I-5 Transportation Alternatives Analysis and Traffic Operational Model

Executive Summary

September 2010

City of Lakewood

WSDOT

transpoGROUP

What is the I-5 Transportation Alternatives Analysis and Traffic Operations Model Project/Study?

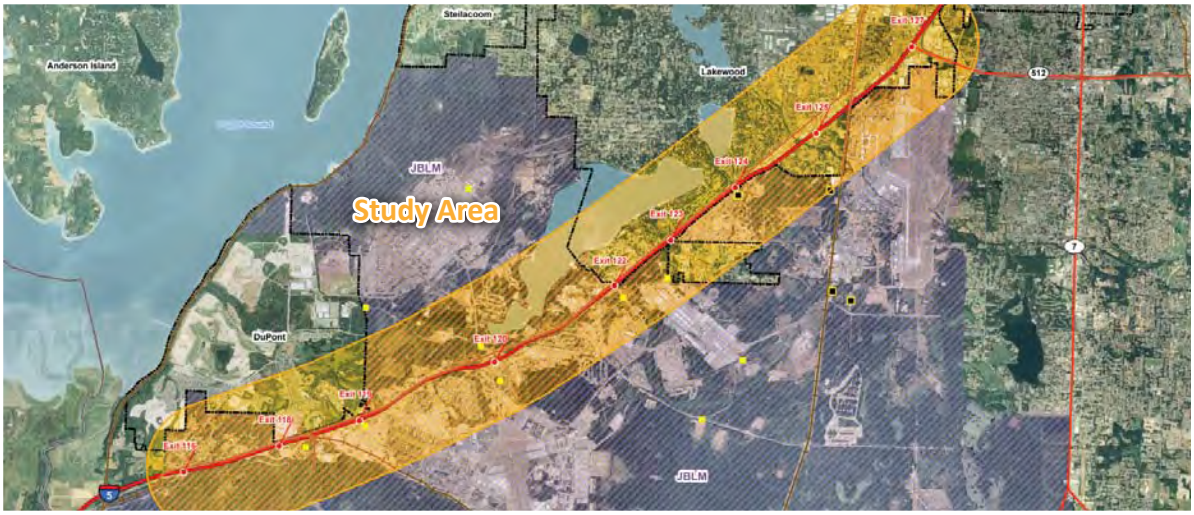
The City of Lakewood and Washington State Department of Transportation (WSDOT) partnered on this project supported with grant funding from the Office of Economic Adjustment (OEA) at the Department of Defense (DOD). The project is an evaluation of Interstate 5 (I-5) from Mounts Road to SR 512 in southern Pierce County, an approximately 11-mile segment of I-5. It includes the development of an operations model for I-5 and the adjacent arterial intersections to assess the potential impacts to I-5 and the local street system due to regional and Joint Base Lewis-McChord (JBLM) growth. The operations model is intended to evaluate impacts and long-term transportation improvement concepts for I-5 and the adjacent arterial intersections to support regional mobility needs, as well as providing improved access to JBLM. The alternative analysis included an evaluation of an integrated set of improvements to maintain safe, efficient and acceptable I-5 operations and address safety and current and future mobility deficiencies directly related to growth in the region and at the installation.

The recommendations from this project will be incorporated into a broader study of the growth impacts of the region and JBLM, otherwise referred to as the Growth Coordination Plan. The City of Lakewood is leading the Growth Coordination Plan, which identifies and analyzes community "gaps" that exist in the region in regards to accommodating anticipated growth at JBLM.

What is the Purpose of this Study?

I-5 is designated as a National Highway System (NHS) route and supports the United States strategic defense policy by providing access to JBLM and Camp Murray (home of the Washington National Guard, Washington Military Department, and the Washington State Emergency Management Center). I-5 also provides access to intermodal transportation facilities and accommodates interstate and interregional travel and is designated by the State Legislature as a Highway of Statewide Significance (HSS). Complicating the importance of this link is the lack of alternative north-south routes to facilitate regional and local travel. The topography of the area, combined with the presence of JBLM and Camp Murray make local travel difficult, with I-5 often serving as the only local connection.

