

Practice Workbook



NCDOT Quick Start for OpenRoads Designer CONNECT Edition

NCDOT Roadway Design Unit

About this Practice Workbook...

- This PDF file includes bookmarks providing an overview of the document. Click on the bookmark to quickly jump to any section in the file. You may have to turn on the bookmark function in your PDF viewer, such as Adobe Reader.
- The dataset used throughout this Quick Start guide uses English units.
- Each module in this Quick Start guide is self-contained. You can jump to any module and begin the exercises.
- This training uses the *NCDOT_Roadway* workspace and the *Quick Start* workset installed. It is very important that you select the *Quick Start* workset when working the exercises in this course.
- The theme of this workbook is modeled from the Bentley Institute and its Quick Start Guides.
- This workbook was written with the release of OpenRoads Designer 10.01.00.15 (Update 1).
- This workbook has been updated for OpenRoads Designer 10.07.00.56 (2019 Release 1 Update 7).

Module 1: Overview and Terrain

Description

In this module you will review the OpenRoads Designer interface and import the existing ground terrain.

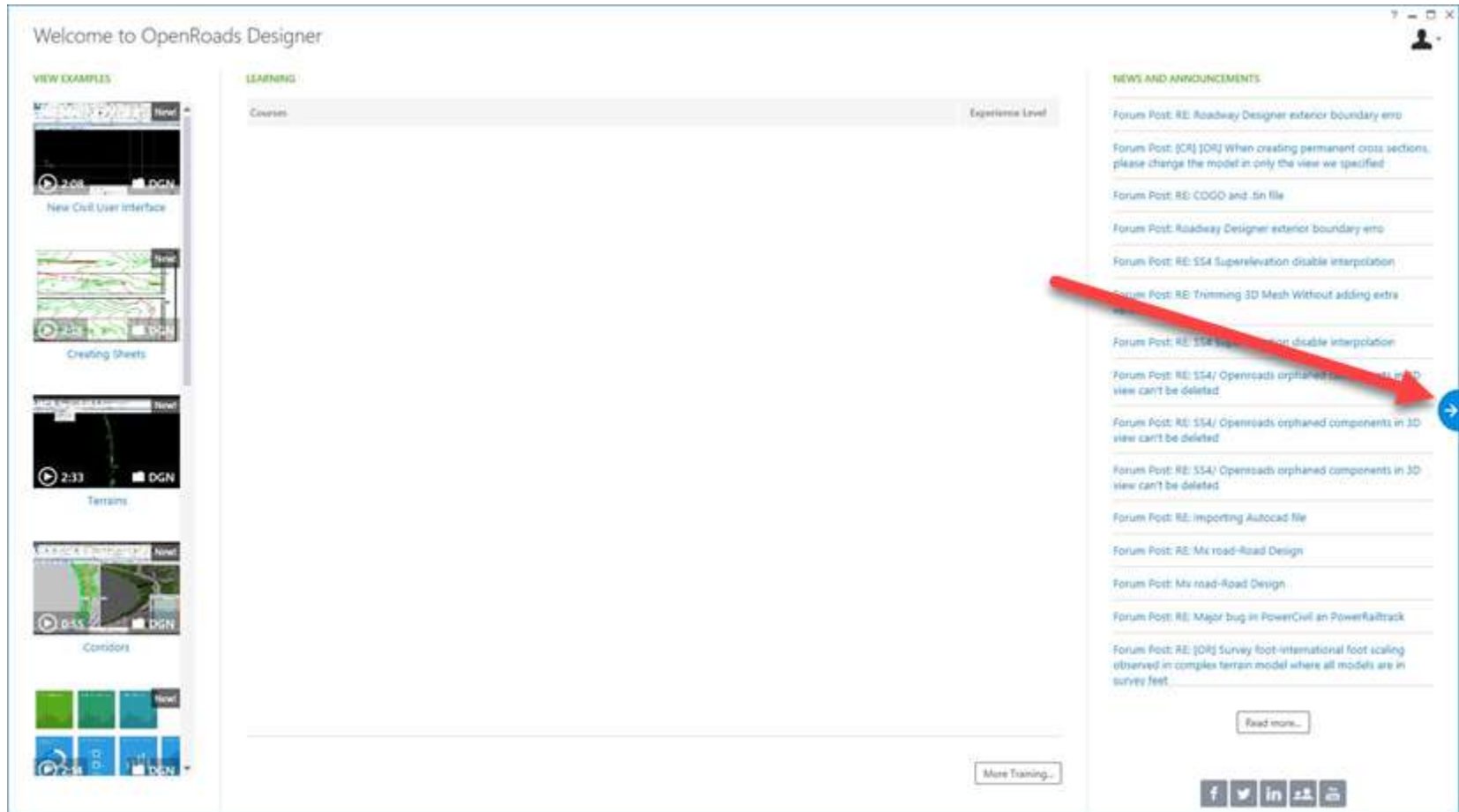
Objectives

- User Interface (Ribbon)
- Backstage Functionality
- Search Capability
- Bentley Connect Advisor
- Quick Access Toolbar
- Integration with GEOPAK

Start OpenRoads Designer and Select Workspace



1. Start the **OpenRoads Designer** software by double-clicking on the desktop icon.

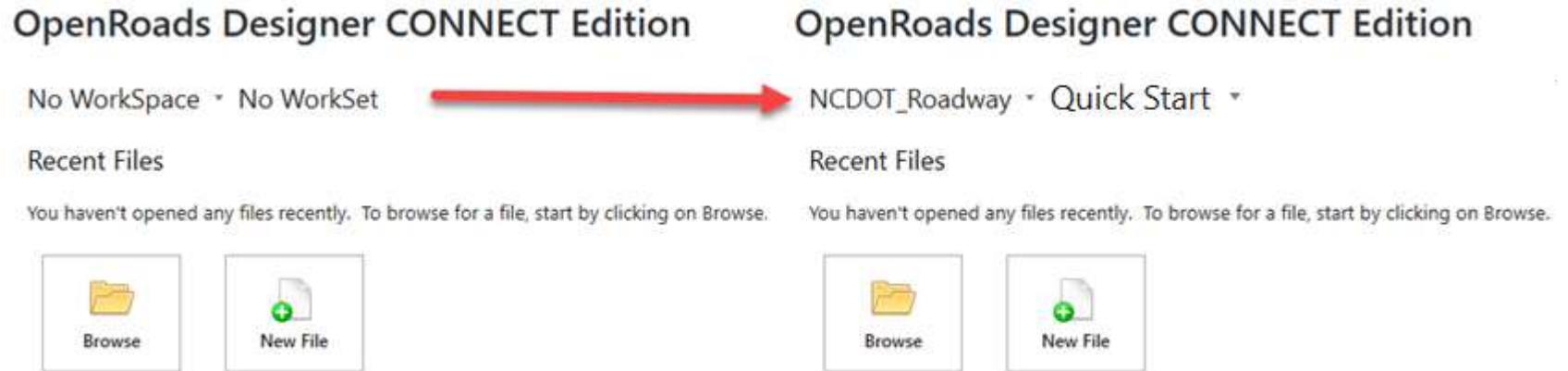


2. Click the **Start a Work Session** arrow on the right side of the screen.

3. Set the Workspace and Workset

This workshop requires the *NCDOT_Roadway* Workspace and *Quick Start* Workset installed with the OpenRoads Designer software.

- a. Select **NCDOT_Roadway** from the *Workspace* menu.
- b. Select **Quick Start** from the *Workset* menu.
- c.



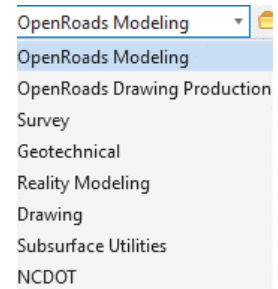
4. Create a new 3D file for the existing terrain.

- a. Select **New File**.
- b. Browse to *C:\NCDOT Training\Roadway\Quick Start Module 1 (Overview and Terrain)* or other folder where you unzipped the dataset files.
- c. Set the *Seed* to **Seed3D - English Design.dgn**.
- d. Create a new file named **r2635c_rdy_etm.dgn**.

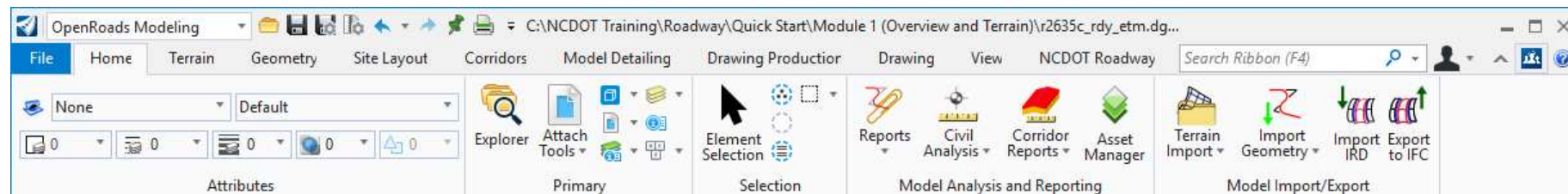


Review the Interface

1. Select the **OpenRoads Modeling** workflow from the pick list in the upper left corner if it is not already active.



The ribbon menu changes to OpenRoads Modeling tools organized into similar categories called *ribbon tabs*.



- **Home** - Common tools such as attributes, Explorer, references, models, element selection, fences, and reports.
- **Terrain** - Element Selection and terrain modeling tools.
- **Geometry** - Element Selection, Civil AccuDraw, and geometry tools including Lines, Arcs, and Points.
- **Site Layout** – Import SITEOPS File, Parking, Pad, Pathway, Vertical Geometry, Grading Proposed
- **Corridors** - Element Selection, superelevation, and corridor modeling tools.
- **Model Detailing** - Element Selection, Civil Cells, and 3D (linear template, surface templates, etc.) tools.
- **Drawing Production** - Element Selection, notes, text, annotations, and plans production (cross section, plan, and profile) tools.
- **Drawing** - Commonly used MicroStation drawing tools. To access the complete set of MicroStation tools change the active workflow to Drawing, Modeling (3D only), or Visualization (3D only).
- **View** - Commonly used view control tools.
- **NCDOT_Roadway**- AutoTurn, Power Delete, Common Roadway Design Tools

2. Searching the ribbon.

When you are not sure where to find a tool on the ribbon interface, the Search Ribbon field in the upper right corner is your best friend.

a. Type **Template** in the search field.

The matches found in the ribbon menus appear. The search is across all ribbon menus, not just the currently active ribbon.

b. Hover over **Create Template**.

The search results expand showing where this tool is located on the ribbon.

c. Select **Create Template** to start that tool.

Notice that the Create Template tool started but the ribbon menu did not change.

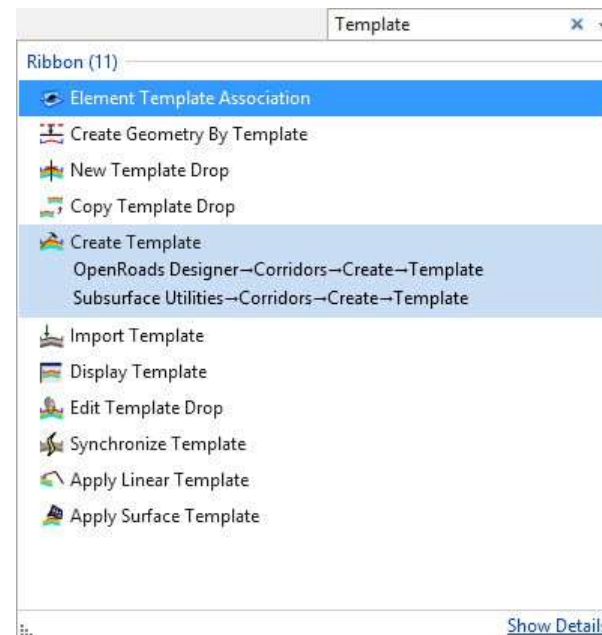
d. Close the *Create Template* dialog.

e. Type **Template** in the search field again.

f. Hover over **Create Template** to expand the search options.

g. Select **OpenRoads Designer → Corridors → Create → Template**.

The ribbon changes to the selected menu which contains the Create Template tool.



3. Auto hide ribbon.

a. Double click on any *Ribbon Tab* (such as Corridors) to set the ribbon menu in auto hide mode.

b. Double click a *Ribbon Tab* again disable auto hide mode.

4. Introduction to the Backstage.

a. Activate the *Back Stage View* by clicking **File** in the ribbon menu.

b. Select **Settings**.

c. Design File settings, preferences, customizations, etc. are found in the Backstage, keeping the ribbon menus focused on the tools.



d. Click the Arrow in the upper left corner to return to the design canvas.



5. Use the **Bentley CONNECT Advisor** (upper right corner) to search for topics and Q&A's in the Bentley Communities.

6. The **Quick Access Toolbar** (upper left corner) contains common tools found in most workflows and ribbon tabs.



Import Existing Ground Terrain from GEOPAK TIN

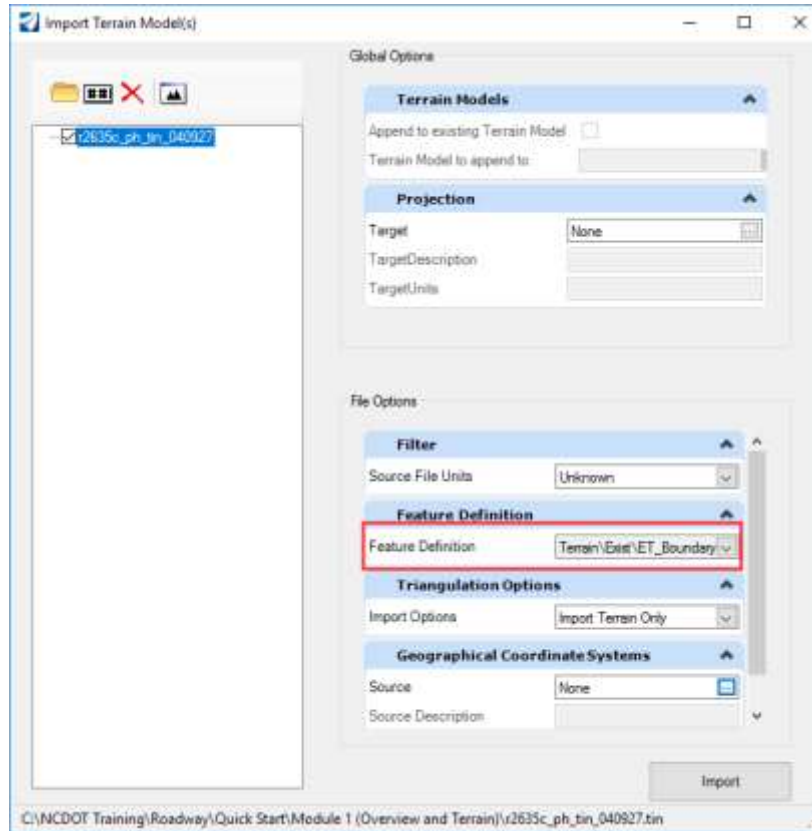


1. Select **From File** from the *Terrain > Create* tab on the OpenRoads Modeling workflow (ribbon).
2. Select **r2635c_ph_tin_040927.tin** from the *Module 1 (Overview and Terrain)* folder.
3. Set the *Feature Definition* to **Terrain > Existing > ET_Boundary-RDY**.

This terrain could have originated in ConceptStation, InRoads, GEOPAK, or other applications.



4. Click **Import**.
 5. Close the *Import Terrain Model* dialog.
 6. Select **Fit View** to see the terrain model.
 7. Select **Save Settings**.
- HINT: The icon is found in the Quick Access toolbar at the top of the screen.
8. Exit OpenRoads Designer.



The modules in this Quick Start guide are designed to be self contained. Please exit the software after each module and begin again with the files included in the next module.

Module 2: Geometry

Description

In this module you will import and annotate geometry from GEOPAK (GPK) and inRoads (ALG).

Objectives

- Integration with GEOPAK and inRoads
- Attach Reference File
- Annotation Group
- Annotation Scale
- Civil Labels
- Feature Definitions

Attach Original Ground Terrain

1. Start the **OpenRoads Designer** software and ensure that the *Workspace* is set to **NCDOT_Roadway** and the *Workset* is set to **Quick Start**.

OpenRoads Designer CONNECT Edition

NCDOT_Roadway ▾ Quick_Start ▾

Recent Files

You haven't opened any files recently. To browse for a file, start by clicking on Browse.



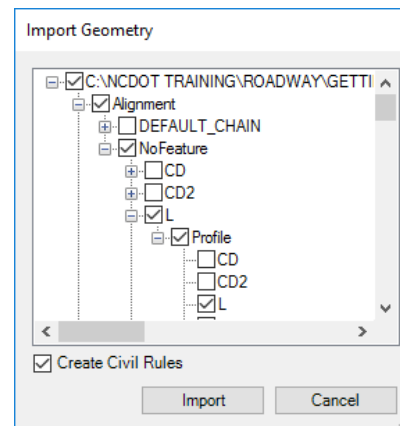
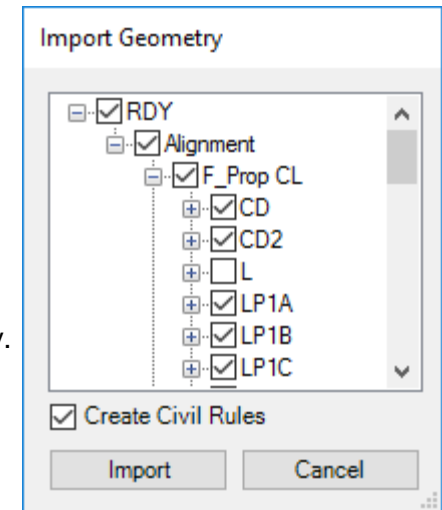
2. Use the **Browse** button to open the file **r2635c_rdy_alg.dgn** from the *Module 2 (Geometry and Annotation)* folder.
3. Attach **r2635c_rdy_etm.dgn** as reference using a *Coincident-World* orientation.
HINT: Reference tools are on the *Home* ribbon tab.
4. **Fit** the view.
5. Set the *original ground* as the **Active Terrain Model**.
6. Select **Save Settings**.

