

Guidelines enacted in October 1993 through the Intermodal Surface Transportation Efficiency Act (ISTEA) require the evaluation of alternative investment strategies for addressing the transportation deficiencies that the proposed project is intended to resolve. The Major Investment Study (MIS) in Section 2.1 focuses on transportation demand management (TDM) and transportation system management (TSM) strategies, restricted use facilities, and multimodal alternatives.<sup>7</sup> The subsequent sections in this chapter describe all of the alternatives considered (Section 2.2); identify the alternatives that were subsequently rejected and indicate why (Section 2.3); provide a more detailed description of the alternatives selected for further study (Section 2.4); and identify the selected preferred alternative and the associated rationale (Section 2.5). The final section (Section 2.6) discusses the facility design for the proposed Cross-Base Highway that would apply under any of the Build Alternatives.

## **2.1. Major Investment Study**

### **2.1.1 Introduction**

A wide variety of TDM and TSM strategies and facilities were considered as part of the MIS. TDM/TSM strategies attempt to optimize the capacity of the existing transportation system and avoid construction of new transportation facilities by modifying travel behavior and improving system efficiency.

TDM strategies are policies, programs, and actions implemented to eliminate or shorten single-occupancy vehicle (SOV) trips. They include promoting the use of high-occupancy vehicles (HOVs) through public transit or ridesharing, non-motorized transportation, and flexible work schedules.

TSM strategies are physical improvements and modifications to the transportation system that focus on improving the efficiency of existing transportation facilities. They include intersection widening, exclusive left-turn lanes, ramp metering, access management, and transit-priority treatments.

An extensive package of TDM/TSM strategies was evaluated to determine whether some combination or suite of strategies could reduce the underlying need for the proposed action. Some of the ideas in this package of strategies were suggested by 1,000 Friends of Washington and Tahoma Audubon Society representatives. Some of the TDM/TSM strategies were also analyzed as part of the No Build and Build Alternatives, since they are part of existing programs and would be implemented with or without the proposed Cross-Base Highway.

---

<sup>7</sup> The Transportation Equity Act for the 21st Century (TEA-21) eliminates the MIS as a separate requirement as set forth in the planning regulations and calls for integration of the requirement into the planning and NEPA analyses, as appropriate. The MIS analysis completed for the 1998 DEIS has been updated and is included in this FEIS for consistency through the NEPA process.

## **2.1.2 TDM Strategies**

TDM strategies can be organized into five main categories: (1) employer-based strategies, (2) TDM support facilities, (3) telecommunications, (4) transportation pricing, and (5) land use strategies. Of the five, employer-based strategies and TDM support facilities have the greatest potential for influencing travel demand on the Cross-Base Highway or on existing arterials and freeways. Effective land use strategies have been identified through development of the Pierce County Comprehensive Plan and will be implemented with or without the Cross-Base Highway.

Within each of the five main categories, there are numerous specific individual strategies. For the employer-based strategies category alone, there are specific strategies that are unique to particular companies, locations, or employment sectors. While most of the more successful strategies are discussed below, there may be a few additional specific strategies available for implementation. Some of the strategies with the greatest potential for success are the pricing strategies; however, these strategies are beyond the ability of one local government to implement and are not currently identified for implementation in PSRC's *Destination 2030: Metropolitan Transportation Plan for the Central Puget Sound Region*.

The following TDM strategies have been implemented with varying success throughout the country's metropolitan areas. These strategies have been identified as those most likely to succeed near the proposed Cross-Base Highway. Other strategies may be more appropriate for central city areas and large urban centers, but are not as applicable to the more widely dispersed employment patterns in the areas of Pierce County served by the proposed Cross-Base Highway. Table 2.1-1 lists each TDM strategy and indicates how each strategy was evaluated as part of the No Build Alternative, Build Alternatives, and TDM/TSM Alternative.

### **2.1.2.1 Employer-Based Strategies**

#### **Ridesharing Programs**

Ridesharing programs encourage carpooling and vanpooling over an entire city or region. They are usually implemented by regional rideshare agencies, often affiliated with regional or state governments. Programs include employee matching, reserved carpool/vanpool parking spaces, and monetary incentives to encourage carpooling and vanpooling. For the TDM/TSM Alternative, this strategy was expanded to include most employers (see Table 2.1-1, footnote 2, for a description of the employers), not just employers subject to Commute Trip Reduction (CTR) requirements. Ridesharing programs are generally more successful for large employers where numerous employees have similar work schedules. In some instances, ridesharing programs among many different companies have been successful within a large office building or group of buildings.

#### **Parking Subsidy Elimination or Cash-Out Provisions**

Subsidized parking encourages employees to drive alone. Parking subsidy strategies encourage employers to eliminate free parking altogether or eliminate the free parking and directly compensate the employee with the amount of money it

**Table 2.1-1. Summary of TDM Strategies and Evaluation Assumptions for the No Build, Build, and TDM/TSM Alternatives**

<b>TDM Strategy</b>	<b>Existing Degree of Implementation</b>	<b>No Build Alternative</b>	<b>Build Alternatives</b>	<b>TDM/TSM Alternative</b>
<b>Employer-Based Strategies</b>				
Ridesharing Programs	Available at most CTR <sup>1</sup> sites	Some expansion potential from Pierce County employers	Rideshare programs at Fort Lewis and McChord AFB can be expanded	Expand CTR <sup>1</sup> to most employers <sup>2</sup> regardless of size
Parking Subsidy Elimination	Limited	Substantial expansion potential	Substantial expansion potential	Implemented at most employment sites in Pierce County <sup>2</sup>
Monetary Incentives	Available at some CTR <sup>1</sup> sites	Some expansion potential	Greater expansion potential than No Build <sup>3</sup>	Greater expansion potential than No Build
Alternative Work Schedules	Implemented by many employers	Some expansion potential	Some expansion potential	Some expansion potential
Trip Reduction Ordinances	CTR <sup>1</sup>	CTR would be expanded to include employers with 50 employees or more	CTR would be expanded to include employers with 50 employees or more	Expand CTR <sup>1</sup> to most employers <sup>2</sup> regardless of size
Preferential Carpool Parking	Available at some CTR <sup>1</sup> sites	Some expansion potential	Some expansion potential	Greater expansion potential
Work Location Exchange	Limited to 1 or 2 employers in the Puget Sound region	Limited expansion potential	Limited expansion potential	Limited expansion potential
<b>Support Facilities</b>				
HOV Lanes on Existing Facilities	Planned to be added to I-5 between the Steilacoom-DuPont Road interchange (Exit 119) and SR 512 (Exit 127) <sup>4</sup> by 2020	No additional HOV lanes	Cross-Base Highway design will accommodate future HOV lanes	HOV lanes on 176th Street E, Canyon Road, E and SR 512
Transit Facilities	Pierce Transit Service	Normal expansion of Pierce Transit Service and new Sound Transit commuter rail line in Lakewood	No Build plus Sound Transit express bus route on Cross-Base Highway	No Build plus new commuter rail service on the Tacoma Rail
Non-Motorized Facilities	Some available	New facilities consistent with Pierce County Non-Motorized Transportation Plan	No Build plus bicycles will not be prohibited from using the shoulders of the Cross-Base Highway	Greater emphasis on pedestrian and bicycle facilities compared to other alternatives

**Table 2.1-1. Summary of TDM Strategies and Evaluation Assumptions for the No Build, Build, and TDM/TSM Alternatives (Continued)**

<b>TDM Strategy</b>	<b>Existing Degree of Implementation</b>	<b>No Build Alternative</b>	<b>Build Alternatives</b>	<b>TDM/TSM Alternative</b>
<b>Telecommunications</b>				
Telecommuting	Available at some CTR <sup>1</sup> sites	Some expansion potential	Some expansion potential	Some expansion potential
Telework Centers & Tele-conferencing	Limited	Some expansion potential	Some expansion potential	Some expansion potential
Teleshopping & Tele-education	Limited	Some expansion potential	Some expansion potential	Some expansion potential
<b>Transportation Pricing</b>				
Congestion Pricing	None	Not considered	Not considered	Not considered
Traditional Toll Roads	None	Not considered	Not considered	Not considered
Parking Pricing	No experience in Pierce County	Market-driven increase only	Market-driven increase only	Government-mandated parking charge to SOVs assumed to occur
<b>Land Use Strategies</b>				
Increase Residential Density	Limited Pierce County experience except in urban areas of Tacoma and Lakewood	High-density districts on 176th Street E	High-density districts on 176th Street E	High-density districts on 176th Street E
Increase Mixed-Use Development	Limited experience in unincorporated Pierce County; some experience in Tacoma and Lakewood	Mixed-use districts on SR 7, SR 161, and Canyon Road E	Mixed-use districts on SR 7, SR 161, and Canyon Road E	Mixed-use districts on SR 7, SR 161, and Canyon Road E
Jobs/Housing Balance	Limited experience as a TDM/TSM strategy; improves in future with the Comprehensive Plan	Substantial improvement in Pierce County area	Substantial improvement in Pierce County area	Substantial improvement in Pierce County area

<sup>1</sup> CTR refers to the State's Commute Trip Reduction regulations that require employers with more than 100 employees (full-time employees arriving at work between 6:00 am and 9:00 am) to develop and implement transportation management plans to reduce the amount of single-occupancy vehicle commuting.

<sup>2</sup> Employer-based strategies were applied within Activity, Community, Employment, and Major Urban Centers as well as Employment-based and Master Planned Communities and Mixed Use Districts. Work trip reductions were applied to the following job sites: DuPont, Fort Lewis, McChord Air Force Base, Western State Hospital, Pierce College, Clover Park Technical College, and Matsushita Semiconductor.

<sup>3</sup> Monetary incentives for riding transit would be more effective with the Cross-Base Highway Build Alternatives since regional express bus service would be implemented in the corridor. They would also be more effective with the TDM/TSM Alternative because of the proposed HOV facilities and proposed commuter rail service on the Tacoma Rail.

<sup>4</sup> HOV lanes on I-5 between SR 512 and DuPont are currently on the 20-year mobility strategy list in the State Highway System Plan 2003-2022. Projects in this list would require approval of additional transportation revenue to be completed by the year 2022.

costs to pay for the parking. The cash subsidy gives employees the option to use the subsidy to pay for their own parking or to keep the cash and use transit, carpools/vanpools, bicycling, or walking modes of travel to work. For the TDM/TSM Alternative, this strategy was assumed to be implemented at most employment sites in the mid-Pierce County area.

### **Monetary Incentives such as Transit Pass and Rideshare Subsidies**

Monetary incentives can be provided in the form of transit pass subsidies for transit riders or a cash “transportation allowance” to carpool/vanpool riders, bicyclists, and walkers. Providing monetary incentives is a “carrot” approach to encourage employees to use alternative travel modes as opposed to a “stick” approach, such as parking fees or tolls that penalize SOVs. Monetary incentives would be more effective with the Build Alternatives because of proposed regional express bus service on the Cross-Base Highway. They would also be more effective with the TDM/TSM Alternative because of the proposed HOV lanes and commuter rail service proposed on the Tacoma Rail.

### **Alternative Work Schedules**

Work hour management strategies are meant to shift the demand on highway facilities to less congested time periods than during the conventional business day arrival and departure times. Flexible work hours (flextime), staggered work hours, and modified work schedules (4-day work week and work at home options) fall into this TDM category. Benefits from this strategy would not change among alternatives.

### **Trip Reduction Ordinances**

Trip reduction ordinances are regulations passed by local governments and air quality districts requiring employers and/or developers to implement trip reduction or TDM programs. The ordinances typically require an on-site transportation coordinator responsible for implementing TDM programs, regular travel employee surveys, and a regular plan and report.

The State of Washington’s CTR regulation is an example of a trip reduction ordinance. CTR requires employers with more than 100 employees arriving at work between 6:00 and 9:00 AM to develop plans for reducing SOV commuting. The SOV reduction goals are as follows:

- 15 percent by 1995
- 20 percent by 1997
- 25 percent by 1999
- 35 percent by 2005

If employers are not meeting these goals, they must make good faith efforts by implementing additional TDM strategies. For the TDM/TSM alternative, this strategy was assumed to apply to all employers, not just those with 100 or more employees.

### **Preferential Carpool Parking**

Desirable parking spaces are set aside for carpools and vanpools or possibly clean fuel vehicles. This TDM strategy provides incentive for desirable modes by

allowing access to close, covered, secure, or otherwise attractive spaces. This strategy would have a greater opportunity for success with the TDM/TSM Alternative due to parking pricing.

### **Work Location Exchange**

This strategy, sometimes referred to as proximate commuting, can eliminate or substantially reduce some long-distance commuting, thereby reducing traffic volumes. It achieves this through voluntary transfers, exchanges, and new-hire placements to shorter-commute work sites with similar job positions available at multi-site employers. Multi-site employer locations may include banks and retail chains. Work location exchange programs can substantially reduce the number of long-distance commutes through efforts to match new and existing employees to work sites closer to their homes. In addition, this strategy improves air quality, reduces traffic congestion, and enables employers and employees to enjoy shorter commutes, more productivity, lower turnover, and lower commuting costs. Benefits from this strategy would not change among alternatives.

