Appendix C
Traffic Operations Model Validation

SR 167 VISSIM Model Development for SR 167 Corridor Study

Introduction

WISSIM was selected for the simulation modeling for SR 167 Corridor Study project. VISSIM is a microscopic, time-step and behavior based simulation model. It was developed to analyze the full range of the classified roadways and public transportation operations. SR 167 VISSIM model was developed and calibrated for the existing 2005 PM peak hour.

Data Collection

WSDOT provided the existing PM peak hour freeway traffic counts and signal timing information and Cities of Renton, Kent and Auburn provided PM peak hour traffic counts and signal information at the local intersections for the bottleneck project areas. WSDOT also provided travel time survey data for the freeway mainline operations during the existing PM peak period.

Model Development

The SR 167 PM peak hour VISSIM model was developed base on a previous VISSIM model for SR 167 provided by WSDOT I-405 team. The previous VISSIM model covered only part of the SR 167 Corridor, from I-405 to Ellington Road and used dynamic assignment function for the multiple-hour simulations. The first task of the VISSIM development was to extend the VISSIM network south from Ellingson Road to SR 161. The local street networks were also created for the four bottleneck areas in addition to the freeway network. Next, traffic counts were balanced out through the SR 167 corridor. The static routing method was used for the existing one hour PM peak hour simulation. The dynamic assignment function was not used due to the data availability and the budget limitations of the project. The HOV and heavy vehicle

percentages were derived from the traffic counts and used in the input volumes to represent the mixed components of the existing traffic.

Model Calibration

The goal of the model calibration was to fine tune the VISSIM mode that technically and visual replicates existing PM peak hour traffic conditions. The field travel time survey data were compiled and used to calibrate the VISSIM model.

Two customized link types, Ramp Merge and Ramp Merge 2, were inherited from the previous VISSIM model and applied during the calibration. Ramp Merge and Ramp Merge 2 link type were used at the congested merge and diverge areas such as the SR 167 at 43rd Street/S. 180th, SR 167 at SR 18 and SR 167 at SR 410/SR 512 interchange areas.

In order match the variation of the traffic operations on SR 167, 5 different random seeds were used to obtain the VISSIM results. The averages of the 5-run VSSIM outputs were calculated and compared against the compiled average field travel time data. The average travel time differences between VISSIM model outputs and the field data for SR 167 freeway mainline are about 4% for northbound and 2% for southbound for the existing PM peak hour as shown in Exhibits 1 and 2.

Exhibit 1 SR 167 Northbound Freeway Mainline Average Travel Time between VISSIM Model and Field Travel Time Survey for Existing PM Peak Hour