Import Geometry

1. Import the geometry.



- Select **Import Geometry** from the *Geometry* ribbon tab
- Browse** to and select the **cmjobRDY.alg** file.
- Select the check box next to *F_Prop CL* to select all alignments, **except for L**.
- Enable the *Create Civil Rules* option.
- Click **Import**.
- Repeat steps a thru e, with the exception of selecting the *jobrdy.gpk* and the alignments L/L(pro) only.



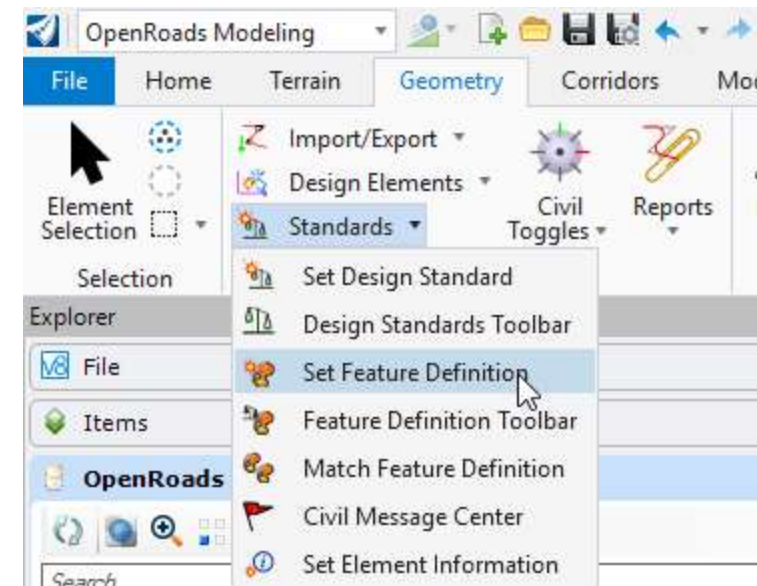
2. Assign Feature Definition to geometry.



- Select All** to add the geometry elements to a selection set.
- From the *Geometry > General Tools > Standards* tab, select **Set Feature Definition**.
- Set the parameters and data point to update the feature definitions.
 - *Feature Type* = **Alignment**
 - *Feature Definition* = **Alignment > ALG_Centerline-RDY**.

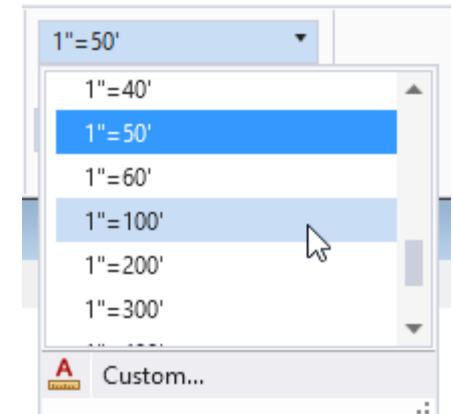


d. **Select None** to clear the selection set.



Annotate Geometry

1. Zoom to where the first interchange is visible.
2. Annotate a single alignment.
 - a. Select **Annotate Element** from the *Drawing Production* ribbon tab **Annotation** tools group.
 - b. Select the *L* (mainline) centerline.
 - c. Reset to annotate the alignment.
3. Change the annotation scale.
 - a. Set the **Annotation Scale** on the *Drawing* ribbon tab to **1"=100'** to make the annotations larger.
4. Remove annotation from a single alignment.
 - a. Select **Remove Element Annotations** from the *Drawing Production* ribbon tab.
 - b. Select the *L* (mainline) centerline
 - c. Reset to clear the annotation.
5. Annotate multiple alignments.
 - a. Fit the view so all alignments are visible.
 - b. **Select All** to add the geometry elements to a selection set.
 - c. Select **Annotate Element** from the *Drawing Production* ribbon tab.
 - d. Data point to annotate the selected geometry.
6. Set the **Annotation Scale** on the *Drawing* ribbon tab to **1"=50'** to update all annotations to a 50 scale.



Civil Labels

1. Zoom to the beginning of *Jenks Road (-Y11-)*. It is the first minor crossing road after the first interchange.
2. Label begin construction limit.



- a. Select **Place Label** from the *Drawing Production* ribbon tab **Notes** tools group.



- Place a label with a leader
- *Type* = **Cell**
- *Cell Name* = **_Lbl_Pln_Beg Const -Y- Line**
- *Dimension Style* = **_Lbl_Pln_Beg Const -Y- Line**

Note: Dimension Style is automatically selected if the Cell Name is the same.

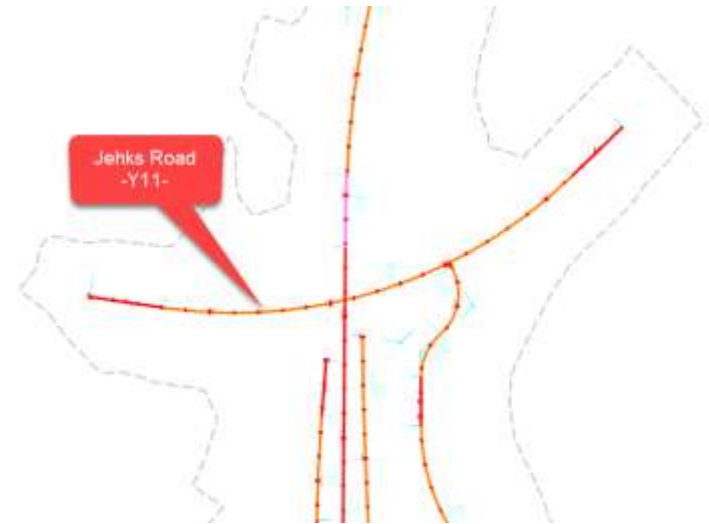
- *Label Rotation* = **Horizontal**
- *Start At* = **Terminator**
- *Horizontal Attachment* = **Auto**
- Enable **Annotation Scale**, **Association**, and **Relative Association**



- b. Select the *Y11* centerline.
- c. Data point near the beginning of the alignment within the tangent section.
- d. Place the label above the alignment.



3. Move and rotate (*Drawing* ribbon tab) the label and notice the stationing dynamically updates.



Aerial Raster Tiles – NCDOT Workflow (Internal Only)

1. Rotate view to **Top**.

a. Select **Rotate View**.



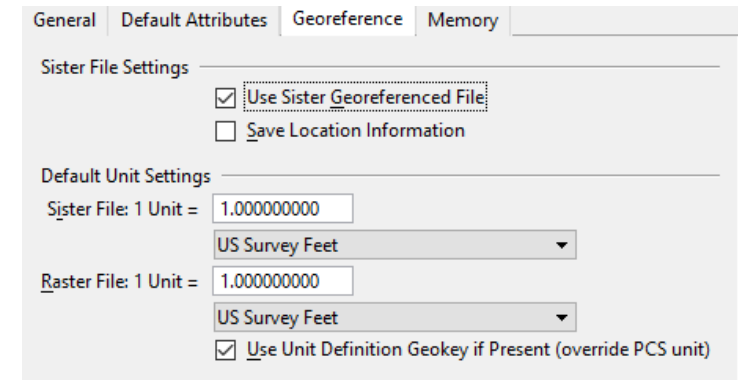
b. Method: **Unrotated**

2. Verify **Raster Unit Settings**.

a. File → Settings → User → Preferences → Raster Manager → Georeference (tab)

- Use Sister Georeferenced File
- *Sister File Unit: 1 US Survey Feet*
- *Raster File Unit: 1 US Survey Feet*

b. **OK**



3. Switch to the **NCDOT** workflow.



4. Select **Aerial Tiles** under the **Apps** ribbon tab **Raster** tool group.

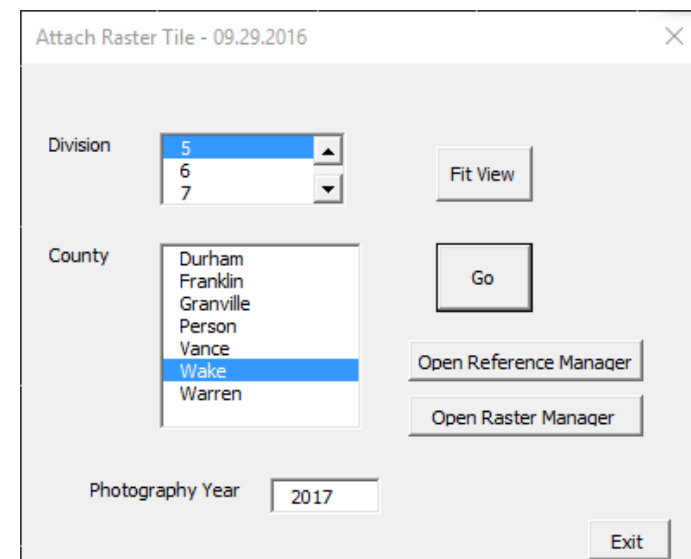
5. When the **Attach Raster Tile** dialog box appear:

a. *Division: 5*

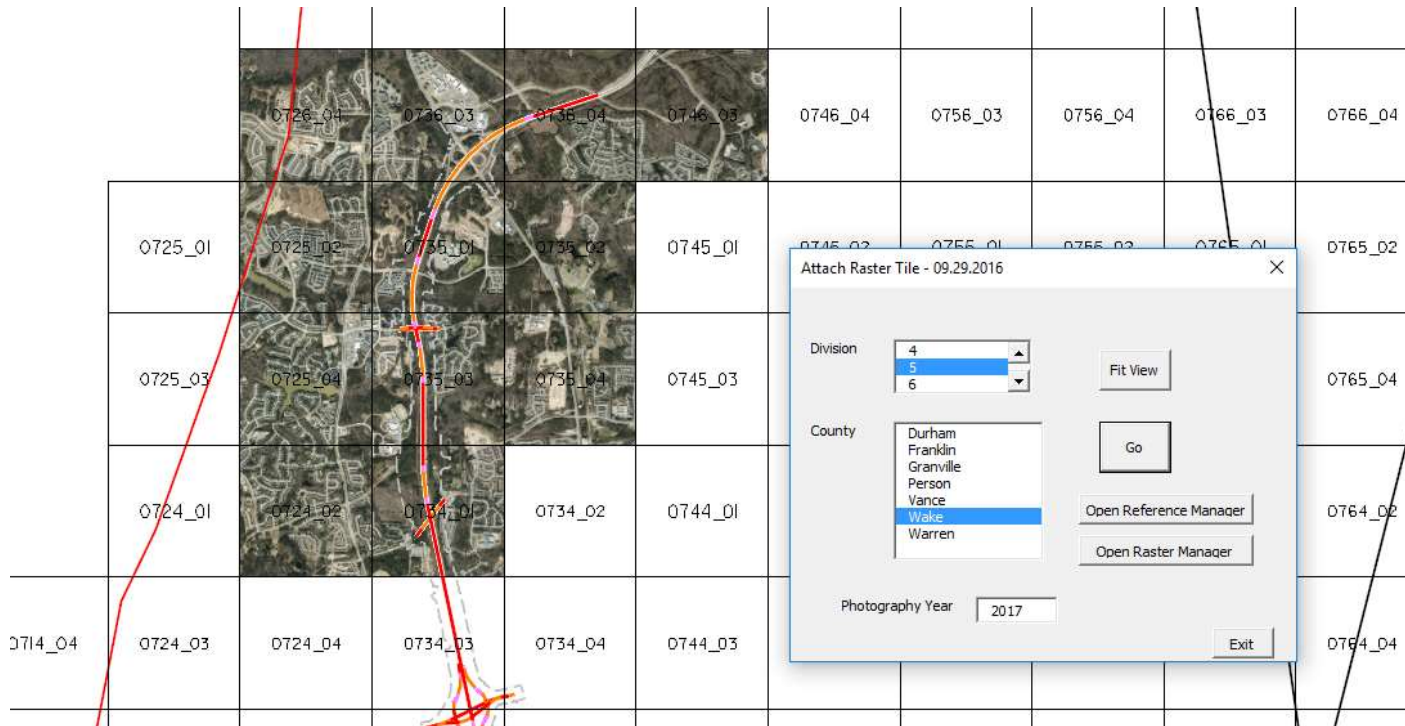
b. *County: Wake*

6. Click on **Fit View** in the **Attach Raster Tile** dialog box.

7. Click **Go**. This will attach a reference file *Wake_tile_layout.dgn* with tile blocks and corresponding numbers for each tile for the whole county. Note that each county may contain 300 to over 1000 tiles depending on the size of the county.

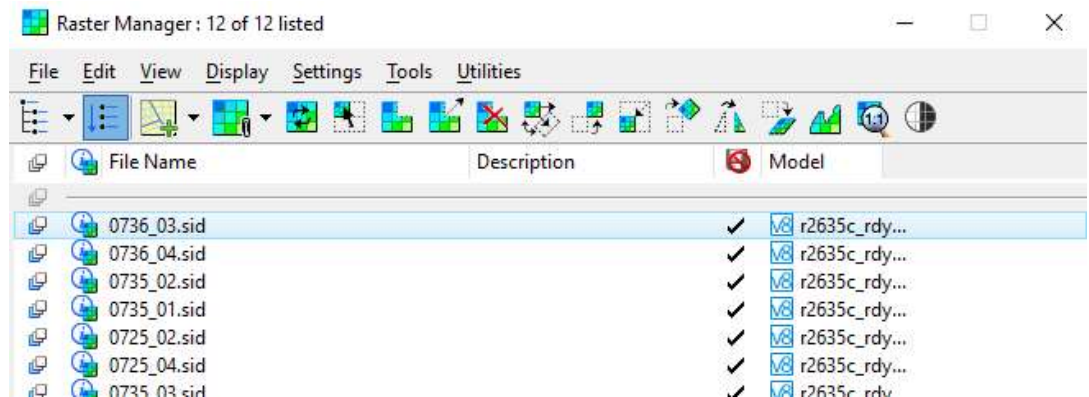


8. Click on the number inside each block you wish to attach the raster tiles.



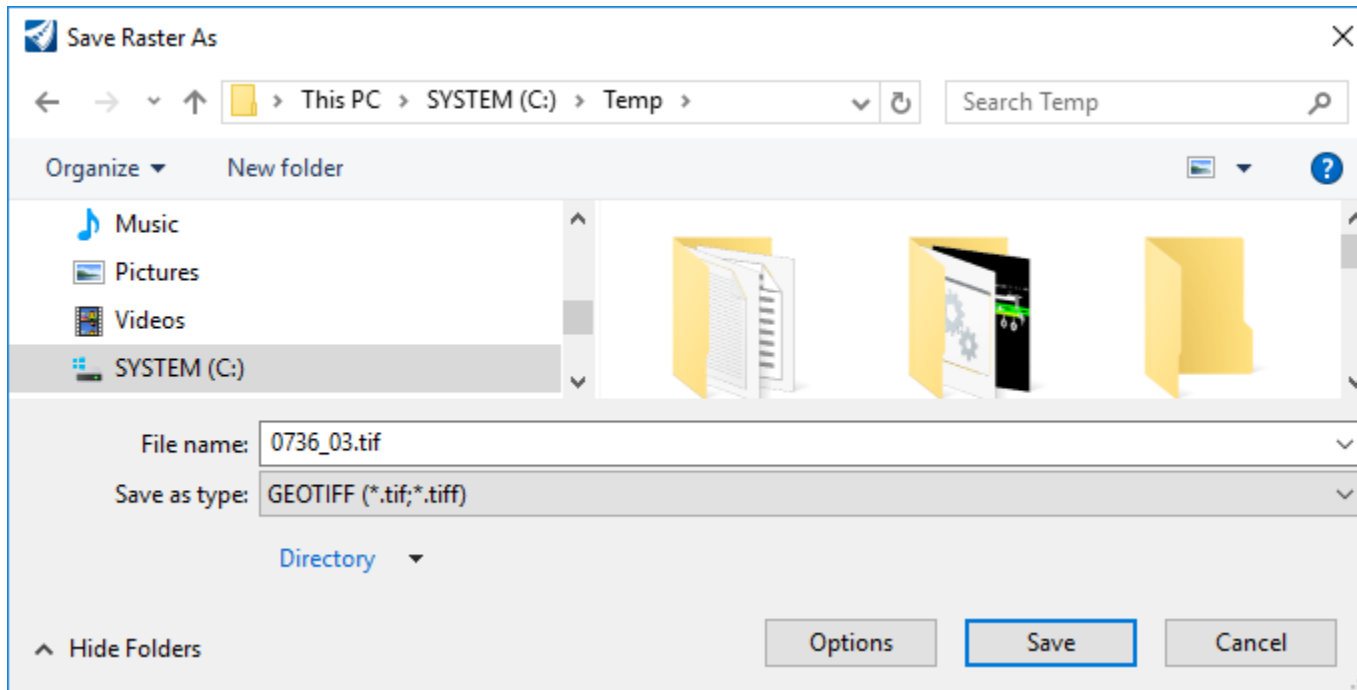
9. Once all desired raster tiles have been attached, you can then detach the *Wake_tile_layout.dgn* file through the **Open Reference Manager** button in the **Attach Raster Tile** dialog box.

10. Click on **Open Raster Manager** to verify each raster tile (.sid file) has been attached properly.



11. As an option each tile or .sid file can be saved locally to the **C:\ drive** by right mouse click each .sid file in the **Raster Manager** dialog box and then choose **Save as**.

a. *Save as type:* **GEOTIFF (*.tif)**



12. Exit OpenRoads Designer.

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Module 3: Modeling

Description

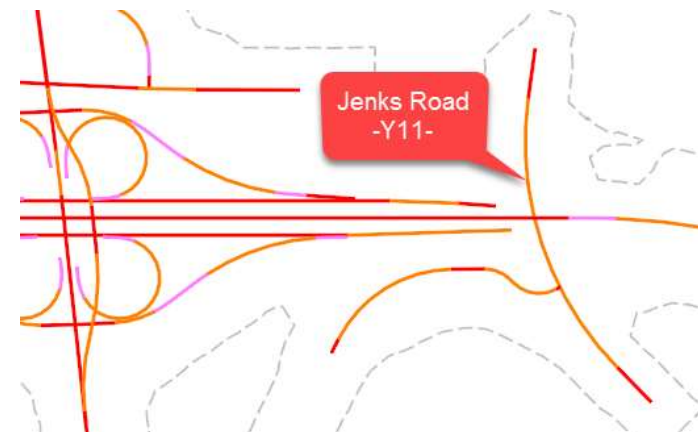
In this module you will model a minor roadway and a temporary model of the bridge. You will also model a 7.25 mile long section of roadway.