Since 2003, Army restationing decisions have added more than 36,000 soldiers, family members and civilian employees to the population associated with JBLM. A majority of these new personnel reside in the local communities and daily commutes to/from the base along with local travel by this expanded population have added pressure to an already congested I-5 corridor and the interchanges that service the base and nearby communities. Increased travel demand through this section of I-5 from significant growth in Thurston and Pierce Counties has put severe strain on I-5 in this study corridor. Compounding the already congested corridor is the fact that the military-related growth exceeded the population projections developed by local jurisdictions. Further environmental documentation regarding military growth is being carried out by JBLM, but the analysis has not yet considered the I-5 corridor's operations.



The project evaluated I-5 from Mounts Road to SR 512 in southern Pierce County.

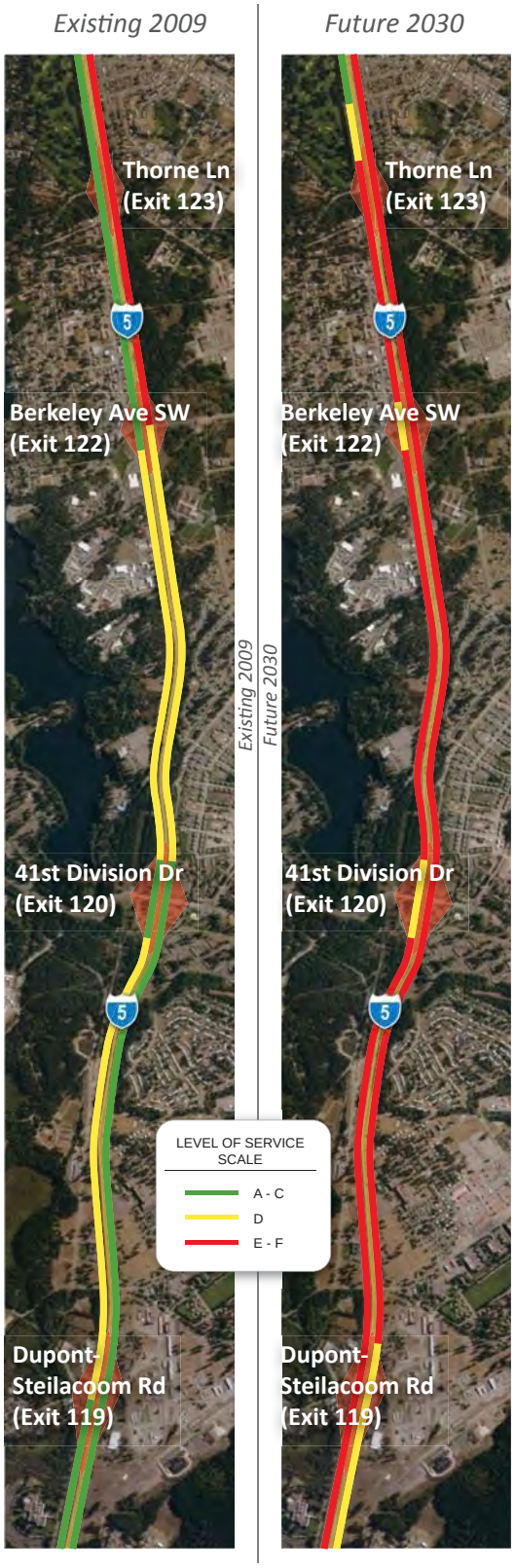
What Existing and Future Issues did the Study Identify and Address?

The analysis of existing and year 2030 conditions and identification of issues included a review of the baseline conditions as if no improvements were implemented. The analysis included an evaluation of traffic operations and general geometric constraints within the study area. Several of the key issues in this study include:

- I-5 is an important regional **freight corridor** where freight represents up to 15% of traffic in this section and is backbone of connectivity to the Port of Tacoma and Port of Seattle with global and local economic implications associated with increased freight delay.
- This section of I-5 serves as a key **commuter corridor** linking two of the fastest growing counties in the State of Washington and providing access to key employment centers.
- Traffic congestion on this section of I-5 occurs many hours of the day and is not just a weekday AM and PM peak hour phenomenon, and regional travel demands are increasing over the next 20 years.
- JBLM's primary mission is threatened by **increasing congestion and safety issues** on I-5.
- The Joint Base Lewis-McChord (JBLM) has seen significant growth in troop levels and activity and base activity is anticipated to grow further as JBLM also serves Veterans and other military personnel living throughout the Thurston and Pierce Counties.
- There is **very little transit and HOV** use along this corridor especially to/from JBLM.

