Best Practice Corridor Modelling

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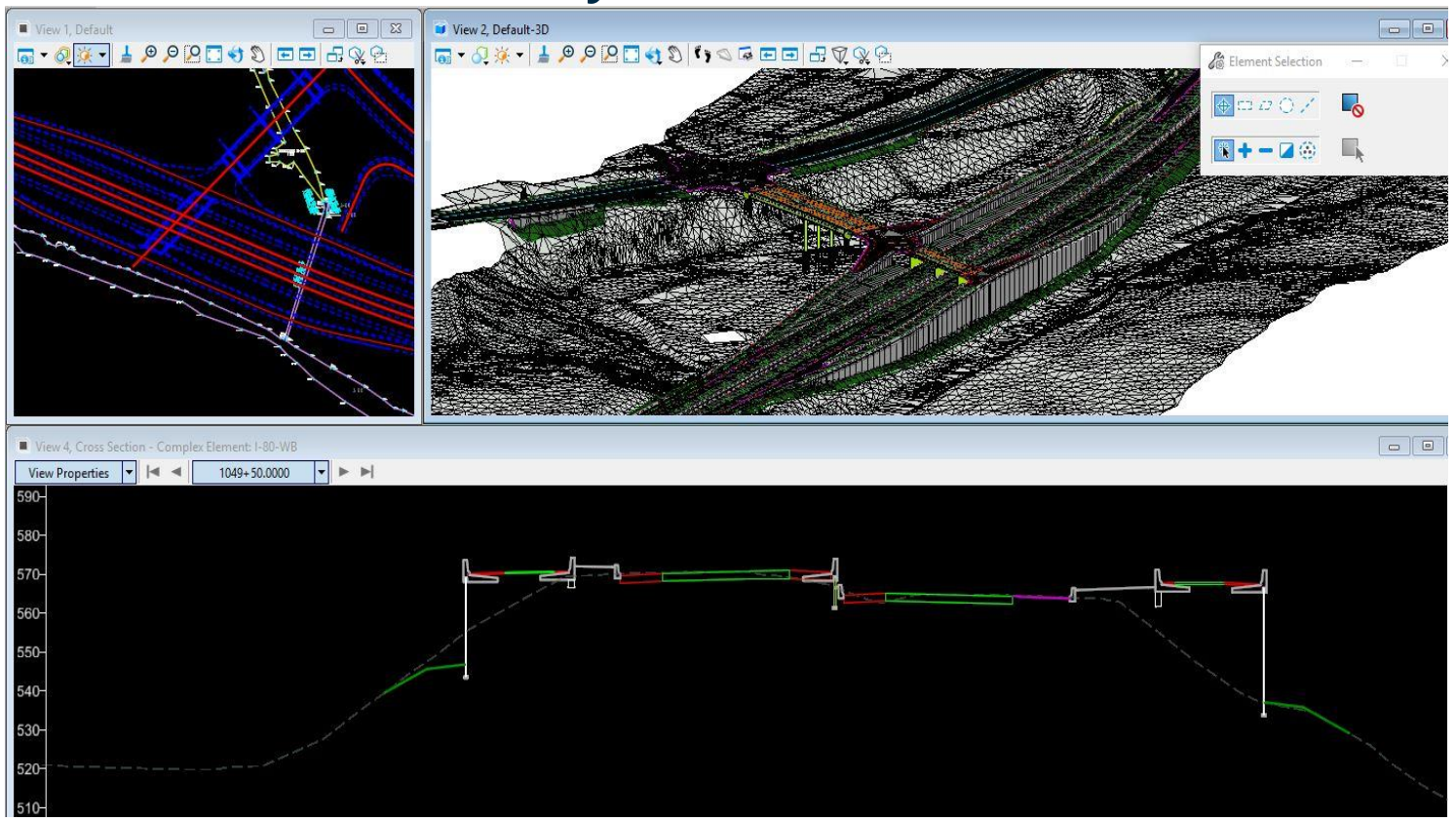
Advancing Infrastructure

Preface

The purpose of this presentation is to provide guidance and tips on creating an accurate roadway model.



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Agenda

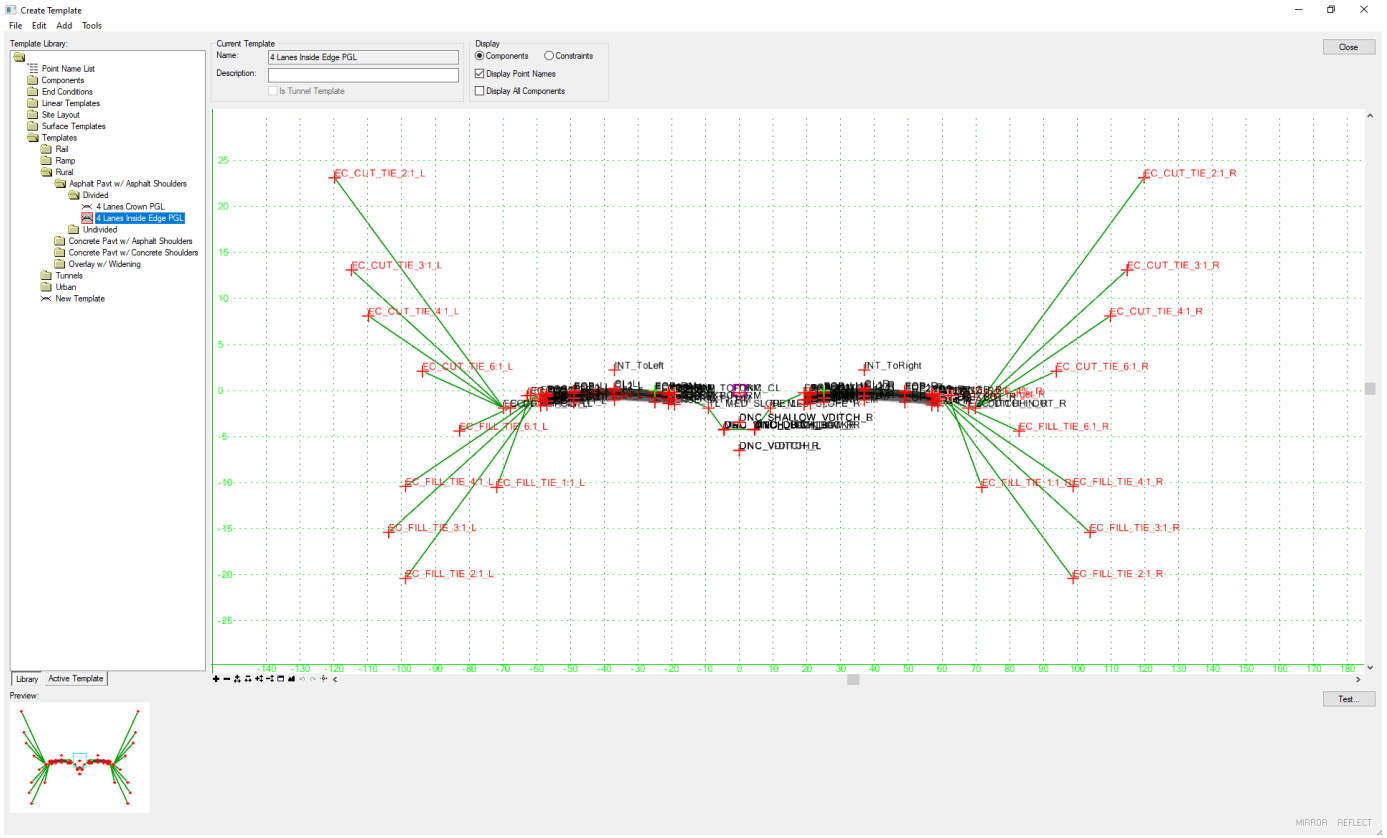
- Modeling Strategy
- File Federation/Separation
- Corridor Feature Definitions
- Template Drop Interval
- Key Stations
- Corridor Clipping and Target Aliasing
- Geometry Stroking
- Secondary Alignment

Modeling Strategy

- Evaluate your project to determine best modeling strategy
  1. Full Width Templates and Corridors (Traditional workflow)
     - Pavement and End Conditions all in one template
  2. Separate Templates and Corridors (Alternate workflow)
     - Backbone Only Templates and Corridors
     - End Condition Only Templates and Corridors
  3. Consider Corridor Length, Width and File Size
     - Length of corridor, template drop interval, number of template drops and other variables can slow down corridor processing
     - Think ahead about the length (and file size) of the corridor and all of the processing that may occur
     - Use engineering judgement
     - Break up long corridors into smaller ones
  4. Simple vs. Complex Templates

Modeling Strategy

- Full Width Templates and Corridors
  - Traditional workflow, one corridor with one or multiple template drops



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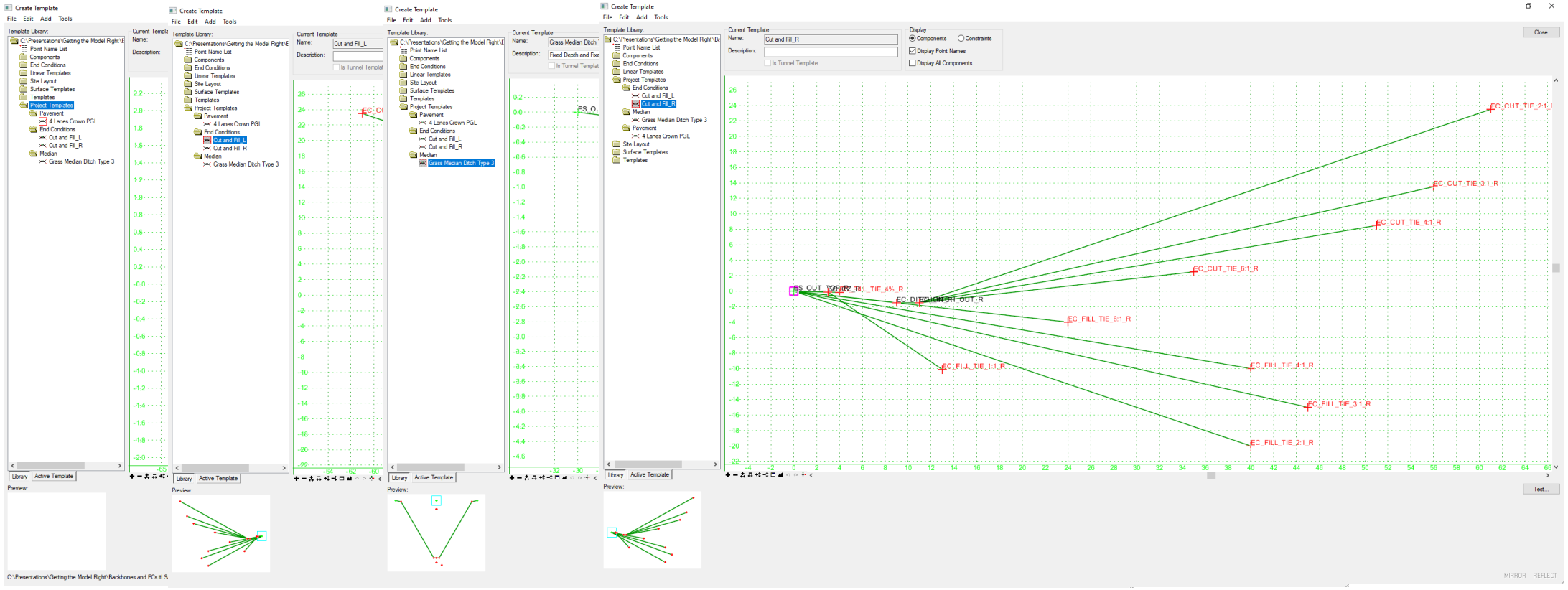
Modeling Strategy

