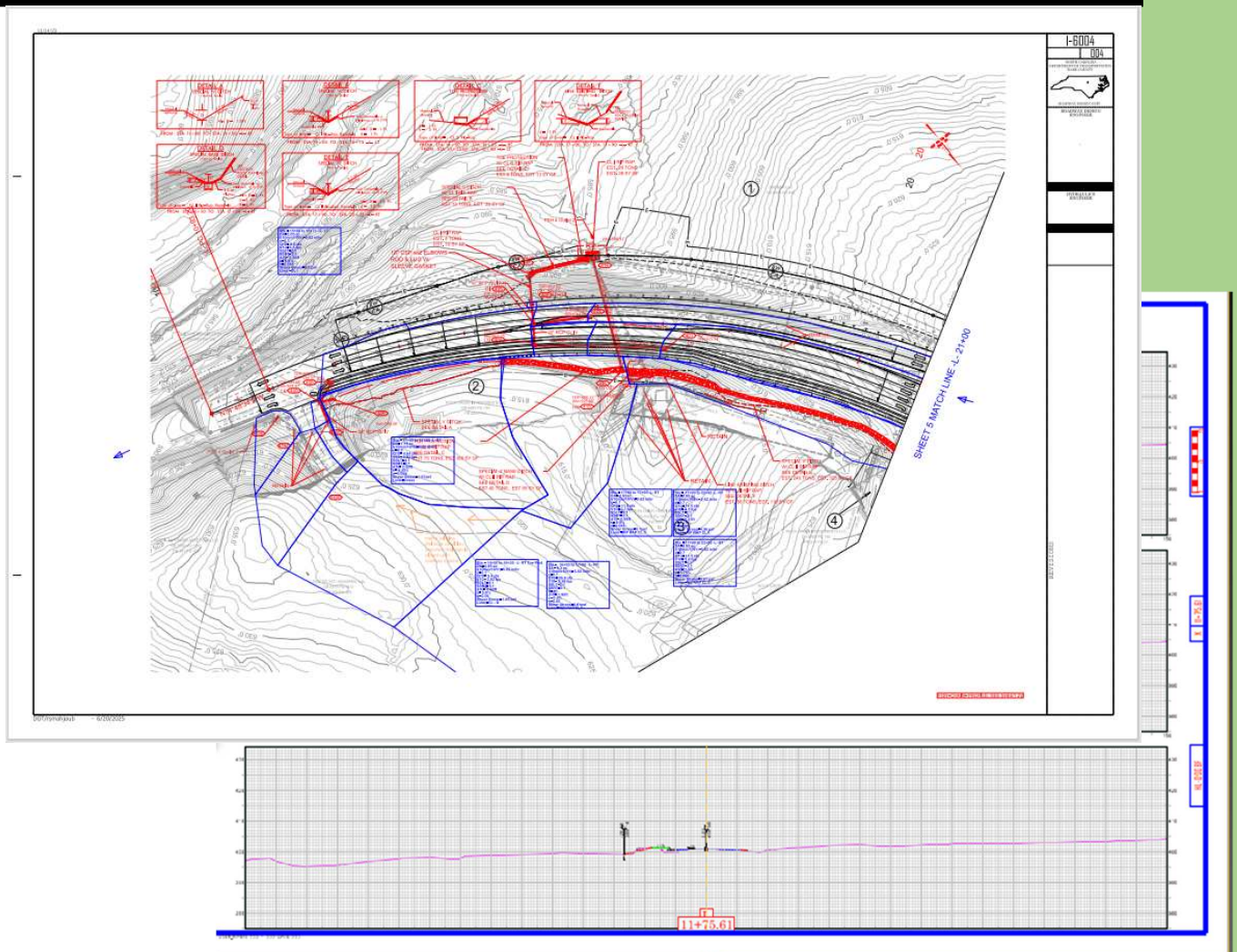


Printing Hydraulic Sheets in ORD



Michelle Berry
NCDOT Hydraulics



Printing Hydraulic Sheets in ORD

Table of Contents

Introduction to Printing in ORD	2
Setting up to Print Sheets for Hydraulic Review or Permits	3
How to Print Sheet Models.....	8
How to Delete Drawing and Sheet Models.....	11
Enlargements and Detail Sheets	13
Alternative Method for Enlargement Sheets.....	15
Alternative Method for Enlargements within Plan sheets	16
Creating Profile Sheets	18
Creating Profile Named Boundaries	24
Creating Sheets from Existing RDWY Cross-Sections Named Boundaries (Method 1)	26
How to add an additional XSC at a single location	29
Creating Sheets from Cross-Section Named Boundaries	31
Creating Sheets from Existing Cross-Sections Files (Method 3).....	36
Common Issues that may happen with XSC and how to fix them:	40
How to Print the Title Sheet for Redline Drainage.....	41
Print Organizer: Printing Multiple Sheets Together (Plan, Profile and/or XSC sheets)	44
Common Errors and How to fix them.....	48



Printing Hydraulic Sheets in ORD

Introduction to Printing in ORD

These instructions were created utilizing the current sheeting method documented by the NCDOT Roadway Design Unit in the Module 13-Sheeting manual. This method should give the user a better understanding of the sheeting process, enough to find the appropriate drawings and print out their Hydraulics plan sheets. Steps shown here are from within the ProjectWise program and utilize that directory structures unless stated otherwise. This can be done in the unmanaged workspace as well, but the referenced files may show broken paths.

Sheeting involves the use of two models per plan sheet; one is a Drawing Model and the other is a Sheet Model. The Drawing Model, denoted by its **gray** background color, has a clipped and rotated view of the design plan. The Sheet model is a Full Size 1:1 model, normally located at the 0,0 lower left coordinate in which the Drawing Model is referenced. This Sheet Model includes the sheeting border and Title Block which can be changed to accommodate each Unit or Discipline. The sheet model has a **white** background and appears to look like a sheet. Rather than utilizing the old method of copying the Design plan sheet files and changing the Title Block cell, the Hydraulics Unit has suggested that user “cut” their own sheets through the Named Boundary dialog in the Drawing Production Tab. Using the same Named Boundaries, the newly cut sheets will have the same coverage as the original plan sheets but allow the users to add or subtract the information shown on the sheets and to add their own Title Block if desired.



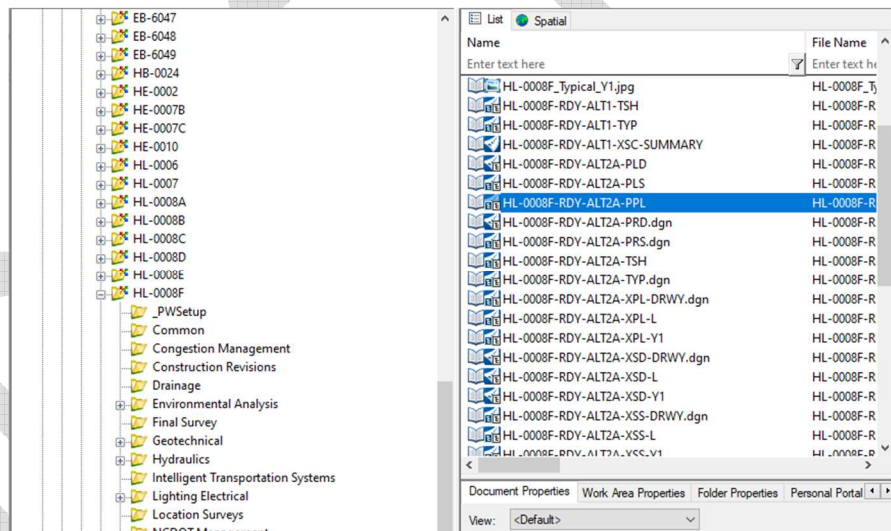
Printing Hydraulic Sheets in ORD

Setting up to Print Sheets for Hydraulic Review or Permits

The Current Hydraulic Printing Method recommends recreating a Hydraulic PPL file separate from the Roadway PPL file. Currently, it is recommended that all users create their own Hydraulic PPL file. The User can then either match Roadway's file setup with the creation of separate Hydraulics PLS (Plan Sheets), PLD (Plan Drawing Sheets) files or included the Drawing and sheet models with in the ppl file. It is recommended to include the drawing and sheet models in the PPL file if you have a smaller project, such as a Bridge replacement project.

The **first step** for printing any type of sheet is to create a new 2D file in the Hydraulics -> Design folder on ProjectWise. For plan and Profile sheets, this will be the HYD_PPL file. (3D files are ONLY for making contours)

Next, the user will need to locate the RDY_PPL file containing the Named Boundaries that will be utilized to create the existing sheets. These are most often located in the Sheets directory under the Roadway area in ProjectWise.



The default view in a PPL file should only contain the Named Boundaries and have all the remaining design data referenced to it.

In this new dgn file, reference the located PPL and set the Live Nesting to 2, then review the data to see if the graphics depict the data you desire. (Note: During this review of the references make sure that the references have the correct Logical Name assigned to them allowing for the correct plotting of the files.) Change the Live Nesting Depth to a larger value in order to see all the referenced data if needed. In most cases the user will need to Attach the DRN file as a reference, and needs to ensure that the Logical



Printing Hydraulic Sheets in ORD

Name is set to “DRN” for the Pen Table to correctly plot the Hydraulic data in the red color. This container file may have the following files referenced (if created for the project): DCM, SDM, DTL, DA, or SUR. The DRN file in the Drainage folder will be a container file that references the drainage design and may include the labels to allow the roadway users to adjust labels as needed. In order for the Hydraulics pen table included in the ORD Workspaces to print correctly, the following files must have the following logical names:

Recommended Reference Files	
Name	Logical Name
RDY_ALG	ALG
RDY_DSN*	DSN
RDY_PPL	DSN
RDY_ss	SS
RDY_row	ROW
RDY_TSH	TSH
LS_FS	FS
HYD_CON	CON_HYD
HYD_DRN	DRN
LS_ETCM	CON
Projects that tie or will be built by others	DASH

While it may seem like it is quicker to increase the nesting depth of the PPL file (FS file) to show all of it's references, it has been shown that in some cases, the logical names are not set up in the RDY ppl files (and many other container files) at this time and the nested files will not print correctly for Hydraulics. This is the same for older FS files.

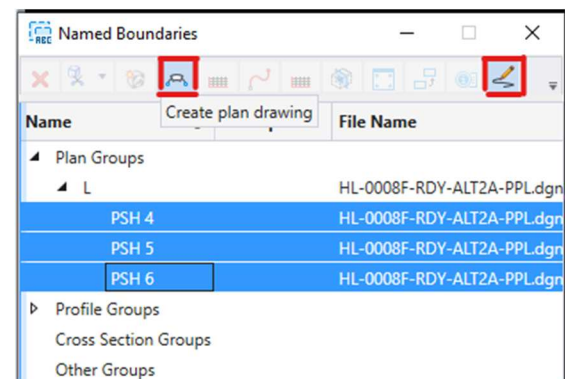
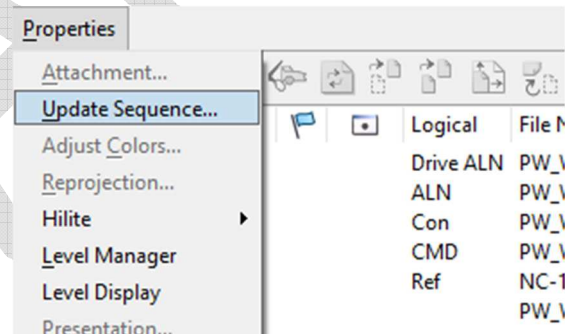
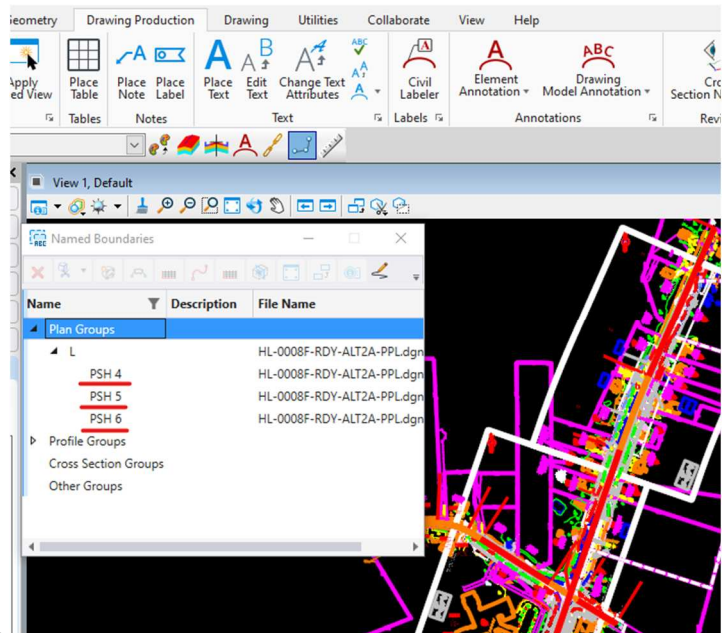


Printing Hydraulic Sheets in ORD

This document will explain the method that places the Drawing and Sheet Models into this newly created HYD_PPL dgn file, but there are options for placing them into their own separate dgn files which will be shown later in this document. When adding files to be referenced, the order of the files in the reference list affects the order that the lines will print on top (or below) of each other. To override the printing order in the reference list, the user can go to the “Update Sequence” tool box, located under the properties in the reference toolbox. The order of list is opposite of the order of printing the lines. The top of the list will be printed first and the bottom of the list will have the files that will print on top of all other files, unless the level print order has been overridden by the pen table.

After the referenced data is displayed, the user will see the graphical Named Boundaries utilized by design. Open the Named Boundaries dialog from the Drawing Production Tab and there should be a list of the Sheets under the Plan Section.

Select any or all the Sheets desired and toggle on the Show the Create Drawing Dialog icon on the right of the menu along the top of the dialog. Then click on the Create Plan Drawing icon. Because the “Show the Create Drawing” Dialog was toggled, the Create Drawing Dialog opens allowing the user to change the default settings.





Printing Hydraulic Sheets in ORD

In the Create Drawing Dialog, users can change the name of the View Name, Drawing Model and Sheet Model to an appropriate name. NCDOT starts their Plan sheet numbers at 4 so is that what is shown here.

