3.7 Energy

Potential impacts from the proposed SR 167 highway extension improvements would primarily affect petroleum fuel resources. During construction, various types of petroleum would be consumed in the manufacturing of construction supplies and materials and in the operation of construction equipment. Following construction, individual vehicles using the new freeway would consume energy resources. Annual maintenance activities would also consume energy.

The Tier 1 NEPA process estimated that once built the proposed SR 167 highway extension would reduce fuel consumption by approximately five percent relative to the No Build Alternative. Reduced fuel consumption would be expected to benefit air quality in the project area.

The current conditions of SR 167 affect energy consumption, especially during peak hour traffic conditions. Primary factors increasing energy consumption include increased traffic volumes, decreased vehicle speed and increased number of stops during heavy traffic periods. Vehicles use more fuel under these conditions than under free-flow conditions at moderate speeds. The new route would be shorter to the Port of Tacoma and destinations to the north reducing travel distances for some vehicles. All of these factors result in greater fuel efficiency and offer potential long-term benefits compared to the No Build Alternative.

3.7.1 Studies Performed and Coordination Conducted

This section incorporates information compiled in the *Energy Discipline Report* for the SR 167 Tier II EIS (Washington State Department of Transportation [WSDOT] 2001). WSDOT evaluated two procedures for calculating fuel consumption. One procedure is quantitative and is based on the Federal Highway Administration (FHWA) publication *Procedure for Estimating Highway User Costs, Fuel Consumption and Air Pollution* (FHWA 1980). This procedure uses uniform speeds, stopping, speed reductions and idling of vehicles to compute fuel consumption. The FHWA procedure has not been updated in over 20 years and its energy use predictions are no more accurate than using a qualitative procedure. The procedure does not accurately account for the improved fuel efficiency of modern cars and trucks. For these reasons, WSDOT decided to use a qualitative analysis in the discipline report for this project.

Fuel efficiency is mainly dependent on type and efficiency of vehicle, miles traveled, average speed, and number of slowdowns and stops. The study assumes that the type and efficiency of vehicles using SR 167 would be similar for the Build and No Build Alternatives. Vehicle miles traveled were obtained from the WSDOT Highway and Video Logs and a field review. For the existing situation, average speed, number of slowdowns and stops were calculated from reports of commuters and the WSDOT Highway and Video Logs.

The following assumptions were used to predict future energy use in the project area.

- Population, business and traffic will continue to increase.
- Light rail and other public transportation will not be capable of substantially reducing traffic volumes in the study area under the No Build or Build Alternatives.
- Fuel will continue to be available and be relatively affordable.
- Truck traffic ratios will remain constant under either alternative.
- The vehicle fleet will be equally fuel efficient under either alternative.
- Most truck traffic would choose to use a limited access freeway if available.
- Some commuter traffic would be diverted from local streets to the proposed freeway.

3.7.2 Affected Environment

The existing SR 167 (River Road) provides a major transportation link between Puyallup, I-5, SR 509, and the Port of Tacoma. It is a four-lane urban facility with numerous intersections and driveways. There are supplemental left and right turn lanes at some intersections. Local residents use the highway for work, shopping, social, and recreation purposes. The highway also functions as a major transportation arterial for freight.

West of 70th Avenue East, the existing non-freeway segment of SR 167 has an average daily traffic volume (ADT) of about 36,000 vehicles per day in both directions. Between 70th Avenue East and North Meridian, the current ADT is 31,500. Traffic flows reasonably well on SR 167 during non-peak traffic periods. The average traffic speed on the facility is about 28 miles per hour (mph). Traffic moves slowest on the North Meridian segment of the route.

Valley Avenue is another major transportation link from the west terminus of the existing SR 167 freeway. Valley Avenue connects to I-5 about two miles north of its interchange with SR 167 and provides a route from Puyallup to the Port of Tacoma and points north. The current ADT on Valley Avenue ranges from 11,780 west of 70th Avenue East to 15,200 between 70th Avenue East and the North Meridian intersection.

Traffic congestion occurs on weekdays during peak hour traffic on state and local roads in the project area. Currently, peak hour traffic occurs from about 7:15 a.m. to 8:45 a.m. and 4:15 p.m. to 5:45 p.m. Major bottlenecks on existing SR 167 occur at North Meridian , Pioneer Avenue, 66th Avenue East (Clark's Creek Bridge), and the I-5 interchange. During peak hour conditions, the average speed on the facility is 19 mph. Stop and go traffic during peak hour traffic increases fuel consumption, compared to free-flow conditions at moderate speeds.