- Separate Templates and Corridors



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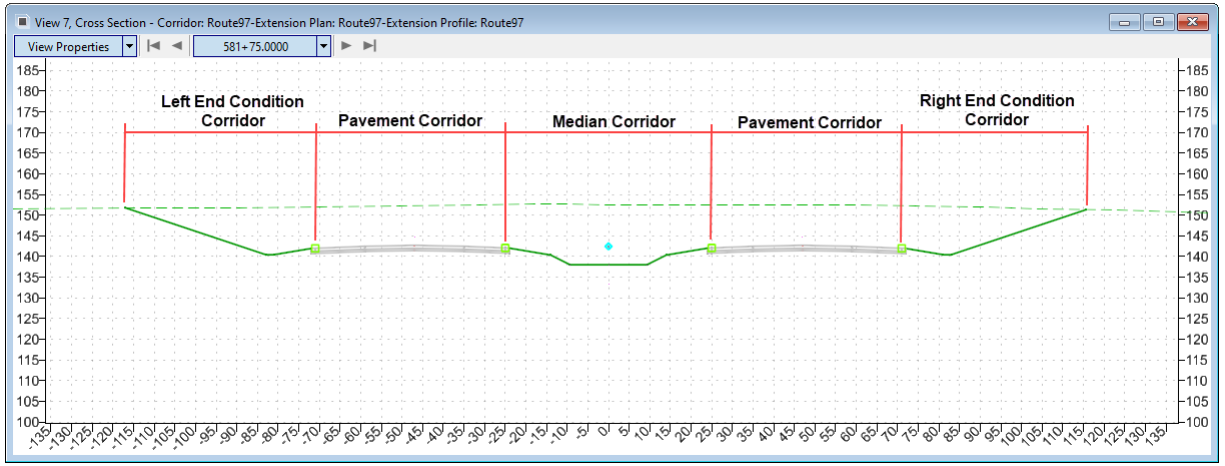
Modeling Strategy

- Separate Templates and Corridors
  - Simplifies Templates
  - Distribution of work between multiple designers
  - Reduced time for finished model (more designers working simultaneously on the project)
  - More corridors to manage but processing speeds will be much quicker (in most cases)



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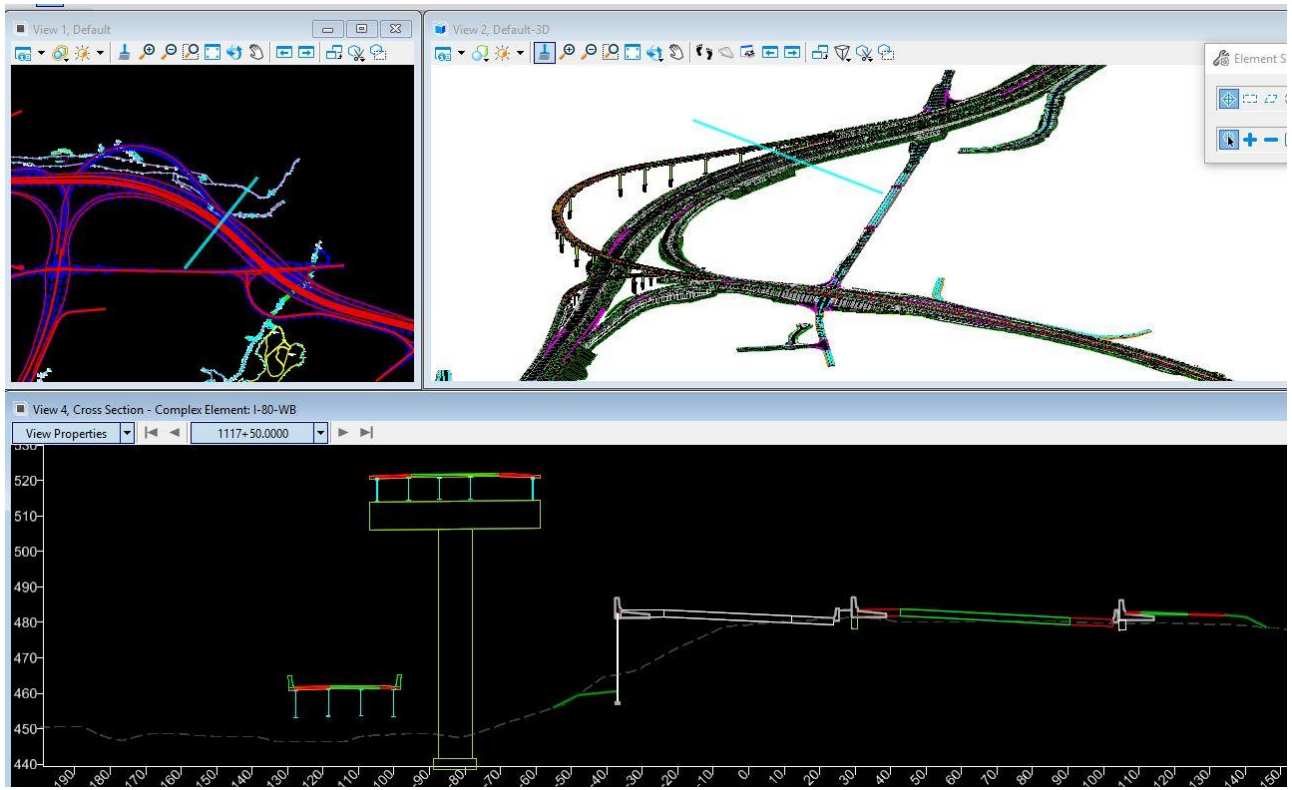
Modeling Strategy

- Why split up corridors?
  - File Size
    - Try to keep DGN files less than 10MB
    - Keeps processing time down
      - Function of length and complexity of the corridors
  - Mitigate reference corruption
    - Allows tracking down of broken references to be more targeted
  - Allows for specific modeling based on corridor constraints
    - ROW, key features, etc.
  - Can apply different template drop intervals to corridors where greater level of detail is required



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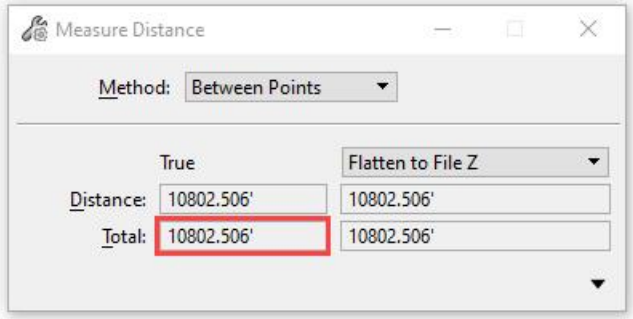
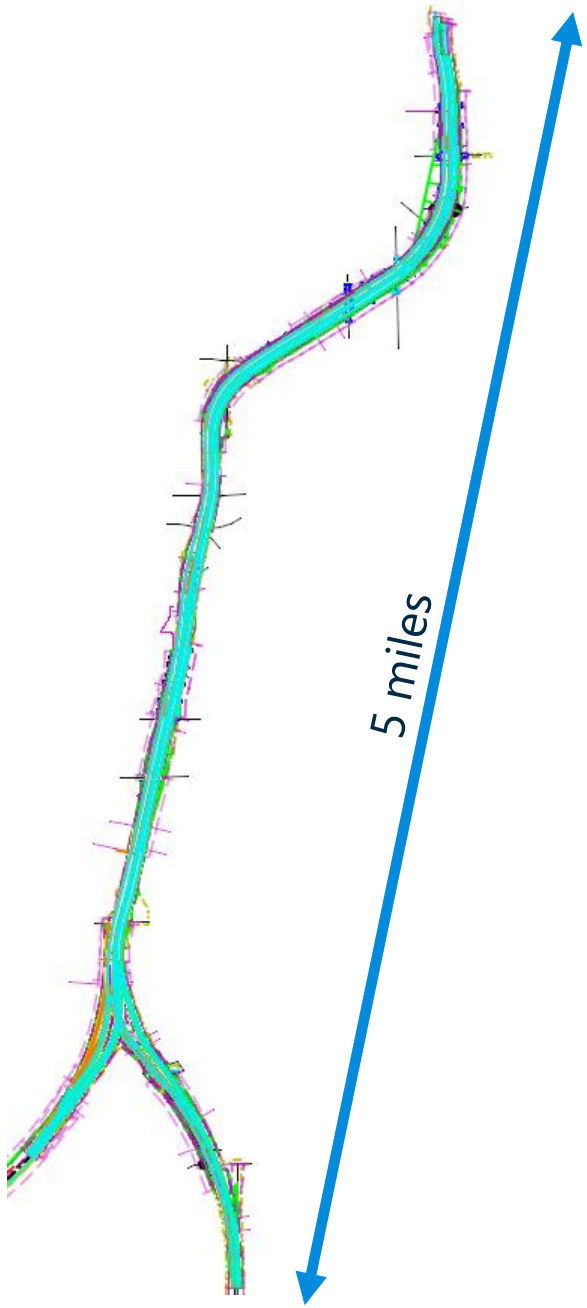
Modeling Strategy