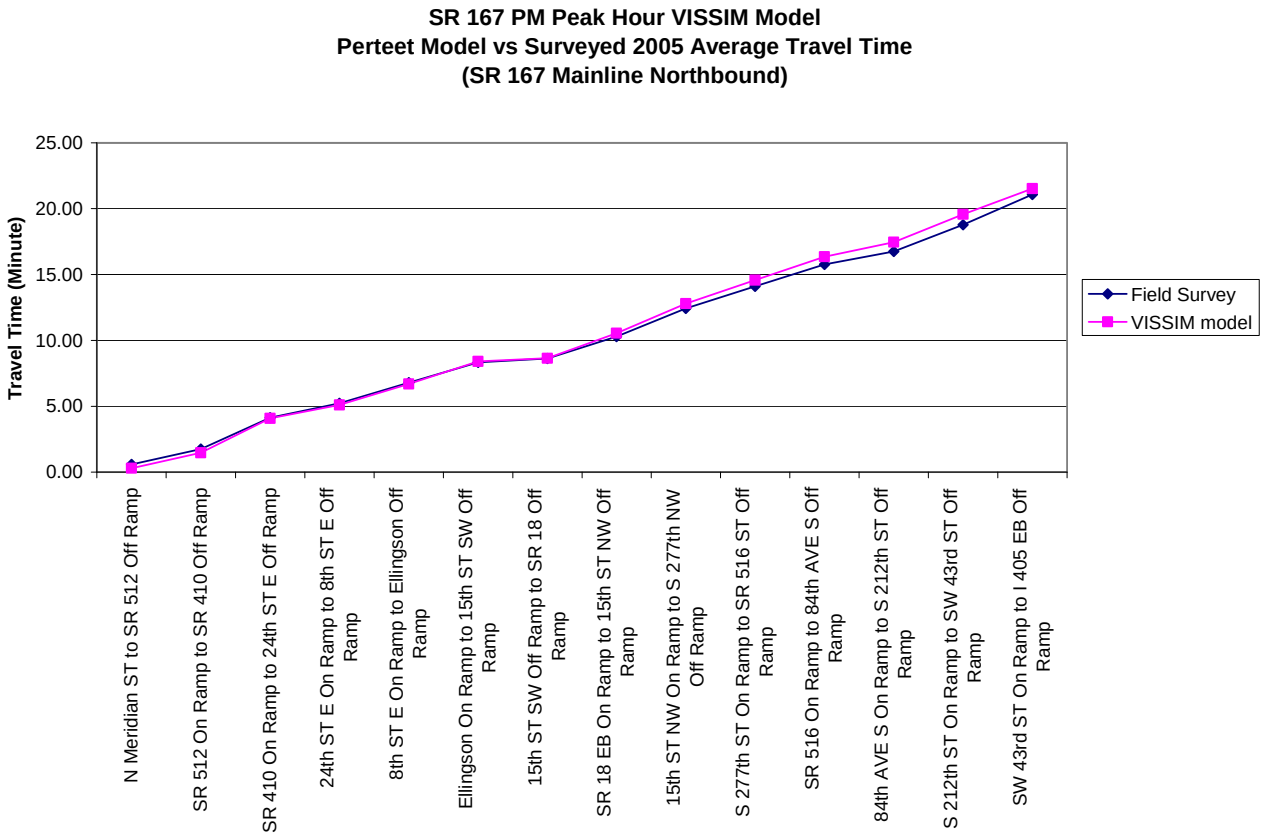
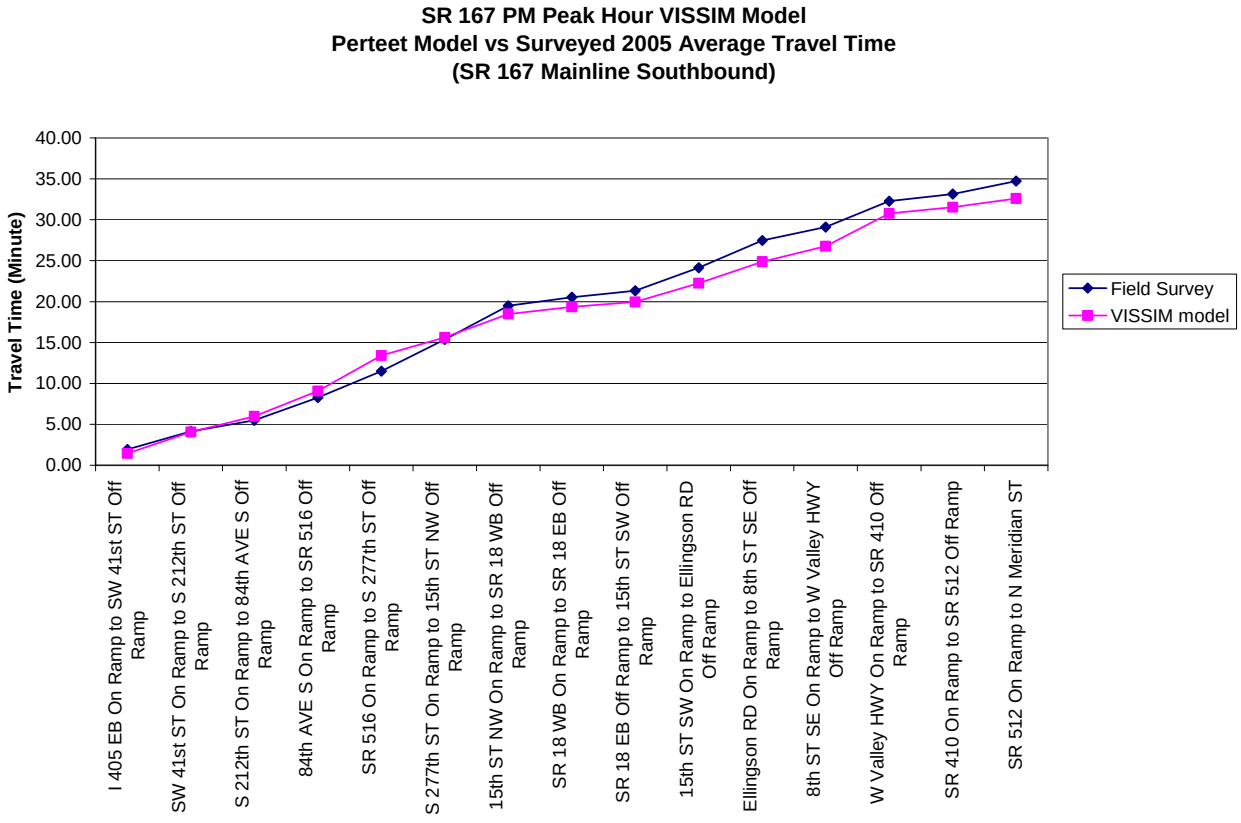


Exhibit 2 SR 167 Southbound Freeway Mainline Average Travel Time between VISSIM Model and Field Travel Time Survey for Existing PM Peak Hour



Overall the PM peak hour VISSIM model was well calibrated and is ready for use.