RWR 4015

Traffic Simulation for Planning Applications

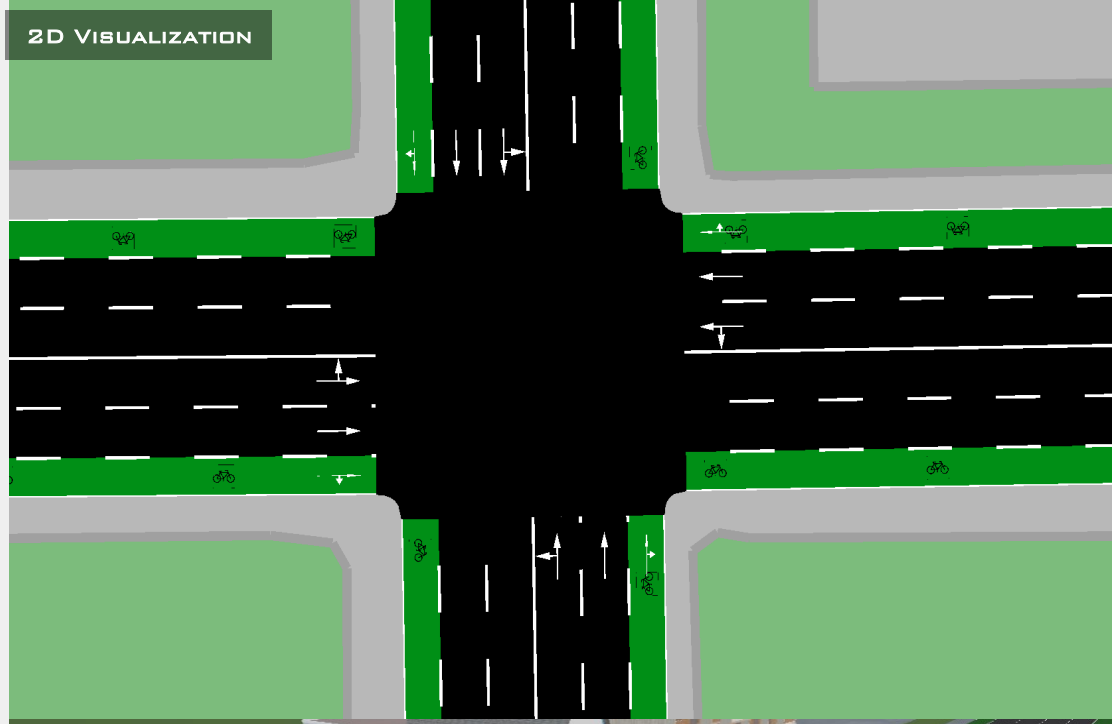
Dr. Ahmad Mohammadi

Week 11 | Hands-on:
3D Simulation in Planning II

Fall 2026

RoadwayVR

roadwayvr.github.io/TrafficSimulationforPlanningApplications



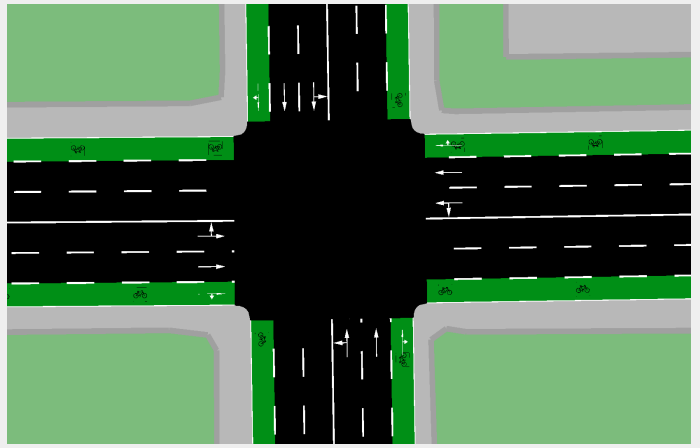
Scenario 3: (Bicycle, Scooter)

1. Create Road Network

2. Run Sumo2Unity Integration

3. Generate Performance Functions

1



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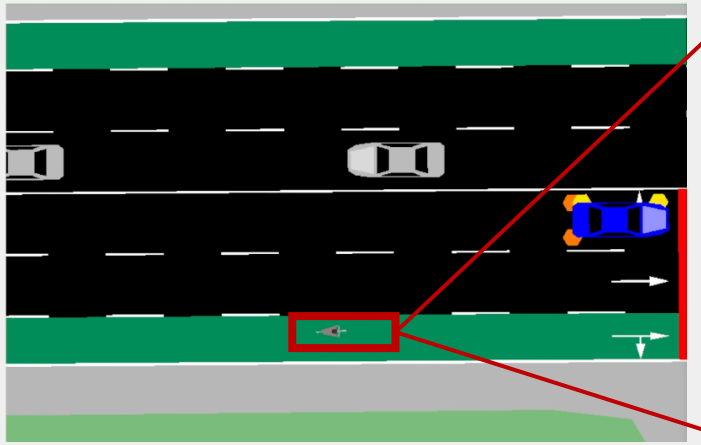
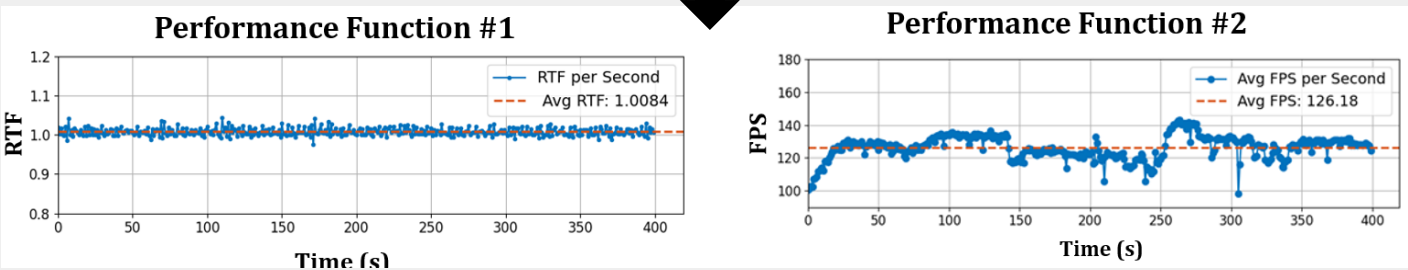