- Corridor Length, Width and File Size





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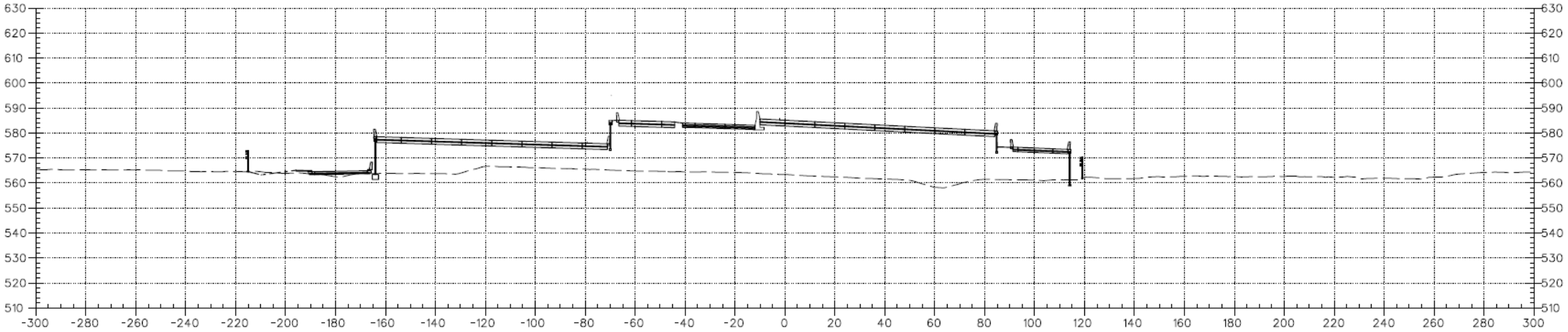
Modeling Strategy

- Corridor Length, Width and File Size
  - Very wide cross section
  - Multiple roadways (Frontage roads, SB lanes, NB lanes, HOV lanes, Ramps)
  - Separate corridors definitely a better solution



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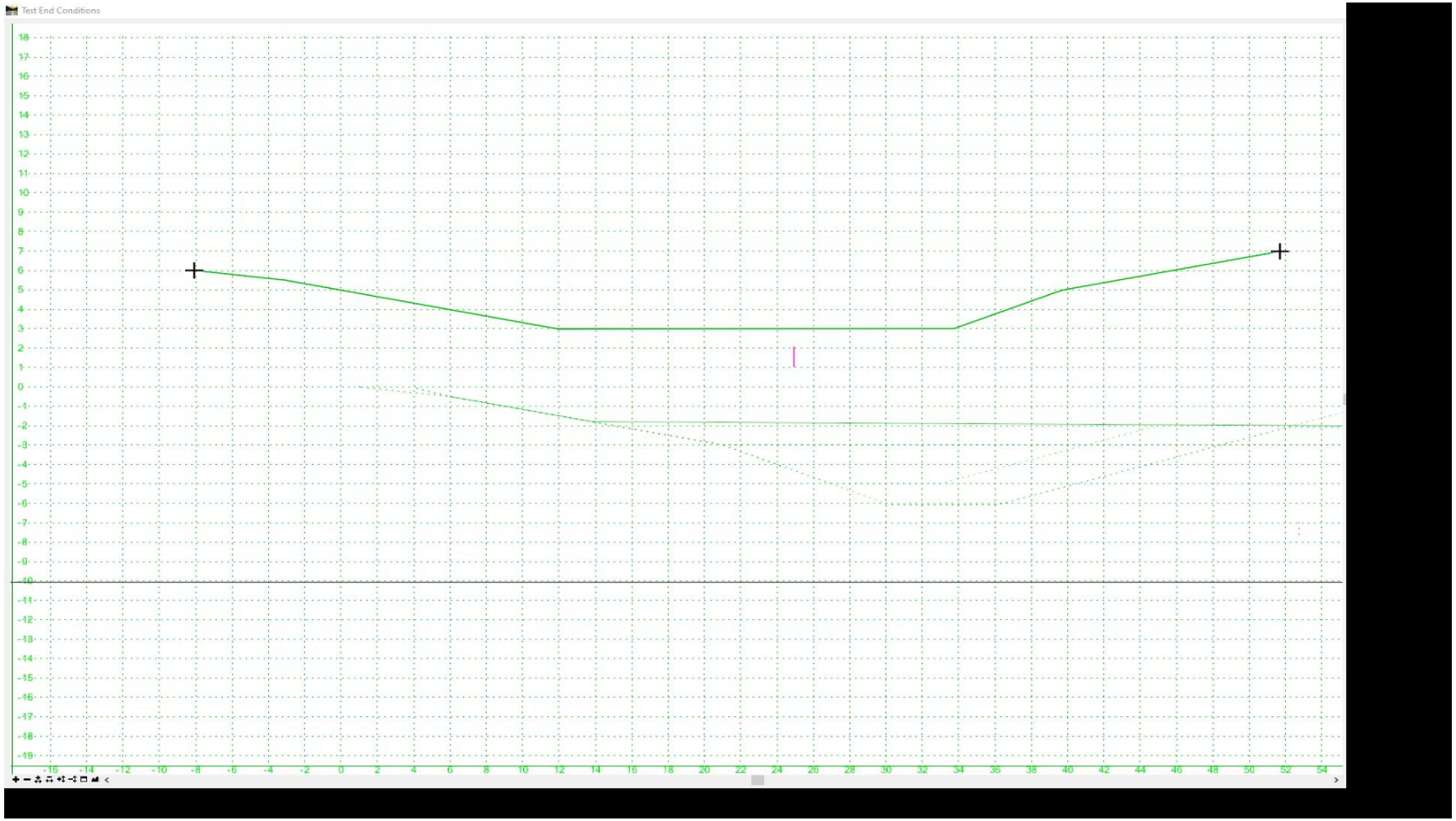
Modeling Strategy

- Simple vs. Complex Templates
  1. Simple Templates
     - Easier to debug and less processing time (typically)
     - Not much engineering automation
     - Usually requires more templates drops to manage (which can cause slow processing)
  2. Complex Templates
     - Difficult to debug and may cause slow processing
     - Engineering automation (solve for real problems)
     - Less template drops if done correctly

Modeling Strategy

- Complex Templates



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File Federation/Separation

- OpenRoads Designer stores all civil data in the .DGN file
  - Everything is a .DGN
  - *Survey, terrains, geometry, superelevation, corridors, etc.*
- OpenRoads Designer is designed to work with reference files
- Important to establish how you are going to work with each .DGN
  - Federate/Separate your project files
  - Establish logical folder structure and file naming

File Federation/Separation

- Topo / Survey
- Terrain
- Geometry
- Corridors
- Superelevation
- Utilities
- Cross Sections
- Plan-Profile Sheets
- Drainage
- Bridges
- Geotech
- Control Features
- Proposed Terrains
- Etc.

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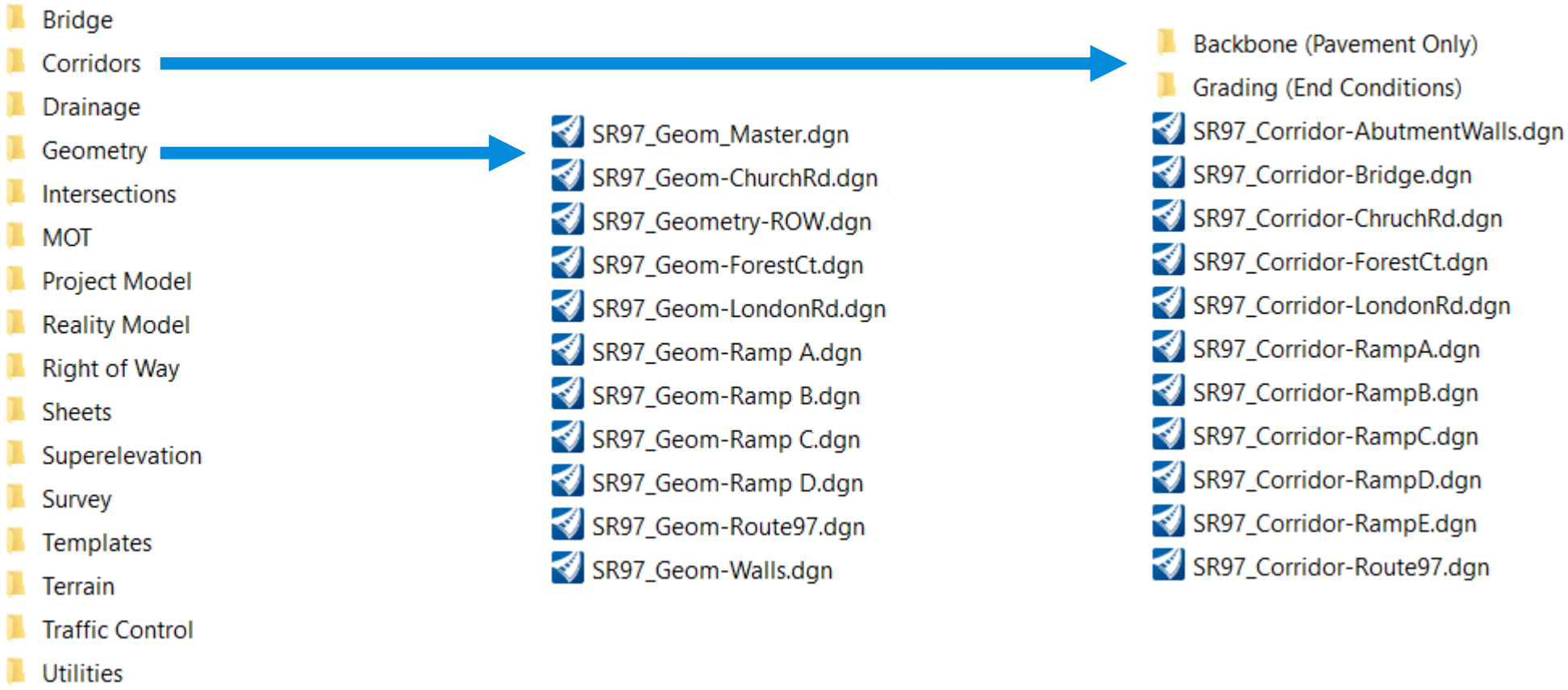
Why?

