrestrial wildlife, recreation, and cultural resources will play an important role in identifying and addressing impacts within the WNF, and obtaining USFS concurrence on this EIS.

**Building Relocations.** A few properties within the forested portion of the project area, both on private and federal property, were identified for potential impacts to land use. No adverse impacts were found to affect the properties except one (a possible building relocation for the property just north of Exit 62 and Kachess Lake Road). This would represent a change in land use, and an ownership change from private to public land.
**Access Roads.** Existing access points from I-90 interchanges to project area destinations are not impacted in any of the proposed alternatives. Careful adherence to design and construction strategies will minimize effects to access roads fronting I-90 along the Hyak and Easton communities.

**Construction-Related Impacts.** Temporary land use effects related to possible traffic detouring, increases in commercial and residential demand during the construction period, and increases in light, noise, and dust may occur within the project area. Mitigation could include daylight work hours in proximity to residential land use activities, and appropriate Best Management Practices (BMPs) in regard to other light, noise, and dust impacts. Other temporary impacts may include local increases in retail and commercial sales during construction periods, in addition to increases in wholesale trades on a regional level.

**Beneficial Effects.** While the primary purpose of the proposed action is to improve operational efficiency, accommodate projected growth in travel demand, decrease existing congestion, increase reliability, and improve safety, the proposed action would also increase capacity and improve freight mobility on I-90. The proposed project is intended to meet the existing and/or projected traffic demand based upon local land use plans. The project accommodates planned growth and economic development, but is unlikely to induce growth and development beyond that planned. Secondary impacts related to freight mobility will likely be seen in additional opportunity for statewide economic development. No adverse effects are expected to future land use plans.

3.11.2.1 **NO-BUILD ALTERNATIVE**

Under the No-Build Alternative, only maintenance improvements would occur along the existing alignment, and land use patterns, ownership, plans, and regulations would not be changed.

3.11.2.2 **KEECHELUS LAKE ALIGNMENT ALTERNATIVES**

There are no adverse environmental consequences for land use associated with the Keechelus Lake Alignment Alternatives. Potential issues, described in the preceding paragraphs, include: consistency with the Wenatchee Forest Plan and potential effects to certain I-90 access roads. Construction-related impacts to land use would be temporary and not considered adverse. Land use, ownership, and land management plans would be unchanged within the Slide Curve alignment.

3.11.2.3 **IMPROVEMENT PACKAGES**

The environmental consequences associated with the Improvement Packages are the same as those described above. However, a potentially affected property (a possible building relocation just north of Exit 62 and Kachess Lake Road) occurs
June 2005

within the Swamp Lake Connectivity Enhancement Area (CEA). Otherwise, land use, ownership, and plans would not be altered due to the Improvement Packages. There is the potential for the USFS to limit recreation and other human uses in the vicinity of connectivity structures to enhance their effectiveness. Currently, plans are being developed that would change the USFS management.

3.12 Visual Quality

This section was prepared based on the Visual Impact Assessment Discipline Report (Washington State Department of Transportation [WSDOT] 2002j, WSDOT 2003k, WSDOT 2004d) (Appendix W). The purpose of the visual analysis was to evaluate and document potential visual impacts from key viewpoints. The viewpoints were chosen according to the visibility of the project, accessibility to the public, frequency of public use, and representation of the overall impacts to the project area. Locations of “Key Views” were established to analyze the change in visual quality between current and proposed conditions. Figure 3.12-1 shows the locations of the selected Key Views and Landscape Units. The visual analysis was performed following the guidelines of the United States Department of Transportation, Federal Highway Administration (FHWA), publication Visual Assessment for Highway Projects, March 1981 (FHWA 1981).

The study area for visual resources consists of the proposed footprint of the realigned and widened highway from the Hyak Interchange (Milepost [MP] 55.1) to the West Easton Interchange (MP 70.3). For analysis purposes, the project area was divided into four Landscape Units based on topography and viewsheds that have similar characteristics.

Key Views were selected both from the highway and toward the highway according to visibility of the project, accessibility to the public, frequency of public use, and their representation of the overall impacts within the project area. These views were analyzed for vividness, intactness, and unity, which are explained in greater detail under Methodology.

- **Landscape Unit 1** (MP 55.1 to MP 60.75) runs from the western projects limits along the entire eastern shore of Keechelus Lake.

- **Landscape Unit 2** (MP 60.75 to MP 64.41) is defined by broad, relatively flat topography as the highway runs along the eastern side of the narrow valley formed by the Yakima River.
Figure 3.12-1. Map of Project Corridor with Landscape Units and Key Views
• **Landscape Unit 3** (MP 64.41 to MP 67.46) runs along the southwestern flank of Amabilis Mountain before it descends to the Yakima River.

• **Landscape Unit 4** (MP 67.46 to MP 70.30) runs along a plateau south of Kachess Lake.

### 3.12.1 Affected Environment

The project corridor runs through the Mountains-to-Sound Greenway National Scenic Byway. The Mountains-to-Sound Greenway begins in Seattle and runs to Thorp (MP 101) along Interstate 90 (I-90). The study area begins just east of Snoqualmie Pass in the Cascades Mountain range. I-90 runs in a north-south direction between the eastern shore of Keechelus Lake and Keechelus ridge, which rises approximately 2,500 feet above the roadway elevation of 2,700 feet above sea level, on average.

The Mountains-to-Sound Greenway is also designated as a Washington State Scenic Byway. The State and National Scenic Byway designations for the Mountains-to-Sound Greenway are based upon the route’s “scenic character, intrinsic qualities, recreational opportunities, and general environmental experiences that exist along this heavily traveled route.” Because the designation is based upon the route’s outstanding scenic character and significant environmental experiences, any changes in the corridor must be careful to retain those qualities as much as possible. WSDOT is coordinating with the Mountains-to-Sound Greenway Trust to ensure visual elements of the project will complement this status.

The Mountains-to-Sound Greenway Trust, in conjunction with WSDOT’s Northwest Region, developed a corridor Master Plan and an Implementation Plan. Concepts and goals of these plans were considered in this assessment. A primary goal of the Mountains-to-Sound Greenway Trust is to retain or add visual separation between eastbound and westbound lanes of traffic.

One of the predominant views in the project area is of Keechelus Lake. There are also numerous views of conifer forests with mountains in the background. There are potential views of the Kachess Lake valley. The Silver fir plant community near Hyak transitions into a western hemlock community near MP 61. At the top of Easton Hill (MP 68), the forests transition into a grand fir community until the project end at MP 70.3. Douglas-fir, an early successional species, currently dominates existing vegetation.

The project area runs through public lands that are managed for multiple objectives, including habitat, ecological connectivity, and recreation. The principle land manager throughout the project corridor is the United States Forest Service (USFS). The USFS manages the I-90 corridor as a scenic viewshed. Recent land transfers have moved Public Land Survey Sections from private...
ownership to USFS management, thus protecting viewsheds within the project corridor for the future.

WSDOT’s Roadside Classification Plan (1996) classifies the entire project area as “Forest.” This classification is characterized as predominantly natural or naturalized forest, with natural-appearing landforms and native trees or understory vegetation. The zone near the roadway edge may be classified meadow.

3.12.1.1 LANDSCAPE UNITS

The project corridor is highly scenic because of the presence of Keechelus Lake, tall trees, and mountain peaks. As described above, the project corridor was divided into four Landscape Units based on topography and viewsheds that have similar characteristics. The four Landscape Units are listed by milepost and described below.

Landscape Unit 1 – MP 55.10 to MP 60.75

Landscape Unit 1 runs from the western project limits along the entire eastern shore of Keechelus Lake. The view from the road is of a sharp rise to the east, the lake, and distant mountains. The dominant landscape characteristic in this unit is openness. Views across Keechelus Lake and up the Gold Creek Valley draw the eye away from the road. The road follows the sinuous curve of the shoreline. The traveler can see Gold Creek as it flows into the lake at the northern end of the Landscape Unit. This is the only Landscape Unit with extensive views toward the road. Typical topography is seen in Figure 3.12-2.

![Figure 3.12-2. Typical Topography in Landscape Unit 1](image)

The John Wayne Pioneer Trail, a part of the Iron Horse State Park, runs along the western shore of Keechelus Lake and has views toward I-90. There are brief views of the road from Forest Service Road (FSR) 4832, which runs parallel and above I-90 to the east, in the vicinity of Gold and Rocky Run creeks. Located off this road are the Gold Creek Sno-park, the Rocky Run Historic Campsite, and
summer homes. Currently, concrete barriers form the median between the two lanes of traffic. Figure 3.12-3 shows the view at MP 58.

**Figure 3.12-3. Topography at MP 58 (the Snowshed) in Landscape Unit 1**

**Landscape Unit 2 – MP 60.75 to MP 64.41**

Landscape Unit 2 is defined by broad, relatively flat topography as the road runs along the eastern side of the narrow valley formed by the Yakima River. Here the landscape allows a wide median between the eastbound and westbound lanes of traffic. Typical topography is shown in Figure 3.12-4.

**Figure 3.12-4. Typical Topography in Landscape Unit 2**

The dominant landscape characteristic in Landscape Unit 2 is of a forested foreground. The road here feels safer because of the wide median and the forested enclosure on both sides of the roadway. The Douglas-fir-dominated forest encloses the road and reveals mountain views ahead, as shown in Figure 3.12-5.

FSR 4823 runs briefly along the west side of I-90 south of the Cabin Creek Interchange, and the Cabin Creek Sno-park is located just off I-90. Currently, this road serves a few homes and recreational facilities. FSR 4823 dead-ends at the Yakima River.
Landscape Unit 3 – MP 64.41 to MP 67.46

Landscape Unit 3 runs along the southwestern flank of Amabilis Mountain before it descends to the Yakima River. Its topography is similar to that of Landscape Unit 1, with a rise to the northeast and a valley to the southwest. Figure 3.12-6 shows topography typical of this Landscape Unit as seen from the westbound lanes.

The character of Landscape Unit 3 is mixed. There are steep cut rock faces and forested foreground views. The road curves sinuously with only a Jersey barrier separating the directions of traffic. Electrical transmission lines run parallel to the road to the southwest. These lines lie approximately 400 feet from I-90. There are no significant views toward the road within this Landscape Unit. The westbound view from the roadway, typical of this Landscape Unit, is seen in Figure 3.12-7.
Landscape Unit 4 – MP 67.46 to MP 70.30

Landscape Unit 4 runs along a plateau south of Kachess Lake. There is room for a wide median, which forms a heavily forested hill between the two directions of traffic. This is shown in Figure 3.12-8.

This Landscape Unit forms the southeastern entry into the project area and is the eastern entry into the forests of western Washington. In this Landscape Unit, the Grand fir plant association is the climax plant community. Figure 3.12-9 shows a typical view of this Landscape Unit. There is a secure feeling driving through this area because of the wide median and the enclosure of the forest on both sides of the roadway. Mountain views are seen straight ahead, in the distance. There are views toward the roadway from Lake Easton State Park.
3.12.1.2 KEY VIEWS

Views within each of the Landscape Units were selected to examine the visual conditions of the existing project corridor and to assess the visual quality of the roadway. The locations of these “Key Views” were established to optimally analyze the change in visual quality between current and proposed conditions. For example, views were selected where vegetation removal could affect the view from or toward the road, or where the realignment of the road has the potential to change views. Other criteria that may be used for selecting a Key View location include visibility of the project area from the viewpoint, frequency and duration of the public viewing time, and the similarity of the view to a larger portion of the project.

Much of the land within the viewshed of the Mountains-to-Sound Greenway has been bought by or traded to the USFS. The harvested slopes have been planted, and will mature and provide enhanced views within the next 20 years. The analysis of views for this project rates these harvested slopes as they are now, but ratings for vividness of vegetation, intactness, and unity are expected to improve as the forests mature. Rating sheets for these views can be found in Appendix A of the 2004 Visual Impact Assessment Visual Discipline Report (WSDOT 2004d).

3.12.2 ENVIRONMENTAL CONSEQUENCES

3.12.2.1 METHODOLOGY

Visual quality is inherently subjective; therefore, objective descriptions are used to quantify the visual assessment. Three criteria used to perform an evaluative appraisal of the landscape visual quality are vividness, intactness, and unity.
Expert evaluation based on these three criteria and using the following sample equation have proven to be good predictors of visual quality:

\[
\text{Visual Quality} = \frac{\text{Vividness} + \text{Intactness} + \text{Unity}}{3}
\]

Each of the three criteria is independent; each is intended to evaluate one aspect of visual quality. Definitions of these terms are as follows.

**Vividness:** The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.

**Intactness:** The integrity of visual order in the natural and human-built landscape, and the extent to which the landscape is free from visual encroachment.

