Module 13
OpenRoads Designer
Sheeting
2024

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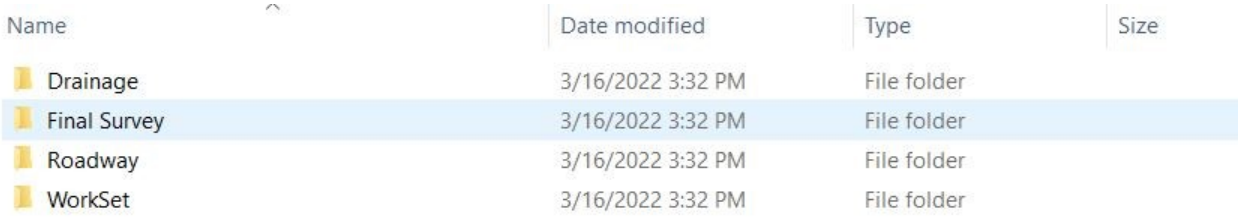
Module 13 – Sheeting

About this Practice Workbook...

- The Module 13 – Sheeting.Zip file will be provided for download.
- Exact the zip file to the root C:\
- All files are then automatically extracted here: C:\NCDOT Training\Roadway\ Module 13 – Sheeting
- With these subfolders:



Name	Date modified	Type	Size
Drainage	3/16/2022 3:32 PM	File folder	
Final Survey	3/16/2022 3:32 PM	File folder	
Roadway	3/16/2022 3:32 PM	File folder	
WorkSet	3/16/2022 3:32 PM	File folder	

The Module 13 Sheeting PDF will also be located here.

- 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 module uses English units and US Survey Feet.

- Each module in this series is self-contained. You can jump to any module and begin the exercises.

- The ***NCDOT_WorkSets.inp*** on your desktop should be set the following variables:
  - **NCDOT_USE_LOCAL_WORKSETS = L2**
  - **NCDOT_UNIT_TRAINING_WORKSETS = Roadway**
- This training module uses the **DOT-US North Carolina** WorkSpace, **R-2635C (Training)** WorkSet and **NCDOT_Roadway** Role. It is very important that you select the correct WorkSpace, WorkSet and Role.

- **For more information on setting up workspaces, click here.**

- The tool tips and help were copied from the Bentley Online Help. See this link for the complete list of tools and common usage.
  OpenRoads Designer CE Help (bentley.com)

- NCLUG/NCDOT Bentley ORD Open X presentations from each NCDOT Department:

NCLUG - 2022 TECH Talks

- **This workbook was written with the release of OpenRoads Designer 10.10.XX.XX (2021)**
  OpenRoads Designer 2021 R2 update:
  OpenRoads Designer Readme (bentley.com)
  OpenRoads Designer 2021 Release 2 Introduction - YouTube
- **This workbook has been updated for the 2023 Release of OpenRoads Designer (23.00.00.129)**

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Overview

OpenRoads Designer (ORD) provides the tools to easily create plan, profile and x-section sheets in various formats such as plan only, plan and profile, or profile only sheets. MicroStation Named Boundaries are used to define the clipping areas for the plan, profile and X-section portions of the drawings and sheets.

The various design files required to assemble the sheets are attached as references to the a layout file. For Example, the alignment (ALGG) geometry and survey files are attached to the plan profile layout (PPL) as references. Sheets will be created by using the Named boundary tool and selecting the ***Mode*** (plan, profile or XS) and ***Drawing Seed*** of the sheet you wish to

create. The software then creates “Drawing” and “Sheet” Models for each named boundary. Named boundaries will be created in the 2D plan view for plan sheets, 2D profile view for profile sheets and a 3D models view for X-sections. This is a new workflow that this module will help explain.

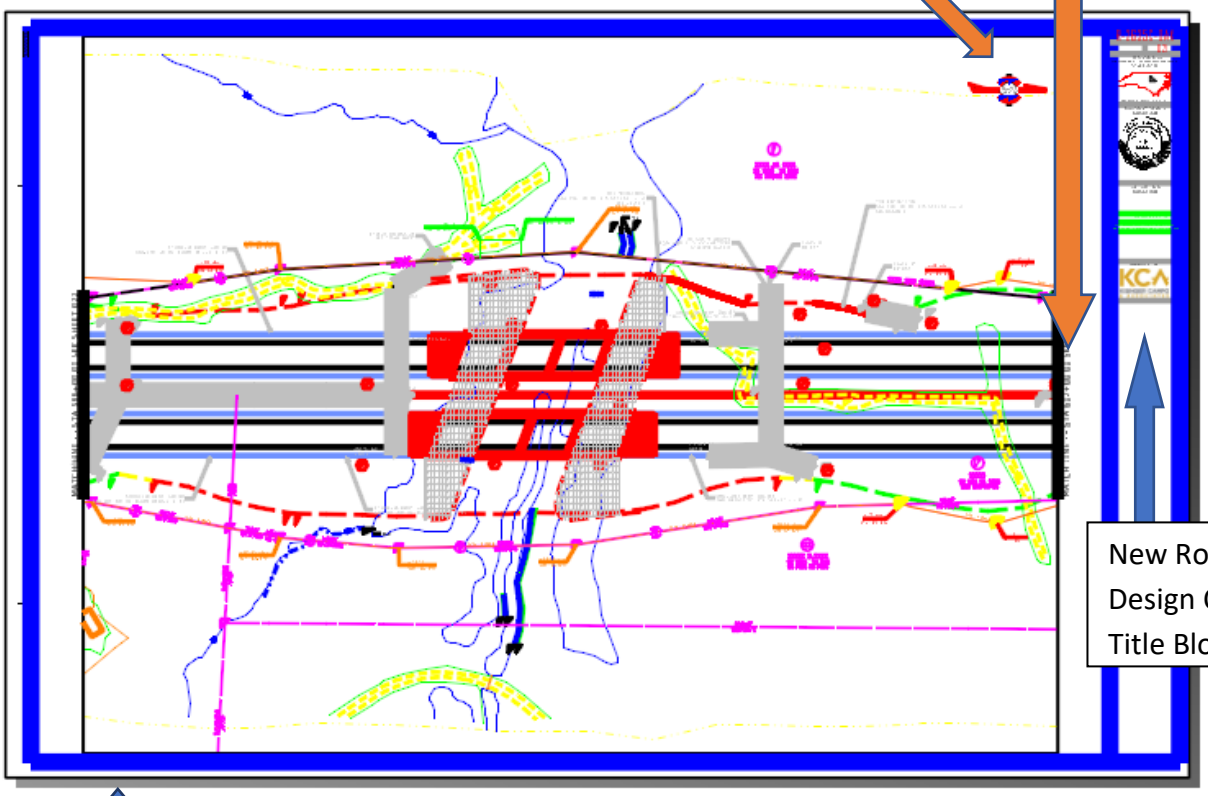
Note that this workbook refers to a “model” as a Microstation model space, such as a design model (black background), a drawing model (gray background) and a sheet model (white background). Further explanation of Microstation models is included in this workbook.

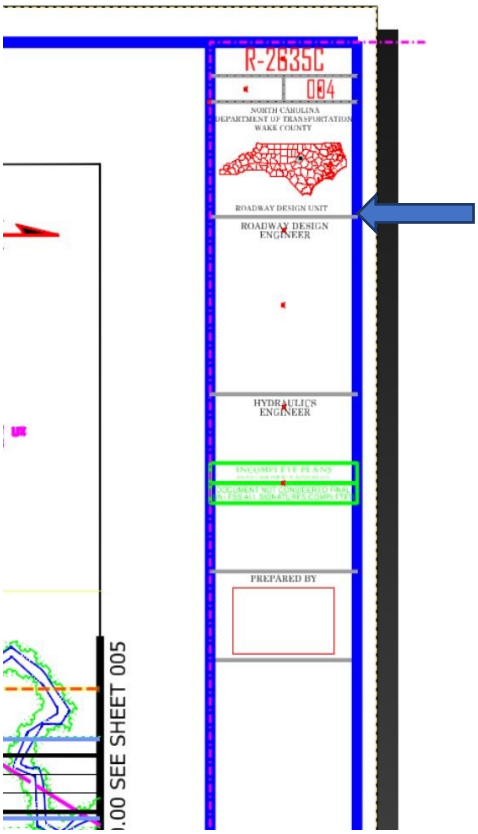
The rest of the plan sheets such as title, typical, details, and summaries are produced as in the past with design elements being drawn into the DGN files (design model) and a border referenced. Then they are referenced to a sheet model for ***Sheet Indexing*** (explained later in this workbook).

The sheet model is then used for plotting or PDF generation.

New Sheet Components overview for OpenRoads Designer

This is an Example of a Roadway sheet you will create in the module. A few new components to a sheet have been noted for new users.





New NCDOT Unit Customized Title Block (Roadway Design Shown)

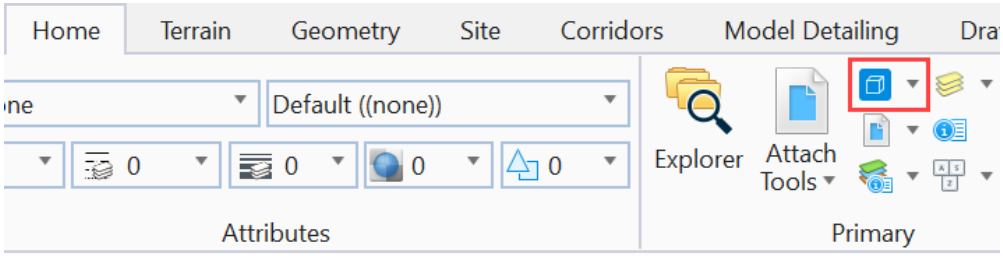
MicroStation Models and Type

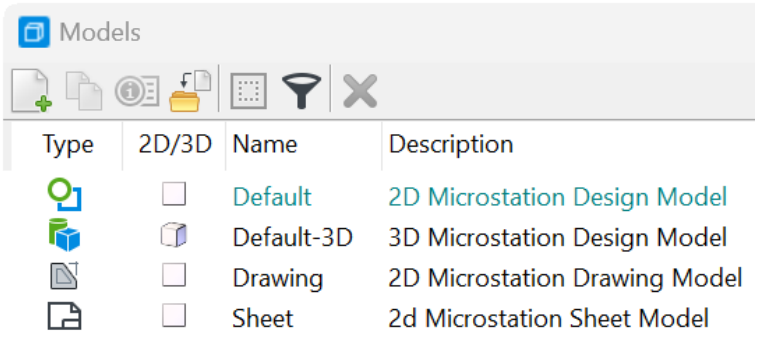
In the past, the designer had **one 2D default design Model** inside of a design DGN file. The concept of **multiple Microstation Models** within a design file will be used often in ORD. There are three (3) basic Microstation Model Types, **Design** (black background), **Drawing** (gray background) and **Sheet** (white background). Design Models can be 2D or 3D. Drawing and Sheet Models are usually 2D.

It is helpful to think of a Microstation Model as a design file within a design file or another analogy to think of is that a Microstation Model in a design file is like Worksheets in a Workbook in MS Excel. The Microstation Model is a container that the elements are stored in. This term **MicroStation Model** should not be confused with the ORD **3D Design Model** of the proposed surfaces that the designer produces with the ORD software. It is likely that the designer will have an ORD **3D Design Model** of the proposed surfaces drawn into a **3D Microstation Model** inside of a **2D design DGN file**. That is one DGN file containing one or more Microstation Models. This concept will be further explored in the **Corridor Modeling Module** in NCDOT's ORD Training

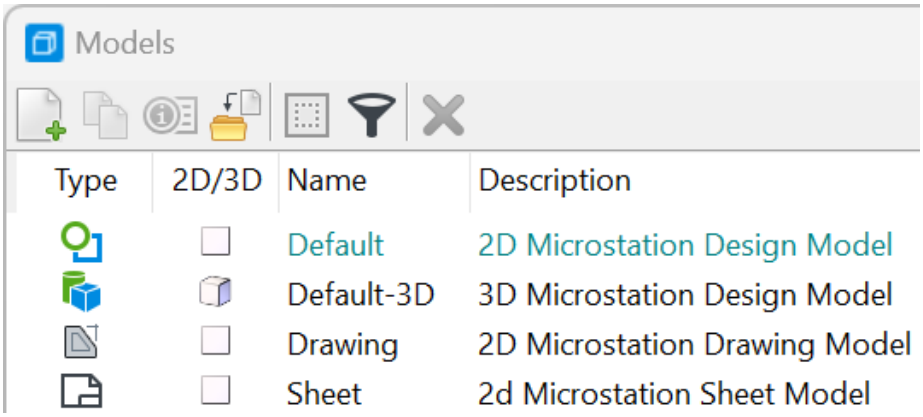
Looking under the *Home Tab* → *Primary Tool Group* → **Models Tool** in this file shows an example of multiple **Models** used in a DGN file to contain the design as well as plan sheets in one DGN file. This concept will be further explored in the **Sheeting Module** in NCDOT's ORD Training.

Multiple **Microstation Models** in a DGN File

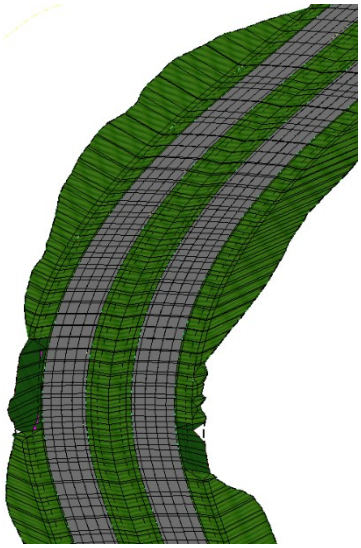




Microstation Model Types (Icons) in a DGN File

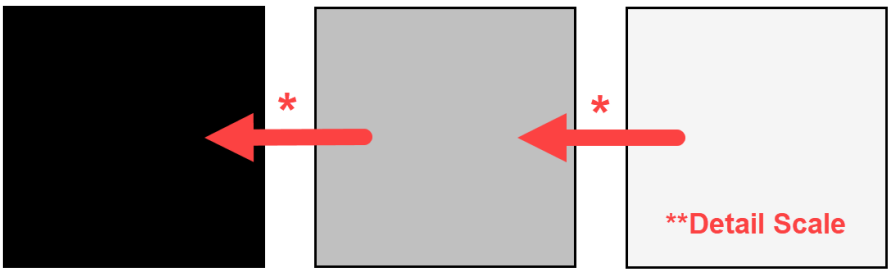


Below is an example of a **3D Design Model** produced with the ORD software.A new concept



introduced in ORD is the use of different types of **Microstation Models** in a DGN file. ORD uses **Microstation Design, Drawing, and Sheet Models** to carry the project from design through plan sheet production. Each type of **Microstation Model** has a distinguishing background color for easy identification when the user is in it.

Design to Sheet Models



***Nested Depth = 99**

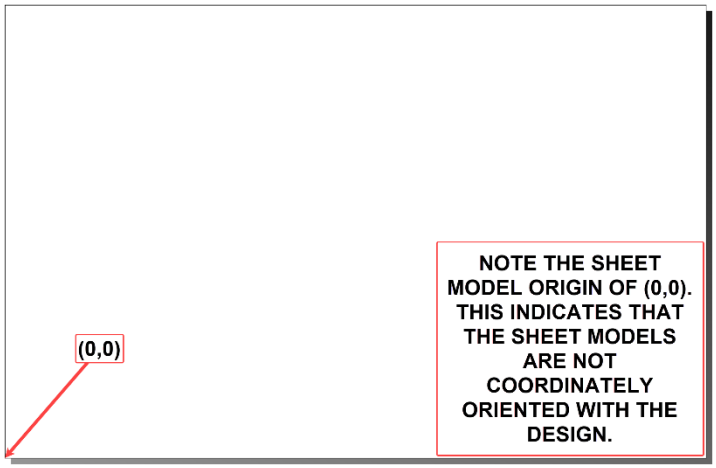
****Calculated Master:Reference Scale - usually the same as annotation scale in the drawing model.**

F

	Design	Drawing	Sheet
Plan	Yes	Yes	Rarely
Profile	Rarely	Yes	Rarely
XS	No (N/A)	Yes	Rarely

Features drawin in 2D/3D design models may appear on the drawing and sheet models (not actual labels)

Note that the **Microstation 3D Design Model** is usually shown in *illustration* mode which also have a white background. The distinguishable difference between the **Microstation 3D Design Model** and the **2D Microstation Sheet Model** (both have white background) is the **Microstation 2D Sheet Model** is usually shown with sheet border (shadow) and it's at a 1:1 Annotation Scale.



General Sheeting Process Overview

1. Create Custom Title Block Border (**TBB**) for the NCDOT Unit. Each NCDOT Unit and for each STIP Project, the TBB will be unique, e.g. PE seal blocks, company logo, right of way and construction revision notes, etc.

2. Create the Plan Profile Layout (**PPL**) file. Cross section will have the XS Port Layout (**XPL**) equivalent. The PPL and XPL contain the **Named Boundaries** (clip areas) and reference files that are shown in plan, profile and XS sheets.

3. Generate the **Drawings** and **Sheets** from the **Named Boundaries.** All Drawings should be placed in the Plan Drawings (**PLD)**, Profile Drawings (**PRD**) and XS Drawings (**XSD**) DGN file. All Sheets should be placed in the Plan Sheets (**PLS**), Profile Sheets (**PRS**) and XS Sheets (**XSS**) DGN file. Rather than placing all the drawings and sheets in the active PPL file, it is recommended to place them in the listed files above to prevent file size getting too large causing extremely slow navigation.

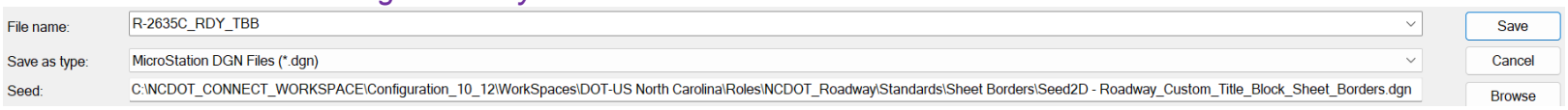
4. Edit the **WorkSet** (.dgnws) properties to place the STIP Number on the sheets and use **Sheet Indexing** to organize and re-number the project sheet sets.

5. **Print**, **Print Organizer** and **PDF** Creation

Exercise 1 – Create Title Block Border (TBB)

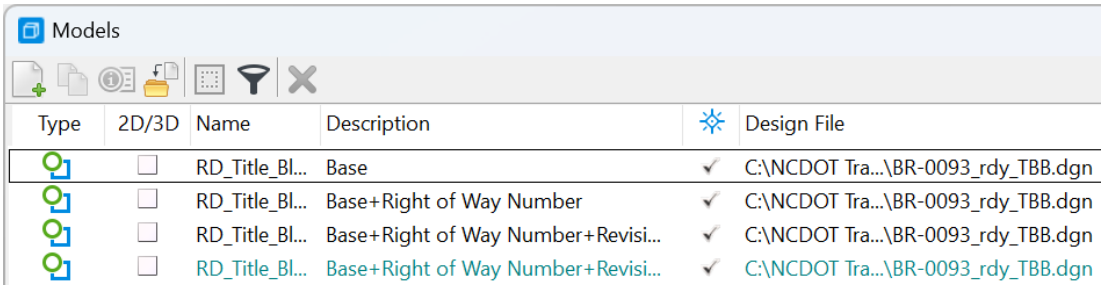
A custom Title Block Border (TBB) file should be created by each NCDOT Unit and for each STIP Project. Each TBB file will reside in each NCDOT Unit folder which may also include the PE seal cell and PEF's company logo where applicable. The following procedure is customized to Roadway Design.

A. Create a new file called **R-2635C_RDY_TBB.dgn** and place it in the following folder: *C:\NCDOT Training\Roadway\Training-RD_R-2635C\Module 13 - Sheeting\Roadway\Sheets*

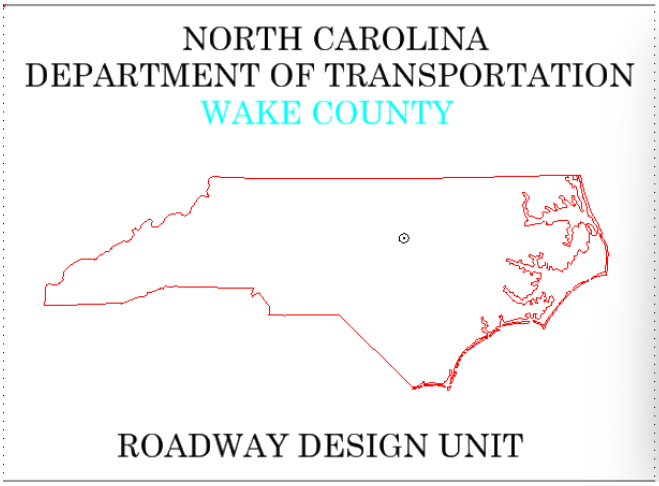


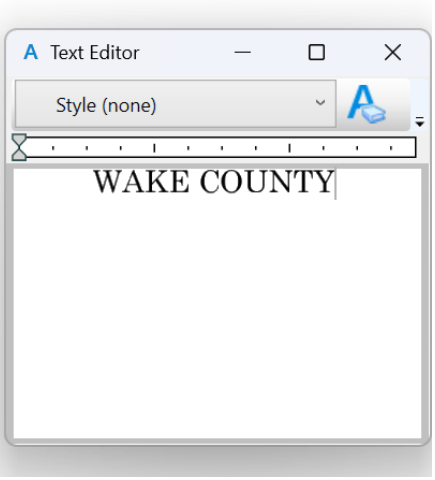
Note that there is a **TBB Seed File** to be used when creating this new **TBB** file in the WorkSpace which have predefined template borders.
C:\NCDOT_CONNECT_WORKSPACE\Configuration_2023\WorkSpaces\DOT-US North Carolina\Roles\NCDOT_Roadway\Standards\Sheet Borders

B. Open the **R-2635C_RDY_TBB.dgn** file and note the four different predefined template borders.

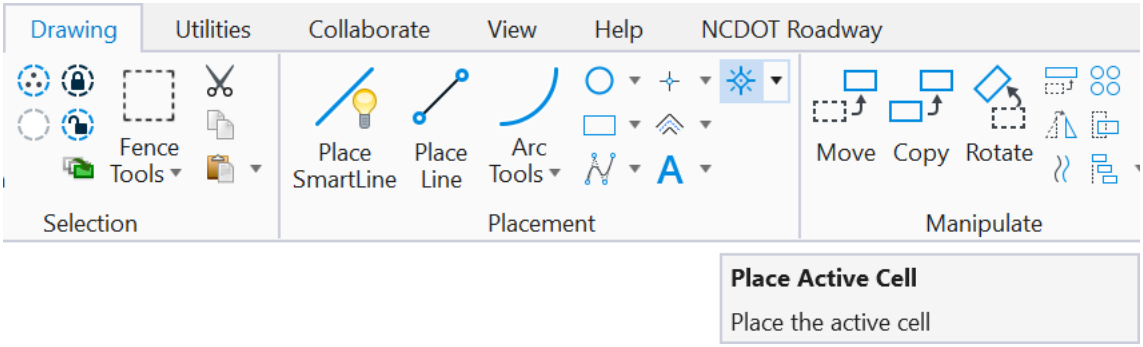


C. In the **RD_Title_Block_Basic** Microstation Design Model customize the project location information. Edit the county text to **WAKE** (default).

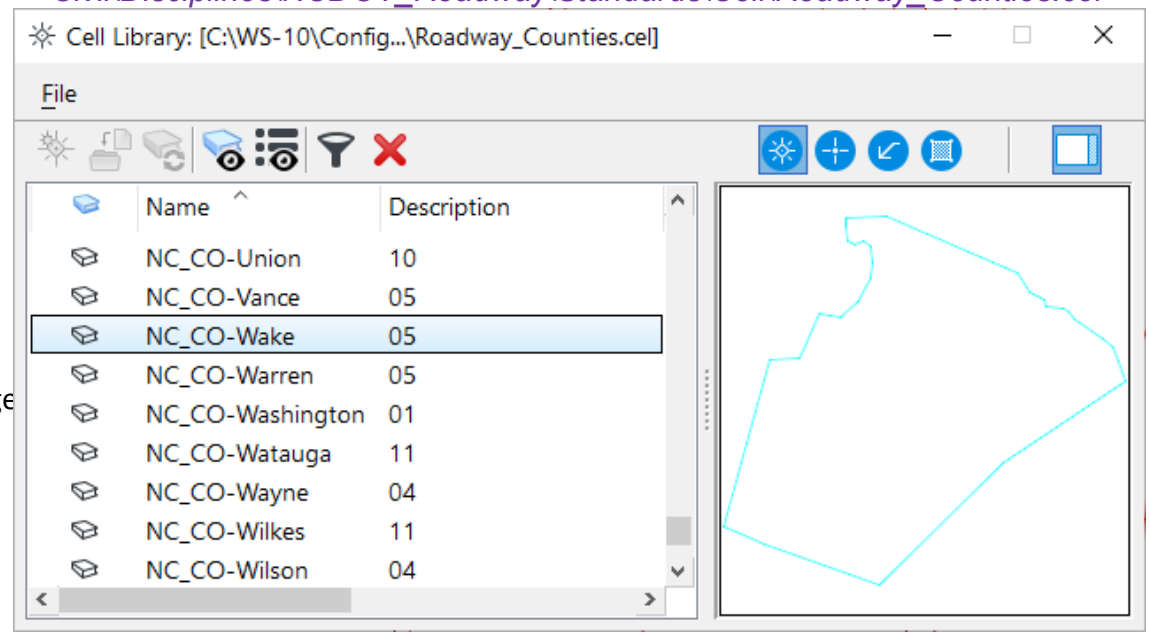


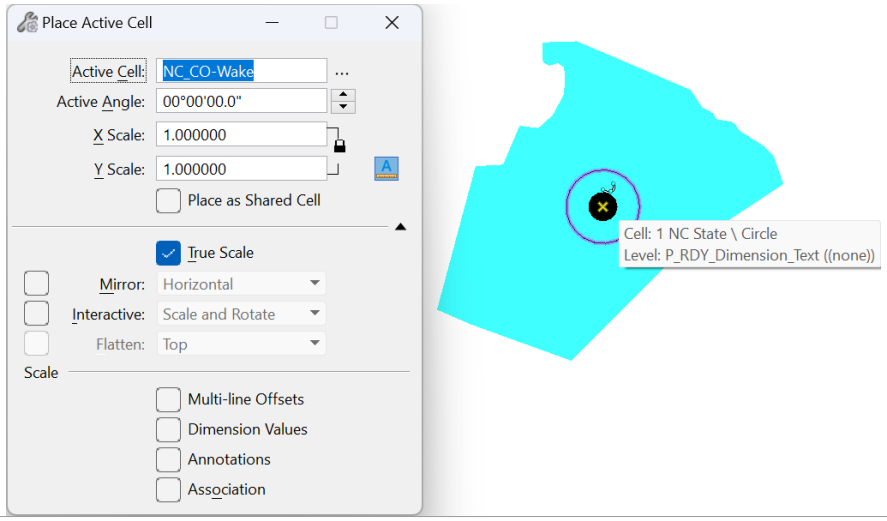


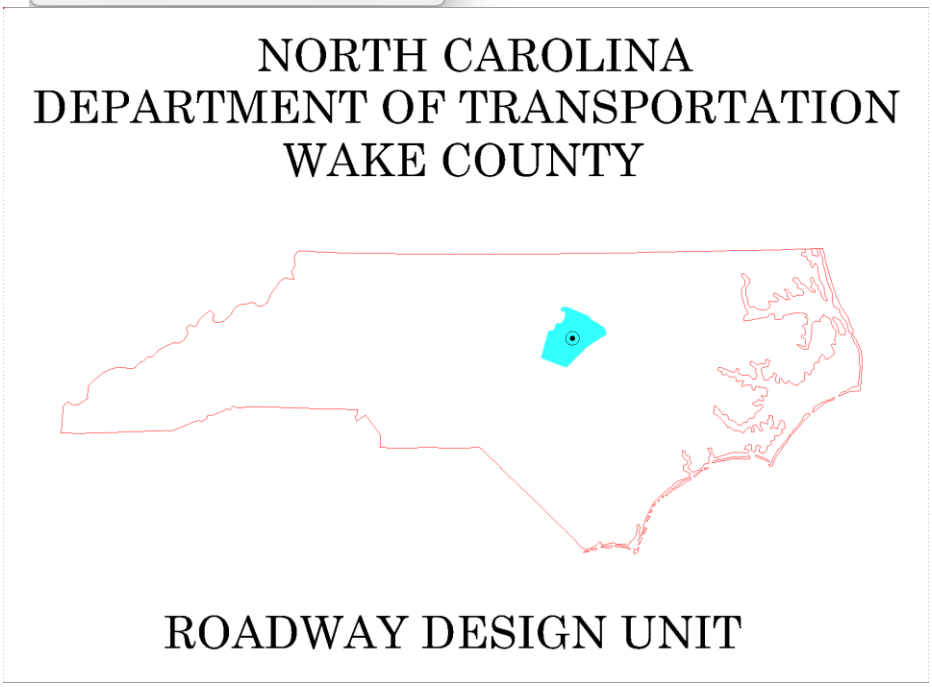
D. The **dot** in the middle of the State (downtown Raleigh) should be used as the anchor point to place the shape of the county or counties the project is located in. Navigate to the Drawing tab, and select the Place Active Cell tool.



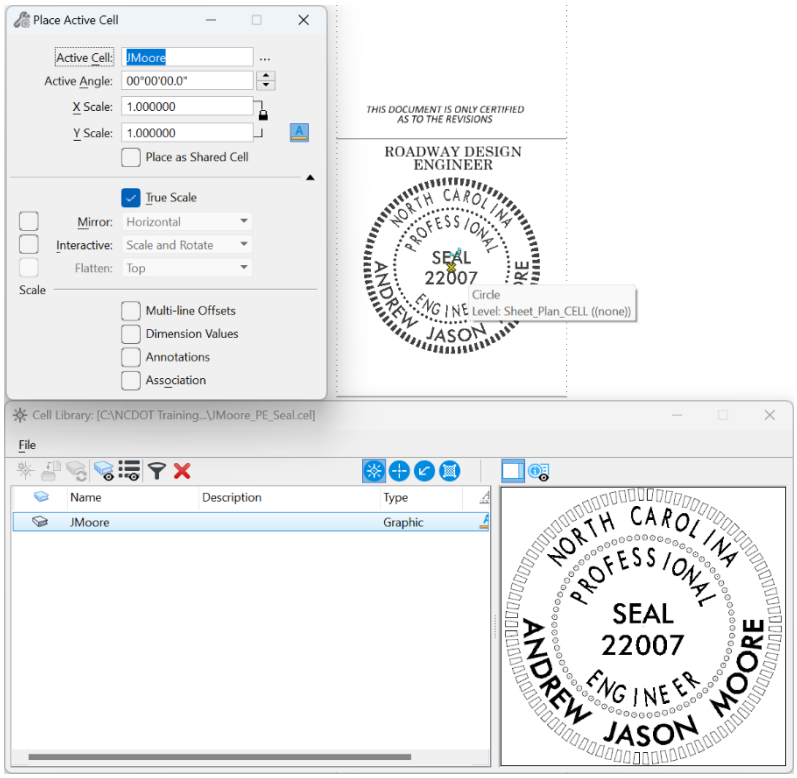
The cell library (.cel) with all the counties in North Carolina is stored in the WorkSpace: *{WorkSpace)\Configuration\Organization-Civil\Disciplines\NCDOT_Roadway\Standards\Cell\Roadway_Counties.cel*




Place Active Cell
Active Cell: NC_CO-Wake
Active Angle: 00°00'00.0"
X Scale: 1.000000
Y Scale: 1.000000
Place as Shared Cell
True Scale
Mirror: Horizontal
Interactive: Scale and Rotate
Flatten: Top
Scale
Multi-line Offsets
Dimension Values
Annotations
Association
Cell: 1 NC State \ Circle
Level: P_RDY_Dimension_Text ((none))

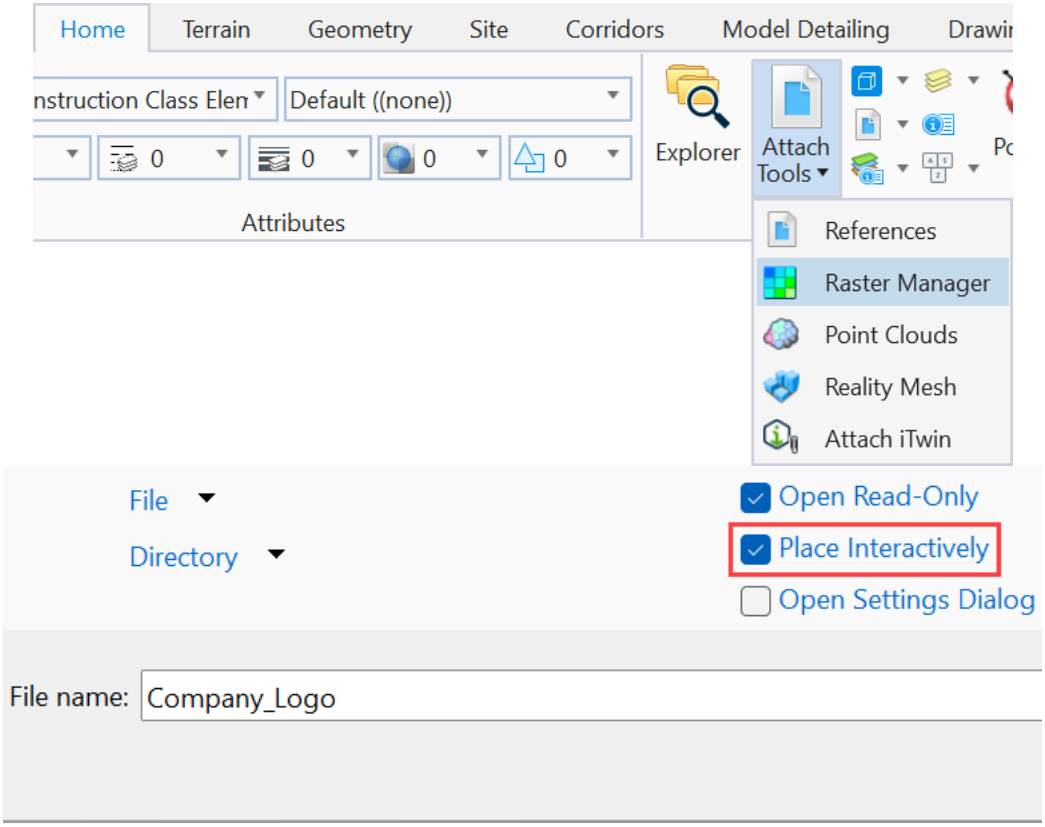

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY
ROADWAY DESIGN UNIT

E. Place **PE seal** (when applicable). In the *C:\NCDOT Training\Roadway\Training-RD_R-2635C\Module 13 - Sheeting\Roadway\Sheets* folder there is a **cell library** (.cel) with an example PE seal cell. Place this cell in the center **red dot** as the cell anchor point for the appropriate seal block (ROADWAY DESIGN ENGINEER).

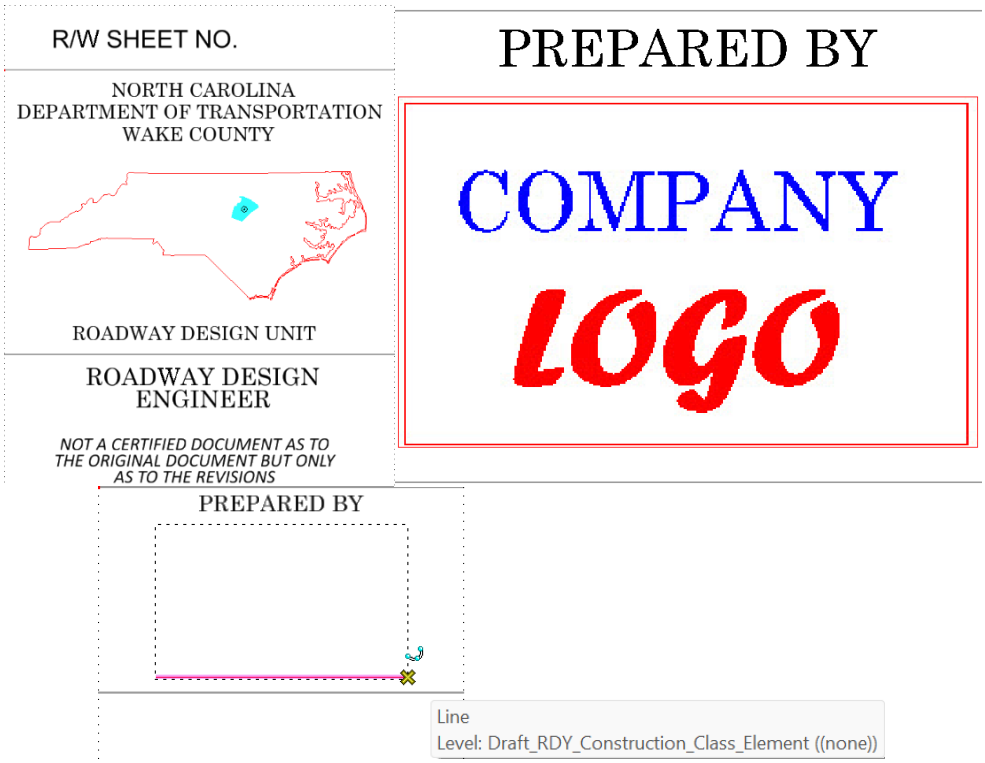


F. Place **company logo** (for PEFs when applicable). Place a fence around the layout of the **PREPARED BY** block **to the right of the title block** and using the **red dot** as the anchor point, **Copy** the fence content into the **starting point** of the **last separator line**.

G. In the **Roadway\Sheet** folder there is a generic **image** of a company logo. Use **Raster Manager** to place this image Interactively using the corners of the red block. Go to *Home > Raster Manager > File > Attach > Raster* and select the **Company_Logo.jpg** file from C:\NCDOT Training\Roadway\Training-RD_R-2635C\Module 13 - Sheeting\Roadway\Sheets. Make sure **Place Interactively** is checked.



Note for the other three (3) predefined borders, the county block is automatically referenced in from the first border as a **Saved View**. The other blocks, such as **PE seals** and **company logo** will have to repeat the procedure as the first border if needed.



At this point you are done with the TTB file creation. The next step is determining when and how the TBB is attached to the plan and profile sheets.

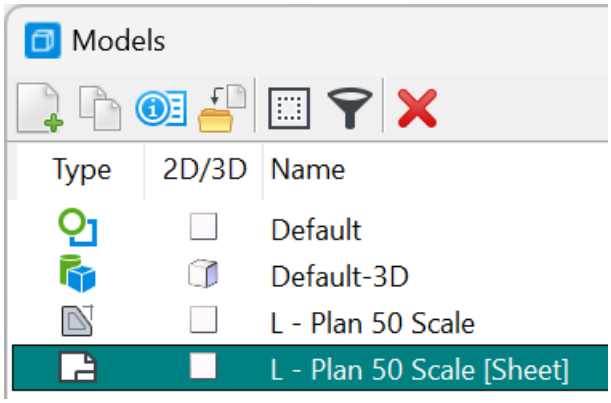
***** IMPORTANT *****

There are two (2) ways to attach the **TBB** to the plan and profile sheets; 1) **before** creating the sheets, attach (reference) the **TBB** to the **Drawing Seed** (.dgnlib) in the **WorkSpace** or 2) **after** creating the sheets, attach (reference) the **TBB** to the **Microstation Sheet Models**.
The determining factor will mostly be whether you are working inside ProjectWise (PW) or outside it. If you are working outside PW (non-managed WorkSpace), you are allowed to edit or attach the TBB file to the WorkSpace .dgnlib (Drawing Seed) file. If you are working inside PW (managed WorkSpace) you are not allowed to edit and attach the TBB to the WorkSpace .dgnlib (Drawing Seed) file.

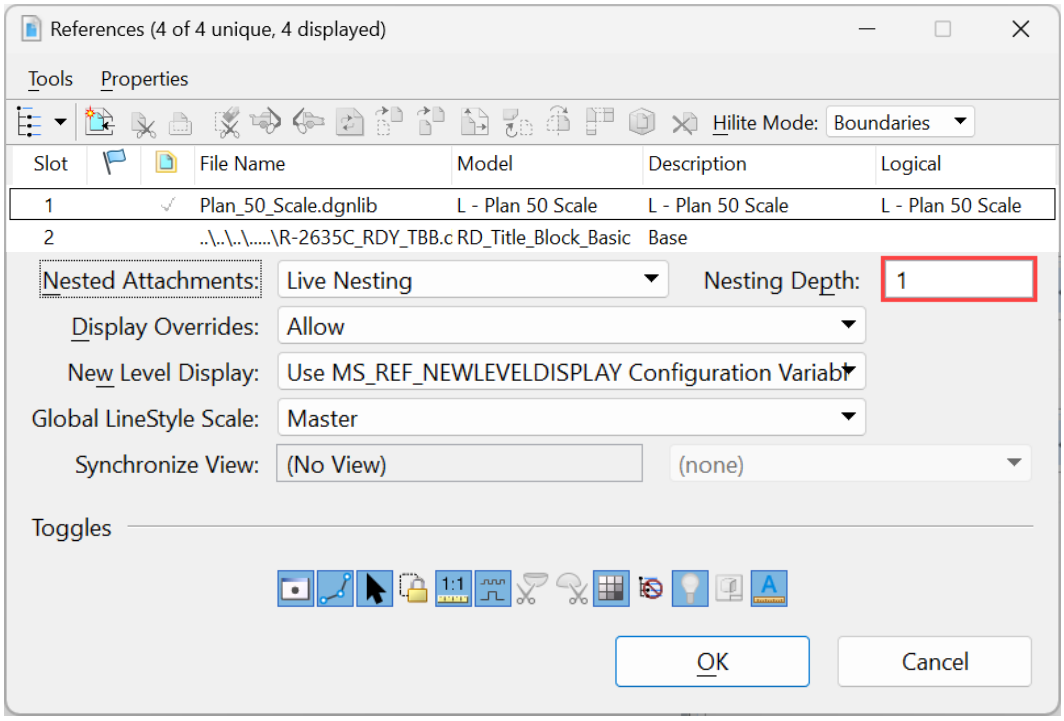
Steps to Attach the TBB to the WorkSpace .dgnlib (Drawing Seed) File

A. All Drawing Seed Files (.dgnlib) are stored in the WorkSpace.
{WorkSpace}\Configuration_2023\Organization-Civil\NCDOT\Dgnlib\Sheet Seeds
Open the **Drawing Seed DGNLIB** you are going to use (in this exercise it is **Plan Only 50 Scale.dgnlib**). Make sure the **DOT-US North Carolina WorkSpace**, **R-2635C (Training) WorkSet** and the **NCDOT_Roadway Role** are active when opening this file.

B. Open the Microstation Sheet Model **L – Plan 50 Scale [Sheet].**

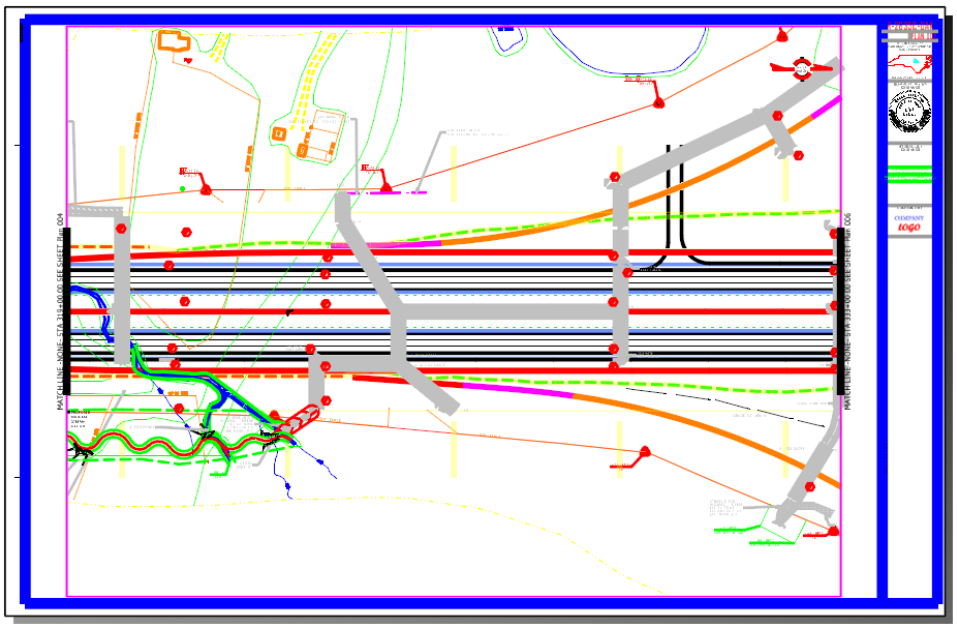


C. **Reference** the **TBB** file to this Microstation Sheet Model. Use **Coincident World** because the origin of the sheet model is (0,0). Remember to set the **Nested Depth = 1** to display the county block **Saved View** in the other three (3) predefined template borders.



D. Go back to the **Default** (2D) Microstation Design Model, **Fit View**, **Save Settings** and **Exit** out of the file.

When the sheets are created (in the next exercises) using this **Drawing Seed**, the **TBB** is included as a reference file with the rest of the sheet border attached to the sheet.

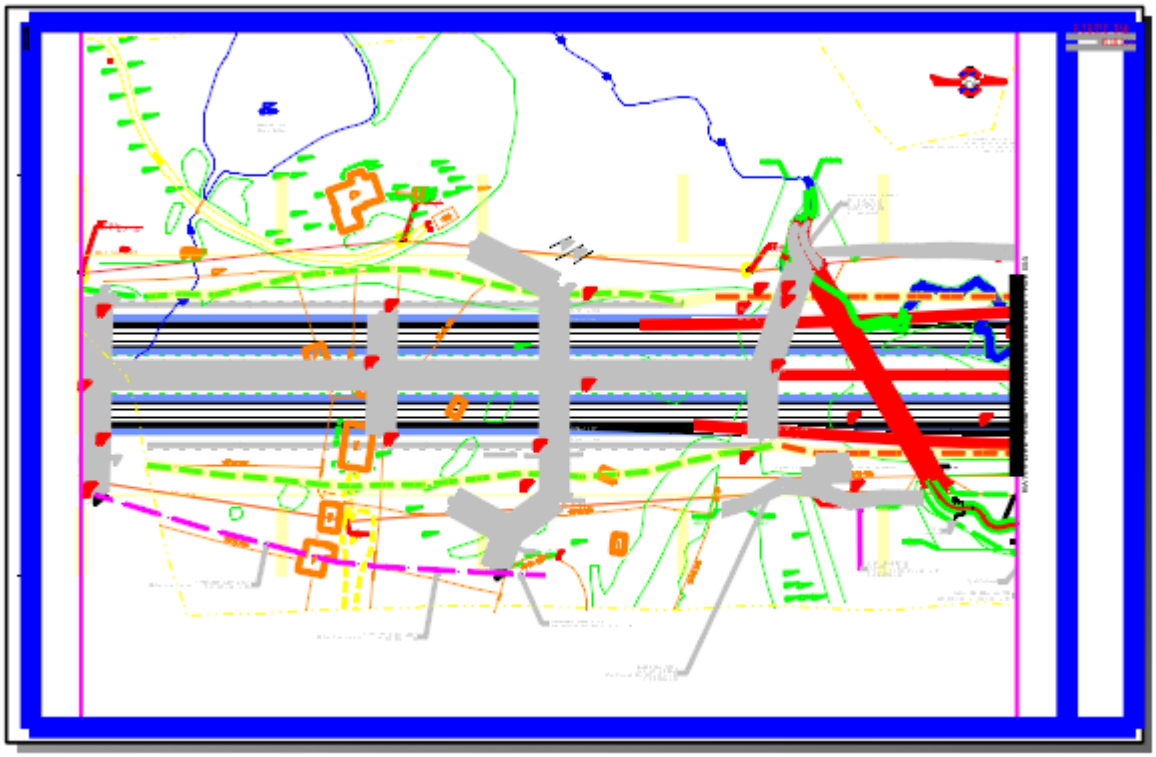


Once the sheets have been created, the **TBB** can be detached from the WorkSpace .dgnlib (Drawing Seed) file.