Objectives

- Drawing Scale across references
- General Modeling
- File Federation
- Integration with OpenBridge Modeler (OBM)
- Performance

Model Jenks Road (-Y11-)

1. Start the **OpenRoads Designer** software and ensure that the *Workset* is set to **Quick Start**.
2. Open the file **r2635c_rdy_cmd_y11.dgn** from the *Module 3 (Corrido Modeling)* folder.
3. Click in *View 1* to make it the active view and model.
4. Use **New Corridor** from the *Corridors* ribbon tab to create a corridor along -Y11- from the beginning of alignment to the bridge at approximately station 19+35 +/-.
 - *Feature Definition* = **Corridor > Design – A50** (set in the Tool Settings dialog)
 - *Profile* = **Active Profile**
 - *Feature Name* = **Y11**
 - *Template* = **Template > TMLT-Shoulder Dual Lane Roadway** (**Alt + ↓** to open template library)
 - *Start Station* = **Beginning of Alignment** (**Alt** to lock to beginning station)
 - *End Station* = **19+35**
 - *Drop Interval* = **5**
 - *Minimum Transition Before Drop* = **0**
 - *Minimum Transition After Drop* = **0**



5. Continue the corridor from the end of the bridge at approximately station 22+00 +/- to the end of the alignment.

- *Template* = **Template > TMPLT-Shoulder Dual Lane Roadway**
- *Start Station* = **22+00**
- *End Station* = **End of Alignment** (**Alt** to lock to ending station)
- *Drop Interval* = **5**
- *Minimum Transition Before Drop* = **0**
- *Minimum Transition After Drop* = **0**

6. Change corridor feature definition.

a. Select the corridor.

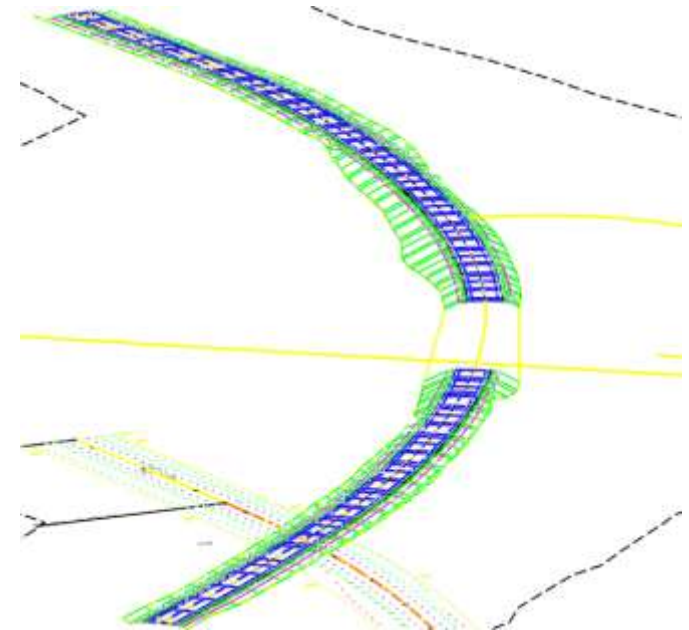


b. Open the corridor *Properties*.

c. Set the *Feature Definition* = **Corridor > Final**

Notice the cross section drop interval tightens.

d. Close the Properties Window.



Feature Name	Y11
Feature Definition	Final
Name	Y11
Horizontal Name	Y11
Use Active Profile	True
Profile Name	Y11

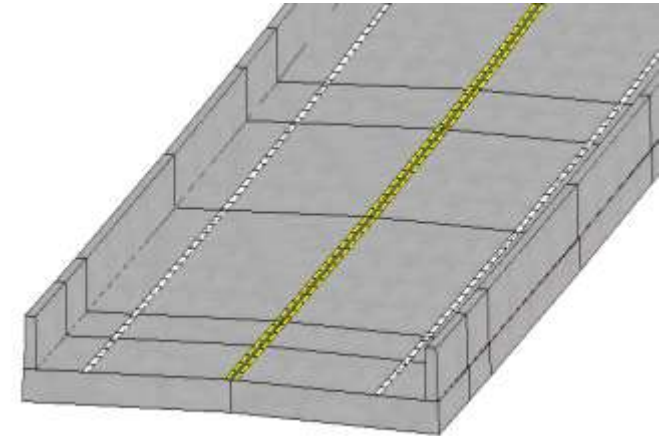
Model the Preliminary Bridge along Jenks Road (-Y11-)

1. Open the file **r2635c_rdy_cmd_bridge.dgn** from the *Module 3 (Corrido Modeling)* folder.



2. Use **New Corridor** from the *Corridors* ribbon tab to create a corridor along Y11 for the bridge. This preliminary bridge will be replaced later by the actual bridge modeled using OpenBridge Modeler (OBM).

- *Feature Definition* = **Corridor > Design – A50** (set in the Tool Settings dialog)
- *Profile* = **Active Profile**
- *Feature Name* = **Y11-BRG**
- *Template* = **Template > TMPLT-Bridge Dual Lane** (**Alt + ↓** to open template library)
- *Start Station* = **19+35**
- *End Station* = **22+00**
- *Drop Interval* = **5**
- *Minimum Transition Before Drop* = **0**
- *Minimum Transition After Drop* = **0**



3. Select **Create Parametric Constraint** and locate the Y11 corridor to change the bridge deck depth to approximate the depth of the superstructure.



- *Start Station* = **19+35** (or **Alt** to lock to beginning station)
- *Stop Station* = **22+00** (or **Alt** to lock to ending station)
- *Constraint Label* = **BR_Depth Deck**
- *Start Value* = **-5**
- *Stop Value* = **-5**

4. Review the 3D Model. Notice the depth of the temporary bridge deck is to approximate the depth of the superstructure.

Create Par...	
Lock To Start	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Start	10+00.00
Lock To End	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Stop	34+33.17
Constraint Label	BR_Depth Deck
Start Value	-5.0000
Stop Value	-5.0000

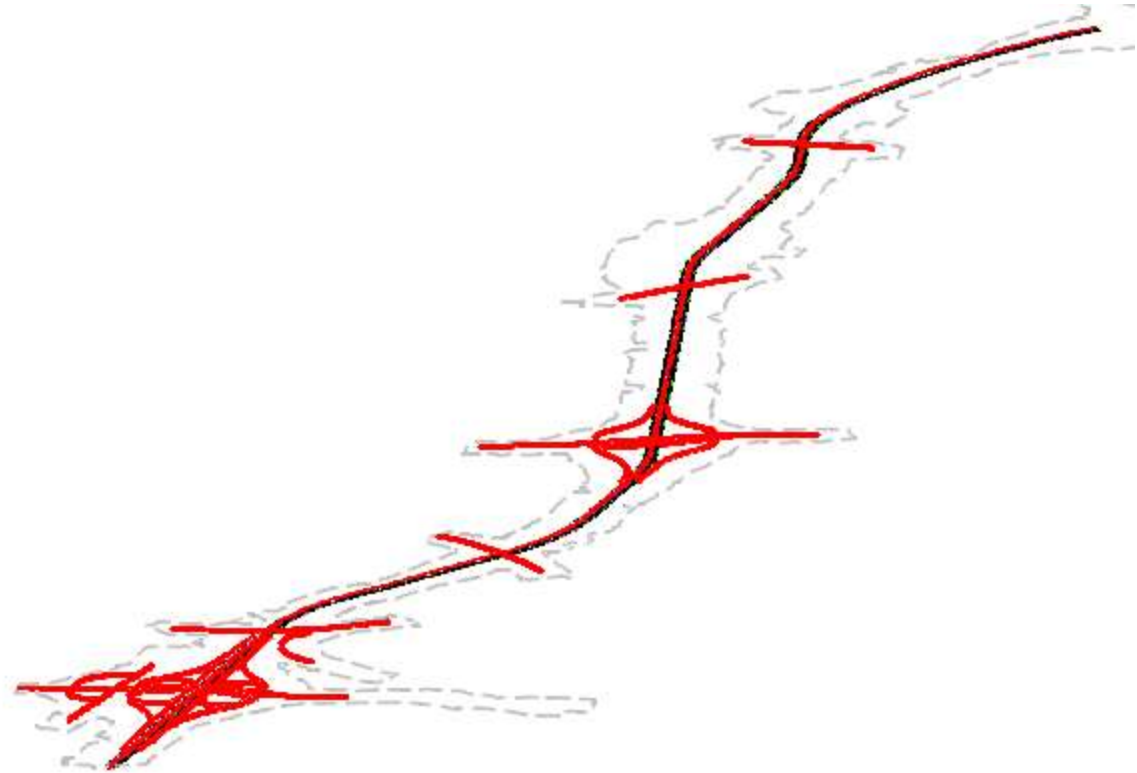
Model the I-540 Western Wake Expressway (-L-)



1. In the file **r2635c_rdy_cmd_l.dgn**, create a corridor for I-540 (-L-) a 7.25-mile north-south alignment.

- *Feature Definition* = **Corridor > Design – A50**
- *Profile* = **Active Profile**
- *Feature Name* = **L**
- *Template* = **Template > TMPLT-Shoulder Divided Highway**
- *Start Station* = **Beginning of Alignment (Alt to lock to beginning station)**
- *End Station* = **End of Alignment (Alt to lock to ending station)**
- *Drop Interval* = **5**
- *Minimum Transition Before Drop* = **0**
- *Minimum Transition After Drop* = **0**

2. Review the 3D model.
3. Exit OpenRoads Designer.



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Module 4: Superelevation

Description

In this module you will define and edit superelevation and assign the superelevation to a corridor with multiple templates.

Objective

- General Superelevation
- Create Superelevation Section
- Create Superelevation Lanes (alternative Create Superelevation Lanes by Road Template)
- Calculate Superelevation and Superelevation Rule Files
- Edit Superelevation and Superelevation Model
- Assign Superelevation to Corridor

Define Superelevation for Jenks Road (-Y11-)

1. Start the **OpenRoads Designer** software and ensure that the *Workset* is set to **Quick Start**.
2. Open the file **r2635c_rdy_sup.dgn** from the *Module 4 (Superelevation)* folder.
3. Create superelevation definitions for Y11.



a. Select **Create Superelevation Sections** from the *Corridors > Superelevation* ribbon tab.

- *Name* = **Section_Y11**
- *Feature Definition* = **Superelevation > Superelevation**
- *Name* (Feature) = **SE_Y11**
- *Start Station* = **Beginning of Alignment** (**Alt** to lock to beginning station)
- *Stop Station* = **End of Alignment** (**Alt** to lock to ending station)
- *Minimum Tangent Length* = **5000**



b. The **Create Superelevation Lane** tool should start automatically. If not, select the tool.

- *Name* = **SE_Y11-LT**
- *Type* = **Primary**
- *Side of Centerline* = **Left**
- *Inside Edge Offset* = **0**
- *Width* = **12**
- *Normal Cross Slope* = **-2%**

Name	Section_Y11
Minimum Tangent Length	5000.0000
Feature	
Feature Definition	Superelevation
Name	SE_Y11



Name	
Name	Section_Y11

Name	SE_Y11-LT
Type	Primary
Side Of Centerline	Left
Inside Edge Offset	0.0000
Width	12.0000
Normal Cross Slope	-2.00%



Normal Cross Slope	
Normal Cross Slope	-2.00%



c. The **Create Superelevation Lane** tool should start automatically. If not, select the tool.

- *Name* = **SE_Y11-RT**
- *Type* = **Primary**
- *Side of Centerline* = **Right**
- *Inside Edge Offset* = **0**
- *Width* = **12**
- *Normal Cross Slope* = **-2%**

Name	SE_Y11-RT
Type	Primary
Side Of Centerline	Right
Inside Edge Offset	0.0000
Width	12.0000
Normal Cross Slope	-2.00%



Normal Cross Slope	
Normal Cross Slope	-2.00%

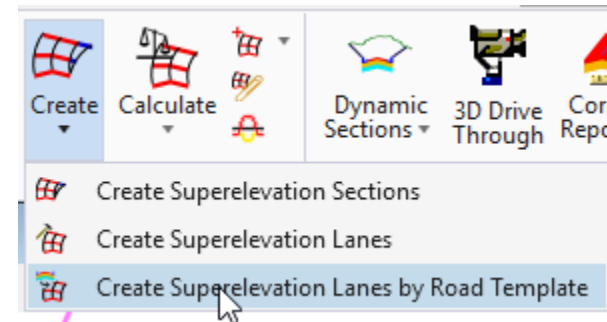
d. Reset to stop defining superelevation lanes.

Note that there is the option to **Create Lanes by Road Template**. Demo how sometime this is easier and faster to use.



e. The **Calculate Superelevation** tool should start automatically. If not, select the tool.

- *Standards File Name* = **AASHTO_2018_English.xml**
- *e selection* = **8%**
- *L Selection* = **Speed Table**
- *Design Speed* = **50**
- *Pivot Method* = **Centerline**
- *Open Editor* = **No**

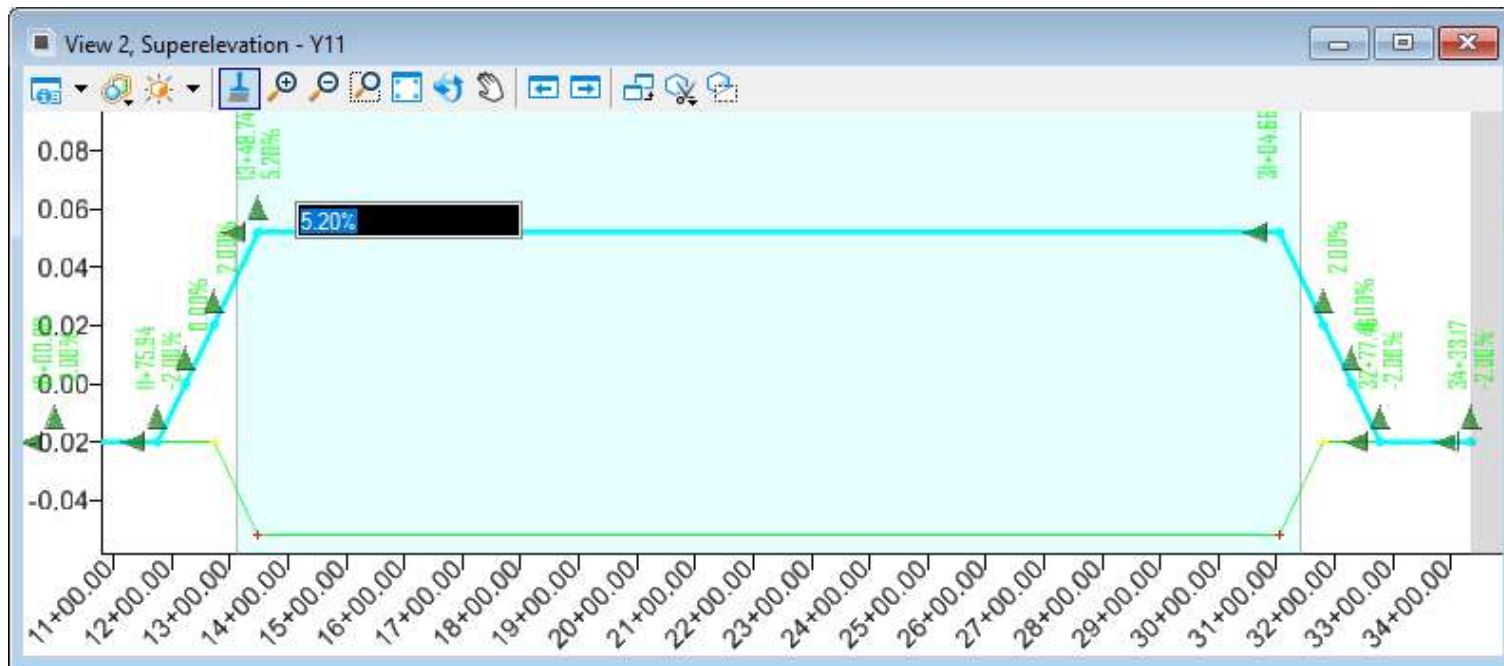


Rules File Name	WorkSpaces\NCDOT\NCDOT_Roadway\Standards\Superelevation\AASHTO_2018_English.xml
e Selection	8%
L Selection	Speed Table
Design Speed	50
Pivot Method	Centerline
Open Editor	<input type="checkbox"/>

Review and Edit the Superelevation for Jenks Road (-Y11-)

Superelevation can be edited with the Superelevation Editor (table) or through the Superelevation Model View (below).

1. Select the superelevation section.
2. Hover over the superelevation section until the context menu appears.
3. Select **Open Superelevation Model** from context menu.
4. Display the model in *View 2*.
5. Select the top superelevation line.
6. Change the **5.2%** full superelevation rate to **5.0%**.



Assign Superelevation to Y11 Corridor



1. Open the file **r2635c_rdy_cmd_road.dgn**.
2. Click in *View 1* to set the 2D model active.
3. Attach the *Default* model from **r2635c_rdy_sup.dgn** as a reference to the *2D model*.
4. Assign the superelevation to the Y11 corridor.



- a. Select **Assign to Corridor** from the *Corridors* ribbon tab.
- b. Select the *Section_Y11-1* superelevation section.
- c. Reset to stop selection of superelevation sections.
- d. Select the *Y11* corridor.
- e. Confirm the Superelevation and Pivot points set automatically by the template.