### **2.1.2.2 TDM Support Facilities**

#### **High-Occupancy Vehicle Lanes**

HOV lanes provide opportunities for travelers to benefit from changing their trip-making habits by carpooling, vanpooling, or using transit. Such changes can decrease travel time for carpools and vanpools and result in an improved level of service (LOS) along a corridor with HOV lanes. HOV lanes on I-5 between the Steilacoom-DuPont Road (Exit 119) and the SR 512 interchange (Exit 127) are currently on the 20-year mobility strategy list in the State Highway System Plan 2003-2022. This project would require approval of additional transportation revenue to be completed by the year 2022.

There are three possible HOV implementation scenarios:

- Adding HOV lanes on Canyon Road E, 176th Street E, and SR 512 for the TDM/TSM Alternative.
- Implementing HOV lanes on the existing facilities listed above with the proposed Build Alternatives.
- Implementing HOV lanes on the Cross-Base Highway with the proposed Build Alternatives. Designated HOV lanes are not included as part of the initial Cross-Base Highway; however, the highway is being designed in accordance with WSDOT P1/P6 standards. These design standards would allow future construction of two HOV lanes in the median area.

HOV use would be higher for the TDM/TSM Alternative because of the additional HOV facilities in place, combined with other SOV disincentives.

#### **Transit Facilities**

Transit facilities also provide increased opportunities for travelers to change their trip-making habits by using bus or rail transit. Three principal examples of transit service increases were considered:

- Increased local and express bus service through added routes or increased service on existing routes by Pierce Transit.

- Additional regional express bus service and commuter rail service to Lakewood envisioned in the Sound Transit plan.
- Passenger rail service on the Tacoma Rail facilities.

The first two transit service increases above were assumed to be part of all alternatives. The final option was assumed as part of the TDM/TSM Alternative only.

### **Bicycle Lanes and Support Facilities**

Bicycle lanes can provide an efficient and pleasant alternative to driving alone. In areas of stop and go traffic due to congestion, bicyclists can safely ride to and from work and other destinations away from traffic or adjacent to traffic streams. In addition, development standards that require on-site paths, bicycle parking, and other amenities such as showers or lockers at places of employment can be added incentives to encourage bicycle use.

In the Cross-Base Highway study area, there is generally very little bicycle use for commuting due to the lack of adequate bicycle facilities in the area. Because of security concerns, the proposed Cross-Base Highway would not provide designated bicycle lanes; however, bicycle riding on the paved shoulders of the highway would not be prohibited. Therefore, construction of the highway would improve the bicycle riding environment for longer-distance bicycle trips to and from Lakewood, Spanaway, and the two military installations. This would complement the CTR programs at McChord AFB and Fort Lewis since one element of these programs is to encourage bicycle commuting. With the No Build Alternative, the bicycling environment would improve over current conditions with implementation of many of the planned future roadway improvements, identified in Table 2.2-1, which will have provisions for non-motorized users incorporated into their scope. With the TDM/TSM Alternative, additional emphasis would be placed on non-motorized facility improvements to increase bicycle and pedestrian trips and minimize SOV trips. The regional bicycle facility within the Cross-Base Highway right-of-way, however, would not be implemented in the TDM/TSM Alternative.

#### **2.1.2.3 Telecommunications**

Implementation of telecommunications strategies has been somewhat limited in Pierce County and the Puget Sound region. The potential exists for these strategies to be used more frequently in the future. While the future effectiveness of telecommunications as a TDM strategy remains difficult to predict, research conducted by PSRC in this area<sup>8</sup> has generally indicated that significant travel demand reductions would not occur as a result of telecommunications strategies. The emphasis on telecommunications as a substitute for travel would be similar among the No Build, Build, and TDM/TSM Alternatives. With the TDM/TSM Alternative, there would be greater incentive due to a desire to avoid increased traffic congestion for individuals to consider telecommunications strategies to minimize SOV trips.

---

<sup>8</sup> Telecommunities Conference Report, January 6, 1995; Telecommunications and Travel Study was conducted by John Niles of Global Telematics.

## **Telecommuting**

Telecommuting is a strategy that attempts to reduce home-to-work trips by allowing employees to work at home. Employees may be linked to their central office location by telephone and computer or may take home work that does not require being at the worksite. With proper equipment, many telecommuting functions may be completed from home or remote locations. Laptop or personal computers can connect to a host computer to retrieve information, update files, and relay products.

## **Telework Centers, Teleconferencing**

Telework centers allow employees to work at a satellite work center located in neighborhoods of participating employees. The centers are typically equipped with computers linked to the main office. Teleconferencing allows employees to conduct meetings or hold discussions over the phone from home, which would reduce the number of home-to-work trips.

## **Teleshopping, Tele-education**

Teleshopping is a strategy that can shorten or eliminate vehicle trips that are not home-to-work related. Teleshopping may include applications that affect specific industries such as consumer retail and distribution. This strategy enables shoppers to make purchases over the phone or via a computer. Catalogues and television and computer monitors also assist by displaying products to the shopper. Tele-education enables students to take courses via the computer, thus eliminating trips between home and classroom.

### **2.1.2.4 Transportation Pricing**

Transportation pricing strategies beyond those driven by market conditions are not currently implemented in the Puget Sound region, and no specific plans for pricing currently exist. Pricing concepts have been discussed as a possible future regional strategy for managing traffic congestion and minimizing vehicle miles traveled. The concepts were evaluated in early work on the Metropolitan Transportation Plan, but were later dropped because of substantial public opposition. Increasing fuel costs could also help to reduce travel demand; however, the real price of fuel adjusted for inflation has decreased in the past 20 years, and local jurisdictions have little to no ability to control fuel pricing. Without a regional travel price strategy such as congestion pricing or fuel tax increases, it would not be equitable for pricing to only be considered on the Cross-Base Highway or in the mid-Pierce County area.

### **Parking Pricing**

Employment centers that charge for parking combined with other incentives for commuting to work using non-SOV travel modes are generally effective. Requiring employers to charge employees for parking may not be feasible, however, since there is no legal mechanism for jurisdictions to impose this at a particular employment site or subarea. For the TDM/TSM Alternative, government-mandated SOV parking charges were assumed to exist in the mid-Pierce County area. For the No Build and Build Alternatives, market-driven parking pricing could reach the mid-Pierce County area by 2025, but was not assumed to be in place.

### **Congestion Pricing**

Congestion pricing charges road users different rates, varying by time of day and location, depending on the level of congestion. Tolls may be set by the time of day

and vehicle occupancy to reduce congestion; they may be imposed by toll booths, electronic devices (automatic vehicle identification), or special permits. Congestion pricing was not considered with any of the alternatives since a pricing system would need to be established on a regional basis.

### **Traditional Toll Roads**

Traditional toll roads require a fixed fee for travelers passing through a particular corridor. Longer distances, which can be determined by different zones, have higher fees. Typically, travelers manually pay a fee when they exit a toll plaza at various points along the corridor. Toll roads were not considered with any of the alternatives.

#### **2.1.2.5 Land Use Strategies**

Land use strategies have been implemented in many jurisdictions throughout the Puget Sound region, especially after completion of local land use/transportation plans to meet state Growth Management Act (GMA) requirements. The Pierce County Comprehensive Plan identifies a large increase in jobs, resulting in a substantially better balance between jobs and housing. Other land use strategies that will also have a positive effect on reducing travel demand are contained in the Pierce County Comprehensive Plan. A detailed subarea plan in the Fredrickson area focusing on design treatments to accommodate pedestrians, bicyclists, and transit riders would also help to promote the use of alternative transportation modes. A draft of the Fredrickson Community Plan was completed in May 2003 and will be considered by the County Council in September 2003. For the MIS, land use strategies considered were limited to those found to be consistent with the adopted Pierce County Comprehensive Plan.

### **Increased Residential Densities**

Typically, higher development densities are required to support transit service. Denser development often leads to more efficient use of public transit and also makes more efficient use of public facilities, reducing the costs of providing sewer, water, and transportation services. High-density residential districts (up to 25 units per acre) are planned at several locations on 176th Street E. Most of the mid-Pierce County area is designated moderate-density residential with up to six units per acre. This is a substantial increase in density compared to existing development.

### **Increased Mixed-Use Development**

Separation of housing from jobs and shopping opportunities has led to increased auto usage, reduced opportunities for walking, and related increases in congestion and air pollution. Mixed-use development may be incorporated in local zoning codes, especially in areas where shopping and other activities have become more accessible to residents. This zoning (up to 25 units per acre) is now in place along SR 7, SR 161, Canyon Road E, and 112th Street E.

Methods of implementing mixed-use development include providing more housing in urban areas, combining retail at the street level with apartments on upper levels, and siting basic commercial establishments within walking distance of residential development. Combining commercial and light industrial uses, and in some cases residential and light industrial uses, can also enhance the work environment and reduce auto trips.

## **Jobs/Housing Balance**

The inability of lower-wage workers to afford housing near their work and the willingness of people to make longer commutes in exchange for more affordable or desirable housing have led to increasing separation of housing and employment areas. Jobs/housing balance strategies include promoting mixed-use development, setting housing to job ratio targets for communities or developments, and requiring more affordable housing near employment centers.

## **Neighborhood Centers**

Neighborhood commercial centers located within residential areas can eliminate the need for people to drive longer distances for everyday services. These neighborhood centers would be located within residential areas and would provide shopping opportunities for local residents, reduce trip lengths, and promote walking and bicycling. Stores that could be included in a neighborhood center may include grocery stores, hardware stores, hair stylists, or other small businesses. Zoning for community and activity centers is in place along SR 7 on Canyon Road E near SR 512.

### **2.1.3 TSM Strategies**

TSM strategies evaluated for the No Build, Build, and TDM/TSM Alternatives include traditional TSM improvements and intelligent transportation systems (ITSS).

#### **2.1.3.1 Traditional TSM Improvements**

- Intersection modifications/management (traffic channelization at intersections, signal coordination programs, grade separations)
- Street/highway modification/management (ramp metering, HOV priority treatments, reversible traffic lanes)
- Enhanced preservation (retrofitting of regional streets and arterials for transit and non-motorized travel opportunities)
- Areawide transit service (higher frequencies on major routes, coordinated connections at hubs, fare consolidation)
- Priority treatment for transit vehicles (ramp meter bypasses, freeway flyer stops, signal priority for buses)
- Increased transit efficiency (utilization of innovative operational efficiencies)

#### **2.1.3.2 Intelligent Transportation Systems**

ITSS are coordinated systems of people and devices that monitor and regulate traffic flows and deliver important messages to travelers—both before they enter their cars and while they are driving. Information that may be relayed to travelers includes expected delays and congested roadways, accident locations, construction activity, and other information critical to efficient travel.

The proposed Cross-Base Highway, along with other proposed and new highways in the region, could benefit from the new technologies in the area by installing ITS infrastructure as the facility is built. Some of the technologies currently employed in the Puget Sound region and elsewhere that could be applied to the Cross-Base Highway are described below.

**Loop Detectors** are connected to a data collector that transmits data through fiber-optic cables to computers at a central location.

**Ramp Meters** usually allow one car to proceed with each green light, as a means to control the rate at which vehicles enter the freeway. Ramp meters help control mainline freeway traffic flow and reduce the potential for accidents, maximizing freeway use.

**Variable-Message Signs (VMSs)** are large, illuminated signs that present messages controlled either by on-site field personnel or remotely by Traffic System Management Center (TSMC) operators. VMSs are used for scheduled closures, as well as unpredicted, unscheduled events.

**Closed-Circuit Television (CCTV) Cameras** can be mounted along freeways or roads. CCTVs can show accident details, allowing for complete and efficient use of emergency vehicles.

**Highway Advisory Board Signs** alert motorists that highway advisory messages are being broadcasted on low-powered AM radio transmitters.

**Traveler Information Systems** may include telephone-based or kiosk-based public transportation information systems. Through the use of a dedicated cable channel, a computer, or a screen at a bus shelter, travelers could monitor transit schedules, maps, and the route location of approaching and departing transit vehicles.

The ITS functions presented above are some that are most likely to be effective for enhancing safe and efficient travel in the Cross-Base Highway study area. Other ITS projects beyond the 20-year development horizon of the Cross-Base Highway project may someday change the concept of freeway travel altogether. The ITS functions that would be included on the Cross-Base Highway or other roads in the area will be determined during future stages of project development.

## 2.2. Corridor Alternatives Considered

The National Environmental Policy Act (NEPA) and corresponding regulations by the Council on Environmental Quality and FHWA require consideration of reasonable alternatives that could satisfy the underlying need for and purpose of a proposed project and actions. The alternatives are the basis for the subsequent comparative analysis of environmental consequences. The range of alternatives evaluated during the planning process for the Cross-Base Highway included a suite of elements such as improvements to other roadways and a variety of TDM and TSM strategies that attempt to address the need for the project and avoid construction of a new roadway in the project area. A variety of Build Alternatives were developed that address both the purpose of the project and the need for the action by construction of a new roadway.

To improve system linkage and increase capacity, the Cross-Base Highway was originally conceived to provide an additional highway link between I-5, in the vicinity of Fort Lewis and McChord AFB south of SR 512, and the mid-Pierce County area. Without the new Cross-Base Highway link or a substantial change in travel patterns and behavior, the movement of people and goods would continue to be constrained by increasingly congested freeway and arterial routes such as

SR 512, SR 7, and Canyon Road E. These existing routes are also somewhat circuitous, resulting in longer trips between common origins and destinations.

The concept for a Cross-Base Highway has existed for more than 20 years. During this time, a wide range of new highway alignments and other alternative transportation solutions have been considered. Potential corridors and alignments for a new roadway have been studied since 1990. Alternatives to building a new roadway have been studied as part of the PSRC's Metropolitan Transportation Plan (*Destination 2030*) and the Pierce County Transportation Plan.

