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A GUIDE TO DOCUMENTING VISSIM-BASED MICROSCOPIC TRAFFIC SIMULATION MODELS

by

Matthew Beaulieu
Graduate Research Assistant

Kathy Davis
Graduate Research Assistant

David Kieninger
Graduate Research Assistant

Kevin Mizuta
Graduate Research Assistant

Euneka Robinson-McCutchen
Graduate Research Assistant

Duane Wright
Systems Analyst Programmer

Adam Sanderson
Software Engineer

John M. Ishimaru
Senior Research Engineer

Mark E. Hallenbeck
Director

Washington State Transportation Center (TRAC)
University of Washington, Box 354802
1107 NE 45th Street, Suite 535
Seattle, Washington 98105-4631

Washington State Department of Transportation Technical Monitor
Shuming Yan
Technical Services Manager, Urban Planning Office

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16. ABSTRACT

This document is a guide to developing documentation for microscopic traffic simulation models developed for the Washington State Department of Transportation (WSDOT) by using the VISSIM simulation environment.

Model documentation produced according to the guidelines in this document are designed to assist prospective project managers and model users in determining whether the associated model meets their analytical needs, as well as assisting future simulation model users/analysts who consider modifying or expanding the model. This guide provides a procedure for the development of VISSIM model documentation that reflects key elements of the model, including objectives, inputs, and functional components; describes the format, topics, and level of detail of the resulting documentation; and outlines a documentation methodology that does not require an unreasonable amount of time and effort.

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DISCLAIMER

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I. INTRODUCTION

This document is a guide to developing documentation for microscopic traffic simulation models developed for the Washington State Department of Transportation (WSDOT) by using the VISSIM simulation environment. Model documentation produced according to the guidelines in this document are designed to assist prospective project managers and prospective model users in determining whether the associated model meets their analytical needs, as well as assisting future simulation model users/analysts who might be considering modifying or expanding the model.

Background

In recent years the WSDOT has utilized microscopic traffic simulation tools to model performance of selected freeway facilities in the state. These models can be used to analyze existing performance, based on known traffic pattern data, that might otherwise be impossible to estimate via conventional data collection methods or standard traffic engineering analytical methods. Simulation models can also be used to predict future estimated performance on the basis of forecasted changes in vehicle demand or travel patterns, proposed changes in freeway facility geometry such as roadway expansion or redesign, or potential operational strategies such as ramp metering, HOV lane restrictions, or congestion pricing. In addition, simulations allow sensitivity analyses to be performed to estimate the effects of incremental changes in freeway conditions on performance.

In addition to providing important engineering and planning capabilities that supplement empirical data and analytical techniques, microscopic traffic simulation models also go beyond aggregate estimates of performance based on average or median conditions by providing dynamic (time-varying) performance estimates as well. These models can also generate animated three-dimensional representations of freeway conditions that help convey the nature of traffic performance to the engineer as well as to decision makers and the general public. Animated displays also provide useful diagnostic cues during the model development phase, which in turn enhances user confidence in the validity of the resulting model's outputs.

Unfortunately, the benefits of microscopic time-varying models are accompanied by increased complexity. A typical freeway simulation requires a modeled representation of a number of real-world elements, including vehicle flows and movement (including driver behavior such as lane changing), driver/vehicle interactions with one another, and driver/vehicle reactions to their environment (e.g., road geometry, other vehicles, intersections, signals, pedestrians, etc.).

The resulting model design logic is complicated, and the associated simulation model somewhat opaque. Model inputs (e.g., vehicle volume flows, vehicle driving characteristics) and modeling choices (traffic routing, vehicle conflict resolution, etc.) are not readily understandable from a cursory review of the model and are often hidden in menus or abstracted graphical representations. Furthermore, the original intent behind the model is often a critical factor in determining the applicability of a model to a future analytical need, since the level of detail provided for a specific aspect of a model

instantiation that is required to satisfy one purpose might not be sufficient for another purpose; that intent, however, is not necessarily clear from a review of the model itself.

All this can introduce considerable uncertainty for analysts who are considering the use of (or outcome from) a simulation model, especially if the user was not involved in or otherwise familiar with the model's original intent and development. One way to overcome this uncertainty is to document the model in a way that identifies the key inputs and model hypotheses in a succinct manner, so that the prospective user or model developer can review the basic elements of the model at a level of detail sufficient to understand whether the model suits his or her needs, while reducing the need to explore the model specifics manually. However, there is little in the technical literature that provides guidance on how to develop such a document, and what to include in it. Therefore, a guide for writing such model documentation was developed.

Objective of This Guide

This guide is designed to assist the VISSIM simulation model developer in developing useful summary documentation of a model that will help future users evaluate its usefulness and applicability. This guide does not result in documentation that addresses every aspect of the model in minute detail, since such a task can be impractical for all but the simplest models. Instead, the focus is on designing documentation to address the important questions that a user might have prior to using a model (e.g., the original purpose of the model, the modeling approach, the level of detail), and the questions a project manager needs answered before accepting the work performed by consultant. In large part this means summarizing the key input parameters used to run the model.

Writing documentation is a difficult task that can also be underfunded or considered to be of a lower priority; it is therefore often performed as an afterthought (or not at all). This documentation guide was designed to address those realities by providing a practical mechanism for producing a base amount of useful model information in a timely manner. The result is a focus on model objectives, overall modeling approach, and input data. Such a method was determined to be preferable to a more highly detailed documentation approach; the latter approach would be more comprehensive but was a) unlikely to be used by the model developer because of the onerous level of effort required, and b) likely to produce a voluminous document that would not be used by anyone else. The chosen approach attempts to strike a practical balance between the level of documentation detail desired and the amounts of time and effort required.

Scope of This Guide

These guidelines are designed specifically for models produced with PTV America's VISSIM simulation modeling environment. The guidelines are based on experience with arterial and freeway models developed with version 4.1x of VISSIM, although the suggested documentation tasks should be feasible with other versions as well, perhaps with some adjustment (particularly if there are any user interface or menu structure changes). Furthermore, this general documentation approach should be transferrable to non-VISSIM simulation modeling environments, although some work would likely be required to map specific VISSIM concepts to the equivalent feature of another software package. This guide (and the documentation that it would help produce) also assumes that the reader is familiar with VISSIM at a level equivalent to the

introductory VISSIM classes taught by PTV America[1]. (Some documentation might require knowledge of advanced VISSIM features as well, if the model uses those features.)

Acknowledgments and Disclaimer

This guide summarizes a documentation methodology that was developed by a team of researchers at the University of Washington (UW) as part of a graduate level special projects class on Traffic Simulation Applications. The team consists of master's students in the Civil and Environmental Engineering (CEE) department at the UW, including some WSDOT employees who are completing the CEE master's program through a WSDOT scholarship/internship.

The researchers were

Matthew Beaulieu
Kathy Davis
David Kieninger
Kevin Mizuta
Euneka Robinson-McCutchen.

The development of this guide was supported in part by funding from the Traffic Simulation Laboratory program at the University of Washington. The Traffic Simulation Laboratory is a research effort to enhance educational and research opportunities associated with traffic simulation modeling in the Pacific Northwest. The laboratory is being developed with the support of a multi-agency, multi-university research consortium consisting of the following partners:

- Transportation Northwest (TRANSNOW) (Region X UTC)
- Washington State Department of Transportation

[1] See course descriptions at <http://www.ptvamerica.com/trainingcoursedescriptions.html>.

- Puget Sound Regional Council (Puget Sound area RTPO/MPO)
- University of Idaho
- Portland State University
- Washington State Transportation Center (TRAC), University of Washington (principal project researchers)

The objectives[2] of this research program are to

1) increase the availability of courses in the area of traffic flow simulation modeling, thus increasing the number of people trained in the use of simulation models and increasing the number of qualified staff available to both public agencies and the private sector
2) decrease the time and cost required by the WSDOT, PSRC, and other jurisdictions to apply simulation models to a wide range of traffic analyses within the state and region
3) perform specific simulation analyses for the WSDOT, PSRC, and other agencies participating in the simulation lab
4) provide the analytical capabilities required to improve simulation model functionality.

The Traffic Simulation Laboratory is located at the TRAC office at the University of Washington in Seattle.

This document summarizes project papers prepared by the aforementioned research team. Every effort was made to summarize their work in a way that accurately reflects the intent and technical approach envisioned by that team. Any omissions or

[2] Excerpted from Hallenbeck, Mark E., "Traffic Simulation Laboratory: WSDOT Research Proposal", July 2006.

inaccuracies in this summary are the responsibility of the TRAC technical staff that assisted in preparing this document.

II. A VISSIM MODEL DOCUMENTATION GUIDE

Overview

This documentation guide was developed to

- provide a procedure for the development of VISSIM model documentation that reflects key elements of the model, including objectives, inputs, and functional components
- describe the format, topics, and level of detail of the resulting documentation
- outline a documentation methodology that does not require an unreasonable amount of time and effort.

Proposed Uses of This Guide

This guide describes a format for model documentation that can be used to support the use of an existing VISSIM model, the enhancement of an existing VISSIM model, or the development of a new VISSIM model:

- **From the user perspective**: Documentation based on this guide will address the basic information requirements of a prospective user of the model, including model history and goals, model scope and assumptions, model inputs, and key model components. The resulting documentation should supply the information necessary to understand the functionality and analytical limitations of the model.
- **From the model developer perspective**: Documentation based on this guide will address the basic information requirements of a modeler who is considering modifying or enhancing the associated model. A developer considering modifying the model should be able to use the documentation to help understand the

modeling "philosophy" and implementation approach of the simulation. Note that the documentation should not be considered a replacement for a thorough review of the model files themselves; the documentation will, however, provide a convenient overview of the principal features, modeling techniques, and assumptions used.

- **From the new model developer/consultant perspective:** This guide can be used by a modeler or consultant who is building a new VISSIM model for WSDOT. In this context, the guide could also be considered as the specification for the documentation deliverable that should accompany the developer/consultant's model. The documentation will not only provide assistance to future users of the model, or future model developers, but will also provide the WSDOT project monitors with an additional tool that can help them review project progress, determine compliance with any specified model requirements, and judge the reliability of the analytical results produced.

Ideally, the model documentation is developed during the original development of the model, when the original developers are still available and details of the process are still fresh in their minds. However, a number of VISSIM models have already been developed for WSDOT, some of which have limited or no documentation. In those cases, this guide can be used to help produce documentation for an existing model that was not originally documented. For example, TRAC has begun a project to archive existing WSDOT VISSIM models that were developed in-house or by consultants. To be useful, this archive will require organized, consistent descriptions of each model; this document

provides guidance about developing such documentation for any existing models that do not have documentation.

Overview and Comments on Using This Documentation Method

The documentation resulting from this method can be thought of as a reference guide providing a comprehensive overview of key model inputs and assumptions. However, it is not a user's guide. Nor does it take the place of a thorough review of the model itself. For example, while key geometry implementation techniques associated with priority rules, connectors, and the like are described in general terms in this documentation, the specifics of the implementation may require examination of the graphical representation of the model itself.

This documentation method has the benefit of being relatively easy to routinely produce. Tests of the method using a three-intersection arterial model and a 17-mile urban freeway model determined that the process is relatively straightforward. This is accomplished by relying on graphics, including screen shots of key inputs and model components, combined with brief text descriptions. However, even though the resulting document is only a summary, it can still be a large document. Therefore, to further enhance this documentation approach, research is also now in progress to develop an online documentation tool that will a) make the process of building the documentation easier, and b) provide dynamic, on-demand querying capabilities that will enable the user to extract specific elements of the documentation on-line. A preliminary version of this tool is described in Appendix B.

The documentation produced using this guide is designed for a reader who is an experienced VISSIM user.

III. DOCUMENTATION OUTLINE

What follows is an outline that can be used to produce documentation for a VISSIM model.[3] This outline is based on a review of arterial and freeway VISSIM models. It is designed to accommodate both types of models.

As a general rule,

- Variations from the VISSIM default parameters should always be described and justified in the documentation.
- Because of the extensive use of screen shots, the documentation should be in color.

[3] VISSIM Model Documentation, Beaulieu M., K. Davis, D. Kieninger, K. Mizuta, E. Robinson-McCutchen, CE 599C Project 1, November 7, 2006.

1. Background Information

This section describes essential information about the model's purpose and scope, including the following:

- a general description of the model
- the location or corridor being modeled
- the time of day being modeled (if time-specific, e.g., PM peak period from 3:00-7:00 PM)
- the purpose of the model
- the original project limits
- the version of VISSIM used to develop the model (e.g., 4.10)
- the model creation or completion date
- contact information (name of the company, name of company contact person most knowledgeable about the model, phone number, and email address)
- agency project number and/or federal ID number.

2. Visual Representation of Model Elements

This section is a visual summary (in screen shot form) of key components of the model. Typically, this will include the following:

- the background photo used to develop the model (usually Google map-based, or equivalent aerial view), with the model superimposed on the photo; include the scale of the original photo, if possible
- each key intersection (arterial) or interchange (freeway), in both regular and centerline views, with pavement markings.

3. Inventory of Model Elements (by intersection or freeway segment)

This section provides a reference guide to the principal model components in the form of a series of mostly graphical summary descriptions based on screen shots and some accompanying notes and comments. The model components documented are based on the principal menu and sub-menu options that are used to define, initialize, and control a VISSIM model. The model elements are as follows (note that the model elements are listed in order of the tool bar icons/modes and should be documented in this order):

Desired Speed Distributions

- Describe the vehicle speed distributions used and how they were defined.

Vehicle Types

- Describe in spreadsheet form the type, category, length, and class of vehicle types (including pedestrian and bicycle categories).

Driver Behavior

- List the driver behavior (CC) parameters used. Identify any parameters that differ from the default value and justify why they differ.

Link Types

- Summarize each link type, including the associated vehicle class and driver behavior set.

Traffic Compositions

- Summarize each traffic composition used (including pedestrian and bicycle categories). Provide the source and date of the traffic composition data used to produce the model composition.

Signal Controllers

- Describe each controller type and the associated files. Provide signal timing plans in a screen shot or by inclusion of the .vap file. Provide the source and date of the signal timing data used to describe the model signal controllers.

Evaluation

- Provide a description of any evaluation files or databases (include filename and location).

Simulation Parameters

- Describe parameters used to run the simulation, including simulation step size, seeding, etc.

Background Image

- Provide the source photo used to develop the model geometry, and describe the photo's source and date. Include the scale of the photo, if possible.

Links/Connectors

- Identify any data used to define unique geometry elements in the model, including lane closures, grade information, and lane change information.

Lane Assignments

- Provide screen shots of all locations.

Traffic Volumes

- Describe vehicle input locations and volume data. Include the source and date of the information.

Routes and Relative Flow

- Define each route and describe the source and date of relative flow data.

Desired Speed Decisions

- Describe the locations of desired speed regions and define the associated speed profiles and their rationale.

Reduced Speed Areas

- Describe the locations of reduced speed areas and define the associated speed profiles and their rationale.

Priority Rules for Non-Signalized Intersections

- Describe the locations of non-signalized intersections. Also define the level of detail of the priority rules, as follows:
    - Basic: Minimum required right-of-way (ROW) rules were implemented for vehicle traffic and pedestrian movements
    - Advanced: Additional conditions are modeled (e.g., such as oversaturated conditions)
    - Other: Other comments on the priority rules, including elements not modeled, such as "no pedestrian priority rules"
    - Car/truck headways and gap time settings

Stop Signs for Non-Signalized Intersections

- Describe locations

Roundabouts

- Describe locations and clarify priority rules—particularly gap acceptance

Signal Heads

- Describe locations.

Detectors

- Describe locations, as well as the source and date of data used to define detector locations.

Stop Signs for RTOR

- Describe locations.

Priority Rules for Signalized Intersections

- Describe the locations of signalized intersections. Also define the level of detail of the priority rules, as follows:
    - Basic: Minimum required rules were implemented for vehicle traffic and pedestrian movements
    - Advanced: Additional conditions were modeled (e.g., such as oversaturated conditions)
    - Other: Other comments on the priority rules, including elements not modeled such as "no pedestrian priority rules"
    - Car/truck headways and gap time settings

Transit (Dwell Time Distributions)

- Describe the transit stop dwell time distributions used, as well as the source and date of the data upon which they are based.

Transit (Stops)

- Summarize transit stop locations and dimensions, passenger boarding data, and the source and date of the data upon which they are based.

Transit (Routes)

- Summarize the transit routes, by intersection, the schedules and vehicle types, and the source and date of the data upon which they are based.

Data Collection Points

- Display data collection locations.

Travel Time Sections

- Display travel time section locations.

Queue Counters

- Display queue counter locations.

Parking Lots

- Display parking lot locations.

Nodes

- Display node locations.

Error File

- Display error file (if significant) and corresponding simulation run date.

Output Files:

- List the names of specific output files produced by the model, along with brief descriptions. This information is noted if the model was originally developed to answer a specific analytical question, and the model produced output files for that specific analytical purpose. If so, those files should be identified here so that, if necessary, answers to the analytical questions can be traced back to their supporting data. Because of the nature of output files that VISSIM produces, it is often the case that

additional post-processing (e.g., through spreadsheets or statistical software) is required to either reformat the results into a more usable form or to compute subsequent metrics. If that is the case, one can simply list the output files that formed the basis of the analyses and then cite a separate document that discusses the analytical results derived from those output files.

4. Model Modifications (either completed or proposed)

Some model development projects are stopped because of time or budget limitations. In other cases, a model has been developed to a level of detail sufficient to address a short-term analytical need, even though the developers acknowledge that the model will have limitations if used for other purposes. In addition, one might wish to develop documentation for a model that has previously been developed by another modeler. In any of those situations, model limitations or errors may be discovered in the process. If that occurs, those limitations or model errors should be documented in this section. These include modifications that were actually completed to fix model bugs, as well as recommendations for future changes. In addition, modifications are prioritized by their importance (high, medium, low). This is also the section where known functional limitations to the model should be noted.

5. Lessons Learned

Any noteworthy lessons learned about the model itself, or the model development process, should be documented here.

IV. VISSIM MENU PATHS FOR EACH MODEL COMPONENT

The following table shows the menu/submenu paths for each model component described above in Section 3 of the documentation outline. These paths can be used to determine the location of standard screen shots used in the documentation.

- A menu name followed by an ellipsis "…" indicates that the menu displays a list of the different types of the model element (e.g., each vehicle type), each of which should be selected to obtain corresponding parameter values.
- Items in ( ) are non-menu instructions.
- In some cases, additional screen shots are required as well.
- In most cases, accompanying narrative is also required (e.g., rationale for non-default choices, etc.).

Table 1. Menu/submenu paths for each model component

Model Element	***Menu or Mode***	***Submenu***	***Sub-submenu or Comments***
Desired Speed Distribution	Base Data	Distributions	Desired Speed…
Vehicle Types (summary table)	Base Data	Vehicle Types…	(Summarize in table)
Driver Behavior	Base Data	Driving Behavior	
Link Types	Base Data	Link Types…	
Traffic Composition	Traffic	Compositions…	
Signal Controllers	Signal Control	Edit Controllers…	(Screen shot of .vap)
Evaluation			(File names, locations, description)
Simulation Parameters	Simulation	Parameters…	
Background Image			(File source, date)
Links/Connectors			(Descriptions of customized features)
Pavement Markings			(Screen shot)
Traffic Volumes	MODE Vehicle Inputs…		(Double-click link)
Routes and Relative Flow	(Right-click outside of network)		(Screen shot of routes)
Desired Speed Decisions			(Screen shots of locations)
Reduced Speed Areas			(Screen shots of locations)
Priority Rules for Non-Signalized Intersections			(Screen shots of locations)
Stop Signs for Non-Signalized Intersections			(Screen shots of locations)
Signal Heads			(Screen shots of locations)
Detectors			(Screen shots of locations)
Stop Signs for RTOR			(Screen shots of locations)
Priority Rules for Signalized Intersections			(Screen shots of locations)
Transit (Dwell Time Distributions)			(Screen shots of locations)
Transit (Stops)			(Screen shots of locations)
Transit (Routes)			(Screen shots of locations)
Data Collection Points			(Screen shots of locations)
Travel Time Sections			(Screen shots of locations)
Queue Counters			(Screen shots of locations)

Parking Lots		(Screen shots of locations)
Nodes		(Screen shots of locations)
Error File		(Screen shot of file)
Output Files		File names and directory name

APPENDIX A: SAMPLE DOCUMENTATION

The following is a sample of documentation developed by using the method described in this document. The example is taken from a WSDOT model for I-90 from Eastgate to Issaquah.

