

# How to make Culvert TSL Sheet and annotate the structures

These instructions were created on 7/13/2021. These instructions were created with:

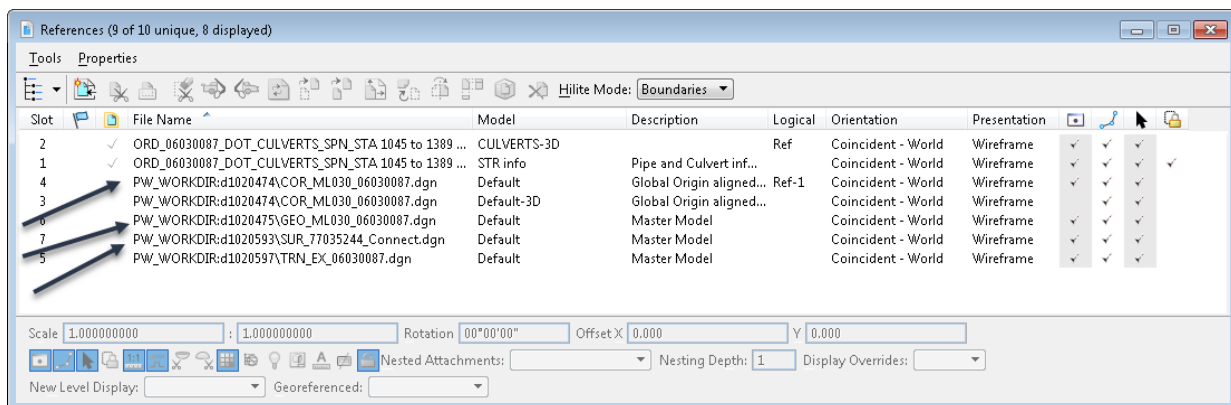


**OpenRoads Designer CONNECT Edition - 2020 Release 3 Update 9 - Version 10.09.00.91**

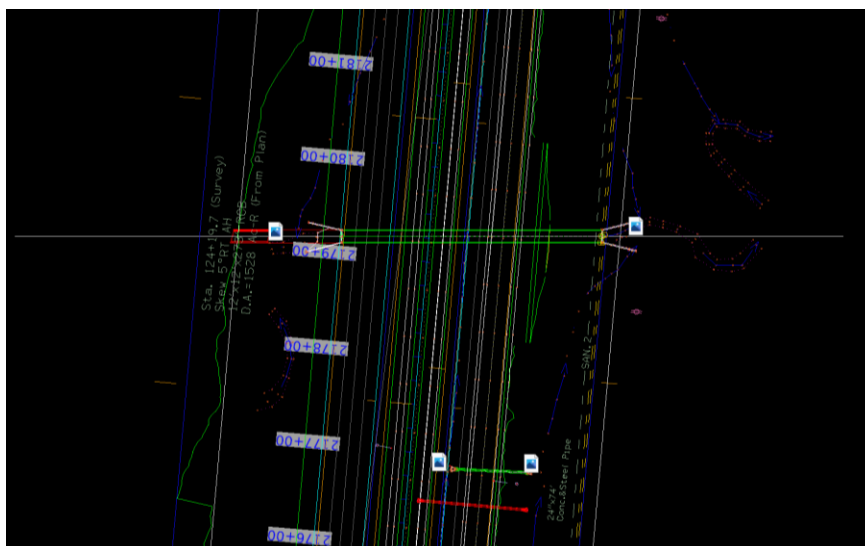
This is the stage to use the Create Drawing dialog to automate the drawing and sheet model creation and place the views in them.

To create a Culvert TSL sheet, open the DGN file. This example will use the ORD\_06030087\_DOT\_CULVERTS\_SPN.dgn.

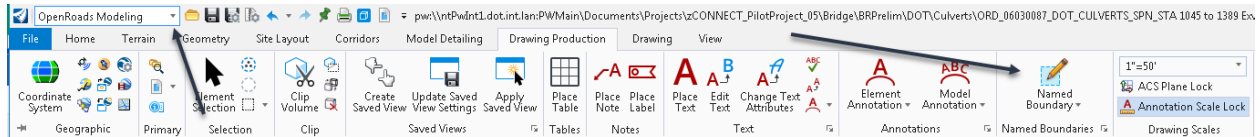
In the 2D PIPES model, reference attach everything that will be used to design the structure, all the source information that will be needed and/or wanted to display on the TSL sheet in the plan view. Also needed will be the TXT\_CCRRRPPP.dgn file from the Design folder to get the station and tick marks for the alignment.



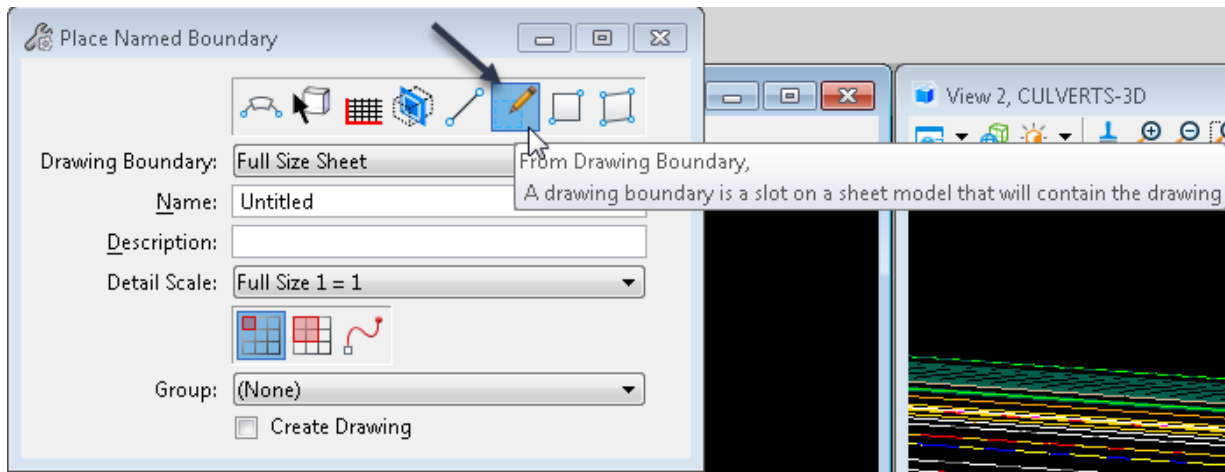
Next rotate the view into the orientation that is needed to be displayed on the TSL sheet. It should look something like this:



Next, under the OpenRoads Modeling workflow, select the **Named Boundary** tool. Note: if working in a Multi Model View, be sure to have the 2D view active when placing the boundary in the 2D view. Also make sure to have all the references turned on in the 3D view for the information to properly display on the plan sheet.



Selecting the Named Boundary tool will open the Place Named Boundary dialog box. Select **From Drawing Boundary** option at the top.

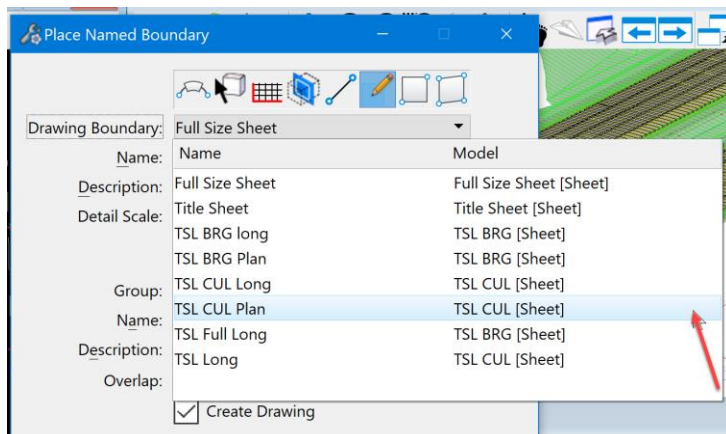


In the From Drawing Boundary pull down, select the sheet seed that will best fit the desired output.

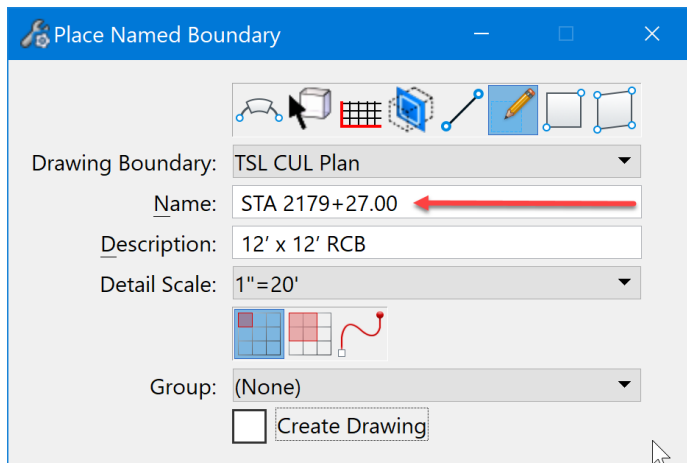
The first Drawing Boundary needed is the **TSL CUL Plan**. This option will place the traditional plan view and will leave space on each side of the plan view for extra notes.

The second Drawing Boundary needed is the **TSL BRG Plan**. This option will place a plan view that will cover the fullwidth of the TSL page and is intended to be used in the bridge TSL creation process.

Decide what plan view is ideal for the design and sheet layout. For this example, the TSL CUL Plan was used.

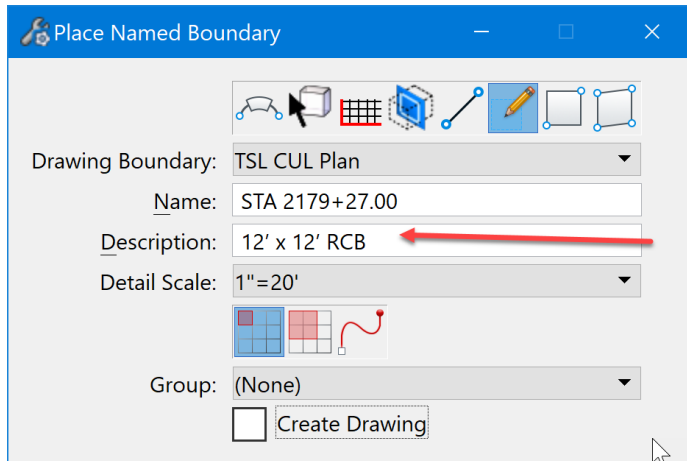


In the **Name** field, enter the station of the structure. For this example, used STA 2179+27.00.



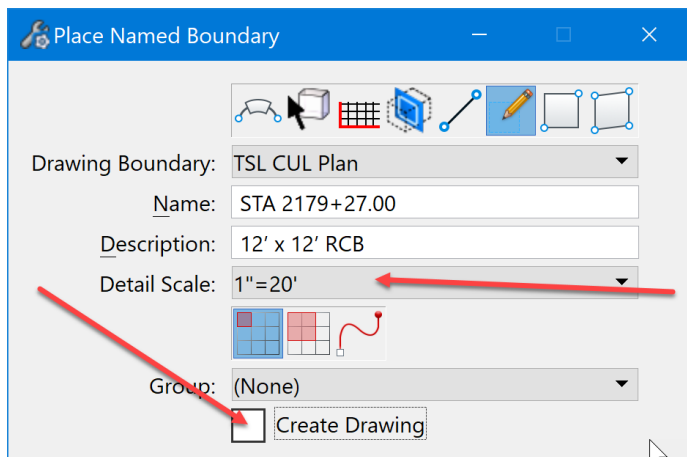
The screenshot shows the 'Place Named Boundary' dialog box. At the top is a toolbar with icons for various drawing tools. Below the toolbar, the 'Drawing Boundary' is set to 'TSL CUL Plan'. The 'Name' field is highlighted with a red arrow and contains the text 'STA 2179+27.00'. The 'Description' field contains '12' x 12' RCB'. The 'Detail Scale' is set to '1"=20''. There are two grid icons below the scale, one blue and one red. The 'Group' is set to '(None)'. At the bottom, there is a checkbox labeled 'Create Drawing' which is currently unchecked.

Next in the **Description** field, describe the structure. For this example, used 12' x 12' RCB.



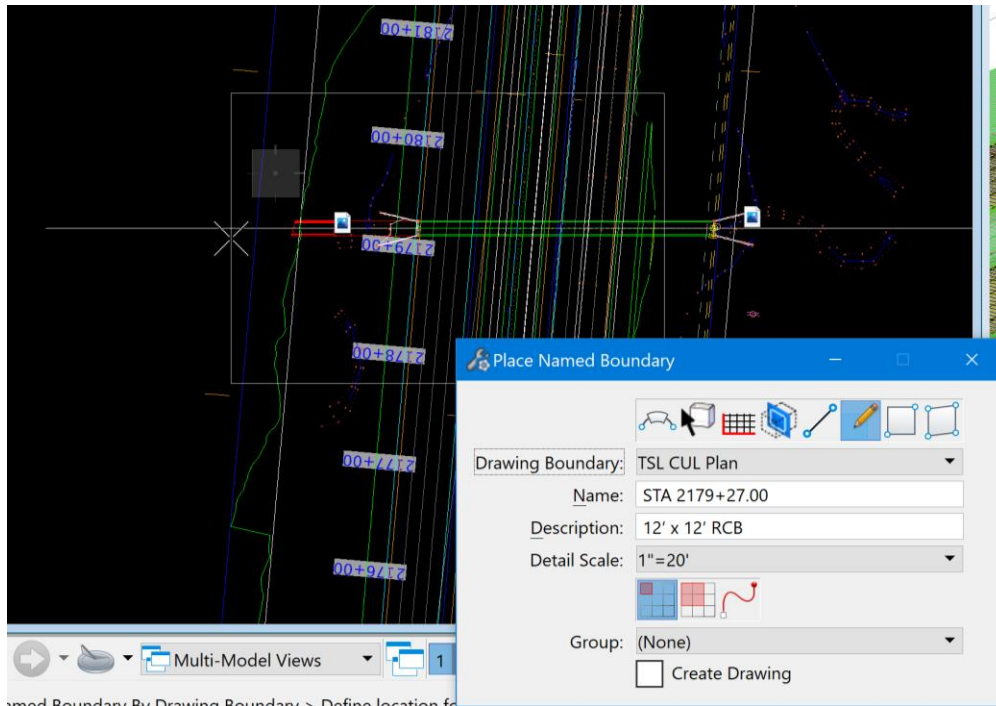
This screenshot is identical to the previous one, but the 'Description' field is now highlighted with a red arrow. It contains the text '12' x 12' RCB'.

Next select the detail scale. The scale for this example is 1" = 20'. Note: make sure to not have "Create Drawing" checked/toggled on. This is done so that the named boundary can be moved after it is placed to enable an ideal position in relationship to the structure, then the drawing and sheet model will be created.