### **2.2.1 Corridor Termini**

In the broadest sense, corridor alignments were considered as far north as SR 512 and as far south as the Nisqually River in Thurston County. However, due to the existence of Fort Lewis and McChord AFB in this entire area, the corridor where a new Cross-Base Highway could be implemented without causing substantial impacts narrows to an area between the two military installations. Commanders from both Fort Lewis and McChord AFB have made it clear since the mid-1980s that a new Cross-Base Highway corridor in this area was possible, but only if the alignment was as close as feasible to the existing boundary between the two military installations. This requirement is primarily related to the potential loss of existing and future training areas necessary for either military installation to continue its mission. This position is founded on issues of military security and is intended to ensure the ability of the two installations to conduct their missions and maintain the long-term viability of both military installations. Where corridor alignments would interfere with current military activities or substantially constrain future use, Fort Lewis and McChord AFB have stated easements would not be granted.

In addition to military constraints, there are other reasons for such a narrow project corridor. This corridor location minimizes impacts to important natural environment areas such as Spanaway Marsh. The project's eastern terminus at SR 7 in the vicinity of 176th Street S creates the opportunity for Pierce County to complete a long-distance, improved east-west travel corridor between I-5 and Orting in Pierce County through a series of independent improvements consistent with the County's Transportation Plan. A corridor-level State Environmental Policy Act (SEPA) EIS has been completed on extending 176th Street S between SR 161 and SR 162 in Orting. Because of military and natural environment constraints, the eastern terminus of the new Cross-Base Highway could only occur in the vicinity of 176th Street S at the intersection with SR 7. The western terminus for the corridor could be at several locations on I-5 between Berkeley Street SW and Gravelly Lake Drive.

### **2.2.2 No Build Alternative**

Under the No Build Alternative, the Cross-Base Highway would not be constructed; however, other planned roadway improvements would be implemented, as well as other reasonably foreseeable projects such as the development of an industrial complex on Fort Lewis, the relocation of the McChord AFB runway, and the development of master planned communities in mid-Pierce County. In addition, the increases in population and employment projected for the study area, based on regional and local planning, would still occur.

All planned roadway improvements identified in the Pierce County Comprehensive Plan and shown in Table 2.2-1 would be implemented with the No Build Alternative. PSRC's *Destination 2030* also identified a number of other roadway projects that, if funded, could be implemented by other agencies by the year 2030. Table 2.2-2 lists these additional roadway projects in the study area that have been sponsored by surrounding cities, WSDOT, and Pierce County and are not included in Table 2.2-1. Given the current funding environment in Washington State, it is difficult to determine whether many of these projects will be implemented by the estimated completion dates. Some of these projects, while not evaluated as part of the No Build or Build Alternatives, were evaluated as part of the TDM/TSM Alternative, as described in Section 2.2.4.

Traffic modeling of the No Build Alternative incorporated all planned roadway improvements included in the Pierce County Comprehensive Plan (listed in Table 2.2-1), some of the roadway improvements identified in PSRC's *Destination 2030* (identified in Table 2.2-2), and also included planned TDM/TSM strategies identified in Table 2.1-1. Improvements not included in the Cross-Base model are unlikely to substantially affect the model results or conclusions. Figure 2.2-1 shows the planned improvements (both modeled and un-modeled) in areas surrounding the proposed Cross-Base Highway corridor.

**Table 2.2-1. Future Roadway Improvements Assumed for All Build (Cross-Base) and No Build Alternatives**

Facility	Location	Project Description
94th Avenue E	112th Street E to 152 Street E	Widen to 5 lanes
112th Street E	SR 161 to SR 7	Widen to 5 lanes in all sections
152nd Street E/Military Road S	SR 7 to Waller Road E	Widen to 5 lanes
160th Street E	Canyon Road E to 70th Avenue E	Widen to 5 lanes
176th Street E	Canyon Road E to SR 161	Widen to 5 lanes
176th Street E Extension	SR 161 to 130th Avenue E	Construct new 5-lane arterial
Canyon Road E	106th Street E to 116th Street E	Widen to 7 lanes
Canyon Road E	116th Street E to Military Road E	Widen to 5 lanes
Canyon Road E	Military Road E to 176th Street E	Widen to 5 lanes
Canyon Road E Extension	192nd Street E to 224th Street E	Construct new 4-lane arterial
Spanaway Loop Road S	174th Street S to SR 7	Add continuous center turn lane/realign at 176th Street E

Source: Pierce County Department of Public Works (2001).

**Table 2.2-2. Additional Future Roadway Improvements Identified in PSRC's *Destination 2030***

Facility	Location	Project Description	Estimated Completion Date	In Cross-Base Model?
Center Drive	McNeil St. to I-5	Widen to 7 lanes	2005	Included as a 6-lane facility
DuPont-Steilacoom Rd.		Roadway widening	2004	Not included
72nd St. E	Tacoma City Limits to Canyon Rd. E	Widen to 5 lanes	2020	Not included
96th St. E	SR 7 to Fruitland Ave. E	Widen to 3 lanes	2030	Not included
112th St. E/S	86th Ave. E to Steele St.	Widen to 5 lanes	2010	Included as 4 lanes west of Golden Given Rd, 5 lanes to east
128th St. E	SR 7 to SR 161	Widen to 3 lanes	2020	Not included
176th St. E	SR 7 to Canyon Rd. E	Widen to 5 lanes	2010	Not included
224th St. E	SR 7 to SR 161	Widen to 6 lanes	2020	Not included
Canyon Rd. E	72nd St. E to 106th St. E	Widen to 5 lanes	2020	Included as 4 lanes between 106th St. E and 96th St. E
Military Rd. S/ 152nd St. E	Waller Rd. E to Spanaway Loop Rd.	Widen to 5 lanes	2030	Included
Spanaway Loop Rd.	SR 7 to 10th Ave. S	Widen to 3 lanes	2007	Included
72nd St. E	McKinley Ave. to Portland Ave.	Widen to 5 lanes	2010	Included as 4 lanes
I-5	BN RR crossing to 96th St. vicinity	Core HOV lanes, interchange improvements	2010	Not included
I-5	96th St. vicinity to Tacoma SCL vicinity	Core HOV lanes, interchange improvements	2010	Not included
I-5	Tacoma SCL vicinity to 72nd St. vicinity	Core HOV lanes, interchange improvements	2010	Not included
I-5	Gravelly Lake Dr. undercrossing to Bridgeport Way undercrossing	Add HOV lanes, interchange improvements	2020	Not included
I-5	Bridgeport Way undercrossing to BN RR undercrossing after Carlyle Rd. undercrossing	Add HOV lanes, interchange improvements	2020	Not included
I-5	DuPont Rd undercrossing to Fort Lewis Rd. vicinity	Add HOV lanes and northbound collector-distributor	2020	Not included
I-5	Fort Lewis Rd. vicinity to Thorne Lane undercrossing	Add HOV lanes, interchange improvements	2020	Not included

**Table 2.2-2. Additional Future Roadway Improvements Identified in PSRC's *Destination 2030* (Continued)**

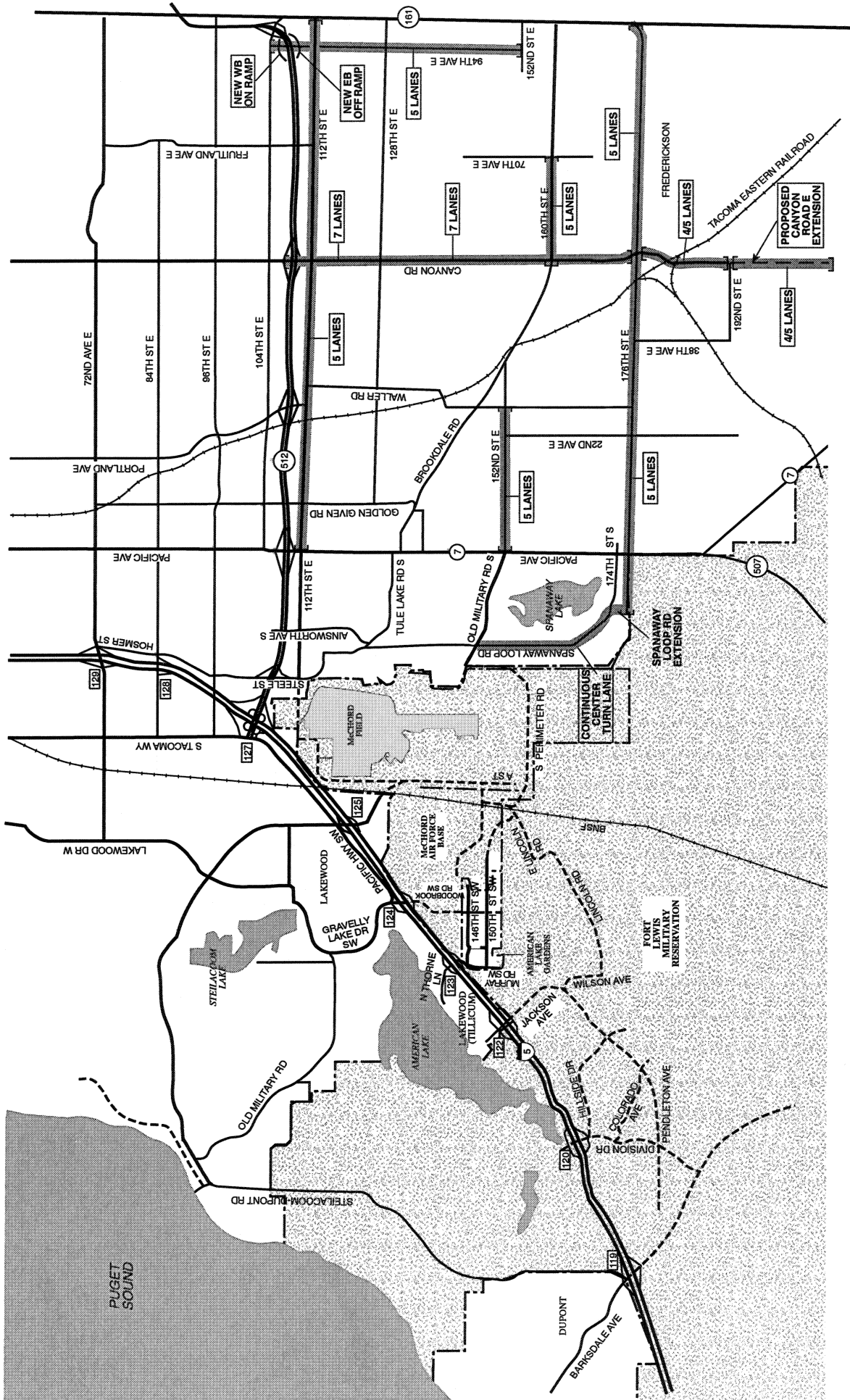
Facility	Location	Project Description	Estimated Completion Date	In Cross-Base Model?
I-5	Thorne Lane undercrossing to Gravelly Lake Dr. undercrossing	Add HOV lanes, interchange improvements	2020	Not included
SR 161	234th St. E to 204th St. E	Widen to 5 lanes	2010	Not included
SR 161	204th St. E to 176th St. E	Widen to 5 lanes	2010	Not included
SR 161	176th St. E intersection	Intersection improvements	2030	Not included
SR 161	176th St. E to Meridian St.	Access management and transit improvements	2030	Not included
SR 161	Meridian St. to SR 512	Add one lane each direction and structure over SR 512	2030	Not included
SR 512	I-5 to Canyon Rd. E	Widen to 8 lanes	2020	Not included
SR 512	Canyon Rd. E to SR 161	Widen to 6 lanes	2030	Not included
SR 512	SR 161 to Meridian St.	Widen to 6 lanes	2030	Not included
SR 512	Meridian St. to SR 167	Widen to 6 lanes	2030	Not included
SR 7	SR 507 Wye Connection to 108th St. S	Access management or new local arterials	2030	Not included

Notes: *BN RR = Burlington Northern railroad.*




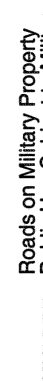


*Core HOV Lane = A specific system of high priority HOV lanes in King, Pierce, and Snohomish counties.*

*SCL = south city limits.*

Source: *PSRC 2001a*



**Figure 2.2-1  
Future Roadway  
Improvements**

 NOT TO SCALE  
 Military Property  
 Military Property Boundary  
 Roads on Military Property Public Use Subject to Military Permission  
 I-5 Exit Number  
 Road Improvements in Cross-Base Model

### **2.2.3 Build Alternatives**

At a corridor level, all Build Alternatives connect the project termini described above from I-5 in the vicinity of Lakewood to SR 7 near 176th Street S. The alignment alternatives are subject to a number of physical and natural resource constraints, such as safety clearances for the McChord AFB runway, the Ammunition Supply Point area on Fort Lewis, and several wetlands supporting important plant and animal species (see Figure 2.2-2). All Build Alternatives would provide four through lanes and would meet WSDOT standards for lane width, shoulders, and geometry.

### **2.2.4 TDM/TSM Alternative**

With the No Build Alternative, the combination of all planned or approved roadway improvements and TDM/TSM strategies (including employer-based programs, support facilities, telecommunications, and land use strategies) are included in the traffic volume forecasts and LOS analysis results summarized in Chapter 1. These data indicate that something beyond approved TDM/TSM strategies is needed to satisfy the purpose of and need for the project, because traffic congestion in the mid-Pierce County area would increase substantially.

