



# Best Practice Corridor Modelling

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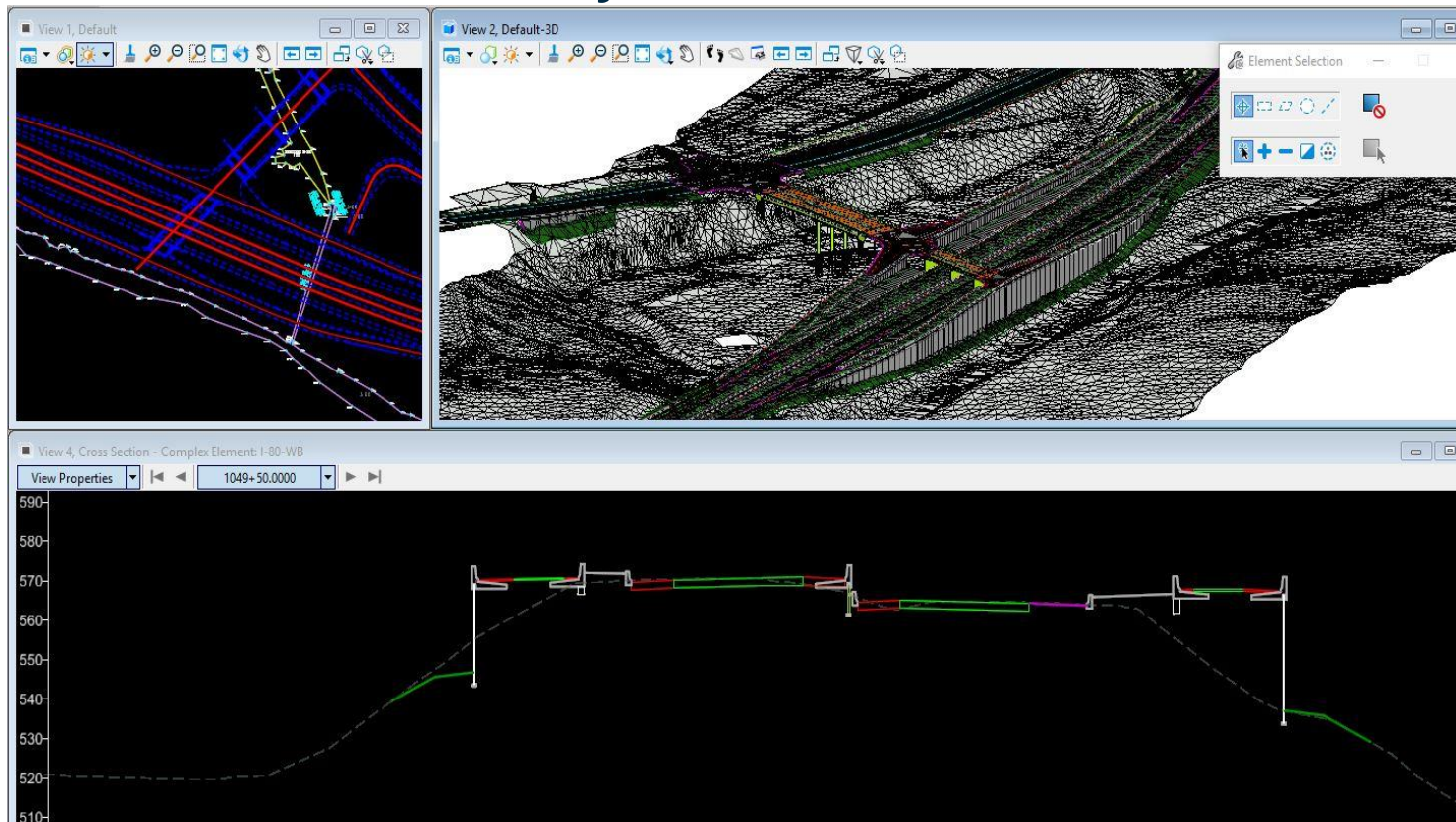
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# Preface

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



# Agenda

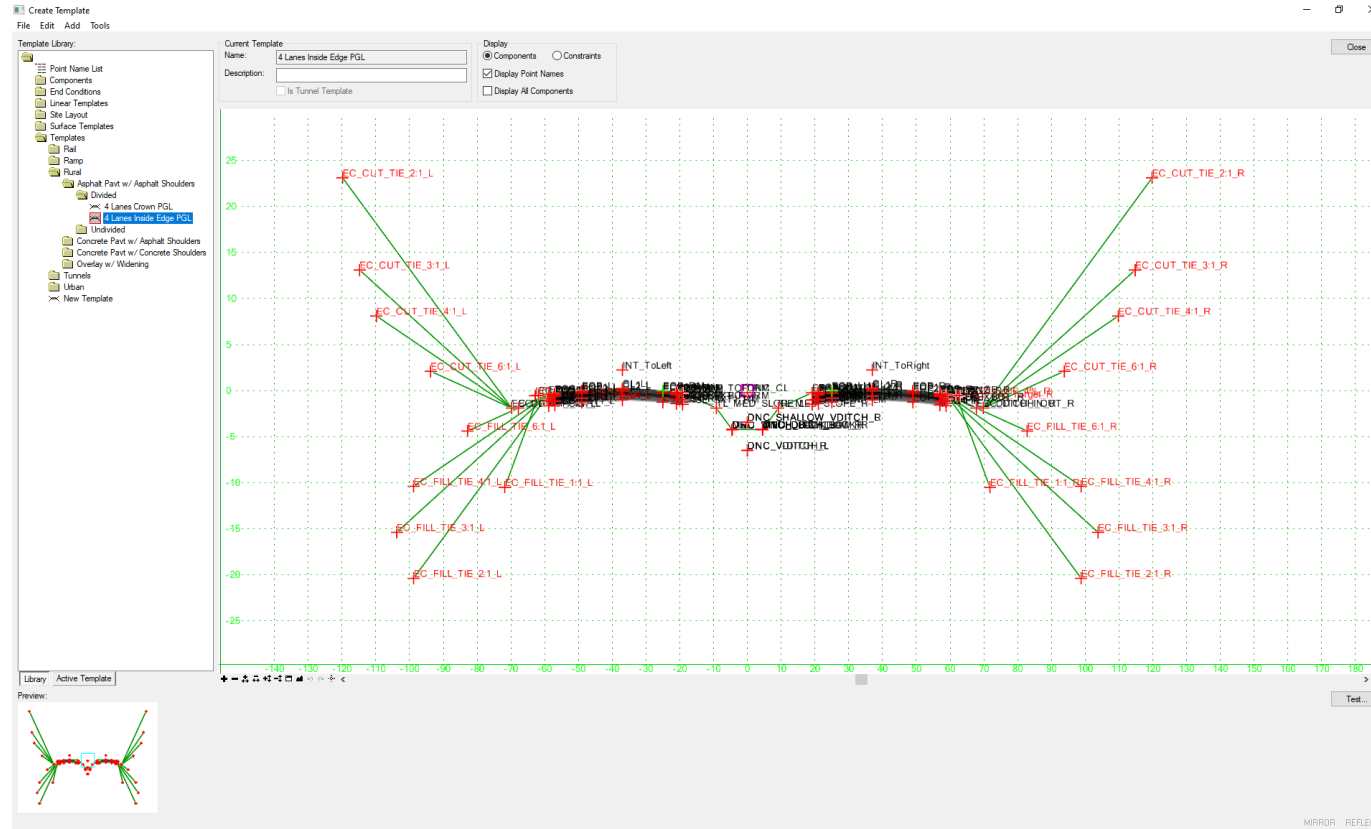
- Modeling Strategy
- File Federation/Separation
- Corridor Feature Definitions
- Template Drop Interval
- Key Stations
- Corridor Clipping and Target Aliasing
- Geometry Stroking
- Secondary Alignment