The checkboxes located on the left side of the dialog in the Drawing and Sheet Model areas allow the models to be stored in separate dgn files (HYD_PLD & HYD_PLS) and may become necessary as projects grow in size. In the center of the dialog is the “Annotation Group” pull-down where there is a list, under NCDOT > Plan > Drawing, of annotation groups that will draw a North Arrow on each Sheet and create matchlines between sheets with the correct stationing. The user should make sure to select the annotation group that matches the correct horizontal and vertical datum. The Open Model checkbox at the lower portion of the dialog means that after the sheets are cut, the last sheet will be displayed.

Click on the Ok button will initiate the sheeting process, and, in this example, the Sheet and Drawing Models will be created in this dgn file.

Once all drawing and sheet models have been created, it is recommended to open the drawings models and change the “Synchronize View” to “Settings From Design Model”. This allows for any changes to the default view (such as a level being turned off or on) to be shown on the Drawing view and thus the sheet view.

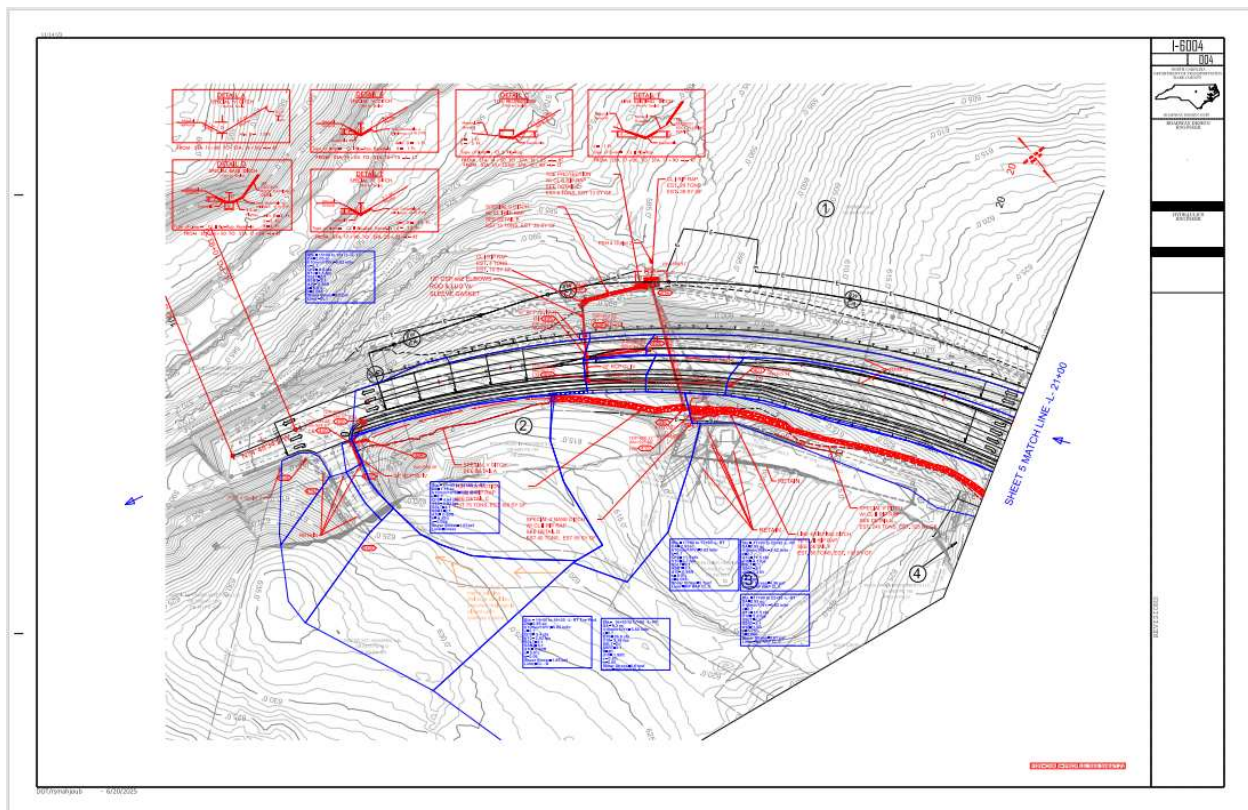
Another setting that can be adjusted is the “Display Overrides”. If the “allow” is selected the user can override the levels in a reference but if it is set to “never” the level settings in the reference file will be locked. It is suggested that the user set this to “never” if they are referencing a container file that they know has the correct levels turned



Printing Hydraulic Sheets in ORD

on or off. If the user is referencing a file that the user can not open or edit, such as the FS or a roadway container file (if the user is internal to NCDOT), it is suggested that the user set this to “allow”.

Annotation and labeling of plan sheets will be discussed in a separate guidance document.





Printing Hydraulic Sheets in ORD

How to Print Sheet Models

Once the desired sheet model has been created, it is a simple process to print the sheet.

1. All printing must be done in the sheet model if the user would like to have the Hydraulic pen

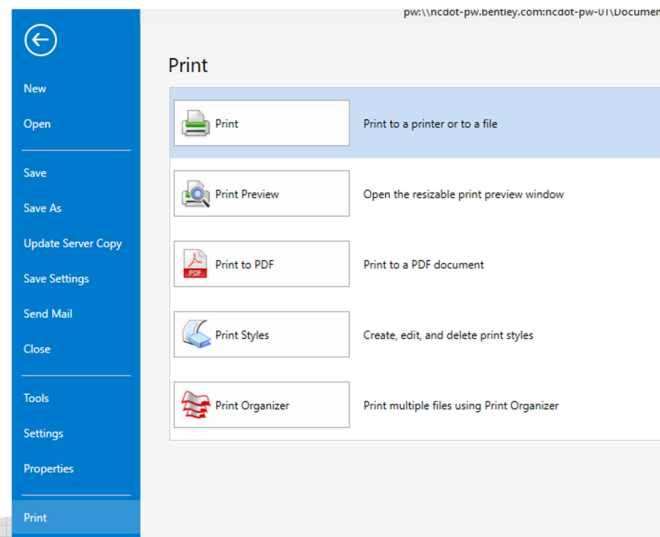
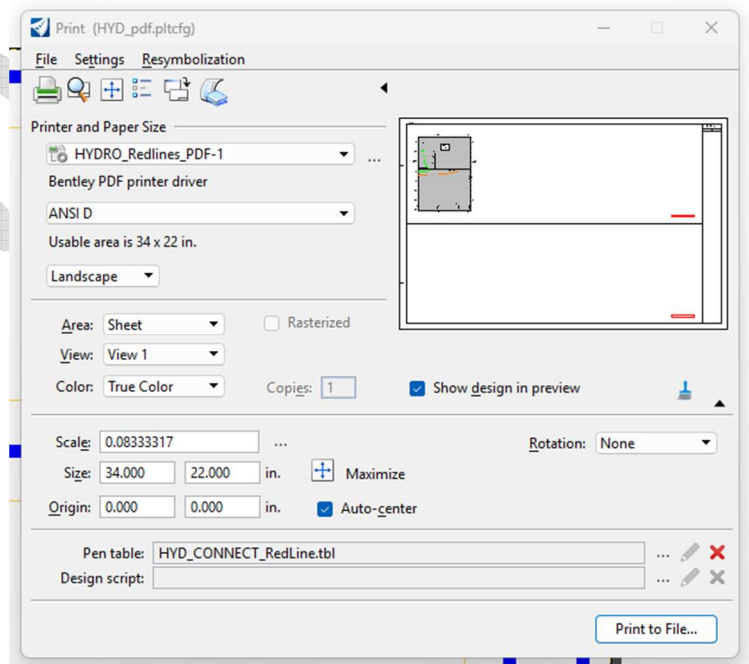


table control all levels, such as thickness or color. Preliminary documents can be printed from the default view but they will not match NCDOT standard practices.

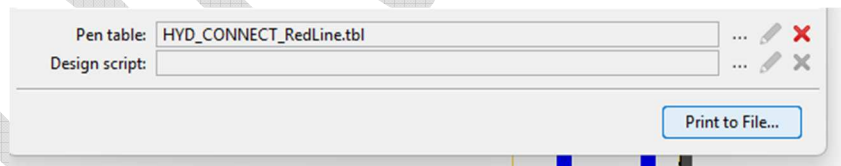
2. The Print tool is located in the "File" section of ORD. It is recommended to use the "print" tool and not the "print to PDF".
3. Once the Print tool is opened, the Hydraulic Configuration file will auto load. This will select the correct pen table, that include different page sizes and will control the levels based on the logical names.



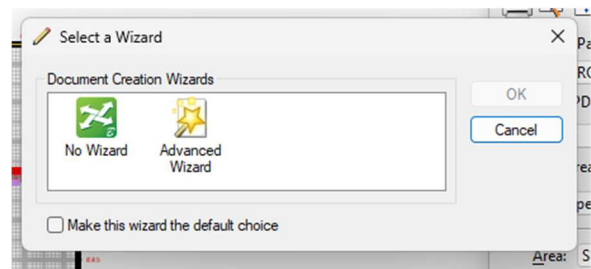


Printing Hydraulic Sheets in ORD

4. There is a drop down located next to the “ANSI D” that will allow the user to select non standard page sizes such as BSR (25.5” X 22”) or INTERCHANGE (34” x 62”). Another page size the user may need to know is “ANSI B”, which is a 17”x 11” sheet. Please note that page sizes are landscape orientation based on the configuration file but this can be changed by the user.
5. At this time, a Design Script file is not provided by NCDOT Hydraulics. Users can create their own, but a design script is not necessary for printing.
6. The NCDOT Hydraulic Pen table “HYD_CONNECT_Redlines.tbl” will autoload. The edit “pencil symbol” will be grayed out if the ORD file is located on ProjectWise. The user can select the ellipse “...” and select a pen table on their machine if they want. This would allow them to make a custom pen table.
 - a. Common issue: ProjectWise may not update the pen table that is pulled down on to the users computer. If the user is having issues with lines printing the correctly, the user can reload the pen table by using the ellipse box to re-select the pen table on ProjectWise. In ORD 2023, the Pen table for Hydraulics is located at:
pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\Administration\WorkspaceGroups\NCDOTWorkspaces\Configuration_2023\WorkSpaces\DOT-US North Carolina\Roles\NCDOT_Hydraulics\Standards\Plot\HYD_CONNECT_RedLine.tbl



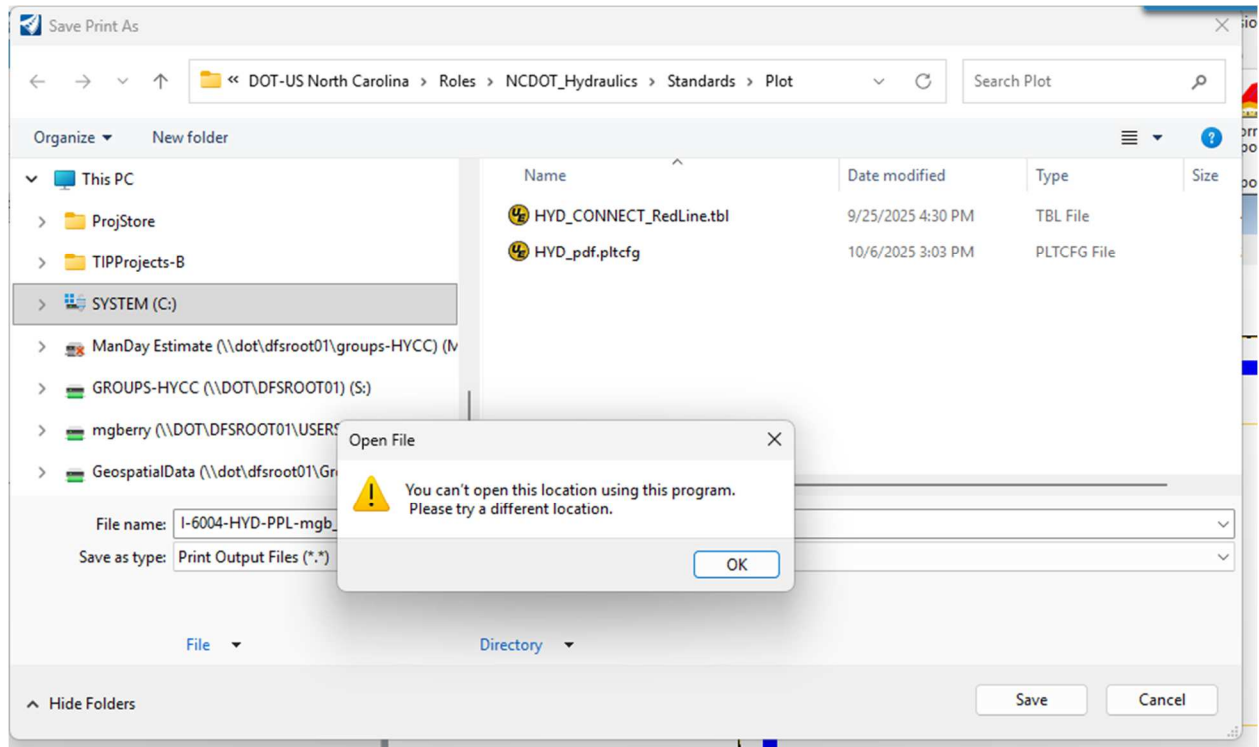
7. Once the “Print to File” button is selected, a “Select a Wizard” prompt will open if the user is working on ProjectWise. The user can select “No Wizard” or “Advance Wizard” if the user wants to save the pdf directly to ProjectWise. If the user selects “cancel”, a “Save Print As” prompt will





Printing Hydraulic Sheets in ORD

open, allowing the user to save their sheet pdf to their computer.



8. NCDOT Users will frequently get an error stating “You can’t open this location using this program. Please try a different location.” The user should select “OK” and then path to where the PDF needs to be saved and then select the Save button.
 - a. Please note that in earlier versions of ORD, there was a prompt to automatically open the pdf after creation. This no longer works on NCDOT computers. The user will only be able to tell if the pdf creation was successful by either the Command Prompt (in the lower left of the ORD program screen) or by checking the location that the pdf should have been saved to.