Steps to Attach the TBB to the Microstation Sheet Model File

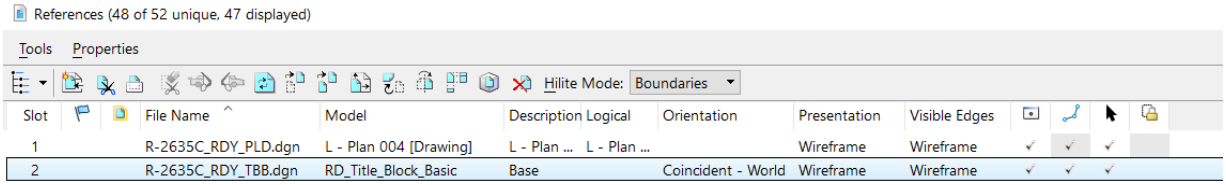
COME BACK TO THIS SECTION AFTER MAKING THE SHEETS IN EXERCISE 2

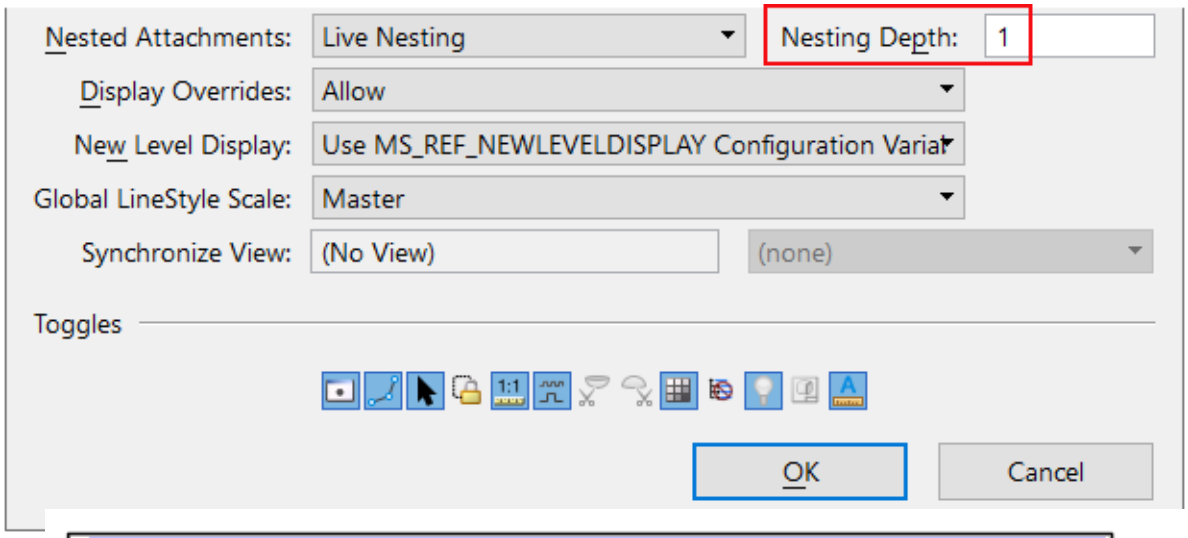
A. **After** the sheets have been created, **Open** the Plan Sheet (**PLS**) file in the **Roadway\Sheets** folder.

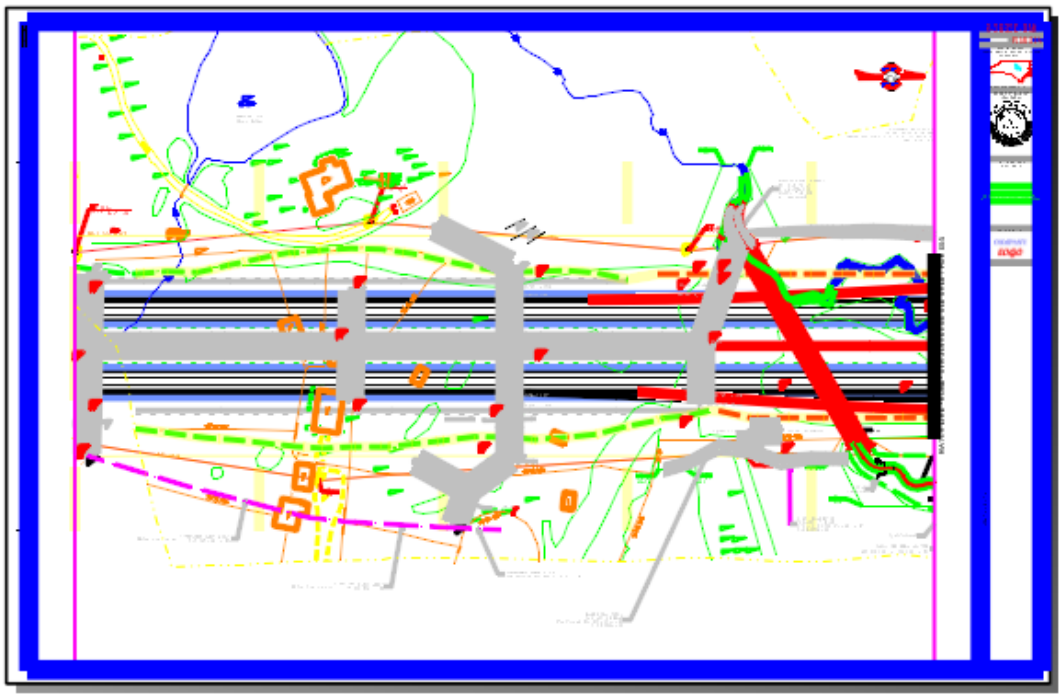


B. **Navigate** to the first Microstation Sheet Model.

C. **Reference** the **TBB** file to this Microstation Sheet Model. Use **Coincident World** because the origin of the sheet model is (0,0). Remember to set the **Nested Depth = 1** to display the county block **Saved View** in the other three (3) predefined template borders.

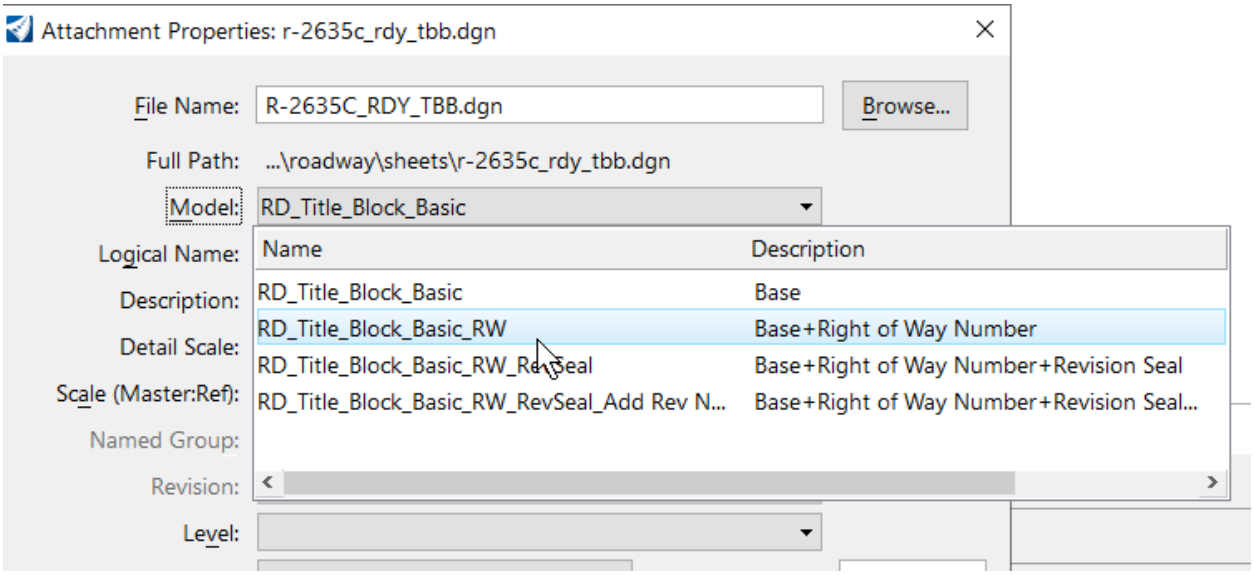

References (48 of 52 unique, 47 displayed)
Tools
Properties
Hilite Mode:
Boundaries
Slot
File Name
Model
Description
Logical
Orientation
Presentation
Visible Edges
1
R-2635C_RDY_PLD.dgn
L - Plan 004 [Drawing]
L - Plan ...
L - Plan ...
Wireframe
Wireframe
2
R-2635C_RDY_TBB.dgn
RD_Title_Block_Basic
Base
Coincident - World
Wireframe
Wireframe


Nested Attachments:
Live Nesting
Nesting Depth:
1
Display Overrides:
Allow
New Level Display:
Use MS_REF_NEWLEVELDISPLAY Configuration Variat
Global LineStyle Scale:
Master
Synchronize View:
(No View)
(none)
Toggles
OK
Cancel



Changing to a different predefined template border on a per sheet basis

When there is a construction revision or right of way revision to one or more sheets, while in the Microstation Sheet Model you may simply go to the **Reference** dialog box. After double-clicking on the **TTB** reference file, select the desire border under the **Model** drop-down list.



Exercise 2 – Plan Sheets

Preparing the Plan Profile Layout (PPL) file. The PPL file contains reference files shown on the plan sheets as well as *Named Boundaries*. Named Boundaries are simply clipped areas of each sheet. This PPL file will be provided in the training dataset. For a NEW Project, Follow the instructions in Module 1 for creating design files from the WorkSpace seed.

C:\NCDOT Training\Roadway\Training-RD_R-2635C\Module 13 - Sheeting\Roadway\Sheets\R-2635C_NCDOT_PPL.dgn

A. Reference the master ***R-2635C_RDY_ALG.dgn*** file (Interactive – **Default** Model and **Nested Depth** =1) from the **Roadway\Alignment** folder and give it the logical name of "dsn" (so the pen table can print it solid black).
Note that the master ALG file reference other Alignment (ALG) DGN files. The **Nested Depth**=1 is necessary to include the other reference files associated with the master ALG. For this training all alignments were placed in the master ALG file.

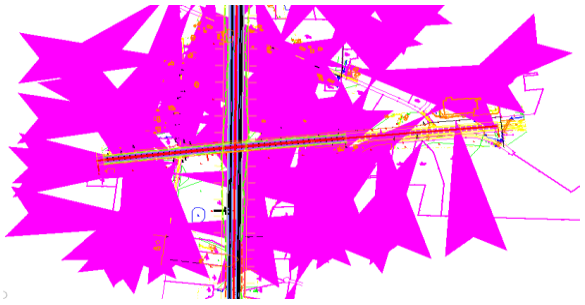
B. Open the file: ***R-2635C_NCDOT_PPL.dgn*** using the **DOT-US North Carolina *WorkSpace***, **R-2635C (Training) *WorkSet*** and **NCDOT_Roadway *Role***.

C. Reference the ***R-2635C_NCDOT_FS.dgn*** file from the **Final Survey** folder (Coincident World - Default model) from the Final Surveys folder and give it the logical name of "pln1" (so the pen table can print it dithered/gray scale).

D. Reference the ***R-2635C_NCDOT_FS.dgn*** file (Interactive - Existing Terrain Model) from the **Final Survey** folder and **make it Active**. This is necessary to show the existing ground profile on the profile sheets. The existing terrain boundaries are not to be printed so no logical names are required.

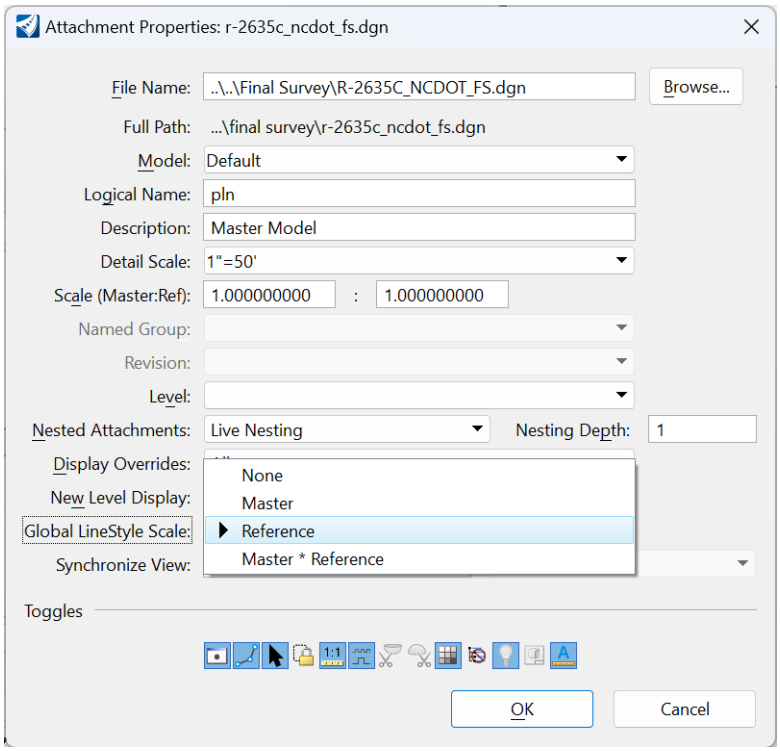
Note: selecting the existing terrain boundary and using the heads-up display to make it the ***Active*** terrain model creates a **Default-3D** Microstation Design Model and automatically referenced to the **Default** (2D) Microstation Design Model.

E. Older V8 DGN files may display large arrowheads when this file is referenced.



Newer DGN files (included with this dataset) will not have this issue.

This is an issue with the custom line style scaling. If the problem exists, change the **Global LineStyle Scale** from *Master* to *Reference* and disable **Annotation Scale** ("A" icon at the bottom right corner of the reference dialog box).



F. Reference the ***R-2635C_HYD_DRN.dgn*** file from the **Drainage** folder and give it the logical name of "drn1" (so the pen table can print it solid black).

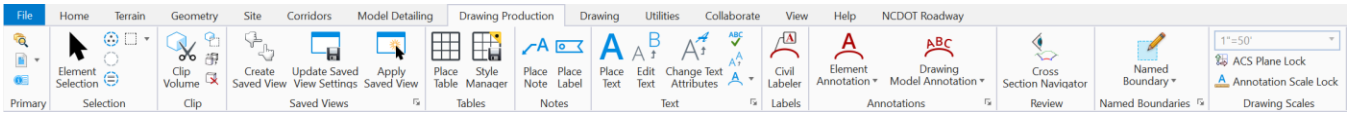
G. Reference the ***R-2635C_RDY_ROW.dgn*** file from the **Roadway\Design** folder and give it the logical name of "dsn1" (so the pen table can print it solid black).

H. Reference the master ***R-2635C_RDY_CMD.dgn*** file (Interactive – **Default-3D** Model and **Nested Depth** =1) from the **Roadway\Design** folder and give it the logical name of "dsn2" (so the pen table can print it solid black).
Note that when referencing the **Default-3D** Microstation Design Model, the **Default** (2D) Microstation Design Model is automatically referenced.
Also note that the master CMD file reference other corridor modeling (CMD) DGN files. The **Nested Depth**=1 is necessary to include the other reference files associated with the master CMD.
CMD files contain the slope stake linework generated from the corridor models as well as other traditional DSN elements, e.g. EOTs, paved shoulder, curb and gutter and other 2D linework.

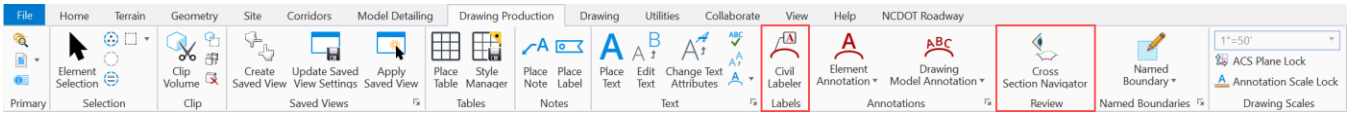
I. Reference the ***R-2635C_RDY_DSN.dgn*** file from the **Roadway\Design** folder and give it the logical name of "dsn3" (so the pen table can print it solid black). DSN files may contain annotations.

Drawing Production Ribbon Tab

The *Drawing Production Tab* is found under the **OpenRoads Modeling** *Workflow*.



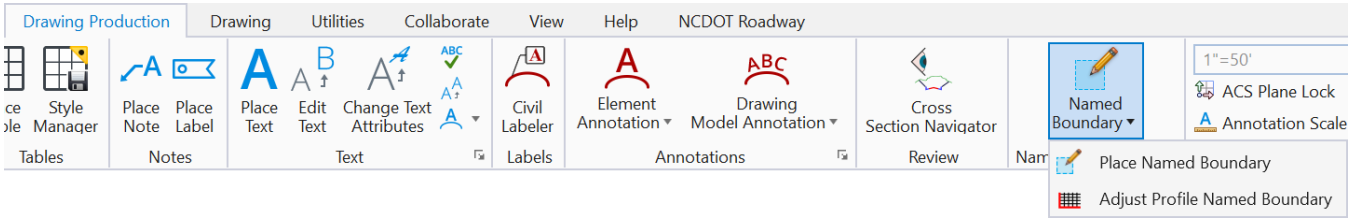
New tools: Civil Labeler/Civil Label Manager and Cross Section Navigator (more on these later in the training)



The *Drawing Production* Tab or Ribbon tab is broken into 12 tool groups and contains the tools that the roadway designer needs to automatically and manually create **Named Boundaries,** annotation to designs and drawings as well as create plan, profile, and cross section sheets.

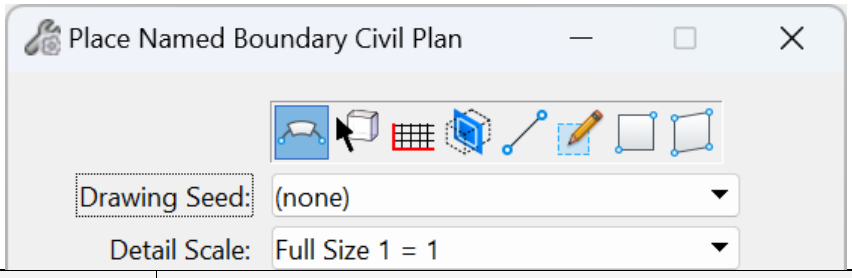
Named Boundaries Tool Group

One of the tool groups of the *Drawing Production* Ribbon Tab is the *Named Boundaries* Tool Group. Choosing the tools in this group will place or adjust the named boundaries (clip area shapes) to create plan, profile, and cross section sheets. Note currently adjusting the named boundaries is only applicable to profiles.



Place Named Boundary Tool

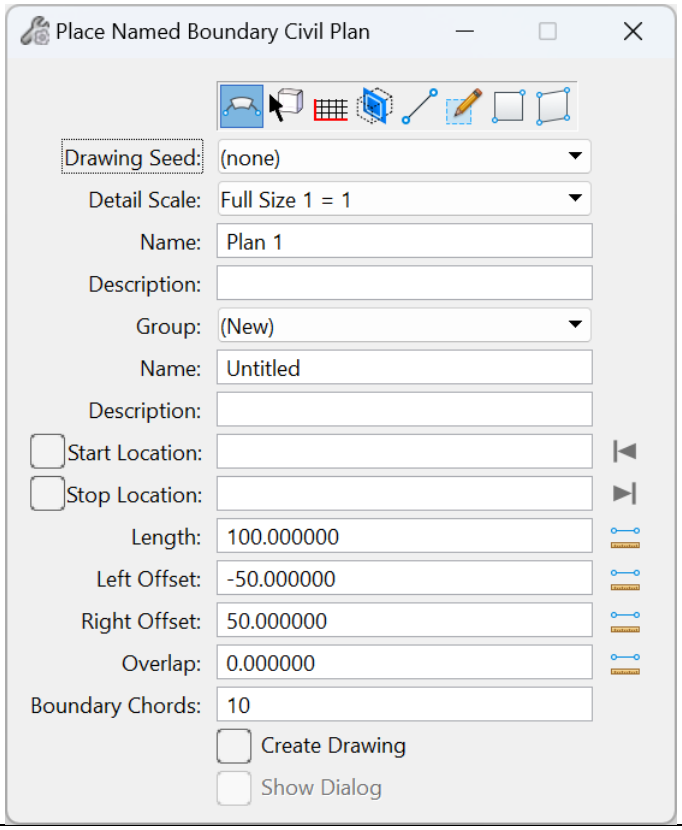
Modes across the top of **Place Named Boundaries** tools:



Setting	Description
Place Named Boundary	Opens the Place Named Boundary tool to create place named boundaries.
Civil Plan	Place named boundary **civil plan** mode tool.
Civil Plan by Element	Place named boundary **civil plan by element** mode tool.
Civil Profile	

Setting	Description
	Place named boundary **civil profile** mode tool.
Civil Cross Section	 Creates **civil cross section** sheets.
Civil Cross Section 2 Points	 Place named boundary **civil cross section 2 points** mode tool.

Place Named Boundary **Civil Plan** Mode



Drawing Seed	Specifies the drawing seed that sets default values. Also contains default values for the next dialog box "Create Drawing".
Detail Scale	Sets the scale at which the named boundary will be placed.
Name	Enter name of the named boundary. This is usually a sheet number association but not required. **Note:** MicroStation models cannot contain the following characters in the name or group: \\/:*?<>|\"\t\n&=,'
Description	Enter brief description for the new group.
Group	Selects the named boundary group. You can also create a new group by selecting New from the drop-down. This automatically set when selecting the horizontal alignment. **Note:** MicroStation models cannot contain the following characters in the name or group: \\/:*?<>|\"\t\n&=,'

Name	Enter name of the new group.
Description	Enter brief description for the new group.
Start Location	Sets the begin station.
Stop Location	Sets the stop station.
Length	Sets the length, along the path element (horizontal alignment). It's usually 1400' stations per sheet at 1"=50' scale.
Left Offset	(Available only when By Length is selected) Sets the distance from left of the path. If you use the Measure Distance tool next to the field, the measured distance displays in the Left Offset field.
Right Offset	(Available only when By Length is selected) Sets the distance from right of the path. If you use the Measure Distance tool next to the field, the measured distance displays in the Right Offset field.
Overlap	(Available only when place an array of named boundaries along a path is selected) Sets the distance, along the path element, by which the named boundary element is to be extended. Positive values extend it and negative values shorten it. If you use the Measure Distance tool next to the field, the measured distance displays in the Overlap field.
Boundary Chords	(Available only when By Length is selected) Sets the number of chord of vertices along the top and bottom of the named boundary. More the chords, better is the stroking of the named boundary in a curve.
Create Drawing	Opens the Create Drawing dialog after creating the named boundary to create a saved view from the selected named boundary and automate dynamic views.
Show Dialog	When enabled, a dialog with additional parameters set by the Drawing Seed is shown.

Place Named Boundary Civil Plan by Element

This is not covered in this training but the link to Bentley help located below:

Place Named Boundary Civil Plan by Element (bentley.com)

***** IMPORTANT *****

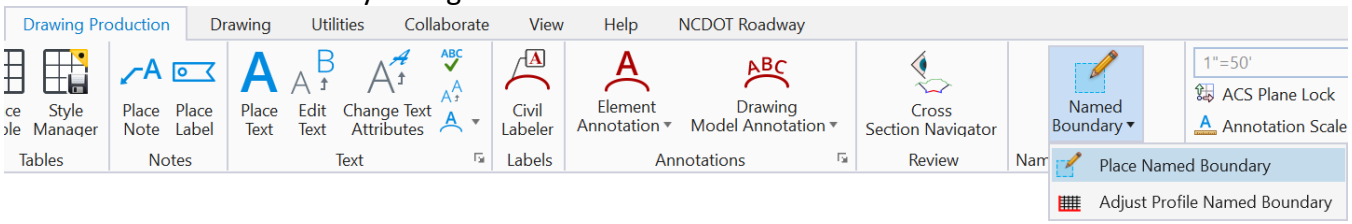
If your project has an interchange sheet or multiple interchange sheets, please go to **Exercise 3 – Named Boundaries for Interchange Sheets** first**.** The procedure is different than normal sheets and you first must create the Interchange sheets, then the surrounding sheets afterward.

Place Civil Plan Named Boundary Workflow

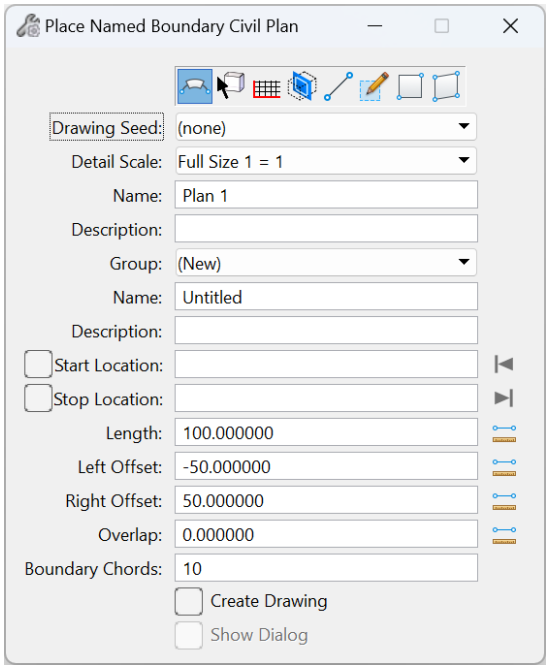
1. Select ***Civil Plan*** mode.
2. Select the ***Drawing Seed*** to be used. This seed will contain the default scaling and named boundaries dimensions users can override.
3. Key in the name of the starting Named Boundary, e.g. “Plan 004”.
4. Select the horizontal alignment as the baseline element for named boundary placement.
5. Key in (or graphically select on-screen) the **Start** and **Stop** Station values.
6. Modify other fields as needed.
7. Enable the ***Create Drawing*** toggle. This will display the next **Create Drawing** dialog box.
8. Data point in the DGN file to place boundaries, then another data point to Accept.
9. Select OK on the **Create Drawing** dialog is displayed.
10. The **Create Drawing** dialog box is where users can select the North Arrow NAD designation and in which DGN file the Microstation Drawing and Sheet Microstation Models are to be stored.

A. Open the **R-2635C_NCDOT_PPL.dgn** file in the **WorkSet** folder.

B. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.

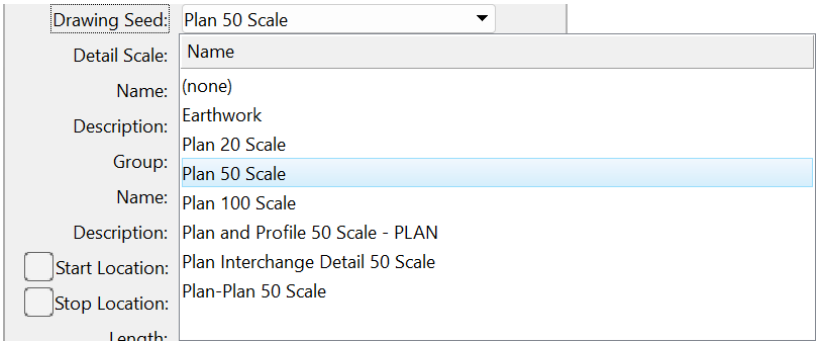


C. Choose the **Civil Plan** tool to change the data fields in the dialog box to reflect the data needed for plan sheet layout.



D. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

E. Select the **50 Scale Plan** *Drawing Seed*.
Note: The **Drawing Seed** defines default values and other parameters required to create sheets. The **Drawing Seeds** for *Civil Plan* mode are:



Note the **Detail Scale** automatically changes to **1" = 50'** and the **Length** and **Offset** of the sheet boundary and **Boundary Chords** change to accommodate the 1" = 50' scale.

F. Set the first Name field to be **004** since NCDOT begins their plan sheets at sheet 4. The first Name field defines the **root name** of each of the named boundaries. Using the name **Plan 004** begins the incremental numbering with the first named boundary.

Name Specified in Dialog	**004**
First Named Boundary	004
Second Named Boundary	005
Third Named Boundary	006

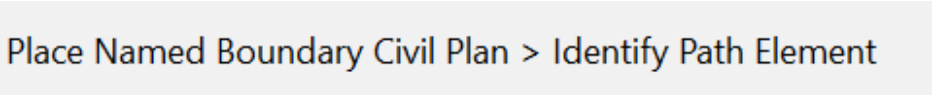
G. A **Description** can be entered but the Name alone is typically sufficient.

H. Set the *Group* to **New** to create a new named boundary group. Once named boundaries have been created for alignments, the names of the boundary groups appear here to be chosen later if necessary.

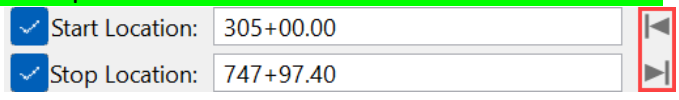
I. Set the second *Name* field to be **L** to coincide with the alignment name. This second name is the name of the **Group** of named boundaries used along the **L** alignment. This field may also be automatically set when a horizontal alignment is selected.

J. A **Description** can be entered but the Name alone is typically sufficient.

K. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the mainline **L alignment** on screen**.**

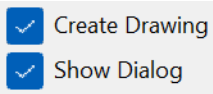


L. Select the left arrow and right arrows to lock the **Start** and **Stop** Locations to the beginning and end of the L alignment (This works for placing sheets for the entire alignment). You may also key-in the desired stop and stop stations in these fields. For this training select the start station by checking box or selecting start station in the plan view and for the stop location select 10 sheets or so to save time.

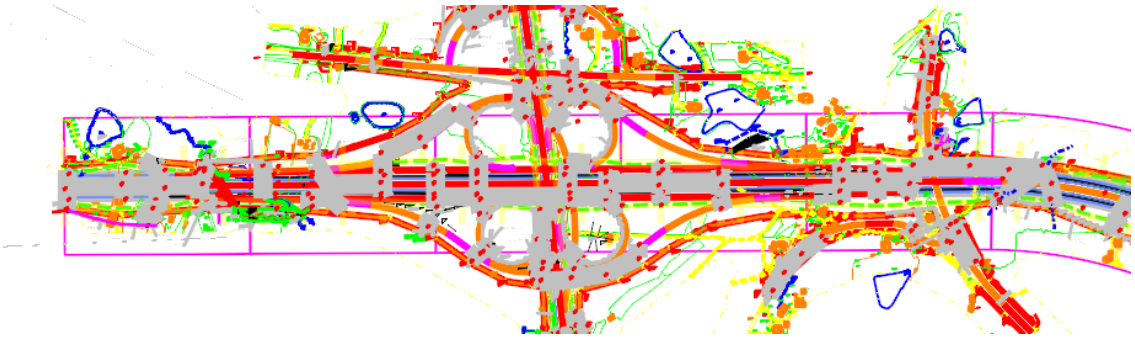


M. Check the **Create Drawing** box to create the Drawing Microstation Models for the purpose of annotations.

N. Check the **Show Dialog** box to open the Create Drawing Dialog Box where the user can select the North Arrow NAD designation as well as define in which files the drawing and sheet models are to be created in.



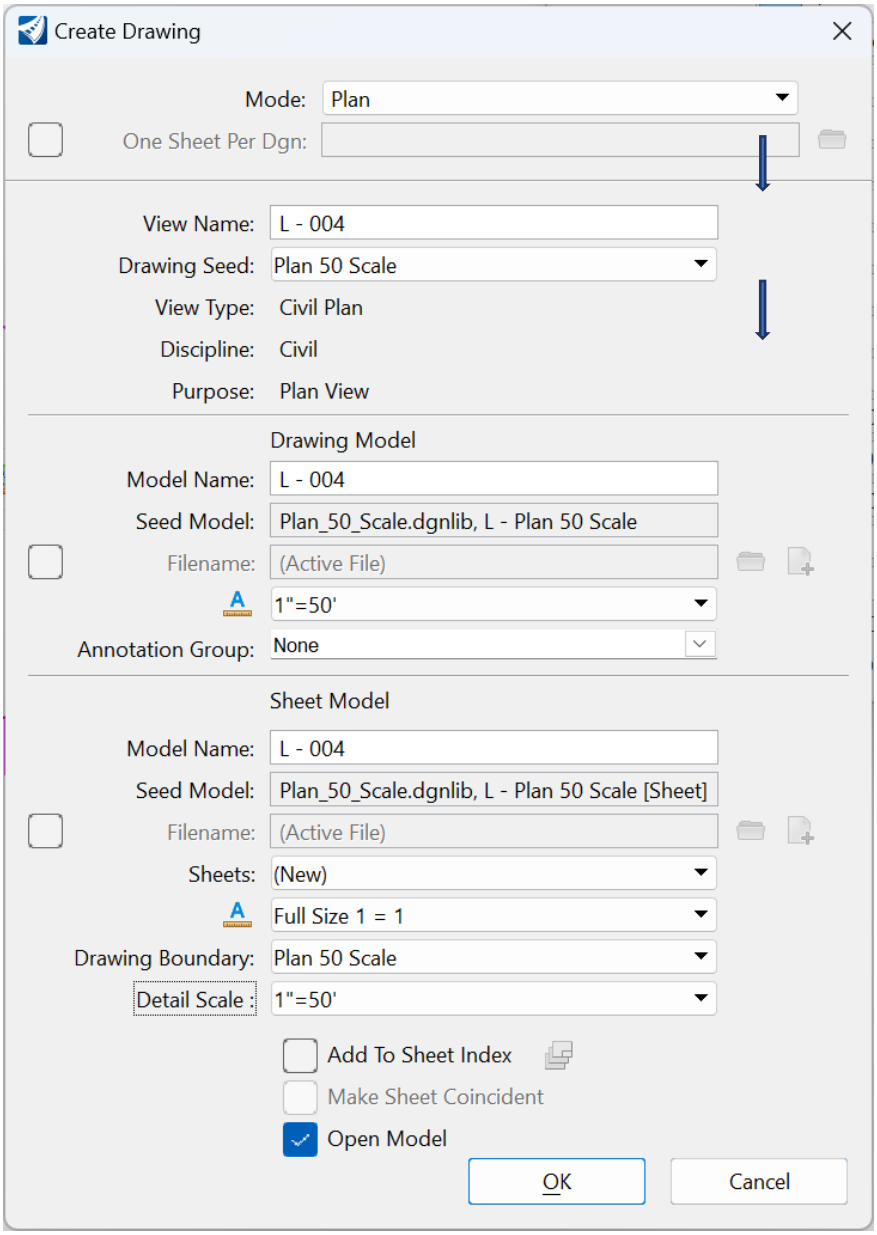
O. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown.



Once the Named boundaries have been created the **Create Drawing** dialog box will appear next.

Create Drawing (Plan)

Most of the settings have been filled in by default from the selected **Drawing Seed** (previous dialog box). Here are some settings requiring user's input:



Each Item in the **CREATE DIALOG** box Description.

Setting	Description
Mode	Plan
Name	Shows the name of the saved view that will be created.
One sheet per Dgn	If on, each sheet model, and all drawing models attached to the sheet model, are created in an individual .dgn file in the selected folder. The name of each .dgn file created will match the name of the created saved view.
Drawing Seed	Defines the drawing seed template from which the detailing symbol style will be used for the callout.
View Type	Displays the saved view type. The saved view type displayed depends on the saved view settings in the seed file selected in the Drawing Seed drop-down list.
Discipline	Displays the discipline of the drawing. It can be modified from the saved view properties in the Properties dialog.
Purpose	Displays the purpose of the saved view. It can be modified from the saved view properties in the Properties dialog.
Seed Model	Displays the seed model from which the drawing model will be created. This seed model is derived from the template selected in the Drawing Seed drop-down list.
Filename	If on, you can select the file in which the drawing model will be created. By default, the drawing model is created in the active file. You can create a new file that will contain the new drawing model by clicking Create New Drawing File icon. You can also create the drawing model in an existing file by clicking Browse Drawing File Browse Drawing File icon. **Note:** If you select an existing file to create the drawing model, make sure the file belongs to the same WorkSet, else the OK button in the dialog will be dimmed.
Annotation Scale	Sets the scale factor for text and dimensioning in the drawing model. The annotation scale of the drawing model is used as the detail scale when it is attached to a sheet. **Note:** Only the scales that match the master units of the seed file are populated in this drop-down list.

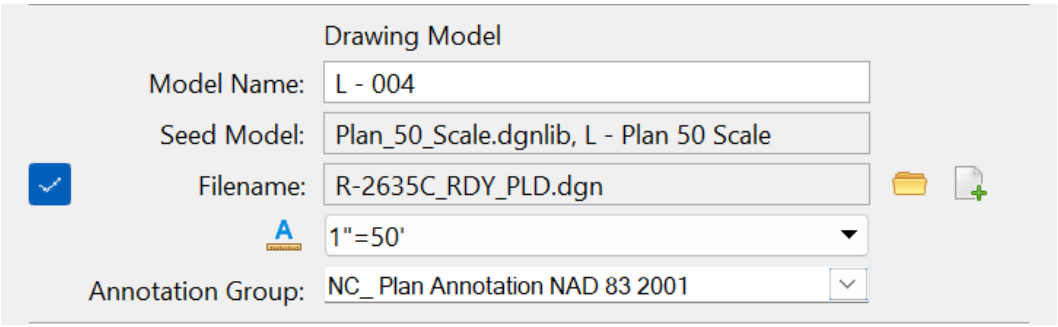
Setting	Description
Annotation Group	Selects the drawing annotation group that defines how drawing models are annotated. The drawing annotation group defines grids, XY coordinate labels, north arrows, frame annotation, etc. that are created in the drawing model and are to be shown on the final sheet. Annotation groups are found in the OpenRoads Standards under Annotation Groups.
Seed Model	If on, you can select the seed model from which the sheet model will be created. This seed model is derived from the template selected in the Drawing Seed drop-down list, except for the case when you place a named boundary using a drawing boundary with the Create Drawing check box turned on. In this case, the sheet-seed model is the one that contains the drawing boundary. This is to make sure that the drawing fits exactly in the selected drawing boundary.
Filename	If on, you can select the file in which the sheet model will be created. By default, the sheet model is created in the active file. You can create a new file that will contain the new sheet model by clicking Create New Sheet File icon. You can also create the sheet model in an existing file by clicking Browse Sheet File icon. **Note:** If you select an existing file to create the sheet model, make sure the file belongs to the same WorkSet, or else the OK button in the dialog will be dimmed.
Sheets	Sets the sheet model in which you want to place the drawing. You can also select New to create a new sheet model.
Annotation Scale	Sets the scale factor for text and dimensioning in the sheet model. **Note:** Only the scales that match the master units of the seed file are populated in this drop-down list.
Drawing Boundary	Sets the drawing boundary in the sheet model where the drawing will be placed. This option lists the following: • New - Creates a new drawing boundary. • List of empty drawing boundaries (drawing boundaries that do not have a saved view attached) of same View Type contained in the sheet model selected in the Sheets drop-down list. If Sheets is set to New, lists the empty drawing boundaries of same view type available in the sheet-seed model. In this case, a new sheet model is created and the selected drawing boundary is filled with the saved view. If multiple

Setting	Description
	saved views are to be placed, then for each saved view a new sheet model is created and the saved view is placed with new drawing boundary. If Sheets is set to an existing sheet model, then the first saved view is placed in that sheet model, in the selected drawing boundary. For the remaining saved views, a new sheet model cloned from sheet seed model is created for each saved view and the saved view is placed in the selected drawing boundary in each sheet model. • Optimize For - This option is available when you want to place multiple views and if the sheet model in which you want to place the saved views contains more than one drawing boundary of the same View Type. Following examples explain the use of this option in different scenarios ○ Say you want to place an array of four named boundaries of view type "Section" and the sheet model selected in the Sheets drop-down list contains five empty drawing boundaries of type "Section". In this case, if you select Optimize For, the name boundaries will be placed on the first four drawing boundaries, in the sequence of their drawing identifiers. This option is also available if you choose to create a new sheet model and if the sheet-seed model contains more than one drawing boundary of the same view type. ○ Say you have six saved views to be placed and the selected sheet-seed model has only two empty drawing boundaries. If you select Optimize For, two saved views will be placed in the selected sheet model. For the remaining four saved views, two new sheet models will be created by cloning the sheet-seed model and two saved views will be placed in each of the sheet models.
Detail Scale	Sets the detail scale of the drawing attachment in the sheet model. In addition to standard scales, MicroStation calculates following recommended scales and displays them in this drop-down list: • By Named Boundary - (Available only when you create dynamic view from a named boundary) The detail scale stored on the named boundary. • Fit View to Drawing Boundary - The closest standard scale at which the saved view attachment will fit into the selected drawing boundary.

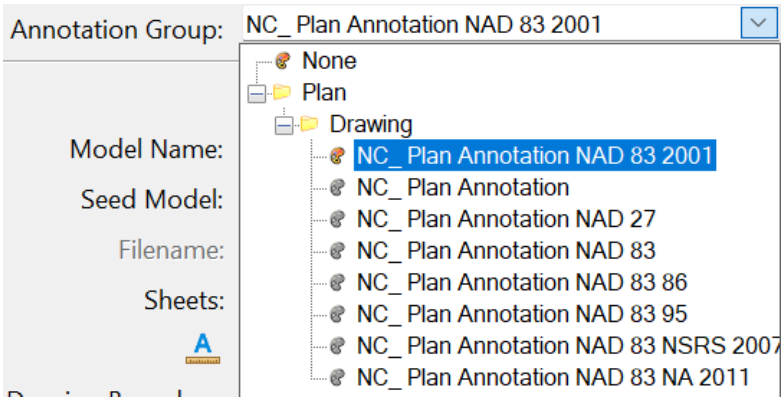
Setting	Description
	• Fit View to Sheet Boundary - The closest standard scale at which the saved view attachment will fit into the sheet boundary. • Custom - allows you to define a custom scale. **Note:** Only the scales that match the master units of the seed file are populated in this drop-down list.
Add to Sheet Index	Adds the sheet model to the sheet index. **Note:** If some other user already has the sheet index in edit mode, the sheet model cannot be added to the sheet index. In such case, a message is displayed in the message center.
Select a folder from Sheet Index	Opens the Sheet Index Folder Picker from which you can select the folder in which the sheet model should be added.
Make Sheet Coincident	(Available only if the sheet model does not contain a drawing boundary) If on, the reference in the sheet model is made coincident with the design model. For this, if required, the sheet boundary is moved and rotated to fit around the reference. If off, the reference is moved and rotated so that it is attached at the center of sheet boundary.
Open Model	If this check box is on, the last sheet model that was created opens.

A. The check box for **One Sheet per DGN** if checked a DGN file will be created for each sheet. The NCDOT standard is leave this unchecked.

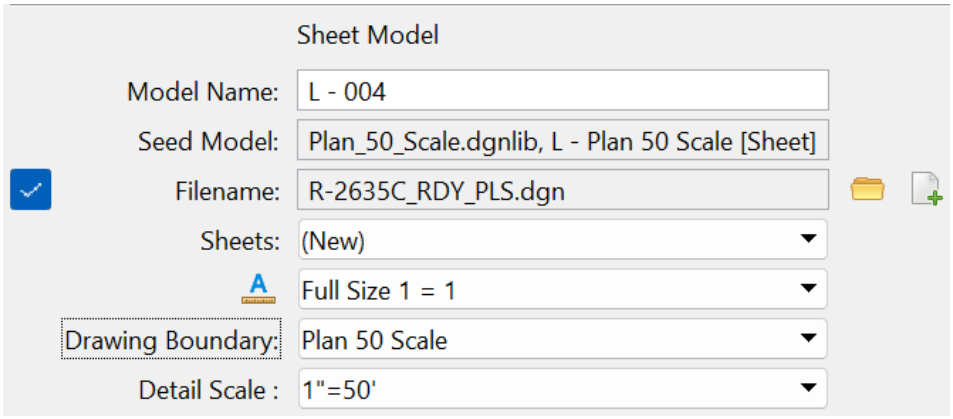
B. **Drawing Model** Options (where and how to annotate – north arrows and match lines - the drawings):



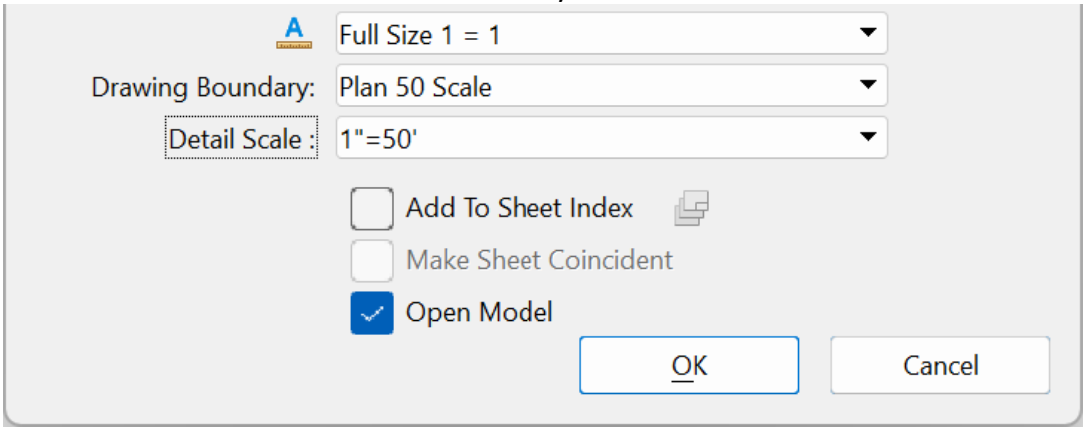
Filename (check to enable):
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PLD.dgn** (Plan Drawings)
Note the two (2) icons to the right of this field . The first folder icon is **Browse Drawing File** and the second icon with the "+" symbol is **Create New Drawing File**. *Browse Drawing File* will add drawings to the existing drawings already in the file. *Create New Drawing File* will create a new file to place the drawings in. If selecting *Create New Drawing File* and selecting an existing file, it will **DELETE** any the existing drawings in the file and make a fresh blank copy.
If **Create New Drawing File** is selected, a seed file from the WorkSpace can be used.
{WorkSpace}\Configuration\Organization-Civil\NCDOT\Seed**Seed2D - English Design.dgn**.
It is not necessary to choose a specific drawing seed since the software will place the Microstation Drawing Models in this file. The master Default Model (from the seed) is a Microstation Design Model.
In this exercise this is our first set of plan drawings, we can select **Create New Drawing File** and select the existing **PLD** file (blank) to put the drawings in. As you generate more drawings, you may select **Browse Drawing File** to add to it.
Annotation Group (North Arrow NAD and Match Lines):



C. **Sheet Model** Options (attaching the drawing to the sheet and scale it down to **Full Size 1 = 1**):



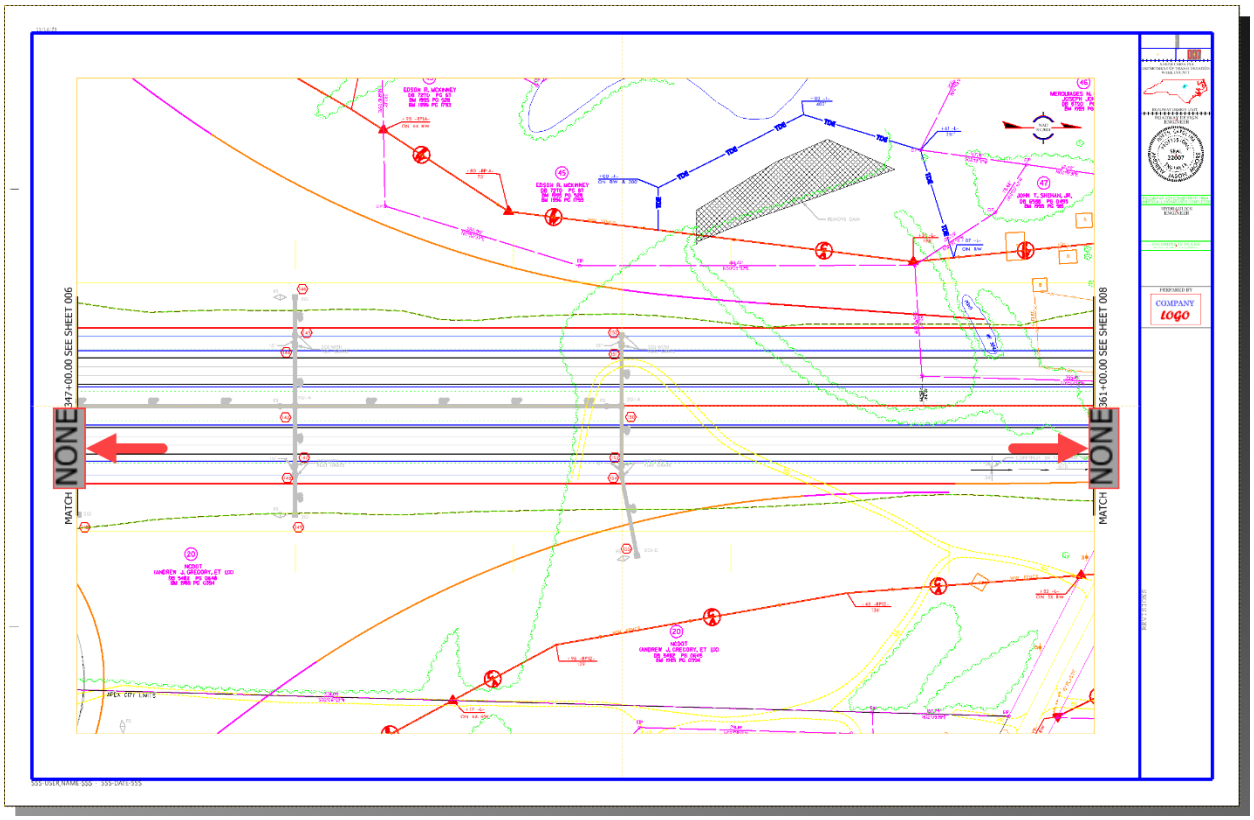
Filename (check to enable):
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PLS.dgn** (Plan Sheets)
Note the two (2) icons to the right of this field . The first folder icon is **Browse Sheet File** and the second icon with the "+" symbol is **Create New Sheet File**. *Browse Sheet File* will add sheets to the existing sheets already in the file. *Create New Sheet File* will create a new file to place the sheets in. If selecting *Create New Sheet File* and selecting an existing file, it will **DELETE** any the existing sheets in the file and make a fresh blank copy.
If **Create New Sheet File** is selected, a seed file from the WorkSpace can be used. {WorkSpace}\Configuration\Organization-Civil\NCDOT\Seed**Seed2D - English Design.dgn**.
It is not necessary to choose a specific sheet seed file since the software will place the Microstation Sheet Models in this file. The master Default Model (from the seed) is a Microstation Design Model.
In this exercise this is our first set of plan sheets, we can select **Create New Sheet File** and select the existing **PLS** file (blank) to put the sheets in. As you generate more sheets, you may select **Browse Sheet File** to add to it.
Note the **Annotation Scale** is always set to **Full Size 1 = 1** for all sheets.