**Unity:** The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

**Evaluation Overview**

A visual quality evaluation was conducted on I-90 between MP 55.10 and MP 70.1 for the existing and proposed highway (WSDOT 2002j, WSDOT 2003k, WSDOT 2004d). Key Views were chosen according to the visibility of the project components, accessibility to the public, frequency of public use, and representation of the overall impacts to the project area. The views were analyzed for vividness, intactness, and unity within the four landscape units. Location of selected Key Views were established to analyze the change in visual quality between current and proposed conditions. Figure 3.12-1 depicts the locations of these Key Views. Table 3.12-1 presents the rating scale.

**Impact Analysis Overview**

Project impacts may occur during construction and/or may be permanent changes as a result of the project. Impacts from construction are temporary in nature, and include elements such as night construction lights, blasting, bridge scaffolding, pile driving, construction signs, detour roads, construction and silt fencing, and miscellaneous construction vehicles. During construction, these activities would detract from existing visual quality. These impacts will not be analyzed for their visual impact because of their temporary nature. Vegetation removed as a result of construction impacts is analyzed and would be mitigated by revegetation.
Table 3.12-1. Visual Rating Scale

<table>
<thead>
<tr>
<th>Rating</th>
<th>Value</th>
<th>Quality</th>
<th>Intactness</th>
<th>Unity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vividness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very High</td>
<td>7</td>
<td>The visual impression received is highly memorable, as contrasting landscape elements combine to form distinctive visual patterns. Strongly defined landscape or landforms are noted, including mountains, large water bodies, distinctive patterns, colors, and textures of vegetation, or significant manmade structures.</td>
<td>There is a high visual integrity between the natural and manmade landscape to the extent that the landscape is free from visual encroachment. Visual integrity occurs where natural areas and manmade landscapes blend into the surrounding character, and create no visual discontinuity between the natural and manmade elements. Natural and manmade patterns are not disturbed, and they maintain visual order.</td>
<td>The visual elements of the landscape join together to form a highly coherent, harmonious visual pattern. Manmade and natural elements blend together.</td>
</tr>
<tr>
<td>Medium</td>
<td>4</td>
<td>The visual impression received is moderately memorable, with some distinctive patterns; moderately defined landscape or landforms are present, including low rolling hills and smaller water bodies. Vegetation patterns, colors, and textures are less visible. Some significant manmade structures may be present.</td>
<td>There is an average visual integrity between the natural and manmade landscape. Some visual encroachment on to the landscape is present, and it lacks visual order. There is some disruption of the natural and manmade patterns.</td>
<td>The visual elements of the landscape join to form a moderately coherent, harmonious visual pattern. Manmade elements blend with natural elements, but the visual order is disrupted.</td>
</tr>
<tr>
<td>Very Low</td>
<td>0</td>
<td>The visual impression received is of low memorability. Little visual pattern is formed because landscape elements do not combine to form a striking and distinctive pattern. Homogeneous landforms or landscapes, and small bodies of water may be present. Vegetation patterns, colors, and textures are not noticeable, and manmade structures are insignificant or not memorable.</td>
<td>There is low visual integrity between the natural and manmade landscape features. Visual encroachment onto the landscape is very apparent. The pattern of elements is disrupted, and the integrity of the natural visual order is lost.</td>
<td>Visual resources do not join together to form a coherent, harmonious visual pattern. Manmade elements do not have a visual relationship to natural landforms or land cover patterns, and visual order is lacking.</td>
</tr>
</tbody>
</table>
Because this project is within a State and National Scenic Byway, visual quality of all components of the project is especially important. Many of the views from, and toward, I-90 already have very high visual quality, and retaining that quality is one of the many objectives of this project. The Architectural Guidelines and revegetation according to Treatment Level 2 of the Forested Classification, found in the Roadside Classification Plan are being proposed to achieve high visual quality within the project corridor. Best Management Practices (BMPs) found in the 2004 Highway Runoff Manual (HRM), such as natural dispersion areas and compost filter strips, can improve the visual impacts of stormwater facilities by reducing the need for large stormwater ponds that were required in the past. All of these elements would provide the opportunity to blend the highway with the adjacent forest and to make the corridor even more memorable than it is at the present time.

**Architectural Structures**

Architectural structures, such as bridge piers and railings, bridge abutments, tunnel portals, retaining walls, traffic barriers, and light standards would carry a Cascadian theme, where possible, throughout the project corridor. The Cascadian theme uses native stone, or concrete forms that simulate native stone, and arches. A similar treatment that has been used at Mount Rainier National Park is seen in Figure 3.12-10. A corridor theme would unite structural elements from a visual perspective and improve the visual quality ratings from those existing at present.

**Restoration**

Roadside restoration under Treatment Level 2 for a “Forest” classification consists of the restoration of native forest communities using small plant material (bare root, plugs, and one gallon container size plants) as well as soil restoration (which includes but is not limited to compost, topsoil, and mycorrhizal inoculation), and hydroseeding, fertilizing, and mulching.

Restoration of healthy soils and a native plant community in disturbed areas would be conducted. Shrubs in the median, where possible, can provide headlight and distraction screening, as well as providing some impact attenuation for run-off-the-road vehicles. Trees and shrubs within the right-of-way (ROW) on roadsides blend the roadway into the surrounding landscape, would also provide visual screening, and facilitate driver guidance and navigation. Construction impacts are temporary, and permanent project mitigation would address temporary impacts.
Fencing

Avalanche fencing and rock bolting are used in the project corridor at the present time. When new, they are highly visible, but with time they begin to blend with the hillside, and vegetation begins to establish within their matrix. Much of the fencing would be out of sight of most viewers, either because it would be above the highway or across the lake, in the case of views toward the road. Where avalanche fencing would be highly visible, it would be colored to blend with the adjacent rock, or have screening vegetation planted where possible.

In addition to avalanche fencing, wildlife fencing would be placed along the project corridor to limit the ability of wildlife to reach the roadway. The actual areas to be fenced are still undefined, although areas in the vicinity of Connectivity Enhancement Areas (CEAs) would be emphasized for inclusion of fencing. The fencing would most likely consist of wire mesh with 8-inch by 8-inch wood posts. This fencing may be visible to users of the I-90 corridor. However, with time, vegetation would likely provide some screening cover.

Lighting

To minimize adverse impacts from lighting (glare) associated with luminaires, directed lighting would be used. The sketch in Figure 3.12-11 shows an artist’s concept of luminaires along the chain-off area in the vicinity of MP 56.

Figure 3.12-11. Key View 2 Concept

New traffic barriers would be designed to fit visually into the Cascadian corridor design theme. These barriers may include new light standard bases that are integrated throughout the corridor.

Tunnel Portals

The tunnel portals and any associated structures, such as ventilation housing and maintenance facilities, would be designed according to the Architectural Guidelines with a Cascadian theme. Lighting inside the tunnel would provide
glare-free illumination. Figure 3.12-12 depicts the concept for Key View 3. Tunnel portals may have a headwall of native stone or simulated stone to follow the Cascadian theme.

![Figure 3.12-12. Key View 3 Concept](image)

The existing roadbed, when removed, would be restored to a native forest plant community. This would blend the road with the surrounding landscape.

**Bridges**

High visibility bridges would be designed with architectural elements in accordance with the Architectural Guidelines. These elements include large tapered columns with rock texture, and rock patterned barriers.

With the restoration of the native forest community, this alternative would blend into the existing forest. The tunnel portals can be blended into surrounding rock by using colored concrete or stains. Bridges built over the rock chutes would have the Cascadian design theme to carry a common rhythm throughout the corridor. The concept for this alternative is seen is Figure 3.12-13.
Walls and Native Plant Community Restoration

Retaining walls would be designed using the Architectural Guidelines for this project. The median would be planted with shrubs to soften the face of the wall, and to provide visual interest and color. The concept for retaining walls is seen in Figure 3.12-14.
Visual Quality Rating Analysis

The analysis and description of total visual quality ratings for the project alternatives assume mitigations based upon WSDOT’s Roadside Classification Plan (1996), the Roadside Manual (2003) and the Architectural Design Standards for this project. For most views, total visual quality ratings would improve and enhance this section of the Mountains-to-Sound Greenway after the project has been constructed due to the increase in vegetation after restoration according to the Roadside Classification Plan, and the use of the Architectural Design Standards for this project. These will provide increased corridor continuity, visual, and environmental benefits.

Where possible, the median would be wide enough to allow planting of shrubs or small, multi-stem trees to provide visual screening between east and westbound lanes of traffic. This aligns with one of the Mountains-to-Sound Greenway Trust’s highest goals, and with policies in the Roadside Classification Plan (1996).

3.12.2.2 NO-BUILD ALTERNATIVE

The No-Build Alternative (the existing condition) was analyzed from all views. The analysis generated a numerical baseline for use in comparing changes caused by project alternatives. Comparisons can only be made between ratings within each key view.

Views in this alternative range from average to high depending upon the Landscape Unit and the visual character in each Landscape Unit. In two of the Landscape Units (1 and 3), much of the median consists of a Jersey barrier topped with green plastic slats. While they screen headlight glare, these devices decrease the visual quality ratings of the Landscape Units. In Landscape Units 2 and 4, the wide, vegetated medians contribute to high visual quality ratings. Views of Keechelus Lake cause vividness ratings for Landscape Unit 1 to be higher than the other three Landscape Units because the presence or absence of water affects the values in this methodology.

3.12.2.3 KEECHELUS LAKE ALIGNMENT ALTERNATIVES

Among the four Keechelus Lake Alignment Alternatives, Alternative 2, the Short Tunnels Alternative, has the highest visual quality ratings. The existing roadbed would not be needed if maintenance activities were conducted from the Hyak Maintenance Facility, and fewer structures would be needed for ventilation of a smaller tunnel system than for Alternative 1, the Long Tunnel Alternative. Alternative 2 would remove the road from the sight of viewers across the lake while minimizing the amount of time that travelers on the highway would be in a tunnel. While ratings for views toward Alternative 1 are very high because 1.9 miles of the existing roadbed would be removed, ratings for views from the road
are very low for the time the traveler is inside the tunnel. This lowers the overall rating of Alternative 1 substantially.

Ratings for Alternatives 3 and 4 are very close to one another, and to Alternative 2. Alternatives 3 and 4 both retain I-90, with its views of the lake, around Slide Curve. Alternatives 3 and 4 have larger footprints than Alternatives 1 and 2. This decreases the opportunity for plantings to buffer and screen I-90 from views toward the road. Figure 3.12-15 provides a graphic comparison of the total average visual quality ratings for each of the Keechelus Lake Alignment Alternatives compared to the existing conditions. Only Alternative 1 has ratings below the existing conditions because of the lack of views from the road while in the tunnel.

Figure 3.12-15. Comparison of Visual Ratings for Keechelus Lake Alignment Alternatives

This graph and the averages show ratings for all views from and toward the road. They provide a general basis for comparison. Details are found in the Visual Impact Discipline Report (WSDOT 2004d).

### 3.12.2.4 IMPROVEMENT PACKAGES

All Improvement Packages are very close in visual quality averages and rate higher than the existing condition. This section considers the effects to visual quality from the Improvement Packages and corridor wide roadway improvements (outside the Keechelus Lake Alignment Alternatives). Among the Improvement Packages, Improvement Package A has the highest visual quality ratings because of the opportunity for increased vegetation, and the use of the Architectural Guidelines on bridge railings and bridge piers. However, all Improvement Packages are very close in

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**I-90 Snoqualmie Pass East Draft EIS and Section 4(f) Evaluation**

**Chapter Three Affected Environment and Consequences**

3-219
visual quality averages and rate higher than the existing condition. Figure 3.12-16 shows the overall averaged ratings of the three Improvement Packages and their relationship to each other.

![Graph showing visual ratings for Improvement Packages](image)

**Figure 3.12-16. Comparison of Visual Ratings for Improvement Packages**

Although the overall averages show Improvement Package A to have the highest ratings, at some locations there are equal visual quality ratings for two Improvement Packages. For example, Improvement Packages A and B remove the pavement at the Price Creek Sno-park, and restore native vegetation there. This results in equal ratings for Improvement Packages A and B at that location. Increases in the opportunity for planting native vegetation raise visual quality ratings. Tables in Section 7 of the *Visual Impact Discipline Report* (2004d) give the ratings for each Improvement Package at each key view.

The combination of Improvement Package A with Keechelus Lake Alignment Alternative 2 would have the highest visual quality potential of all the proposed alternatives because of the opportunity for revegetation using a native plant community and the reduction of the I-90 footprint around Slide Curve, while not containing the traveler in a tunnel for a significant period of time under average driving conditions.