- Smaller files are inherently faster and more efficient.
- Easier to manage and recall where things are.
- Multi-user access to files.
- More control later when you need to compile them for different scenarios (*i.e. alternative designs, create composite models, etc.*)

File Federation/Separation

- Establish logical folder structure and file naming



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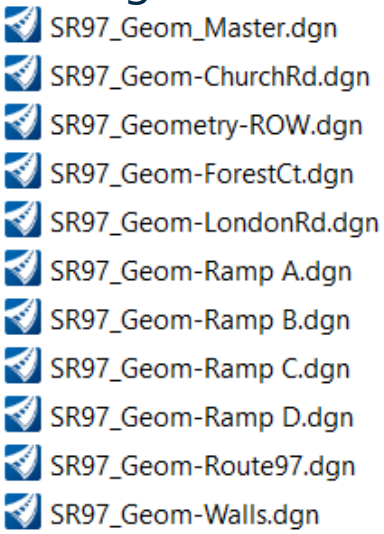
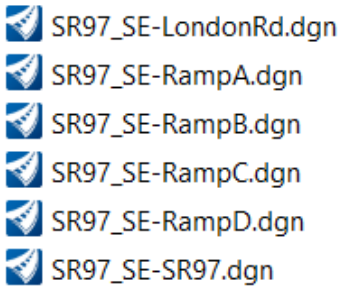
File Federation/Separation

- How should we separate alignments, corridors and superelevation?
  - Each alignment should have its own file
  - Superelevation Sections should have their own file
  - Each corridor should have its own file
  - Container files can be created that reference each individual file

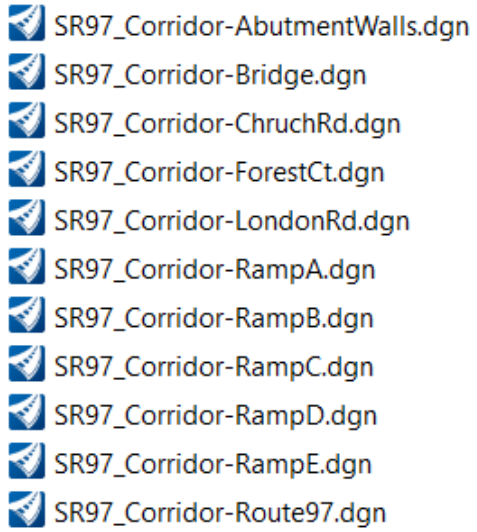
Alignments



Superelevation



Corridors



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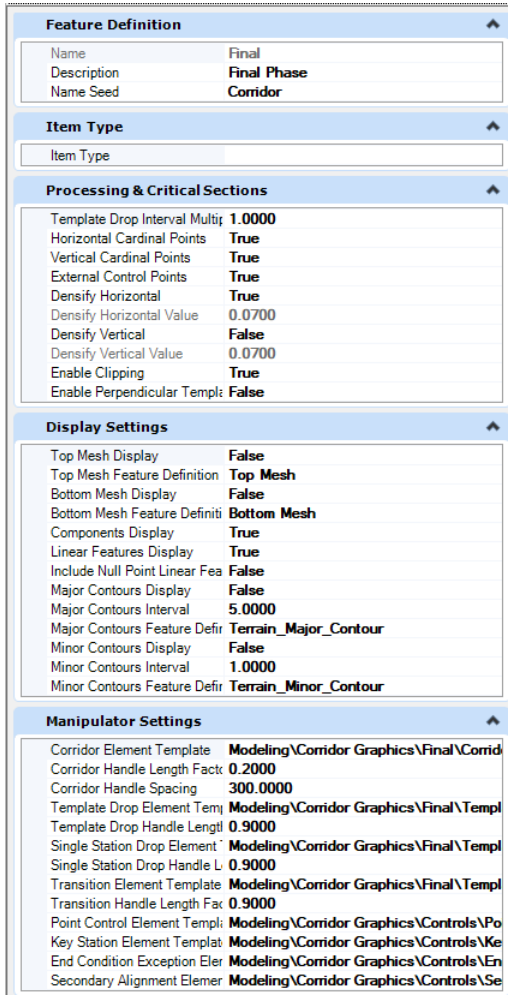
Corridor Feature Definitions

- Control the display and accuracy of the corridor model
- Processing & Critical Stations
  - Very import for level of detail
  - Processing Speed
- Display Settings
  - Very import for level of detail
  - Processing Speed
- Manipulator Settings



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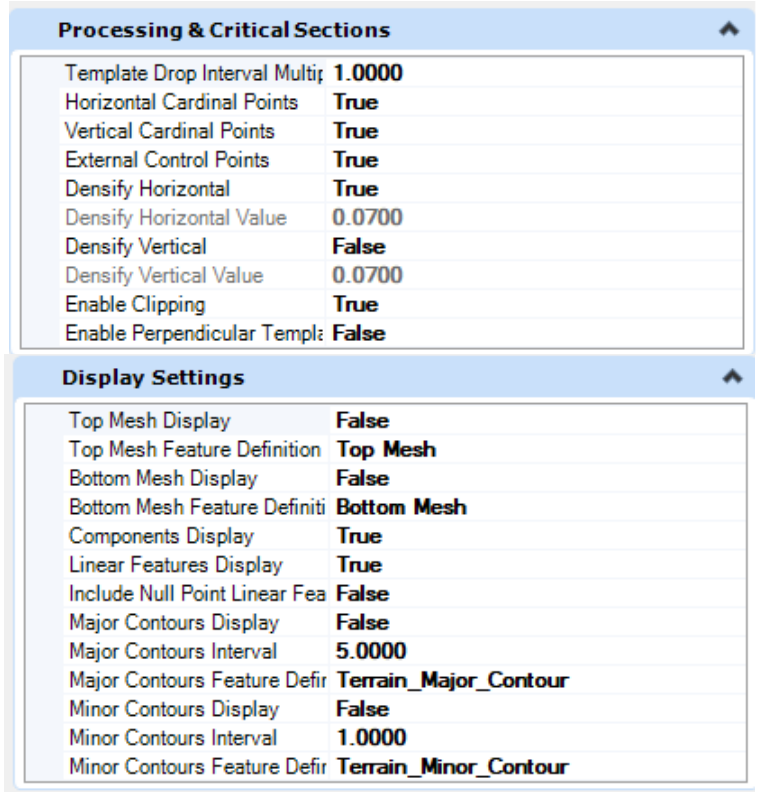
Corridor Feature Definitions

- Define the settings based on the level of detail required
- Some settings can cause slow processing
  - Cardinal Points and Densify options
  - Top Mesh Display and Bottom Mesh Display used simultaneously
- Be aware of what settings you really need
  - *If unsure, use the default settings*



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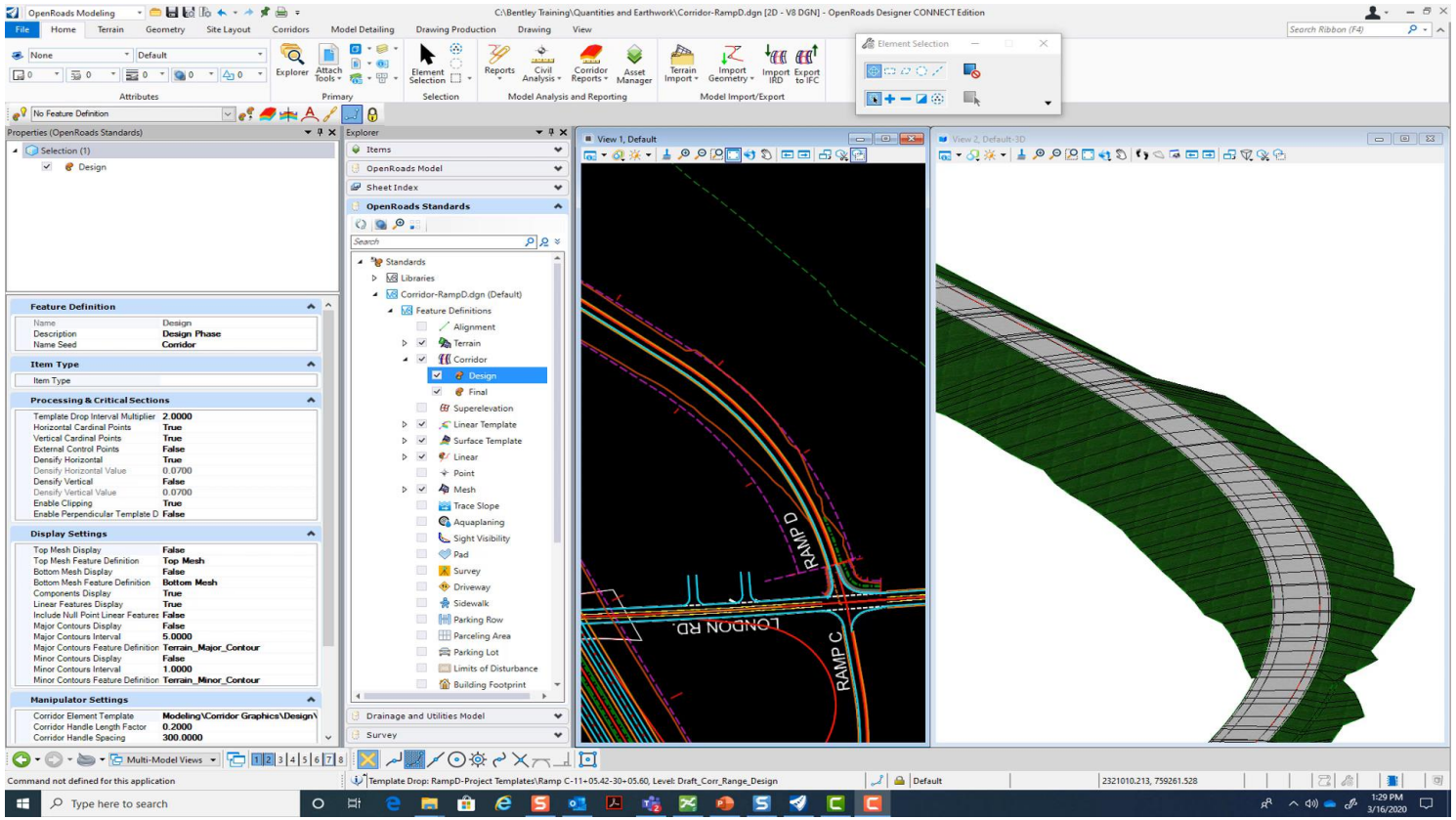
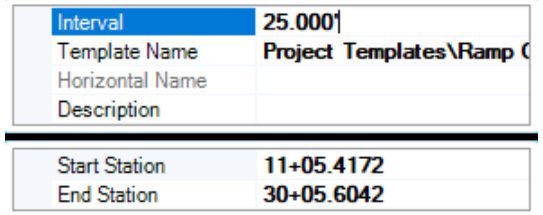
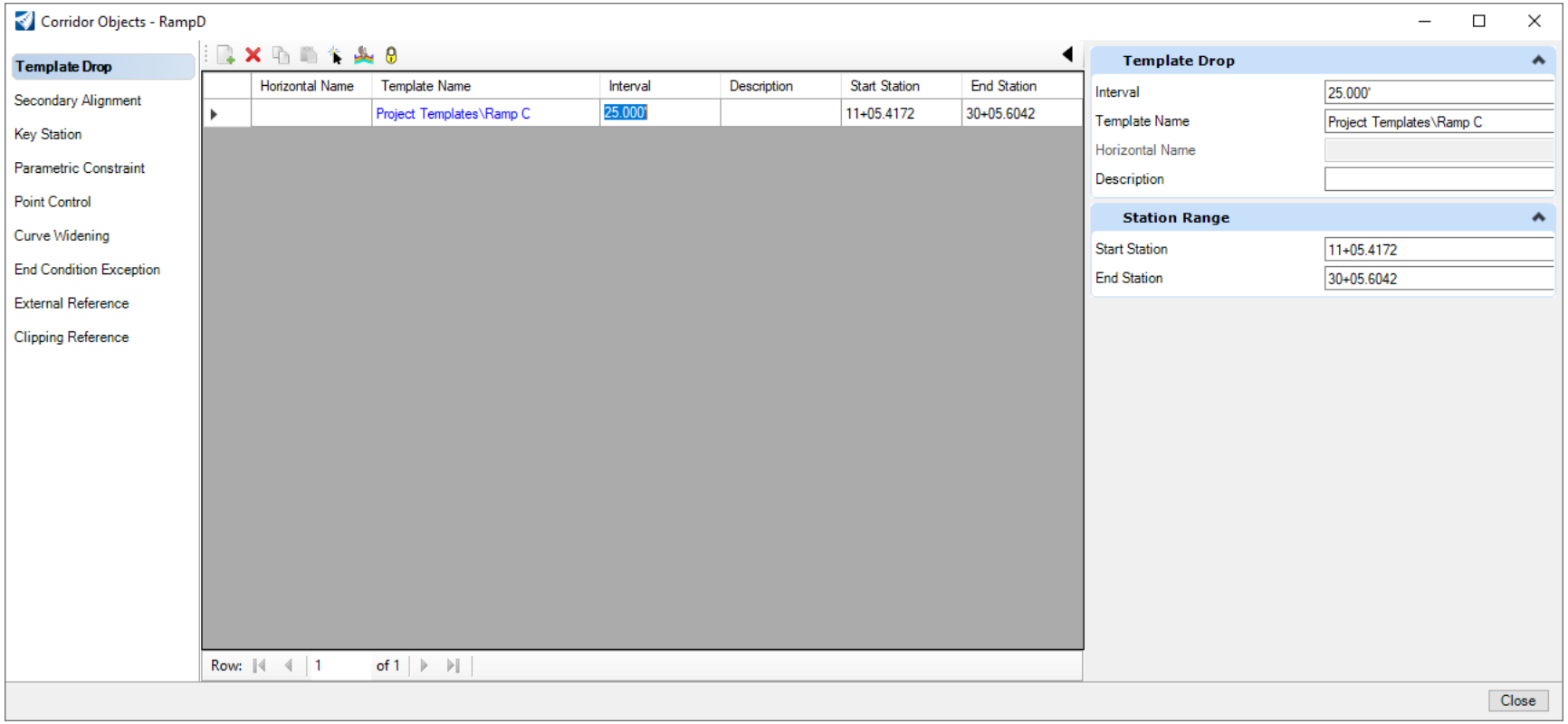
Corridor Feature Definitions