Travel demand reductions associated with the TDM/TSM Alternative were estimated using Pierce County's transportation forecasting model. Assumptions used to model this alternative were consistent with the individual strategies for this alternative, summarized previously in Table 2.1-1. The TDM/TSM Alternative incorporated many of the TDM/TSM strategies suggested in scoping comments from the 1,000 Friends of Washington and the United States Environmental Protection Agency (EPA). Refinements and revisions to the 1,000 Friends proposal were discussed and coordinated with 1,000 Friends representatives to arrive at the final TDM/TSM Alternative elements.

Modeling of the TDM/TSM Alternative assumed that many areas in Pierce County would achieve a 35 percent reduction in vehicle trips made for work purposes (home-based work trips) by the year 2025. This 35 percent work trip reduction was applied to all commute trips between employment and housing areas in Pierce County, regardless of employer size. This assumption is a substantial step beyond the current Washington State CTR law that only applies to affected employers with more than 100 employees.

For this analysis, a subarea was defined as the unincorporated urban area south of SR 512, east of I-5, north of 208th Street E, and west of the Orting Valley (see Figure 1.1-1). Reductions were applied to job-site-related work trips within the subarea for employers within the following land use areas (as identified in the Pierce County Comprehensive Plan):

- Activity Center (includes Pacific Lutheran University area)
- Community Center
- Employment-Based Planned Community
- Employment Center (includes Frederickson and Thun Field areas)

#### Master Planned Community

- Major Urban Center (includes South Hill Mall area)
- Mixed-Use District

Reductions were also applied to job-site-related work trips for the following locations:

- DuPont
- Fort Lewis Military Reservation
- McChord Air Force Base
- Western State Hospital
- Pierce College (Lakewood and Puyallup campuses)
- Clover Park Technical College
- Matsushita Semiconductor

In addition, reductions were applied to all home-end work trips within the subarea related to households within the following land use areas:

- Activity Center
- Community Center
- Employment-Based Planned Community
- High-Density Residential District
- Master Planned Community
- Major Urban Center
- Mixed-Use District

Reductions were also applied to home-end work trips for the following locations:

- DuPont
- Fort Lewis Military Reservation
- McChord Air Force Base

To support this large 35 percent reduction in work trips, additional HOV and transit facilities were assumed to be in place. Without these facility improvements to encourage mode shifts from SOVs to HOVs and transit, the assumed 35 percent work trip reduction would not be realistically achievable. Therefore, the TDM/TSM Alternative assumes that HOV facilities would exist on 176th Street E, Canyon Road E, SR 7, and SR 512 and that commuter rail service would be implemented on the Tacoma Rail between Frederickson and Tacoma.

Other elements of the suggested 1,000 Friends of Washington alternative were either already assumed in the original travel demand modeling for the No Build and Build Alternatives or would not have a quantifiable reduction in travel demand. The following sections describe other elements of the 1,000 Friends of Washington alternative and how they relate to the travel demand modeling for the TDM/TSM Alternative.





### **Frederickson Area Community Plan/Higher-Intensity Development**

The travel demand forecasting model for the Build and No Build Alternatives already considered relatively high-density development in the Frederickson area, especially along Canyon Road E and 176th Street E. Vacant land was considered to have allowable densities consistent with the adopted Pierce County Comprehensive Plan land use designations. These allowable densities can be found under Objectives 34.1 through 34.3 of the Land Use Element of the Pierce County Comprehensive Plan (Pierce County Code, Title 19A). The following urban land use designations and allowable uses and densities are present in the Frederickson area:

- Moderate-Density Single-Family: up to 6 dwelling units per acre
- High-Density Residential District: up to 25 units per acre and limited commercial uses
- Mixed-Use District: up to 25 units per acre and commercial and office uses
- Employment Center: various industrial and commercial uses; no residential

Counties are mandated to use the 20-year population projection from the Washington State Office of Financial Management (OFM). This is outlined in Section 19.20.060B of the Comprehensive Plan (Pierce County Code, Title 19). Any additional growth that might be allocated to the mid-Pierce County area would have to be shifted from other parts of the county, likely from higher-priority growth areas such as downtown Tacoma, Lakewood, and Puyallup.

The draft Fredrickson Community Plan, published in May 2003, includes consideration of changes to the land use designations. The proposed changes were developed according to the County's Buildable Lands Report and are consistent with the Comprehensive Plan.

In regard to transit-oriented development, the Comprehensive Plan encourages residential development that includes access to transit service and non-motorized facilities (Objectives 33.2 and 35.3 under Pierce County Code, Title 19A). The designation of Mixed-Use and High-Density Residential Districts allows for residential and commercial areas to be located close to each other. The siting of parks and public facilities in locations convenient to residential areas is encouraged (Objective 62.2).

In summary, the Build and No Build Alternative modeling currently assumes mixed-use, transit-oriented development and higher-intensity development possibilities in the mid-Pierce County area consistent with the Comprehensive Plan. No additional modeling adjustments for the TDM/TSM Alternative were made to address this issue.

### **Protect Existing Corridors**

Future design of Canyon Road E was fully examined in the South Canyon Corridor Plan, a lengthy community-based study completed in December 1995. The study report was prepared under the direction of a broad-based committee including residents, businesses, and representatives from the Canyon Road Community Council, Frederickson-Clover Creek Community Council, and Canyon Road Improvement Coalition; the report recommends access management and roadway

improvements. The focus of access management is on sharing and consolidation of driveways for existing and future development, while roadway improvements focus on providing capacity expansion and non-motorized facilities to reduce congestion. The recommendations of the South Canyon Corridor Plan do not go as far as the 1,000 Friends of Washington suggestion of “limiting access to major, signalized intersections”; however, the recommendations from this plan were a result of considerable community and adjacent property owner involvement. From a modeling standpoint, recommendations from this community-based corridor plan were already incorporated into the Build and No Build modeling efforts.

### **Improve Existing Transportation Routes**

Table 2.2-1 lists the future roadway improvements assumed for the Build and No Build Alternatives. The Pierce County projects on this list are programmed in the current Pierce County Transportation Improvement Program (TIP) and will likely be completed in the next 20 years.

In addition to these improvements, HOV facilities were assumed to be in place on 176th Street E, Canyon Road E, SR 7, and SR 512. Spanaway Loop Road was also assumed to be widened from three to four or five lanes between 176th Street S and Military Road.

### **Manage Demand for Single-Occupancy Vehicle Use**

All of the TDM strategies are assumed to be implemented by those employers described at the beginning of this section. To achieve the 35 percent work trip reduction assumed in the modeling, parking charges would likely be needed at many of the employment sites to deter SOV use.

### **Transit and Bicycle/Pedestrian Improvements**

The TDM/TSM Alternative assumes an increase in express transit service to the mid-Pierce County area and commuter rail service on the Tacoma Rail line between Frederickson and Tacoma. However, there are no active plans by Pierce County, Sound Transit, or Tacoma Rail to establish commuter rail service. The alternative also assumes implementation of additional non-motorized facilities consistent with the Pierce County Non-Motorized Transportation Plan.

## **2.2.5 Comparison of No Build, Build, and TDM/TSM Alternatives**

The TDM/TSM Alternative resulted in improved travel times over the No Build Alternative from Pierce County to destinations along I-5, but less improvement than the Build Alternatives. The Build Alternative includes the same modeling assumptions as the No Build Alternative, plus the proposed Cross-Base Highway. Table 2.2-3 summarizes the PM peak-hour travel time differences among the No Build, Build, and TDM/TSM Alternatives.

Travel demand modeling for the TDM/TSM Alternative also resulted in lower 2025 traffic volumes and improved LOS compared to the No Build Alternative. Figure 2.2-3 shows the 2025 average daily traffic volumes for the TDM/TSM Alternative. Table 2.2-4 compares the resulting LOS and volume/capacity (V/C) ratios among the No Build, Build, and TDM/TSM Alternatives.

Figure

2.2-3 TDM/TSM Alternative Year 2025 Average Daily Traffic

**Table 2.2-3. Year 2025 PM Peak-Hour Travel Time Summary (Minutes)**

From	To	No Build	Build	Percent Decrease <sup>1</sup>	TDM/TSM	Percent Decrease <sup>1</sup>
DuPont	Frederickson <sup>2</sup>	33.1	22.8	31%	31.1	6%
DuPont	Spanaway <sup>3</sup>	30.6	17.2	44%	28.5	7%
Frederickson n <sup>2</sup>	DuPont	29.3	21.5	27%	28.4	3%
Spanaway <sup>3</sup>	DuPont	25.8	16.2	37%	25.0	3%
Lakewood <sup>4</sup>	Frederickson <sup>2</sup>	24.0	21.4	11%	23.1	4%
Lakewood <sup>4</sup>	Spanaway <sup>3</sup>	23.2	15.8	32%	22.3	4%
Spanaway <sup>3</sup>	Lakewood <sup>4</sup>	18.8	14.4	23%	18.6	1%

<sup>1</sup> Percent decrease compared to the No Build Alternative.

<sup>2</sup> Frederickson area was assumed to be at the Canyon Road E/176th Street E intersection.

<sup>3</sup> Spanaway area was assumed to be at the SR 7/176th Street S intersection.

<sup>4</sup> Lakewood area was assumed to be at the Bridgeport Way/Lakewood Drive intersection.

**Table 2.2-4. Year 2025 PM Peak-Hour Level of Service Summary**

Facility	No Build		Build		TDM/TSM	
	LOS	V/C	LOS	V/C	LOS	V/C
SR 512 east of I-5 (Eastbound)	F	1.34	F	1.20	F	1.27
SR 512 east of I-5 (Westbound)	E	0.93	E	0.91	D	0.89
Spanaway Loop Road south of Tule Lake Road	F	1.51	F	1.26	F	1.45
SR 7 north of 112th Street	F	1.21	F	1.11	F	1.14
Canyon Road E north of 112th Street <sup>1</sup>	E	0.98	E	0.91	E	0.92

<sup>1</sup> Assumes widening to seven lanes by 2025.

## 2.3. Alternatives Considered But Rejected

### 2.3.1 TDM/TSM Alternative

From a travel demand and congestion reduction perspective, the TDM/TSM Alternative achieves some systemwide results; however, the alternative was eliminated from further consideration because it does not address the purpose of the project or satisfy many of the basic transportation improvement needs that are satisfied by the Build Alternatives. The TDM/TSM Alternative does not increase the transportation system linkage and capacity between Pierce County and destinations along the I-5 Corridor nearly as much as the Build Alternatives. In addition, some elements of the TDM/TSM Alternative have implementation difficulties that may be impossible to overcome. Specific implementation difficulties and other reasons for rejecting the TDM/TSM Alternative are summarized below.

- Peak-hour travel time improvements between Spanaway/Frederickson and destinations along I-5 (Lakewood and DuPont) are considerably greater for the Build Alternative than for the TDM/TSM Alternative. As shown in Table 2.2-3, peak-hour travel times for various origin/destination pairs decrease from the No Build Alternative by 11 to 44 percent for the Build Alternative compared to 1 to 7 percent for the TDM/TSM Alternative. These travel time decreases for the Build Alternative would benefit all vehicles, including transit and trucks moving freight and goods. These substantially higher travel time decreases for the Build Alternative compared to the TDM/TSM Alternative are important for providing connectivity and access between major population and employment centers identified in the Pierce County Comprehensive Plan.
- Some of the HOV facilities included in the TDM/TSM Alternative would be difficult to implement or are inconsistent with prior Pierce County planning efforts. The two major north-south arterial HOV facilities on SR 7 and Canyon Road E both fall into this category. WSDOT and Pierce County do not have current plans to add arterial HOV lanes in either of these corridors. Widening SR 7 between SR 512 and 176th Street S for arterial HOV lanes would potentially affect 262 individual parcels. Most of these parcels (193) have existing businesses, with the remaining parcels classified as vacant commercial (44), residential (11), business/residential (6), vacant residential (2), and other (6). Many of these property impacts would result in full or partial property acquisitions and business relocations. The 262 parcels have a total land value of \$69,714,140 and improvement value of \$77,462,300 (Pierce County Assessor's Office 2003). Even if a small percentage of these properties were affected by SR 7 widening, the property acquisition and business relocation costs would be substantial. Based on a preliminary review of these substantial property impacts, WSDOT has no plans to pursue arterial HOV widening on SR 7. The other major north-south arterial in the mid-Pierce County area, Canyon Road E, was the subject of a Canyon Road E corridor planning effort, including extensive public outreach with affected property owners, business owners, and residents. The issue of arterial HOV widening in the corridor was considered, but was not recommended as part of the final South Canyon Corridor Plan. Without arterial HOV lanes on SR 7 or Canyon Road E, the effectiveness of HOV lanes on the major east-west facilities (SR 512 and 176th Street E) would be limited.
- Commuter rail service on the Tacoma Rail line between Frederickson and Tacoma is also not included in the Sound Transit plan, PSRC's *Destination 2030*, or the Pierce County Transportation Plan. In addition, any commuter rail service must be subjected to a "reasonableness" test required by Section 24 of the Revised Code of Washington (RCW Section 81.104.120), which states the following:

"Transit agencies and regional transit authorities may operate or contract for commuter rail service where it is deemed to be a reasonable transit mode. A reasonable alternative is one whose passenger costs per mile, including costs of trackage, equipment, maintenance, operations, and

administration are equal to or less than comparable to bus, entrained bus, trolley bus, or personal rapid transit systems.”

