SECTION 9.1 ANALYSIS OF ALTERNATIVES
(WAC 463-42-645)

9.1.1 INTRODUCTION

Olympic Pipe Line Company (OPL) is proposing to construct and operate a 231-mile long refined petroleum products pipeline across the state of Washington. The proposed pipeline will be an expansion of an existing 400-mile long OPL pipeline system which generally runs north-south parallel to Interstate 5 in western Washington. The proposed pipeline will begin near Woodinville in western Washington and terminate at an existing storage and distribution facility at Pasco in eastern Washington. A storage and distribution facility will be constructed at Kittitas which is near the midpoint of the proposed pipeline in central Washington.

Refined petroleum products from the refineries in northwestern Washington that are destined for central and eastern Washington are currently transported by one of three methods: via OPL's existing pipeline to Portland, Oregon where they are transferred to river barges for transport up the Columbia River to Pasco; via sea-going barges through the Strait of Juan de Fuca and south along the Pacific Ocean coast of Washington to the Columbia River, then east along the Columbia River to Portland, Oregon where they are transferred to river barges for transport up the Columbia River to Pasco; and transported via OPL's existing pipeline to the south Puget Sound area where they are transferred to tanker trucks for transport to central and eastern Washington using highways across the Cascade Mountains.

OPL's proposed project is as a result of requests to OPL from the shippers qualified to use the existing pipeline that OPL construct and operate a pipeline with direct connections to central and eastern Washington. The shippers desire a transportation mode that is more direct (fewer miles), more efficient (fewer product transfers), safer (not dependent upon road closures due to accidents, rock slides, and avalanches) and non-weather dependent (not controlled by severe snow or ice storms); a mode that is not affected by potential closures of locks or river drawdowns on the Columbia River; and a transportation mode that will cost the shippers less than or equal to the existing transportation system. The shippers have demonstrated their support for the Cross Cascade Pipeline Project by signing throughput and deficiency agreements with OPL in sufficient quantities to financially justify the project and to ensure a reasonable rate of return.

9.1.2 BACKGROUND

OPL's existing system has served western Washington and Oregon since 1965. Over the years, it has also been a link in the transportation system supplying markets east of the Cascades, augmenting the traditional sources - the refineries of Billings and Salt Lake City and their associated pipeline systems. Over the past ten years, increased cost of crude oil supply, increased demand in local markets, and refinery closures have

reduced the amount of Rocky Mountain refined product available in eastern Washington at competitive costs. These trends are expected to continue into the foreseeable future.

Table 9.1-1 shows the volume of product transported into central and eastern Washington from 1987 to 1996 based on data from Energy Analysts International, Inc. (EAI):

TABLE 9.1-1
VOLUME OF PRODUCT TRANSPORTED INTO CENTRAL AND EASTERN WASHINGTON
(Average Barrels Per Day)

YEAR	Yellowstone Pipeline	Chevron Pipeline	Trucked	Barged	TOTAL
1987	24,534	13,468	11,587	25,434	75,023
1988	26,895	16,458	11,587	18,891	73,831
1989	24,600	15,742	8,950	23,255	72,547
1990	29,183	13,361	9,213	23,199	74,956
1991	29,583	14,899	9,213	20,605	74,300
1992	28,083	12,300	13,500	24,056	77,939
1993	26,324	11,199	11,300	32,396	81,219
1994	27,879	9,702	8,200	36,904	82,685
1995	22,856	7,336	8,200	43,449	81,841
1996	22,905	6,401	13,800	38,405	81,511
Yearly Average	26,284	12,087	10,555	28,659	

Using the EAI data, the demand for product in eastern Washington has grown from the 1987 estimate of 75,023 BPD to approximately 81,511 BPD in 1996. During this period, the transport of product by the Yellowstone and Chevron pipelines has steadily decreased, while the volume of product transported by truck and barge has steadily increased. Volumes transported on the Yellowstone and Chevron Pipelines in 1991 was a combined total of 44,484 BPD. This volume had decreased in 1996 to 29,306 BPD. At the same time the combined volume transported by truck and barge grew from 29,818 BPD in 1991 to 52,205 BPD in 1996.

EAI data shows that the demand for product in Eastern Washington is expected to grow to 88,305 BPD in 1999, and to continue to grow to 95,130 BPD in 2004, 102,482 BPD in 2009, and 118,935 BPD in 2019. EAI has assumed that the Yellowstone and Chevron Pipelines will continue to provide product at the same levels as provided in 1995, and will not continue to decrease their shipments into eastern Washington as has been the historical case.

To meet the forecasted increase in demand for product in central and eastern Washington, the existing system of ocean tankers along the Washington coast, river barges on the Columbia and tanker trucks over the Cascade Mountain passes will either need to continue to grow through more frequent trips or larger vessels, or a new system must be put in place to replace and/or supplement the barges and tanker trucks.

The No Action Alternative (the continued use of ocean tankers, river barges and tanker trucks) must increase to meet the increased demand. This system, which utilizes the existing north-south OPL pipeline, results in greater demands on the existing OPL pipelines to Seattle for transshipment by truck over the Cascade Mountain passes to central Washington, and to Portland for loading onto river barges for shipment to Pasco. As noted above, the existing pipeline is operating at capacity, with a shipper demand currently exceeding the capacity. The existing pipeline system cannot meet the projected needs of central and eastern Washington. As described below, OPL also considered expansion of the existing north-south line and found that it would not be cost-effective for either OPL or the shippers who use the system, it would not increase efficiency in the transport of petroleum products from the northwest Washington refineries to central and eastern Washington, and it would not meet the objectives of OPL's customers.

After a study of alternatives, OPL determined that the Cross Cascade Pipeline project is the most effective option to improve the transportation system for refined petroleum products from the Puget Sound refineries to the markets of Washington and Oregon. This determination is based on the assumption that a corridor could be selected with minimal impacts on the environment while providing an economically viable path for pipeline construction and operations.

9.1.3 NO ACTION ALTERNATIVE

The No Action Alternative is for OPL to continue to operate its existing pipeline system at its current levels, and at rates which provide economic returns under tariffs approved by the Federal Energy Regulatory Commission (FERC) and the Washington Utilities and Transportation Commission (WUTC).

For the reasons set forth below, the No Action Alternative would not achieve the objectives of OPL and would have an adverse environmental impact. The adverse public safety and environmental impact results from the continuing and increasing use of barges on the Columbia River and tanker trucks on interstate highways across the Cascade Mountains to ship product to central and eastern Washington.

9.1.3.1 Current Product Movement

Currently, product from the Puget Sound refineries to central and eastern Washington is transported in one of three ways:

(1) By existing OPL pipelines to Portland, where it is transferred onto river barges for shipment up the Columbia River to Pasco;
(2) By ocean barge or tanker from north Puget Sound through the Strait of Juan de Fuca, and then along the Washington coast to Portland, where it is transferred onto river barges for shipment up the Columbia River to Pasco; or
(3) By tanker truck across the Cascade Mountain passes.

The existing OPL pipeline system reached its capacity for shipments from the refineries near Anacortes and Ferndale to Seattle and Vancouver/Portland in 1995; therefore, all future growth in central and eastern Washington demand would have to be transported by barge and truck.

The current mode of transportation to central Washington is by truck from Seattle, Pasco, or Spokane. Approximately 60 trucks per day cross the Cascade Mountains to transport product to Ellensburg and other central Washington cities. During 1996-1997 winter's storms, both Snoqualmie and Stevens Passes were closed for days at a time, and periodic closures due to storm conditions or for avalanche control are regularly experienced in the winter months. At one point during the I-90 Pass closures, the emergency service providers in Ellensburg organized a specially-escorted caravan of tanker trucks to bring product from the Seattle area as they were dangerously close to running out of fuel. The proposed project includes a terminal at Kittitas in central Washington. The intent is to provide a reliable fuel supply that is not limited by weather conditions in the Cascade Mountains.

In addition to the inability to serve central and eastern Washington, the No Action Alternative will also have an impact on the ability of OPL to serve Seattle, Tacoma, and Vancouver/Portland. Because of the lack of capacity of the existing OPL pipeline system, OPL has had to place restrictions on the existing OPL pipeline system by prorating capacity among shippers. This has two particularly significant impacts for the future: first, the number of ocean barges and product tanker movements in Puget Sound and the Strait of Juan de Fuca will continue to increase; and second, the ability to serve the airlines at Sea-Tac International Airport may be negatively affected. Because the existing OPL pipeline is the only means for getting jet fuel to the airport and there are no alternative delivery systems in place at the airport, proration has a particularly adverse impact on air transportation.

9.1.3.2 Expand Existing System

From 1989 to early 1995, OPL added pumping equipment, began using flow improving polymers (drag reduction agents), and added motor horsepower in order to increase capacity to Portland by approximately

28,000 barrels per day. Unfortunately, this has failed to keep pace with the demand on the existing system to transport product for transshipment to eastern and central Washington. By 1994, the product volume moving from OPL pipeline by barge and truck to eastern/central Washington had increased to an average of 50,000 barrels per day.

9.1.4 CROSS CASCADE ALTERNATIVES

The purpose of the project is to transport refined petroleum products from western Washington refineries to central and eastern Washington to meet the long range needs for product transportation. A number of alternatives have been considered for the corridor, beginning with the alternatives for the origin point, the alternatives for the destination point, and the alternative corridors that would connect the desired origin and destination points.