Other specific operational and safety issues include:

- **Close intersection spacing and at-grade rail line crossings** at the I-5 ramp interchanges at Bridgeport Way, Thorne Lane, Berkeley Street, 41st Division Drive, and DuPont-Steilacoom Road.
- Additional safety and operational delays from the Point Defiance Bypass project that will reroute passenger rail service to the rail line that parallels I-5.
- Significant mainline congestion during PM peak hour periods at the Thorne Lane interchange due to the **choke point on I-5** from 4 lanes to 3 lanes.
- Poor circulation and frequent congestion in the Tillicum neighborhood due to the close proximity to the Berkeley Street interchange.
- Three of the four interchange structures serving as primary access to JBLM are considered **Structurally Deficient or Functionally Obsolete**.
- PM peak hour I-5 mainline and ramp congestion at the SR 512 interchange, northbound Gravelly Lake Drive off-ramp, and between the Berkeley Street northbound on-ramp and Thorne Lane off-ramp.
- AM peak hour congestion at the southbound I-5 off-ramp at Berkeley Street resulting from the general capacity of the interchange and access control at JBLM.
- **Poor out-bound JBLM operations** at Berkeley Street (to northbound I-5), DuPont gate/DuPont-Steilacoom Road (to southbound I-5), and Center Drive (to DuPont and southbound I-5).



What Existing and Future Issues did the Study Identify and Address? (continued)

JBLM generates 126,000 to 152,000 daily off-site vehicle trips. Approximately 80% of these trips use I-5 to access the installation.

- High incidence of rear-end and side swipe collisions due to frequent mainline congestion.
- Ingress/egress traffic from JBLM, as well as I-5 congestion impacts the speed and reliability of transit as well as the movement of freight.

Truck traffic currently accounts for 10 to 15 percent of the daily traffic along I-5, and as such, I-5 is classified as a T1 freight route meaning it carries more than 10 million tons of freight per year and provides primary access to the Ports of Tacoma, Olympia, and Seattle and has implications for local economic vitality.

Due to the congestion along the I-5 mainline as well as the operations at the interchanges themselves, transit speed and reliability along the corridor is expected to worsen in the future.

What Types of Improvements Were Considered?

ITS improvements can improve the efficiency of the existing system and have been identified as a high priority project along this segment of I-5 by WSDOT.

Through the screening process, multiple strategic geometric and system improvements at each of the four primary interchanges and the I-5 mainline were developed, evaluated and ultimately grouped to form three overall concept groupings. The following highlight the various types of improvements considered:

- **Intelligent Transportation System (ITS) Improvements** – Used to improve the efficiency of the system. Items include closed circuit cameras, variable message signs, and ramp meters.
- **Demand Management** – Used to reduce the demand of single occupant vehicle traffic. Strategies include vanpools, carpooling, and flexible work schedules.
- **Transit System Improvements** – Used to improve travel options for users along the corridor. Improvements could include expanded park-&-rides, more frequent bus service, and extension of commuter rail service.
- **Strategic I-5 Mainline Improvements** – Used to increase capacity on the I-5 corridor, such as new general purpose lanes, HOV lanes, and auxiliary lanes.
- **Parallel Corridor Improvements** – Used to reduce the demand and provide system redundancy for travel destined for I-5 by constructing or improving other parallel facilities, such as SR 507 or SR 7.
- **Interchange Widening/Reconfiguration** – Used to improve efficiency and better integrate I-5 and surface street operations along with serving ingress/egress movements from JBLM and/or capacity on the local arterial system. Alternative interchange configurations were considered including Single Point Urban Interchange and Diverging Diamond.

Transit strategies and facilities were evaluated as part of the improvement concepts.

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How were the Proposed Concepts Selected?

Three levels of screening were used to focus the study locations and identify improvements. The screening process was used to filter and refine improvements. The end result of the screening process was a group of preferred improvement concepts that will be carried forward in future environmental review and operational studies and for the required through the Federal Interchange Justification Report (IJR) and NEPA processes.

The project team worked closely with a Technical Review Committee (TRC) throughout the study process. The purpose of the TRC was to review basic analysis methodologies and evaluation criteria, and assist in developing key findings and recommendations. The TRC members included representatives from the surrounding jurisdictions, including JBLM. A three level screening process was used to identify and refine proposed improvement concepts. This process enabled broad participation in the development and refinement of concepts.

