Grading Design and Modeling at Bridge Abutments

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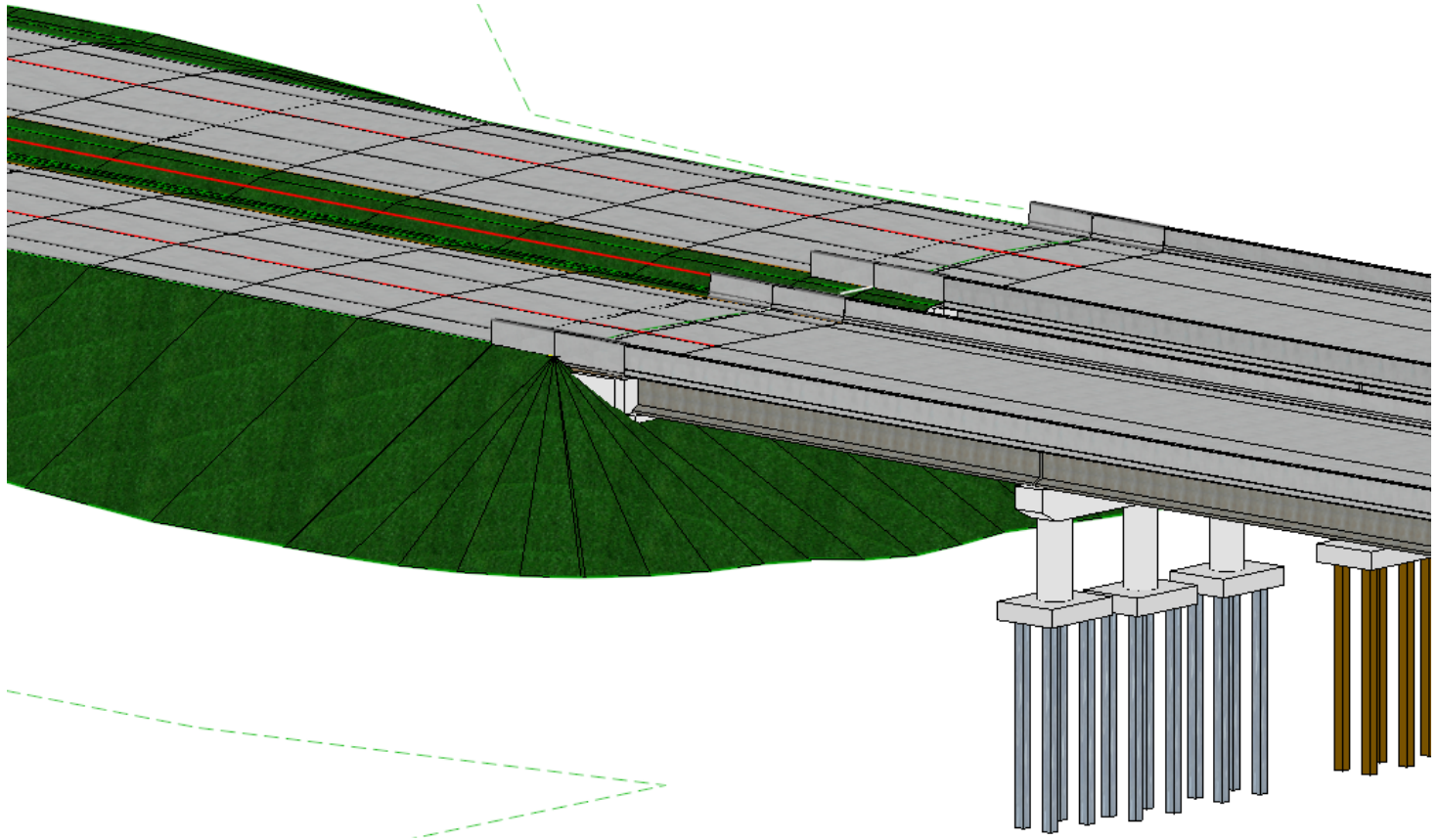
Grading Design and Modeling at Bridge Abutments

Objective

- To learn tools and techniques for modeling grading around bridge abutment areas



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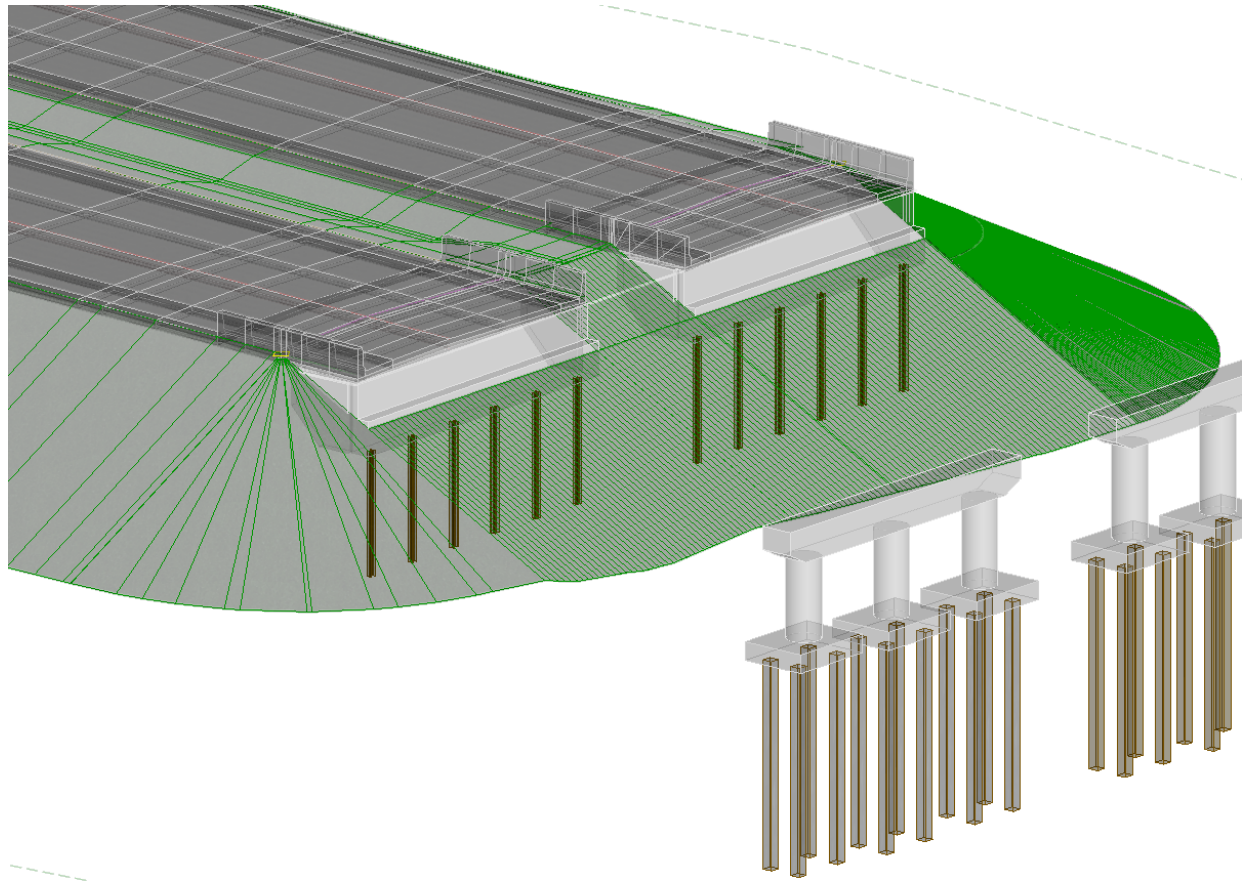
Grading Design and Modeling at Bridge Abutments

Agenda

- Create 3D Terrain by Slope
  - Simple Grading
    - Top Down Method
  - Detailed Grading
    - Down-Up Method
- Linear Templates
  - Slopewall Grading
  - Retaining Walls



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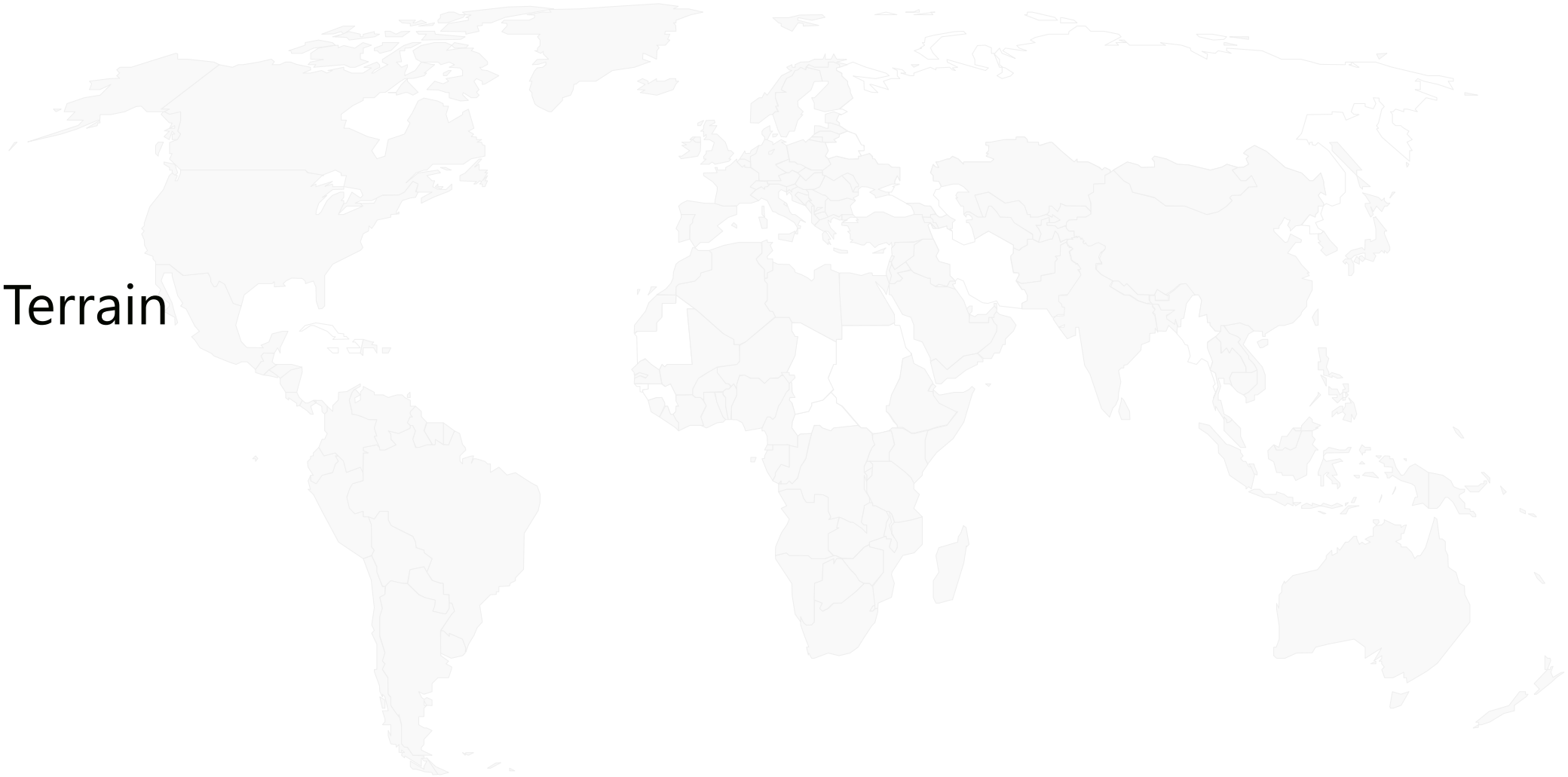

