

BIM Portfolio

John Yang



2022 Engineering Competition

Ministry of Trade, Industry and Energy

Team Lego, Lego.

Summary:

Legoland Korea has been a hotspot for families and their children since its grand opening. However, despite the number of tourists visiting the park, the limited number of roads going towards it has been the cause of massive traffic congestion during its peak hours. Therefore our team took the challenge of designing another route that allows entry to Legoland.

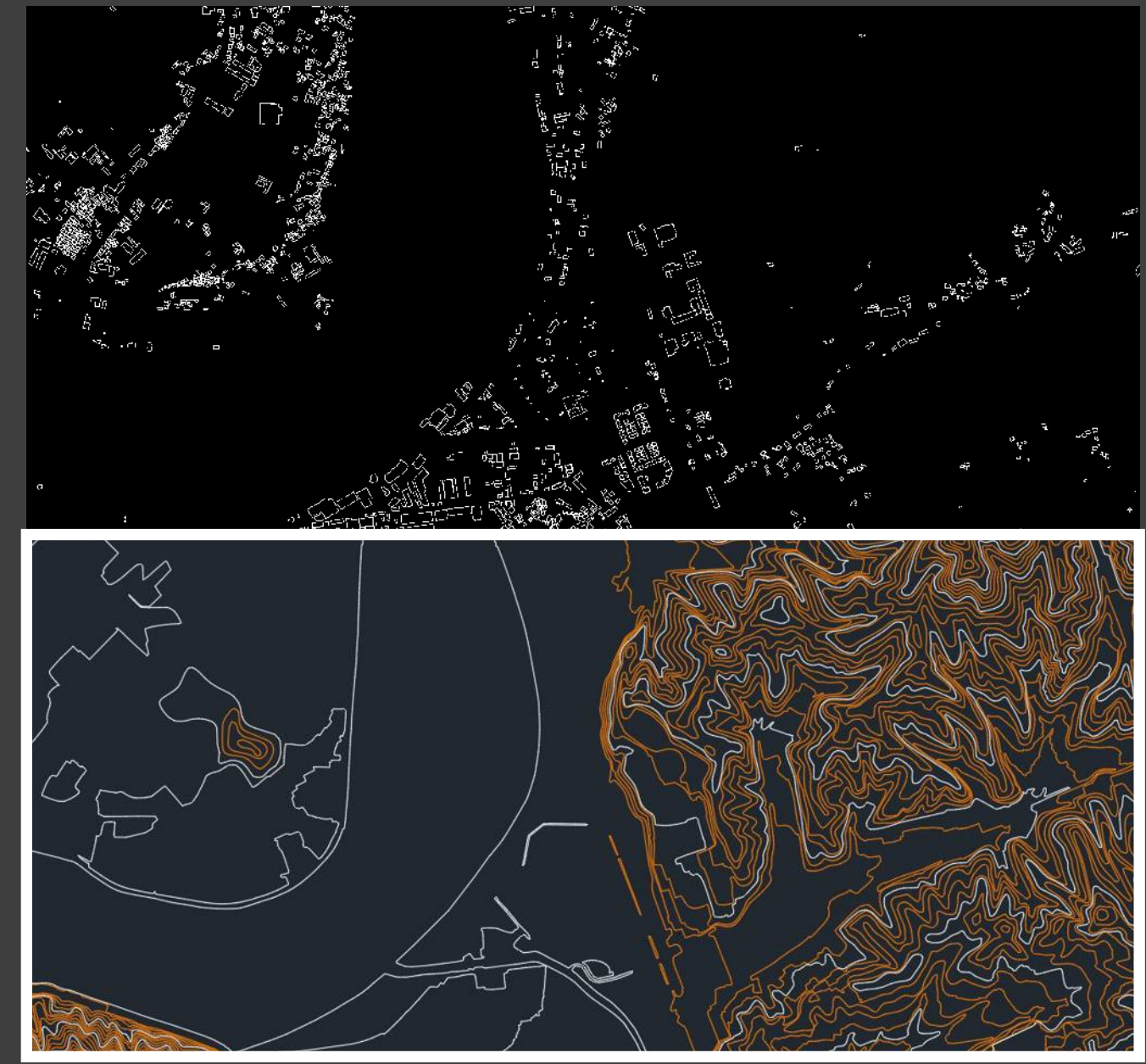
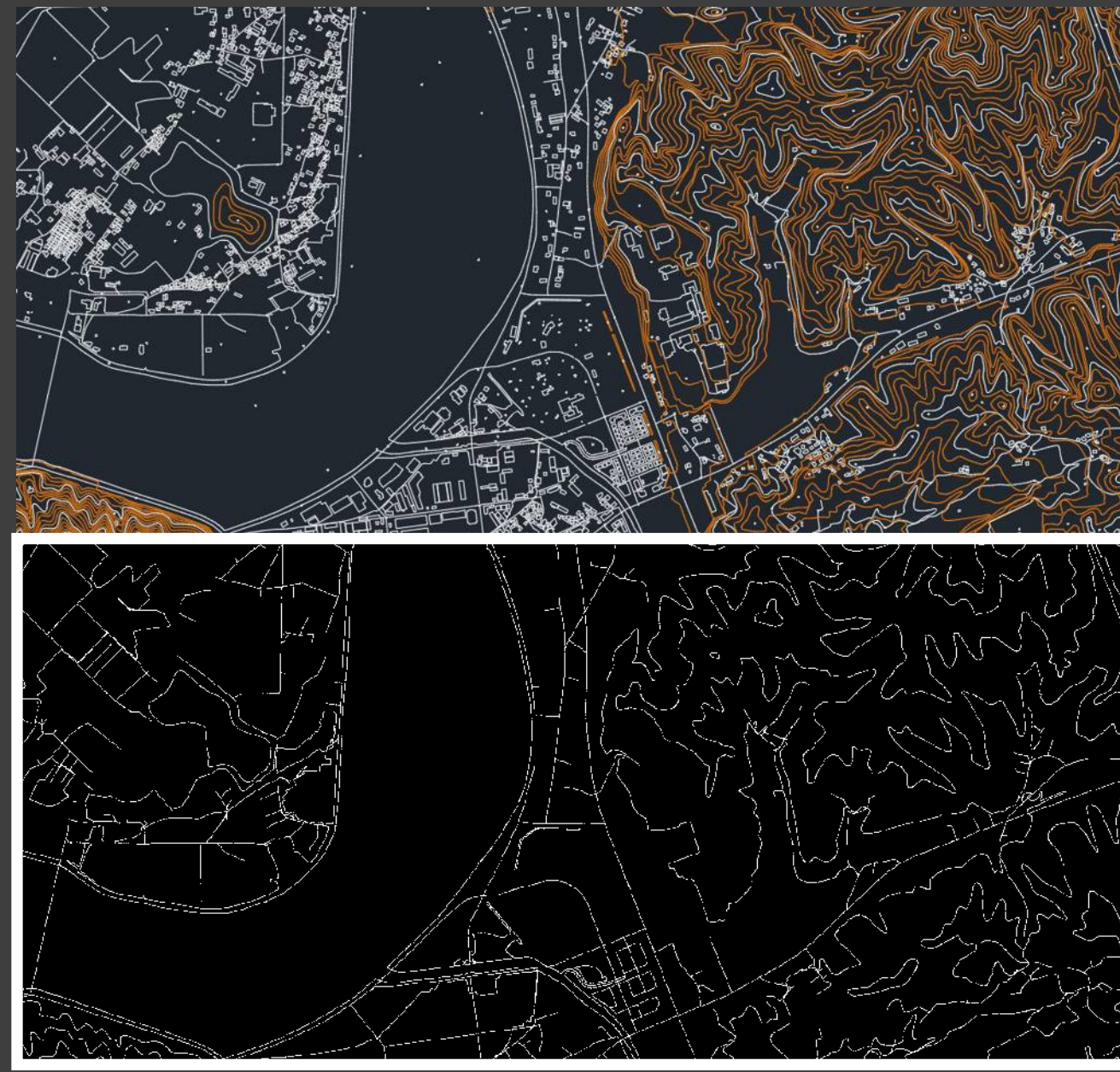
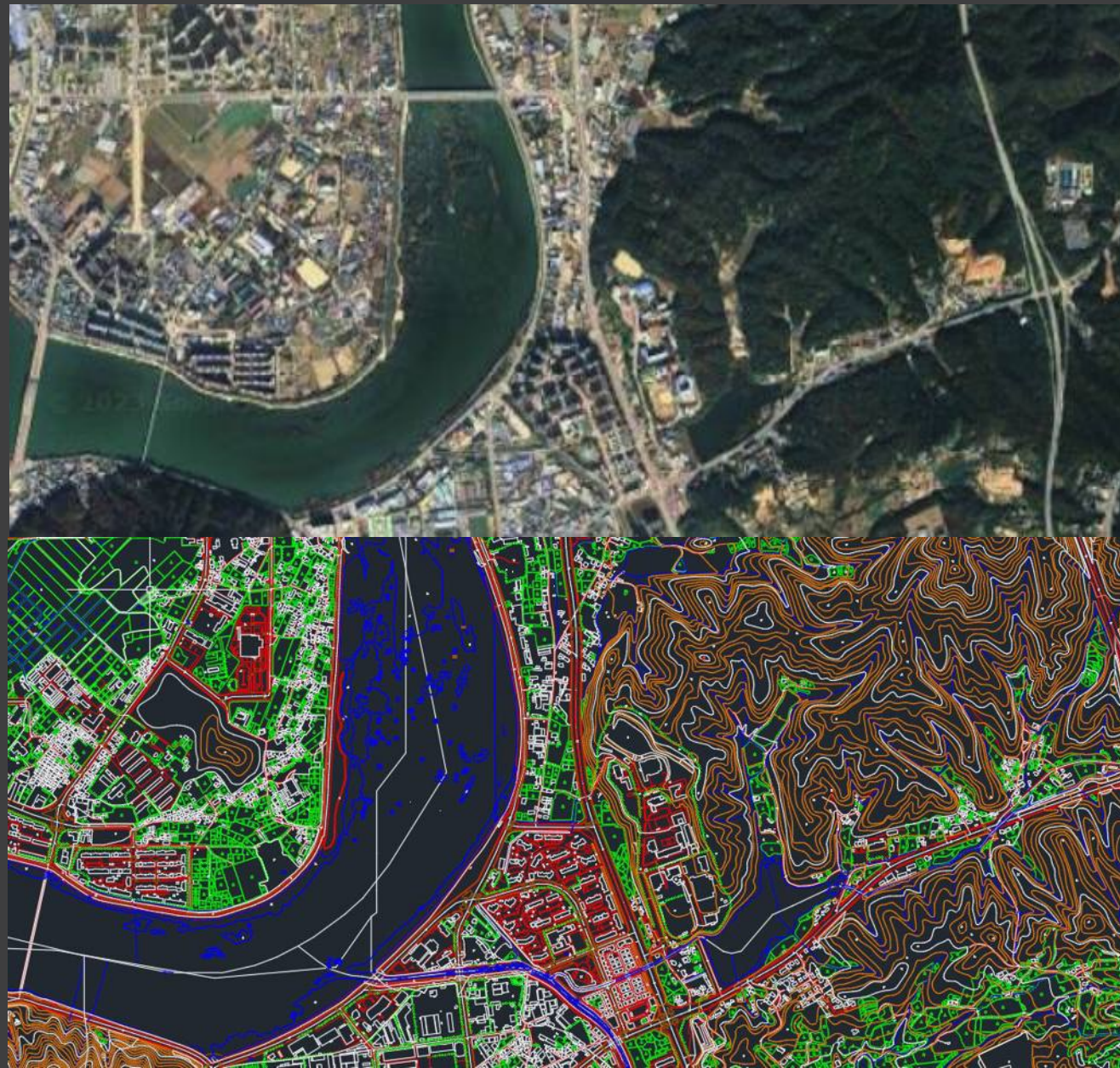


Landscape:

The topographic orthophotos and digital elevation models (DEM) of Chuncheon terrain were downloaded from the National Geographic Information Institute.

Only the necessary data such as road centerlines and contour lines of buildings were extracted and separated for insertion into Infracore.

