

AutoCAD and Civil 3D 2022

Instructions for using Key New Features of 2021 and 2022

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PREPARED FOR:



**US Army Corps
of Engineers®**
Engineer Research and
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Introduction

Autodesk continues to update their products and release new versions on a yearly cycle. For this reason, there have been many new features added to both AutoCAD and Civil 3D between the 2020 release and the 2022 release. This document provides instructions on how to apply and use some of the key functionality improvements between these versions.

For a more complete list of the AutoCAD and Civil 3D performance, option, and functionality improvements between the 2020 release and the 2022 release, please refer to the "AutoCAD and Civil 3D 2020 to 2022 New Features Checklist.docx" document in the "Documentation" folder of the USACE standards folder structure.

The steps provided below are intended for users who are already familiar with AutoCAD 2014 or later.

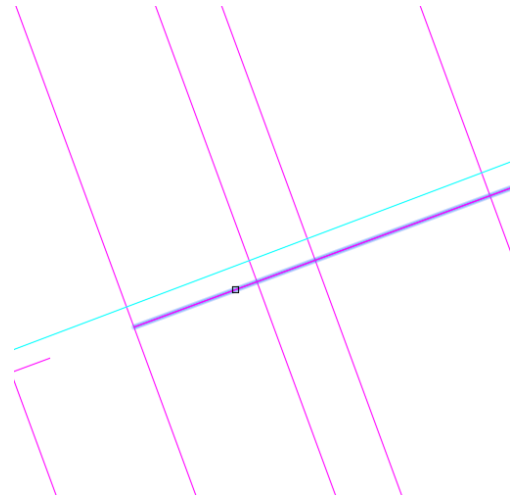
AutoCAD 2021 and 2022 New Features

The following are some of the features that were added to the base AutoCAD functionality in the 2017, 2018, 2019, and 2020 releases. These new features are present in any AutoCAD-based software with the same version.

AutoCAD 2021

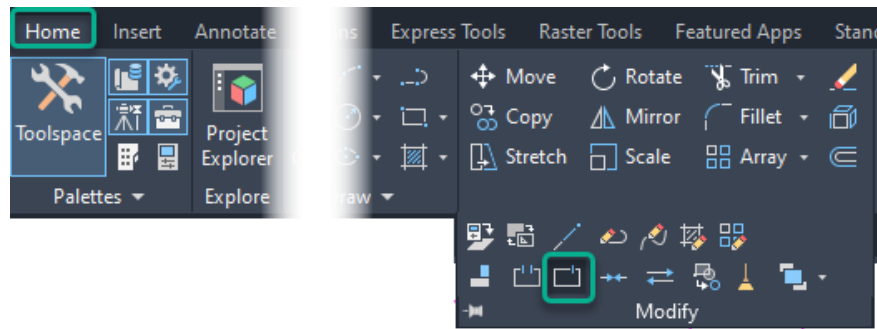
Quick mode for Trim and Extend

1. Open any AutoCAD-based product.
2. Open the desired drawing
3. Zoom into the desired area.
4. Initiate the TRIM command. In the **Command Line**, notice the lines above the main entry line state "Mode=Quick".
 - a. If the "Mode" is set to something different, click on the "mOde" option in the **Command Line** and choose "Quick"
5. Place the cursor over the entity to be trimmed, making sure to be on the side to be trimmed.
6. Left click once to perform the trim automatically without the need to first specify a cutting edge.
7. To extend an object, hold down the <Shift> key then left click on the desired entity. The end of the entity that was closest to the location of the cursor when the left click was performed will be extended to the closest edge.

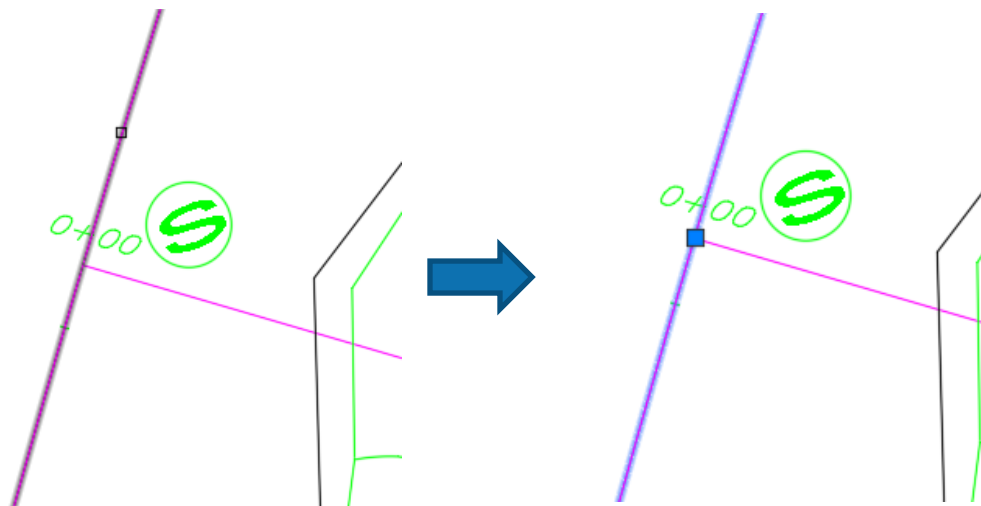


Break Objects at a Single Point

1. Open the desired drawing.
2. From the “Home” tab of the Ribbon, on the “Modify” panel, click the down-arrow next to the panel name to expand the panel, then click on the “Break at Point” button.