3D Terrain

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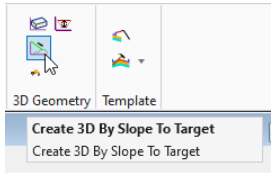
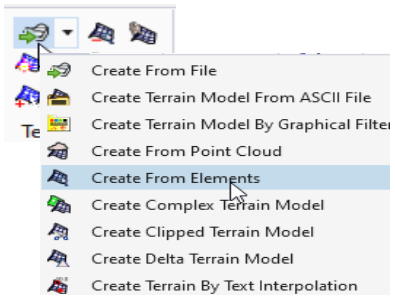
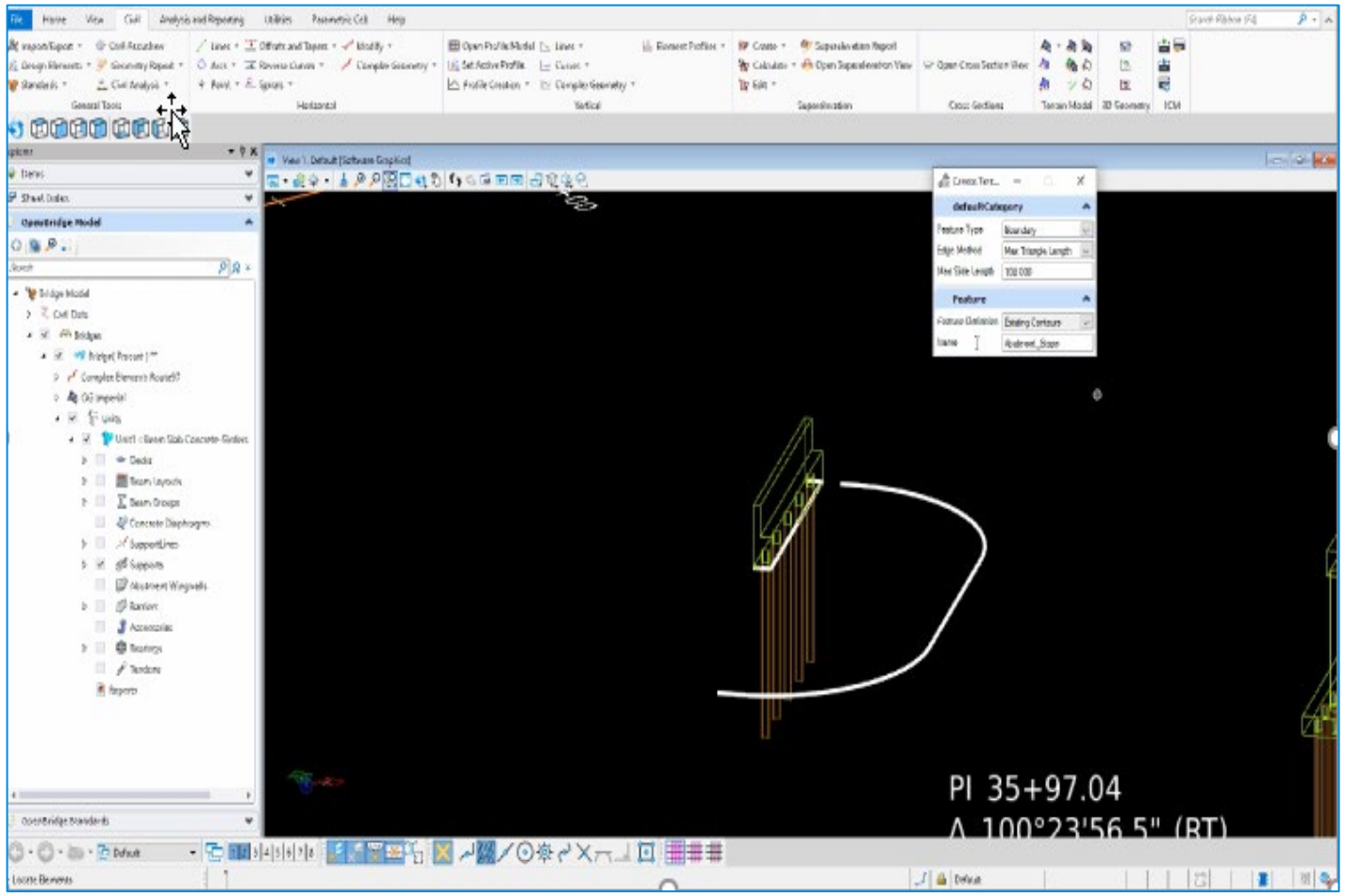
Simple Grading

- Place Smartline around the bottom of the abutment.
- Under the Civil tab, use



- Create a new terrain from elements, using the bottom “smartlined” abutment (breakline) and the projected slope (boundary).





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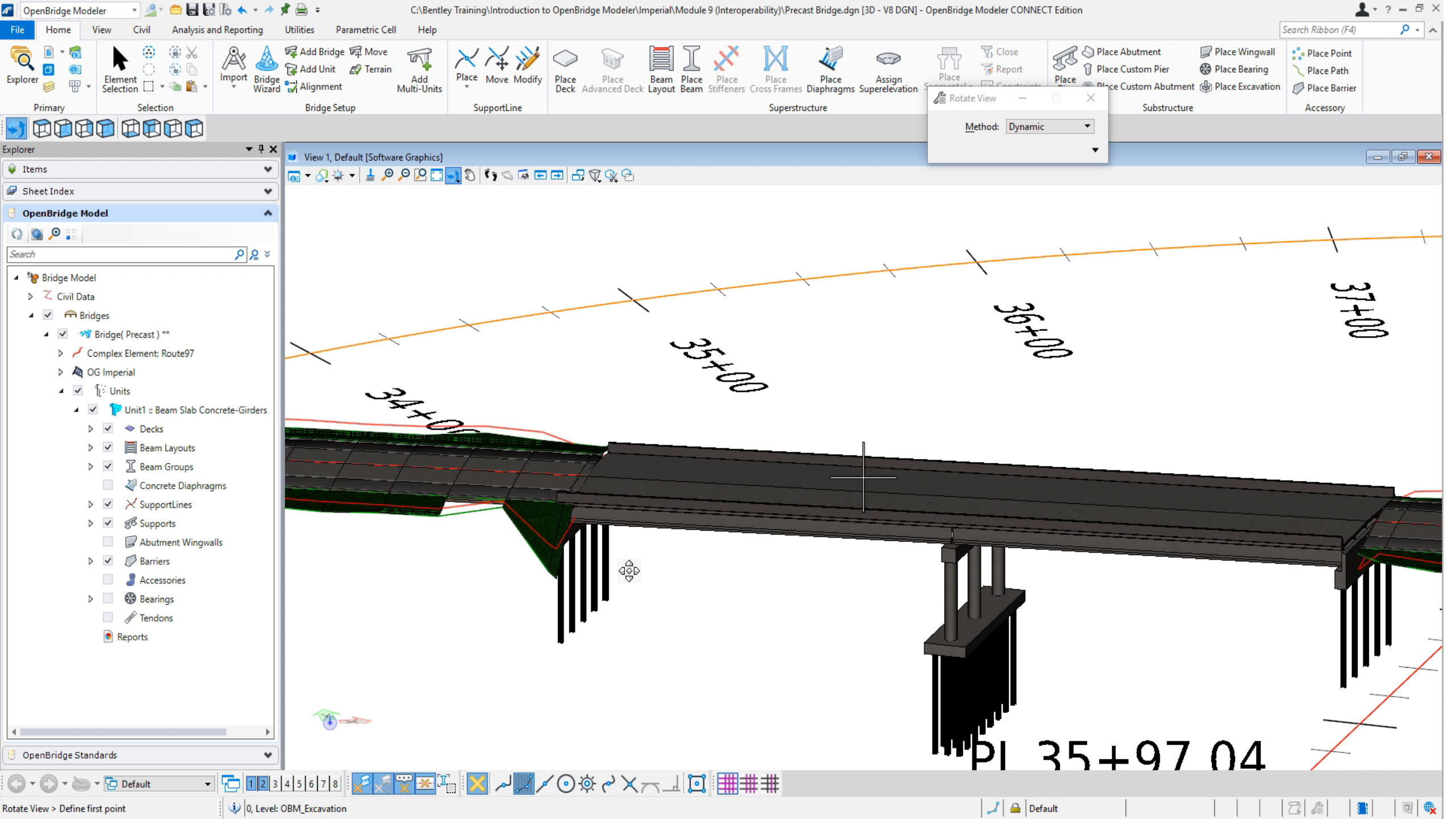
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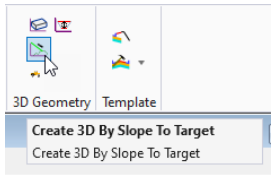
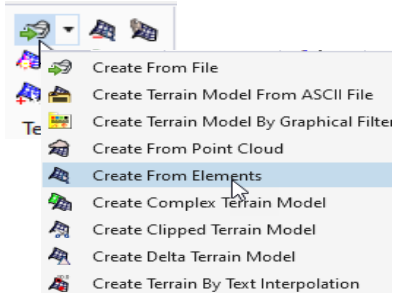
Simple Grading and Earthworks

