

Executive Summary

The SR 167 Corridor

State Route (SR) 167, also known as the Green River Valley Freeway, is an important 27-mile route that links south King County and north Pierce County to Interstate 405 (I-405). In conjunction with I-405 and SR 512, SR 167 is one of two north-south routes in the region and provides an alternative to I-5. SR 167 and the Green River Valley play an important role in the distribution and movement of freight since one third of the region's warehouses are located near the SR 167 Corridor.

Currently, SR 167 is a six-lane facility with two general-purpose (GP) lanes and one High Occupancy Vehicle (HOV) lane in each direction north of SR 18; and is a four-lane facility south of SR 18 with two general purpose lanes in each direction.

WSDOT Corridor Plans

Corridor Plans provide the Washington State Department of Transportation (WSDOT), along with other agencies and jurisdictions, a long-range vision of a state route.

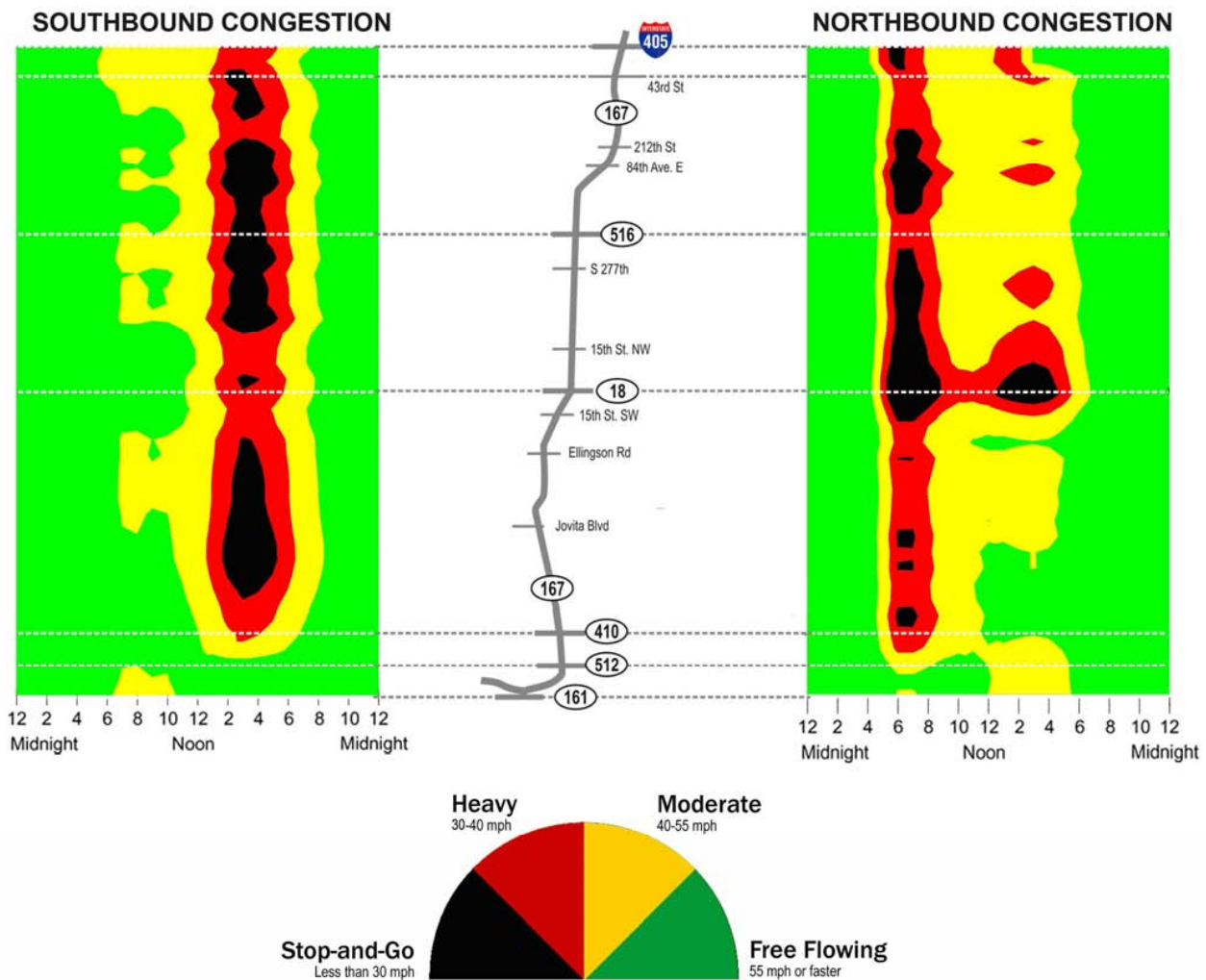
The SR 167 Corridor Plan outline and long-term improvement options were initially developed in 2003 (Phase 1) to provide the Regional Transportation Investment District (RTID), a series of projects and cost estimates that address congestion in this corridor, such as HOV access ramps, weave lanes, and additional general purpose lanes. In 2005, WSDOT and the local agencies worked together to complete this outline and refine the options. From these analyses, WSDOT has developed a list of projects, some of which were included on the RTID ballot measure put before Snohomish, King, and Pierce County voters in November 2007. The RTID ballot measure did not pass in the election. The improvement list is still valid although the measure failed.