The Architectural Guidelines are a key component for providing corridor continuity, carrying a theme throughout the project corridor, and for making this section of I-90 a memorable stretch of highway. When combined with native plant restoration, this project has the potential to improve the scenic quality of the Mountains-to-Sound Greenway between Hyak and Easton.
3.13 Social and Economic Resources

This section is based on four Discipline Reports: Socioeconomics (Washington State Department of Transportation [WSDOT] 2003g) (Appendix S), Environmental Justice (WSDOT 2003h) (Appendix J), Public Services (WSDOT 2003i) (Appendix Q), and Utilities (WSDOT 2003j) (Appendix V).

The Socioeconomics Discipline Report addresses the economic and social characteristics of the region, particularly population, housing, employment, and income, and the potential effects the proposed Interstate 90 (I-90) improvements may have to the local and regional economy. Special consideration is given in this report to the opportunity cost of I-90 road closures and assessing the personal and commercial cost of weather-related travel delays.

The Environmental Justice Discipline Report evaluates the alternatives for compliance with Executive Order 12898 and Federal Highway Administration (FHWA) Order 6640.23. These orders establish that it is federal policy to avoid, to the extent practicable, disproportionately “high and adverse” human health or environmental impacts on minority or low-income populations. The locations of minority and low-income populations have been identified primarily using race and poverty data reported in the 2000 Census.

The Public Services Discipline Report consisted of a review and analysis of the Kittitas County Comprehensive Plan, which contained a section on Capital Facilities, and conversations with Kittitas County officials regarding the type and location of public services within the project area. Public services evaluated included police, fire, medical and emergency services, and schools.

The Utilities Discipline Report was prepared in coordination with major utility providers in the project area including Bonneville Power Administration, Puget Sound Energy, Snoqualmie Utility District, and Qwest telecommunications. The primary data source on existing utilities located within the I-90 right-of-way (ROW) is the WSDOT database of utility franchises and permits, and as-built plans obtained from Puget Sound Energy and Qwest covering water, sewer, electrical power, fiber optic, and telecommunications. Each permit/franchise was analyzed to determine location, description, and ownership of the utility. This information was compared to maps of improvements proposed under each alternative, and areas of potential conflict were identified.

The study area for social and economic resources includes all of Kittitas County, and the communities of Hyak and Easton, as well as the various public service districts and emergency service departments within the county. Social and economic impacts are expected to extend beyond the project area and Kittitas County.
3.13.1 Affected Environment

Social and economic impacts of the proposed project are expected to extend far beyond the potential construction area, affecting all of Kittitas County, as well as the Puget Sound counties of King, Pierce, and Snohomish. Construction materials and equipment may easily be purchased from anywhere within this region, and construction workers and design engineers working on this project may be employed by firms located within this region. The project is also expected to indirectly affect the economies of Kittitas County and the Puget Sound area.

3.13.1.1 Socioeconomic Resources

Population. The project area is a sparsely populated rural area immediately east of Snoqualmie Pass. The community of Hyak/Snoqualmie Pass (population 201) forms the western boundary, and the community of Easton (population 383) forms the eastern boundary (United States Census Bureau 2002b). There are no population centers between Hyak and Easton. The 2000 Census found 20 residents living in the census blocks that include the project area. The project lies entirely within Kittitas County (population 33,362). Kittitas County has a population density of 14.8 persons per square mile and is classified as rural (population density of fewer than 100 persons per square mile) (Washington State Office of the Forecast Council 2001). Ellensburg, located 54 miles east of Hyak, is the largest city in the county, with a population of 15,414 (United States Census Bureau 2002a). Central Washington University, with a student population of about 8,000, comprises a large portion of Ellensburg’s population (Central Washington University 2004). The project area lies approximately 45 miles east of the Seattle-Tacoma-Everett metropolitan area. The combined population of this area is 2,414,616 (United States Census Bureau 2002a).

Housing. The 2000 Census indicates that, of the 64 residences within the socioeconomic project area, nine are occupied housing units, and the rest are either vacant or have seasonal, recreational, or occasional uses. The area is increasingly being developed with houses for permanent residents, including those who are willing to commute to the Seattle-Tacoma-Everett metropolitan area for employment and shopping. Twenty-six housing subdivisions of varying age and size are located in and around the project area.

The 2000 Census found a limited number of housing units along the I-90 corridor between Snoqualmie Pass/Hyak and Ellensburg. There are a total of just over 7,000 housing units in these communities with a vacancy rate just under 7.0 percent (United States Census Bureau 2002b). The vast majority of housing units and vacant units are located in the Seattle-Tacoma-Everett metropolitan area.
Economy. Land within the project area is mostly undeveloped National Forest System Land managed by the United States Forest Service (USFS), with more intense outdoor recreation opportunities near the interstate and dispersed recreation activities as one travels away from the interstate. Very little industrial development has occurred within the region. Logging traditionally has been the leading industry in the region, although there are no wood or paper mills within the project area. The nearest wood processing facility is located just west of Cle Elum, approximately 10 miles east of the project.

Recreation and tourism represent a leading economic activity in the area. The few commercial and retail businesses that currently operate along the project segment of I-90 are generally related to outdoor recreation, including skiing, mountain biking, camping, hiking, horseback riding, and snowmobile riding. The area is used for recreation year-round. Some seasonal-use houses and condominiums have been built in the vicinity area to provide lodging for outdoor recreational users. Fish and wildlife resources provide a substantial economic benefit to the State of Washington in terms of commercial fish harvest, sport hunting and fishing, and other recreational activities. An effective I-90 design with good ecological connectivity is important to maintaining and enhancing these resource benefits for the future.

The construction industry in Kittitas County employed a total of 420 workers in 1997, with most employment concentrated in the general building trades (primarily single-family residential construction), and special trades including electricians, painters, and plumbers (Washington Department of Labor and Industries 1998). Specific information for the heavy construction sector, primarily road construction, is not available for Kittitas County. The heavy construction sector in King, Pierce, and Snohomish counties employs a total of 10,309 workers, over 54 percent of the state’s total heavy construction workforce of 18,988 (Washington Department of Labor and Industries 2001a, b, c).

Median annual family income in Kittitas County was $40,148, compared with a statewide average of $57,114, during the first quarter of 2001 (Washington Department of Labor and Industries 2001a). The average wage in the heavy construction sector statewide was $44,229 in 1999.

3.13.1.2 Opportunity Cost of I-90 Road Closure

The opportunity cost of a 24-hour pass closure is estimated between $5 million to $7 million.

Closures of I-90 due to avalanche control, landslides, or bad weather disrupt cross-state travel, interfere with freight commerce, and result in opportunity costs to the regional economy. The term opportunity cost is defined as the value of resources that would otherwise be productively employed, including time. The opportunity cost of a weather-related closure of I-90 includes the value of passenger and commercial drivers’ time, and costs to operate passenger vehicles or loss of revenue for commercial trucks. Revenue for commercial trucks includes both operating costs and profit. Analytical methods for opportunity cost analysis are described in the Socioeconomic Discipline Report (WSDOT 2003g).
As presented in the Socioeconomics Discipline Report, depending upon precipitation and snow conditions, the frequency and length of highway closures vary from year to year. During the seven winters from 1995 to 2002, Snoqualmie Pass was closed an average of 100 hours annually due to avalanches, avalanche control work, rock fall, and landslides. The opportunity cost of road closures due to bad weather or avalanche control were calculated using two methods described in the Socioeconomic Discipline Report (2003g): the Cross-Cascades Corridor Method and the WSDOT Method. The nature and duration of weather-related road closures determine the availability of alternate routes and the magnitude of the opportunity cost. Table 3.13-1 displays the opportunity costs associated with different closure scenarios under the two methods. The proposed roadway improvements to I-90 in the project corridor would be expected to reduce the frequency and duration of weather-related road closures, and reduce the accrual of opportunity costs to personal and commercial travelers.

Table 3.13-1. Opportunity Costs of I-90 Road Closures

<table>
<thead>
<tr>
<th>Type of Closure</th>
<th>Cross-Cascades Corridor Method</th>
<th>WSDOT Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-Hour Closure</td>
<td>3-Hour Closure</td>
</tr>
<tr>
<td>Avalanche (alternative route available)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver</td>
<td>N/A</td>
<td>$63,000</td>
</tr>
<tr>
<td>Operating cost</td>
<td>N/A</td>
<td>$8,000</td>
</tr>
<tr>
<td>Combined cost</td>
<td>N/A</td>
<td>$42,000</td>
</tr>
<tr>
<td>Freight trucks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver</td>
<td>N/A</td>
<td>$23,000</td>
</tr>
<tr>
<td>Operating cost</td>
<td>N/A</td>
<td>$55,000</td>
</tr>
<tr>
<td>Combined cost</td>
<td>N/A</td>
<td>$70,000</td>
</tr>
<tr>
<td>Total cost</td>
<td>N/A</td>
<td>$149,000</td>
</tr>
<tr>
<td>Heavy Weather (no alternative route available)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automobiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver</td>
<td>$10,000</td>
<td>$69,000</td>
</tr>
<tr>
<td>Operating cost</td>
<td>$2,000</td>
<td>$11,000</td>
</tr>
<tr>
<td>Combined cost</td>
<td>$10,000</td>
<td>$72,000</td>
</tr>
<tr>
<td>Freight trucks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver</td>
<td>$4,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Operating cost</td>
<td>$10,000</td>
<td>$72,000</td>
</tr>
<tr>
<td>Combined cost</td>
<td>$11,000</td>
<td>$77,000</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$25,000</td>
<td>$177,000</td>
</tr>
</tbody>
</table>

Notes: 1. An alternative route was assumed as part of the quantitative analysis (WSDOT 2003g).

Opportunity cost estimates are based on current (2000) average daily traffic volumes of 25,000 vehicles, including 6,000 trucks. Cost estimates use current value dollars and are not discounted.
Value of Just-In-Time Deliveries. As a means to reduce warehousing and handling costs, many manufacturing firms schedule delivery of components for use immediately upon receipt from a supplier. Delay of just-in-time deliveries could halt manufacturing operations when parts are unavailable for use. An unexpected closure of I-90 delays delivery for the 6,000 trucks that use the highway each day and increases uncertainty for manufacturers and shippers. Closure-related effects for commercial trucking operations may include unexpected violation of mandated curfew hours, increased overtime costs, and missed shipping connections.

3.13.1.3 Environmental Justice

Minority Populations. Similar to the overall racial composition of Kittitas County, where 91.8 percent of the population is white, all 20 persons living in the census blocks that include the project construction area are white, non-Hispanics. The minority population as a percentage of the overall project area (Kittitas County) is only 8.2 percent. By comparison, minorities comprise 18.2 percent of the state population.

Low-Income Populations. The poverty threshold for a family of four was $13,738 in 2000 (United States Census Bureau 2001). A total of 13.3 percent of the population of Kittitas County lives below the poverty level, compared with 10.2 percent for the state. The difference in poverty rates between the county and the state may be attributable to the higher percentage of the county’s workforce engaged in agriculture, an 8,000-member student body at Central Washington University in Ellensburg, and fewer manufacturing jobs.

Population by Age. The median age of Kittitas County residents is 31.4 years. The percentage of the population over the age of 65 years is 11.6 percent, virtually the same as the state average of 11.2 percent. The percentage of residents under the age of 18 is 20.6 percent in Kittitas County, compared with 25.7 percent for Washington State.

3.13.1.4 Public Services

The communities of Hyak and Easton are near the boundaries of the project area. There are two public school districts (Easton School District No. 28 and Cle Elum School District No. 404) and three fire districts (Easton Fire District No. 3, Snoqualmie Pass Fire District No. 5, and Kachess Lake Fire District No. 8) within the project area. The nearest hospital is in Cle Elum (Hospital District No. 2). The Kittitas County Sheriff’s Department provides law enforcement countywide. There are no churches, cemeteries, or other social organizations within the project area.

3.13.1.5 Utilities

The following discussion describes the utility segments that cross or are adjacent to portions of the project area where alternatives are being analyzed.
**Water.** The Snoqualmie Pass Utility District in the Hyak area is the agency contact for water in the project area. An 8-inch-diameter water line crosses I-90 at Milepost (MP) 55.14 then turns west parallel with I-90 along the frontage road. This water line is owned by Snoqualmie Utility District. This water line serves the few residents in the area and is part of the water line system that feeds into the WSDOT Hyak maintenance site.

**Sanitary Sewer.** The Snoqualmie Pass Utility District is the agency that provides sanitary sewer management in the project area. A 10-inch cast iron sewer line crosses I-90 at MP 55.24 then turns west parallel with I-90 along the frontage road. This sewer line is owned by Snoqualmie Utility District. This sewer line serves the few residents in the area and it is part of the sewer line system that serves the WSDOT Hyak maintenance site.