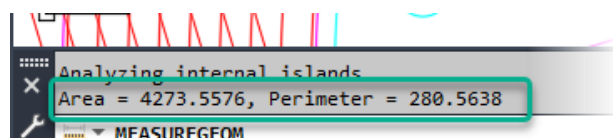
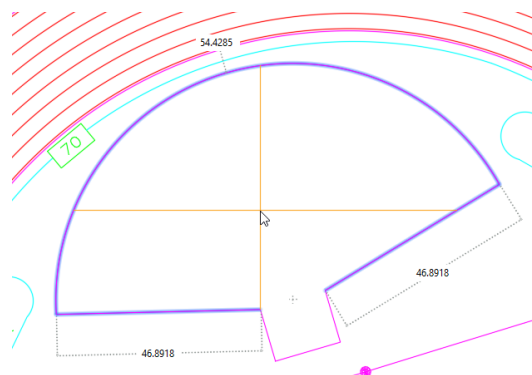


3. Select the desired object to break. Note that the location of the cursor along the object when it is selected does not matter at this point.
4. Use object snaps or the cursor to select the desired break point, and the object will break into two separate objects.



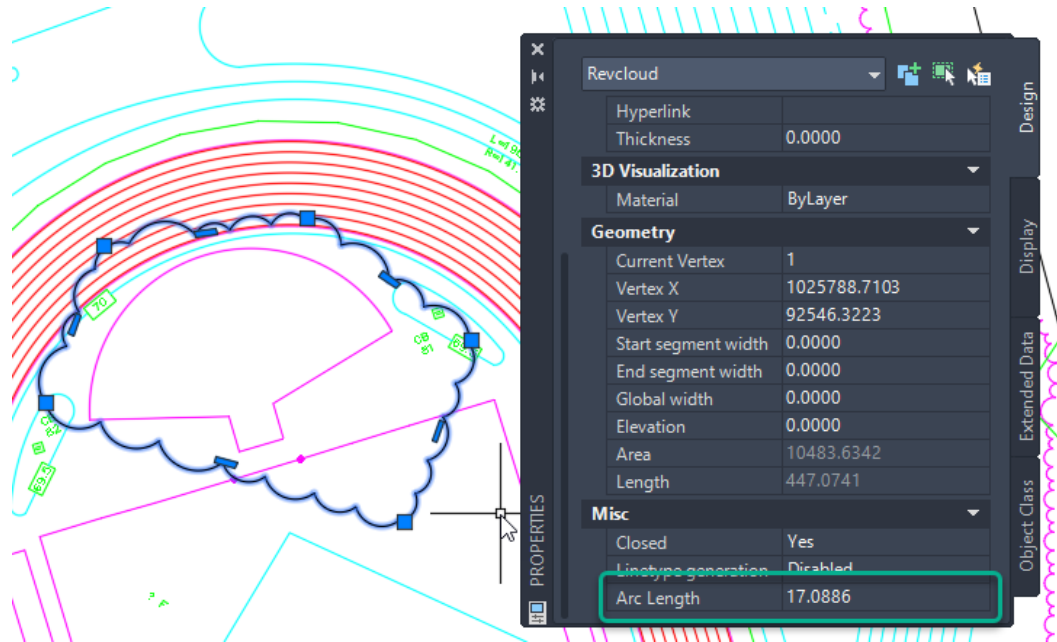
Using Quick Measure for Areas and Perimeters

1. Open a drawing containing areas to be measured.
2. Isolate the layers that surround the desired area.
3. At the **Command Line**, type in “MEASUREGEOM” and hit <Enter>. The “Quick” option should be the default.
4. Move the cursor over the enclosed area, then left click. The area and perimeter will be reported in the command line.