Add To Sheet Index should remain *uncheck* at this point. We will go over **Sheet Indexing** later in this training.

Open Model should be *checked* on to display the last sheet when it has completed the process.

Now that we have created the Sheets let's look at where all the named boundaries are stored

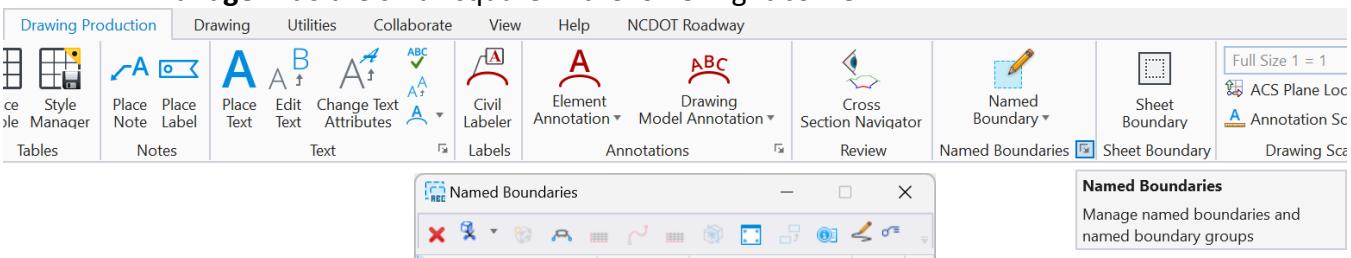


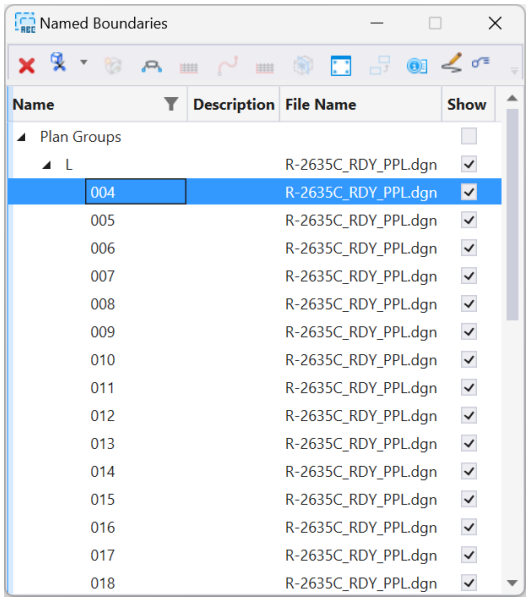
NOTE: the match line text is not filling in the alignment name -L- currently. Manually edit this text.

Named Boundary Manager

The **Named Boundary Manager** is where are the named boundaries placed in the PPL file and their groups are stored in. You may open the Named Boundary Manager and create drawings and sheets anytime after the Named boundaries have been placed in the PPL file.

A. Go back to the ***R-2635C_NCDOT_PPL.dgn*** file and Select the **Named Boundary Manager**. It's the small square in the lower right corner.



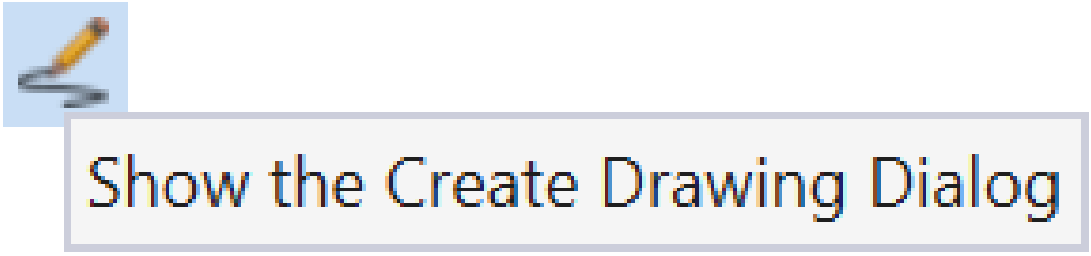


- Expand the **Plan Group** L and pick the named boundary **004**. Notice the icons that were greyed out now become active.
- This is where you can delete your Named Boundaries if you need to re-create them.
- Other options are shown below for Icons along the top, but you can also right click on the named boundary **004** to get same options.
- Another note is that the **Named boundaries** when selected has grips for editing. This helps when trying to show something just off the clipped area on top or bottom of the sheet.

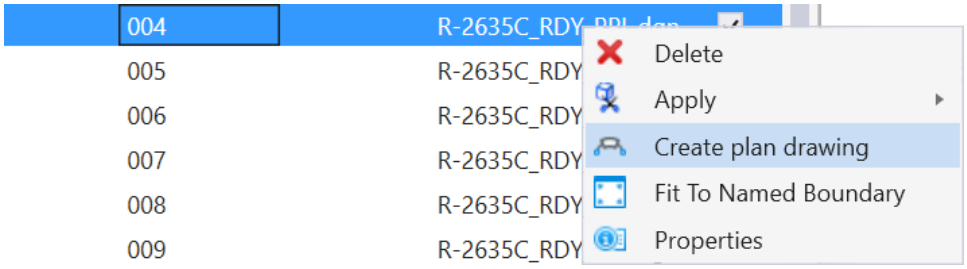
Setting	Description
Delete	 Deletes the selected named boundary or named boundary group. Also, if the named boundary is deleted, it's associated saved view is also deleted.
Apply	Enabled when you select a named boundary. Selecting the down arrow next to the Apply icon gives following options: • As Clip Volume - Applies the selected named boundary as a clip volume. • As Fence - Applies the selected named boundary as a fence. As Clip Mask - Applies the selected named boundary as a clip mask.
Create Drawing	 • Opens the Create Drawing dialog in which you can create saved view from the selected named boundary and automate dynamic views.
Create Plan Drawing	 Enabled when you select a plan named boundary or plan named boundary group.
Create Profile Drawing	 Enabled when you select a profile named boundary or profile named boundary group.
Create Cross Section Drawing	 Enabled when you select a cross section named boundary or cross section named boundary group.
Fit to Named Boundary	 Adjusts the magnification such that the selected named boundary is fit in the view.
Copy Named Boundary	 Enabled when you select a plan named boundary. Starts the Copy Named

Setting	Description
	Boundary tool to create a copy of the selected named boundary. You can change the default name of the named boundary in the Name field of the Copy Named Boundary tool settings window.
Properties	 Opens the Properties dialog and displays the properties of the selected named boundary or named boundary group. For detailed information refer to Properties Dialog in MicroStation help.
Show Create Drawing dialog	 Opens the Create Drawing dialog in which you can create saved view from the selected named boundary and automate dynamic views.
Annotate Plan Drawing Models	 Adds annotation to selected element.
Named Boundaries list box	The named boundaries list box displays the following columns: • Name - Name of the named boundary or named boundary group. • Description - Description of the named boundary or named boundary group. • File Name - Sets the name of the named boundary or named boundary group you want to create. Show - Check box to turn on or off the display of the named boundary or named boundary

A. To create the drawings and sheets, at any point after the Named Boundaries are stored in the Named Boundary Manager, simply enable Show the **Create Drawing Dialog** (highlighted in light blue when enabled) and right mouse click on either the **Named Boundary Gr**oup (to create drawing and sheets for the entire group) or just the **individual Named Boundary or Boundaries** you wish to create.



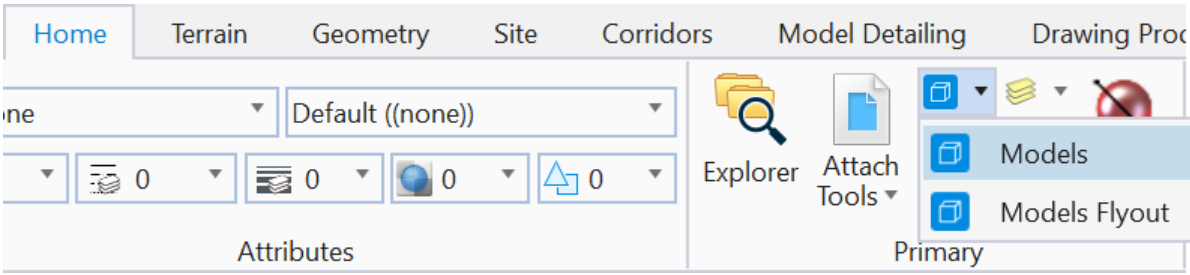
B. Select **Create plan drawing**. This will take you to the **Create Drawing** dialog box in the previous exercise.



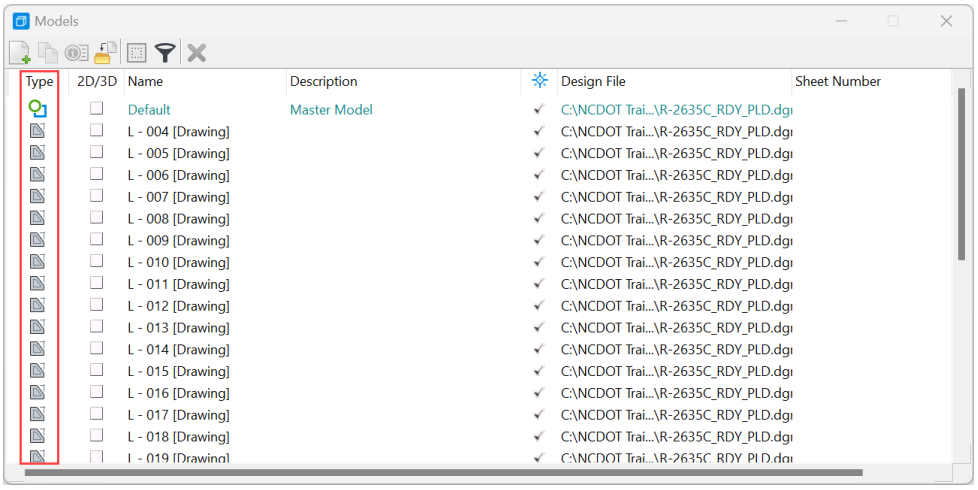
Reviewing the Drawings

A. Go back to the ***R-2635C_RDY_PLD.dgn*** *file* in the **Roadway\Sheets** folder.

B. Click on the **Models** tool button.

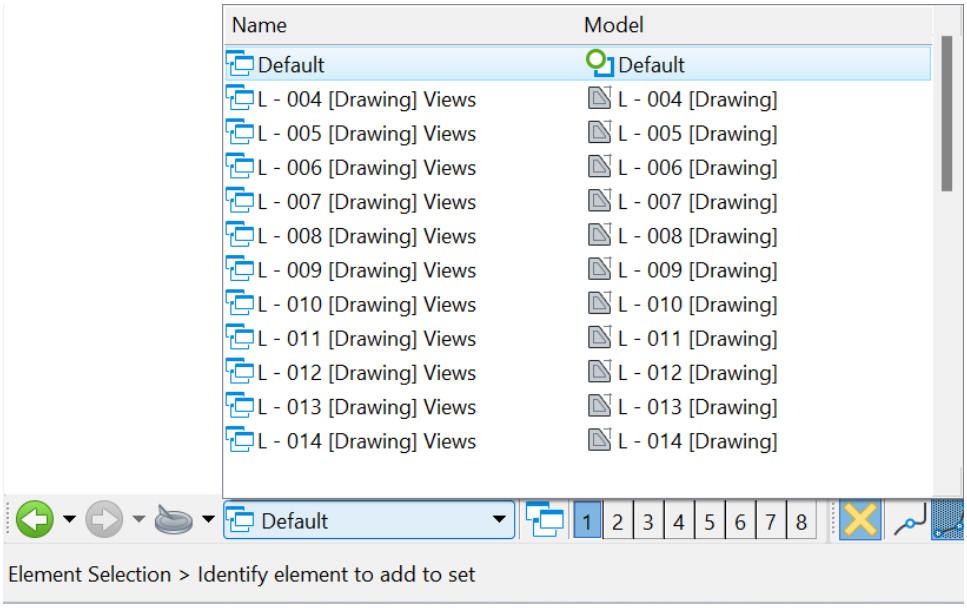


C. Note the Microstation Drawing Model **Type** in this file.

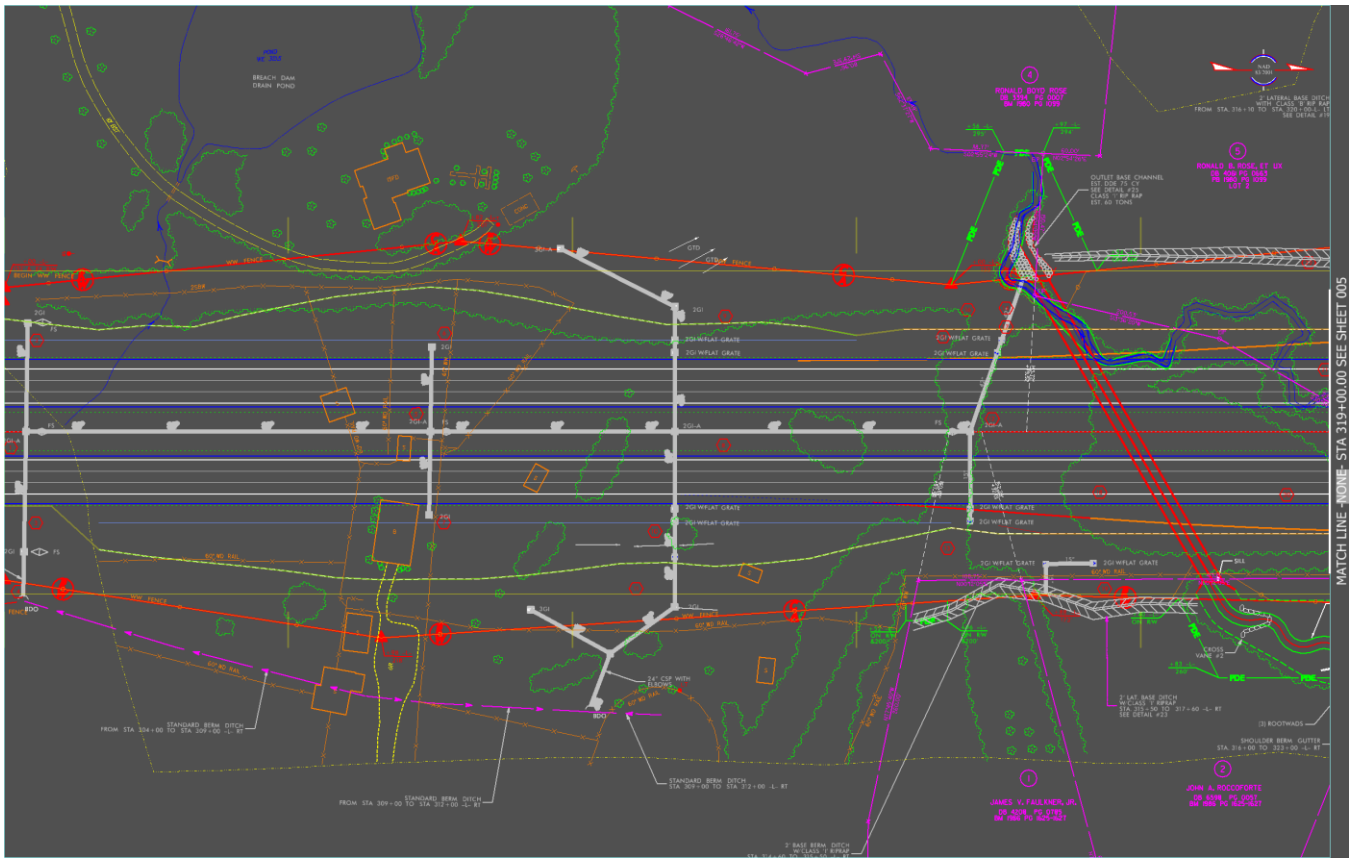


D. double click on any of these Microstation Drawing Models to take you to to that plan drawing. You can also right click on these to get more options.

E. You can also access the Microstation Drawing Models from the **View Group** pull down at the bottom left corner of the screen.



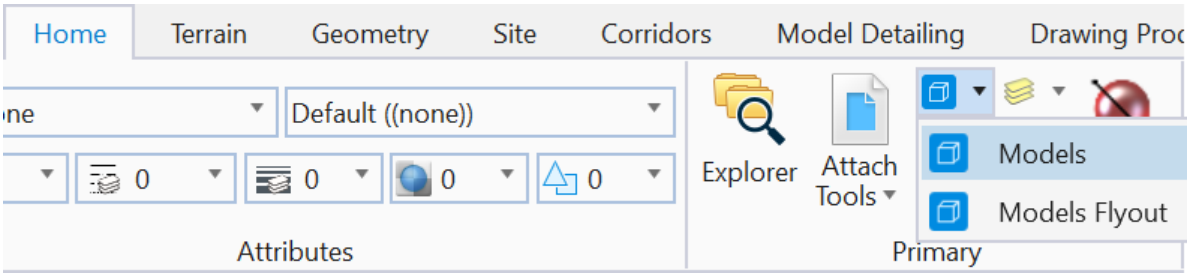
Note in each Microstation Drawing Model, the addition of the **North Arrows** in the upper right corner and **Match Lines** (and Match Line Text) as part of the annotation group selected earlier. The north arrow cell can be moved and reposition anywhere in the drawing.



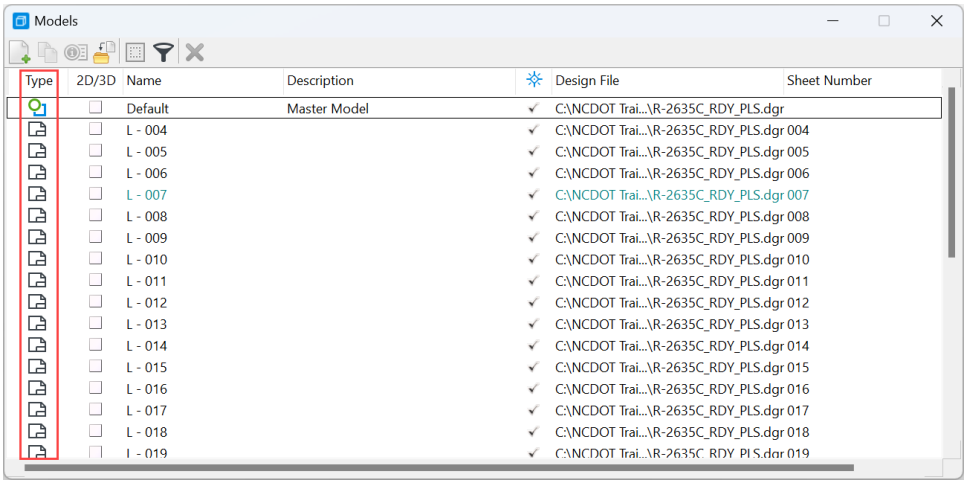
Reviewing the Sheets

A. Go back to the ***R-2635C_RDY_PLS.dgn*** *file* in the **Roadway\Sheets** folder.

B. Click on the **Models** tool button.

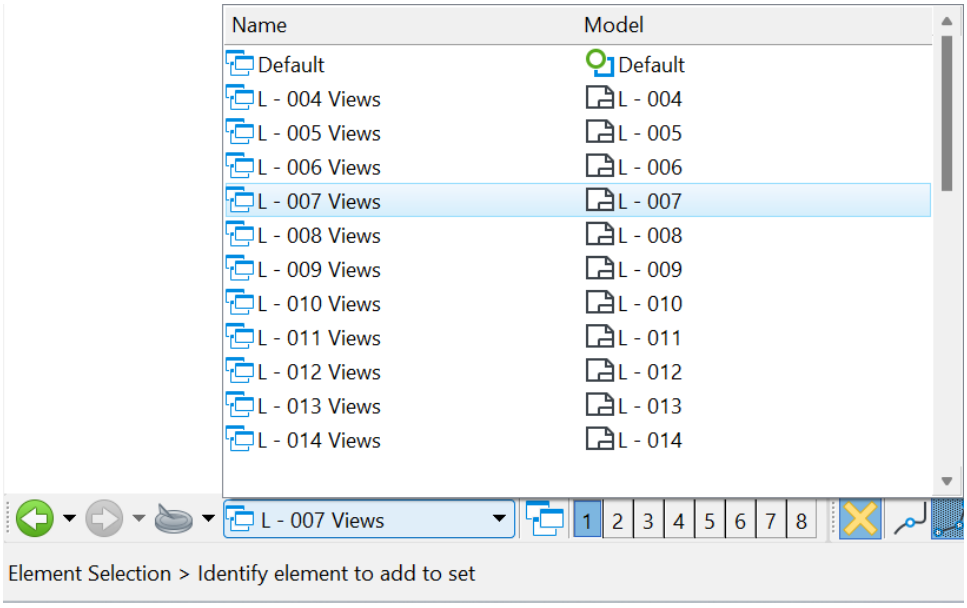


C. Note the Microstation Sheet Model **Type** in this file.

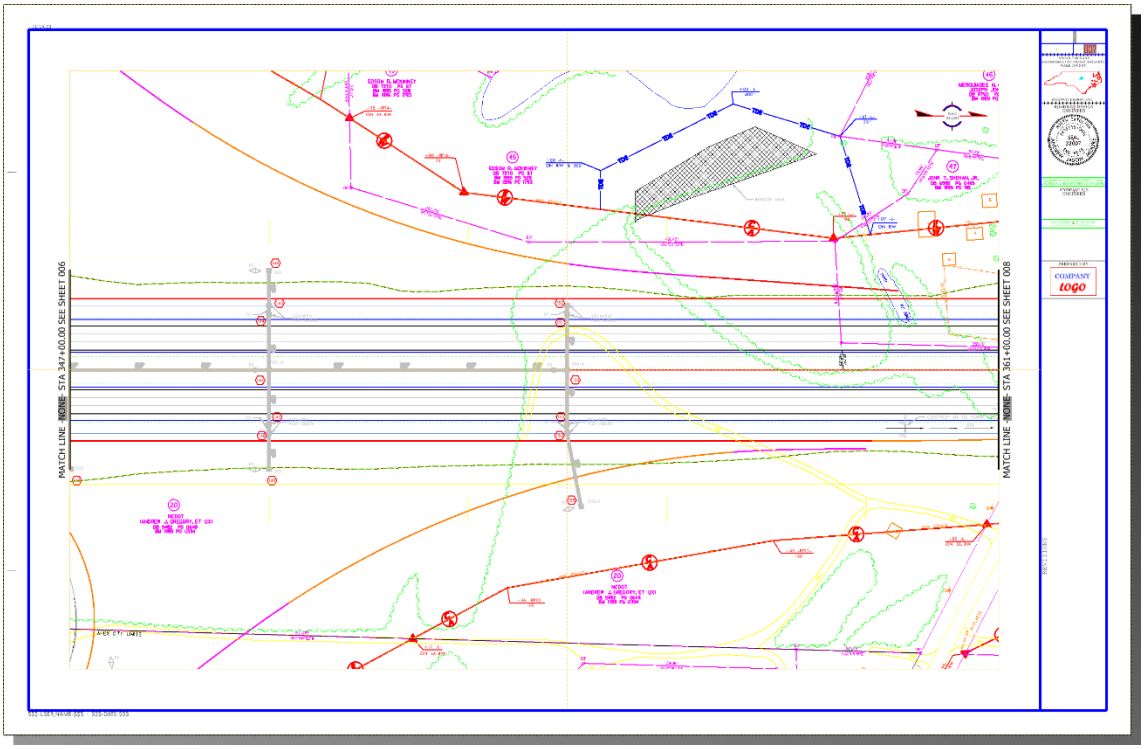


D. Double click on any of these Microstation Sheet Models to take you to that plan sheet. You can also right click on these to get more options.

E. You can also access the Microstation Sheet Models from the **View Group** pull down at the bottom left corner of the screen.



Note in each Microstation Sheet Model, the drawings and the NCDOT Unit **TBB** file are referenced in. Additionally, the **Project STIP Number** and **sheet number** fields are also filled in.

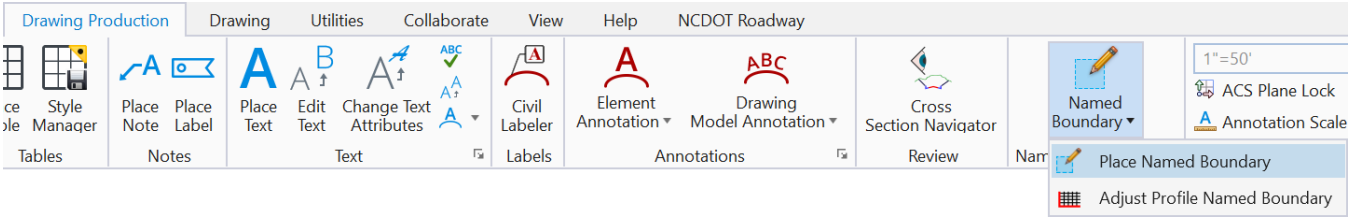


Exercise 3 – Named Boundaries for Interchange Sheets

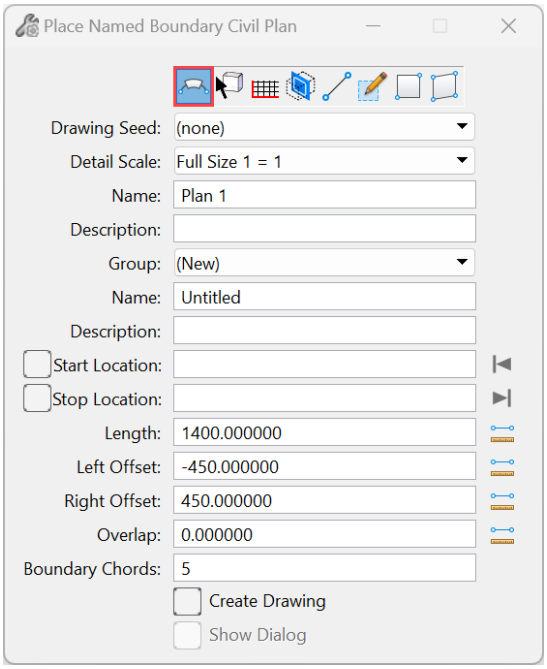
This exercise focuses on creating the Named Boundaries for the interchange sheets first. Then create the surrounding Named Boundaries. Careful upfront planning should be exercised.

A. Open the **R-2635C_NCDOT_PPL_INTERCHANGE.dgn** file in the **WorkSet** folder.

B. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.

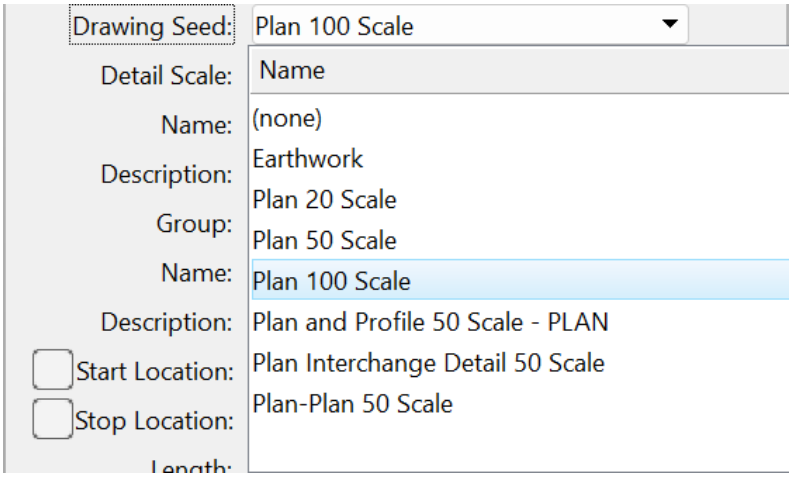


C. Choose the **Civil Plan** tool to change the data fields in the dialog box to reflect the data needed for plan sheet layout.



D. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

E. Select the **100 Scale Plan** *Drawing Seed*.
Note: The **Drawing Seed** defines default values and other parameters required to create sheets. For an interchange layout, you may place it on a **100 Scale 22"X34"** (ANSI D) paper or on a **50 Scale Interchange Detail Sheet 34"x62"** paper. The **Drawing Seeds** for *Civil Plan* mode are:



Note the **Detail Scale** automatically changes to **1" = 100'** and the **Length** and **Offset** of the sheet boundary and **Boundary Chords** change to accommodate the 1" = 100' scale.

F. Set the first **Name** field to be **006** since we have estimated sheet 4 and sheet 5 will come before our first interchange sheet.

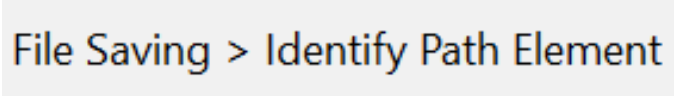
G. Key-in **100 Scale Interchange Sheet** as the **Description**.

H. Set the *Group* to **New** to create a new named boundary group. Once named boundaries have been created for alignments, the names of the boundary groups appear here to be chosen later if necessary.

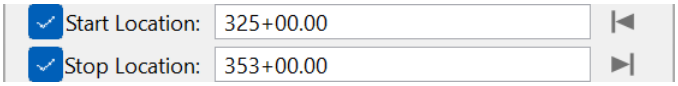
I. Set the second *Name* field to be **L** to coincide with the alignment name. This second name is the name of the **Group** of named boundaries used along the **L** alignment. This field may also be automatically set when a horizontal alignment is selected.

J. A **Description** can be entered but the Name alone is typically sufficient.

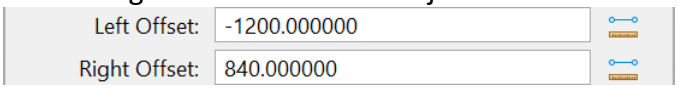
K. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the mainline **L alignment** on screen**.**



L. Key-in the **Start (325+00)** and **Stop** (**353+00**) stations on mainline chain **-L-** of the interchange sheet. This is usually **2800'** stations in lengths for a typical interchange (twice the 1400' length of a regular 50 Scale sheet). Hitting **Enter** after the station key-in will lock the value indicated by the check mark on the left.

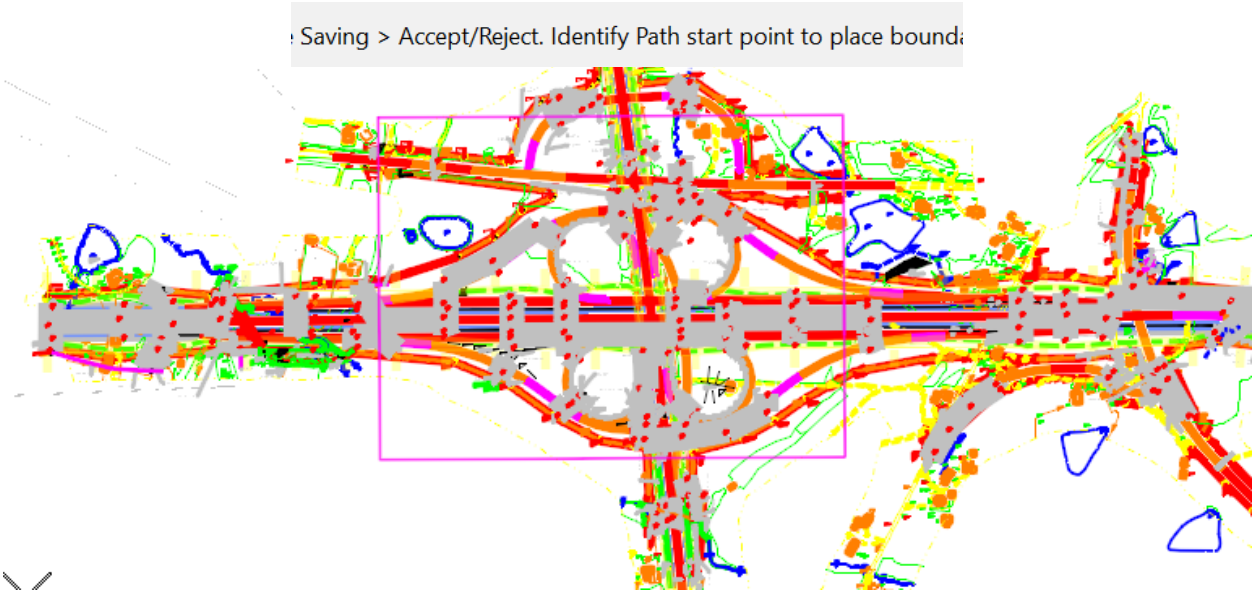


M. By default, it will split the left and right offsets at an even **1030'** on each side (100 Scale). In this layout we want to encompass more on top of the sheet so the left offset should be key-in as **-1220** and right offset should be adjusted to **840**.



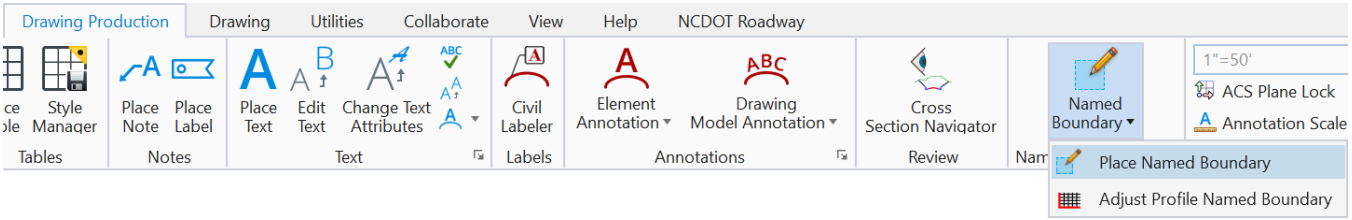
N. **Uncheck Create Drawing** and **Show Dialog** because we want to store just the named boundaries for now.

O. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown. **Data Point** three (3) times to complete the placement and dialog box should disappear.

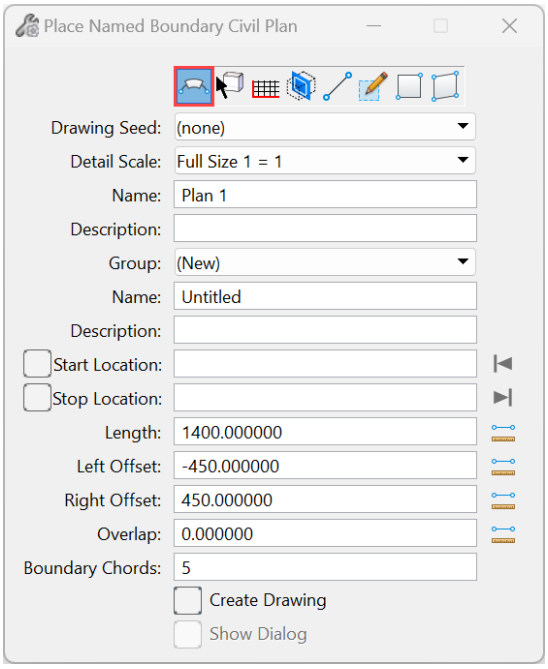


Q. Locate the next interchange on **sheet 15** near the middle of the project.

R. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.

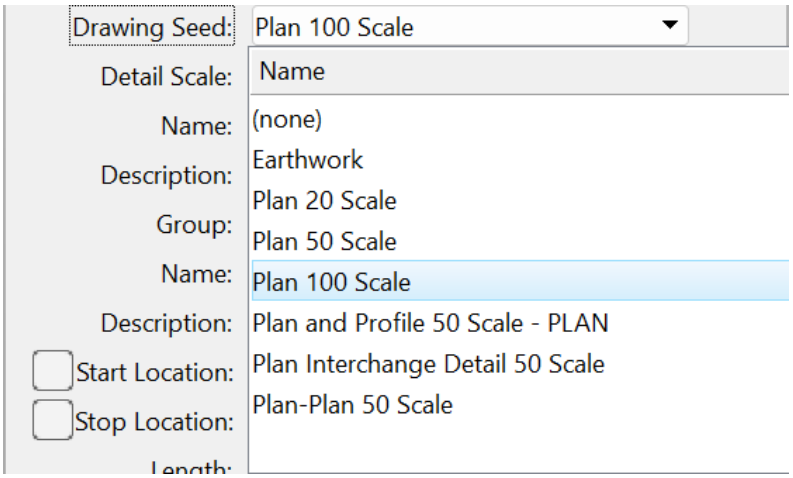


S. Choose the **Civil Plan** tool to change the data fields in the dialog box to reflect the data needed for plan sheet layout.



T. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

U. Select the **Plan 100 Scale** *Drawing Seed*.
Note: The **Drawing Seed** defines default values and other parameters required to create sheets. For an interchange layout, you may place it on a **100 Scale 22"X34"** (ANSI D) paper or on a **50 Scale Interchange Detail Sheet 34"x62"** paper. The **Drawing Seeds** for *Civil Plan* mode are:



Note the **Detail Scale** automatically changes to **1" = 100'** and the **Length** and **Offset** of the sheet boundary and **Boundary Chords** change to accommodate the 1" = 100' scale.

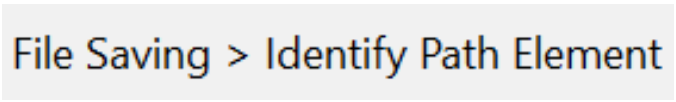
V. Set the first Name field to be **015** since we have estimated sheet 7 thru 14 will come before this interchange sheet.

W. Key-in **100 Scale Interchange Sheet** as the **Description**.

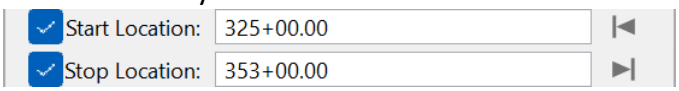
X. Set the *Group* to **L** to add to the **006** named boundary created in this group.

Y. A **Description** can be entered but the Name alone is typically sufficient.

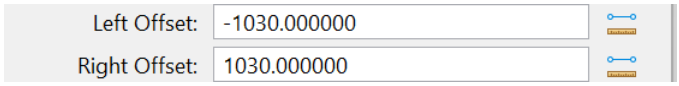
Z. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the mainline **L alignment** on screen**.**



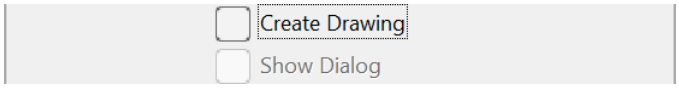
AA. Key-in the **Start (465+00)** and **Stop** (**493+00**) stations on mainline chain **-L-** of the interchange sheet. This is usually **2800'** stations in lengths for a typical interchange (twice the 1400' length of a regular 50 Scale sheet). Hitting **Enter** after the station key-in will lock the value indicated by the check mark on the left.



BB. By default, it will split the left and right offsets at an even **1030'** on each side (100 Scale). These values may need to be re-entered if it holds the same values from the previous steps.

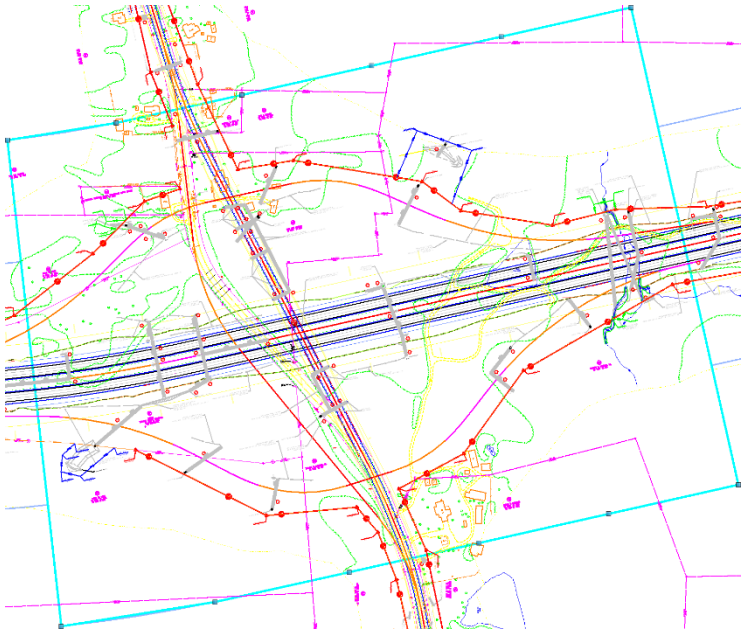


CC. **Uncheck Create Drawing** and **Show Dialog** because we want to store just the named boundaries for now.



DD. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown. **Data Point** three (3) times to complete the placement and dialog box should disappear.

For the purpose of this exercise, we are done with the two (2) interchange sheets. The next exercise will be creaating the surrounding sheets.

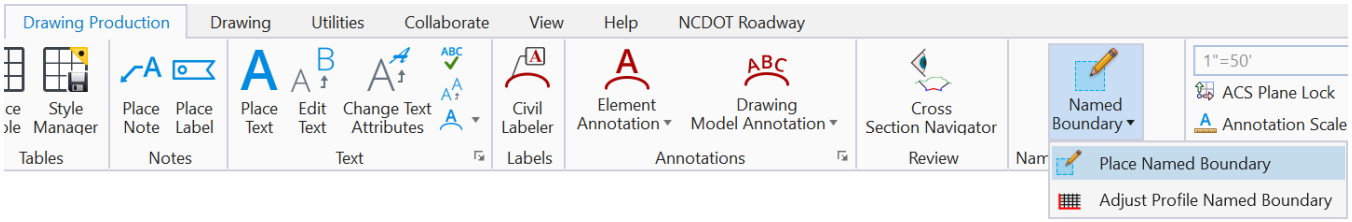


Exercise 4 – Named Boundaries Surrounding Interchange Sheets

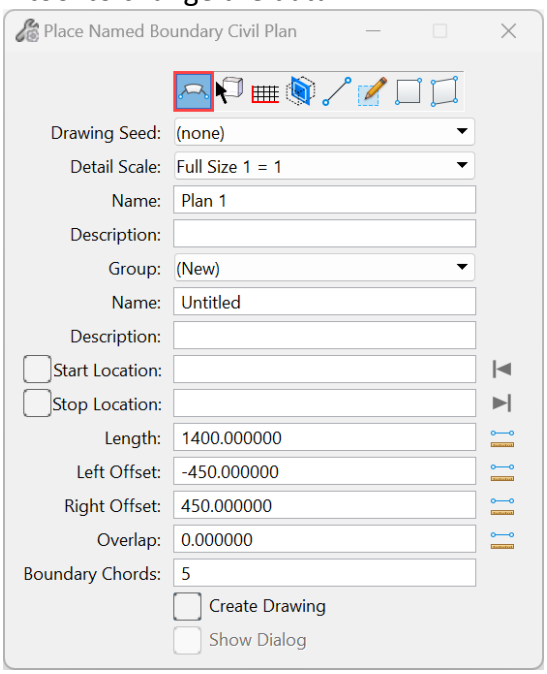
This exercise focuses on creating the Named Boundaries surrounding the interchange sheets after they have been created. Careful upfront planning should be exercised.

A. Open the **R-2635C_NCDOT_PPL_INTERCHANGE.dgn** file in the **WorkSet** folder.

B. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.



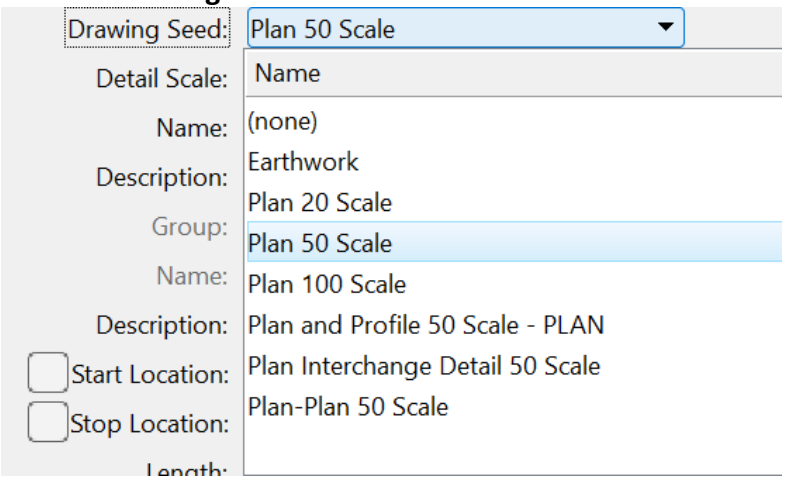
C. Choose the **Civil Plan** tool to change the data.



D. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

E. Select the **50 Scale Plan** *Drawing Seed*.

Note: The **Drawing Seed** defines default values and other parameters required to create sheets. The **Drawing Seeds** for *Civil Plan* mode are:



Note the **Detail Scale** automatically changes to **1" = 50'** and the **Length** and **Offset** of the sheet boundary and **Boundary Chords** change to accommodate the 1" = 50' scale.

F. Set the first Name field to be **004** since NCDOT begins their plan sheets at sheet 4. The first Name field defines the **root name** of each of the named boundaries. Using the name **Plan 004** begins the incremental numbering with the first named boundary.

Name Specified in Dialog	**004**
First Named Boundary	004
Second Named Boundary	005
Third Named Boundary	006

G. A **Description** can be entered but the Name alone is typically sufficient.

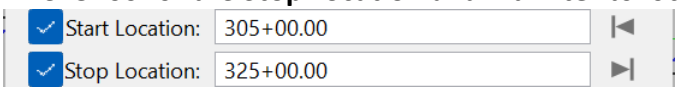
H. Set the Group to **L** to add to the **006** and **015** named boundaries created in this group.

I. Set the second *Name* field to be **L** to coincide with the alignment name. This second name is the name of the **Group** of named boundaries used along the **L** alignment. This field may also be automatically set when a horizontal alignment is selected.