# 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

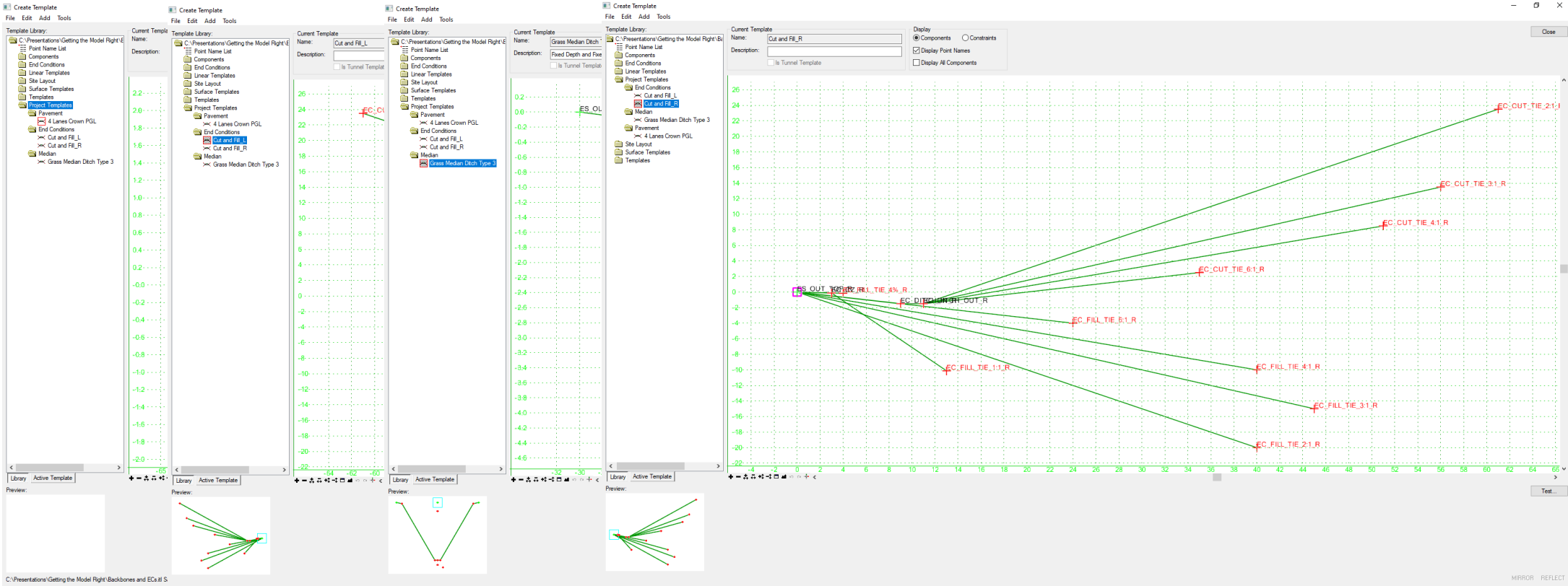
# Modeling Strategy

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



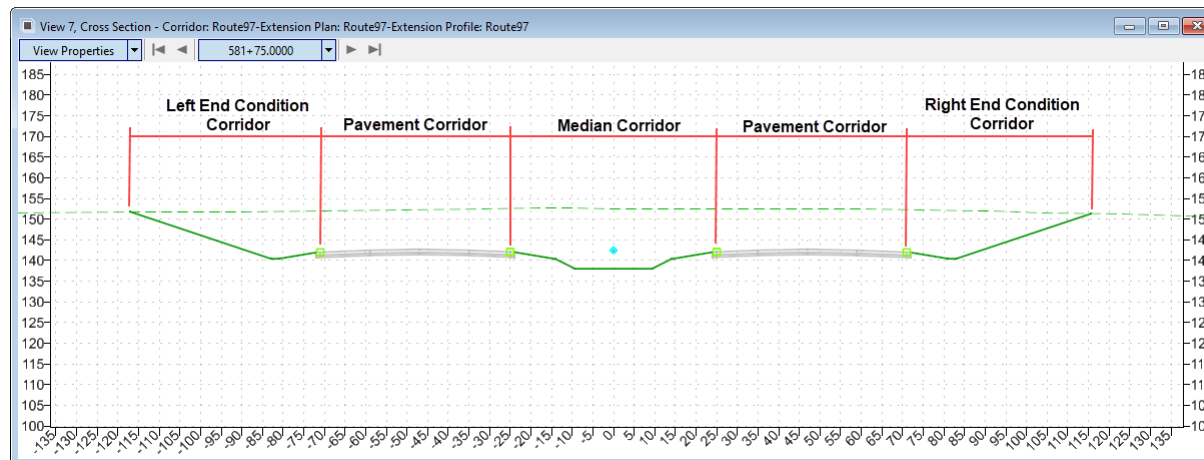
# Modeling Strategy

- Separate Templates and Corridors



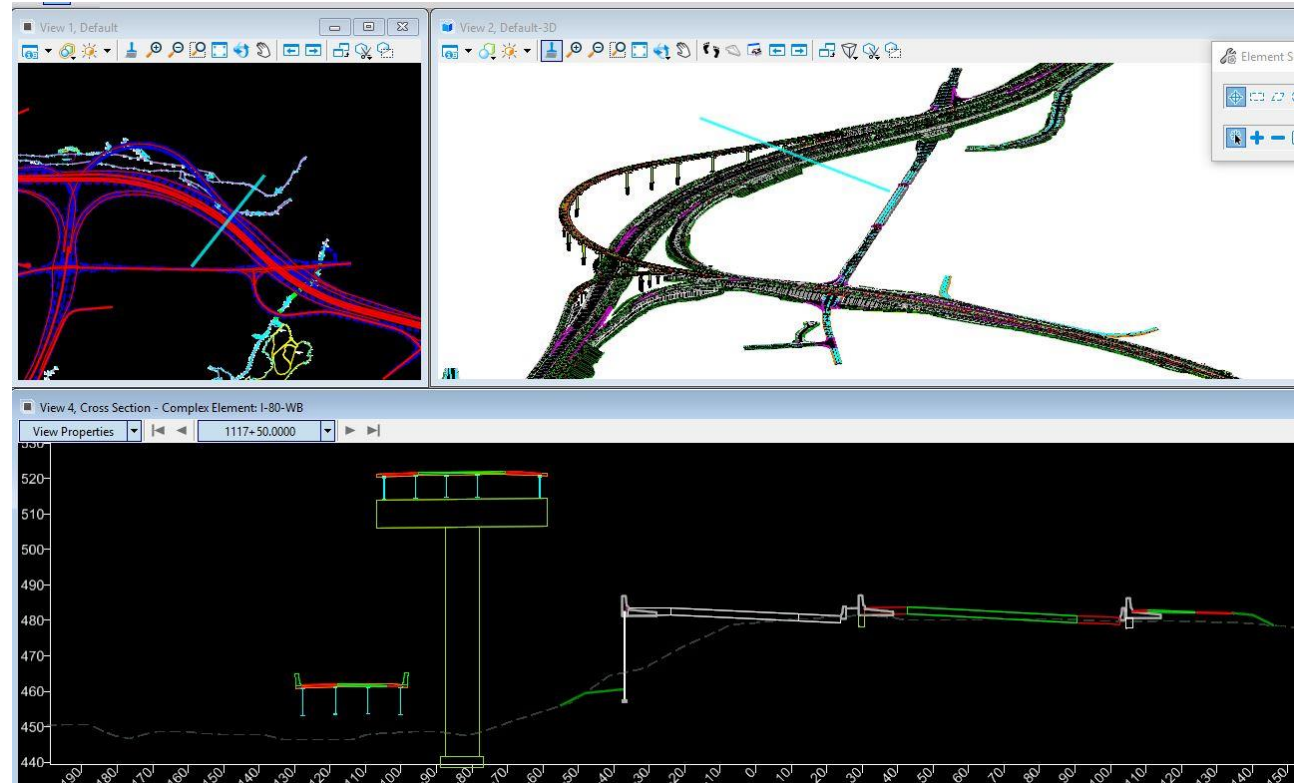
# Modeling Strategy

- 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)



# Modeling Strategy

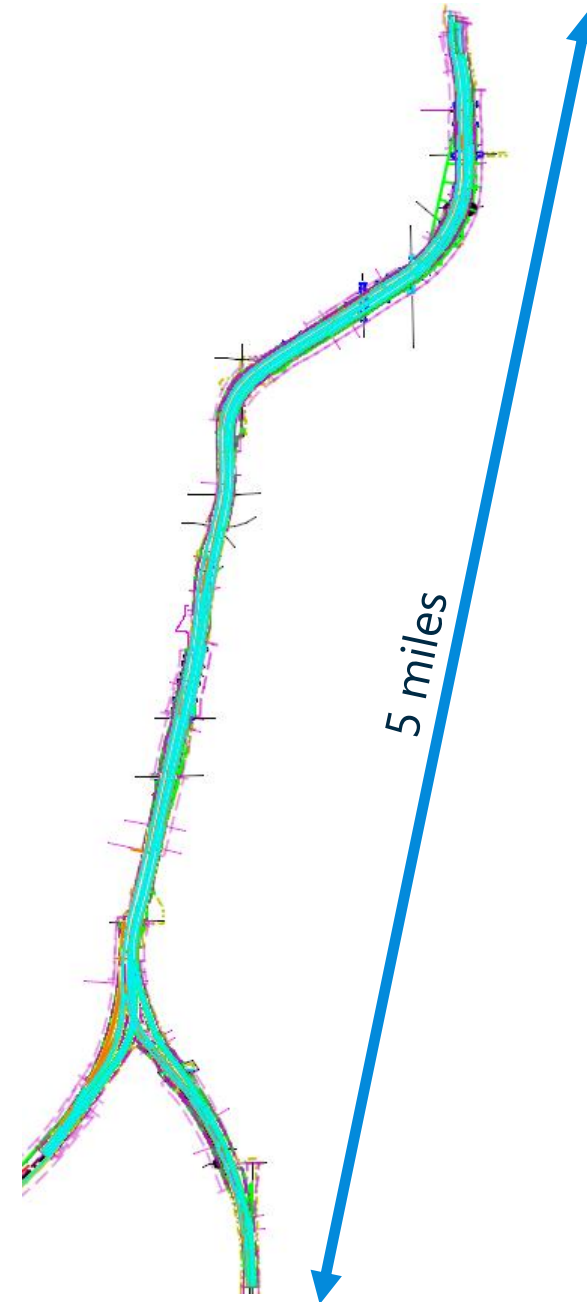
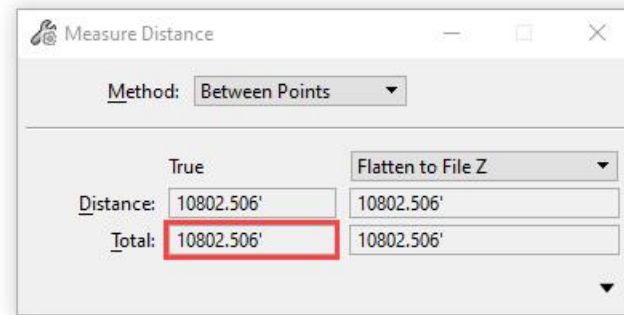
- Why split up corridors?
  - File Size
    - Try to keep DGN files less than 10MB
    - Keeps processing time down
      - Function of length and complexity of the corridors
  - Mitigate reference corruption
    - Allows tracking down of broken references to be more targeted
  - Allows for specific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