For the suggested Tacoma Rail service, the passenger cost per mile analysis has not been conducted; however, if this service was reasonable, as defined by RCW Section 81.104.120, it would likely have been included in the Sound Transit plan.

When revisions were made to the approved Sound Transit plan in 1995 and 1996, the Sound Transit Board was charged with adding high-capacity transit service in Pierce County to provide greater geographic equity within the Sound Transit service area. Since then, the Tacoma light rail line and the Tacoma to Lakewood commuter rail service have been added to the overall Sound Transit plan.

As a point of comparison, the Tacoma to Lakewood commuter rail service, which is part of the Sound Transit plan, achieves a cost per passenger mile of \$2.73, compared to \$2.92 for an express bus service alternative in the Tacoma to Lakewood corridor (Parsons Brinckerhoff/Kaiser Engineers Team 1994). Therefore, the cost per passenger mile for rail service in this Tacoma to Lakewood corridor with a much higher population and employment density than the Tacoma to Frederickson corridor is only marginally lower than an express bus service alternative. Furthermore, even if the Tacoma Rail service were found to be “reasonable” based on the RCW definition, it would not serve the origin/destination patterns served by the Build Alternatives and would not address the purpose of the project or many of the transportation needs.

- Widening Spanaway Loop Road to four lanes between 176th Street S and Military Road would decrease volumes on SR 7 by approximately 4 to 7 percent. This would provide little congestion relief to SR 7 and would not materially provide relief to SR 512. Furthermore, this widening would cause considerable impacts to existing residential land uses on both sides of the street. In addition, the two-way, left-turn lane on Spanaway Loop Road between 174th Street S and 176th Street S has been provided to facilitate turning movements off of the roadway into the high number of access points. Widening to four lanes would eliminate this two-way left turn lane and would increase turning movement conflicts.
- Requiring all employers to achieve a 35 percent reduction in peak-period SOV travel regardless of the number of employees is very speculative. The current CTR law applies only to employers with more than 100 employees. This program could be expanded to include employers with fewer than 100 employees; however, there are no current plans for this to occur, and implementation would require legislative action.

In conclusion, many important elements of the TDM/TSM Alternative, such as the arterial HOV lanes on SR 7 and Canyon Road E and commuter rail service on the Tacoma Rail line, have significant implementation challenges that would be difficult to overcome. These improvements are not currently part of any regional or countywide plans. Without these facility improvements to encourage commuters to change travel modes from SOVs to HOVs and transit, the estimated travel demand

reductions associated with the TDM/TSM Alternative could not be achieved. Furthermore, even if these travel demand reductions for the TDM/TSM Alternative were possible, the purpose of the project and many transportation needs satisfied by the Build Alternatives would not be satisfied by the TDM/TSM Alternative. The TDM/TSM Alternative would provide the following:

- Smaller traffic and congestion reduction benefits on SR 7, SR 512, and Spanaway Loop Road (see Tables 2.2-3 and 2.2-4).
- No connectivity between the major urban center (Lakewood) and employment centers (Frederickson and DuPont) from Pierce County's Comprehensive Plan.
- No improvement in freight and goods movement between I-5 and the Frederickson, North McChord, and Thun Field employment centers.
- No improvement in regional public transit access between I-5 and SR 7.
- Less public safety benefit than the Build Alternatives from faster emergency vehicle access to Madigan Army Hospital.

Therefore, the TDM/TSM Alternative was eliminated from further consideration.

### **2.3.2 Build Alternatives**

As shown in the following sections, the primary basis for eliminating Build Alternatives was the impact to military operations on McChord AFB or Fort Lewis. Other considerations included the following:

- Disproportionately high or adverse impacts to minority or low-income populations. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires all federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. For this project, the U.S. Department of Transportation (DOT) guidelines (Federal Register Vol. 62, No. 72, April 15, 1997) on environmental justice apply.
- Substantially higher impacts to wetlands, streams, groundwater, wildlife habitat, and listed species relative to other alternative alignments.
- Adverse effects on other transportation facilities.
- Estimated project cost.

The Build Alternatives that were considered but rejected are discussed for the following sections, as shown in Figure 2.2-2:

- West Section
- Central Section
- East Section

Additional documentation is provided in Appendix H (Alternatives Considered but Rejected).

### 2.3.2.1 West Section

The following alignments, listed from north to south, were rejected for the stated reasons (see Figure 2.2-2):

- **Lincoln Boulevard Alignment** – This alignment would begin at the Gravelly Lake Road interchange with I-5 (Exit 124). From the interchange, the alignment would proceed south along Lincoln Boulevard through McChord AFB, west of the McChord Golf Course. The alignment would continue south through Westcott Hills to 150th Street SW and then curve east to connect with the central section alignment in the vicinity of the BNSF railroad crossing.

This alignment would affect existing and future operations of McChord AFB. The location of the alignment and the interchange with I-5 are less desirable than other alignments connecting to the Thorne Lane interchange (Exit 123). Impacts to McChord AFB are related to the roadway alignment dividing an existing contiguous section of the base. This would create operational concerns, including possible schedule delays and security incidents. For these reasons, McChord AFB will not grant an easement for an expanded roadway through this area.

In addition, terminating the Cross-Base Highway at Gravelly Lake Drive rather than Thorne Lane is expected to substantially increase project cost. While the majority of Cross-Base Highway traffic is destined for areas within or north of Lakewood on I-5, approximately 20 percent of Cross-Base Highway traffic is destined to and from the south on I-5. The existing Gravelly Lake Drive interchange (Exit 124) currently has higher traffic volumes and would likely require directional flyover or loop ramps to accommodate the 2025 traffic volume projections with acceptable LOS. These ramps could add substantial cost to the overall project due to additional property acquisition and structural construction costs.

- **Northern Alignment-1** – This alignment would begin at the I-5 Thorne Lane interchange (Exit 123). The alignment would proceed in an easterly direction along 146th Street SW to avoid the Emerson Lake wetlands to the north. The route would curve in a northeast direction, then would proceed eastward along the south side of the McChord AFB/City of Lakewood boundary. The alignment would cross Woodbrook Road SW and continue east before curving south almost 90 degrees through the Westcott Hills area. As the alignment approaches 150th Street SW, it curves eastward on the north side of Lake Mondress to connect with the central section alignment beginning near the BNSF railroad crossing.

This alignment would cause McChord AFB's Military Radio Transmission Facility, located in the Westcott Hills, to be relocated. This facility is a necessary part of the military installation and could not be relocated without interfering with navigational aids and other nearby radio facilities. Because of these impacts, McChord AFB would not provide an easement for a new roadway through this area.

- **Northern Alignment-2** – This alignment would begin at the I-5 Thorne Lane interchange (Exit 123). The alignment would proceed in an easterly

direction to the north of 146th Street SW. The centerline of the new Cross-Base Highway would be located approximately 540 feet south of the McChord AFB boundary. Approximately 1,000 feet east of the Woodbrook Road SW intersection, the alignment would turn southeast, passing through Westcott Hills. East of Westcott Hills, the alignment would follow 150th Street SW around the north side of Lake Mondress, connecting with the central section alignment in the vicinity of the BNSF railroad crossing.

This alignment would displace McChord AFB's Military Radio Transmission Facility and was rejected for similar reasons to the Northern alignment-1.

- **Central Alignment** – This alignment would begin at the I-5 Thorne Lane interchange (Exit 123). It would follow a diagonal, southeasterly course across the American Lake Gardens residential area, joining 150th Street SW near Woodbrook Road SW. The alignment would continue east north of 150th Street SW past the north side of Lake Mondress and eventually curve to the southeast to connect with the central section alignment near the BNSF railroad crossing.

This alignment cuts diagonally through American Lake Gardens. The American Lake Gardens area is higher in minority populations than Pierce County as a whole. The area also has relatively more households near or at the established poverty level.

The Central alignment is not a reasonable alternative due to the high level of displacements compared to all other alternative alignments. More than 500 dwelling units, with more than 1,300 residents, would be displaced, with disproportionate impacts to minority populations. These impacts are contrary to Executive Order 12898 on environmental justice.

- **North of Lake Mondress Alignment** – Lake Mondress and its immediate surroundings provide habitat for wildlife. This alignment variation east of Woodbrook Road SW would curve to the north around the north end of Lake Mondress and connect back with the central section alignment near the BNSF railroad crossing. This northern alignment variation would avoid separating the Lake Mondress habitat from other contiguous undeveloped areas on Fort Lewis.

This alignment variation is not possible because it would have substantial impacts on existing facilities on McChord AFB. The Western Air Defense Sector Headquarters is located south of Lincoln Boulevard north of Perimeter Road. This facility provides early monitoring and early warning for air space along the west coast of North America, from Alaska to California. Part of the facility includes high-frequency antennas located near Lake Mondress. These antennas would be displaced by the northern alignment variation, and they could not be relocated without interfering with other communication facilities on McChord AFB. Because of these impacts, McChord AFB would not provide an easement through this area.

- **South Central Alignment** – The South Central alignment was evaluated in detail in the project's 1998 DEIS and would begin at the I-5 Thorne Lane interchange (Exit 123). The alignment would follow a southeasterly diagonal

course north of the Woodbrook Middle School ball field to the intersection of Spring Street SW and 146th Street SW. The alignment would then continue southeast, crossing 150th Street SW approximately 1,050 feet east of Spring Street SW, to the boundary of Fort Lewis. It would then pass south of Lake Mondress and continue east.

The alignment avoids impacts to Section 4(f) resources<sup>9</sup> but passes diagonally through the American Lake Gardens community. The South Central alignment would displace more than one-quarter of the households in American Lake Gardens and would have a disproportionate impact on minority populations in American Lake Gardens. In addition to the large number of displacements, the South Central alignment would effectively divide the American Lake Gardens community. The new roadway would prevent most social interaction between the northeast and southwest portions of the neighborhood. The South Central alignment would also have greater noise and visual impacts than the other alignments. These impacts are contrary to Executive Order 12898 on environmental justice.

Although the City of Lakewood's current comprehensive plan changes the land use designation of this area from residential to include light industrial, impacts of the proposed highway are evaluated based on existing conditions. Impacts to these populations make the South Central alignment imprudent; therefore, it is no longer being considered.

- **Equestrian Buffer Alignment** – This alignment variation would connect to other alignments near Woodbrook Road SW. The alignment veers to the south away from the Fort Lewis boundary and equestrian properties east of Woodbrook Road SW, creating a buffer area of approximately 75 acres on Fort Lewis between the proposed Cross-Base Highway and the City of Lakewood. This alignment could accommodate equestrian activities (with Fort Lewis's permission to ride on their property) and shift the highway away from the equestrian areas and adjacent residences south of 150th Street SW in American Lake Gardens.

The primary concern with this alignment is the separation of an additional 75 acres of Fort Lewis property north of the proposed highway. Fort Lewis also has long-term development plans for a portion of this area, as documented in the Industrial Complex Study Final Report, Fort Lewis, April 1994. This study identifies future development for military reserve organizations and other Department of Defense organizations with local or regional missions. Portions of this area are already developing in accordance

---

<sup>9</sup> Section 4(f) of the Department of Transportation Act of 1966, as amended (23 U.S.C. 138 and 49 U.S.C. 303) states that the Secretary of the U.S. Department of Transportation shall not approve any transportation program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance as determined by the federal, state, or local officials having jurisdiction thereof, or use of any land from a historic site of national, state, or local significance as determined by such officials unless: (1) there is no feasible and prudent alternative to the use of such land; and (2) such action includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use.

with the study plan. The Industrial Complex Master Plan would have to be completely revised to accommodate this alignment. Because of the impacts to existing and future operations, Fort Lewis would not grant an easement for this alignment.

In Resolution No. 1996-15, the City of Lakewood requested that the roadway east of Woodbrook Road SW be located as far south as possible within the 200-foot easement Fort Lewis has identified as available for the proposed roadway. This was intended to further mitigate impacts on the equestrian community and to develop a natural buffer strip on the north side of the proposed noise barrier. This request has been included in the Build Alternative to the extent possible, given Fort Lewis easement requirements.

- **New Interchange Alignment** – This alignment would require the construction of a new modified diamond interchange halfway between the existing Thorne Lane/East Tillicum (Exit 123) and Tillicum (Exit 122) interchanges. The interchange design would require a southbound to eastbound loop ramp in the southwest quadrant of the interchange to accommodate traffic volumes. Both of the existing interchanges would be eliminated with this alternative, although the structures crossing I-5 could remain.

From the new interchange, the Cross-Base Highway would proceed east through Fort Lewis property and connect with the other alignments in American Lake Gardens just south of the 150th Street SW/Murray Road SW intersection.

The new roadway would create a barrier between Fort Lewis property west of Murray Road SW and the rest of the installation. Fort Lewis has stated that this separation would not be acceptable and that an easement for a new roadway through this area would not be provided. In addition, the City of Lakewood has stated that the impacts of the new interchange are not acceptable to the community. Finally, the new interchange would require closure of two existing interchanges (Exit 122 and Exit 123) and would cause substantial disruption to local travel patterns. For these reasons, the alignment is not a reasonable alternative.

- **Exit 122 Alignment** – This alignment would be located entirely within Fort Lewis property through the existing Logistics Center. Expansion of the I-5/Jackson Avenue interchange (Exit 122) would be required. From the reconstructed interchange, the alignment would proceed east and south of Lake Mondress.