I-90 WB: Issaquah to Eastgate
Westbound I-90 AM Congestion vs. Beginning of HOV Location
Model created by Matt Beaulieu, WSDOT, 2005

DESCRIPTION

This model was developed to study the impact to the AM peak traffic when the start of the westbound HOV lane is The final moved. The original location of the HOV start was at the SR 900 overpass. It was understood that the beginning of the HOV lane at this location with other physical conditions were causing significant congestion in the area. The purpose of the model is to examine how traffic is affected when the HOV start is moved further east or west. The AM peak was chosen because it is the critical, high-volume period for this westbound corridor. Vehicle inputs and routing for the eastbound direction is not complete. The traffic volumes represent data from 2004. Simulation run length is 4 hours (14400 seconds).

UNIQUE MODEL CHARACTERISTICS

SOV and HOV vehicle types have been separated by driver behavior in relation to HOV use:

	Type	Category	Length	Class
100	Car - SOV	Car	13.48 to 15.62	GP users
101	SOV-Car-HOV violator	Car	13.48 to 15.62	Passive HOV users
102	SOV-Car-HOV scofflaw	Car	13.48 to 15.62	Aggressive HOV users
103	HOV-Car-Aggressive HOVer	Car	13.48 to 15.62	Aggressive HOV users
104	HOV-Car-passive HOVer	Car	13.48 to 15.62	Passive HOV users
200	HGV	HGV	33.51	HGV, GP users
300	Bus	Bus	37.87	Bus, Passive HOV users

On links with 4 lanes, the far right lane is closed to HOV traffic. This allows all HOV traffic to "see" the HOV lane. Vehicles only look 2 lanes on either side to find the optimal travel lane. Origin-Destination routing is not used. Vehicles are seeded into the network at on-ramps and relative ratios are used to route vehicles at each decision point. 9 vehicle inputs exist with each dedicated to one traffic composition. 10-minute volumes are fed to each input every 600 seconds. 3 unique traffic compositions are seeded into the network as defined below:

Composition 1

Vehicle	Type	Relative Flow
100	Car- SOV	0.890
101	SOV-Car-HOV violator	0.010
103	HOV-Car Aggressive HOVer	0.010
104	HOV-Car-passive HOVer	0.005
200	HGV	0.020
300	Bus	0.005

Composition 2

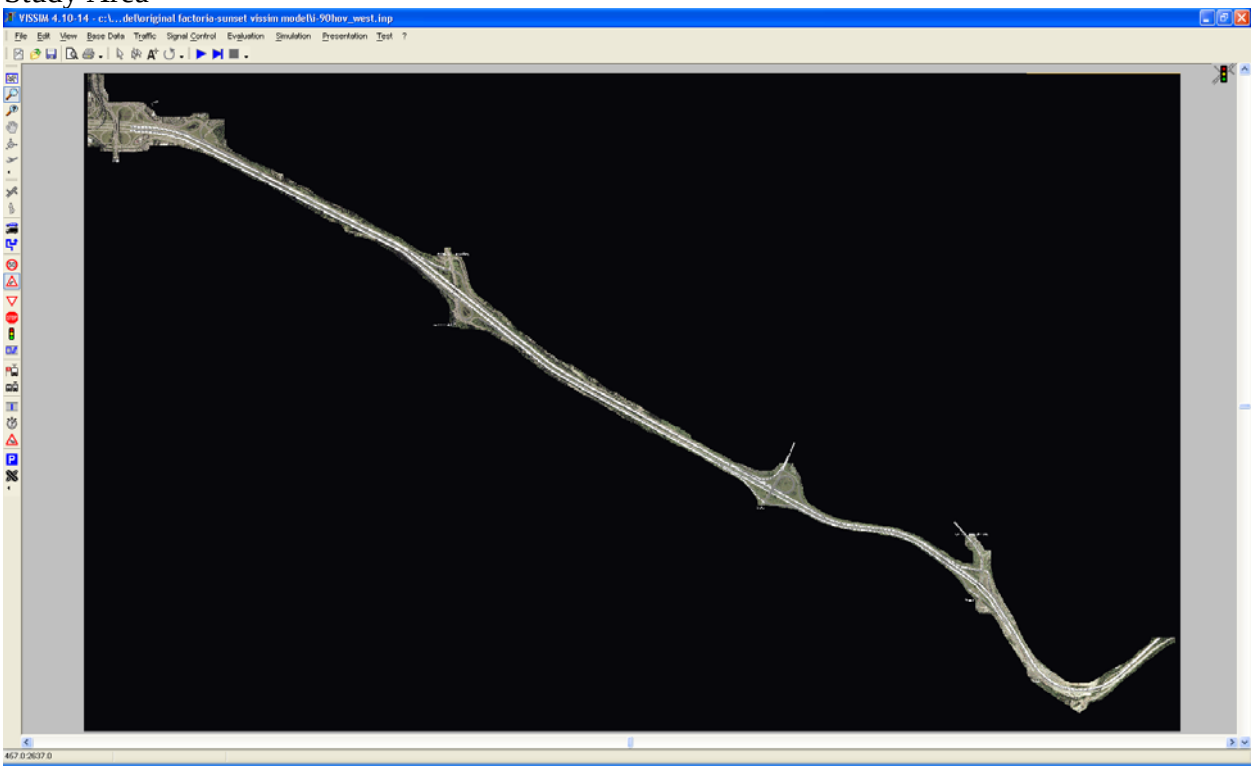
Vehicle	Type	Relative Flow
100	Car- SOV	0.970
101	SOV-Car-HOV violator	0.005
102	SOV-Car-HOV scofflaw	0.005
200	HGV	0.020

Composition 3

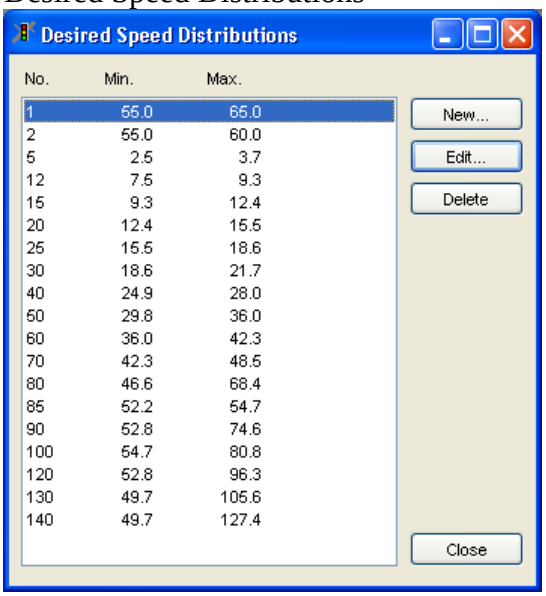
Vehicle	Type	Relative Flow
103	HOV-Car Aggressive HOVer	0.470
104	HOV-Car-passive HOVer	0.470
300	Bus	0.050

Detailed Model Documentation

Study Area



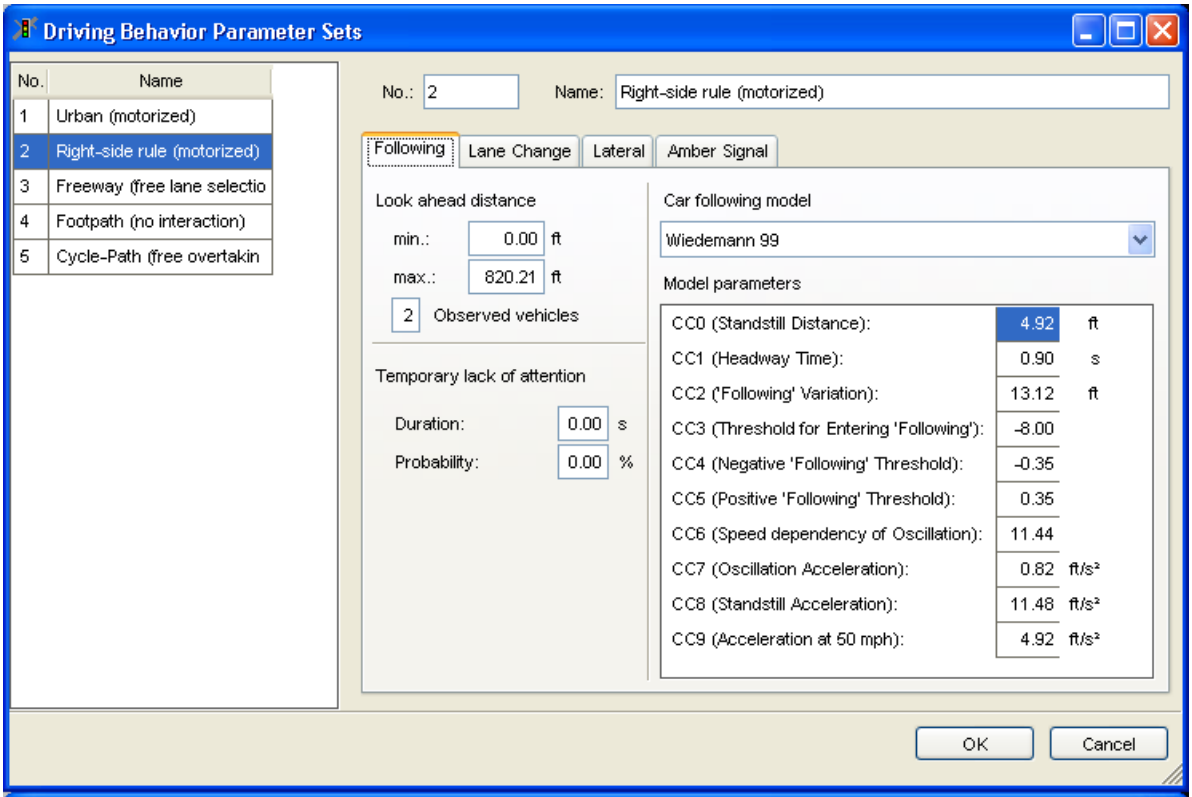
Desired Speed Distributions

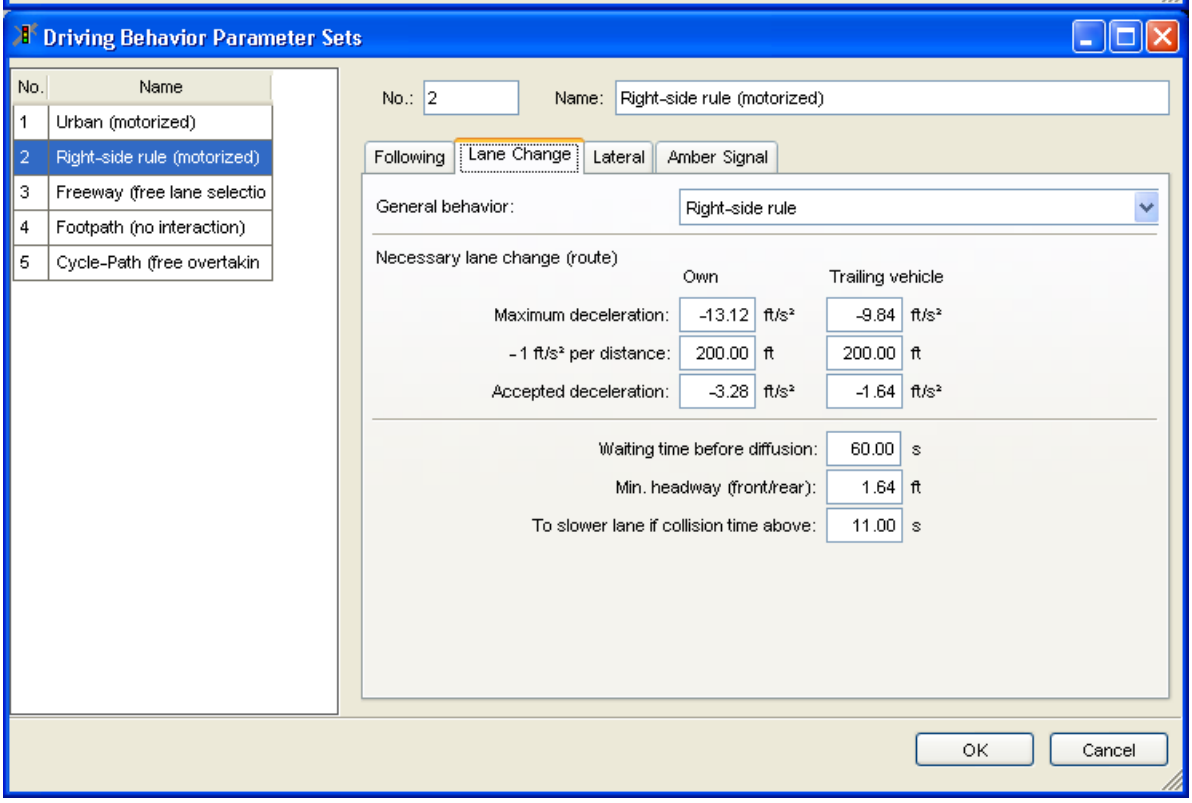


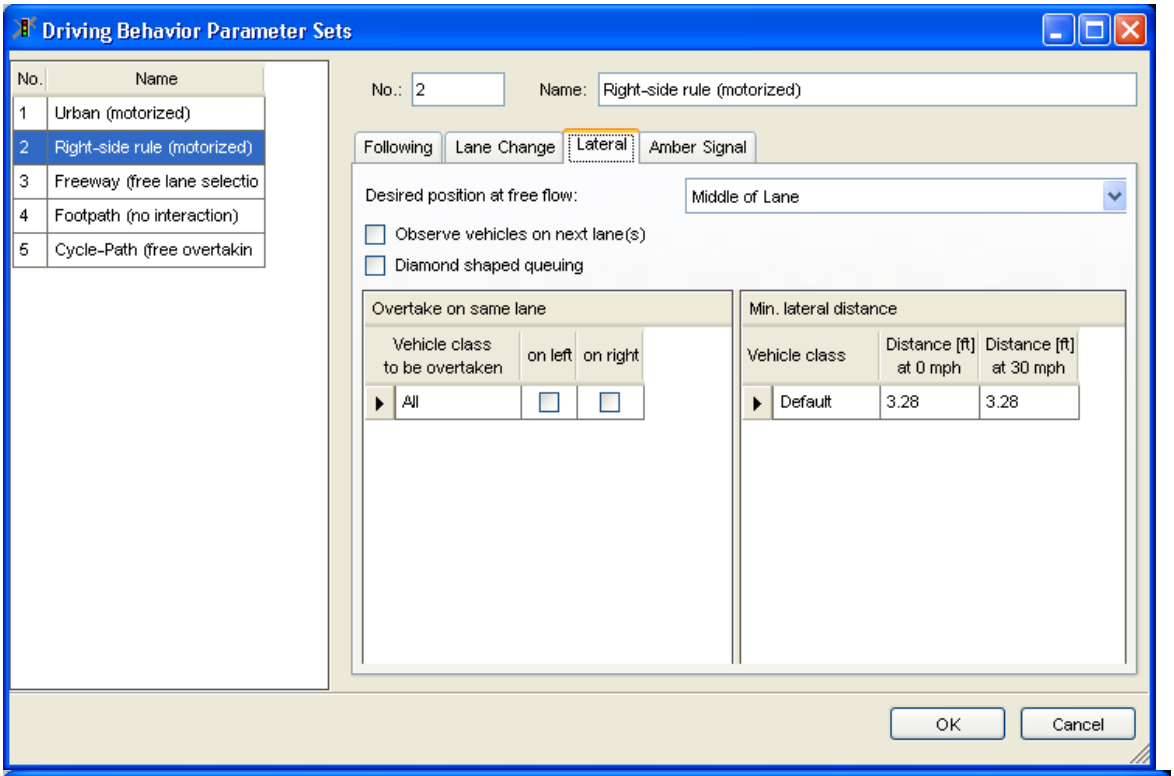
Vehicle Types

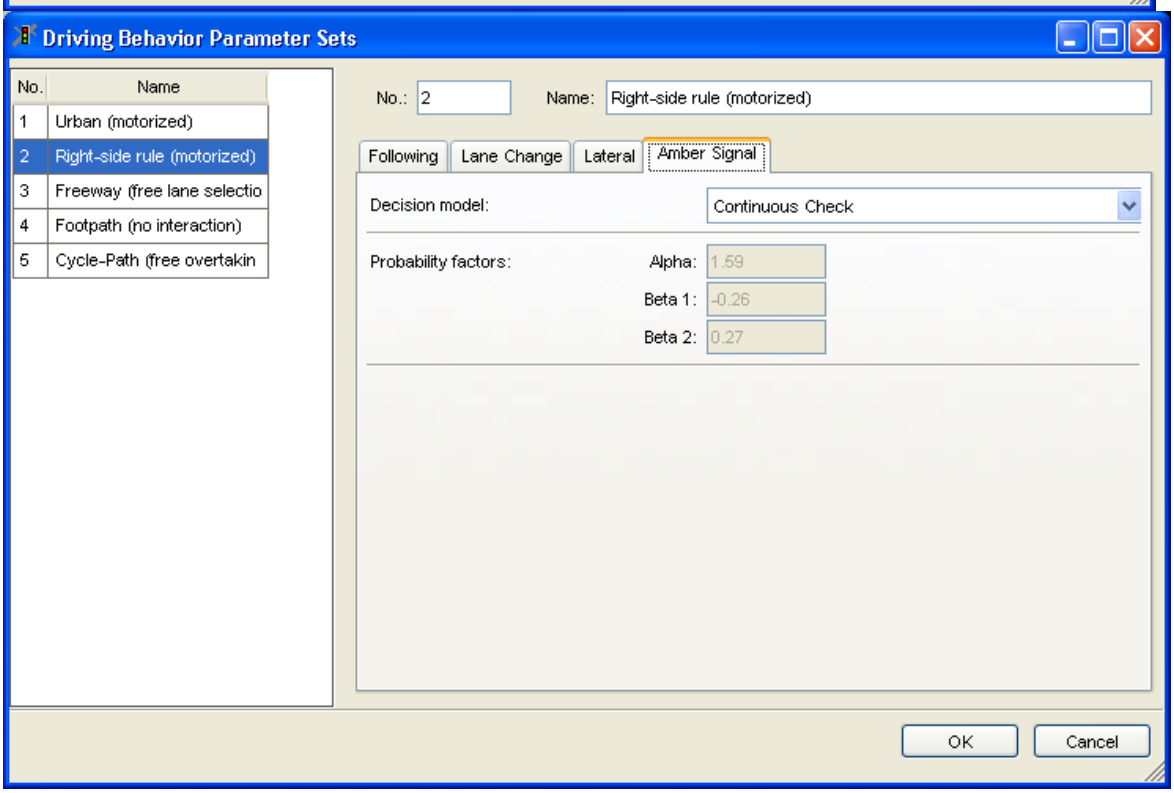
	Type	Category	Length	Class
100	Car - SOV	Car	13.48 to 15.62	GP users
101	SOV-Car-HOV violator	Car	13.48 to 15.62	Passive HOV users
102	SOV-Car-HOV scofflaw	Car	13.48 to 15.62	Aggressive HOV users
103	HOV-Car-Aggressive HOVer	Car	13.48 to 15.62	Aggressive HOV users
104	HOV-Car-passive HOVer	Car	13.48 to 15.62	Passive HOV users
200	HGV	HGV	33.51	HGV, GP users
300	Bus	Bus	37.87	Bus, Passive HOV users