Peak hour traffic currently averages about 1,700 vehicles in both directions. Trucks comprise about 25 percent of the vehicle mix. Most of the major congestion occurs at intersections during peak hour traffic. Some intersections are operating at level of service F which is unstable flow or stop and go conditions and there are substantial traffic backups that tend to increase traffic accidents. Commuters often use the local street network to bypass congested areas.

3.7.3 Impacts of Construction

No Build Alternative

Under this alternative the project would not be built. The local jurisdictions would continue with improvements to existing roads to improve traffic conditions. At the same time, the area is expected to grow pursuant to state and local plans. More traffic is forecasted as a consequence. The improvements in the transportation system are not likely to overcome the impacts of increased volumes with respect to energy consumption.

WSDOT would continue to improve the existing facilities including SR 167, SR 99, SR 509, and I-5. These improvements would result in fuel consumption during construction but would likely result in less energy used because the scope of the construction activity is substantially less. Once completed, these projects would be expected to reduce fuel consumption by improving traffic flow.

Build Alternative (Preferred)

Since the 1980s, there have been several empirical reviews of the energy required for highway construction projects. These studies found that construction costs are directly related to the amount of energy used. Predictions of energy use based on construction costs are almost as accurate as using complicated quantitative formulae. The analysis used here does not break out the costs of the different interchange options from the mainline. Instead, the analysis used the highest cost combination of alternatives.

The total proposed project cost in year 2000 dollars is anticipated to be about $2.1 to 2.4 billion. Right-of-way and preliminary engineering costs do not generate energy impacts. Construction costs to build the facility are estimated at $1.4 billion in 2004 dollars. These costs relate to the substantial amount of energy used to manufacture, transport, and place roadway materials into a finished product.

The Build Alternative will involve a greater amount of construction energy than the No Build Alternative. However, construction energy use will be spread over several years because the project is proposed to be built in stages. Construction of the proposed SR 167 project and design features (interchange configurations, ramp options, etc.) will not result in a measurable impact on regional or local fuel availability.

3.7.4 Impacts of Operation

No Build Alternative

Traffic congestion will continue to increase every year. By 2030, ADT is predicted to substantially increase. On the existing non-freeway segment of SR 167 west of 70th Avenue East, the ADT is expected to increase from 36,000 to 58,000 vehicles per day in both directions. Valley Avenue ADT is predicted to increase to 22,000 vehicles at the west end and 36,000 vehicles at the North Meridian intersection. Local roads will experience similar traffic increases.

Peak hour traffic would increase by 147 percent to about 4,200 vehicles. Peak hour traffic conditions will double in the length of time they occur. Peak hour conditions will run from about 6:15 a.m. to 9:15 a.m. and 3:30 p.m. to 6:30 p.m. Based on these predictions, more than 20,000 vehicles would be traveling on the existing SR 167 during the peak hour period. Similar peak hour traffic increases are expected on Valley Avenue and other local roads.

Traffic would barely move during the peak hour periods. Average traffic speeds are anticipated to decline to about 10 mph. Much of the slow down would be due to waiting at traffic signals at 66th Avenue East (Clark's Creek Bridge), Pioneer Avenue, and North Meridian. The whole regional road network would be overwhelmed as commuters struggle to find ways around the traffic bottlenecks.

Standard fuel usage tables show that an average car or truck will use substantially more fuel at 10 mph (2030 predicted peak hour traffic speed) than at 19 mph (estimated 2000 peak hour average speed). The additional stops and slowdowns will further increase fuel consumption. Also, the existing SR 167 (River Road) is 0.8 mile (12.9 percent) longer than the proposed freeway and has traffic signals.

Based on the above predictions, operational energy consumption in 2030 would be greater during peak hour traffic than that predicted for the Build Alternative.

Build Alternative (Preferred)

The operational impacts to energy resources depend on fuel consumption. The differences between the intersection alternatives on fuel consumption are insignificant and therefore the analysis considers the mainline and the intersections together.