Associate Superelevation

	Superelevation Object	Superelev Point	Pivot Point	Start Station	Stop Station	Priority	
▶	SE_Y11-LT	-ETO	CL	10+00.00	34+33.17	1	▲
	SE_Y11-RT	+ETO	CL	10+00.00	34+33.17	1	
*							▼

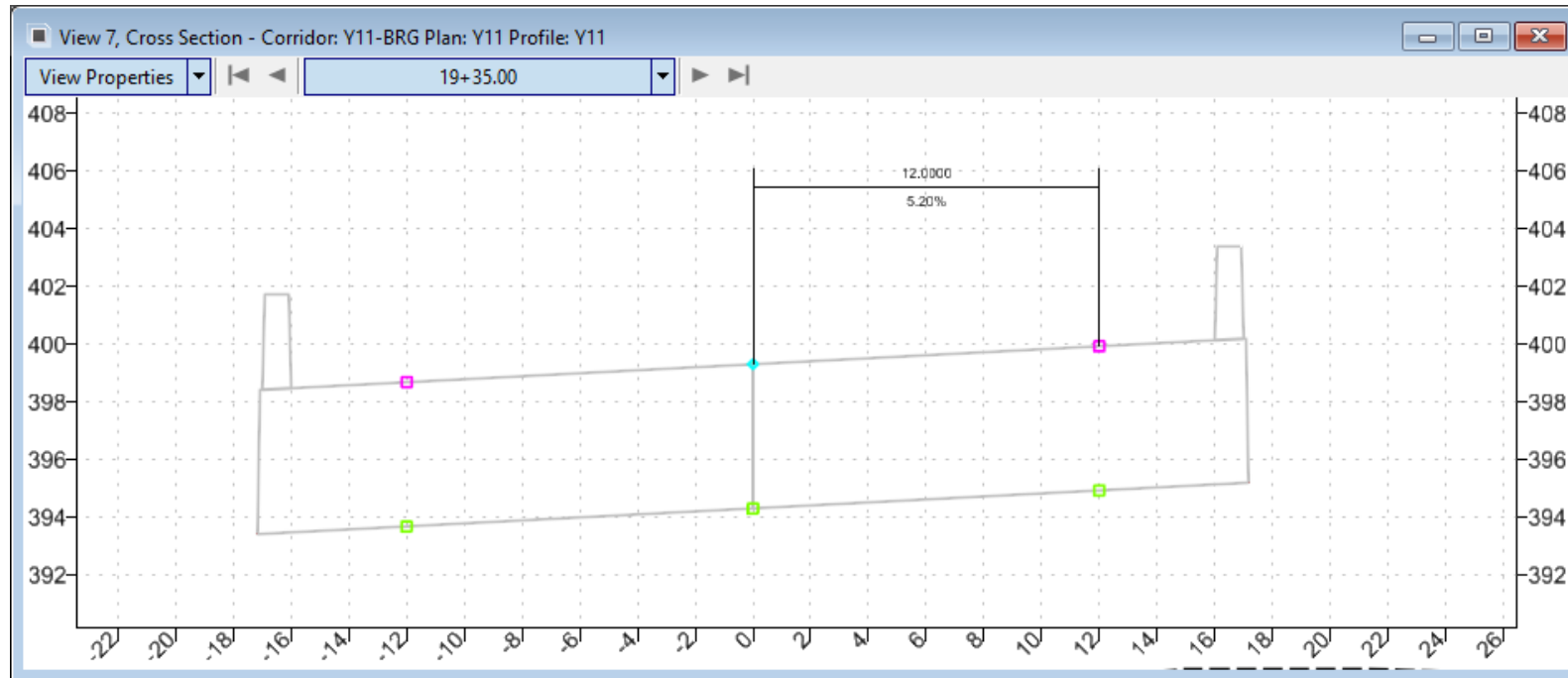
OK Cancel

- f. Click **OK** to associate the superelevation with the corridor.
5. Assign the superelevation to the *Y11-BRG* corridor in the file **r2635c_rdy_cmd_bridge.dgn**.

Review Superelevation for Y11-BRG Corridor



1. While in the file **r2635c_rdy_cmd_bridge.dgn**, **Place Dimension Line** in the Dynamic Cross Section View from the centerline to the right edge of travel point.
2. Review Dynamic Cross Sections for the **Y11-BRG** corridor.



3. Exit OpenRoads Designer.

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Module 5: OpenBridge Modeler Integration

Description

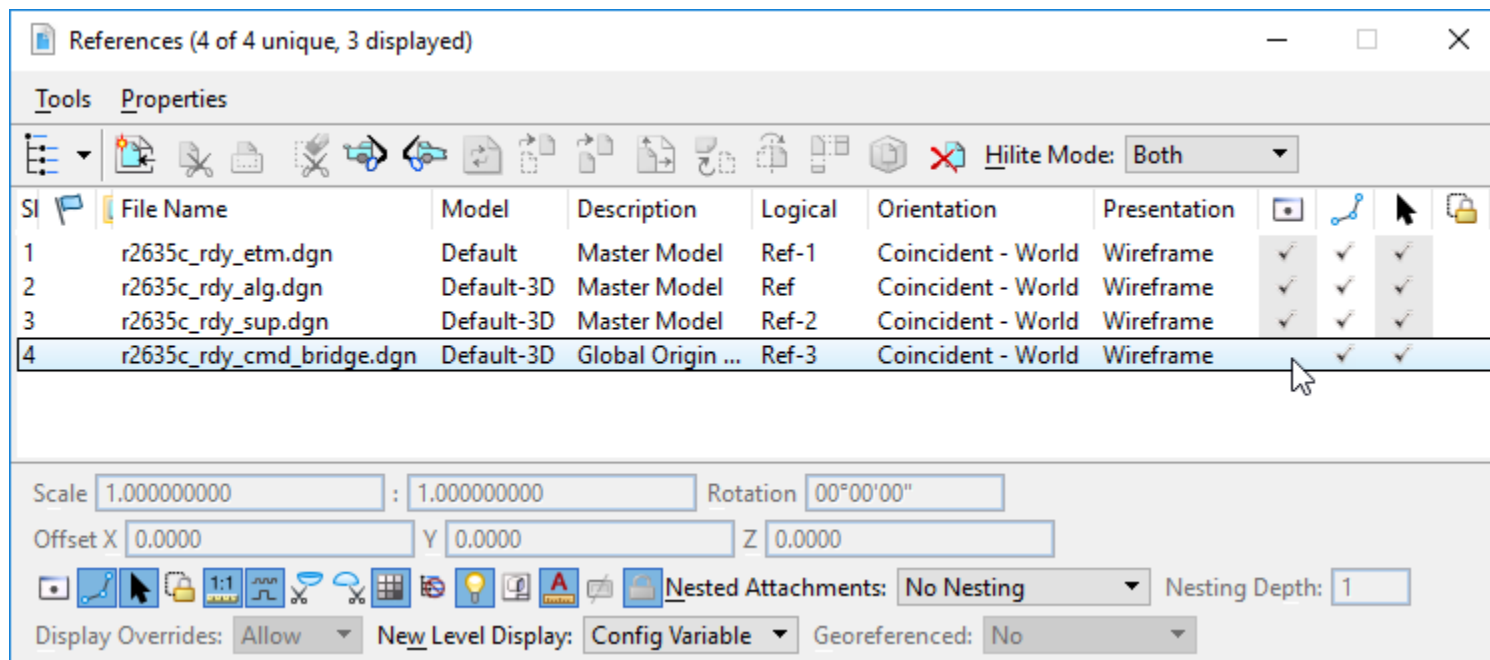
In this module you will integrate a bridge model from OpenBridge Modeler (OBM) into the roadway model.

Objective

- Integration with OpenBridge Modeler (OBM)

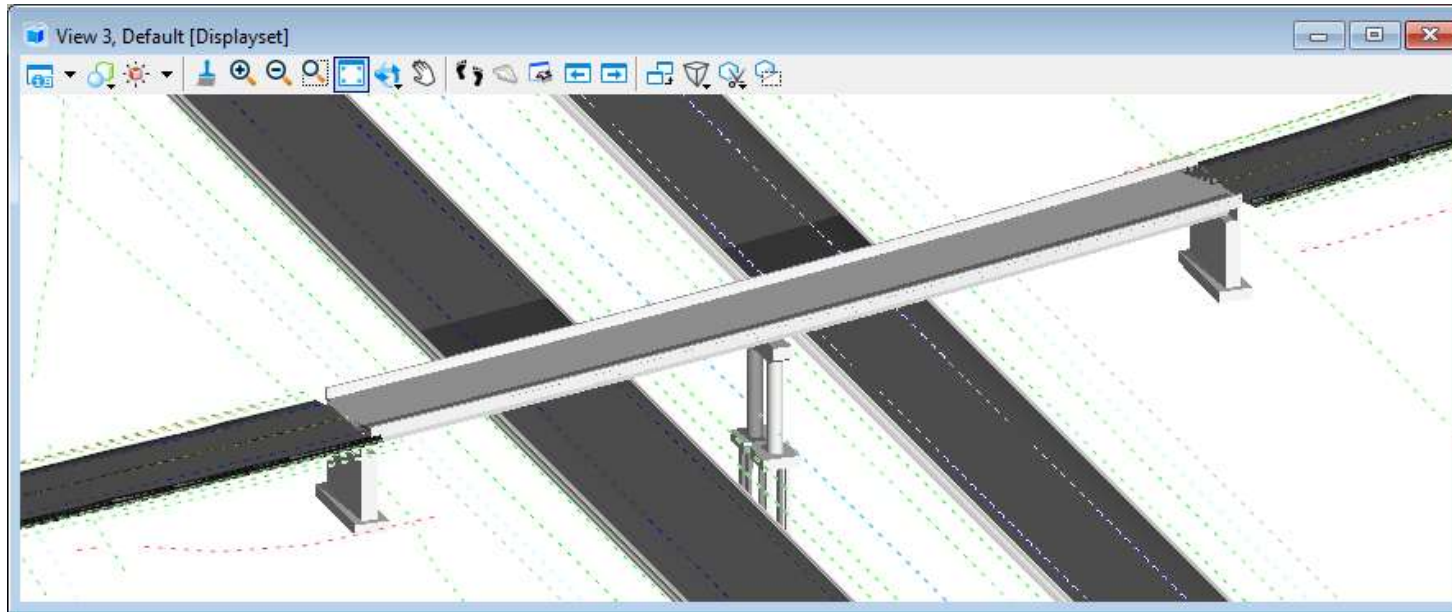
Integrate Bridge Model from OpenBridge Modeler

1. Start the **OpenRoads Designer** software and ensure that the *Workset* is set to **Quick Start**.
2. Open the file **r2635c_rdy_cmd_road.dgn** from the *Module 5 (Integration)* folder.
3. Turn off display of temporary bridge modeled with OpenRoads Designer.
 - a. Select the **References** tool from the *Home* ribbon tab.
 - b. Click in the 3D view to ensure the references for that file are being manipulated. There should be 4 to 7 references.
 - c. Disable the **Display** parameter for both the Default and Default-3D models in the **r2635c_rdy_cmd_bridge.dgn** file.




4. Attach **r2635c_rdy_obm.dgn** to the 3D view as reference using a *Coincident-World* orientation.

5. Review the detailed bridge now included in the model.



Note the more detailed model of the bridge actually has a beginning station of 19+37 and ending station of 22+02. The approaches have a skew angle. The end caps and end walls as well as the detailed mid pier with footings are also modeled.

6.  Since the bridge model is not part of the *Y11* corridor, use the Alignment option when **Open Cross Section View** (View 7).
- Left Offset* = -75
 - Right Offset* = 75
 - Station* = 19+00
 - Interval* = 25

Predefine Sheet Index Settings



1. Select the **Explorer** icon from the *Primary* group of the *Home* tab.

2. Select **Sheet Index**.

3. Click on the **Quick Start**.



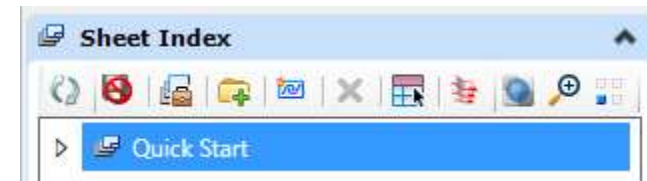
4. Click on the icon *Open Sheet Index for Edit* to enable the rest of the tools.



5. In the **Home** tab, **Primary** group, click on the **Properties** dialog box.

6. Set the following in the **Sheet Numbering Control** property.

- *Automatic Naming of Sheet*: **On**
- *Increment*: **1**
- *Inherit Naming Rule From Parent*: **Off**
- *Number of Digits*: **3**
- *Sheet Number Prefix*: (blank)
- *Sheet Number Suffix*: (blank)
- *Show Leading Zero*: **On**
- *Start Number*: **4**
- *Sheet Number Prefix*: **1**



Sheet Numbering Controls	
Automatic Naming of Sheet	On
Increment	1
Inherit Naming Rule From Parent	Off
Number of Digits	3
Sheet Number Prefix	
Sheet Number Suffix	
Show Leading Zero	On
Start Number	4
Total Sheets Count	0

7. Exit **openRoads Designer**.

The modules in this Quick Start guide are designed to be self-contained. Please exit the software after each module and begin again with the files included in the next module.

Module 6: ORD Plans Production Plan Sheets



Description

In this module you will learn to create Plan sheets and make minor modifications to the sheet layouts. You will also use the sheet index to navigate and batch print the sheets.

Objective

- Using Drawing Production to Create Plan Sheets
- Using Sheet Index

Create Plan Named Boundaries

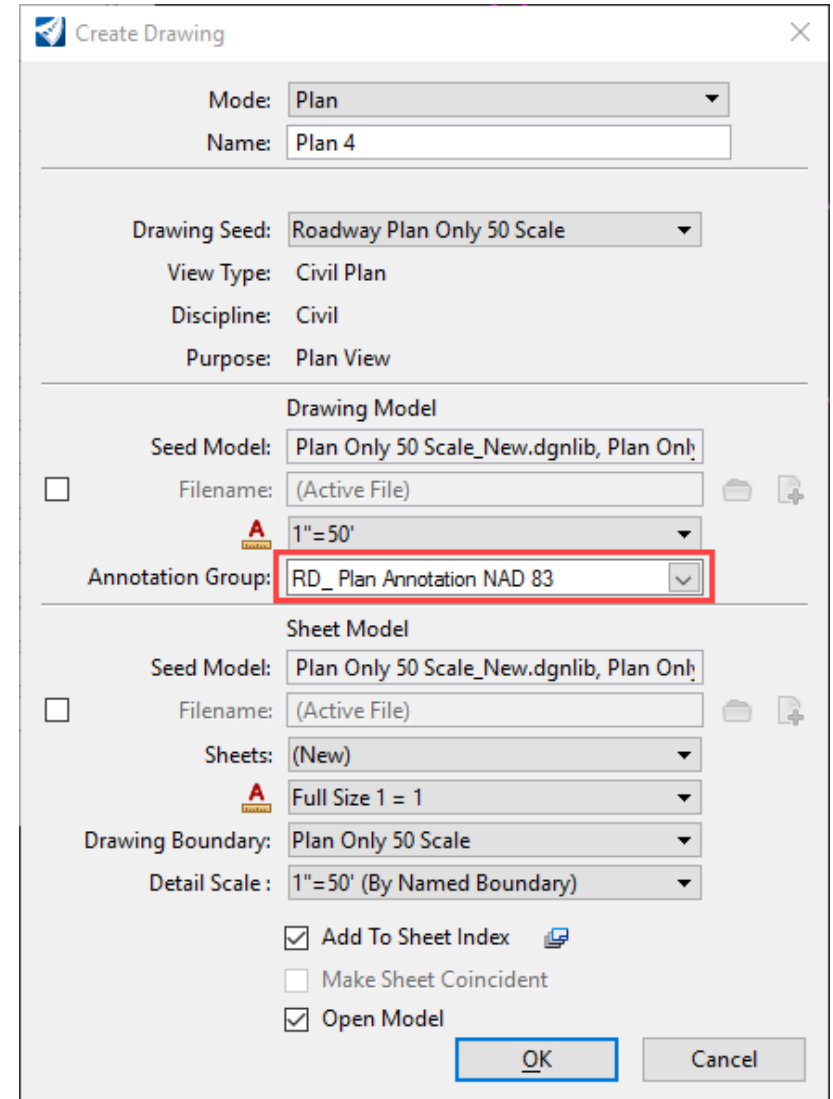
2. Start the **OpenRoads Designer** software and ensure that the *Workset* is set to **Quick Start**.
3. Open the file **r2635c_rdy_ppl.dgn** (plan profile layout) from the *Module 6 (Plan Sheets)* folder.
-  4. Select **Place Named Boundary** tool from the *Drawing Production* ribbon tab.
-  5. Select the **Civil Plan** mode.
6. Disable the check boxes for the *Start Location* and *Stop Location* if they are enabled.
7. Graphically select the centerline geometry for mainline **-L- (I-540 Western Wake Expressway)**.
8. Set the following options.

- *Drawing Seed* = **Roadway Plan Only 50 Scale**

The drawing seed sets default values for all values on the dialog except the start and stop locations. The drawing seed also defines which seed files are used to create the drawing and sheet models.

- Top *Name* = **Plan 4** (This is the root name of named boundaries. The number on the end will increment for each boundary.)
 - *Group* = **(New)**
 - Bottom *Name* = **L** (This is the name of the new group that the named boundaries will be organized into. Sometime this is fixed to a Feature Name.)
 - *Start Location* = Lock to the beginning station of **305+00.00** (Use icon at right to set begin station)
 - *Stop Location* = Disable the check box
9. Enable the **Create Drawing** and **Show Dialog** options.
 10. Data point in the view to define, or accept, the start location and initiate placement of named boundaries.
 11. Move the cursor near the end of the alignment and observe the plan named boundaries that will be created.
 12. Data point to define the stop location of the plan named boundaries.

13. Data point a third time to accept and create the named boundaries.
14. In the **Create Drawing** dialog box under the Drawing Model **Annotation Group** select *Plan > Drawing > RD_Plan Annotation NAD 83*.
15. Enable the **Add to Sheet Index** option.



16. Click **OK** to create the Plan sheets.

A progress bar in the lower right corner is shown as the sheets are created.