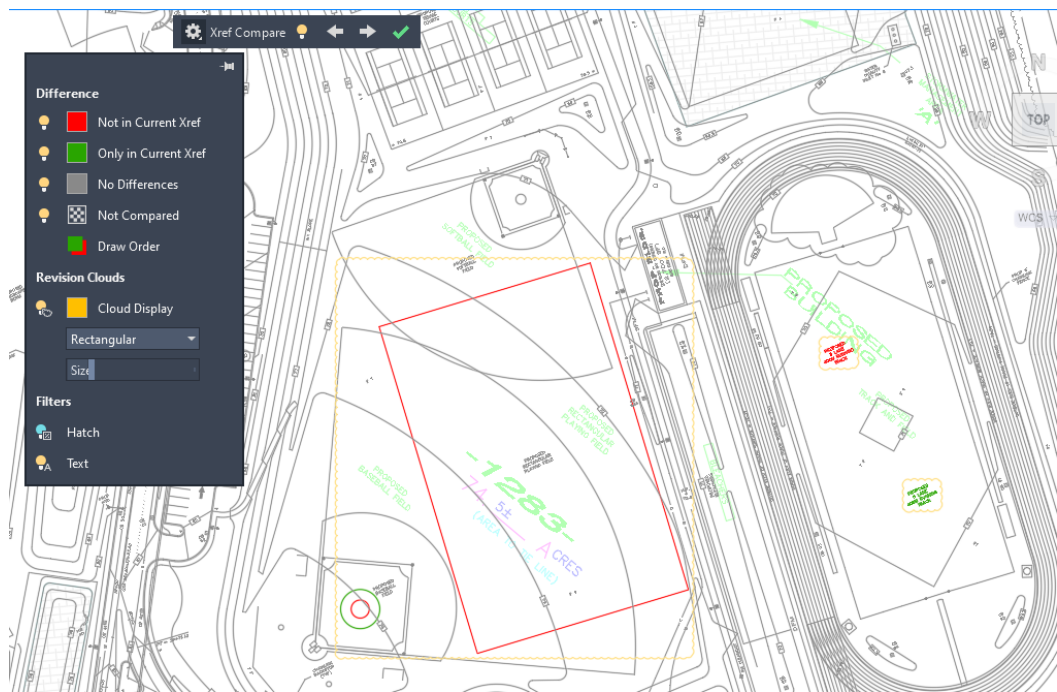
Enhanced Revision Clouds

1. Open a drawing.
2. Initiate the REVCLOUD command and create a Revision Cloud in a desired area. By default, the program will place a cloud using arc lengths that are based on the size of the current view.
3. Select the Revision Cloud in the drawing, right-click and choose "Properties" to open the Properties Palette.
4. With the Revision Cloud still selected, scroll down to the bottom of the **Properties Palette** to display the "Misc" section.
5. Use the "Arc Length" Property to change the sizing of the arcs in the Revision Cloud.



XREF Compare

1. Open a drawing that has a file XREFed into it
2. Open the original XREFed file.
3. Make a change to the XREF file, then save it.
4. Back in the first drawing (the one that has the 2nd file XREFed into it), look down to the bottom right corner of the program window, locate the notification bubble that states "An Xref was modified"
5. Make sure the check box next to "Compare the changes" is checked, then click the "Reload <xref file name>...." link. A visual overlay will be displayed and a temporary "Xref Compare" toolbar will appear.
6. In the Toolbar, click on the gear button to review and/or change the settings for comparison display.

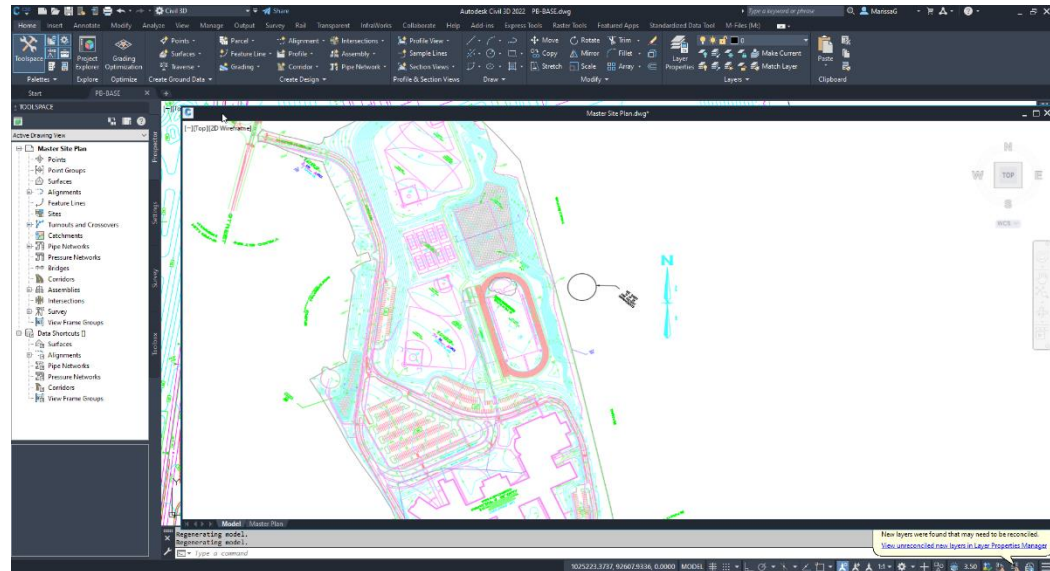


7. Make sure the check box next to “Compare the changes” is checked, then click the “Reload <xref file name>....” link. A visual overlay will be displayed and a temporary “Xref Compare” toolbar will appear.
8. Use the light-bulb button to temporarily hide the comparison display.
9. Use the arrow keys to move around the drawing and zoom in to areas where differences are found.
10. Click the green check mark to close the toolbar and the comparison display.