One of the primary considerations in selecting a Cross Cascade corridor was how to serve eastern Washington markets through existing operational product pipelines in Eastern Washington. Currently, there are two petroleum product pipelines serving eastern Washington (see Figure 9.1-1). One pipeline (Chevron) comes from Salt Lake City, Utah through Boise, Idaho to the Northwest Terminalling facility in Pasco, Washington. A continuation of this pipeline extends from the Northwest Terminalling distribution facility northeast to Spokane, Washington. The second existing pipeline originates at refineries near Billings, Montana and comes to Spokane, Washington (Yellowstone Pipeline), then continues via a smaller 6 inch pipeline to Moses Lake, Washington. In evaluating the viability of a new pipeline to eastern Washington, two operational scenarios were considered. One scenario would be to build a new product line to Moses Lake, Washington (Moses Lake Terminus Alternative), and then to move product to and from Spokane via the existing pipeline to Pasco. The second operating scenario would be to construct a new pipeline directly to Pasco (Pasco Terminus Alternative).

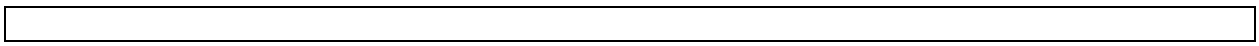

FIGURE 9.1-1 - WASHINGTON STATE REFINED PRODUCT PIPELINES

9.1.4.1 Alternatives for Origin of the Proposed Pipeline

OPL currently operates a 16" pipeline which extends south from the refineries in Whatcom County and is joined by a 16" pipeline that extends easterly from the refineries near Anacortes in Skagit County. These two pipelines come together (Allen Station) west of Burlington, Washington, near the intersection of Allen Road and State Route 20. From this point to Renton, Washington (Renton Station), a 16" and 20" pipeline parallel each other. At Renton, these pipelines are connected to a 12" pipeline which serves the Seattle-Tacoma International Airport, a 12" line which serves the petroleum product terminals on Harbor Island (Seattle), and a 14" pipeline that extends to Portland, Oregon.

Five alternative locations between the Allen Station and the Renton Station were identified as possible points for the new pipeline to central and eastern Washington to tie into the existing two parallel pipelines:

- Allen Station - existing OPL Pump Station
- Snohomish - intersection of the existing pipeline with the BNRR right-of-way south of Everett
- Thrashers Corner - north of OPL's existing Woodinville Station
- Hollywood - Sammamish River Valley
- Renton Station - existing OPL pump station

OPL determined that there was adequate capacity in the existing pipelines from the refineries to the Woodinville Station to serve both the existing and proposed pipelines. Origin locations south of Woodinville would require the addition of pump stations on the existing lines beyond those planned for the proposed project.

These alternative origin points are reviewed below as part of an overall corridor alternative.

9.1.4.2 Alternatives for Terminus or Destination of the Proposed Pipeline

One of the primary considerations in selecting a Cross Cascade corridor was determining how to integrate the services to be provided by the new pipeline with those of existing operational petroleum pipelines in Eastern Washington. Currently, there are two petroleum product pipeline systems serving eastern Washington. One pipeline system (Chevron) comes from Salt Lake City, Utah through Boise, Idaho to the Northwest Terminalling facility in Pasco, Washington. A continuation of this pipeline extends from the Northwest Terminalling distribution facility northeast to Spokane, Washington. The second existing pipeline (Yellowstone) originates at refineries near Billings, Montana and comes to Spokane, Washington, and then continues via a smaller 6 inch pipeline to Moses Lake, Washington. In evaluating the viability of a new pipeline to eastern Washington, two operational scenarios were considered:

- Moses Lake Terminus Alternative - One scenario would be to build a new product line to Moses Lake, Washington (Moses Lake Terminus Alternative), and then to move product to and from Spokane and Pasco via the existing pipelines by reversing or bi-directing their flow.

- Pasco Terminus Alternative - The second operating scenario would be to construct a new pipeline directly to Pasco. Product would then be moved to Spokane and Moses Lake via the existing pipelines.

Moses Lake Terminus Alternative

The Moses Lake Terminus Alternative would require the least amount of new pipeline right-of-way. However, the existing pipelines from Moses Lake and Spokane would have to be rebuilt by constructing new pump stations and replacing valves since they are hydraulically constructed for a one way flow of product. In addition, the current owners of these pipelines would not be likely to permit reversal of these pipelines for competitive reasons. Furthermore, the pipelines are too small (6") to carry the estimated flows to meet market conditions. It was anticipated that both pipelines would either have to be replaced or new parallel lines constructed. Because of the high cost of reversing the existing lines or constructing parallel lines this scenario was dropped from further consideration.

Pasco Terminus Alternative

Essentially, the Pasco Terminus Alternative provides an option to the current system which entails a 300-mile pipeline movement to Portland, a transfer from a Portland terminal to a barge, then a 200-mile barge trip through four locks to Pasco. It replaces this circuitous route with a single 231-mile pipeline movement to Pasco. The option eliminates the risk of the barge movement and other hazards associated with the barge loading/unloading.

Based on an operating scenario of constructing a new product pipeline to Pasco, Washington, a number of alternative pipeline corridors were identified following the three central mountain passes in Washington (Stevens, Snoqualmie and Stampede). The first step in considering alternatives was a map review and discussion of potential corridors that would meet the criteria described in Section 8.2. Based on this early review and consideration of potential corridors, a field review of the selected corridors was conducted. This initial field review included an aerial overview by helicopter and discussions with representatives from major land owners and others with personal knowledge of potential corridors. The alternative corridors are described below and shown on Figure 9.1-2.

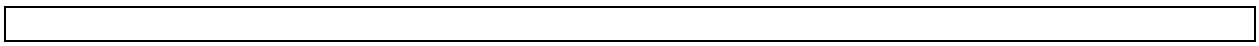

FIGURE 9.1-2 - ALTERNATIVE PIPELINE ROUTES

9.1.4.3 Alternative Corridors for Proposed Pipeline

Based on an operating scenario of constructing a new product pipeline to Pasco, Washington, a number of alternative pipeline corridors were identified following the three central mountain passes in Washington:

- Stevens Pass;
- Snoqualmie Pass; and
- Stampede Pass.

Maps of these mountain passes were reviewed to identify any existing road or utility corridors that could potentially be used for a pipeline. The alternative mountain pass corridors which have been considered based on the Pasco Terminus Alternative are:

- Allen Station via Stevens Pass to Pasco
- Snohomish via Stevens Pass to Pasco
- Thrashers Corner via Snoqualmie Pass to Pasco
- Thrashers Corner via abandoned railroad corridor (Centennial Trail) and Snoqualmie Pass to Pasco
- Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco
- Renton Station via Stampede Pass to Pasco

In addition, there is one variation through the Yakima Valley to Pasco that could use any of the three mountain pass corridors.

An evaluation of each of these corridors is provided in the next section.

9.1.5 PRELIMINARY ENGINEERING AND ENVIRONMENTAL FEASIBILITY OF ALTERNATIVE CORRIDORS

Each of the identified corridor alternatives have been evaluated following the six criteria for line placement:

- Length of pipeline as a cost factor for both construction and operation;
- Elevation profile;
- Constructability;
- Pipeline Access;
- Environmental Impacts; and
- Ownership/land use.

A preliminary review of environmental impacts and pipeline access was determined based on an aerial

review by helicopter. If a corridor alternative was eliminated based on one of the first four criteria, it was considered as either not buildable or not operable from a cost viewpoint. In those cases a review of environmental impacts and ownership/land use impacts was not performed.

9.1.5.1 Allen Station Alternative Via Stevens Pass

The Allen Station Alternative corridor would take advantage of the point where the two existing product lines first come together at the Allen Pump station approximately 2.5 miles west of Burlington, Washington. From this point a new pipeline would be constructed in the existing right-of-way (ROW) to a point approximately 4 miles south of Everett where the existing pipelines cross the Burlington Northern Railroad (BNRR) tracks. At this point, a new pump station would be constructed and the corridor would turn east and parallel the BNRR right-of-way through the communities of Monroe, Sultan, and Gold Bar. Because the BNRR right-of-way narrows near the community of Index, the pipeline corridor would enter the BPA powerline right-of-way which also parallels Highway 2 to a point approximately 5 miles east of the Stevens Pass summit. At this location, the corridor would follow the old BNRR right-of-way to the abandoned Old Cascade Tunnel under Stevens Pass.

The corridor, after exiting the east portal of the Old Cascade Tunnel, would generally follow State Route 2 and BPA powerlines easterly approximately 24 miles to Chumstick Creek in the Wenatchee National Forest. The corridor turns south and parallels Chumstick Creek and a county road for approximately 8 miles to Leavenworth. At Leavenworth, the corridor would again generally follow existing BPA powerlines southeasterly for approximately 39 miles passing north of Cashmere, crossing the Wenatchee River east of Monitor and going west of Wenatchee.

South of Wenatchee the corridor would follow BPA powerlines that parallel the Columbia River. The corridor would cross the Columbia River south of Rock Island Dam where a BPA powerline crosses the Columbia River west of Moses Coulee. After crossing the Columbia River, the corridor would traverse southeasterly through the Columbia Basin irrigation Project and intersect SR 26 east of the community of Royal City. This alternative would parallel SR 26 to a point approximately 4 miles west of Othello, then turn south following county roads to Pasco along the same corridor as the Thrasher to Pasco corridor.

- Pipeline Length: The approximate length of the pipeline would be 285 miles.
- Elevation profile: Eight (8) pump stations would be required.
- Constructability: Corridors using Stevens Pass were considered more rugged with more steep slopes and rock outcroppings, and therefore less "constructable" than corridors using Snoqualmie Pass.
- Pipeline Access: The terrain was considered more "remote" than corridors using Snoqualmie Pass, and therefore less accessible.
- Environmental Impacts: There would be four major river crossings: Columbia, Snohomish, Skykomish and Wenatchee rivers, with at least six crossings of the Skykomish

between Monroe and Index.

- Ownership/Land use: Seven cities would be impacted, Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere and Wenatchee.

