RepliMap

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1 Preparation

1.1 Installation

RepliMap is available through the official **Automotive Artificial Intelligence (AAI)** Shop. You can easily explore AAI's products and get your RepliMap license here:

👉 Get RepliMap on the AAI Shop

Once you have access, the latest RepliMap builds can be downloaded from the official Software Download portal:
🔗 Software Downloads Portal

1.1.1 To Install

Installation Steps

1. **Download the RepliMap build** from the official Software Downloads portal.
2. **Run the installer** and follow the on-screen instructions.
3. **Accept the license terms and conditions** to proceed with installation.
4. The installer will automatically set up RepliMap in the **user's local directory (C:\Users\YourName\RepliMap)**.
5. During setup, the installer will create a **Start Menu shortcut** for quick access.
6. Once installation is complete, you can **launch RepliMap directly from the desktop icon** or via the Start Menu. **Desktop shortcut**.

1.1.2 After Installation

- When you launch RepliMap for the first time, log in using the credentials provided by AAI.
- The application will automatically verify your license and activate your workspace.
- You can update or reinstall RepliMap at any time by downloading the latest version from the Software Downloads Portal.

1.1.3 Tips

- Always ensure you're using the **latest RepliMap version** for new features and bug fixes.

- For any issues with installation or activation, contact **AAI Support** at support@automotive-ai.com.

1.1.4 RepliMap System Requirements

Index	Minimum Requirements	Recommended Requirements
1	CPU: Core i5 (7 Gen +)	CPU: Core i7 (9 Gen +)
2	RAM: 16 GB	RAM: 32 GB
3	GPU: 4 GB	GPU: 6 GB
4	Platform: Windows 10 / 11 (64-bit)	Platform: Windows 10 / 11 (64-bit)

> 💡 *RepliMap is officially supported on Windows 10 and Windows 11 (64-bit). Ubuntu/Linux builds can be provided upon specific user or project requests.*

2 Get Started

2.1 Introduction

Transforming raw data into simulation-ready maps — efficiently and purposefully._

RepliMap is an all-in-one platform for building and visualizing high-quality road and environment maps — **built for purpose** to support simulation, testing, and digital twin creation.

Whether you're designing **test tracks**, **simulation environments**, or **autonomous driving scenarios** focusing on **road geometry and static assets**, RepliMap helps you move from raw data to detailed, simulation-ready maps quickly and intuitively.

RepliMap is built for purpose — designed for **engineers, researchers, and test teams** who require precision, flexibility, and speed in their mapping workflows.
It streamlines every stage — from data preparation to export — ensuring accuracy and efficiency across simulation and development tasks.

2.1.1 Welcome

Welcome to the **RepliMap Documentation**.
This guide provides a structured overview of RepliMap's tools and features — from installation and setup to advanced editing and export workflows.

Use the sidebar to explore specific topics and learn how to get the most out of **RepliMap's built-for-purpose mapping environment**.

2.1.2 User Guide

Tool Guidelines

Tool bar — Use tools for scaling, measuring, and adjustments.
Editor bar — Create your custom map.
Menu bar — Make changes to your map.
Navigation bar — Zoom, pan, and focus on map sections.
Console — Learn about more parameters.

Use Guidelines

Map Creation Guide — Learn about more parameters.
Best Practices — Extra features for map editing (among others). Further Recommendations — Recommendations for up-to-date development.

Among Others

Shortcuts — Learn about more parameters.
Other Parameters — Extra features for map editing (among others).
Miscellaneous — Extra features for map editing (among others).

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2.2 Overview

Last Updated: October, 2025

2.2.1 Contents

*Welcome to **RepliMap**'s User Guide.*

This user guide contains all the information related to **RepliMap** and its current up-to-date usage information.

After **installation**, when you run RepliMap,and after selection of the map from home screen, a window opens up containing:

1. Toolbar
2. Editor Bar
3. Menu Bar
4. Navigation Bar
5. Console

2.2.2 Before you start

Review and follow the **installation guide** to install **RepliMap** correctly. If you have RepliMap already installed, we recommend checking the **User Guide** for better orientation.

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3 Tool Guidelines

3.1 Toolbar

3.1.1 Overview

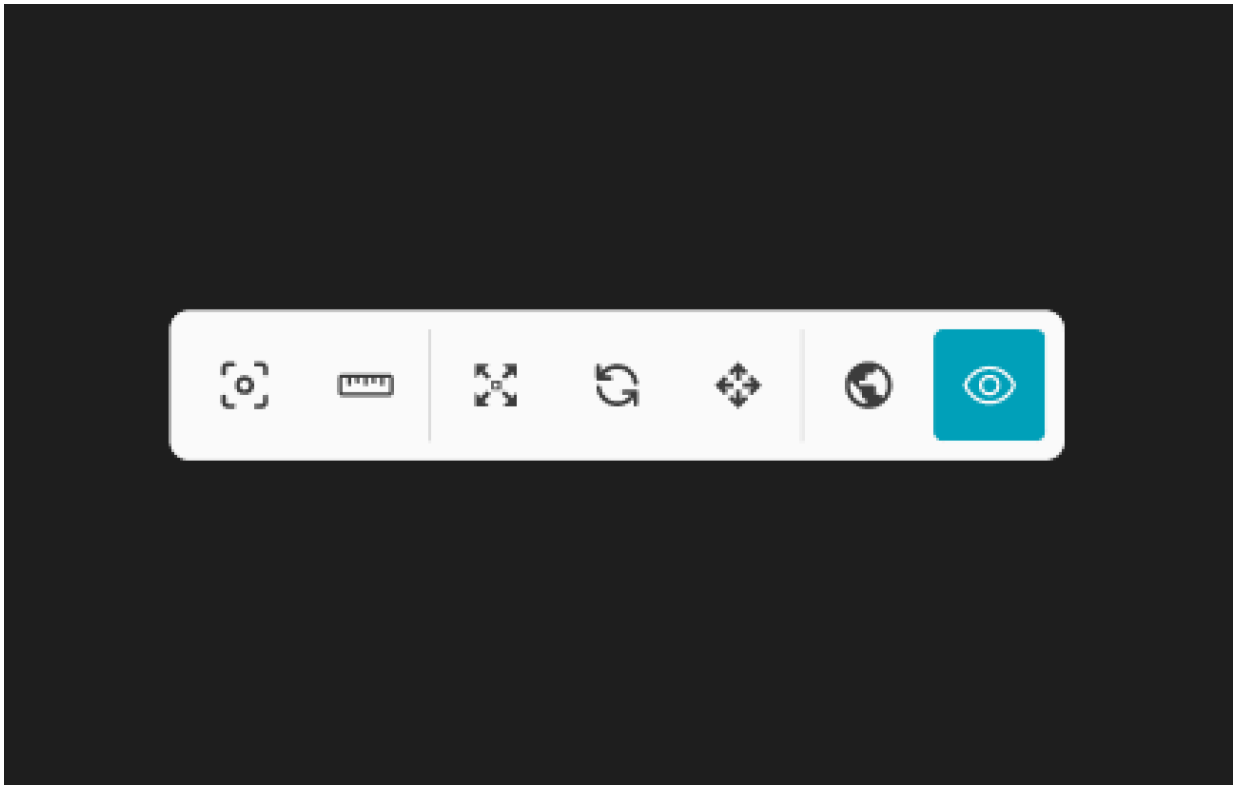
The **Toolbar** provides you a variety of options while **creating a map** in the map-editing window.

3.1.2 View

View Icon allows the user to change the way the current XODR is being perceived by the user. It allows the user to experiment with multiple angles how we can change and modify the file with more accuracy.

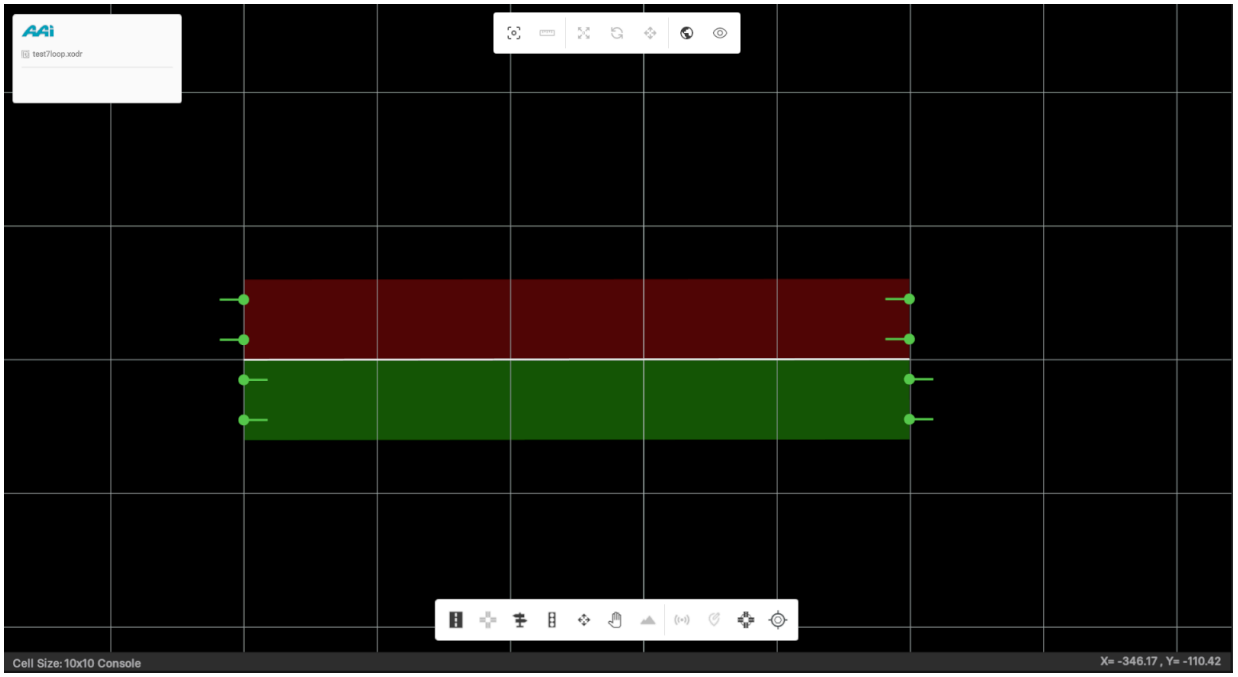
View offers three possibilities for the user to change to:

- 2D View
- 3D View
- Scenery

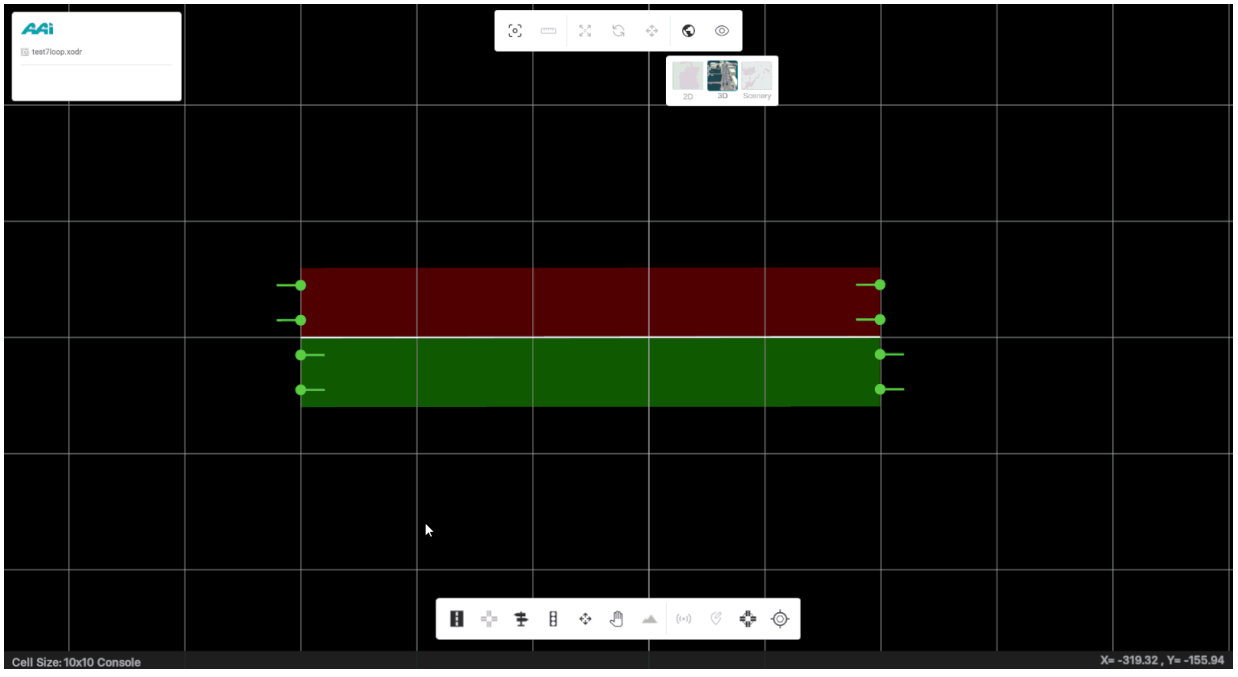


2D View

This is the default perspective or scene, providing access to RepliMap's core functionalities. It offers a balanced view—both technical and simplified—for efficiently developing and managing the map in progress.



Hold the **Left Alt** key and drag with the **left mouse button** to rotate the camera and adjust the viewing angle into a 3D perspective. The rotation is relative to the current camera orientation, allowing smooth and intuitive control over pitch and yaw.



When the **Left Alt** key is released, the view automatically resets to the original **2D top-down perspective**.
This behavior ensures that the camera returns to its default alignment, maintaining accuracy and preventing unintended edits in the temporary 3D view.

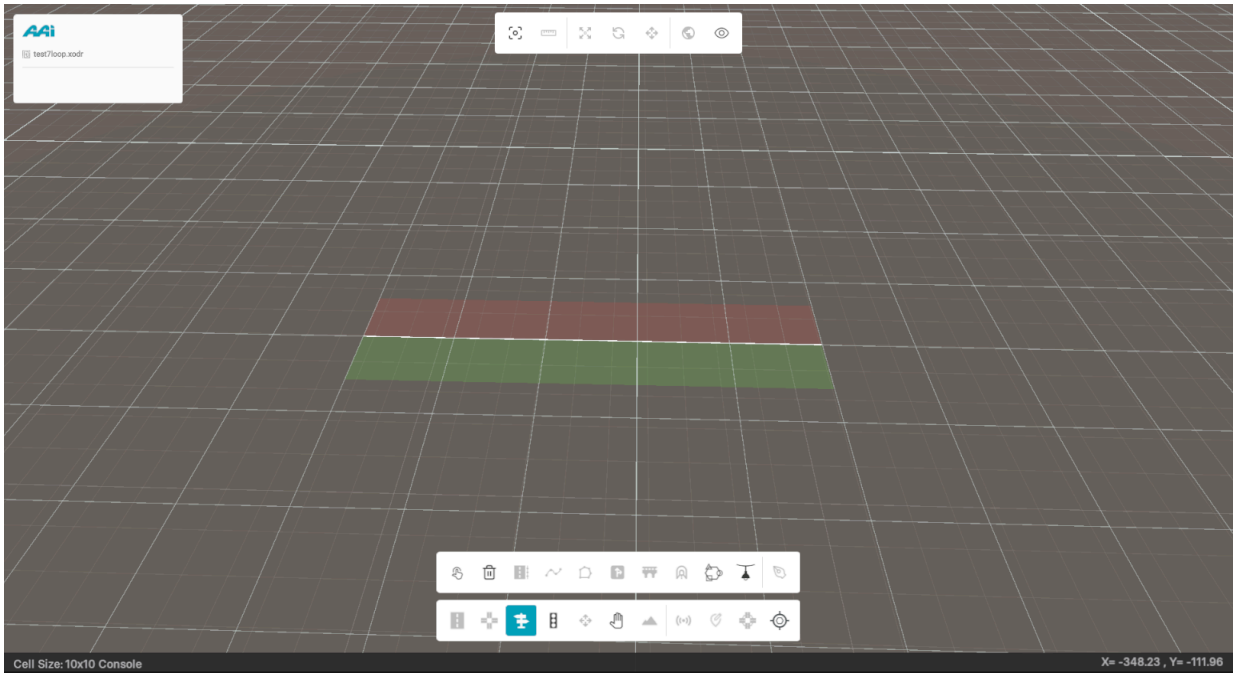
> **Note:** Editing functions such as placing objects, extending roads, or adjusting anchors are not available in the temporary 3D view.
> To make geometry or object changes, switch back to the standard **2D editing mode**.

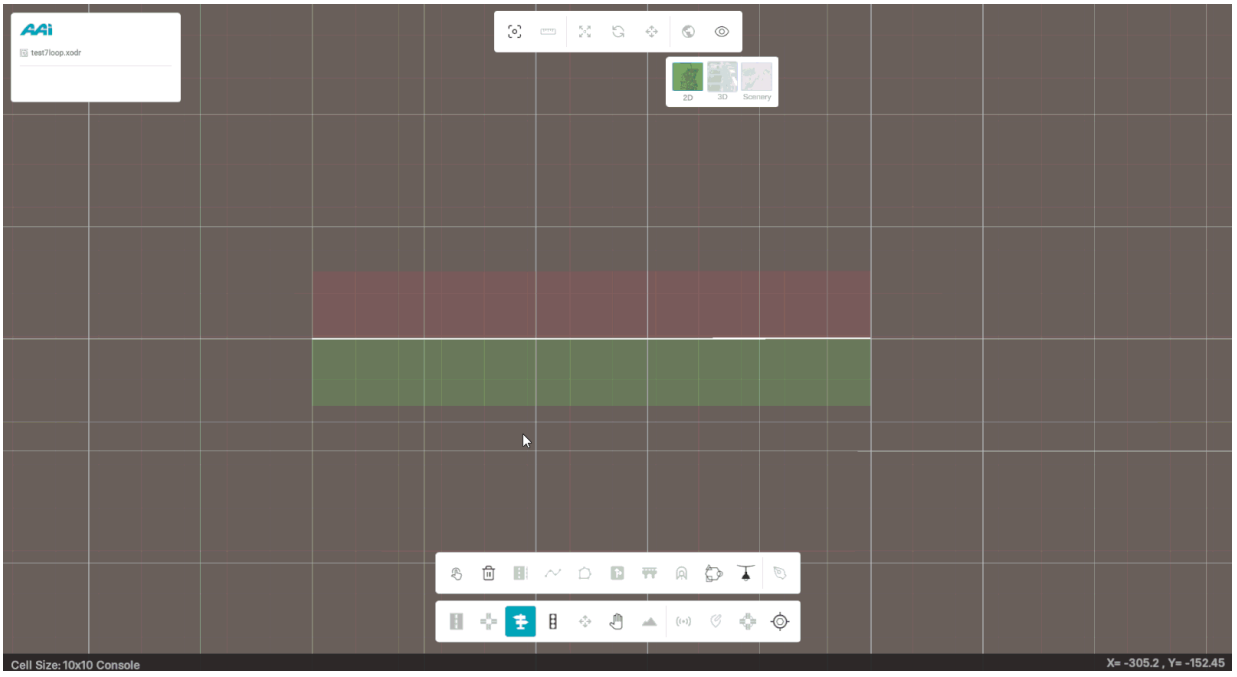
Scenery View

The Scenery View offers a more immersive perspective for interacting with your map. Users can navigate using:

- **W**: Translate camera position forward along the local Z-axis.
- **A**: Translate camera position left along the local X-axis (negative direction).
- **S**: Translate camera position backward along the local Z-axis.
- **D**: Translate camera position right along the local X-axis (positive direction).
- **Q**: Translate camera position upward along the global Y-axis while holding the right mouse button (usually right).
- **E**: Translate camera position downward along the global Y-axis while holding the right mouse button (usually right).

This view also enhances visual clarity, displaying improved textures for placed assets such as signals and objects.

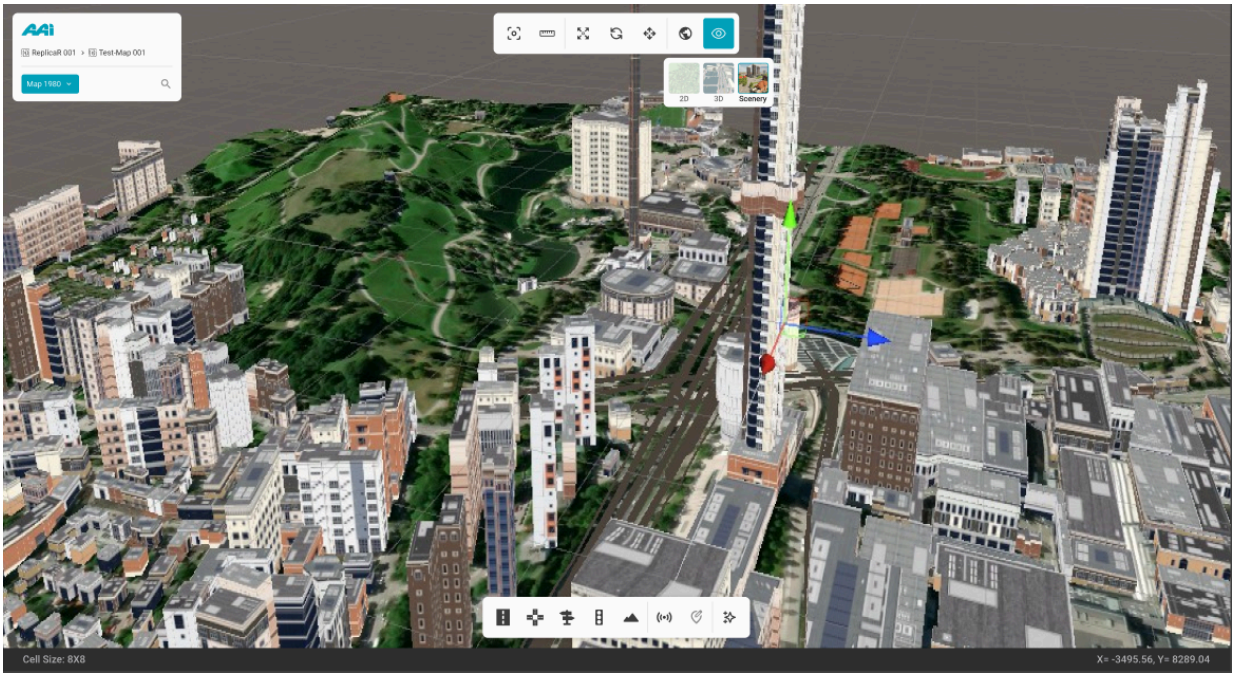




3D View

Feature is currently unavailable in the latest RepliMap version.

The 3D View provides a high-fidelity, fully rendered version of the map — ideal for visualizing the final result.
While editing is disabled in this mode, users can freely navigate the scene to review details and overall aesthetics.
Use the same navigation controls as in the Scenery View for seamless exploration.

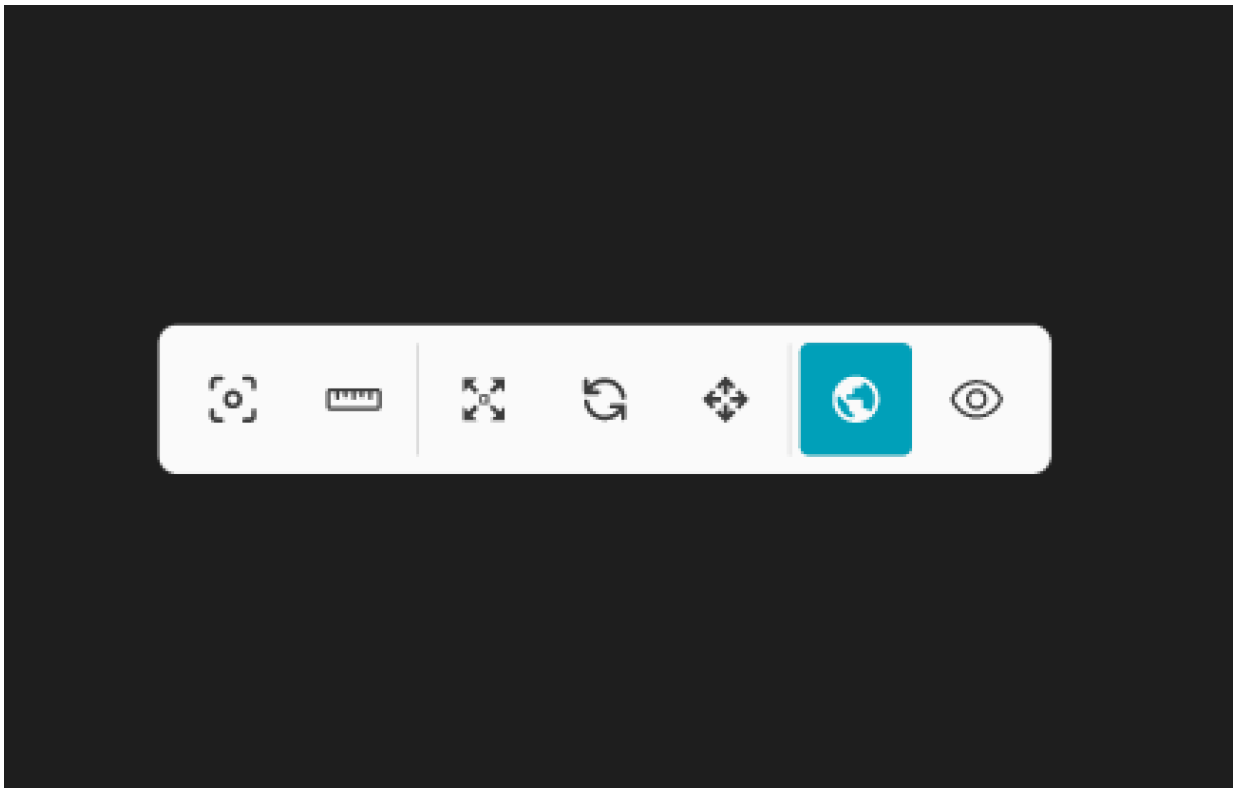


3.1.3 Mapbox

Mapbox enables users to specify multiple factors that influence the map's positioning and general properties.
It also allows users to select a background reference, providing valuable context to ensure accuracy and precision when working with and experimenting on XODR file content.

Once enabled, users can **interactively draw roads, place objects, and visualize assets** directly over the Mapbox background.
This feature helps in aligning map elements with real-world coordinates and improves the editing experience when referencing satellite or vector-based layers.

The Mapbox includes:
- Display Map
- Latitude
- Longitude
- Offset X, Y, Z
- Map Style



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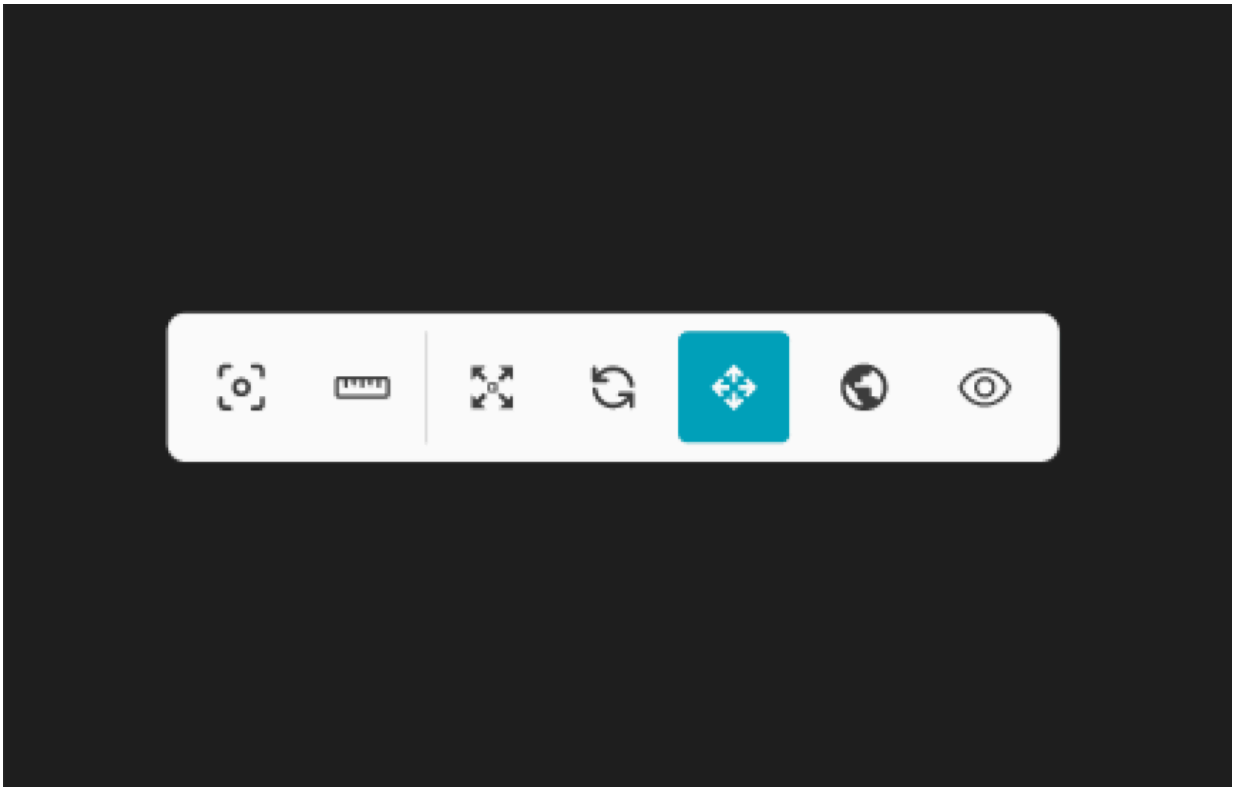
3.1.4 Move

Move allows users reposition an object to a desired location using an XY coordinate-based arrow system. Any changes made will be instantly reflected across all views.

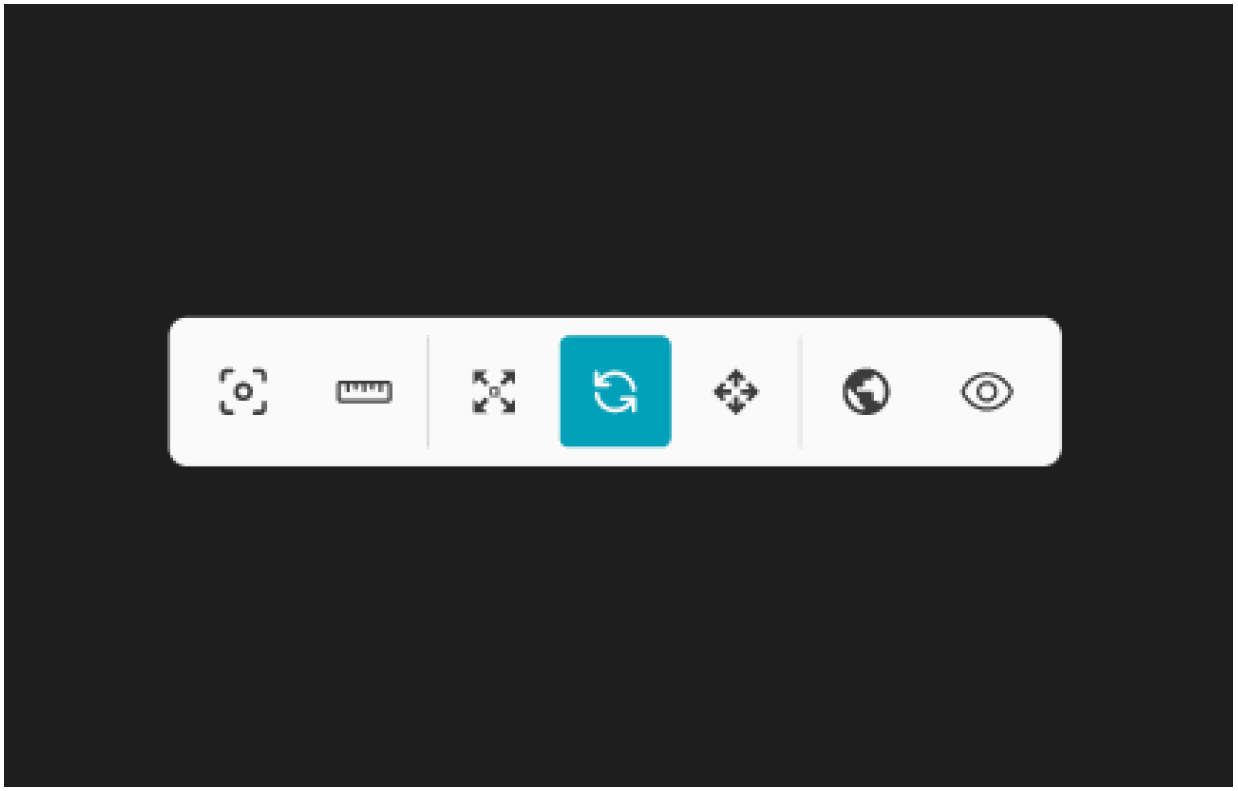
When the 3D view is selected, dimensions such as the Z plane will be added to the view accordingly. This feature can also be activated by selecting the object or signal and pressing the "W" key. This feature will only work if the "Objects" or "Signals" tool is selected.



3.1.5 Rotate

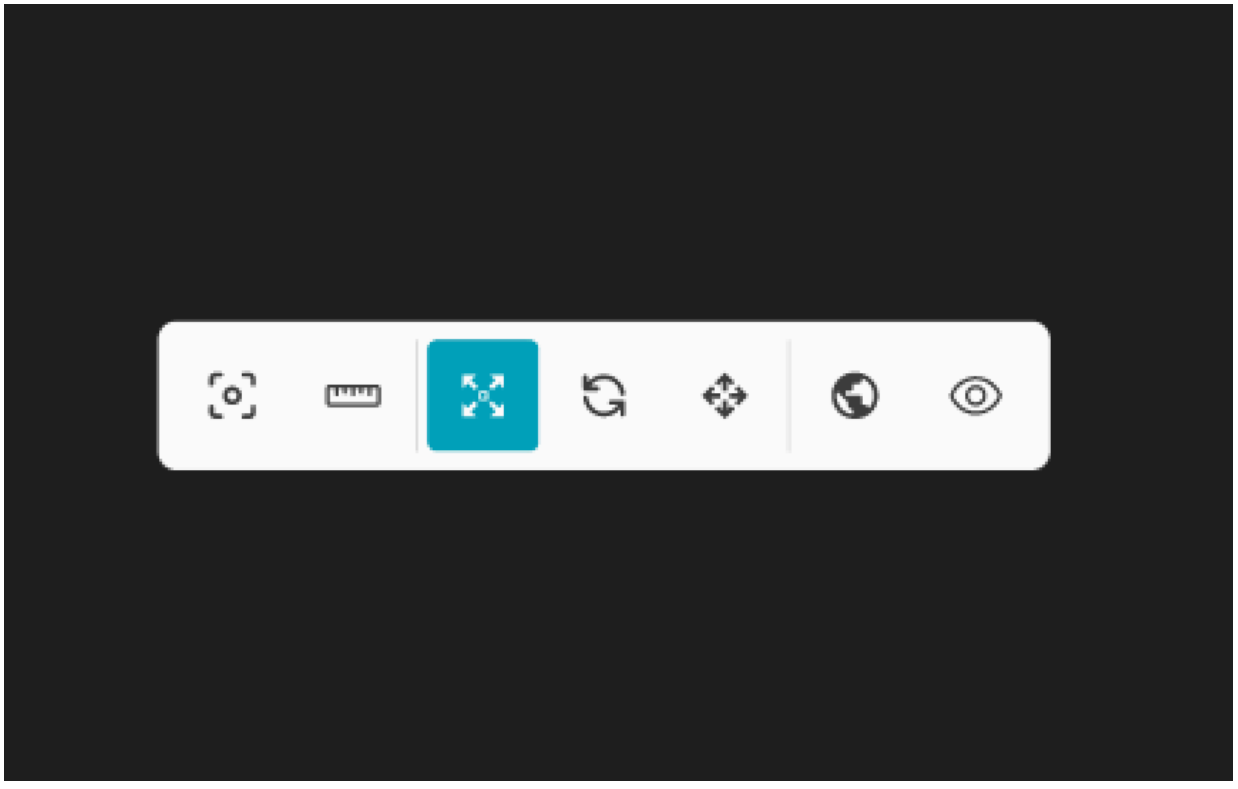
Rotate allows users to rotate an object to a desired angle using a degree-based system. Any adjustments made will be immediately reflected across all views.

When the 3D view is selected, dimensions such as the Z plane will be added to the view accordingly.This feature can also be activated by selecting the object or signal and "pressing the "E" key. This feature will only work if the "Objects" or "Signals" tool is selected.



3.1.6 Scale

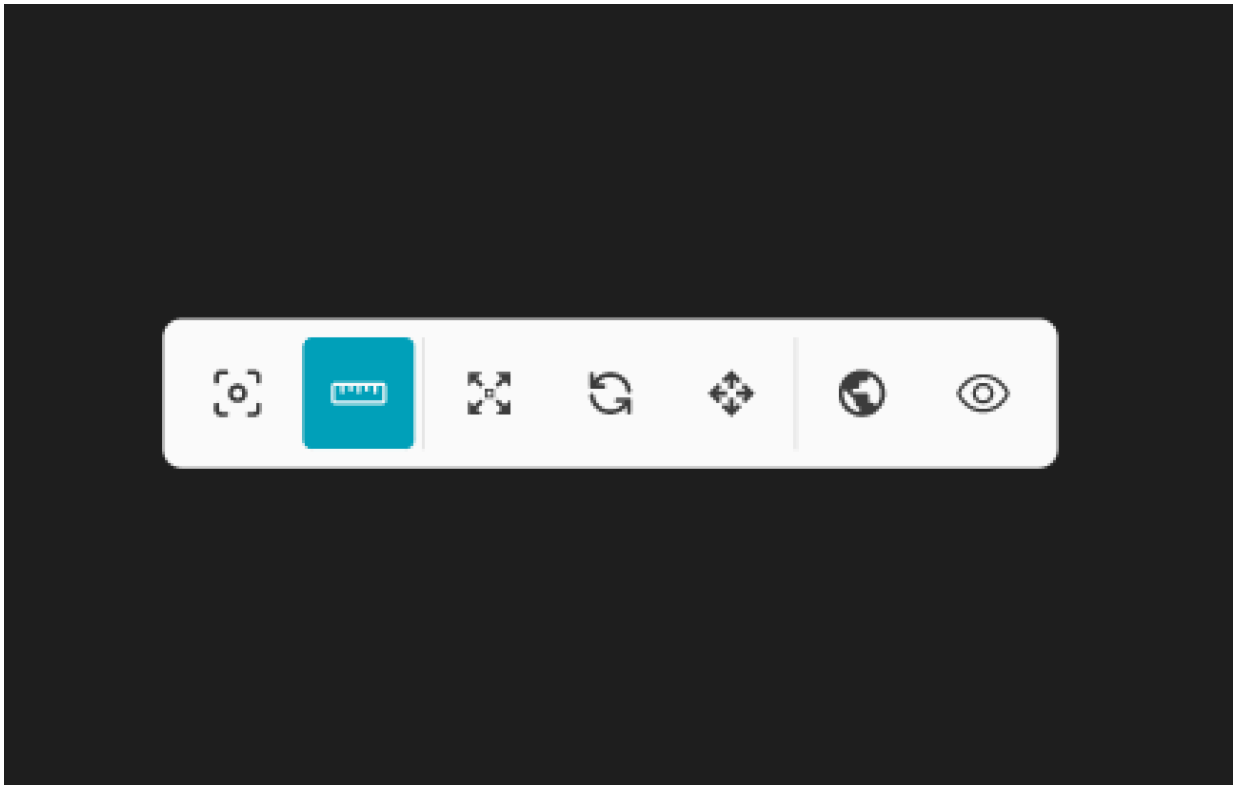
Scale allows users to adjust the size of an object to a desired scale using a proportion-based system. Any changes made will be immediately reflected across all views. This feature can also be activated by selecting the object or signal and pressing the "R" key. This feature will only work if the "Objects" or "Signals" tool is selected.

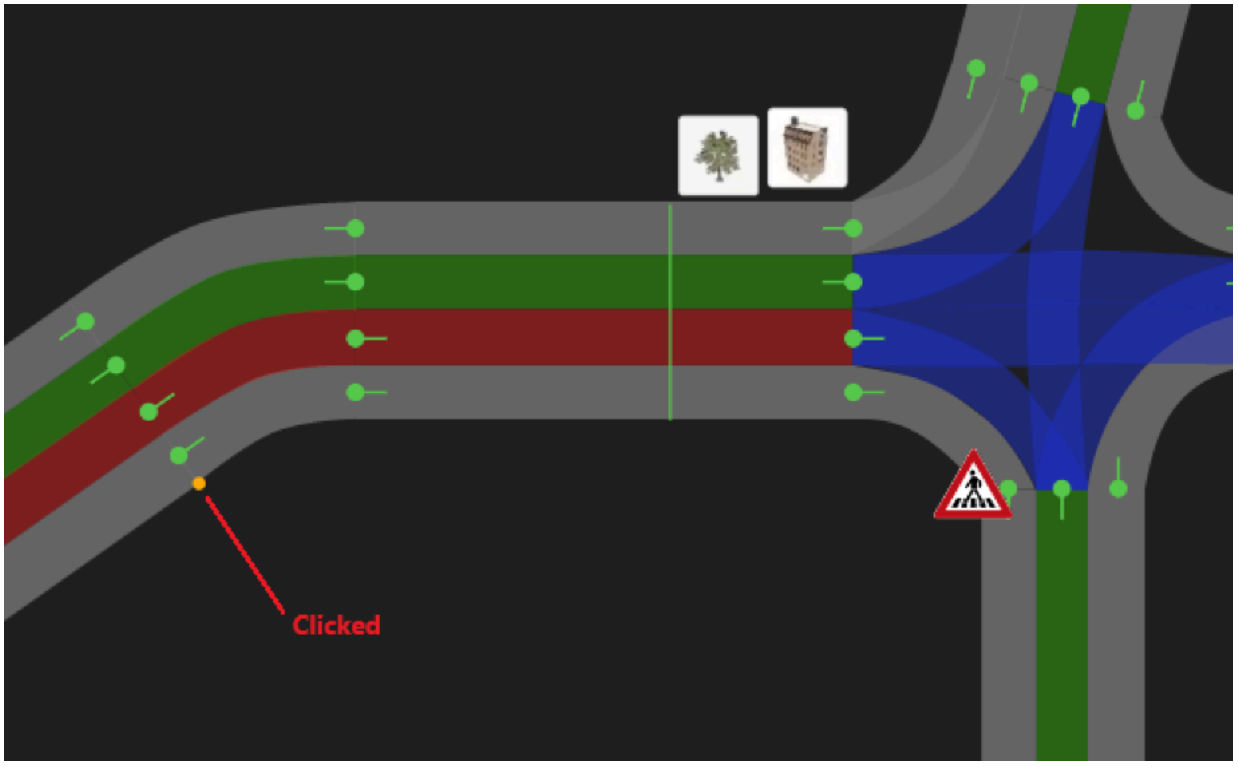


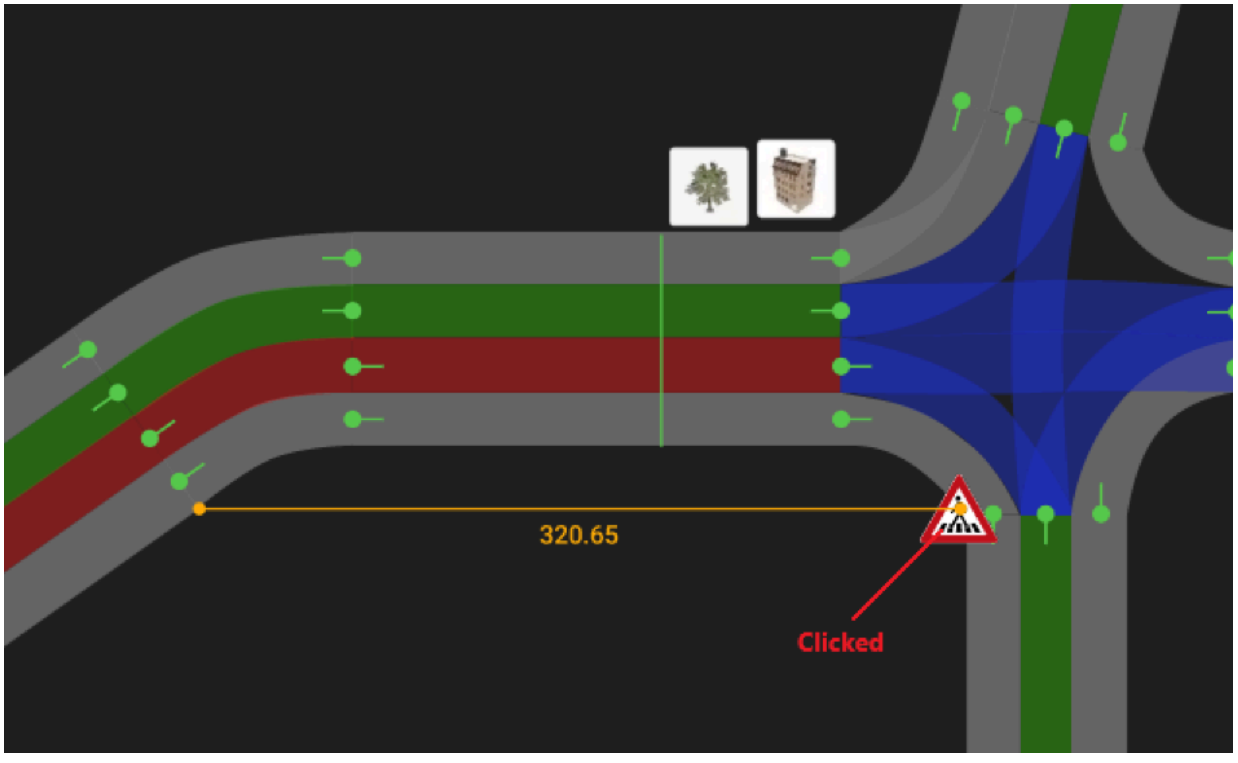
3.1.7 Ruler

Feature is currently unavailable in the latest RepliMap version.

Ruler enables users to measure specific distances without needing to create a helper road as a placeholder (as in earlier iterations of the development version). It allows users to calculate the distance between two selected points, providing precise measurements in meters.

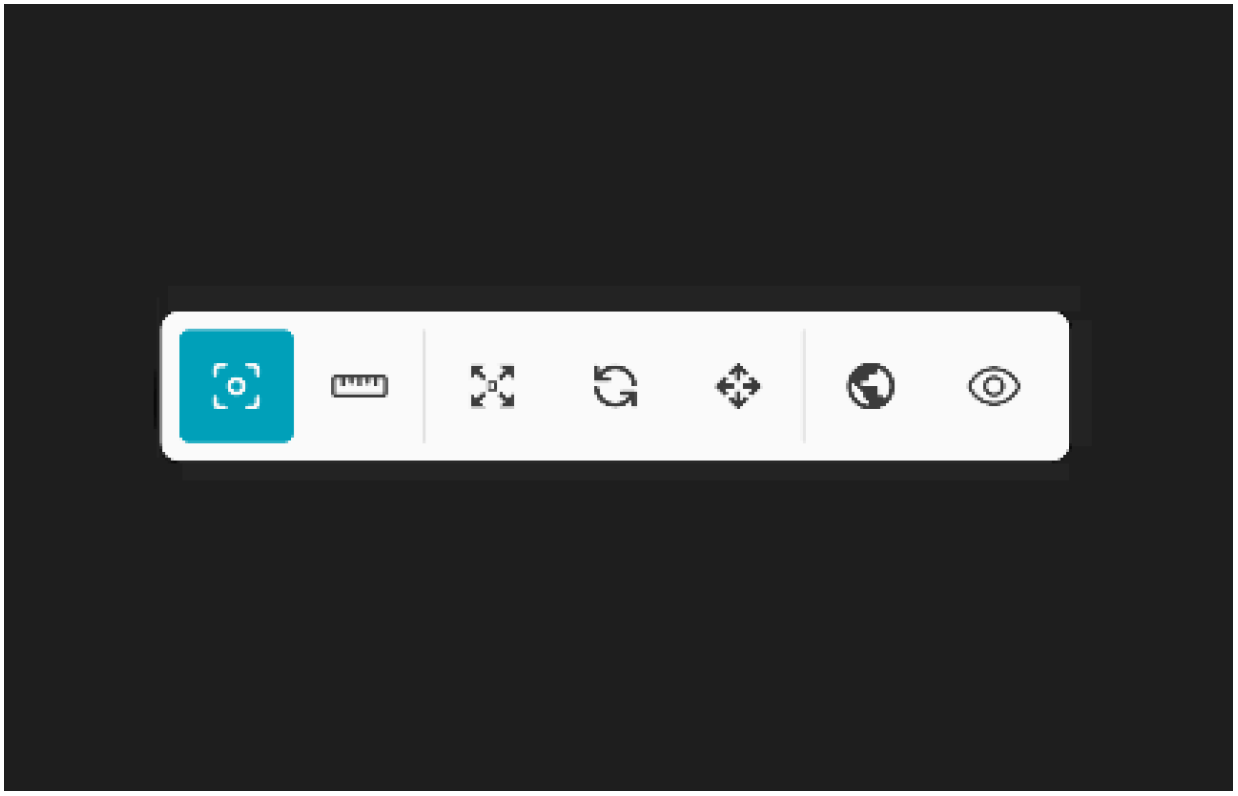






3.1.8 Focus

Focus allows users to quickly center and zoom in on a selected road within the map. This feature helps streamline navigation by bringing the chosen road into view, making it easier to analyse or edit specific sections with precision. This feature can also be activated by selecting the object or signal and pressing the "F" key. This feature will only work if the "Objects" or "Signals" tool is selected.



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3.2 Editor bar

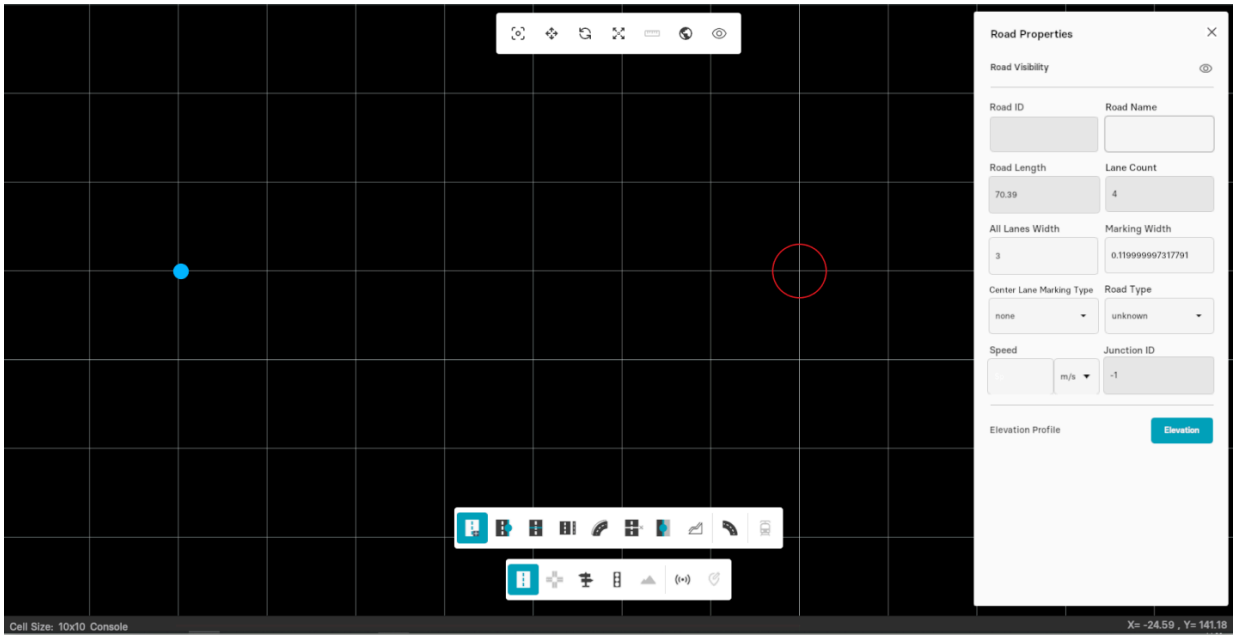
3.2.1 Roads

The **Toolbar** provides you a variety of options while creating a map in the window.

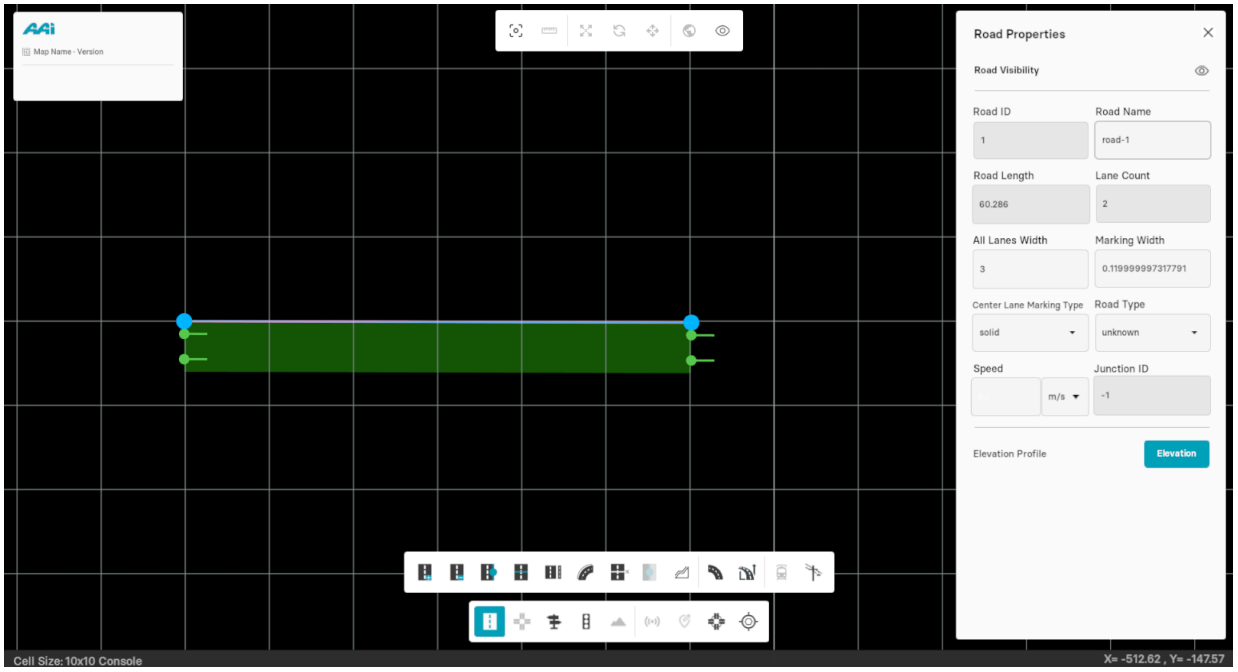
Create Road

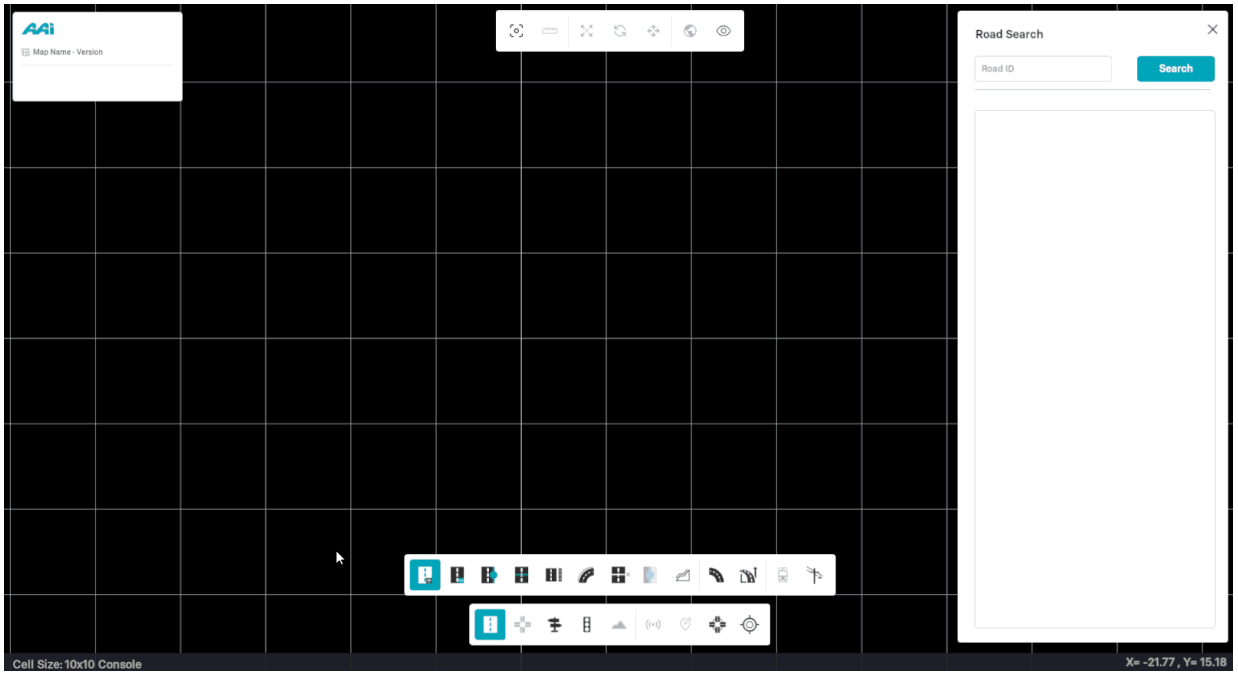
This tool lets the user draw a road in your map. All roads consist of a reference line which defines its basic geometry. This reference line requires an initial and a final point on the grid window defined by the user.

```
1. Select the "Create Road" sub-tool inside of the "Road Edit" tool. Click the secor
```

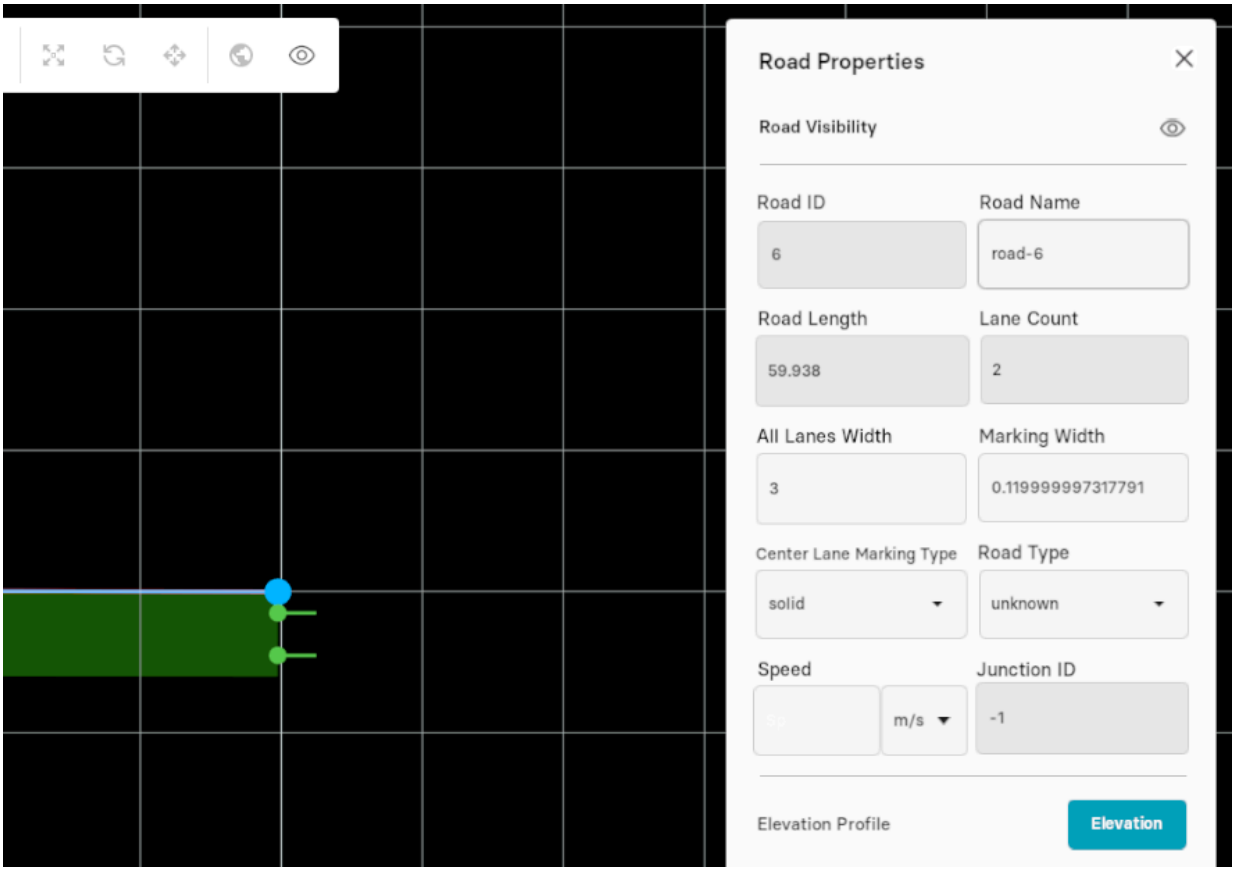



```
2. Press the secondary-mouse button (usually right) at a different position for the
```





Once you click the points consecutively, a road is automatically laid out between them. On the right side of the window, you"ll find all the road features displayed. These parameters can be adjusted as needed.



For more details about these parameters, click here

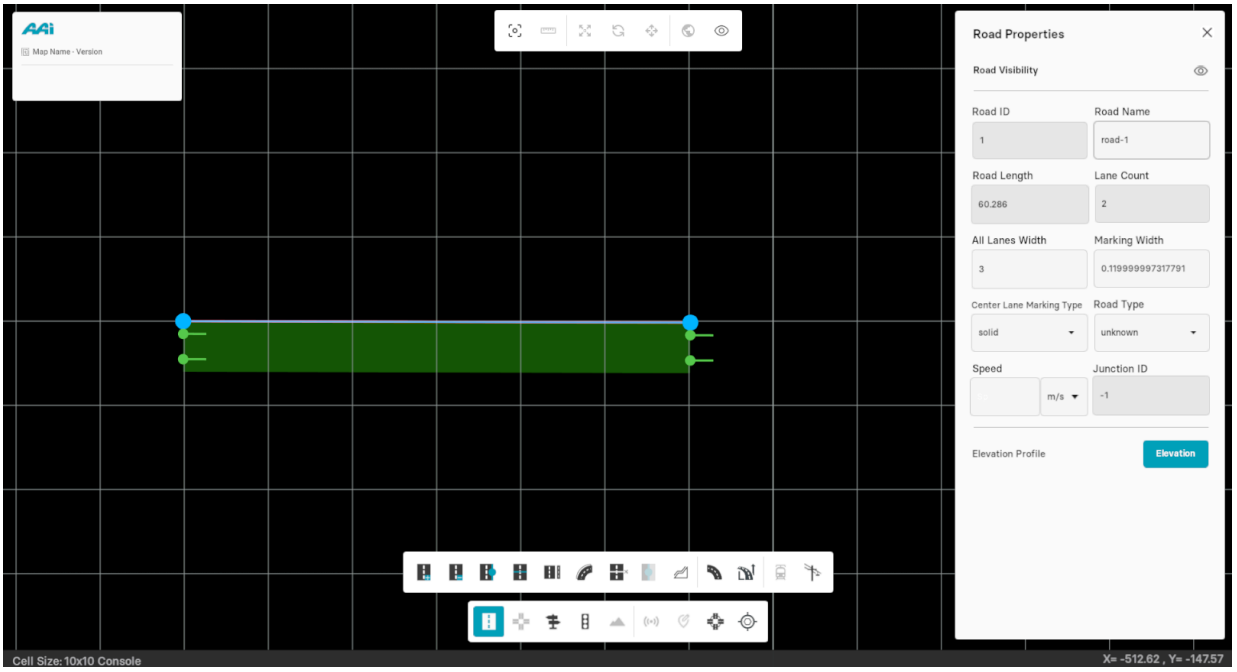
Delete Road

This sub-tool allows the user to delete any existing road within the window. There are, however, two ways in which you can delete a road:

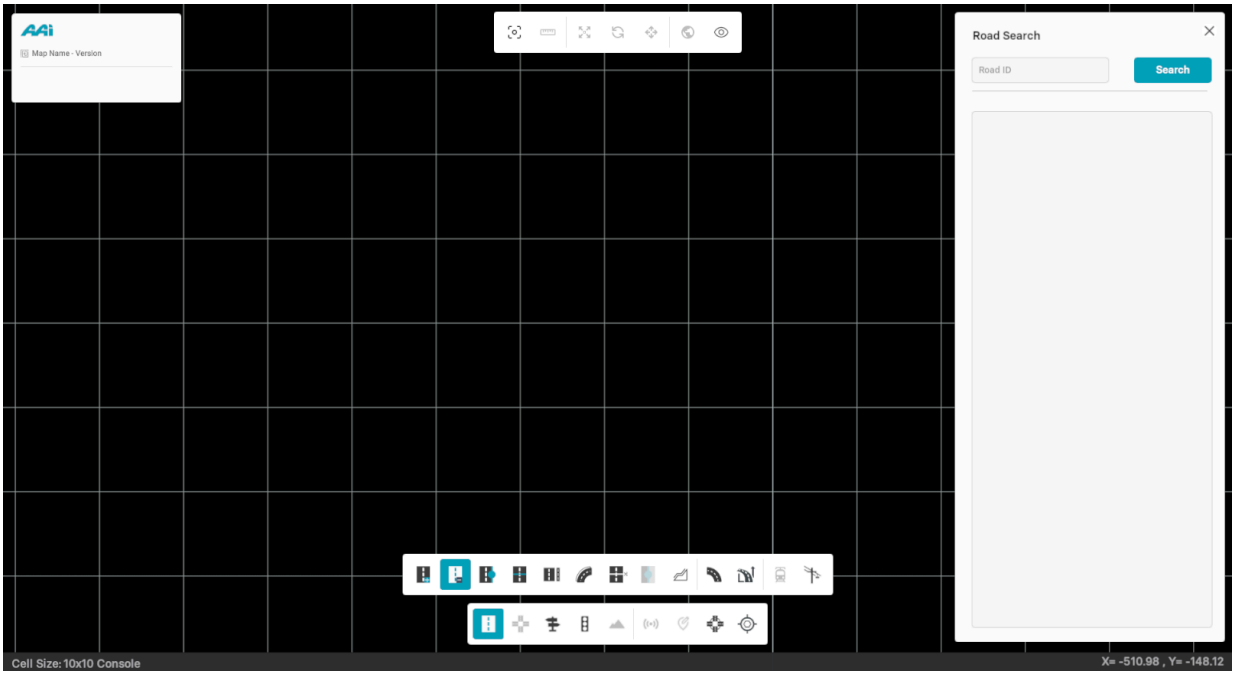
1. Directly through the **Delete Road** sub-tool
2. Through the **del** shortcut

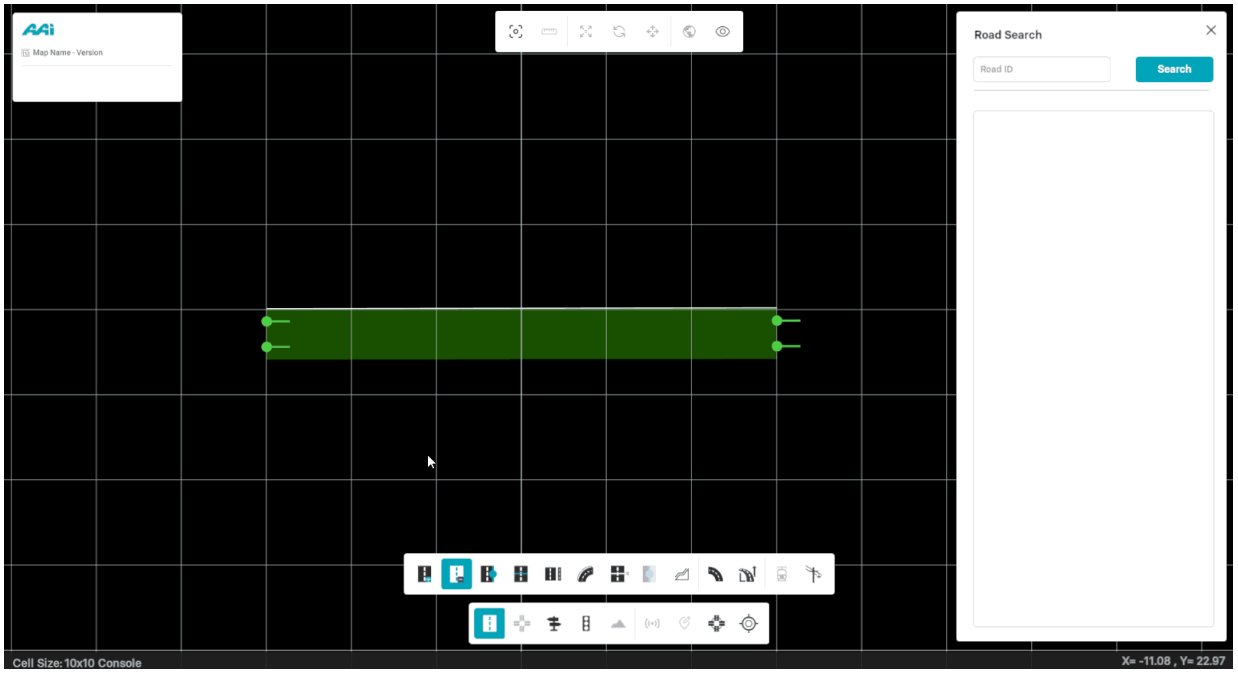
Approach #1: Through the "Delete Road" tool

```
1. Select the "Delete Road" sub-tool inside of the "Road Edit" tool.
```



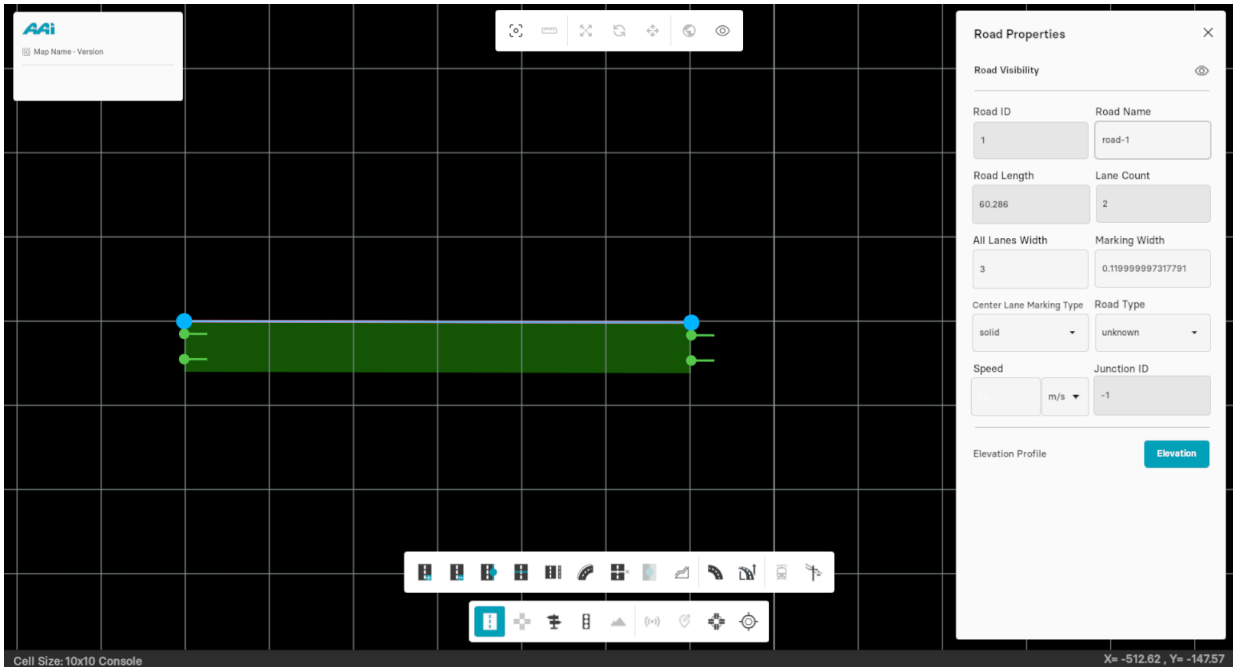
2. Press the 'Del' key on your keyboard. This will delete the selected road



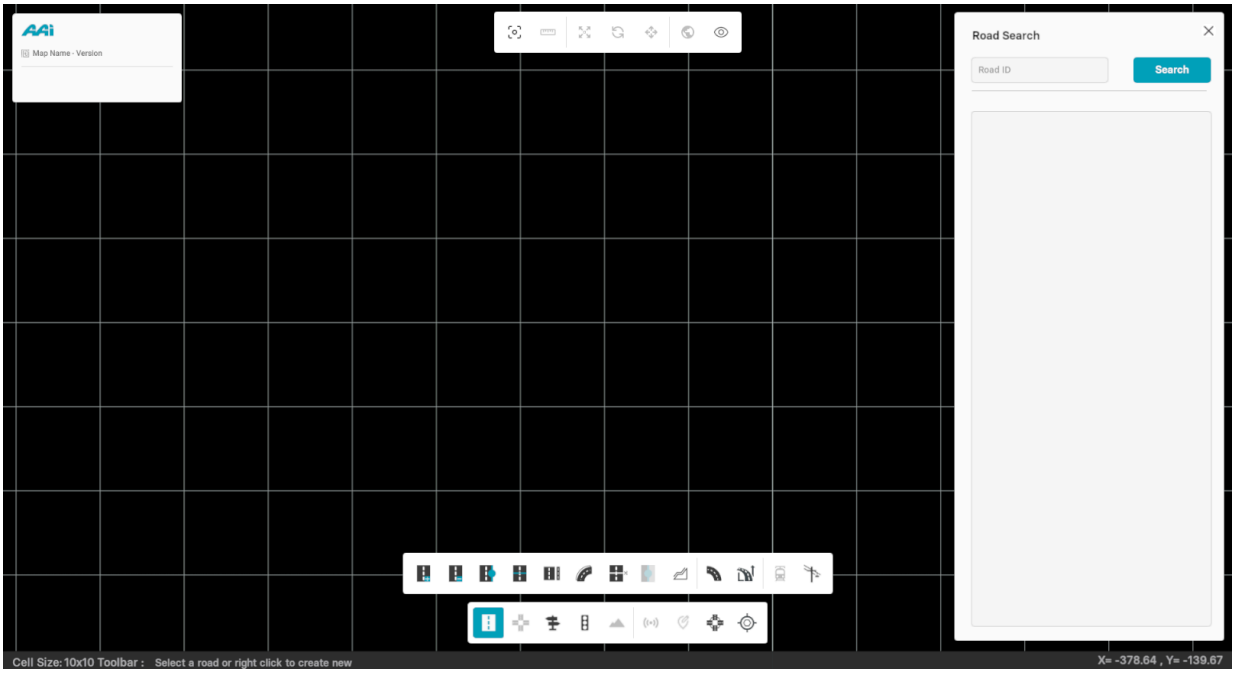


Approach #2: Through the "del" shortcut

1. Select the road by using the "Road Edit" tool.



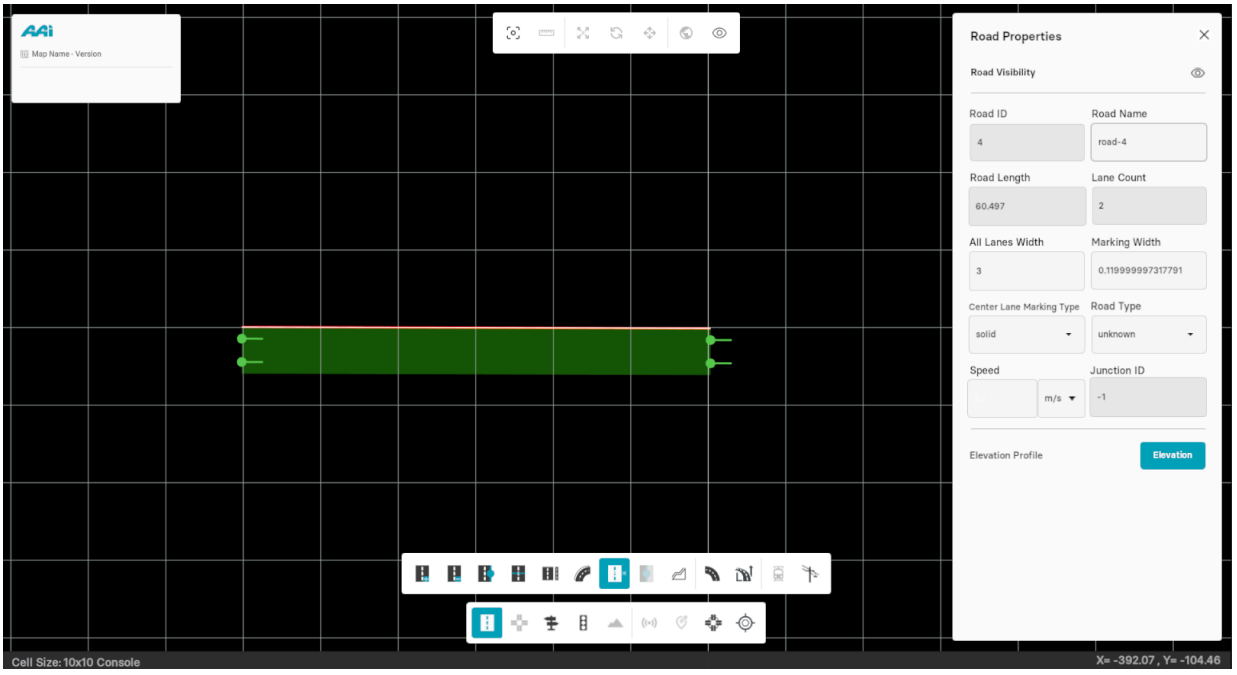
2. Press the "del" key in your keyboard. This should cause the selected road to be (



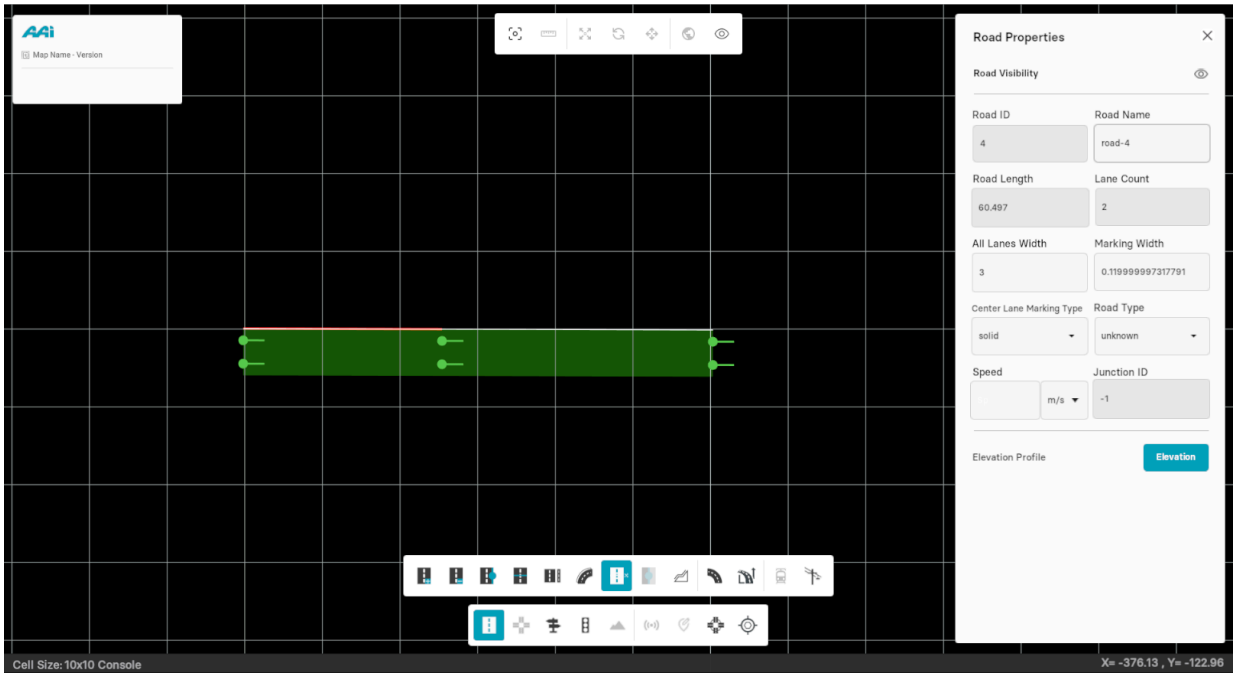
Cut Road

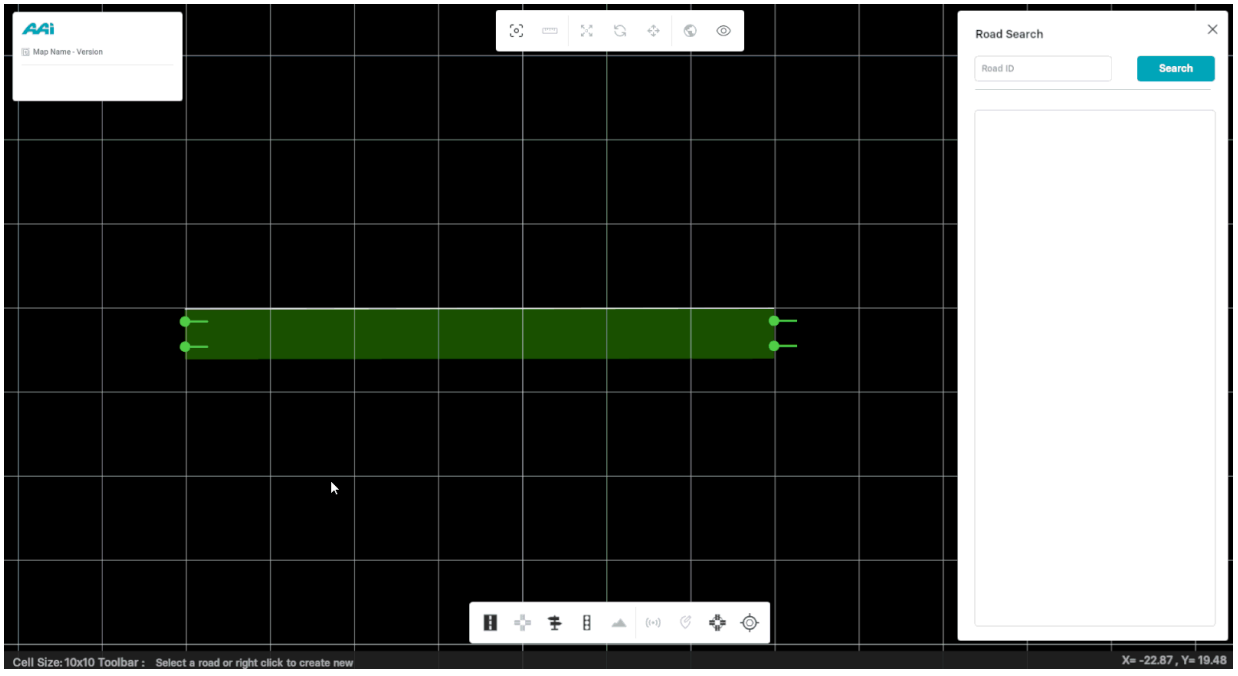
This sub-tool allows you to split up the existing road into two or more sections.

```
1. Select the 'Cut Road' sub-tool within the 'Road Edit' tool.
```




```
2. Press the road with the primary-mouse button (usually left) in the area you want
```



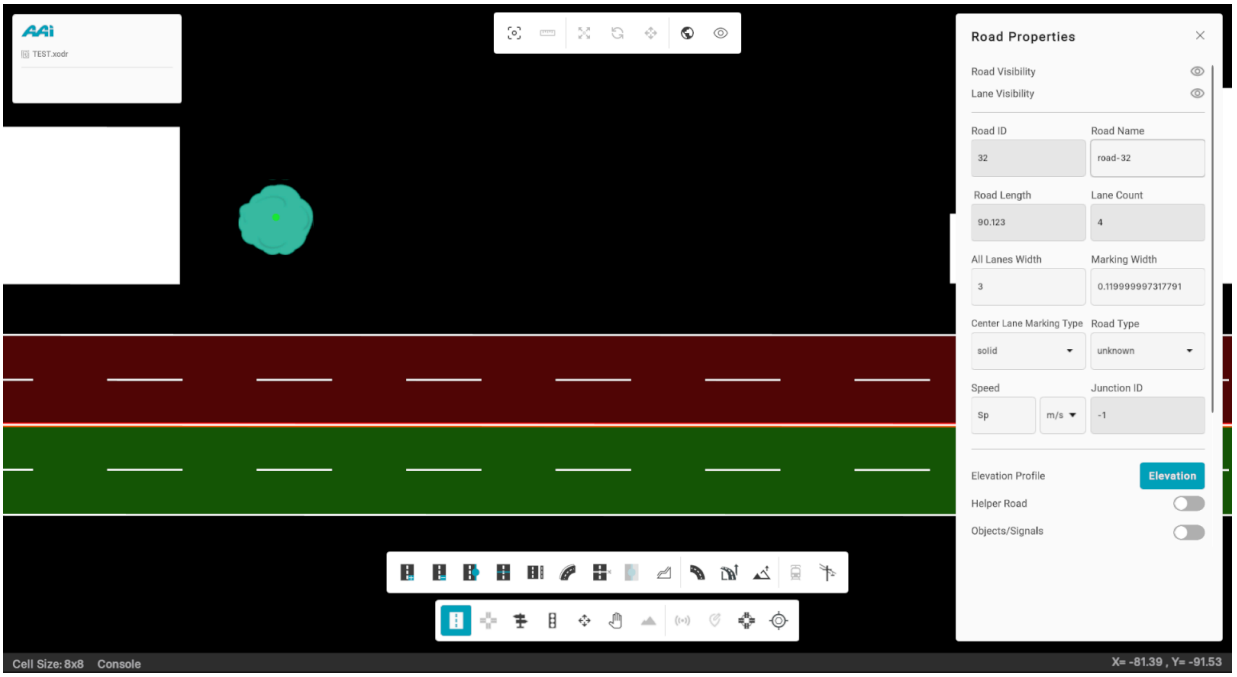


Road Visibility

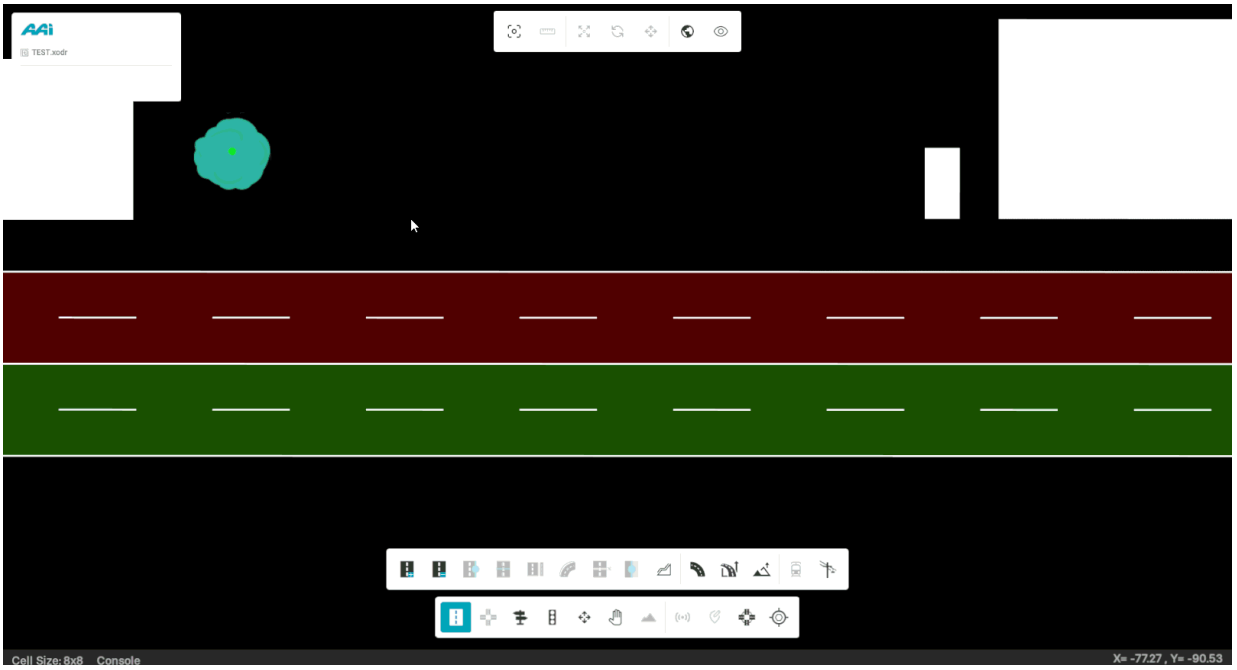
Hide Road

This tool allows the user to temporarily remove a road from the visible map display without deleting it. When selected, the user can click on any existing road within the grid window to hide it from view. The road's geometry and associated data remain intact and can be re-displayed later. This is useful for decluttering the map or focusing on other elements during editing.

1. Click the desired road with the primary (usually left) mouse button to open its p



2. Click the eye icon on the right side of "Road Visibility" using the primary (usua



Show Road

This tool enables the user to make a previously hidden road visible again on the map. When activated, the user can select from a list of hidden roads or click on the desired road's location if known. Once selected, the road will reappear in the grid window with its original geometry and attributes. This helps restore the full layout of the map when needed.

Approach #1: Directly through "Road Properties" panel

```
1. Click the desired road with the primary (usually left) mouse button to open its p
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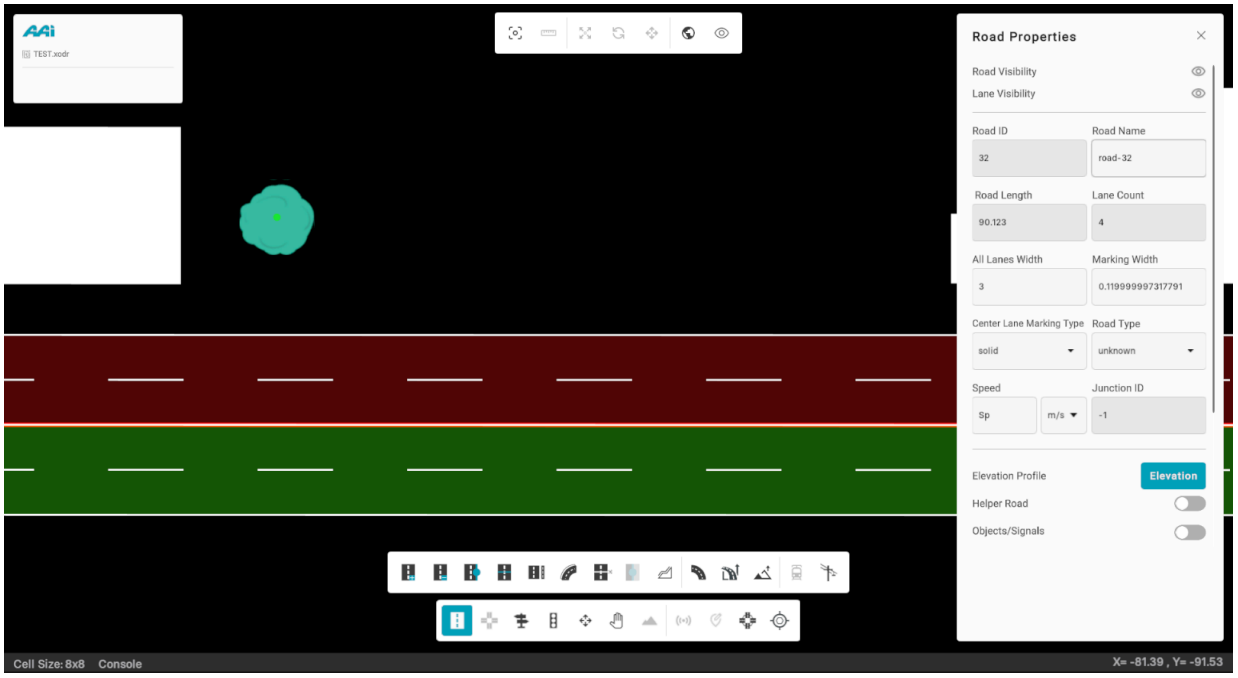


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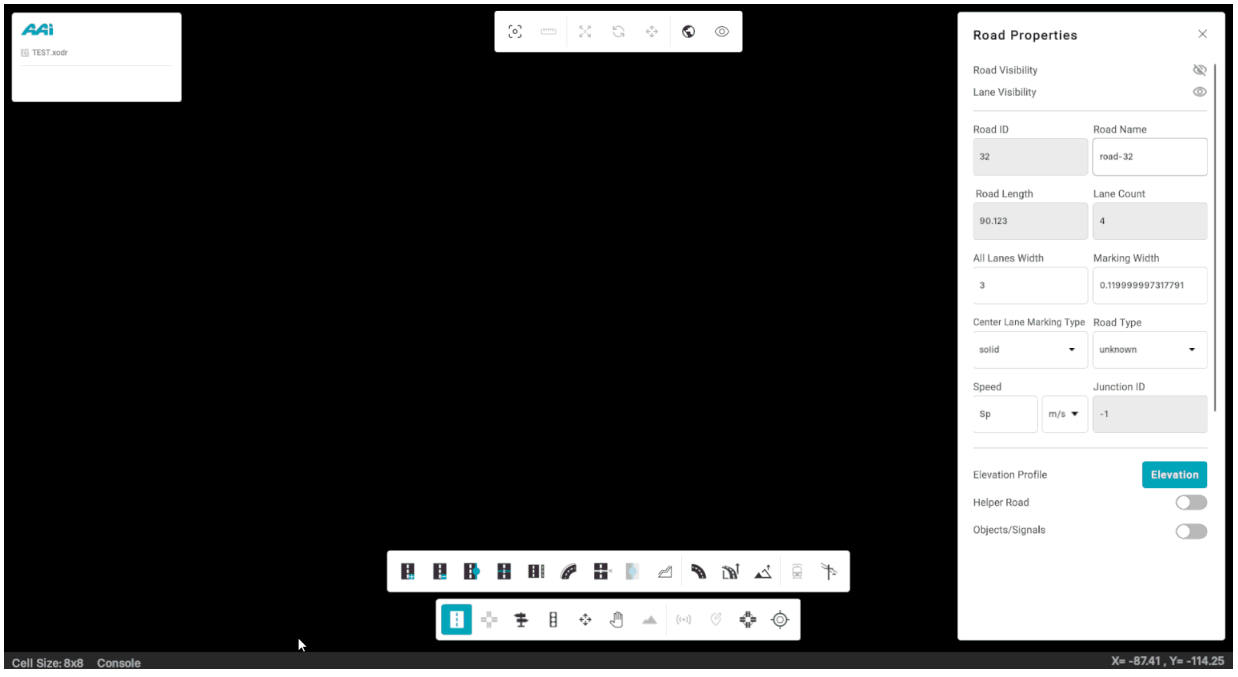

Approach #2: Using the shortcut

Hold the "Shift + S" hotkey combination to make the most recently hidden road visible again.

3.2.2 Lanes

While creating a map in RepliMap, first **add a road** in your map (*by default, two lanes are added to right-side of the road*), now follow the steps below to include more lanes in either side of that road.

Adding Lanes

```
1. Select a road by using the "Edit Road" tool by clicking with the primary-mouse bu
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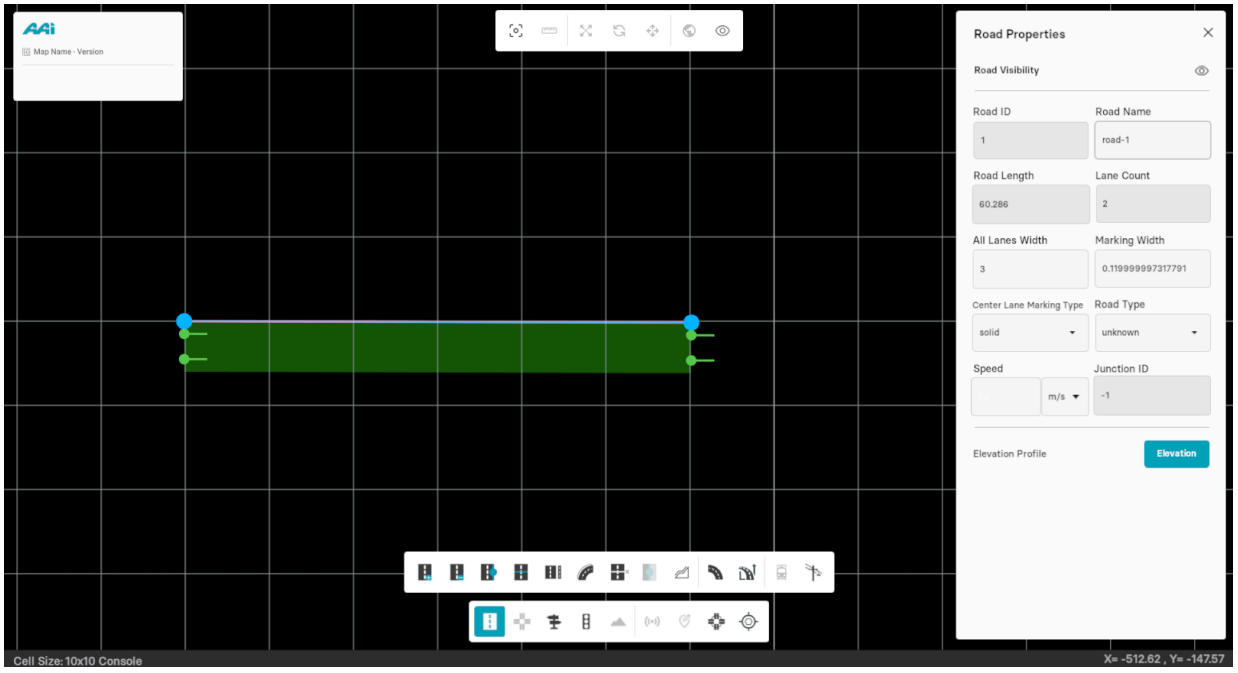
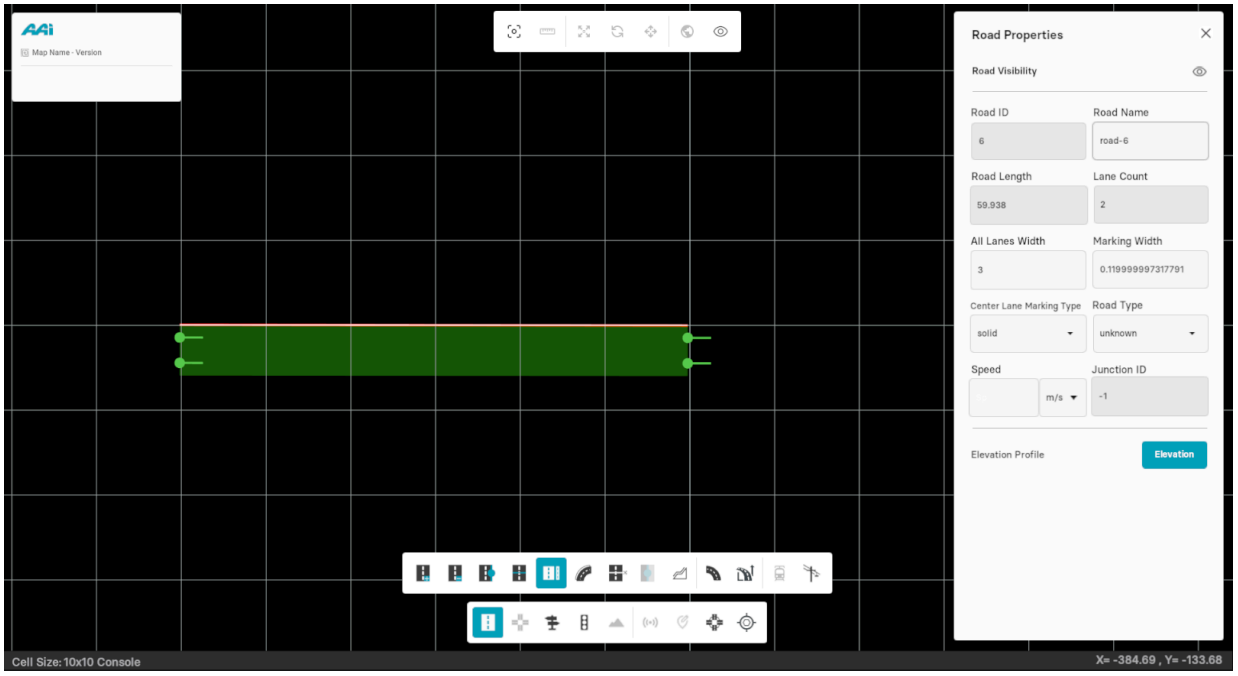
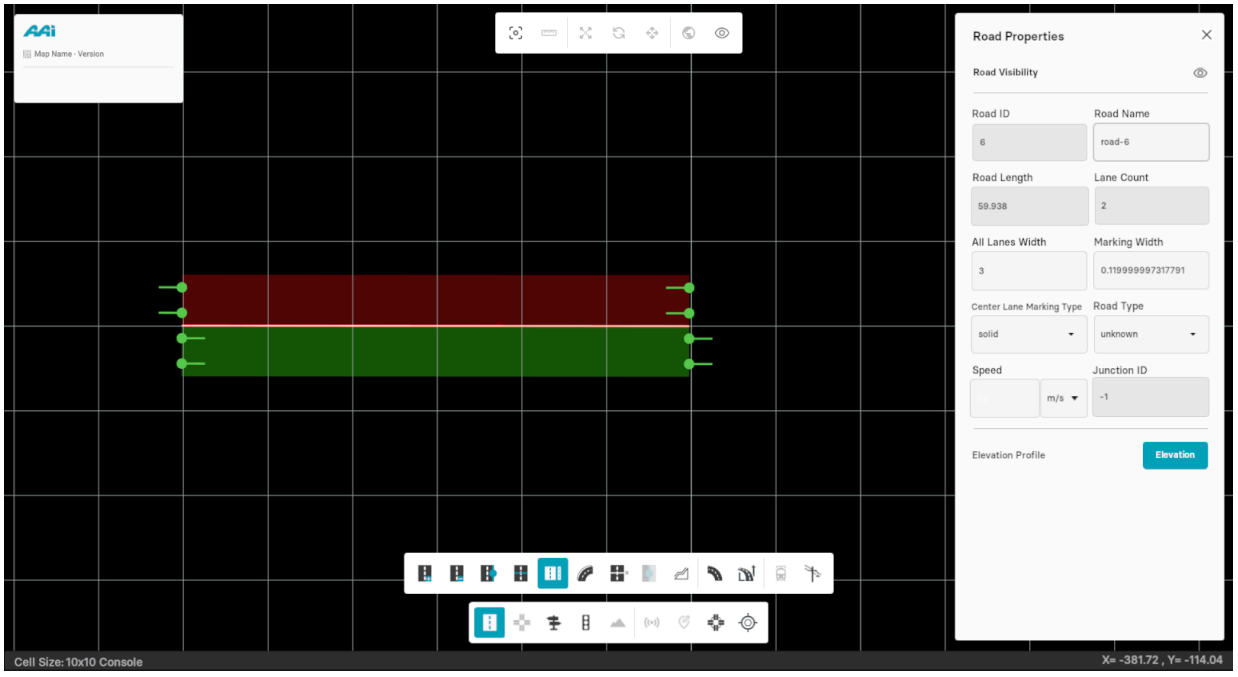
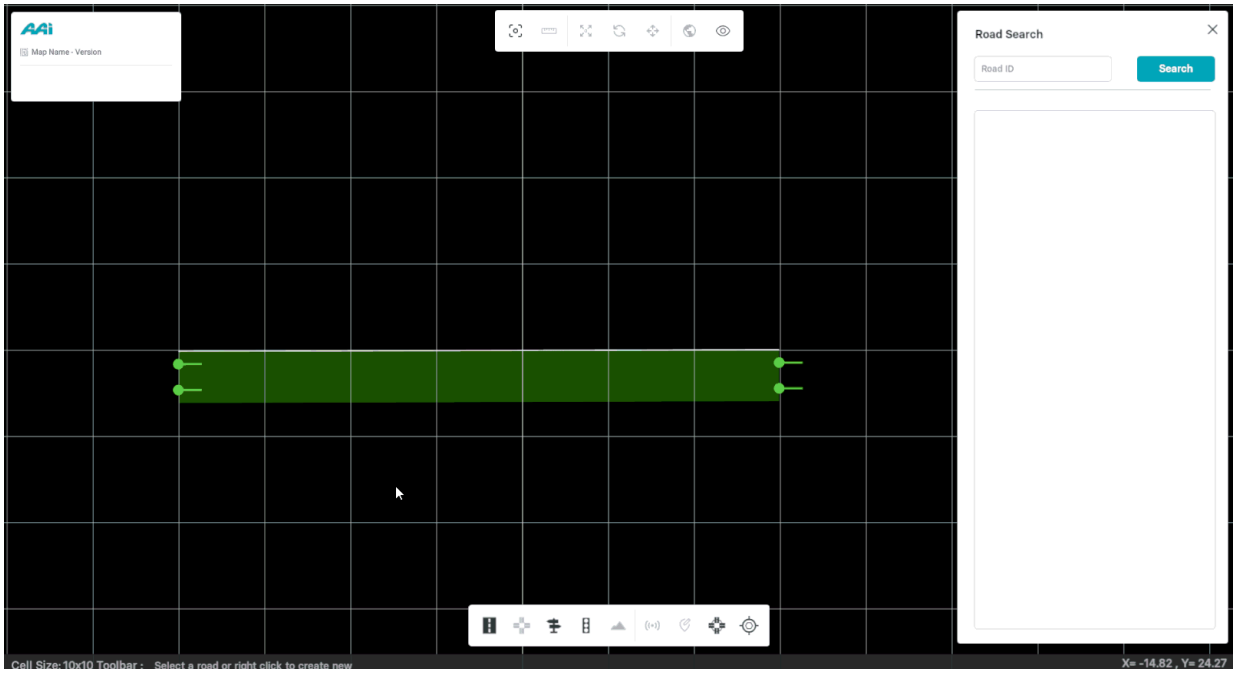



```
2. Select the "Lane Tool" sub-tool from the editor bar.
```



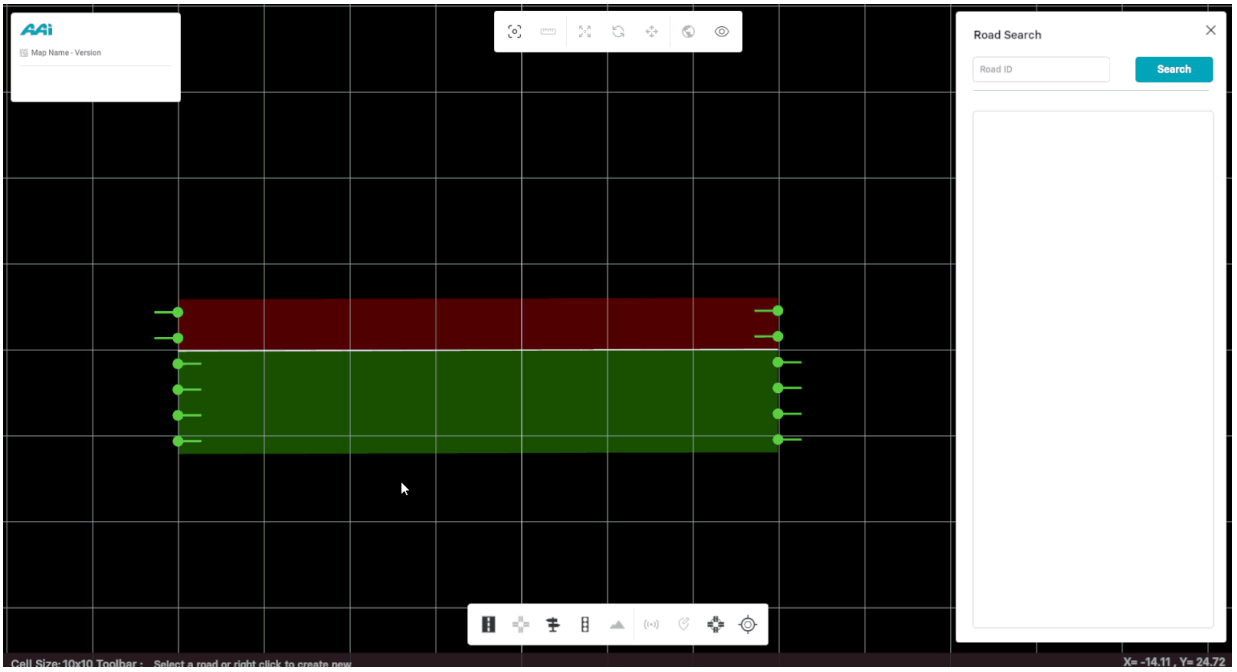
3. Move the mouse to either horizontal extremity of the road and using the primary-r





Deleting Lanes

Select the "Lane Tool" from the toolbox, and press the secondary-mouse button (usua