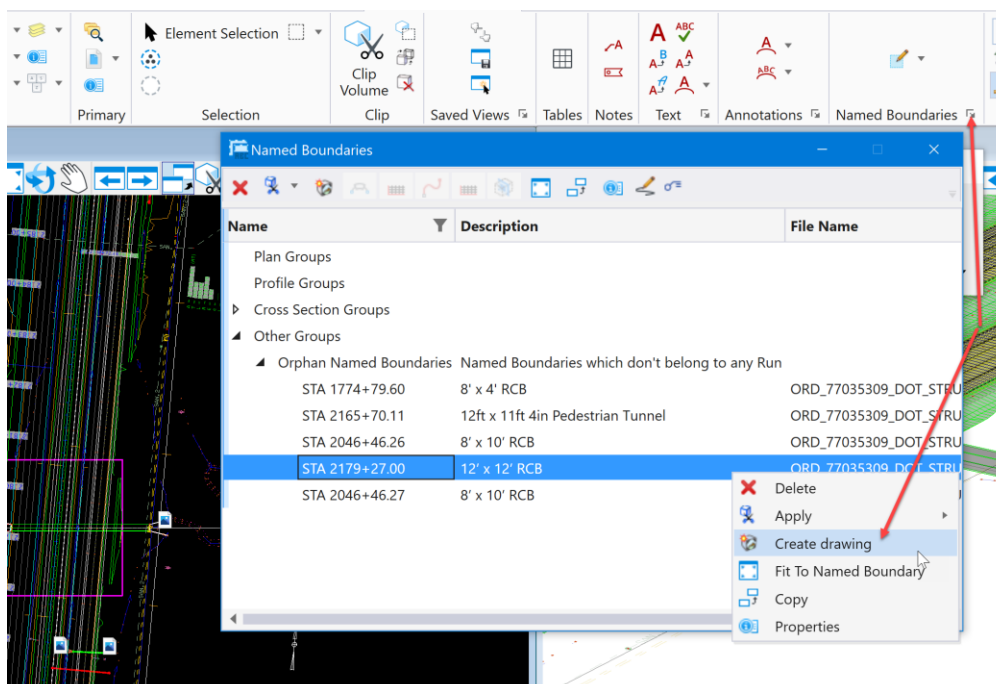


This screenshot is identical to the previous ones, but the 'Detail Scale' is now highlighted with a red arrow. It contains the text '1"=20''. Additionally, a red arrow points to the 'Create Drawing' checkbox, which remains unchecked.

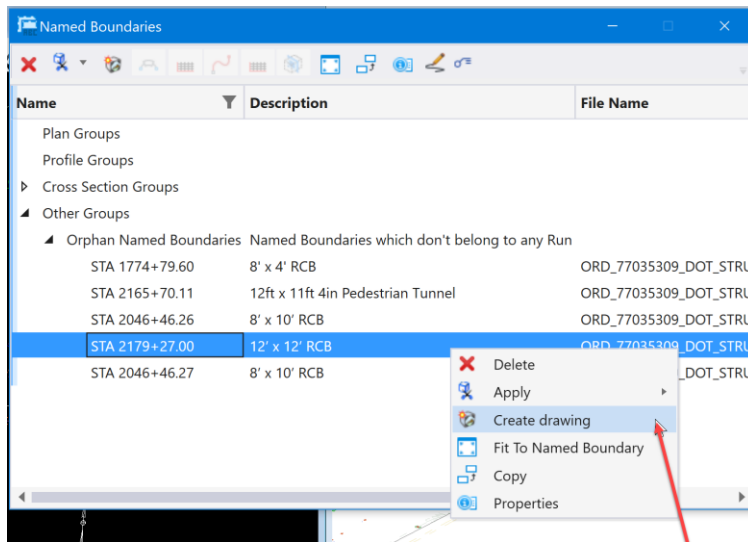
Now place the boundary. It will appear at the end of the cursor. Note: It may be preferred to place it on the outer edge of the structure layout and then move it to the correct location to ensure that the center of the plan view detail on this sheet will be at the centerline of the structure = centerline of the roadway.



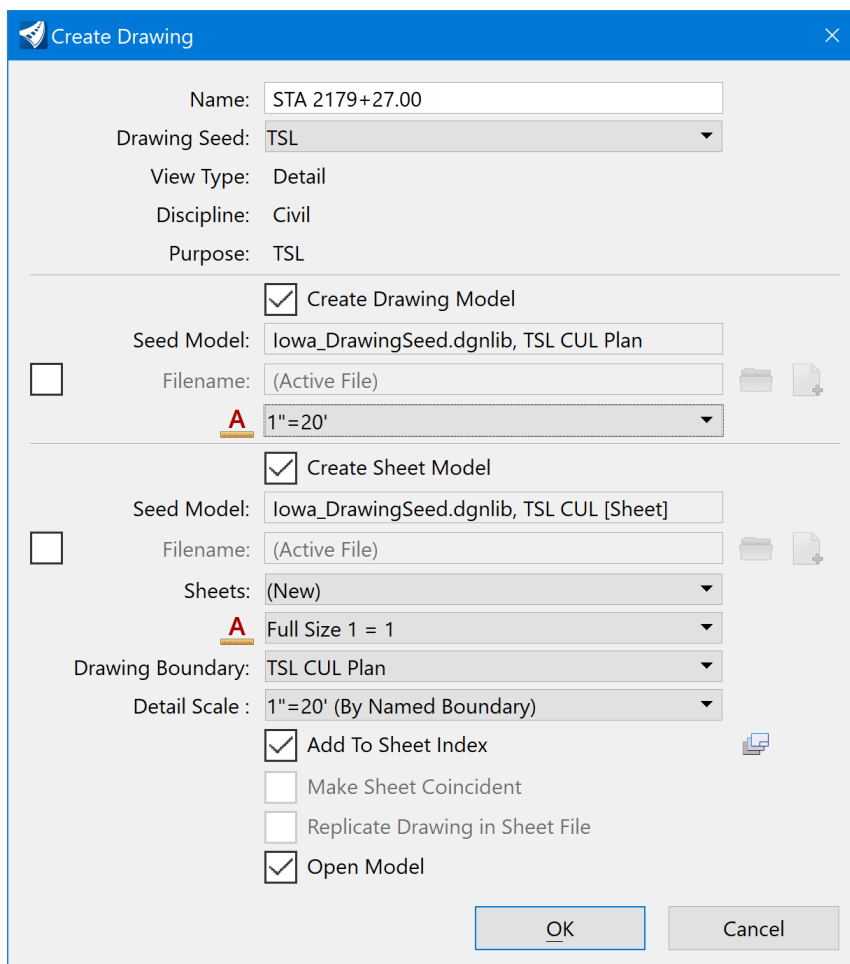
To move the boundary after it is placed, use the Element Selection tool and select the boundary, then use the move command to move the boundary to the position that is needed to place it on the sheet. Once placed, then select the Named Boundaries tool to open the dialog box.



Select the boundary that was created and right click on it. Several options will display to choose from. Select the **Create Drawing** option.



The Create Drawing dialog box will open. The name will already be filled out based on the name of the boundary. The example used STA 2179+27.00.



Next, ensure the scales are set correctly for the sheet.

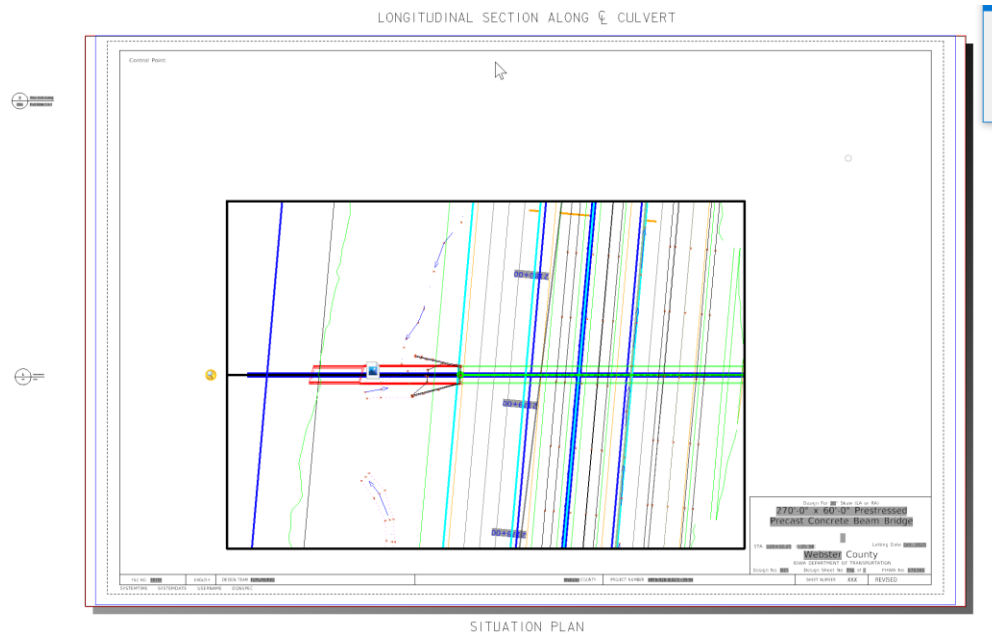
1. Under the Create Drawing Model section set Annotation scale to 1"=20'. The scale is set to match the scale used when referencing the Drawing Model details into the Sheet Model.
2. Under the Create Sheet Model section set Annotation scale to Full Size 1 = 1 and ensure that the Detail Scale is set to 1" = 20' (By Named Boundary). The scale is set to match the scale used when referencing the Drawing Model details into the Sheet Model.

The screenshot shows the 'Create Drawing' dialog box with the following settings and annotations:

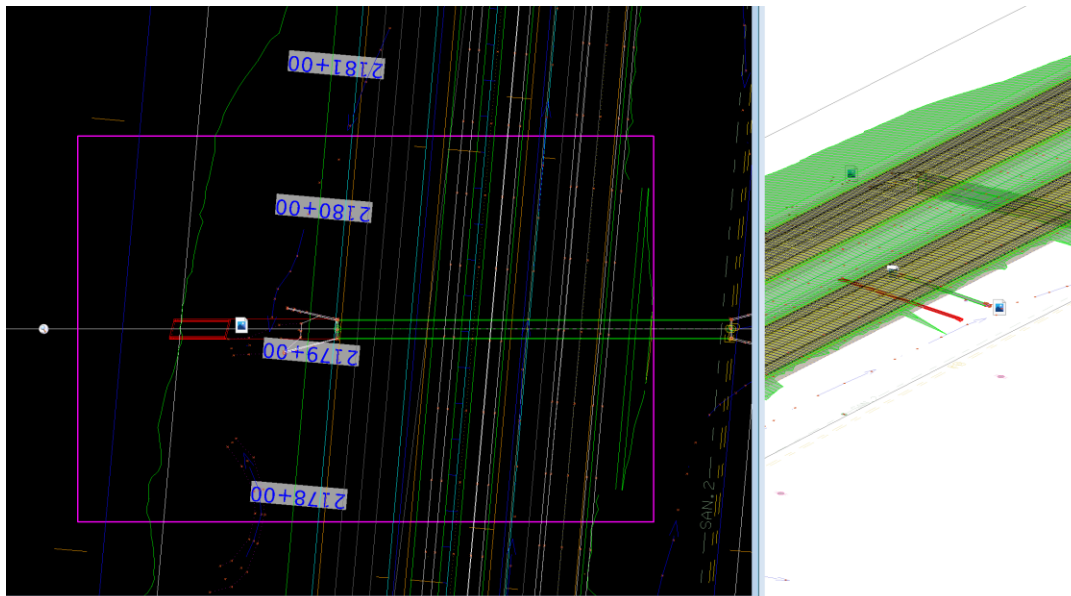
- Name:** STA 2179+27.00 (Red arrow pointing to the text field)
- Drawing Seed:** TSL (Dropdown menu)
- View Type:** Detail
- Discipline:** Civil
- Purpose:** TSL
- Create Drawing Model:** ☒ (Red arrow pointing to the checkbox)
- Seed Model:** Iowa\_DrawingSeed.dgnlib, TSL CUL Plan
- Filename:** (Active File)
- Annotation Scale:** 1"=20' (Red arrow pointing to the dropdown menu, with a red 'A' icon next to it)
- Create Sheet Model:** ☒ (Red arrow pointing to the checkbox)
- Seed Model:** Iowa\_DrawingSeed.dgnlib, TSL CUL [Sheet]
- Filename:** (Active File)
- Sheets:** (New)
- Annotation Scale:** Full Size 1 = 1 (Red arrow pointing to the dropdown menu, with a red 'A' icon next to it)
- Drawing Boundary:** TSL CUL Plan
- Detail Scale:** 1"=20' (By Named Boundary) (Red arrow pointing to the dropdown menu)
- Add To Sheet Index:** ☒ (Red arrow pointing to the checkbox)
- Make Sheet Coincident:** ☐
- Replicate Drawing in Sheet File:** ☐
- Open Model:** ☒ (Red arrow pointing to the checkbox)
- OK** button (Red arrow pointing to the button)
- Cancel** button

Check/toggle on Open Model, if desired. Add to Sheet Index may be checked if using the Sheet Indexing feature. Another option is to add sheets to the Sheet Index later in the plan sheet development process. When everything is correct, click OK.

This will create the plan sheet. It should look something like this:

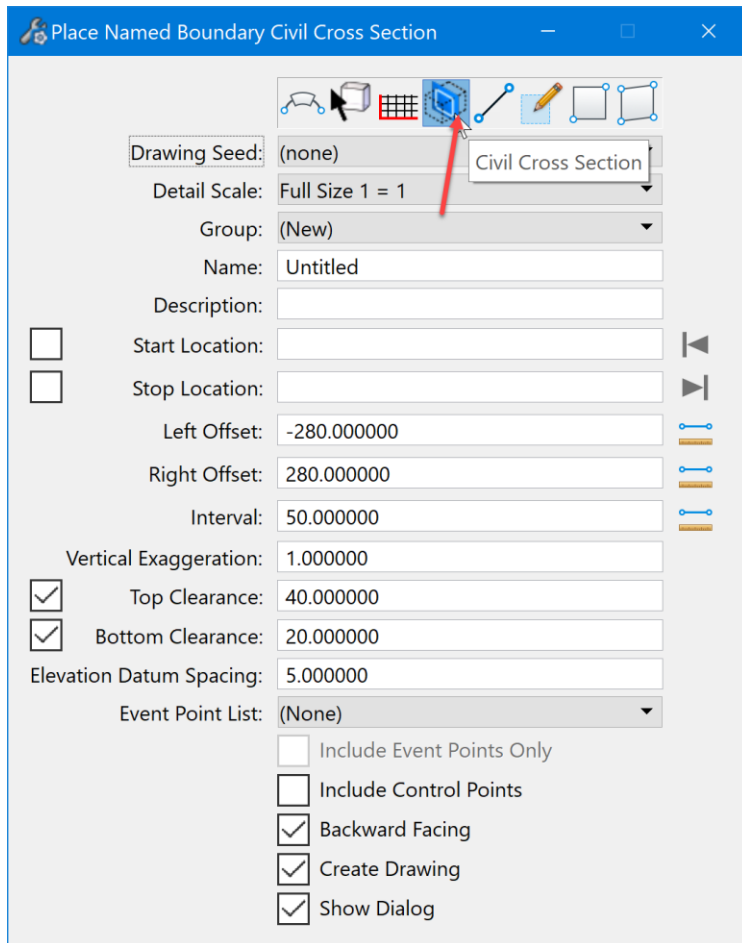


Next, go back to the Multi Model View to make the Longitudinal Cross Section for the sheet.

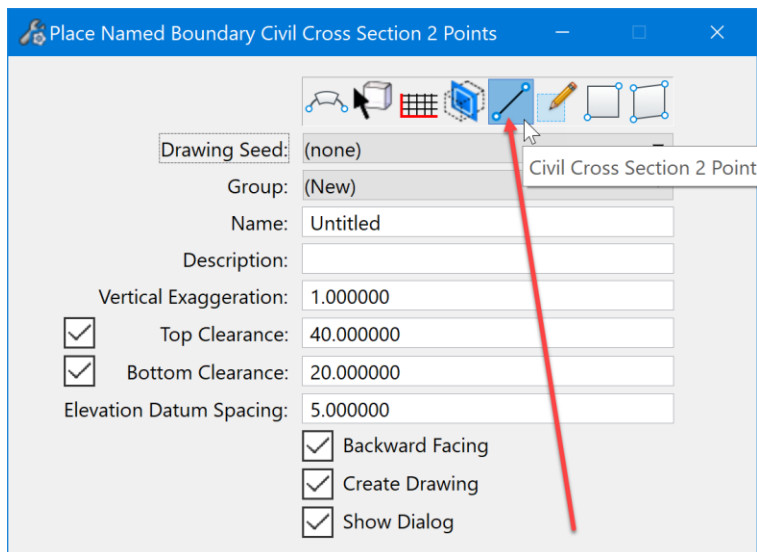


To make the Longitudinal Cross Section for the sheet, there are two tools to choose from. The tool chosen depends on if the structure is perpendicular, at a 90-degree right angle to the alignment, or if it is a skewed Longitudinal section that is needed.