9.1.5.2 Snohomish Alternative via Stevens Pass

An alternative to the Allen Station corridor is to tie into the two existing pipelines at the crossing of the BNRR right of way south of Everett. From this location, the corridor would be the same as the Allen Station alternative.

- Pipeline Length: The approximate length of the pipeline would be 240 miles.
- Elevation profile: Seven (7) pump stations would be required.
- Constructability: Corridors using Stevens Pass were considered more rugged with more steep slopes and rock outcroppings, and therefore less "constructable" than corridors using Snoqualmie Pass.
- Pipeline Access: The terrain was considered more "remote" than corridors using Snoqualmie Pass, and therefore less accessible.
- Environmental Impacts: There would be four major river crossings: Columbia, Snohomish, Skykomish and Wenatchee rivers, with at least six crossings of the Skykomish between Monroe and Index.
- Ownership/Land use: Seven cities would be impacted, Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere and Wenatchee.

9.1.5.3 Thrashers Corner Alternative via Snoqualmie Pass to Pasco (Proposed Corridor)

The proposed pipeline would begin with the construction of a pump station at Thrashers Corner north of Woodinville. With the exception of the descent down to the Snoqualmie River, this segment lies within existing Bonneville Power Administration (BPA) transmission line right-of-way. Near the Snoqualmie River, the proposed right-of-way deviates from the BPA corridor and traverses northeasterly to the Snoqualmie River, and across the river in a utility box located on a newly constructed county bridge. The corridor rejoins the BPA corridor east of the Snoqualmie River. For the most part, the corridor would be within existing the BPA corridor for the first 27 miles of the corridor. After a short segment utilizing a private forest road and following forest land to the south, the pipeline corridor would follow a county road before joining the Cedar Falls Trail. The pipeline is proposed to be within the trail right-of-way through the cities of Snoqualmie and North Bend.

At approximately MP 40, the corridor would leave the Cedar Falls Trail and follow Edgewick Road before traversing a short segment of new right of way and entering the John Wayne Trail (JWT). From this point to Snoqualmie Pass, the corridor would be within the John Wayne Trail right-of-way for short distances with the majority of the corridor utilizing USFS roadways. The corridor would cross Snoqualmie Pass in

the abandoned Chicago, Milwaukee, and St. Paul railroad tunnel.

East of Snoqualmie Pass, the proposed corridor would be inside the JWT to an area of recently harvested forest land, and then runs parallel to the Puget Power transmission line corridor which joins a 4-line BPA transmission corridor. The corridor drops south of the BPA right-of-way at MP 81.8 for approximately 1.5 miles, and then returns to the northern limit of the BPA right-of-way at MP 83.2. Forest land predominates south of the pipeline corridor and farmland predominates to the north. The proposed pipeline corridor crosses I-90 approximately 1.5 miles east of the Indian John Rest Area.

After crossing under I-90, the corridor begins the descent into the Upper Yakima River Valley. The proposed corridor crosses the JWT on the west bank of the Yakima River and State Highway 10 on the east side of the river. All of this segment is within existing transmission line corridor. To avoid very steep terrain and sensitive oak forest habitat, this segment deviates from the BPA right-of-way by turning south to descend the steep western slope into Swauk Creek Canyon. The corridor crosses Swauk Creek at MP 97.8 and then ascends the eastern side of the Swauk Creek Canyon.

The proposed corridor rejoins the east/west BPA right-of-way and passes to the northeast of the town of Thorpe. The corridor crosses Highway 97 near MP 100.5, crosses Green Canyon Road, and then parallels Robinson Road on the north side. After leaving the BPA corridor, the corridor traverses southeasterly through alternating grazing land and irrigated farmland. The proposed corridor passes approximately 2 miles northeast of the City of Ellensburg. North of the intersection of Lyons Road and Naneum Road, the proposed pipeline corridor turns south and parallels the east side of Naneum Road. The corridor briefly intersects the JWT at the junction with Kittitas Highway, approximately .75 mile west of the town of Kittitas. The corridor continues parallel to the JWT through a portion of the City of Kittitas and then turns south to the site of the proposed storage and distribution facility.

At the northeast corner of the intersection of I-90 (Exit 115) and Badger Pocket Road, a storage and distribution facility and pump station (Kittitas Terminal) will be constructed on 26 acres that are currently used for irrigated agriculture. Upon exiting this site, the pipeline will be reduced to a 12" diameter.

The proposed corridor will continue east from the Kittitas Terminal through grazing land, then continue north of I-90 through the Ginkgo State Park. An alternative route studied for the February 1996 Application would cross the Highline Canal and I-90 into the Yakima Training Center (YTC). The proposed corridor descends to the Columbia River to cross the river in one of five locations. The proposed crossing location and method is to use a horizontal directional drill south of Wanapum Dam. The other four alternatives are to install the pipeline on the I-90 bridge, Beverly railroad bridge, or on the Wanapum dam, or to dredge across the Columbia north of the I-90 bridge.

On the east side of the Columbia River, the corridor ascends the slopes to the east of Wanapum Village in new right-of-way. The pipeline corridor joins and runs adjacent to the north side of Beverly Burke Road to approximately MP 147.9, where it crosses to the south side of Beverly Burke Road. A pump station is planned for future construction at approximately MP 148.8 (Beverly-Burke Station). At MP 153.2, Beverly Burke Road turns to the north, but the proposed pipeline corridor continues easterly for approximately 3 miles. The corridor then turns northeasterly, crossing agricultural land, and easterly again to cross under the Royal Branch Canal at MP 156.2. The corridor crosses the canal again at MP 157.1 and runs parallel to 14 SW Road to the east through rangeland. At MP 163, the proposed pipeline corridor crosses Smyrna Road and enters an industrial area southeast of Royal City. The proposed corridor then turns to the southeast and runs adjacent to State Highway 26 to MP 176. The corridor turns south and follows farm fence lines, crosses Lower Crab Creek Road and turns easterly along the base of the Saddle Mountains. It crosses the Grant/Adams County line at MP 176.9 and continues southeast and parallel to Kuhn Road from MP 179 to MP 181.5.

The proposed corridor runs adjacent to local farm roads to approximately MP 183.1 where it turns south. Here, the proposed corridor is adjacent to and parallel with an existing powerline corridor through irrigated agricultural land, and again runs adjacent to farm roads. A pump station will be constructed in the future at MP 182.2, in agricultural land approximately 2,200' north of Highway 24. The proposed pipeline crosses Highway 24 at MP 184.5; this point is also near the boundary between Adams and Franklin counties.

At MP 186.6, the proposed corridor turns southeast, continuing through range and agricultural land. The corridor crosses the Wahluke Branch Canal and parallels the Burlington Northern Railroad tracks. The proposed corridor will be constructed adjacent to Hendrikson Road from MP 189.3 to MP 190.9, then parallels the railroad in a southerly direction to MP 193.4.

From MP 193.4, the corridor turns southeast and at MP 194.4 crosses the Hendricks extension, agricultural lands and a wetland area associated with Eagle Lakes. The proposed corridor continues southeast to MP 198, where it enters a small industrial area, crosses Road 170 just east of Basin City, and turns south adjacent to Glade North Road. The corridor crosses the Potholes Canal at MP 200.6 and the Eltopia Canal at MP 203.6.

At MP 205.2, the proposed corridor departs from Glade North Road to avoid an agricultural/industrial area and goes south through agricultural fields; it intersects Glade North Road (MP 207.1) and runs parallel to it to MP 216. Most of the pipeline construction in this segment will be in new right-of-way adjacent and parallel to existing corridors.

South of Esquatzel Coulee, the corridor joins a BPA transmission line right-of-way. The proposed corridor crosses Highway 395 at MP 217.6 leaving the BPA right-of-way at MP 221.9. The corridor traverses agricultural and industrial land within the city limits of Pasco to the corridor termination at the Northwest

Terminalling bulk storage facility west of Highway 12 and adjacent to the Snake River.

- Pipeline Length: The approximate length of the pipeline would be 230 miles.
- Pipeline Hydraulics: Six (6) pump stations would be required.
- Constructability: Corridors using Snoqualmie Pass were considered less rugged than Stevens Pass corridors with fewer steep slopes and rock outcroppings, and therefore more "constructable" than corridors using Stevens Pass.
- Pipeline Access: The majority of the corridor follows existing roads, trails, and transmission line corridors. Where new right-of-way corridors are needed, they are located near existing roads or utility corridors. Due to the proximity of I-90, the use of the Cedar Falls Trail and the John Wayne Trail, and many existing county and private roads, the corridor is considered very accessible.
- Environmental Impacts: Approximately 115 miles of the corridor would be in existing cleared rights-of-ways. These will limit the need to disturb uncleared land and limit impacts on wetland and vegetation habitats. The corridor would cross 285 rivers, streams, or culverts, however 8 or 9 of these crossings would be on existing bridges, and many of these crossings would be located above or below an existing culvert, or below an existing irrigation canal.
- Ownership/Land use: Federal agencies own 33 miles of the corridor; state agencies own or control 33 miles; local agencies own or control 7 miles; and there are 154 miles in private ownership with many ownerships in large tracts. The pipeline would cross through three cities or towns (North Bend, Snoqualmie, and Kittitas), although the corridor through North Bend and Snoqualmie would be on the existing Cedar Falls Trail and would not require new right-of-way to be developed.

9.1.5.4 Thrashers Corner via abandoned railroad corridor (Centennial Trail) and Snoqualmie Pass to Pasco

This alternative would use the abandoned railroad right-of-way that follows the Snoqualmie River valley. This alternative would begin at Thrashers Corner and head east along the existing BPA powerline corridor. However, after crossing the Snoqualmie River, the alternative corridor would utilize the railroad right-of-way that generally parallels SR 203 on the east side of the Snoqualmie River valley. The corridor would have stayed on old railroad right-of-way over Snoqualmie Pass, the Columbia River, and to a point just east of Royal City where it would turn south to Pasco following the same corridor as described above for the Thrashers Corner to Pasco corridor.