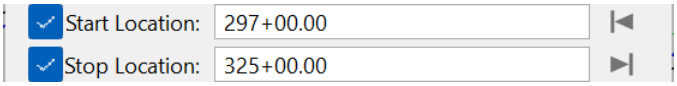
J. A **Description** can be entered but the Name alone is typically sufficient.

K. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the mainline **L alignment** on screen**.**

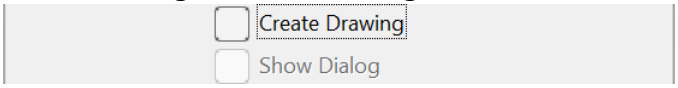
L. Select the **left arrow** to lock it to the beginning of the horizontal alignment. We know the sheet **006** (interchange) begins on station **325+00** so this will be **Stop Location** for sheet **005**. Key-in **325+00** for the **Stop Location** and hit **Enter** to lock it.



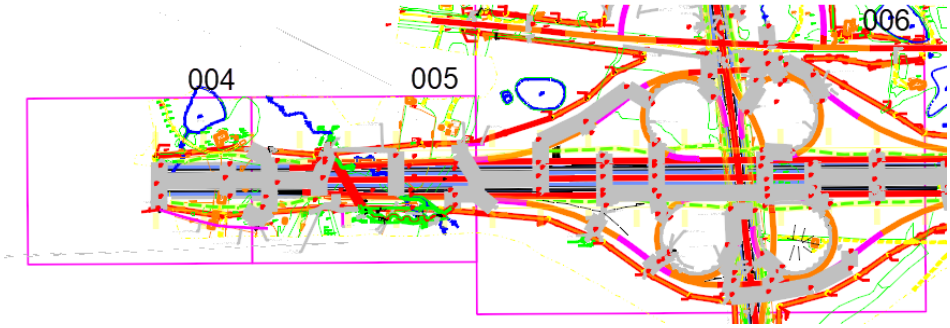
M. The two sheets (**004** and **005**) can accommodate up to 2800' stations in length. Therefore, we can adjust the beginning of sheet **004** to have more room by keying-in **297+00** (305+00 – 800) as the **Start Location**. This results in evenly distributing 1400' stations of length between the two (2) sheets.



N. Uncheck the **Create Drawing and Show Dialog** box.

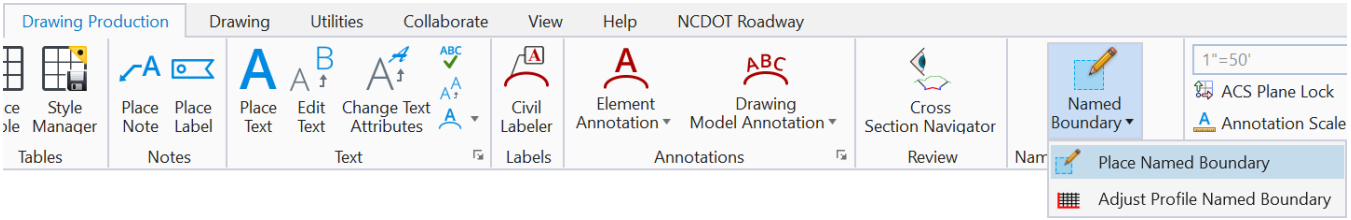


O. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown.



P. Continue to sheet **007** after sheet **006** (interchange).

Q. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.



R. Choose the **Civil Plan** tool to change the data

P. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

Q. Select the **50 Scale Plan** *Drawing Seed*.

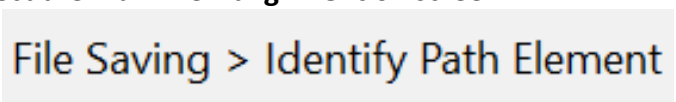
R. Set the **Name** field to **007.**

S. A **Description** can be entered but the Name alone is typically sufficient.

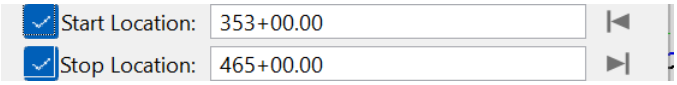
T. Set the Group to **L**.

U. A **Description** can be entered but the Name alone is typically sufficient.

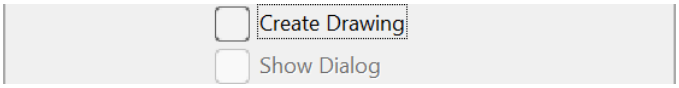
V. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the mainline **L alignment** on screen**.**



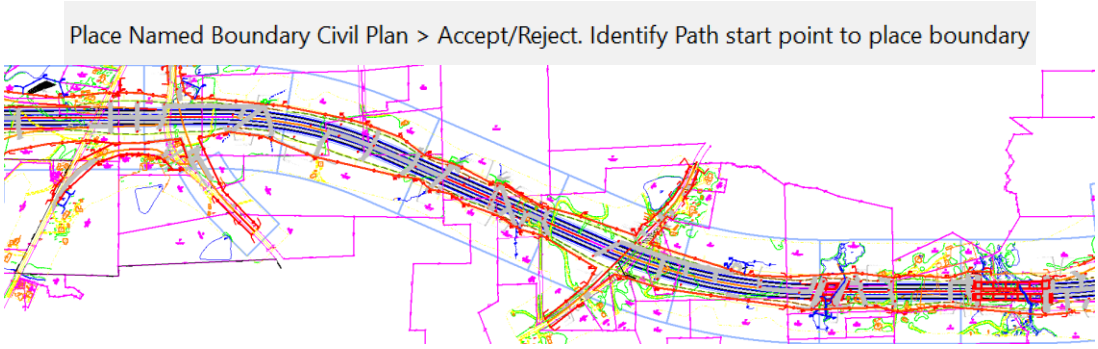
W. Key-in **353+00** for **Start location** and **465+00** as the **Stop Location** and hit **Enter**.



X. Uncheck the **Create Drawing and Show Dialog** box.

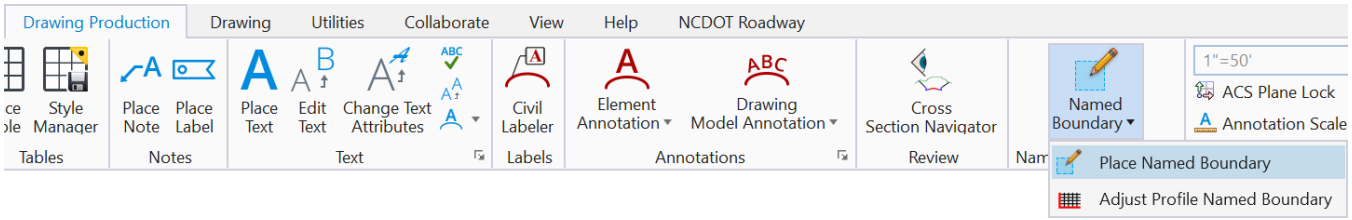


Y. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown.



AA. Continue to sheet **016** after sheet **015** (interchange).

BB. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.



CC. Choose the **Civil Plan** tool to change the data

DD. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

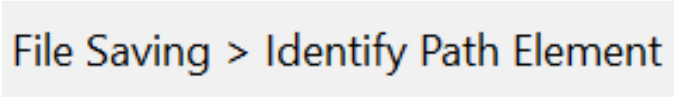
EE. Select the **50 Scale Plan** *Drawing Seed*.

FF. Set the **Name** field to **016**

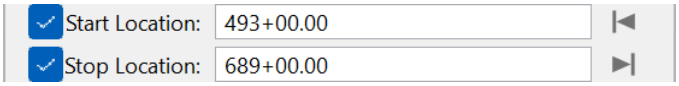
GG. Set the Group to **L**.

HH. A D**escription** can be entered but the Name alone is typically sufficient.

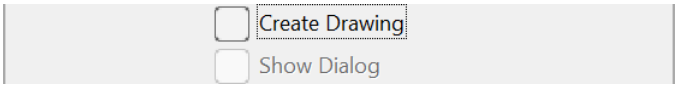
II. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **mainline L alignment** on screen.



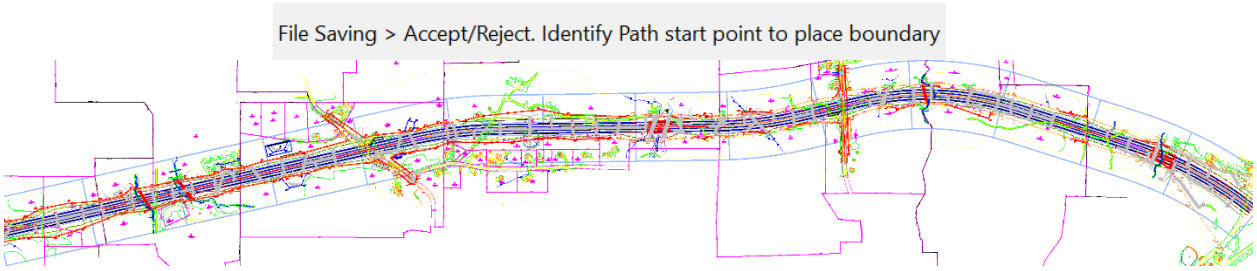
JJ. Key-in **493+00** (Sheet 016) for **Start Location** and **689+00** (Sheet 029) as the **Stop Location** and hit **Enter.**



KK. Uncheck the Create Drawing and Show Dialog box.

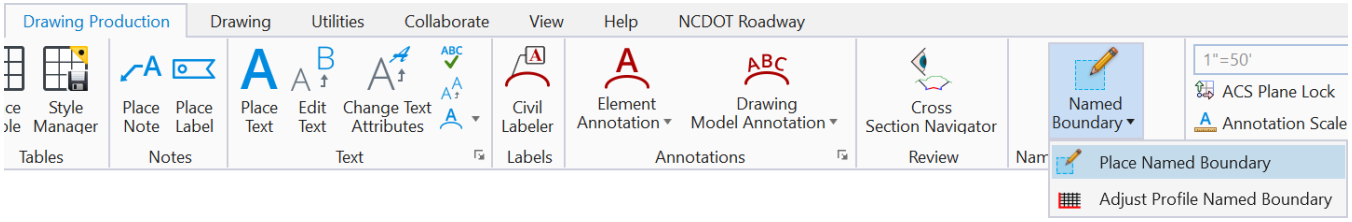


MM. Follow the prompt and **Data Point** in the **2D** View to accept placement of the boundaries as shown.



OO. Continue to sheet **030** top of the first interchange sheet **006**.

PP. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.



QQ. Choose the **Civil Plan** tool to change the data

RR. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

SS. Select the **50 Scale Plan** *Drawing Seed*.

TT. Set the **Name** field to **016**

UU. Set the Group to (**New)**.

VV. Set the second **Name** field to be **Y8** to coincide with the alignment name. This second name is the name of the Group of named boundaries used along the **Y8** alignment. This field may also be automatically set when a horizontal alignment is selected.

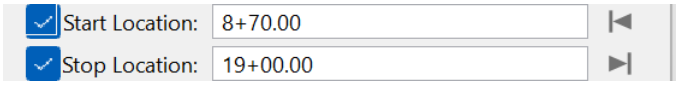
WW. A **Description** can be entered but the Name alone is typically sufficient.

XX. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **Y8** alignment on screen.

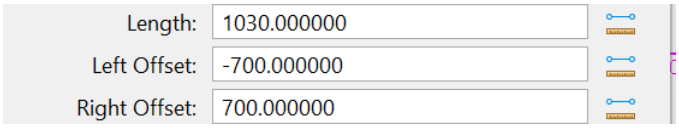
YY. Deviation from Normal Layout

Normally it is customary to use the horizontal alignment lengthwise (1400’ at 50 Scale) to layout the named boundaries. In this situation, we will need to use the sheet “width-wise” to accommodate the two-way loops\ramps.

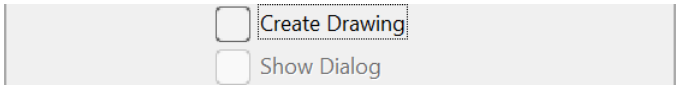
Key-in **8+70** for **Start Location** and **19+00** as the **Stop Location** and hit **Enter.**



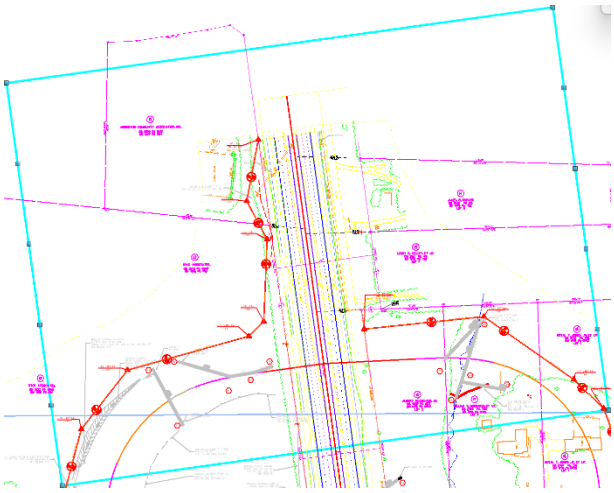
ZZ. Key-in **1030** as the **Length**, **-700** as the **Left Offset**, **700** as the **Right Offset**.



AAA. Uncheck the **Create Drawing** and **Show Dialog** box.



BBB. Follow the prompt and **Data Point** in the **2D** View to accept placement of the boundaries as shown.



CCC. Continue to sheet **031** bottom of the first interchange sheet **006**.

DDD. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.

EEE. Choose the **Civil Plan** tool to change the data Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

FFF. Select the **50 Scale Plan** Drawing Seed.

GGG. Set the **Name** field to **031**.

HHH. Set the **Group** to **Y8.**

III. Set the second **Name** field to be **Y8** to coincide with the alignment name. This second name is the name of the Group of named boundaries used along the **Y8** alignment. This field may also be automatically set when a horizontal alignment is selected.

JJJ. A **Description** can be entered but the Name alone is typically sufficient.

KKK. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **Y8** alignment on screen.

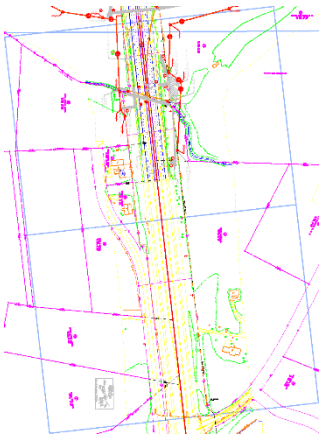
I'm going to assume you know how to do all of these steps now, and I'll just show the end result of these exercises. If you're still not sure on the steps, refer to previous examples.
– A tired intern

LLL. Key-in **38+15** for Start Location and **52+14** as the **Stop Location** and hit **Enter**. Note that depending on the sensitivity, when keying-in the full 1400' station (52+15) to a sheet, it sometime wants to create two (2) named boundaries, instead of one.

MMM. Reset and take the default **Length**, **Left Offset** and **Right Offset**.

NNN. Uncheck the **Create Drawing** and **Show Dialog** box.

OOO. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown.



PPP. Continue to sheet **032** on **-Y11-** next crossing grade separation. This part of the exercise we will be placing a new type of sheet, **Plan (Top)-Plan (Bottom).** It's similar to the dual-profile sheet.

QQQ. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.

RRR. Choose the **Civil Plan** tool to change the data Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

SSS. Select the **50 Scale Plan-Plan** Drawing Seed.

TTT. Set the **Name** field to **032T**. ”T” is the top part of the sheet. (set it to 033T if the previous steps made 2 named boundaries)

UUU. Set the **Group** to **(New).**

VVV. Set the second **Name** field to be **Y11** to coincide with the alignment name. This second name is the name of the Group of named boundaries used along the **Y11** alignment. This field may also be automatically set when a horizontal alignment is selected.

WWW. A **Description** can be entered but the Name alone is typically sufficient.

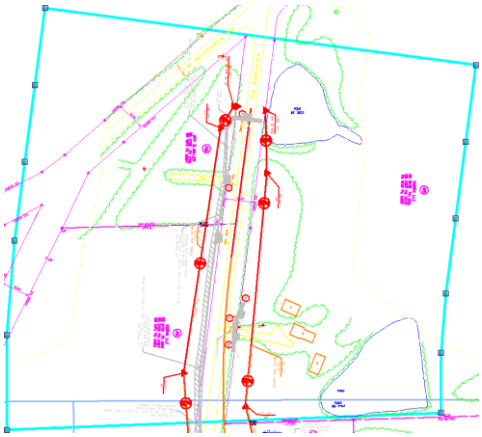
XXX. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **Y11** alignment on screen.

YYY. Key-in **8+50** for **Start Location** and **16+50** as the **Stop Location** and hit **Enter**.

ZZZ. Key-in **800** as the **Length** and accept the default values for **Left Offset** and **Right Offset**.

PPP. Uncheck the **Create Drawing** and **Show Dialog** box.

QQQ. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown.



RRR. Continue to sheet **032** on **-Y11-** next crossing grade separation. This part of the exercise we will be placing a new type of sheet, **Plan (Top)-Plan (Bottom).** It's similar to the dual-profile sheet.

SSS. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.

TTT. Choose the **Civil Plan** tool to change the data Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

UUU. Select the **50 Scale Plan-Plan** Drawing Seed.

VVV. Set the **Name** field to **032B**. "B" is the bottom part of the sheet. (or 033B)

WWW. Set the **Group** to **Y11.**

XXX. Set the second **Name** field to be **Y11** to coincide with the alignment name. This second name is the name of the Group of named boundaries used along the **Y11** alignment. This field may also be automatically set when a horizontal alignment is selected.

YYY. A **Description** can be entered but the Name alone is typically sufficient.

ZZZ. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **Y11** alignment on screen.

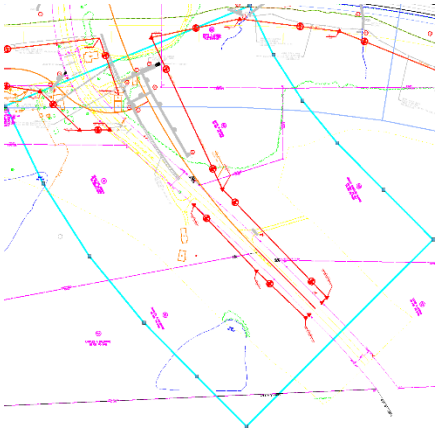
AAAA. Key-in **23+50** for **Start Location** and **35+49** as the **Stop Location** and hit **Enter**.

BBBB. Key-in **1200** as the **Length** and accept the default values for **Left Offset** and **Right Offset**.

CCCC. Uncheck the **Create Drawing** and **Show Dialog** box.

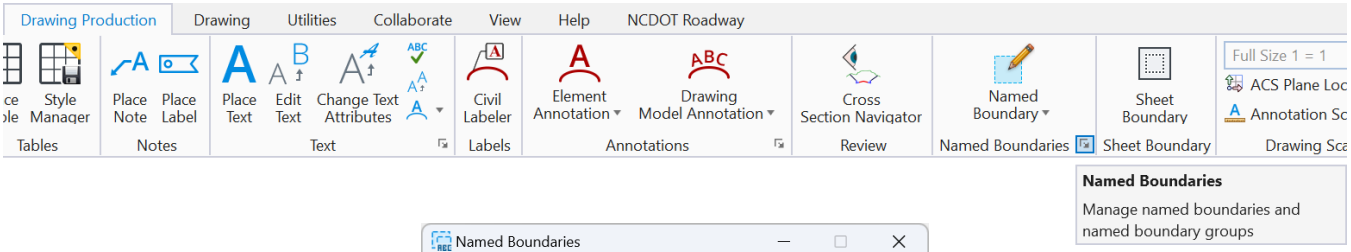
so close to cccp

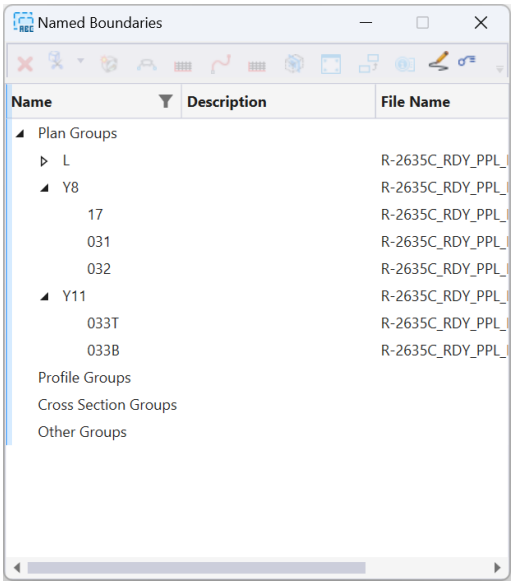
DDDD. Follow the prompt and **Data Point** in the **2D View** to accept placement of the boundaries as shown.



You may choose to complete the other intersections the same manner, but this part of the exercise is complete.

Once they are complete, use the **Named Boundary Manager** to inspect the named boundaries and their **Groups**.



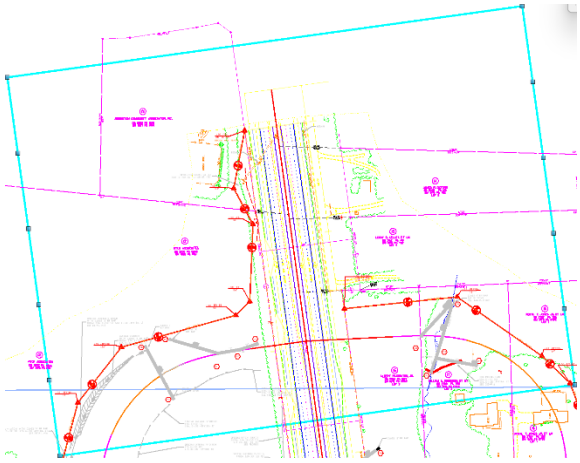


Next, we will focus in joining the overlapping named boundaries at their **Match Line** locations.

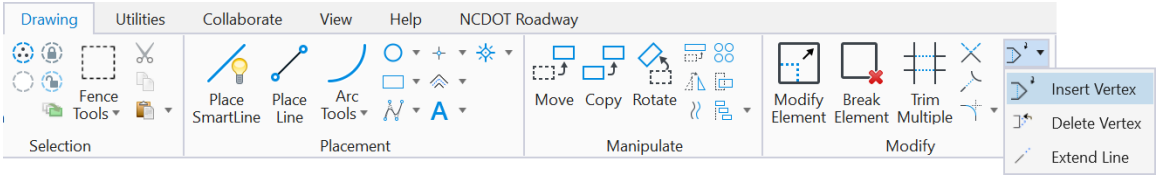
Exercise 5 – Crossing Road Match Lines

After placing the Named Boundaries on the surrounding sheets, the next step is to merge the two (2) Named Boundaries together, therefor eliminating any overlap. This is done with basic Microstation commands at the Match Line location.

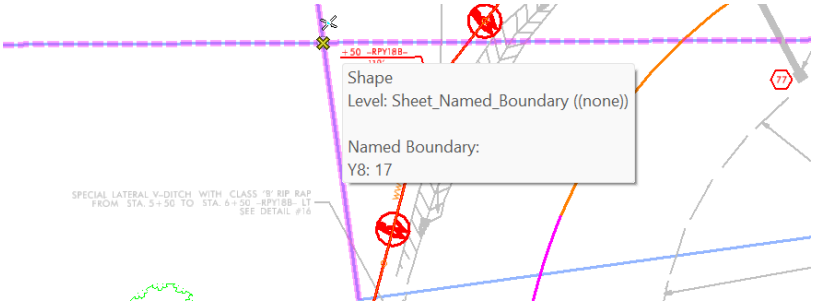
A. Locate the first interchange sheet **006** at the top where it overlaps with sheet **030.**



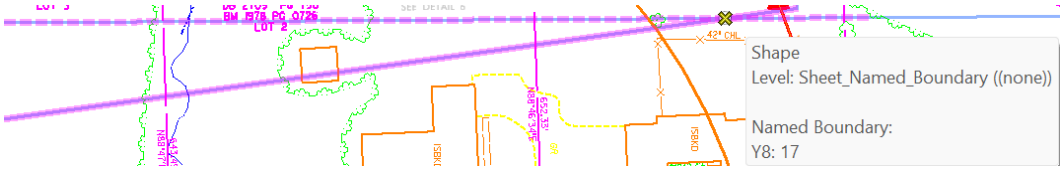
B. Under the *Drawing* Ribbon Tab, *Modify* Tool Group, select **Insert Vertex**.



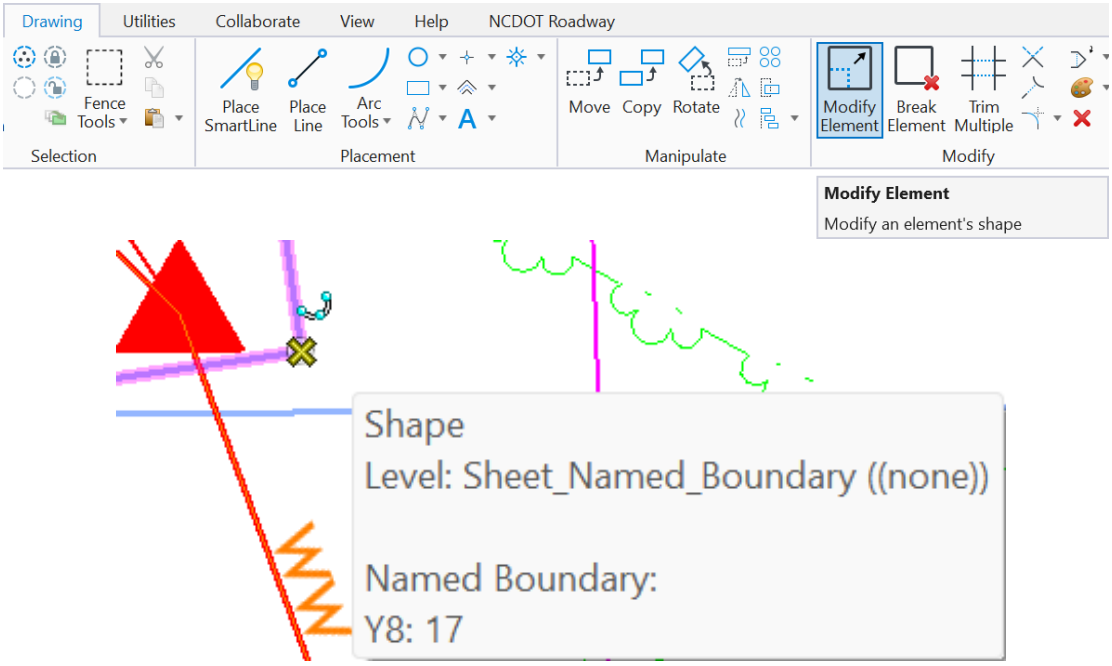
C. Select the top part of the **006** Named Boundary and **Insert Vertex** to where the two (2) named boundaries intersects on the left of **030**. Use **Intersection** snap mode.



D. Select the same top part of the **006** Named Boundary and **Insert Vertex** to the right where it intersects with **030**.

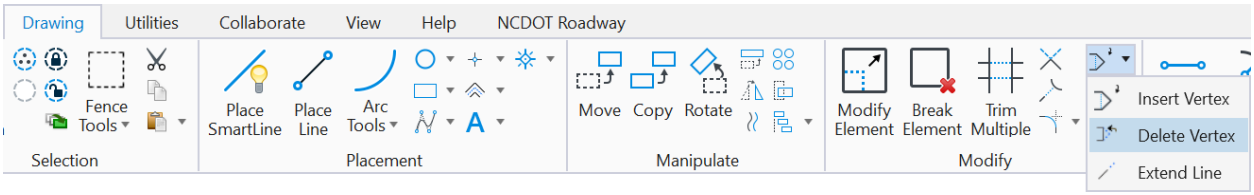


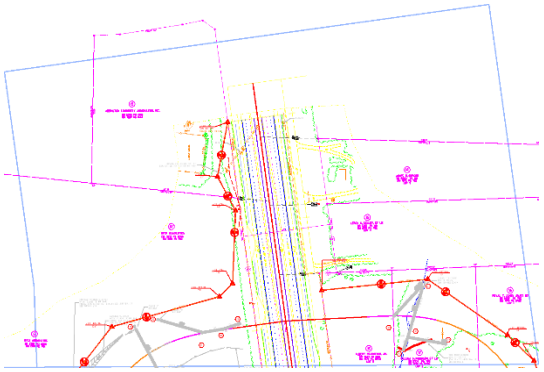
E. Select **Modify Element** and click on the adjacent point on the **006** Named to the left (inside) of the intersection point and place it on the bottom right corner of **030**.



F. Do the same (**Modify Element**) for the **left bottom corner** of **030**.

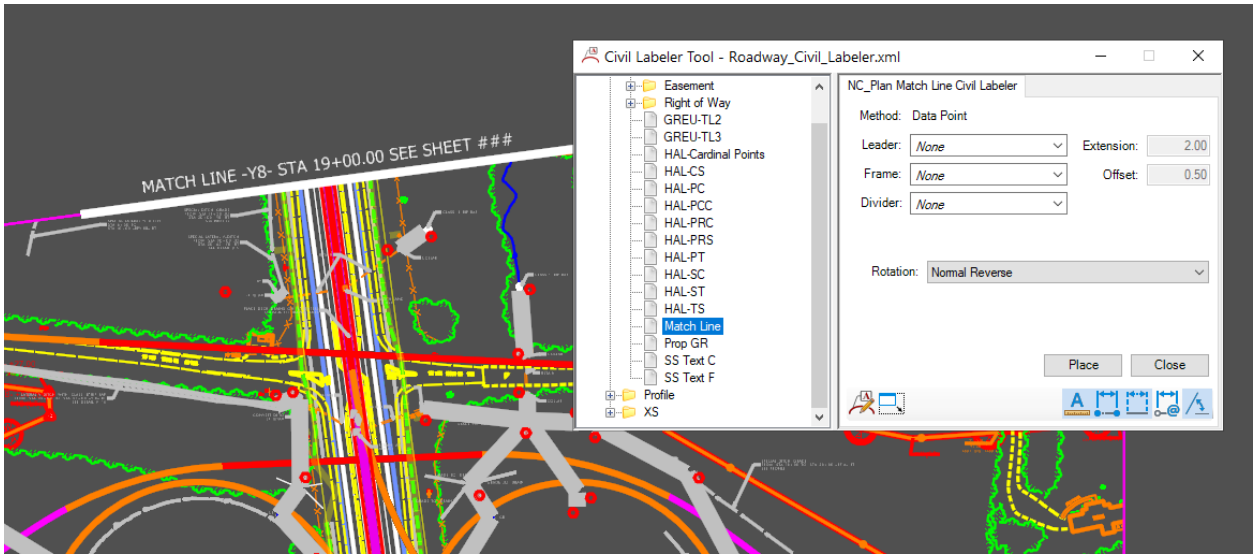
G. The remaining **vertices** inside **030**, use the **Delete Vertex** tool to remove them forming the two (2) merged named boundaries.





H. Follow the same procedure for the other overlapping named boundaries. Use the same set of **basic Microstation Tools**.

After the drawings and sheets have been created, use **Microstation** to draw the **Match Lines** and use the **Civil Labeler** to place the **Match line Texts**. Do these things in the Microstation Drawing Model.

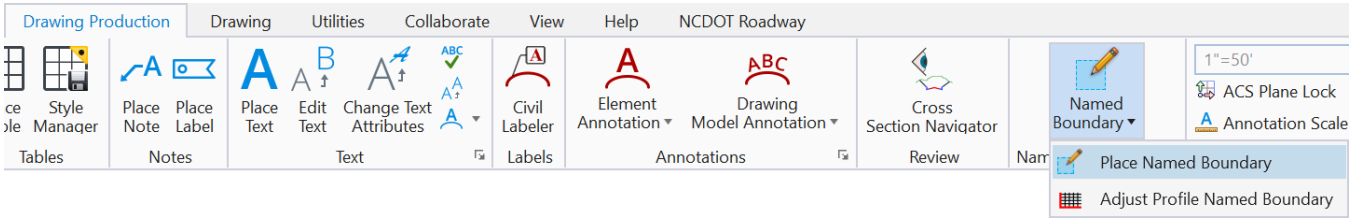

MATCH LINE -Y8- STA 19+00.00 SEE SHEET ###
Civil Labeler Tool - Roadway_Civil_Labeler.xml
Easement
Right of Way
GREU-TL2
GREU-TL3
HAL-Cardinal Points
HAL-CS
HAL-PC
HAL-PCC
HAL-PRC
HAL-PRS
HAL-PT
HAL-SC
HAL-ST
HAL-TS
Match Line
Prop GR
SS Text C
SS Text F
Profile
XS
NC_Plan Match Line Civil Labeler
Method: Data Point
Leader: None
Extension: 2.00
Frame: None
Offset: 0.50
Divider: None
Rotation: Normal Reverse
Place
Close

Exercise 6 - Profile Sheets

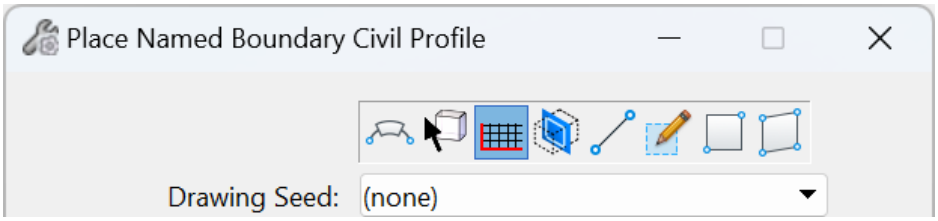
Now let's create the (base) Profile sheet boundary layout in the file ***R-2635C_NCDOT_PPL_INTERCHANGE.dgn (plan/profile layout) and*** write the profile sheets to this file ***R-2635C_NCDOT_PRS.dgn.*** (Note: Just like the plan sheets NCDOT is looking into creating a "PRD" file to put the drawings in and the "PRS" to put just sheets in).

1. Open the ***R-2635C_NCDOT_PPL.dgn*** in the **WorkSet** folder.
2. Have both the **Plan View** and **Profile View** opened. We will be working mostly in the Profile View.
3. **Place Named Boundary Civil Profile**
   A. Workflow
      1. In the **PPL** open the **Profile View** (required).
      2. Select the **Civil Profile** Mode and **Drawing Seed.**
      3. Set the station limits as desired.
      4. Modify other fields and toggles as needed.
      5. Enable the **Create Drawing** toggle.
      6. **Data Point** in the **Profile View** to place boundaries.

   A. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary Create** tool to access the Place Named Boundary dialog box.



   B. `Choose the **Civil Profile** Mode to change the data fields in the dialog box to reflect the data needed for profile sheet layout.



Below are the descriptions of the data fields for creating profile drawings and sheets:

Setting	Description

Setting	Description
Drawing Seed	Specifies the drawing seed that sets default values for all of the values on the dialog except the start and stop locations. Also contains definitions for what seed files are used to create the cross sections drawing and seed models including how the drawings are positioned on the sheets.
Detail Scale	Sets the scale at which the named boundary will be placed.
Name	Enter name of the named boundary.
Description	Enter brief description for the new group.
Group	Selects the named boundary group. You can also create a new group by selecting New from the drop-down.
Method	• Station Limits • From Plan Group The limits of the profile boundaries will match the plan boundaries in the specified Plan Group.
Plan Group	Available if From Plan Group is selected as the method.
Group	Selects the named boundary group. You can also create a new group by selecting New from the drop-down.
Name	Enter name of the new group.
Description	Enter brief description for the new group.
Vertical Exaggeration	Specifies the vertical exaggeration for displayed profile. Values greater than 1.0 for this parameter increase the exaggeration.
Available Profile Height	The depth of view in model units (unscaled) that the profile view can display before needing to adjust and step the view.
Top Clearance	The height in model units (unscaled) above the profile that is maintained relative to the design and or terrain models in the view.
Bottom Clearance	The height in model units (unscaled) below the profile that is maintained relative to the design and or terrain models in the view.
Elevation Datum Spacing	When a profile is shifted, the starting elevation will always be a multiple of this this value.
Station Datum	The rounding applied to the station location when splitting the profile to

Setting	Description
Spacing	generate stepped profiles.
Profile Shifts	Datum Stations, Where Needed or Do Not Shift
Use Terrains	Enable to use active surface information in drawing the profile.
Use Active Vertical	Enable to use active vertical information in drawing the profile.
Whole Conduits Only	Draws whole conduits on a sheet.
Create Drawing	Opens the Create Drawing dialog after creating the named boundary to create a saved view from the selected named boundary and automate dynamic views.
Show Dialog	When enabled, a dialog with additional parameters set by the Drawing Seed is shown.

C. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

D. Select the **Profile - 50 Scale Profile** Drawing Seed. This will create a **Top** and **Bottom** (dual) Profile 1400' stations each per sheet.

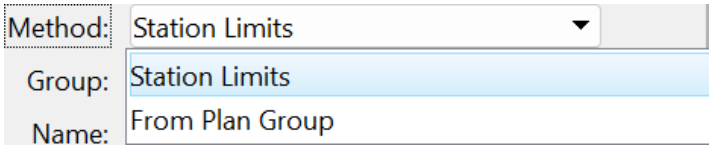
Note: The **Drawing Seed** defines default values and other parameters required to create drawings and sheets. The Drawing Seeds for **Civil Profile** mode are:

Also note the D**etail Scale** automatically changes to **1" = 50'** and the **Length** and other settings changed based on the **Drawing Seed** selected.

E. Set the first Name field to be **040** since the last plan sheet is **039**. This is just the continuation from the **last plan sheet** number.

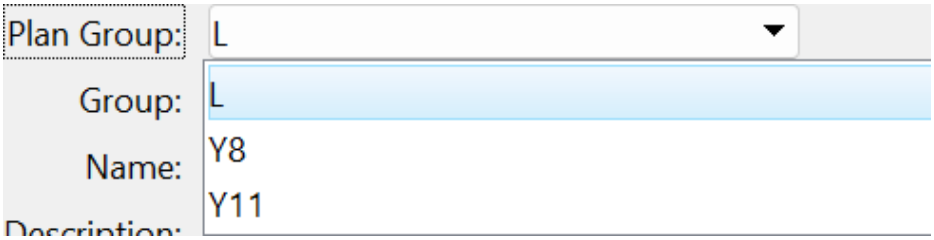
F. A **Description** can be entered but the Name alone is typically sufficient.

G. Select **Station Limits** as the method.



Note the other option is **From Plan Group.** From Plan Group uses the station limits based on the plan named boundaries. When the stations on the plan sheets match the stations on the profile sheet, sheet per sheet, sometime this desirable and standard. In this situation we have 100 scale interchange sheets (2800') so we are not able to match the plans. If From Plan Group is selected an option to select a Named Boundary Plan Group is made available.

H. Set the **Group** to **New** to create a new profile named boundary group.

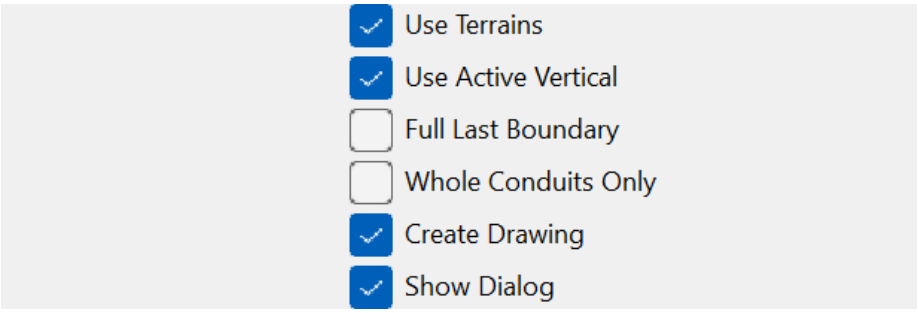


I. The **Name** of the Profile Group will automatically be set to the vertical alignment name when you **Data Point** to the **Profile View**.

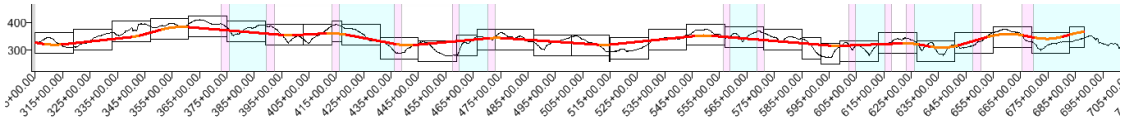
J. **Start Location: Data Point** in the **Profile View** and click on the **left arrow button** to the right of field to lock it to the beginning station (**305+00**)

Stop Location: Data Point in the **Profile View** and click on the **right arrow button** to the right of field to lock it to the ending station (**688+31.97**)

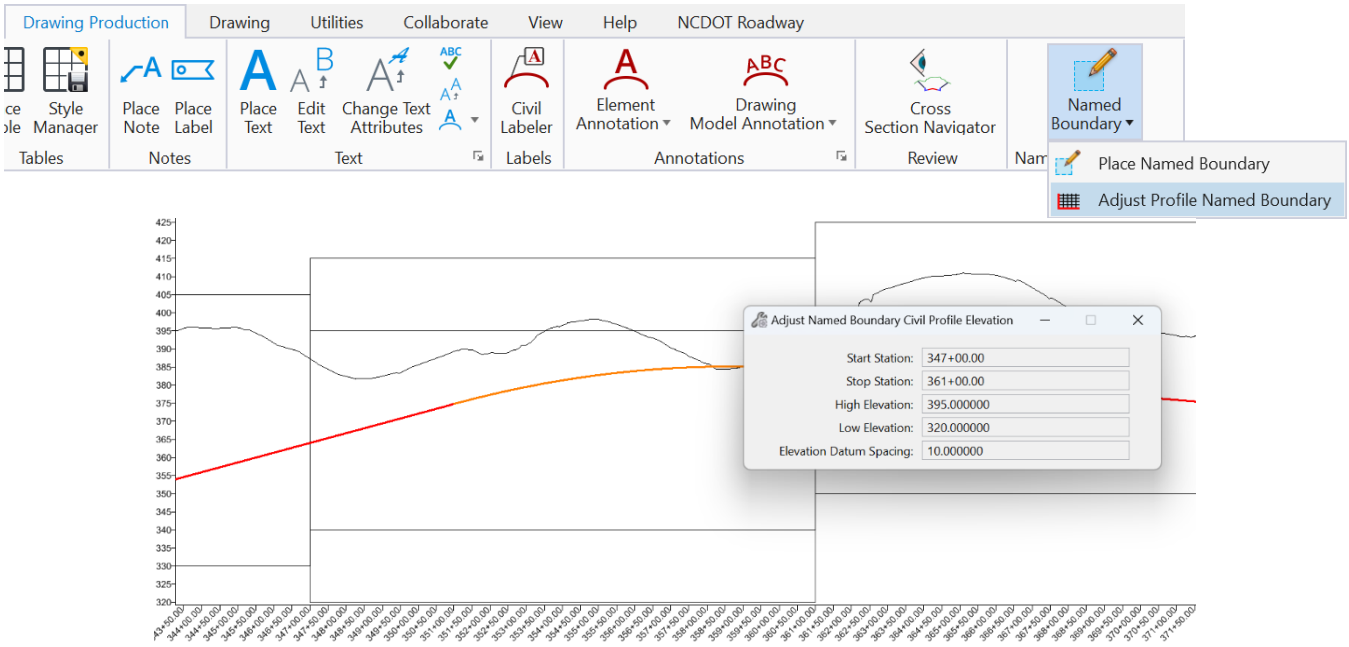
K. Check on **Use Terrains**, **Use Active Vertical**, **Create Drawing** and **Show Dialog**.



L. **Data Point** in the **Profile View** twice to accept and place the named boundaries. The **Create Drawing** dialog box should then appear.

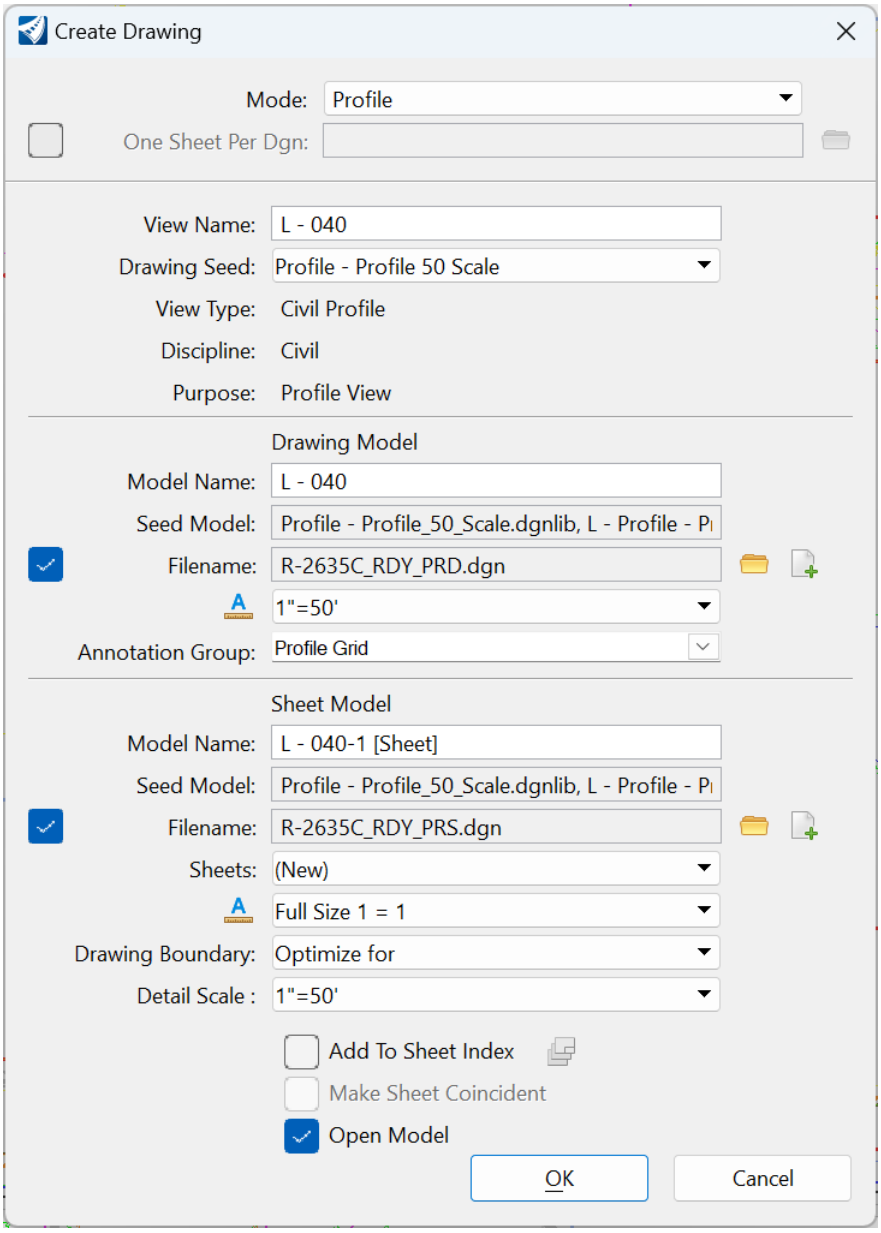


Note that after the placement, the individual profile named boundaries can be adjusted up and down using the **Adjust Profile Named Boundary** tool



Create Drawing (Profile)

Most of the options have been filled in by default from the selection of the **Drawing Seed**. There are some values the user can override.