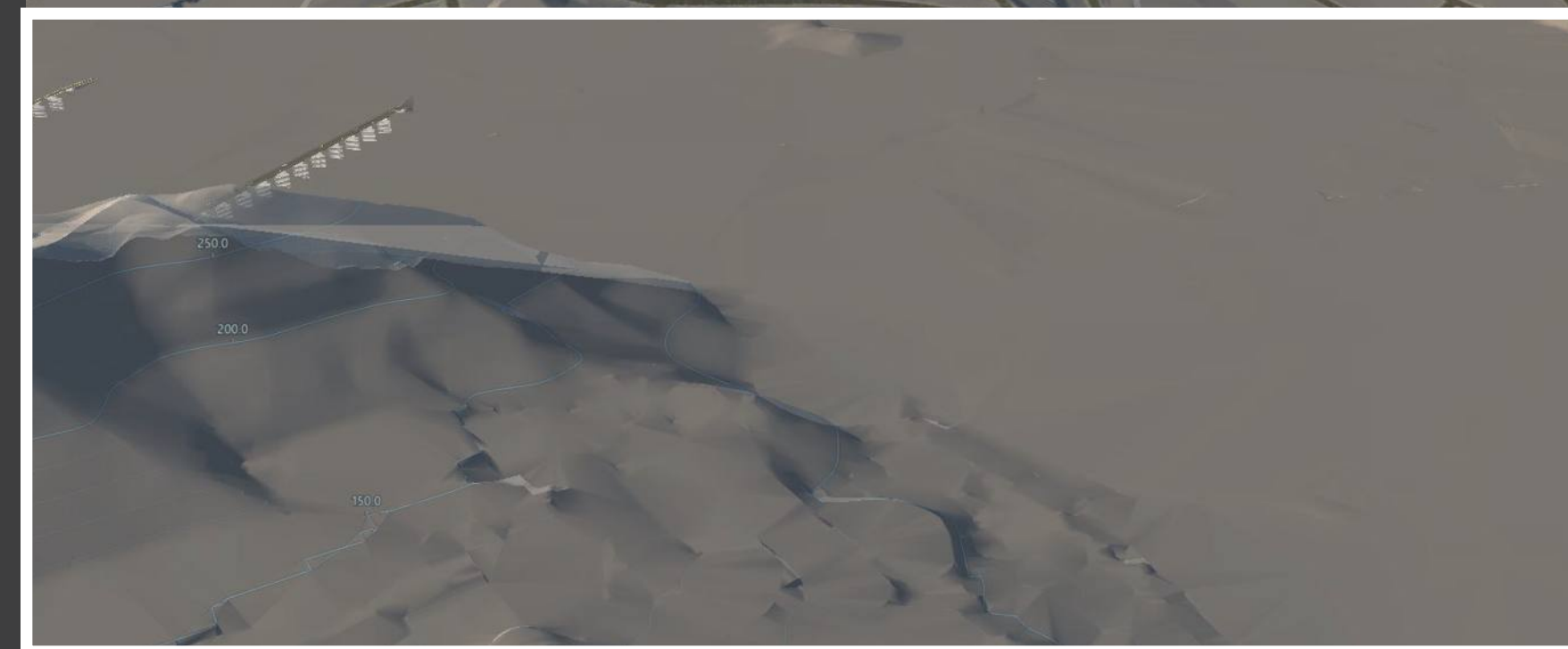
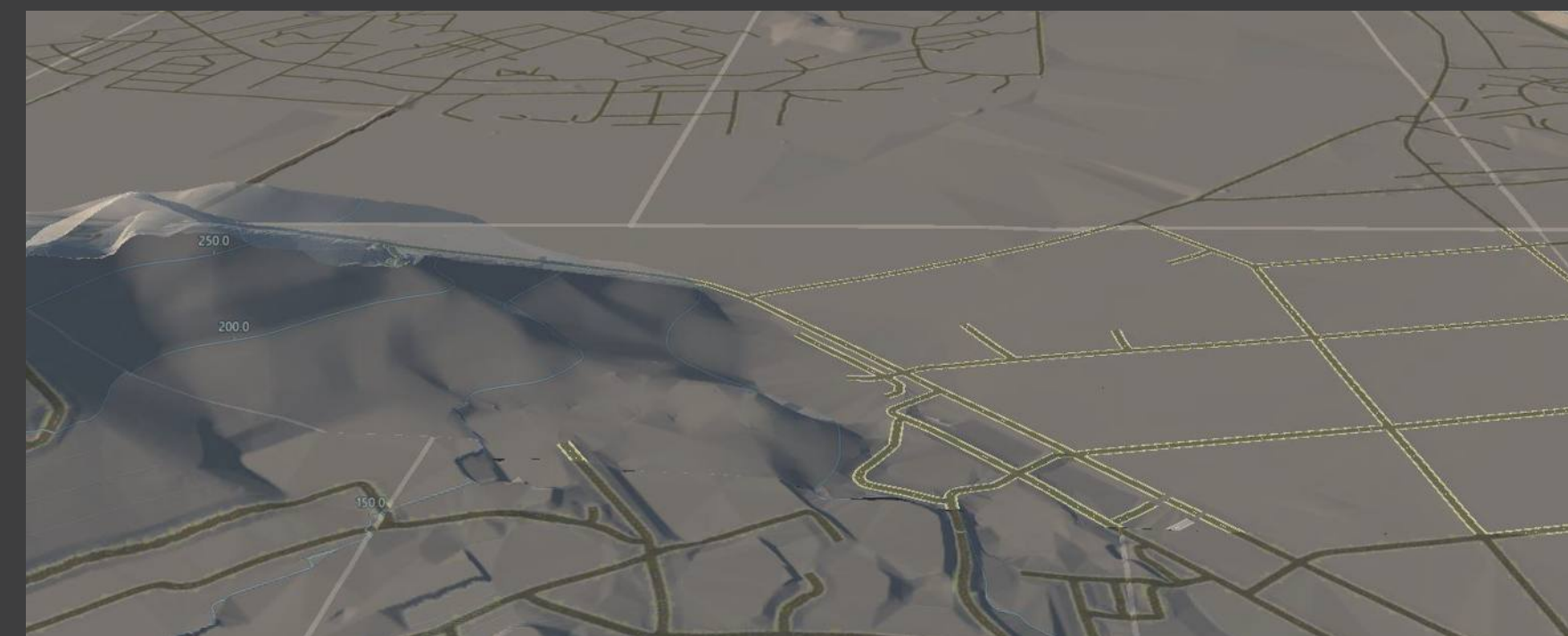
The buildings and road centerlines were saved as shape files(.shp), while the contour lines were saved as LandXML(.xml) format. The downloaded orthophoto image was applied to create the terrain using Raster Design.





Landscape:

From the datafiles extracted using Civil 3D, the downloaded orthophoto image was applied to create the terrain using Infracore, Raster Design.





Alignment:

The alignment for the sections where the tunnel and the bridge will be constructed, as well as an alternative road, were drawn based on the surveyed terrain.

Subsequently, the tunnel was inserted based on the drawn alignment, and the slope and gradient were adjusted according to the numerical values, while considering the landscape.

Once the design was completed, the alignment was imported into Civil 3D and extracted in IMX format for precise alignment work.



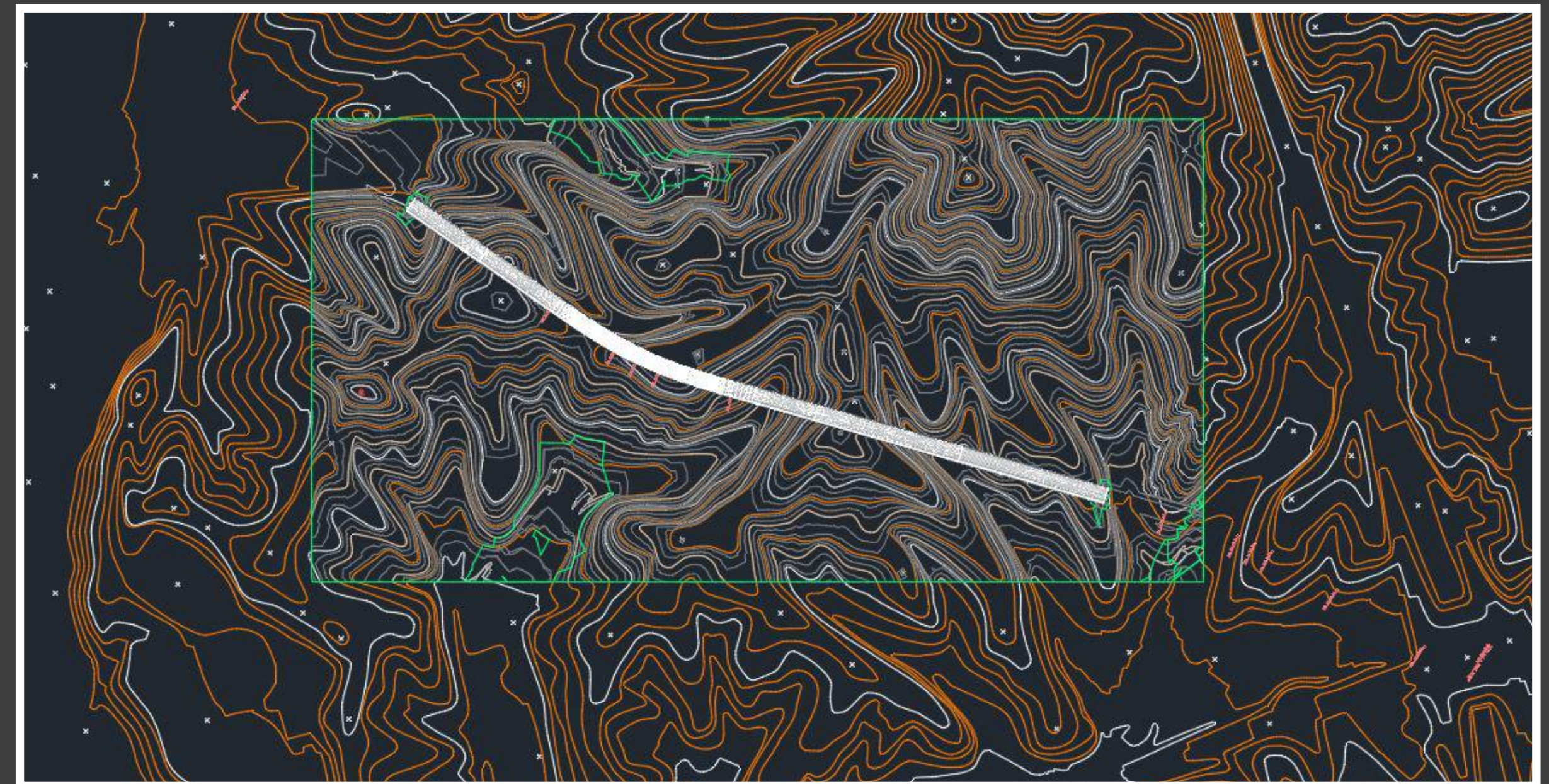
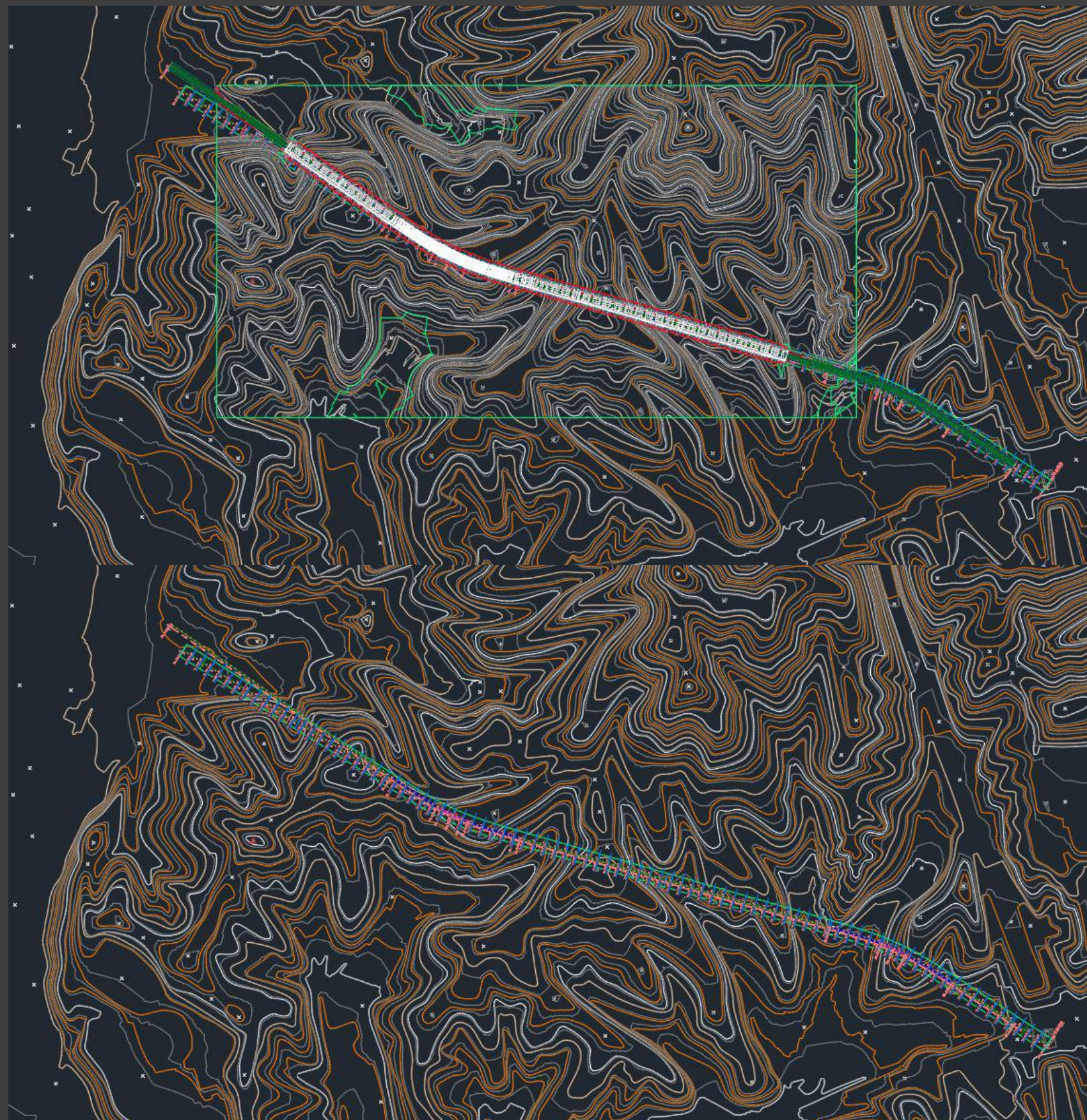


Alignment:

The alignment of the tunnel exported from Infracore is imported into Civil 3D to verify its position.

The tunnel's alignment is then modified, and cross-sectional profiles are created to generate a corridor.

Afterwards, the alignment of the tunnel corridor is compared with the imported path from Infracore to ensure they match.