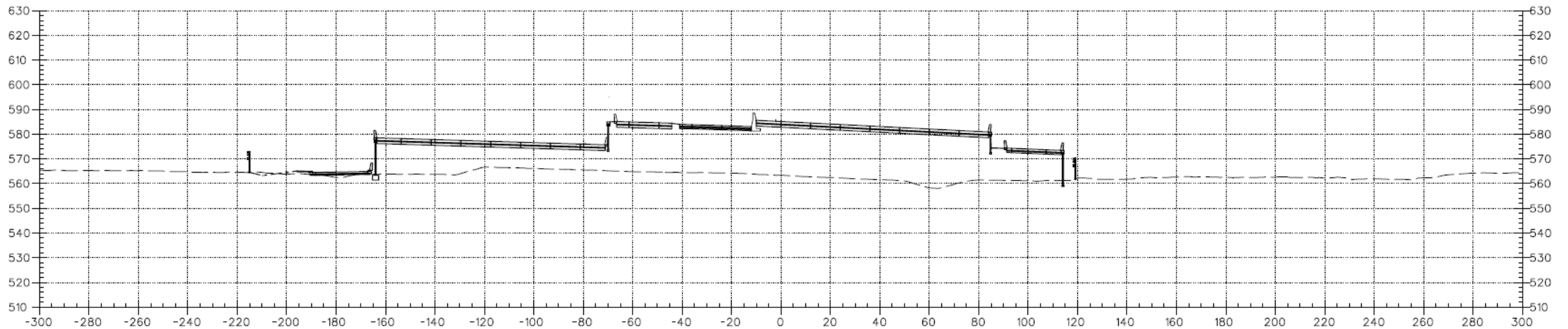
# Modeling Strategy

- Corridor Length, Width and File Size



# 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



# Modeling Strategy

- Simple vs. Complex Templates

1. Simple Templates

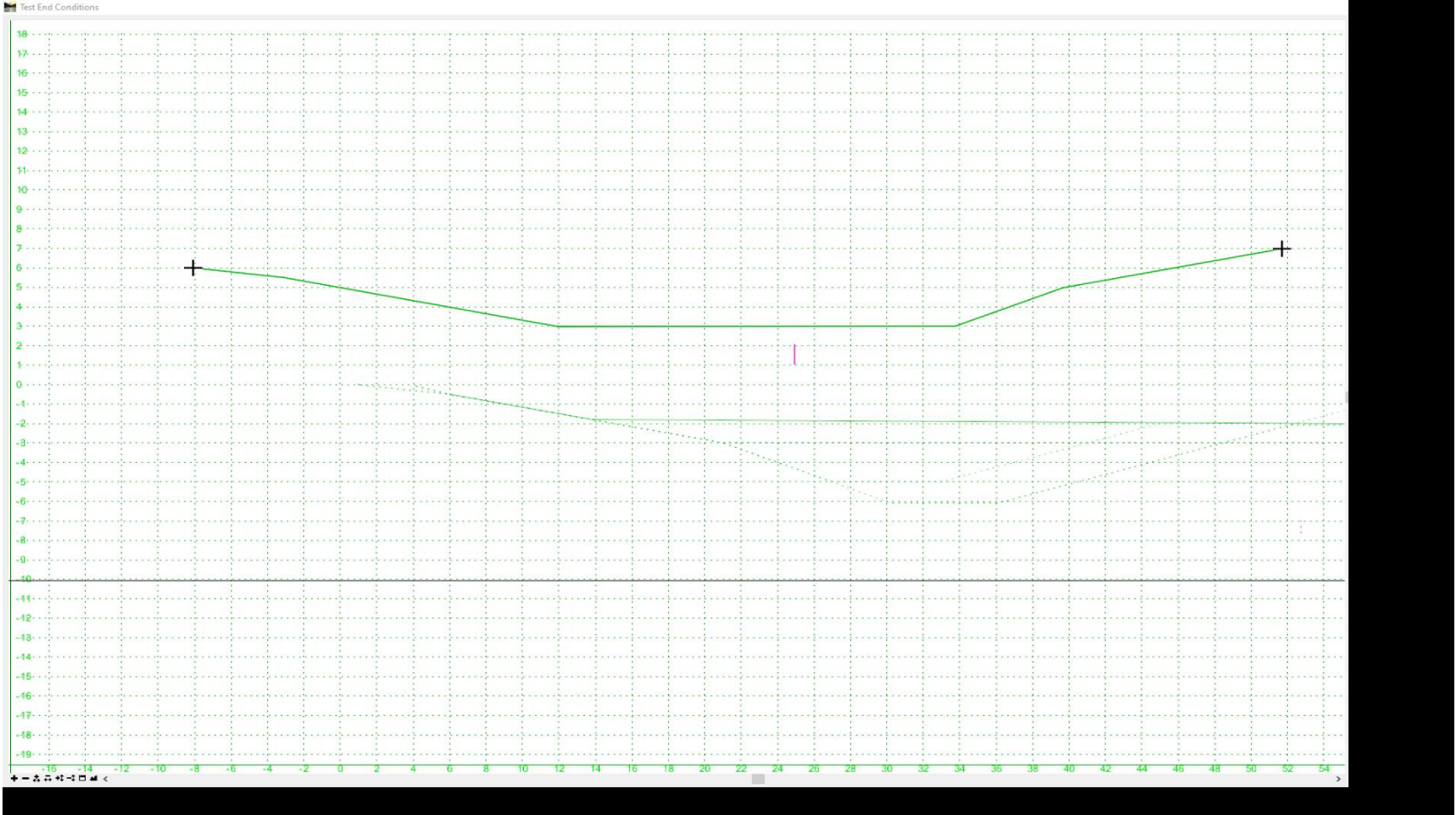
- Easier to debug and less processing time (typically)
- Not much engineering automation
- Usually requires more templates drops to manage (which can cause slow processing)

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





# 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.

***SEPARATE YOUR FILES***



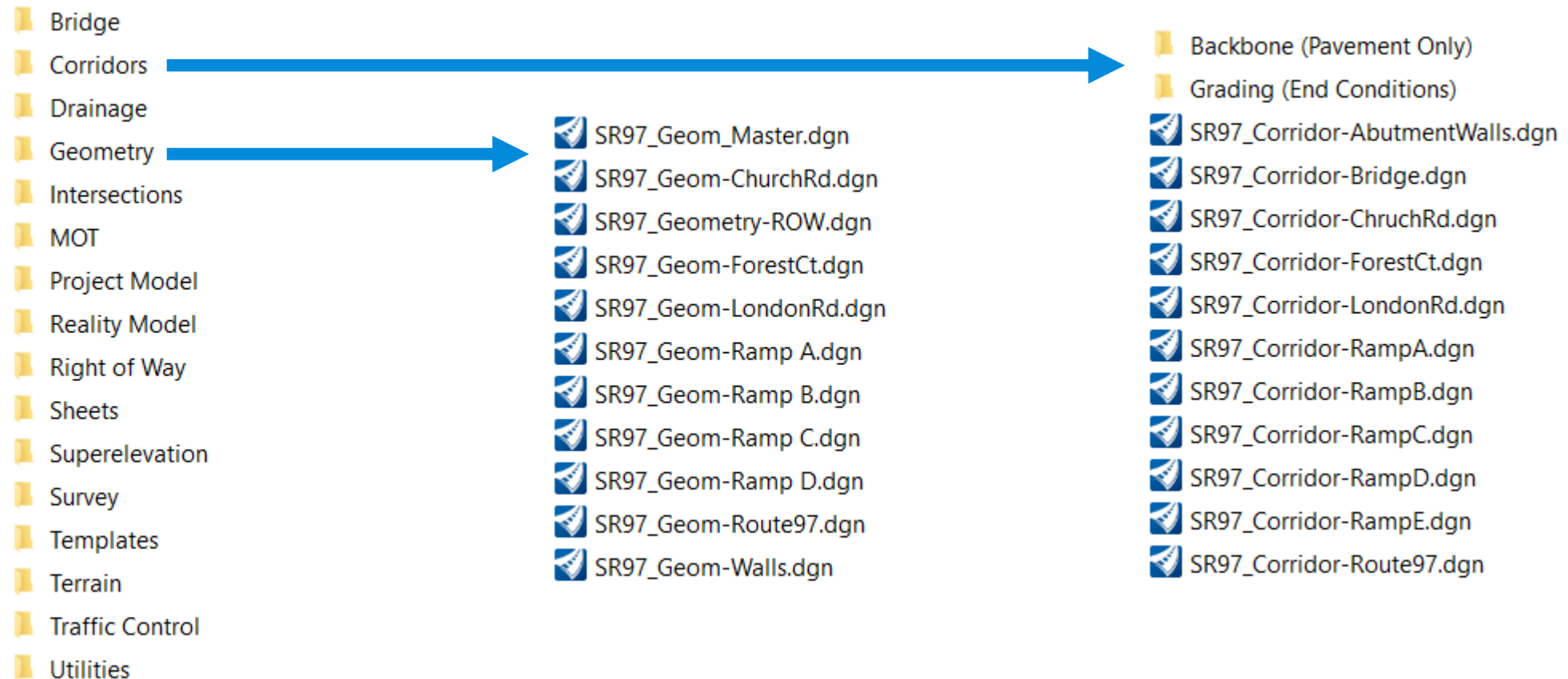
# Why?