Printing Hydraulic Sheets in ORD

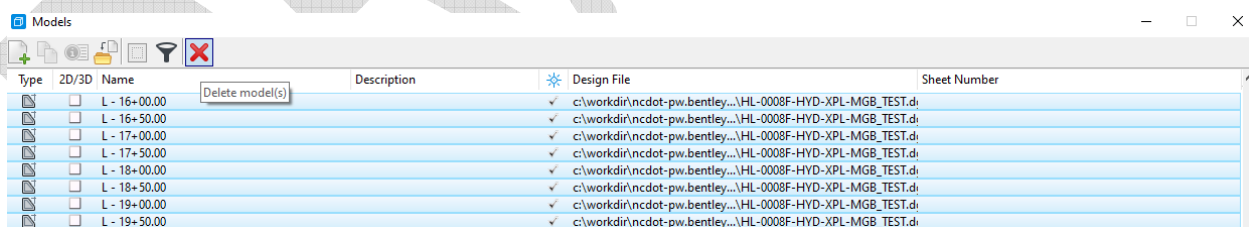
How to Delete Drawing and Sheet Models

Sometimes it is necessary to delete the drawing and sheet models, whether it is due to a re-alignment of the main alignment or an error in the sheet models. Deleting them is simple but there is one step that is not intuitive unless the user is an advanced ORD User with an understanding of how models are created with “Saved Views”.

1. Open the Models Dialog.



2. Then select the drawing and sheet models that you would like to delete but do not select the default or default-3D models.
3. Then delete the models.



4. To prevent instability and printing errors, you must delete the Saved Views that were created by ORD when you made your drawing and sheet models.
5. Open the “Saved Views” dialog box. Then select and delete all saved views.

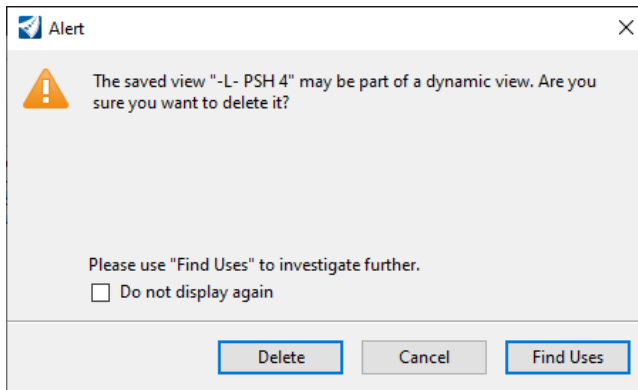


6. The user will have an Alert pop-up window warning you that the saved view may be part of a dynamic view and whether the user is sure that they would like to delete the saved view. Select



Printing Hydraulic Sheets in ORD

the “Delete” button. The user may receive an alert for each saved view that you are deleting.



7. Tip: when you use the named boundaries to re-create your drawing and sheet models, make sure that you have your 3D view open if you are working with cross sections.

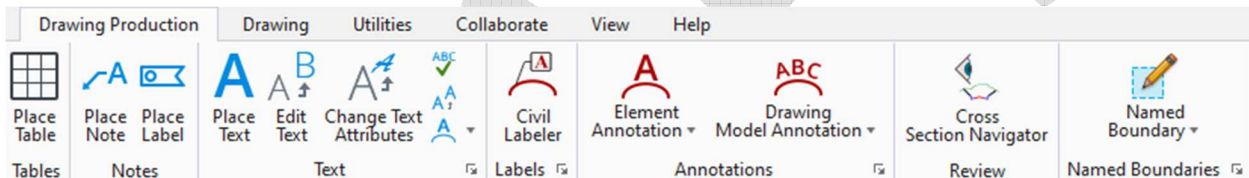


Printing Hydraulic Sheets in ORD

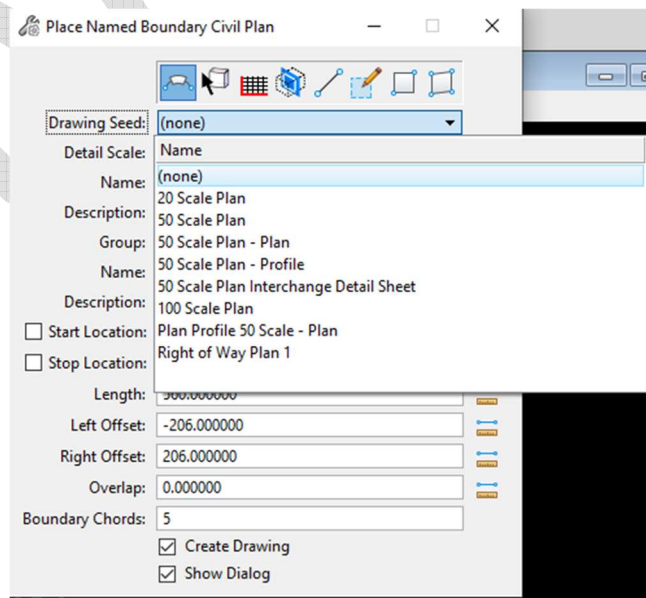
Enlargements and Detail Sheets

To create Enlargement and Detail sheets the user can utilize two main methods. One is to use the scaled sheets from the Design workspace or the other is to increase the Detail Scale of the larger Sheet Detail. Either method will require the creation of a new Named boundary. At the creation of this document, it has not been decided yet in what file the user should place the Named Boundaries. Roadway's Sheeting instructions state that the PPL file that is created during the design phase is to be used by the other disciplines as well for any Named Boundaries, but since that file is stored in the Roadway subdirectory in ProjectWise, permissions have been a stumbling block.

Once in the Hydraulic PPL file, in the Default Model, the user can then navigate to the Drawing Production Tab located in several of the Workflows and click on the Named Boundary icon in the Named Boundary Group.



The Place Named Boundary Civil Plan dialog will open, and the user should select the left most icon on the top of the dialog for Civil Plan. This first method shown will use the currently created Drawing Seed used by the Design Unit. Click to open the drawing Seed pull down and select the 20 Scale Plan option. The Status bar in the lower left corner of the application states to Identify Path Element, so select the horizontal alignment. If you are creating Details in a file without an alignment, it is recommended that you create a "dummy" alignment in your file that is at least 1400' long. Once selected a dynamic line appears graphically allowing the user to place the Start Location. The Start Location inside of the dialog will display the stations as the user moves the





Printing Hydraulic Sheets in ORD

cursor. Once a left click is given, dynamic sheet boundaries will be shown as the user moves the cursor along the alignment, and the Stop Location in the dialog displays the station. Give a data point inside the last border to fix the Start and Stop locations.

Next in the dialog box, add the desired name for the Sheets, such as “Hydro_Permit 1”, into the Name field. If this were a multi-sheet process, this Name will incrementally increase for each sheet.

The Length, Left Offset, Right Offset and Overlap are default settings from the Drawing Seed and will not be adjusted during normal sheeting. The Boundary Chords is the number of vertices used along the boundary to duplicate curved section of the alignment. It is recommended to do a boundary Chord of 5 or 10.

The last two toggles of Create Drawing and Show Dialog should be toggled on.

The Status Bar along the lower left of the application should now state to Data/Accept the boundaries, so click in the view to accept and proceed to the Create Drawing dialog.

The settings in the dialog are as follows:

View Name, Drawing Model Name and Sheet Model Name can be changed to users' preference, but a good rule of thumb is to use the same from the previous dialog.

Drawing Seed should be filled in correctly from the previous dialog.

Annotation Group places the Match Lines and North Arrows on multiple Sheets if applicable.

The open Model toggle at the bottom of the dialog should be checked On as this will open the last Sheet model created during this process.

Mode: Plan

☐ One Sheet Per Dgn:

View Name: Hydro_Permit 1

Drawing Seed: 20 Scale Plan

View Type: Civil Plan

Discipline: Civil

Purpose: Plan View

Drawing Model

Model Name: Hydro_Permit 1

Seed Model: Plan Only 20 Scale.dgnlib, PLN_D-

☐ Filename: (Active File)

Annotation Group: NC_Plan Annotation NAD 83 NSRS 2007

Sheet Model

Model Name: Hydro_Permit 1

Seed Model: Plan Only 20 Scale.dgnlib, PLN_S-

☐ Filename: (Active File)

Sheets: (New)

Full Size 1 = 1

Drawing Boundary: PLN-

Detail Scale: 1"=20' (By Named Boundary)

☐ Add To Sheet Index

☐ Make Sheet Coincident

☒ Open Model

OK Cancel



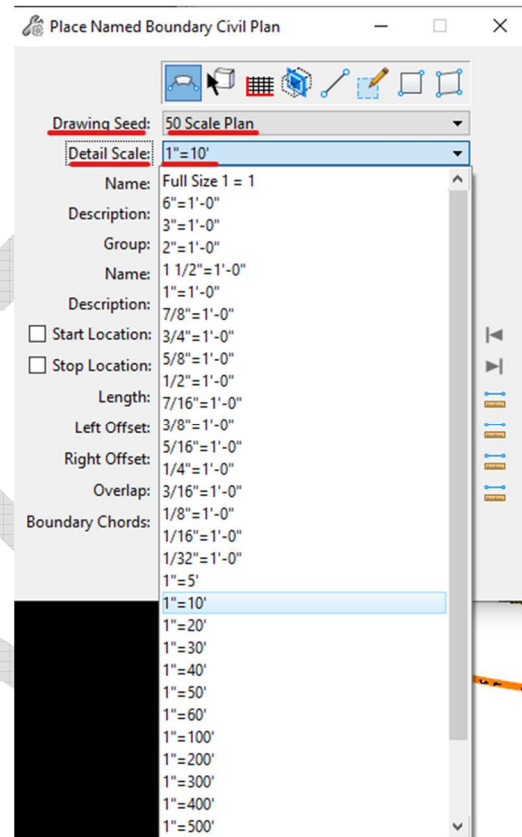
Printing Hydraulic Sheets in ORD

Selecting Ok will begin the process and close that dialog.

Alternative Method for Enlargement Sheets

This method allows the user to select a larger variety of scales when making their enlargements rather than just the 1"=20' from the first method. The procedure is much the same, just changes to the Drawing Seed back to the original 50 Plan Sheet and then select a Detail Scale from the pull down.

After selecting the alignment feature the user can then graphically select the area for the enlargement or type in know Stations for the Start and Stop Locations. Both will now show a scaled Named Boundary along the alignment. Once this is completed, the user can change the Name field, as before, and then select OK which will invoke the Create Drawing dialog as shown in the previous method. Fill in the dialog as was done in the first method and click OK to begin the processing of the sheet(s).



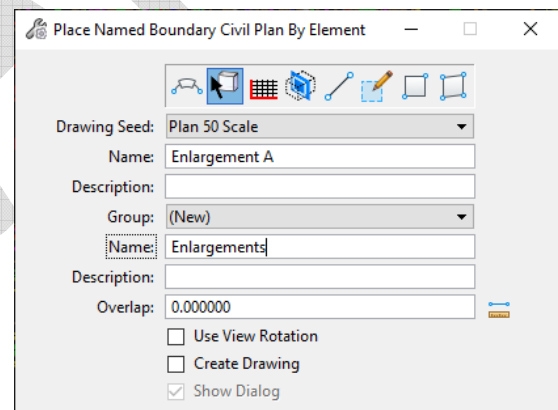
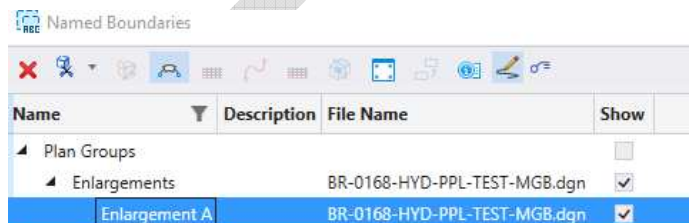


Printing Hydraulic Sheets in ORD

Alternative Method for Enlargements within Plan sheets

This method allows the user to add an enlargement to a Plan Sheet that has already been created. It is recommended that a shape is added to either the DRN file or the PPL file to show the location that will be enlarged. This method involves creating a new named boundary for the enlargement boundary and then inserting that named boundary into a plan sheet model that was previously created.

1. In the Hydraulic PPL file, in the Default view, make sure an enlargement boundary has been added to this PPL file. This boundary should be on a drainage level that will print red, i.e. pattern_3. Do not use the default level as it will not print.
2. Open the Create Named Boundary tool and select the “Civil Plan by Element” button and then select your Enlargement boundary.
3. Left click to accept.
4. Your Enlargement Named Boundary will now appear in the Named Boundary list. Select the enlargement named boundary that you would like to add to a previously created Sheet model.
5. Next select the Create Drawing by Plan button.
6. In the Create Drawing dialog box, the user will need to select the plan sheet that the enlargement will need to be add to and make sure the “Drawing Boundary” is set to “(new)”.
7. In this example sheet, “L 004” is the sheet that the enlargement will be inserted into. The Drawing Boundary needs to be “(new)”.





Printing Hydraulic Sheets in ORD

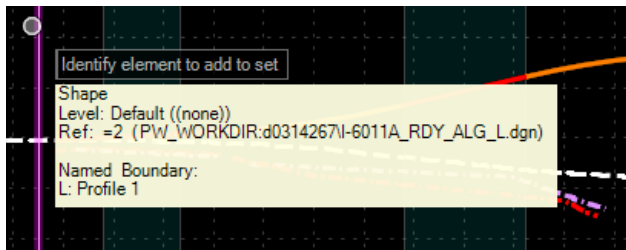
8. Click 'ok' and then go to the plan sheet model. The Enlargement will be in the center of the sheet model. The Enlargement has been inserted as a reference of the drawing model. This reference can then be moved and scaled using the reference manipulation tools. You will need to mask the plan drawing in the final location of the enlargement.

Sheets: L 004 [Sheet]
Full Size: 1 = 1
Drawing Boundary: (New)
Detail Scale: 1"=50'
☐ Add To Sheet Index
☐ Make Sheet Coincident
☒ Open Model
OK Cancel

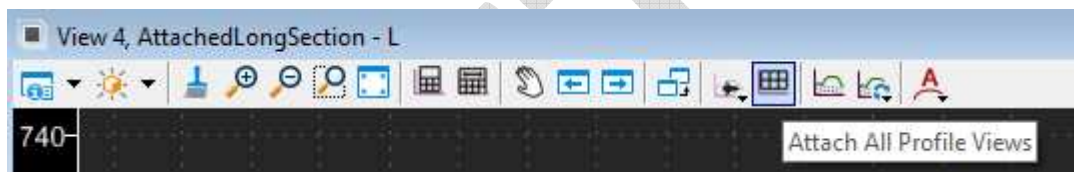


Printing Hydraulic Sheets in ORD

profile sheets. Creation of Profile Named Boundaries will be discussed in the next section.



- a. If the proposed alignment or the named boundaries do not show in the profile view, select the “Attach All Profile Views” button.