If it is a perpendicular cross section that is needed, then use the **Civil Cross Section** boundary tool. This tool is located on the Place Named Boundary Civil Cross Section dialog box.

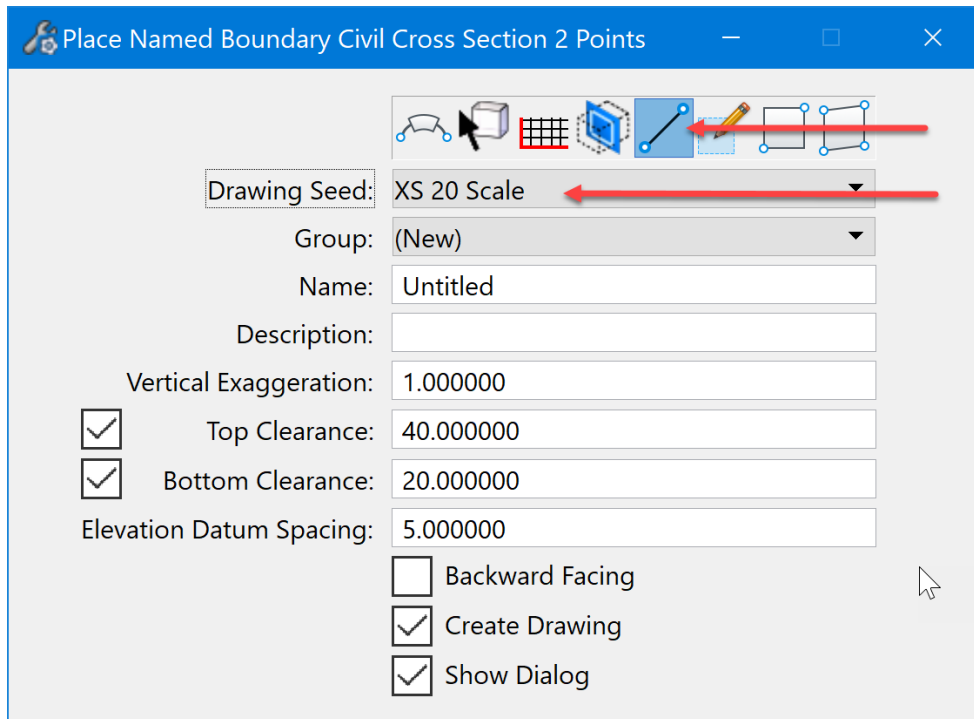


If it is a skewed Longitudinal Cross Section that is needed, then use the **Civil Cross Section by 2 Point** boundary. This tool is also located on the Place Named Boundary Civil Cross Section dialog box.

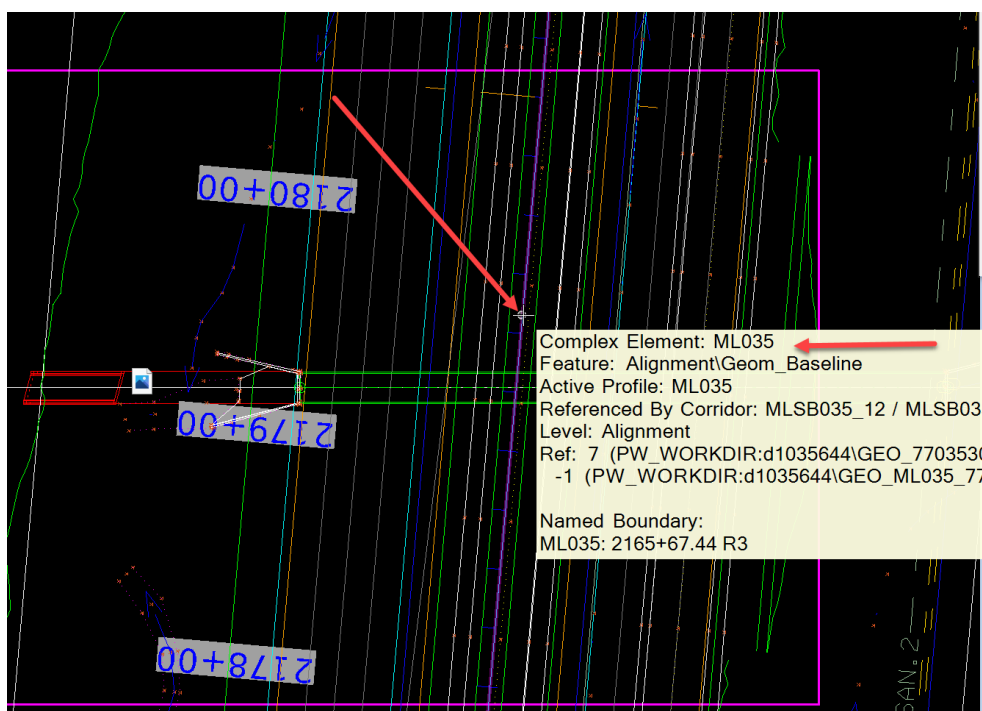




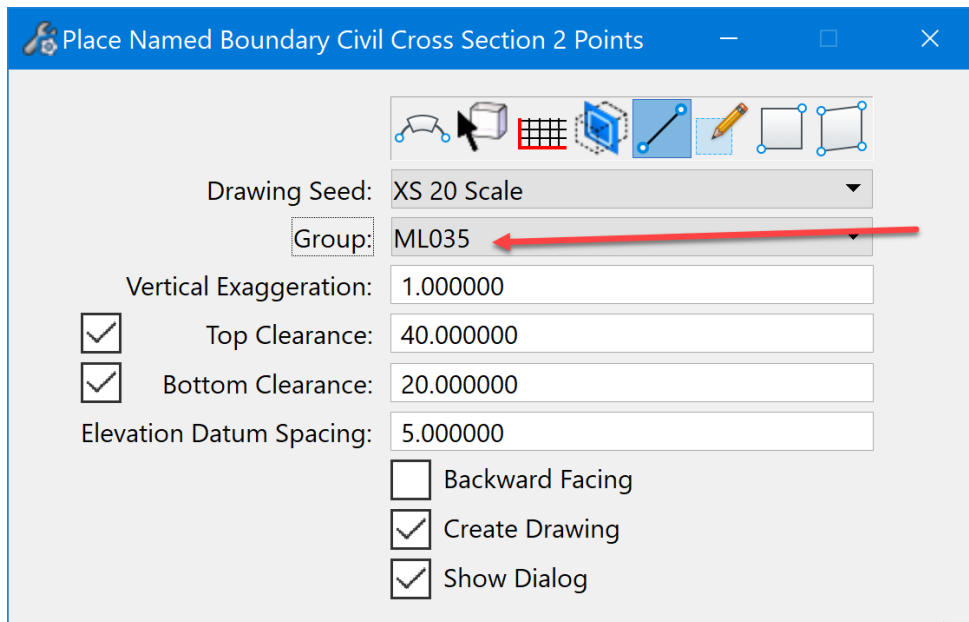
This example used the Civil Cross Section by 2 Point boundary tool. Select a **Drawing Seed**. For this example, used the XS 20 Scale seed to make a 1" = 20' scale cross section.



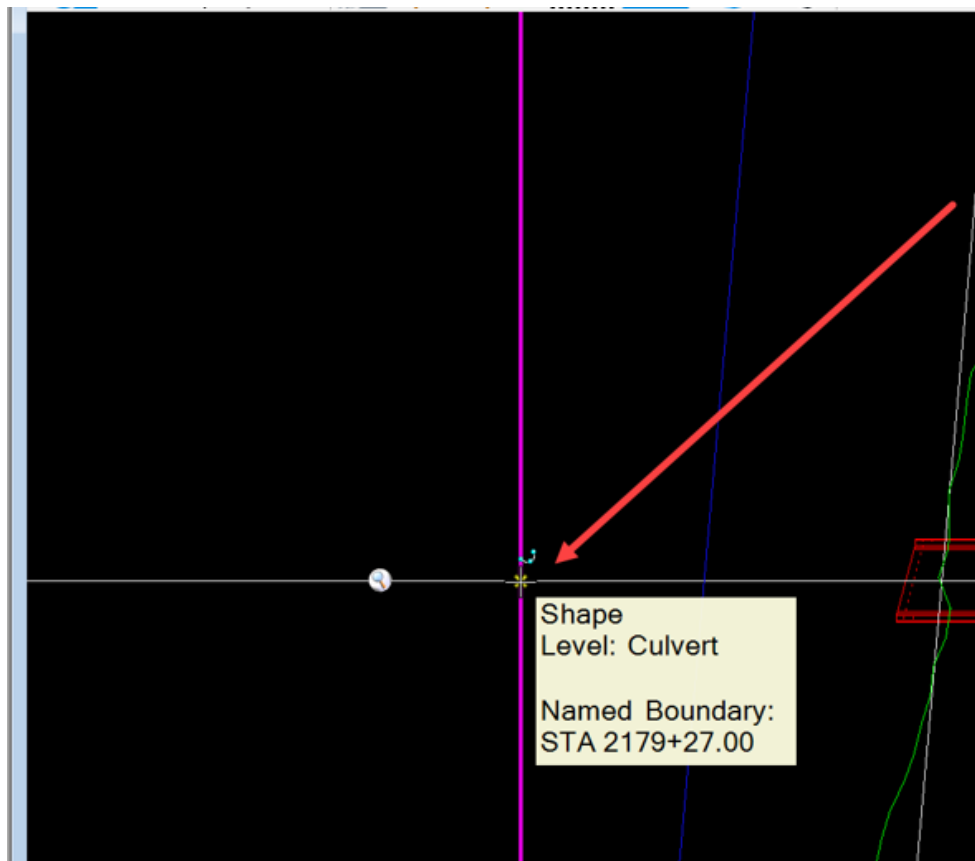
Next identify the path element. For this process, it will be the roadway horizontal alignment that crosses the structure that is shown on the sheet. Note: selecting the alignment will also set the Group. It is very important to set this so that in a large corridor project the cross sections can be placed on their own sheets when the drainage design is complete. To identify the path element, select it in the 2D view.



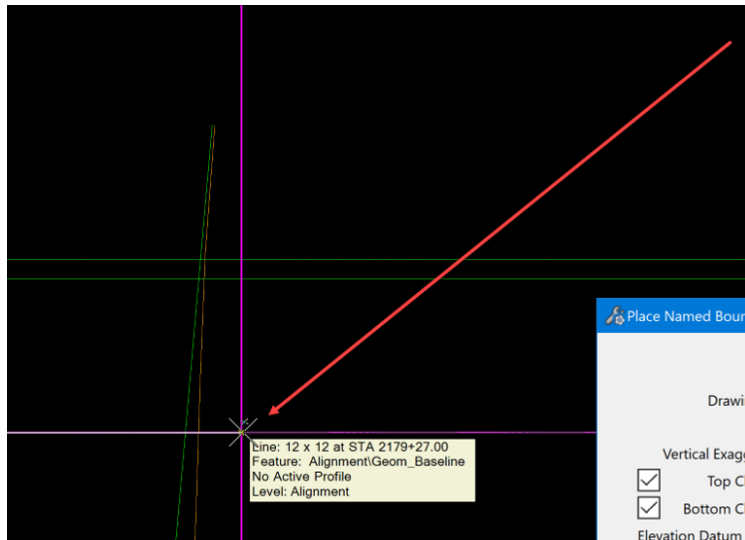
The **Group** should be named the same as the alignment.



Next, identify the start point. To do this, snap to the intersection point of the structure centerline and the edge of the plan view boundary placed earlier.



Next, identify the end point. To do this, snap to the intersection point of the structure centerline and the edge of the plan view boundary placed earlier.



Once everything is set correctly, then Data point in the plan view to accept the settings and this will open the Create Drawing dialog box. It should be filled in similar to this:

The screenshot shows the "Create Drawing" dialog box with the following settings:

- Mode: Cross Section
- Name: ML035 - 2179+27.00 R3
- One Sheet Per Dgn: ☐
- Drawing Seed: XS 20 Scale
- View Type: Civil Cross Section
- Discipline: Civil
- Purpose: Section View
- Drawing Model
  - Seed Model: Cross Section Sheet Seed 20 Scale.dgnlib, XS
  - Filename: (Active File)
  - Annotation Group: XS Grid w/ Annotation 20 Scale
- Sheet Model
  - Seed Model: Cross Section Sheet Seed 20 Scale.dgnlib, XS
  - Filename: (Active File)
  - Sheets: (New)
  - Full Size 1 = 1
  - Drawing Boundary: XS 20 Scale
  - Detail Scale: 1"=20'
- ☒ Add To Sheet Index
- ☐ Make Sheet Coincident
- ☒ Open Model
- Buttons: OK, Cancel

Select an **Annotation Group** and select the **Sheet** that the section will be placed on. Check/toggle on Open Model. When adding a detail/cross section to an existing plan sheet, the “Add to Sheet Index” option is grayed out. When creating a new plan sheet, the “Add to Sheet Index” option will appear selectable.

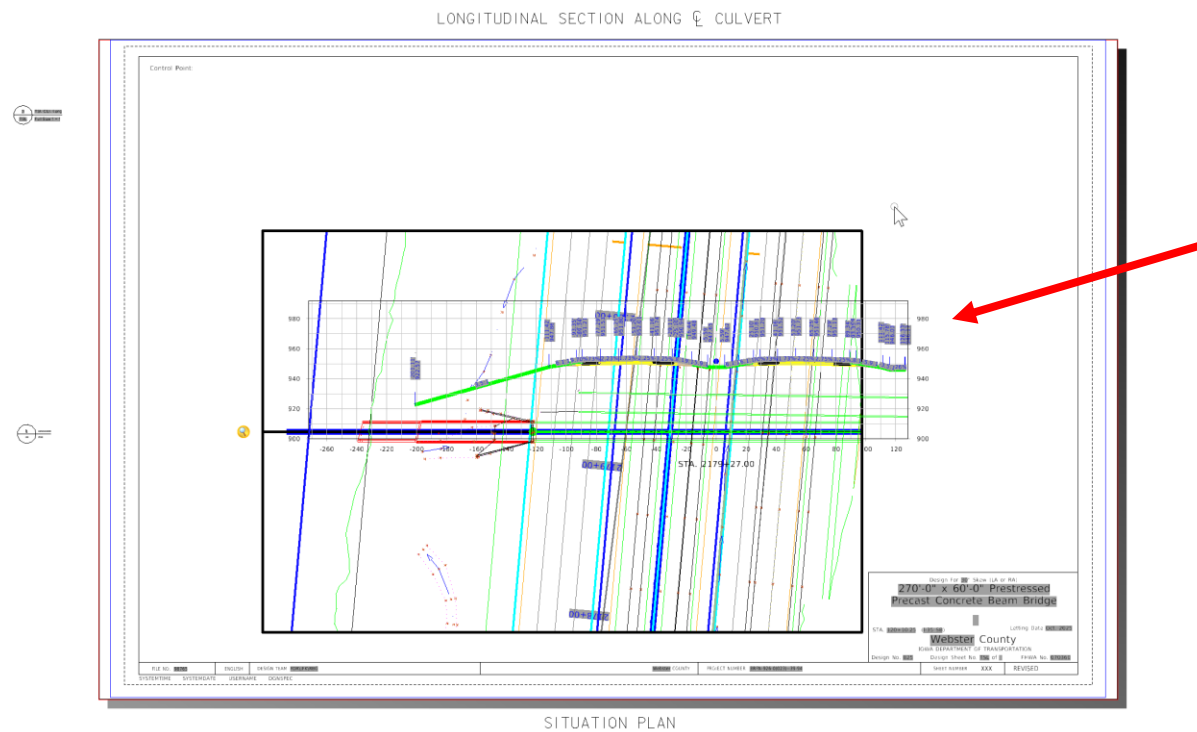
The screenshot shows the 'Create Drawing' dialog box with the following settings:

- Mode: Cross Section
- Name: ML035 - 2179+27.00 R3
- One Sheet Per Dgn: ☐
- Drawing Seed: XS 20 Scale
- View Type: Civil Cross Section
- Discipline: Civil
- Purpose: Section View
- Drawing Model
  - Seed Model: Cross Section Sheet Seed 20 Scale.dgnlib, XS
  - Filename: (Active File)
  - Scale: 1"=20'
  - Annotation Group: XS Culvert Grid w/ Annotation 20 Scale
- Sheet Model
  - Seed Model: Cross Section Sheet Seed 20 Scale.dgnlib, XS
  - Filename: (Active File)
  - Sheets: STA 2179+27.00 [Sheet]
  - Full Size: 1 = 1
  - Drawing Boundary: (New)
  - Detail Scale: 1"=20'
- ☒ Add To Sheet Index
- ☐ Make Sheet Coincident
- ☒ Open Model
- Buttons: OK, Cancel

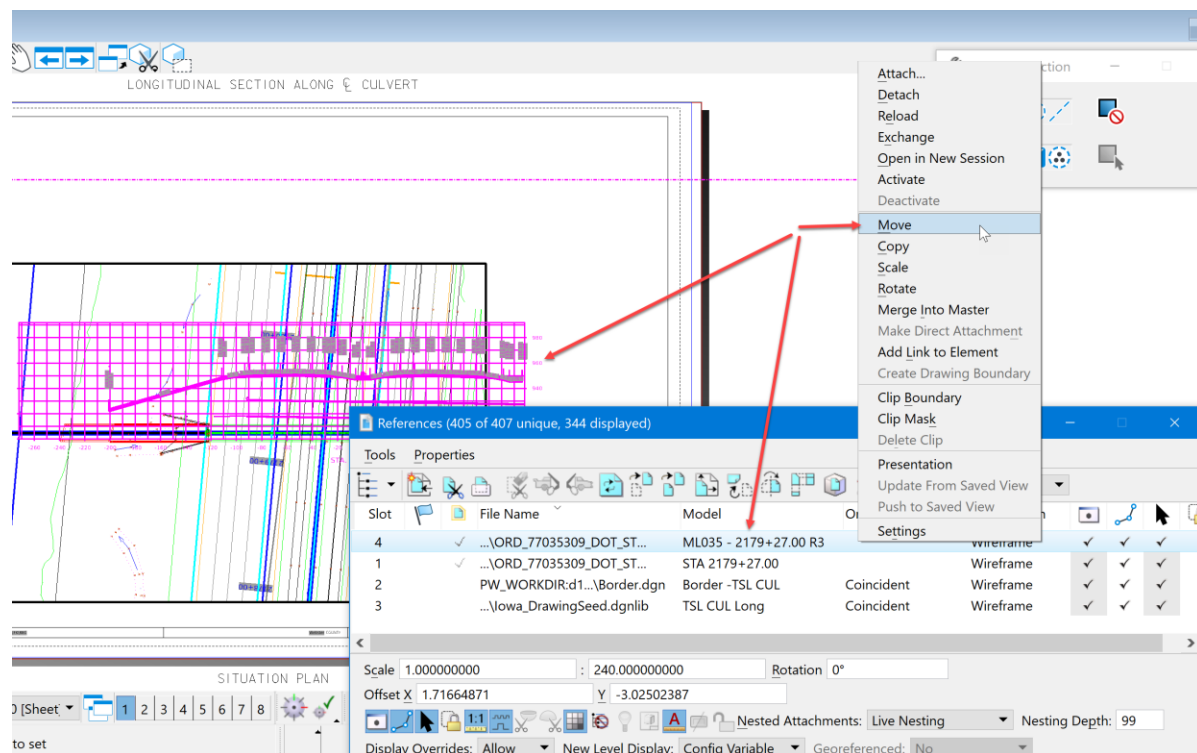
Red arrows in the image point to the 'Name' field, the 'Annotation Group' dropdown, the 'Sheets' dropdown, and the 'OK' button.

Then click OK.

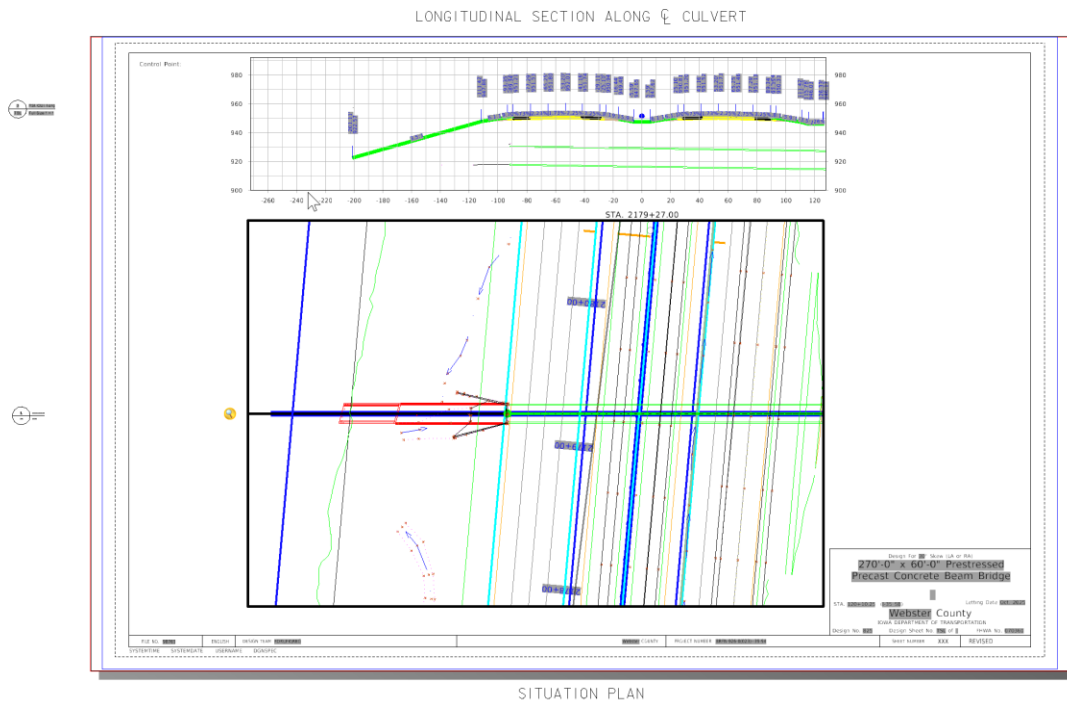
This will place the cross section on the sheet as the Longitudinal Cross Section. It will appear in the center of the sheet.



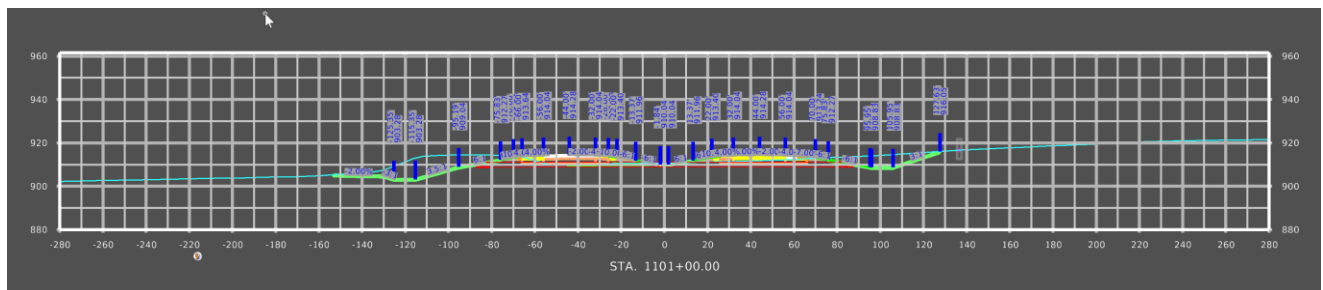
To move it to the proper location, open the References dialog box and select it in the list. Then right click and select the Move option. This is a reference therefore the reference move tool is used.



Then data point somewhere outside of the sheet. With the AccuDraw compass locked vertically, move it up into the correct position. The sheet should look similar to this:

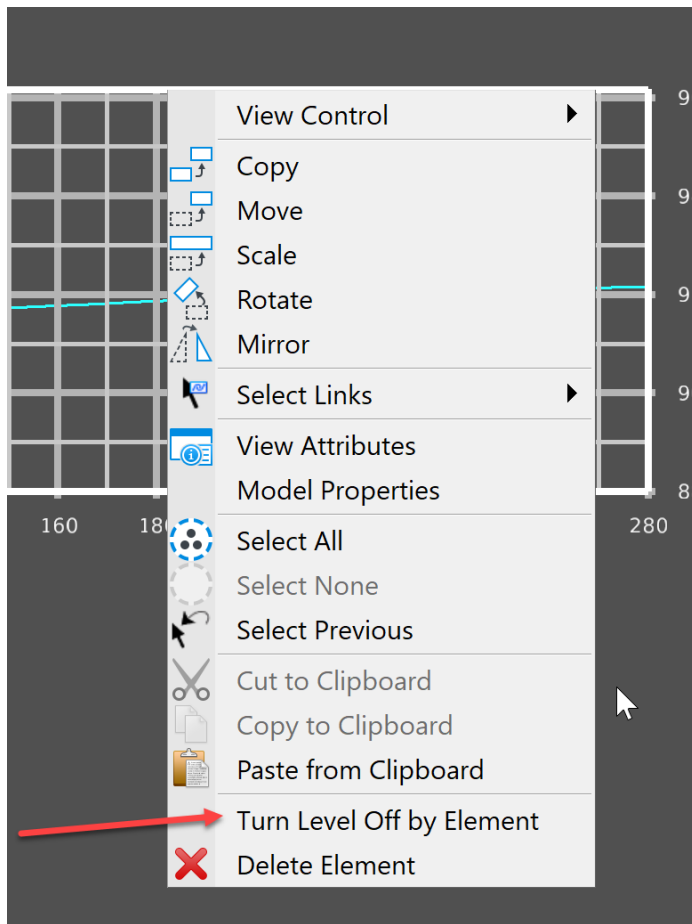


Next, annotate the structure in the Plan View drawing model and in the Longitudinal Cross Section drawing model. For example, start with the Longitudinal Cross Section drawing model and annotate a 24" RCP pipe at STA 1101+00.00. Open the model. Note: This will work the same for any drawing model linked to a sheet model.

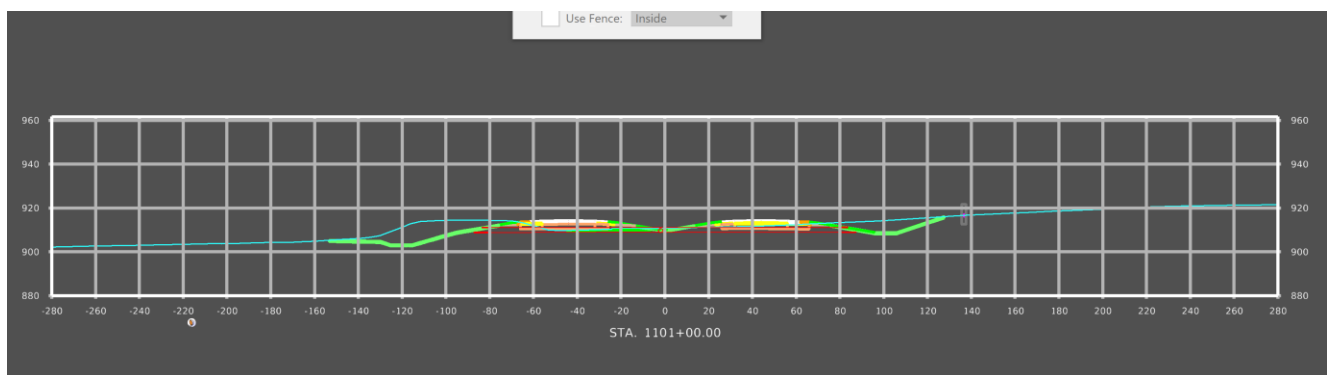


Turn off some of the automatic annotations of this Longitudinal Cross Section to make room for some of the information that will be needed to display.

To turn off some of the automatic annotations, right click and hold to bring up the menu options:



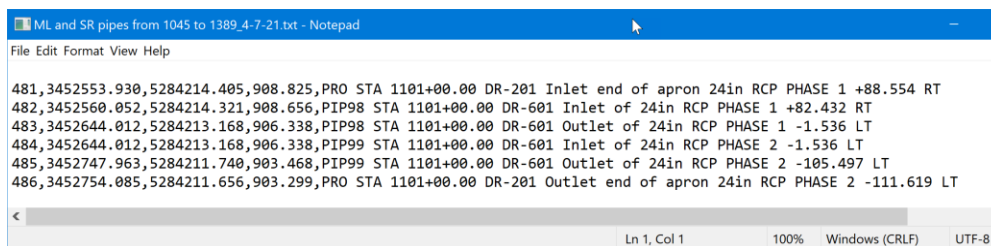
Then select the Turn Level Off by Element option, click on the items not wanted or needed for the sheet. It should look similar to this:



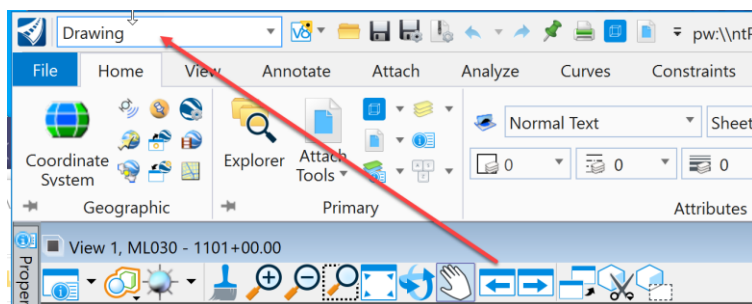
When annotating a structure in the Longitudinal Cross Section, label the items listed below.

1. Design Cover.
2. Profile Grade Elevation.
3. Distance from centerline right.
4. Distance from centerline left.
5. Flowline Elevation at each critical point in the structure.
6. Structure description and any other unique items that need to be called out.

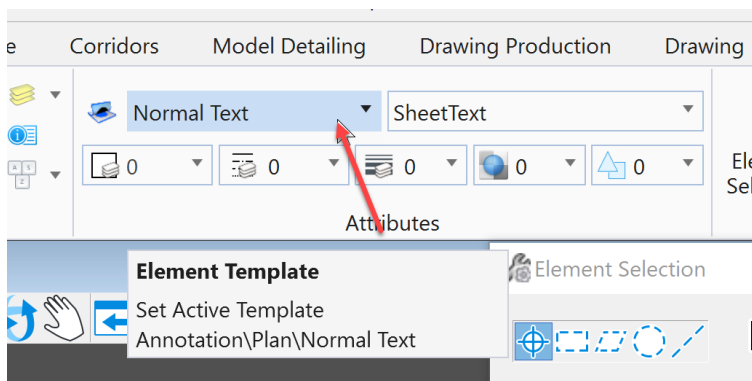
Some of this information is stored in the ASCII graphics input file. It is helpful to have that file open to the structure that is be annotated when doing this process. Copy and paste information from it to the Place Note tool to save on typing.



Before starting, a few things need set. The first is to change the workflow to the Drawing workflow. Note this may be a user's preference because some users find it easier to locate the tools to annotate in this workflow. These tools are available on other workflows as well.

