

Simulation Data Editor for Re:sim



SEdit

Manual Part 1: Basic Operation

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design.

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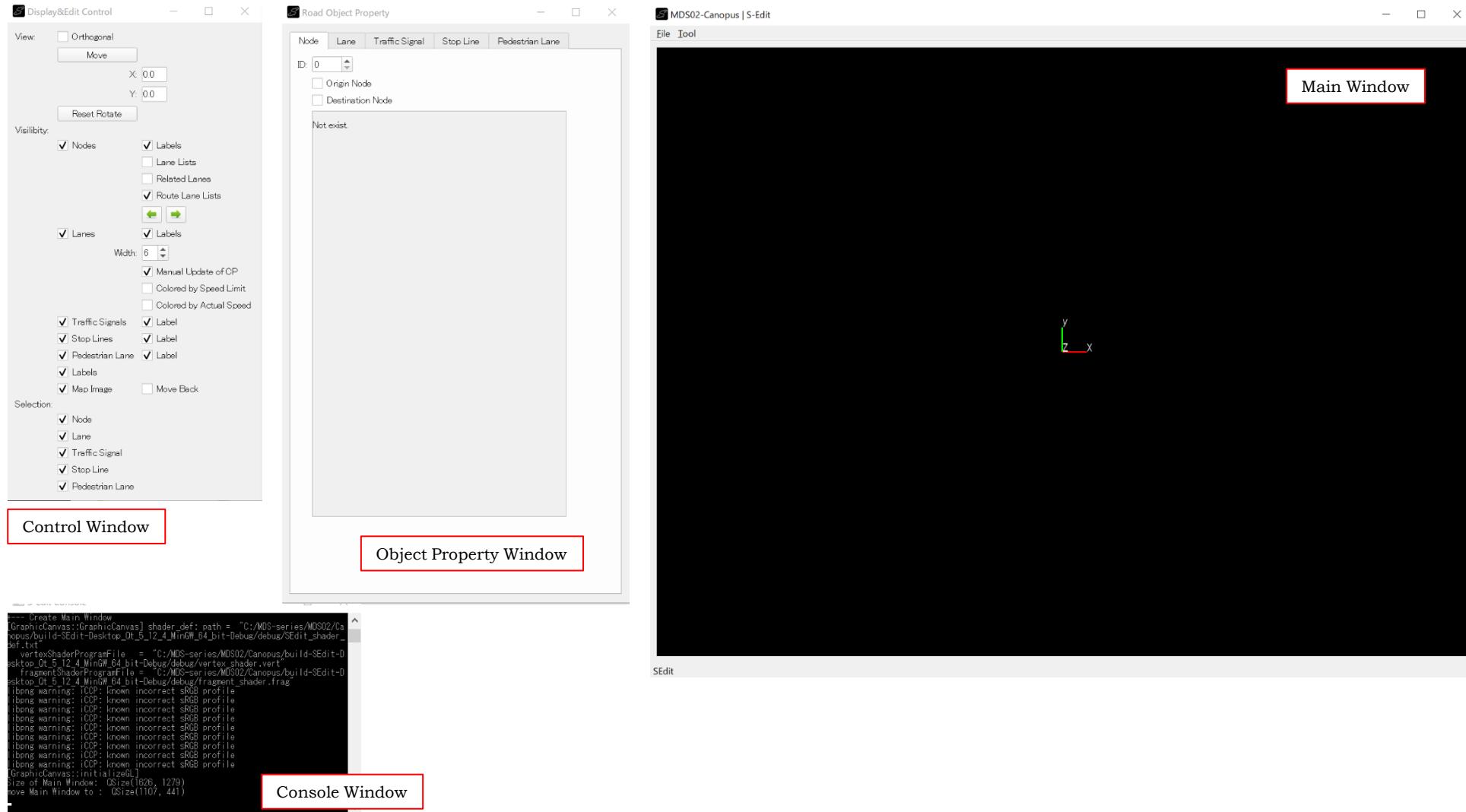
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1. The Graphical User Interface (GUI)

The GUI of SEdit consists of Main Window and several sub-windows.



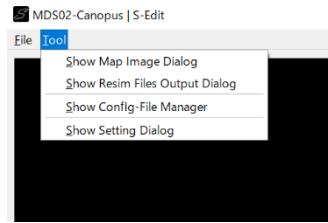
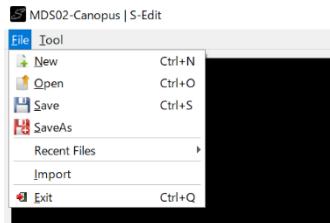
1.1 Main Window

Main Window is where you view and edit the simulation data.

The right figure show the visualized sample data available from

<https://github.com/Reisim/Reisim/tree/master/Resim-Simulation-Sample>

Menu bars:

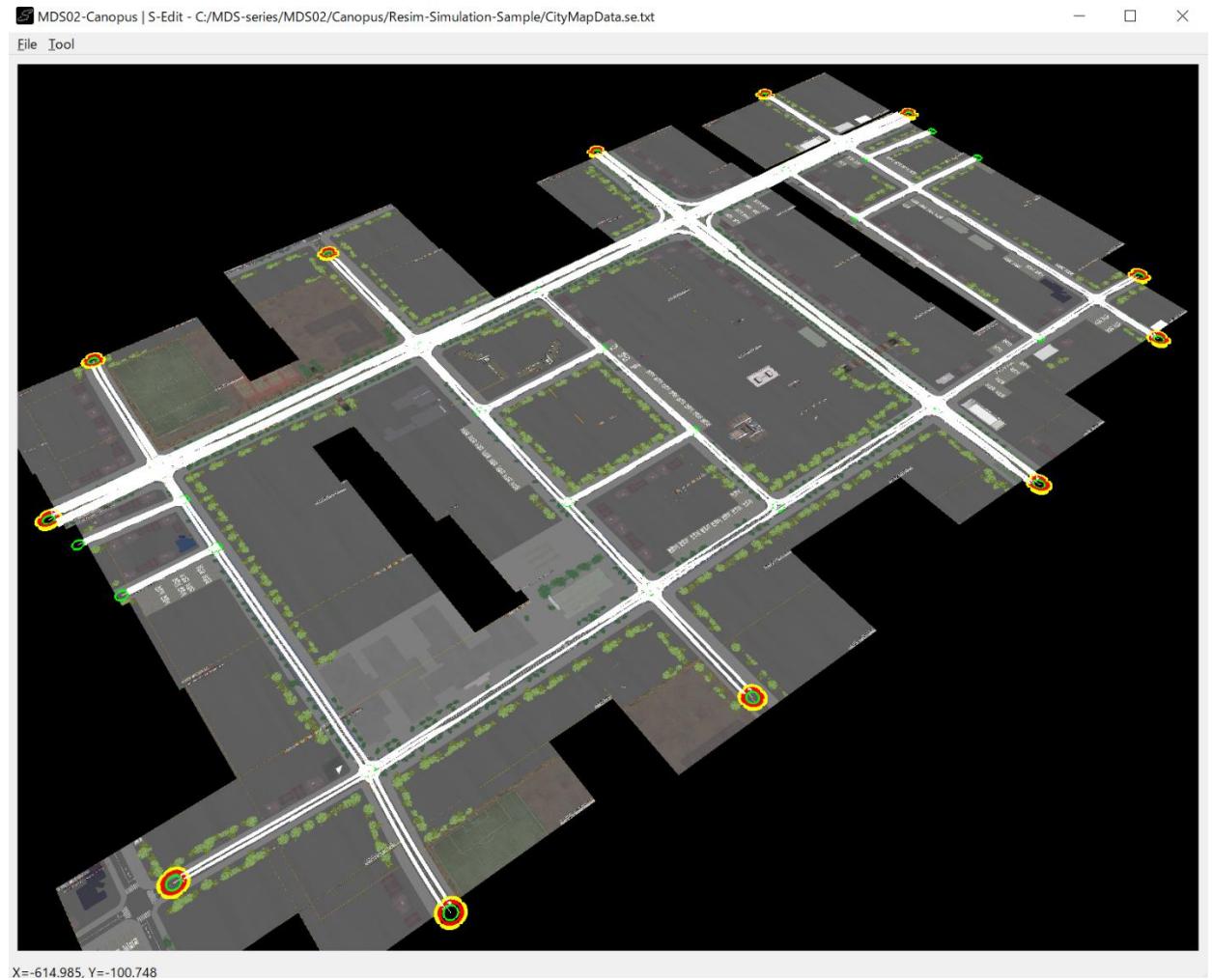
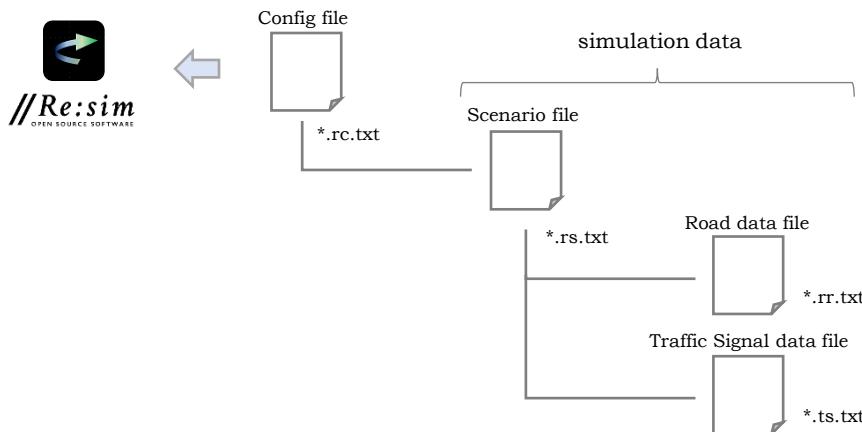


Important

The extension of S>Edit data file is .se.txt, the text file of original format.

The Tool Menu is used to show the dialogs for managing map-image file, making re:sim simulation data files, re:sim config file, and setting of Sedit. The detail of these dialogs is explained later, at this stage, the relationship between re:sim simulation data file and config file is illustrated as follow.

Important

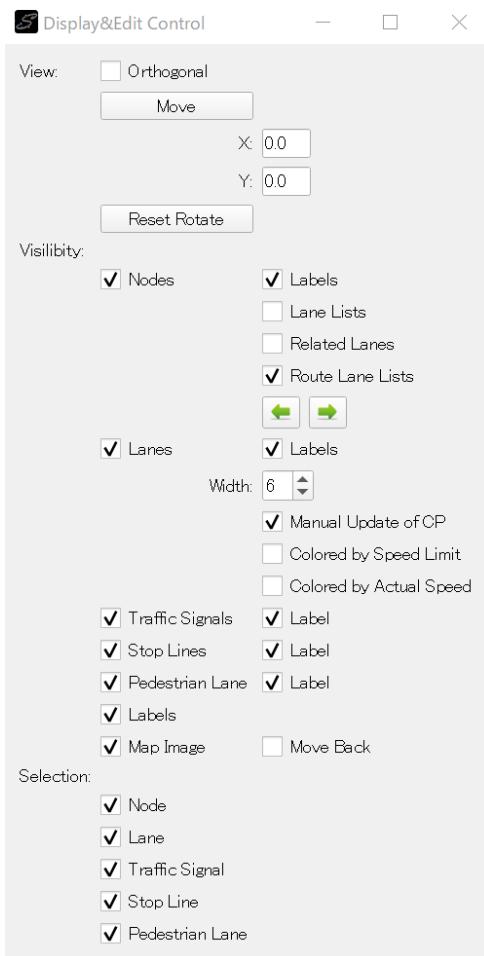


1.2 Control Window

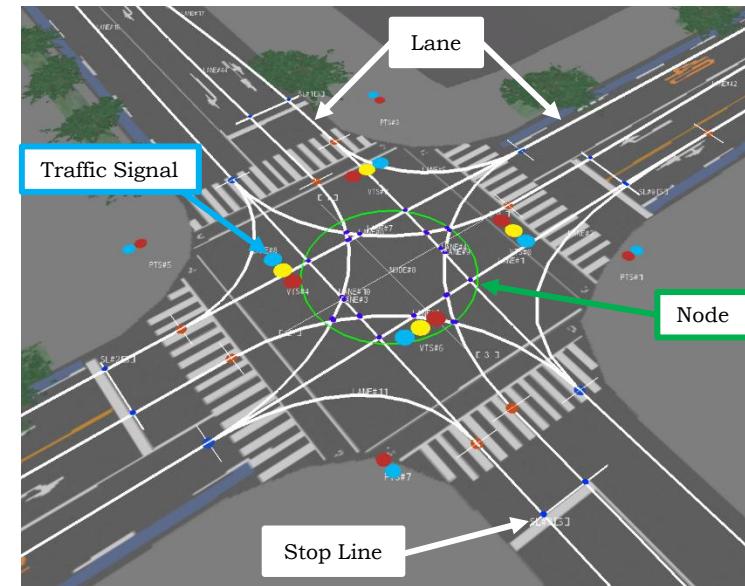
Control Window provides control of view and edit functionality of Main Window.

The meanings of each items are almost clear, except some items like Lane List, Related Lanes, etc.

Detail of such items will be explained when it is necessary.



The main elements to express road network data in SEdit is the Node, Lane, Traffic Signal, Stop Line, and Pedestrian Lane. They are illustrated as the figure below.



Important

The Node is the abstraction of the intersection, to represent road network.

Actual road shape is given by the Lanes, which correspond to the center of road lanes.

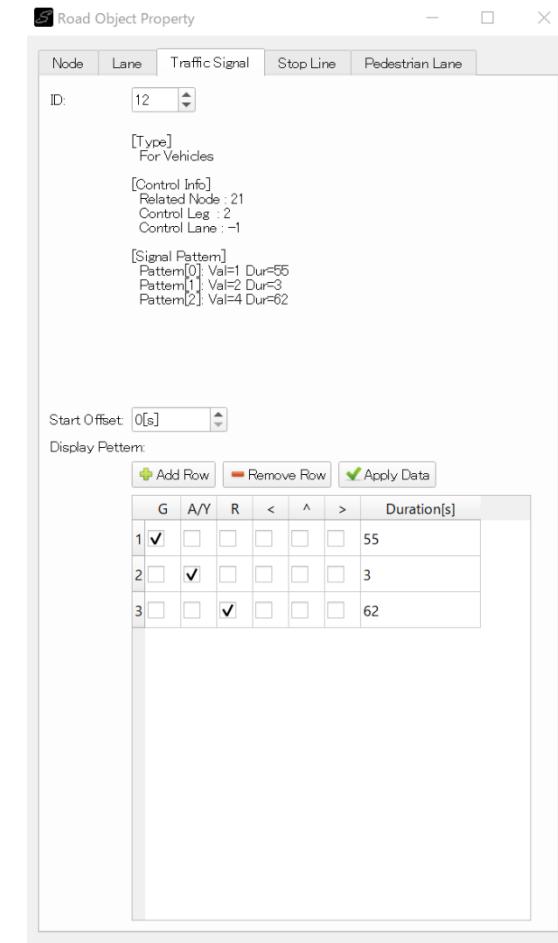
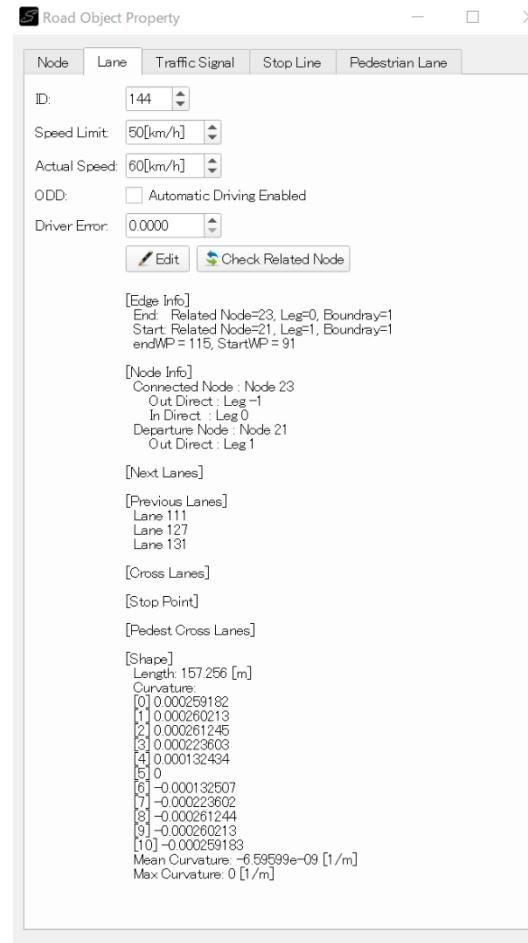
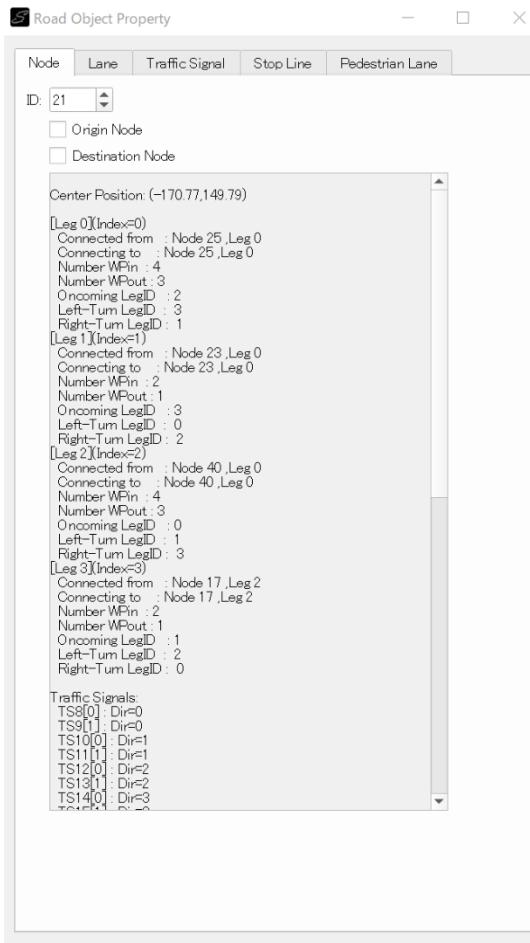
The Lanes are referenced by steering control of driver-agent in Re:sim to calculate the deviation of the vehicle, so that the lanes should be given inside the intersection.