Template Drop Interval

- Define template drop interval based on level of detail
- Intervals of 5’ (2m), 10’(5m) and 25’(10m) most common





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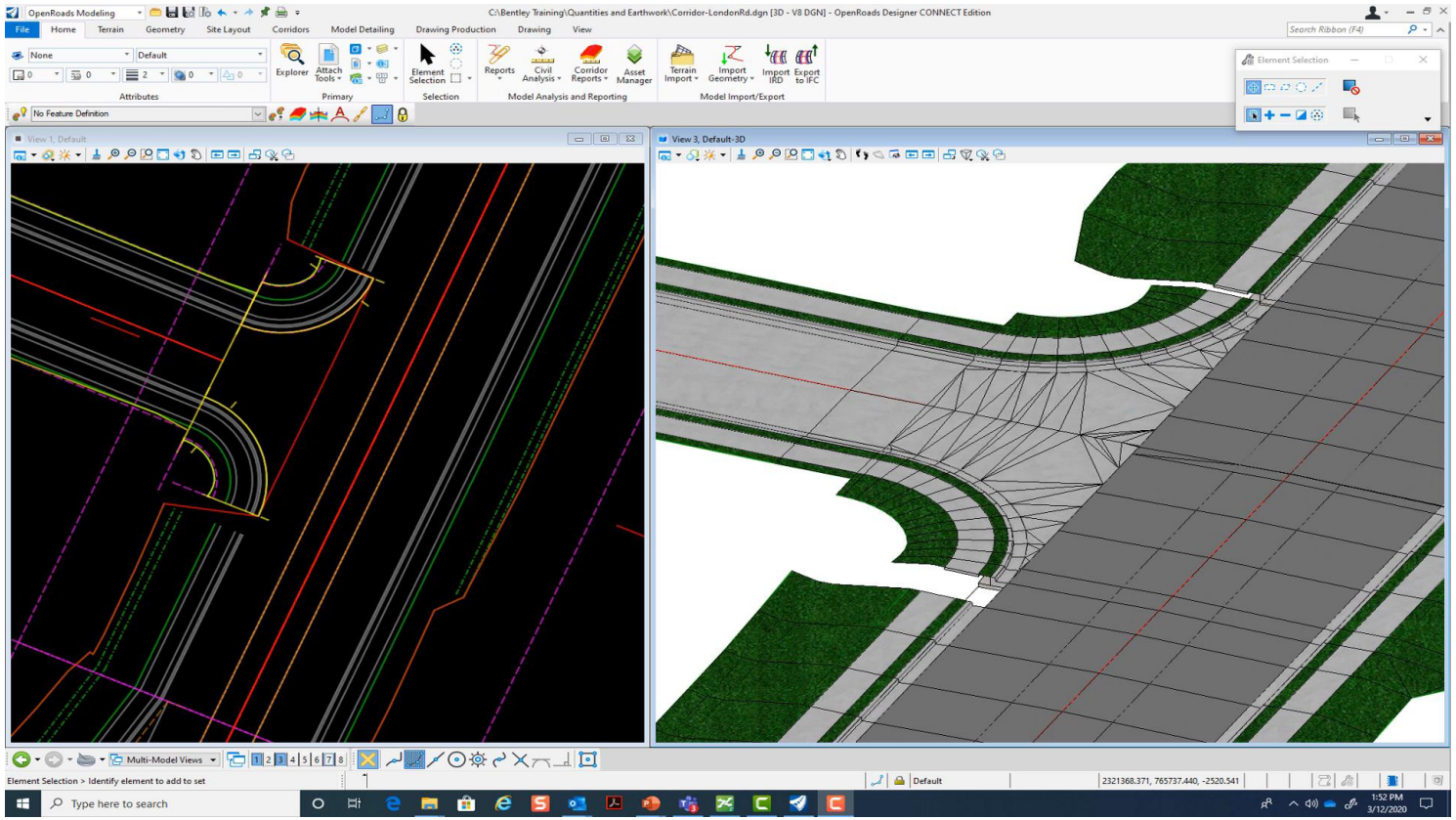
Key Stations

- Use to add additional template processing stations
- Can be used to close up gaps between components

Let’s take a look…

Key Stations



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Corridor Clipping and Target Aliasing

- Use Target Aliasing and Corridor Clipping to remove overlapping slopes
- Clip corridors for median islands

Let’s take a look….