3



Step 1: Create Road Network

1.1. SUMO Steps

A) Adding Lane

B) Adding Terrain

C) Adding Roadside

D) Adding Residential

E) Adding Wood

1.2. Unity Steps

F) Import SUMO Road Network

G) Road Marking As Decals: Stamp an image on a 3D model

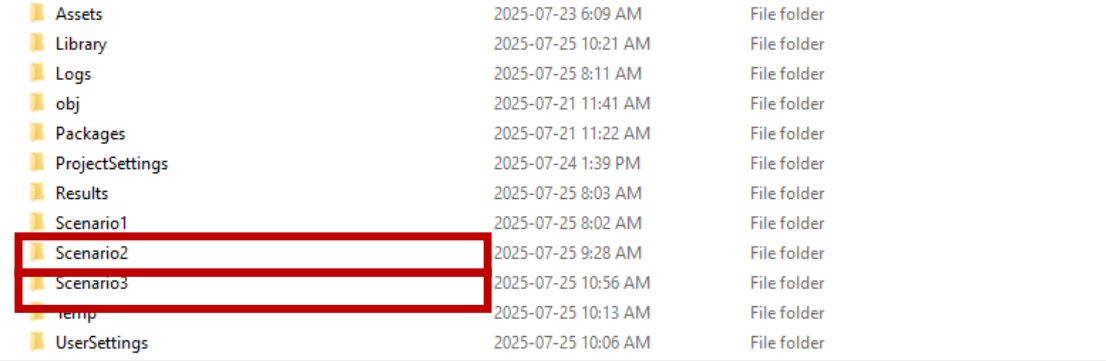
H) Add Stop Signs, and Navigation Arrow

I) Add Trees, Buildings, and Road Signs

Step 1. Create Road Network

SUMO Steps:

- ❑ **Note: We use Scenario 2 files for demonstrating**

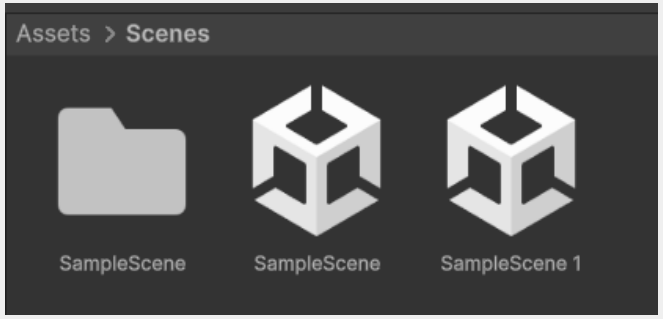


Copy and Paste Scenario 2 and name it Scenario 3

Unity Steps:

- ❑ **Note: Create a Scene "Scenario3"**

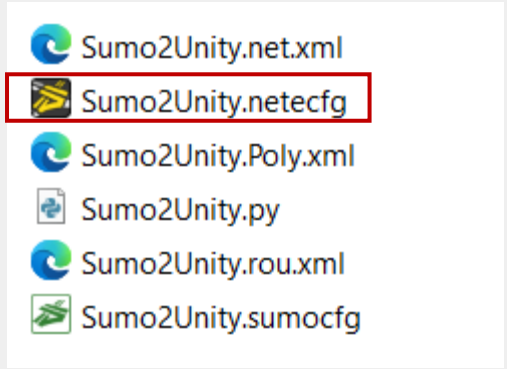
- ❑ **Project Window → Scenes → Duplicate Scenario2 (Ctrl + D) → Name it Scenario3**