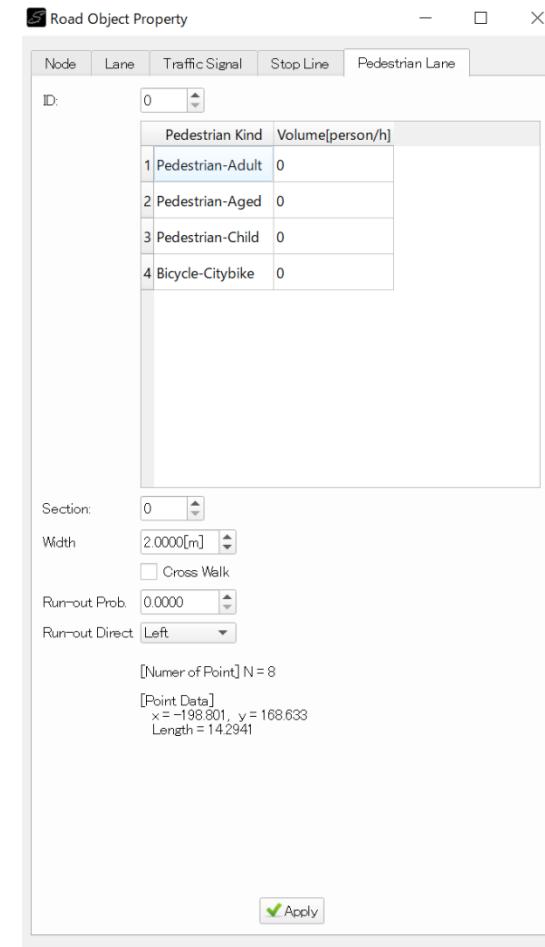
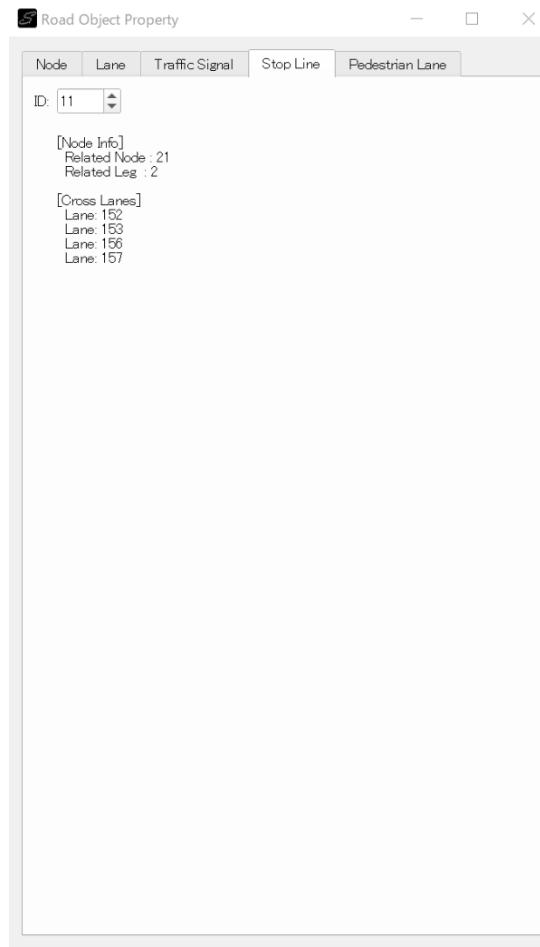
1.3 Object Property Window

Object Property Window show the data of selected road object.

Some data can be set on this window.

The content displayed in this window will different from the kind of selected road object as follows.





2. Basic Mouse and Keyboard Operation

2.1 Normal Mouse Operation

Normal mouse operation is show below. With the “SHIFT” modifier, speed of move and scaling will be larger.



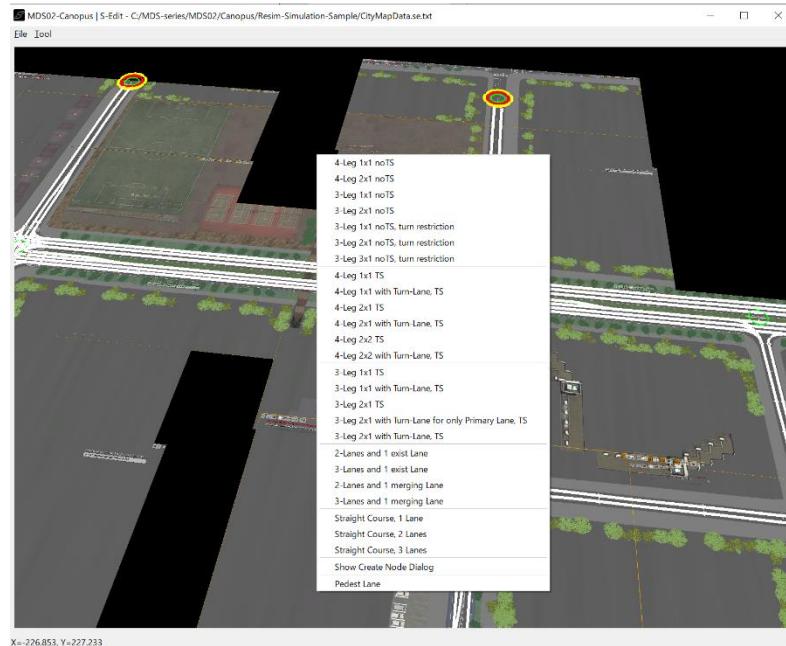
2.2 Popup Menus

Popup Menus can be shown by “ALT” modifier + alphabet key operation as follows.

Important

The popup menus would not be shown if any road object is selected. In that case, press “ESC” to release the selection before try again.

“ALT” + ‘n’ : show menus to create Node and pedestrian lane



“ALT” + ‘u’ : show Utility menus to calculate necessary information



“ALT” + ‘s’ : show menus to search road objects



2.3 Road Object Selection

Important

The selection of road object is done by a left click of mouse with the “CTRL” key pressed.

Multiple selection is possible, which means sequential selection of the road object by a left click with the “CTRL”+“SHIFT” key pressed.

To deselect the road object, “CTRL” + left click the object again.

If “ESC” is pressed, all the selection is cleared.

If the state of the checkbox of the control window is off, the object is not selected by the left click. See the right figures.

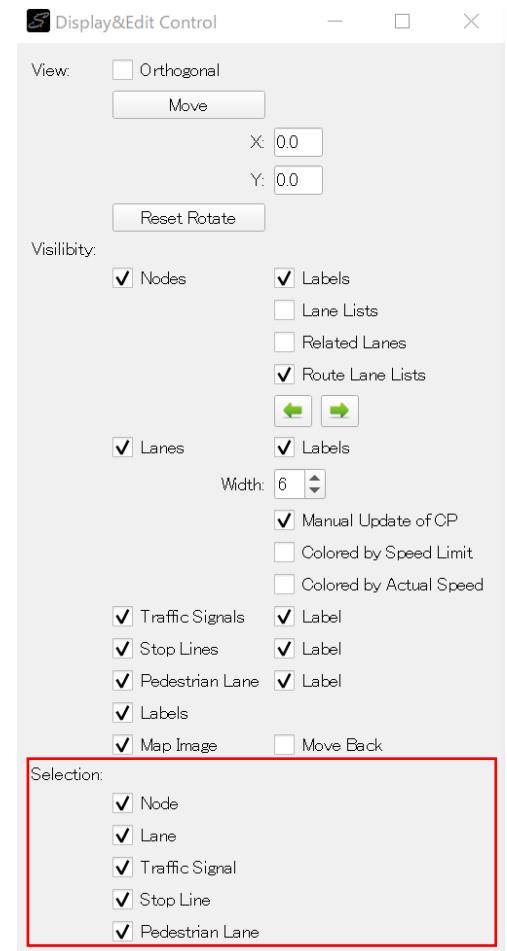
To select the road object, where to click is important.

The following sections shows the tips for the object selection.

Node:

Click near center of the node (yellow circle of left figure below).

If the node is selected, the thickness of the circle is increased.

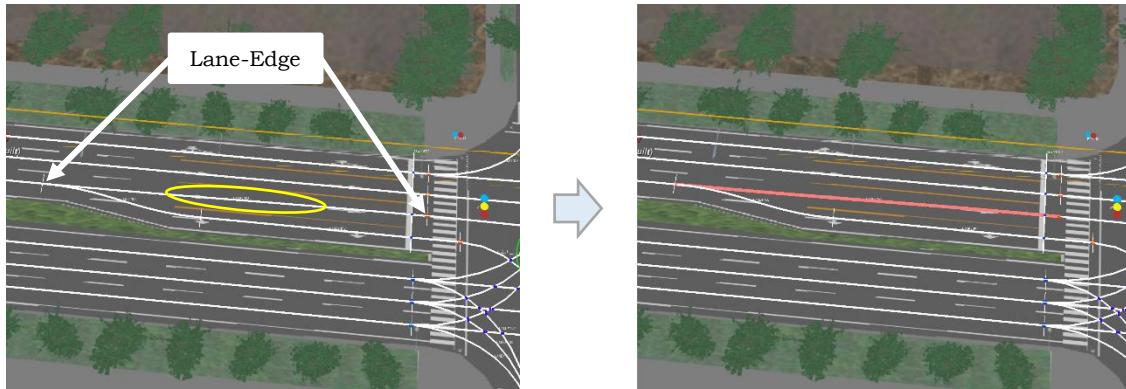


The object becomes unselectable
if the checkbox is unchecked.

Lane:

To select the lane, click around middle of the lane.

If the lane is selected, the color of the lane is changed as shown in the right figure below.

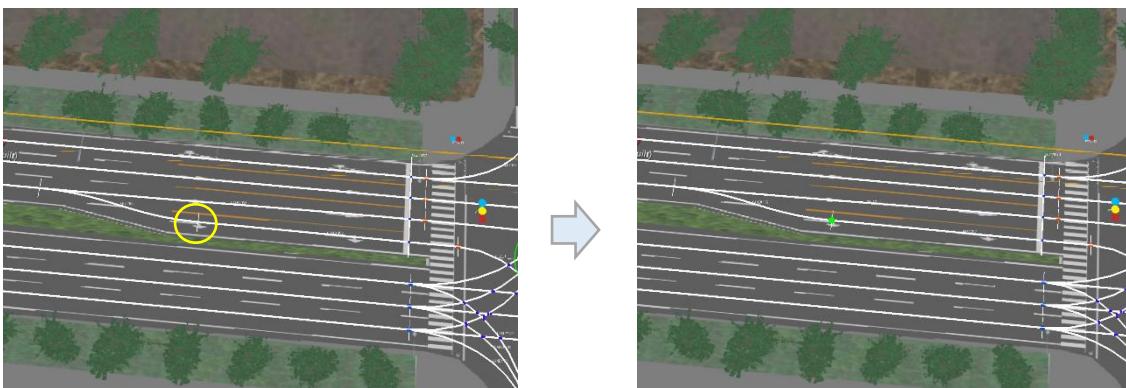


Lane-Edge:

The lane-edge is also selectable to reshape the lane.

To select the lane-edge, click around the lane edge.

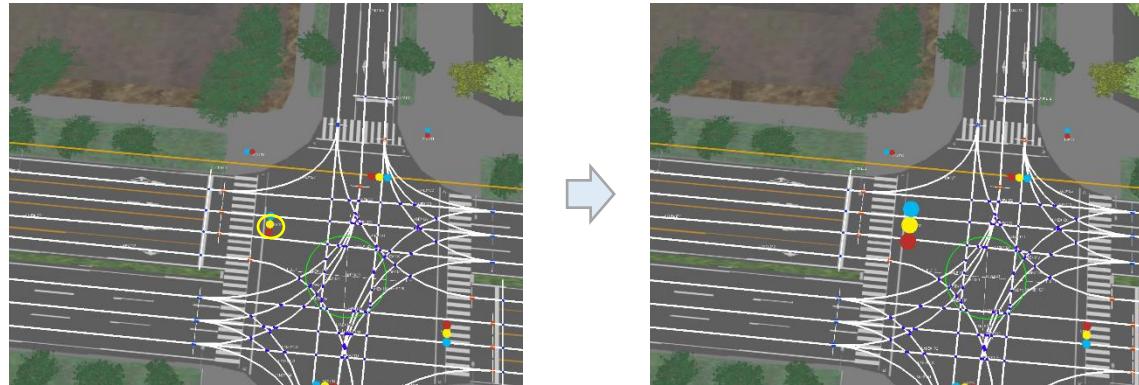
If the lane-edge is selected, the green point is drawn at the selected lane-edge as shown in the right figure below.



Traffic Signal:

To select the traffic signal, click around the center of traffic signal.

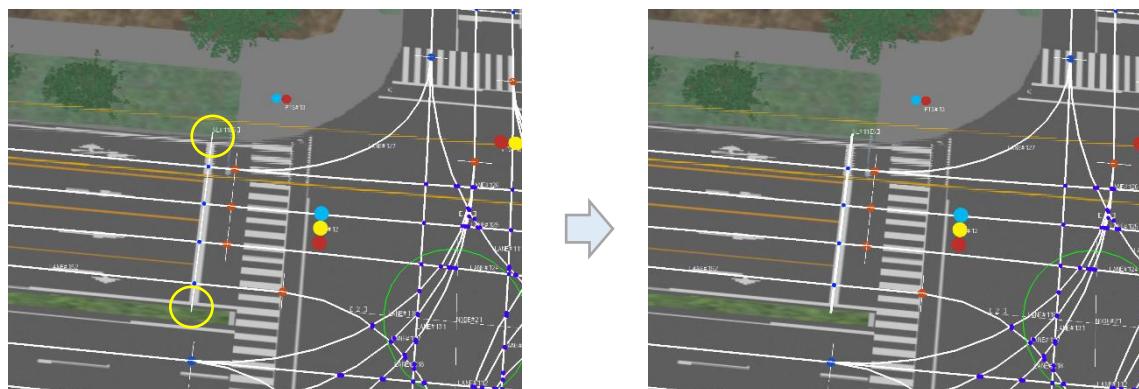
If the traffic signal is selected, the size of the traffic signal become larger as shown in the right figure below.



Stop Line:

To select the stop line, click around the edge of the stop line.

If the stop line is selected, the thickness of the line is increased.



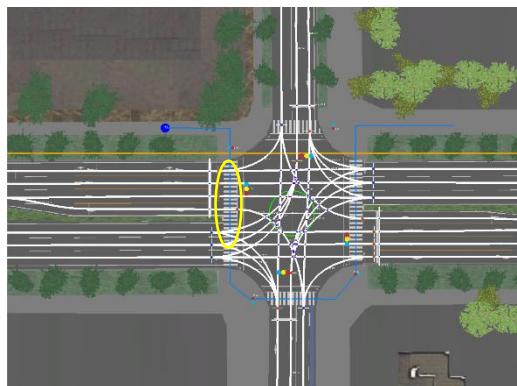
Pedestrian Lane:

The pedestrian lane consists connected multiple lines.

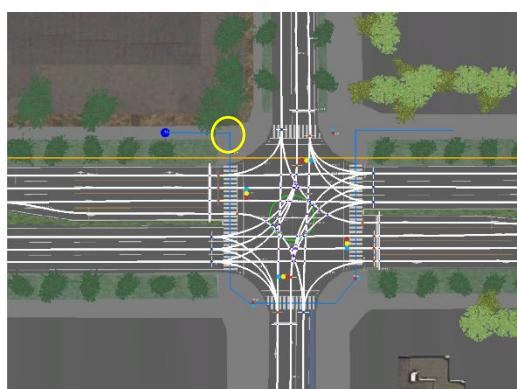
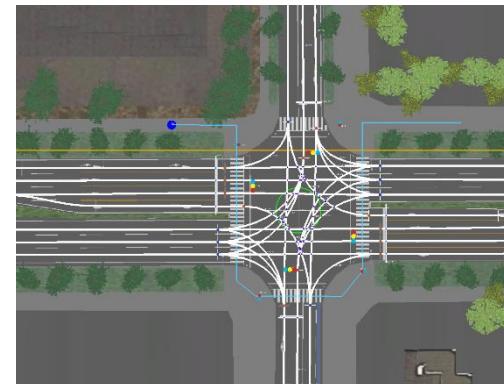
Thus the selection of pedestrian lane have two option, one is the selection of all lines of the pedestrian lane and the other is the selection of one line from the member of pedestrian lane.

To select the whole lines as the pedestrian lane, click around the middle of the lines.

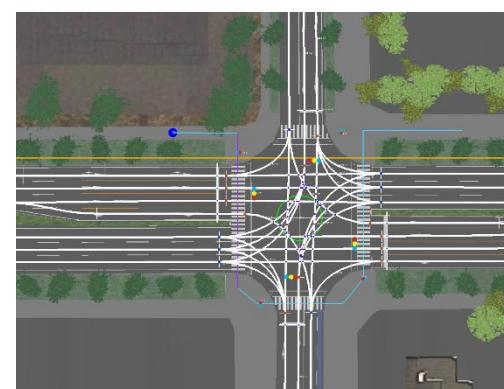
If the clicked point is near start point of the line, only the line of the pedestrian lane is selected as shown in right figure.



The selected pedestrian lane turn to light blue color(all lines of the lane).



The selected line turn to violet color.



2.4 Road Object Move and Rotation

The selected road object can be moved or rotated.

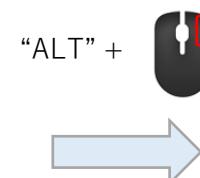
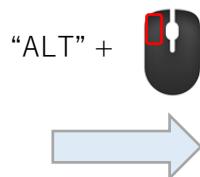
Press “ALT” modifier and then drag the mouse.

The left click will move the object, and the right click will rotate the object.

The undo function has not fully supported yet.

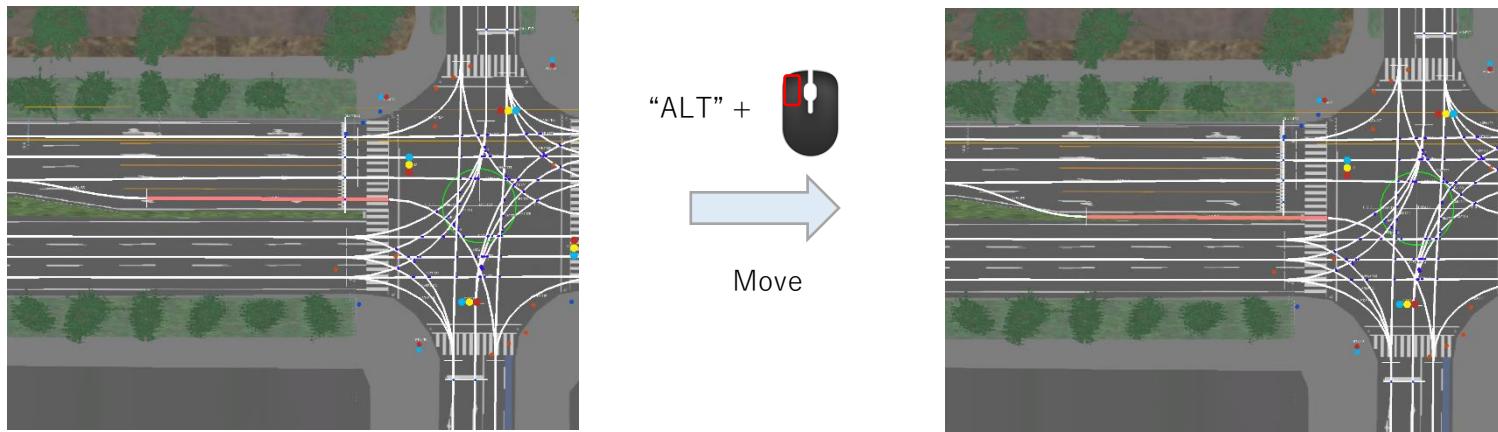
Node:

The selected node and related lanes, traffic signals, stop lines are moved or rotated together.



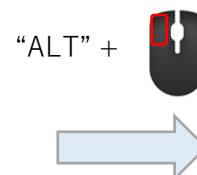
Lane:

For the lane, only move function is supported.



Lane-Edge:

For the lane-edge, move and rotate function is both supported.