**Electrical Power.** Puget Sound Energy provides electrical power in the project area. Overhead power lines cross I-90 at approximately MP 61.4, MP 62.8, MP 64.10, MP 65.46, and MP 67.61. There are two buried power line crossings of I-90 at approximately MP 55.04 and MP 69.04. Between MP 62.6 to MP 66.56, the power line enters and leaves the I-90 ROW at several locations along the project area. There are approximately 20 buried power vaults along this segment of I-90. The voltage of the above-mentioned power lines is between 12 to 15 kilovolts. They are owned by Puget Sound Energy.

A Bonneville Power Administration high voltage transmission line (345 kilovolts) crosses I-90 at approximately MP 68.00. A high voltage transmission line (100 kilovolts or higher) is considered a major factor in alignment selection.

**Telecommunications.** Qwest Communications provides telecommunication services in the project area. Buried telephone lines cross I-90 at MP 62.6, MP 62.9, MP 63.45, MP 68.63, and MP 68.96. The telephone lines and cable television lines serve the few cabin residents in this area and Keechelus Lake Dam. Qwest owns the telecommunication lines.

**Fiber Optics.** Level 3 Communications, LLC provides fiber optic management in the project area. Two buried high-density polyethylene conduits of fiber optic lines cross I-90 at MP 63.98. The conduits are attached to the bridge. This line is part of a nationwide service owned by Level 3 Communications.

### 3.13.2 Environmental Consequences

Estimates of the impacts on the local economy projected to result from the project (both beneficial and adverse) were analyzed by translating the cost of construction into employment and income data, using an input-output model developed from data tables prepared by the Washington State Office of Financial Management (WOFM), Forecasting Division (1993). The impact of project construction and operation on the demand for housing was estimated by comparing associated employment projections with the available housing stock.
The potential for disrupting existing communities is estimated by reviewing the physical extent of the proposed action and nearby residences to see whether the project would divide any communities, isolate any areas, or adversely affect access to properties. Given that the I-90 improvements are proposed for an area of limited development, socioeconomic impacts to Kittitas County are expected to be minimal to moderate.

**Construction Impacts.** Potential economic impacts associated with the build alternatives primarily would be driven by construction expenditures. Project costs for each Alignment Alternative and Improvement Package were developed based on current construction costs for materials, labor, and engineering, but do not factor in inflation. Project costs and associated economic impacts for the Keechelus Lake Alignment Alternatives and the Improvement Packages are presented in Table 3.13-2.

### Table 3.13-2. Estimated Construction-Related Economic Impacts

<table>
<thead>
<tr>
<th></th>
<th>Project Costs ($million)</th>
<th>Direct Impacts</th>
<th>Total Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Employment (Jobs)</td>
<td>Income ($million)</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>470</td>
<td>5,590</td>
<td>150</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>310</td>
<td>3,800</td>
<td>105</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>240</td>
<td>2,850</td>
<td>80</td>
</tr>
<tr>
<td>Alternative 4</td>
<td>140</td>
<td>1,670</td>
<td>45</td>
</tr>
<tr>
<td>Improvement Package A</td>
<td>260</td>
<td>3,210</td>
<td>90</td>
</tr>
<tr>
<td>Improvement Package B</td>
<td>220</td>
<td>2,610</td>
<td>70</td>
</tr>
<tr>
<td>Improvement Package C</td>
<td>170</td>
<td>2,020</td>
<td>55</td>
</tr>
</tbody>
</table>

Note: Impacts based on multipliers derived from the WOFM Forecasting Division’s Washington State Input-Output Study (WOFM 1993).

Potential economic impacts associated with buildout are represented in terms of output, employment, and labor income. Direct impacts are those that are “directly” related to the project construction, including construction employment and payroll expenditures. Total impacts include both the direct impacts and secondary impacts generated by the “multiplier” effect of the economic activity associated with buildout expenditures and employment. Economic multipliers derived from the Washington State Input-Output Study were utilized to estimate the magnitude of the potential impacts associated with the project (WOFM 1993).

While the project costs are presented as lump sum figures, it is assumed the length of buildout would be at least 10 years; hence, the estimated impacts presented in Table 3.13-2 would be distributed over many years. The actual project costs that may be incurred will depend upon the level and timing of...
funds, construction schedule, and duration, and actual material and labor costs. The main utility of the analysis presented in the following sections is to evaluate the relative construction-related impacts (both adverse and beneficial) of the alternatives.

**Operational Impacts.** Each of the build alternatives is expected to reduce the frequency of road closures, and increase the reliability of travel between eastern and western Washington. The economic value of the project would be greatly enhanced if the roadway improvements result in I-90 remaining open during bad weather when other routes are not available. Under existing conditions and the No-Build Alternative, I-90 would continue to experience road closures due to avalanches, avalanche-control activities, and general bad weather for up to 7 days per year. During each of these closures, society would incur economic losses due to travel delays. Each of the action alternatives would be expected to reduce the number and duration of delays experienced under existing roadway conditions.

**Ecological Impacts.** Fish and wildlife resources provide a substantial economic benefit to the State of Washington in terms of commercial fish harvest, sport hunting and fishing, and other recreational activities. An effective I-90 design with good ecological connectivity would maintain and enhance these resources for future economic benefit. As described in Chapter 2, certain design elements of the proposed Keechelus Lake Alignment Alternatives and the Improvement Packages were included specifically to enhance ecological connectivity. The costs to include these elements are included in the project cost data presented in Table 3.13-2. Please refer to Tables 2-2, 2-3, and 2-5 for a more detailed presentation and discussion of project baseline and connectivity costs.

3.13.2.1 **NO-BUILD ALTERNATIVE**

Under the No-Build Alternative, existing land use patterns and socioeconomic trends in the project area would continue. There would be no impact on population, housing, employment, income, or general economic activity. There would be no change to the social constituency of the area; racial composition, poverty, and age of the population would not be affected. Utilities in the project area would be expected to continue at their existing service levels. Public services may experience some degradation of service levels as traffic congestion increases and the Level of Service (LOS) declines.

If the No-Build Alternative were selected, I-90 would continue to operate as it does under current conditions, with existing maintenance procedures and standards. Under the No-Build Alternative, the traveling public would continue to encounter occasional road closures during the winter months. Each of the build alternatives is expected to reduce the frequency of road closures, and increase the reliability of travel between eastern and western Washington.

I-90 closures because of avalanches or avalanche-control activities result in costs to society in terms of lost time, productivity, and increased uncertainty. Closures of I-90 due to general bad weather have a greater opportunity cost due to the lack
of alternate routes (see Table 3.13-1). The cost of road closures is expected to increase over time as traffic volumes on I-90 increase.

Under the No-Build Alternative, it is anticipated that usage of the roadway and the potential for accidents could increase slightly as traffic becomes more congested, and the LOS declines. Persons requiring immediate medical attention and situations requiring police protection may be impacted by delays caused by increased congestion. These impacts to police, fire/emergency medical response, or hospital service are not likely to be substantial.

3.13.2.2 KEECHELUS LAKE ALIGNMENT ALTERNATIVES

Alternative 1: Long Tunnels

Employment. Under Alternative 1, construction expenditures for I-90 improvements are expected to be nearly $470 million, generating substantial employment and income in the region over the project period (see Table 3.13-2). Direct employment over the course of the project could amount to as many as 6,000 jobs, diminishing as the project nears completion. The level of annual employment generated by the project would depend upon the duration of the construction period and the timing of project expenditures. The majority of construction workers employed for this project are likely to come from the Seattle-Tacoma-Everett metropolitan area, with a relatively small number coming from Kittitas County.

After construction is complete, operation and maintenance of the highway could have nominal effects on employment within the county or the state. The new roadway may increase travel across the state, including interstate commerce, which could indirectly generate minor increases in employment within the state.

Income. Although information about the allocation of project construction costs between material and labor is not currently available, input-output models (WOFM 1993) estimate that 60 to 70 percent of the average annual cost of construction is spent on materials, and 30 to 40 percent goes to workers as income. Over the course of construction, Alternative 1 is expected to generate an estimated $150 million in direct labor income, and $320 million in materials, engineering and other purchases. This income would be spent locally or elsewhere for goods and services, and would circulate throughout the economy.

It is likely that the majority of project-related materials and services would be purchased in the Seattle-Tacoma-Everett metropolitan area rather than in Kittitas County. A small number of local businesses could be adversely affected by the proposed action. Impacts could include loss of property acquired by the state and obstruction of access to private properties. In this case, the business owner would be provided with compensation in compliance with the Uniform
Relocation Act of 1970, as amended. Business owners and qualified tenants would also be provided with relocation assistance.

Other potential impacts on local businesses could include construction noise and dust, temporarily impaired access to businesses and loss of customers who are not aware that businesses are open during construction. WSDOT would take measures to minimize construction noise and dust, and would work with business owners to maintain adequate access and provide signage indicating that businesses are open during construction.

Because a small number of businesses would be potentially affected, the project is not expected to have more than a minor impact on the economy of the area and the region. Nearby restaurants and convenience stores would gain customers among construction workers purchasing food and other goods.

**Population.** As discussed in detail in the Employment Section above, Alternative 1 would employ a sizable portion of the heavy construction workers in Kittitas, King, Pierce, and Snohomish counties for a period of at least 10 years. Given the size of this project and the associated increase in the demand for workers, the project may induce people to move into the area for work. However, this potential population increase is unlikely to represent a substantial change to the existing population of Kittitas, King, Pierce, and Snohomish counties.

After construction of the project is complete, the improved roadway conditions may make the area east of the project from Easton to Ellensburg more attractive to people who work in the Puget Sound region. Combined with current growth, the area may experience a moderate increase in population growth as a result of the project.

**Housing.** In order to live reasonably near their job sites, construction workers on large projects often rent housing in the local market and temporarily move to the area. Because of the relatively inexpensive cost of housing in Kittitas County, workers on the I-90 project would have a strong incentive to look for housing east of Snoqualmie Pass rather than in the more expensive Seattle-Tacoma-Everett metropolitan area. Workers on the project could occupy many of the vacant dwellings in Kittitas County, thereby reducing housing vacancy rates in the county and inducing increases in rental rates.

However, given the smaller number of housing units in the project vicinity, including Cle Elum and Ellensburg, it is likely that the majority of construction workers not currently living in the project area would reside in the Seattle-Tacoma-Everett metropolitan area where there are more housing opportunities. Areas in King County closest to the project, including North Bend and Issaquah, would be affected more by the increased demand for housing than would the more distant areas of Tacoma and Everett. In the larger Seattle-Tacoma-Everett housing market, the I-90 project would have no discernible effect on demand for housing or vacancy rates.
ROW acquisitions for the proposed project could result in the loss of a few housing units within the project corridor. Given the limited number of dwelling units potentially affected, this would not be a substantial loss of housing. Property acquisitions for the I-90 Snoqualmie Pass East improvement project would not be finalized until a preferred alternative is selected, the project area is surveyed, property owners are contacted, and property purchase is negotiated between WSDOT and the owners. Property owners are compensated for their properties at fair market value. Additionally, the Uniform Relocation Act of 1970 requires WSDOT to provide owners and qualified tenants with relocation assistance to avoid or minimize adverse financial impacts of displacement.

Opportunity Cost of I-90 Road Closure. Each of the build alternatives is expected to reduce the frequency of road closures, and increase the reliability of travel between eastern and western Washington. The economic value of the project would be greatly enhanced if the roadway improvements result in I-90 remaining open during bad weather when other routes are not available. I-90 has been designated a strategic freight corridor, and decreasing the length and duration of closures supports the goals of Washington’s Transportation Plan 2003–2022. For a detailed discussion of the opportunity costs of I-90 road closures, please refer to Section 3.13.1.2.

Compared with the other alternatives considered for this project, the tunnels associated with Alternative 1 can be expected to reduce the frequency of road closures due to snow or bad weather. Avalanche control accounts for 55 percent of the average 126 hours of annual closures on Snoqualmie Pass. The remaining 45 percent of closures are due to accidents and weather conditions. Alternative 1 is expected to eliminate closures due to avalanche control/risk on the project corridor.

Environmental Justice. Executive Order 12898 – Environmental Justice – states that people of all races, incomes, and cultures are to be treated fairly with respect to the impacts of development. Disadvantaged populations in Kittitas County represent a small portion of the community (the minority population is 8.2 percent, and the low-income population is 13.3 percent according to 2000 United States Census Bureau information). The population of the project area is entirely white and non-Hispanic, and, thus, the project would not have a disproportionate impact on a minority community. Kittitas County does not have a substantially greater incidence of poverty than the state as a whole, and the age distribution of the population in the project area is similar to the state. The project would not have a disparate or disproportional impact on low-income communities.