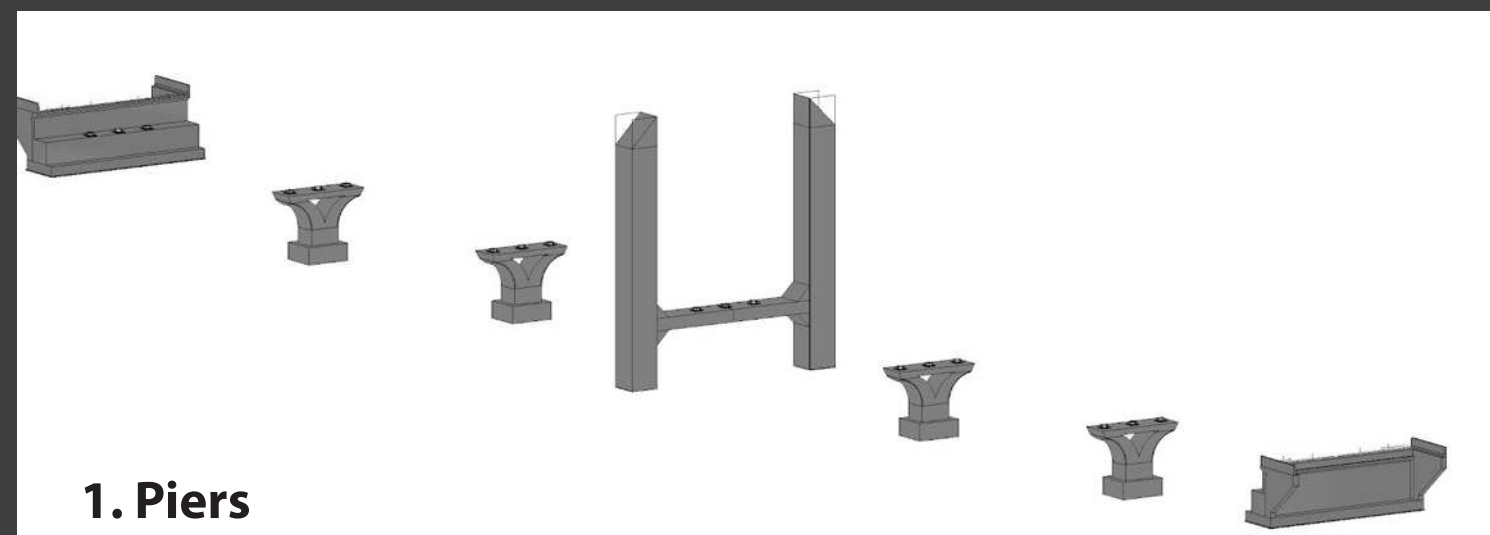


Modeling:

After examining the length of the straight segment where the bridge will be constructed, the bridge was modeled to match the dimensions.

Considering the theme park called "Legoland" and aiming to symbolize the local area, a bridge design that matched that would be more aesthetically satisfying. As a result, a girder bridge in the shape of Lego blocks was designed.

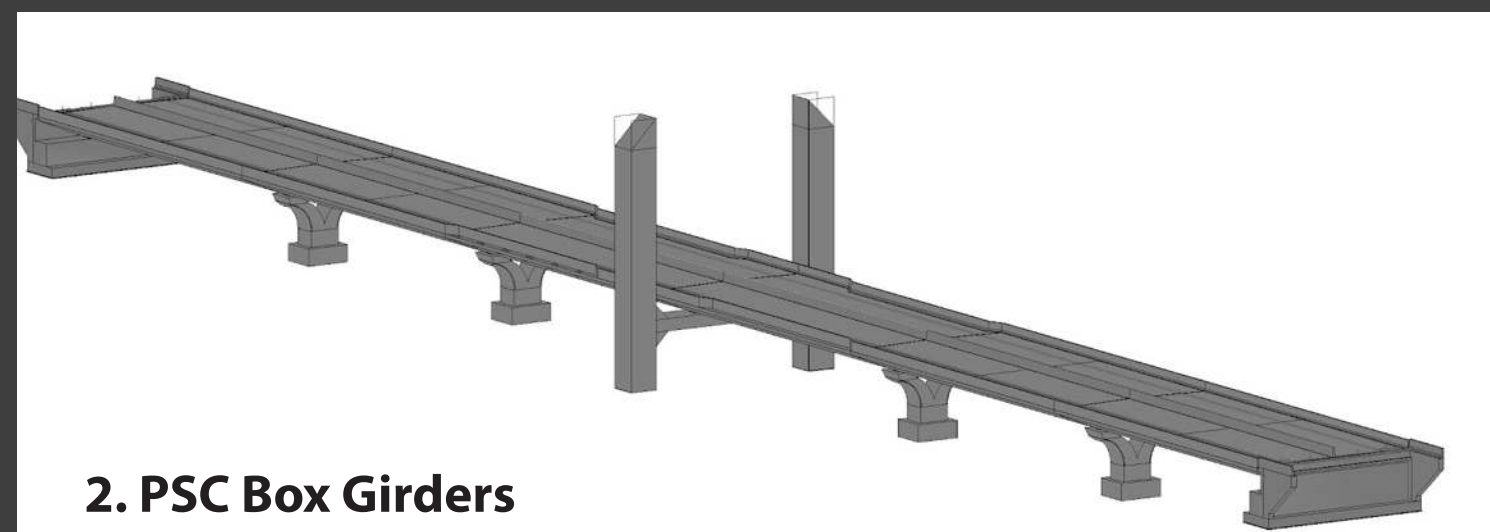
The piers were placed, and the girders, cables, streetlights, and pedestrian dividers were designed accordingly. Finally, the Lego image was applied to the piers to enhance the Lego-themed feeling.



1. Piers



3. Cables



2. PSC Box Girders



4. Streetlights and pedestrian dividers



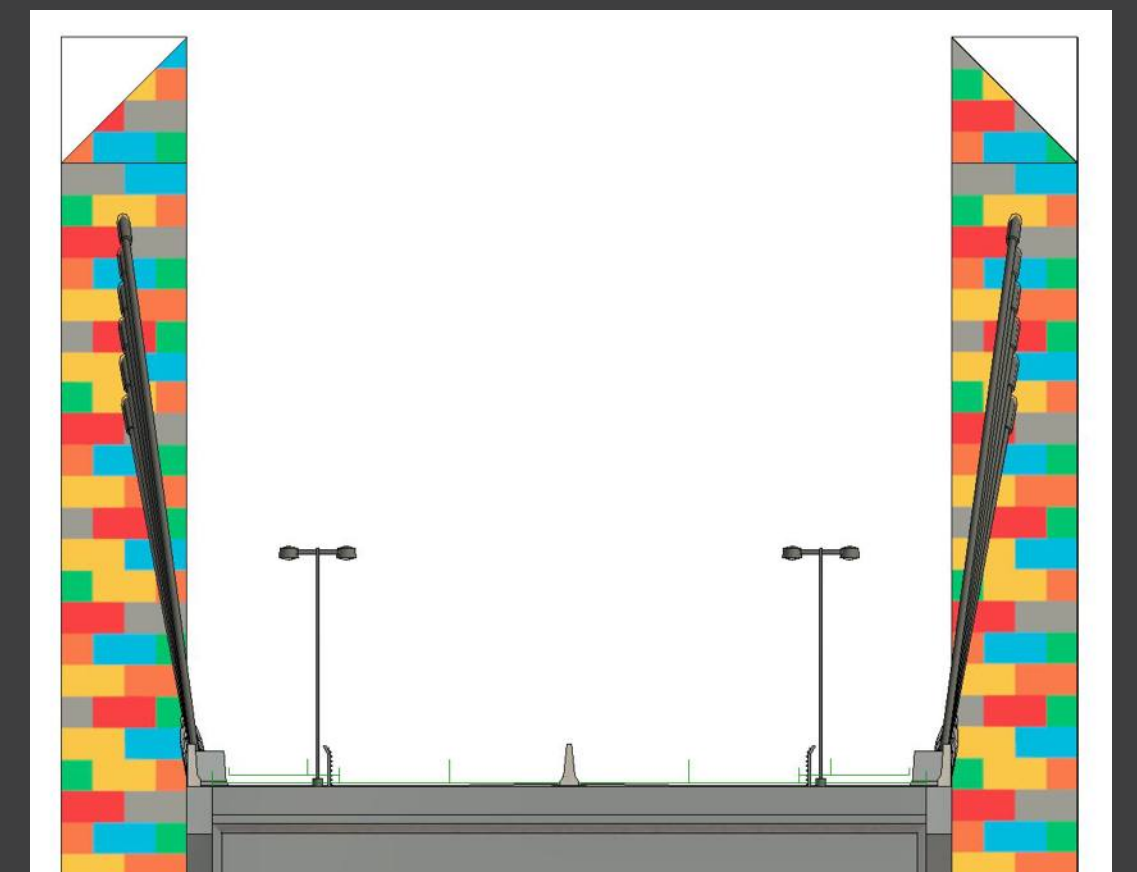
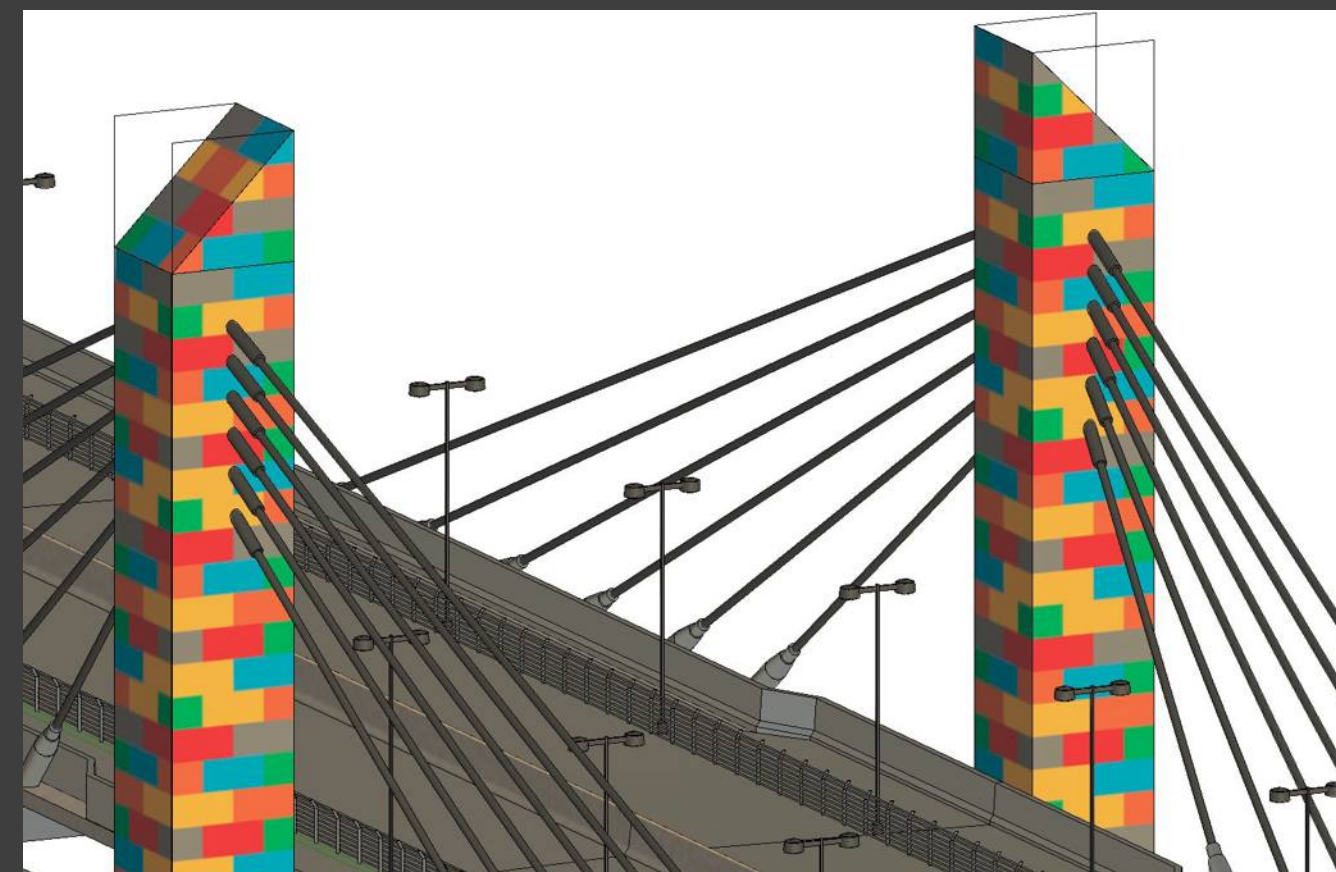
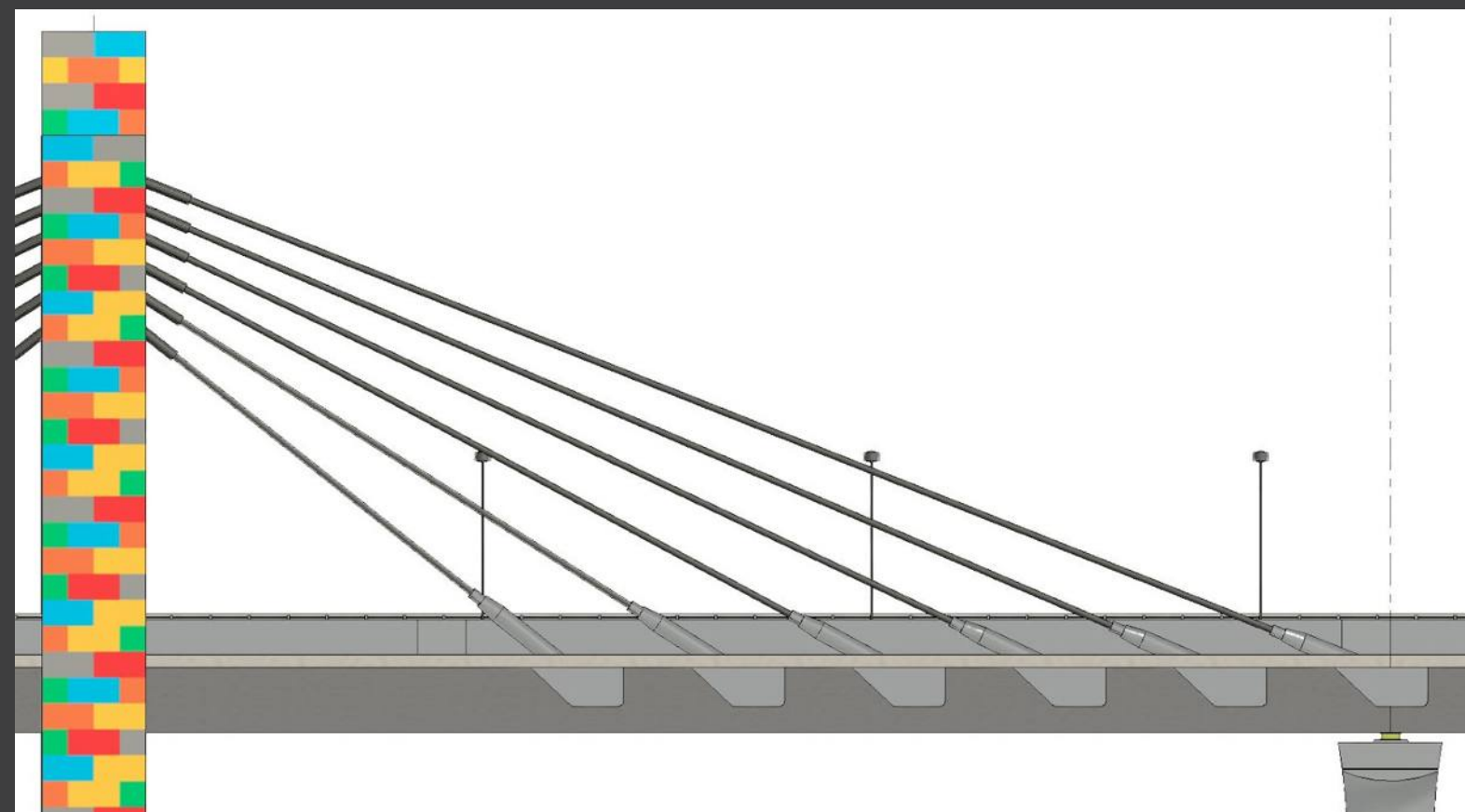
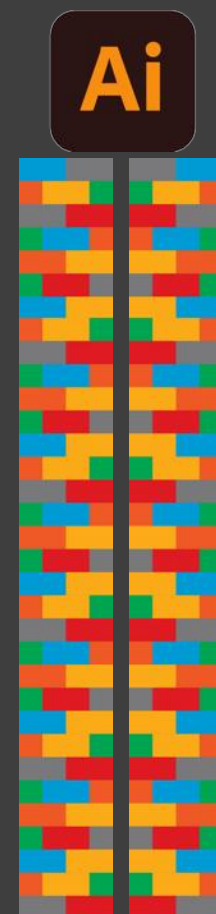
5. Insertion of Lego themed images on piers