- **Level I Screening.** The study area included a total of nine interchanges, over ten miles of interstate freeway, numerous local arterials, and four primary military installation gates and access roads. This screening identified the locations in the study area with the greatest need of improvement and which are directly related to military operations and/or growth.
- **Level II Screening.** Typically a "fatal flaw" screening is conducted first; however the Level 1 screening process focused on refining the study area and did not evaluate actual improvement concepts. The Level 2 screening process utilized in this study was a relatively simple evaluation of "yes" or "no" to ascertain fatal flaws with any of the proposed interchange improvement concepts or system improvements within the refined study area.
- **Level III Screening.** The Level 3 screening evaluated the concept groupings, rather than focusing on individual interchange improvements. This required the preparation of preliminary engineering drawings and cost estimates for each of the concept groupings in order to evaluate each based on the categories and metrics identified for this evaluation process.

A defined screening process was used to refine the set of improvements.

Improvements were ultimately focused on four interchanges along I-5 after the completion of Level 1 screening.

What are the Proposed Concepts?

The proposed strategic capacity improvements include a set of integrated concepts along I-5 and at the four study area interchanges and are illustrated on the following pages. The improvements work hand-in-hand to improve regional mobility and safety along I-5, coupled with improved access to/from JBLM and the adjoining local communities. They are summarized by system or interchange improvement.

System Improvements:

- Construct ITS improvements along the corridor consistent with Tier 1 improvements identified in the 2007-2026 State Highway System Plan. These improvements include ramp metering at each interchange and driver information systems along the I-5 corridor.
- Construct northbound and southbound general purpose lane from Mounts Road to Thorne Lane.
- Construct southbound auxiliary lanes between the Berkeley Street and Thorne Lane interchanges. Construct braided ramps northbound between Berkeley Street and Thorne Lane interchanges.
- Construct northbound auxiliary lane between Thorne Lane and Gravelly Lake Drive.

Transit and Travel Demand Management Improvements:

In addition to the strategic capacity improvements, formulating successful public transportation and TDM strategies that are designed to service both military and civilian populations, on- and off-post, in a coordinated manner is a common challenge throughout the United States. The location of JBLM within the region, in combination with commute patterns, mean that several different agencies currently provide some type of bus or vanpool service to the area. Sound Transit, Pierce Transit and Intercity Transit service area on or near JBLM in the form of express buses, local routes, vanpools and park-and-ride lots. Whether it is a transit bus, a wheelchair equipped van, a taxi, a carpool, or a vanpool, there are challenges to providing access due to security requirements at JBLM gates. The types of improvements that will incremently improve the operations on/off the base and assist in reducing demand on I-5 include:

- Area transit agencies and JBLM creating a transit transfer center off-post but near one of the main gates at one of the re-built interchanges. This would allow personnel to walk through the base gates to board transit services on-post.
- Options such as providing preferential treatment for carpool and vanpool riders could also be explored or enhanced in combination with the interchange and I-5 improvements.
- For transit riders, a coordinated fare structure or pass system as well as a centralized billing function for passes or incentive program reimbursement can also help make transit more convenient.
- To create awareness of existing or potential services, the area's transit agencies, JBLM, and surrounding communities could coordinate to develop joint promotional materials to inform employees about the services that are available.

The location of JBLM within the region, in combination with commute patterns, mean that several different agencies currently provide some type of bus or vanpool service to the area.