Existing Traffic Conditions in the Corridor

In 2005, daily volumes ranged from 98,000 vehicle trips (117,000 person trips) south of SR 18 to 127,000 vehicle trips (153,000 person trips) near SR 516. Traffic flow on SR 167 is highly directional with peak flows northbound in the morning and southbound in the afternoon.

Exhibit i-1 illustrates typical 2005 congestion in the general purpose lanes over a 24-hour weekday period. Southbound traffic congestion is illustrated on the left and northbound on the right. Congestion commonly occurs at the major ramps and interchanges, as queues form due to sheer volume. The Puget Sound Regional Council’s (PSRC) traffic forecast model

Exhibit i-1
Typical Congestion along the SR 167 Corridor (2005 Volumes)



Source: Perteet

estimates that by 2030 SR 167 could carry up to 156,000 vehicles per day. This includes over 190,000 person trips. Currently, SR 167 experiences up to six hours of congestion a day. If no investments are made by 2030 (beyond currently funded projects) the computer model forecasts indicate that the travel time on the entire length of the corridor could jump from an average of 39 minutes to as much as one hour and 29 minutes during peak hours.

Options Analyzed for the SR 167 Corridor Planning Process

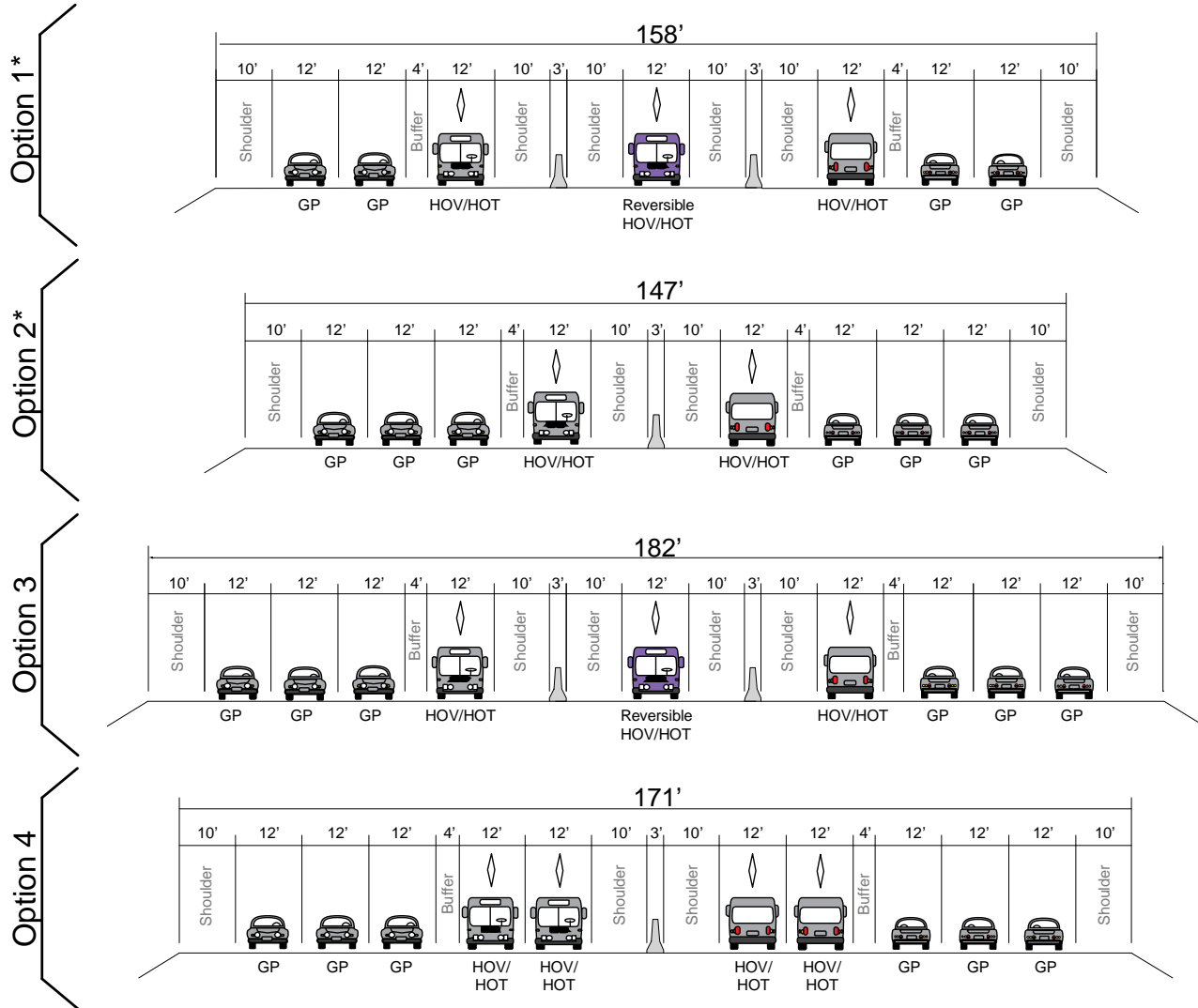
To address the forecasted demand several corridor options were considered.

- Option 1:** Expand the SR 167 Corridor to seven lanes, including one HOV/HOT lane and two general purpose lanes in each direction and one reversible HOV/HOT lane.
- Option 2:** Expand the SR 167 Corridor to eight lanes, including three general purpose lanes and one HOV/HOT lane in each direction.