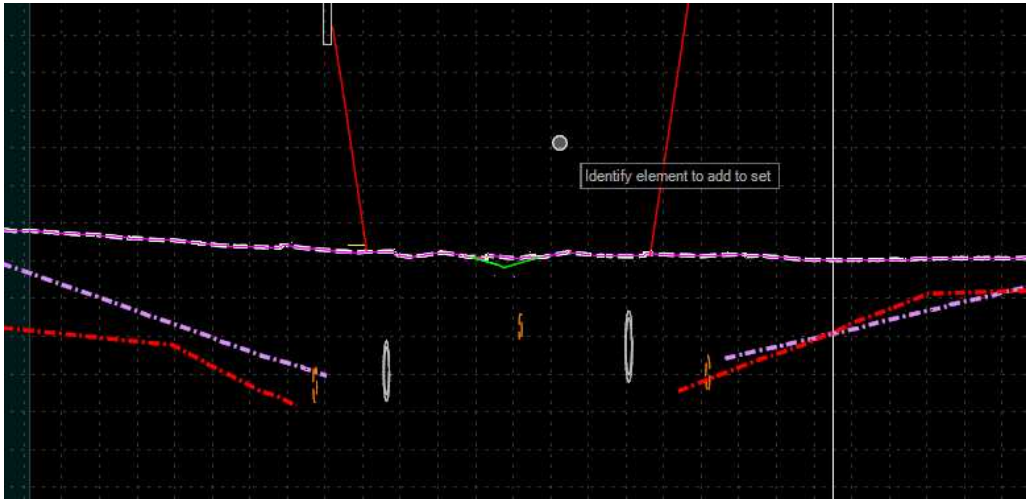
5. The NCDOT Profile sheets will need to show all existing pipes that will be retained and proposed pipes under the centerline of each Alignment. In MicroStation V8i, the pipes had to be hand drawn. ORD allows the user to create a “3D cut” to show these pipes on the profile sheets.



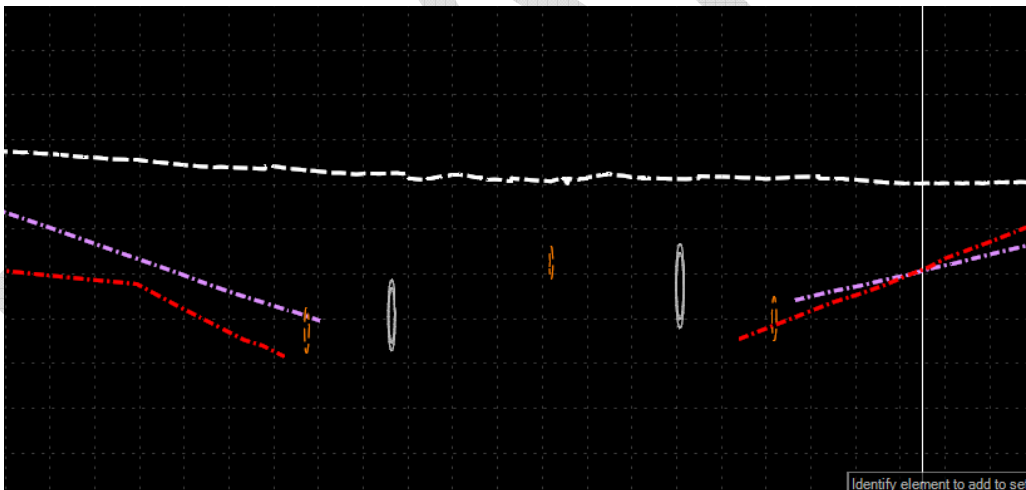
6. Once selected, the user will be prompted to choose a “Placement Method”. This guide uses “corners”, but others can be used.
7. Next, select the entire area that has named boundaries in your profile view. First, select the top left corner, then the bottom right.



Printing Hydraulic Sheets in ORD



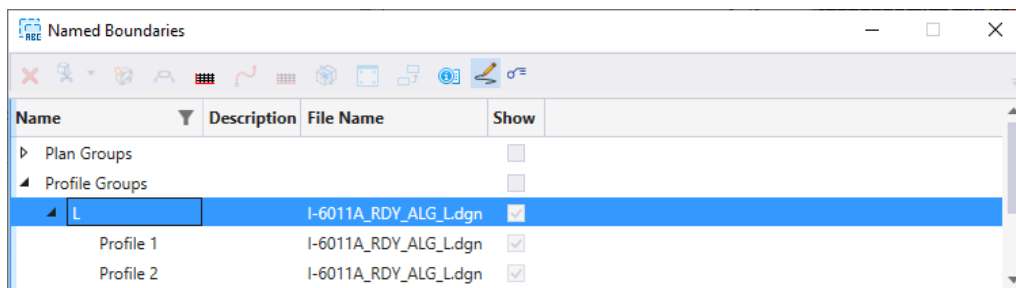
8. If the CMD file is turned on in the default view, the user may see too much information such as pavement substructure or bridge abutments (as of 2024 Hydraulic is not responsible for adding them in the CMD model). Turn off any reference in the Profile view that you do not want to have printed.



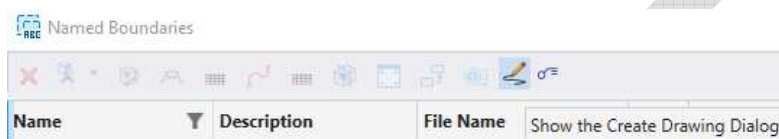
9. Open the “Named Boundaries” tool box. (available from the Drawing Production tab in the Ribbon)
10. Select the arrow next to the “Profile Group” to see the available named boundaries.



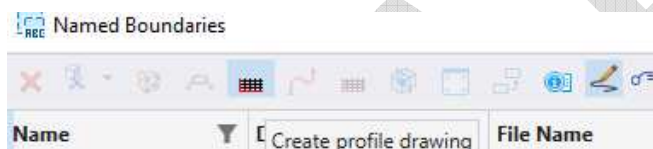
Printing Hydraulic Sheets in ORD



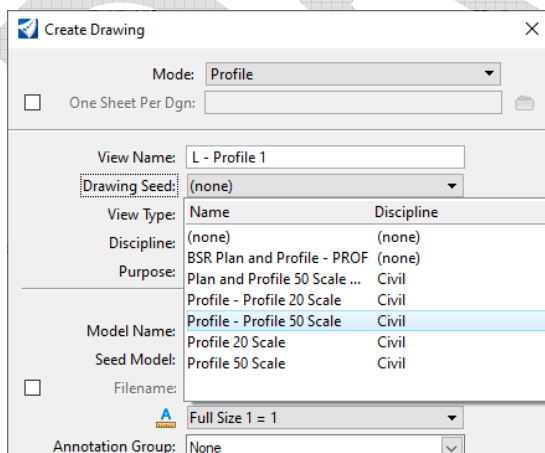
11. Turn on the “Show the Create Drawing Dialog”



12. Select the Profile group name that you would like to create the sheets for. In this example, L is selected. Then select the “Create Profile Drawing” button.



13. Once the dialog box appears, select the Drawing Seed. Most Profile sheets will have at least two profile views on them, as such make sure to select one of the “Profile - Profile” drawing seed files.





Printing Hydraulic Sheets in ORD

14. After clicking "OK", it may take a few minutes for ORD to create all of the drawing and sheet models.
15. Next, the user must add ditch labels to each ditch profile in the drawing models with Civil Labeler.
16. Civil Labeler is located on the Drawing Production tab of the Ribbon.

17. Select the correct ditch to be labeled and continue until all of the data labels have been placed on the profiles such as Ditch Begin, PI and End labels, Existing Pipes and Proposed Pipes. The



Printing Hydraulic Sheets in ORD

Pipe Hydraulic Data tables should also be inserted on to the Drawing models. These are available as cells, labeled “TABLE PIPE HYDRAULIC DATA”.

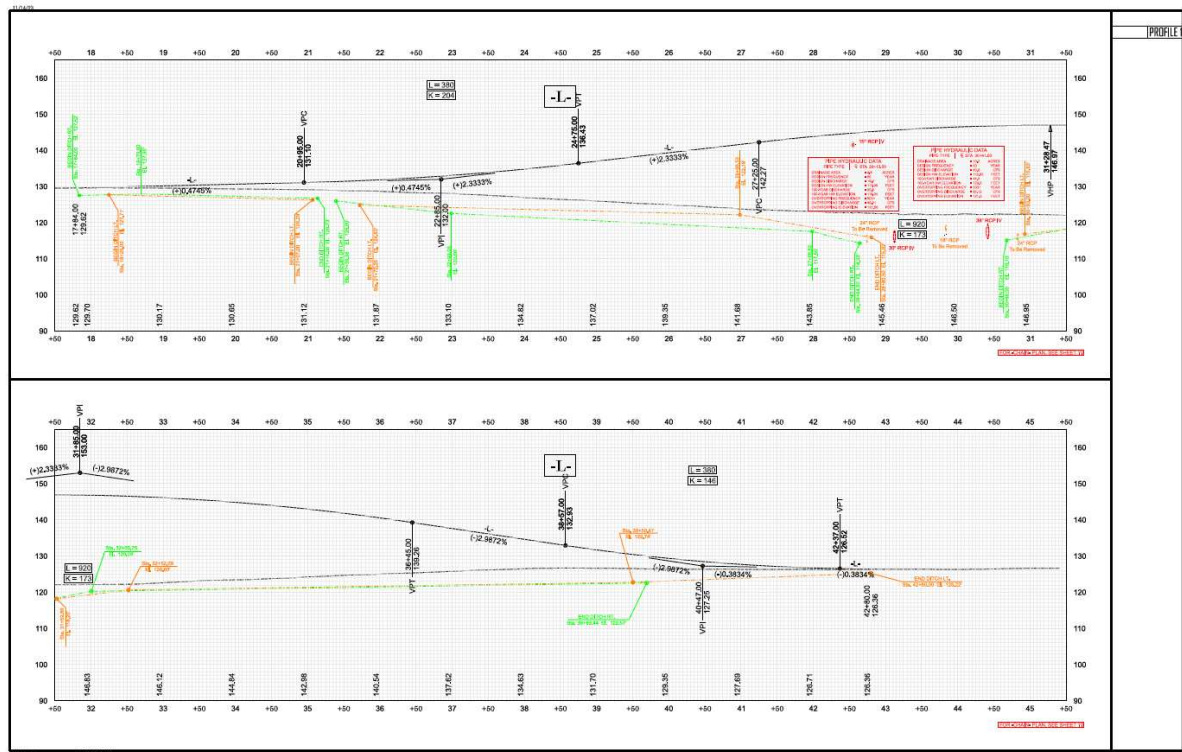
18. Save Settings and then “update server copy”.

19. Update all Drawings Models that will be shown on the Sheets models before printing.

- Note: if you exit out of your file and re-open it onto a Sheet model that then shows your pipe labels as “utility.description”, do not panic. Open the Drawing Model for the associated sheet model and your label should automatically update with the correct description.

20. Open the Sheet Model and select Print.

- Make sure you have the correct pen table loaded.
- Directions for using Print Organizer are included at the end of this manual.



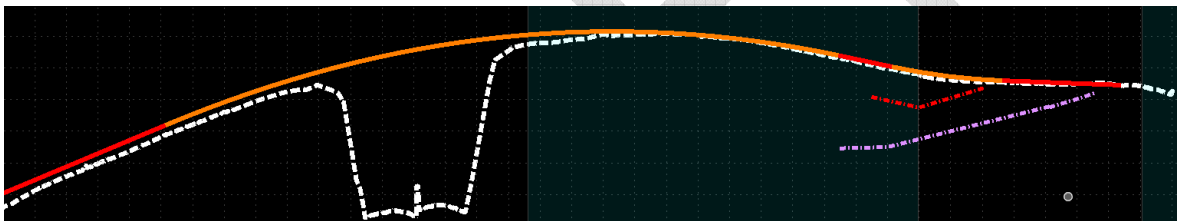


Printing Hydraulic Sheets in ORD

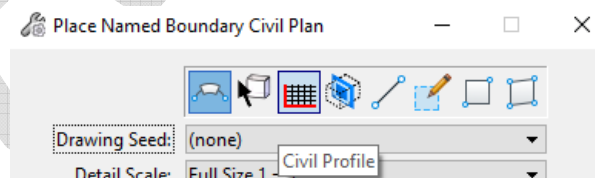
Creating Profile Named Boundaries

When named boundaries are not created by the RDWY Designer or if the project does not include existing named boundaries, the Hydraulic Designer can create their own named boundaries to be used for plan production. This method can also be used for creating profile views along a culvert or large pipe for permit drawings. The main difference is the hydraulic designer will need to create their own horizontal alignment along the culvert.

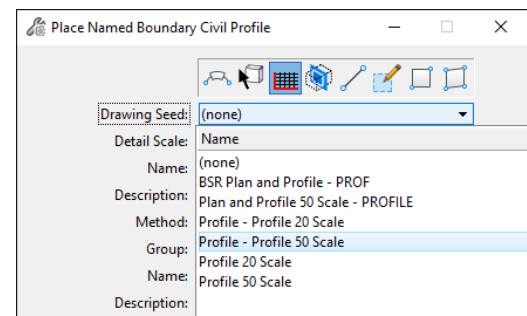
1. Open the Hydraulic PPL file (or create one if a hydraulic ppl file is not already available).
2. Attach all Alignment files and the ETCM if they are not already attached.
3. Open the Dynamic Profile view for the alignment that you would like to create named boundaries for. Confirm that all of the alignments are shown, such as the ditch alignments that were previously placed in the alignment file.



4. Next, open the “Place Named Boundary” toolbox. And select the “Civil Profile tool”.
5. Select the Drawing Seed that matches roadway’s profile sheets or use the standard “Profile-Profile 50 scale” which has two view ports to show two profiles on the sheet. Other options include “profile- profile 20 scale”.



6. In the name field, add the name of the Alignment “-L-” or “Y35”.
7. Next select the alignment and then choose the start and stop locations for the profile boundaries.
8. The Length is set to “1400”, this should not be changed as it is the standard value.
9. The Vertical Exaggeration is set to “1”. While NCDOT used the vertical exaggeration of 5 feet, it is controlled by a different step in the sheeting process.