Lane Visibility

Hide Lane

This tool allows the user to temporarily hide the lanes of a road from the map without deleting them. Once selected, the lanes will be removed from view in the grid window, but their geometry and attributes remain intact. This is useful for decluttering the map or focusing on other components during editing.

```
1. Click the desired road with the primary (usually left) mouse button to open its p
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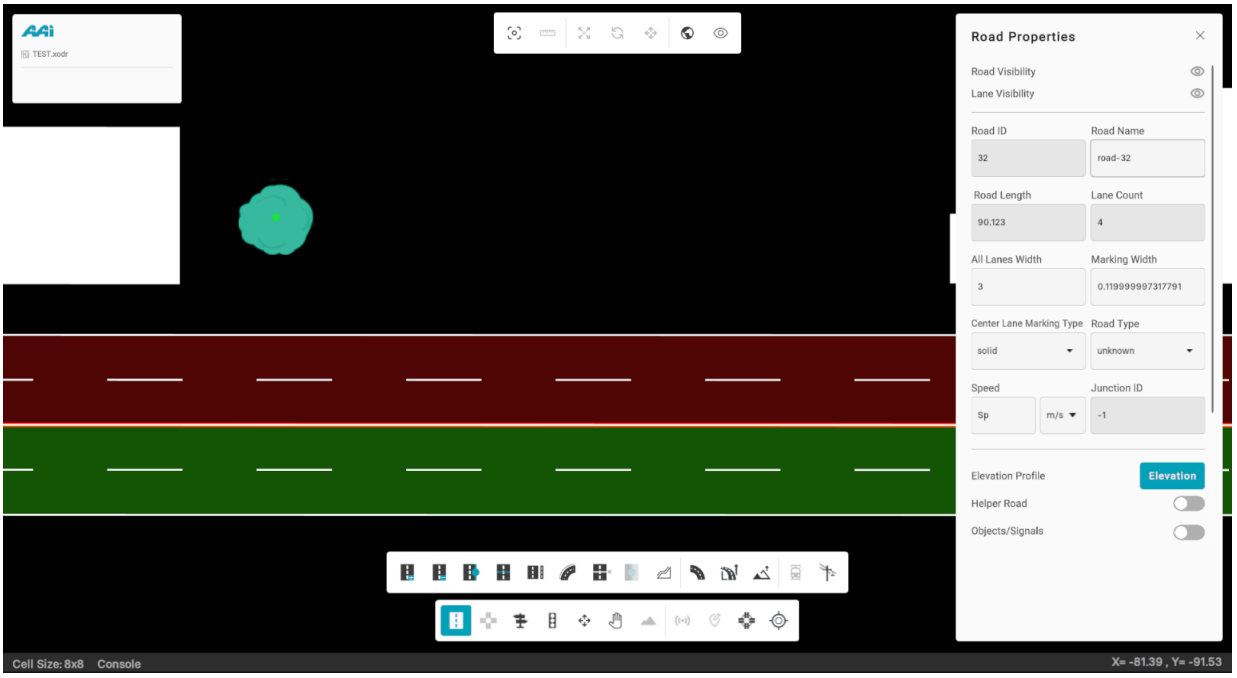

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2. Click the eye icon on the right side of "Lane Visibility" using the primary (usua
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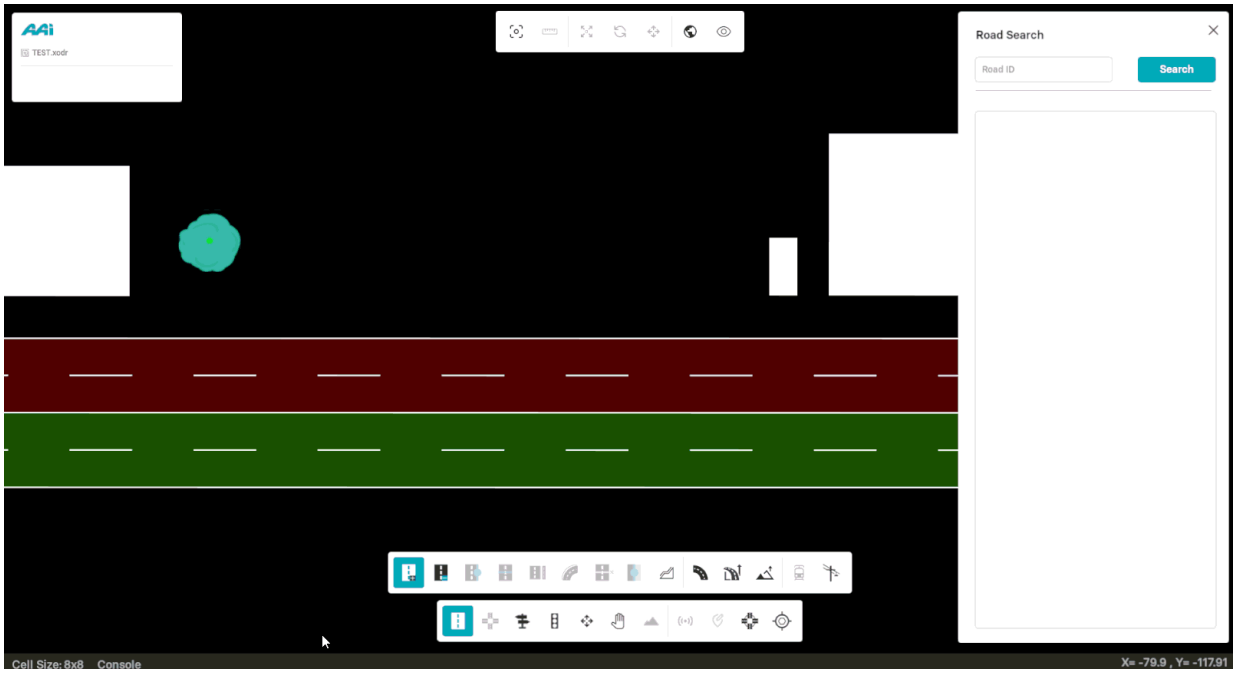
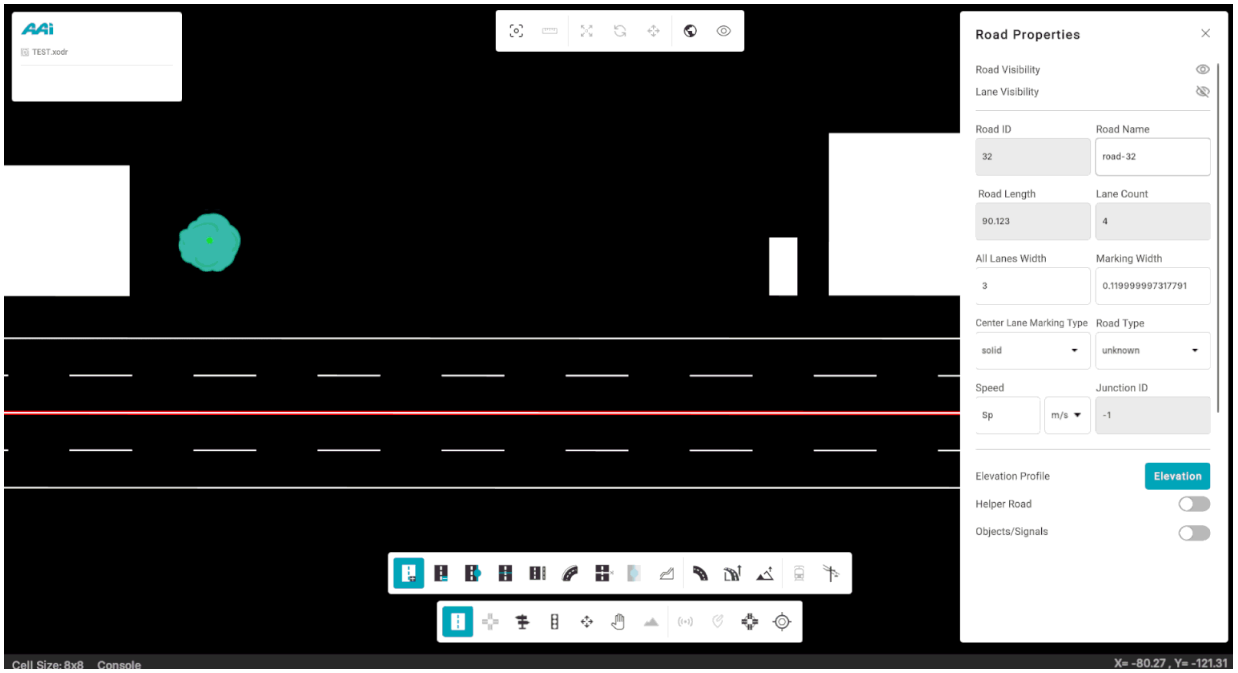


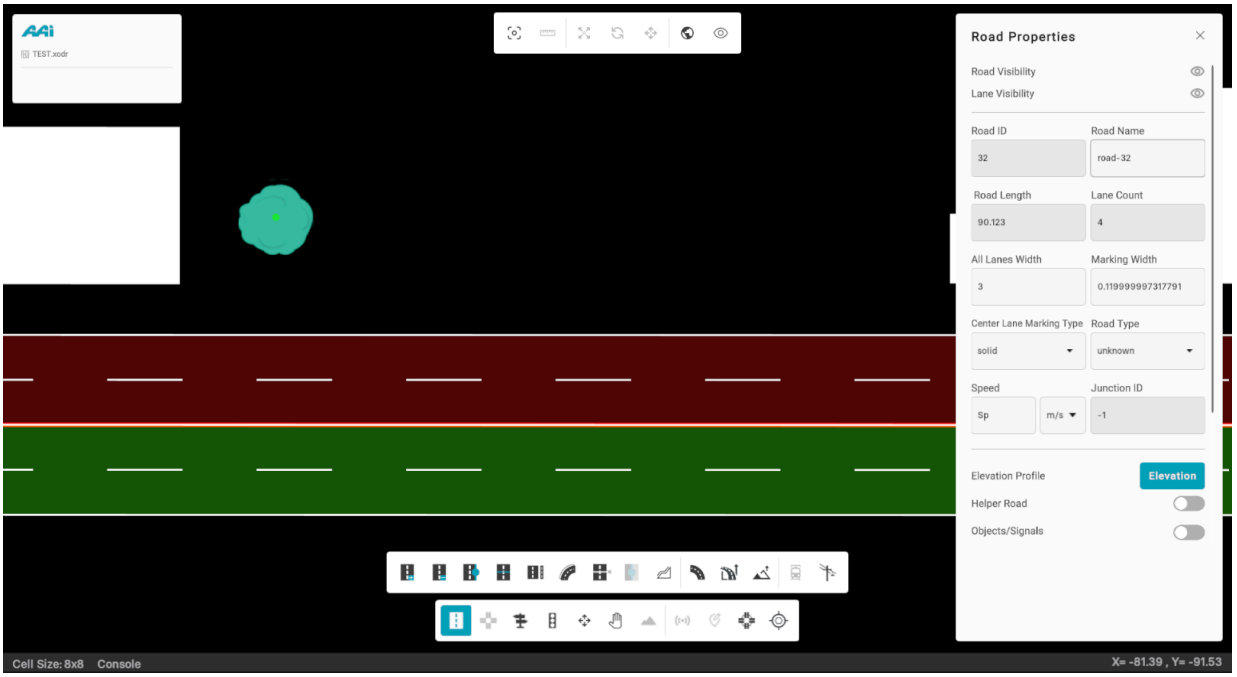
Show Lane

This tool enables the user to make a previously hidden lanes in a road visible again on the map. Once selected, the lanes will reappear in the grid window with its original geometry and attributes. This helps restore the full layout of the map when needed.

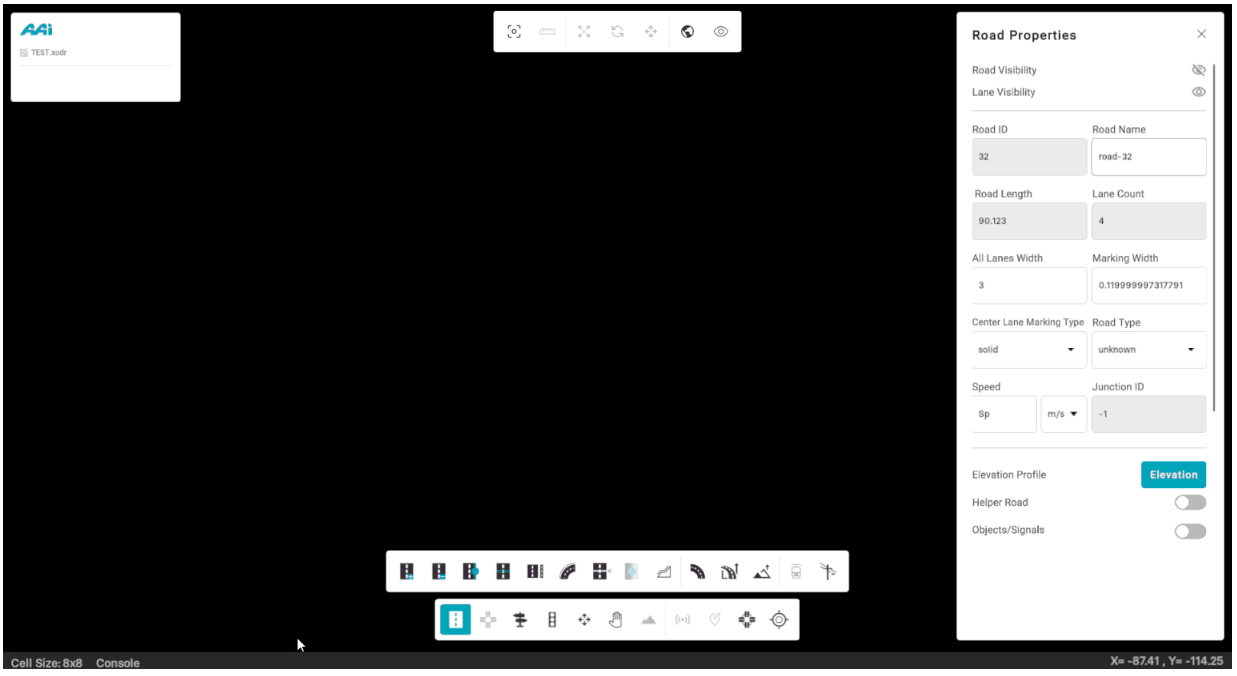


Approach #1: Directly through "Road Properties" panel

```
1. Click the desired road with the primary (usually left) mouse button to open its p
```




```
2. Click the eye icon on the right side of "Lane Visibility" using the primary (usua
```

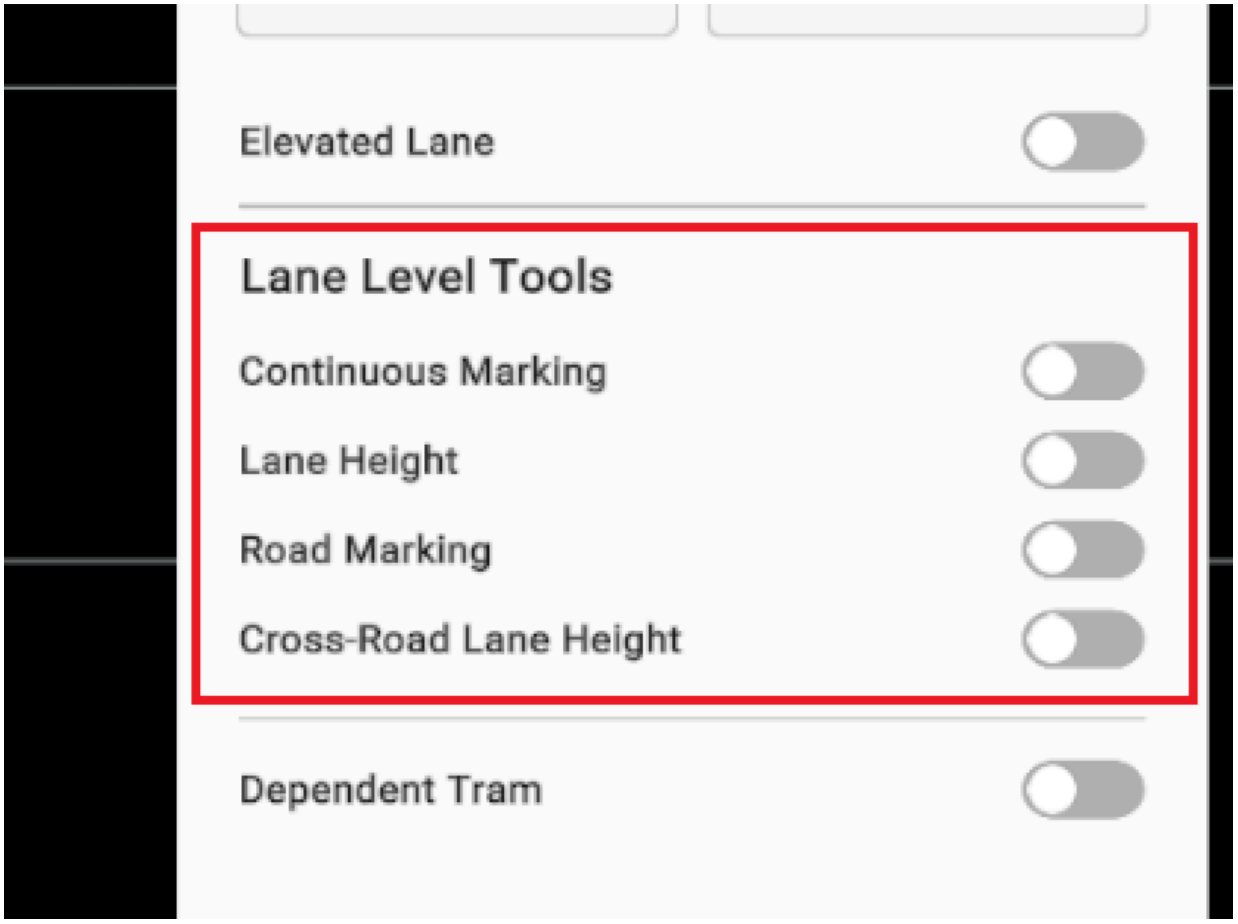


Approach #2: Using the shortcut

Hold the "Shift + S" hotkey combination to make the most recently hidden lanes visible again.

Lane Level Tools

These properties are accessible through the lane-level properties panel within a selected road. This panel allows users to customize various lane features, supporting better design practices while aligning with the aesthetic requirements of the road.

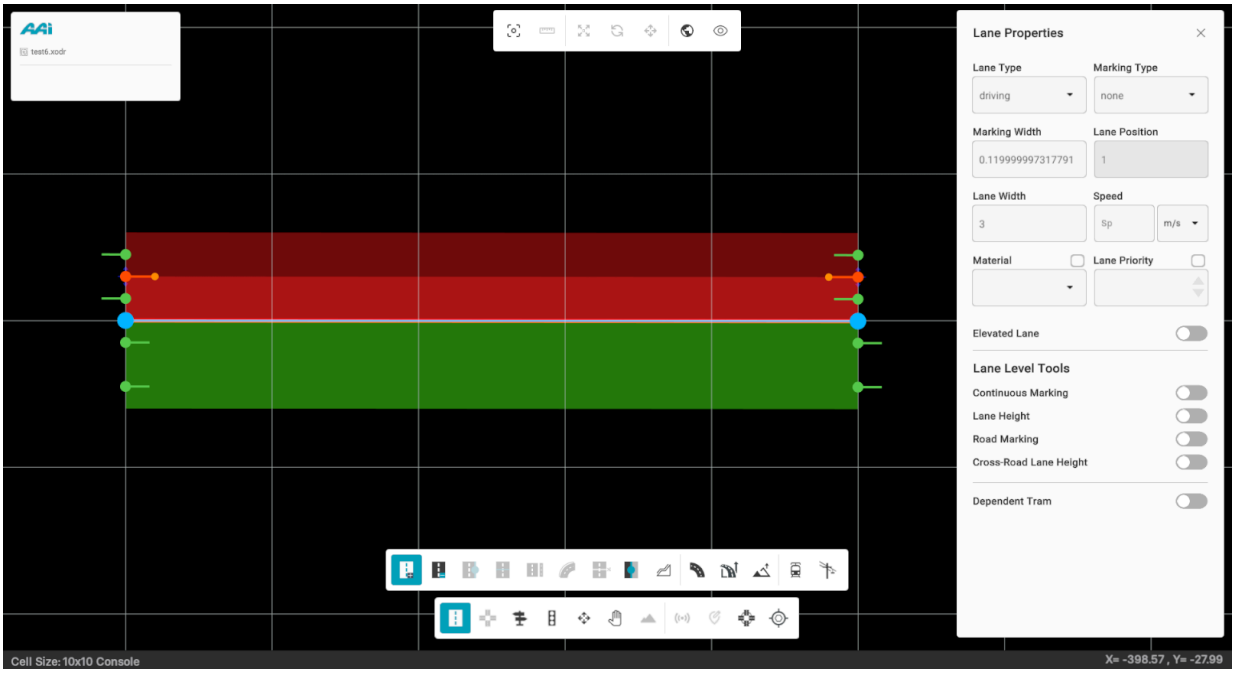


Continuous Marking

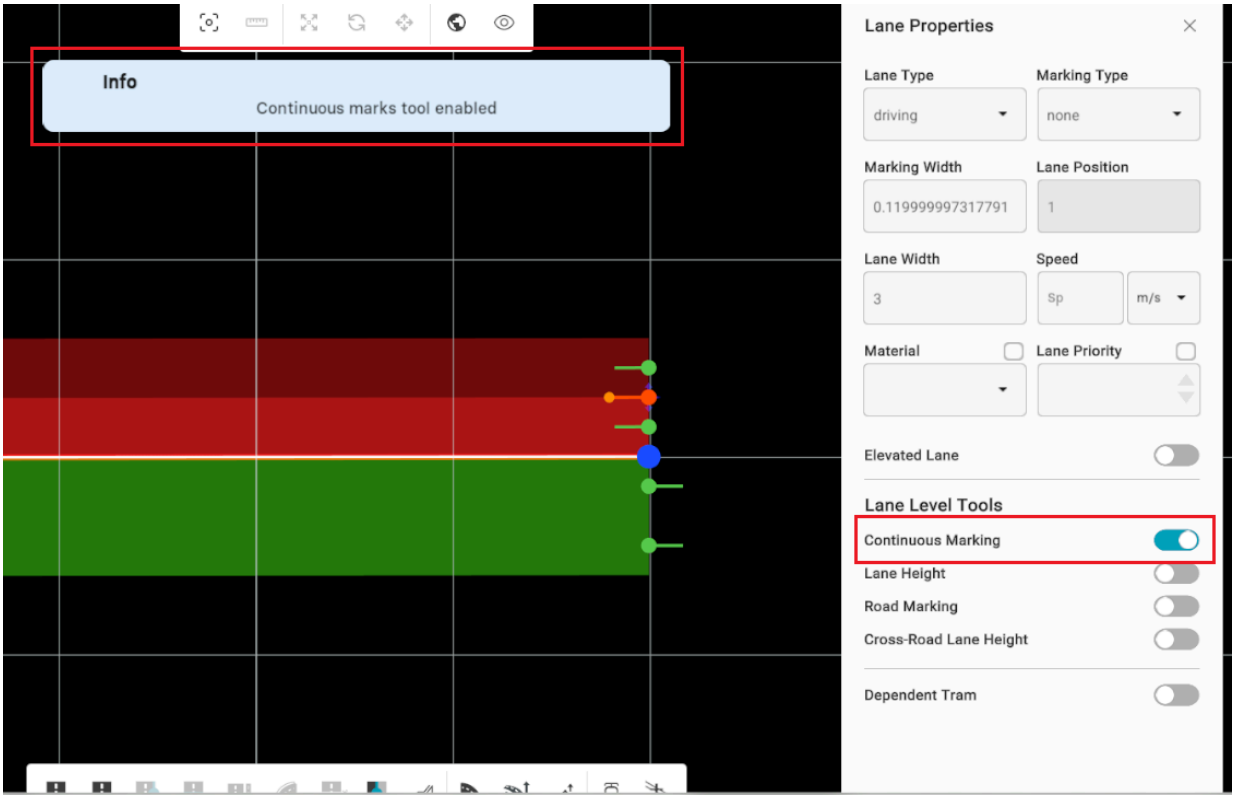
It allows the user to place anchors for lane-level styling. This feature enables the placement of continuous road markings across a section without needing to add multiple individual anchors—streamlining the process and promoting best practices for managing multiple sections.

Approach #1: Through the "Continuous Marking" toggle

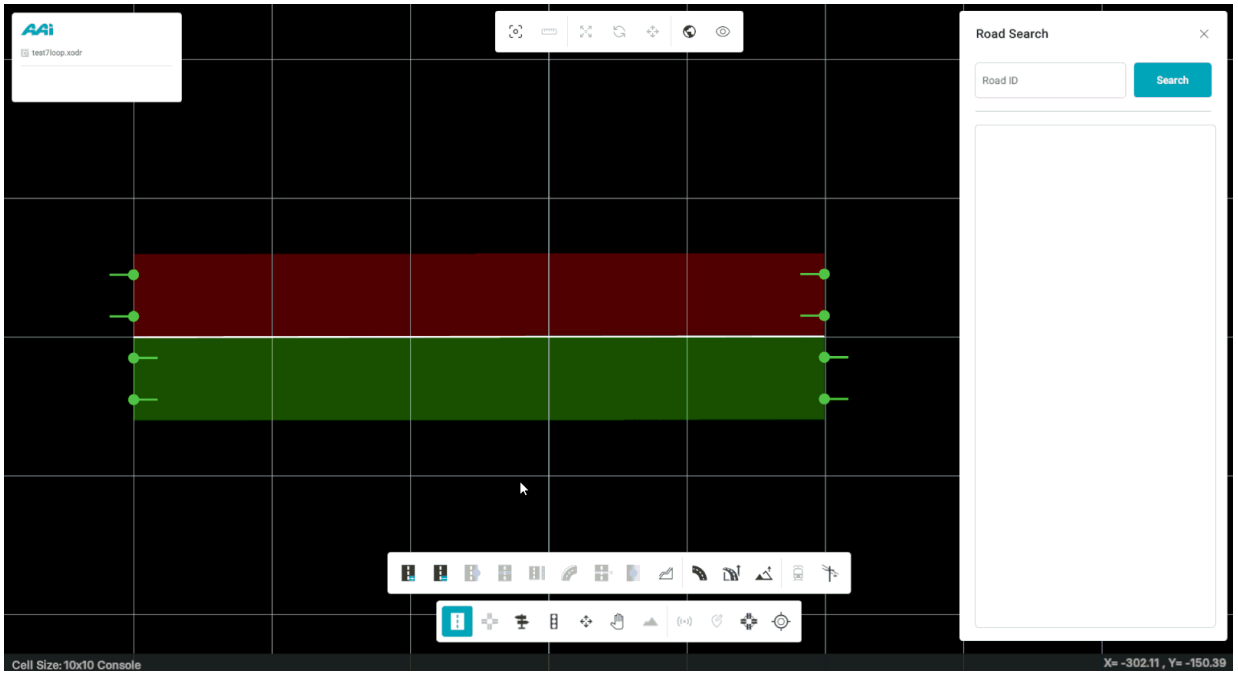
```
1. Triple-click the desired lane on the selected road using the primary (usually le
```



2. Toggle the "Continuous Marking" switch. When enabled, it will turn cyan. A confi

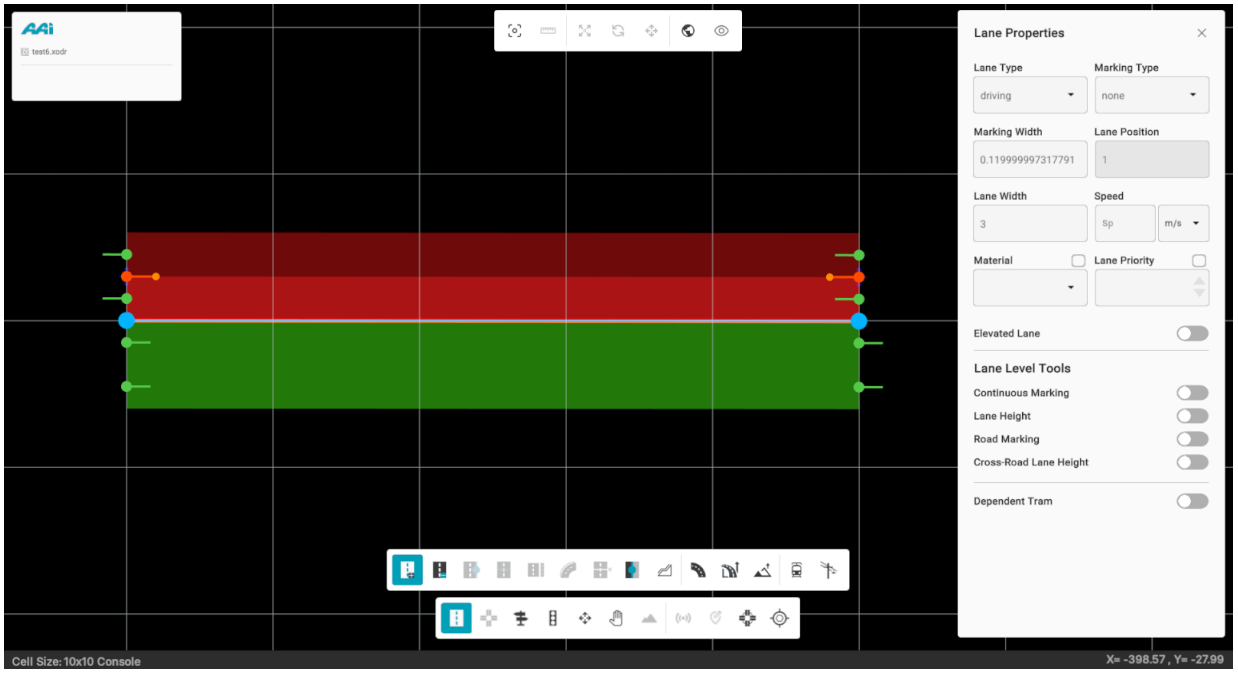


3. Once enabled and with a lane selected, hover over the desired area on the lane ar

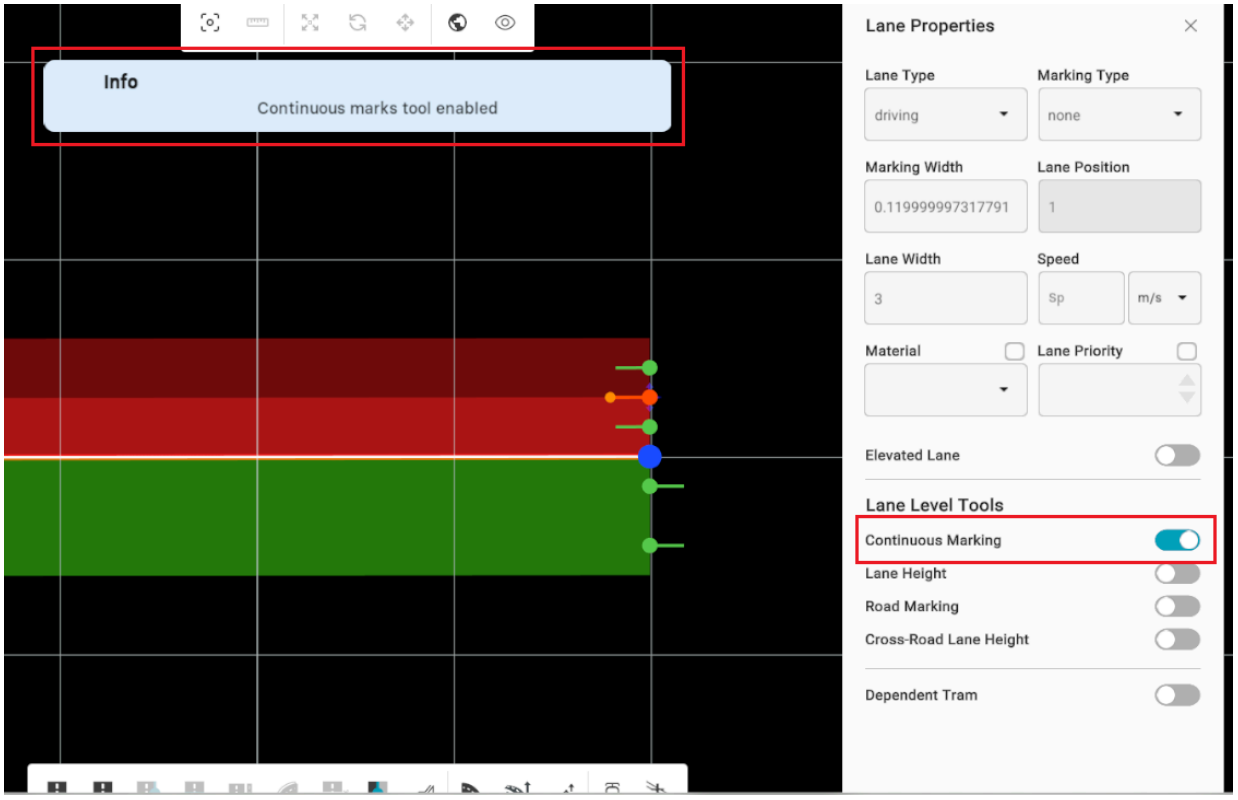


Approach #2: Through the hotkey

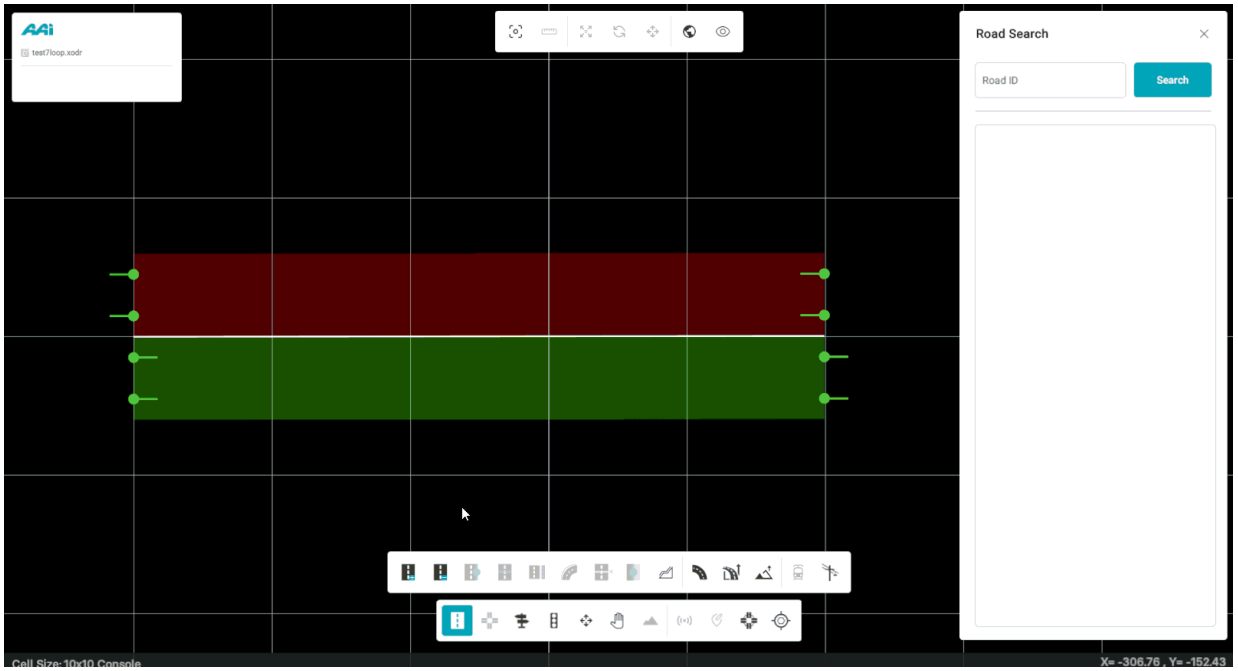
1. Triple-click the desired lane on the selected road using the primary (usually le



2. Toggle the "Continuous Marking" by pressing the "W" hotkey. When enabled, it wil




```
3. Once enabled and with a lane selected, hover over the desired area on the lane ar
```



Lane Height

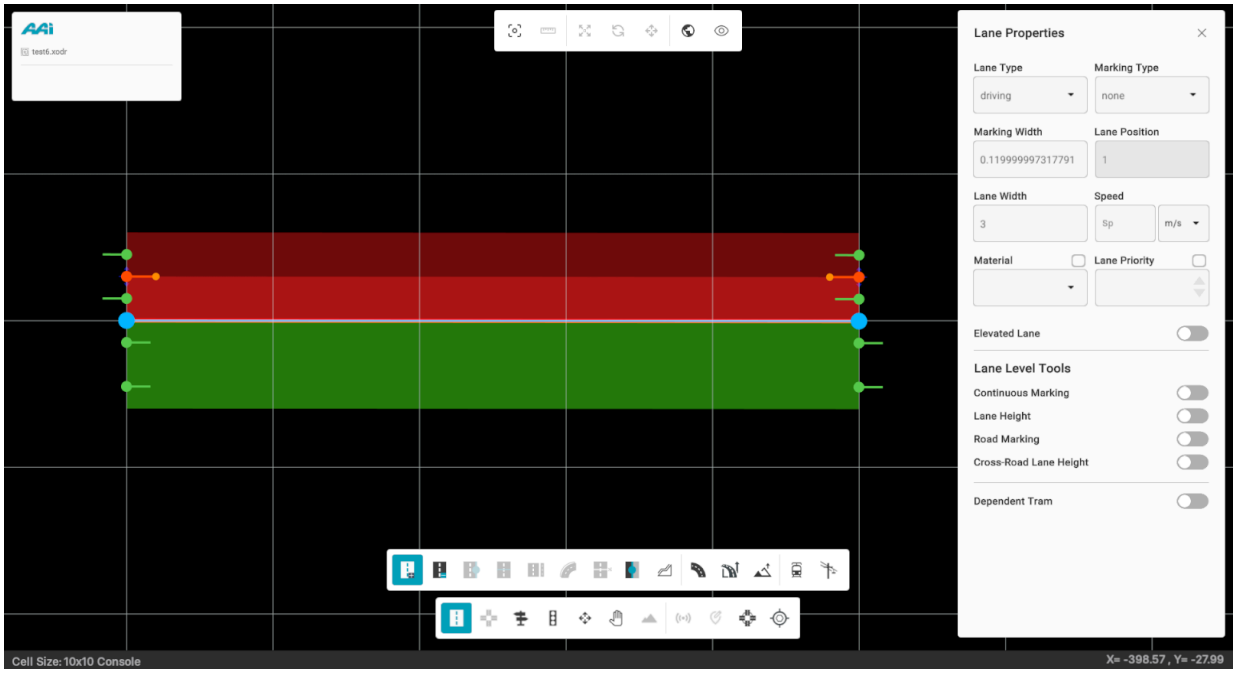
Allows the user to place an anchor that controls the elevation of a lane at a specific point. This anchor is draggable, enabling smooth adjustments to the lane's vertical profile along its path.

Inner/Outer Height Adjustment

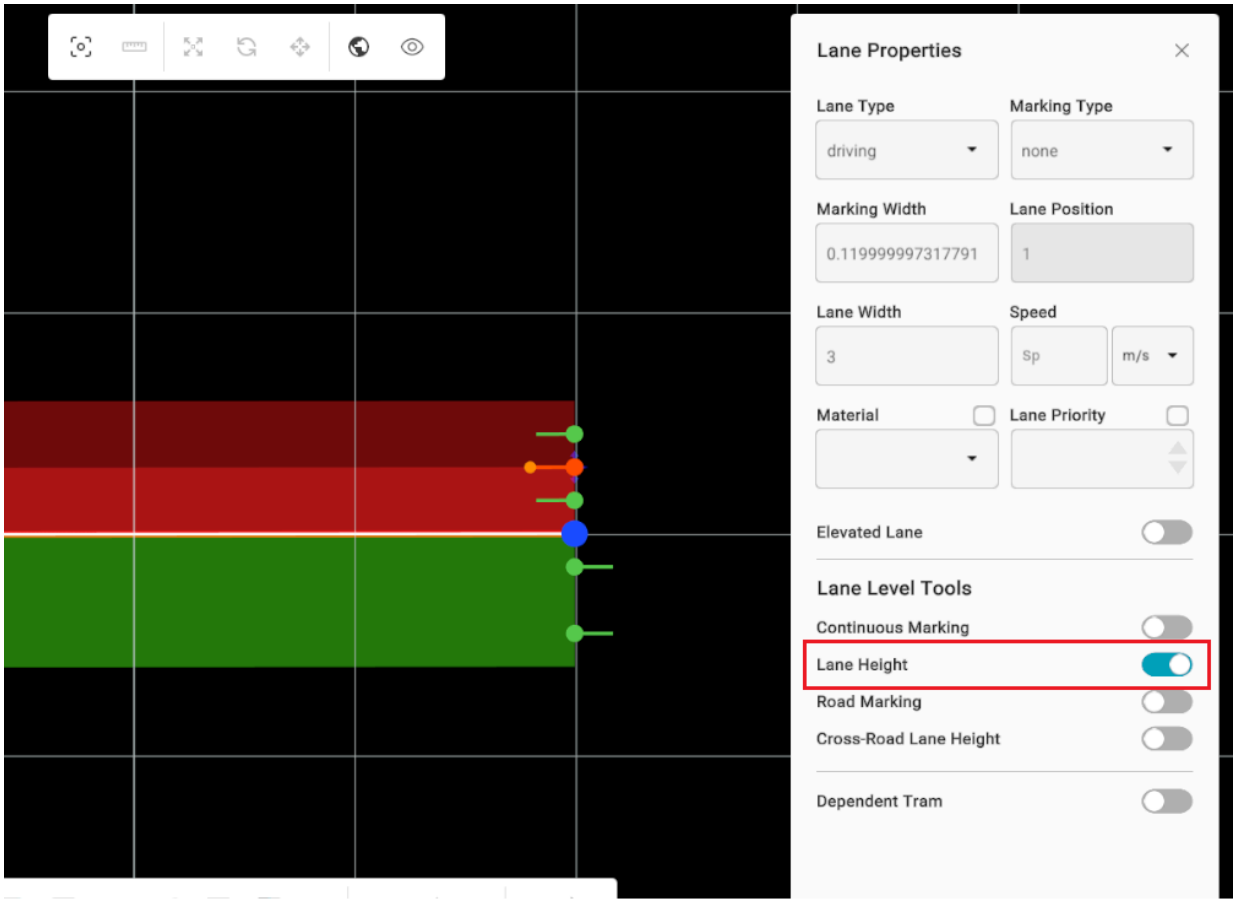
When modifying **lane elevation**, users can also adjust **inner** and **outer** height offsets along the lane borders.
In OpenDRIVE (ODR), these offsets are defined per lane border.
Currently, markers may appear on the topmost lane instead of the active one — to fix this:

1. Select the correct lane by **triple-clicking** on it to activate its properties.
2. Ensure that the **inner** and **outer** circle markers map to the selected lane's borders.
3. A visual highlight of the active lane will appear before applying height adjustments.

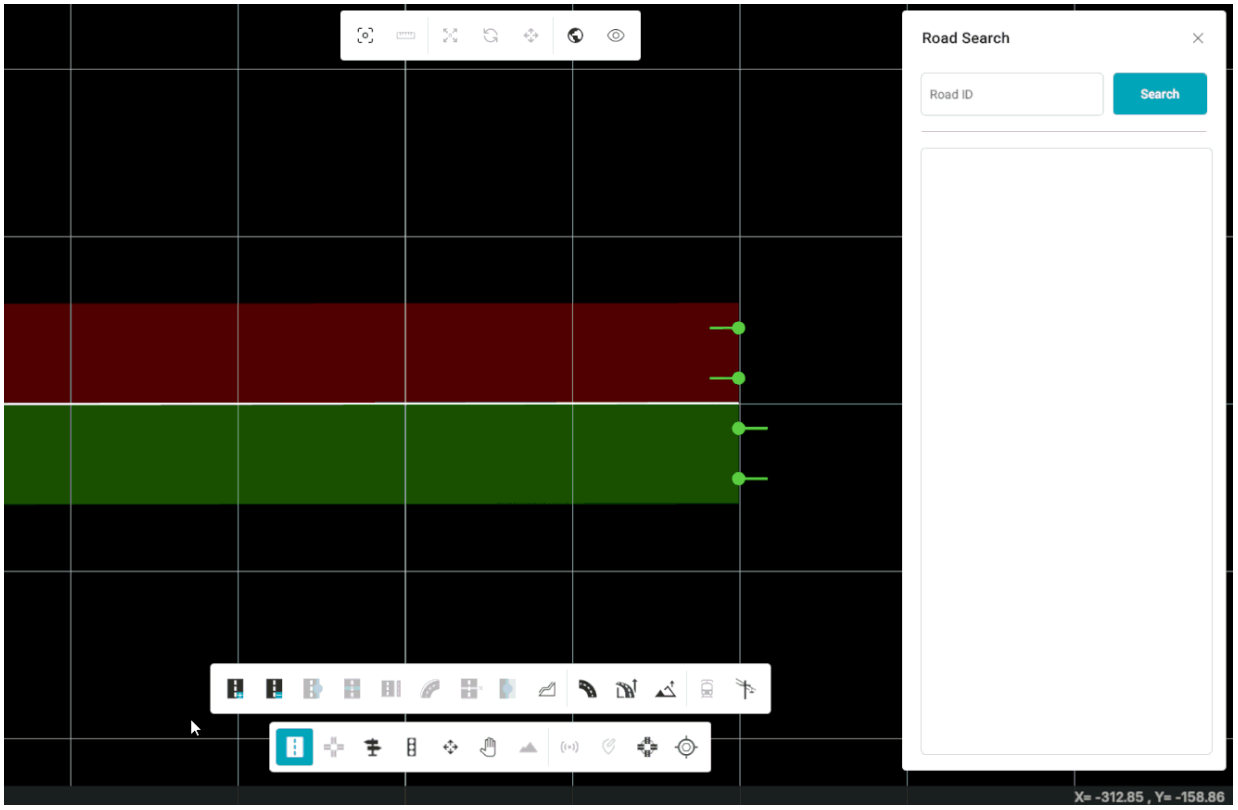
> **Note:** Editing and moving anchors in tilted (3D) view is not supported — lane editing remains available in 2D view only.




```
2. Toggle the "Lane Height" switch. When enabled, it will turn cyan.
```

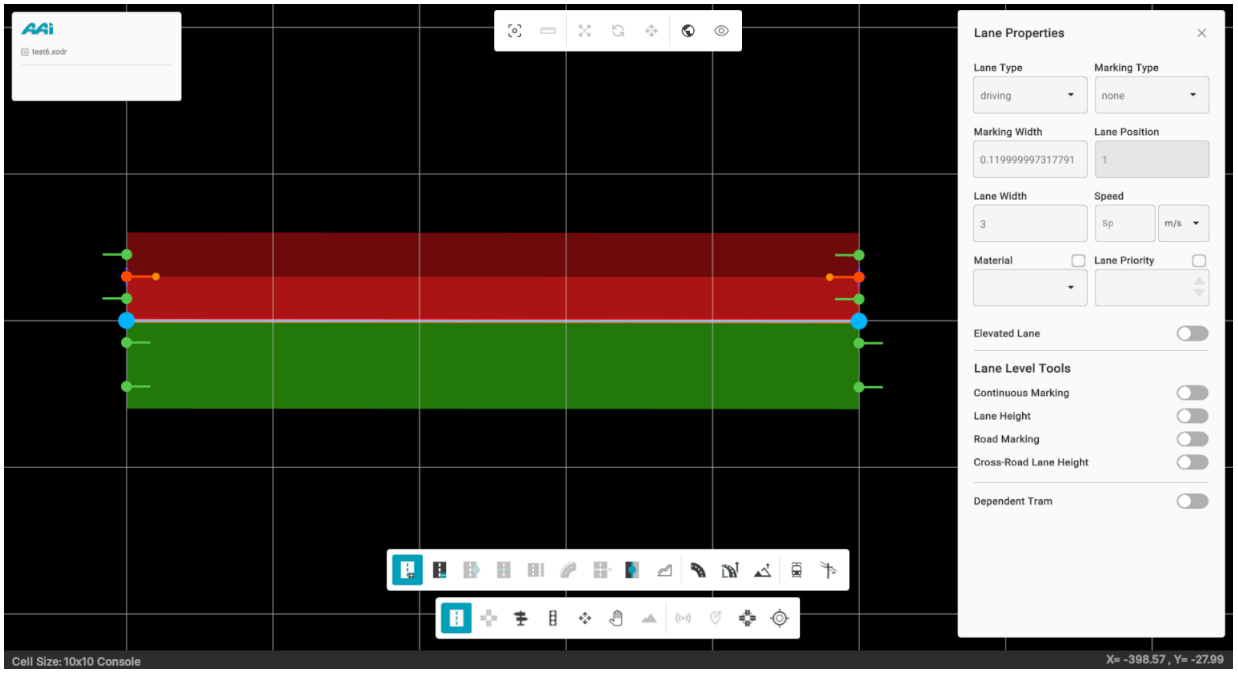



```
3. Once enabled and with a lane selected, hover over the desired area on the lane ar
```

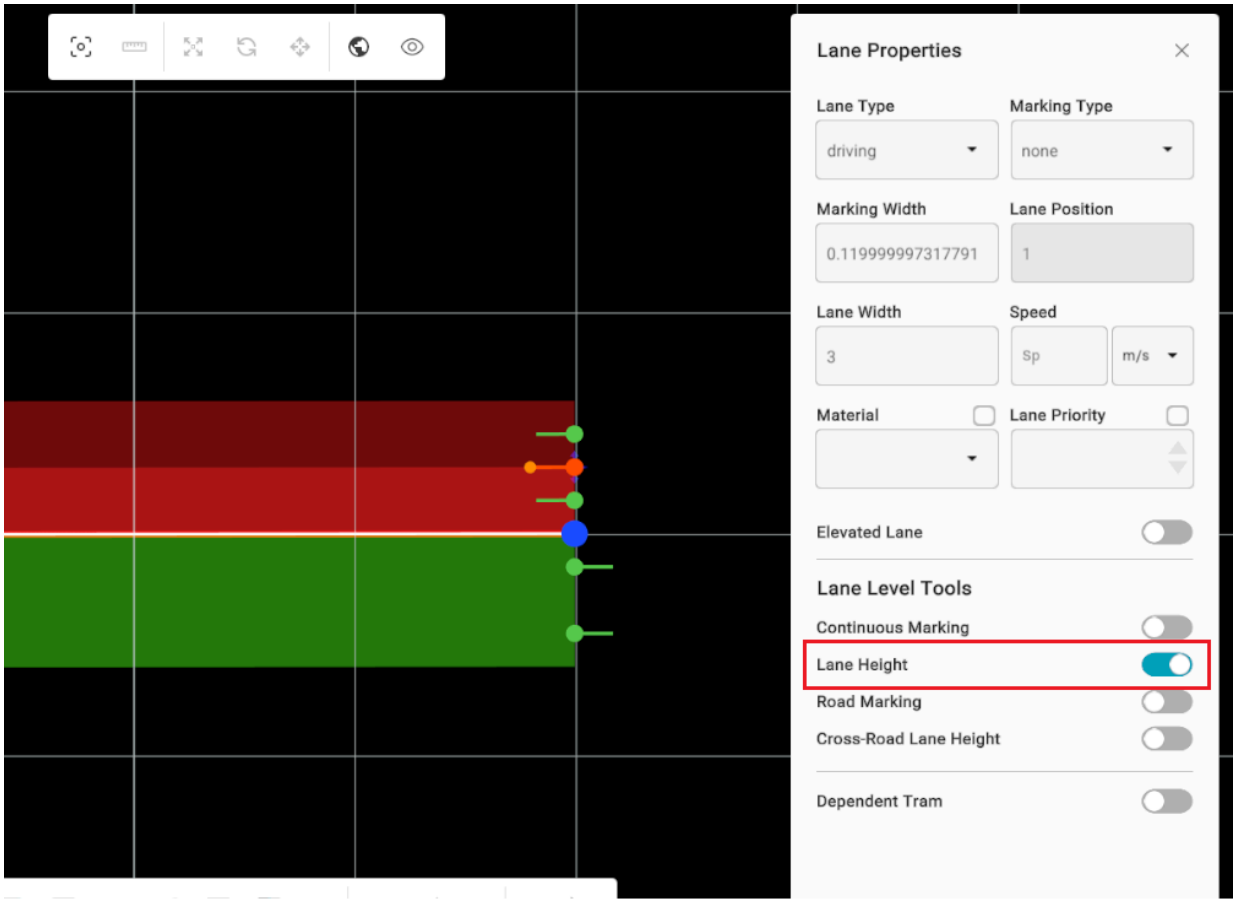


Approach #2: Through the hotkey

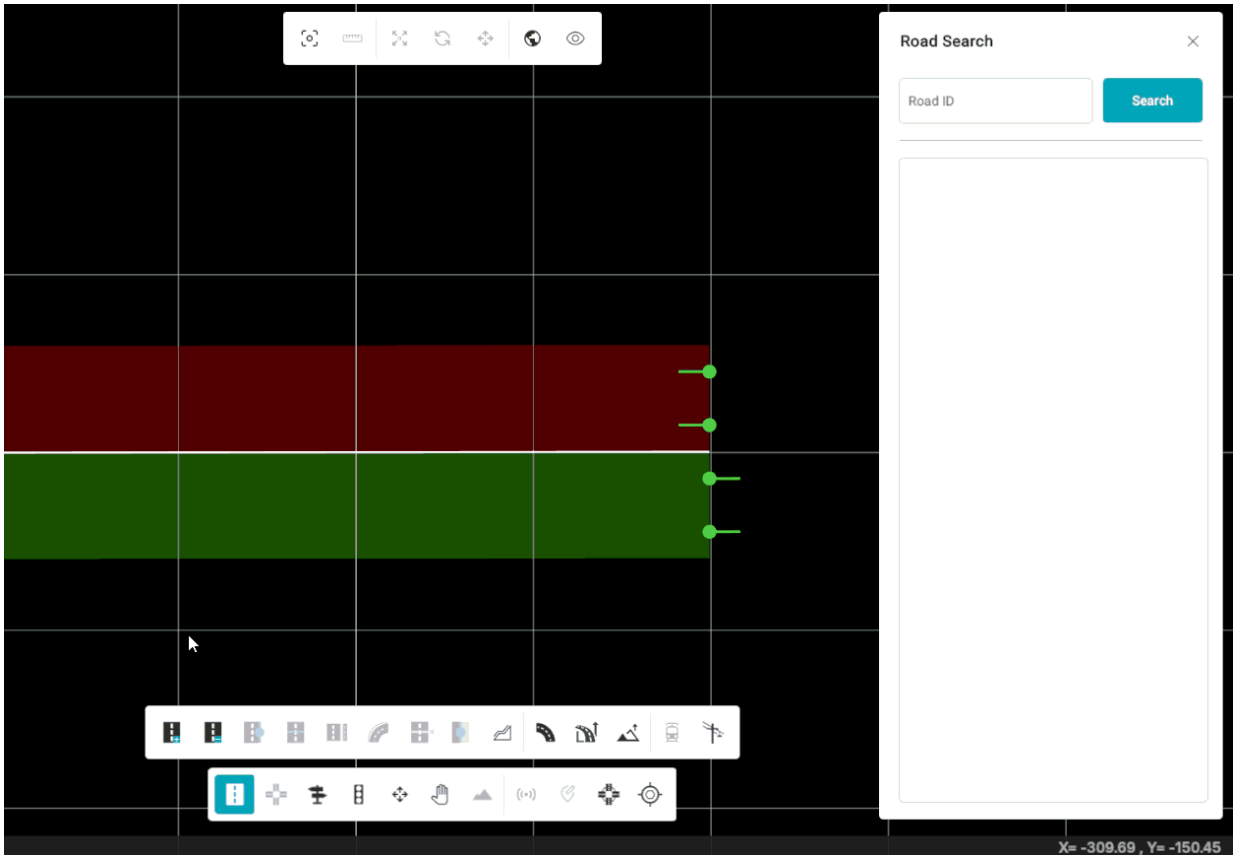
1. Triple-click the desired lane on the selected road using the primary (usually le



2. Toggle the "Lane Height" by pressing the "E" hotkey. When enabled, it will turn



3. Once enabled and with a lane selected, hover over the desired area on the lane ar

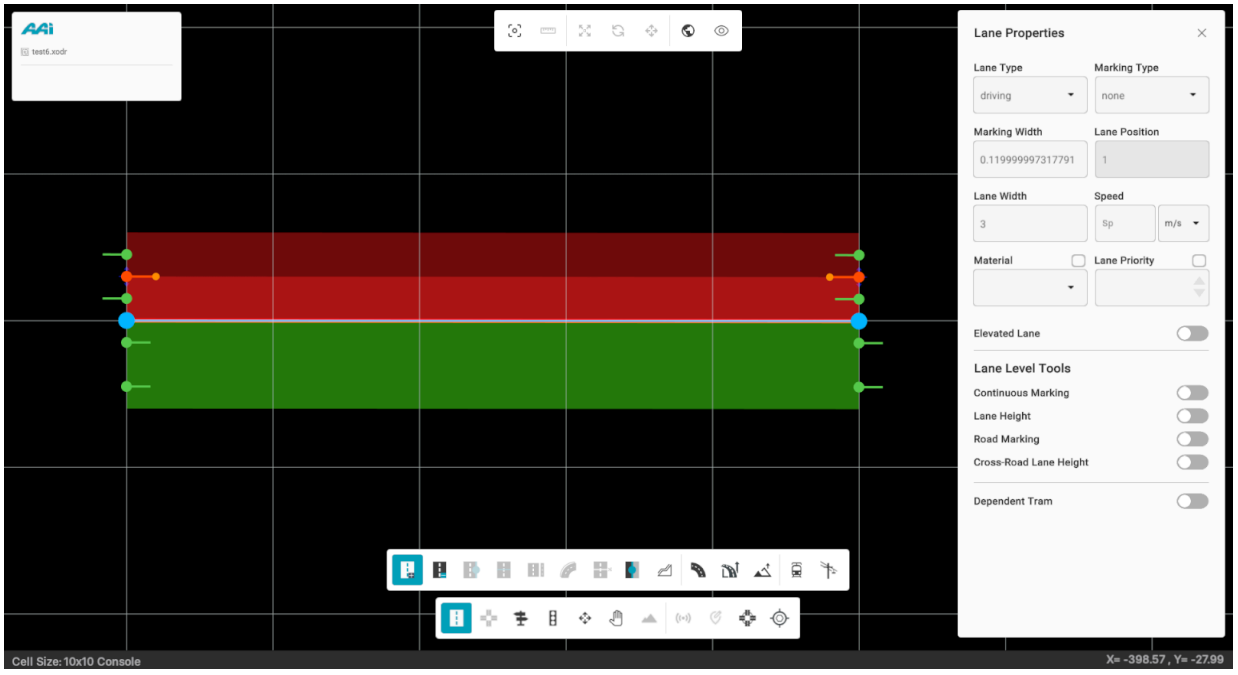


Road Marking

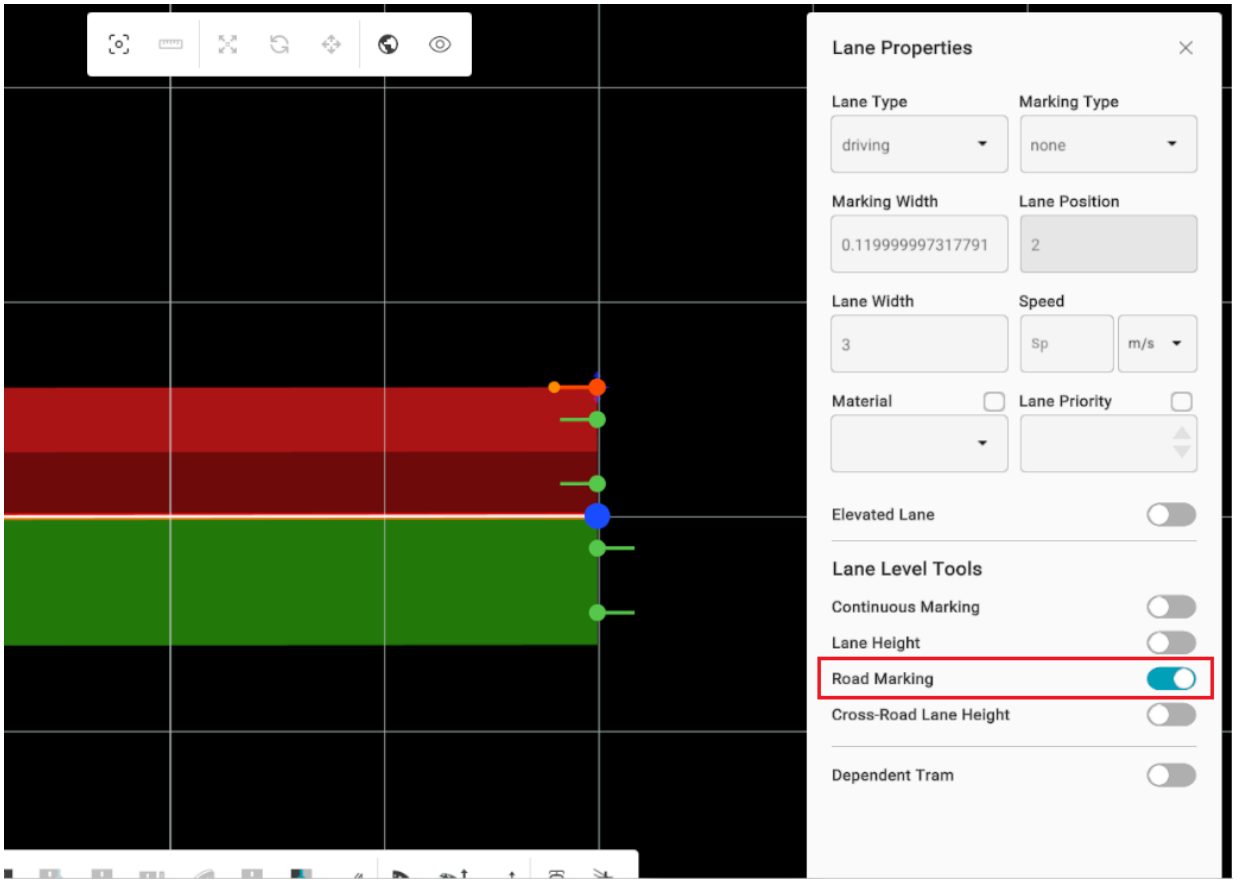
It allows the user to place anchors for lane-level styling. This feature enables the placement of road markings across a section.

Approach #1: Through the "Road Marking" toggle

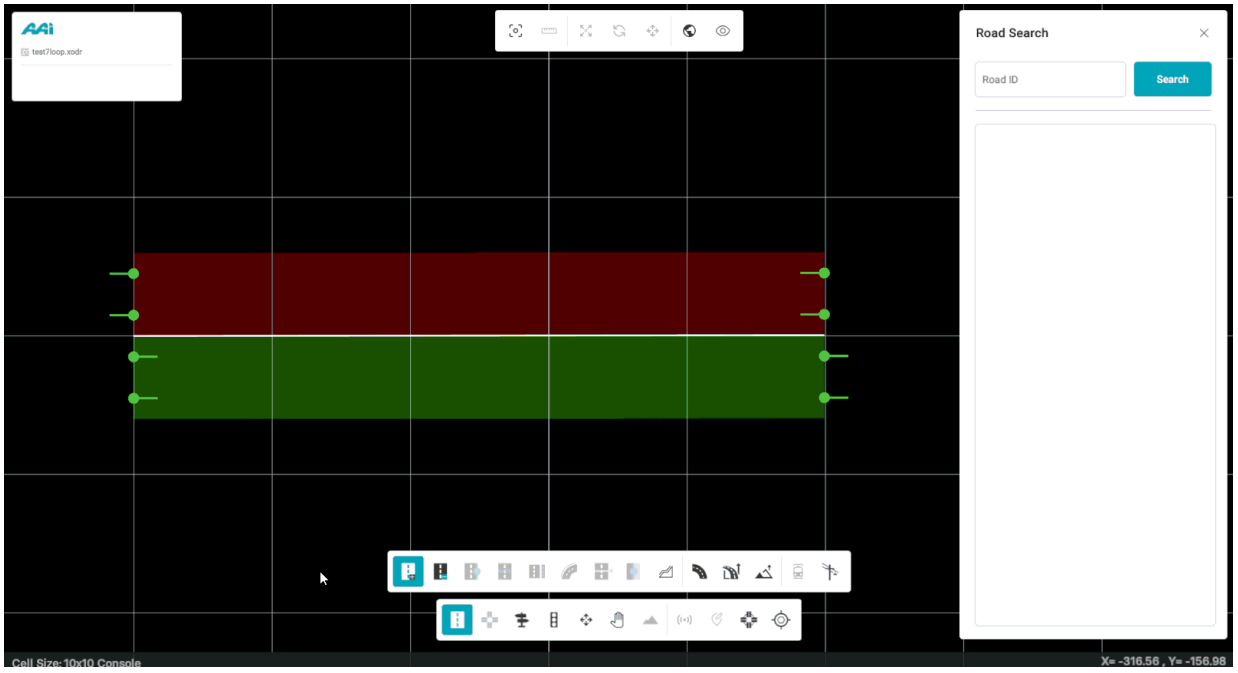
```
1. Triple-click the desired lane on the selected road using the primary (usually le
```



2. Toggle the "Road Marking" switch. When enabled, it will turn cyan.

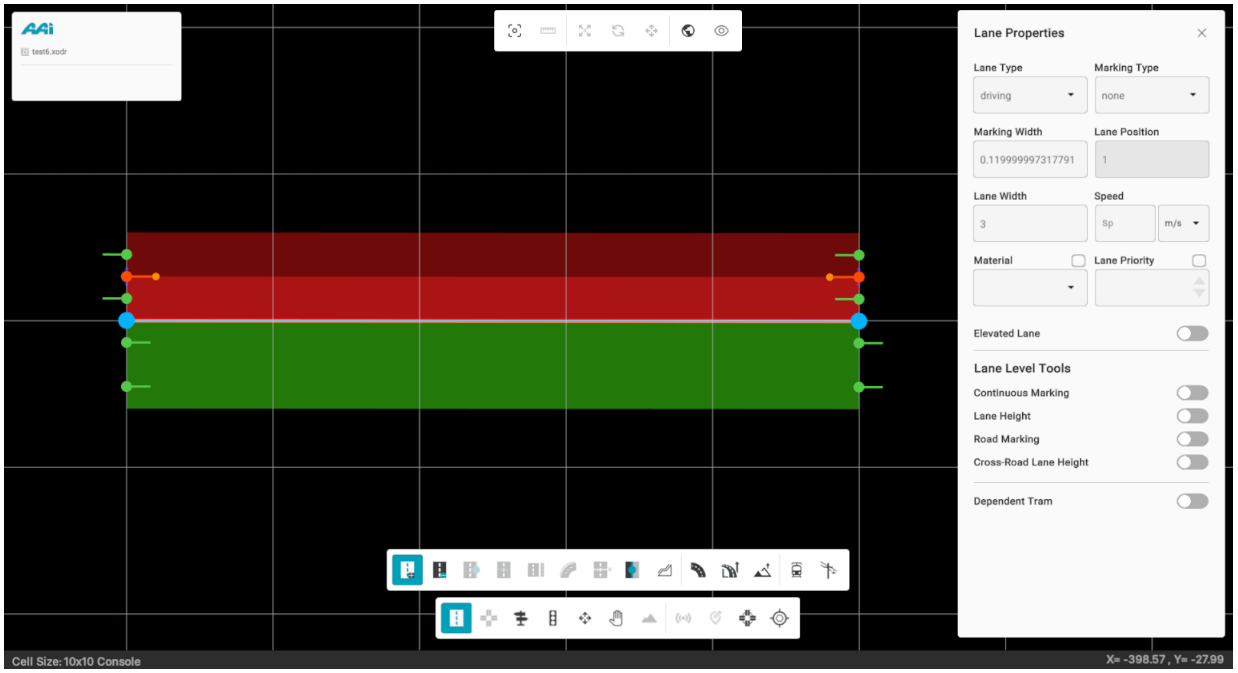


3. Once enabled and with a lane selected, hover over the desired area on the lane ar

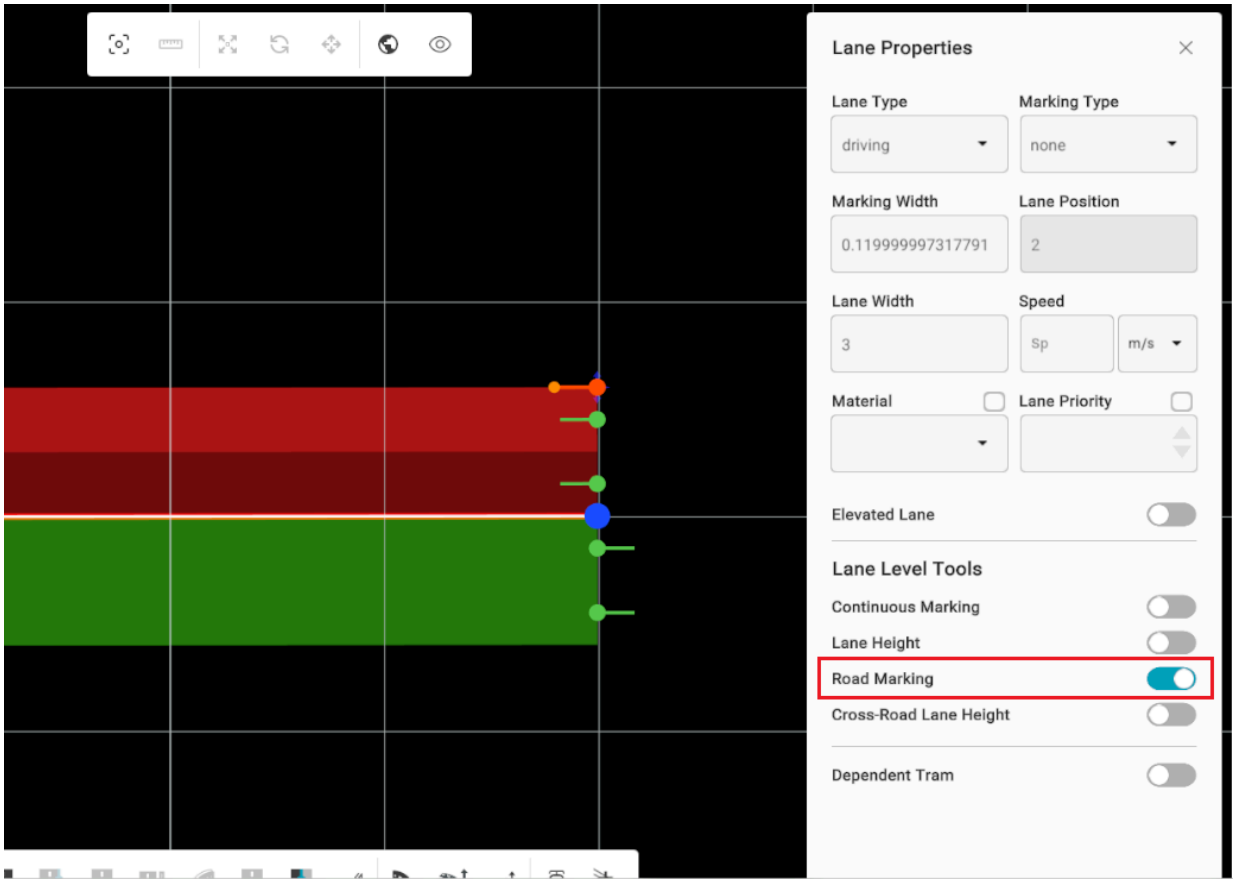


Approach #2: Through the hotkey

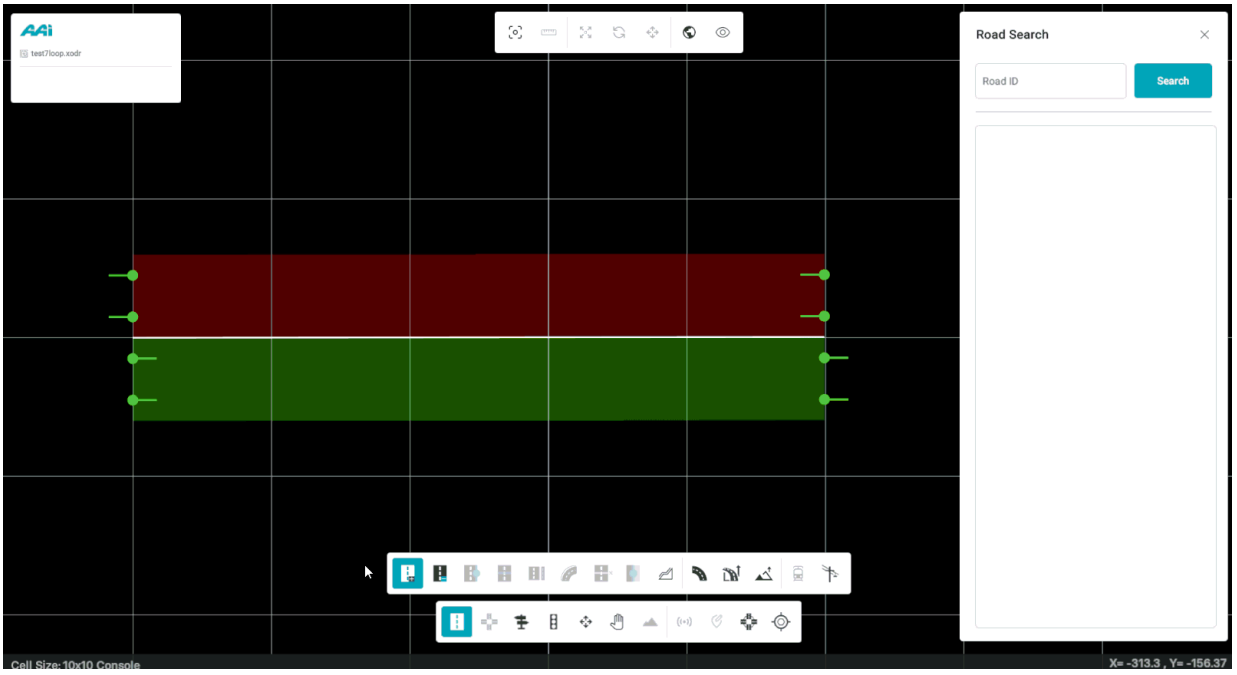
1. Triple-click the desired lane on the selected road using the primary (usually le



2. Toggle the "Continuous Marking" by pressing the "R" hotkey. When enabled, it wil



3. Once enabled and with a lane selected, hover over the desired area on the lane ar



Cross-Road Lane Height

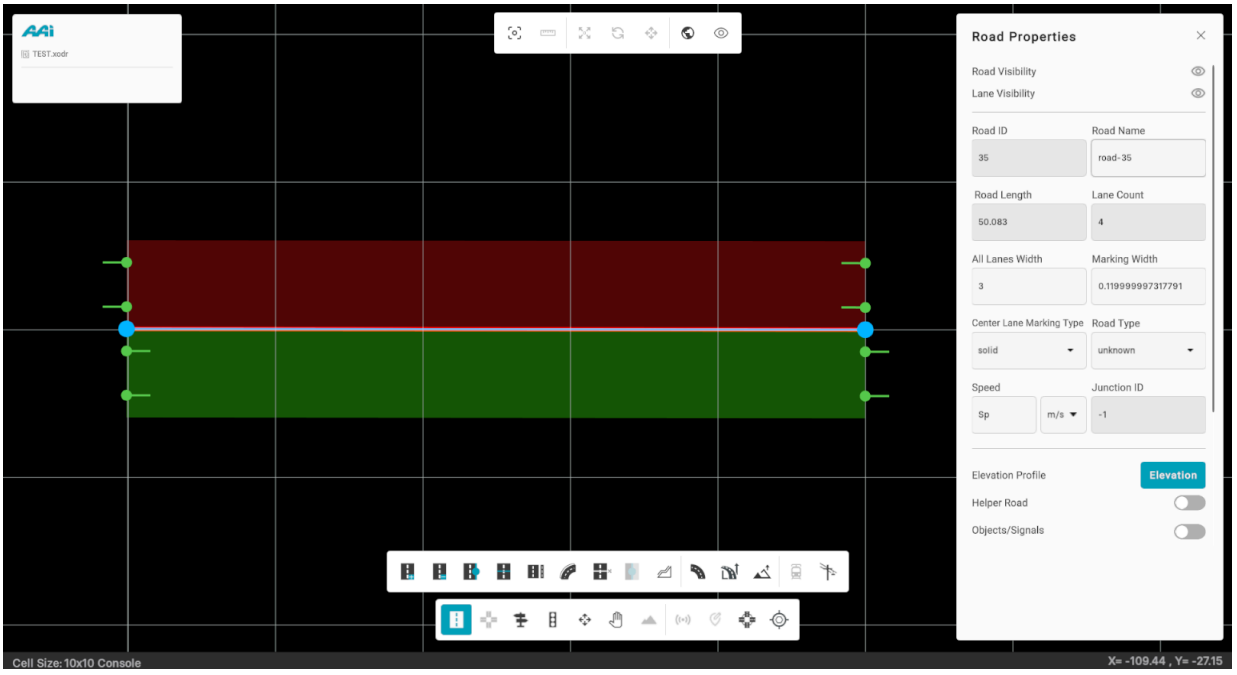
Information is currently unavailable in the latest RepliMap version.

Lane Marking

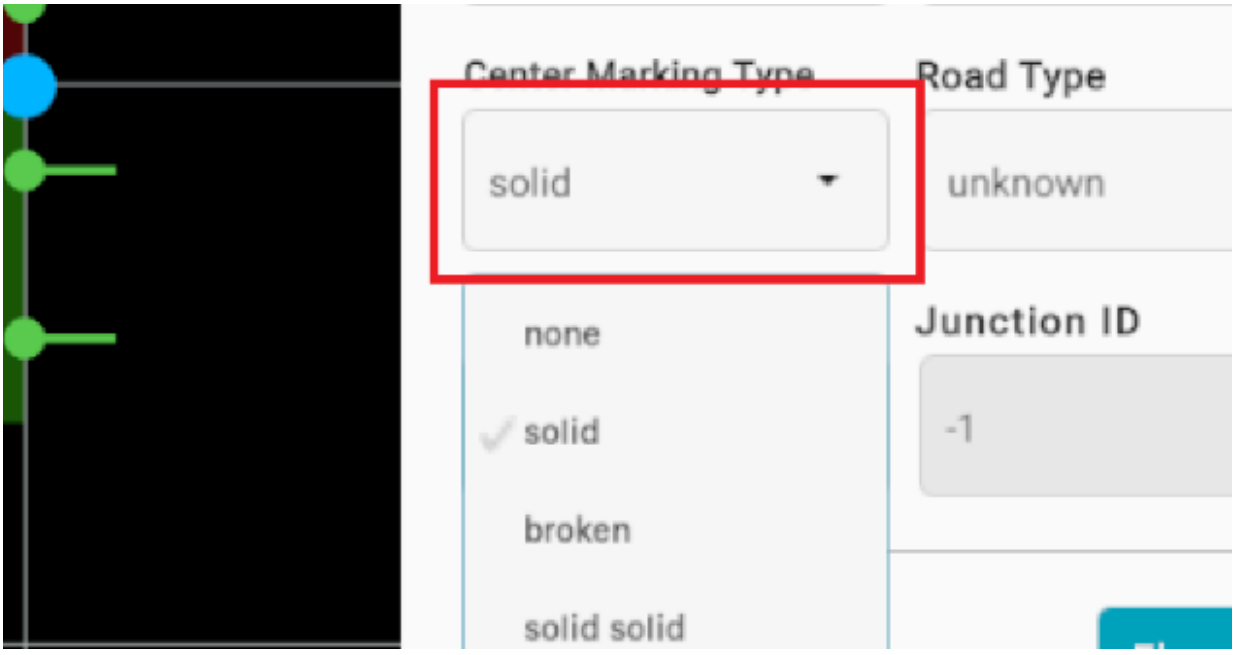
Allows the user to change the designated lane markings based on their preferences. By default, a solid line appears along the center of the road, but this can be modified, along with individual lane markings, at the lane level.

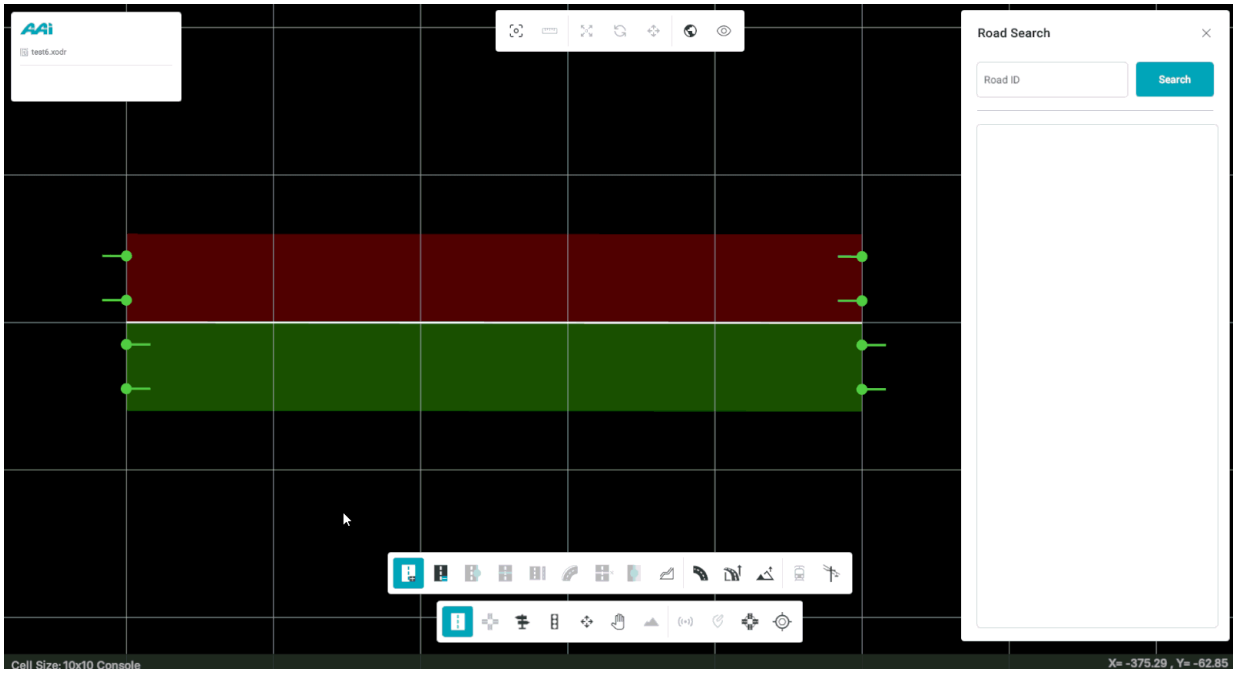
Changing the reference line marking

```
1. Click the desired road with the primary (usually left) mouse button to open its p
```



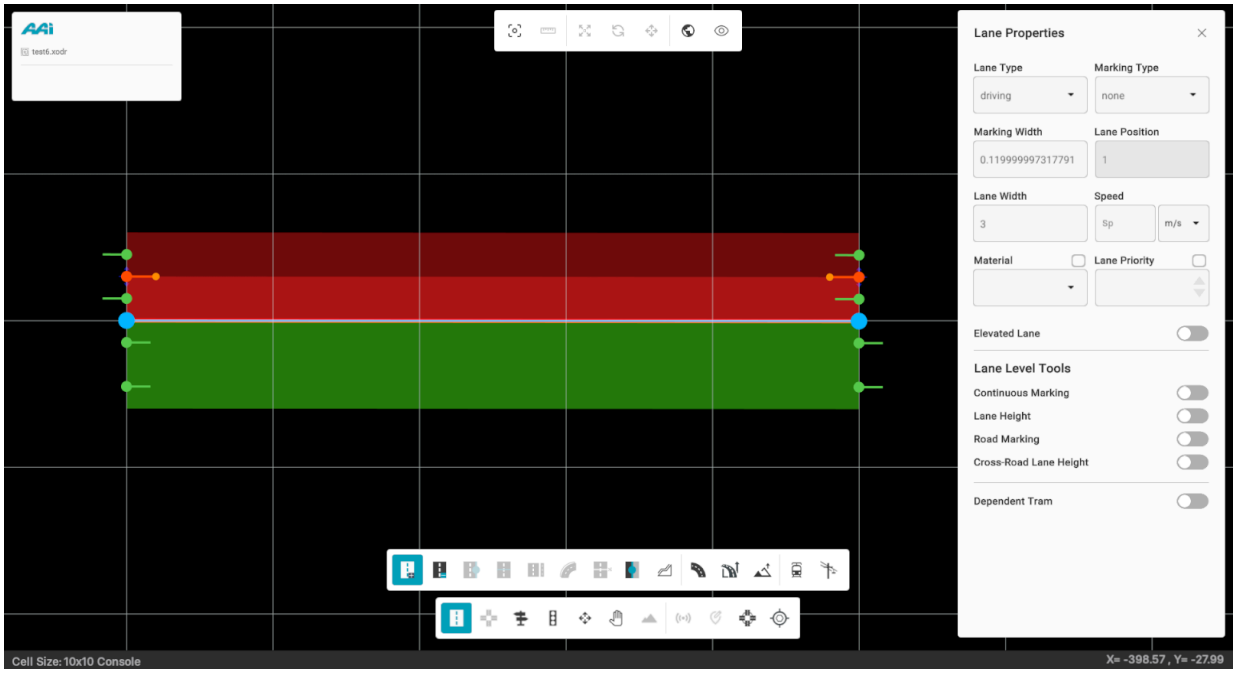
2. Open the "Center Line Marking Type" dropdown and select the desired marking type



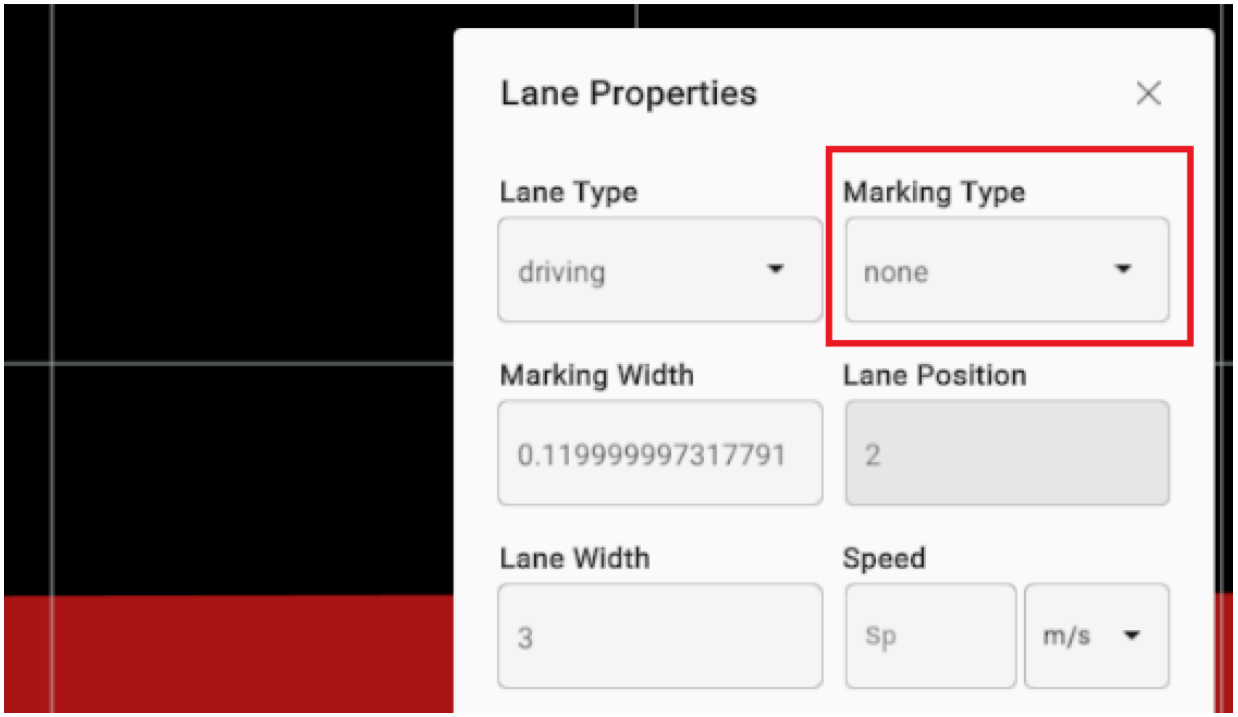


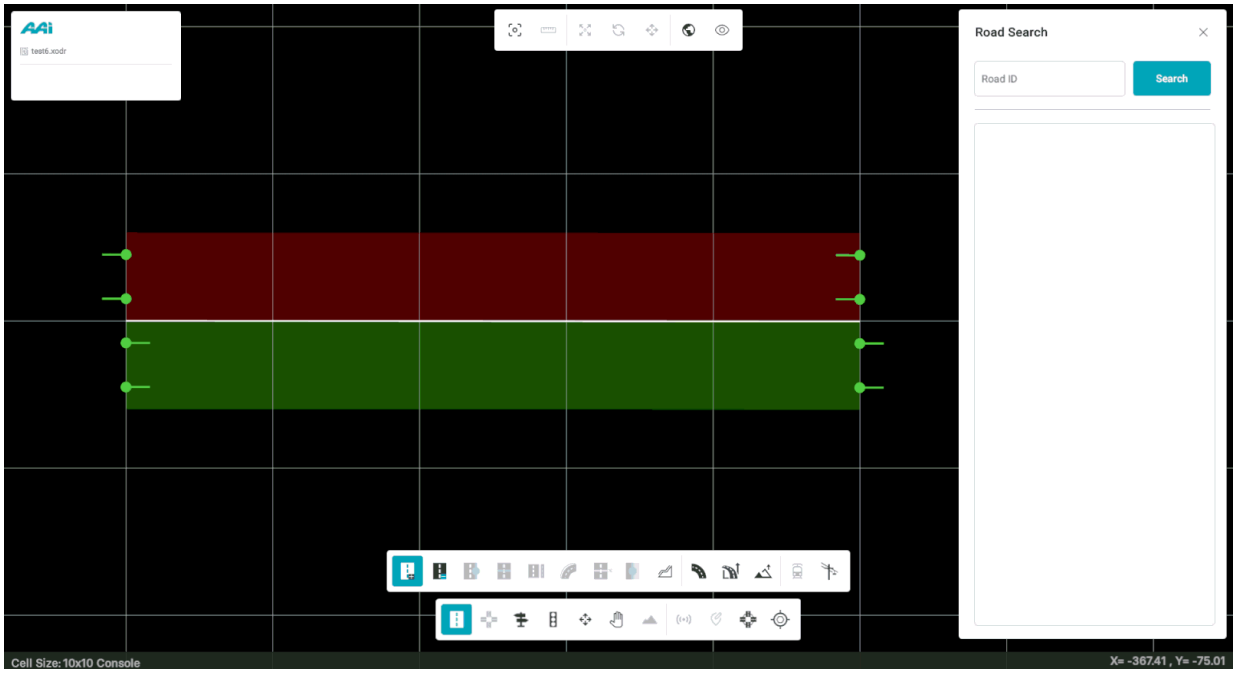
Changing specific lane marking

1. Triple-click the desired lane on the selected road using the primary (usually le



2. Open the "Marking Type" dropdown and select the desired marking type.



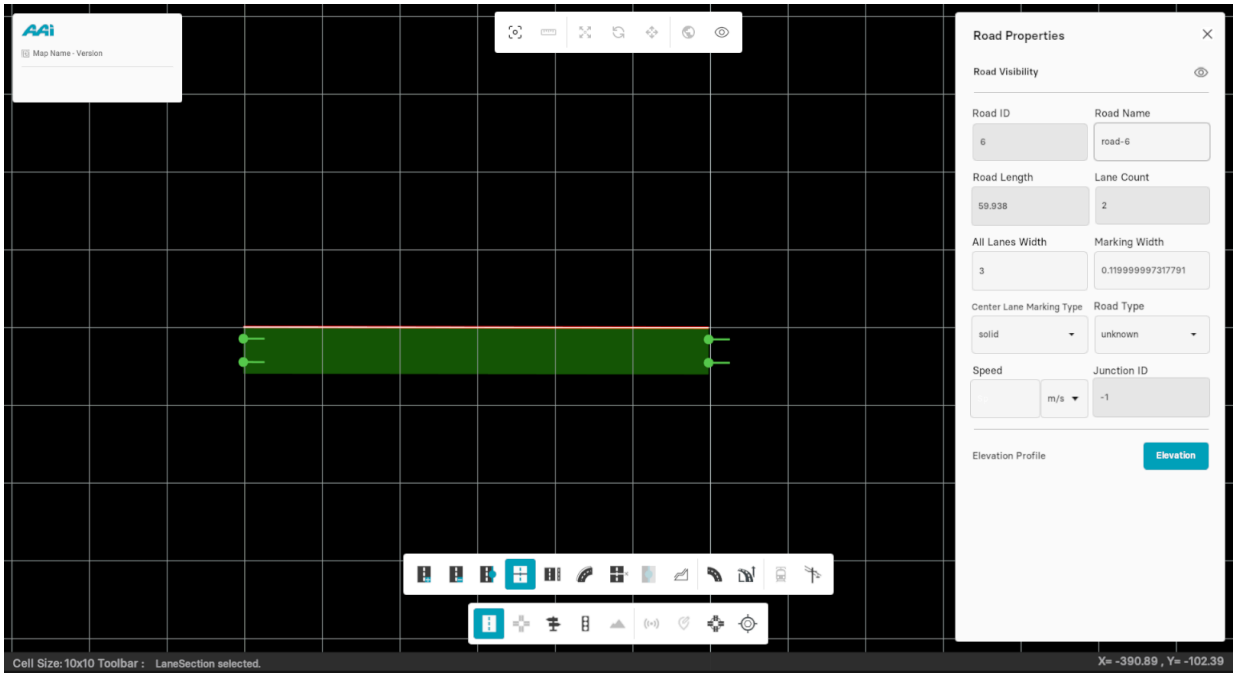


Lane Section

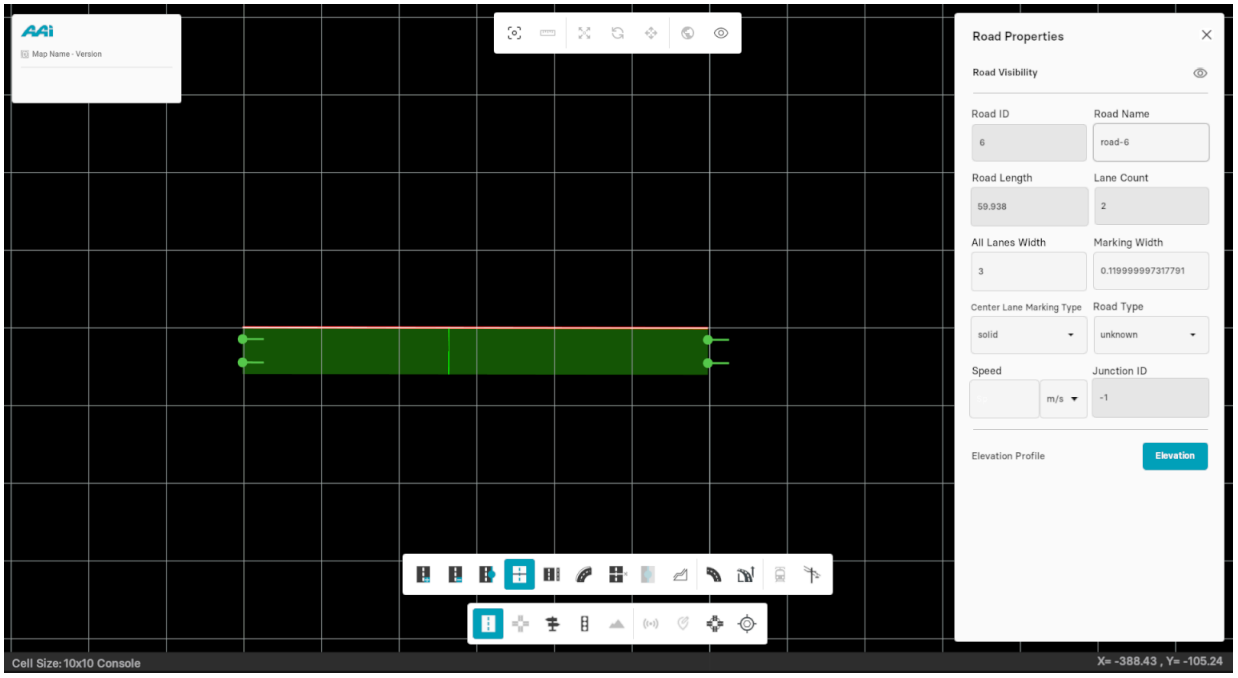
This sub-tool inside of the **Road Edit** tool allows the user to divide the existing road into two or more sections. It also enables adding and deleting lane sections within the same interface.

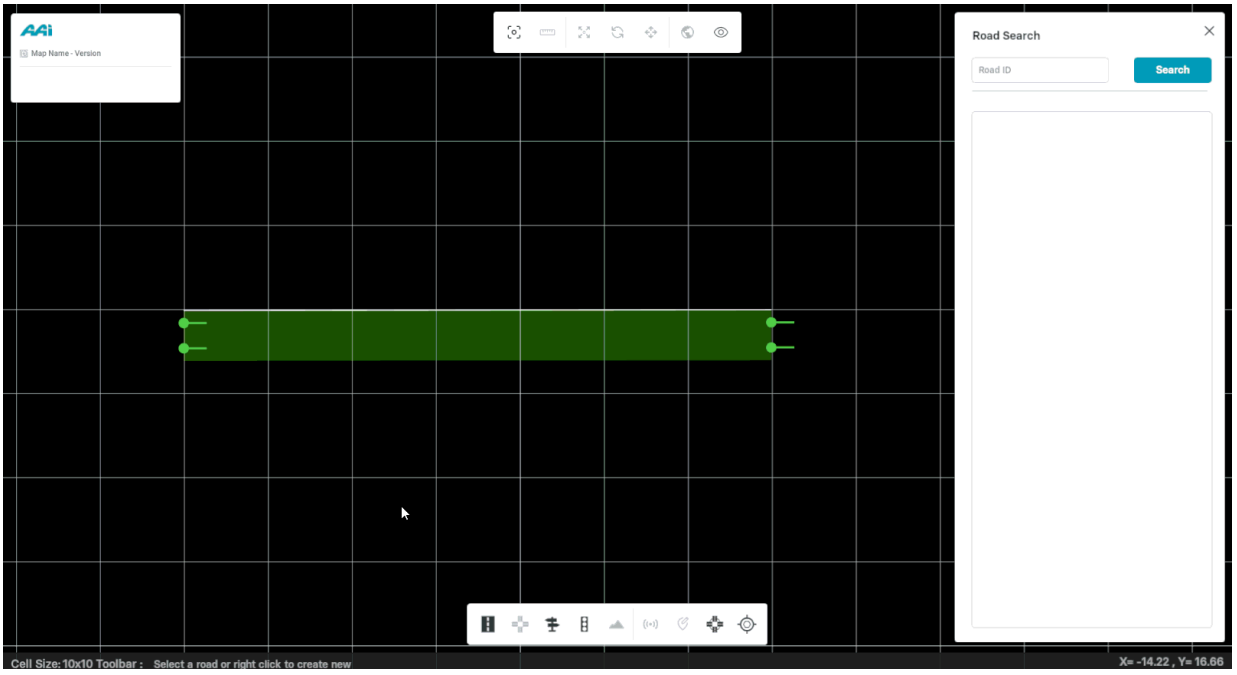
Adding a Lane Section

```
1. Select the "Road Edit" tool and click on "Lane Section" sub-tool.
```



2. Now, move your cursor towards the selected road and click at desired position on

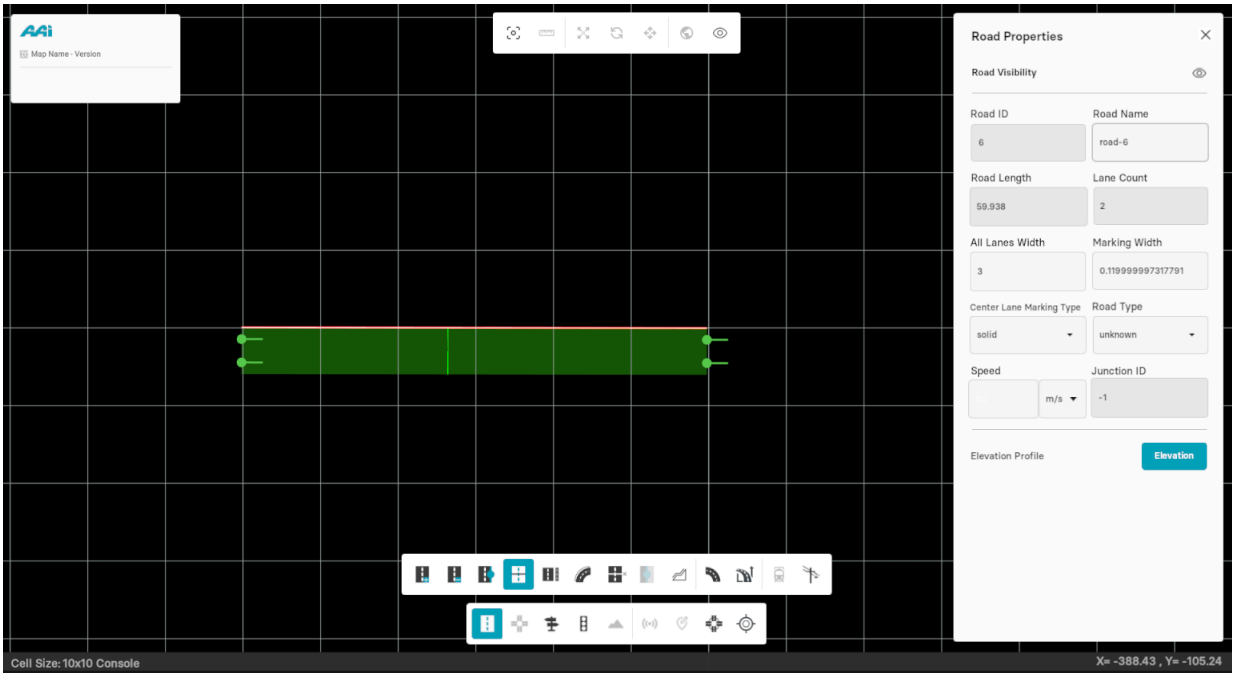


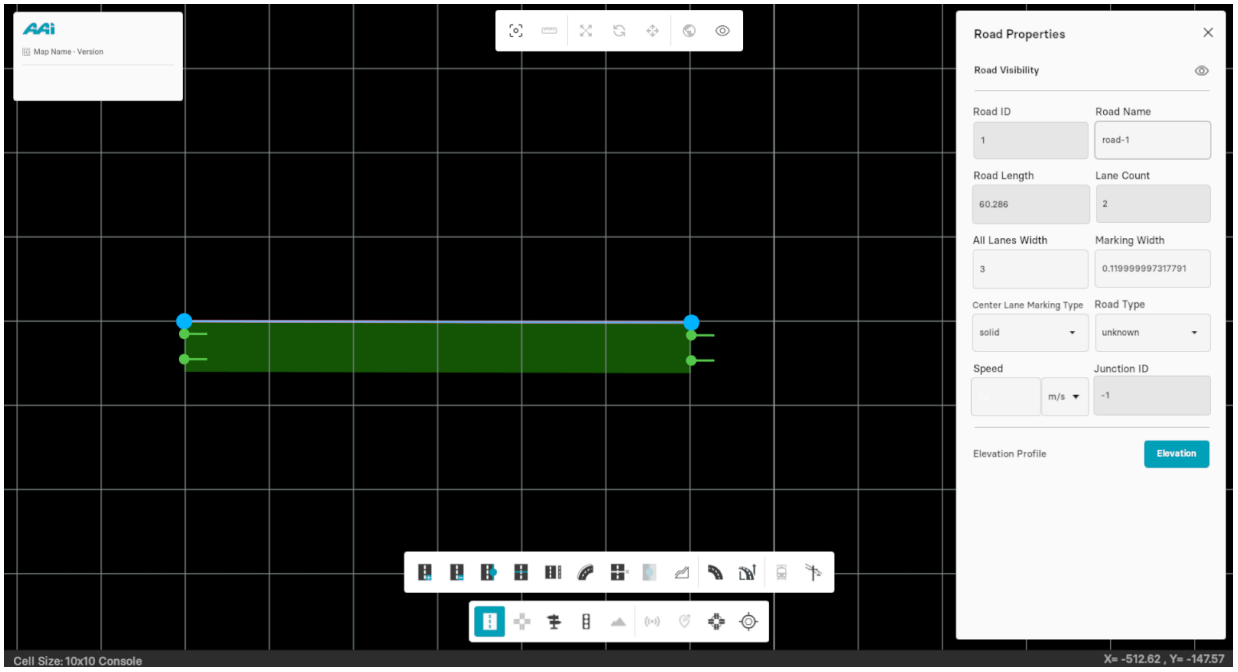


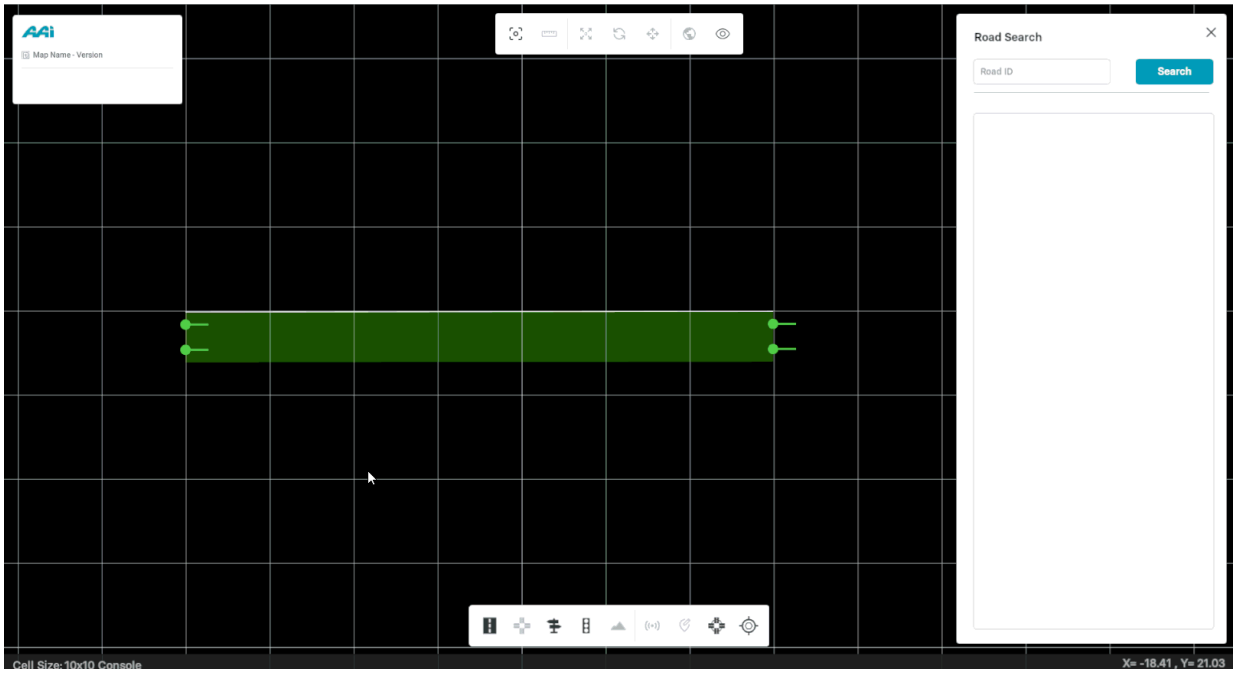
Delete Lane Section

Choose **Delete lane Section** to delete any existing section from any lane of the road.

```
1. Use your secondary-mouse button (usually right) on a lane section within the roa
```





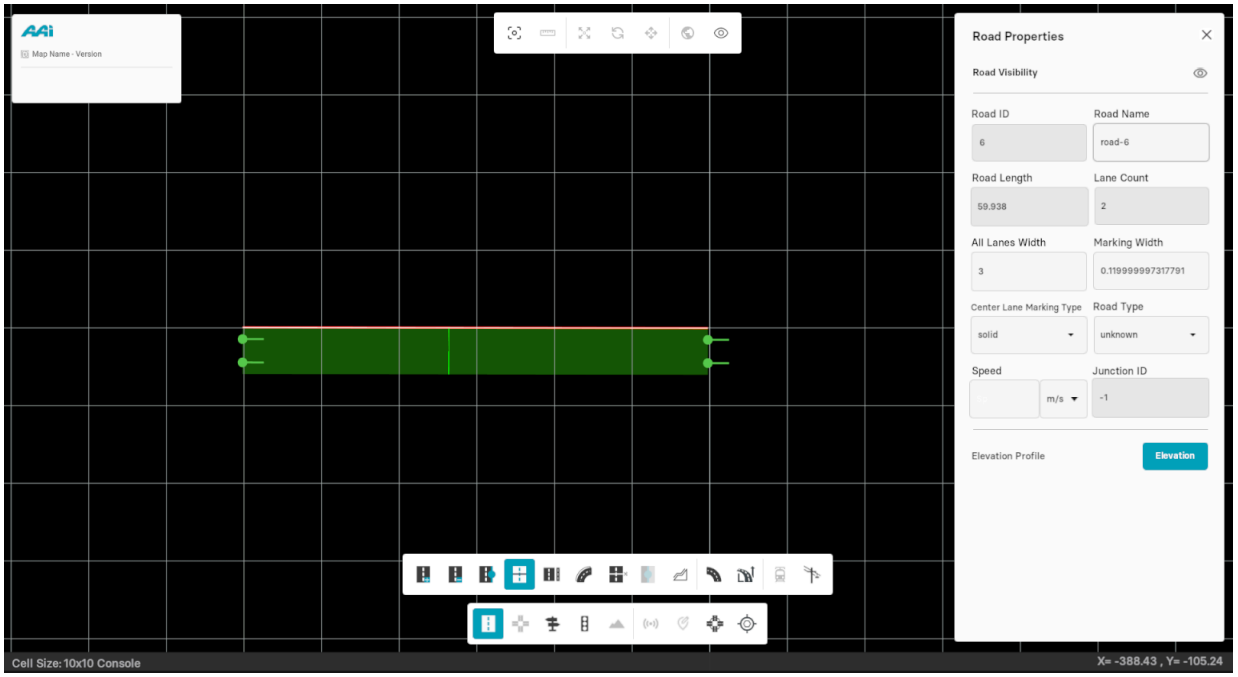


Note that if no lane section is clicked and only the road is clicked, lane sections will be removed in a First-In, First-Out (FIFO) order.

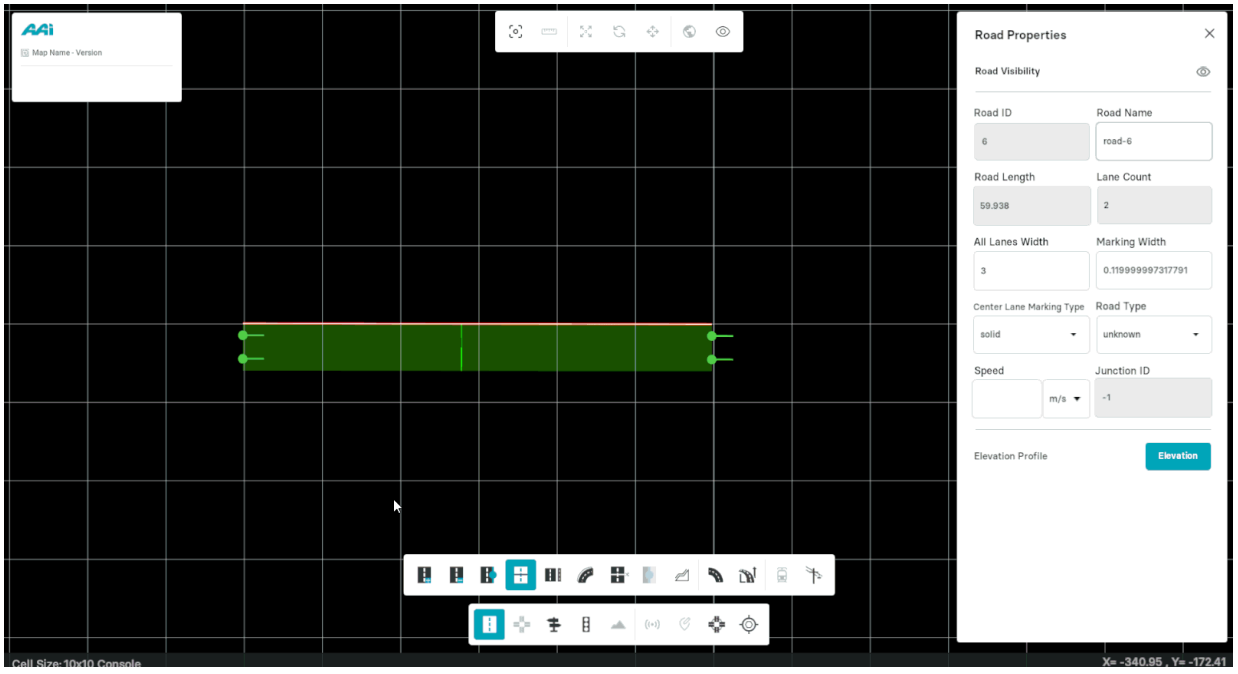
Move Lane Section

This tool helps to adjust the position of formerly added section to the lane.