- Option 3:** Expand the SR 167 Corridor to nine lanes, including one HOV/HOT lane and three general purpose lanes in each direction and one reversible HOV/HOT lane.
- Option 4:** Expand the SR 167 Corridor to 10 lanes, including three general purpose lanes and two HOV/HOT lanes in each direction.

Currently Funded Projects on SR 167:

- Add a southbound auxiliary lane from I-405 to 43rd Street.
Construction: 2008
- Extend the southbound HOT lane from S 277th Street to 8th Street E.
Construction: 2012-2014

Exhibit i-2
Corridor Options



* One additional 12-foot wide auxiliary lane in each direction from I-405 to S 180th Street and SR 516 to S 277th Street not shown.

Option 2A: Option 2 except with two general purpose lanes and two HOV/HOT lanes in each direction north of SR 18 and two general purpose lanes and one HOV/HOT lane in each direction south of SR 18.

Option 4A: Option 4 except with 10 lanes north of SR 18 and 8 lanes south of SR 18. Two HOV/HOT lanes in each direction are provided through the entire corridor.

Transportation Demand Management (TDM) and transit improvements are included in the model that forecasts future traffic conditions for each of these options.

Level of Analysis

To reach a recommendation that was based on effectiveness, benefits, and safety improvements, several levels of analysis and screening were conducted for the long-term options and bottleneck/segment options. The information on the overall goal, criteria, existing conditions, and analyses are contained in eight technical memorandums, which are located in Appendix D of this report.