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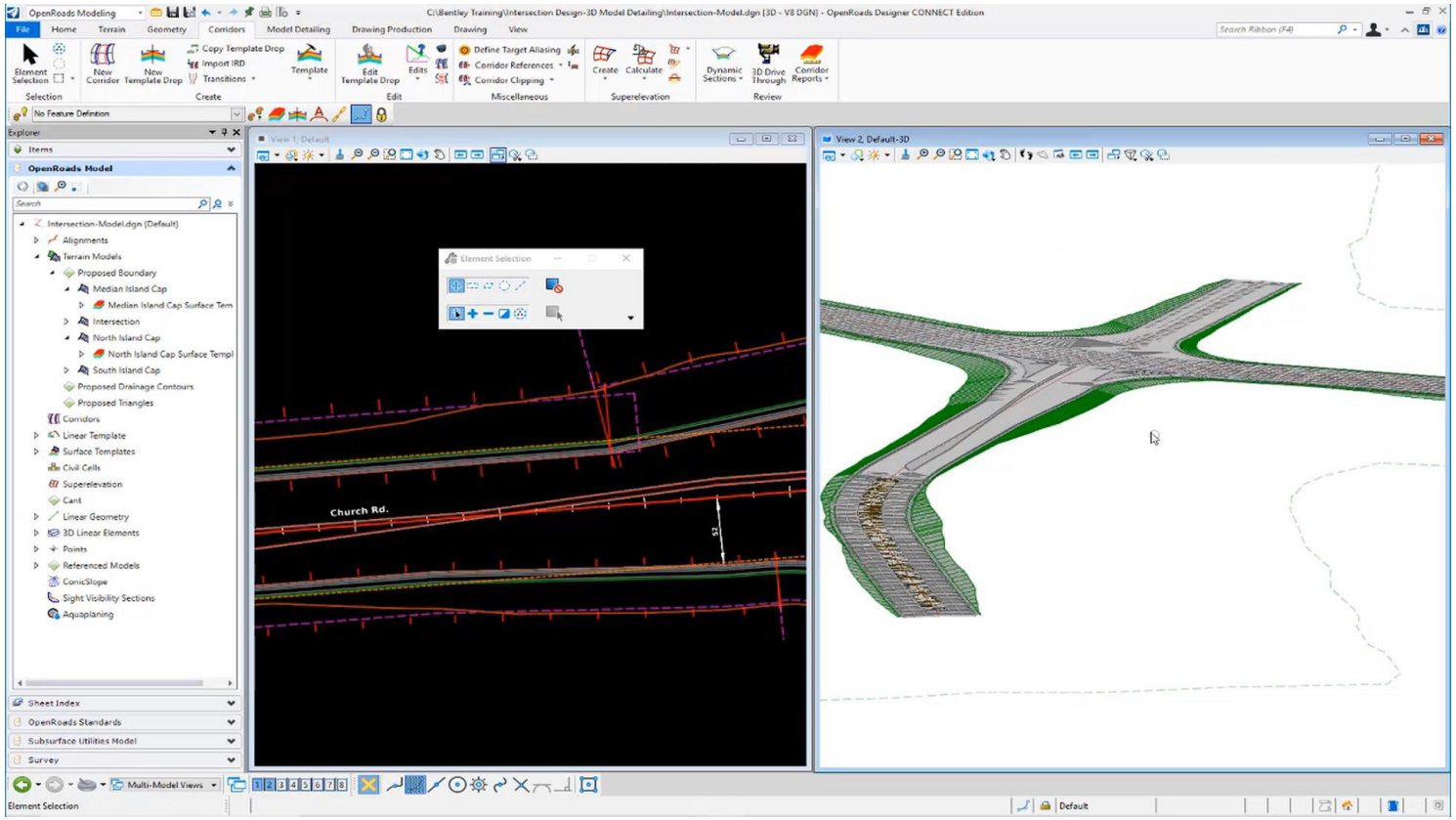
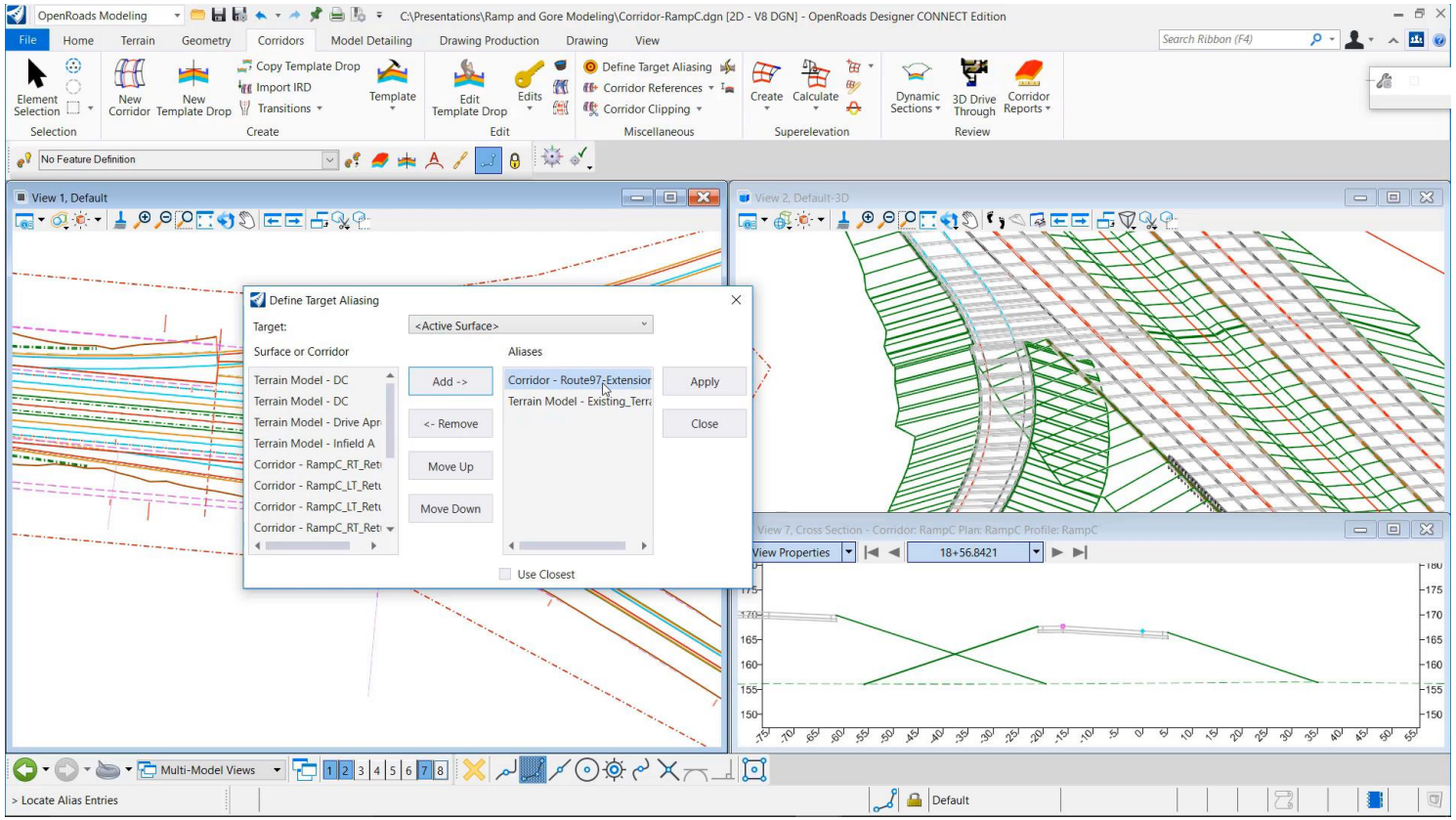
Corridor Clipping – Overlapping Slopes Example



Corridor Clipping and Target Aliasing



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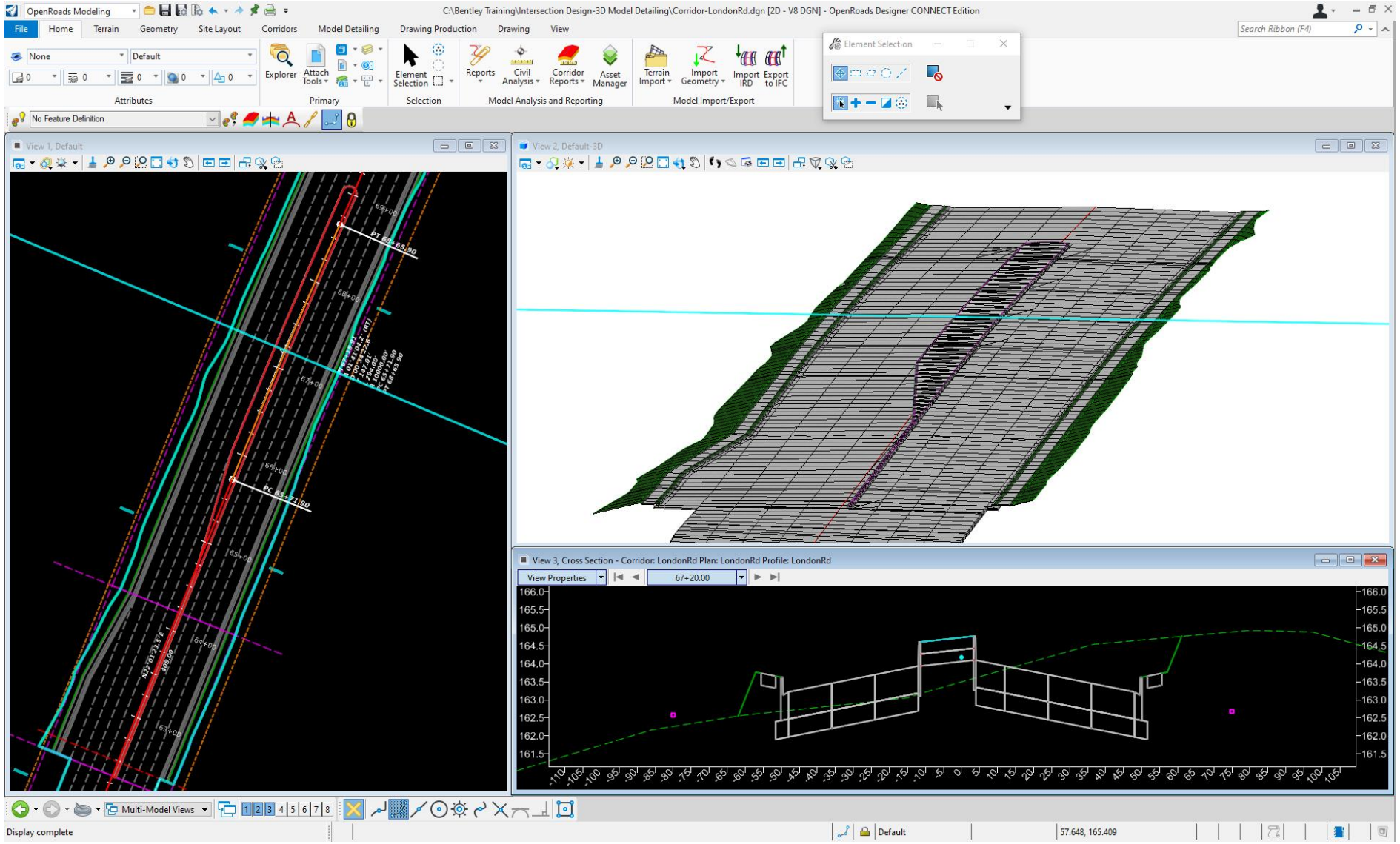
Corridor Clipping – Median Island Example



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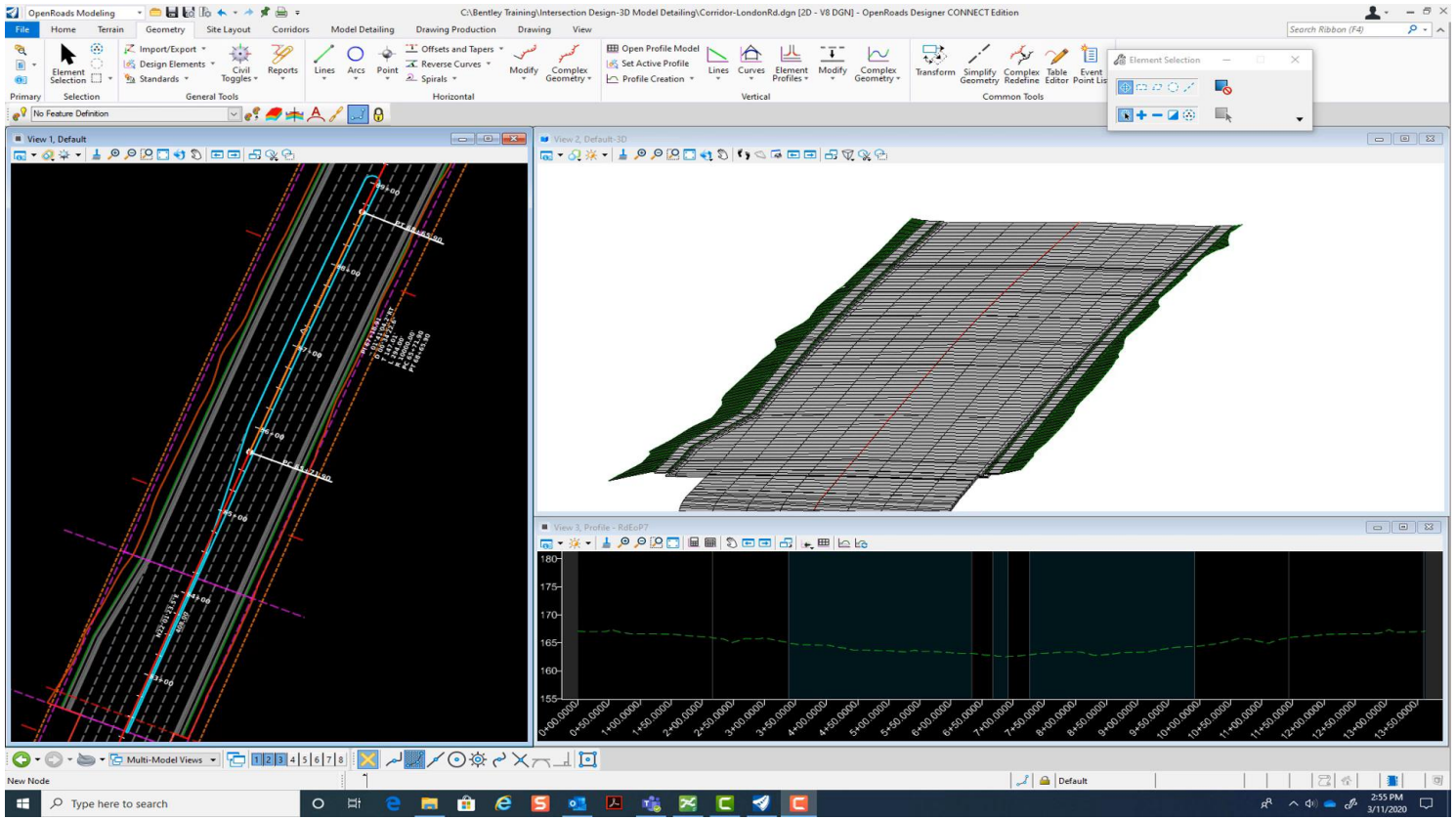
Corridor Clipping – Median Island Example