Public Services. Alternative 1 uses a straighter alignment that includes twin 1.9-mile tunnels. Most of the construction work would be done during the summer months; however, there may be some work that occurs before and/or after this likely seasonal timeframe. Phased construction means that only limited portions of the project would be reconstructed at one time. It is anticipated that public
services would not be substantially adversely impacted as a result of this project based on construction phasing and proposed mitigation measures.

During construction, accidents or medical incidents in the construction areas could require emergency medical services and police/fire service response. However, no substantial impacts to public services are anticipated. In some instances, detour route contingency plans will be developed and implemented to address temporary road closures and/or lane restrictions.

During operation of the improved roadway, emergency services could possibly be delayed if an accident occurred within the tunnel due to its length. However, no substantial police, fire/emergency medical response or hospital operational impacts are anticipated because the roadway will be designed to eliminate many existing traffic flow and transportation safety impediments.

**Utilities.** There would be no construction impacts for any of the alternatives since all the utilities would be relocated prior to the construction of the project. Utility locator service would be requested to field locate the ground utilities before the construction of the project. Operation of Alternative 1 is not anticipated to have any direct effect on the major utilities described in this section.

**Alternative 2: Short Tunnels**

The economic and social impacts associated with Alternative 2 would be similar to those described for Alternative 1. Because Alternative 2 has a substantially smaller construction budget of about $310 million, economic and related social impacts would be lower than under Alternative 1 (see Table 3.13-2).

Each of the build alternatives is expected to reduce the frequency of road closures, and increase the reliability of travel between eastern and western Washington. Although specific benefits related to reduced closure times are difficult to predict, it is anticipated that the improvements associated with Alternative 1 would be more likely to reduce the frequency of road closures due to snow or bad weather than under Alternative 2. The proposed alignment under Alternative 2 has less curvature than Alternatives 3 and 4, which has been shown in studies to decrease accident risk. Therefore, there should be less risk of closure due to accidents under Alternative 2 than Alternatives 3 and 4.

**Alternative 3: Short Tunnel Westbound, No Tunnel Eastbound**

The economic and social impacts associated with Alternative 3 would be similar to those described above for Alternative 1. Because Alternative 3 has a substantially smaller construction budget of approximately $240 million, economic and related social impacts would be lower than under Alternatives 1 and 2 (see Table 3.13-2).
Each of the build alternatives is expected to reduce the frequency of road closures, and increase the reliability of travel between eastern and western Washington. Although specific benefits related to reduced closure times are difficult to predict, it is anticipated that the improvements associated with Alternative 1 would be more likely to reduce the frequency of road closures due to snow or bad weather than under Alternative 3.

**Alternative 4: Both Directions of Traffic Along Keechelus Lake Around Slide Curve**

The economic and social impacts associated with Alternative 4 would be similar to those described above for Alternative 1. Because Alternative 4 has a substantially smaller construction budget of $140 million, economic and related social impacts would be lower than under Alternatives 1, 2, or 3 (see Table 3.13-2).

Each of the build alternatives is expected to reduce the frequency of road closures, and increase the reliability of travel between eastern and western Washington. Although specific benefits related to reduced closure times are difficult to predict, it is anticipated that the improvements associated with Alternative 1 would be more likely to reduce the frequency of road closures due to snow and bad weather than under Alternative 4.

### 3.13.2.3 IMPROVEMENT PACKAGES

This section considers the effects on social and economic resources from the Improvement Packages and corridor-wide roadway improvements (outside the Keechelus Lake Alignment Alternatives). Construction costs for the Improvement Packages and the related economic impacts to employment and income are presented in Table 3.13-2. It is estimated that the approximately $260 million completion cost of Improvement Package A would directly generate over 3,000 jobs, $90 million in labor income, and $180 million in materials and other purchases. These economic benefits would last throughout the duration of construction activity and would end soon after construction is complete. The level of annual employment would depend upon the duration and timing of the construction activities.

The approximately $220 million completion cost of Improvement Package B would generate about 2,600 jobs and $70 million in labor income. The approximately $170 million completion cost of Improvement Package C would generate 2,000 jobs and $55 million in labor income. Potential effects to the other socioeconomic resources would be similar to, though lower than, those described under Alternative 1.

Constructing the proposed project could potentially affect the following businesses and properties: 1) undeveloped portions of the Wenatchee National Forest; 2) Bavarian Village condominium and hotel; 3) various private lots located in Section 15, Township 22, Range 11; 4) Price Creek rest area; and 5) a...
tow truck operation that serves Snoqualmie Pass. The owners of the Bavarian Village hotel have held pre-application meetings with Kittitas County planners to discuss proposed improvements to their property (personal communication, Dunn 2001). If developed, these hotel improvements might be adversely affected by the proposed I-90 highway improvements.

Preliminary information indicates that construction of the proposed I-90 improvements could adversely affect one private business, the Bavarian condominium and hotel, as well as the WSDOT-owned Price Creek rest area. The project would require the acquisition of undeveloped forestland from public agencies and private owners. These ROW acquisitions are not expected to have more than minor effects on employment and the economy.

Without construction of one of the proposed Improvement Packages, none of the benefits of improved hydrological connections and resulting restoration of fish and other aquatic species passage would occur, nor would the benefits of improved terrestrial species movement and habitat connections. Fish and wildlife resources provide a substantial economic benefit to the State of Washington in terms of commercial fish harvest, sport hunting and fishing, and other recreational activities. Failure to address connectivity issues could result in economic harm from loss of opportunity. Additional economic loss could occur if, due to population and habitat fragmentation, species are ESA listed and result in new regulatory burdens, and additional loss of opportunity.

### 3.13.3 Funding Scenarios

The list of identified transportation needs in Washington State far exceeds available conventional funding. Alternate sources of revenue for transportation improvements must be considered in order to meet the needs of increasing traffic congestion and safety concerns. Generally, potential financing mechanisms for transportation projects may include:

- Gasoline sales taxes
- Vehicle licensing fees
- Local option vehicle excise taxes
- Tolls

The construction costs of the proposed I-90 improvements range from a low of $310 million to a high of $730 million. Due to the cost and complexity of this project, WSDOT is breaking the corridor into separate, smaller design and construction phases.

**Current Funding Situation.** In 2005, the Washington State Legislature allocated $387.7 million from the Transportation Partnership Account for the improvement of I-90 between Mileposts 55.1 and 59.1 (Hyak to Keechelus Lake dam vicinity).
Additional funding for the remaining portion of the project may come from one or both of the following two scenarios.

**New Project Listing.** Certain new projects may be eligible for a portion of additional funding. The funding level for new projects under this scenario is $100 million for a 10-year period. These funds would be in addition to the current corridor funding of $10 million per biennium for spot projects.

**Corridor Financing.** A second scenario would finance transportation projects through bonds to be repaid by tolls over a specified period. WSDOT analyzed tolling practices nationwide to provide information on different tolling approaches, timing of tolling facilities, and objectives and limitations of tolling (WSDOT 2002n, *Technical Summary of Toll Analyses*).

The use of tolls to fund roadway improvements links drivers to the financing of the project. On average, 25,000 vehicles cross Snoqualmie Pass on I-90 each day; approximately 25 percent of these vehicles are trucks. A typical holiday weekend may see close to 60,000 vehicles on this section of I-90. At these traffic volumes, toll-paying drivers on this roadway could provide additional revenues to fund the proposed improvements.

The WSDOT *Technical Summary* found a wide range of toll rates and revenues. Many toll facilities practice “value pricing,” charging different toll rates at different times to deter congestion at peak times. Table 3.13-3 summarizes toll information on the three facilities most similar in length and development cost to the proposed project.

**Table 3.13-3. Toll Information for Representative Facilities**

<table>
<thead>
<tr>
<th></th>
<th>Dulles Greenway</th>
<th>Southern Connector</th>
<th>San Joaquin Toll Road</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Northern Virginia</td>
<td>Greenville, South Carolina</td>
<td>Orange County, California</td>
</tr>
<tr>
<td><strong>Year Opened</strong></td>
<td>1995</td>
<td>2001</td>
<td>1996</td>
</tr>
<tr>
<td><strong>Length (miles)</strong></td>
<td>14</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td><strong>Toll Range (auto)</strong></td>
<td>$0.50 to $2.00</td>
<td>$0.50 to $1.50</td>
<td>$2.50</td>
</tr>
<tr>
<td><strong>Toll Rate per Mile</strong></td>
<td>$0.14</td>
<td>$0.09</td>
<td>$0.17</td>
</tr>
<tr>
<td><strong>Annual Toll Revenue</strong></td>
<td>$19.8 million</td>
<td>$2.6 million</td>
<td>$59.3 million</td>
</tr>
<tr>
<td><strong>Annual Vehicle Trips</strong></td>
<td>14.4 million</td>
<td>3.5 million</td>
<td>38.0 million</td>
</tr>
<tr>
<td><strong>Revenue per Mile</strong></td>
<td>$1.4 million</td>
<td>$0.2 million</td>
<td>$4.0 million</td>
</tr>
<tr>
<td><strong>Revenue per Trip</strong></td>
<td>$1.38</td>
<td>$0.75</td>
<td>$1.56</td>
</tr>
<tr>
<td><strong>Development Cost</strong></td>
<td>$350 million</td>
<td>$191 million</td>
<td>$800 million</td>
</tr>
<tr>
<td><strong>Development Cost per mile</strong></td>
<td>$25.0 million</td>
<td>$12.0 million</td>
<td>$53.3 million</td>
</tr>
</tbody>
</table>

*Source: WSDOT 2002n*
Information regarding the annual revenue per trip at these selected facilities is used to estimate the potential revenue that could be generated by a toll facility on the 15-mile project corridor. Based on tolls ranging from $.75 to $1.56, $6.8 million to $14.2 million annually might be generated by the 9.1 million annual trips across Snoqualmie Pass.

Most tolled facilities rely on a combination of toll revenues and other funding from development impact fees, vehicle registration fees, and other sources. Additional analysis is needed to predict if the amount of revenue generated from a Snoqualmie Pass toll facility would be sufficient, alone or in combination with other funding sources, to complete the project on a reasonable implementation schedule.

3.13.4 Construction Best Management Practices

Measures to avoid or minimize social and economic impacts are listed below.

- WSDOT would comply with the terms of the federal Uniform Relocation Act of 1970, as amended. WSDOT would provide both business and residential property owners the fair market value for all properties to be acquired for the proposed project. Owners and qualified tenants would also be provided with relocation assistance, as described in detail in the Uniform Relocation Act.

- WSDOT would ensure that contractors comply with the equal employment opportunity provisions of their contracts, including compliance with Executive Order 11246, Equal Employment Opportunity and Affirmative Action Guidelines for Federal Contractors Regarding Race, Color, Gender, Religion, and National Origin.

In addition, the following mitigation measures would minimize possible social and economic impacts.

- Signs and notices would be placed to inform travelers and customers that businesses along the project corridor are open during construction.

- Police, fire, emergency, and school transportation service providers would be contacted to address possible temporary disruptions in service during construction.

- Buses could be provided to transport workers to construction sites from Issaquah (or some other suitable location west of Snoqualmie Pass). This would encourage workers to live on the western side of the Cascade Mountains, shifting the demand for housing from Kittitas County to eastern King County where more housing units are available.
Utilize the 511 telephone number for updates on current road conditions, and radio or electronic signboards to notify travelers in advance of closures or delays. These measures should give drivers the opportunity to take alternate routes before they have committed to traveling on I-90. For eastbound traffic, signs should be installed west of the I-90/405 interchange so that drivers could divert north to U.S. 2. For westbound traffic, signs should be installed east of Cle Elum so that drivers could divert to State Route 97 and then U.S. 2. Posting information on the WSDOT internet site could also be useful to the traveling public.

### 3.14 Hazardous Materials and Waste

This section was prepared based on the *Hazardous, Toxic, or Radiological Waste (HTRW) Discipline Report* (Washington State Department of Transportation [WSDOT] 2002k) (Appendix M). The purpose of the discipline report was to identify known or contaminated sites within 1 mile on either side of the existing Interstate 90 (I-90) alignment, where current or historical usage of hazardous or toxic waste could affect construction during realignment of certain portions of I-90 between Hyak and Easton. The investigations and analysis involved a review of various sources of historical information, a reconnaissance of the corridor for evidence of contaminated sites, and a review of current federal and state databases for confirmed and suspected contaminated sites, including underground storage tanks (USTs).

The study area for this resource consists of 1 mile on either side of I-90 for a 15-mile section to include the proposed footprint of the realigned and widened roadway, from the Hyak Interchange (Milepost [MP] 55.1) to the West Easton Interchange (MP 70.3) in Kittitas County.

#### 3.14.1 Affected Environment

Information regarding the history of environmental issues along the I-90 corridor and land uses in the area was gathered through interpretation of aerial photographs of the corridor and vicinity dated 1944, 1967, 1969, and 1997. Additional information was collected by reviewing property records at Washington Department of Ecology’s (WDOE’s) Central Regional Office, as well as interviews with persons having some knowledge of the site use history.