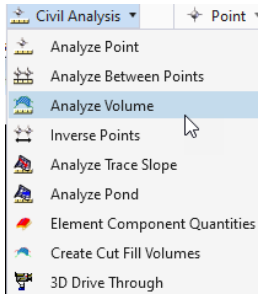
- Place Smartline around the bottom of the abutment.
- Under the Civil tab, use

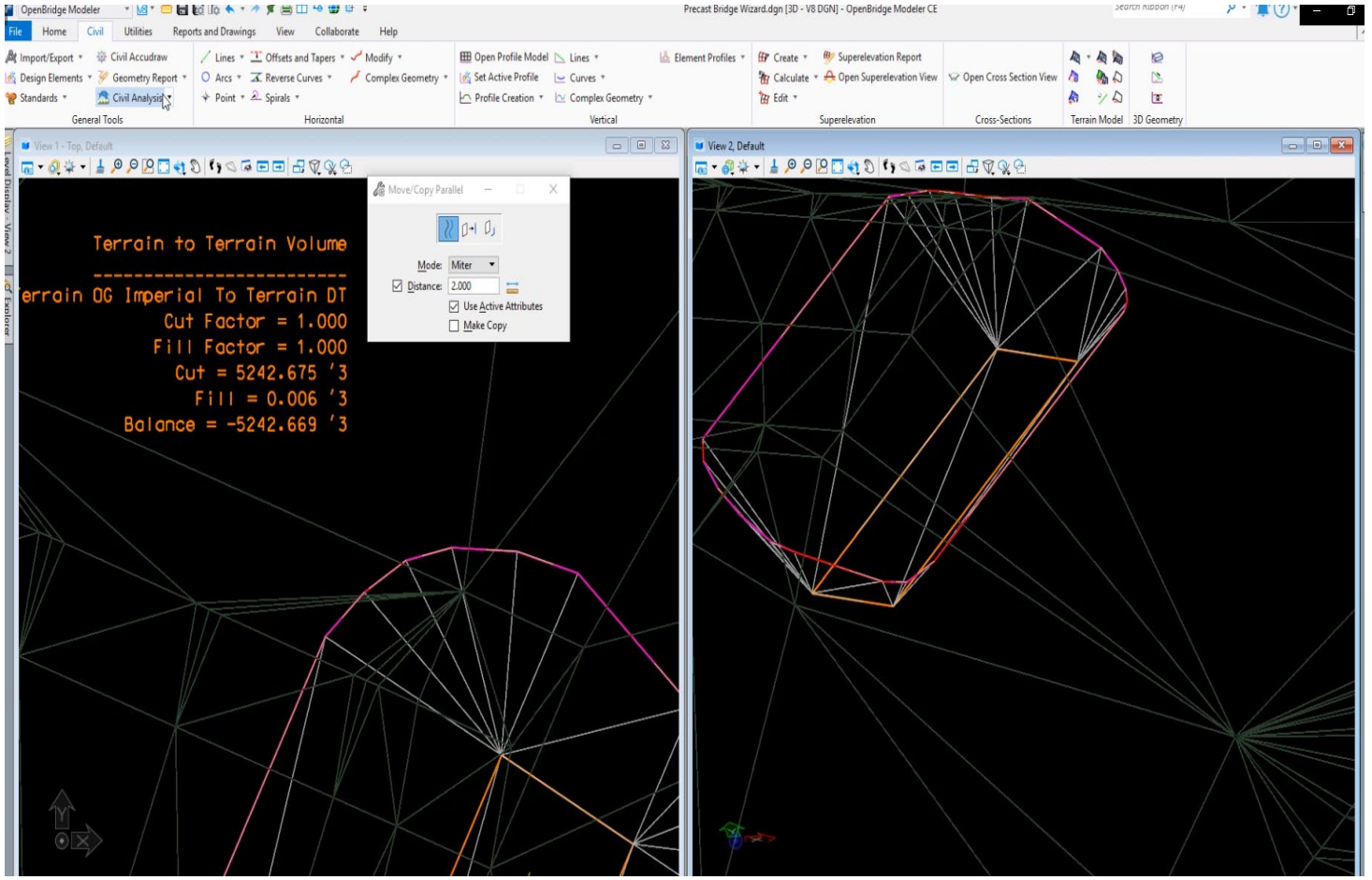


- Create a new terrain from elements, using the bottom "smartlined" abutment (breakline) and the projected slope (boundary).



- Under Civil Analysis>Analyze Volume using the ground data against the new graded terrain.





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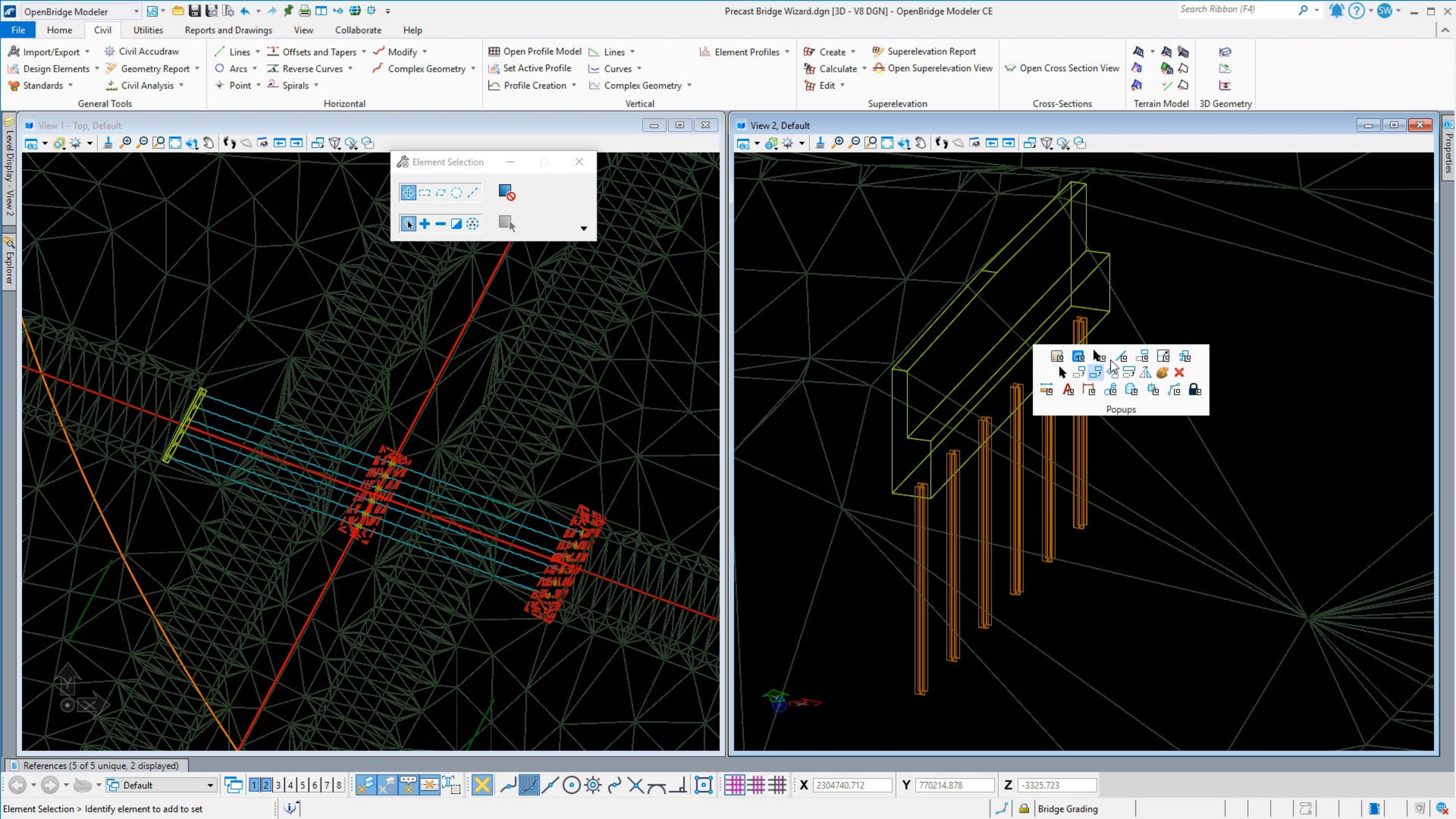
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Explorer
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Z -3325.723
Element Selection > Identify element to add to set
Bridge Grading