Designs:

The bridge modeling adopted the form of a girder bridge with PSC box girders, utilizing voids and basic families.

The process of applying colors to the main pier section was enhanced by integrating image files created through Adobe Illustrator into Revit, adding precision to the design.

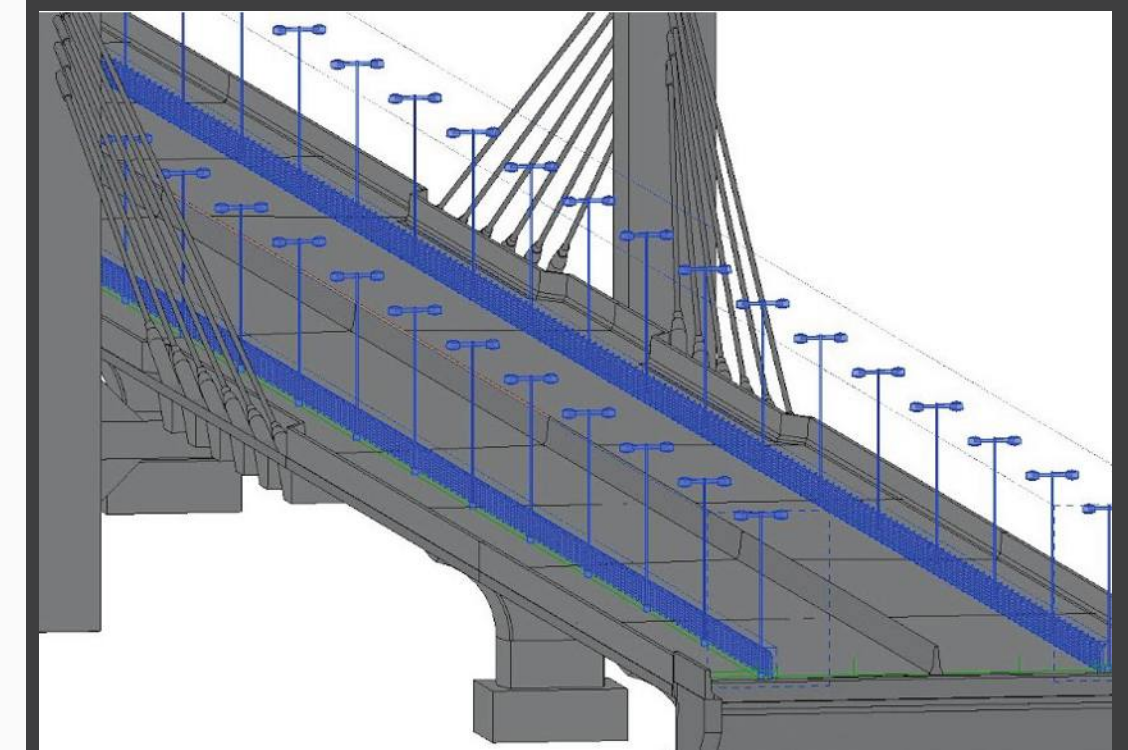
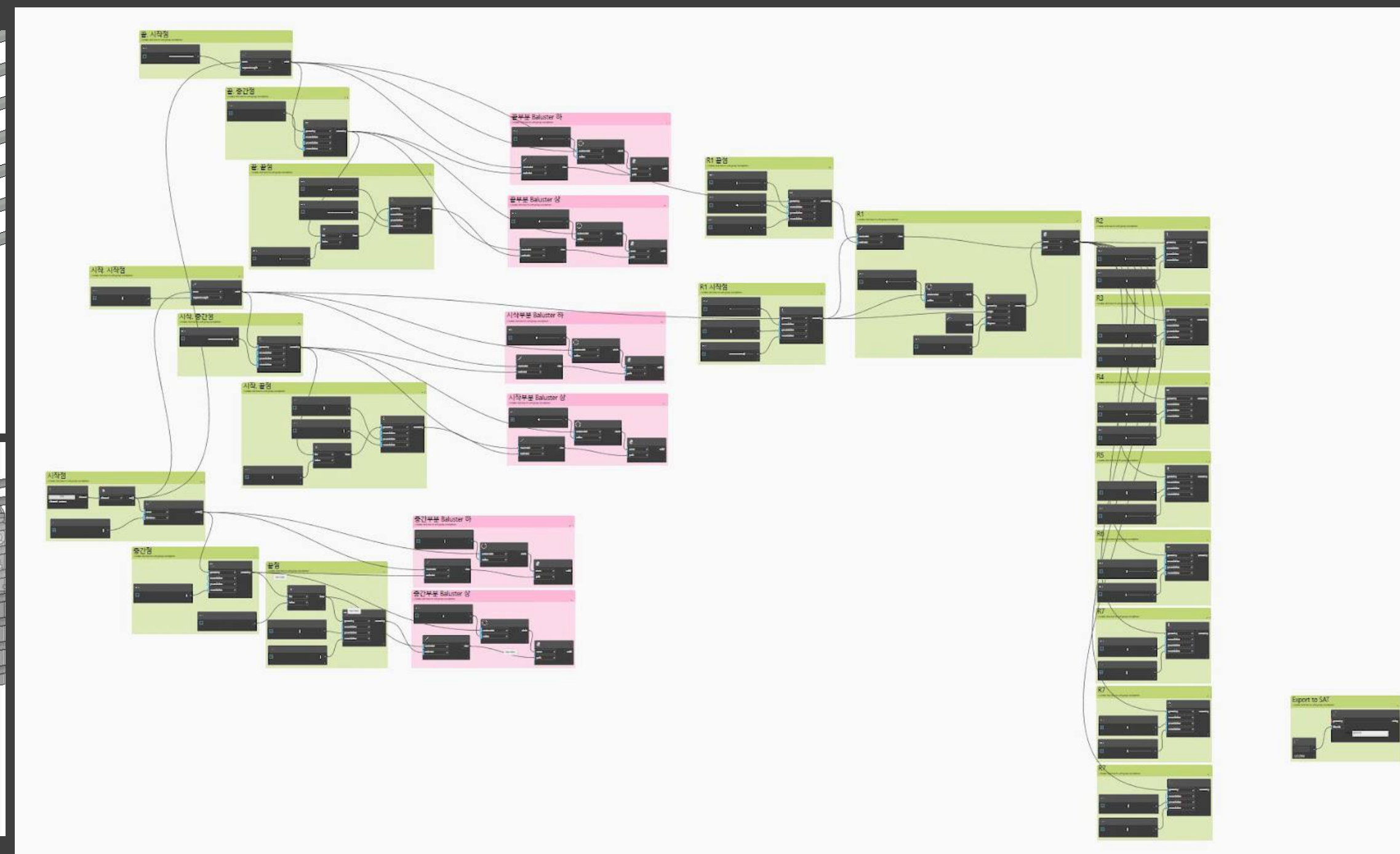
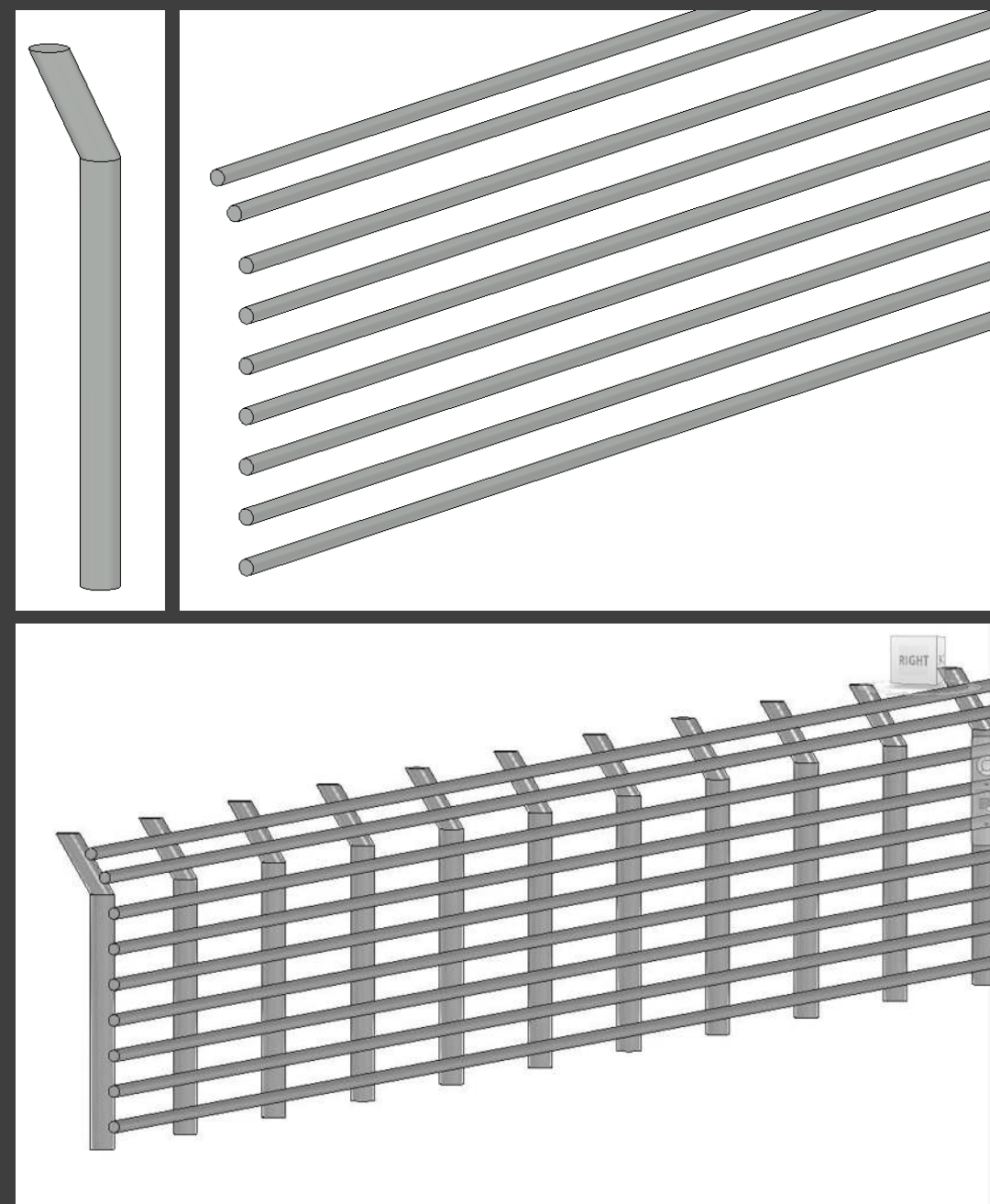




Dynamo:

The uniform arrangement of streetlights and the design of pedestrian dividers during the design process were achieved through Dynamo, enabling more efficient design.

This approach resulted in a significant reduction in time compared to manual design methods.