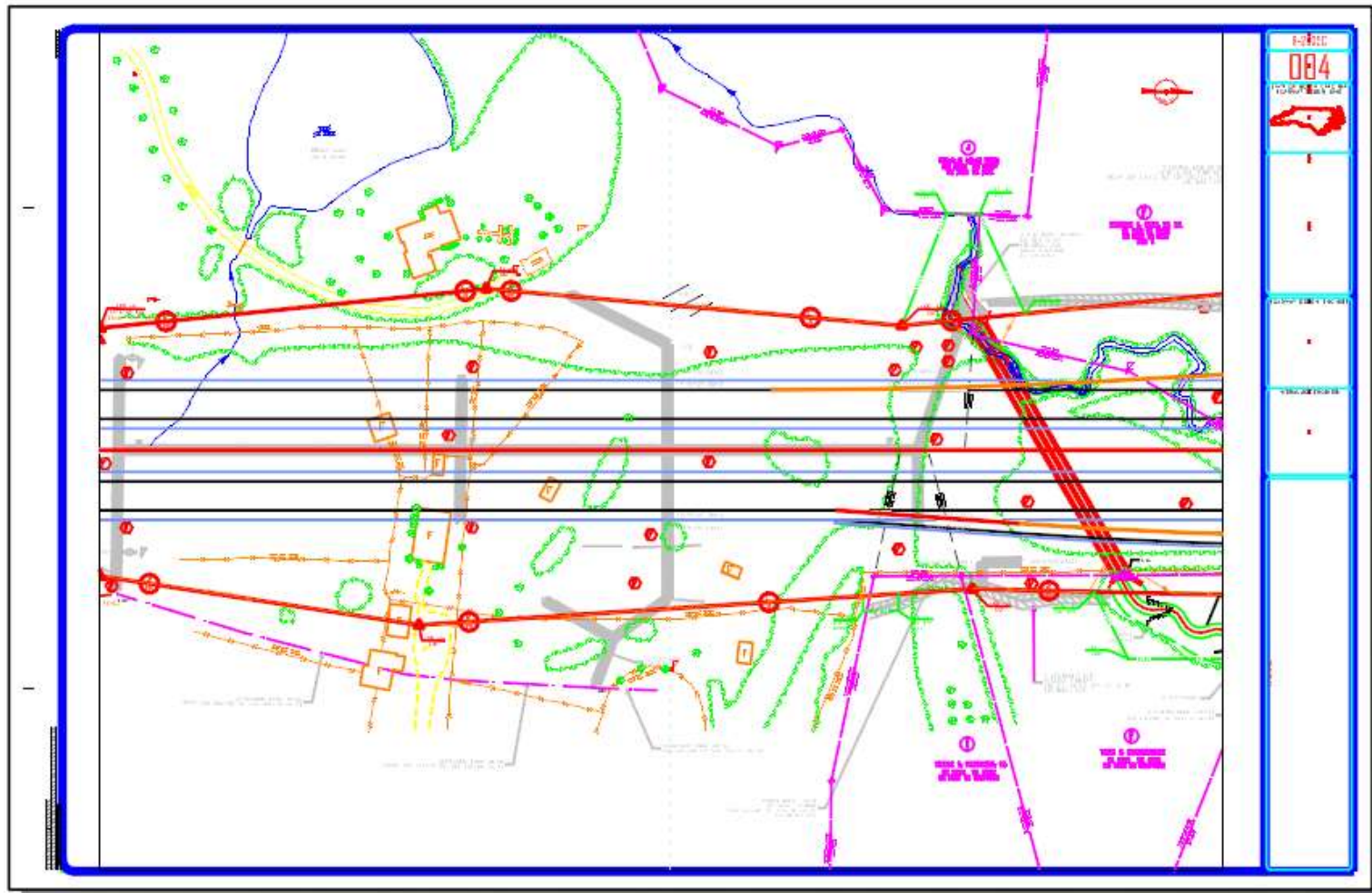


17. Reference design file **r2635c_rdy_row.dgn**

- Select **Multi-Model View** from the *View Group* list in the lower left corner of the screen.
- Attach file **r2635c_rdy_row.dgn**. Use *Interactive* method and set **Global Linestyle Scale** to *Reference*.

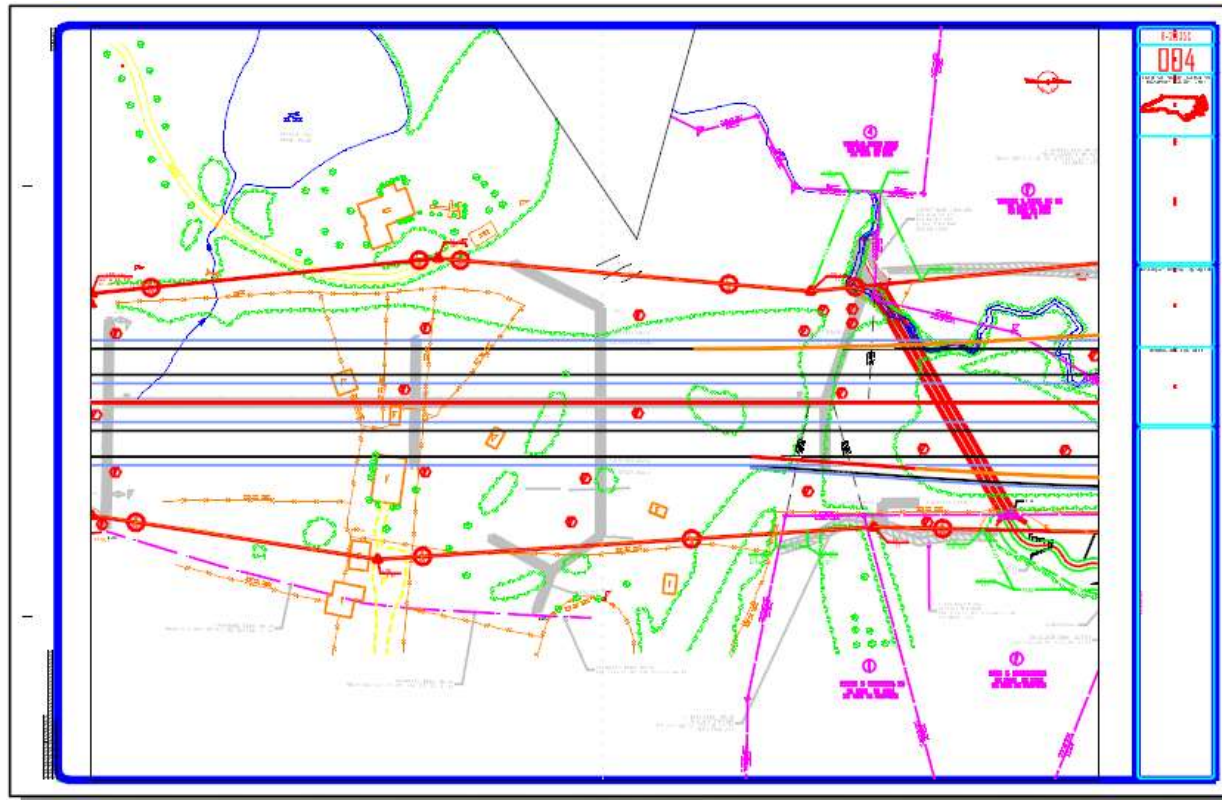


18. Select **Plan 4 [Sheet]** from the *View Group* list in the lower left corner of the screen.



Modify Sheet Layout – Named Boundary

1. Select **Multi-Model View** from the *View Group* list in the lower left corner of the screen.
2. Select the first named boundary and modify one of the vertex points along the top.
3. Open **Explorer** from the *Home* ribbon tab.
4. Select the **Sheet Index** tab.
5. Expand the **Quick Start** folder.
6. Double click on **004 [1,1] Plan 4 [Sheet]** to open Sheet 4.

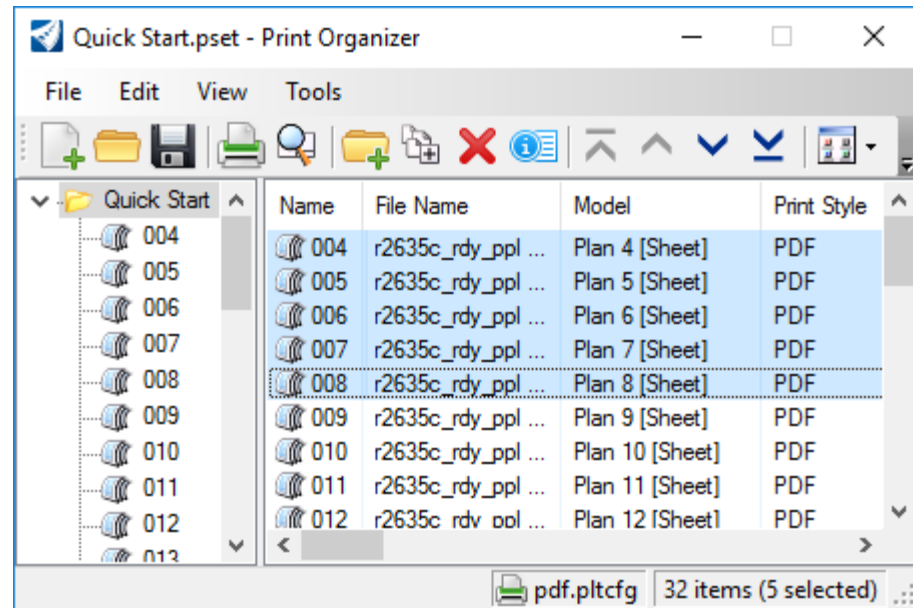


Batch Print Plan Sheets

1. Batch Print sheets to PDF.
 - a. Select the **Quick Start** project folder in the *Sheet Index* tab of the **Explorer**.
 - b. Click the **Open Print Organizer** icon.
 - c. Select **PDF** and click **OK**.

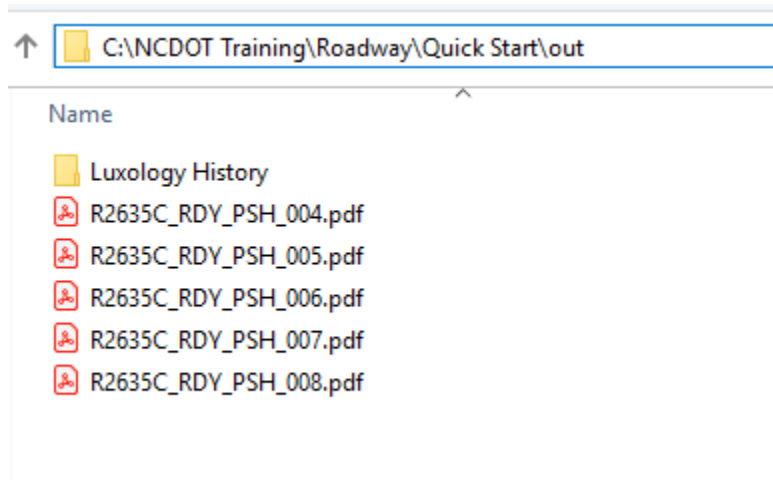
The Print Organizer dialog appears. All of the sheets that will be printed are listed on the right side of the dialog.

- d. Select the plan sheets.
- e. Click the **Print** icon.
- f. Click the **Ellipsis** icon next to the *Destination* field.
- g. Browse to the output location and name of the PDF that will be created and click **Save**.
- h. Select **Separate print jobs** for multiple sheets.
- i. Select **Output File Names**.



- j. In the **Custom** field key-in *"R2635C_RDY_PSH_" & PrintDefinition.SheetNumber*
 - k. Disable **Use source file for print destination**.
 - l. Click **OK** to create the PDF.
 - m. **Close** Print Organizer.
2. Open the **pdf** files to review.
 3. Exit **OpenRoads Designer**.

Output File Names	
Pri...	Output File Name
004	R2635C_RDY_PSH_[SheetNumber].pdf
005	R2635C_RDY_PSH_[SheetNumber].pdf
006	R2635C_RDY_PSH_[SheetNumber].pdf
007	R2635C_RDY_PSH_[SheetNumber].pdf
008	R2635C_RDY_PSH_[SheetNumber].pdf



The modules in this Quick Start guide are designed to be self-contained. Please exit the software after each module and begin again with the files included in the next module.

Module 7: ORD Plans Production Profile Sheets

Description

In this module you will learn to create Profile sheets.

Objective

- Using Drawing Production to Create Profile Sheets
- Profile Annotation and Sheet Grid
- Dual-Port Profile Sheets

Create Profile Boundaries

1. Start the **OpenRoads Designer** software and ensure that the *Workset* is set to **Quick Start**.
2. Open the file **r2635c_rdy_ppl.dgn** (plan profile layout) from the *Module 7 (Profile Sheets)* folder.
3. Select **Place Named Boundary** tool from the *Drawing Production* ribbon tab.
4. Select the **Civil Profile** mode.
5. Set the following options.

- *Drawing Seed* = **Roadway Dual Profile 50 Scale**
- Top *Name* = **Profile 1** (This is the root name of named boundaries.
The number on the end will increment for each boundary.)
- *Method* = **From Plan Group**
- *Plan Group* = **L**
- *Group* = **(New)**
- *Name* = **L**
- Bottom *Name* = **L** (This is sometime fixed to a Feature Name.)
- *Vertical Exaggeration* = **5**
- *Available Profile Height* = **95**
- Disable *Top Clearance*
- Disable *Bottom Clearance*
- *Elevation Datum Spacing* = **5**
- *Station Datum Spacing* = **1**
- *Profile Shift* = **Datum Stations**

Place Named Boundary Civil Profile

Drawing Seed: Roadway Dual Profile 50 Scale

Detail Scale: 1"=50'

Name: Profile 1

Description:

Method: From Plan Group

Plan Group: L

Group: (New)

Name: L

Description: From Plan Group: L

Vertical Exaggeration: 5.000000

Available Profile Height: 95.000000

Top Clearance: 0.500000

Bottom Clearance: 0.500000

Elevation Datum Spacing: 5.000000

Station Datum Spacing: 1.000000

Profile Shifts: Datum Stations

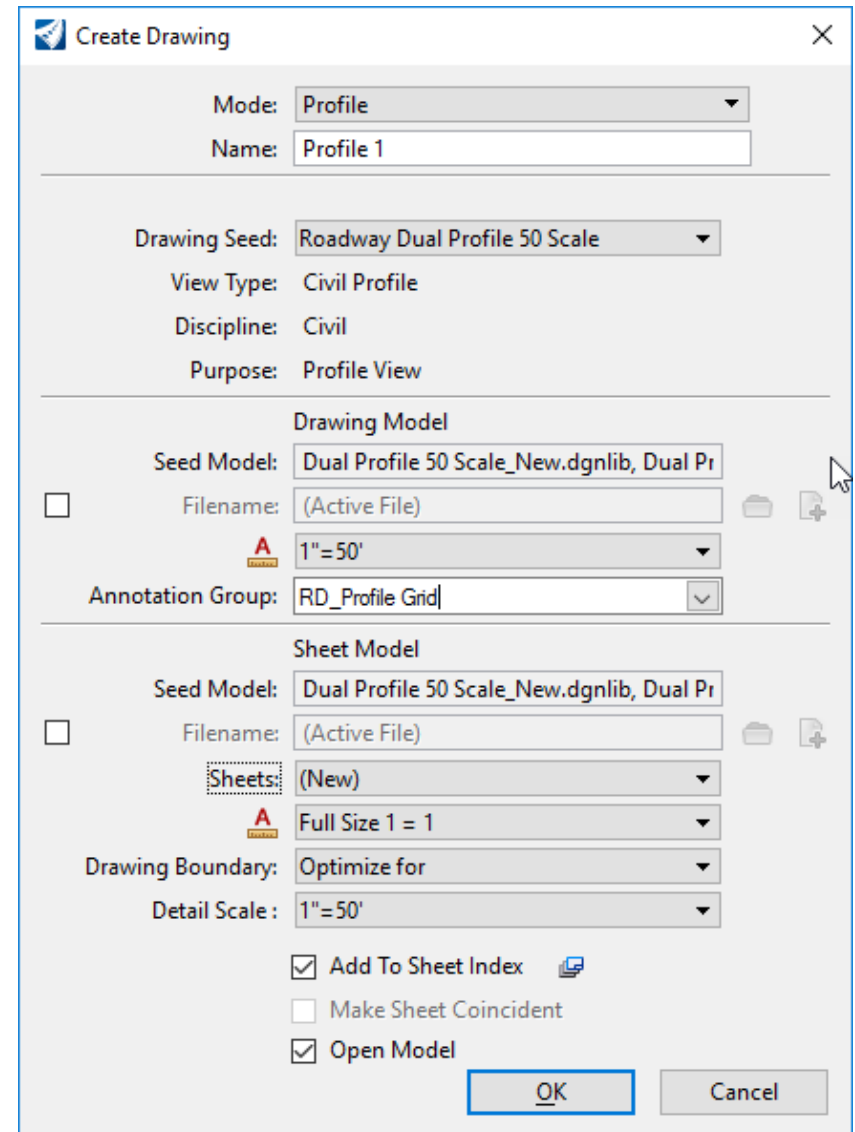
Use Terrains

Use Active Vertical

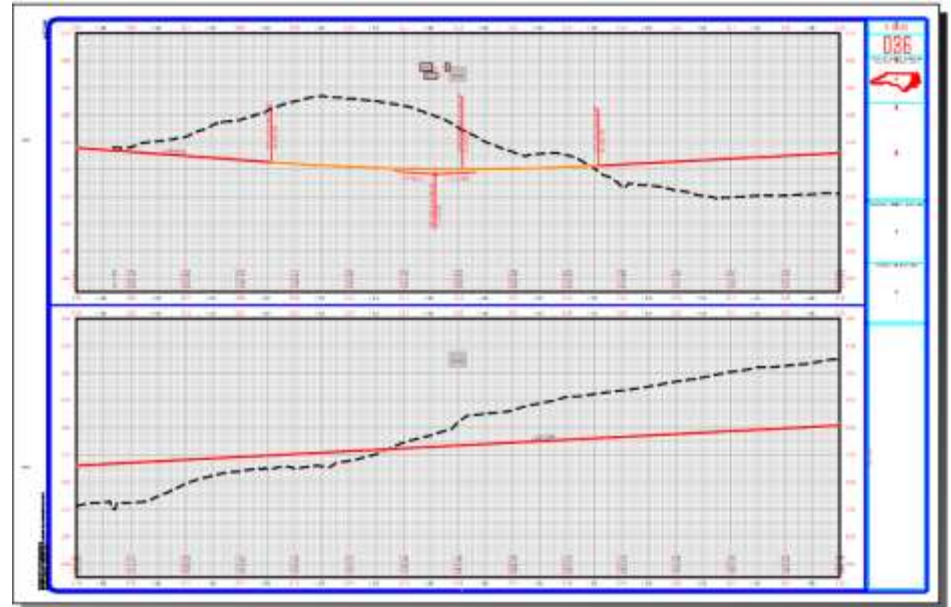
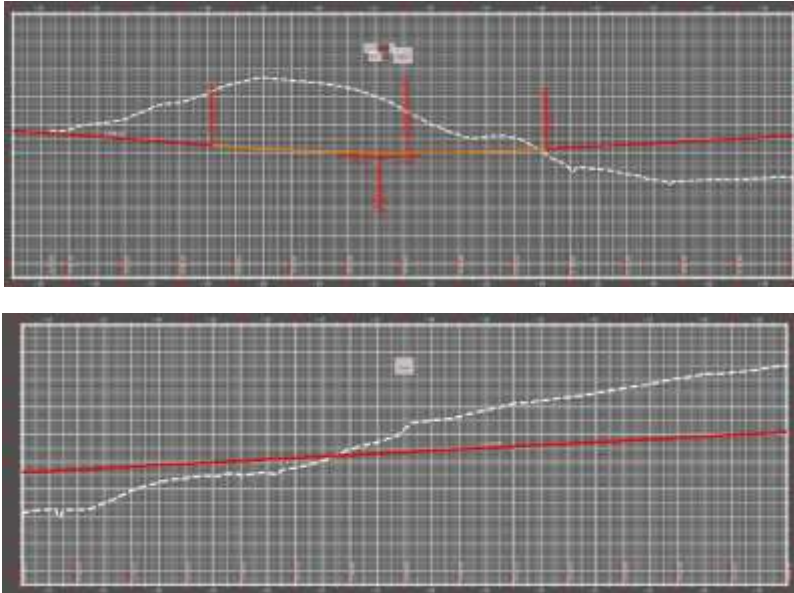
Create Drawing