Driver Behavior Parameters: Right-side rule (motorized)

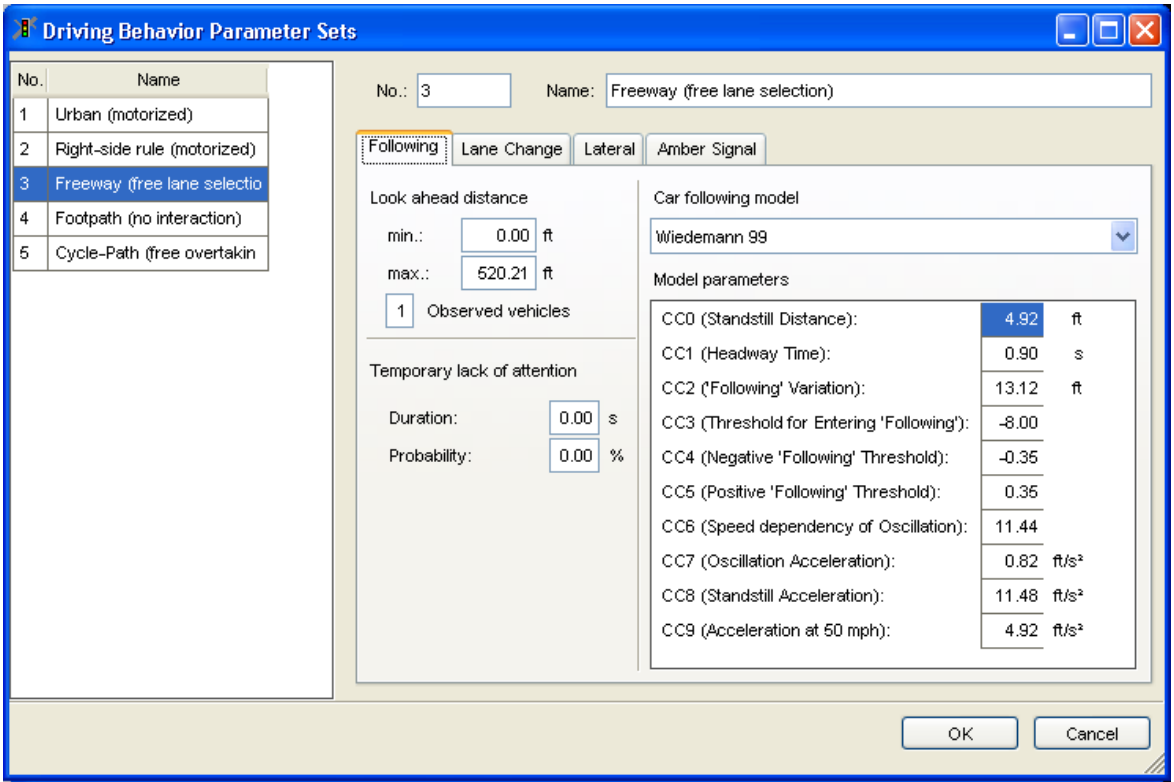


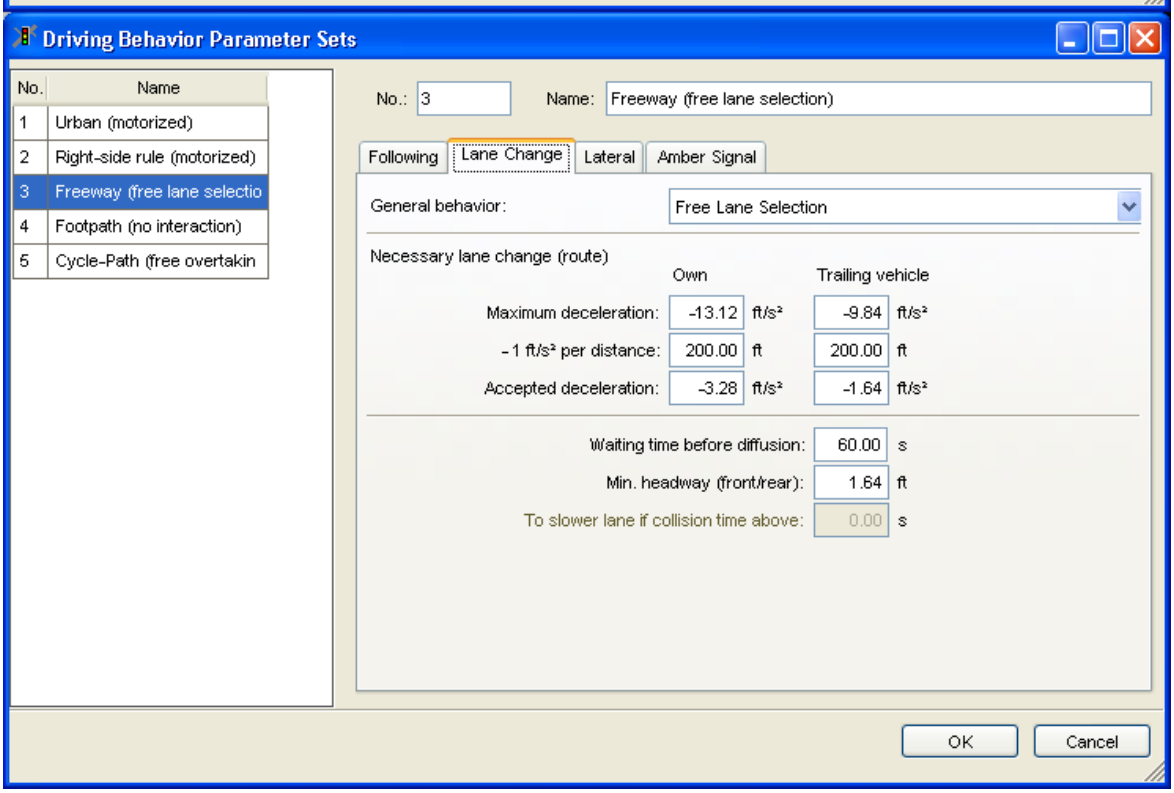


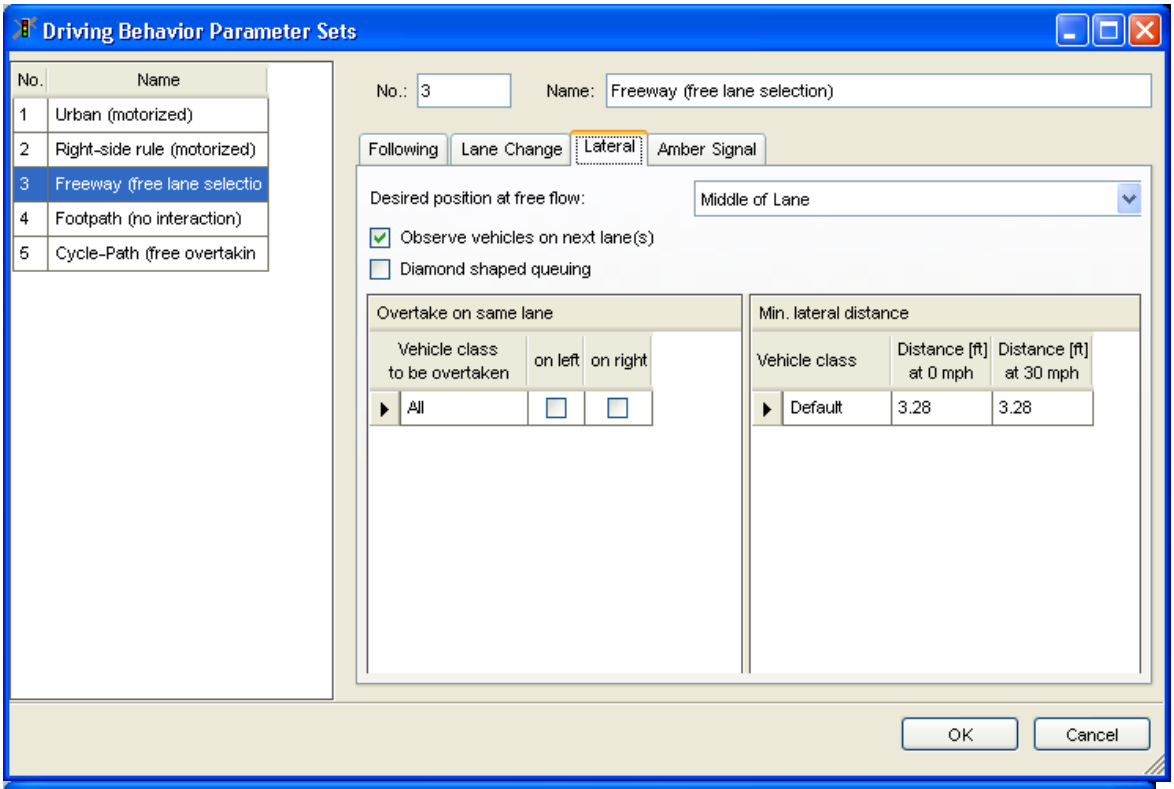

Driving Behavior Parameter Sets
No.
Name
1
Urban (motorized)
2
Right-side rule (motorized)
3
Freeway (free lane selectio
4
Footpath (no interaction)
5
Cycle-Path (free overtakin
No.: 2
Name: Right-side rule (motorized)
Following
Lane Change
Lateral
Amber Signal
Desired position at free flow:
Middle of Lane
Observe vehicles on next lane(s)
Diamond shaped queuing
Overtake on same lane
Vehicle class to be overtaken
on left
on right
All
Min. lateral distance
Vehicle class
Distance [ft] at 0 mph
Distance [ft] at 30 mph
Default
3.28
3.28
OK
Cancel

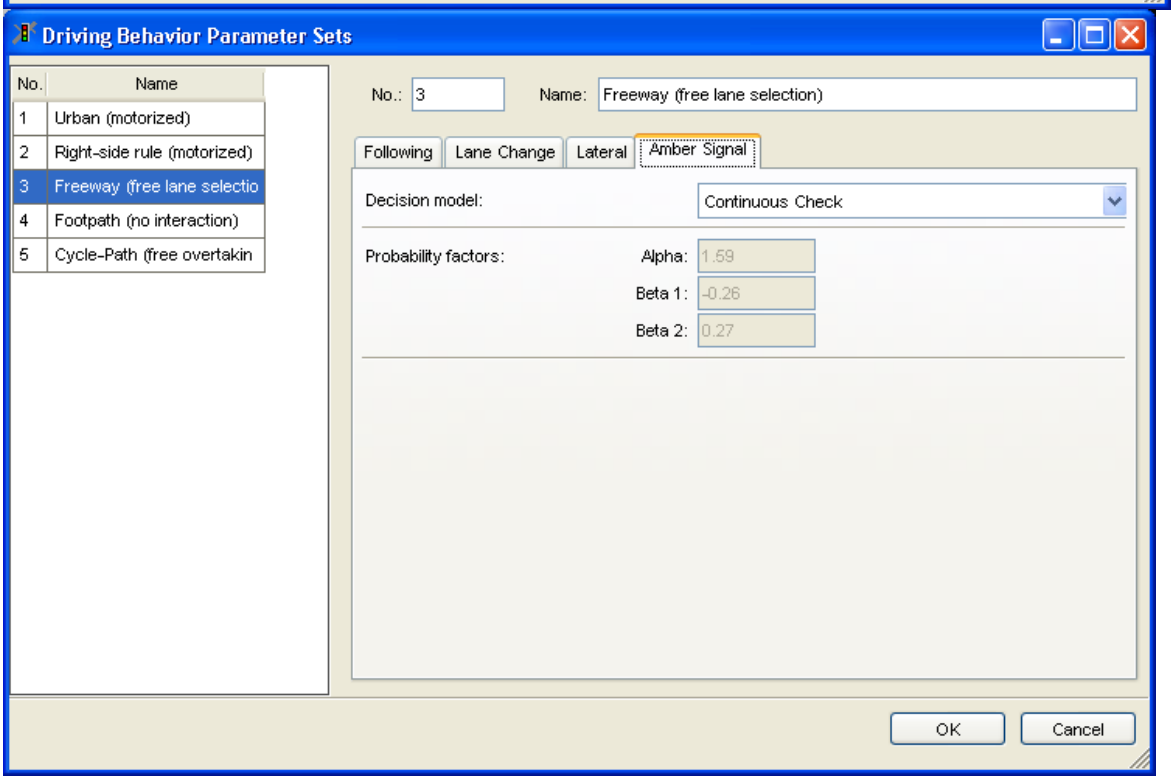

Driving Behavior Parameter Sets
No.
Name
1
Urban (motorized)
2
Right-side rule (motorized)
3
Freeway (free lane selectio
4
Footpath (no interaction)
5
Cycle-Path (free overtakin
No.: 2
Name: Right-side rule (motorized)
Following
Lane Change
Lateral
Amber Signal
Decision model:
Continuous Check
Probability factors:
Alpha: 1.59
Beta 1: -0.26
Beta 2: 0.27
OK
Cancel

Driver Behavior Parameters: Freeway (free lane selection)

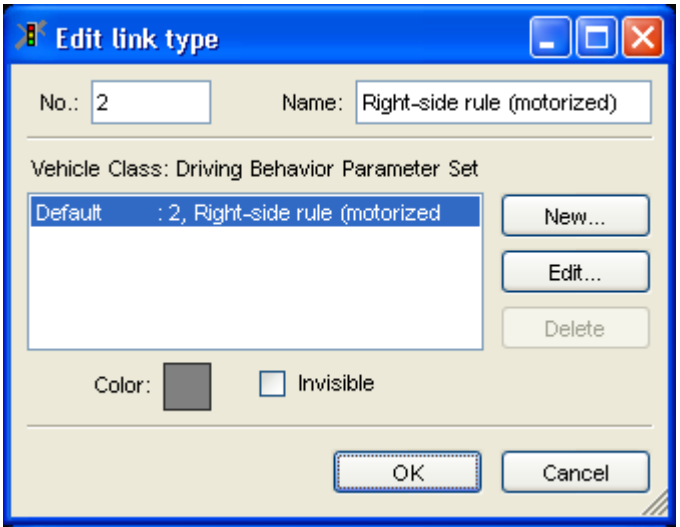


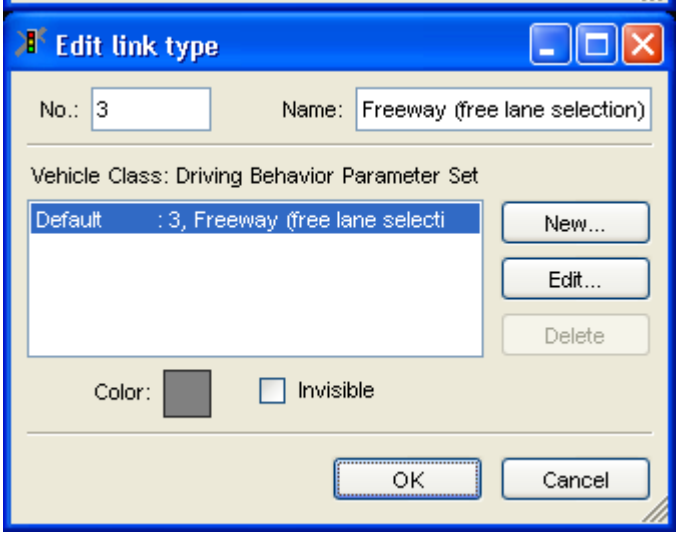



Driving Behavior Parameter Sets
No.
Name
1 Urban (motorized)
2 Right-side rule (motorized)
3 Freeway (free lane selectio
4 Footpath (no interaction)
5 Cycle-Path (free overtakin
No.: 3
Name: Freeway (free lane selection)
Following
Lane Change
Lateral
Amber Signal
Desired position at free flow:
Middle of Lane
Observe vehicles on next lane(s)
Diamond shaped queuing
Overtake on same lane
Vehicle class to be overtaken
on left
on right
All
Min. lateral distance
Vehicle class
Distance [ft] at 0 mph
Distance [ft] at 30 mph
Default
3.28
3.28
OK
Cancel

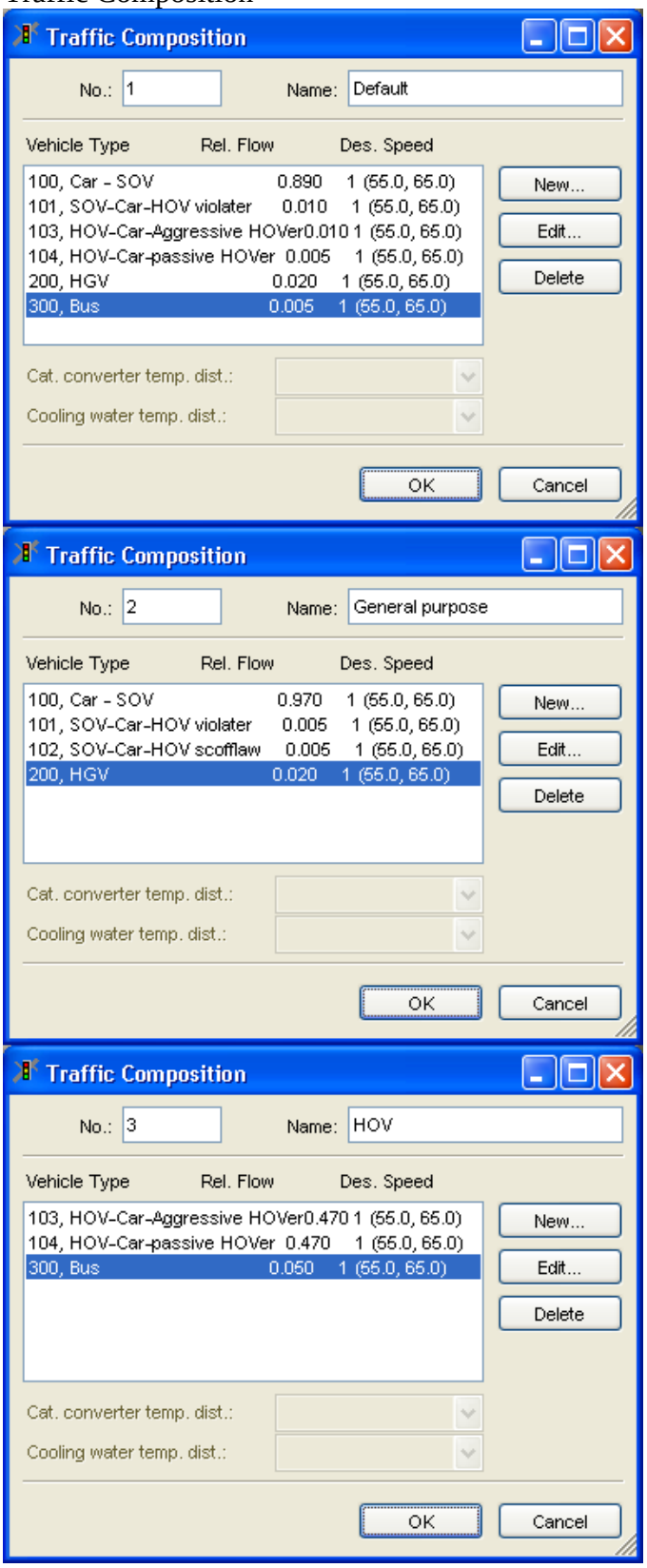

Driving Behavior Parameter Sets
No.
Name
1 Urban (motorized)
2 Right-side rule (motorized)
3 Freeway (free lane selectio
4 Footpath (no interaction)
5 Cycle-Path (free overtakin
No.: 3
Name: Freeway (free lane selection)
Following
Lane Change
Lateral
Amber Signal
Decision model:
Continuous Check
Probability factors:
Alpha: 1.59
Beta 1: -0.26
Beta 2: 0.27
OK
Cancel