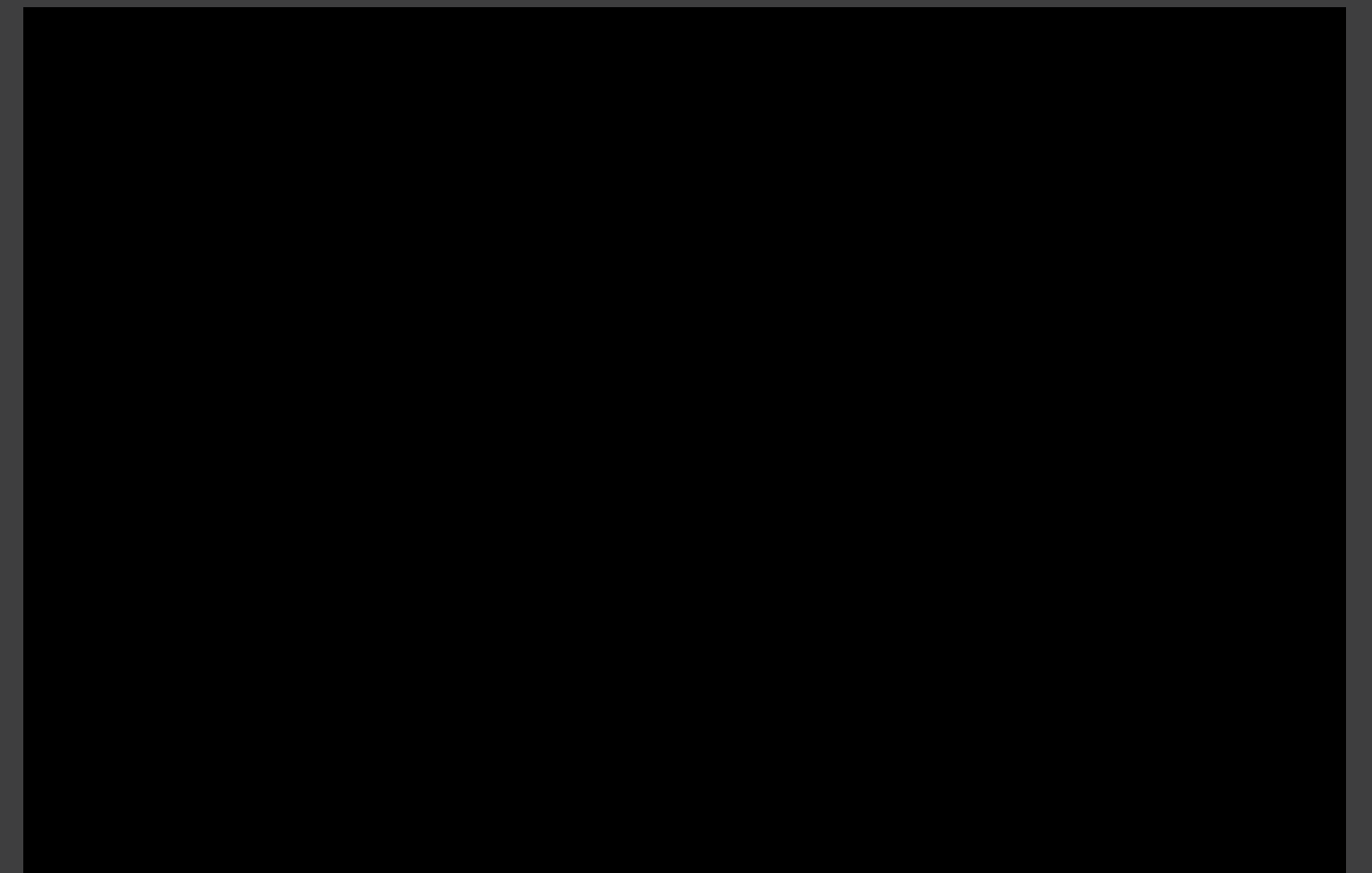
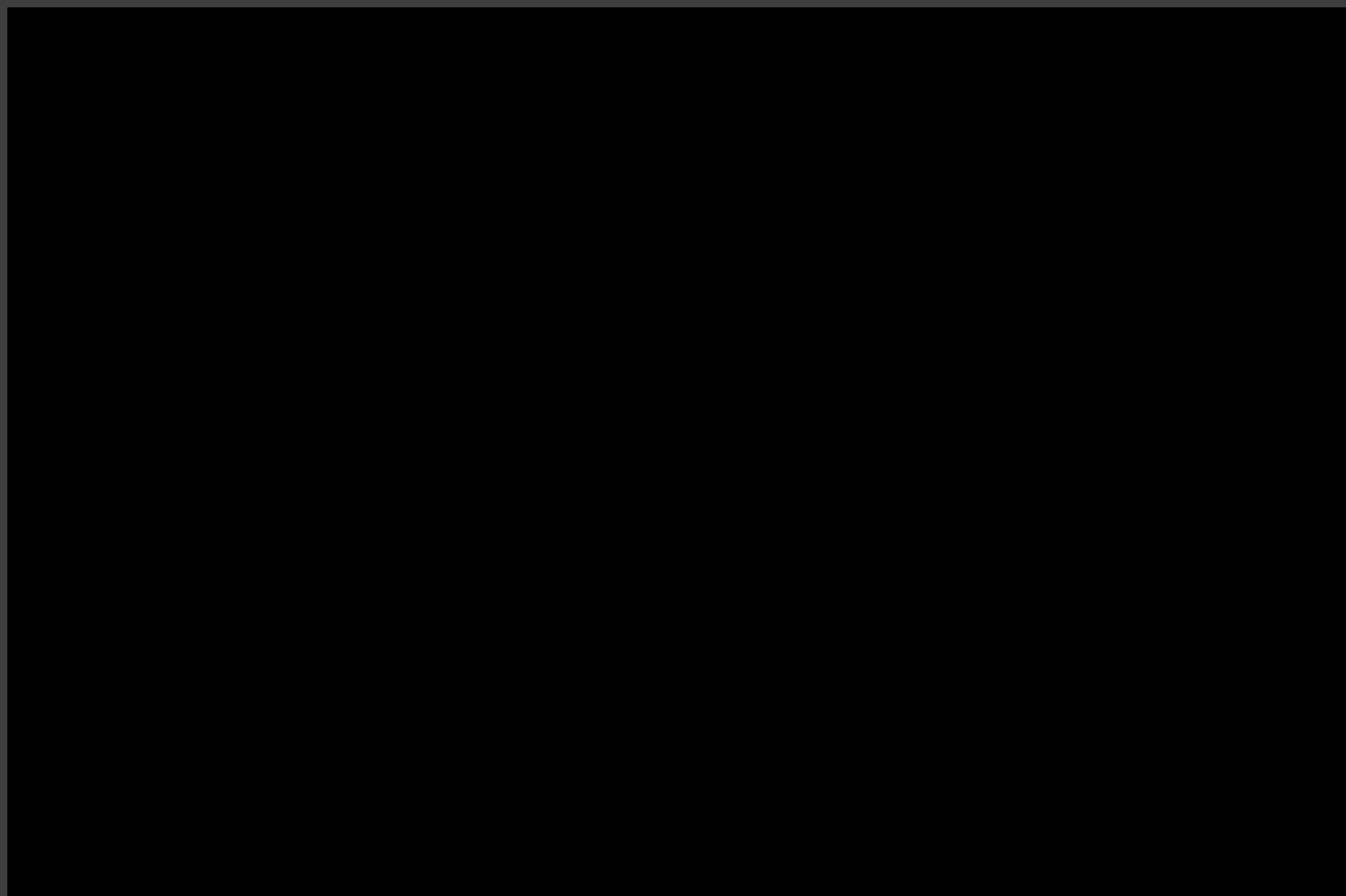
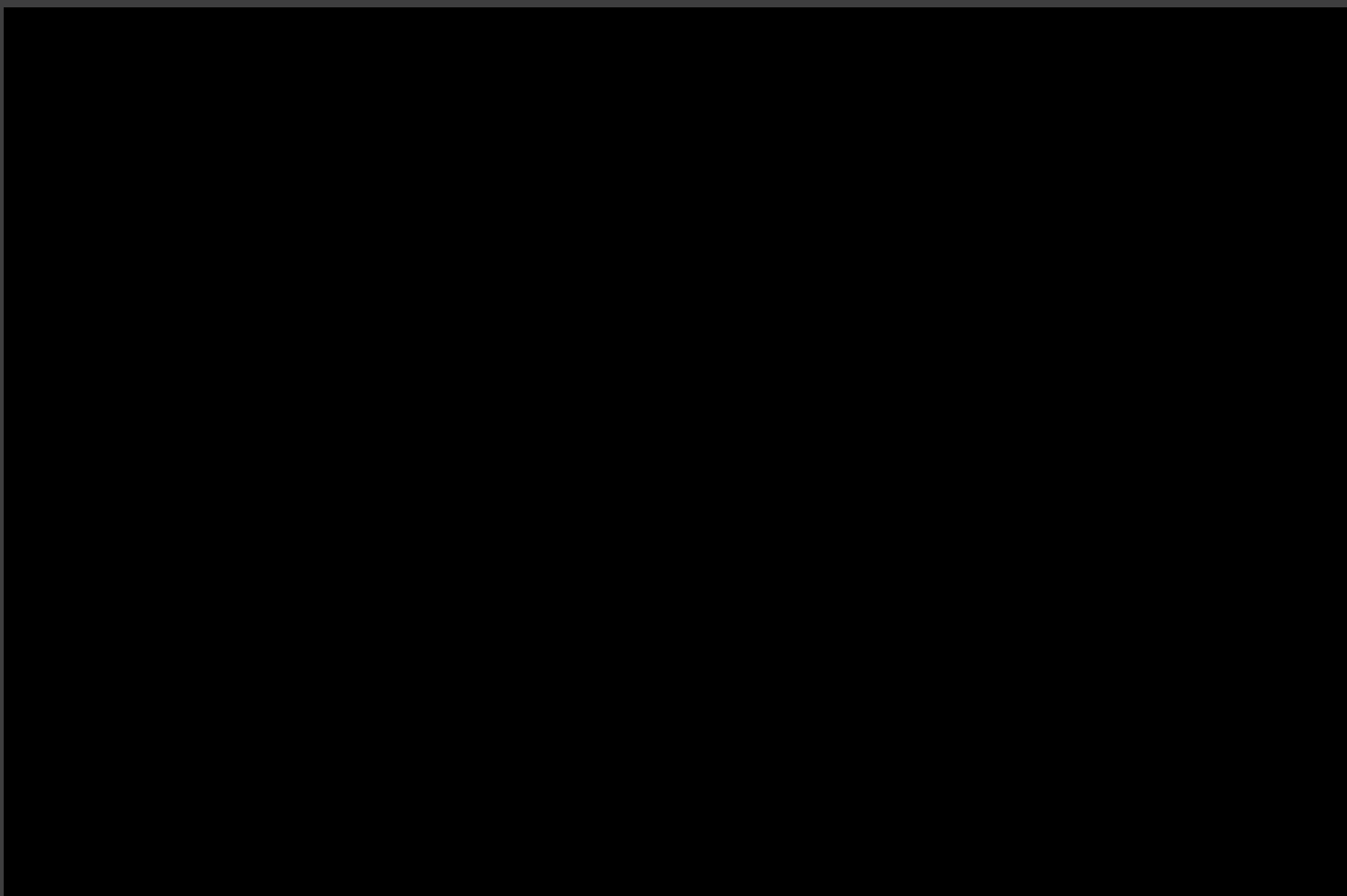




Drafts/Designs:

As one of the team's goals were to successfully translate Revit models to AutoCAD designs accurate enough for actual construction, from the created 3D bridge models, 2D cross-section designs were extracted.

These cross-sections were extracted in various formats such as DWG, IFC, DXF, allowing for the extraction of different drawings from desired positions and angles.



Professional BIM Training

Korean Institute of Construction Technology Education
3 months Intensive Training