Based on review of available historical information, the project area has been used for logging, recreation, and transportation purposes. The I-90 right-of-way (ROW) has been used for transportation purposes. Potential environmental risks posed by these uses appear to be low.
The historical development of the project area and surrounding areas has been controlled in large part by geography. The project area is dotted with lakes and small mountain ranges that have been primarily used for logging and recreational purposes. The development of the Burlington Northern Santa Fe Railway that runs along a small section of I-90 was also a key factor in the development of the surrounding area and the community of Easton. The original railroad was built across Snoqualmie Pass in the early 1880s.

No National Priority List sites within approximately 1 mile of the I-90 Snoqualmie Pass East project were revealed. A Puget Sound Energy substation in Hyak has two tanks totaling 567 gallons that contain polychlorinated biphenyls below regulatory limits for dangerous waste.

The current WDOE listing of USTs cites 12 facilities with registered USTs within 1 mile of the I-90 corridor. Because available state records regarding USTs date back only to 1964, some former potential UST sites, such as fuel dealers, do not appear in the current WDOE-maintained UST list. A description of USTs within the project area cited in WDOE’s UST list is provided in the HTRW Discipline Report.

On August 29, 2000, and September 21, 2000, WSDOT contractor personnel made two site visits along the I-90 area from Hyak to Easton. Based on the visual reconnaissance of the I-90 ROW within the project area, it would appear that the project area is free from significant contamination.

### 3.14.2 Environmental Consequences

This section describes all known or suspected sites containing HTRW within 1 mile of the proposed alignment, and indicates which sites (if any) could potentially impact construction or operation within the ROW. Descriptions of each site and evaluations of each site’s potential impacts are given in the following sections.

Accidental spilling of fuel or other hazardous chemicals during construction activities could substantially impact soil quality, surface water quality, or groundwater quality. If such accidental releases occurred, they could substantially disrupt construction activities. Based on these concerns, WSDOT and WDOE have developed a set of Best Management Practices (BMPs) for spill prevention and control applicable to all WSDOT construction projects.

WSDOT’s Hazardous Materials Program has developed a number of documents and guidance materials to assist contractors in developing a Spill Preventions, Control, and Countermeasure Plan (SPCCP) to satisfy the WSDOT contractual requirements.
3.14.2.1 **NO-BUILD ALTERNATIVE**

No known or suspected hazardous material sites are within 1 mile of the ROW in the project corridor and no impacts are expected from the No-Build Alternative.

3.14.2.2 **KEECHELUS LAKE ALIGNMENT ALTERNATIVES**

The Keechelus Lake Alignment Alternatives apply to the segment of I-90 from MP 56.4 to MP 60.0. HTRW sites have been identified in the Hyak vicinity (MP 55), approximately 1.5 miles north-northwest of the project start and in the Stampede Pass Interchange (MP 62.7) approximately 2.7 miles south-southeast of the project end. No known or suspected sites are within 1 mile of the ROW or construction window for the alternatives, and no impacts are expected.

3.14.2.3 **IMPROVEMENT PACKAGES**

The potential impacts for all Improvement Packages and corridor wide roadway improvements (outside the Keechelus Lake Alignment Alternatives) are the same. These potential impacts are related to known or suspected HTRW sites along the corridor, as identified below.

**Hyak Area**

A WSDOT maintenance facility is located at Hyak approximately 200 feet south of I-90. There are currently three operational USTs on the site. Two contain diesel fuel, and one contains unleaded gasoline. A single UST containing diesel fuel was removed in December 1964. None of the storage tanks are listed by WDOE as leaking underground storage tanks (LUSTs).

The USTs are distant (at least 200 feet away) from any of the alternative ROWs, and the maintenance yard is lower in elevation than the existing highway ROW. Based on that distance, there is a very minimal potential that incidental spills at the fueling facility could migrate far enough to impact either soil or groundwater at any of the alternative alignments. No further investigation of these storage tanks is recommended.

Utility Local Improvement District Number 3 Sewage Substation is located in Hyak, approximately 0.5 mile south of I-90. One UST was removed in December 1994.

Ski Acres is located on State Road 906, 0.75 mile west of Hyak. Two USTs were removed in December 1964. One contained unleaded gasoline, and the contents of the other former UST were unknown.

The Summit West site is located approximately 0.5 mile northwest of Hyak on the north side of I-90. There is currently one active UST on site.
The Summit Central site is located 0.5 mile southeast of Hyak. Currently, this site is listed in WDOE’s LUST citation list. One UST has been reported as “cleaned up,” while cleanup of another is reported as having been started. A sewage treatment plant is located at Hyak approximately 0.5 mile south of the I-90 roadway. One UST was removed from the site in December 1964. Based on that distance, there is a very minimal potential that incidental spills from the removed storage tank could migrate far enough to impact either soil or groundwater at any of the alternative alignments. No further investigation of these storage tanks is recommended.

One potential HTRW site (the Stampede Pass site) is located between Hyak and Easton (MP 60.8 to MP 64.7), and is approximately 0.75 mile north of the existing highway on the road to Kachess Lake. A single UST used to store leaded gasoline was removed in January 1967. There is a very minimal potential that any leaks from this tank could migrate far enough to affect soil or groundwater at any of the alternative alignments. No further investigation of this site is recommended.

**Easton Area**

The RV Town site is located near the Town of Easton and is approximately 500 feet to the south of I-90. It currently contains three operational tanks ranging in size from 5,000 to 19,999 gallons that contain leaded and unleaded gasoline. Two previous USTs were removed in December 1964.

C.B.’s General Store and Service Station is located approximately 0.25 mile south of I-90 at the west end in the Town of Easton. There are currently four USTs containing leaded and unleaded gasoline, with closures in process. This site is currently cited on WDOE’s LUST citation list. Tanks range in size from 111 to 4,999 gallons.

The Cresto and Lanphere site is approximately 200 feet from I-90 immediately to the south of the eastbound off-ramp. Three USTs containing leaded gasoline were removed from the site in December 1964.

School District #28 is approximately 0.25 mile south of I-90 in the Town of Easton. Currently, one UST is operational on the site. This UST, with a capacity of between 2,001 and 4,999 gallons, contains diesel fuel.

The Burlington Northern Santa Fe Railway site is located on Frontage Road 906 in Easton. A release was reported on the site in 1990, and contaminated soil was reported cleaned up in June 1996. Investigation by Environmental Management Resources, Inc., of Redmond, Washington, revealed that soils surrounding a 100-gallon diesel UST contained concentrations of petroleum hydrocarbons of less than 100 milligram/kilogram. In accordance with WDOE’s Model Toxics Control Act cleanup criteria, no cleanup was required. Review of WDOE
archived project files revealed no further action with regard to the cleanup status of the site.

3.14.3 Construction Best Management Practices

Accidental spills of fuel or other hazardous chemicals during construction activities could seriously impact soil quality, surface water quality, or groundwater quality. If such accidental releases occurred, they could seriously disrupt construction activities. Based on these concerns, WSDOT and WDOE developed a set of BMPs for spill prevention and control applicable to all WSDOT construction projects. The required practices are specified in the document entitled Implementing Agreement Between WDOE and the Washington State Department of Transportation, Regarding Compliance with the Washington State Surface Water Quality Standards, dated February 1998.

Additionally, WSDOT’s Hazardous Materials Program has developed a number of documents and guidance materials to assist contractors in developing a SPCCP to satisfy the requirements of Standard Specification #1-07.15(1). Information on these requirements can be found in the Final Discipline Report for HTRW (WSDOT 2002k). The contractor would be required to develop a SPCCP.

3.15 Energy

This section was prepared based on the Final Energy Discipline Report (Washington State Department of Transportation [WSDOT] 2002e) (Appendix I). The purpose of the report was to analyze and determine both construction-specific and operational energy consumption between the four Keechelus Lake Alignment Alternatives and the three Improvement Packages. The emphasis on energy consumption for construction involves materials manufacturing, transport, and construction equipment operation. Operational energy consumption focuses on motor vehicle fuel consumption determined by daily vehicle miles traveled and speed.

The study area for energy is the Interstate 90 (I-90) roadway corridor for a 15-mile section from the Hyak Interchange (Milepost [MP] 55.1) to the West Easton Interchange (MP 70.3) in Kittitas County.

3.15.1 Affected Environment

Energy consumption during construction in the project corridor is discussed based on the estimated construction cost of the project. Energy consumption to complete a project is proportional to the cost of the project. 2002 construction dollars were first converted to 1987 dollars using a factor of 0.492 from the WSDOT Construction Cost Index. Then the 1987 construction dollars were converted to 1977 dollars using a factor of 0.92 from the Highway Construction Price Index from the 1st quarter of 1990 in the summary of the Price Index for
Selected Highway Construction Items. A Construction Energy Factor of 82,700 British Thermal Units (BTUs)/1977 construction dollars was used to convert the construction costs in 1977 dollars to BTUs (Caltrans 1983).

Operational energy consumption analysis within the project area is based on the operational traffic impact analyses prepared for this document. Net changes in overall energy use for the project area caused by operation of the alternatives are assessed using daily vehicle miles traveled and average speed values calculated from the transportation forecasting model. Energy consumption is calculated by multiplying daily project area vehicle miles traveled with the appropriate fuel consumption rate for the average speed. Alternatives are compared based on daily differences in fuel consumed by traveling vehicles. This value is approximate for each alternative and neglects several factors, such as energy consumption at idle; however, it provides a good basis for comparison between the various alternatives.

3.15.2 Environmental Consequences

3.15.2.1 NO-BUILD ALTERNATIVE

The No-Build Alternative would not improve or expand the existing roadway. It does include periodic resurfacing of the existing roadway with Asphalt Concrete Pavement (ACP) to maintain the route in the current configuration. Preliminary resurfacing recommendations set the interval between overlay projects at 4 to 6 years. Minor safety improvements as part of the ongoing operation of the project would also be included. These actions would consume an equivalent of 799,823 barrels of oil.

There are no operational energy impacts associated with the No-Build Alternative. Future maintenance-related improvements would likely be needed and would require additional energy resources due to congestion resulting from increased traffic volume.

3.15.2.2 KEECHELUS LAKE ALIGNMENT ALTERNATIVES

Energy would be consumed during construction of any of the alternatives to manufacture materials, transport materials, and operate construction equipment. Energy consumption to complete a project is proportional to the cost or size of the project. The energy expended on each of the build alternatives would be the result of structure and roadway construction. An equivalent 3,086,919 barrels of oil would be consumed during the construction of Alternative 1.

For purposes of comparison, 5.3 million barrels of oil is approximately equivalent to the total daily amount of motor gasoline consumed in the United States. Assuming construction for the entire project from Hyak to Easton would take 10 years, and work would take place for nine months out of the year, the daily consumption rate for construction is approximately 200 barrels of oil.
The various alternatives would provide additional capacity in the I-90 corridor in different ways. Traffic would increase annually through the year 2020, independent of construction of this project. All alternatives would result in additional person capacity. Vehicle fuel consumption dominates the energy use for each alternative, and is largely determined by daily vehicle miles traveled and speed. Vehicle miles traveled and average speed data were used to compare the operational energy consumption between the alternatives. Annual power requirements for lighting and ventilating the long tunnel are estimated at 60,732 million BTUs. Energy consumption resulting from daily vehicle operations in the project area was computed for this alternative for 2020.

At a design speed of 70 miles per hour (mph), motor vehicles would consume 6,049 million BTUs daily, a 16 percent increase in energy consumption compared to the No-Build Alternative.

Construction of Alternative 2 would consume an equivalent 2,058,387 barrels of oil or approximately 130 barrels per day. At a design speed of 70 mph, motor vehicles would consume 6,049 million BTUs daily, a 16 percent increase in energy consumption relative to the No-Build Alternative.

Construction of Alternative 3 would consume an equivalent 1,824,719 barrels of oil or approximately 115 barrels per day. At a design speed of 65 mph, motor vehicles would consume 5,643 million BTUs daily, which is no change compared to the No-Build Alternative.

Construction of Alternative 4 would consume an equivalent 924,093 barrels of oil or approximately 60 barrels per day. At a design speed of 60 mph, motor vehicles would consume 5,237 million BTUs daily, which is no change compared to the No-Build Alternative.

3.15.2.3 IMPROVEMENT PACKAGES

Constructing Improvement Package A would consume an equivalent of 1,751,017 barrels of oil, or approximately 112 barrels per day. Constructing Improvement Package B would consume an equivalent of 1,340,529 barrels of oil, or approximately 86 barrels per day. Constructing Improvement Package C would consume an equivalent of 1,142,887 barrels of oil, or approximately 73 barrels per day.