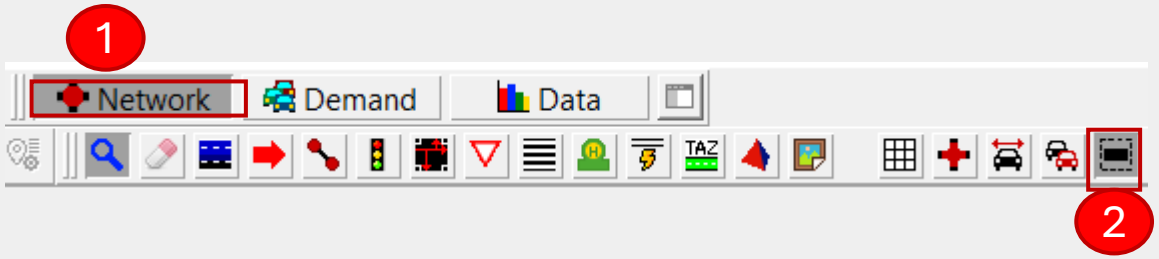
Step 1: Create Road Network

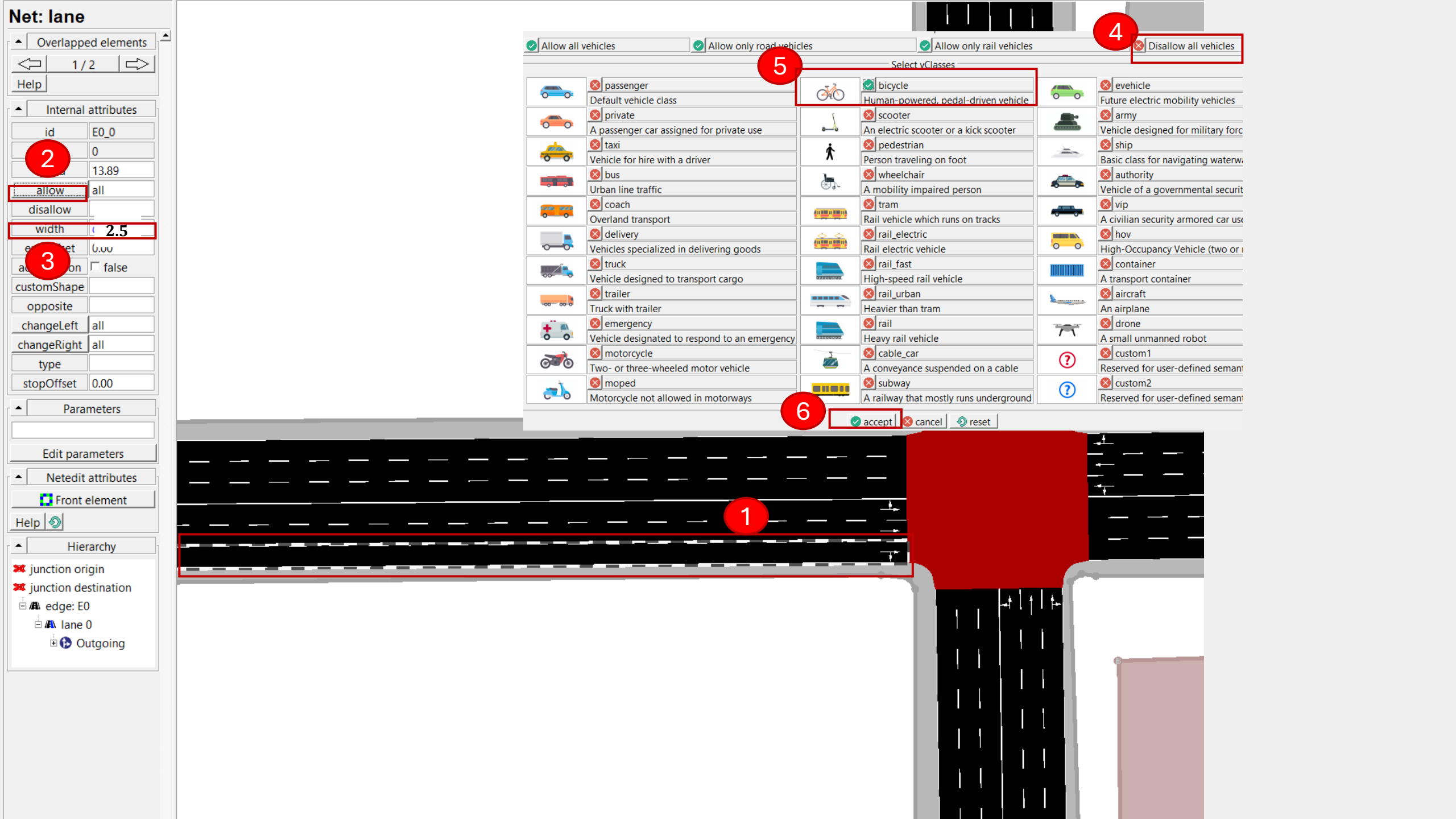
A) Adding Lanes

❑ Scenario3→Open Sumo2Unity.netecfg →



❑ Select “Lane”

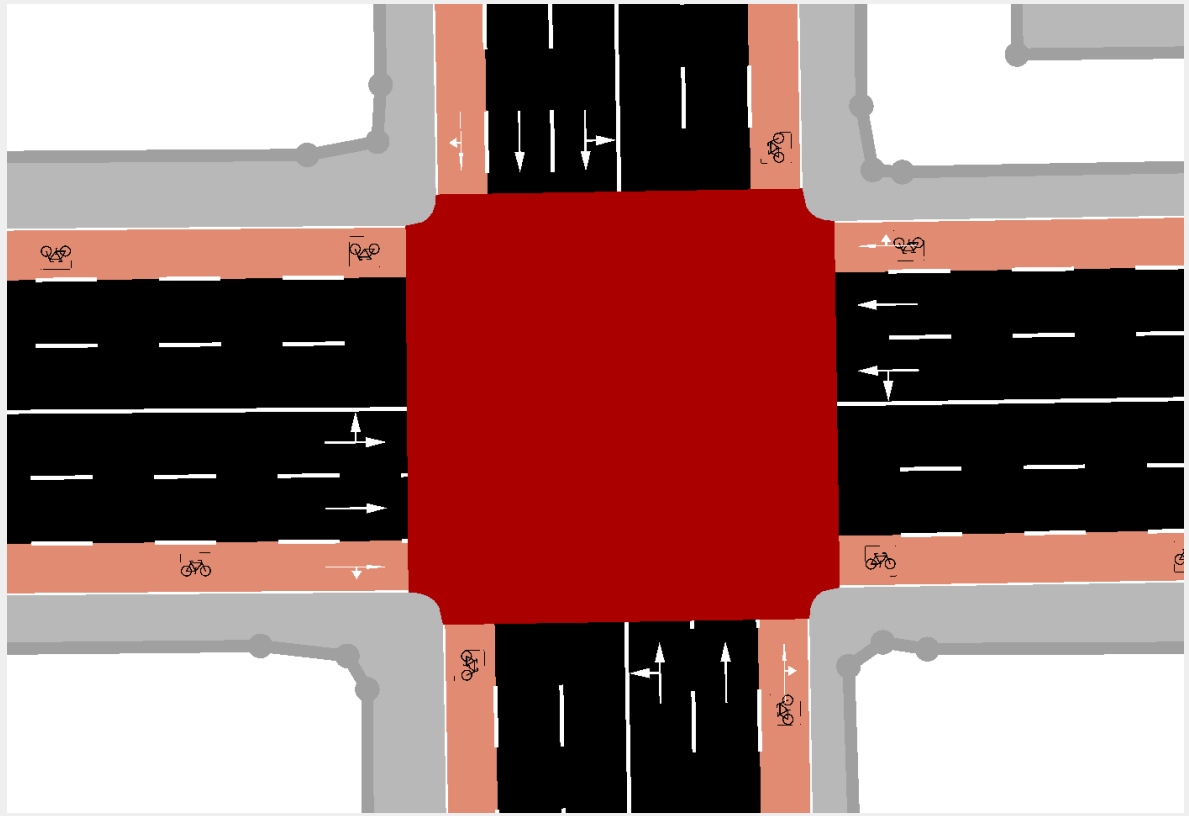



Net: lane
Overlapped elements
1 / 2
Help
Internal attributes
id
E0_0
0
13.89
allow
all
disallow
width
2.5
false
customShape
opposite
changeLeft
all
changeRight
all
type
stopOffset
0.00
Parameters
Edit parameters
Netedit attributes
Front element
Help
Hierarchy
junction origin
junction destination
edge: E0
lane 0
Outgoing
Allow all vehicles
Allow only road vehicles
Allow only rail vehicles
Disallow all vehicles
Select vClasses
passenger
Default vehicle class
bicycle
Human-powered, pedal-driven vehicle
evehicle
Future electric mobility vehicles
private
A passenger car assigned for private use
scooter
An electric scooter or a kick scooter
army
Vehicle designed for military forc
taxi
Vehicle for hire with a driver
pedestrian
Person traveling on foot
ship
Basic class for navigating waterw
bus
Urban line traffic
wheelchair
A mobility impaired person
authority
Vehicle of a governmental securit
coach
Overland transport
tram
Rail vehicle which runs on tracks
vip
A civilian security armored car us
delivery
Vehicles specialized in delivering goods
rail_electric
Rail electric vehicle
hov
High-Occupancy Vehicle (two or
truck
Vehicle designed to transport cargo
rail_fast
High-speed rail vehicle
container
A transport container
trailer
Truck with trailer
rail_urban
Heavier than tram
aircraft
An airplane
emergency
Vehicle designated to respond to an emergency
rail
Heavy rail vehicle
drone
A small unmanned robot
motorcycle
Two- or three-wheeled motor vehicle
cable_car
A conveyance suspended on a cable
custom1
Reserved for user-defined seman
moped
Motorcycle not allowed in motorways
subway
A railway that mostly runs underground
custom2
Reserved for user-defined seman
accept
cancel
reset
1
2
3
4
5
6