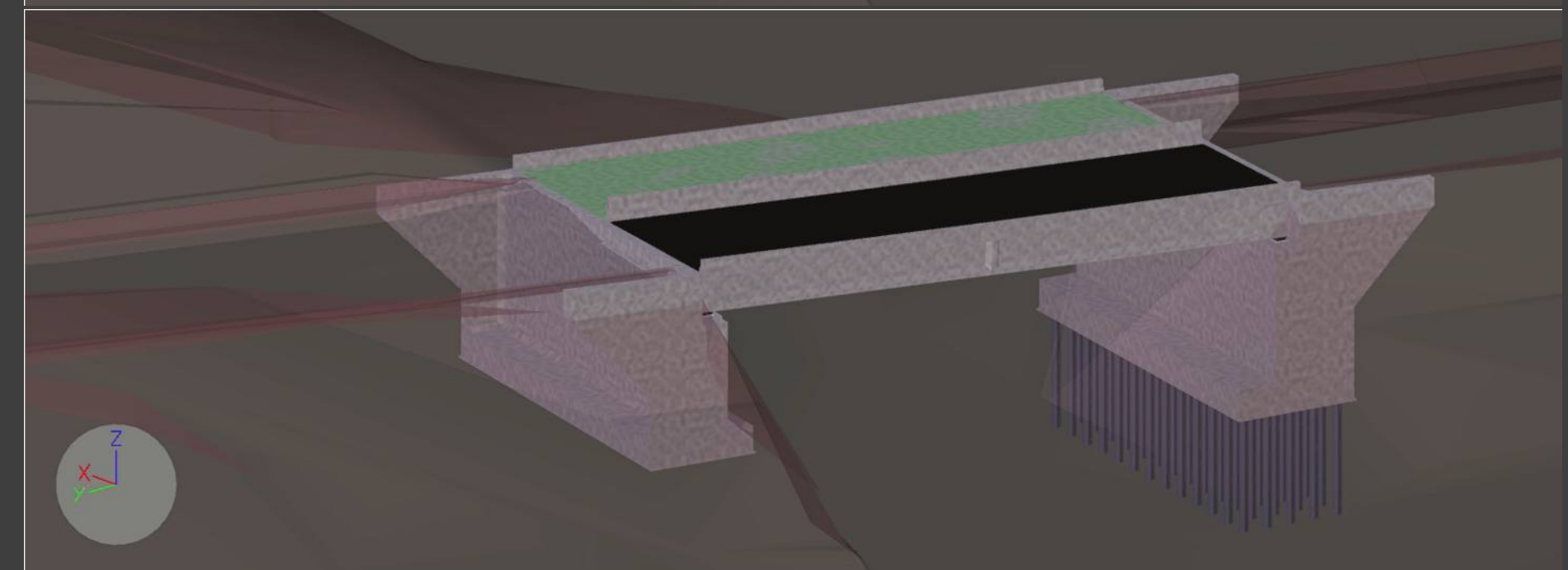
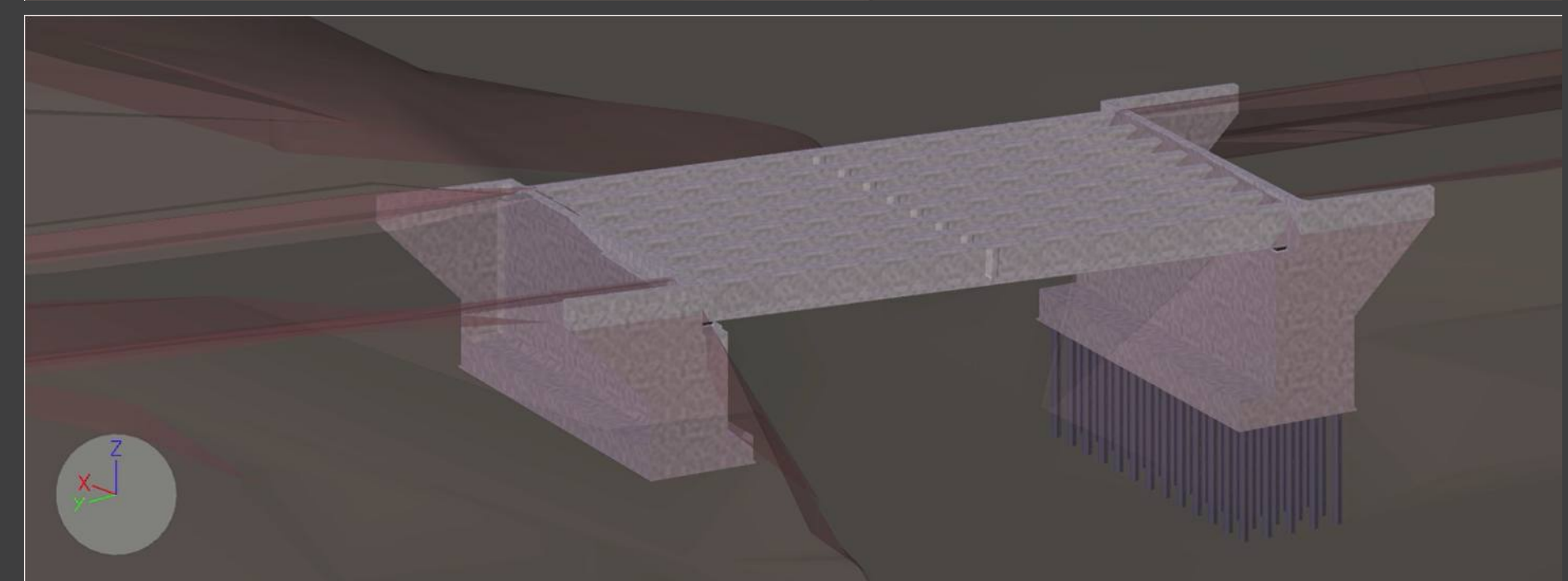
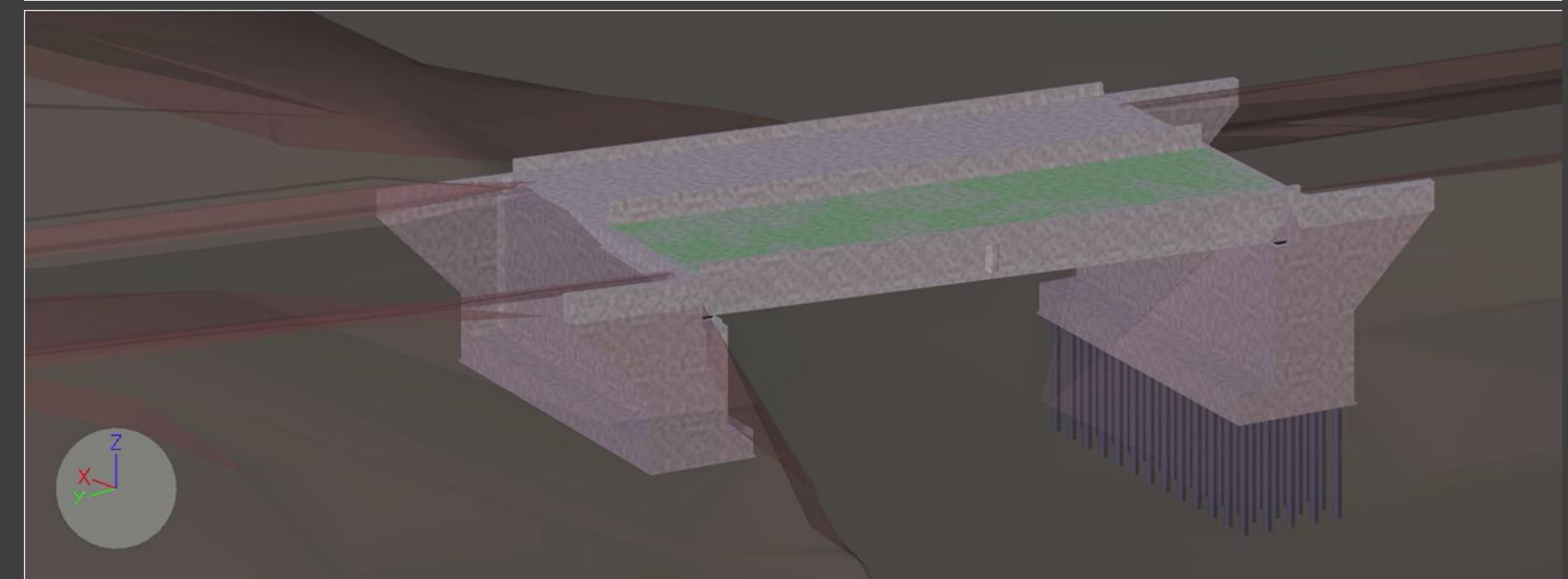
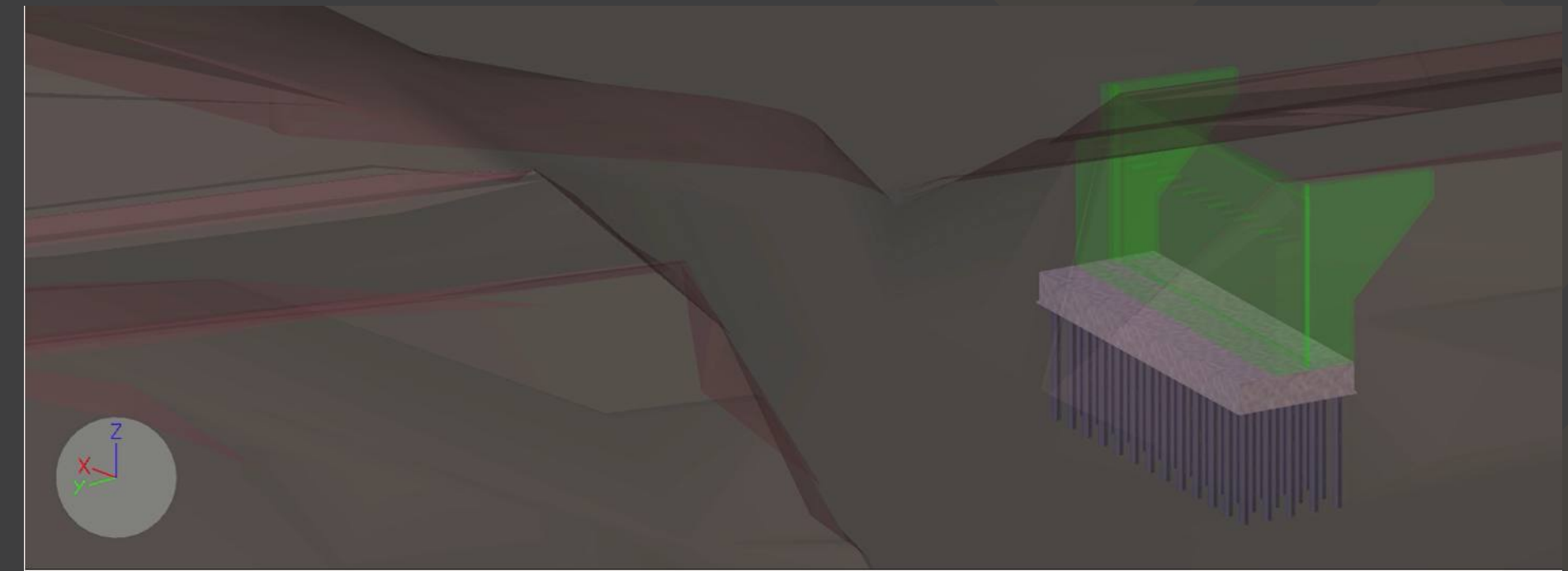
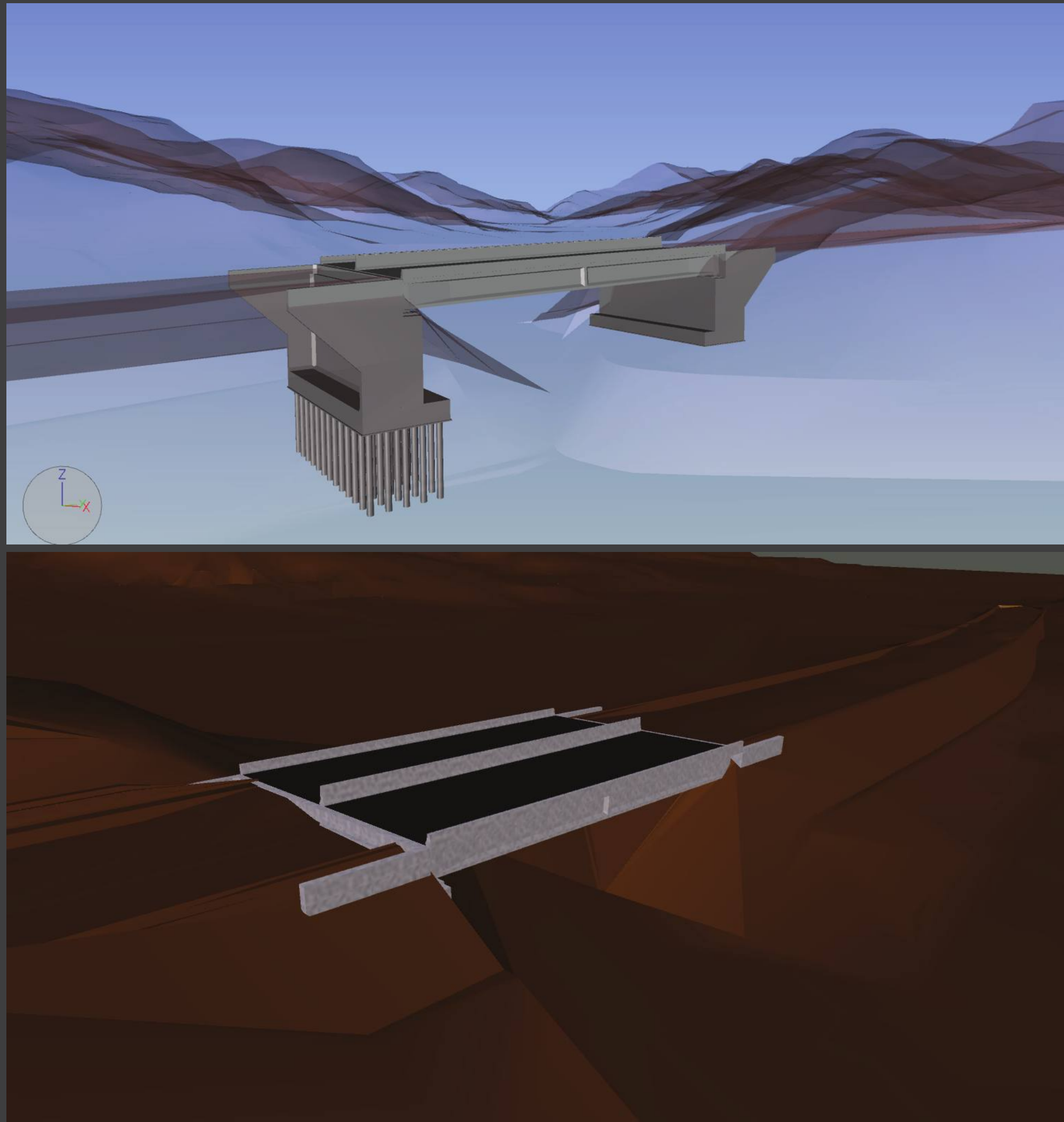
Summary:

The following are some screenshots of the designs that we were required to create, using real world projects, AutoCAD designs, and exercise samples.