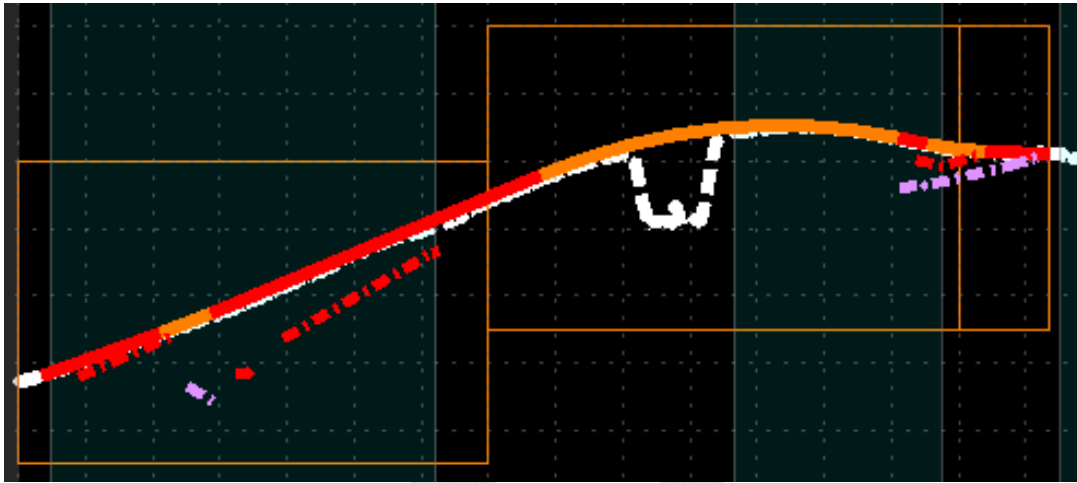




North Carolina Department of Transportation Hydraulics Unit

Printing Hydraulic Sheets in ORD

10. Select the box for “Use Active Vertical”
11. A preview of the Named Boundaries will be shown on the profile view.
12. Then accept the named boundaries.





Printing Hydraulic Sheets in ORD

Creating Sheets from Existing RDWY Cross-Sections Named Boundaries

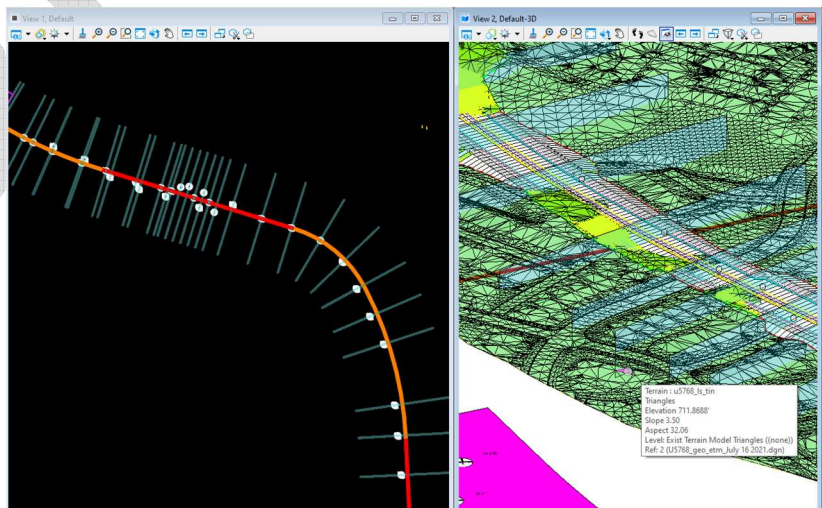
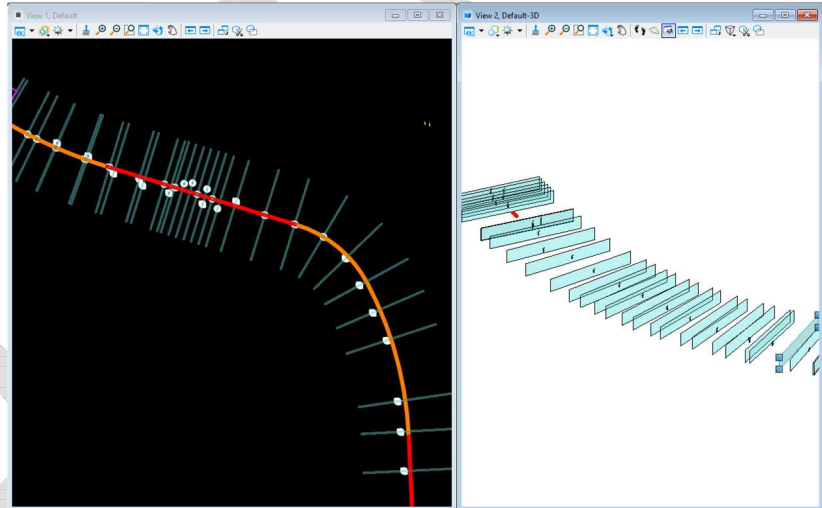
(Method 1)

DOES NOT WORK IN ORD 10.12 (Use Method 2 for 10.12)

The current version of the Sheet Module for Roadway Design instructs that there will be a _XPL file created which is to house the Named Boundaries for cross-sections. It is important to note, that to create or utilize cross-sections, there must be a 3D view opened in the application. Bentley says you can also set the terrain as active. This is the view where the user can graphically see the boundaries. This 3D

view is what the cross-section uses to display the desired information, so the user must ensure that the proper files are attached in order to display for example, the existing terrain, Design proposed model, boreholes, etc.

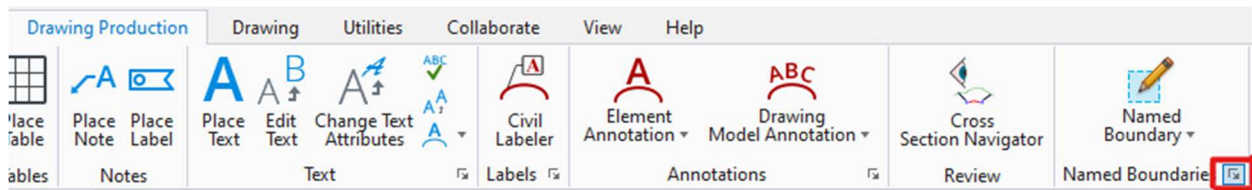
This first illustration is an example of the Plan and 3D views in a cross-section _XPL file, but with all the reference turned off in the 3D view. This meant to show what the Named Boundaries look like in a 3D view. The next illustration shows the same project with the Design proposed surface and the existing terrain turned on. The boundaries are still visible but harder to visualize with conflicting references on.



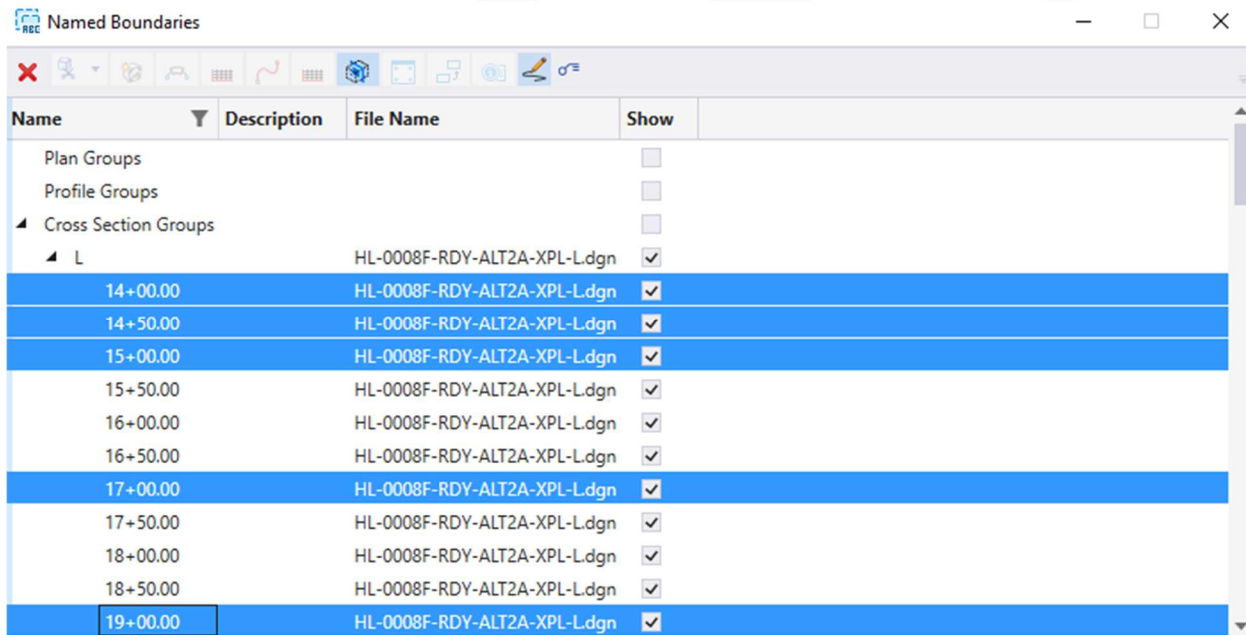


Printing Hydraulic Sheets in ORD

With the Default View set as the Active View (by just clicking inside that view) select the Named Boundaries expander button in the lower right-hand corner of the icon. **Do Not turn off (or close) the 3D view or you will not be able to make XSC drawing models/sheet models.**



This will open the Named Boundaries dialog from which the user can select all the sections listed (It is recommended to select all for the first time) or the user can select a random selection. Then, as before, the user should select the pencil icon for the Show the Create Drawing Dialog and finally the Create Cross-section Drawing icon.



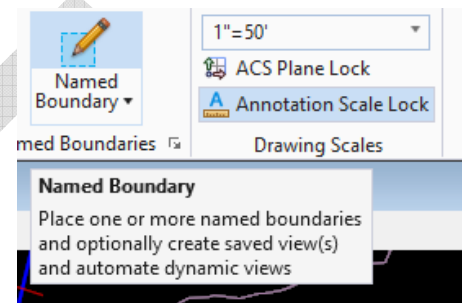


Printing Hydraulic Sheets in ORD

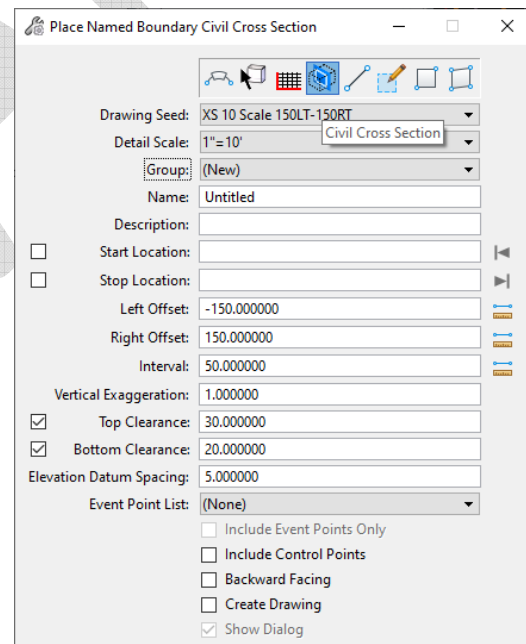
Creating New Named Boundaries for Cross Section Sheets (Method 2)

In cases where you do not have Roadway Cross section named boundaries or when using an older version of ORD that did not allow for the use of referenced named boundaries for creating cross-section sheets, you can create your own cross section named boundaries quickly.

1. The first step is to open the Create Named Boundary tool.
2. Then you will need to select the Civil Cross Section tool. (the blue tool below) and then select the Drawing Seed . For most Projects you will be using the “XS 10 Scale 150LT- 150RT” seed. For Projects where fill heights are low and the road width is narrow, you may want to select the “XS 5 Scale 75LT- 75RT”.



3. The Detail scale is set based on your selected drawing seed file.
4. The Group is set to “(New)” if you do not have an existing Named Bound Group. The “name” field is where you can name the new Named Boundary Group. We recommend naming the Group based on the alignment that the cross section will be based on, I.e. “L” or “DRWY35”. The Discription is optional and does not need to be completed for this tool to work.
5. Then, the user will select the alignment that the cross sections will be based on. Once selected, you can enter the Start/Stop location on the alignment for your cross section.



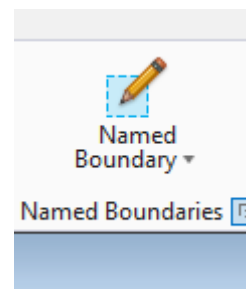
6. If you expect that you will not need additional cross sections to be included, in order, in your Cross section sheets, you can select the “Create Drawing” box. If you need to add additional



Printing Hydraulic Sheets in ORD

cross sections, such as at an intersection or driveway at an odd station (-L- 56+12.25), DO NOT SELECT “CREATE DRAWING” BOX YET.

7. Left click through the prompts in the plan/Default view to create your named boundaries.
8. Once complete, open the “Named Boundaries” tool. Your named boundaries that you just created will appear in the list under Cross Sections. Once you have all named boundaries that you need, you can skip the next section about how to add additional sections at specific stations to match Roadway’s intersecting cross sections.



How to add an additional XSC at a single location

Sometimes Roadway will add additional cross sections at locations where alignments tie. It is recommended to check the Roadways Cross sections (pdf or ppl file) to see if they have included additional cross sections.

There are only two differences in the previous procedure of cross section named boundaries creation that allows for a user to create/ or add a single cross section named boundary:

1. You will need to select the Named Boundary Group that you created for the last section i.e. “L”. This allows you to automate the addition of this cross section in the cross-section sheets in order.
2. The start and stop stations will both be the station of the additional cross section. You will want to select

Place Named Boundary Civil Cross Section

Drawing Seed: XS 10 Scale 150LT-150RT
Detail Scale: 1"=10'
Group: L

☒ Start Location: 15+32.00
☒ Stop Location: 15+32.00

Left Offset: -150.000000
Right Offset: 150.000000
Interval: 50.000000
Vertical Exaggeration: 1.000000

☒ Top Clearance: 30.000000
☒ Bottom Clearance: 20.000000
Elevation Datum Spacing: 5.000000
Event Point List: (None)

☐ Include Event Points Only
☐ Include Control Points
☐ Backward Facing
☐ Create Drawing
☒ Show Dialog

the boxes to the left of the Start Location/ Stop Location so that the station will not move as you move your cursor.



North Carolina Department of Transportation

Hydraulics Unit

Printing Hydraulic Sheets in ORD

3. **Do not change the Vertical Exaggeration.** NCDOT 5' vertical exaggeration is already included in this drawing seed and adjusting this value will create an error in the user's XSC sheets.