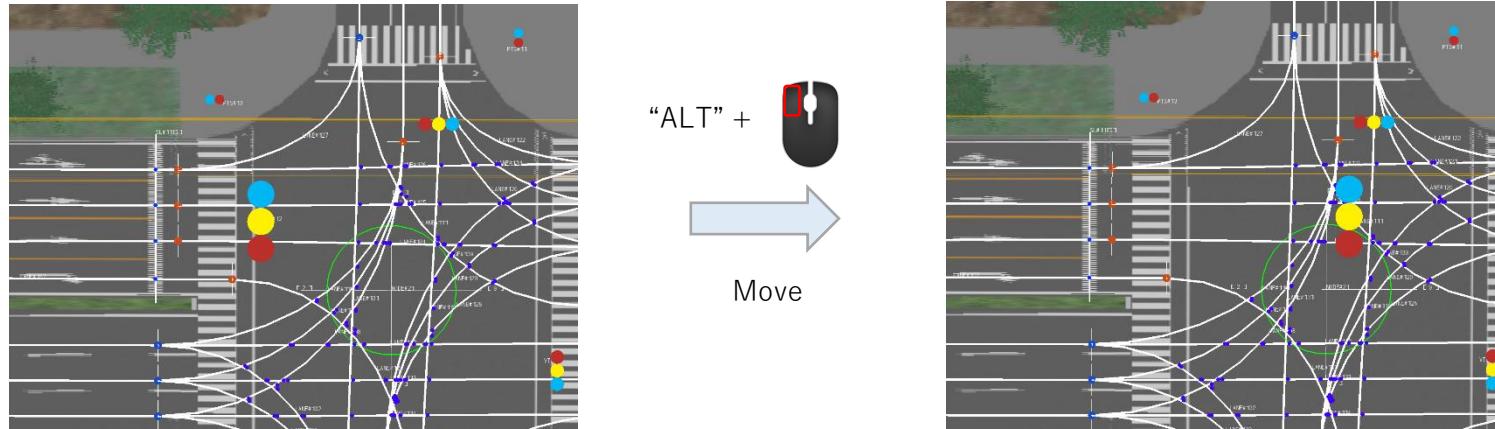
Move



Rotate

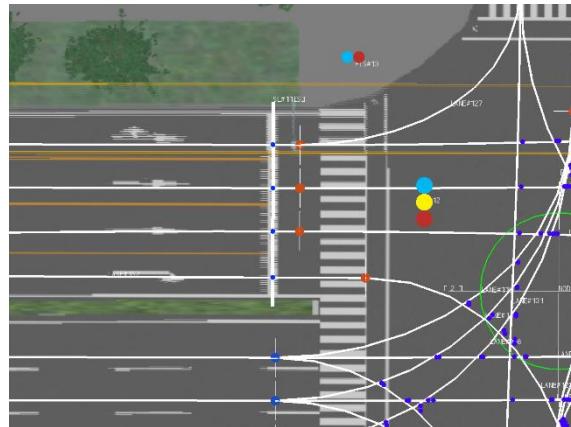
Traffic Signal:

For the traffic signal, only move function is supported.

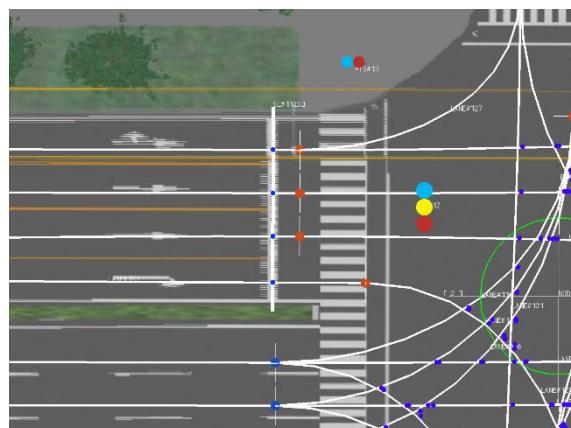
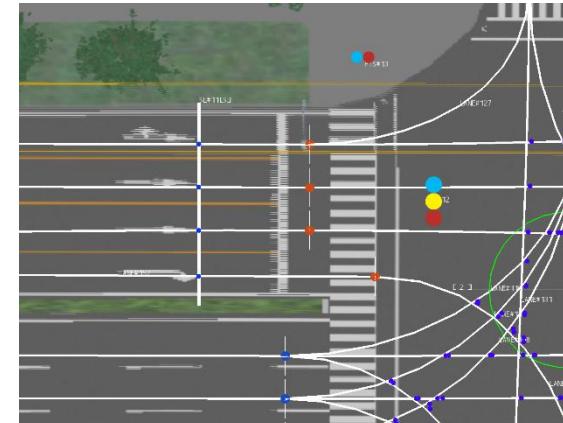


Stop Line:

For the stop line, move and length-adjustment functions are assigned with mouse operation.



“ALT” + Move



“ALT” + Rotate

Important



The blue small point represent the cross point of the stop line and the lane.
If no blue small point is drawn, the stop line is not associated with the lane,
and the Re:sim driver agents can not determine where to stop at
intersection, thus they will ignore the traffic signal.

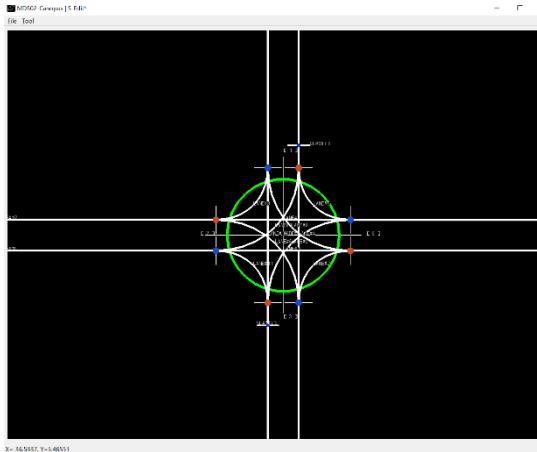
2.5 Add Traffic Signal and Stop Line to Node

To add traffic signal and stop line to the selected node, firstly the direction of node should be assigned by pressing number button.

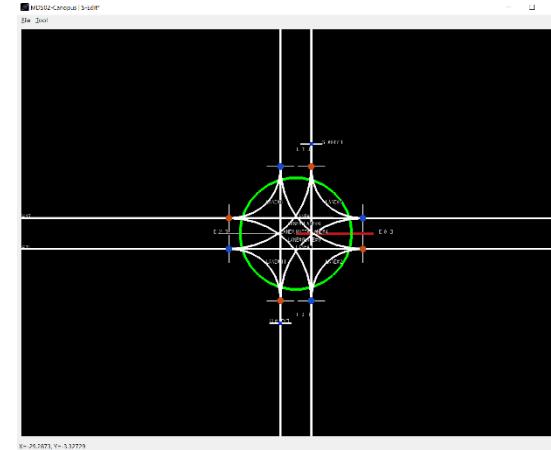
The number of the button - 1 is the leg ID to be assigned.

Then mouse wheel button click to show popup menu to create traffic signals or stop line and select the command.

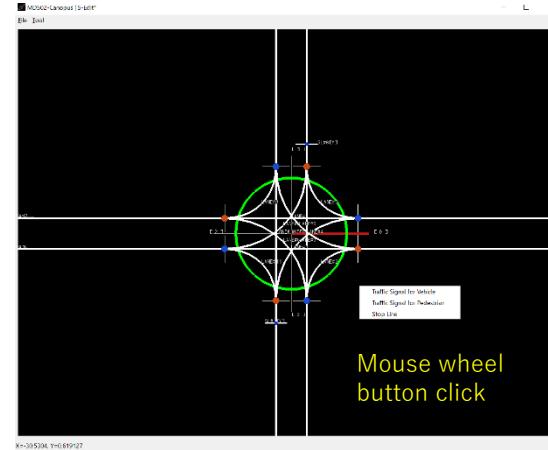
Select the node.



Press '1' key to select leg ID = 0.

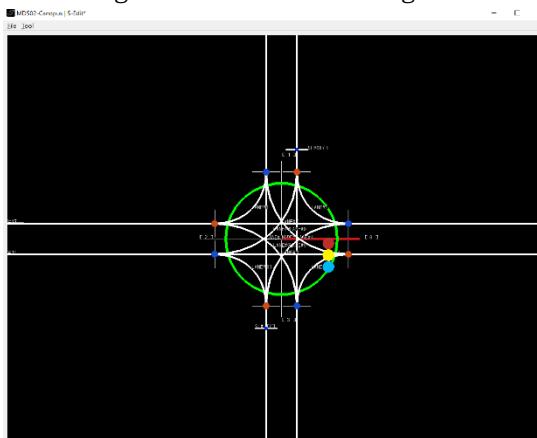


Click wheel button of mouse to show popup menu.



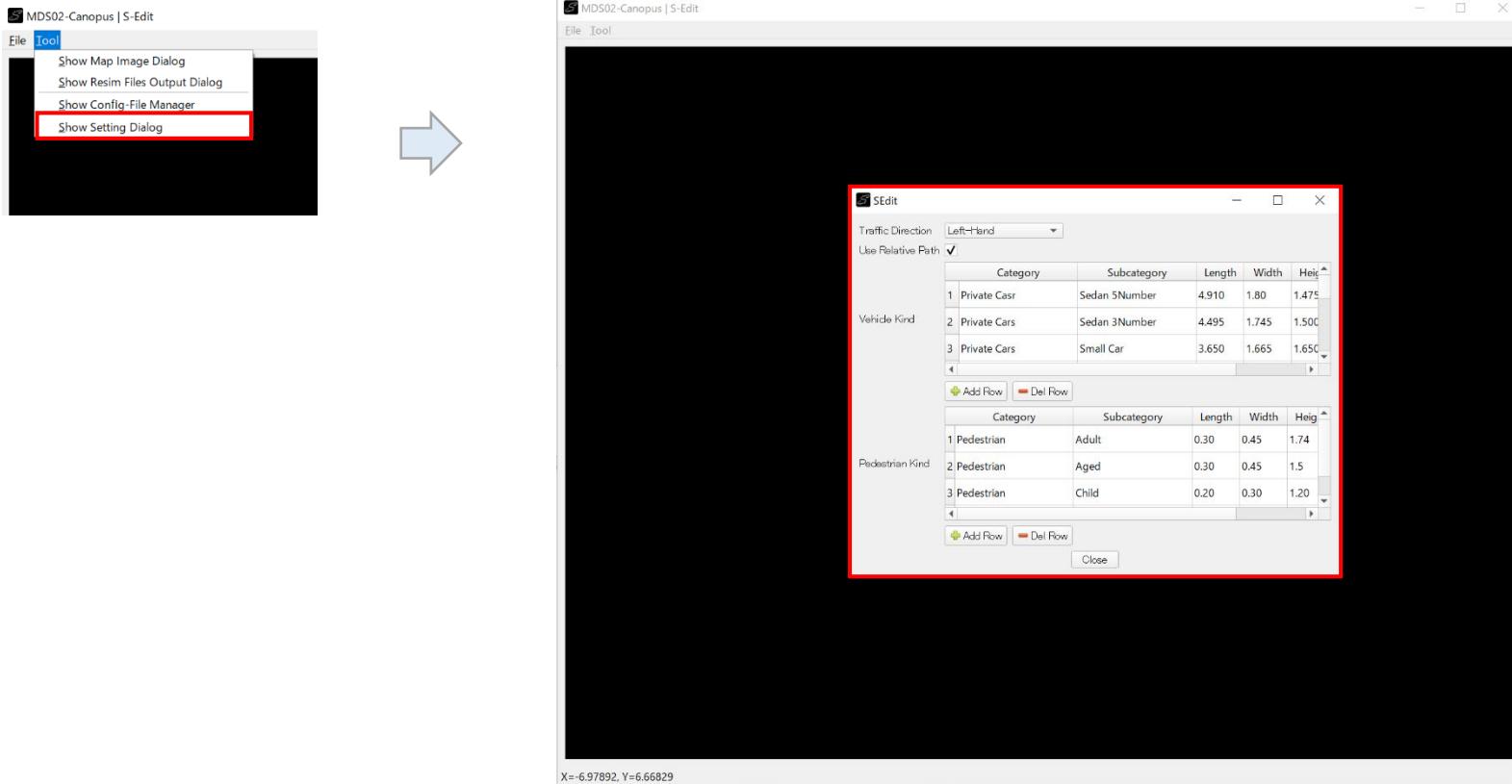
Mouse wheel
button click

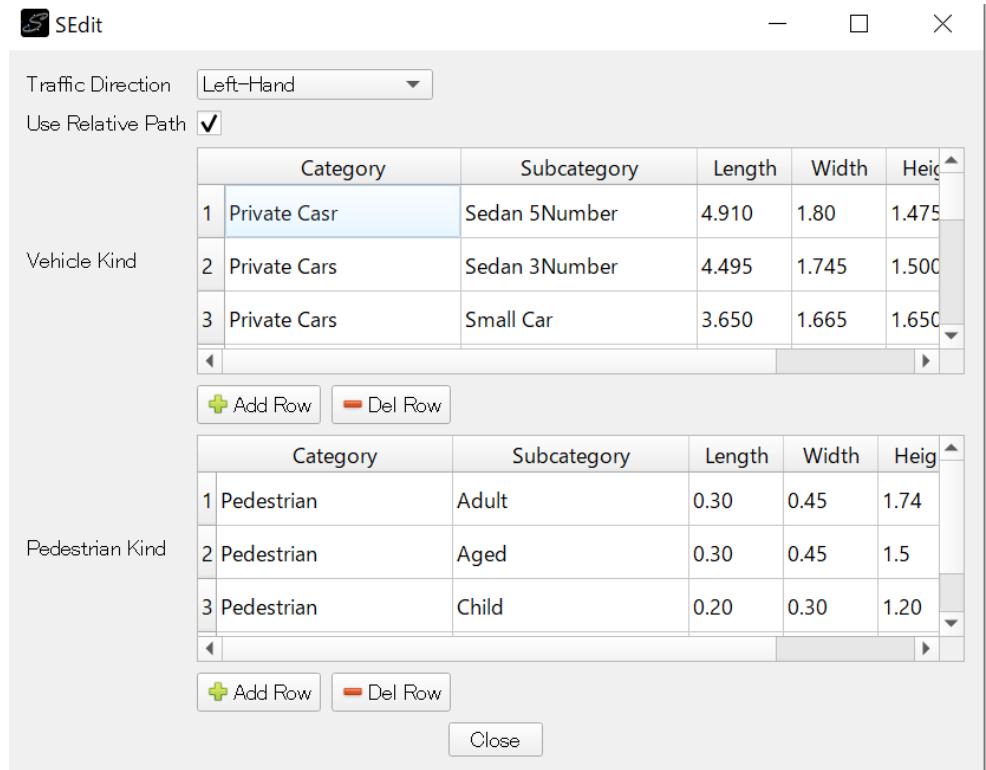
Following is the result of selecting "Traffic Signal for Vehicle"



3. System Setting

Before starting making simulation data, the system setting should be checked.
From the tool menu, select “Show Setting Dialog”, then the dialog will be shown.
Currently, there are not so much items to be set.





Traffic Direction:

Select Left-Hand or Right-Hand

Use Relative Path:

This is the option to use relative path to the files, that will be written in SEdit data file and the simulation data files.

The relative path option is useful when you move the data to different directory.

Vehicle Kind:

The vehicle category and its representative size is defined.

It should be noted that the such data as traffic volume and route selection are given to each vehicle kinds defined here.

The name of category and subcategory are arbitrary, not used in the Re:sim simulation logic.

Pedestrian Kind:

The pedestrian category and its representative size is defined.

The motorcycle is classified as vehicle kind, on the other hand, bicycle is classified as pedestrian kind in Re:sim.

The difference of vehicle kind and pedestrian kind in Re:sim is:

vehicle kind: move along lanes

pedestrian kind: move along pedestrian lanes

4. Use Map Image File

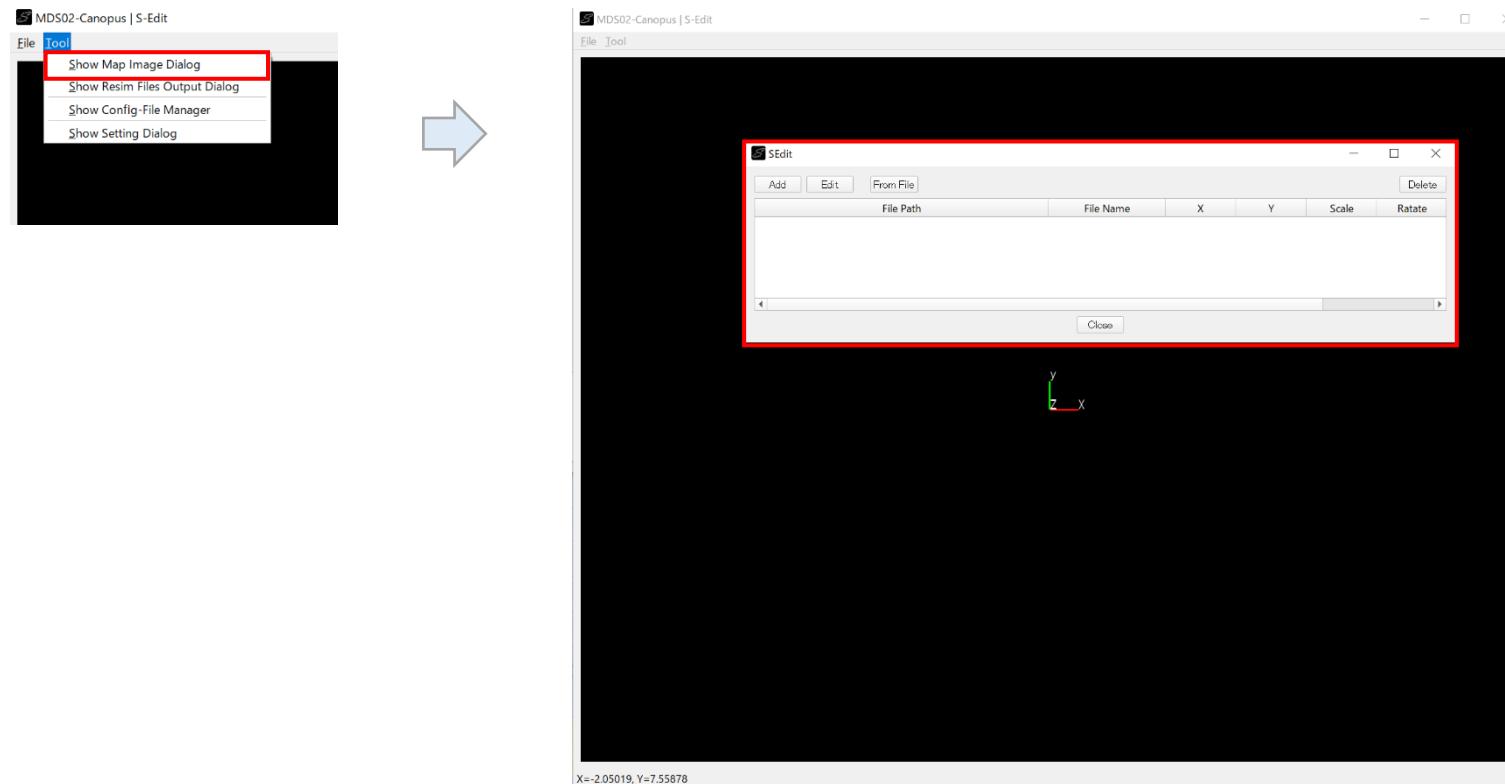
SEdit can draw 2D image by reading image files of jpg, png format, which is used as the reference to make the road data.

Important

This is an option / support function to make it easy to shape the road data.