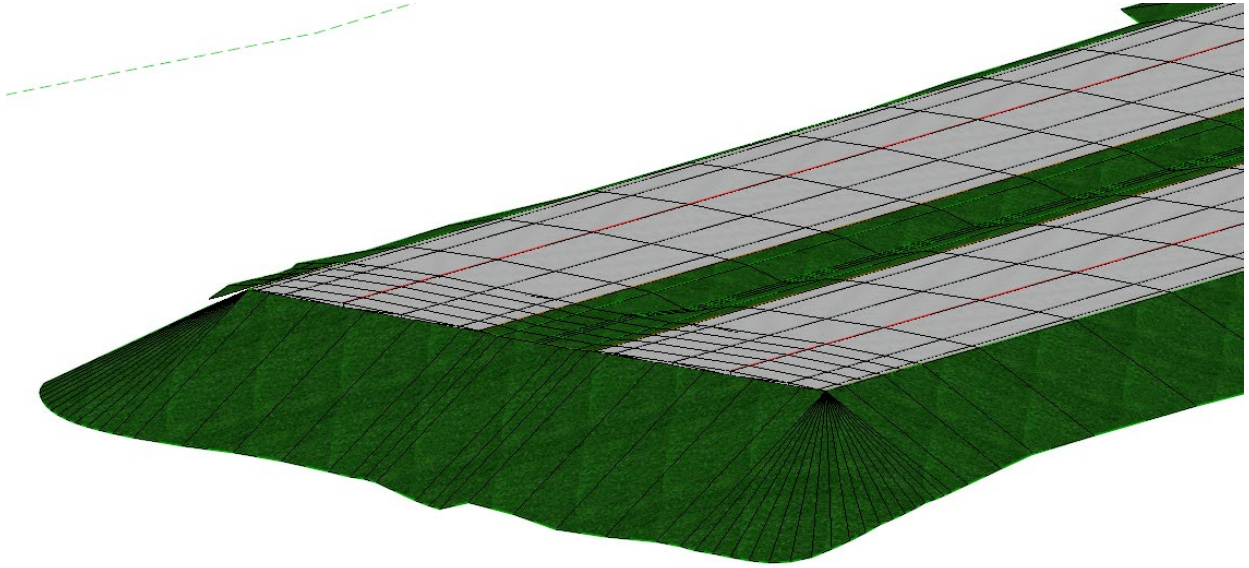
Grading Design and Modeling at Bridge Abutments

Linear Templates

Grading Design and Modeling at Bridge Abutments

Simple Grading – Top Down Method

- Establish horizontal geometry at approx. location of abutment
- Establish vertical geometry along top or bottom of corridor
- Apply linear template along horizontal geometry to create 2:1 grading slopes to existing terrain
- Good for preliminary engineering



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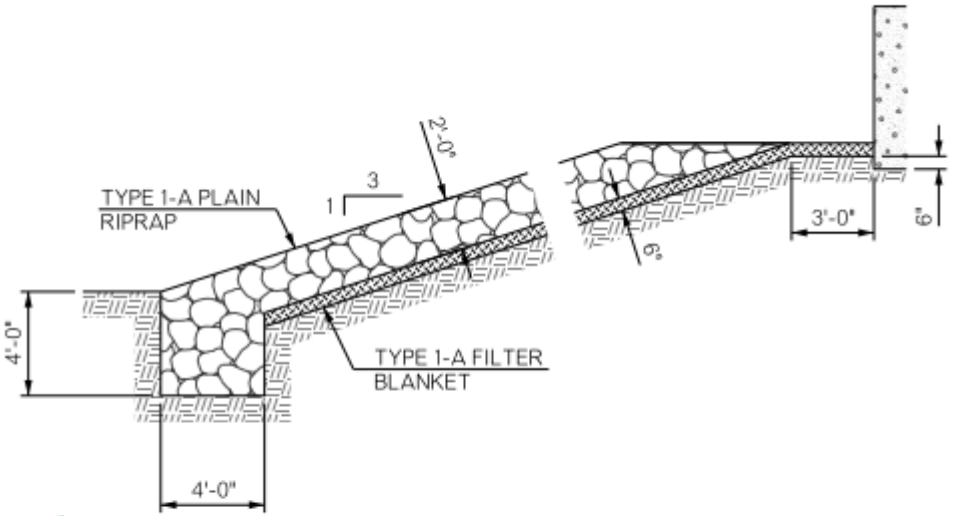
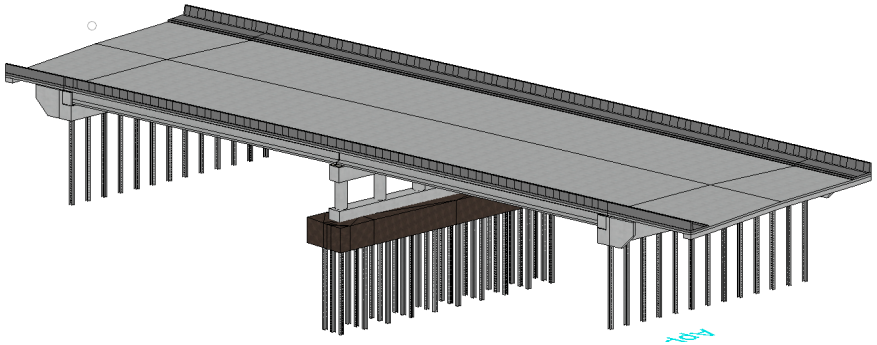
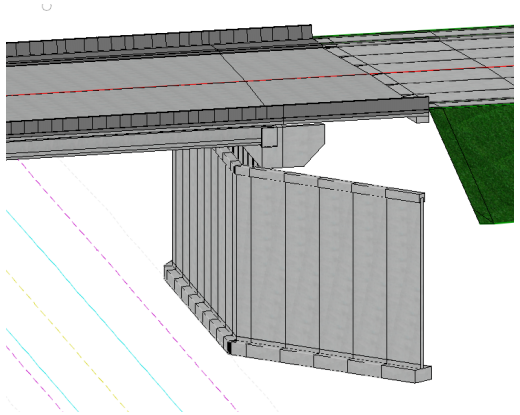
Detailed Grading – Top Down Method

- Needs Civil geometry: alignment and profile.
- Create alignment using a 2D Design Model.
- Create a profile.
- Apply a linear template
  - Template can be as complex as need, including attaching item types for additional design data



SECTION THRU RIPRAP AT BRIDGE SEAT





** Work selecting the 2D elements. See the results in 3D

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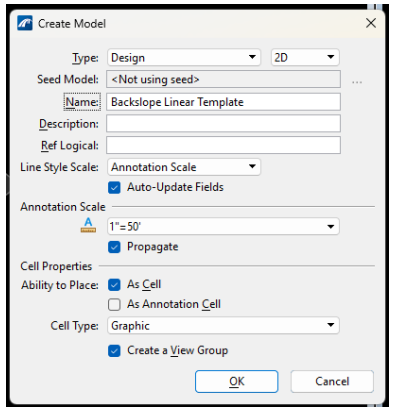
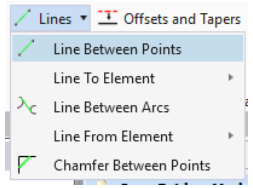
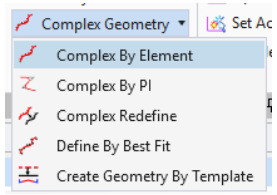
Linear Templates – Slopewall / Rip Rap

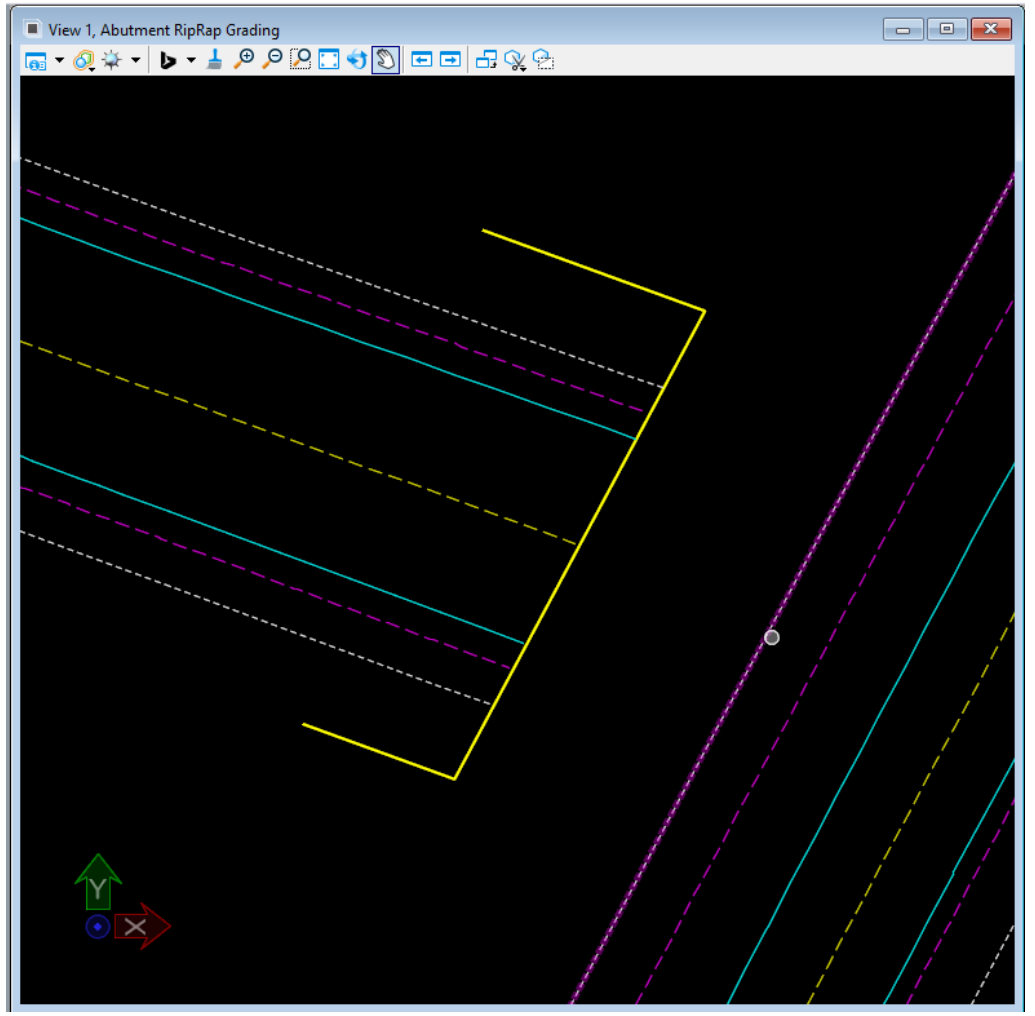
- Starting with 2D model, we will reference our bridge and terrain files