AutoCAD 2022

Floating Drawing Windows

1. Open multiple drawings. Multiple tabs will be shown under the Ribbon.
2. For one of the drawings, left-click and hold, then drag the drawing down. A new, separate window for that individual drawing will appear. This window can be moved and resized separately from the AutoCAD/Civil 3D interface.

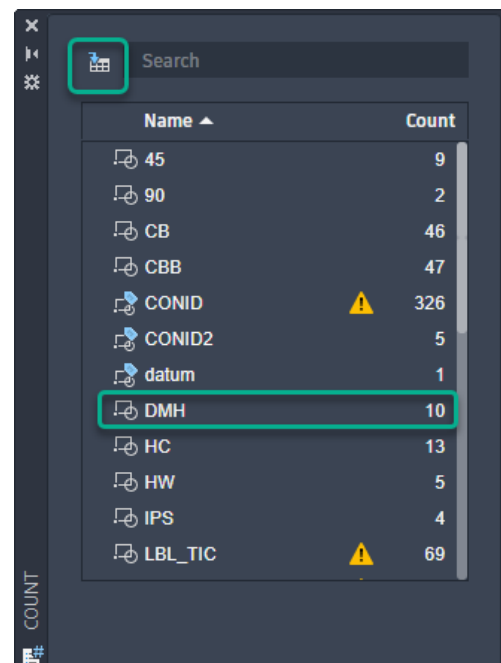


3. To merge the window back into the main interface, left-click and hold on the title bar for the window, then drag it back up towards the other tabs in the interface until a temporary tab appears, then let go.

Object Counts and Count Tables

Count all Blocks

1. At the **Command Line**, type in COUNT, then hit <Enter>.
2. Hit <Enter> again to provide a counted list of all blocks. The **Count Palette** will appear.
3. Review the list of blocks and their counts on the right-hand side.
4. Select any block in the list to review data about the count, then click "Back to list" at the top-left corner.
5. To display a table, select the table button at the top-left corner of the palette.
6. Select the blocks to include in the table.
7. Click the "Insert" button, then select an empty location in the drawing that will be the top-left corner of the table.



Item	Count
CB	46
DMH	10
SIGN1	60
SMH	11

Count One Block

1. At the **Command Line**, type in COUNT, then hit <Enter>.
2. Select a block in the drawing, then hit <Enter>. A toolbar will appear near the top of the drawing window.



3. Review the count total in the “Count” toolbar.
4. Use the arrows to zoom to different instances of the block in the drawing.
5. Click on the  button to insert a dynamic text field into the drawing that will display the count for this block.
6. To display the full list of counted blocks, click on the blue “i” to open the **Count Palette**.
7. In the palette, review the information about the selected block.
8. Hit the “Back to List” button in the top-left corner of the palette.
9. To display a table, select the table button at the top-left corner of the palette.
10. Select the blocks to include in the table.
11. Click the “Insert” button, then select an empty location in the drawing that will be the top-left corner of the table.

Civil 3D 2021 and 2022 New Features

The following are some of the features that were added to the Civil 3D functionality in the 2021 and 2022 releases.

Civil 3D 2021

Pressure Network Improvements

Creating Pressure Network Runs, Alignments, and Profiles

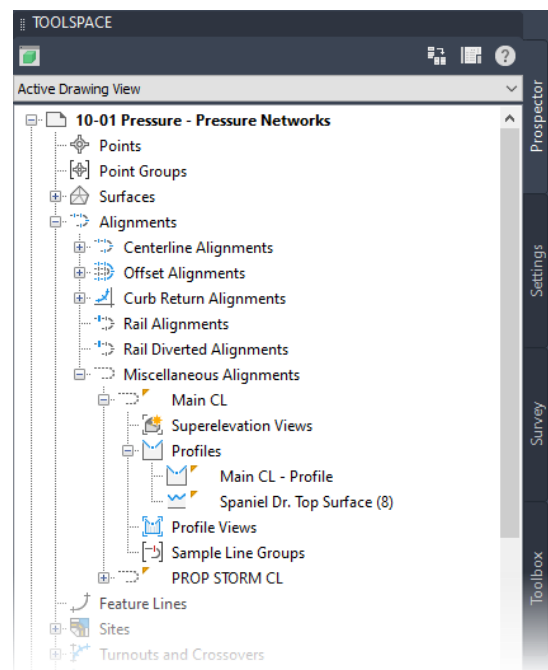
1. In the desired drawing, go to the “Home” tab of the Ribbon and on the “Create Design Panel”, click the “Pipe Network” button and choose “Pressure Network Creation Tools”.
2. In the dialog that appears, provide a name for the network and for the Pipe Run that will be created from the initial layout command.
3. Select the desired Parts List, beginning Pipe Size, and Reference Surface.
4. Make sure the “Create Surface Profile to Follow” box is checked.
5. Enter in the desired cover.
6. Select any desired Reference Alignment and/or Label Styles, then click “OK”. The “Pressure Network” contextual tab will appear in the **Ribbon**.
7. In this tab, on the “Pipe Run” Panel, make sure the “Add Bends Automatically” box is checked.
8. Layout the first run of pipes using the desired pipe size.
9. To create another branch of pipe off the first one, go to the “Pipe Run” panel again, click “Add New Pipe Run”, then choose “Create New Pipe Run”.
10. Select the desired pipe size/type, make sure the “Add Bends Automatically” box is still checked, then begin layout. If the new run intersects the first one in the same Network and the Parts List contains adequate fittings, the necessary crosses or T’s will be added automatically.