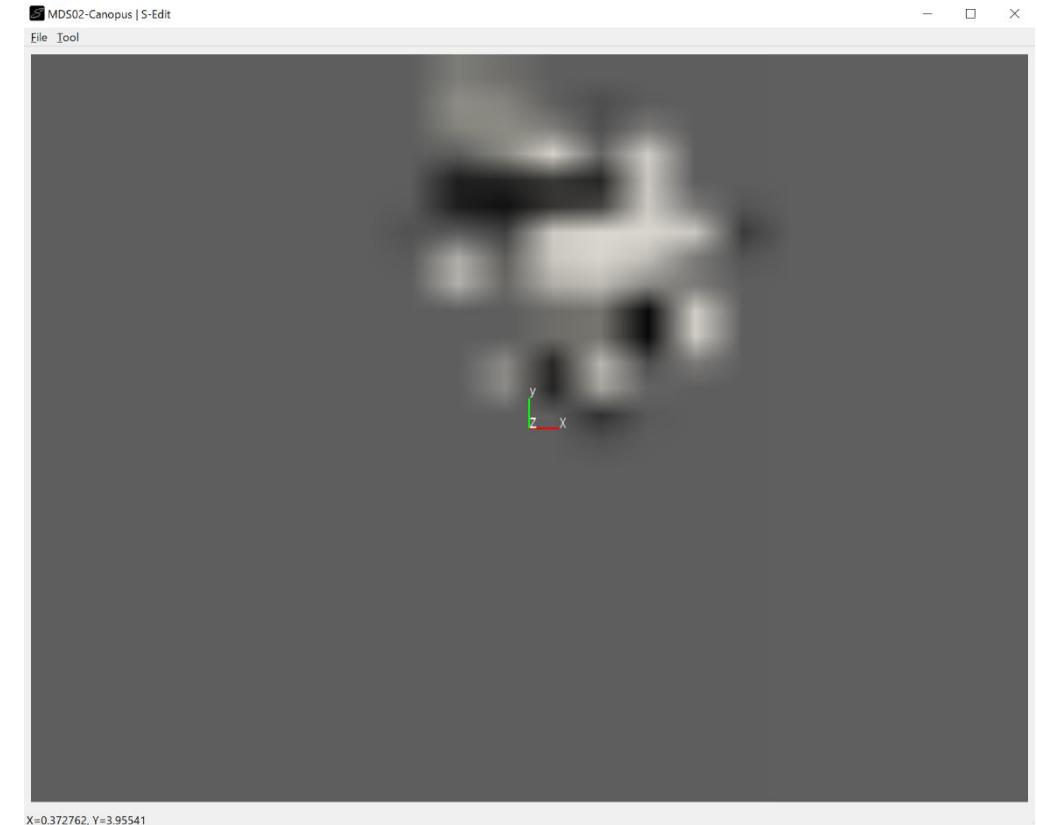
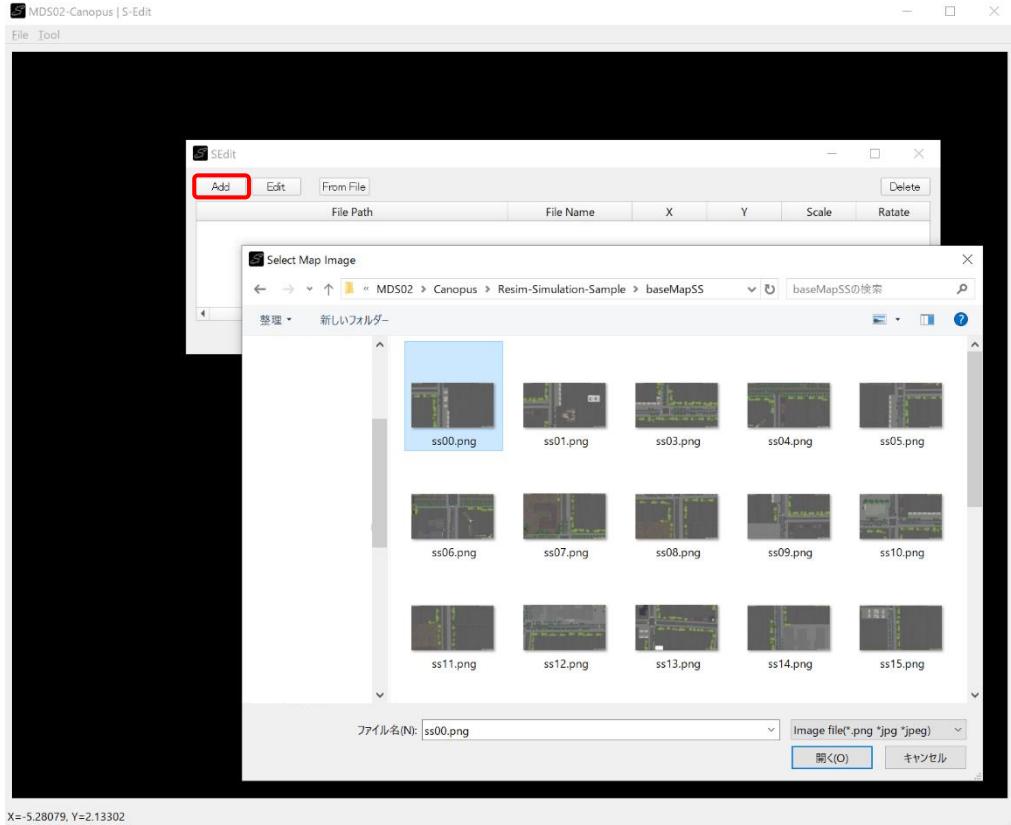
Not always required to read image files.

From the tool menu, select “Show Map Image Dialog”, then the dialog will be shown.



Press “Add” button to select the image file to read.

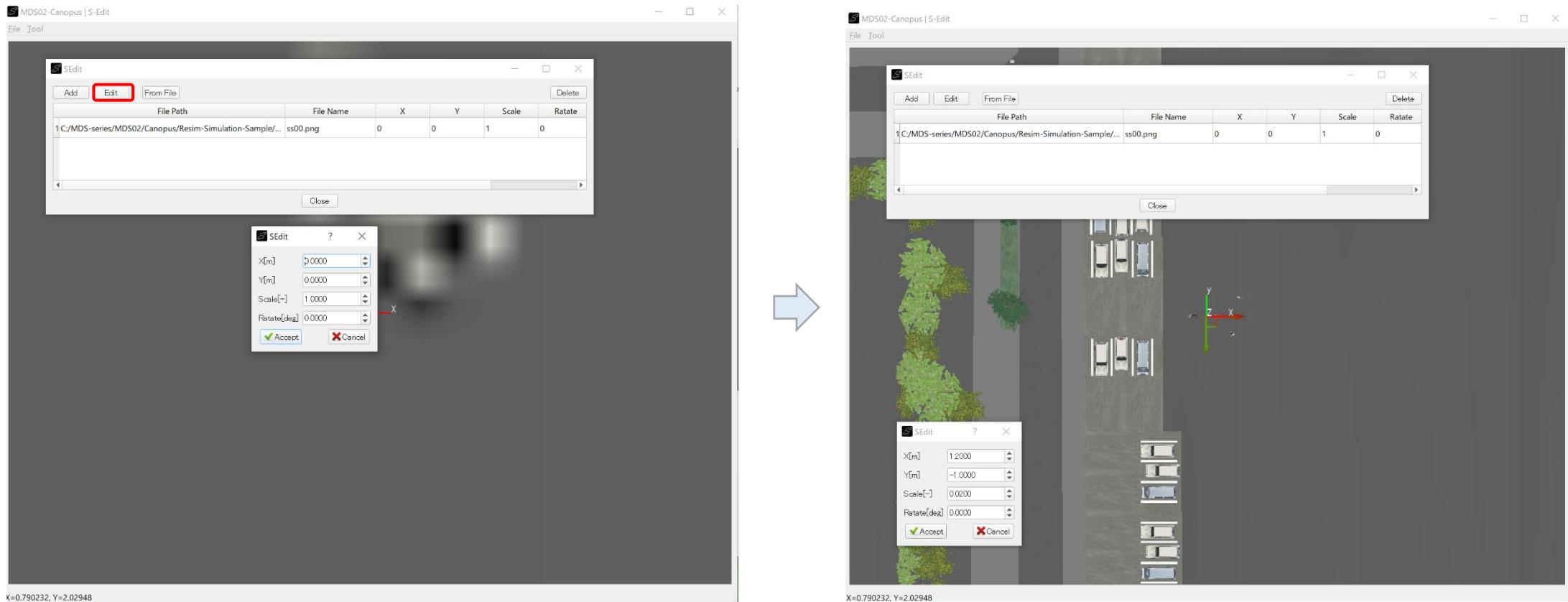
Current version of SEdit, “From File” function has not been implemented yet.



The position, rotation and scale of the image can be changed by the dialog shown by pressing “Edit” button.

If the adequate values are set, press “Accept” button of the dialog.

If the “Cancel” button of the dialog is pressed, the change of values will be discarded.



5. Creating Node and Shaping Lanes

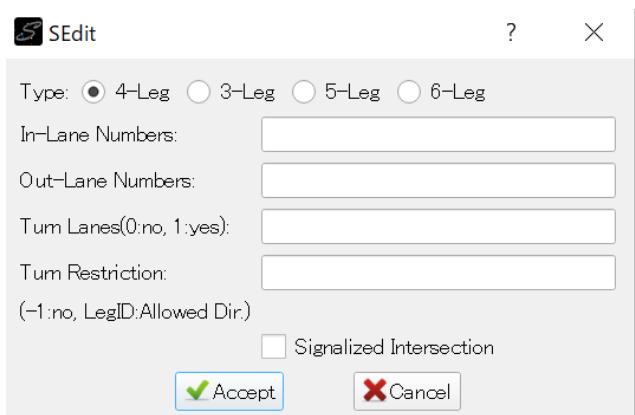
The main task of making road data consists of two part: creating node and shaping lanes.

5.1 Creating Node

To create node, click on the map where you want to make the node and show popup menu by “ALT” + ‘n’, and select the type of the node to be created.

The most flexible way to create node is to select “Show Create Node Dialog”.

Create Node Dialog:



Popup menu:

4-Leg 1x1 noTS
4-Leg 2x1 noTS
3-Leg 1x1 notS
3-Leg 2x1 notS
3-Leg 1x1 noTS, turn restriction
3-Leg 2x1 noTS, turn restriction
3-Leg 3x1 noTS, turn restriction
4-Leg 1x1 TS
4-Leg 1x1 with Turn-Lane, TS
4-Leg 2x1 TS
4-Leg 2x1 with Turn-Lane, TS
4-Leg 2x2 TS
4-Leg 2x2 with Turn-Lane, TS
3-Leg 1x1 TS
3-Leg 1x1 with Turn-Lane, TS
3-Leg 2x1 TS
3-Leg 2x1 with Turn-Lane for only Primary Lane, TS
3-Leg 2x1 with Turn-Lane, TS
2-Lanes and 1 exist Lane
3-Lanes and 1 exist Lane
2-Lanes and 1 merging Lane
3-Lanes and 1 merging Lane
Straight Course, 1 Lane
Straight Course, 2 Lanes
Straight Course, 3 Lanes
Show Create Node Dialog
Pedest Lane

Following is the procedure to create a node using “Create Node Dialog”.

1. Determine number of in- and out-lane for each node legs.

Important

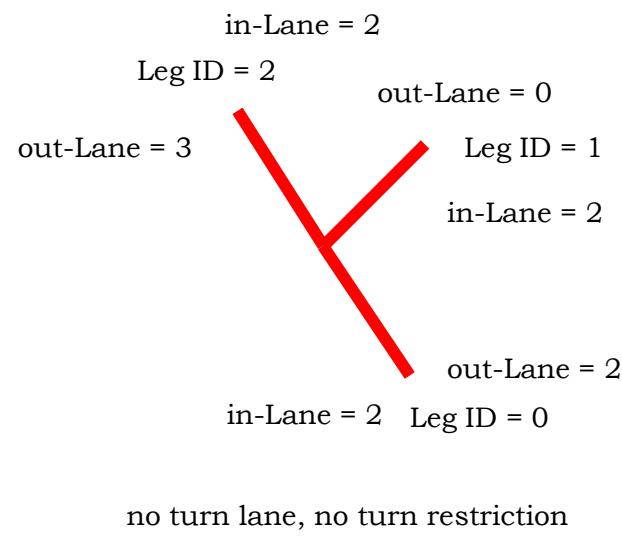
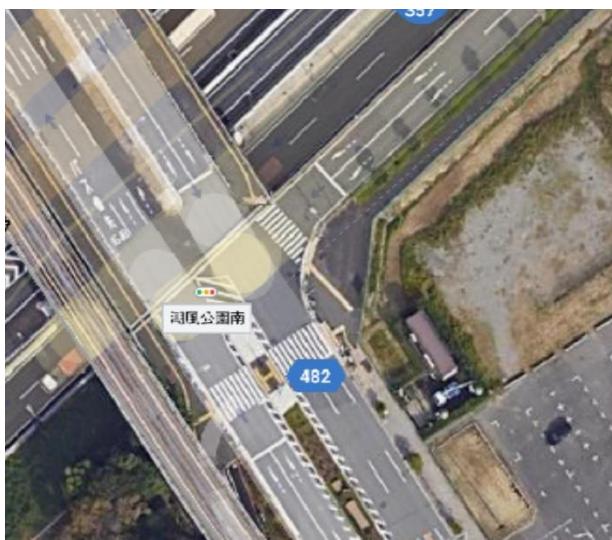
Node leg ID is started from 0, counter-clockwise.

For non-signalized 3-leg intersection, node leg ID = 1 means it is the yielding lane.

2. Determine to create turn lane for each legs.

3. If turn restriction exist, set allowed leg IDs go from that leg.

Example 1:



SEdit

Type: 4-Leg 3-Leg 5-Leg 6-Leg

In-Lane Numbers: 2,2,2

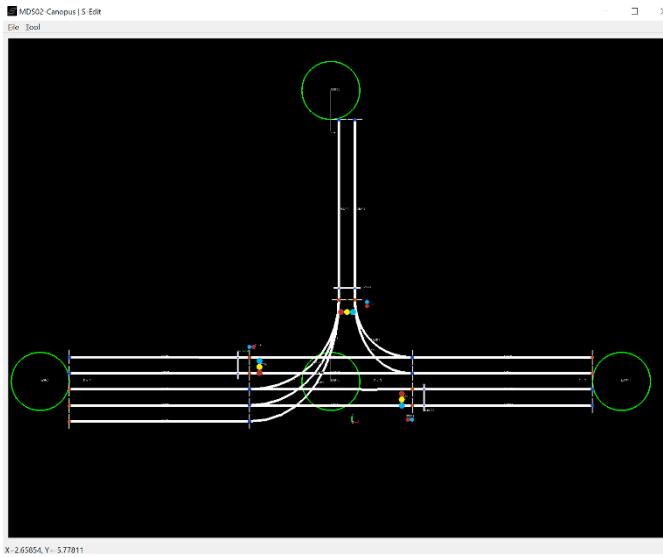
Out-Lane Numbers: 2,0,3

Turn Lanes(0:no, 1:yes):

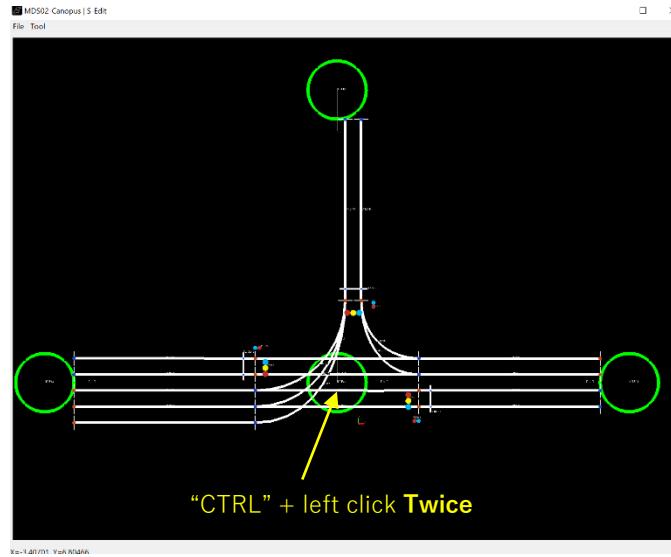
Turn Restriction: (-1:no, LegID:Allowed Dir.)

Signalized Intersection

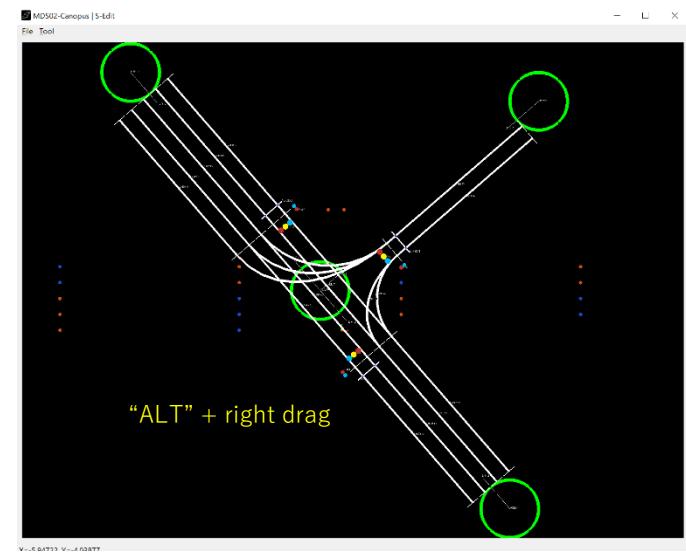
The node shown below is created.



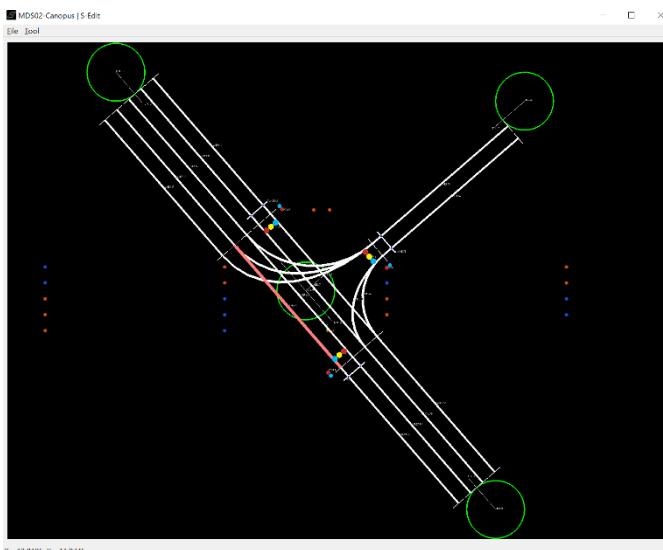
Click twice (not double-click) to select all connected node to move together.



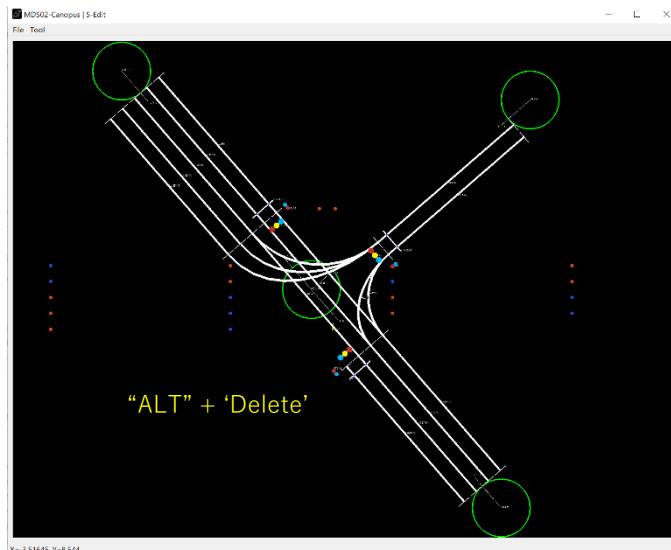
Rotate the node.