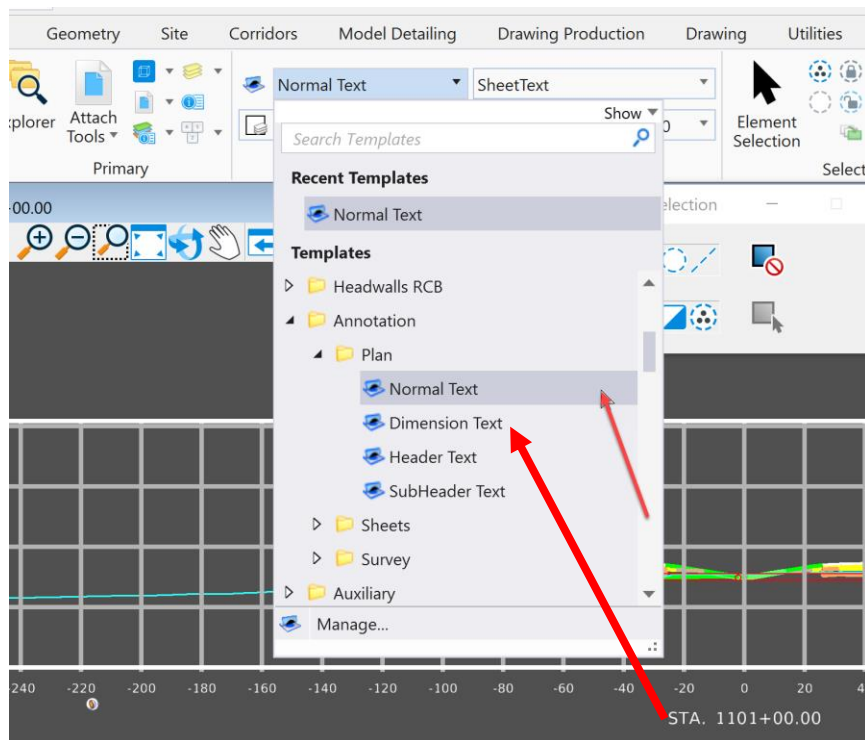


The second is to select the correct text Element Template for placing the annotations. Click on the Element Template drop down menu in the Attributes Group on the Home tab.





Navigate to the Annotation folder, Plan subfolder and select the Dimension Text Element Template.



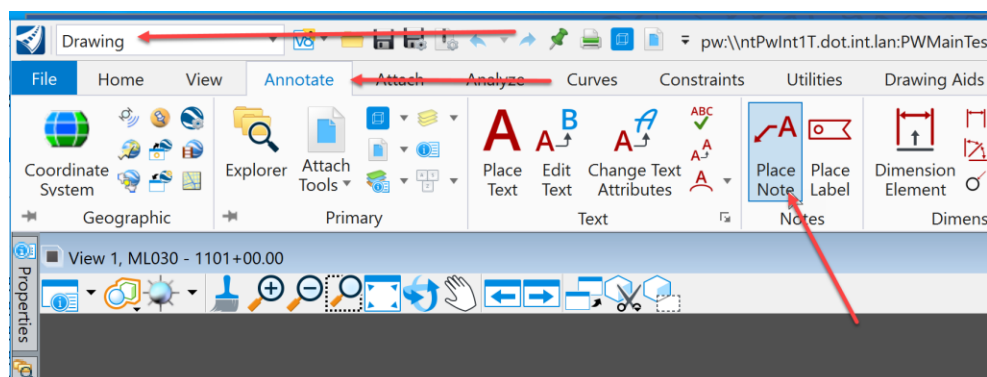
**Normal Text:** Use for any notes except dimension leader notes.

**Dimension Text:** Use for all dimensions, leader notes and dimensional/numerical values and text used in tables or fields. See tables used on Iowa DOT Culvert Barrel Details standard sheets as an example.

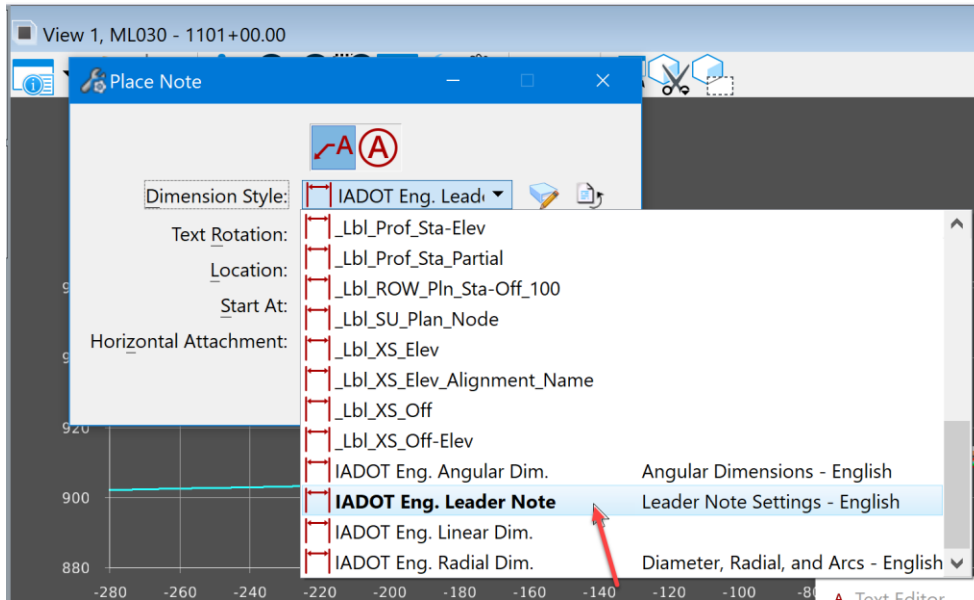
**Header Text:** Use for all headers and title blocks.

**SubHeader Text:** Use when Header and Normal text do not seem appropriate. Such as the word “Notes” used when labeling a group of notes or instructions.

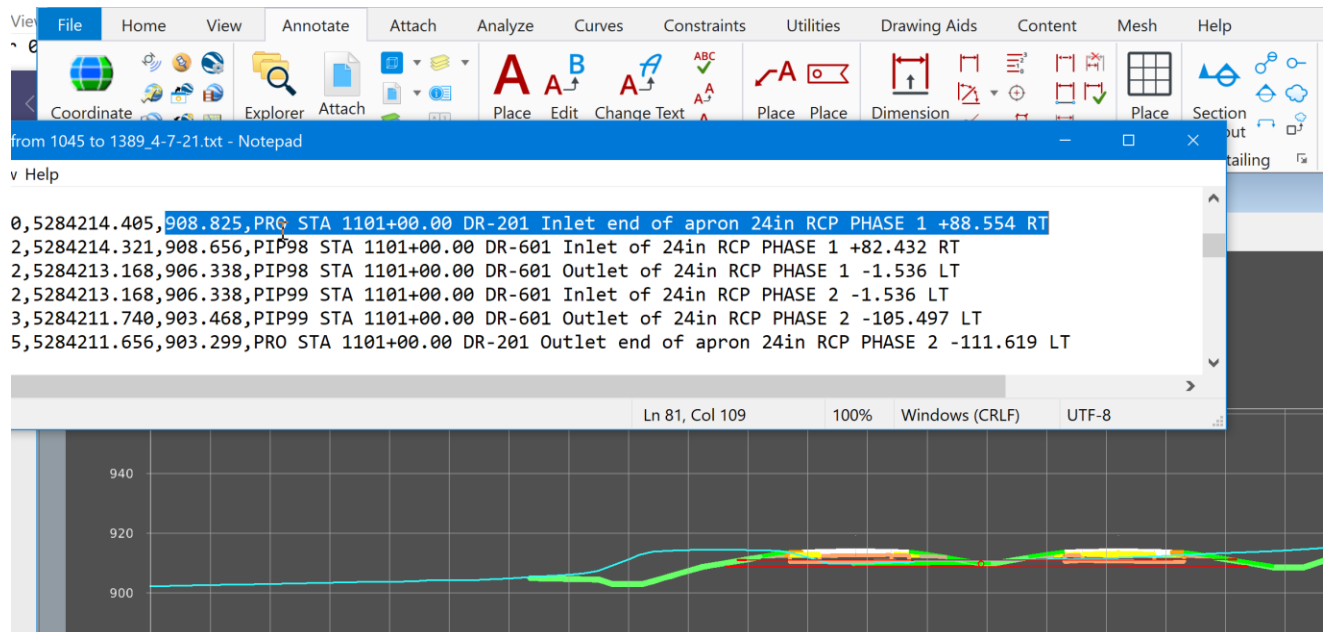
Next, select the correct annotation tool. This example will be placing the Flowline Elevation at the Inlet end of the apron and the offset from centerline. To do this, use the Place Note tool in the Notes Group on the Annotate tab in the Drawing workflow.



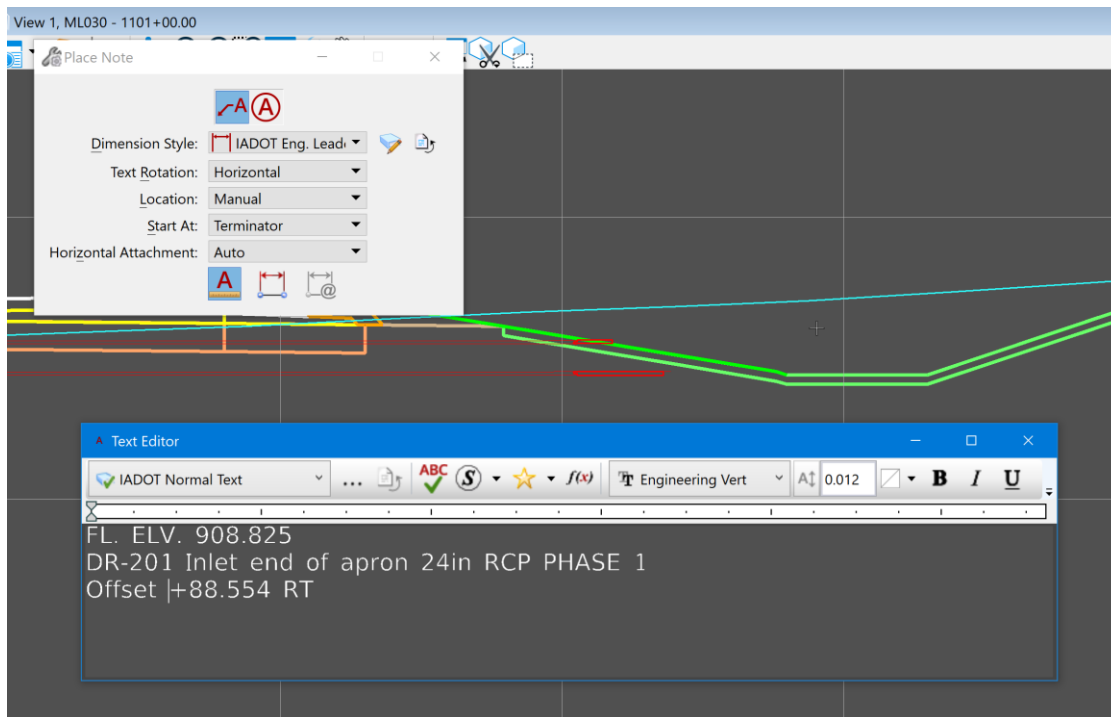
Selecting the Place Note tool will open the Place Note dialog box shown below. Select the correct Dimension Style. This example will use the IADOT Eng. Leader Note style.



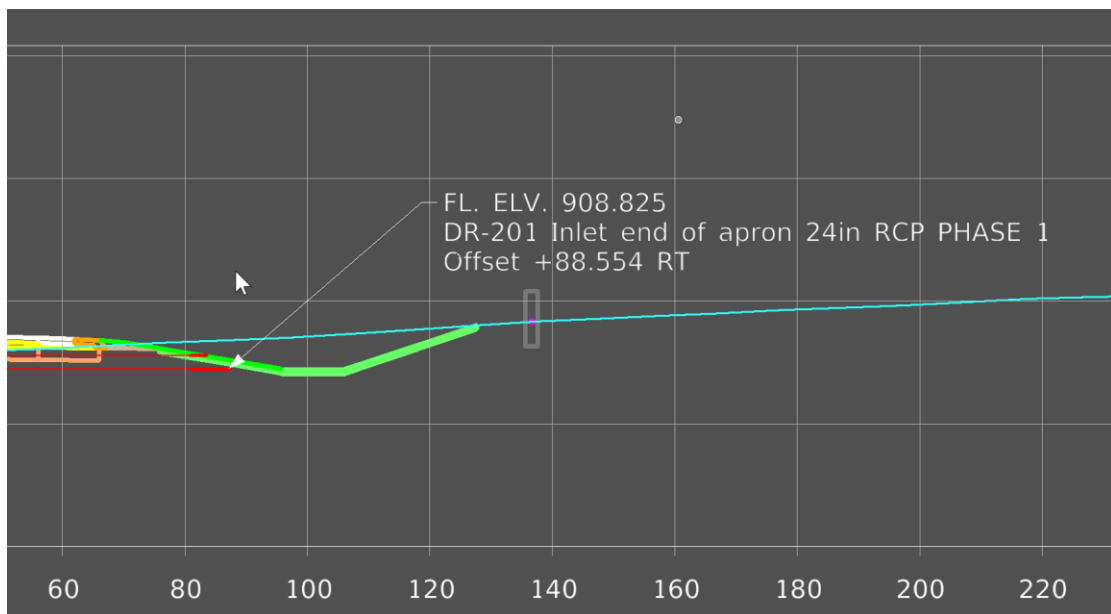
By selecting the correct Dimension Style and Element Template, this will ensure the notes are placed with the correct settings. Once this is set, type in the note needing placed. This is where the ASCII graphics input file may be used. With it opened to the specific structure, highlight the information needed to be placed and copy it from the ASCII graphics input file.



Then paste it into the text window.

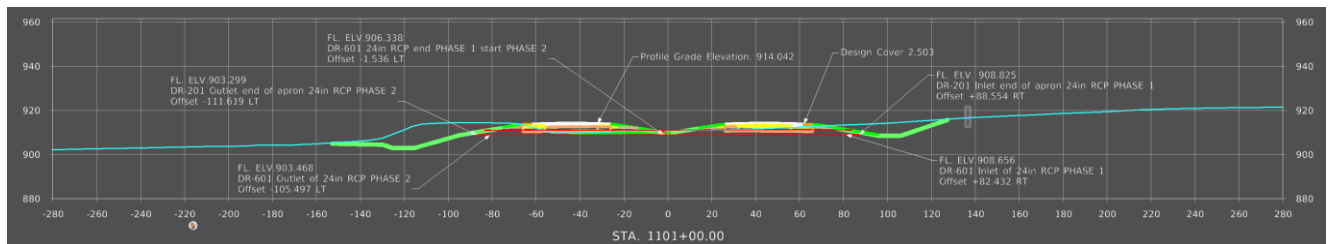


Then snap to the appropriate point to locate the note and place the note.

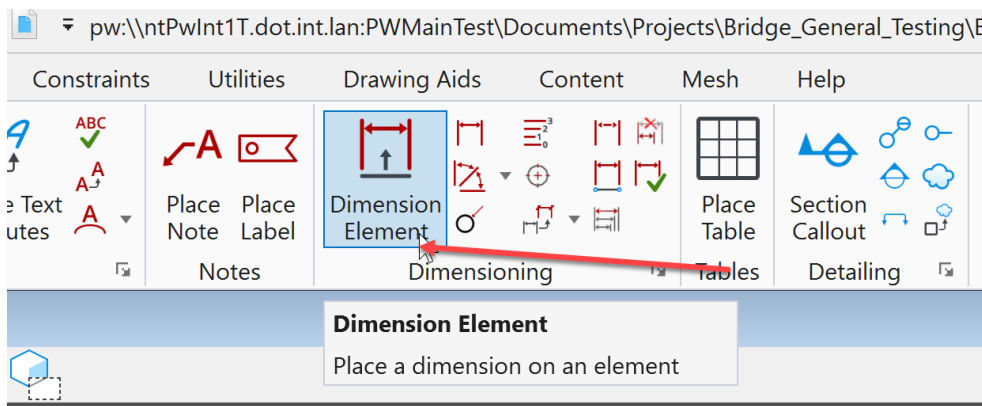


Then repeat the same process to place all the annotation notes needed.