Step 1: Create Road Network

A) Adding Lanes

- ❑ Assing bike lane for all directions
- ❑ Processing → Compute Junctions



Step 1: Create Road Network

1.2. Unity Steps

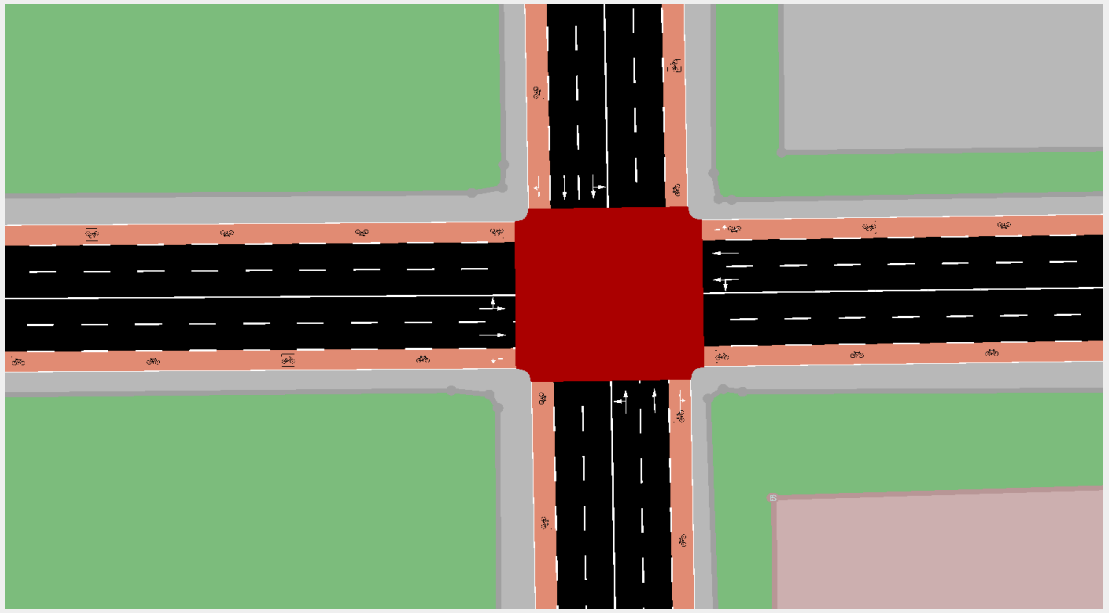
F) Import SUMO Road Network

G) Road Marking As Decals: Stamp an image on a 3D model

Step 1: Create Road Network

F) Import SUMO Road Network

- ❑ **Note: Open Scene "Scenario3"**
- ❑ Remove Existing GameObject "RoadNetworkRoot"
- ❑ Sumo2Unity → 1. Create Road Network → Set Sumo Files Folder as Directory\SUMO2Unity\Scenario3 → Start



Step 1: Create Road Network

G) Road Marking As Decals: Stamp an image on a 3D model

- ❑ Fix Road Marking

Step 1: Create Road Network

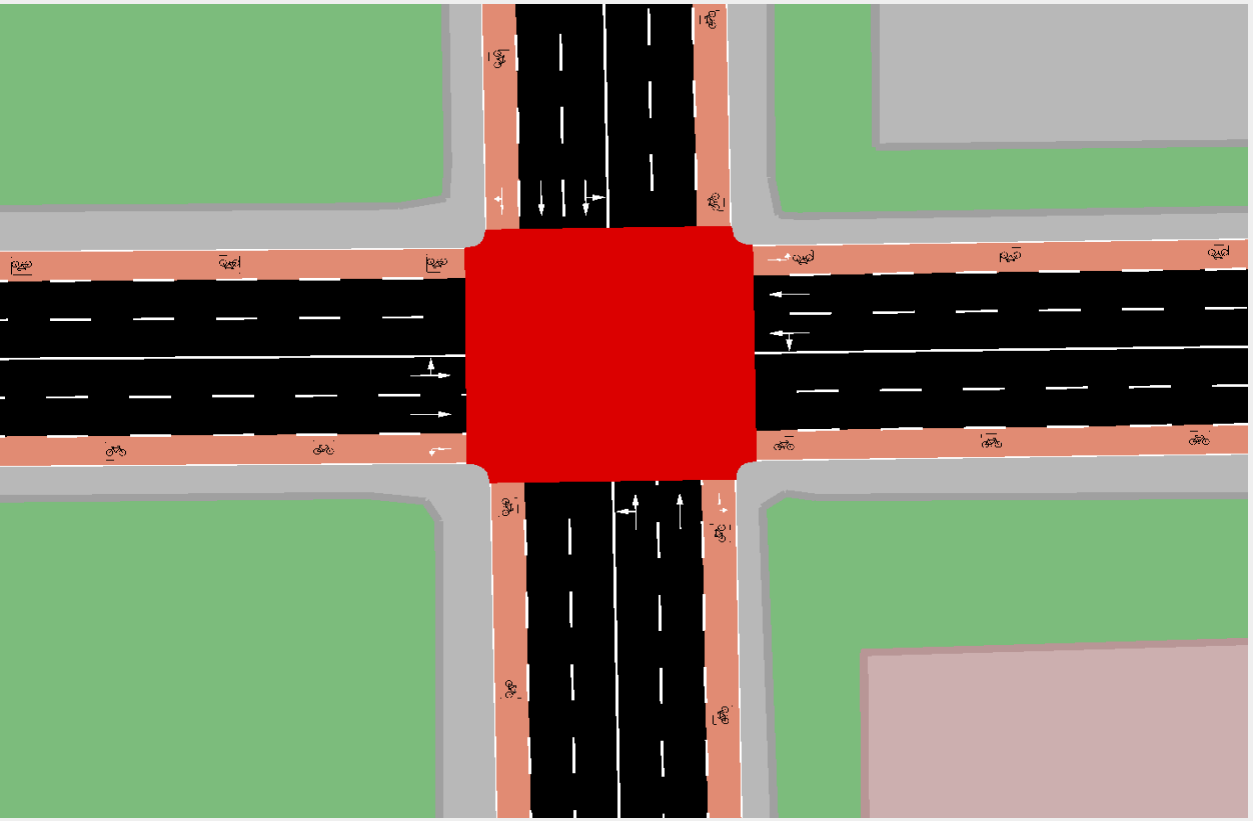
G) Road Marking As Decals: Stamp an image on a 3D model