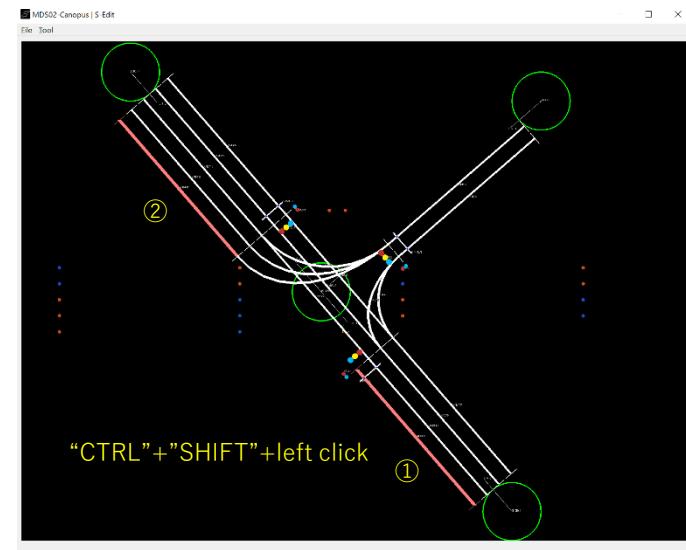
Select the Lane to remove.



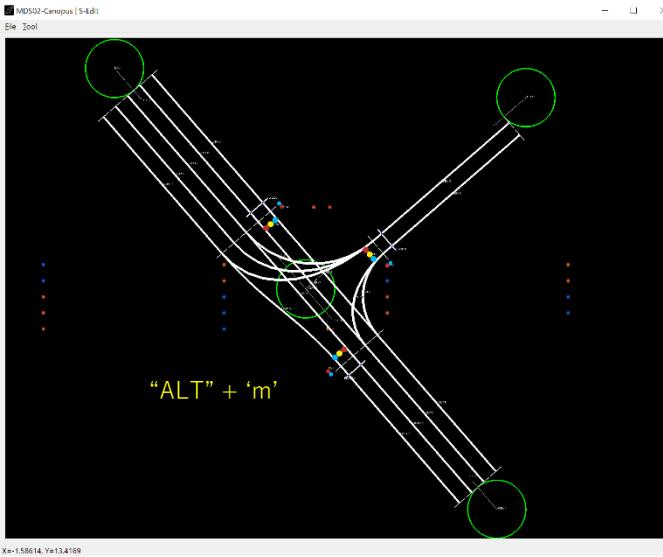
Delete selected Lane by "ALT" + "Delete".



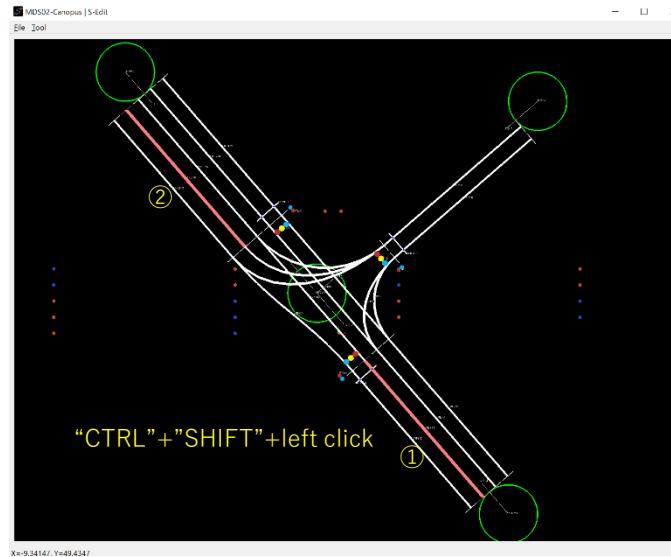
Select Lanes to merge by "CTRL"+"SHIFT"+left click.



Merge lanes by “ALT” + ‘m’



Select other lanes to merge by “CTRL”+”SHIFT”+left click.



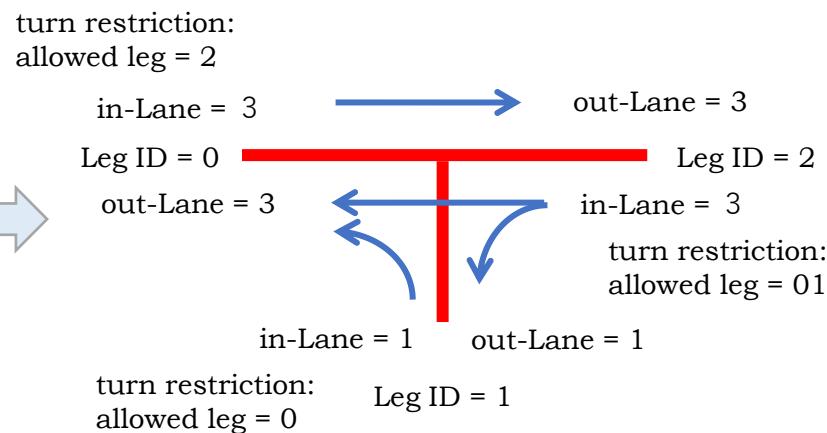
Adjust lanes, traffic signals, and stop lines position.



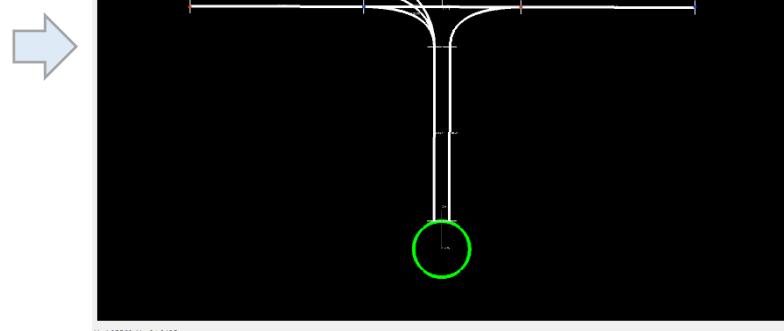
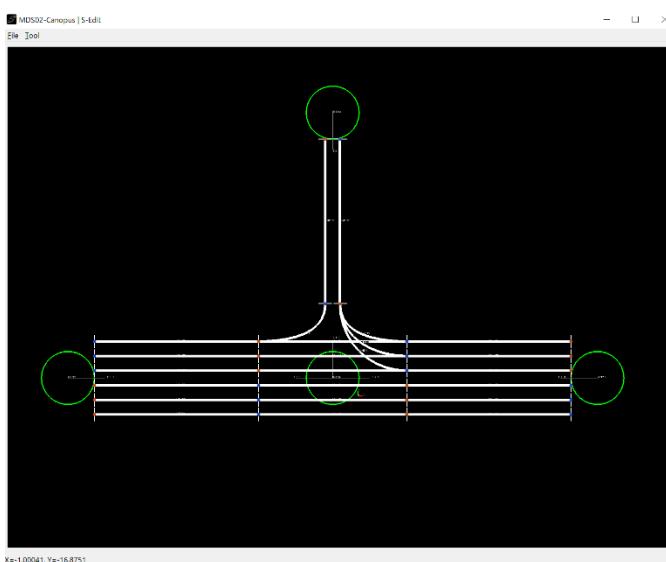
Important

To merge lanes, select lanes in order that vehicle moves.

Example 2:



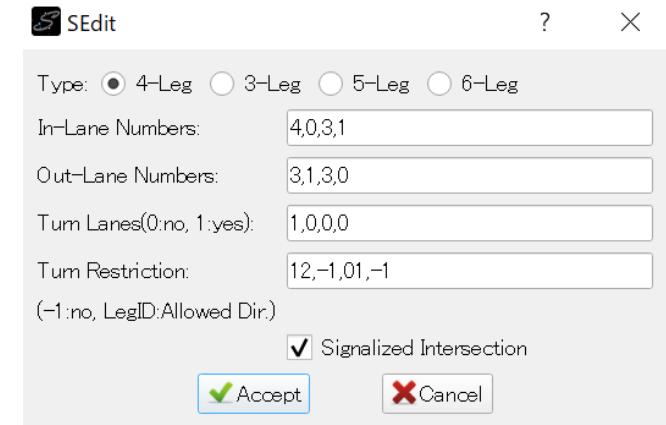
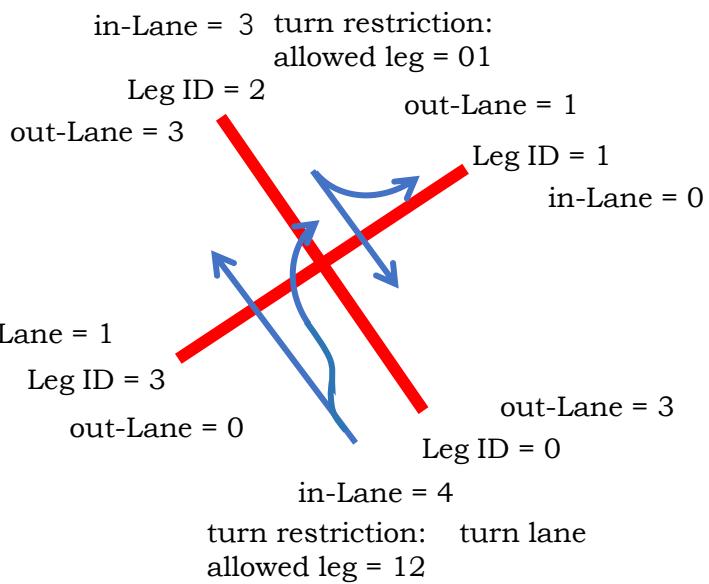
The node shown below is created.



Important

Allowed leg data in turn restriction is handled as string type, not integer.
Thus the data 01 means leg 0 and leg 1.

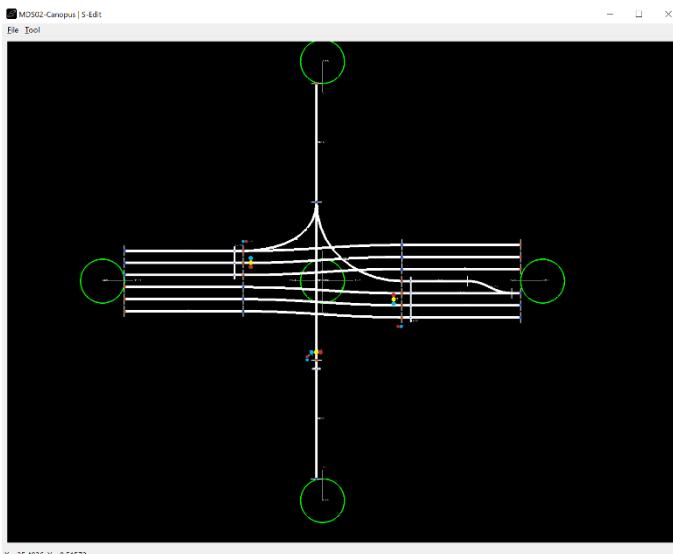
Example 3:



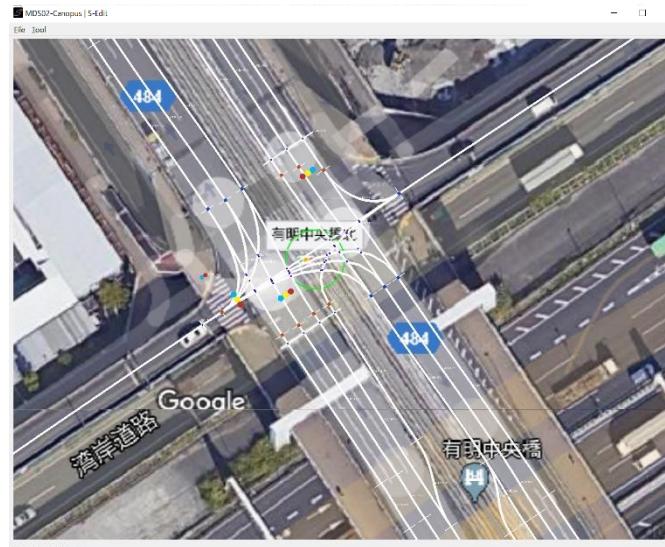
Important

In-Lane Number is counted at stop line or entrance of intersection.

The node shown below is created.



Adjust lanes, traffic signals, and stop lines position.

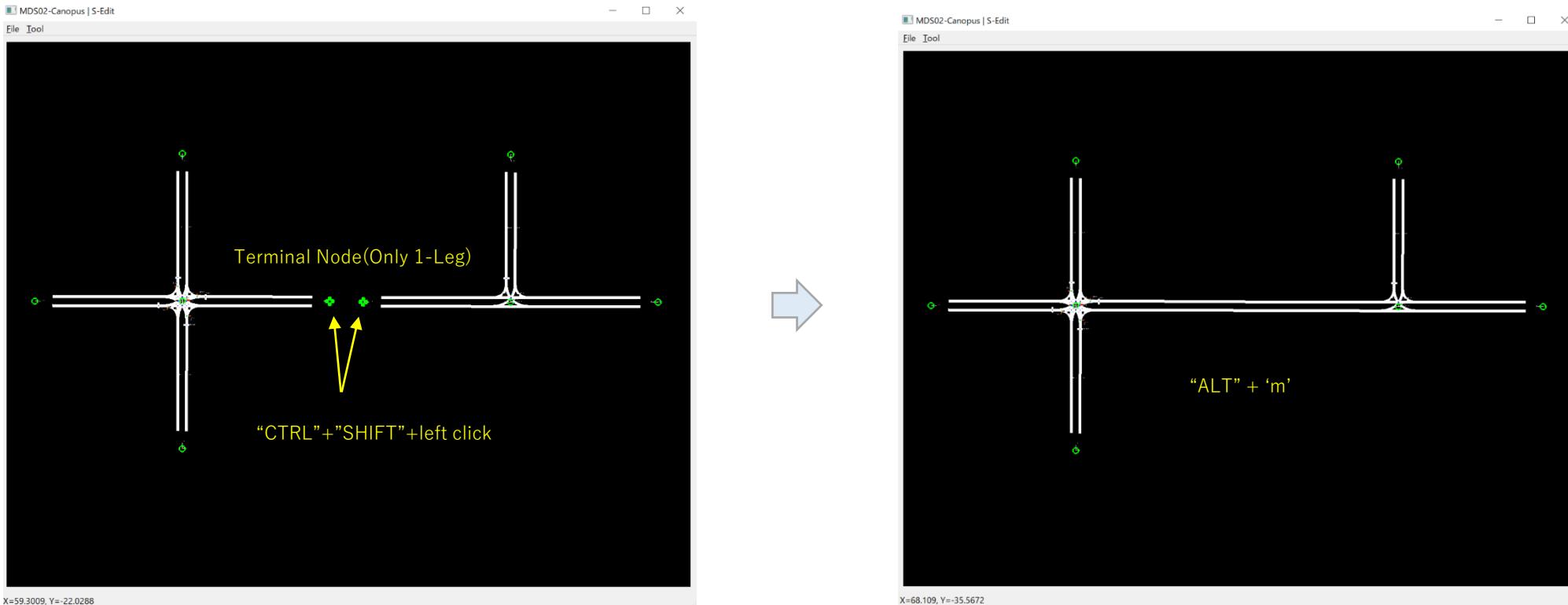


5.2 Merging Terminal Nodes

The terminal node is the node that has only one leg.

The two terminal nodes can be merged by “ALT”+‘m’ operation if those in-lane number and out-lane number are the same.

The order of the terminal node selection is not involved.



5.3 Shaping Lanes

The lane can be divided into two lanes.

By this operation, new lane edge is created at middle of the original lane.

You can move and rotate this lane-edge to fit to the road lane shape.

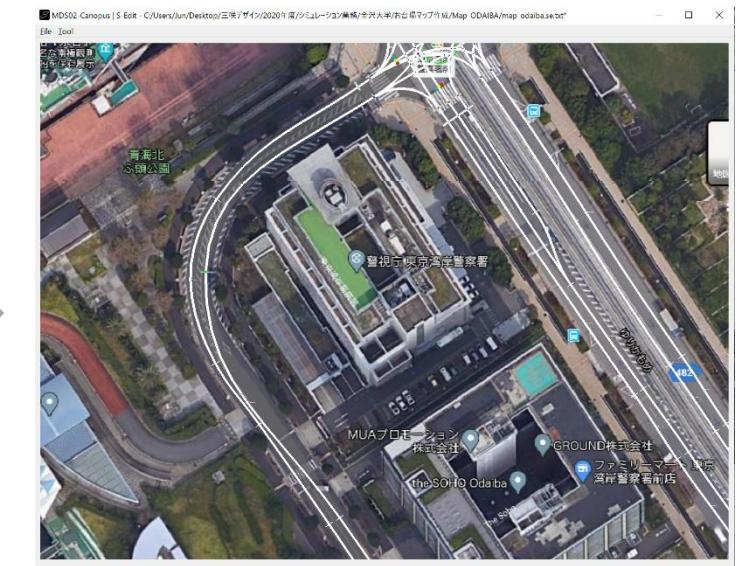
Select the lane to divide.



Press "ALT" * 'd' and new lane-edge appear at middle of selected lane.



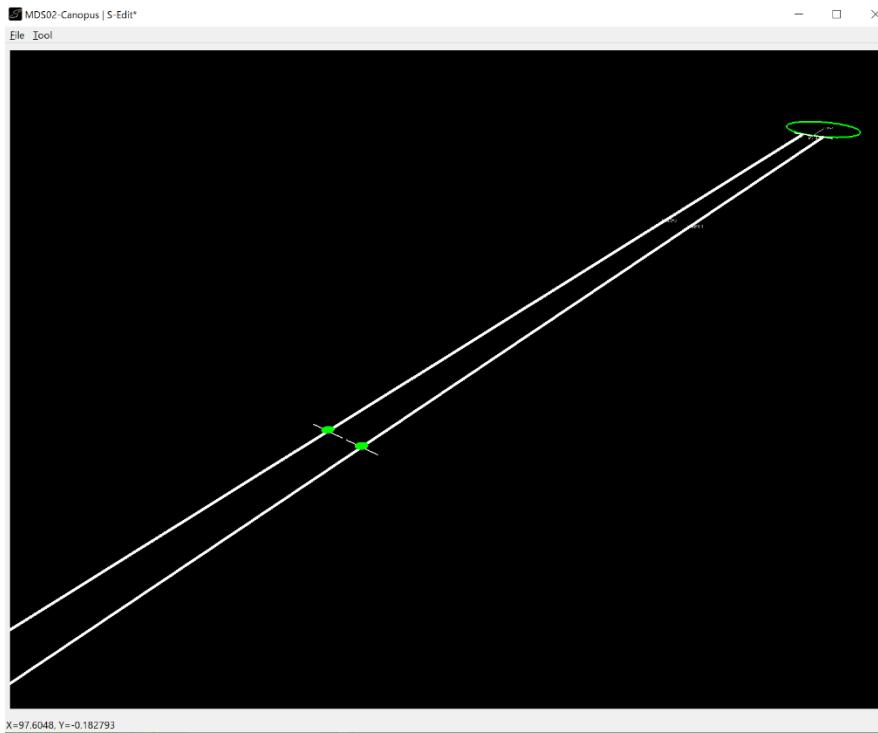
Select created lane-edge and move, rotate the edge to fit to road lane.