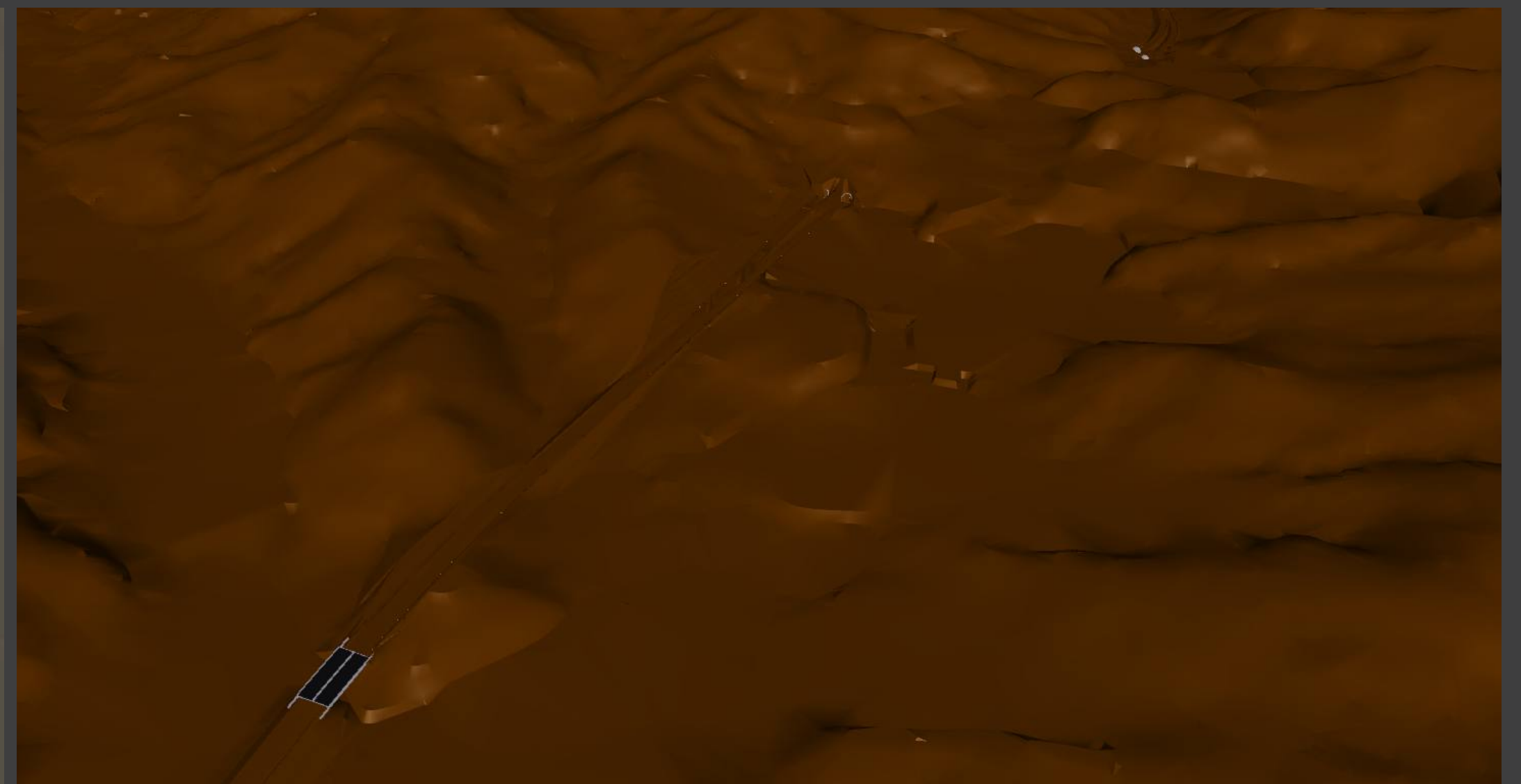
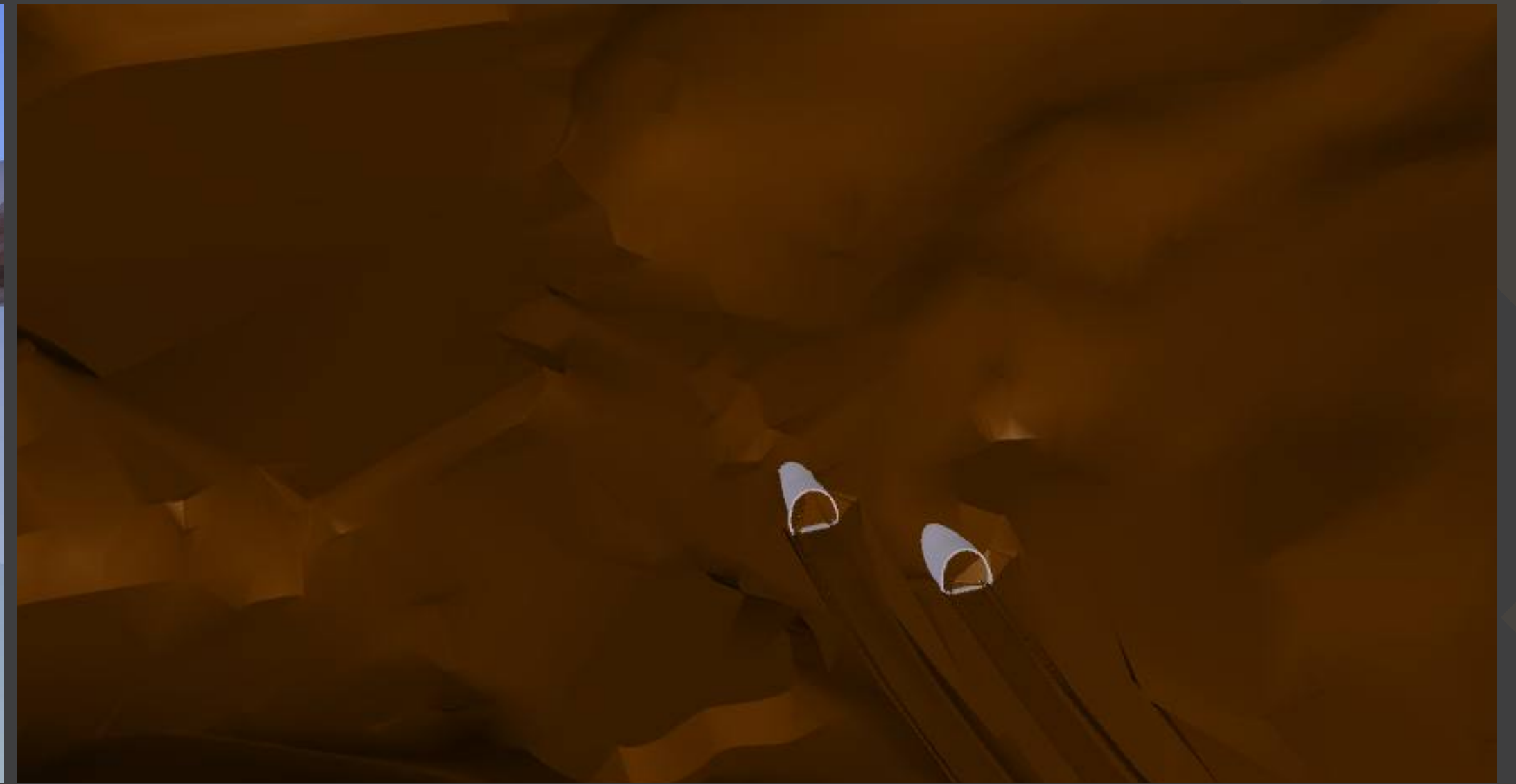
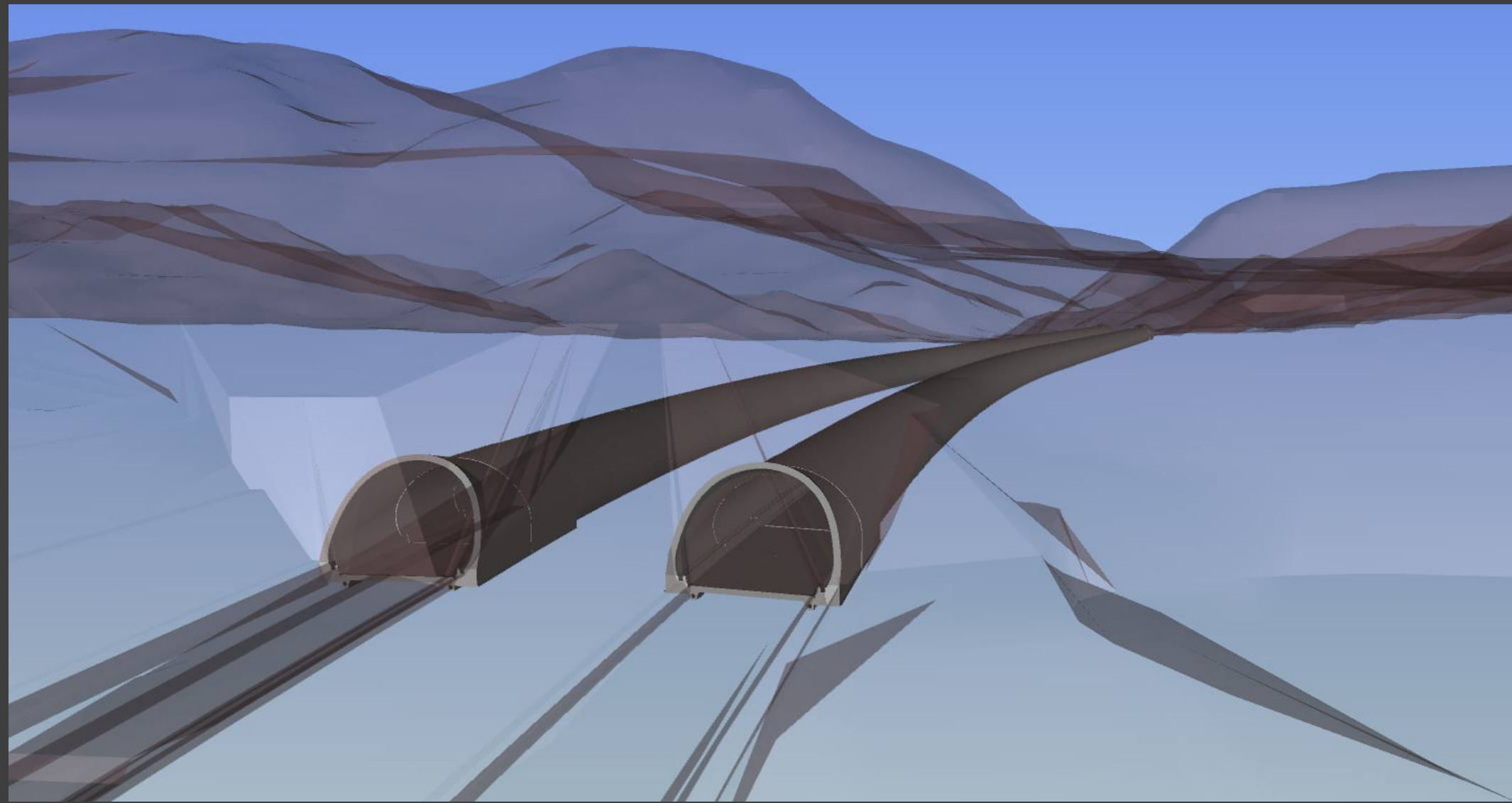