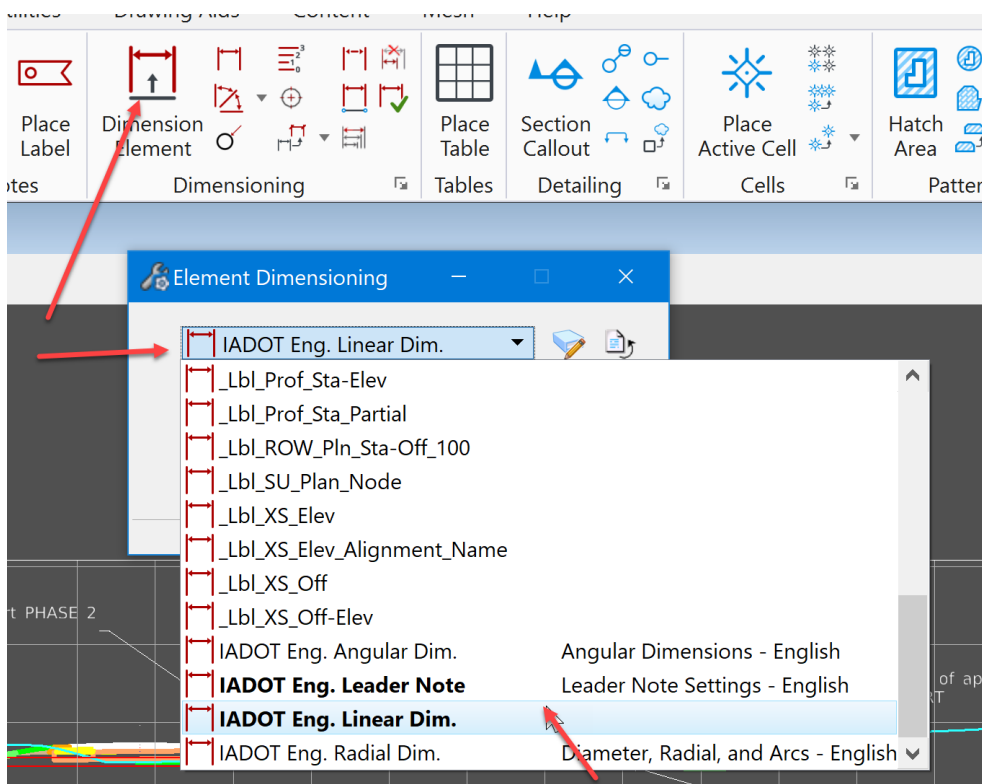
When complete it should look similar to this:



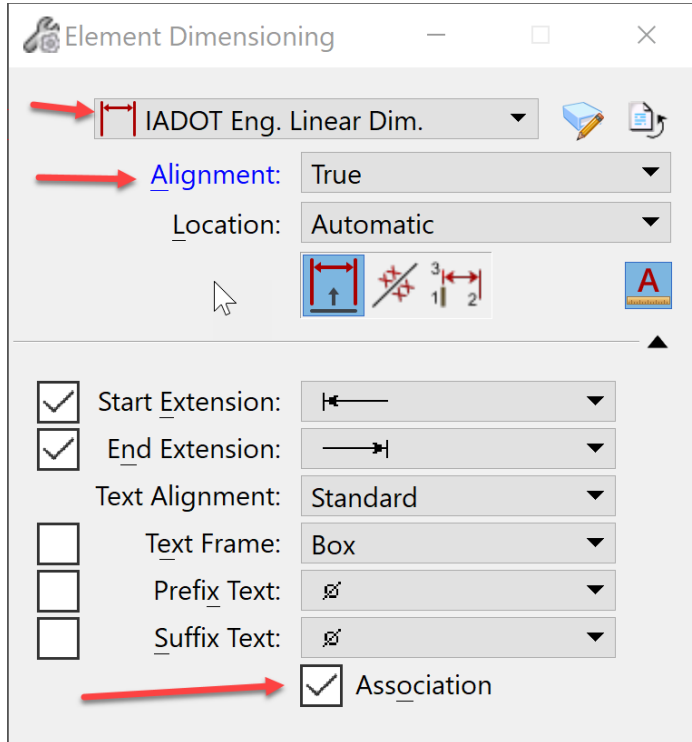
Once done placing the notes, then dimension the pipes. Select the Dimension Element tool in the Dimensioning group on the Annotate tab in the Drawing workflow.



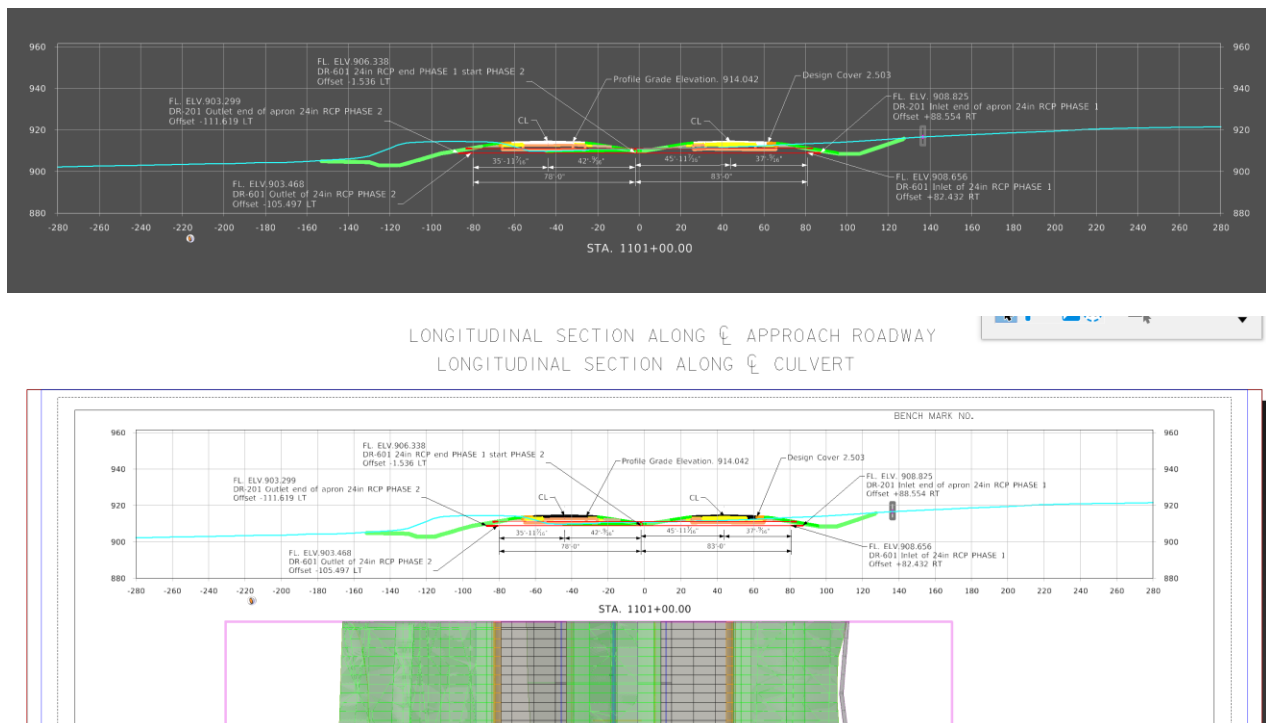
Next, select the correct Dimension Style. This example will use the IADOT Eng. Linear Dim style.



By selecting the correct Dimension Style and Element Template, this will ensure the dimensions are placed with the correct settings. Next, set the **Alignment** to True and the **Location** to Automatic. If Association is checked/toggled on, it will make the dimension capable of auto correcting if the pipe is adjusted.



When complete it should look similar to this:

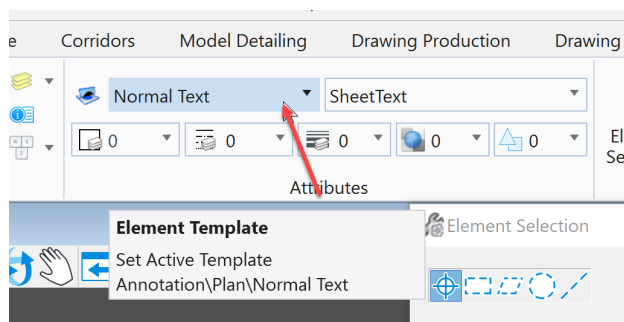


Note: Cut and annotate a cross section for every structure that is designed in the project, even if it is not a B1 Design and will not be placed on a TSL sheet. The cross sections are needed to complete the last part of the Prelim Section Design culvert workflow covered in chapter **CW09\_Enter Pipe and Structure Information into the Access Database**.

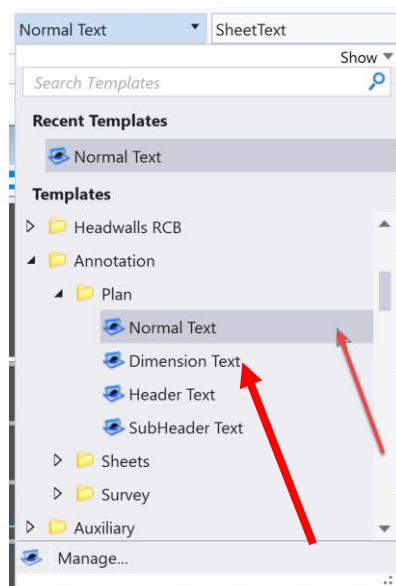
Next, annotate the Plan View portion of the TSL Sheet. When annotating a structure in the Plan View, label these items listed below.

1. Station at centerline of structure = centerline of the alignment.
2. Station at Even Station tic marks before and after the structure.
3. Station of the outside corners of the proposed revetment.
4. Dimension distance from centerline left.
5. Dimension distance from centerline right.
6. Dimension to length of new structure.

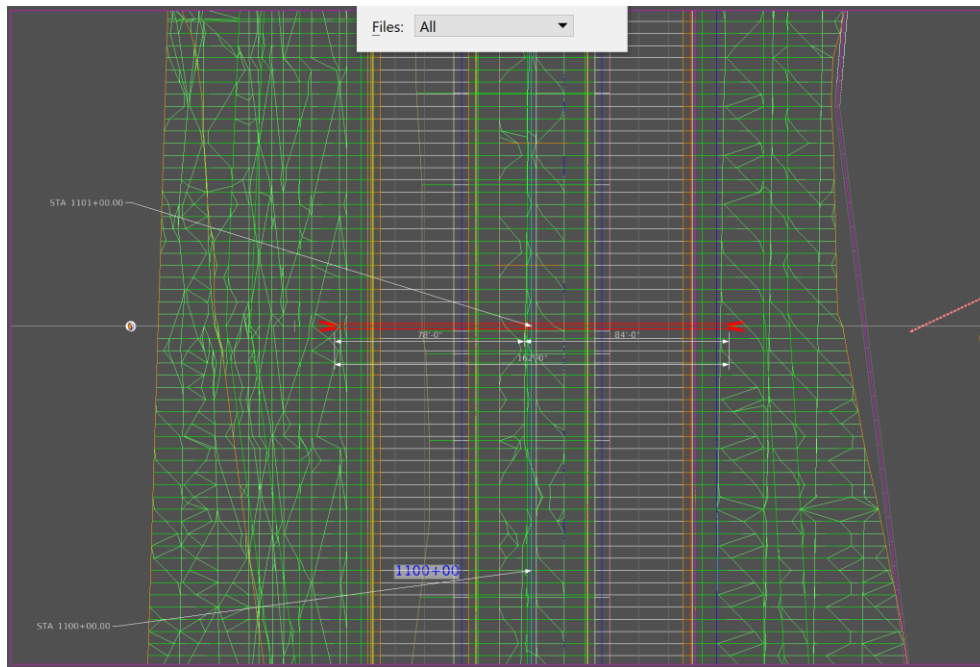
Similar to annotating the Longitudinal Cross Section, make sure to select the correct Element Template for placing the annotations.



Next, navigate to the Annotation folder, Plan subfolder and select the Dimension Text Element Template.

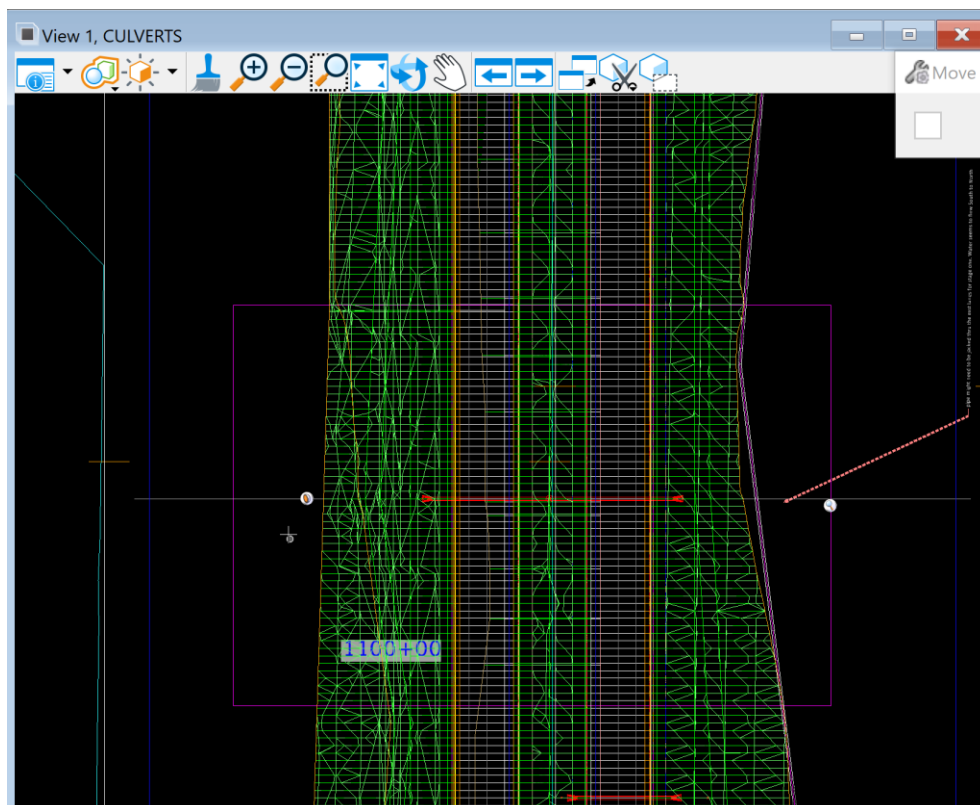


By selecting the correct Dimension Style and Element Template, this will ensure the notes are placed with the correct settings. It should look similar to this:

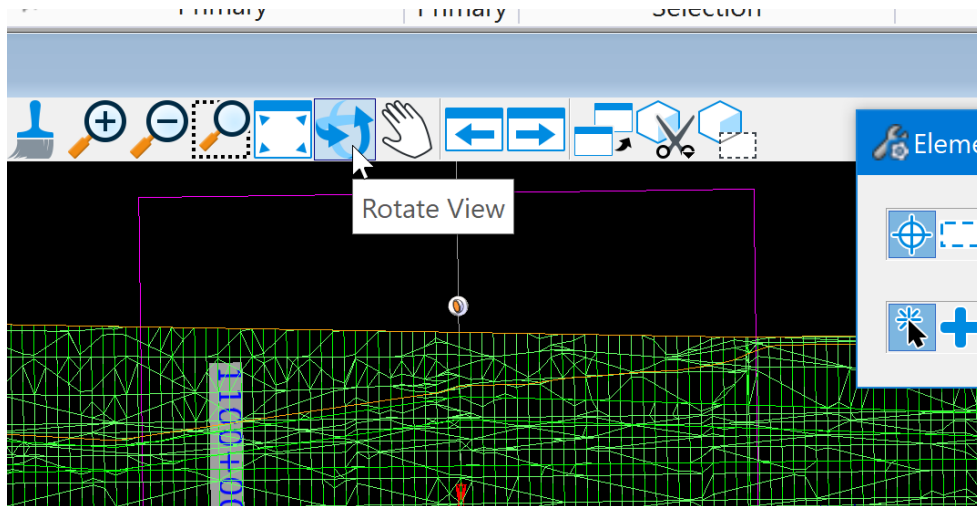


Once all the annotation is complete, then place the North Arrow in the Plan View.