Link Types

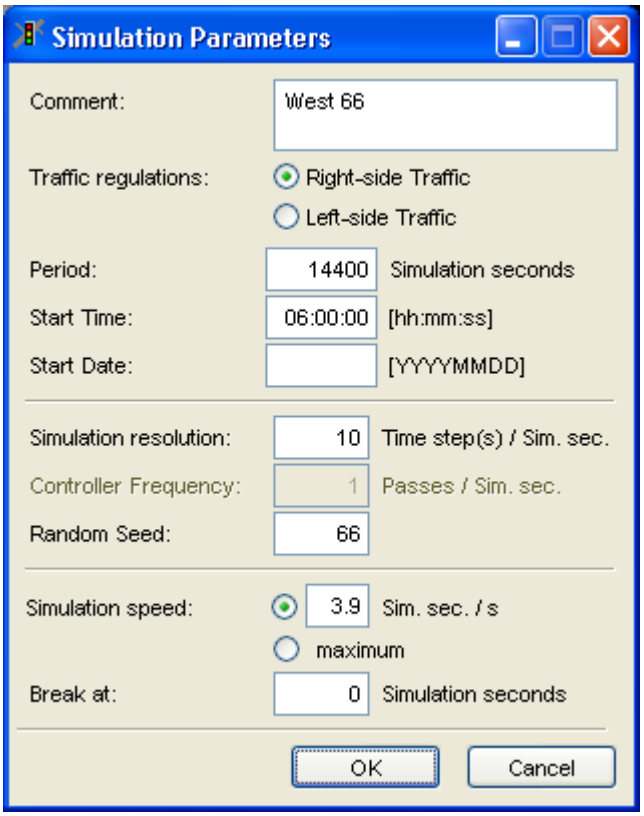

Edit link type
No.: 2
Name: Right-side rule (motorized)
Vehicle Class: Driving Behavior Parameter Set
Default : 2, Right-side rule (motorized
New...
Edit...
Delete
Color:
Invisible
OK
Cancel


Edit link type
No.: 3
Name: Freeway (free lane selection)
Vehicle Class: Driving Behavior Parameter Set
Default : 3, Freeway (free lane selecti
New...
Edit...
Delete
Color:
Invisible
OK
Cancel

Traffic Composition



Simulation Parameters



Vehicle Inputs 1-60

Vehicle Inputs: 216

No.	Name	Traffic...	Volume	From	To
1	WB mainline	1	1704.00	0	600
2	WB mainline2	1	2124.00	600	1200
3	WB mainline3	1	2664.00	1200	1800
4	WB mainline4	1	3180.00	1800	2400
5	WB mainline-5	1	4188.00	2400	3000
6	WB mainline-6	1	4536.00	3000	3600
7	WB mainline-7	1	4776.00	3600	4200
8	WB mainline-8	1	4608.00	4200	4800
9	WB mainline-9	1	4992.00	4800	5400
10	WB mainline-10	1	4873.00	5400	6000
11	WB mainline-11	1	4596.00	6000	6600
12	WB mainline-12	1	4296.00	6600	7200
13	WB mainline-13	1	3216.00	7200	7800
14	WB mainline-14	1	3432.00	7800	8400
15	WB mainline-15	1	3516.00	8400	9000
16	WB mainline-16	1	3300.00	9000	9600
17	WB mainline-17	1	2916.00	9600	10200
18	WB mainline-18	1	2832.00	10200	10800
19	WB mainline-19	1	2856.00	10800	11400
20	WB mainline-20	1	2712.00	11400	12000
21	WB mainline-21	1	2628.00	12000	12600
22	WB mainline-22	1	2112.00	12600	13200
23	WB mainline-23	1	2076.00	13200	13800
24	WB mainline-24	1	2052.00	13800	14400
25	WB GP from Front 1	2	894.00	0	600
26	WB GP from Front2	2	1494.00	600	1200
27	WB GP from Front3	2	1350.00	1200	1800
28	WB GP from Front4	2	1542.00	1800	2400
29	WB GP from Front5	2	1740.00	2400	3000
30	WB GP from Front6	2	1590.00	3000	3600
31	WB GP from Front7	2	1506.00	3600	4200
32	WB GP from Front8	2	1128.00	4200	4800
33	WB GP from Front9	2	864.00	4800	5400
34	WB GP from Front10	2	744.00	5400	6000
35	WB GP from Front11	2	738.00	6000	6600
36	WB GP from Front12	2	516.00	6600	7200
37	WB GP from Front13	2	894.00	7200	7800
38	WB GP from Front14	2	618.00	7800	8400
39	WB GP from Front15	2	714.00	8400	9000
40	WB GP from Front16	2	918.00	9000	9600
41	WB GP from Front17	2	972.00	9600	10200
42	WB GP from Front18	2	780.00	10200	10800
43	WB GP from Front-19	2	936.00	10800	11400
44	WB GP from Front-20	2	1272.00	11400	12000
45	WB GP from Front-21	2	1200.00	12000	12600
46	WB GP from Front-22	2	1032.00	12600	13200
47	WB GP from Front-23	2	1380.00	13200	13800
48	WB GP from Front-24	2	1044.00	13800	14400
55	WB HOV from Front1	3	6.00	0	600
56	WB HOV from Front2	3	6.00	600	1200
57	WB HOV from Front	3	0.00	1200	1800
58	WB HOV from Front4	3	48.00	1800	2400
59	WB HOV from Front5	3	24.00	2400	3000
60	WB HOV from Front6	3	56.00	3000	3600

Zoom
Data...
Delete
Close

Vehicle Inputs 61-142

Vehicle Inputs: 216

No.	Name	Traffic...	Volume	From	To
61	WB HOV from Front7	3	156.00	3600	4200
62	WB HOV from Front8	3	180.00	4200	4800
63	WB HOV from Front9	3	114.00	4800	5400
64	WB HOV f/ Front10	3	114.00	5400	6000
65	WB HOV f/ Front11	3	120.00	6000	6600
66	WB HOV f/ Front12	3	258.00	6600	7200
67	WB HOV f/ Front13	3	126.00	7200	7800
68	WB HOV f/Front14	3	156.00	7800	8400
69	WB HOV f/ Front15	3	162.00	8400	9000
70	WB HOV f/ Front16	3	174.00	9000	9600
71	WB HOV f/ Front17	3	150.00	9600	10200
72	WB HOV F/ Front18	3	84.00	10200	10800
73	WB HOV f/ Front-19	3	108.00	10800	11400
74	WB HOV f/ Front-20	3	84.00	11400	12000
75	WB HOV f/ Front-21	3	36.00	12000	12600
76	WB HOV f/ Front-22	3	30.00	12600	13200
77	WB HOV f/ Front-23	3	36.00	13200	13800
78	WB HOV f/ Front-24	3	24.00	13800	14400
101	WB GP f/ SB 900-1	2	528.00	0	600
102	WB GP f/ SB 900-2	2	672.00	600	1200
103	WB GP f/ SB 900-3	2	852.00	1200	1800
104	WB GP f/ SB 900-4	2	792.00	1800	2400
105	WB GP f/ SB 900-5	2	828.00	2400	3000
106	WB GP f/ SB 900-6	2	936.00	3000	3600
107	WB GP f/SB 900-7	2	1026.00	3600	4200
108	WB GP f/ SB 900-8	2	1152.00	4200	4800
109	WB GP f/ SB 900-9	2	1170.00	4800	5400
110	WB GP f/ SB 900-10	2	1170.00	5400	6000
111	WB GP f/ SB 900-11	2	1104.00	6000	6600
112	WB GP f/ SB 900-12	2	1158.00	6600	7200
113	WB GP f/ SB 900-13	2	1092.00	7200	7800
114	WB GP f/ SB 900-14	2	1044.00	7800	8400
115	WB GP f/ SB 900-15	2	1128.00	8400	9000
116	WB GP f/ SB 900-16	2	948.00	9000	9600
117	WB GP f/ SB 900-17	2	954.00	9600	10200
118	WB GP f/ SB900-18	2	936.00	10200	10800
119	WB GP f/ SB900-19	2	846.00	10800	11400
120	WB GP f/ SB900-20	2	972.00	11400	12000
121	WB GP f/ SB900-21	2	840.00	12000	12600
122	WB GP f/ SB900-22	2	774.00	12600	13200
123	WB GP f/ SB900-22	2	774.00	13200	13800
124	WB GP f/ SB900-24	2	762.00	13800	14400
131	WB HOV f/ SB900-1	3	48.00	0	600
132	WB HOV f/ SB900-2	3	72.00	600	1200
133	WB HOV f/ SB900-3	3	90.00	1200	1800
134	WB HOV f/ SB900-4	3	96.00	1800	2400
135	WB HOV f/ SB900-5	3	96.00	2400	3000
136	WB HOV f/ SB900-6	3	132.00	3000	3600
137	WB HOV f/ SB900-7	3	180.00	3600	4200
138	WB HOV f/ SB900-8	3	246.00	4200	4800
139	WB HOV f/ SB900-9	3	282.00	4800	5400
140	WB HOV f/ SB900-10	3	252.00	5400	6000
141	WB HOV f/ SB900-11	3	402.00	6000	6600
142	WB HOV f/ SB900-12	3	276.00	6600	7200

Zoom
Data...
Delete
Close

Vehicle Inputs 143-218

Vehicle Inputs: 216

No.	Name	Traffic...	Volume	From	To
143	WB HOV f/ SB900-13	3	336.00	7200	7800
144	WB HOV f/ SB900-14	3	348.00	7800	8400
145	WB HOV f/ SB900-15	3	264.00	8400	9000
146	WB HOV f/ SB900-16	3	174.00	9000	9600
147	WB HOV f/ SB900-17	3	186.00	9600	10200
148	WB HOV f/ SB900-18	3	174.00	10200	10800
149	WB HOV f/ SB900-19	3	198.00	10800	11400
150	WB HOV f/ SB900-20	3	192.00	11400	12000
151	WB HOV f/ SB900-21	3	240.00	12000	12600
152	WB HOV f/ SB900-22	3	180.00	12600	13200
153	WB HOV f/ SB900-23	3	186.00	13200	13800
154	WB HOV f/ SB900-24	3	150.00	13800	14400
161	WB HOV f/ NB900-1	3	162.00	0	600
162	WB HOV f/ NB900-2	3	144.00	600	1200
163	WB HOV f/ NB900-3	3	222.00	1200	1800
164	WB HOV f/ NB900-4	3	192.00	1800	2400
165	WB HOV f/ NB900-5	3	222.00	2400	3000
166	WB HOV f/ NB900-6	3	252.00	3000	3600
167	WB HOV f/ NB900-7	3	180.00	3600	4200
168	WB HOV f/ NB900-8	3	234.00	4200	4800
169	WB HOV f/ NB900-9	3	162.00	4800	5400
170	WB HOV f/ NB900-10	3	168.00	5400	6000
171	WB HOV f/ NB900-11	3	180.00	6000	6600
172	WB HOV f/ NB900-12	3	138.00	6600	7200
173	WB HOV f/ NB900-13	3	72.00	7200	7800
174	WB HOV f/ NB900-14	3	198.00	7800	8400
175	WB HOV f/ NB900-15	3	198.00	8400	9000
176	WB HOV f/ NB900-16	3	162.00	9000	9600
177	WB HOV f/ NB900-17	3	174.00	9600	10200
178	WB HOV f/ NB900-18	3	180.00	10200	10800
179	WB HOV f/ NB900-19	3	144.00	10800	11400
180	WB HOV f/ NB900-20	3	270.00	11400	12000
181	WB HOV f/ NB900-21	3	186.00	12000	12500
182	WB HOV f/ NB900-22	3	126.00	12600	13200
183	WB HOV f/ NB900-23	3	210.00	13200	13800
184	WB HOV f/ NB900-24	3	228.00	13800	14400
201	WB GP f/ NB900-1	2	156.00	0	600
202	WB GP f/ NB900-2	2	168.00	600	1200
203	WB GP f/ NB900-3	2	330.00	1200	1800
204	WB GP f/ NB900-4	2	294.00	1800	2400
205	WB GP f/ NB900-5	2	342.00	2400	3000
206	WB GP f/ NB900-6	2	186.00	3000	3600
207	WB GP f/ NB900-7	2	330.00	3600	4200
208	WB GP f/ NB900-8	2	294.00	4200	4800
209	WB GP f/ NB900-9	2	348.00	4800	5400
210	WB GP f/ NB900-10	2	330.00	5400	6000
211	WB GP f/ NB900-11	2	330.00	6000	6600
212	WB GP f/ NB900-12	2	294.00	6600	7200
213	WB GP f/ NB900-13	2	306.00	7200	7800
214	WB GP f/ NB900-14	2	246.00	7800	8400
215	WB GP f/ NB900-15	2	240.00	8400	9000
216	WB GP f/ NB900-16	2	252.00	9000	9600
217	WB GP f/ NB900-17	2	228.00	9600	10200
218	WB GP f/ NB900-18	2	228.00	10200	10800

Zoom
Data...
Delete
Close

Vehicle Inputs 219-354

Vehicle Inputs: 216

No.	Name	Traffic...	Volume	From	To
219	WB GP f/ NB900-19	2	240.00	10800	11400
220	WB GP f/ NB900-20	2	192.00	11400	12000
221	WB GP f/ NB900-21	2	282.00	12000	12600
222	WB GP f/ NB900-22	2	270.00	12600	13200
223	WB GP f/ NB900-23	2	168.00	13200	13800
224	WB GP f/ NB900-24	2	324.00	13800	14400
301	WB GP f/ WLS-1	2	336.00	0	600
302	WB GP f/ WLS-2	2	504.00	600	1200
303	WB GP f/ WLS-3	2	510.00	1200	1800
304	WB GP f/ WLS-4	2	660.00	1800	2400
305	WB GP f/ WLS-5	2	924.00	2400	3000
306	WB GP f/ WLS-6	2	972.00	3000	3600
307	WB GP f/ WLS-7	2	834.00	3600	4200
308	WB GP f/ WLS-8	2	882.00	4200	4800
309	WB GP f/ WLS-9	2	912.00	4800	5400
310	WB GP f/ WLS-10	2	936.00	5400	6000
311	WB GP f/ WLS-11	2	918.00	6000	6600
312	WB GP f/ WLS-12	2	864.00	6600	7200
313	WB GP f/ WLS-13	2	726.00	7200	7800
314	WB GP f/ WLS-14	2	732.00	7800	8400
315	WB GP f/ WLS-15	2	786.00	8400	9000
316	WB GP f/ WLS-16	2	816.00	9000	9600
317	WB GP f/ WLS-17	2	744.00	9600	10200
318	WB GP f/ WLS-18	2	708.00	10200	10800
319	WB GP f/ WLS-19	2	690.00	10800	11400
320	WB GP f/ WLS-20	2	738.00	11400	12000
321	WB GP f/ WLS-21	2	864.00	12000	12600
322	WB GP f/ WLS-22	2	468.00	12600	13200
323	WB GP f/ WLS-23	2	666.00	13200	13800
324	WB GP f/ WLS-26	2	558.00	13800	14400
331	WB NOV f/ WLS-1	2	24.00	0	600
332	WB NOV f/ WLS-2	3	48.00	600	1200
333	WB NOV f/ WLS-3	3	36.00	1200	1800
334	WB NOV f/ WLS-4	3	30.00	1800	2400
335	WB NOV f/ WLS-5	3	60.00	2400	3000
336	WB NOV f/ WLS-6	3	114.00	3000	3600
337	WB NOV f/ WLS-7	3	162.00	3600	4200
338	WB NOV f/ WLS-8	3	246.00	4200	4800
339	WB NOV f/ WLS-9	3	174.00	4800	5400
340	WB NOV f/ WLS-10	3	192.00	5400	6000
341	WB NOV f/ WLS-11	3	282.00	6000	6600
342	WB NOV f/ WLS-12	3	246.00	6600	7200
343	WB NOV f/ WLS-13	3	270.00	7200	7800
344	WB NOV f/ WLS-14	3	318.00	7800	8400
345	WB NOV f/ WLS-15	3	240.00	8400	9000
346	WB NOV f/ WLS-16	3	192.00	9000	9600
347	WB NOV f/ WLS-17	3	246.00	9600	10200
348	WB NOV f/ WLS-18	3	192.00	10200	10800
349	WB NOV f/ WLS-19	3	174.00	10800	11400
350	WB NOV f/ WLS-20	3	150.00	11400	12000
351	WB NOV f/ WLS-21	3	138.00	12000	12600
352	WB NOV f/ WLS-22	3	102.00	12600	13200
353	WB NOV f/ WLS-23	3	78.00	13200	13800
354	WB NOV f/ WLS-24	3	66.00	13800	14400

Zoom
Data...
Delete
Close

Routing

Routes: 25

Decision	Route	Volume
1	1	440
1	2	4230
2	1	350
2	2	5300
8	1	1
10	1	1
11	1	1
12	1	1
17	1	1
18	1	1
19	1	1
20	1	1
23	1	1
24	1	1
27	1	6190
27	2	480
28	1	5600
28	2	1700
29	1	10
29	2	90
30	1	1
30	2	1
34	1	45
34	2	55
35	1	1

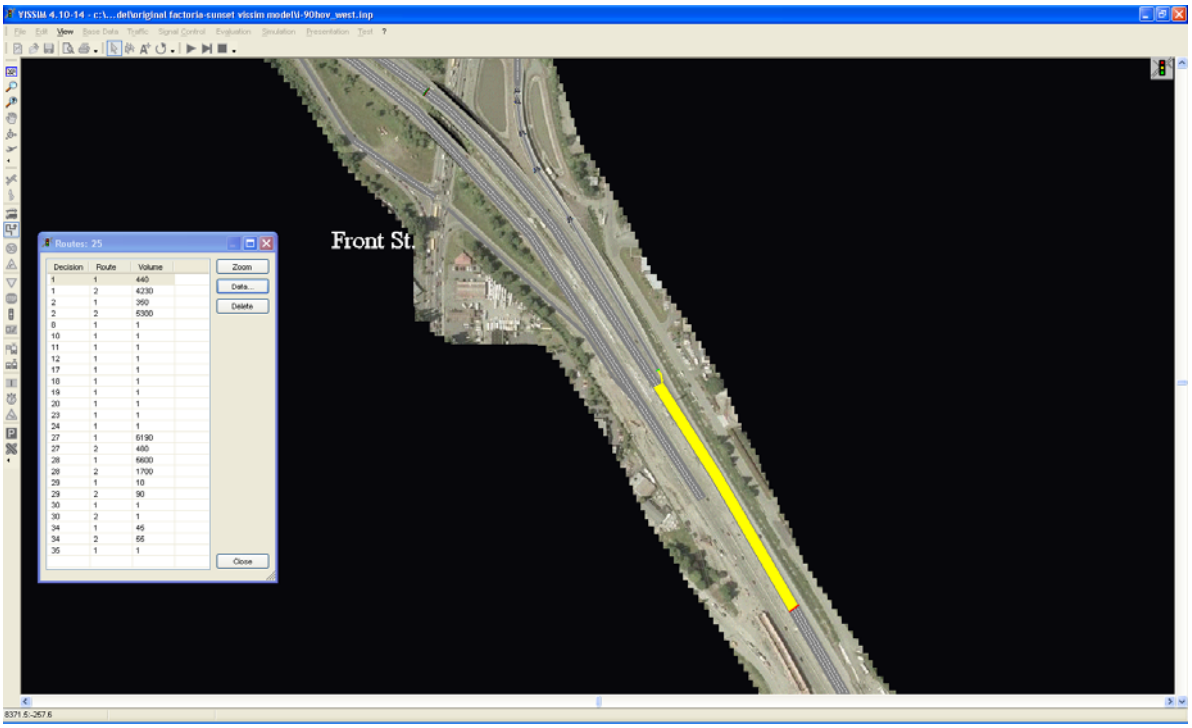
Zoom

Data...