- 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



















# 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

-  SR97\_Geom\_Master.dgn
-  SR97\_Geom-ChurchRd.dgn
-  SR97\_Geometry-ROW.dgn
-  SR97\_Geom-ForestCt.dgn
-  SR97\_Geom-LondonRd.dgn
-  SR97\_Geom-Ramp A.dgn
-  SR97\_Geom-Ramp B.dgn
-  SR97\_Geom-Ramp C.dgn
-  SR97\_Geom-Ramp D.dgn
-  SR97\_Geom-Route97.dgn
-  SR97\_Geom-Walls.dgn

## Superelevation

-  SR97\_SE-LondonRd.dgn
-  SR97\_SE-RampA.dgn
-  SR97\_SE-RampB.dgn
-  SR97\_SE-RampC.dgn
-  SR97\_SE-RampD.dgn
-  SR97\_SE-SR97.dgn

## Corridors

-  SR97\_Corridor-AbutmentWalls.dgn
-  SR97\_Corridor-Bridge.dgn
-  SR97\_Corridor-ChruchRd.dgn
-  SR97\_Corridor-ForestCt.dgn
-  SR97\_Corridor-LondonRd.dgn
-  SR97\_Corridor-RampA.dgn
-  SR97\_Corridor-RampB.dgn
-  SR97\_Corridor-RampC.dgn
-  SR97\_Corridor-RampD.dgn
-  SR97\_Corridor-RampE.dgn
-  SR97\_Corridor-Route97.dgn

# 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

Feature Definition	
Name	Final
Description	Final Phase
Name Seed	Corridor

Item Type	
Item Type	

Processing & Critical Sections	
Template Drop Interval Multi	1.0000
Horizontal Cardinal Points	True
Vertical Cardinal Points	True
External Control Points	True
Densify Horizontal	True
Densify Horizontal Value	0.0700
Densify Vertical	False
Densify Vertical Value	0.0700
Enable Clipping	True
Enable Perpendicular Templ	False

Display Settings	
Top Mesh Display	False
Top Mesh Feature Definition	Top Mesh
Bottom Mesh Display	False
Bottom Mesh Feature Definiti	Bottom Mesh
Components Display	True
Linear Features Display	True
Include Null Point Linear Fea	False
Major Contours Display	False
Major Contours Interval	5.0000
Major Contours Feature Defir	Terrain_Major_Contour
Minor Contours Display	False
Minor Contours Interval	1.0000
Minor Contours Feature Defir	Terrain_Minor_Contour

Manipulator Settings	
Corridor Element Template	Modeling\Corridor Graphics\Final\Corrid
Corridor Handle Length Fact	0.2000
Corridor Handle Spacing	300.0000
Template Drop Element Tem	Modeling\Corridor Graphics\Final\Templ
Template Drop Handle Lengtl	0.9000
Single Station Drop Element	Modeling\Corridor Graphics\Final\Templ
Single Station Drop Handle L	0.9000
Transition Element Template	Modeling\Corridor Graphics\Final\Templ
Transition Handle Length Fax	0.9000
Point Control Element Templ	Modeling\Corridor Graphics\Controls\Po
Key Station Element Templat	Modeling\Corridor Graphics\Controls\Ke
End Condition Exception Eler	Modeling\Corridor Graphics\Controls\En
Secondary Alignment Elemer	Modeling\Corridor Graphics\Controls\Se

# Corridor Feature Definitions

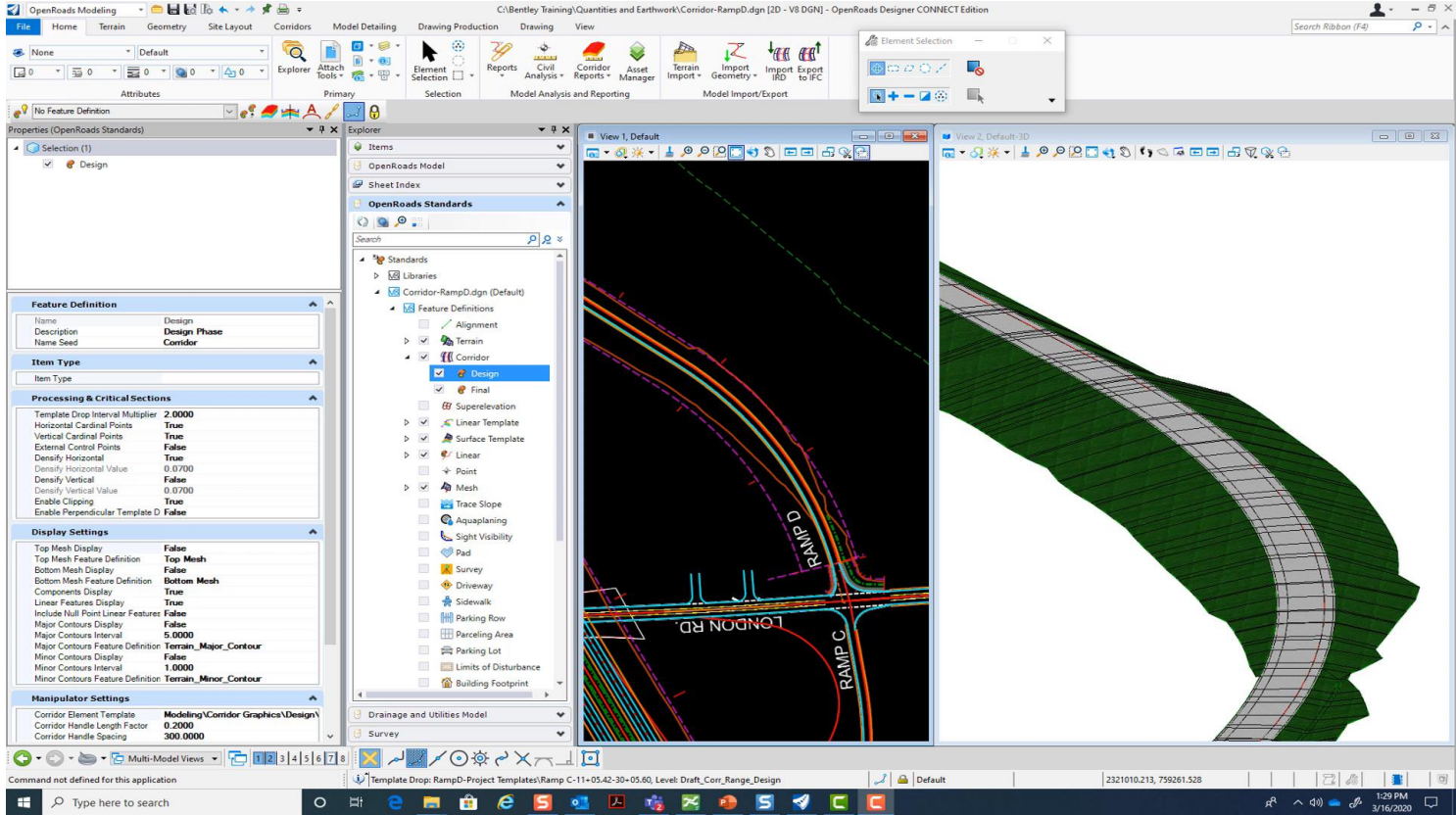
- Define the settings based on the level of detail required
- Some settings can cause slow processing
  - Cardinal Points and Densify options
  - Top Mesh Display and Bottom Mesh Display used simultaneously
- Be aware of what settings you really need
  - *If unsure, use the default settings*

Processing & Critical Sections	
Template Drop Interval Multi	1.0000
Horizontal Cardinal Points	True
Vertical Cardinal Points	True
External Control Points	True
Densify Horizontal	True
Densify Horizontal Value	0.0700
Densify Vertical	False
Densify Vertical Value	0.0700
Enable Clipping	True
Enable Perpendicular Templ	False

Display Settings	
Top Mesh Display	False
Top Mesh Feature Definition	Top Mesh
Bottom Mesh Display	False
Bottom Mesh Feature Definiti	Bottom Mesh
Components Display	True
Linear Features Display	True
Include Null Point Linear Fea	False
Major Contours Display	False
Major Contours Interval	5.0000
Major Contours Feature Defir	Terrain_Major_Contour
Minor Contours Display	False
Minor Contours Interval	1.0000
Minor Contours Feature Defir	Terrain_Minor_Contour