Reviewing Created Alignment and Profile

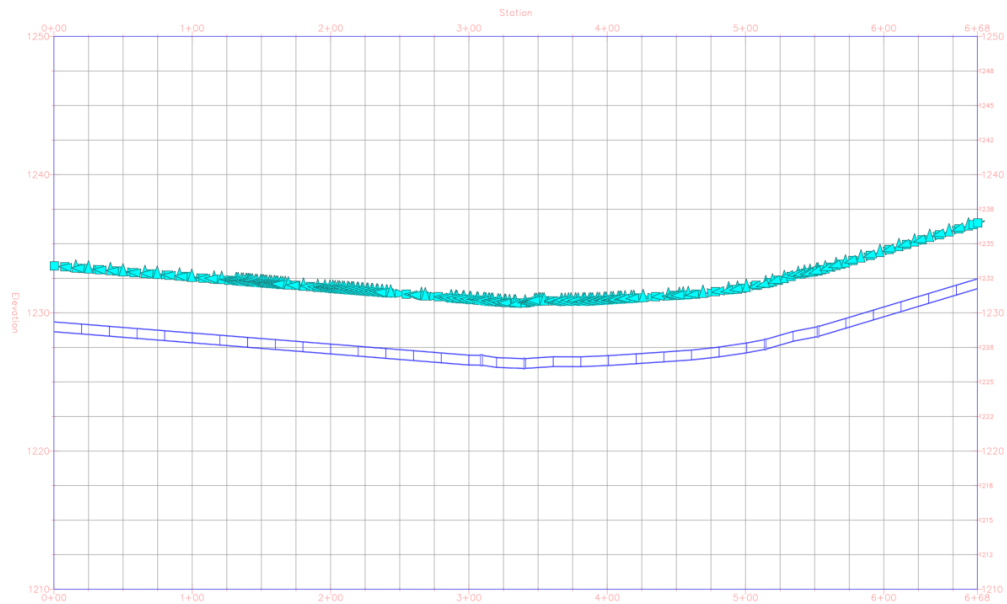
1. In the “Prospector” tab of the **Toolspace**, expand “Alignments”, then “Miscellaneous Alignments”. Hit the + next to one of the newly created Pressure Pipe Alignments (named for the Pipe Runs), then expand the “Profiles” category. A design Profile and a sampled Surface Profile will be displayed in the list.

Displaying the Pressure Network Profiles

1. From the “Home” tab of the **Ribbon**, on the “Profile & Section Views” tab, click “Profile View” and choose “Create Profile View”.
2. On the “General” page of the Wizard, select the Alignment that matches the name of the desired Pressure Network Pipe Run.

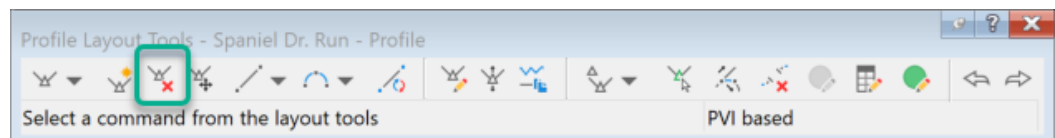
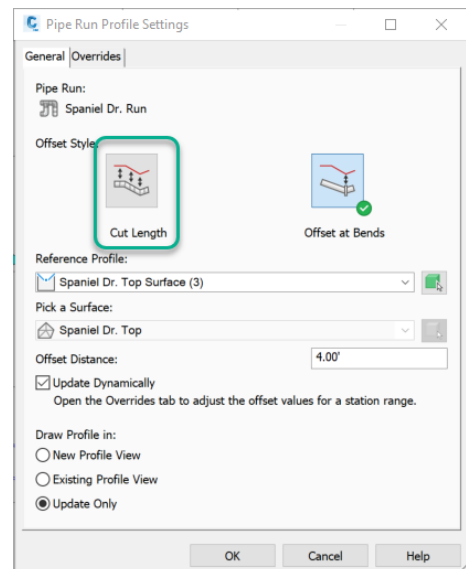


3. Enter settings in the “Station Range” and the “Profile View Height” pages of the wizard.
4. In the “Profile Display Options” page, make sure both the sampled Surface and the Design Profile are checked, then use the “Style” column to set them to the necessary Styles.
5. On the “Pipe/Pressure Network” page, make sure the desired Pressure Network and options are chosen.
6. Make the desired selections on the “Data Bands” page, then click “Create Profile View”
7. Place the Profile View in the drawing.
8. Click on any of the Pipes in the Profile to display the Pressure Network Pipe Run Profile.