5.4 Changing Height of Lane-Edge

The height of the lane-edge can be changed by “ALT”+“SHIFT”+left drag operation.

Select the lane-edges to be changed their height .



“ALT”+“SHIFT”+left drag operation changes height of the lane-edges.



Important

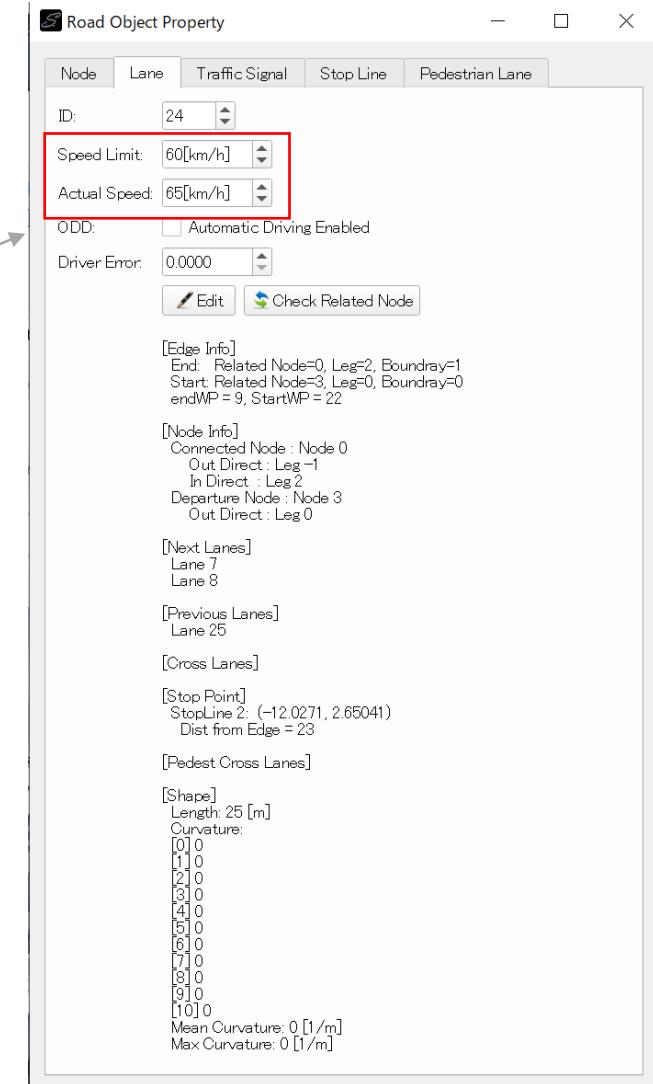
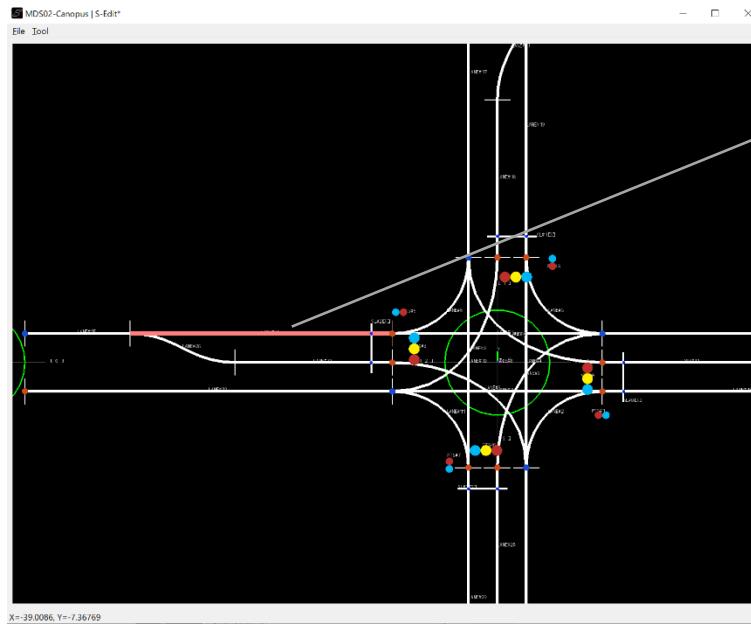
The selection of lane-edge is done by using their X and Y coordinate.

If the height is set, which means Z value is not 0, it is easy to select the lane-edge with Orthogonal View Mode.

5.5 Changing Speed Information of Lanes

The speed information should be given to the lane.

By selecting the lane, speed information is shown in the object property window as shown in the right figure.



Important

There are two speed information; Speed Limit and Actual Speed.

The driver agents of Re:sim use Actual Speed to determine their target speed.

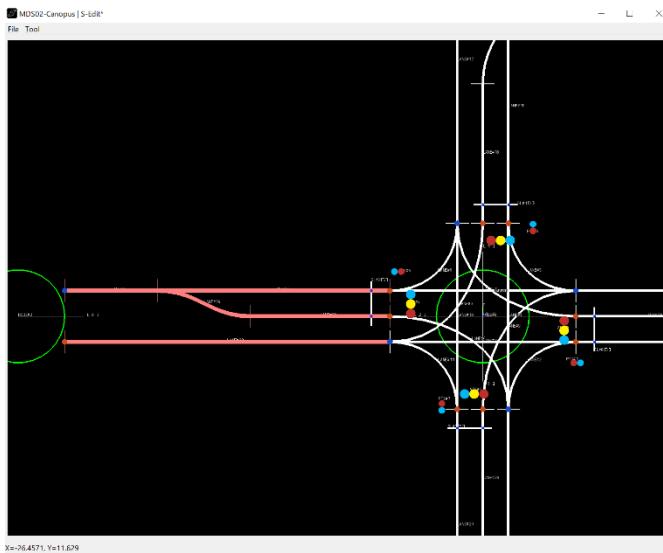
It should be noted that the target speed varies among driver agents, randomly selected from the probability distribution whose parameter is calculated using the Actual Speed.

Speed Limit is provided for such purpose as kind of speed warning system and automatic driving vehicle implementation by customizing Re:sim.

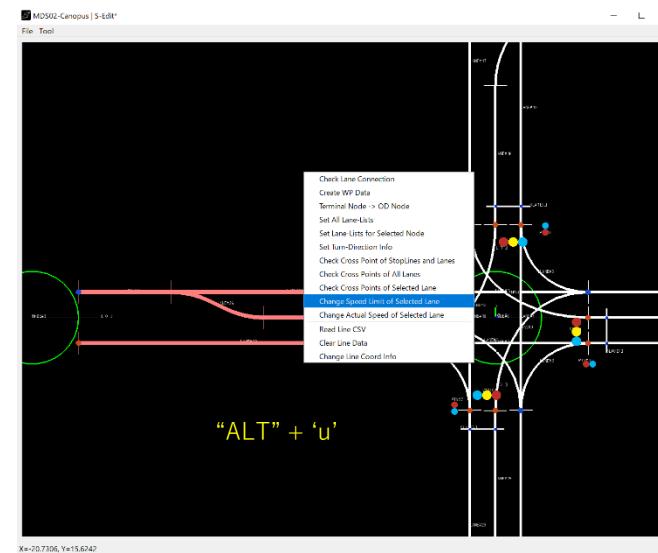
To set Speed Limit or Actual Speed to multiple lanes at the same time, show utility popup menu and select “Change Speed Limit of Selected Lanes” or “Change Actual Speed of Selected Lanes”

Then, the small dialog to input speed value will appear and set the value and press “OK” to apply.

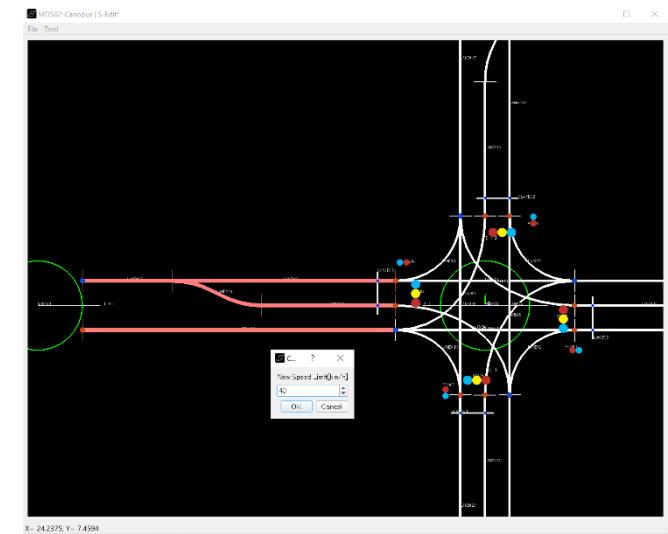
Select the lanes to change speed information.



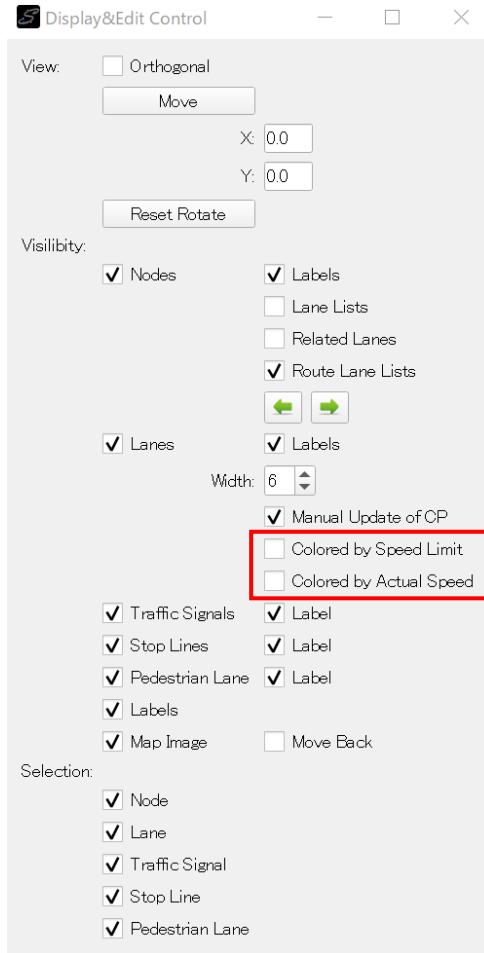
Press “ALT”+’u’ key to popup Utility menu and select the command.



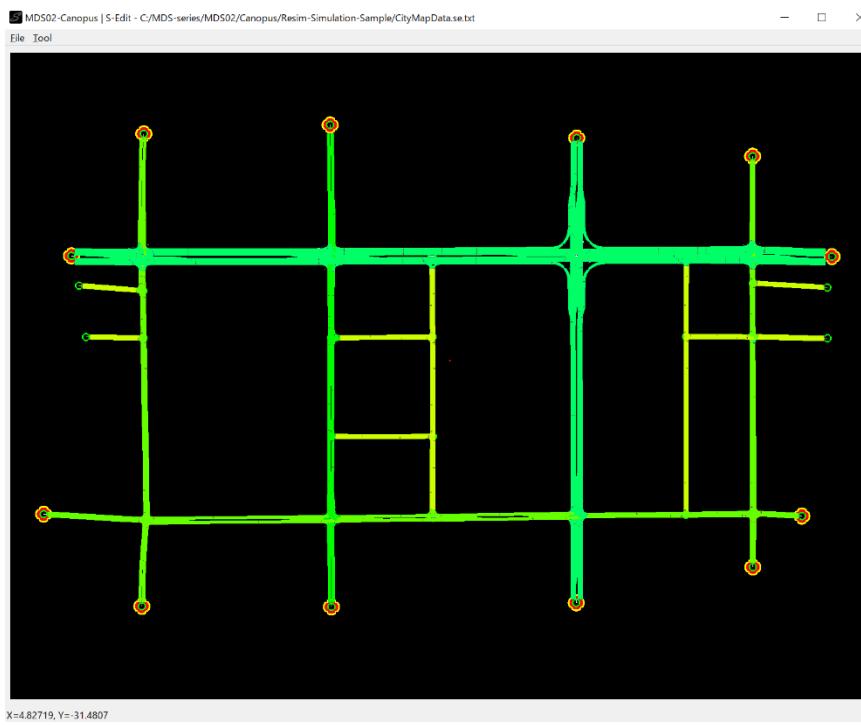
The dialog to input speed information appears.



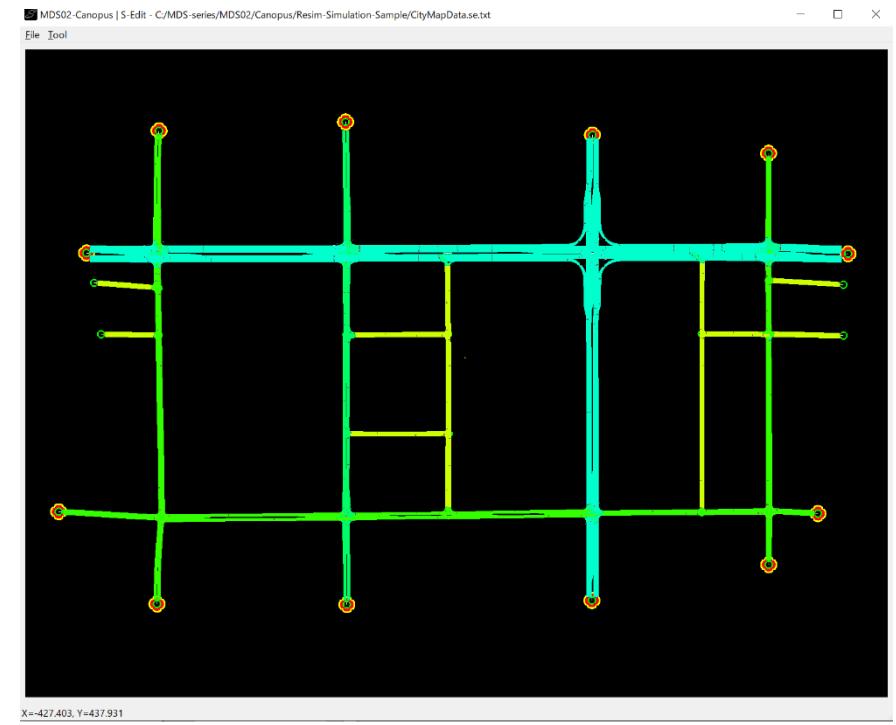
Speed information can be visualized by checking “Colored by Speed Limit” or “Colored by Actual Speed” in Control Window.



“Colored by Speed Limit”

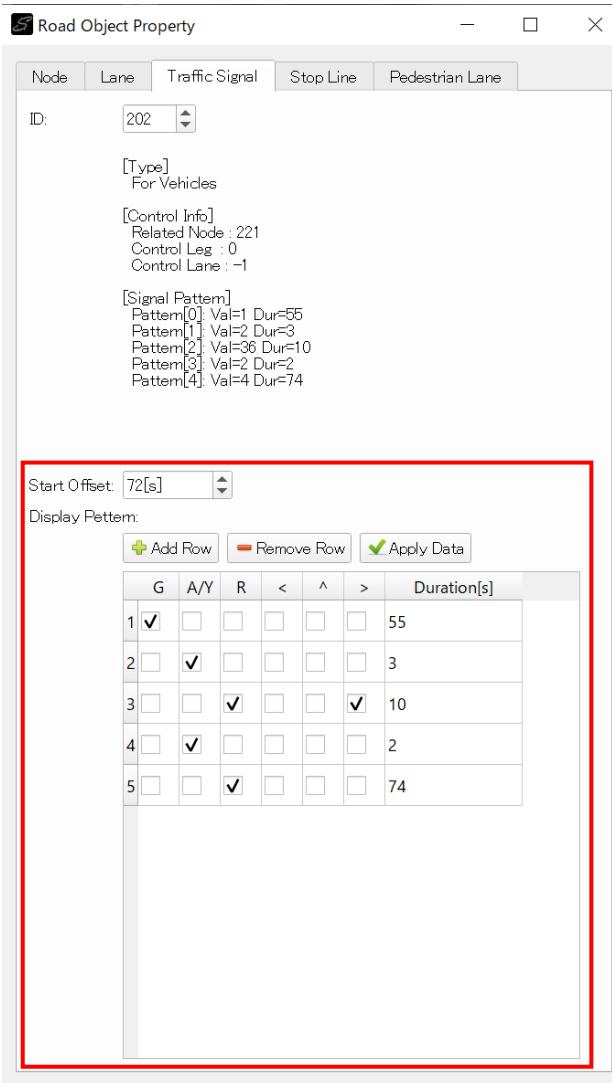


“Colored by Actual Speed”



6. Traffic Signals

The signal display information of the traffic signal is set in object property window.

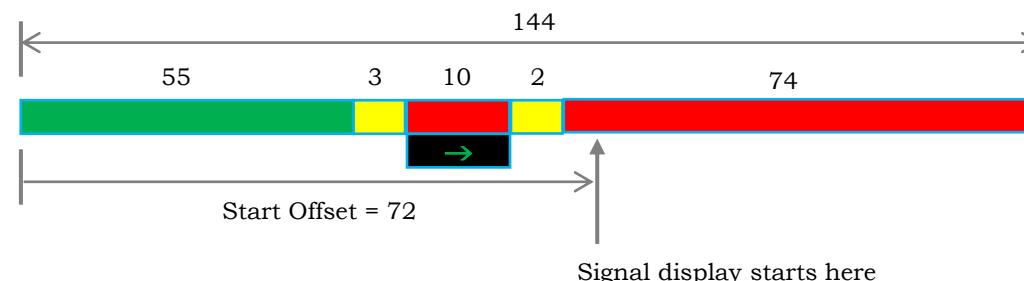


The meanings of the abbreviations are as follows:

- G : Green signal
- A/Y : Amber or Yellow signal
- R: Red signal
- < : Left arrow signal
- ^ : Straight arrow signal
- > : Right arrow signal

Start Offset is used to determine the signal display when simulation starts.

The traffic signal with the left setting firstly shows red signal for 72[s] when simulation starts as shown below.



Important

"Apply Data" button should be pressed when the data is changed, unless the changes will be discarded when the different data is display in object property window.

7. Route and Traffic Volume Setting

The route means the list of nodes from the origin node to the destination node.

First procedure to set the route is to make the node Origin and/or Destination in the object property window.

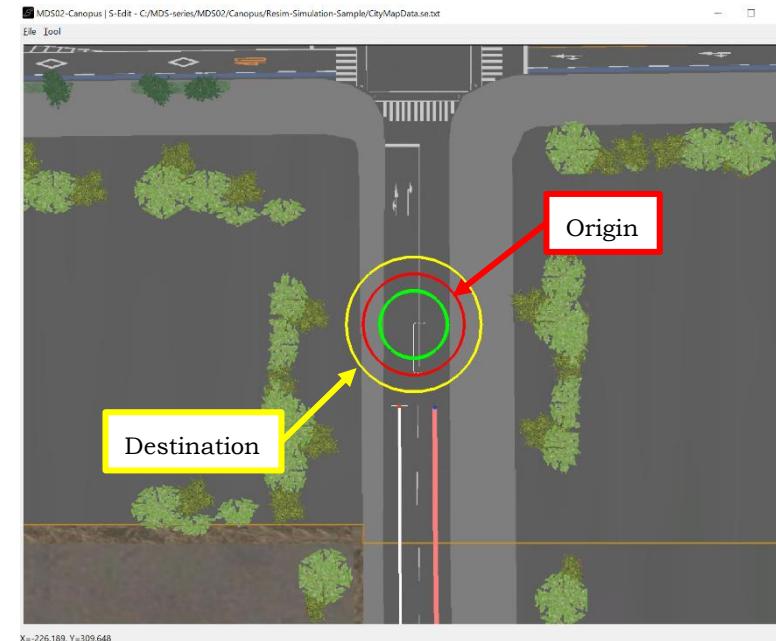
7.1 Origin and Destination Node



Select the node and check “Origin Node” and/or “Destination Node” in the object property window as shown in the left figure.