Energy consumption during operation is included in the Keechelus Lake Alignment Alternatives discussions above.

3.15.3 Energy Reduction During Construction

Measures taken to reduce energy consumption during construction are common to all alternatives and include the following:
• Limiting the idling of construction equipment and employee vehicles.
• Encouraging car pooling or van pools among construction workers.
• Locating staging areas as close as possible to work sites.

After construction is completed, efficiencies associated with the proposed improvements are expected to enhance traffic flows, avoid road closures, reduce traffic idling time, and reduce lane miles driven.

3.16 Cumulative Effects

Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Section 1508.7 and 1508.8) stipulate that the cumulative effects analysis within an Environmental Impact Statement (EIS) should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions,” commonly referred to as “cumulative effects.”

This section provides: 1) the definition of cumulative effects; 2) a description of past, present, and reasonably foreseeable actions relevant to cumulative effects; 3) an assessment of the nature of interaction of the proposed Interstate 90 (I-90) Snoqualmie Pass East improvements, and alternatives, with other past, present, and reasonably foreseeable actions; and 4) an evaluation of cumulative effects potentially resulting from these interactions.

3.16.1 Cumulative Effects Approach

The first step in assessing cumulative effects involves defining the scope of other actions and their interrelationship with the proposed action and alternatives (1997 CEQ guidance, Considering Cumulative Effects). The cumulative effects analysis evaluates the interaction of multiple actions. Cumulative effects most likely arise when a relationship or synergism exists between a proposed action and alternatives, and other actions occurring in close proximity or during a similar time period. Actions geographically overlapping or close to the proposed actions would likely have more potential for a relationship than those farther away. Similarly, actions coinciding in time with the proposed actions would have a higher potential for cumulative effects. The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even secondary impacts, but can nonetheless add to other disturbances, and eventually lead to measurable environmental change.

Geographic boundaries are based upon the natural boundaries of the resources of concern. For the proposed actions, the geographic focus is generally constrained to the western portion of Kittitas County. Some resource areas, such as energy or transportation, may have impacts beyond Kittitas County.
Cumulative effects analysis includes consideration of past, present, and reasonably foreseeable future actions. Federal Highway Administration (FHWA) Guidance indicates that “…the design life be used as the maximum period of time that a project can be expected to contribute to potential secondary and cumulative impacts.” For Alternatives 1 through 4, the Portland Cement Concrete Pavement (PCCP) structure is predicted to have a 40-year design life. The majority of impacts from all alternatives are expected to occur during construction, which is estimated to take 5-15 years. Therefore, the temporal boundary for the proposed action will focus on the immediate 15-year future and any impacts that may have effects up to 40 years in the future.

To identify cumulative effects, this Draft EIS analysis addresses three questions:

1. Is there a potential that the proposed action will interact with elements of past, present or reasonably, foreseeable actions?

2. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

3. If such a relationship exists and there are potentially significant impacts that are not identified when the proposed action is considered alone, what are those impacts?

The cumulative effects analysis incorporates details from other actions that have a potential to interact with the proposed action. Incorporation of these details provides decision makers with adequate information to address incremental and cumulative environmental consequences.

### 3.16.2 Past, Present, and Reasonably Foreseeable Actions

Table 3.16-1 shows past and present actions that have some relevance to the proposed action. The project area has a long history of management and development activities, including timber harvest, road construction, intensive recreation, railroad development, transmission line and other utility development, and development of large water storage reservoirs. Of particular note is the I-90 Land Exchange, which resulted in over 20,000 acres of land moving from Plum Creek Timber Company ownership to United States Forest Service (USFS) ownership within the Snoqualmie Pass Adaptive Management Area (SPAMA). Following that controversial land exchange, a coalition named The Cascade Conservation Partnership was formed to help the USFS accomplish its goal of acquiring checkerboard properties. Comprising the USFS and many private conservation and recreation groups (Sierra Club, Audubon Society, Wilderness Society, Alpine Lakes Protection Society, Washington Trails Association, Northwest Ecosystem Alliance), The Cascade Conservation Partnership undertook an unprecedented 3-year campaign to purchase and protect over 75,000 acres of privately owned forests that link the Alpine Lakes to Mount
Rainier. The Cascade Conservation Partnership raised $15.7 million of private funds and spearheaded the effort to secure $79 million in public funds. The cooperative activities of The Cascade Conservation Partnership along with partners Mountains-to-Sound Greenway and other land trusts (including The Nature Conservancy, Cascade Land Conservancy, and Trust for Public Land) resulted in the acquisition and consolidation of public lands (personal communication, Raines 2005). Reasonably foreseeable future actions are identified as below.

**Table 3.16-1. Relevant Past and Present Actions**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Date</th>
<th>Environmental Documentation</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>USFS</td>
<td>1999</td>
<td>I-90 Land Exchange Final EIS</td>
<td>Consolidation of public lands as contemplated in SPAMA EIS.</td>
</tr>
<tr>
<td></td>
<td>1994</td>
<td>Northwest Forest Plan Final Supplemental EIS and Record of Decision (ROD)</td>
<td>Management of federal lands to protect and enhance habitat for late-successional and old-growth forests. ROD established standards and guidelines for the management of these areas.</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>USFS Forest Ecosystem Management Team strategy</td>
<td>Established and described ecosystem management principles on federal lands.</td>
</tr>
<tr>
<td>USBR</td>
<td>2003</td>
<td>Keechelus Safety of Dams Project</td>
<td>Dam repair; fish passage feasibility study.</td>
</tr>
<tr>
<td>Private</td>
<td>1999</td>
<td>Trendwest Resorts Mountain Star EIS</td>
<td>Development (east of I-90 project area) of large scale, phased mixed-use planned development.</td>
</tr>
<tr>
<td></td>
<td>1997</td>
<td>Plum Creek Timber, LLC; Mosquito Creek Watershed Analysis</td>
<td>Forest practices on fish habitat, water quality and public works.</td>
</tr>
</tbody>
</table>

3.16.2.1 KEECHELUS SAFETY OF DAMS PROJECT

The United States Bureau of Reclamation (USBR) issued a Final EIS in September 2001 to correct safety deficiencies found at Keechelus Dam in order to prevent significant loss of life and property associated with potential failure of the dam. Under this project, the reservoir would be returned to its full function, although during construction, shortages could increase during dry years, system carry-over storage at the end of the irrigation season could decrease, and Keechelus spring discharges could be higher, and fall discharges could be lower. Fish passage was not included in the project since it did not contribute to meeting the purpose and need for the work, and USBR does not have the authority to conduct fish passage facilities at the dam. This project was finished in 2003.

In April 2002, the USBR and the Washington Department of Fish and Wildlife (WDFW) signed a Mitigation Agreement in response to concerns raised during the Keechelus Dam Safety of Dams Modification Project EIS process. As a result, USBR committed to conducting a fish passage feasibility study. In addition, the Cold Creek fish passage project is scheduled for construction. This project involves replacing the culvert at Cold Creek leading to Keechelus Lake.
3.16.2.2 **SUMMIT SKI AREA MASTER PLAN**

The Summit Ski Area has completed a comprehensive Master Plan, which identified plans to replace and update their ski lifts, cut new trails, improve base area transit service, upgrade base area facilities (skier support services, restaurants, shops), and improve base area parking. The USFS plans to issue a Draft EIS.

3.16.2.3 **SAFETY REST AREA**

Reconstructing I-90 from Hyak to Easton presents an opportunity to construct a needed safety rest area along I-90. However, a safety rest area is not required to meet purpose and need. The Traveler’s Rest, a Washington State Department of Transportation (WSDOT)-owned facility located at the Snoqualmie Pass summit and just outside the project corridor, is no longer able to keep up with the demands made upon it from the number of travelers using this rest area. The future demands by the traveling public on this facility are expected to increase in the future.

WSDOT is currently in the process of determining the future status of the Traveler’s Rest. Public input has been received and will assist WSDOT in this process. In April 2004, WSDOT staff assessed four possible sites located between North Bend and Easton. No action has been taken since that initial site assessment. Once an area is determined, WSDOT will look at individual sites. Due to constraints such as water availability, siting difficulty, and waste management, it may be difficult to find an appropriate location for a safety rest area within the project termini.

3.16.2.4 **SNO-PARKS**

The Price Creek and Cabin Creek Sno-parks are located within the project corridor at interchanges maintained by the WSDOT. Recreationists use these parking lots, which are located adjacent to the project corridor, during the winter as Sno-parks that have access to winter recreation trails. These Sno-parks are located within Connectivity Enhancement Areas (CEAs) that have multiple connectivity options. The Toll Creek CEA is not expected to impact the Cabin Creek Sno-park. Whether the Price Creek Sno-park is left open for future use will depend on the level of connectivity selected in the area adjacent to the Sno-park (Improvement Packages A and B would remove the Sno-park). The I-90 Interdisciplinary Team (IDT) is examining alternative Sno-park locations if the Price Creek Sno-park is closed. WSDOT is discussing potential Sno-park locations with the Washington State Parks and Recreation Commission (WSPRC) and the USFS to mitigate for the loss of the Price Creek facility if it is closed.
3.16.2.5 Alpine Lakes Wilderness Area Expansion

The USFS is proposing to expand the existing Alpine Lakes Wilderness area. The I-90 Wilderness Study Report and Draft Legislative EIS is currently being reviewed. This documentation is necessary to meet the October 19, 1998, legislation commonly referred to as the Interstate 90 Land Exchange Act of 1998. Section 610 of this Act established an approximately 15,000-acre Alpine Lakes Wilderness Study Area. The Study Report and Draft Legislative EIS does not make a determination about which parcels should or should not be designated as wilderness. Rather, it responds to the legislated direction to review the study area as to its suitability for preservation as wilderness. The final decision about which parcels should be recommended, if any, to Congress for designation as wilderness will be made by the Secretary of Agriculture at the conclusion of the National Environmental Policy Act (NEPA) process. Public meetings, using an “open-house” format, were held in January 2003 to answer questions regarding the content of the Study Report and Draft Legislative EIS, and to provide an opportunity to comment on the document.

3.16.2.6 Other Activities

Acquisition of private lands and transfers to the USFS or other public ownership are anticipated to continue. In addition, road closures and other restoration activities on private lands that have been transferred to public ownership will occur pending publication of an updated access and travel management plan by the USFS.

Furthermore, due to the importance of the project corridor for recreational use and access, increased recreational use and development may be anticipated. For example, the Trendwest Development in Kittitas County is in the process of receiving development approvals by phase (residential, commercial, recreational). Limited road construction and rural housing development could occur on other private lands in the vicinity of the project corridor.

3.16.3 Cumulative Effects Analysis

The following analysis examines how the impacts of the actions presented above might be affected by those resulting from the proposed project, whether such a relationship would result in potentially significant impacts not yet identified when the proposed action or alternatives are considered together, and identifies what those impacts might be.

For the I-90 Snoqualmie Pass East project, the primary analytical goal is to determine both the magnitude and significance of the proposed action within the context of other past, present, and reasonably foreseeable future actions. The first task is to define the baseline for affected resources, with an emphasis on how conditions have changed over time. For this project, the current-conditions baseline is discussed in Sections 3.1 through 3.15.
After describing the affected environment, the next task is to determine or predict the consequences of those effects. These consequences are discussed in Sections 3.1 through 3.15. Thresholds are then established and applied to each resource in order to assess the extent to which the resource may be enhanced or degraded by the proposed project. To avoid an unwieldy report, the analysis focuses on those resources where the threshold of significance has been approached or exceeded.

Scoping for the cumulative effects analyses relied on information gained throughout the I-90 Snoqualmie Pass East EIS process. The scope of the analyses was based on public and agency input requested during formal scoping meetings early in the EIS process; informal input received from the public and agencies as a result of public meetings; responses to WSDOT I-90 newsletters; feedback from the IDT and Mitigation Development Team (MDT); and the results of prior research and technical analyses of direct and indirect effects conducted as part of the I-90 Snoqualmie Pass East EIS discipline studies.

Scoping for the cumulative effects analyses was conducted to identify: 1) resources likely to be affected by the proposed action; 2) geographic (spatial) boundaries for evaluating potential effects; 3) temporal (time frame) boundaries for each analysis; and 4) relevant past, present, and future actions that could affect the resources, ecosystems, and human communities of concern. This scoping ensured that the analyses were focused on those effects that were truly meaningful and to avoid unwieldy analyses.

The cumulative analysis presents an assessment as to the likelihood of cumulative effects and what those effects may be. The analysis also documents the absence of cumulative impacts or when no cumulative impacts to a particular resource are expected.