```
1. Select the "Road Edit" tool and click on "Lane Section" sub-tool.
```




```
2. Hold primary-mouse button (usually left) + "left ctrl" on top of the section line
```

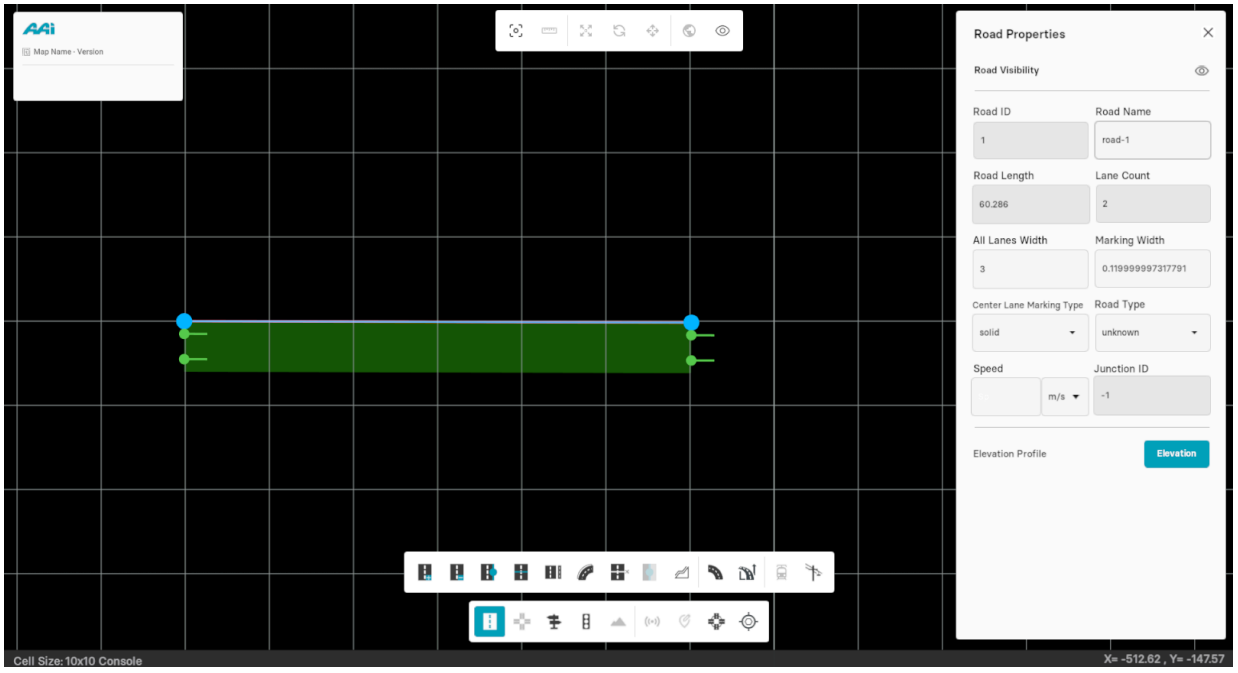


Lane Offset

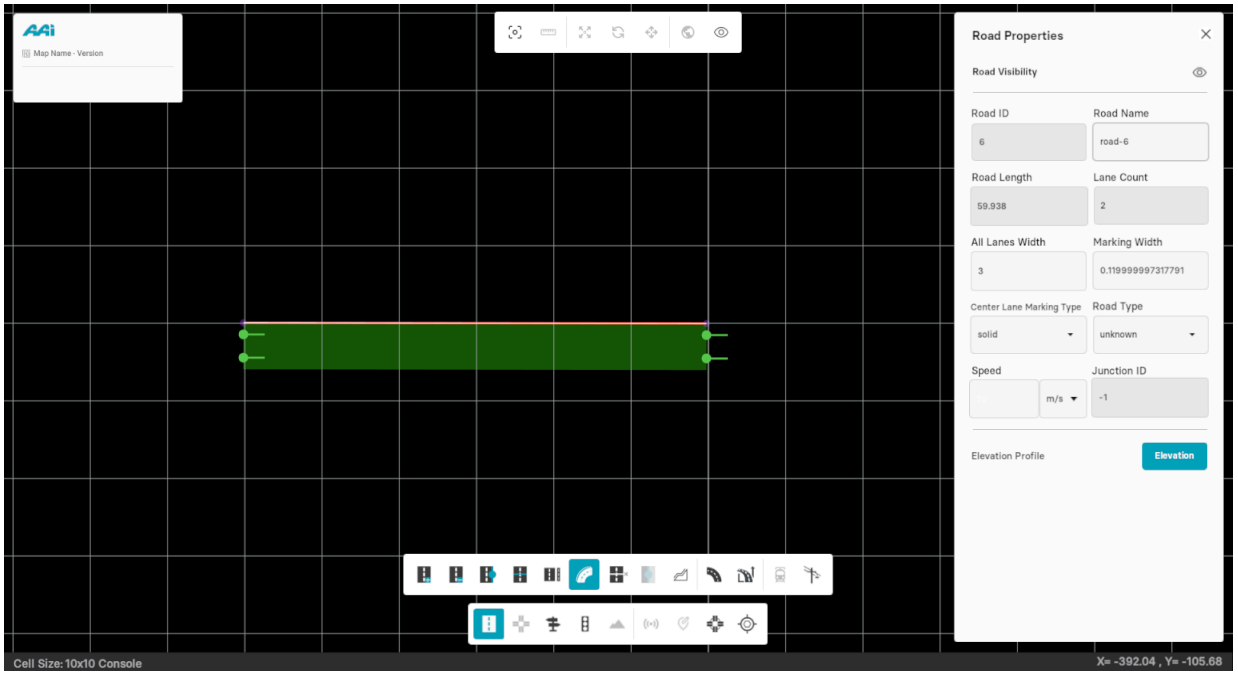
This sub-tool (inside of the "Road Edit" tool) allows the user to shift the lane profile instead of shifting the reference line. The lane offset defines a lateral shift of the lane reference line (which is usually identical to the road reference line).

Add Lane Offset

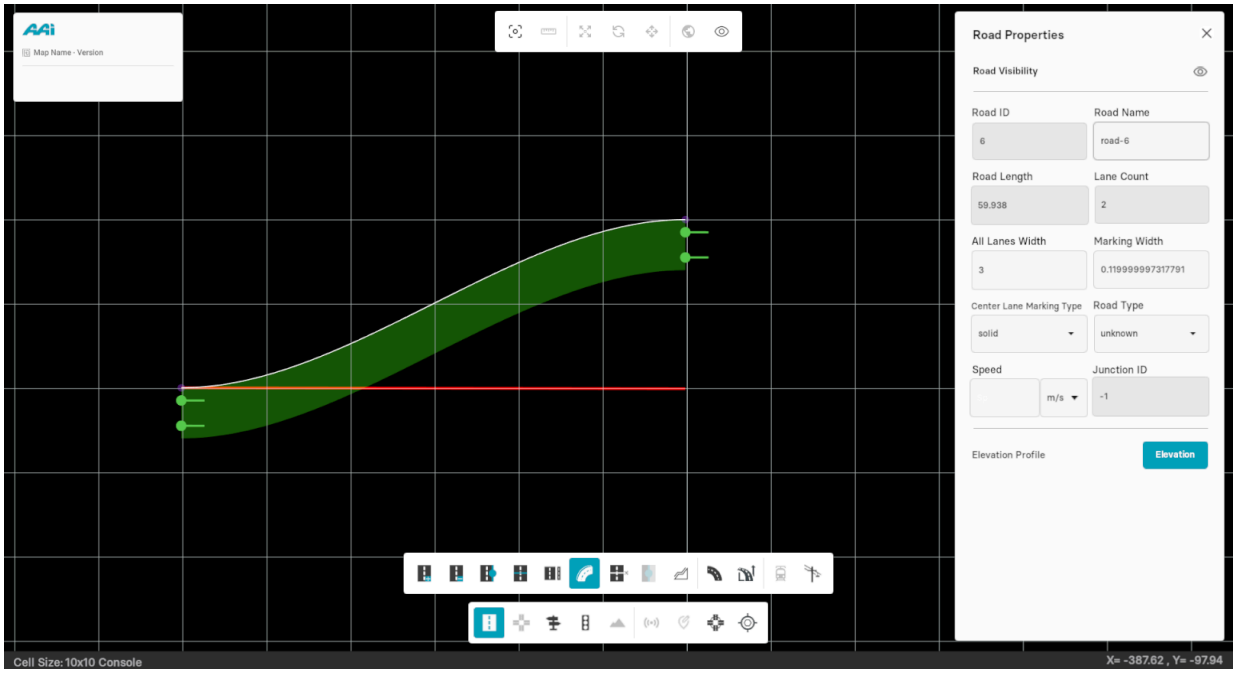
1. Select the road by selecting the "Road Edit" tool from the editor bar.

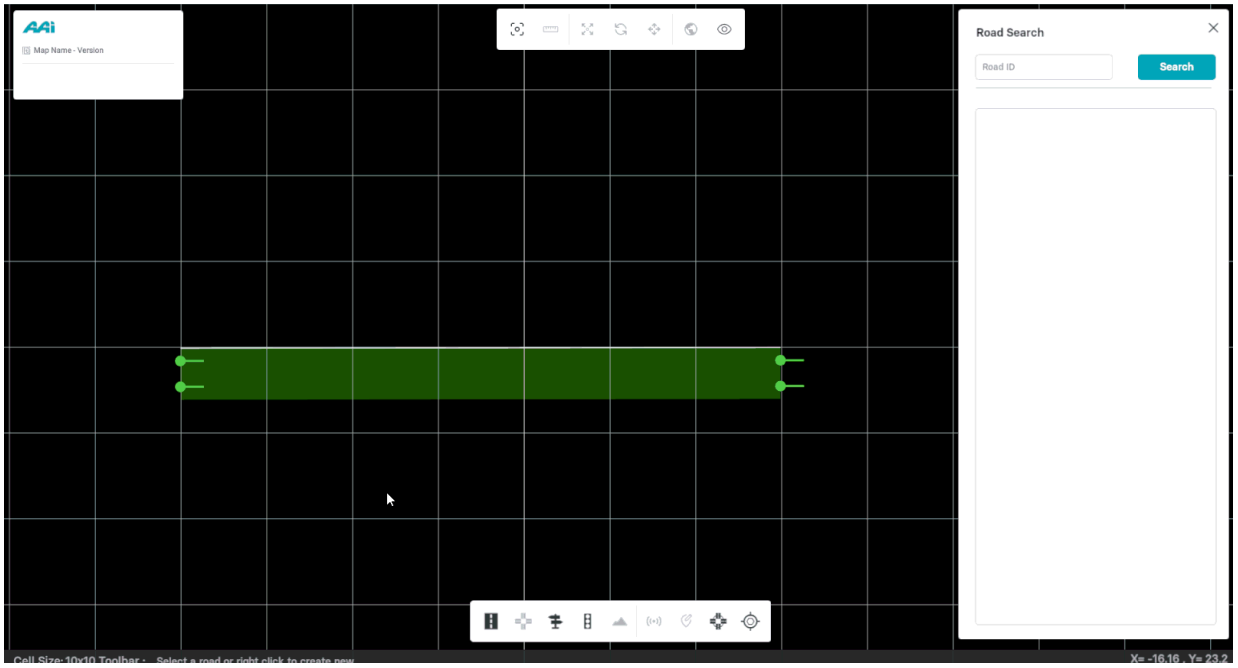


2. Go to the "Road Edit" tool and choose the "Lane Offset" sub-tool.



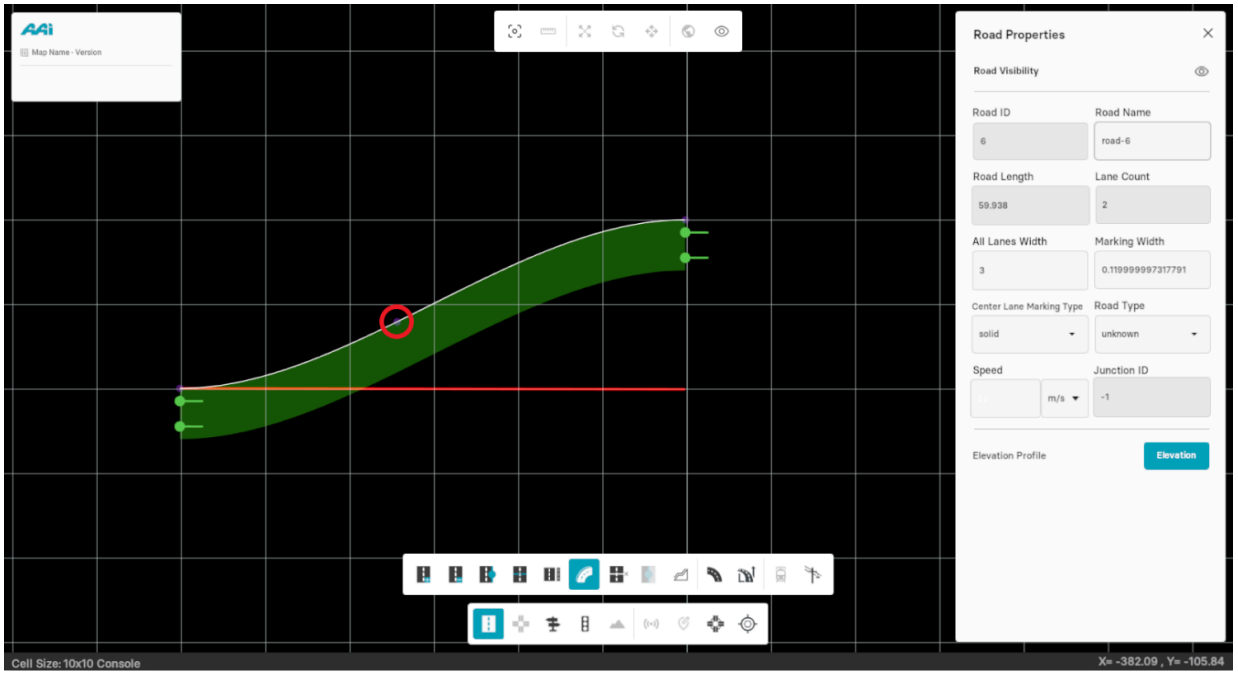
3. Hold and drag the existing anchor inside of the road with the primary-mouse butt





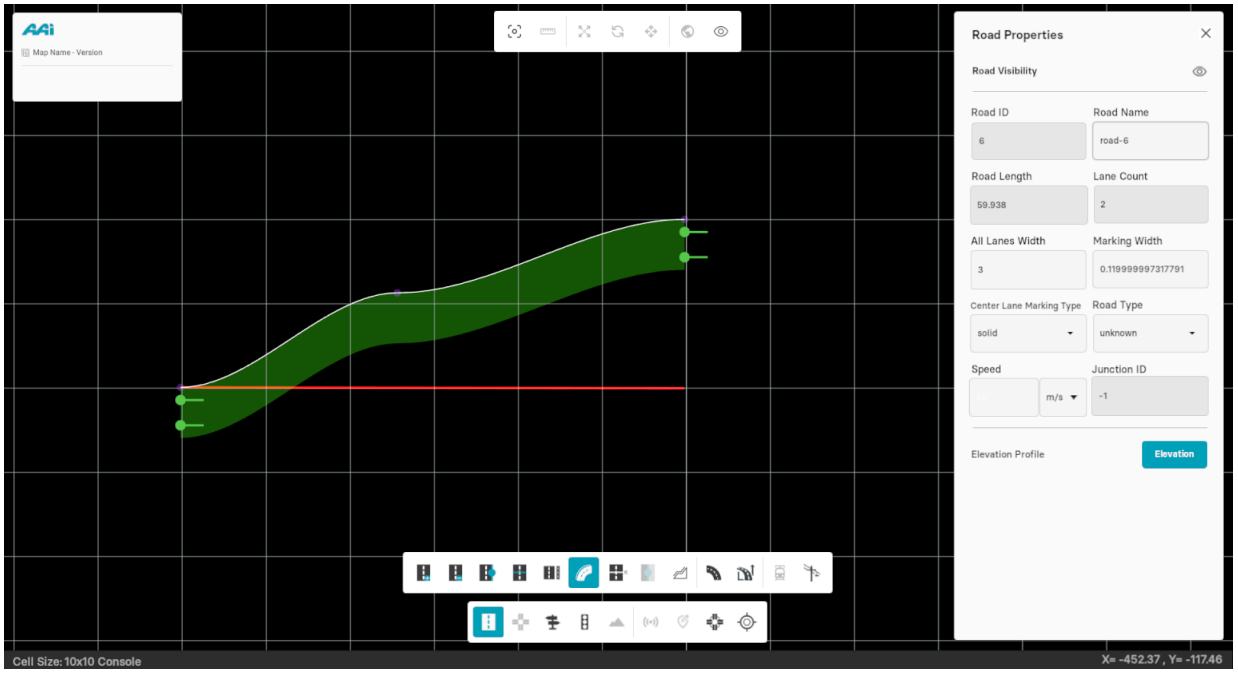
Add Lane Offset Anchors

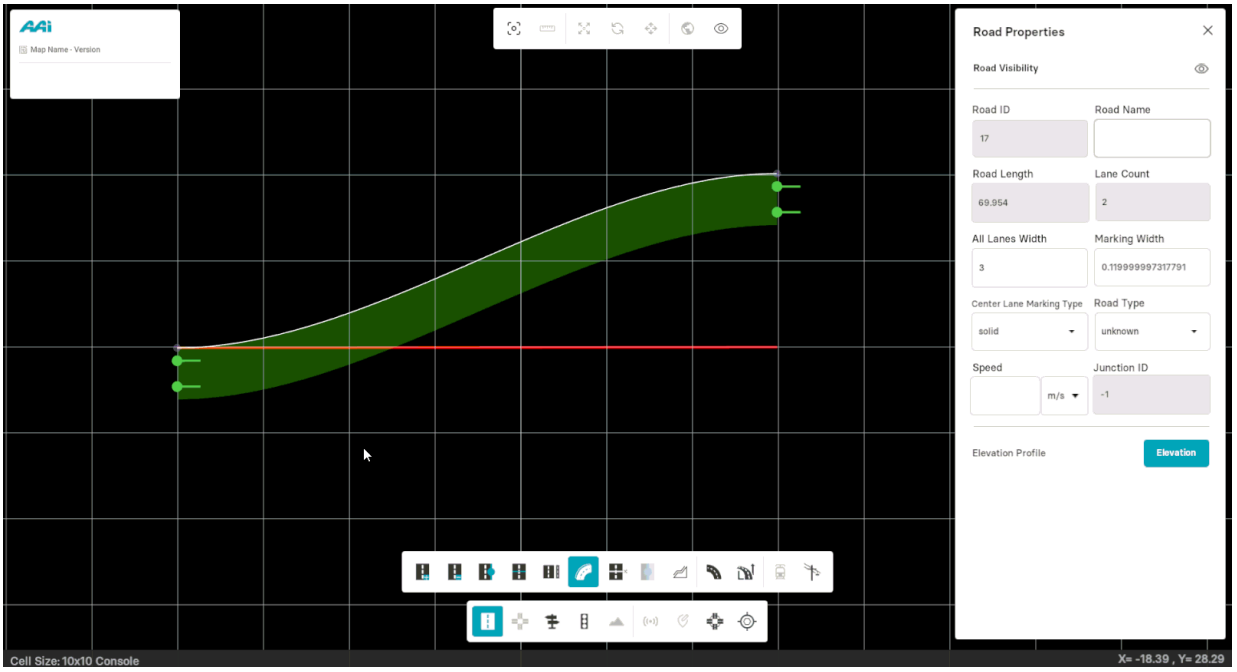
```
Hold "left ctrl" and click with the primary-mouse button (usually left) on desired t
```



Move Lane Offset Anchors

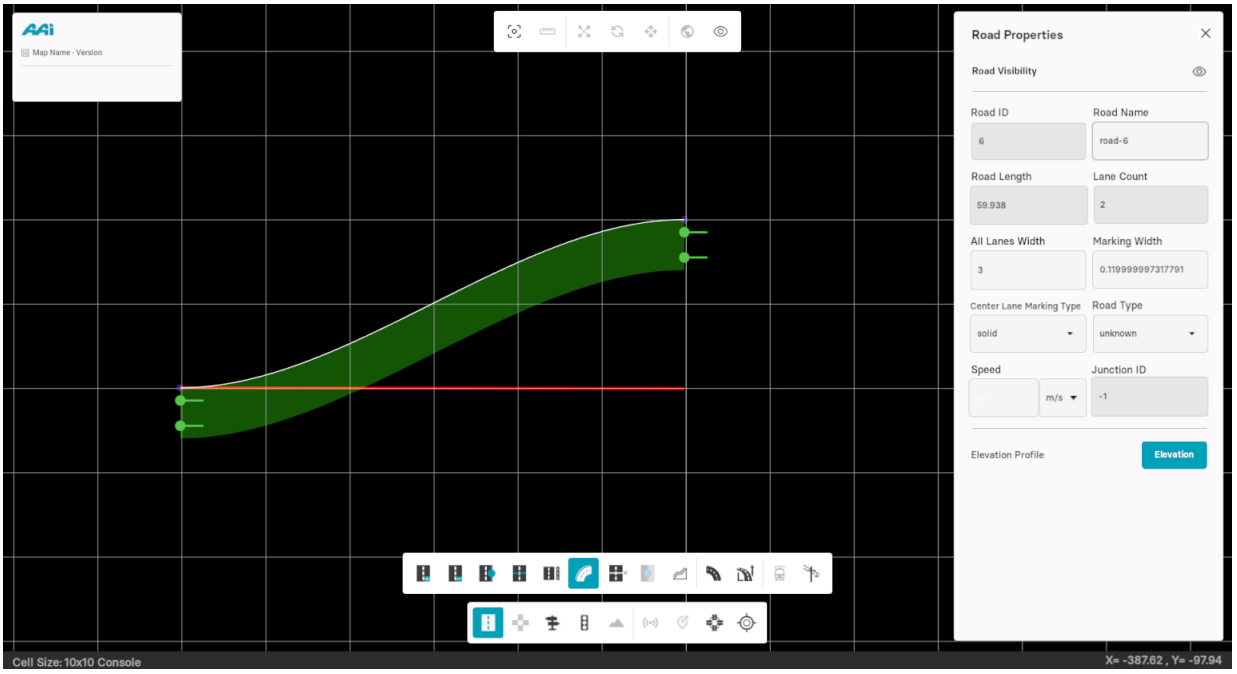
```
Hold primary-mouse button (usually left) on top of the lane offset anchors and drag
```

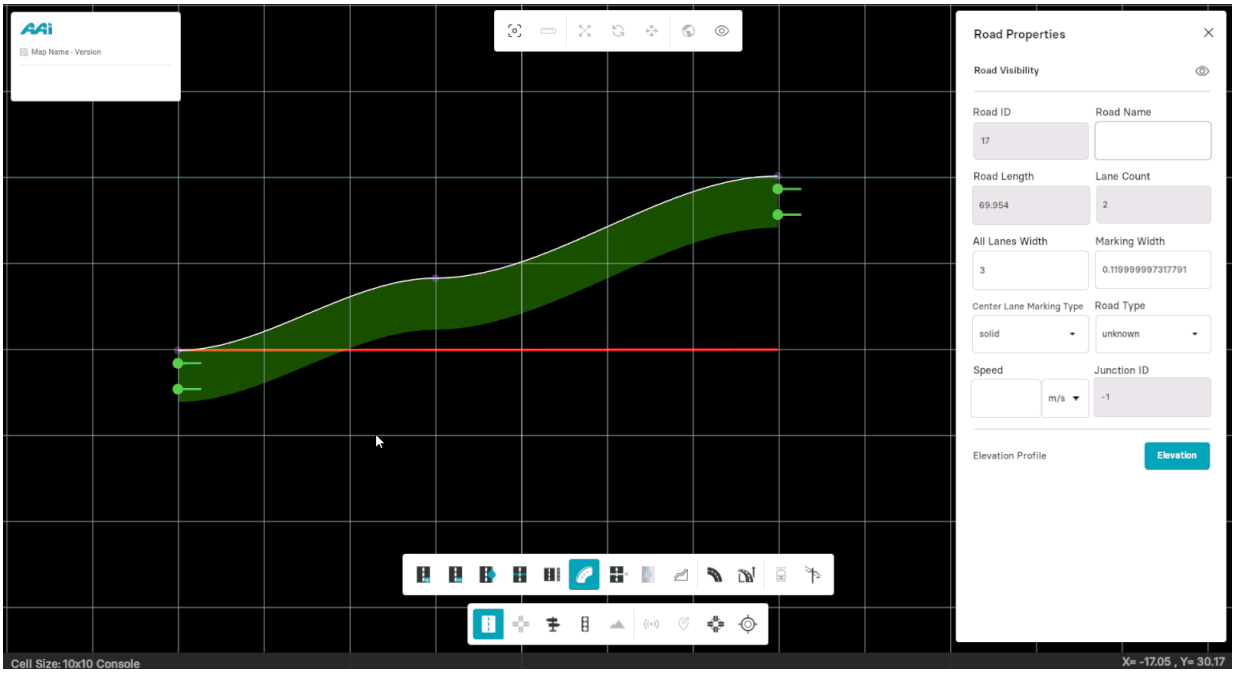




Delete Lane Offset Anchors

```
Hold "left shift" and click primary-mouse button (usually left) on the anchor to de
```



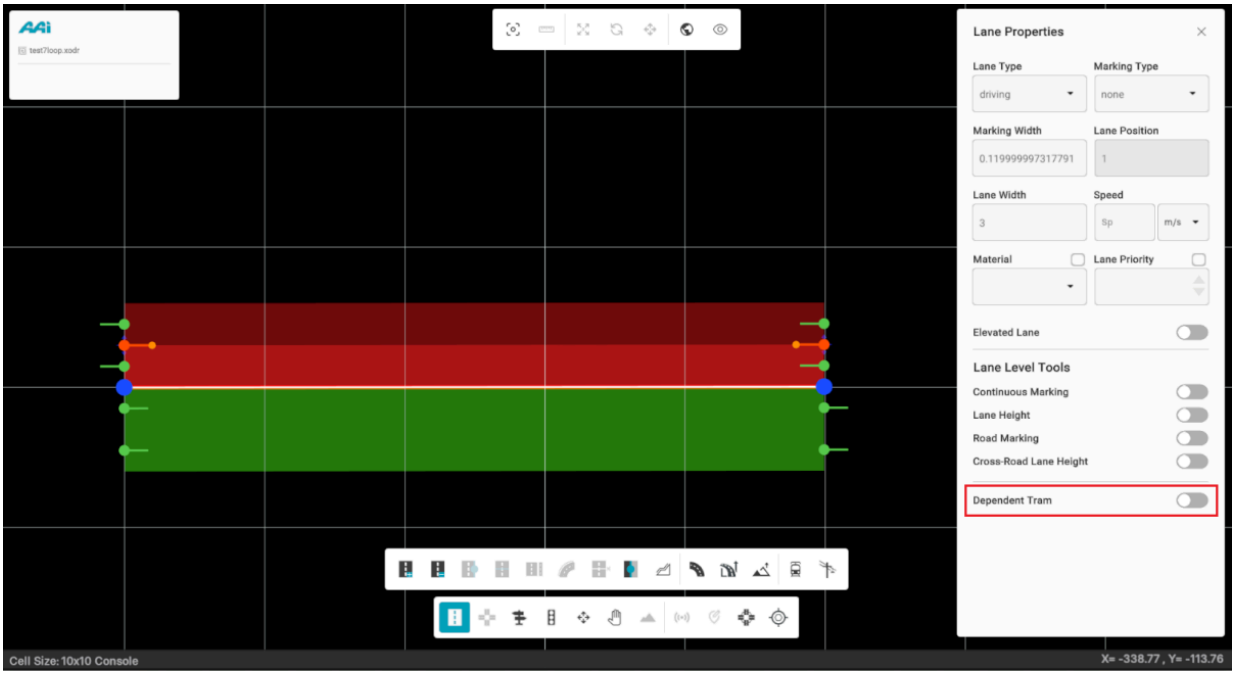


Note that if for a lane section no lane offset record is defined, the lane reference line is identical to the road reference line.

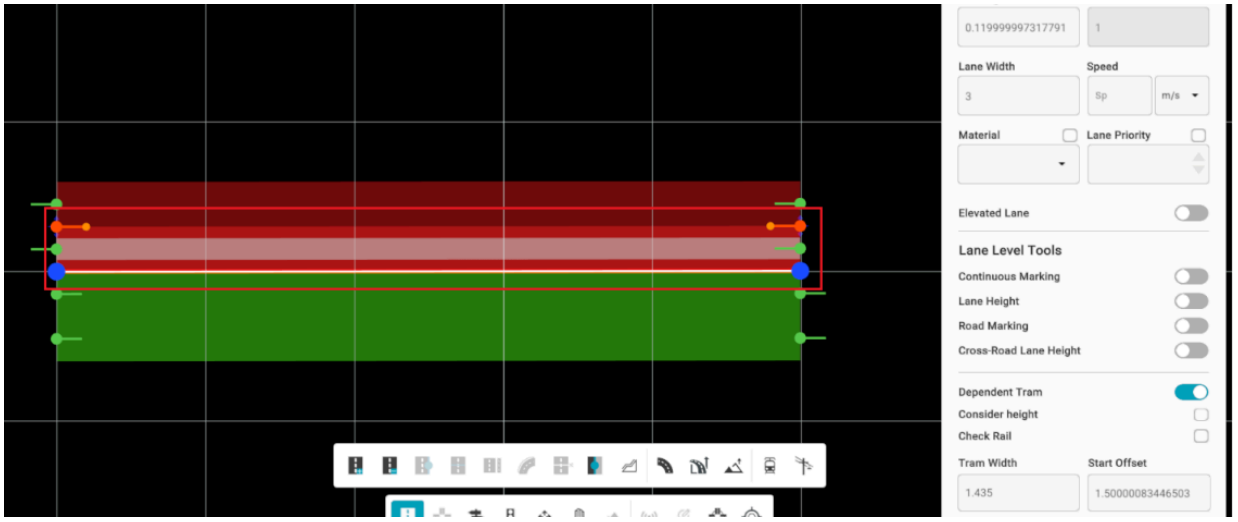
Dependent Tram

Enables users to create an accurate dependent tram system based on tram specifications, facilitating a more precise and efficient map development experience.

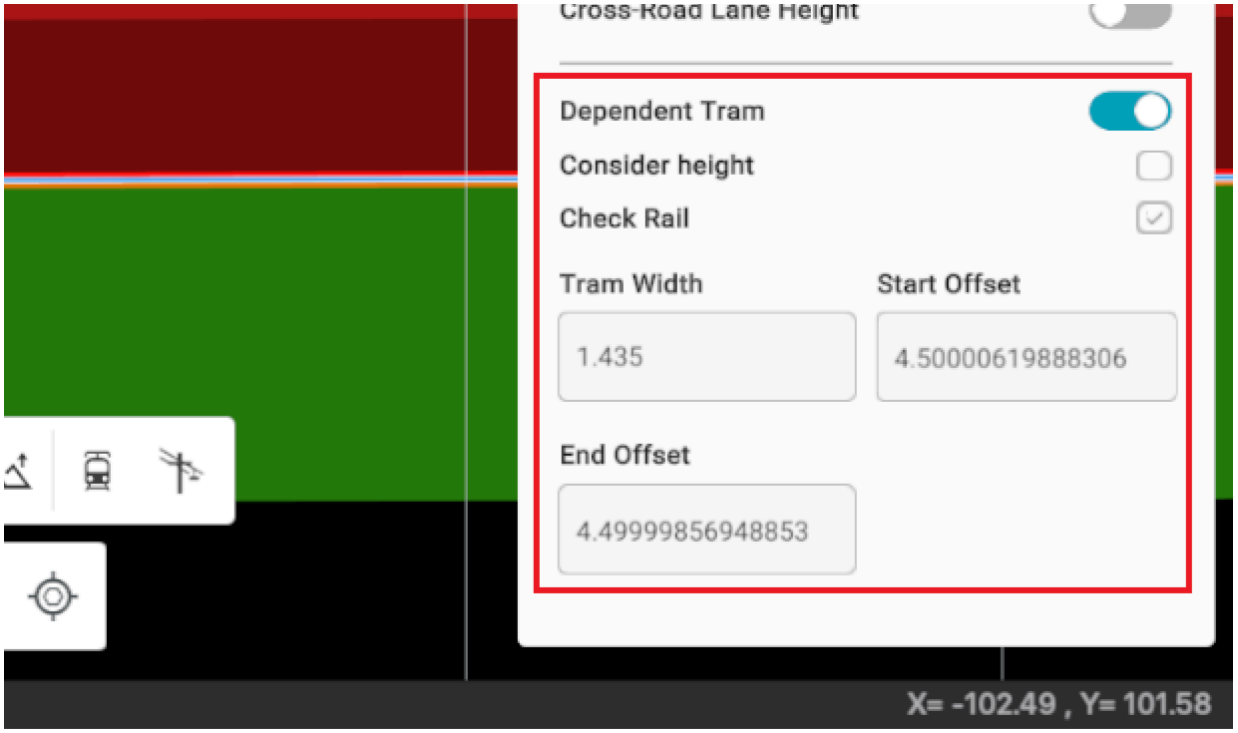
```
1. Select the "Edit Road" tool. Select the lane by triple-clicking it with the prima
```



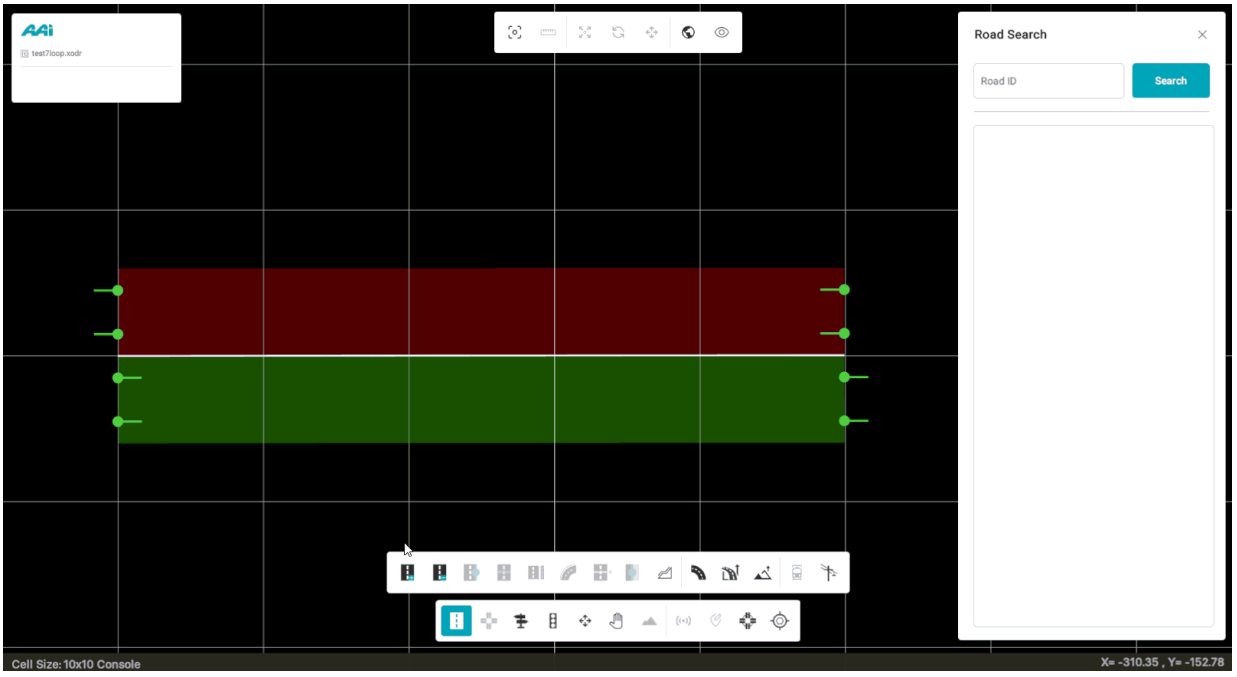

```
2. Toggle the "Dependent Tram" switch. When enabled, it will turn cyan.
```




```
3. A properties panel will appear below the Dependent Tram toggle. This panel allows
```



Hiding the road while the dependent tram is enabled will only hide the parent road, not the dependent tram track itself. This can be useful for creating precise tram connections without interference from the main road layout.

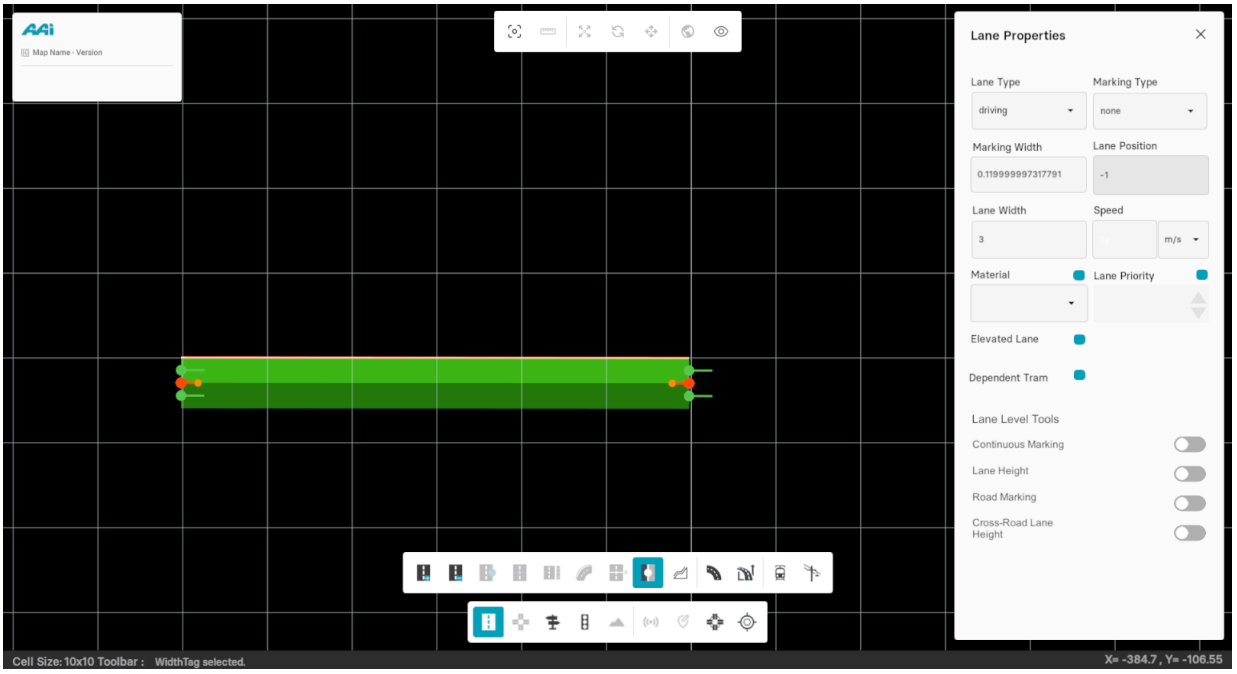


3.2.3 Width Tag

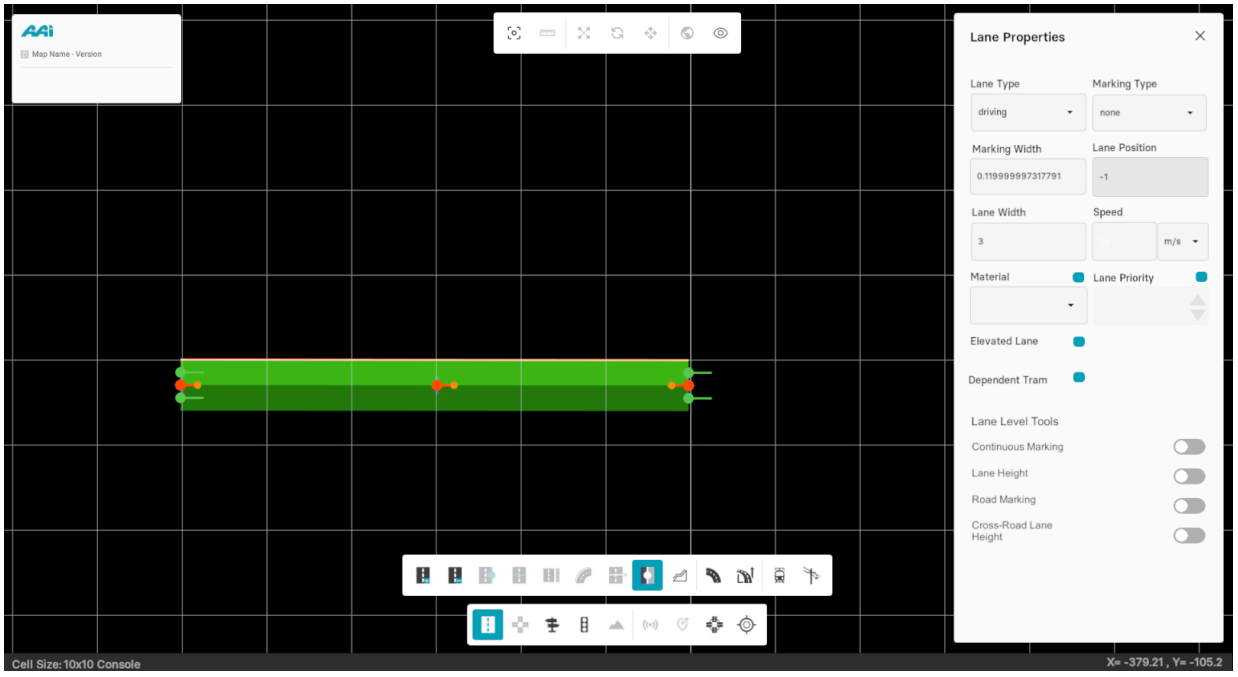
This sub-tool allows the user to edit the width and some existing properties of a particular lane within a road.

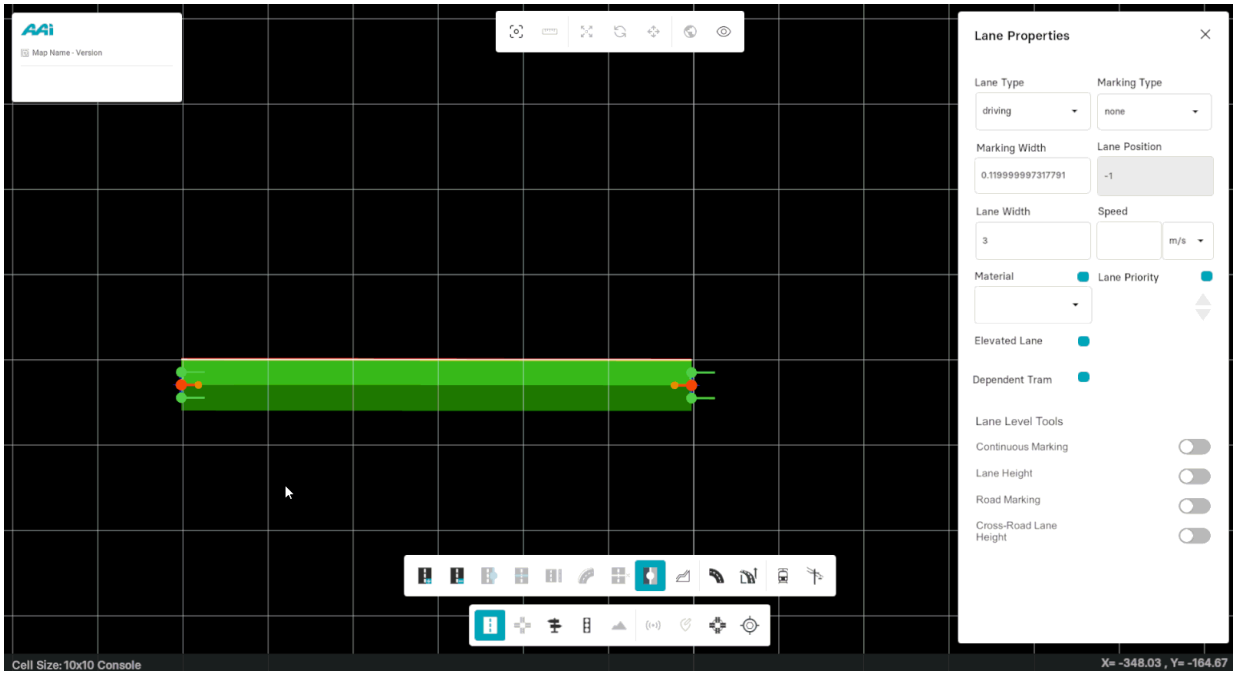
Adding Width Tags

```
1. Select the "Edit Road" tool. Select the lane by triple-clicking it with the prima
```



```
2. Equip the "Width Tag" sub-tool" and primary-button click (usually left) at any de
```

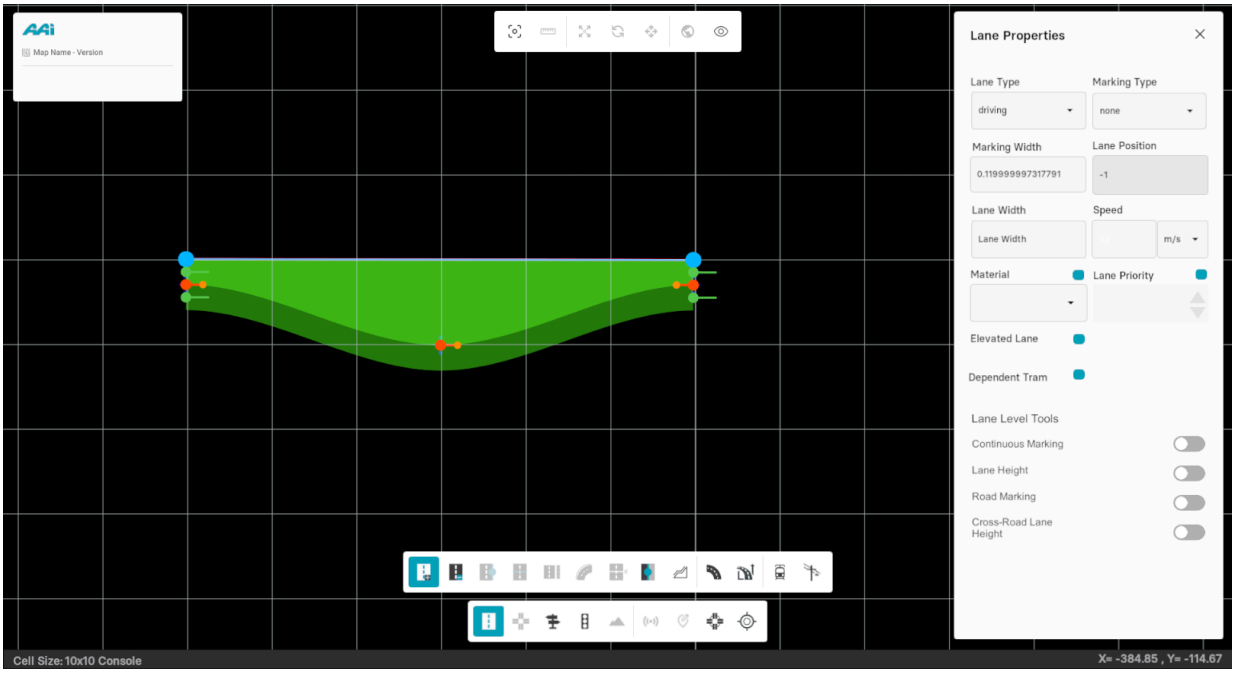




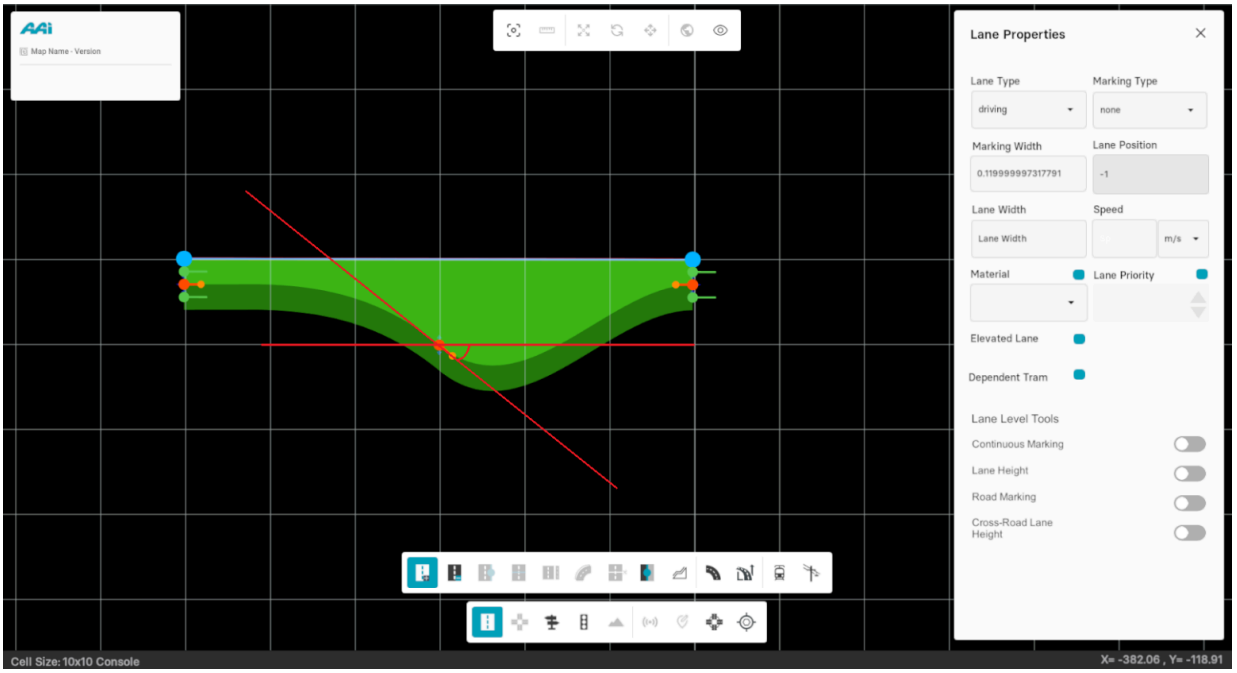
Moving Width Tags

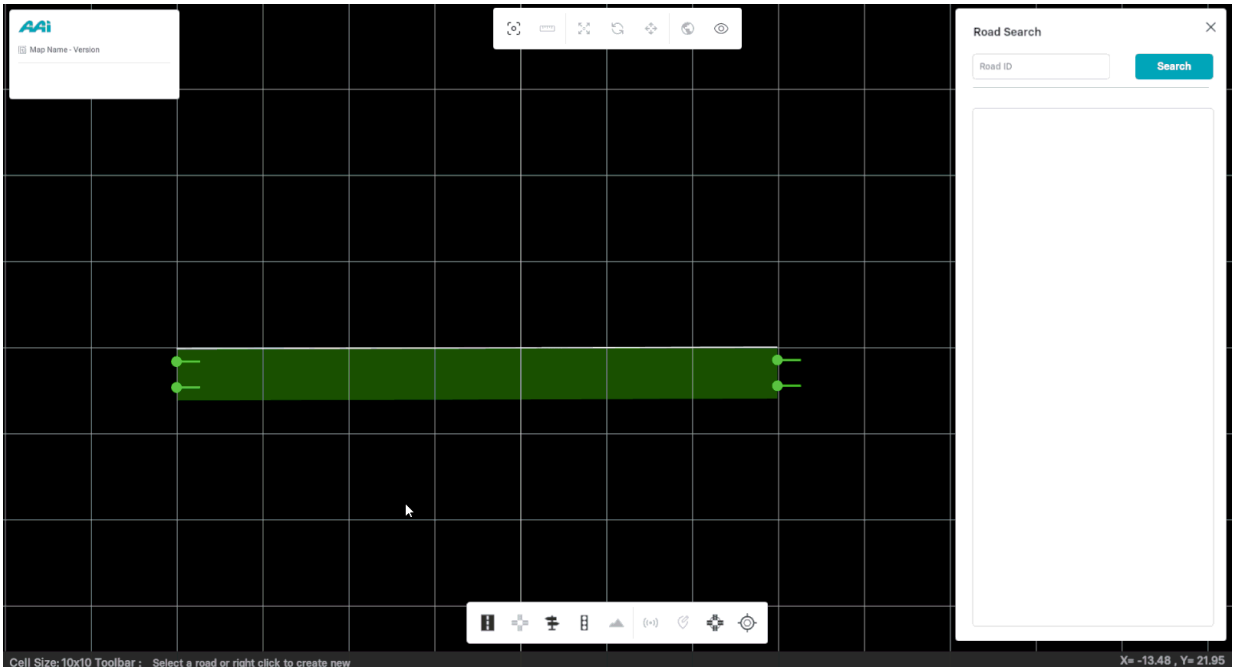
When a width tag has been added, the user is able to change the width of that lane manually.

```
1. Unequip the sub-tool (maintain the "Road Edit" tool equiped), drag the head of th
```



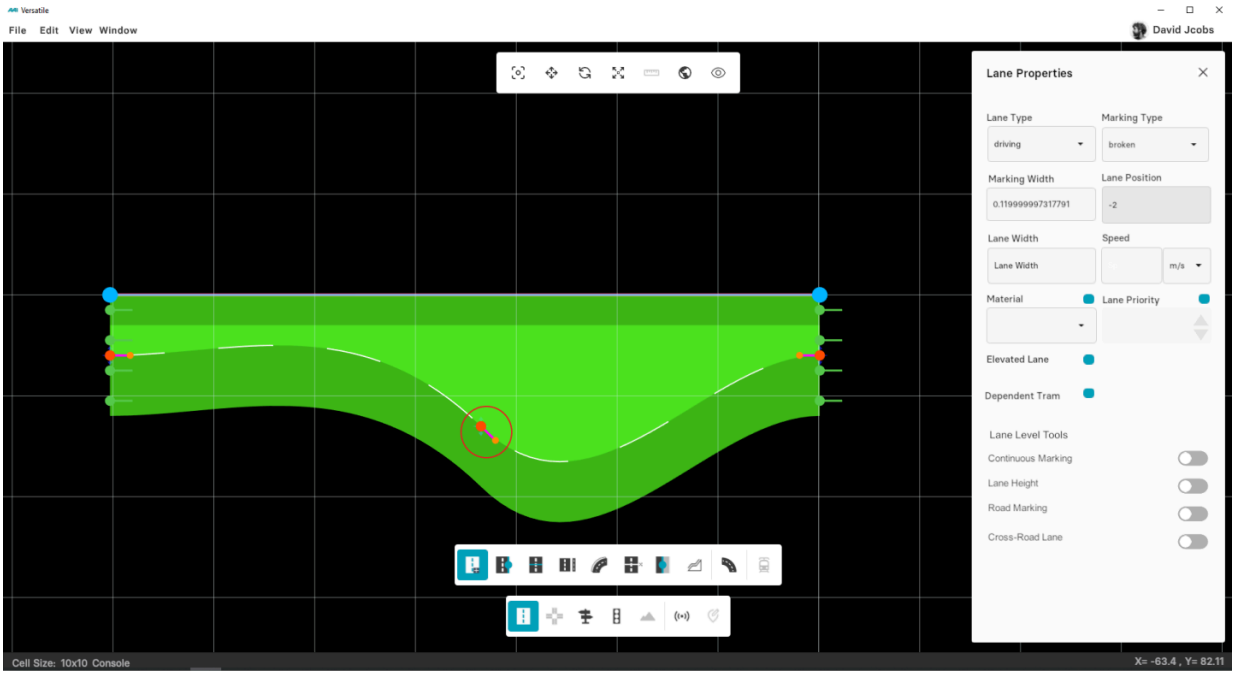
2. Drag the tail of the width tag to change the heading of the width as shown in fig



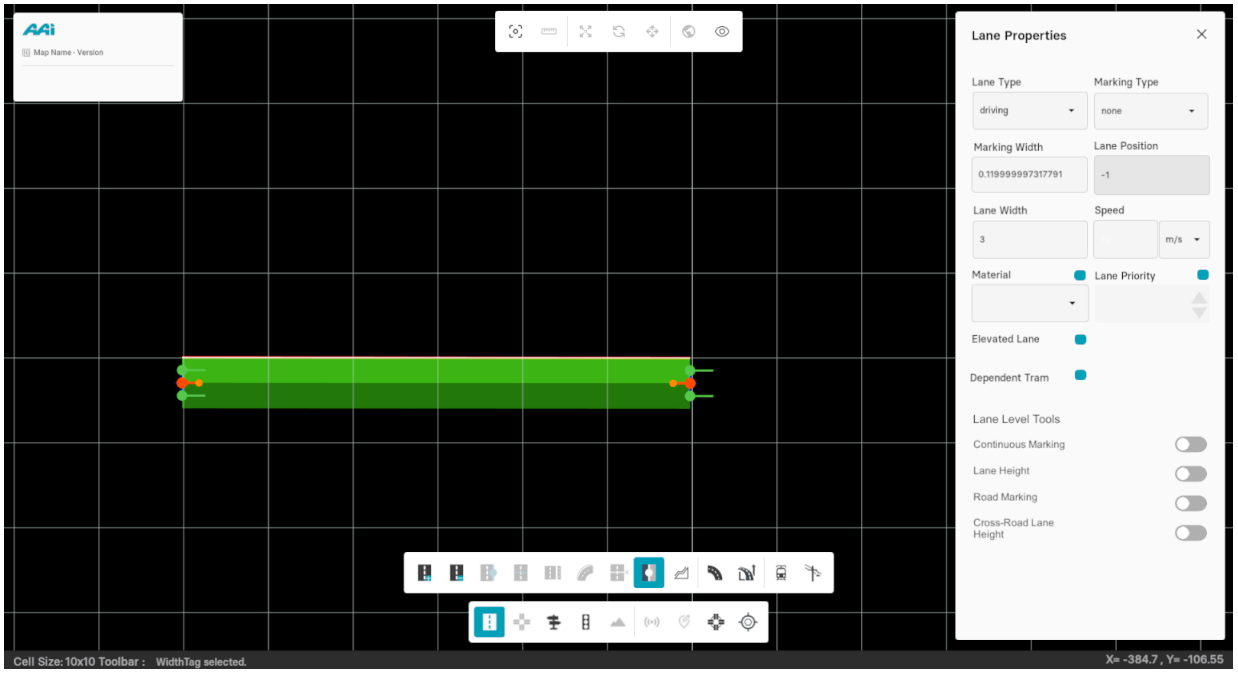


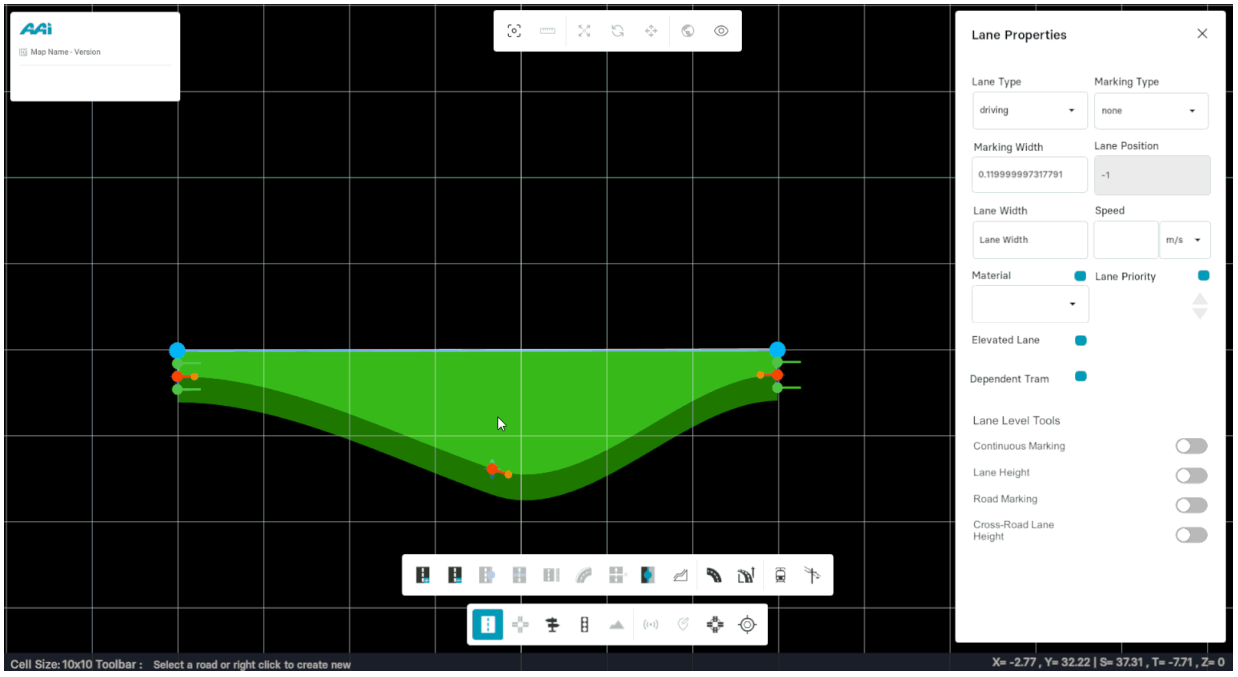
Delete Width Tag

1. Select "Road Edit" from the editor bar, and triple-click using the primary-mouse



2. Hover on top of the width tag and right-click on the existing width tag.



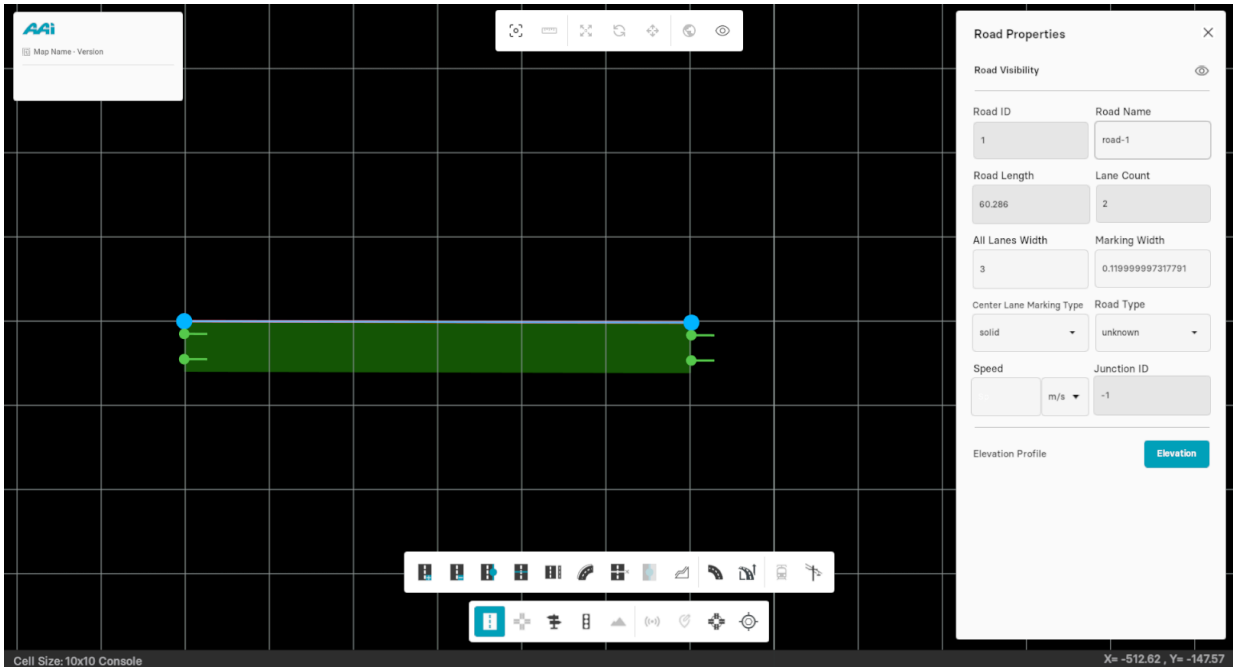


3.2.4 Road Anchor

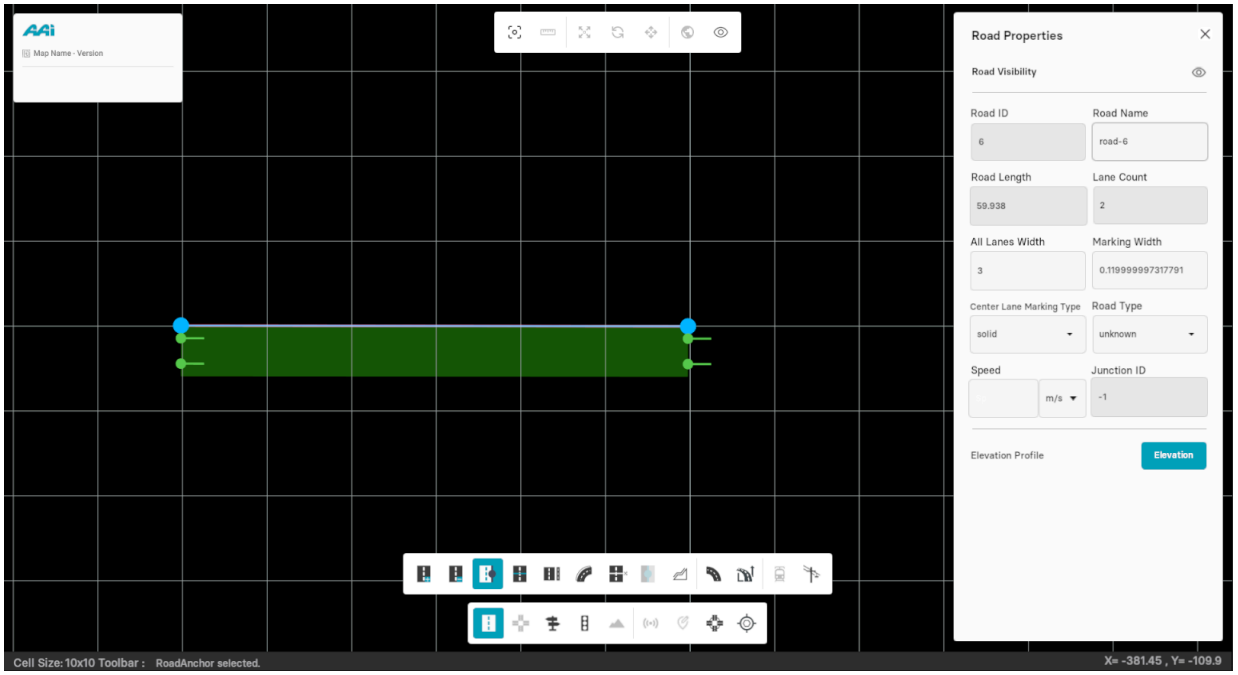
This sub-tool allows the user to add a new anchor point on the lane that lets you modify the geometry of the road.

Inserting Anchors

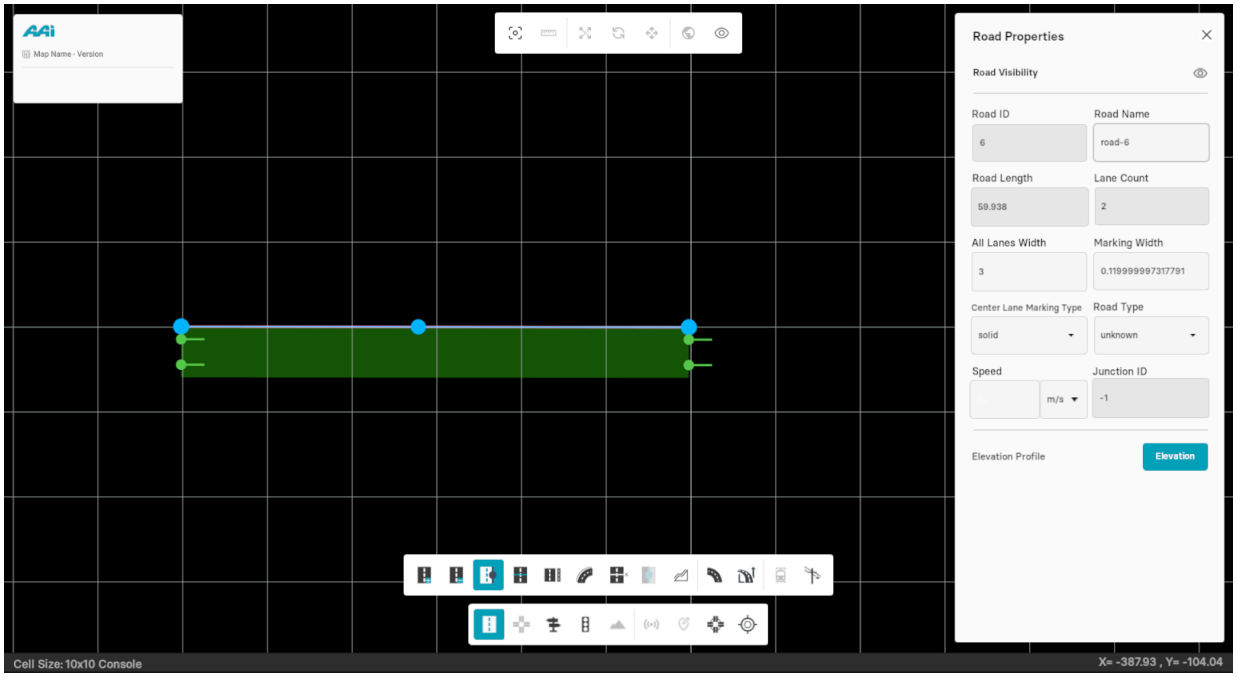
```
1. Select a road by using the "Edit Road" tool by clicking with the primary-mouse bu
```



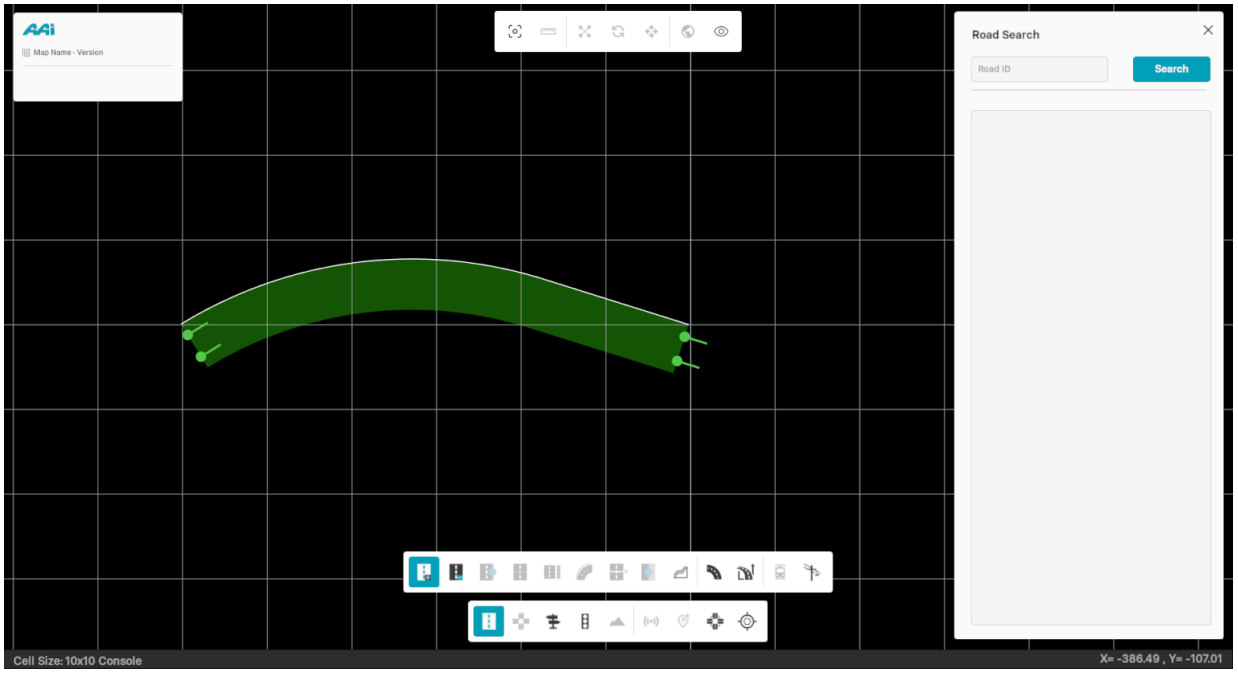
2. Select the "Road Anchor" sub-tool from the toolbox.

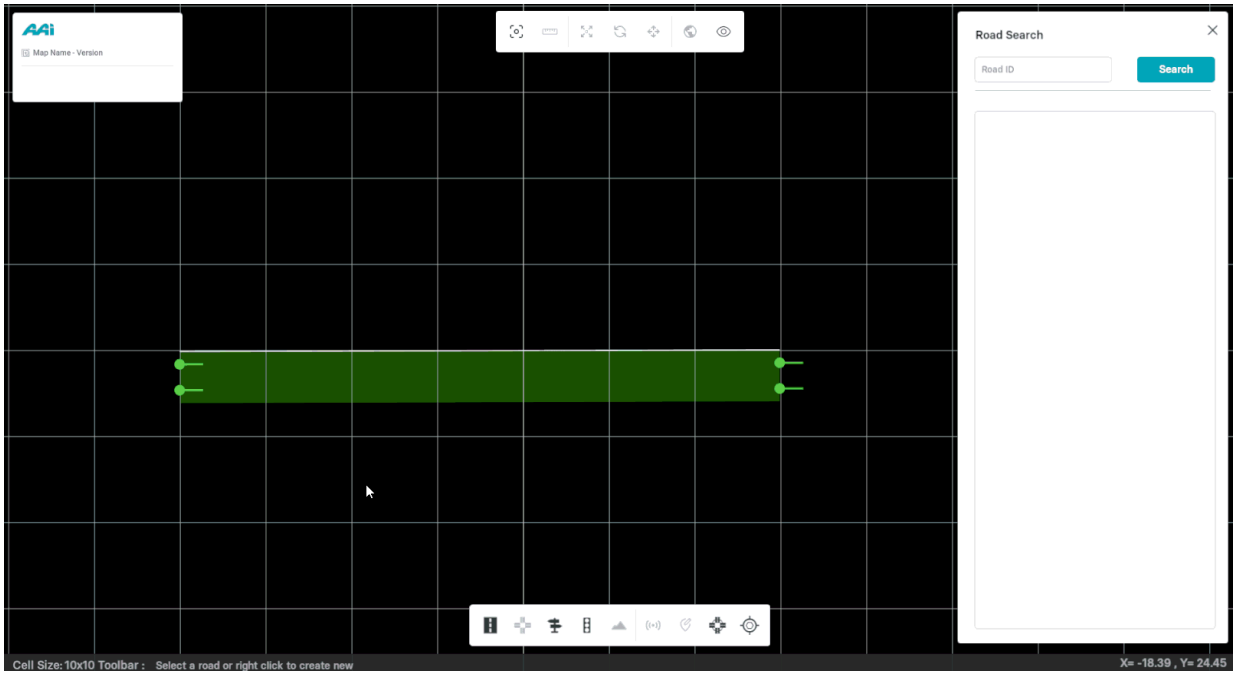


3. Click using the primary-mouse button (usually the left) on the existing road to



4. Unequip the sub-tool from the editor bar (keep the "Road Edit" tool equiped). It

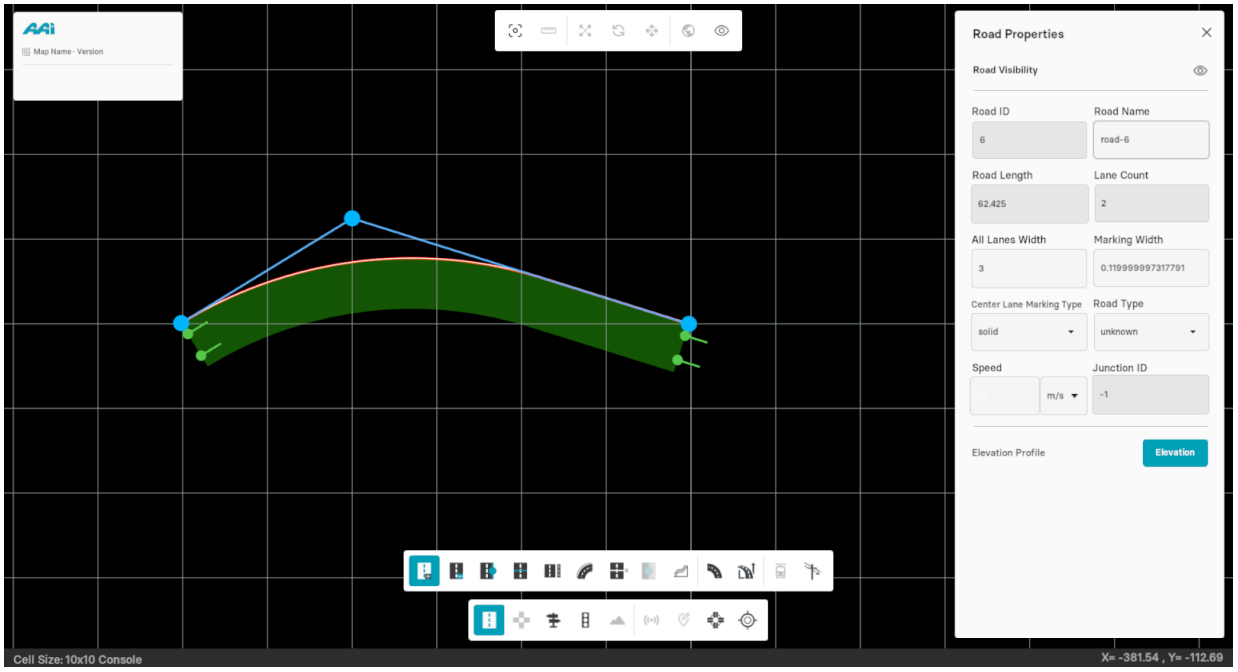


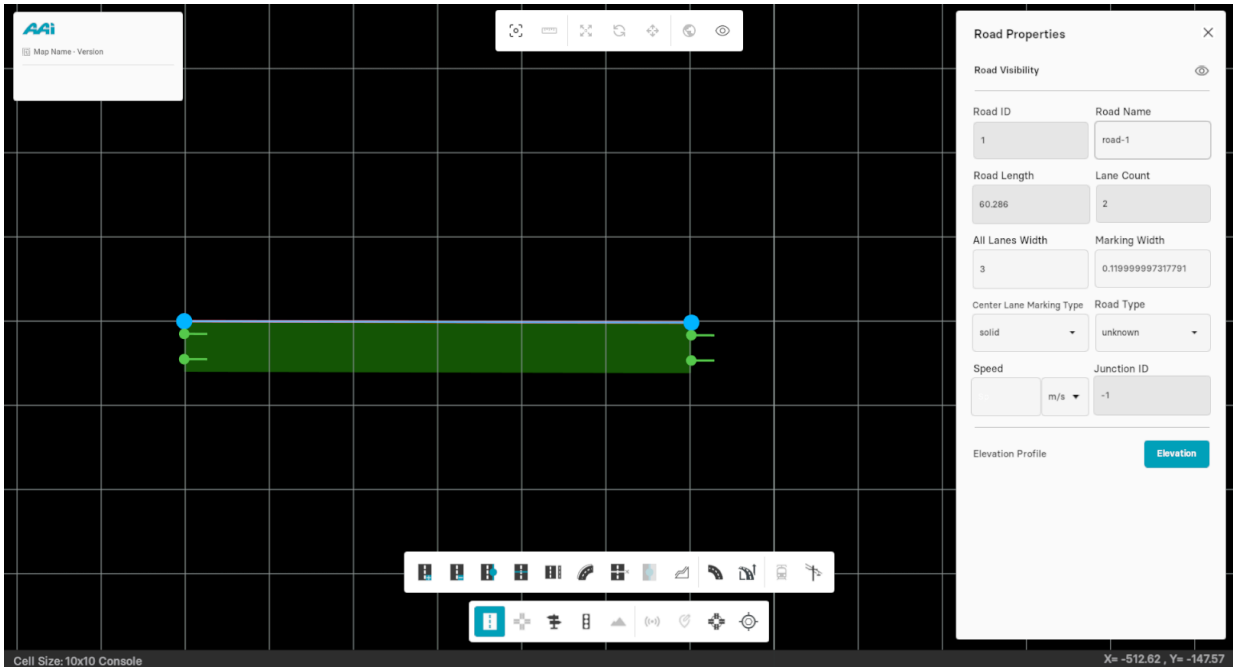


Deleting Anchors

This tool terminates the anchor points from the road. Thus, the road returns to its original profile.

```
Select the desired road. Go to editor bar, select "Road Anchor" from the tools and
```



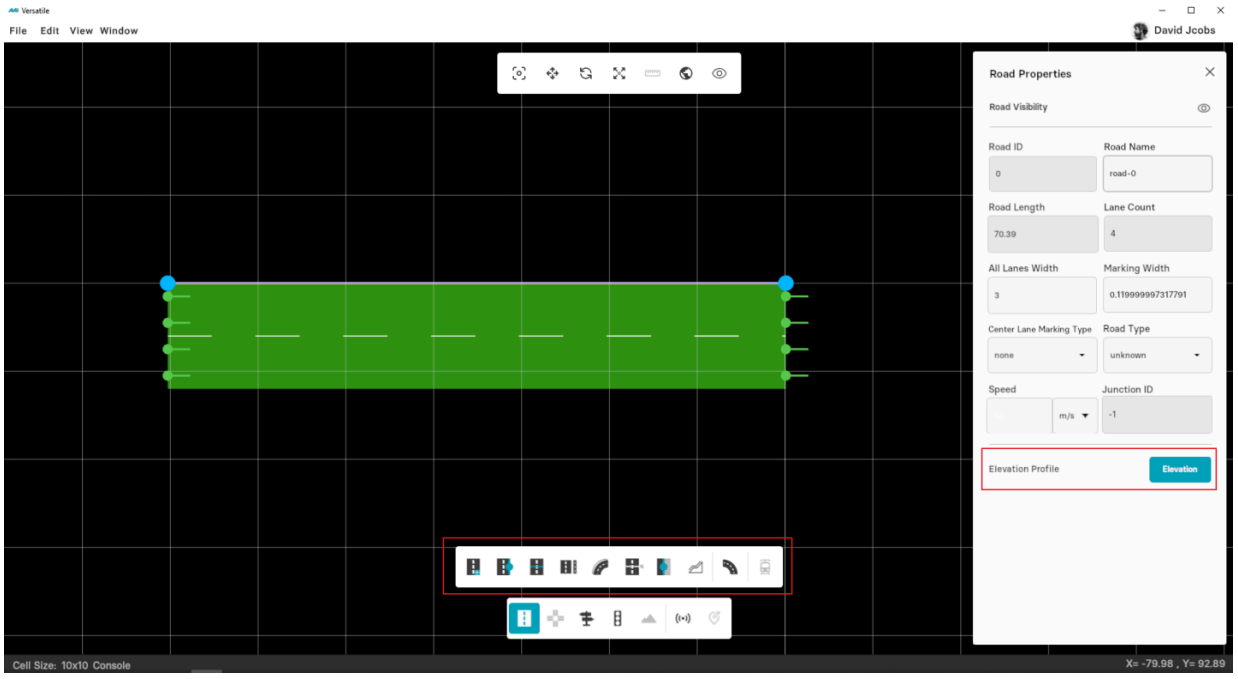


3.2.5 Elevation Profile

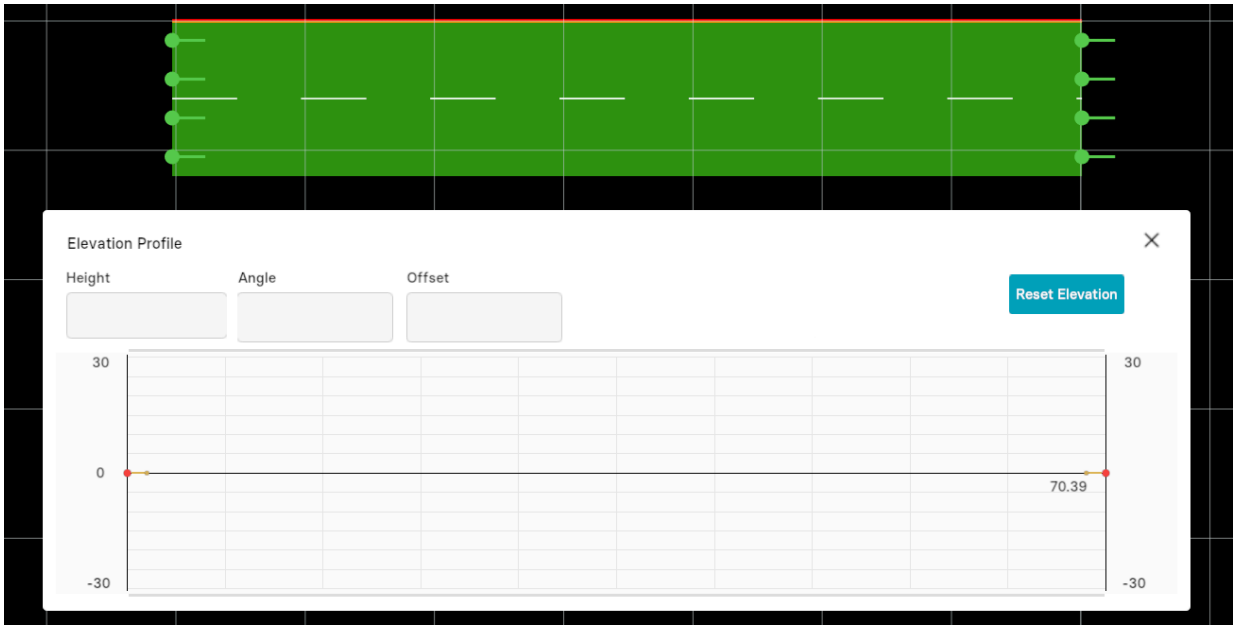
This option allows the user to define *Height* , *Angle*, and *Offset* to the existing road in the map.

Set Elevation

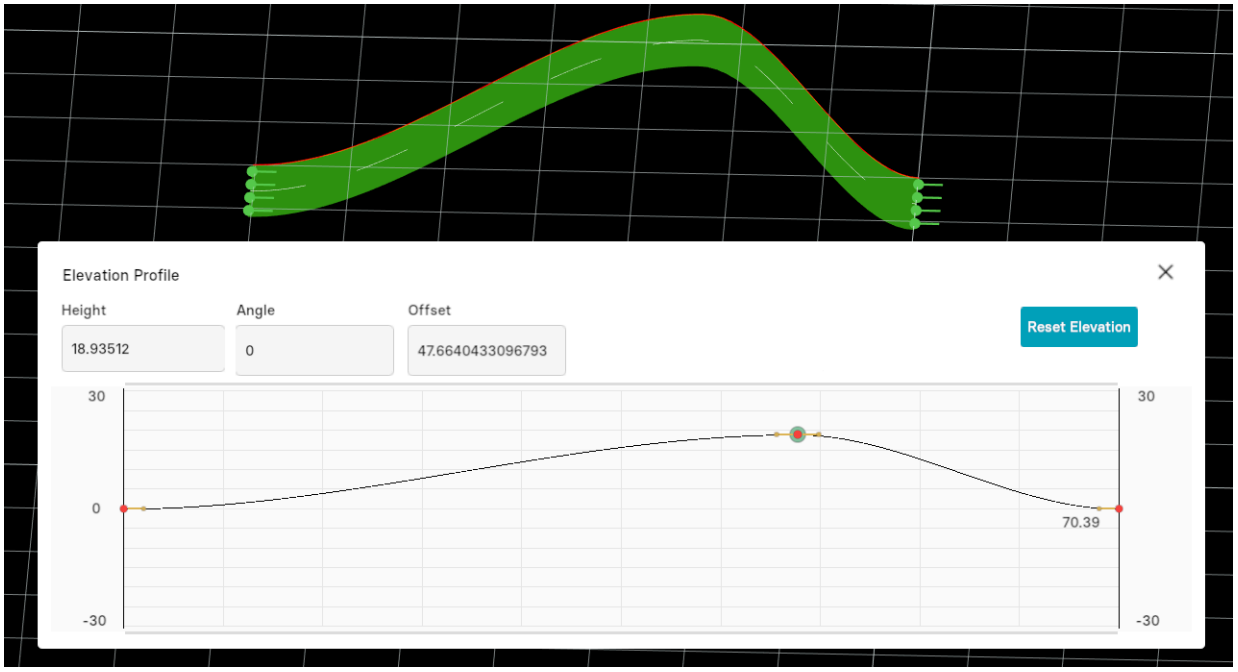
```
1. Select the existing road in the map. Click on "Elevation Profile" from parameters
```

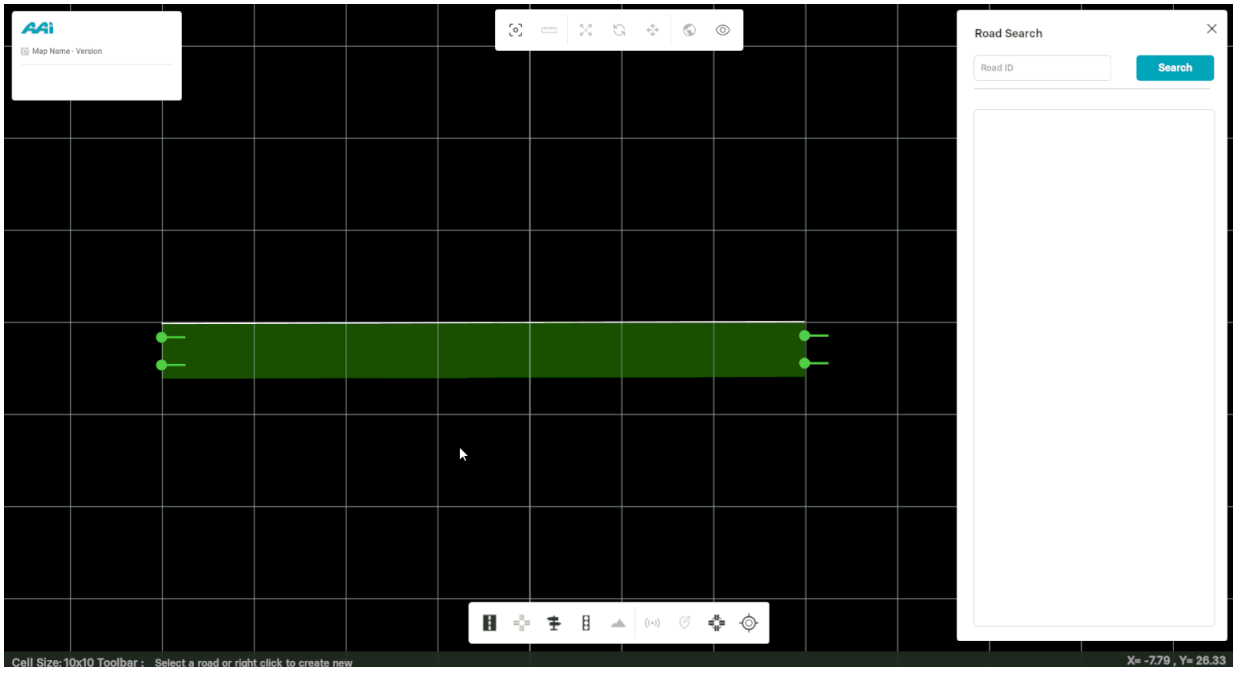


2. Click using secondary-mouse button (usually right) at any point to add anchor poi



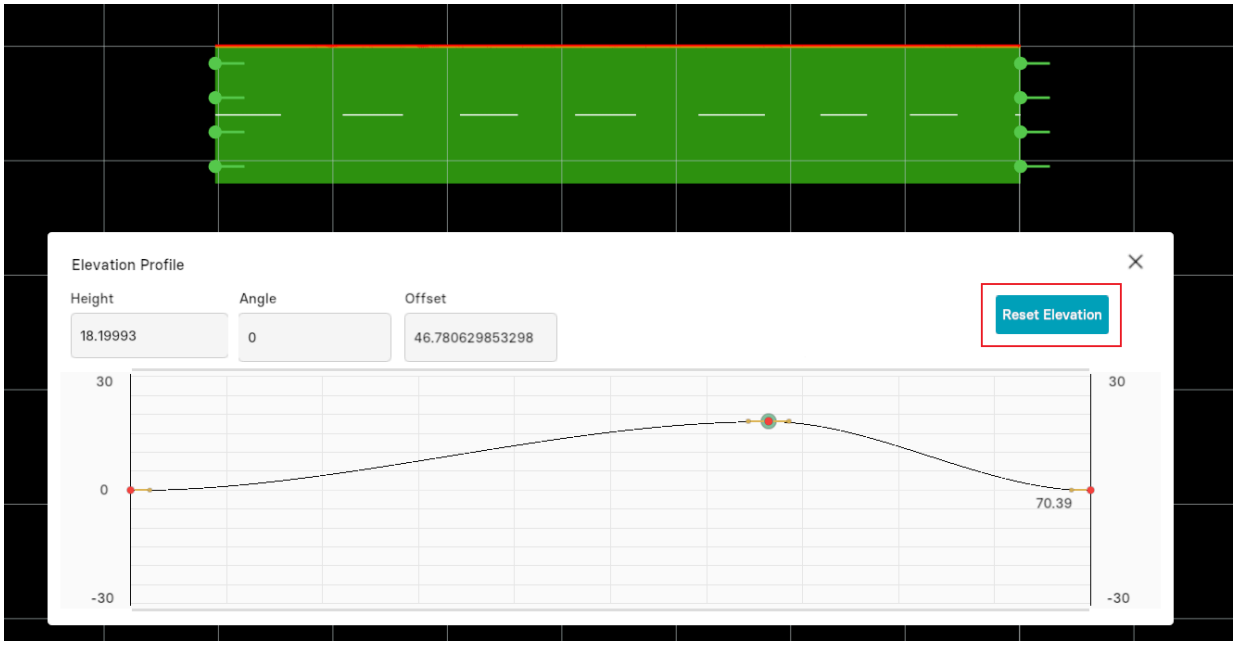
3. Close the "Elevation Profile" window. Hold "left alt" and click using the primary





Reset Elevation

```
From the "Elevation Profile" window, select the "Reset Elevation" option to revert t
```

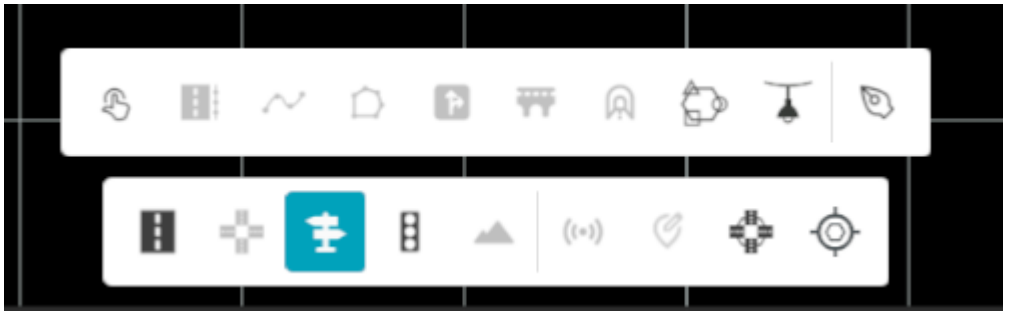


3.2.6 Objects

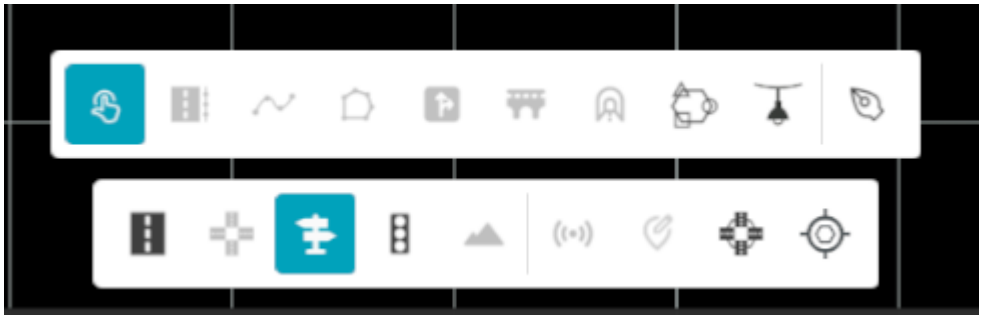
Allows the user to place objects inside of the selected road. When selected, the object menu display will be provided on the right side of the mapping platform. Use secondary click to highlight the road for object placement (most commonly right click)

Adding Objects

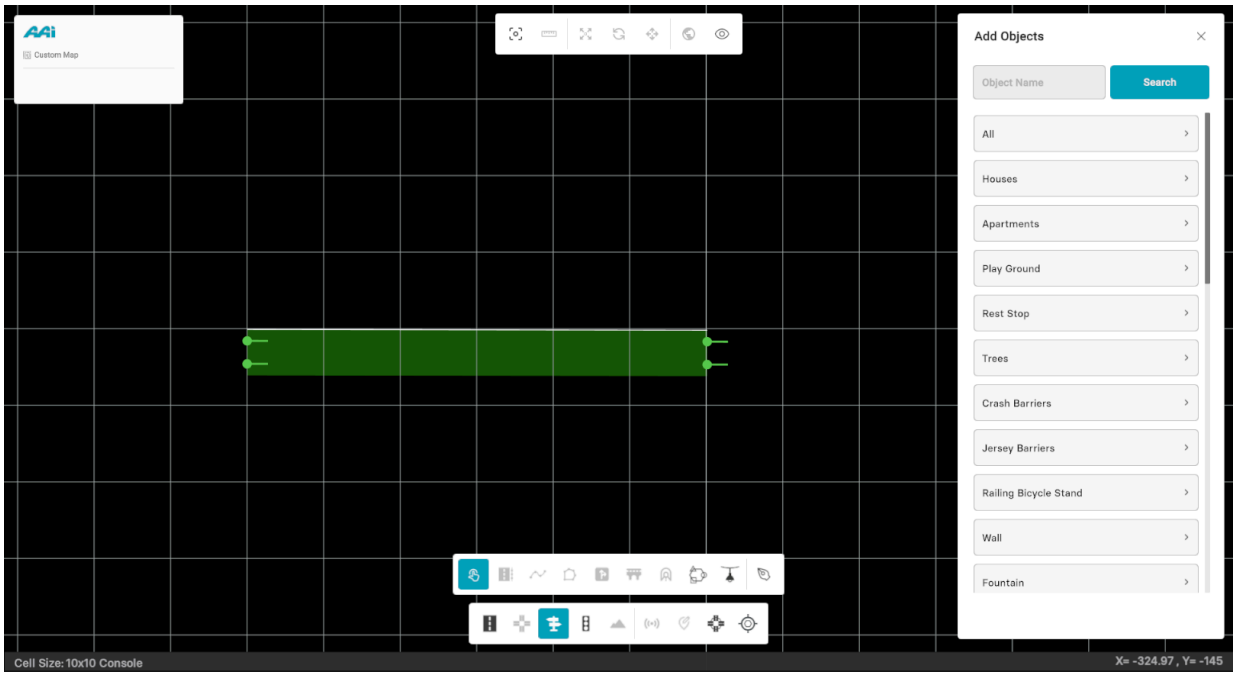
```
1. From the Editor Bar, select the "Add Objects" tool.
```



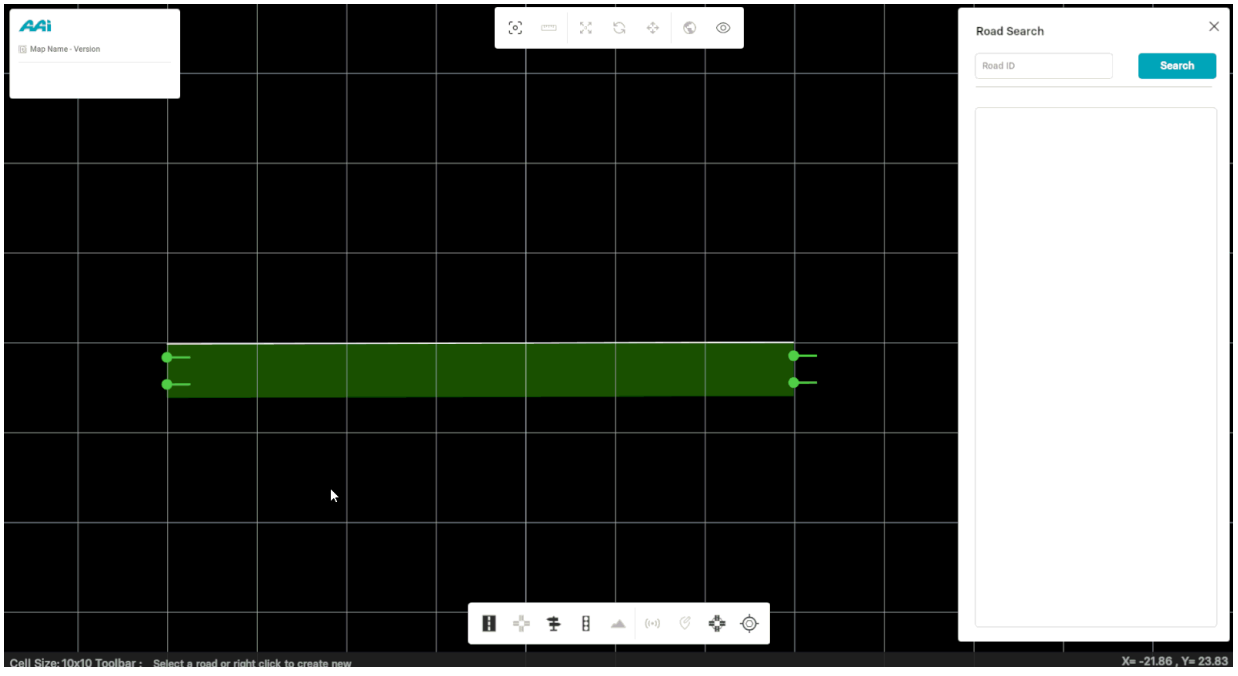
```
2. Click the "Single Object" tool displayed once the "Add Objects" tool is selected
```



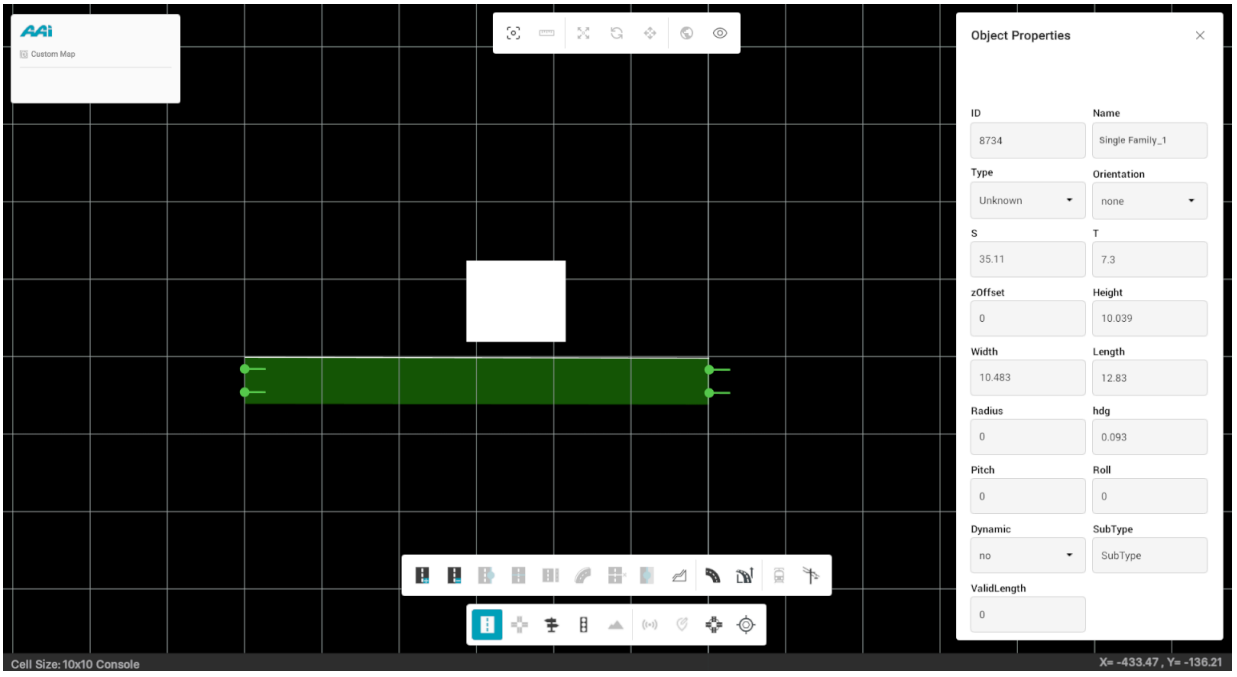
3. The "Add Objects" panel displays all available signal options and alternatives ca



4. Drag and drop an object to any desired position on the road while the "Objects" t