To accommodate the projected travel demand on SR 167, the corridor planning team evaluated the options above. In order to determine the level of benefits and what would be the most cost-effective option, WSDOT used several tools. Transportation modeling was done for each scenario to determine the congestion relief benefits. Cost estimates developed for each scenario underwent a combination of Cost Estimate Validation Process (CEVP[®]) and engineering interpolation to better quantify costs. The results of the transportation modeling analysis indicate a need for 10 lanes north of SR 18 and eight south of SR 18. However, the competition for limited funds, the high costs of stormwater and wetland mitigation, possible liquefaction mitigation, and the need to rebuild most interchanges, makes the cost of expanding to a 10-lane/8-lane configuration unlikely by 2030.

SR 167 Technical Memorandums	
No. 1:	Goals and Objectives
No. 2:	Improvement Options Screening Criteria
No. 3:	Existing Conditions
No. 4:	Existing Traffic Operations
No. 5:	Corridor Improvement Options
No. 6:	Future Travel Demand Travel Operations
No. 7:	Evaluation and Final Screening of SR 167 Corridor Options
No. 8:	Public Involvement Summary

WSDOT must balance the need to address current and future travel demand with the amount of funding that can be reasonably assumed between now and the year 2030. Additional funding will be essential to meet the necessary improvements outlined in the 2030 vision because RTID failed.

The Recommended 2030 Vision

The final recommendation is a modified version of Option 2. The analyses indicate that the extreme costs of Options 4 and 4A outweigh the benefits (improved travel time). While Options 2 and 2A cost less, they too carry a large price tag in comparison to current funding levels. Based on these factors an Option 2 Modified, which is based on Option 2 and the Baseline considerations, was determined to be the most cost-effective and beneficial option for the SR 167 Corridor through the year 2030. **Option 2 Modified** allows for expanding capacity, maintaining the efficiencies of the HOV/HOT lane system, and minimizing the impacts to natural resources in the SR 167 Corridor.

The long-term 2030 recommendation is:

Option 2 Modified

North of SR 18:

Eight-lane configuration between I-405 and SR 18, which includes one HOV/HOT lane in each direction.