Each Item in the **CREATE DRAWING** box Description:

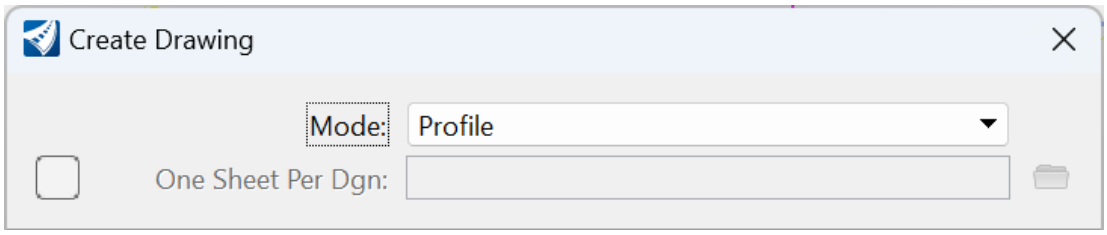
Setting	Description
Mode	Profile
Name	Shows the name of the saved view that will be created.
One sheet per Dgn	If on, each sheet model, and all drawing models attached to the sheet model, are created in an individual .dgn file in the selected folder. The name of each .dgn file created will match the name of the created saved view.
Drawing Seed	Defines the drawing seed template from which the detailing symbol style will be used for the callout.
View Type	Displays the saved view type. The saved view type displayed depends on the saved view settings in the seed file selected in the Drawing Seed drop-down list.
Discipline	Displays the discipline of the drawing. It can be modified from the saved view properties in the Properties dialog.
Purpose	Displays the purpose of the saved view. It can be modified from the saved view properties in the Properties dialog.
Seed Model	Displays the seed model from which the drawing model will be created. This seed model is derived from the template selected in the Drawing Seed drop-down list.
Filename	If on, you can select the file in which the drawing model will be created. By default, the drawing model is created in the active file. You can create a new file that will contain the new drawing model by clicking Create New Drawing File icon. You can also create the drawing model in an existing file by clicking Browse Drawing File Browse Drawing File icon. **Note:** If you select an existing file to create the drawing model, make sure the file belongs to the same WorkSet, else the OK button in the dialog will be dimmed.
Annotation Scale	Sets the scale factor for text and dimensioning in the drawing model. The annotation scale of the drawing model is used as the detail scale when it is attached to a sheet. **Note:** Only the scales that match the master units of the seed file are populated in this drop-down list.

Setting	Description
Annotation Group	Selects the drawing annotation group that defines how drawing models are annotated. The drawing annotation group defines grids, XY coordinate labels, north arrows, frame annotation, etc. that are created in the drawing model and are to be shown on the final sheet. Annotation groups are found in the OpenRoads Standards under Annotation Groups.
Seed Model	If on, you can select the seed model from which the sheet model will be created. This seed model is derived from the template selected in the Drawing Seed drop-down list, except for the case when you place a named boundary using a drawing boundary with the Create Drawing check box turned on. In this case, the sheet-seed model is the one that contains the drawing boundary. This is to make sure that the drawing fits exactly in the selected drawing boundary.
Filename	If on, you can select the file in which the sheet model will be created. By default, the sheet model is created in the active file. You can create a new file that will contain the new sheet model by clicking Create New Sheet File icon. You can also create the sheet model in an existing file by clicking Browse Sheet File icon. **Note:** If you select an existing file to create the sheet model, make sure the file belongs to the same WorkSet, or else the OK button in the dialog will be dimmed.
Sheets	Sets the sheet model in which you want to place the drawing. You can also select New to create a new sheet model.
Annotation Scale	Sets the scale factor for text and dimensioning in the sheet model. **Note:** Only the scales that match the master units of the seed file are populated in this drop-down list.
Drawing Boundary	Sets the drawing boundary in the sheet model where the drawing will be placed. This option lists the following: • New - Creates a new drawing boundary. • List of empty drawing boundaries (drawing boundaries that do not have a saved view attached) of same View Type contained in the sheet model selected in the Sheets drop-down list. If Sheets is set to New, lists the empty drawing boundaries of same view type available in the sheet-seed model. In this case, a new sheet model is created and the selected drawing boundary is filled with the saved view. If multiple

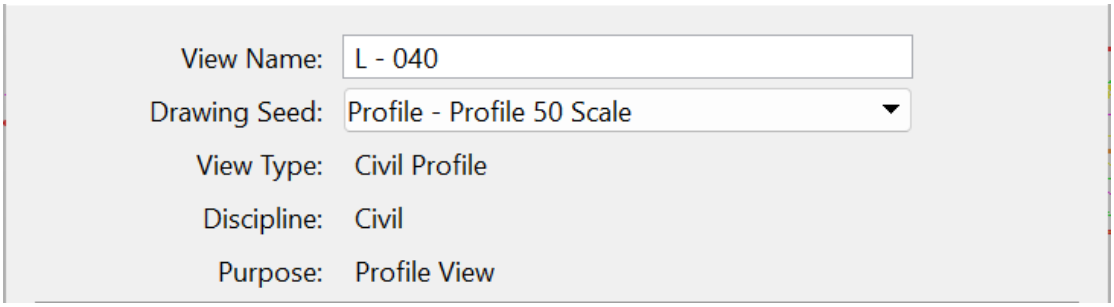
Setting	Description
	saved views are to be placed then for each saved view a new sheet model is created and the saved view is placed with new drawing boundary. If Sheets is set to an existing sheet model, then the first saved view is placed in that sheet model, in the selected drawing boundary. For the remaining saved views, a new sheet model cloned from sheet seed model is created for each saved view and the saved view is placed in the selected drawing boundary in each sheet model. • Optimize For - This option is available when you want to place multiple views and if the sheet model in which you want to place the saved views contains more than one drawing boundary of the same View Type. Following examples explain the use of this option in different scenarios ○ Say you want to place an array of four named boundaries of view type "Section" and the sheet model selected in the Sheets drop-down list contains five empty drawing boundaries of type "Section". In this case, if you select Optimize For , the name boundaries will be placed on the first four drawing boundaries, in the sequence of their drawing identifiers. This option is also available if you choose to create a new sheet model and if the sheet-seed model contains more than one drawing boundary of the same view type. ○ Say you have six saved views to be placed and the selected sheet-seed model has only two empty drawing boundaries. If you select Optimize For, two saved views will be placed in the selected sheet model. For the remaining four saved views, two new sheet models will be created by cloning the sheet-seed model and two saved views will be placed in each of the sheet models.
Detail Scale	Sets the detail scale of the drawing attachment in the sheet model. In addition to standard scales, MicroStation calculates following recommended scales and displays them in this drop-down list: • By Named Boundary - (Available only when you create dynamic view from a named boundary) The detail scale stored on the named boundary. • Fit View to Drawing Boundary - The closest standard scale at which the saved view attachment will fit into the selected drawing boundary.

Setting	Description
	• Fit View to Sheet Boundary - The closest standard scale at which the saved view attachment will fit into the sheet boundary. • Custom - allows you to define a custom scale. **Note:** Only the scales that match the master units of the seed file are populated in this drop-down list.
Add to Sheet Index	Adds the sheet model to the sheet index. **Note:** If some other user already has the sheet index in edit mode, the sheet model cannot be added to the sheet index. In such case, a message is displayed in the message center.
Select a folder from Sheet Index	Opens the Sheet Index Folder Picker from which you can select the folder in which the sheet model should be added.
Make Sheet Coincident	(Available only if the sheet model does not contain a drawing boundary) If on, the reference in the sheet model is made coincident with the design model. For this, if required, the sheet boundary is moved and rotated to fit around the reference. If off, the reference is moved and rotated so that it is attached at the center of sheet boundary.
Open Model	If this check box is on, the last sheet model that was created opens.

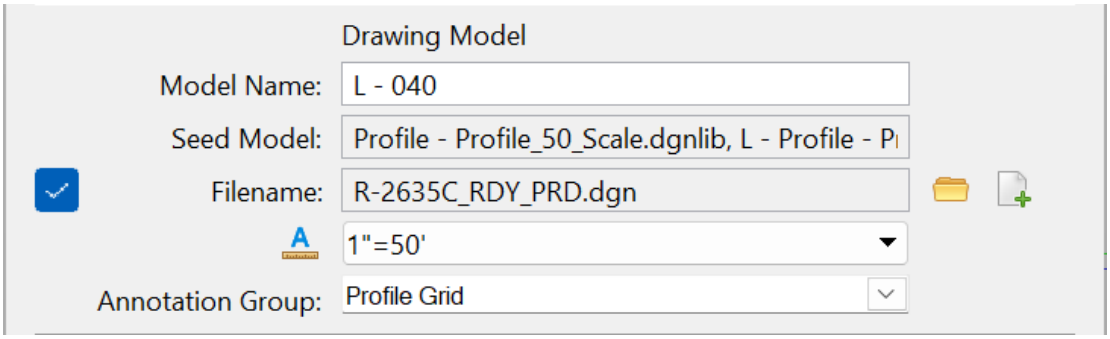
I. The check box for **One Sheet Per Dgn** if checked a DGN file will be created for each sheet. The NCDOT standard is leave this **unchecked**.



J. **Verify** default mode settings from the Drawing Seed selection.



K. **Drawing Model** Options (Profile Annotation and Grid Lines):

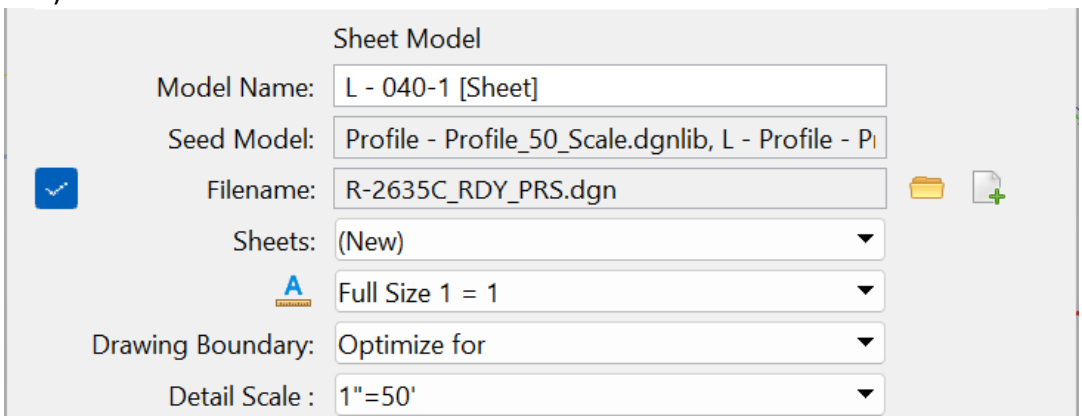


Filename (check to enable):
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PRD.dgn** (Profile Drawings)

Note the two (2) icons to the right of this field . The first folder icon is **Browse Drawing File** and the second icon with the "+" symbol is **Create New Drawing File**. *Browse Drawing File* will add drawings to the existing drawings already in the file. *Create New Drawing File* will create a new file to place the drawings in. If selecting *Create New Drawing File* and selecting an existing file, it will **DELETE** any the existing drawings in the file and make a fresh blank copy. If **Create New Drawing File** is selected, a seed file from the WorkSpace can be used.

{WorkSpace}\Configuration\Organization-Civil\NCDOT\Seed**Seed2D - English Design.dgn**.
It is not necessary to choose a specific drawing seed since the software will place the Microstation Drawing Models in this file. The master Default Model (from the seed) is a Microstation Design Model.
In this exercise this is our first set of profile drawings, we can select **Create New Drawing File** and select the existing **PLD** file (blank) to put the drawings in. As you generate more drawings, you may select **Browse Drawing File** to add to it.
Annotation Group (**Profile Grid** – set by default by the Drawing seed Selection):

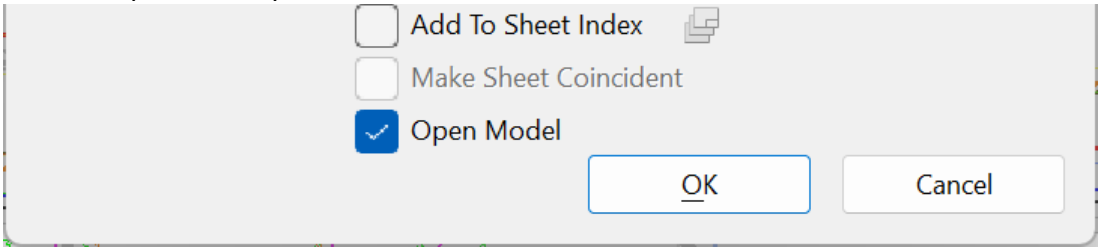
L. **Sheet Model** Options (attaching the drawing to the sheet and scale it down to **Full Size 1 = 1**):



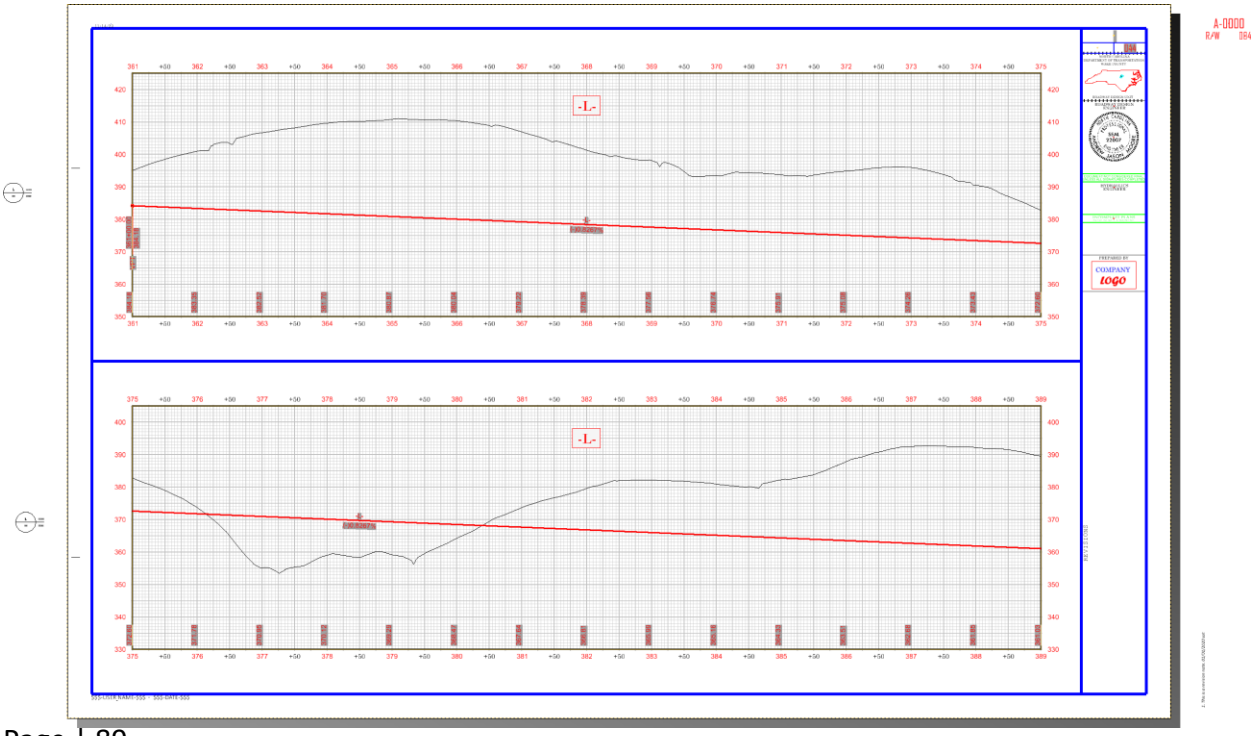
Filename (check to enable):
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PRS.dgn** (Profile Sheets)
Note the two (2) icons to the right of this field . The first folder icon is **Browse Sheet File** and the second icon with the "+" symbol is **Create New Sheet File**. *Browse Sheet File* will add sheets to the existing sheets already in the file. *Create New Sheet File* will create a new file to place the sheets in. If selecting *Create New Sheet File* and selecting an existing file, it will **DELETE** any the existing sheets in the file and make a fresh blank copy.
If **Create New Sheet File** is selected, a seed file from the WorkSpace can be used. {WorkSpace}\Configuration\Organization-Civil\NCDOT\Seed**Seed2D - English Design.dgn**.
It is not necessary to choose a specific sheet seed file since the software will place the Microstation Sheet Models in this file. The master Default Model (from the seed) is a Microstation Design Model.

In this exercise this is our first set of sheets, we can select **Create New Sheet File** and select the existing **PLS** file (blank) to put the sheets in. As you generate more sheets, you may select **Browse Sheet File** to add to it.
Note the **Annotation Scale** is always set to **Full Size 1 = 1** for all sheets.
The **Detail Scale** is based on the Drawing Seed selection and the scale of Ptofile Named Boundaries.

M. **Add To Sheet Index** should remain *uncheck* at this point. We will go over **Sheet Indexing** later in this training. **Open Model** should be *checked* on to display the last sheet when it has completed the process.

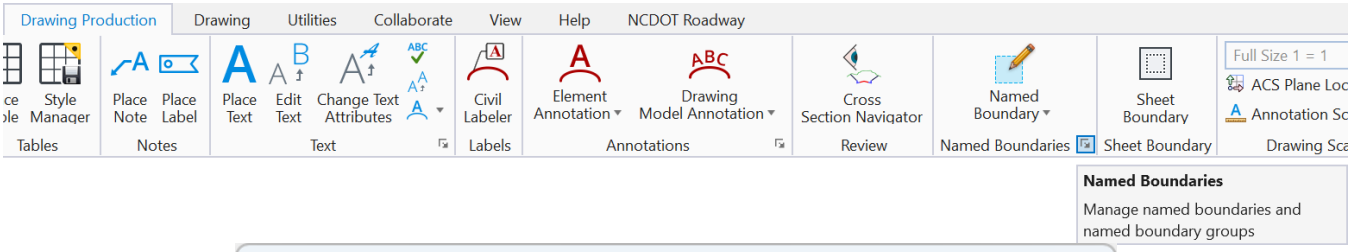


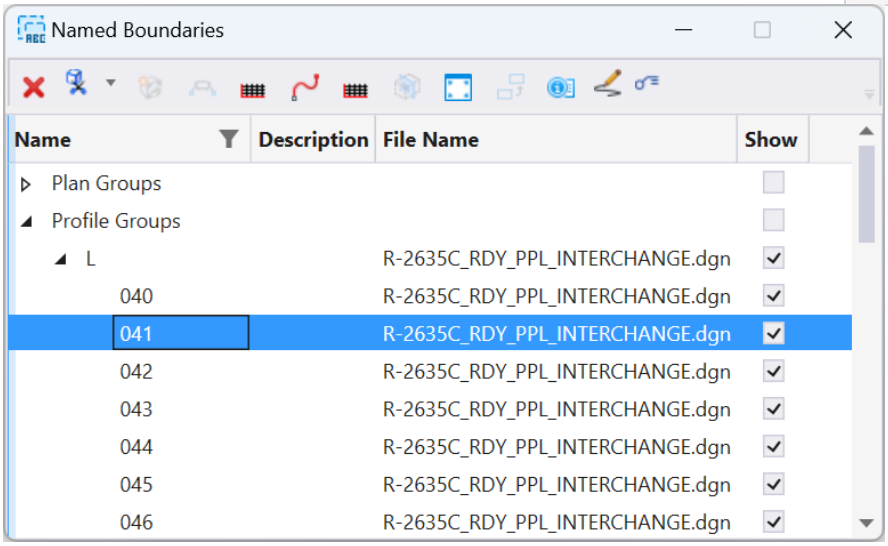
N. Review the created profile drawings and sheets. Remember to reference the Roadway Design Title Block Border (TBB) file to the WorkSpace Sheet Seed DGNLIB before creating the drawings and sheets or reference the TBB manually to the sheets afterward.



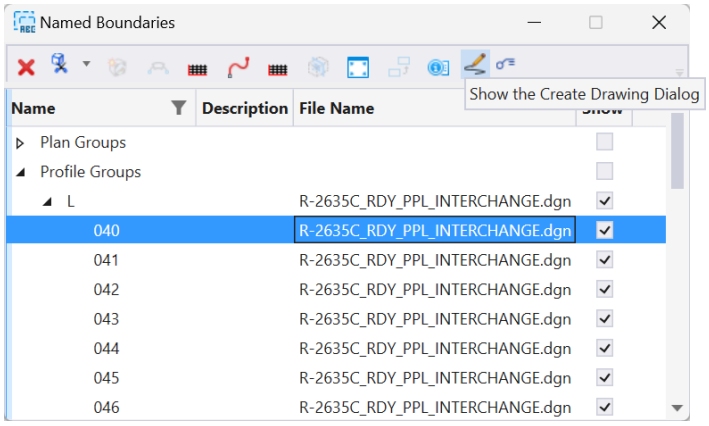
Now that we created sheets let's look at where all the links are located:

O. Go back to the ***R-2635C_NCDOT_PPL_INTERCHANGE.dgn*** in the **WorkSet** folder and Select **Named Boundary Manager**. (It's the small square in the lower right-hand corner).





P. Select the Profile Group **L** or the individual Named Boundary. Notice the icons across the top that were greyed out now become active. The Name Boundary Manager (NBM) is where the named boundaries can be edited and renamed/re-numbered. The drawings and sheets can also be created from the NBM by enabling **Show the Create Drawing Dialog**, right mouse click on the Group or individual named boundary and select **Create profile drawing**.



Exercise 7 – Multiple Profiles Per Sheet

A. Open the ***R-2635C_RDY_PPL_DRWYS.dgn*** in the **Roadway\Sheets** folder.

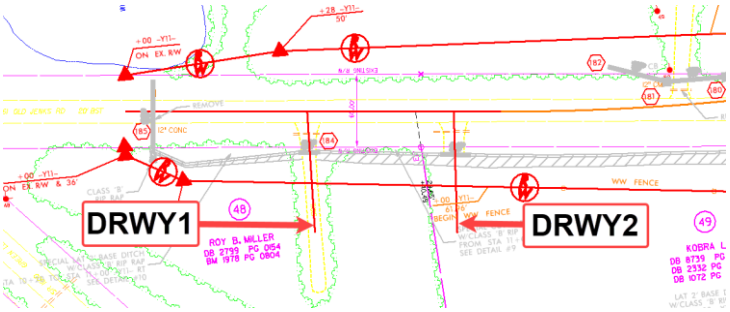
B. Have both the **Plan View** and **Profile View** opened. We will be working mostly in the Profile View.

C. **Place Named Boundary Civil Profile**

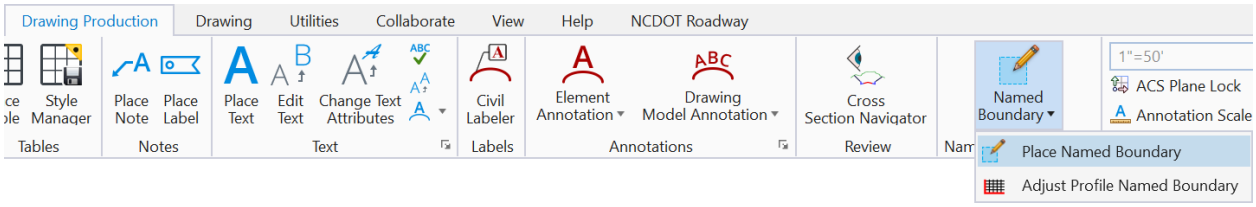
   B. Workflow

      1. In the **PPL** open the **Profile View** (required).
      2. Select the **Civil Profile** Mode and **Drawing Seed.**
      3. Set the station limits as desired.
      4. Modify other fields and toggles as needed.
      5. Enable the **Create Drawing** toggle.
      6. **Data Point** in the **Profile View** to place boundaries.
      7. Repeat steps 1-6 for the second profile.
      8. In the **Create Drawing** dialog box, select the previous sheet instead of **New**.
      9. Place the second and consecutive profiles on the same sheet.

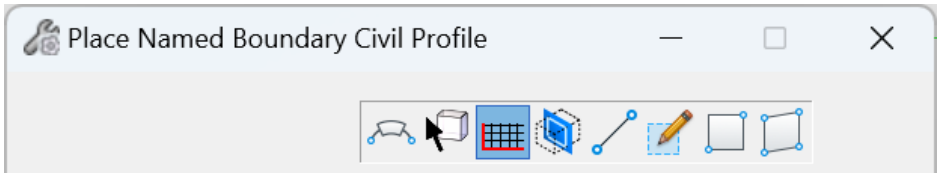
D. Zoom in the area begin inning of **-Y11-** with the two 100' driveways. Open the **Plan** and **Profile** Views for **-DRWY1-**.



E. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary Create** tool to access the Place Named Boundary dialog box.

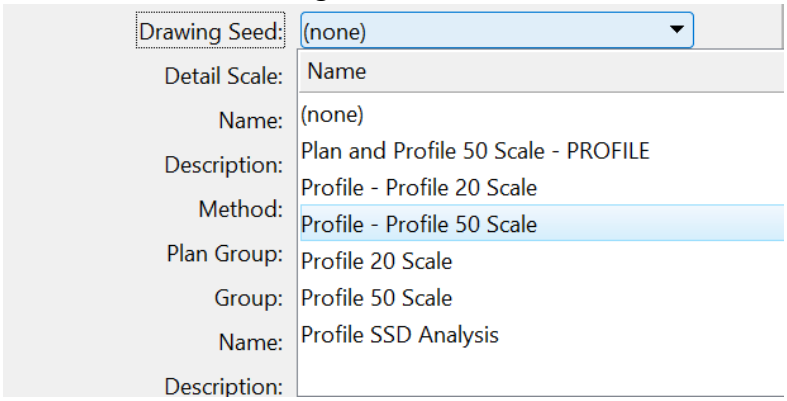


F. Choose the **Civil Profile** Mode to change the data fields in the dialog box to reflect the data needed for profile sheet layout.



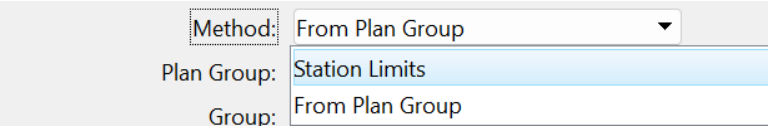
G. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.
H. Select the **50 Scale Profile - Profile** Drawing Seed. This will create a **Top** and **Bottom** (dual) Profile 1400' stations each per sheet.

Note: The **Drawing Seed** defines default values and other parameters required to create drawings and sheets. The Drawing Seeds for **Civil Profile** mode are:



Also note the D**etail Scale** automatically changes to **1" = 50'** and the **Length** and other settings changed based on the **Drawing Seed** selected.

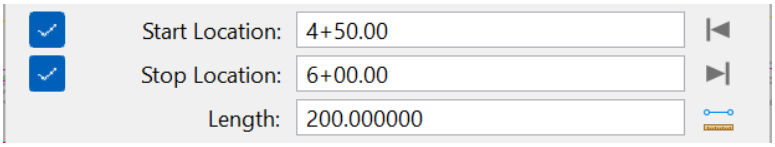
I. Set the first Name field to be **Profile 1**.
J. A **Description** can be entered but the Name alone is typically sufficient.
K. Select **Station Limits** as the method.



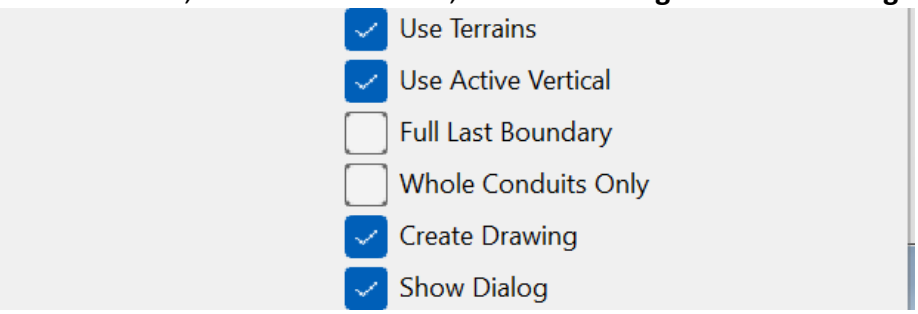
L. Set the **Group** to **New** to create a new profile named boundary group.
M. The **Name** of the Profile Group will automatically be set to the vertical alignment name when you **Data Point** to the **Profile View**.
N. **Start Location: Data Point** in the **Profile View** and key-in **4+50** (allow for the 50' buffer before the beginning of the profile).

Stop Location: Data Point in the **Profile View** and click on the **right arrow button** to the right of field to lock it to the ending station (**6+00**)

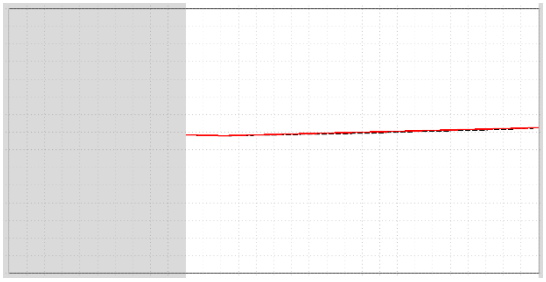
Length: key-in **200** (allow for the 50' buffer after the end of the profile).



O. Check on **Use Terrains**, **Use Active Vertical**, **Create Drawing** and **Show Dialog**.



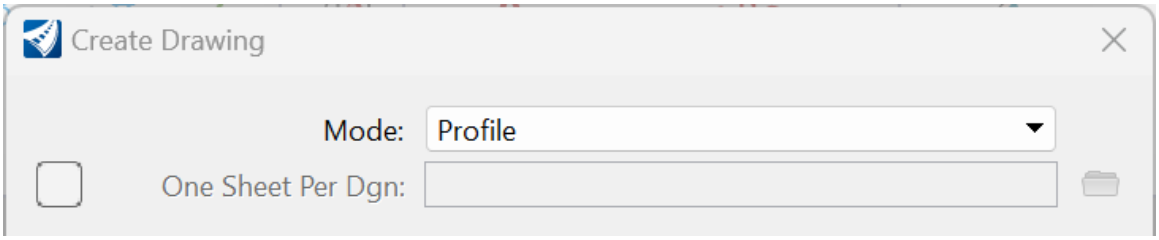
P. **Data Point** in the **Profile View** twice to accept and place the named boundaries. The **Create Drawing** dialog box should then appear.



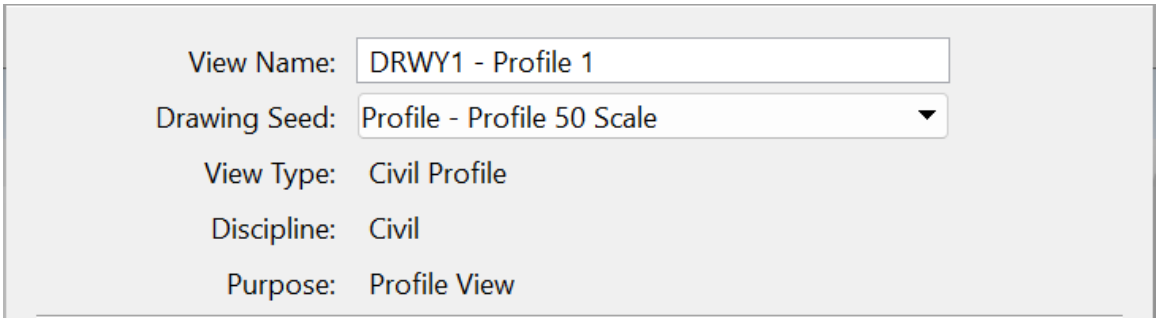
Create Drawing (Profile)

Most of the options have been filled in by default from the selection of the **Drawing Seed**. There are some values the user can override.

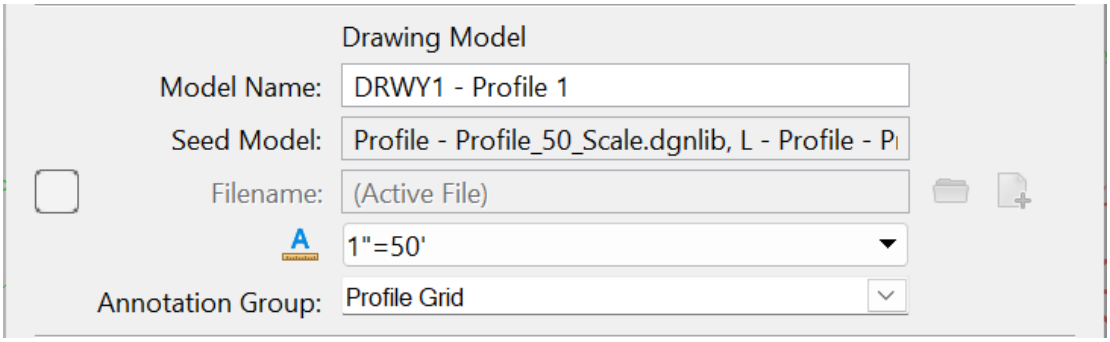
Q. The check box for **One Sheet Per Dgn** if checked a DGN file will be created for each sheet. The NCDOT standard is leave this **unchecked**.



R. **Verify** default mode settings from the Drawing Seed selection.

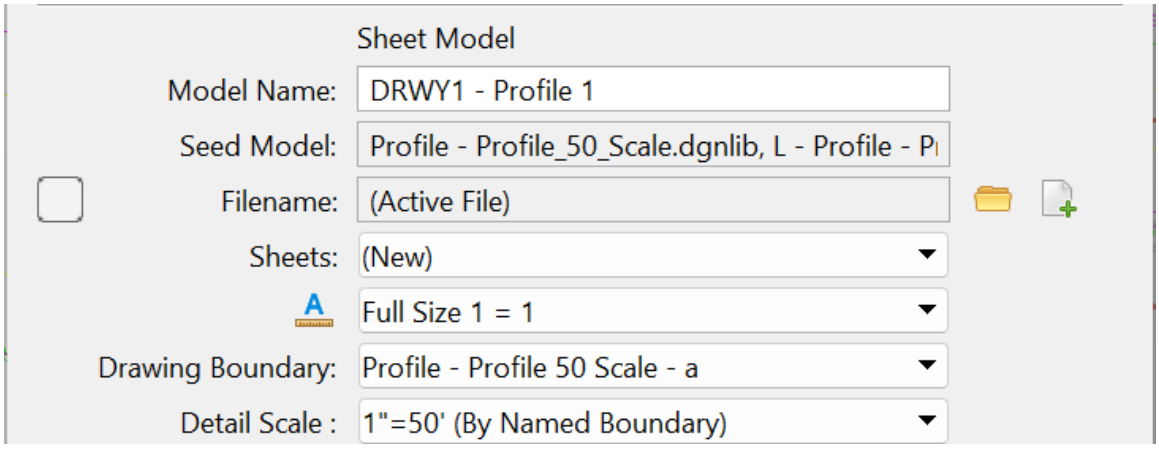


S. **Drawing Model** Options (Profile Annotation and Grid Lines):

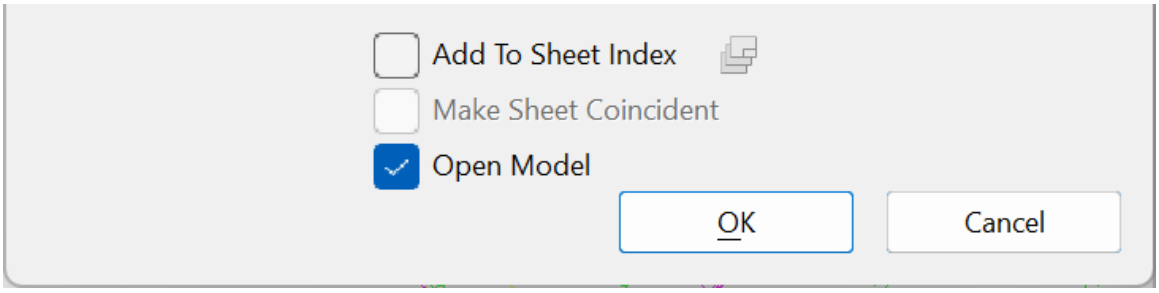


~~**Currently multiple profile drawings can be placed on a single sheet only if they are in the active PPL file. This is a known bug in 10.10.21.**~~

T. **Sheet Model** Options (attaching the drawing to the sheet and scale it down to **Full Size 1 = 1**):

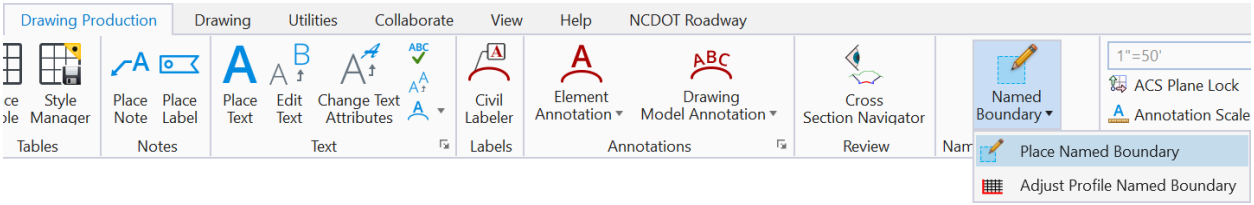


U. **Add To Sheet Index** should remain *uncheck* at this point. We will go over **Sheet Indexing** later in this training. **Open Model** should be *checked* on to display the last sheet when it has completed the process.

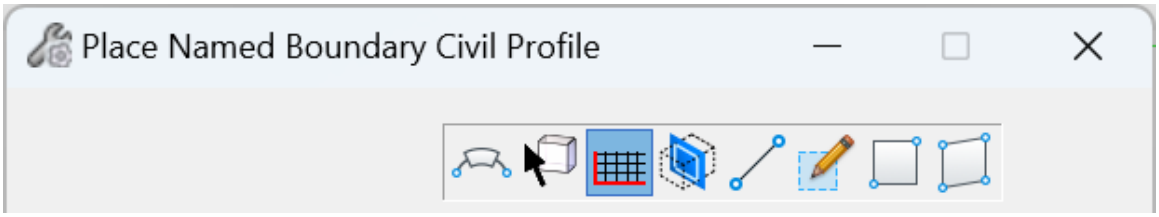


V. After the sheet has been created, go back to the **Multi-Model Views** and focus on the second driveway. Open the **Plan** and **Profile** Views for **-DRWY2-**.

W. Under the *Drawing Production* Tab → *Named Boundary* tool group → **Named Boundary** dropdown, choose the **Place Named Boundary Create** tool to access the Place Named Boundary dialog box.

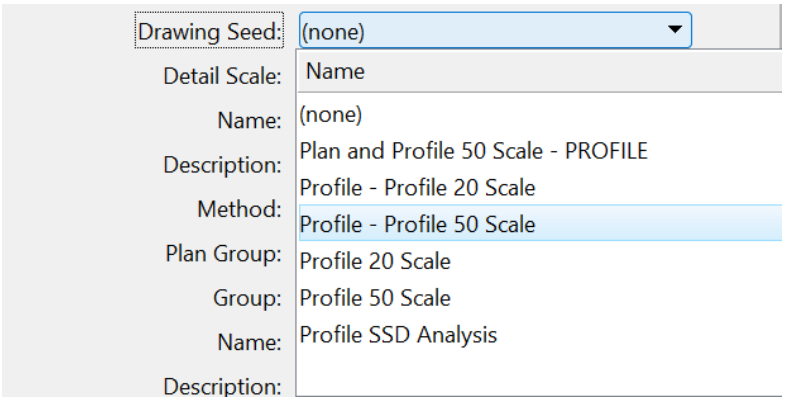


X. Choose the **Civil Profile** Mode to change the data fields in the dialog box to reflect the data needed for profile sheet layout.



Y. Uncheck the boxes for the **Start Location** and **Stop Location** if they are checked.

Z. Select the **50 Scale Profile - Profile** Drawing Seed. This will create a **Top** and **Bottom** (dual) Profile 1400' stations each per sheet.



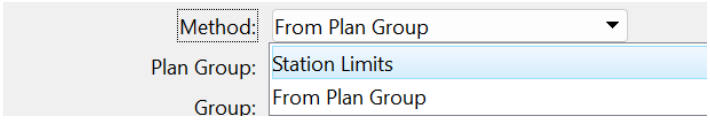
Note: The **Drawing Seed** defines default values and other parameters required to create drawings and sheets. The Drawing Seeds for **Civil Profile** mode are:

Also note the D**etail Scale** automatically changes to **1" = 50'** and the **Length** and other settings changed based on the **Drawing Seed** selected.

AA. Set the first Name field to be **Profile 1**.

BB. A **Description** can be entered but the Name alone is typically sufficient.

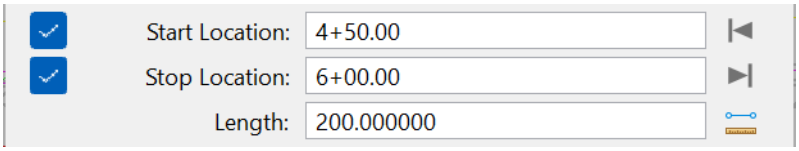
CC. Select **Station Limits** as the method.



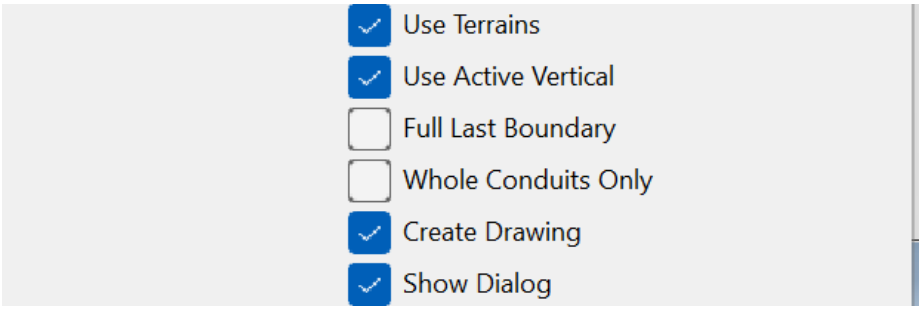
DD. Set the **Group** to **New** to create a new profile named boundary group.

EE. The **Name** of the Profile Group will automatically be set to the vertical alignment name when you **Data Point** to the **Profile View**.

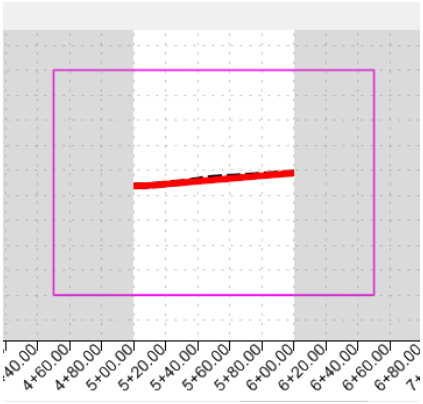
FF. **Start Location: Data Point** in the **Profile View** and key-in **4+50** (allow for the 50' buffer before the beginning of the profile).
Stop Location: Data Point in the **Profile View** and click on the **right arrow button** to the right of field to lock it to the ending station (**6+00**)
Length: key-in **200** (allow for the 50' buffer after the end of the profile).



GG. Check on **Use Terrains**, **Use Active Vertical**, **Create Drawing** and **Show Dialog**.



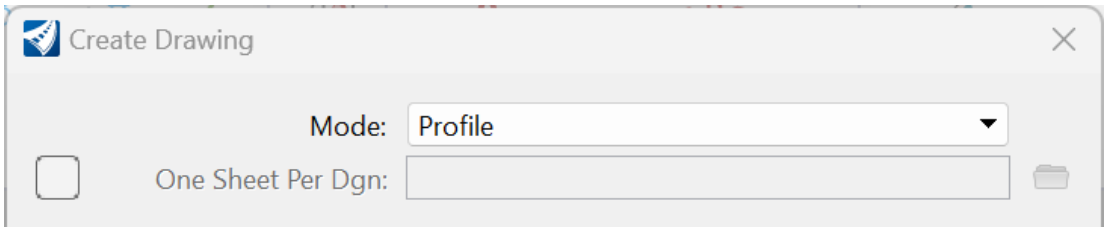
HH. **Data Point** in the **Profile View** twice to accept and place the named boundaries. The **Create Drawing** dialog box should then appear.



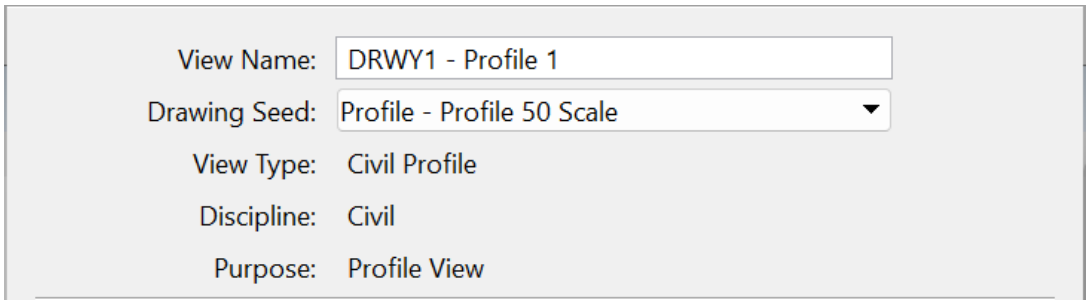
Create Drawing (Profile)

Most of the options have been filled in by default from the selection of the **Drawing Seed**. There are some values the user can override.

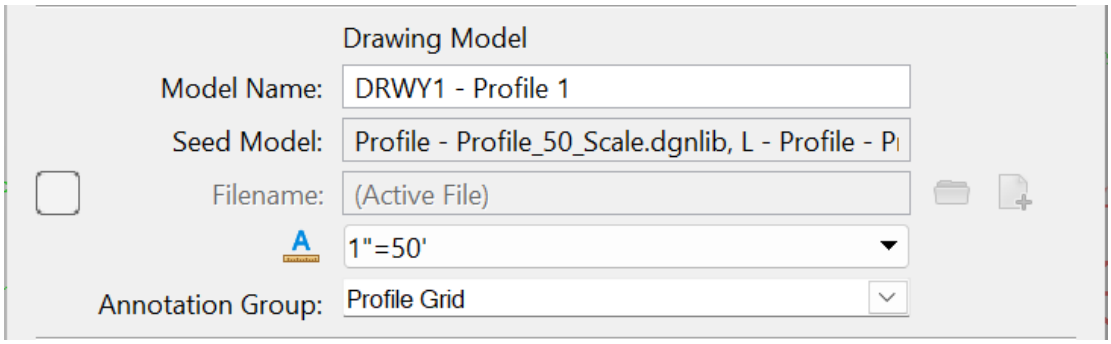
II. The check box for **One Sheet Per Dgn** if checked a DGN file will be created for each sheet. The NCDOT standard is leave this **unchecked**.



JJ. **Verify** default mode settings from the Drawing Seed selection.

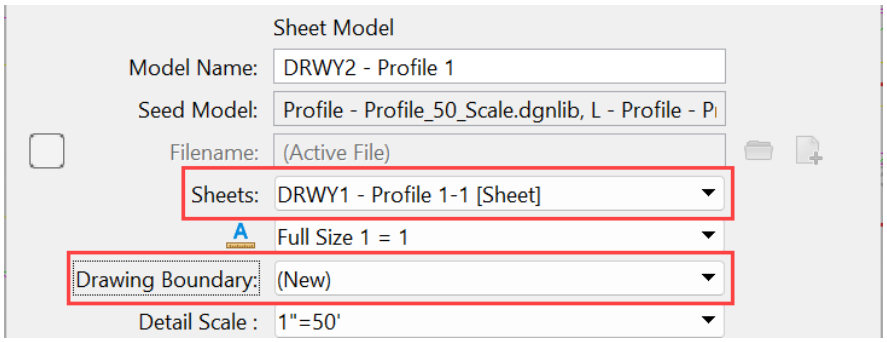


KK. **Drawing Model** Options (Profile Annotation and Grid Lines):



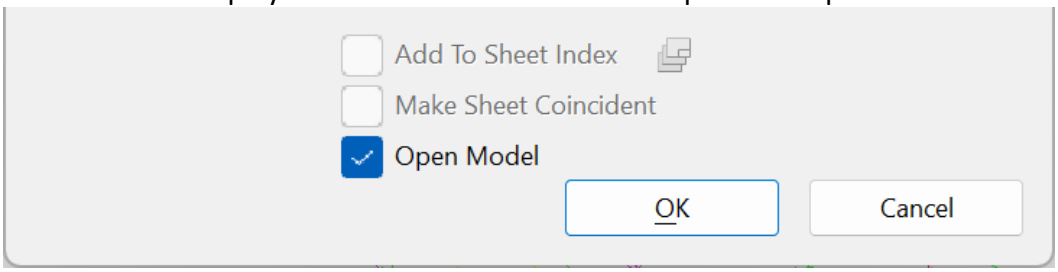
~~**Currently multiple profile drawings can be placed on a single sheet only if they are in the active PPL file. This is a known bug in 10.10.21.**~~

LL. **Sheet Model** Options (attaching the drawing to the sheet and scale it down to **Full Size 1 = 1**):

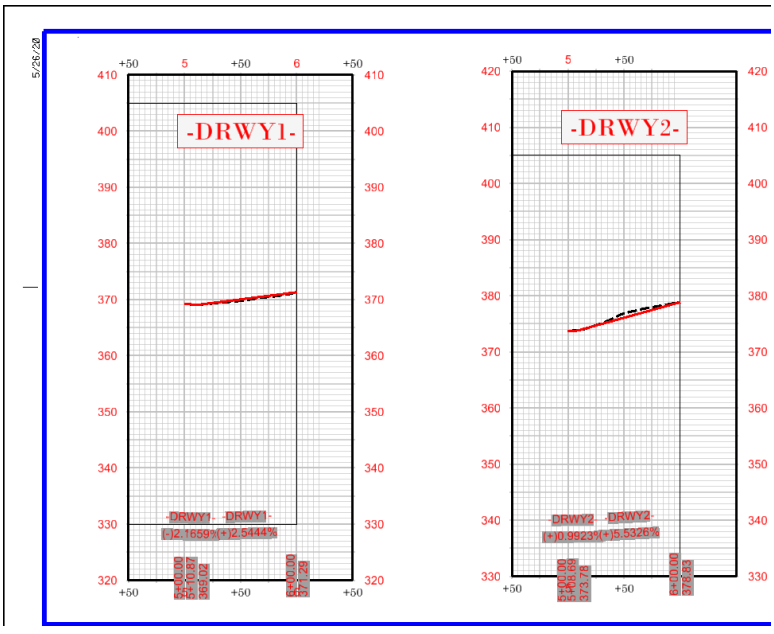


Note the **Sheets** field should be set to the sheet model the first profile was drawn in. The **Drawing Boundary** option is whether you want to place the drawing on the top (where the first profile was placed) or bottom of the sheet.