```
5. To select the object properties, deselect the "Objects" tool and click on the obj
```



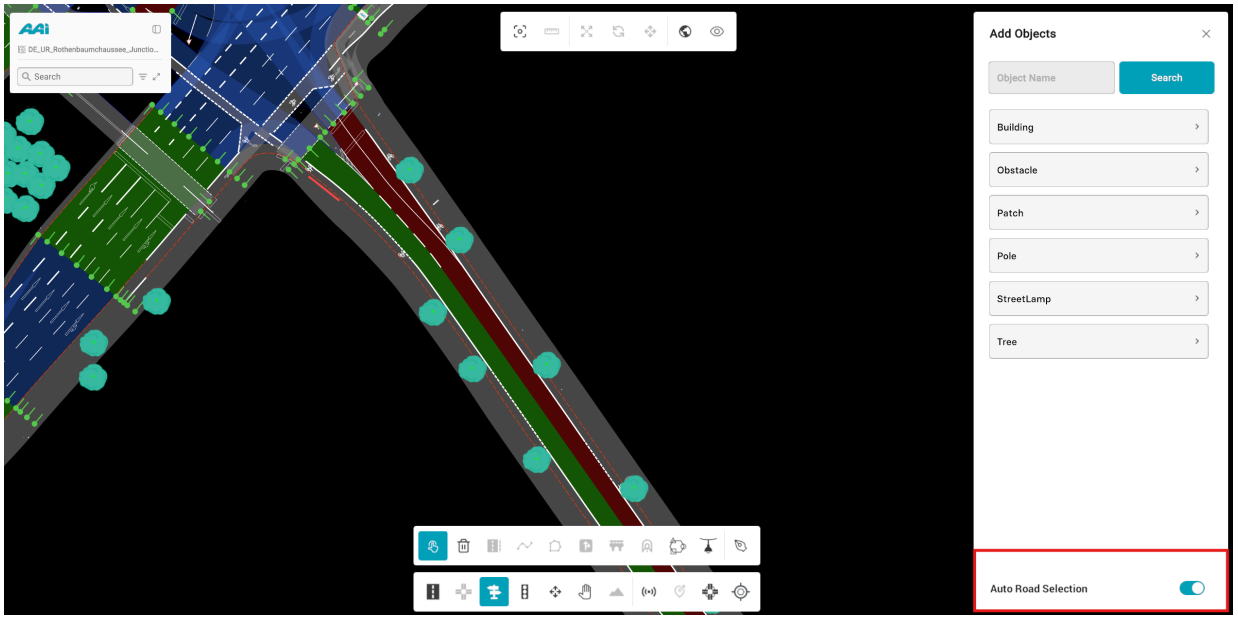
You can adjust the desired properties as needed to suit the situation and meet the user's specific requirements using the right panel.

Auto Road Selection

The **Auto Road Selection** toggle helps streamline object placement from the library.

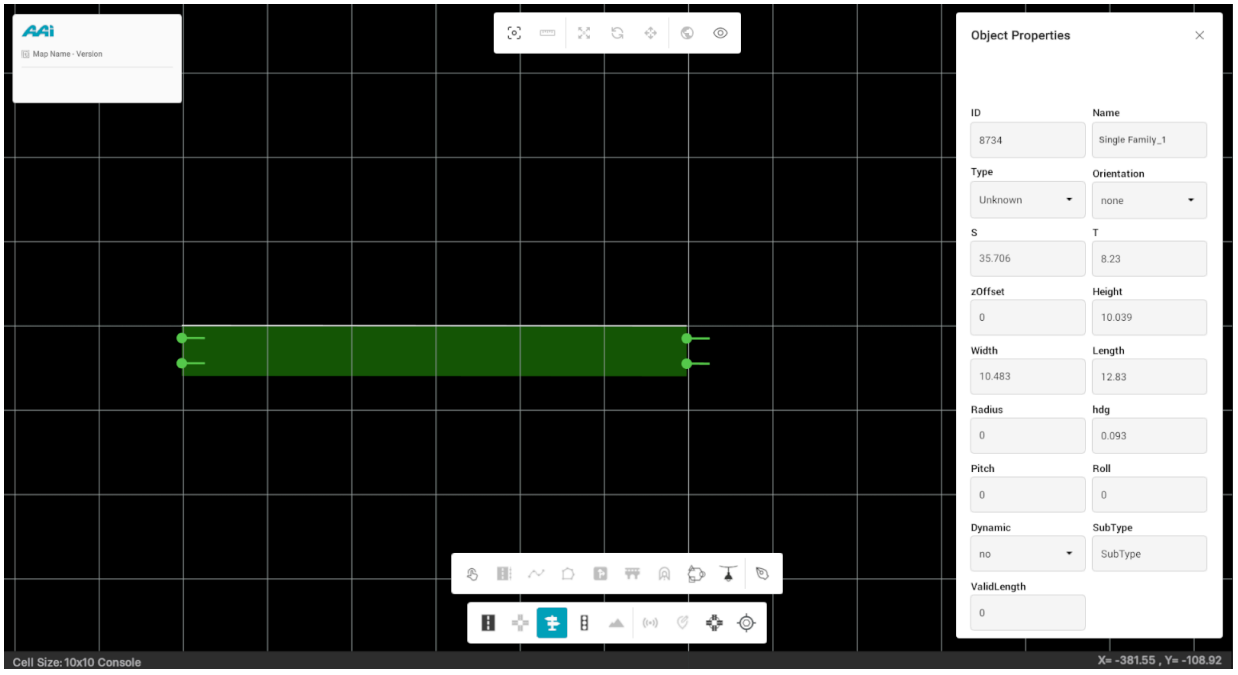
- When **enabled**, RepliMap will **automatically detect and attach** the selected object (e.g., building, pole, or tree) to the **nearest road** when you drag and drop it into the scene.
- When **disabled**, you must **manually select a road** by **right-clicking** on it before placing any object.

This feature ensures that placed objects maintain proper alignment with road geometry, improving accuracy and reducing manual adjustment.

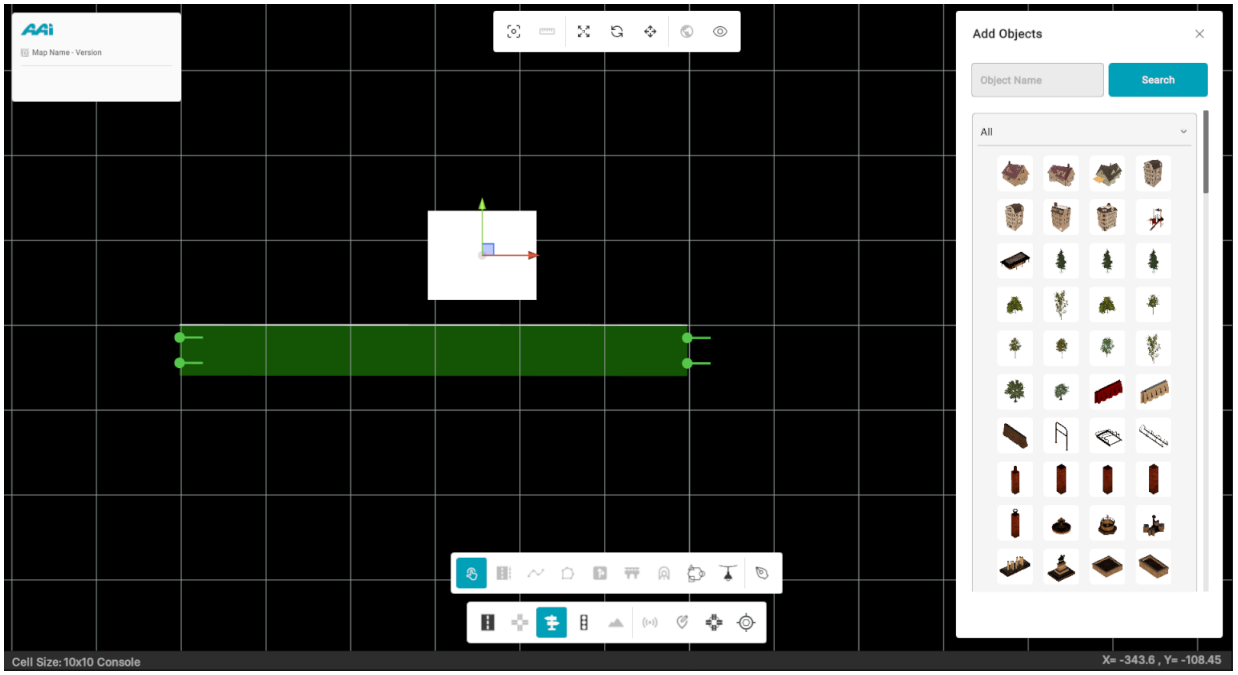


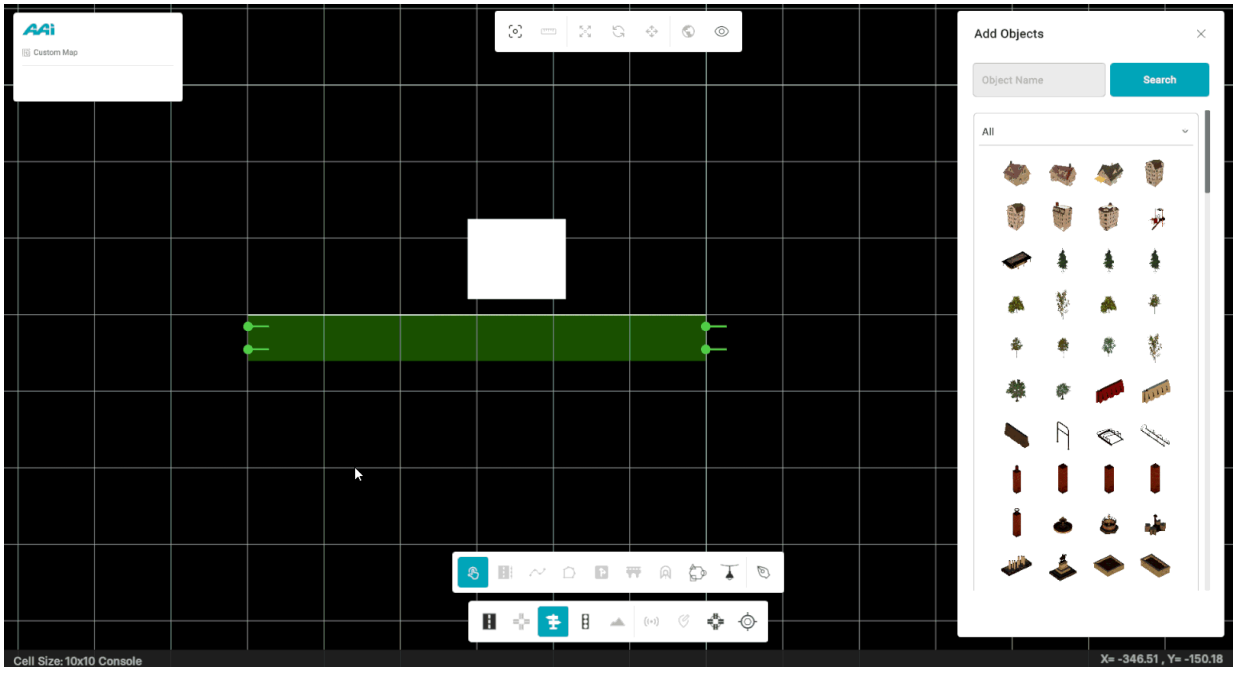
Moving Objects

1. Select the "Objects" tool from the editor bar.



2. Click on the object using the primary-click button (usually left). By default, th

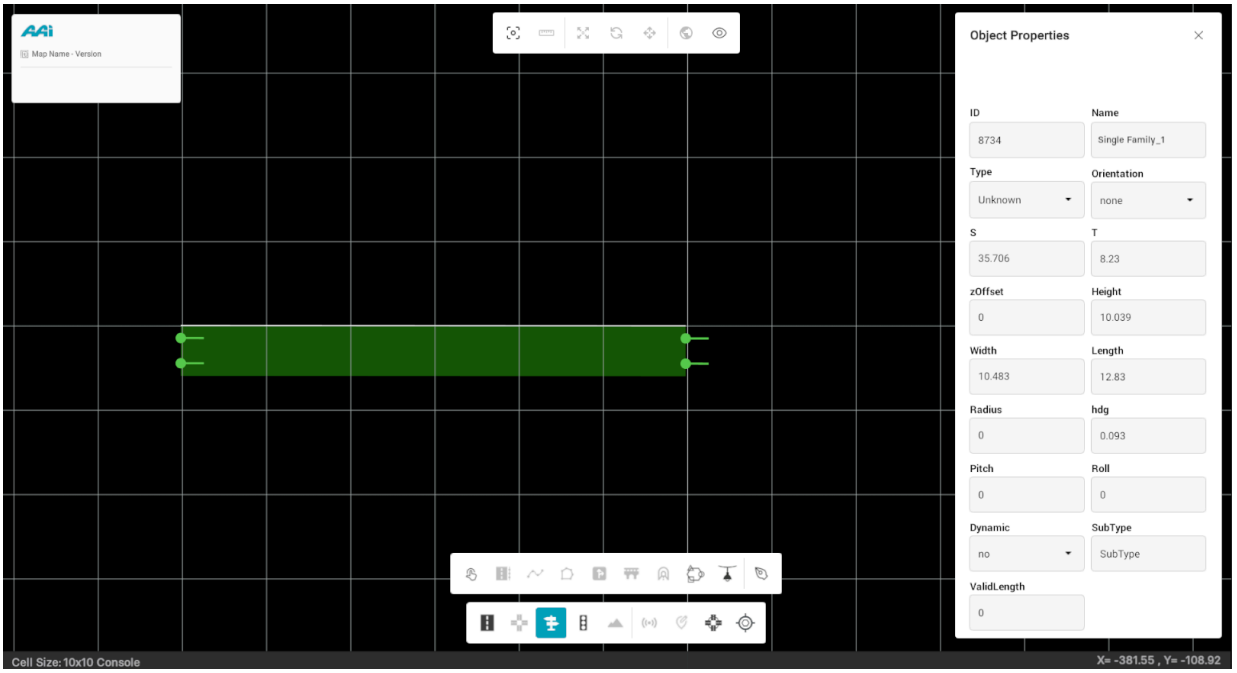




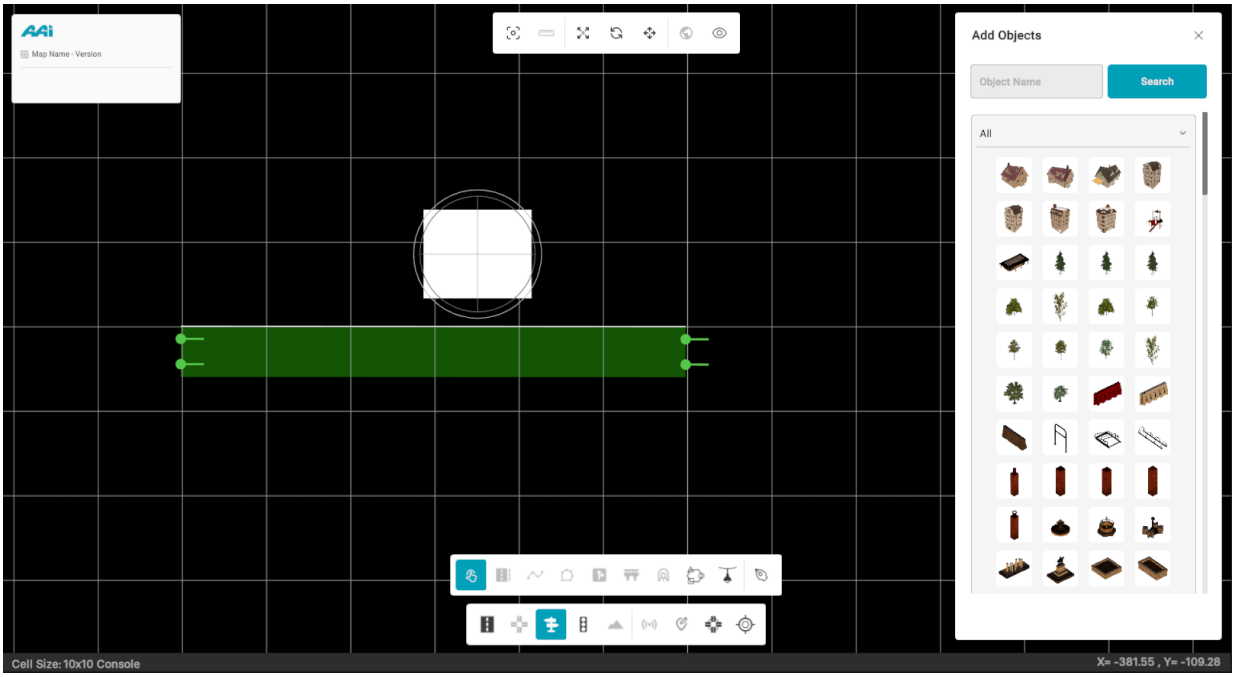
This will display the X and Y axis arrows relative to the object.

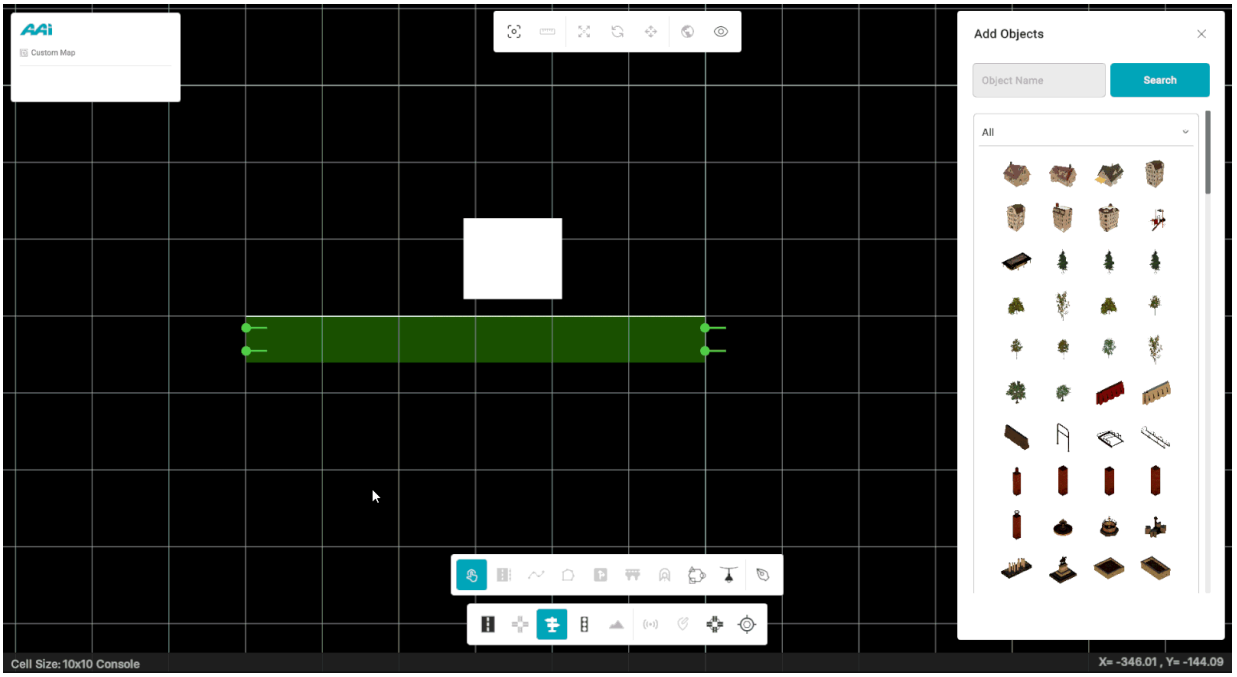
Rotating Objects

```
1. Select the "Objects" tool from the editor bar.
```



2. Once hovering over the object, primary-mouse button (usually left) click on it. N

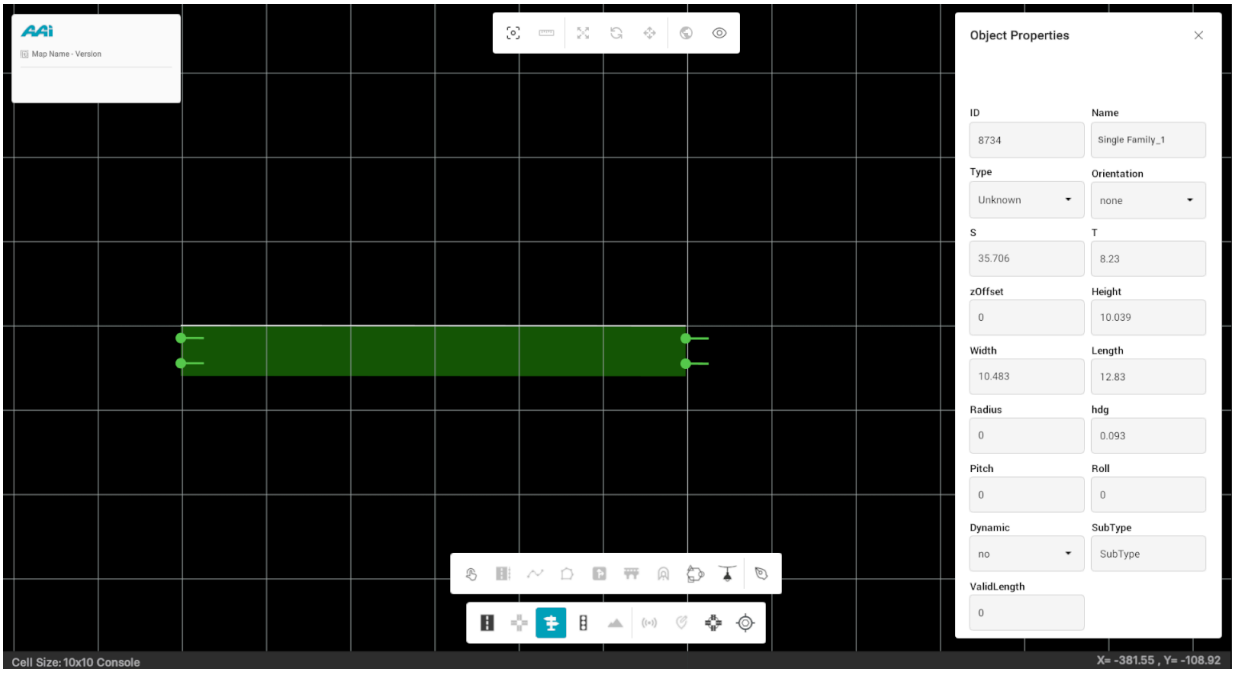




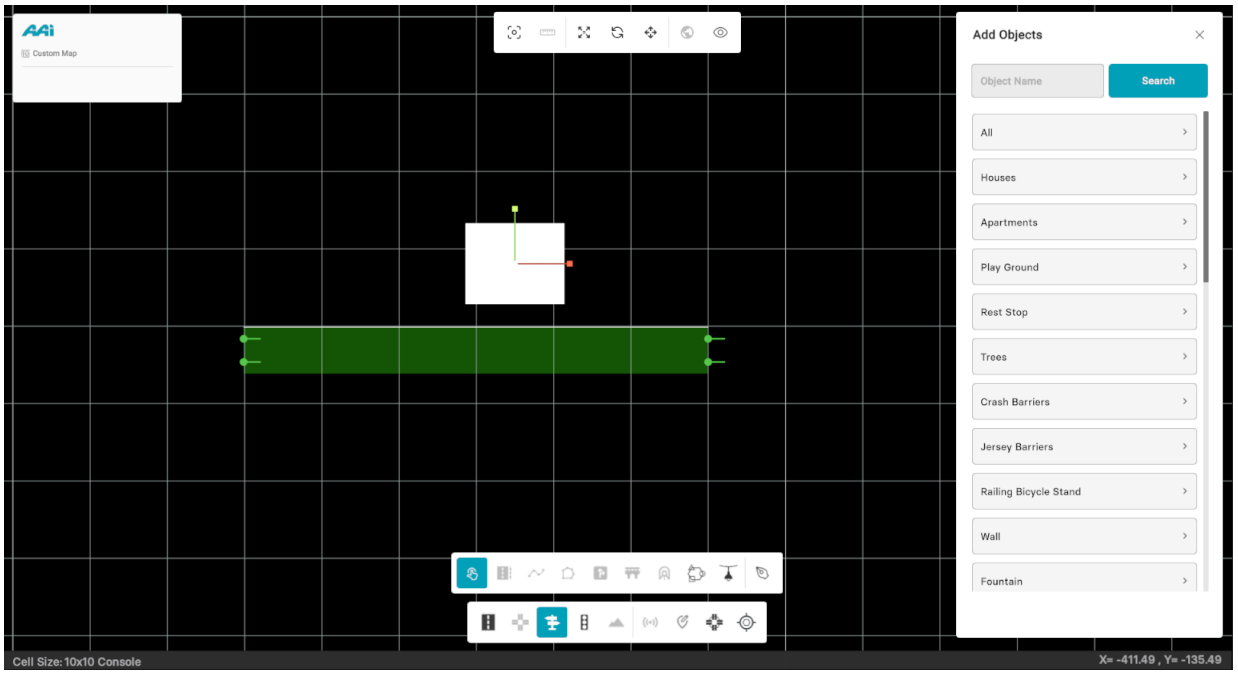
Selecting the option will display a 360-degree radial selection wheel to indicate the specific rotation of the selected object.

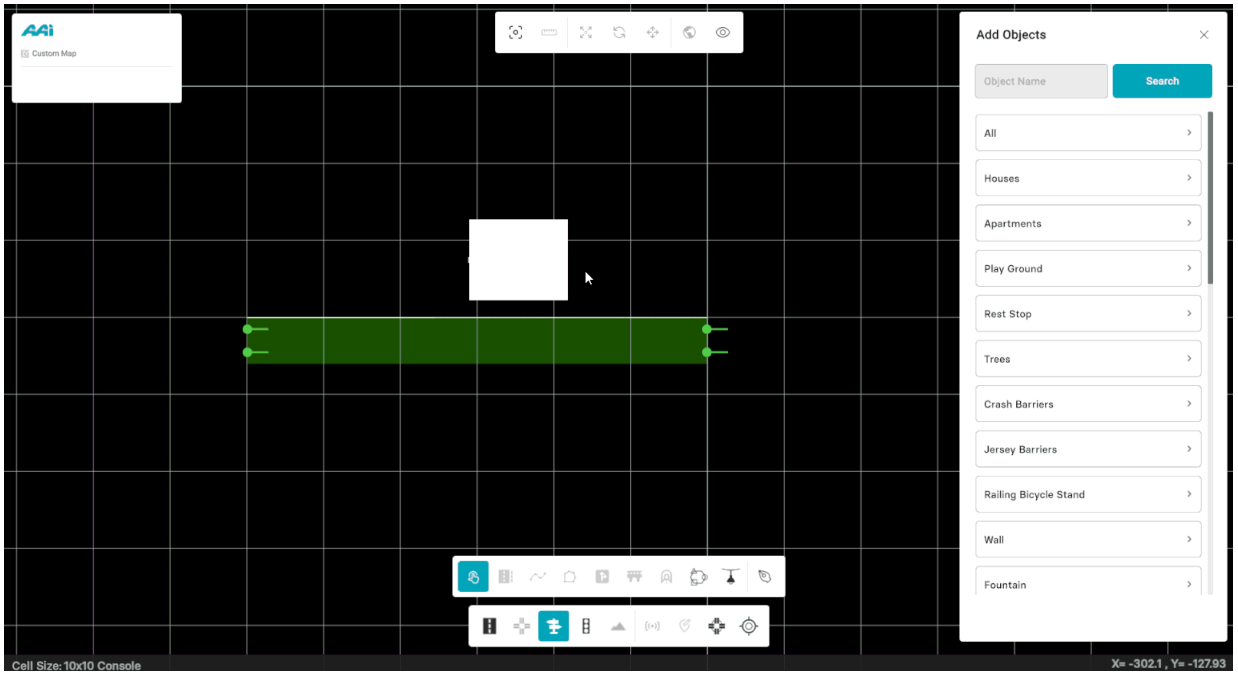
Scaling Objects

```
1. Select the "Objects" tool from the editor bar.
```




```
2. Once hovering over the object, primary-mouse button (usually left) click on it. N
```





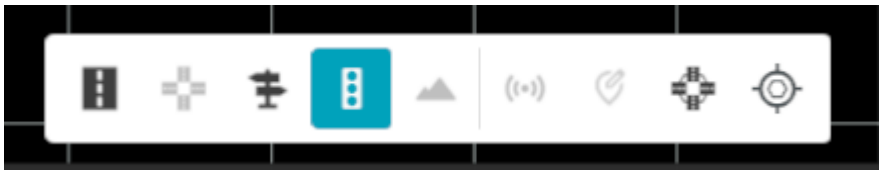
This will display the X and Y axis arrows relative to the object.

3.2.7 Signals

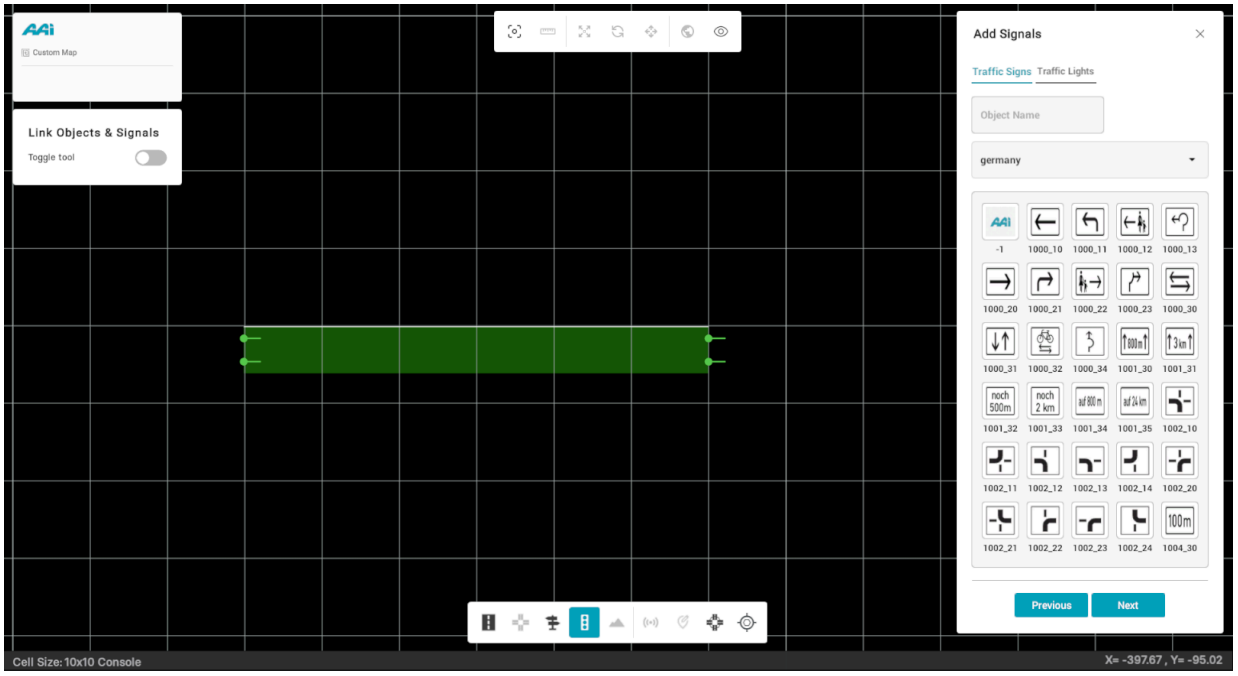
Allows the user to place signals as part of the selected or near-by road. When selected, the signal menu will be provided on the right side of the mapping platform.

Adding Signals

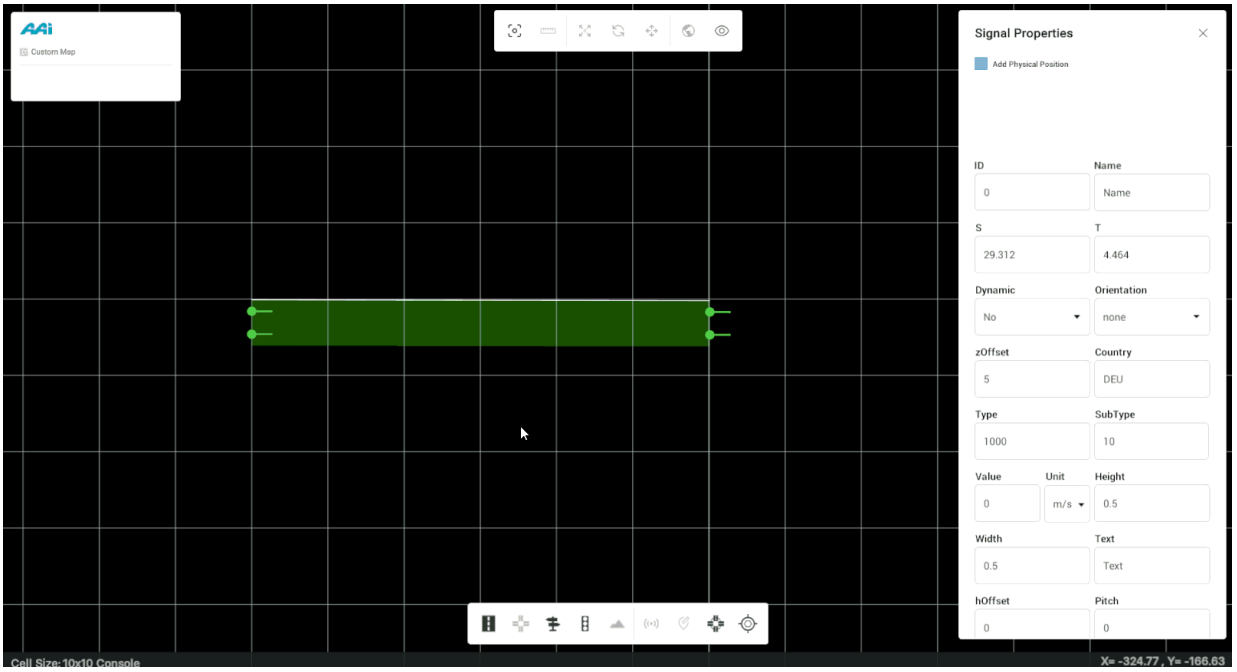
1. Select the "Signals" tool from the editor bar.



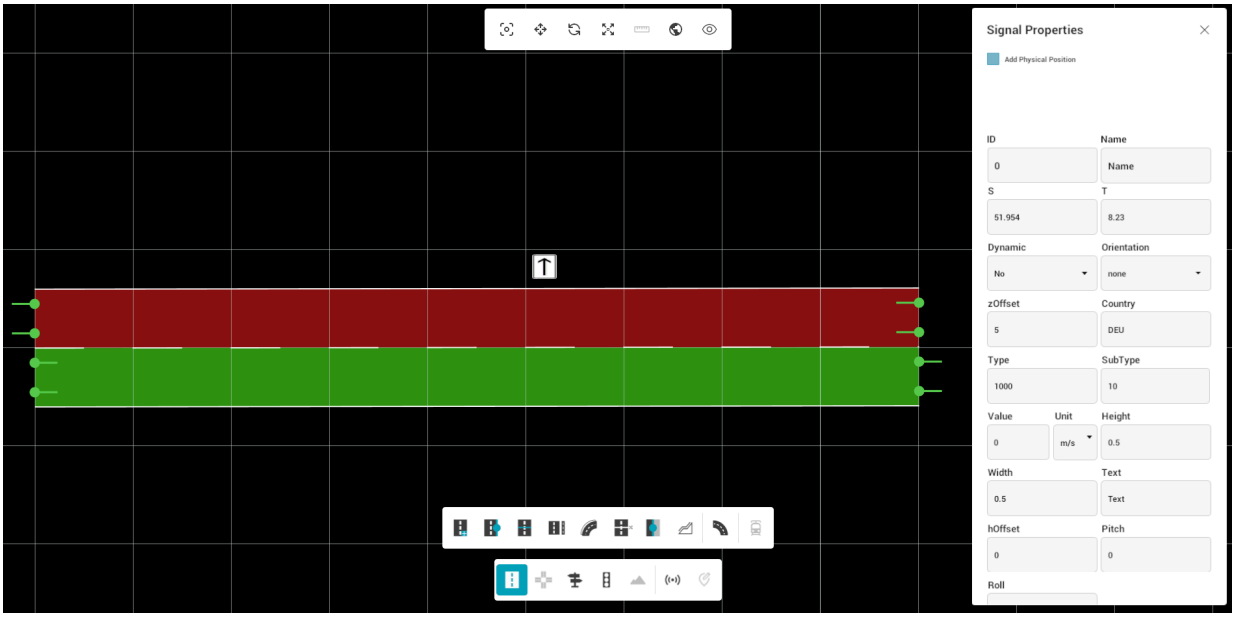
2. The "Signals" side panel will displays all available object options and alternati



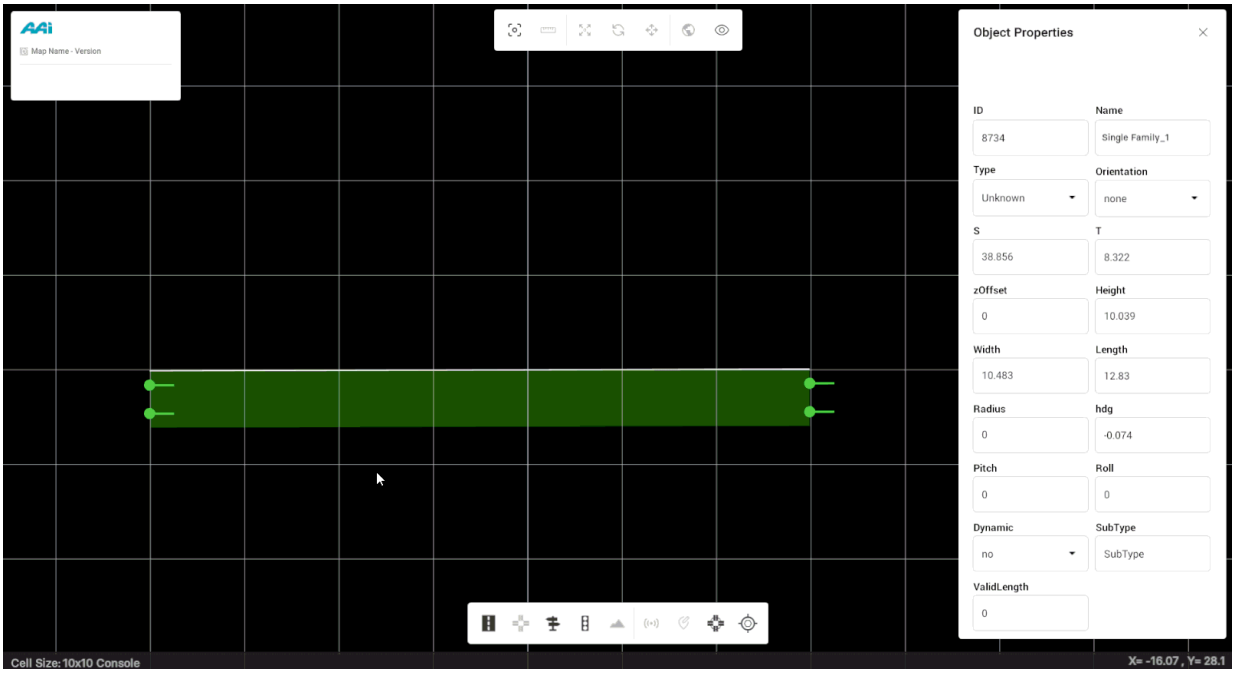
3. Drag and drop a signal to any desired position on the road while the "Signals" to



4. To select the signal properties, deselect the "Signals" tool and click on the ob



5. You can adjust the desired properties as needed to suit the situation and meet th

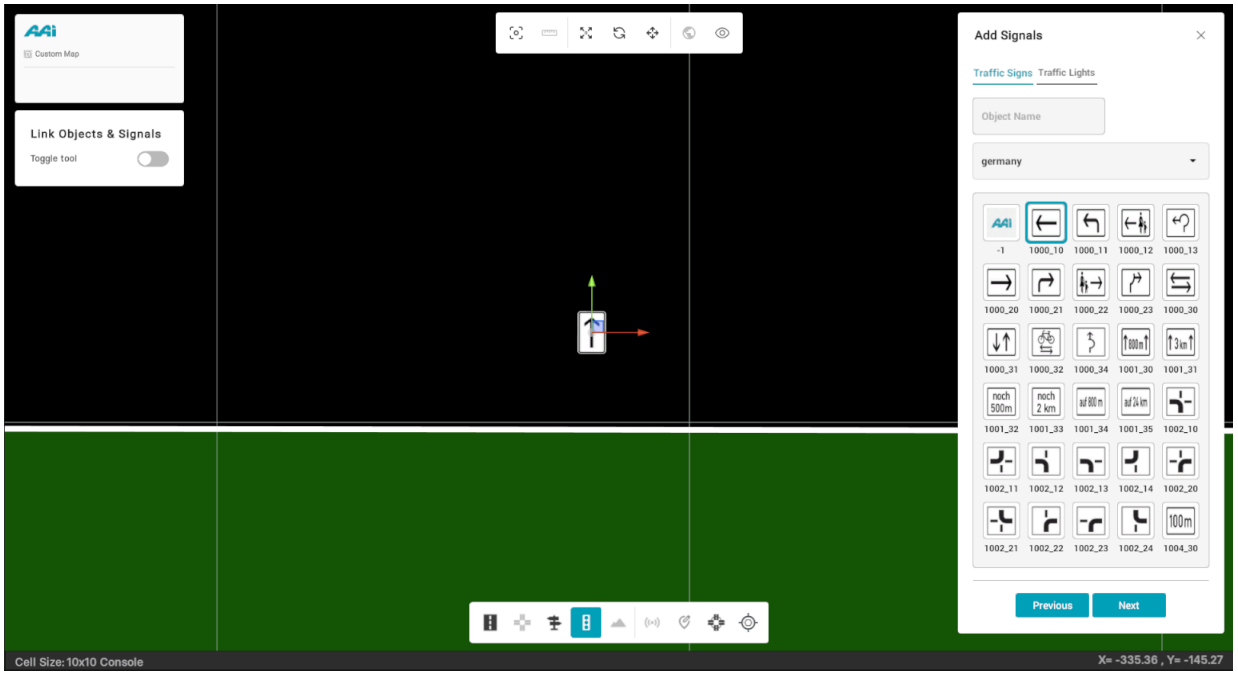


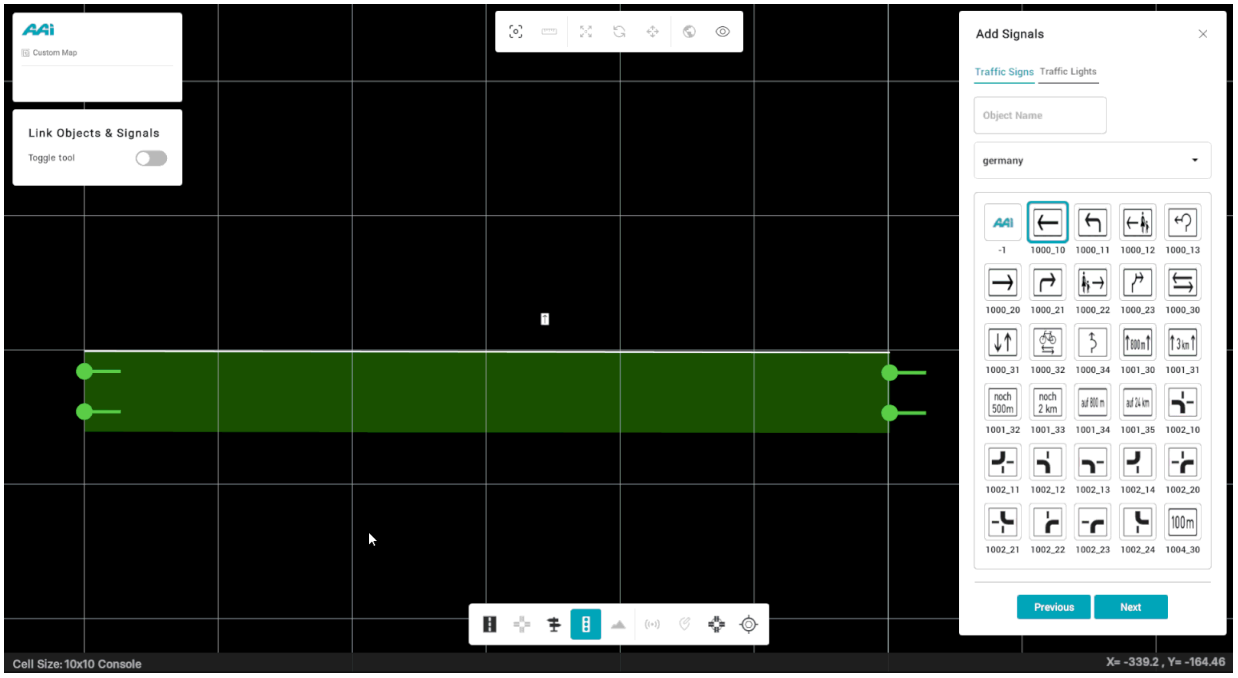
Moving Signals

1. Hover over the signal while the "Signals" selection is active in the editor bar.

2. Once hovering over the signal, click on it. By default, the "Move" (also selectab

3. This will display the X and Y axis arrows relative to the signal.



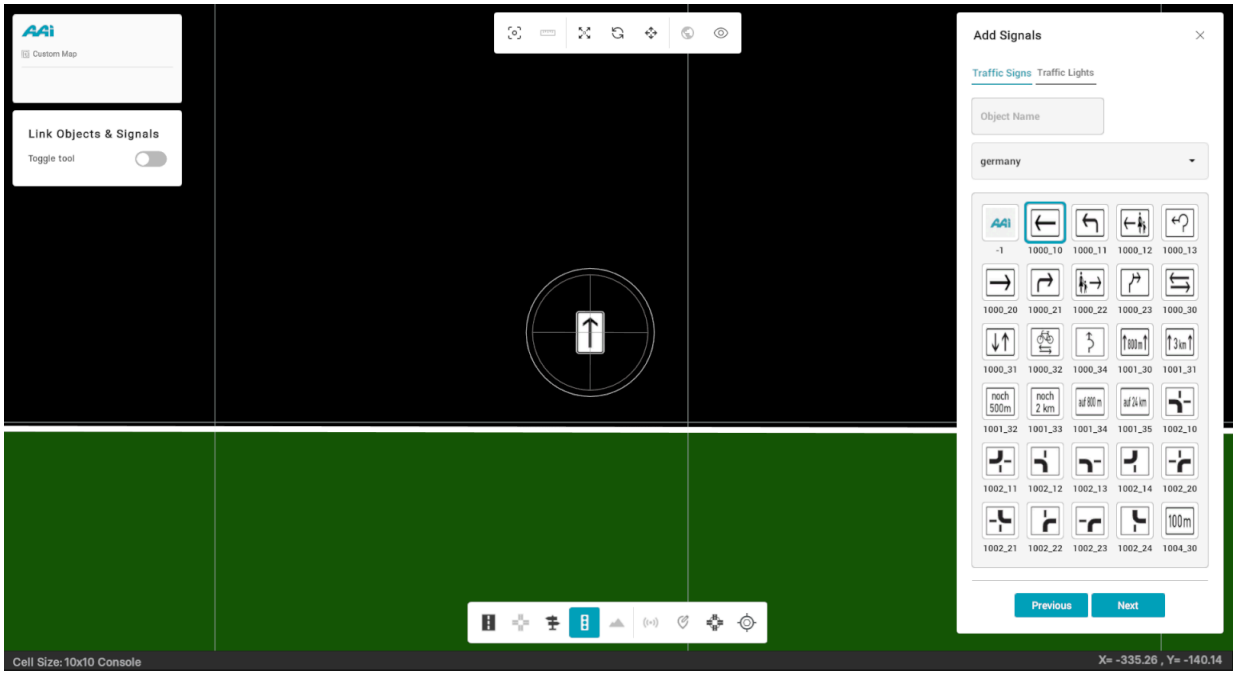


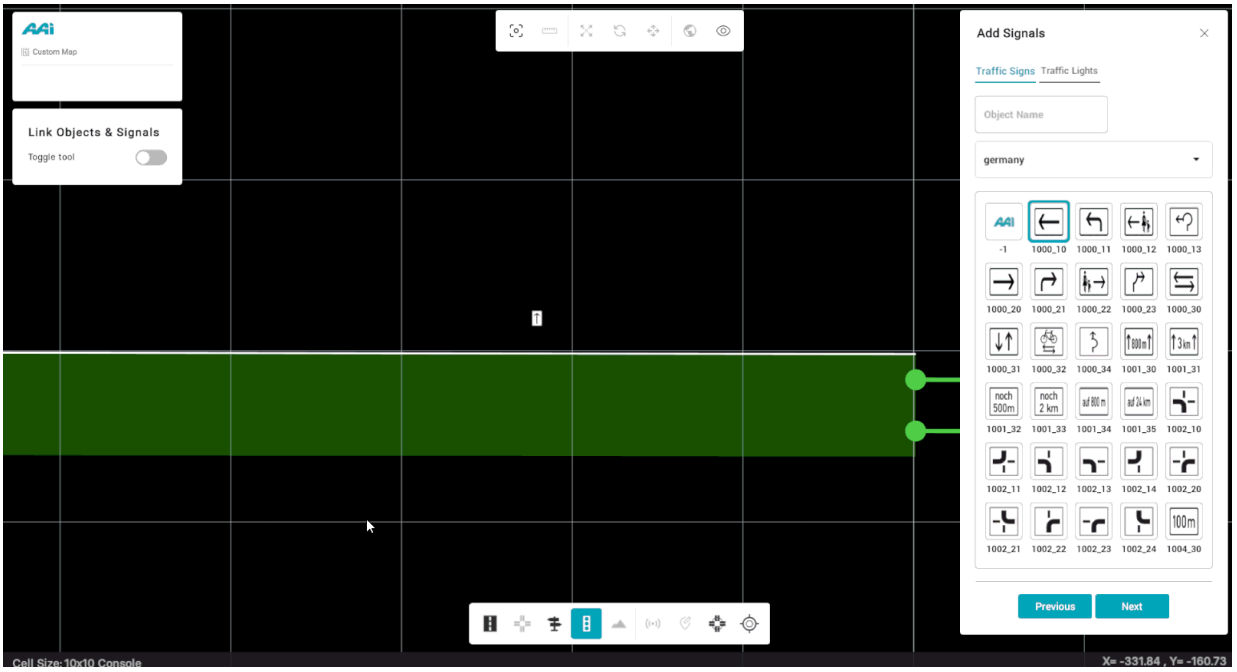
Rotating Signals

```
1. Hover over the signal while the "Signals" selection is active in the editor bar.
```

2. Once hovering over the signal, click on it. Make sure you have the "Rotate" optic

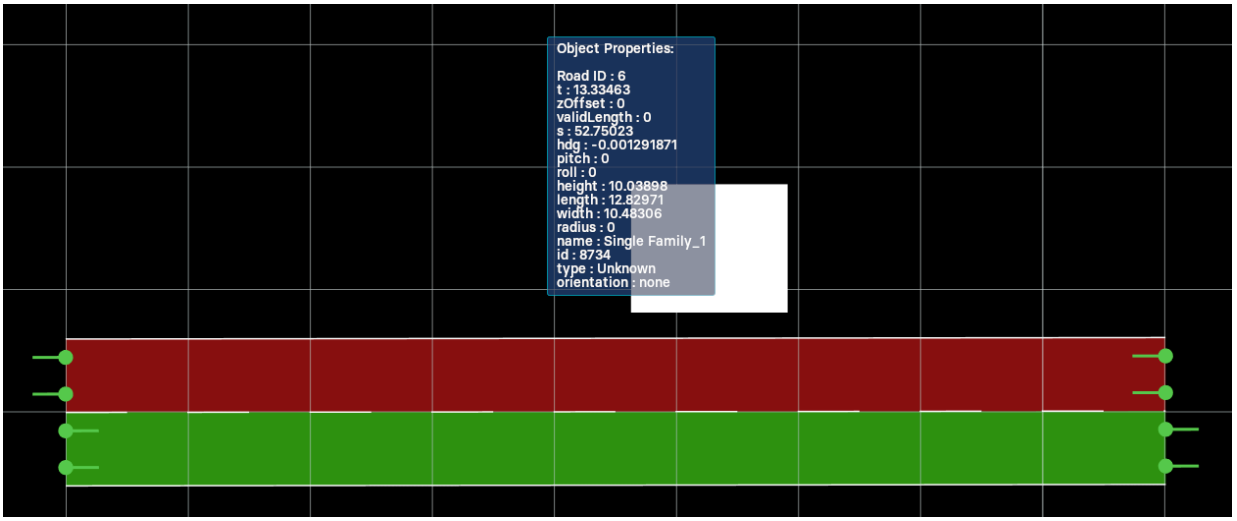
3. This will display a 360-degree radial selection wheel to indicate the specific r





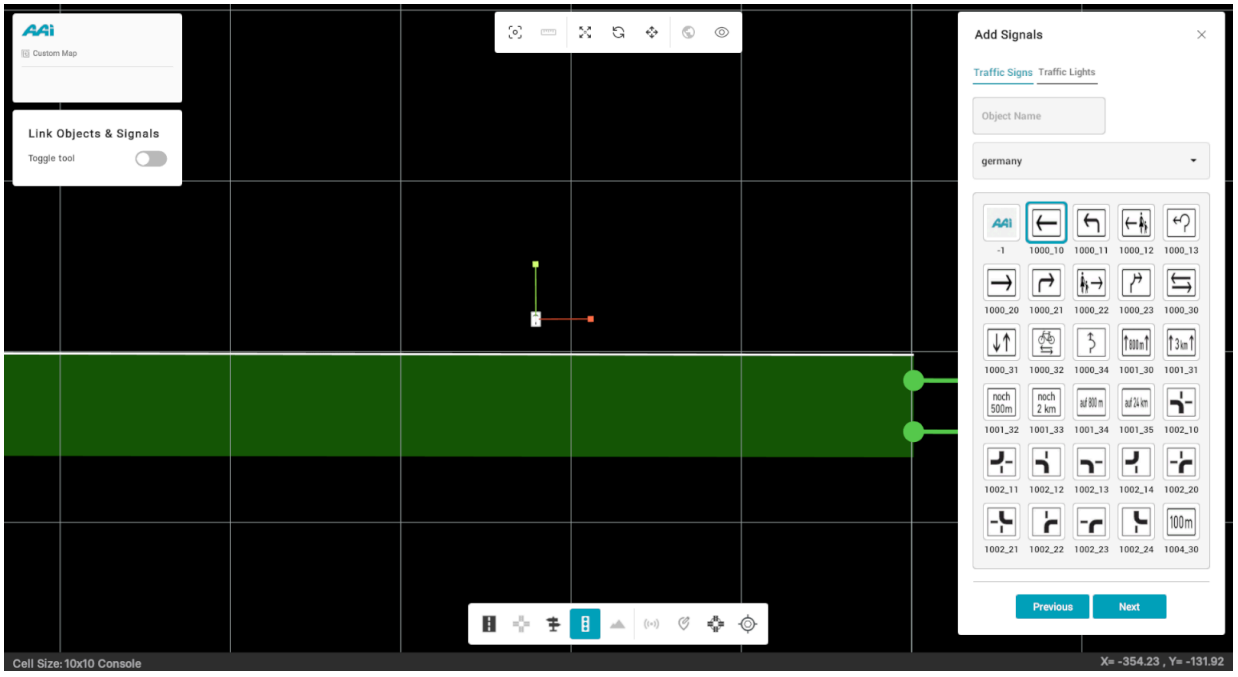
Scaling Signals

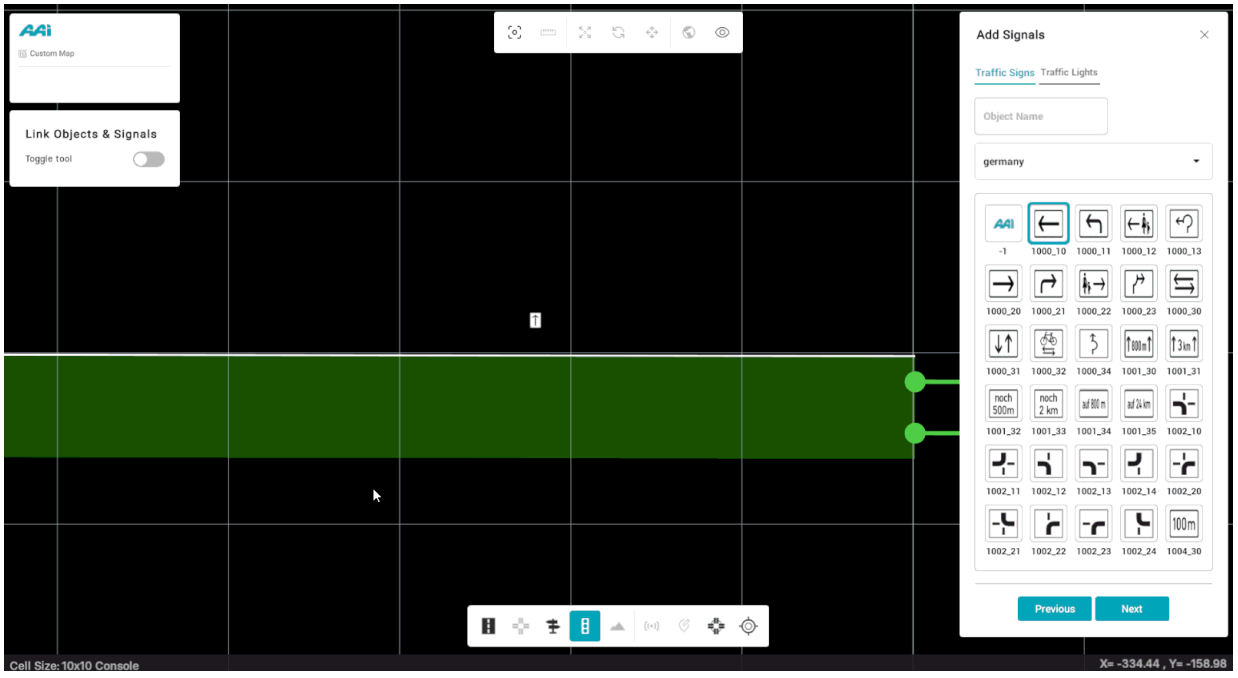
1. Hover over the signal while the "Signals" selection is active in the editor bar.



2. Once hovering over the signal, click on it. Make sure you have the "Scale" optior

3. This will display the X and Y axis arrows relative to the signal.



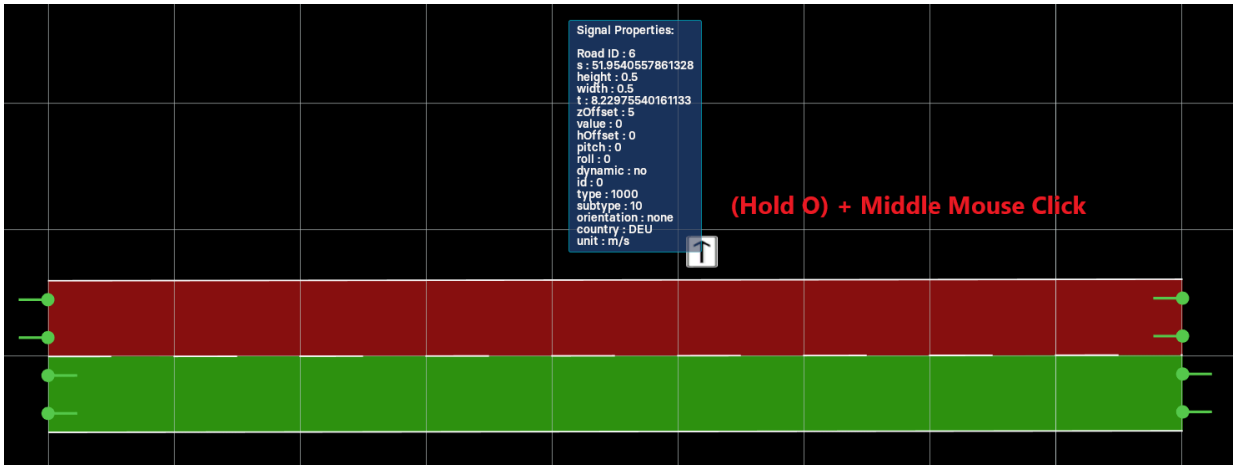


3.2.8 Objects & Signals

Deleting Objects and Signals

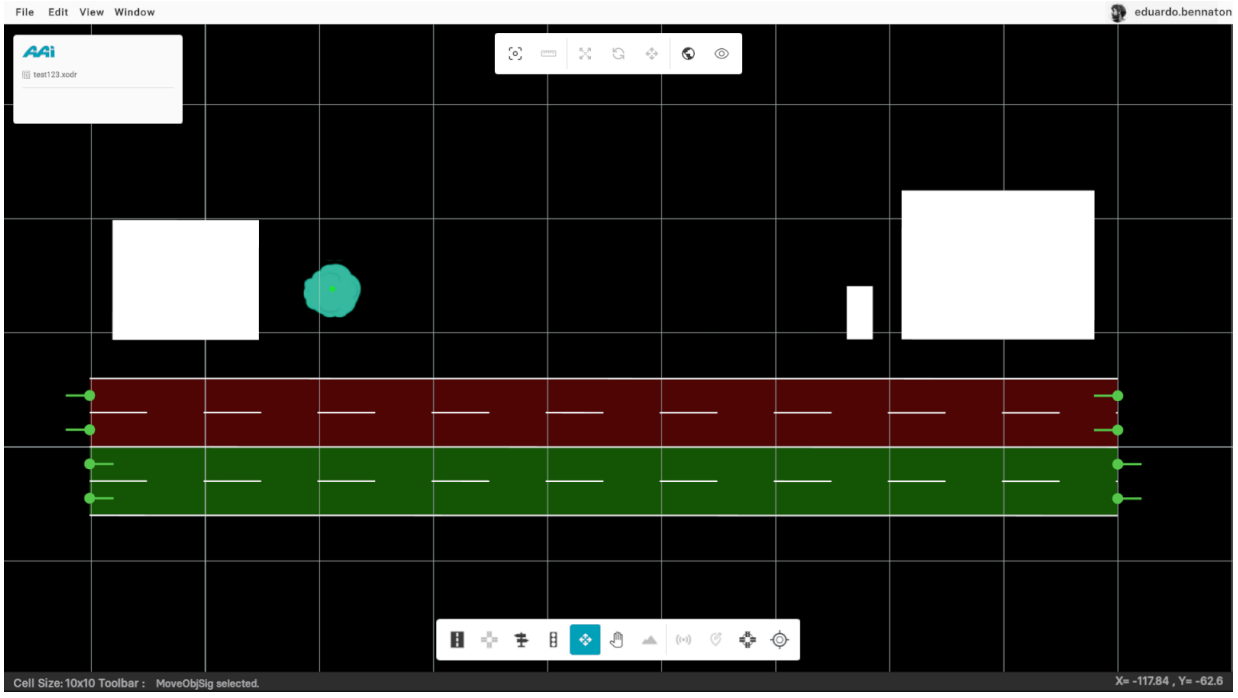
To delete an object or signal, the user must hover over the corresponding object/signal and use a designated hotkey combination.

Hold "o" and click over the signal/object using the "middle-mouse button".

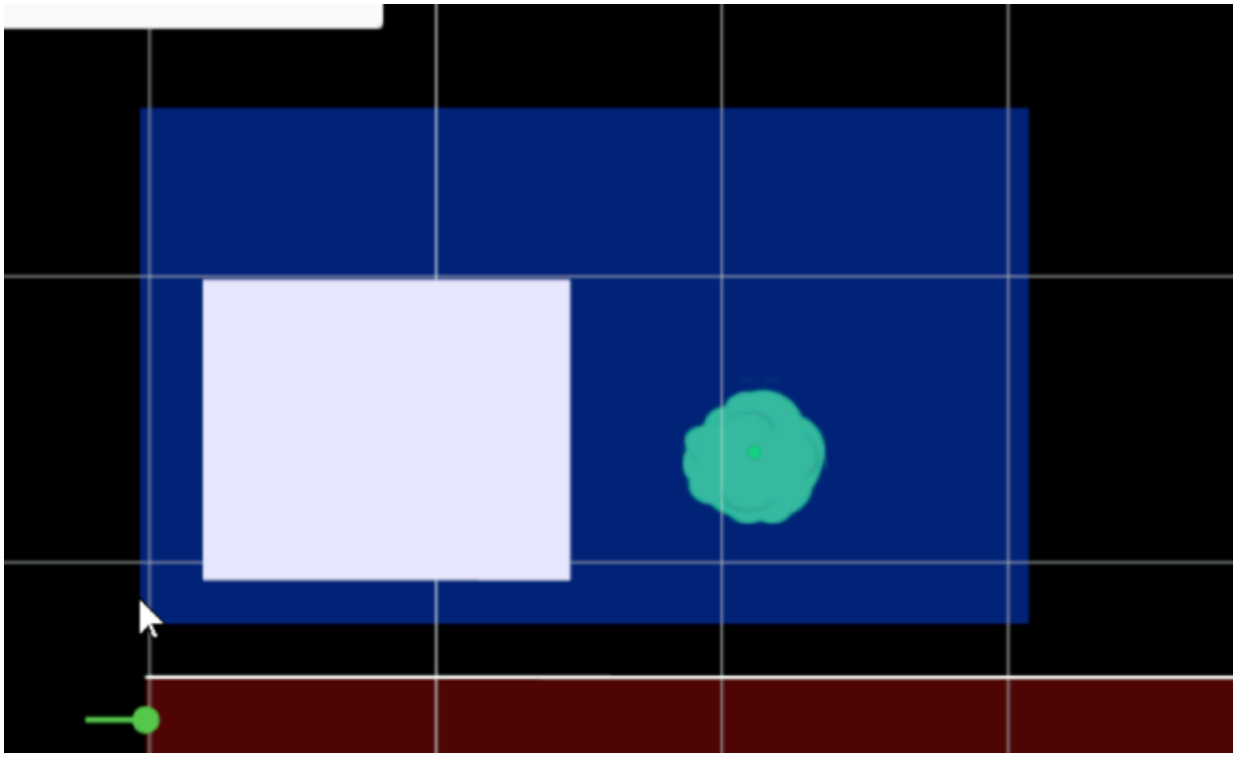


3.2.9 Move ObjSig

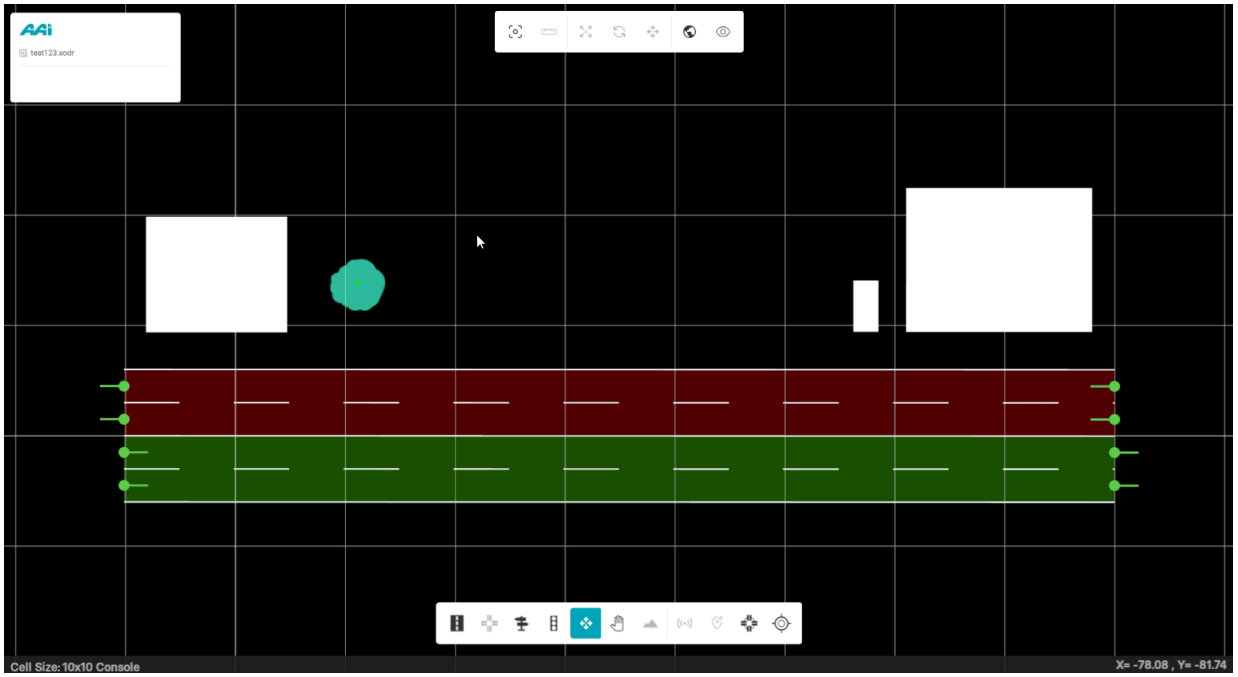
To move multiple objects and/or signals simultaneously, the user can use the Move ObjSig tool to select a specific section of the map and drag the desired objects/signals to a new location.




```
1. Click and hold the secondary mouse button (usually the right button).
```

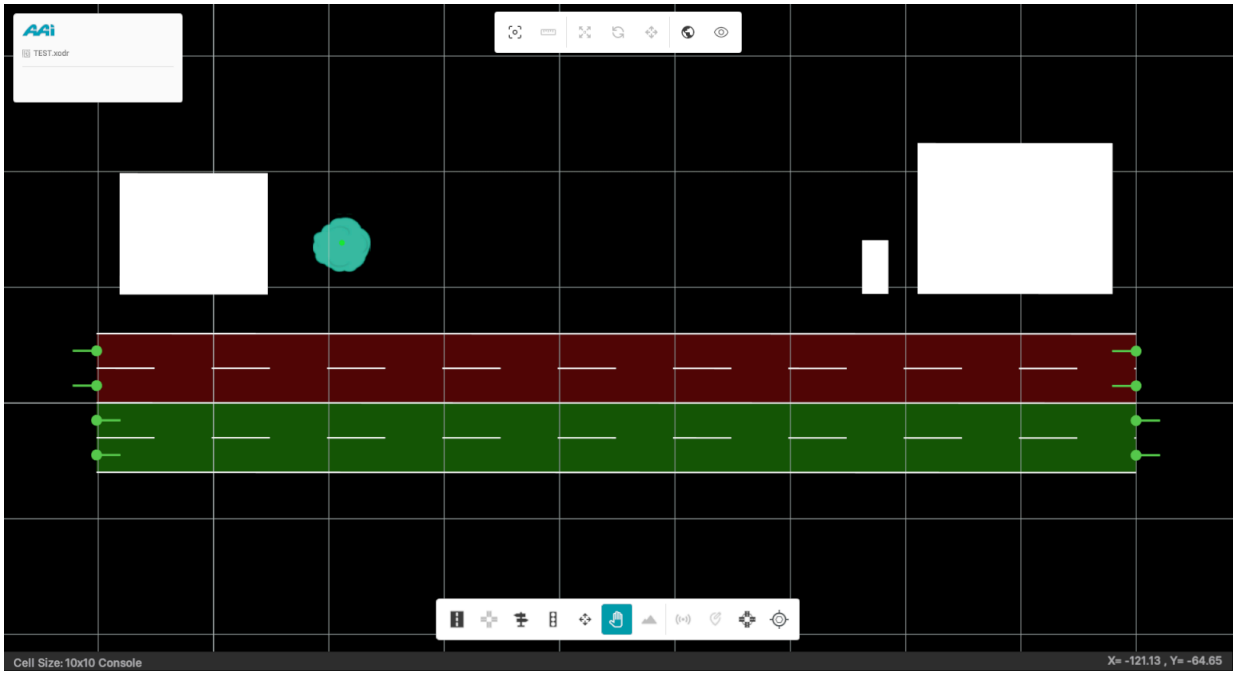


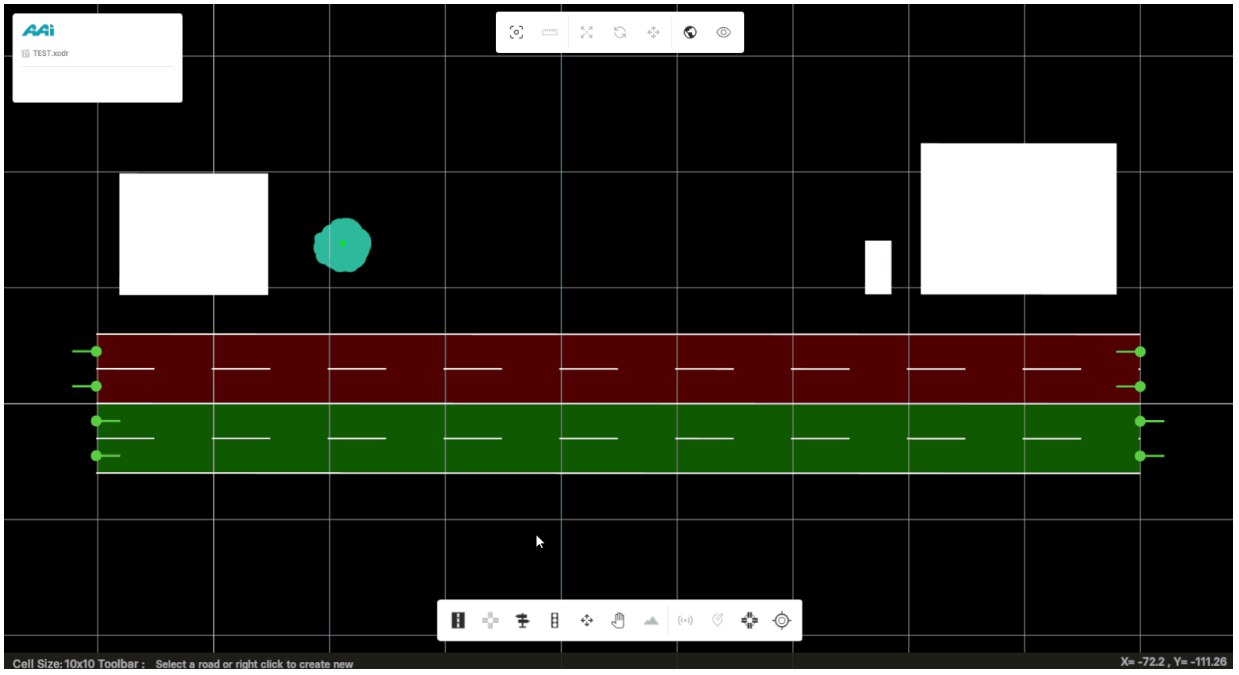
```
2. With the secondary mouse button on hold, drag the objects / signals to the new lo
```



3.2.10 Pan

This option allows the user to navigate the map-editing window in a view-only mode—enabling panning without making any edits



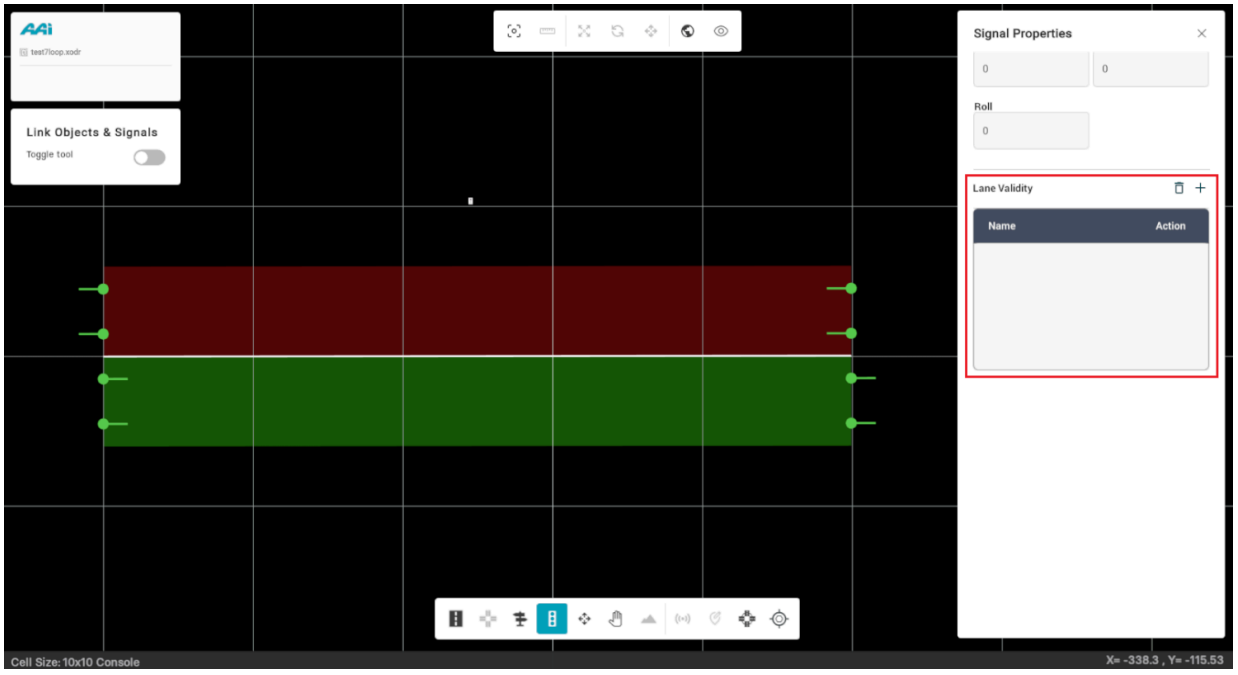


3.2.11 Lane Validity

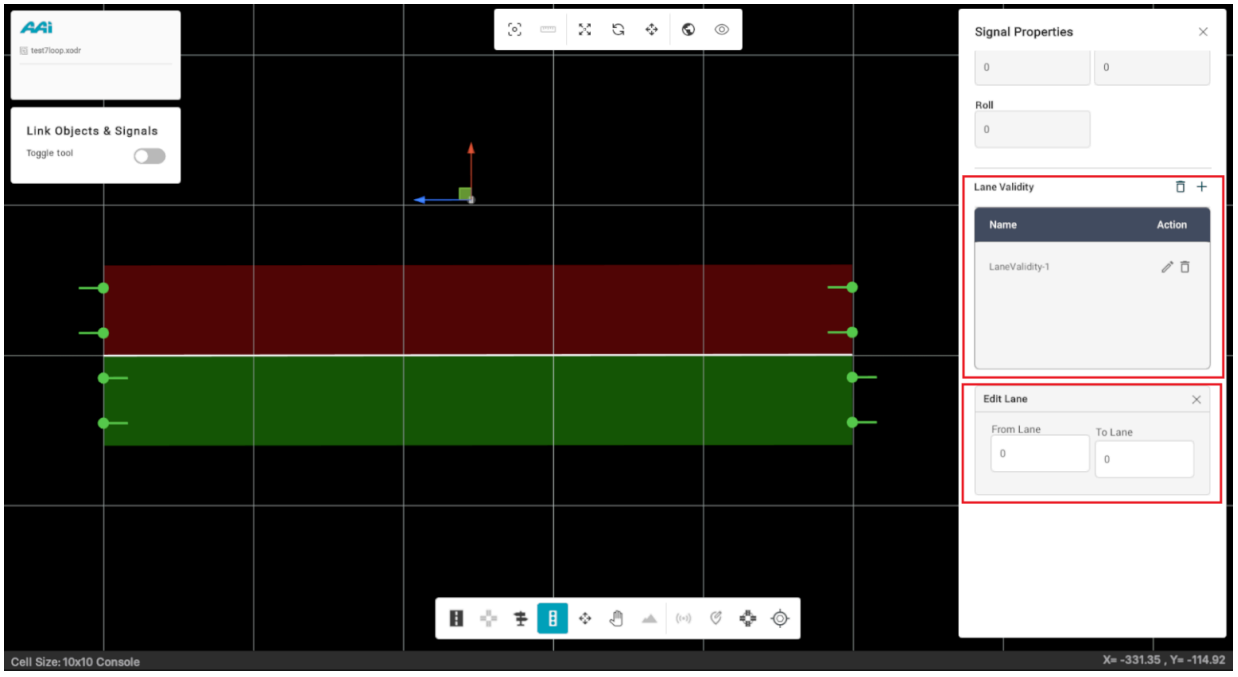
By default, objects are valid for all lanes pointing into the object's direction. Once you have added object/objects on a road, you can specify their validity on the limited lanes. For instance, there are multiple lanes in a road, and you want to limit the existing object on a road to only few lanes.

Note: For single-lane-validity of the signal, provide identical values for fromLane and toLane.

```
2. Select the "Add" button (or the "+" icon).
```



In **From Lane**, enter the Lane Position of the starting lane and in toLane entry box, type the Lane Position of the last lane for lane validity.

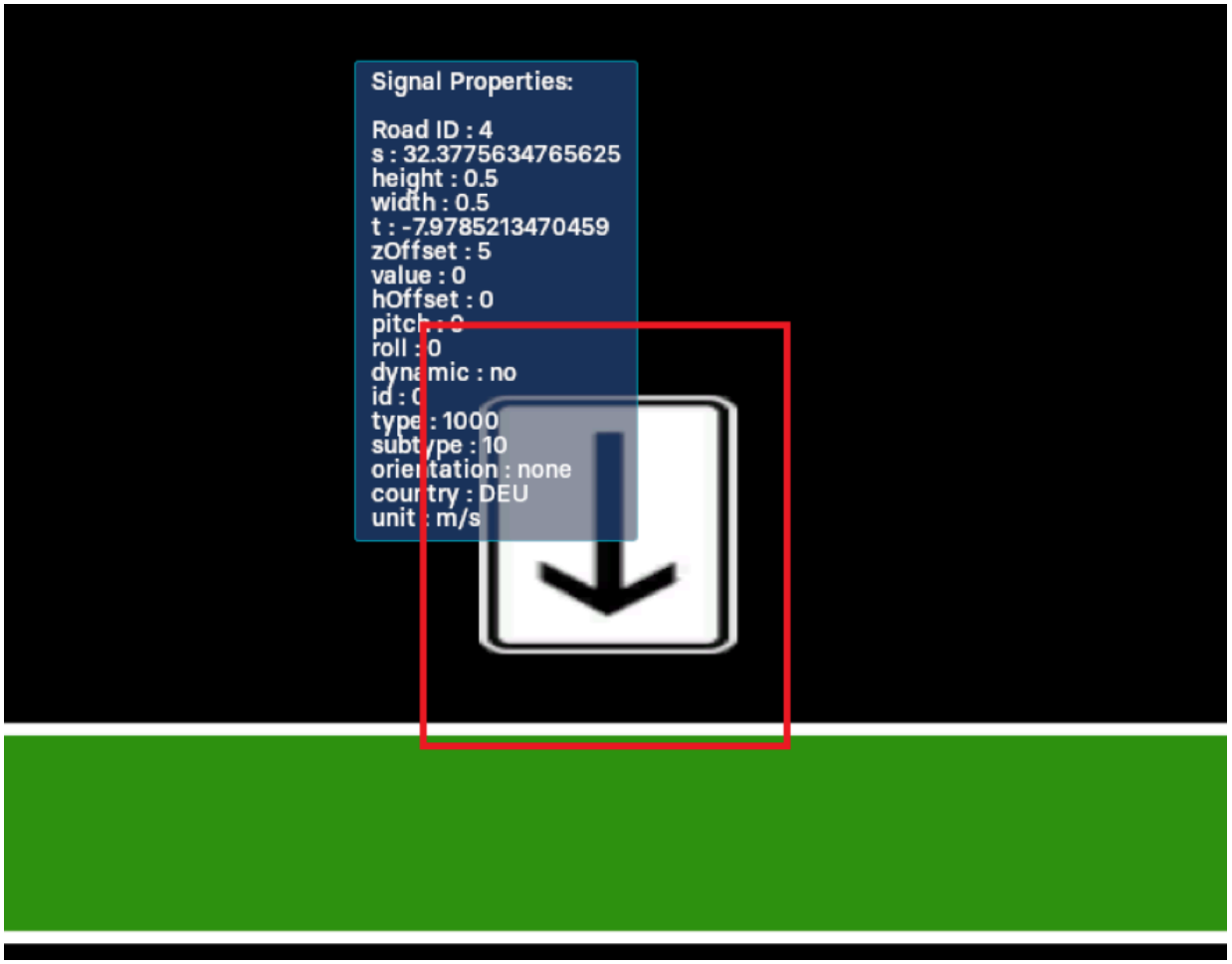


3.2.12 Position Road

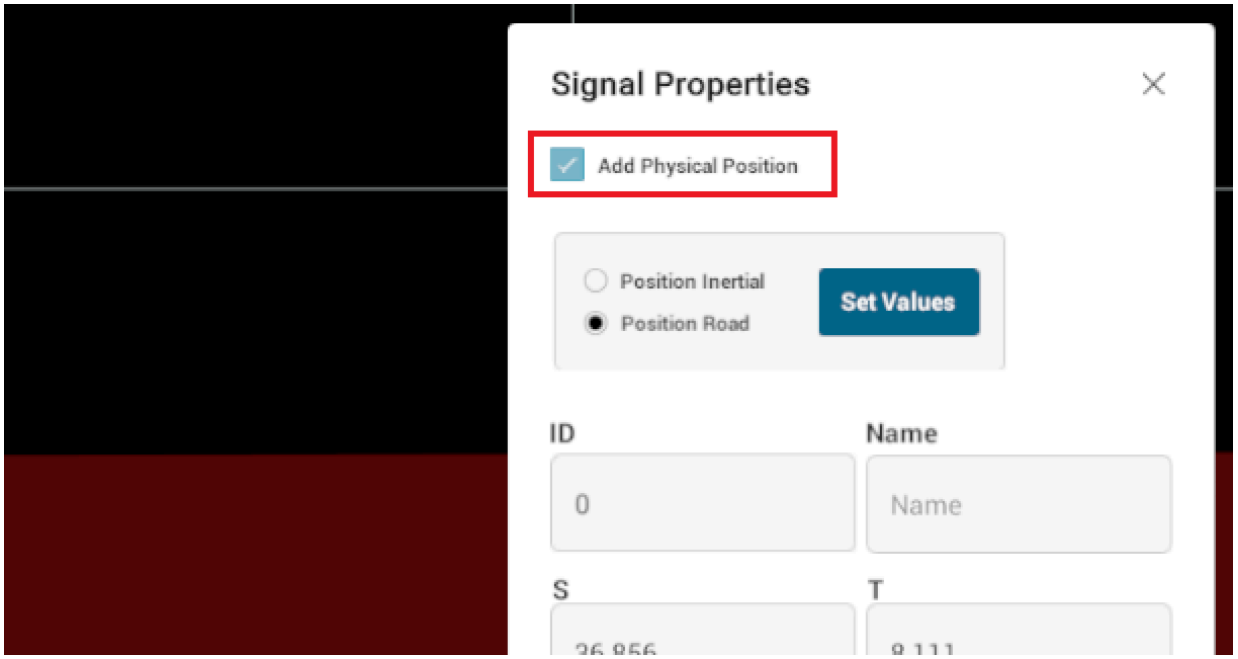
This option lets you relocate the physical position of the existing signal. *Note that the logical position of the signal remains the same.*

position inertial, needs x, y and z coordinates of the new location of the signal.

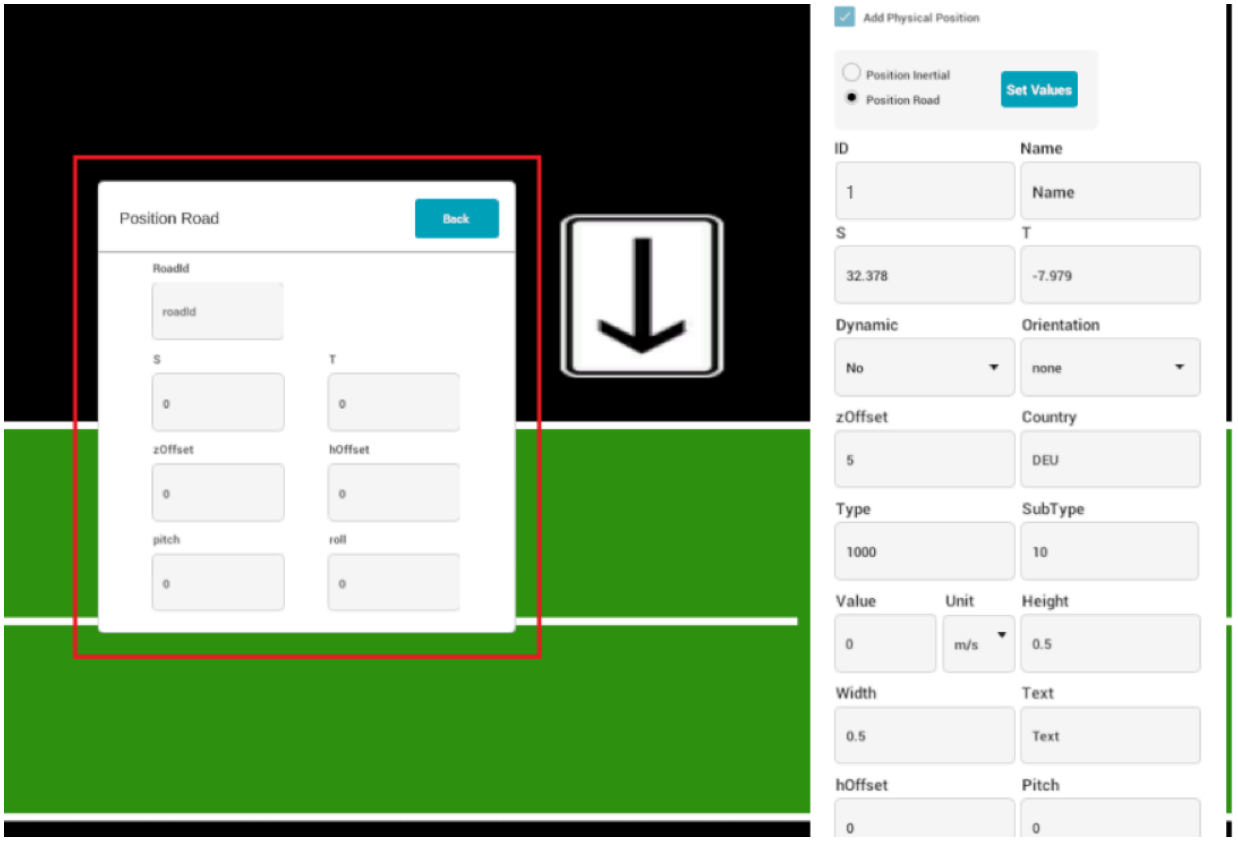
Add a signal if you currently have none. Locate and click the signal without having



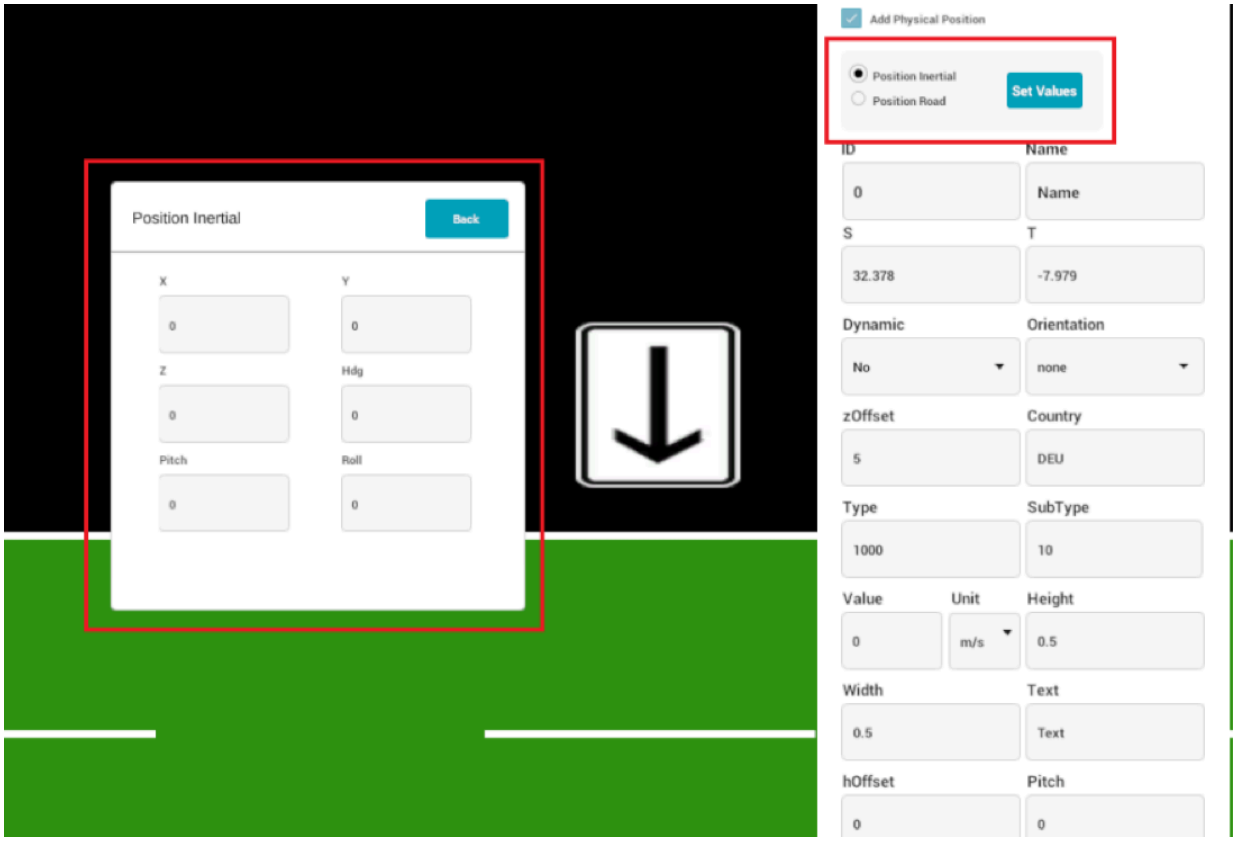
From the signal properties panel, select "Add Physical Position". This will appear a



When the checkbox is enabled, some new variables will show up on a new popup.



Make sure to select "Position inertial". This will modify the variables inside of th



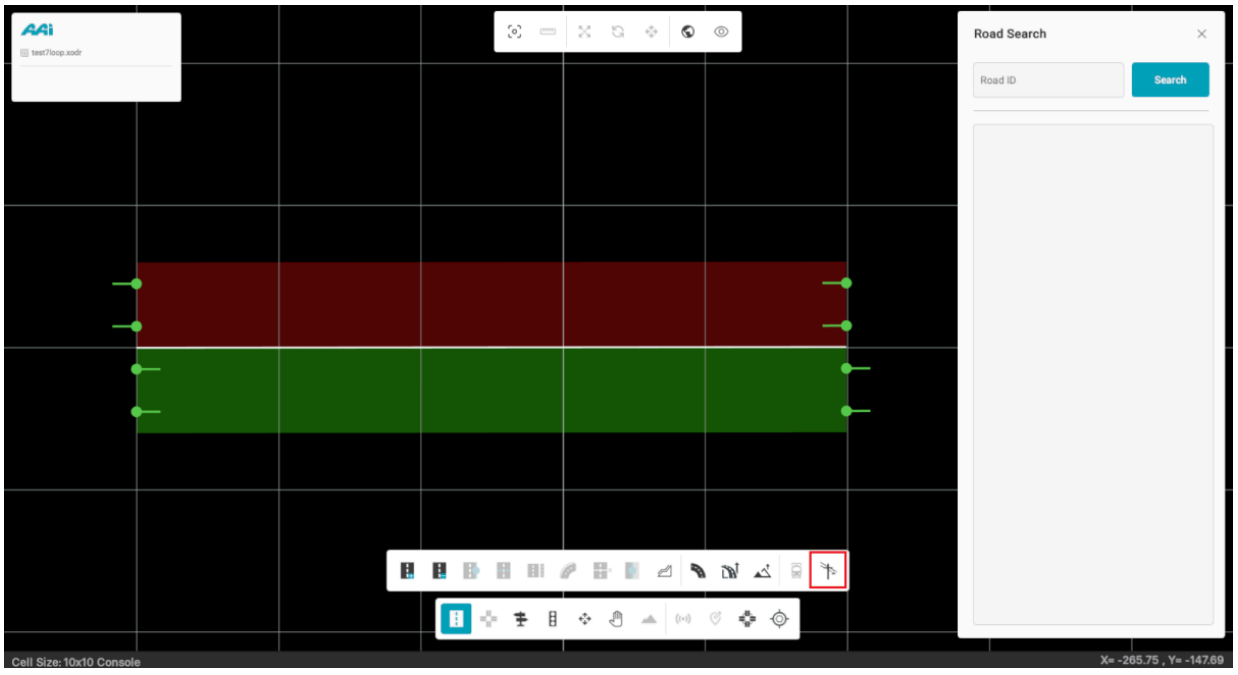
3.2.13 Transform Ego

Information is currently unavailable in the latest RepliMap version.

3.2.14 Tram Powerlines

This tool enables users to create and link connectors within the map-editing view, supporting multiple connection configurations. It is designed to realistically depict wire-based connections—such as power lines—between poles, connectors, and the dependent tram feature itself.