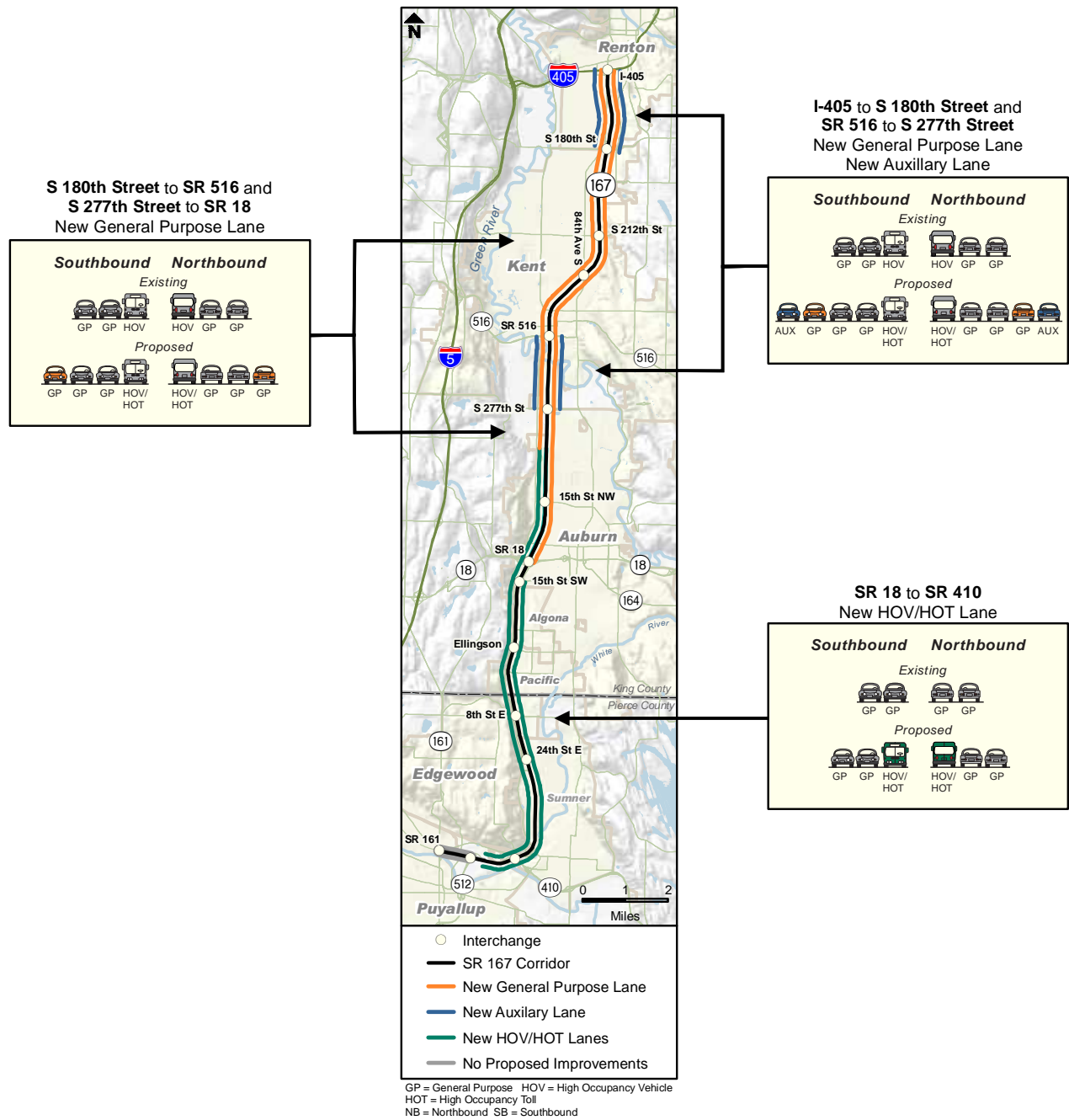
South of SR 18:

Six-lane configuration between SR 18 and SR 512, which includes one HOV/HOT lane in each direction.

Additionally:

Additional northbound and southbound auxiliary lanes between I-405 and S 180th Street, as well as between SR 516 and S 277th Street.

Exhibit i-3
Option 2 Modified: Conceptual Design



This recommendation addresses some of the future travel demand without triggering the costly expense of retrofitting, widening, or replacing most bridges and interchanges. To accommodate capacity expansion beyond the year 2030, consideration should be given to an ultimate footprint of 10

lanes by preserving right-of-way for interchange improvements; and, if and when bridges are replaced, they should be built to accommodate a 10-lane footprint, plus auxiliary lanes where recommended.

It is important to note the analysis found that travel demand in the corridor based on future population, employment, and freight movement growth in the Green River Valley would overwhelm any capacity improvements that could reasonably be assumed to be implemented by 2030. Therefore, in addition to providing the **Option 2 Modified** lane improvements, increased transit service and Transportation Demand Management (TDM) measures will be necessary.

No Improvement Scenario:

The **No Improvement** (No Build) Scenario assumes that no SR 167 projects will be constructed beyond those currently funded:

- Add a southbound auxiliary lane from I-405 to 43rd Street.
Construction: 2008
- Extend the southbound HOT lane from S 277th Street to 8th Street E.
Construction: 2012-2014

The TDM programs will need to be a coordinated effort between WSDOT, Sound Transit, and the local jurisdictions, which will encourage the shift from automobile to heavier use of rail and transit along the corridor. There is a great opportunity for this along the SR 167 Corridor, as the core Urban Centers of Renton, Kent, Auburn, Sumner, and Puyallup all have light rail stations and will continue to develop transit oriented development (TOD) that encourages high-density and less automobile usage.

Additional express and local transit services, and other strategies that provide alternative mobility options in support of rail, transit, and urban centers, should be the focus of the Corridor TDM strategies.

