

Ventura County Transportation Model

user's guide

prepared for

Ventura County Transportation Commission & Iteris

prepared by

Cambridge Systematics, Inc.

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1.0 Introduction

This User's Guide provides instructions on operation of the Ventura County Transportation Model (VCTM). Information is provided regarding installing the model, managing model scenario data, and running the model.

The model is run from the TransCAD software platform through a customized user interface. Scenario and file management is achieved through a scenario management system integrated into the user interface. A basic understanding of the TransCAD software program is recommended for model users. However, users unfamiliar with the software should be able to perform some modeling tasks with the assistance of this guide.

1.1 System Requirements

The model must be run on a computer running Windows and the TransCAD software program. Specific system requirements are shown in Table 1.1. The listed requirements are suggested minimums; a computer that does not meet these requirements may still succeed in running the model. Increased processor speeds and multiple processor cores will reduce the amount of time required to run the model. The disk space required for installation must be available on the drive where TransCAD has been installed. The disk space required for additional scenarios should be located on a local drive and must be available before attempting to run the model.

Table 1.1 System Requirements

Operating System	Windows 10 or later (1)
Processor	Recent Intel or AMD processor with 16 to 32 cores, 32 recommended (2)
Memory	32 GB
TransCAD Software	Version 9.0, build 32920
Storage	A High-speed, locally attached solid state drive is recommended
Disk Space (Installation and Input)	700-800 MB
Disk Space (Each scenario)	20 GB for each scenario, about 16 GB if some intermediate files are deleted (3)
Disk Space (Temp Files)	About 100 GB Free on the C:\ Drive, or if present, Z:\TEMP (4)

Notes:

- (1) VCTM has been tested on Windows 10 and on Windows Server 2022. It has not been tested with other versions of Windows.
- (2) Multiple cores significantly improve model run times, but there are diminishing returns with more than 32 cores and testing has resulted in occasional model run crashes on computers with more than 32 cores.
- (3) To reduce output space requirements, intermediate files defined in Section 3.5 can be deleted.
- (4) if a Z:\TEMP folder is present and the UseZDrive parameter is set to 1, some temporary files will be written to this location. This can improve model run times if a very fast Z drive is available.

1.2 Microsoft Message Queuing Service (MSMQ)

VCTM makes use of TransCAD Compute Engines, which improve model run times by better taking advantage of multiple processor cores. Compute engines require the Microsoft Message Queuing Service (MSMQ) to communicate between parallel model processes. Prior to running VCTM, users must enable MSMQ using the process described in Appendix A.

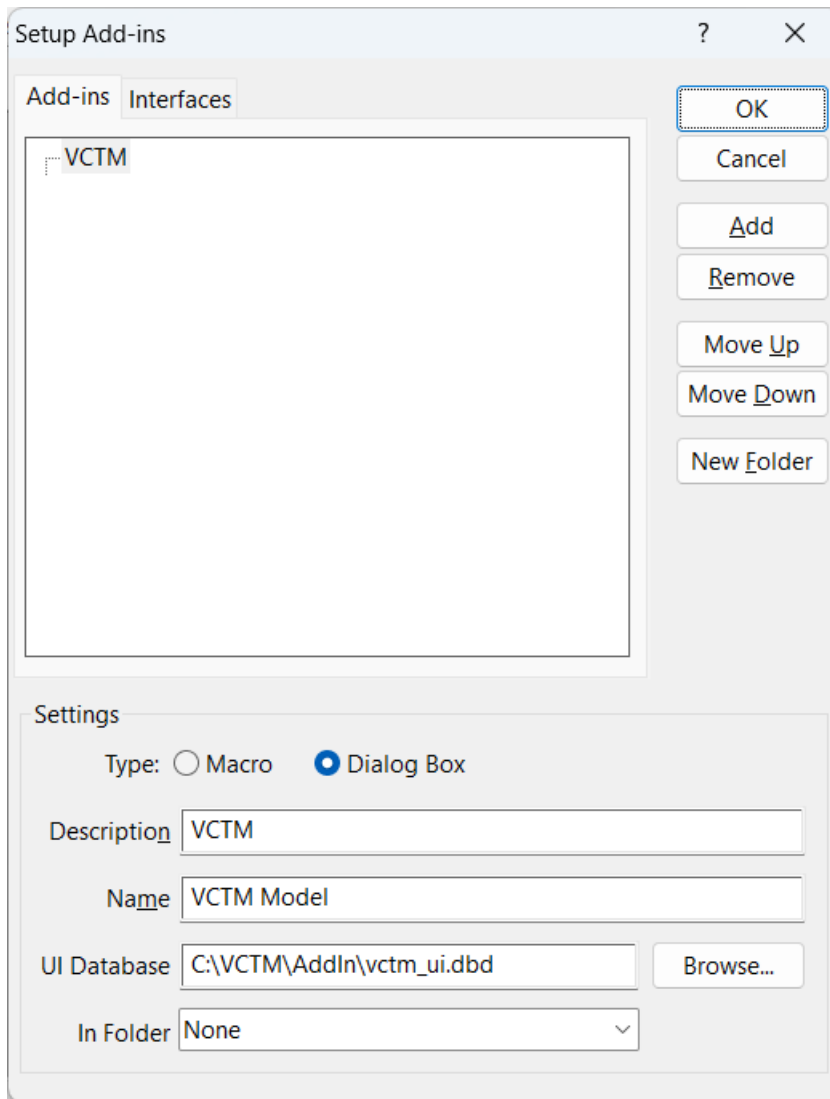
1.3 Installing the Model

Installation of VCTM has been streamlined so that the model can be installed in a simple three-step process. The model is provided in a 7-zip file named *VCTM_Installation.7z*¹. Installation of the model can be completed by following the three steps described below.

1. Extract the provided 7-zip file and place the resulting folder in a user specified location (e.g., C:\VCTM). The 7-zip file can be extracted using the 7-zip software available from www.7-zip.org.
2. Open the TransCAD software and select *Tools → GIS Developer's Kit → Setup Add-Ins...* from the main menu. In the dialog box that appears:
 - a. Click *Add* to create a new entry
 - b. Modify the new entry as shown in Figure 1.1. Make sure to set the Add-in type to Dialog Box.
3. Verify the VCTM dialog box can be started by selecting *Tools → GIS Developer's Kit → Add-Ins → VCTM* from the TransCAD menu.

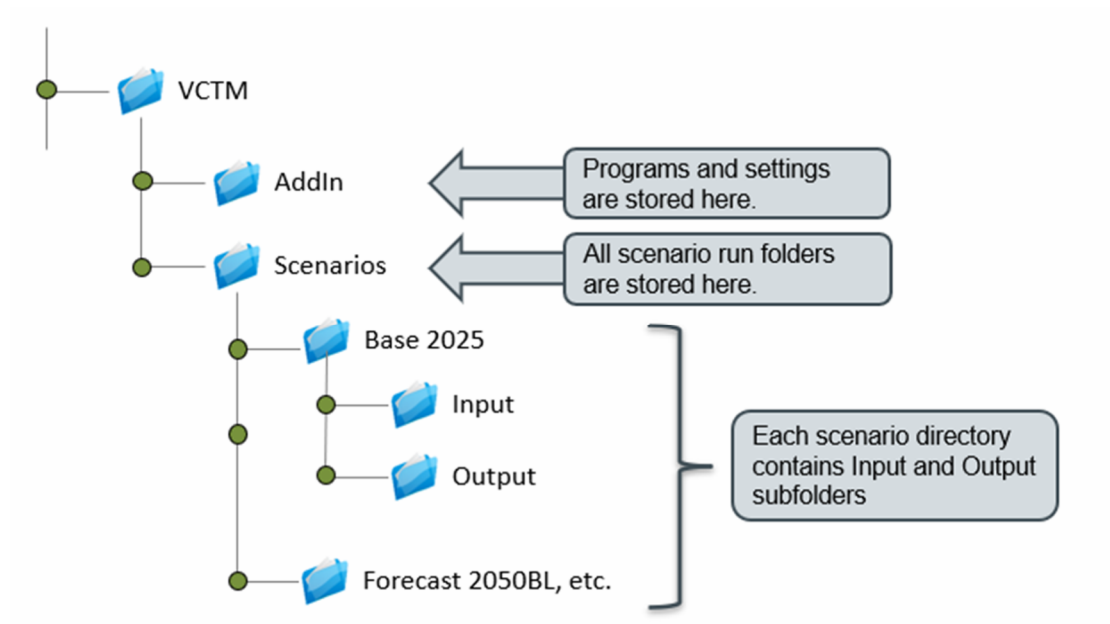
If the model dialog box appears, the model installation has been successful. If necessary, pre-populated scenarios can be modified to reference the installed data.