- Then we will create horizontal geometry using Civil Lines and Complex Geometry in the Horizontal Ribbon Group







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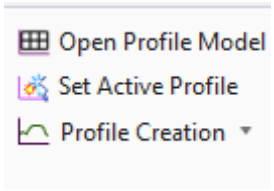
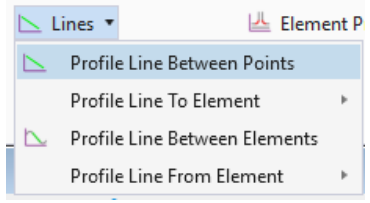
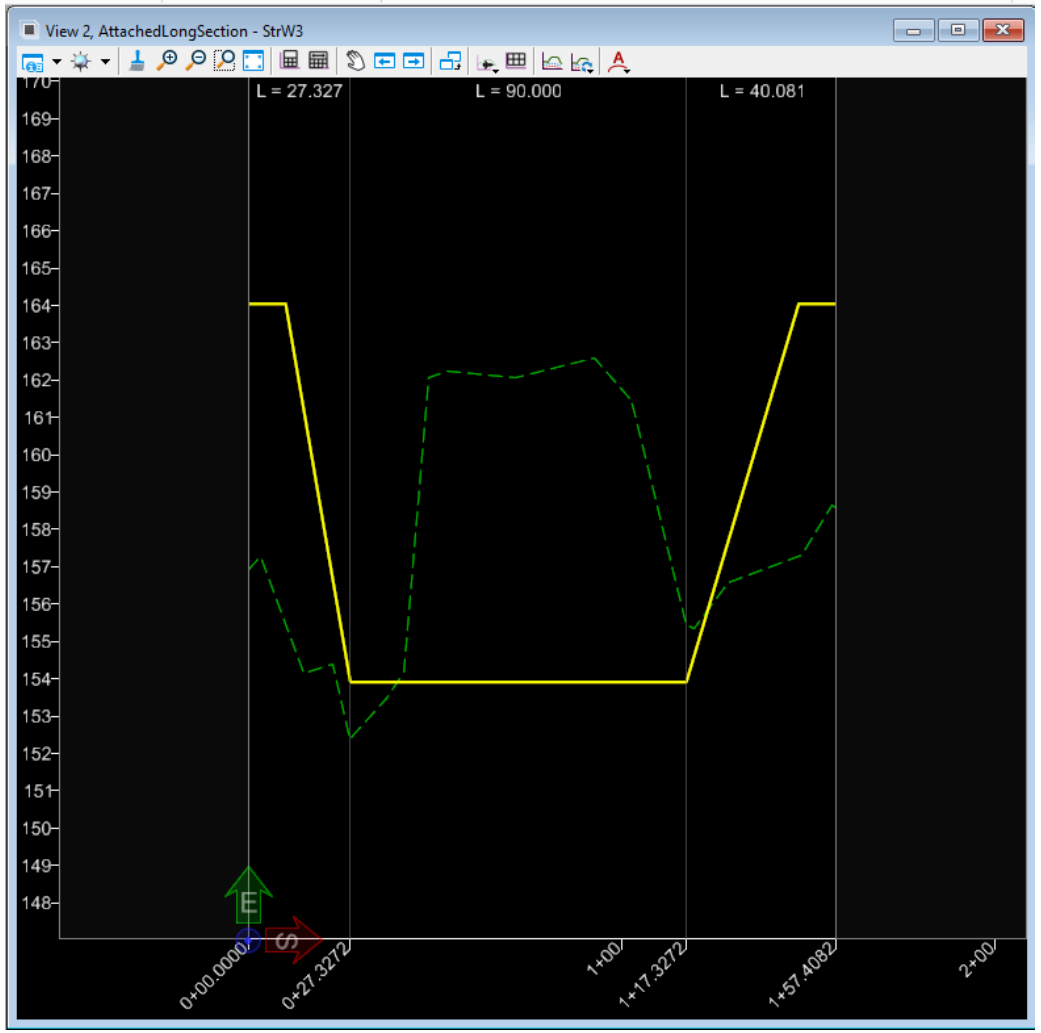
Linear Templates – Slopewall / Rip Rap

- Next, we create profile using vertical civil geometry in the Vertical Ribbon Group
  - Open a profile view with the Open Profile Model tool, and select a view represent the model.
  - Assign vertical lines with elevation based off Bridge Geometry and existing or proposed terrain.
  - Complex geometry when completed
  - Set the Vertical Profile Active







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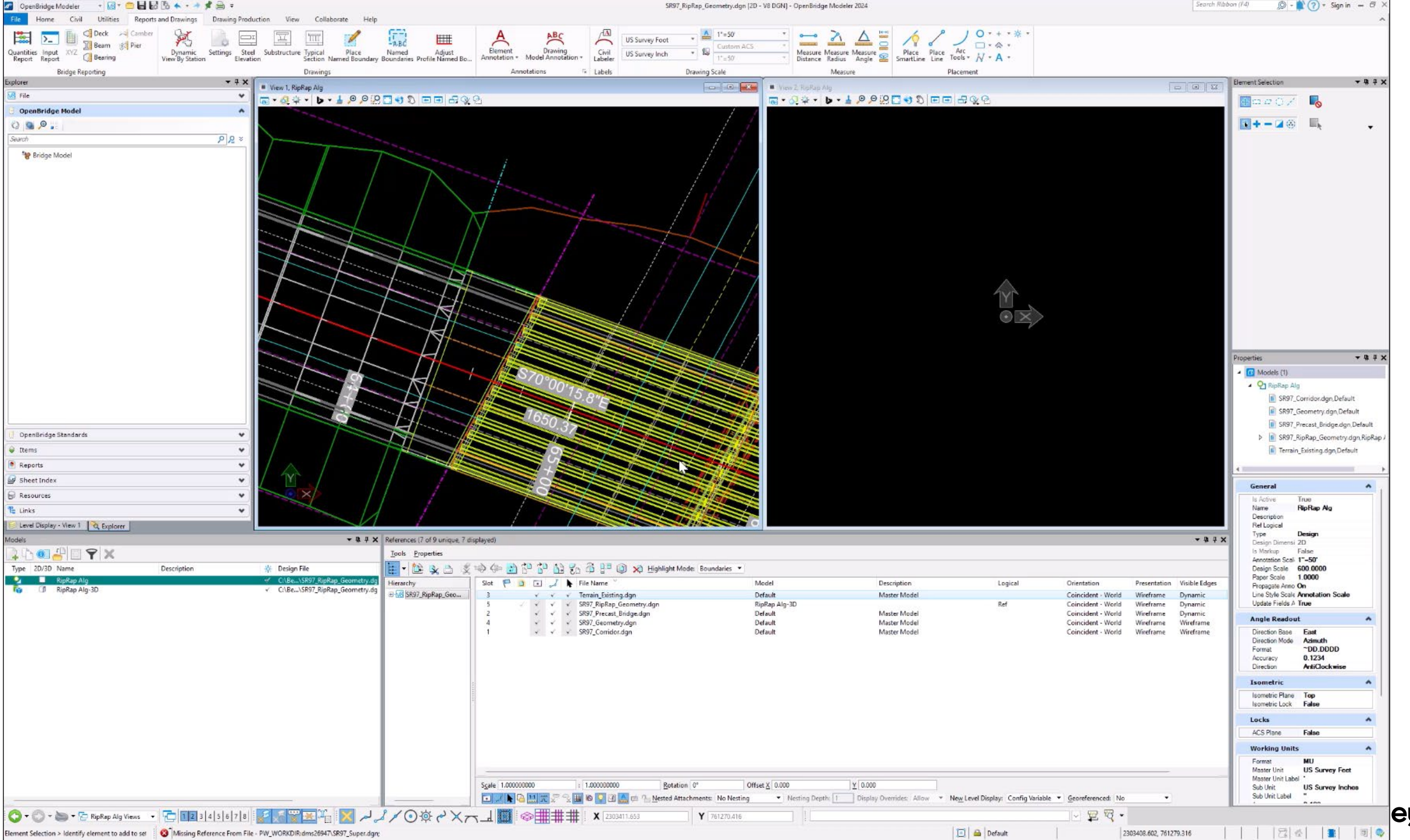
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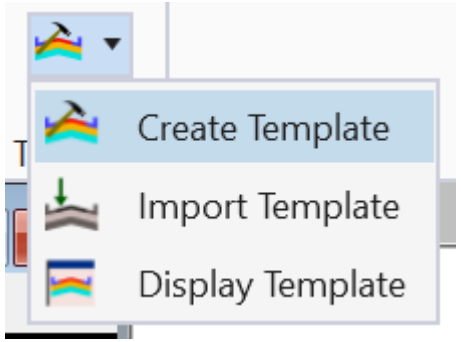
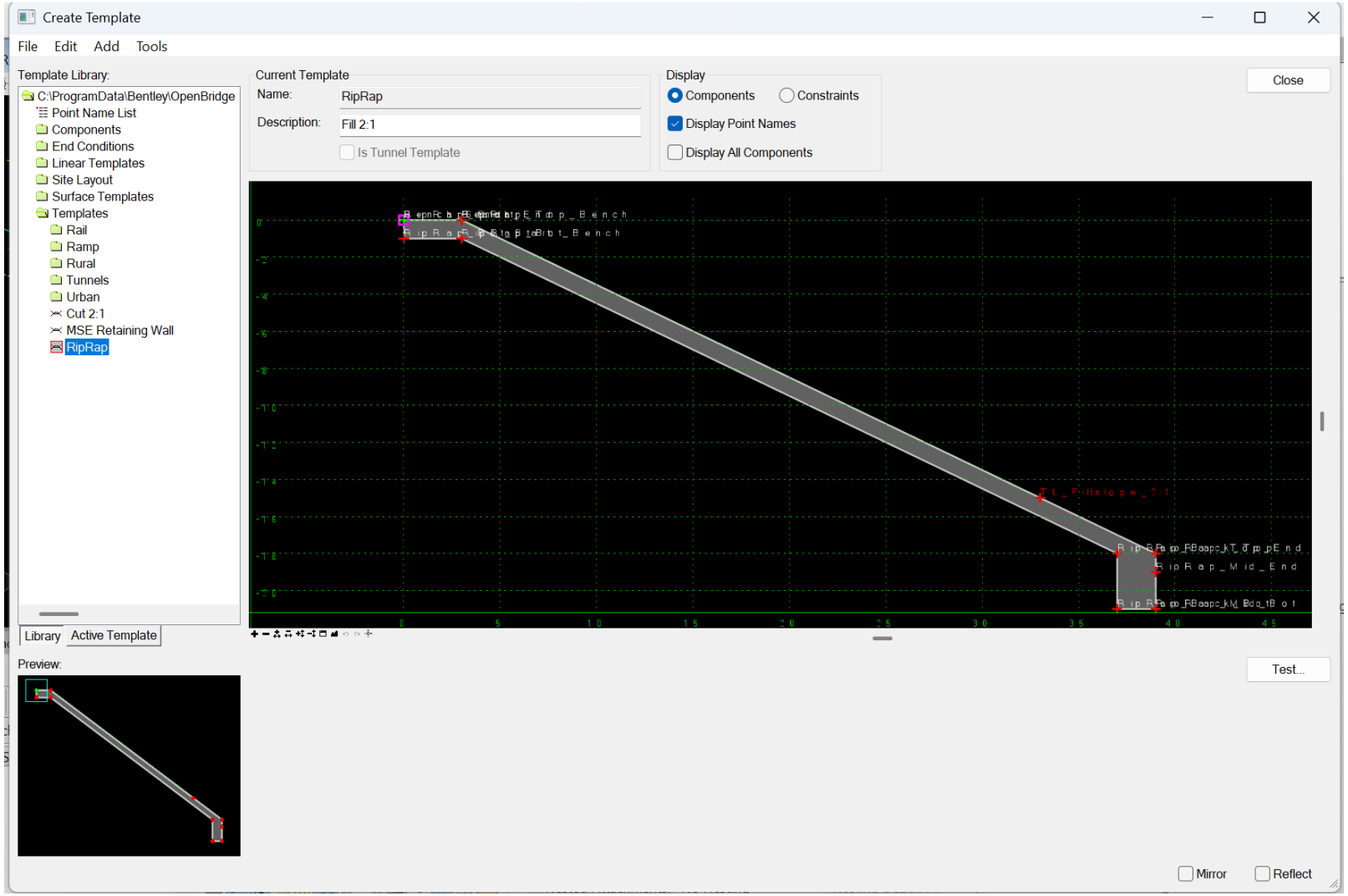
SR97_Corridor.dgn