The January 2007 CEVP[®] cost (and updated in 2008) for adding one additional lane in each direction was \$1.4 billion to \$2.0 billion. This estimate range reflects the rising costs associated with highway construction, as well as the unique geologic features prevalent within the SR 167 corridor. These include significant challenges which reflect not only the rising costs of construction but, because of the Green River Valley's geologic conditions, projects on SR 167 face significant challenges with stormwater, wetland, and possibly liquefaction issues that could require expensive mitigation measures (see *Technical Memorandum 3 – Existing Conditions*, in Appendix D).

Growth in travel along the corridor will continue to overwhelm SR 167 even with additional lanes. Conditions on SR 167 and its surrounding streets will be worse without the recommended improvements.

What are the Forecasted Travel Conditions?

Exhibit i-4 provides the results of the Year 2030 traffic model for **Option 2 Modified**, illustrated in a “thermal scan” of the congestion that will likely occur in the general purpose lanes during a typical weekday 24-hour period. This is compared to the Year 2030 **No Build** option “thermal scan”.

Southbound SR 167

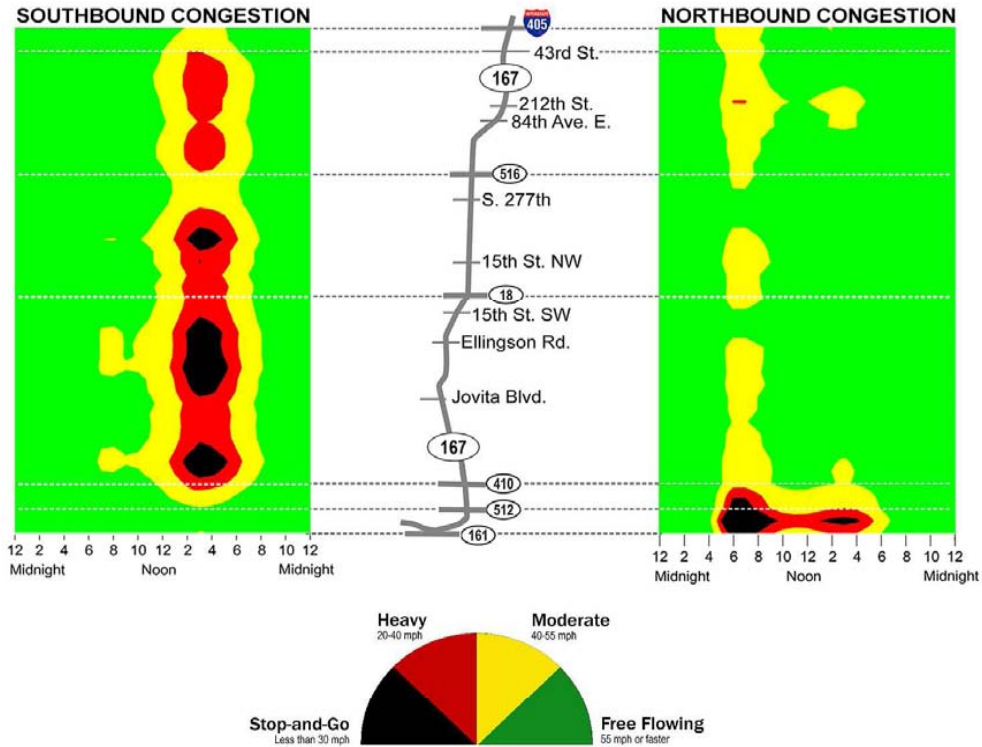
During the afternoon peak commute period, **Option 2 Modified** shows significantly less congestion both in terms of time duration and the physical extent of the congestion. Average travel speeds are more than twice those projected for the Year 2030 **No Build** option. Southbound SR 167 would operate at free-flow speeds during the morning peak hours through the entire corridor.

The “thermal scan” illustrates a small area of black, which represents “stop-and-go” traffic, just south of the S 277th Street interchange on-ramps and north of the 15th Street NW off-ramps. Similar “stop-and-go” areas are illustrated between the Ellingson Road and the Jovita Boulevard / 8th Street E interchanges, as well as between the 24th Street E and the SR 410 interchanges. These congestion areas are a result of the traffic weaving between the stream of on-ramp vehicles merging onto SR 167 at one interchange and the stream of mainline vehicles preparing to exit at the next interchange. An auxiliary lane between the on- and off-ramps at these interchanges could reduce the congestion even further.