MM. **Add To Sheet Index** should remain *uncheck* at this point. We will go over **Sheet Indexing** later in this training. **Open Model** should be *checked* on to display the last sheet when it has completed the process.



NN. Review the created profile drawings and sheets. Move the referenced drawing around to arrange them as desired. You may also have to move the labels around to avoid clutter.



Exercise 7 – Plan (Top) - Profile (Bottom) Sheet

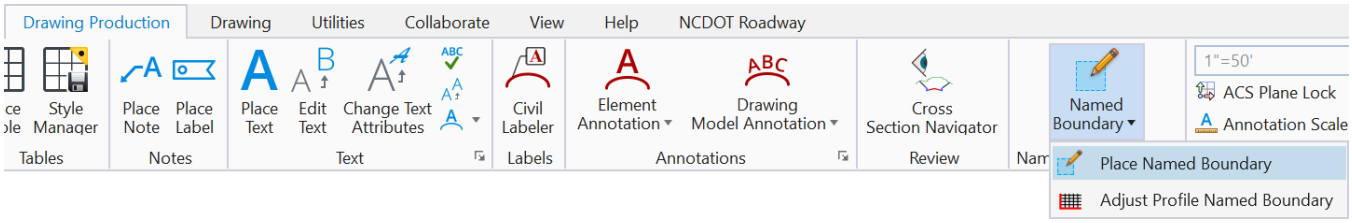
Now let's create the Plan (Top) - Profile (Bottom) sheet named boundary layout in the file ***R-2635C_NCDOT_PPL_Y11-EXAMPLE1.dgn***. Y11 is **Jenks Road** the second grade separation to the right of the first interchange sheet **006.**

A. Open the ***R-2635C_NCDOT_PPL_Y11-EXAMPLE1.dgn*** in the **WorkSet** folder.

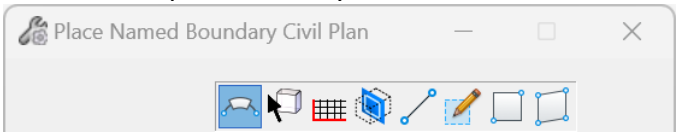
B. Have both the **Plan View** and **Profile View** opened.

C. Place **Named Boundaries.**
Workflow
1. In the **PPL** open the **Plan** and **Profile Views** of **Y11** (required).
2. Select the **Civil Plan** Mode and **Drawing Seed.**
3. Set the station limits as desired.
4. Modify other fields and toggles as needed.
5. **Disable** the **Create Drawing** toggle.
6. **Data Point** in the **Plan View** to place boundaries.
7. Select the **Civil Profile** Mode and **Drawing Seed.**
8. Set the station limits as desired.
9. Modify other fields and toggles as needed.
10. **Enable** the **Create Drawing** toggle.
11. **Data Point** in the **Plan View** to place the named boundaries

D. Under the *Drawing Production* Tab → *Named Boundary* tool group → *Named Boundary* dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.

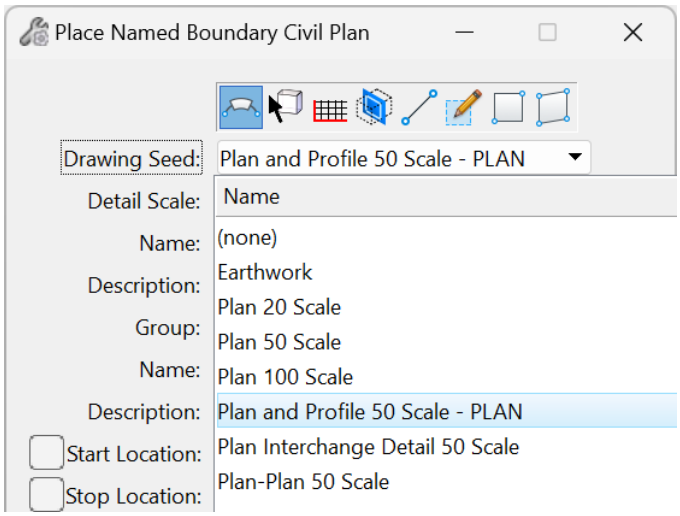


E. In the **2D Plan View** select the **Civil Plan** mode to change the data fields in the dialog box to reflect the data needed for plan sheet layout.



F. **Uncheck** the boxes for the **Start Location** and **Stop Location** if they are checked.

G. Select the **Plan And Profile 50 Scale - PLAN** Drawing Seed.
Note: The Drawing Seed defines default values and other parameters required to create drawings and sheets. The **Drawing Seeds** for **Civil Plan** mode are:



Also note the **Detail Scale** automatically changes to 1” = 50’ and the **Length** and **Offsets** of the sheet boundary and **Boundary Chords** change to accommodate the **1” = 50’ scale**.

H. Set the first **Name** field to be **004.**

I. A **Description** can be entered but the Name alone is typically sufficient.

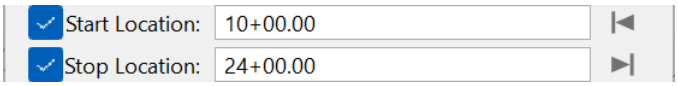
J. Set the Group to **New** to create a new plan named boundary group.

K. The second **Name** of the Group field should be **Y11** to coincide with the alignment name. This field is automatically set when a horizontal alignment is selected.

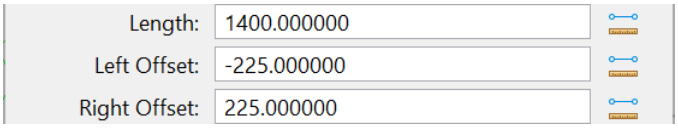
L. A **Description** can be entered but the Name alone is typically sufficient.

M. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **Y11** alignment on screen.

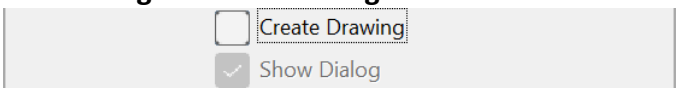
N. Key-in the **Start Location** (10+00) and **Stop Location** (24+00) and hit **Enter**.



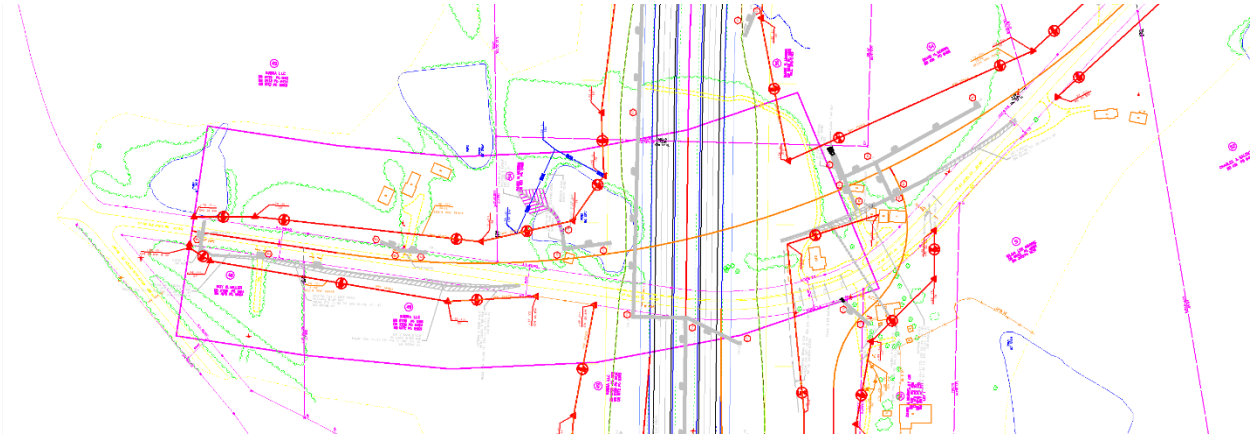
O. Verify **Length** and **Offsets**.



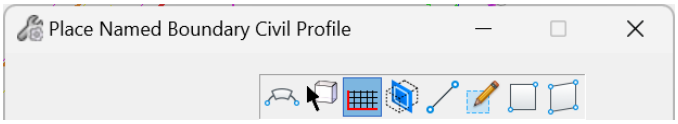
P. Uncheck the **Create Drawing** and **Show Dialog** box.



Q. Follow the prompt and **Data Point** three (3) times in the 2D **Plan View** to accept placement of the boundaries as shown.

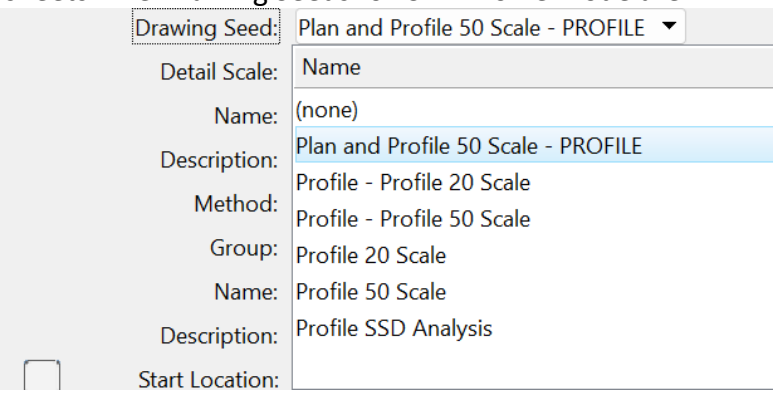


R. In the **2D Profile View** select the **Civil Profile** mode.



S. **Uncheck** the boxes for the **Start Location** and **Stop Location** if they are checked.

T. Select the **50 Scale Plan-Profile** Drawing Seed.
Note: The Drawing Seed defines default values and other parameters required to create drawings and sheets. The Drawing Seeds for Civil Profile mode are:

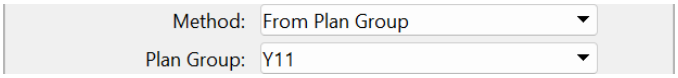


U. Set the first N**ame** field to be **004.**

V. A **Description** can be entered but the Name alone is typically sufficient.

W. Select **From Plan Group** as the **Method.**

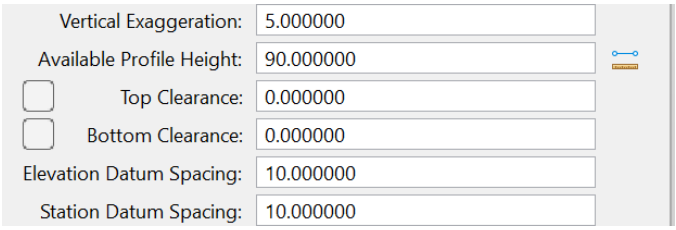
X. Select **Y11** as the **Plan Group**.



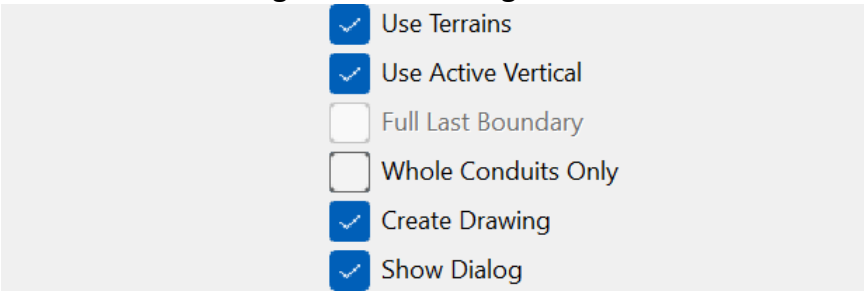
Y. The second **Name** of the Group field should be **Y11** to coincide with the alignment name. This field is automatically set when a **Profile View** is selected.

Z. A **Description** can be entered but the Name alone is typically sufficient.

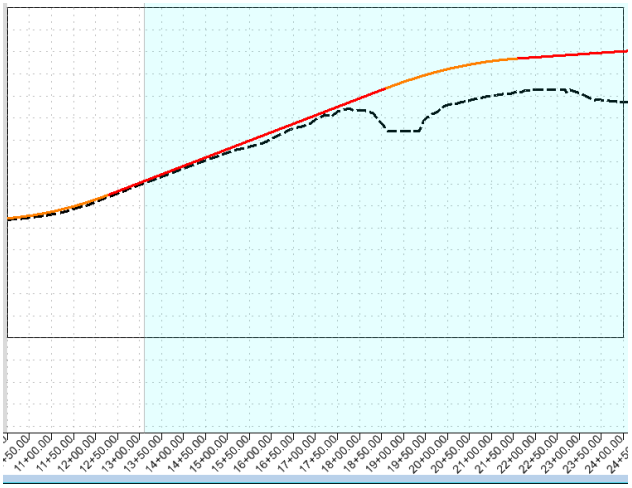
AA. **Verify** the other settings.



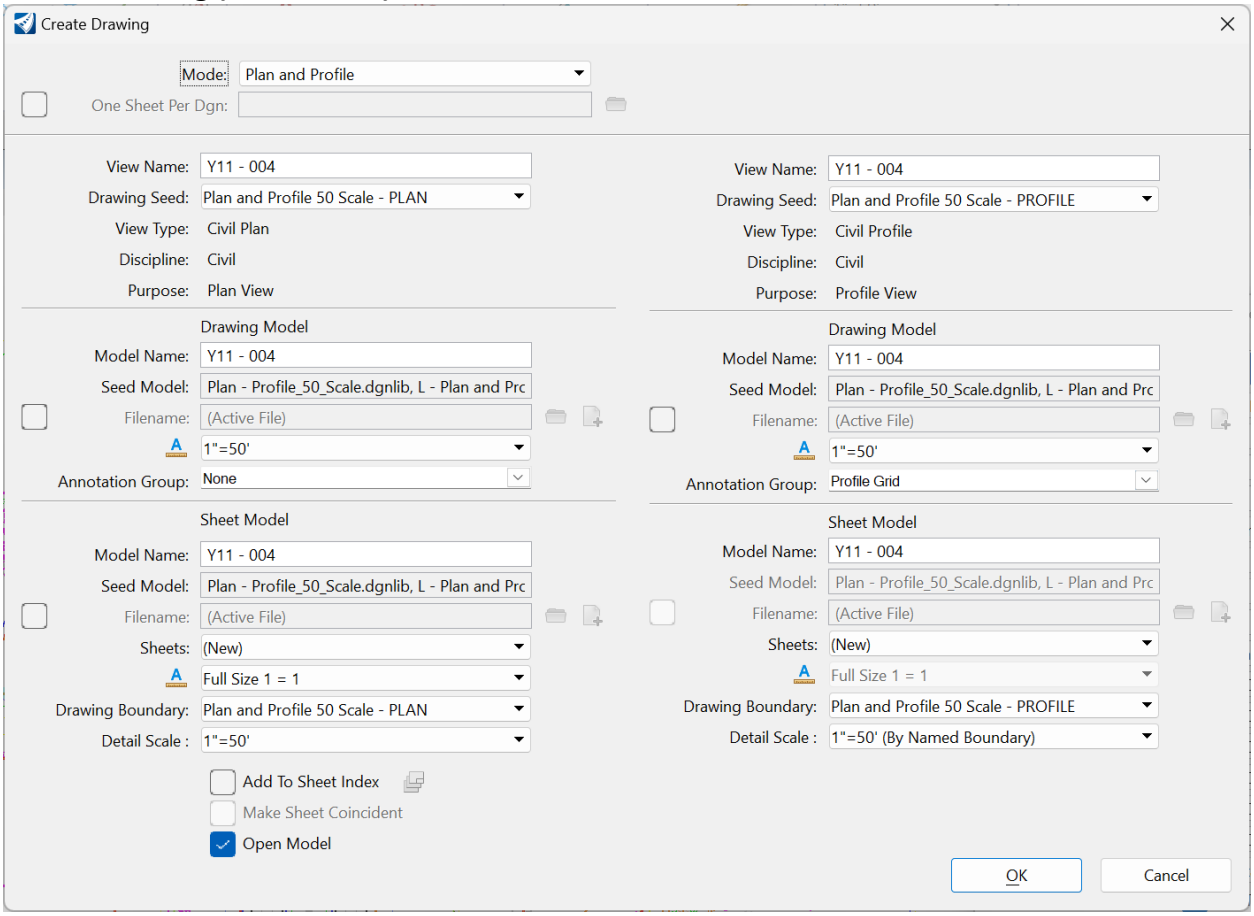
BB. Check the **Create Drawing** and **Show Dialog** box.



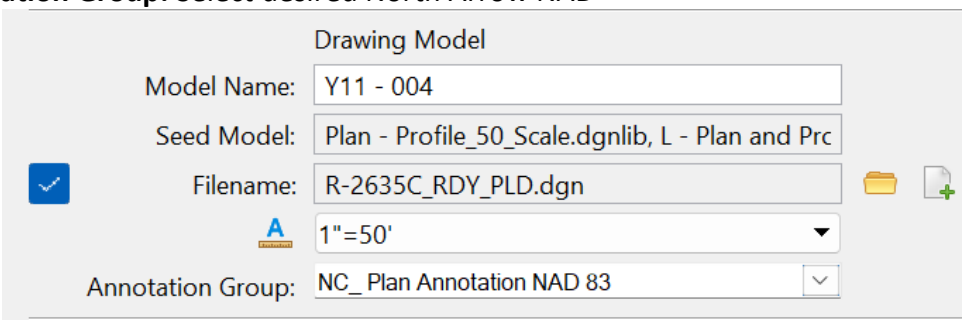
CC. Follow the prompt and **Data Point** three (3) times in the **2D Profile View** to accept placement of the boundaries as shown.



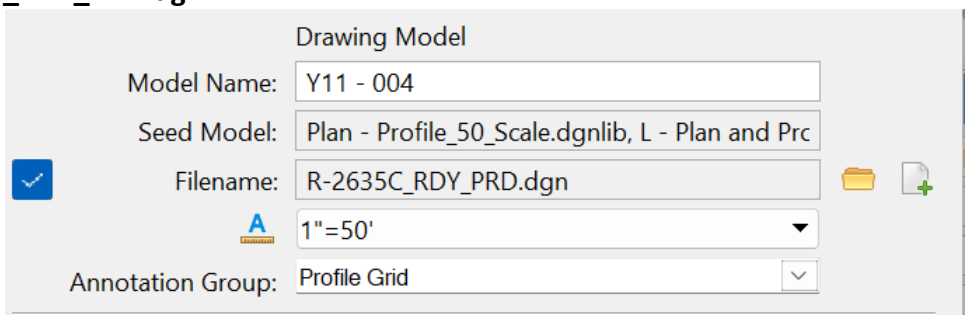
Create Drawing (Plan-Profile)



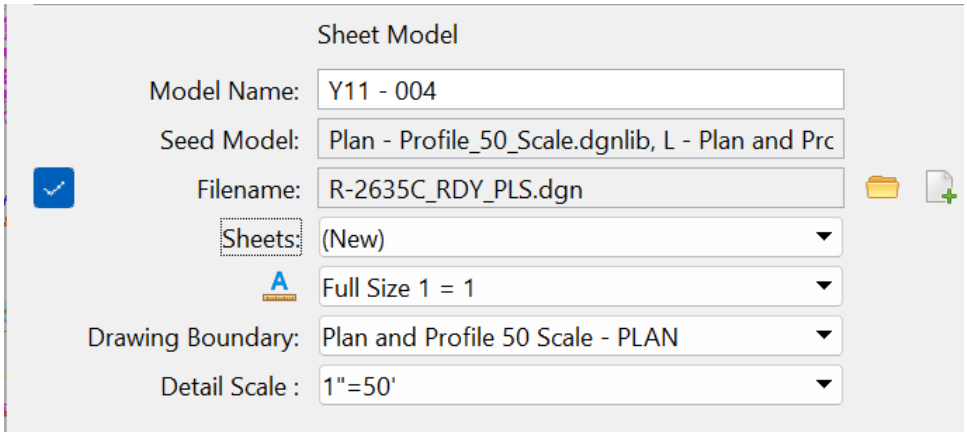
DD. **Drawing Model** options (Plan):
Filename (check on to enable):
Browse Drawing File:
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PLD.dgn**
Annotation Group: Select desired North Arrow NAD



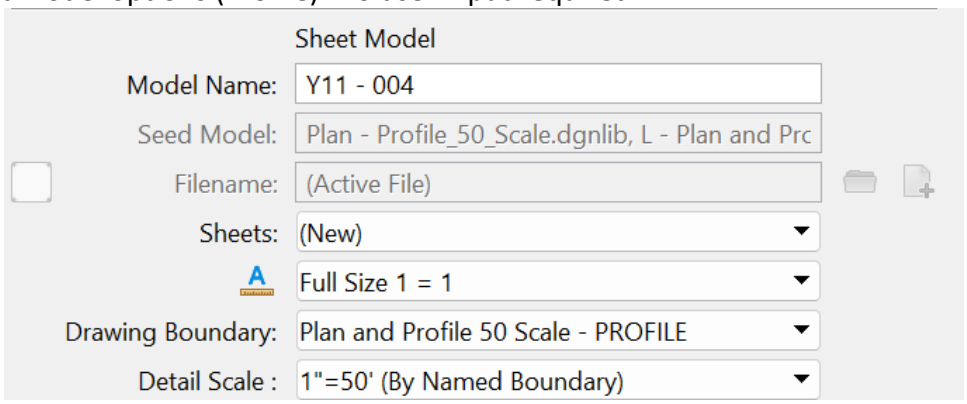
EE. **Drawing Model** options (Profile):
Filename (check on to enable):
Browse Drawing File:
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PRD.dgn**



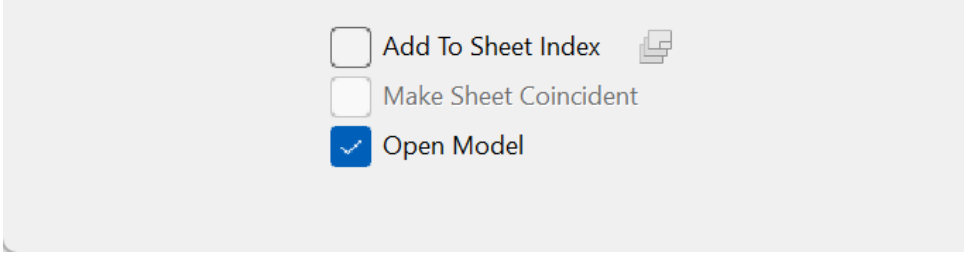
FF. **Sheet Model** options (Plan):
Filename (check on to enable):
Browse Drawing File:
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PLS.dgn**



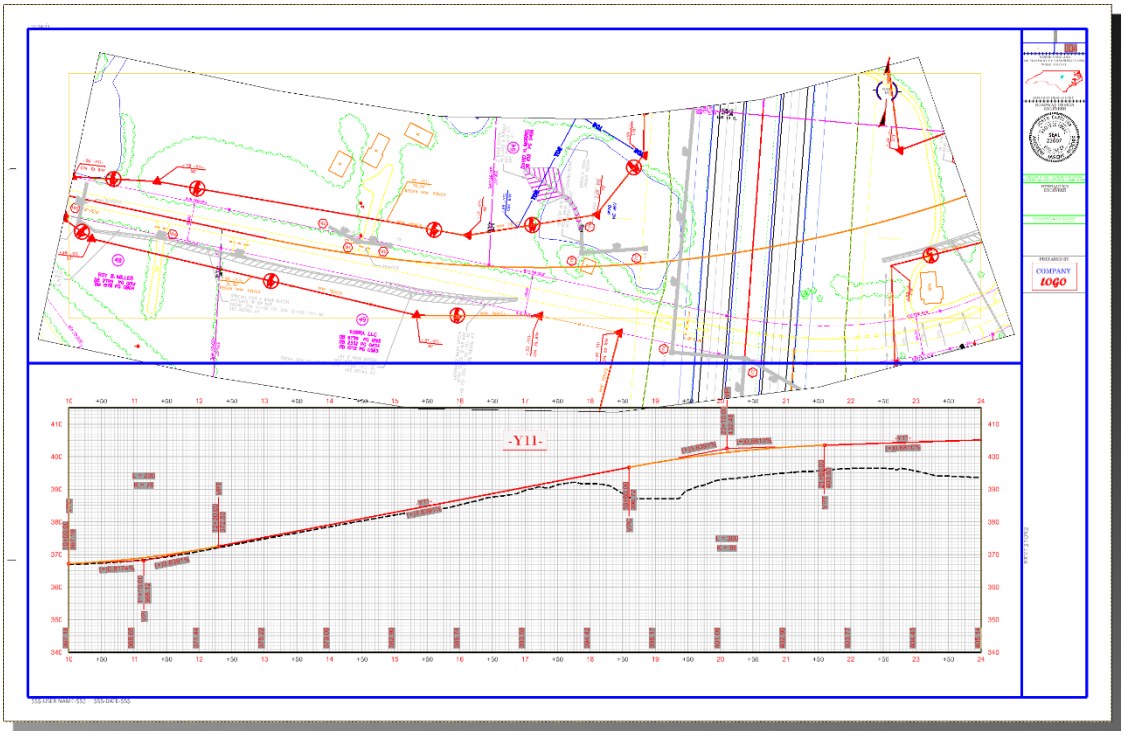
GG. Sheet Model options (Profile): No user input required.



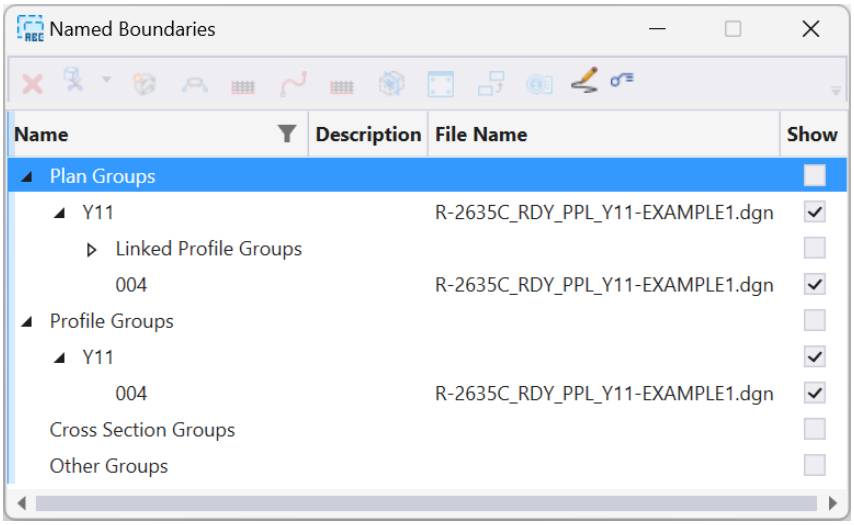
HH.Check **Open Model**.



II. Click **OK** to create the drawings and sheets.



JJ. **Verify** with the **Name Boundary Manager** in the **R-2635C_RDY_PPL_Y11-EXAMPLE1.dgn** file.



Exercise 8 – Plan (Top) - Plan (Bottom) Sheet

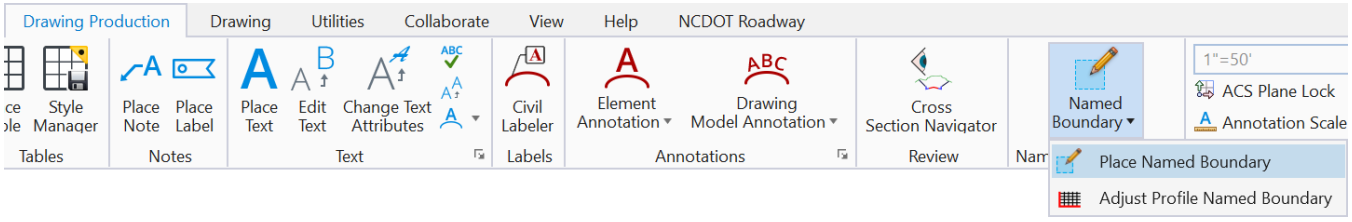
On some bridge projects with more than 1400' stations (less than 2800'), it may not be necessary to place them on two sheets. We can create the Plan (Top) - Plan (Bottom) sheet named boundary layout in the file ***R-2635C_NCDOT_PPL_Y11-EXAMPLE2.dgn*** to account for the extended limits without the need of two (2) sheets. Y11 is **Jenks Road** the second grade separation to the right of the first interchange sheet **006.**

A. Open the ***R-2635C_NCDOT_PPL_Y11-EXAMPLE2.dgn*** in the **WorkSet** folder.

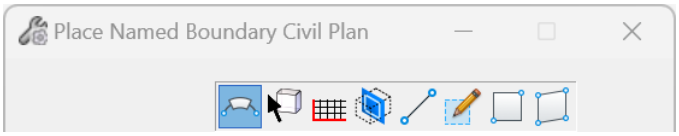
B. Have the **Plan View** opened.

C. Place **Named Boundaries**
Workflow
1. In the **PPL** open the **Plan View** of **Y11** (required).
2. Select the **Civil Plan** Mode and **Drawing Seed.**
3. Set the station limits as desired.
4. Modify other fields and toggles as needed.
5. **Enable** the **Create Drawing** toggle.
6. **Data Point** in the **Plan View** to place the named boundaries

D. Under the *Drawing Production* Tab → *Named Boundary* tool group → *Named Boundary* dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.



E. In the **2D Plan View** select the **Civil Plan** mode to change the data fields in the dialog box to reflect the data needed for plan sheet layout.



F. **Uncheck** the boxes for the **Start Location** and **Stop Location** if they are checked.

G. Select the **Plan-Plan 50 Scale** Drawing Seed.

H. Set the first **Name** field to be **004.**

I. A **Description** can be entered but the Name alone is typically sufficient.

J. Set the Group to **New** to create a new plan named boundary group.

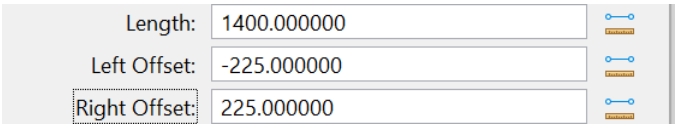
K. The second **Name** of the Group field should be **Y11** to coincide with the alignment name. This field is automatically set when a horizontal alignment is selected.

L. A **Description** can be entered but the Name alone is typically sufficient.

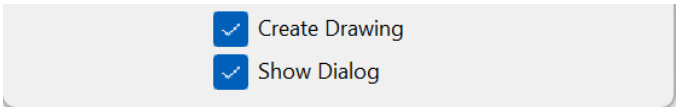
M. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **Y11** alignment on screen.

N. Use the **left and right arrow buttons** to lock the beginning **Start Location** and ending **Stop Location** stations.

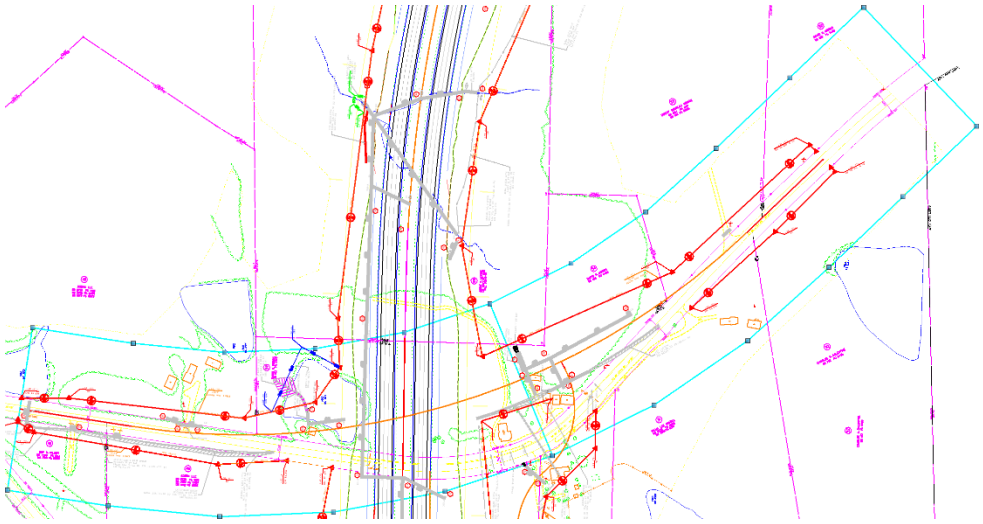
O. Verify **Length** and **Offsets**.



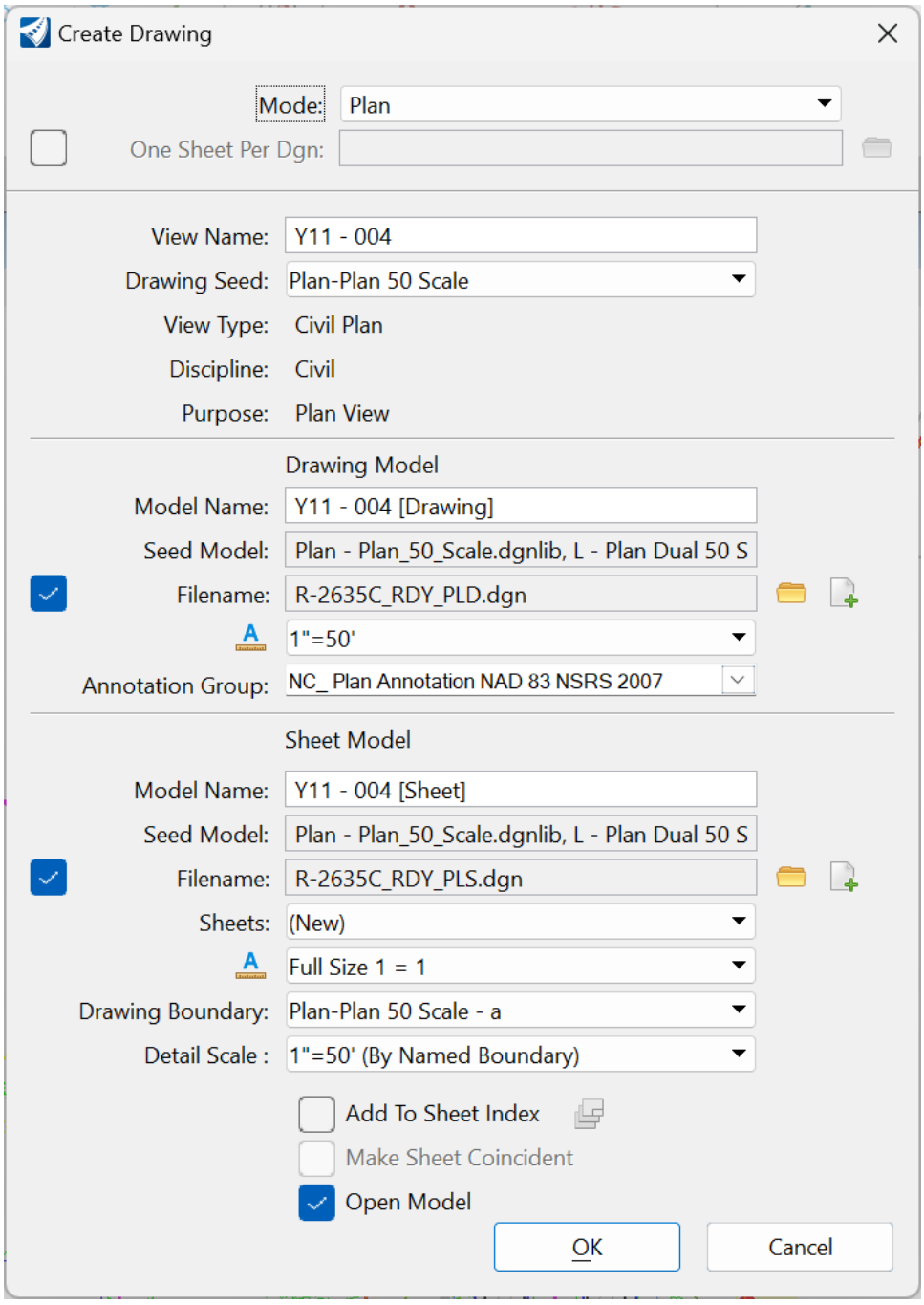
P. Check on the **Create Drawing** and **Show Dialog** box.



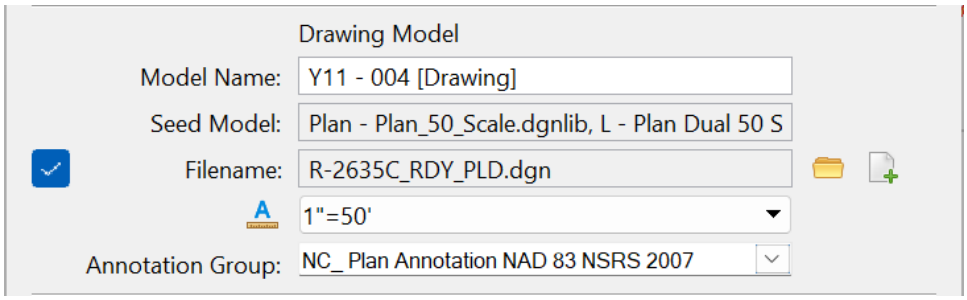
Q. Follow the prompt and **Data Point** three (3) times in the 2D **Plan View** to accept placement of the boundaries as shown.



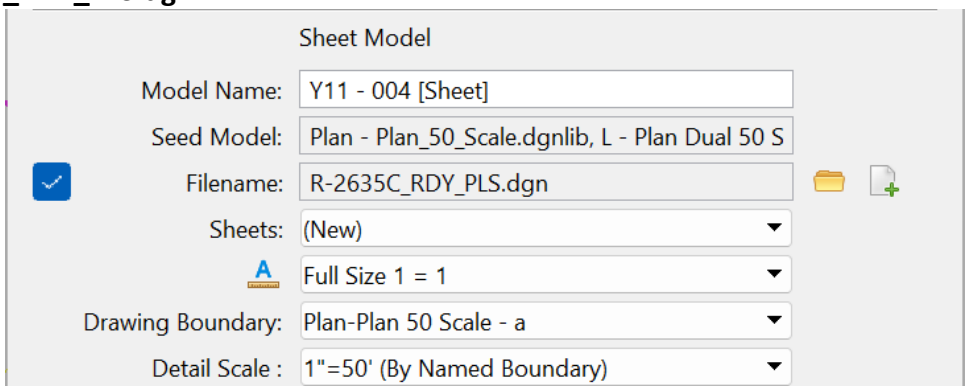
Create Drawing (Plan-Plan)



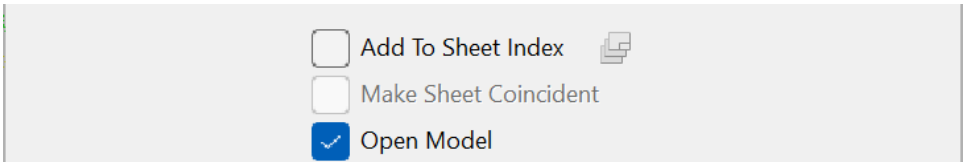
R. **Drawing Model** options:
Filename (check on to enable):
Browse Drawing File:
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PLD.dgn**
Annotation Group: Select desired North Arrow NAD



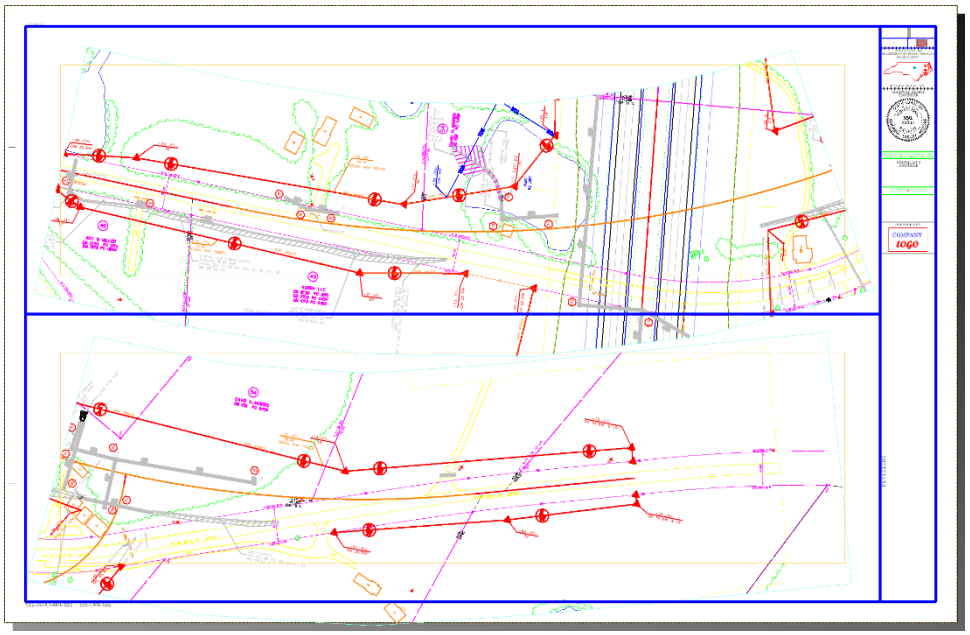
S. **Sheet Model** options:
Filename (check on to enable):
Browse Drawing File:
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_PLS.dgn**



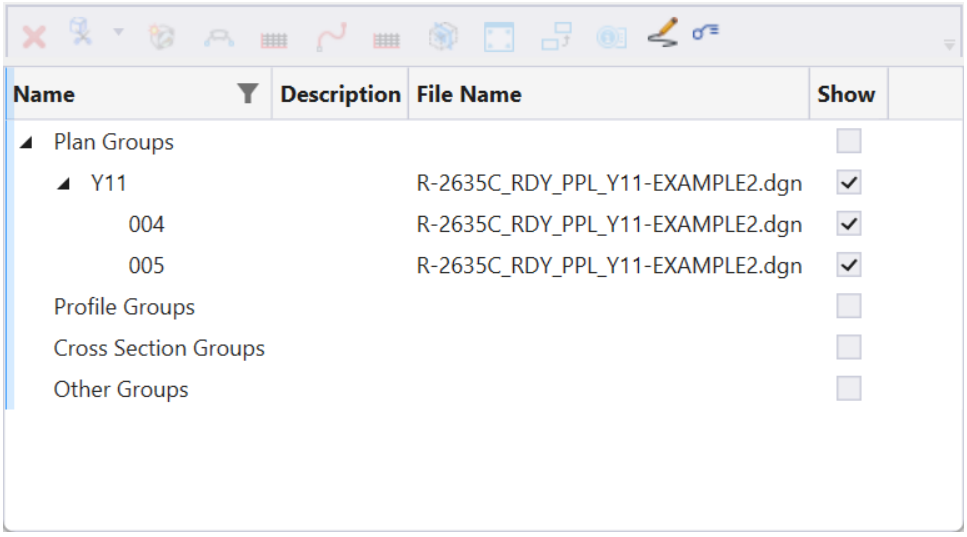
T. Check **Open Model**.



U. Click **OK** to create the drawings and sheets. Adjustments to the reference file is sometime needed to move the named boundaries to fit within the borders.



V. **Verify with** the **Name Boundary Manager** in the **R-2635C_RDY_PPL_Y11-EXAMPLE2.dgn** file. Note you may rename 005 to **004B** (bottom) for clarity.



Exercise 9 – Cross Section Sheets

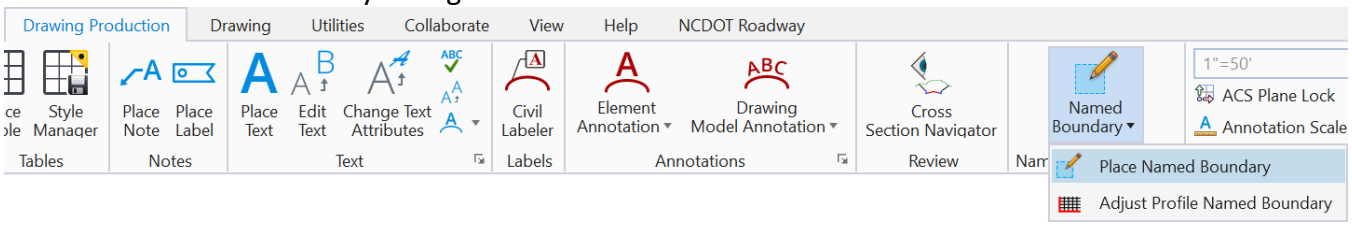
Now let's create the cross section sheets. Note that the intent is each corridor is layout separately in order that intersecting corridors (grade separation) will not display, not unless this is desired by the user.

A. Open the R-2635C_NCDOT_XPL_L.dgn (XS Port Layout) provided in the WorkSet folder: C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets

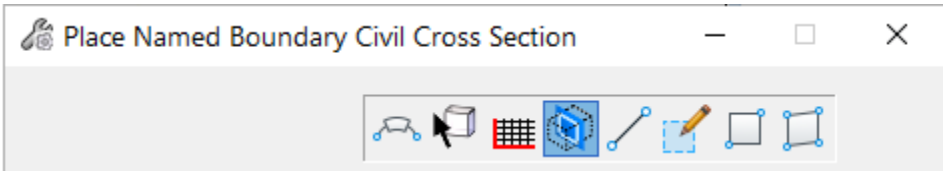
B. Workflow

1. Open both a **2D Plan** and **3D Views** (required).
2. Select the **Drawing Seed**.
3. Graphically ID the **horizontal geometry** in the **2D view**.
4. Set the **Start** and **Stop** station values.
5. Modify other fields and toggles as needed.
6. Enable the **Create Drawing** toggle.
7. Data point in the 2D view to place named boundaries.
8. Select **OK** on the **Create Drawing** dialog to create drawings and sheets.

C. Under the *Drawing Production* Tab → **Named Boundary** tool group → **Named Boundary** dropdown, choose the **Place Named Boundary** tool to access the Place Named Boundary dialog box.



D. Select the **Civil Cross Section** mode.



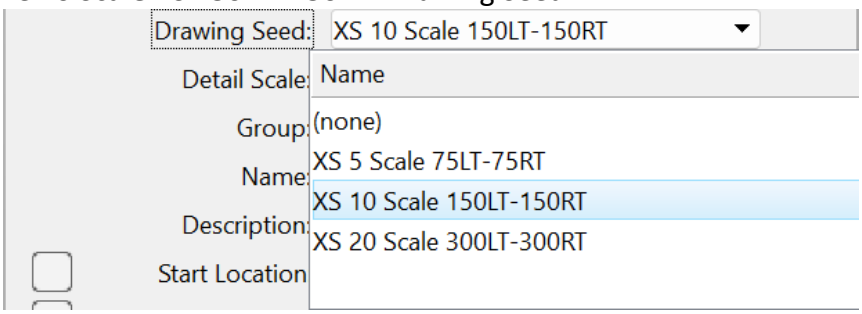
NOTE: You must have both the 2D default view and the 3D model view open before you place the named boundaries.