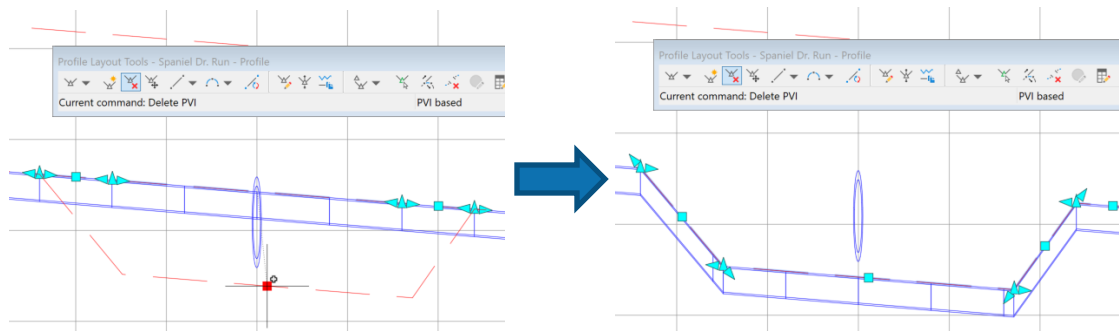


Edit the Pressure Network in Profile (ex. Addressing Crossings)

1. In a Profile View containing Pressure Pipes to be edited, select any of the Pipes to display the Design Profile. The blue, “Pressure Network Profile Layout” contextual tab will appear in the Ribbon.
2. Select “Pipe Run Profiles”
3. In the dialog that appears, under “Offset Style” choose “Cut Length”, then click OK. The Profile will jump to the top of the Pipes in the Profile View containing PVIs at each cut length location.
4. With the Profile still selected, right-click and choose “Edit Profile Geometry”. The **Profile Layout Tools** toolbar will appear.
5. Click the “Delete PVI” button in the toolbar to remove unnecessary PVIs near the crossing.



- Use the grip in the middle of the pipes near the crossing to pull it down. The Pipes will update and follow the Profile.



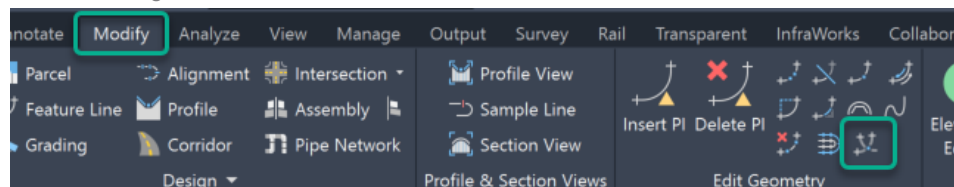
Feature Line Editing Enhancements

Adding full PIs or Elevation Points at Feature Line Crossings

- Open a drawing that contains Feature Lines. Create some Feature Lines on the same Site that cross each other.
- Select one of the Feature Lines, right-click and choose “Elevation Editor”. Notice the white triangles that are displayed for the locations where the cross(es) occur(s).

Station	Elevation(Actual)	Length	Grade Back	Grade Ahead
0+00.00	1225.58'	23.41'		2.00%
0+23.41	1226.05'	0.60'	-2.00%	2.00%
0+24.01	1226.06'	0.10'	-2.00%	2.00%
0+24.12	1226.06'	1.22'	-2.00%	2.00%
0+25.34	1226.08'	24.21'	-2.00%	2.00%
0+49.55	1226.57'		-2.00%	

- From the “Modify” tab of the Ribbon, on the “Edit Geometry” panel, click the “Insert Points at Crossing Locations” button.

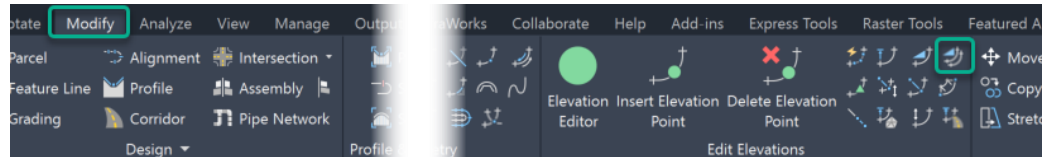


- At the **Command Line**, choose the desired type of point to add (Elevation Point or full PI), then hit <Enter>.
- Select the desired object, then hit <Enter>. PVI's or full PIs will be added to the Feature Lines.