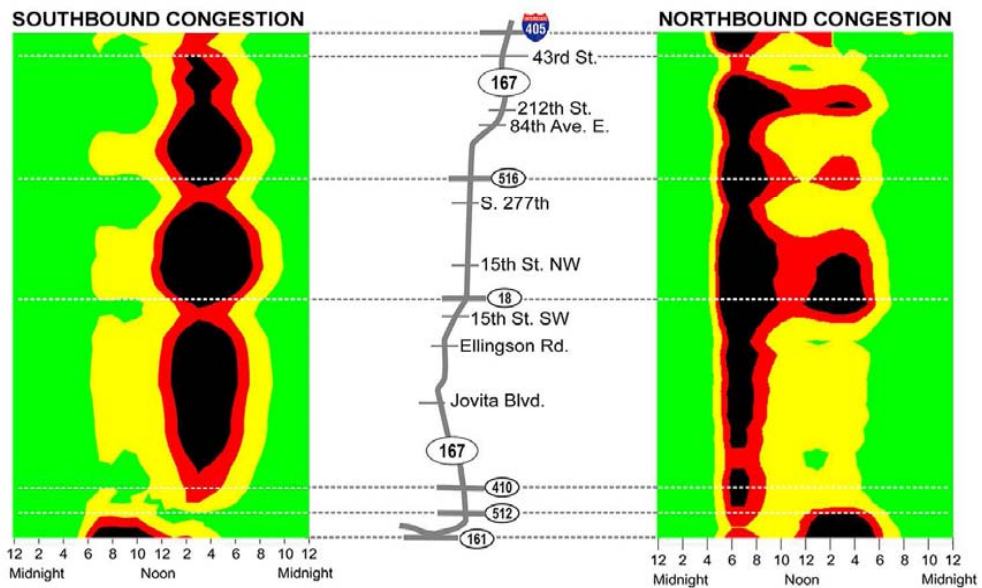
In the future, as funding for various phases of SR 167 improvements becomes available, WSDOT will analyze the exact needs for these additional auxiliary lanes.

Exhibit i-4
Option 2 Modified Year 2030 Traffic Conditions

Weekday Traffic in the SR 167 Corridor with Option 2 Modified (Projection for the Year 2030)



Weekday Traffic in the SR 167 Corridor with No Improvements (Projection for the Year 2030)



Source: Perteet

It is important to note that the reduction from four southbound lanes to three at the SR 18 interchange area would produce congestion from Jovita Boulevard to Ellingson Road for three hours in the afternoon. This congestion could be relieved with an auxiliary lane between these interchanges. This is a significant improvement over the six hours of congestion this area would experience in the No Build condition. These results indicate the preferred option significantly reduces congestion, which further emphasizes that **Option 2 Modified** is the appropriate recommendation for this corridor.

Northbound SR 167

With the assumption that the SR 167 extension to the Port of Tacoma will be built by the Year 2030, there will be more traffic through the SR 161, SR 512, and SR 410 interchanges. This contributes to the “stop-and-go” traffic conditions during the morning peak commute period. Other interchange improvements, such as those illustrated in Section 9, could be considered to reduce this congestion. The remainder of the northbound SR 167 corridor would operate at travel speeds in the range of 40 mph to 60 mph during the morning and afternoon peak commute periods, which is a significant improvement as compared to the existing conditions and to the Year 2030 No Improvement (No Build) option.

A minor slowing of traffic is expected as northbound SR 167 approaches I-405. The resulting traffic conditions would still be significantly better than current conditions, mainly due to the I-405/SR 167 HOV-to-HOV direct-connection ramps that are assumed to be built by the Year 2030.