```
1. Navigate to the "Tram Powerline" tool located in the "Road" section.
```



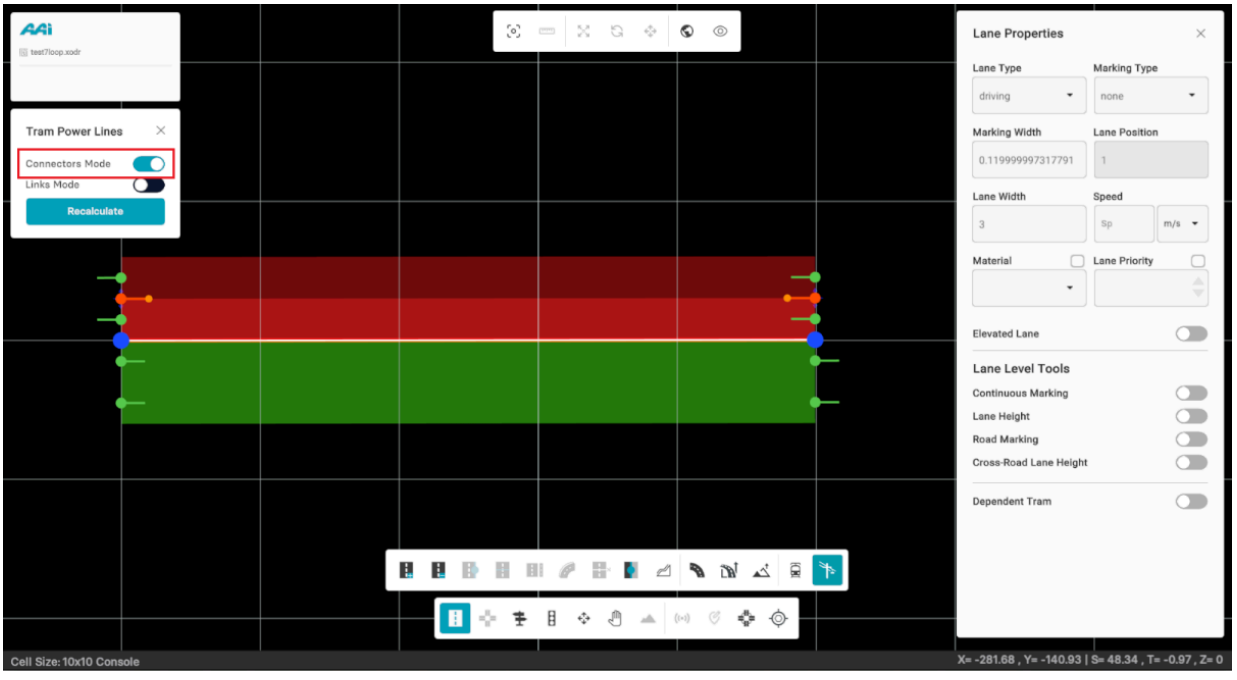

```
2. Once selected, a panel titled "Tram Power Lines" will open, displaying two modes
- Connectors Mode: Connectors Mode allows you to place connectors where needed.
- Link Mode: enables the user to create connections between connectors and the deper
```

Connectors Mode

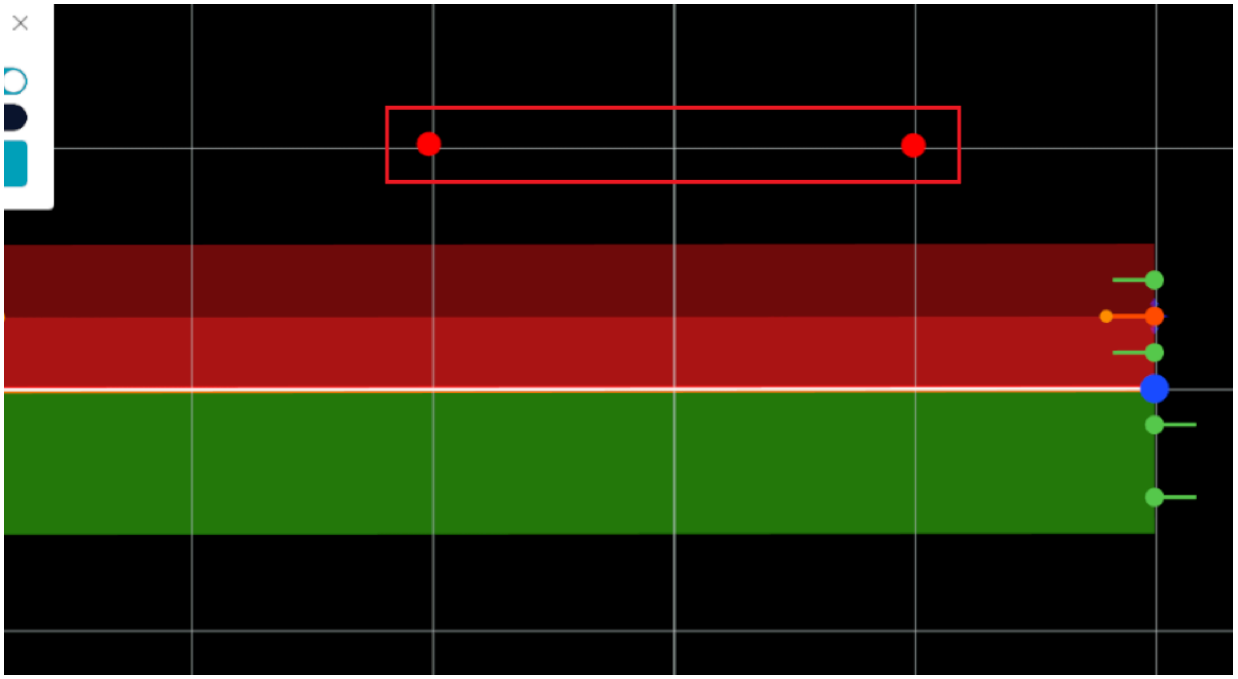
This feature allows users to place connectors as needed for tram powerline configurations. Connectors serve as attachment points for either poles or dependent trams and can be placed freely anywhere on the map, independent of road positions.

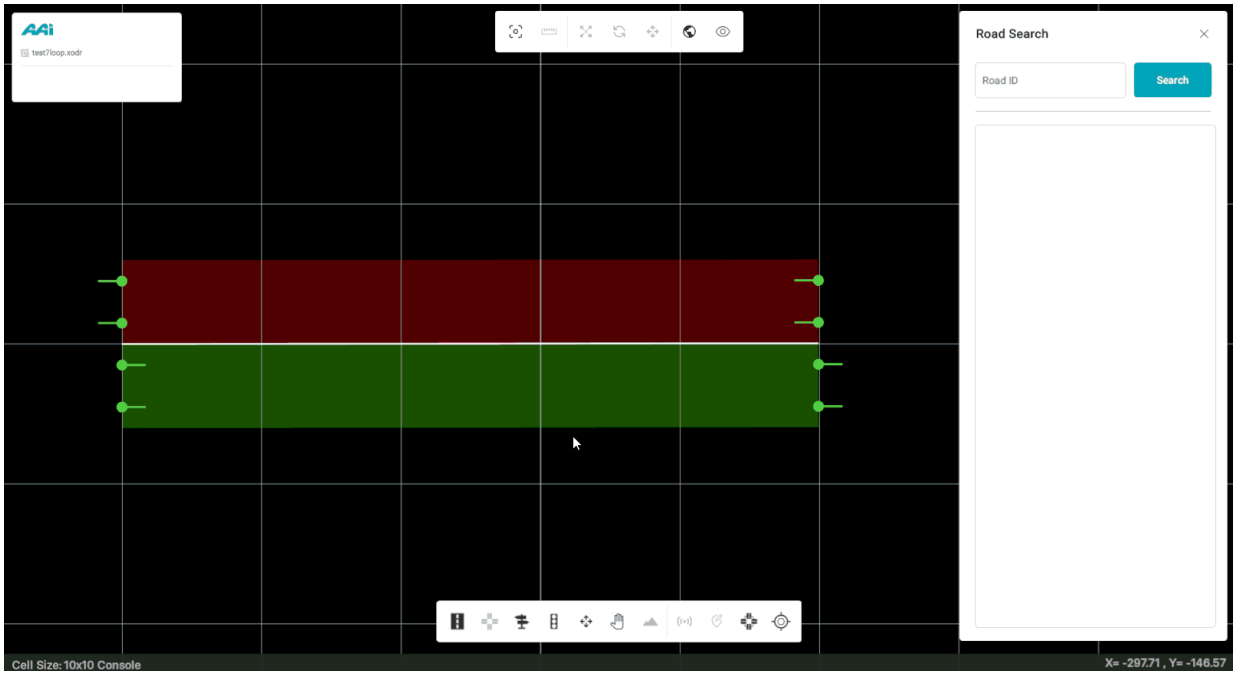
Creating Connectors

```
1. Toggle the "Connectors Mode" switch. When enabled, it will turn cyan.
```



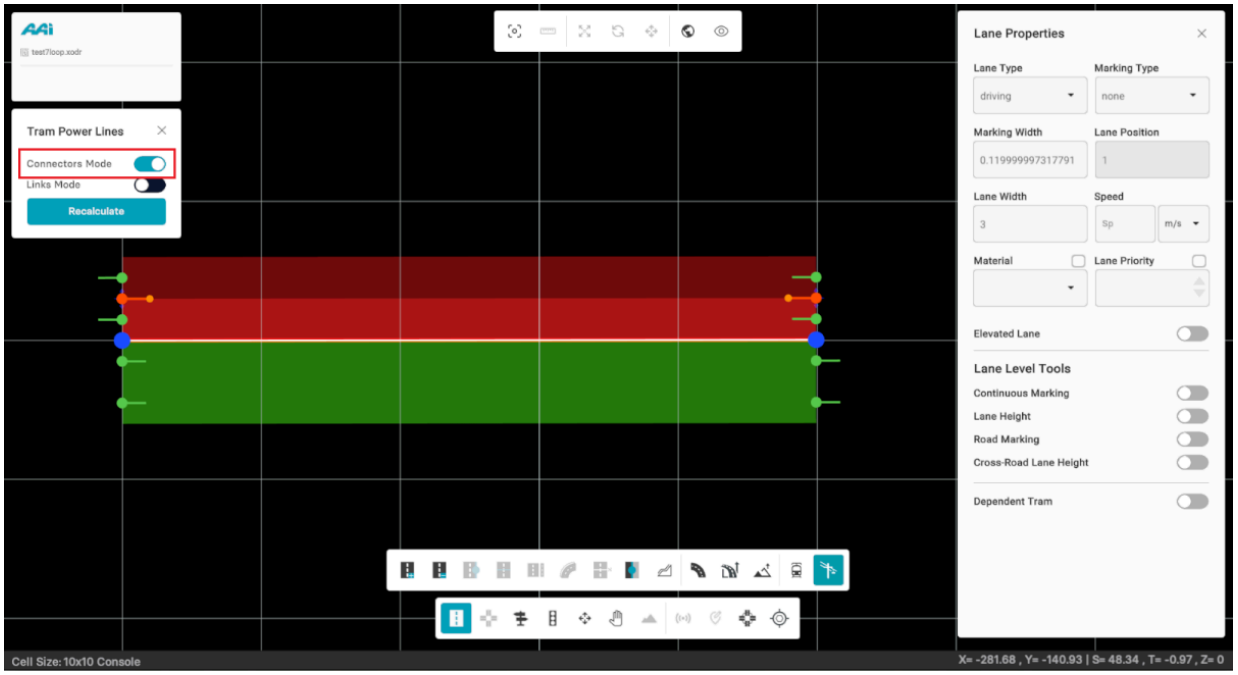
2. Use the primary mouse button (typically the left button) and click on the desired



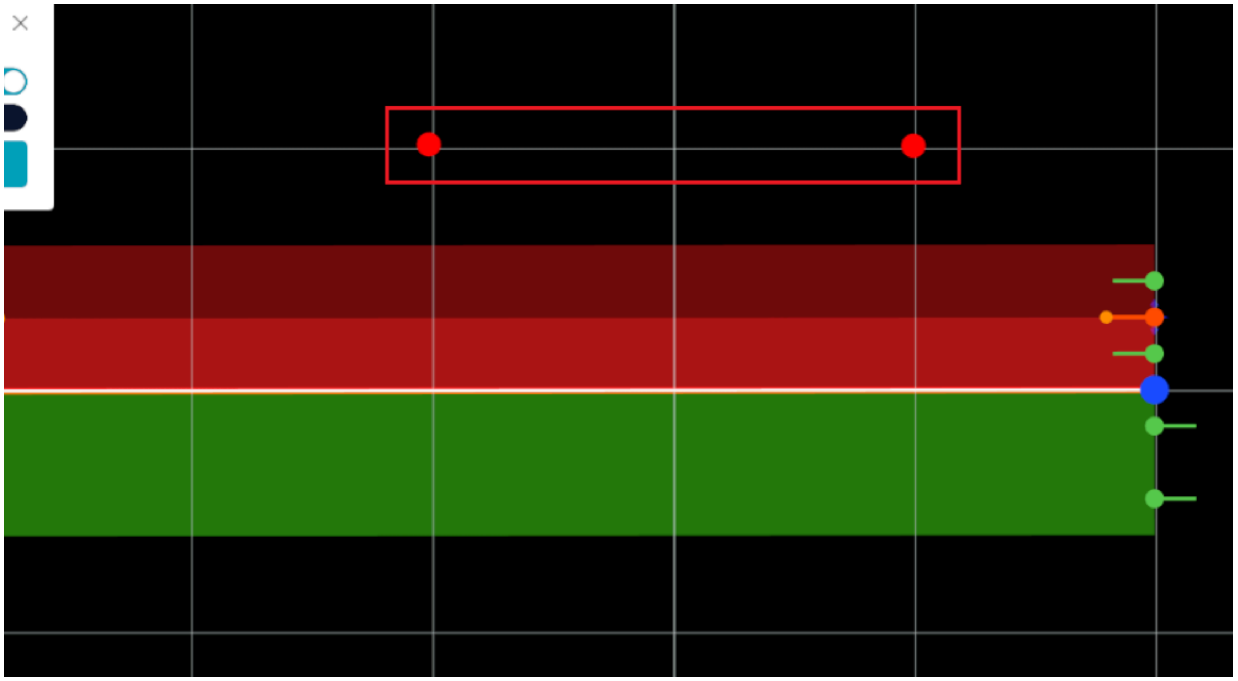


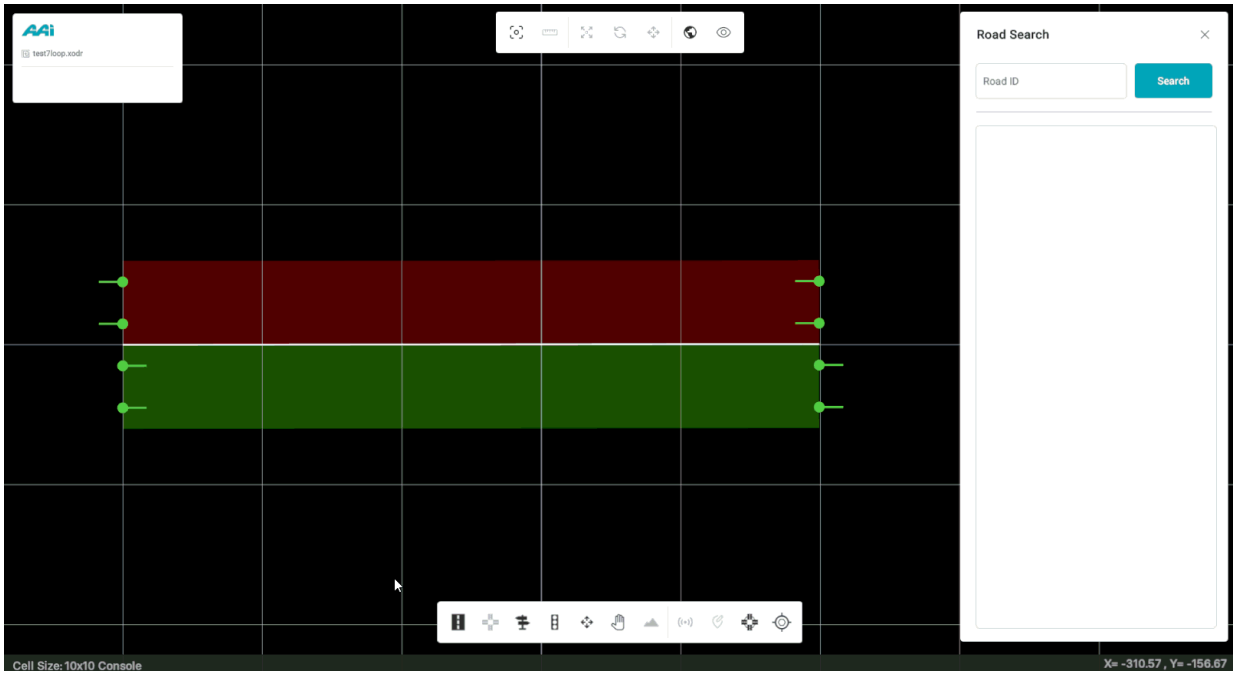
Deleting Connectors

1. Toggle the "Connectors Mode" switch. When enabled, it will turn cyan.

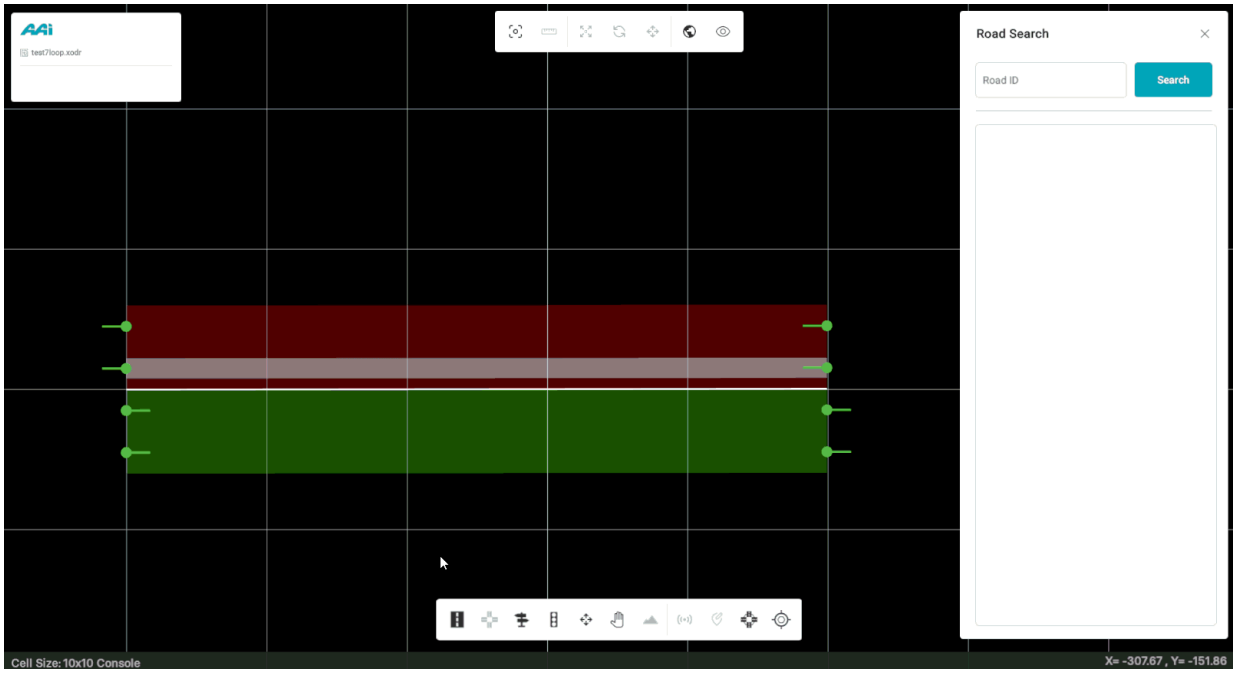


2. Use the secondary mouse button (typically the right button) and click on the desi





Connectors can also be placed directly on a dependent tram track within a lane. When placed, they appear as a green sphere, vertically centered along the lane. These connectors can also be used in the linkage process.

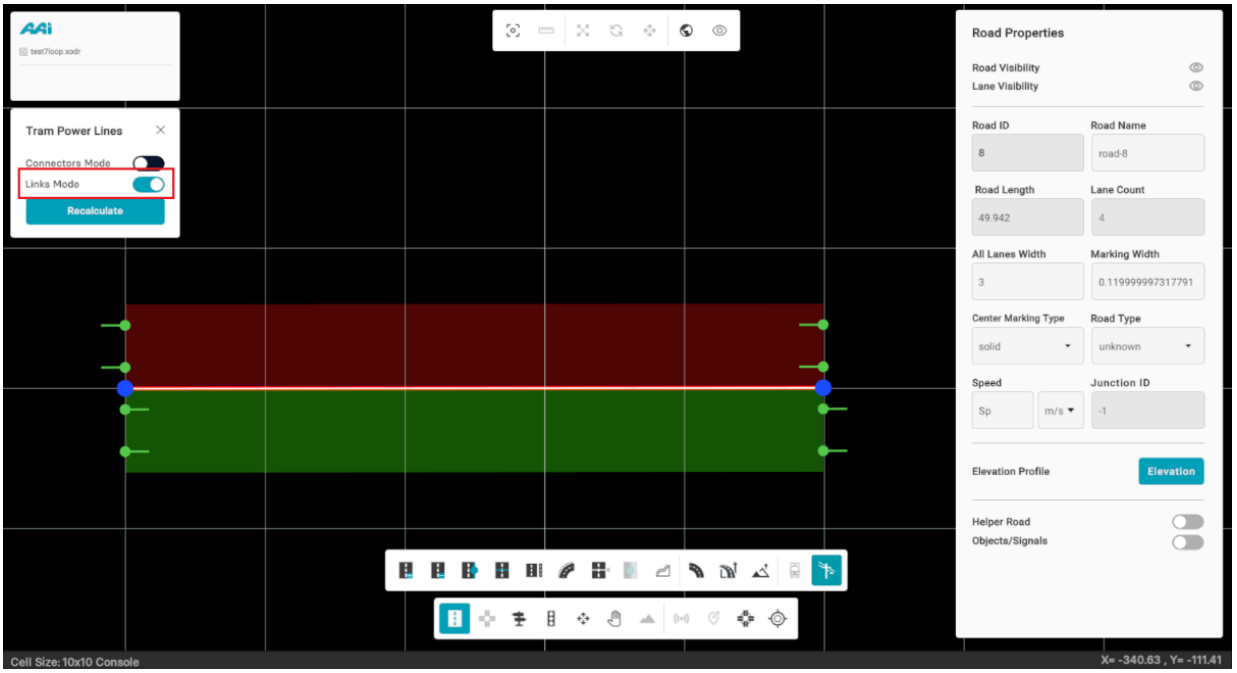


Links Mode

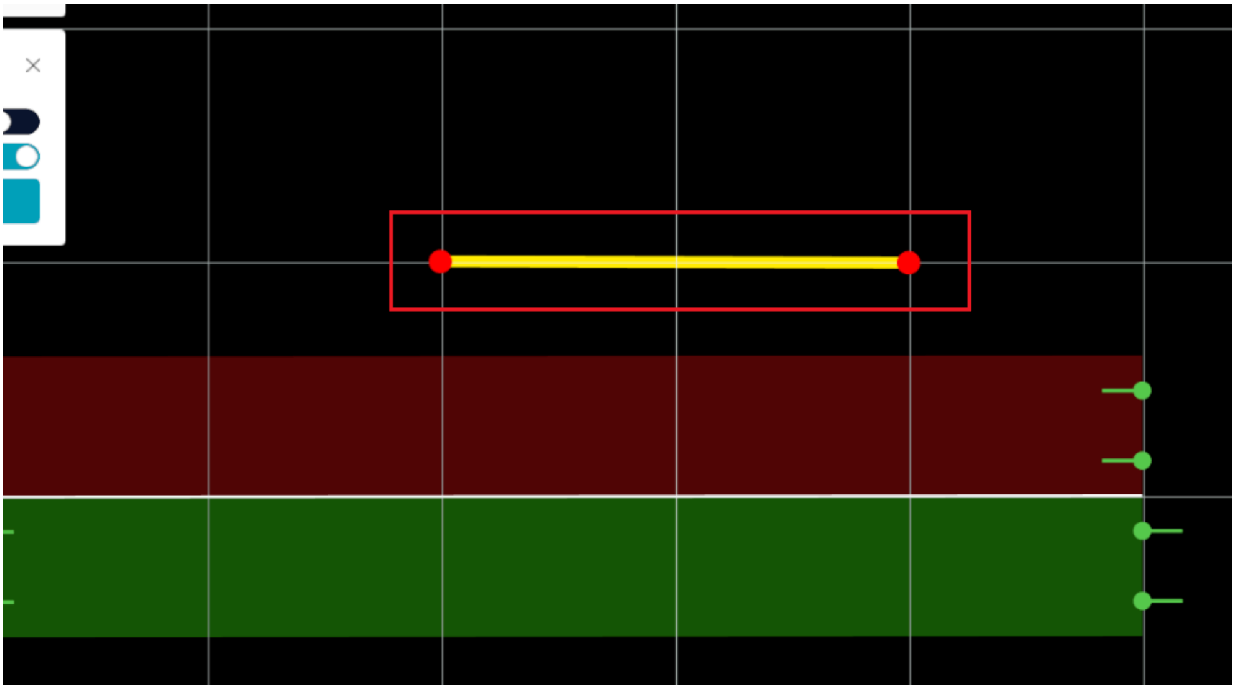
This feature allows users to create links for tram powerline configurations. Links act as connection lines between poles, dependent trams, or connectors, and can be freely established anywhere on the map where these elements are present.

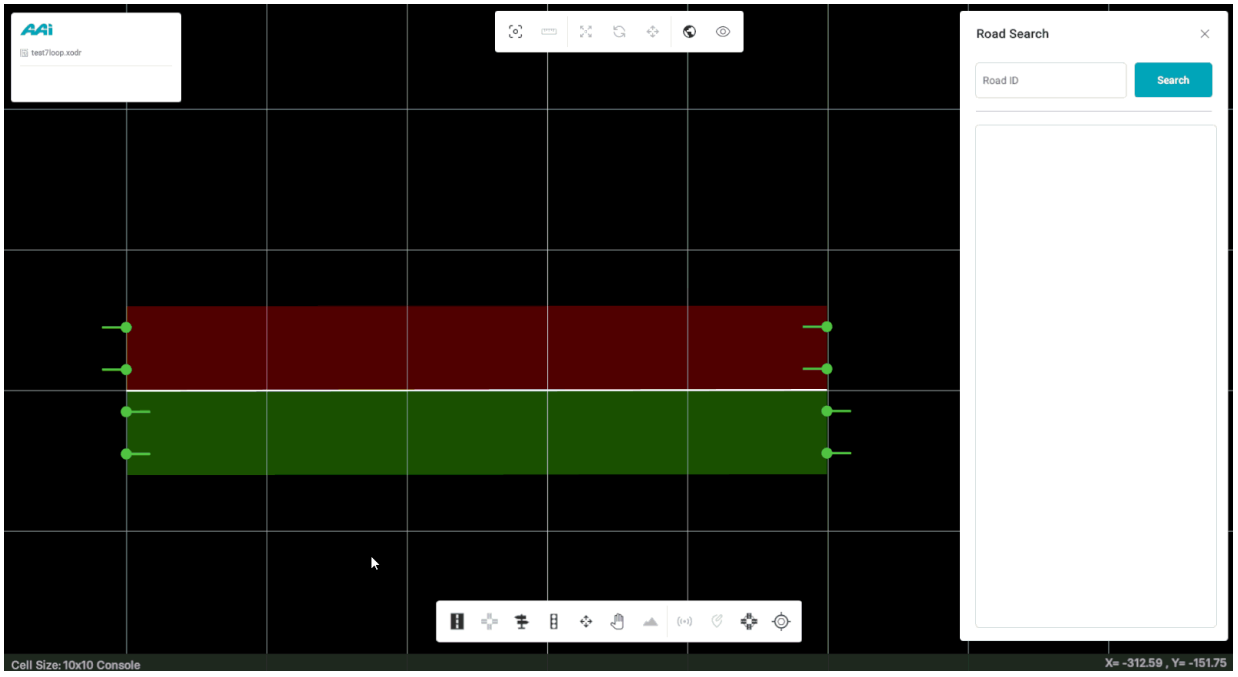
Creating Links

1. Toggle the "Links Mode" switch. When enabled, it will turn cyan.



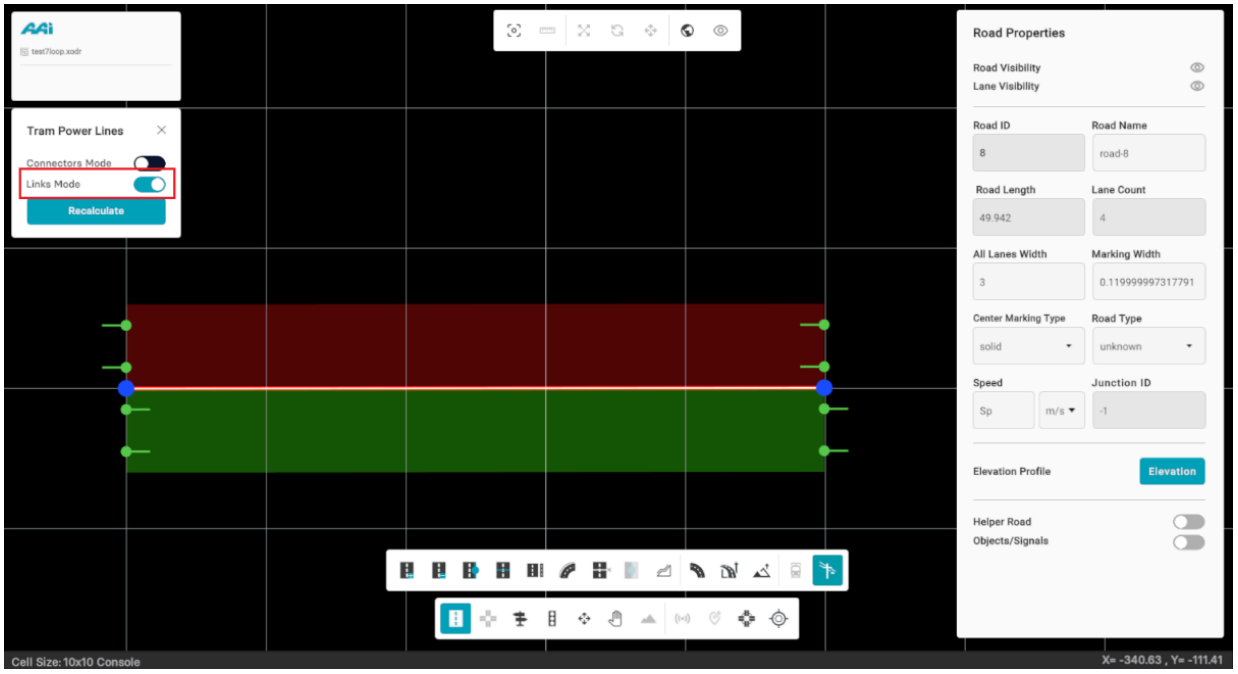
2. Use the primary mouse button (typically the left button) to click on the desired



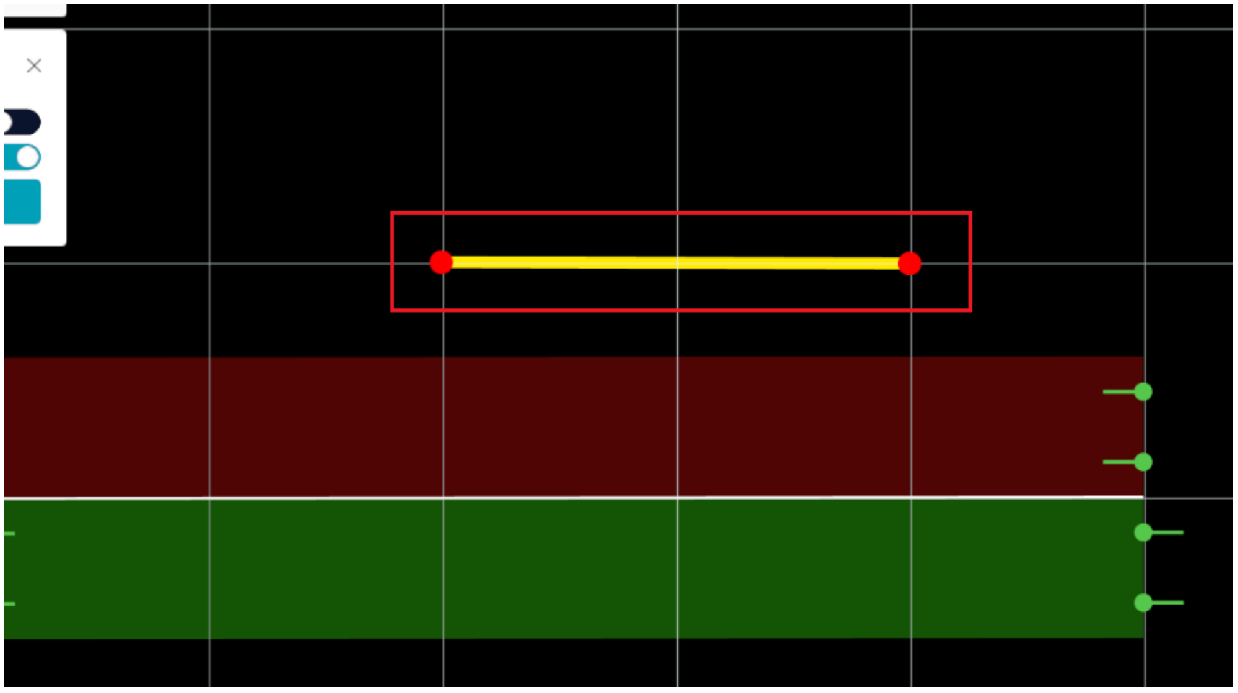


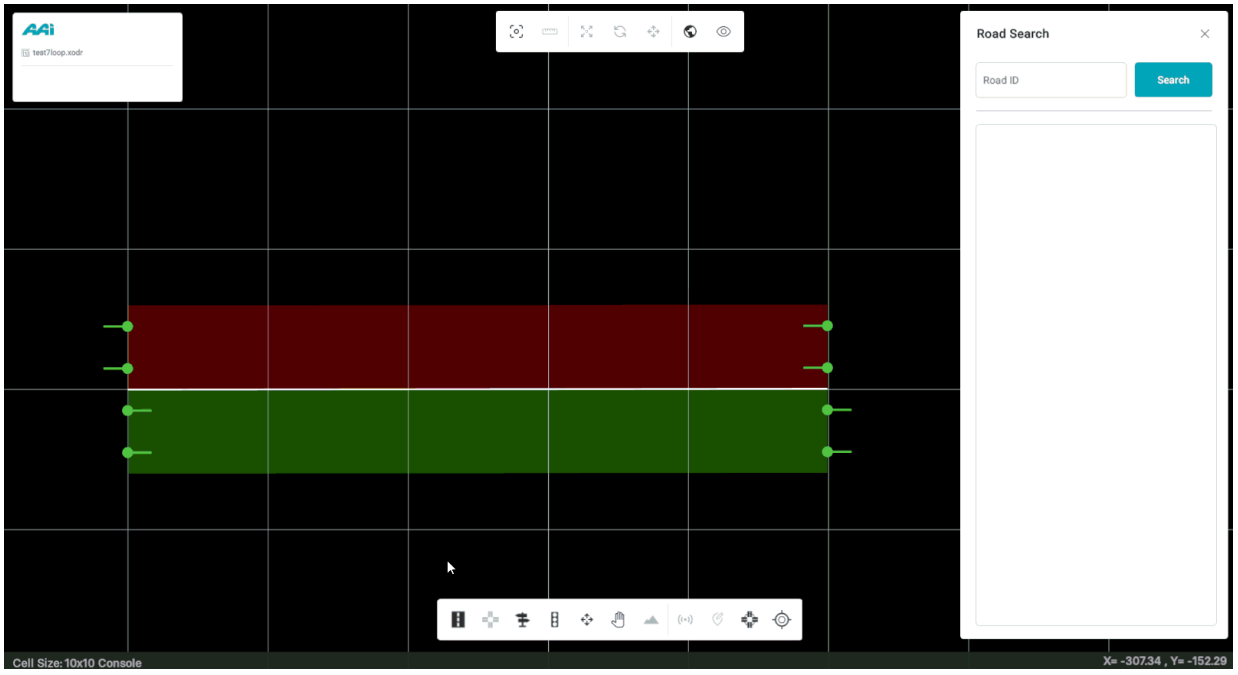
Deleting Links

1. Toggle the "Links Mode" switch. When enabled, it will turn cyan.

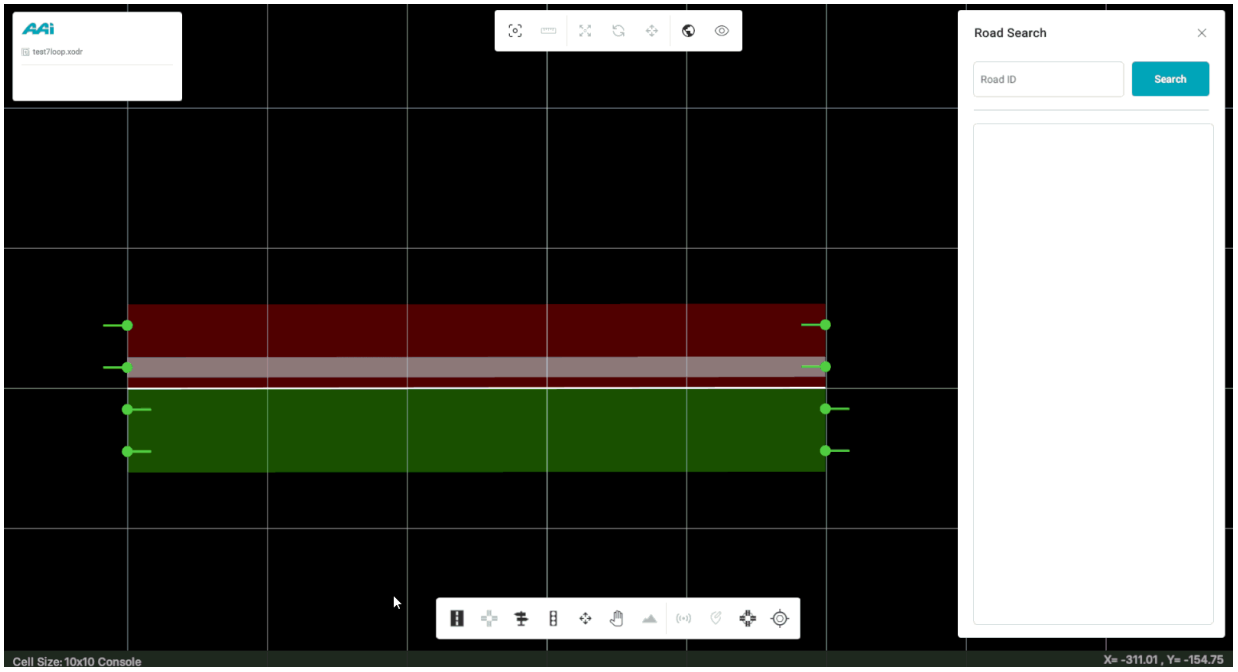


2. Use the secondary mouse button (typically the right button) and click on the link





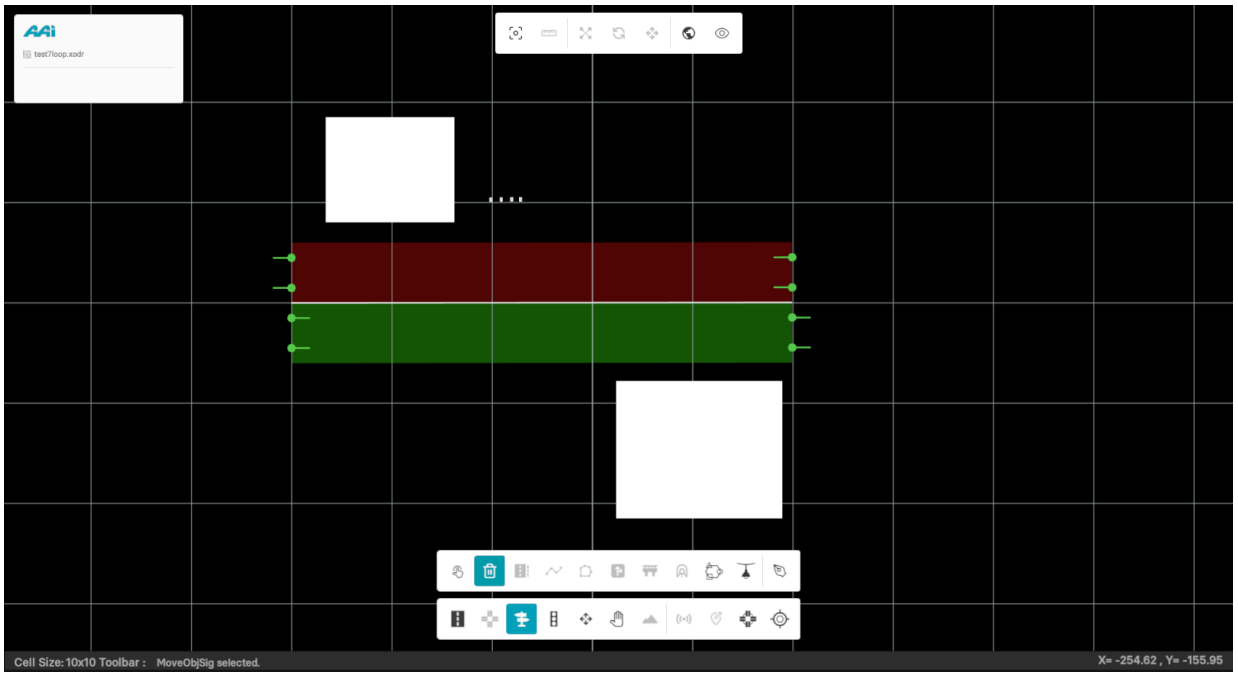
Links can also be made directly on with dependent tram track connectors.



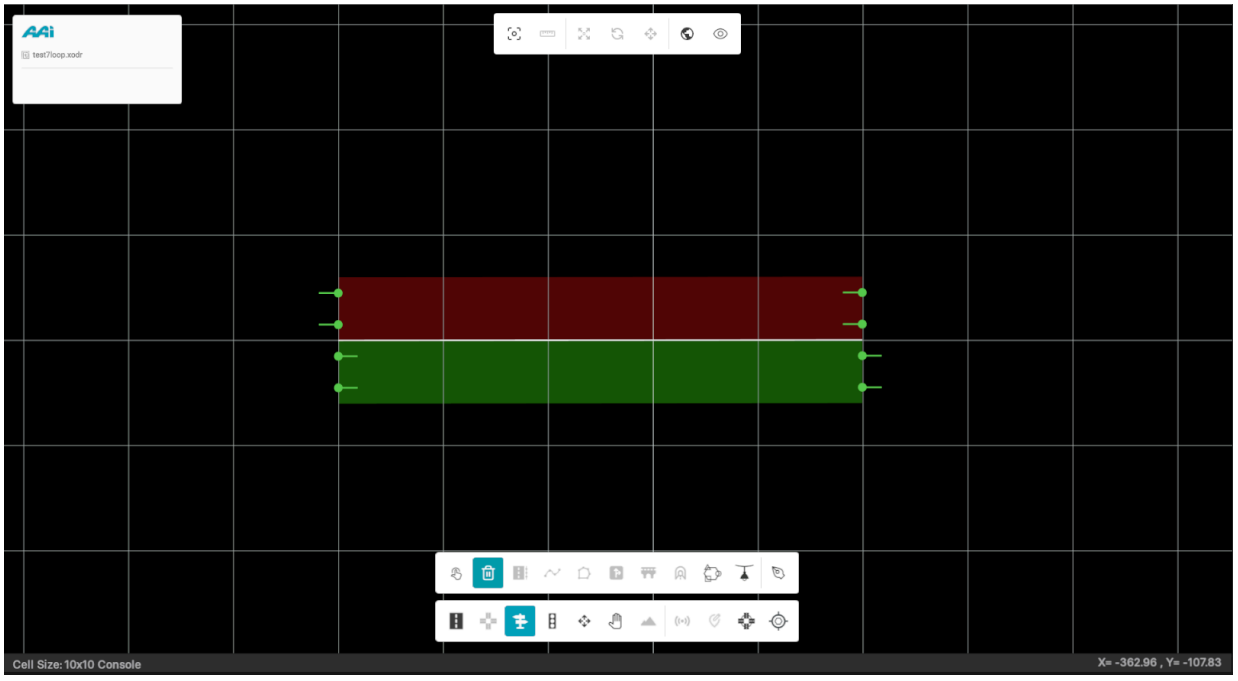
3.2.15 Delete Obj/Sig

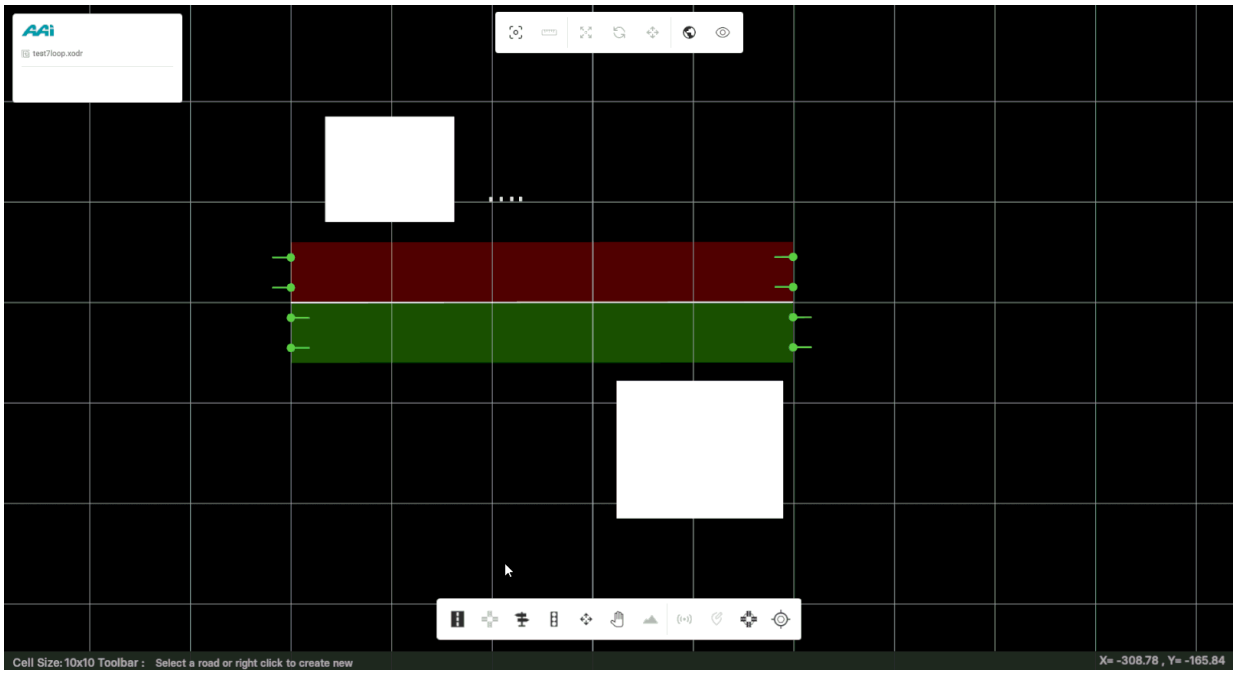
Enables users to delete objects directly, bypassing the need to manually select each item and use the standard deletion shortcut. This streamlines the process for quicker, more efficient object removal.

```
1. Select the "Repeat" sub-tool inside of the "Objects" tool.
```




```
2. Click on the object/signal that you wish to remove.
```

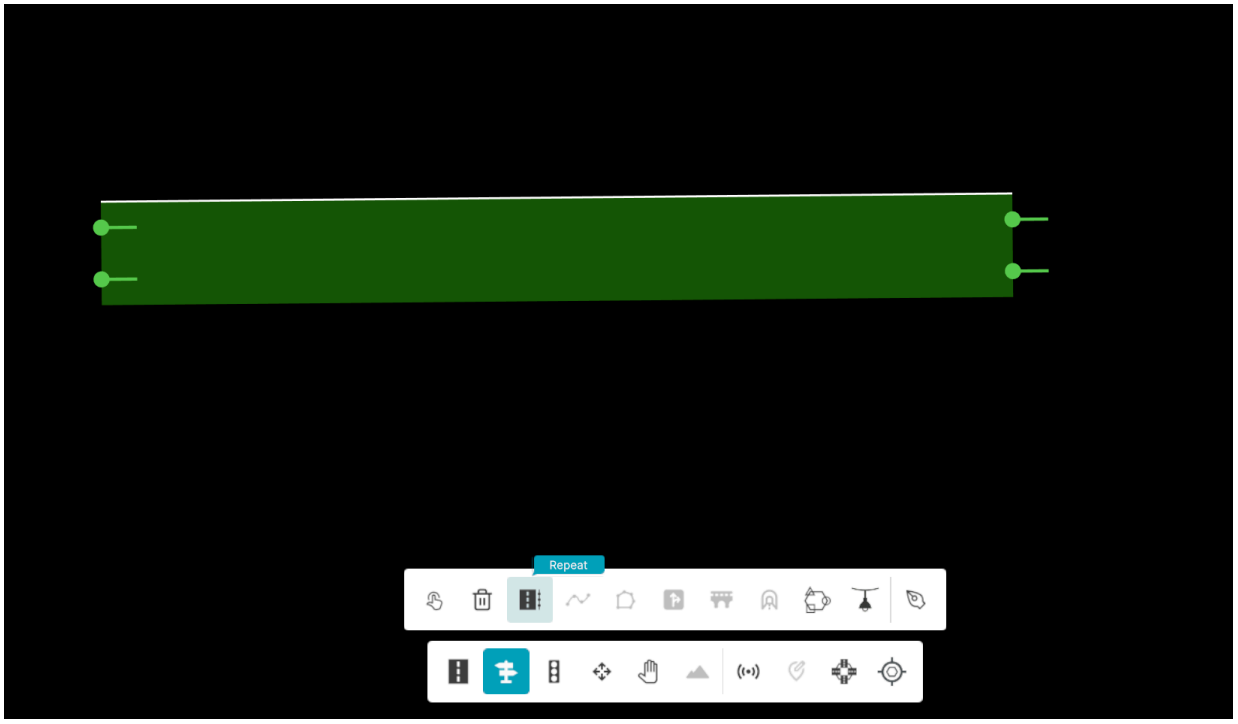




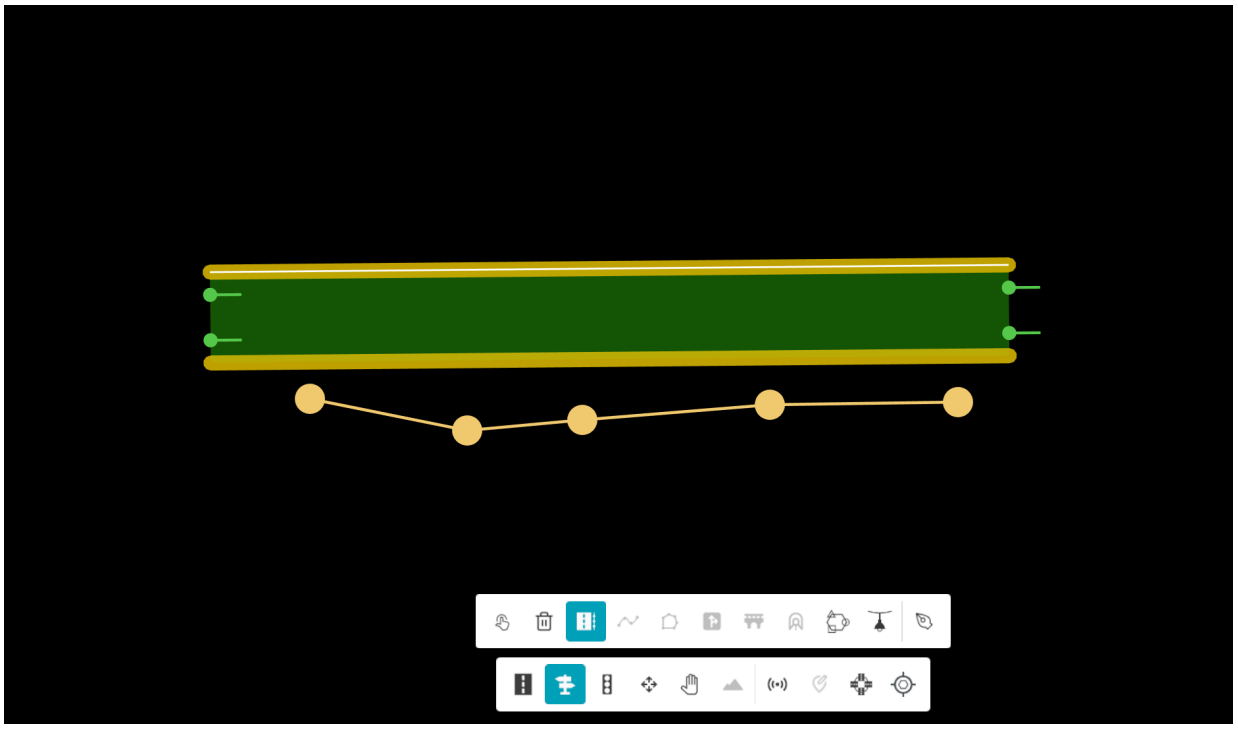
3.2.16 Repeat Tool

The **Repeat Tool** in RepliMap allows users to automatically place multiple static scene objects — such as trees, poles, or other environment assets — along a selected road. It is designed to simplify the process of adding repeated objects along lanes or map edges, supporting both **Discrete** and **Continuous** placement modes.

To begin, first select the **Repeat** tool from the Object Toolbar. This will open the *Add Objects Along the Road* panel on the right-hand side of the editor.



Once the tool is active, left-click on a road to select it. Then, click along the lane to create multiple anchor points that define your desired placement path. Each point represents a segment for object placement. When you have placed the desired anchors, press **Enter** to complete the line — the line will appear in **cyan**, indicating it is ready for configuration.

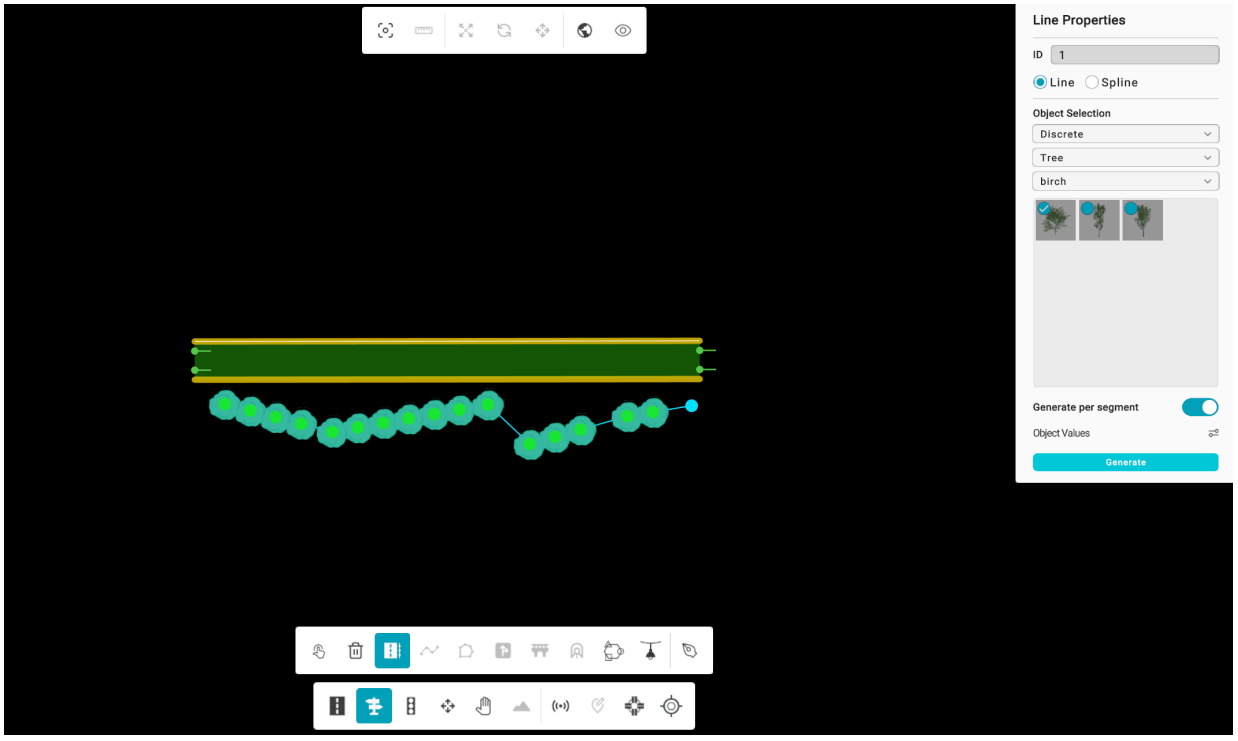


After completing the line, the **Repeat Properties** panel appears automatically. Here, you can select how the objects should be placed along the line — choosing between Discrete or Continuous mode, and defining the specific object type and subtype to use.

Line Mode

In **Line Mode**, RepliMap connects the placed anchor points with straight line segments. This mode is useful for uniform, straight-road sections and supports both **Discrete** and **Continuous** placement.

- **Discrete:** Objects are placed at defined spacing intervals along the line.
- **Continuous:** Objects are placed seamlessly along the path without gaps.
- **Per Segment:** Allows you to apply individual spacing, size, or height values for each segment independently.



Spline Mode

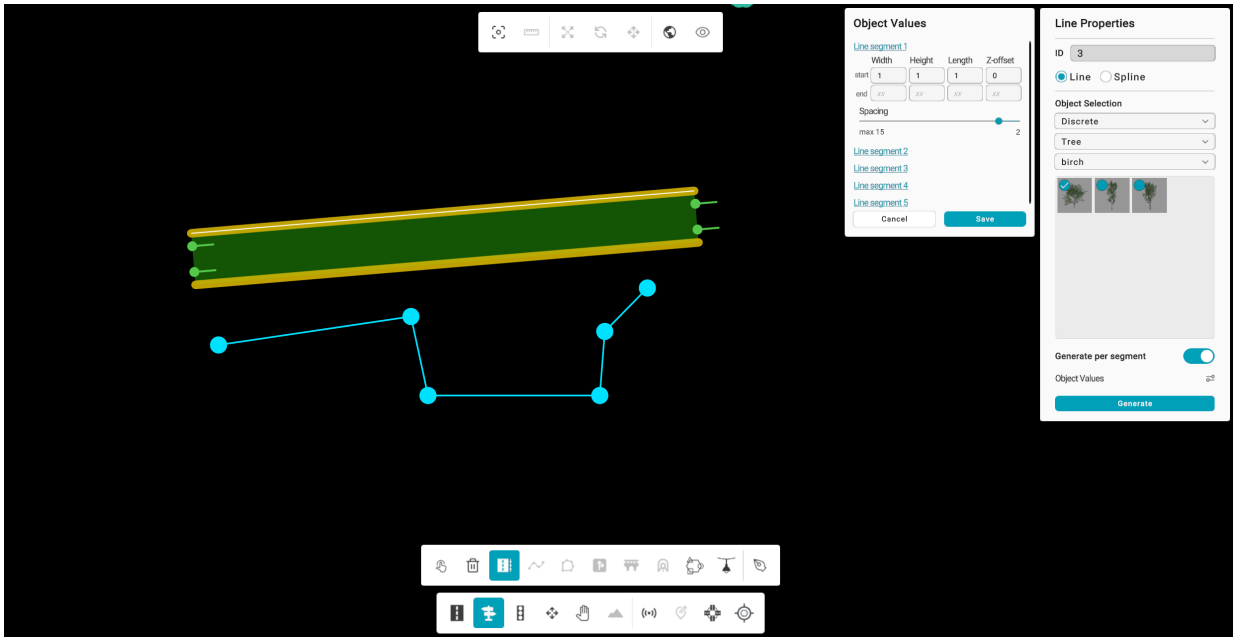
In **Spline Mode**, the tool connects the anchors with a smooth curve, ideal for curved or organic road shapes.
Spline Mode automatically switches to **Discrete placement**, since Continuous placement is not supported for splines. All size and spacing parameters are applied globally along the spline.
Once parameters are adjusted, click **Generate** to apply and visualize the repeated objects along the curved line.

Adjusting Object Values

After drawing your repeat line, open the **Object Values Panel** to customize your object parameters. You can modify:

- Width or Radius
- Height
- Length (Start and End)
- Z Offset
- Spacing

Once your parameters are set, click **Save** to confirm the changes, and then click **Generate** to place the objects along your defined path.



Editing and Deleting Lines

You can easily modify or remove the repeat line after it's created:

- **Move a point:** Drag the anchor node to reposition it.
- **Delete a point:** Select the node and press **Delete**.
- **Delete full line:** Use the *Delete Line* option to remove both the line and the placed objects.

If fewer than two anchors remain, all generated objects for that line are automatically removed.

Notes and Best Practices

- Press **Esc** to cancel line drawing before completing it.
- The **cyan** line color indicates the currently active Repeat line.
- Always click **Save** before **Generate** when changing object parameters.
- Use **Line Mode** for straight alignments and **Spline Mode** for curved ones.
- Switching between Line and Spline will reset the current placed objects (a confirmation prompt will appear).
- Ensure the selected road is highlighted before starting — the Repeat Tool only works when a valid road segment is active.

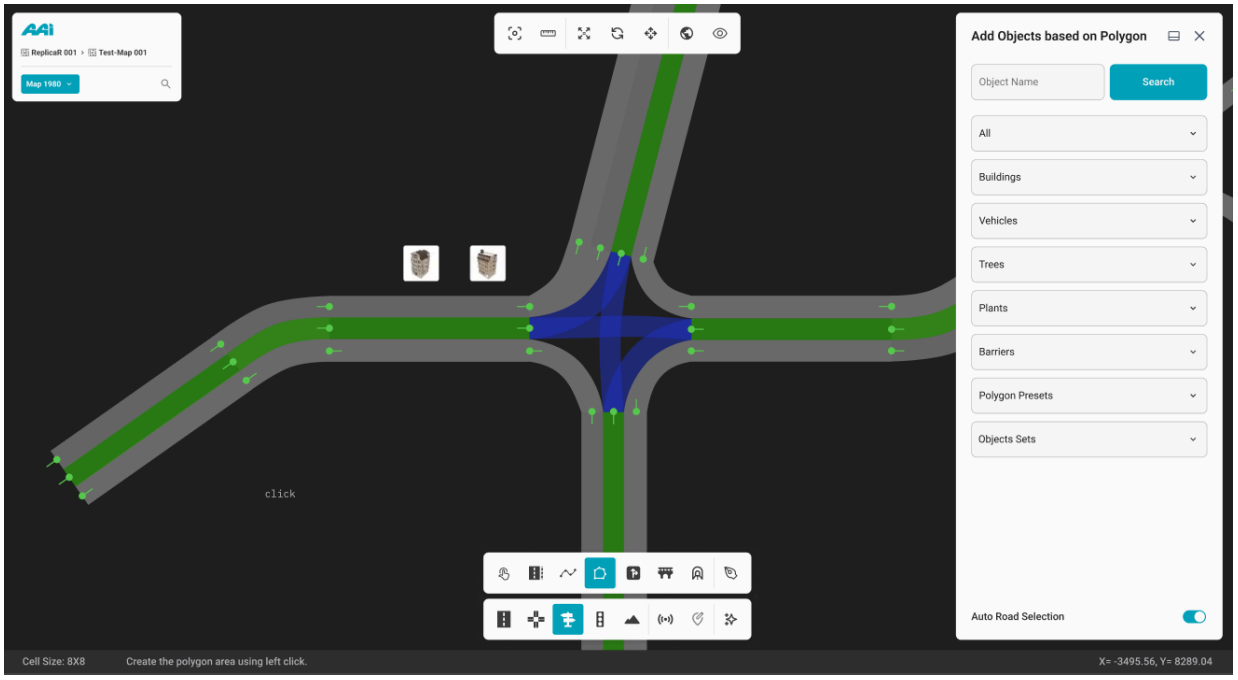
This tool is designed to simplify the process of adding repetitive static assets to your simulation map — enhancing efficiency, reducing manual work, and maintaining consistency in map design.

3.2.17 Area

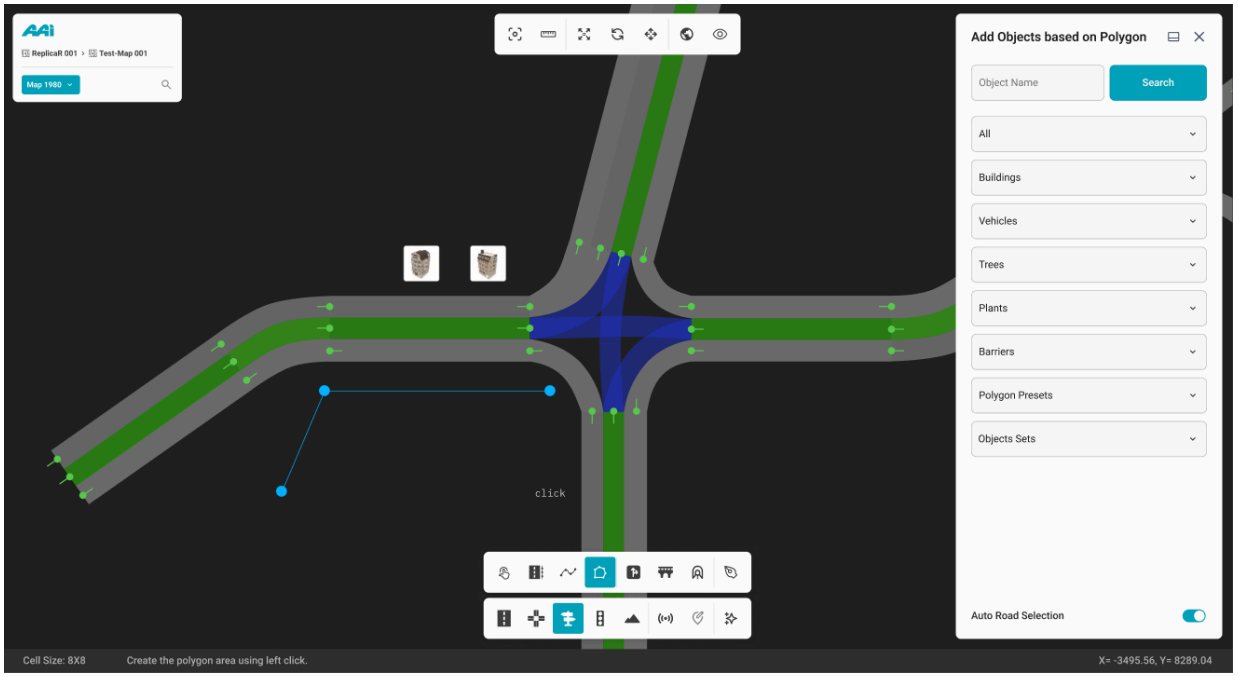
Feature is currently unavailable in the latest RepliMap version.

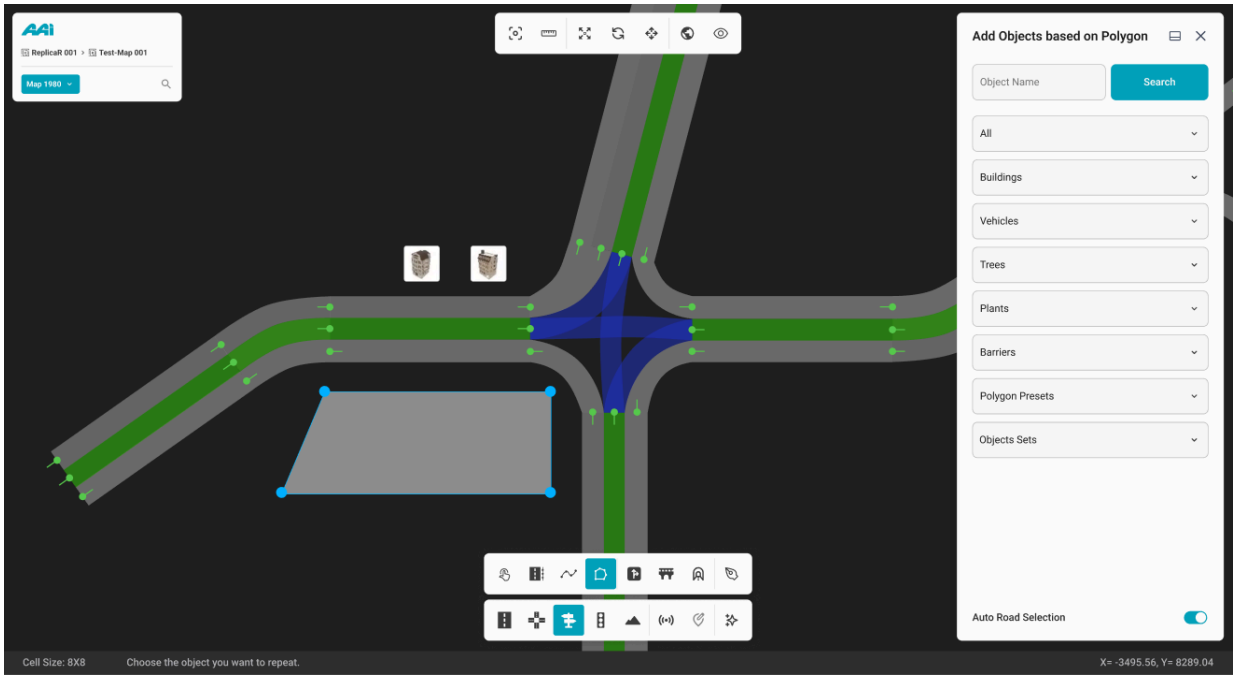
Enables users to define an area using a polygon-based placement method, allowing multiple objects to be traced and placed simultaneously—eliminating the need to manually place each object individually within the selected area.

```
1. Select the "Area" sub-tool inside of the "Objects" tool. This will open the "Add
```

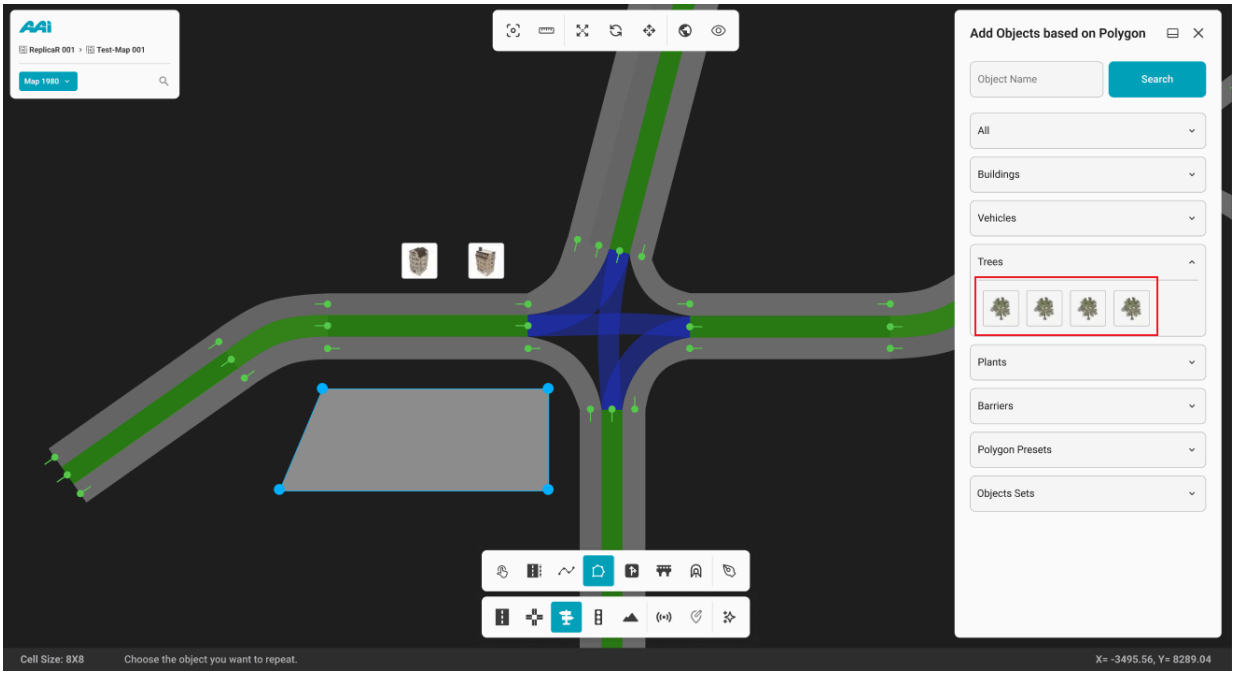



```
2. Continue placing points along the desired area until the polygon shape is fully c
```

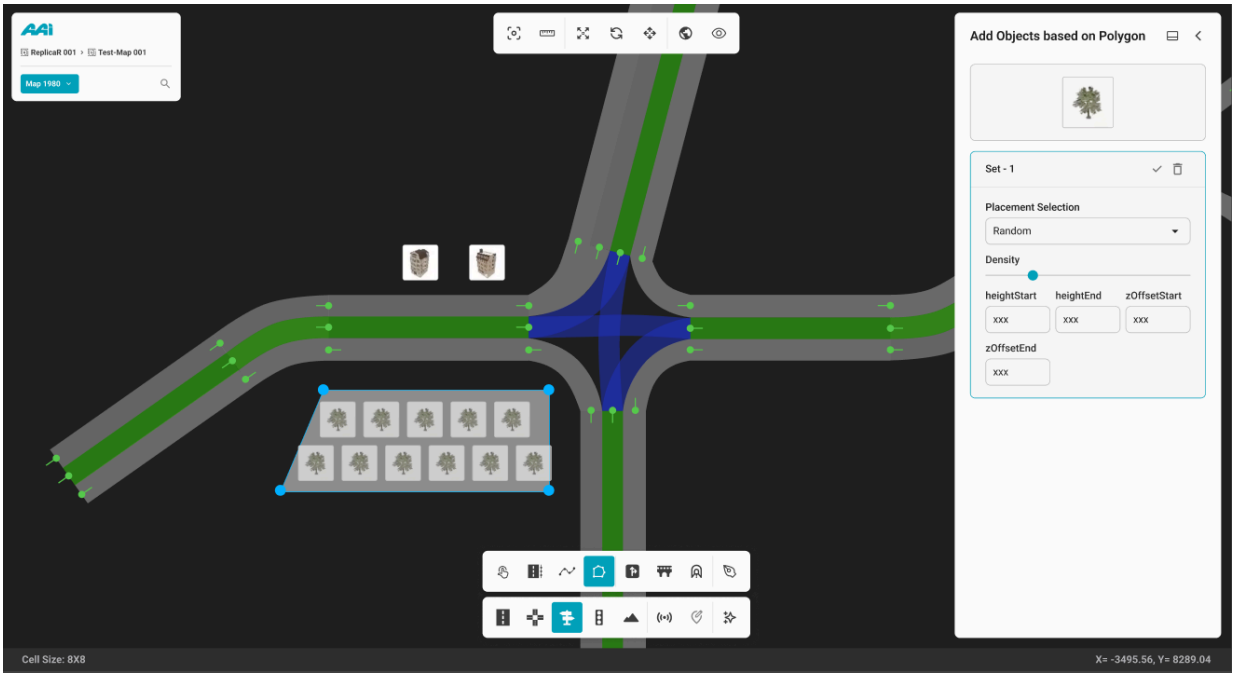




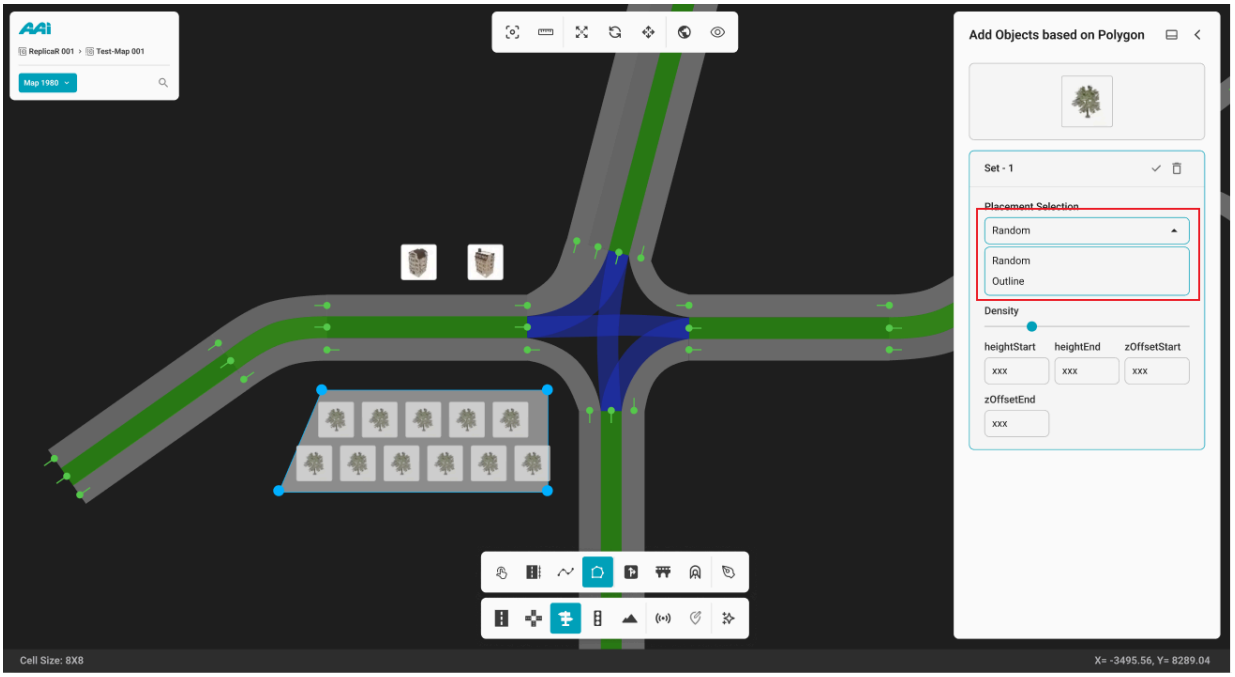
3. Once the polygon is closed, drag and drop the desired object into the polygon are

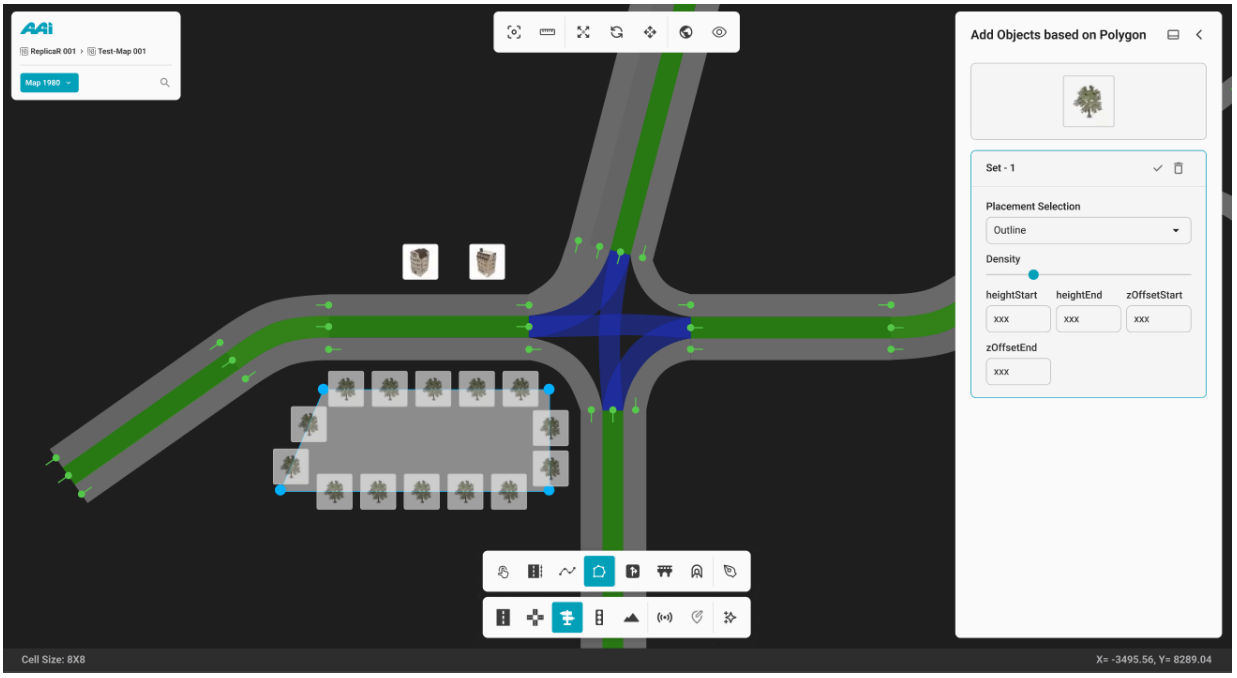


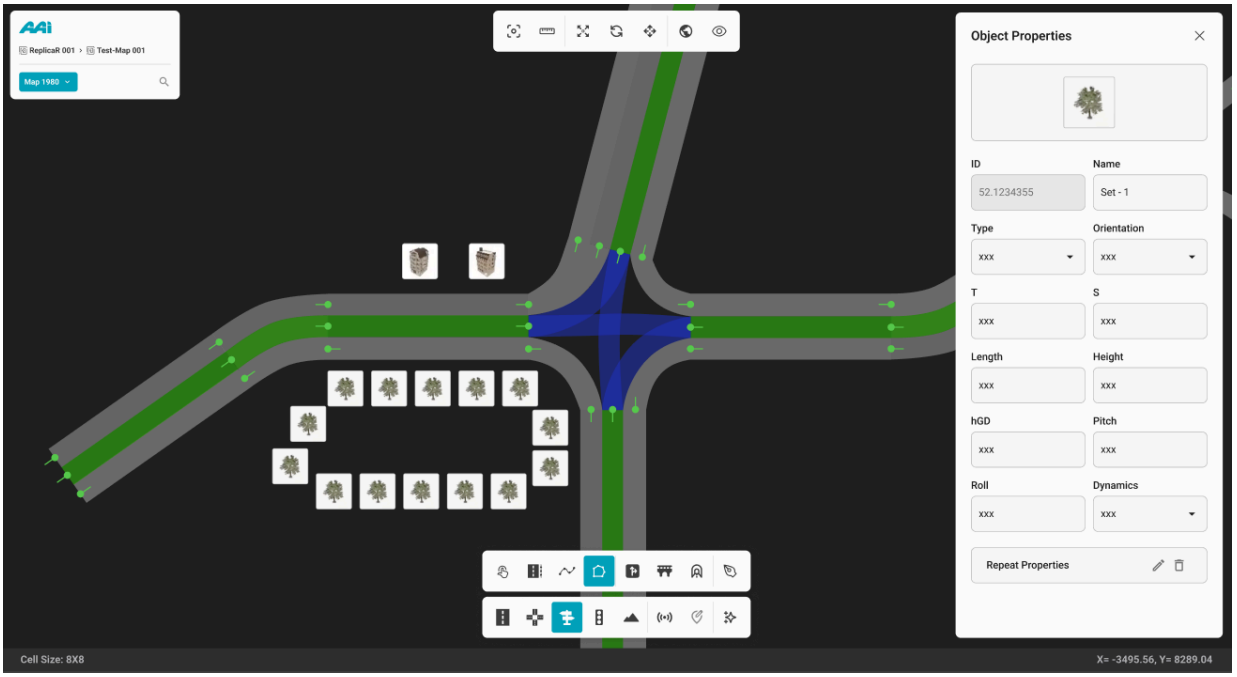
4. Upon completion, the Object Polygon Properties panel will open, allowing the user



5. To define the overall placement pattern within the object polygon area, click the


ReplicaR 001 › Test-Map 001
Map 1980
Add Objects based on Polygon
Set - 1
Placement Selection
Random
Random
Outline
Density
heightStart
heightEnd
zOffsetStart
xxx
xxx
xxx
zOffsetEnd
xxx
Cell Size: 8X8
X= -3495.56, Y= 8289.04


ReplicaR 001 › Test-Map 001
Map 1980
Add Objects based on Polygon
Set - 1
Placement Selection
Outline
Density
heightStart
heightEnd
zOffsetStart
xxx
xxx
xxx
zOffsetEnd
xxx
Cell Size: 8X8
X= -3495.56, Y= 8289.04

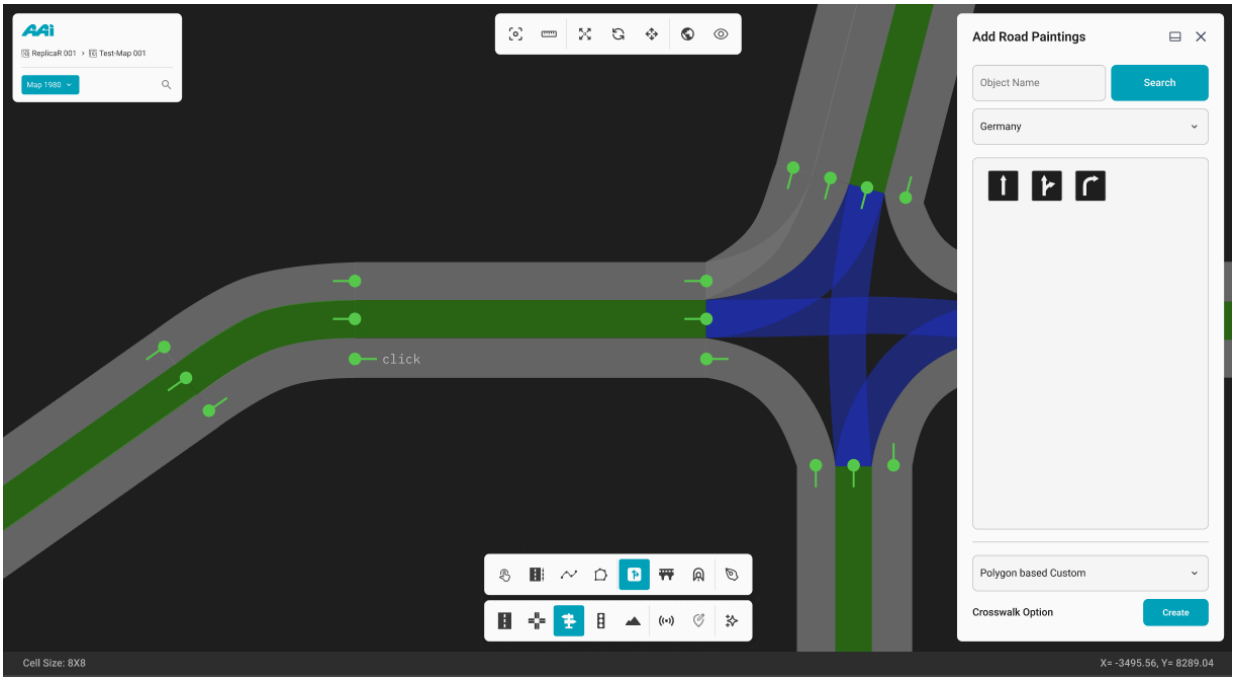


3.2.18 Road Painting

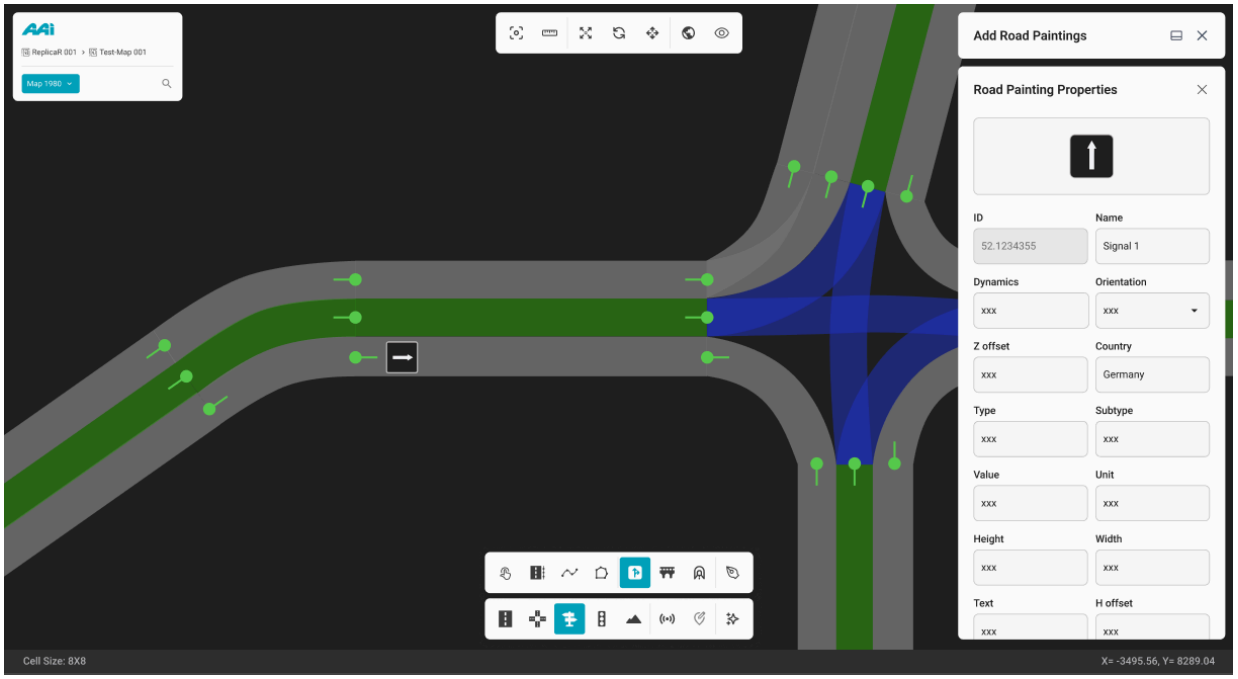
Feature is currently unavailable in the latest RepliMap version.

Enables users to apply road markings based on country-specific sign standards for a more accurate representation of the selected location. This tool also allows for detailed customization of individual road markings to suit specific design requirements.

```
1. Select the "Road Painting" sub-tool inside of the "Objects" tool. Click the prima
```

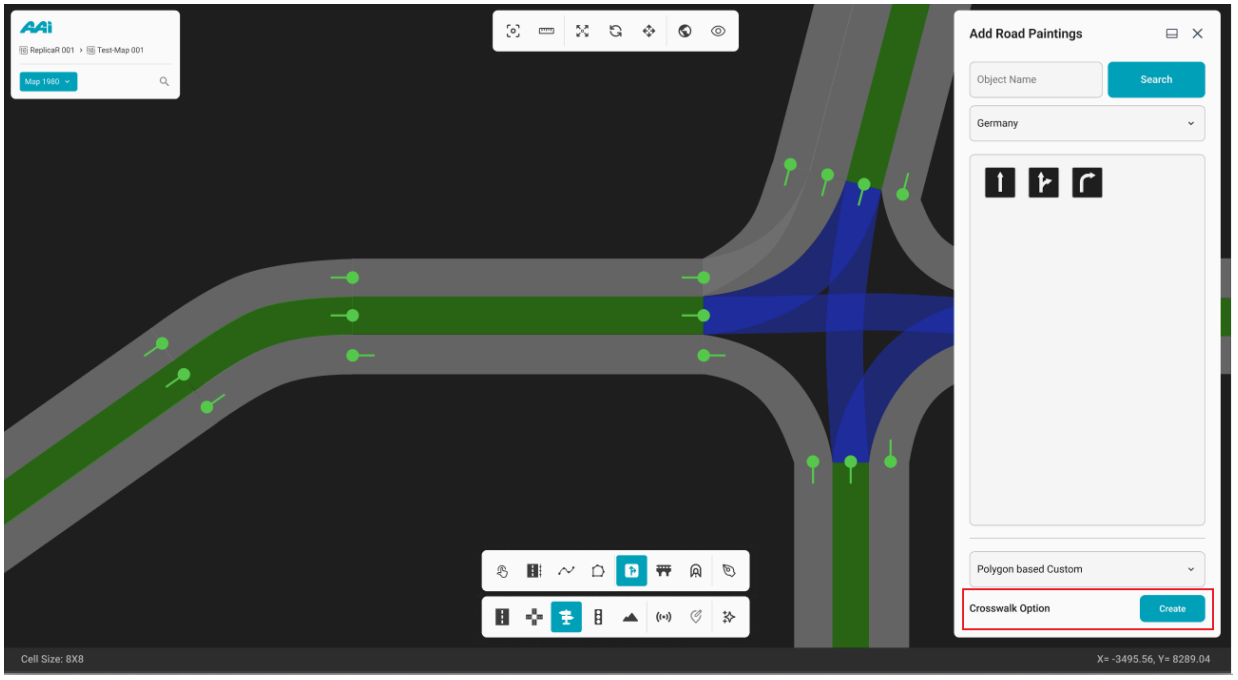


2. This action places the road painting at the clicked position on the designated ro

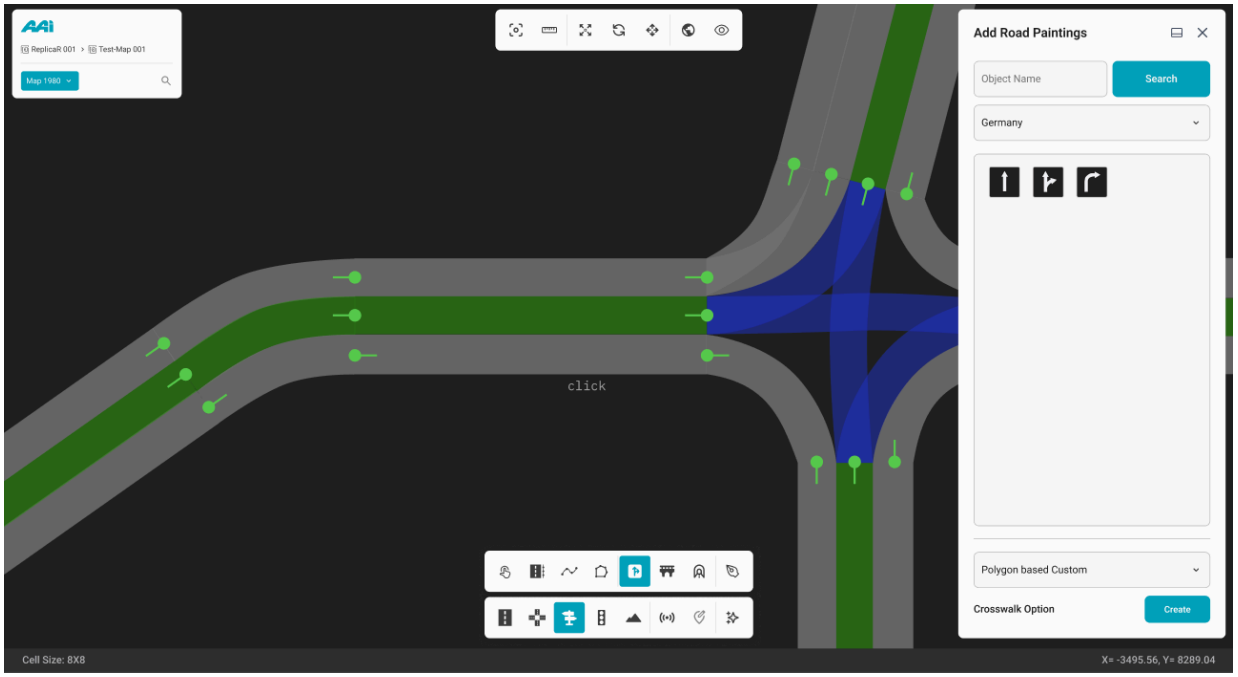


Crosswalk Option

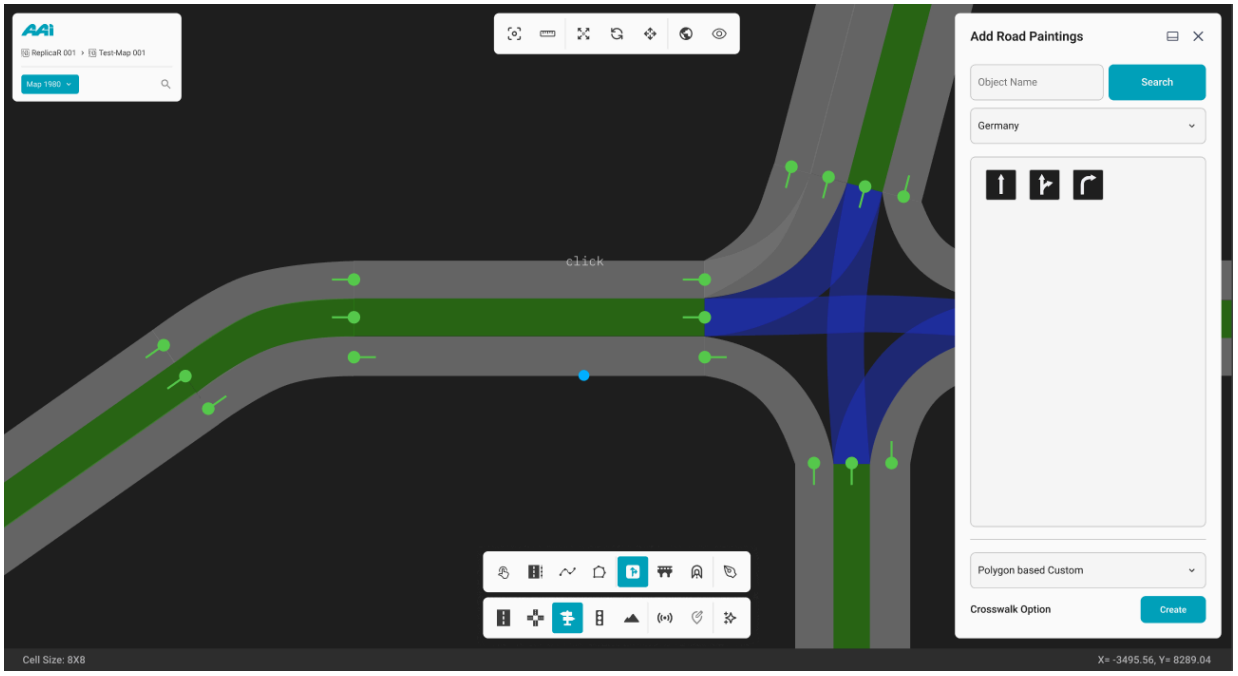
1. Select the "Create" button for the Crosswalk Option within the Add Road Paintings

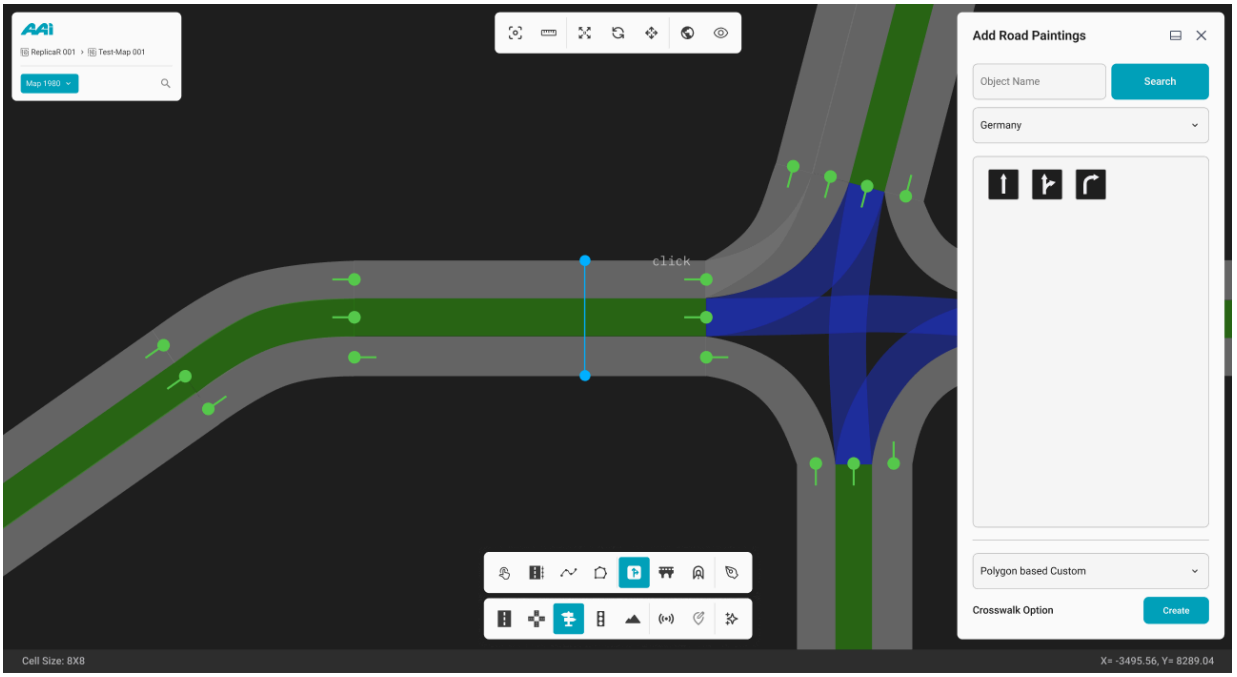


2. Click the primary-mouse button (usually left) within a particular road.

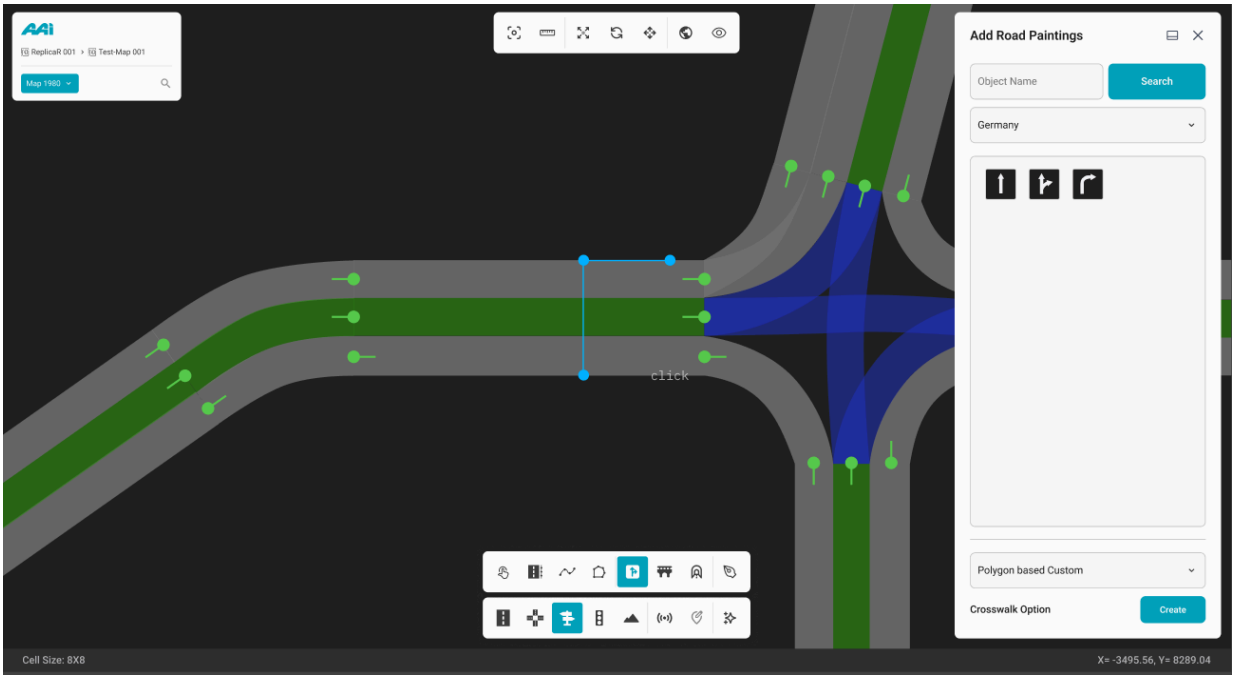


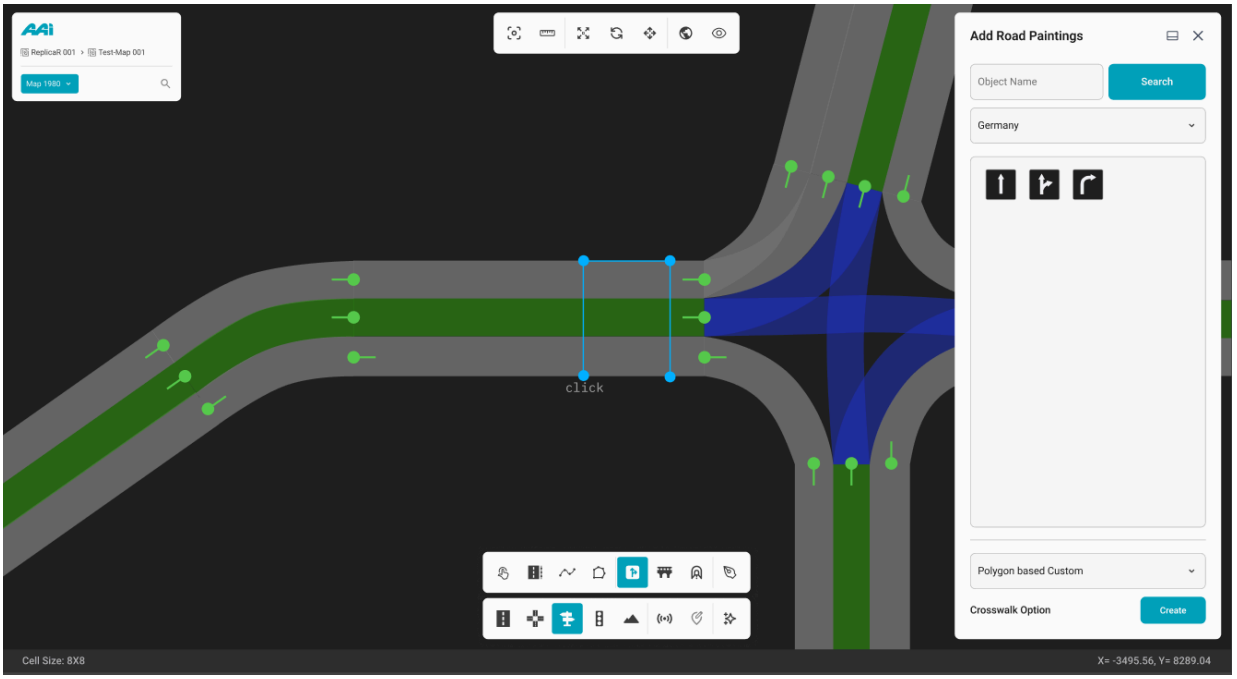
3. Click the primary-mouse button (usually left) again within a particular road to s



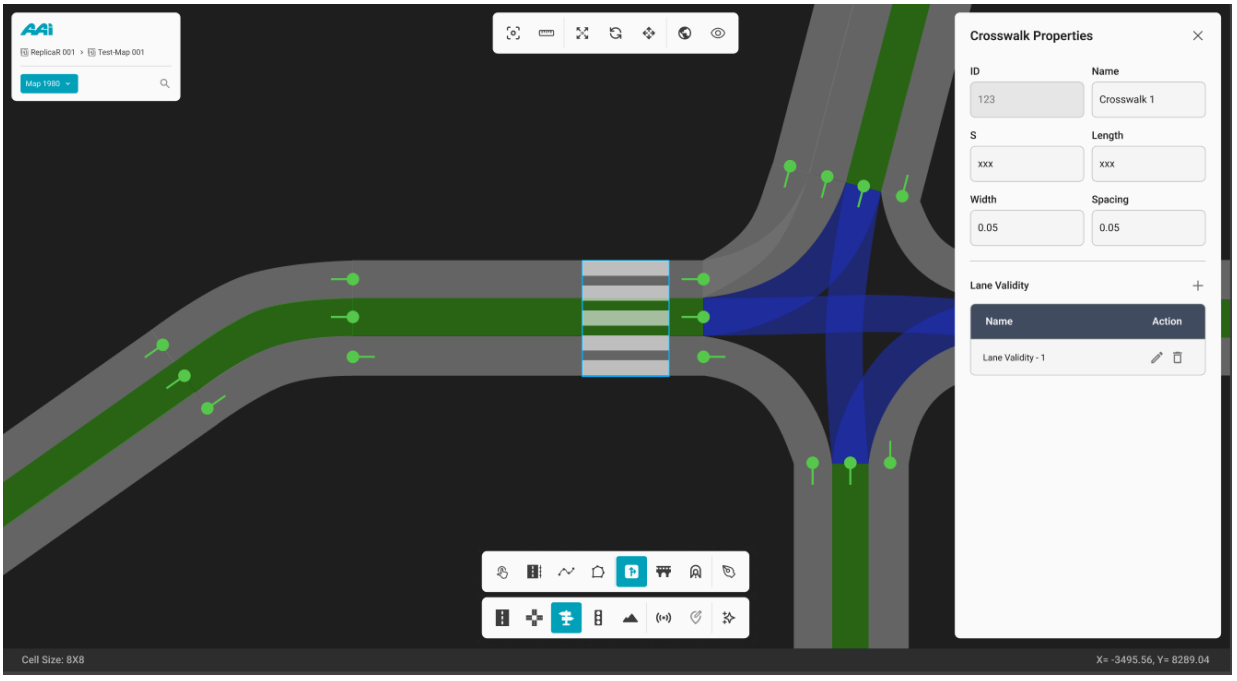


4. Now, repeat this process until the crosswalk anchors outline the entire area of t





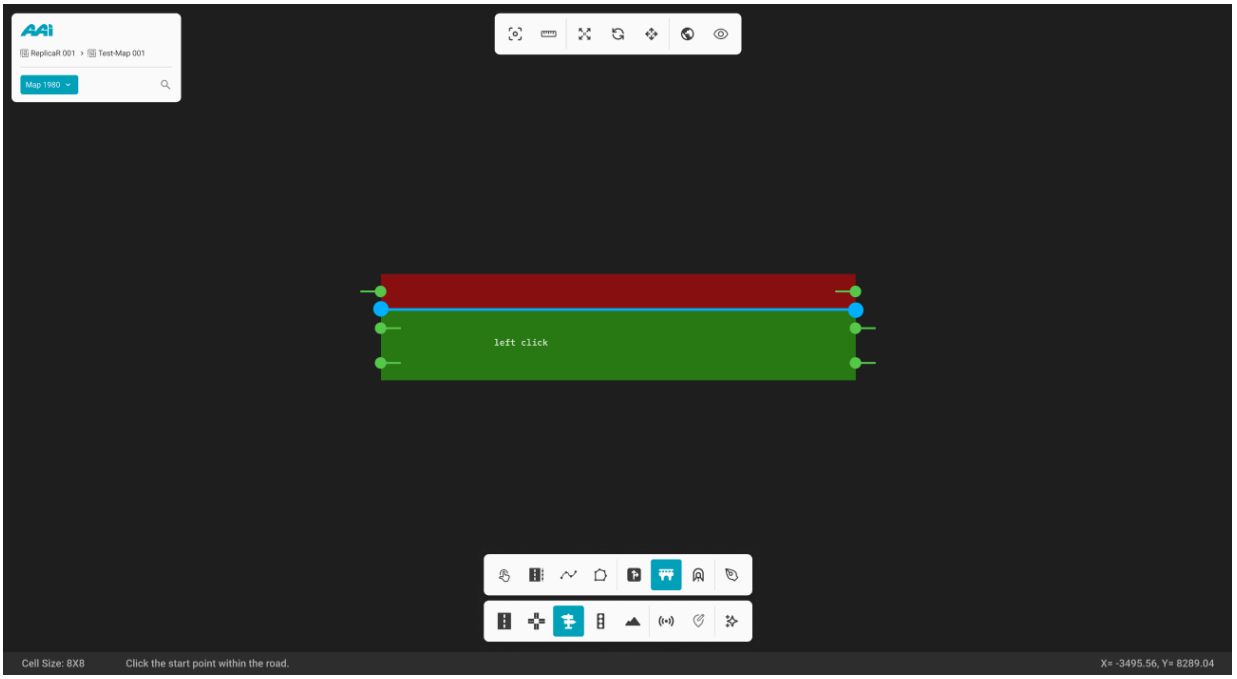

```
Once completed, the "Crosswalk Properties" panel will appear, allowing the user to
```



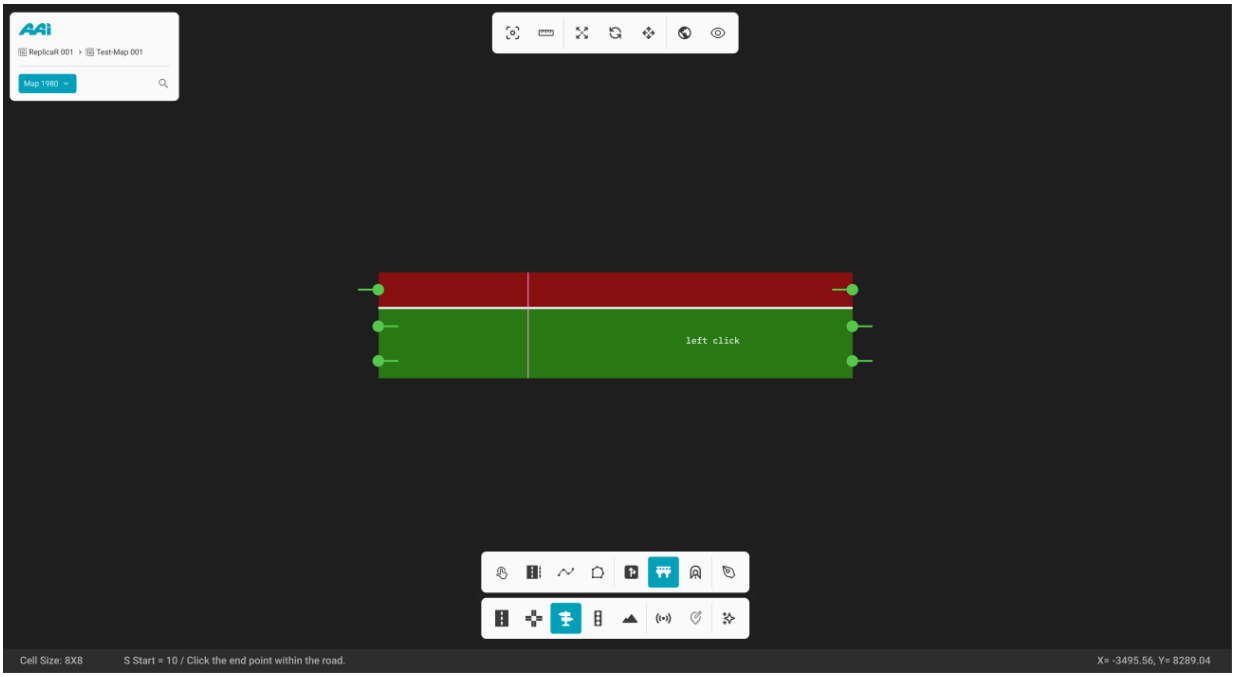
3.2.19 Bridges

Feature is currently unavailable in the latest RepliMap version.

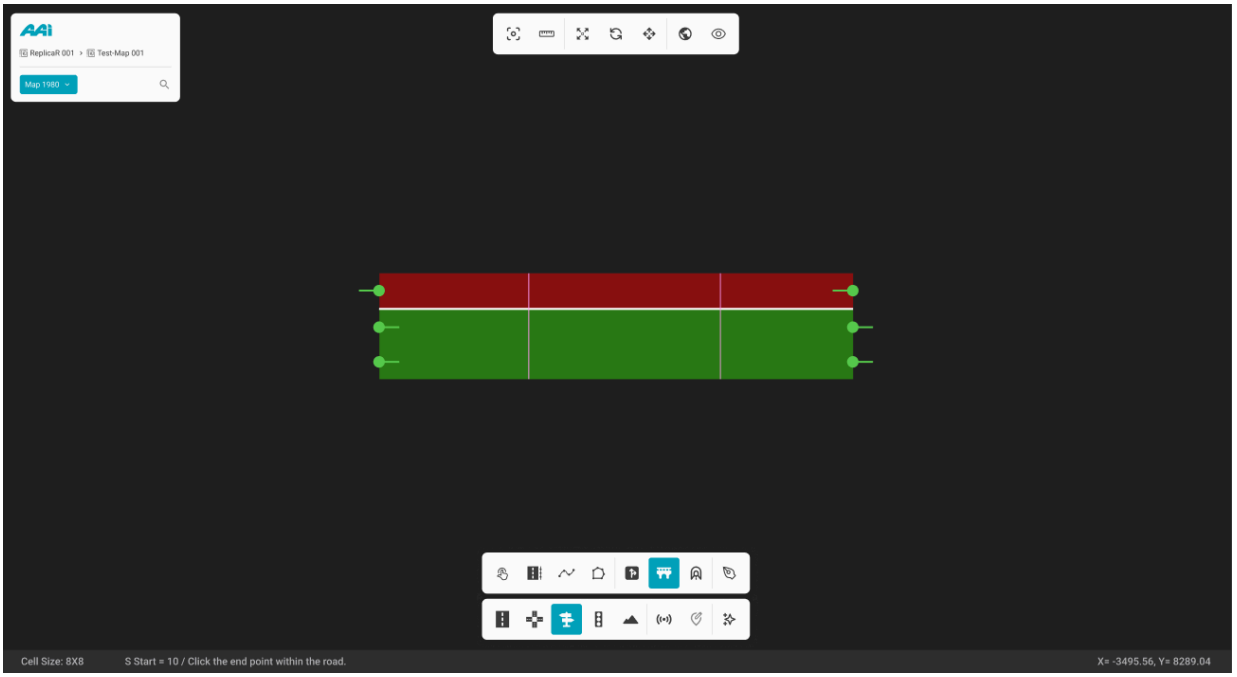
```
1. Select the "Bridge" sub-tool inside of the "Objects" tool. Click the primary-mous
```

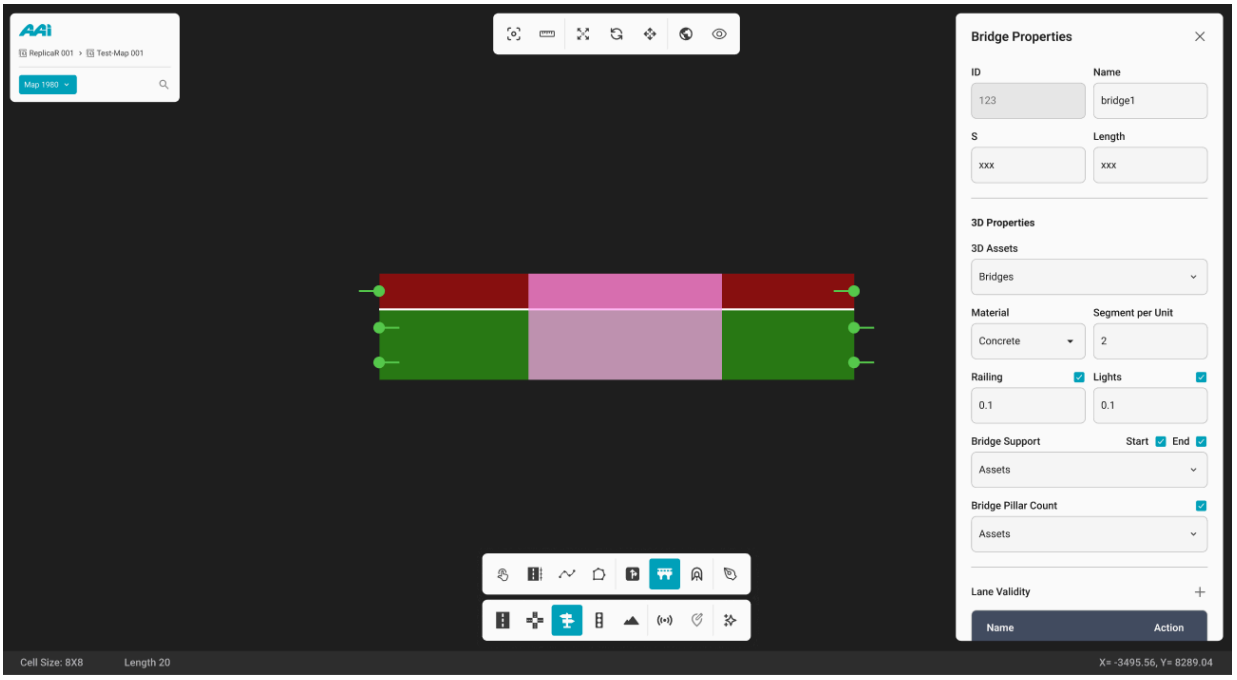


2. Press the primary-mouse button (usually left) at a different position at the end

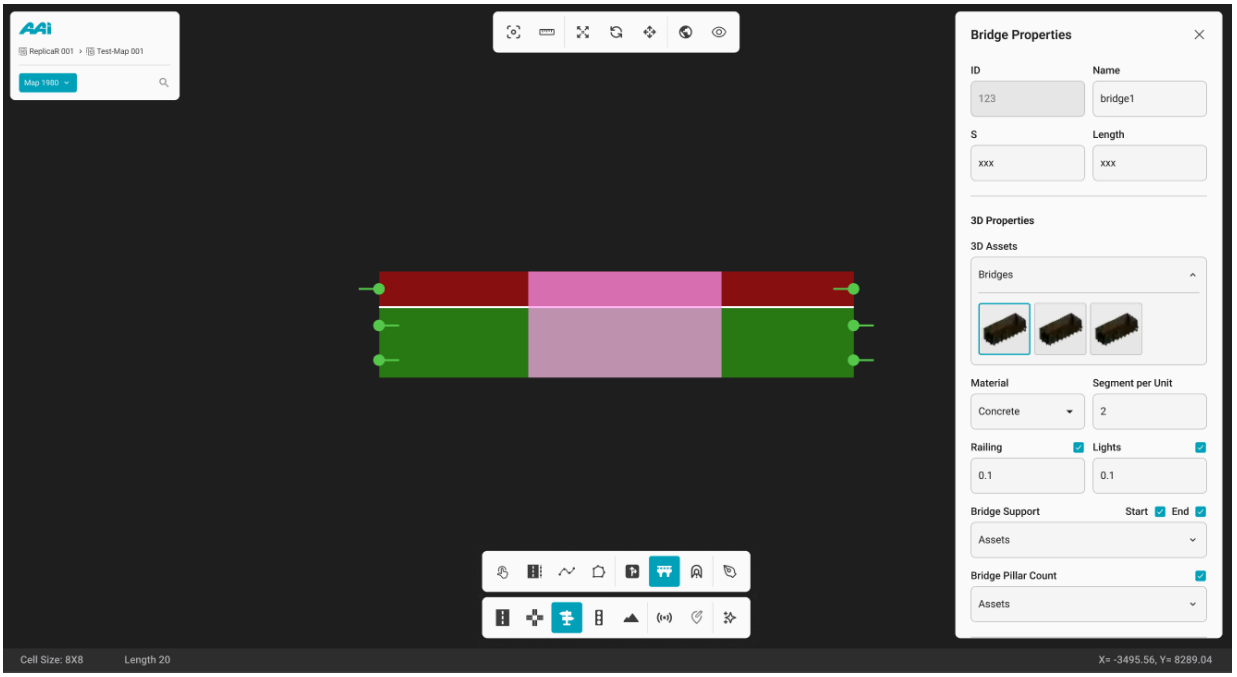


3. This will create the bridge space. Primary (usualy left) mouse click on the bridg





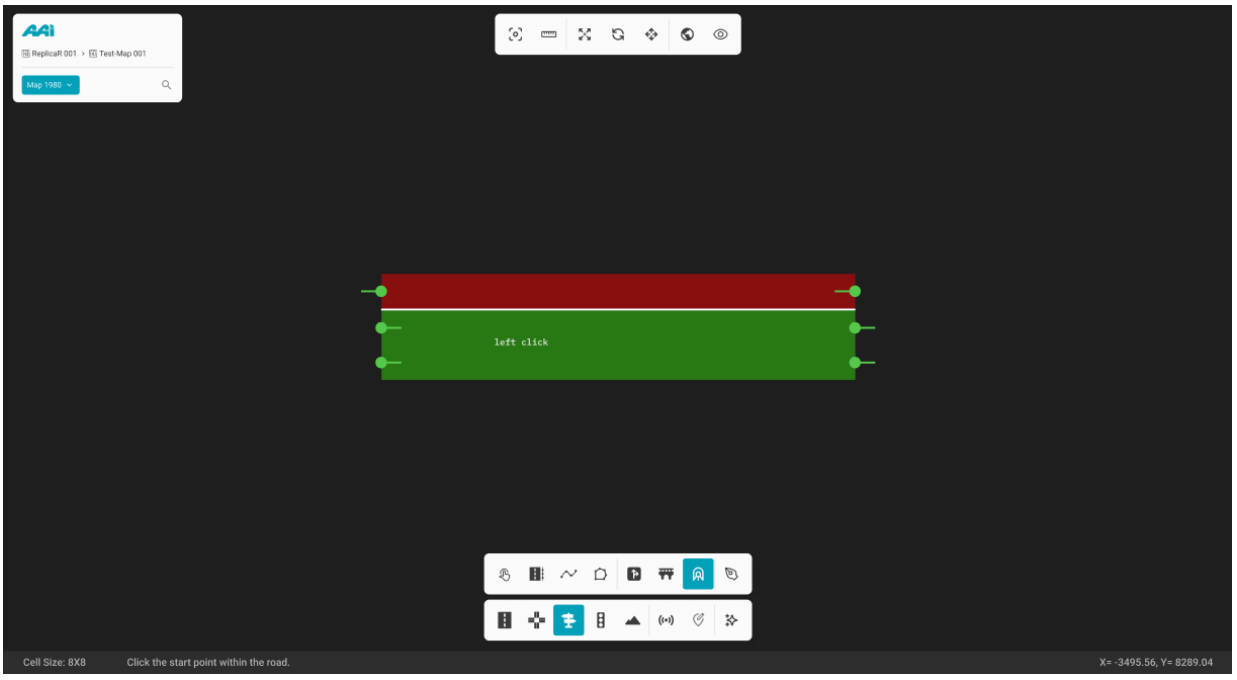
This will open the "Bridge Properties" panel, allowing you to further customize the bridge's attributes to meet specific requirements.



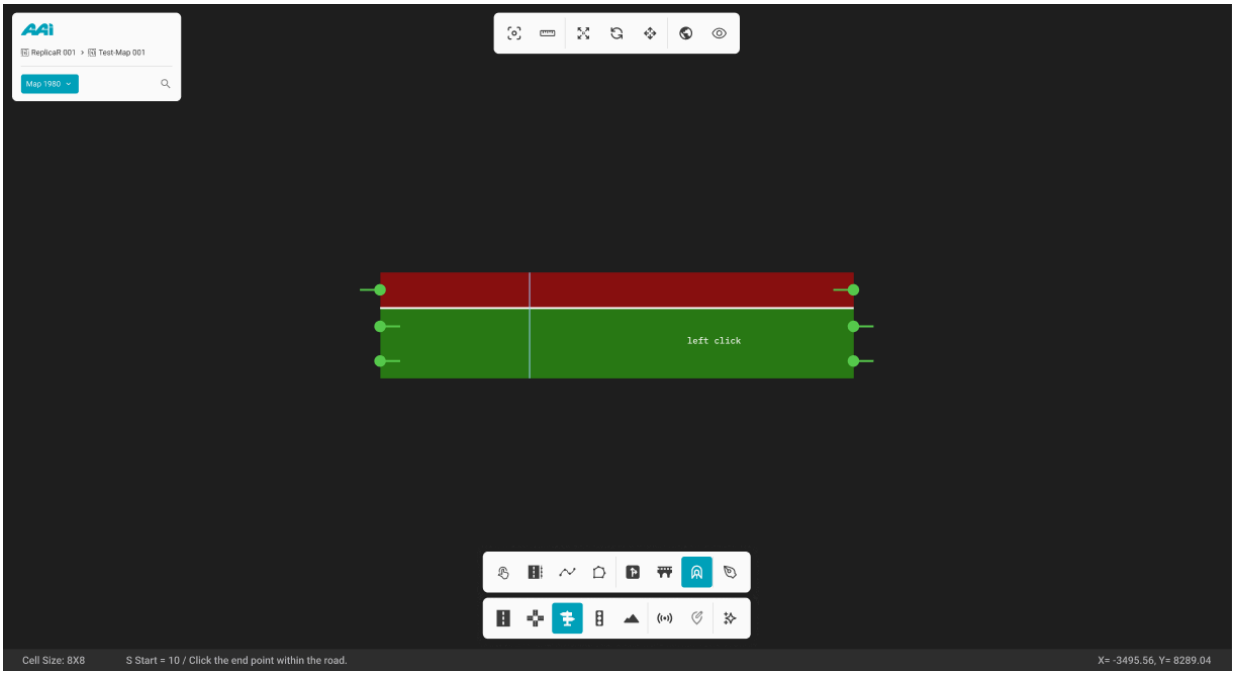
3.2.20 Tunnels

Feature is currently unavailable in the latest RepliMap version.

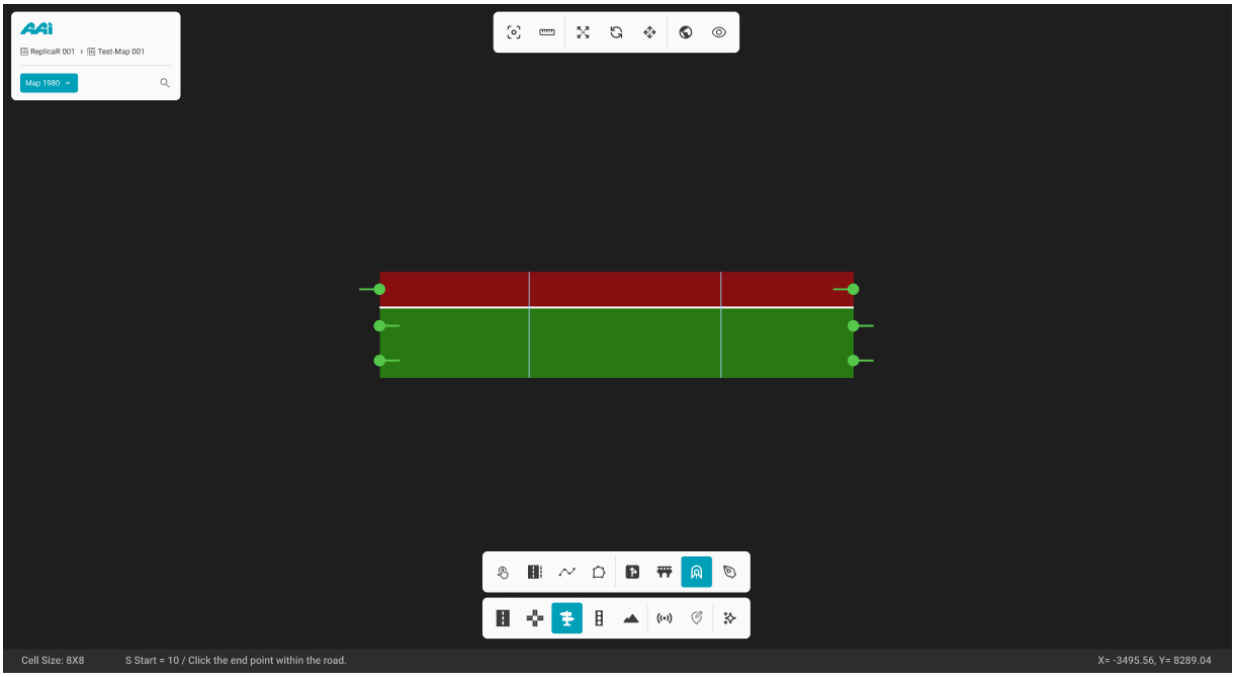
```
1. Select the "Tunnel" sub-tool inside of the "Objects" tool. Click the primary-mous
```

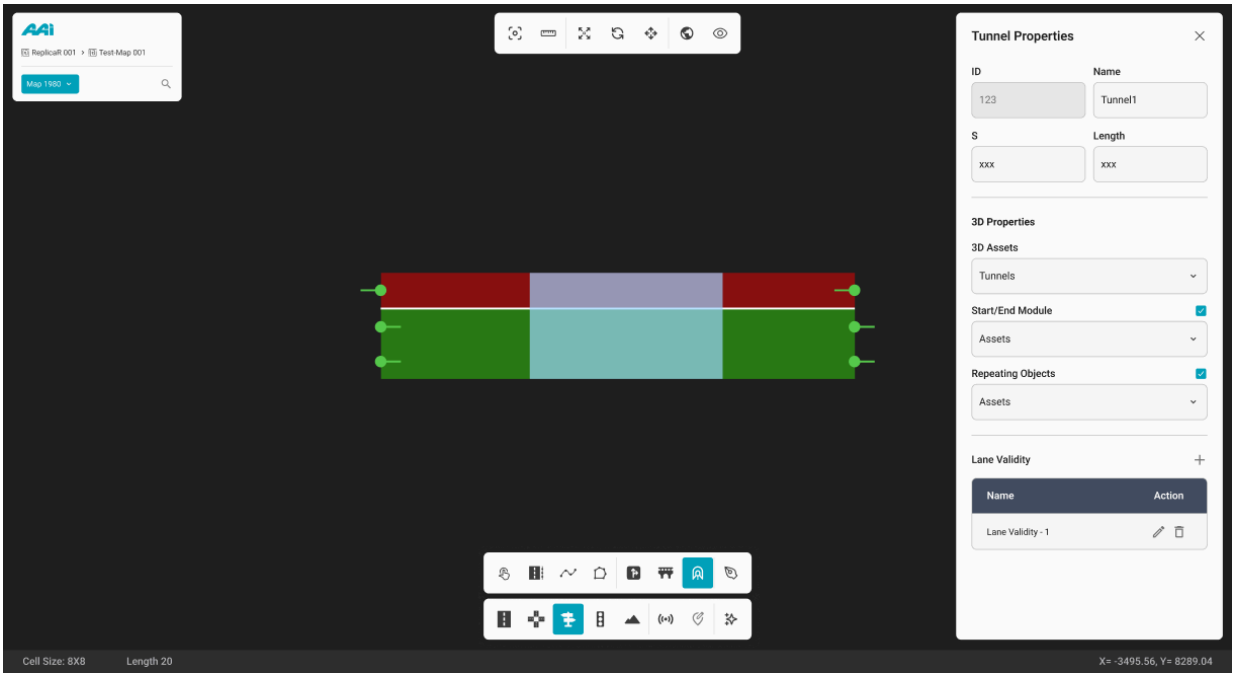