# 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

Interval	25.000'
Template Name	Project Templates\Ramp C
Horizontal Name	
Description	

---

Start Station	11+05.4172
End Station	30+05.6042

Corridor Objects - RampD

**Template Drop**

Horizontal Name	Template Name	Interval	Description	Start Station	End Station
	Project Templates\Ramp C	25.000'		11+05.4172	30+05.6042

Row: 1 of 1

**Template Drop**

Interval: 25.000'

Template Name: Project Templates\Ramp C

Horizontal Name:

Description:

**Station Range**

Start Station: 11+05.4172

End Station: 30+05.6042

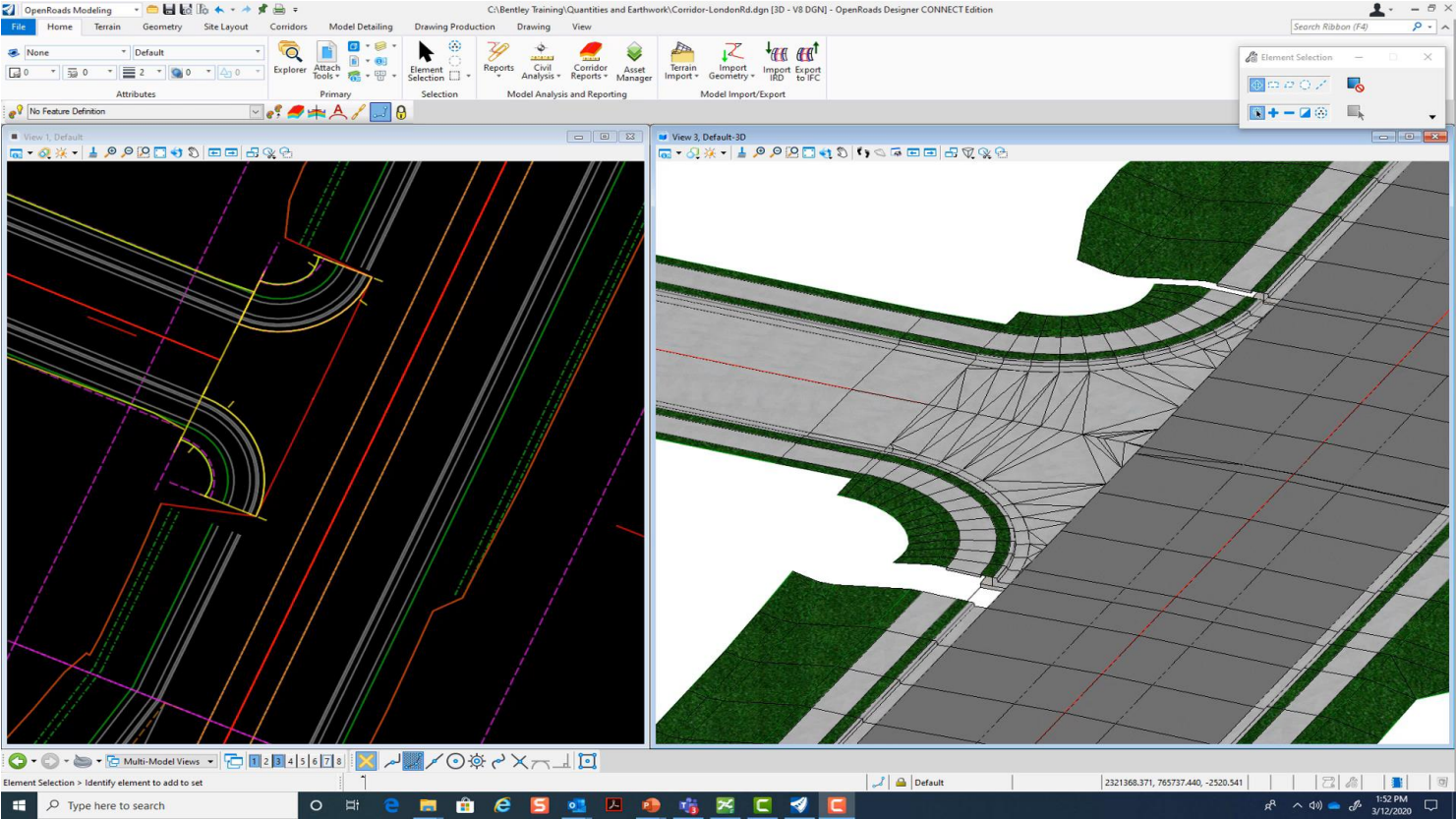
Close

# 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



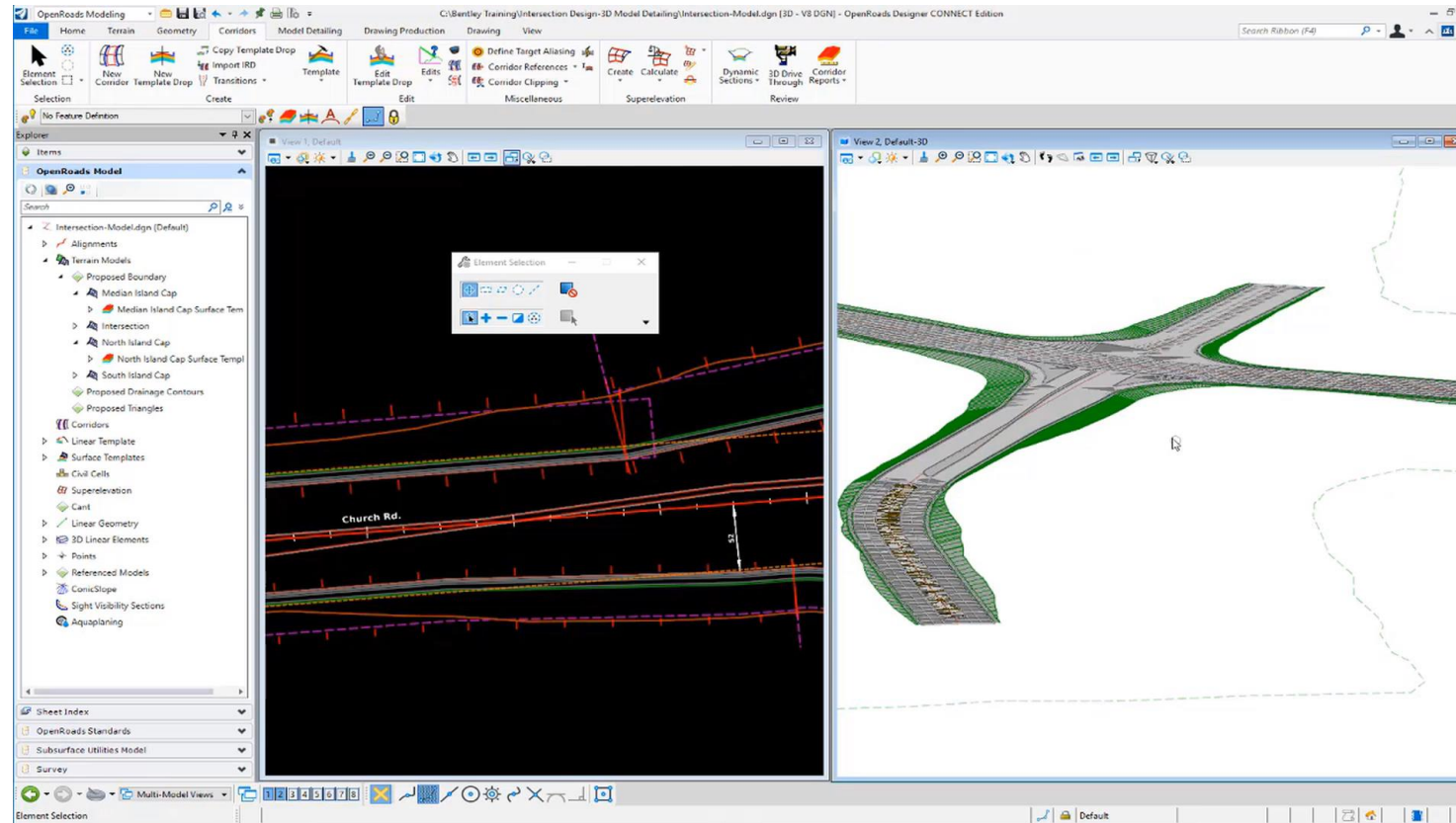
# Corridor Clipping and Target Aliasing

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

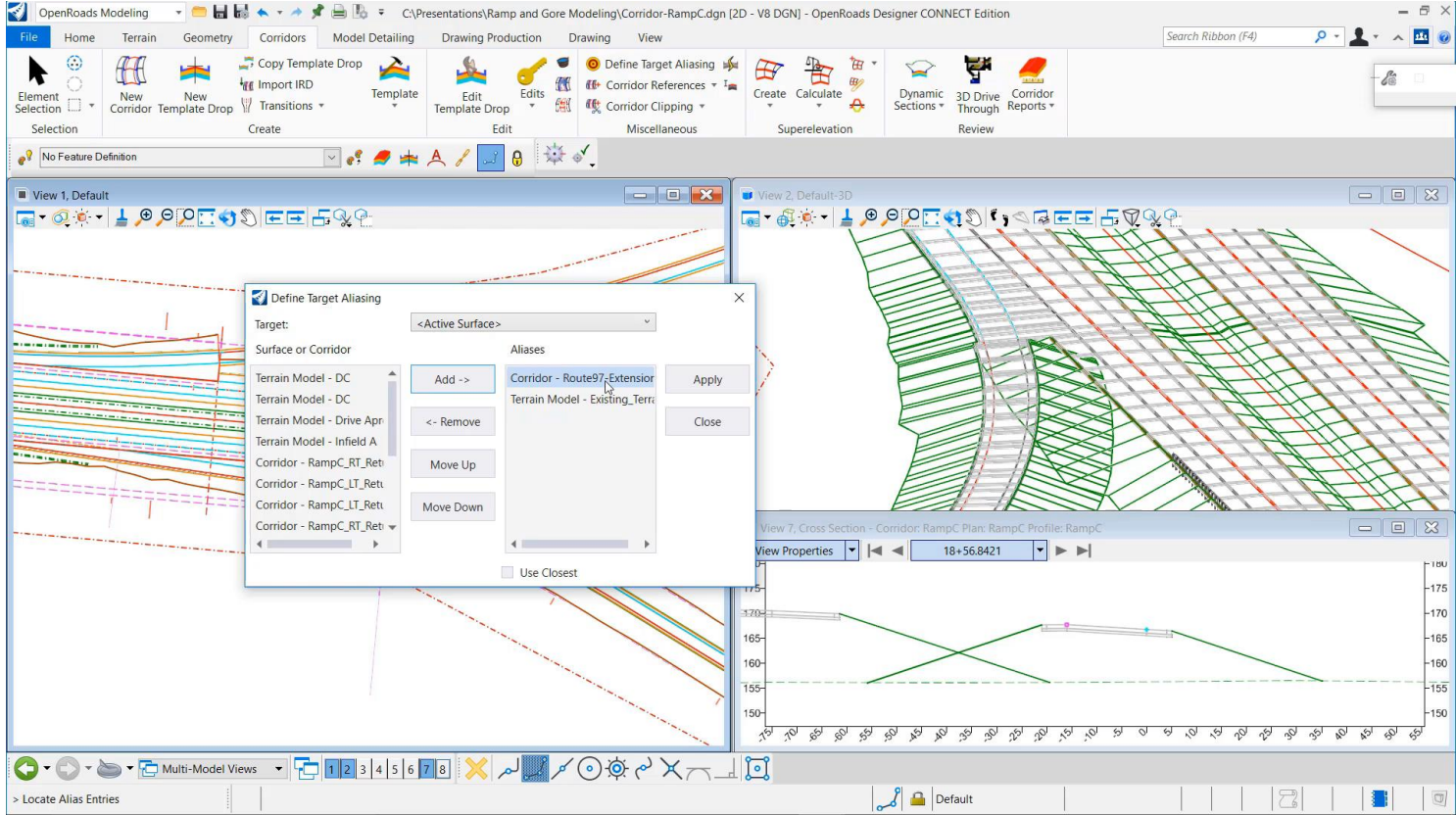
Let's take a look....



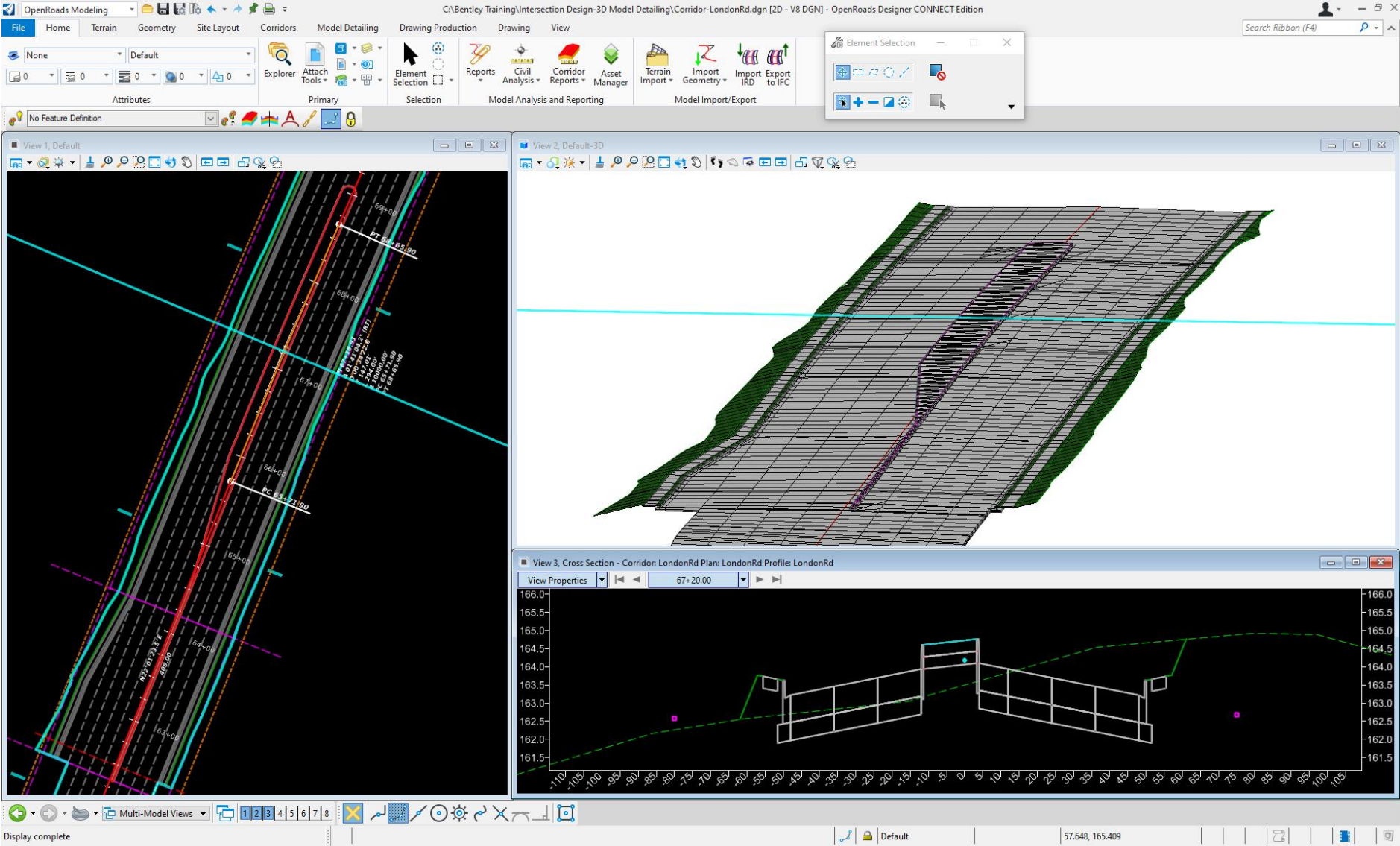
# Corridor Clipping – Overlapping Slopes Example