Show Dialog

6. Enable the **Use Terrain, Use Active Vertical, Create Drawing** and **Show Dialog** options.
7. Data point in the profile view (View 4).
8. Data point again in the profile view to place the profile named boundaries.
9. Data point the third time in the profile view to accept and create the profile named boundaries.
10. When the **Create Drawing** dialog appears enable the **Add to Sheet Index** option.
11. Click **OK**.



12. Review each sheet drawing and sheet models.



13 Exit OpenRoads Designer.

The modules in this Quick Start guide are designed to be self-contained. Please exit the software after each module and begin again with the files included in the next module.

Module 8: ORD Plans Production Cross Section Sheets

Description

In this module you will create cross sections along the I-540 Western Wake Expressway. You will also see how cross sections are dynamically updated when the model changes and learn to manually annotate a cross section.

Objective

- Create cross section sheets along an alignment
- Dynamic Updating of Cross Section Sheets
- Optional: Deleting Sheets and Named Boundaries

Creating Cross Section Sheets for I-540 Western Wake Expressway (-L-)

1. Start the **OpenRoads Designer** software and ensure that the *Workset* is set to **Quick Start**.
2. Open the file **r2635c_rdy_xsc_1.dgn** from the *Module 8 (Cross Section Sheets)* folder.
3. Select the **OpenRoads Modeling** workflow from the pick list in the upper left corner.
4. Create cross section named boundaries along the mainline -L- alignment

The named boundaries define the location cross sections are cut including their width and height.

IMPORTANT: *The order of these steps is significant.* It is recommended you set the options and parameters in the order shown below.

- a. Click in *View 1* (2D view) to set it as the active model.
- b. Select **Place Named Boundary** from the *Drawing Production* ribbon tab.
- c. Select **Civil Cross Section** mode.
- d. Graphically select the centerline geometry for mainline **L** in the 2D view.
- e. Set the following parameters in the dialog.

- *Drawing Seed* = **XS 20 Scale New Roadway**
- *Group* = **(New)**
- *Name* = **L** (Can be blank initially and then automatically changed to the Feature Name when the horizontal alignment is selected).
- *Start Station* = **310+00**
- *Stop Station* = **320+00**
- *Left Offset* = **-150**
- *Right Offset* = **150**
- *Interval* = **50**

Place Named Boundary Civil Cross Section

Drawing Seed: XS 20 Scale New Roadway

Detail Scale: 1"=20'

Group: (New)

Name: L

Description:

Start Location: 310+00.00

Stop Location: 320+00.00

Left Offset: -150.000000

Right Offset: 150.000000

Interval: 50.000000

Vertical Exaggeration: 1.000000

Top Clearance: 20.000000

Bottom Clearance: 10.000000

Elevation Datum Spacing: 1.000000

Include Control Points

Create Drawing

Show Dialog

- *Vertical Exaggeration = 1*
- Enable *Top Clearance = 20*
- Enable *Bottom Clearance = 10*
- *Elevation Datum Spacing = 1*

This determine the cross section drawings begins at an even 1' elevation on a grid line.

f. Disable the **Include Control Points** option.

When enabled, cross sections are added at horizontal control points such as PC and PT.

g. Enable the **Create Drawing** option.

When enabled, the process to create the cross section sheets is automatically started after the named boundaries are created. When disabled, the named boundaries are created but the sheets are not created.

h. Enable the **Show Dialog** option.

When enabled, a dialog with additional parameters set by the Drawing Seed is shown.

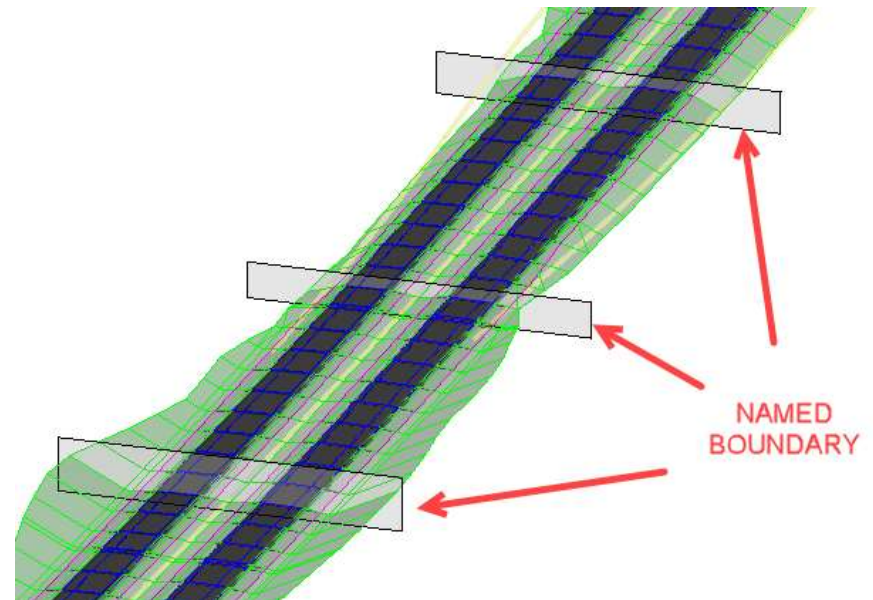
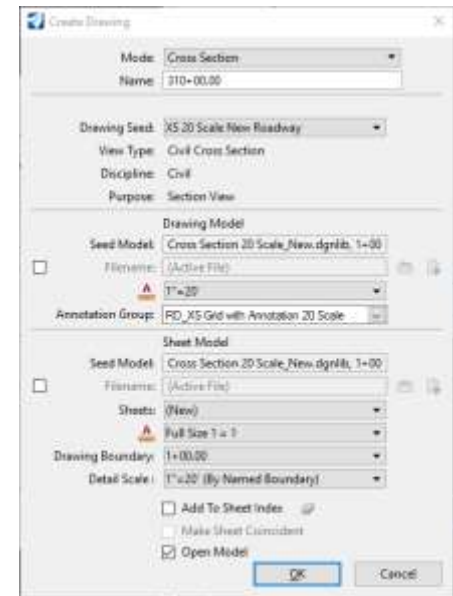
i. Data point in the 2d view to *accept* the start point (station).

j. Data point in the 2d view to *accept* the end point (station).

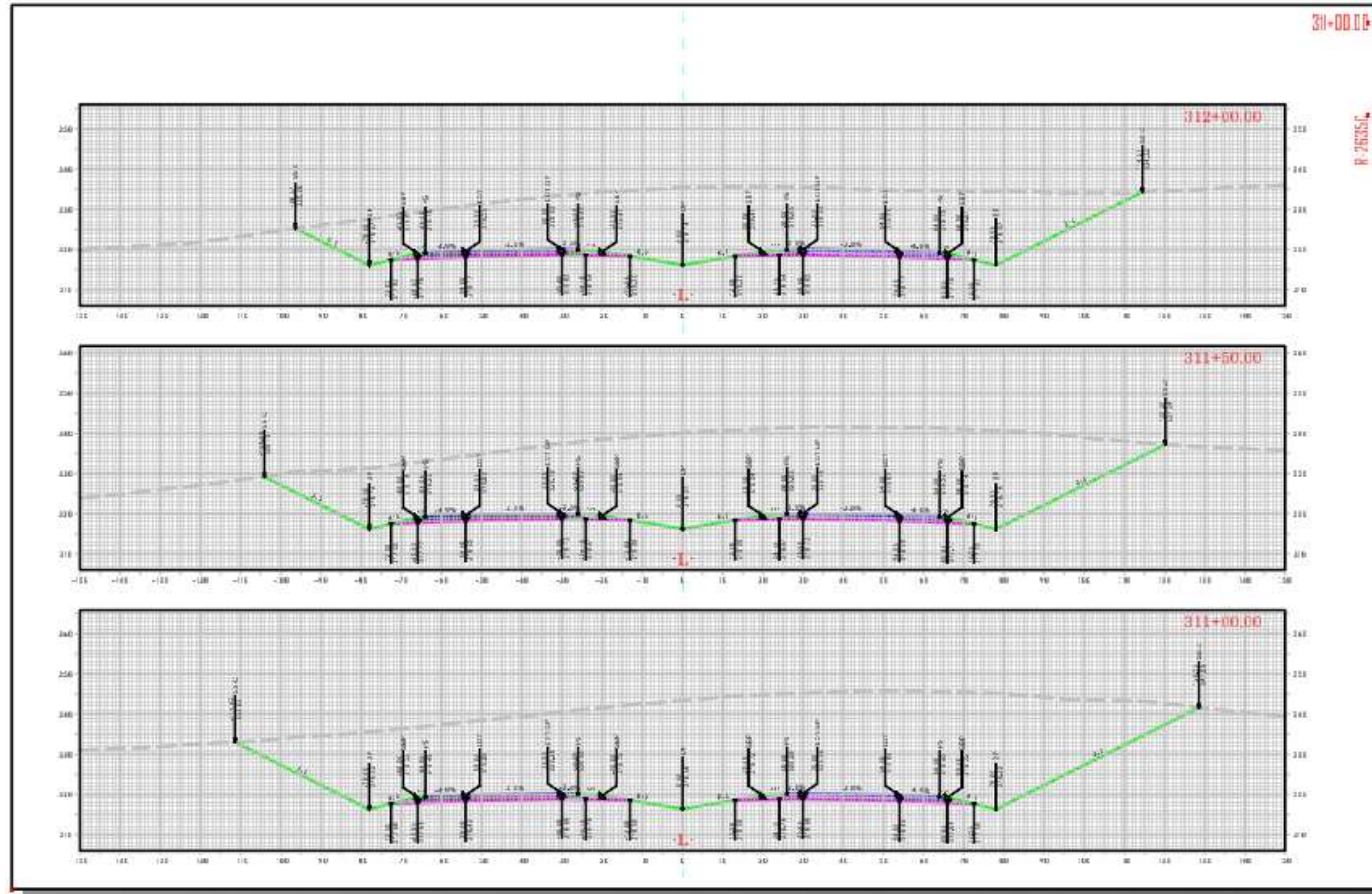
NOTE: If the stop location is not entered on the dialog either by locked to the start station or being keyed in this data point will graphically specify the start and stop locations.

k. Data point in the 2d view to *create* the name boundaries.

Creating the named boundaries will take a short time. Once complete the Create Drawing dialog appears and the named boundaries are visible in the 3D view.

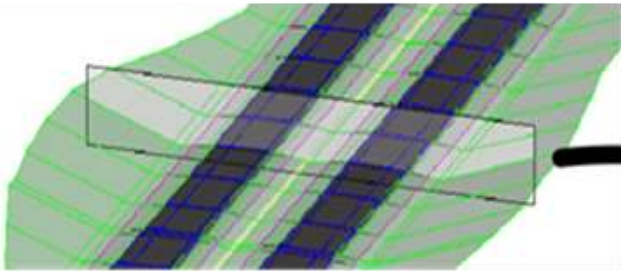


5. Create Cross Section sheets
 - a. *Annotation Group* = Cross Section > Drawing > RD_XS Grid with Annotation 20 Scale
 - b. Disable the **Add to Sheet Index** option.
 - c. Click **OK** on the *Create Drawing* dialog.

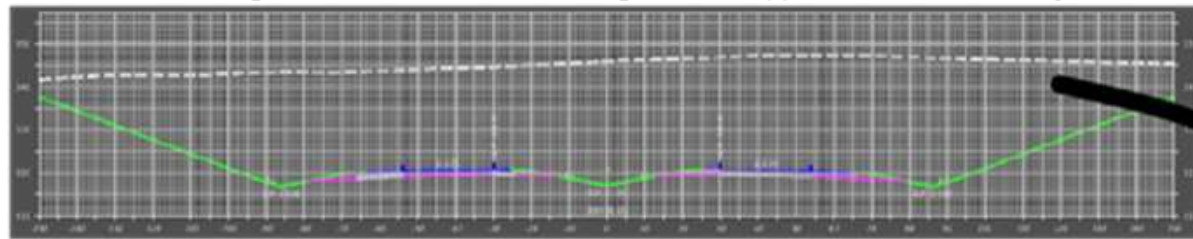


Each cross section is a live reference to a drawing model which in turn is a live reference to the 3D design model. The drawing model is where annotations are added to the cross sections. All graphics that appear in the 3D model are automatically shown on the cross section. In addition, since these are live references, any changes to the 3D model are automatically updated on the cross sections.

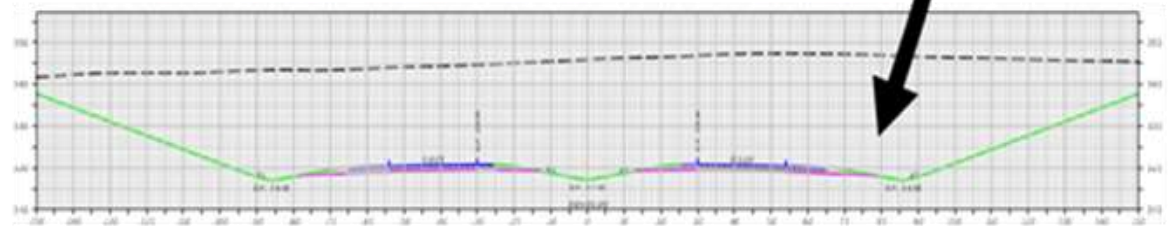
3D Design Model - Named Boundary



Drawing Model - Reference of 3D Design Model Clipped to Named Boundary



Sheet Model - Reference of Drawing Model Laid Out on Sheets



6. Review Cross Section sheets.



a. Select **Models** from the *Home* ribbon tab.

 = Drawing Model

 = Sheet Model

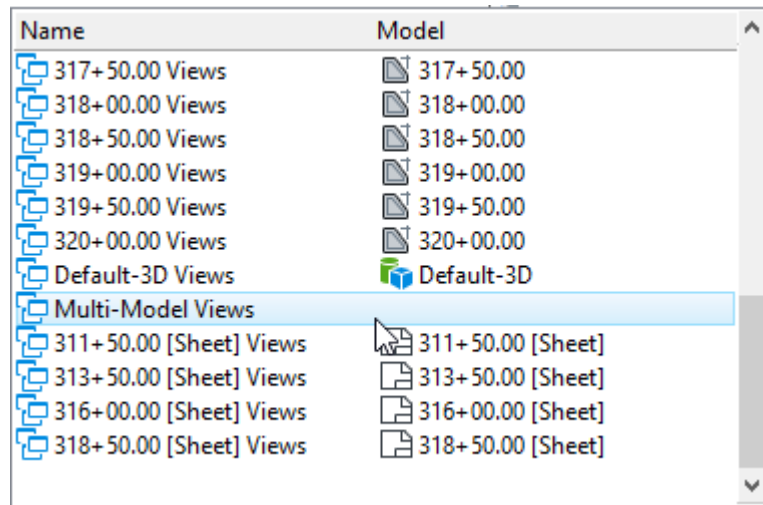
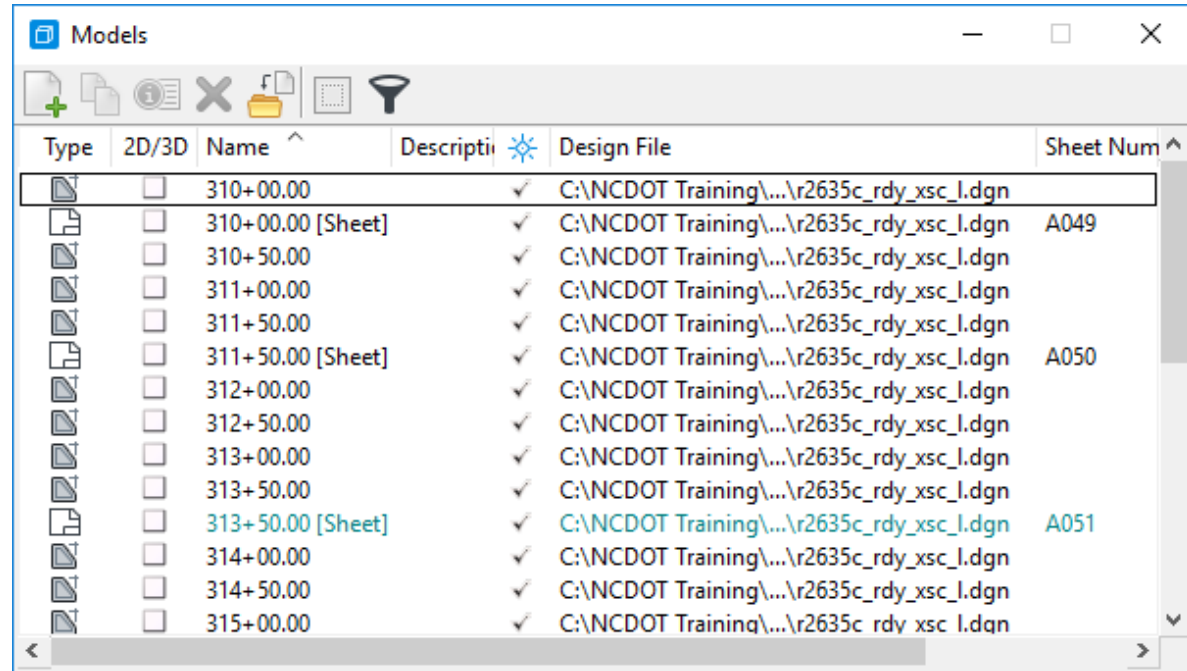
b. Double click on one of the sheet models.