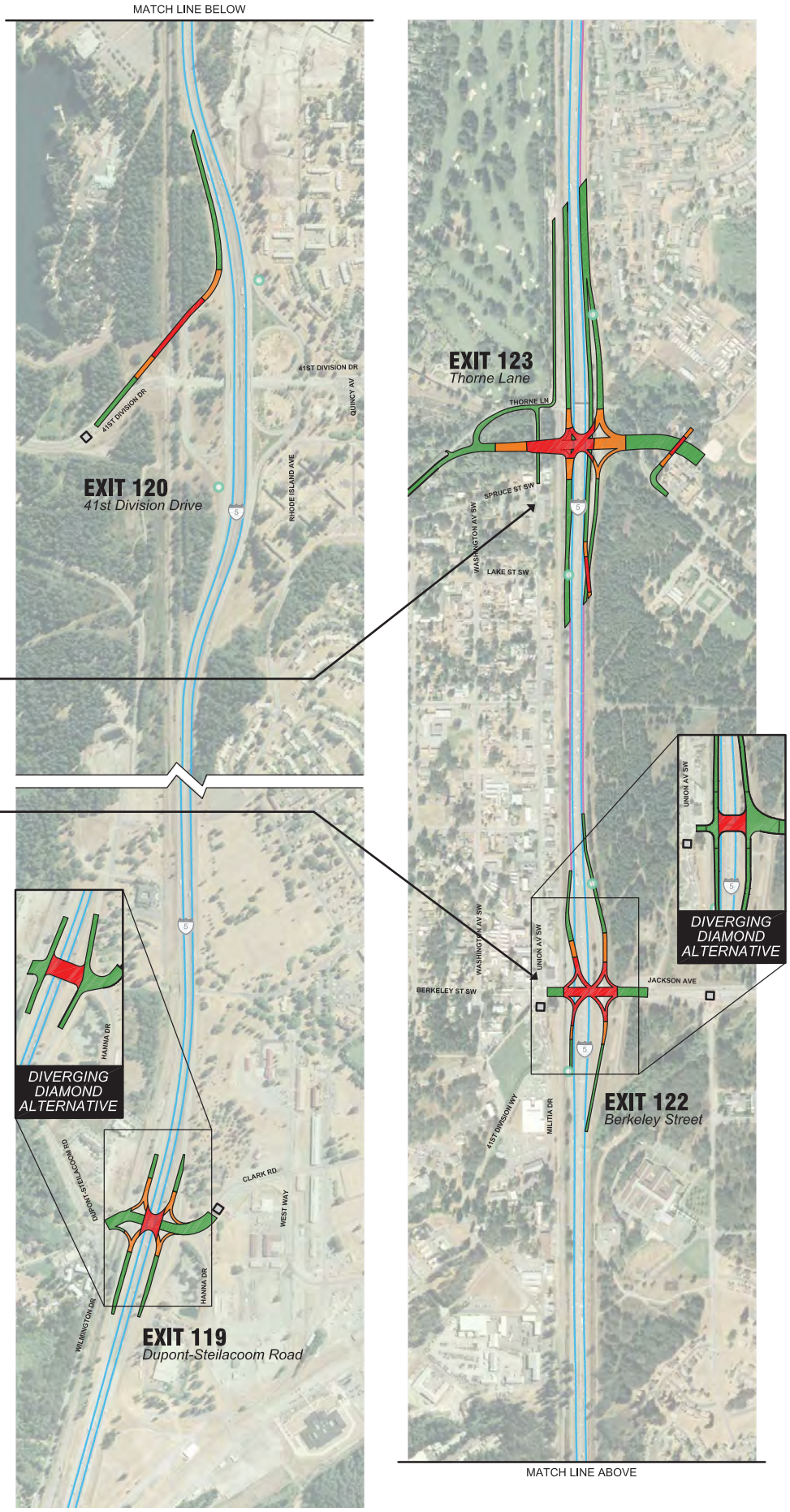
Long-term Improvement Concepts

41st Division Drive (Exit 120):
Provide grade separation for the southbound off-ramp to JBLM North access gate. In addition, due to the widening of I-5, it is anticipated that the clover leaf design on the east (JBLM Main) side of I-5 would be reconstructed.

Thorne Lane (Exit 123):
Construct single point urban interchange (SPUI) consistent with the Cross-Base Highway design plans.

Berkeley Street (Exit 122):
Construct a single point urban interchange or a diverging diamond interchange.

DuPont-Steilacoom Road (Exit 119):
Construct a single point urban interchange or a diverging diamond interchange.



LEGEND

- ARTERIAL BRIDGE
- ELEVATED RAMP
- SURFACE IMPROVEMENTS
- AUXILIARY LANE
- GENERAL PURPOSE LANE
- MILITARY ACCESS CONTROL POINT
- RAMP METER

How will the Improvements Benefit the Region and the Local Communities?

The list of improvements identified to be implemented by 2030 would provide the region and local communities with the following benefits:

Freight Mobility – Average travel speed along the I-5 corridor will be improved by up to 15 mph during peak congestion times, allowing freight to move more efficiently along the I-5 corridor.

Congestion – The amount of congestion experienced by the average motorist is expected to decrease by over 70 percent during the peak travel times, reducing the length of back-ups and stop and go traffic along the I-5 mainline.