Station	Elevation(Actual)	Length	Grade Back	Grade Ahead
0+00.00	1225.58'	23.41'		2.00%
0+23.41	1226.05'	0.60'	-2.00%	2.00%
0+24.01	1226.06'	0.10'	-2.00%	2.00%
0+24.12	1226.06'	1.22'	-2.00%	2.00%
0+25.34	1226.08'	24.21'	-2.00%	2.00%
0+49.55	1226.57'		-2.00%	

Set Grade/Slope Across Feature Lines

1. Open a drawing that contains Feature Lines that intersect and have an Elevation Point or a full PI's where they intersection.
2. From the "Modify" tab of the **Ribbon**, on the "Edit Elevations" panel, click the "Set Grade/Slope Across Feature Lines" button as shown below:

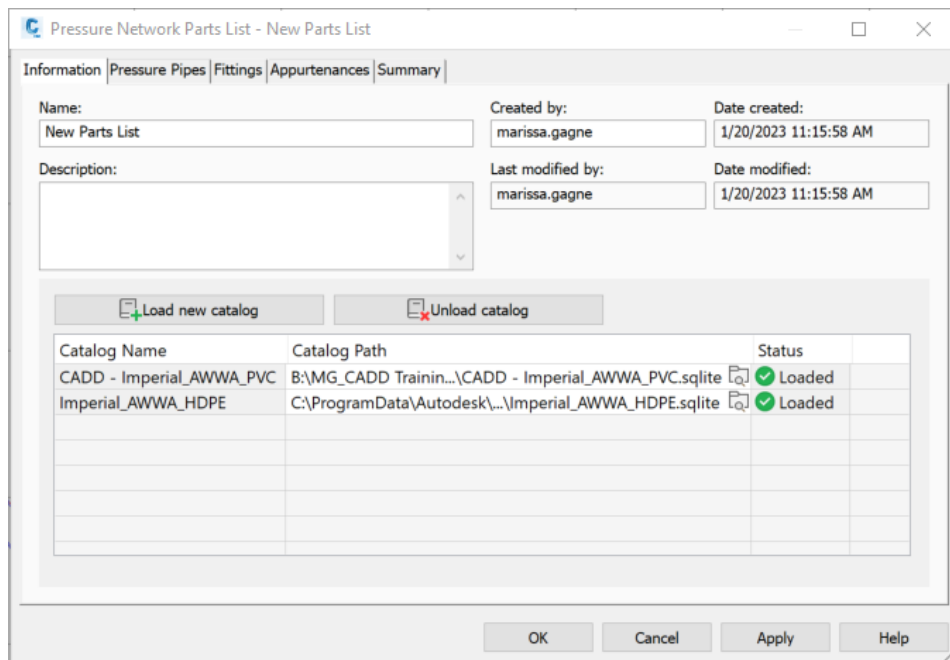


3. Select one of the two Feature Lines
4. Select the start point for the slope (Note - This cannot be the intersection point)
5. In the **Command Line**, enter or accept the elevation of this point.
6. Move the cursor along the points to be updated, then click an end point (usually along the second line).
7. At the **Command Line**, use the options enter in a grade or slope, then hit <Enter>.

Civil 3D 2022

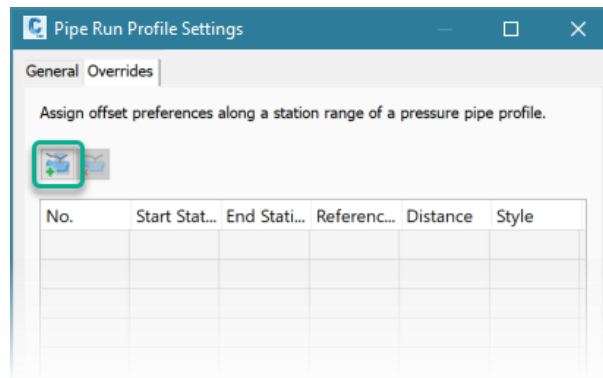
Create Pressure Parts Lists using Multiple Catalogs

1. Open a drawing in which to create the Parts List
2. On the “Settings” tab of the **Toolspace**, expand “Pressure Networks”, right-click on “Parts Lists”, and choose “New”.
3. On the “Information” tab of the dialog that appears, provide a name for the new Parts List.
4. In the bottom half of the dialog, the Catalog that is set as the current catalog will be shown in the list.
5. To add another Catalog, click “Load New Catalog”.
6. Browse to the location of the desired catalog, select the sqlite file, then click “Open”. The second Catalog will be listed.
7. On the “Pressure Pipe” tab of the dialog, right-click on “New Parts List” and choose “Add Material”.
8. Use the drop-down to select the desired catalog, put a check next to the desired Material(s), then click “OK”.
9. Repeat steps 7 - 8 on the “Fittings” tab and the “Appurtenances” tab to add the necessary parts from the catalogs to the Parts List, then click “OK”.