Though the southbound traffic is the peak direction of travel during the afternoon peak hours, there would still be some “stop-and-go” congestion at the SR 161, SR 512, and SR 410 interchanges due to their close proximity to each other. The small black area in the “thermal scan” between 2 p.m. and 4 p.m. on northbound SR 167 is a result of the significant west-to-east commuter-traffic volume that travels from northbound SR 512 onto SR 167 and then immediately exits to eastbound SR 410.

What Are The Low Cost Improvements That Should Be Implemented?

Balancing short and long-term improvement options is important for planning, however, it is also important to identify short-term, lower cost improvements due to the limitations imposed by the reduced transportation revenue.

While this document lays out a phasing plan for strategically adding capacity to SR 167, there are also lower cost improvements that can be made to improve mobility. These improvements also have the advantage of being easier to construct with much less resultant construction related traffic congestion. Strong consideration should be given to implementing the lower cost improvements as a first order of work.

- Install Intelligent Transportation System (ITS) infrastructure including traffic cameras, data loop stations and variable message signs where they do not currently exist and implement Active Traffic Management (ATM) Strategies throughout the SR 167 corridor. South of SR 18, the corridor lacks the ITS infrastructure needed to provide drivers with information about congestion, incidents and other factors that will help them make informed decisions regarding travel on SR 167. In addition to providing drivers with timely travel information, ATM strategies take the use of technology a step further. Gantries are placed over the roadway at regular intervals in order to manage speeds and lane changes to help reduce the number of collisions that tend to occur on congested highway facilities. Collisions account for a significant amount of the congestion experienced on the highway system. Reducing the number of collisions not only improves safety, it also reduces traffic congestion. The planning level cost estimate to install the ITS and ATM infrastructure from Puyallup to Renton is \$152 million.
- Add ramp meters to on-ramps at interchanges where they do not currently exist. Ramp meters help smooth freeway traffic and ease congestion during times of heavy travel

demand. Ramp meters are traffic signals at freeway on-ramps used to improve traffic flow and safety by staggering vehicles as they merge onto the freeway. The on-ramps south of SR 18 are not currently metered. The average cost to install a ramp meter is \$1.5 million each. The following eight interchange on-ramps are not currently metered (for a total cost of approximately \$12 million for all):

- 15th Street SW (northbound only)
- Ellingson Road (north and southbound)
- 8th Street E (north and southbound)
- 24th Street E (north and southbound)
- SR 161 (northbound only)

In addition to the ramp meters themselves, each location should be evaluated during project development to determine if HOV bypass lanes are needed in association with the ramp meter. This determination will depend largely on the number of transit/HOV vehicles that use the on-ramp at the time of the evaluation. By-pass lanes can cost \$1 to \$6 million each, depending on the location and existing natural and built environment. Most of the ramps along the SR 167 corridor have not warranted HOV by-pass lanes. The following eleven interchange on-ramps do not currently have HOV by-pass lanes (for a total cost of approximately \$19 to \$66 million for all):

- S 212th Street (northbound only)
 - 15th Street SW (north and both southbound)
 - Ellingson Road (north and southbound)
 - 8th Street E (north and southbound)
 - 24th Street E (north and southbound)
 - SR 161 (northbound only)
- There are two off-ramp termini that meet signal warrants but remain stop controlled (stop sign rather than traffic signal) intersections. At these locations, traffic operations could be improved with the installation of a traffic signal. A traffic signal generally costs approximately \$250,000 each. The following locations should be considered for traffic signal installation:

- 8th Street E (southbound)
 - Ellingson Road (southbound)
- Continue to monitor and refine the traffic signal timing on the major arterial streets that both parallel and cross SR 167. While Section 3 of this document indicates the signals on all major arterials have been coordinated, this is a condition that needs to be regularly monitored and adjusted to make certain optimal signal timing is maintained.
- Consider the advanced development of wetland impact mitigation sites. Wetlands exist all along the SR 167 corridor (See Section 6). Any capacity expansion project we choose to undertake is likely to disrupt a wetland in some way. Identifying locations for new wetland establishment and, at a minimum, purchasing the needed right of way will help save dollars in the future. As real estate increases in value over time, securing the property needed for wetland mitigation sites well in advance of construction will reduce the amount of investment needed in the future.