¹ To facilitate partial downloads of the model or updates that only affect portions of the system, the model may be sometimes be distributed in separate 7-zip files containing the Add-In and model inputs.

Figure 1.1 VCTM Add-In Dialog Box

1.4 Folder Structure

VCTM has been set up to use a streamlined file and folder structure that maintains all model data and macro files within a common folder. This folder can be placed at a user-specified location anywhere on the computer that will be used to run the model. It is recommended that the model be installed on a local hard drive rather than a network drive, as use of a network drive to run the model will significantly impact performance. In addition, it is not advisable to install the model in a location that is actively synced using tools such as DropBox or OneDrive, as these tools may interfere with TransCAD's ability to repeatedly read and modify files. If model files are stored in a location that is actively synced, the synchronization should be paused for the duration of any model run. The general VCTM folder structure is shown in Figure 1.2.

Figure 1.2 VCTM Folder Structure

2.0 Running the Model

The model is controlled through a series of dialog boxes that allow the user to specify model run settings or to copy settings from a previously defined scenario. The dialog boxes, shown with annotations in Appendix B, facilitate running the travel model, creating reports and maps, and specifying model run options.

Some input and files are defined using placeholders such as {SUBPER}, {PKOP}, and {OCC}. These placeholders are expanded to represent a group of files for each sub-period, period, or occupancy class. When interacting with the scenario manager, users may select a single file that is part of the relevant group and the program will automatically manage placeholders.

2.1 Model Input Data

To successfully run the model, various data files are required. Some input files are optional and will provide additional functionality. Input files are organized in subfolders within the Input directory for each model scenario and will not be modified when the model is run.

Several of the input files must be set to represent a specific forecast year or model scenario. The highway network, socioeconomic data, external trips, and special generator files vary by scenario. Parameter files are fixed and should not be modified in most cases. Input files that are most commonly modified in scenario development are listed in Table 2.1. Input files that vary with year but are not commonly modified are listed in Table 2.2. A complete listing of model input files is included in Appendix C.

VCTM includes a folder containing various SCAG model input files, obtained directly from SCAG and not modified for VCTM. These files should not typically be changed, as any socioeconomic data for Ventura County included in the VCTM SED input file override values in the SCAG files. If model users wish to change socioeconomic data outside of Ventura County, this can be done by changing files in the SCAG folder.

Table 2.1 Commonly Modified Input Files

ID	Description and Notes
RdNetwork	Input Roadway Geographic File
RouteSystem	Input Transit Route System
TurnPen	Optional Turn Penalty File, not used or included in the official VCTM model runs
VCTM SED	Socioeconomic Data for VCTM Zones, overrides any SCAG SED
SelectLinkQuery	Optional Select Link/Zone Query, select link/zone analysis is run if this file is present

Table 2.2 Rarely Modified Year-Specific Input Files

ID	Description and Notes
SCAG SED T2 Ctrl	Tier 2 SED Control Totals from SCAG
SCAG Truck SED	SCAG Truck SED at the Tier 1 TAZ Level
EI Files	External-Internal Matrices by Time of Day
EE Files	External-External Matrices by Time of Day
Port Trip Tables	Port Trip Matrices by Time of Day
Special Gen OD Files	Special Generator OD Matrices by Time of Day

2.2 Performing a Model Run

Prior to running the model, a scenario must be defined from the model dialog box. Model scenarios are accessible from the scenario toolbox and contain information about the following:

- The scenario directory;
- Filenames;
- A scenario description;
- Feedback and assignment settings; and
- Advanced settings and parameters.

Scenarios can be copied based on existing scenarios or can be created using default settings. An overview of the process to conduct a model run is as follows:

1. Create a new model run folder, named with the desired scenario name (e.g., C:\VCTM\Scenarios\TestScenario 2025). Copy the Input folder from an existing scenario.
 - a. Optionally modify input files to reflect different conditions for the model scenario.
2. Open TransCAD start the VCTM Model Dialog Box
3. Create a new scenario by either making a copy of an existing scenario () or creating a new default scenario ()
4. In the resulting Scenario Editor window:
 - a. Type the new scenario name (e.g., TestScenario 2025).
 - b. Set the scenario folder by either clicking the **Set Dir** button or **Browse** button.
 - c. Verify that all required files show as existing (green color with a status <Exists - Required>) or optional (yellow color with a status of <Missing - Optional>).

- d. If desired/necessary, modify input file references to alternate files.
 - e. Check the **General** tab in the Scenario Editor and review speed feedback settings.
5. Click OK to save the edits.
 - a. The scenario will be shown with a filled green circle (●) if it is ready to run.
 - b. A red X (✖) indicates that one or more required input files is missing or not correctly referenced.
 - c. A partially filled orange circle (◐) indicates that input files are present and some but not all output files are present.
 - d. A green check mark (✓) indicates that a complete set of output files is present.
 6. To run the complete model, ensure that **Stop after Stages** is not selected, and optionally click the **Create Report** checkbox to automatically create a summary report on model run completion.
 7. Click the **Network Processing** button to start the model run. Alternatively, click on the green wrench to select a subset of the steps to run.

The model will take several hours to complete. The exact run time will depend on computer type and run settings. For example, a speed feedback run with 5 iterations is expected to take approximately 12-14 hours on a computer with 32 fast processor cores.

2.3 Speed Feedback Settings

VCTM includes a **Warm Start** function that facilitates consistent scenario runs based on a common set of speeds. This modeling approach reduces iteration noise in model runs and considerably reduces model run times. There are three different valid ways to run the model, described below (running a single non-feedback loop with initialized speeds is not advised).

2.3.1 Feedback Model Run – Initialized Speeds

A feedback run with initialized speeds will start with a common set of input speeds obtained from a lookup table, and then run speed feedback. Testing of the base year and 2050 model scenarios has shown that 5 iterations are sufficient for feedback convergence.

To run feedback, set the feedback options as shown below.

☒ Initialize Speeds
☒ Run Speed Feedback
 Iterations

2.3.2 Single Loop Run – Copied Speeds (Warm Start)

A single loop run does not include speed feedback, but uses copied speeds from a completed run to ensure destination and mode choice models consider congestion effects. It is appropriate to run multiple scenarios

with minor to moderate changes using this approach and a common set of copied speeds. This can be accomplished using the steps below:

1. Perform a baseline run that includes speed feedback.
2. Copy speeds from the baseline run to the scenario's input network using the **Copy Feedback Speeds** utility, found in the **Utilities** tab of the model dialog box.
3. Create one or more new scenarios, using the network containing the copied speeds as an input network. If desired, edits can be based to the copy of this network in the new scenario. Other data such as socioeconomic data can also be changed.
4. Run the new scenario, with feedback options as shown below.

- ☐ Initialize Speeds
☐ Run Speed Feedback

If users are unsure if speed feedback should be run for a particular scenario or project, they are advised to run the model with and without speed feedback and review results to determine the best approach.