Linear Templates – Slopewall / Rip Rap

- Select Create Linear Template to review templates available, open additional templates, or Create a new template if needed.





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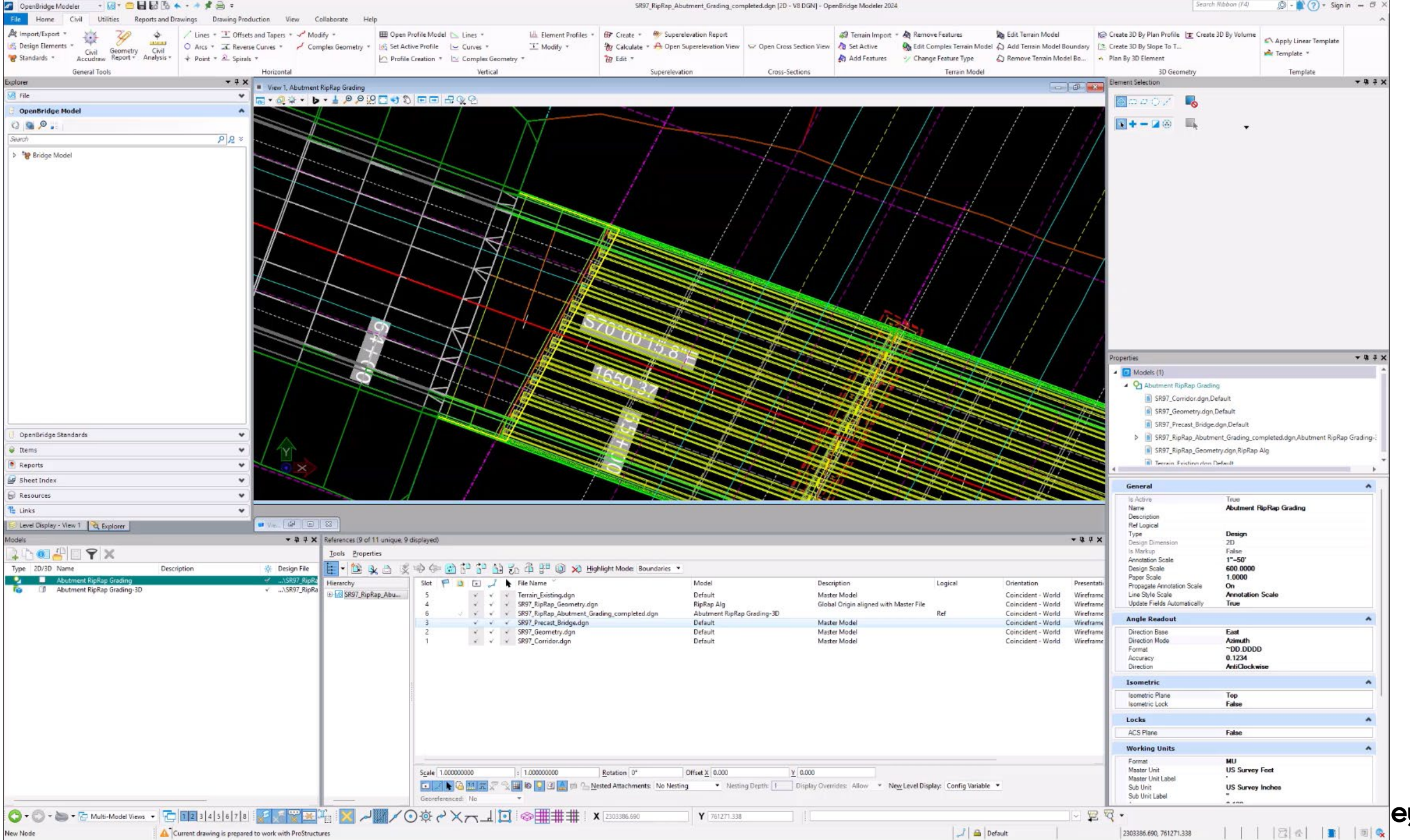
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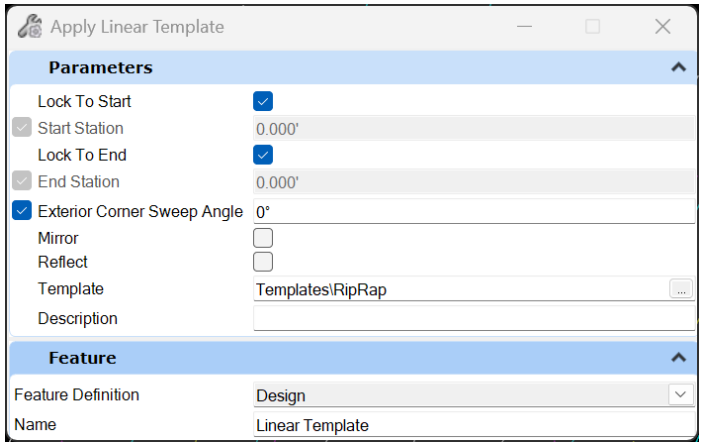
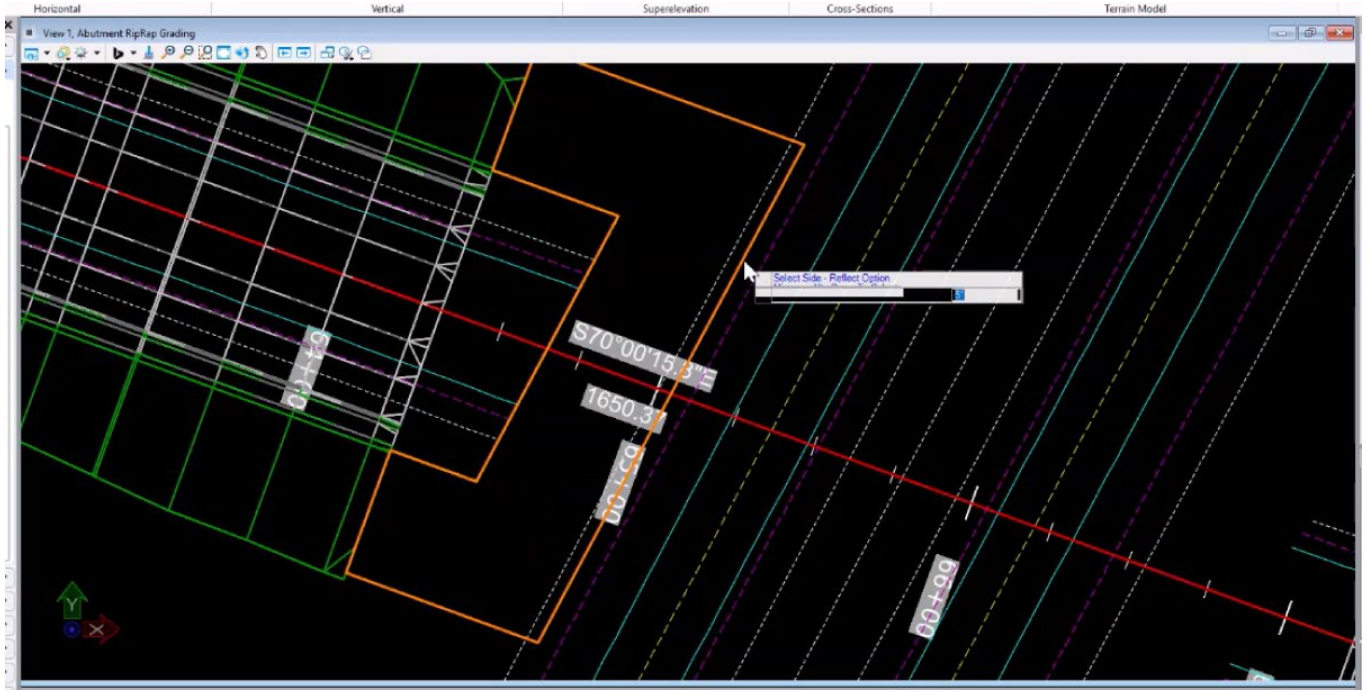
SR97_Corridor.dgn
New Node
Current drawing is prepared to work with ProStructures