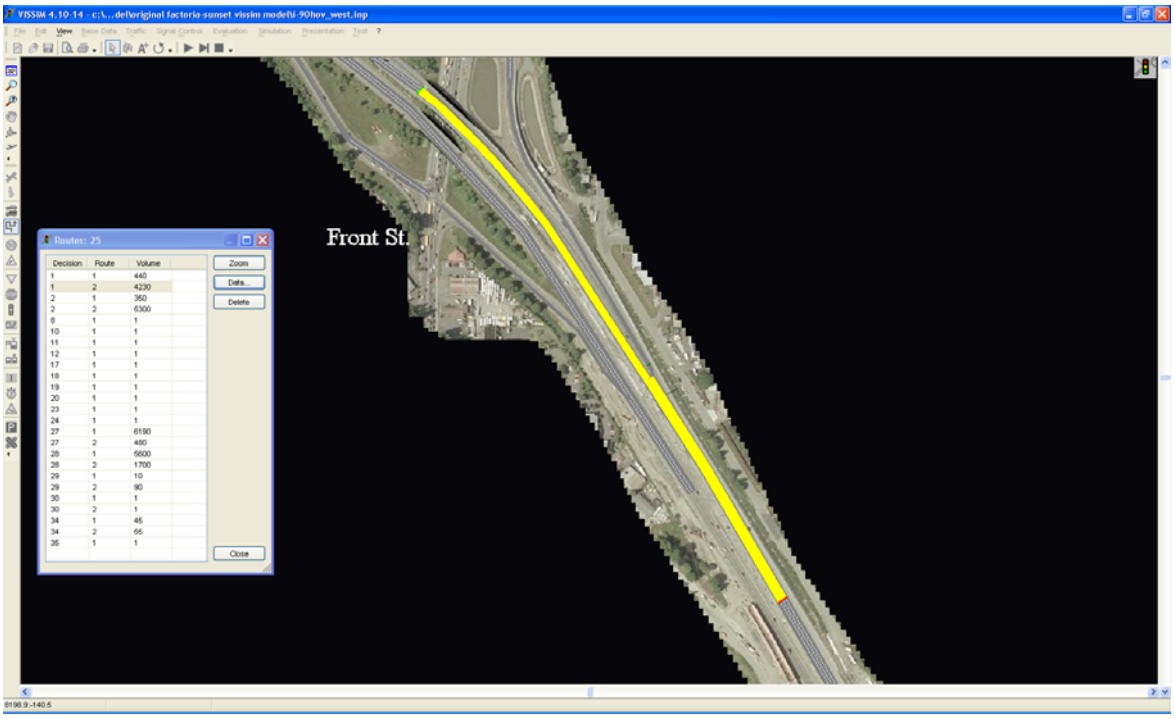
Delete

Close

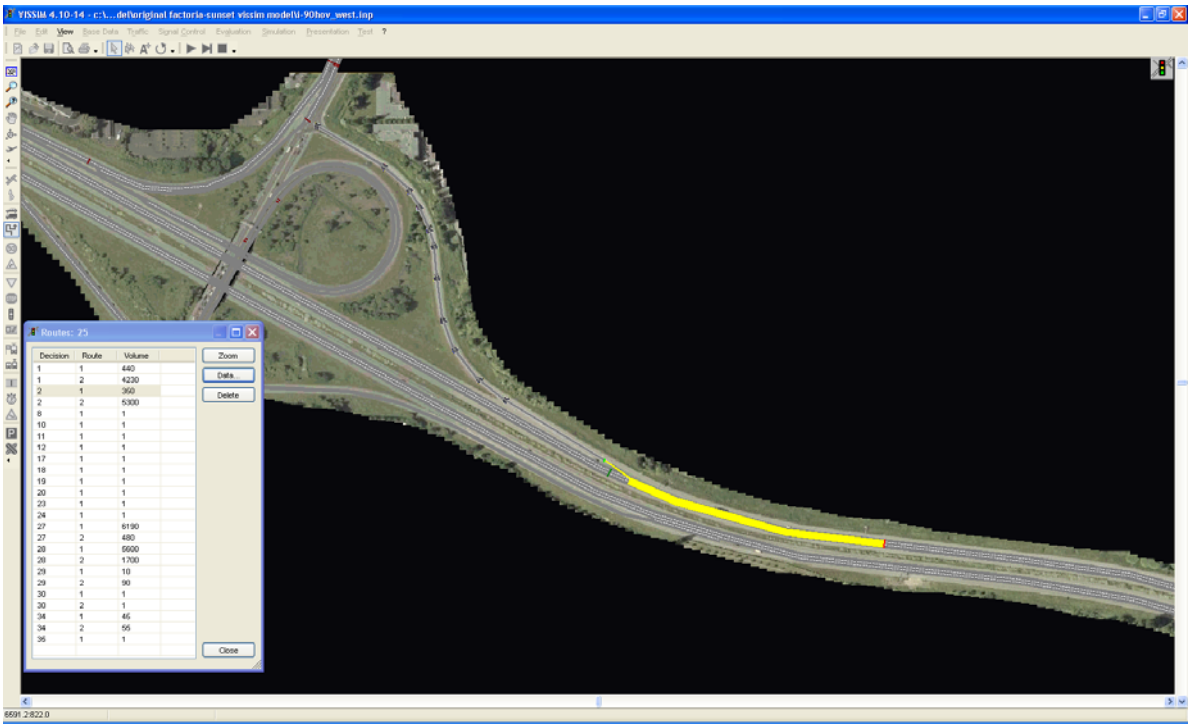
Route 1-1



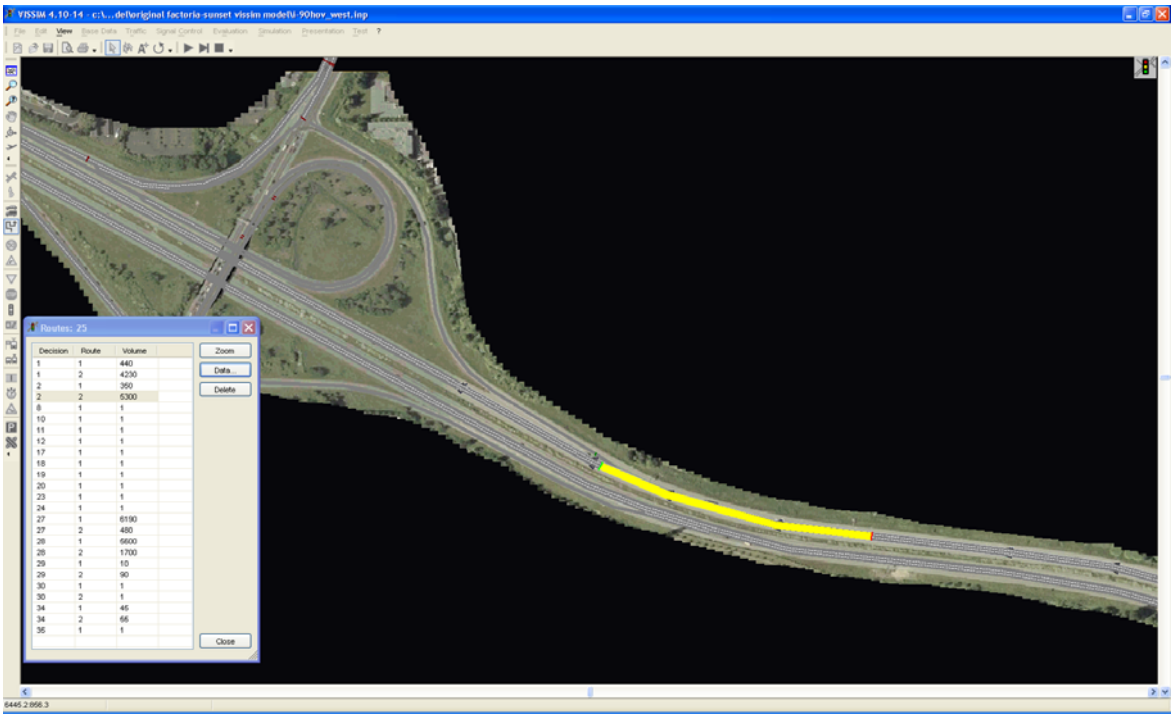
Route 1-2



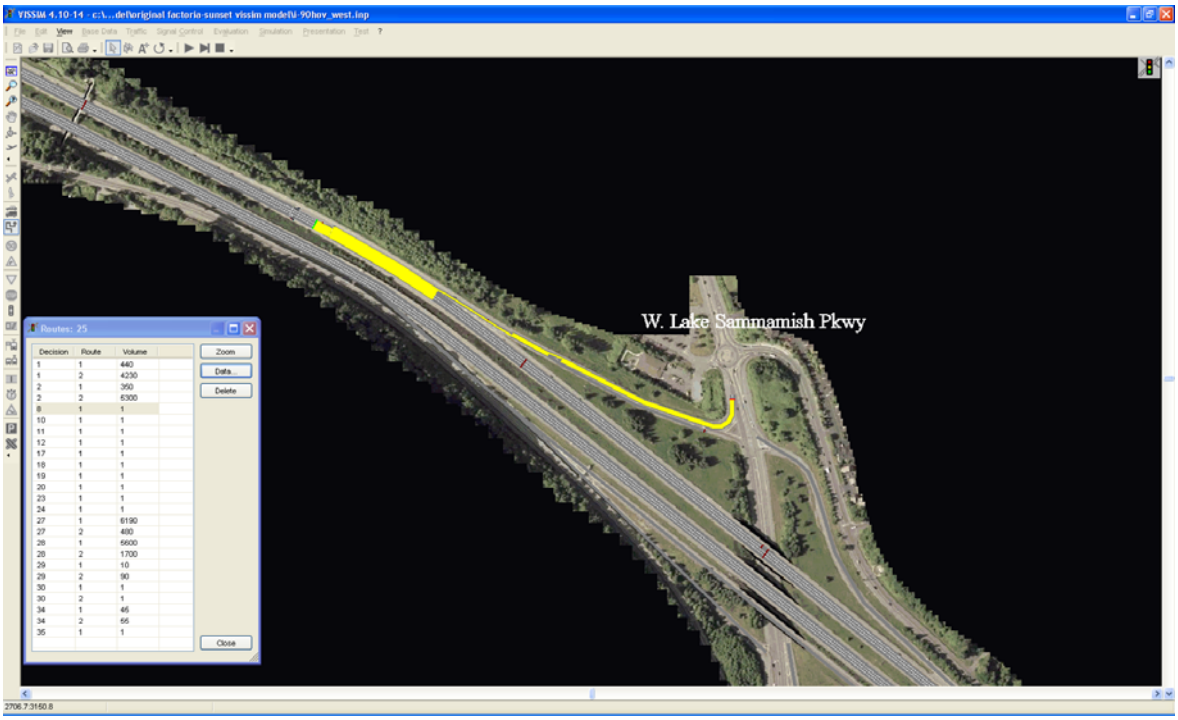
Route 2-1



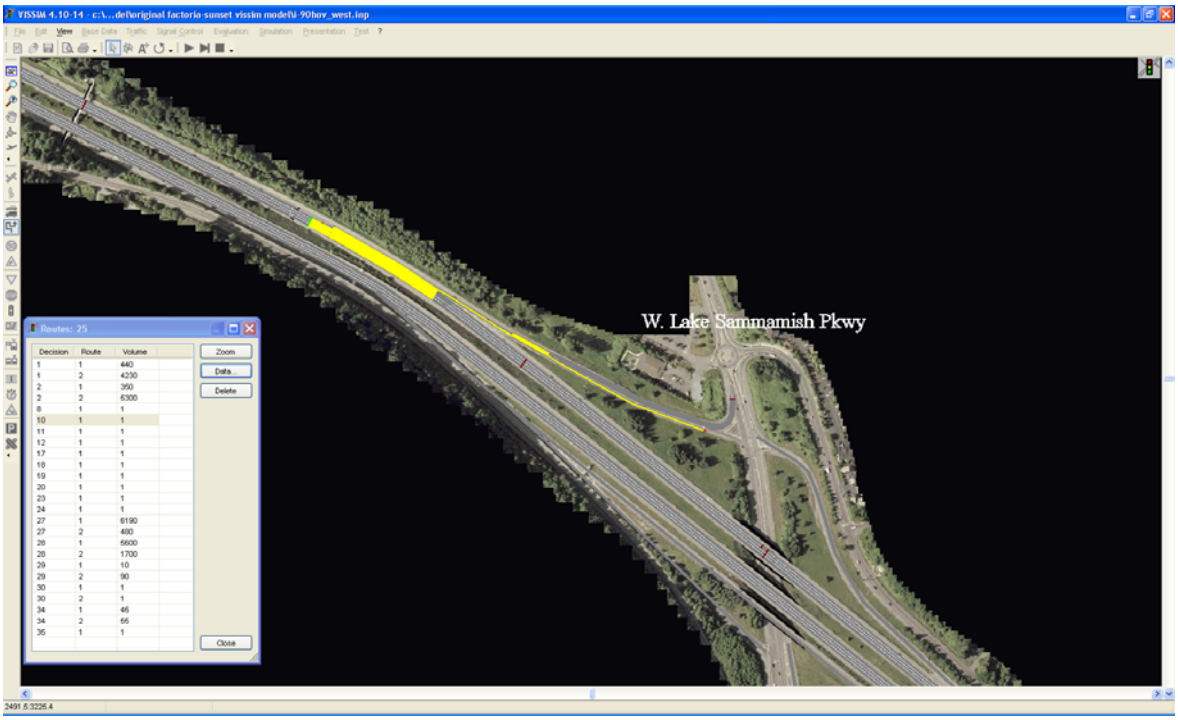
Route 2-2



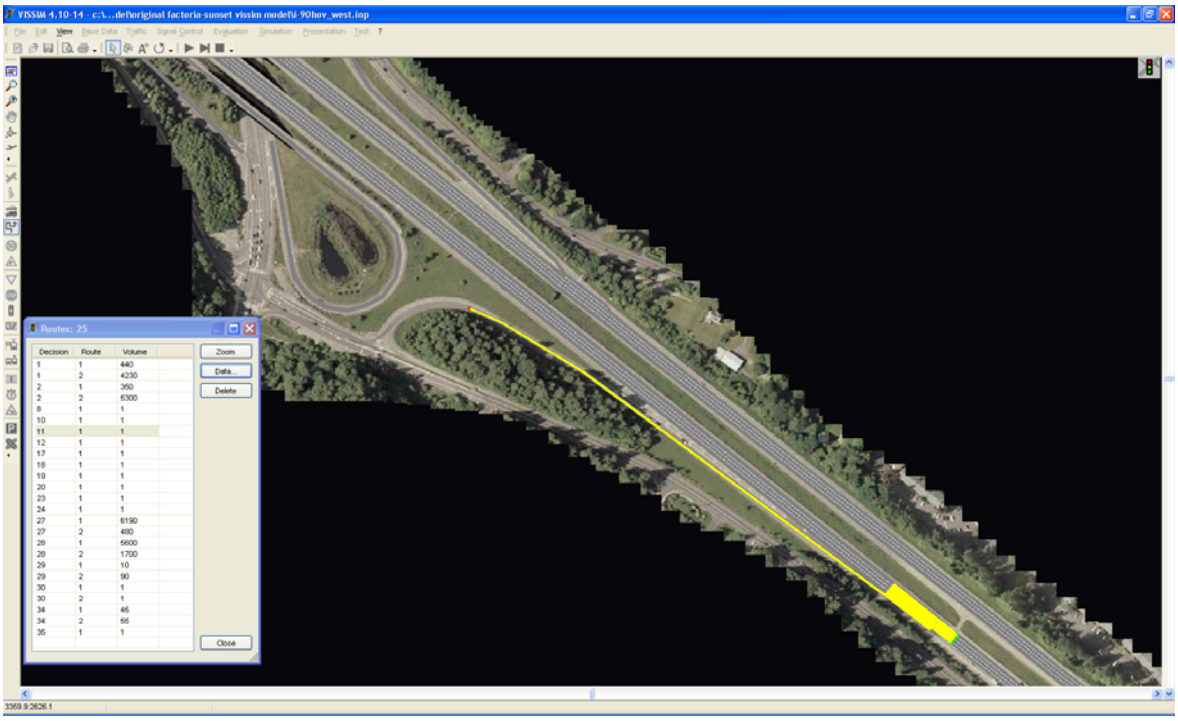
Route 8-1



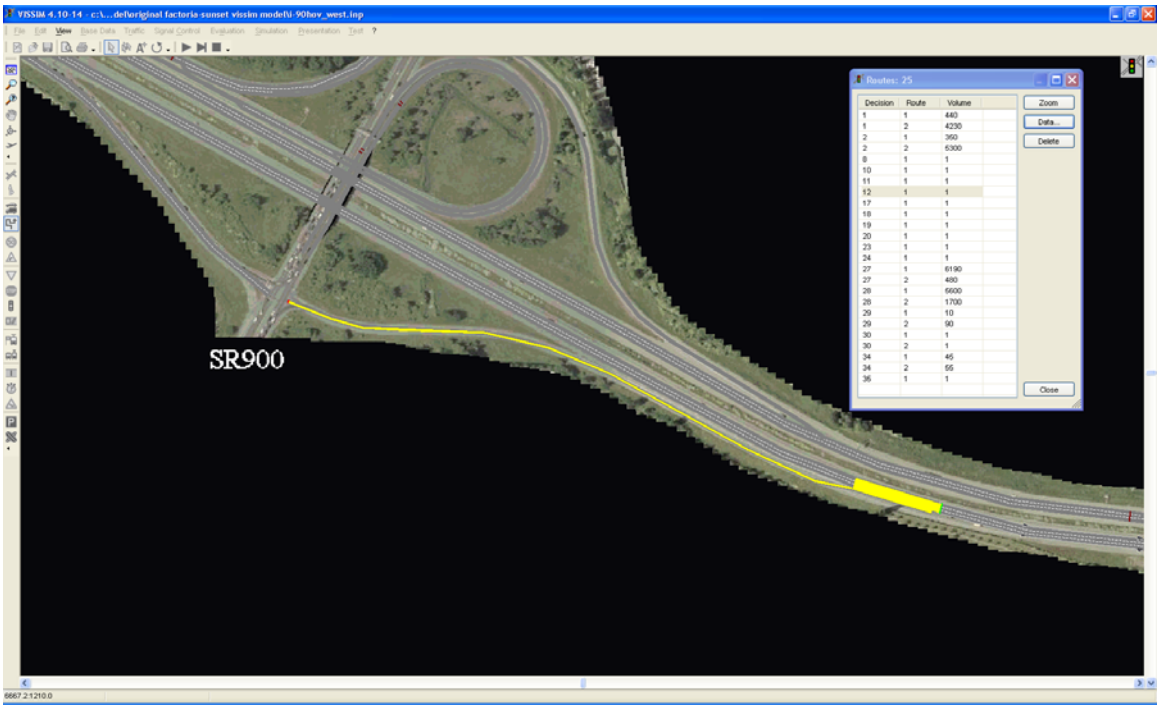
Route 10-1



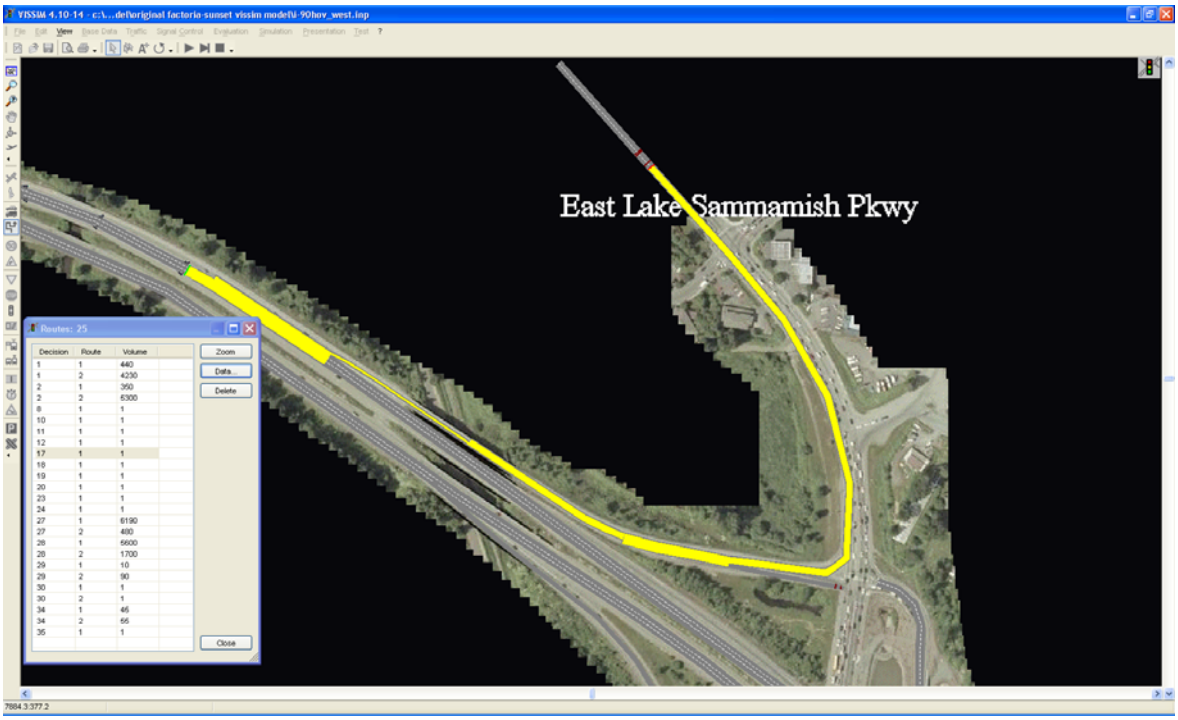
Route 11-1



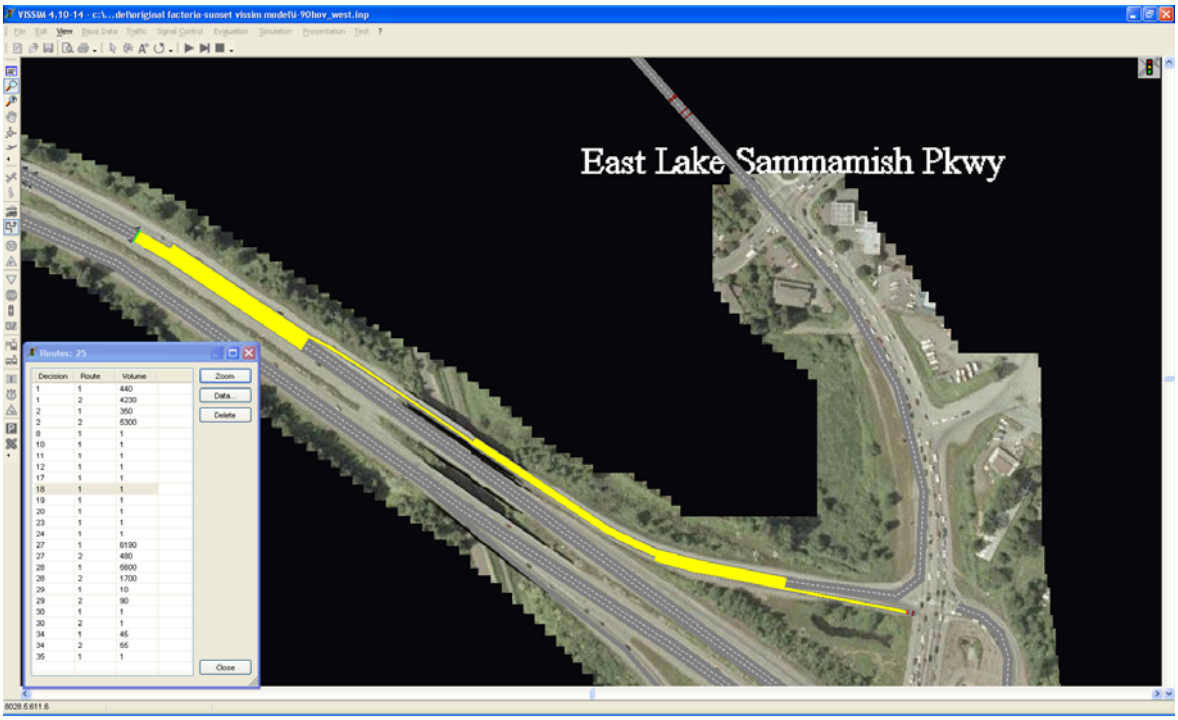
Route 12-1



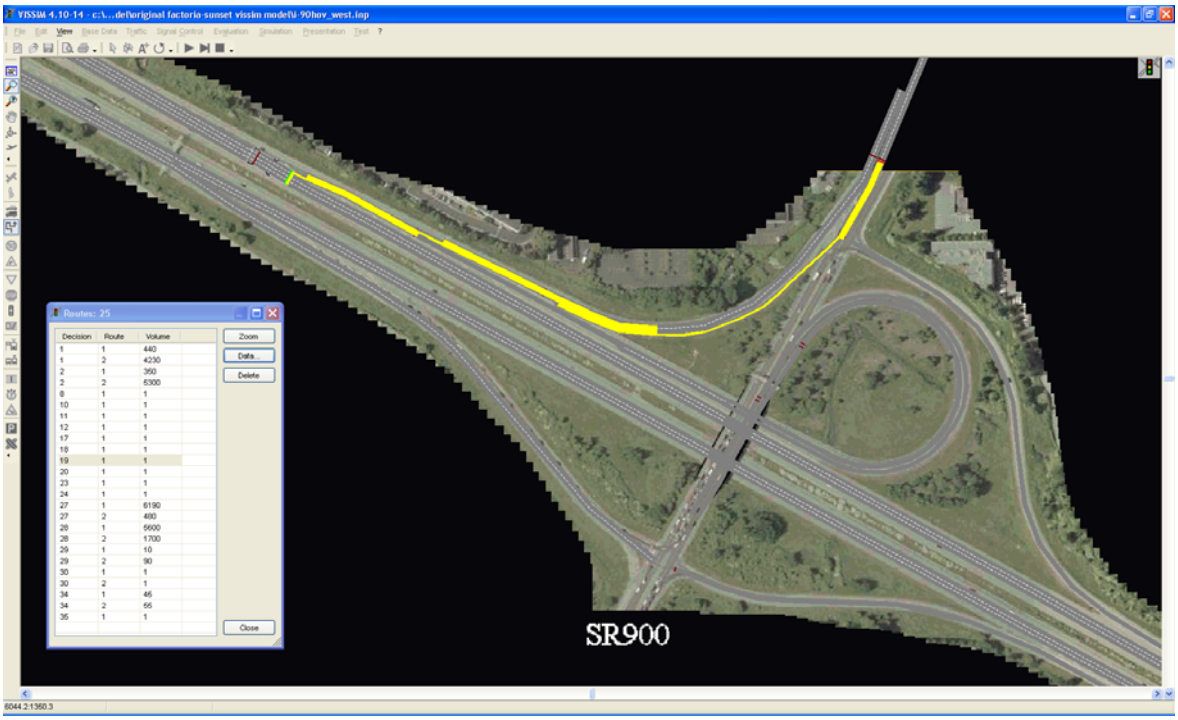
Route 17-1



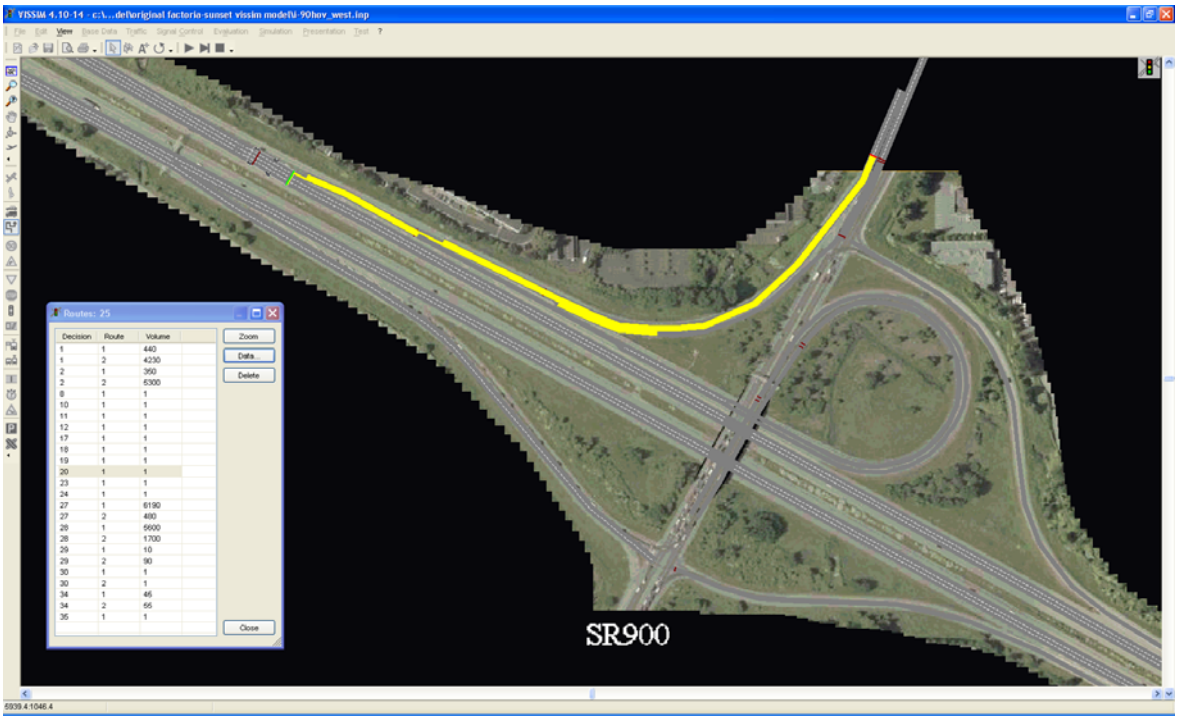
Route 18-1