- Pipeline Length: The approximate length of the pipeline would be 245 miles.
- Elevation profile: Six (6) pump stations would be required.
- Constructability: The existing right-of-way in the Snoqualmie Valley is very narrow, and would cause a considerable increase in the construction time due to the difficulties of

moving labor and equipment in a confined space.

- Pipeline Access: The majority of the corridor would follow an abandoned railroad line. In some places, this corridor parallels existing highways or roads. However in the vicinity of Snoqualmie Pass, the corridor would be farther from I-90 and other existing roads than the Thrashers Corner to Pasco Corridor. It was therefore considered less accessible.
- Environmental Impacts: Approximately 115 miles of the corridor would be in existing cleared rights-of-ways. While this would generally limit the need to disturb uncleared land and limit impacts on wetland and vegetation habitats, there are a number of wetlands which are directly adjacent to the Centennial Trail. Due to the narrowness of the trail, it would be very difficult if not impossible to avoid temporary construction impacts to the wetlands. In addition, the trail bed would require widening to allow space for the pipeline in addition to the existing cable, and this widening would require filling of wetlands on one or both sides of the trail.
- Ownership/Land use: Federal agencies own 10 miles of the corridor; state agencies own or control 33 miles; local agencies own or control 7 miles; and there are 87 miles in private ownership. The pipeline would cross through seven cities or towns (Duvall, Carnation, North Bend, Snoqualmie, Kittitas, Ellensburg, and Beverly), although the corridor through would be on the existing Centennial Trail and would not require new right-of-way to be developed.

9.1.5.5 Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco

The Hollywood - Tolt Pipeline Alternative would originate near Hollywood in the Sammamish River valley, and would head directly east following the right-of-way of the City of Seattle's Tolt River Waterline. This corridor would cross the Snoqualmie River south of Duvall and connect with the BPA powerline corridor north of Stillwater. At this point the corridor would follow the Thrasher-Pasco corridor over Snoqualmie Pass to Pasco.

Although this corridor is a cleared pipeline corridor and would have fewer direct landowner and environmental impacts, the City of Seattle has plans to develop an additional water pipeline within their corridor, and concerns have been expressed by the City of Seattle over placing a petroleum products pipeline in the same right-of-way as the water pipeline that supplies potable water to the City of Seattle.

- Pipeline Length: The approximate length of the pipeline would be 225 miles.
- Elevation profile: Eight (8) pump stations would be required.
- Constructability: Corridors using Snoqualmie Pass were considered less rugged than Stevens Pass corridors with fewer steep slopes and rock outcroppings, and therefore more "constructable" than corridors using Stevens Pass.
- Pipeline Access: The majority of the corridor follows existing utility corridors, roads, trails, and transmission line corridors. Where new right-of-way corridors are needed, they

are located near existing roads or utility corridors. Due to the proximity of I-90, the use of the Cedar Falls Trail and the John Wayne Trail, and many existing county and private roads, the corridor is considered very accessible.

- Environmental Impacts: Four rivers would be crossed, Snoqualmie, Tolt, Columbia and Yakima.
- Ownership/Land use: The Tolt River Pipeline corridor owned by the City of Seattle who has plans to place a second water pipeline in the corridor, eliminating space for a petroleum products pipeline.

9.1.5.6 Renton Station via Stampede Pass to Pasco

One corridor was considered over Stampede Pass, starting near I-405 and SR 167 at the existing OPL Renton Station. The Renton Station, in addition to being a pump station, is also the main office and monitoring station for OPL. The corridor would go northeasterly out of the Renton Station to SR 169 (Maple Valley Road). The corridor would use the existing powerline and railroad right-of-way and traverse southeasterly paralleling SR 169. Near 192nd Street the corridor would turn east crossing SR 18 just north of Hobart and connect with the BPA powerline corridor. The corridor would then generally follow the existing powerline right-of-way southeasterly past Howard Hanson Reservoir, then northeasterly ascending Stampede Pass. The corridor would then turn to the southeast and connect with the John Wayne Trail and follow the same corridor as the Thrasher-Pasco corridor.

- Pipeline Length: The approximate length of the pipeline would be 210 miles.
- Elevation profile: Eight (8) pump stations would be required.
- Constructability: Corridors using Stampede Pass were considered more rugged than Snoqualmie Pass corridors with more steep slopes and rock outcroppings, and therefore less "constructable" than corridors using Snoqualmie Pass.
- Pipeline Access: Because Stampede Pass is more remote in places, the access to the pipeline in mountainous areas was considered less accessible than corridors over Snoqualmie Pass.
- Environmental Impacts: The corridor would pass through both the Cedar River and Green River watersheds. There are strict prohibitions on construction within watershed areas.
- Ownership/Land use: The corridor would pass through more densely populated areas in south King County and was viewed to have greater ownership and land use impacts than corridors using Snoqualmie Pass.

9.1.5.7 Corridor Using Yakima Valley

An alternative corridor to Pasco was considered that would turn south near Ellensburg and go through the Yakima Valley. The Yakima Alternative would have used any of the three alternative corridors over Snoqualmie Pass, or the corridor over Stampede Pass. East of Snoqualmie Pass, all of the considered

corridors would follow the existing BPA powerlines going south and east of Cle Elum. East of Cle Elum, where the powerline corridor crosses the Yakima River, the corridors would also cross the John Wayne Trail. The Yakima alternative would follow the trail and cross over the Yakima River several times on existing railroad bridges. West of Ellensburg, the corridor would turn south, crossing the Yakima River several times, and would generally parallel the west side of the Yakima River.

Approximately 5 miles south of Ellensburg, the corridor would cross to the east side of the Yakima River and follow the railroad right-of-way. The corridor through the canyon would cross the Yakima River a minimum of five times.North of Yakima, the corridor would turn southeasterly and follow an existing BPA powerline right-of-way that is north of the Roza Canal. Near the Yakima/Benton County line and SR 241, the corridor would turn south along an existing powerline corridor. Approximately 6 miles north of Grandview, the corridor would turn east and southeast crossing the Columbia on the I-182 bridge and going north of Pasco before turning south to the Northwest Terminalling facility.

- Pipeline Length: The approximate length of the pipeline would be 240 miles.
- Pipeline Hydraulics: Eight (8) pump stations would be required.
- Constructability: The Yakima Sub-corridor could use any of the three mountain pass corridors. It was considered "less constructable" because it would have crossed the Yakima River a minimum of six times (at approximately $3/4 - 1 million for each crossing) and would have crossed irrigation canals 43 times, including 2 crossings each of the Sunnyside and Rosa Canals.
- Pipeline Access: With the Snoqualmie Pass crossing, this corridor would be as accessible as the Thrasher to Pasco corridor.
- Environmental Impacts: The corridor would cross the Yakima River a minimum of six times. The corridor would cross a number of vineyards, croplands and orchards. The corridor would cross the Sunnyside and Rosa Irrigation Canals twice. The corridor would cross irrigation canals 43 times.
- Ownership/Land use: The corridor would pass through the densely populated areas of Ellensburg, Yakima, Selah and Richland. Construction impacts to vineyards, orchards and croplands such as used for growing asparagus would be significant.

9.1.6 SUMMARY AND COMPARISON OF CROSS-STATE CORRIDOR ALTERNATIVES

A comparison of the six cross-state corridor alternatives and one sub-alternative is shown on the following table.

The corridors were compared first of all for pipeline length as the length adds significantly to both the construction and operation costs. The construction costs for the pipeline through generally level terrain is approximately $460,000 per mile. The Allen Station via Stevens Pass to Pasco Corridor Alternative would be 45 to 60 miles longer than other corridors and would therefore cost a minimum of between $20 and $28

million more to build than other corridors. This corridor and the Snohomish Alternative would both go over Stevens Pass. Stevens Pass is much more rugged, with more steep slopes and more rock outcroppings than Snoqualmie Pass. These factors add to the construction difficulty, and will significantly increase construction costs and the time required for construction in mountainous areas. Both corridors would also require going through 7 cities with construction impacts to both residents and motorists on Highway 2. For these reasons, both the Allen Station and Snohomish Alternatives have been eliminated from further consideration.

The Renton Station Alternative would use Stampede Pass, and would go through the City of Seattle's Cedar River watershed and the Green River watershed. Stampede Pass was judged to be less constructable than Snoqualmie Pass Alternatives, the pipeline access would be more remote than Snoqualmie Pass alternatives, and it was viewed as unlikely that permission would be granted by the City of Seattle to construct within the Cedar River watershed. For these reasons, this alternative has been eliminated from further consideration.

Three alternatives using Snoqualmie Pass have been considered. One corridor, using the Centennial Trail would be approximately 20 miles longer than the other two at an approximate increase of $10 million in construction costs. The Hollywood Alternative would require two additional pump stations, at a construction cost of approximately $4 million over the Thrashers Corner Alternative. Pipeline access would range from easy to moderate for all three alternatives. All three would have the same number of river crossings. A preliminary review of wetland impacts for the three alternatives has shown that the alternative using the abandoned railroad line along the Centennial Trail would create the unavoidable impact of filling high quality wetlands. High quality wetlands can be avoided on the other two Snoqualmie Pass alternatives. The railroad alternative also would impact a greater number of cities than the other two Snoqualmie Pass Alternatives. Due to the need to add fill to widen the Centennial Trail corridor, the resulting unavoidable impacts to wetlands, and the greater number of cities that would be affected during construction, the railroad alternative has been eliminated from further consideration.