Linear Templates – Slopewall / Rip Rap

- Select Apply Linear Template to being the process of placement
  - Lock Start and End Stations
  - Determine which side the template drop is needed





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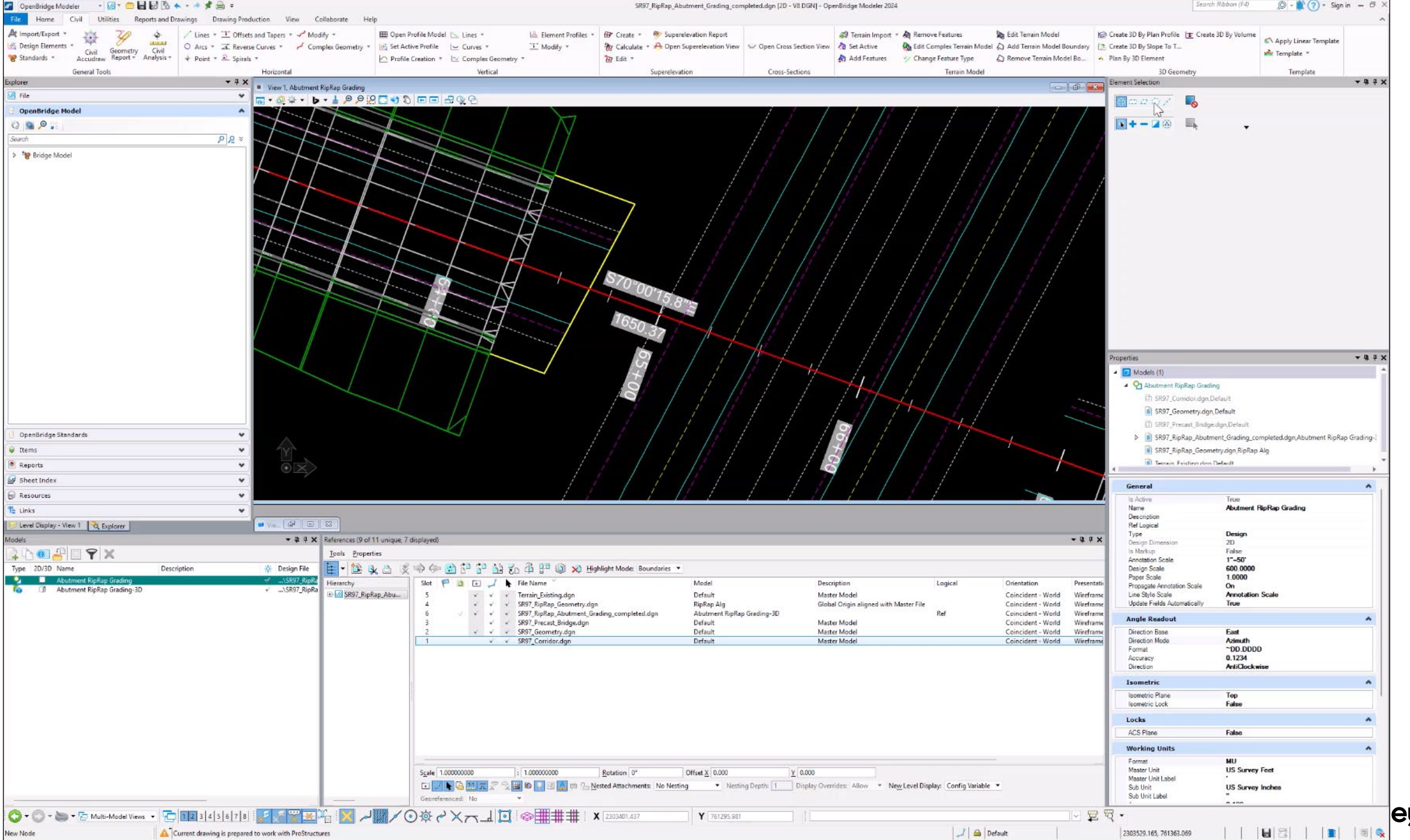
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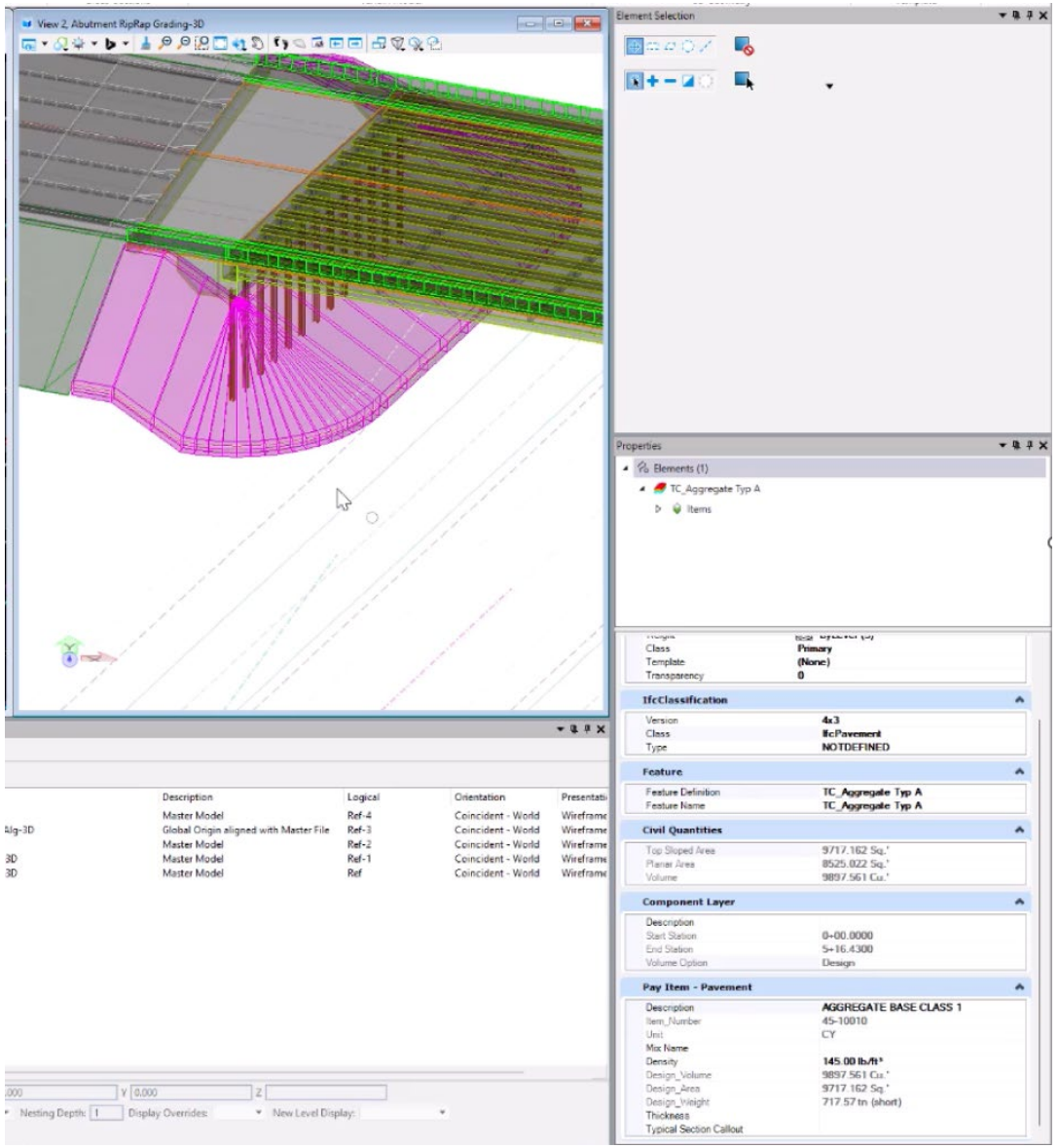
SR97_Corridor.dgn
Multi-Model Views
New Node
Current drawing is prepared to work with ProStructures

Linear Templates – Slopewall / Rip Rap

- Using Item Types or Corridor analysis tools, we can assign pay items or other data to be exposed from our linear template
- If applicable to your template, we also set up end conditions to seek ground targets
  - To enable those in our model, we need to have an active terrain
- We can also seek other Feature Definitions to tie into