DRAFT



Printing Hydraulic Sheets in ORD

Creating Sheets from Cross-Section Named Boundaries

The same Create Drawing dialogs follow as in the previous examples so the user can select new names for the Drawing and Sheets along with files names where to store them. It is important to note, that to create or utilize cross-sections, there must be a 3D view opened in the application. This is the view where the user can graphically see the boundaries. This 3D view is what the cross-section uses to display the desired information, so the user must ensure that the proper files are attached in order to display for example, the existing terrain, Design proposed model, boreholes, etc.

The Create Drawing dialog will have default View, Drawing Model and Sheet Model Names but the user can override these with appropriate names. The toggles on the right-hand side allow the user to create their Drawings and Sheet Model in other files, other than the active one. The Drawing Seed is populated with the settings used for the original sheet but if “none” is shown, please select the correct Drawing seed. It is **NOT** recommended to select an Annotation Group as we do not want to over-ride the one in the Seed file. The drawing models will be created with roadway annotations and we will add Hydro Annotation in after the sheets/drawings are created.

Hydro and Roadway may combine Annotation Groups at a Later Date. Hydro users must annonate seperately as of July 2024.

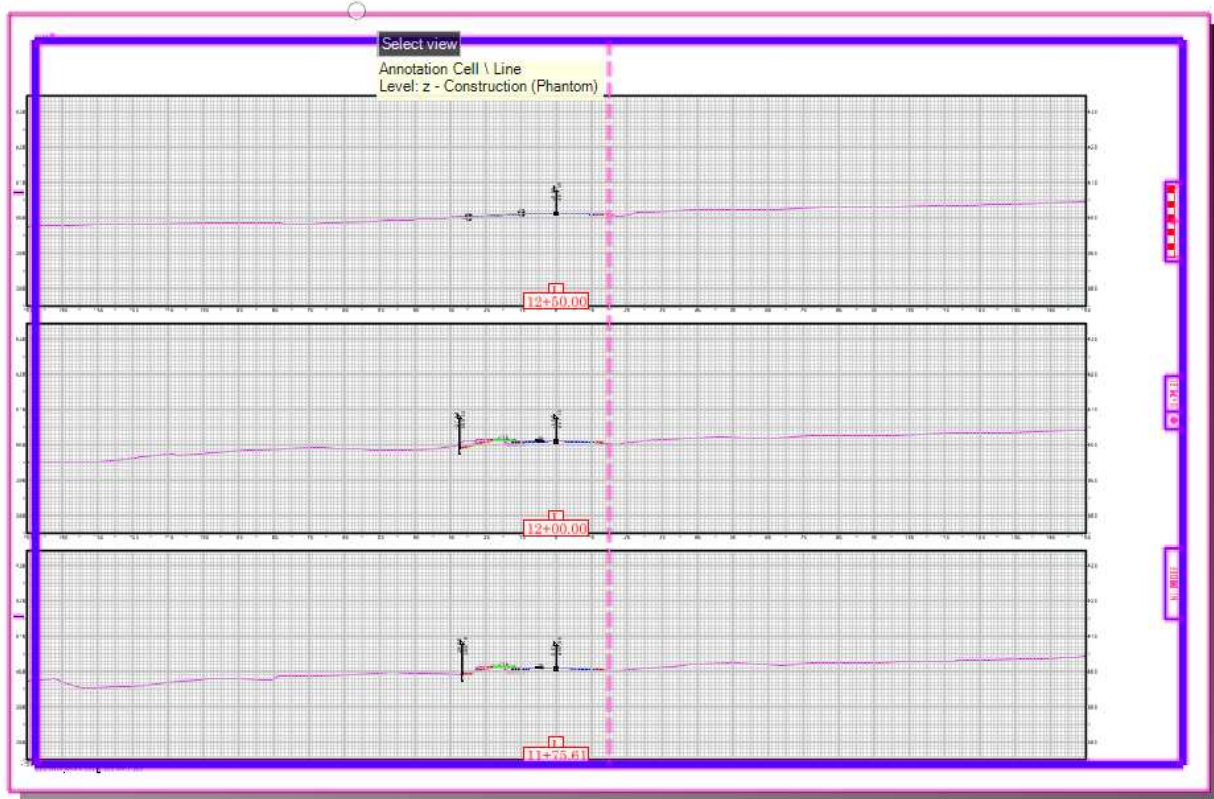
If the user selects the Drawing Boundary under the sheet model section, otherwise you will get multiple drawing models overlaping on the sheets, instead of them being placed in order into different view ports on the sheets.

With the toggle at the bottom of the dialog to Open Model toggled On, picking the Ok button will start the sheeting process for the selected cross-sections and display the last Sheet model in the set.

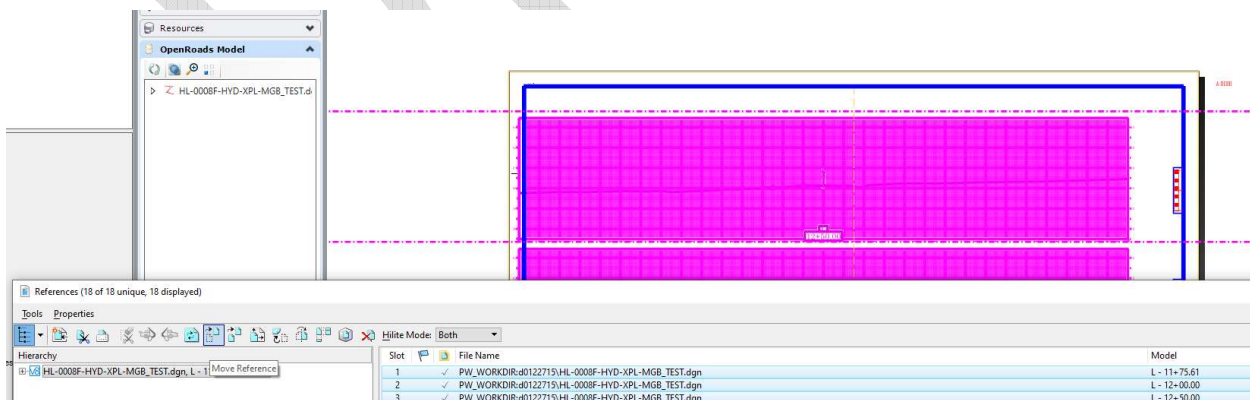


Printing Hydraulic Sheets in ORD

Once the drawing models and sheets have been created, they may look like this:



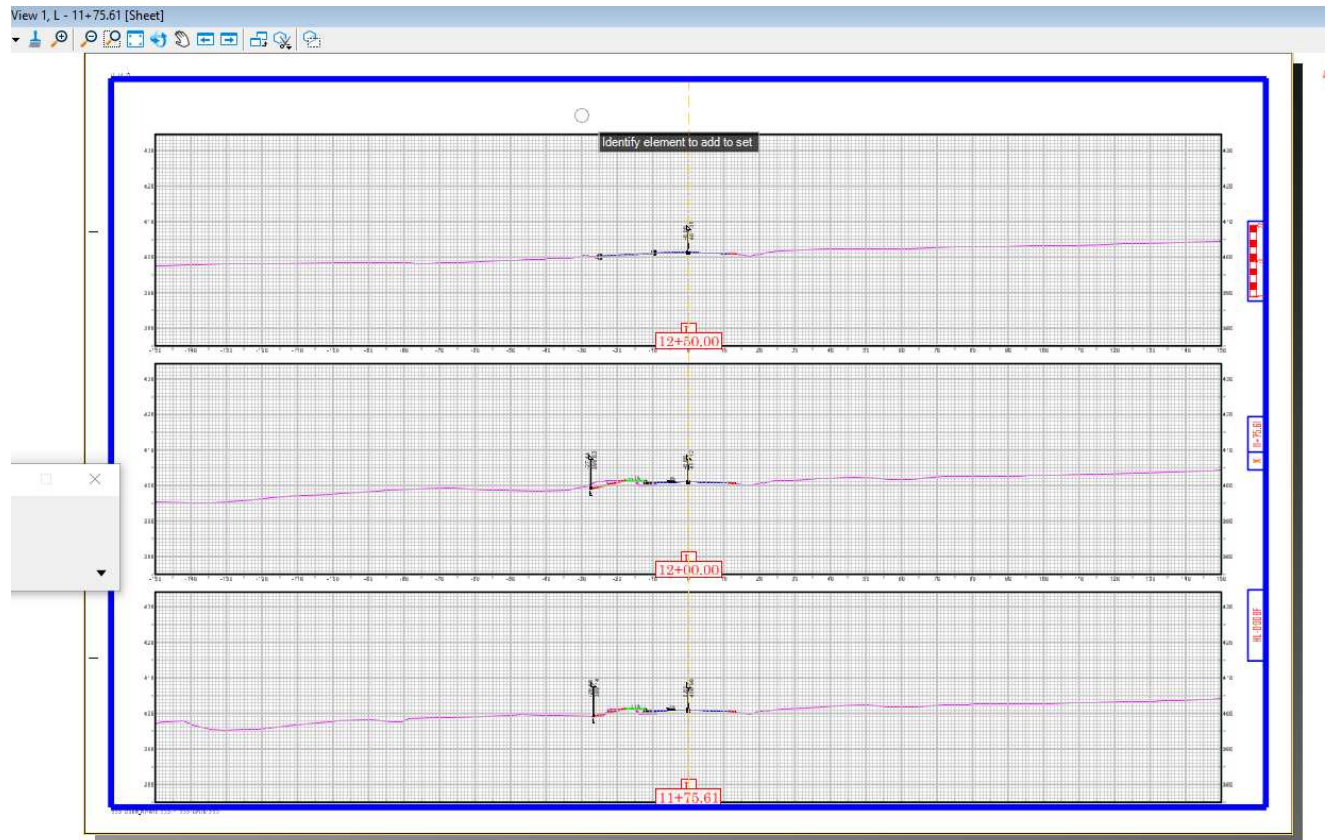
Note that it may not come into the exact correct location on the sheet model. They can be easily fixed. Open the reference manager and move the reference so that the center line of the view points/references match the centerline of the sheet.



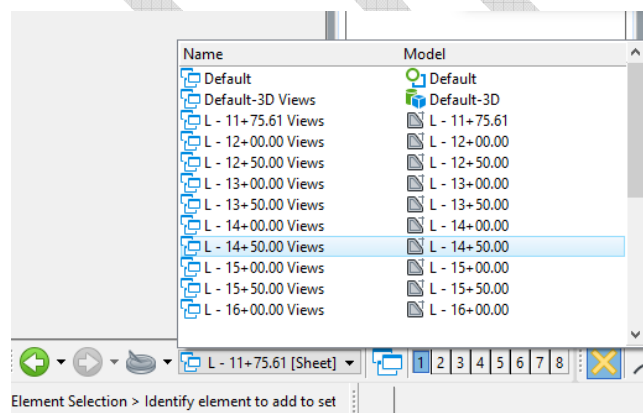


Printing Hydraulic Sheets in ORD

Make it look like this:



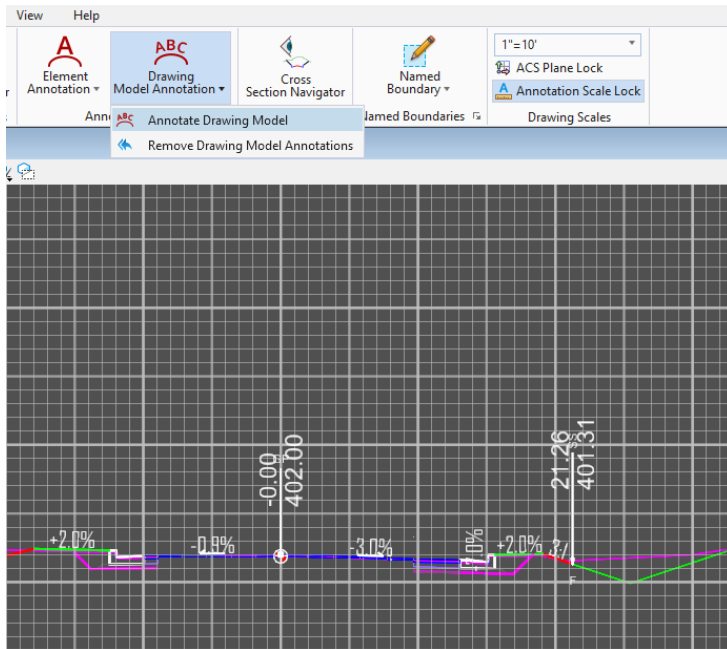
Next, Open a drawing model. It does not matter which one along as the model contains hydraulic and roadway information (ie. Shows a proposed model).



Then select Annotate Drawing:

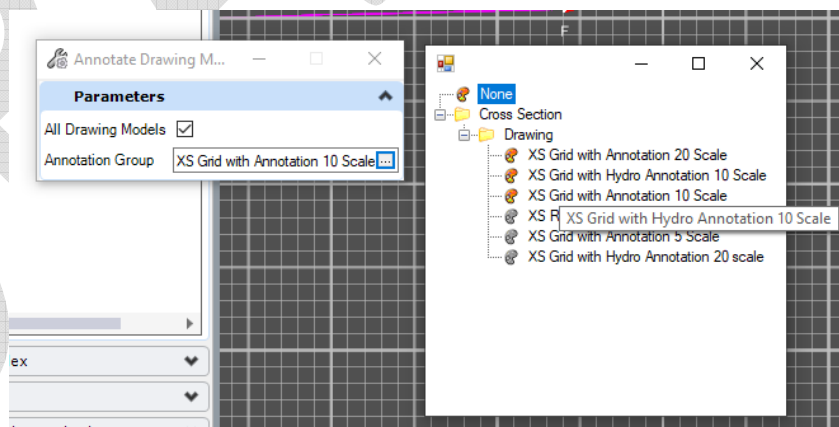


Printing Hydraulic Sheets in ORD



You can select the “All Drawing Models” box if you would like to add the drainage annotation to all drawing models at once. If you are re-annotating just one drawing model, do not select this box as you will have overlapping annotations.

Select the “XS Grid with Hydro Annotation 10 Scale”. Then left click twice. This is to accept your selection whether to annotate all drawing models and to accept the Annotation Group.