Of the two remaining Snoqualmie Pass alternatives, the Hollywood Alternative would place the proposed pipeline in the City of Seattle Tolt River Water Pipeline corridor. The City has initiated plans to add a second water pipeline within this corridor, and there would not be room for two water pipelines plus the refined petroleum products pipeline. Because this corridor would now require the clearing of new right-of-way it has been eliminated from further consideration.

The Yakima Valley subcorridor could be used with any of the three mountain pass crossings. The environmental impacts have been judged to be greater than the Thrashers Corner alternative because it would require crossing the Yakima River a minimum of six times as compared to one crossing for the Thrashers Corner alternative. The increase in crossings would increase construction costs by approximately $5 million (river crossing costs are estimated at $1 million per crossing). The corridor would also cross through vineyards, orchards and crops such as asparagus. The Thrashers Corner

alternative would cross through primarily grazing land and would skirt around irrigated fields. The Yakima Valley subcorridor was judged to have a greater impact on land uses for this reason. The purchase of right-of-way easements from property owners was also estimated to be greater due to the impacts to vineyards, crop lands, and orchards. The construction impacts to these areas would take longer to recover as compared to brief impacts to open grazing land. For these reasons, the Yakima Valley subcorridor has been eliminated from further consideration.

The remaining alternative, Thrashers Corner via Snoqualmie Pass to Pasco, has been found to be constructable and accessible. The alternative makes extensive use of existing utility or road corridors to minimize the need to clear new right-of-way. The corridor avoids crossing through major populated areas, and crosses through two cities within an existing trail. This corridor is being advanced for further consideration in the Environmental Impact Statement.

TABLE 9.1-2
COMPARISON OF CROSS CASCADE CORRIDOR ALTERNATIVES

	Pipeline Length	# of Pump Stations	Constructability	Pipeline Access	Environmental Impacts	
Allen Station via Stevens Pass to Pasco	285 miles	8	less constructable than Snoqualmie Pass corridors	difficult	River crossings: Columbia, Snohomish, Skykomish (6 crossings), Wenatchee	7
Snohomish via Stevens Pass to Pasco	240 miles	7	less constructable than Snoqualmie Pass corridors	difficult	River crossings: Columbia, Snohomish, Skykomish (6 times), Wenatchee	7
Thrashers Corner via Snoqualmie Pass to Pasco (Proposed Corridor)	227 miles	6	more constructable than Stevens Pass corridors	easy	River crossings: Snoqualmie, Tolt, Columbia, Yakima	3 ci
Thrashers Corner via abandoned railroad corridor (Centennial Trail) and Snoqualmie Pass to Pasco	245 miles	6	more constructable than Stevens Pass corridors	moderate	River crossings: Snoqualmie, Tolt, Columbia, Yakima Significant wetland impacts along Centennial Trail	7 c
Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco	225 miles	8	more constructable than Stevens Pass corridors	easy	River crossings: Snoqualmie, Tolt, Columbia, Yakima	Co
Renton Station via Stampede Pass to Pasco	210 miles	8	less constructable than Snoqualmie Pass corridors	moderate	River crossings: Cedar, Green Columbia, Yakima	Cor
Yakima Valley Sub-corridor Alternative	240 miles	8	constructable assuming paired with Snoqualmie Pass corridor	easy	River crossings: Snoqualmie, Tolt Columbia, Yakima (4 times) Construction impacts to vineyards, orchards, crops	con

9.1.7 DESCRIPTION OF ALTERNATIVE PUMP STATION LOCATIONS

The proposed project will have six pump stations, including one at the Kittitas Terminal. The siting of the Kittitas Terminal is discussed separately in Section 3.C. Pump stations are generally located based on the needed hydraulics for efficient operation of the pipeline. The criteria for evaluating alternative pump station locations is:

- Appropriate hydraulic location
- Adequate land area for pump station
- Adequate existing electrical power supply, or proximity of existing electrical supply
- Year-round access to site
- Avoidance of wetlands and other environmentally sensitive areas.

9.1.7.1 Thrasher Pump Station

The Thrasher Pump Station is the origin of the pipeline. Two alternative sites, one at OPL's existing Woodinville Pump Station, and a second site on 46th Avenue North, north of 212th Street NE in Woodinville (Thrashers Corner) were considered. The Thrashers Corner site is located directly adjacent to a BPA transmission line corridor, a corridor desired for routing of the pipeline.

The Woodinville Pump Station site is surrounded by residential development and cannot be enlarged. The site was found to be not large enough to accommodate both the existing and proposed pump stations. The site is approximately 2 to 3 miles from the BPA transmission line corridor. This additional mileage would have added approximately $1 - 1.5 million in construction costs for the additional line length.

The Thrasher Pump Station site was selected as the preferred pump station location based on site size and immediate proximity to the proposed pipeline corridor. This site also satisfied the criteria of avoiding environmentally sensitive areas.

9.1.7.2 North Bend Pump Station

Six alternative sites were considered for the location of the North Bend Pump Station. The pipeline in this area is proposed to be located on the Cedar Falls Trail. Three sites along the trail were evaluated in or near North Bend, one on the north side of the trail at SE 120th, one directly to the south on the south side of the trail, and a third location near I-90. A fourth location was reviewed further to the east near Edgewick Road. The sites near I-90 and Edgewick Road were eliminated due to the lack of electrical power. Two additional sites approximately two miles further to the east were considered. Neither site had an adequate power supply, and one site would not be accessible during the winter months.

The two sites near SE 120th were viewed to be equal in terms of power supply, access, and site size.

Neither site has wetlands nor significant wildlife habitat. The southern site was selected based on the landowner's willingness to grant an easement for both the pipeline and the pump station.

9.1.7.3 Stampede Pass Pump Station

The Stampede Pass Pump Station is located at the intersection of Stampede Pass Road and the John Wayne Trail. The proposed pipeline alignment for this segment is within the trail. There were no alternative sites in this vicinity that were found to have power, access, or adequate land area.

9.1.7.4 Beverly Burke Pump Station

After crossing the Columbia River near Vantage, the proposed pipeline corridor heads east along Beverly Burke Road. There was only one site identified in this area that was of suitable size, with adequate power and access and available for sale. The site is directly adjacent to Beverly Burke Road approximately 4 miles east of the Columbia River.

9.1.7.5 Othello Pump Station

The Othello Pump Station site is located on Mound Road just to the north of Highway 246 near the boundary between Adams and Franklin County. The site is on the proposed pipeline corridor. No alternative sites were found in this area with adequate land size, access, and power, and available for sale.

9.1.8 DESCRIPTION OF ALTERNATE SITES FOR THE KITTITAS TERMINAL

As noted above, the criteria used for evaluating alternative sites for the Kittitas Terminal area:

- Site must be located near the middle of central Washington to serve as an efficient distribution point for central Washington.
- Site must be located in close proximity to major east-west and north-south highways to provide efficient distribution to central Washington.
- In order to avoid maintaining excessive amounts of back pressure on the pipeline, the site needs to be located in an area of gradual elevation change and far enough east or west of areas such as Elk Height where there is a rapid elevation gain.
- Adequate site size.
- Availability of electric power at the site.
- Compatible land uses adjacent to the site and along connecting corridors between the site and major highways.
- Availability of existing adequate transportation infrasture from major highways to the site for tanker truck traffic.
- Ability to purchase site for the facility and to secure proper zoning.

A search was made for sites generally near Ellensburg in the I-90 corridor. Three sites were identified by right-of-way personnel and a third site at the Ellensburg Airport was identified by Kittitas County commissioners. The four sites evaluated are:

- A 27-acre tract adjacent to the Kittitas exit on I-90.
- A tract near the intersection of SR 10 and SR 97.
- A site near Elk Heights.
- County-owned industrially-zoned property at the Ellensburg Airport.

A comparison of the four sites is shown on the following table:

TABLE 9.1-3
COMPARISON OF KITTITAS TERMINAL SITES

	Kittitas	**SR 10/SR 97**	**Ellensburg Airport**	**Elk Heights**
System Hydraulic Impact	none	high back pressure	high back pressure	none
Electric Power Availability	3/4 mile to suitable substation need to build feeder two viable suppliers	3/4mile to suitable substation need substation and feeder upgrades one viable supplier	2-3 miles to suitable substation need substation and feeder upgrades two viable suppliers	7 miles to suitable substation need to build feeder and substation one viable supplier
Land Uses at Site and Along Transportation Corridor	interstate highway highway commercial and agricultural uses	state highway agricultural uses	residential residential and agricultural uses	rural residential residential and agricultural uses
Transportation Infrastructure	adjacent to interstate highway very easy access to regional system may need minor revision of ramps good all-weather access moderate volume use for residential and agricultural access	adjacent to state highway easy access to regional system need to build signals or acceleration lane good all-weather access moderate volume use for residential and agricultural access	adjacent to county road difficult access to regional system need to build road section and upgrade intersection dangerous grade for winter driving high volume use for residential and agricultural access	adjacent to interstate highway very easy access to regional system need major revision of ramps good all-weather access low volume use for residential and agricultural access
Property Ownership	Purchase from private landowner	Purchase from private landowner	Lease from public landowner	Purchase from private landowner
Wetlands or sensitive areas on	None	None	Yes	Not evaluated

site				

The Ellensburg Airport site was eliminated from consideration based on the difficult truck access to the regional system, the need to build new roads, safety considerations related to winter driving conditions, the high back pressure in the system that would be caused by the location, and the presence of wetlands on the site.

The Elk Heights site was eliminated based on construction costs due to the need to construct 7 miles of new electrical supply lines, the need to build an electrical substation, and the need to construct major revisions to existing ramps to the interstate system.

The Kittitas site and the SR 10/SR 97 site are comparable in terms of access to the regional transportation system, and access to power. The SR 10/SR 97 site was viewed as less desirable due to the high back pressure that would be created in the system based on its location, and the construction costs of needed to build an electrical substation.