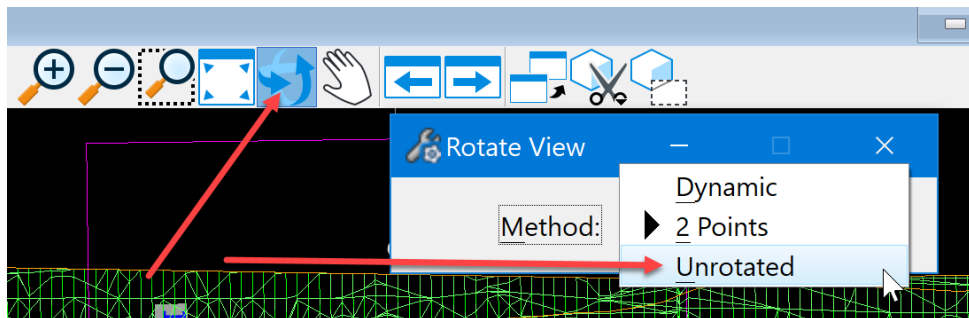
To do this, view the Design model that is the 2D Design model in the file being worked in.



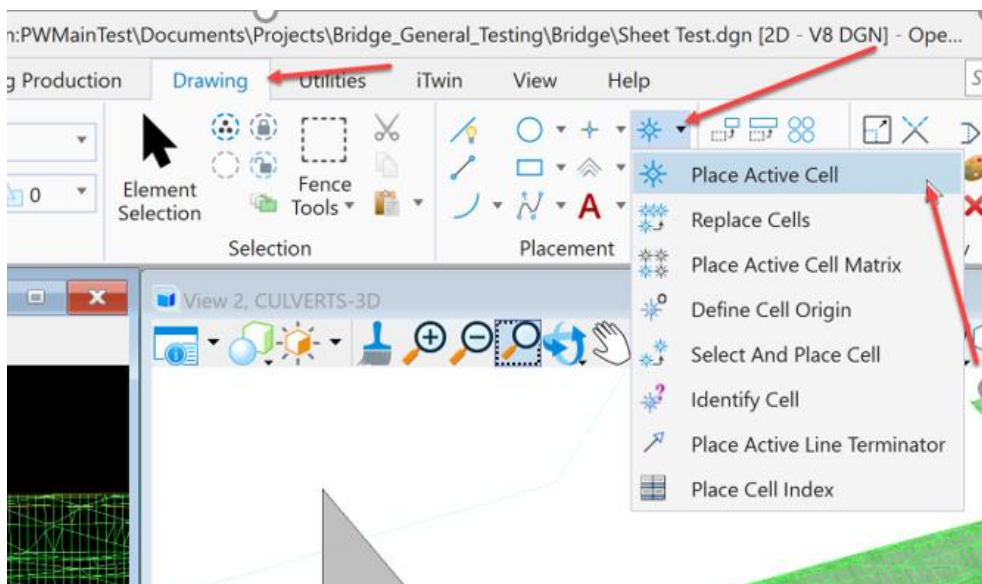
Then reset the rotation of the view to unrotated. Select the Rotate View tool at the top of the view.



Then select the Unrotated Method.

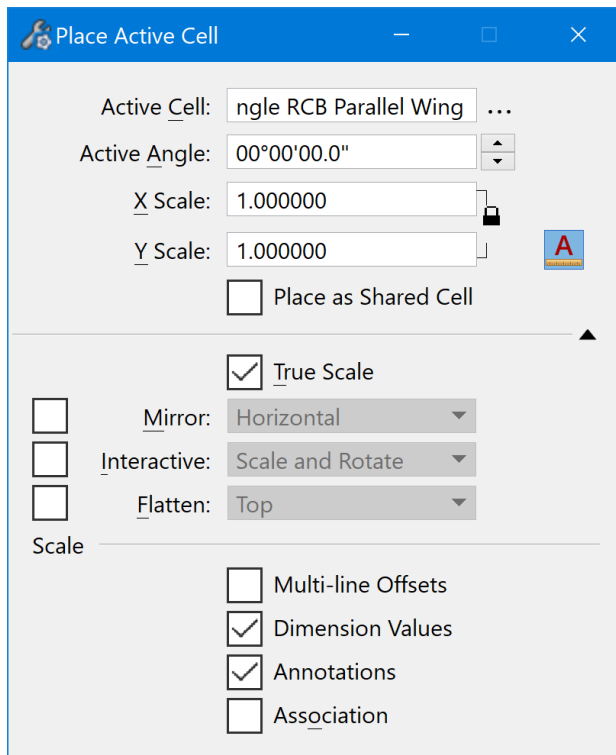


This will set it so that the Design model will have North to the top of the view. Next, select the Place Active Cell tool in the Placement group on the Drawing tab.



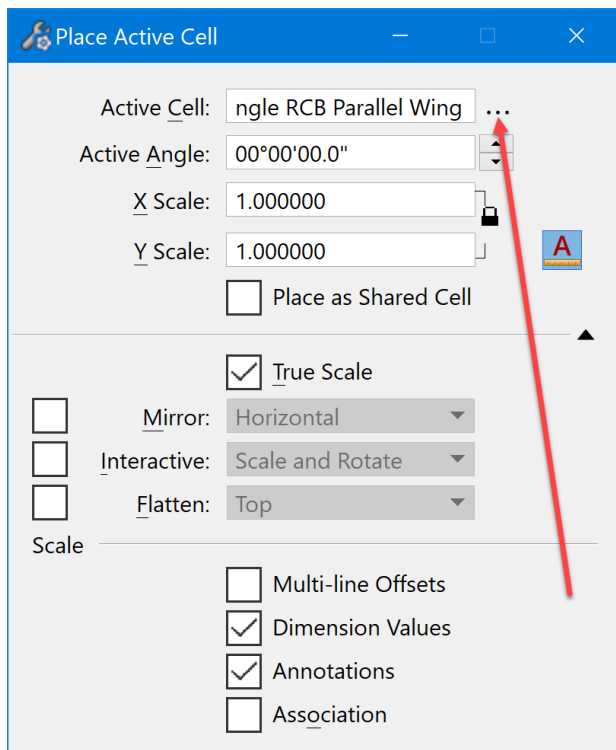


It will open the Place Active Cell dialog box.

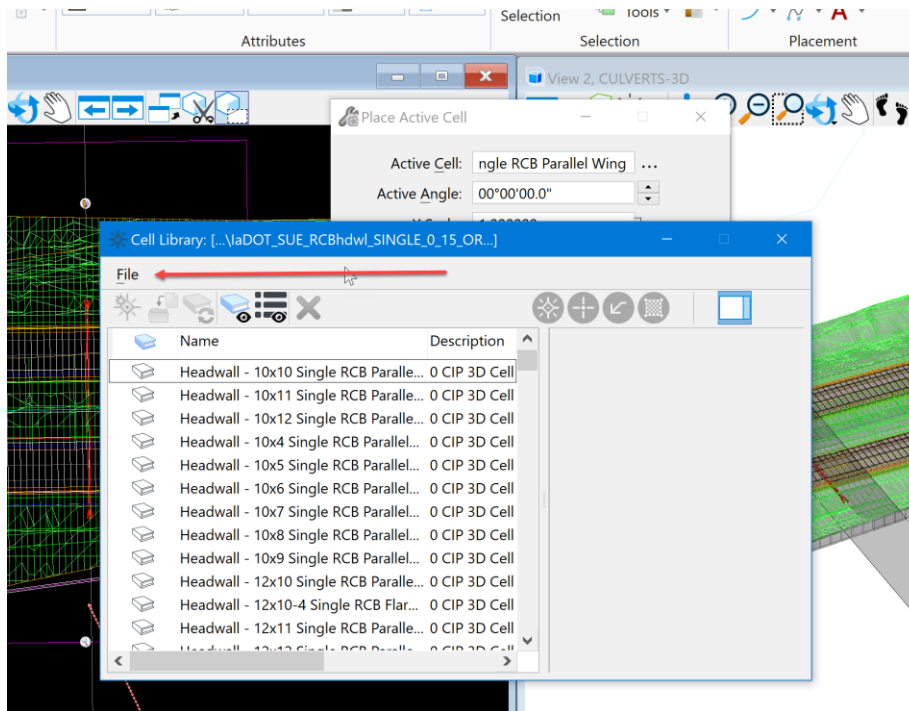


Make the North Arrow cell the active cell.

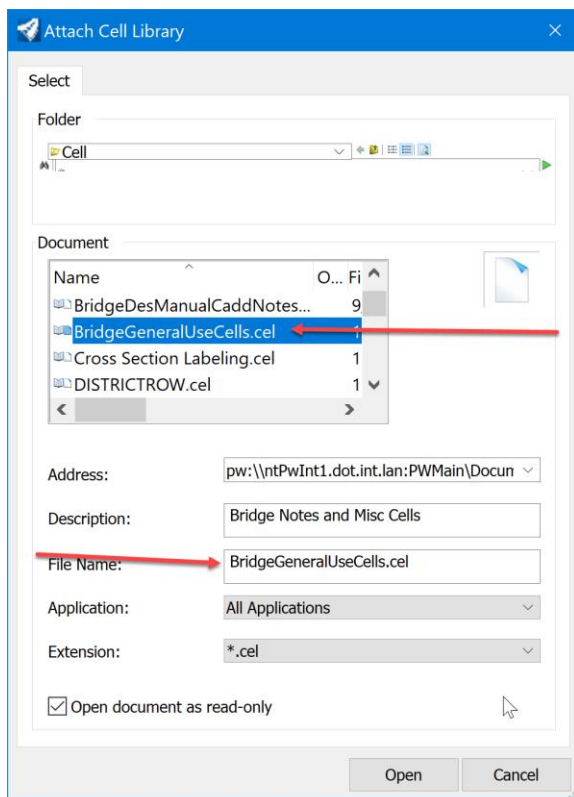
To do this, click on the three dots next to the Active Cell field.



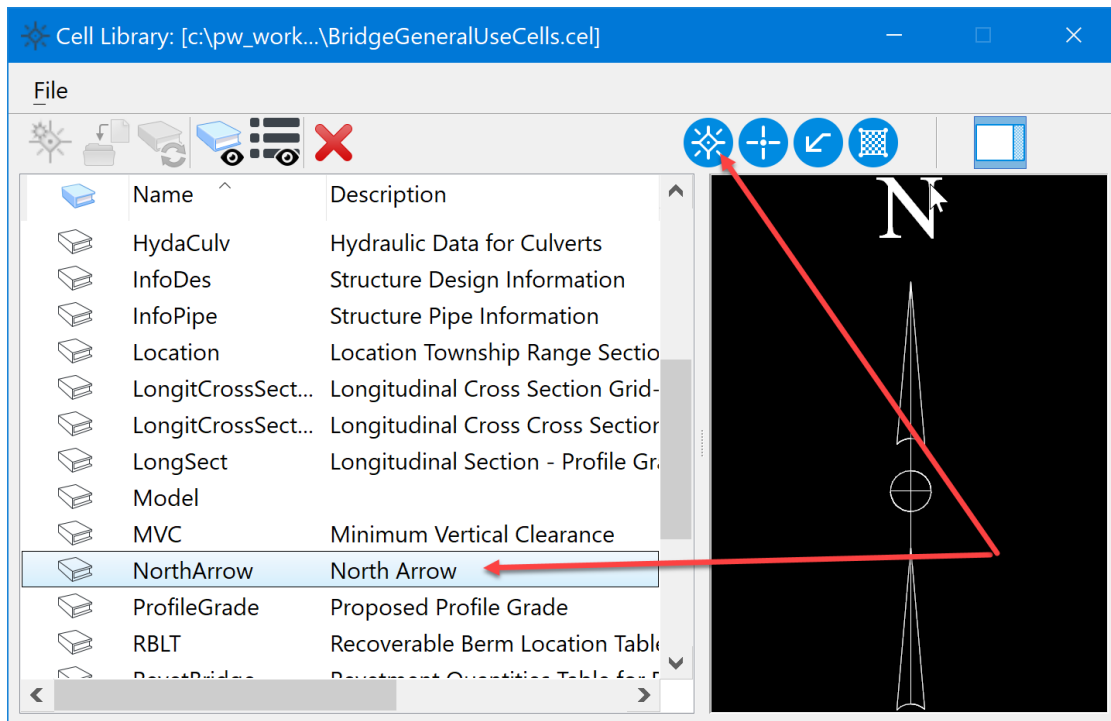
It will open the listing of the cells in the Cell Library.



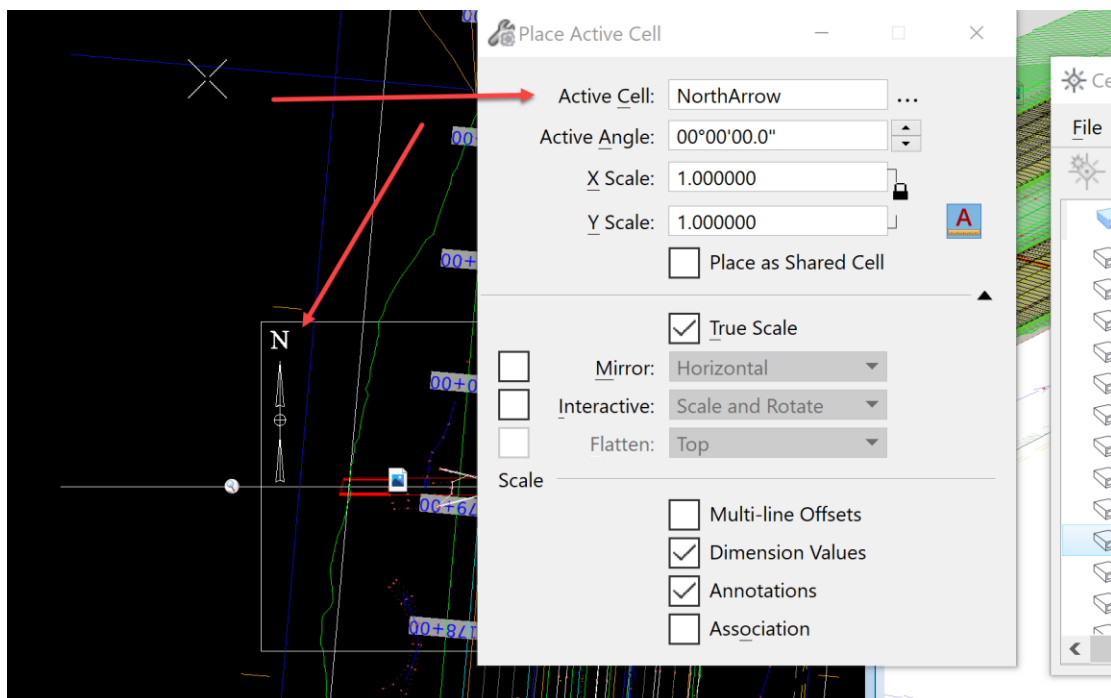
Click on the File menu to navigate to and open the BridgeGeneralUseCell.cel file located at PWMain\Documents\IowaDOTStandardsConnect\Configuration\Organization-Civil\IowaDOT\_Standards\Cell\BridgeGeneralUseCells.cel