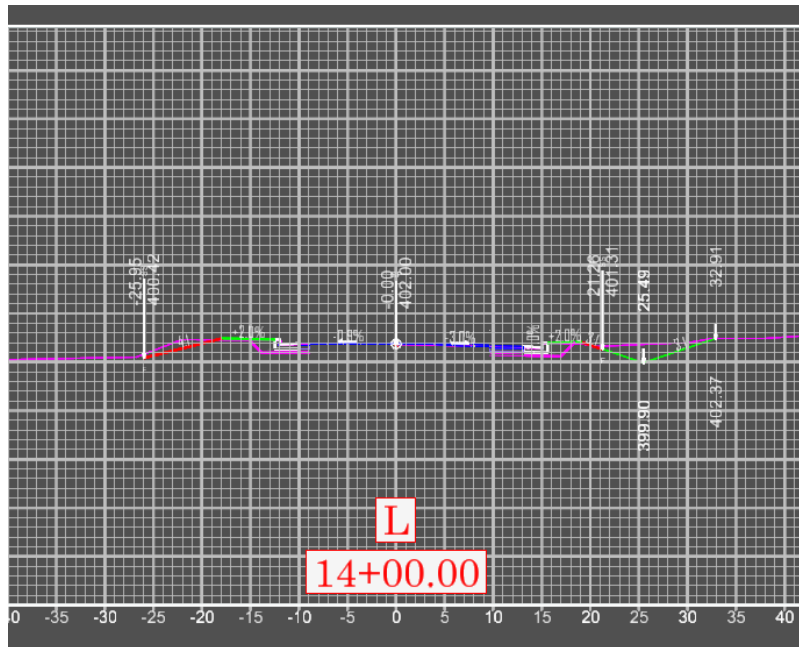


Adjust any overlapping labels using drawing tools.



Printing Hydraulic Sheets in ORD

Last step is to go to the Sheet Models and Print the pdfs.





Printing Hydraulic Sheets in ORD

Creating Sheets from Existing Cross-Sections Files (Method 3)

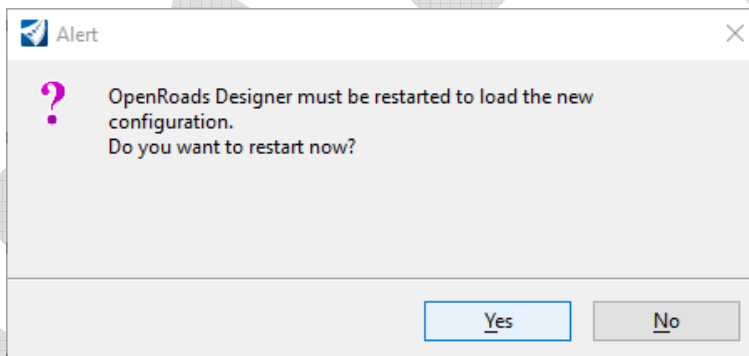
This section is under development and has been tested OFF of ProjectWise and shown to work in ORD 10.12 on July 2025.

The current version of the Sheet Module for Roadway Design instructs that there will be a _XPL file created which is to house the Named Boundaries for cross-sections.

This method differs from method one as we will be “copying” the XPL (cross-section layout), XSD, and XSS files that Roadway has created instead of creating our own.

Step one is to open the roadway files. Hydraulic users will have to open the files as read-only if the files are located on ProjectWise due to access permissions. They each files needs to be saved to

to a Hydraulic location, preferably the Design folder. Note that ORD will alert you that it must restart to load a new configuration. This means that it is going from a Roadway user to a Hydraulics user. Select



“Yes”.

(The Next steps must be completed in this order, or it will fail.)

Next, Open the Hyd_XPL file in ORD. Attach the DRN (and DRN_Ditch or DCM files) to the Default view (view one). And exit and check-in the file (Or save file if working outside of ProjectWise, which is not recommended). If any aerial tiles, rasters, or NC OneMap are turned on or attached, it is recommended to detach/ turn off as this may slow down your file. Next you need to create a “scratch” Drawing model in this file in order to add the Hydraulic Annotation groups to this file.



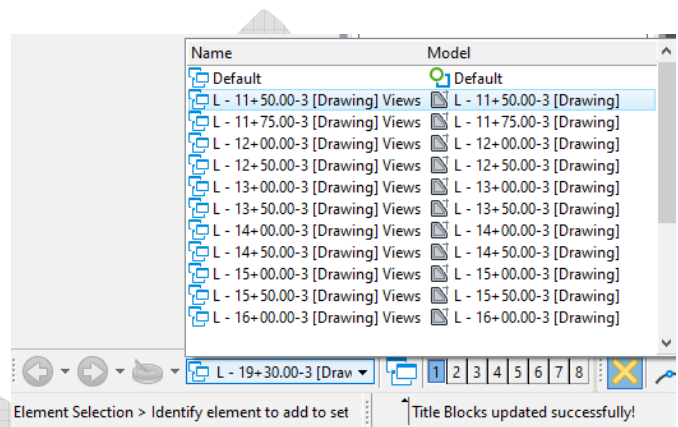
Printing Hydraulic Sheets in ORD

Turn on the 3D view and select Named Boundaries and select any single cross section to create a drawing model. Detailed instructions on how to create a drawing model from existing referenced named boundaries are in the previous section of this manual.

Then, open the Hyd_XSD file. The default view will be empty.

Select a Drawing model. It does not matter which model you start with as all must be updated.

Once the drawing model is open, open the reference tool box and right click on the reference and select “settings”. Notice how the path of the reference is to the Roadway XPL file. Select “browse” and path to your HYD_XPL file.



Do not delete the reference file!

DRAFT



Printing Hydraulic Sheets in ORD

Repeat until all drawing models have been updated with the correct reference file.

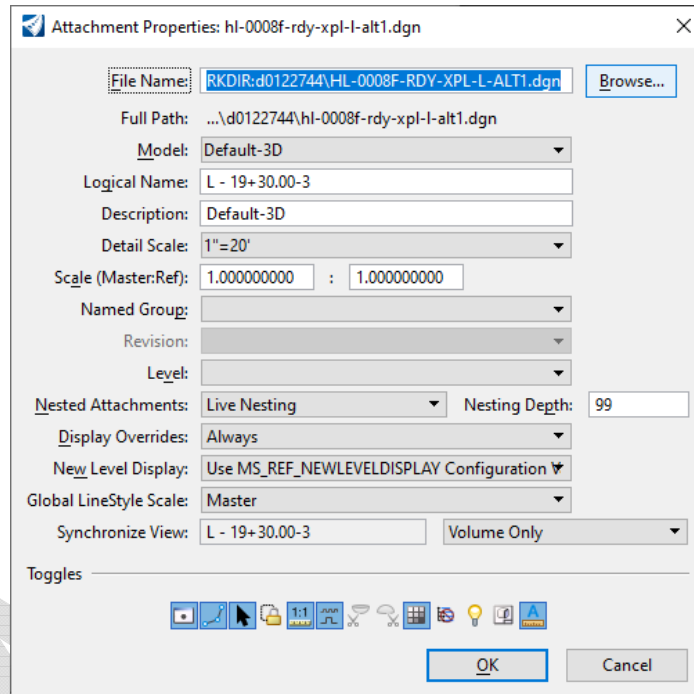
Save/Check-in your XSD file.

To Annotate your drawing models with Hydraulic annotation groups, you must re-open the XSD file. (Do not skip the check-in/ save and exit out of the XSD file, otherwise the annotation will not work).

If a cell with annotation comes in very large, check the active scale (not the drawing scale). The easiest way to check the active scale is to open the scale element tool and see what is listed.

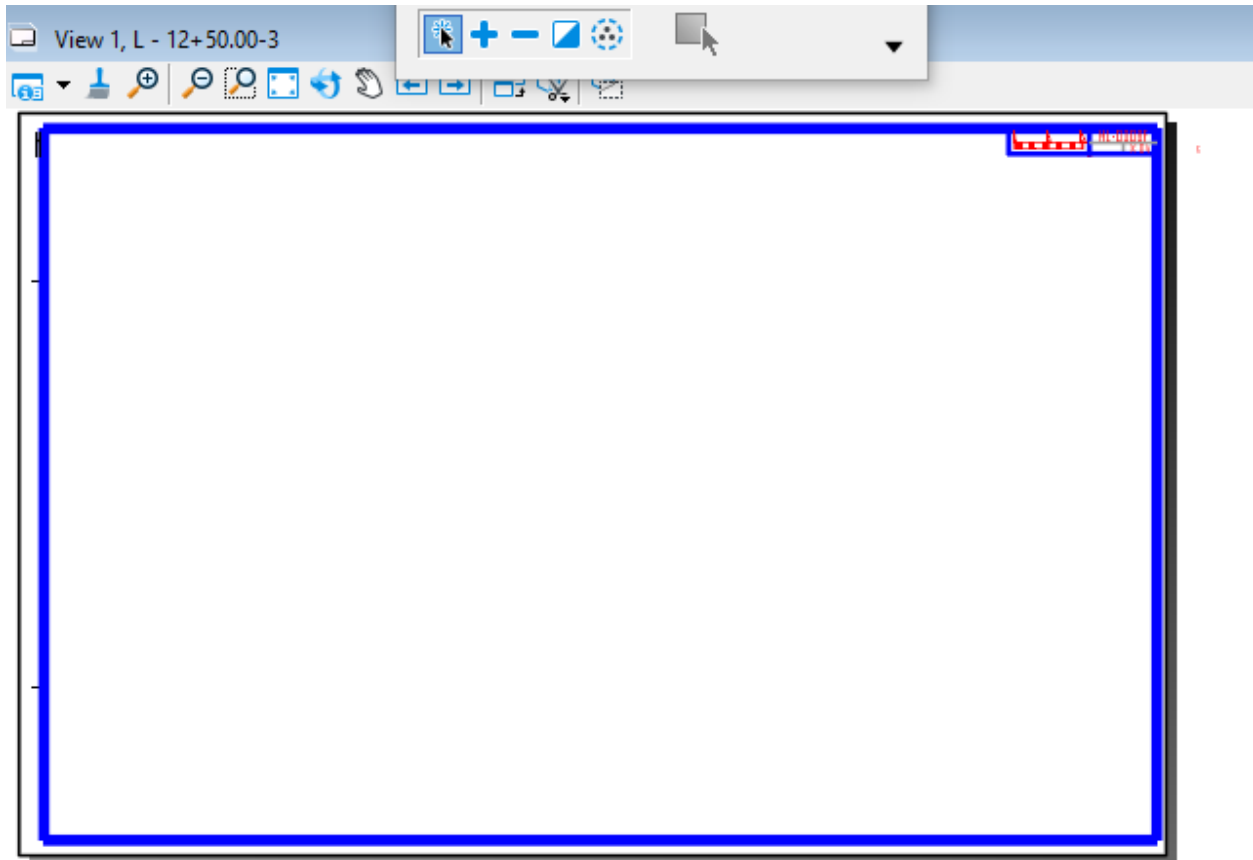
Save/Check-in and exit the XSD file.

Then open the XSS file, in order to update all of the reference links for the plan sheets to the hydraulic XSD file.





Printing Hydraulic Sheets in ORD



When you open the XSS file, you will notice that the sheet models appear to be blank until the references to the XSD file are updated.



Printing Hydraulic Sheets in ORD

Common Issues that may happen with XSC and how to fix them:

1. All but the last drawing model was brought correctly into the sheets. The last drawing model is located on top of another.
 - a. Delete that referenced drawing model from the sheet model.
 - b. Go to the Default/ design model and create a single sheet with that model.
2. Can not create any drawing or sheet models due to error “No View Found for Cross section boundaries”



- a. 3D view must be turned on. XSC view does not need to be on.
3. The sheets have 2 or 3 cross-sections but roadway XSC/XSS sheet models only have two.
 - a. Check that the correct scale was used.
 - b. (July 2024) Hydraulics is in the process of updating the sheet seeds to match Roadways.
Or Roadway has updated their Sheet Seeds since the last time Hydraulics did.



Printing Hydraulic Sheets in ORD

How to Print the Title Sheet for Redline Drainage

1. Create a new 2D file in ORD
2. Reference in the Roadway Design Title sheet, which normally is labeled “TSH” in the file name.

Set this reference to “live Nesting” and set the logical name to “TSH”



Title Mode: Both				
Slot	File Name	Model	Description	Logical
1	PW_WORKDIR:d0122744\HL-0008F-RDY-ALT1-TSH.dgn	Title Design	Master Model	tsh

3. Using the “Place Text” tool add “REDLINE DRAINAGE PLANS” (a future cell is planned)

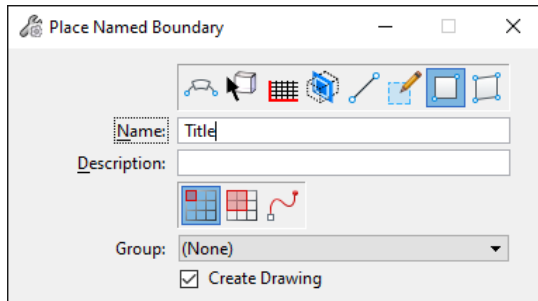


- 4.

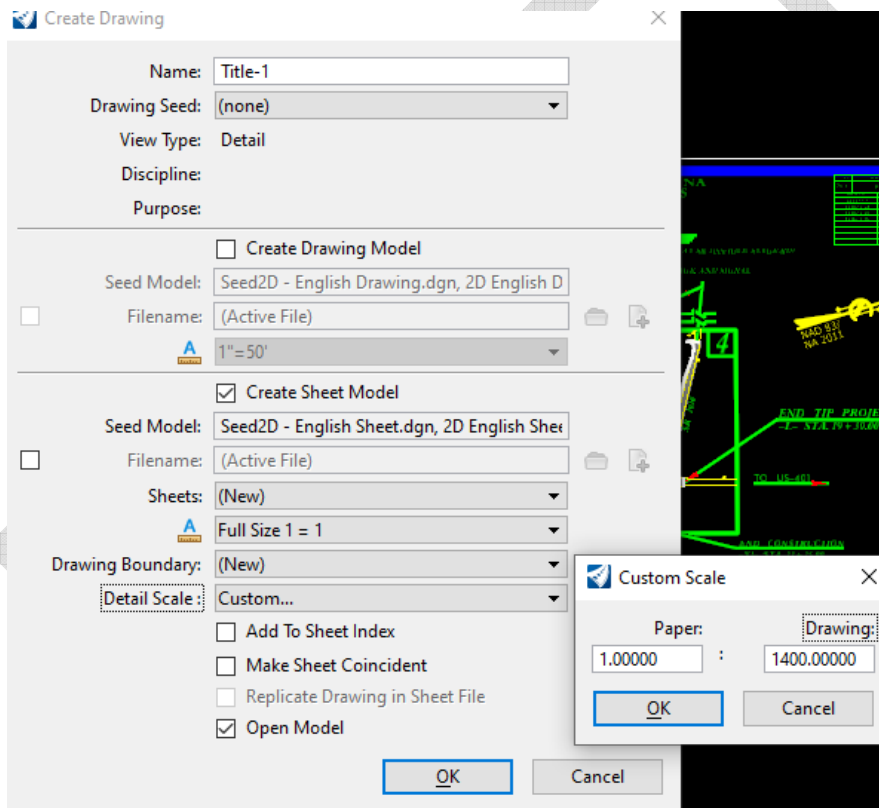


Printing Hydraulic Sheets in ORD

5. Select the “Place Named Boundary” tool and select “by 2 points” option. Then select Left Top corner of the outside boarder of the title sheet, then the bottom right corner point.