The Kittitas Terminal site was selected as the preferred site.

9.1.9 PROPOSED CORRIDOR

The preferred corridor is described in Section 2.1 Site Description. In identifying the specific alignment for the preferred corridor, there have been many adjustments, some small and some large, to accommodate land owner issues, environmental issues, and construction feasibility. Some of the more significant route adjustments are discussed below. These adjustments are identified by mile post on the preferred route starting at the Thrasher Pump Station. It is anticipated that there will continue to be minor refinements to the actual alignment of the pipeline within the proposed corridor to accommodate environmental, engineering, and landowner concerns.

As stated in Section 8.2, the criteria used for evaluating alternative centerline locations include:

- Preference for use of existing cleared rights-of-way, including transmission line corridors, trails, and roadways.
- Avoidance of high quality wetlands or wildlife habitat.
- Minimizing impacts at stream crossings by the use of existing serviceable bridges.
- Minimizing impacts at stream or river crossings by using the narrowest feasible crossing points.
- Avoidance of land use impacts, such as existing structures, irrigated crop lands, gardens, orchards, and golf course fairways.
- Land owner preferences as to line location.

The map atlas that was prepared in February 1996 presented a proposed centerline based on known issues at that time. Since that time, a number of route improvements within the proposed corridor have been made

to avoid wetlands or other wildlife habitat, to accommodate landowner preferences, and to improve constructability. Key alternatives include:

- Crossing of the Snoqualimie River
- Use of land within the Ginkgo State Park as an alternative to crossing the Yakima Training Center
- Crossing of the Columbia River
- Realignment along Highway 26 to avoid the Corfu Landslide area

Snoqualmie River: There are three alternatives for crossing the Snoqualmie River: placing the pipeline within the utilidor under the newly constructed county-owned bridge, dredging through the river, or horizontally drilling under the river. The preferred alternative is to use the bridge, and Snohomish County staff have indicated their preference for this alternative. Use of the bridge will depend upon the timing of obtaining EFSEC approval for the project and whether there is still space available within the utilidor. At this time, however, there is no reason to believe that there will not be space in the utilidor for the proposed pipeline.

Yakima Training Center: The original route crossed the Yakima Training Center. A second alternative was developed to move the centerline to the north along the Army's property line to eliminate conflicts between the pipeline and the Army's training exercises. OPL is now proposing instead to move the centerline to the north side of I-90 onto State Park land and is currently in discussions with State Parks. The outcome of preliminary discussions resulted in the identification of one route across the Ginkgo State Park that will be evaluated environmentally against the Yakima Training Center route alternatives. The northern route is shown as the proposed route in this revised Application for Site Certification.

Columbia River: Nine alternative crossing methods were considered for the Columbia River:

- Drilling north of the I-90 bridge
- Dredging north of the I-90 bridge
- Crossing on the I-90 bridge
- Drilling south of the I-90 bridge
- Dredging south of the I-90 bridge
- Crossing on Wanapum Dam
- Drilling south of Wanapum Dam
- Dredging south of Wanapum Dam
- Crossing on the Beverly Railroad Bridge

Five of the alternatives were selected for further studies based on constructability, cost, and environmental impacts:

- Crossing on the I-90 Bridge
- Crossing on the Beverly Railroad Bridge
- Crossing on the Wanapum Dam
- Drilling south of Wanapum Dam
- Dredging north of I-90 Bridge

OPL is proposing to perform a horizontal directional drill south of Wanapum Dam, although any of the other four alternatives may be acceptable to OPL should the horizontal directional drill be found not to be permittable.

Corfu Landslide Area: The original route crosses the toe and eastern portion of the Corfu Landslide area. An alternative route has been identified which would parallel Highway 26 to near Danielson Road. This alternative route would avoid the landslide area, be shorter in length, and avoid impacting approximately 1.5 acres of wetlands which would be crossed on the Corfu Landslide route and has been adopted as the proposed route.

The improvements and alternatives that were considered for the placement of the centerline are described below by mile post increments and are shown in the revised Map Atlas (Appendix A).

MP 0 - 3.3

West of Maltby Road, there is an existing wetland. The alternatives to avoiding this wetland would have caused impacts to residential structures in Halo Estates. A route selection was made to both avoid the residential area and to trench through slightly less of the wetland area.

The wetland at Little Bear Creek will be crossed by the pipeline. There were no alternatives to route placement due to topography and the desire to stay within the existing BPA transmission line corridor. Consideration was given to both the use of a horizontal directional drill (HDD) and trenching using a temporary diversion of the creek. The diversion method was selected as the preferred crossing method because of the environmental damage that would be caused in order to clear space for the HDD on both sides of the wetland and creek.

East of Highway 9, the proposed centerline has been moved from the south side of the BPA right-of-way to the north side to minimize wetland impacts.

Between Station 137.5 and 147.5, the route has been moved to the north side of the powerline to accommodate the landowner's development.

MP 3.03 - 5.97

Between station 230 and 237, the centerline has been moved to the north side of the corridor to minimize wetland impacts.

Echo Lake Road Wetlands (MP 4.5): The preferred corridor is within the BPA right-of-way. The initial route crossed from the south side of the BPA right-of-way to the north side to avoid residences adjacent to the south side of the right-of-way. While the route avoided the homes, the route would have crossed an open-water portion of a wetland. After a more thorough investigation, it was decided to maintain the proposed corridor on the south side of the BPA right-of-way within a dirt access road, and to then cross to the north side of the right-of-way to avoid the homes. The proposed corridor avoids the more sensitive open water portion of the wetlands although it is anticipated that there will still be some impacts to less sensitive portions of the wetland from construction of the pipeline.

The route then crosses the Echo Lake Golf Course. The centerline has been rerouted to follow the existing golf cart path to minimize impacts to the golf course and to avoid wetlands.

MP 5.97 - 8.90

Near Welch Road between approximately Station 320 and 327, the centerline has been slightly moved to accommodate the landowner's desires.

At approximately Station 410, the route crosses the Snoqualmie River. There are three alternatives: to use the new Snohomish County Snoqualmie River Bridge, or to dredge or drill across the river. The preferred crossing method is to use the bridge, provided that there is still room in the utilidor under the bridge at the time this project is permitted. The revised route would cross two small low value wetlands on the west side. The bridge crossing would avoid drilling or dredging through the river, and avoid construction staging in flood plains.

MP 8.90 - 11.74

At station 557 near Peoples Creek, the centerline has been rerouted from the north side of the corridor to the south side to minimize impacts to the creek. At station 596, the centerline has been rerouted outside of the BPA corridor to use an existing road and to cross the creek at a location where it is already in a culvert.

MP 8.90 - 11.74

Between Station 683 an 694, the centerline has been rerouted onto an existing road to avoid a wetland. At the King County line, at station 725, the centerline has been rerouted to the west to accommodate the

landowner. There are no wetland impacts caused by the reroute.

North Road Wetlands (MP 12.8 to 13.0): The initially-considered corridor and the preferred pipeline corridor are within the BPA corridor. The initial route would have crossed through a large wetland and open water area extending across the right-of-way. The first alternative to crossing this wetland/open water area was to go around it on the west side through private roads. Further investigation of this route concluded that there would still be potential impacts to wetlands and numerous residential yards. It was determined that a route around the east side of the wetland/open water area was more feasible with less impacts to the wetland and residential properties.

MP 11.58 - 20.64

Between station 822 and 837, the centerline has been moved from the east side of the BPA corridor to minimize impacts to wetlands. Between station 873 and 877, the centerline has been rerouted to the east to decrease wetland impacts.

MP 20.64 - 25.19

At the Tolt River, the centerline has been moved farther to the west to cross the main stem through the riprap along the northern, or right bank, in an area that has been previously disturbed, The route has also been revised to avoid a newly constructed house.

MP 25.19 - 30.40

At Griffin Creek, the centerline has been moved west of the BPA corridor to avoid a mature Spruce tree,

MP 30.40 - 39.02

At Tokul Creek the line has been relocated to intersect Tokul Road north of the creek and crosses it on the bridge. The line lies longitudinally in Tokul Road, SE 53rd Way, and 396th Avenue SE until it joins an old railroad corridor north of Renig Road and follows it to the southeast side of North Bend. By utilizing the abandoned railroad bed mature trees were avoided.

Tokul Creek (MP 30.6 to MP 32.9): Crossing of Tokul Creek created significant engineering difficulties due to the extremely steep slopes. The original route selected crossed Tokul Creek farther to the east, and would have required clearing a construction corridor through approximately .5 miles of forested area. The initial route would also have impacted some wetland areas, and would have required a significant drop and rise in elevation. Two other routes were investigated and both had similar constraints. After discussions with the commercial property owner, it was decided that the route that eventually followed Falls Station Road(396th) would be more suitable environmentally.

MP 39.02 - 41.38

There are two alternative routings in this area, one using Edgewick Road. Edgewick Road is a moderately heavily travelled 2-lane paved road. During construction the road would have to be closed to through traffic. A route has been selected to avoid the roadway impacts and to avoid the adjacent Category 1 forested wetland. The route at station 2115 has been moved to the south to avoid Boxley Creek. At Station 2155, the centerline has been moved to accommodate the landowner and moved slightly onto Twin Falls State Park land on land recently acquired by the State Parks.

Edgewick Road Wetlands (MP 38.6 To MP 41.2): This area has numerous wetlands and small ponds. Many alternative routes were investigated to cross this area to reach the John Wayne Trail. The selected corridor has the least impacts of the routes investigated.

MP 41.38 - 47.44

At stations 2303 and 2314, the route has been moved to the south side of the streams for constructability.