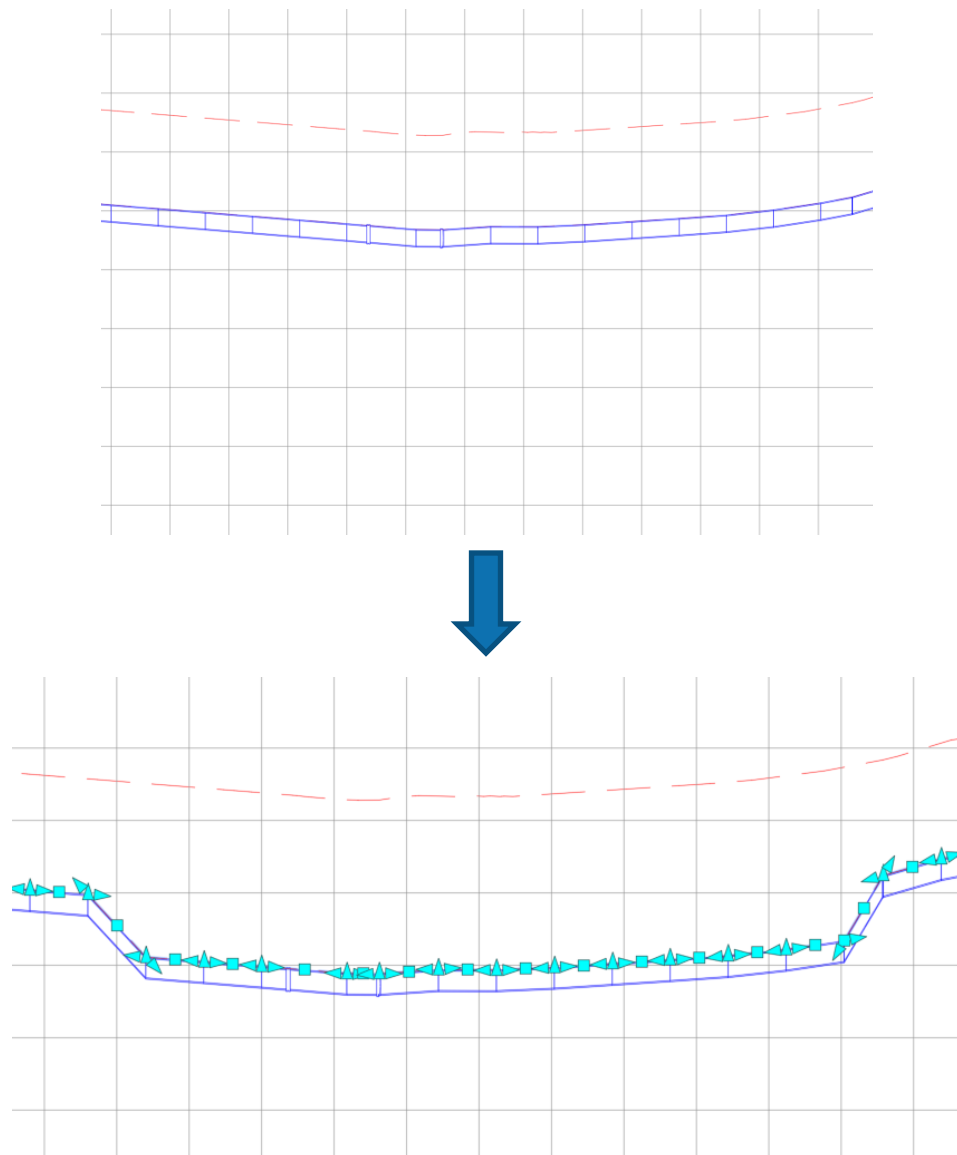


Override Pressure Pipe Cover by Station Range

1. Open a drawing containing at least one Pressure Network that has an Alignment and Profile and a corresponding Profile View has been created.
2. In the Profile View containing the Pressure Pipes to be edited, select any of the Pipes to display the Design Profile. The blue, “Pressure Network Profile Layout” contextual tab will appear in the Ribbon.
3. On the “Profile” panel, click “Pipe Run Profile”
4. In the dialog that appears, on the “Overrides” tab, click on the “Add offset...” button to create a new range.



5. Enter in a Start and End Station for the range.
6. In the "Reference Profile" column, use the drop down to select the necessary Surface profile to follow.
7. In the "Distance" column, type in the desired depth below the Surface for the area.
8. At the bottom of the dialog, put a check in the box next to "Clean up PVIs", then click "OK".



Working with Pressure Vertical Bends in Profile Views

1. Open a drawing containing at least one Pressure Network that has an Alignment and Profile and a corresponding Profile View has been created.
2. In the Profile View containing the Pressure Pipes to be edited, select any of the Pipes to display the Design Profile. The blue, “Pressure Network Profile Layout” contextual tab will appear in the Ribbon.
3. In the “Layout” panel, in the drop-down next to “Add Bend”, select the desired size and angle.
4. Click “Add Bend/PVI”, then click the desired location along the Pipes in the Profile View. A new Bend will appear.

Creating Advanced Connected Alignments

1. Open a drawing that contains two crossing Alignments.
2. On the “Home” tab of the **Ribbon**, on the “Create Design” panel, click the “Alignment” button and select “Create Connected Alignment”.
3. In the drawing, select the first Alignment, then the second, then click in the desired area between the two Alignments where the Connected Alignment will be created.
4. Review the graphic preview, then hit <Enter> to accept the chosen location.
5. In the dialog that appears, provide a name for the new Connected Alignment.
6. Near the middle of the dialog, click on the “Parameters” tab.
7. In the “Curve group type”, select the desired type from the list.
8. Enter in a desired curve radius and any necessary spiral parameters
9. If an option other than “Circular Fillet” is chosen, select the desired Degree of Curvature (< 180° or >180°).
10. Enter desired parameters for the connection offsets and overlap, then click “OK”.