If the node is the Origin node, red circle is shown to normal green circle of the node.

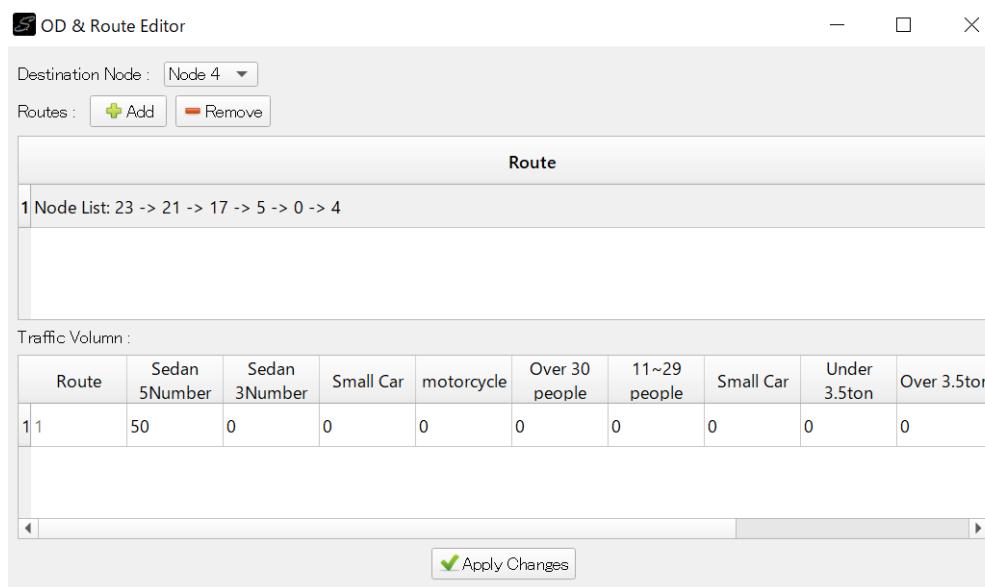
If the node is the Destination node, yellow circle is displayed.



7.2 OD & Route Editor

If the selected node is the Origin node, the “OD & Route Editor” window is shown.

With this editor, route to the destination node and the traffic volume(given by [number of vehicle / hour]) can be set.

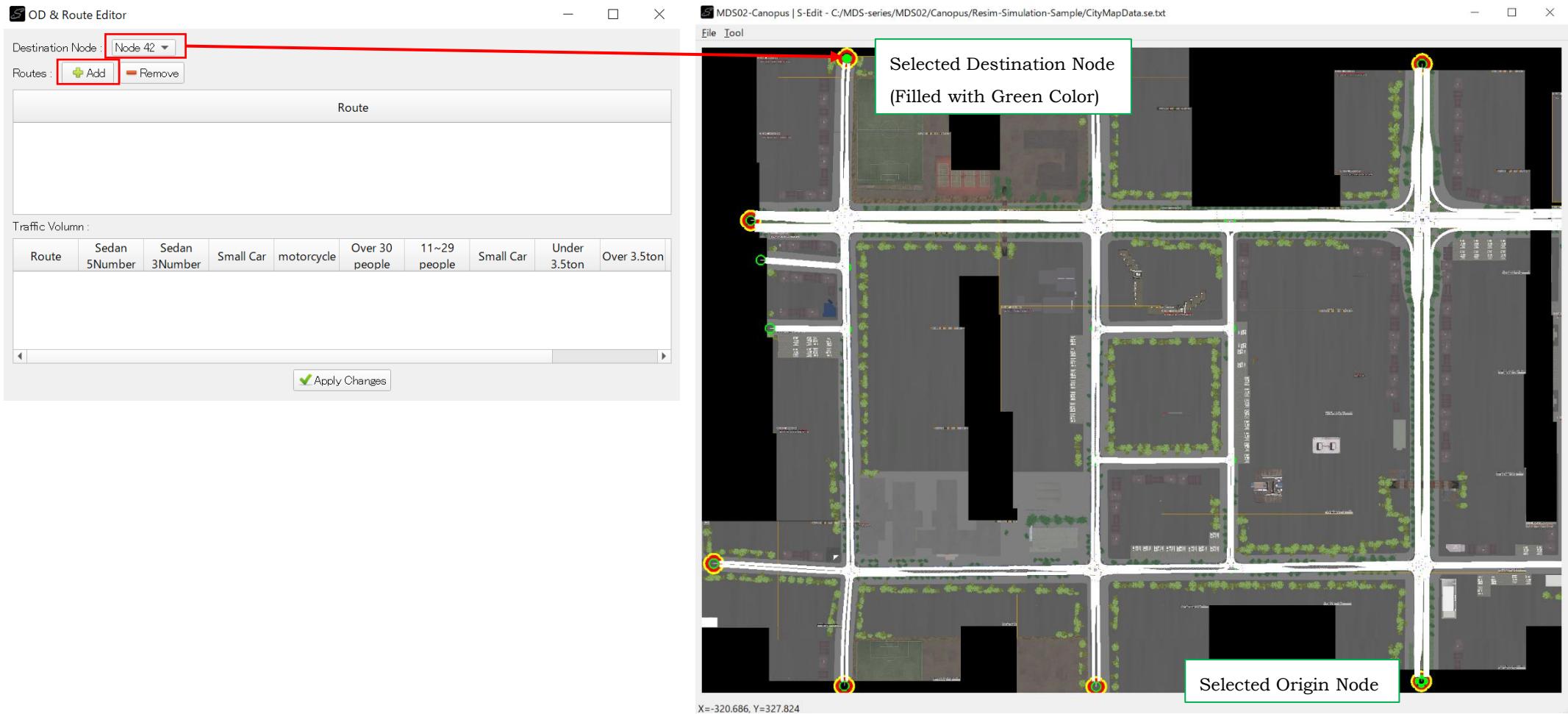


Important

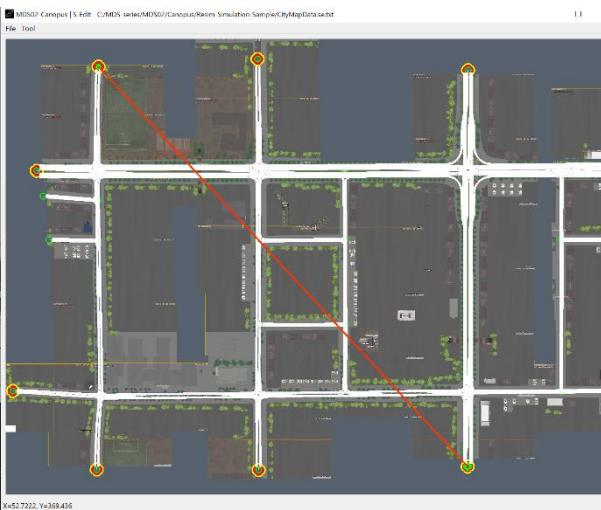
“Apply Changes” button should be pressed when the data is changed, unless the changes will be discarded when the different data is display in OD & Route Editor.

7.3 Add Route Data

Select the destination Node and Push “Add” button.



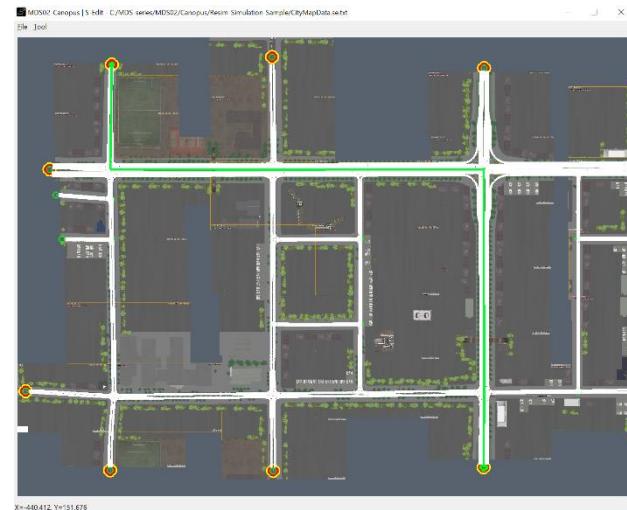
Enter node-pick mode for route setting.



Pick the node with “CTRL” modifier pressed.



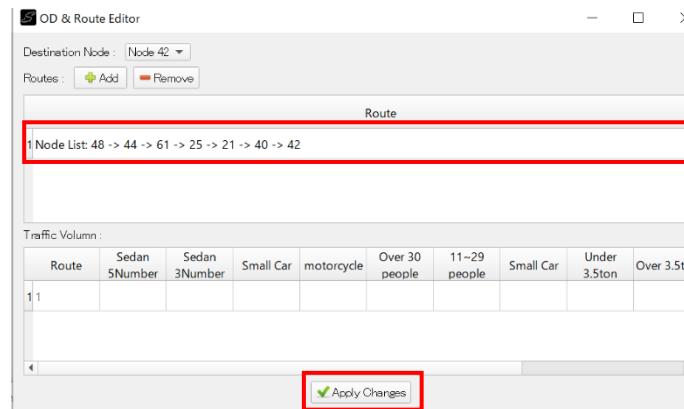
Pick the nodes in order.



Finally pick the destination node, then the node-pick mode ends.



Node list from origin to destination is displayed in the table. Push “Apply Change” button.



The Lane-list to the destination is calculated and shown by different color.



In this sample road, lane-change should be done once to reach destination by its lane structure.

Therefore, two lane lists are shown.

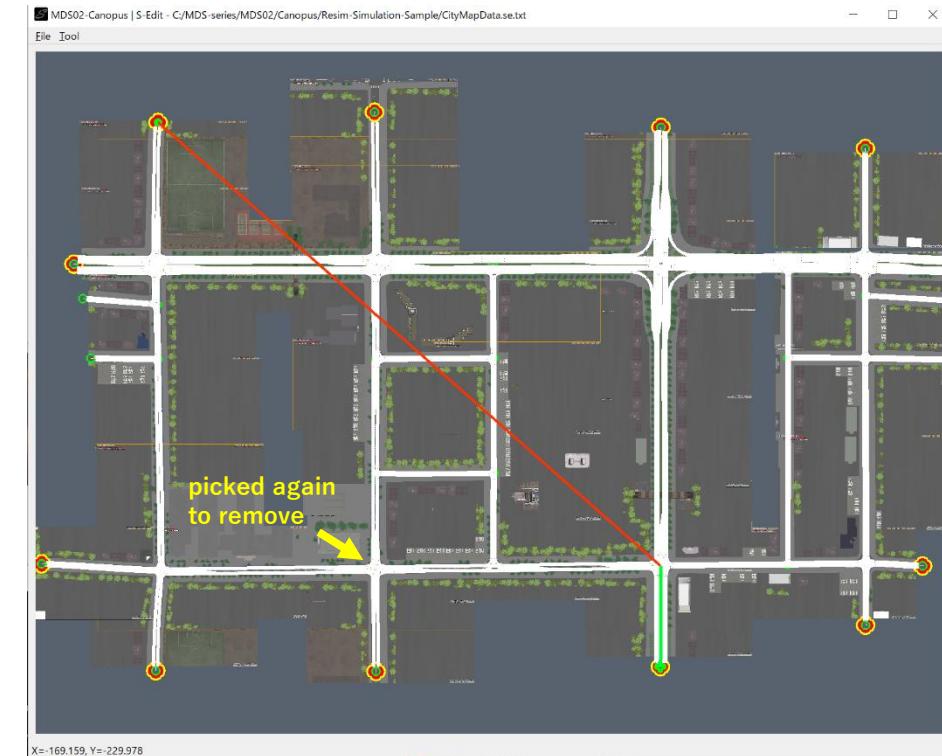
Re:sim driver agents can handle this information and change lane automatically.



Important

If you pick inadequate node, that is, the node is not connected to the previous node, then the red line is drawn.

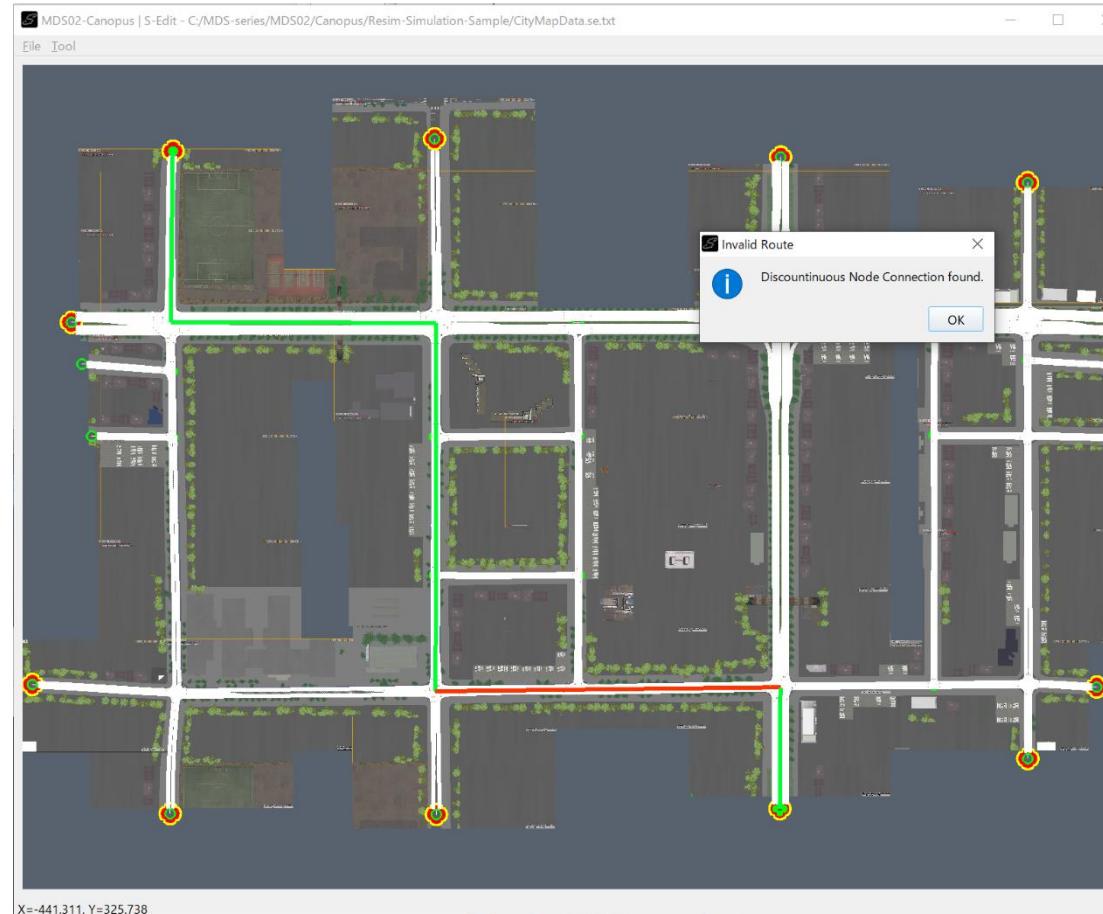
Reselect the node will remove the node from the list, then pick correct node.



Important

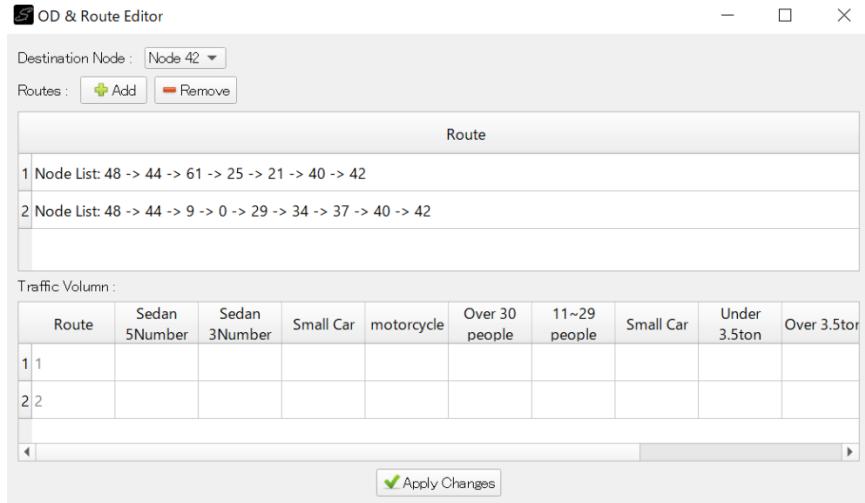
If you pick the destination node and the node list is invalid, following message is displayed.

Remove the last node list element by reselection and fix the node list or press “ESC” key to exit from node-pick mode.



More than two routes to the destination can be set.

Since the traffic volume is provided by each route, selection of the route do not appear in Re:sim.



7.4 Traffic Volume

As mentioned, the traffic volume data should be provided for each route.

Concretely, the number of vehicle appears in one hour is assigned for each vehicle kind defined in the setting dialog.

The time interval of vehicle appearance is calculated in Re:sim based on random selection from Exponential distribution.

The expected vehicle appearance interval would be $3600 / [\text{total number of vehicle appear in one hour}] \text{ sec}$.

The image shows two dialog boxes: 'OD & Route Editor' on the left and 'SEdit' on the right. A large downward arrow points from the 'OD & Route Editor' box to the 'SEdit' box, indicating a flow or dependency between the two.

OD & Route Editor:

- Destination Node: Node 4
- Routes:
 - + Add
 - Remove
- Route:
1 Node List: 23 -> 21 -> 17 -> 5 -> 0 -> 4
- Traffic Volume:

Route	Sedan 5Number	Sedan 3Number	Small Car	motorcycle	Over 30 people	11~29 people	Small Car	Under 3.5ton	Over 3.5ton
11	50	0	0	0	0	0	0	0	0
- Buttons: Apply Changes

SEdit:

- Traffic Direction: Left-Hand
- Use Relative Path:
- Vehicle Kind:**

Category	Subcategory	Length	Width	Height	
1	Private Cars	Sedan 5Number	4.910	1.80	1.475
2	Private Cars	Sedan 3Number	4.495	1.745	1.500
3	Private Cars	Small Car	3.650	1.665	1.650
- Pedestrian Kind:**

Category	Subcategory	Length	Width	Height	
1	Pedestrian	Adult	0.30	0.45	1.74
2	Pedestrian	Aged	0.30	0.45	1.5
3	Pedestrian	Child	0.20	0.30	1.20
- Buttons: + Add Row, - Del Row, Close

8. Pedestrian Lanes

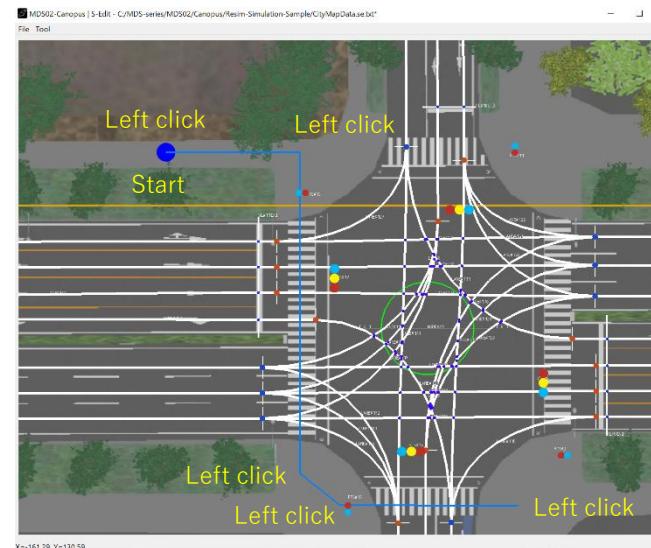
8.1 Creating pedestrian lanes

To create the pedestrian lanes, select “Pedestrian Lane” from create popup menu shown by “ALT”+’n’ key.