MP 47.44 - 53.50

In the vicinity of Alice Creek and Tinkham Road, the route has been located to maximize the use of the road and previously disturbed areas, and to avoid impacts to the recreational trail. The centerline has also been moved to avoid potential spotted owl habitat.

MP 53.50 - 66.57

At station 2860 - 2900, the centerline has been moved from the John Wayne Trail to an abandoned railroad siding to minimize recreational impacts to trail users and to use previously disturbed lands. The centerline was also moved to use the narrowest crossing points for Humpback and Olallie Creeks to minimize impacts to the creek.

MP 66.57 - 69.60

At approximately Mile Post 68, the centerline has been rerouted around the existing tunnel due to limited construction space within the tunnel.

MP 69.60 - 72.54

At Cabin Creek (Station 3820), consideration was given to using the existing bridge. The bridge has been found to be unusable for the pipeline, and the centerline has been rerouted to use a Puget Power maintenance road. The road is elevated away from most of the wetlands. This route will minimize wetland impacts and avoid mature trees.

MP 72.54 - 75.47

At station 3845, the centerline has been routed onto Monahan Road as a means of access to the Puget Power transmission line corridor. At station 3935, the centerline has been rerouted around the wetland that was found in the powerline corridor.

MP 75.47 - 78.41

At station 4057-4077, the centerline has been realigned to cross the concrete-lined canal at a 90 degree angle. From station 4113 - 4120, the centerline has been moved onto an existing road to avoid a wetland.

MP 78.41 - 81.25

At Big Bear Creek (MP 79), the centerline has been moved to the west to accommodate a landowner. At Little Creek (Station 4250-4058), the centerline has been moved to the east to minimize impacts to the creek.

MP 81.25 - 82.95

At MP 82 there are two alternative alignments. One alignment would be in a spotted owl circle. An agreement has been reached with a nearby landowner to cross onto the landowner's property to avoid the spotted owl circle.

MP 82.95 - 91.87

Between station 4382 and 4417, the centerline has been moved to the north onto the power line corridor to avoid a spotted owl circle, and then to the south edge of the BPA corridor to avoid wetlands. At station 4435-4445, the centerline has been moved to the north onto an existing road to avoid a wetland. At station 4467-4478, the centerline has been moved to the south to use an existing road and culvert crossing to avoid wetlands and Spex Art Creek.

MP 91.87 - 94.79

At Station 5000, the route will cross the Yakima River. The centerline has been moved to the north at the river crossing to avoid the cottonwood trees. There was consideration given to building a bridge to cross the river in this location to extend the John Wayne Trail and to provide access to the Wallace Ranch, but a decision was made based on engineering constraints and costs not to construct a bridge. The alternative is under discussion with both State Parks and the landowner.

MP 94.79 - 106.91

At station 5097-5210, the centerline has been moved off of the powerline to avoid wetlands, oak woodlands, and talus slope areas.

Swauk Creek (MP 97.5): The preferred route follows the BPA corridor. Several important habitat features have been identified in this area, and the routes are further constrained by the Swauk Creek Canyon which has very steep slopes with rock outcroppings. Field investigations have determined that a more southerly route down the canyon slopes and then northerly back up the eastern side of the canyon is the most feasible and would avoid impacts to the oak woodland habitat features. Although the preferred corridor passes through small areas of oak woodland, no oak trees will be removed.

MP 106.91 - 108.90

From station 5675-5742, the centerline has been moved to the north and east to minimize impacts to wetlands and Currier Creek.

Ellensburg (MP 105.5 to MP 119): The initial route would have brought the pipeline closer to Ellensburg with a terminal and pump station constructed on the northeast side of the Ellensburg Airport. Further investigation of this route and site for the terminal identified a number of issues: a significant number of wetlands would have been impacted; traffic patterns to the proposed terminal were difficult. To avoid these constraints, the preferred corridor was significantly rerouted to traverse farther north of Ellensburg, and the proposed terminal site moved near Kittitas. The preferred corridor minimizes the wetland impacts and has improved truck access to the terminal.

MP 108.90 - 115.91

From approximately MP 109 - 115, the centerline has been relocated to the property lines to accommodate the landowners and to accommodate future development of the land.

MP 115.91 - 121.88

From station 6245, where the pipeline crosses under the Kittitas Highway, to station 6320, the centerline

has been moved to the west and south to accommodate the landowner. At station 6350 - 6410, the line has been moved to the north to parallel the John Wayne Trail to avoid the existing sewage lagoon. The route then follows an existing road to the south to the Kittitas Terminal.

MP 121.88 - 124.91

From station 6444 - 6565, the centerline has been moved off of the John Wayne Trail to parallel I-90 to accommodate the landowner concerns. The realignment decreases impacts to private irrigation canals and lessens impacts on farming.

MP 124.91 - 127.94

From station 6572 to 6610, the centerline has been moved to the north to avoid a gravel pit. Use of the existing railroad right-of-way was considered as an alternative route, but it was found to be too narrow to accommodate construction. From station 6727 - 6755, the centerline has been moved to the north to improve constructability.

MP 127.94 - 146.02

The original route would cross the Yakima Training Center, owned by the U.S. Army. To accommodate concerns of the Army over potential future conflicts between the pipeline and training exercises, a second alternative has been developed to move the centerline north to the Army's fence line. A third alternative, which is now the proposed route, moved the centerline to remain on the north side of I-90 on privately owned land and land owned by the Ginkgo State Park. A comparison of the environmental impacts of these alternatives will be provided in the EIS.

At Johnson Creek, the original route has been moved further to the west to minimize the wetland impacts.

MP 146.02 - 156.53

At MP 147.3, the pipeline will cross the Columbia River. Nine (9) alternative crossing methods or locations have been considered:

TABLE 9.1-4
COMPARISON OF COLUMBIA RIVER CROSSING ALTERNATIVES

Location	Geotechnical Feasibility	Environmental Impacts	Estimated Cost[1]
Drilling north of I-90 bridge	unknown	need large cleared area for drilling base	$8.5 million
Dredging north of I-90 bridge	gravel - feasible	need to minimize impacts to fish habitat and shorelines	$10 million
Crossing on I-90 bridge	structurally feasible	none	$6.9 million
Drilling south of I-90 bridge	unknown	no place for drilling base	>$8 million
Dredging south of I-90 bridge	gravel - feasible	need to minimize impacts to fish habitat and shorelines	$10 million
Crossing on Wanapum Dam	structurally feasible	none	$6.9 million
Drilling south of Wanapum Dam	gravel - feasible	none	$7.8 million
Dredging south of Wanapum Dam	gravel - feasible	need to minimize impacts to fish habitat and shorelines	$7.0 million
Crossing on Beverly Railroad Bridge	structurally feasible	none	$7.6 million

[1] All costs are based on routes beginning at Stevens Road east of Kittitas Terminal, and ending at the Beverly-Burke Pump Station.

Five of the alternatives were selected for further studies based on constructability and cost, and ranked in order of preference based on cost, and environmental impacts. The five alternatives under consideration are:

- Crossing on the I-90 Bridge
- Crossing on the Beverly Railroad Bridge
- Crossing on the Wanapum Dam
- Drilling south of Wanapum Dam
- Dredging north of I-90 Bridge

The proposed crossing is the horizontal directional drill south of Wanapum Dam. An environmental comparison of the proposed route and the other four alternatives, and the land routes that would connect with those alternatives, is provided in the EIS and in this application.

The proposed method is to do a horizontal directional drill under the Columbia River south of Wanapum Dam. The pipeline crossing location (SEC20 T16N R23E) was selected because it would be a narrow crossing of the river, and the slopes on either side of the river would provide better constructability for the pipeline than the steeper slopes to the north. The preference when crossing a large river such as the Columbia is to cross using a horizontal directional drill at lease 30 feet below the bed of the river. The

installed pipeline would have little or no maintenance needs, would have less exposure to the weather elements, and would not be subject to the potential need to move or replace the pipeline should a bridge structure be in need of repair or replacement.

If the route is selected to cross the Columbia River using the I-90 bridge, the pipeline would be routed towards the river on the north side of I-90 in eastern Kittitas County. At a point near the Vantage/I-90 interchange (NE SEC30 T17N R23E) the pipeline would be routed onto the I-90 right-of-way, and cross over the Columbia River on the I-90 bridge. On the eastern side of the river, the pipeline would then be routed to the south along SR26 for approximately 1 mile to a point near the SR26/SR243 junction (SW SEC28 T17N R23E). At this point the pipeline would be routed to the southeast and would rejoin the original alignment at a point (SE SEC13 T16N R23E) approximately 4 miles east of Wanapum Dam, at the location of the Beverly-Burke Pump Station as described in the EFSEC Application. Selection of this alternative will be based on whether it would be permittable by both the State of Washington and the Federal Highway Administration. OPL has initiated discussions with the Washington State Department of Transportation (WSDOT). As of the date of this application, WSDOT has not made a decision either in favor or opposition to installing the pipeline on the bridge.

Under the Beverly Railroad Bridge alternative, the pipeline would be routed to a point (SW SEC33 T16N R23E) near the western end of the train trestle. The pipeline would then cross over the Columbia River on the trestle to the eastern side of the river near the community of Beverly. The pipeline would then be routed to the northeast following Beverly Cutoff Road for approximately 2.5 miles where it would rejoin the original alignment as described in the EFSEC Application at a point (NE SEC22 T16N R23E) approximately 2 miles east of Wanapum Dam. Use of the train trestle would eliminate the need to trench or directionally drill across the Columbia River. However, crossing on the trestle would increase the total distance of the pipeline route, and the pipeline would be exposed for a significant distance. Discussions with Burlington Northern and Washington State Parks have identified a potential reactivation of the bridge by the railroad which would reduce the desirability of using it for the pipeline.