Safety – Improved travel speed is expected to result in a reduction in the number of rear-end vehicle collisions which are typically caused by stop and go traffic. Rebuilding the interchanges will reduce vehicles queuing back onto the I-5 mainline.

Access – The interchange improvements allow for improved access to and from JBLM and the adjacent local communities by reducing the amount of congestion experienced by the average motorist by up to 85 percent.

Transit – The mainline improvements to I-5 provide up to 11 minutes in travel time savings for buses traveling between Pierce and Thurston Counties. In addition, transit stops and other facilities will be integrated into interchange designs to provide improved access to transit.

Pedestrian/Bicycle – All improvements at the interchanges will include facilities for pedestrian and bicycles, enhancing the non-motorized connections across the freeway.

Single Point Urban Interchange Concept

Diverging Diamond Interchange Concept

Joint Base Lewis-McChord

JBLM is one of the most highly requested bases by service men and women in the country due to its military opportunities, premier location in the backyard of Mount Rainier, and urban amenities in the south Puget Sound. The U.S. Army's I Corps is the primary unit on Fort Lewis, and the U.S. Air Force 62nd Airlift Wing is the primary unit on McChord Air Force Base. They join more than 30 different units from the Army, Air Force, Navy, Marine Corps, Reserve and National Guard, and Department of Defense agencies on the joint base.

In 2005, the Base Realignment and Closure Commission designated Fort Lewis and McChord Air Force Base as a joint base, one of 12 joint bases in the Department of Defense. On January 31, 2010 Joint Base Lewis-McChord became operational. When the transition period is completed on September 30, there will be one base with a common boundary, an Army joint base commander, an Air Force deputy commander, and base services managed and provided by the Army.

How Will the Improvements be Implemented?

The proposed improvement concept provides a long-term list of transportation mobility needs and investments along the I-5 corridor. Due to the need to secure additional funding and conduct environmental studies for the improvements, it is estimated that the identified improvements will be implemented over a time frame that is 10 to 15 years with immediate steps taken for implementation. The next step in the process is to complete an environmental analysis of the recommendations, along with an Interchange Justification Report (IJR), to satisfy both state and federal requirements. Once these further studies have been completed, further design of the improvements can occur.

The following steps are needed to implement the proposed improvements:

- **Step 1:** Update Regional Plans and State Highway System Plan (HSP)
- **Step 2:** Complete an Interchange Justification Report and Conduct an Environmental Analysis of Impacts
- **Step 3:** Prepare Final Design, Acquire Right-of-Way (if needed), Obtain Necessary Permits
- **Step 4:** Construct Improvements

Cost estimates for each of the various infrastructure improvement concepts were prepared after the schematic, 10% designs for the proposed concepts were developed. These planning level estimates included costs associated with new structures, new roadway, right-of-way, utilities, engineering and design fees, and a contingency.

Project Component	Estimated Cost*
DuPont Steilacoom Road Interchange	$22 to $72 million**
41st Division Drive Interchange	$16 million
Berkeley Street Interchange	$22 to $72 million**
Thorne Lane Interchange	$300 million (included in cross-base highway project)
I-5 Mainline Improvements (ITS, Auxillary Lanes, General Purpose Lanes)	$600 million

**Planning level costs only (2010 dollars)*
***Range of costs represent alternate interchange concepts as diverging diamond is less expensive due to reduced additional structure need*

Transportation Review Committee Participants

- Joint Base Lewis-McChord
- City of Lakewood
- Washington State Department of Transportation (WSDOT)
- Federal Highway Administration (FHWA)
- Puget Sound Regional Council (PSRC)
- Pierce County
- Thurston Regional Planning Council (TRPC)
- City of DuPont
- City of Lacey
- Camp Murray
- Nisqually Tribe
- Pierce Transit
- Sound Transit
- Clover Park School District
- Office of Congressman Norm Dicks

How Can I Find Out More Information on the Project?

The City of Lakewood is managing efforts, along with assistance from the WSDOT Urban Planning Office. The main contacts include:

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The following web sites provide more information about this specific project, along with more general information about the larger Growth Coordination Plan being prepared for JBLM.

WSDOT Project Web Site
http://www.wsdot.wa.gov/projects/i5/ftlewismcchordtransportation/

City of Lakewood Web Site
http://www.cityoflakewood.us/departments/economic-development/military-growth.html

JBLM Growth Coordination Plan Web Site
http://www.jblm-growth.com/

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