Select “Pedestrian Lane”.



Click the point on the map to define pedestrian lane.



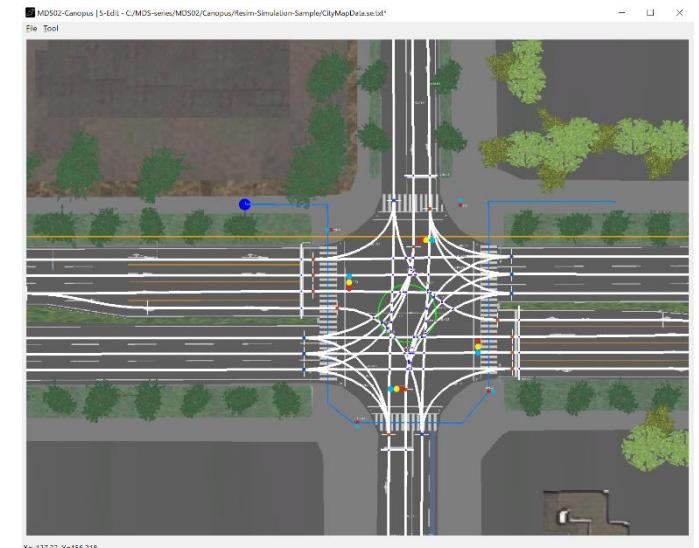
Important

“CTRL” modifier is NOT necessary to pick the point on the map to define pedestrian lane.

Important

The pedestrian lane is one-way. You should define two pedestrian lanes, e.g., to let pedestrian walk on the crosswalk from both direction.

Press “ESC” to end.

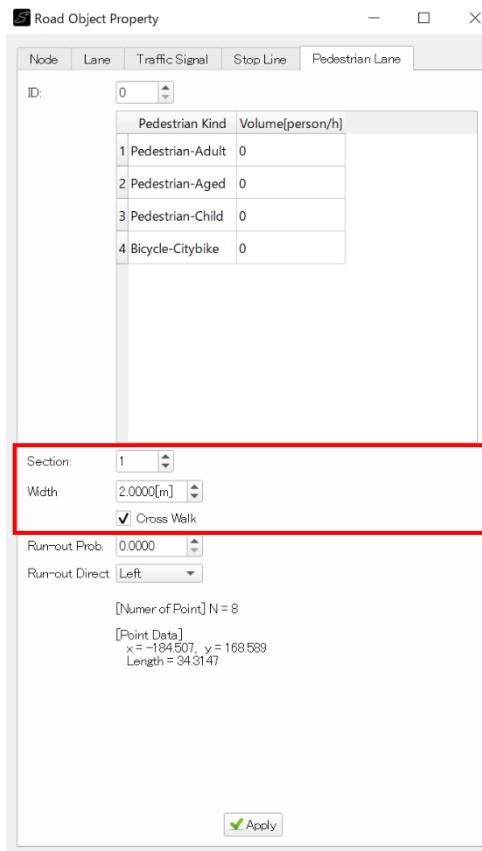


8.2 Changing pedestrian lane property

The main properties that pedestrian lane hold are the width of the section and “Cross Walk” flag.

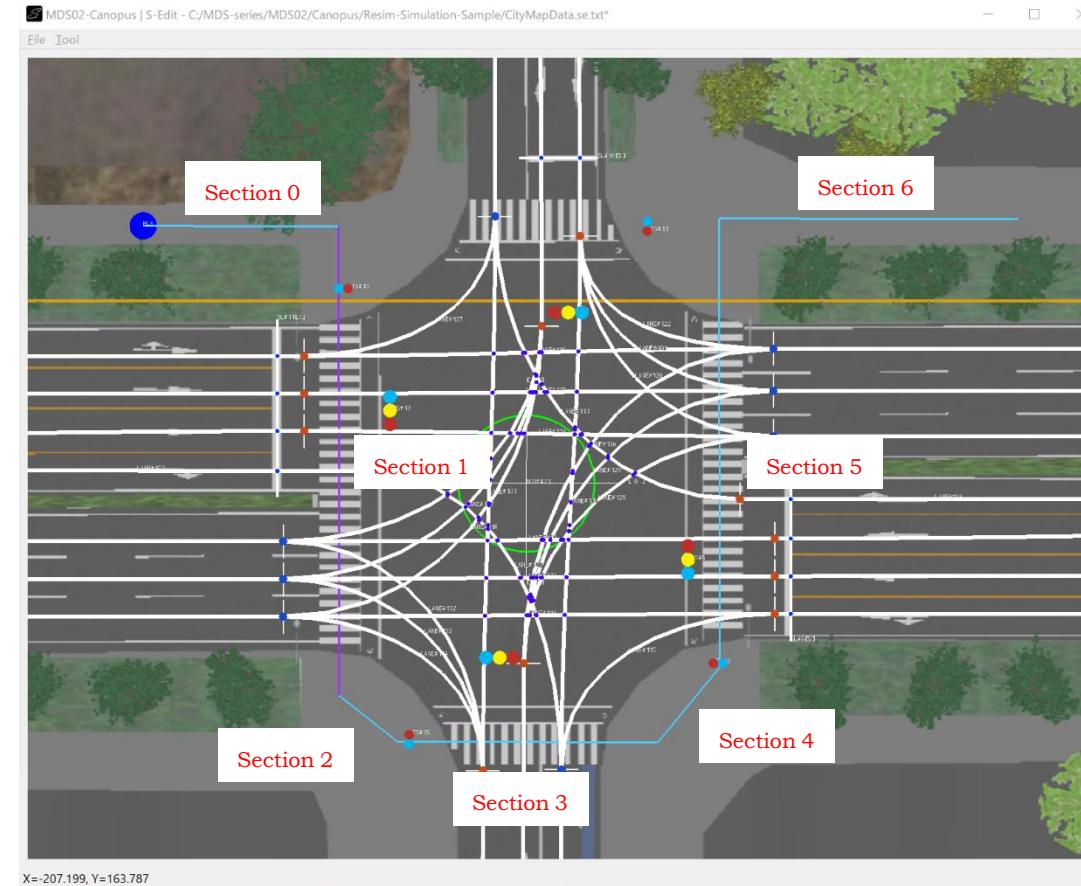
The section is the number assigned to the line segment of the pedestrian lane.

The Run-out probability and Run-out Direct has not been supported in Re:sim yet.



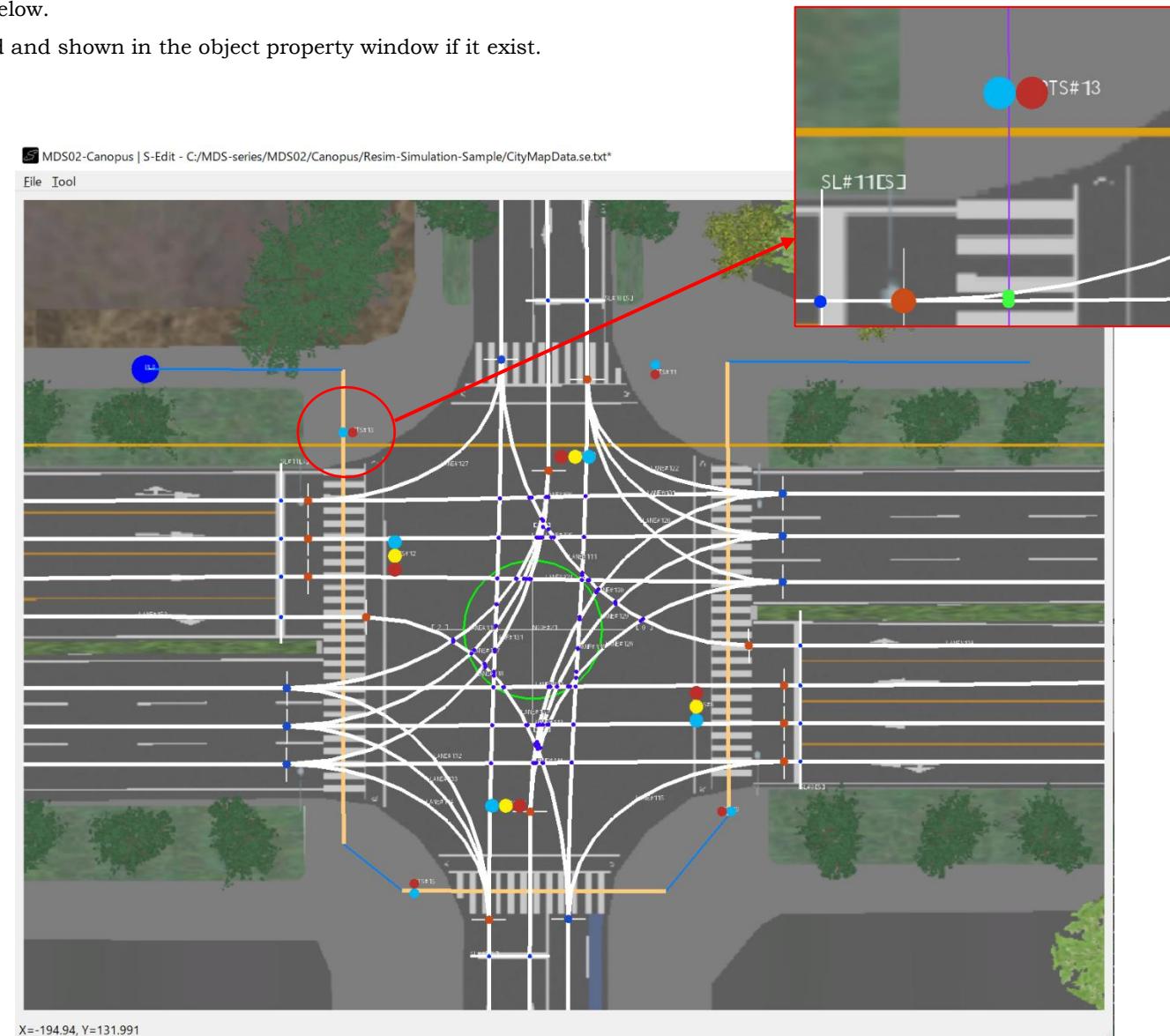
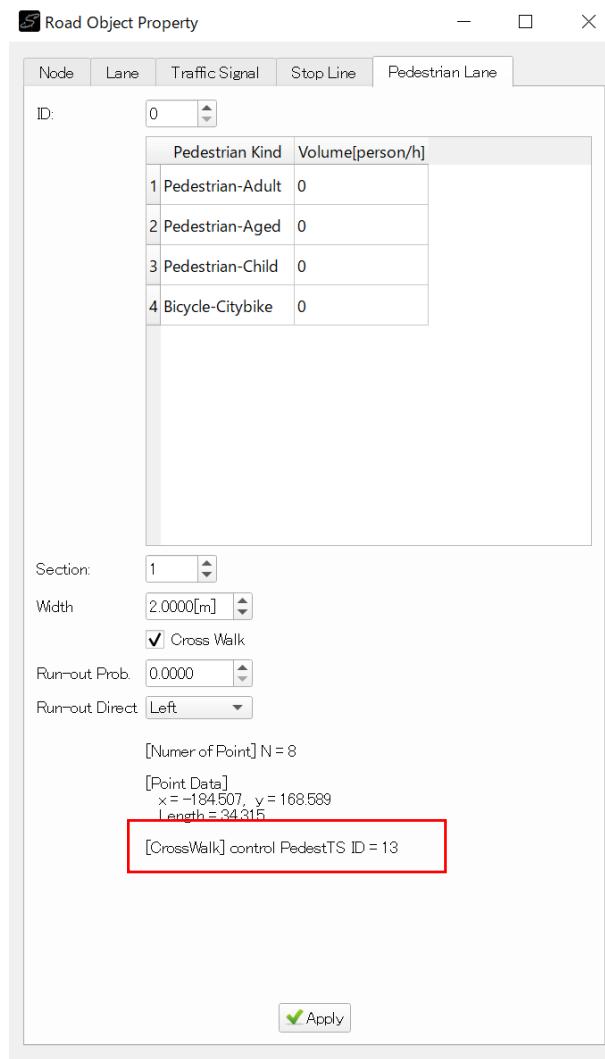
Important

“Apply” button should be pressed to reflect the change of the data. Otherwise it would be lost.



The “Cross Walk” section is drawn different color as shown below.

Beside, corresponding traffic signal for pedestrian is assigned and shown in the object property window if it exist.

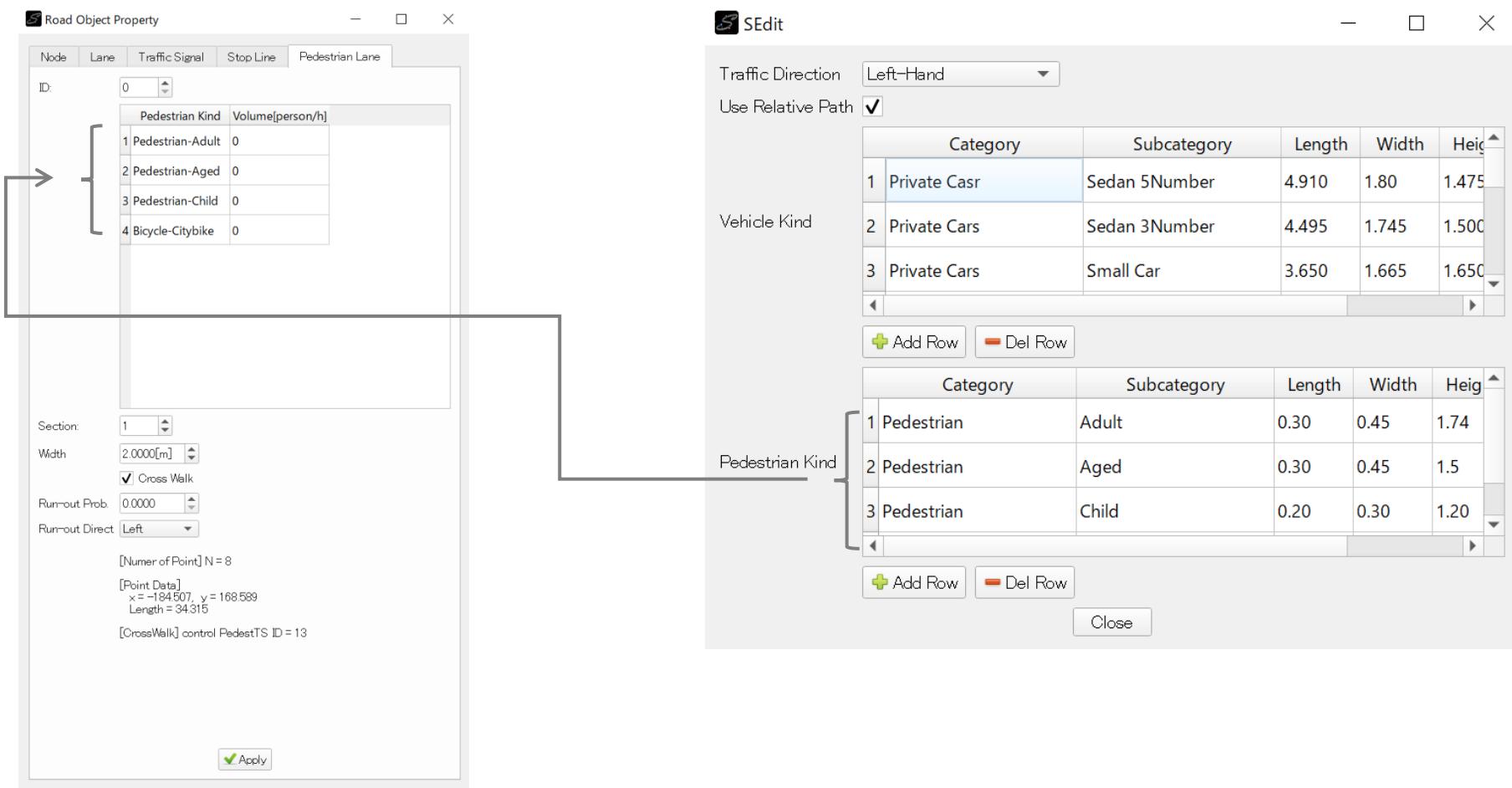


8.3 Traffic Volume of Pedestrian

The traffic volume data for pedestrian should be provided for each pedestrian lanes.

The number of pedestrian appears in one hour is assigned for each pedestrian kind defined in the setting dialog.

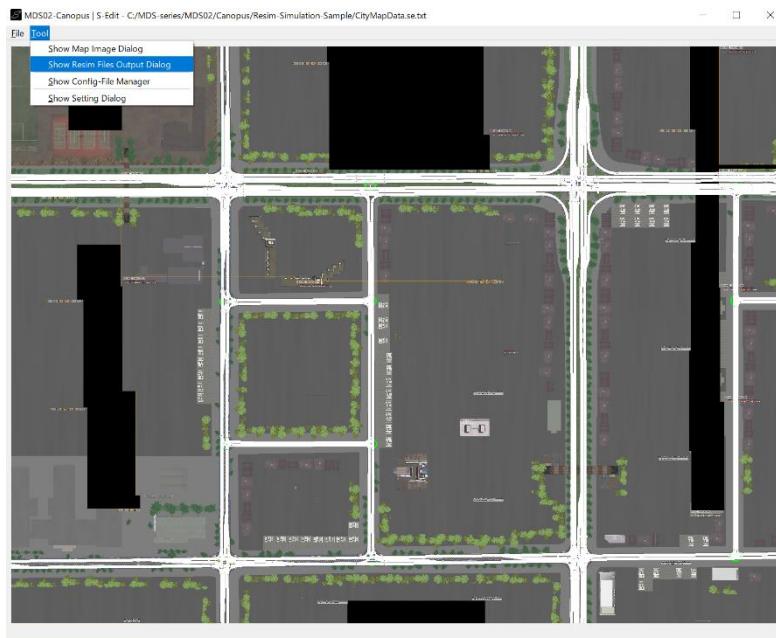
The time interval of pedestrian appearance is calculated in Re:sim based on random selection from Exponential distribution.



9. Output Re:sim Simulation Data Files

After all simulation data has been set, Re:sim simulation data files is created by following step.

Select Tool menu “Show Re:sim Files Output Dialog”



Set Output filename and folder and push “Output” button.



Important

If “Only File Name” is checked, the path to the road data and traffic signal data files described in scenario file are omitted. This is convenient for the case these three files are in the same directory and that directory will be moved frequently.

Check created files.