Below are the descriptions of the data fields for creating plan sheets:

Drawing Seed	Specifies the drawing seed that sets default values for all of the values on the dialog except the start and stop locations. Also contains definitions for what seed files are used to create the cross sections drawing and seed models including how the drawings are positioned on the sheets.
Detail Scale	Sets the scale at which the named boundary will be placed.
Name	Enter name of the named boundary.
Description	Enter brief description for the new group.
Group	Selects the named boundary group. You can also create a new group by selecting New from the drop-down.
Name	Enter name of the new group.
Description	Enter brief description for the new group.
Start Location	Sets the begin station.
Stop Location	Sets the stop station.
Length	(Available only when By Length is selected) Sets the length, along the path element, of the named boundary element. Also determines the location, along the path, of subsequent boundary elements. If you use the Measure Distance tool next to the field the measured distance displays in the Length field.
Left Offset	(Available only when By Length is selected) Sets the distance from left of the path. If you use the Measure Distance tool next to the field, the measured distance displays in the Left Offset field.
Right Offset	(Available only when By Length is selected) Sets the distance from right of the path. If you use the Measure Distance tool next to the field, the measured distance displays in the Right Offset field.
Interval	Specifies the spacing between consecutive cross sections.
Vertical Exaggeration	Specifies the vertical exaggeration for displayed cross sections. Values greater than 1.0 for this parameter increase the exaggeration.
Top Clearance	Enables the top clearance to enter a value.
Bottom	Enables the bottom clearance to enter a value.

Clearance	
Elevation Datum Spacing	When a profile is shifted, the starting elevation will always be a multiple of this this value.
Include Event Points Only	Adds Horizontal and Vertical Event points.
Include Control Points	Adds cross sections at horizontal control points such as PC and PT.
Backward Facing	When toggled on, the named boundary is created from right to left instead of left to right. This causes a cut view that faces the descending direction of the alignment. It will be possible to open files created in 10.08.00.88 in this version and vice versa. The Backward Facing attribute will be true on named boundaries that are created with the Backward Facing option toggled on. It will be false otherwise.
Create Drawing	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.
Show Dialog	When enabled, a dialog with additional parameters set by the Drawing Seed is shown.

E. Select the **20 Scale XS 150 LT-150 RT** Drawing Seed.



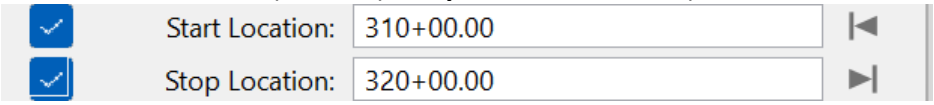
F. Set the **Group** to **(New)**.

G. The **Name** of the Group will automatically be set when selecting the **horizontal alignment**.

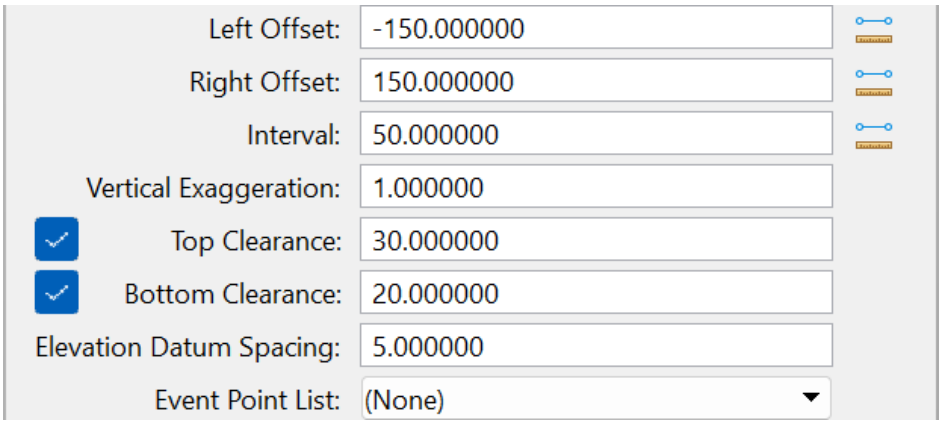
H. **Description** is optional.

I. Note the prompt in the lower left corner asking to **Identify Path Element**. The user will graphically select the **L** alignment on screen.

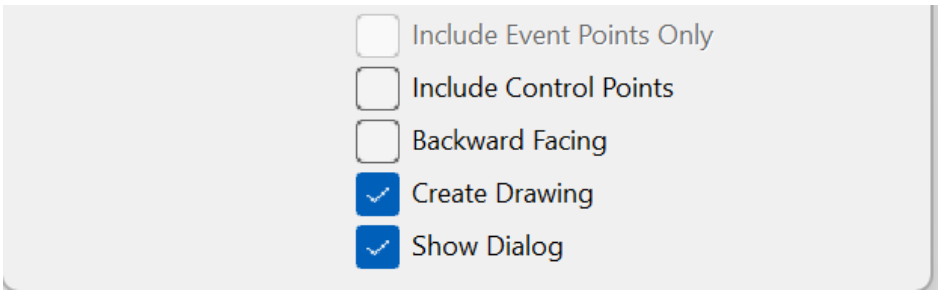
J. Key-in the **Start Location** (310+00), **Stop Location** 320+00) and hit **Enter**.



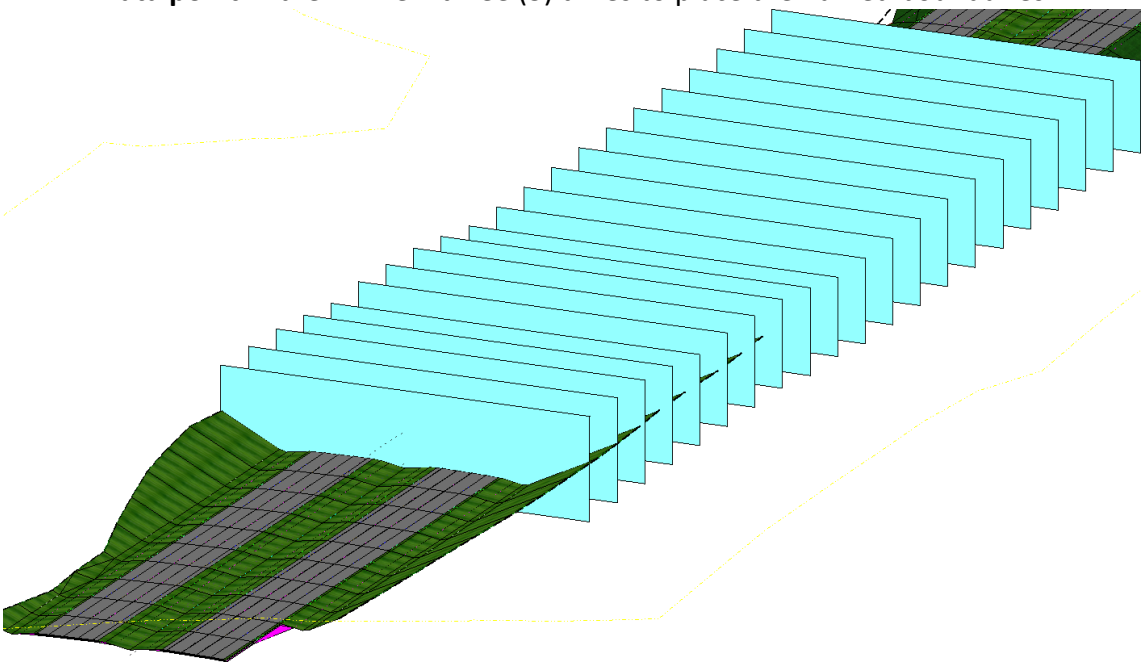
K. Verify remaining value based on the Drawing Seed selection.



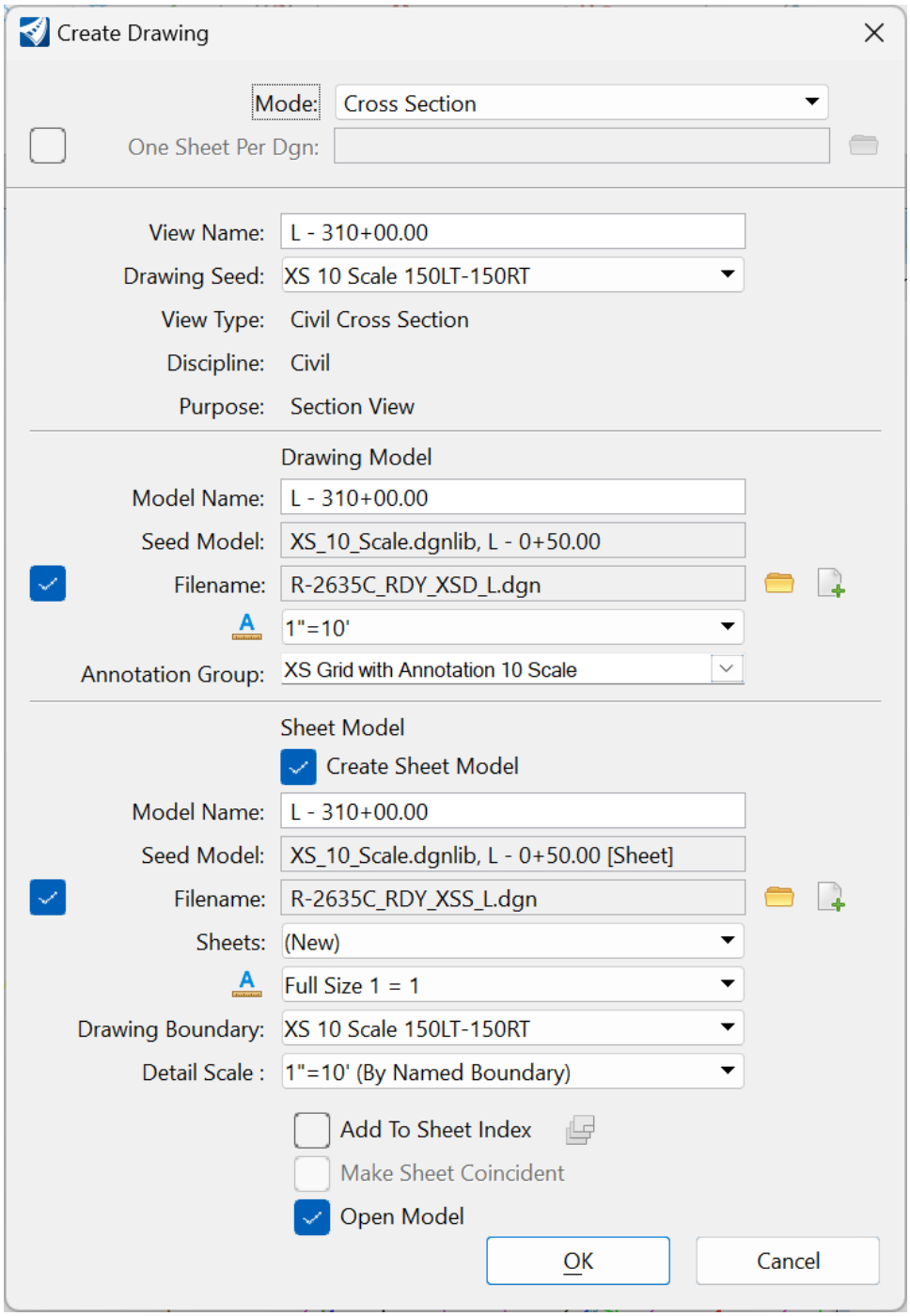
L. Check **Create Drawing** and **Show Dialog** Box.



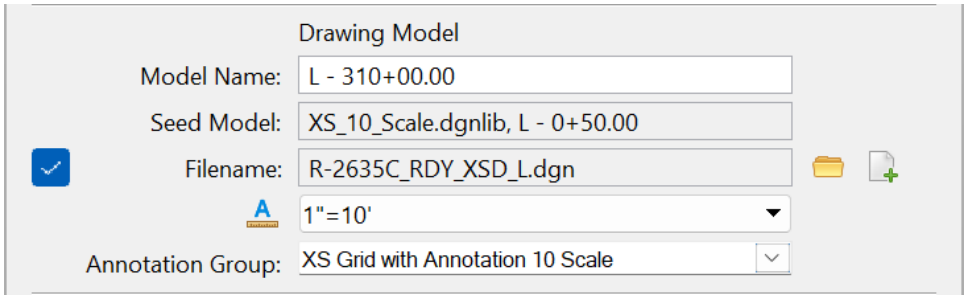
M. **Data point** in the 2D view three (3) times to place the named boundaries.



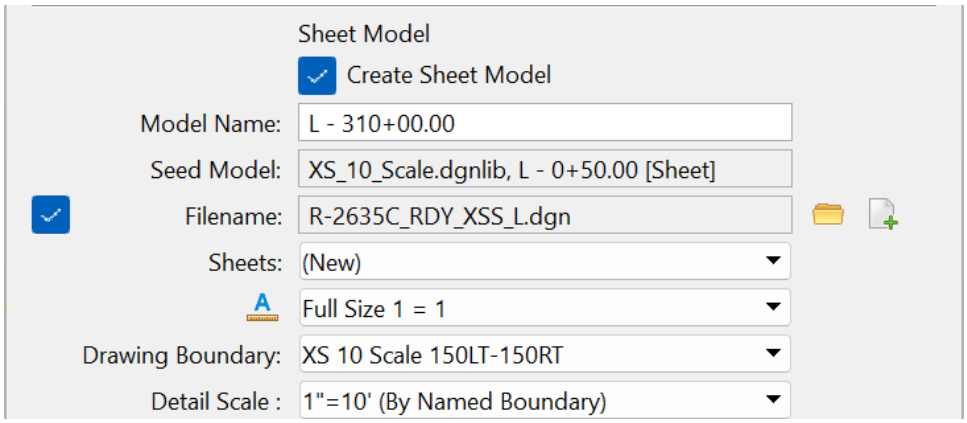
Create Drawing (Cross Section)



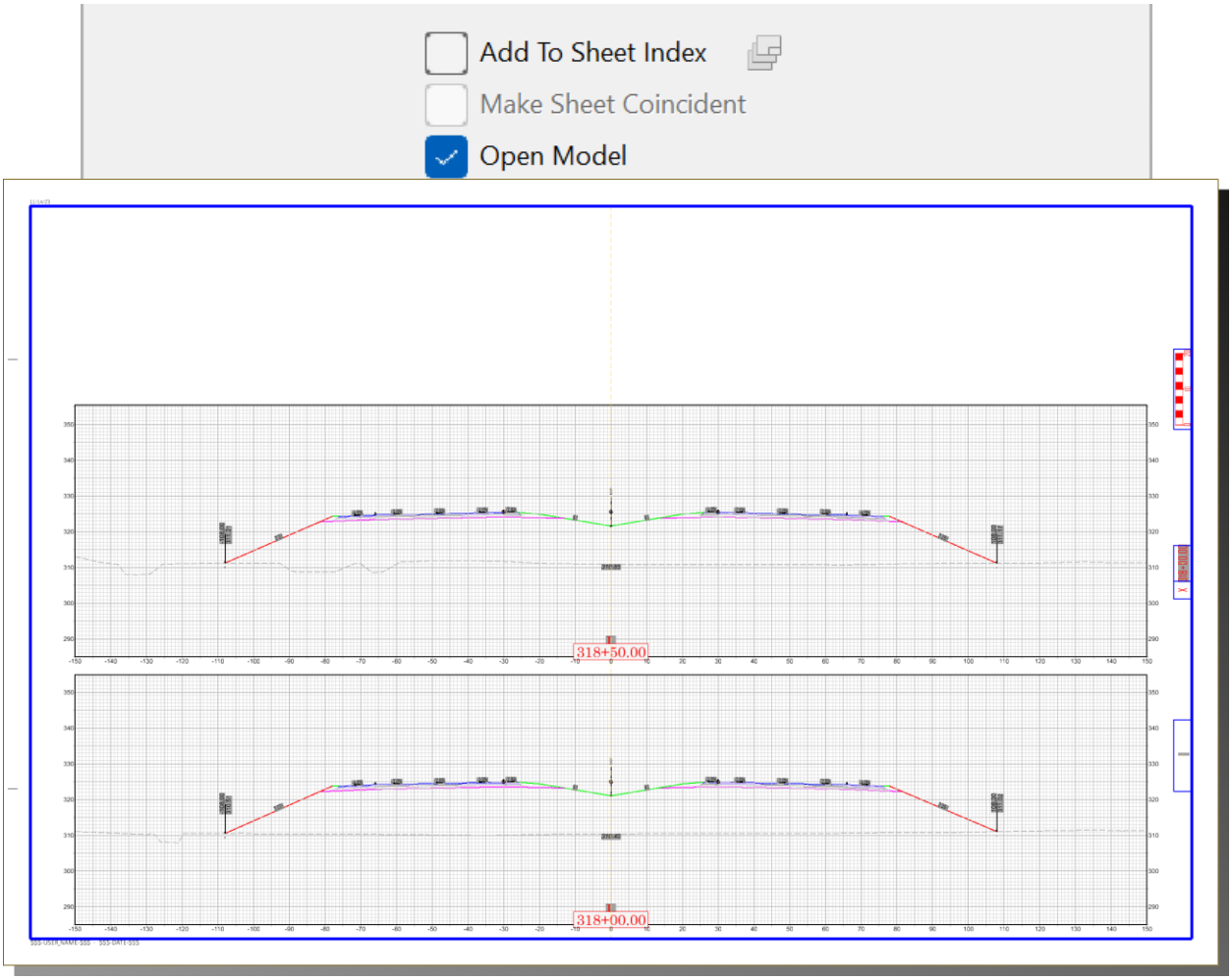
N. **Drawing Model** options:
Filename (check on to enable):
Browse Drawing File:
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_XSD_L.dgn**



O. **Sheet Model** options:
Filename (check on to enable):
Browse Drawing File:
C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_XSS_L.dgn**



P. Check the **Open Model** box and click the **OK** button to create drawings and sheets.



Exercise 10 – WorkSet and Sheet Index

Sheet Index is a **core Microstation function** to organize, group and re-number the **WorkSet** (Project) sheets. It works together with **Microstation Print, Print Organizer,** and **Pen Tables** (.tbl) to offer an extensive post-reproduction functionality. Sheet Index reads the **WorkSet DGNWS** file as its data source.

Project TIP Number

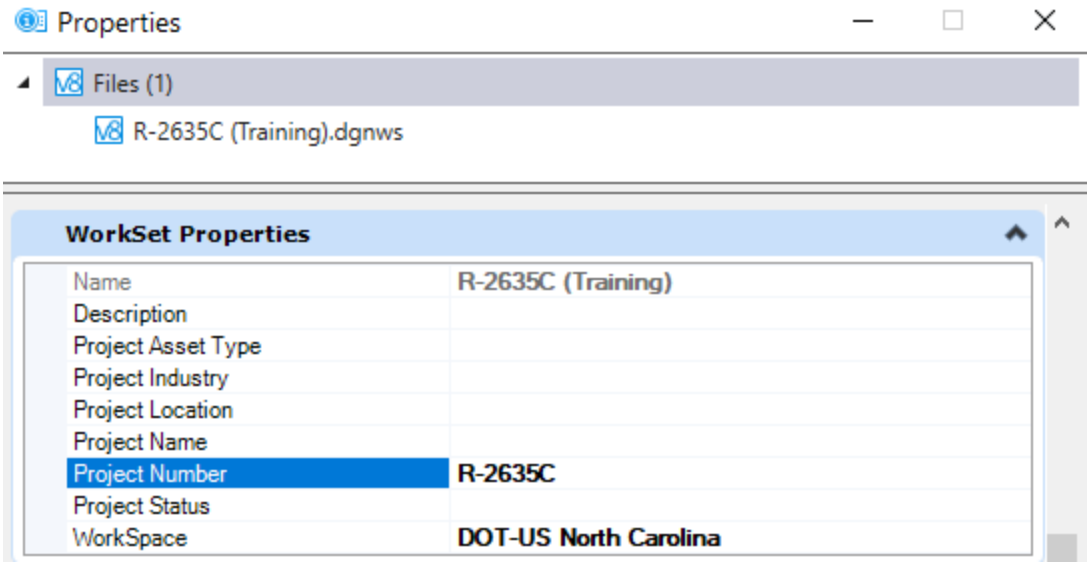
The **Project TIP Number** can automatically be entered on most sheets by directly editing the WorkSet **DGNWS** file. A DGNWS file is like any other DGN file you can open with Microstation. For most Projects, the DGNWS will be stored in a **WorkSet** folder. For this training, it is stored under:

{WorkSpace}\Configuration\Organization-Civil\Disciplines\NCDOT_Roadway\WorkSets**R-2635C (Training).dgnws**

A. Open the file **R-2635C (Training).dgnws.**

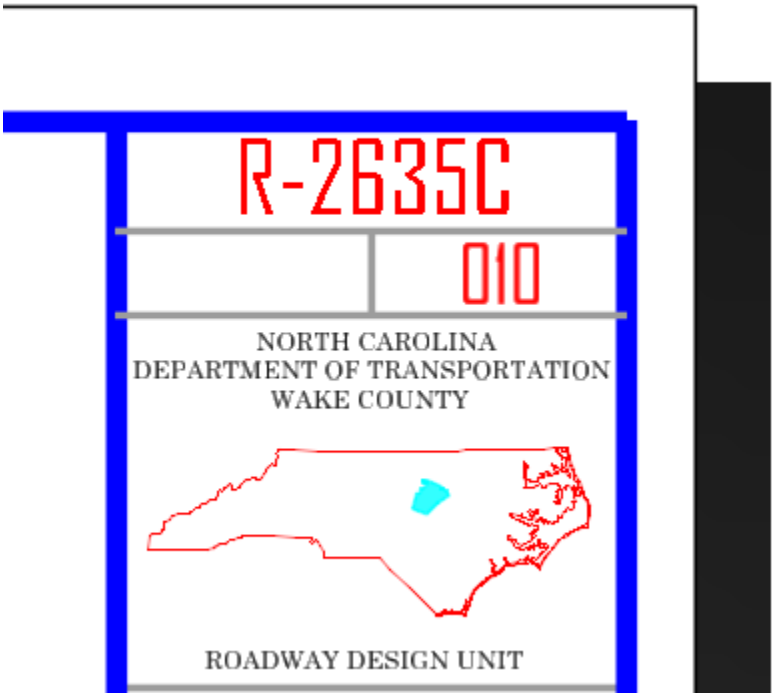
B. Click **File** >>> **Properties**.

C. Under the **WorkSet Properties** heading key-in **R-2635C** as the **Project Number**.



D. **Save Settings** and **Exit** out of the file.

E. Open a sheet model produced in earlier exercises and the **Project TIP Number** should automatically display in the upper right corner of the sheet.

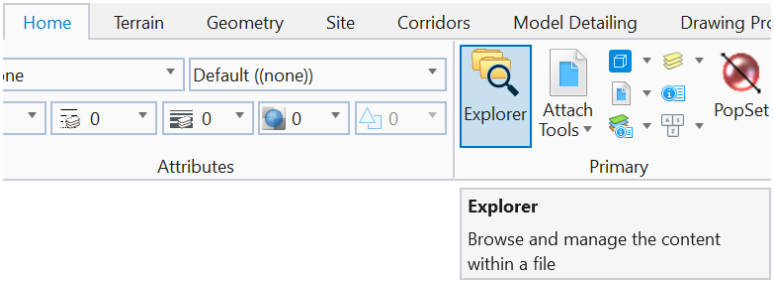


Sheet Index
Workflow

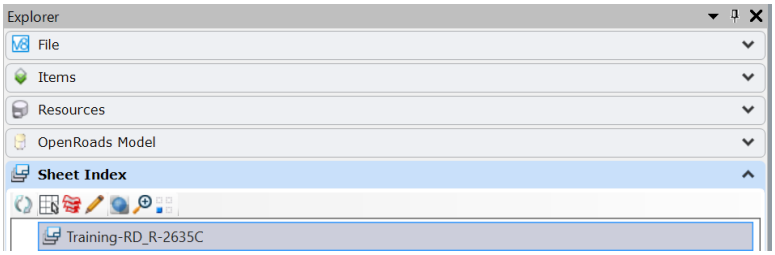
1. Create the **folder structure**.
2. Edit the **folder properties,** e.g., starting sheet number.
3. **Add** sheet models into the folder (create **sheet numbers**).
4. Manage and access any sheets from any location within the **WorkSet** (Project).
5. **Print, Print Organizer** and **PDF Creation**

A. Sheet Index can be edited from any DGN file within the WorkSet (Project). Open the **R-2635C_NCDOT_XPL_L.dgn** in the WorkSet folder.

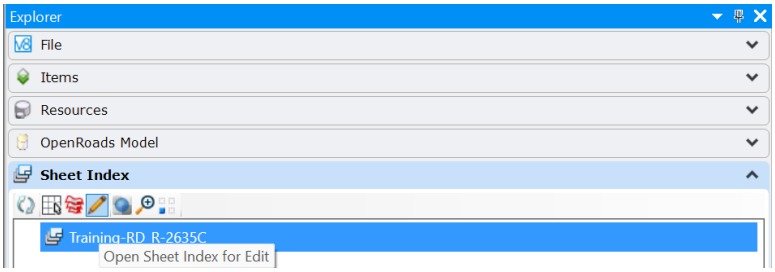
B. Click on the **Explorer** tool button.



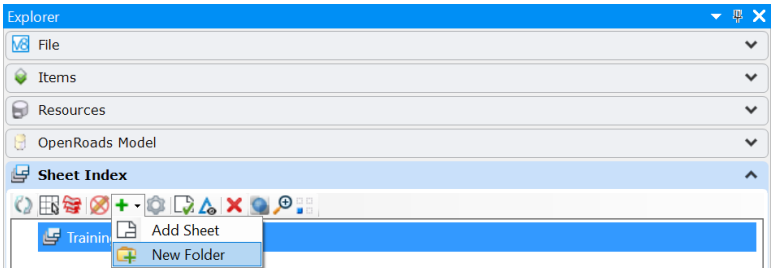
C. Click on the **Sheet Index** heading



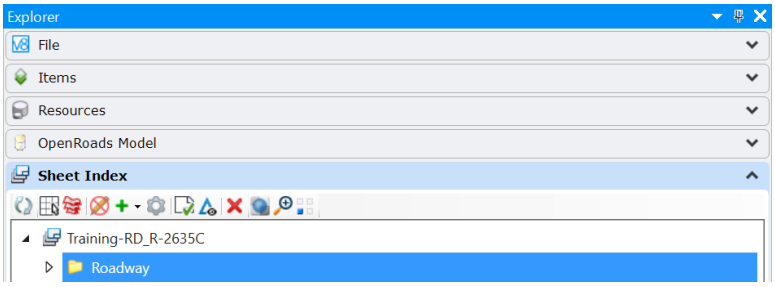
D. Click on **Open Sheet Index for Edit**.



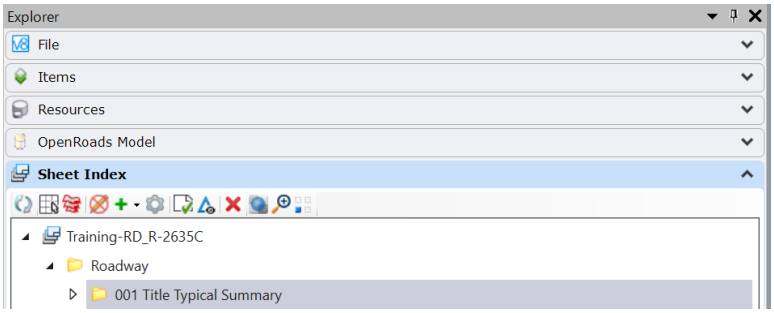
E. Click on **Create Folder**.



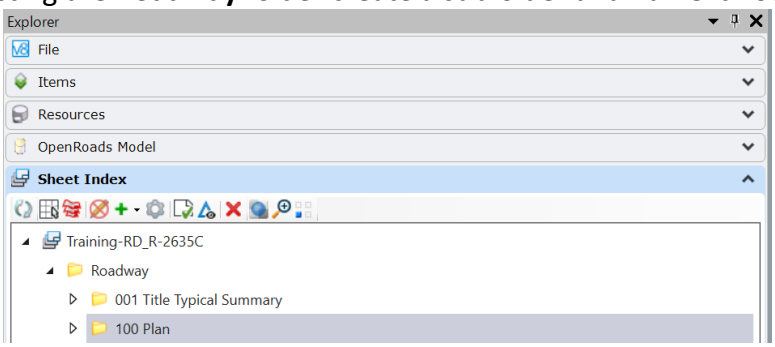
F. Key-in **Roadway** as the folder name.



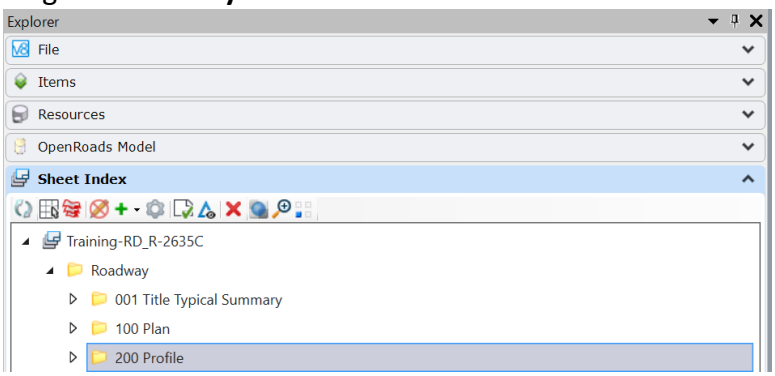
G. While selecting the **Roadway** folder create a subfolder and name it **001 Title Typical Summary.**



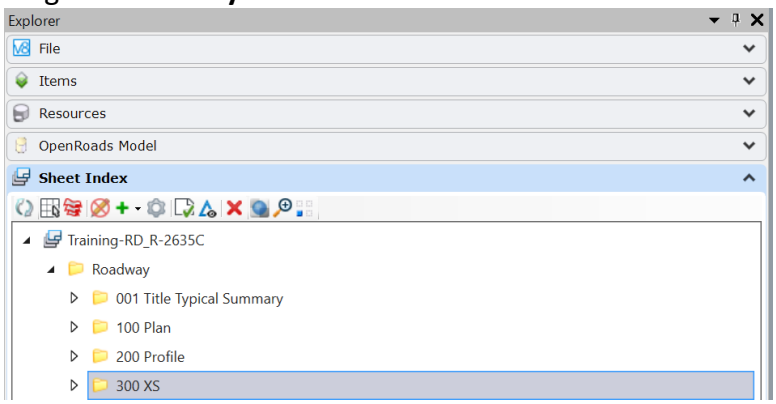
H. While selecting the **Roadway** folder create a subfolder and name it **100 Plan**.



I. While selecting the **Roadway** folder create a subfolder and name it **200 Profile**.



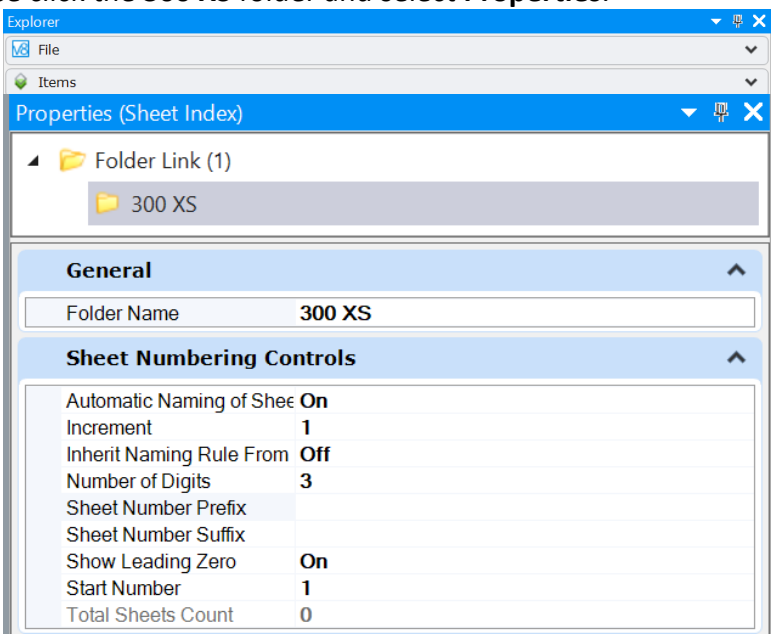
J. While selecting the **Roadway** folder create a subfolder and name it **300 XS**.



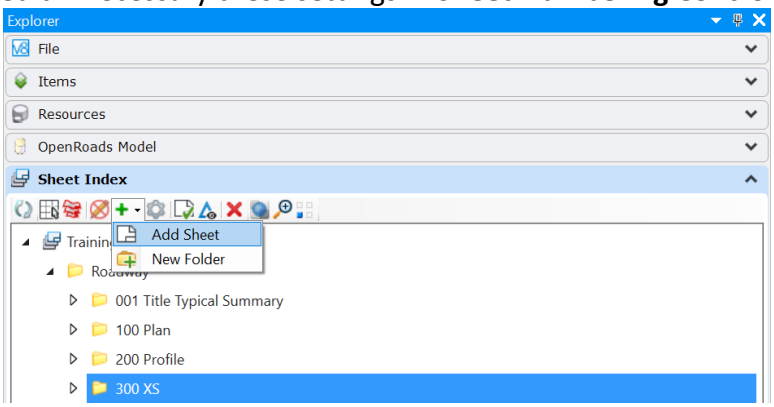
Sheet index can be used to renumber any plan, profile or cross section sheet as long as it is a **Microstation Sheet Model**. In this exercise we will renumber the cross section (XS) sheets.

Before

K. Right mouse click the **300 XS** folder and select **Properties**.



L. Verify and edit if necessary these settings in **Sheet Numbering Controls**, **Close** the dialog

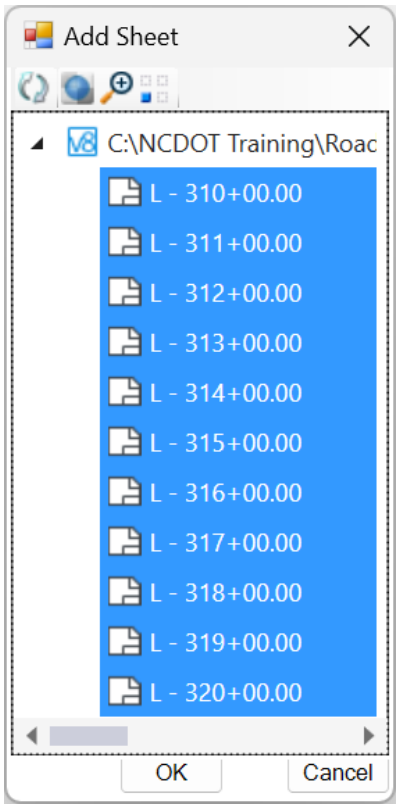


box and **Save Settings**.

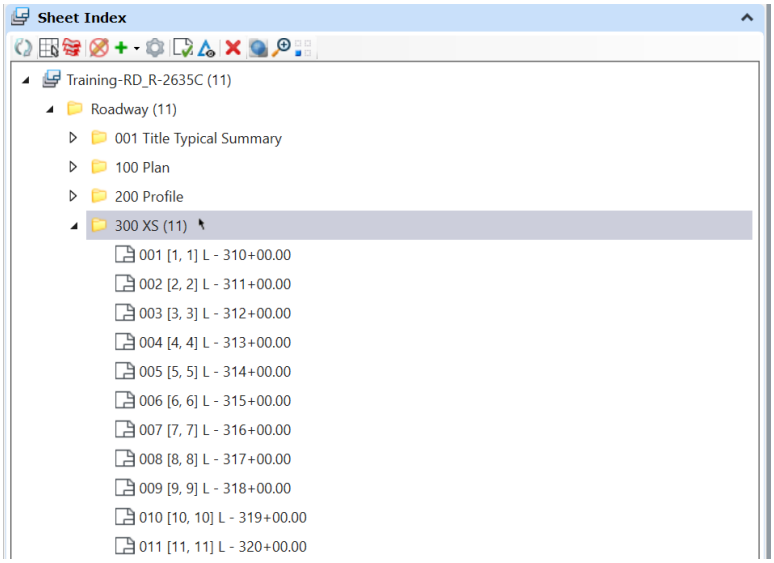
M. While selecting the **300 XS** folder click on **Add Sheet**.

N. Browse to:
C:\NCDOT Training\Roadway\Training RD_R-2635C\Module 13 - Sheeting\Roadway\Sheets**R-2635C_RDY_XSS_L.dgn**

O. Select all the sheet models and click **OK**.

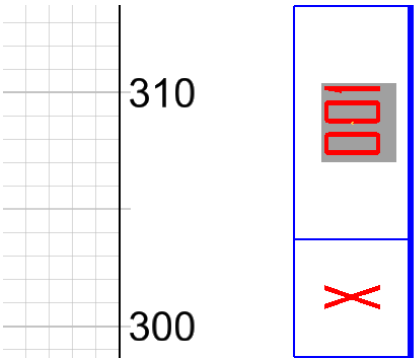


Sheets are now added to this folder and renumbered as part of the WorkSet (Project) Sheet Index.



You may access and open these sheets from any DGN file location (Windows file folder permissible) within the WorkSet (Project) simply by double clicking on it.

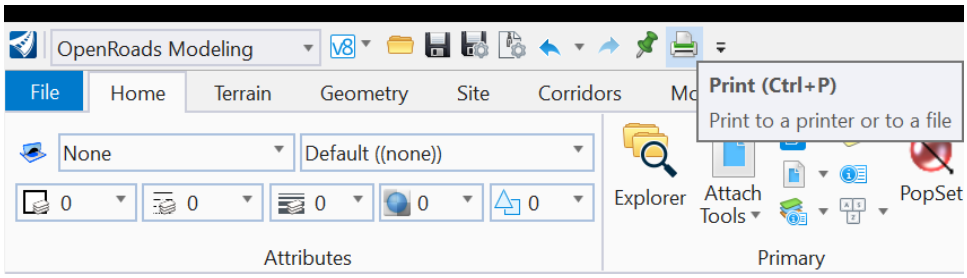
After



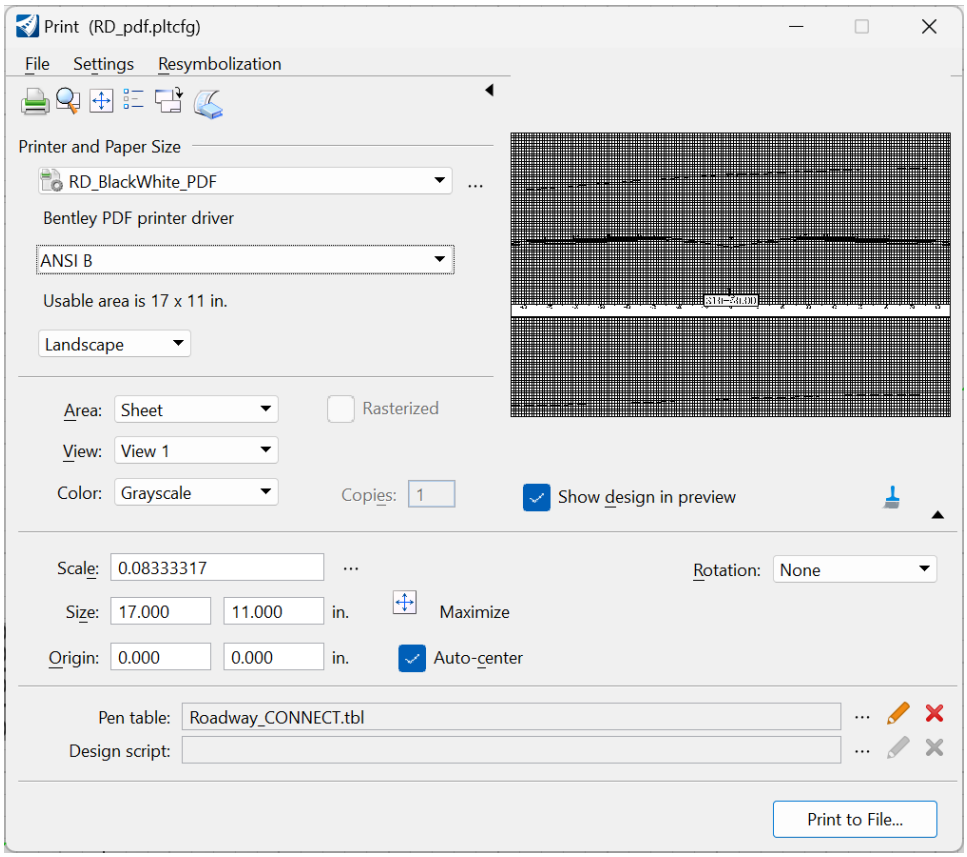
Print, Print Organizer and PDF Creation

Unlike iPlot and iPlot drivers where we can directly print from Microstation to the plotter, the procedure now is to create a PDF and then print if necessary.

A. To create a **PDF** from a **Microstation Sheet Model,** simply click on the **Print** icon in the **Quick Access Toolbar** (upper left corner).

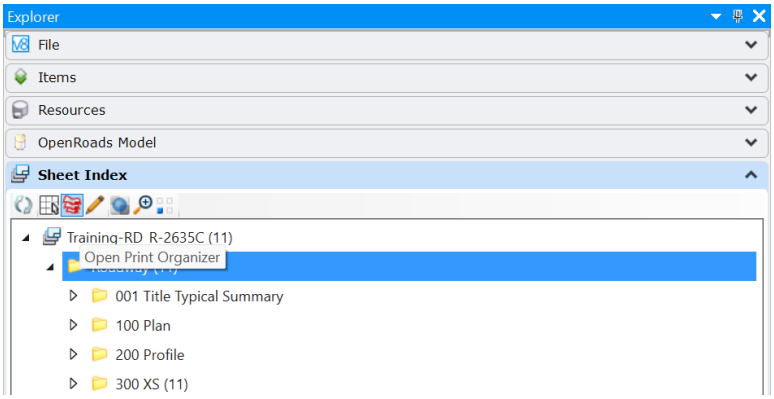


B. Note the default settings as configured in the WorkSpace. Adjust as needed and click **Print to File** to create the PDF.

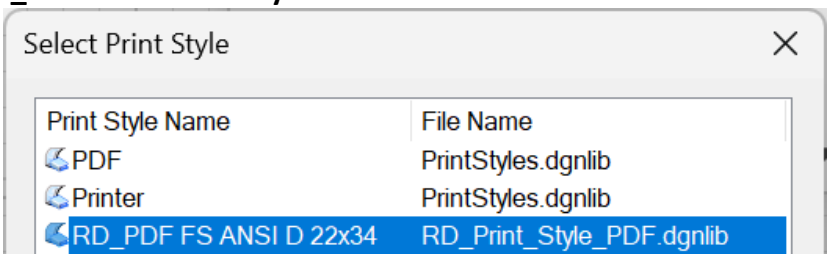


Print Organizer (.pset) is similar to iPlot Organizer (.ips) in terms of functionality. It can be used to organize, group and store the WorkSet (Project) sheets for post-reproduction work.

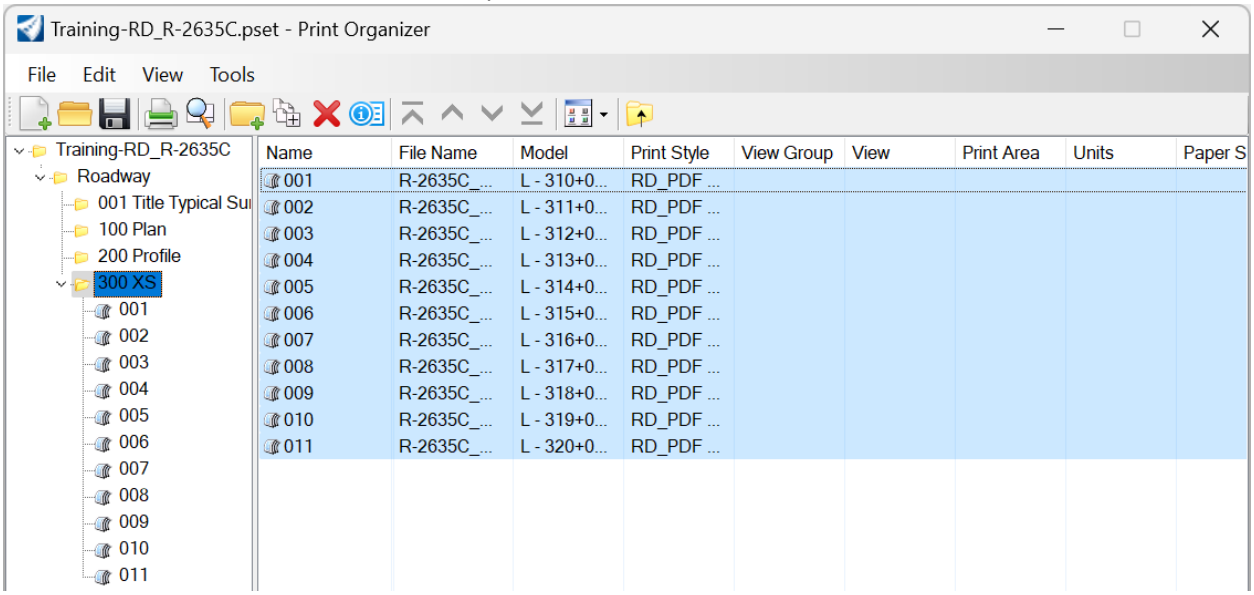
A. **Print Organizer** can be accessed in a couple of ways. One method is through **Sheet Index**. Select the root folder of your Unit and click on **Open Print Organizer**.



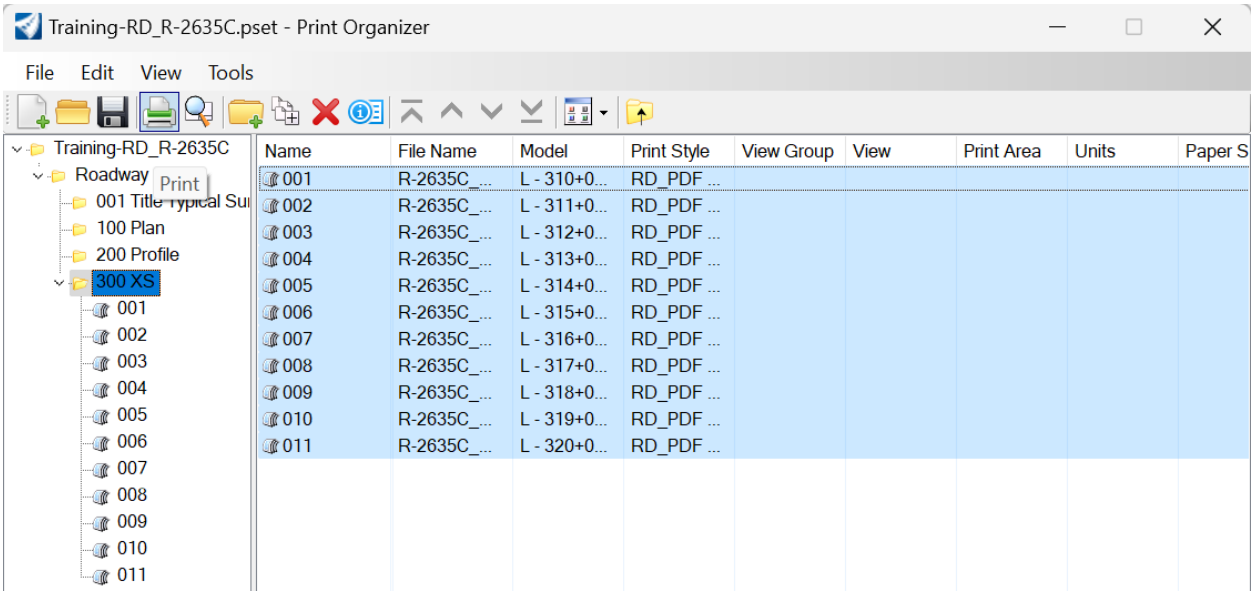
B. Select **RD_PDF** as the **Print Style**.



C. **Expand** the folder and select the sheets to create the PDF. (Click the folder icon on the left, not the individual sheets.)