A third alternative would be to place the pipeline along the upper portion of the Wanapum Dam. A permit application has been made to Grant County Public Utility District (PUD) to request approval for this option.

The least preferred alternative would be to trench across the Columbia River north of the I-90 bridge. Under this alternative, the pipeline would be routed to the western edge of the river at the terminus of old highway 10 (SE SEC18 T17N R23E) approximately 1 mile north of the I-90 bridge on the Columbia River. The roadbed at this location gradually slopes into the Columbia River and is used occasionally as an informal boat ramp. The pipeline would cross the river using a "wet trench" method. This construction technique is described in Section 2.14 Construction Methodology of the EFSEC Application. On the eastern side of the river, the pipeline would be routed to the southeast approximately 1 mile to the I-90/SR26 interchange (SW SEC21 T17N R23E). At this point the pipeline would be routed to the south

along SR26 for approximately 1 mile to a point near the SR26/SR243 junction (SW SEC28 T17N R23E). From here the pipeline would be routed to the southeast and would rejoin the original alignment at a point (SE SEC13 T16N R23E) approximately 4 miles east of Wanapum Dam, at the location of the Beverly-Burke Pump Station as described in the EFSEC Application. The old highway 10 terminus location north of the I-90 bridge is suitable for a wet trench crossing.

MP 156.53 - 161.46

Between station 8270 and 8365, there were two alternative routes considered. The shortest route would traverse the land diagonally. The alternative route requires that the pipeline go due north for one mile before turning east. The longer route was selected because there would be fewer wetland impacts.

MP 161.46 - 170.45

Between station 8605-8657, the centerline has been moved farther to the north to avoid wetlands and at the landowner's request (Quack, Inc.) to avoid duck hunting areas. Between station 8700 - 8810, the centerline has been rerouted to follow the section line, and moved to the north paralleling the railroad line, to avoid the wetlands that are important to waterfowl.

MP 170.45 - 173.30

At station 9147, the centerline has been moved to the north side of Highway 26 to avoid the Columbia National Wildlife Refuge and wetlands.

MP 173.30 - 188.92

The original route crosses the toe and eastern portion of the Saddle Mountains. An alternative has been developed to parallel Highway 26 to Danielson Road. This alternative route would avoid the Corfu Landslide area, be shorter in length, and decrease wetland impacts by approximately 1.5 acres and has been selected as the new alignment. At MP 182, the route would be located within the existing county road right-of-way.

Saddle Mountain (MP 177.7 to MP 184): The initial corridor followed a transmission line that is approximately midslope on the Saddle Mountains (elevation approximately 1,300'). The geologic review indicated that this route traversed geologic formations similar to what has been identified as the Corfu Landslide (MP 175 to MP 178). Although the Corfu Landslide occurred thousands of years ago, it was decided to relocate the pipeline corridor to the toe of the slope along Kuhn Road to avoid crossing the potential landslide area.

MP 188.92 - 196.88

The proposed route in this location will go through a wetland. Alternatives were explored to avoid the wetland, but the route is constrained on the east by an existing irrigation circle. The irrigation pivot has electrical lines throughout the field and drainage tiles.

MP 196.88 - 202.94

At station 10455 - 10500, the centerline has been zigzagged to minimize impacts to the Eagle Lakes wetlands. At station 10635-10645, the centerline has been moved further east of Glade North Road to avoid a wetland, and to cross the abandoned railroad bed at a 90 degree angle.

MP 202.94 - 205.97

At station 10735-10822, the centerline has been moved to the east side of the to improve constructability, and to accommodate the landowner.

MP 205.97 - 208.99

At station 10945, the centerline has been moved to the east side of Glade North Road to avoid an asparagus field and landowner concerns.

MP 208.99 - 217.99

At station 11095, the centerline has been moved to the edge of an irrigation sprinkler circle which was not there at the time the route was originally planned. The relocated centerline then follows the property line.

MP 217.99 - 227.27

At stations 11614 - 11627, the centerline has been moved to the south at Esquatzel Coulee to cross the coulee at a right angle, and to avoid conflicts with the power line.

MP 227.27 - 230.09

At station 12130, the centerline has been rerouted to the north to follow an existing road into Northwest Terminalling's facility.

9.1.10 ALTERNATIVE WATER CROSSING LOCATIONS AND CONSTRUCTION METHODS

The proposed pipeline corridor crosses approximately 78 wetlands and approximately 293 watercourses. The watercourses include 8 river crossings, 224 stream crossings, and 61 crossings of irrigation canals. The first principle in selecting the proposed route was to avoid water crossings wherever possible. Because streams are long linear features, it is not possible for a pipeline alignment to completely avoid crossing them. Section 8.2 describes the criteria that were used in selecting both the crossing locations and the crossing methodologies. As stated in Section 8.2, the criteria are as follows:

- Are there practicable alternative locations for the pipeline alignment that would result in less impact to the aquatic ecosystem?

- Are there practicable alternative construction techniques that could be utilized at a given crossing location that would reduce the impact to the aquatic ecosystem?

The results of the alternatives analysis is provided in Table 9.1-5. Each crossing was reviewed first to determine whether the construction method would cause impacts to water quality or aquatic habitat if not mitigated. If impacts would be caused, alternative methods or locations were reviewed to determine whether they would be usable or available for the crossing. If alternative methods or locations were available, the alternatives were then reviewed to determine whether the alternative would enable a meaningful reduction of impacts.

If no alternative methods or locations were available, or if the alternatives would not meaningfully reduce impacts, mitigation measures were then developed to minimize or eliminate the construction impacts. These mitigation measures are described in Section 2.14 of this Application, and include:

- Construction will be performed during periods of lowest sensitivity,
- Trenching will be done perpendicular to the stream,
- The construction time and clearing of riparian vegetation will be minimized,
- Standard erosion and sediment control measures will be used, and spill prevention best management practices will be followed during construction,
- Blasting around and within streams will be limited as much as possible,
- Debris accidentally introduced into streams will be promptly removed,
- All other appropriate Best Management Practices will be followed, and
- Streambanks, vegetation, and streambeds will be restored immediately after construction. (Bank restoration is particularly important in shallowly incised streams with low banks, to prevent channel migration).

Protection of sensitive areas will focus on erosion and sediment control measures in or near wetland areas and other watercourses. A variety of control measures will be used to reduce erosion and sedimentation during construction, and these are described in Section 2.10 Surface Water Runoff. These measures include both limiting certain construction activities and installing temporary control structures such as sediment traps and filter fences. Control measures will be further detailed in a Stormwater Pollution Prevention Plan for Construction. Specific sizing and locations of control measures will be included in the final design.

Wetlands

Many wetlands and other sensitive areas have been avoided by OPL through the route selection process. Subsequent to detailed field studies, 22 additional wetlands were avoided by altering the pipeline route. OPL was successful in avoiding wetlands in the corridor more than 98 percent of the time they were encountered. In the remaining wetlands, additional alignment adjustments to avoid trees and particularly fragile plant communities further minimized impacts. All 77 of these wetlands will be trenched. Best management practices will be used during construction, and the impacts will be temporary. Wetlands will be restored, and only in rare cases will even the vegetation type be changed. For many of the wetlands, no alternative method was feasible, and for the remaining ones, available alternative methods would not provide a meaningful reduction of overall impacts.

Streams

There are 9 stream crossings that are proposed on existing bridges. There are 75 stream crossings that are proposed either under or over existing culverts. One stream is proposed to be crossed by HDD. These are crossing methods for which there is no alternative method that would have less impact to aquatic resources because the methods do not entail any direct impact to the stream channel or banks.

There are 103 jurisdictional streams that are proposed to be crossed by one of the trenching methods described above. All of the crossings are either high sensitivity streams for which any other method of crossing is infeasible or streams with sensitivity ratings of moderate, low, or no fish. For those with alternative crossing methods or locations available, no meaningful reduction of overall impacts would result from choosing another method.

There is one alternative route segment that needs to be considered in detail. This would entail using a segment of the John Wayne Trail between Alice Creek and the Snoqualmie Tunnel instead of Tinkham Road. By doing so, seven streams and one wetland along the Tinkham Road route, which must be trenched through alongside the road because the bridges or other road crossings are not suitable for the pipeline, could be avoided or crossed over existing culverts. Rock and Harris Creeks have little or no fish habitat at the crossing locations, but are near the floodplain of the South Fork of the Snoqualmie River where fine sediments are more prevalent. Carter and Hansen Creeks are minor fish producers in the reaches of the

proposed crossings, but are also in the floodplain, and Hansen Creek has rather unstable banks. Humpback Creek is a significant trout producer. Crossing 82, an unnamed stream, has no fish. Olallie Creek has trout some distance downstream, but nothing significant at the crossing. The one wetland is associated with Carter Creek.

The tradeoff is not a simple one. The JWT route is longer, and use of that section of the JWT requires placing the pipe on the bridge over Hansen Creek. Construction and maintenance crews would be at greater safety risk during work on the bridge, and there is little assurance that during the life of the pipeline, the Hansen Creek bridge would never be vulnerable to a flood such as washed out the Hall Creek bridge. The culvert system at Ollalie Creek is another concern. The creek is diverted through a long culvert at that location, and the railtrail has washed out in the past when a debris flow blocked the culvert. Because of the washout, the trail is significantly narrower and is in a dip at that location. To have room for the pipe, the downslope side would have to be built up, probably using pilings to hold the fill in place. The real concern is that another debris flow might again block the culvert, causing the creek to overflow the trail and wash it out again. Protecting the pipeline against such forces is not a sure thing. Considering all these factors, OPL believes the Tinkham Road route is the better choice.

TABLE 9.1-5 ANALYSIS OF ALTERNATIVE CROSSING METHODOLOGIES

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