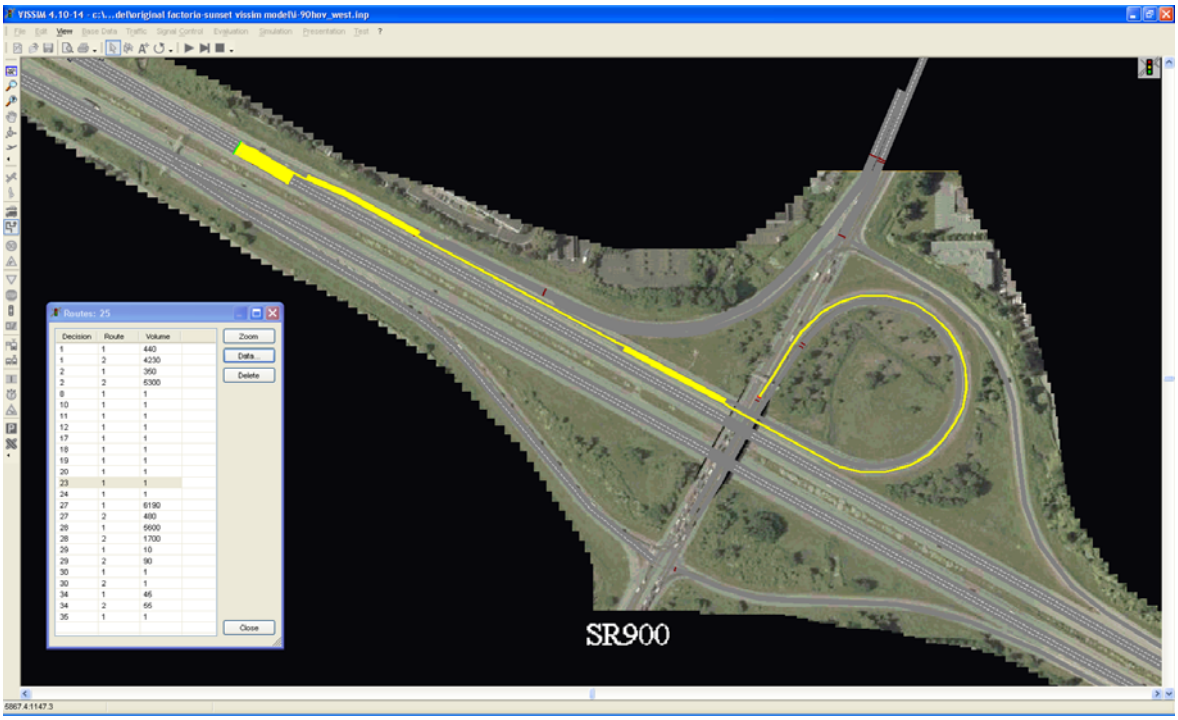
Route 19-1



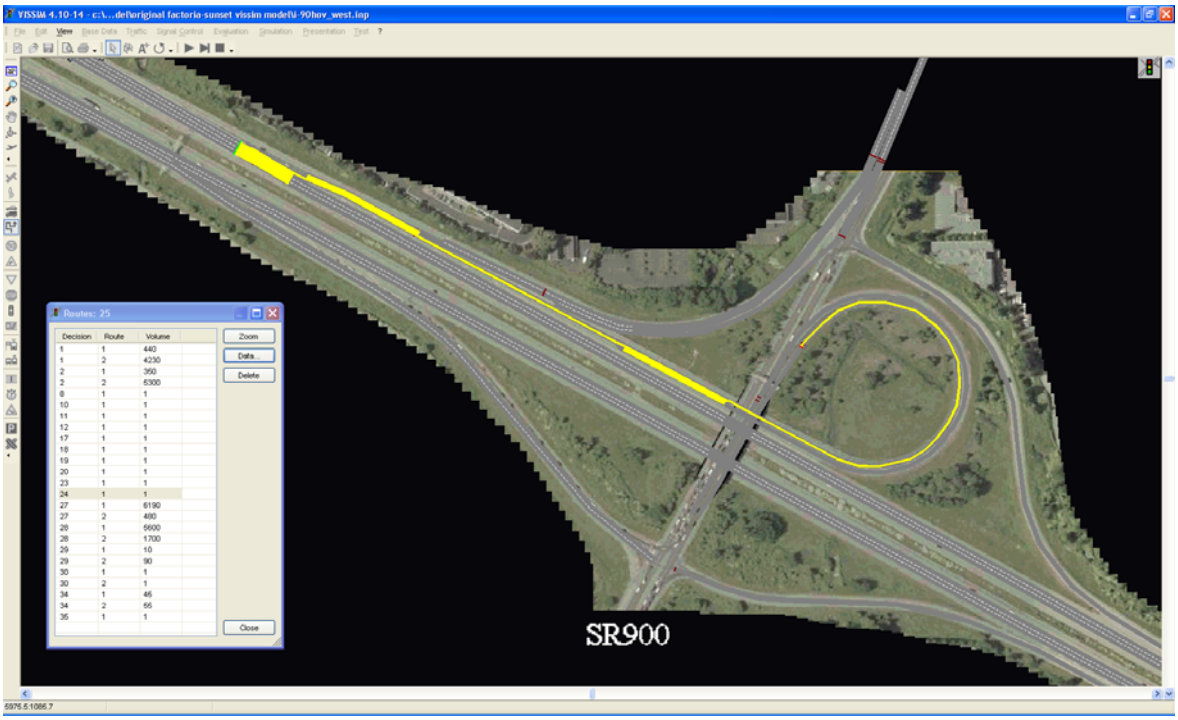
Route 20-1



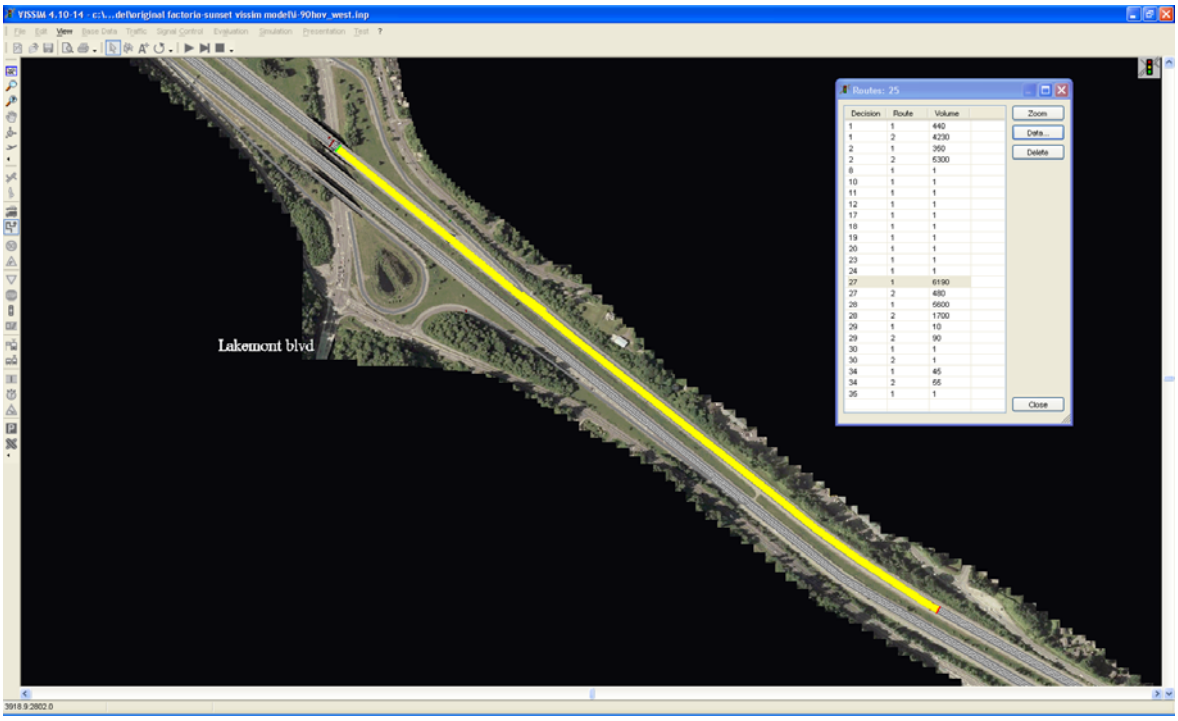
Route 23-1



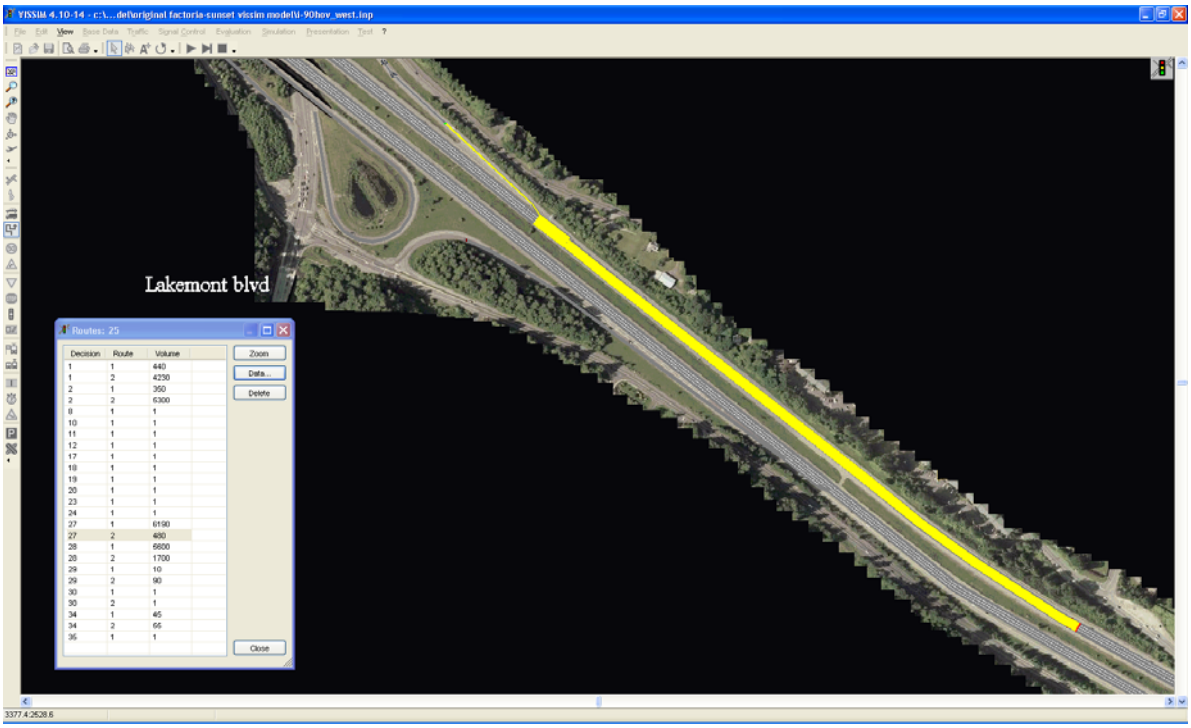
Route 24-1



Route 27-1



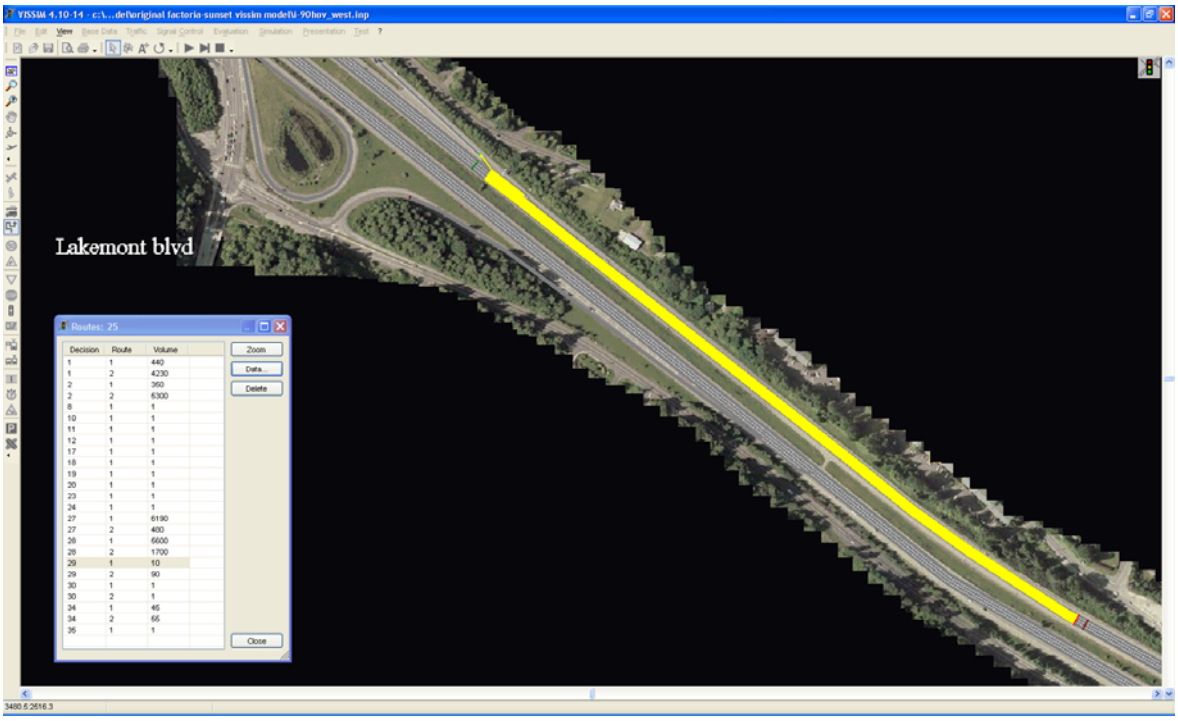
Route 27-2



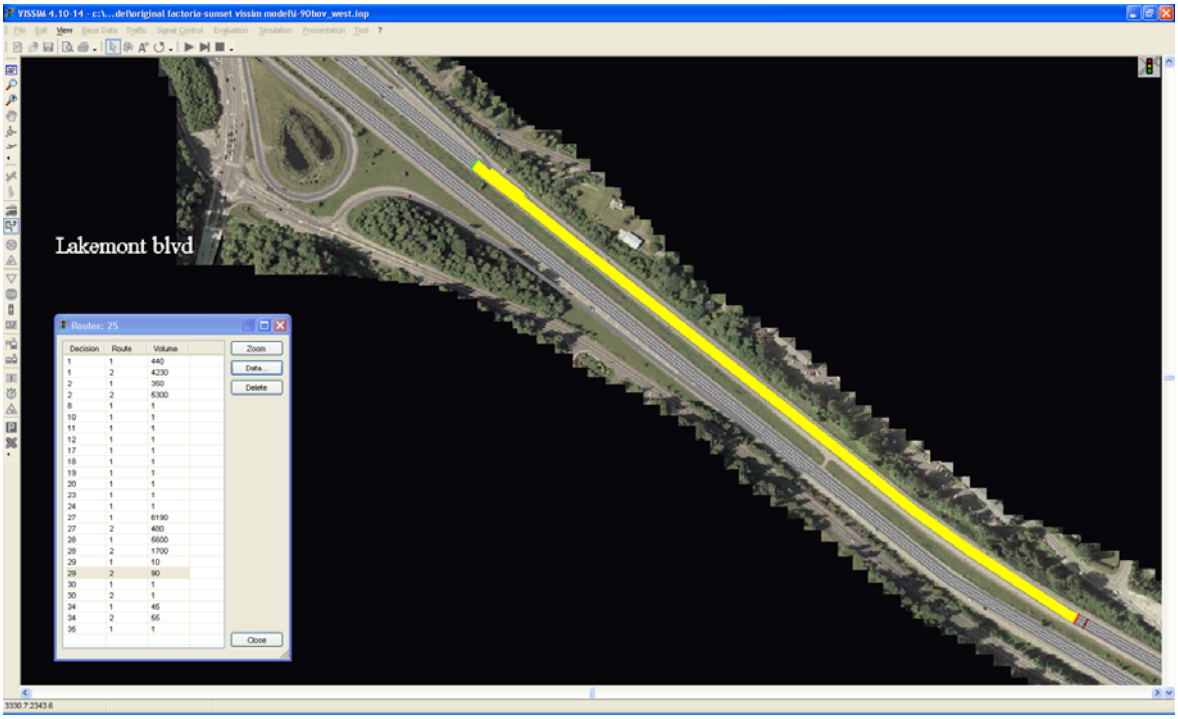
Route 28-1

Route 28-2

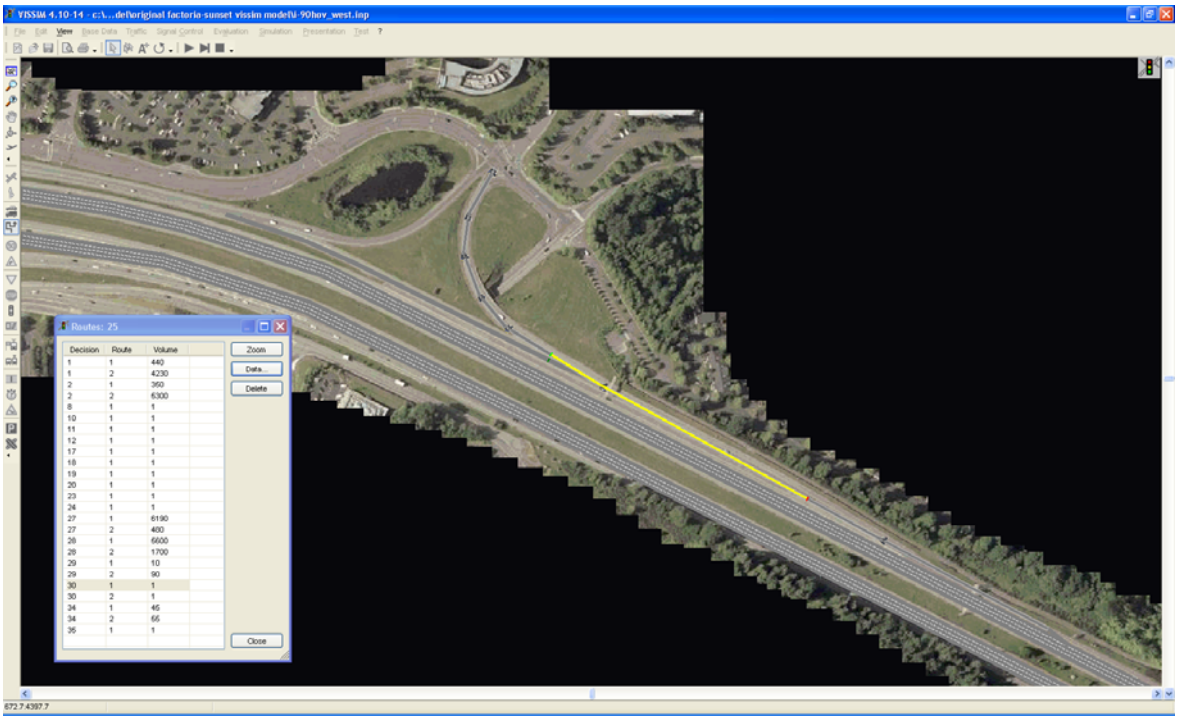
Route 29-1



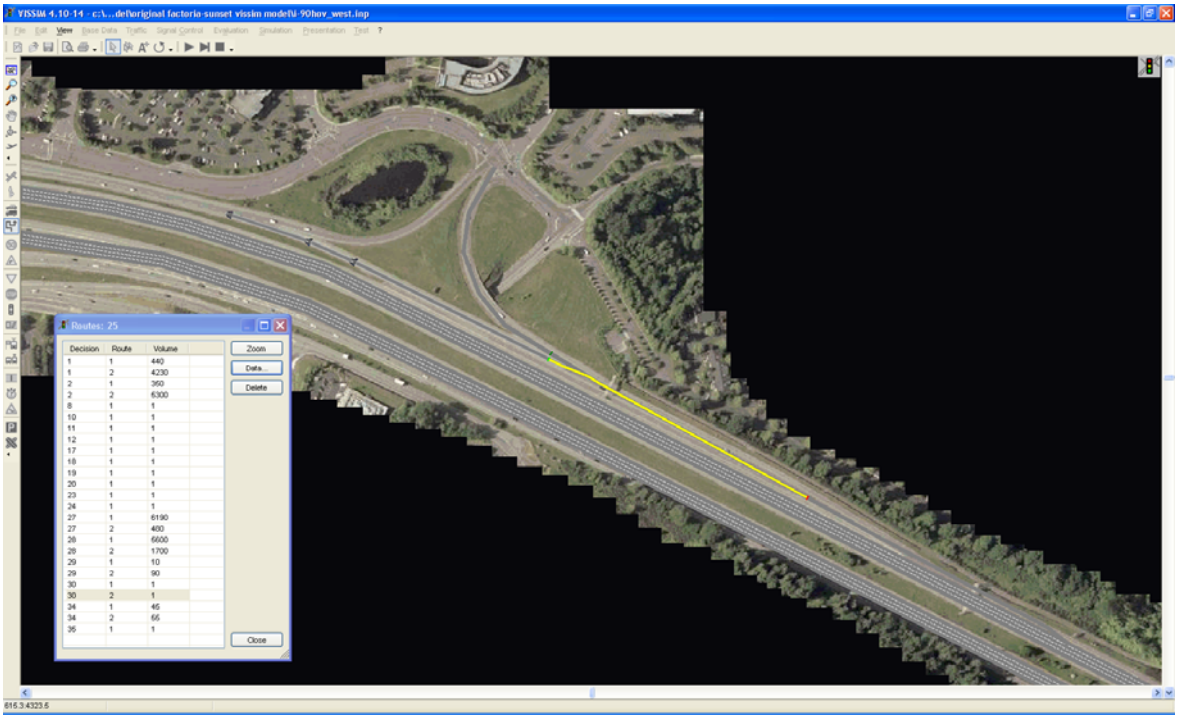
Route 29-2



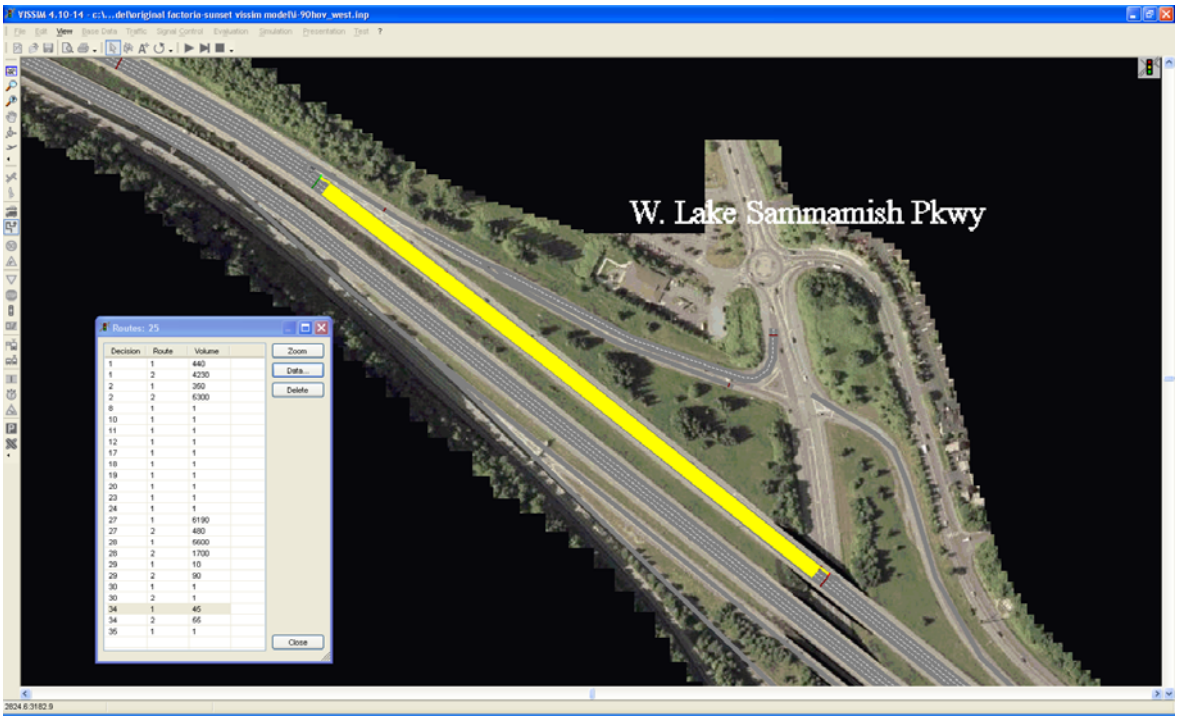
Route 30-1



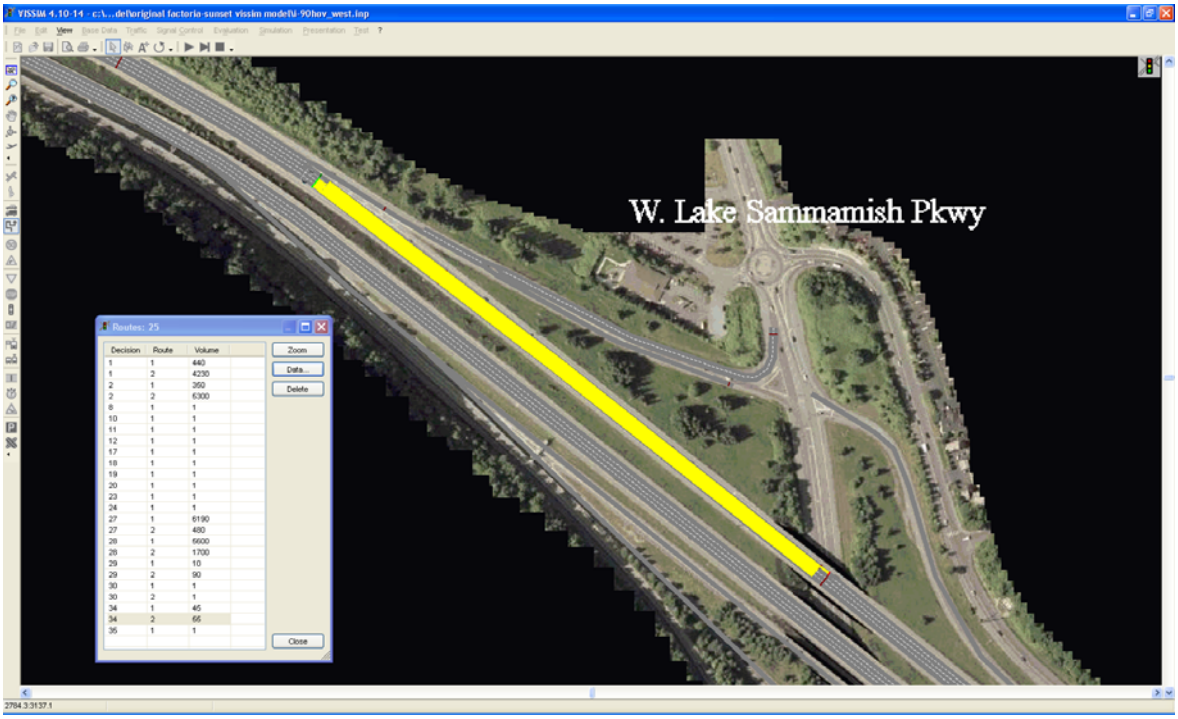
Route 30-2



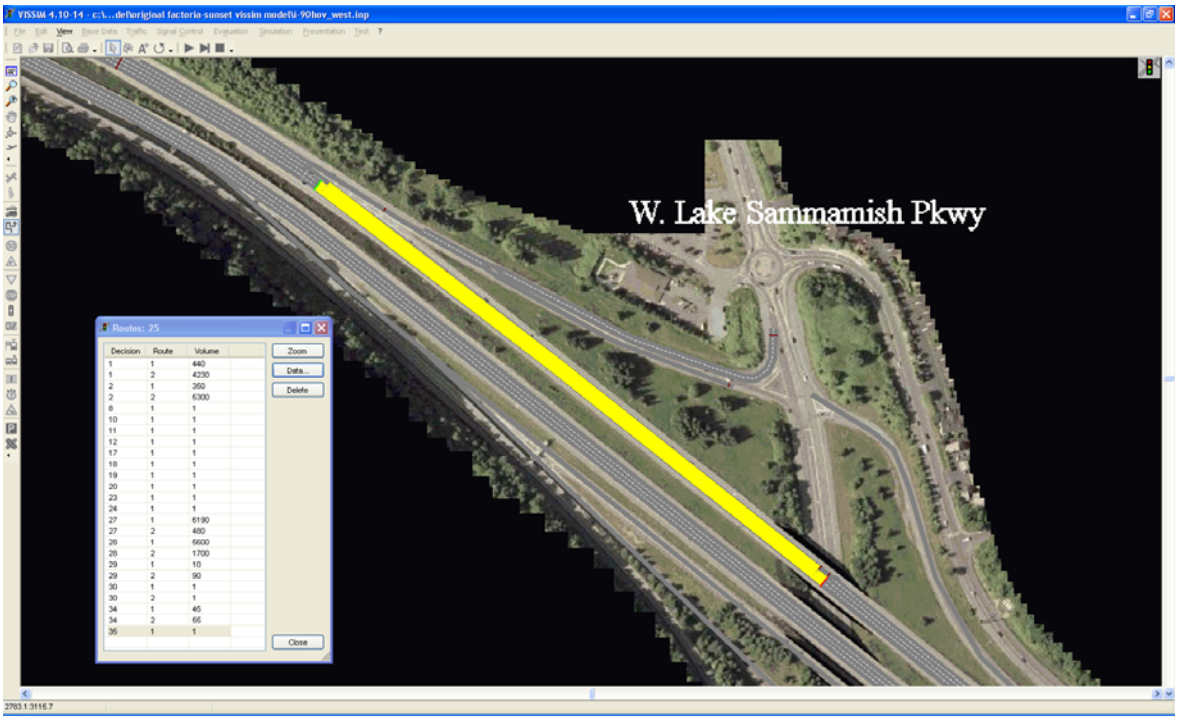
Route 34-1