6. Accept the named boundary and then the “Create Drawing” tool box will pop-up.

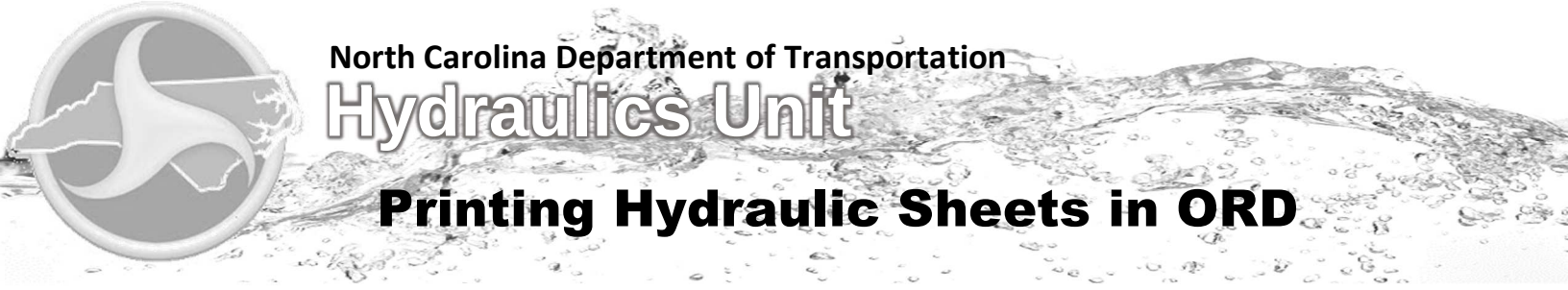


- 7.
8. You do not need to create a “create Drawing model”. The detail Scale will match the scale that roadway inserted the title sheet cell into their file. In this example the scale was included in their file on the “scratch_Level_3”. If roadway has not listed it in the file, some trial and error may be needed.



-
- Print (HYD_pdf.pltcfgr)
- File Settings Resymbolization
- Printer and Paper Size
- HYDRO_Redlines_PDF
- Bentley PDF printer driver
- ANSI D
- Usable area is 34 x 22 in.
- Landscape
- Area: Sheet ☐ Rasterized
- View: View 1
- Color: True Color
- Copies: 1
- ☒ Show design in preview
- Scale: 0.08333317
- Rotation: 0.0 deg
- Size: 34.000 22.000 in. Maximize
- Mirror: None
- Origin: 0.000 0.000 in. ☒ Auto_center
- Pen table: HYD_CONNECT_RedLine.tbl
- Design script:
- Print to File...

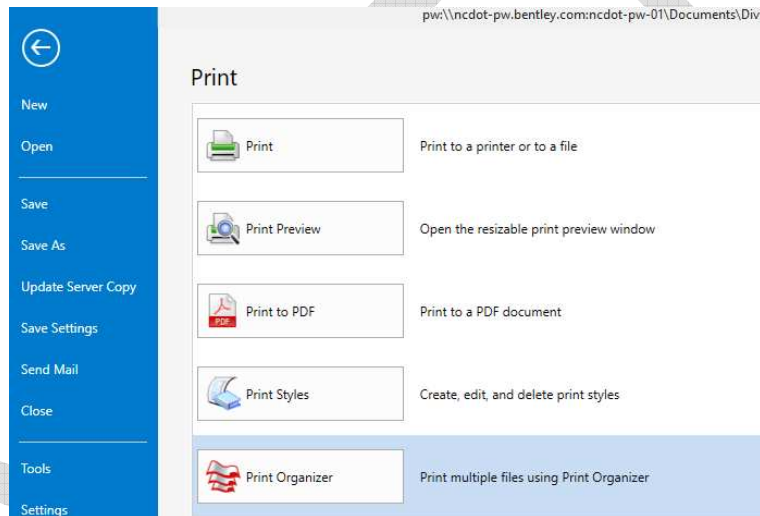




Print Organizer: Printing Multiple Sheets Together (Plan, Profile and/or XSC sheets)

These instructions were created utilizing the current sheeting method documented earlier in the manual and assumes that all sheet models to be printed are located in the same file. It is recommended that the next steps should not be started until all edits to the sheets models are completed and they are ready to be printed.

1. Select the Print Organizer located on the File -> Print section of ORD.

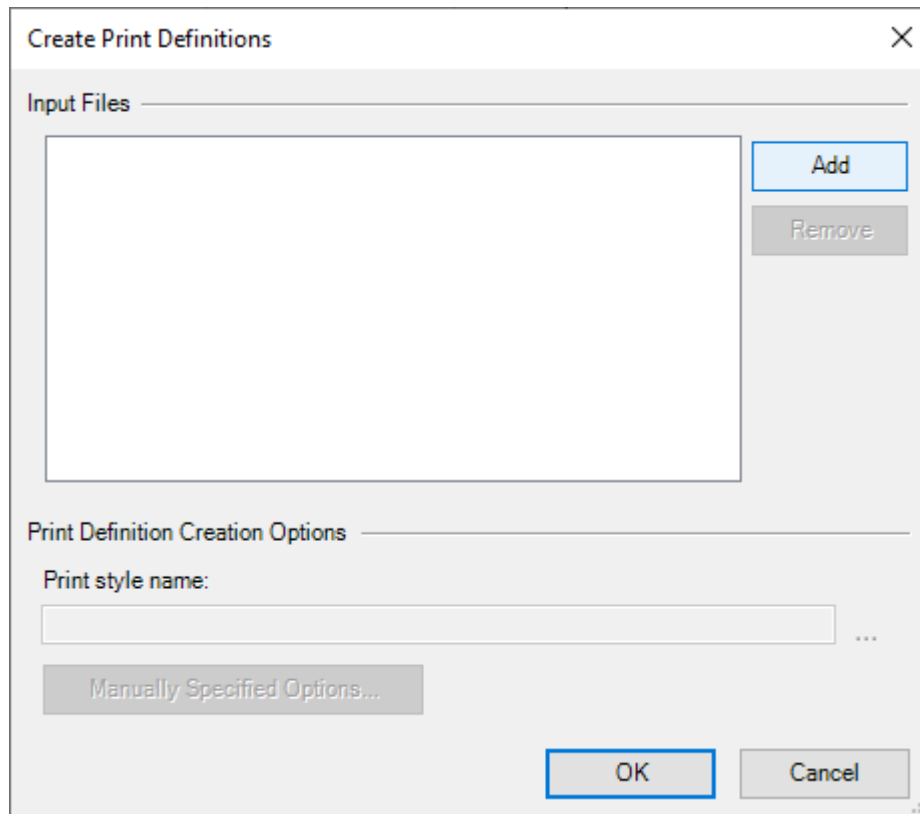


2. Once selected, the Printer Organizer will show up blank until files are added via the "Add Files to Set" button.

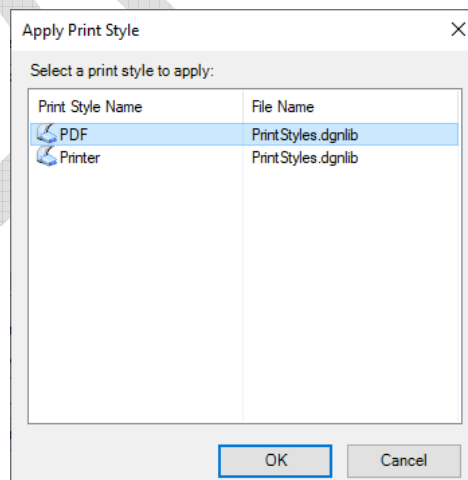




Printing Hydraulic Sheets in ORD



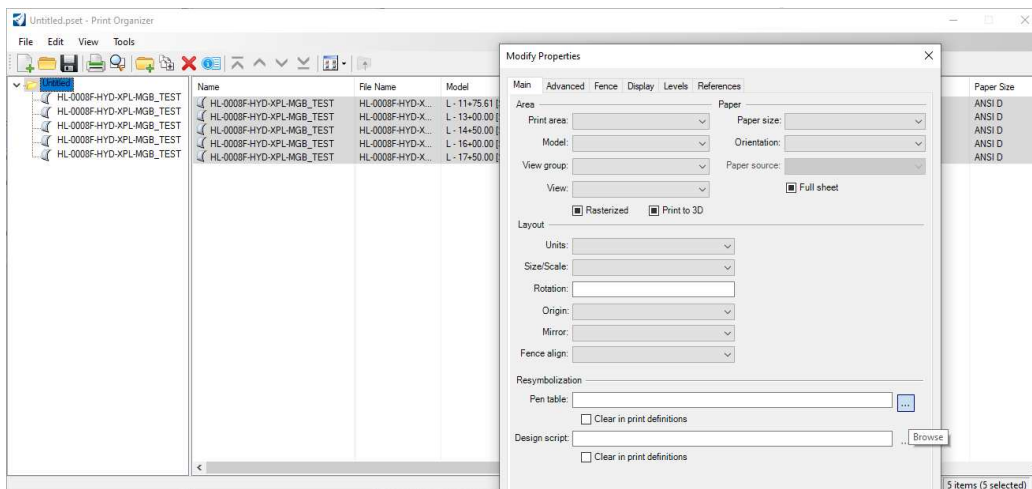
3. Select the Current File that has the sheet drawings in it then select OK. Select the 3 dots next to the “Print Style” field and select the “ PDF” file. This will not show up until you have selected the current file. Please note that at this time, the NCDOT Hydraulics workspace does not include a separate “Print Style.dgnlib” like Roadway’s workspace.



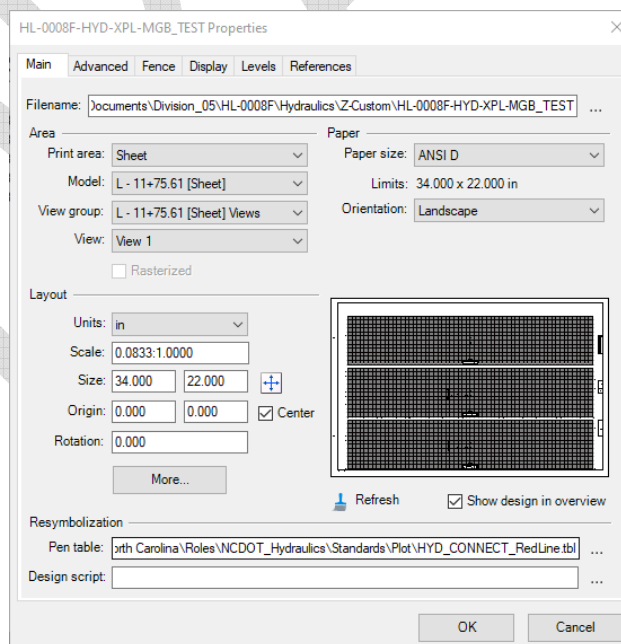


Printing Hydraulic Sheets in ORD

4. Select the “PDF” Print Styles Library.
5. Once the Print Organizer has added all of the Sheet Models contained within the file, select them and right click and select Properties. On the main tab of the properties window, select the “. . .” next to the Pen Table field and browse to the “HYD_Connect_Redlines” pen table located in the Hydraulic Workspace.



6. If needed, you can select each sheet model separately to adjust the file properties and to attach the correct pen table.



7. Once the pen table has been added to all sheets, select print.



Printing Hydraulic Sheets in ORD

Print

Printer Driver Configuration

File name: HYD_pdf.pltcf
Type: Bentley PDF printer driver

Print Range: Selection
Copies: Number of copies: 1

Submit: Create print file
Submit as: Single print job
Destination: C:\Users\vmgerry\Documents\Untitled.pdf
☒ Open print file after creation

OK Cancel

8. Now, you can choose to create a single pdf of all sheets or to save each sheet separately by using the “Submit as” drop down.

Print

Printer Driver Configuration

File name: HYD_pdf.pltcf
Type: Bentley PDF printer driver

Print Range: Selection
Copies: Number of copies: 1

Submit: Create print file
Submit as: Single print job
Destination: Division_05\HL-0008F\out\Untitled.pdf
☐ Open print file after creation

OK Cancel

9. Check the Destination that your pdf will be saved to as the default may not be a location that you can access on ProjectWise.

Submit

Create print file

Submit as: Single print job

Destination: om.ncdot-pw-01\Documents\Division_05\HL-0008F\out\Untitled.pdf

☐ Open print file after creation

Browse

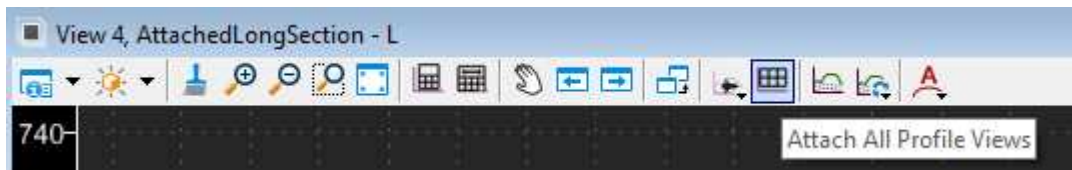
OK Cancel



Printing Hydraulic Sheets in ORD

Common Errors and How to fix them

1. If the proposed alignment or the named boundaries do not show in the profile view, select the “Attach All Profile Views” button.



2. When working ORD 2022 release 3 (10.12) if a change in the default view does not populate to the Drawing/sheet views as the “Multi -Model View” might be controlling what is seen in sheet/drawing models. The user might want to make the change in the Multi-Model view to see if the drawing/sheet models will update. This was corrected in ORD 2023.
3. If the user’s profile boundary (or sheet) extends past the end of the selected alignment, the user can select “Full Last Boundary” when creating named boundaries for profiles.
4. LOGICAL NAMES: The Hydraulic pen table is set up to read the logical names of reference files. If a reference file does not print correctly, check that the file has the correct logical name. If the file is not referenced directly, make sure that the container file does not have a logical name listed for that file.