2.3.3 Feedback Model Run – Copied Speeds (Warm Start)

When running scenarios with moderate to large changes that may impact congestion levels, it is possible to run speed feedback starting with a set of speeds resulting from a previous model run. This can reduce the number of iterations required to reach convergence, and/or improve feedback convergence. This can be accomplished by following the steps described for a single loop run with copied speeds, but setting feedback options as shown below.

- ☐ Initialize Speeds
☒ Run Speed Feedback
Iterations

Modelers may wish to vary the number of iterations to achieve an acceptable level of convergence for a specific study. Speed feedback convergence is reported in the file named Feedback.txt, located in the 7_TripAssignment folder.

3.0 Model Outputs

VCTM produces intermediate and output files, sorted into the model output directories listed in Table 3.1. A short description of each file generated by the model can be found from the **Output** tab in the model scenario manager². Additional detail on key intermediate and output files is provided in the following sections.

Table 3.1 Description of Output Folders

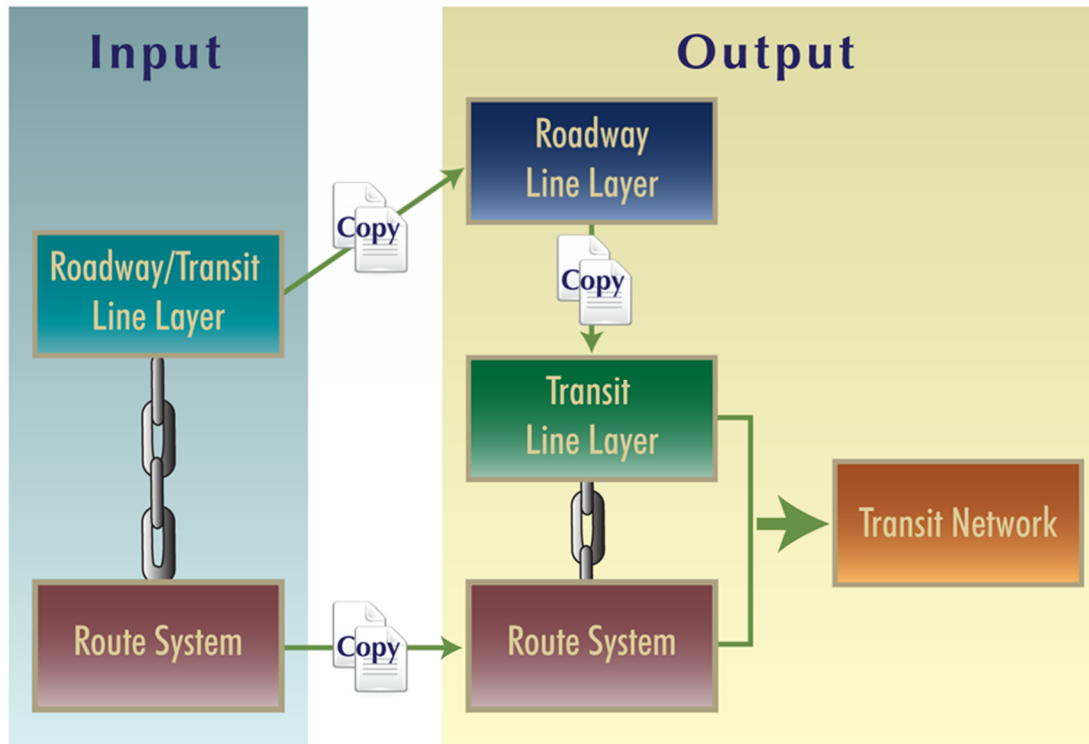
Folder Name	Contents
1_Network Highway network	- Processed copy of the input roadway network - Routable (".net") networks and copies of related turn penalty tables
2_Routes Transit routes	- Processed copy of the transit line layer (based on the roadway network) - Processed copy of the transit route system - Transit network (".tnw") files and copies related mode/mode transfer tables
3_Skims Highway and transit skims	- Roadway shortest path (skim) files - Transit shortest path (skim) files
4_TripGeneration Trip generation results	- Processed socioeconomic data at the TAZ level - Trip production and attraction tables at the TAZ level
5_TripDistribution Trip distribution results	- Consolidated logsum matrices for use in destination choice (ModeLogsum folder) - The ModeLogsum folder can usually be deleted once run is complete - Destination choice and gravity model results - Trip length frequency distributions
6_ModeChoice Mode choice results	- Person trips by purpose and mode - Transit trips by time period for transit assignment - Mode choice model summary by market segment - TransCAD nested logit mode choice model definition files (ModeModel subfolder) - Intermediate Mode Choice Probability files (ModeProb subfolder) - The ModeProb folder can usually be deleted once run is complete
7_TripAssignment Highway and transit assignment results	- Origin-destination matrix files by time of day for highway (traffic) assignment - Traffic (highway) assignment flow files by period and summarized to daily - Transit assignment files by period, access mode, and transit mode - Transit assignment files summarized to daily totals - Optional select link/zone matrix files - Optional intermediate speed feedback flow files
8_Trucks Truck model intermediate files	- Truck trip generation files (production and attraction tables) - Truck skims - Truck trip distribution results (truck origin and destination matrix files) - intermediate truck model files produced by the SCAG truck model

² Some intermediate files used internally by the model are not listed/described in the scenario manager.

3.1 Output Roadway and Transit Networks

VCTM makes separate copies of the input roadway geographic file and route system for use in roadway and transit modeling as illustrated in **Figure 3.1**. The roadway and transit line layers include additional fields populated during the model run, such as speeds, capacities, tolls, and volume delay function parameters.

Figure 3.1 Roadway and Transit Layer Processing



3.2 Output Zone Data

The trip generation model produces an aggregate TAZ-level socioeconomic data file, located in the **4_TripGeneration** folder. Output trip generation data is similar to the input VCTM trip generation file, but with data for all zones including those outside of Ventura County.

3.3 Output Shortest Path (Skim) Files

Shortest path (skim) files located in the **3_Skims** folder are produced for auto and transit travel. The different skims created are described below. Skim files can be used along with trip tables to generate trip length frequency distributions, to compute average trip lengths, and to calculate generated VMT. Skims can also be useful when troubleshooting or calibrating the model.

- **Roadway Skims** are produced separately for AM (peak) and Mid-day (off-peak) time periods and for drive alone, shared ride 2, and shared ride 3+. Each roadway skim file contains congested travel time (minutes) and distance (miles) for each zone pair:

- **Transit Skims** are created for peak and off-peak conditions, for walk and drive access, and for each transit mode type (i.e., local bus, commuter rail, etc.). Transit skims contain the following information, as applicable to the various access modes:
 - Generalized Cost, which converts the weighted aspects of the transit path into dollars;
 - Components of transit travel time including wait time, walk time, drive access time, in-vehicle time, and transfer time;
 - Drive access and transit vehicle distance;
 - Transit in-vehicle distance by transit mode; and
 - Initial wait time segmented into short and long components.

3.4 Person Trip Tables Resulting from Mode Choice

Mode Choice produces person trip tables by mode in production to attraction (PA) format, located in the **6_ModeChoice** folder. Trip tables are produced by time period and trip purpose, and each separate trips into auto modes, non-motorized modes, and transit modes.

Trip tables by mode can be combined with skim files to generate trip length frequency distributions, compute generated VMT, and to compute average trip lengths. Trip tables can also be aggregated to district levels to gain insight into regional travel and mode choice patterns, and can be inspected in detail to aid in model calibration and validation.

3.5 Intermediate Mode Choice Outputs

The destination and mode choice procedure generates a large amount of intermediate data in order to allow these steps to interact. After a model run has completed, some folders can usually be deleted. These folders contain approximately 24 GB of data that is rarely necessary after model completion. The scenario manager does not require these files for dashboard functionality. Folders that can be deleted include:

- 5_TripDistribution\ModeLogsums; and
- 6_ModeChoice\ModeProb.