The cumulative analysis is organized as follows and groups individual resource topics:

- Resources with No Cumulative Impacts
- Physical Resources
- Biological Resources
- Transportation, Noise, and Air Quality
- Visual and Recreation Resources
- Cultural Resources
- Social, Economic, and Land Use Resources
RESOURCES WITH NO CUMULATIVE IMPACTS

There are no cumulative impacts to the environment due to the use or storage of hazardous materials or waste, or to energy resources as part of, or due to, the proposed action.

PHYSICAL RESOURCES (GEOLOGY AND SOILS, AND WATER RESOURCES)

Constructing the new project features would consume gravel and rocks as fill and bedding materials. These are non-renewable resources. Other planned construction projects, such as Summit Ski Area improvements, safety rest area construction, and improvements to the Sno-parks, may also consume these resources. In light of these projects, consumption of gravel and crushed rock from known deposits can be considered a cumulative, although not significant, impact to geology and soil resources.

All of the build alternatives associated with the proposed project offer improved ability for channel migration and greater hydrologic connectivity between the surface water, groundwater, and floodplains. This would allow the hydrologic systems to function properly and more easily adapt to changes caused by other proposed actions identified within the project area.

Additional actions identified within the project area that are anticipated to occur within the reasonably foreseeable future include the Summit Ski Area improvements, Sno-parks, and Alpine Lakes Wilderness Area expansion. The Summit Ski area improvements and other projects located upstream of I-90 may cause additional sediment loading into the streams, which may alter the stream morphology and meander patterns downstream. The addition of Sno-parks along I-90 may also cause temporary sediment loading into nearby streams during construction.

Loss of riparian habitat is included in Section 3.5.2; the loss of riparian vegetation, organic inputs, and increased sediment delivery are also addressed in Section 3.5.2.

All of the I-90 Snoqualmie Pass East alignment alternatives and Improvement Packages offer improved hydrologic connectivity and greater ability for stream migration by extending bridges and replacing culverts. Therefore, it is anticipated that the I-90 Snoqualmie Pass East project would have a net beneficial effect on the water resources within the study area. The potential cumulative impacts resulting from other projects would be lessened. Likewise, it is possible that improved hydraulic connectivity may quickly or slowly drain areas of ponded water and wetlands that may have been created and subsequently been impounded during previous highway construction.
BIOLOGICAL RESOURCES (TERRESTRIAL SPECIES AND HABITATS, WETLANDS, AND FISH AND AQUATIC HABITAT)

The proposed project would have beneficial long-term effects on terrestrial species, their habitats, and connectivity of wetlands, and fish and aquatic habitat; therefore, it is very unlikely that the project would contribute to adverse cumulative impacts with other projects. Several projects are included in this cumulative impact analysis that may have impacts on terrestrial species and their habitats, and wetlands. Despite the Improvement Packages, there remains the possibility that, in the aggregate, greater traffic volumes on a six-lane vs. a four-lane facility would result in increasing roadkill.

“The road system ties the land together for us yet slices nature into pieces” (Forman et al. 2003). This proposed interstate improvement project represents one of the many means by which our modern industrial society further “slices” natural habitat into ever-smaller chunks. Railroads, power transmission corridors, logging roads, petrochemical pipelines, and off-road recreation trails are other examples of different corridors.

Corridors serve to both divide and connect the various landscapes through which they pass and in which they are found (Forman and Godron 1986). Unfortunately, no quantitative data exists regarding how a road’s design regulates its barrier effect. However, it is logical to assume barrier effects increase for all species with increased road width, and the addition of retaining walls, fences, median barriers, guardrails, and substantial increases in volume and/or speed of traffic. As an expansion project, this project aims to reduce these harmful effects by building on or adjacent to the existing disturbance area. In addition, long-term monitoring of wildlife usage patterns following construction will help WSDOT address the quantitative data gap that currently exists.

The operation of the Keechelus Reservoir results in fluctuating lake levels and downstream flows that could adversely affect riparian habitats and wetlands. The Yakima Project, of which Keechelus is a feature, may also cause a blocking of fish passage downstream of the project area, and, therefore, the beneficial impacts to fish and aquatic habitats in the project area may not be realized.

The expansion of the Summit Ski Area could have adverse effects on wetlands and terrestrial species habitats and movements, although it is likely that these would be avoided or compensated for through mitigation measures. The expansion of the Alpine Lake Wilderness Area could benefit terrestrial species, wetlands, and fish and aquatic species through habitat preservation.

As a result, the proposed I-90 Snoqualmie Pass East project is not expected to contribute to adverse cumulative impacts on terrestrial species, their habitats, or connectivity, or to wetlands, or fish and aquatic habitats. The beneficial effects of this project on terrestrial species, wetlands, and fish and aquatic habitats may
compensate to some extent for any adverse impacts resulting from other projects in the area.

TRANSPORTATION, NOISE, AND AIR QUALITY

The reasonably foreseeable projects set forth previously in this section incrementally contribute to the projected traffic volumes on I-90 that serve as part of the proposed action’s purpose and need. Consequently, these incremental contributions to cumulative transportation impacts have already been addressed in Section 3.7, *Transportation*.

The reasonably foreseeable projects would not be expected to add construction-related traffic delays for motorists using I-90 within the project area or beyond the project area. However, routine maintenance activities along I-90 beyond the project limits, and other road maintenance and improvements elsewhere in the vicinity of the project would incrementally contribute to travel times for motorists using I-90 and the local road network. These incremental impacts may or may not occur simultaneously with the proposed improvements. In either event, their contribution to overall delay would not be expected to be substantial.

The reasonably foreseeable projects that could result in construction activity (e.g., Sno-parks, rest areas, etc.) may cause a temporary increase in noise levels in the area. However, the construction activities of these projects would have to occur during the same time as the construction resulting from the proposed project and associated Improvement Packages to cause adverse impact. It is expected that mitigation measures developed as a result of the construction of the Sno-park, rest area, or other development would be developed prior to or during project initiation to decrease any noise-related impacts.

Proposed construction activities would produce intermittent combustive and fugitive dust emissions that would spread over a large geographic region surrounding I-90, and would not contribute to an exceedance of an ambient air quality standard at any location. As a result, air quality impacts resulting from the proposed action, in combination with impacts from any reasonably foreseeable future project, would not produce any adverse cumulative air quality impacts.

VISUAL AND RECREATION RESOURCES

Many of the reasonably foreseeable projects such as the Summit Ski Area expansion, Sno-parks, and a safety rest area occur in landscapes already modified. It is unlikely that the proposed modifications would adversely impact the scenic resources. Because I-90 is a National Scenic Byway, any proposed construction type activity would need to be reviewed for its compatibility with this program.
The Alpine Lakes Wilderness expansion would not likely cause a cumulative impact because the proposed action would not change the viewshed. In general, no cumulative visual impacts are expected.

Recreation would not likely be affected by the proposed cumulative action in the future. Constructing safety rest areas gives travelers a place to rest and view scenery. The impact of a rest area on recreation in the local area is expected to be minimal. Safety rest areas are generally used by travelers passing through an area. No overnight camping is allowed.

While Sno-parks may be used as construction staging areas, the construction season would be limited to April through October, and no materials or equipment would be stored over winter. Access to all Sno-parks and winter trails would be maintained during construction; therefore, construction would have a minimal impact on winter recreation facilities or opportunities in the corridor.

Wilderness designation is unlikely to create a cumulative impact to recreation. Wilderness designation includes criteria such as roadless and undeveloped areas. Developed recreation sites and trails exist within the area, which would not likely meet or preclude wilderness designation criteria.

**Cultural Resources**

Cumulative effects to cultural resources under the proposed action are not likely. Increased population and recreational use can result in indirect effects to cultural resources. However, such effects would occur independently of the present project as a result of a general increase in recreational use and development throughout the region.

**Social, Economic, and Land Use Resources**

No potentially adverse socioeconomic or land use effects to the region are expected as a result of implementation of the alignment alternatives or Improvement Packages. The cumulative effects of the project, when viewed in conjunction with the relevant past, present, and reasonably foreseeable future actions described in Table 3.16-1, would be unlikely to yield any substantial impact to the social and economic resources of the project area. Any new developments, if completed, would tend to supplement the potential economic activity generated by the proposed I-90 improvements.

The improvements associated with the Summit Ski Area, the safety rest area, and Sno-park, as well as the improvements proposed as part of the I-90 project, could result in increased residential development on private lands in the vicinity of the project corridor. All new development would be reviewed for compliance with plans, guidelines, and regulations of Kittitas County. Any land use changes within the WNF, including expansion of the Alpine Lake Wilderness area, would
be reviewed and considered by the USFS for consistency with forest plans and requirements.

3.17 **Other Environmental Considerations**

3.17.1 **Irreversible and Irretrievable Commitment of Resources**

National Environmental Policy Act (NEPA) Council on Environmental Quality (CEQ) regulations require environmental analysis to identify “...any irreversible and irretrievable commitments of resources, which would be involved in the proposed action should it be implemented” (40 Code of Federal Regulations [CFR] Section 1502.16). Implementing the proposed Interstate 90 (I-90) improvements involves committing natural, physical, human, and fiscal resources. CEQ guidelines describe primary irreversible and irretrievable resource commitments as uses of nonrenewable resources throughout a project that may be irreversible if removal of the resources occurs and cannot be replaced within a reasonable time frame (e.g., extinction of a threatened or endangered species), or if obstruction of the use of resources occurs after the project (e.g., building over a cultural site).

Other indirect impacts can result from environmental accidents or developments associated with a project, such as explosive fires or highway improvements that provide access to previously inaccessible areas [California Environmental Quality Act Guidelines 15126(e)]. Such commitments impact resource uses by future generations. Natural resources include minerals, energy, land, water, forestry, and biota. Nonrenewable resources are those resources that cannot be replenished by natural means, including oil, natural gas, and iron ore. Renewable natural resources are those resources that can be replenished by natural means, including water, lumber, and soil.

For the proposed project, most impacts are short-term and temporary, or longer lasting but negligible. Resources that may involve a possible irreversible or irretrievable commitment under the proposed project are discussed below.

The proposed transportation improvements would involve a long-term conversion of land resources to provide right-of-way (ROW) for the build alternatives. Although these transportation facilities conceivably could revert to forested land or other uses, there is no reason to expect that such a conversion would be necessary or desirable. Reduction in wildlife habitat resulting from widening and realigning the I-90 corridor is considered an irreversible commitment of resources during the time period that the land is used for a highway facility. Wetlands would be filled where they cannot be avoided or impacts minimized. Unavoidable wetland impacts could be offset by compensatory mitigation at other locations in the corridor.

The major nonrenewable resource that would be consumed by the construction of the proposed project, and the energy consumption resulting from daily vehicle
operations, are fossil fuels used to power construction and daily vehicle operation.

Considerable amounts of labor and construction materials such as cement, aggregate, asphalt, sand, fill materials, lime, and steel would be expended on the road construction. Additionally, large amounts of labor and natural resources are used in the fabrication and preparation of construction materials. These materials are generally not retrievable, though they are not in short supply, and their use would not have an adverse impact upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds that are not retrievable. The commitment of these resources is based on the concept that local, regional, state, and national residents will benefit by the improved quality of the overall transportation system. These benefits consist of improved efficiency, accessibility, and safety; and savings in time spent transporting goods or traveling along I-90.

3.17.2 Relationship Between Local Short-Term Uses of the Environment, and the Maintenance and Enhancement of Long-Term Productivity

Pursuant to NEPA CEQ regulations (40 CFR Section 1502.16), an Environmental Impact Statement (EIS) must consider “…the relationship between short-term uses of man’s environment, and the maintenance and enhancement of long-term productivity.” Special attention should be given to impacts that narrow the range of beneficial uses of the environment, or pose a long-term risk to human health or safety. In general, the short-term effects, which include the majority of the costs and inconveniences from construction, are borne during and shortly after construction. Long-term productivity of most areas where construction is proposed would not be affected. Long-term benefits would be shared by both present and future generations. This section evaluates short-term benefits of the proposed alternatives compared to long-term productivity derived from not pursuing the proposed alternatives.

The proposed build alternatives would have similar short-term impacts and long-term benefits.

A short-term use of the environment is generally defined as a direct consequence of a project in its immediate vicinity. Short-term effects include localized disruptions, higher noise levels, increased air pollution, and rerouting traffic during the construction period. These impacts would be relatively inconsequential in the long-term.

Long-term productivity is related to direct and/or indirect results of the facility, which, in most cases, are considered to be permanent effects. The proposed build alternatives have taken into account future population growth, existing future land use, and existing and future transportation needs. Long-term productivity would be reduced in areas where habitat is used for highway expansion, new
alignments, or road widening. The long-term use of these areas would be permanently affected.

Implementation of the proposed action, including the local short-term impacts and the use of resources, is consistent with the maintenance and enhancement of the long-term productivity for the regional area and the State of Washington.