```
2. Press the primary-mouse button (usually left) at a different position at the end
```



3. This will create the tunnel space. Primary (usualy left) mouse click on the tunne

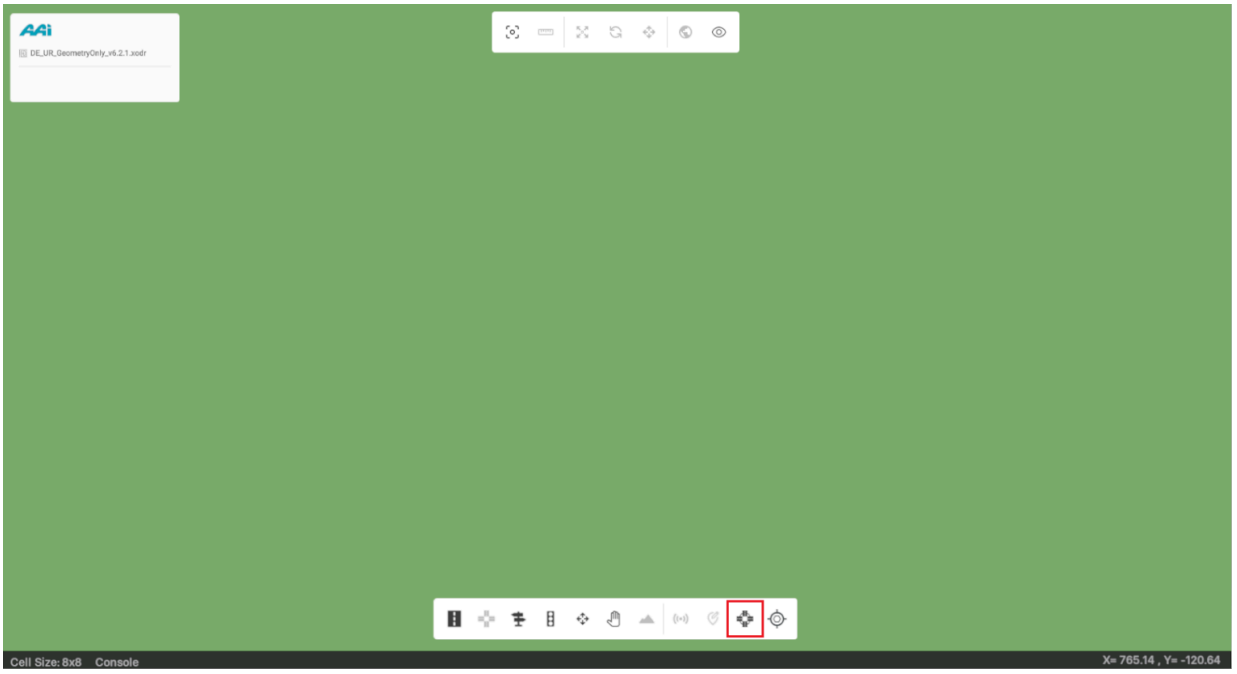




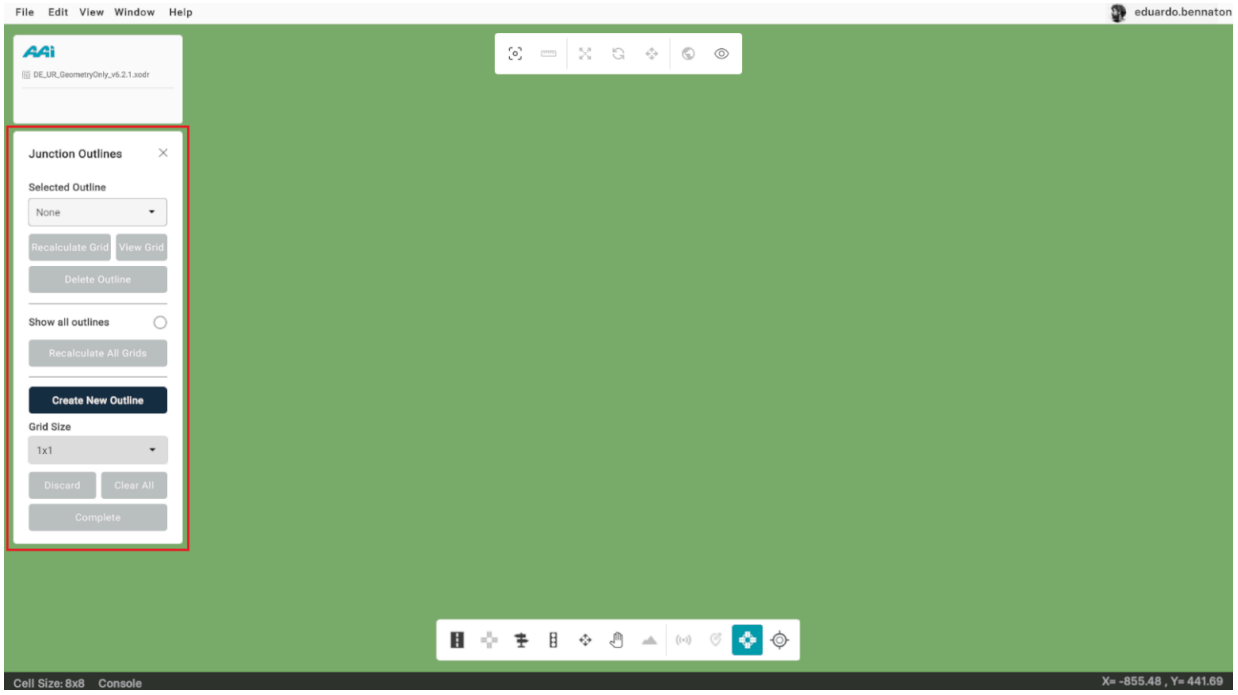
This will open the "Tunnel Properties" panel, allowing you to further customize the tunnel's attributes to meet specific requirements.

3.2.21 Junction Outline

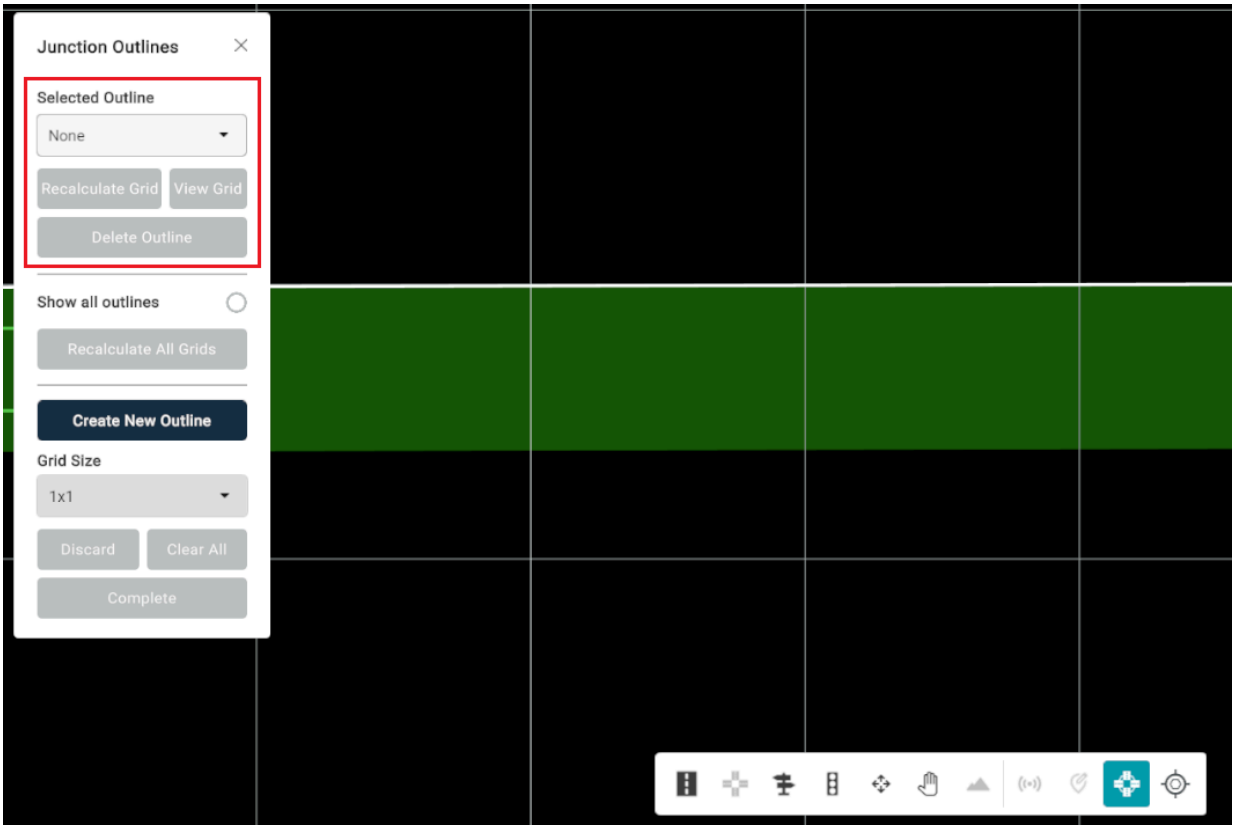
Enables the user to combine multiple junctions into a single group, improving map visuals and offering enhanced functionality for future designations if required. To operate the Junction Outline tool, navigate to the editor bar and select "Junction Outline".



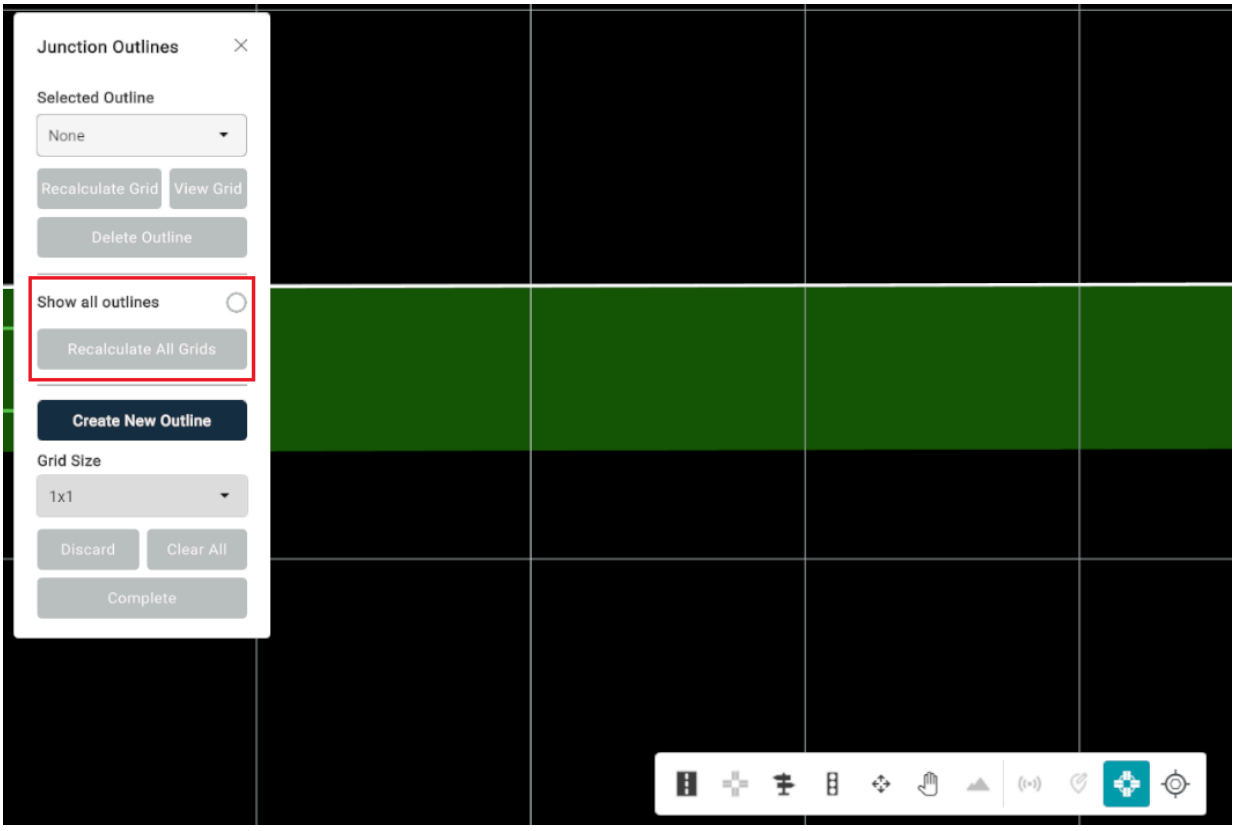
The user will be prompted with a UI panel displaying the tool. The tool includes multiple sections that allow the user to use the tool differently depending on their intended use.



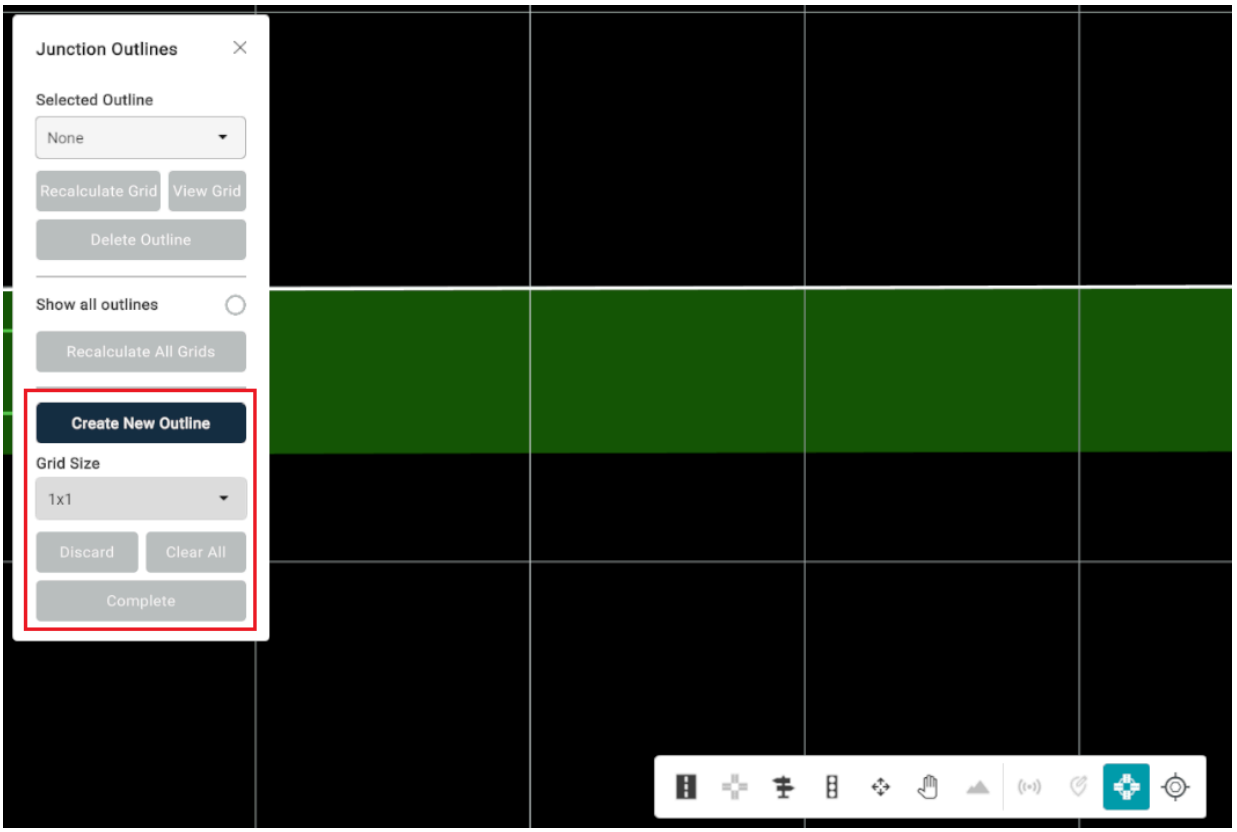
The "Selected Outline" dropdown and section display existing junction outlines. If no junction outlines have been created, it defaults to "None." The "Recalculate Grid" button allows users to recalculate the current grid associated with the selected junction outline. The "View Grid" button visualizes the grid, and the "Delete Outline" button removes the selected grid.



The "Show All Outlines" checkbox displays all existing junction outlines simultaneously. The "Recalculate Grids" button allows users to recalculate the current grids associated with the junction outlines.

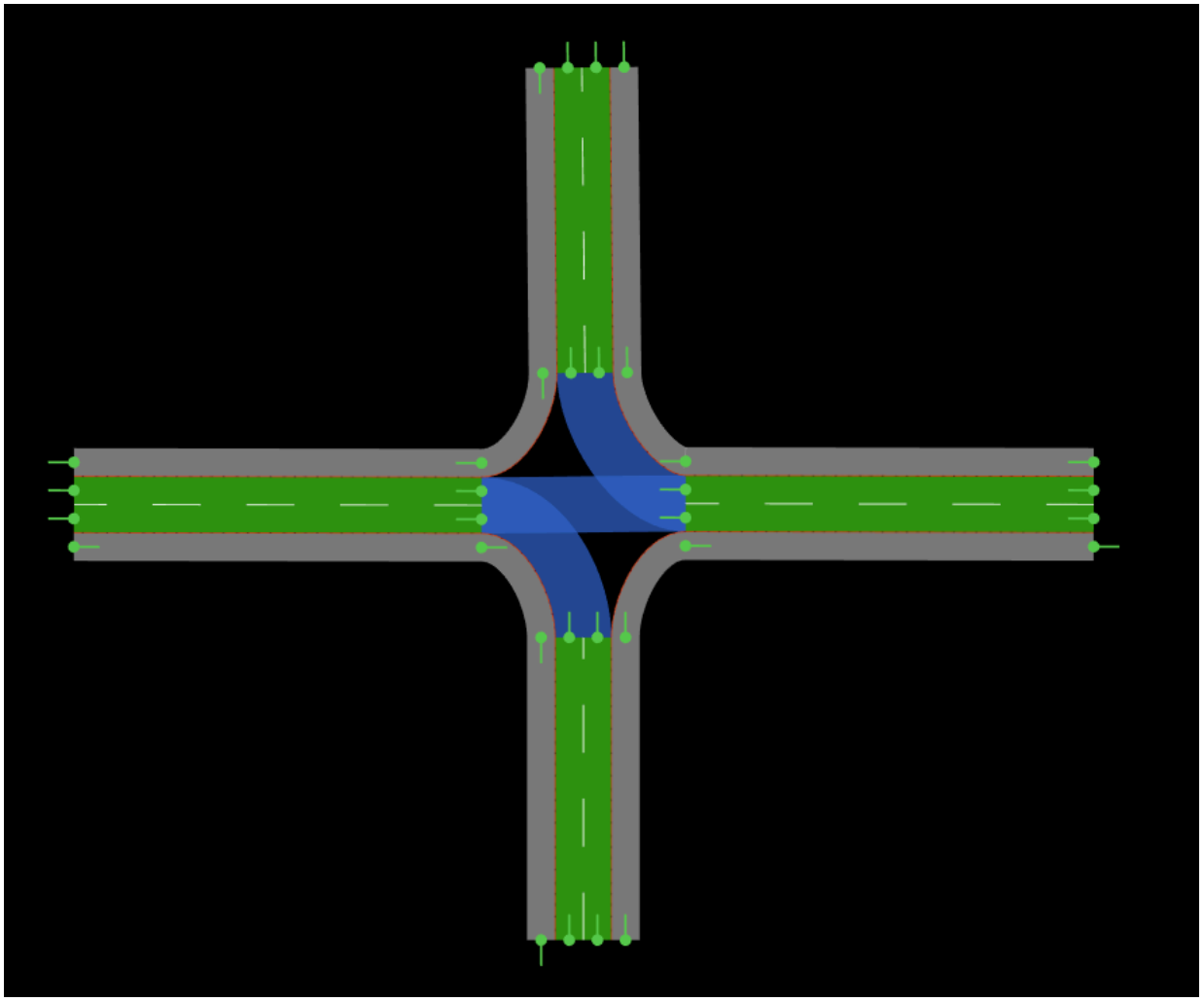


The "Create New Outline" button allows the user to create a custom outline of a junction. This highlighting process (outline creation process) has to be created manually. The user has to:

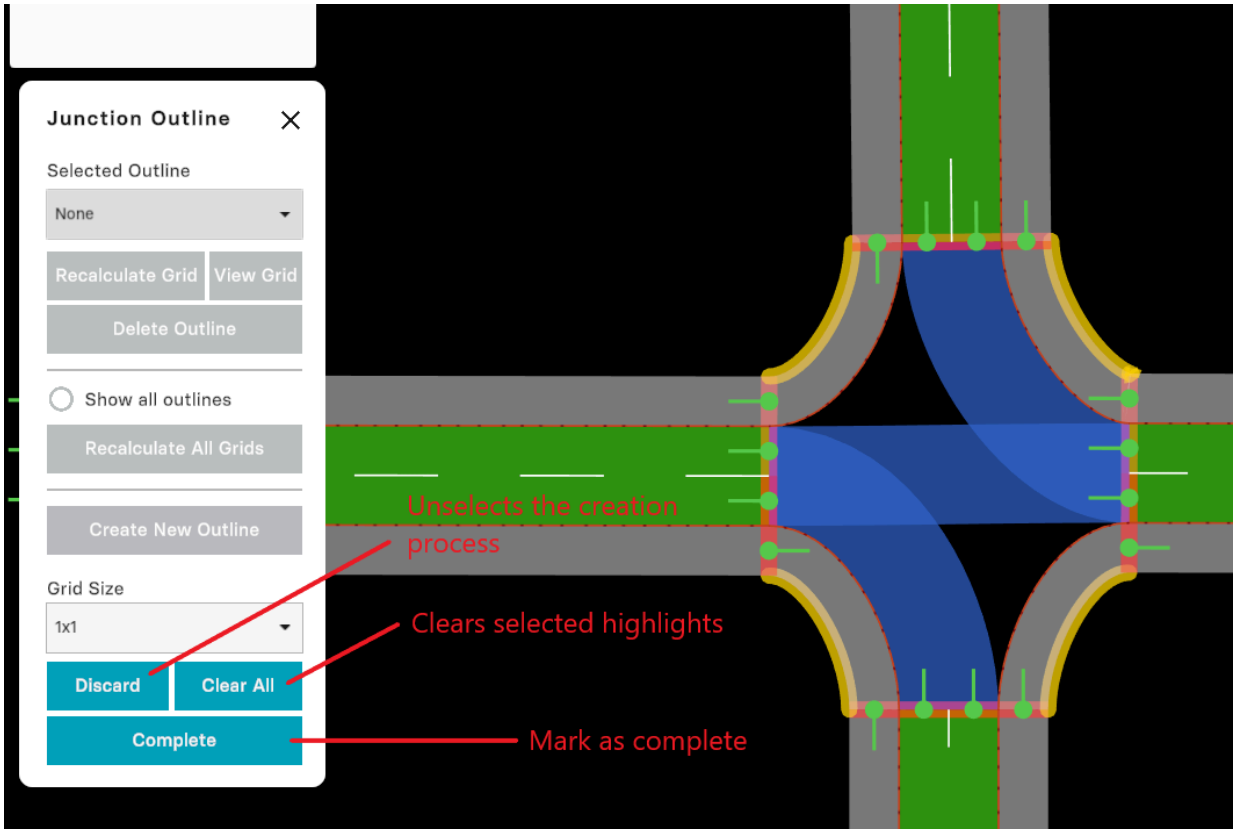


Guidelines

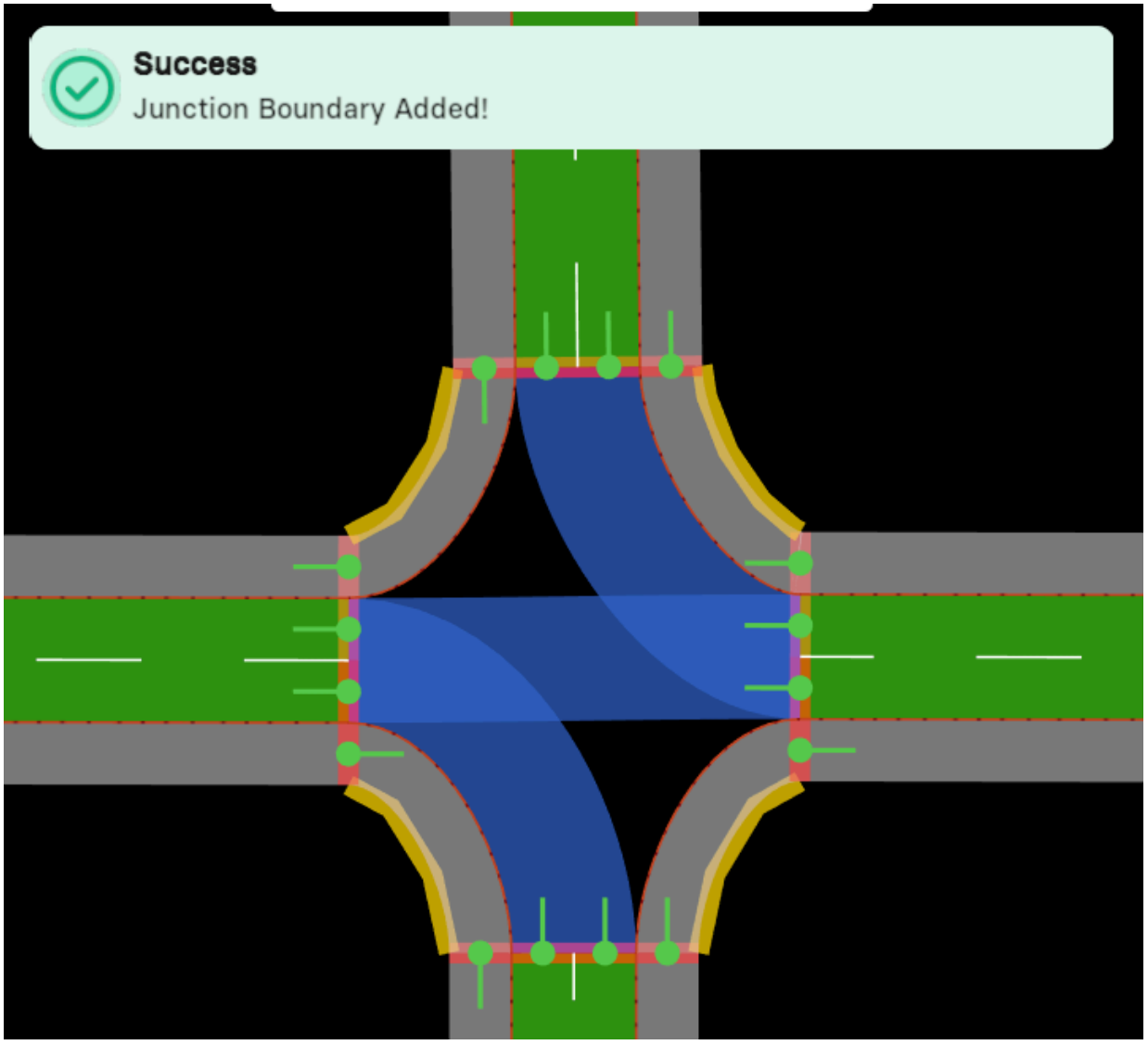
```
Navigate to the location where the roads intersect.
```

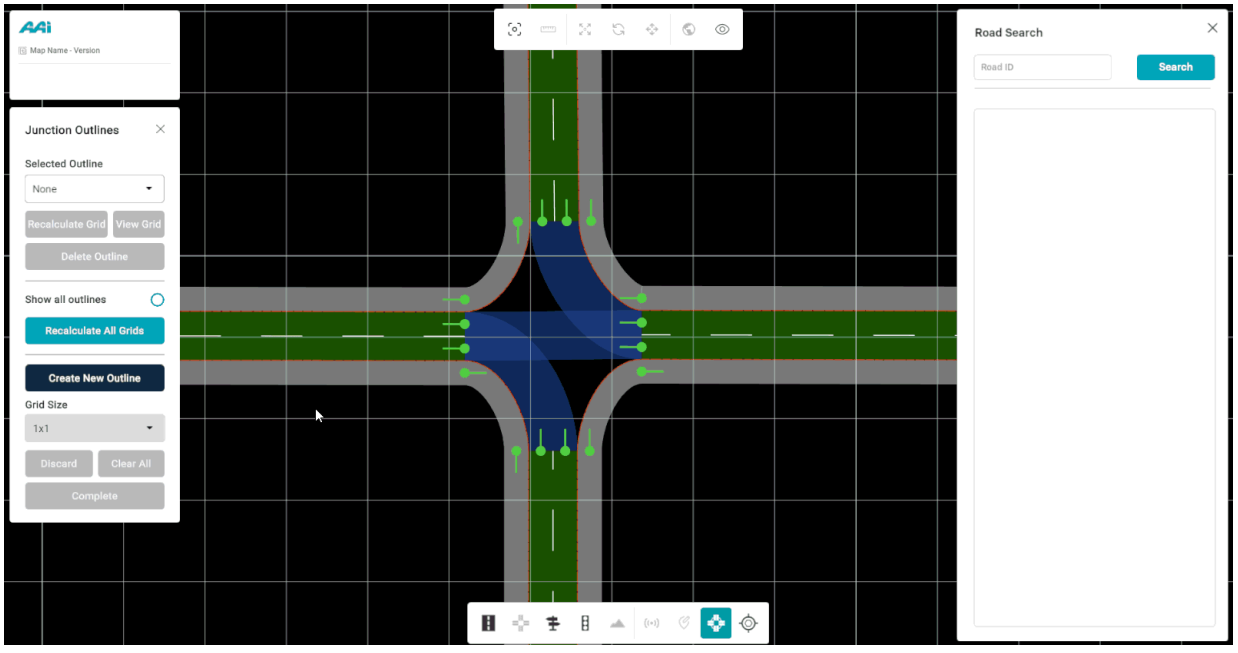


```
Right-clicking specifies the literal road connection origin, which will turn red. Le
```



After the junction highlight process is complete, you will visualize the outline in

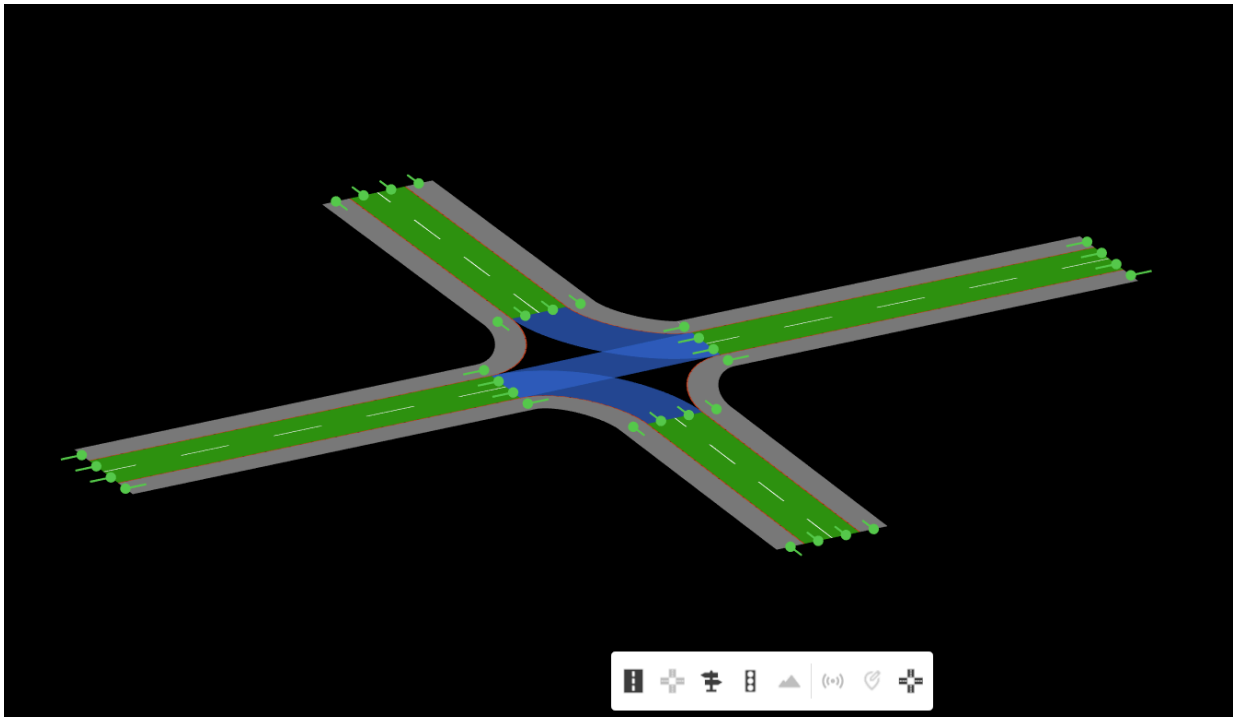


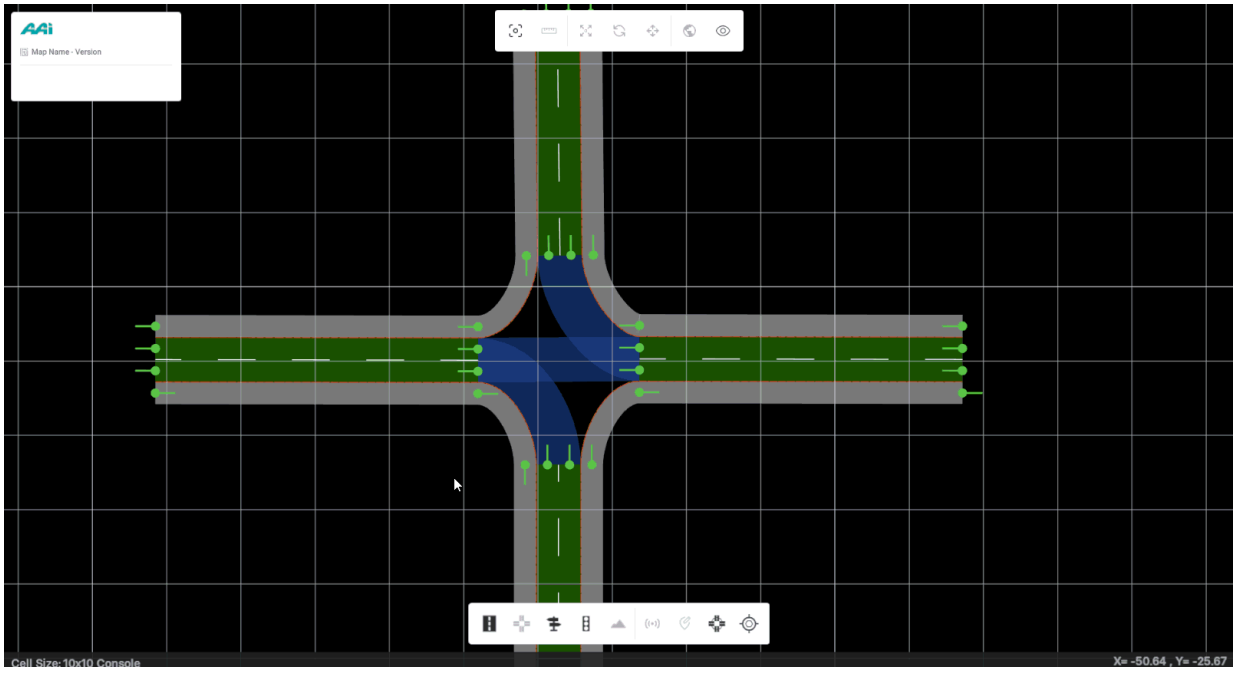


3.2.22 Elevation Tools

Enables the user to define a specific elevation diversity for a given road. These changes can be visualized by holding the "Alt" key and using the mouse (with directional input) to pan seamlessly between 2D and 3D views within the 2D plane. Unlike the **View** feature in the toolbar, this displays 3D content within the standard 2D visualization.

For this to work, the user must have all tools unequipped. Hold **Alt + drag with Mouse Button 1** in the desired panning direction.





3.2.23 Sensor Tool

Feature is currently unavailable in the latest RepliMap version.

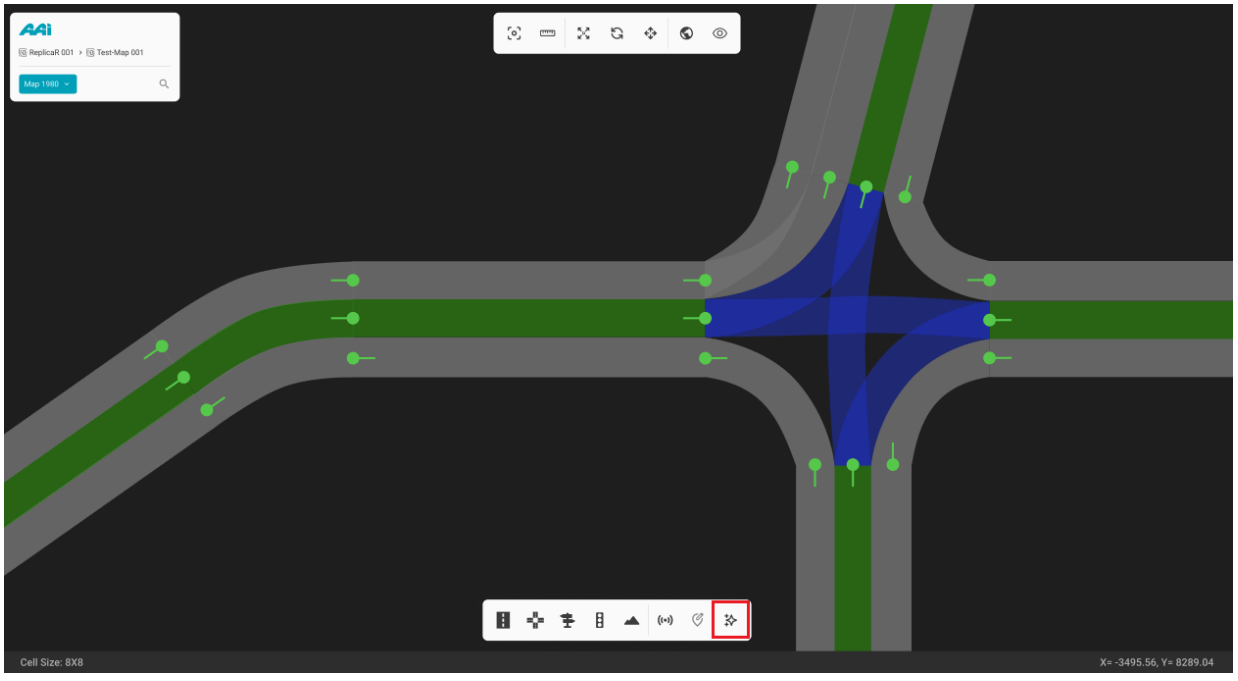
Enables users to import sensor data into a visualized map of travel corresponding to the XODR file. Users can retrace the steps recorded in the sensor data, including visual representations of the vehicle, allowing for detailed inspection and analysis.

3.2.24 RepliMap Assistant

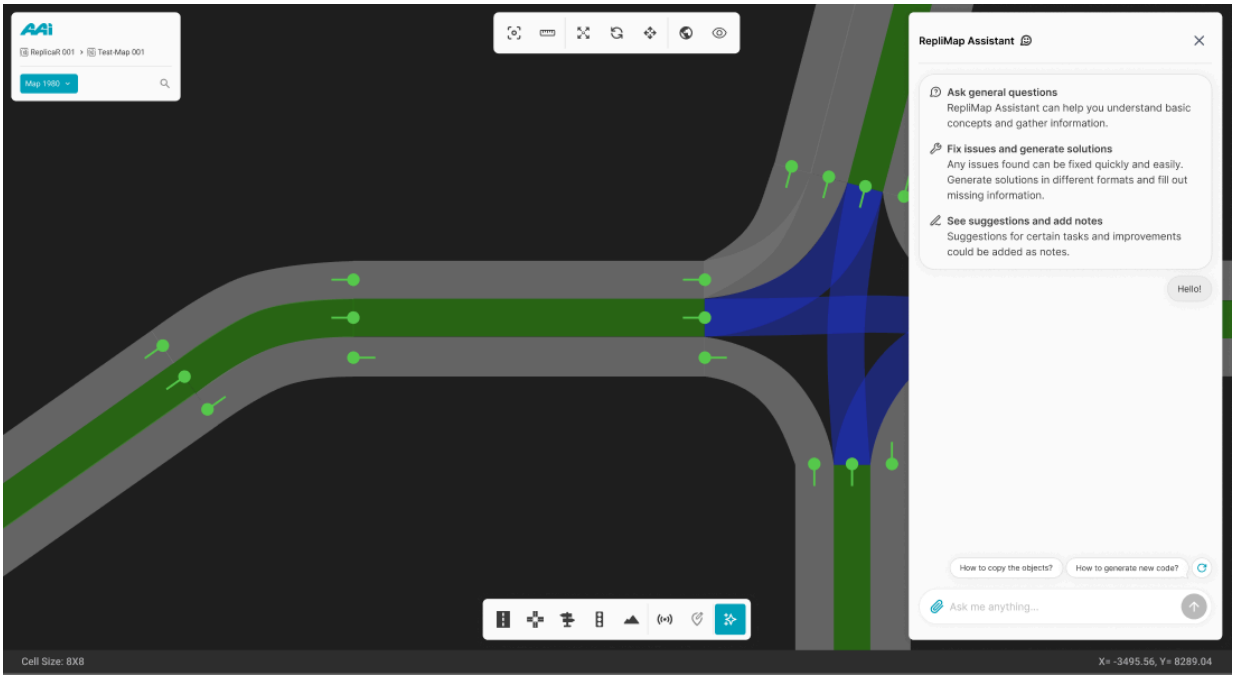
Feature is currently unavailable in the latest RepliMap version

Provides users with assistance for general questions related to the development of RepliMap. It also helps generate solutions for current issues, such as filling in information and other tasks. Additionally, it suggests improvements and allows users to add notes as needed.

```
1. Navigate to the "Editor bar" and select the "Assistant" tool.
```




```
2. Once selected, a side panel will appear featuring RepliMap’s AI assistant chat, w
```



Back to the top

3.3 Menu bar

Content's accurate location depictions are currently unavailable in the latest RepliMap version.

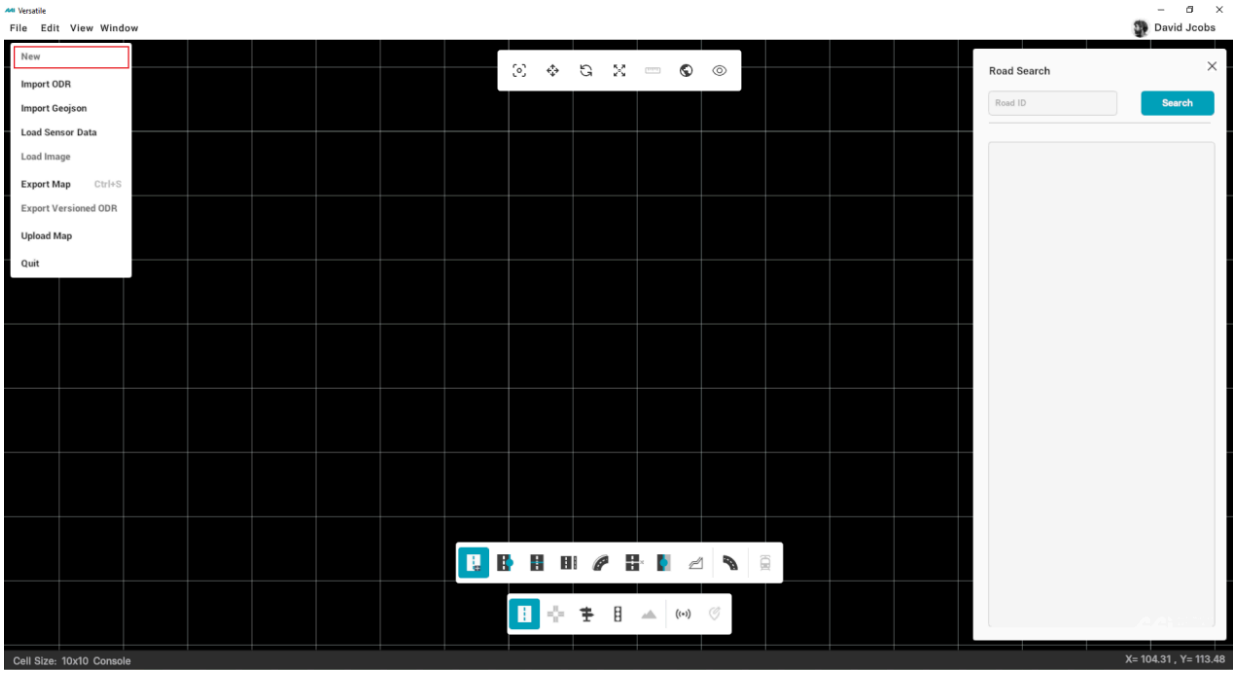
3.3.1 File

A horizontal bar located at the top left of the menu bar offers a variety of functions, including importing, exporting, and editing a map, as well as exiting the RepliMap software.

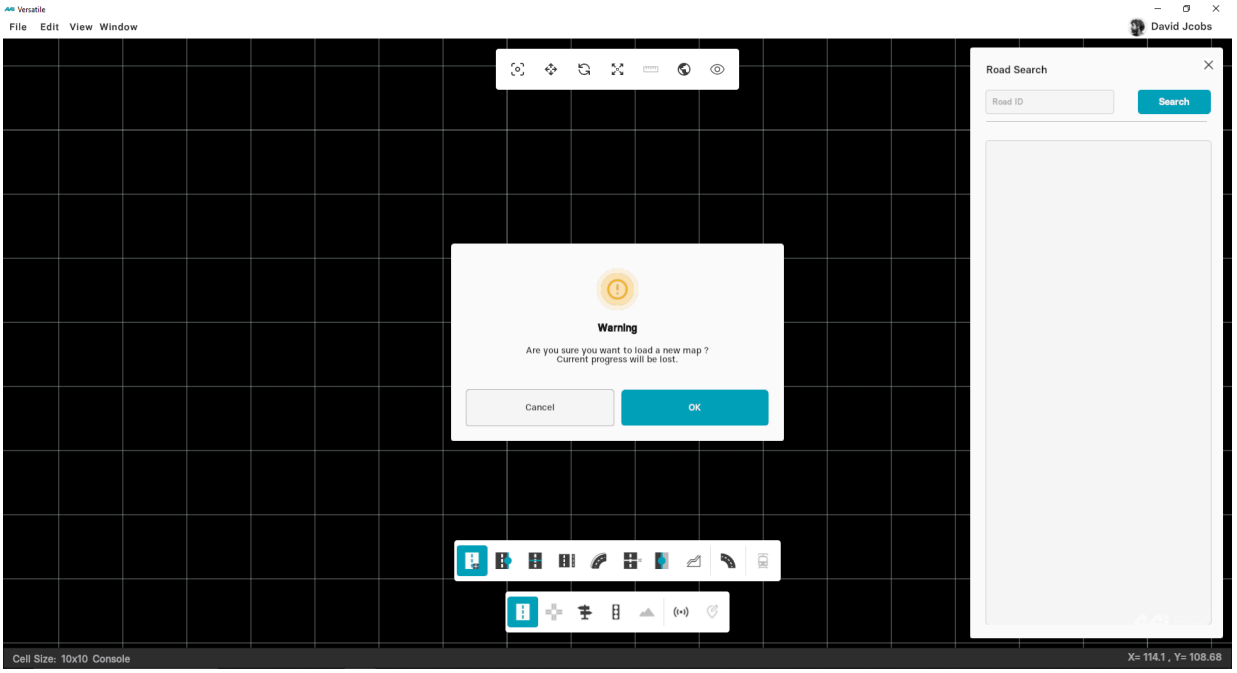
New

Below is a basic guideline to create your custom map in RepliMap by accessing several tools directly from the **Editor bar**. You can start creating your maps using the **Menu bar** tools. However, if you want to create a new, clean file, follow the steps below:

```
1. Move the cursor to the "File" option inside of the menu bar. Select "New" from dı
```



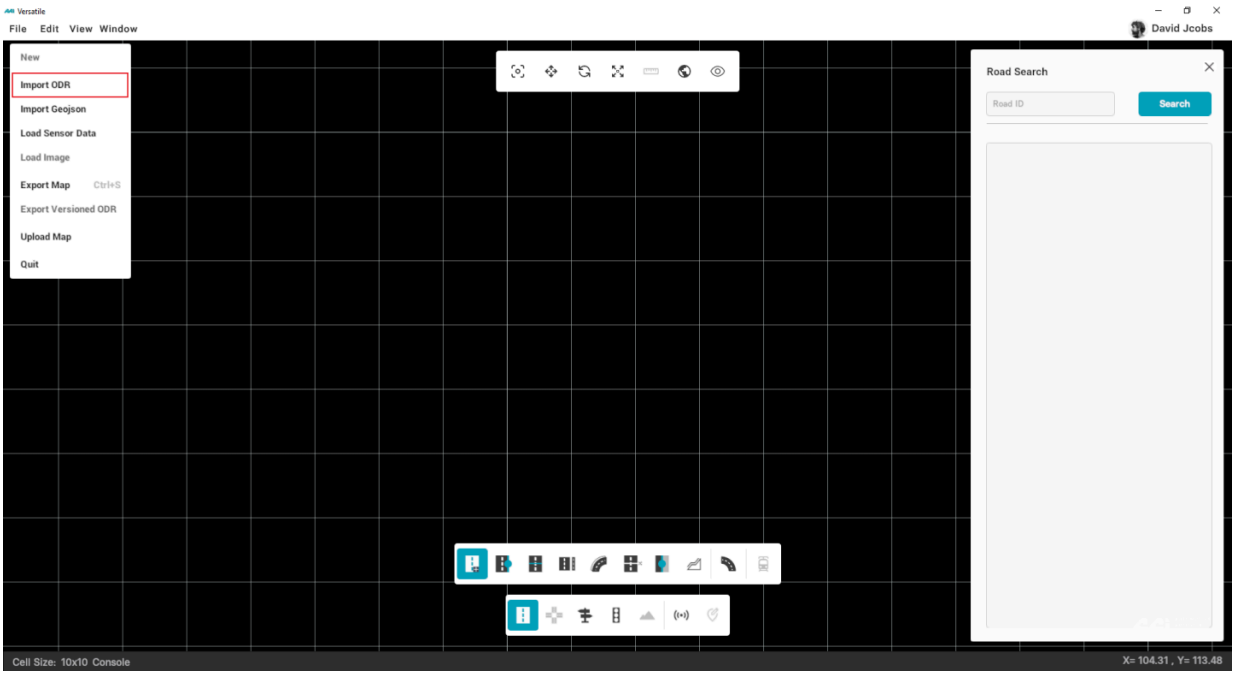

```
2. A prompt window appears displaying a warning as shown in figure below. Click "OK'
```



Import ODR

RepliMap allows you to import your previously saved maps. Note that the filename of your map should have the `.xodr` extension.

```
1. Move the cursor to the "File" option inside of the menu bar. Select "Import ODR"
```




```
2. The browser will now open a predefined directory. You can select file destinatio
```


```
3. Press "Enter" from your keyboard or click on "Import" button to load your map in
```

Load Image

Enables users to insert a desired image of their choice into the RepliMap, offering versatility. Users can select the image, resize it, and position it anywhere on the map as needed.

Load Sensor Data

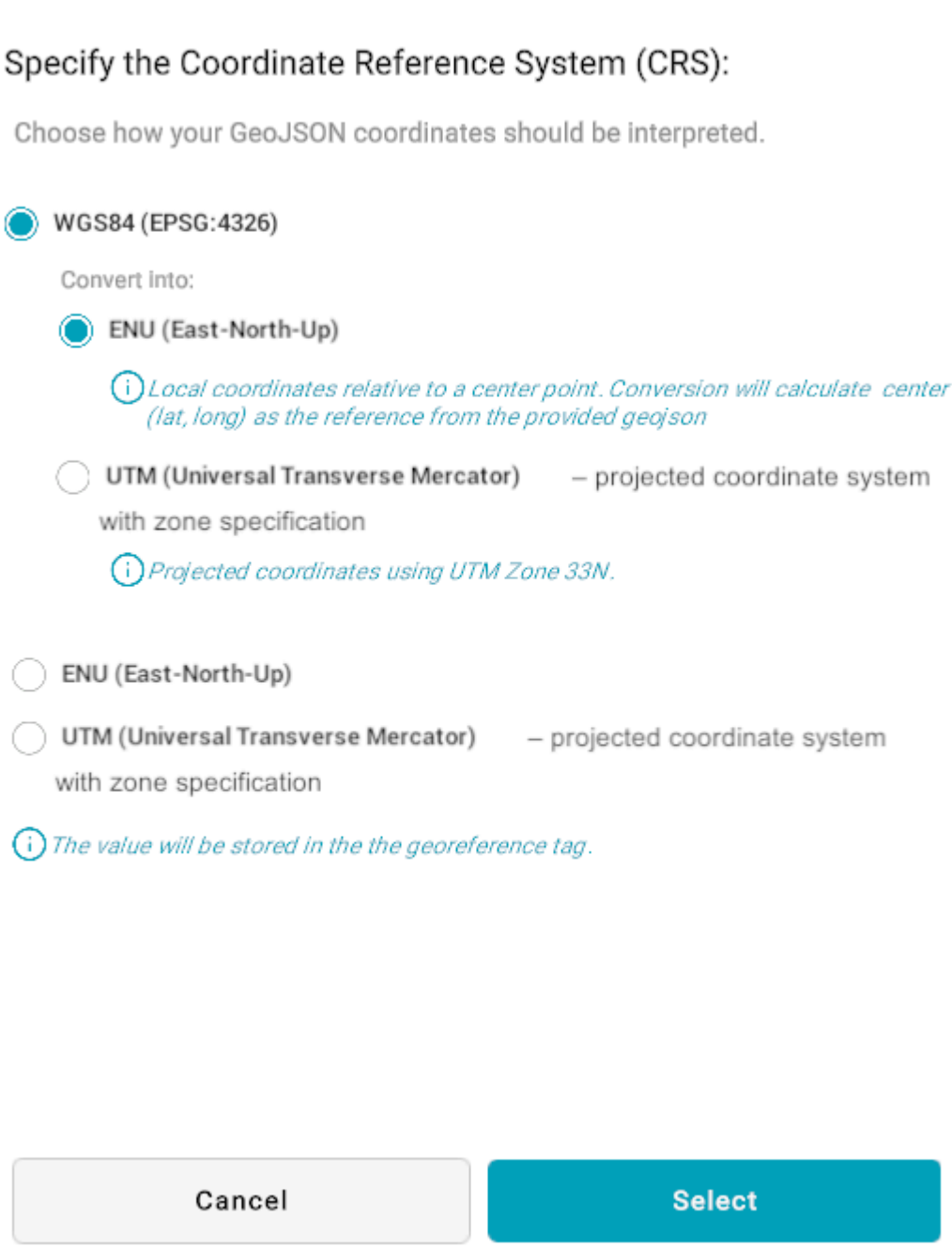
This function/option enables users to import sensor data into the mapping tool. Users can further adjust the data, including positioning and angles. The data comes directly from the measurement drives and is mainly point cloud data. However, the specifics of these adjustments will be covered later through the documentation accordingly. Once clicked, File Window will be opened with Folders file type.

3.3.2 Import GeoJSON

Used to bring **external geometry or data layers** into RepliMap for further editing, visualization, or scenario creation.

Coordinate Reference System (CRS)

When importing a GeoJSON file, users must specify the **Coordinate Reference System (CRS)** to ensure coordinates are correctly interpreted and converted.
Selecting the proper CRS guarantees that all features appear at the correct position and scale in the RepliMap environment.



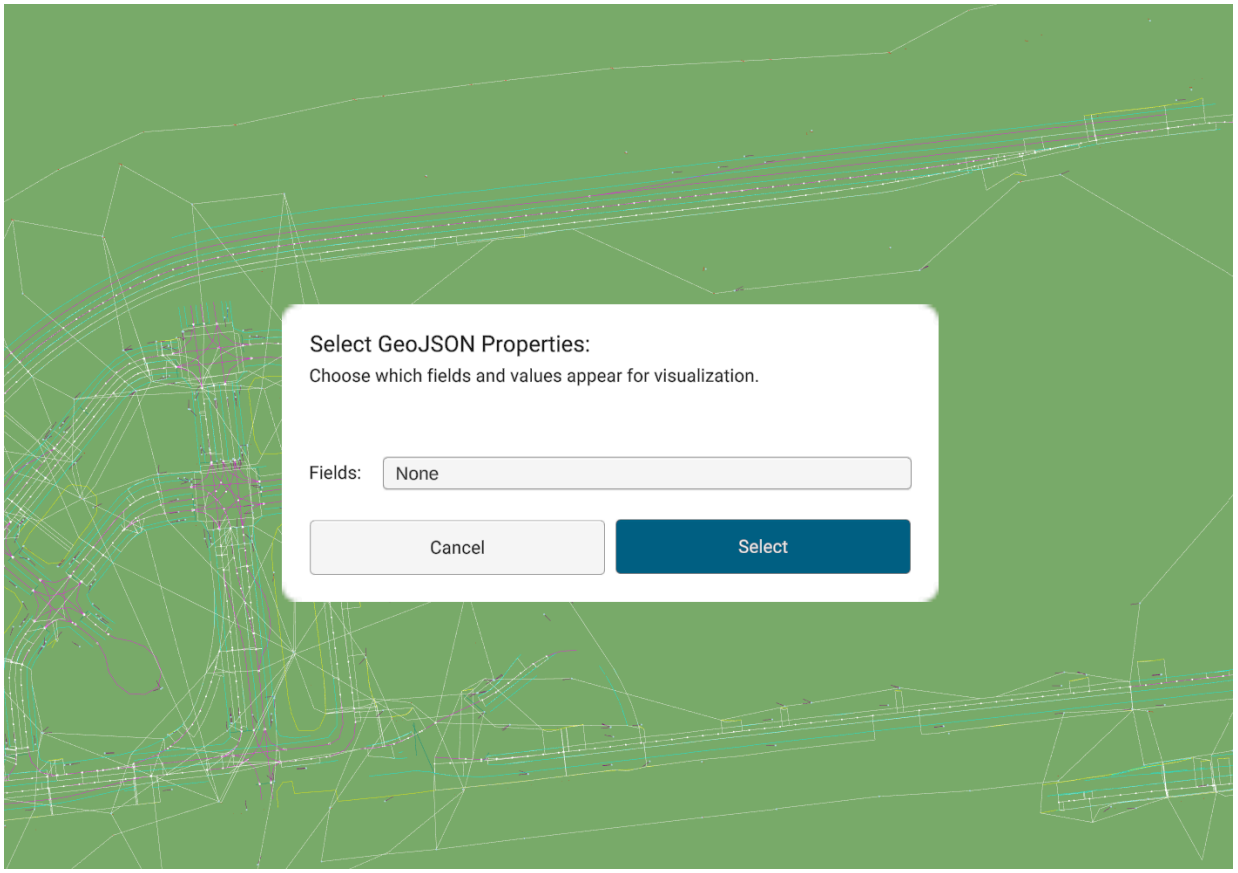
Example: CRS selection panel displayed during GeoJSON import.

Supported CRS Options

- **WGS84 (EPSG:4326)** — A *geographic coordinate system* using latitude and longitude values (in degrees). Recommended for global or GPS-based datasets.
- **ENU (East-North-Up)** — A *local tangent plane coordinate system* using metric units (meters).
- **UTM (Universal Transverse Mercator)** — A *projected coordinate system* using meters, divided into multiple geographic zones.

Selecting GeoJSON Properties

After pressing the **Select** button, a dialog box titled *"Select GeoJSON Properties"* appears, listing all detected fields from the imported GeoJSON file.



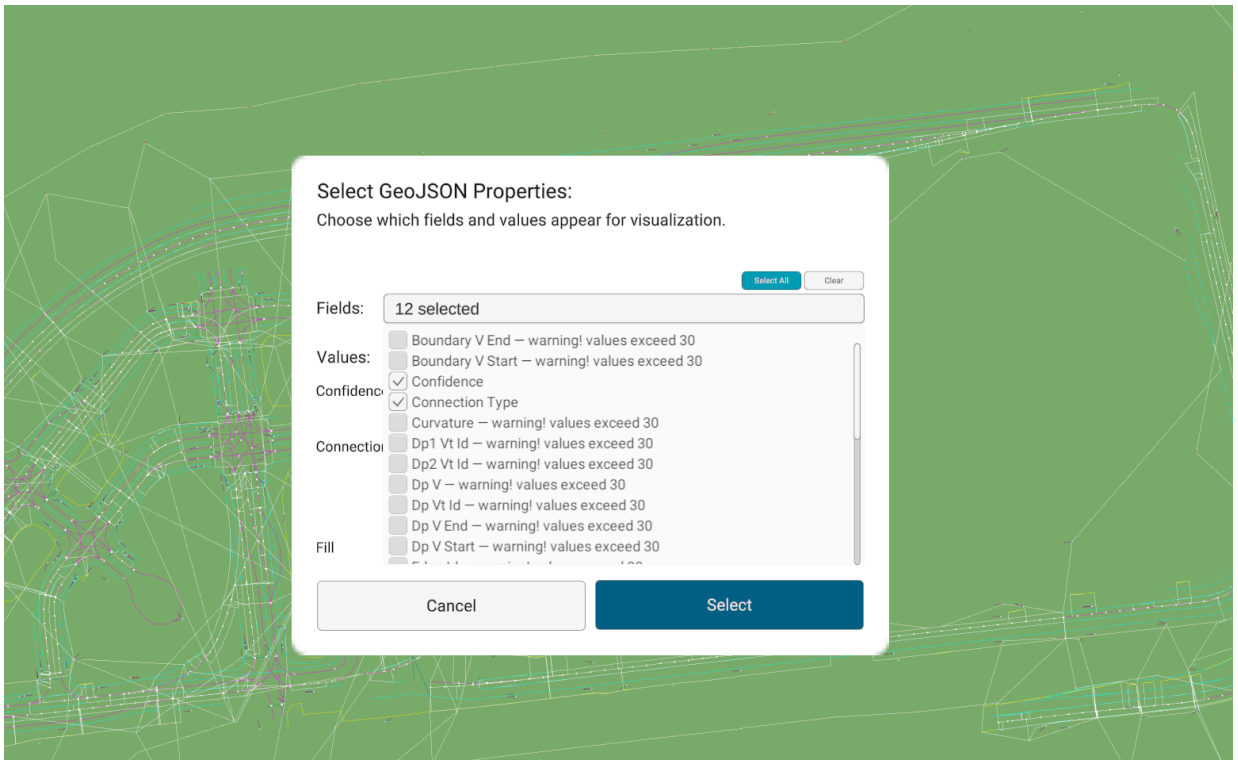
Field Selection Rules

Within the *Select GeoJSON Properties* dialog, users can manage which fields will be visible and available for further customization.

Rules: - Only fields with values **less than 30** are selectable.
- Fields containing values **greater than 30** are automatically disabled (non-selectable).
- Users can: - **Select All** – Select all available (value < 30) fields at once.
- **Clear** – Deselect all currently selected fields.

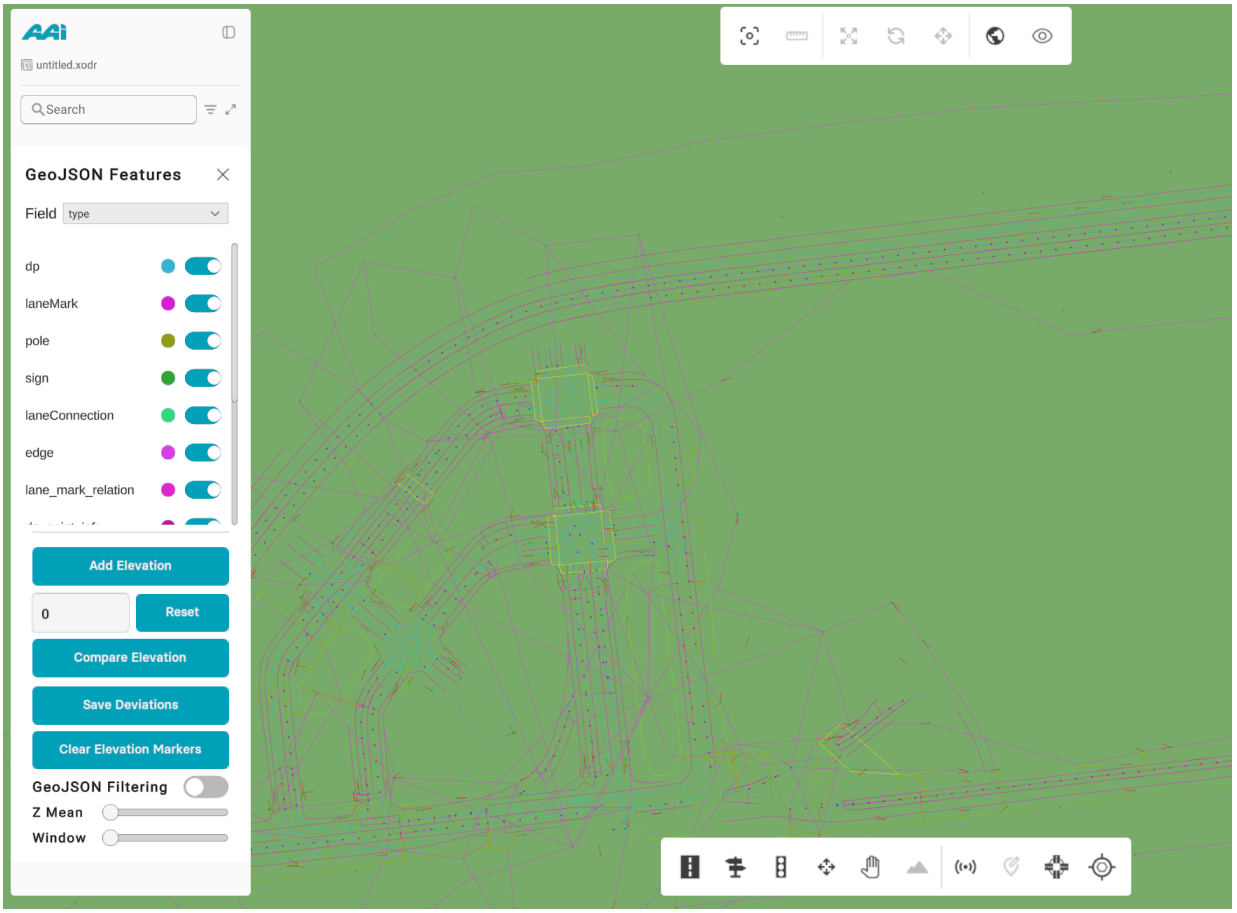
Before proceeding, users can review the list of selected fields and their data types within the dialog box for confirmation.

3.3.3



Confirming Selection

After verifying the field list, click on the **Select** button.
Once confirmed, the **GeoJSON Features** panel appears on the right side of the RepliMap editor interface.



Managing Fields and Types

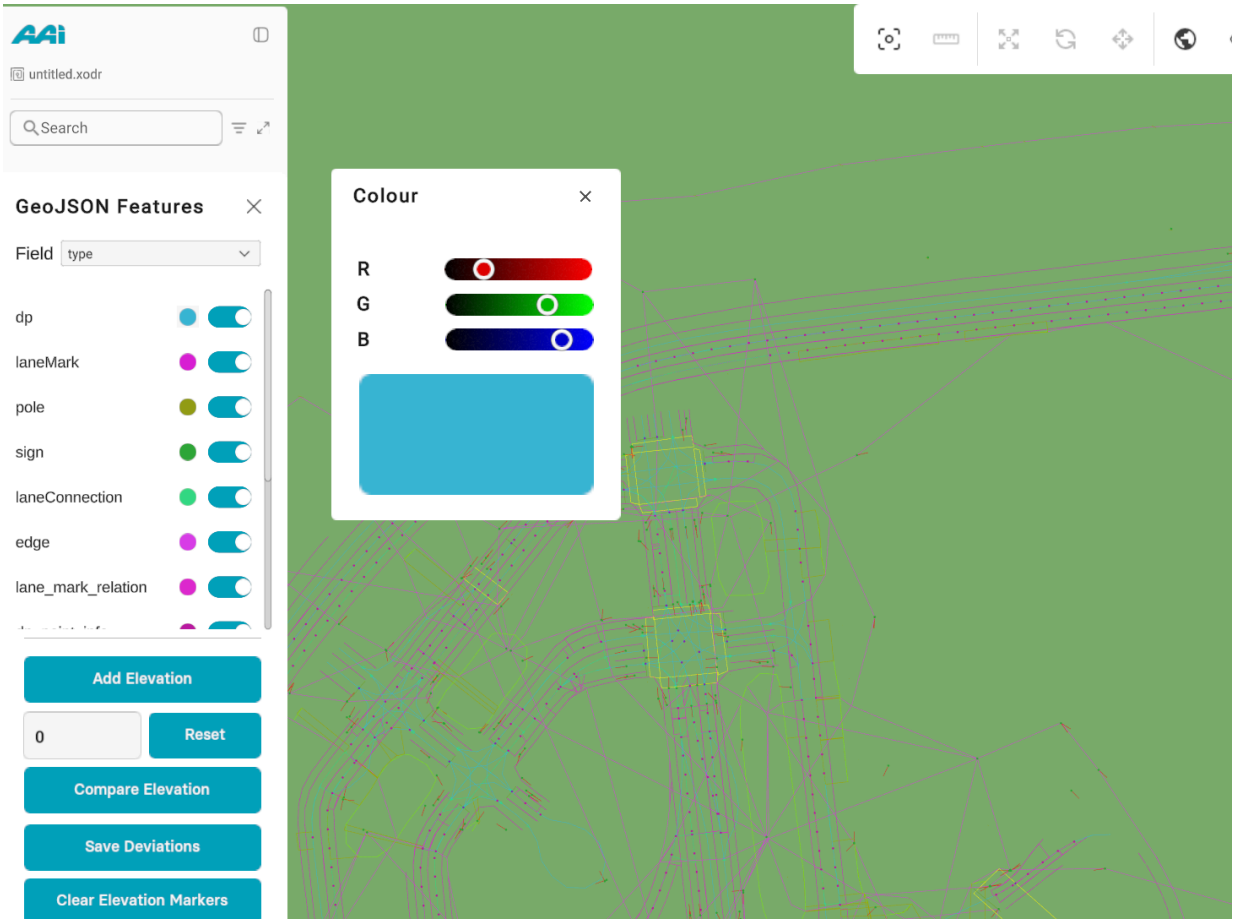
Inside the **GeoJSON Features** panel:

- The **Field dropdown** contains all previously selected fields.
- When a user selects a specific field, its **types** (unique values within that field) are displayed below.
- Each type includes:
- A **color indicator** showing its assigned visualization color on the map.
- A **toggle switch** to control visibility (ON/OFF) directly within the editor.

This enables users to filter visible data dynamically and instantly view corresponding color-coded geometries on the map.

Type Color Customization

Users can personalize how each type appears visually by customizing its color.

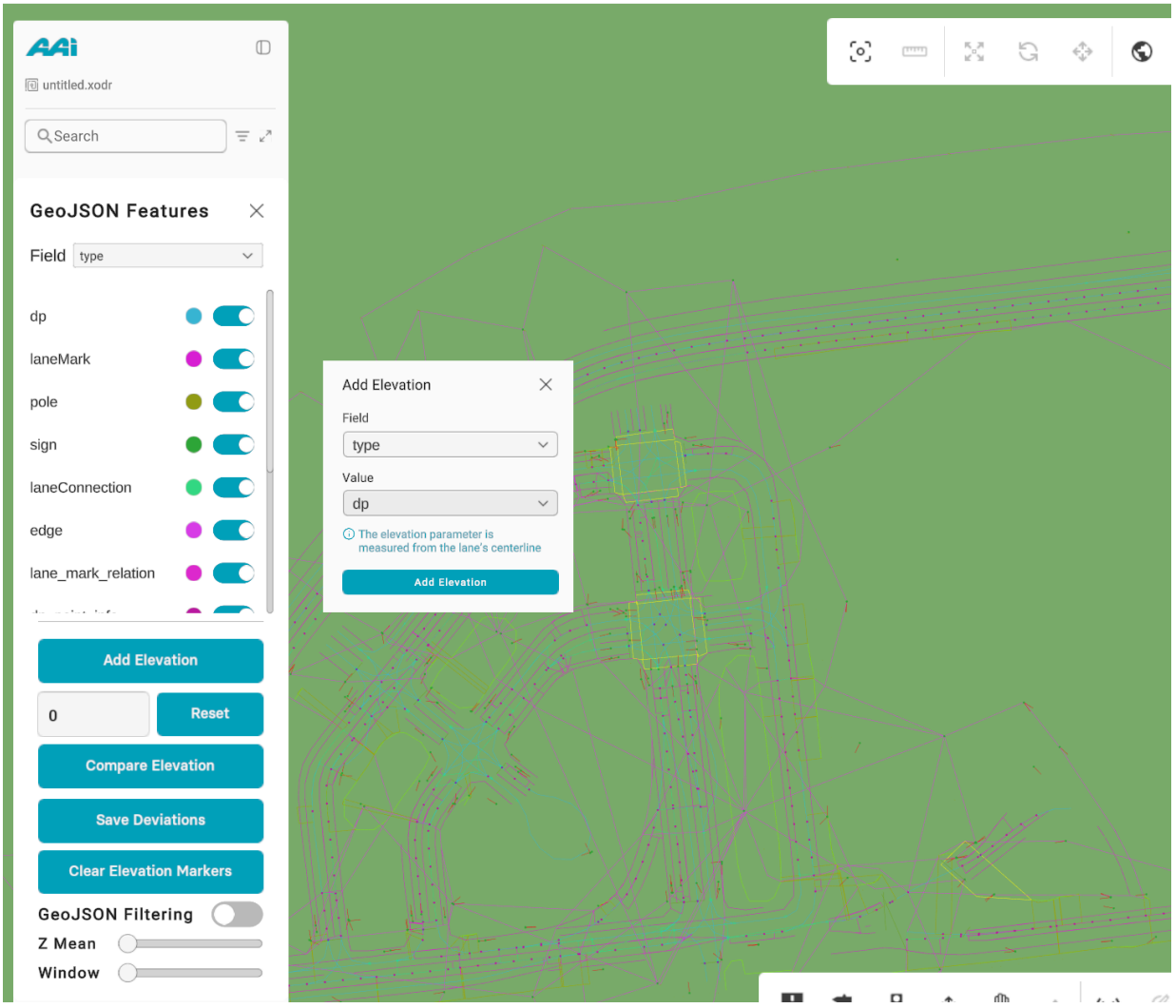


Color Editing: - Click the color icon beside any type to open the color picker.
- Choose a new color — it immediately updates the visualization of that type in the editor.

Color Conflict Rule: If a type (e.g., *edge*) exists in multiple fields with different assigned colors: - Only the color associated with the **currently selected field** in the Field dropdown will be displayed.

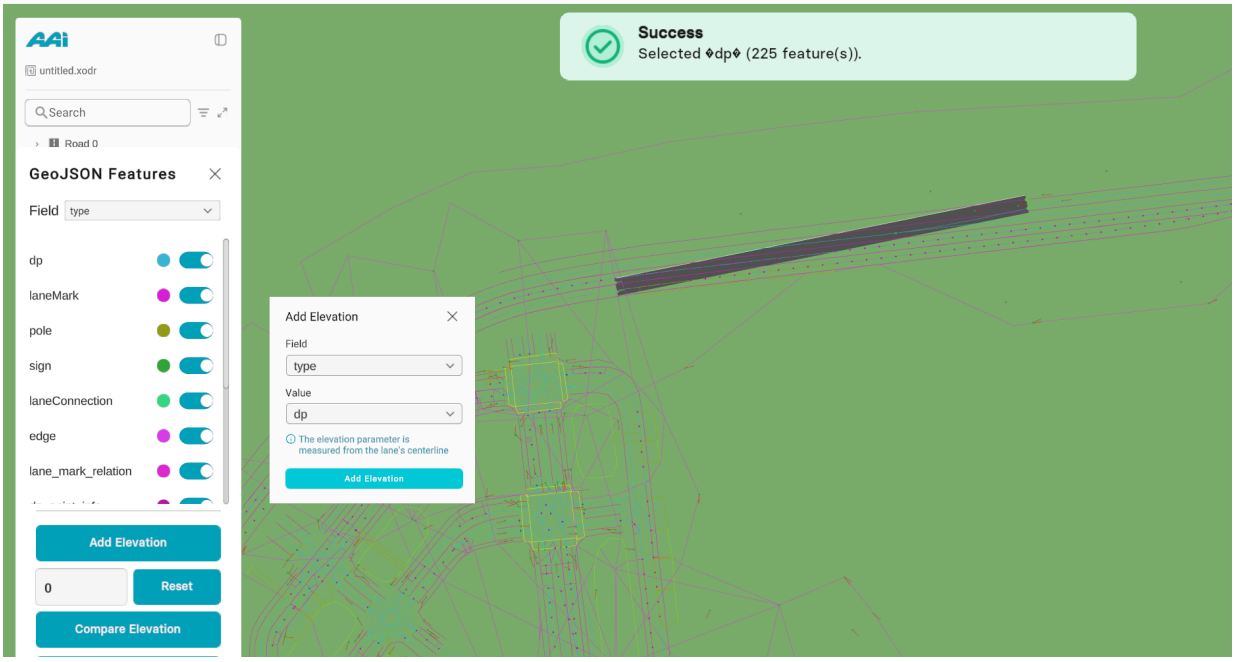
Adding Elevation Data

RepliMap allows users to **add elevation values** to imported GeoJSON geometries, enhancing spatial accuracy for simulation and visualization.



Elevation Editing: - Click the **Add Elevation** button located within the *GeoJSON Features* panel.
- A small dialog box appears, allowing the user to: - Enter the **Field name** (e.g., `elevation` or `height`).
- Specify a **Value** representing the elevation in meters.

Once applied, RepliMap automatically updates the selected GeoJSON features, assigning the elevation value and visually reflecting it on the map surface.



This feature is particularly useful for defining **terrain-based geometries**, bridges, slopes, and 3D map components.

Visualization Behavior

- GeoJSON geometries are color-coded based on the selected field and its types.
- Visibility toggles allow users to focus on specific attributes by hiding or showing relevant geometries dynamically.
- The **Add Elevation** function ensures imported data aligns with the 3D map surface for enhanced realism.
- This ensures **clear, accurate, and elevation-aware** visual interpretation of complex spatial data layers.

Summary of Key Features

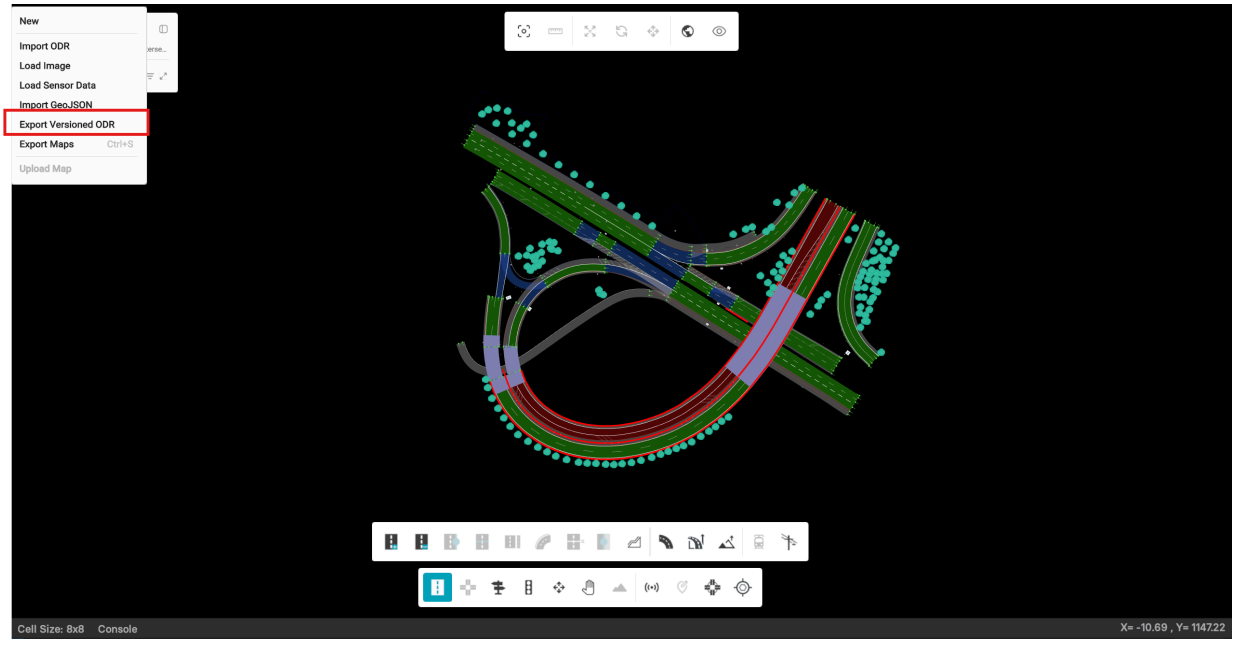
Feature	Description
Field Filtering	Only fields with values < 30 are selectable.
Bulk Actions	“Select All” and “Clear” buttons for quick selection management.
Field Review	Preview field names and data types before selection.
Type Visibility	Individual toggles to control visibility of each type.
Color Customization	Editable color palette for type-based visualization.

Feature	Description
Add Elevation	Assign custom elevation values to imported GeoJSON geometries.
Conflict Resolution	Color priority is given to the currently selected field.

Benefits

- Enhanced **visual clarity** and **3D accuracy** of imported GeoJSON data.
- Selective visibility for focusing on **specific spatial attributes**.
- Customizable colors for clearer **map analysis and presentation**.
- Simplified elevation management for **terrain-aware map visualization**.
- Reduced visual clutter in large datasets by filtering irrelevant fields.

Export Versioned ODR



The **Export Versioned ODR** panel allows users to export customized OpenDRIVE (XODR) map versions for multiple target tools, including **3D Simulation**, **ModelDesk**, and **RoadRunner**.
This export process ensures compatibility across tools and helps resolve map consistency issues detected in DSpace or similar validation environments.

Overview

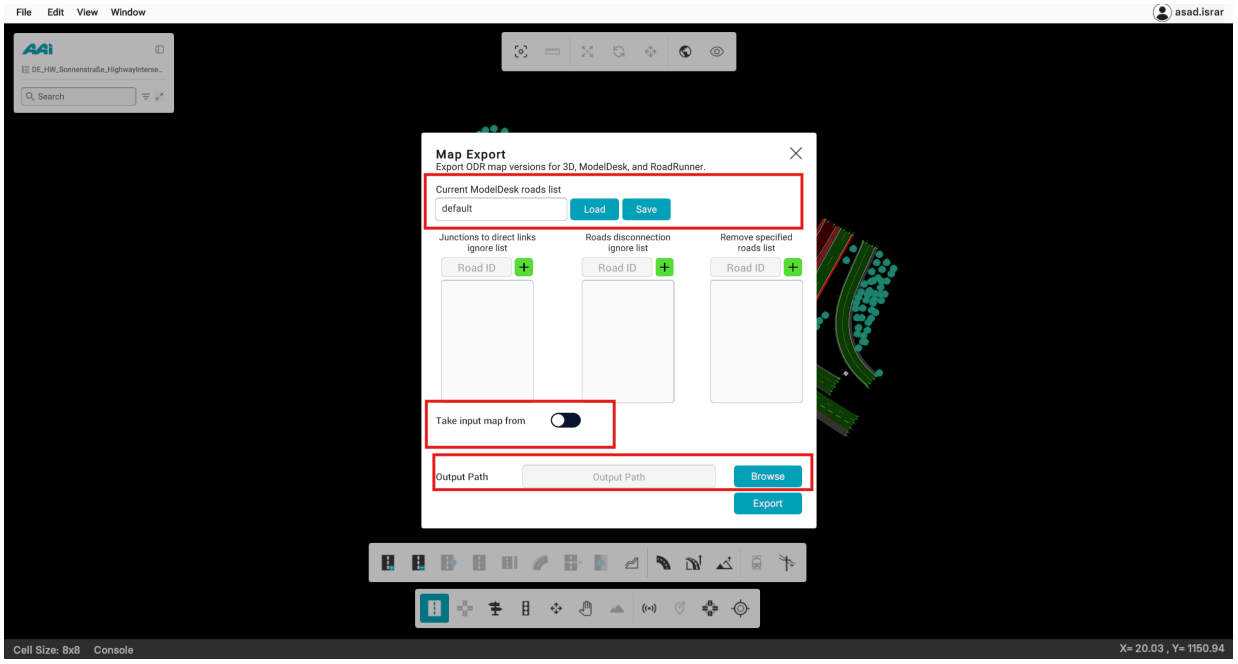
The export panel provides flexible options to manage road-level corrections and export configurations before generating map files.

Export Types

The system generates up to **four versioned ODR files** during export:

1. **3D Simulation ODR** — complete file for 3D visualization and use in simulation tools.
2. **ModelDesk (Full)** — includes all map objects and attributes, ideal for internal validation.
3. **ModelDesk (Limited)** — excludes specific object categories for simplified export or lightweight setups.
4. **RoadRunner ODR** — optimized export for RoadRunner compatibility, maintaining geometry and road connectivity.

Panel Description



1. Current ModelDesk Roads List

Displays the active road list configuration (default or custom).
Users can **Load** a previously saved road list or **Save** a new configuration for later reuse.

2. Road ID Lists (Ignore Lists)

To handle validation issues, users can define road IDs in three ignore lists:

- **Junctions to Direct Links Ignore List** — used to skip roads causing invalid junction connections
  (e.g., single-connecting-road junctions not allowed by ASAM OpenDRIVE).
- **Roads Disconnection Ignore List** — skips roads that cause "disconnection" consistency errors during validation.
- **Remove Specified Roads List** — excludes selected road IDs completely from the export.

  💡 *Example:*
  If DSpace consistency checks highlight red or blue road errors or warnings, simply add those road IDs
  to the relevant list and re-export. The new export automatically resolves the reported connection
  or geometry conflicts.

3. Take Input Map From (Toggle Option)

- When enabled, users can attach an external road list file to use predefined IDs for ignore lists.
- When disabled, IDs can be manually entered in the fields above.

4. Output Path

Defines the export destination for the generated ODR files.
Use the **Browse** button to select the target folder.

5. Export Button

Initiates the export process.
The system automatically generates all selected ODR variants (3D, ModelDesk full/limited, RoadRunner).

Typical Workflow

1. Open the **Export Versionized ODR** panel from the export menu.
2. (Optional) Load a previously saved **ModelDesk roads list** configuration.
3. Add any road IDs into the **ignore lists** to bypass invalid junctions, disconnections, or unwanted roads.

4. (Optional) Enable **Take Input Map From** to load IDs directly from an external list file.
5. Choose an **Output Path** for the exported ODRs.
6. Click **Export** to generate all ODR files.
7. Load the exported files in your preferred environment (**ModelDesk**, **RoadRunner**, or **3D simulation**) for verification.

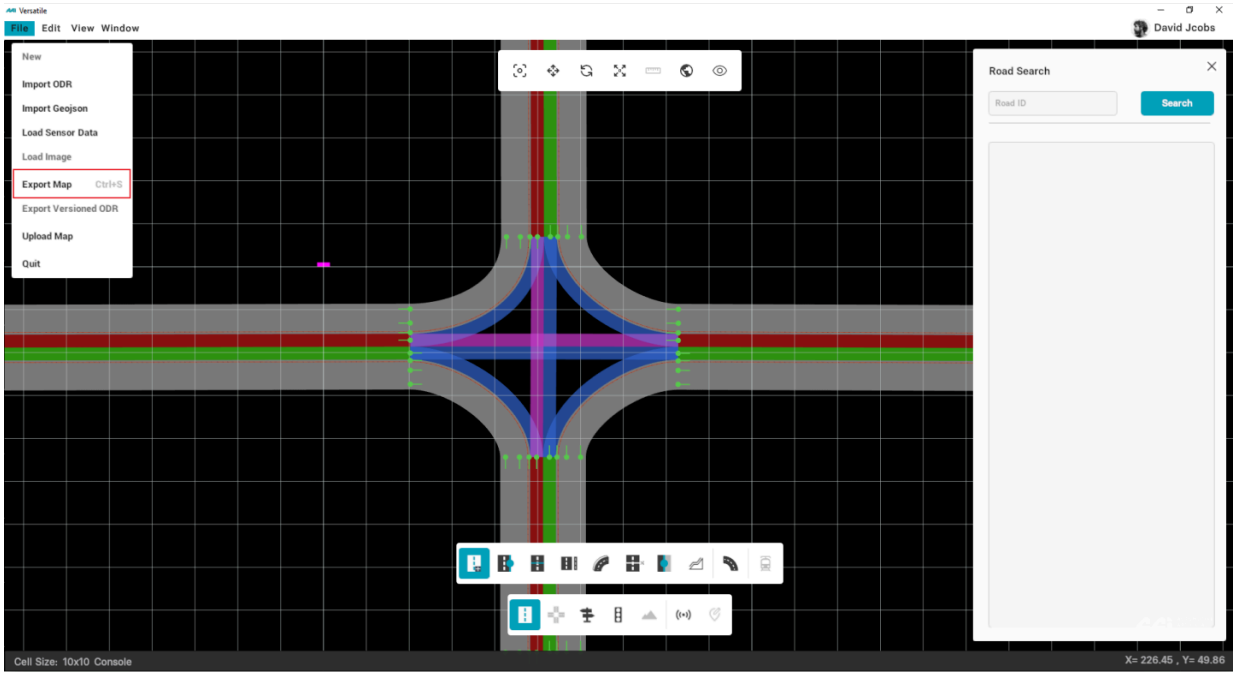
Benefits

- Streamlined handling of **consistency check errors** (e.g., red/blue connection issues).
- Ensures **ModelDesk and RoadRunner compliance** in one unified export workflow.
- Allows fine-grained control with **custom road exclusion lists**.
- Reduces manual rework by saving reusable road ID configurations.

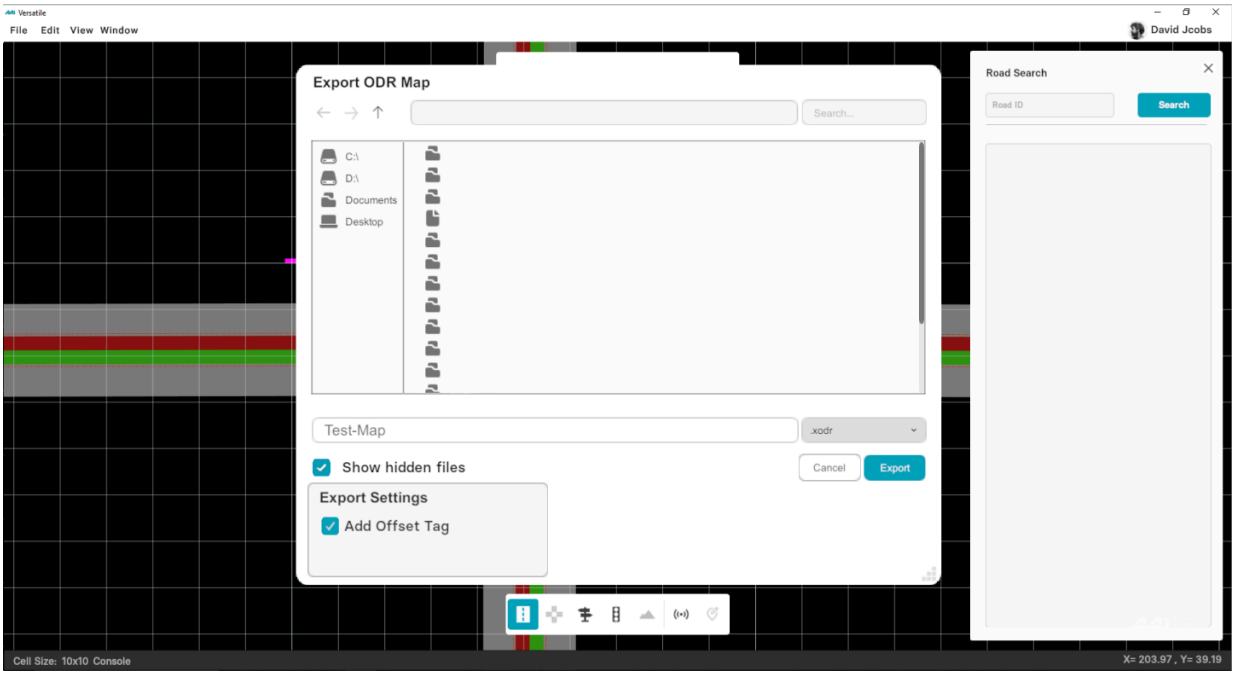
Export Maps

Once you have created or opened a map in RepliMap, you will be able to export your map by pressing ***CTRL + S*** from your keyboard or by simply following the given steps:

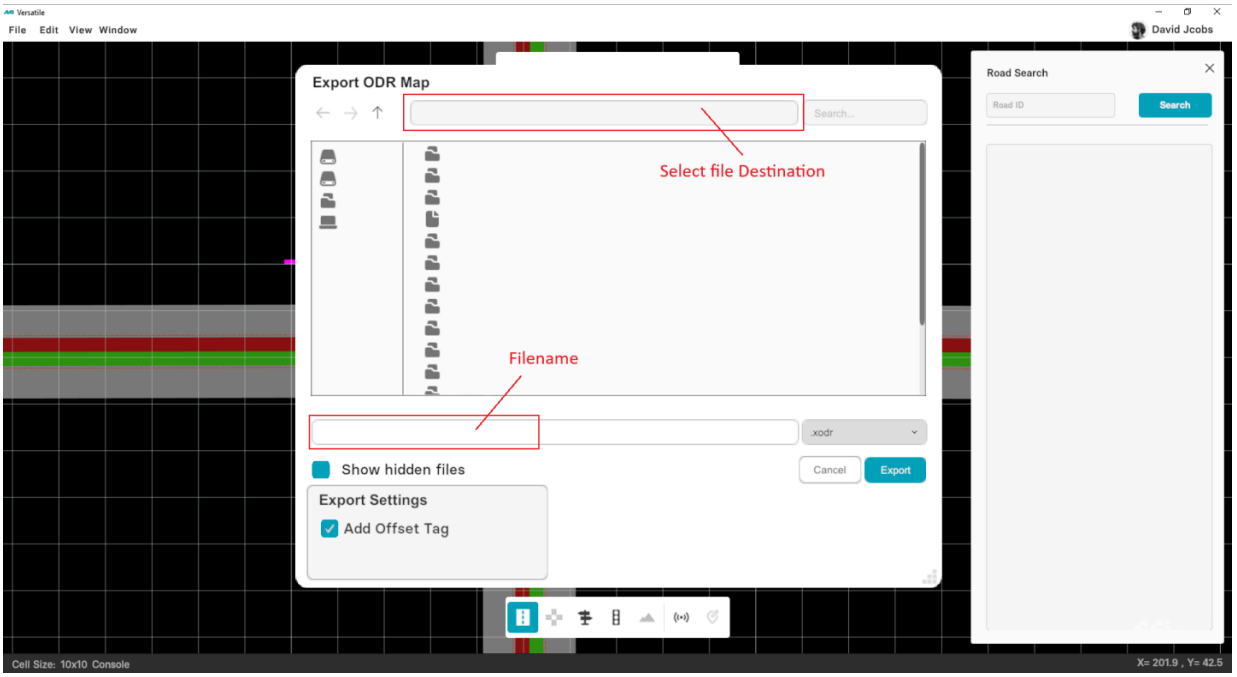
```
1. Click on "File", select "Export Map" from the drop-down menu.
```



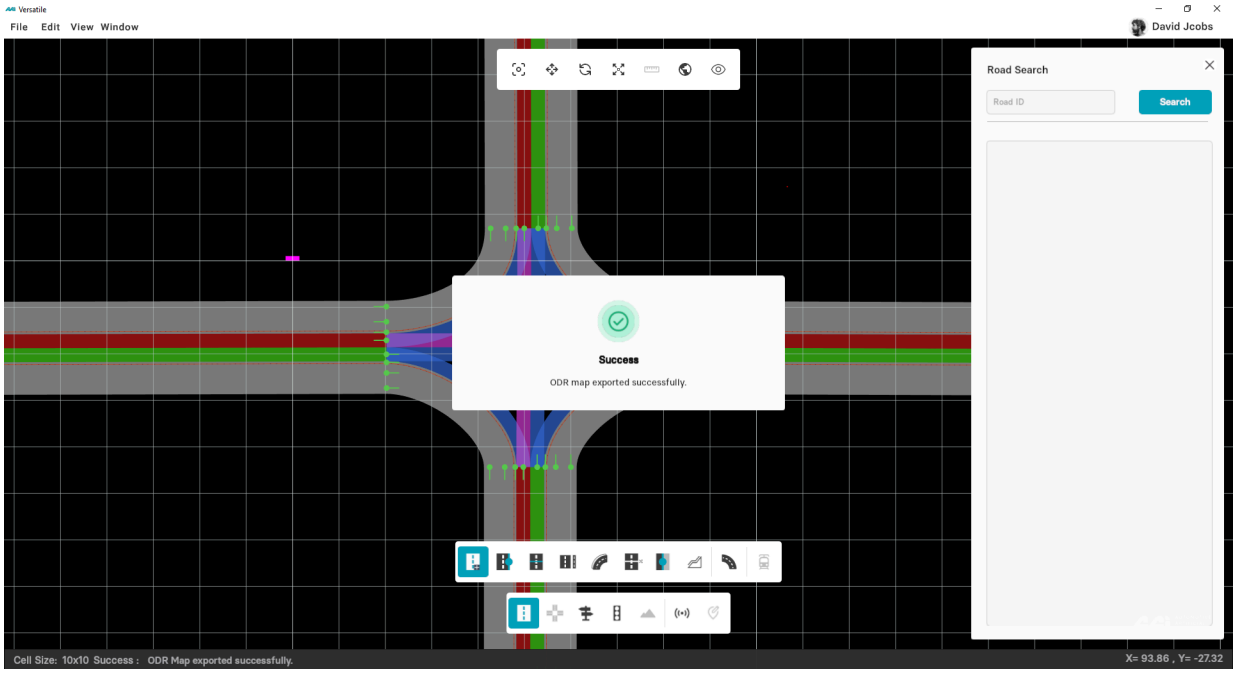