3.6 Vehicle Trip Tables by Time of Day

The time of day model produces vehicle trip tables by class and time of day, located in the **7_TripAssignment** folder. These trip tables are in origin to destination (OD) format, and include totals by trip purpose and vehicle class. Vehicle trip tables for the Drive Alone, Shared Ride 2+, Shared Ride 3+, Light heavy duty truck (LHDT), medium heavy duty truck (MHDT), and heavy heavy duty truck (HHDT) vehicle classes are assigned to the network.

Vehicle trip tables can be used along with skim files to generate vehicle trip length frequency distributions and to compute average vehicle trip lengths. Vehicle trip tables can also be aggregated to district levels to

gain insight into regional travel patterns, and can be inspected in detail to aid in model calibration and validation.

3.7 Traffic Assignment Output Files

VCTM produces traffic assignment results in a series of Flow files that can be joined to the roadway network. Flow files are produced for each of the time defined in the technical documentation and repeated in Table 3.2 for reference. Total daily flow files are created by combining results from the individual periods. If users need to obtain peak hour volumes, the recommended approach is to review local count data to determine the share of peak period traffic that occurs during the peak hour.

Table 3.2 VCTM Time Periods

Period Name	Time Period
AM	6:00 AM to 9:00 AM
Mid-Day (MD)	9:00 AM to 3:00 PM
PM	3:00 PM to 7:00 PM
Evening (EVE)	7:00 PM to 9:00 PM
Night Time (NT)	9:00 PM to 6:00 AM

Flow files from traffic assignment can be joined to the roadway geographic file by matching the **ID** field in the roadway geographic file to the field **ID1** included in the flow files. Flow files contain fields defined in Table 3.3, with each field including directional values (AB and BA). Many fields also include a 2-directional total (TOT) or directional maximum (MAX). If select link or zone analysis has been enabled, an additional set of flow fields representing only the selected volumes is included for each select link/zone query.

Table 3.3 Traffic Assignment Flow Table Fields

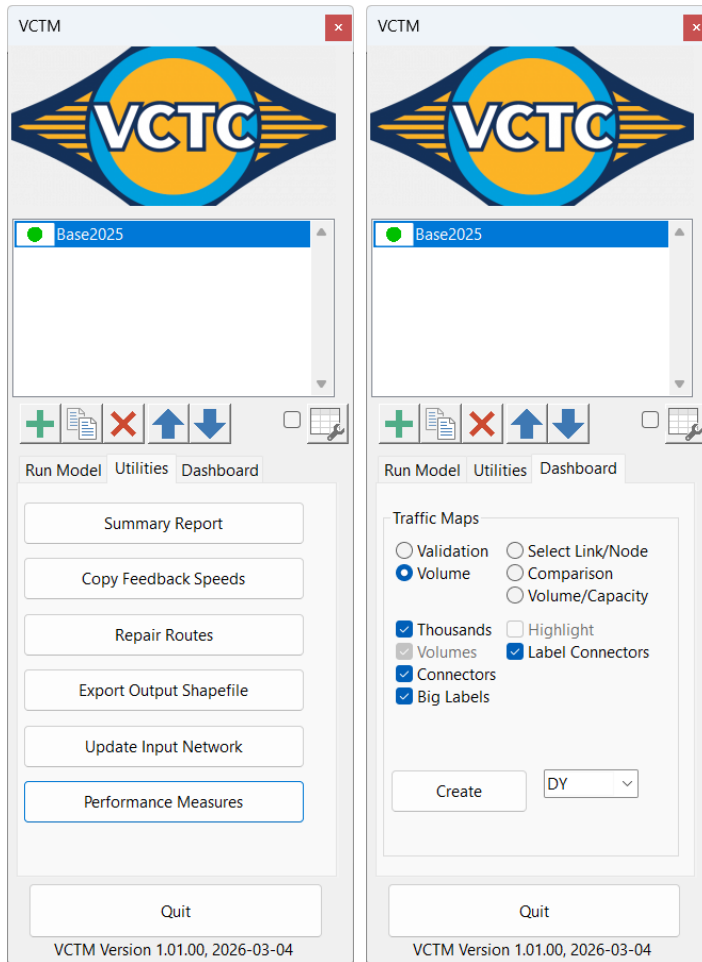
Field Name	Contents
ID1	Link ID
{DIR}_Flow_PCE	Passenger car equivalent flow for each direction and total
{DIR}_Time	Congested travel time for each direction, and maximum over both directions
{DIR}_VOC	Volume to capacity ratio for each direction, and maximum over both directions
{DIR}_VMT	Vehicle miles traveled for each direction and total
{DIR}_VHT	Vehicle hours traveled for each direction and total
{DIR}_Speed	Congested travel speed for each direction
{DIR}_VDF	Volume delay function for each direction, and maximum over both directions
{DIR}_Flow_Drive Alone	Directional vehicle volume for single occupant vehicles
{DIR}_Flow_Shared Ride 2	Directional vehicle volume for 2 occupant vehicles
{DIR}_Flow_Shared Ride 3+	Directional vehicle volume for 3+ occupant vehicles
{DIR}_Flow_LHDT	Directional vehicle volume for light heavy duty trucks
{DIR}_Flow_MHDT	Directional vehicle volume for medium heavy duty trucks
{DIR}_Flow_HHDT	Directional vehicle volume for heavy heavy duty trucks
{DIR}_Flow	Total vehicle flow for each direction and total

Note: {DIR} represents a pair of AB and BA fields, with some fields also including a Tot or Max field.

4.0 Model Utilities

VCTM includes a set of utilities that automate tasks related to preparation of model inputs and review of model outputs. These utilities, accessible from the Utilities and Dashboard tabs on the model dialog box shown in Figure 4.1, are described below.

Figure 4.1 VCTM Utilities and Dashboard Tabs



4.1 Summary Report

The **Summary Report** utility generates a report summarizing results of one or more model runs. The summary report is created in the model output folder, and is named Sumary.html unless the user has changed the relevant output filename in the scenario manager. When creating a summary report, users may elect to include all sections, or a limited subset of sections through the dialog box shown in Figure 4.2. When creating summary reports for forecast year model runs, it is not advisable to include the Validation Reports, as they are only relevant to the base year.

The summary report can be created automatically during a model run by selecting the **Create Report** button on the **Run Model** tab prior to starting a model run, or can be created after a model run is complete using the **Summary Report** tab on the Utilities tab.

Figure 4.2 Summary Report Selection Dialog Box

Performance

Scenario: Base2025

Output: C:\VCTM\Scenarios\Base2025\Output\Summary.html

Basic Reports:

☐ Title Page

☐ Input Files and Parameters

☐ Input Network Summary*

All None

Performance Reports:

☒ Trip Generation Summary

☐ Trip Distribution Summary

☐ Trip Length Frequencies

☐ Mode Choice Summary*

☐ Transit Assignment Summary

☐ Daily Assignment Summary*

All None

Validation Reports:

☐ Screenline Summary

☐ Vehicle Validation Summary

All None

* Create Reports For:

☒ Entire Model

☒ Ventura County

☒ Imperial County

☒ Los Angeles County

☒ Orange County

☒ Riverside County

☒ San Bernardino County

☒ Santa Barbara County

Global Selection:

Select All Reports Select No Reports

Select All Areas Select No Areas

OK Cancel

4.2 Copy Feedback Speeds

The **Copy Feedback Speeds** utility copies MSA-weighted speeds generated during a speed feedback run to a set of directional peak and off-peak feedback speed fields on the input network. The model uses congested speeds contained in these fields, named with the template {AB/BA}_{PK/OP}FB, when running without initializing speeds. More information on different ways to run speed feedback utilizing these fields are included in Section 2.3.