This alignment would sever access to Madigan Army Hospital, an important regional center providing medical care to military personnel and veterans throughout the Puget Sound. Further, the alignment would substantially disrupt operations at the Fort Lewis Logistics Center. For these reasons, Fort Lewis has stated that an easement for a new roadway connecting to Exit 122 would not be provided.

### **2.3.2.2 Central Section**

The following alignments, listed from north to south, were rejected:

- **Perimeter Road Alignment** – In mid-1999, representatives from the EPA met with staff from several resource agencies and proposed an alignment following Perimeter Road across McChord AFB, either on the surface or in a tunnel, and connecting to either Spanaway Loop Road or Military Road. In January 2000, after several meetings between agency staff, EPA formally requested that McChord AFB consider this alignment. McChord AFB responded in February 2000, stating that the new alignment was not acceptable for the long-term viability of the base and the need to maintain a secure facility.
- **Spanaway Loop Road Alignment** – The Tahoma Audubon organization proposed an alternative alignment in August 2001. The alignment is intended to avoid crossing Audubon Springs, a popular bird-watching location, and to reduce the amount of habitat fragmentation caused by the new roadway. The alternative alignment deviates from the proposed project near the west side of the McChord AFB runway departure clearance area and proceeds in an east-northeasterly direction to connect with Spanaway Loop Road at a new signalized intersection with the Cross-Base Highway. The intersection would require three southbound approach lanes on Spanaway Loop Road to improve the operational efficiency of the intersection: an exclusive westbound right-turn lane and two eastbound left-turn lanes. The Cross-Base Highway would then turn south and generally follow Spanaway Loop Road to 176th Street S and the same terminus at SR 7 as in the proposed alignment. The portion of this new alignment on Spanaway Loop Road would result in widening the roadway from three to five lanes to accommodate future traffic volumes on the Cross-Base Highway. Widening could occur directly on top of the existing roadway or to the side. The former option would impact residential access, while the latter would avoid the access impacts but would slightly increase impacts to wetland buffers.

This alignment was eliminated from further consideration because of its relatively greater impacts to (1) the environment, including more than 3.5 acres of wetland fill and more than 12 acres of wetland buffer impacts; (2) training operations at McChord AFB; and (3) neighborhoods in the area of the eastern terminus, including up to 239 displacements due to loss of access. The approximately 58 displacements west of Spanaway Loop Road could potentially be avoided by designing and constructing revised access; however, additional natural resource impacts would occur. The approximately 181 displacements east of the road could not be avoided without lowering design standards and highway performance. Technical memorandums summarizing these impacts are provided in Appendix H (Alternatives Considered but Rejected).

- **Runway Approach Zone Alignment** – This alignment is located 100 to 200 feet north of the proposed alignment directly south of the McChord AFB runway. The alignment is proposed to avoid oak and Douglas-fir trees that provide habitat for wildlife and are part of a large, contiguous area of habitat extending south through Fort Lewis. The alignment was rejected because it encroaches on the clear zone requirements for the proposed 5,000-foot southerly extension of the McChord AFB runway. Maintaining the potential for this runway relocation is vital to McChord's long-term base viability and

its ability to support changing mission requirements. A memorandum from Headquarters Air Mobility Command (November 6, 1997), as well as subsequent comments from McChord AFB on the 1998 DEIS and 2002 SDEIS, confirmed the U.S. Air Force's interest in maintaining the ability to relocate the runway to the south.

A tunnel option of this Runway Approach Zone alignment was also rejected because of cost and impacts to groundwater. In 1992, the cost for this tunnel was estimated to be \$50 million. A tunnel would also have substantial impacts to groundwater within the boundaries of the Central Pierce County Sole-Source Aquifer.

### **2.3.2.3 East Section**

The following alignment was rejected:

- **176th Street S Alignment** – East of McChord AFB, this alignment skirts the north side of Spanaway Marsh on private property, crossing Coffee Creek and proceeding east toward the current end of 176th Street S. The Cross-Base Highway would continue east from here within the existing 176th Street S roadway. Direct access from the Cross-Base Highway to existing residential properties north of 176th Street S would not be permitted. The existing north-south streets such as 8th Avenue Court S, Yakima Avenue S, Park Avenue S, and C Street would be terminated in cul-de-sacs north of the proposed Cross-Base Highway.

The 176th Street S alignment was rejected because of the substantial increase in residential displacements compared to the South of 176th Street S alignment. In addition, Fort Lewis has agreed to allow the alternative alignment south of 176th Street S to be implemented using up to 200 feet of their property for the new highway easement.

## **2.4. Alternatives Selected for Further Study**

### **2.4.1 No Build Alternative**

Under the No Build Alternative, the Cross-Base Highway would not be considered; however, other planned roadway improvements and TDM/TSM strategies would be implemented (see Section 2.2.2).

### **2.4.2 Build Alternatives**

The potential alignments considered fall into three sections:

- (1) A West Section beginning at I-5 and at the Thorne Lane interchange (Exit 123), including Tillicum and American Lake Gardens to the east end of American Lake Gardens.
- (2) A Central Section including the new interchange proposed near "A" Street, Lincoln Boulevard, the BNSF railroad crossing, the south approach zone on McChord AFB, and east to the existing portion of 176th Street S near the Spanaway Loop Road extension.

- (3) An East Section along the Fort Lewis easement south of the existing 176th Street S right-of-way to SR 7.

All Build Alternatives are subject to a number of physical and natural resource constraints such as safety clearances for the McChord AFB runway and the Ammunition Supply Point area on Fort Lewis, as well as several wetlands supporting important plant and animal species (see Figure 2.2-2).

Elements common to all Build Alternatives include the following:

- The new roadway would provide four through lanes.
- Access would be limited to three at-grade signalized intersections (two in American Lake Gardens and one at Spanaway Loop Road S extension) and an interchange at “A” Street providing access to McChord AFB and Fort Lewis.
- The Thorne Lane interchange would be reconstructed to accommodate additional traffic and would be relocated 300 feet southwest (1) to allow for future potential uses of rail corridor and vertical separation of rail and vehicular traffic, and (2) for overall constructibility of the interchange.
- To alleviate congestion on southbound I-5, a single-lane, one-way, southbound local access roadway would connect Gravelly Lake Drive to the Cross-Base Highway at Thorne Lane, eliminating the need for traffic eastbound from Lakewood to travel on southbound I-5.
- The intersection of 176th Street S and SR 7 would be enlarged with additional lanes for turning movements.
- On Fort Lewis, Lincoln Road would be realigned to connect with the new “A” Street interchange, and a new military access road between Fort Lewis and McChord AFB would be constructed on the east side of the BNSF railroad right-of-way or west of the new “A” Street interchange.
- An overcrossing structure of Cross-Base Highway over BNSF.

In addition, to provide security for both military facilities and to minimize wildlife mortality due to vehicles, special fencing would be installed along most of the highway:

- Where the roadway would be next to McChord AFB or Fort Lewis Military Reservation, the fencing, referred to in this document as the “security fence,” would meet military security requirements of 8 feet of chain link topped by barb wire (see Figure 4.6-13).
  - The security fence would be designed to prevent animals from reaching the roadway, with the bottom 6 feet of the fence faced with galvanized steel or a similar material. To meet military requirements, a 12-foot clearing would be maintained adjacent to the security fence.
  - In a few areas where the highway design accommodates small animal passage under the roadway, the bottom portion of the fencing would consist of an 8-inch grid that would allow small animals to pass, but would exclude humans (and other large animals).

- Other proposed fencing would include a 6-foot-high wildlife fence along the highway outside the military bases near Audubon Springs. This fence would be intended to prevent most animals from reaching the roadway, although deer could cross the fence.
- Other barriers to wildlife would include 12- to 14-foot-high noise barriers.

All of the barriers would extend 1 foot below the ground to prevent burrowing. The location of these barriers is depicted in Figure 4.6-14, and the barriers are described in detail in the *Wildlife, Fish, and Vegetation Discipline Report* (Appendix K in Volume 2).

#### **2.4.2.1 Western Section**

At the western terminus, all alignments would begin at the I-5 Thorne Lane interchange (Exit 123), which provides the only direct access point to I-5 from the Cross-Base Highway. To better serve traffic from the north and west and to ensure that the entire network operates efficiently, a new local southbound connector between Gravelly Lake Drive and Thorne Lane SW (Gravelly-Thorne Connector) and southbound ramp meters at four interchanges are proposed. These improvements, as well as those to the Thorne Lane interchange, apply to all Build Alternatives and are discussed below.

##### **Gravelly-Thorne Connector**

The Gravelly-Thorne Connector would be a single-lane, one-way, southbound road that would eliminate the need to travel on southbound I-5 (Figure 2.4-1). A non-motorized facility along the Gravelly-Thorne Connector will be considered during the detailed design phase of the Cross-Base Highway project. The connector would be located within BNSF’s right-of-way, between the BNSF tracks and the Tacoma Country and Golf Club (golf course). The connector would be approximately 6,120 feet long. A sewer dry line would be installed under the Gravelly-Thorne Connector to accommodate sewer service in American Lake Gardens in the future. The BNSF right-of-way extends 50 feet toward the golf course from the existing track centerline for the northerly two-thirds of the connector and widens to 100 feet for the southerly third of the connector (near the Ferrell Gas storage site). The southeast edge of the connector would be 30 to 80 feet from the existing track centerline, in the westerly 20 feet of right-of-way. This alignment would avoid existing golf course property and would respond to a number of current and future operational concerns raised by BNSF (see Appendix I, Rail Corridor Coordination). Addressing these concerns is critical for BNSF to relinquish its right-of-way for non-rail use. Key to BNSF’s decision process is the endorsement by WSDOT State Rail Office and Sound Transit for the non-rail usage, as noted in the Rail Corridor Coordination in Appendix I.

The Gravelly-Thorne Connector was one of several solutions developed and evaluated by a multi-agency review team established to review the I-5 access modifications at the Thorne Lane interchange. Agencies represented in this group included Pierce County, WSDOT, FHWA, McChord AFB, and the City of Lakewood. The Gravelly-Thorne Connector with the Thorne Lane interchange improvements and the related railroad grade separation (both described in Section 2.4.2.2 below) were determined to be the most appropriate solution to minimize

impacts to adjacent properties, traffic operations on southbound I-5, and future passenger and freight rail use of the BNSF right-of-way.

### **Ramp Meters**

In addition to the Gravelly-Thorne Connector, another tool for preventing degradation in the I-5 LOS is ramp metering. A ramp meter is a signal located on the on-ramp that regulates the flow of traffic accessing a highway.

Implementing a ramp meter involves reconfiguring the on-ramp to (1) add an HOV lane that bypasses the signal, and (2) provide an adequate queue for vehicles waiting at the signal. Ramp metering and HOV lanes on I-5 are part of the WSDOT system plan, and these improvements are part of the baseline for the Cross-Base Highway interchange analysis (WSDOT 1998a).

Metering would be used at the following interchanges on only the southbound on-ramps:

- Berkeley Street SW (Figure 2.4-2)
- Thorne Lane SW (Figure 2.4-3)
- Gravelly Lake Drive (Figure 2.4-4)
- Bridgeport Way (Figure 2.4-5)

The figures depict the additional lane(s) necessary to accommodate the ramp meters and HOV bypass. The signals would be located at the crossbar shown on the figures. The depicted length of the ramp meter lanes would accommodate the projected vehicle queue without backing traffic up onto local roadways.

### **2.4.2.2 West Section**

In the West Section of the corridor, the South, South A, and South B alignments were selected for detailed environmental review. All alignments would begin at the I-5 Thorne Lane interchange (Exit 123).

#### **Thorne Lane Interchange**

The I-5 interchange at Thorne Lane is proposed as a single-point urban interchange (SPUI) because the intersection LOS would be better, and the improvement cost would be lower than for a conventional diamond interchange design. This design would bring all left-turn movements together at one signalized intersection instead of two intersections with a more conventional diamond interchange design concept. Detailed information regarding future traffic volumes and operational analysis is summarized in the I-5/Thorne Lane Interchange Added Access Report (Pierce County 2002c). This report is an FHWA requirement for approval of a new or modified interchange on the Interstate Highway System.

The access improvements discussed in Section 2.4.2.1 also include modifying the design for and shifting the location of the Thorne Lane interchange. These changes are necessary (1) to allow for future potential uses of rail corridor and vertical separation of rail and vehicular traffic, and (2) for overall constructibility of the interchange.

Figure (11x17--must start on odd page)

2.4-1 Cross-Base Highway Gravelly-Thorne Connector

Figure 2.4-1 continued (11x17)

Figure

2.4-2 Cross-Base Highway Berkeley Street SW S.B. I-5 Ramp Metering

Figure

2.4-3 Cross-Base Highway Thorne Lane S.B. I-5 Ramp Metering

Figure

2.4-4 Cross-Base Highway Gravelly Lake Drive S.B. I-5 Ramp Metering

Figure

2.4-5 Cross-Base Highway Bridgeport Way S.B. I-5 Ramp Metering

The existing BNSF tracks are commonly referred to as the Nisqually bypass tracks and solely serve Fort Lewis on an infrequent basis—one to three times per week. Potential future uses were discussed with WSDOT and Sound Transit, as well as BNSF. Future uses include high-speed passenger rail and the potential for expanded commuter rail. Current plans show a single track serving the freight and passenger rail service needs, with provisions for a possible second track to the east of the existing BNSF track (see Appendix I, Rail Corridor Coordination). To avoid potential delays for vehicles on the Gravelly-Thorne Connector and associated traffic queues, the proposed interchange passes over the BNSF tracks, providing the necessary clearance for existing freight and future potential passenger rail use.