```
2. When a dialog box appears on screeen, choose a file destination from the list of
```



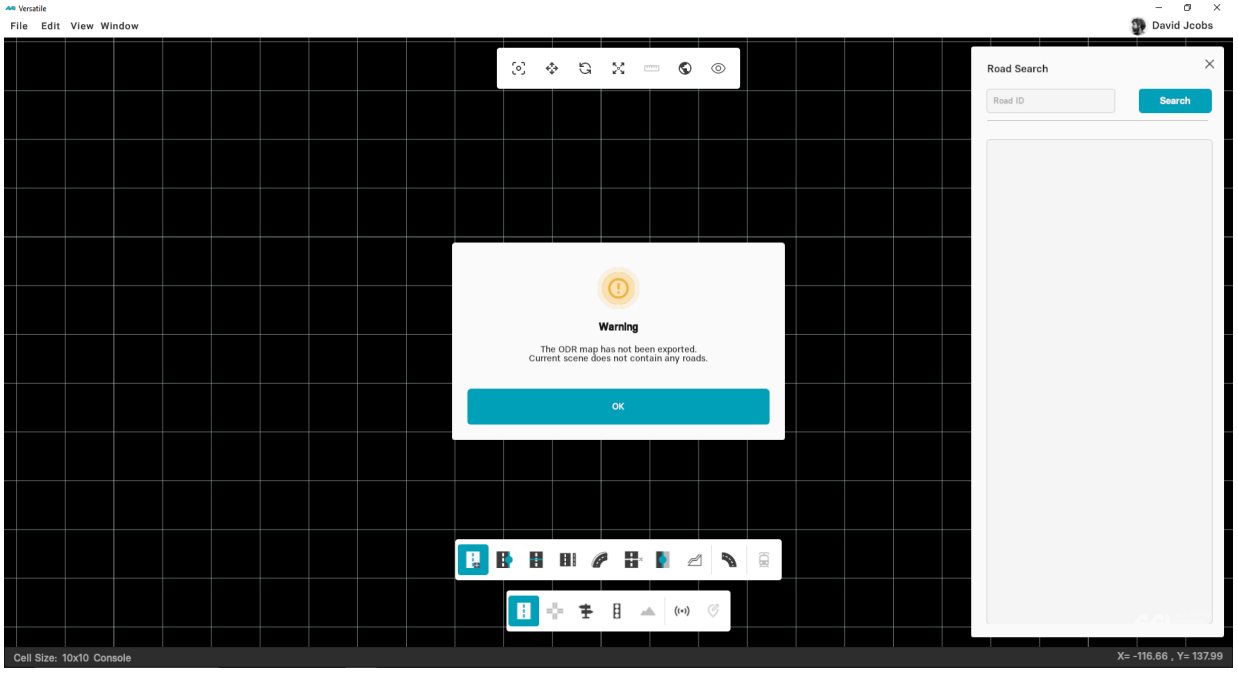
3. Press"Enter" from your keyboard or click "Export" to save your map. The map is sa



4. A prompt message "Exported Successfully" appears on your screen.



Before exporting, make sure your RepliMap window is not empty. Otherwise, a warning alert pops up on the screen.



Upload Map

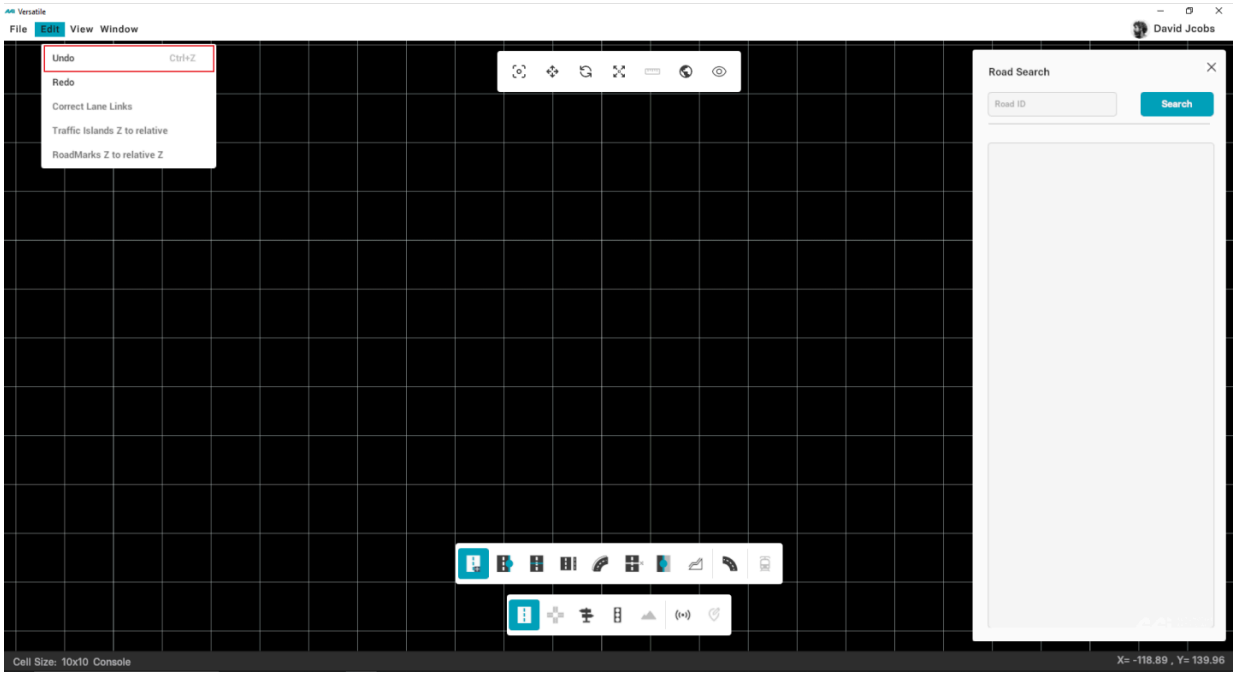
Information is currently unavailable in the latest RepliMap version.

3.3.4 Edit

The Edit drop-down menu, provides operations such as Undo last change and Redo last undone change from your currently opened map in RepliMap. *Note: Undo/Redo is not supported with imported maps.*

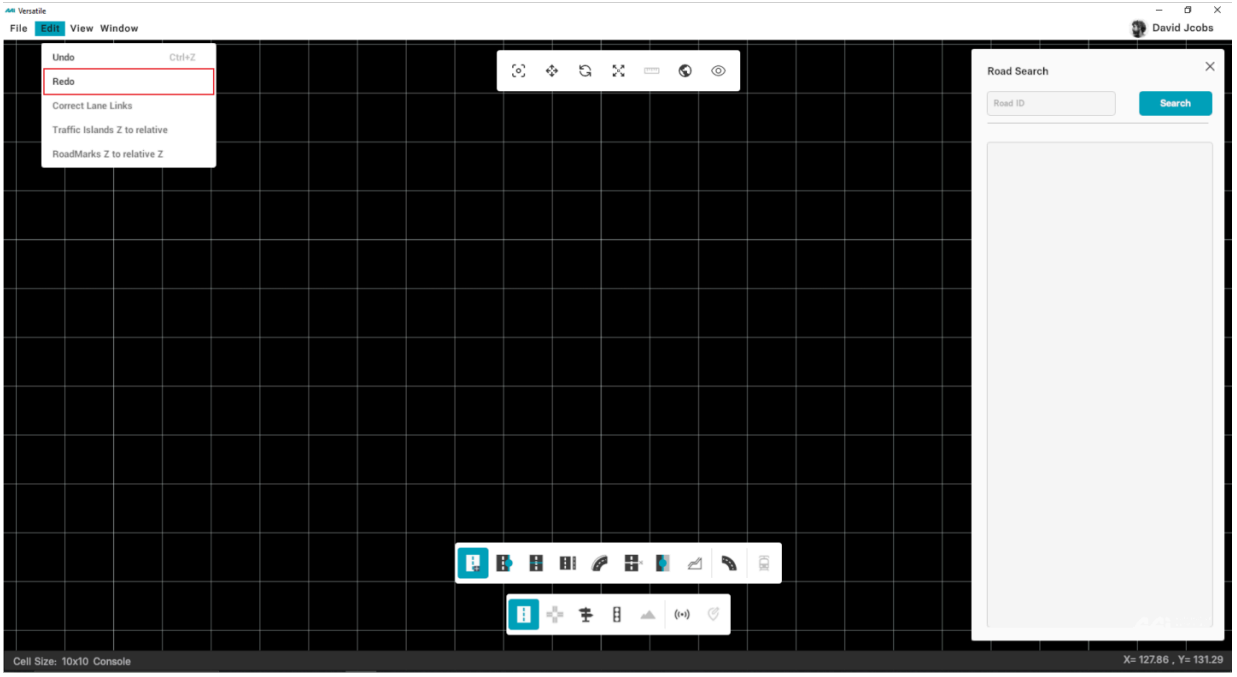
Undo

```
To undo the changes, simply press "CTRL+Z" from your keyboard or click on "EDIT"in t
```



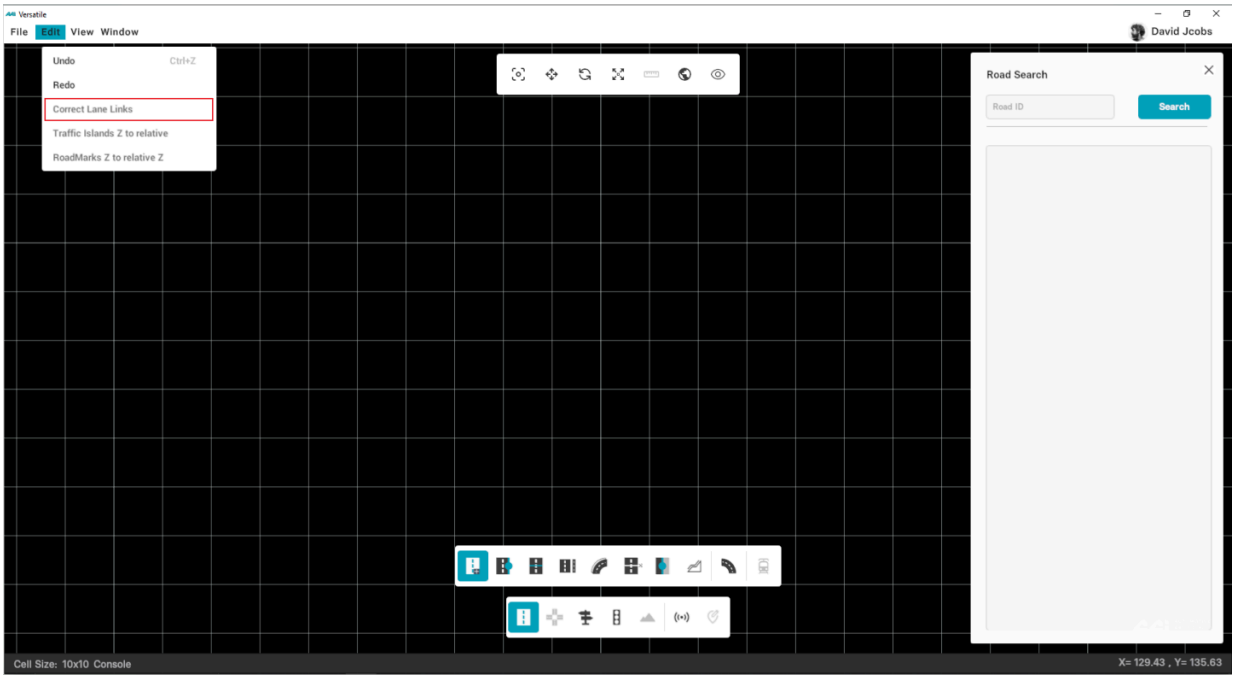
Redo

```
To redo the changes, simply press "CTRL+Y" from your keyboard or click on "EDIT"in t
```



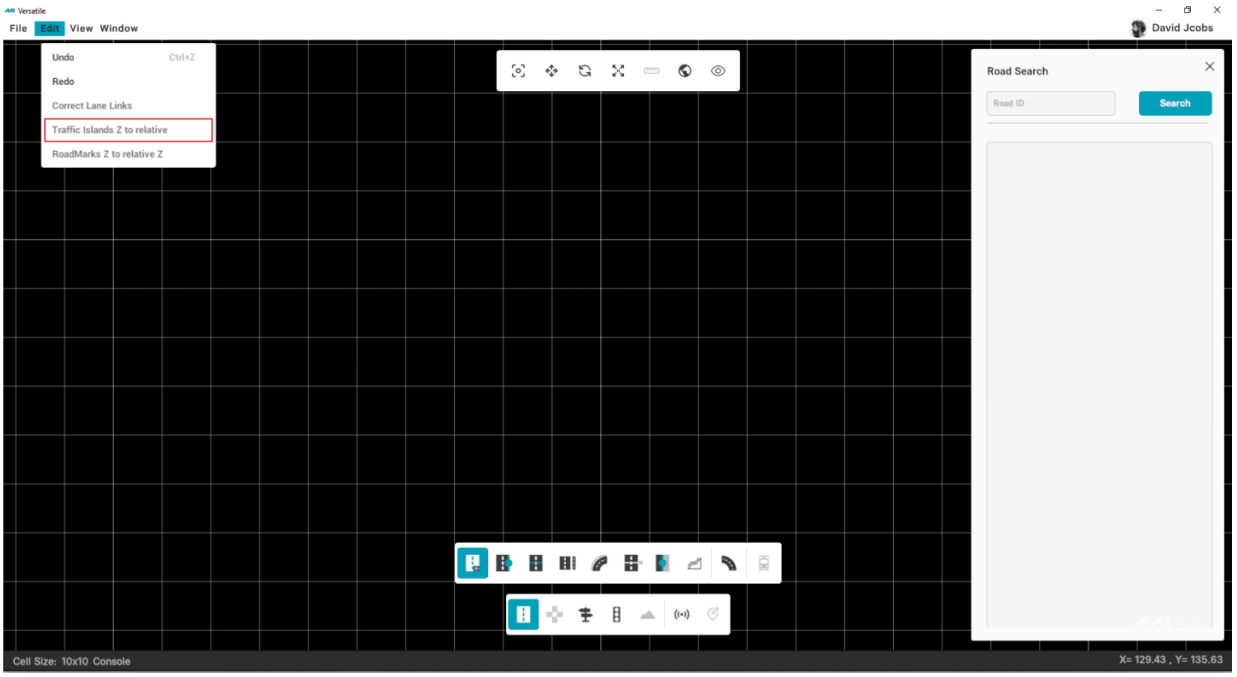
Correct Lane Links

Goes through the entire map that are not logically connected and tries to connect the links. Shows the status in the console logs. This tool is not advisable and is subject to further development.



Traffic Islands Z to relative Z

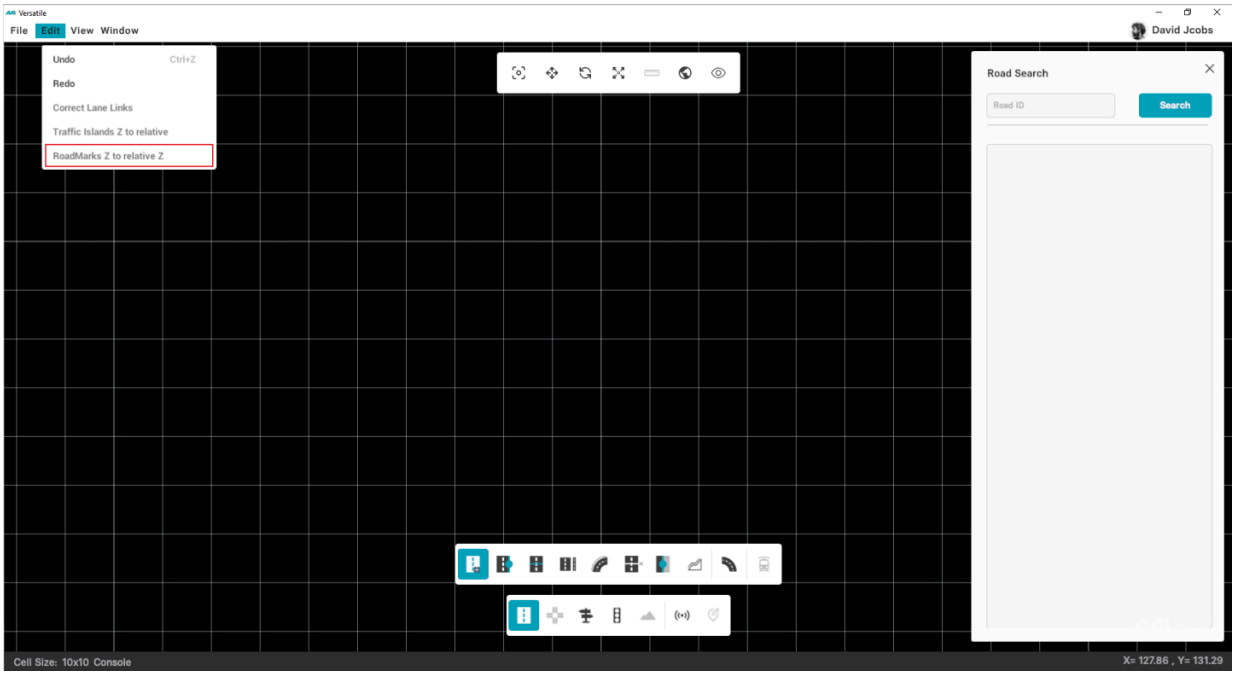
It allows the users to modify the traffic islands (if any) in congruence with the roads' elevation. If variations after the process do not match, manually will be required.



Can only be done once per session.

RoadMarks Z to relative Z

Mainly used and required for super elevation. Allows the already-existing road marks to stay with the road's elevation complexity.

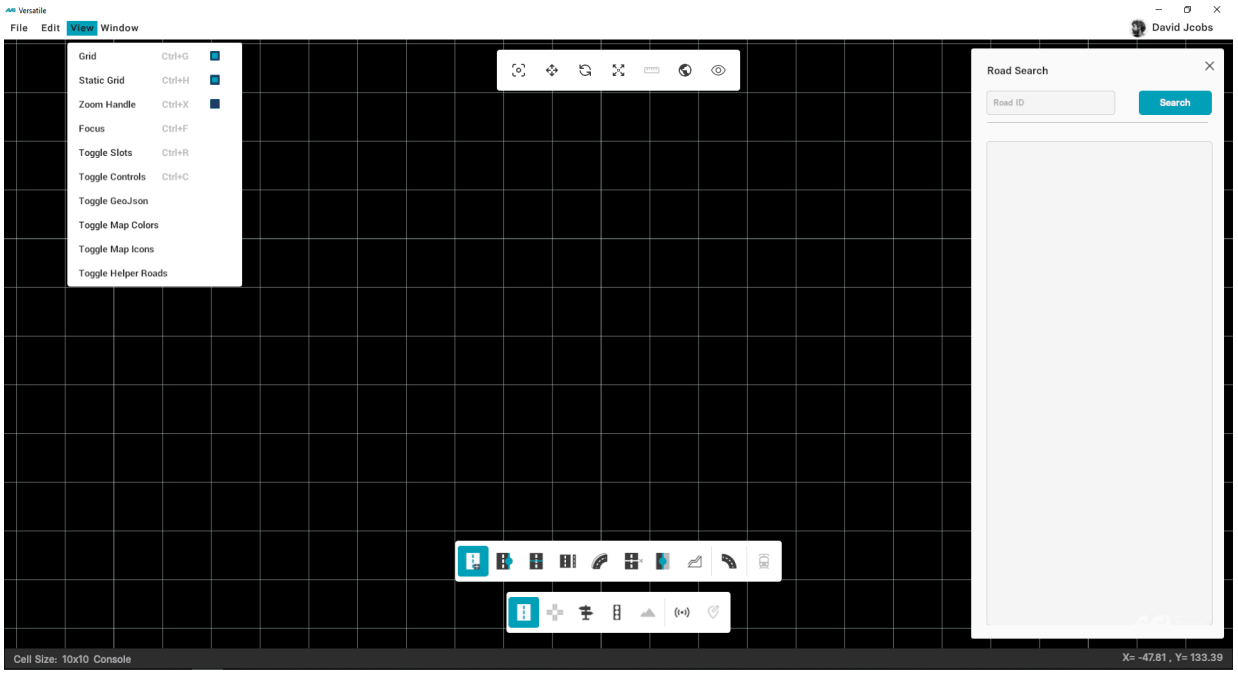


Can only be done once per session.

3.3.5 View

A horizontal bar located at the top-left of the menu bar, provides you a variety of functions. Kindly note the listed.

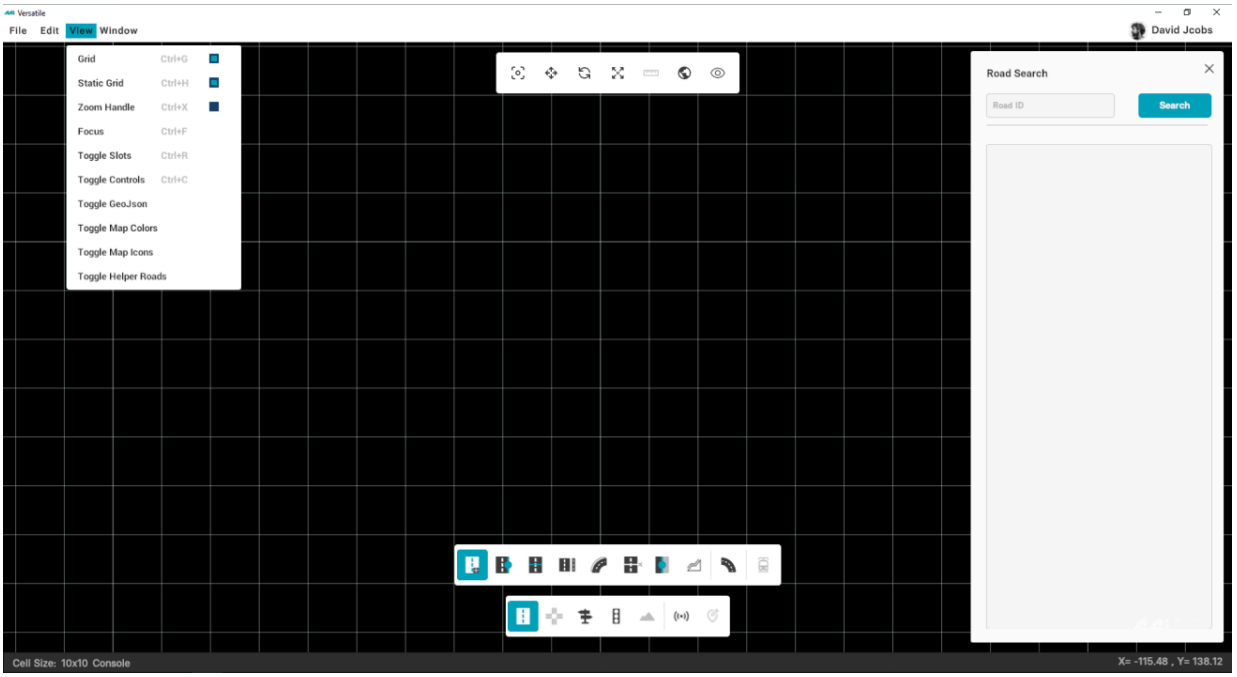
- Grid
- Static Grid
- Zoom Handle
- Toggle Slots
- Toggle Controls
- Toggle GeoJson
- Toggle Map Colors
- Toggle Map Icons
- Toggle Helper Roads

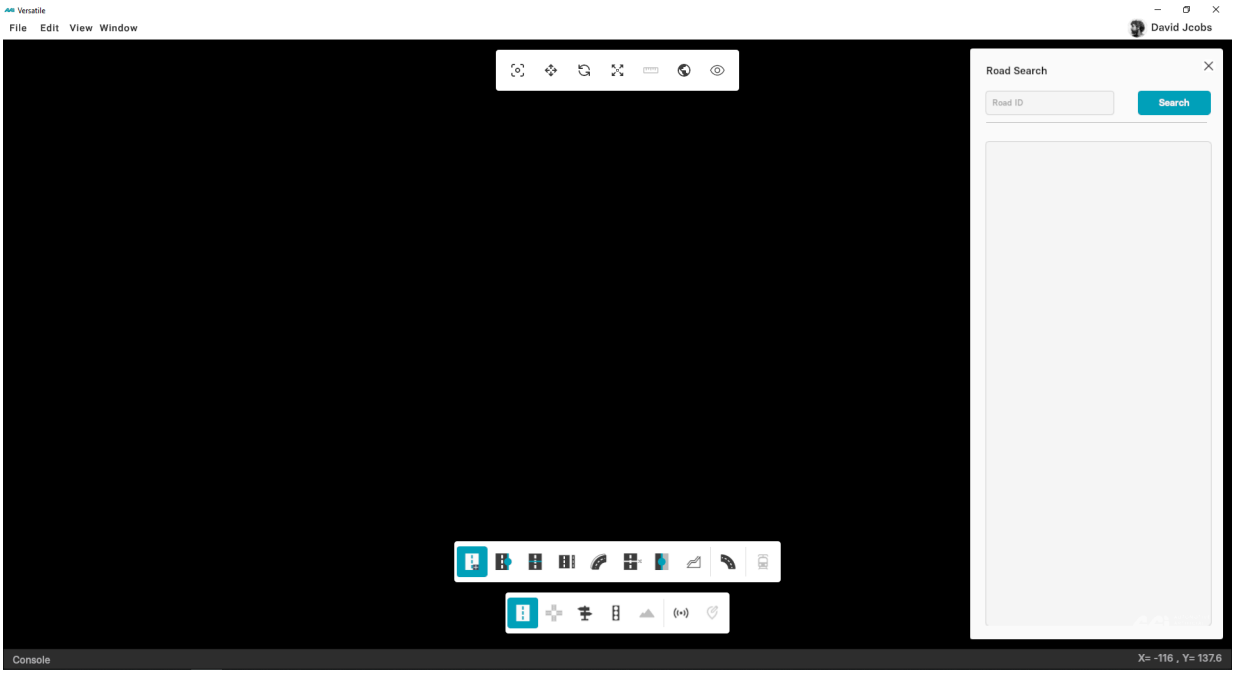


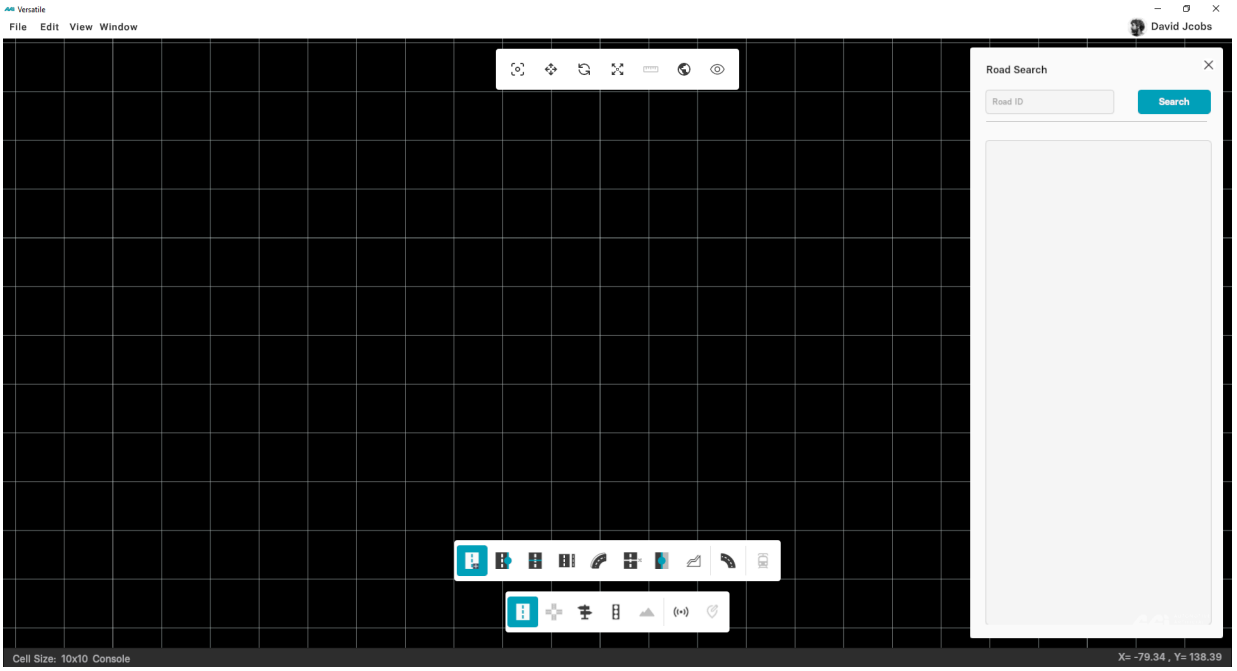
Grid

This command lets you enable or disable the grid view from the menu bar as shown in *figure 2.13* given below.

```
Click on "View" from menu bar at top-left of the window. Select "Toggle Grid" from
```

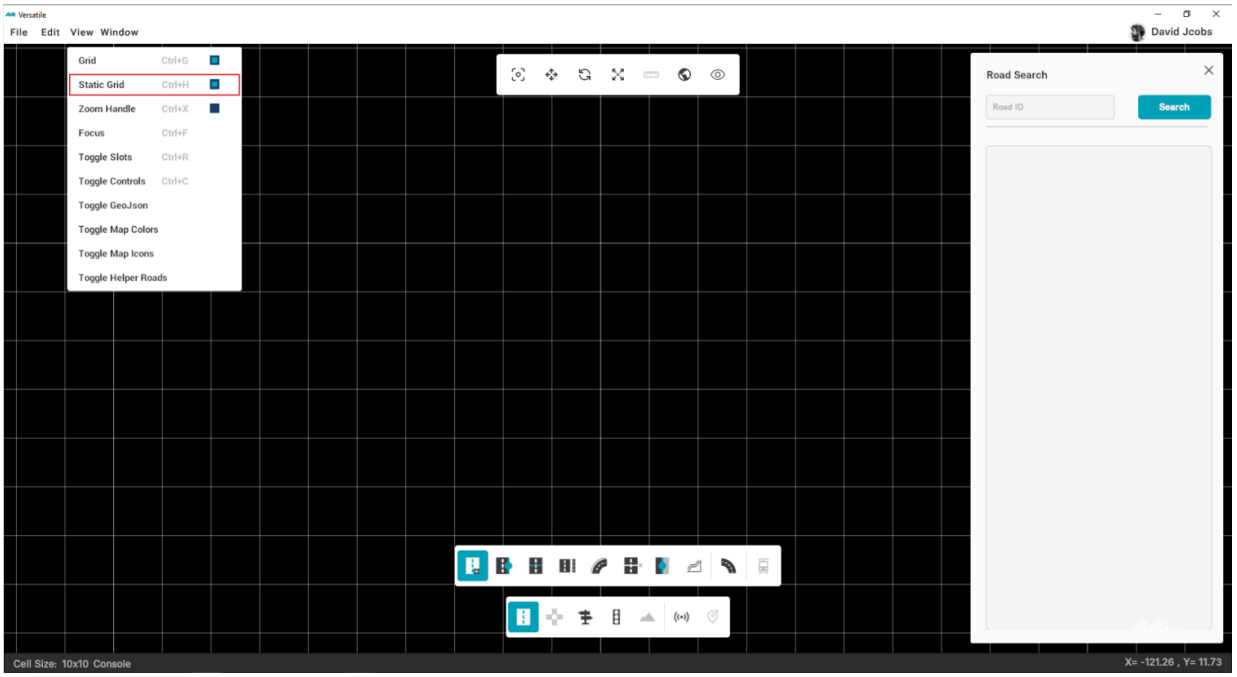

Versatile
File Edit View Window
David Jcobs
Grid Ctrl+G
Static Grid Ctrl+H
Zoom Handle Ctrl+X
Focus Ctrl+F
Toggle Slots Ctrl+R
Toggle Controls Ctrl+C
Toggle GeoJson
Toggle Map Colors
Toggle Map Icons
Toggle Helper Roads
Road Search
Road ID
Search
Cell Size: 10x10 Console
X= -115.48 , Y= 138.12

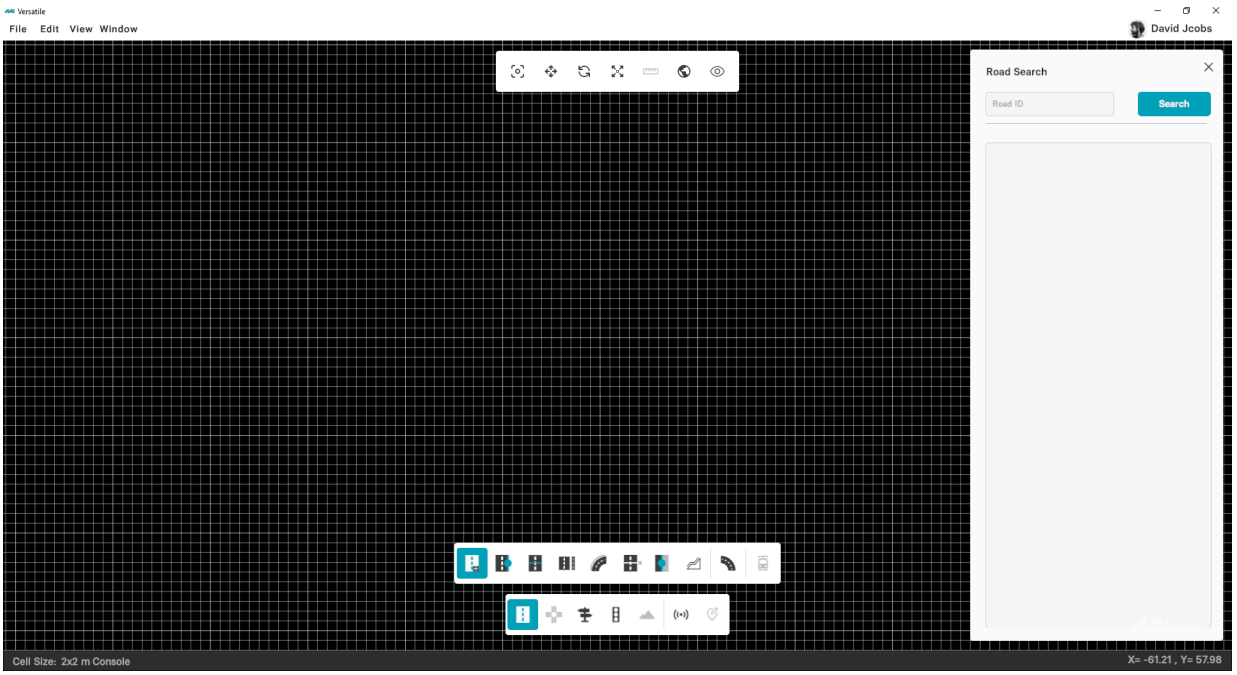

Versatile
File Edit View Window
David Jcobs
Road Search
Road ID
Search
Console
X= -116 , Y= 137.6



Static Grid

This option toggles the grid between static and dynamic XXX. Click on **Toggle Static Grid** from *View* in Menu bar or press ***CTRL+H*** from your keyboard. *By default, grid is set to static position.*

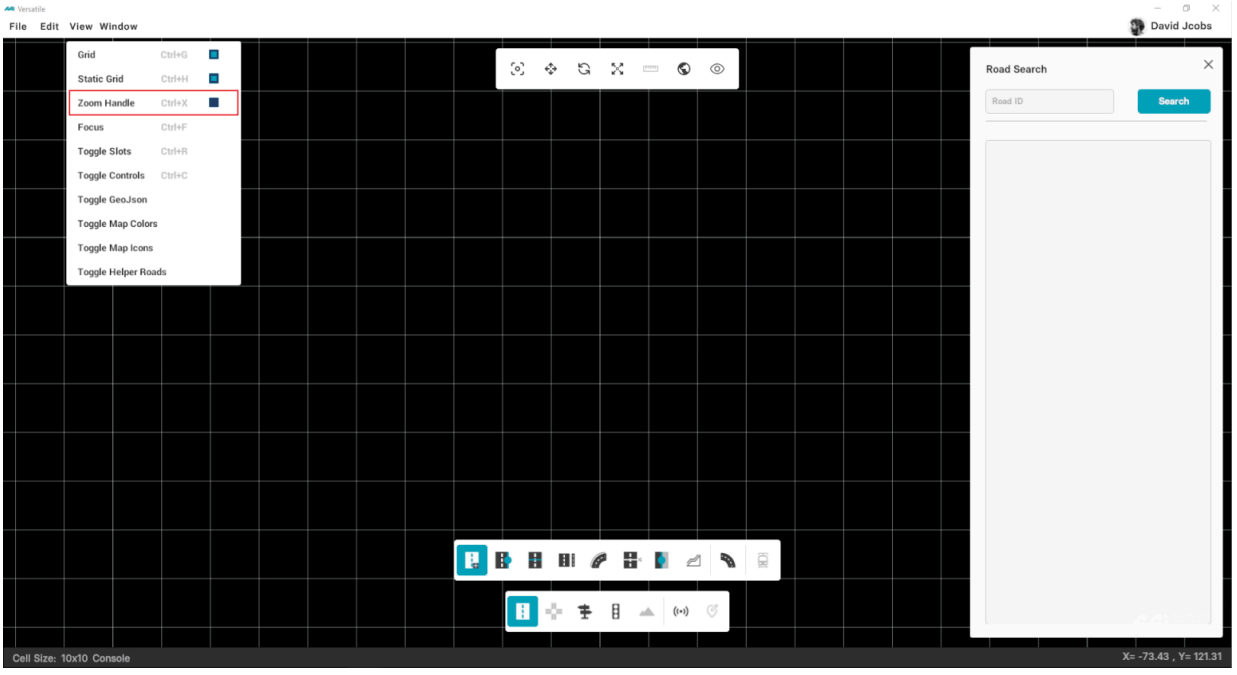




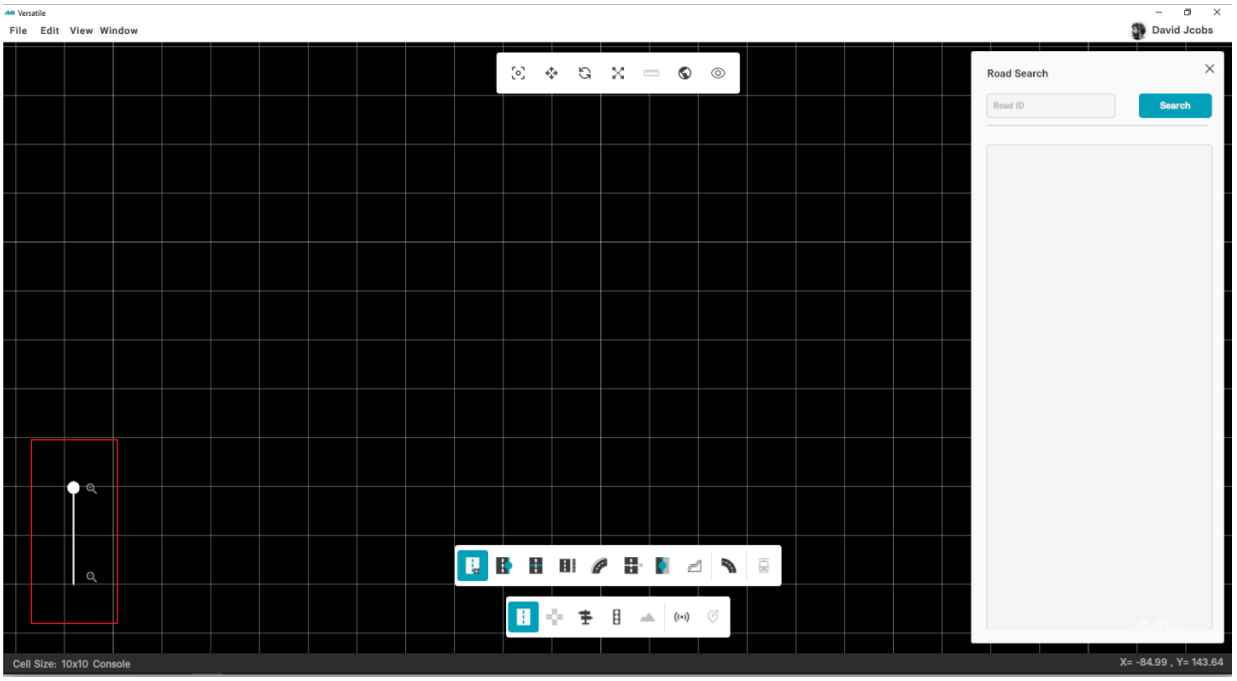
Zoom Handle

To zoom in and out a map, place the mouse over the desired location and rotate (or scroll) your mouse wheel forwards or backwards respectively. You can also zoom in or out by using the zoom handle at the bottom-left corner of the screen as illustrated in *figure 2.17* below.

```
1. Go to "View" at the top-left of the window, select "Zoom Handle" from drop-down r
```

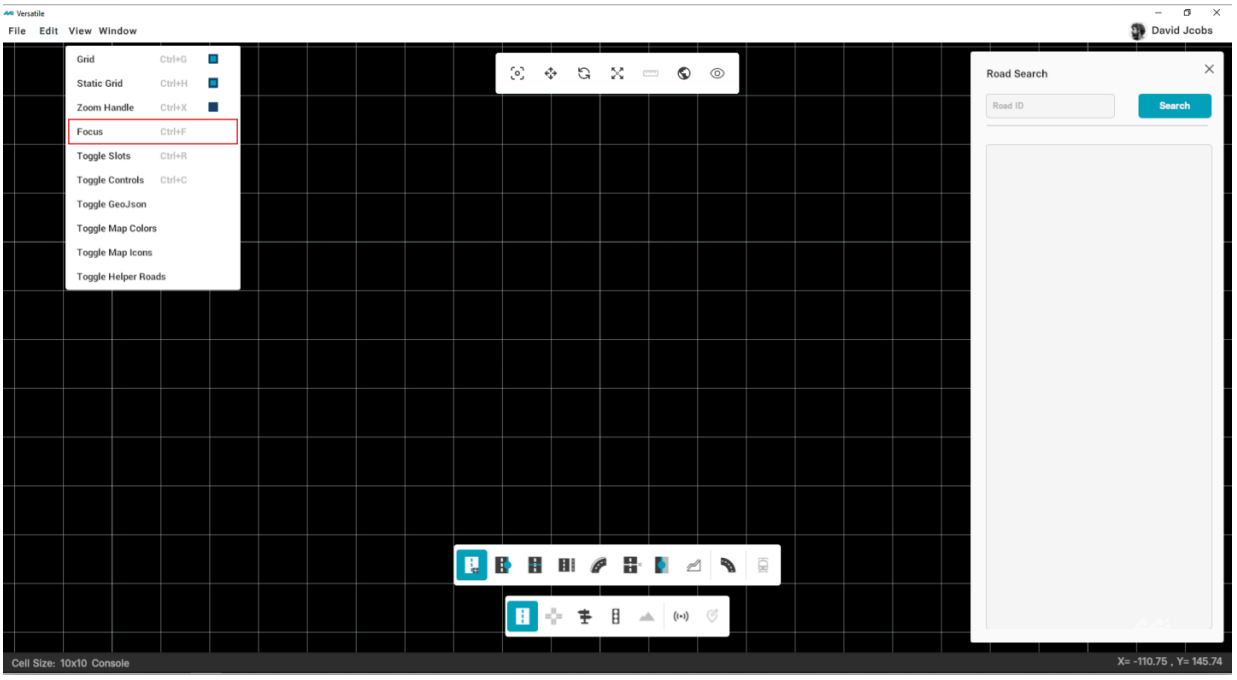



```
2. A bar appears at the bottom-left of the menu bar with a draggable knob on it, let
```



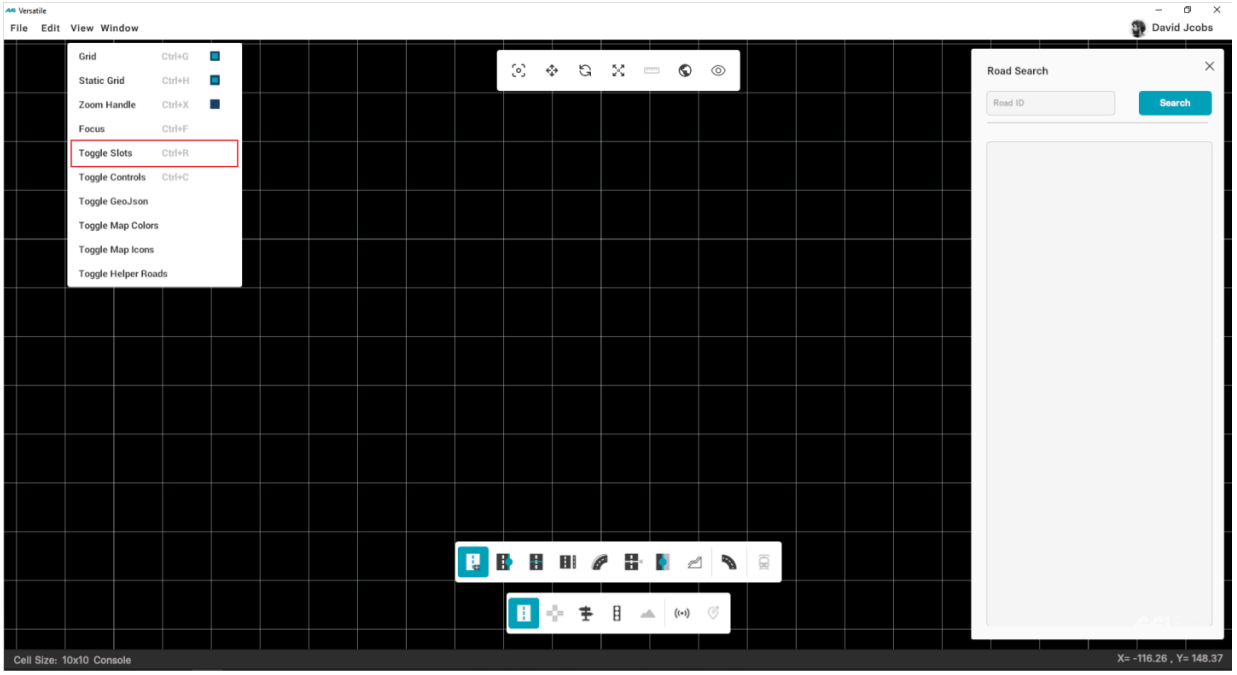
Focus

```
Go to "View" at the top-left of RepliMap window, select "Focus" from the drop-down r
```



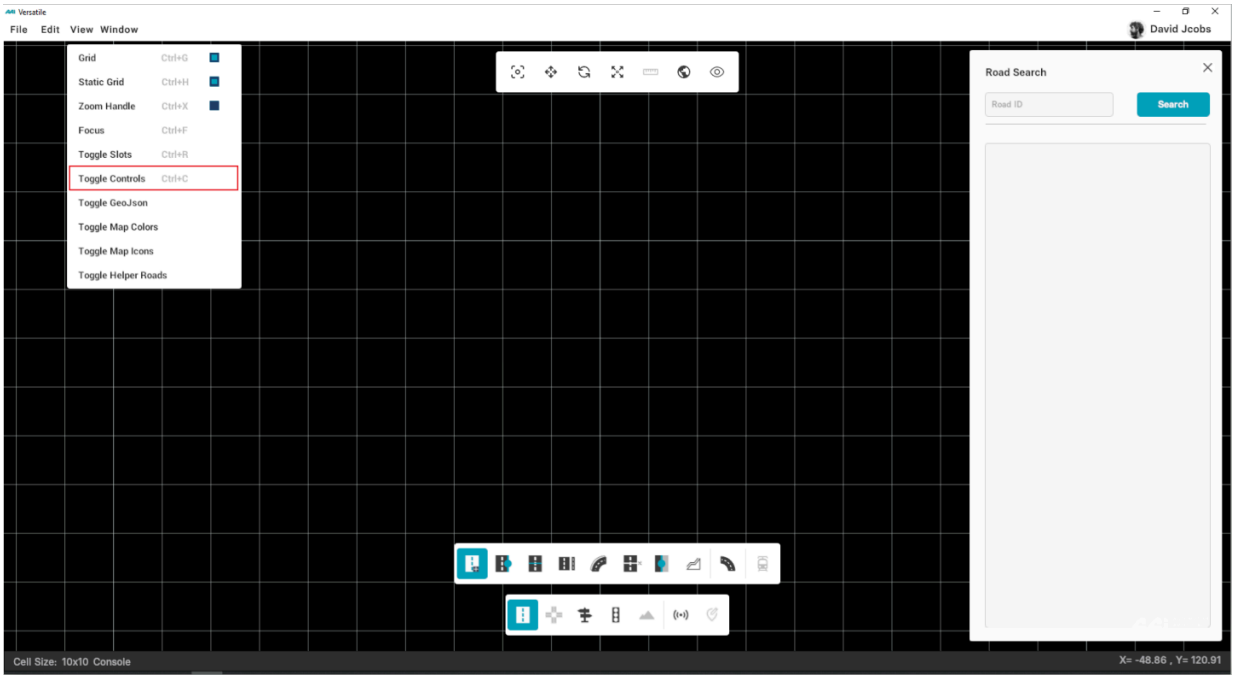
Toggle Slots

This function enables users to visualize a deeper-levelled grid in the mapping tool for better alignment references. For convenience, the function is linked to the shortcut “Ctrl+R”.



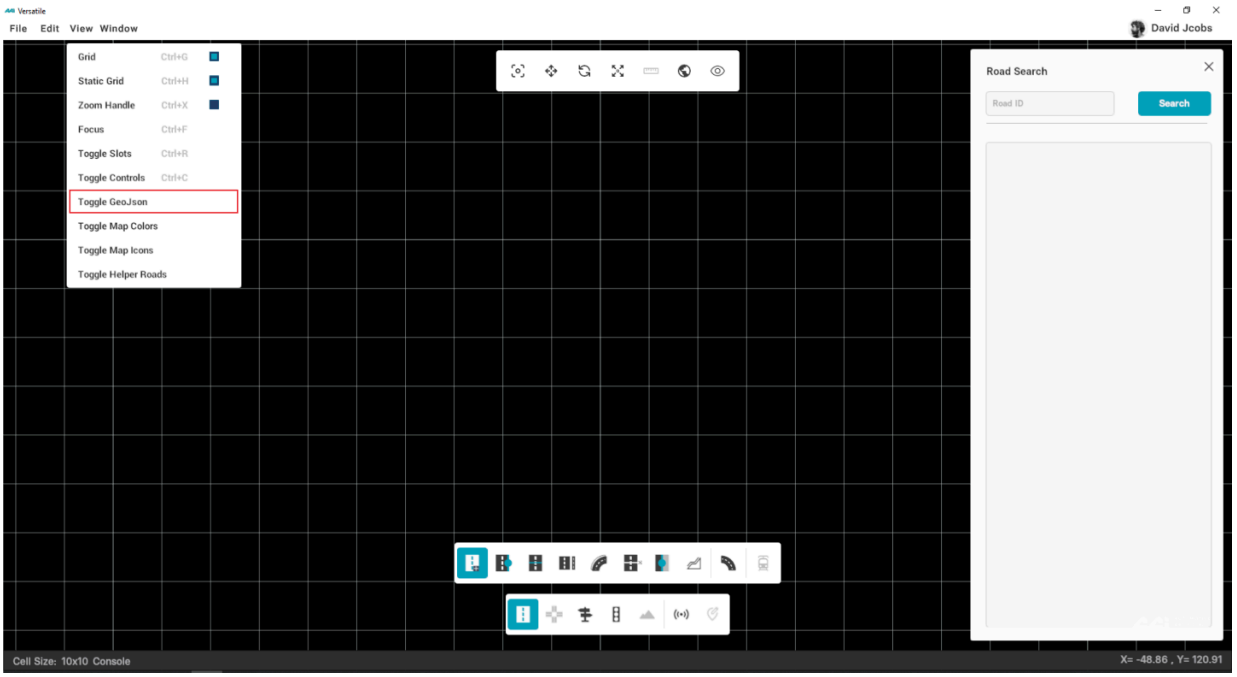
Toggle Controls

This function toggles the visualization of curvature and bezier control when entering the Road section. For convenience, the function is linked to the shortcut “Ctrl+C”. As of 29/05/2024, shortcuts for this feature are disabled.



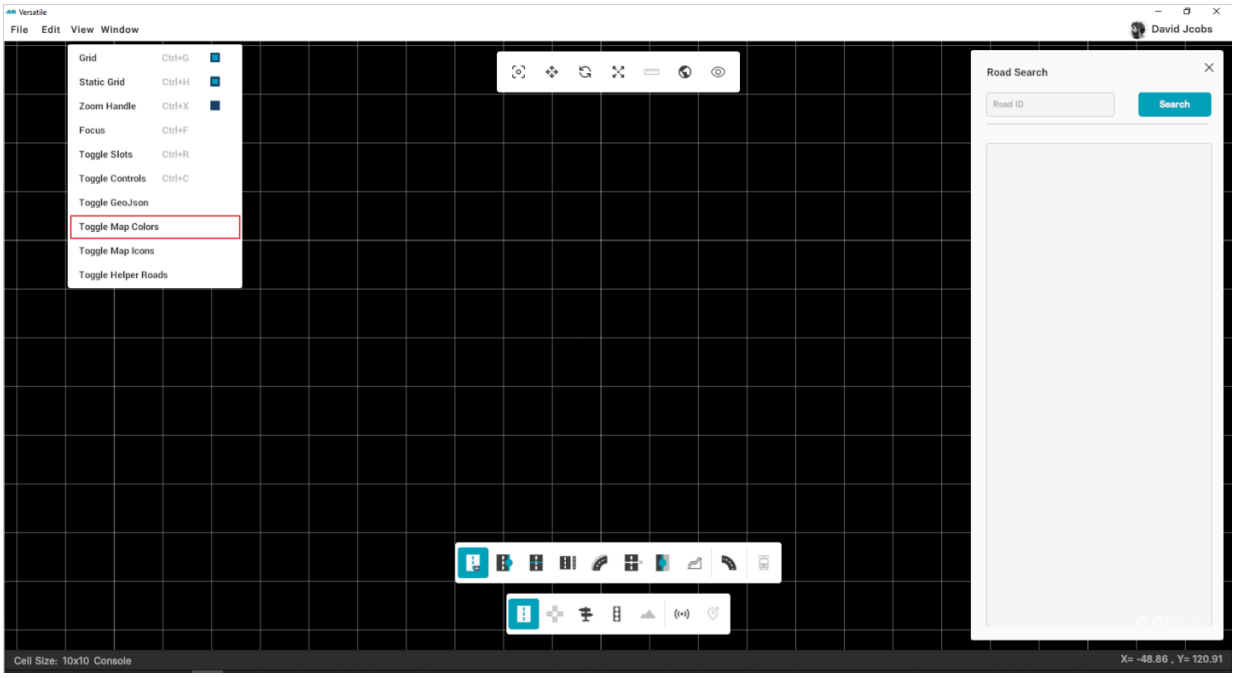
Toggle GeoJson

This function toggles the visualization of the imported GeoJson data for necessary in-depth development.



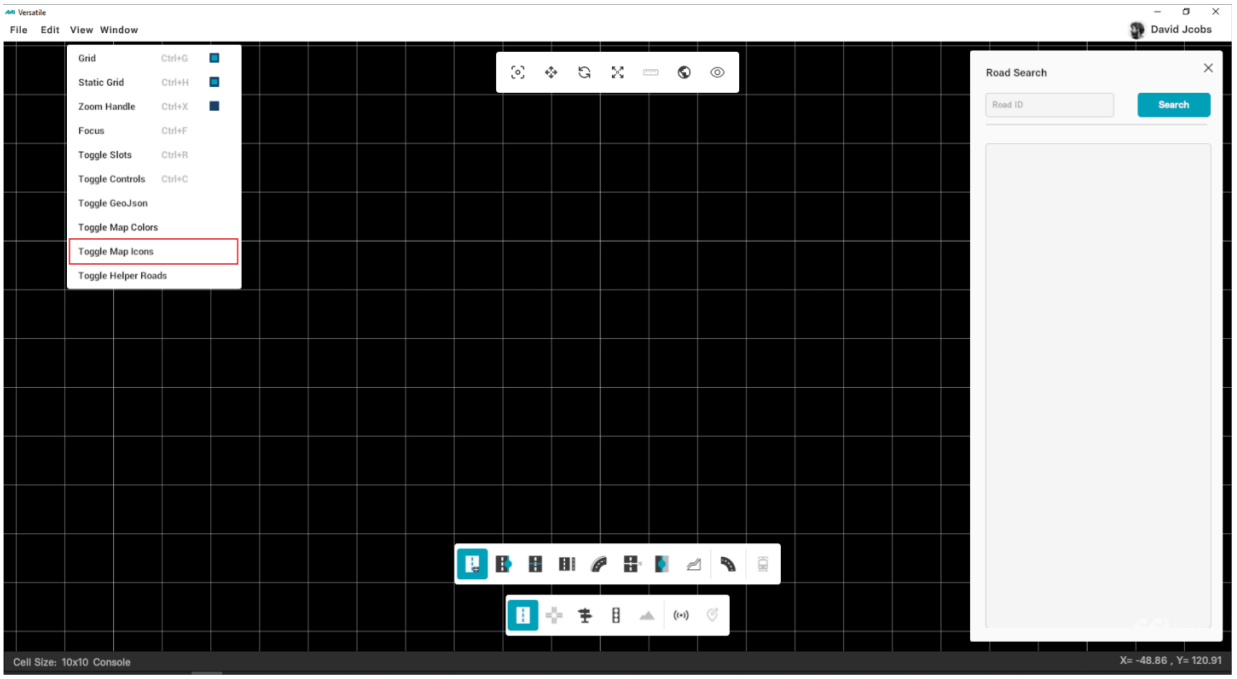
Toggle Map Colors

This function toggles an alternative view of the ODR file, enhancing comprehensibility, particularly in complex scenarios. It aids in better distinguishing lane sections and markings for improved clarity.



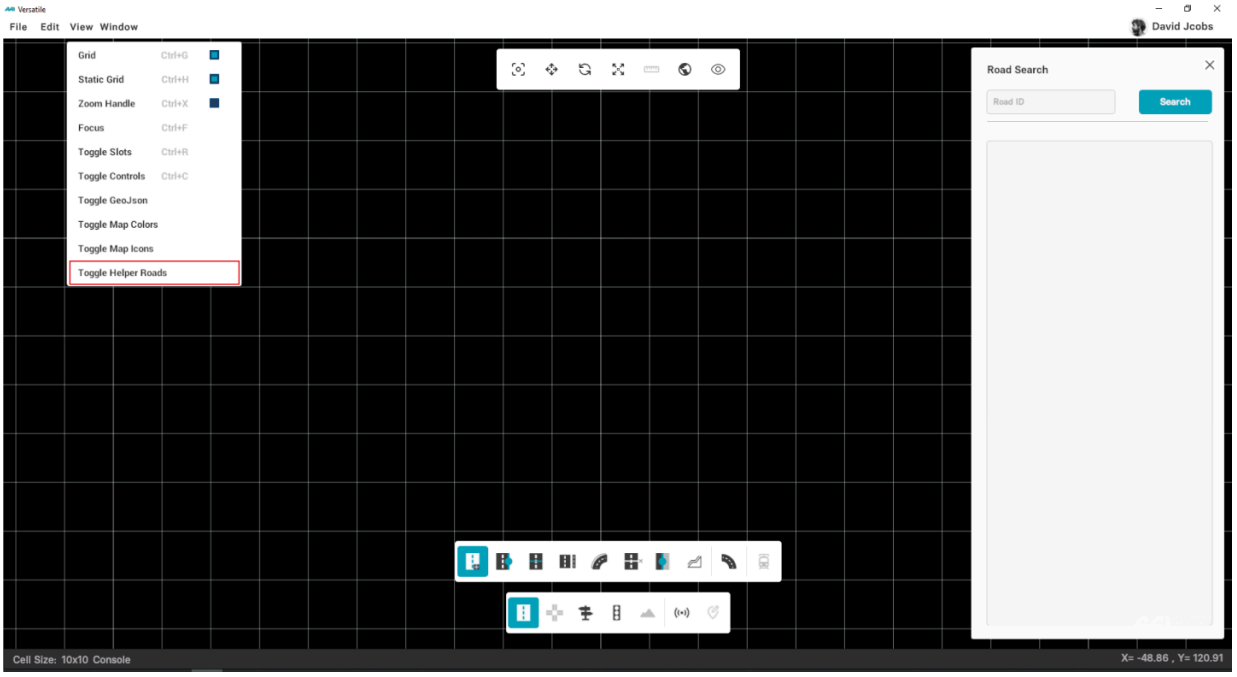
Toggle Map Icons

Allows the user to hide the objects/signals inside of a specific road without the need of moving them (hides the sign).



Toggle Helper Roads

Allows the user to toggle the visibility of helper roads.

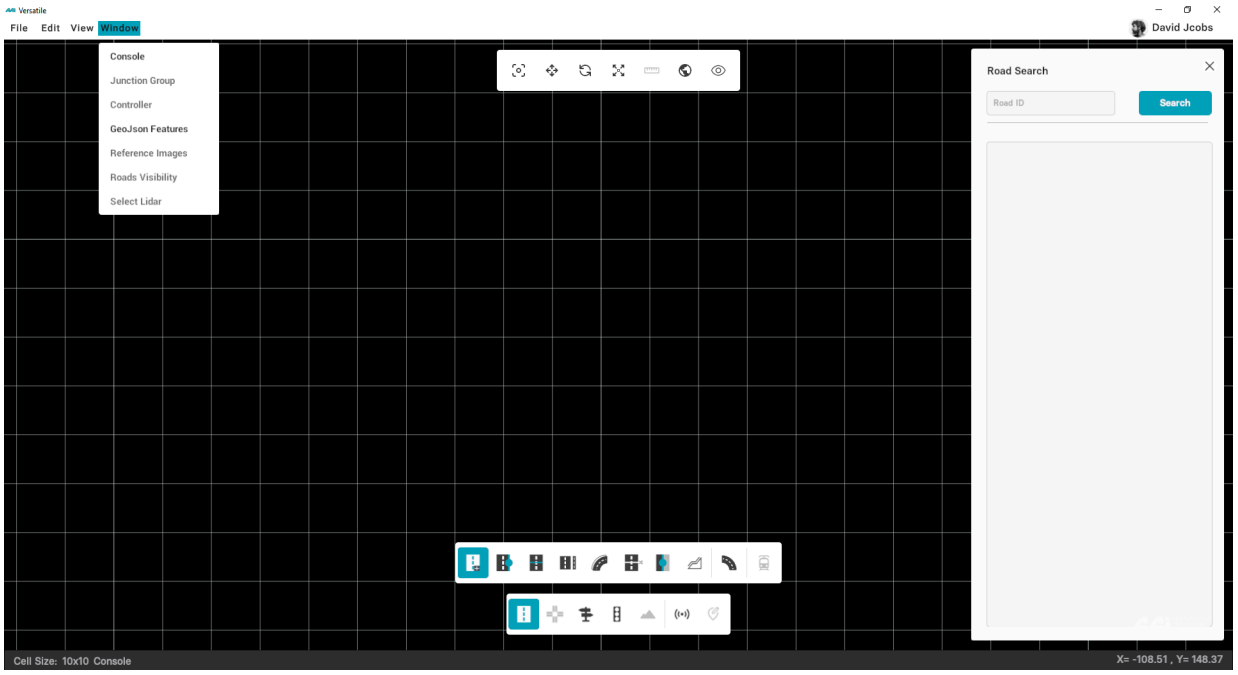


3.3.6 Window

A horizontal bar located at the top-left of the menu bar, provides you a variety of functions. Kindly note the listed.

- Console

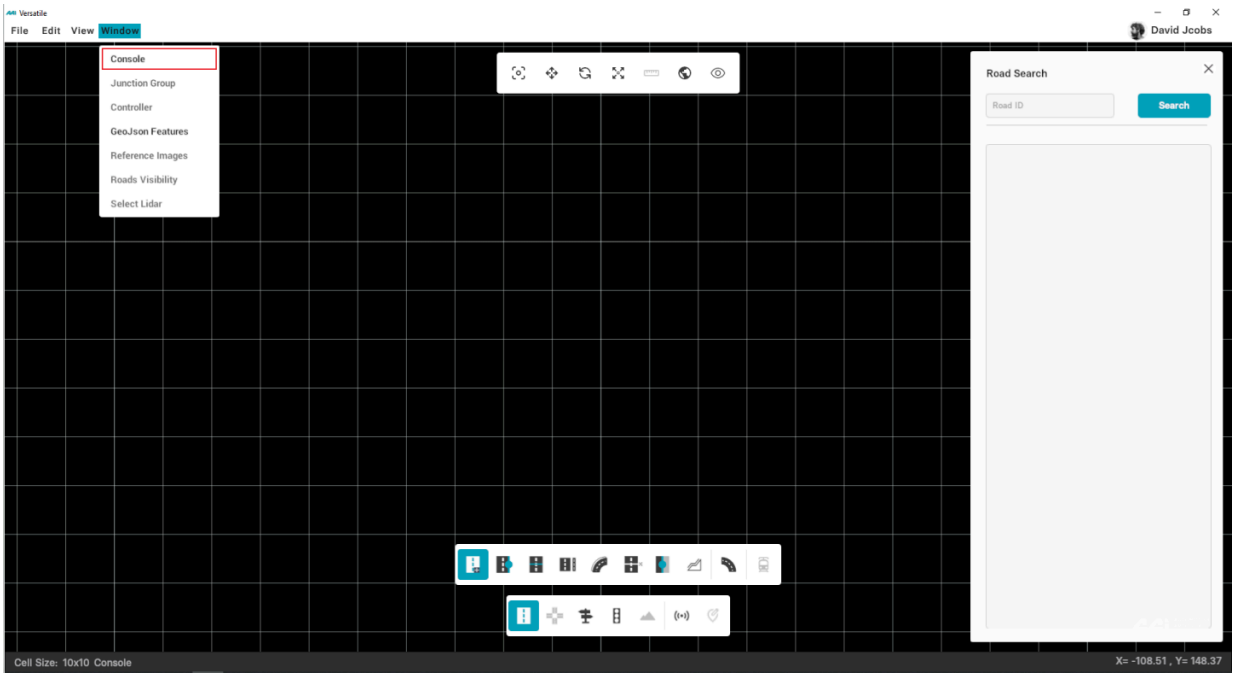
- Junction Group
- Controller
- GeoJson Features
- Reference Images
- Roads Visibility
- Select Lidar



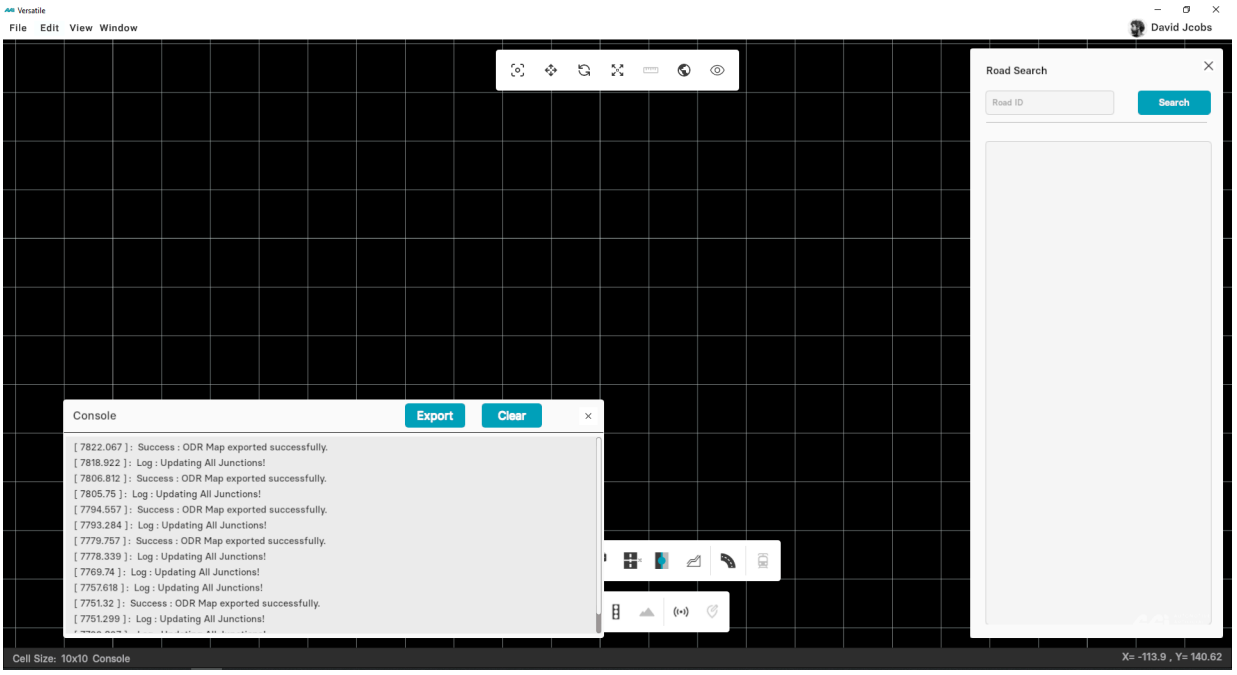
Console

The purpose of **Console** is to display errors and warnings while using any tool or performing any operations in RepliMap. Furthermore, it shows alerts if something goes wrong during loading or saving a map in RepliMap.

```
1. Select "Console" from drop-down menu that appears by clicking on "Window" in menu
```




```
2. A new window pops up at the bottom-left side of your screen, displaying all the e
```



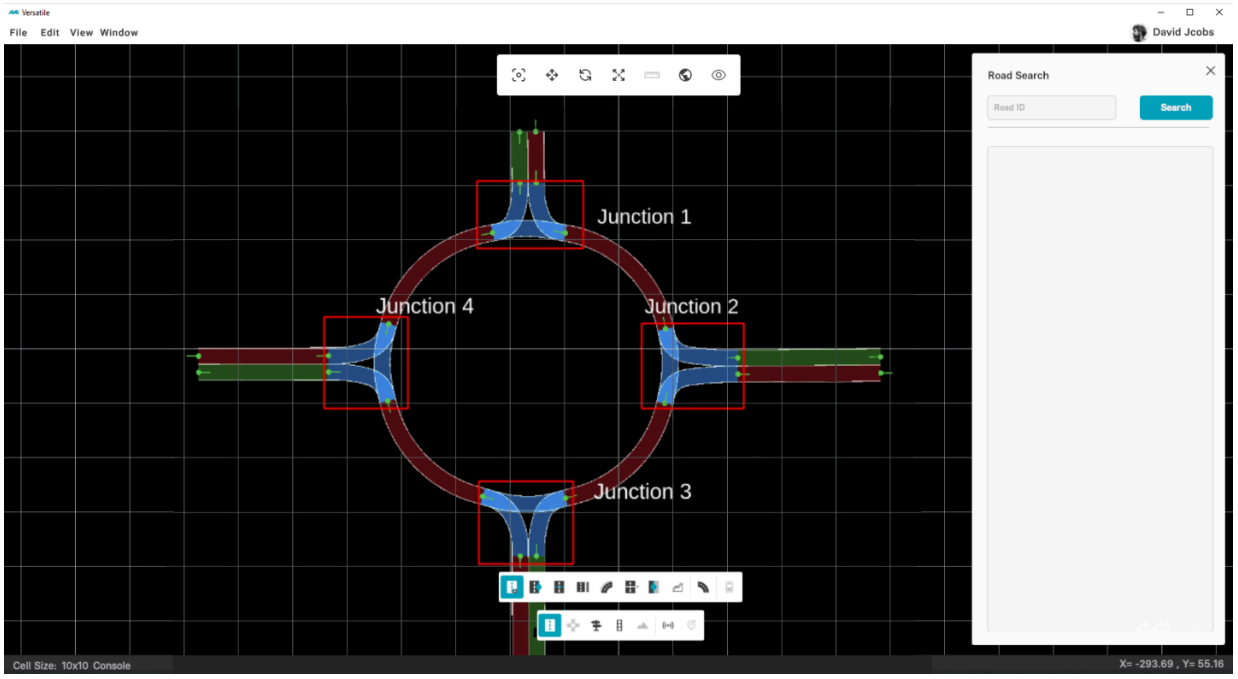
Script

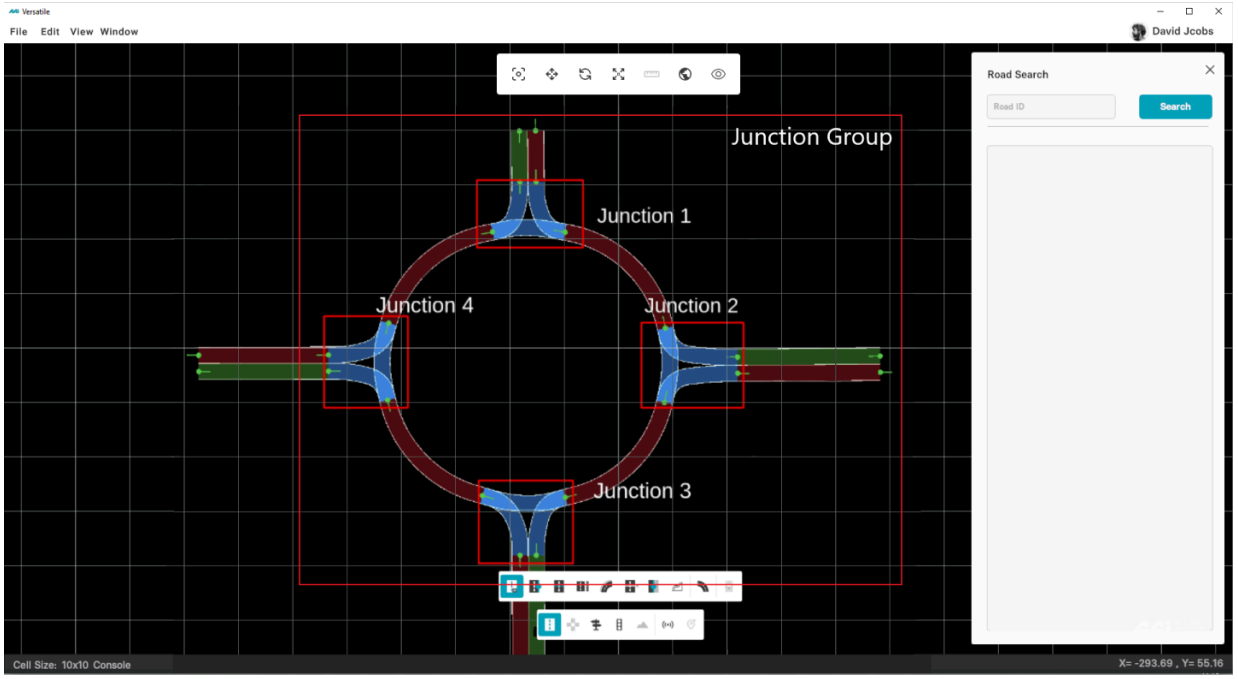
Feature is currently unavailable in the latest RepliMap version.

Provides the user with the ability to execute custom scripts. A dedicated window opens, displaying a detailed description of the script, configuration options, and a console for viewing script details before execution. Additionally, clear instructions are included to guide the user through the script execution process.

Junction Group

This feature lets you combine two or more existing junctions together to serve as a single junction group (e.g. roundabouts) for traffic simulation purposes.



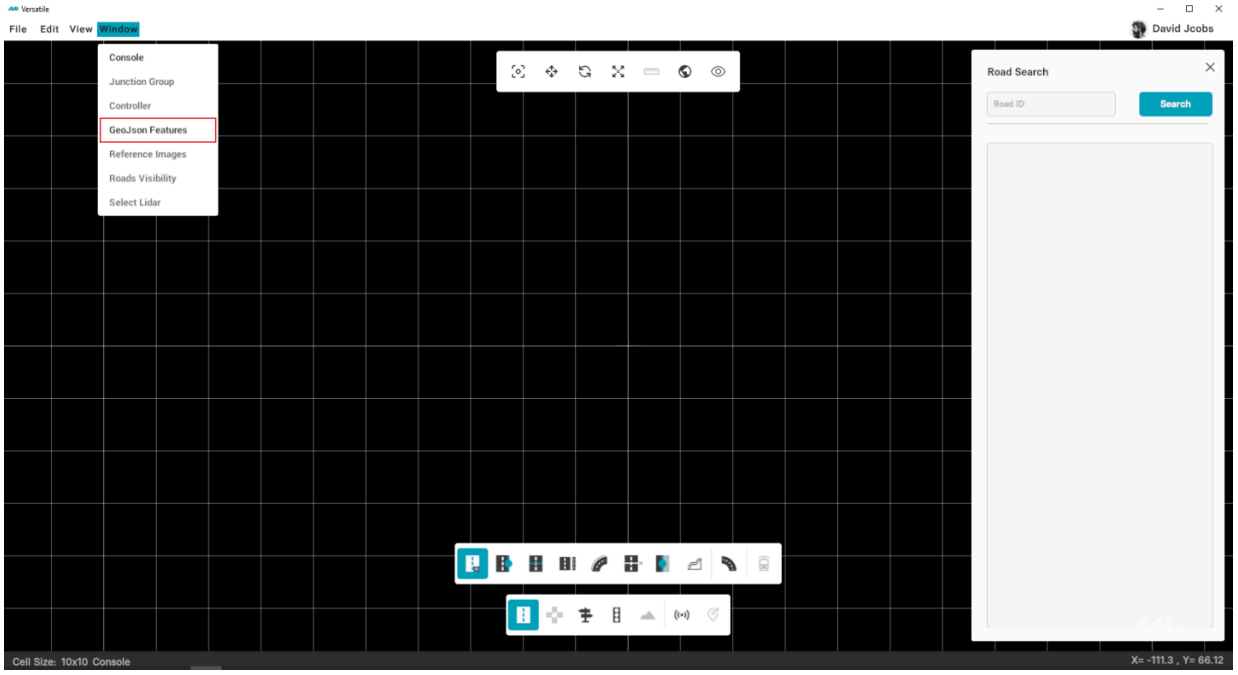


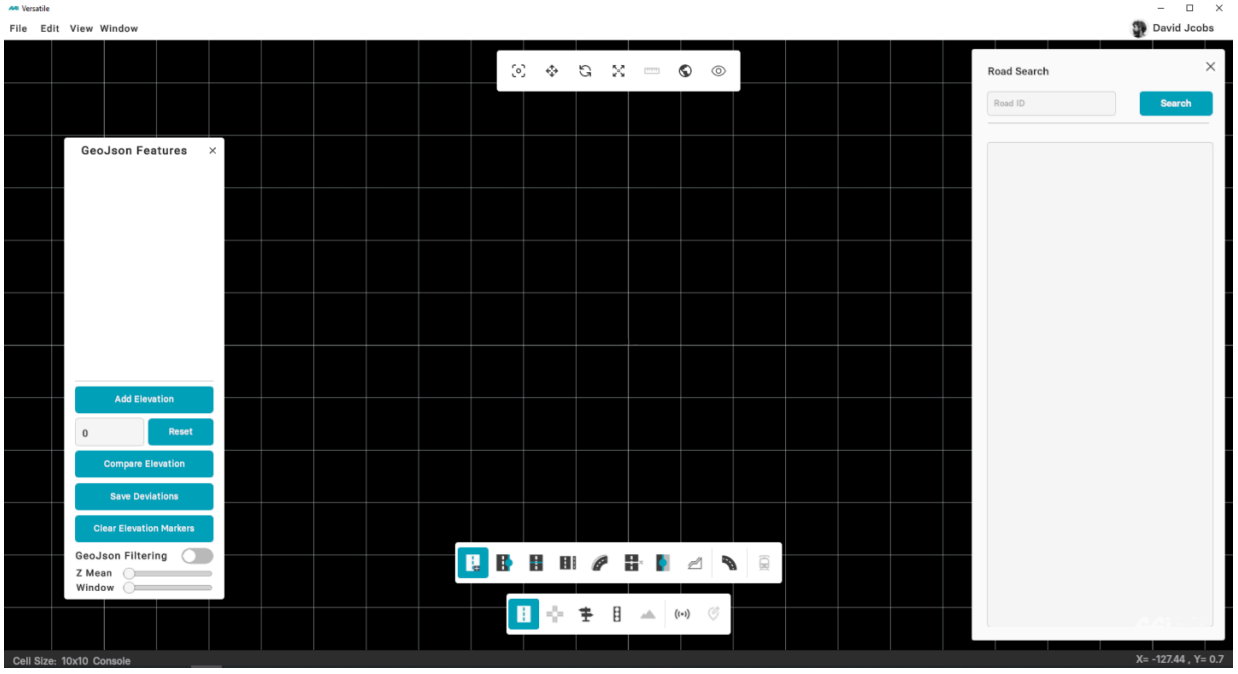
Controller

Information is currently unavailable in the latest RepliMap version.

GeoJson Features

This function toggles the GeoJson customization display, allowing users to adjust the user interface according to their preferences.





Reference Images

Enables users to insert a desired image of their choice into the RepliMap, offering versatility. Users can select the image, resize it, and position it anywhere on the map as needed.

Road Visibility

Allows the user to change the appearance of a specific road without altering the road (not deleting nor modifying). It shows all the hidden roads in the map with their corresponding ID. First toggle shows/hides the entire road, second toggle shows/hides the lanes.

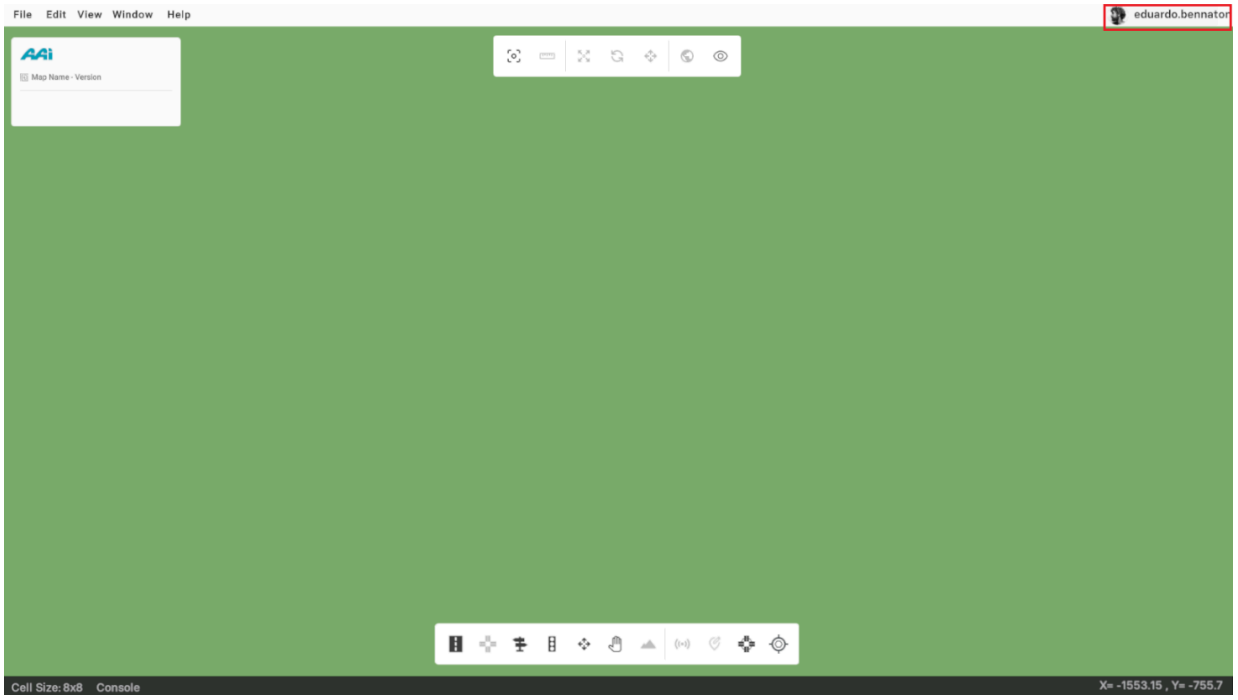
Three State Toggle:
• Polygon: Allows the user to select specific roads as per specification.
• Middle: Neutral/normal visibility.
• Junction: Allows the user to select the roads based on a junction group.

Select Lidar

Subject to further description for more information.

3.3.7 User

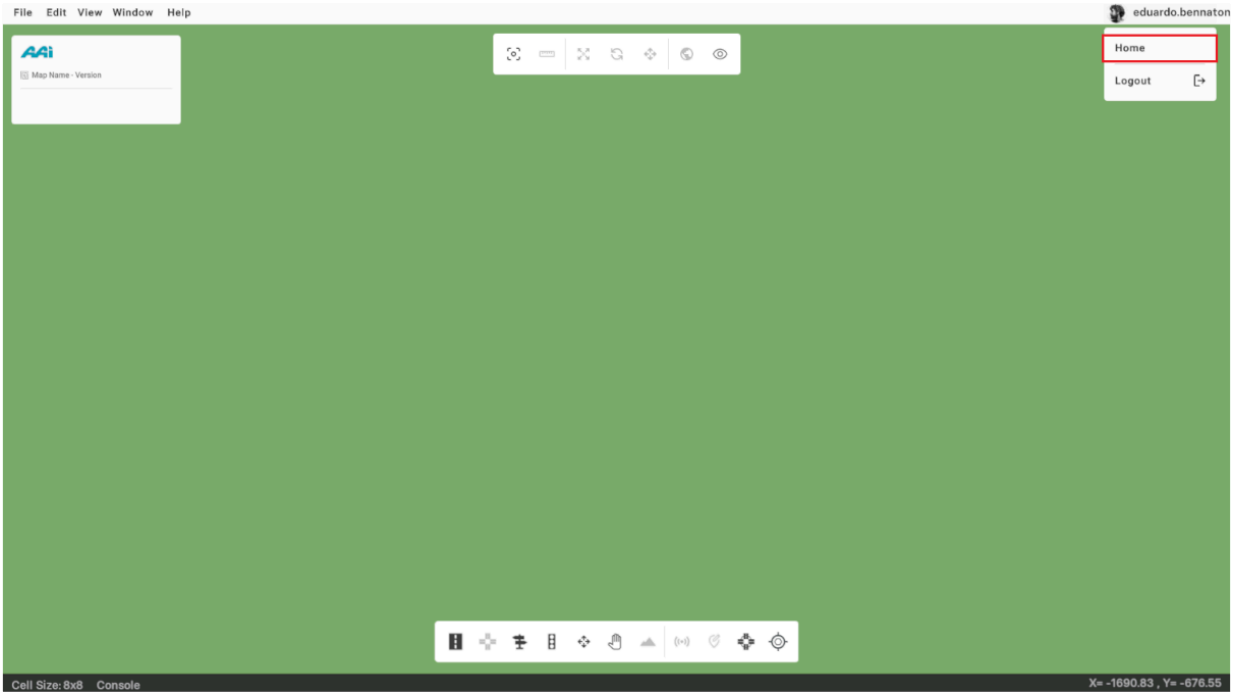
Displays the user's profile picture and account name in the top-right corner of the application window. This element serves both as a means of identification and as an access point for additional functionality within the software.



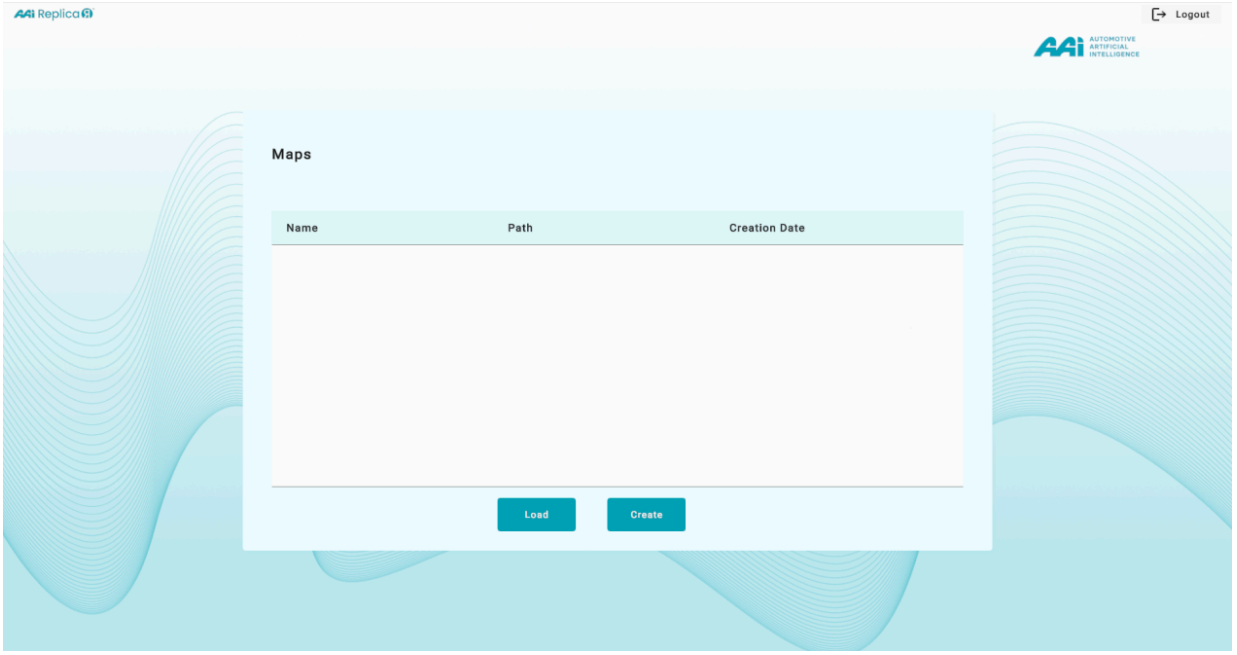
Home

Allows the user to return to the home page, where the cloud map information is stored within the software platform. If the currently loaded map has unsaved changes, attempting to navigate away will trigger a warning about unsaved progress.

1. Select the "Home" option under the user profile's selection panel.



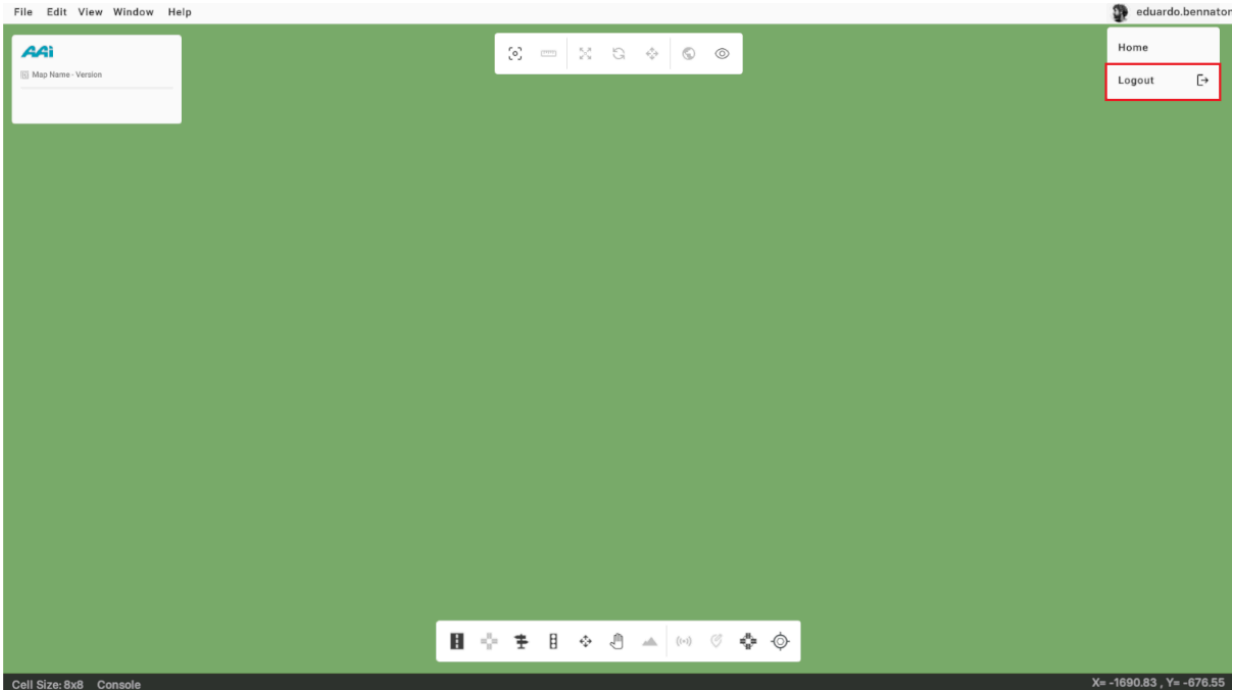
2. Redirects the user to the home page, where their cloud-saved maps are located. Fı



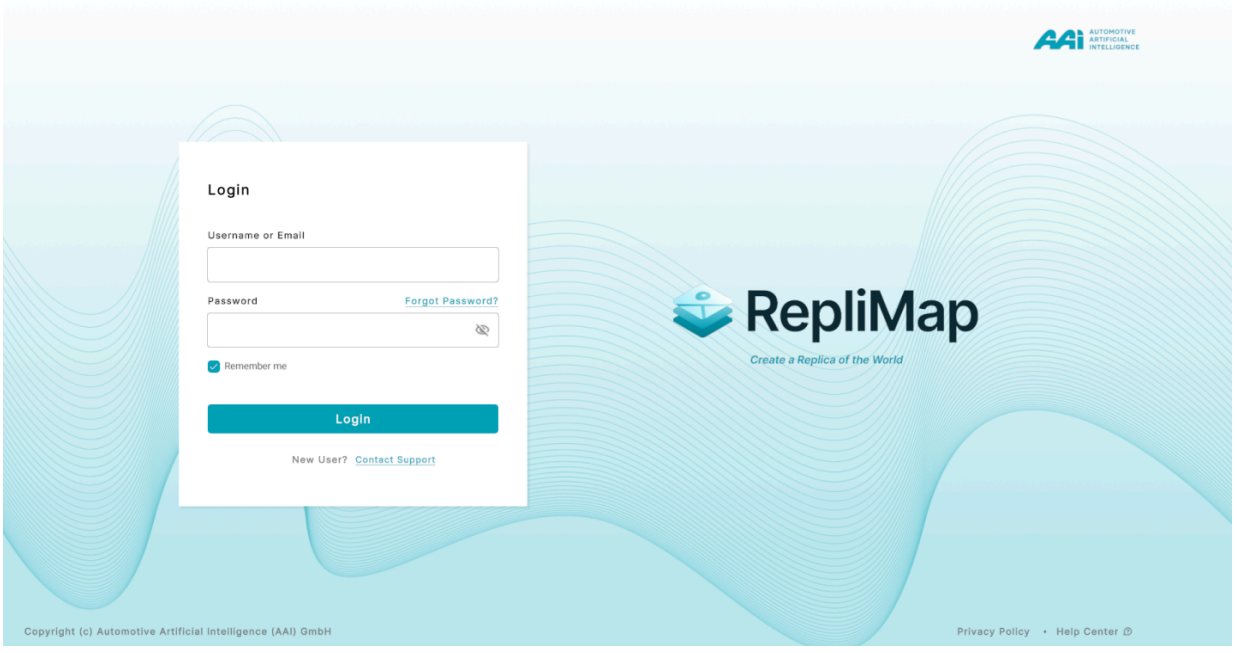
Logout

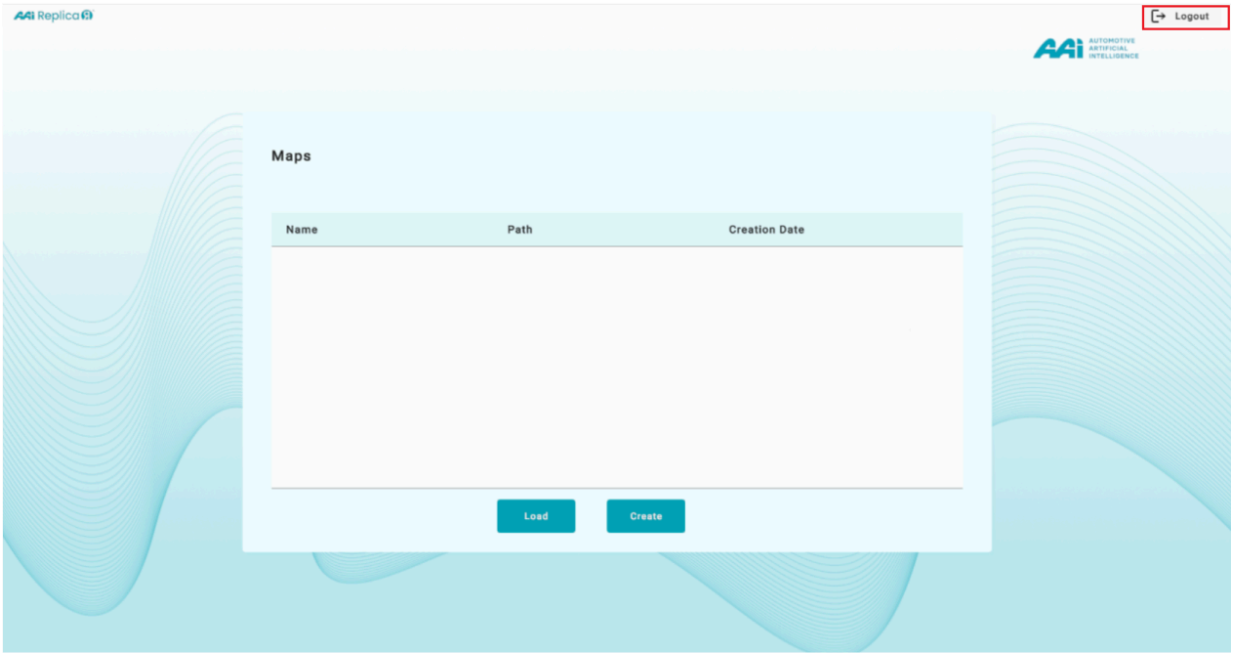
Signs the user out of the mapping software platform, ending the current session and returning to the login screen.