4.3 Repair Routes

The **Repair Routes** utility runs SCAG's repair routes procedure that performs some maintenance on the transit route system. This maintenance includes matching stops with nearby nodes, checking for and correcting routes with zero headway values, and marking duplicate stops to be ignored.

Users are advised to run this utility after making edits to the transit route system.

4.4 Export Output Shapefile

The **Export Output Shapefile** utility generates a shapefile containing the highway network with selected attributes and traffic assignment results. Due to a 10-character field length limitation in the shapefile format, many field names are abbreviated. Exported shapefiles contain the information listed in Table 4.1.

Table 4.1 Exported Shapefile Contents

Field Name	Field Contents
ID	TransCAD Link ID
DIR	TransCAD Direction indicator (0, -1, or 1 indicating two-way, BA only, or AB only, respectively)
LENGTH	Link length in miles
ROAD_NAME	Road name
FT	Link facility type
{DIR}_LANES	Directional number of lanes
COUNTY	Code indicating the county in which a link is located
CITY	Name of the city in which a link is located
ATYPE	Area Type computed based on TAZ area type
VAL_COUNT	Validation traffic count (applicable to the base year only, blank for forecast years)
VAL_TRK_CO	Validation truck traffic count ³ (applicable to the base year only, blank for forecast years)
{DIR}DA_{PER}	Directional vehicle volume for single occupant vehicles, by period and daily
{DIR}SR2_{PER}	Directional vehicle volume for 2 occupant vehicles, by period and daily
{DIR}SR3P_{PER}	Directional vehicle volume for 3+ occupant vehicles, by period and daily
{DIR}LHDT_{PER}	Directional vehicle volume for light heavy duty trucks, by period and daily
{DIR}MHDT_{PER}	Directional vehicle volume for medium heavy duty trucks, by period and daily
{DIR}HHDT_{PER}	Directional vehicle volume for heavy heavy duty trucks, by period and daily
{DIR}_FLOW_{PER}	Total vehicle flow for each direction, by period and daily
TOT_{PER}	Total two-way vehicle flow, by period and daily

4.5 Update Input Network

This utility updates the styling of the functional classifications on the input roadway network for easier visualization of the roadways in the Southern California region, and in Ventura County specifically. The utility also updates the styling of the node layer, distinguishing between centroids and all others nodes.

This utility is helpful in creating a standardized way of viewing the links and the nodes on the input roadway network. It re-applies those preset themes to the layers if a model user updated them using the TransCAD interface and wants to revert back to the original symbology.

³ See the technical documentation for notes on truck traffic count reliability.

4.6 Performance Measures

This utility automates the calculation of critical performance measures to support VMT calculations in fulfillment of SB 743 requirements. It also generates plots showing key network attributes as well as level of service by time of day for different subregions within Ventura County.

4.7 Model Dashboard

VCTM includes a **Dashboard** functionality to automatically maps that display model results, accessible from the **Dashboard** tab on the main model dialog box. It allows the user to specify a map type and then choose options described in **Table 4.2** and **Table 4.3**. Once settings have been chosen, the **Create** button will generate the specified map.

Table 4.2 Map Types

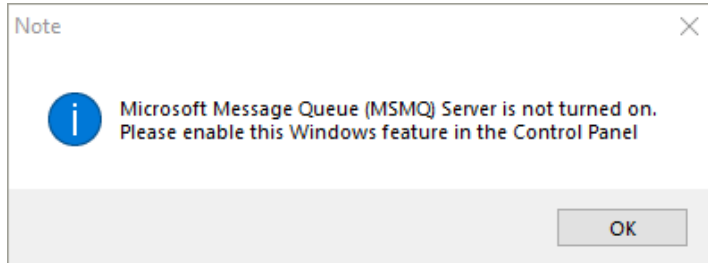
Map Type	Description
Validation	The validation map displays model volumes and traffic counts. Volumes are shown in thousands, with counts also shown in thousands and placed in parentheses. Model results are shown on all links, while count data is only shown on links where validation traffic count data is available. If the highlight option is selected, a color-coding scheme will identify model data similar, higher, or lower than count data. This map is only meaningful when created for a base year model run.
Volume	The volume map displays model volumes in total vehicles or thousands. The user can opt to display daily volumes or volumes for a specific period.
Select Link/Node	The select link/node map displays the results of a select link or node analysis. This map can only be created successfully if select link or node analysis has been run for the selected scenario.
Traffic Comparison	The traffic comparison map displays the differences between two model runs. When creating this map, the user will be prompted to select a scenario for comparison.
Volume/Capacity	The volume/capacity map displays the volume to capacity ratio using a color theme.

Table 4.3 Map Options

Map Option	Description
Thousands	If selected, the map will display volumes in thousands of vehicles.
Volumes	If selected, the map will include traffic volume labels. If left blank, the model will not include labels. This option is automatically selected for validation and volume maps.
Connectors	If selected, the map will show centroid connectors. If left blank, centroid connectors will be hidden.
Highlight	If selected, a validation map will differentiate between links where model results are similar to, higher than, or lower than traffic count data. This option can only be selected when creating a validation map.
Label Connectors	If selected, volume labels will be plotted on centroid connectors. Labels will only be shown if the Connectors and Volumes options are also selected.

Appendix A. Microsoft Message Queue MSMQ

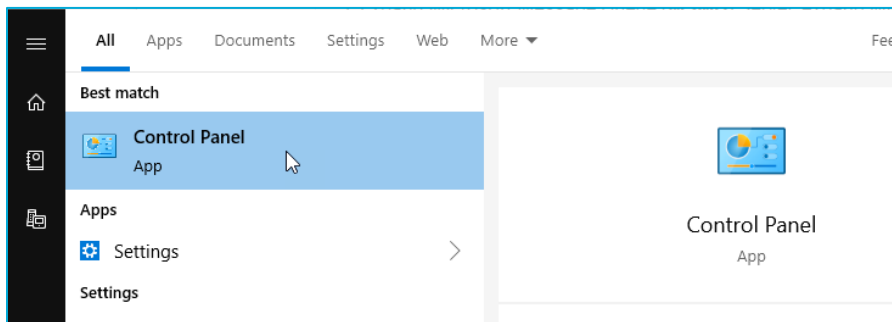
This TransCAD model requires the use of Microsoft's multi-threading support, known as Microsoft Message Queue (MSMQ) Server. When running model, if MSMQ is not already enabled, TransCAD will ask the user to enable MSMQ to support multithreading with a message similar to that shown below⁴. MSMQ only needs to be enabled once per machine.



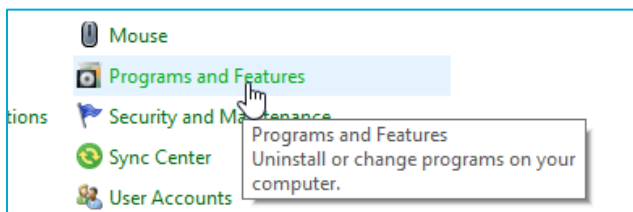
Messages and setup details will differ based on the operating system used but will likely require administrative privileges. Below are instructions for enabling MSMQ on both a workstation and a server.

A.1.1 Instructions for a Windows 10 Workstation

1. Start the Windows **Control Panel** (not the Windows 10 Settings app).

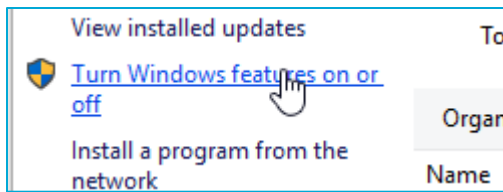


2. Choose Programs and Features.

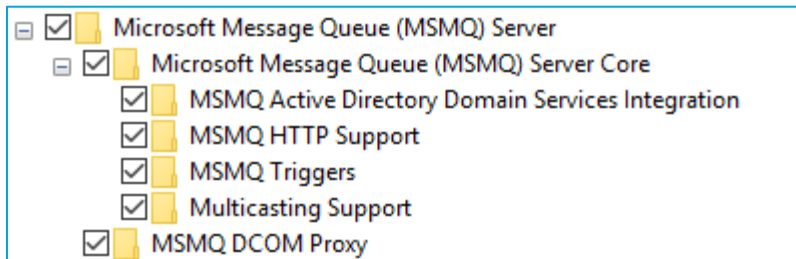


3. Choose Turn Windows features on or off.

⁴ The MSMQ error message will not appear until later stages of the model run are reached, which may be over an hour after a model run is started.