The practical implication of routing the highway over the rail is an expanded footprint for the connection with the Gravelly-Thorne Connector. The proposed interchange shifts 300 feet southwest from its existing location, thus (1) allowing the existing interchange to remain in use while the new interchange is constructed, and (2) avoiding impacts to the south corner of the golf course. Following construction, the old interchange and unused remainder of Murray Road SW and the existing at-grade BNSF track crossing would be removed.

The interchange structure also includes non-motorized facilities, consistent with the City of Lakewood Comprehensive Plan (City of Lakewood 2000a). Refer to Section 4.12.2.2, Land Use, for further discussion of consistency of the project with the Lakewood Comprehensive Plan. The non-motorized facilities would provide non-motorized access between American Lake Gardens and the Tillicum area, which is consistent with the City of Lakewood Comprehensive Plan (City of Lakewood 2000a).

Figures 2.4-6, 2.4-7, and 2.4-8 depict the Thorne Lane interchange for the South, South A, and South B alignments, respectively.

### **South Alignment**

The South alignment would begin at the I-5 Thorne Lane interchange (Exit 123). The alignment would proceed in a southerly direction between Murray Road SW and the Woodbrook Middle School property. This alignment passes through the American Lake South school, a site eligible for the National Register of Historic Places and a Section 4(f) resource. As the alignment continues south past 150th Street SW, it curves to the east to parallel the City of Lakewood/Fort Lewis property boundary. The alignment connects to the central section alignment west of Lake Mondress. Figure 2.4-9 shows the South alignment through American Lake Gardens.

Two signalized at-grade intersections would be implemented. A “T” intersection at Woodbrook Road SW would include an exclusive left-turn lane from eastbound Cross-Base Highway to northbound Woodbrook Road SW. The second intersection would be located near the existing intersection of Murray Road SW and 150th Street SW. The western leg of the intersection would provide access to Murray Road SW and the Fort Lewis Logistics Center gate, and the eastern leg would connect to 150th Street SW. Murray Road SW would remain a local access roadway providing access to the Clover Park Technical Institute Landscape Construction training facility and residences along Murray Road SW. This intersection would include

Figure

2.4-6 Cross-Base Highway Thorne Lane Interchange South Alignment

Figure

2.4-7 Cross-Base Highway Thorne Lane Interchange South A Alignment

Figure

2.4-8 Cross-Base Highway Thorne Lane Interchange South B Alignment

Figure

2.4-9 South Alignment and Intersections

exclusive left-turn lanes on the Cross-Base Highway in both directions and two-lane side street approaches to the intersection.

### **South A Alignment**

The South A alignment would begin at the I-5 Thorne Lane interchange (Exit 123). The alignment would proceed in a southerly direction, parallel to and slightly east of the South alignment. This alignment would avoid the American Lake South school but would pass through the west side of the recreation field associated with Woodbrook Middle School, a Section 4(f) resource. The alignment would then connect with the previously described South alignment just south of the Murray Road SW/150th Street SW intersection. Figure 2.4-10 shows the South A alignment through American Lake Gardens.

### **South B Alignment**

The South B alignment would begin at the I-5 Thorne Lane interchange (Exit 123). The alignment would proceed south running west of Murray Road SW on Fort Lewis property, through a portion of the Clover Park Technical College landscape construction training facility. The training facility has a 25-acre site leased from Fort Lewis. The roadway would require 2.6 acres of this area west of Murray Road SW. The alignment would then connect with the previously described South alignment just south of the Murray Road SW/150th Street SW intersection. The alignment would minimize impacts in the American Lake Gardens area and would avoid impacts to the American Lake South school site or Woodbrook Middle School recreation field, both Section 4(f) resources. Figure 2.4-11 shows the South B alignment through American Lake Gardens.

#### **2.4.2.3 Central Section**

One alignment is proposed through the central section (see Figure 2.2-2). Between Woodbrook Road SW and Spanaway Loop Road S, the highway would provide full access management. In this section, there would be no at-grade access across or to and from the highway.

### **Lake Mondress**

The alignment would proceed east on Fort Lewis property and then curve south to avoid Lake Mondress. Small animal passage would be provided around the south and west side of Lake Mondress by means of a 200-foot-long bridge spanning a naturally occurring low area with approximately 5 feet clearance (see Figure 4.6-14).

### **BNSF Overcrossing/"A" Street Interchange**

The proposed alignment would proceed southeast from the BNSF railroad overcrossing and would include a bridge structure crossing the BNSF railroad and a new "A" Street interchange (Figure 2.4-12) near the intersection of Perimeter Road.

The bridge structure crossing the BNSF railroad at "A" Street would have a minimum vertical clearance of 22.5 feet to allow for future passage of hi-cube double-stack rail cars. At "A" Street, a new conventional diamond interchange would be constructed with stop-sign-controlled ramp intersections. These

Figure

2.4-10 South A Alignment and Intersections

Figure

2.4-11 South B Alignment and Intersections

Figure

2.4-12 Cross-Base Highway BNSF Overcrossing and A Street Interchange

intersections would not require traffic signals in the future based on the year 2025 traffic volume forecasts and LOS analysis. The intersections are projected to operate at LOS C under stop-sign control. Traffic volumes would have to be monitored in the future to determine if and when traffic signals would be needed.

One of the conditions of the project required by Fort Lewis is to have unimpeded access for troop and supply movement between Fort Lewis and McChord AFB. The intent of this condition is to provide for the secure movement of troops and supplies without having to temporarily close the Cross-Base Highway to general civilian traffic. At present, Perimeter Road can be closed by the military, should the need arise. A number of alternatives to accomplish this goal were examined, including a grade-separated tunnel under the “A” Street interchange and a full cloverleaf interchange design with a separate center roadway for unimpeded troop and supply movement. The recommended solution for providing this connection is to construct a new two-lane roadway on the east side of the BNSF railroad from the Lincoln Road realignment on Fort Lewis to S Gate Street on McChord AFB. This roadway would cross under the same Cross-Base Highway structure at the BNSF railroad.

#### **Southern Approach Zone Through Spanaway Marsh**

As the alignment continues to the southeast south of the McChord AFB runway, alignment alternatives in this section are tightly constrained because of the existing natural features and military facilities in the area, such as clearance requirements from the Fort Lewis Ammunition Supply Point, McChord AFB runway, and several wetlands.

On the west side of the south approach zone on McChord AFB, a small depression would be crossed using a bridge instead of fill (see Figure 4.6-14). This would take advantage of the local topography to provide small animal passage under the roadway.

The proposed alignment would skirt the north side of Spanaway Marsh on private property, cross Coffee Creek, and pass to the south of the existing 176th Street S roadway on Fort Lewis property (see Figure 2.2-2).

Two bridges (one eastbound and one westbound) across Audubon Springs would be provided, each approximately 200 feet long. Space would be provided between the bridges to reduce shading of the area below. Coffee Creek would be crossed with a 20-foot-wide, open-bottom culvert (Figures 2.4-13 and 4.6-14). These bridges would provide the dual benefits of crossing over an environmentally important stream and creating an area for small animals to cross under the new Cross-Base Highway.

#### **2.4.2.4 East Section**

One alignment is proposed through the East Section (see Figure 2.4-14).

The existing 176th Street S would remain intact from west of 8th Avenue Court S to 4th Avenue S, providing access to residential properties north of 176th Street S. East of 4th Avenue S, the Cross-Base Highway alignment would turn north onto the existing 176th Street S alignment to intersect with SR 7 at an expanded intersection.

Figure

2.4-13 Proposed Bridge Over Audubon Springs Wetland and Culvert at Coffee Creek

In a separate and independent project, Pierce County is extending Spanaway Loop Road to reduce congestion and improve turning movements. This extension will begin near Spanaway Loop Road S west of 10th Avenue S and proceed south past the existing alignment of 176th Street S. The new roadway would then turn east on Fort Lewis property and proceed toward SR 7, merging with the existing 176th Street S just east of C Street. The east-west portion of this new roadway could also become part of the Cross-Base Highway.

Signalized, at-grade intersections would be constructed at the Spanaway Loop Road S extension and at SR 7 (Figure 2.4-14). The Spanaway Loop Road S intersection would include an eastbound exclusive left-turn lane on the Cross-Base Highway and a three-lane southbound approach to the intersection (two left-turn lanes and one right-turn lane). The existing SR 7/176th Street S intersection would become the eastern terminus of the Cross-Base Highway limited access highway and would be configured as follows:

- Northbound—two left-turn, one through, and one through/right-turn lane.
- Southbound—one left-turn, two through, and one right-turn lane.
- Eastbound—one left-turn, two through, and two right-turn lanes.
- Westbound—one left-turn, two through, and one right-turn lane.

## **2.5. Preferred Alternative**

The Cross-Base Highway lead agencies (Pierce County, WSDOT, and FHWA) have identified the South A alignment as the preferred alternative. This selection was made in consideration of public and agency comments received during environmental documentation, the potential impacts of each alignment as described in Chapters 4 and 5 of this document, and meetings and coordination with Clover Park School District, Fort Lewis, and the City of Lakewood.

### **2.5.1 Rationale**

Of the three remaining alignments, both the South and South A alignments directly affect recreational or historic resources that are protected by Section 4(f) of the 1966 Transportation Act (see Chapter 5). The South alignment would pass through the American Lake South School, which is eligible for the National Register of Historic Places. The South A alignment would pass through the west side of the recreation field associated with Woodbrook Middle School and used for a variety of community sporting activities. The Clover Park School District owns both the American Lake South School and the recreation field.

The South B alignment passes west of Murray Road SW on Fort Lewis property. However, Fort Lewis will not provide an easement for the new roadway in this area. Because military property cannot be acquired through condemnation, the South B alignment is not a feasible alternative. It is evaluated in this EIS because it avoids impacts to any Section 4(f) resources. FHWA is required to seek alternatives that avoid impact to Section 4(f) resources.

Figure

2.4-14 Cross-Base Highway Spanaway Loop Road, SR 7 Intersections,  
and New Cul-de-Sacs

While both the South and South A alignments affect Section 4(f) resources and a portion of American Lake Gardens, the South A has fewer, and more effectively mitigable, impacts. The recreational field can be relocated to an adjacent area, resulting in no net loss of recreational capacity. With the South alignment, the American Lake South School would be demolished or possibly moved to a new location. Moving the building would not provide complete mitigation, since part of its historical significance derives from the current setting. The South A alignment would also have fewer residential displacements (as shown in Section 4.14, Relocation) and would leave parcels along Murray Road SW intact.

The South A alignment would partially isolate residences and businesses along Murray Road SW from the rest of the American Lake Gardens community. Access for both vehicles and pedestrians would be at the 150th Street SW intersection. Noise barriers on the west edge of the right-of-way would mitigate noise impacts from the new roadway, but these 14-foot-high barriers would also emphasize the sense of separation from the rest of the community. The area along Murray Road SW would benefit from much lower traffic volumes since all through traffic would use the Cross-Base Highway. The area along Murray Road SW is designated for residential use in the Lakewood Comprehensive Plan, although existing businesses could continue to operate. A-1 Transmission and Woodbrook Honey, located on Murray Road SW, would have less drive-by traffic but would become visible to much higher traffic volumes using the Cross-Base Highway.

The American Lake South School is owned by the Clover Park School District and has been used for a variety of purposes. Currently the facility is used for the ReLife program run by Puget Sound Educational Service District. This service provides coordinated, multi-service programs for students, grades 6 through 9, with severe emotional and behavioral characteristics, referred by school districts. This service does not have direct ties to the local community. Access to the ReLife program by students is mostly by bus. Some use taxis, while others are driven in private cars. For the most part, each student's transport is considered an individual trip, which usually is a bus trip. The second service provided at the American Lake South School is the Lakewood Family Support and Resource Center. The center offers a variety of community support services and programs, including a safe house, food bank distribution, counselors, a community health nurse, and a summer recreational lunch program for disadvantaged youth who would otherwise get subsidized lunches at school while school is in session. In addition to these services, the center hosts a variety of community-based events. The center serves the American Lake Gardens and Tillicum neighborhoods and has close ties to both communities, although it is separated from Tillicum by I-5. The center is reached by car, bus, bike, and on foot, although there are no sidewalks in most of American Lake Gardens. The South A alignment would make pedestrian access to these programs circuitous from the eastern parts of American Lake Gardens and could reduce the perceived connection and integration with the community. The center would be located elsewhere in American Lake Gardens to maintain the community ties. No specific location has been identified; however, there are several properties that could be redeveloped for this purpose that would be more convenient to the American Lake Gardens community.

The partial isolation of the area along Murray Road SW would be reduced by providing a pedestrian overcrossing at 146th Street SW. This overcrossing would

allow residents along Murray Road to reach the northern portions of American Lake Gardens relatively easily and would complement the signalized pedestrian crossings at the 150th Street SW intersection. In addition, pedestrian access would be provided from the new cul-de-sac at the north end of Murray Road SW to connect with the sidewalk crossing the new Thorne Lane interchange. This connection would provide closer connection and access to the stores and community services available in the Tillicum area along Union Avenue.

Section 4.11.1.1 summarizes public outreach efforts.