7. Set the **313+50.00 [Sheet]** view active and observe the cross section annotations.

8. Return to design model.

You can select the design model from the Models dialog, however only to selected Default or Default-3D model will be shown, not the multiple model view of both the 2D and 3D models. There is a better way by selecting a view group.

Select **Multi-Model Views** from the *View Group* list in the lower left corner of the screen.



Update Cross Section Annotation



1. Review cross section at station 313+50.
 - a. Open the **Drawing Model** for **313+50**.
 - b. Fit the view if the cross section is not visible.
 - c. Observe currently the 2:1 cut slope.

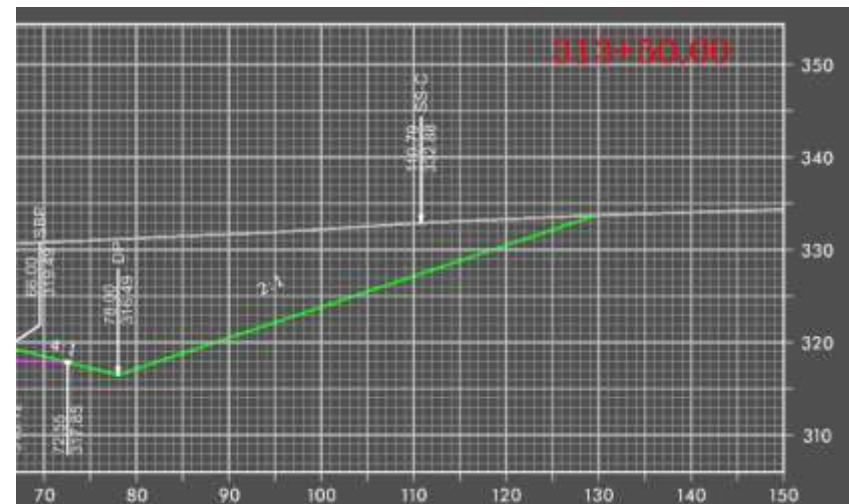
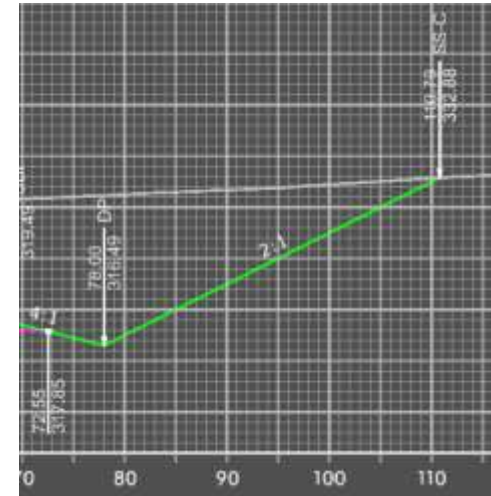


2. Open the file **r2635c_rdy_cmd_road.dgn** from the *Module 8 (Cross Section Sheets)* folder.
3. Change the corridor cut slope from 2:18 to 33.33% (3:1).
 - a. Edit the *Corridor* for **L**.
 - b. Edit the Parametric Constraint *SS_Slope Cut* to **33.33% (3:1)**.

The model will re-process automatically.



4. Open the file **r2635c_rdy_xsc_1.dgn** from the *Module 8 (Cross Section Sheets)* folder.
5. Review cross section drawing model at station 313+50 again.
 - a. Open the **Drawing Model** for **313+50**.
 - b. Fit the view if the cross section is not visible.
 - c. Observe the cut slopes are now at 3:1 but the annotation still labels the previous 2:1 slope.



6. Update cross section annotation.



a. Select **Remove Model Annotations** from the *Drawing Production* ribbon tab.

This includes only the annotations and grid. Remember, the cross section itself is a reference of the 3D Design model.

b. Set *All Drawing Models* to **No**.



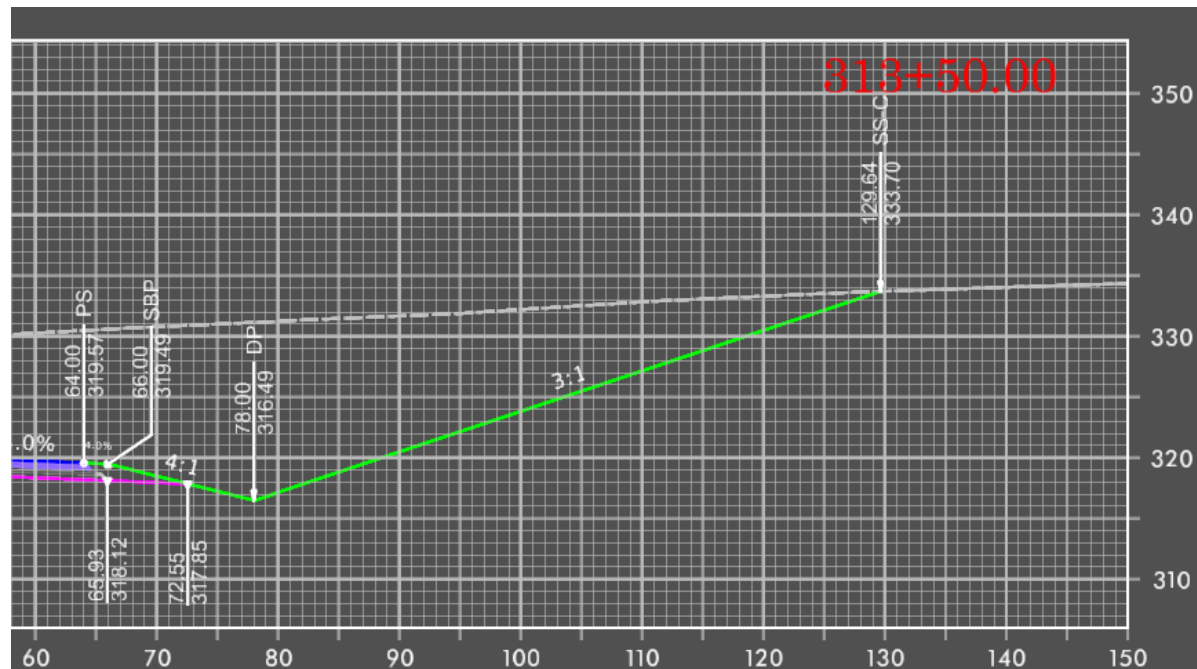
c. Select **Annotate Model** from the *Drawing Production* ribbon tab.

d. Set *All Drawing Models* to **No**.

e. Set *Annotation Group* to **RD XS Grid with Annotation 20 Scale**.

The cross section is annotated.

NOTE: This re-annotation process will be automated for the future release.

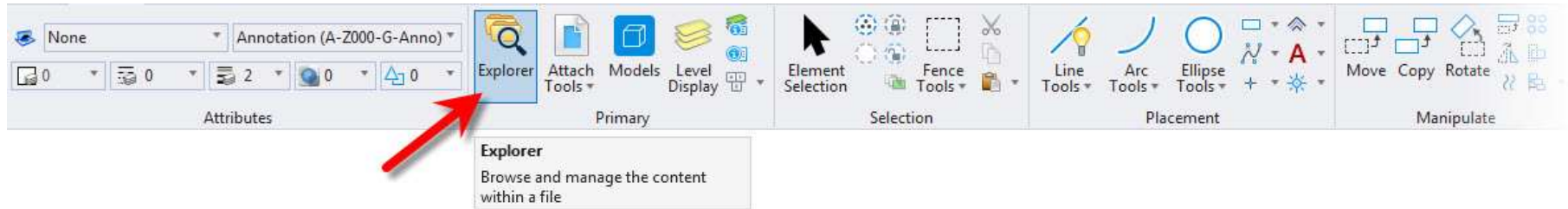


Sheet Index Post Creation

In this section, we will create a drawing sheet index. A sheet index is a centralized and structured collection of sheets in your project. A sheet index can be useful in creating a construction document set (also called as sheet set or construction set) that contains all the sheets of your project. You may link any sheet model from any design file of your project into a sheet index. Sheet numbering rules enable you to define rules to generate sheet numbers for all sheets in the sheet index. Sheets can be organized hierarchically in folders, with the ability to override sheet numbering rules for sheets in each folder. Custom properties can be attached to sheets and placed as text fields in the sheet. Custom properties can also be attached to the folders and the sheet index. The sheet index is managed from the Explorer Dialog Sheet Index Tab.

- Utilizing Explorer, create an organized hierarchical of folders
- Link sheet models from design files of the project into their respective folders within the sheet index
- Manage properties (sheet numbering, sheet numbering prefix) of the sheet models within the sheet index

1. To begin, we will create a drawing sheet index of our project. Along the *Ribbon*, select the **Explorer** from the *Primary* group of the *Home* tab.



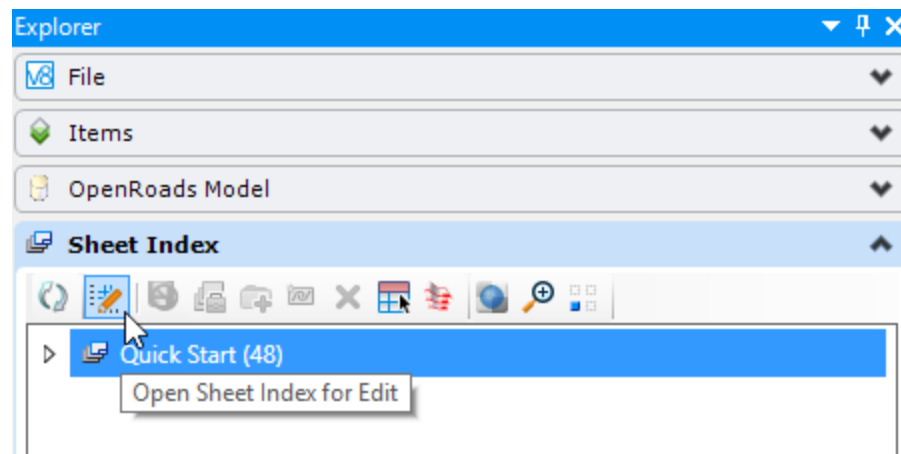
The *Explorer* dialog builds upon the foundation of the Project Explorer found in earlier editions of MicroStation. In MicroStation CONNECT, you can manage the project data using *Explorer* dialog. It is a single interface that provides browsing function for files, links, items, resources, and sheet indexes.

2. On the *Explorer* dialog, click the *Sheet Index* tab.

A sheet index is a centralized and structured collection of sheets in your project. Sheet index can be useful in creating a construction document set (also called as sheet set or construction set) that contains all the sheets of your project. You may link any sheet model from any design file of your project into a sheet index. Sheets may also be organized hierarchically in folders, with the ability to override sheet numbering rules for sheets in each folder. You can then manage the properties of all the sheet models within the sheet index collectively. Sheet indexes may also be added to print organizer print sets for printing.



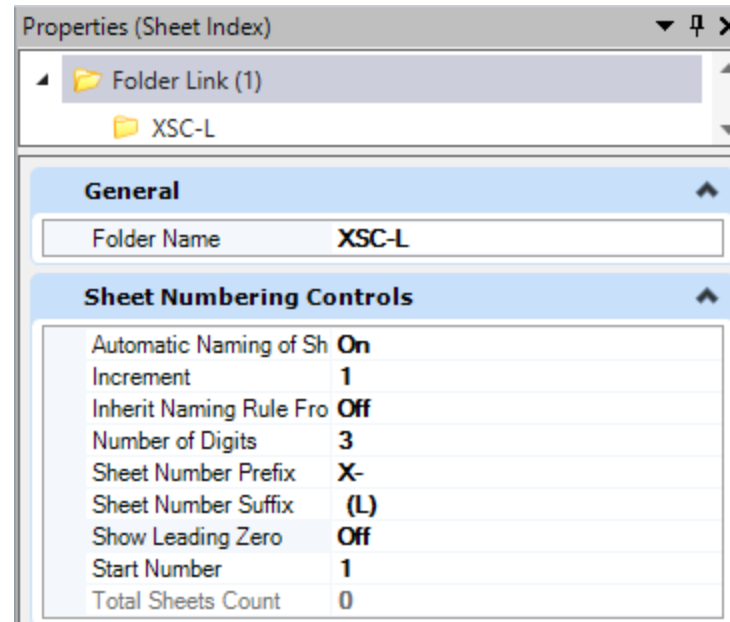
3. By default, the sheet index is read only. In the icon bank of the *Sheet Index* tab, click **Open Sheet Index for Edit**. The sheet index can now be edited.



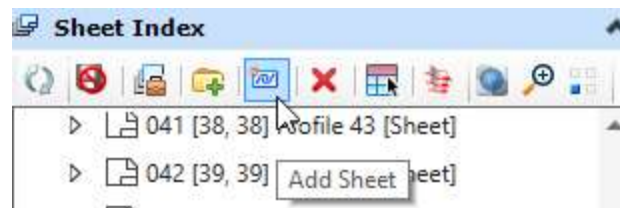
4. Click the **Create Folder** icon. From here, you can separate the sheets according to your needs within the sheet index. Let's rename the newly created folder, **XSC-L**.

Note: you may need to click the **Refresh** icon to see your changes from time to time.

5. Click **Properties** icon from the Home tab and key in the following.



6. With the **XSC-L** folder selected, click the **Add Sheet** icon from the icon bank of the *Sheet Index* tab.

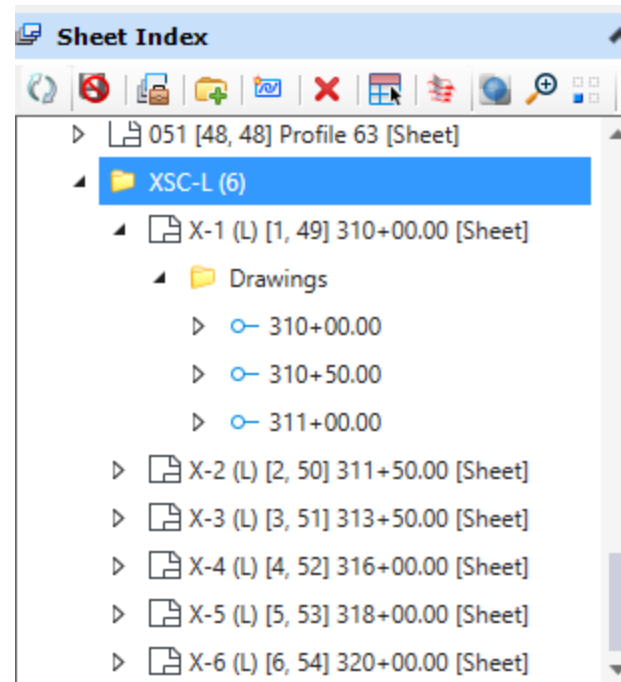
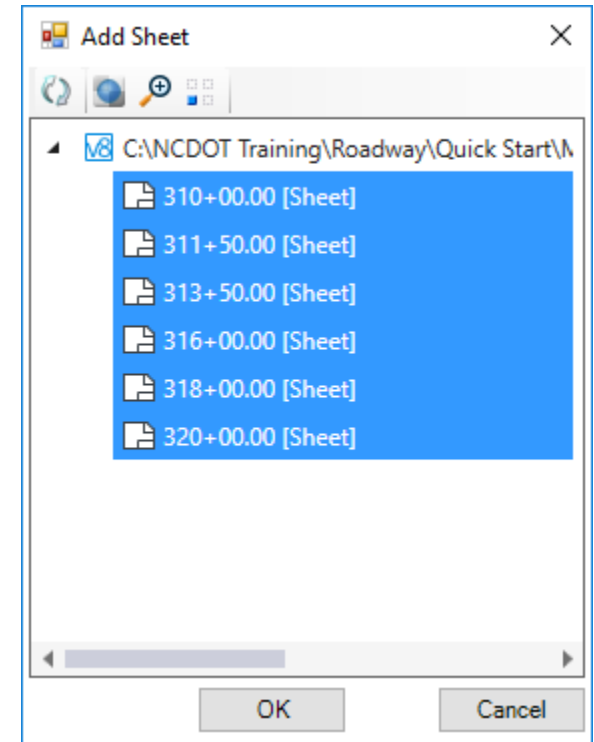


7. From the *Module 8 (Cross Section Sheets)* folder, select the **r2635c_rdy_xsc_l.dgn** and then click **Open**.

8. The *Add Sheets* dialog opens. From here, expand to view the available sheet models by clicking the arrow next to the file path/name.

Select the **all sheet models in this file** and then click **OK**.

9. After the sheets have been added, you can navigate to each cross section drawing or sheet model simply by double-clicking on it.