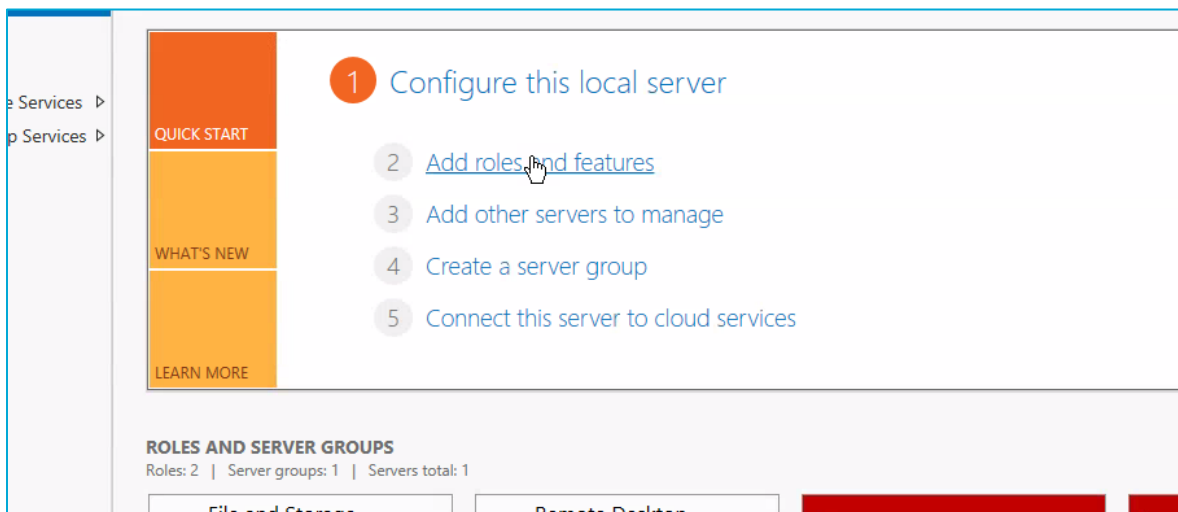
4. Scroll down to Microsoft Message Queue (MSMQ) Server, expand it, and enable all components.



After clicking OK, Windows will install the required components. (This may take a few minutes)

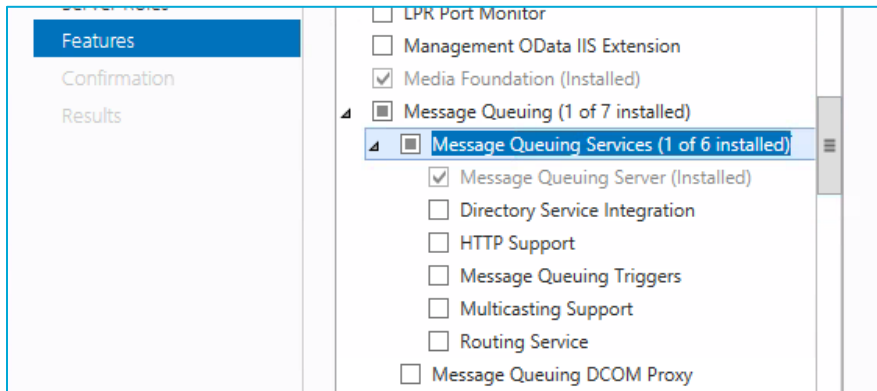
A.1.2 Instructions for a Windows Server (Tested on Windows Server 2012)

5. Open Server Manager (this will likely require administrative privileges)
6. Click Add roles and features:



7. Click Installation Type.
8. Click Role-based or feature-based installation.
9. Click Next.
10. Click Features.
11. Expand Message Queuing.

12. Check Message Queuing Server



Windows will install and enable the required components.

Appendix B. Annotated Model Dialog Boxes

This appendix contains annotated screenshots of the VCTM dialog boxes.

Figure B.1 The Model Dialog Box – Run Model tab

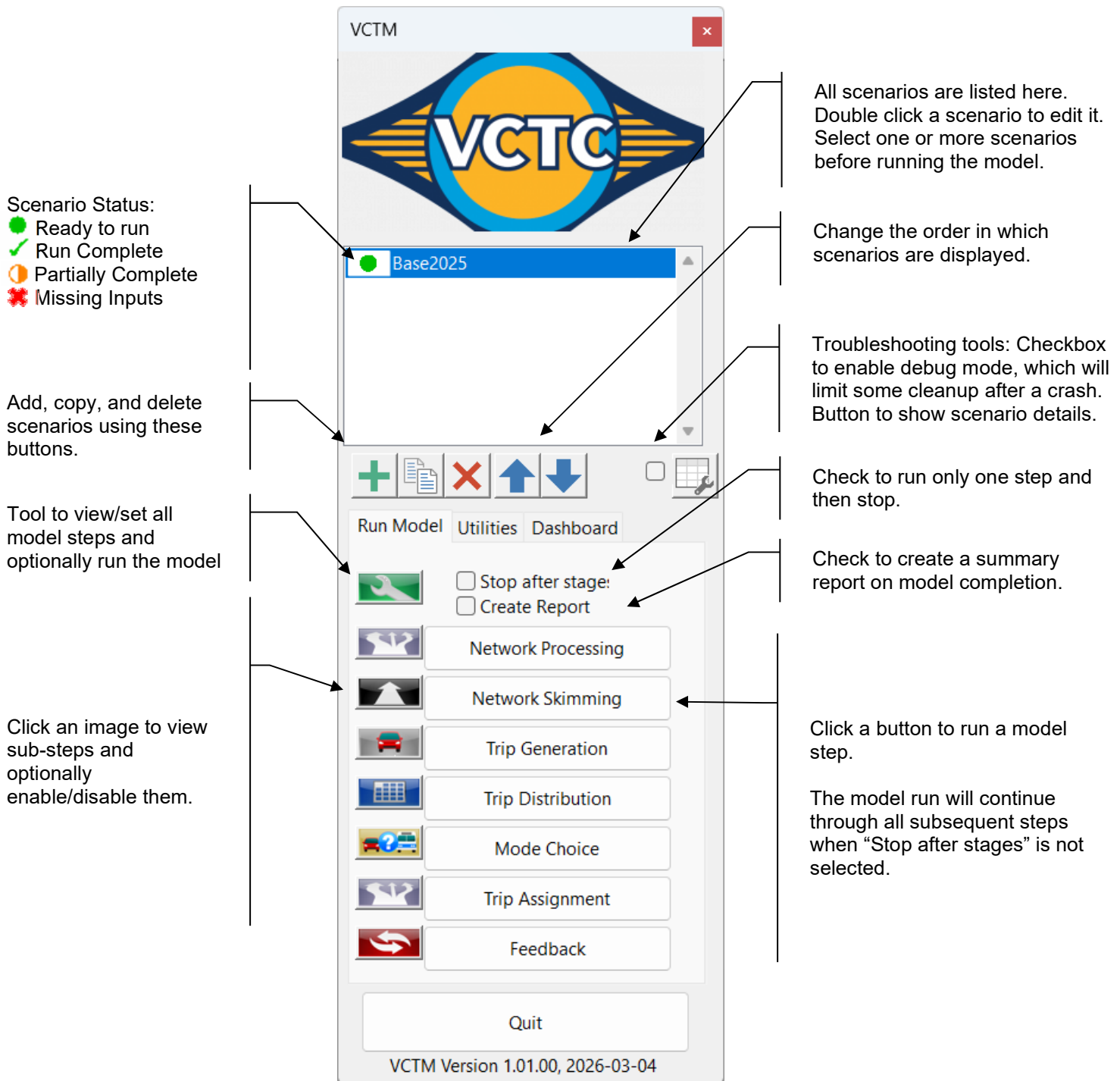


Figure B.2 Scenario Editor – Input Tab

The screenshot shows the 'Scenario Editor' window with the 'Input' tab selected. The window contains fields for 'Scenario Name' and 'Scenario Dir', a table of input files, and a 'File Description' field. Annotations provide instructions on how to use these elements.