## **2.6. Facility Design**

### **2.6.1 Design Standards**

The proposed Cross-Base Highway would be a four-lane limited access highway designed to WSDOT P-1 Principal Arterial standards between the proposed Woodbrook Road SW and Spanaway Loop Road S intersections. In the American Lake Gardens area between I-5 and Woodbrook Road SW and on the eastern end of the project area between Spanaway Loop Road S and SR 7, the highway would be designed to WSDOT P-6 Principal Arterial standards. Figure 2.6-1 shows the typical P-1 and P-6 highway sections. Improvements to local roadways within American Lake Gardens would be designed to City of Lakewood standards.

The P-6 Principal Arterial standard for special cases on the west and east ends of the corridor is appropriate to minimize impacts to existing residences and commercial businesses. The P-6 standard was used instead of the P-1 standard in these areas because of the need for at-grade signalized intersections in American Lake Gardens (two locations) and at Spanaway Loop Road (the P-1 standard requires grade-separation at all highway and railroad crossing locations). On the west end, there is a need to provide access to the American Lake Gardens area under all alternatives in at least two different places for emergency vehicle access and general accessibility. Because grade-separated interchanges at two locations in the American Lake Gardens area would result in much higher residential dwelling unit displacements, and because traffic volumes would not be high enough to warrant grade-separations, two at-grade intersections would be needed. Similarly, on the east end of the corridor, projected traffic volumes at both the Spanaway Loop Road S and SR 7 intersections would not warrant grade-separation.

The design speed for the proposed highway would be 70 miles per hour (mph), except for the west end of the corridor through American Lake Gardens and the east end near Spanaway Loop Road. For all alignments, the design speed would be 50 mph near the horizontal curve near 150th Street SW and near Spanaway Loop Road. Posted speeds will be 60 mph and 40 mph, respectively.

### **2.6.2 Right-of-Way Acquisition**

Approximately 80 percent of the rights-of-way would be provided as roadway easements by the U.S. Army Corps of Engineers after approval from Headquarters, U.S. Air Force, and Headquarters, U.S. Army. In American Lake Gardens, a number of private properties would have to be acquired for the Cross-Base Highway project to proceed. In this area, a roadway width of 150 feet would be needed to

Figure

2.6-1 Cross-Base Highway Principal Arterial Typical Sections

accommodate the WSDOT P-6 design standard for all Build Alternatives. For the remainder of the corridor, 200 feet of roadway would be needed to accommodate the WSDOT P-1 design standard for all Build Alternatives. Refer to the Social Elements and Relocation sections of this document (Chapter 4, Sections 4.11 and 4.14) for a discussion of the number of individual properties and dwelling units displaced by the project. Additional rights-of-way would be needed for interchanges, fill slopes, turning lanes at intersections, and stormwater treatment facilities.

### **2.6.3 Illumination**

Lighting for the new Cross-Base Highway would conform to WSDOT standards. Luminaries selected would direct light onto the highway and interchange areas, while minimizing light and glare intrusion outside of the roadway area. Lighting would likely be provided on the west (between I-5 and Woodbrook Road SW) and east (between Spanaway Loop Road S and SR 7) ends of the corridor and in the “A” Street interchange area.

### **2.6.4 Landscaping**

Opportunities for native vegetation planting would exist within the highway median area and outside the paved shoulder area. Vegetation would have to be carefully located to avoid placement in areas causing a traffic safety hazard, a sight distance obstruction, military aircraft clear zone intrusion, or military security issues.

### **2.6.5 Pedestrian and Bicycle Facilities**

Pierce County’s Non-motorized Transportation Plan recommends that a new bicycle/pedestrian trail be built along the Cross-Base Highway, and the roadway would be fenced through the military installations to maintain security. However, both Fort Lewis and McChord AFB are concerned that non-motorized travel facilities would create a security risk. Therefore, no bicycle lane or other designated facilities would be provided along the Cross-Base Highway. While not specifically consistent with the Pierce County Non-motorized Transportation Plan, the project would improve access. Bicyclists would not be prohibited from using highway shoulder areas, but no bicycle route signing or pavement markings would be used in these shoulder areas. By not prohibiting bicycle use of the roadway shoulders, the project compliments CTR programs at Fort Lewis and McChord AFB that encourage bicycle commuting to work.

The modified I-5/Thorne Lane interchange would include a pedestrian facility across I-5 and the BNSF railroad. This pedestrian facility would provide a connection between the American Lake Gardens and Tillicum neighborhoods in the City of Lakewood. In addition, a non-motorized trail along the Gravelly Thorne Connector would be considered during the detailed design phase of the project.

### **2.6.6 Construction**

#### **2.6.6.1 Phasing**

The Cross-Base Highway would likely be constructed in phases as funding becomes available for various project sections. Phasing may be necessary due to the sequence and timing of obtaining funding for the project. One possible phasing

sequence and some of the major construction issues and constraints are summarized below:

- The first phase of construction could be the eastern section between the Spanaway Loop Road S extension and SR 7. This section is the logical first phase of construction since Pierce County is currently moving ahead with design of the Spanaway Loop Road S extension. The Spanaway Loop Road S extension and connection to SR 7 has independent utility from the entire Cross-Base Highway and is needed, in part, to relieve traffic congestion on 174th Street S. Therefore, the Spanaway Loop Road S extension would be constructed even if the Cross-Base Highway is not constructed.
- The second phase of construction could be the western section in American Lake Gardens from I-5 to Woodbrook Road SW, regardless of which alignment is ultimately selected as the preferred alternative. By constructing a new interchange 300 feet southwest, traffic flow at the I-5/Thorne Lane interchange (Exit 123) and into the American Lake Gardens area will be maintained, which is important since this is the only access to the area from the west. Construction of the new Cross-Base Highway alignment could proceed concurrently or sequentially with the interchange improvements. Maintaining traffic flow into the American Lake Gardens area would be more of a challenge with concurrent construction. The Gravelly-Thorne Connector and I-5 ramp meters could also be constructed with the I-5/Thorne Lane interchange (Exit 123) improvements or after the main portion of the new roadway opens to future traffic volumes.
- The final construction phase could be the central section from Woodbrook Road SW to Spanaway Loop Road S, including construction of the “A” Street interchange, BNSF overcrossing, troop access road, and Lincoln Road realignment on Fort Lewis. This section could be separated into two phases if necessary, with the section from Woodbrook Road SW to the new “A” Street interchange constructed first. This would provide a new main access road to McChord AFB at the earliest possible date.

The total time required for construction would be a minimum of 3 years, if all phases were constructed concurrently. Otherwise, the project would probably take 7 years. Phase 1 is a 2-year project due to the time constraints for construction windows to avoid impacts to fish and wildlife. Phase 2 is a 3-year project to construct the new interchange, including bridges, under traffic and to maintain access to American Lake Gardens. Phase 3 is also a 3-year project due to the same time constraints as Phase 1.

The most cost-effective way to construct the project would be to divide it in four to five smaller contracts. This could result in lower overall costs since a larger number of contractors would qualify due to lower bonding requirements. The separate smaller contracts could include the following:

- The SPUI at I-5.
- The structure spanning the BNSF railroad, troop access road, and “A” Street, including the new diamond interchange and the Lincoln Road realignment.
- The roadway between I-5 and the BNSF railroad near “A” Street.

- The roadway between the “A” Street interchange area and SR 7 in Spanaway.

All structural work could be contracted separately, except for the structures crossing the Spanaway Marsh wetland areas. These structures would require a portion of the highway to be constructed for access to the area.

#### **2.6.6.2 Cost**

Compared to the No Build Alternative, the new roadway would provide an annual cost savings of approximately \$17,068,000 for peak-hour travel due to travel time and vehicle operating cost savings. The detailed discussion is found in the Transportation Discipline Report, Appendix G.

In the 2002 SDEIS, construction costs for the Cross-Base Highway, new Thorne Lane interchange, Gravelly-Thorne Connector, and I-5 ramp meters and HOV bypass lanes ranged from \$127.45 million for the South A alignment to \$125.45 million for the South alignment. These costs include all construction, traffic control, right-of-way, environmental mitigation, and contingency costs, as well as Washington State sales tax.

On July 10, 2002, Pierce County participated in a Scope, Cost, and Risk Evaluation (SCoRE) workshop conducted through WSDOT. The SCoRE process is a peer-level review that has been applied to a number of major transportation projects in the state of Washington. The objective of the process is to evaluate the cost estimates that have been prepared for proposed projects and to identify risk factors and associated costs that could significantly escalate the final project costs.

The factors that typically contribute to escalation of preliminary estimates are as follows:

- Elements missing from the preliminary scope and estimate.
- Delays and the related inflation costs.
- Other risks that could increase project costs.

The SCoRE team requested that the preliminary cost estimate that had been prepared by Pierce County in 2002 for the SDEIS be adjusted for inflation to 2003 dollars, which resulted in an estimate of \$131,340,000 for the South A Alignment. The team then reviewed the estimate and made minor adjustments to some unit cost items and scope elements. After these adjustments, the SCoRE team estimated the baseline cost of the project at \$131,990,000, very close to Pierce County’s estimate of \$131,340,000 (both in 2003 dollars).

The SCoRE team then applied risk factors to project elements that could increase costs, such as delays in constructing the project, or changes in design codes and environmental regulations. The result of applying these risk factors is a bell curve distribution of potential project cost in *future* dollars. For the Cross-Base Highway, the distribution ranged from approximately \$160 million to \$200 million. The mean (peak of the bell curve) was \$174.4 million. The impact of inflation was estimated at approximately \$30 million. The greatest risk factor was estimated to be implementation of a more stringent seismic design code, which could increase the cost of structures. Currently WSDOT determines if a structure is “critical or essential” and designs substructures to a higher performance standard when it is

determined to be critical or essential. Bridges designated as “other” are not designed to the higher standards. At the present time all new bridges are built to the “other” standards. The new seismic standards would result in new bridges being included in the “critical or essential” category and designed at the higher performance standard. The new seismic code was not adopted by ASSHTO and subsequently is not in use at WSDOT. Therefore the cost risk is negligible.

The process essentially confirmed the baseline cost estimate of approximately \$132 million in 2003 dollars and highlighted the significance of time delays to increased project costs.

The 2002 baseline cost estimate has subsequently been updated (see Table 2.6-1). The revised estimate is based on 2003 dollars, and mitigation cost estimates are updated to reflect current commitments in this FEIS. For example, the previous estimate included mitigation around Lake Mondress, which will not be allowed by McChord AFB. The amount of wildlife fencing has increased, as well. Other additions include a new pedestrian overcrossing in American Lake Gardens and the relocation of a community social services facility.

**Table 2.6-1. Preliminary Cost Estimates**

Section/Location	Cost in 2003 Millions of Dollars		
	South A Alignment	South Alignment	South B Alignment
<b>CONSTRUCTION<sup>1</sup></b>			
<b><u>West Section</u></b>			
Gravelly-Thorne Connector	4.40	4.40	4.40
New Interchange	33.93	32.83	33.27
Ramp Metering (3 Interchanges)	1.35	1.35	1.35
I-5 through American Lake Gardens	12.28	9.03	9.32
<b>Section Total</b>	<b>51.96</b>	<b>47.61</b>	<b>48.34</b>
<b><u>Central Section</u></b>			
American Lake Gardens to “A” Street	40.20	40.20	40.20
“A” Street to Spanaway Loop Road	19.57	19.57	19.57
<b>Section Total</b>	<b>59.77</b>	<b>59.77</b>	<b>59.77</b>
<b><u>East Section</u></b>			
Spanaway Loop Road to SR 7	3.87	3.87	3.87
<b>Section Total</b>	<b>3.87</b>	<b>3.87</b>	<b>3.87</b>
<b>SUBTOTAL</b>	<b>115.60</b>	<b>111.25</b>	<b>111.98</b>

**Table 2.6-1. Preliminary Cost Estimates (Continued)**

Section/Location	Cost in 2003 Millions of Dollars		
	South A Alignment	South Alignment	South B Alignment
<b>RIGHT-OF-WAY ACQUISITION</b>			
Gravelly-Thorne Connector	0.02	0.02	0.02
New Interchange (including Union Ave.)	0.11	0.11	0.11
American Lake Gardens	1.97	2.68	2.49
“A” Street to Spanaway Loop Road	0.20	0.20	0.20
Spanaway Loop Road to SR 7	0.22	0.22	0.22
<b>Subtotal</b>	<b>2.52</b>	<b>3.23</b>	<b>3.04</b>
<b>ENVIRONMENTAL MITIGATION</b>			
Offsite Habitat Mitigation Cost	3.54	3.54	3.54
Offsite Habitat Property Cost	7.33	7.33	7.33
Project Area Mitigation <sup>2</sup>	0.59	0.59	0.59
<b>Subtotal</b>	<b>11.46</b>	<b>11.46</b>	<b>11.46</b>
<b>TOTAL COSTS</b>	<b>129.58</b>	<b>125.94</b>	<b>126.48</b>

<sup>1</sup> All cost estimates are in 2003 dollars and include 10 percent for mobilization, 25 percent for contingencies, and 8.8 percent Washington State sales tax.

<sup>2</sup> Includes wetland mitigation at Thorne Lane, Spanaway Marsh, and Audubon Springs, as well as prairie habitat restoration in the Fort Lewis BNSF triangle. Does not include cost already imbedded in construction estimate, such as wildlife fencing. Associated property acquisition costs are included in the right-of-way acquisition estimates.