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Geometry Stroking

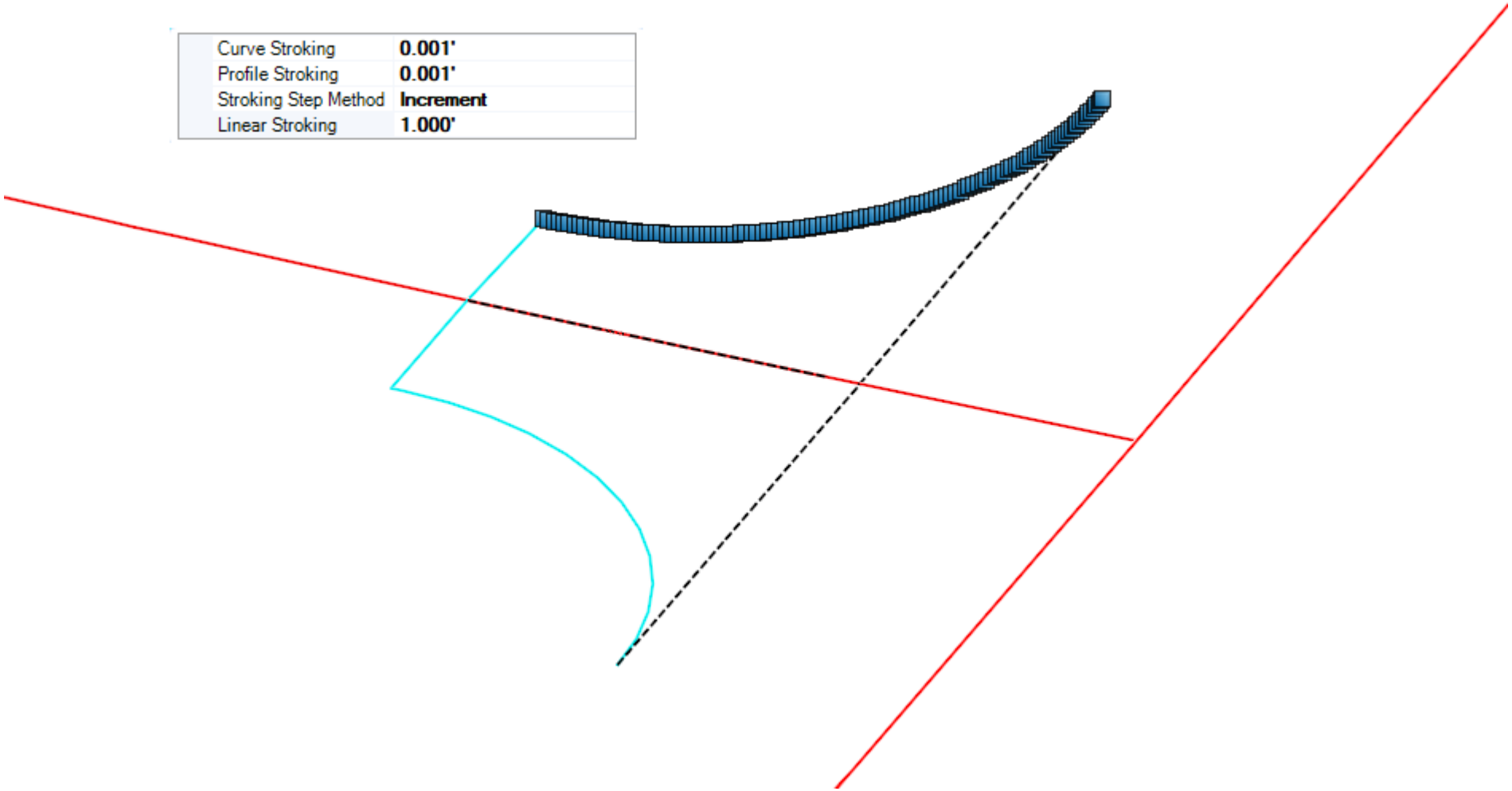
- Sets the accuracy of linear and curvilinear geometry: 3D geometry and 3D features
- Smaller values = greater accuracy
- Can affect the accuracy of Terrain Models, Corridors, Linear Templates and Surface Templates
- 3 Types of Stroking:
  - Curve Stroking
  - Profile Stroking
  - Linear Stroking
- Default values are set through config variables
  - CIVIL_DEFAULT_LINEAR_STROKING
  - CIVIL_DEFAULT_PROFILE_STROKING
  - CIVIL_DEFAULT_CURVE_STROKING

Geometry Stroking

- Linear Stroking
  - Defines how often to compute a point or template drop interval location on a tangent segment. This variable is not used by Corridor Modeling. If not set, the value defaults to 10. This is used when generating 3D elements and the apply Template command.
- Profile Stroking
  - Defines how often to compute a point or template drop interval location along a profile, with extra points being computed based on a chord offset from the profile. The value defines the chord height used to calculate the extra points. If not set, the value defaults to 0.1. This is used in Corridor Modeling when Vertical Curve Densification is applied.
- Curve Stroking
  - Defines how often to compute a point or template drop interval location along a curve segment with extra points being computed based on the chord offset from the horizontal curve. The value defines the chord height used to calculate the extra points. If not set, the value defaults to 0.01. This is used in Corridor Modeling when Horizontal Curve Densification is applied.

Geometry Stroking

Curve Stroking	**0.001'**
Profile Stroking	**0.001'**
Stroking Step Method	**Increment**
Linear Stroking	**1.000'**



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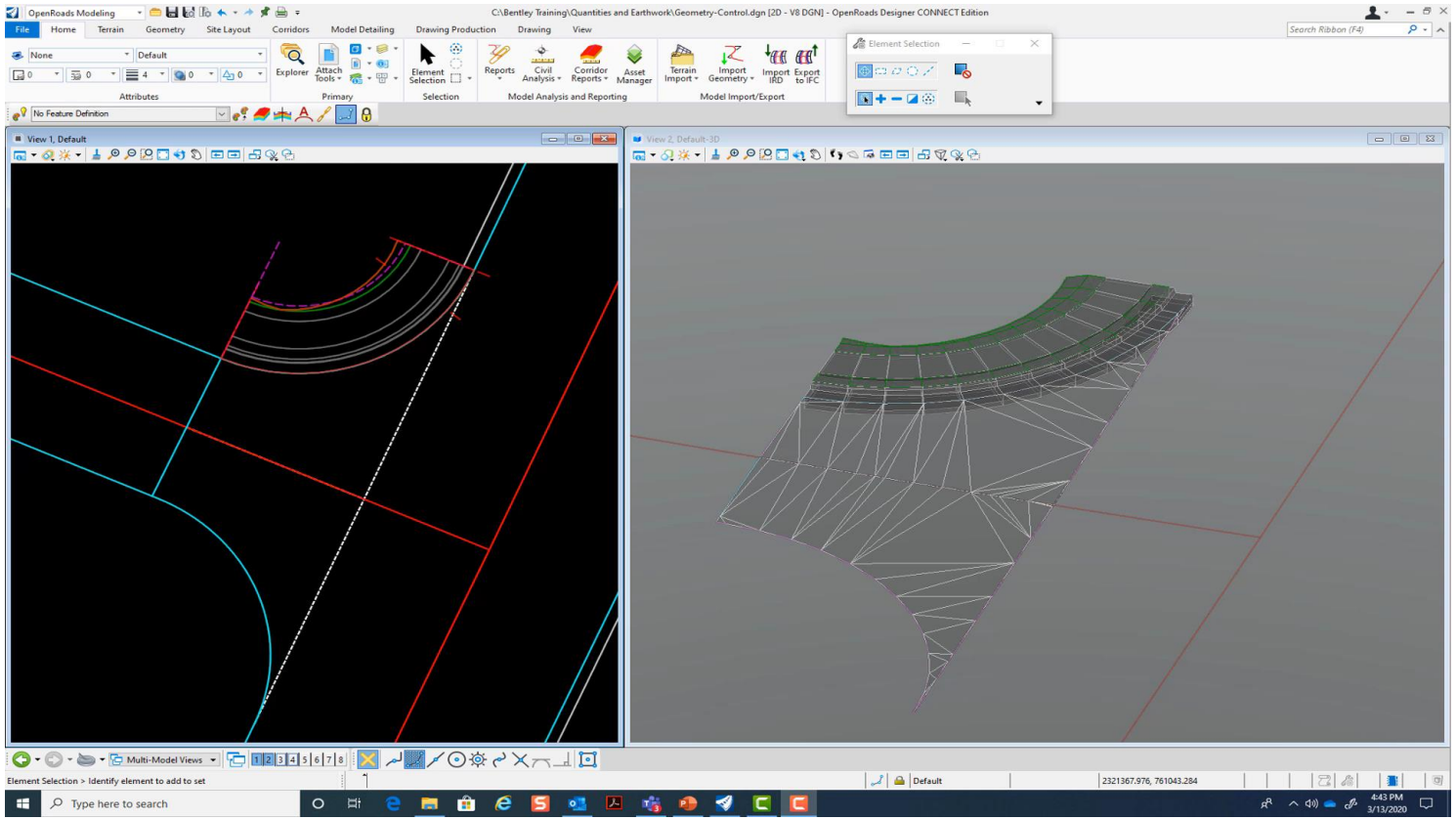
Geometry Stroking