Annotations:

- Enter a scenario name:** Points to the 'Scenario Name' text box containing 'Base2025'.
- Identify the scenario directory:** Points to the 'Scenario Dir' text box containing 'C:\VCTM\Scenarios\Base2025\'.
- Use the Set button to assign a scenario directory based on the scenario name:** Points to the 'Set Dir' button.
- Use the Browse button to choose a scenario directory:** Points to the 'Browse' button.
- When a file is selected, its description will be shown here:** Points to the 'File Description' text box containing 'Input Roadway Network'.
- Use the Browse button to choose a scenario directory:** Points to the 'Browse' button.
- Filenames and file status are displayed here; double-click an item to change the filename or location:** Points to the table of input files.

Table of Input Files:

ID	File Name	Status
RdNetwork	C:\VCTM\Scenarios\Base2025\Input\1_Network\24r25p_links.dbd	<Exists - Required>
RouteSystem	C:\VCTM\Scenarios\Base2025\Input\1_Network\24r25p_routes.rts	<Exists - Required>
TurnPen	C:\VCTM\Scenarios\Base2025\Input\1_Network\TurnPen.bin	<Missing - Optional>
SpeedLookup	C:\VCTM\Scenarios\Base2025\Input\3_Params\1_Network\speed_ta	<Exists - Required>
CapLookup	C:\VCTM\Scenarios\Base2025\Input\3_Params\1_Network\cap_con	<Exists - Required>
VDFFile	C:\VCTM\Scenarios\Base2025\Input\3_Params\1_Network\vdf_tabl	<Exists - Required>
FixedTolls	C:\VCTM\Scenarios\Base2025\Input\3_Params\1_Network\Toll_Fix.k	<Exists - Required>

File Description: Input Roadway Network

Buttons: OK, Cancel

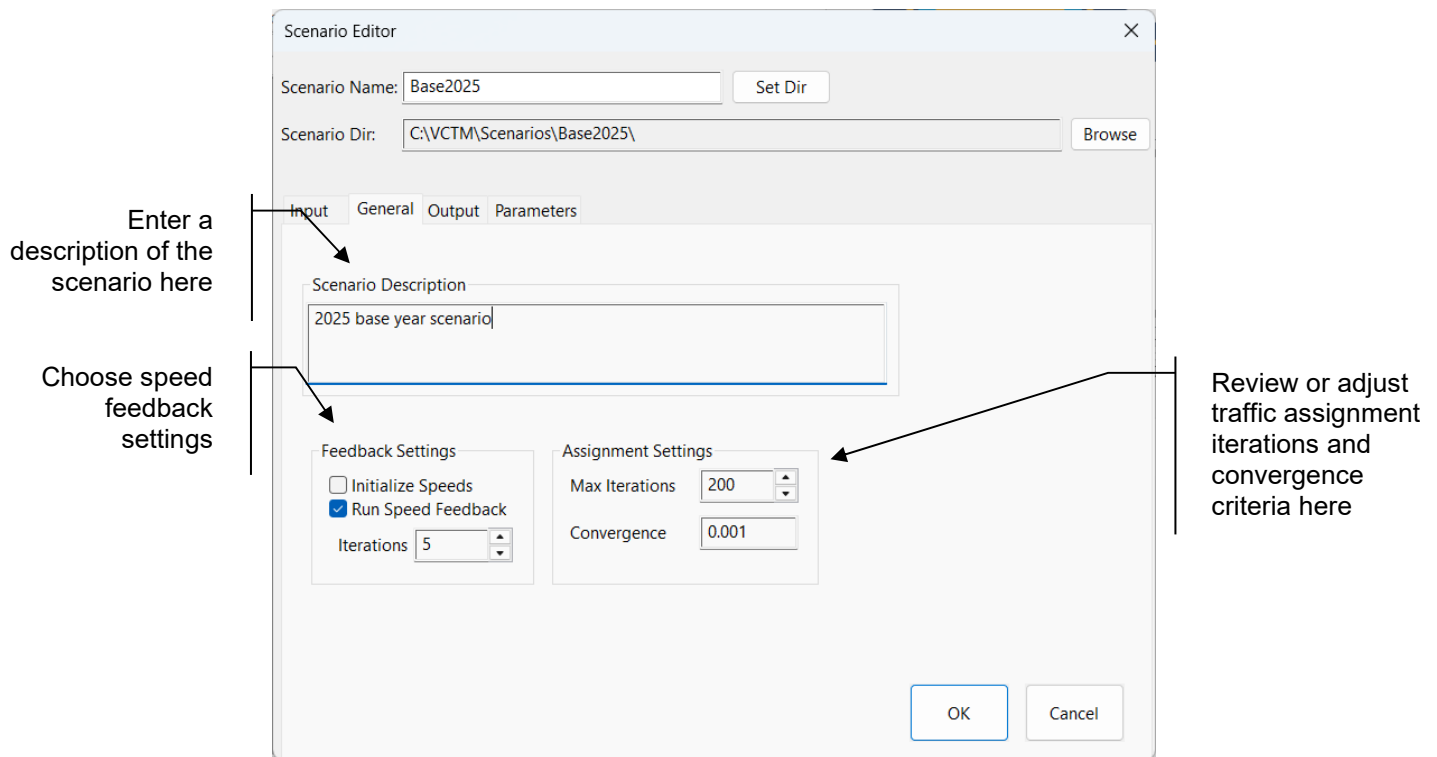
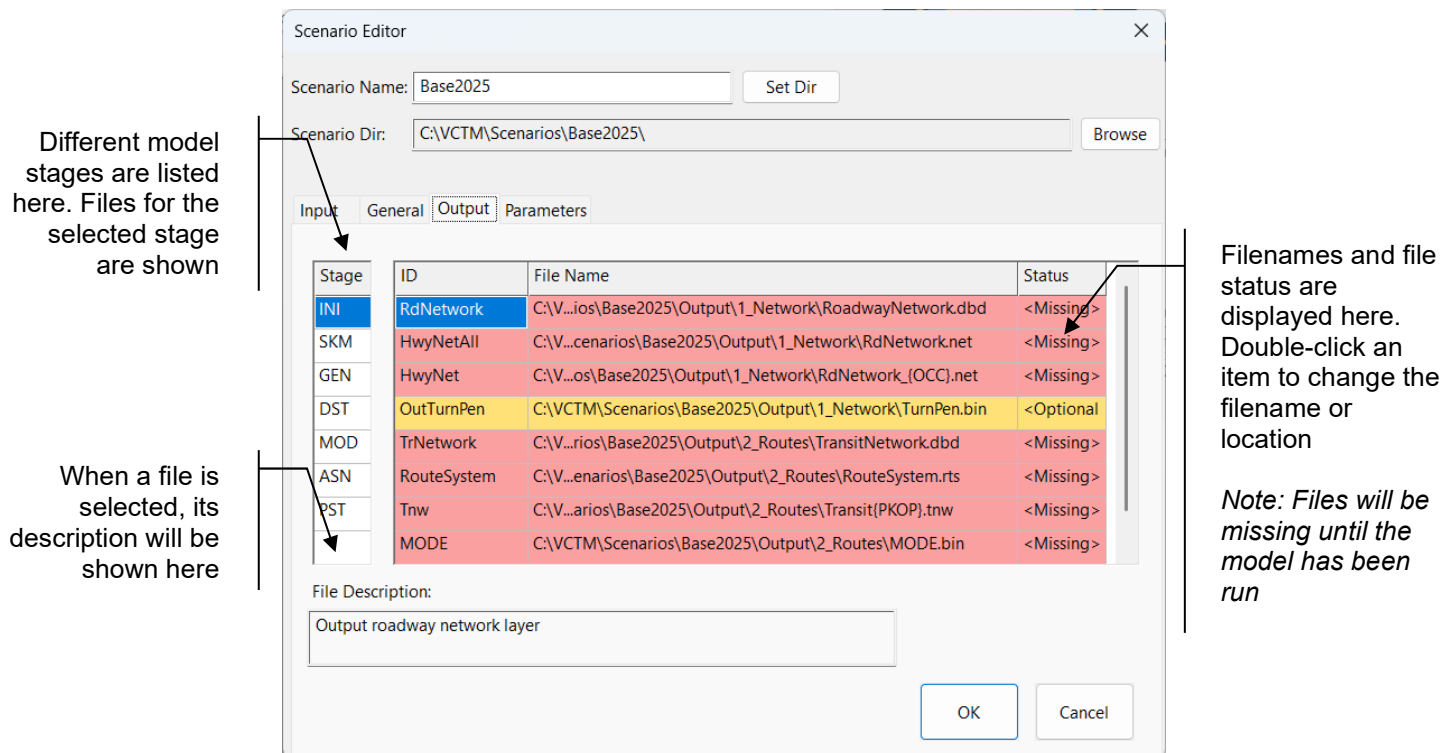
Figure B.3 Scenario Editor – General Tab**Figure B.4 Scenario Editor – Output Tab**