Take note of the numbers within the sheet index. The number next to the project root folder indicates the total number of sheets for the set. Beside each folder name, the number shown represents the total number of sheets within that respective folder. And within each folder, there are two numbers in brackets next to each sheet. The first number represents the sheet sequence within that folder and the second number indicates the overall sequence relative the sheet set.

Also note the sheet index is organized and stored in the project workset .dgnws file. If this file is deleted, then the sheet index is also deleted.

10. Review the automatic generation of the sheet numbers and project TIP number extracted from the WorkSet and Sheet Index.



Optional - Deleting Sheets and Named Boundaries

The following process describes how to delete sheets and their boundaries.

1. Delete the Drawing and Sheet models.



a. Select **Models** from the *Home* ribbon tab.

b. Select all of the Drawing and Sheet models for the plan, profile, or cross section sheets.



c. Click Delete Model(s).

NOTE: The sheet models are also deleted from the sheet index.

2. Delete the Named Boundaries

a. Data Point in the view/model where the boundaries are stored to make it active.

Named Boundaries are stored in specific models and only appear in the Named Boundary Manager when the correct model is active.

- Cross Section Boundaries - 3D model
- Plan Boundaries - 2D Model
- Profile Boundaries - Profile Model



b. Select the **Named Boundary Manager** from the *Drawing Production* ribbon tab.

c. Select the *Named Boundary Group* to be deleted.

d. Click **Delete Selected Named Boundary or Group**.



An Alert appears confirming the *Named Boundaries* and their associated *Saved Views* will be deleted.

e. Click **Yes**.

3. Repeat step 2 if necessary for additional named boundaries. For example, plan and profile sheets have boundaries for both the plan and the profile portions of the sheet and both need to be deleted.



Module 9: Earthwork

In this exercise, you are going to learn how to display and calculate 3D mesh elements that represent the cut and fill volumes between the existing terrain model and the bottom mesh of the corridor model. This is a more exact method than using the Component Quantities tool for volumes since it is calculating the volumes directly from the 3D data.

Skills Taught

- Creating a Bottom Mesh from a Corridor Feature Definition
- Create 3D Cut and Fill Volumes
- Create Named Boundaries
- Create Quantities Report by Named Boundary

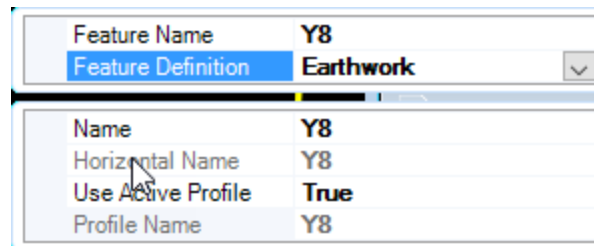
Create/Display Bottom Mesh from Corridor Feature Definition

In order to display and calculate the 3D volumes between the existing terrain model and bottom mesh of the corridor you need to change the corridor feature definition to display the bottom mesh. In this section, you will learn how select the corridor feature definition to display the bottom mesh of the corridor model.

1. Start the **OpenRoads Designer** software and ensure that the *Workset* is set to **Quick Start**.
2. Open the file **r2635c_rdy_cmd_road.dgn** from the *Module 9 (Earthwork)* folder.
3. Select the **OpenRoads Modeling** workflow from the pick list in the upper left corner.
4. **Select** the corridor and **Hover** your cursor over the corridor boundary until the context menu appears.



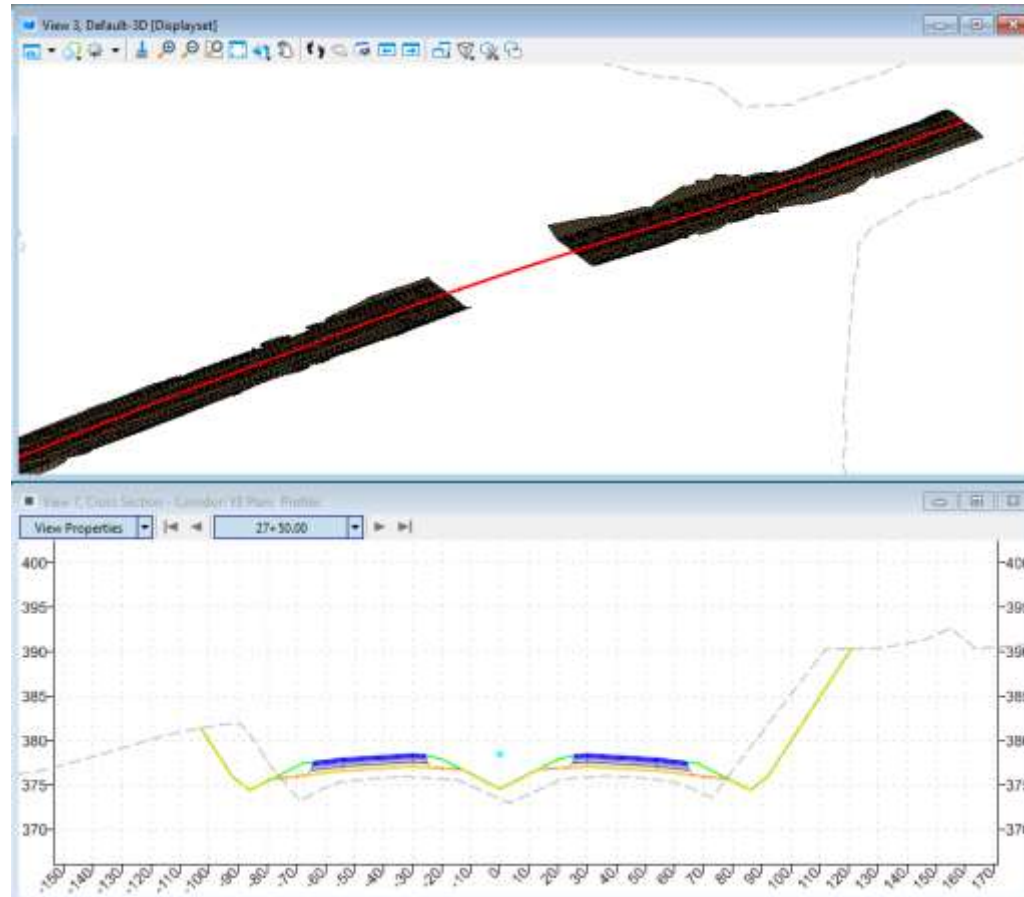
5. Select **Properties** and change the *Feature Definition* to **Earthwork**.



6. Again, **select** the corridor until the context menu appears and Select the **Process Corridor** tool.



The corridor will be re-processed, and the new feature definition will be applied. The surface of the bottom mesh will now be displayed in the 3D model and the cross sections. The bottom mesh is required in order to compute volumes between the existing terrain model and bottom of the corridor model.



Create 3D Cut and Fill Volumes

In this section, you are going to learn how to display the 3D mesh elements that represent the cut and fill volumes between the existing terrain model and the bottom mesh of the corridor model. We will use the **Create Cut Fill Volumes** tool to accomplish this task. The **Create Cut Fill Volumes** tool compares terrains/3D mesh elements and creates a 3D mesh element for cut (green) and a 3D mesh element for fill (red).

1. Open **r2635c_rdy_ear.dgn**, the existing terrain model and geometry are already attached as reference files.

2. Make **View 1** active.



3. Attach the corridor model, **r2635c_rdy_cmd_road.dgn** as a reference file.

a. From the ribbon menu select **Home > Attach Tools > References**.

b. Select **Attach Reference**.

c. Select the file **r2635c_rdy_cmd_road.dgn**.

d. Set *Attachment method* to **Coincident World**.

e. Select **Open** to attach the file.

f. Close the References dialog.



4. Select **Home > Model Analysis and Reporting > Civil Analysis > Create Cut Fill Volumes**

a. Follow the heads up prompts (after each prompt, **Left click** to accept values and move to next prompt):

- *Cut Feature Definition:* **Mesh/Volumes/Volumes_Cut**
- *Fill Feature Definition:* **Mesh/Volumes/Volumes_Fill**
- *Compute Unsuitable:* **No**
- *Compute Custom:* **No**
- *Compute Substrata:* **No**
- *Data point to accept selection.*

b. **Left click** to complete the command.

3D mesh elements are now created displaying where the cut and fill are located in the model. This is useful for visualizing earthwork, top mesh, and bottom mesh. The **Red** 3D mesh element indicates *Fill* and the **Green** 3D mesh element indicates *Cut*.

The 3D mesh elements have volume attributes associated with them which can be viewed via the *Properties* tool. The cut and fill volumes from the 3D mesh elements can also be viewed in the **Quantities Report by Named Boundary** report.

5. In **Default-3D** view, turn off the *r2635c_rdy_cmd_road.dgn* reference file.



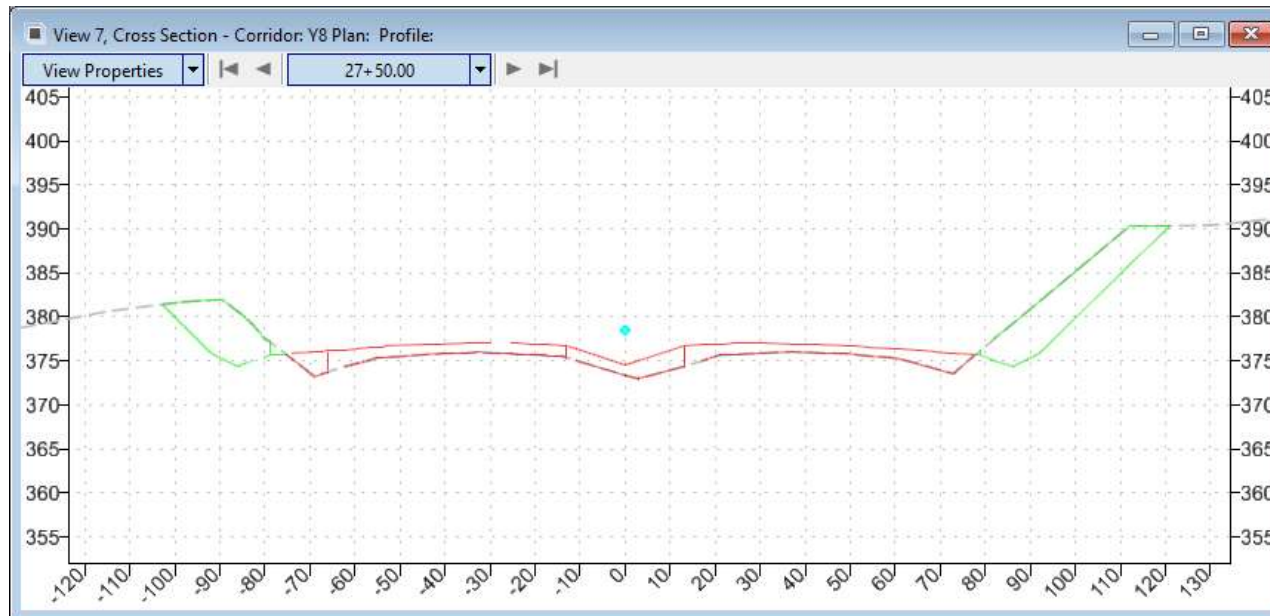
- a. Select **Home > Attach Tools > References**.
- b. Select *r2635c_rdy_cmd_road.dgn* in the references dialog.
- c. Select the **Display** icon to toggle off the road corridor.



6. Rotate the view and observe the cut and fill areas in 3D.

- a. Select the **View Rotation** tool at the top of the view window.
- b. **Left click** and **hold** the left mouse button to begin view rotation. Slowly move your mouse up and down or side to side to rotate the view.
- c. Release the left mouse button and **Right click** to reset.

7. Review the cut and fill volumes in the XS view.



Create Quantities Report by Named Boundary

In this exercise, you will learn how to compute quantities using the **Named Boundaries** and **Quantities Report by Named Boundary** tools. The **Named Boundary** tool allows the user to create custom boundary shapes along the corridor. Quantities can then be calculated within a **Named Boundary** using the **Quantities Report by Named Boundary** tool. This exercise will focus on how to create **Named Boundaries** along the corridor model and then how to calculate quantities within each **Named Boundary** or station range.

Skills Taught

- Create Named Boundaries
- Create Quantities Report by Named Boundary

Create Named Boundaries for Northbound and Southbound

The **Named Boundary** tool allows the user to create custom boundary shapes along the corridor. Quantities can then be calculated within the named boundary using the **Quantities Report by Named Boundary** tool. Practical applications include quantities between station ranges, construction sequencing and staging, left and right of centerline, etc. This section will focus on how to create **Named Boundaries** along the corridor model at 50' stations. For a more accurate prismoid earthwork, note that the model is composed of 5' min. interval template drops.

1. Set **View 1, Default** active.

2. Create Named Boundaries.



a. Select **Drawing Production > Named Boundaries > Place Named Boundary**.

b. Select the **Civil Plan** tool and populate the following fields with the values shown:

- *Set Drawing Seed:* **Earthwork**
- *Detail Scale:* **1"=50'**
- *Name (under Detail Scale):* **Y8_EW**
- *Set the length:* **50**
- *Left Offset:* **300**
- *Right Offset:* **300**
- *Overlap:* **0**
- *Boundary Chords:* **50**
- *Create Drawing:* **Disable**

c. Select the **Y8 (US 64)** alignment to identify path element.

d. Select **Lock Start Location** icon to lock the starting location.

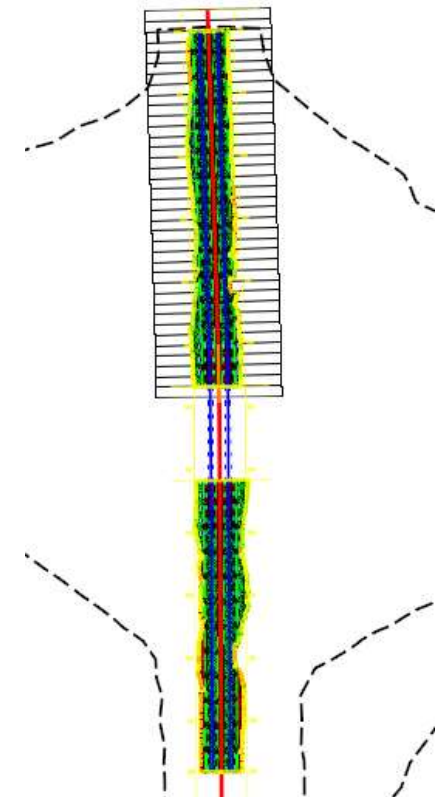
e. **Left-click** to accept.

f. Data point near the beginning of the bridge to lock the end location.

g. **Left-click** to accept.

h. In the *Name (Under Group)* field key in **Y8** (locked), press **Tab** on your keyboard

i. **Left-Click** to accept. Named boundaries will now be created along the Y8 corridor up to the bridge.



Quantities Report by Named Boundary

In this section, you will learn how to create corridor quantities for the named boundary limits using the **Quantities Report by Named Boundary** tool.

TIP: If only the cut and fill volumes are to be shown in the report, excluding pavement and other volumes from the corridor model, detach the corridor modeling file before creating the report.



1. Select **Home > Model Analysis and Reporting > Civil Analysis > Quantities Report by Named Boundary**.

a. Follow the heads up prompts (after each prompt, **Left click** to accept values and move to next prompt):

- *Named Boundary Group: Y8*
- *Display Clipped Graphics: Yes*
- **Left Click** to display report.

TIP: When **Display Clipped Graphics** is set to **Yes**, the 3D data inside of each named boundary will be clipped in the 3D model. This is useful for checking and verifying the results of the **Quantities Report by Named Boundary**. One could simply select a clipped 3D element and use the **Properties** tool to verify the quantity.

2. Review the report and note the station ranges are based on the begin and end location of each named boundary placed, and the quantities are calculated within each named boundary.

Quantities Report by Named Boundary						
Named Boundary Group: Y8			Report Created: Monday, July 15, 2019			
Alignment Name: Y8			Time: 8:12:25 AM			
Input Grid Factor:			Note: All units in this report are in feet, square feet and cubic yards unless specified otherwise.			
Station	Named Boundary Name	Material	Count	Length	Slope Area	Volume
10+50.00	Y8_EW					
11+00.00	Y8_EW-1					
		Volumes_Cut:				
11+50.00	Y8_EW-2					
		Volumes_Cut:			7936.20	260.06
		Volumes_Fill:			1365.91	34.99
		ALG_Centerline-RDY:		50.00		
12+00.00	Y8_EW-3					
		Volumes_Cut:			7422.44	225.81
		Volumes_Fill:			2233.06	43.97
		ALG_Centerline-RDY:		50.00		

Assessment

1. True or False: A 3D terrain model can be referenced into a 2D model space.
 2. Which is NOT part of the superelevation **creation**?
 - A. Use Superelevation Table Editor
 - B. Assign Superelevation to Corridor and Point Control for Pivot Points
 - C. Select AASHTO Runoff Table
 - D. Create Superelevation Section(s)
 3. What is/are required to cut cross section sheets?
 - A. Alignment
 - B. Corridor Model
 - C. Existing Terrain Model
 - D. All of the Above
 4. Named boundaries are required to create sheets for:
 - A. Plan
 - B. Profile
 - C. Cross Section
 - D. All of the above.
 5. True or False: The project sheet index information is stored in the active file and folder where the sheets are created.
- *Bonus Question: True or False: Oak is a great instructor and deserves a raise for his hard work.

Answer

1. Correct Answer: True. When a 3D terrain model is referenced and made active in a 2D model space, a 3D-Default model is automatically created and attached to the 2D model space.
2. Correct Answer: B. Assigning the superelevation to a corrido is done after the creation process.
3. Correct Answer: D. The alignment, corridor model, and existing terrain files are needed to cut cross sections sheets. In addition the 3D model view must be opened (not necessary active) to create the XS named boundaries.
4. Correct Answer: D. Nameed boundaries are required to create sheets for plan, profile, and cross section. In addition, earthwork report with station range requires the named boundaries.
5. Correct Answer: False. Sheet index is stored in the .dgnws (workset) file and it is project specific, not file or folder.

*Extra Credit: True