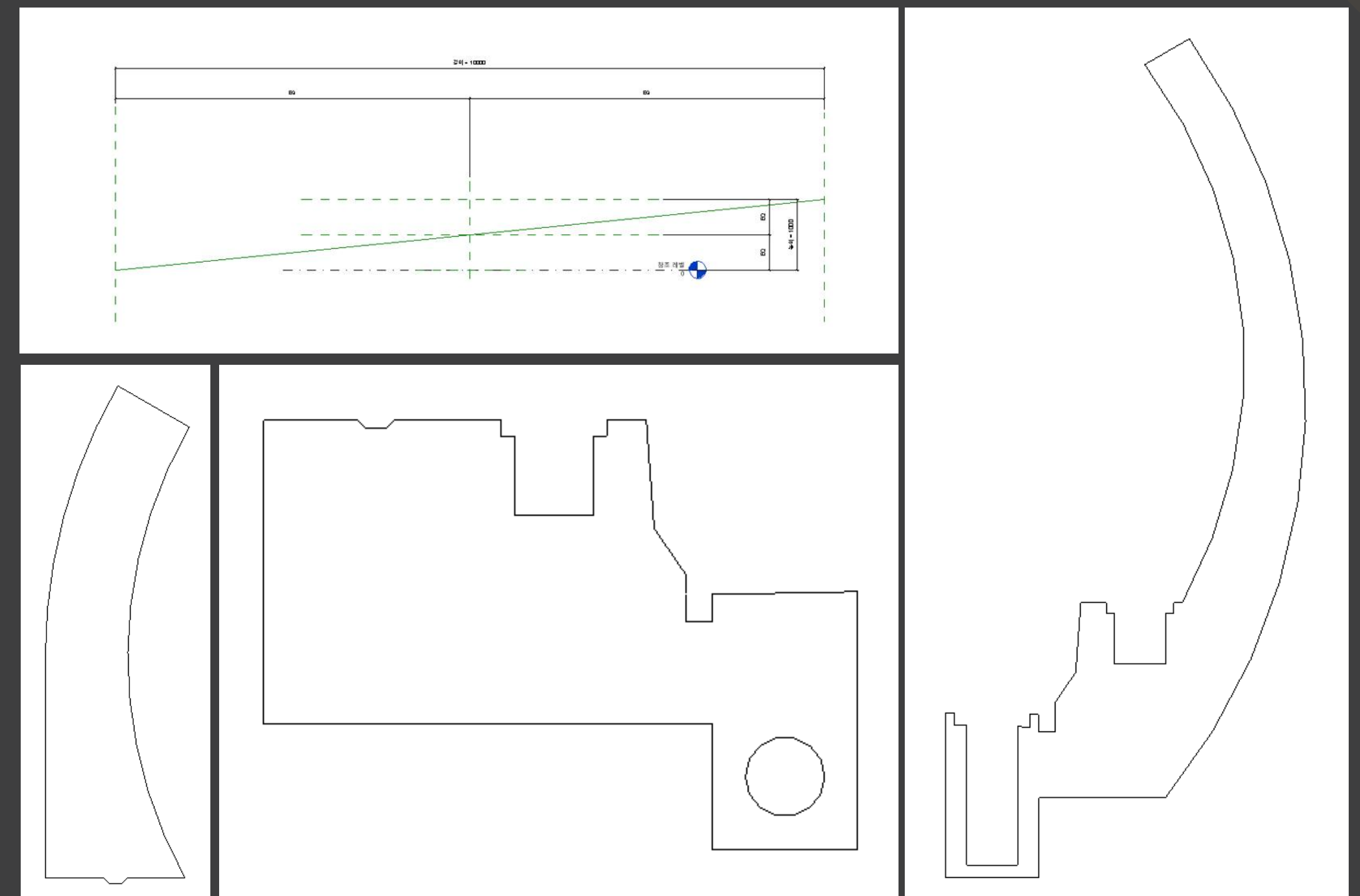
Navisworks

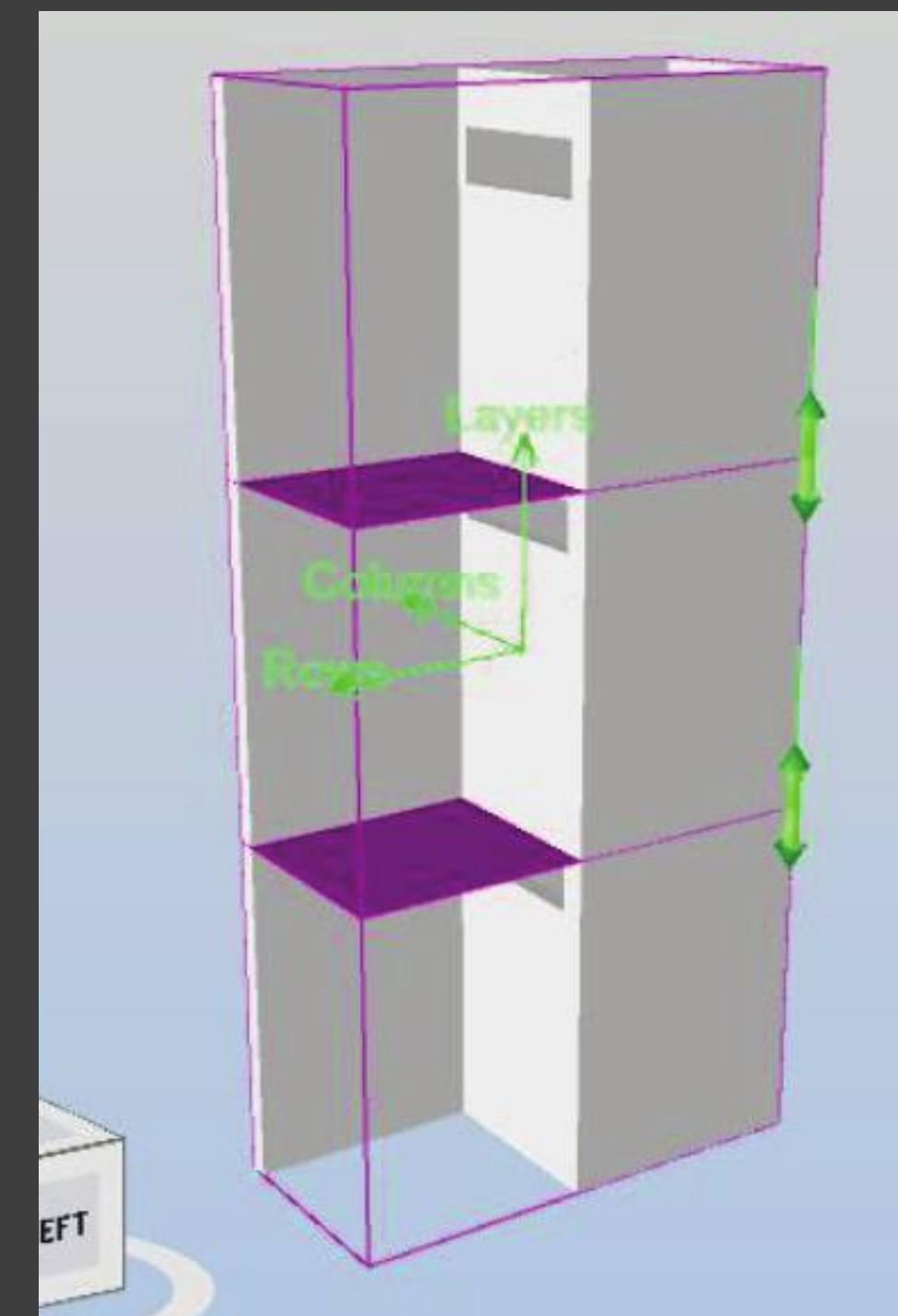
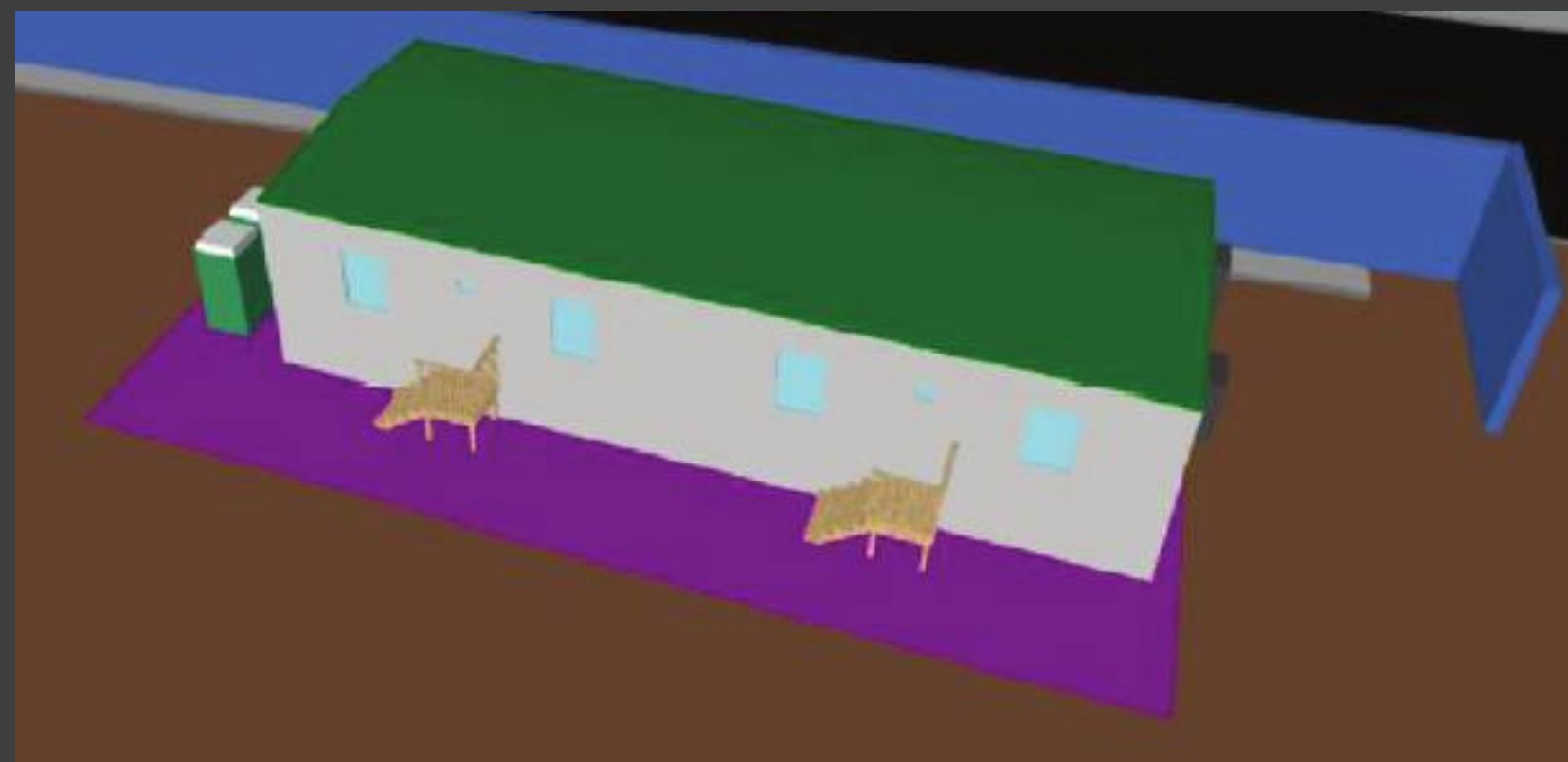
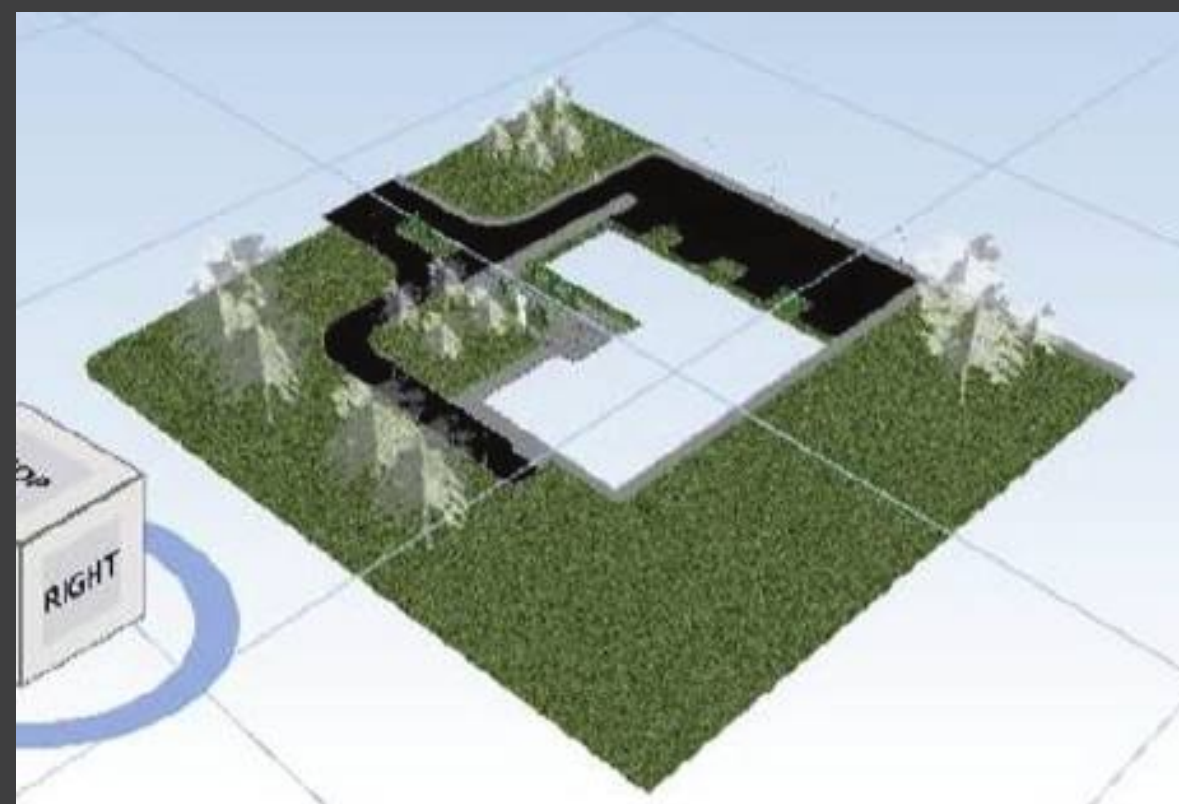
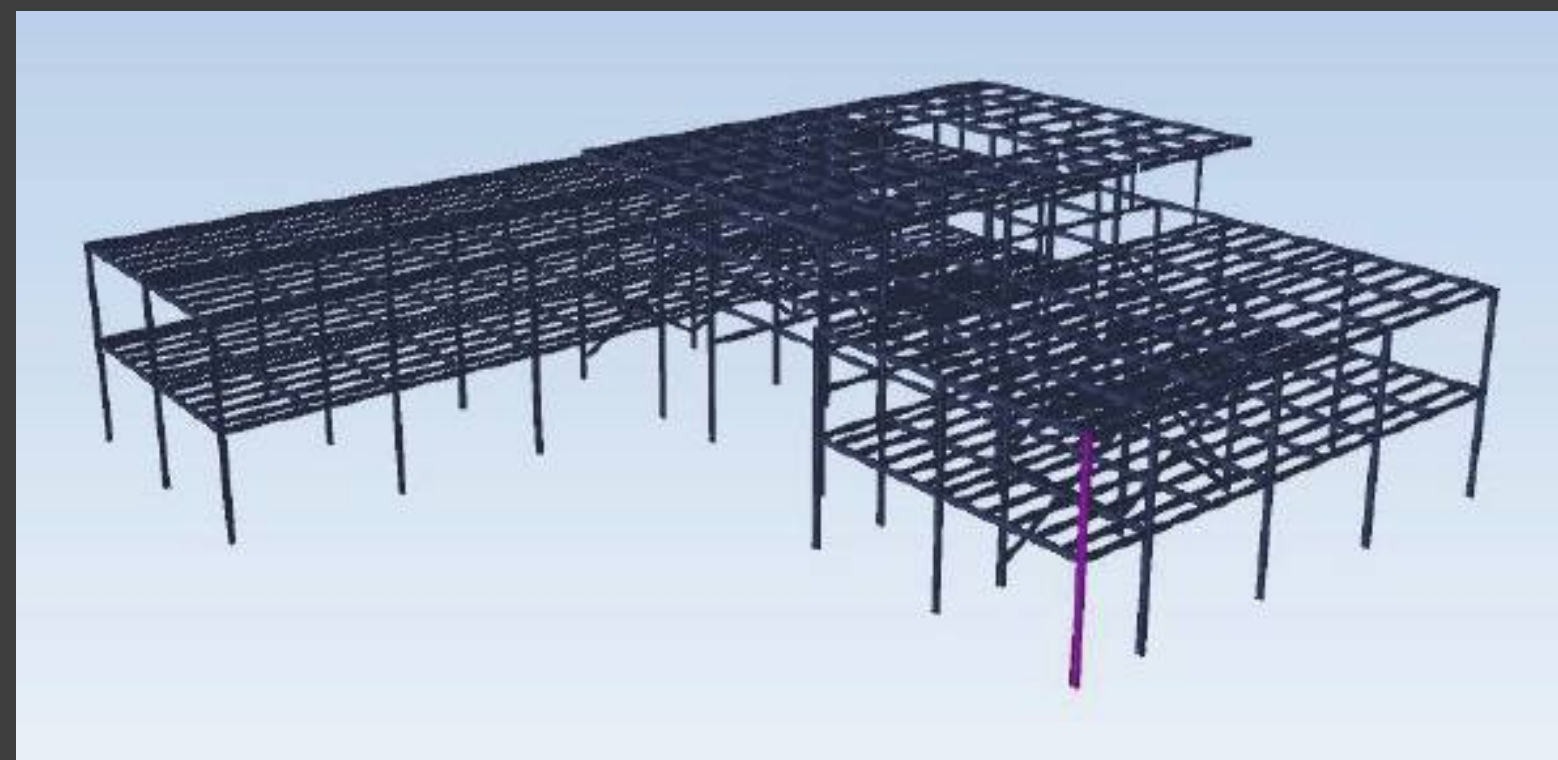
Bridge construction process demonstration using models created on Revit.



Tunnel construction process demonstration using models created on Revit.









Infraworks

City landscape modeling and city view video production