Figure B.5 Scenario Editor – Parameters Tab

Scenario Editor

Scenario Name: Base2025 Set Dir

Scenario Dir: C:\VCTM\Scenarios\Base2025\ Browse

Input General Output **Parameters**

Stage: ☐ General ☒ Params ☐ Table

Stage	ID	Value
INI	InitSpd	0
SKM	PeriodFacs	{{3, 4}, {6, 2, 8}}
GEN	RoadQry	Select * where (mode = 2 or mode = 4 or mode=26 or FT = 100)
DST	TollQry	Select * where mode = 2 or mode = 4 or mode = 26
MOD	TruckTolls	1
ASN	AutoOpCost	26.78
PST	AOCTollDiv	{{26.78, 26.78}, {26.78, 26.78, 26.78}}

Description:
Set to 1 (True) to initialize congested speeds using lookup table, 0 (False) to use saved speeds

Set To Defaults

OK Cancel

Annotations:

- Select a type of parameter here (points to the Stage radio buttons)
- Model stages are listed here (points to the Stage list)
- Parameter names are shown here (points to the ID column)
- A description of the selected parameter is shown here (points to the Description text box)
- Available data is shown here. Some data can be edited directly in the grid. Arrays will be edited in a separate dialog. (points to the Value column)
- Subarray data can be displayed by clicking in a cell and selecting Edit. (points to the AOCTollDiv cell)
- This button will reset all parameters currently shown (including subarrays) to default values. (points to the Set To Defaults button)

Note: Model parameters should not typically be changed from this dialog box.

Appendix C. Input File Listing

A listing of model input files is provided in Table C.1 below. Some additional input files provided by SCAG must also be included in the 2_SED\SCAG folder.

Table C.1 Input File Listing

ID	Description and Notes	Varies by Scenario	Required / Optional
RdNetwork	Input Roadway Geographic File	Yes	Required
RouteSystem	Input Transit Route System	Yes	Required
TurnPen	Optional Turn Penalty File. <i>[Not used/included by default]</i>	Yes	Optional
SpeedLookup	Speed Lookup Table	No	Required
CapLookup	Capacity Lookup Table	No	Required
VDFFile	VDF Curve Lookup Table	No	Required
FixedTolls	Fixed Toll Cost File	No	Required
PerMileTolls	Per Mile Toll Cost File	No	Required
TollPen	Toll/HOT Penalty Table for Cost Calculation	No	Required
Modes	Transit Mode Table	No	Required
ModeXfer	Transit Mode Transfer Table	No	Required
TrnSpdCurve	Auto-to-Transit Speed Curve Table	No	Required
TrnSpdLkp	Area-Facility Type Transit Speed Curve Type Table	No	Required
FareMatrix	Fare Matrix for Metrolink and HSR	No	Required
TAZ	Input TAZ Layer	No	Required
SCAGTAZ	SCAG Tier 2 TAZ Structure	No	Required
TAZ Merge File	TAZ Merge File defining aggregations of Tier 1 TAZs to merged TAZs	No	Required
SCAG SED T2 Ctrl	Tier 2 SED Control Totals from SCAG	Yes	Required
SCAG Truck SED	SCAG Truck SED at the Tier 1 TAZ Level	Yes	Required
VCTM SED	Socioeconomic Data for Ventura County Zones	Yes	Required
PumaData	SCAG Puma Data for Vehicle Availability	No	Required
PUMA Supplement Table	PUMA Supplement Data Table	No	Required
School Allocation Table	Table that allocates children to households by number of children	No	Required
HBW Prod Rates	Home-Based Work Trip Production Rates	No	Required
HBO Prod Rates	Home-Based Other Trip Production Rates	No	Required
HBSC Prod Rates	Home-Based School Trip Production Rates	No	Required
HBCU Prod Rates	Home-Based College/University Trip Production Rates	No	Required
WBO Prod Rates	Work-Based Other Trip Production Rates	No	Required

ID	Description and Notes	Varies by Scenario	Required / Optional
Attr Rates	Trip Attraction Rates for All Purposes	No	Required
TripGen TOD	Trip Generation Time of Day Factors	No	Required
NHB Reallocation	Reallocation Production Rates for NHB Trips	No	Required
Auto Para Table	SCAG Auto Ownership Choice Model parameters table	No	Required
Mode Coef	Mode Choice Coefficients File	No	Required
Mode Constants	Mode Choice Constants File	No	Required
Mode Targets	Mode Choice Calibration Targets (Optional), used only for calibrating mode choice	No	Optional
DC Coef	Destination Choice Parameters File	No	Required
Friction Factor Parameters	HBSC and HBCU Gravity Model Friction Factor File	No	Required
Geographic Constants	Constant Adjustment Matrix for Geographic Calibration of Trip Distribution	No	Required
Assignment TOD	Assignment Time of Day Factors to Convert Peak and Off-Peak PA Trips to AM, PM, MD, EVE and NT OD Trips	No	Required
EI Files	External-Internal Matrices by Time of Day	Yes	Required
EE Files	External-External Matrices by Time of Day	Yes	Required
HDT Cost Table	Heavy Duty Truck Cost Table	No	Required
Truck Trip Rates	Truck Trip Rates	No	Required
LTRK FF	Light Truck Friction Factors	No	Required
MTRK FF	Medium Truck Friction Factors	No	Required
HTRK FF	Heavy Truck Friction Factors	No	Required
Port Trip Tables	Port Trip Matrices by Time of Day	Yes	Required
Port Disagg	Port Disaggregation Table - Used to disaggregate from T1 to T2 or T3 zones	No	Required
Port Agg	Port Aggregation Table - Used to aggregate CSA, CSA-Part, and Port zones.	No	Required
Truck Hourly	Truck Time of Day Factors	No	Required
Special Gen OD Files	Special Generator OD Matrices by Time of Day	Yes	Required
SelectLinkQuery	Optional Select Link Query	Yes	Optional
TAZ County File	SCAG Tier 2 TAZ to County Equivalency File	No	Required