```
1. Select the "Logout" option under the user profile's selection panel.
```




```
2. This action will redirect the user to the login screen. Alternatively, the user c
```



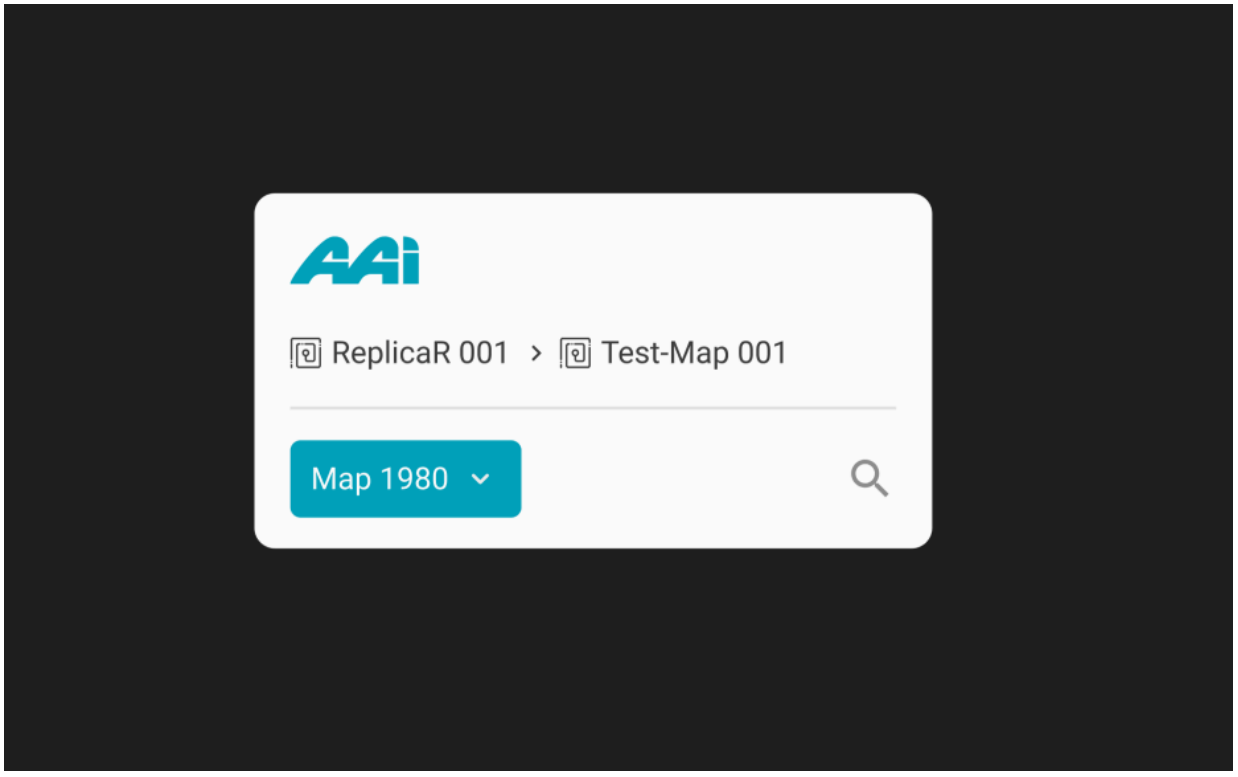


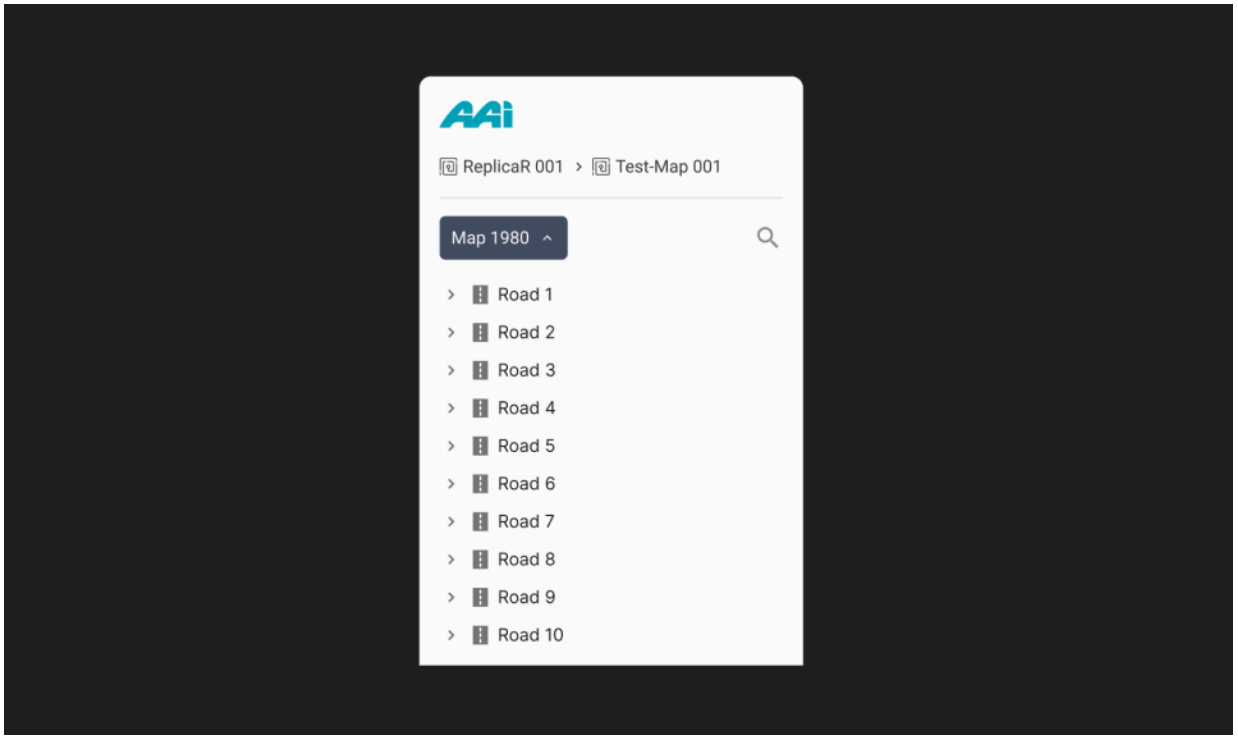
Back to the top

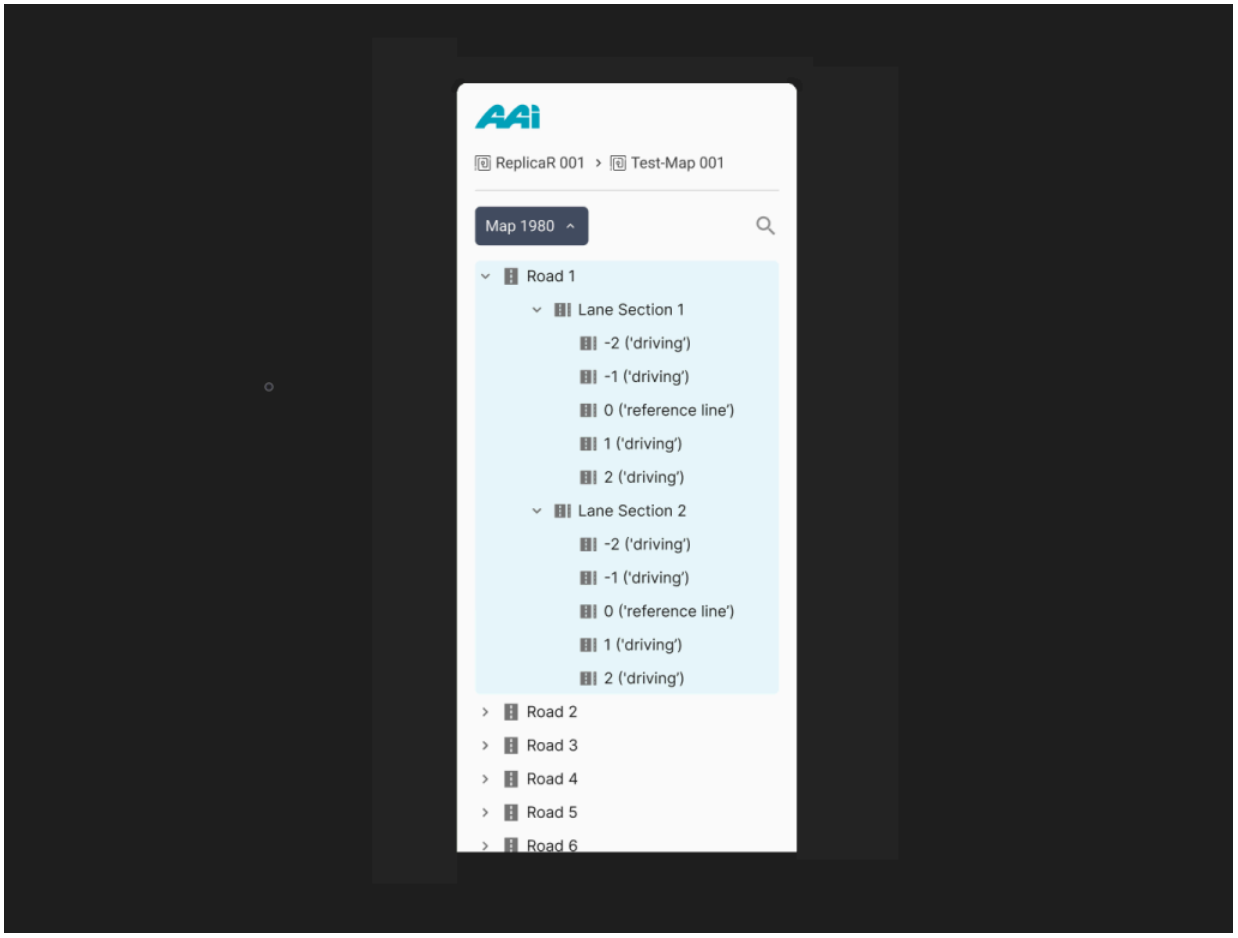
3.4 Navigation bar

Feature is currently unavailable in the latest RepliMap version.

The navigation bar provides an overview of all the roads within the currently selected map. It offers a comprehensive view of the entire map, enabling quick and easy access to specific roads as needed.







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3.5 Console

The console displays general information to the user in RepliMap. The console has 3 sections:

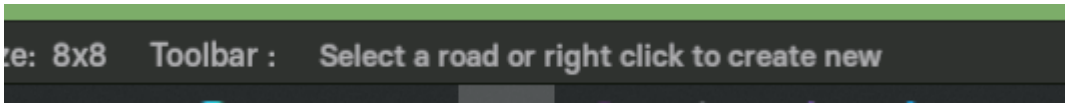
1. Cell Size: 8x8
2. Console
3. XY Mouse Values

3.5.1 Cell Size

The cell size of 8×8 means the environment is divided into 8x8 meter grid cells, impacting how roads, objects, and navigation meshes interact with the terrain.

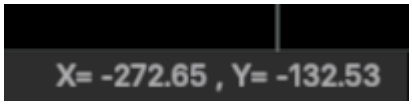
3.5.2 Hints

Helps users better understand a specific tool and its intended purpose. The console, depending on the tool, directs users toward a particular action (or set of actions) based on its functionality.



3.5.3 XY Mouse Values

These values with dynamically change based on the mouse's current position within the RepliMap software. This allows the user to better orient themselves relative to the general XYZ values (this can be for placing objects or general notion).



4 Use Guidelines

4.1 Map Creation Guide

This section guides the user through creating a map that covers the fundamentals of road building. While some processes may vary based on specific map requirements, this section aims to cover all essential aspects.

Please note that explanations for RepliMap components are **not** included in this section, as they are available in the corresponding *RepliMap Components* section.

To facilitate the use of this guide, it will include a mock process that replicates the development process, accompanied by the guide's narration.

⚠️ **Important Notice : Progression Uniformity** ⚠️
Do not divide your designated development section and attempt to complete it using a bottom-up approach individually. If changes are required later due to properties or due diligence in other parts of the section, you may need to redo the entire progress, which is against development practices and will delay your work.

Instead, **follow the bottom-up approach uniformly throughout the entire designated XODR section**.

No skipping!

4.1.1 Layout Planning

In this section, you will plan the development of the map without delving into practical details yet. Identify the zones and project boundaries you need to cover to achieve the best possible outcome, while staying within the project's vision and scope to avoid wasting time.

If you need assistance understanding which parts of the project you are required to complete, consult your team leader. This will ensure that you do not overlap with your colleagues' work areas, avoiding duplication of effort.

Once your section(s) is/are confirmed, use reference sources to gather information about the corresponding area. Use Google Maps to obtain fundamental measurements, as it offers:

- 3D View
- Street View
- Measure Distance

4.1.2 Creating The Basics

❕ **Tip : Do Versioning** ❕
To ensure you can revert any mistakes, it is recommended and considered best practice to **save your progress in stages throughout the current development**. This allows you to revert to a particular "safe" stage if needed.

Placing Roads (Primary Roads)

Once you have met the necessary requirements for the fundamentals, you can begin implementing them within the XODR file. In this process, you will start by laying down basic roads, adhering to a bottom-up approach.

At this stage, focus solely on creating roads **without adding any additional elements, including connection roads** (will be covered later through the steps). Road markings should be added to each of the placed primary roads. This will help prevent overlooking specific road characteristics later while developing other roads.

This will help you have a solid foundation for future steps of the development process.

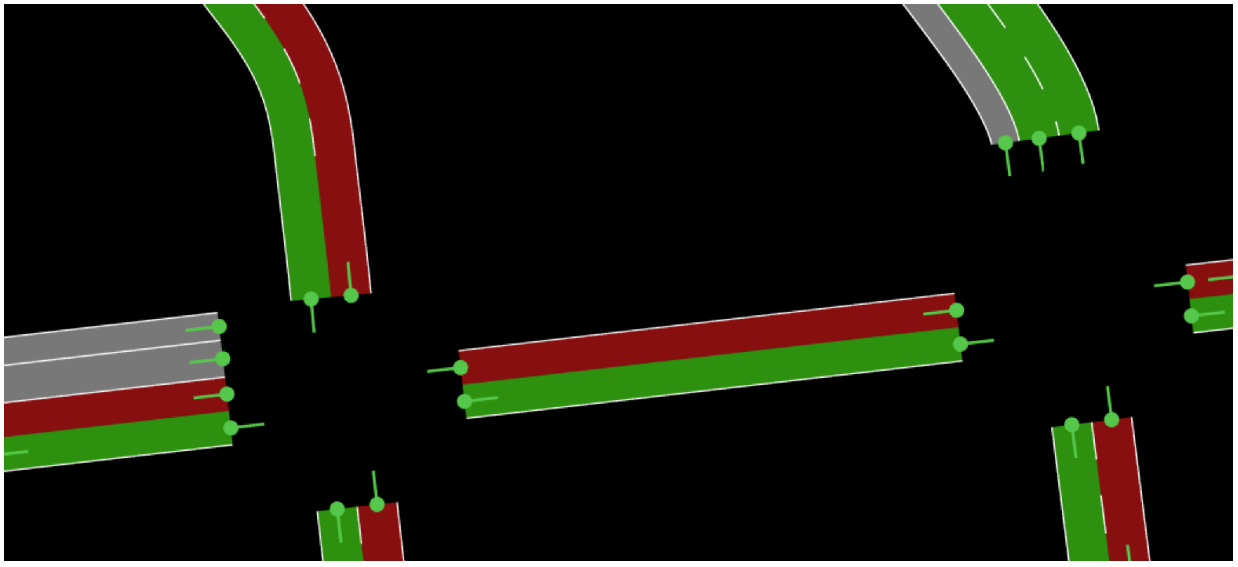
What to include in this section?

- Primary Roads
- Road Markings
- Road Width
- Road Type
- Material
- Lanes
- Lane Priority

1. Placing Foundational Primary Roads

(First-Level) Foundational Primary Roads: *main roads that form the core composition of the current section. Priority is First-Level.*

These roads form part as majority of the vital work required for rendering (and analysis).

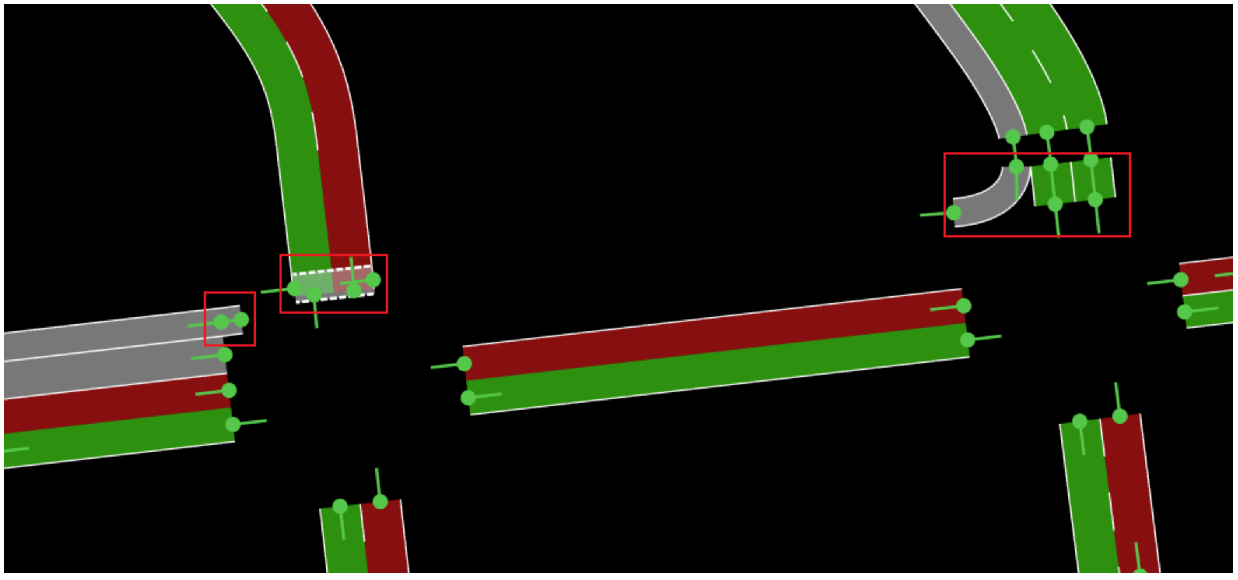


2. Placing Secondary-Level Primary Roads

Second-Level Primary Roads: *main roads that form the core composition of the current section. Priority is Second-Level, however* ***still required****.*

Example:

- Pedestrian crossings
- Dedicated Primary Roads (detached from other roads workflow)

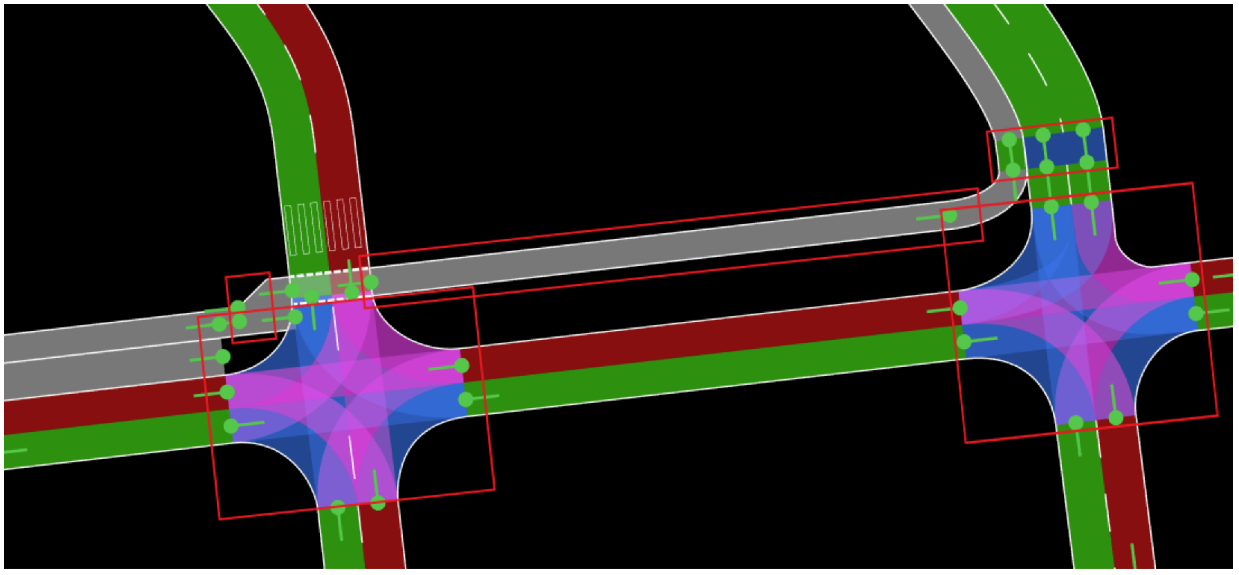


Making Road Connections (Connecting Roads)

Once you have placed the fundamental roads (primary roads) with their corresponding measurements, you can start adding connection roads that logically link the roads to one another.

What to include in this section?

- Connection Roads
- Connection Road Markings
- Connection Road Width
- Connection Road Lanes



⚠️ Important Notice : Logical Considerations ⚠️
Connection roads are based on logical connections rather than just their appearance. This means that connection roads are designed to allow for the possible directions actors can take throughout their journey within the section you are currently developing.

Additionally, when creating connection roads, ensure you also include their corresponding visual characteristics, such as road markings, lanes, and appropriate widths.

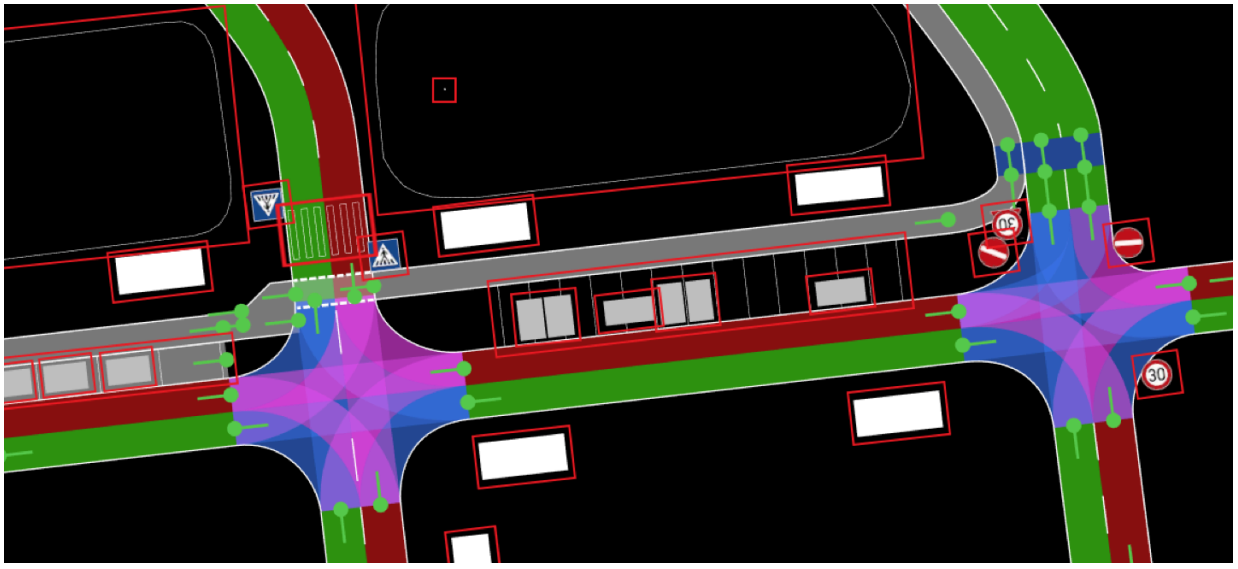
⚠️ Important Notice : Pedestrian Sidewalks ⚠️
As previously stated, logical connections are designed to allow for the possible directions that actors can take throughout their journey within a specific section. In the case of pedestrians, these logical connections must also be included.

You must connect the first-level (foundational) primary roads sidewalks to the corresponding secondary-level primary roads (could be pedestrian crossing areas, among others), **which should have already been placed in the previous stage**.

4.1.3 Adding The Complementations

🎇 Congratulations, you are about 70% done with the XODR file if you have reached this point! 🎇

Now, it is time to start placing more complex objects within the map. This section will include elements that enhance the map beyond the necessary vehicular and actor logical requirements.



Placing Objects

When placing objects, there is a general approach that is regularly followed. However, this can be done in two ways:

Approach #1

1. **Placing Houses/Physical Objects:** These are physical objects.
2. **Placing Logical Objects:** These are objects that require logical configuration, such as traffic lights, among others.
3. **Among others:** This approach is most effective when the visual layout of the environment is created first, followed by the configuration of logic.

Approach #2

1. **Placing Logical Objects:** These are objects that require logical configuration, such as traffic lights, among others.
2. **Placing Houses/Physical Objects:** These are physical objects.
3. **Among others:** This approach is better suited when your primary focus is on establishing the logic and controls before constructing the surrounding environment.

Placing Polygon Objects

These are flat surface shapes placed on the ground to represent areas such as green spaces, parking lots, sidewalks, or ground markings. They contribute to both the visual realism and the functional accuracy of the environment.

4.1.4 Revision Process

This section focuses on revising the current "finalized" version of the XODR file.

Once you have completed the previous steps, return to Creating The Basics with a revision mindset. You will now review the structure of the XODR file from bottom to top to ensure it is correct and accurate according to the references gathered.

Should you require assistance with this process, please do not hesitate to seek help from your assigned team members or team leader.

4.1.5 Work Delivery

Once you have ensured that your XODR file meets quality standards "as close as it can be", you can proceed to submit your work to your team lead.

How do I send my team lead my work?
Export the most up-to-date, revised version of your file and send the XODR file to your team lead through your designated communication channel. They will know what to do from there.

The responsibility for quality assurance will then be delegated back to them for examination.

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4.2 Best Practices

4.2.1 Development Best Practices

- **Avoid including too many sub-sections**
  This will result in a more complex map than is necessary, which will cause issues further in the development process.

- **Do not use subsections for road markings**
  This is considered an unnecessary expense, as it affects the whole portion of the road rather than the marking required for a specific road. In the case that the road marking matches the necessity to make a road section, it will be excluded.

- **Avoid creating more/less lanes in the middle of the road without following logical connections**
  This can result in the car becoming detached from the road and potentially having no connections to a road.

- **Avoid using width tags unless absolutely necessary**
  It is advisable to avoid using width tags unless they are absolutely necessary.

- **To achieve the desired curvature on certain road surfaces, you may need to use the curb tool.**
  For more information, refer to the Console or Side Tab.

- **Experiment with good techniques to visually simulate a curb correctly when needed**
  It is recommended that you experiment with good techniques, such as using a regular connection with an outer lane and width change, to visually simulate the curb correctly.

4.2.2 General Best Practices

- **Avoid “Ctrl + Z” and “Ctrl + Y”**
  Avoid undoing/redoing (Ctrl + Z, Ctrl + Y) too many times. This will eventually crash the system and force you to close the editor and reopen all the files.

- **Constantly save changes**
  Always remember to save your changes frequently to prevent losing your work and having to redo your progress from scratch.

- **Version control**
  Ensure you create different versions of your files before making any complex changes. This practice helps prevent irreversible actions and provides a way to revert to previous versions if needed, effectively implementing version control.

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4.3 Further Recommendations

4.3.1 OpenDRIVE Documentation

Review the ASAM Website latest documentation to understand industry practices and up-to-date critical technological changes and development recommendations.

4.3.2 OpenDRIVE Viewer Confirmation

It is recommended to use the OpenDRIVE Viewer to confirm the geometric validity of your map data. This tool provides a visual interface for inspecting OpenDRIVE files and ensures that lane geometries, road structures, and connectivity are accurately represented before further processing or deployment.

5 Among Others

5.1 Sample Maps

This section contains a collection of maps designed for users to explore and experiment with various geometric layouts and foundational project setups. Each map highlights a different use case or development scenario, showcasing its unique purpose and context.

DE_UR_GeometryOnly_v6.2.1:

Description: A minimal map representation.
Content: Contains only the road geometry layer.
Purpose: Ideal for testing base routing, simple visualizations, or initial map loading performance.

Click to download XODR file

DE_UR_Monckebergstrabe_Junction_v6.2.1
DE_UR_Rothenbaumchaussee_Junction_v6.2.1

Description: A highly detailed map segment representing a city junction.
Content: Includes road geometry, lane-level detailing, road markings, traffic signs, objects (e.g., traffic lights, poles), and pedestrian elements.
Purpose: Useful for validating perception, localization, and behavior planning modules in urban settings.

Click to download XODR file #1
Click to download XODR file #2

DE_HW_Sonnenstraße_HighwayIntersection_v6.2.1

Description: A map section featuring a complex highway merging or splitting.
Content: Enriched with elevation differences (z-values or layers), guardrails, signs, lane separations, and merging zones.
Purpose: Supports testing of high-speed navigation, sensor calibration, and multi-layered routing.

Click to download XODR file

DE_UR_Barlachstraße_Tunnel_v6.2.1

Description: Represents a segment of road passing through a tunnel.
Content: Contains road geometry, enclosed space modeling, objects like tunnel lights and emergency signs, and visibility constraints.
Purpose: Enables testing of SLAM in low-GNSS environments and perception challenges in enclosed spaces.

Click to download XODR file

DE_UR_Paul_Heyse_Straße_Tram_v6.2.1

Description: A mixed-traffic map that includes tram infrastructure.
Content: Features tram tracks, shared lane segments, priority zones, and signaling objects.
Purpose: Supports simulation of scenarios where trams interact with other road users, enabling advanced decision-making tests.

Click to download XODR file

5.2 Euro NCAP Sample Maps

This section contains a collection of Euro NCAP-oriented maps for users to explore and build scenarios. Each entry describes the map, its contents, how it can be used to create scenarios, and links to official Euro NCAP references.

5.2.1 AEB Car-to-Car

RepliMap_CCRs_CarToCar_Stationary_2022.xodr

Description: Road segment for car-to-car AEB evaluation (stationary, moving, braking, lane-change conflict, turning across path).
Content: Static assets include: - Lane markings (dashed/solid) - Shoulder - Traffic lanes
Geometry: Length 220.24 m · Driving lanes 2 · Sample lane width 3.5 m · Intersection: none
Purpose: Create AEB Car-to-Car scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Target vehicle

Click to download XODR file

RepliMap_CCRm_CarToCar_Moving_2022.xodr

Description: Road segment for car-to-car AEB evaluation (stationary, moving, braking, lane-change conflict, turning across path).
Content: Static assets include: - Curb - Lane markings (dashed/solid) - Traffic lanes
Geometry: Length 358.43 m · Driving lanes 2 · Sample lane width 3.5 m · Intersection: none
Purpose: Create AEB Car-to-Car scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Target vehicle

Click to download XODR file

RepliMap_CCF_LaneChange_Conflict_2022.xodr

Description: Road segment for car-to-car AEB evaluation (stationary, moving, braking, lane-change conflict, turning across path).
Content: Static assets include: - Lane markings (dashed/solid) - Shoulder - Sidewalk - Traffic lanes
Geometry: Length 495.68 m · Driving lanes 2 · Sample lane width 6.5 m · Intersection: junction
Purpose: Create AEB Car-to-Car scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Target vehicle

Click to download XODR file

RepliMap_CPTA_CarToCar_Turning_2022.xodr

Description: Road segment for car-to-car AEB evaluation (stationary, moving, braking, lane-change conflict, turning across path).
Content: Static assets include: - Barrier - Bike lane - Lane markings (dashed/solid) - Parking bay - Pole - Refuge/traffic island - Sidewalk - Streetlight - Traffic lanes - Tree
Geometry: Length 1357.73 m · Driving lanes 6 · Sample lane width 3.21 m · Intersection: junction
Purpose: Create AEB Car-to-Car scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Target vehicle

Click to download XODR file

5.2.2 AEB VRU -- Pedestrian

RepliMap_CPNA_Pedestrian_NearSide_2022.xodr

Description: Urban segment for AEB-VRU pedestrian evaluation (near-side, far-side, longitudinal walking).
Content: Static assets include: - Barrier - Bike lane - Bollard - Crosswalk - Lane markings (dashed/solid) - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree - Vegetation belt
Geometry: Length 1645.34 m · Driving lanes 10 · Sample lane width 2.85 m · Intersection: junction
Purpose: Create AEB VRU -- Pedestrian scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Adult pedestrian

Click to download XODR file

RepliMap_CPFA_Pedestrian_FarSide_2022.xodr

Description: Urban segment for AEB-VRU pedestrian evaluation (near-side, far-side, longitudinal walking).
Content: Static assets include: - Barrier - Bike lane - Bollard - Building - Lane markings (dashed/solid) - Parking bay - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree - Vegetation belt - Wall/Fence
Geometry: Length 6504.52 m · Driving lanes 15 · Sample lane width 3.5 m · Intersection: junction
Purpose: Create AEB VRU -- Pedestrian scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Adult pedestrian

Click to download XODR file

RepliMap_CPLA_Pedestrian_Longitudinal_2022.xodr

Description: Urban segment for AEB-VRU pedestrian evaluation (near-side, far-side, longitudinal walking).
Content: Static assets include: - Barrier - Bike lane - Lane markings (dashed/solid) - Parking bay - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree
Geometry: Length 2244.23 m · Driving lanes 48 · Sample lane width 2.7 m · Intersection: junction
Purpose: Create AEB VRU -- Pedestrian scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Adult pedestrian

Click to download XODR file

5.2.3 AEB VRU -- Cyclist

RepliMap_CBFA_CarToBicycle_FarSide_2022.xodr

Description: Urban/junction segment for AEB-VRU cyclist evaluation (far-side crossing, turning, longitudinal riding).
Content: Static assets include: - Barrier - Bike lane - Lane markings (dashed/solid) - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree
Geometry: Length 831.88 m · Driving lanes 8 · Sample lane width 3.31 m · Intersection: junction
Purpose: Create AEB VRU -- Cyclist scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Cyclist

Click to download XODR file

RepliMap_CBTA_Cyclist_Turning_2022.xodr

Description: Urban/junction segment for AEB-VRU cyclist evaluation (far-side crossing, turning, longitudinal riding).
Content: Static assets include: - Barrier - Bike lane - Lane markings (dashed/solid) - Parking bay - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree
Geometry: Length 2853.89 m · Driving lanes 8 · Sample lane width 2.75 m · Intersection: junction
Purpose: Create AEB VRU -- Cyclist scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Cyclist

Click to download XODR file

RepliMap_CBLA_Cyclist_Longitudinal_2022.xodr

Description: Urban/junction segment for AEB-VRU cyclist evaluation (far-side crossing, turning, longitudinal riding).
Content: Static assets include: - Barrier - Bike lane - Bollard - Building - Lane markings (dashed/solid) - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree - Vegetation belt - Wall/Fence
Geometry: Length 1542.15 m · Driving lanes 25 · Sample lane width 3.25 m · Intersection: junction
Purpose: Create AEB VRU -- Cyclist scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Cyclist

Click to download XODR file

5.2.4 Lane Support / ELK

RepliMap_LSS_RoadEdge_Parkings_2022.xodr

Description: Segment for lane support / emergency lane keeping evaluation.
Content: Static assets include: - Barrier - Bike lane - Lane markings (dashed/solid) - Parking bay - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree
Geometry: Length 1631.53 m · Driving lanes 36 · Sample lane width 3.49 m · Intersection: junction
Purpose: Create Lane Support / ELK scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle

Click to download XODR file

RepliMap_ELK_Curved_RoadEdge_2022.xodr

Description: Segment for lane support / emergency lane keeping evaluation.
Content: Static assets include: - Barrier - Bike lane - Building - Curb - Lane markings (dashed/solid) - Parking bay - Pole - Refuge/traffic island - Shoulder - Sidewalk - Streetlight - Traffic lanes - Tree - Vegetation belt - Wall/Fence
Geometry: Length 8343.16 m · Driving lanes 15 · Sample lane width 2.8 m · Intersection: junction
Purpose: Create Lane Support / ELK scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle

Click to download XODR file

5.2.5 Official References

- Euro NCAP Protocols (overview)
- AEB Car-to-Car
- AEB Vulnerable Road Users
- Lane Support Systems
- Speed Assistance Systems

5.3 US NCAP Sample Maps

This section contains a collection of US NCAP-oriented maps for users to explore and build scenarios. Each entry describes the map, its contents, how it can be used to create scenarios, and links to official US NCAP references.

5.3.1 AEB Car-to-Car

RepliMap_US_NCAP_2025_FCW.xodr

Description: Road segment for Forward Collision Warning (lead vehicle stationary or decelerating).
Content: Static assets include: - Lane markings (dashed/solid) - Shoulder - Sidewalk - Barriers - Vegetation belt
Geometry: Length 716.50 m · Driving lanes 3 · Sample lane width 3.6 m · Intersection: none
Purpose: Create FCW scenarios with stationary or decelerating lead vehicles following US NCAP procedure.
Dynamic assets to add in simulator: EGO vehicle, Target vehicle

Click to download XODR file

RepliMap_US_NCAP_2025_AEB_CCRs.xodr

Description: Road segment for AEB Car-to-Car Rear test (stationary lead).
Content: Static assets include: - Lane markings (dashed/solid) - Shoulder - Barriers - Sidewalk
Geometry: Length 600.00 m · Driving lanes 2 · Sample lane width 3.6 m · Intersection: none
Purpose: Create AEB Car-to-Car Rear scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Stationary target vehicle

Click to download XODR file

RepliMap_US_NCAP_2025_DBS.xodr

Description: Road segment for Dynamic Brake Support (DBS) performance evaluation.
Content: Static assets include: - Lane markings (dashed/solid) - Shoulder - Barriers
Geometry: Length 520.30 m · Driving lanes 2 · Sample lane width 3.5 m · Intersection: none
Purpose: Create Dynamic Brake Support scenarios for braking assistance validation.
Dynamic assets to add in simulator: EGO vehicle, Target vehicle

Click to download XODR file

5.3.2 AEB VRU -- Pedestrian / Cyclist / Motorcyclist

RepliMap_US_NCAP_2025_PAEB.xodr

Description: Urban segment for Pedestrian AEB (PAEB) near-side crossing scenario.
Content: Static assets include: - Crosswalk - Lane markings (dashed/solid) - Shoulder - Sidewalk - Traffic signs - Barriers
Geometry: Length 438.50 m · Driving lanes 2 · Sample lane width 3.5 m · Intersection: crosswalk zone
Purpose: Create Pedestrian AEB (PAEB) near-side crossing scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Adult pedestrian

Click to download XODR file

RepliMap_US_NCAP_2025_VRU_Bicyclist_Motorcyclist.xodr

Description: Road segment for AEB VRU evaluation (bicyclist or motorcyclist crossing or longitudinal).
Content: Static assets include: - Bike lane - Lane markings (dashed/solid) - Shoulder - Sidewalk - Pole - Barriers
Geometry: Length 425.00 m · Driving lanes 3 + bike lane 1 · Sample lane width 3.6 m · Intersection: none
Purpose: Create VRU Bicyclist or Motorcyclist scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Bicyclist or Motorcyclist

Click to download XODR file

RepliMap_US_NCAP_2025_AEB_Intersection_CrossTraffic.xodr

Description: Intersection layout for AEB Cross-Traffic Alert and Intersection AEB testing.
Content: Static assets include: - Lane markings (dashed/solid) - Crosswalk - Sidewalk - Poles - Traffic signs - Barriers
Geometry: Length 356.90 m · Driving lanes 4 (2 per direction) · Sample lane width 3.5 m · Intersection: T-junction
Purpose: Create Intersection AEB Cross-Traffic scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Cross-traffic vehicle

Click to download XODR file

5.3.3 Lane Support / Blind Spot Warning and Intervention

RepliMap_US_NCAP_2025_LKA_LDW.xodr

Description: Road segment for Lane Keeping Assist (LKA) and Lane Departure Warning (LDW) evaluation.
Content: Static assets include: - Lane markings (dashed/solid) - Shoulder - Vegetation - Barriers
Geometry: Length 813.40 m · Driving lanes 3 · Sample lane width 3.6 m · Intersection: none
Purpose: Create Lane Support scenarios for LKA/LDW evaluation.
Dynamic assets to add in simulator: EGO vehicle

Click to download XODR file

RepliMap_US_NCAP_2025_BSW_BSI.xodr

Description: Multi-lane highway segment for Blind Spot Warning (BSW) and Blind Spot Intervention (BSI).
Content: Static assets include: - Lane markings (dashed/solid) - Shoulder - Median barrier - Vegetation belt - Road signs
Geometry: Length 950.20 m · Driving lanes 6 (3 per direction) · Sample lane width 3.6 m · Intersection: none
Purpose: Create Blind Spot Warning and Intervention (BSW/BSI) scenarios on this map.
Dynamic assets to add in simulator: EGO vehicle, Adjacent-lane POV

Click to download XODR file

5.3.4 Crashworthiness Tests

RepliMap_US_NCAP_2025_SideImpact_MDB.xodr

Description: Test pad for Moving Deformable Barrier (MDB) side-impact evaluation.
Content: Static assets include: - Lane markings - Shoulder - Barriers - Poles
Geometry: Length 215.00 m · Driving lanes 1 · Sample lane width 4.0 m · Intersection: none
Purpose: Create Side Impact MDB crashworthiness scenarios on this map.
Dynamic assets to add in simulator: SUT (vehicle under test), MDB carrier

Click to download XODR file

RepliMap_US_NCAP_2025_SideImpact_Pole.xodr

Description: Test pad for oblique side-pole impact evaluation.
Content: Static assets include: - Lane markings - Shoulder - Pole fixture - Barriers
Geometry: Length 182.60 m · Driving lanes 1 · Sample lane width 4.0 m · Intersection: none
Purpose: Create Side Pole Impact (VSP) scenarios on this map.
Dynamic assets to add in simulator: SUT (vehicle under test)

Click to download XODR file

RepliMap_US_NCAP_2025_RigidBarrier_Impact.xodr

Description: Straight test track for full-frontal rigid barrier impact evaluation.
Content: Static assets include: - Lane markings - Shoulder - Rigid barrier fixture
Geometry: Length 320.00 m · Driving lanes 1 · Sample lane width 4.0 m · Intersection: none
Purpose: Create Frontal Rigid Barrier Impact crashworthiness scenarios on this map.
Dynamic assets to add in simulator: SUT (vehicle under test)

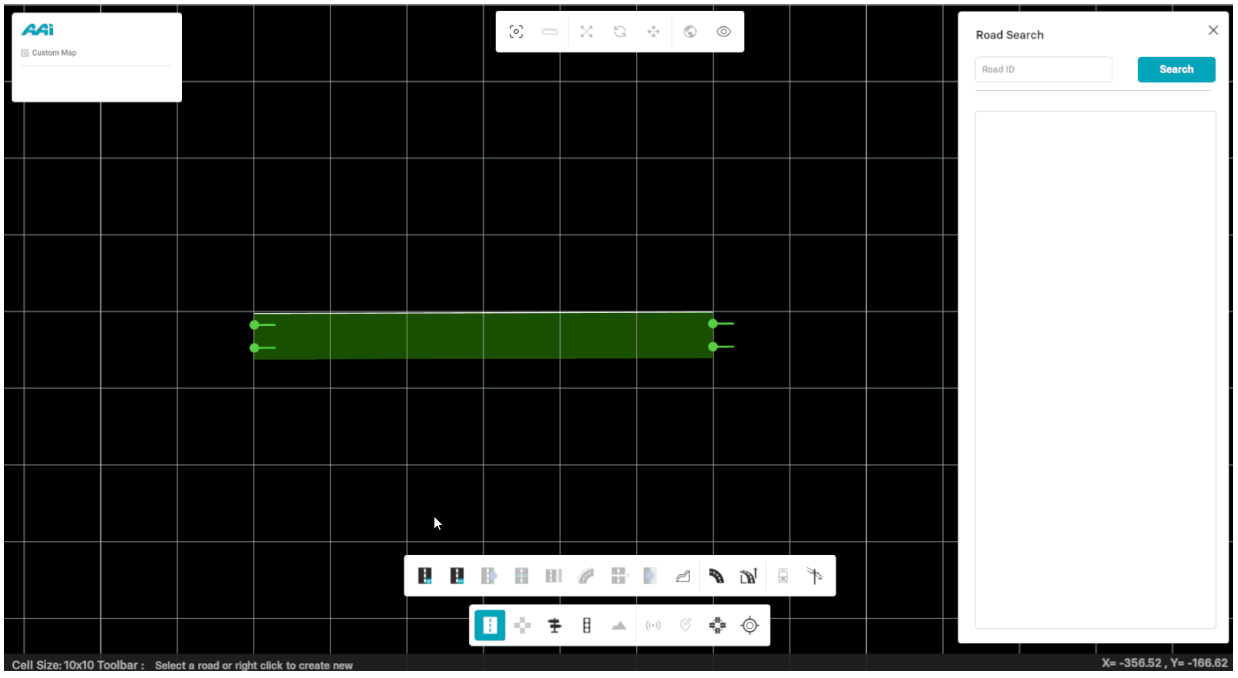
Click to download XODR file

5.3.5 Official References

- US NCAP Protocols (Overview)
- Crash Avoidance (AEB, FCW, BSW, LKA)
- Crashworthiness (Frontal / Side Impact Tests)
- VRU and Intersection AEB Protocols (2024)

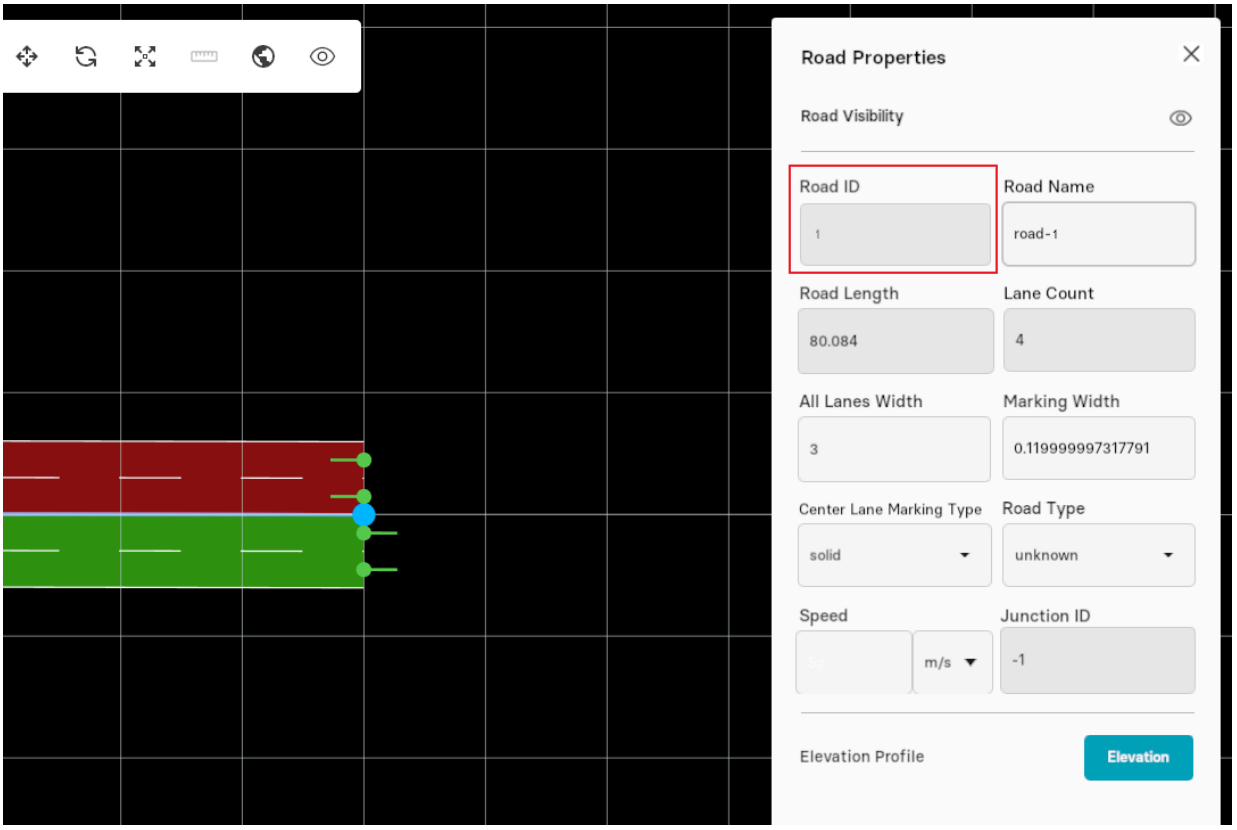
5.4 Other Parameters

A parameter pane is given at the right side of the main window, it provides all the information about the selected road and lets you adjust settings accordingly. Click once on the road to get all related parameters, double-click at any point on the road to see lane section ID and lane count, and triple-click on any lane to set values and specify lane and marking types.



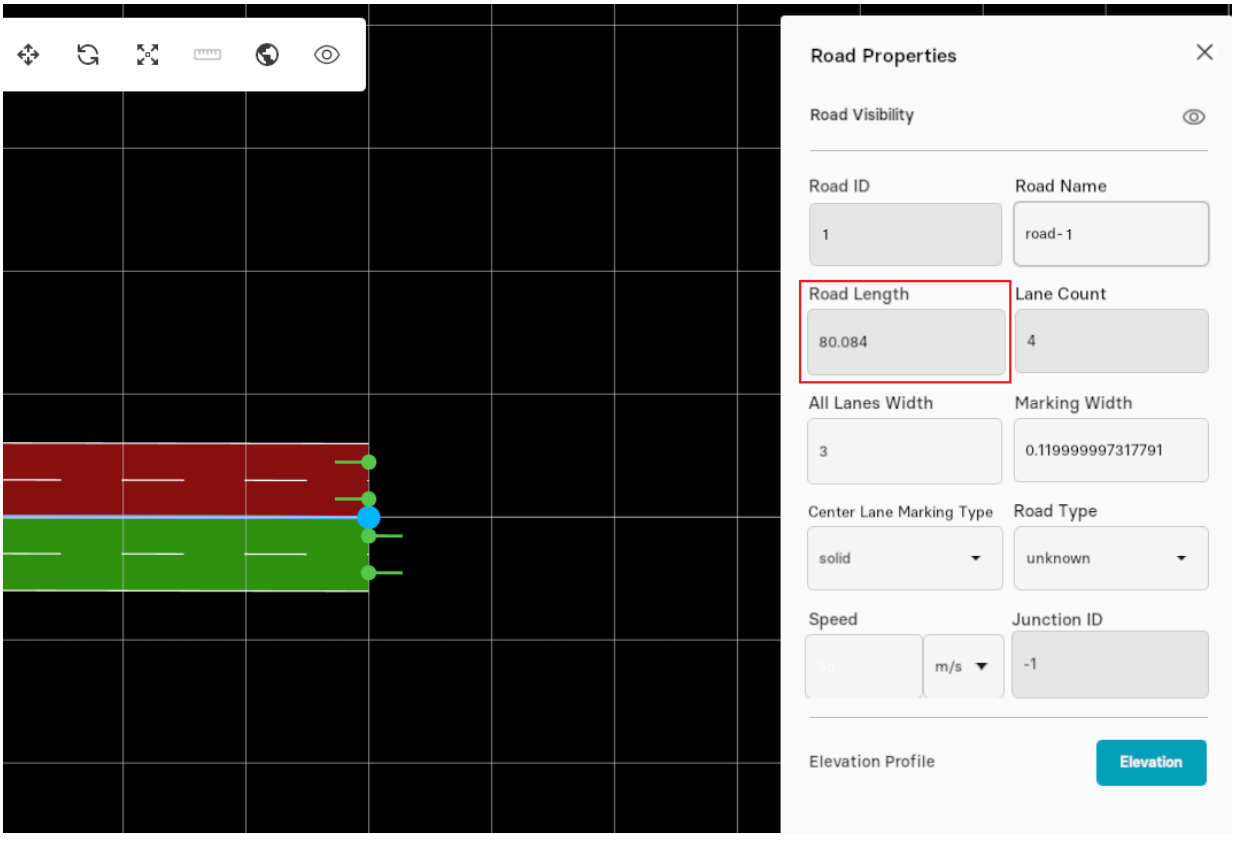
5.4.1 Road ID

Road ID is a unique identification number of a selected road. In parameters pane, road ID is displayed at the top of other road properties.



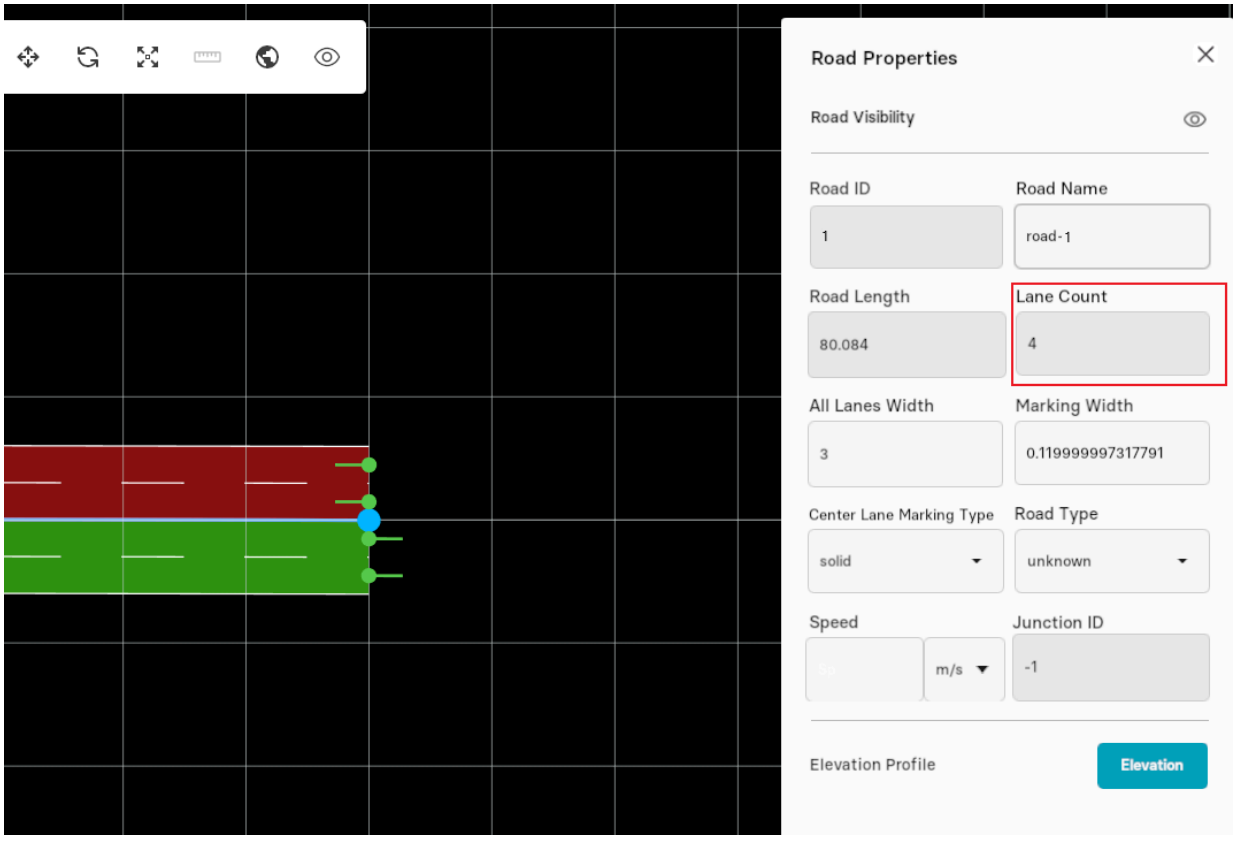
5.4.2 Road Length

This feature describes the length of the selected road in the map.



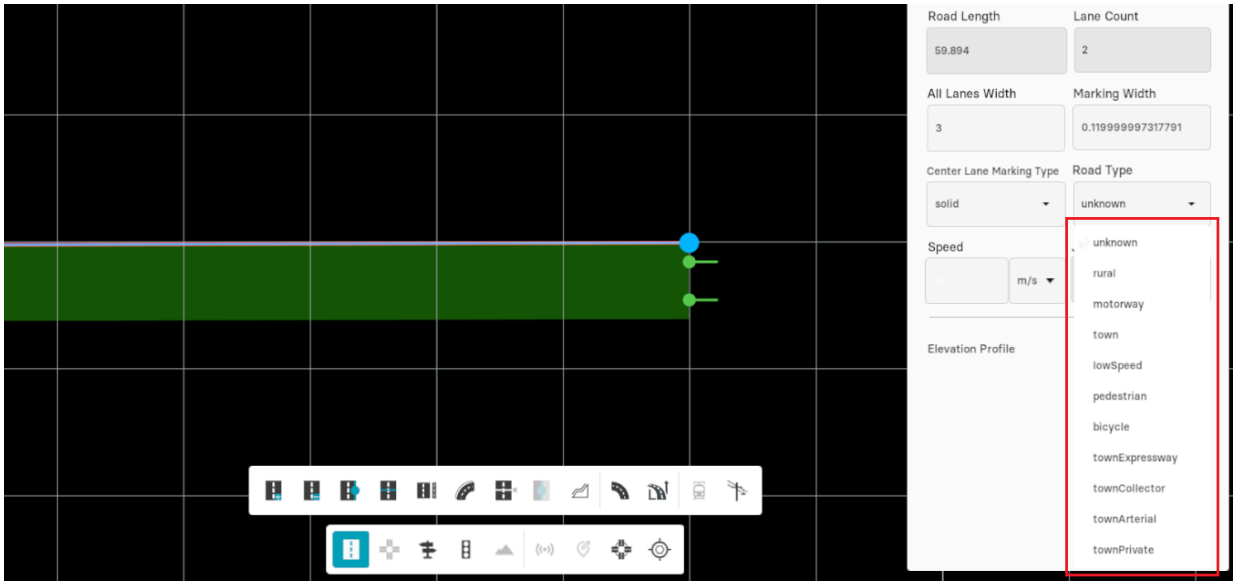
5.4.3 Lane Count

Lane Count gives the number of existing lanes in first lane section of the selected road in the map.



5.4.4 Road Type Information

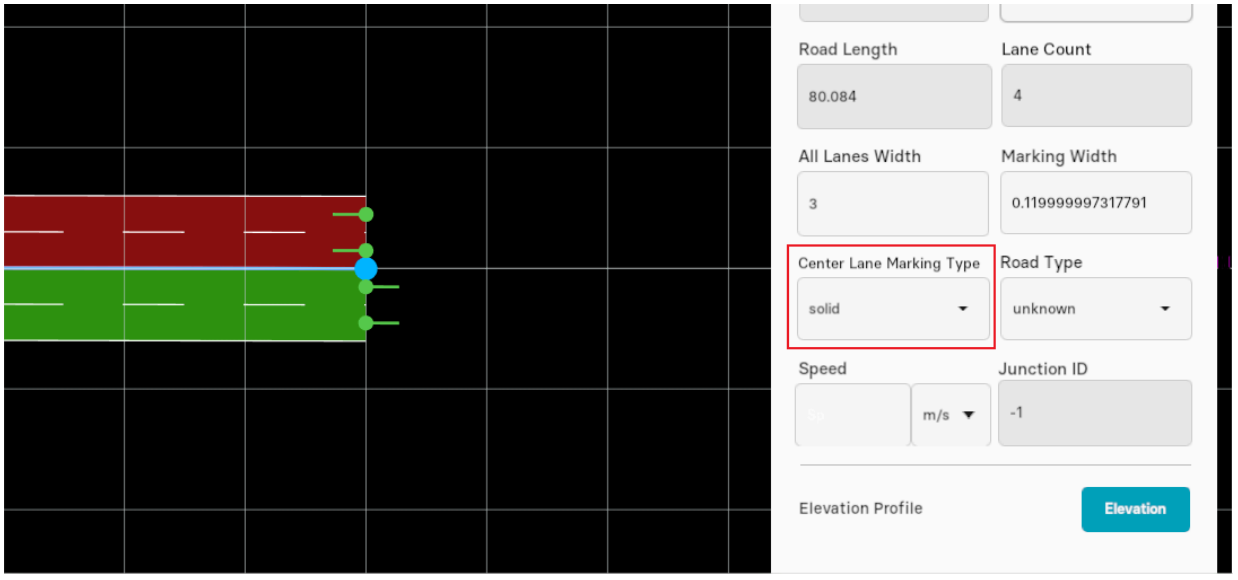
This option provides a range of road types which can be adjusted later according to the requirements by clicking on **"Road Type"** in parameters pane and then selecting your desired road type from drop-down menu as displayed in *figure* below.



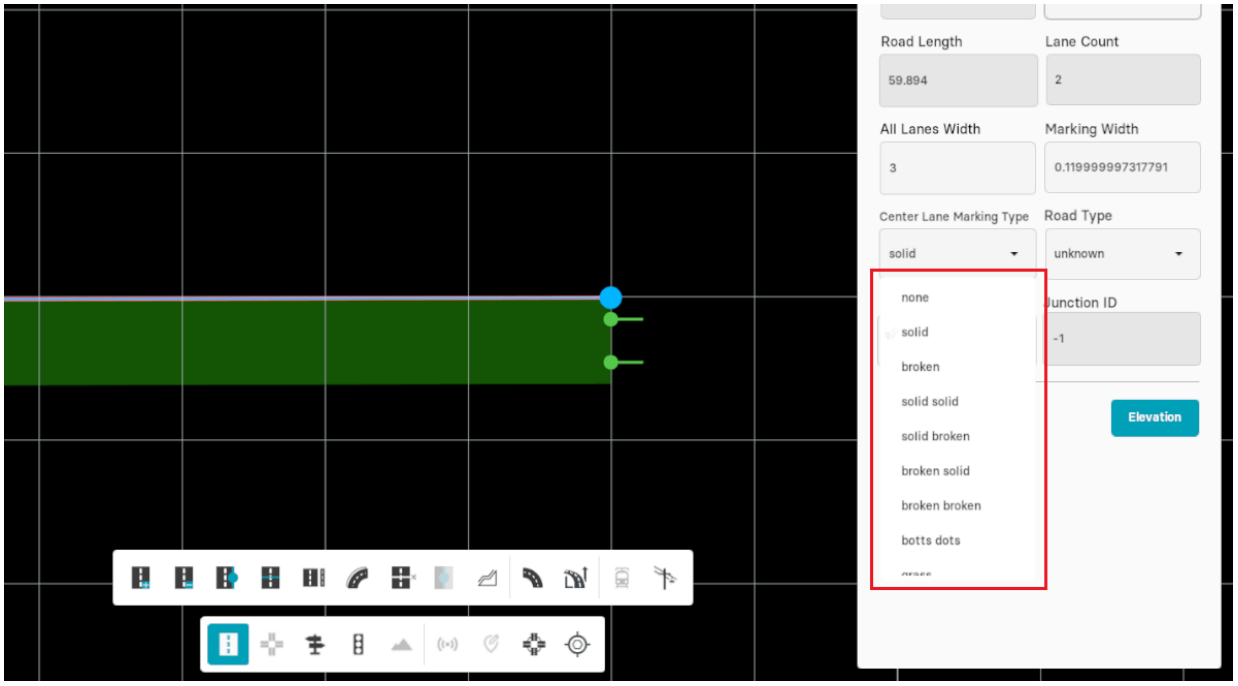
5.4.5 Center lane Marking Type

There are certain ways of marking a center lane of the road. Once you have created a road in Map Editor, now it allows you to select the marking type from parameters pane at the right side of the window as shown in *figure* below. *Note: Only selecting the road enables the parameters pane that appears at the right side of your screen* .

```
Select a road from your map by clicking on it once. Move your cursor to the right-s
```



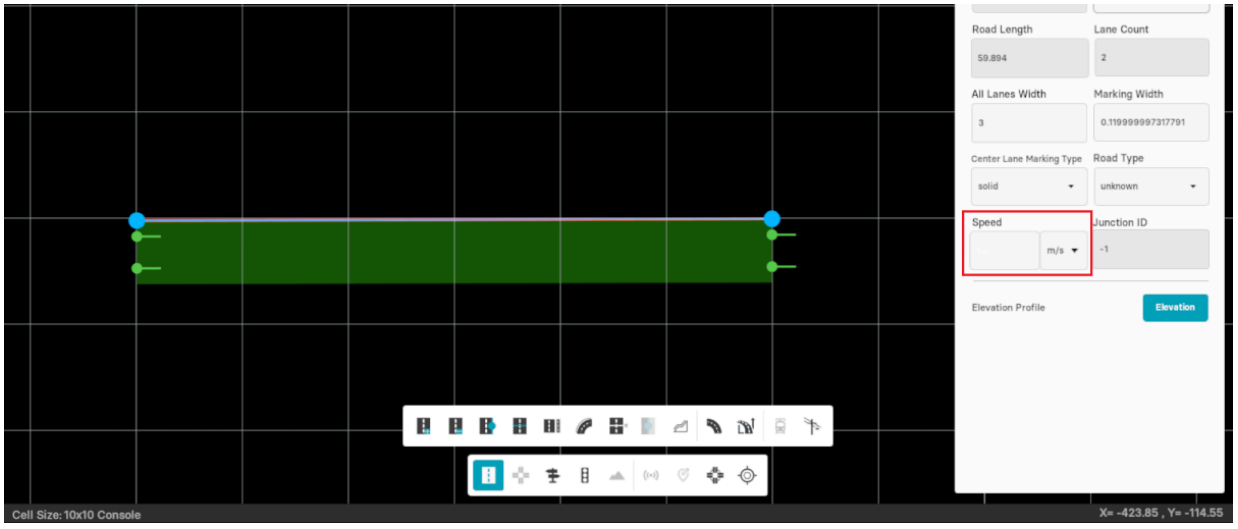

```
A scrollable drop-down menu appears showing several centerlane marking types.
```



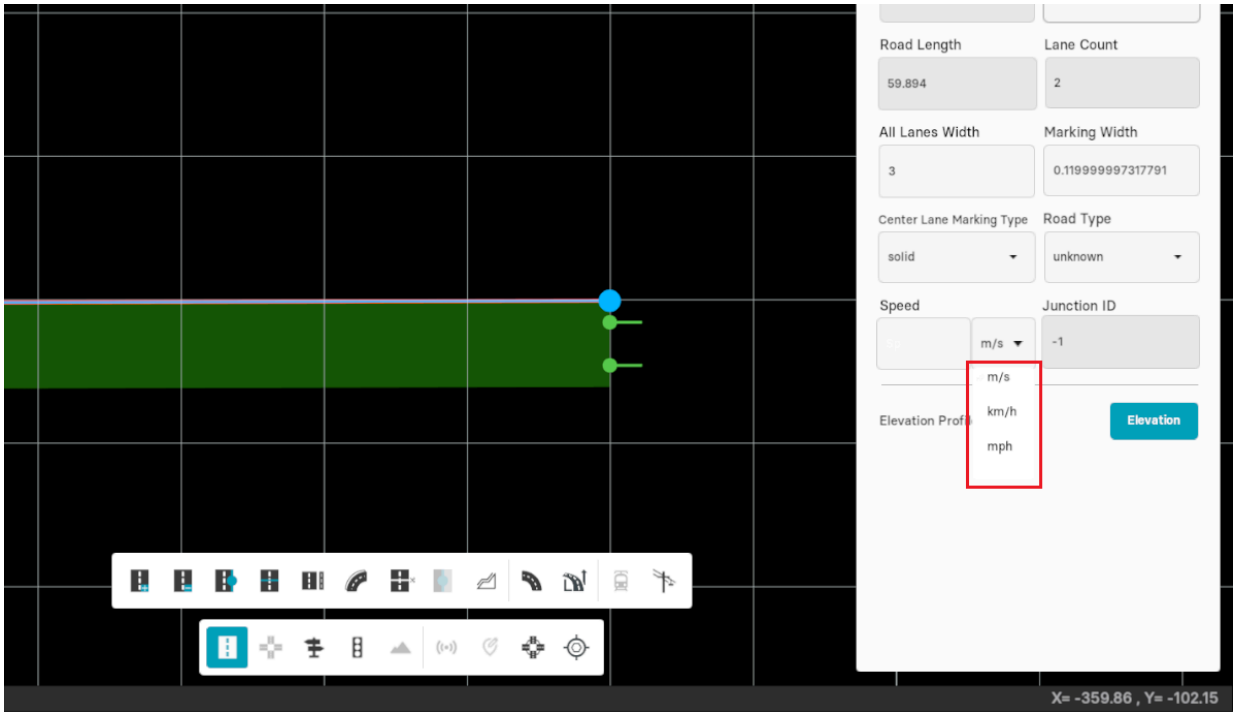
5.4.6 Speed

This option lets you define maximum speed for the selected road.

1. Go to "Parameters Pane", click on the drop-down box next to "Speed". Here, a scr



2. Enter speed in "digits" in given entry box labelled as "Sp" as illustrated in fig



Units

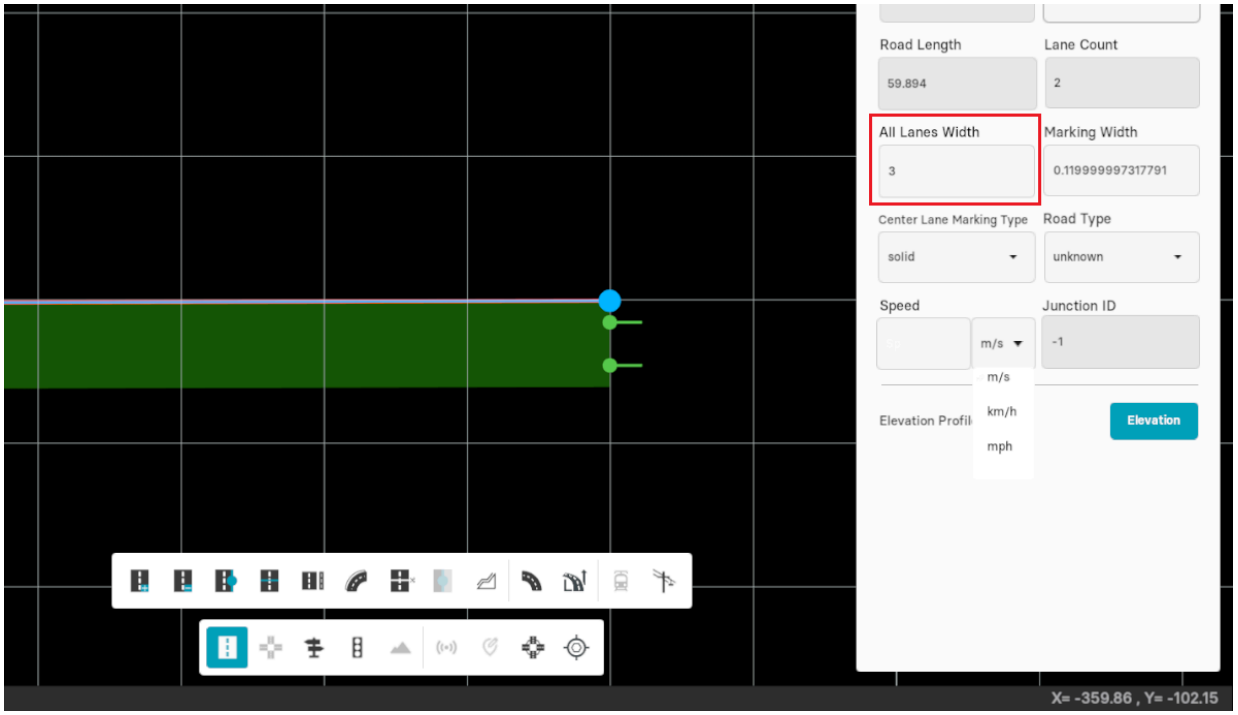
Following are the units indicating the speed of traffic on the road:

Unit	Identifier
Meters per second	m/s
Kilometers per hour	kph
Miles per hour	mph

5.4.7 Lane Width

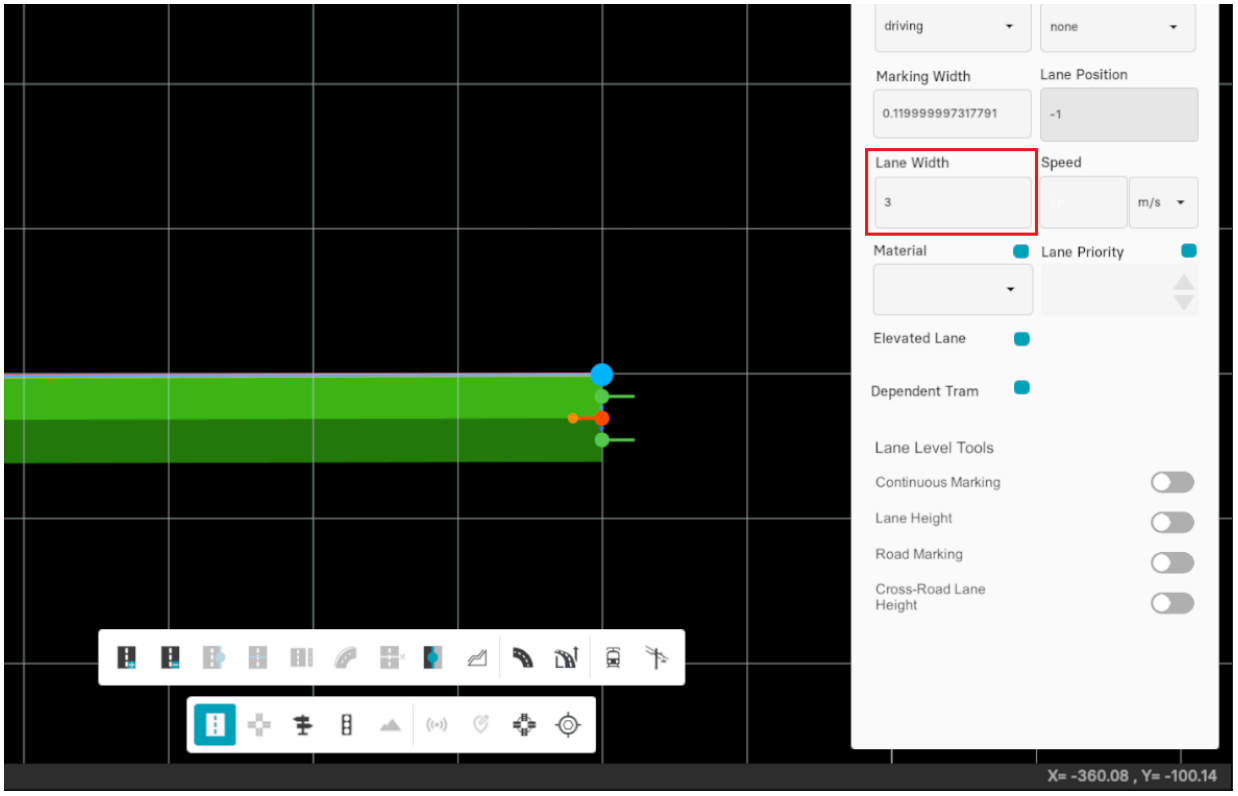
The width for any lane can be specified manually from the given parameters pane. By default, all lane width is set to 3. You can change the width of all the lanes according to the requirements.

Select "Create Road" from the toolbar, single-click on the road to enable the parameters pane displaying all the road properties. Here, you can change the width value for all the lanes simultaneously.



Single-lane width

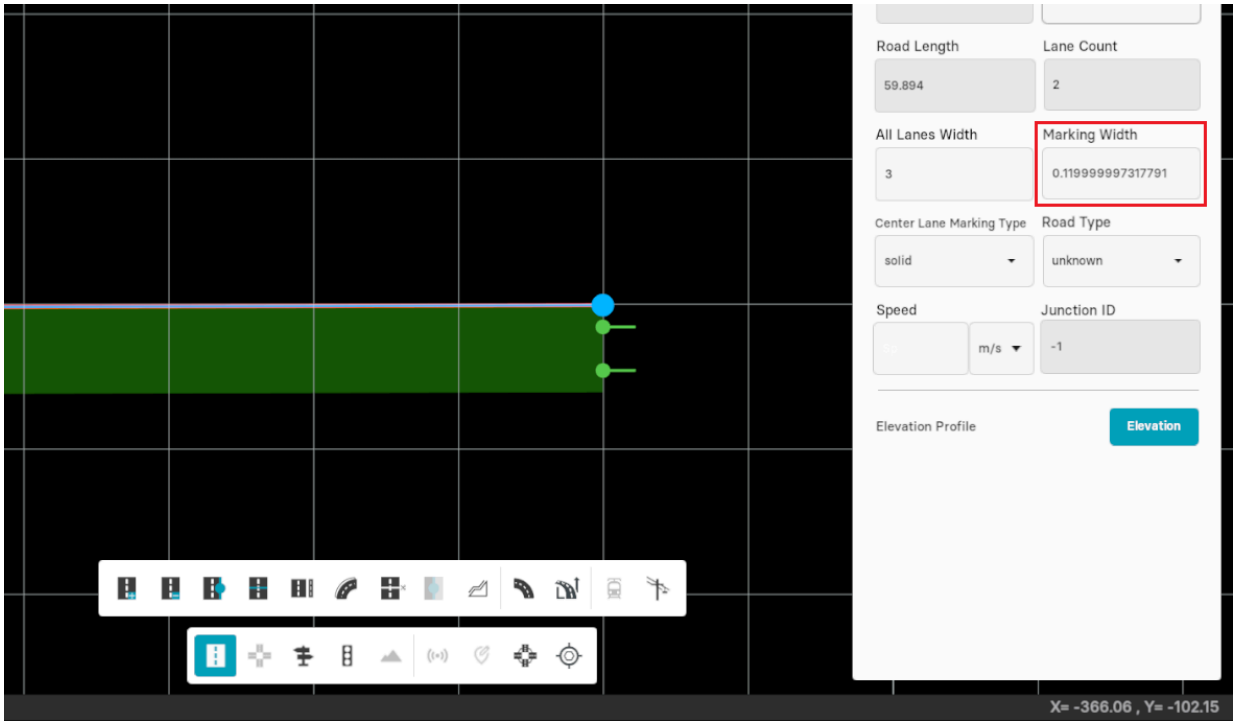
Select "Create Road" from the toolbar, triple-click on the lane to see all the lane properties. Here you can set the width of each lane individually.



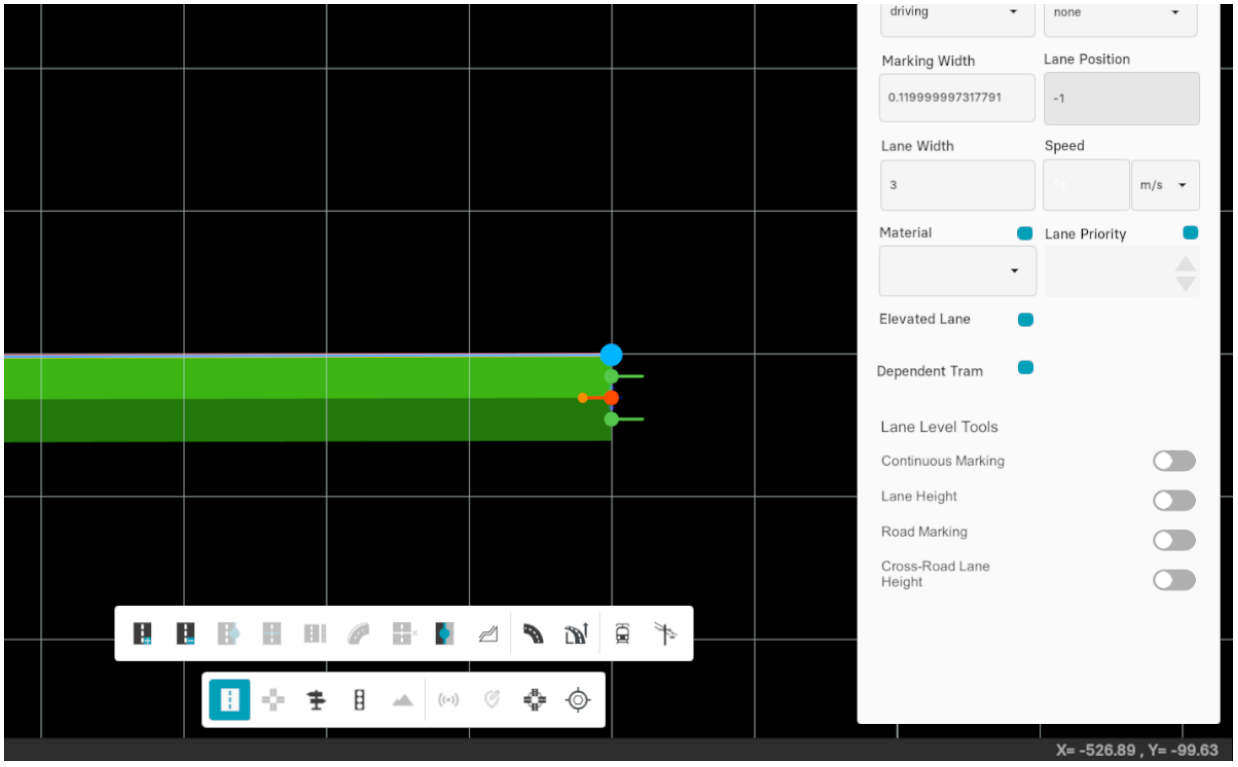
5.4.8 Marking Width

Marking Width defines the width of the marking on each lane. When you select a road, a parameter pane opens up at the right-side of the screen simultaneously. These properties enables you to modify the marking width of each individual lane in the map.

- Single-click on the road to set the marking width of the center lane. *By default, this value is set to 0.125.* Enter the new value in the given entry box next to **Marking Width** and click on **Set**.



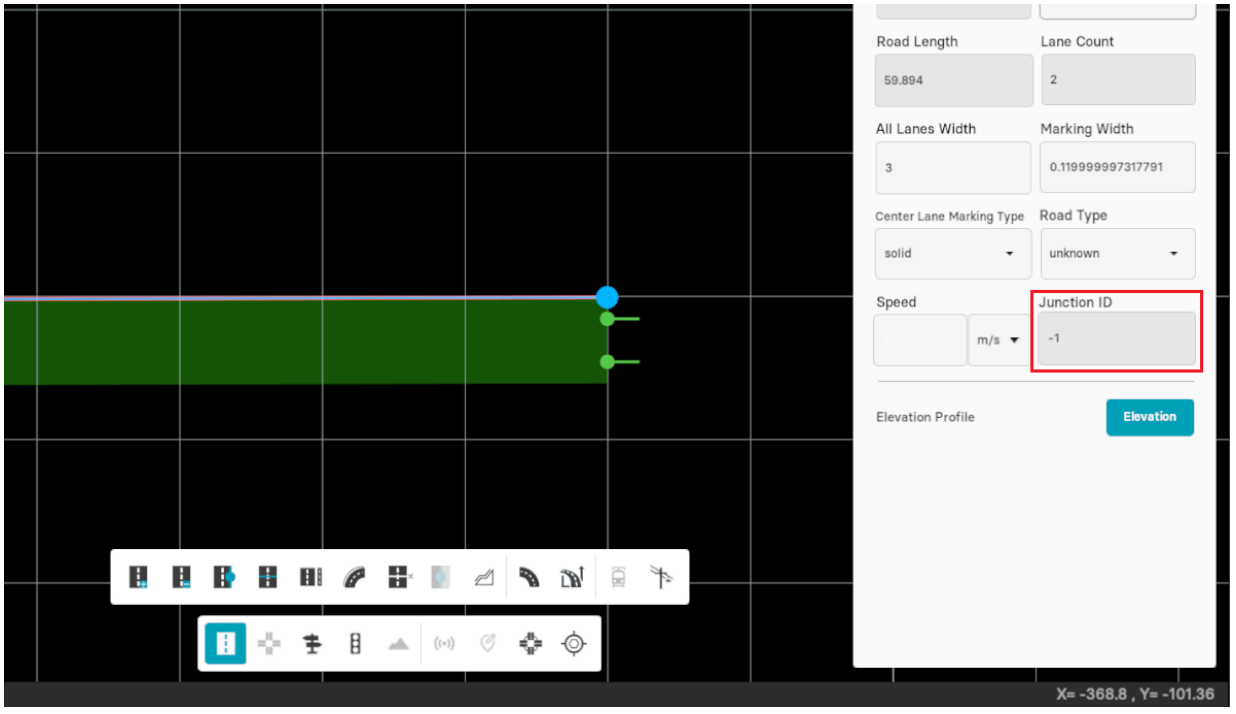
- Triple-click on the particular lane to adjust its marking width. *By default, this value is set to 0.125.* Enter the new value in the given entry box next to **Marking Width** and click on **Set**.



5.4.9 Junction ID

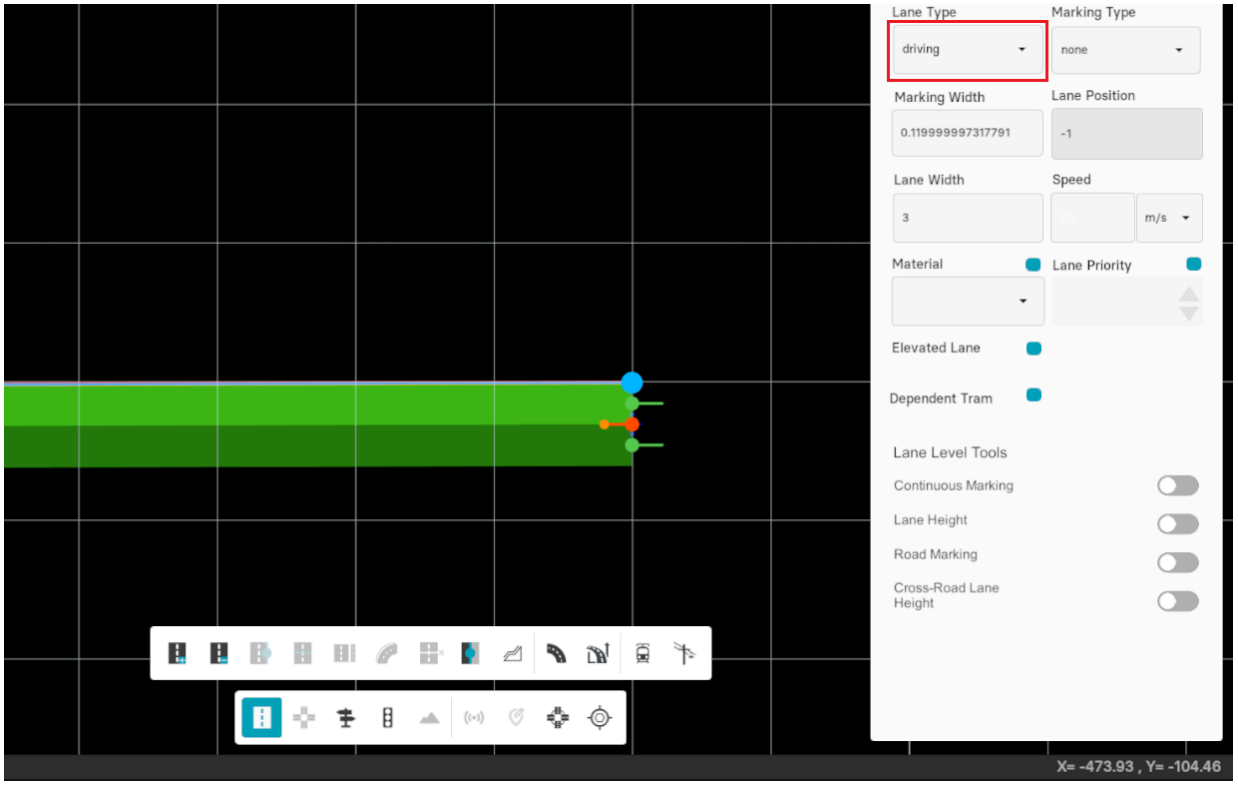
This feature displays the *junction id* for the loaded maps. Note that it is not applicable in created maps.

- Press left-mouse button on the road to select it. In parameters pane, junction id is present as illustrated in figure given below.



5.4.10 Lane Type

This feature defines different types of lanes in the map, representing the type of traffic on the road.



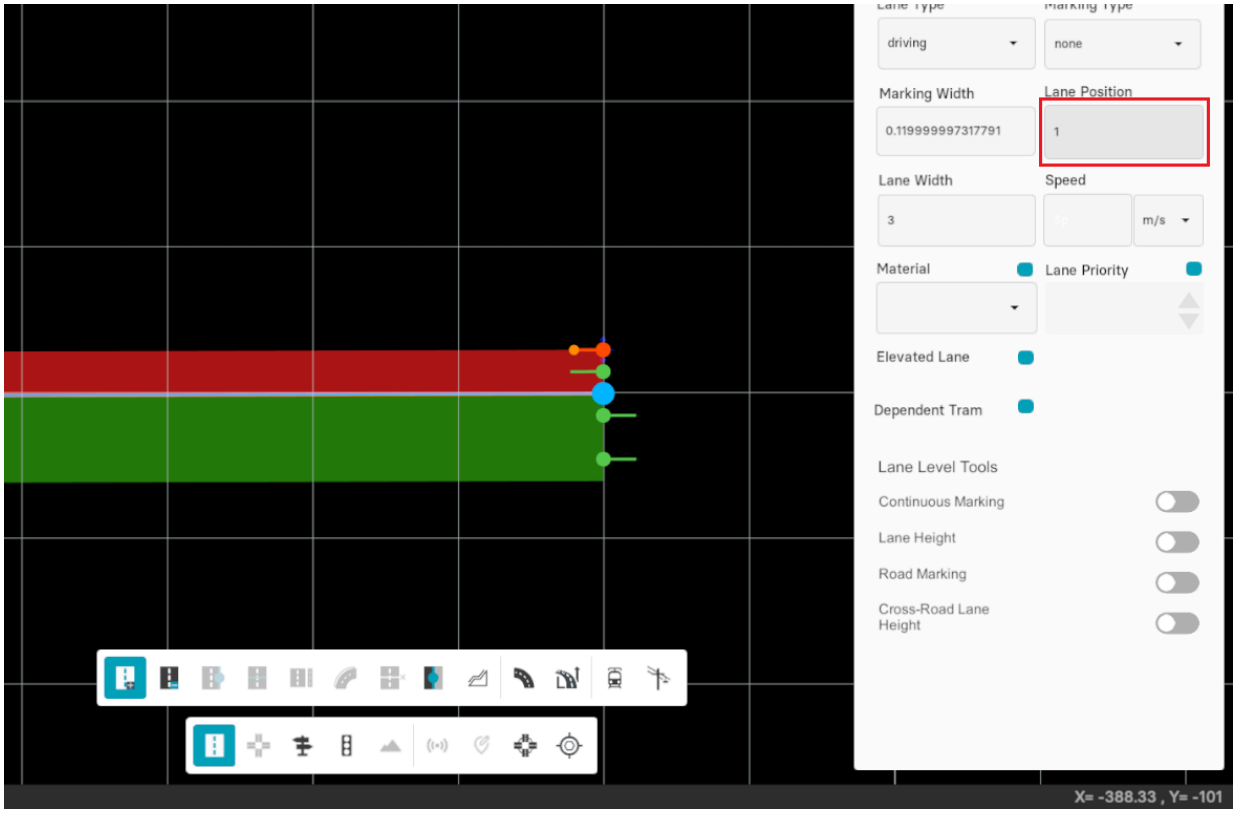
5.4.11 Lane Position

Lanes are identified by numbers which are:

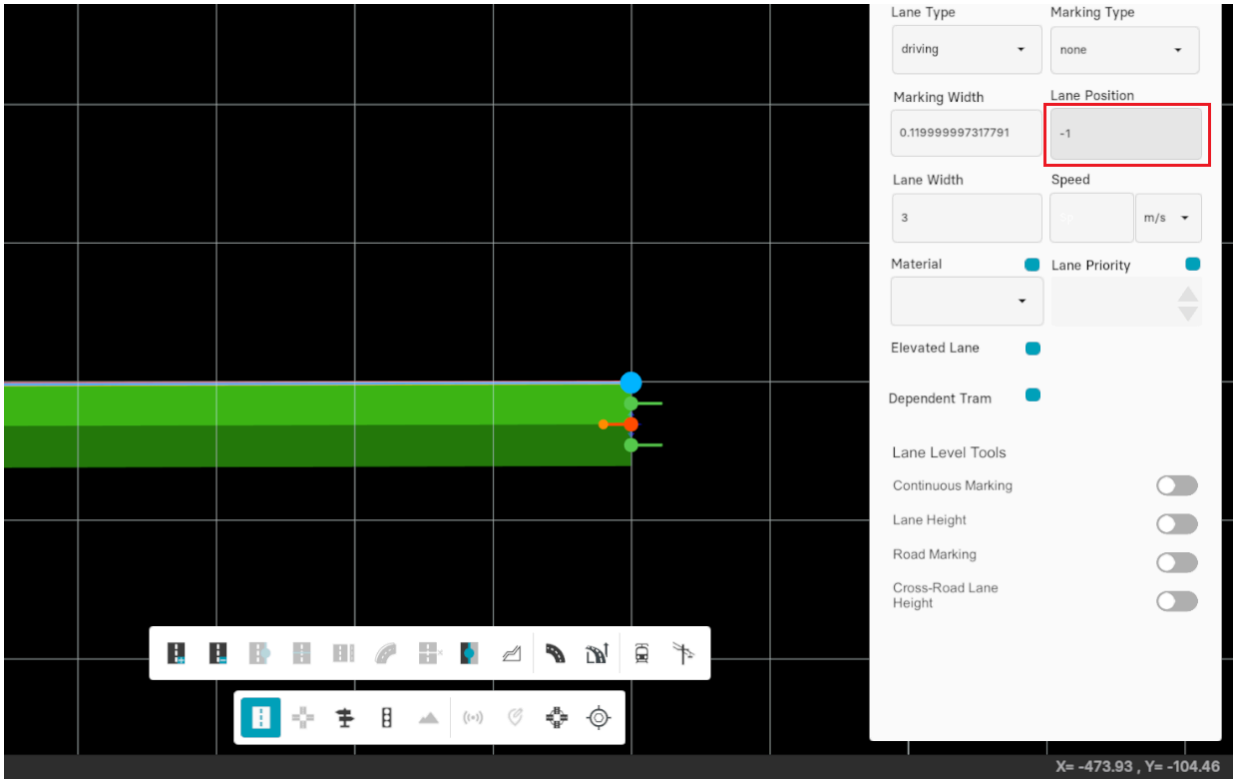
- Unique (per lane section)
- In sequence (without gaps),
- Starting from 0 on the reference line
- Ascending to the left (positive value)
- Descending to the right (negative value)

The total number of lanes is not limited. The reference line itself is defined as lane zero and must not have a width entry (i.e. its width must always be zero).

- Selecting the lane from the left side of the reference line gives a positive (i.e. 1) lane position to the selected lane.



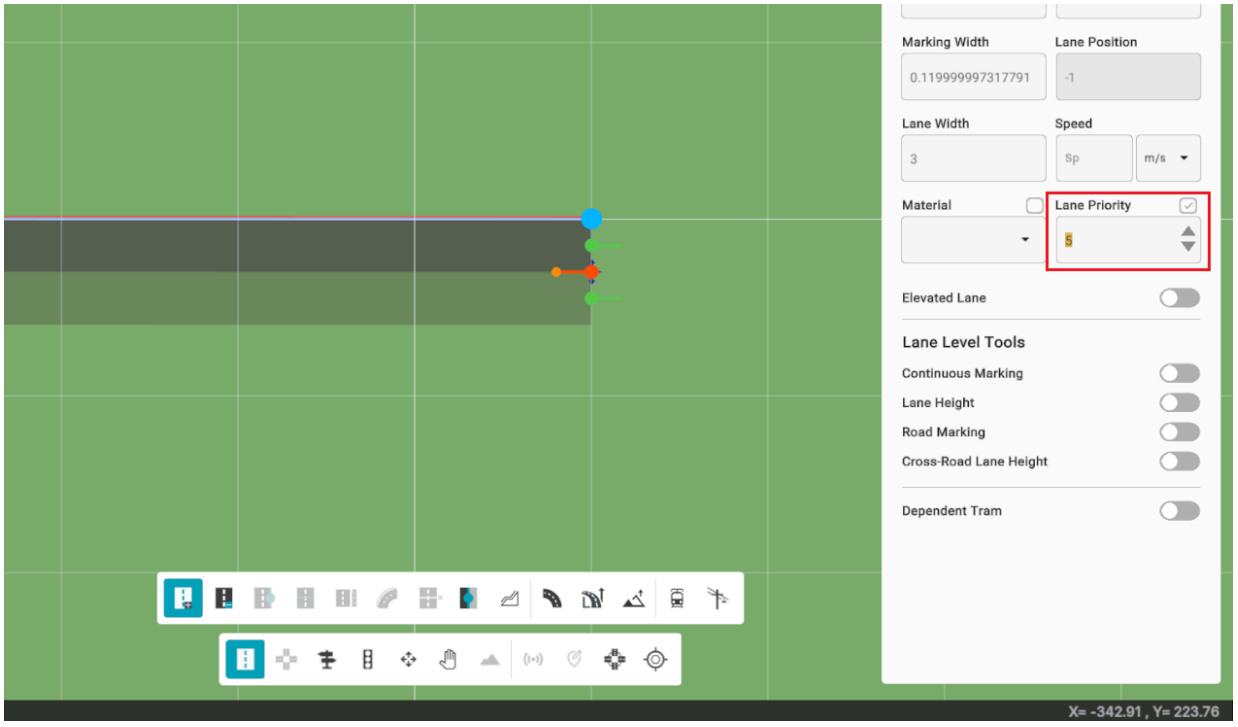
- Selecting the right lane defines (-1) value to the selected lane.



According to above information, it is obvious that there are no gaps between adjacent lanes. However, it is possible to define lanes which shall not be used by vehicles or other road users, as discussed in above section.

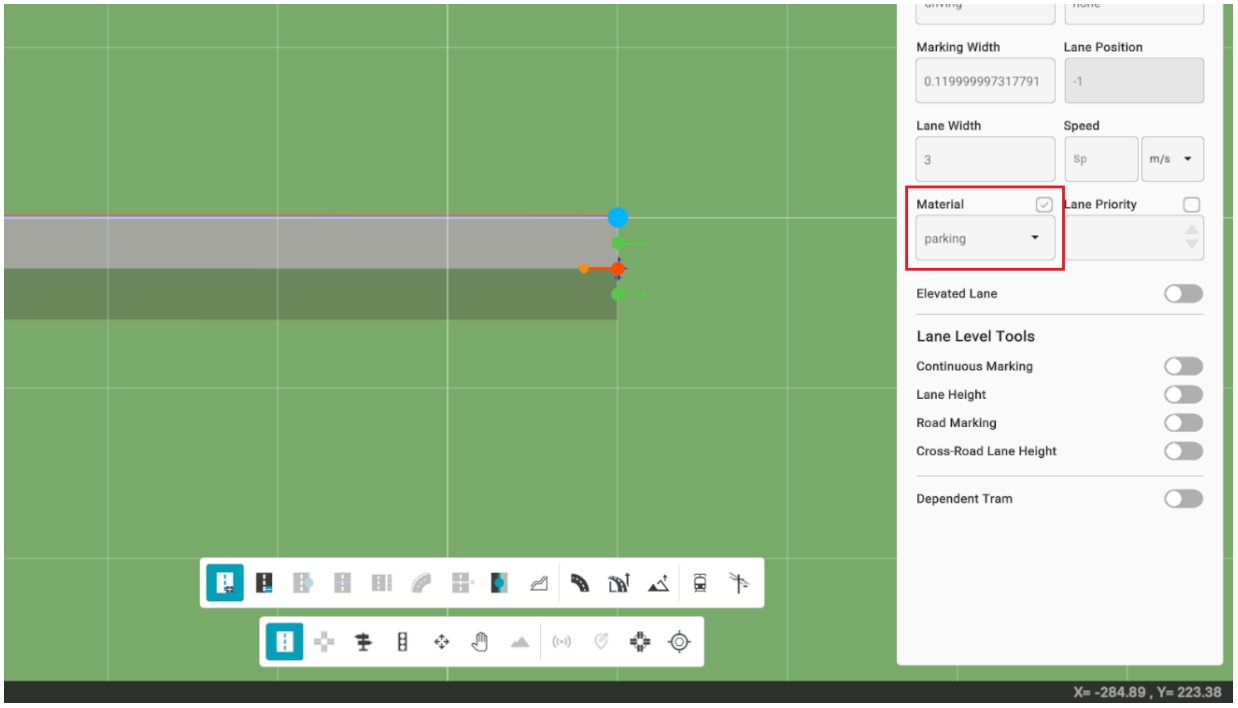
5.4.12 Lane Priority

This feature defines the priority level of a lane, which can be used to indicate right-of-way rules at intersections and influence traffic behavior in simulations or routing logic.



5.4.13 Material

This feature defines the material applied to lanes in the map, allowing for visual differentiation and representation of surface types such as asphalt, concrete, or custom textures.



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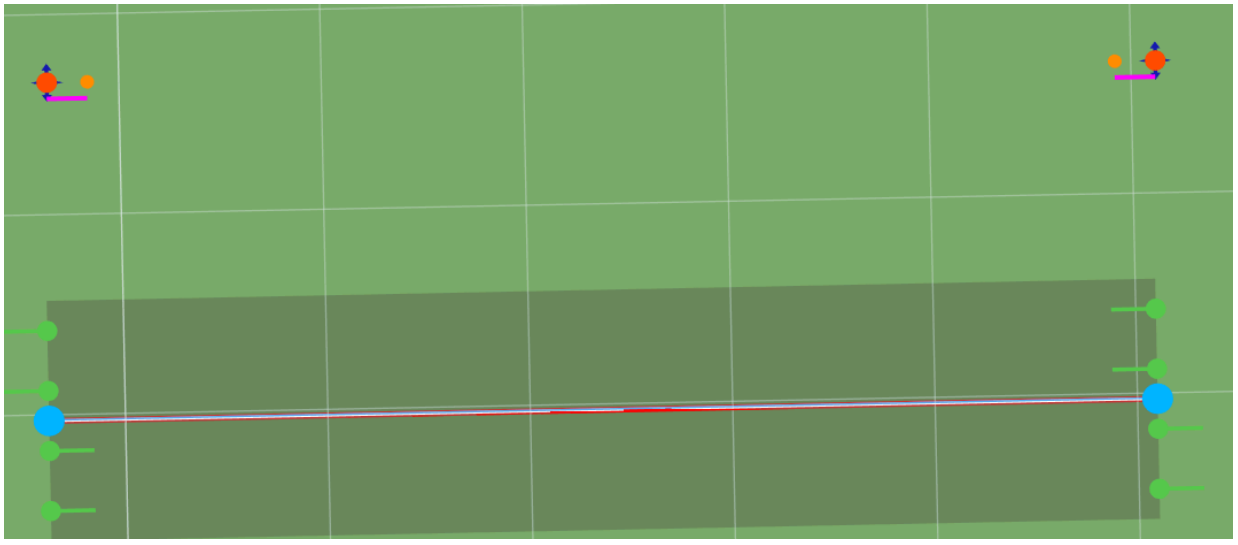
5.5 Miscellaneous

Rotation Behavior in Different Views (Alt + Left Click)

When rotating the view using **Alt + Left Mouse Button**, the scene temporarily enters a **3D viewing mode**.
In this mode, the **road anchors (green/blue dots)** may appear **above the road surface or shifted** visually.
However, these anchors remain **logically connected** to the lane geometry — their actual position on the road does not change.



Why this happens
- The rotation only affects the **camera perspective**, not the lane geometry.
- In 2D mode, RepliMap provides a **temporary 3D tilt** for better visual inspection, but not for editing.
- Anchors are drawn in screen space and may appear lifted or offset during this temporary rotation.

Important notes
- Editing actions like **extending roads, placing objects, or moving anchors** are **disabled** while using this temporary 3D view.
- Once the user **releases the Alt key**, the view resets to the **default 2D projection**, where anchor alignment is restored.

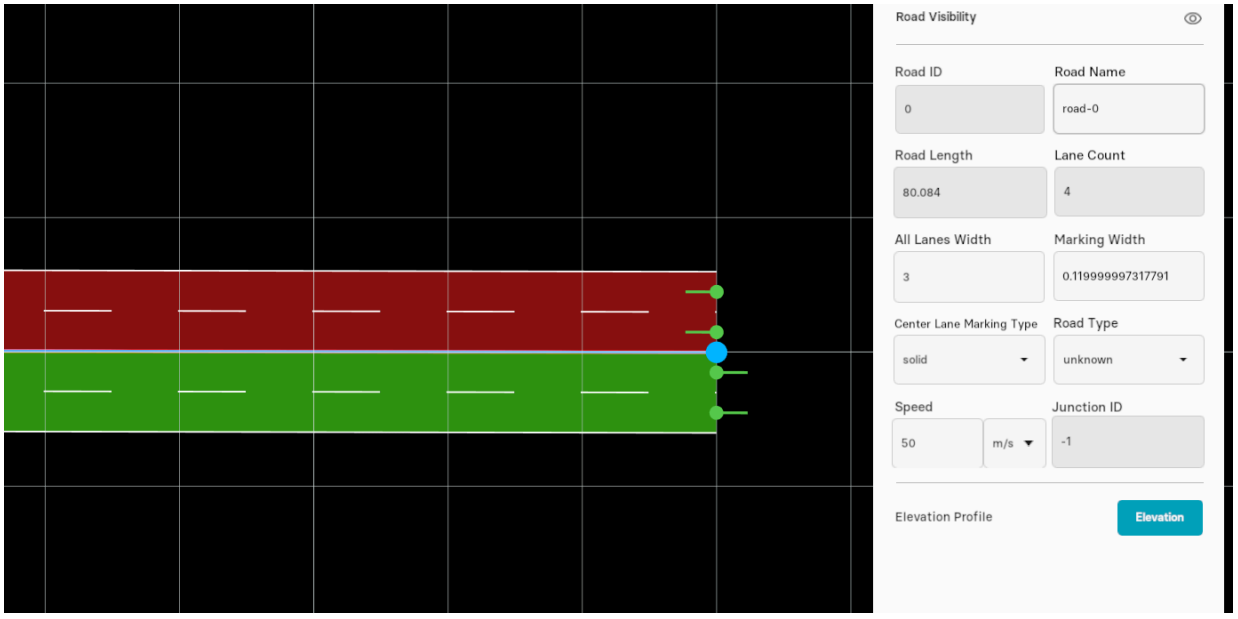
Recommended workflow
- Use the **temporary 3D tilt** only to check road slopes, alignments, or junction geometry visually.
- To perform edits, **switch back to 2D mode** (release Alt) — this ensures precision for all anchor-based operations.

Tip: For continuous 3D editing, switch to the dedicated **3D view mode** from the Road Properties panel.

5.5.1 Clicks

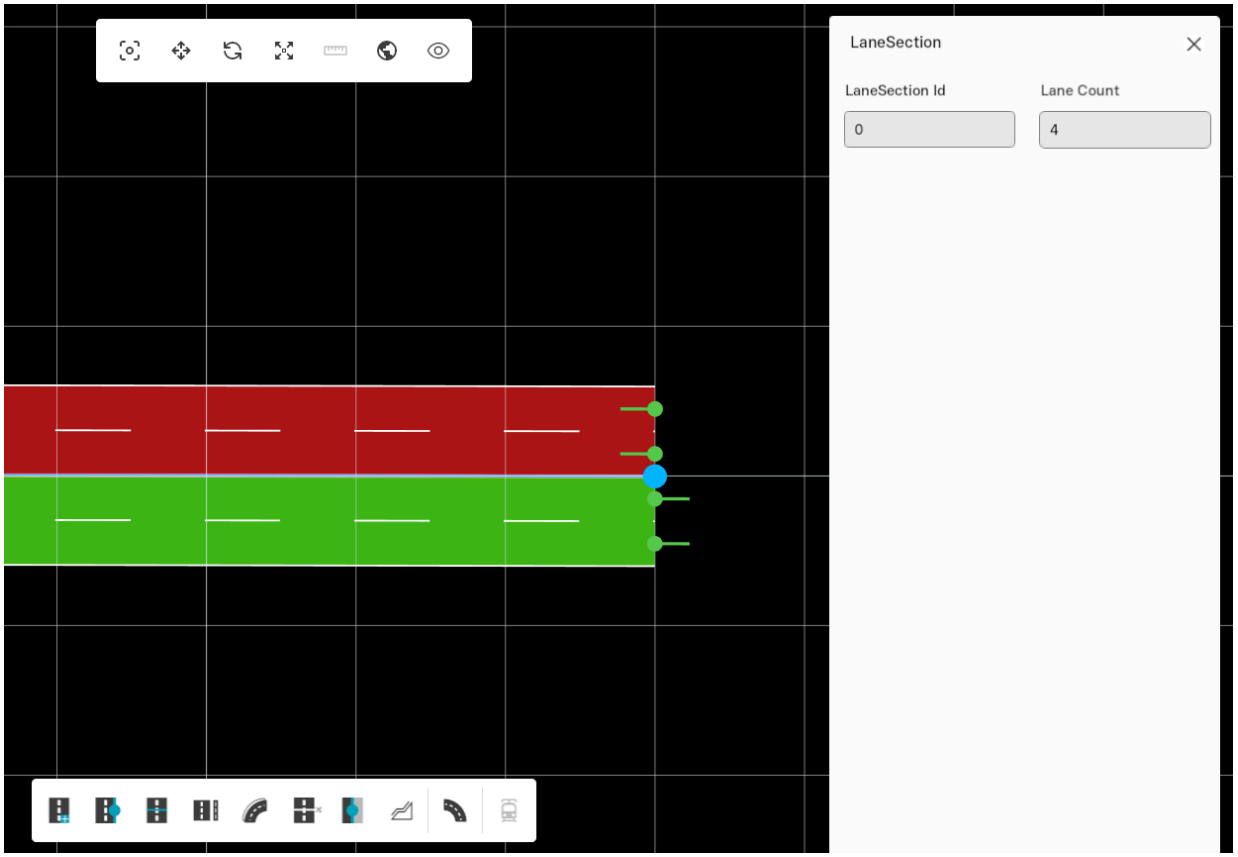
Single Click

Once you have created a road on the map, press left-mouse button once on the road to select the road and its anchor points. Click at any point on the main window to deselect the specified road.



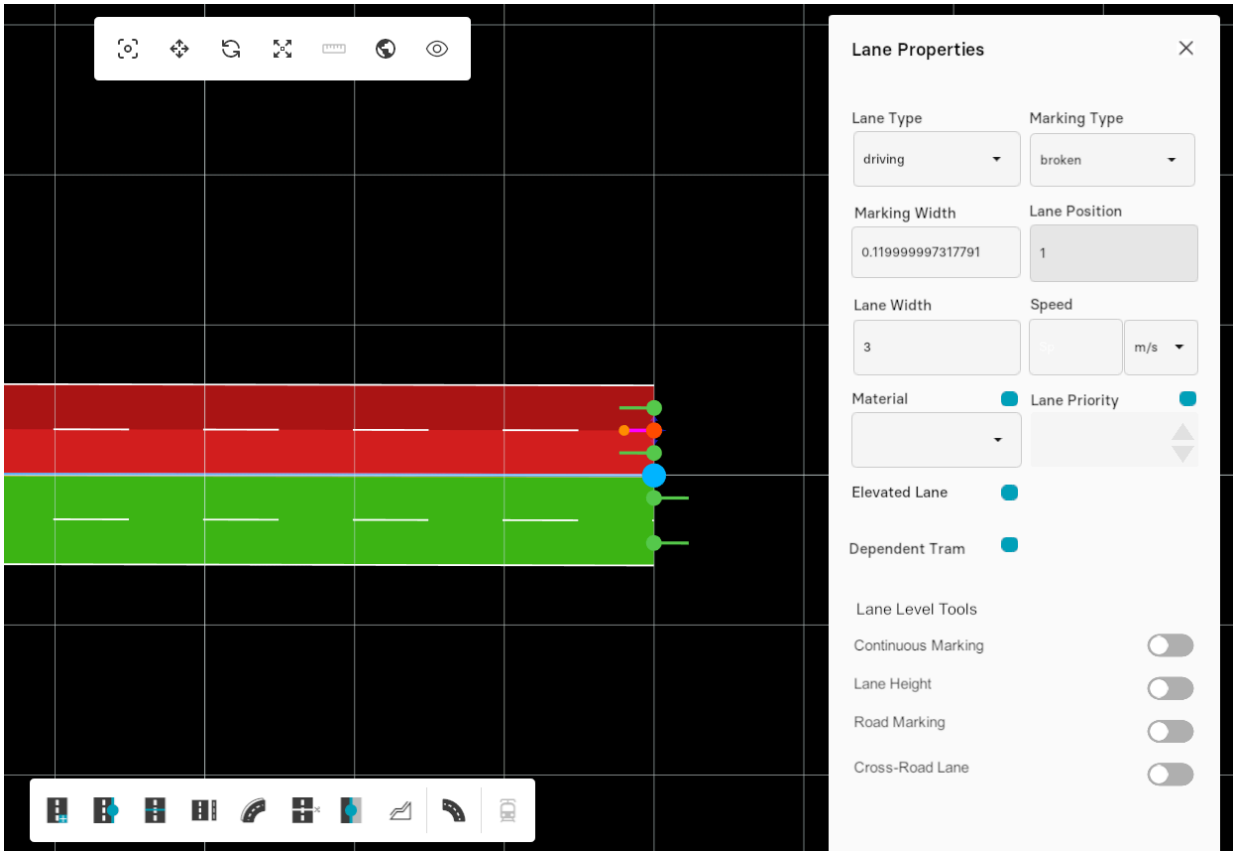
Double Click

By doucle-click left-mouse button on the road, all parameters related to lane section appears at the rightside of the map-editor window as illustrated in *figure* below.



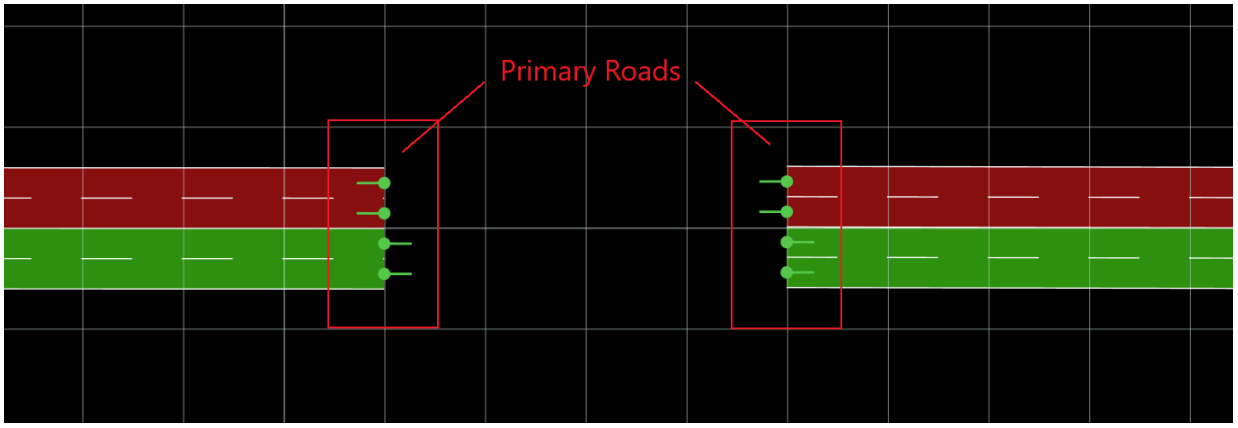
Triple Click

To select a particular lane from the specified road, press triple-click left-mouse button on that lane. Click once at any point on the main window to deselect it.

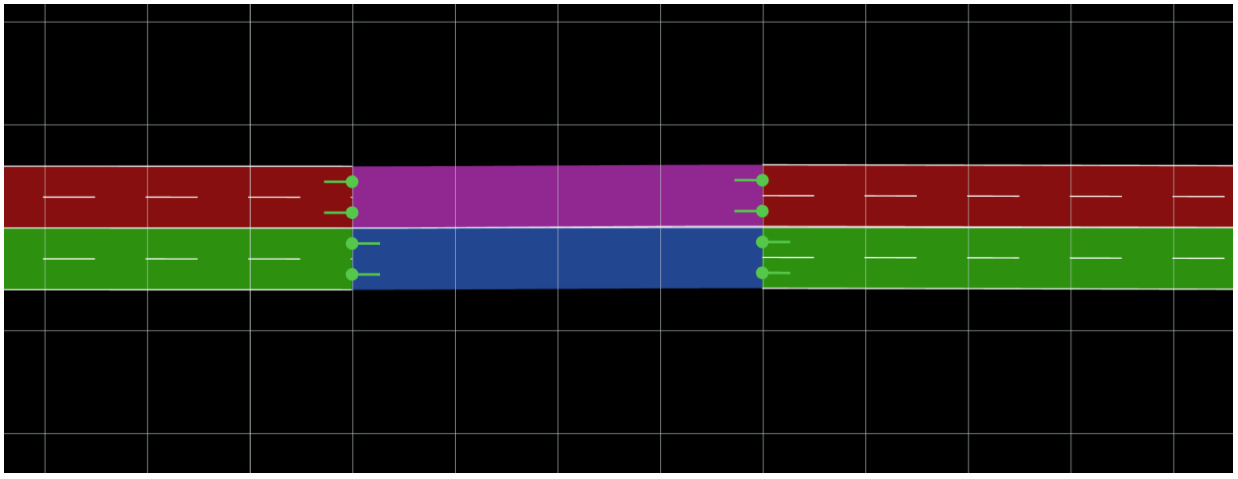


5.5.2 Road Connections

A road linkage is created between two separate primary roads, first one with outward slots is served as *incoming road* and other with inward slots as *outgoing road*.

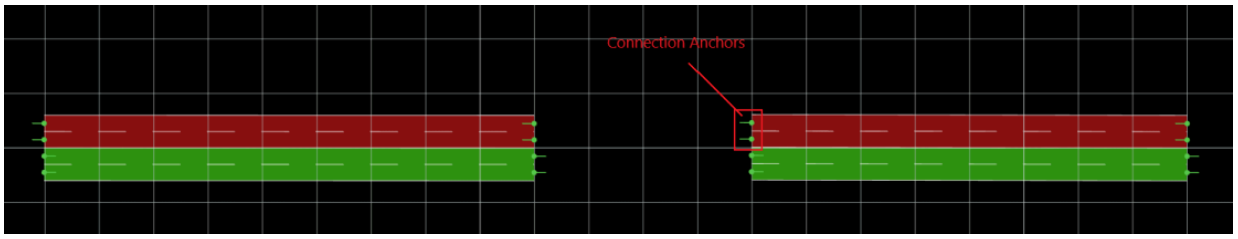


A connecting road (*blue colored*) is created between two primary roads.

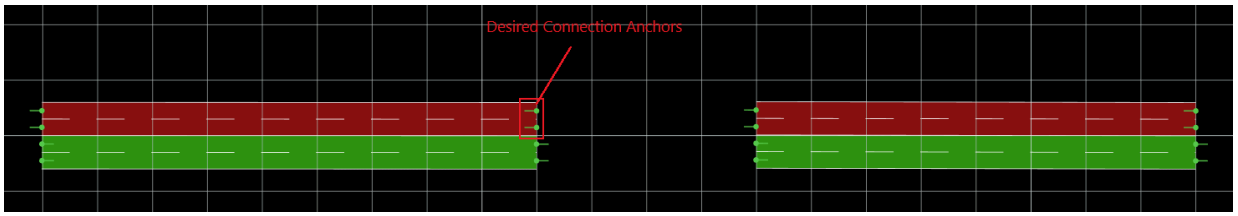


Follow the steps below to create a connection between two single roads:

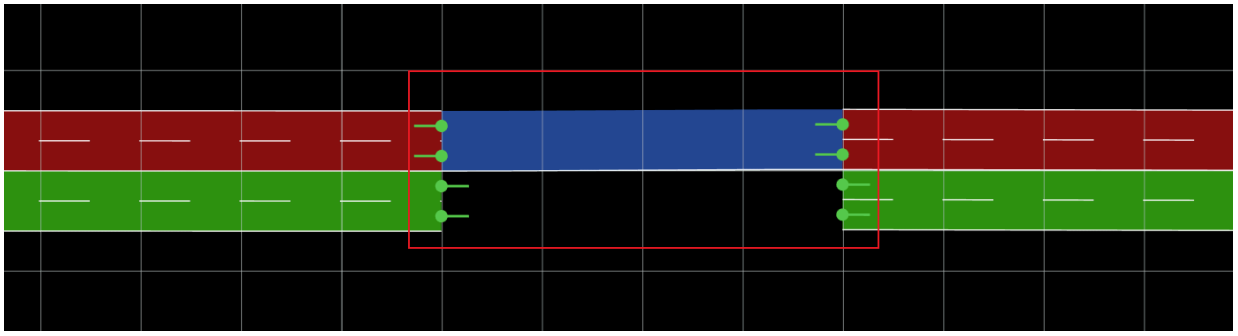
- Thus, add two different roads in your map or select the existing roads.
- Simply, click on *"green"* outward slot of first primary road. Note that you need to click on the slot of the lane nearest to the reference line of this road.



- Now, move your cursor towards other primary road and click on the slot of desired lane.



- By doing this, a new connecting road appears as a link between those two roads making a **Multiple lanes connection**. Ensure discretion when creating roads with connection anchors, as detailed in Creating Connection Roads.



5.5.3 Creating Connecting Roads

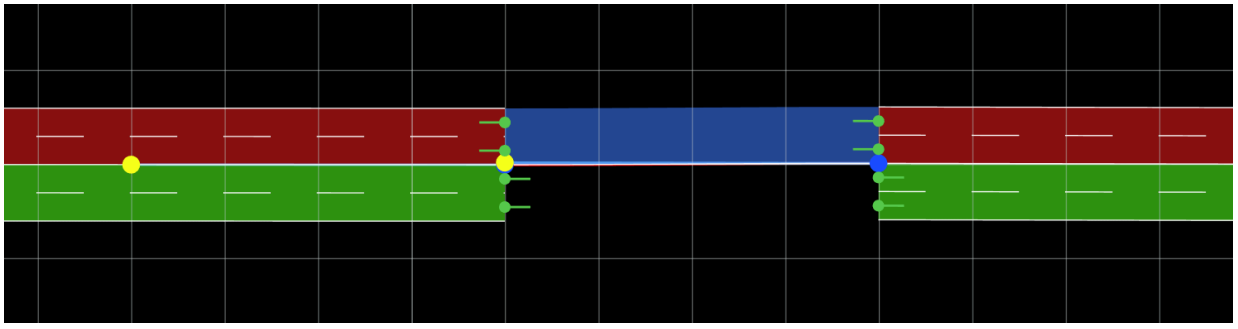
```
In order to create a an all-lane connection, click on outward "green" slot of incom
```

```
Road pairs can also be formed by focusing on the edge-most connection anchor of the
```

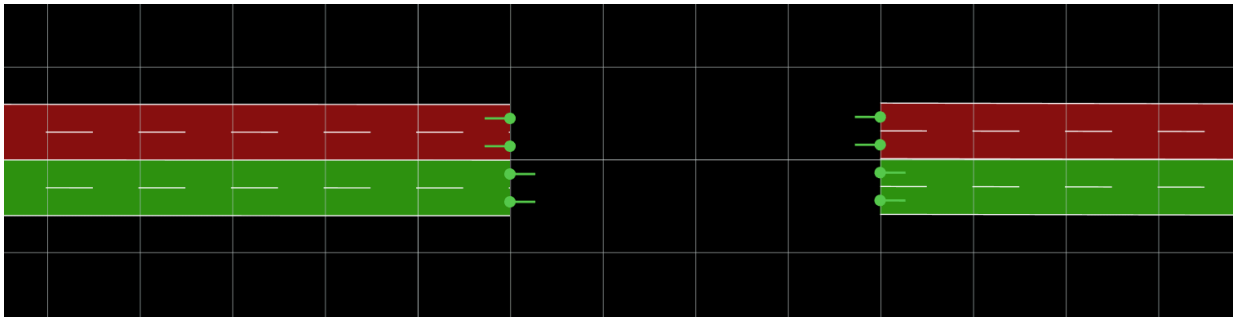
```
Hold "L" from your keyboard to create single lane connections except for right-most
```

Delete Connecting Roads

```
Go to toolbar and select the "Select Road" tool. Now, move your cursor towards the c
```

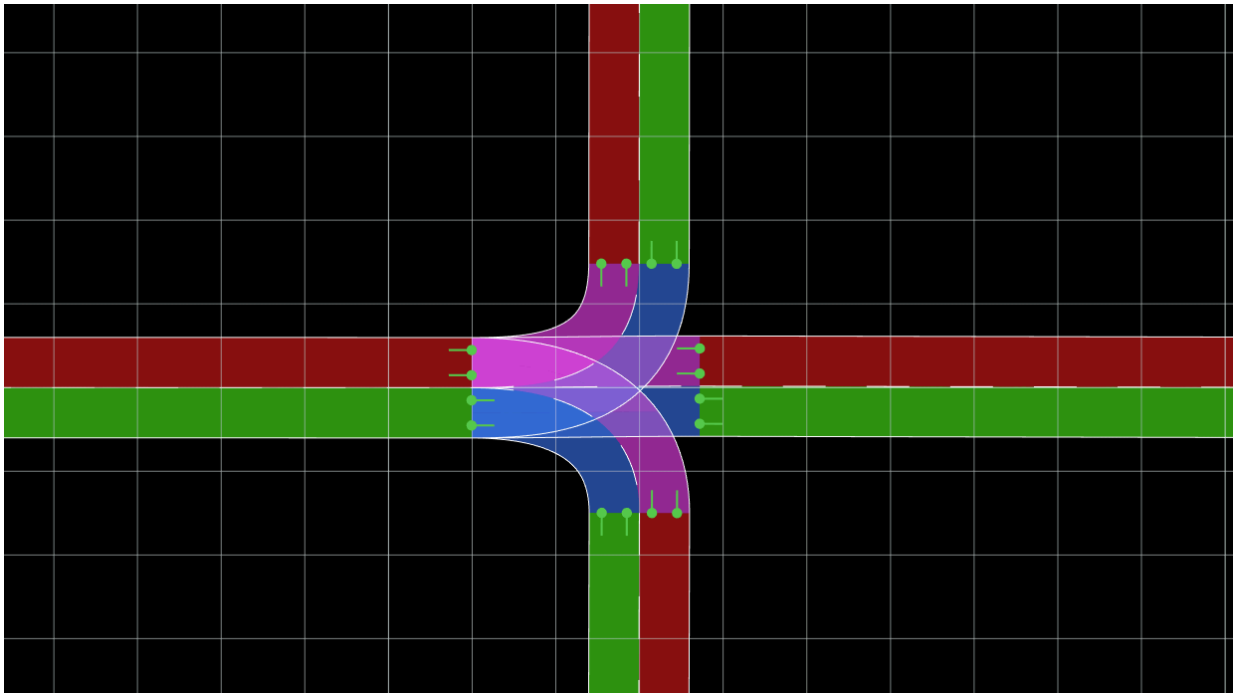


```
Once the connecting road is selected, you can click the "del" button on your keyboar
```



Junctions

Junctions consist of a connection matrix which indicates all possibilities to enter a connecting road from a given *incoming road*. As illustrated in the figure given below, all these connecting roads are sharing a single primary road that forms a single junction.



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