# Corridor Clipping and Target Aliasing

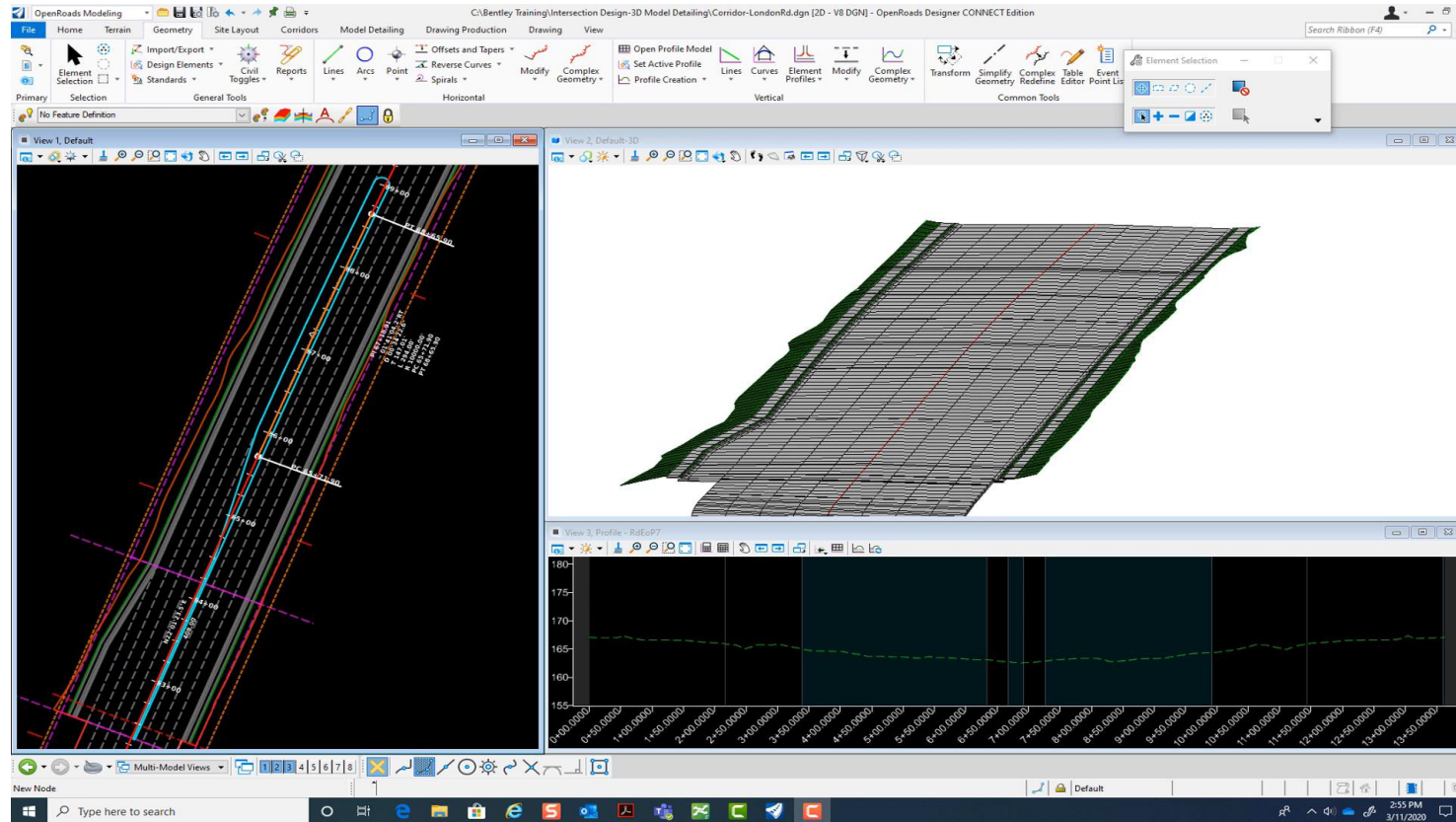


# Corridor Clipping – Median Island Example





# Corridor Clipping – Median Island Example



# 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

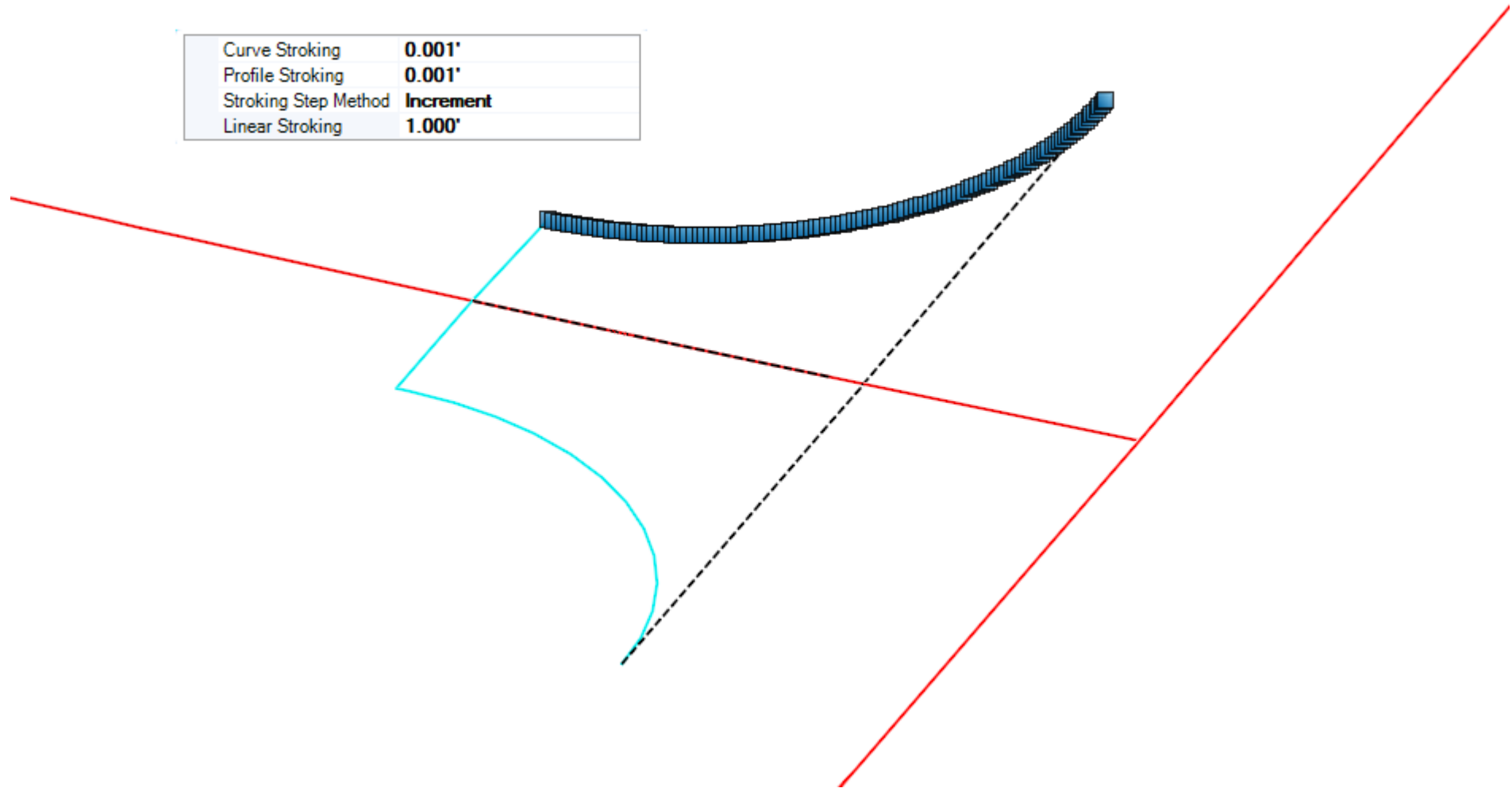


# Geometry Stroking

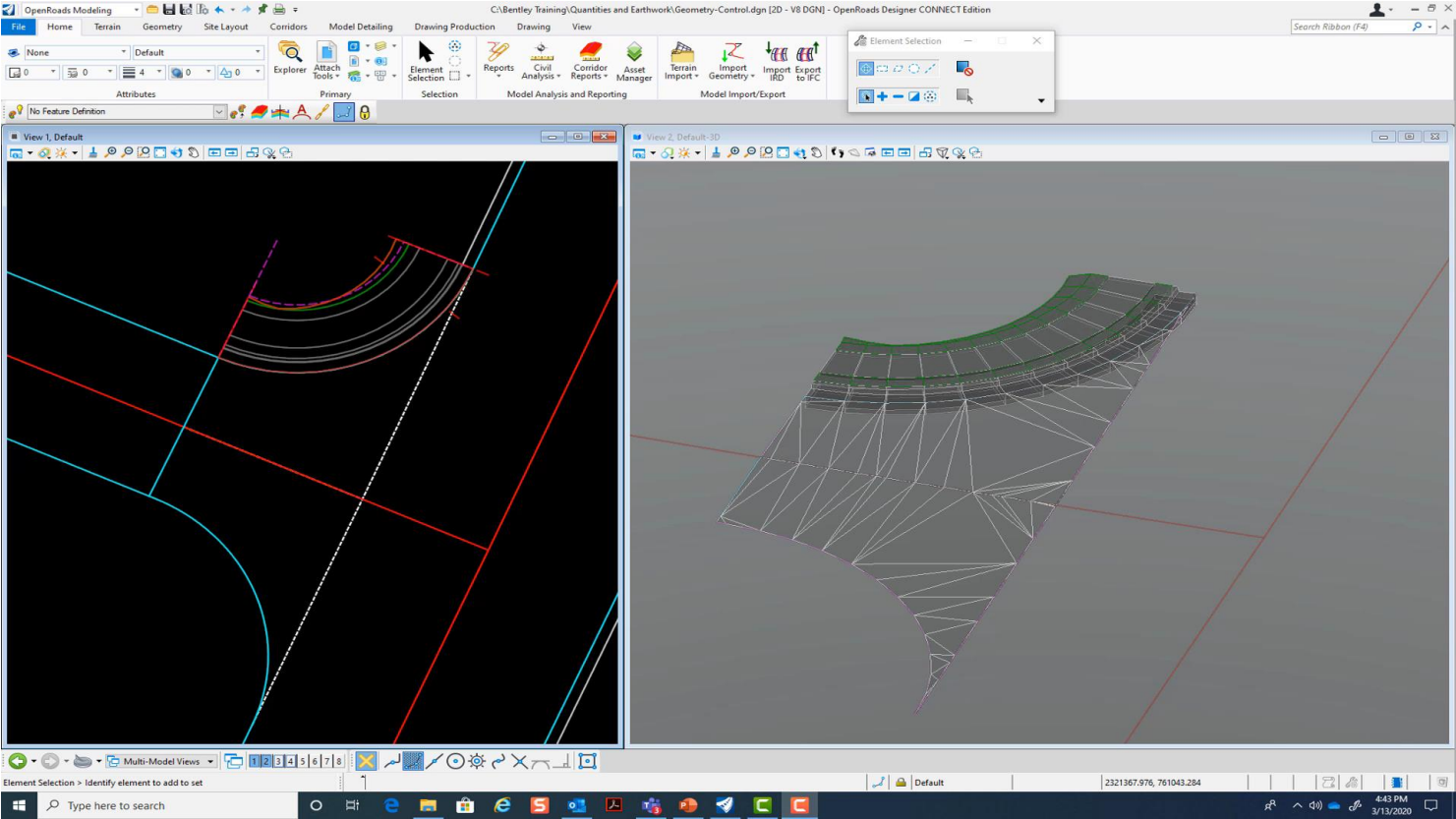
- Linear Stroking
  - Defines how often to compute a point or template drop interval location on a tangent segment. This variable is not used by Corridor Modeling. If not set, the value defaults to 10. This is used when generating 3D elements and the apply Template command.
- Profile Stroking
  - Defines 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'



# Geometry Stroking



# Secondary Alignment

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

The screenshot shows the 'Corridor Objects - LondonRd' window. The 'Point Control' tab is selected, showing a table of control objects and a detailed configuration panel on the right. The 'Use as Secondary Alignment' checkbox is highlighted with a red box.