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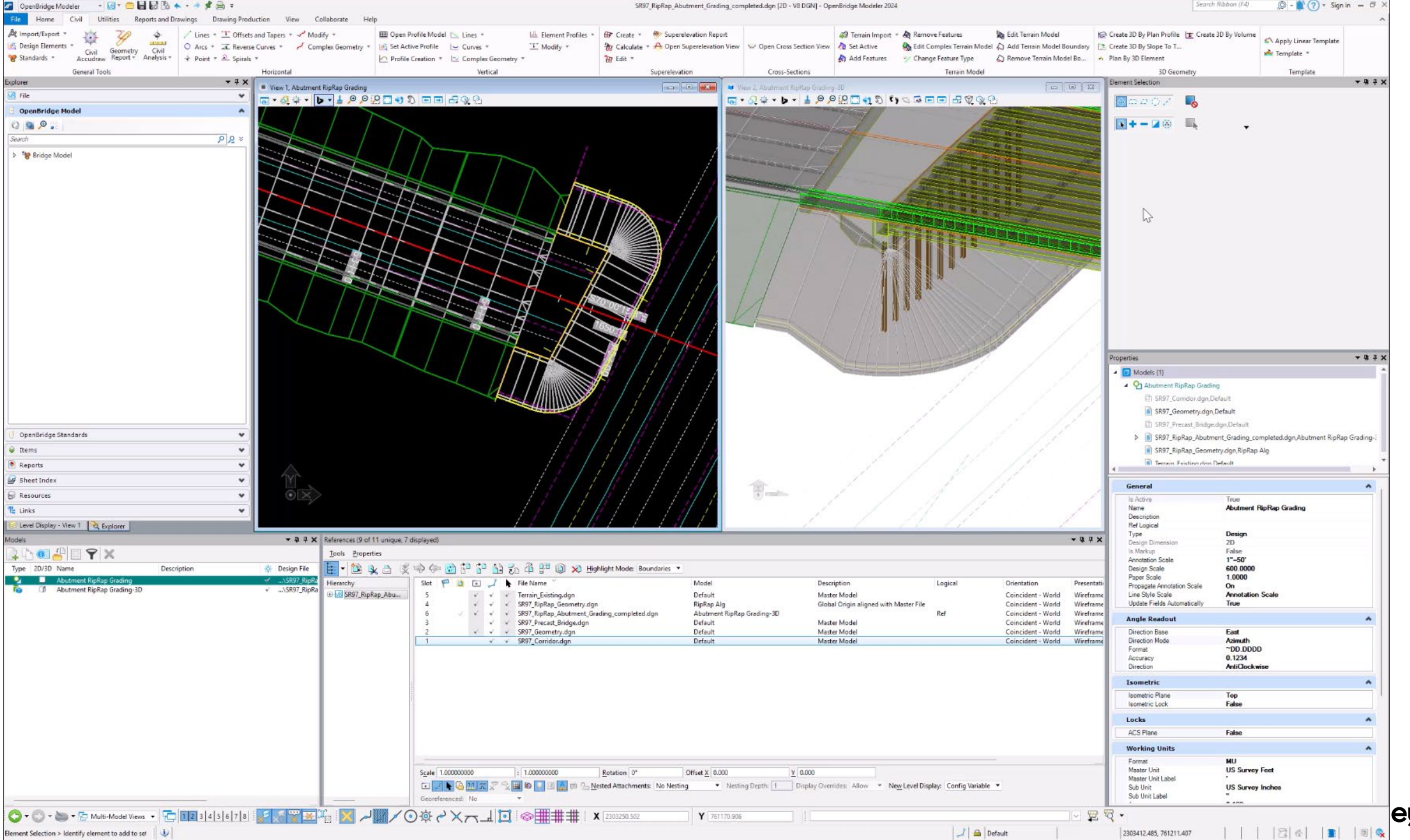
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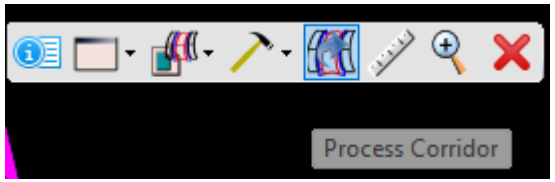
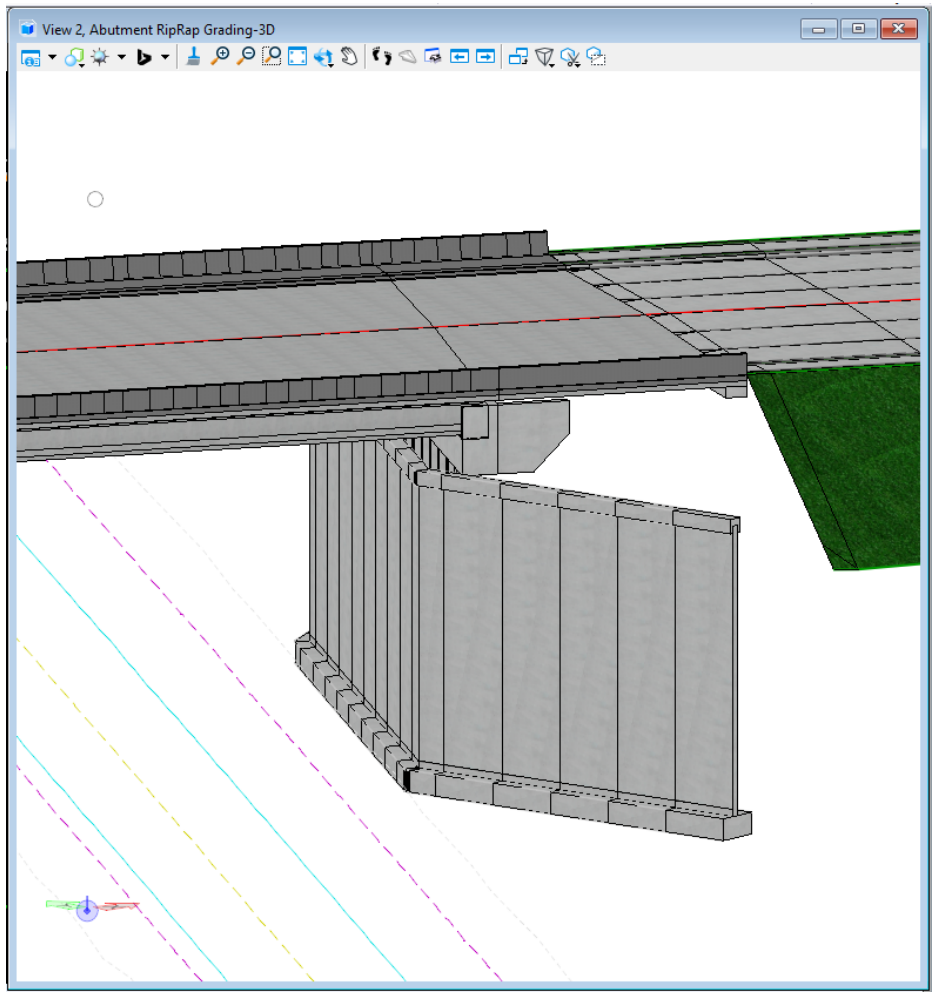
Element Selection > Identify element to add to set

Linear Templates – Retaining Walls

- Same Concept, Different Template
- Can still target the terrain, footing a set distance below the existing surface
- Regenerate the Linear Template with the corridor process tool if it has changed





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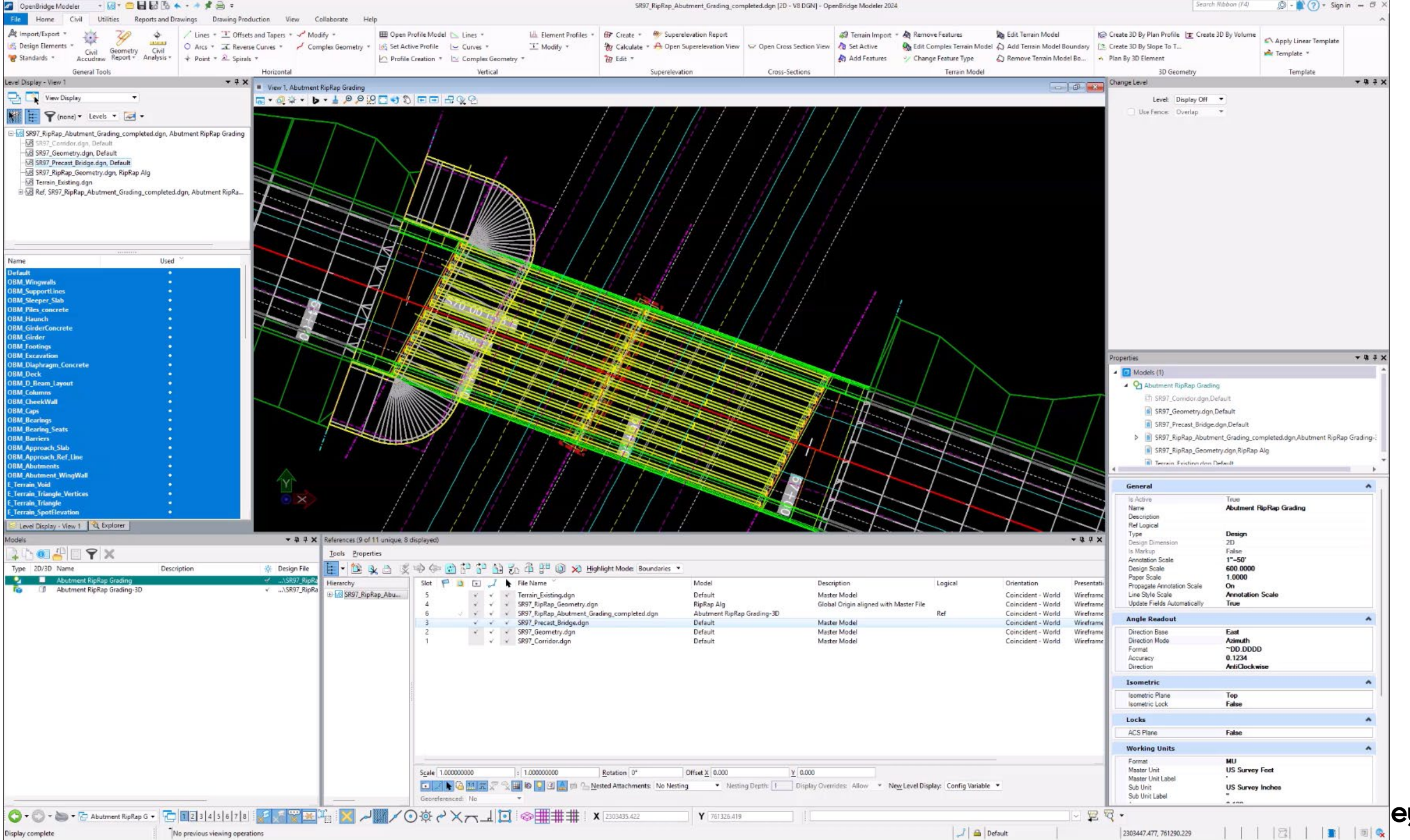
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Thank You