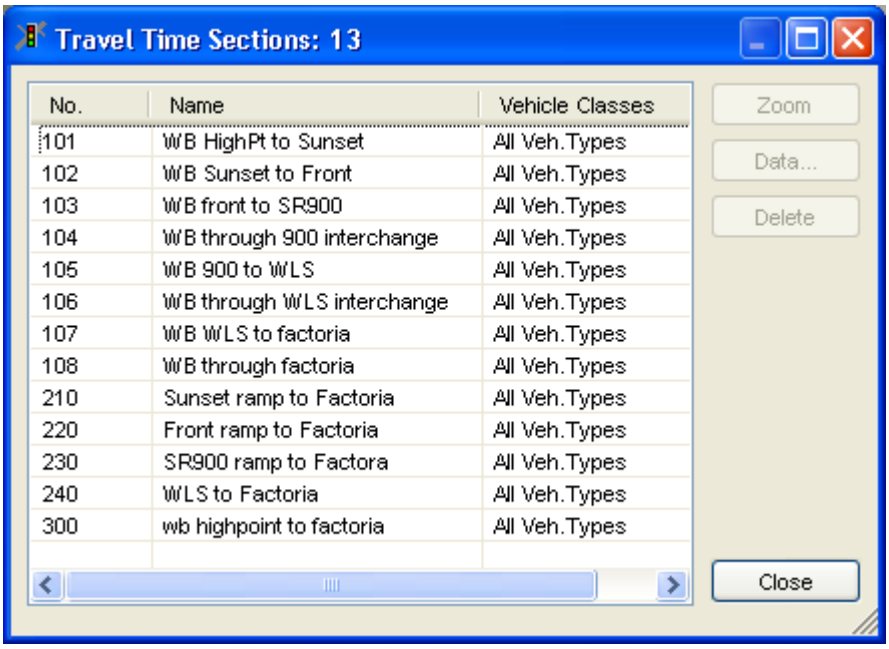
Route 34-2



Route 36-1



Travel Time Sections



No.	Name	Vehicle Classes
101	WB HighPt to Sunset	All Veh.Types
102	WB Sunset to Front	All Veh.Types
103	WB front to SR900	All Veh.Types
104	WB through 900 interchange	All Veh.Types
105	WB 900 to WLS	All Veh.Types
106	WB through WLS interchange	All Veh.Types
107	WB WLS to factoria	All Veh.Types
108	WB through factoria	All Veh.Types
210	Sunset ramp to Factoria	All Veh.Types
220	Front ramp to Factoria	All Veh.Types
230	SR900 ramp to Factora	All Veh.Types
240	WLS to Factoria	All Veh.Types
300	wb highpoint to factoria	All Veh.Types