- ❑ Add Decal Bike Lane
- ❑ Hierarchy Window → Rendering → URP Decal Projector
- ❑ Inspector Window → Material → BikeLane-Decal

Step 1: Create Road Network

G) Road Marking As Decals: Stamp an image on a 3D model

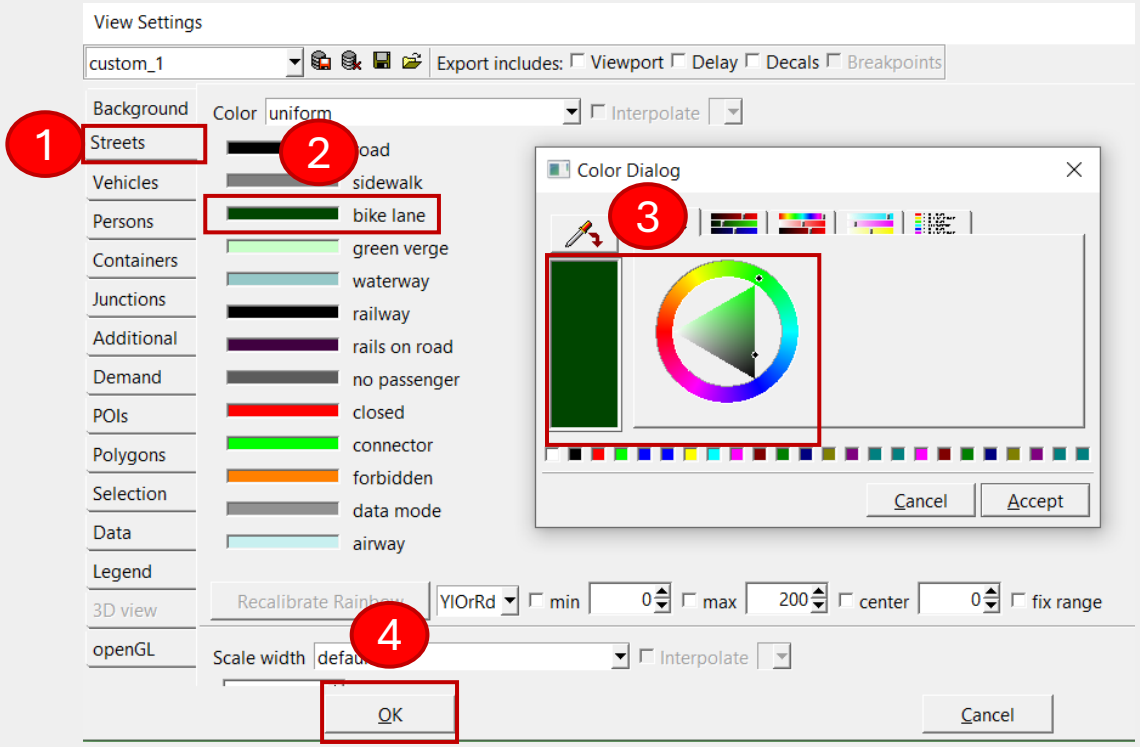
- ❑ Add orange Material to Bike Lane
- ❑ Project Window → Materials → Drag and Drop BikeLaneMaterial into each Bike Lane

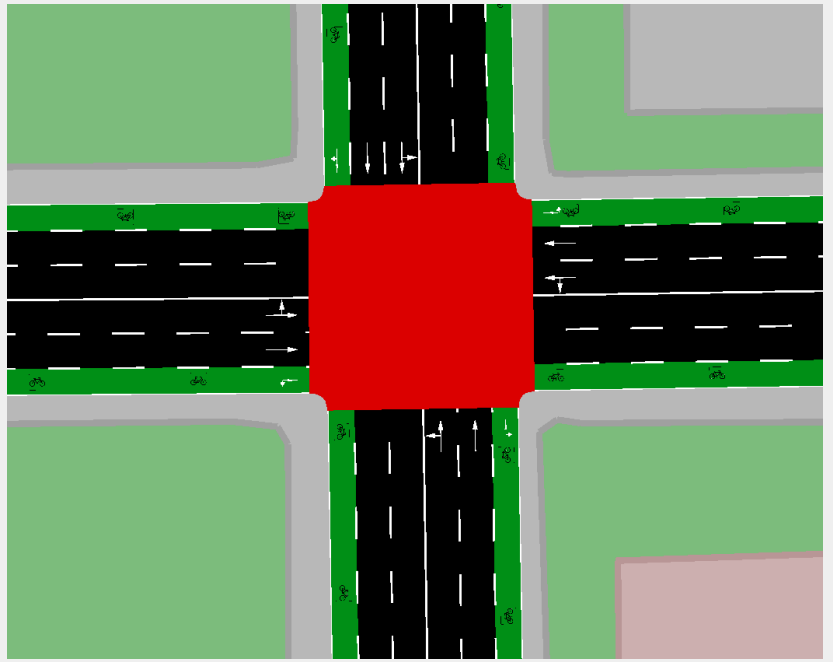


Step 1: Create Road Network

G) Road Marking As Decals: Stamp an image on a 3D model

- ❑ It is better to Change the color of Bike Lanes to Green
- ❑ In SUMO: Edit→ Edit Visualization → Streets → bike lane → Project Window → Materials → Drag and Drop BikeLaneMaterial into each Bike Lane