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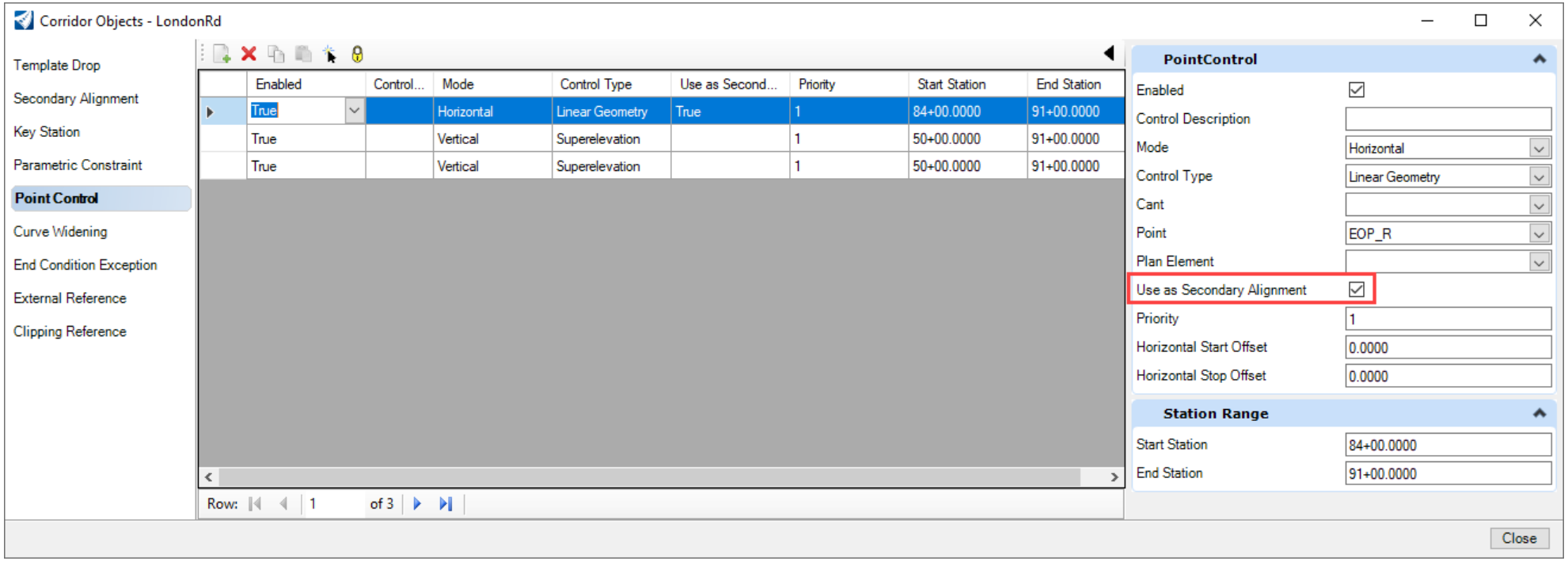
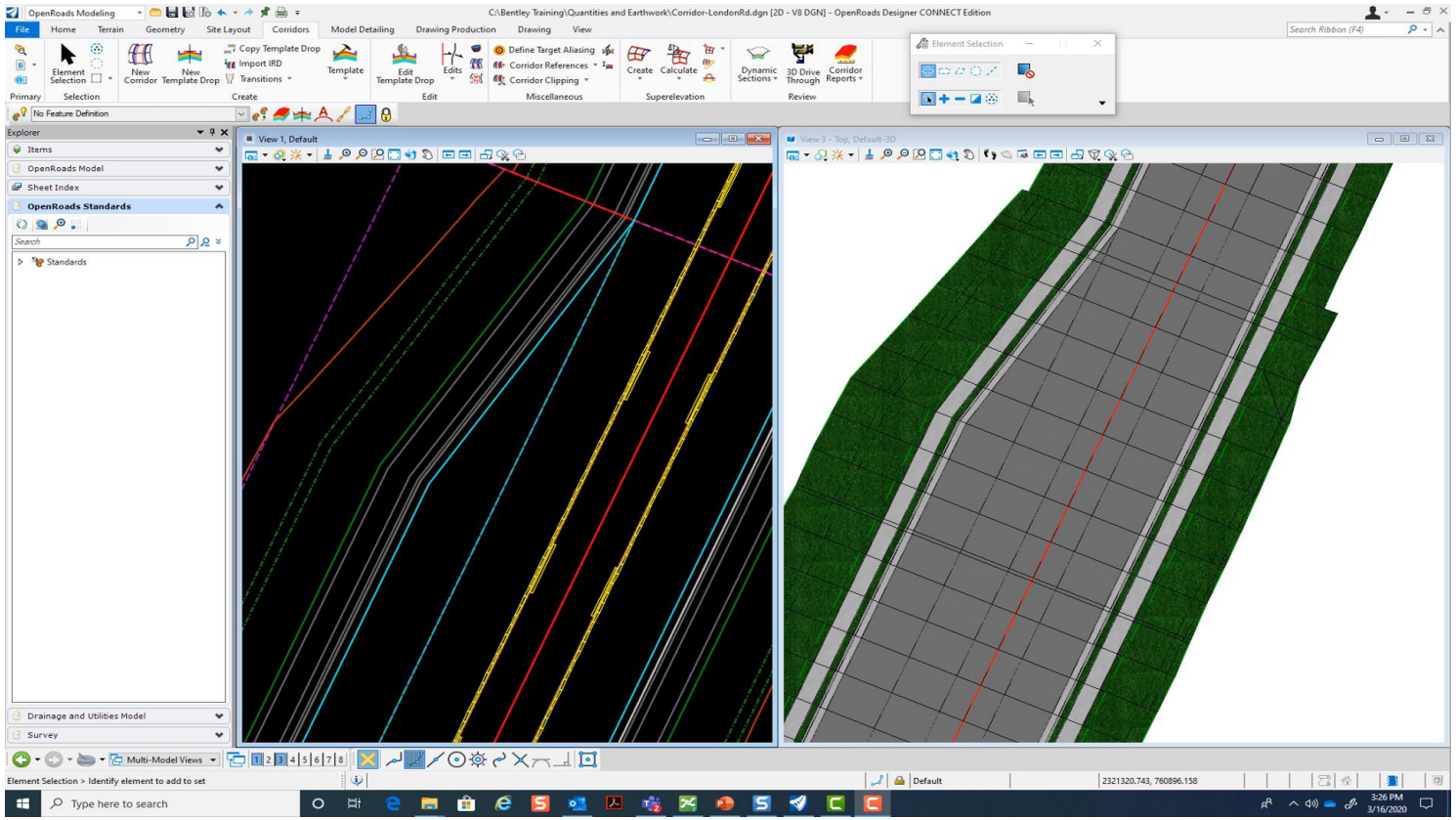
Secondary Alignment

- Used to change the direction of template/corridor processing
- Stand alone tool or option in the Point Control



Secondary Alignment



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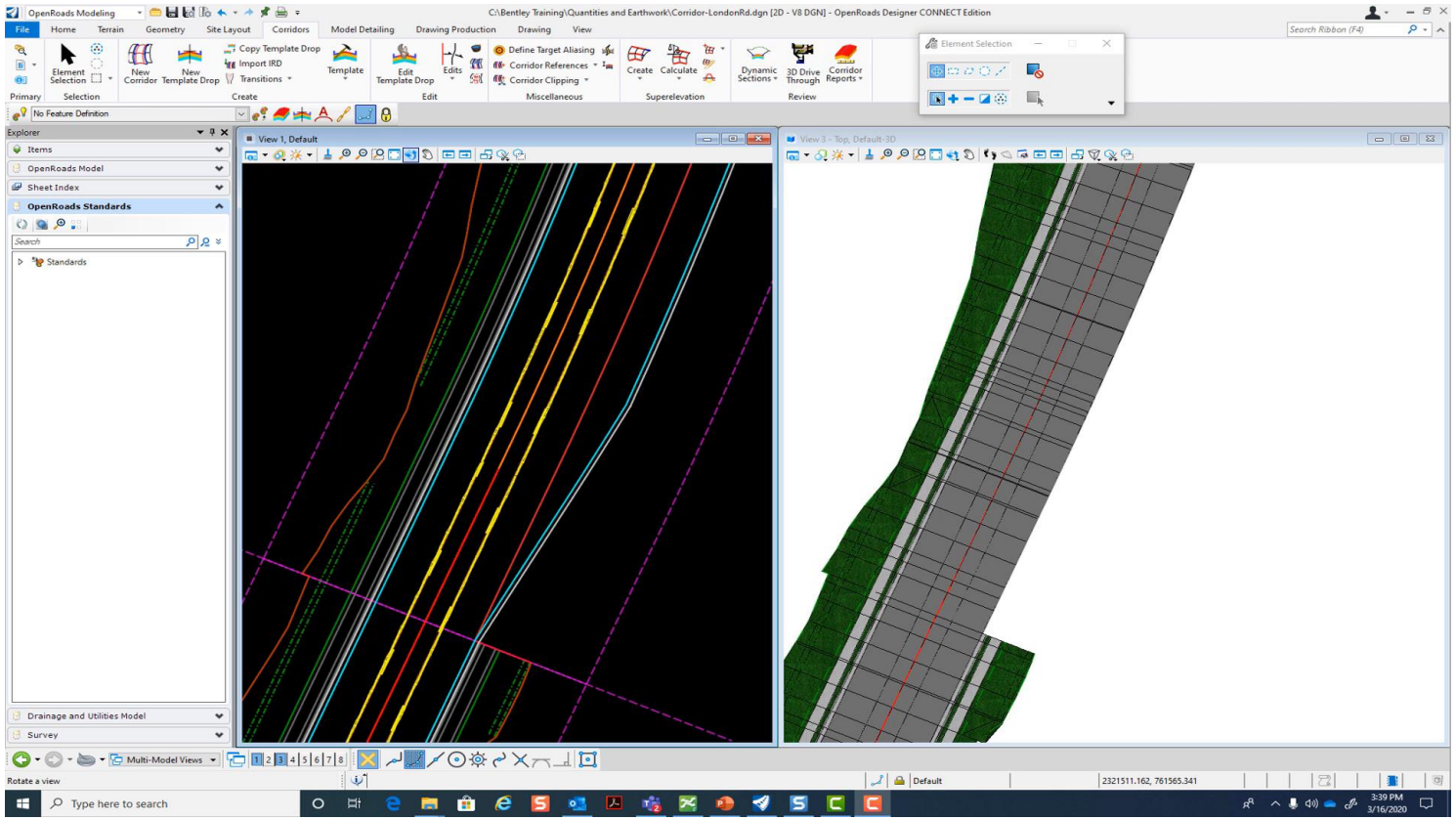
Secondary Alignment – Point Control Example



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Getting the Model Right

- Modeling Strategy
- File Federation/Separation
- Corridor Feature Definitions
- Template Drop Interval
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