APPENDIX B: USING THE VISSIM ARCHIVE

The Simulation Archive (SA) website simplifies the process of documenting, storing, and locating VISSIM models. The Simulation Archive also assists in creating and maintaining a library of this documentation.

The website is accessible through any standard Web browser.

INTRODUCTION

Simulation Archive is a prototype of an automated tool to implement the guidelines contained in "A Guide to Documenting VISSIM-Based Microscopic Traffic Simulation Models."

Simulation Archive Approach

1. **Design a browser-based interactive tool.**

2. **Automate the documentation process whenever possible.**

3. **Prompt the user for information that cannot be readily determined from the model files.**

4. **Use the VISSIM model documentation approach developed during the Sim Lab project to structure the resulting documentation.**

5. **Develop tools to build a collection of VISSIM models.**

Simulation Archive Functions

1. **Automatically extract model descriptions from the VISSIM model's input data files.**

2. **Prompt the user interactively for other brief descriptive text, narratives (e.g., objective of the model, assumptions), and associated documentation files.**

3. **Enable the user to produce graphical snapshots of user-specified model sub-areas (e.g., interchanges) to enhance the documentation.**

4. **Archive each documented model, and enable future look-up and retrieval of a model.**

Simulation Archive Product

A browser-accessible online document containing:

1. **Model geometry data, vehicle attributes and volume inputs, driving behavior parameters, signal controller settings, and roadway attributes.**

2. **Maps of the model and snapshots of subsets of the model.**

3. **Links between associated elements in the documentation, using hyperlink pop-ups (e.g., link a roadway type name to corresponding driver behavior parameters, or link a street name to a map)**

4. **Model description text from the user.**

5. **Links to associated files (e.g., other documentation, graphics, etc.).**

Simulation Archive automatically generates items 1, 2, and 3, while items 4 and 5 are produced through interactive prompts to the user. In addition, Simulation Archive has tools to enable the user to add a new model into a library of models, keep a record of the library's contents, and retrieve any model in the future.

FIND A SIMULATION MODEL

On the right side of the dark border (see Figure 1), on top of the opening window, are the choices: *Submit Model*, *Log In*, *Sign Up*.

Search

This choice allows the user to search for an archive by keywords.

Browse

Listing Simulations

Figure 2 shows available models (one model per .inp file in an uploaded archive).

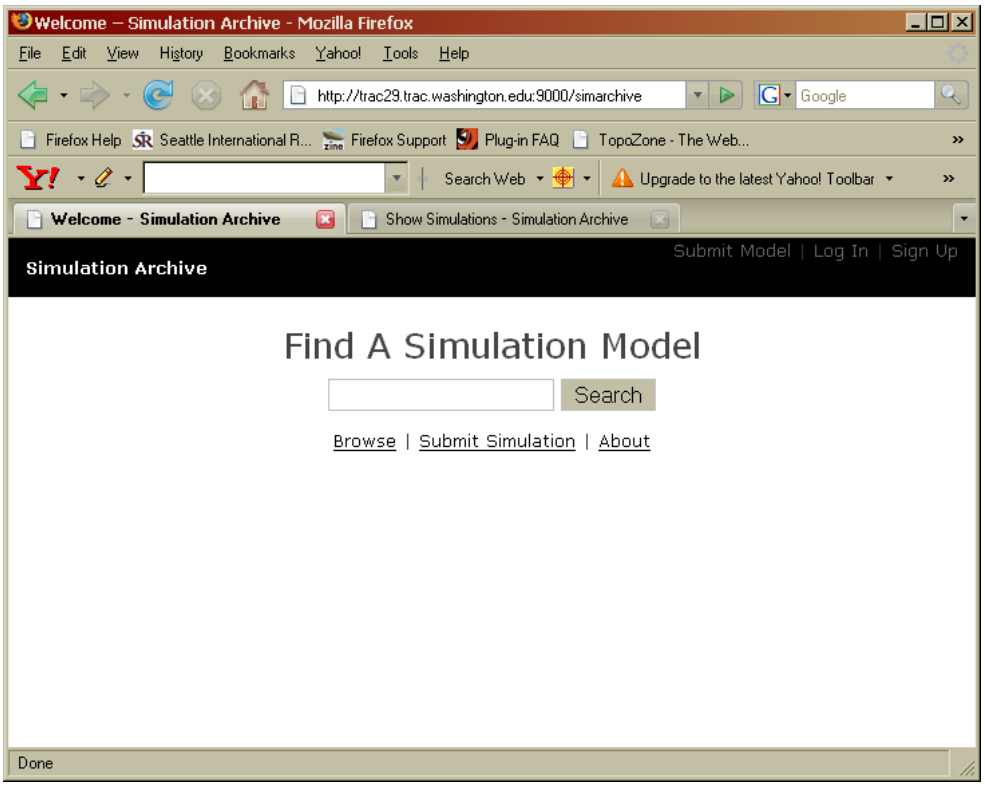


Figure 1. Entering the URL in the Web browser displays the opening screen.

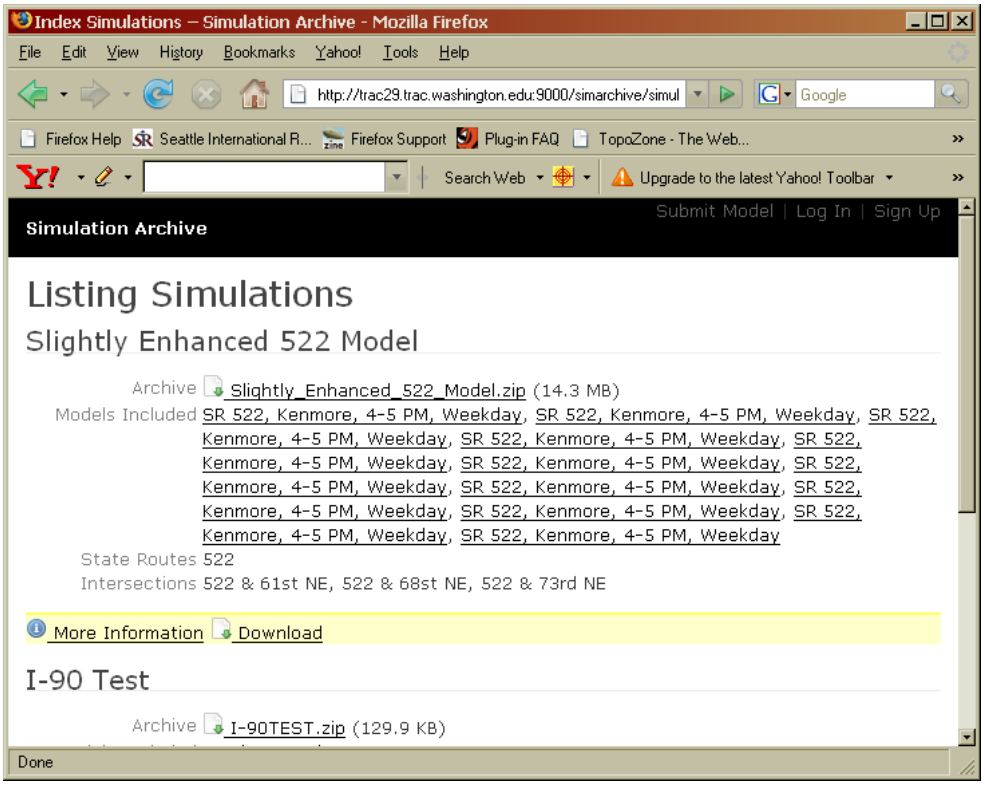


Figure 2. The list of models is displayed.

Archive

The name of the archive, in the library, is listed. The creator of the archive supplies this name.

Clicking on the archive will present the user with a dialog window to select a utility to unzip the archive (see Figure 3).

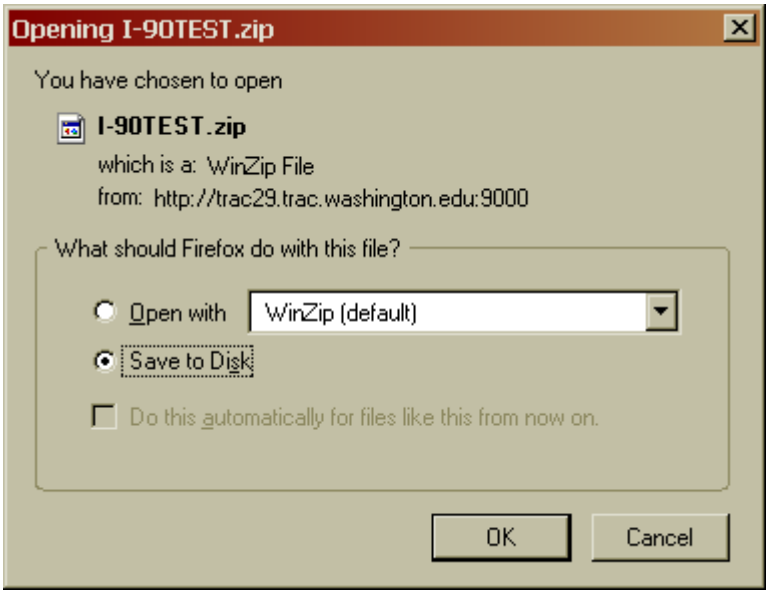


Figure 3. The user may opt to unzip the archive (select *Open with*).

If the archive is unzipped, the files contained in it will be listed in a new window. (See Figure 4)

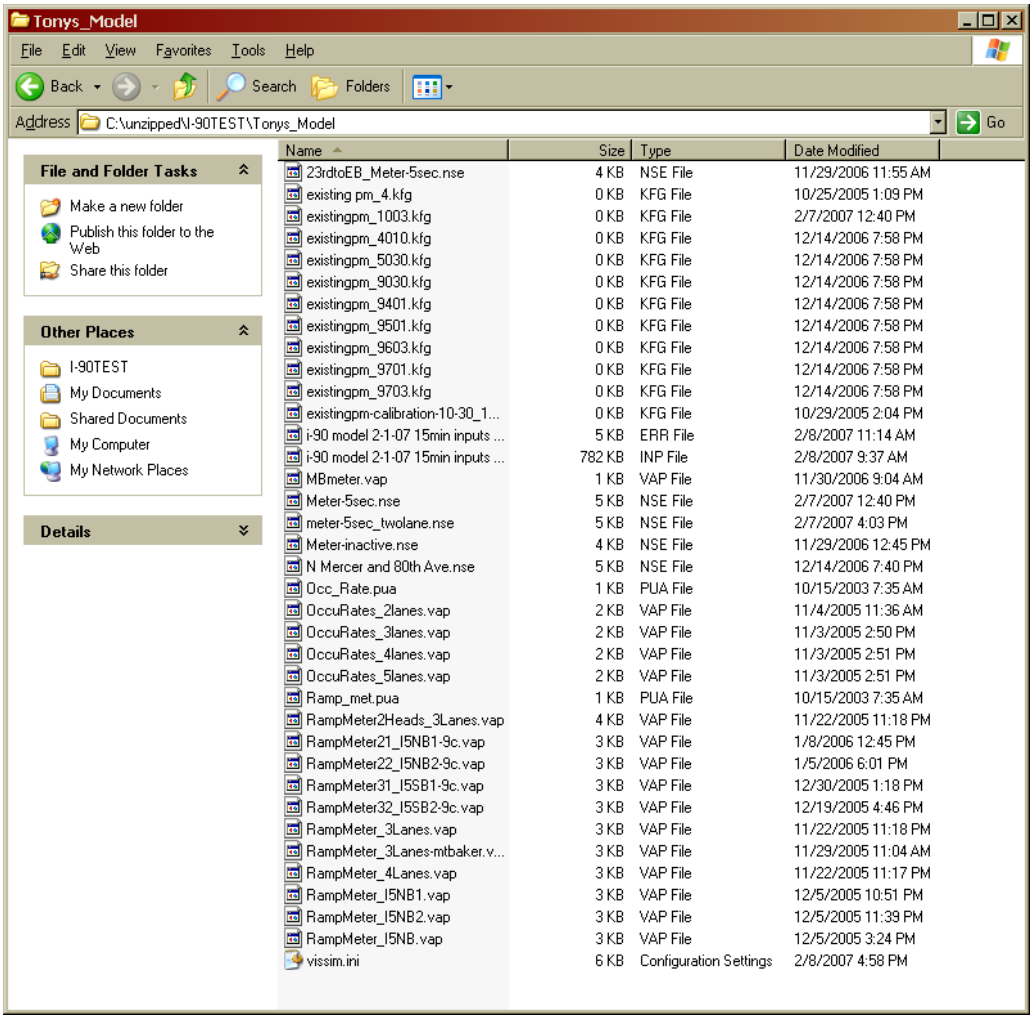


Figure 4. The contents of the unzipped archive are displayed.

Models Included

These are the models that make up the archive. The Simulation Archive automatically generates the list of files that make up the archive when it scans the archive.

Clicking on a model will display information about it, including a map (see Figure 5), Vehicle Types, Driving Behaviors, Signal Controllers, Link Types, Transit Lines, Traffic Compositions, Vehicle Inputs, and Travel Time Observations.

522 MODEL: SR 522, KENMORE, 4-5 PM, WEEKDAY

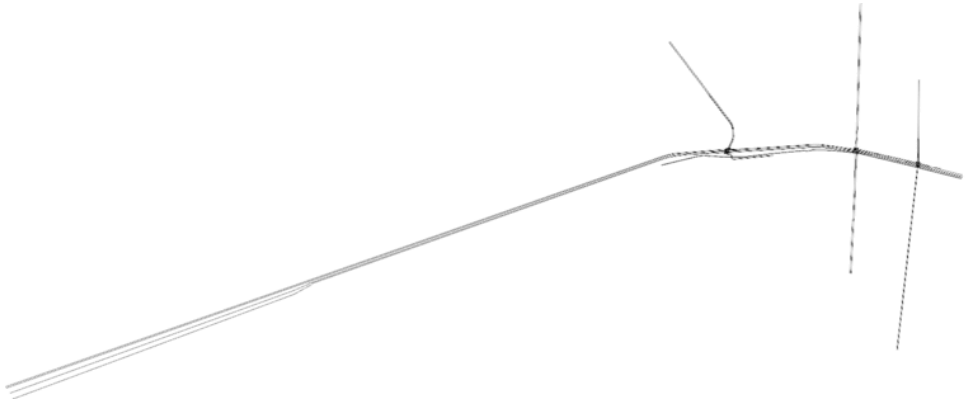


Figure 5. The freeways and arterials of the model are shown. This image is displayed by selecting a model.

State Routes and Intersections

State Routes and Intersections are entered when the archive is uploaded. These metadata are used when archives are searched and are displayed when archives are browsed.

More Information

This choice displays information about the model. A map of the modeled roads is displayed, along with more detailed views of specific locations the submitter has highlighted. When possible, the Simulation Archive will display configuration parameters from the model.

Download

This choice downloads a simulation archive (all the .inp files, images, etc.) from the library. This archive is complete and allows the user to run the model.

Submit Simulation

This is equivalent to selecting *Submit Model* in the upper right hand margin.

From the opening menu (see Figure 1) choose "Submit Simulation."

If you are not already signed up, choose "Sign Up" from the upper right hand corner of the top margin.

Enter "Login" and "Password."

You will be asked to verify that Simulation Parameters (e.g., Start Time and Period) are defined and that Major Elements (e.g., links, vehicle types, driving behaviors) are named.

The folder containing the model must already be zipped.

Use the Browse button to locate the zip archive.

List each State Route modeled by using the Add Route and Add Intersection links.

There is an option to also input annotated close-up views of specific parts of the map by clicking on a particular location. As each part of the map is selected, a separate close-up graphic of that location will appear, and you can attach a description or key words to that graphic.

Add contact information.

Hit the Save button.

Verify That the Model Has Been Uploaded

Go back to the main menu and select Browse. A list of available archives is displayed (see Figure 2). At the bottom of the list is highlighted text for viewing simulations not yet accepted (see Figure 6). Selecting this option displays the recently uploaded archive (see Figure 7).

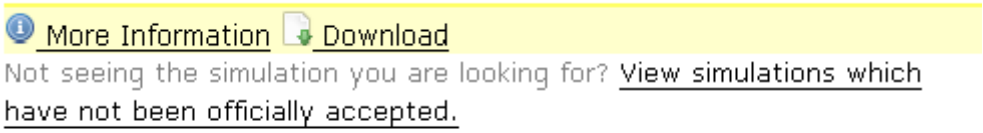


Figure 6. At the bottom of the list of archives is a link to display archives not yet officially accepted.

Figure 7. The recently uploaded archive is displayed, with "Pending Acceptance" as its Status.

About

Accesses the Simulation Archive, the library of simulation models.

CONCLUSION

Simulation Archive is an initial attempt to facilitate documenting, storing, and locating VISSIM models. It contains the features necessary for dealing with the current state of simulation models. The growing popularity of VISSIM will lead to a greater complexity of models. This increase in complexity, accompanied by an increased scope of Simulation Archive applications, will lead to the need for enhanced features in Simulation Archive.