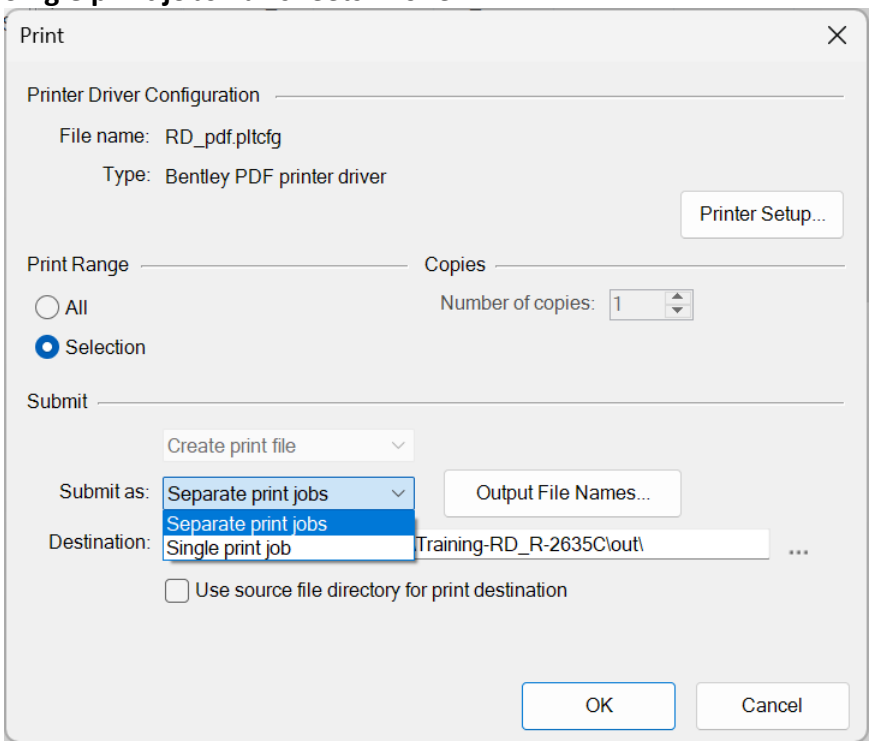


D. Click on the **Print** button

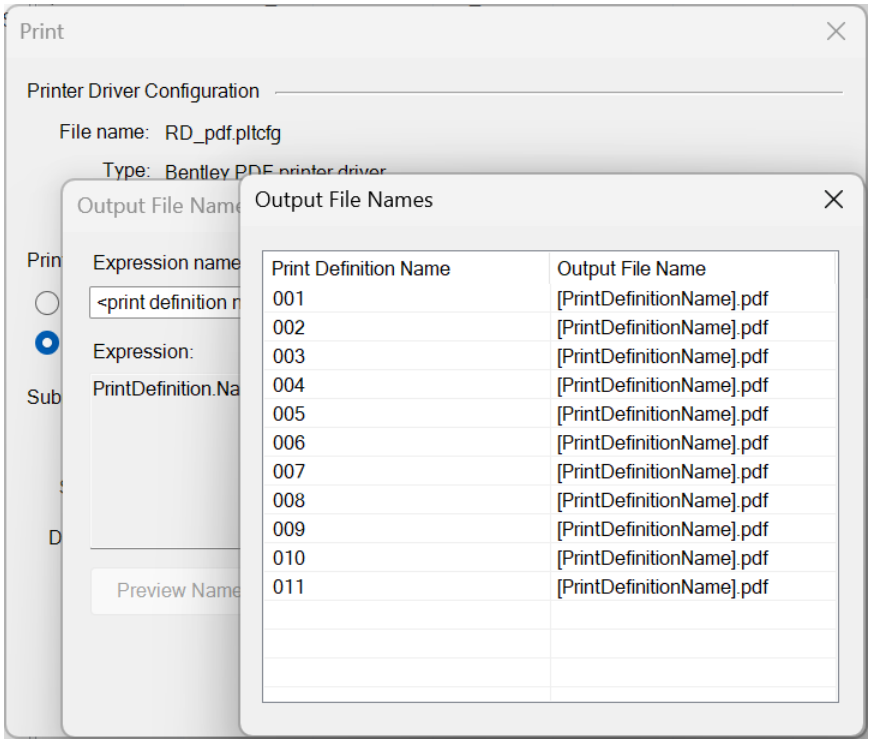


E. In the Print dialog box, **Submit as** has two (2) options:

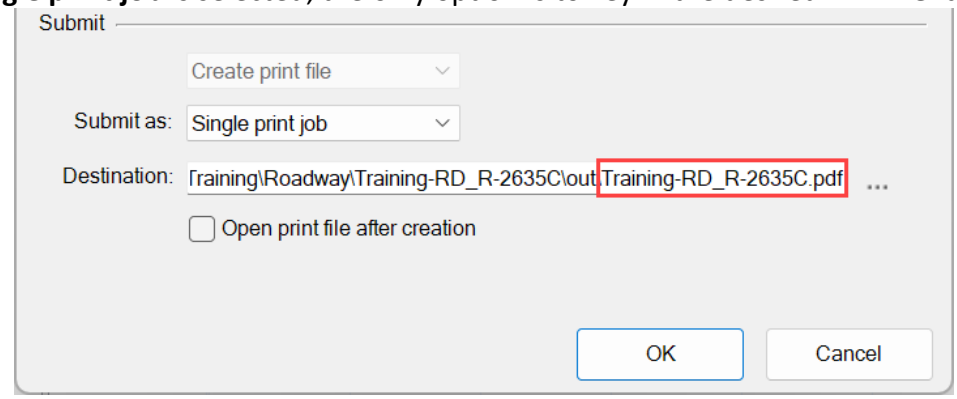
- **Separate print jobs** - each sheet in each PDF
- **Single print jobs** - all sheets in one PDF



If **Separate print jobs** is selected, an option to **Output File Names** is available. Users can customize the **PDF file name** with **sheet numbers**.



If **Single print job** is selected, the only option is to key in the desired **PDF filename**.



F. Review the created PDF(s).

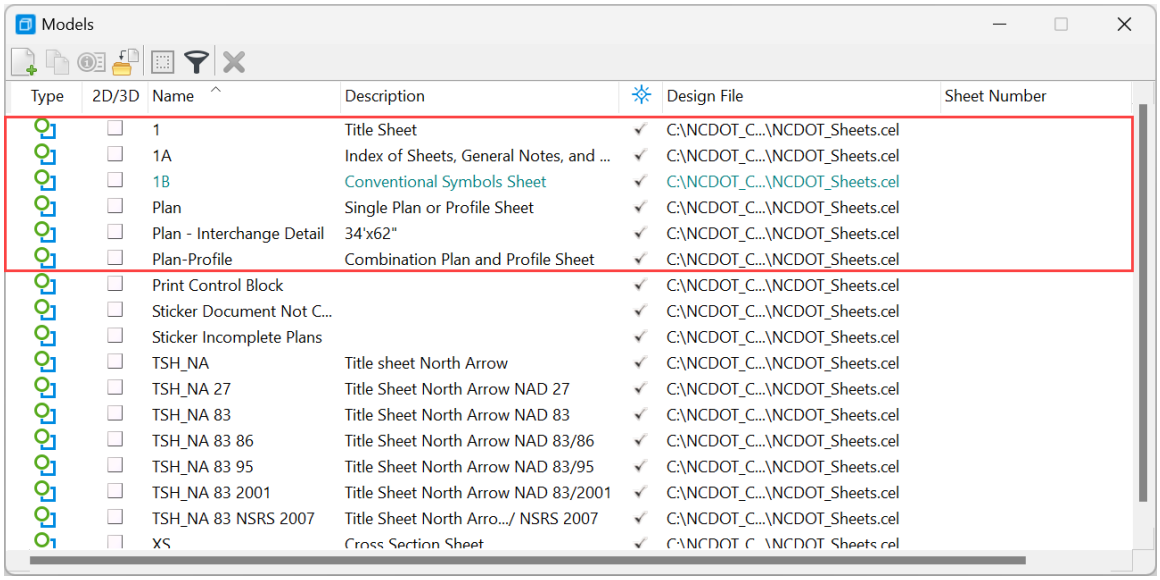
G. Save this file (**R-2635C (Training).pset**) for future use in the appropriate Project folder. C:\NCDOT Training\Roadway\Module 13 - Sheeting\Roadway\Sheets

Exercise 11 - Front End Sheets – (1 Series Sheets)

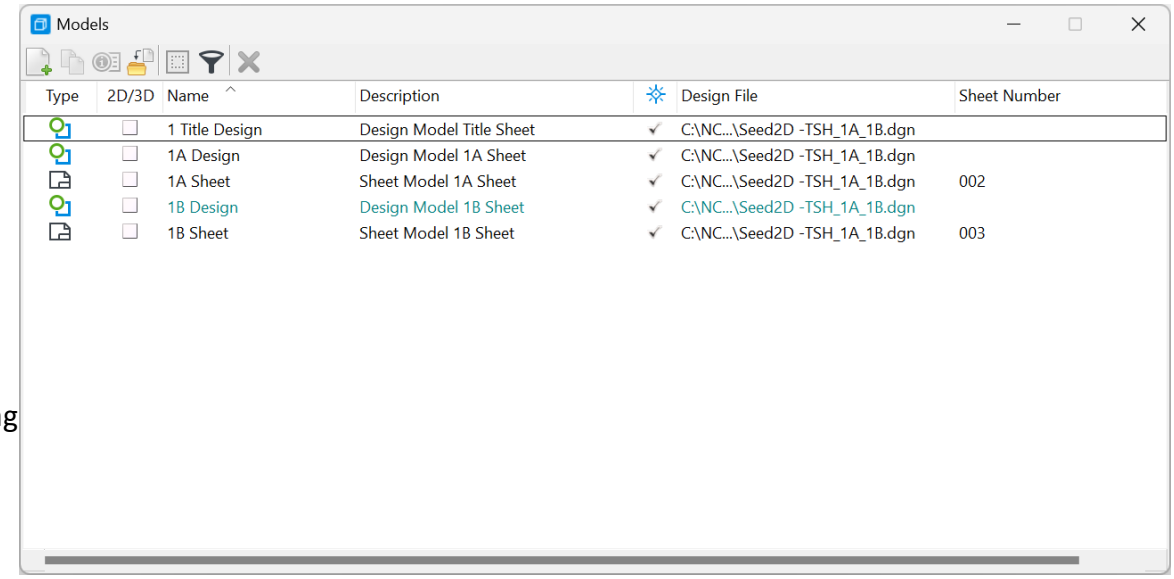
The rest of the plan sheets such as **title, typical, details, summaries** are produced as in the past with design elements being drawn into the files.

The sheet borders for these types of sheets are contain in the cell library (.cel).

{WorkSpace}\Configuration\Organization-Civil\NCDOT\Cell**NCDOT_Sheets.cel**

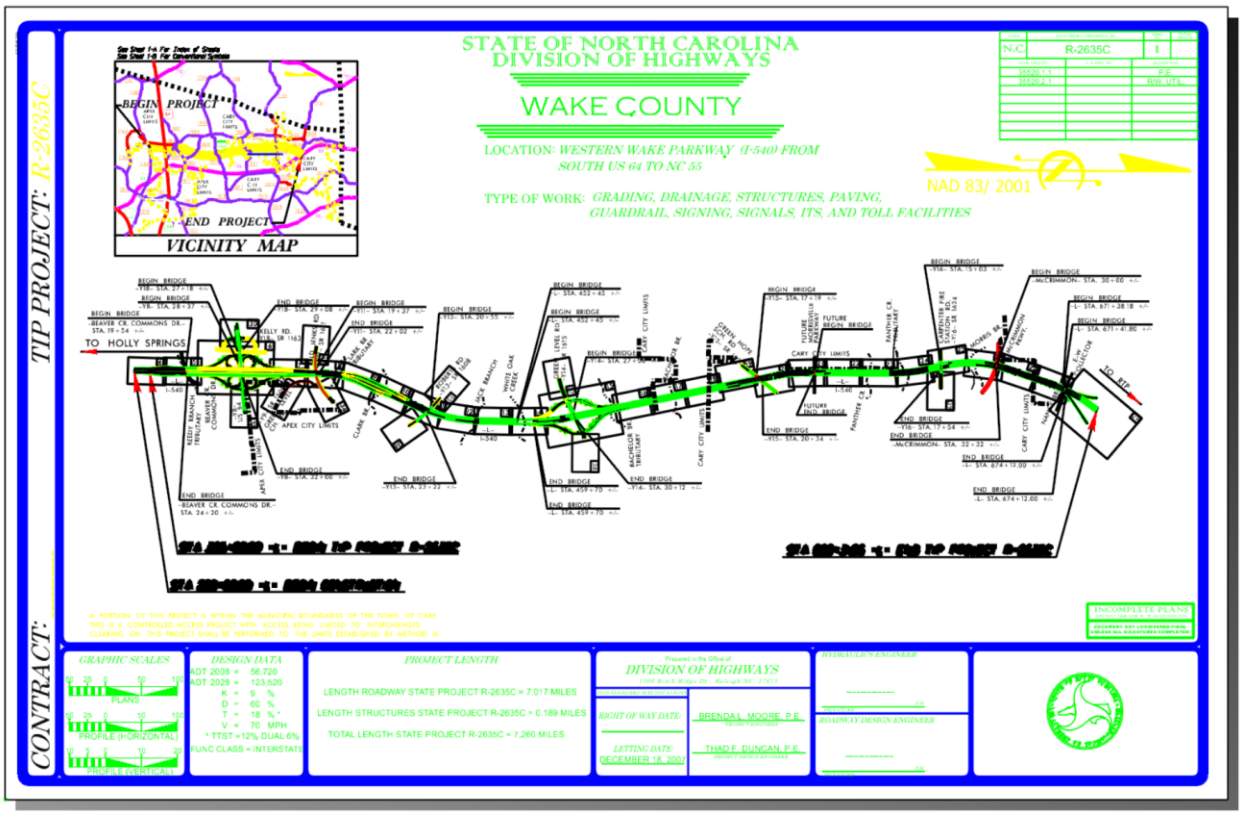


Note there is also a seed file in the WorkSpace which can be used to create the Title, 1A and 1B Sheets.
{Workspace}\{Configuration}\WorkSpaces\DOT-US North Carolina\Roles\NCDOT_Roadway\Standards\Seed**Seed2D -TSH_1A_1B.dgn**



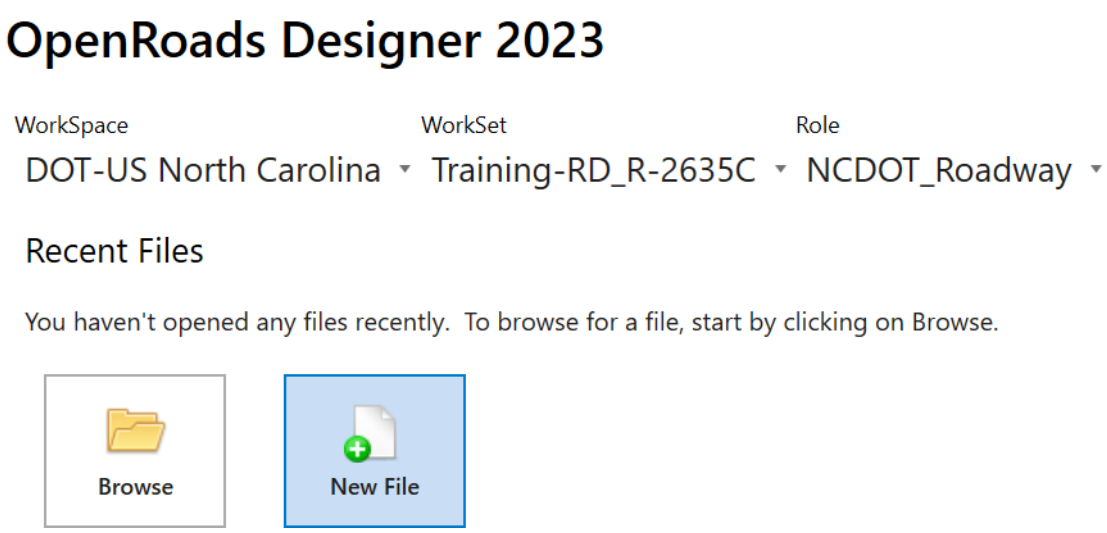
Pag

The Title sheet has a Design model that is referenced into the Sheet Model so it can be added to the Sheet Index. Below is an example of a new title Sheet referenced into a SHEET Model. There are only a few changes for this sheet in ORD

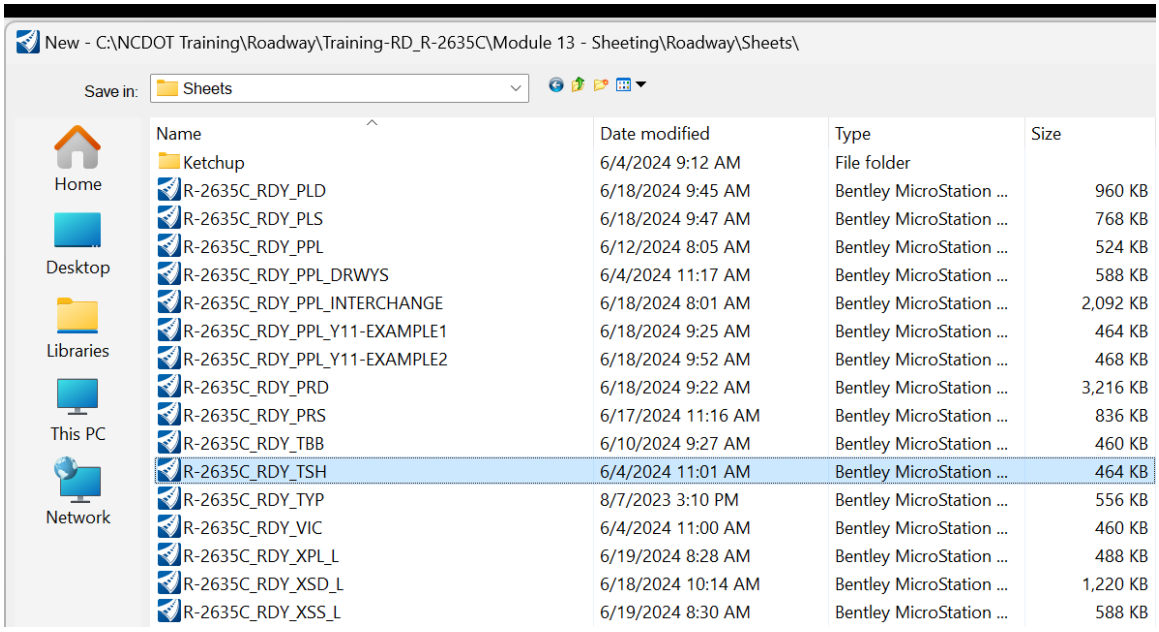


The seed file to start with is located here: C:\NCDOT_CONNECT_WORKSPACE\Configuration 10_10\Organization-Civil\NCDOT\Seed\Sheets\ Seed2D - English Design and 3 Sheets - ANSI D 22X34.dgn. This file contains 3 sheets set up for you to start and a design model to place the Title sheet border cell just as in V8i. The Title sheet will be produced as in the past in the Design model and then Referenced to a SHEET Model so it can be added to the Sheet Index for Printing. For this Training Module training this file has been provided
To create the Title Sheet drawing model that the sheet model is created from will be provided in the Data set.

Create a base Title sheet from a seed file
Create a new file with the above DGN used as a seed.



Select new file



Navigate to the Folder: C:\NCDOT Training\Roadway\Training-RD_R-2635C\Module 13 - Sheeting\Roadway\Sheets

There is already a completed Title sheet provided in data set to create a sheet model with so we will name this training Title sheet: R-2635C_RDY_TSH_training.dgn. We will use the seed file: C:\NCDOT_CONNECT_WORKSPACE\Configuration 10_10\Organization-Civil\NCDOT\Seed\Sheets\ Seed2D - English Design and 3 Sheets - ANSI D 22X34.dgn.

Pag

Select Save

We now have a blank file to start the Title sheet with.

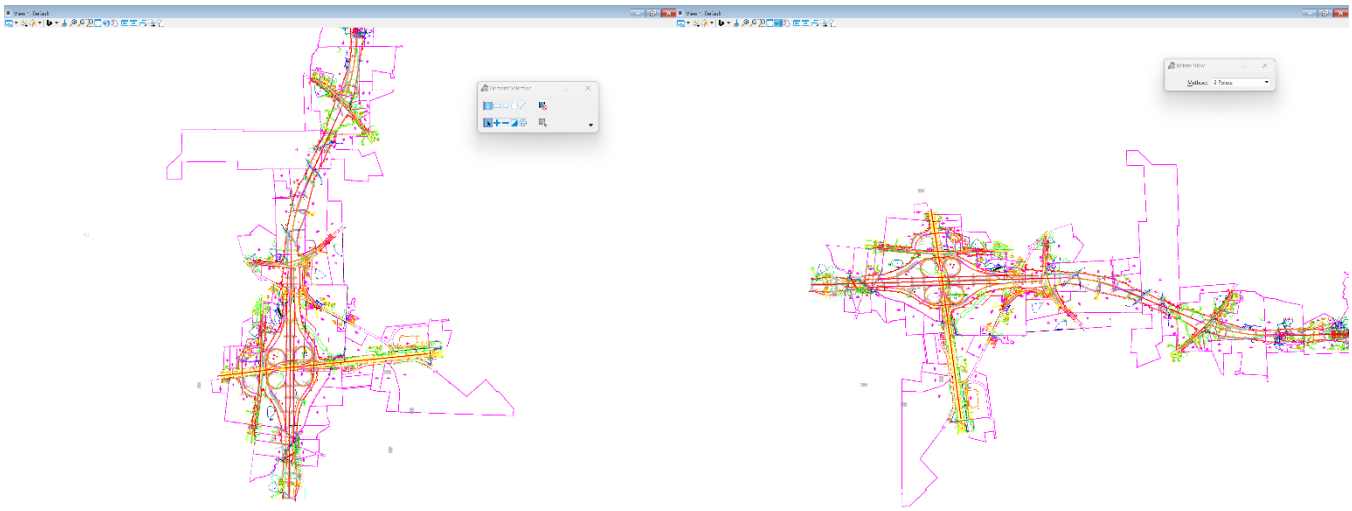
Next we need to attach the Sheet Boundary Layout file Located here:

C:\NCDOT Training\Roadway\Training-RD_R-2635C\Module 13 - Sheeting\Roadway\Sheets\R-2635C_RDY_PPL.dgn

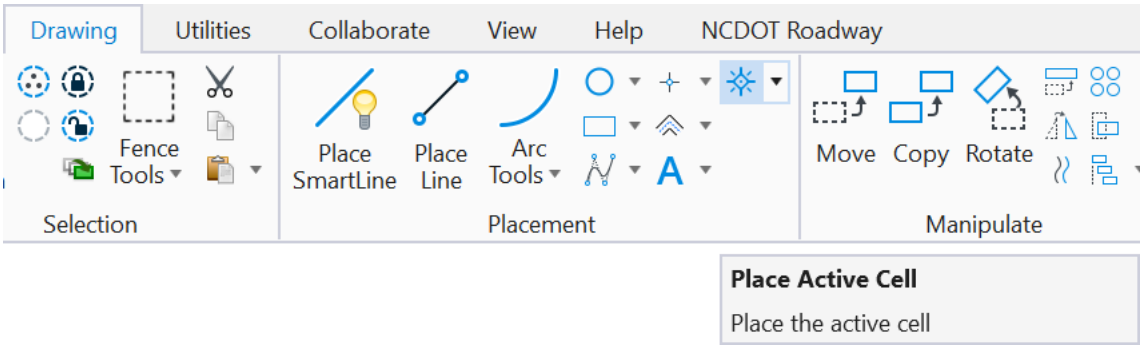
And, the Alignment file located here:

C:\NCDOT Training\Roadway\Training-RD_R-2635C\Module 13 - Sheeting\Roadway\Alignment\R-2635C_RDY_ALG.dgn

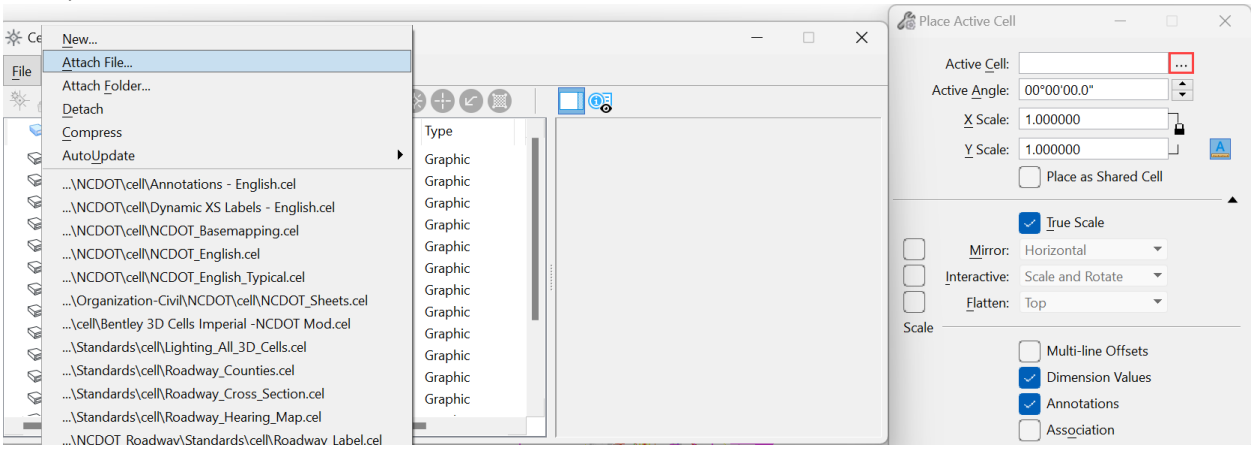
These files come in oriented north so we need to rotate the view 90 Deg. You can also use one of the borders to rotate the view by 2 points



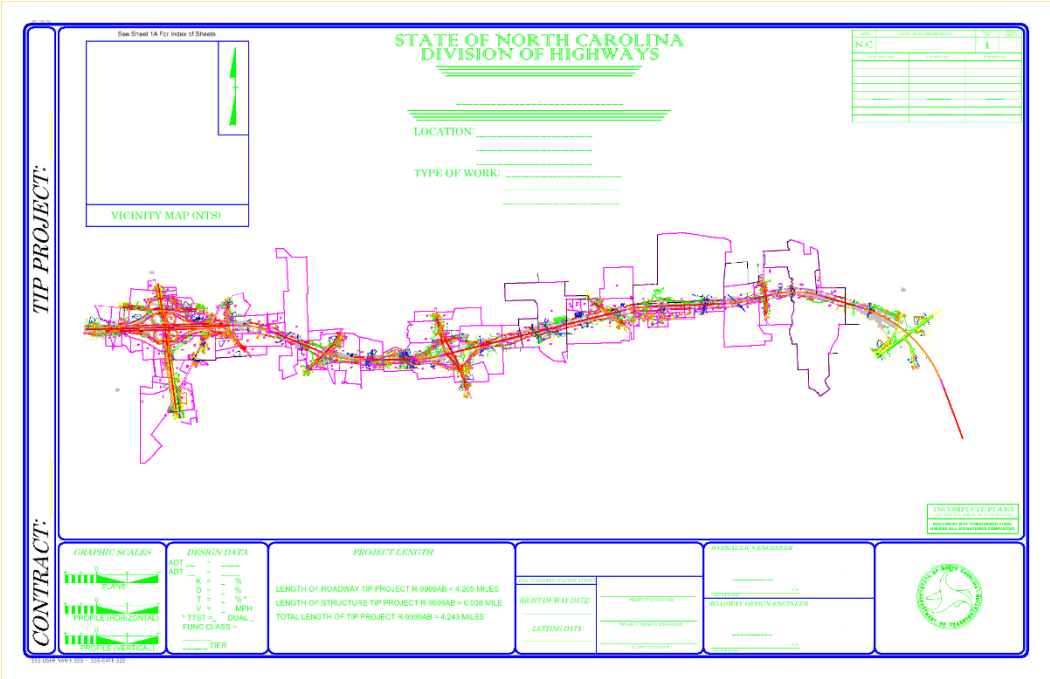
We can now place a Title sheet cell from the C:\NCDOT_CONNECT_WORKSPACE\Configuration_2023\Organization-Civil\NCDOT\Cell NCDOT_Sheets.cel select 1 for Title Cel
You must use the Place Active Cell tool



Then, attach the cells to the file.



The scale for the cell needs to be large to cover the sheet layout I used 17000. Place the cell so that the sheet boundary is in this general location.



Now we will manually place a sheet block to cover the area of the sheet boundary which only goes from matchline to matchline.

Sheets 1A and 1B have the sheet cell from NCDOT_ Sheets Cell library directly inserted into the sheet. (This process is the same as Microstation SS2 other that this needs to be done in a Sheet Model so the sheet can be added to the Sheet Index.)

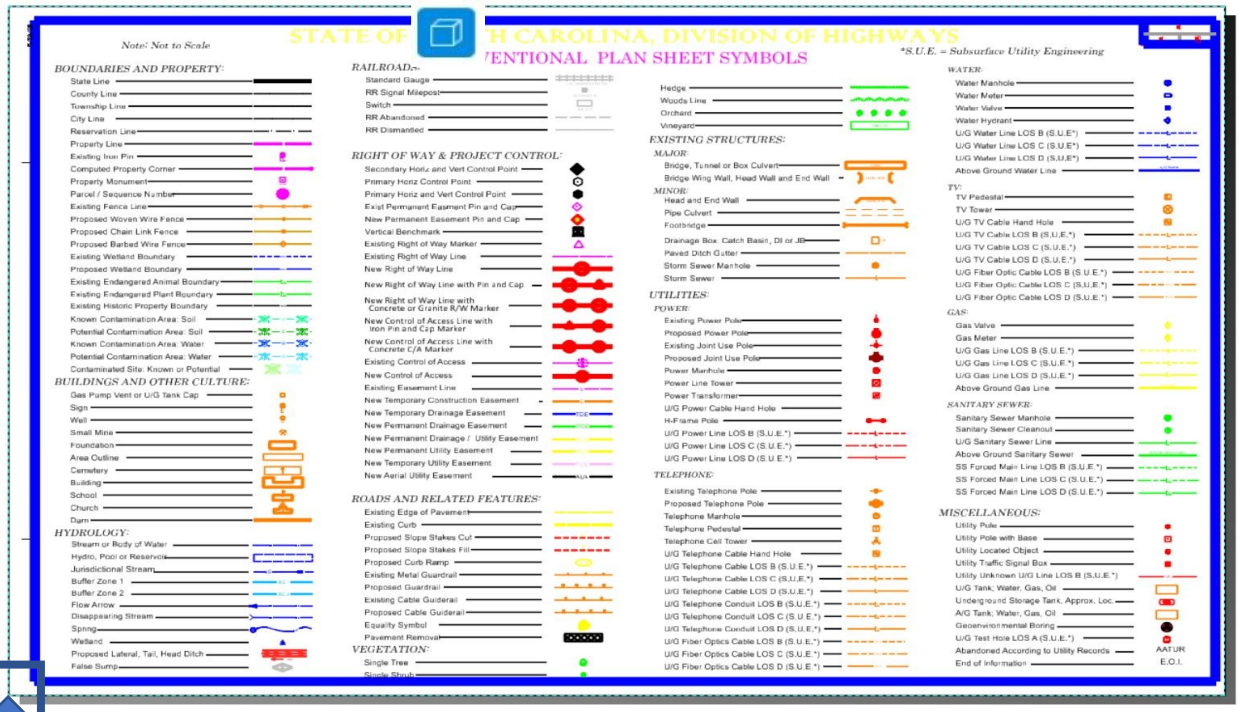
Index of sheets, Standard Drawing List and General Notes- Sheet 1A
Sheets 1A and 1B have the sheet cell from NCDOT_ Sheets Cell library directly inserted into the sheet. (This process is the same as Microstation SS2 other that this needs to be done in a Sheet Model so the sheet can be added to the Sheet Index.)
As discussed before in this module you can go to the Models (Select Home > Primary > Models) Drag and drop the sheet model project sheet Index folder.

sheet models are located at 0,0. This is also the insertion point for cells to create these sheets.

Conventional Plan Sheet Symbols – Sheet 1B

Sheets 1A and 1B have the sheet cell from NCDOT_ Sheets Cell library directly inserted into the sheet. (This process is the same as Microstation SS2 other that this needs to be done in a Sheet Model so the sheet can be added to the Sheet Index.)

As discussed before in this module you can go to the Models (Select Home > Primary > Models) Drag and drop the sheet model to the project sheet Index folder.



All sheet models are located at 0,0. This is also the insertion point for cells to create these sheets.

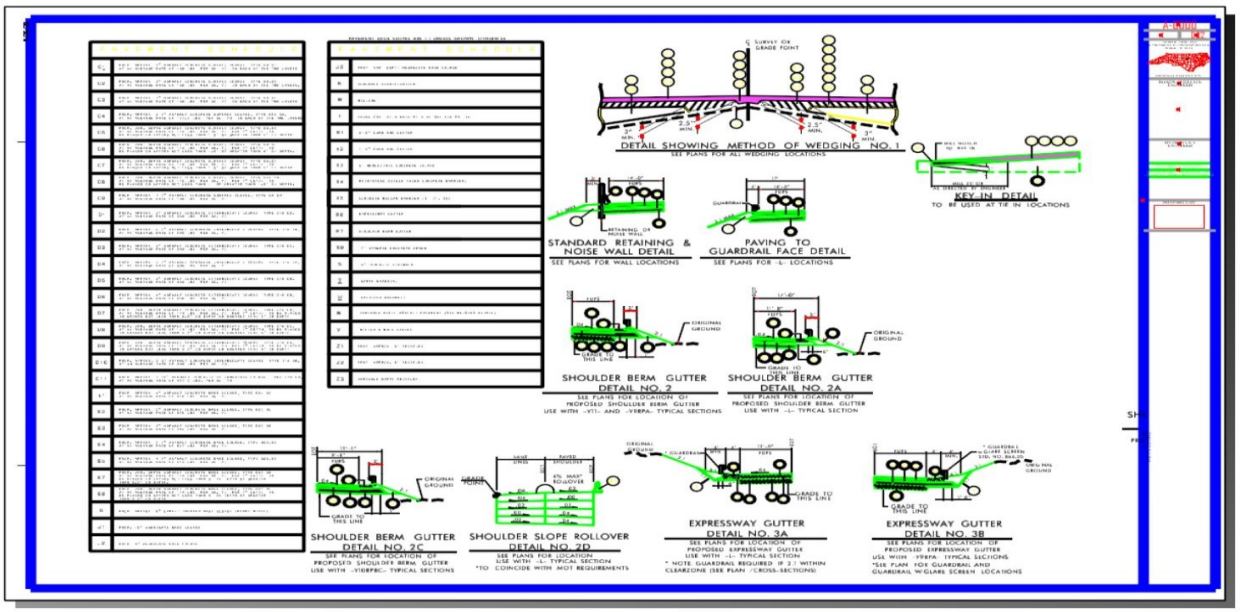
Typical Section Sheets - Sheet 2 (Series 2 sheets)

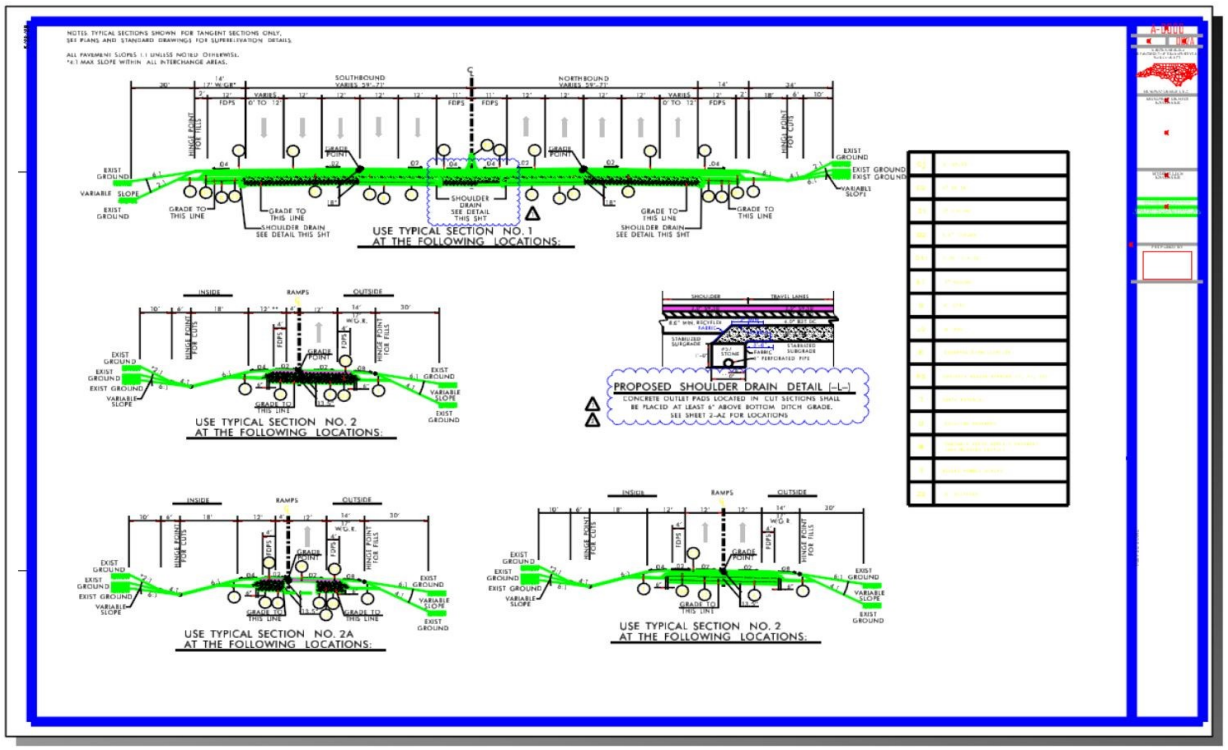
The Typical section sheet has a Design model that is referenced into the sheet Model so it can be added to the sheet index. sheet cell from NCDOT_ Sheets Cell library directly inserted into the sheet.

Plan sheets such as title, typical, details, summaries are produced as in the past with design elements being drawn into the files and a border referenced. The seed file to start with is located here: C:\NCDOT_CONNECT_WORKSPACE\Configuration 10_10\Organization-Civil\NCDOT\Seed\Sheets\ Seed2D - English Design and 3 Sheets - ANSI D 22X34.dgn. This file contains 3 sheets set up for you to start. The user will manually reference a design Model to a sheet Model for producing these sheets. This is a different workflow that the sheets semi-automatically produced for plan, profile, and cross section layout.

(This process is the same as Microstation SS2 other that this needs to be done in a Sheet Model so the sheet can be added to the Sheet Index.)
As discussed before in this module you can go to the Models (Select Home > Primary > Models) Drag and drop the sheet model project sheet Index folder.

R-2635C_RDY_TYP.dgn (Typical Sections)

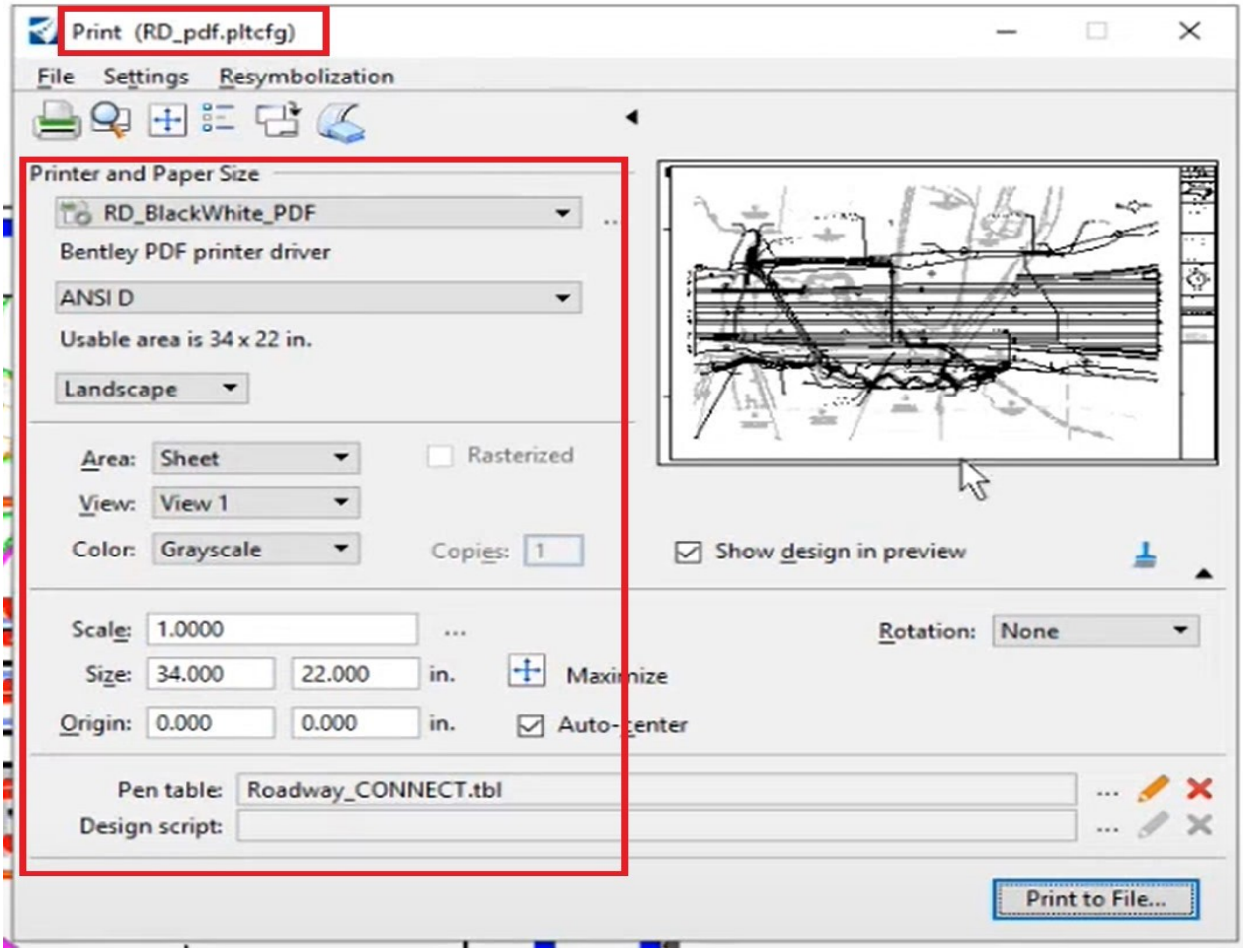




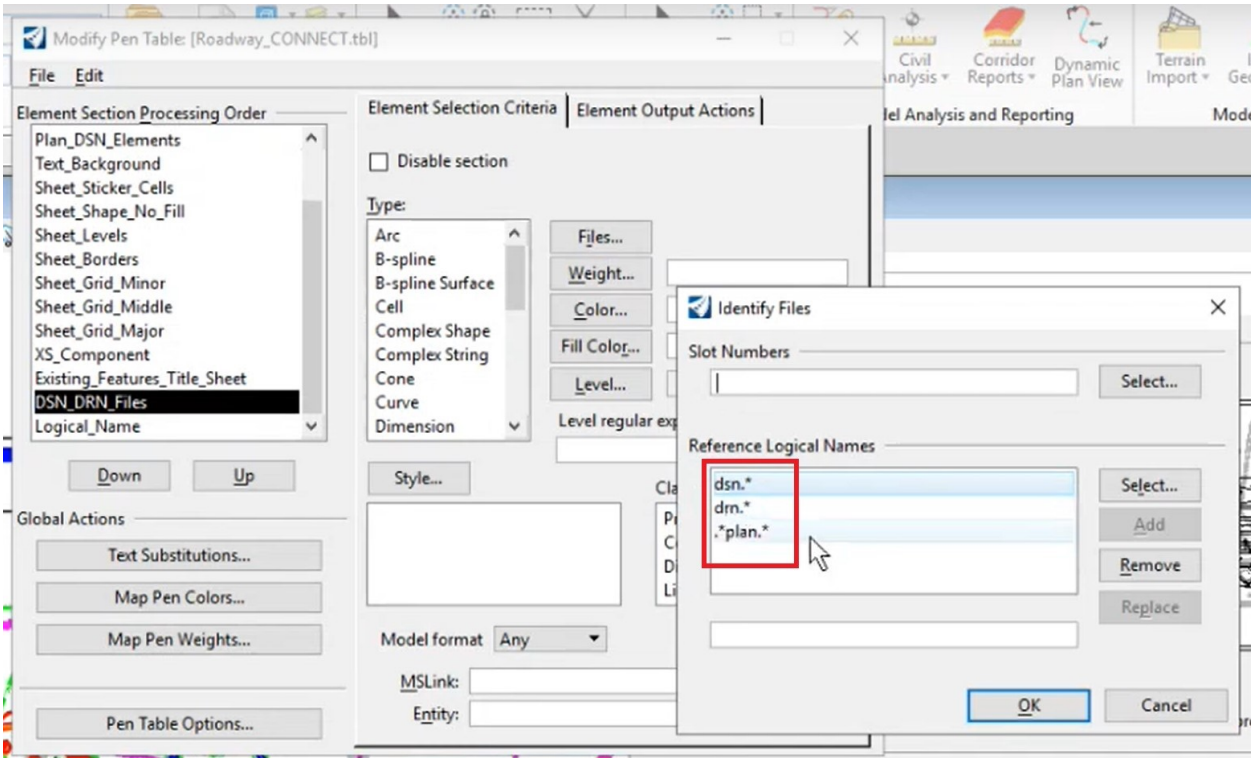
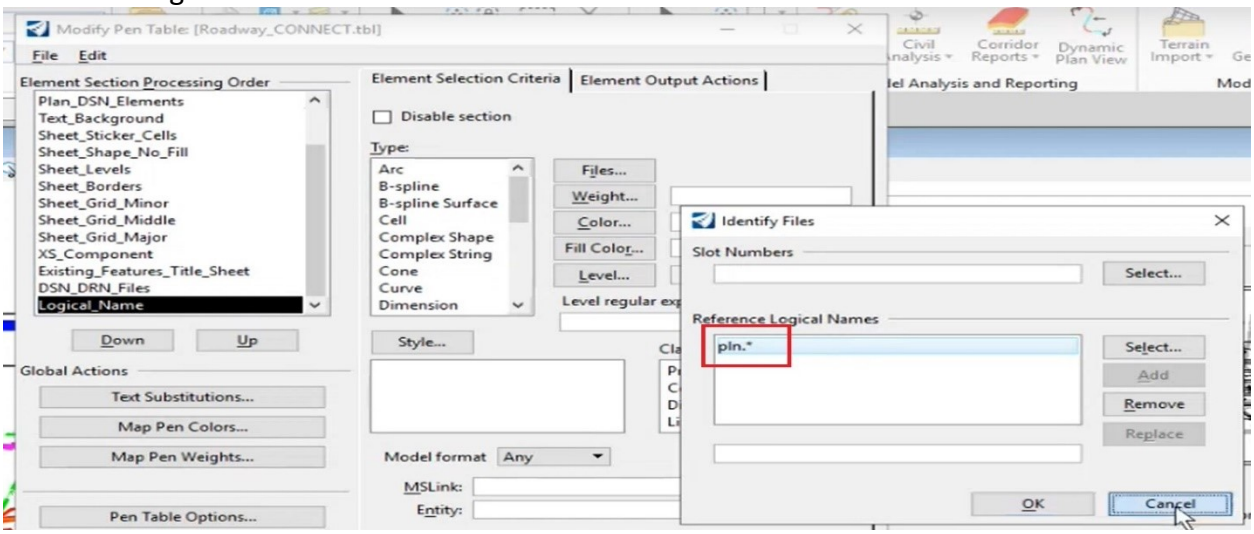
Printing: Exercise 10

NCDOT ORD workspace now uses Microstation print to produce PDF and plots.

The PLTCFG are located here C:\MICROSTATION_CONNECT_WORKSPACE-10.10\Configuration\Organization-Civil\Disciplines\NCDOT_Roadway\Standards\Plot\RD_pdf.pltcfg. This is the roadway example but other disciplines have a plot config in the same folder.
The Roadway pen table is also located in this folder : Roadway_CONNECT.tbl
If you use the Roadway role the PLTCFG will setup your print dialog box for you to print.



The Roadway_CONNECT.tbl still uses levels but also uses logical names to control printing.



The above logical names will make these elements in the file BOLD.