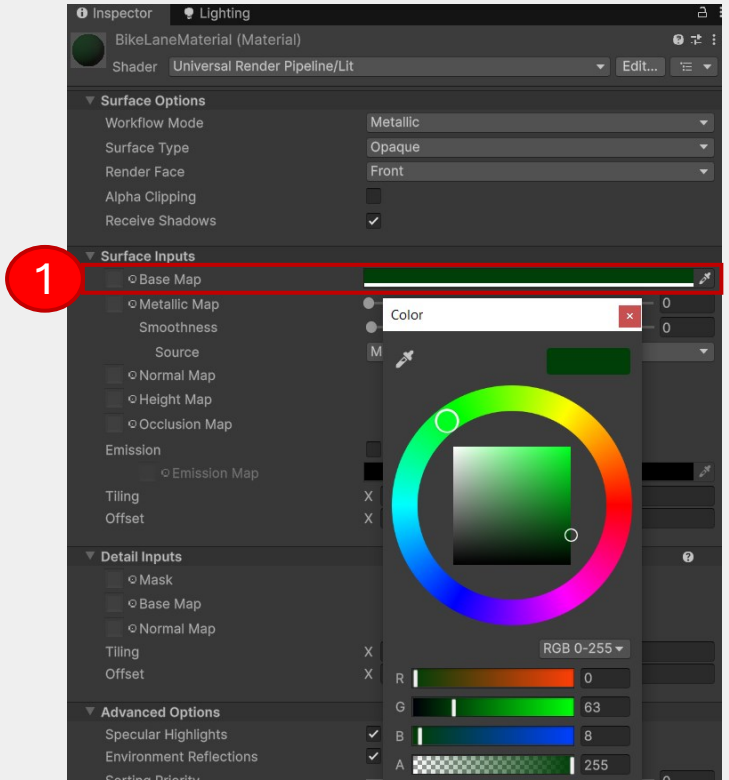




Step 1: Create Road Network

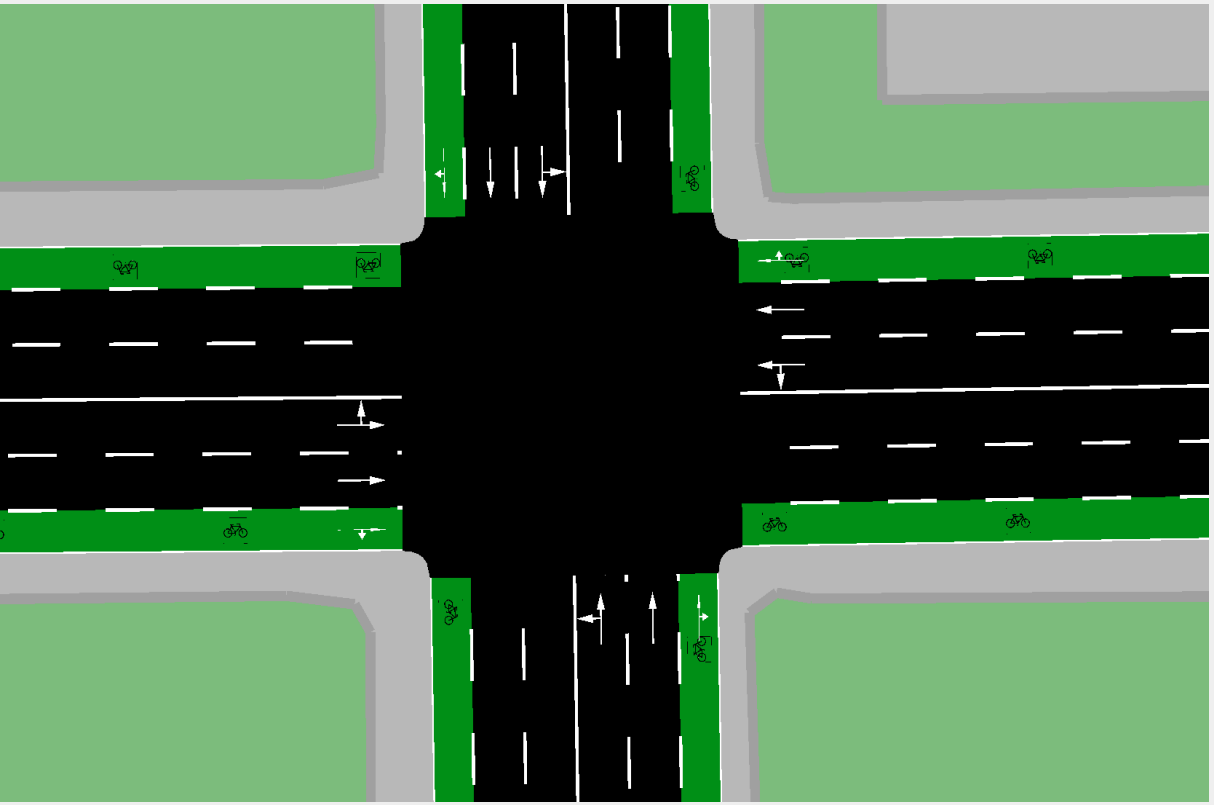
G) Road Marking As Decals: Stamp an image on a 3D model

- ❑ It is better to Change the color of Bike Lanes to Green
- ❑ In Unity: Project Window → Materials → Select BikeLaneMaterial → Inspector window → BaseMapColor to Green



Step 1: Create Road Network

- ❑ This is Final Result



Step 2: Run Sumo2Unity integration

2.1. SUMO Steps

A) Add Ego Bike:

A.1. Create Vehicle Type for EgoBike

A.2. Add Vehicle To Network

B) Add Traffic Volume

B.1. Create Vehicle Types for Traffic Cars

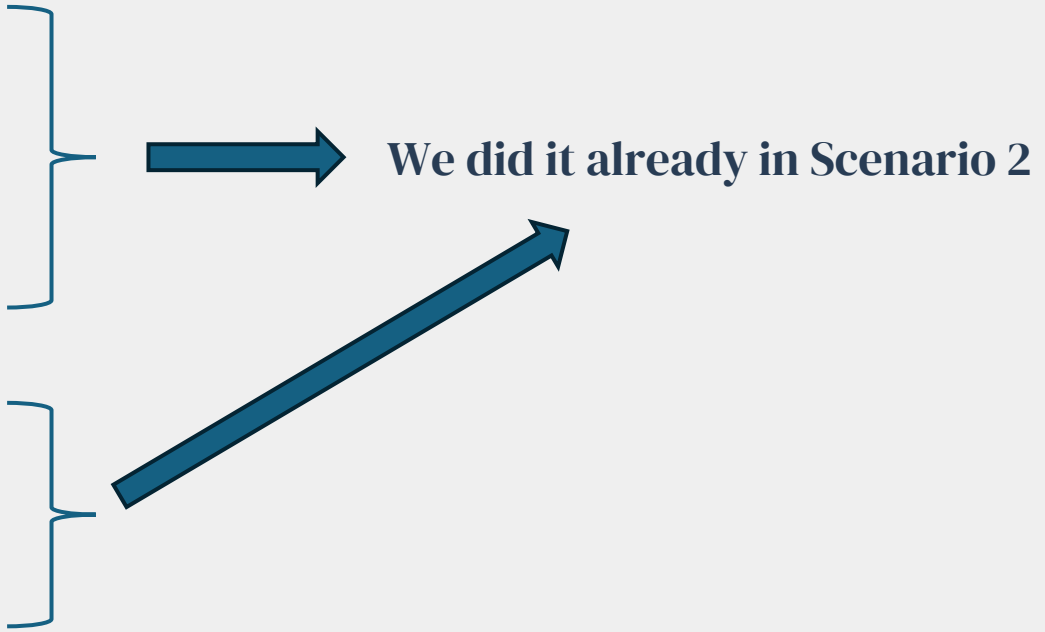
B.2. Add Vehicle To Network

C) Assign Ego Bike and Traffic Volume in Unity

D) Prepare and Run Python Code (Sumo2Unity.py)

E) Add Traffic Lights in SUMO

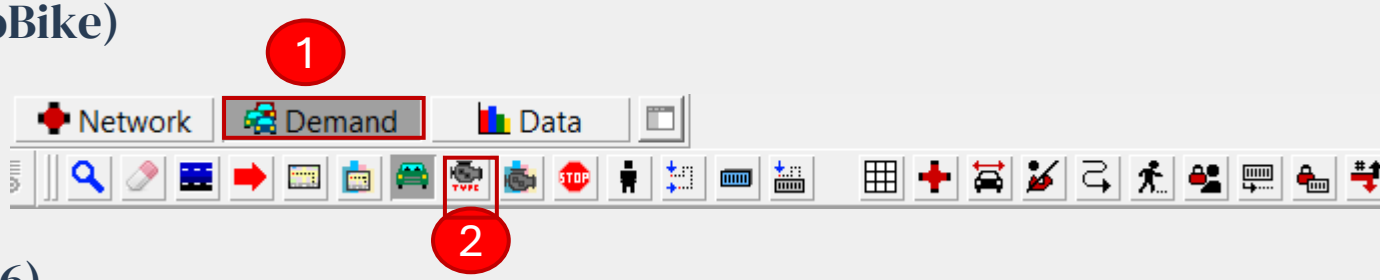
F) Add Traffic Light in Unity

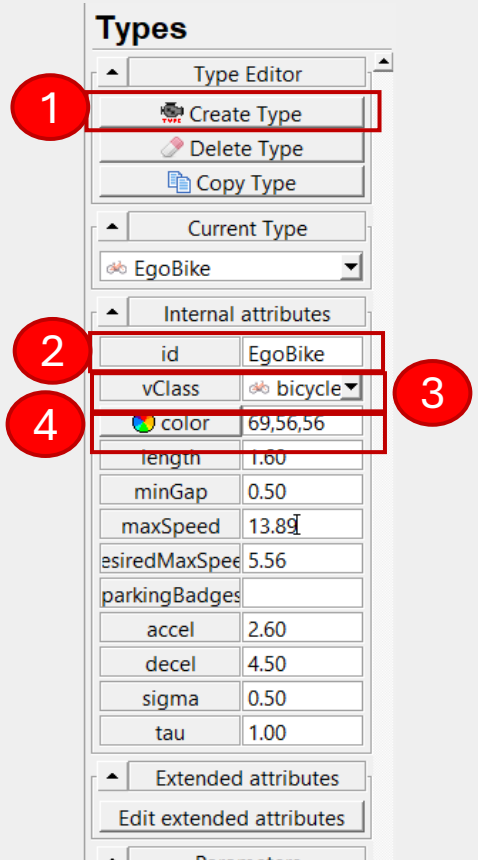


Step 2: Run Sumo2Unity integration

A) Add Ego Bike (A.1. Create Vehicle Type for EgoBike)

- ❑ UI → Demand → Select “Creating Vehicles”
- ❑ Create vehicle types EgoBike (Black) (69,56,56)
- ❑ See image
- ❑ File → Demand Element → Save Demand Element