The proposed SR 167 freeway will draw vehicles from many sources. Some commuters driving between I-5 and Puyallup will choose to use the new freeway for destinations north of downtown Tacoma. Traffic levels on River Road (existing SR 167), N. Levee Road East and West Pioneer Avenue will continue to increase, but not as dramatically as under the No Build Alternative. Peak hour traffic on River Road ("existing" SR 167) in 2030 is predicted to be about 2,800 under the Build Alternative (Table 3.7-1). Most people using the local roads will drive less than 2 miles before reaching either the proposed SR 167 or a local destination.

Table 3.7-1: Number of Vehicles in 2015 for Proposed Project

Proposed Freeway Segment	2015 Predicted ADT	2015 Predicted Peak Hour Traffic	2015 Predicted Peak Hour HOV
North Meridian to Proposed Valley Ave. I/C	52,000	4,300	400
Proposed Valley Ave. I/C to I-5	70,000	5,500	500
I-5 to SR 509	42,500	4,150	0

Much of the truck traffic on Valley Avenue will also use the proposed freeway except for local deliveries. Some truck traffic from SR 18 may also choose SR 167 to access the Port of Tacoma and destinations to the south. Trucks may comprise as much as 25 percent of the traffic on the proposed freeway.

The new freeway is scheduled for completion in 2015. At that time, about 500 vehicles are expected to use HOV lanes during peak hour traffic conditions.

By 2030, if traffic growth continues as predicted, traffic congestion may occur during peak hour traffic (Table 3.7-2). The level of congestion and energy efficiency will be better than the No Build Alternative because there will be no traffic signals, fewer slowdowns, and higher traffic speed.

Roadway segments accessing the Valley Avenue interchange will see increased volumes of traffic especially truck traffic. There will be a localized increase in traffic congestion and fuel use. Traffic using SR 512 to access I-5 from SR 167 may shift to SR 167. Truck traffic heading to eastern Washington from the Port of Tacoma may also shift from SR 18 to SR 167 to avoid the steep grades on SR 18.

Most surface streets will flow better than under the No Build Alternative because many vehicles will be diverted to the proposed freeway. There may be more congestion near freeway ramps. Regionally, there will be a modest energy savings for vehicles traveling on local streets.

The new facility will feature HOV lanes from I-5 to SR 161 that will make carpooling and taking the bus more attractive than it is presently. Between Valley Avenue and I-5 about 1,170 vehicles are predicted to use the HOV lanes during peak hour traffic conditions in 2030 (Table 3.7-2). Two park and ride lots will also be constructed in association with the new freeway. The HOV lanes, park and ride lots, and transit service will combine to reduce energy consumption relative to the No Build Alternative.

Table 3.7-2: Number of Vehicles in 2030 for the Proposed Project

Proposed Freeway Segment	2030 Predicted ADT	2030 Predicted Peak Hour Traffic	2030 Predicted Peak Hour HOV
North Meridian to Proposed Valley Ave. I/C	120,000	5,320	1,010
Proposed Valley Ave. I/C to I-5	100,000	6,850	1,170
I-5 to SR 509	42,000	5,300	0

Indirect and Cumulative Impacts

A substantial amount of energy would be used to construct the new freeway; however, construction of the proposed project would not result in a measurable impact on regional or local fuel availability. In 2015, when the facility first opens, the operational energy savings of the Build Alternative on a per day basis would begin to occur. After this time, the energy used to construct the new freeway would begin to be recouped. Countering these energy savings would be the energy costs of maintenance. These are not expected to be substantial.

By 2030, traffic will have increased but the freeway would still flow better than under the No Build Alternative. The HOV lanes would be fully operational. Operational energy savings of the Build Alternative on a per day basis would continue to increase consistent with federal energy requirements.

New lighting would be installed, but there would be no measurable impact on the amount of electricity or natural gas used in the region.

Construction of the proposed project would consume energy resources from manufacturing construction materials, transporting construction workers, and operating construction equipment. If the No Build Alternative were adopted, vehicles would consume more fuel because of the circuitous route and severe traffic congestion.

3.7.5 Cumulative Impacts

Cumulative impacts to energy are not discussed because the proposed transportation project is not likely to contribute, either positively, negatively, nor is it likely to alter the magnitude of other foreseeable impacts.

3.7.6 Mitigation Measures

The energy impacts of the proposed project are predicted to be less than the No Build Alternative and therefore no mitigation is required or necessary.