Enabled	Control...	Mode	Control Type	Use as Second...	Priority	Start Station	End Station
True		Horizontal	Linear Geometry	True	1	84+00.0000	91+00.0000
True		Vertical	Superelevation		1	50+00.0000	91+00.0000
True		Vertical	Superelevation		1	50+00.0000	91+00.0000

**PointControl**

Enabled

Control Description

Mode Horizontal

Control Type Linear Geometry

Cant

Point EOP\_R

Plan Element

Use as Secondary Alignment

Priority 1

Horizontal Start Offset 0.0000

Horizontal Stop Offset 0.0000

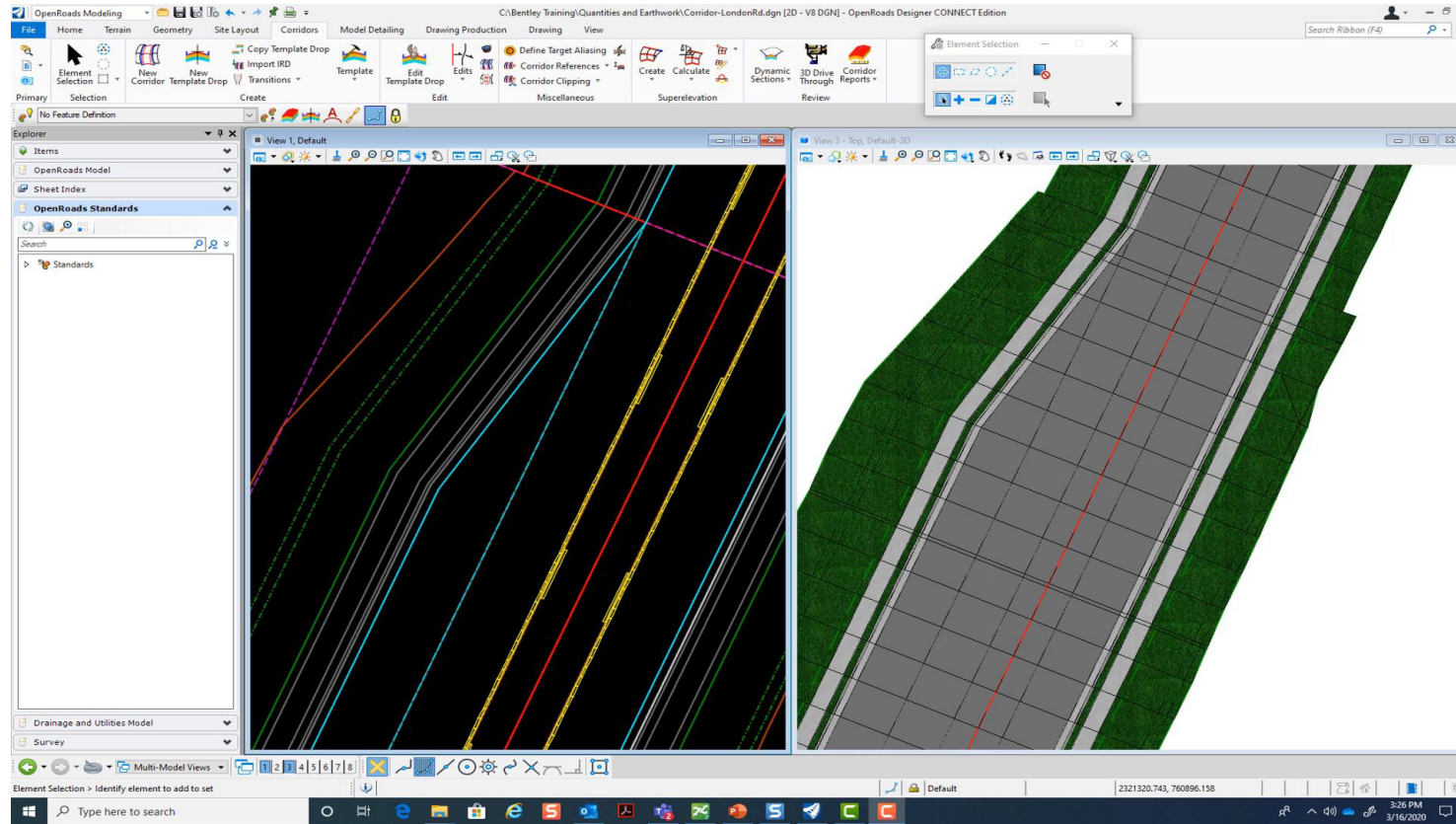
**Station Range**

Start Station 84+00.0000

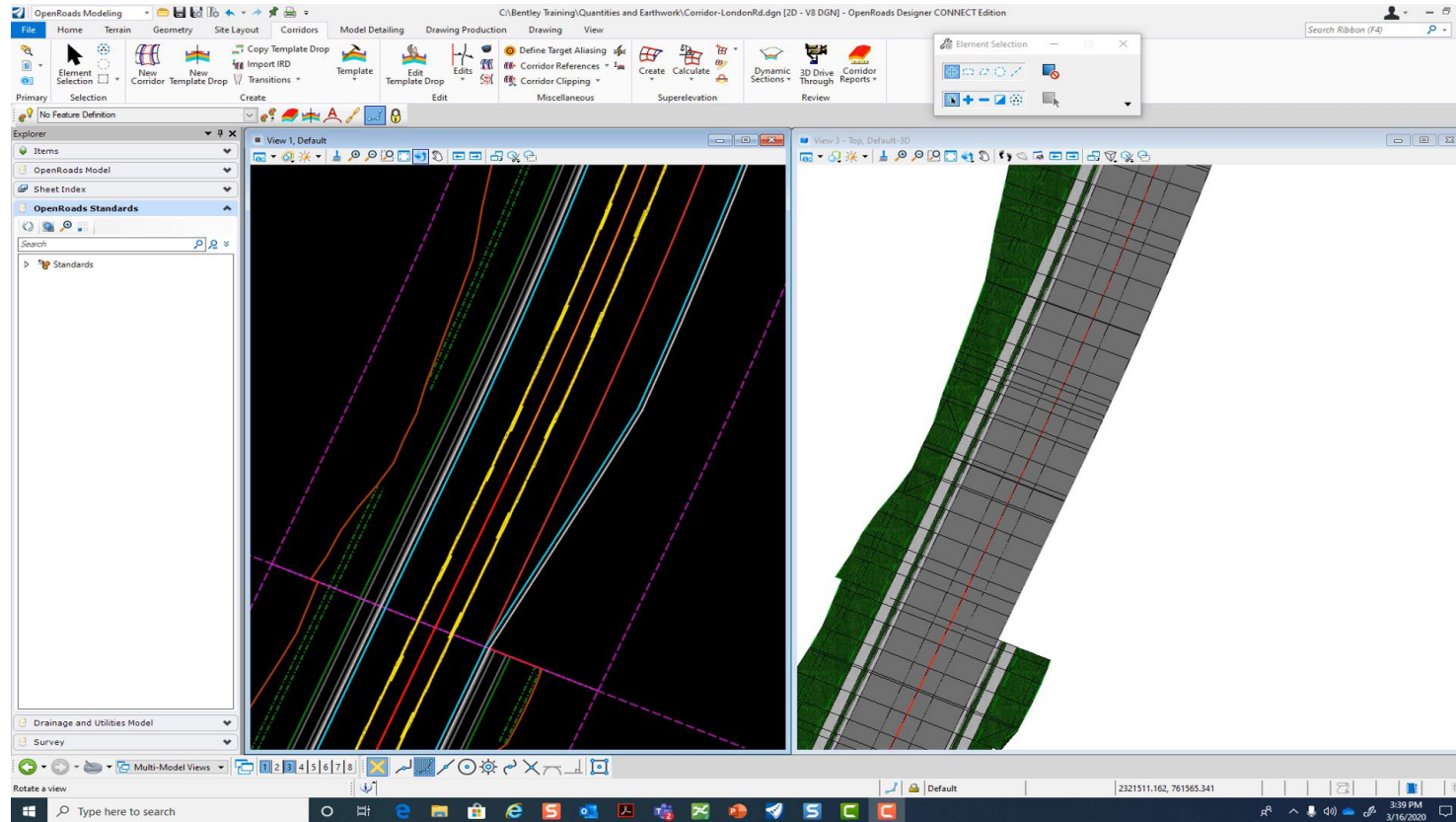
End Station 91+00.0000

Close

# Secondary Alignment



# Secondary Alignment – Point Control Example





# Getting the Model Right

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



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