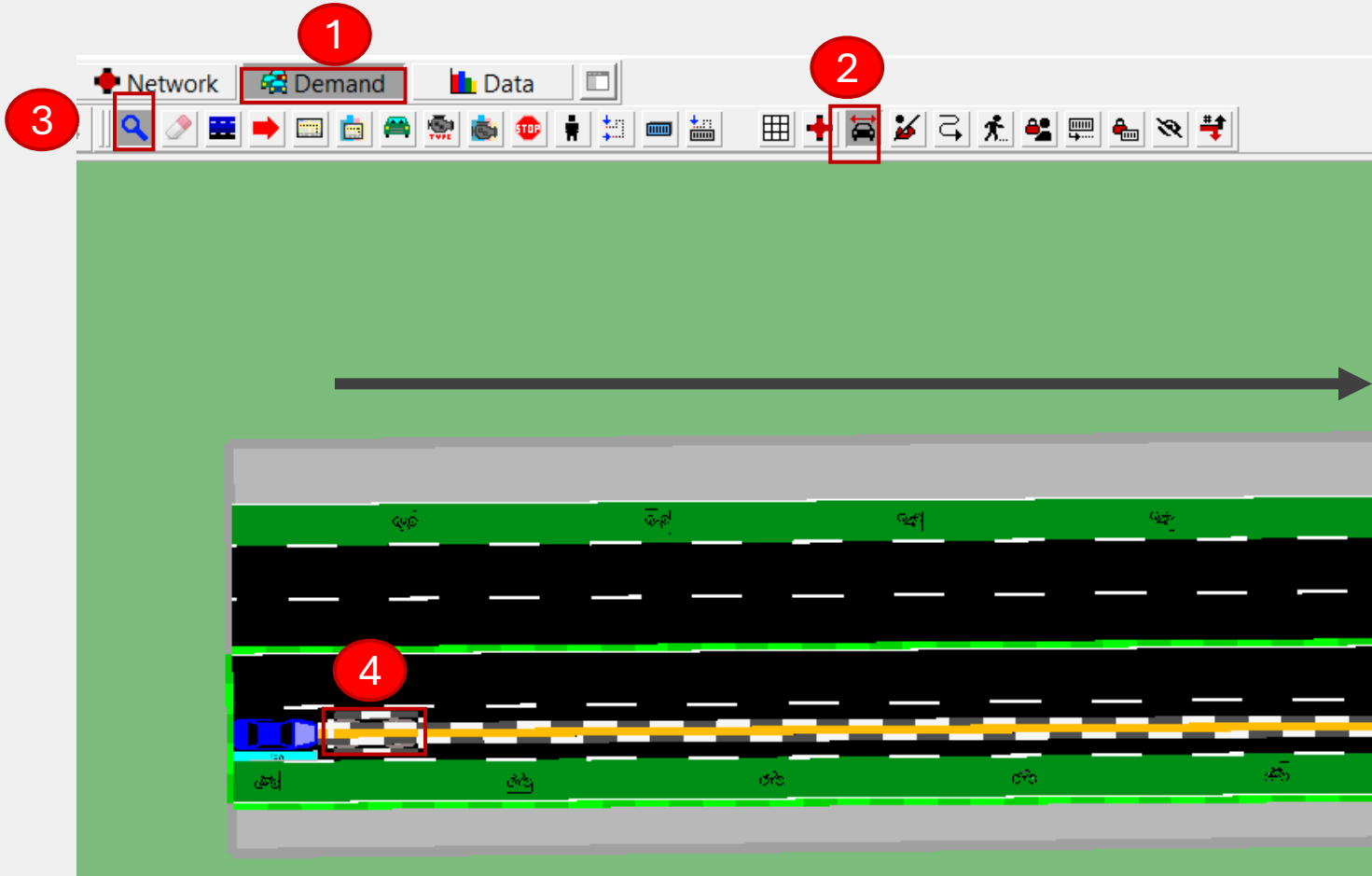




Step 2: Run Sumo2Unity integration

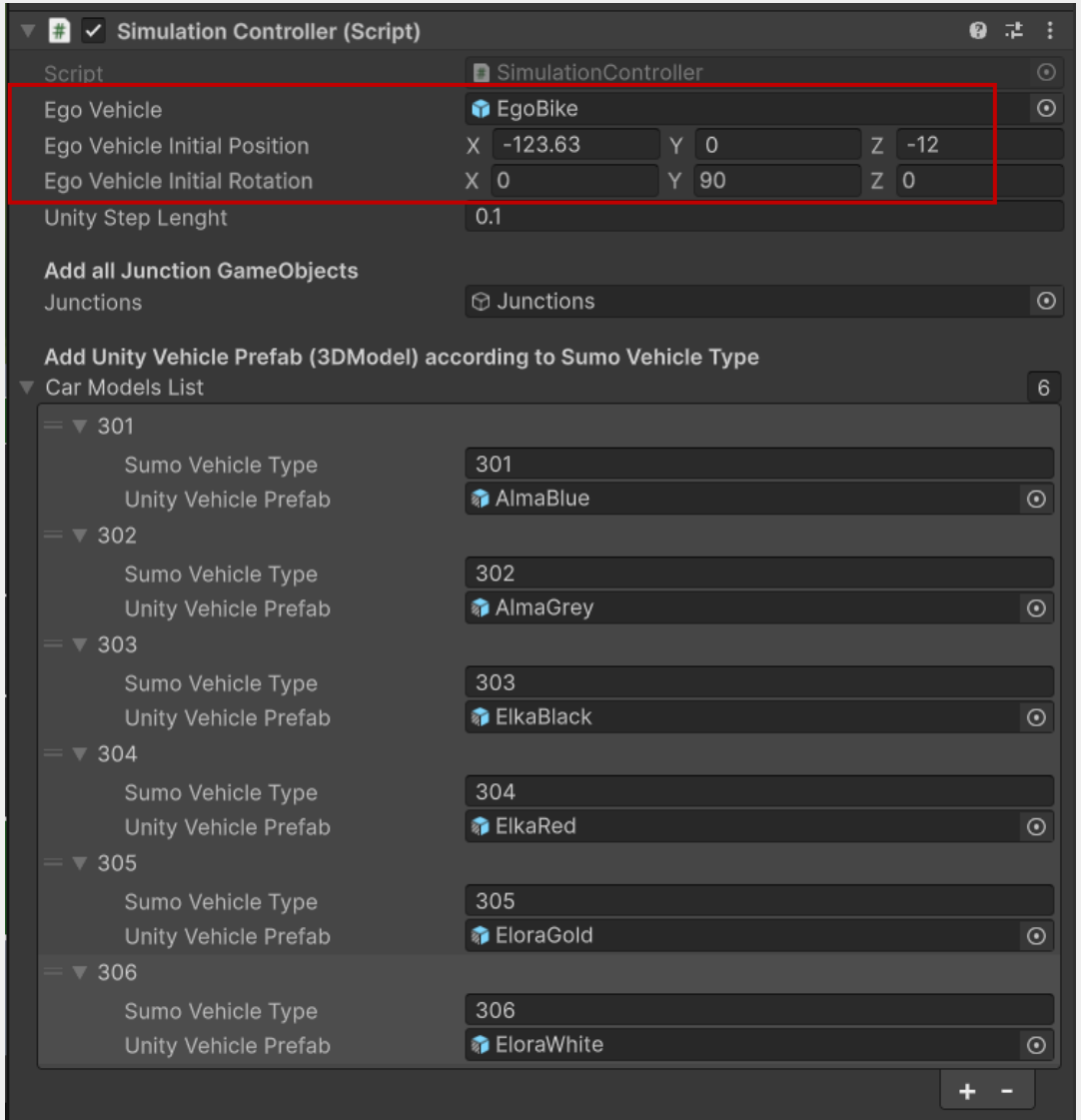
A) Add Ego Bike (A.2. Add Bike To Network)

- ❑ Follow Steps 1-4 in the image and press button “Delete” in the keyboard to delete EgoCar



Step 2: Run Sumo2Unity integration

C) Assign Ego Bike



Step 2: Run Sumo2Unity integration

D) Prepare and Run Python Code (Sumo2Unity.py)

- ❑ Run Python
- ❑ When it reaches second 540, SUMO ego bike will be added, then Run Unity