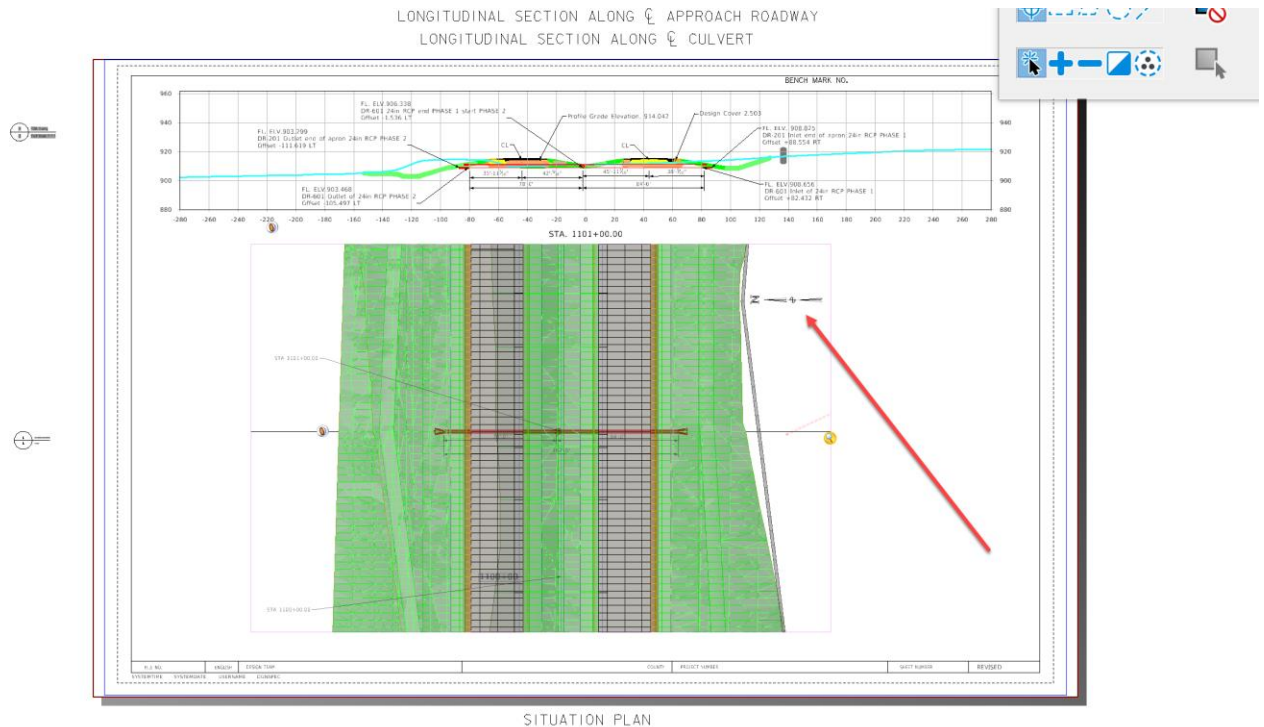
Select the North Arrow cell. Then click on the Place Active Cell tool in the Cell Library dialog box



Place it in the Unrotated 2D design model within the plan view boundary.



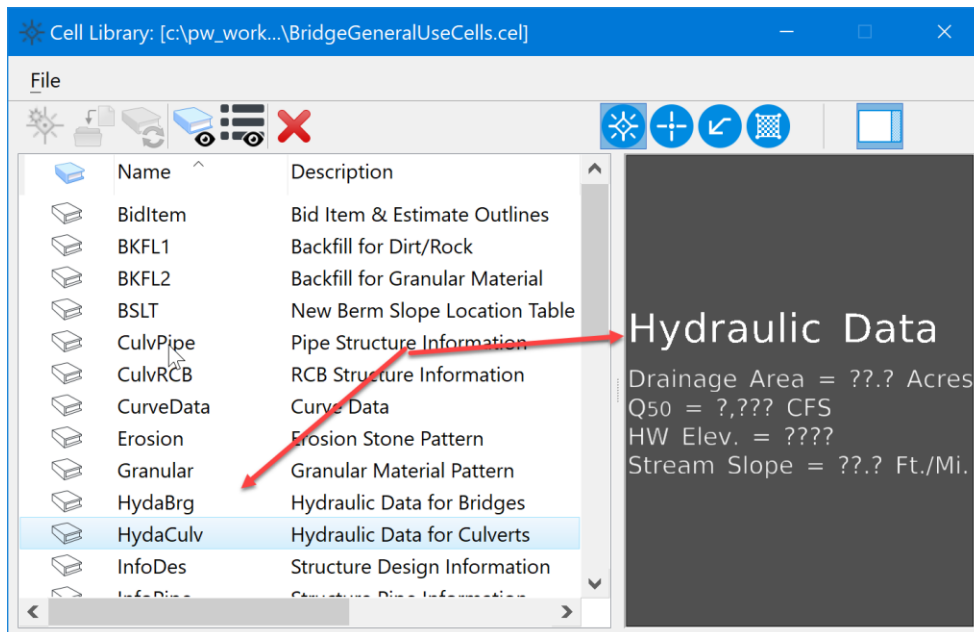
This will make the arrow appear on the sheet at the correct scale and true North Azimuth of the Design file.



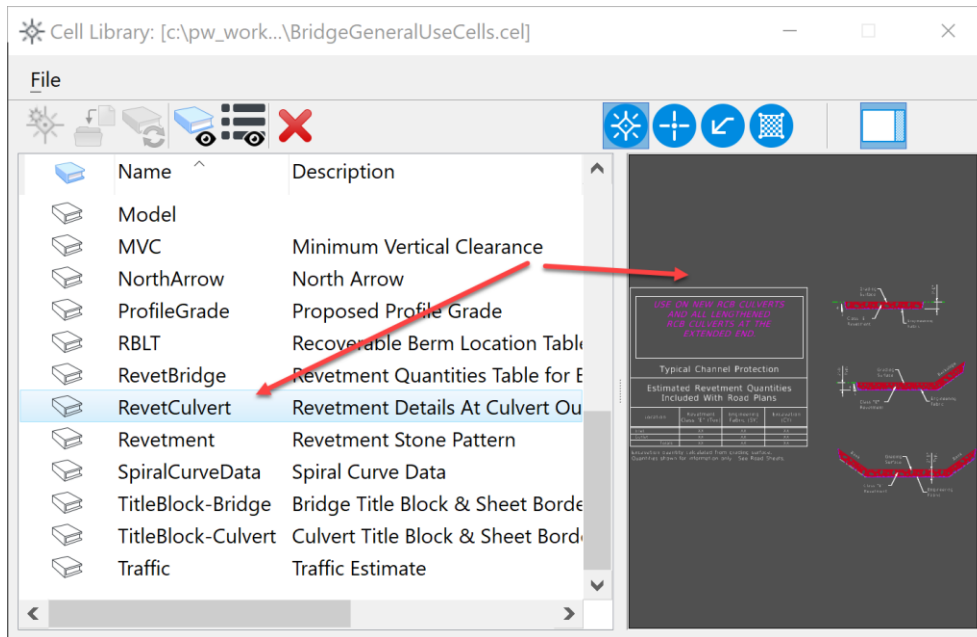
Next, place any of the other notes that need added to this sheet model to properly convey the design intent of the structure.

In the plan view Drawing model, select and place the following cells.

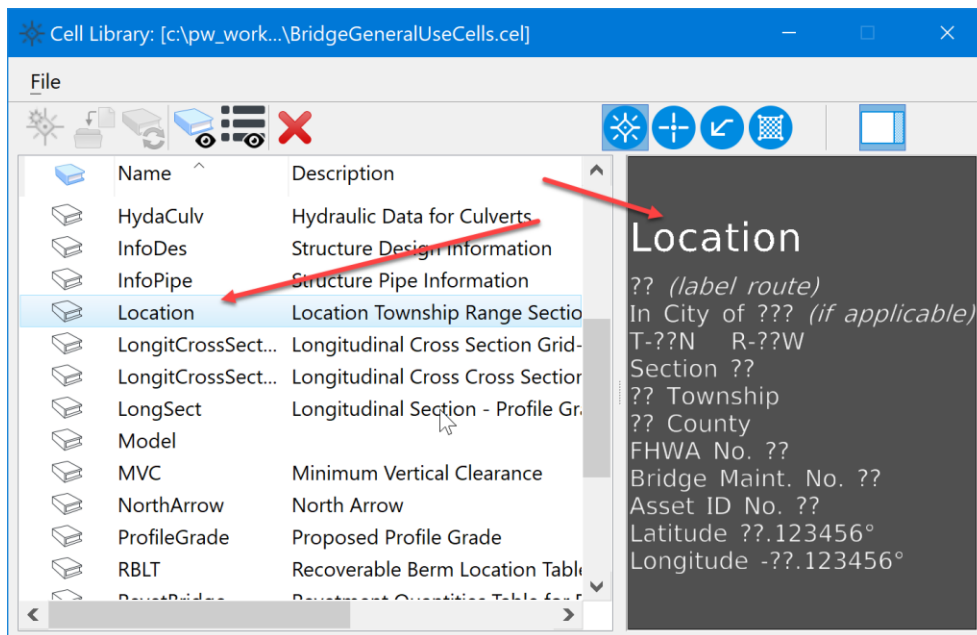
### 1. Hydraulic Data (HydraCulv)



2. Estimated revetment quantities (RevetCulvert) - This will be included with the road plans along with the channel protection typical.

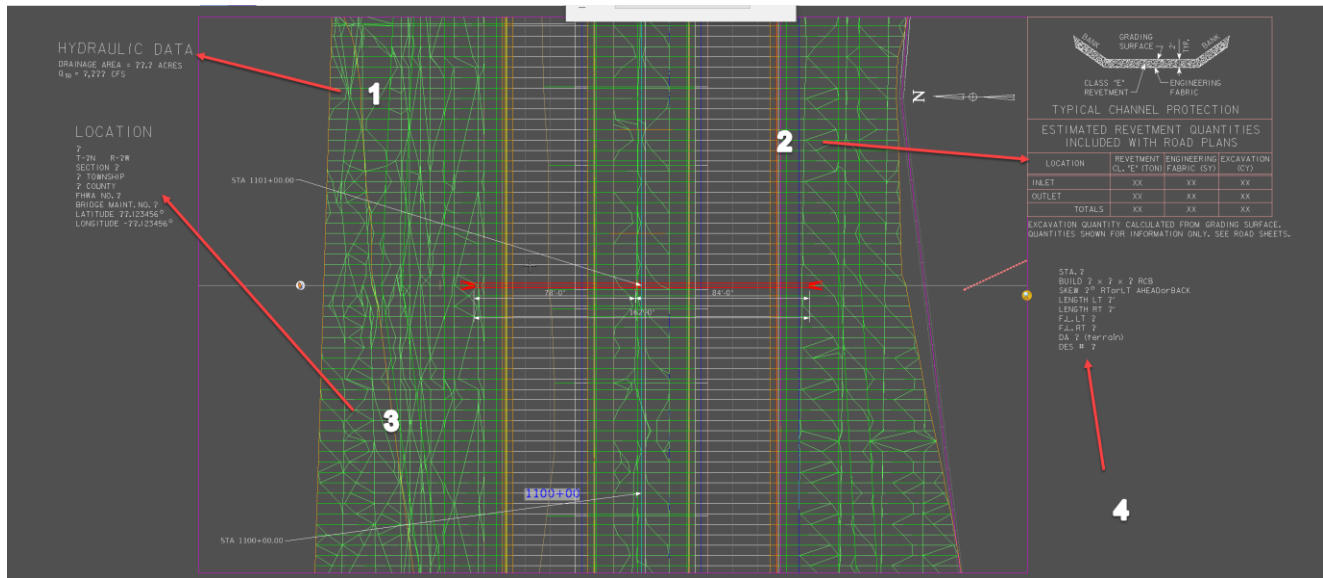


3. Site location (Location)

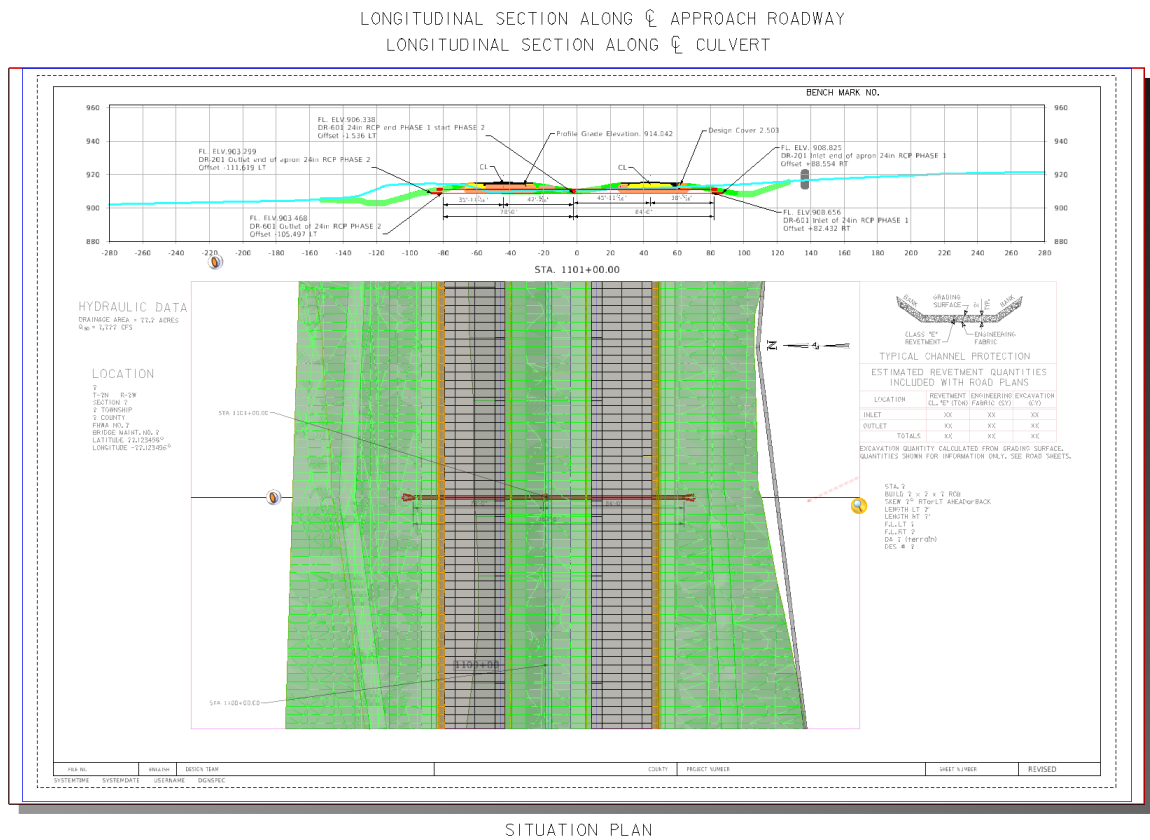


4. Any other notes needed to convey the design intent of the structure.

Once completed, it should look similar to this:



After completing notes, the sheet should appear similar to this:



SITUATION PLAN

Next, enter the Control Point information on the sheet. This information is in the SHT\_PS\_CCRRRPPPZ00.dgn file in the PrelimSurvey directory in ProjectWise. Once the correct control point for the structure is determined, edit the text on the sheet model of the TSL sheet to add this information.

The last step in completing the TSL sheet is the Title Block information and working with the Sheet Index in the IaDOT\_WS file that is accessed thru the Project Explorer. This step will be explained in the next chapter. Please refer to **CW07\_Enter and Editing Title Block Information on Sheets**.